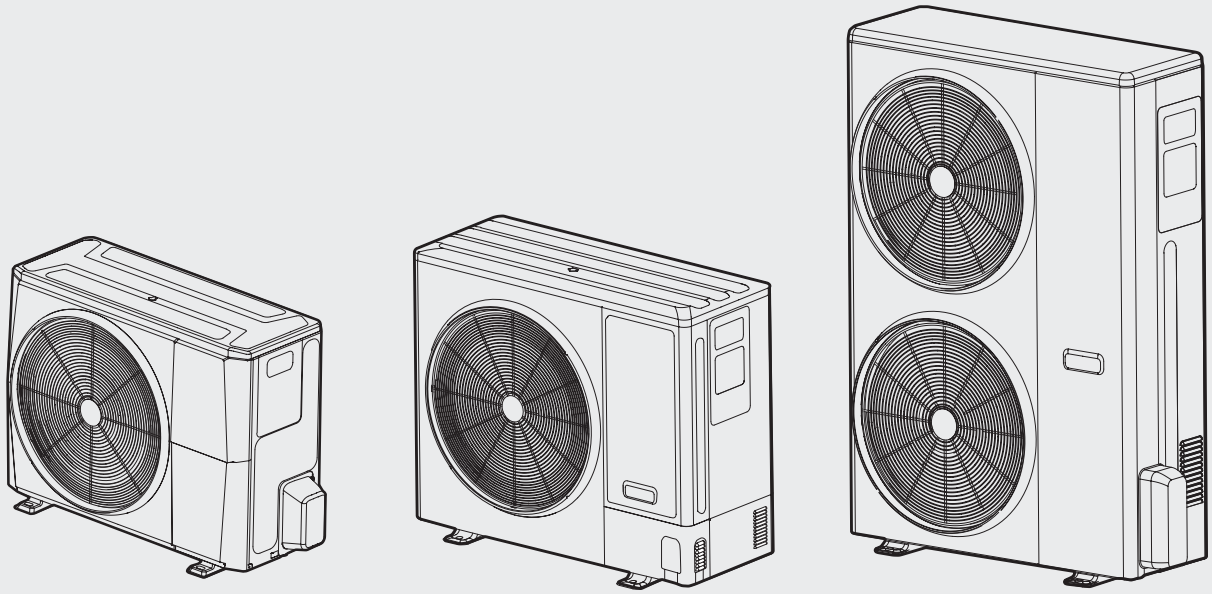
BOSCH

Installation and Operating Instructions

Bosch IDS Heat Pump
Edge Series - Condensing Unit

1.5-2-3-4-5 Ton Capacity | R-454B



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AHRI CERTIFIED® www.ahridirectory.org
Unitary Small HP
AHRI Standard 210/240
Certification applies only when the complete system is listed with AHRI.

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Intertek

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1 Key to Symbols and Safety Instructions

1.1 Key to Symbols

Warnings

In warnings, signal words at the beginning of a warning are used to indicate the type and seriousness of the ensuing risk if measures for minimizing danger are not taken.

The following keywords are defined and can be used in this document:

DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor to moderate injury.

NOTICE

NOTICE is used to address practices not related to personal injury.

Important information

The info symbol indicates important information where there is no risk to people or property.

1.2 Explanation of Symbols Displayed on the Unit

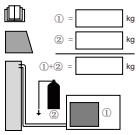
Symbol	
	WARNING This symbol shows that this appliance used a flammable refrigerant. If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire.
	WARNING This symbol shows that appliance shall be installed, operated and stored in a room with a floor area not less than the minimum room area.
	CAUTION This symbol shows that the operation manual should be read carefully.
	CAUTION This symbol shows that a service personnel should be handling this equipment with reference to the installation manual.
	CAUTION This symbol shows that information is available such as the operating manual or installation manual.
	CAUTION This symbol shows that when addition of charge is required by the manufacturer installation instructions for completing the REFRIGERATING SYSTEM. Recorded the resulting total REFRIGERANT CHARGE for each REFRIGERATING SYSTEM.

Table 1

1.3 Safety Warnings

Please read safety precautions before installation

WARNING

Electrical hazard 380 Volts DC!

Failure to follow this warning could result in property damage, severe personal injury, or death.

WAIT FIVE (5) MINUTES after disconnecting power prior to touching electrical components as they may hold a dangerous charge of 380 VDC,then verify DC Voltage is less than 42VDC at inverter TEST POINTS P-N.

This document is customer property and is to remain with this unit. Please return to service information pack upon completion of work.

These instructions do not cover all variations in systems or provide for every possible contingency to be met in connection with the installation.

Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to your installing dealer or local distributor.

The manufacturer recommends installing only approved matched indoor and outdoor systems. All of the manufacturer's split systems are AHRI rated only with TXV indoor systems. Some of the benefits of installing approved matched indoor and outdoor split systems are maximum efficiency, optimum performance and the best overall system reliability.

This document contains a wiring diagram and service information. This is customer property and is to remain with this unit. Please return to service information pack upon completion of work. installation.

WARNING

Personal injury, product damage!

This information is intended for use by individuals possessing adequate backgrounds of electrical and mechanical experience. Any attempt to repair a central air conditioning product may result in personal injury and/or property damage.

WARNING

Risk of electric shock!

Failure to follow this warning could result in property damage, severe personal injury, or death.

Disconnect all electric power, Including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized.

WARNING

Refrigerant oil!

Any attempt to repair a central air conditioning product may result in property damage, severe personal injury, or death. These units use R454b refrigerant. Use only R454b approved service equipment. All R454b systems with variable speed compressors use a POE oil (VG75 or equivalent)that readily absorbs moisture from the atmosphere. To limit this 'hygroscopic" action, the system should remain sealed whenever possible. If a system has been open to the atmosphere for more than 4 hours, the compressor oil must be replaced. Never break a vacuum with air and always change the driers when opening the system for component replacement.

WARNING

Hot surface!

May cause minor to severe burning. Failure to follow this Caution could result in property damage or personal injury.

Do not touch high temperature components such as the compressor.

WARNING

Contains refrigerant!

Failure to follow proper procedures can result in personal illness or injury or severe equipment damage.System contains oil and refrigerant under high pressure. Recover refrigerant to relieve pressure before opening system. Flammable refrigerant used.

WARNING

Contains lead!

This product can expose you to chemicals including Lead and Lead components, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www. P65Warnings.ca.gov.

CAUTION

Grounding required!

Failure to inspect or use proper service tools may result in equipment damage or personal injury. Reconnect all grounding devices. All parts of this product that are capable of conducting electrical current are grounded. If grounding wires, screws, straps, clips, nuts, or washers used to complete a path to ground are removed for service, they must be returned to their original position and properly fastened.

WARNING

Service valves!

Failure to follow this warning will result in abrupt release of system charge and may result in personal injury and/ or property damage. Extreme caution should be exercised when opening the Liquid Line Service valve. Turn valve stem counterclockwise only until the stem contacts the rolled edge.

WARNING

Brazing required!

Failure to inspect lines or use proper service tools may result in equipment damage or personal injury. If using existing refrigerant lines make certain that all joints are brazed, not soldered.

If refrigerant gas leaks during installation, ventilate the area immediately.

Comply with national gas regulations.

WARNING

High current leakage!

Grounding is required before connecting electrical supply. Failure to follow this warning could result in property damage, severe personal injury, or death.

WARNING

Risk of fire!

Mildly flammable refrigerant used.

Follow handling instructions carefully in compliance with national regulations.

DANGER

Fire, explosion!

Store in a well ventilated room without continuously operating flames or other potential ignition.

WARNING

Risk of electric shock!

Can cause injury or death.Disconnect all remote electric power supplies before servicing.

WARNING

Risk of fire!

Flammable refrigerant used. To be repaired only by trained service personnel. Do not puncture refrigerant tubing.

Dispose of properly in accordance with federal or local regulations. Flammable refrigerant used.

Flammable refrigerant used. Consult repair manual/owner's guide before attempting to service this product. All safety precautions must be followed.

Auxiliary devices which may be ignition sources shall not be installed in the ductwork, other than auxiliary devices listed for use with the specific appliance. See instructions.

WARNING

Personal injury!

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or persons who lack experience andknowledge, unless they are supervised or have been given instructions concerning the use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

Any person who is involved with working on or opening a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority,which authorizes their competence to handle refrigerants safely in accordance with an industry recognized assessment credential.

Servicing shall only be performed as recommended by the equipment manufacturer.

Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of a person competent in the use of flammable refrigerants.

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to minimize the risk of ignition.

WARNING

Flammable refrigerant!

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

The appliance shall be stored in a room that does not have continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).

Do not pierce or burn the unit.

Be aware that refrigerants may not contain an odour.

WARNING

Safe handling of flammable refrigerant!

Be sure the air conditioner is grounded.In order to avoid electric shock, make sure that the unit is grounded and that the earth wire is not connected to a gas or water pipe, lightning conductor or telephone earth wire.

Do not operate the air conditioner with a wet hands.An electric shock may happen.

Do not operate the air conditioner when using a room fumigation - type insecticide. Failure to observe this precaution could cause the chemicals to become deposited in the unit,which could endanger the health of those who are hypersensitive to chemicals.

To avoid oxygen deficiency, ventilate the room sufficiently if equipment with a burner is used together with the air conditioner.

Arrange the drain hose to ensure smooth drainage. Incomplete drainage may cause wetting of thebuilding, furniture, etc.

Never touch the internal parts of the controller.Do not remove the front panel. Some parts inside are dangerous to touch, and machine troubles may occur.

Attention is drawn to the fact that additional transportation regulations may exist with respect to equipment containing flammable gas. The maximum number of pieces of equipment or the configuration of the equipment permitted to be transported together will be determined by the applicable transport regulations.

Signs for similar appliances used in a work area are generally addressed by local regulations and give the minimum requirements for the provision of safety and/or health signs for a work location.

Storage package protection should be constructed such a way that mechanical damage to the equipment inside the package will not cause a leak of the REFRIGERANT CHARGE.

The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations.

Do not place appliances which produce open flame in places exposed to the air flow from the unit or under the indoor unit. It may cause incomplete combustion or deformation of the unit due to the heat.

Do not install the air conditioner in a location where flammable gas may leak out. If the gas leaks out and stays around the airconditioner, a fire may break out.

WARNING

Flammable refrigerant!

The appliance uses R454B refrigerant.

NOTICE

Indoor unit required!

The indoor units must be matched with R-454B TXV. The model of R-454B TXV can be changed according to the system capacity.

WARNING

Personal Injury, flammable refrigerant!

When repairing the refrigerating system, comply with the following precautions prior to conducting work on the system:

- Work shall be undertaken according to controlled procedures to minimize the risk of the presence of flammable gases or vapors while the work is being performed.
- All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.
- The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable environment. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e., non-sparking, adequately sealed or intrinsically safe.
- If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available and easily accessible. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.
- When carrying out work in relation to a refrigerating system that involves exposing any pipe work, no sources of ignition shall be used in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repair, or removal and disposal of the unit, during which refrigerant can possibly be released into the surrounding space. Prior to beginning work, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. “No Smoking” signs shall be clearly displayed.

WARNING

Personal Injury, flammable refrigerant!

Ensure that the area is in the open or that it is adequately ventilated before opening the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the surroundings.

Where electrical components are being changed, they shall be fit according to their purpose and to the correct specification. At all times the manufacturer’s maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer’s technical department for assistance. The following checks shall be applied to installations using flammable refrigerants:

- The actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed.
- The ventilation machinery and outlets are operating adequately and are not obstructed.
- If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.
- Equipment marking must remain visible and legible. Markings and signs that are illegible shall be corrected.

WARNING

Personal Injury, flammable refrigerant!

Refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substances which may corrode refrigerant containing components, unless the components are constructed of materials that are inherently resistant to corrosion or are suitably protected against corrosion.

Repair and maintenance of electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until the fault has been dealt with.

- That capacitors are discharged: this shall be done in a safe manner to avoid the possibility of sparking.
- That no live electrical components and wiring are exposed while charging, recovering or purging the system.
- That there is continuity of grounding.

WARNING

Flammable refrigerant!

Sealed electrical components shall be replaced.

Intrinsically safe components must be replaced.

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

Under no circumstances shall potential sources of ignition be used while searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated for the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.
If a leak is suspected, all naked flames shall be removed/extinguished.

If a leakage of refrigerant which requires brazing is found, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

Examples of leak detection fluids are:

- bubble method,
- fluorescent method agents.

WARNING

Flammable refrigerant!

When breaking into the refrigerant circuit to make repairs or for any other purpose conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

- safely remove refrigerant following local and national regulations.
- evacuate.
- purge the circuit with inert gas.
- evacuate.
- continuously flush or purge with inert gas when using flame to open circuit, and.
- open the circuit.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant they contain.

Cylinders shall be kept upright. Ensure that the refrigeration system is grounded prior to charging the system with refrigerant.

Label the system when charging is complete (if it is not already labeled).

Take extreme care not to overfill the refrigeration system.

WARNING

Flammable refrigerant!

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of reclaimed refrigerant. It is essential that electrical power is available before the task is commenced.

a. Become familiar with the equipment and its operation.
b. Isolate system electrically.
c. Before attempting the procedure ensure that:
    - mechanical handling equipment is available, if required, for handling refrigerant cylinders.
    - all personal protective equipment is available and being used correctly.
    - the recovery process is supervised at all times by a competent person.
    - recovery equipment and cylinders conform to the appropriate standards.
d. Pump down refrigerant system, if possible.
e. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
f. Make sure that the cylinder is situated on the scales before recovery takes place.
g. Start the recovery machine and operate it in accordance with the manufacturer's instructions.
h. Do not overfill cylinders. (No more than 80% volume liquid charge).
i. Do not exceed the maximum working pressure of the cylinder, even temporarily.
j. When the cylinders have been filled correctly and the process has been completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
k. Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

Equipment shall be labeled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

WARNING

Flammable refrigerant!

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition.

The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

Do not use the air conditioner for other purposes. In order to avoid any quality deterioration, do not use the unit for the cooling of precision instruments, food, plants, animals or works of art. Before cleaning, be sure to stop the operation, turn the breaker off or unplug the supply cord. Otherwise, electric shock and injury may occur.

To avoid electric shock or fire, make sure that a leak detector is installed. Never touch the air outlet or the horizontal blades while the swing flap is in operation. Fingers may be come caught or the unit may break down.

Never put any objects into the air inlet or outlet. Objects touching the fan at high speed can be dangerous. Never inspect or service the unit by yourself. Ask a qualified service person to perform this task.

Do not dispose of this product as unsorted municipal waste. This waste should be collected separately for special treatment. Do not dispose of electrical appliances as unsorted municipal waste. Use separate collection facilities. Contact your local government for information regarding the connection systems available.

If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, hazardous to one's health and well-being.

To prevent refrigerant leak, contact your dealer.

When the system is installed and operates in a small room, it is required to maintain the concentration of the refrigerant below the limit, in case a leak occurs. Otherwise, oxygen in the room may be affected, resulting in a serious accident.

The refrigerant in the air conditioner is safe and normally does not leak.

If the refrigerant leaks into the room and encounters the fire of a burner, a heater or a cooker, a harmful gas could be released.

Turn off any combustible heating devices, ventilate the room, and contact the dealer where the unit was purchased.

Do not use the air conditioner until a service person confirms that the refrigerant leak is repaired.

Keep ventilation openings clear of obstruction.

WARNING

Product damage, personal injury!

This outdoor unit must combine the indoor unit with refrigerant leak detection device.

These instructions are exclusively intended for qualified contractors and authorized installers. Work on the refrigerant circuit with mild flammable refrigerant in safety group A2L may only be carried out by authorized heating contractors. These heating contractors must be trained in accordance with UL 60335-2-40, Section HH. The certificate of competence from an industry accredited body is required.

Work on electrical equipment may only be carried out by a qualified electrician.

Before initial commissioning, all safety – related points must be checked by the particular certified heating contractors. The system must be commissioned by the system installer or a qualified person authorized by the installer.

1.3.1 Gateway Related Warnings

NOTICE

FCC compliance!

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTICE

ISED compliance!

This device contains licence-exempt transmitter(s)/ receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

WARNING

RF exposure!

This equipment complies with FCC/ISED RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 8 inches (20 centimeters) between the antenna and your body.

NOTICE

ISED compliance!

This device contains licence-exempt transmitter(s)/ receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

NOTICE

ICES statement!

CAN ICES-3 (B)/NMB-3 (B).

This Class B digital apparatus complies with Canadian ICES-003.

2 Bosch IDS Gateway Accessory and EasyAir Mobile App

This Heat Pump has a connectivity feature available as an option with the purchase of an IDS Gateway Accessory which enables receiving Demand Reponse commands from your local utility company. The accessory can be ordered using Part Number 8733982717. Download the Bosch EasyAir app on your smartphone and create an account to get started.

The connectivity features on this heat pump will only work when installed with an IDS Premium AHU, a BMXF Modular Blower, or a BGH97 Furnace.

1. Download the Bosch EasyAir app on your smartphone by searching for it in Google Play Store (for Android devices) or App Store (for iPhone). Alternatively, you can scan this QR code with your phone's camera:

Figure 1

2. Launch the Bosch EasyAir App and refer to the Gateway Accessory installation instructions or scan QR code below for connecting to the App.

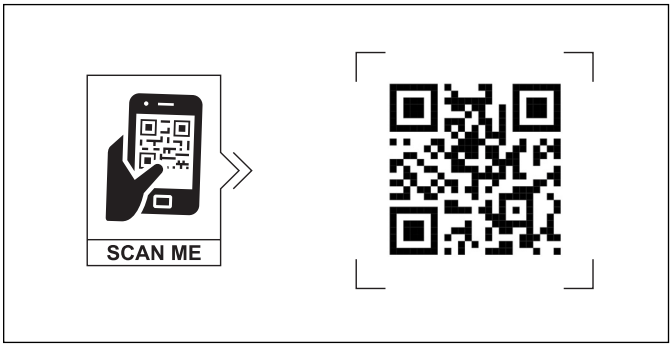


Figure 2

3 Unit Location Considerations

3.1 Unit Dimensions

The unit's weight values are on the carton box.

When mounting the outdoor unit on a roof, be sure the roof will support the unit's weight. Properly selected isolation is recommended to prevent sound or vibration transmission to the building structure.

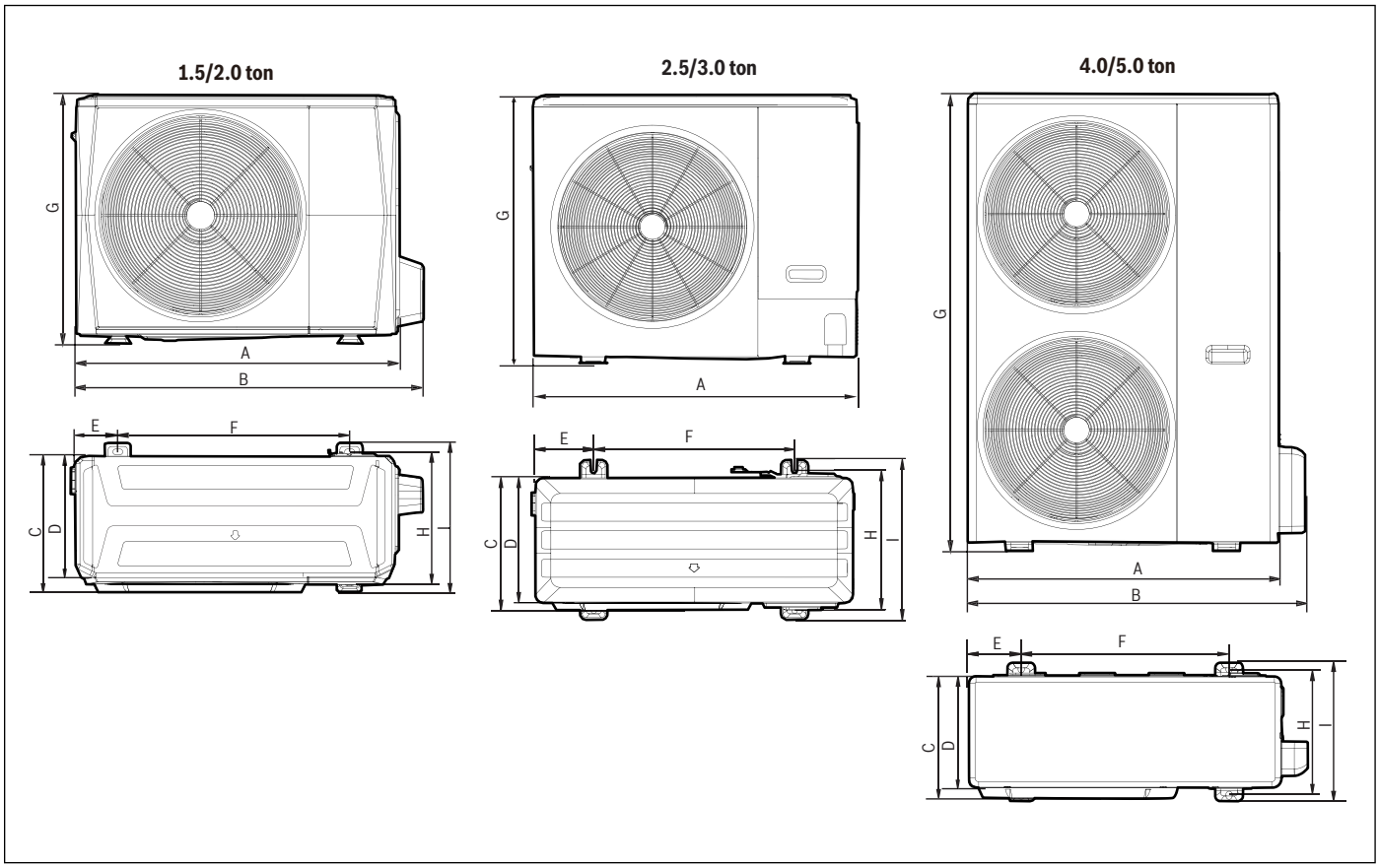


Figure 3

Model	A	B	C	D	E	F	G	H	I
1.5T, 2T	36.4 (925)	39.2 (994)	15.4 (390)	13.5 (342)	4.8 (121)	26.1 (663)	28.0 (712)	14.8 (375)	16.8 (426)
3T	41.0 (1042)	/	17.0 (433)	16.1 (410)	7.5 (191)	25.8 (656)	34.0 (864)	18.0 (458)	20.6 (523)
4T, 5T	35.6 (905)	38.5 (978)	13.9 (352)	12.7 (322)	5.9 (151)	23.6 (600)	52.2 (1327)	14.2 (360)	15.7 (400)

Table 2 Dimensions - inches (mm)

3.2 Refrigerant Piping Limits

These limits apply to all outdoor unit models regardless of capacity.

Description	Value
Maximum Allowable Total Length of Refrigerant Pipe (L2)	164 ft
Maximum Allowable Height Difference Between Outdoor Unit and Indoor Unit	98 ft

Table 3 Refrigerant piping limits

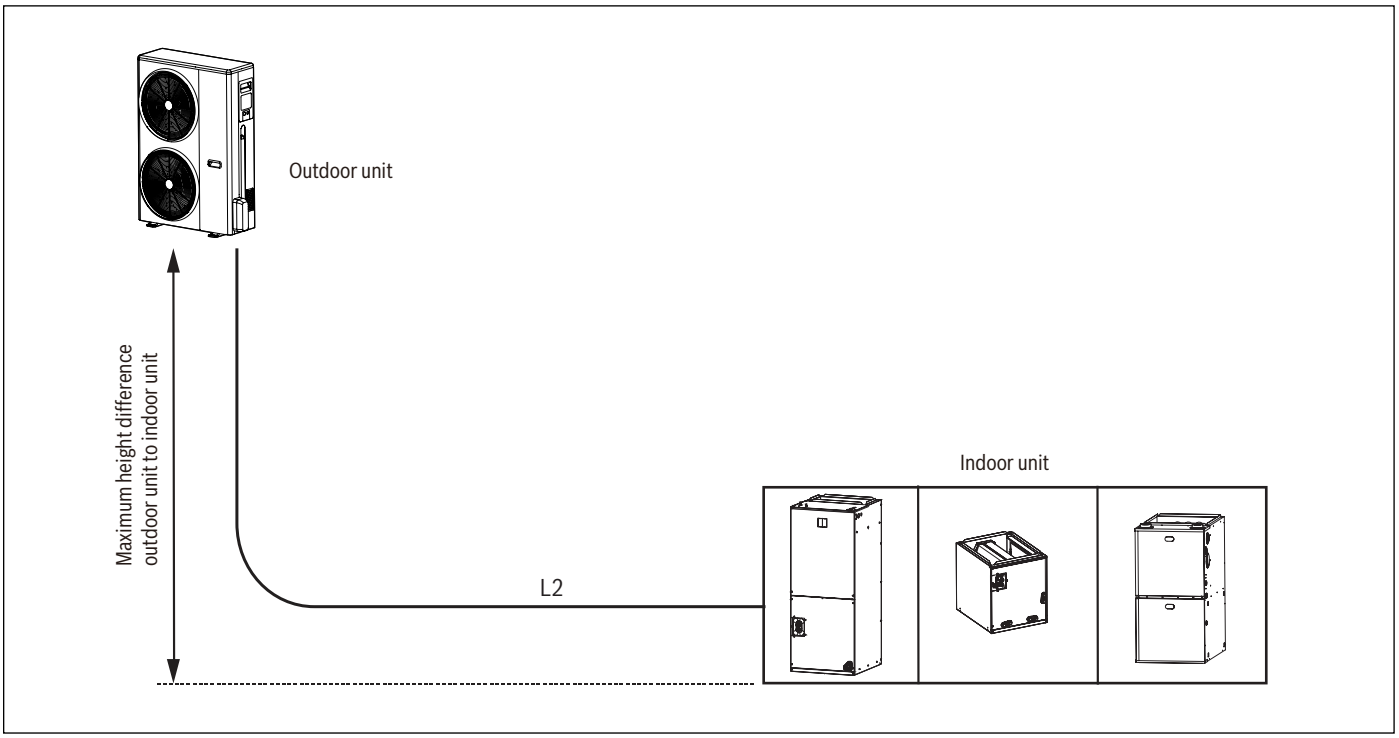


Figure 4

3.3 Location Restrictions

WARNING

Flammable refrigerant!

Appliance shall be installed, operated in a room that meets special requirements and has an area limit as shown in "3.4 Refrigerant Charge and Room Area Limitations"

WARNING

Flammable refrigerant!

The outdoor unit shall be located in a well-ventilated location other than the occupied space, such as in the open air.

For installation of the indoor unit, refer to the corresponding installation and operation manual. If an indoor unit is installed in an unventilated area, the area shall be so constructed that should any refrigerant leak, it will not stagnate so as to create a fire or explosion hazard.

Refer to the images for minimum distance to walls and objects.

Position unit where water, snow, or ice from roof or overhang cannot fall directly on unit.

Only use this unit in well-ventilated spaces and ensure that there are no obstructions that could impede the airflow into and out of the unit. Do not use this unit in the following locations:

- Locations with mineral oil.
- Locations with saline atmospheres, such as seaside locations.
- Locations with sulphurous atmospheres, such as near natural hot springs.
- Where high voltage electricity is present, such as in certain industrial locations.
- On vehicles or vessels, such as trucks or ferry boats.
- Where exposure to oily or very humid air may occur, such as kitchens.
- In proximity to sources of electromagnetic radiation, such as high-frequency transmitters or other high strength radiation devices.

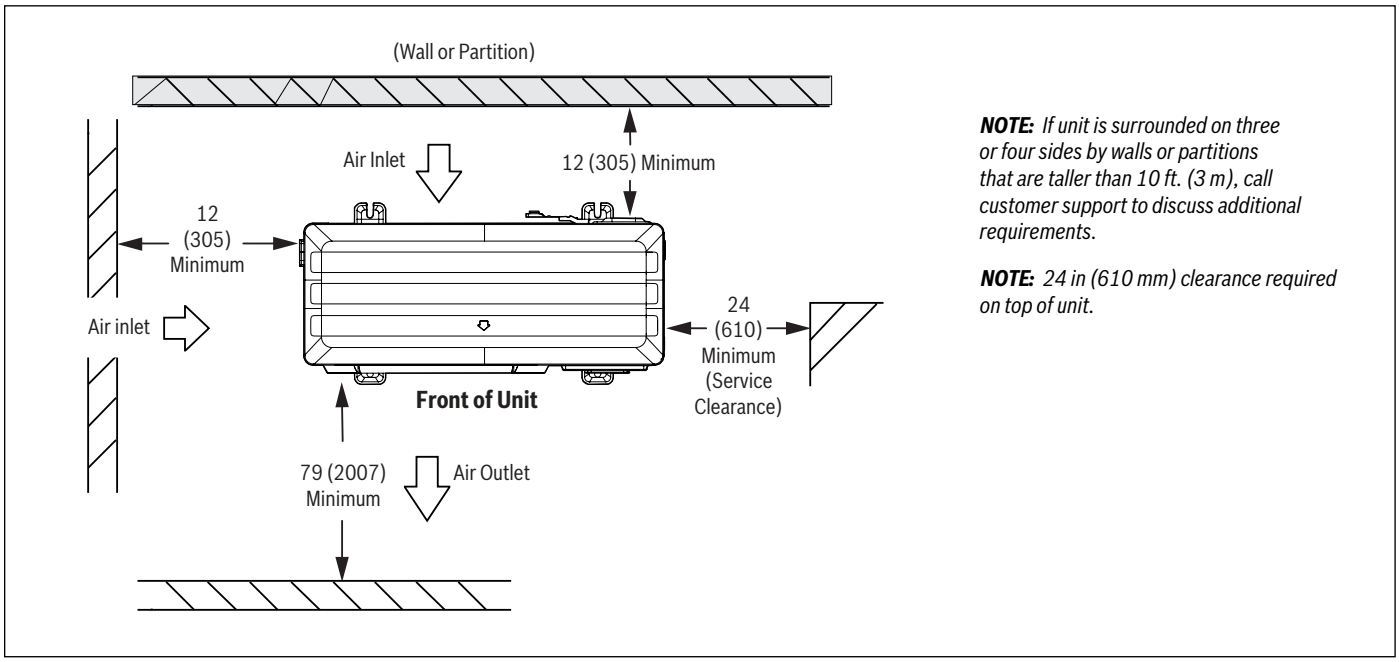


Figure 5 Installation of single outdoor unit - inches (mm)

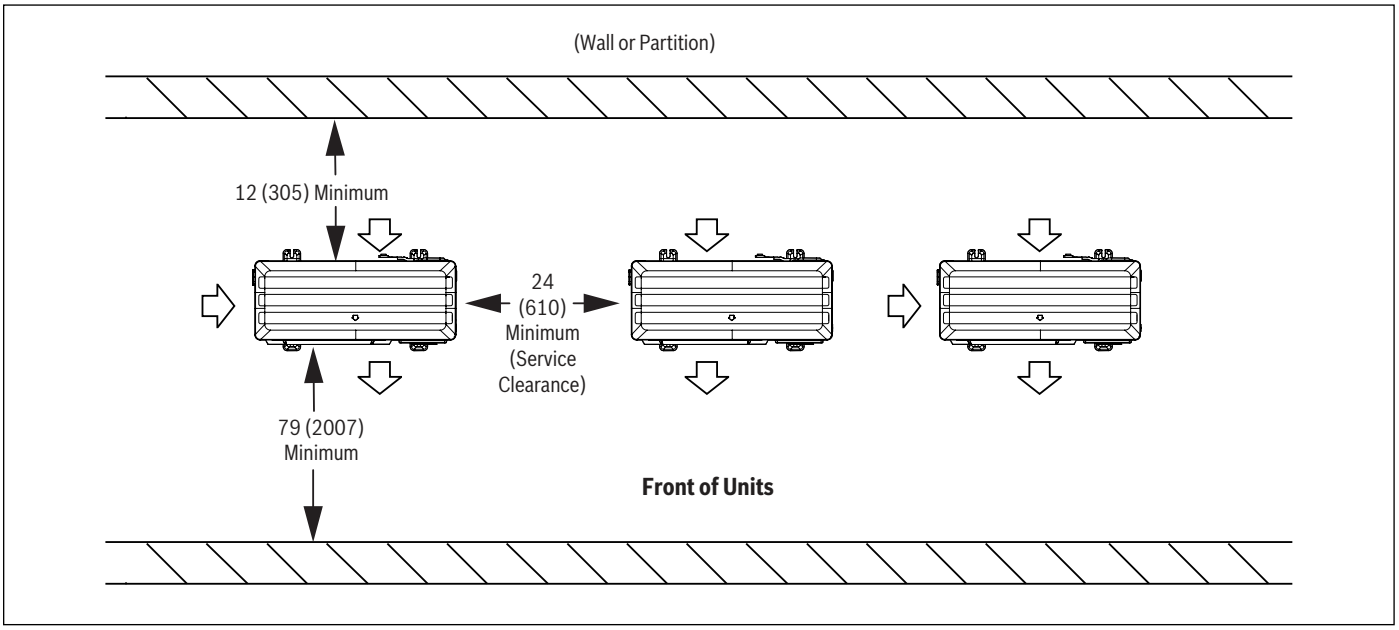


Figure 6 Installation of two or more outdoor units in a side-by-side - inches (mm)

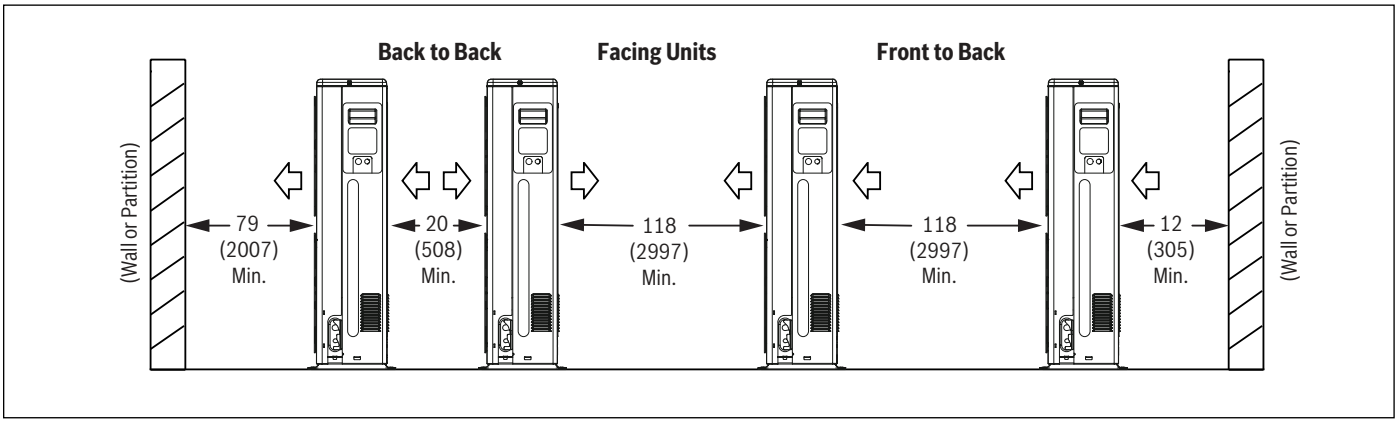


Figure 7 Installation of two or more outdoor units in a front-to-back - inches (mm)

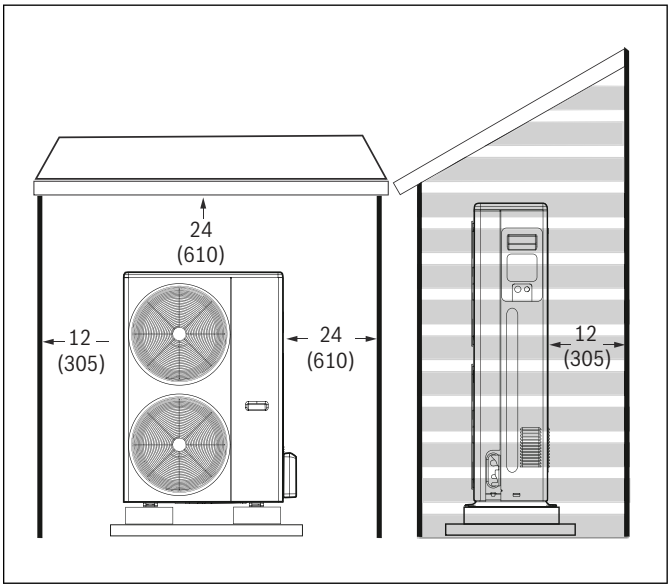


Figure 8 Installation inside wind enclosure - inches (mm)

Precautions must be taken for units being installed in areas where snow accumulation and prolonged below-freezing temperatures occur.

- Units should be elevated 3-12 inches above the pad or rooftop, depending on local weather. This additional height will allow drainage of snow and ice melted during defrost cycle prior to its refreezing. Ensure that drain holes in unit base pan are not obstructed, which could prevent the drainage of defrost water.
- If possible, avoid locations that are prone to snow drifts. If not possible, a snow drift barrier should be installed around the unit to prevent a build-up of snow on the sides of the unit.

Using a 5-point support system with snow legs is an effective way to distribute the weight of the outdoor unit, specifically supporting the compressor within it. This setup helps to prevent stress on individual points and ensures that the weight is evenly distributed, reducing the risk of damage or instability, especially in snowy conditions. By providing multiple points of contact, you're enhancing the unit's stability and longevity, which is crucial for its efficient operation over time.

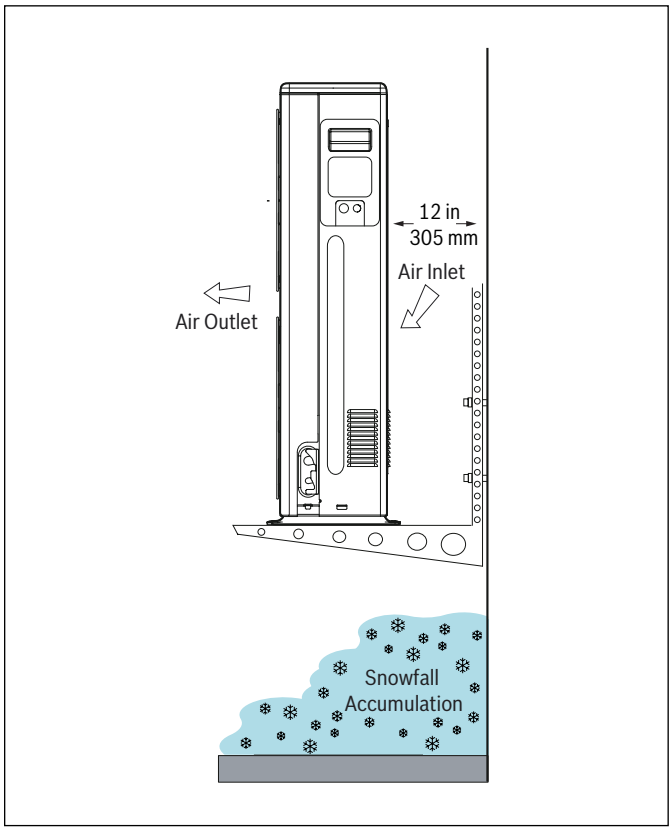


Figure 9

Corrosive Environment

Exposure to a corrosive environment may shorten the life of the equipment, corrode metal parts, and/or negatively affect unit performance. Corrosive elements include, but are not limited to: sodium chloride, sodium hydroxide, sodium sulfate, and other compounds commonly found in ocean water, sulfur, chlorine, fluorine, fertilizers, and various chemical contaminants from industry/manufacturing plants. If installed in areas which may exposed to corrosive environments, special attention should be given to the equipment placement and maintenance.

- Lawn sprinklers/hoses/waste water should not spray directly on the unit cabinet for prolonged periods of time.
- In coastal areas: locate the unit on the side of the building away from the waterfront.
- Fencing or shrubbery may provide some shielding protection to the unit, however minimum unit clearances must still be maintained.
- Approximately every three months, wash the outdoor coil and any exposed cabinet surfaces with clean water.

3.4 Refrigerant Charge and Room Area Limitations

In UL/CSA 60335-2-40, R454B refrigerant is classified as class A2L, which is mildly flammable. Therefore, R454B refrigerant is suitable for systems needing additional refrigerant charge and which will limit the area of the rooms being served by the system.

Similarly, the total amount of refrigerant in the system shall be less than or equal to the allowable maximum refrigerant charge. The allowable maximum refrigerant charge depends on the area of the rooms being served by the system.

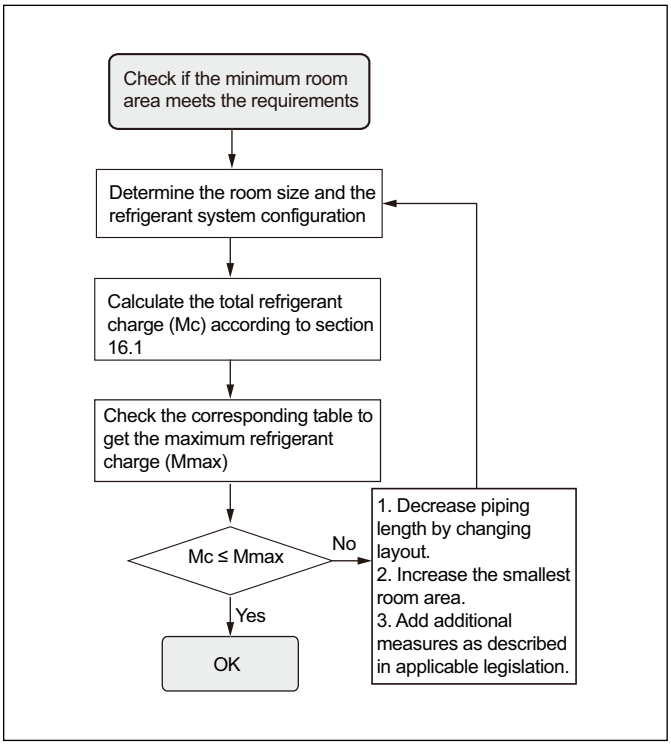


Figure 10

The terms in this section are explained as follows:

- Mc: The actual refrigerant charge in the system.
- A: the actual room area where the appliance is installed.
- Amin: The required minimum room area.
- Mmax:The allowable maximum refrigerant charge in a room.
- Qmin: The minimum circulation airflow.
- Anvmin:The minimum opening area for connected rooms.
- TAmin: The total area of the conditioned space (For appliances serving one or more rooms with an air dut system).
- TA: The total area of the conditioned space connected by air ducts.

3.4.1 The Room Area Calculation Requirements

CAUTION

Flammable refrigerant!

The space considered shall be any space which contains refrigerant-containing parts or into which refrigerant could be released.

The room area (A) of the smallest, enclosed,occupied space shall be used in the determination of the refrigerant quantity limits.

For determination of room area (A) when used to calculate the refrigerant charge limit, the following shall apply.

The room area (A) shall be defined as the room area enclosed by the projection to the base of the walls, partitions and doors of the space in which the appliance is installed.

Spaces connected by only drop ceilings, ductwork, or similar connections shall not be considered a single space.

Units mounted higher than 70-55/64 inches and spaces divided by partition walls that are no higher than 62-63/64 inches shall be considered a single space. Rooms on the same floor and connected by an open passageway between the spaces can be considered a single room when determining compliance to Amin, if the passageway complies with all of the following.

1. It is a permanent opening.
2. It extends to the floor.
3. It is intended for people to walk through.

The area of the connected rooms, on the same floor,connected by permanent opening in the walls and/or doors between occupied spaces, including gaps between the wall and the floor, can be considered a single room when determining compliance to Amin, provided all of the following conditions are met as shown in Figure 10.

Low level opening:

1. The opening shall not be less than Anvmin in Table 4.
2. The area of any openings above 11-13/16 inches from the floor shall not be considered in determining compliance with Anvmin.
3. At least 50% of the opening area of Anvmin shall be below 7-7/8 inches from the floor.
4. The bottom of the opening is not more than 3-15/16 inches from the floor.
5. The opening is a permanent opening that cannot be closed.
6. For openings extending to the floor the height shall not be less than 25/32 inches above the surface of the floor covering.

High level opening:

1. The opening shall not be less than 50% of Anvmin in Table 4.
2. The opening is a permanent opening that cannot be closed.
3. The opening shall be at least 59 inches above the floor.
4. The height of the opening is not less than 25/32 inches.

Room size requirement:

1. The room into which refrigerant can leak, plus the connected adjacent room(s) shall have a total area not less than Amin. Amin is shown in Tables 6-8.
2. The room area in which the unit is installed shall be not less than 20% Amin. Amin is shown in Tables 6-8.

The requirement for the second opening can be met by drop ceilings, ventilation ducts, or similar arrangements that provide an airflow path between the connected rooms.

The minimum opening for natural ventilation (Anv_{min}) in connected rooms is related to the room area (A), the actual refrigerant charge of refrigerant in the system (m_c) , and the allowable MAXIMUM REFRIGERANT CHARGE in the system (m_{max}), Anvmin can be determined according to Table 4.

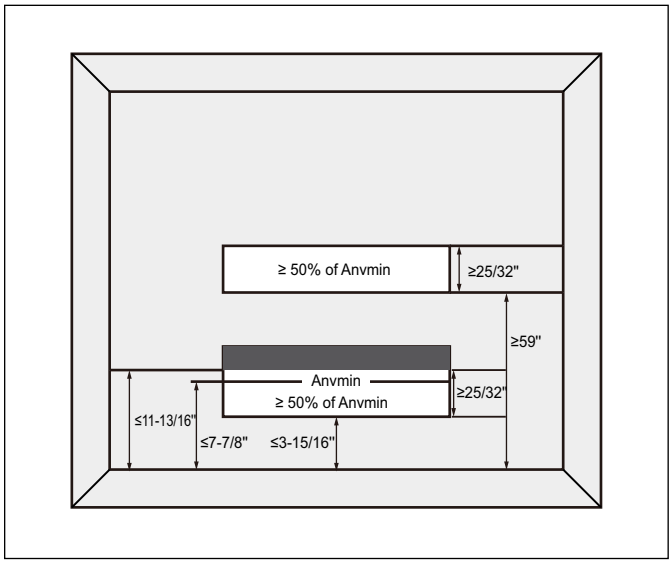


Figure 11

The minimum opening area for connected rooms:

A		m_c		m_{max}		Anv_{min}	
ft^2	m^2	lb-oz	kg	lb-oz	kg	ft^2	m^2
100	9.2	15-8	7	3-5	1.5	2.1	0.19
120	11.1	15-8	7	3-15	1.8	2.0	0.18
140	13.0	15-8	7	4-10	2.1	1.9	0.17
160	14.8	15-8	7	5-5	2.4	1.8	0.16
180	16.7	15-8	7	6-3	2.8	1.7	0.15
200	18.5	15-8	7	6-13	3.1	1.6	0.14
220	20.4	15-8	7	7-8	3.4	1.4	0.13
240	22.2	15-8	7	8-3	3.7	1.3	0.12
260	24.1	15-8	7	8-13	4.0	1.2	0.11
280	26.0	15-8	7	9-8	4.3	1.1	0.10
300	27.8	15-8	7	10-2	4.6	1.0	0.09
320	29.7	15-8	7	11-0	5.0	0.8	0.07
340	31.5	15-8	7	11-11	5.3	0.7	0.06
360	33.4	15-8	7	12-6	5.6	0.6	0.05
380	35.3	15-8	7	13-0	5.9	0.5	0.04
400	37.1	15-8	7	13-11	6.2	0.4	0.03
420	39.0	15-8	7	14-5	6.5	0.3	0.02
440	40.8	15-8	7	15-0	6.8	0.2	0.01
460	42.7	15-8	7	15-14	7.2	0.1	0.00

Table 4

Note: Take the Mc=15lb 8oz as an example.

For appliances serving one or more rooms with an air duct system, The room area calculation shall be determined based on the total area of the conditioned space (TA) connected by ducts taking into consideration that the circulating airflow distributed to all the rooms by the appliance integral indoor fan will mix and dilute the leaking refrigerant before entering any room.

3.4.2 The Allowed Maximum Refrigerant Charge and Required Minimum Room Area

If the fan incorporated to an appliance is continuously operated or operation is initiated by a REFRIGERANT DETECTION SYSTEM with a sufficient CIRCULATION AIRFLOW rate, the allowable maximum refrigerant charge (Mmax) and the required minimum room area (Amin/TAmin) is shown in Table 5 and Tables 6-8.

The allowable maximum refrigerant charges:

A/TA		m_{max}		*A/TA*		m_{max}	
ft^2	m^2	lb-oz	kg	ft^2	m^2	lb-oz	kg
30	2.7	0-14	0.4	250	23.2	8-10	3.9
40	3.7	1-5	0.6	260	24.1	8-13	4.0
50	4.6	1-9	0.7	270	25.0	9-4	4.2
60	5.5	2-0	0.9	280	26.0	9-8	4.3
70	6.5	2-3	1	290	26.9	9-15	4.5
80	7.4	2-10	1.2	300	27.8	10-2	4.6
90	8.3	3-1	1.4	310	28.7	10-9	4.8
100	9.2	3-5	1.5	320	29.7	11-0	5.0
110	10.2	3-12	1.7	330	30.6	11-4	5.1
120	11.1	3-15	1.8	340	31.5	11-11	5.3
130	12.0	4-7	2.0	350	32.5	11-14	5.4
140	13.0	4-10	2.1	360	33.4	12-6	5.6
150	13.9	5-1	2.3	370	34.3	12-9	5.7
160	14.8	5-5	2.4	380	35.3	13-0	5.9
170	15.7	5-12	2.6	390	36.2	13-7	6.1
180	16.7	6-3	2.8	400	37.1	13-11	6.2
190	17.6	6-6	2.9	410	38.0	14-2	6.4
200	18.5	6-13	3.1	420	39.0	14-5	6.5
210	19.5	7-1	3.2	430	39.9	14-12	6.7
220	20.4	7-8	3.4	440	40.8	15-0	6.8
230	21.3	7-11	3.5	450	41.8	15-7	7.0
240	22.2	8-3	3.7	460	42.7	15-14	7.2

Table 5

The required minimum room area:

m_C		A_{min}/TA_{min}		m_C		A_{min}/TA_{min}	
lb-oz	kg	ft^2	m^2	lb-oz	kg	ft^2	m^2
2-2	1.0	64.6	6.0	10-2	4.6	293.9	27.3
2-9	1.2	77.6	7.2	10-9	4.8	306.8	28.5
3-0	1.4	89.4	8.3	11-0	5.0	319.7	29.7
3-7	1.6	102.3	9.5	11-7	5.2	331.6	30.8
3-15	1.8	115.2	10.7	11-14	5.4	344.5	32.0
4-6	2.0	128.1	11.9	12 -5	5.6	357.4	33.2
4-13	2.2	141.1	13.1	12-12	5.8	370.3	34.4
5-4	2.4	154.0	14.3	13-3	6.0	383.2	35.6
5-11	2.6	165.8	15.4	13-10	6.2	396.2	36.8
6-2	2.8	178.7	16.6	14-1	6.4	409.1	38.0
6-9	3.0	191.6	17.8	14-8	6.6	420.9	39.1
7-0	3.2	204.6	19.0	14-15	6.8	433.8	40.3
7-7	3.4	217.5	20.2	15-6	7.0	446.8	41.5
7-15	3.6	230.4	21.4	15-14	7.2	459.7	42.7
8-6	3.8	243.3	22.6	16-5	7.4	472.6	43.9
8-13	4.0	255.2	23.7	16-12	7.6	485.5	45.1
9-4	4.2	268.1	24.9	17-3	7.8	497.3	46.2
9-11	4.4	281	26.1				

Table 6

The required minimum room area if installed at an altitude over 2000ft:

Altitude (m)		601-800		801-1000		1001-1200		1201-1400		1401-1600		1601-1800		1801-2000	
Altitude (ft)		1970-2625		2626-3280		3281-3938		3940-4593		4596-5250		5251-5905		5908-6562	
m_c		A_{min}/TA_{min}													
lb-oz	kg	ft²	m²	ft²	m²	ft²	m²	ft²	m²	ft²	m²	ft²	m²	ft²	m²
2	0.9	60	5.5	62	5.7	63	5.8	65	6.0	66	6.1	67	6.2	69	6.4
3	1.4	90	8.3	92	8.5	94	8.7	96	8.9	98	9.1	101	9.3	101	9.3
4	1.8	119	11.0	122	11.3	124	11.5	129	11.9	131	12.1	134	12.4	134	12.4
5	2.3	149	13.8	153	14.2	156	14.4	160	14.8	163	15.1	167	15.5	167	15.5
6	2.7	178	16.5	183	17.0	187	17.3	192	17.8	195	18.1	201	18.6	201	18.6
7	3.2	207	19.2	214	19.8	218	20.2	223	20.7	228	21.1	234	21.7	234	21.7
8	3.6	237	22.0	244	22.6	248	23.0	256	23.7	260	24.1	267	24.8	267	24.8
9	4.1	266	24.7	274	25.4	279	25.9	287	26.6	292	27.1	301	27.9	301	27.9
10	4.5	297	27.5	305	28.3	311	28.8	319	29.6	324	30.1	333	30.9	333	30.9
11	5.0	326	30.2	335	31.1	342	31.7	351	32.6	357	33.1	366	34.0	366	34.0
12	5.4	355	32.9	365	33.9	372	34.5	383	35.5	390	36.2	400	37.1	400	37.1
13	5.9	385	35.7	396	36.7	403	37.4	415	38.5	422	39.2	433	40.2	433	40.2
14	6.4	414	38.4	426	39.5	434	40.3	446	41.4	455	42.2	467	43.3	467	43.3
15	6.8	444	41.2	457	42.4	466	43.2	478	44.4	487	45.2	500	46.4	500	46.4
16	7.3	473	43.9	487	45.2	496	46.0	510	47.3	519	48.2	533	49.5	533	49.5
17	7.7	502	46.6	517	48.0	527	48.9	542	50.3	552	51.2	567	52.6	567	52.6
18	8.2	532	49.4	547	50.8	558	51.8	573	53.2	584	54.2	600	55.7	600	55.7
19	8.6	561	52.1	577	53.6	589	54.7	605	56.2	616	57.2	632	58.7	632	58.7
20	9.1	591	54.9	609	56.5	619	57.5	637	59.1	648	60.2	666	61.8	666	61.8

Table 7

Altitude (m)		2001-2200		2201-2400		2401-2600		2601-2800		2801-3000		3001-3200		above 3200	
Altitude (ft)		6565-7218		7221-7874		7877-8530		8533-9186		9190-9843		9846-10500		above 10500	
m_c		A_{min}/TA_{min}													
lb-oz	kg	ft²	m²	ft²	m²	ft²	m²	ft²	m²	ft²	m²	ft²	m²	ft²	m²
2	0.9	72	6.6	60	5.5	62	5.7	63	5.8	65	6.0	66	6.1	67	6.2
3	1.4	101	9.3	90	8.3	92	8.5	94	8.7	96	8.9	98	9.1	101	9.3
4	1.8	134	12.4	119	11.0	122	11.3	124	11.5	129	11.9	131	12.1	134	12.4
5	2.3	167	15.5	149	13.8	153	14.2	156	14.4	160	14.8	163	15.1	167	15.5
6	2.7	201	18.6	178	16.5	183	17.0	187	17.3	192	17.8	195	18.1	201	18.6
7	3.2	234	21.7	207	19.2	214	19.8	218	20.2	223	20.7	228	21.1	234	21.7
8	3.6	267	24.8	237	22.0	244	22.6	248	23.0	256	23.7	260	24.1	267	24.8
9	4.1	301	27.9	266	24.7	274	25.4	279	25.9	287	26.6	292	27.1	301	27.9
10	4.5	333	30.9	297	27.5	305	28.3	311	28.8	319	29.6	324	30.1	333	30.9
11	5.0	366	34.0	326	30.2	335	31.1	342	31.7	351	32.6	357	33.1	366	34.0
12	5.4	400	37.1	355	32.9	365	33.9	372	34.5	383	35.5	390	36.2	400	37.1
13	5.9	433	40.2	385	35.7	396	36.7	403	37.4	415	38.5	422	39.2	433	40.2
14	6.4	467	43.3	414	38.4	426	39.5	434	40.3	446	41.4	455	42.2	467	43.3
15	6.8	500	46.4	444	41.2	457	42.4	466	43.2	478	44.4	487	45.2	500	46.4
16	7.3	533	49.5	473	43.9	487	45.2	496	46.0	510	47.3	519	48.2	533	49.5
17	7.7	567	52.6	502	46.6	517	48.0	527	48.9	542	50.3	552	51.2	567	52.6
18	8.2	600	55.7	532	49.4	547	50.8	558	51.8	573	53.2	584	54.2	600	55.7
19	8.6	632	58.7	561	52.1	577	53.6	589	54.7	605	56.2	616	57.2	632	58.7
20	9.1	666	61.8	591	54.9	609	56.5	619	57.5	637	59.1	648	60.2	666	61.8

Table 8

The minimum circulation airflow:

m_c		Q_{min}		m_c		Q_{min}	
lb-oz	kg	CFM	m^3/h	lb-oz	kg	CFM	m^3/h
2-2	1.0	116	196	10-2	4.6	530	900
2-9	1.2	139	235	10-9	4.8	553	939
3-0	1.4	162	274	11-0	5.0	576	978
3-7	1.6	185	313	11-7	5.2	599	1017
3-15	1.8	208	352	11-14	5.4	622	1056
4-6	2.0	231	391	12 -5	5.6	645	1095
4-13	2.2	253	430	12-12	5.8	668	1134
5-4	2.4	277	470	13-3	6.0	691	1173
5-11	2.6	300	509	13-10	6.2	713	1212
6-2	2.8	323	548	14-1	6.4	736	1251
6-9	3.0	346	587	14-8	6.6	759	1290
7-0	3.2	369	626	14-15	6.8	782	1329
7-7	3.4	392	665	15-6	7.0	806	1369
7-15	3.6	415	704	15-14	7.2	829	1408
8-6	3.8	438	743	16-5	7.4	852	1447
8-13	4.0	461	782	16-12	7.6	875	1486
9-4	4.2	483	821	17-3	7.8	898	1525
9-11	4.4	506	860				

Table 9

CAUTION

Min. room area and airflow required!

The allowable maximum refrigerant charge in Table 5 or the required minimum room area in Tables 6-8 is available only if the following conditions are met:

Minimum velocity of 3.28ft/s, which is calculated as the indoor unit airflow divided by the nominal face area of the outlet. And the grill area shall not be deducted.

Minimum airflow rate must meet the corresponding values in Table 9, which is related to the actual refrigerant charge of the system (Mc).

R454B refrigerant leakage sensor is configured.

The maximum refrigerant limit described above applies to unventilated areas. If adding additional measures, such as areas with mechanical ventilation or natural ventilation, The maximum refrigerant charge can be increased or the minimum room area can be reduced.

R454B refrigerant leakage sensor is configured for the indoor unit, meets the incorporated circulation airflow requirements, the maximum refrigerant charge or minimum room area can be determined according to Table 5 or Tables 6-8.

CAUTION

Min. room area and airflow required!

If the actual room area, air outlet height, and refrigerant charge amount are not reflected in the above table, more severe cases need to be considered according to the data in the tables 4-9.

4 Unit Preparation

4.1 Prepare the Unit for Installation

- Check for damage and report promptly to the carrier any damage found to the unit Figure 12.
- The charge port can be used to ensure the refrigerant charge has been retained during shipment.

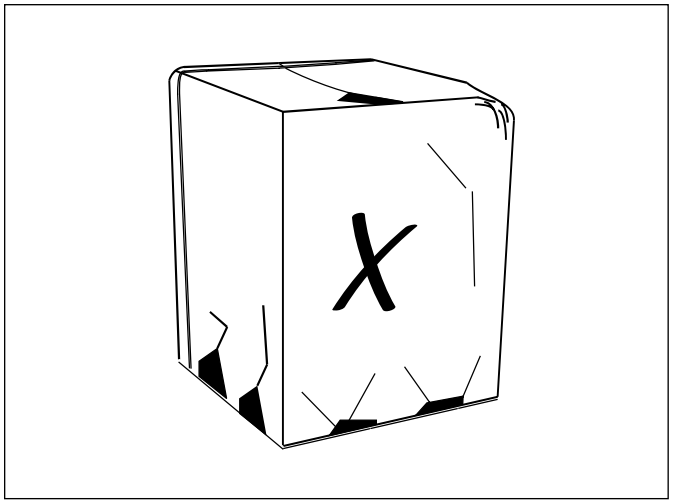


Figure 12

NOTICE

Product damage!

Appliances shall be transported, marked and stored in accordance with the applicable warnings from "1.3 Safety Warnings" in mind. The appliance shall be stored so as to prevent mechanical damage from occurring.

5 Setting the Unit

5.1 Pad Installation

When installing the unit on a support pad, such as a concrete slab, consider the following:

- The pad must be at least 1-2" larger than the unit on all sides.
- The pad must be separated from any structure.
- The pad must be level.
- The pad must be high enough above grade to allow for drainage.
- The pad location must comply with National, State, and local codes.

These instructions are intended to provide a method to tie-down system to cement slab as a securing procedure for high wind areas. Check local codes for tie-down methods and protocols.

Install the unit a minimum of 4 inches (102 mm) above the roof or ground surface to avoid ice build-up around the unit.

Locate the unit above a load bearing wall or area of the roof that can adequately support the unit.

Consult local codes for rooftop applications.

Use a field provided slab or frame.

Install the unit in an upright and level position.

NOTICE

Product damage!

The outdoor unit vapour service valve and liquid service valve need to be protected. do not grab them when moving the outdoor unit.

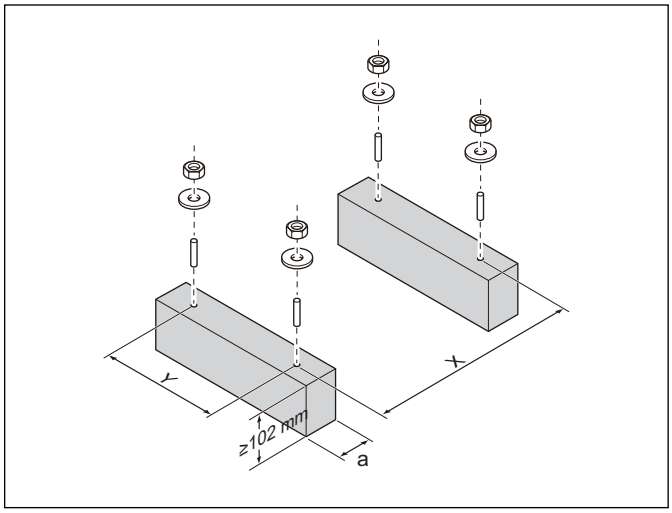


Figure 13

Outdoor unit model (ton)	a in (mm)	X in (mm)	Y in (mm)
1.5/2.0	≥ 4.0 (102)	26.1 (663)	14.8 (375)
2.5/3.0	≥ 4.0 (102)	23.0 (584)	15.4 (390)
4.0/5.0	≥ 4.0 (102)	23.6 (600)	14.2 (360)

Table 10

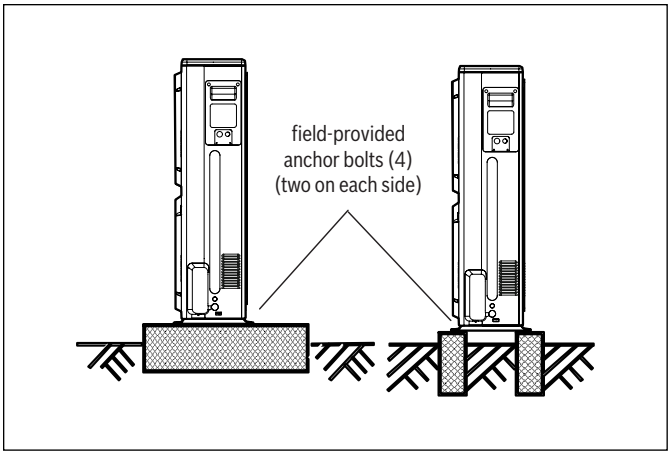


Figure 14

If the unit is installed in a location where strong winds may tilt the unit, please take the following measures:

- Prepare two cables as shown in the following figure (provided on-site).
- Place two cables on the outdoor unit. Insert a rubber plate between the cables and the outdoor unit to prevent the cables from scratching the paint (provided on-site).
- Connect both ends of cables.
- Tighten the cables.

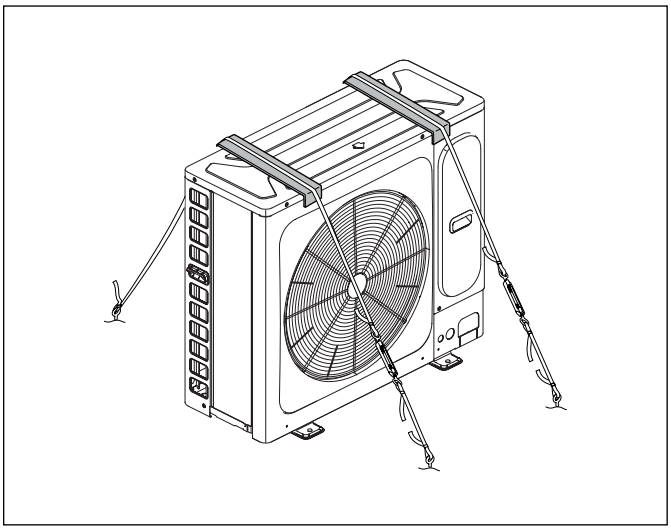


Figure 15

6 Refrigerant Line Considerations

6.1 Refrigerant Line and Service Valve Connection Sizes

Model	Main Outdoor Unit Pipe	
	Gas (Vapor)Pipe Diameter Required	Liquid Pipe Diameter Required
BOHA-24RTB-M18S	3/4[1]	3/8
BOHA-36RTB-M18S	3/4[1]	3/8
BOHA-60RTB-M18S	7/8[2]	3/8

Table 11 Refrigerant line and service valve connection sizes - inches

[1] Field provided 5/8 x 3/4 in. adaptor required for gas (vapor) pipe connection at outdoor unit.

[2] Field provided 5/8 x 7/8 in. adaptor required for gas (vapor) pipe connection at outdoor unit.

6.2 Refrigerant Line Insulation

The Suction Line must always be insulated. DO NOT allow the Liquid Line and Suction Line to come in direct (metal to metal) contact.

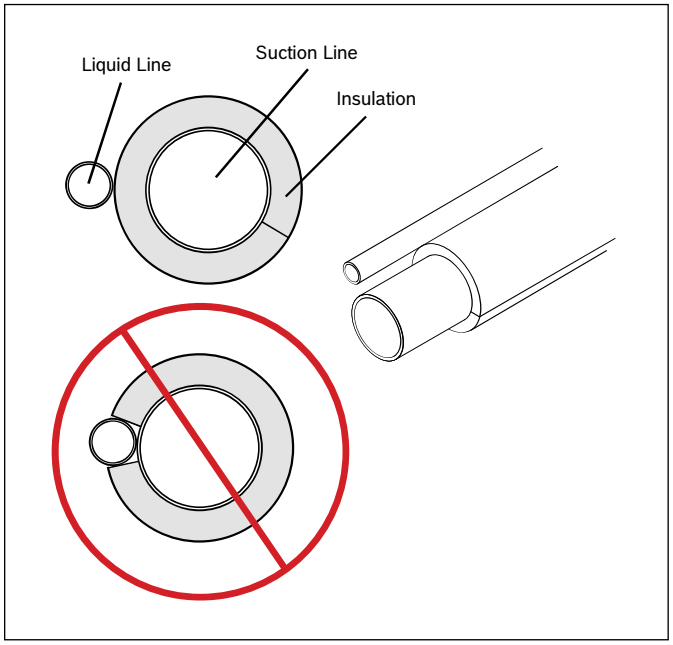


Figure 16

6.3 Reuse Existing Refrigerant Lines

CAUTION

MINOR TO MODERATE BURN!

If using existing refrigerant lines, make certain that all joints are brazed, not soldered.

For retrofit applications, where the existing refrigerant lines will be used, the following precautions should be taken:

- Ensure that the refrigerant lines are the correct size. Refer to “3.2 Refrigerant Piping Limits” and Table 3.
- Ensure that the refrigerant lines are free of leaks, acid, and oil.
- If the existing tube has been used with another refrigerant (e.g. R410A), it should not be reused.

The manufacturer recommends installing only approved matched indoor and outdoor systems. The benefits of installing approved matched indoor and outdoor split systems are maximum efficiency, optimum performance and the best overall system reliability.

7 Refrigerant Line Routing

7.1 Precautions

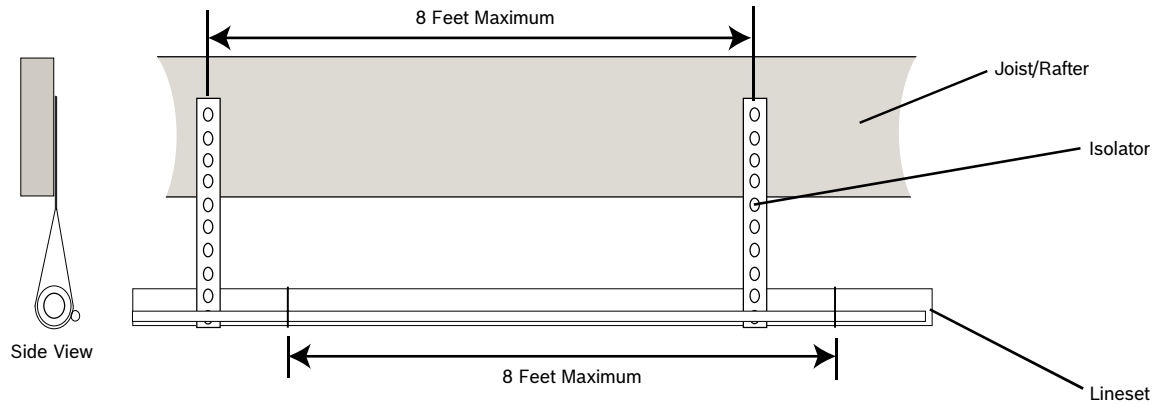
Take precautions to prevent noise within the building structure due to vibration transmission from the refrigerant lines. For example:

- When the refrigerant lines have to be fastened to floor joists or other framing in a structure, use isolation type hangers.
- Isolation hangers should also be used when refrigerant lines are run in stud spaces or enclosed ceilings.
- Where the refrigerant lines run through a wall or sill, they should be insulated and isolated.
- Isolate the lines from all ductwork.
- Minimize the number of 90º turns.

NOTICE

Product damage!

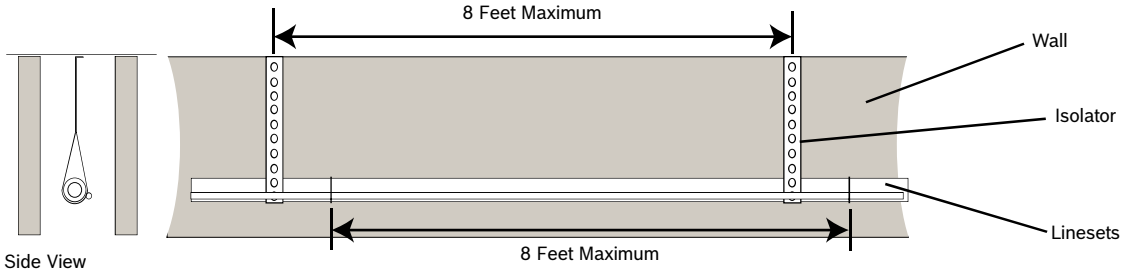
The pipe-work including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code. Inspection prior to being covered or enclosed,or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.



Secure Suction Line from joists using isolators every 8 ft. Secure Liquid Line directly to Suction Line using tape, wire, or other appropriate method every 8 ft.

Isolation From Joist/Rafter

Figure 17

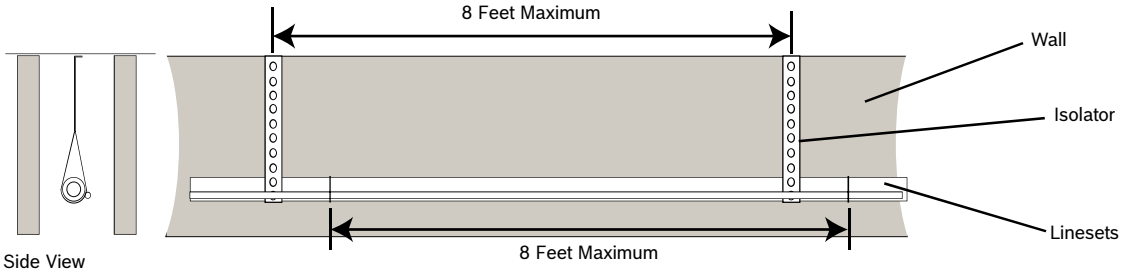


Secure Suction Line using isolators every 8 ft. Secure Liquid Line directly to Suction Line using tape, wire, or other appropriate method every 8 ft.

Isolation On Walls

Figure 18

Comply with National, State, and local codes when isolating linesets from joists, rafters, walls, or other structural elements.



Secure Suction Line using isolators every 8 ft. Secure Liquid Line directly to Suction Line using tape, wire, or other appropriate method every 8 ft.

Isolation On Walls

Figure 19

8 Refrigerant Line Connection

All joints made in the installation between parts of the REFRIGERATING SYSTEM, with at least one part charged, shall be made in accordance with the following:

- A brazed, welded, or mechanical connection shall be made before opening the valves to permit refrigerant to flow between the REFRIGERATING SYSTEM parts. A vacuum valve shall be provided to evacuate the interconnecting pipe or any uncharged REFRIGERATING SYSTEM part.
- Mechanical connectors used indoors shall comply with ISO 14903. When mechanical connectors are reused indoors, sealing parts shall be renewed. When flared joints are reused indoors, the flare part shall be refabricated.
- Refrigerant tubing shall be protected or enclosed to avoid damage.
- Flexible refrigerant connectors (such as connecting lines between the indoor and outdoor unit) that may be displaced during NORMAL OPERATION shall be protected against mechanical damage.

Compliance is checked according to the installation instructions and a trial installation, if necessary.

Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0.25 times the maximum allowable pressure. No leak shall be detected.

For installations with field applied joints that are exposed in the occupied space these joints shall be at least one of the following:

- Mechanical joints in compliance with ISO 14903 or UL 207 (U.S. only).
- Welded or brazed joints.
- Joints in enclosures that vent to the unit or to the outside.

Compliance is checked by inspection and tests.

9 Refrigerant Line Brazing

Alll R454B products have a red tag on the refrigerant lines to indicate the product is charged with A2L refrigerant. It should not be removed.

9.1 Braze The Refrigerant Lines

1. Remove caps or plugs. Use a deburring tool to deburr the pipe ends. Clean both internal and external surfaces of the tubing using an emery cloth.

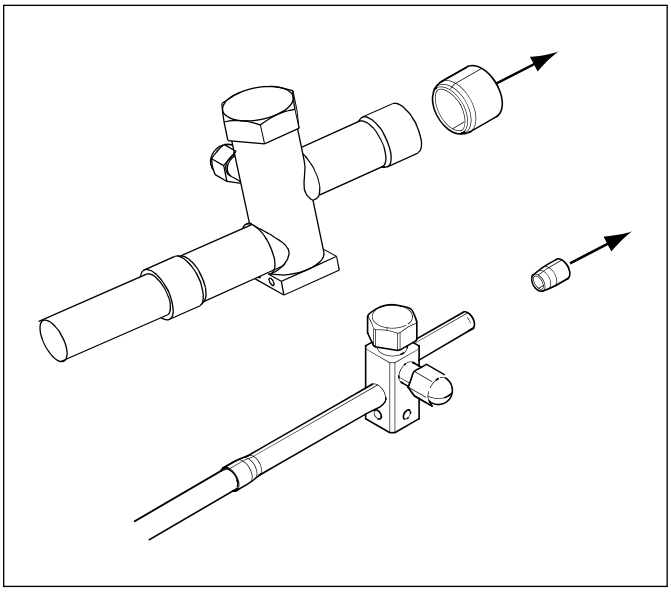


Figure 20

The locking cap might be required by your local code enforcement.

2. Remove the pressure tap cap from both service valves.

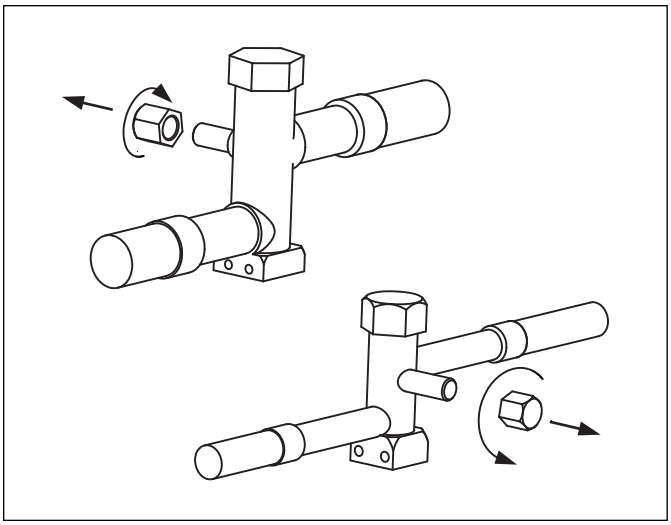


Figure 21

3. Purge the refrigerant lines and indoor coil with dry nitrogen.

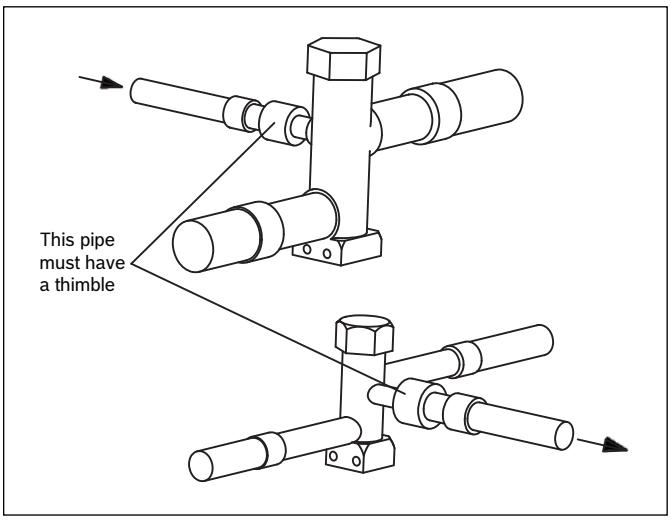


Figure 22

4. Wrap a wet rag around the valve body to avoid heat damage and continue the dry nitrogen purge Figure 23.

   Braze the refrigerant lines to the service valves.

   Braze the filter drier to the Liquid Line.

All units come standard with a bi-flow filter drier. Braze the filter drier to the liquid line, using caution not to push the refrigerant line too hard past the stop within the filter drier (this could damage the drier).

Remove the wet rag before stopping the dry nitrogen purge.

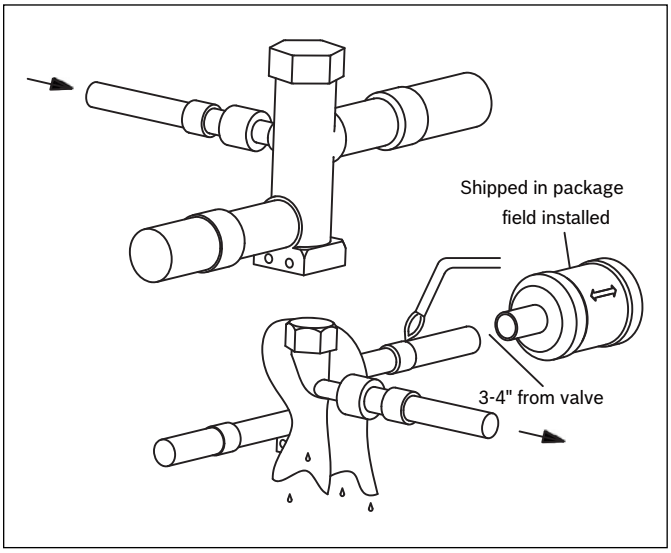


Figure 23

5. Replace the pressure tap caps after the service valves have cooled.

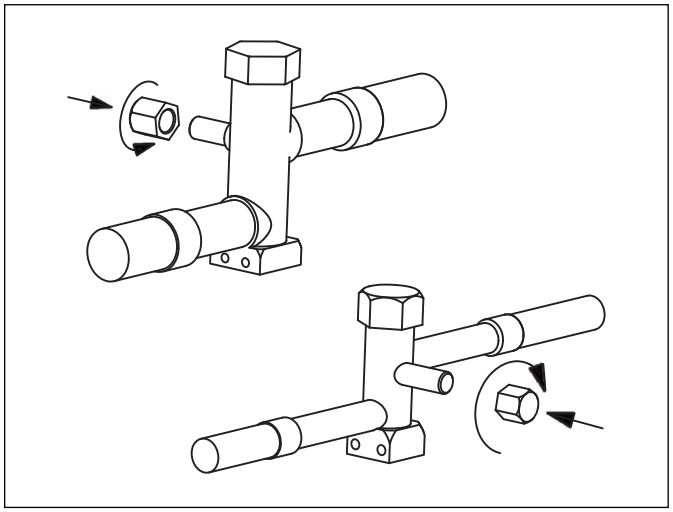


Figure 24

10 Refrigerant Line Leak Check

10.1 Check For Leaks

1. Pressurize the refrigerant lines and evaporator coil to 250 PSIG using dry nitrogen.

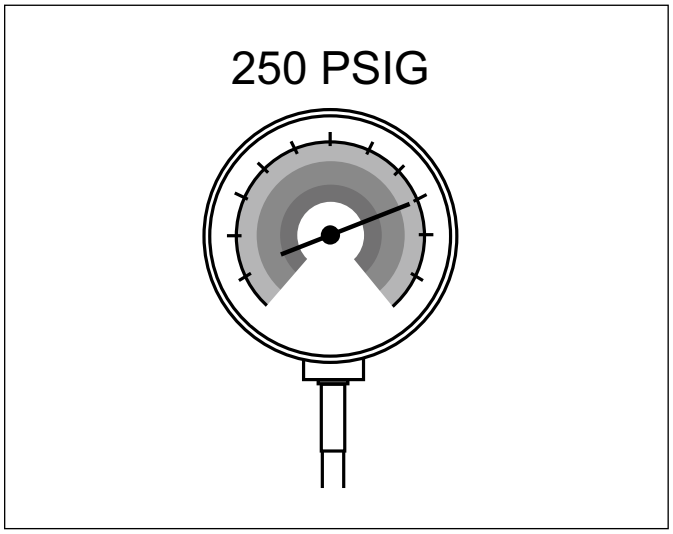


Figure 25

2. Check for leaks by using a soapy solution or bubbles at each brazed location.

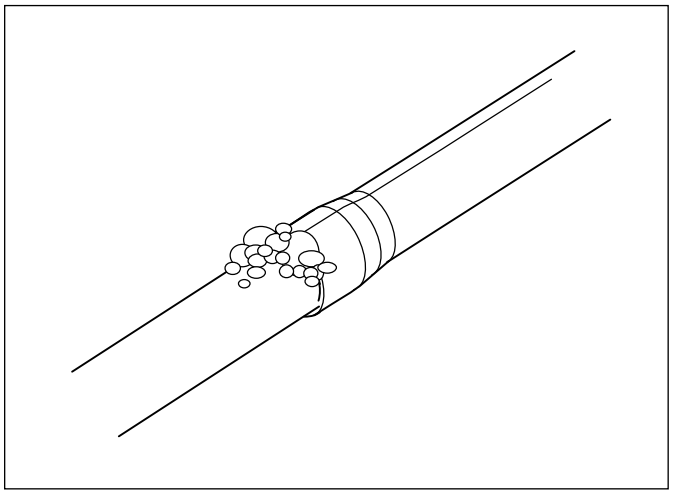


Figure 26

11 Evacuation

11.1 Evacuate the Refrigerant Lines and Indoor Coil

Do not open the service valves until the refrigerant lines and indoor coil leak check and evacuation are complete.

1. Evacuate until the micron gauge reads no higher than 350 microns, then close the valve to the vacuum pump.

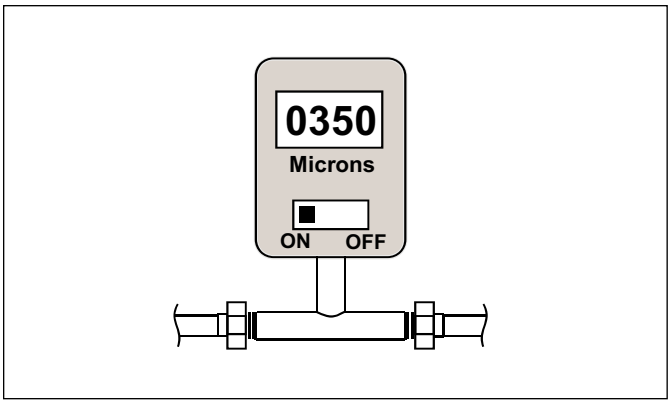


Figure 27

2. Observe the micron gauge. Evacuation is complete if the micron gauge does not rise above 500 microns in one (1) minute.

   Once evacuation is complete, turn off the vacuum pump and micron gauge, and close the valves on the manifold gauge set.

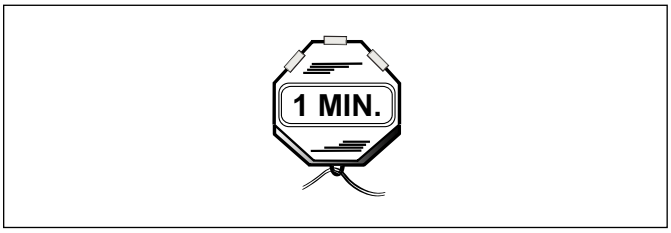


Figure 28

12 Service Valves

12.1 Open the Service Valves

WARNING

Moderate to severe burns!

Extreme caution should be exercised when opening the Liquid Line Service Valve. Turn counterclockwise until the valve stem just touches the rolled edge. No torque is required. Failure to follow this warning will result in abrupt release of system charge and may result in personal injury and /or property damage.

Leak check and evacuation must be completed before opening the service valves. The brazed lineset valves should be used for leak checking and vacuuming. Using the separate suction port for this process will result in loss of charge.

The Suction Service Valve must be opened first BEFORE opening the Liquid Service Valve.

1. Remove Service Valve Cap Figure 29.
2. Fully insert hex wrench into the stem and back out counterclockwise until valve stem just touches the rolled edge (approximately five (5) turns.)
3. Replace the Valve Stem Cap to prevent leaks. Tighten finger tight plus an additional 1/6 turn.
4. Repeat STEPS 1 - 3 for Liquid Service Valve.

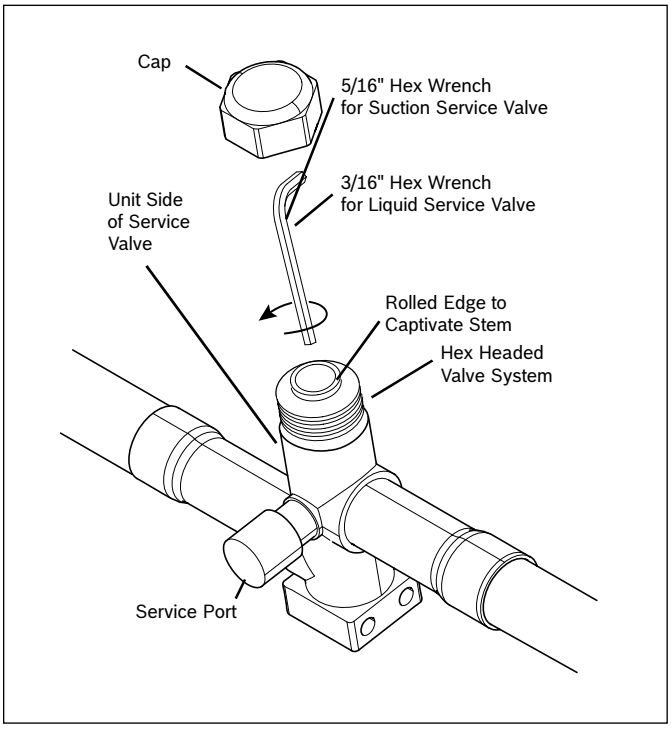


Figure 29

13 System Charge Adjustment

13.1 Charging: Weigh-In Method

Use weigh-in method the initial installation, or anytime a system charge is being replaced. Weigh-in method can also be used when power is not available to the equipment site or operating conditions (indoor/outdoor temperatures) are not in range to verify with the subcooling charging method.

Model	Factory Charge	Charge multiplier for interconnecting refrigerant tube length
36	6lb, 13 oz	0.59 oz/ft
48	9lb, 1 oz	
60	9lb, 1 oz	

Table 12

The factory charge in the outdoor unit is sufficient for 25 feet of standard size interconnecting liquid line.

New Installations—Calculating charge adjustment

1. Total Line Length (ft) = _____(a)
2. Standard Lineset (ft) = 25 (b)
3. (a) minus (b) = _____(c)
4. Refrigerant Multiplier = 0.59 oz/ft (d)
5. Refrigerant Adder (c*d) = _____(e)*

**If lineset is less than 25ft, (e) < 0, recover refrigerant from the system. If lineset is less than 15ft, only recover 6oz of refrigerant from the system.*

Sealed-System Repairs—Calculating total system charge.

1. Total Line Length (ft) = _____(a)
2. Standard Lineset (ft) = 25 (b)
3. (a) minus (b) = _____(c)
4. Refrigerant Multiplier = 0.59 oz/ft (d)
5. Refrigerant Adder (c*d) = _____(e)*
6. Factory Charge (namplate) = _____(f)
7. Total System Charge (e+f) = _____

** If lineset is less than 25ft, (e) < 0, recover refrigerant from the system. If lineset is less than 15ft, only recover 6oz of refrigerant from the system.*

The only mode approved for validating system charge is while in Cooling "Force Mode". Outdoor temperature must be between 55°F and 120°F with indoor temperature kept between 70°F and 80°F.

13.2 Subcooling Charging And Refrigerant Adjustment In Cooling (Above 50°F Outdoor Temp.)

1. Check the outdoor ambient temperatures.

   Subcooling **(in cooling mode)** is the only recommended method of charging above 50ºF outdoor ambient temperatures.

   For outdoor ambient temperatures below 50ºF use weigh-in charge method.

It is important to return in the spring or summer to accurately charge the system in the cooling mode when outdoor ambient temperature is above 50ºF.

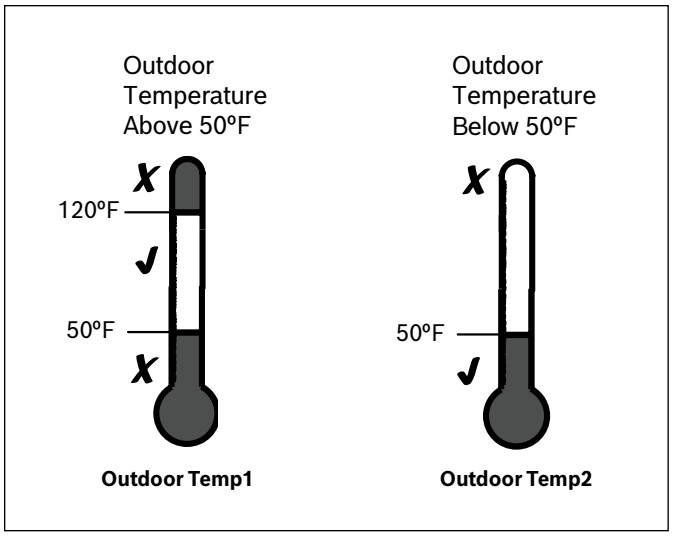


Figure 30

For best results, the indoor temperature should be kept between 70ºF and 80ºF during the install.

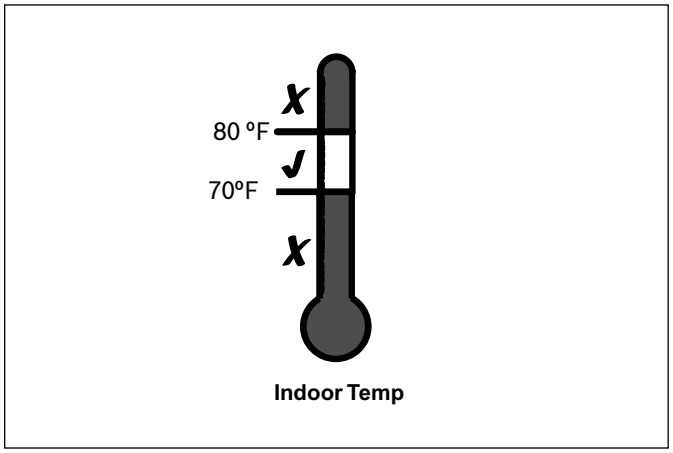


Figure 31

2. Ensure sections 8 to20 have been completed.

3. Stabilize the system.

   After **starting the system in cooling mode**, short press "FORCE" button, and "⊢" symbol should appear. System may take 10 minutes to ramp up. Operate the system for a minimum of twenty (20) minutes.

After a twenty (20) minute stabilization period operating at 100% capacity (i.e. once the compressor reaches the frequency shown in Table 13), maintain continuous operation while adjusting refrigerant charge. After adjusting, operate system for a minimum of five (5) minutes for system to stabilize, otherwise repeat step 3.

Compressor Frequency in Force Mode in Cooling					
ODU Capacity (kBTU/hr)	18	24	36	48	60
Frequency (HZ)	80	90	80	90	90

Table 13

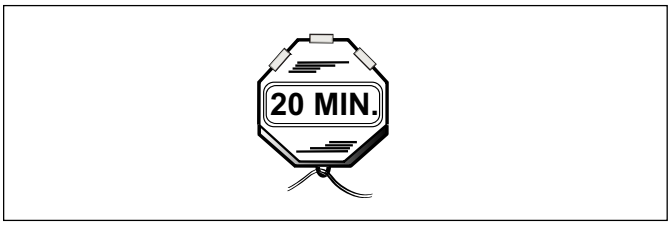


Figure 32

4. Calculate superheat value (According to Table 14)
   - Measured Suction Line Temp = _____ºF
   - Measured Suction Line Pressure = _____ PSIG
   - Calculate superheat value = _____ºF

Check the superheat and select correct subcooling according to superheat, refer to Table 14. It is recommended to keep the superheat at 10-18ºF if a third party indoor unit is used.

5. Calculate subcooling value (According to Table 15)
   - Measured Liquid Line Temp. = _____ºF
   - Measured Liquid Line Pressure = _____ PSIG
   - Calculate subcooling value = _____ºF

If calculated subcooling value is lower than the design subcooling value (Table 15), please add refrigerant. Repeat steps 3 through 5.

To exit force mode, press the force button again for 1 second.

If the superheat is out of range, refer to Troubleshooting section of this IOM.

Suction Temp (ºF)	Final Superheat (ºF)								
	6	8	10	12	14	16	18	20	22
	Suction Gauge Pressure (PSIG)								
40	95	91	87	84	80	77	74	70	67
42	99	95	91	87	84	80	77	74	70
44	103	99	95	91	87	84	80	77	74
46	107	103	99	95	91	87	84	80	77
48	111	107	103	99	95	91	87	84	80
50	116	111	107	103	99	95	91	87	84
52	120	116	111	107	103	99	95	91	87
54	125	120	116	111	107	103	99	95	91
56	129	125	120	116	111	107	103	99	95
58	134	129	125	120	116	111	107	103	99
60	139	134	129	125	120	116	111	107	103
62	144	139	134	129	125	120	116	111	107
64	149	144	139	134	129	125	120	116	111
66	155	149	144	139	134	129	125	120	116
68	160	155	149	144	139	134	129	125	120
70	166	160	155	149	144	139	134	129	125
72	171	166	160	155	149	144	139	134	129

Table 14 R-454B Refrigerant chart - Final Superheat

Liquid Temp (ºF)	Final Subcooling (ºF)							
	6	7	8	9	10	11	12	13
	Liquid Gauge Pressure (PSIG)							
55	164	167	170	172	175	178	181	184
60	178	181	184	187	191	194	197	200
65	194	197	200	203	206	210	213	217
70	210	213	217	220	223	227	230	234
75	227	230	234	238	241	245	249	252
80	245	249	252	256	260	264	268	272
85	264	268	272	276	280	284	288	292
90	284	288	292	297	301	305	309	314
95	305	309	314	318	323	327	332	336
100	327	332	336	341	346	351	355	360
105	351	355	360	365	370	375	380	385
110	375	380	385	390	396	401	406	412
115	401	406	412	417	422	428	433	439
120	428	433	439	445	450	456	462	468
125	456	462	468	474	480	486	492	498

Table 15 R-454B Refrigerant chart - Final Subcooling

Design Subcooling		
Model	Subcooling/°F	Superheat/°F
1.5, 2 ton, 3 ton	5-12	2-7
4 ton, 5 ton	6-14	2-7

Table 16

6. Adjust refrigerant level to attain proper gauge pressure.

Add refrigerant if the subcooling reading fromTable 15 is lower than the designed value (Table 16).

- Connect gauges to refrigerant bottle and unit as illustrated (Figure 67).
- Purge all hoses.
- Open tank.
- Stop adding refrigerant when subcooling matches the design value (Table 16).

Recover refrigerant if the subcooling reading from Table 15 is higher than the design value (Table 16).

7. Stabilize the system.
   - Wait 5 minutes for the system condition to stabilize between adjustments.

When the subcooling matches the design value (Table 16), the system is properly charged.

- Remove gauges.
- Replace service port caps to prevent leaks. Tighten finger tight plus an additional 1/6 turn.

8. Record System Information for reference (Table 17).

   Record system pressures and temperatures after charging is complete.

Description	Value
Outdoor model number	
Measured Outdoor Ambient	°F
Measured Indoor Ambient	°F
Measured Liquid Line Temp	°F
Measured Suction Line Temp	°F
Liquid Gauge Pressure	PSIG
Suction Gauge Pressure	PSIG

Table 17

13.3 Record the Refrigerant Charge Amount

After refrigerant is charged, record the amount of refrigerant to be charged on the label of the outdoor unit. **1** indicates the amount of refrigerant to be charged by the factory, **2** indicates the additional refrigerant, and **1** + **2** indicates the total refrigerant to be charged.

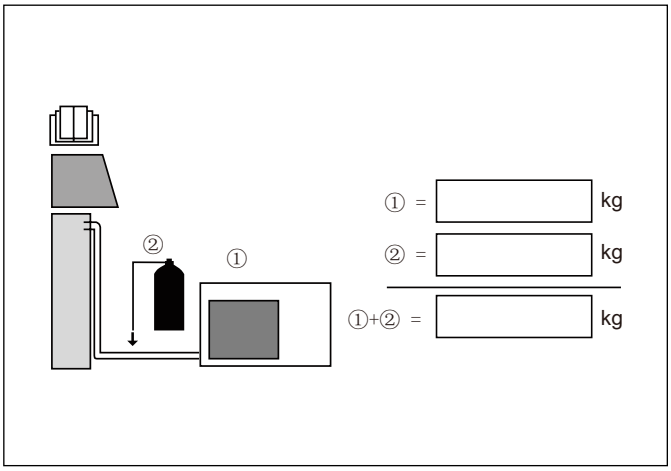


Figure 33

14 Electrical - Low Voltage

14.1 Low Voltage Maximum Wire Length

Table 18 and Table 19 define the maximum total length of low voltage wiring from the outdoor unit to the indoor unit.

Hyper-Link (M1 M2) Communication Wire Size	Max. Wire Length
16/18 AWG	300 Ft.

Table 18

Conventional 24 Volts - Wire size	Max. Wire Length
18 AWG	150 Ft.
16 AWG	225 Ft.
14 AWG	300 Ft.

Table 19

WARNING

Personal injury, property damage!

Installation and servicing of air conditioning equipment can be hazardous due to internal refrigerant pressure and live electrical components. Only trained and qualified service personnel should install or service this equipment. Installation and service performed by unqualified persons can result in property damage, personal injury, or death.

WARNING

Risk of electrical shock!

Disconnect all remote power supplies before installing or servicing any portion of the system. Failure to disconnect power supplies can result in property damage, personal injury, or death.

CAUTION

Personal injury!

The connectors of Hyper-Link (M1 M2) / P Q communication wires must be connected reliably and protected by insulation. The wires unused should be insulated, and the copper wires should not be exposed. Sharp metal edges can cause injury. When installing the unit, use care to avoid sharp edges. Avoid sharp metal edges for wires to prevent wear, or it may lead to short circuit or electric leakage and cause danger.

NOTICE

Product damage!

Electrostatic discharge can affect electronic components. Take care during unit installation and service to protect the unit's electronic controls. Precautions will help to avoid control exposure to electrostatic discharge by putting the unit, the control and the technician at the same electrostatic potential. Touch hand and all tools on an unpainted unit surface before performing any service procedure to neutralize electrostatic charge.

Do not connect the power cords (high voltage) to the Hyper-Link (M1 M2) / P Q communication wires (low voltage), otherwise it will damage the control board.

Tighten the zip tie after connecting the wires to prevent small animals from entering the electric control box and causing damage.

The Hyper-Link (M1 M2) / P Q communication wires should be fixed well. Otherwise, the connectors may be loose or the terminal may be damaged when they are pulled.

NOTICE

Product damage!

The Hyper-Link (M1 M2) communication wires must be routed as close as possible. Otherwise, the communication may be abnormal.

When there is strong electromagnetic interference in the environment, it is recommended to use shielded wires for Hyper-Link(M1 M2) communication wires. Otherwise, the communication may be abnormal. When the shielded wires are used, the shielding layers at both ends must be connected to earth.

Power cords and communication wires and conventional 24VAC noncommunicating control wires must be separated from each other with a distance of more than 2 inches. Otherwise, the communication may be abnormal.

The Hyper-Link (M1 M2) communication wires and conventional 24VAC noncommunicating control wires connectors are SELV connection points.

Hyper-Link (M1 M2) communication wires and conventional 24VAC noncommunicating control wires should be stranded to provide better flexibility and performance.

14.2 Thermostat Wiring

- Be sure power supply agrees with equipment nameplate.
- Power wiring and grounding of equipment must comply with local codes.
- Low voltage wiring to be No. 18 AWG minimum conductor.
- "- - - - - - - -" Field installed electric auxiliary heat connection
- Single-stage auxiliary heating supported by 2H thermostat
- Two-stage auxiliary heating supported by 3H thermostat
- Three stage auxiliary heating supported by 4H thermostat
- W1: The first stage of field installed electric auxiliary heat.
- W2: The second stage of field installed electric auxiliary heat.
- W3: The third stage of field installed electric auxiliary heat.
- The outdoor unit W signal is connected to the electric auxiliary heat or the first stage electric auxiliary heat.

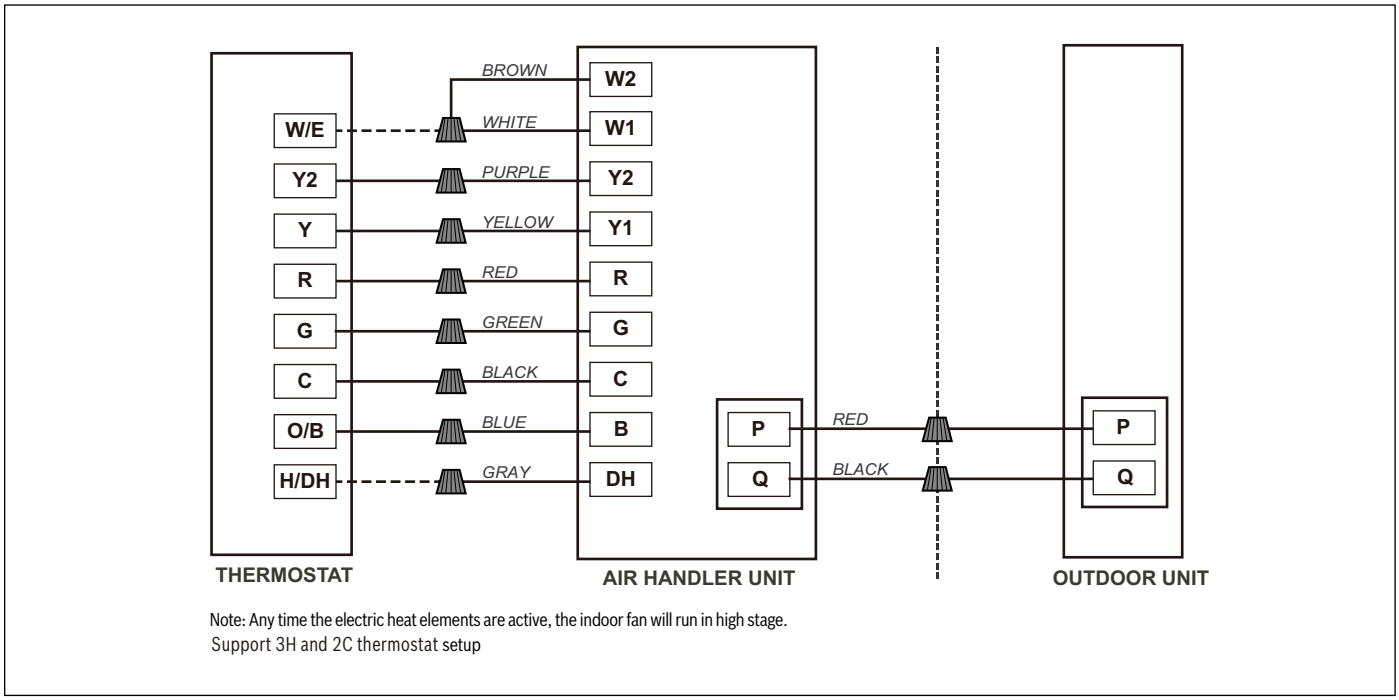
Dashed lines in the following thermostat wiring diagrams refer to optional wiring (wiring for Passive Dehumidification Function and/OR Electric Heat). For thermostat wiring please refer to the Owner's Manual of the thermostat.

B terminal to be connected with thermostat (O/B) wiring. Reversing valve energizes in heating.

14.2.1 Communication Setup When Pairing to IDS Premium AHU

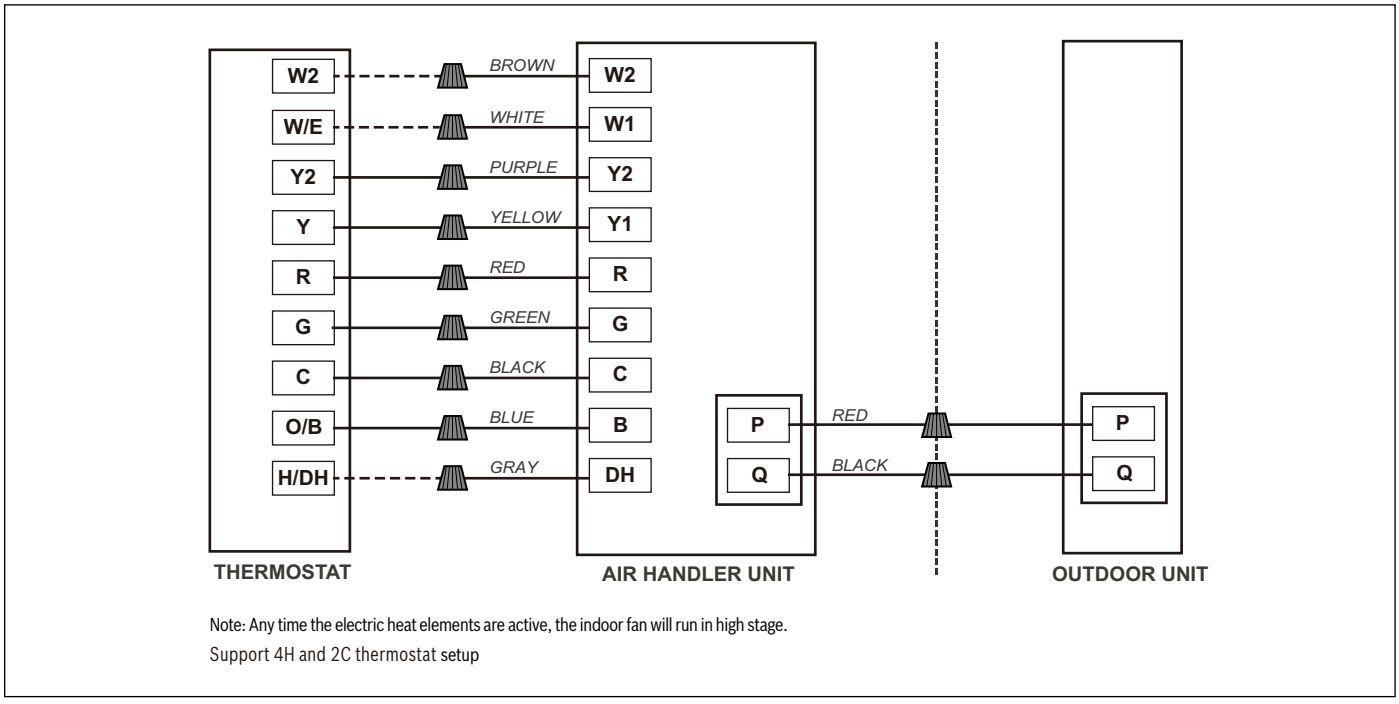
The Edge outdoor unit can be paired with the IDS Premium air handler in a single-zone application. This configuration requires the use of the PQ terminals on both the outdoor unit and the air handler. Refer to the wiring diagram for the PQ terminal locations.

Communicating thermostat wiring diagrams



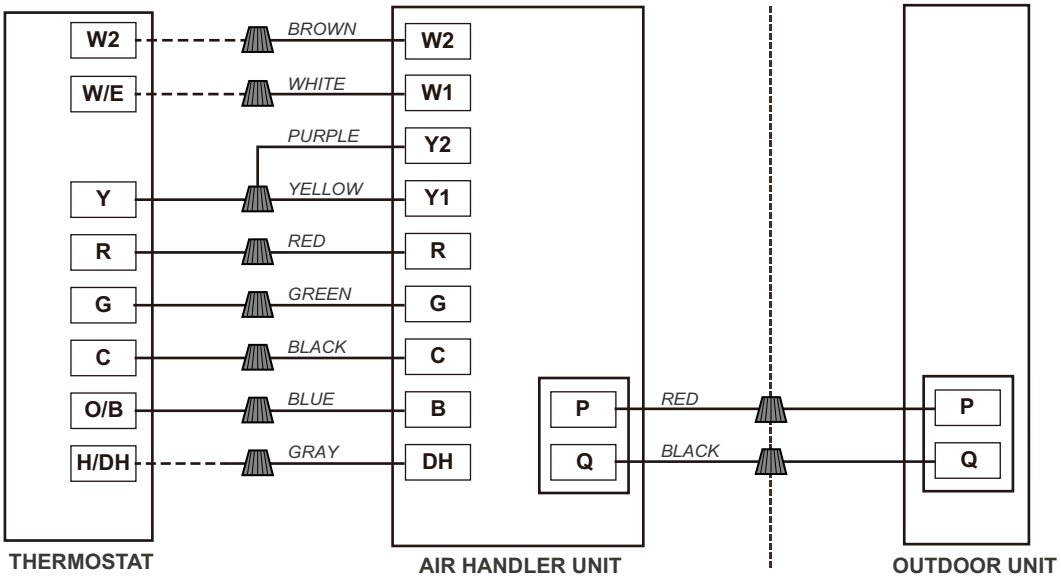
Note: Any time the electric heat elements are active, the indoor fan will run in high stage.
Support 3H and 2C thermostat setup

Figure 34 Control wiring for HP systems



Note: Any time the electric heat elements are active, the indoor fan will run in high stage.
Support 4H and 2C thermostat setup

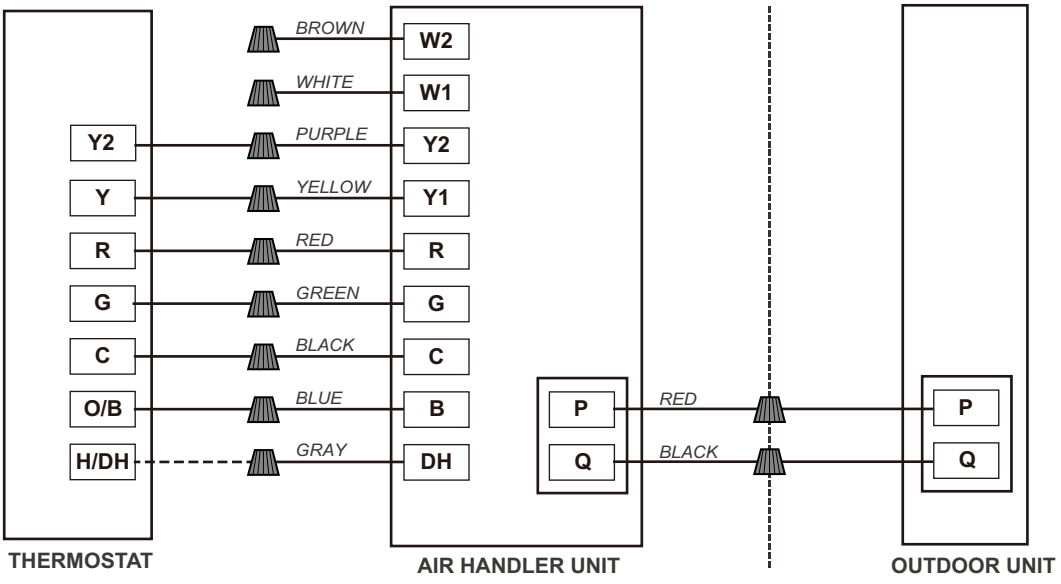
Figure 35 Control wiring for HP systems



Note: Any time the electric heat elements are active, the indoor fan will run in high stage.

Support 3H and 1C thermostat setup

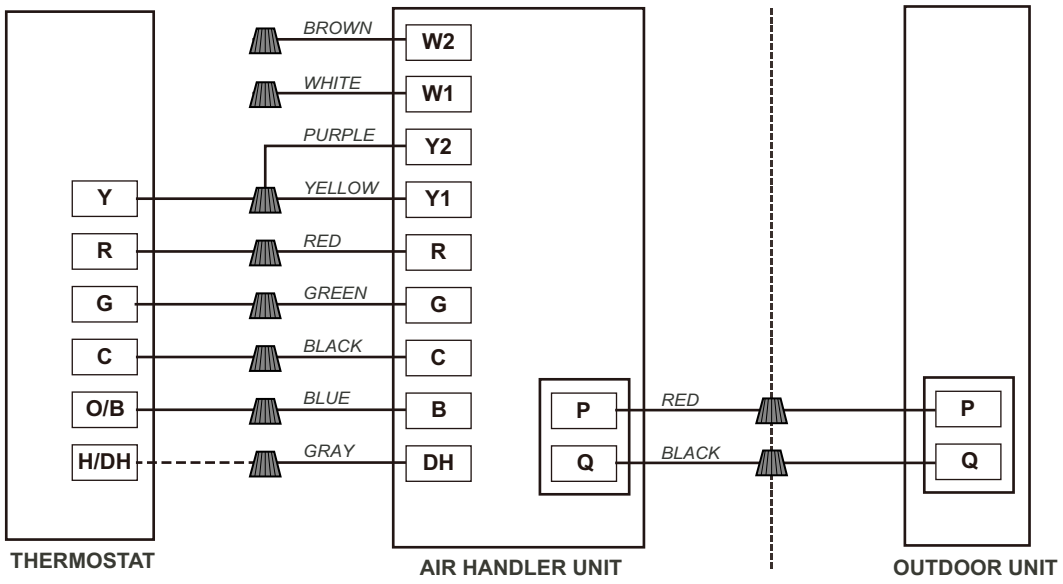
Figure 36 Control wiring for HP systems



Note: Any time the electric heat elements are active, the indoor fan will run in high stage.

Support 2H and 2C thermostat setup

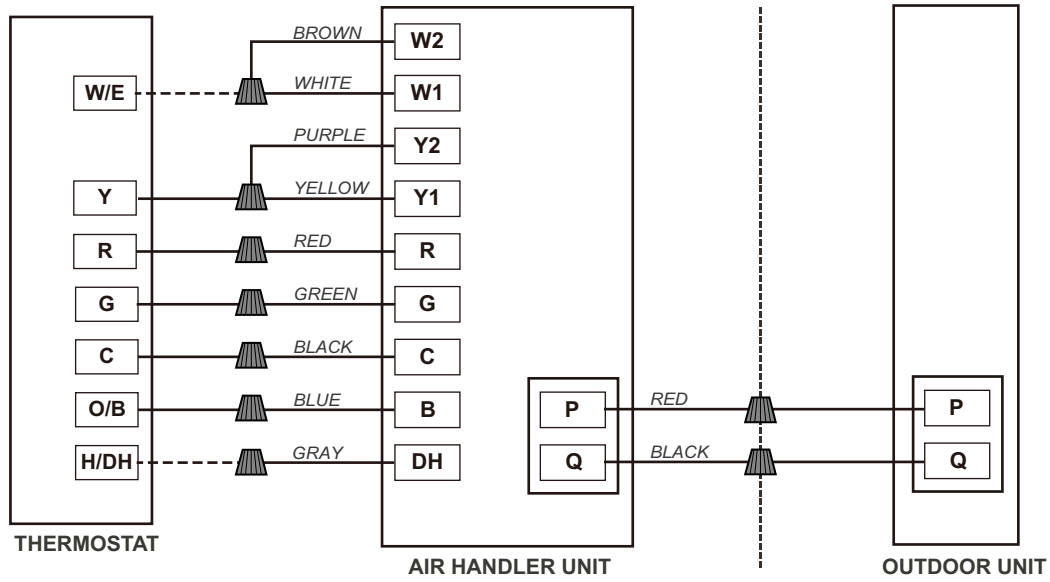
Figure 37 Control wiring for HP systems



Note: Any time the electric heat elements are active, the indoor fan will run in high stage.

Support 1H and 1C thermostat setup

Figure 38 Control wiring for HP systems



Note: Any time the electric heat elements are active, the indoor fan will run in high stage.

Support 2H and 1C thermostat setup

Figure 39 Control wiring for HP systems

14.2.2 Communication Setup When IDS Edge Multi Indoor Units

The Edge outdoor unit can be paired with the IDS Multi series air handler in either single-zone or multi-zone applications. These configurations require the use of the M1M2 terminals on both the outdoor unit and the air handler. Refer to the wiring diagram for the M1M2 terminal locations

Hyper-Link (M1 M2) Communication Wire Size	Max. Wire Length
16/18 AWG	300 Ft.

Table 20

1. Firstly peel off the half-stripped wires of the pre-installed communication wires. Secondly connect the Hyper-Link(M1M2) communication wires to the field supplied wires.

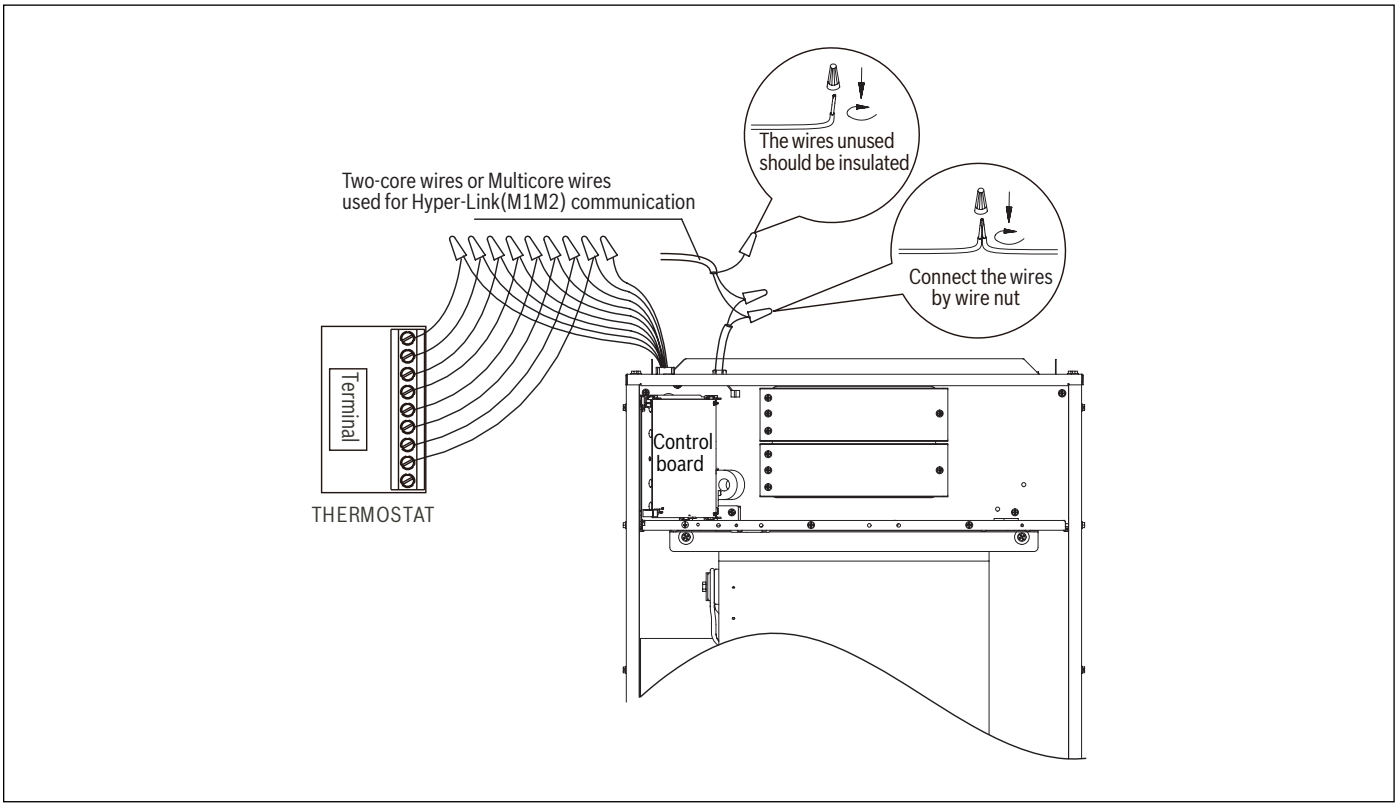
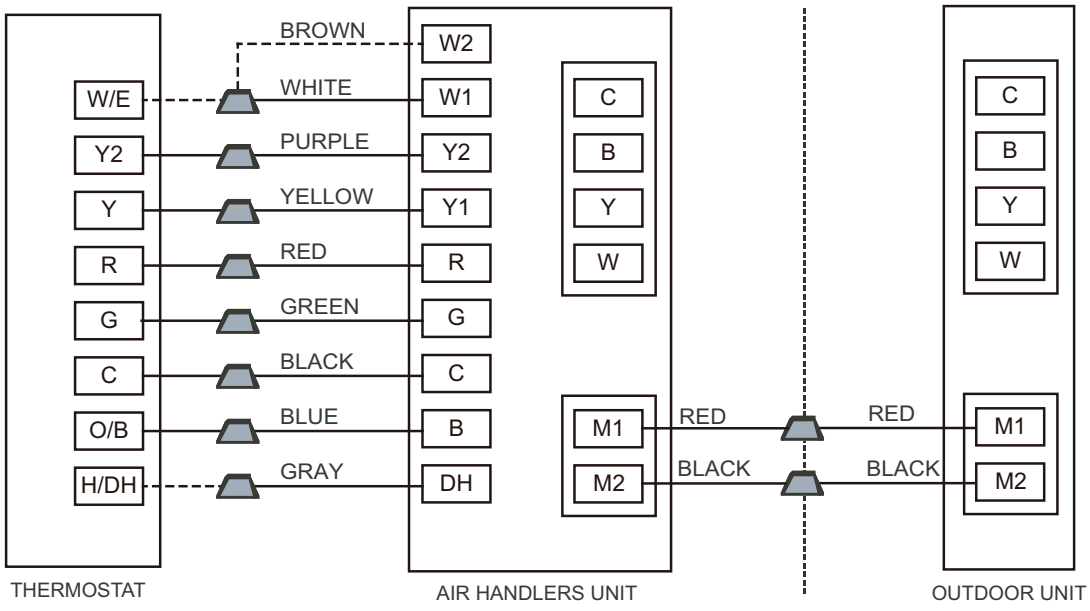


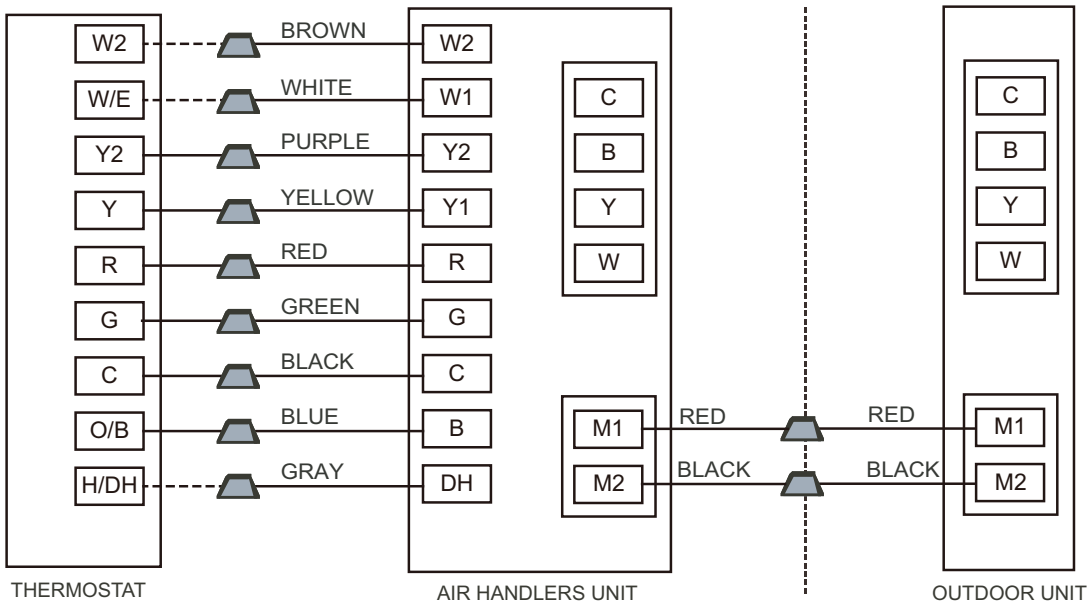
Figure 40

Communicating thermostat wiring diagrams



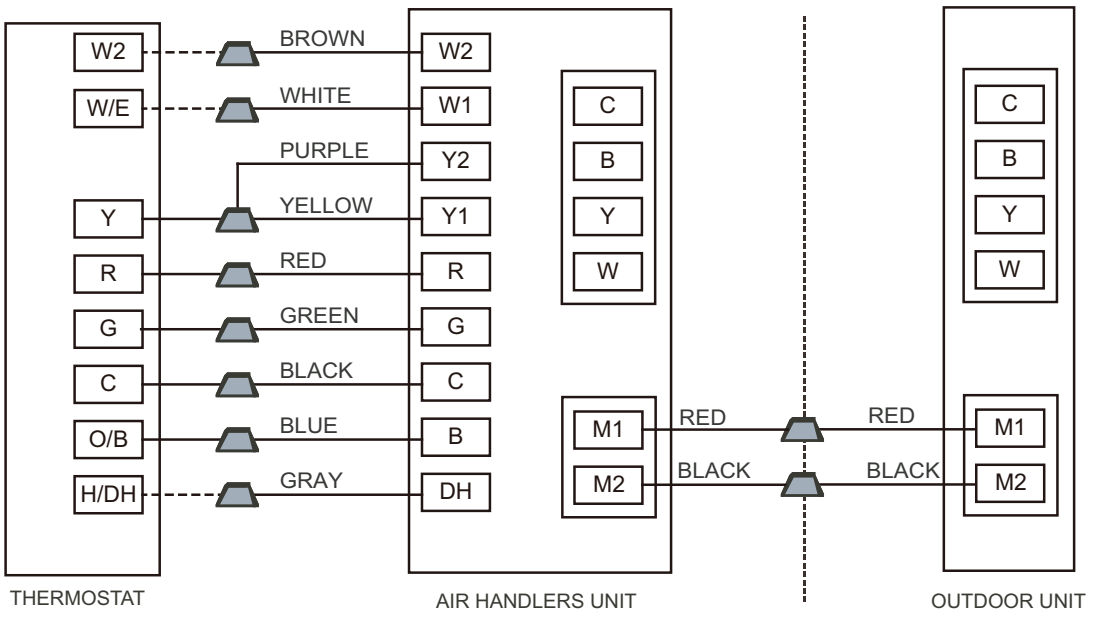
NOTE: Any time the electric heat elements are active, the indoor fan will run in high stage.

Figure 41 3H and 2C Thermostat Communication Mode Setup



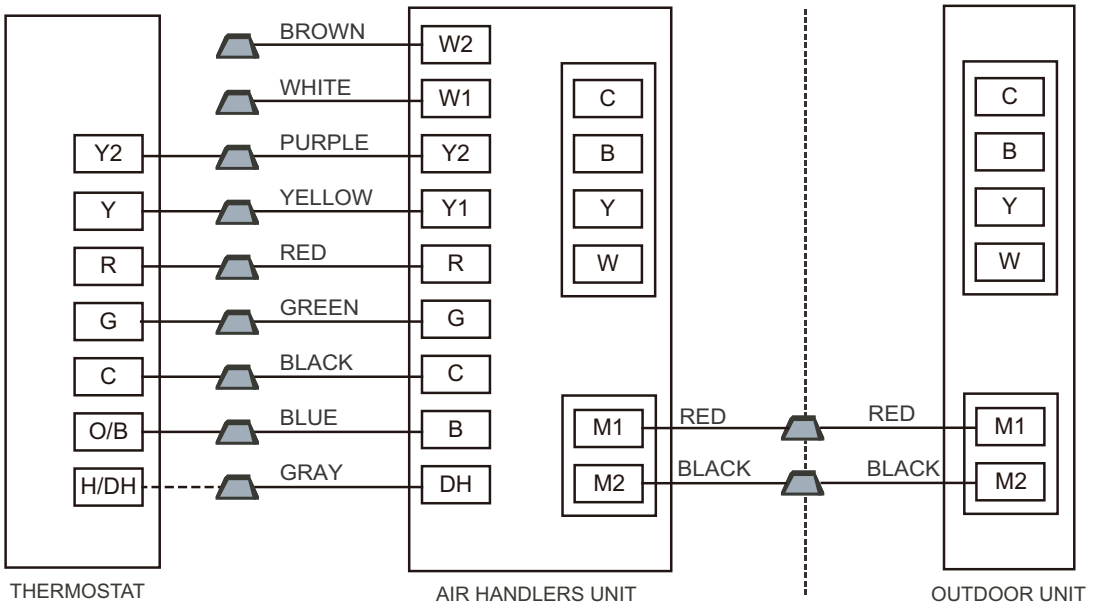
NOTE: Any time the electric heat elements are active, the indoor fan will run in high stage.

Figure 42 4H and 2C Thermostat Communication Mode Setup



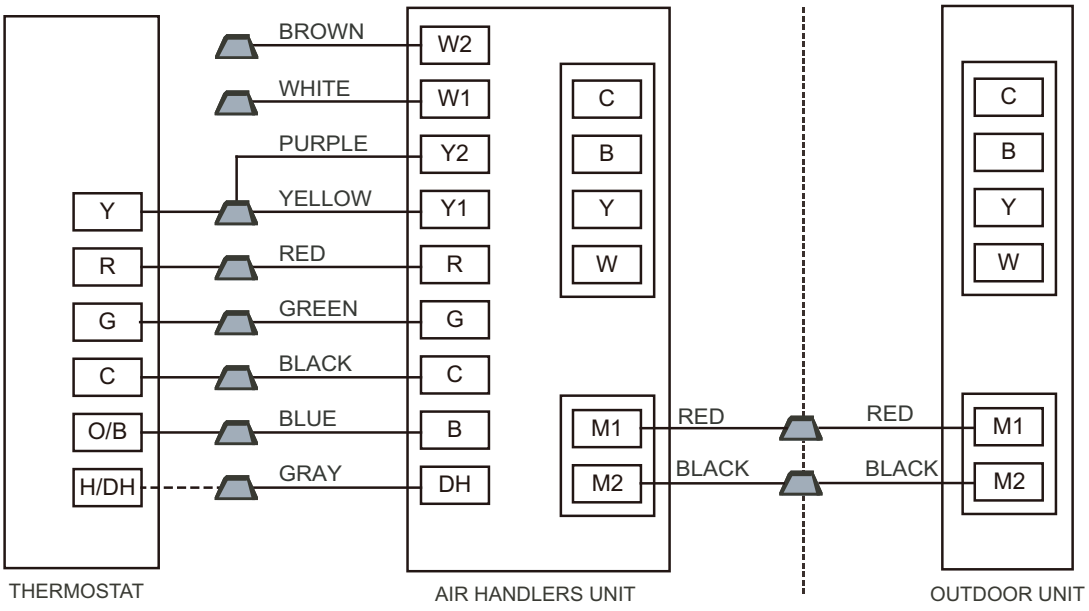
NOTE: Any time the electric heat elements are active, the indoor fan will run in high stage.

Figure 43 4H and 1C Thermostat Communication Mode Setup



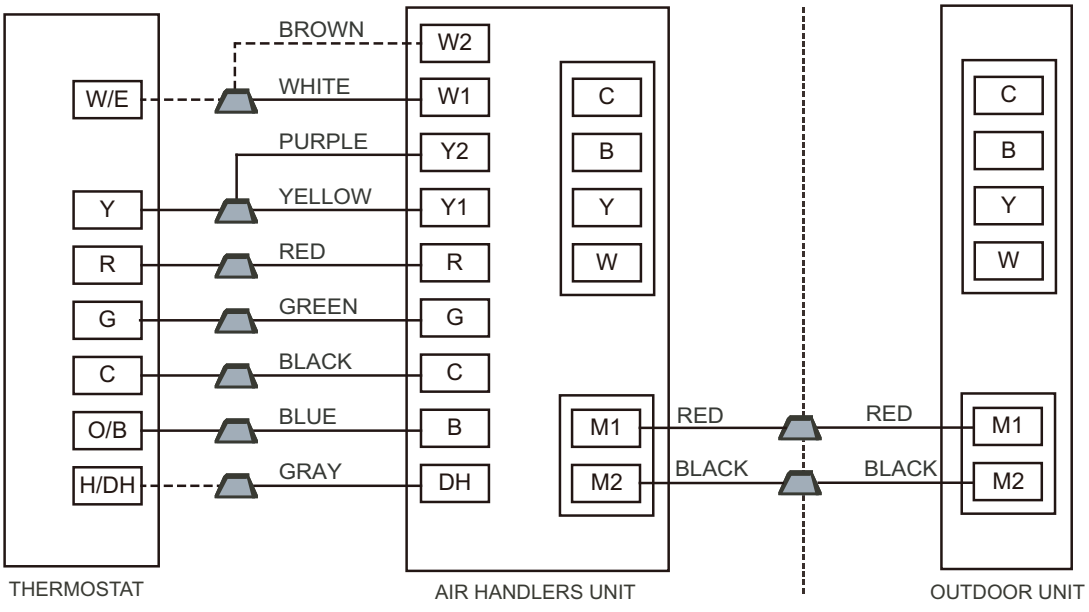
NOTE: Any time the electric heat elements are active, the indoor fan will run in high stage.

Figure 44 2H and 2C Thermostat Communication Mode Setup



NOTE: Any time the electric heat elements are active, the indoor fan will run in high stage.

Figure 45 1H and 1C Thermostat Communication Mode Setup



NOTE: Any time the electric heat elements are active, the indoor fan will run in high stage.

Figure 46 3H and 1C Thermostat Communication Mode Setup

1. Hyper-Link(M1M2) communication supports non-polar communication.

2. If there are 2 or more systems (communication) in the same area, make sure the low voltage wires are connected to the right unit that are connected to the same refrigerant line.

NOTICE

Product damage!

Do not cross-connect Hyper-Link (M1 M2) communication terminal and P Q communication terminal. This can cause damage to the control board. Please see Figure 52 below for reference.

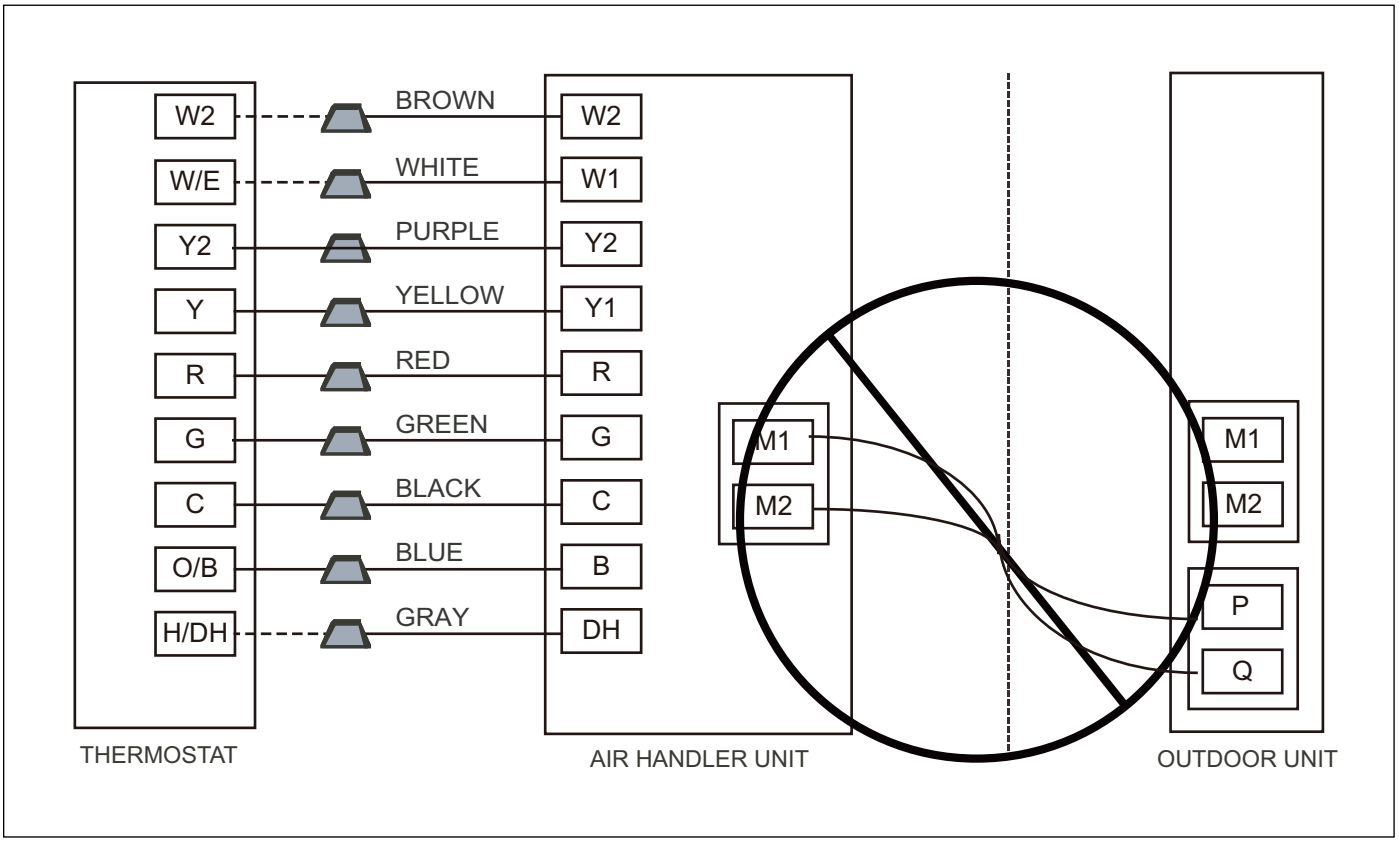


Figure 47

Electric wiring specifications for H/P systems

Model (kBtu/h)		24	36	60
Power	Phase	1	1	1
	Minimum Voltage	198	198	198
	Maximum Voltage	264	264	264
	Frequency (Hz)	60	60	60
Outdoor Unit Power Wire Minimum Size (AWG)		16	14	10
Outdoor - Indoor Unit Communication Wire (M1M2) Minimum Size (AWG)		18	18	18
Outdoor - Indoor Unit Non Communicating Wire (24VAC) Minimum Size (AWG)		18	18	18

Table 21

15 Electrical - High Voltage

15.1 High Voltage Power Supply

WARNING

Risk of electric shock!

During installation, testing, servicing, and trouble shooting of this product, it may be necessary to work with live electrical components. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

The high voltage power supply must match the equipment nameplate (208/230V, 1PH, 60Hz).

Power wiring must comply with national, state, and local codes.

Follow instructions on unit wiring diagram located on the inside of the control box access panel and refer to wiring diagram in this IOM.

15.2 High Voltage Disconnect Switch

Install a separate disconnect switch at the outdoor unit.
Field supplied flexible electrical conduit must be used for high voltage wiring.

It is recommended to install a appropriate surge protection device to safeguard the unit and other electrical components in the event of power surge

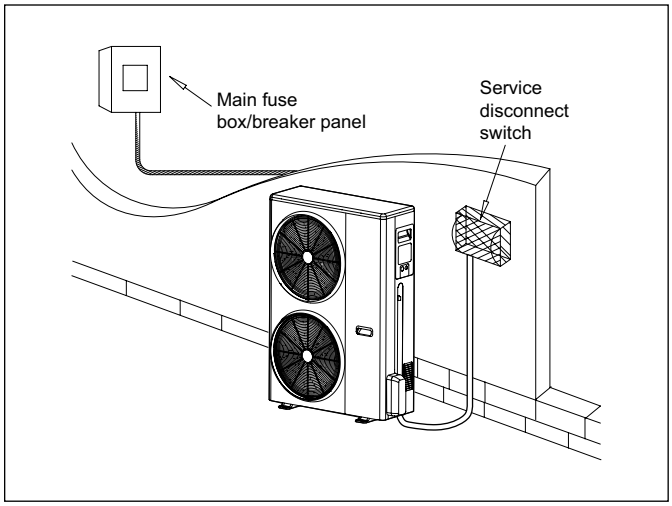


Figure 48 High voltage disconnect switch

15.3 High Voltage Ground

Ground the outdoor unit per national, state, and local code requirements.

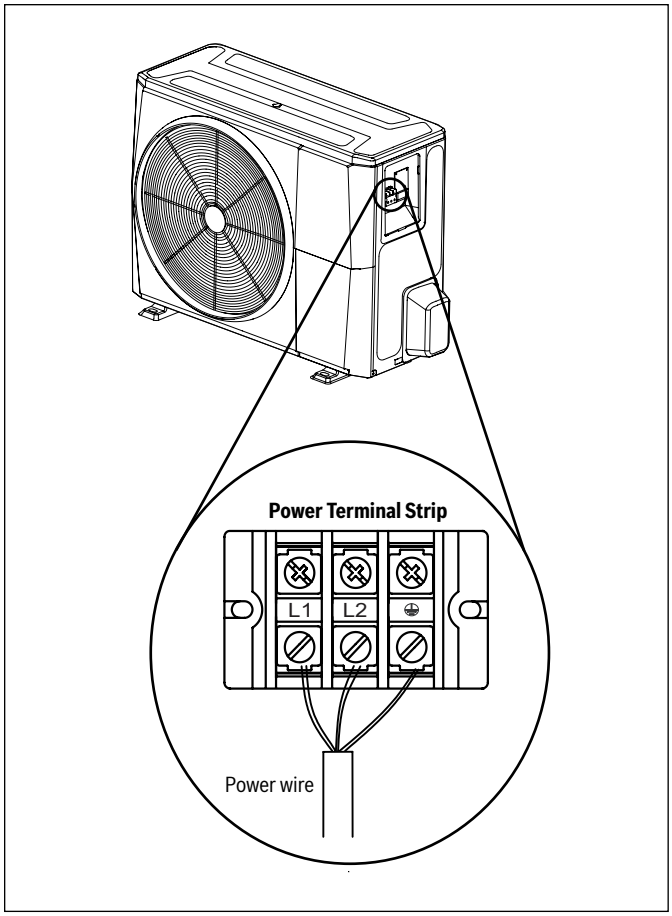


Figure 49 High voltage ground

16 Unit Type Selection

Switch	Setting	Switch positions	Description
ENC1	Model setting		Outdoor unit model setting (Valid at 0-5 ,default is 0) 1 - BOHA-24RTB-M18S 3 - BOHA-36RTB-M18S 5 - BOHA-60RTB-M18S

Table 22

Unit must be power cycled after a DIP switch change for it to take effect.

17 Start Up

17.1 Overview

After installation, and once the field settings have been defined, the installation personnel must verify the correctness of the operations. Follow the steps below to perform the commissioning.

This chapter describes how the test run can be carried out once the installation is complete, and other relevant information. The commissioning usually includes the following stages:

1. Review the "Checklist Before Start Up".
2. Implement the commossioning.
3. Conduct troubleshooting before the commissioning is completed with faults, if necessary.
4. Run the system.

17.2 Checklist Before Start Up

Once this unit is installed, check the following items first. After all following checks have been completed, you must shut down the unit. This is the only way to start the unit again.

Switch	Description
☐	Read the complete installation and operation manual.
☐	Installation: Check that the units are properly installed, to avoid abnormal noises and vibrations when starting up the units.
☐	Compressor and others shipping brackets removed.
☐	'The Piping Length' and 'Additional Refrigerant Charge' are calculated and recorded on the table of the unit.
☐	Be sure that the stop valves are open on both liquid and gas side.
☐	All Controllers installed and all control wiring is installed and properly connected at each terminal block.
☐	All drain piping is connected, including indoor units tie-in, and insulated as required.
☐	Refrigerant lines are completely insulated including flare nut connections at Indoor Units.
☐	All ductwork is connected and air filters installed.
☐	Air inlet/outlet: Check that the air inlet and outlet of the unit is not obstructed by paper sheets, cardboard, or any other material.
☐	Field wiring: Be sure that the field wiring has been carried out according to the instructions described in the manual and according to the applicable legislation.
☐	Earth wiring: Be sure that the earth wires have been connected properly and that the earth terminals are tightened.
☐	Insulation test of the main power circuit: Using a megatester for 500 V, check that the insulation resistance of 2 MΩ or more is attained by applying a voltage of 500 V DC between power terminals and earth. NEVER use the megatester for the communication wiring.
☐	Fuses, circuit breakers, or protection devices: Check that the fuses, circuit breakers, or the locally installed protection devices are of the specified size and type. Do not bypass a fuse and a protection device.
☐	Internal wiring: Visually check the electrical component box and the inside of the unit for loose connections or damaged electrical components.
☐	Components damage: Check for damaged components and extruded piping inside the unit.
☐	Consistency Check between Refrigeration Pipelines and Communication Lines: Check and confirm that the refrigerant piping and communication lines connected to the indoor and outdoor units are belong to the same refrigeration system.
☐	Oil leak: Check if there is oil leaking from the compressor and piping.If there is an oil leak, try to repair the leak. Ifthe repair is not successful, please call the local agent.
☐	Refrigerant leak: Check for refrigerant leaks inside the unit. If there is a refrigerant leak, try to repair the leak. If the repair is not successful, please call the local agent. Do not come into contact with the refrigerant leaking from the refrigerant piping connections. It may cause frostbite.
☐	Flammable refrigerant: If there is a refrigerant leak, keep ventilation to avoid the risk of refrigerant stagnating. If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.
☐	Line Voltage is checked and verified to be within specified range for all system components.
☐	Power the outdoor units 12 hours before operation in order to have power running to the crankcase heater and to protect the compressor.

Table 23

17.3 Commissioning

1. Power on all indoor units and the outdoor unit.
2. If single zone installation that does not use M1M2 communication, the system enters normal standby mode upon power up without further setup required.
3. For multizone systems, enter commissioning mode: When the outdoor unit is first powered on, it displays "- - - -" which means the unit is not commissioned. Press and hold the Down and Up buttons simultaneously for 5 seconds to enter the commissioning mode.
4. Set the indoor unit type (See flow chart on next page)

   The digital display of the outdoor unit displays "01 _0", where 4th digits flashing. The 4th digit represents the type of indoor unit. The initial value is 0 which means indoor unit type is VRF indoor unit or AHU Control Kits. Short press the Down or Up button to change the number.

   Once the number of indoor unit type has been set, short press the OK button to confirm and automatically proceed to the next step.
5. Set the indoor unit amount

   The digital display of the outdoor unit displays "02 __" where 3rd and 4th digits flashing. Short press the Down or Up button to change the indoor unit amount.

   Press OK to confirm. The system will set indoor unit addresses automatically. VRF Indoor Units only.

See Commissioning flow chart on the following page.

This workflow only applies to multizone installations.

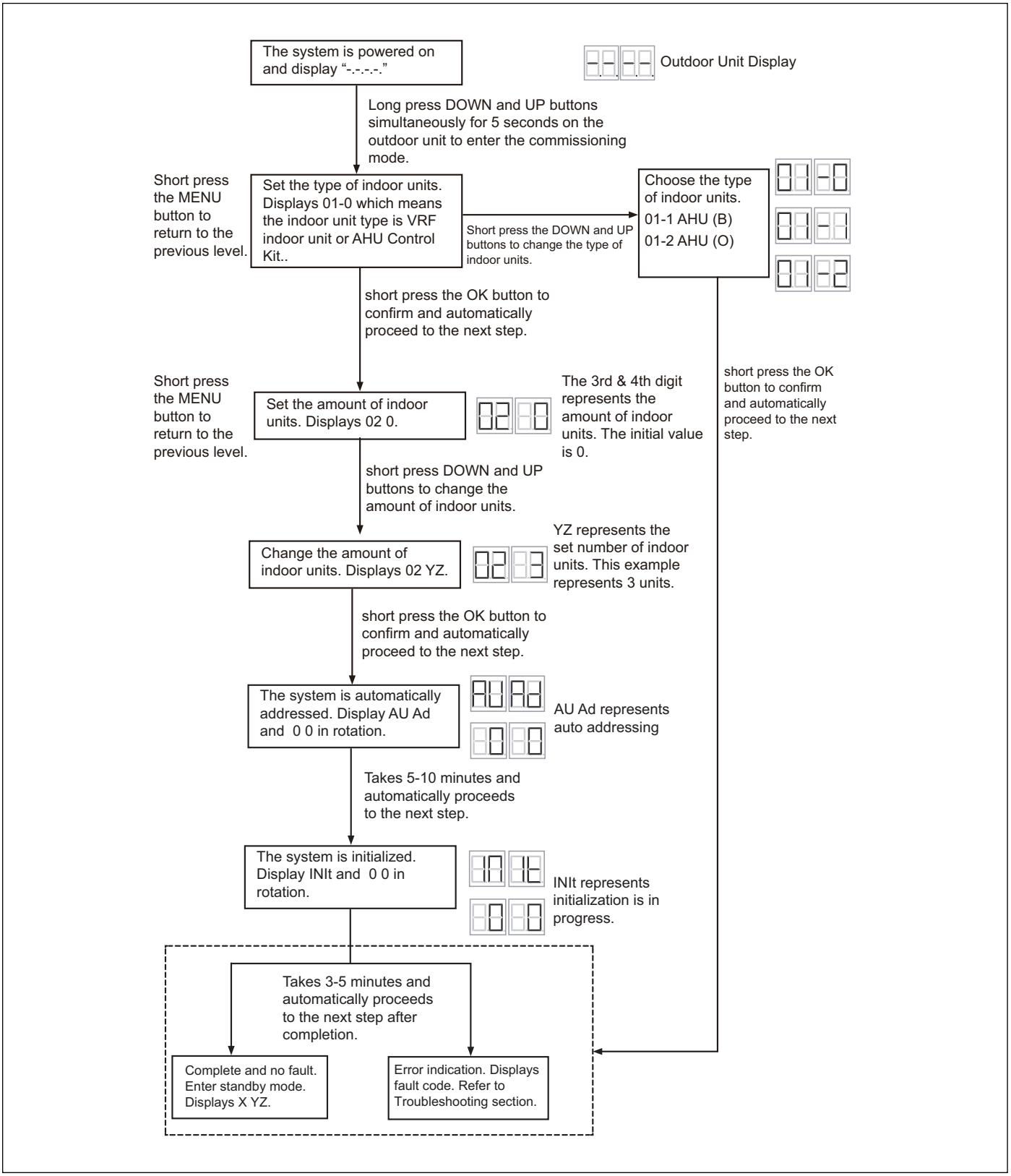


Figure 50

17.4 Rectifications After Commissioning is Completed

The Commissioning is considered complete when there is no error code on the user interface or the outdoor unit display. When an error code is displayed, rectify the operation based on the description in the error code table.

Refer to the installation manual of the indoor unit for details on other error codes related to the indoor unit.

17.5 Operating the Unit

Once the installation of this unit is completed, and the commissioning of the outdoor and indoor units is complete, you can start to run the system.
The indoor unit user interface should be connected to facilitate the operations of the indoor unit. Please refer to the installation manual of the indoor unit for more details.

17.6 Communication with BCC100/BCC110 (Optional)

When using Hyper-Link(M1 M2) communication mode and the system is controlled by a BCC100/BCC110, the homewoner should pair the BCC100/BCC110 with the outdoor unit via the Bosch EasyAir App for optimal system control.

1. Ensure homeowner adds the outdoor unit and the BCC100/BCC110 thermostat to their profile on the Bosch EasyAir App.

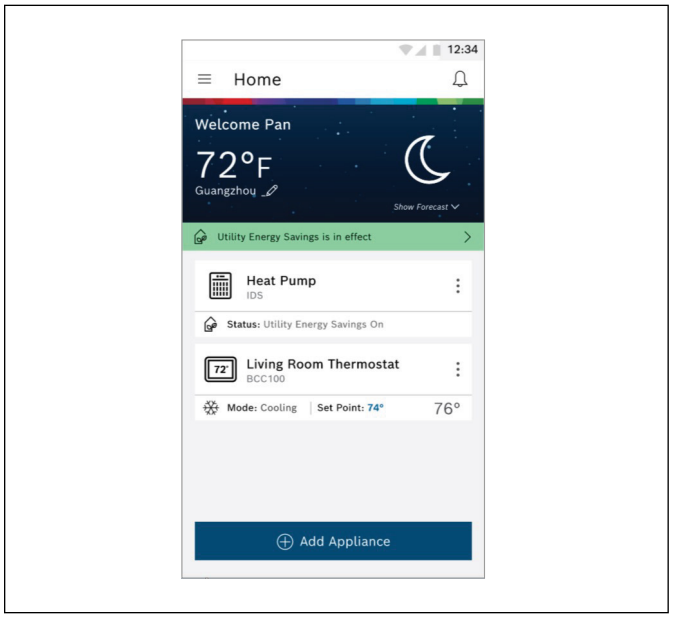


Figure 51

2. Homeowner will find "Appliance Pairing" option in the outdoor unit setting tab.

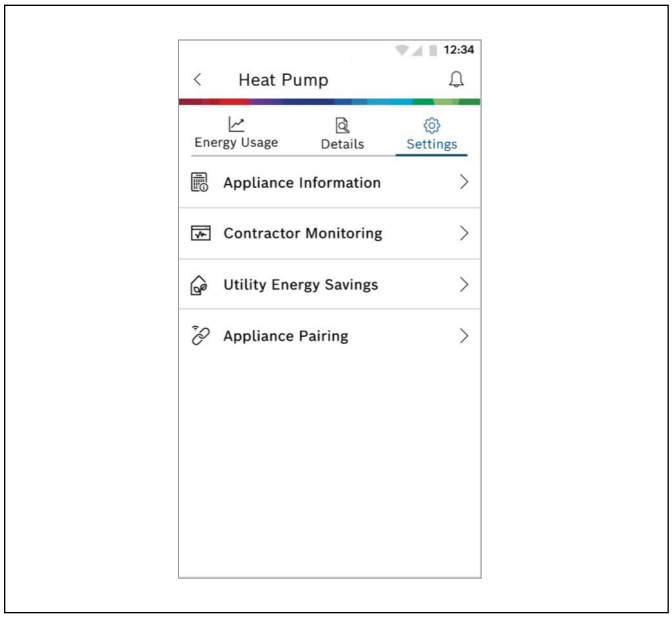


Figure 52

3. Homeowner should click on "Appliance Pairing" and pair the Outdoor Unit with the appropriate BCC100 or BCC110.

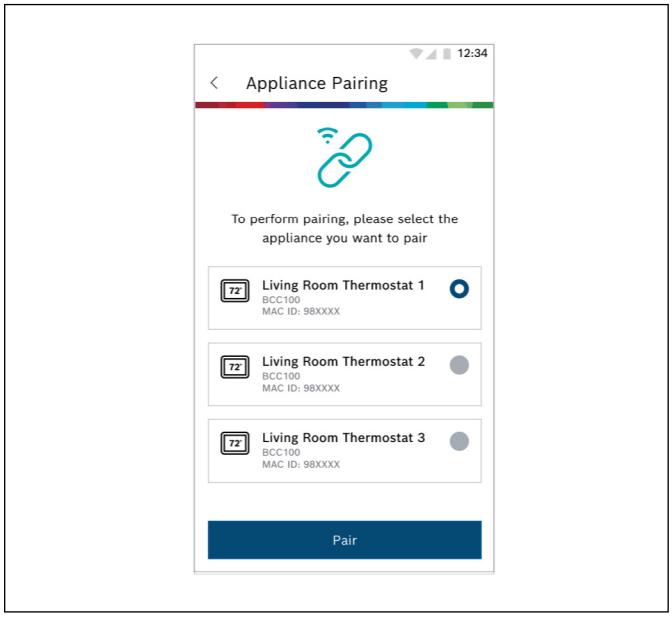


Figure 53

The appropriate thermostat is the one providing the unit with the 24v signals.

For multi-zone applications, multiple thermostats can be paired to the same outdoor unit.

18 System Operation and Troubleshooting

18.1 Control Logic Description

- The variable speed system adopts the same 24VAC control as any conventional heat pump.
- The compressor's speed is controlled based on coil pressures monitored by the unit's pressure transducer. To ensure stable and adequate capacity, the compressor speed will modulate relative to evaporator pressure during cooling operation and relative to condensing pressure during heating operation. The target pressure can automatically adjust based on compressor operation so optimal capacity can be achieved. Target pressure can be manually adjusted (SW4) to achieve improved dehumidification and capacity demands.

18.2 Defrost Description

- The Demand Defrost Control (DDC) monitors the ODU coil temperature using thermistor (T3). A second thermistor (T4) monitors outdoor ambient temperature. Based on these parameters, as well as accumulative run time and high pressure, the DDC calculates proper initiation of defrost.
- Any one of the below three conditions is required to enter defrost:

1. The calculated temperature difference between the outdoor temperature (T4) and the coil temperature (T3) is called Delta T. Defrost is initiated after Delta T is achieved and continues for 3 minutes.
    - T4 ≥ 39°F, Delta T = 18°F
    - T4 ≥ 30°F, Delta T = 16°F
    - T4 ≥ 19°F, Delta T = 14°F
    - When T4 < 19°F, T3 < 9°F, accumulated compressor run time ≥ 95 minutes.
2. After "Minimum Run Time" (MRT) is achieved. MRT is based on outdoor ambient temperature (T4), for example:
    - MRT is 4 hours when: T4 < 23°F
    - MRT is 2 hours when: 23°F ≤ T4 < 42°F
    - MRT is 50 minutes when the previous defrost duration was at least 8 minutes
3. After the high pressure saturation temperature drops below 82°F for 20 minutes and 14°F≤T4<29°F.

- Defrost will terminate once outdoor coil temperature (T3) reaches 64°F for a period of 1 minute or defrost time has exceeded 8 minutes.

Unit must be power cycled after a DIP switch change for it to take effect.

18.3 Compressor Crankcase Heater Description

Refrigerant migration during the OFF cycle can result in noisy start-ups, therefore a CrankCase Heater (CCH) is used to minimize refrigerant migration thereby minimizing start-up noise and/or bearing "wash out". All CCHs must be installed on the lower half of the compressor shell. Its purpose is to warm the compressor during the OFF cycle, driving refrigerant from compressor. After extended shutdown periods in cold weather, it is recommended to allow CCH to be energized for at least 12 hours prior to compressor operation by applying line voltage to heat pump with thermostat OFF.

- CCH operation energizes:
    1. First time line voltage is applied and compressor discharge temperature T5 < 53.6°F.
    2. Compressor stops running for 3 hours (outdoor ambient temperature T4 < 41°F OR compressor discharge temperature T5 < 53.6°F).
- CCH operation de-energizes:
    1. Compressor discharge temperature T5 ≥ 60.8°F.
    2. Compressor start running.

18.4 Reversing Valve Operation

Reversing valve energizes during heat mode and de-energizes in cool mode.

During a heat call on first time operation the unit will run about 1 minute in cooling to build up pressure for reversing valve to change.

18.5 Protection Functions

- Outdoor coil temperature protection (T3)
    i. If T3 > 150.8°F, compressor is de-energized.
    ii. If T3 < 132.8°F, compressor is energized.
- Ambient temperature protection (T4)
    i. If 14°F ≤ T4 < 125°F, unit can operate in cooling.
    ii. If -13°F ≤ T4 < 86°F, unit can operate in heating.
    iii. If T4 < −13°F, heat pump will provide 24V control to indoor unit energizing electric heat (if installed).

See IDS Edge Product Specification for extended performance data.

- Discharge Temperature (DT) protection (T5)
    i. If DT > 230°F during cooling mode, the compressor will stop.
    ii. If DT < 188.6°F during cooling mode, the compressor will restart.
- High Pressure (HP) protection (mechanical open/close pressure switch)
    i. High Pressure Switch opens at P > 580 PSIG, the compressor and outdoor fan stop.
    ii. High Pressure Switch closes at P < 435 PSIG, the compressor and outdoor fan restart.
- Low Pressure (LP) protection
    i. If Low Pressure < 21.8 PSI for 5 minutes during cooling mode, the compressor and outdoor fan will stop.The system will attempt to run again after 6 minutes.
    ii. If Low Pressure < 10.2 psig for 3 seconds during heating mode, the compressor and outdoor fan will stop.
- Low discharge superheat protection
    i. Head discharge superheat HDSH<9°F last 40minutes.

18.6 Digital Display and Button Settings

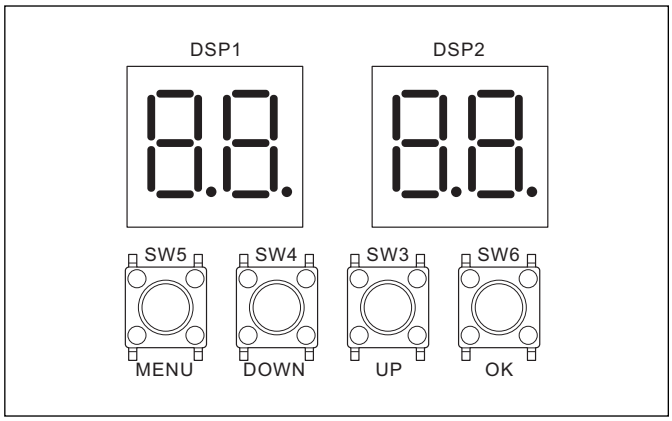


Figure 54

18.6.1 Digital Display Output

Outdoor unit state	Parameters displayed on DSP1	Parameters displayed on DSP2
Standby	Unit's address	The number of indoor units in communication with the outdoor unit
Normal operation	---	Running speed of the compressor in rotations per second
Error or protection	Placeholder and error or protection code	
In menu mode	Display menu mode code	
System check	Display system check code	

Table 24

18.6.2 Function of Buttons SW3 to SW6

Button	Function
SW3 (UP)	In menu mode: previous and next buttons for menu modes.
SW4 (DOWN)	Not in menu mode: previous and next buttons for system check information.
SW5 (MENU)	Enter / exit menu mode.
SW6 (OK)	Confirm to enter specified menu mode.

Table 25

18.6.3 Menu mode

1. Press and hold SW5 “MENU” button for 5 seconds to enter menu mode, and the digital display will display “n1”.
2. Press SW3 / SW4 “UP / DOWN” button to select the first-level menu “n1”, “n2”, “n3”, “n4” or “nb”.
3. Press SW6 “OK” button to enter the specified first-level menu, for example, enter “n4” mode.
4. Press SW3 / SW4 “UP / DOWN” button to select the second-level menu from “n41” to “n47”.
5. Press SW6 “OK” button to enter the specified second-level menu, for example, enter “n43” mode.
6. Press SW3 / SW4 “UP / DOWN” button to select the specified menu mode code.
7. Press SW6 “OK” button to enter specified menu mode.

CAUTION

Risk of electric shock!!

Operate the switches and push buttons with an insulated stick (such as a closed ball-point pen) to avoid touching live parts.

Menu mode selection flowchart:

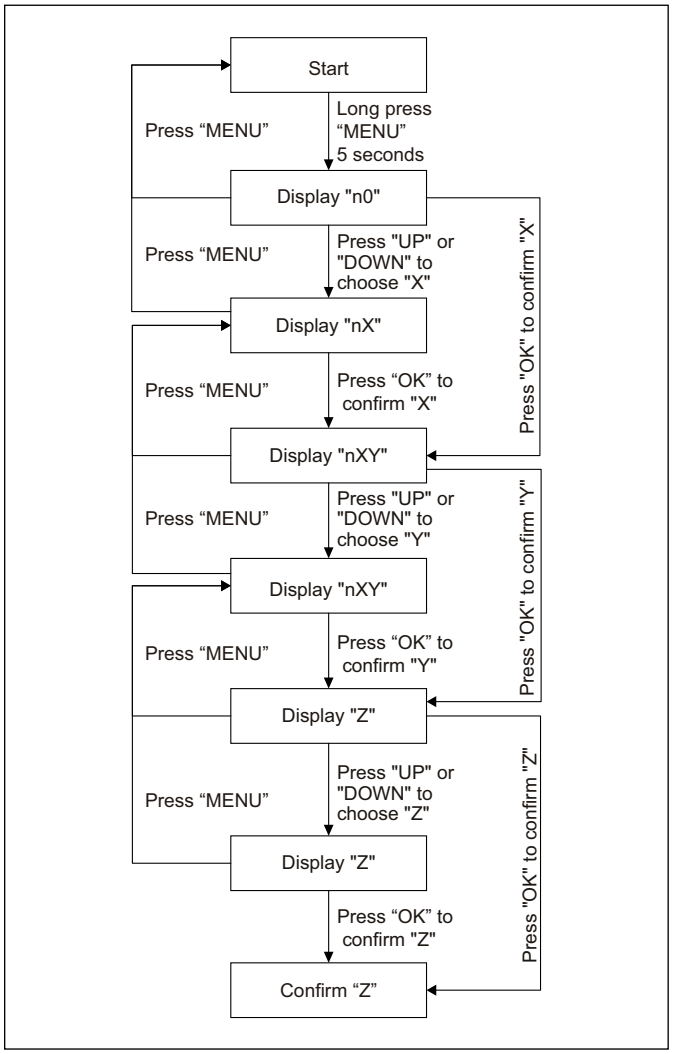


Figure 55

First-level menu	Default	Second-level menu	Specified menu mode	Default
n0	0	0	History error	
		1	Cleaning history error	
	1	0	Query Indoor unit's address	
		2	Query Power OFF Indoor unit's address	
	2	1	Driver's version(compressor and fan displayed in turn)	
n1	1	0	Cooling Test	
		1	Heating Test	
		2	Test running	
	2	0	Refrigerant recovery to outdoor unit	
		1	Refrigerant recovery to indoor unit	
		2	Balance system refrigerant	
	3	0	Manual charge	
	5	-	Vacuum mode	
	6	-	Set No.63 (VIP) indoor unit address	
n2	0	0	Automatic priority mode	
		1	Cooling priority mode	
		2	No.63 (VIP indoor unit)+ voting priority mode	
		3	In response to heating mode only	
		4	In response to cooling mode only	
		5	Heating priority mode	
		6	Change over	
		7	Voting priority mode	
		8	First on priority mode	
		9	Capability requirements priority mode	
	1	0	Non-silent mode	√
		1	Silent mode 1	
		2	Silent mode 2	
		3	Silent mode 3	
		4	Silent mode 4	
		5	Silent mode 5	
	3	40	Power limitation mode, Maximum current = MCA* setting value	
		41		
		~		
		99		
		100		
	4	0	Meta function unavailable	
		1	Meta function available	
	5	0	Celsius unit	
		1	Fahrenheit unit	
	9	Set target ambient temperature (T4 Setpoint) for automatic Priority Mode.		
		0	50	√
		1	60	
		2	70	

Table 26

First-level menu	Default	Second-level menu	Specified menu mode	Default
n3	2	0	0 m level difference between indoor unit and outdoor unit	√
		1	10 m level difference between indoor unit and outdoor unit	
		2	20 m level difference between indoor unit and outdoor unit	
		3	30 m level difference between indoor unit and outdoor unit	
		4	40 m level difference between indoor unit and outdoor unit	
		5	50 m level difference between indoor unit and outdoor unit	
n4	1	-	Network address	
	2	-	Number of indoor units	
	4	0	Auto addressing	
		1	Clear address	
	5	0	V8 communication protocol (RS-485 (P Q) communication)	
		1	Non-V8 communication protocol (RS-485 (P Q E) communication)	
		2	HyperLink (M1 M2) communication -indoor units uniform power supplied	
		3	HyperLink (M1 M2) communication -indoor units separate power supplied	
	6	0	VRF	√
		1	split	
n5	1	0	Sensors backup running unavailable	
		1	Sensors backup running available (Manual)	√
		2	Sensors backup running available (Automatic)	
	2	0	Backup operation time setting (1 day)	
		1	Backup operation time setting (2 day)	
		2	Backup operation time setting (3 day)	
		3	Backup operation time setting (4 day)	
		4	Backup operation time setting (5 day)	
		5	Backup operation time setting (6 day)	
		6	Backup operation time setting (7 day)	√
n6	0	0	Evaporation temperature setting (Ke0 = 3)	
		1	Evaporation temperature setting (Ke0 = 4)	
		2	Evaporation temperature setting (Ke0 = 5)	√
		3	Evaporation temperature setting (Ke0 = 6)	
		4	Evaporation temperature setting (Ke0 = 7)	
		5	Evaporation temperature setting (Ke0 = 8)	
		6	Evaporation temperature setting (Ke0 = 9)	
		7	Evaporation temperature setting (Ke0 = 10)	
		8	Evaporation temperature setting (Ke0 = 11)	
	2	0	Condensation temperature setting (Kc0 = 41)	
		1	Condensation temperature setting (Kc0 = 42)	
		2	Condensation temperature setting (Kc0 = 43)	
		3	Condensation temperature setting (Kc0 = 44)	
		4	Condensation temperature setting (Kc0 = 45)	
		5	Condensation temperature setting (Kc0 = 46)	√
		6	Condensation temperature setting (Kc0 = 48)	
		7	Condensation temperature setting (Kc0 = 51)	

Table 27

First-level menu	Default	Second-level menu	Specified menu mode	Default
n8	b	0	No compressor lockout temperature	√
		1	7 ℉ (- 14 ℃)compressor lockout temperature	
		2	10 ℉ (- 12 ℃)compressor lockout temperature	
		3	16 ℉ (- 9 ℃)compressor lockout temperature	
		4	19 ℉ (- 7 ℃)compressor lockout temperature	
		5	25 ℉ (- 4 ℃)compressor lockout temperature	
		6	30 ℉ (- 1 ℃)compressor lockout temperature	
		7	36 ℉ (2 ℃)compressor lockout temperature	
		8	36 ℉ (4 ℃)compressor lockout temperature	
		9	45 ℉ (7 ℃)compressor lockout temperature	
		10	50 ℉ (10 ℃)compressor lockout temperature	
		11	55 ℉ (13 ℃)compressor lockout temperature	
		12	61 ℉ (16 ℃)compressor lockout temperature	
		13	64 ℉ (18 ℃)compressor lockout temperature	
		14	70 ℉ (21 ℃)compressor lockout temperature	
		15	75 ℉ (24 ℃)compressor lockout temperature	
		16	81 ℉ (27 ℃)compressor lockout temperature	
n9	4	0	Forced Defrost	
		1	Forced Oil Return	
nc	7	0	Non-stop compressor defrosting	
		1	Stop compressor defrosting	
	9	0	Self-cleaning unavailable	
		1	Self-cleaning available	
	4	0	Force defrosting	
		1	Force oil retum	
	5	-	Release central controller emergency stop	
	7	0	Digital electricity meter	
		1	Pulse electricity meter	
	0	0	Dry contact 1 function selection (Cooling only)	
		1	Dry contact 1 function selection (Heating only)	
		2	Dry contact 1 function selection (Force incapacity requirements)	
		3	Dry contact 1 function selection (Force stop)	√
	1	0	Dry contact 2 function selection (Cooling only)	
		1	Dry contact 2 function selection (Heating only)	
		2	Dry contact 2 function selection (Force incapacity requirements)	
		3	Dry contact 2 function selection (Force stop)	√
	2	0	Dry contact 3 function selection (Operation signal)	
		1	Dry contact 3 function selection (Alarm signal)	√
		2	Dry contact 3 function selection (Compressor running signal)	
		3	Dry contact 3 function selection (Defrosting signal)	
		4	Dry contact 3 function selection (Refrigerant leakage signal)	

Table 28

18.7 Display Function

Before pressing the UP or DOWN button, allow the system to operate steadily for more than an hour. On pressing the UP or DOWN button, the parameters listed in the following table will be displayed in sequence.

Disp.	Content	Description
--	Stand by (Outdoor unit address + indoor unit quantity)/frequency/special status	
0	Outdoor unit address	0
1	Outdoor unit capacity	Unit: Ton
2	Quantity of ODU	1
3	Quantity of indoor units	1 - 9
4	Total capacity of IDUs	Unit: Ton
5	Target frequency of outdoor unit	Displacement frequency (1)
6	Target frequency of system	Displacement frequency (1)*10
7	Actual frequency of compressor	Actual frequency
8	--	Reserved
9	Operating mode	0: OFF; 2: Cooling; 3: Heating
10	Fan 1 Speed	Unit: RPM
11	Fan 2 Speed	Unit: RPM
12	T2 (Indoor unit coil temp sensor average)	Actual temperature=DISP. Unit: °F
13	T2B (Indoor unit coil outlet temp sensor average)	Actual temperature=DISP. Unit: °F
14	T3 (Outdoor unit coil temperature sensor)	Actual temperature=DISP. Unit: °F
15	T4 (Ambient temperature sensor)	Actual temperature=DISP. Unit: °F
16	T5 (Liquid pipe temperature sensor)	Actual temperature=DISP. Unit: °F
17	T3B (Outdoor unit coil temperature sensor 2)	Actual temperature=DISP. Unit: °F
18	T10 (Ambient temperature sensor 2)	Actual temperature=DISP. Unit: °F
19	T7C1 (Discharge temperature sensor 1)	Actual temperature=DISP. Unit: °F
20	--	Reserved
21	--	Reserved
22	--	Reserved
23	--	Reserved
24	NTC	Actual temperature=DISP. Unit: °F
25	Tg (Suction temperature sensor)	Actual temperature=DISP. Unit: °F
26	TL (Outdoor unit coil outlet temperature sensor)	Actual temperature=DISP. Unit: °F
27	Discharge superheat degree	Actual temperature=DISP. Unit: °F
28	Primary current	
29	Inverter compressor current	Actual current=DISP./10 Unit: A
30	--	Reserved
31	EEVA position	Actual Value DISP. *24
32	--	Reserved
33	--	Reserved
34	--	Reserved
35	High pressure of unit	Actual pressure DISP. /100Unit: Mpa
36	Low pressure of unit	Actual pressure DISP. /100Unit: Mpa
37	Quantity of online indoor units	Actual quantity
38	Quantity of running indoor units	Actual quantity
39	Heat exchanger status	[0] OFF [1] C1: Condenser [2] D1: Reserved [3] D2: Reserved [4] E1: Evaporator [5] F1: Reserved [6] F2: Reserved

Table 29

Disp.	Content	Description
40	Special mode	[0] Not in special mode [1] Oil return [2] Defrost [3] Startup [4] Stop [5] Quick check [6] Self clean
41	Silent mode setting	0 ~ 5, 5 represents the most silent
42	--	Reserved
43	Evaporating sensor temperature	Actual temperature=DISP. Unit: °F
44	Condensing sensor temperature	Actual temperature=DISP. Unit: °F
45	DC Voltage	Actual voltage Unit: V
46	AC Voltage	Actual voltage Unit: V
47	Quantity of indoor units in cooling mode	
48	Quantity of indoor units in heating mode	
49	Capacity of indoor units in cooling mode	
50	Capacity of indoor units in heating mode	
51	Refrigerant volume	[0]: No result [1]: Critically insufficient [2]: Significantly insufficient [3]: Normal [4]: Slightly excessive [5]: Significantly excessive 0 ~ 10,
52	Dirty blockage rate	0 ~ 10, 10 represents the worst
53	Last error code	Fan error code
54	Software version	
55	Last error code	Error code
56	System Set	[0]: VRF [1]: Split
57	--	Reserved
58	--	Reserved
59	--	Reserved

Table 30

*(1) Need to convert to current compressor output volume. For 1.5/2.0 ton: compressor output volume is 24, Target frequency = Actual frequency * 24 / 60; for 2.5-5.0 ton: compressor output volume is 42, Target frequency = Actual frequency * 42 / 60.*

NOTICE

Product damage!

Heat up the unit for 12 hours after turning on the power switch. Do not turn off the power supply if the unit is designed to stop within 24 hours or less. (This is for heating up the crankshaft heating box and avoiding forced starting of the compressor.)

Do not block the air inlet and outlet.

Blockage may reduce the unit efficiency or activate the protector to shut down the unit.

WARNING

Risk of electric shock!

Operate the switch and button with an insulation rod (such as a ball pen with a cap) to avoid the contact with energized parts.

19 Troubleshooting

19.1 Error Code: Overview

If an error code is displayed on the controller, contact the installation personnel and inform them of the error code, unit model, and serial number (you can find the information on the nameplate of Unit).

Error code	Error description	Manual re-start required?
A01	Emergency stop	NO
A11	Indoor unit refrigerant leakage	YES
Ad1	Refrigerant shut-off device error	NO
C21	Communication error between indoor and outdoor unit	NO
C26	Number of indoor units detected by the outdoor unit has decreased	NO
C28	Number of indoor units detected by the outdoor unit has increased	NO
C2A	Communication error between outdoor unit and refrigerant shut-off device	NO
1C41	Communication error between main control chip and inverter driver chip	NO
E41	Outdoor ambient temperature sensor (T4) error (open/short)	NO
EC1	Refrigerant leakage sensor error	NO
F31	Plate heat exchanger outlet temperature sensor (T6B) error (open/short)	NO
F41	Outdoor heat exchanger temperature sensor (T3) error (open/short)	NO
F62	Inverter module temperature (Tf) protection	NO
F63	Non-inductance resistor temperature (Tr) protection	NO
F6A	F62 protection occurs 3 times in 100 minutes	YES
F71	Discharge temperature sensor (T7C) error (open/short)	YES
F72	Discharge temperature (T7C) protection	NO
F75	Compressor discharge insufficient superheat protection	NO
F7A	F72 protection occurs 3 times in 100 minutes	YES
F91	Liquid pipe temperature sensor (T5) error (open/short)	NO
FA1	Outdoor heat exchanger inlet temperature sensor (T8) error (open/short)	NO
FC1	Outdoor heat exchanger outlet temperature sensor (TL) error (open/short)	NO
Fd1	Compressor suction temperature sensor (T7) error (open/short)	NO
1L--	Compressor error	YES
1L01	1L1* error occurs 3 times in 60 minutes	YES
1J--	Fan motor error	YES
1J01	1J1* error occurs 10 times in 60 minutes	YES
P11	High pressure sensor error	NO
P12	Discharge pipe high pressure protection	NO
P13	Discharge pipe high pressure switch protection	NO
P21	Low pressure sensor error	YES
P22	Suction pipe low pressure protection	NO
P24	Suction pipe low pressure abnormal rise	NO
P25	P22 error occurs 3 times in 100 minutes	YES
1P32	Compressor high DC bus current protection	NO
1P33	1P32 protection occurs 3 times in 100 minutes	YES

Table 31 Error codes of outdoor unit

Error code	Error description	Manual re-start required?
P51	High AC voltage protection	NO
P52	Low AC voltage protection	NO
P53	Power supply BN connect protection, or the phase is missing, or unbalanced when powered on	YES
P54	DC bus low voltage protection	NO
P55	DC bus ripple wave protection, or the phase is missing, or unbalanced when powered on	YES
1P56	Inverter module DC bus low voltage error	YES
1P57	Inverter module DC bus high voltage error	YES
1P58	Inverter module DC bus seriously high voltage error	YES
1P59	Inverter module busbar voltage drop protection	YES
P71	EEPROM error	YES
P91	PFC feedback resistance failure protection	YES
Pb1	HyperLink overcurrent error	NO
1b01	Electronic expansion valve (EEVA) error	YES
4b01	Electronic expansion valve (EEVD) error	YES

Table 32 Error codes of outdoor unit continued

Error code	Error description	Manual re-start required?
U02	Technology barrier	NO
U11	Unit type is not set	YES
U12	Capacity setting error	YES
U21	Indoor unit with old platform in the system	YES
U31	The test run is not performed or was not successful	YES
U32	The test run is not performed or was not successful	YES
U33	Indoor temperature out of operating range	YES
U34	Outdoor and indoor temperature out of operating range	YES
U35	Liquid side stop valve is not opened	YES
U37	Gas side stop valve is not opened	YES
U38	No address	YES
U3A	The communication cable is connected incorrectly	NO
U3b	The installation environment is abnormal	YES
U3C	Auto mode error	NO
U41	Common indoor unit exceeds the allowable connection range	YES

Table 33 Installation and debugging error codes

Error code	Error description	Manual re-start required?
1L1E	Hardware overcurrent	NO
1L11	Software overcurrent	NO
1L12	Software overcurrent protection last 30s	NO
1L2E	Inverter module high temperature protection	NO
1L3E	Low bus voltage error	NO
1L31	High bus voltage error	NO
1L32	Serious over voltage error of bus	NO
1L43	Abnormal current sampling	NO
1L45	Motor code mismatch	YES
1L46	IPM protection	NO
1L47	Module type mismatch	YES
1L5E	Startup failed	NO
1L51	Stall failure	NO
1L52	No load protection	NO
1L6E	Motor phase loss protection	NO
1LbE	High voltage switch action	NO
1Lb7	Other check exceptions/908 diagnosis error	NO

Table 34 Compressor driver error codes

Error code	Error description	Manual re-start required?
1J1E	Hardware overcurrent	NO
1J11	Software overcurrent	NO
1J12	Software overcurrent protection in last 30s	NO
1J2E	Inverter module high temperature protection	NO
1J3E	Low bus voltage error	NO
1J31	High bus voltage error	NO
1J32	Serious over voltage error of bus	NO
1J43	Abnormal current sampling	NO
1J5E	Startup failed	NO
1J51	Stall failure	NO
1J52	No load protection	NO
1J6E	Motor phase loss protection	NO

Table 35 Fan motor error codes

Error code	Error description	Manual re-start required?
d0x	Oil return running, x represents oil return operation steps	NO
dfx	Defrost running, x represents defrosting operation steps	NO
d11	Outdoor ambient temperature exceeds the upper limit in Heating mode	NO
d12	Outdoor ambient temperature exceeds the lower limit in Heating mode	NO
d13	Outdoor ambient temperature exceeds the upper limit in Cooling mode	NO
d14	Outdoor ambient temperature exceeds the lower limit in Cooling mode	NO
d31	Refrigerant judgment, no result	NO
d32	Refrigerant quantity judgment, Significantly excessive	NO
d33	Refrigerant quantity judgment, Slightly excessive	NO
d34	Refrigerant quantity judgment, normal	NO
d35	Refrigerant quantity judgment, Slightly insufficient	NO
d36	Refrigerant quantity judgment, Significantly insufficient	NO
d41	There is a no power indoor unit in the system, HyperLink is controlling the indoor unit's valve	NO

Table 36 Status codes

19.2 System Parameter Check

19.2.1 UP / Down System Check Button

Before pressing UP or DOWN button, allow the system to operate steadily for more than an hour. On pressing UP or DOWN button, the parameters listed in below table will be displayed in sequence.

Disp.	Content	Description
--	"Standby (ODU address+ IDU quantity)/frequency/special status"	
0	ODU address	0
1	ODU capacity	Unit: Ton
2	Quantity of ODU	1
3	Quantity of IDUs	1~9
4	Reserved	
5	Target frequency of ODU	Displacement frequency (1)
6	Reserved	
7	Actual frequency of compressor	Actual frequency
8	Reserved	
9	Operating mode	0: OFF
		2: Cooling
		3: Heating
10	Fan1 speed	Unit: RPM
11	Fan2 speed	Unit: RPM
12	T2 Average	Actual temperature=DISP. Unit: °C
13	T2B Average	Actual temperature=DISP. Unit: °C
14	T3	Actual temperature=DISP. Unit: °C
15	T4	Actual temperature=DISP. Unit: °C
16	T5	Actual temperature=DISP. Unit: °C
17	T3B/TL	Actual temperature=DISP. Unit: °C
18	T10	Actual temperature=DISP. Unit: °C
19	T7C1	Actual temperature=DISP. Unit: °C
20	Reserved	
21	Reserved	
22	Reserved	
23	Reserved	Actual temperature=DISP. Unit: °C
24	Ntc	Actual temperature=DISP. Unit: °C
25	Tg	Actual temperature=DISP. Unit: °C
26	Reserved	
27	Discharge superheat degree	Actual temperature=DISP. Unit: °C
28	Primary current	Actual current=DISP./10 Unit: A
29	Inverter compressor current	Actual current=DISP./10 Unit: A
30	Reserved	
31	EEVA position	Actual Value=DISP. *24
32	Reserved	
33	Reserved	

Table 37 System check list

Disp.	Content	Description
34	EEVD position	Actual Value=DISP. *4
35	High pressure of unit	Actual Pressure=DISP. /100 Unit: MPa
36	Low pressure of unit	Actual Pressure=DISP. /100 Unit: MPa
37	Quantity of online IDUs	Actual quantity
38	Quantity of running IDUs	Actual quantity
39	Heat exchanger status	[0] OFF
		[1] C1: Condenser
		[2] D1: Reserved
		[3] D2: Reserved
		[4] E1: Evaporator
		[5] F1: Reserved
		[6] F2: Reserved
40	Special mode	[0] Not in special mode
		[1] Oil return
		[2] Defrost
		[3] Startup
		[4] Stop
		[5] Quick check
		[6] Reserved
41	Silent mode	1-5
42	Reserved	
43	TES	Actual temperature=DISP. Unit: ℃
44	TCS	Actual temperature=DISP. Unit: ℃
45	DC Voltage	Actual voltage. Unit: V
46	AC Voltage	Actual voltage. Unit: V
47	Quantity of cooling mode IDUs	
48	Quantity of heating mode IDUs	
49	Capacity of cooling mode IDUs	
50	Capacity of heating mode IDUs	
51	Reserved	
52	Reserved	
53	Fan error	
54	Software version	
55	Last error code	Service code
56	VRF/Unitary	0: VRF 1: Unitary
57	Reserved	
58	Reserved	
59	Reserved	

Table 38

Notes:

*(1) Need to convert to current compressor output volume, example: compressor output volume is 70, Target frequency =Actual frequency * 70 / 60.*

(2) Te: Low pressure equivalent saturation temperature (℃) Tes: Target Te value.
Tc: High pressure equivalent saturation temperature (℃) Tcs: Target Tc value.

19.3 Outdoor Unit Main Control Board

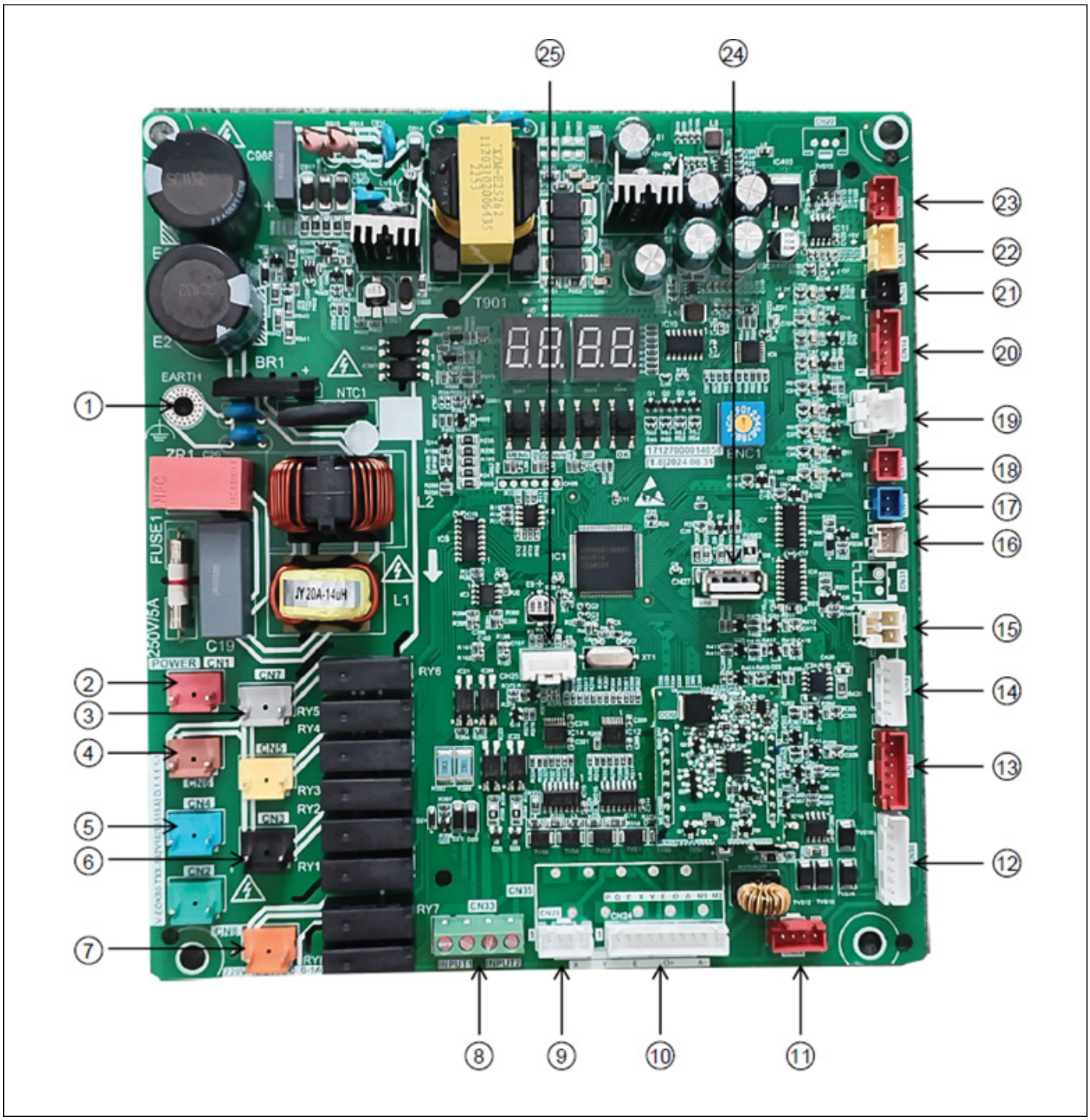


Figure 56

Item	Port code	Content	Port voltage
1	EARTH	Earth	0VDC
2	CN1	Power input	220VAC
3	CN7	HEAT: Compressor crankcase heater	220VAC
4	CN6	HEATB: Chassis electric heating belt	220VAC
5	CN4	ST1: Four-way valve	220VAC
6	CN3	SV4: Solenoid valve (Only for 2.5/3Ton and 4/5Ton)	220VAC
7	CN8	DCO: Dry contact output (Passive)	Passive
8	CN33	DCI 1&2: Dry contact input 1&2	SVDC
9	CN29	Conventional 24VAC non-communicating control signal	24VAC
10	CN24	X/Y/E/M1/M2/O/A communication port (From left to right)	5VDC+24VDC
11	CN28	Smart module communication	SVDC
12	CN30	Communication port between the Control Board and the Drive Board	5VDC+12VDC
13	CN10	EEVD: Electronic expansion valve D	12VDC
14	CN9	EEVA: Electronic expansion valve A	12VDC
15	CN32	L-PRO: Low pressure switch	3.3VDC
16	CN15	T3: Heat exchanger temperature sensor	3.3VDC
17	CN16	T4: Outdoor ambient temperature sensor	3.3VDC
18	CN34	TS: Liquid pipe temperature sensor	3.3VDC
19	CN18	T10: Additional ambient temperaturesensor (optional)	3.3VDC
20	CN14	T3B: Heat exchanger middle temperature sensor (Only for 1.S/2Ton) (Down) TL: Heat exchanger liquid temperature sensor (2.S/3Ton and 4/STon) (Down) Tg: Suction temperature sensor (Up)	3.3VDC
21	CN21	T7C1: Discharge temperature sensor	3.3VDC
22	CN12	Pc/Pe: Pressure sensor (Only for 1.5/2Ton) Pc: High pressure sensor (Only for 2.5/3Ton & 4/5Ton)	SVDC
23	CN13	Pe: Low pressure sensor (Only for 2.5/3Ton & 4/5Ton)	SVDC
24	CN27	USB port	SVDC
25	CN25	Debug port	3.3VDC

Table 39 Status codes

19.4 Outdoor Error Code Table

Error code	Error description	Manual re-start required?
A01	Emergency stop	NO
A11	Indoor unit refrigerant leakage	YES
A15	Recover refrigerant after refrigerant leakage and shut down	NO
Ad1	Refrigerant shut-off device error	NO
C21	Communication error between indoor and outdoor unit	NO
C26	Number of indoor units detected by the outdoor unit has decreased	NO
C28	Number of indoor units detected by the outdoor unit has increased	NO
C2A	Communication error between outdoor unit and refrigerant shut-off device	NO
1C41	Communication error between main control chip and inverter driver chip	NO
E41	Outdoor ambient temperature sensor (T4) error (open/short)	NO
EC1	Refrigerant leakage sensor error	NO
F41	Outdoor heat exchanger temperature sensor (T3) error (open/short)	NO
F42	T3 temperature sensor overtemperature protection	NO
F43	T3B temperature sensor error (open/short)	NO
F62	Inverter module overtemperature (Tf) protection	NO
F6A	F62 protection occurs 3 times in 100 minutes	YES
F71	Discharge temperature sensor (T7C1) error (open/short)	YES
F72	Discharge temperature (T7C1) protection	NO
F75	Compressor discharge insufficient superheat protection	NO
F7A	F72 protection occurs 3 times in 100 minutes	YES
F81	Tg temperature sensor error (open/short)	NO
F91	Liquid pipe temperature sensor (T5) error (open/short)	NO
FC1	Outdoor heat exchanger outlet temperature sensor (TL) error (open/short)	NO
FL1	T10 temperature sensor error (open/short)	NO
1L--	Compressor error. Refer to Table 19.3 for indications of "--"	YES
1L01	1L1* error occurs 3 times in 60 minutes. Refer to Table 19-3 for indications of "*"	YES
1J--	Fan motor error. Refer to Table 19-4 for indications of "--"	YES
1J01	1J1* error occurs 10 times in 60 minutes. Refer to Table 19-4 for indications of "*"	YES
1b01	EEVA error	YES
4b01	EEVD error	YES
P11	High pressure sensor error	NO
P12	Discharge pipe high pressure protection	NO
P13	Discharge pipe high pressure switch protection	NO
P14	P12 protection occurs 3 times in 60 minutes	YES
P21	Low pressure sensor error	YES
P22	Suction pipe low pressure protection	NO
P23	Suction pipe low pressure switch protection	NO
P24	Suction pipe low pressure abnormal rise	NO
P25	P22 error occurs 3 times in 100 minutes	YES

Table 40 Outdoor error code table

Error code	Error description	Manual re-start required?
1P32	Compressor high DC bus current protection (software protection)	NO
1P33	1P32 protection occurs 3 times in 100 minutes	YES
P51	High AC voltage protection	NO
P52	Low AC voltage protection	NO
P54	DC bus low voltage protection	NO
1P56	Inverter module DC bus low voltage error	YES
1P57	Inverter module DC bus high voltage error	YES
1P58	Inverter module DC bus seriously high voltage error	YES
1P59	Inverter module busbar voltage drop protection	YES
P71	EEPROM error	YES
P91	PFC feedback resistance failure protection	YES
Pb1	HyperLink overcurrent error	NO
pd1	Anti-condensation protection	NO
pd2	Pd1 protection occurs 2 times in 60 minutes	YES

Table 41 Outdoor error code table (continued)

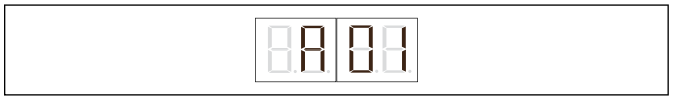
19.5 Error Code Troubleshooting

19.5.1 Errors in Main Control

Error Code:	**A01**: Emergency stop
Description:	The emergency stop signal is detected
Possible Causes:	• Controller send emergency signal to outdoor unit • Defective main board

Table 42

Digital display output



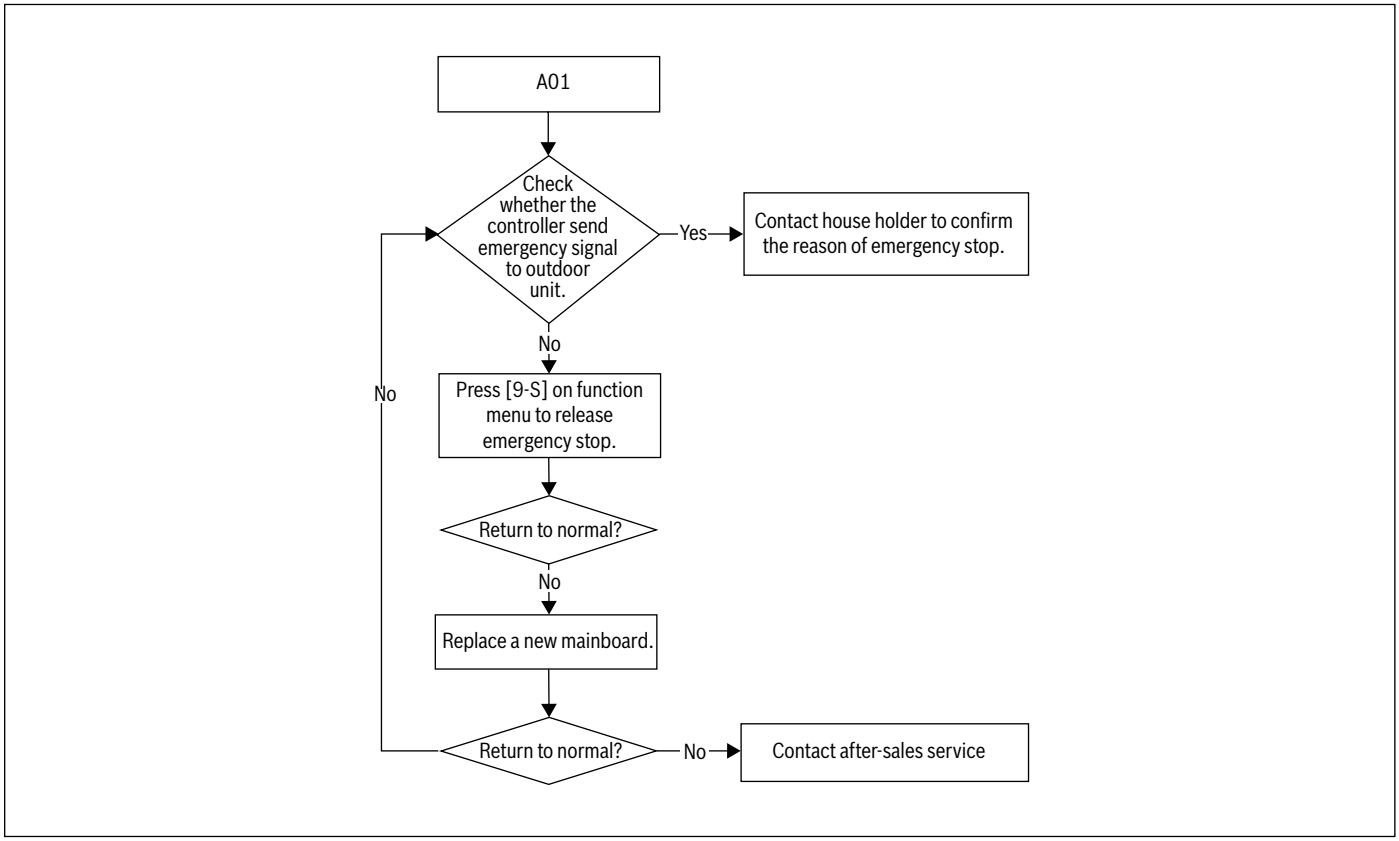


Figure 57

Error Code:	**A11**: Refrigerant leakage error
Description:	• Refrigerant leak detected in some indoor units • The fan of the indoor unit with refrigerant leakage is detected running at the highest air speed and the electronic expansion valve is closed (note: re-powering the unit does not lift the fault), while the buzzer on the display control board of the faulty indoor unit and the buzzer on the line control connected to the faulty indoor unit continuously chirp the alarm.
Possible Causes:	• Indoor unit side R454B refrigerant leak. • If the R454B refrigerant leak detection sensor is found to be damaged or contaminated with external foreign matter (e.g. vapour, oil), then a new sensor is required if the fault cannot be lifted after the sensor is found to be damaged or the contamination is removed. • The main board of the indoor unit is damaged.

Table 43

Digital display output

Note:

Follow the steps below for refrigerant leaks:

1. Use the refrigerant recovery device to recover the residual refrigerant in the unit (when the refrigerant leaks, the refrigerant shut-off device is closed, so it needs to be recovered from the service valve at both the outdoor unit check valve and the refrigerant shut-off device respectively, and at the same time, when recovering the refrigerant, select the menu on the outdoor unit to enter the evacuation mode to ensure clean refrigerant recovery);
2. Locate and repair leaks in pipes in the system;
3. Once the repair is complete, the system piping is tested for airtightness, as described in the piping installation section of the outdoor unit installation instructions. If the airtightness test is passed, proceed to the next step, otherwise repeat the previous repair process until the airtightness is passed;
4. Replace the R454B leak detection sensor on the indoor unit displaying the fault;
5. Re-vacuum and refill the refrigerant according to the installation instructions for the outdoor unit.

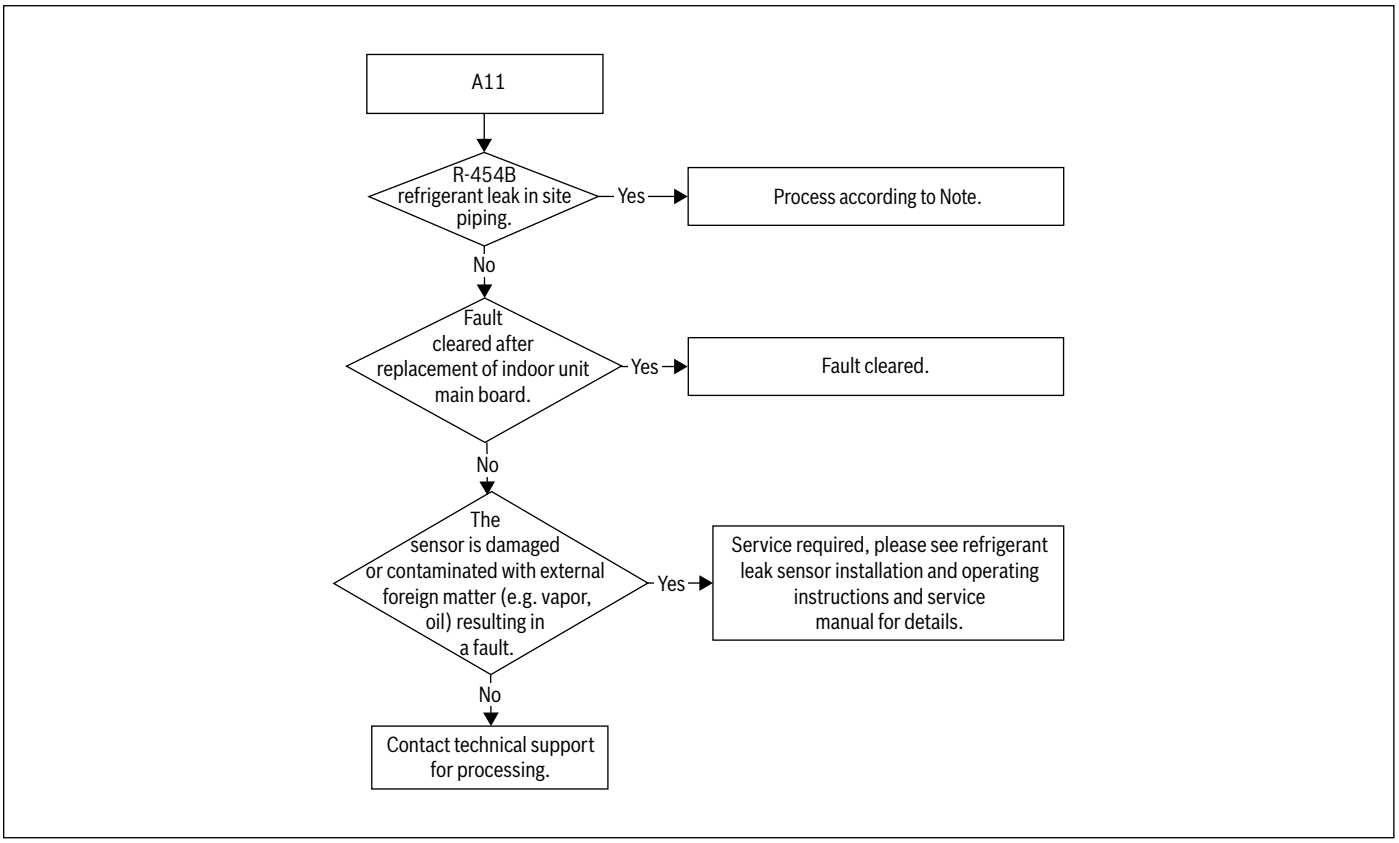


Figure 58

Error Code:	**1b01/4b01:** Electronic expansion valve (EEVA/D) error
Description:	• All units stop running • Error code is displayed on the outdoor unit with the error.
Possible Causes:	• The electronic expansion valve signal was not detected by the mainboard for 2 minutes • Supposed causes: ◦ The electric expansion valve (EEVA/D) winding is disconnected to mainboard ◦ The electric expansion valve (EEVA/D) winding is mismatching ◦ Defective electric expansion valve (EEVA/D) winding ◦ Defective mainboard

Table 44

Notes:

1. Refer to key components and parts type in Appendix

Digital display output

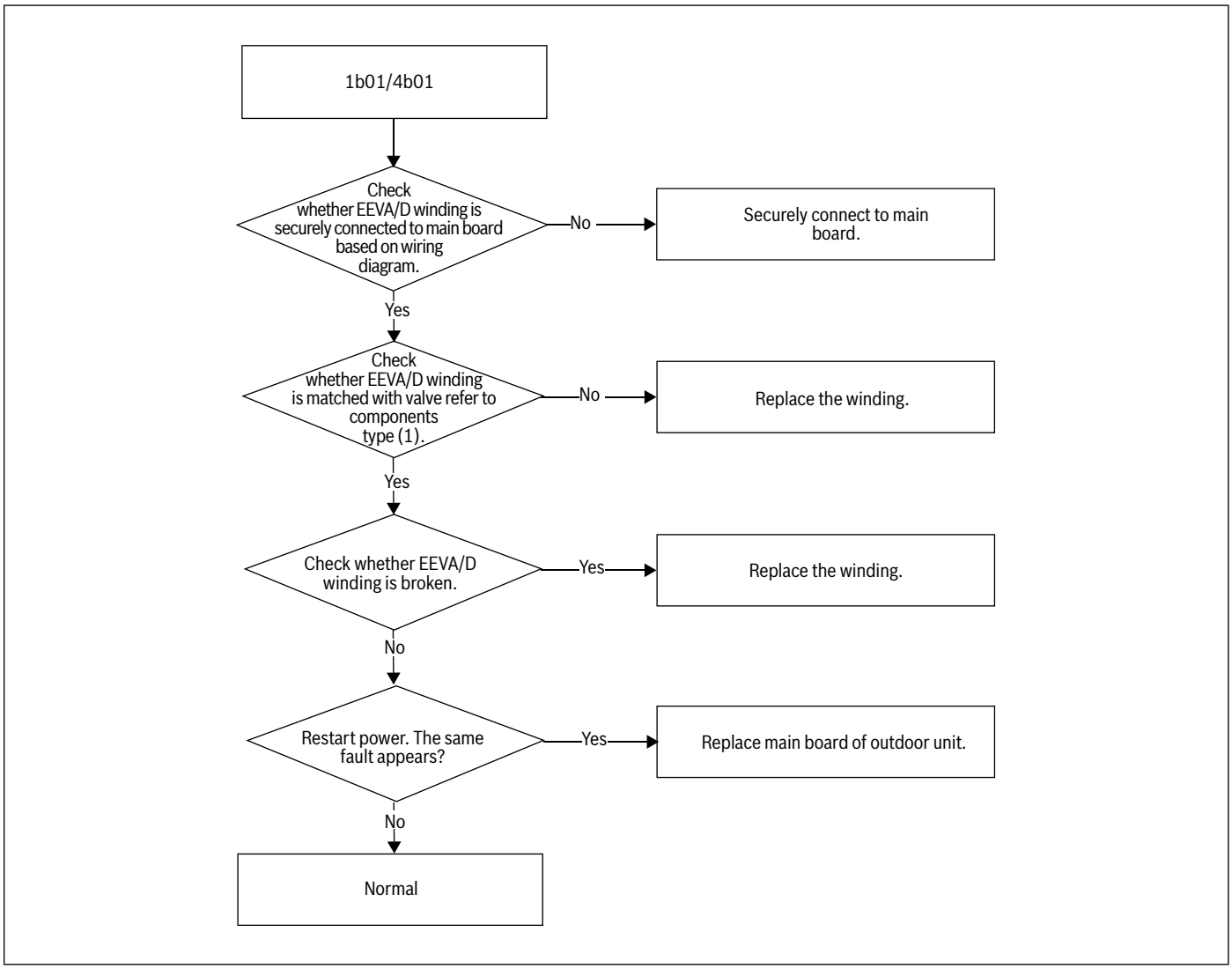


Figure 59

Error Code:	**C21:** Communication error between indoor units and outdoor unit
Description:	• Communication error between IDU and ODU • All units stop running. • Error code is only displayed on the outdoor unit.
Possible Causes:	• Communication cables between ODU and IDUs are unstably or wrongly connected, or in short circuit. • Communication cables between communication board and main board are unstably or wrongly connected, or in short circuit. • Abnormal power supply for all IDUs • Damaged main board or communication board • Too long communication wiring (Over 3937ft.) • External cause (e.g. electromagnetic interference)

Table 45

Digital display output

Note:

1. Make sure that the matched resistance has been connected in the last indoor unit.

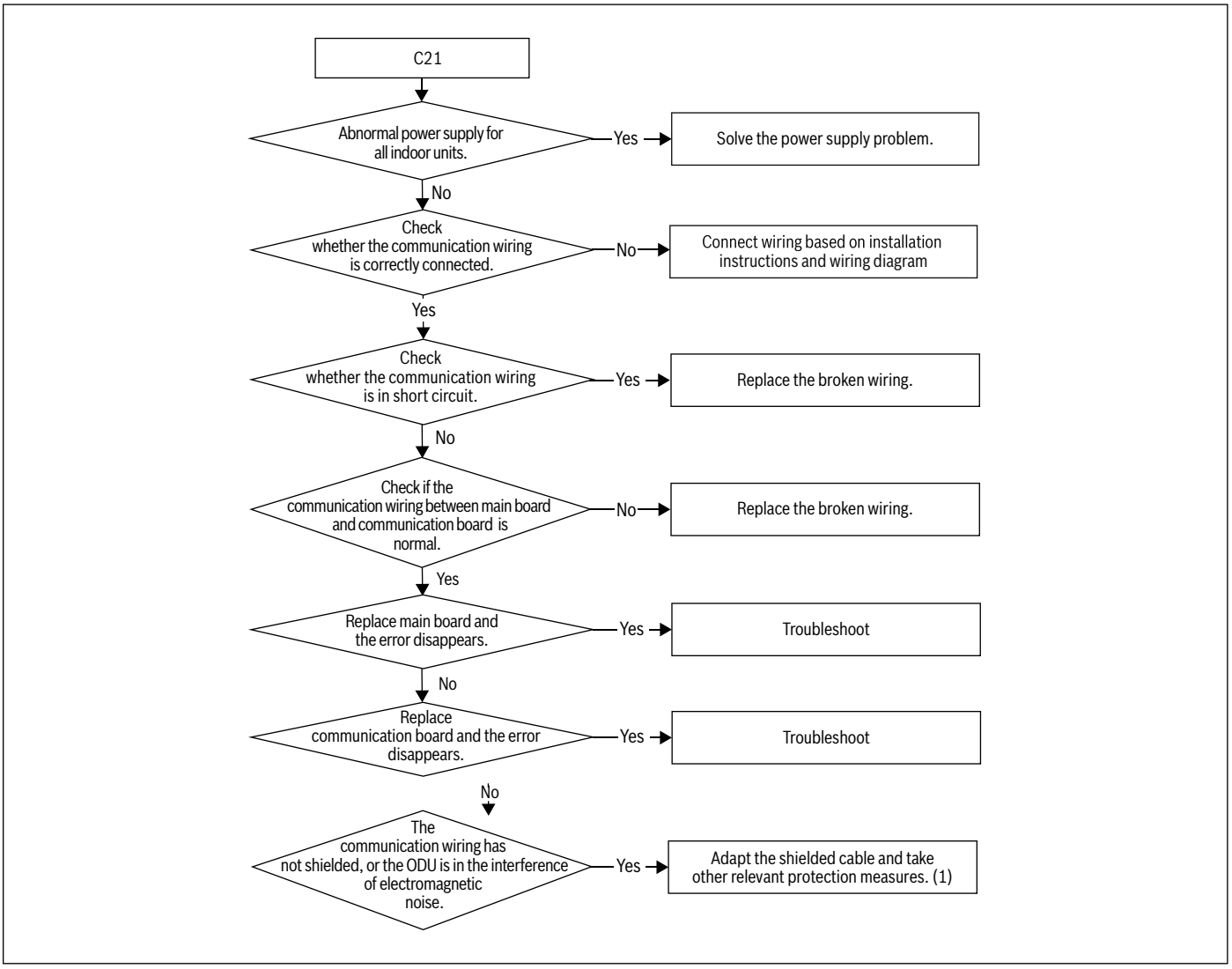


Figure 60

Error Code:	**C26/C28:** Number of indoor units detected by the outdoor unit has decreased/increased
Description:	• The number of online indoor units is smaller/greater than the configured number • All units stop running. • Error code is only displayed on the outdoor unit
Possible Causes:	• Repetitive addresses are exist for the IDUs in the refrigerant system • Power supply abnormal for some IDUs • Communication cable from some IDUs to ODU is improperly connected or in short circuit. • Defective main board to individual IDU • Defective ODU mainboard • Defective ODU communication board

Table 46

Digital display output

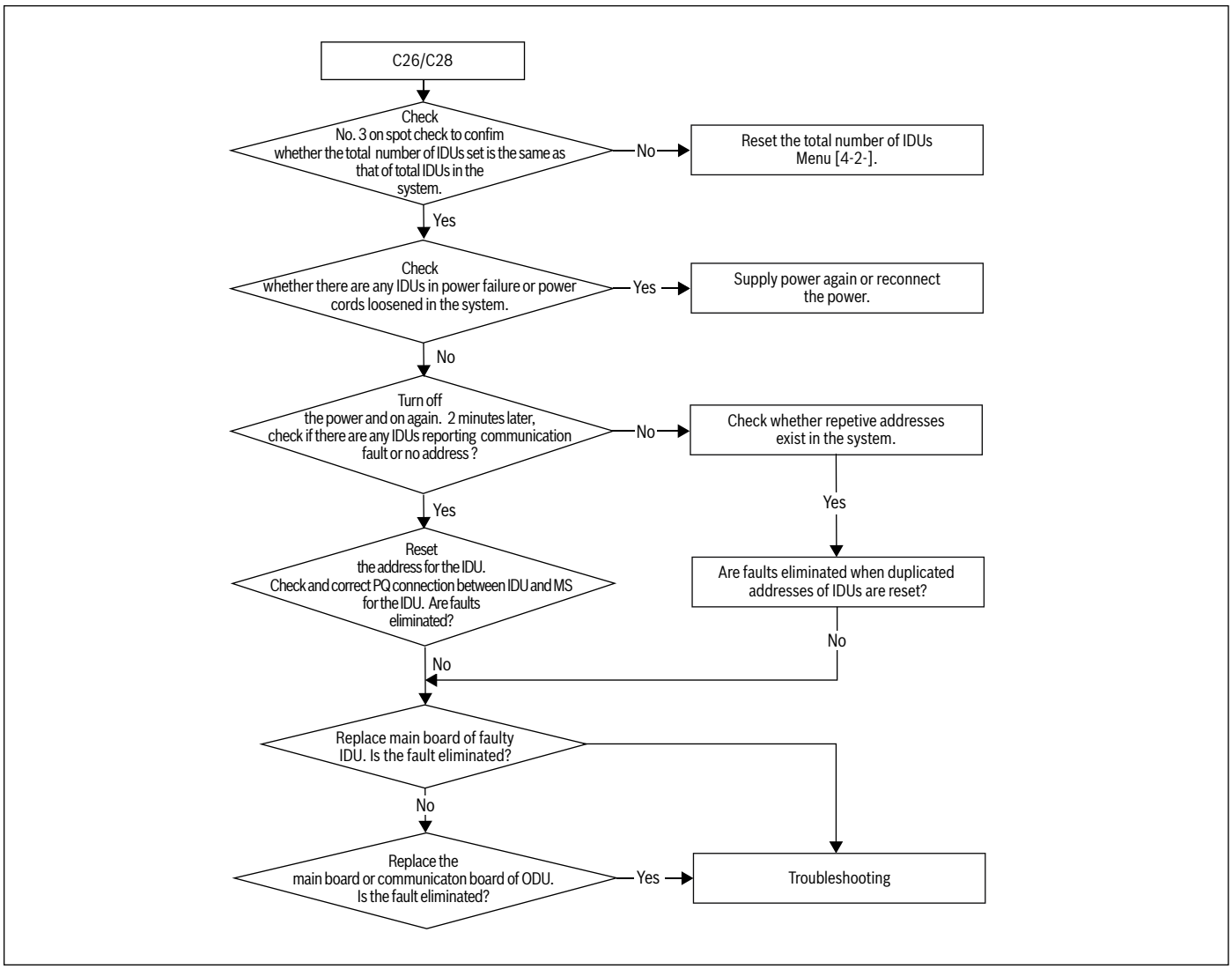


Figure 61

Error Code:	**1C41:** Communication error between main control chip and inverter driver chip
Description:	• The communication between the main control board and inverter driver board is error • All units stop running. • Error code is displayed on the unit with the error
Possible Causes:	• Defective ODU mainboard

Table 47

Digital display output

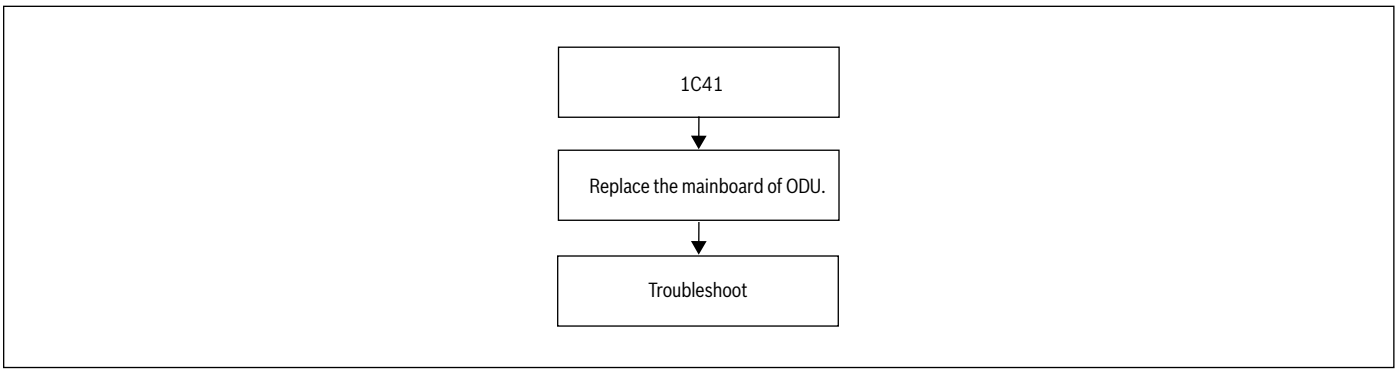


Figure 62

Error Code:	**E41/F41/F43/F91/FC1/F81:** T4/T3/T3B/T5/TL/Tg error (open/short)
Description:	• Temperature sensor error • Detective voltage > 4.95V or < 0.05V • All units stop running. • Error code is displayed on the unit with the error
Possible Causes:	• Contact failure between sensor and main board • The temperature sensor is located at wrong place • Temperature sensor failure • There are other heat sources around the sensor • Defective main board of ODU

Table 48

Note:

1. For sensor resistance, refer to Table 102 and Table 103.

Error code	Error description	Remarks	Digital display output
E41	Outdoor ambient temperature sensor (T4) error(open/short)	sensor error	
F41	Main heat exchanger pipe temperature sensor (T3) error(open/short)	sensor error	
F43	Temperature sensor in the middle of the heat exchanger pipe (T3B) error (open/short)	sensor error	
F91	Liquid pipe temperature sensor (T5) error (open/short)	sensor error	
FC1	Outdoor heat exchanger liquid temperature sensor (TL) error (open/short)	sensor error	
F81	Gas pipe temperature sensor (Tg) error (open/short)	sensor error	

Table 49

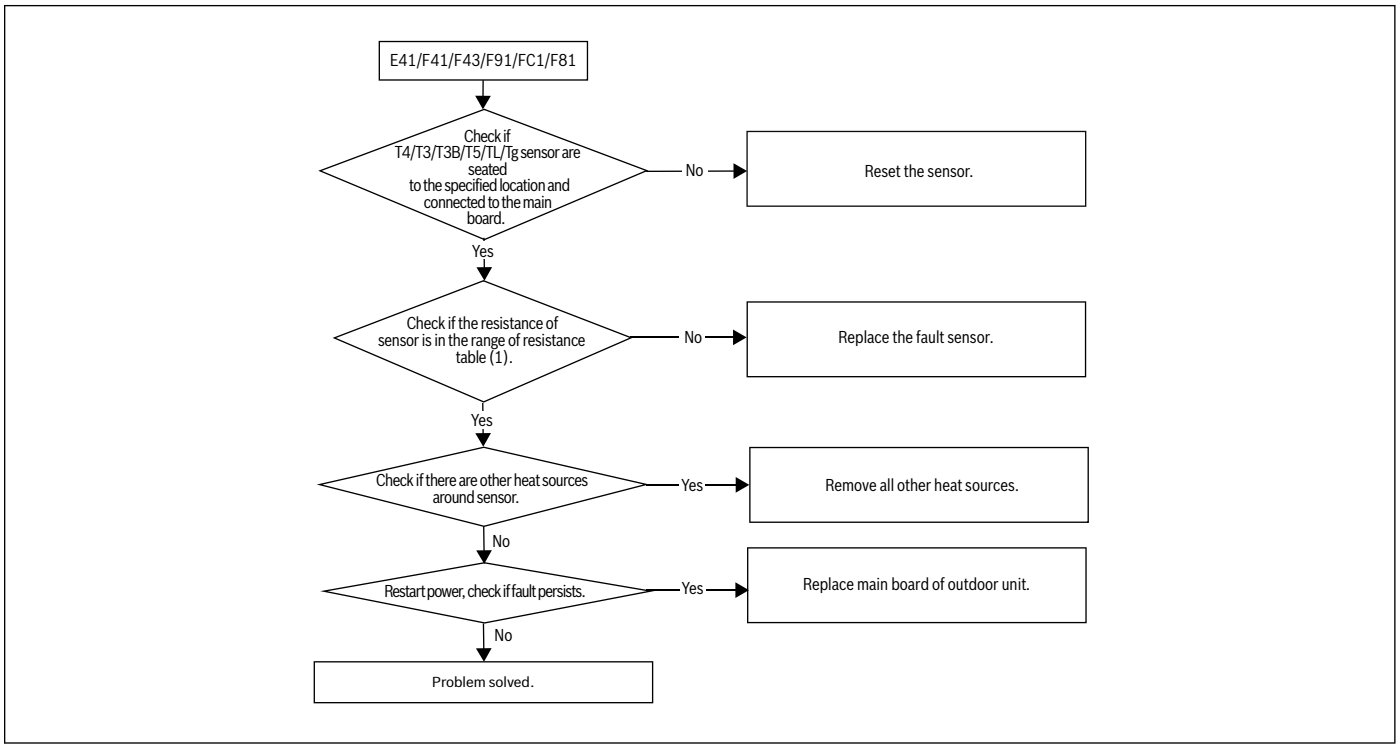


Figure 63

Error Code:	**F71:** Discharge temperature sensor (T7C) error (open/short)
Description:	• Temperature sensor error • Detective voltage > 4.95V or < 0.05V • All units stop running. • Error code is displayed on the unit with the error
Possible Causes:	• Contact failure between sensor and main board • The temperature sensor is located at wrong place • Temperature sensor failure • There are other heat sources around the sensor • Defective main board of ODU

Table 50

Note:

1. For sensor resistance, refer to table XX.

Digital display output

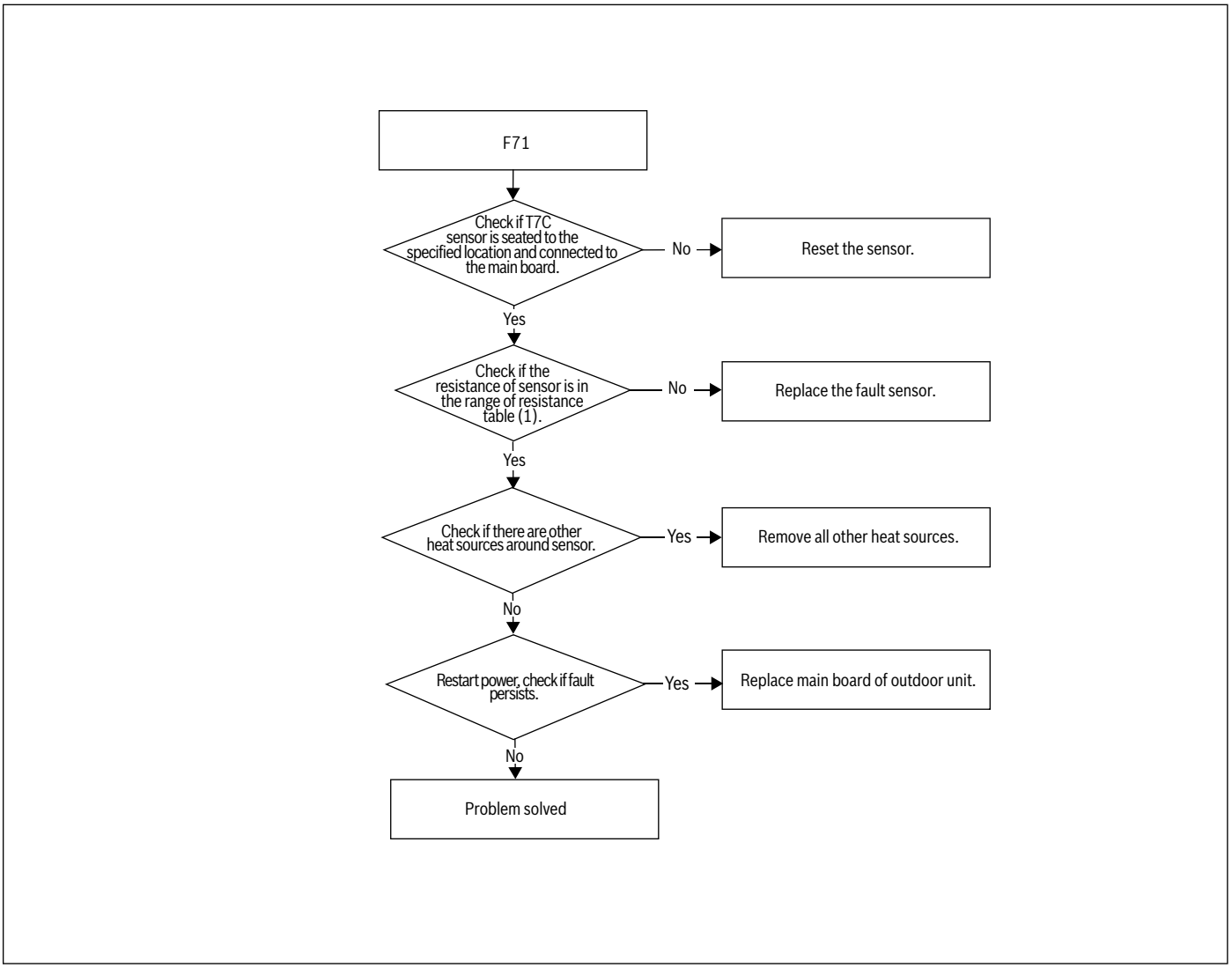


Figure 64

Error Code:	**F62/F6A:** Inverter module temperature (Tf) protection
Description:	• The temperature of the Tf/Ntc radiator is too high. • F62: The temperature of the internal NTC of the compressor module board or fan module is higher than 100°C. • F6A: F62 protection occurs 3 times in 100 min. • All units stop running • Error code is displayed on the outdoor unit with the Error
Possible Causes:	• Poor contact between driver board and cooler • Lack of silicone thermal grease • Defective driver board • Gas/liquid valves closed • Pipe and signal wiring mismatch

Table 51

Digital display output

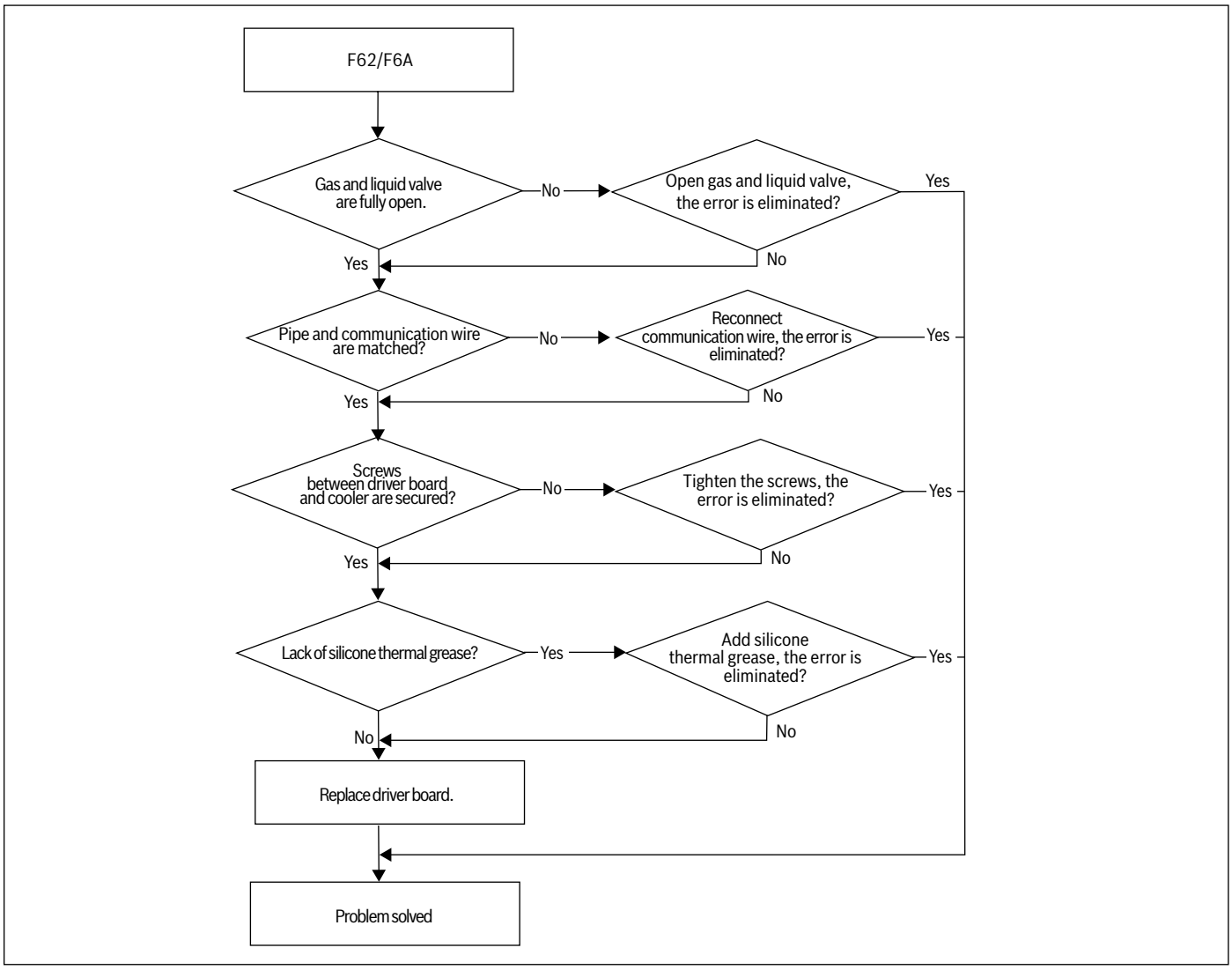


Figure 65

Error Code:	**F72/F7A:** Discharge temperature (T7C) protection
Description:	• Discharge Temperature is over the limit. • F72: Discharge Temperature (T7C) ≥ 115oC. • F7A: F72 protection occurs 3 times in 100 minutes • All outdoor Unit stop running • Error code is displayed on the unit with the error
Possible Causes:	• Too high discharge temperature caused by little refrigerant remains in the system • Misjudgment caused by faulty sensor • Defective main board • Lack of cooling function caused by the EEV in ODU • The refrigerant blocked in high pressure zone owing to the faulty valve

Table 52

Digital display output

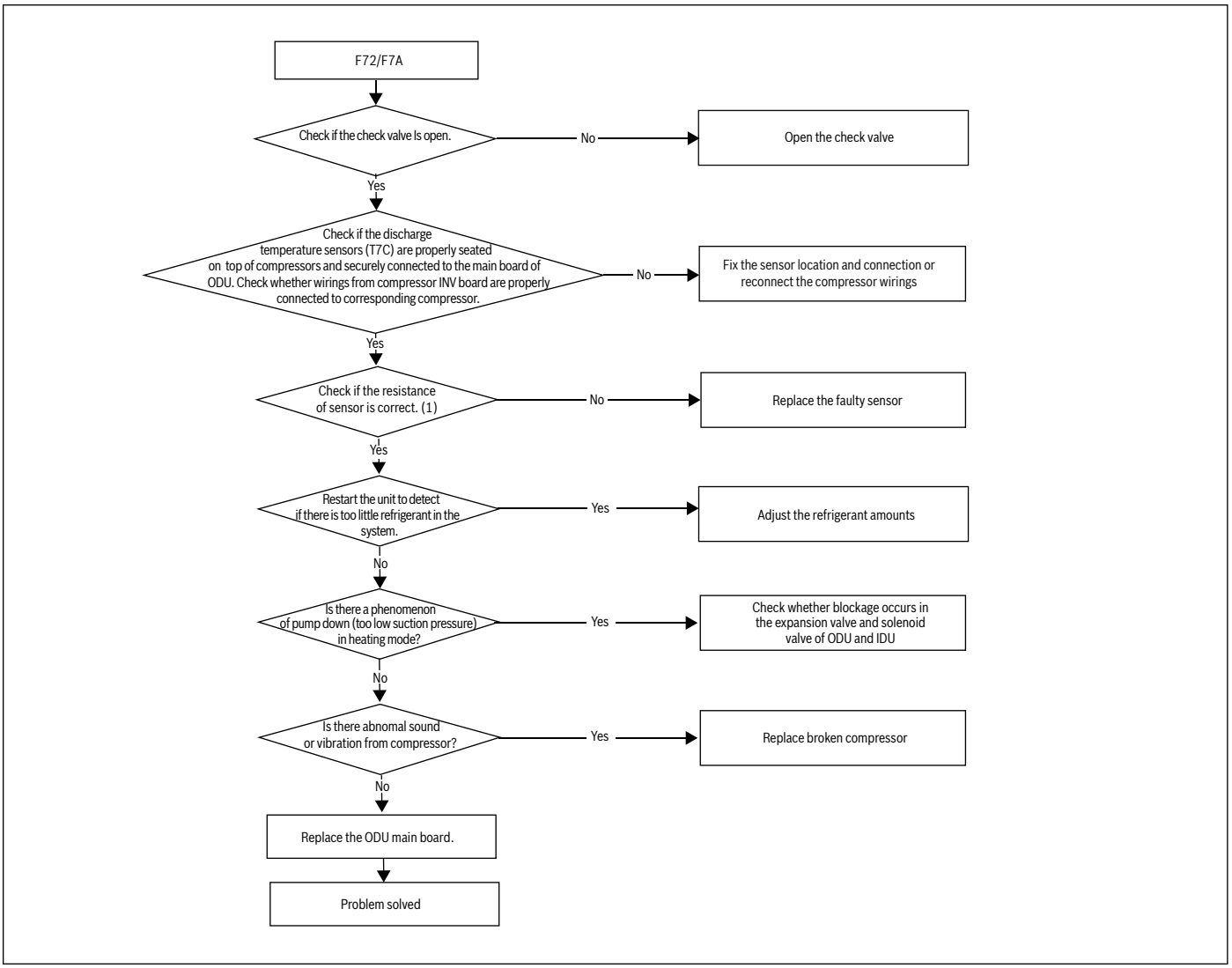


Figure 66

Error Code:	**F75:** Compressor discharge insufficient superheat protection
Description:	• The discharge temperature superheat of compressor is less than 43°F (6°C) for more than 60 minutes • Determination during operation of outdoor unit. • All units stop running. • The error code is displayed on the outdoor unit with error.
Possible Causes:	• Some valves of IDU cannot be fully closed • Misjudgment caused by faulty discharge temperature sensor • Damaged ODU main board • Too much refrigerant charge

Table 53

Digital display output

Cooling Mode:

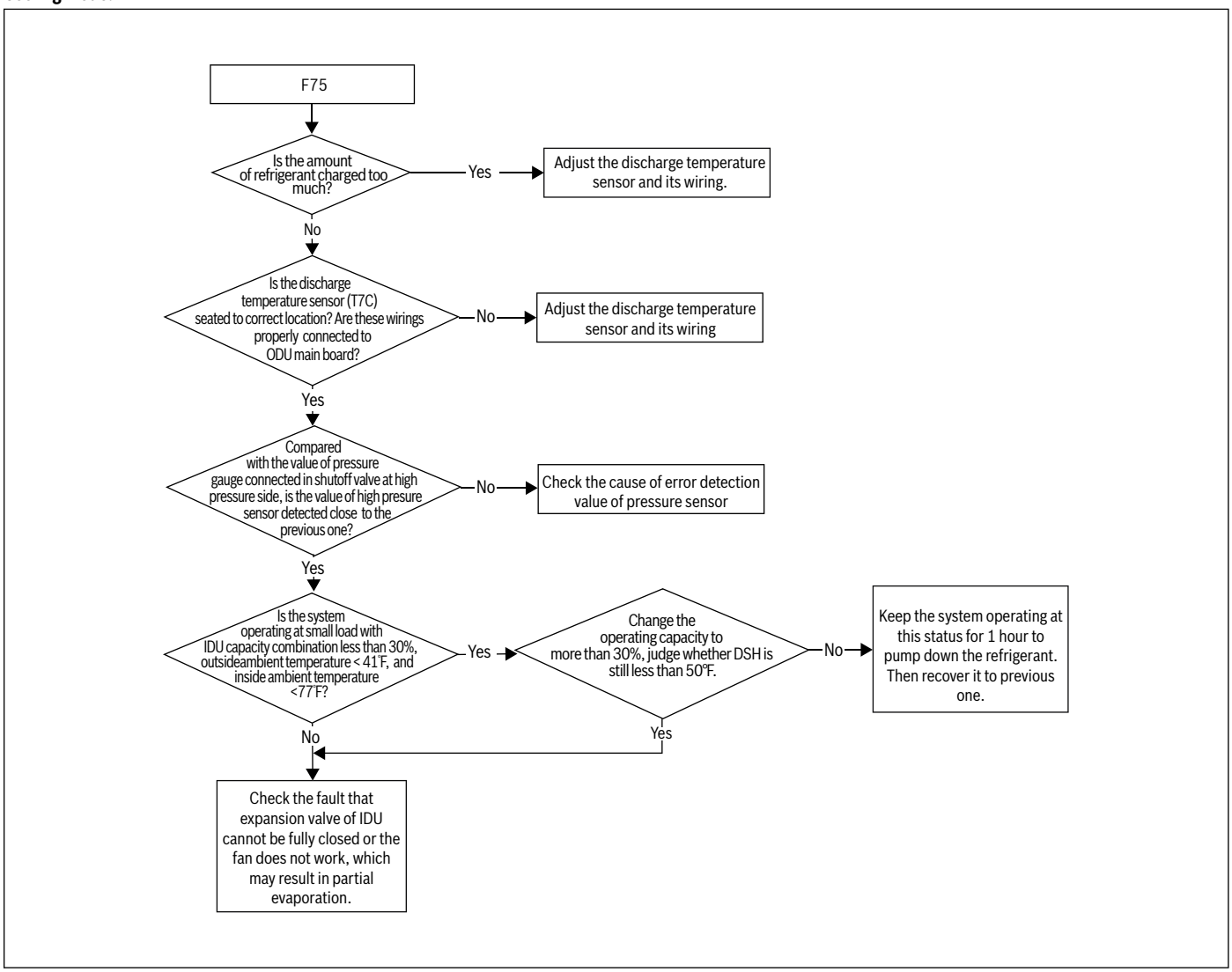


Figure 67

Heating Mode:

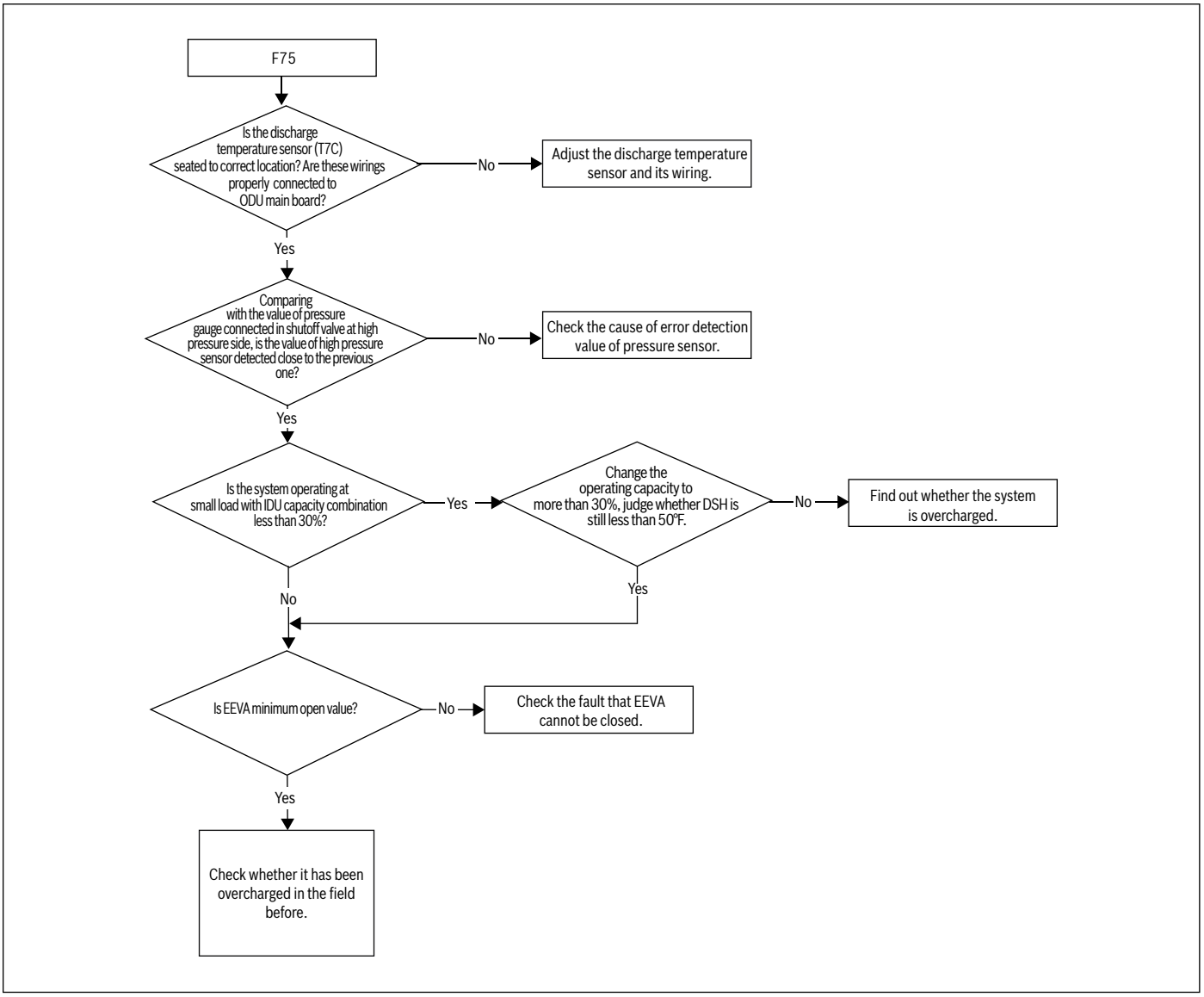


Figure 68

Error Code:	**P11:** High pressure sensor malfunction
Description:	• Open/short circuit error of high pressure sensor • All units stop running. • The error code is displayed on the Outdoor Unit with error.
Possible Causes:	• The high pressure and low pressure are too low caused by less refrigerant in the system • Misjudgment caused by faulty high pressure sensor • Defective main board of outdoor unit • The ambient temperature is extremely high and the value of temperature sensor (T4) is distorted.

Table 54

Digital display output

Cooling Mode:

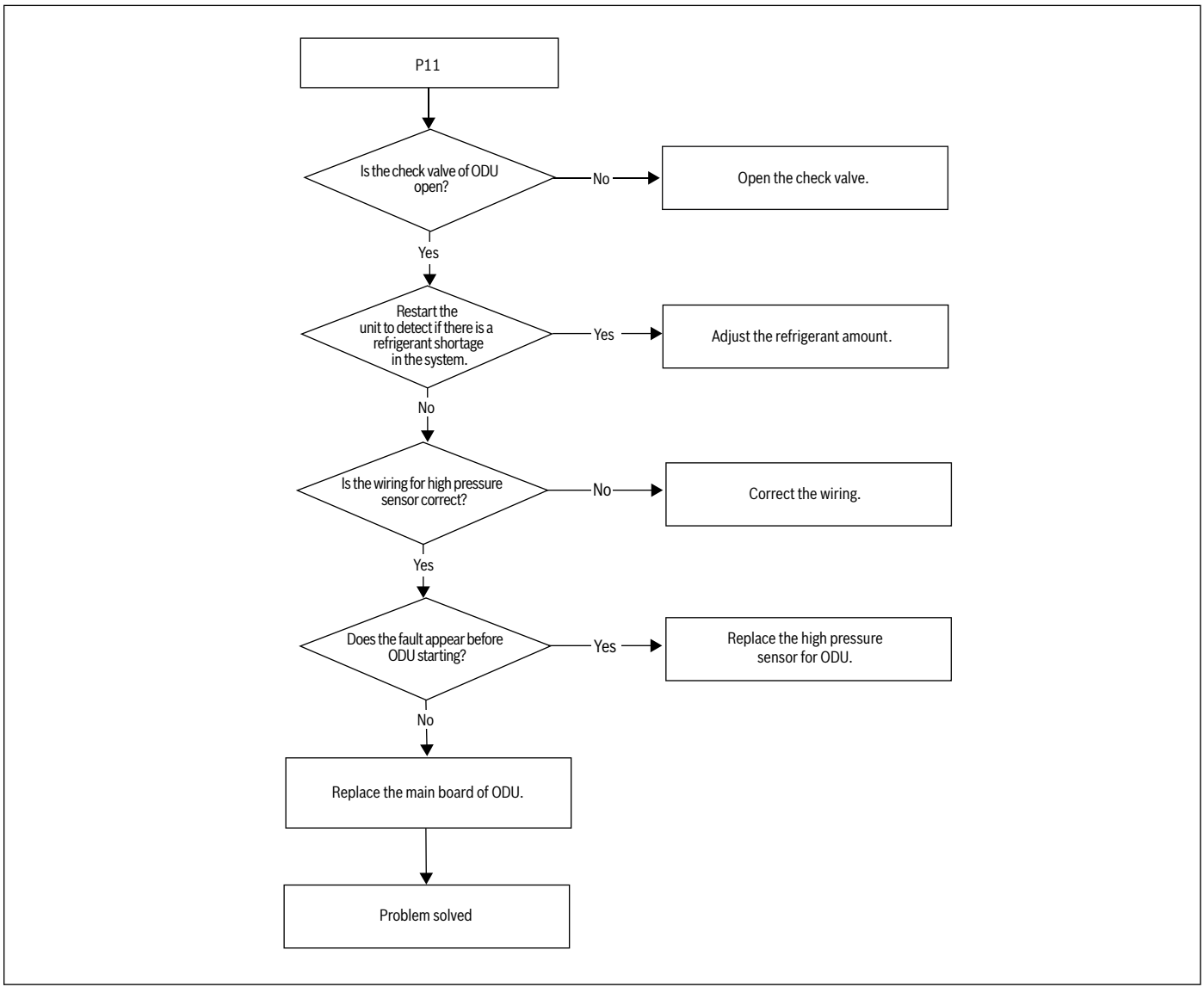


Figure 69

Error Code:	**P12/P14:** High pressure protection
Description:	• P12: The high pressure is over the limit. • P14: 3 times P12 in 100 minutes • The detected high pressure is higher than 3.9 MPa • All units stop running • Error code is displayed on the unit with the Error
Possible Causes:	• Extremely high pressure for too much refrigerant • The refrigerant has been blocked in high pressure zone owing to the valve fault • Compressor operating reversely due to wrong wiring sequence during service work • Defective ODU main board • Ambient temperature is higher than 50°C during cooling operation

Table 55

Digital display output

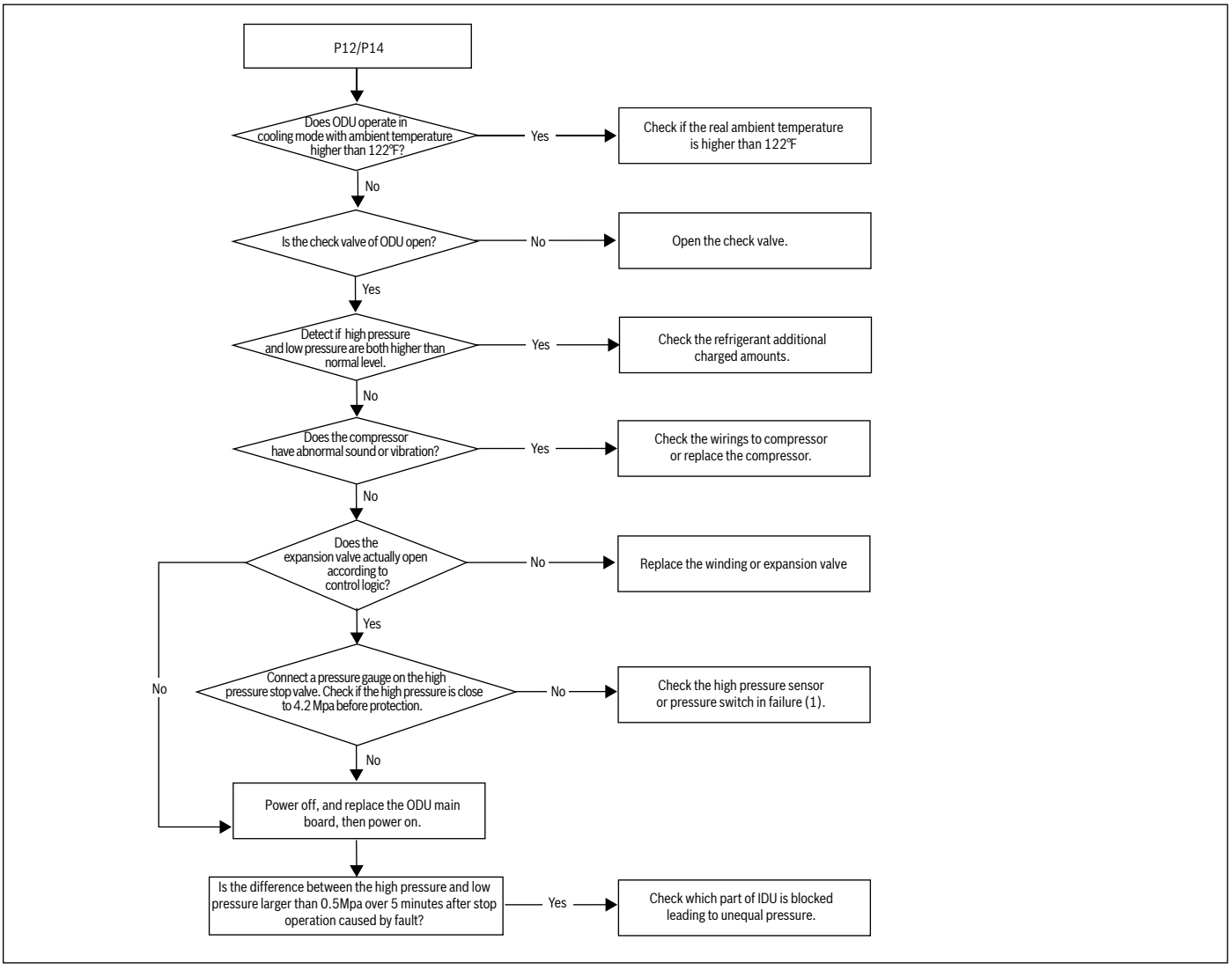


Figure 70

Error Code:	**P13:** High pressure switch protection
Description:	• The detected high pressure is higher than 4.2 MPa • All units stop running • Error code is displayed on the unit with the Error
Possible Causes:	• The outdoor unit's check valve is not open. • The pressure switch is either not connected correctly or is damaged. • The system has an excessive amount of refrigerant. • The system is contaminated with air or nitrogen. • There is a blockage on the high-pressure side. • The outdoor unit has poor heat dissipation • The outdoor unit's control board has malfunctioned.

Table 56

Digital display output

Notes:

1. The high-pressure switch interface is located at the outdoor unit's module board connector CN29.
2. Excessive refrigerant can lead to lower discharge temperatures, higher discharge pressures, and higher suction pressures. Refer to Part 6.4 and Part 6.5.
3. Mixing air or nitrogen into the system can cause higher discharge temperatures, higher discharge pressures, higher compressor currents, abnormal compressor noise, and unusual pressure fluctuations. Refer to Part 6.4 and Part 6.5.
4. High-pressure side blockages can lead to higher discharge temperatures, higher discharge pressures, and higher suction pressures. Refer to Part 6.4 and Part 6.5.
5. For cooling, inspect the outdoor unit's heat exchanger, fan, and discharge opening for blockages. For heating, inspect the indoor unit's heat exchanger, fan, and discharge opening for blockages.

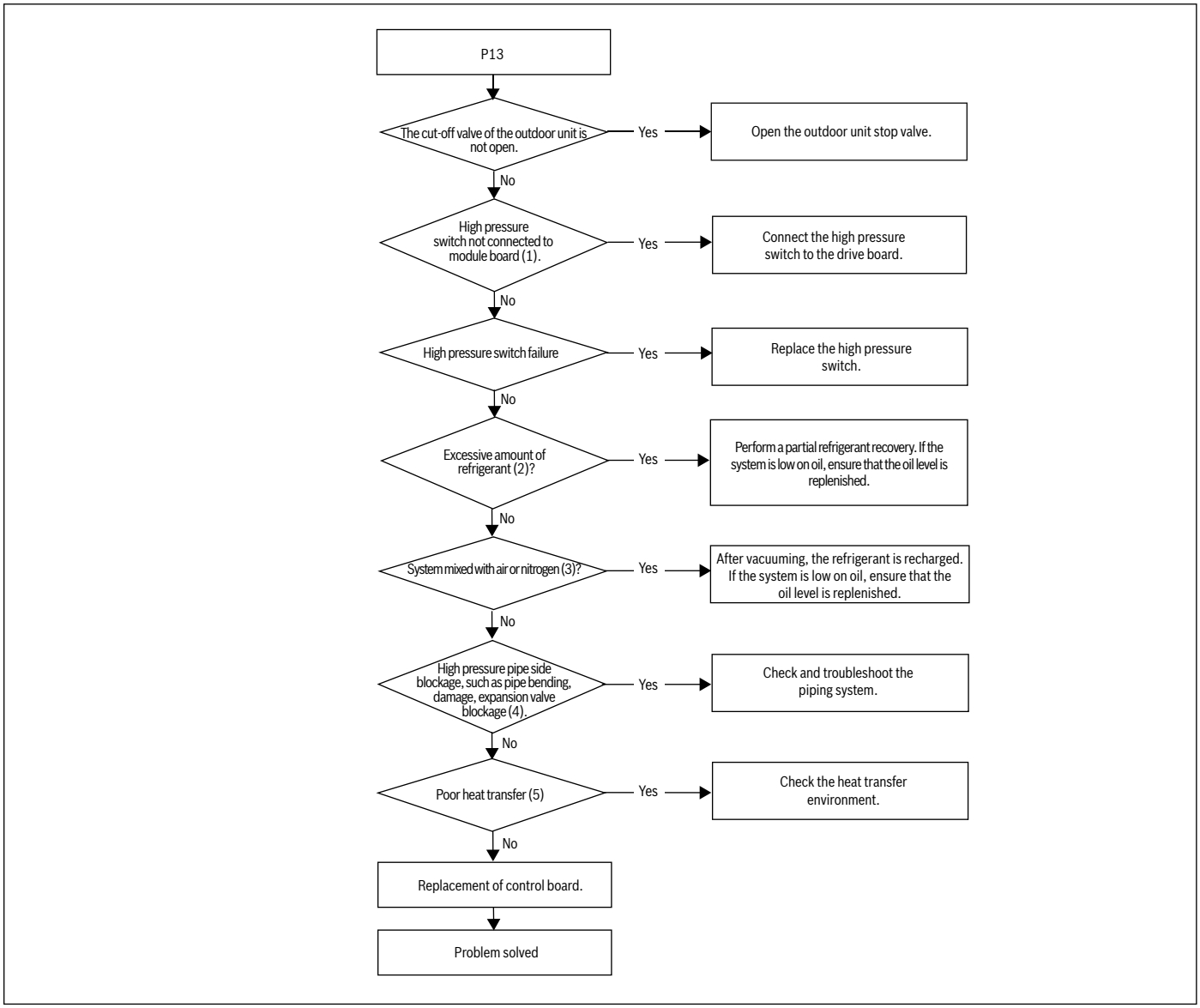


Figure 71

Error Code:	**P21:** Low pressure sensor error
Description:	• Open/short circuit Error in suction pressure sensor • All units stop running. • Error code is only displayed on the unit with the error.
Possible Causes:	• There is air in the system. • Low pressure sensor is not correctly connected to the main board. • There is no refrigerant in the system. • Pressure exceeds the operating range. • Outdoor unit main board is damaged. • Pressure sensor has failed.

Table 57

Digital display output

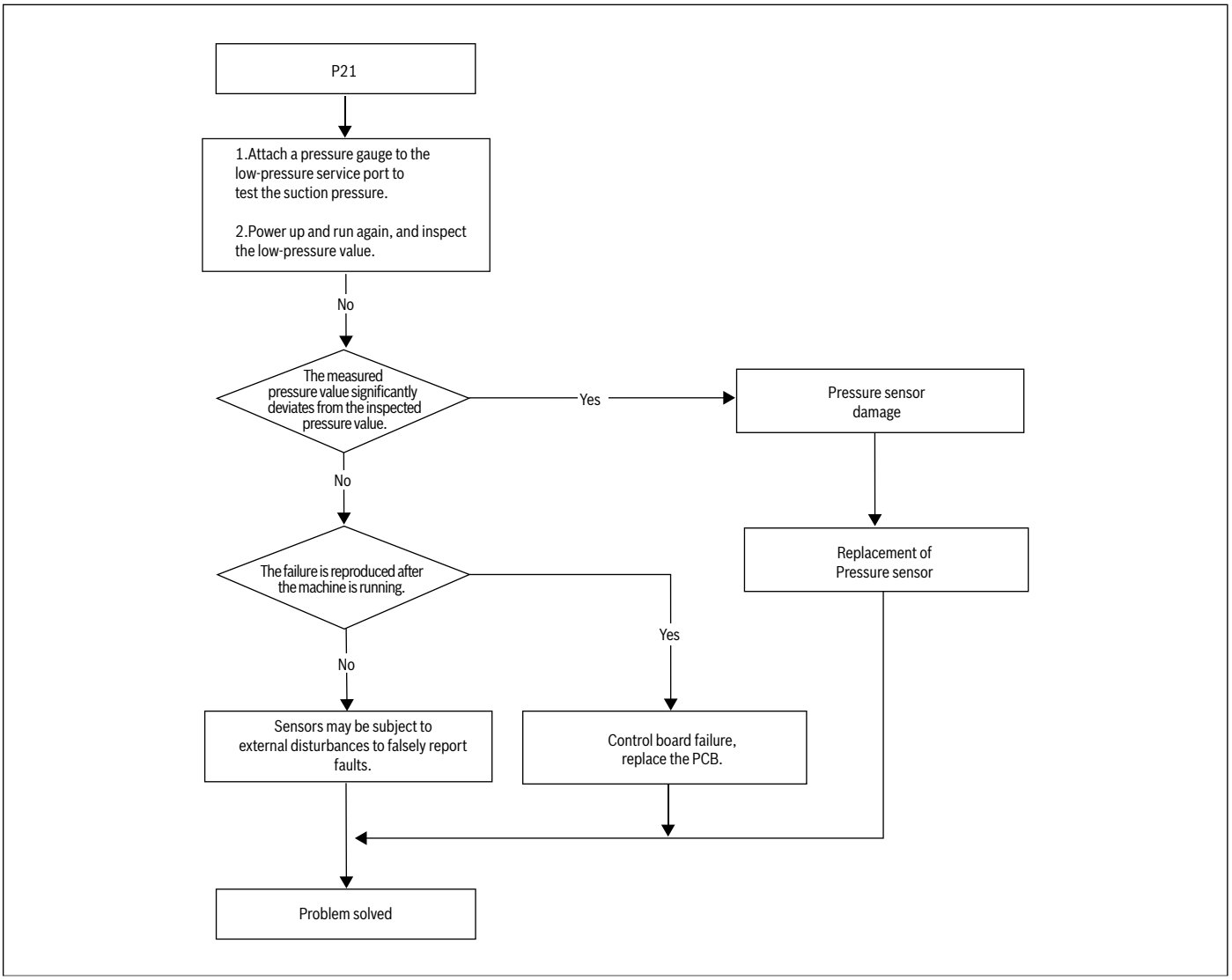


Figure 72

Error Code:	**P22/P25:** Low pressure protection
Description:	• The detected low pressure is lower than 0.12 MPa • P22: Low pressure protection; • P25: Low pressure protection occurs 3 times in 60 min. • All units stop running. • Error code is displayed on the unit with the error.
Possible Causes:	• There is too little refrigerant in the system • Misjudgment caused by faulty sensor • Defective main board of outdoor unit • Ambient temperature is lower than -13℉ during heating operation • Refrigerant has been blocked in high pressure zone owing to the valve fault

Table 58

Digital display output

Note:

1. For sensor resistance, refer to table XX.

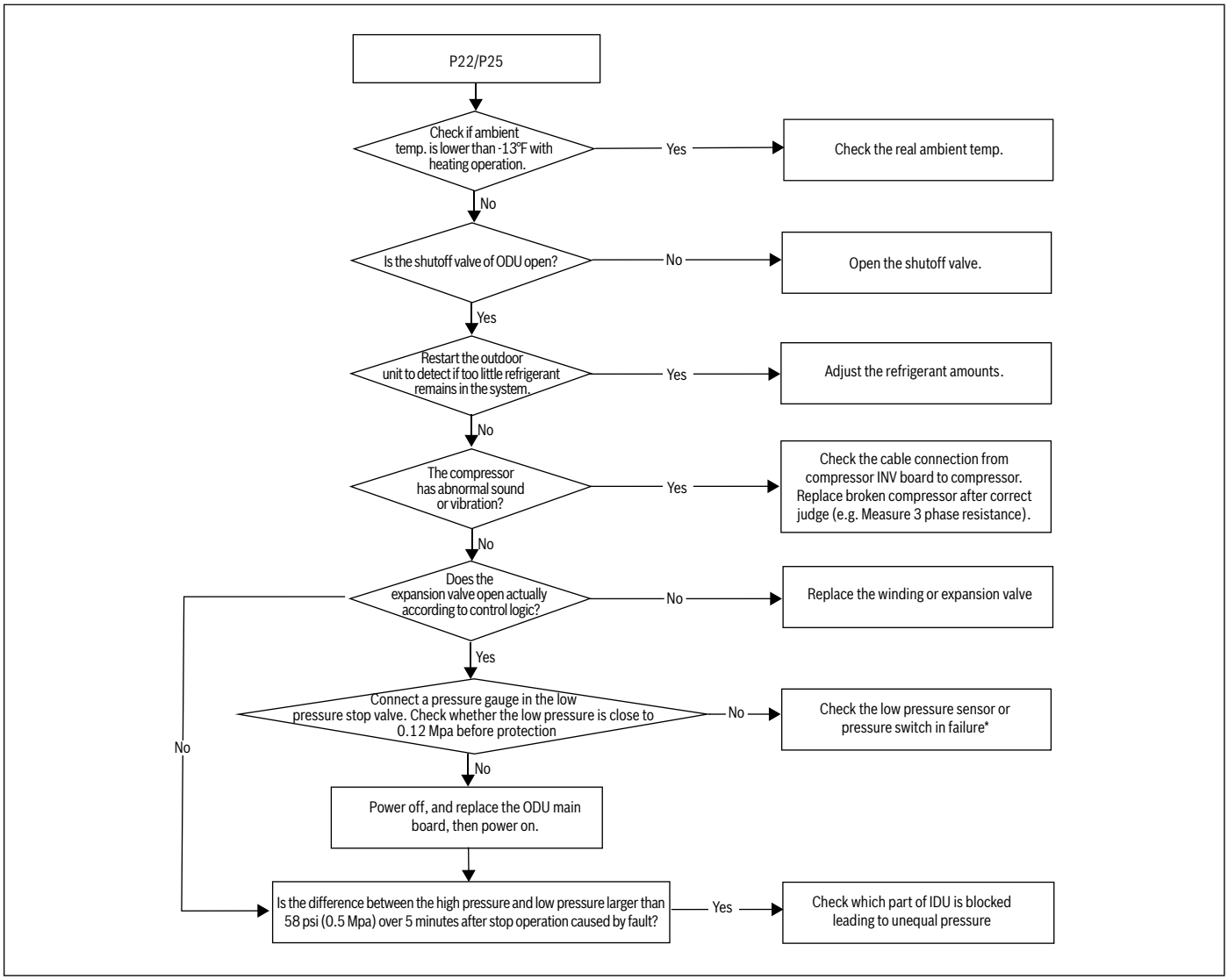


Figure 73

Error Code:	**1P32/1P33:** Compressor high DC bus current protection
Description:	• Compressor current is higher than 17A (single fan model)/24A (double fan model) • All units stop running. • Error code is displayed on the unit with the error.
Possible Causes:	• Stop valve is closed • Abnormal voltage of power supply • Too much refrigerant in the system • Faulty valve or filter resulting in large pressure ratio • Damaged main board • Outdoor ambient temp. is too high during cooling operation • Indoor ambient temp. is too high during heating operation • Incorrect power wiring of compressor • Faulty electronic expansion valve in IDU • Defective compressor

Table 59

Digital display output

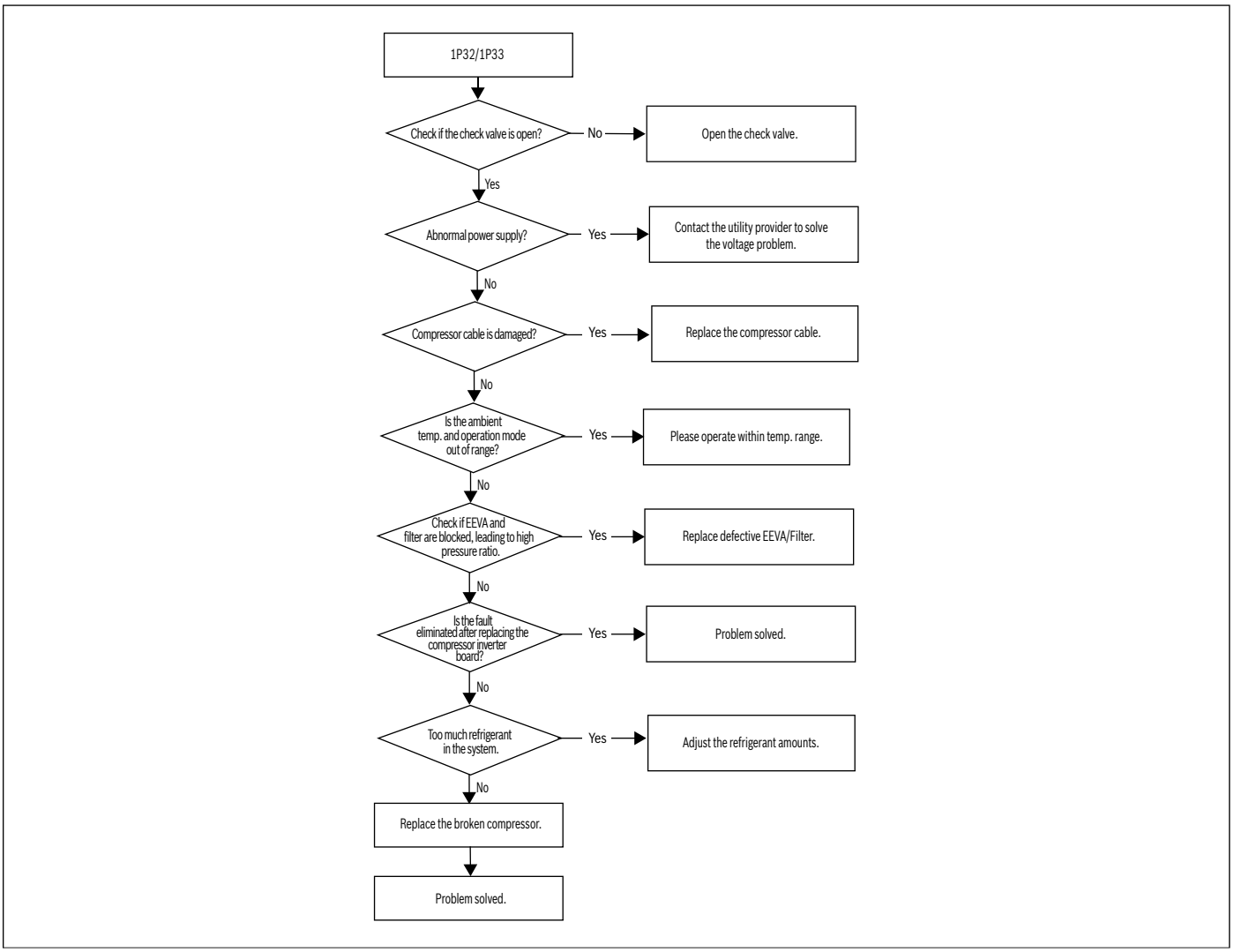


Figure 74

Error Code:	**P51/P52:** Power voltage protection
Description:	• The detected voltage of ODU is not within the range of accepted value • All units stop running • Error code is displayed on the unit with the error.
Possible Causes:	• The voltage of ODU power supply is not within ±10% of rated voltage • Loosened wiring from power supply terminal to drive board • Damaged drive board of ODU

Table 60

Digital display output

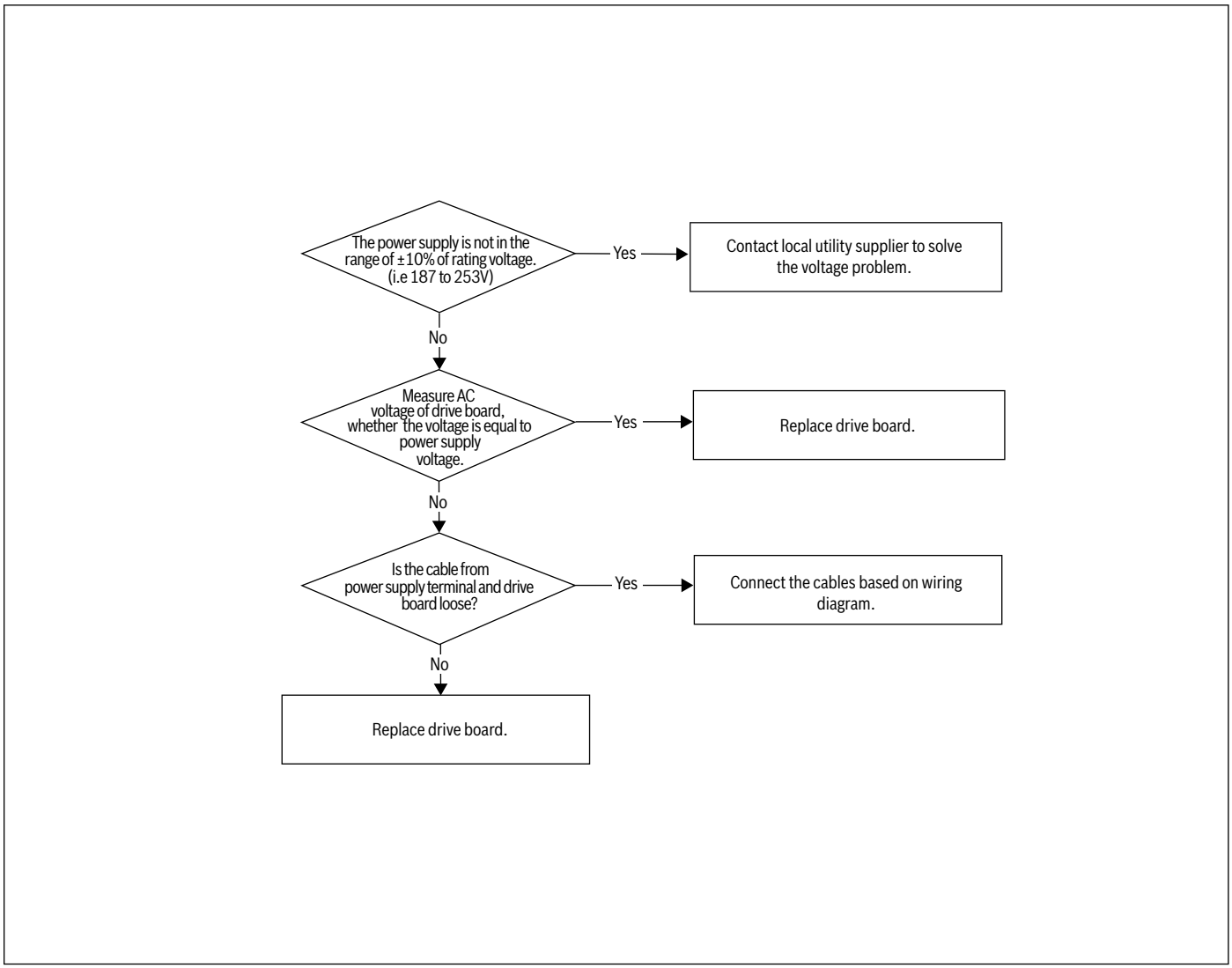


Figure 75

Error Code:	**1P56:** Inverter module DC bus low voltage error
Description:	• Inverter driver board DC bus voltage is too low • All units stop running. • Error code is displayed on the unit with the error
Possible Causes:	• Under voltage or phase loss in the ODU power supply • Loose internal wiring in the electric control box • Driver board PCB damage

Table 61

Digital display output

Note:

1. Refer to 6.7 Compressor & Fan drive board ports detection

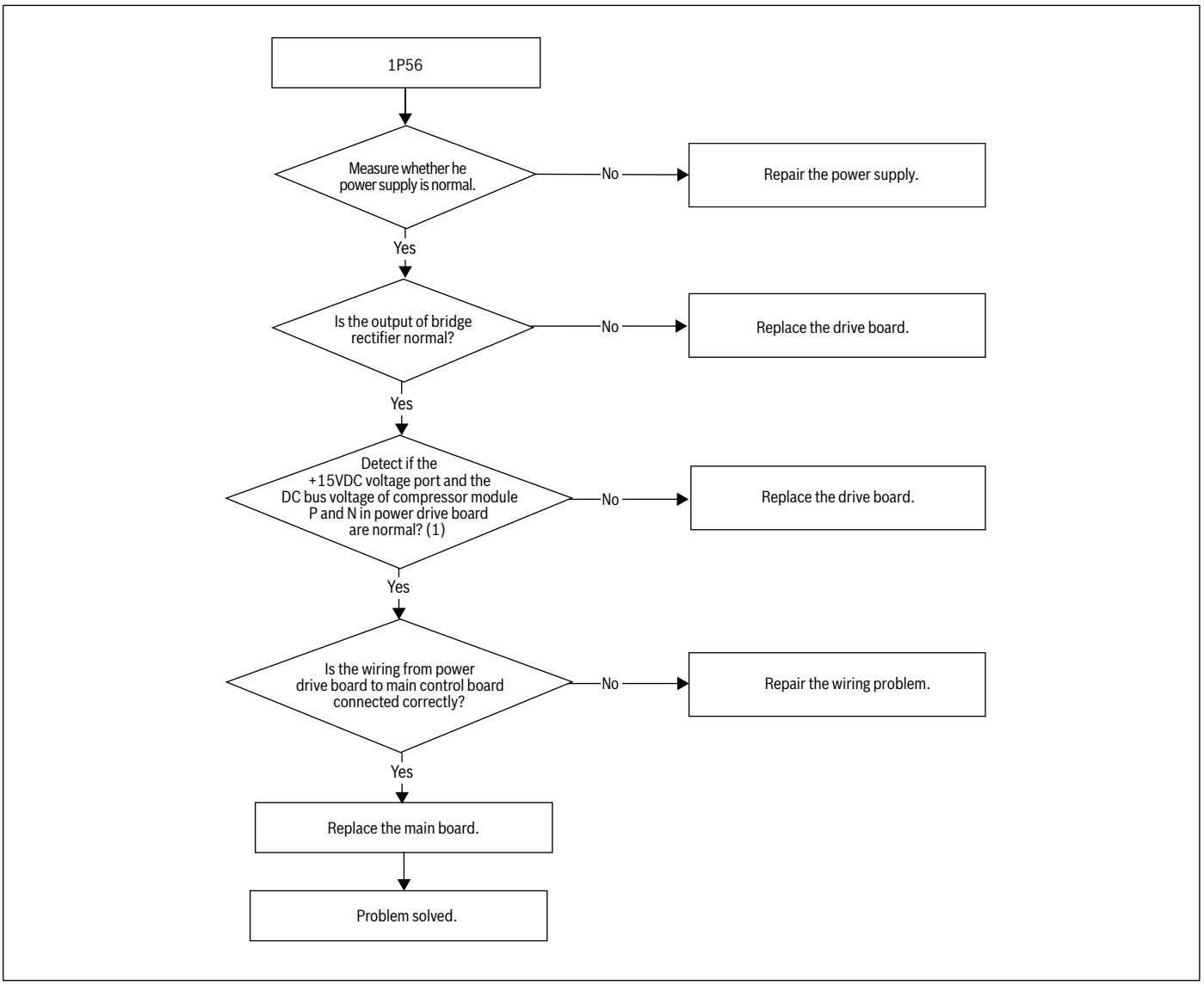


Figure 76

Error Code:	**1P57/1P58:** Inverter module DC bus high voltage error
Description:	• Inverter driver board DC bus over voltage • All units stop running. • Error code is displayed on the unit with the error
Possible Causes:	• ODU power supply overvoltage • Driver board PCB damage

Table 62

Digital display output

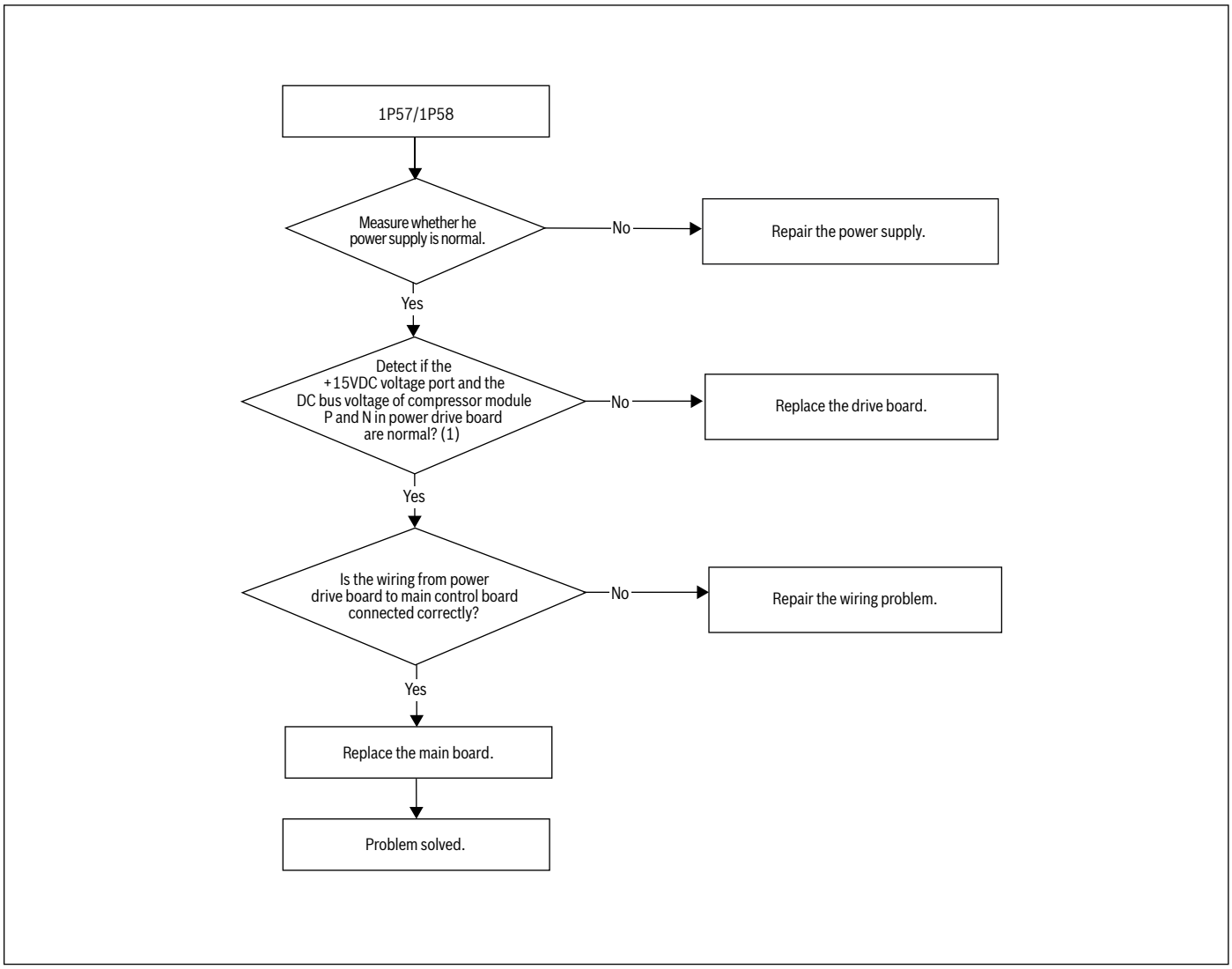


Figure 77

Error Code:	**1P59:** Inverter module DC bus voltage drop protection
Description:	• Driver board DC bus over voltage
Possible Causes:	• Under voltage or phase loss in the ODU power supply • Loose internal wiring in the electric control box • Driver board PCB damage

Table 63

Digital display output

Error Code:	**1P71:** EEPROM error
Description:	• The EEPROM parameter of the ODU main control board is incorrect • EEPROM can't communicate with main chip • All units stop running. • Error code is displayed on the unit with the error
Possible Causes:	• EEPROM is broken • Software in EEPROM is wrong • Wrong EEPROM model

Table 64

Digital display output

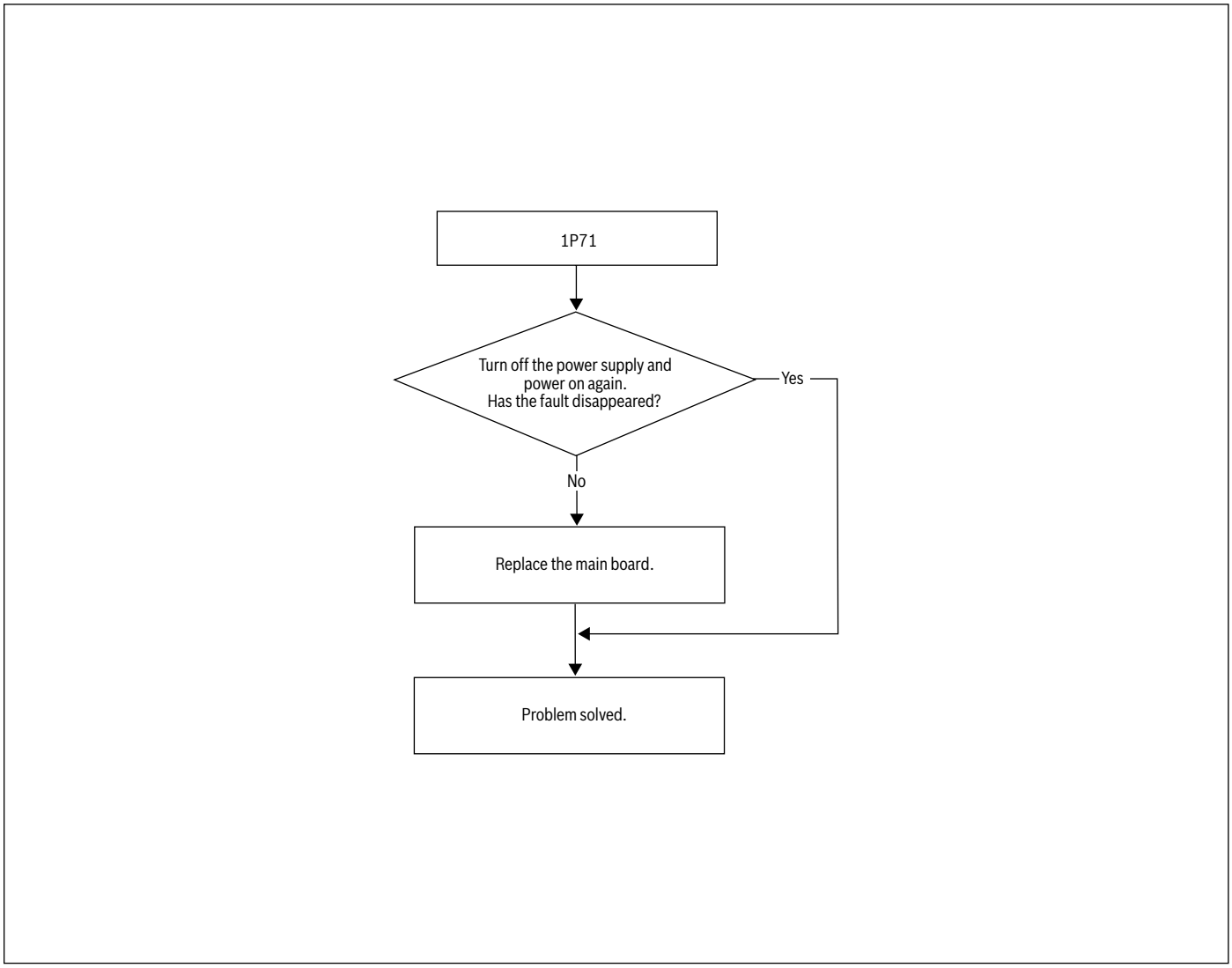


Figure 78

Error Code:	**Pb1:** HyperLink overcurrent error
Description:	• HyperLink overcurrent error • All units stop running. • Error code is displayed on master ODU.
Possible Causes:	• The M1M2 communication wiring of the master ODU is short-circuited. • The M1M2 communication wiring of the master ODU is connected to other communication wiring (not M1M2) of the IDU. • The M1M2 communication wiring of the master ODU is connected to port “TO DOWN IDU” of the repeater. • Main control board is damaged

Table 65

Digital display output

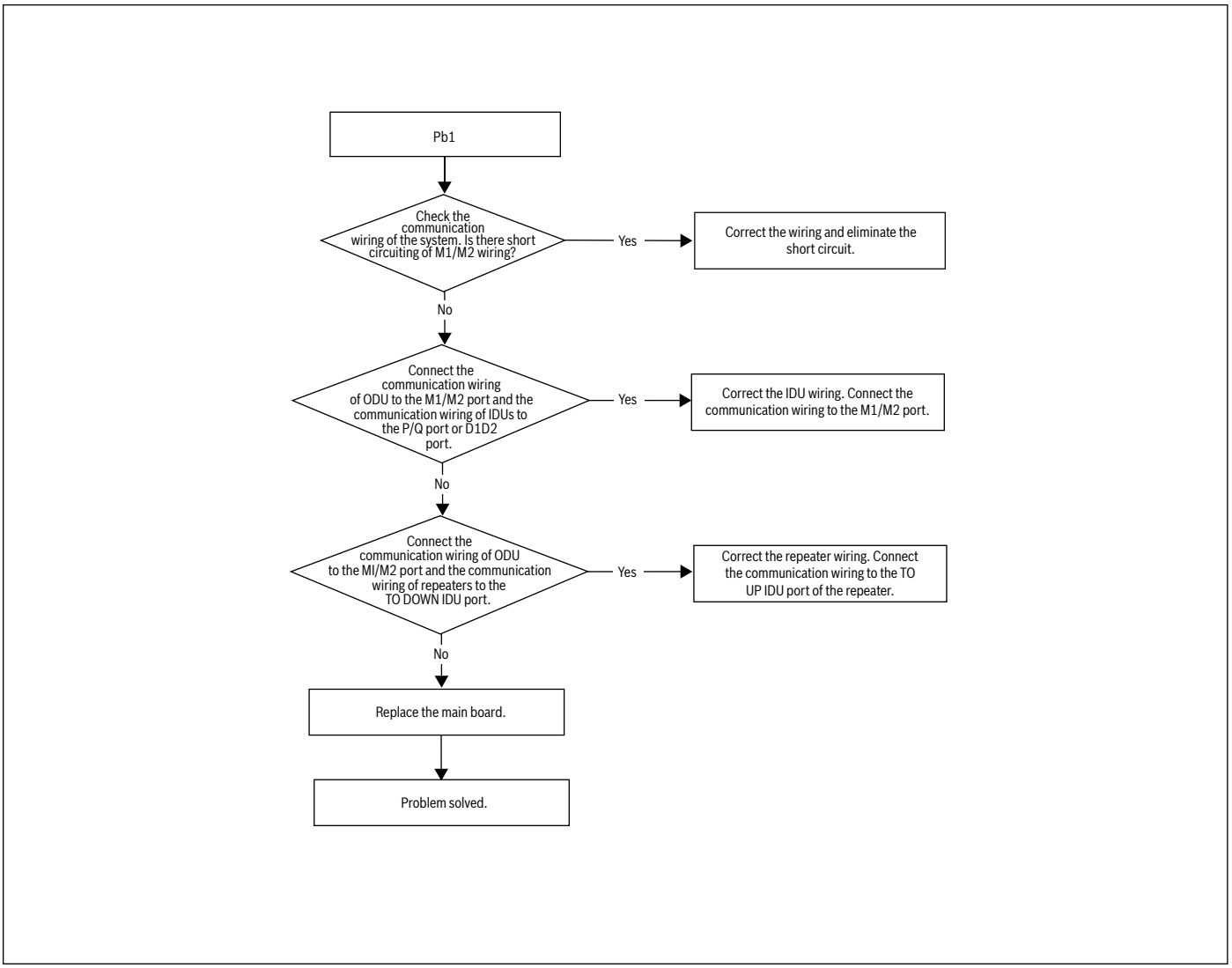


Figure 79

Error Code:	**Pd1/Pd2:** Anti-condensation protection
Description:	• Anti-condensation protection • All units stop running. • Error code is displayed on the unit with the error
Possible Causes:	• The ODU check valve is not opened. • Piping and wiring are inconsistent. For example, the piping for system A is connected to system A and the communication wiring is connected to system B. • Excessive refrigerant • Temperature sensor T5 are not installed in designated positions. • Temperature sensor T5 are damaged. • The main board is damaged.

Table 66

Digital display output

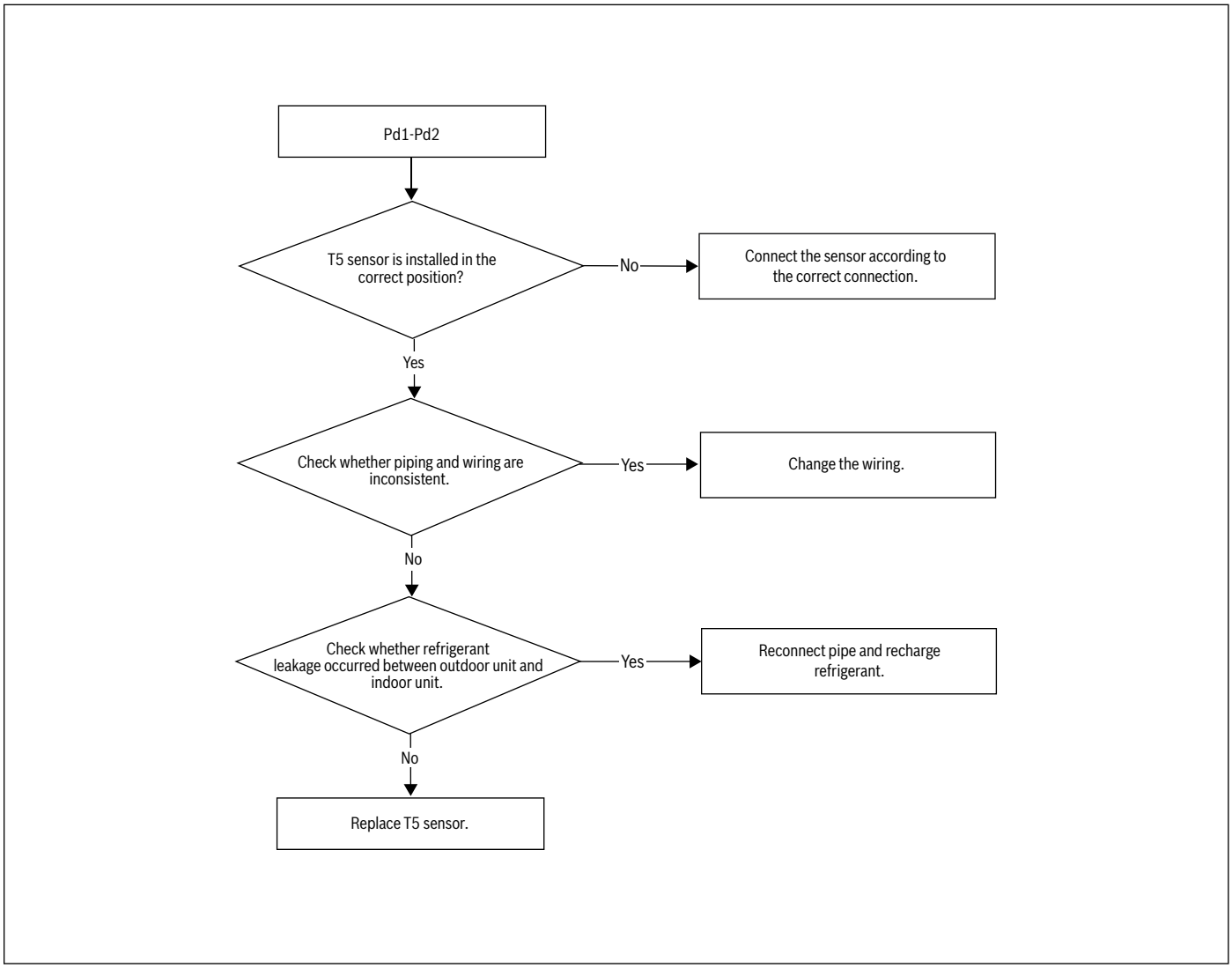
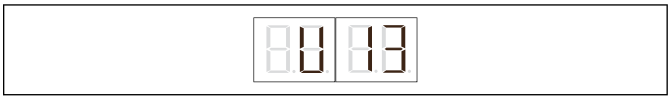


Figure 80

Error Code:	**U13:** Indoor unit type setting error
Description:	• Error code is displayed on ODU. Anti-condensation protection • All units stop running. • Error code is displayed on the unit with the error
Possible Causes:	• Indoor Unit is VRF unit, while system setting is unitary system.

Table 67

Digital display output



19.5.2 Errors in Compressor Driver

Error Code:	**1L01:** Compressor error occurs 3 times in 60 minutes
Description:	• Compressor error occurs 3 times in 60 minutes
Possible Causes:	• Spot check to inquire about the code. Find out the cause by the error code.

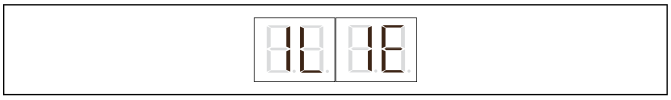
Table 68

Digital display output

Error Code:	**1L1E:** Hardware overcurrent
Description:	• The compressor current exceeds the protection value set for the hardware. • The compressor stops running after the error occurs. If the error disappears one minute later, the compressor starts again
Possible Causes:	• Impurities in the refrigerant system • The compressor cylinder is stuck instantaneously • Compressor windings interphase short circuit • The system power supply voltage drops or is interrupted for a short time • Water on IPM module on account of condensation, resulting in short circuit between chip pins; • Liquid refrigerant returns to compressor; • When the compressor starts, the rotor has a certain speed • Abnormal driver board

Table 69

Digital display output



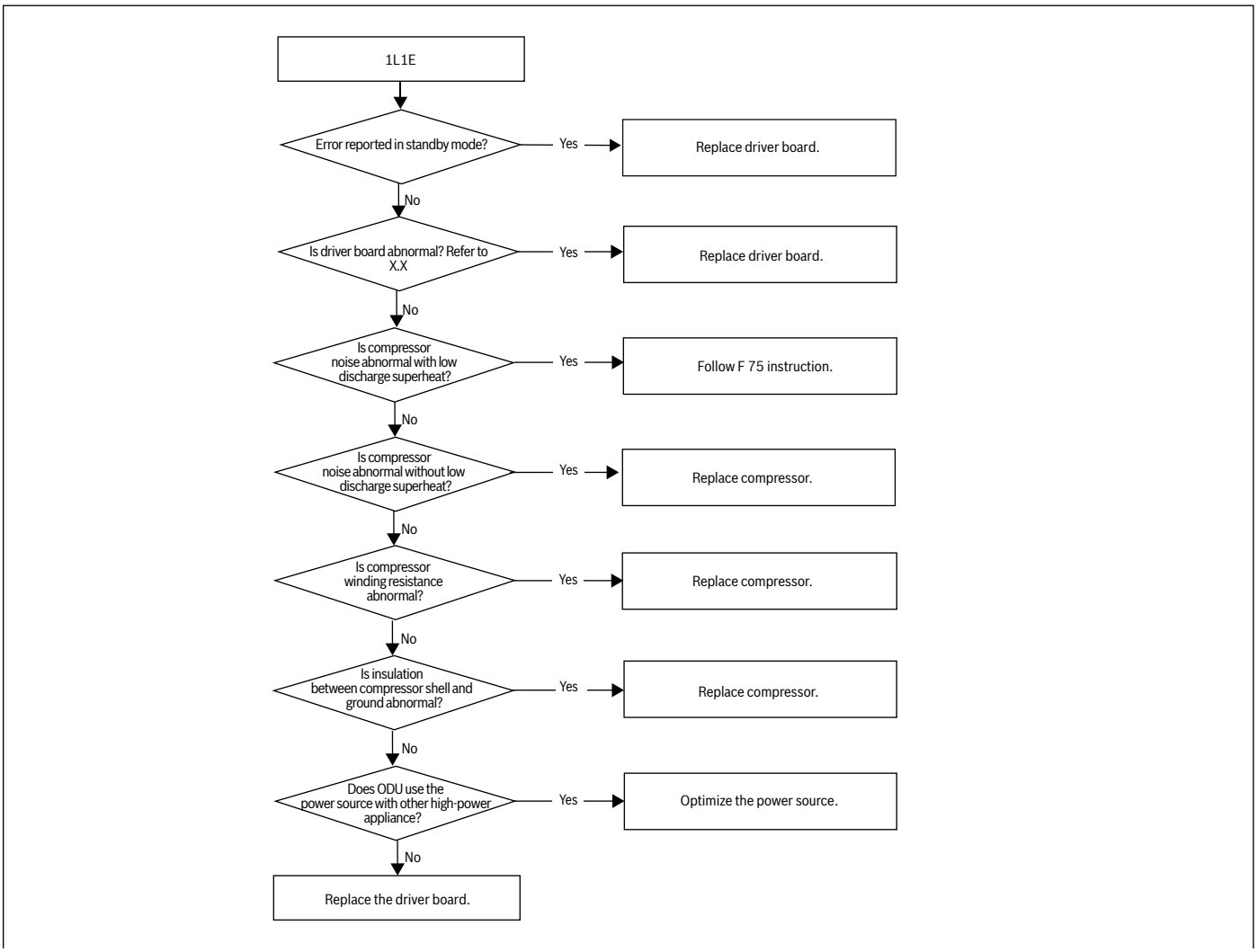


Figure 81

Error Code:	**1L11, 1L12:** Compressor software overcurrent
Description:	• The compressor current exceeds the protection value set by the software. • The compressor will shutdowm when the error occurs. If the error disappears one minute later, the compressor will start again.
Possible Causes:	• There are impurities in the refrigerant system or the compressor is instantaneously locked. • The compressor drive board is faulty. • The system is faulty, due to reasons such as liquid return and impurities.

Table 70

Digital display output

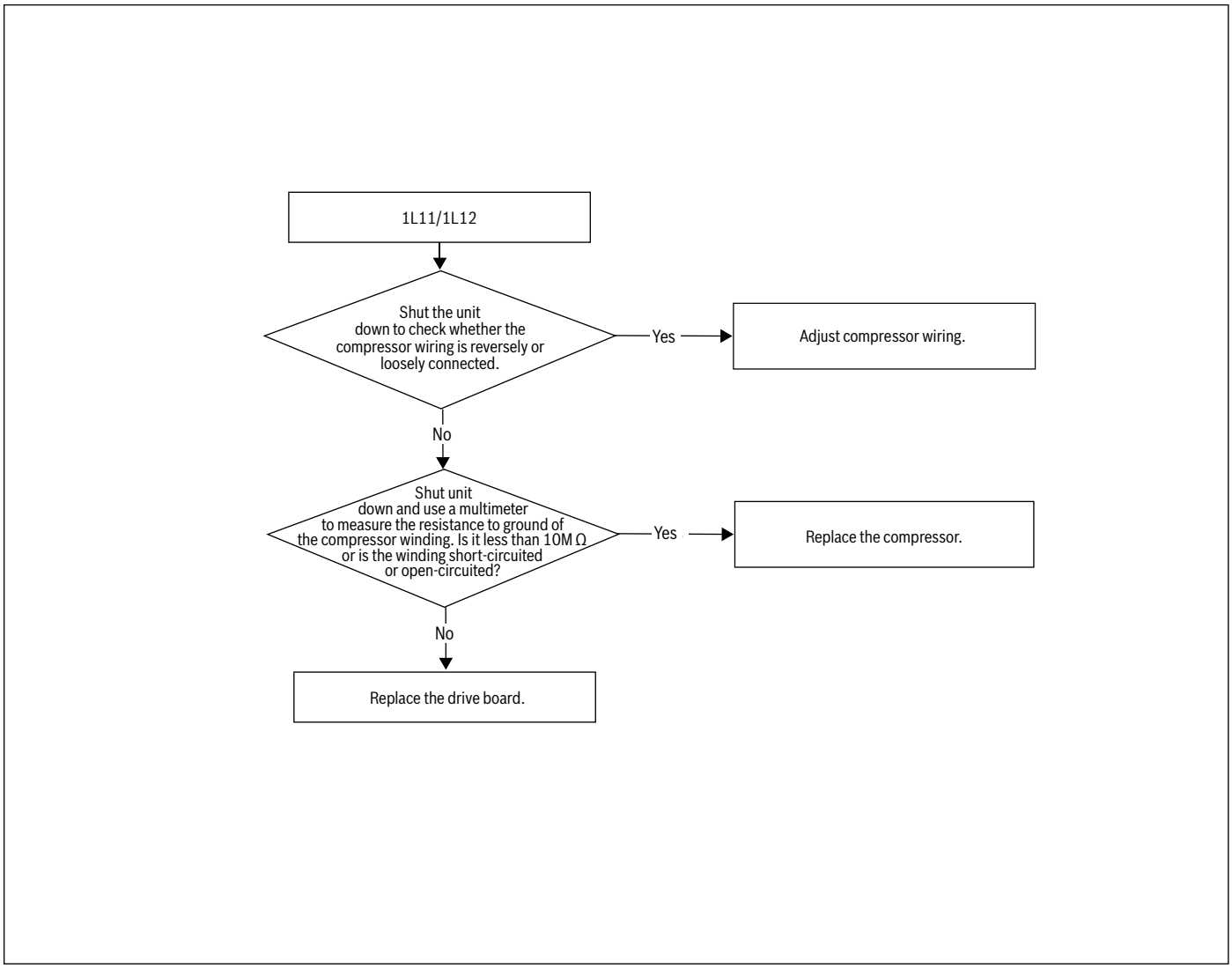


Figure 82

Error Code:	**1L2E:** Compressor inverter module high temperature protection
Description:	• The temperature of the compressor or fan drive board (IPM) exceeds the set value (212℉). • The compressor will stop when the error occurs. If the error disappears one minute later, the compressor will start again
Possible Causes:	• The compressor drive power module (IPM) on the drive board is not tightened, leading to poor heat dissipation. • Poor heat dissipation due to uneven application of heat dissipation silicone gel on the module. • Poor heat dissipation due to insufficient refrigerant in the system or blocked pipelines; • Abnormal module board;

Table 71

Digital display output

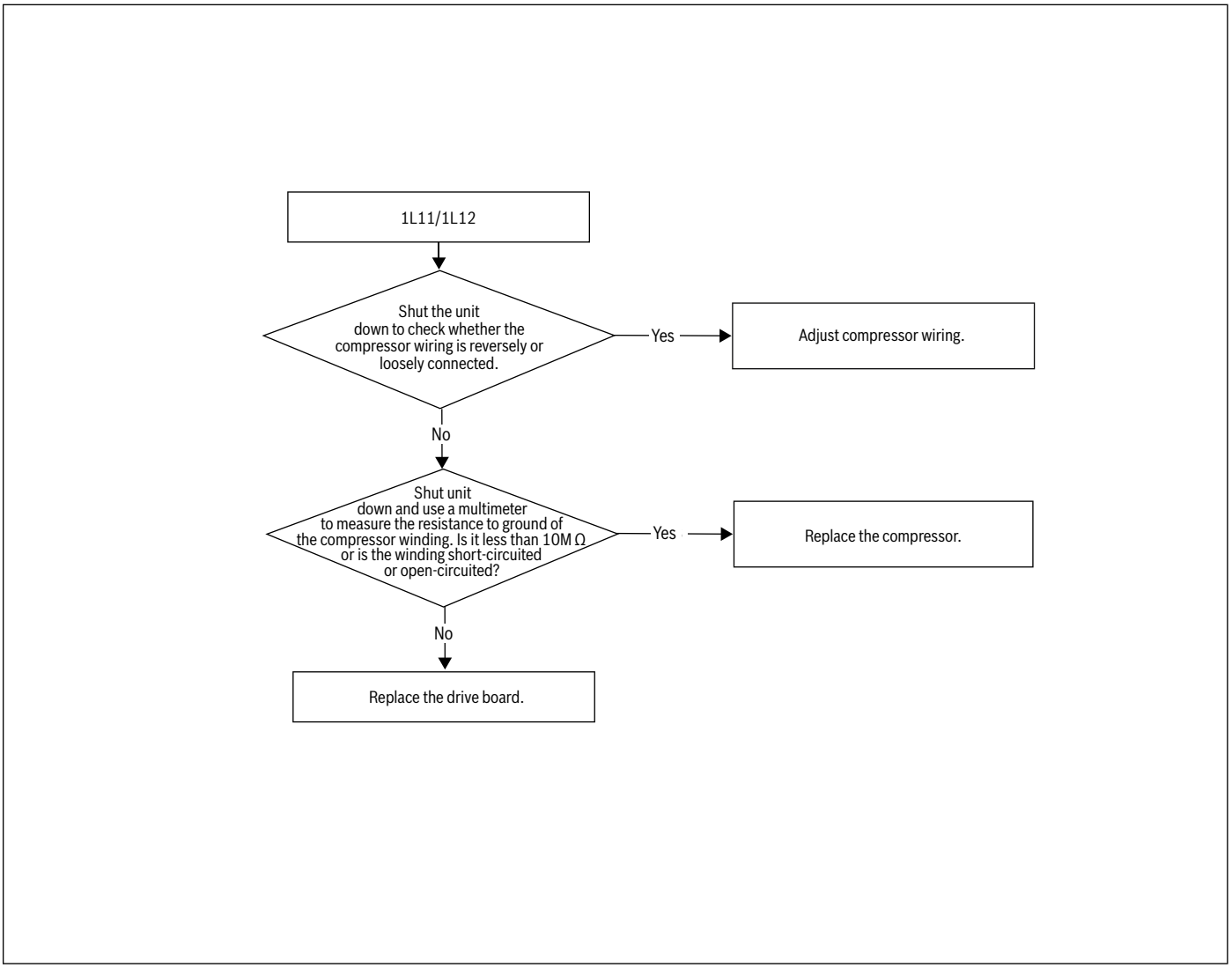


Figure 83

Error Code:	**1L2E:** Compressor inverter module high temperature protection
Description:	• The temperature of the compressor or fan drive board (IPM) exceeds the set value (212°F). • The compressor will stop when the error occurs. If the error disappears one minute later, the compressor will start again
Possible Causes:	• The compressor drive power module (IPM) on the drive board is not tightened, leading to poor heat dissipation. • Poor heat dissipation due to uneven application of heat dissipation silicone gel on the module. • Poor heat dissipation due to insufficient refrigerant in the system or blocked pipelines; • Abnormal module board;

Table 72

Digital display output

Note:

1. Less refrigerant system results in higher Discharge temperature of the compressor, lower Discharge and suction pressure, lower current, and frost on the gas return pipe. Refer to Part 6.4 and Part 6.5

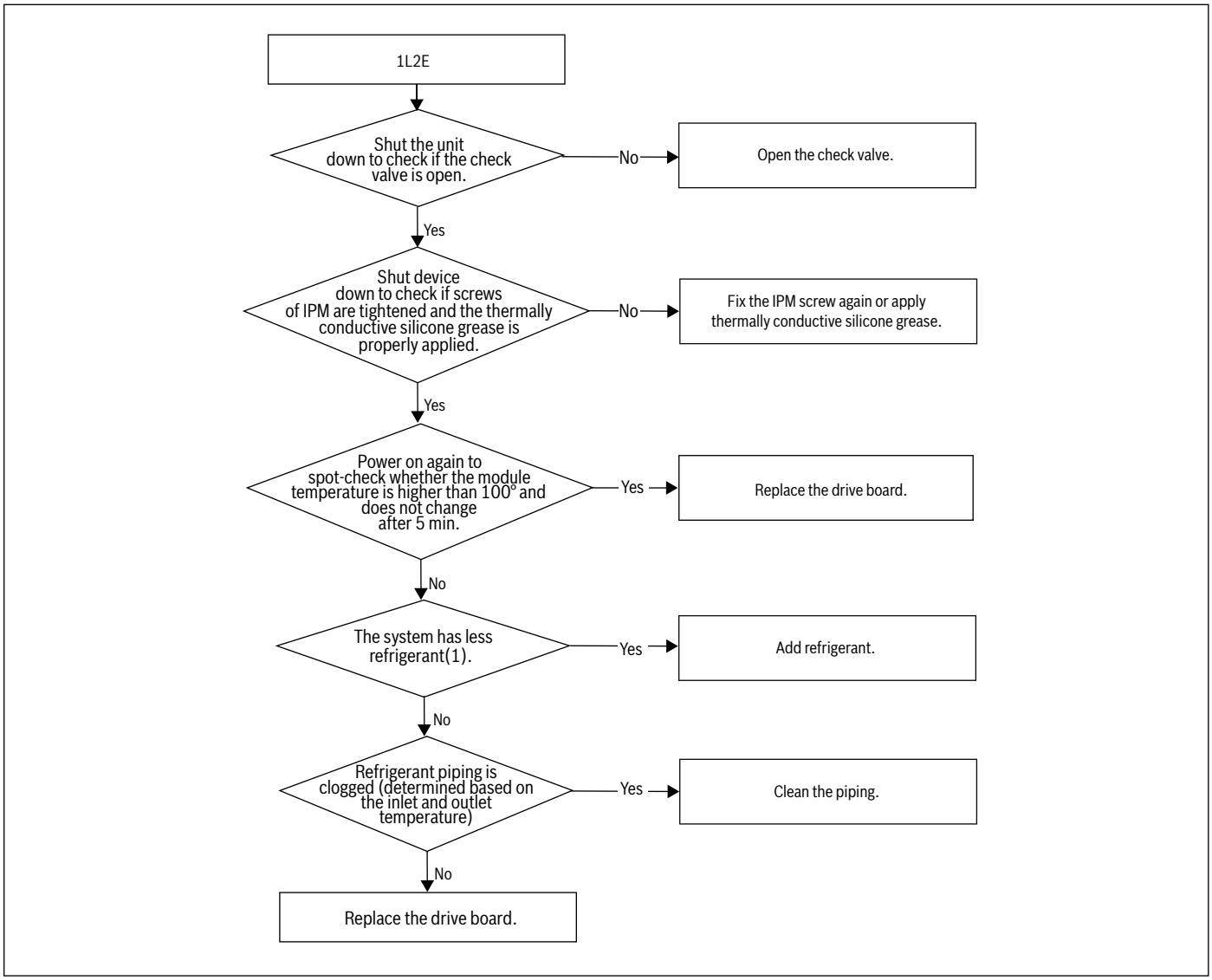


Figure 84

Error Code:	**1L43:** Compressor current sampling bias is abnormal
Description:	• The temperature of the compressor drive board (IPM) exceeds the set value (212℉). • Once this fault occurs, the compressor cannot be started up, and the drive board must be checked.
Possible Causes:	• The compressor and fan drive board is faulty.

Table 73

Digital display output

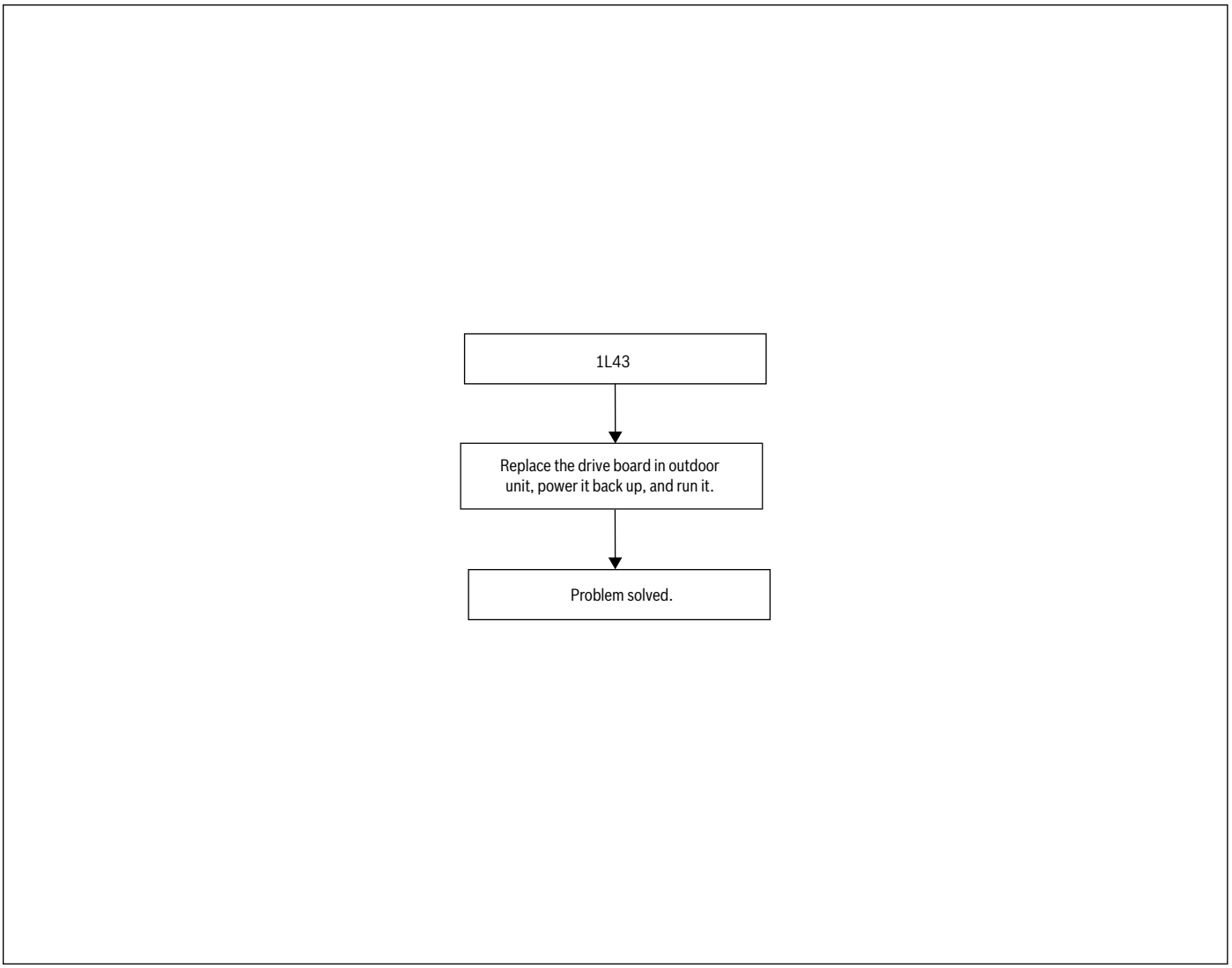


Figure 85

Error Code:	**1L45:** Compressor motor code mismatch
Description:	• The compressor parameters set by the main control board do not match the compressor parameters of the drive board. • Once this fault occurs, the compressor cannot be started up, and the drive board must be checked.
Possible Causes:	• The capacity DIP switch or model DIP switch of the main control board is incorrectly set. • The model selected does not match the drive board. • The main board or compressor drive board is faulty.

Table 74

Digital display output

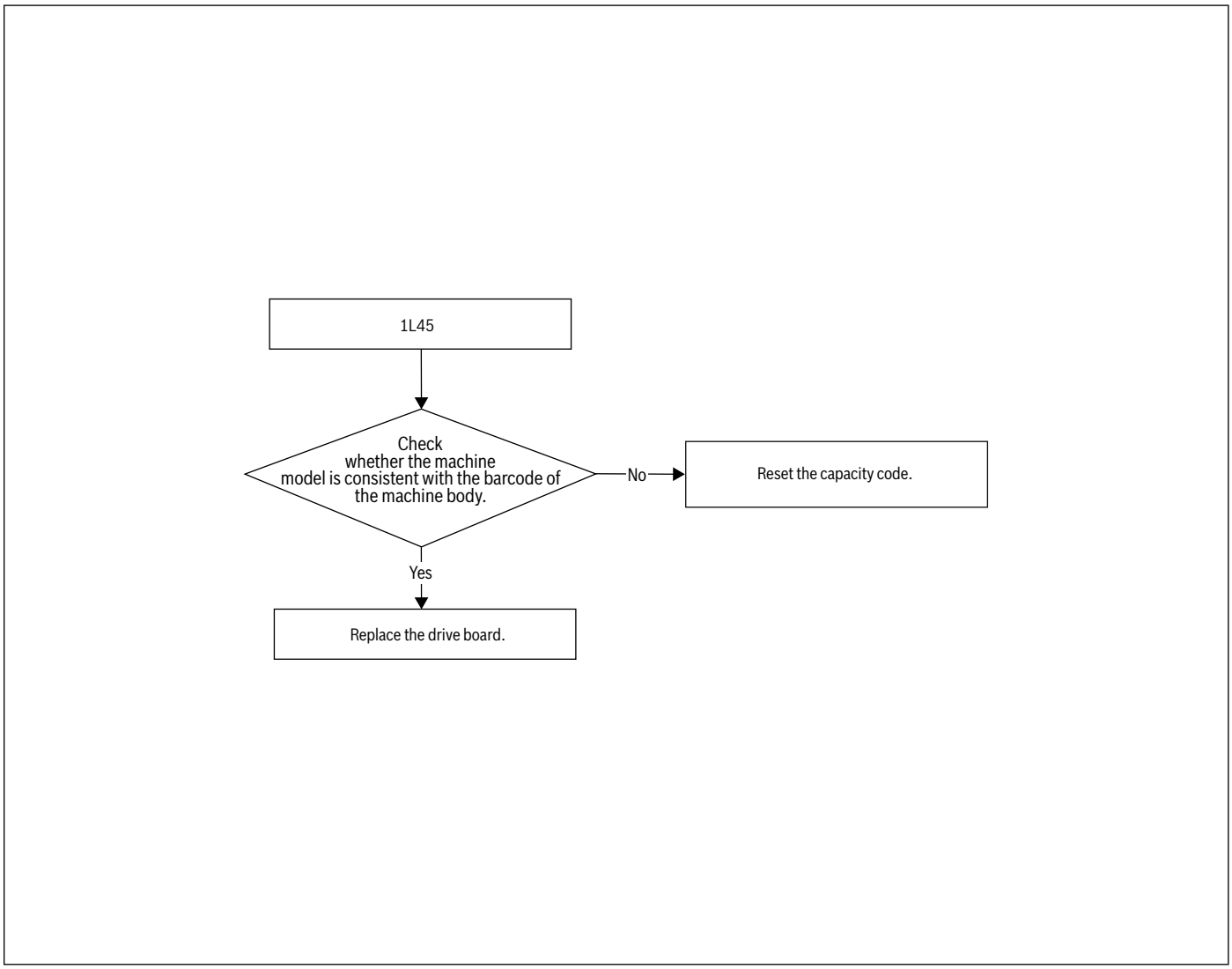


Figure 86

Error Code:	**1L5E:** Compressor startup failed
Description:	• The compressor fails to start • The compressor stops running after the error occurs. If the error disappears one minute later, the compressor starts
Possible Causes:	• The stop valve is not open • There is a pressure difference at system startup • Compressor stuck, wear, system blockage • Abnormal compressor drive board

Table 75

Digital display output

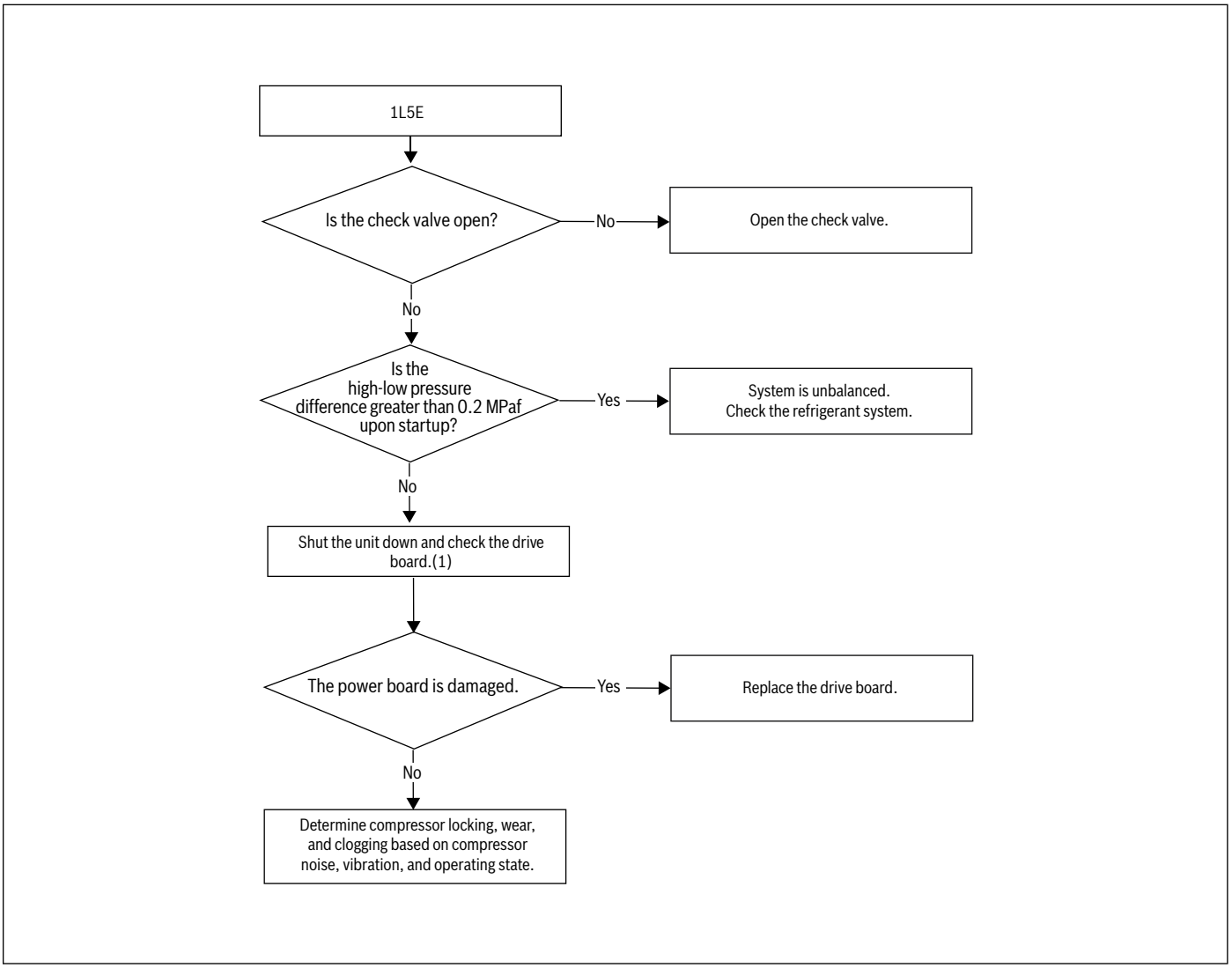


Figure 87

Error Code:	**1L51:** Compressor zero speed protection
Description:	• Compressor locked-rotor occurred
Possible Causes:	• The system has impurities or lacks oil, causing compressor locked

Table 76

Digital display output

Error Code:	**1L52:** Compressor locked-rotor Protection
Description:	• The compressor is blocked. • The compressor stops running after the error occurs. If the error disappears one minute later, the compressor starts again.
Possible Causes:	• The compressor is blocked due to impurities or lack of oil in the system.

Table 77

Digital display output

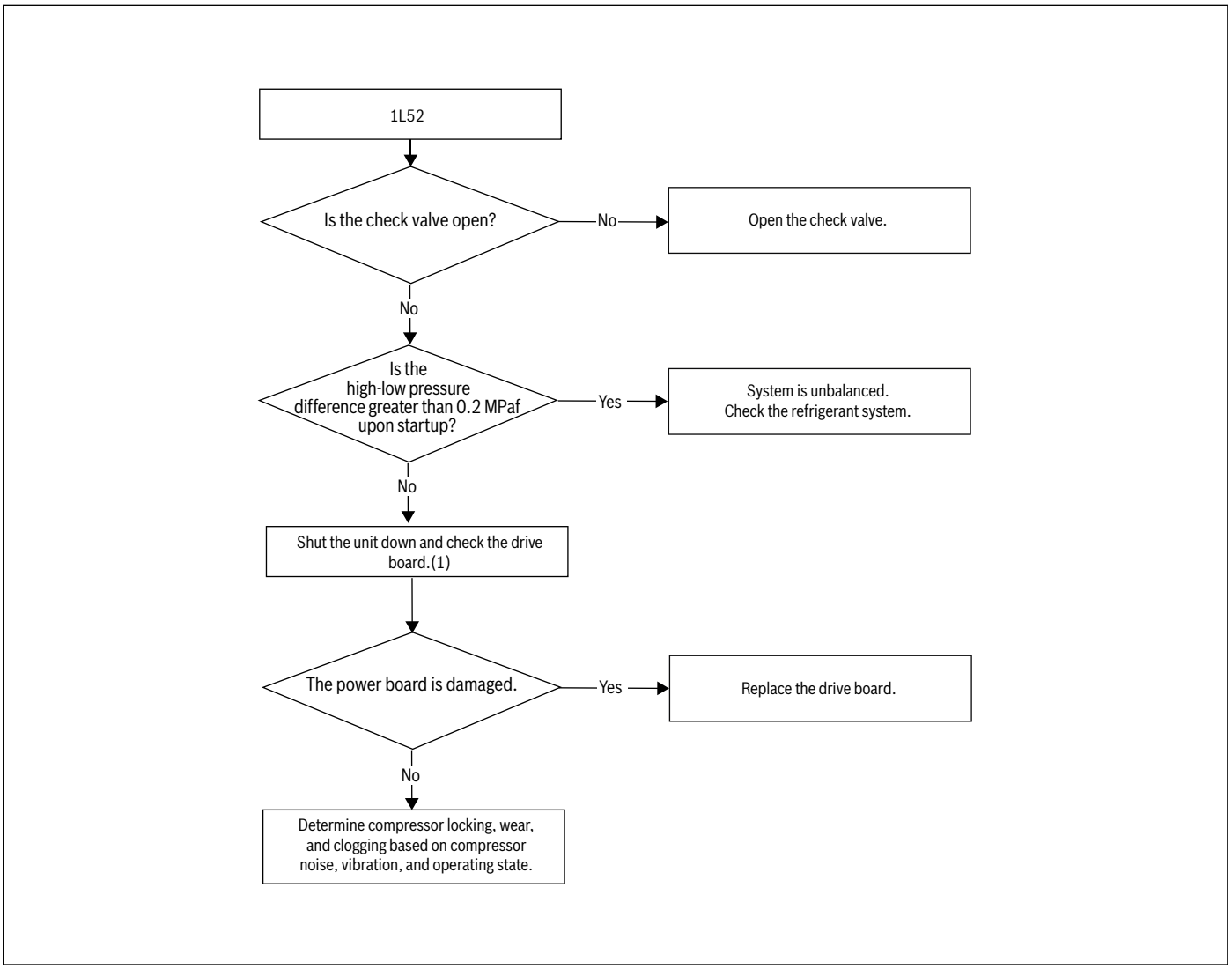


Figure 88

Error Code:	**1L6E:** Compressor motor phase loss protection
Description:	• Compressor phase loss protection occurred
Possible Causes:	• Poor contact of compressor wiring or terminal screw is not tightened

Table 78

Digital display output

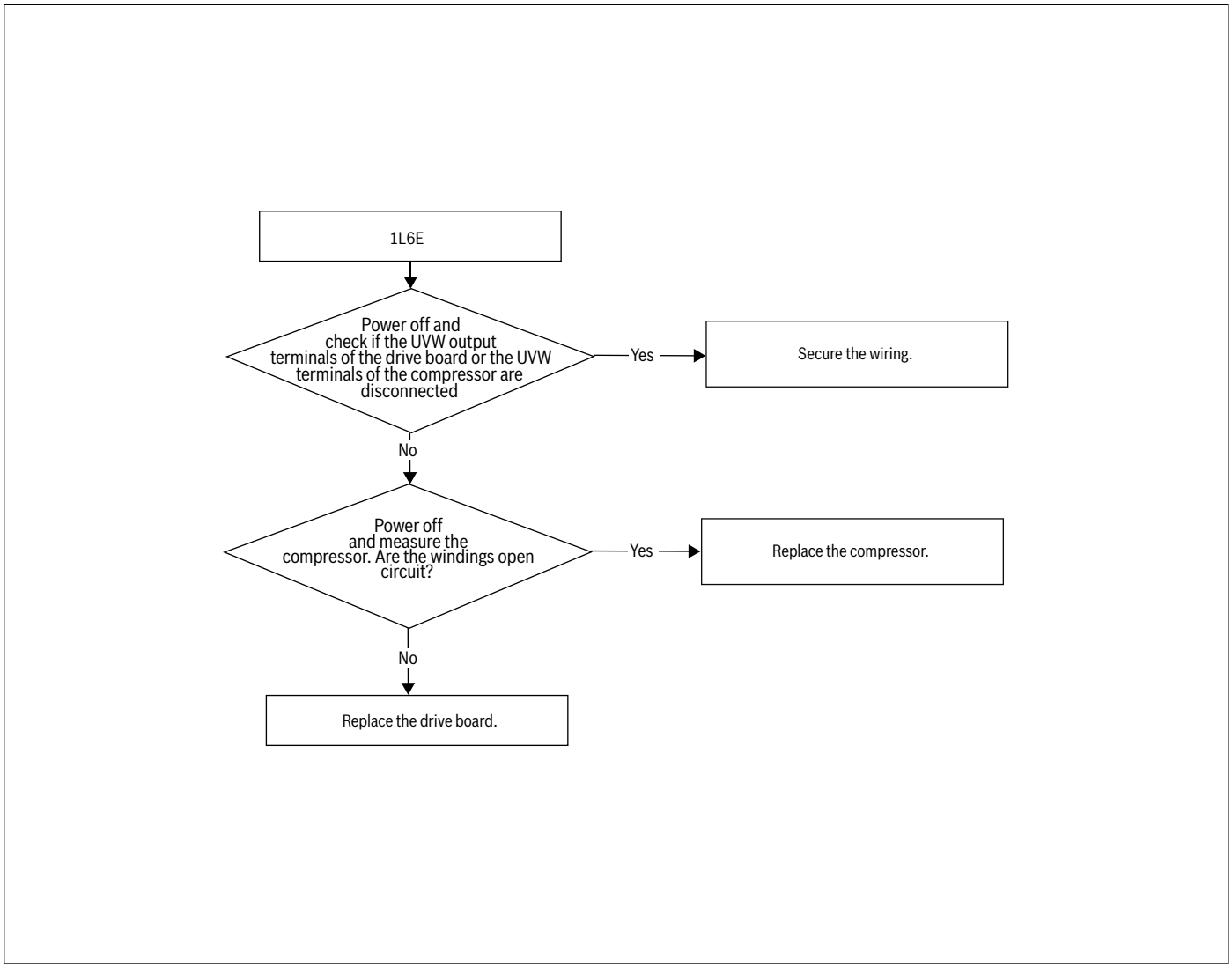


Figure 89

Error Code:	**1L65:** Compressor IPM short circuit
Description:	• Compressor IPM short circuit
Possible Causes:	• Abnormal control board in outdoor unit: damaged

Table 79

Digital display output

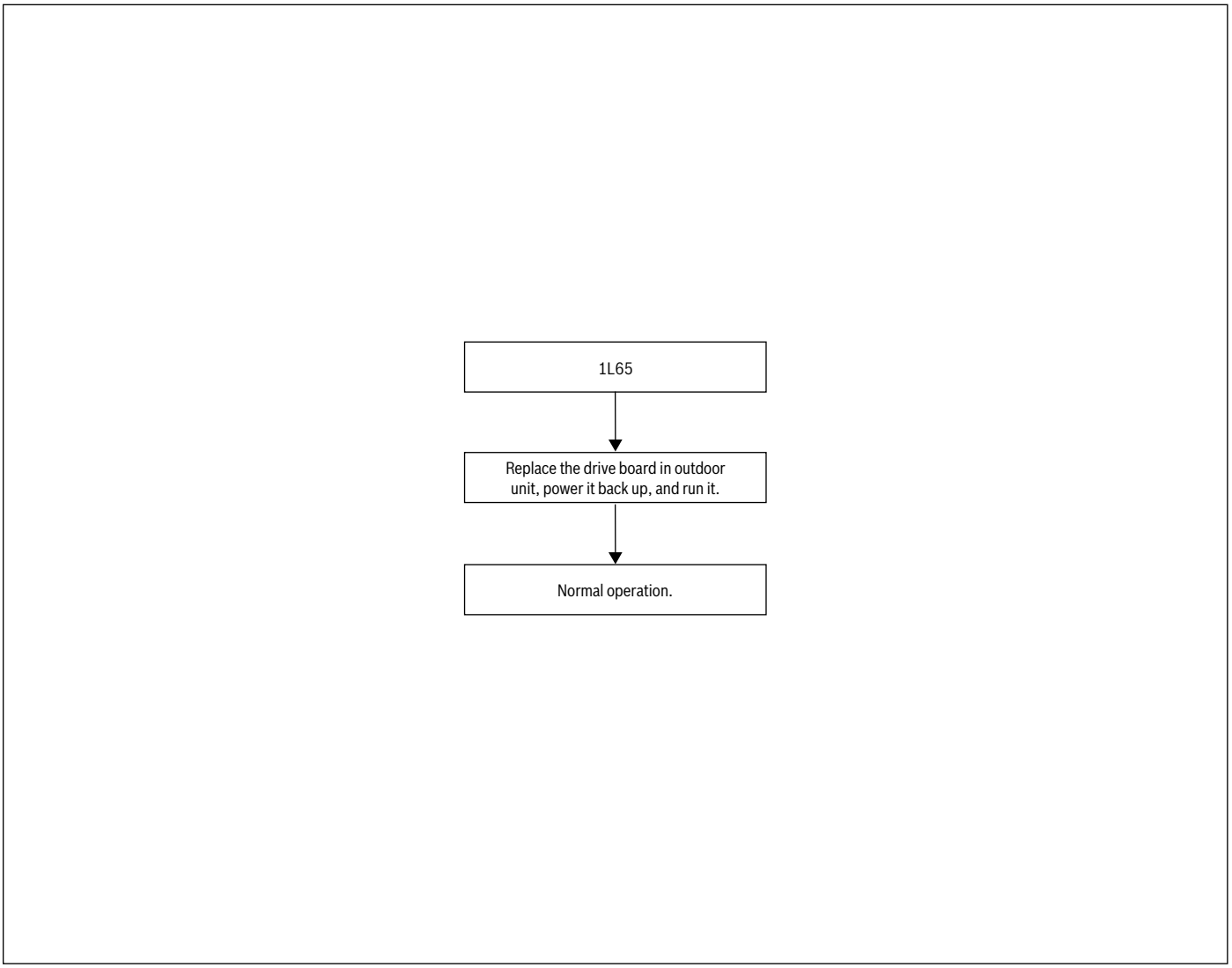


Figure 90

Error Code:	**1Lbe:** High pressure switch protection
Description:	• The high pressure switch connected to the drive board acts. • When the fault occurs, the compressor stops operation. If the fault disappears in 1 min, the compressor is started up again
Possible Causes:	• System pressure is too high. • The high pressure switch is faulty. • The drive board is faulty.

Table 80

Digital display output

Error Code:	**1LCE:** PFC hardware overcurrent
Description:	• PFC hardware over current protection
Possible Causes:	• The PFC IGBT short circuit • The PFC IGBT Open circuit • The Power supply voltage fluctuation • The Power supply voltage distortion

Table 81

Digital display output

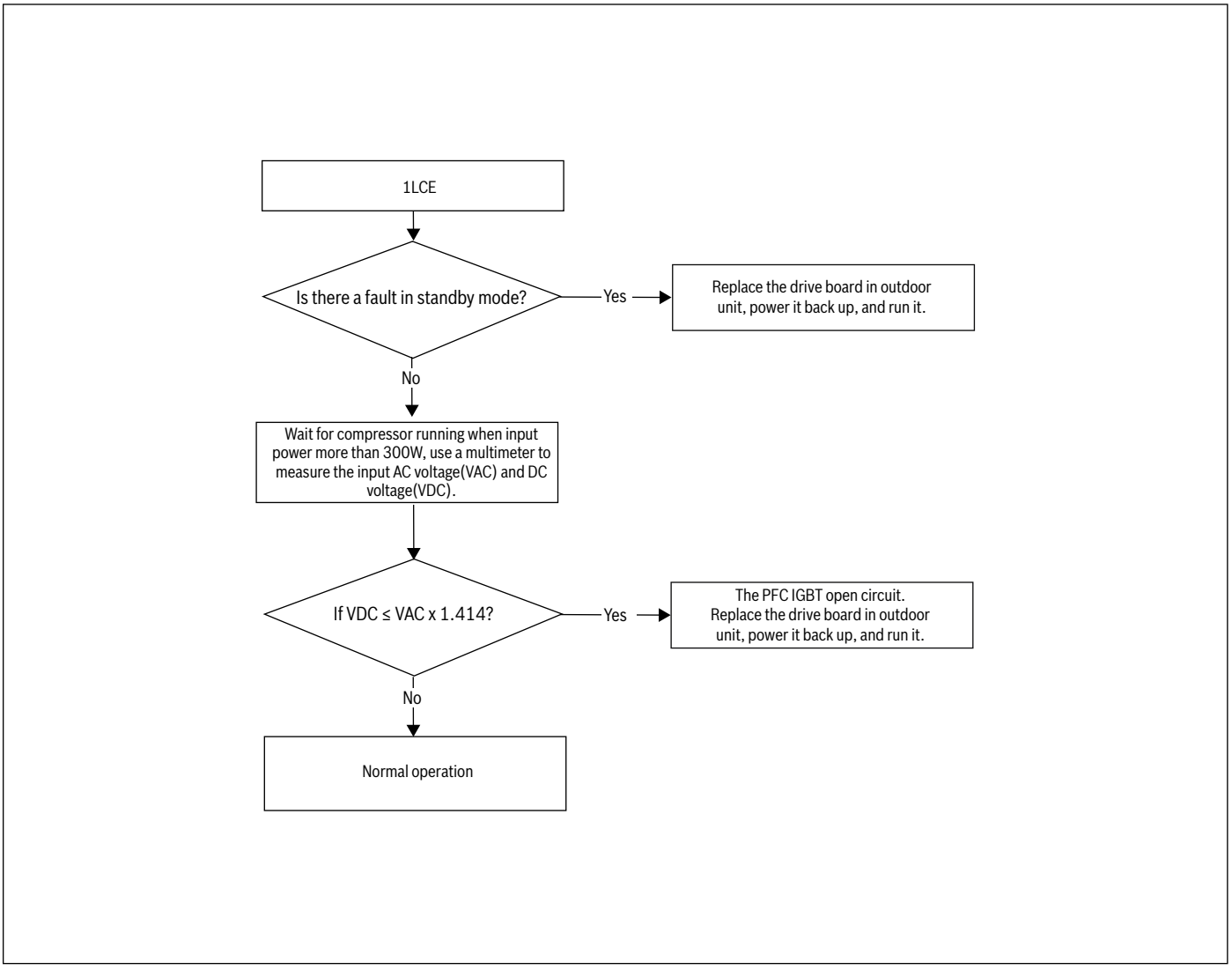


Figure 91

Error Code:	**1LC1:** PFC software overcurrent
Description:	• PFC software over current protection
Possible Causes:	• The PFC IGBT short circuit • The PFC IGBT Open circuit • The Power supply voltage fluctuation • The Power supply voltage distortion

Table 82

Digital display output

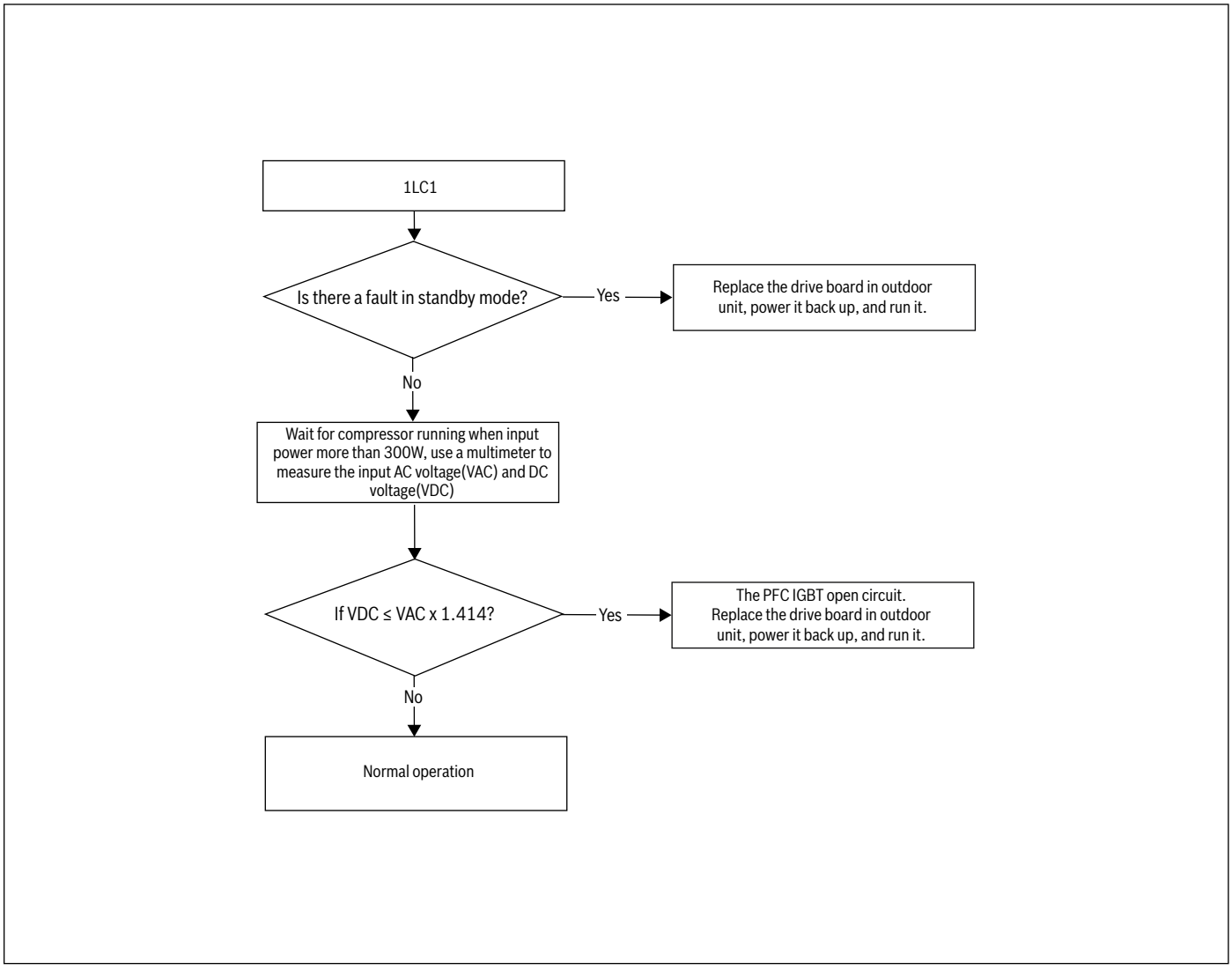


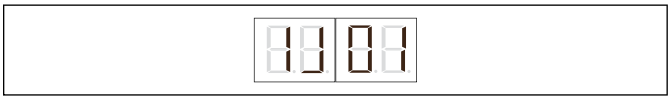
Figure 92

19.5.3 Errors in Fan Driver

Error Code:	**1J01:** Fan error occurs 3 times in 60 minutes
Description:	• Fan error occurs 3 times in 60 minutes
Possible Causes:	• Spot check to inquire about the code. Find out the cause by the error code.

Table 83

Digital display output



Error Code:	**1J1E:** Fan hardware overcurrent
Description:	• Fan error occurs 3 times in 60 minutes
Possible Causes:	• Spot check to inquire about the code. Find out the cause by the error code.

Table 84

Digital display output

Error Code:	**1J11, 1J12:** Fan software overcurrent
Description:	• The fan current exceeds the protection value set for the software. • The fan will stop when the error occurs. If the error disappears five seconds later, the fan will start again.
Possible Causes:	• Severe fan wear. • The fan drive board is faulty.

Table 85

Digital display output

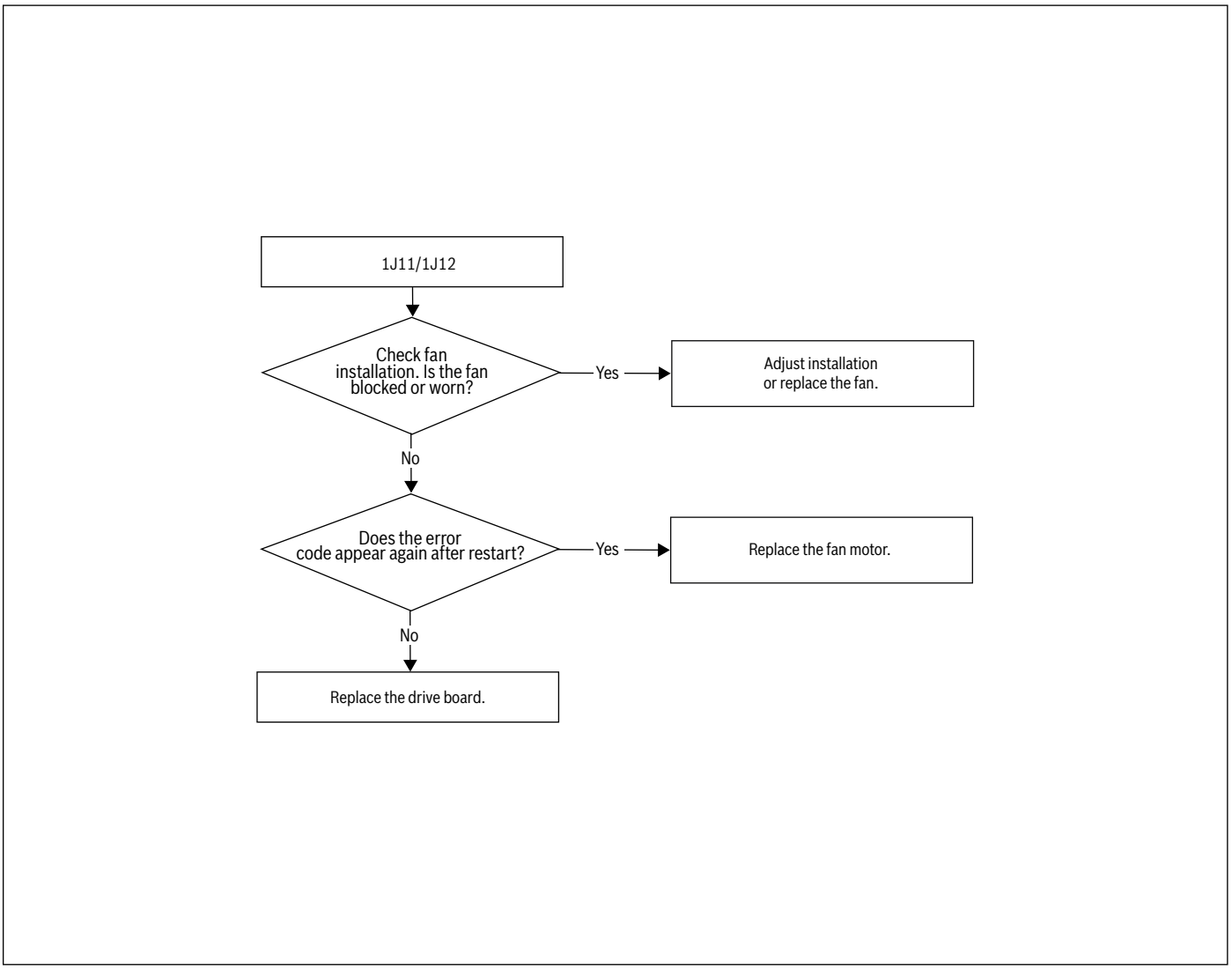


Figure 93

Error Code:	**1J2E:** Fan inverter module high temperature protection
Description:	• The fan current exceeds the protection value set for the software. • The fan will stop when the error occurs. If the error disappears five seconds later, the fan will start again.
Possible Causes:	• Severe fan wear. • The fan drive board is faulty.

Table 86

Digital display output

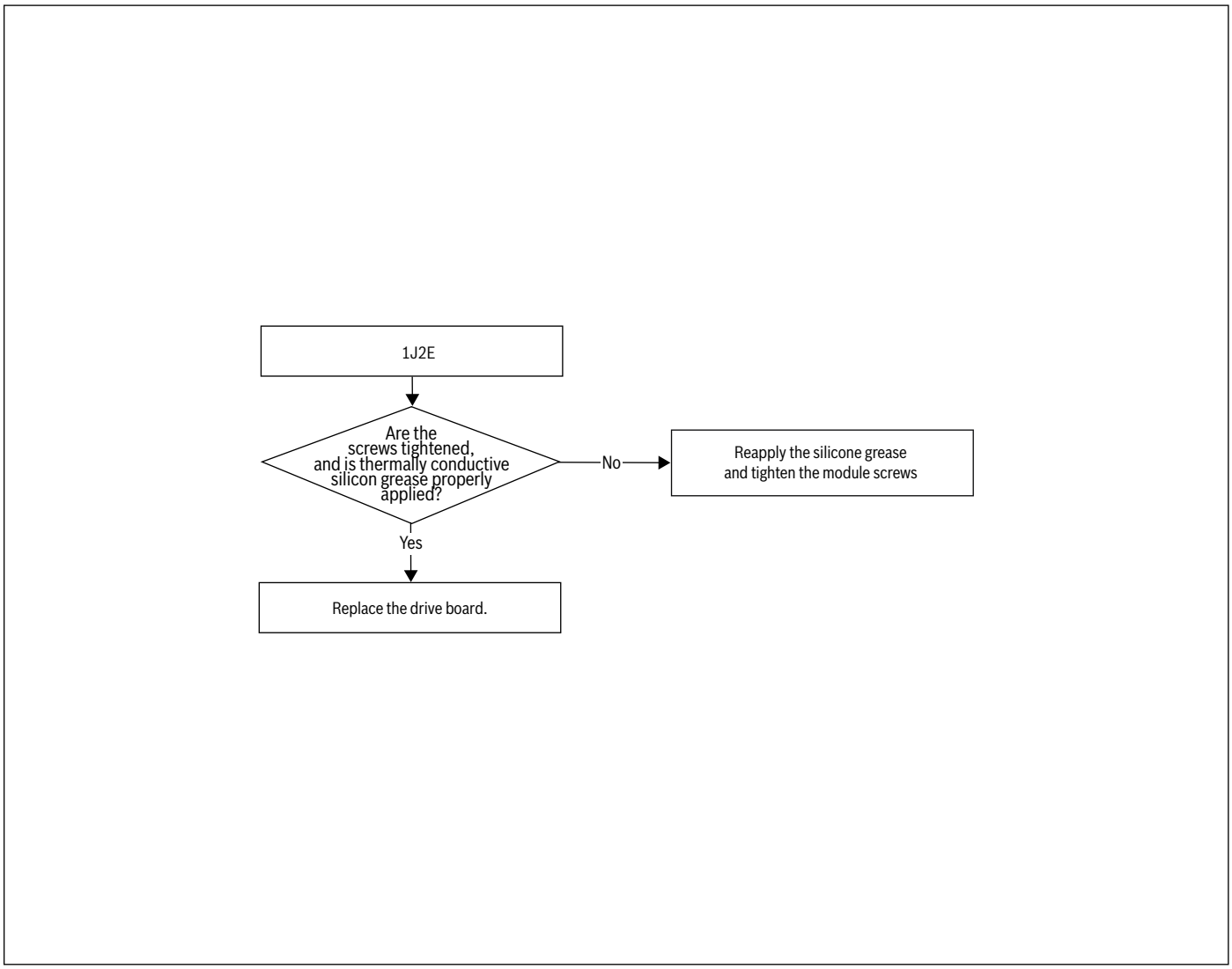


Figure 94

Error Code:	**1J43:** Fan current sampling is abnormal
Description:	• The temperature of the fan drive board (IPM) exceeds the set value (212℉).
Possible Causes:	• The compressor and fan drive board is faulty.

Table 87

Digital display output

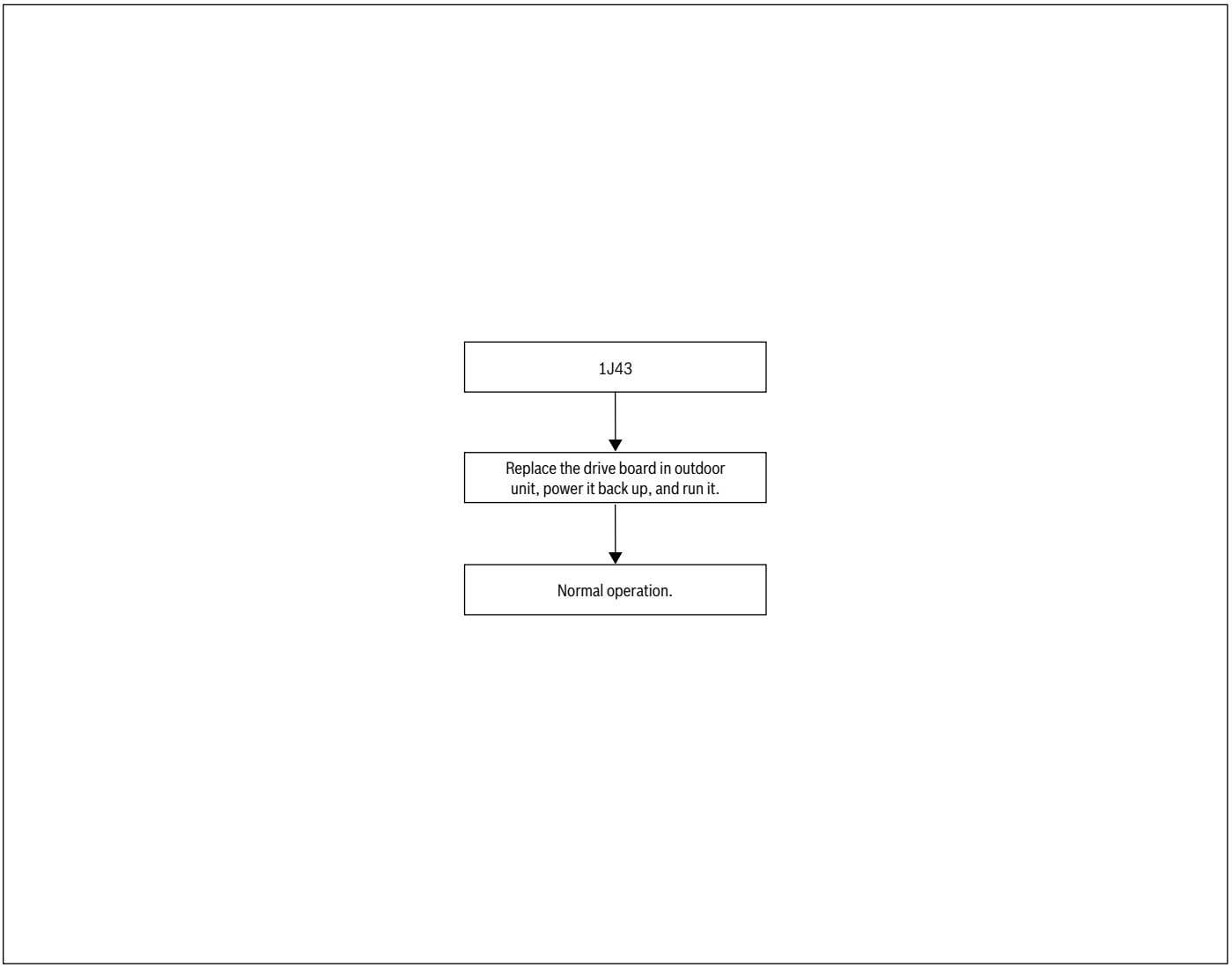


Figure 95

Error Code:	**1J45:** Fan motor code mismatch
Description:	• The compressor parameters set by the main control board do not match the compressor parameters of the drive board. • Once this fault occurs, the fan cannot be started up, and the drive board must be checked.
Possible Causes:	• The capacity DIP switch or model DIP switch of the main control board is incorrectly set. • The model selected does not match the drive board. • The fan drive board is faulty.

Table 88

Digital display output

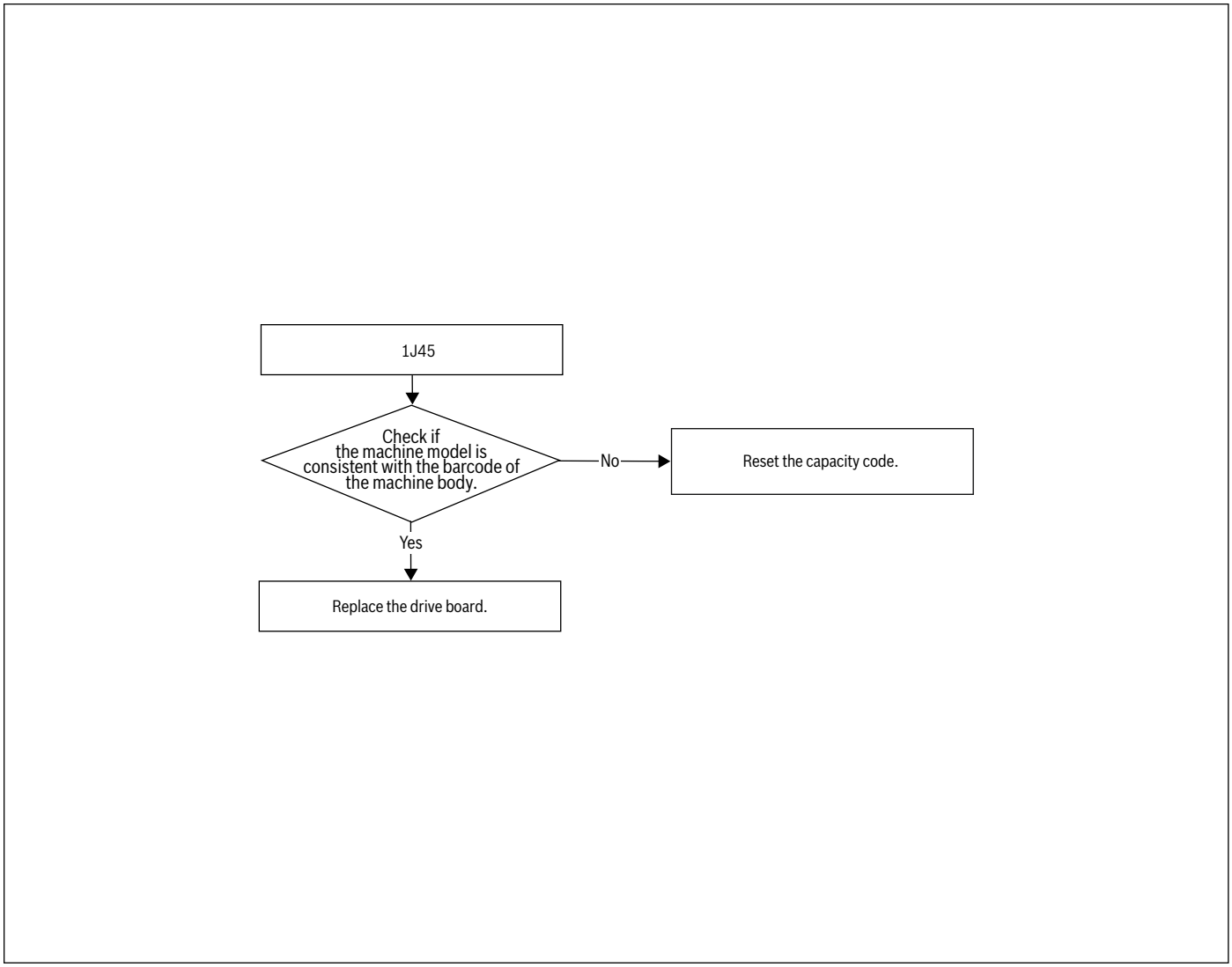


Figure 96

Error Code:	**1J5E:** Fan startup failed
Description:	• The fan fails to be started. • The fan stops running after the error. If the error disappears after five seconds, the fan starts again.
Possible Causes:	• Fan motor stuck • Fan is started against the wind • Fan drive board is abnormal

Table 89

Digital display output

Note:

1. Refer to 6.7 Quick Field Test Guide on Compressor & Fan Drive Board

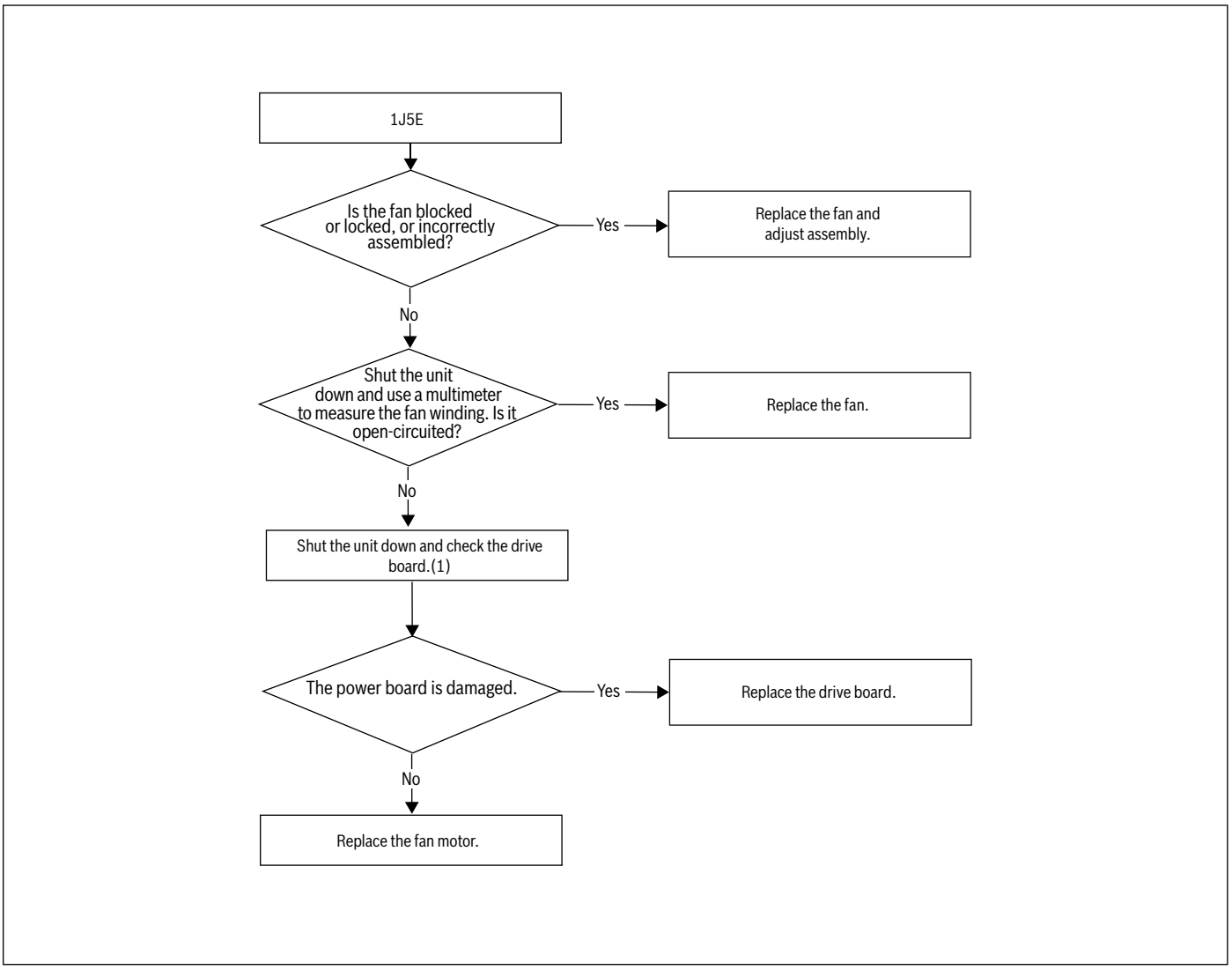


Figure 97

Error Code:	**1J51:** Fan zero speed protection
Description:	• Fan zero speed protection
Possible Causes:	• The system has impurities or lacks oil, causing fan locked

Table 90

Digital display output

Error Code:	**1J52:** Fan locked-rotor Protection
Description:	• The fan is blocked. • The fan stops running after the error. If the error disappears after five seconds, the fan starts again.
Possible Causes:	• The fan shaft is stuck.

Table 91

Digital display output

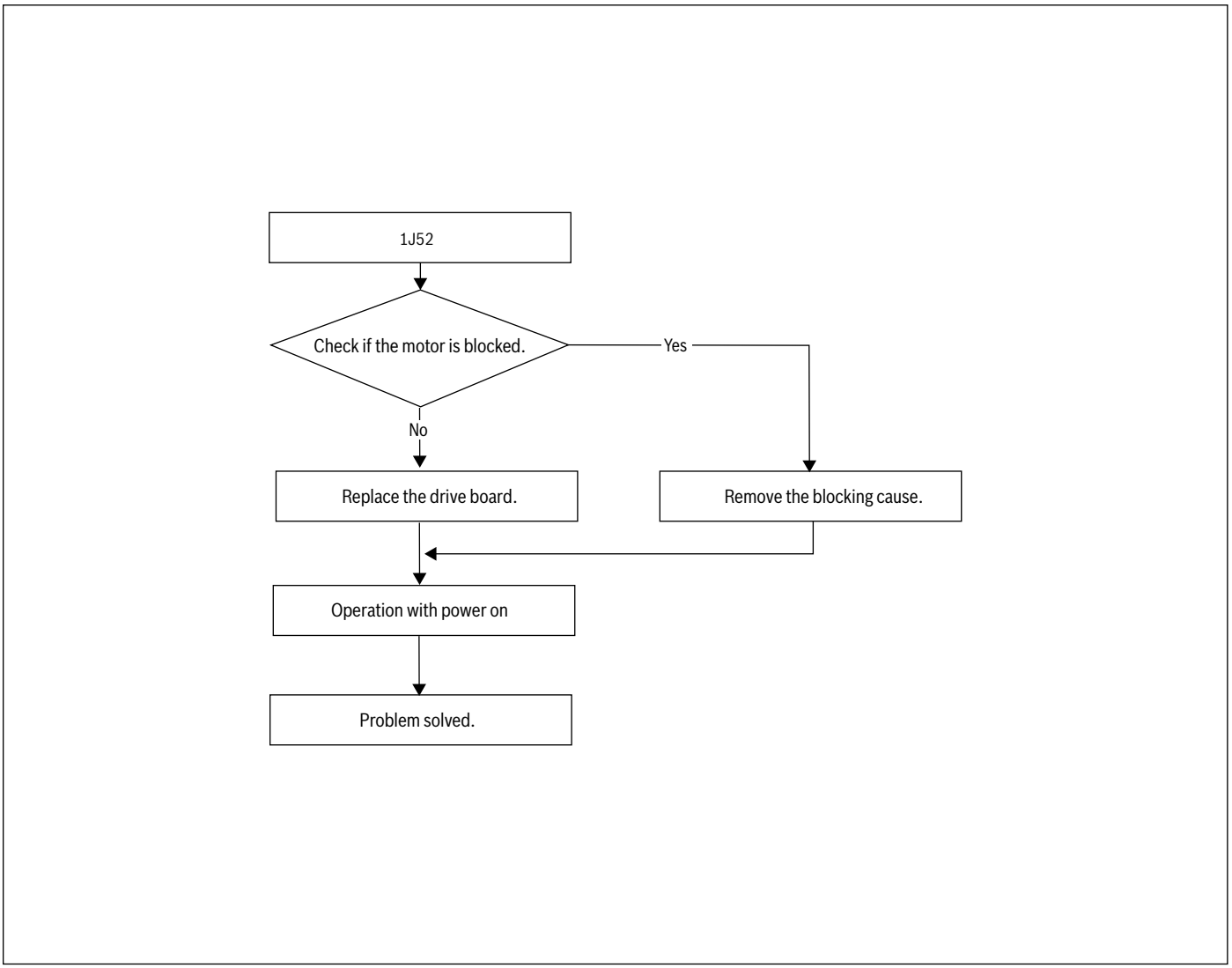


Figure 98

Error Code:	**1J6E:** Fan motor phase loss protection
Description:	• The fan has phase loss protection. • The fan stops running after the error. If the error disappears after five seconds, the fan starts again
Possible Causes:	• The compressor cable is in poor contact or the terminal screw is not tightened. • The IPM of inverter drive board is damaged

Table 92

Digital display output

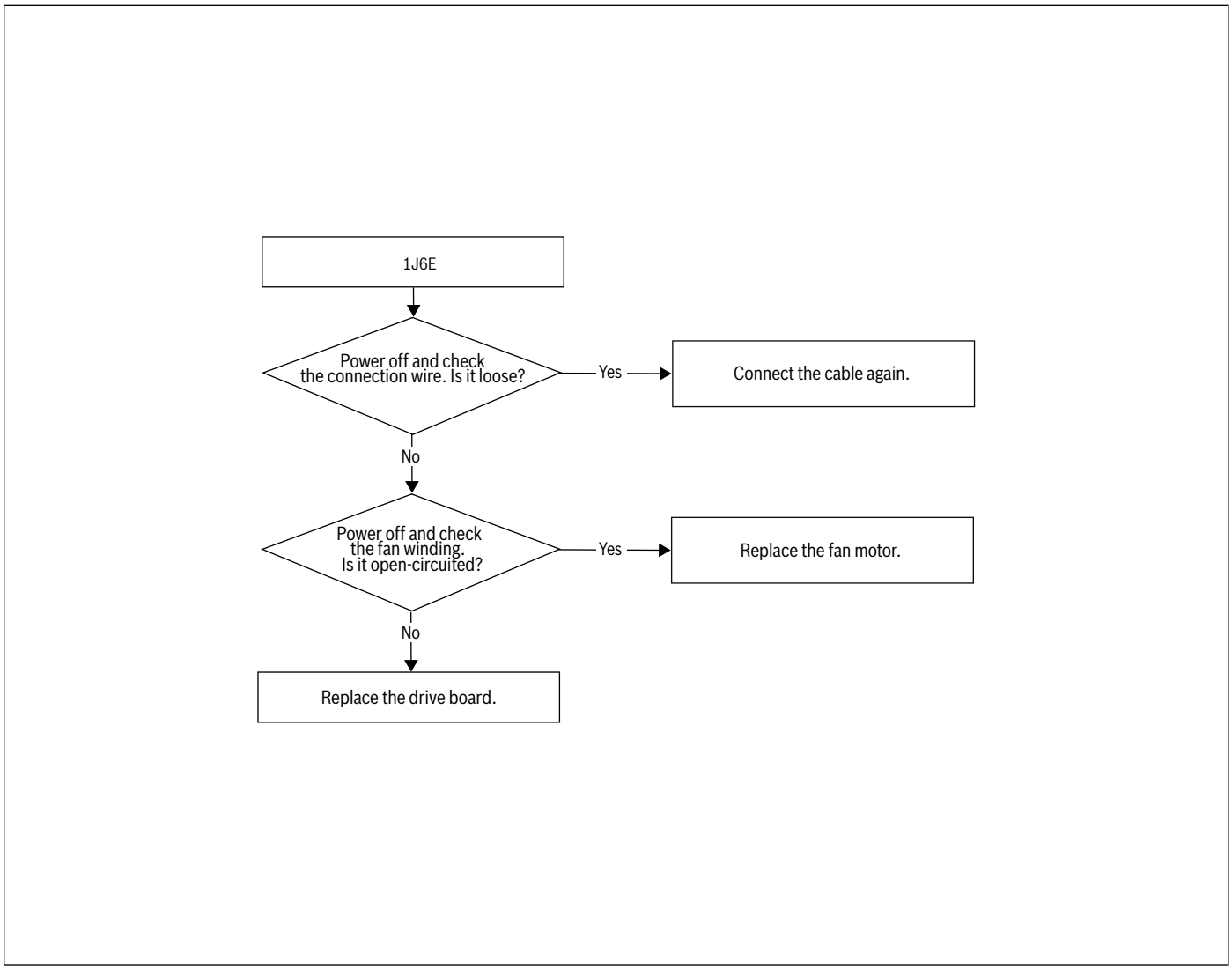


Figure 99

Error Code:	**1J65:** Fan IPM short circuit
Description:	• Fan IPM short circuit
Possible Causes:	• Abnormal control board in outdoor unit: damaged

Table 93

Digital display output

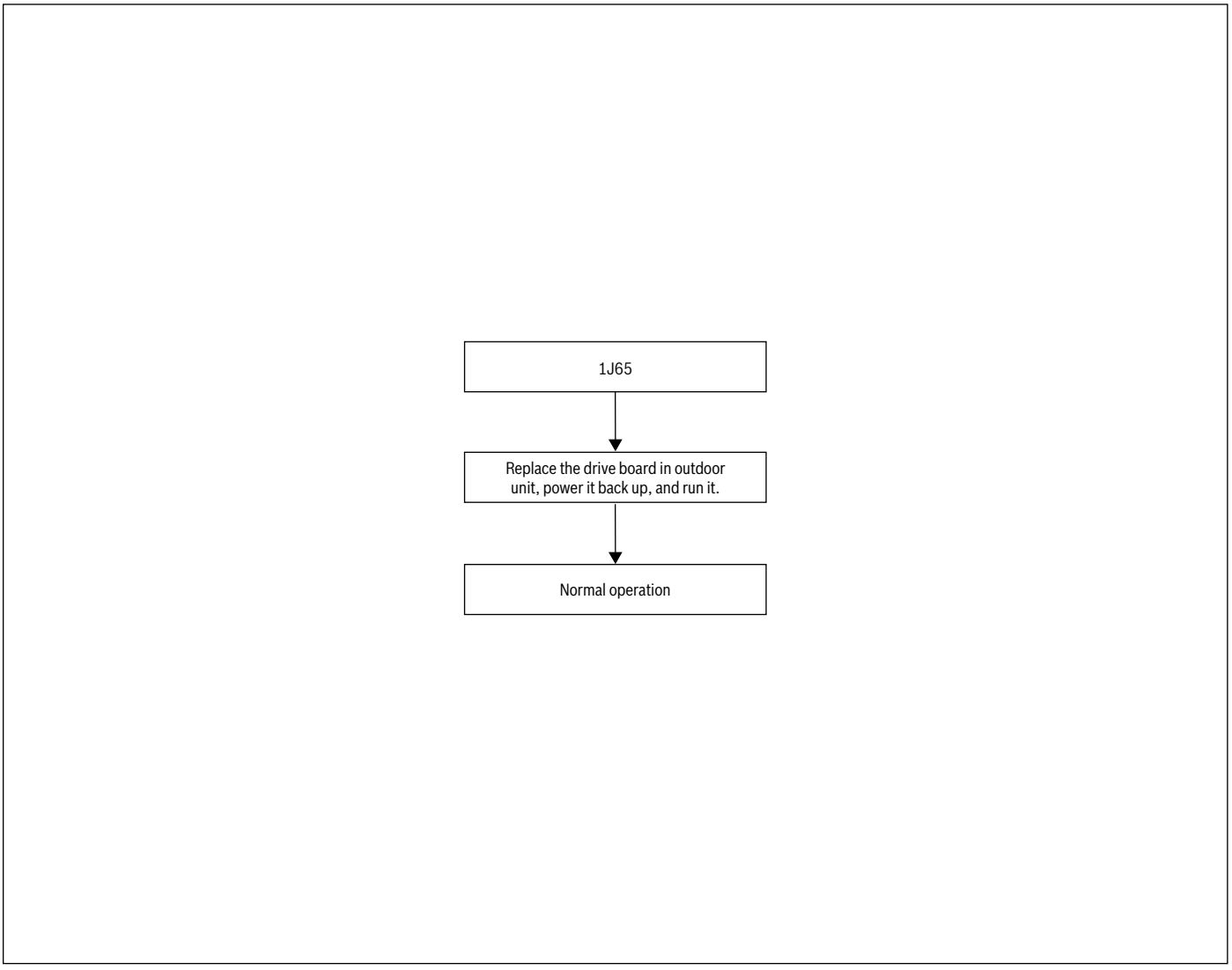


Figure 100

19.5.4 Errors in Shut-off Device

Error Code:	**3b01:** The electronic ball valve is in error
Description:	• All units stop running • Shut-off device displays error code 3b01, the outdoor unit displays error code Ad1
Possible Causes:	• Electronic expansion valve EBVA/B is not connected to main control board correctly. • The electronic expansion valve EBVA/B coil is damaged. • The main control board is damaged.

Table 94

Digital display output

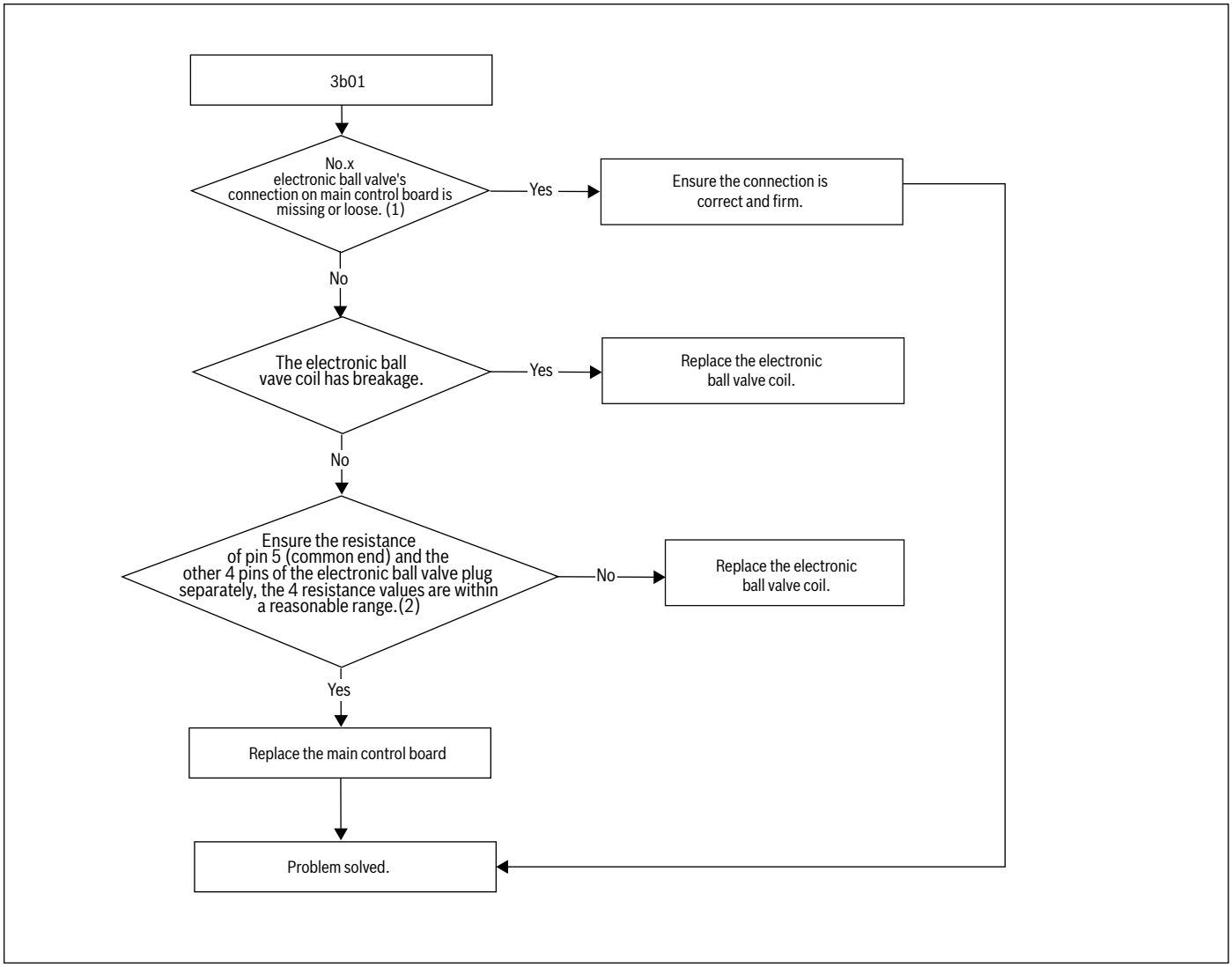


Figure 101

**See Notes on the following page.*

Notes:

1. All models of ODU have electronic ball valves A and B, which are connected to the main boards CN30 and CN31.

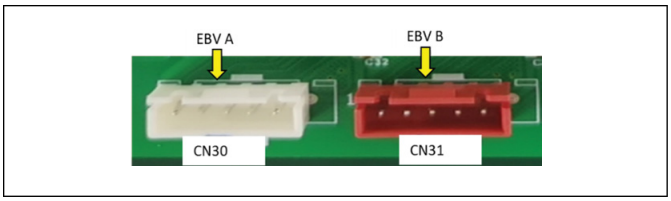


Figure 102

2. Schematic diagram of coil resistance measurement of electronic ball valve and reference range of resistance.

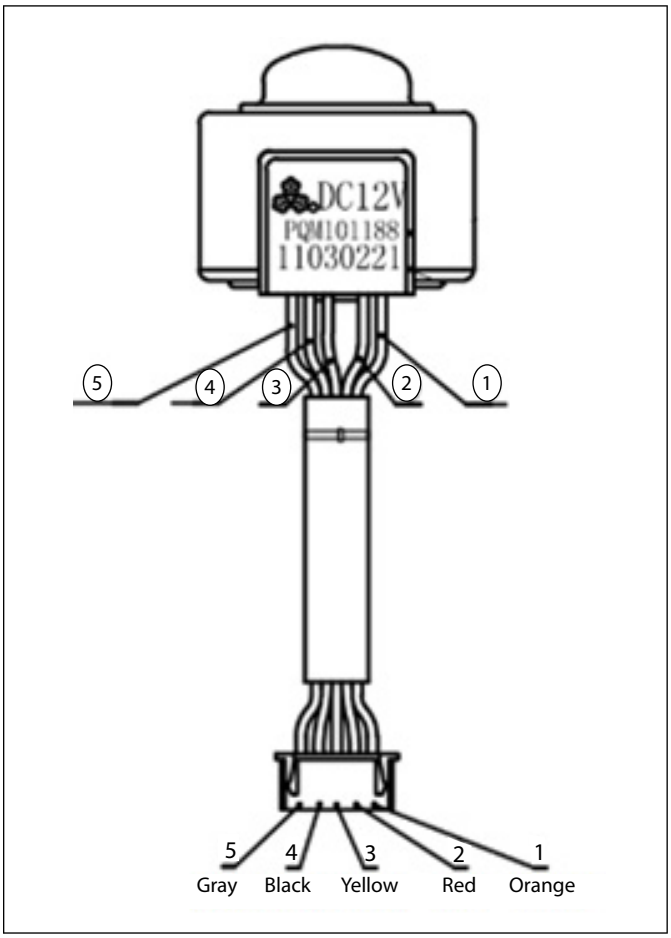


Figure 103

The coil	Valve A/B
Measurement point	Resistance
1-5	46±3.7Ω
2-5	46±3.7Ω
3-5	46±3.7Ω
4-5	46±3.7Ω

Table 95

Error Code:	**C2A:** Communication error between outdoor unit and refrigerant shut-off device.
Description:	• Communication error between outdoor unit and refrigerant shut-off device. • All units stop running. • Shut-off device displays error code C2A, the outdoor unit displays error code Ad1
Possible Causes:	1. Error caused by communication: • See "Error caused by communication" table 2. Error caused by other reasons: • Outdoor unit is not powered on; • The communication wiring is disconnected between the outdoor unit and the shut-off device; ◦ The communication wiring is not tightened or the surface contact of the wiring block is poor between the outdoor unit and the shut-off device; ◦ The communication wiring is disconnected or in bad contact due to various reasons; ◦ PQE wiring sequence is incorrect (e.g. connected as PEQ or QEP); • The communication wiring not standardized as required by the installation instructions; • The total length of communication wiring exceeds the standard requirements, the total length of M1M2 communication L ≤ 2000m; • The communication wiring is disturbed by strong electromagnetic wave

Table 96

Digital display output

Shut-off device	ODU	Error code	Recover
PQE	M1M2	C2A (Risk of damage to the shut-off device)	Recommended shut-off device port to M1 M2 (n8A)

Table 97 Error caused by communication

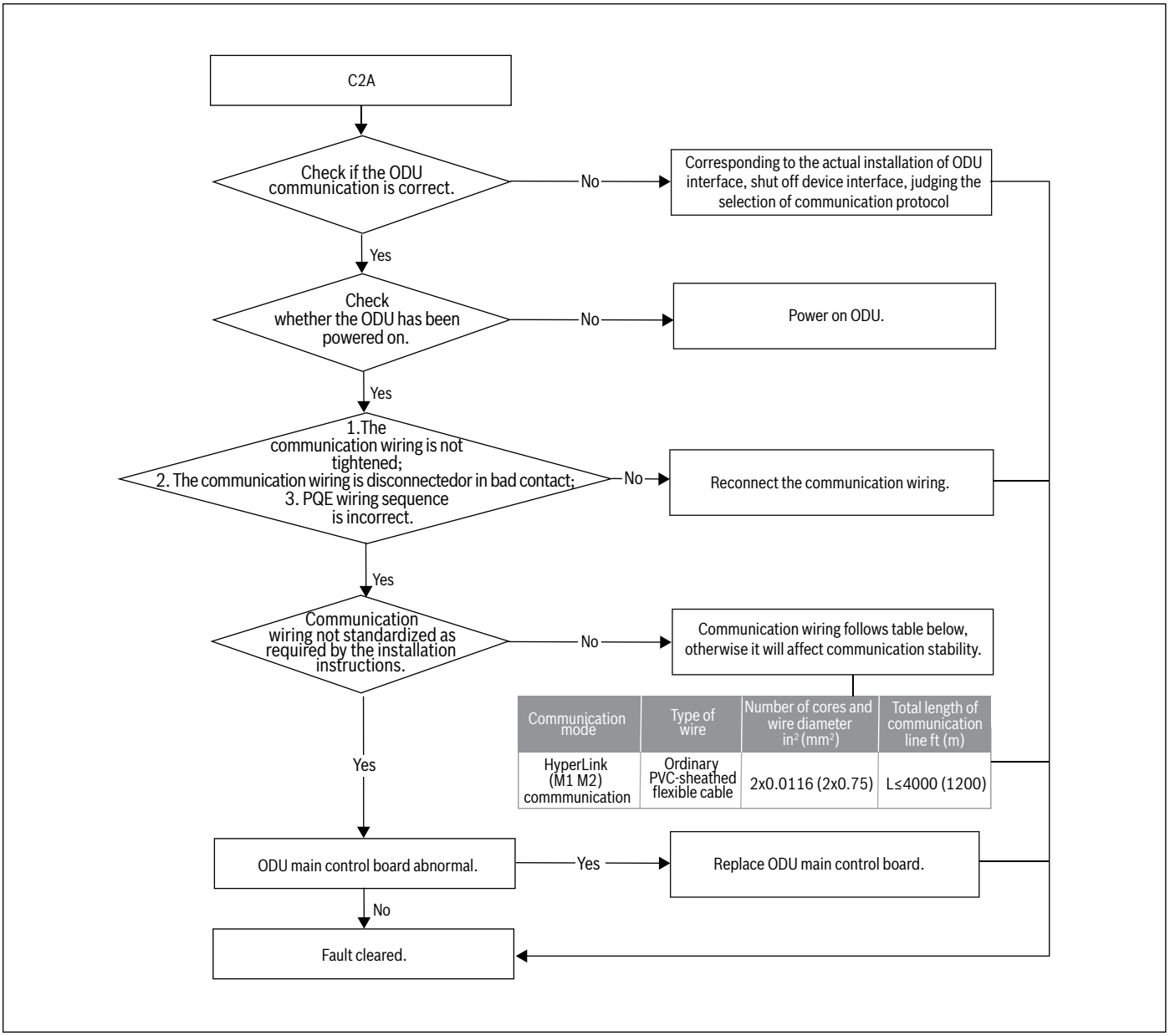

C2A
Check if the ODU communication is correct.
No
Corresponding to the actual installation of ODU interface, shut off device interface, judging the selection of communication protocol
Yes
Check whether the ODU has been powered on.
No
Power on ODU.
Yes
1.The communication wiring is not tightened;
2. The communication wiring is disconnectedor in bad contact;
3. PQE wiring sequence is incorrect.
No
Reconnect the communication wiring.
Yes
Communication wiring not standardized as required by the installation instructions.
No
Communication wiring follows table below, otherwise it will affect communication stability.
Communication mode
Type of wire
Number of cores and wire diameter in² (mm²)
Total length of communication line ft (m)
HyperLink (M1 M2) commmunication
Ordinary PVC-sheathed flexible cable
2x0.0116 (2x0.75)
L≤4000 (1200)
Yes
ODU main control board abnormal.
Yes
Replace ODU main control board.
No
Fault cleared.

Figure 104

Error Code:	**P71:** Error in EEPROM
Description:	• The EEPROM parameter of the shut-off device main control board is incorrect • All units stop running. • Shut-off device displays error code
Possible Causes:	• EEPROM units damaged; • Main control board is damaged

Table 98

Digital display output

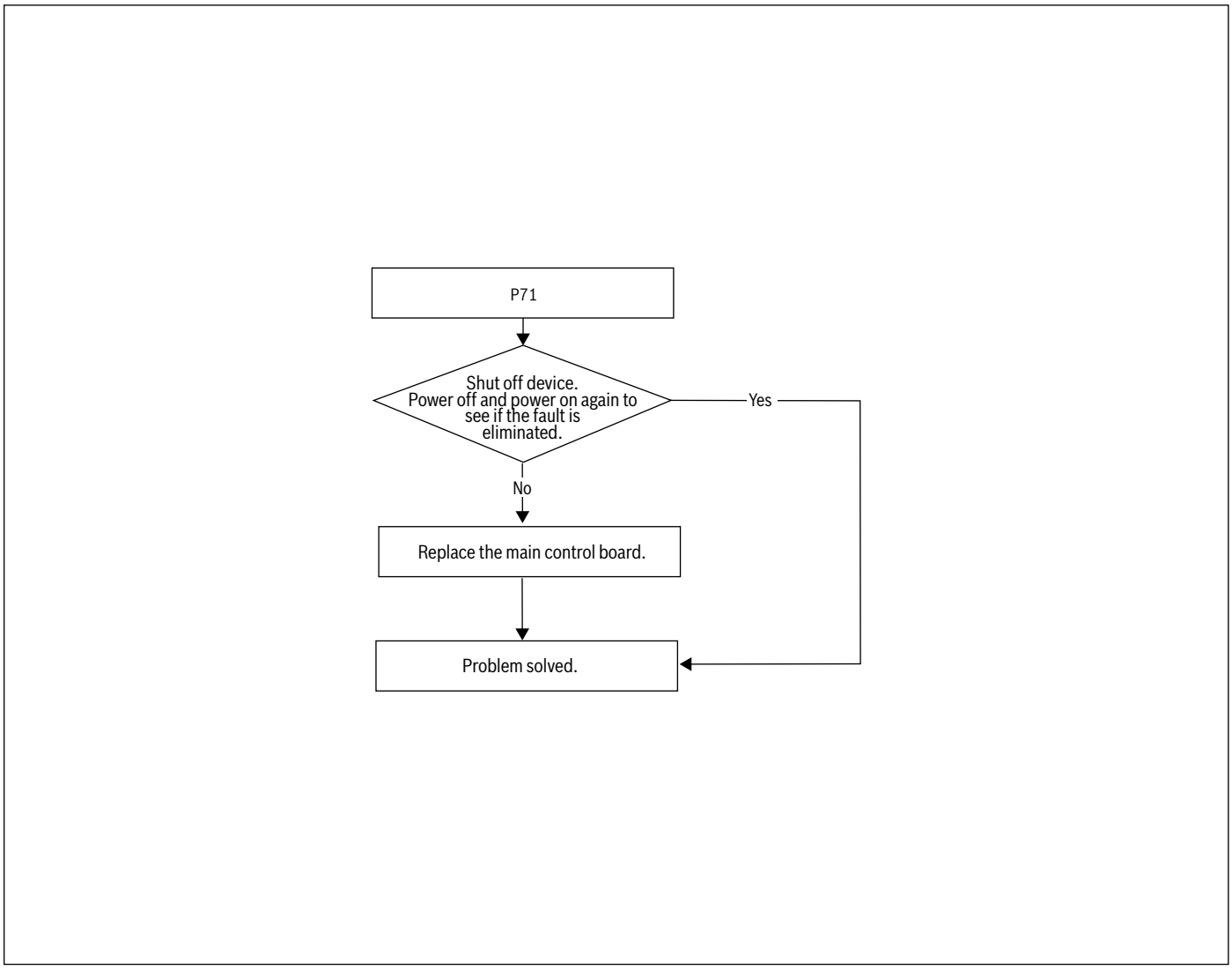


Figure 105

Error Code:	**Ab1:** Error in power-down
Description:	• The power supply to the shut-off device is disconnected. • All units stop running. • Shut-off device displays error code
Possible Causes:	• Power switch jumped turns; • Loose power cord; • Main control board is damaged:

Table 99

Digital display output

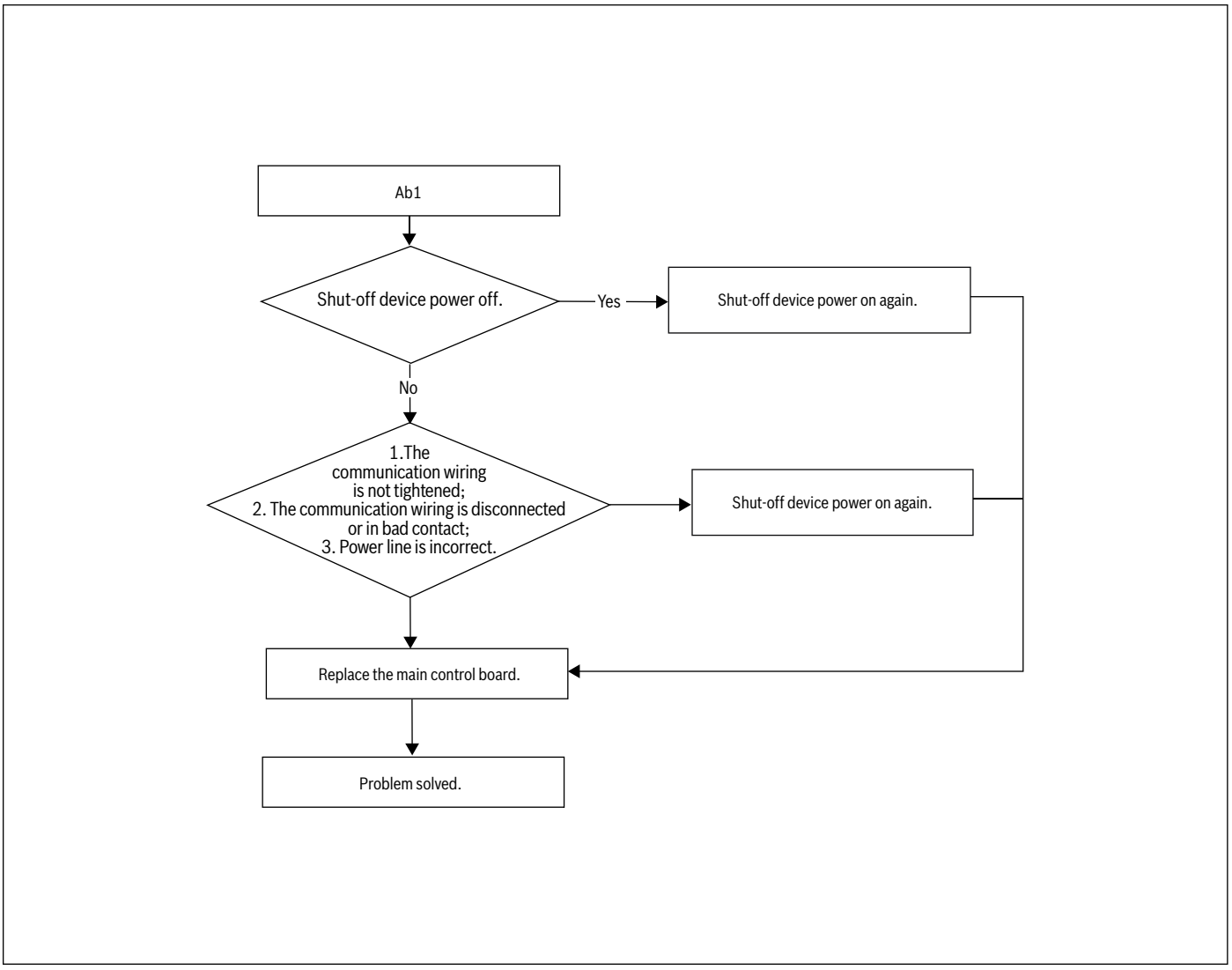


Figure 106

Error Code:	**P5d:** Supercapacitor voltage over rated operational voltage
Description:	• Supercapacitor voltage is seriously too high • All units stop running. • Shut-off device displays error code P5d, the outdoor unit displays error code Ad1
Possible Causes:	• Main control board of refrigerant shut-off device is damaged

Table 100

Digital display output

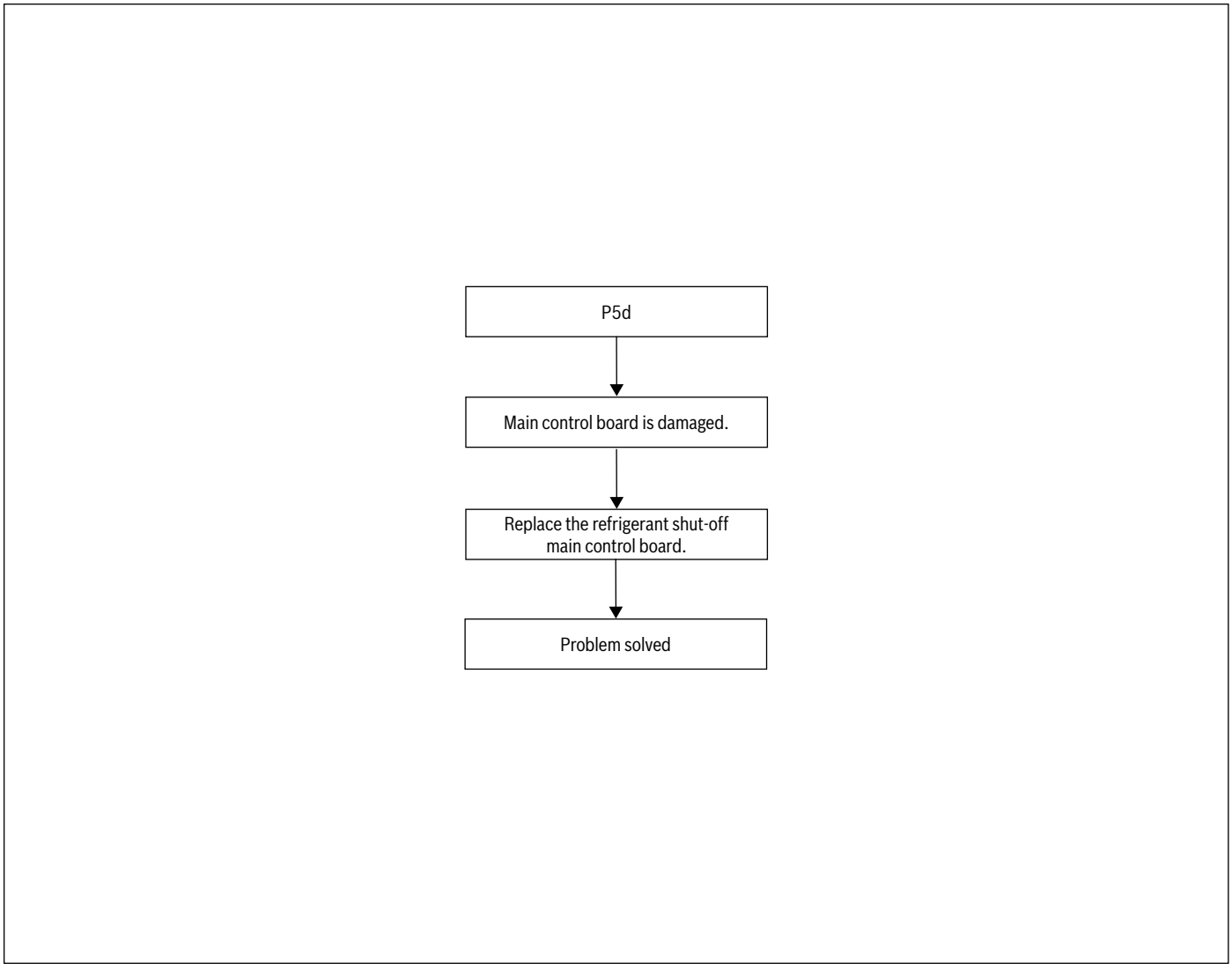


Figure 107

Error Code:	**P5E:** Supercapacitor voltage lower than rated operational voltage
Description:	• Supercapacitor voltage is seriously too low • All units stop running. • Shut-off device displays error code P5E, the outdoor unit displays error code Ad1
Possible Causes:	• Main control board of refrigerant shut-off device is damaged

Table 101

Digital display output

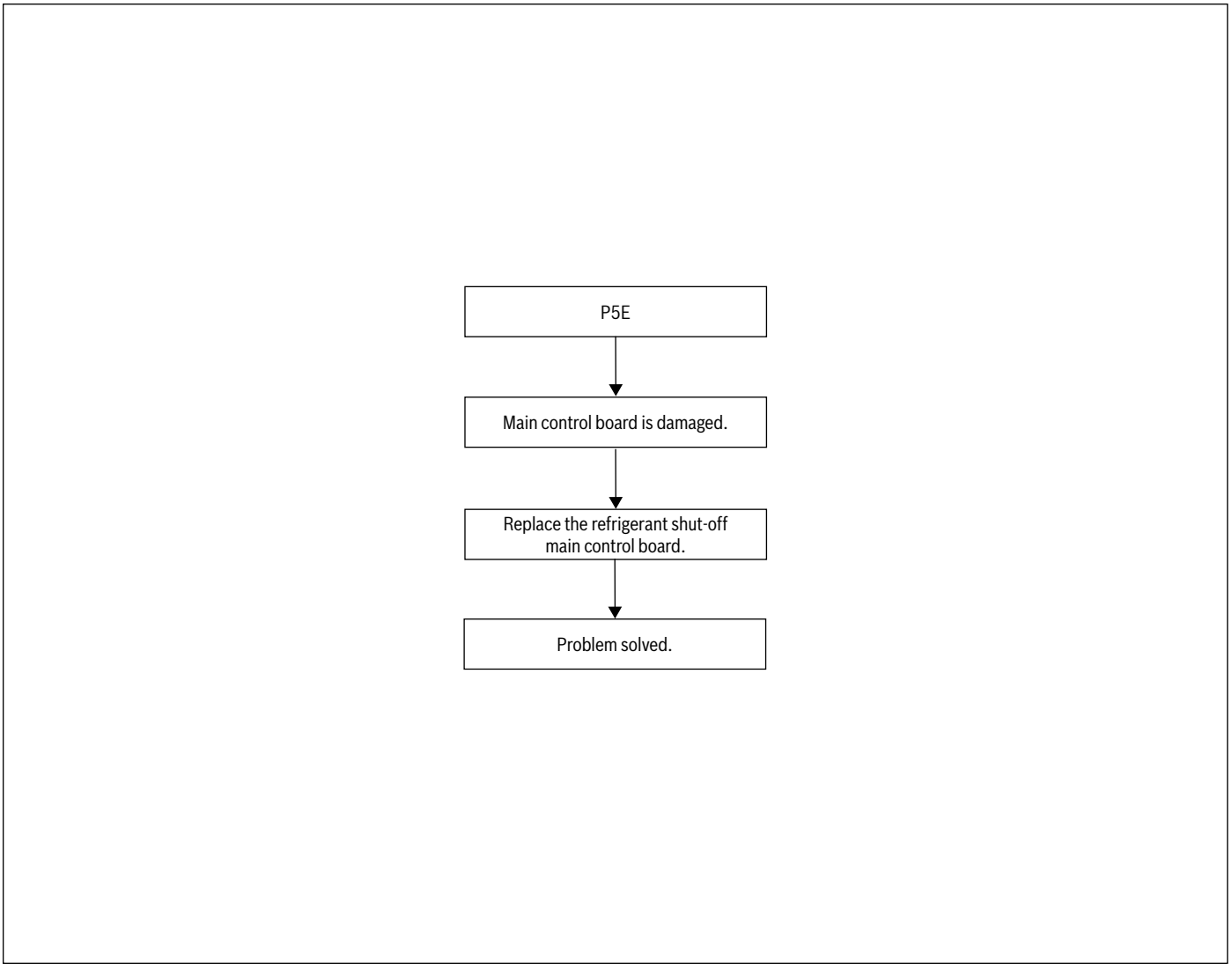


Figure 108

19.6 Online Help Resources

Alternatively, please visit our Service & Support webpage to find FAQs, videos, service bulletins, and more; www.bosch-homecomfort.us/service or use your cellphone to scan the code below.

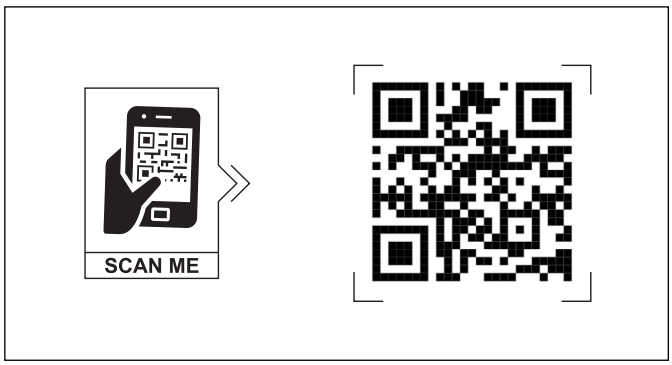


Figure 109

19.7 Temperature and Resistance Relationship Tables (for Sensors)

Temp (°F)	Temp (°C)	Resistance (kΩ)
-20	-28.89	218.11
-15	-26.11	154.74
-10	-23.33	129.74
-5	-20.56	107.73
0	-17.78	99.54
10	-12.22	71.80
20	-6.67	49.65
30	-1.11	36.71
40	4.44	27.39
50	10.00	20.61
60	15.56	15.65
70	21.11	11.99
80	26.67	9.27
90	32.22	7.23
100	37.78	5.68
110	43.33	4.51
120	48.89	3.61
130	54.44	2.90
140	60.00	2.35
150	65.67	1.91
160	71.11	1.57
170	76.67	1.28
180	82.22	1.00
190	87.78	0.91
200	93.33	0.76
210	98.89	0.65
220	104.44	0.56

Table 102 for T3, T3L, T4, T6A, T6B, T7, T1, T2 sensors

19.8 Temperature and Resistance Relationship Tables (for T5 Sensors)

Temp (°F)	Temp (°C)	Resistance (kΩ)
-20	-28.89	862.00
-15	-26.11	725.82
-10	-23.33	612.41
-5	-20.56	600.13
0	-17.78	505.55
10	-12.22	362.74
20	-6.67	265.40
30	-1.11	195.60
40	4.44	146.70
50	10.00	110.71
60	15.56	84.47
70	21.11	65.41
80	26.67	50.90
90	32.22	40.15
100	37.78	31.81
110	43.33	25.51
120	48.89	20.53
130	54.44	16.71
140	60.00	13.64
150	65.67	11.21
160	71.11	9.31
170	76.67	7.75
180	82.22	6.50
190	87.78	5.47
200	93.33	4.65
210	98.89	3.95
220	104.44	3.38

Table 103 for T5

20 Wiring Diagram

20.1 1.5 / 2 Ton Model

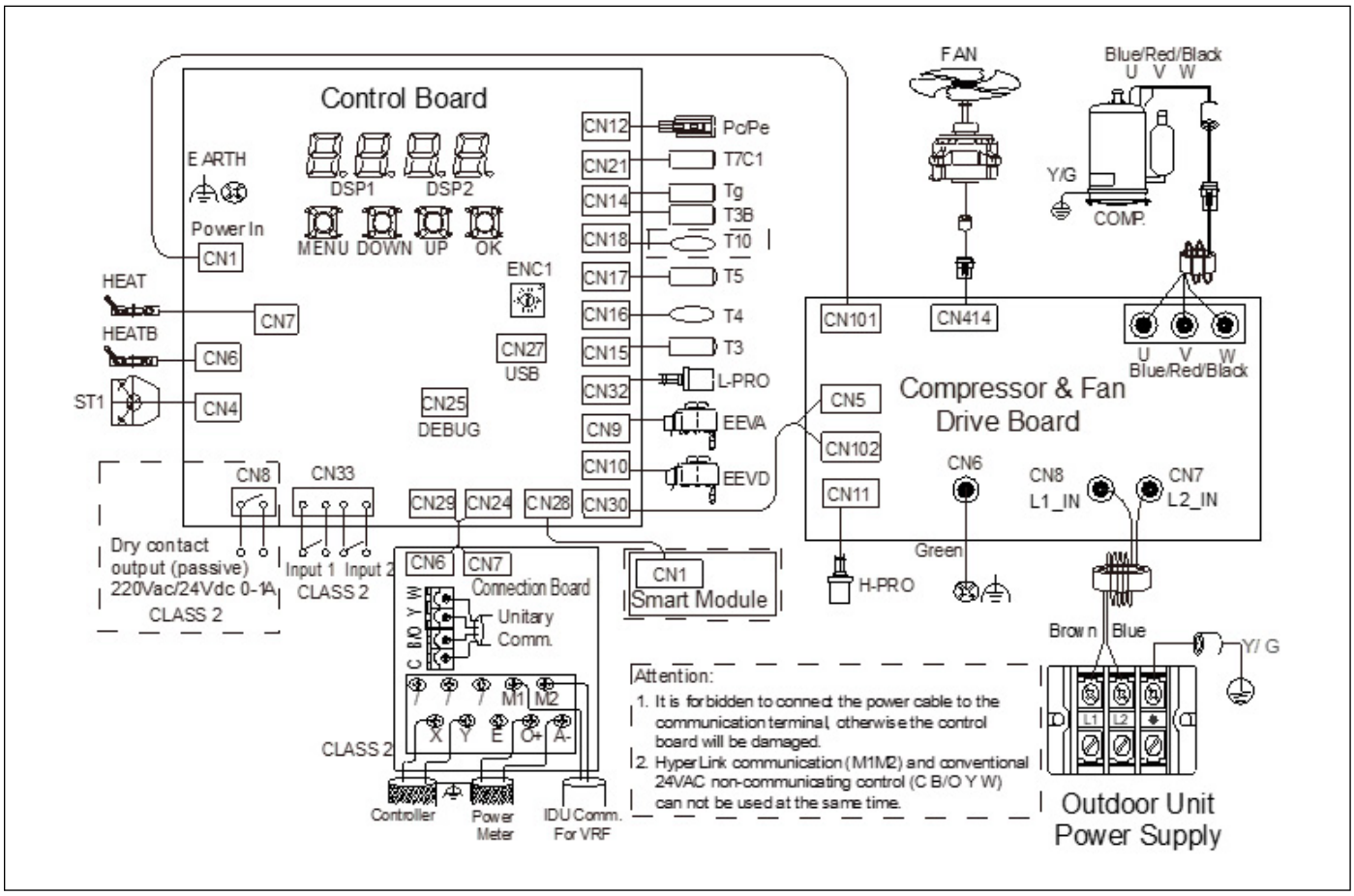


Figure 110

Code	Name
COMP	Compressor
EEVA/D	Electronic expansion valve
FAN	DC Fan
HEAT	Crankcase heater
HEATB	Chassis electric heating belt
H-PRO	High pressure switch
L-PRO	Low pressure switch
ST1	Four-way valve
T3	Heat exchanger temperature sensor
Pc	High pressure sensor
Pe	Low pressure sensor
T3B	Heat exchanger middle temperature sensor
T4	Outdoor ambient temperature sensor
T5	Liquid pipe temperature sensor
Tg	Suction temperature sensor
T10	Additional ambient temperature sensor (optional)
T7C1	Compressor discharge temperature sensor

Table 104 Wiring diagram legend

20.2 2.5 / 3 Ton Model

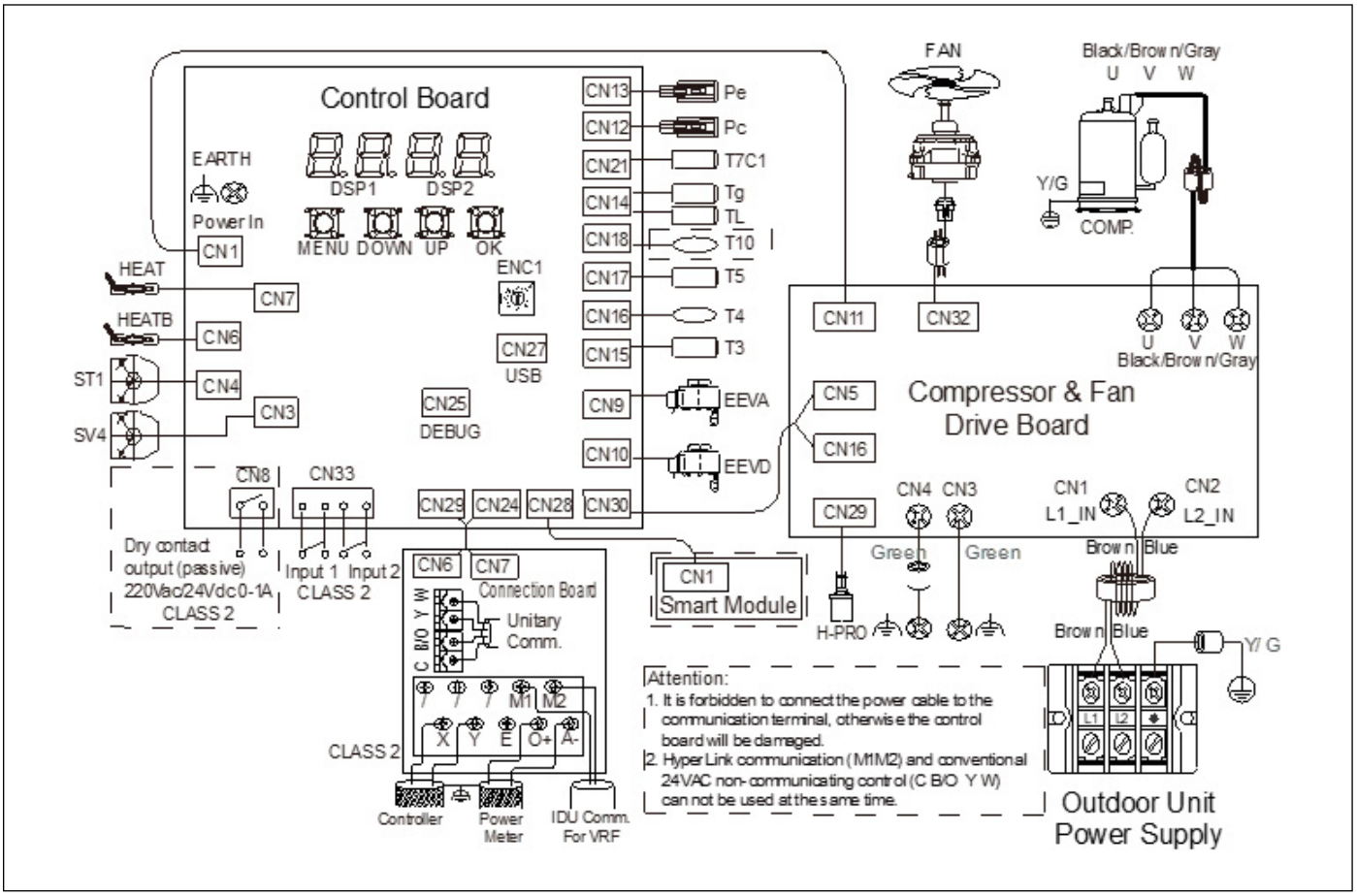


Figure 111

Code	Name
COMP	Compressor
EEVA/D	Electronic expansion valve
FAN	DC Fan
HEAT	Crankcase heater
HEATB	Chassis electric heating belt
H-PRO	High pressure switch
ST1	Four-way valve
SV4	Solenoid valve
Pc	High pressure sensor
Pe	Low pressure sensor
T3	Heat exchanger temperature sensor
T4	Outdoor ambient temperature sensor
T5	Liquid pipe temperature sensor
Tg	Suction temperature sensor
T10	Additional ambient temperature sensor (optional)
T7C1	Compressor discharge temperature sensor
TL	Heat exchanger liquid temperature sensor

Table 105 Wiring diagram legend

20.3 4.0 / 5.0 Ton Model

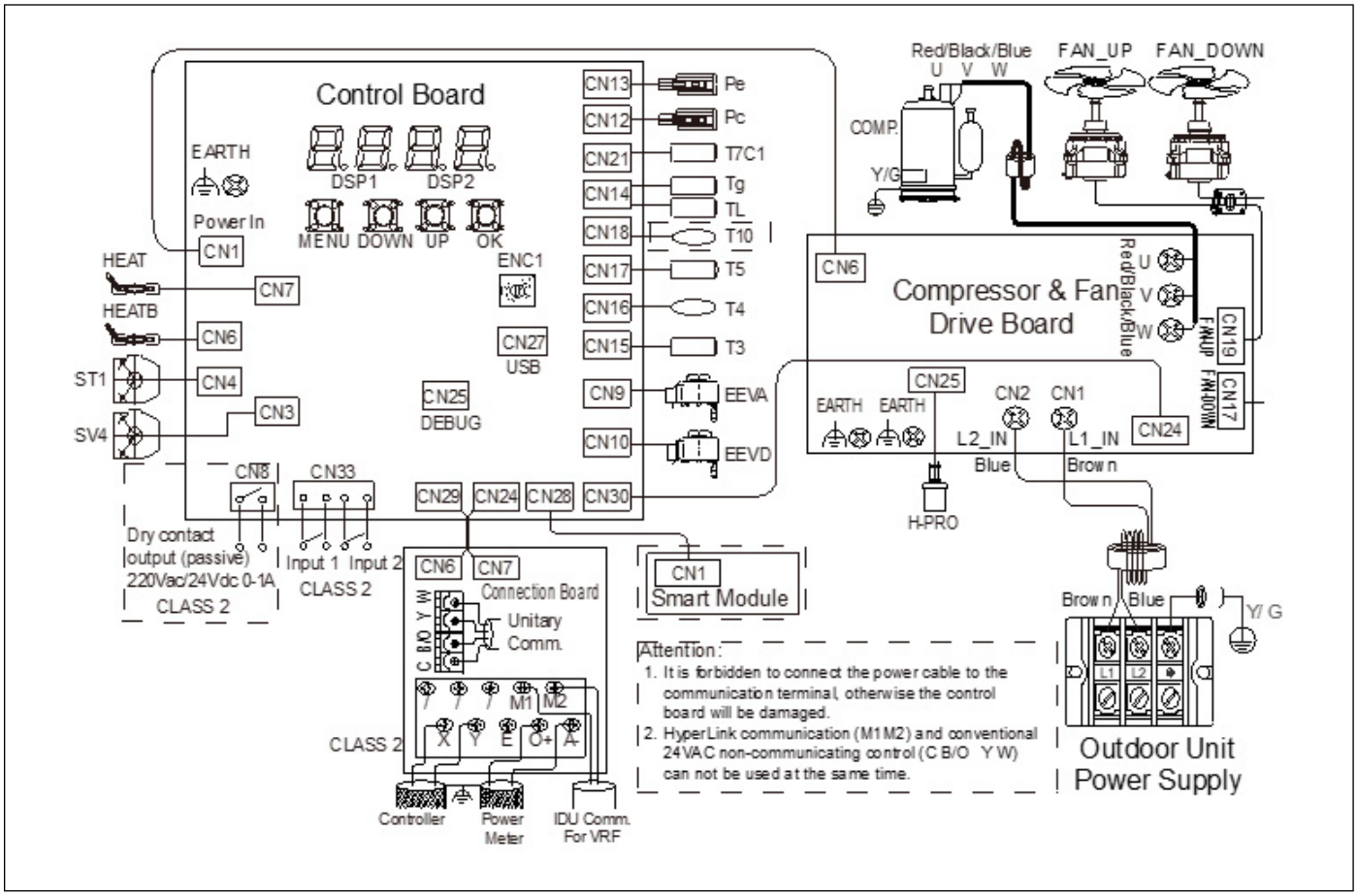


Figure 112

Code	Name
COMP	Compressor
EEVA/D	Electronic expansion valve
FAN_UP/	DC Fan
FAN_DOWN	DC Fan
HEAT	Crankcase heater
HEATB	Chassis electric heating belt
H-PRO	High pressure switch
ST1	Four-way valve
SV4	Solenoid valve
Pc	High pressure sensor
Pe	Low pressure sensor
T3	Heat exchanger temperature sensor
T4	Outdoor ambient temperature sensor
T5	Liquid pipe temperature sensor
Tg	Suction temperature sensor
T10	Additional ambient temperature sensor (optional)
T7C1	Compressor discharge temperature sensor
TL	Heat exchanger liquid temperature sensor

Table 106 Wiring diagram legend

21 Care and Maintenance

21.1 Cleaning Precautions

WARNING

Maintenance and repair!

Any maintenance and cleaning of outdoor unit must be performed by qualified service personnel only.
Any unit repairs must be performed by qualified service personnel only.

CAUTION

Electric shock!

Always turn off your heat pump and disconnect the power supply before cleaning or maintenance. Qualified service personnel only.

NOTICE

Cleaning!

Do not use chemicals or chemically treated cloths to clean the unit .
Do not use benzene, paint thinner, polishing powder or other solvents to clean the unit. Only clean water is recommended.

CAUTION

Personal injury!

When removing filter, do not touch metal parts in the unit. The sharp metal edges can cut you.

21.2 Maintenance – Pre-Season Inspection

At the beginning of each heating or cooling season, the following is required:

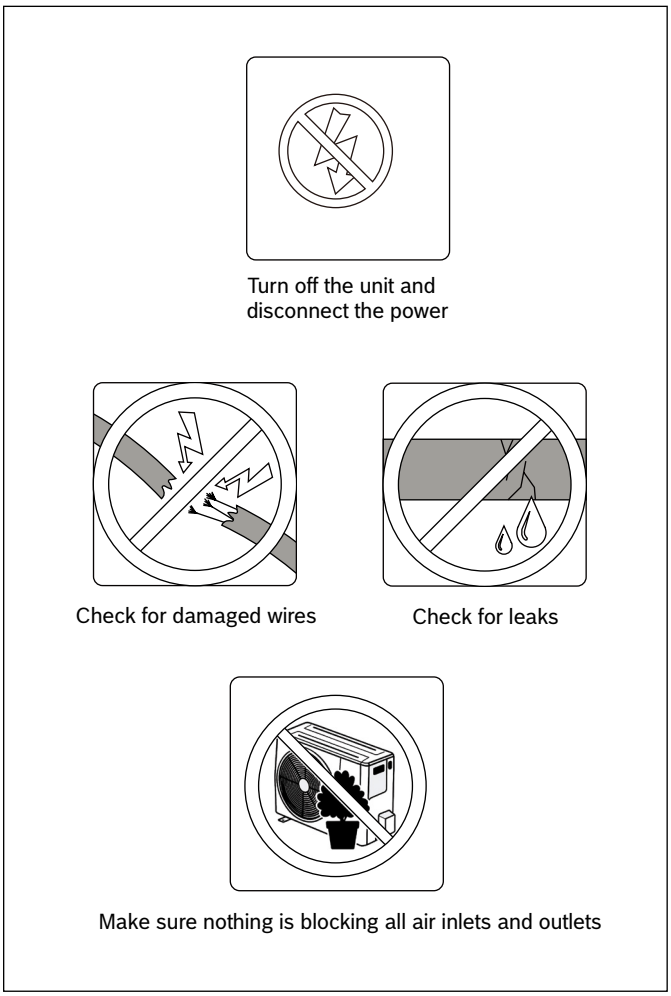


Figure 113

22 Disposal

WARNING

Disposal!

Disposal of unit or components must be performed by qualified service personnel only .
Components and units must be properly disposed in accordance with federal or local regulations.

Components and accessories from the units are not part of ordinary domestic waste.

Complete units , compressors, motors etc. are only to be disposed of via qualified disposal specialists.

This unit uses hydrogen fluorocarbons. Please contact the dealer when you want to dispose of this unit. Law requires that the collection, transportation and disposal of refrigerants must conform with the regulations governing the collection and destruction of hydrofluorocarbons.

NOTES:

NOTES:

United States and Canada
Bosch Thermotechnology Corp.
65 Grove St.
Watertown, MA 02472

Tel: 800-283-3787
www.bosch-homecomfort.us

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