Service Literature

UNIT INFORMATION

100203
05/2025

EL18KSLV

EL18KSLV (R454B) SERIES OUTDOOR UNITS

EL18KSLV-024-230

EL18KSLV-036-230

EL18KSLV-060-230

- Please read this manual before using the heat pump.
- Keep this user manual for future reference.

Design may vary by model number.

INTRODUCTION

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Lineup

	Model	Apperance
Outdoor unit	EL18KSLV-024-230	
	EL18KSLV-036-230	
	EL18KSLV-060-230	

Safety & Precautions

• Read these Safety Precautions carefully to ensure correct installation.
• This manual classifies the precautions by WARNING and CAUTION.
• Follow all precautions below. They are all important for ensuring safety and preventing property/equipment damage.
⚠ WARNING: Failure to follow any of WARNING is likely to result in grave consequences such as death or serious injury.
⚠ CAUTION: Failure to follow any of CAUTION may, in some cases, result in grave consequences.
• The following safety symbols are used throughout this manual:

Observe this instruction	Establish an earth connection	Never attempt

• After installation - pressure test for any leaks before start up. Give the user adequate instructions concerning the use and cleaning of the unit according to the Operation Manual.

⚠ WARNING
• Installation should be performed by the dealer or another professional. Improper installation may cause water leakage, electrical shock, or fire.
• Install the heat pump according to the instructions given in this manual. Incomplete installation may cause water leakage, electrical shock, or fire.
• Use only the supplied or specified installation parts. Use of other parts may cause the unit to come lose, water leakage, electrical shock, or fire.
• Install the heat pump on a solid base that can support the unit's weight. An inadequate base or incomplete installation may cause injury in the event the unit falls off the base.
• Electrical work should be carried out in accordance with the installation manual and national/local electrical wiring codes and rules of practice.Insufficient capacity or incomplete electrical work may cause electrical shock or fire.
• Use a dedicated power circuit. Never use a power supply shared by another appliance.
• For wiring, use a cable long enough to cover the entire distance with no splices. Do not use an extension cord. Do not put other loads on the power supply, use a dedicated power circuit. (Failure to do so may cause abnormal errors codes and performance.)
• Use only the specified wire types for electrical connections between the indoor and outdoor units. Firmly clamp the interconnecting wires so they receive no external stresses. Incomplete connections or clamping may cause terminal overheating or fire.
• After completing interconnecting and supply wiring connections, shape the electrical wires so that they do not put undue force on the electrical covers or panels. Install covers over the wires. Incomplete cover installation may cause terminal overheating, electrical shock, or fire.
• If any refrigerant has leaked out during the installation work, ventilate the room. (The refrigerant produces a toxic gas if exposed to flame.)
• After all installation is complete, check for and repair any system refrigerant leaks. (The refrigerant produces a toxic gas if exposed to flames.)
•When installing or relocating the system, keep the refrigerant circuit free from substances other than the specified refrigerant (R454B), such as air. (The presence of air or other foreign substance in the refrigerant circuit causes an abnormal pressure rise or rupture, resulting in injury.)
• During pump-down, stop the compressor before removing the refrigerant piping. If the compressor is still running, and the stop valve is open during pump-down, air will be sucked into the system while the compressor is running. This will cause abnormal pressure and noncondensables added to the system.
• Be sure to establish a ground. Do not ground the unit to a utility pipe, arrester, or telephone earth. An complete earth may cause electrical shock, or fire. A high surge current from lightning or other sources may cause damage to the heat pumpheat pump.

⚠ CAUTION
• Do not install the heat pump in a place where there is danger of exposure to flammable gas. If the gas builds up around the unit, it may catch fire.
• Install drain piping according to the instructions of this manual.Inadequate piping may cause flooding.
•Tighten the flare nut according to the specified torque using a torque wrench. If the flare nut is overtightened, the flare nut may eventually crack and cause refrigerant leakage.
• Provide adequate measures to prevent the outdoor unit from being used as a shelter by rodents. Rodents making contact with electrical parts can cause malfunctions, smoke or fire. Please instruct the customer to keep the area around the unit clean.

Requirements for Operation, Service and Installation of Appliances Using Flammable Refrigerants

- 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 without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.
- Do not pierce or burn.
- Be aware that refrigerants may not contain an odor.

Warning; Flammable Materials, Refrigerant class per ISO 817

Owner's Manual; Operating Instructions

Read Owner's Manual

Service Indicator; Read Technical Manual

General

– During installation,due to the extended refrigerant pipes, additional REFRIGERANT may be charged. Refer to the nameplate attatched to the unit for details.

– Handling, installation, cleaning, servicing and disposal of refrigerant must comply with the local regulation and the instruction.

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

– Spaces where refrigerant pipes are allowed shall comply with the below requirement:

- that 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, IAPMO Uniform Mechanical Code, ICC International Mechanica lCode, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.
- that the installation of pipe-work shall be kept to a minimum.
- that the mechanical connections between parts created during installation are accessible for maintenance purposes.
- that protection devices, piping, and fittings shall be protected as far as possible against adverse environmental effects, fo rexample, the danger of water collecting and freezing in relief pipes or the accumulation of dirt and debris.
- that piping in refrigeration systems shall be so designed and installed to minimize the likelihood of hydraulic shock damaging the system.

General (cont)

- that precautions shall be taken to avoid excessive vibration or pulsation.
- that after completion of field piping for split systems, the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements:
  - * The minimum test pressure for the low side of the system shall be the low side design pressure and the minimum test pressure for the high side of the system shall be the high side design pressure, unless the high side of the system, cannot be isolated from the low side of the system in which case the entire system shall be pressure tested to the low side design pressure.
  - * The test pressure after removal of pressure source shall be maintained for at least 1 hour with no decrease of pressure indicated by the test gauge, with test gauge resolution not exceeding 5% of the test pressure.
  - * During the evacuation test, after achieving a vacuum level specified in the manual or less, the refrigeration system shall be isolated from the vacuum pump and the pressure shall not rise above 500 microns within 20 min.The vacuum pressure level shall be specified in the manual, and shall be the lessor of 500 microns or the value required for compliance with national and local codes and standards, which may vary between residential, commercial, and industrial buildings.
- that field-made refrigerant joints indoors shall be tightness tested according to the following requirements: 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.

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Requirements for Operation, Service and Installation of Appliances Using Flammable Refrigerants

Qualification of Workers

Every working procedure that affects safety shall only be carried out by industry trained individuals:.

Examples for such working procedures are:

- breaking into the refrigerating circuit;
- opening of sealed components;
- opening of ventilated enclosures.

The industry trained individuals are trained by the national training organisations or manufacturers tha tare accredited to teach the relevant national competency standards that may be set in legislation. The achieved competence should be documented by a certificate.

Information on Servicing

Prior to beginning work on systems containing **FLAMMABLE REFRIGERANTS**, safety checks are necessary to ensure that the risk of ignition is minimised. For repair to the **REFRIGERATING SYSTEM**, the below requirement shall be completed prior to conducting work on the system:

- Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present 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 atmospheres. 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 brazing needs to be performed on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.
- No person carrying out work in relation to a **REFRIGERATING SYSTEM** which involves exposing any pipe work shall use any sources of ignition 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, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, 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 displayed.

Information on Servicing (cont)

- Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or having any type of open flame. 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 atmosphere.
- Where electrical components are being changed, they shall be fit for the 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**:
  * marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
  * refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected protected against severe corrosion.
- Repair and maintenance to 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 it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.
- Initial safety checks shall include:
  * that capacitors are discharged: this shall be done in a safe manner to avoid 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.

Repairs to Sealed Components, Intrinsically Safe Components

- Sealed electrical components shall be replaced.
- Intrinsically safe components must be replaced.
- Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

Requirements for Operation, Service and Installation of Appliances Using Flammable Refrigerants

Electrical wire

- Check that electrical wire 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. Wire routing is designed to keep electrical wiring away from refrigerant containing components. Ensure wire is returned to original routing if any are moved during inspection or repair.

Detection of Flammable Refrigerants

- Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.
- The following leak detection methods are deemed acceptable for all refrigerant systems:
  - 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 Lower Flammability Limit (LFL) of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25% maximum) is confirmed.
  - 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.

NOTE: Examples of leak detection fluids are:

  - bubble method,
  - fluorescent method agents.

- 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. Removal of refrigerant shall be according to the manual.

Removal and Evacuation

- When breaking into the refrigerant circuit to make repairs – or for any other purpose – industry standard 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:
  1. safely remove refrigerant following local and national regulations;
  2. purge the circuit with inert gas;
  3. open the circuit by cutting or brazing.
- 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.
- The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

Charging Procedures

- In addition to industry standard charging procedures,
- the following requirements shall be followed.
  - Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
  - Cylinders shall be kept in an appropriate position according to the instructions.
  - Ensure that the **REFRIGERATING SYSTEM** is grounded prior to charging the system with refrigerant.
  - Label the system when charging is complete (if not already).
  - Extreme care shall be taken not to overfill the **REFRIGERATING SYSTEM**.
- Prior to recharging the system, it shall be pressure-tested with the dry nitrogen. 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.

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Requirements for Operation, Service and Installation of Appliances Using Flammable Refrigerants

Decommissioning

- Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice 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 recovered refrigerant. It is essential that electrical power is available before the task is commenced.
  1. Become familiar with the equipment and its operation.
  2. solate system electrically.
  3. 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.
  4. Pump down refrigerant system, if possible.
  5. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
  6. Make sure that cylinder is situated on the scales before recovery takes place.
  7. Start the recovery machine and operate in accordance with instructions.
  8. Do not overfill cylinders (no more than 80% volume liquid charge).
  9. Do not exceed the maximum working pressure of the cylinder, even temporarily.
  10. When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
  11. Recovered refrigerant shall not be charged into another **REFRIGERATING SYSTEM** unless it has been cleaned and checked.

Labeling

- Equipment shall be labeled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing **FLAMMABLE REFRIGERANTS**, ensure that there are labels on the equipment stating the equipment contains **FLAMMABLE REFRIGERANTS**.

Recovery

- When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice 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.
- 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 all appropriate refrigerants including, when applicable,

FLAMMABLE REFRIGERANTS

- 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. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release.Consult manufacturer if in doubt.
- The recovered refrigerant shall be returned to the refrigerant supplier 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 evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

Application

These units are designed for use in residential and light commercial type buildings. Units should be installed with approved indoor matches listed in the Air-Conditioning, Heating and Refrigeration Institute (AHRI) Directory of Certified Products. Refer to **AHRIDirectory.org**.

These units comply with UL 60335-2-40/CSA C22.2 No. 60335-2-40, or UL 1995/CSA C22.2 No 236. and must be connected to other units that also are compliant.

The majority of states codes have adopted UL60335-2-40 Edition 4. A limited number of local and state codes may require compliance to UL 60335-2-40 Edition 3. Please refer to our website at **GEAppliancesairandwater.com** for guidance on installations in those localities.

1) These units are PARTIAL UNIT AIR CONDITIONERS, complying with PARTIAL UNIT requirements of this Standard, and must only be connected to other units that have been confirmed as complying to corresponding PARTIAL UNIT requirements of this Standard, UL60335-2-40/CSA C22.2 No. 60335-2-40, or UL 1995/CSA C22.2 No 236.

2) Warning: Assure that PARTIAL UNITS shall only be connected to an appliance suitable for the same refrigerant.

3) Assure the maximum operating pressure is considered when connecting to any indoor units.

4) According to ASHRAE 15, these units can stop compressor working in 10s when receiving the signal from the Refrigerant detection systems in indoor units. Please verify and assure the validity during installation.

NOTE – R-454b is a A2L refrigerant. The system installation must meet the following parameters based upon total refrigerant charge (line set included). TAmin (Total minimum conditioned area)is the minimum allowable conditioned area based upon the total system charge at sea level. Values must be multiplied by altitude adjustment factor at installed altitude.

Qmin table refers to minimum airflow requirements during refrigerant leak mitigation by the refrigerant detection system, based upon total system charge.

See tables on this page.

TAmin Table															
Charge (lbs)	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10	10.5	11
Charge (kg)	1.8	2.0	2.2	2.5	2.7	2.9	3.1	3.4	3.6	3.8	4.0	4.3	4.5	4.7	5.0
Minimum Conditioned Area (ft²)	59	67	74	82	89	97	104	112	119	127	134	142	149	157	164
Minimum Conditioned Area (m²)	5.4	6.2	6.8	7.6	8.2	9.0	9.6	10.4	11.0	11.7	12.4	13.1	13.8	14.5	15.2

NOTE – Table is based on the configuration where the discharge port and air return port in the room is higher than 7.22 ft.
NOTE – Multiply values in TAmin table by the Altitude Adjustment Factors to correct TAmin based on installed altitude.

Altitude Adjustment Factor									
Altitude (m)	0	200	400	600	800	1000	1200	1400	1600
Altitude (ft)	0	660	1310	1970	2620	3280	3940	4590	5250
Adj. Factor	1	1	1	1	1.02	1.05	1.04	1.1	1.12
Altitude (m)	1600	1800	2000	2200	2400	2600	2800	3000	3200
Altitude (ft)	5250	5910	6560	7220	7870	8530	9190	9840	10500
Adj. Factor	1.12	1.15	1.18	1.21	1.25	1.28	1.32	1.36	1.4

Qmin Table			
Refrigerant Charge lb (kg)	**CFM Required**	**Refrigerant Charge lb (kg)**	**CFM Required**
5 (2.268)	135	18 (8.165)	487
6 (2.722)	162	19 (8.618)	514
7 (3.175)	189	20 (9.072)	541
8 (3.629)	216	21 (9.525)	568
9 (4.082)	244	22 (9.979)	595
10 (4.536)	271	23 (10.433)	622
11 (4.990)	298	24 (10.886)	649
12 (5.443)	325	25 (11.340)	676
13 (5.897)	352	26 (11.793)	704
14 (6.350)	379	27 (12.247)	731
15 (6.804)	406	28 (12.701)	758
16 (7.257)	433	29 (13.154)	785
17 (7.711)	460	30 (13.608)	812

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These three tables are used together.

For example, EL18KSLV-024-230, the unit comes with refrigerant + piping additional refrigerant + IDU additional refrigerant = 62oz + 10oz + 10oz = 82oz =5.1lbs.

If the altitude =660ft , the altitude correction factor =1. Because 5 <5.1*1 <5.5 , the corresponding minimum area of the table is 82 ft^2, and the minimum airflow rate of the table is 162CFM. It is calculated that the room area of EL18KSLV-024-230 shouldn't be less than 82 ft^2, and the minimum airflow rate of the unit should not be less than 162CFM.

General

Read this entire instruction manual, as well as the instructions supplied in separate equipment, before starting the troubleshoot. Observe and follow all warnings, cautions, instructional labels, and tags. Failure to comply with these instructions could result in an unsafe condition and/or premature component failure.

These instructions are intended as a general guide only for use by qualified personnel and do not supersede any national or local codes in any way. The installation must comply with all provincial, state, and local codes as well as the National Electrical Code (U.S.) or Canadian Electrical Code (Canada). Compliance should be determined prior to installation.

This unit uses R-454B, which is an ozone-friendly HFC refrigerant. The unit must be installed with a matching indoor coil and line set. A filter drier approved for use with R-454B is factory installed in the unit. **No externally installed biflow filter dryer required.**

IMPORTANT: This product has been designed and manufactured to meet ENERGY STAR criteria for energy efficiency when matched with appropriate coil components. However, proper refrigerant charge and proper air flow are critical to achieve rated capacity and efficiency. Installation of this product should follow the manufacturer's refrigerant charging and air flow instructions. Failure to confirm proper charge and airflow may reduce energy efficiency and shorten equipment life.

Safety Precautions

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for brazing operations. Have fire extinguisher available. Read these instructions thoroughly and follow all warning or cautions attached to the unit.

1. Always wear proper personal protection equipment.
2. Always disconnect electrical power before removing panel or servicing equipment.
3. Keep hands and clothing away from moving parts.
4. Handle refrigerant with caution; refer to proper MSDS from refrigerant supplier.
5. Use care when lifting, avoid contact with sharp edges.

Specifications

Model	Outdoor	EL18KSLV-024-230	EL18KSLV-036-230	EL18KSLV-060-230
	UPC	084691963165	084691963219	084691963202
Operating Range	Cooling *°F(°C)*	5~125(-15~52)	5~125(-15~52)	5~125(-15~52)
	Heating *°F(°C)*	-22~75(-30~24)	-22~75(-30~24)	-22~75(-30~24)
Power Supply	Voltage, Cycle, Phase *V/Hz/-*	208-230/60/1	208-230/60/1	208-230/60/1
	Compressor Type	DC Inverter Driven Twins Rotary	DC Inverter Driven Twins Rotary	DC Inverter Driven Twins Rotary
	Maximum Fuse Size *A*	30	35	60
	Minimum Circuit Amp *A*	21	24	37
Cooling	Rated Capacity *Btu/hr*	24000	36000	55000
	Capacity Range *Btu/hr*	10100-24000	13100-36000	19500-55000
	Rated Power Input *W*	2050	3050	5400
	SEER2	18.0	18.0	16.0
	EER2	11.7	11.8	10.0
Heating	Rated Heating Capacity 47°F *Btu/hr*	24000	36000	55000
	Heating Capacity Range *Btu/hr*	7000-24000	10000-36000	15300-55000
	Rated Power Input *W*	2060	3300	5300
	HSPF2 (IV)	10.0	9.5	9.4
	HSPF2 (V)	7.8	7.5	7.4
	Rated Heating Capacity 17°F *Btu/hr*	18000	28000	43000
	Max. Heating Capacity 5°F *Btu/hr*	23000	30000	43000
	COP @ 5°F	1.80	1.80	1.75
Outdoor Unit	Outdoor Fan	Variable speed	Variable speed	Variable speed
	Sound Power Noise Level *dB*	68	72	76
	Dimension: Height *in (mm)*	30 1/8 (765)	33 1/16(840)	56 5/16 (1430)
	Dimension: Width *in (mm)*	36 1/4 (920)	41 3/8(1050)	41 3/8(1050)
	Dimension: Depth *in (mm)*	14 5/8 (372)	15 3/4(400)	15 3/4(400)
	Carton Dimension: Height *in (mm)*	37 5/8 (955)	40 15/16 (1040)	64 3/16 (1630)
	Carton Dimension: Width *in (mm)*	43 5/16 (1100)	45 11/16 (1160)	45 11/16 (1160)
	Carton Dimension: Depth *in (mm)*	19 13/16 (503)	20 1/2 (520)	20 1/2 (520)
	Weight (Ship/Net)- *lbs (kg)*	176.4(80)/134.5(61)	213.8(97)/167.5(76)	306.4(139)/257.9(117)
	Stack Height (Storage)	4	3	2
	Base Pan Heater	Yes	Yes	Yes
	GEA3 Compatible	No	No	No
Refrigerate Line	Connections	Flare+Weld	Flare+Weld	Flare+Weld
	Service valve size (liquid) *in*	3/8	3/8	3/8
	Service valve size (suction) *in*	5/8	3/4	3/4
	Liquid O.D. *in*	3/8	3/8	3/8
	Suction O.D. *in*	3/4	7/8	7/8
	Refrigerant Type	R454B	R454B	R454B
	Factory Charge *Oz*	62	94	125
	Max line length with funished charge (ft)	15	15	15
	additional charge required per linear foot (oz)	0.55	0.55	0.55
	Maximum Line Length *Ft / m*	150/45	150/45	100/30
	Maximum Height *Ft / m*	50/15	50/15	50/15
	Connected	24V communication	24V communication	24V communication
	Thermostat connections	R, C, Y1, Y2, W1, O	R, C, Y1, Y2, W1, O	R, C, Y1, Y2, W1, O
	Service Port adaptor (Ship with)	3/8"(1) 5/8" to 3/4"(1)	3/8"(1) 3/4" to 7/8"(1)	3/8"(1) 3/4" to 7/8"(1)

Sensor	Definition	Sensor	Definition
Td	Compressor discharge sensor	Te	Outdoor coil out temperature sensor
Tc	Coil temperature sensor	Ts	Compressor suction temperature sensor
Tao	Outdoor air temperature	Ps	Refrigerant pressure transducer

Functions and Control

When the Compressor First Starts

The compressor will start in low frequency. After a brief time delay, the compressor will come up to operating speed to meet the demand requirement for capacity.

The Outdoor Fan Control (Exchange Fan)

When adjusting the fan speed, the unit should remain at each speed for 30+ seconds to avoid speed-change malfunctions. In Cooling Mode, the wait time between speed levels should be 15 seconds.

The Outdoor Fan Control When In Cooling or Dehumidifying Mode

Five seconds after compressor starts, the outdoor fan will start running at medium speed. After 30 seconds, it begins to control the fans speed according to the temperature conditions of the outdoor environment.

The Control of the Outdoor Unit Expansion Valve

When unit starts, the EEV valves will energize and change to a standard opening. When operation starts, the EEV will change position to keep the suction vapor superheat level at around 10°F.

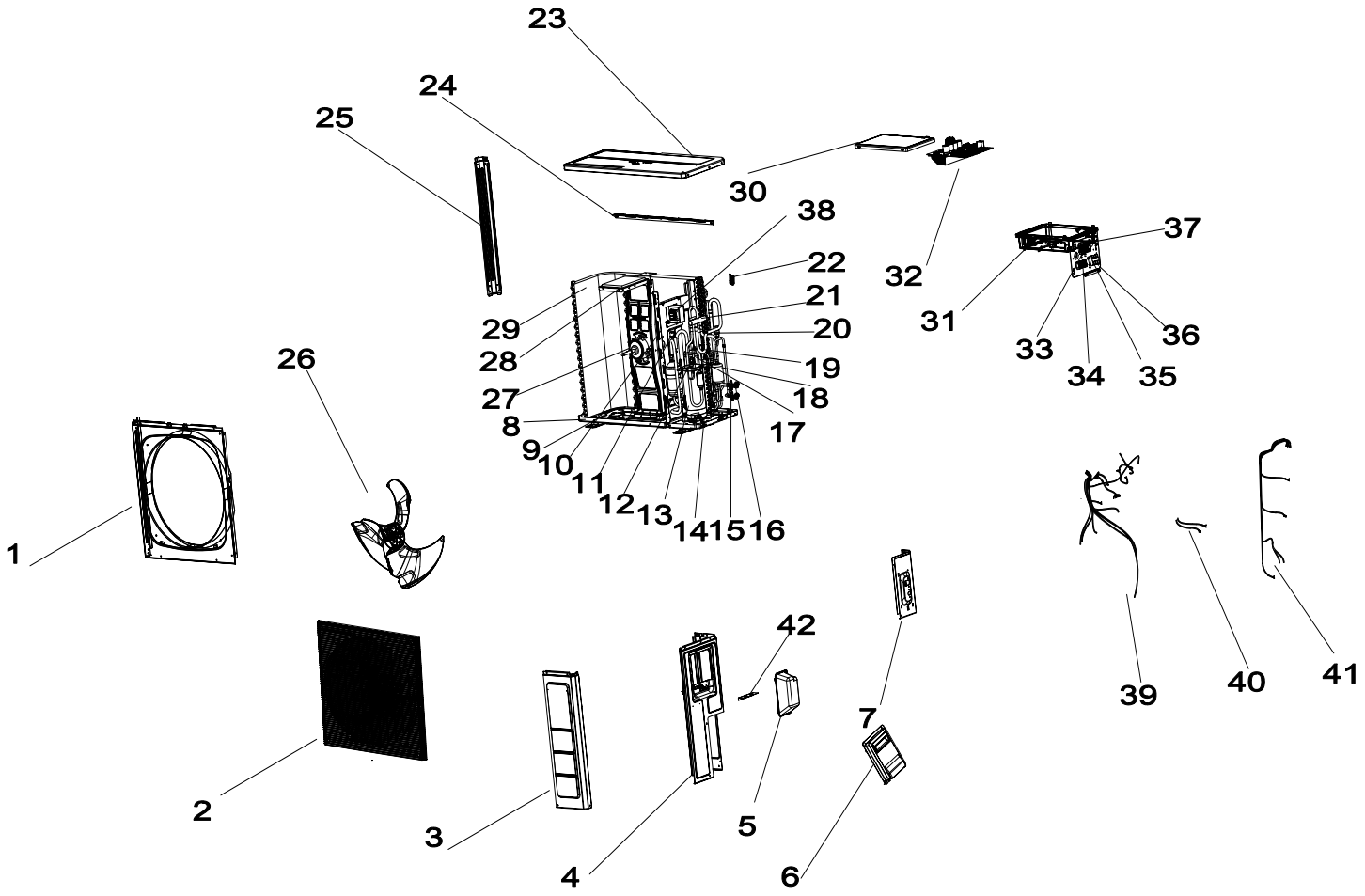
When the unit is shut off, the opening size of the expansion valve of the indoor unit is 5 steps;

Four-Way Valve Control

Under heating mode, the four-way valve opens. If the compressor does not start or changes to a non-heating mode, the compressor will be stopped for 2 minutes, and then the four-way valve will shift.

For the details of defrosting four-way valve control, see the defrosting process.

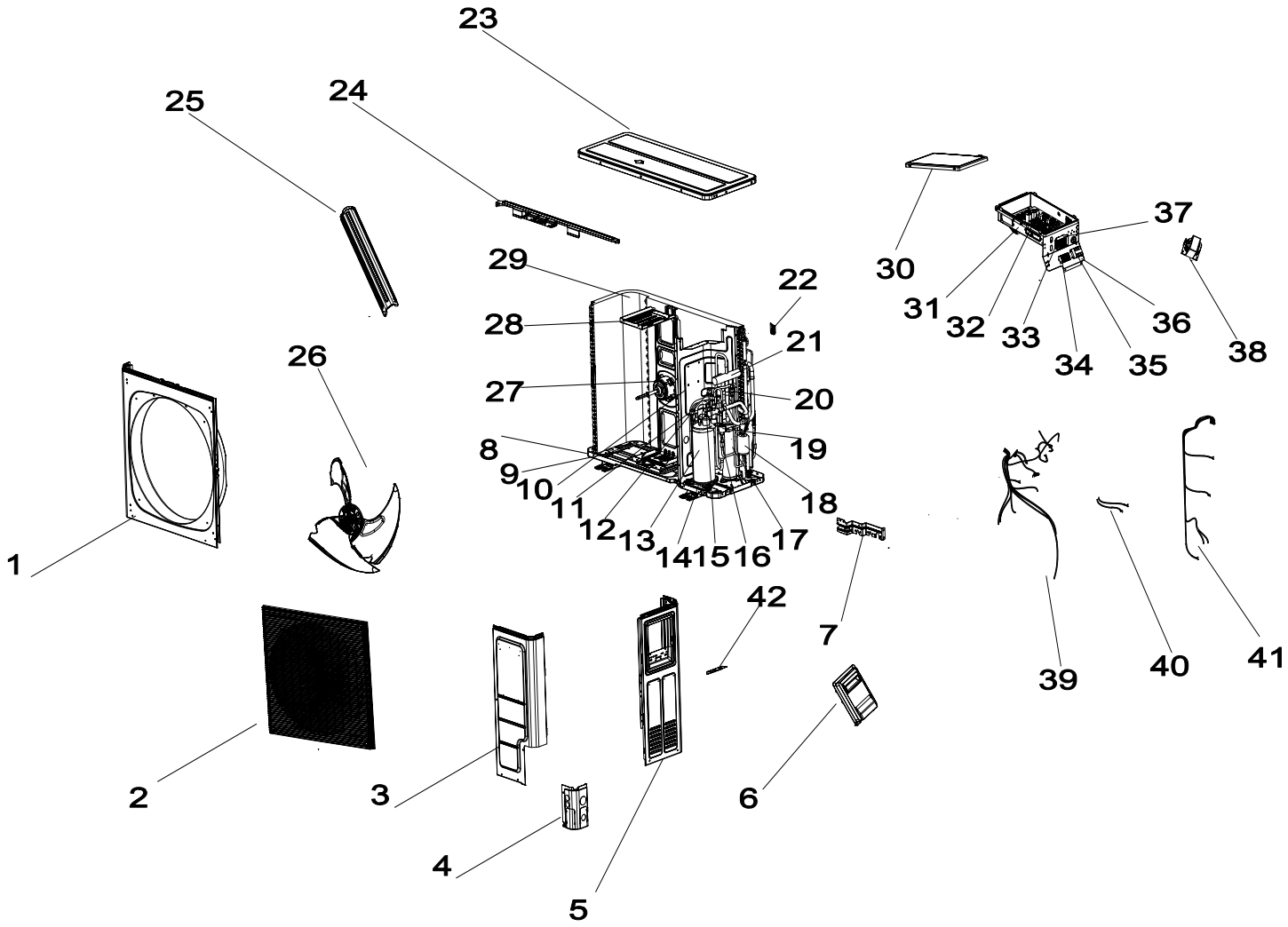
EL18KSLV-024-230



EL18KSLV-024-230

No.	Spare parts description in english	Qty.
1	Front panel	1
2	Outlet grill	1
3	Front service panel	1
4	Right service panel	1
5	Valve cover	1
6	Handle	1
7	Valve seat group	1
8	Bottom plate assy.	1
9	Heating element	1
10	partion plate	1
11	Low pressure switch	1
12	High pressure switch	1
13	Compressor(DC)	1
14	Heater band	1
15	Liquid stop valve	1
16	Gas stop valve	1
17	gas-liquid segerator	1
18	Dry filter	1
19	Expansion valve	1
20	Pressure transducer	1
21	4-way valve	1
22	Sensor fixing card	1
23	Top cover	1
24	Rear beam	1
25	stand column	1
26	Fan	1
27	Fan motor(DC)	1
28	Motor bracket	1
29	Condensor asm.	1
30	Elextrical box cover	1
31	Electric control box base	1
32	Main PCB	1
33	Small service PCB	1
34	Terminal block	1
35		1
36	Terminal strip sheet metal	1
37	Display board base	1
38	Reactor	1
39	Wiring Harnesses .	1
40		1
41		1
42	Sheet metal for securing wires	1

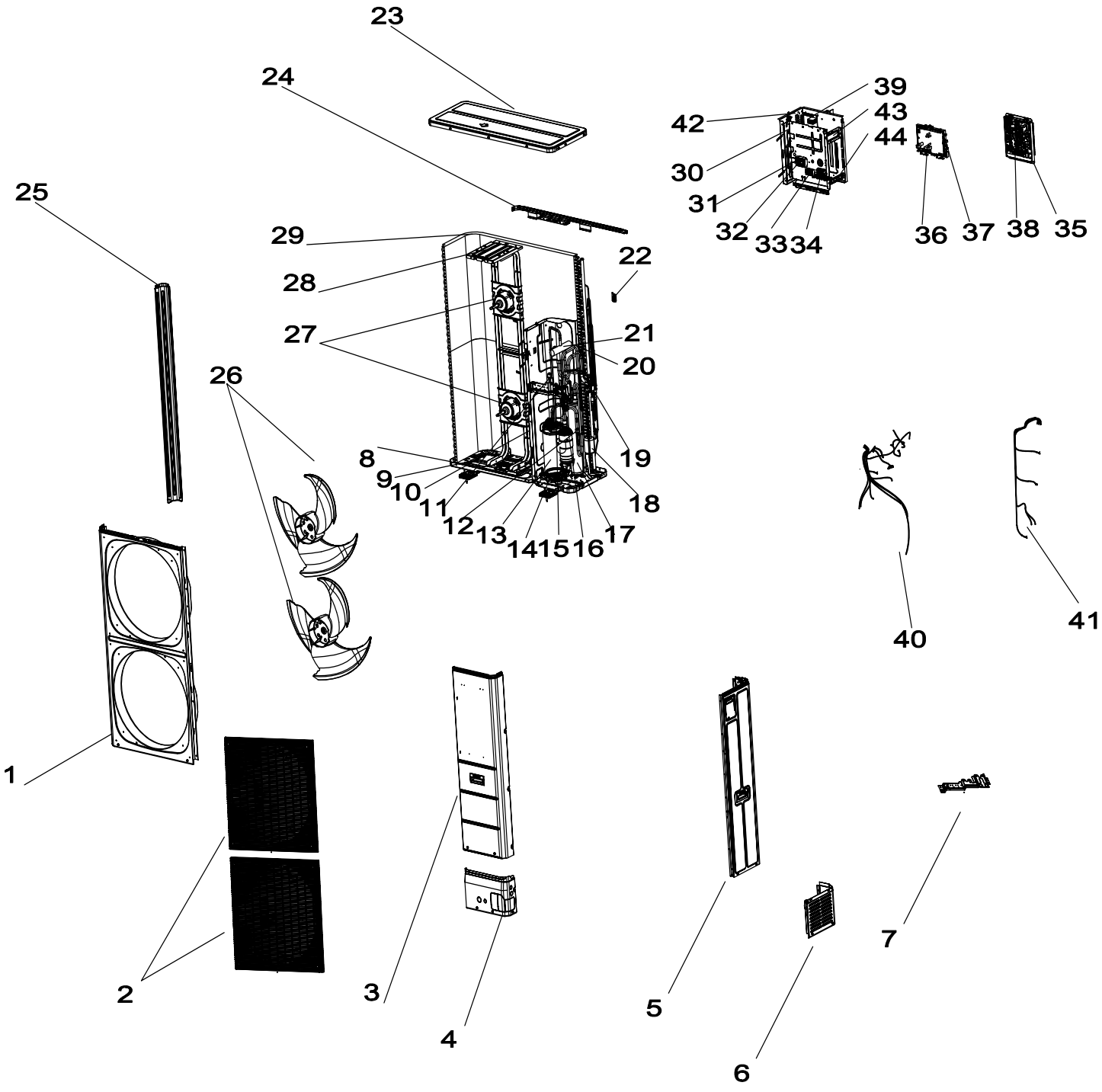
EL18KSLV-036-230



EL18KSLV-036-230

No.	Spare parts description in english	Qty.
1	Front panel	1
2	Outlet grill	1
3	Front service panel	1
4	Front service panel	1
5	Right service panel	1
6	Handle	1
7	Valve seat group	1
8	Bottom plate assy.	1
9	Heating element	1
10	partion plate	1
11	Low pressure switch	1
12	High pressure switch	1
13	Compressor(DC)	1
14	Heater band	1
15	Liquid stop valve	1
16	Gas stop valve	1
17	gas-liquid segerator	1
18	Dry filter	1
19	Expansion valve	1
20	Pressure transducer	1
21	4-way valve	1
22	Sensor fixing card	1
23	Top cover	1
24	Rear beam	1
25	stand column	1
26	Fan	1
27	Fan motor(DC)	1
28	Motor bracket	1
29	Condensor asm.	1
30	Elextrical box cover	1
31	Electric control box base	1
32	Main PCB	1
33	Small service PCB	1
34	Terminal block	1
35	Terminal block	1
36	Terminal strip sheet metal	1
37	Display board base	1
38	Reactor	1
39	Wiring Harnesses .	1
40	Wiring Harnesses .	1
41	Wiring Harnesses .	1
42	Sheet metal for securing wires	1

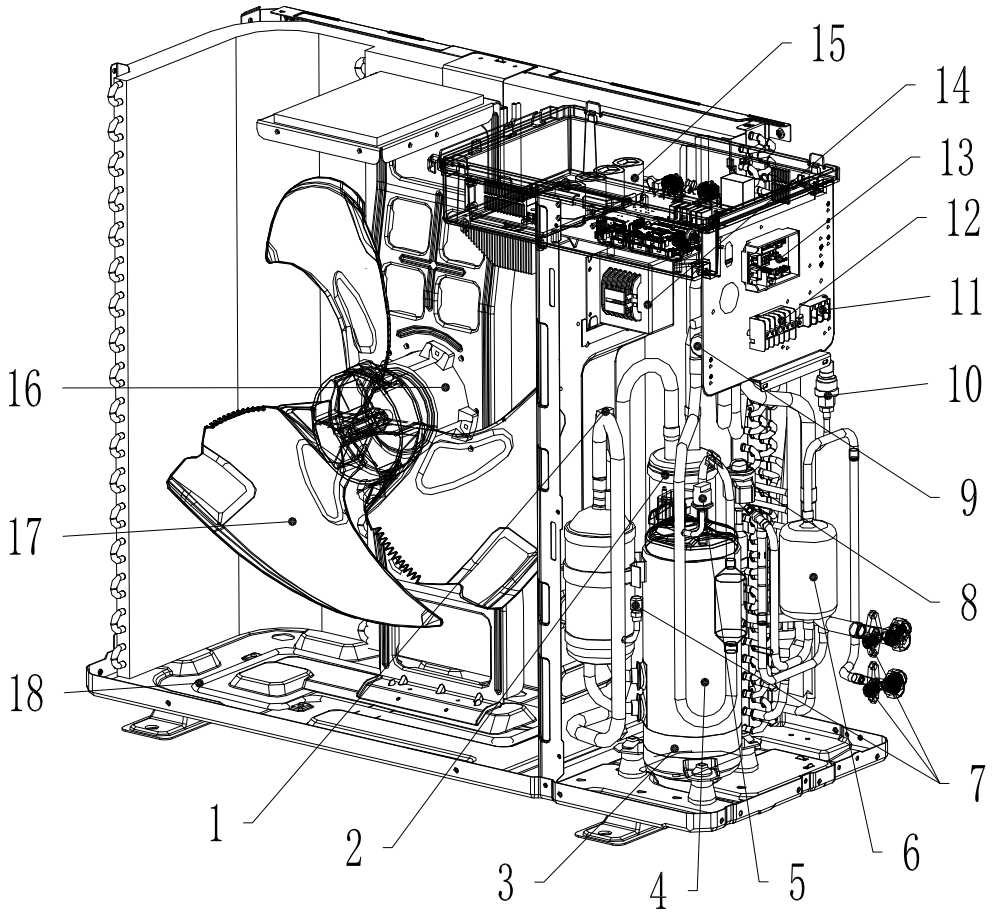
EL18KSLV-060-230



EL18KSLV-060-230

No.	Spare parts description in english	Qty.
1	Front panel	1
2	Outlet grill	2
3	Front service panel	1
4	Little front service panel	1
5	Right service panel	1
6	Little right service panel	1
7	Valve seat group	1
8	Bottom plate assy.	1
9	Heating element	1
10	partion plate	1
11	High pressure switch	1
12	Low pressure switch	1
13	Compressor(DC)	1
14	Heater band	1
15	Liquid stop valve	1
16	Gas stop valve	1
17	gas-liquid segerator	1
18	Dry filter	1
19	Expansion valve	1
20	Pressure transducer	1
21	4-way valve	1
22	Sensor fixing card	1
23	Top cover	1
24	Rear beam	1
25	stand column	1
26	Fan	2
27	Fan motor(DC)	2
28	Motor bracket	1
29	Condensor asm.	1
30	Electric control box -1	1
31	Small service PCB	1
32	Display board base	1
33	Terminal block	1
34	Terminal block	1
35	Power Module plastic base	1
36	PCB	1
37	PCB board base	1
38	Power Module	1
39	module board	1
40	Wiring Harnesses .	1
41	Wiring Harnesses .	1
42	Electric control box -2	1
43	Electric control box -3	1
44	Electric control box -4	1

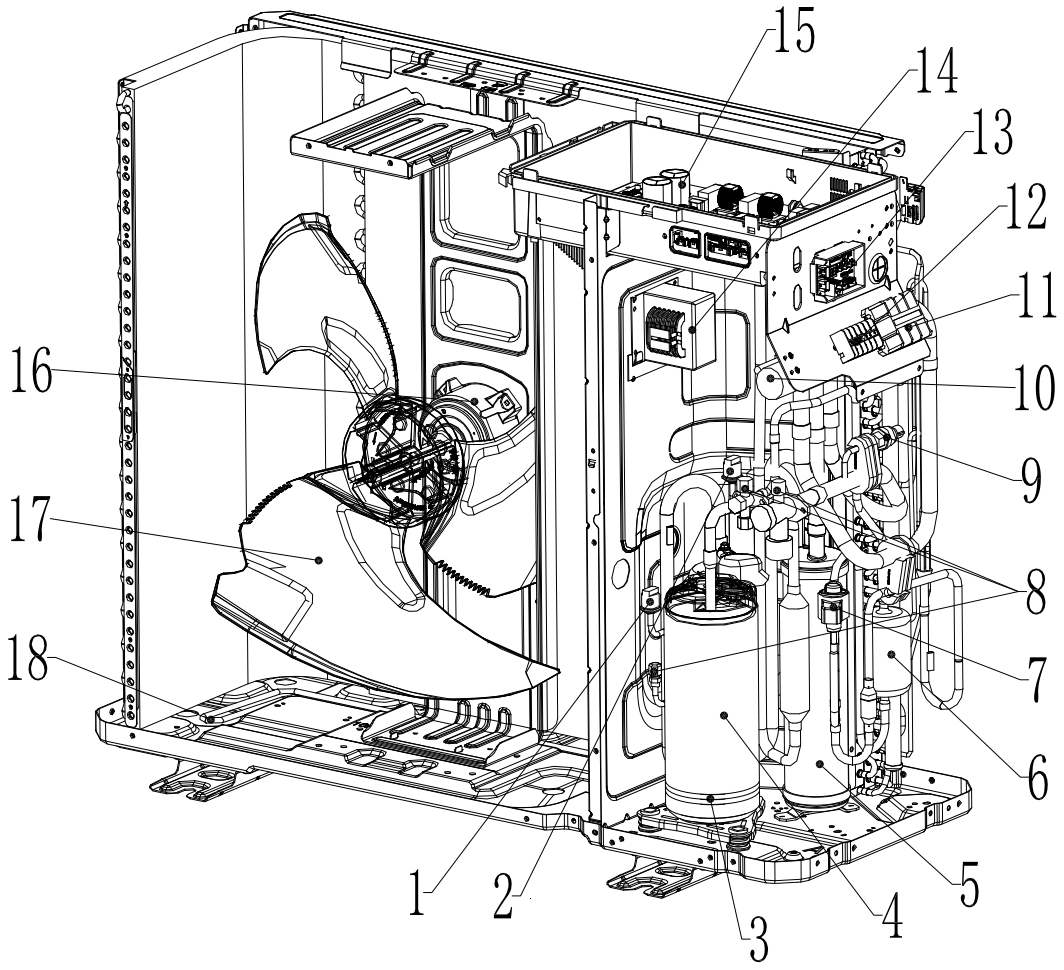
24K
Component Overview



No.	Name	No.	Name
1	Low Pressure Switch	10	Pressure Transducer
2	Accumulator	11	Terminal Block (Power)
3	Crankcase Heater	12	Terminal Block (24V)
4	Compressor	13	Small Service PCB
5	High Pressure Switch	14	Reactor
6	Dry Filter	15	Main PCB
7	Service Valves	16	Outdoor Fan Motor
8	Electronic Expansion Valve	17	Fan Blade
9	4-Way Valve	18	Base Pan Heater

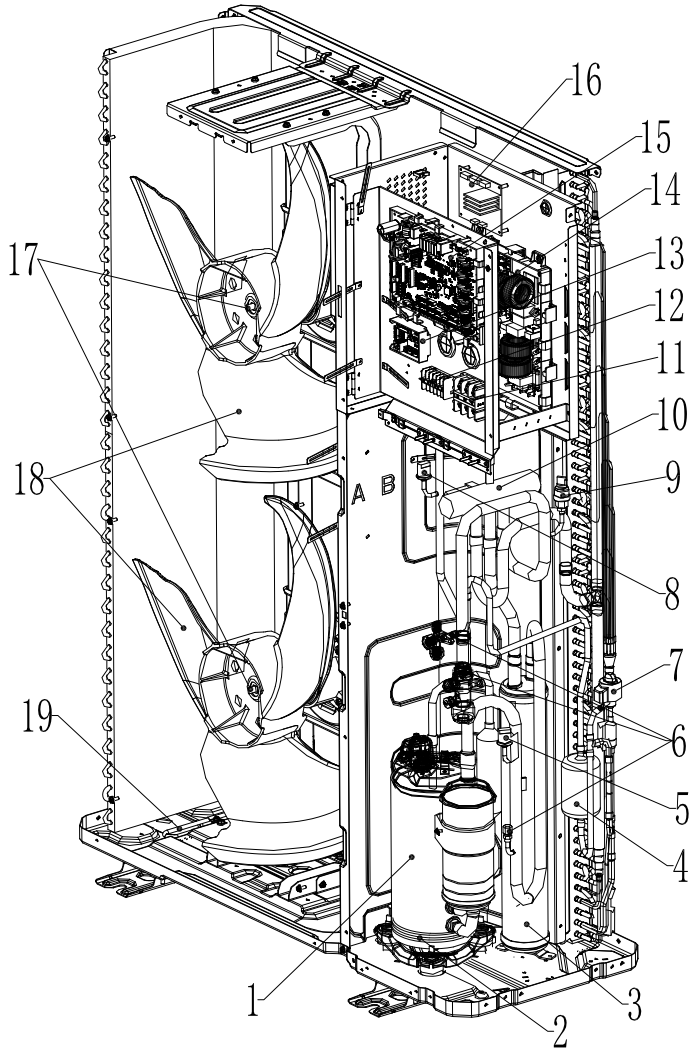
36K

Component Overview



No.	Name	No.	Name
1	Low Pressure Switch	10	4-Way Valve
2	High Pressure Switch	11	Terminal Block (Power)
3	Crankcase Heater	12	Terminal Block (24V)
4	Compressor	13	Small Service PCB
5	Accumulator	14	Reactor
6	Dry Filter	15	Main PCB
7	Electronic Expansion Valve	16	Outdoor Fan Motor
8	Service Valves	17	Fan Blade
9	Pressure Transducer	18	Base Pan Heater

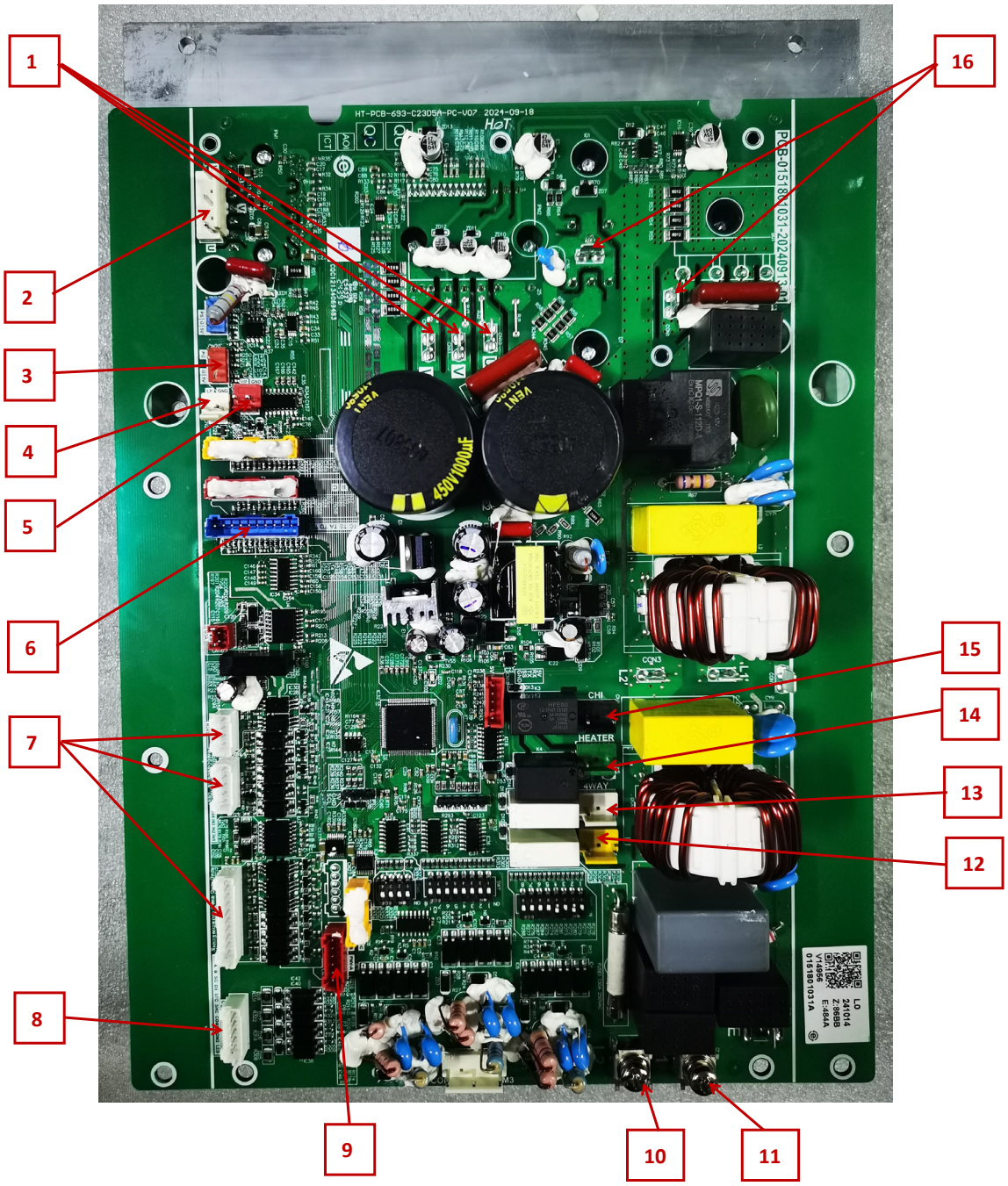
60K
Component Overview



No.	Name	No.	Name
1	Compressor	11	Terminal Block (Power)
2	Crankcase Heater	12	Terminal Block (24V)
3	Accumulator	13	Small Service PCB
4	Dry Filter	14	Module Board
5	Low Pressure Switch	15	Main PCB
6	Service Valves	16	Module Board (Upper Fan Motor)
7	Electronic Expansion Valve	17	Outdoor Fan Motor
8	High Pressure Switch	18	Fan Blade
9	Pressure Transducer	19	Base Pan Heater
10	4-Way Valve		

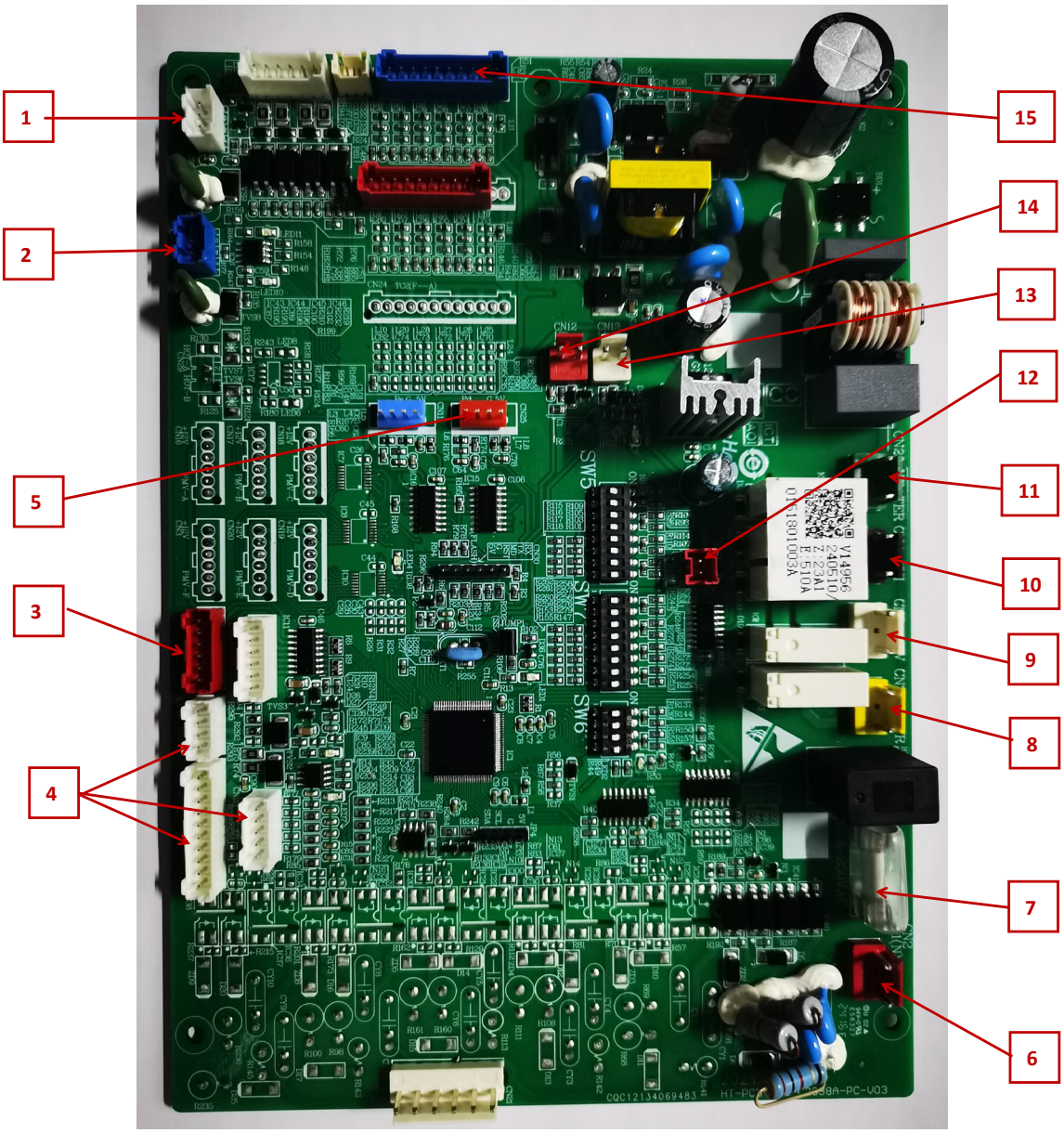
PCB Overview

EL18KSLV-024-230/EL18KSLV-036-230



NO.	Name	NO.	Name
1	U1V1W1 Compressor terminal	9	CN1 Electronic expansion valve
2	CN29 The Outdoor Fan Motor	10	CN3 Power terminal L2
3	CN20 High Pressure sensor	11	CN4 Power terminal L1
4	CN25 Low Pressure Switch	12	CN6 W1 Defrost signal
5	CN24 High Pressure Switch	13	CN7 4-way valve terminals
6	CN21 Temperature sensor Tc,Ts, Tao,Td,Te	14	CN9 Crankcase Heater
7	CN13 CN14 CN15 Connect the display board terminals	15	CN8 Base Pan Heater
8	CN26 24V thermostat terminals	16	Reactor

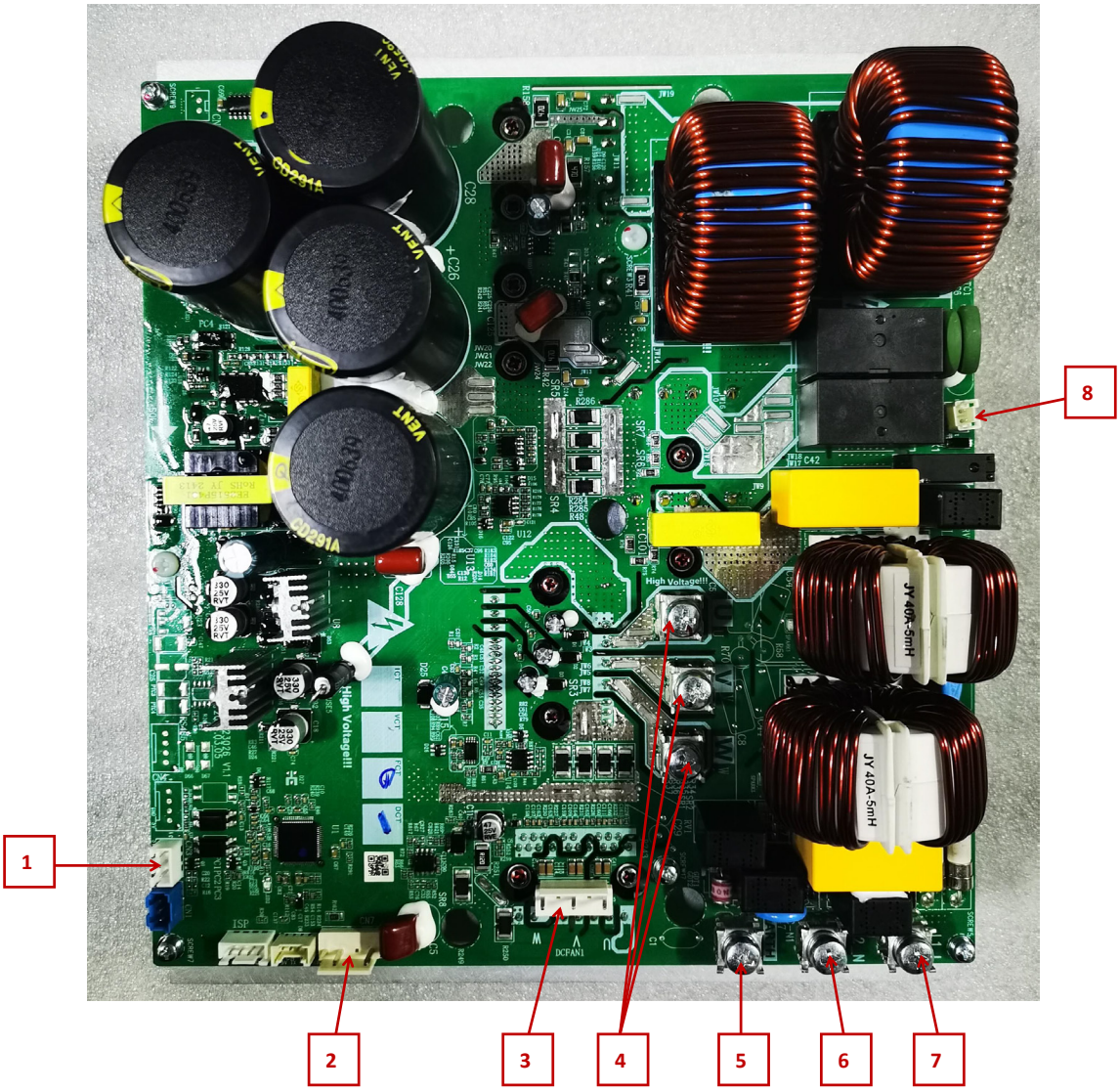
EL18KSLV-060-230



NO.	Name	NO.	Name
1	CN9 Main control module communication terminal	9	CN5 4-way valve terminals
2	CN25 OTA (Reserve)	10	CN4 Base Pan Heater
3	CN15 Electronic expansion valve	11	CN28 Crankcase Heater
4	CN8 CN23 CN26 Connect the display board terminals	12	CN34 12V port on the driver
5	CN21 High Pressure sensor	13	CN13 Low Pressure Switch
6	CN2 Main control board power supply	14	CN12 High Pressure Switch
7	FUSE	15	CN14 Temperature sensor Tc,Ts, Tao,Td,Te
8	CN22 W1 Defrost signal		

PCB Overview

EL18KSLV-060-230



NO.	Name
1	CN1 Communication terminal
2	CN7 DC310V
3	DCFAN1 The Outdoor Fan Motor
4	U1V1W1 Compressor terminal
5	EARTH Ground terminal
6	Inverter Board1 Power Supply L1
7	Inverter Board1 Power Supply L2
8	CN2 12V port on the Inverter Board1

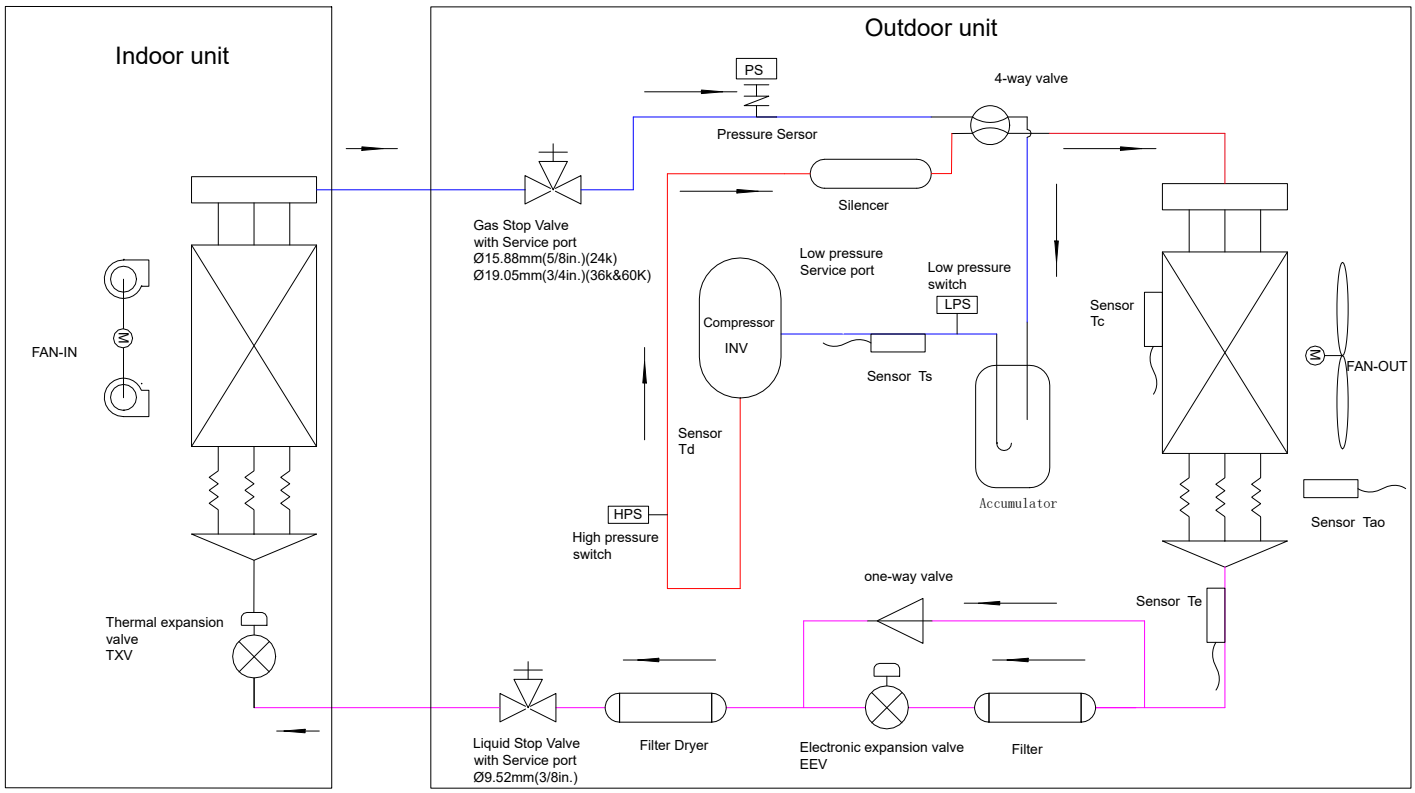
Cooling Mode Sequence of Operation

When the outdoor unit receives the startup signal Y1 or Y2 of the thermostat, it will enter the cooling startup pre-processing stage. If 5 minutes have passed since the last shutdown, the outdoor fan will immediately turn on, and the compressor will turn on 30s later. After each shutdown, it will wait 5 minutes before it is turned on again. Wait 3 minutes for the first power-on.

With the compressor operating, refrigerant will begin to flow throughout the refrigeration circuit.

The operating frequency of the compressor will be displayed on the Service Monitor Board.

Cooling



High temperature and pressure gas

High temperature and pressure liquid

Low temperature and pressure gas

Cooling Mode Sequence of Operation

1 Temperature Sensor Td (Compressor discharge sensor)

The temperature of the compressor discharge hot gas will be monitored by the Discharge Temperature Sensor. If the sensor reads too hot or cool, the frequency/status of the operation will be adjusted accordingly.

The hot gas will leave the oil separator and enter the 4-way valve, which directs the hot gas to the outdoor coil. The refrigerant will condense in the outdoor coil and be subcooled. The refrigerant is now in a liquid state.

2 Temperature Sensor Tc(Outdoor coil temperature sensor)

This sensor monitors the temperature of the outdoor coil during condensing operation. If abnormal condensing temperature is detected, the outdoor fan motor speed or compressor frequency may be adjusted.

3 Temperature Sensor Tao (Outdoor ambient air temperature)

The outdoor air temperature will be monitored by the PCB. If the outdoor air temperature rises or falls, the speed of the outdoor fan may be changed.

4 Temperature Sensor Te(Outdoor coil out temperature)

The Liquid Pipe Sensor will monitor the temperature of the refrigerant.

It is used to control the outdoor fan and refrigerant charging to calculate the subcool

5 Temperature Sensor Ts(Compressor suction temperature)

The temperature of the suction gas entering the compressor is monitored by the Suction Temperature Sensor. Before stopping operation, the EEV may open to feed more refrigerant or close to warm up the line.

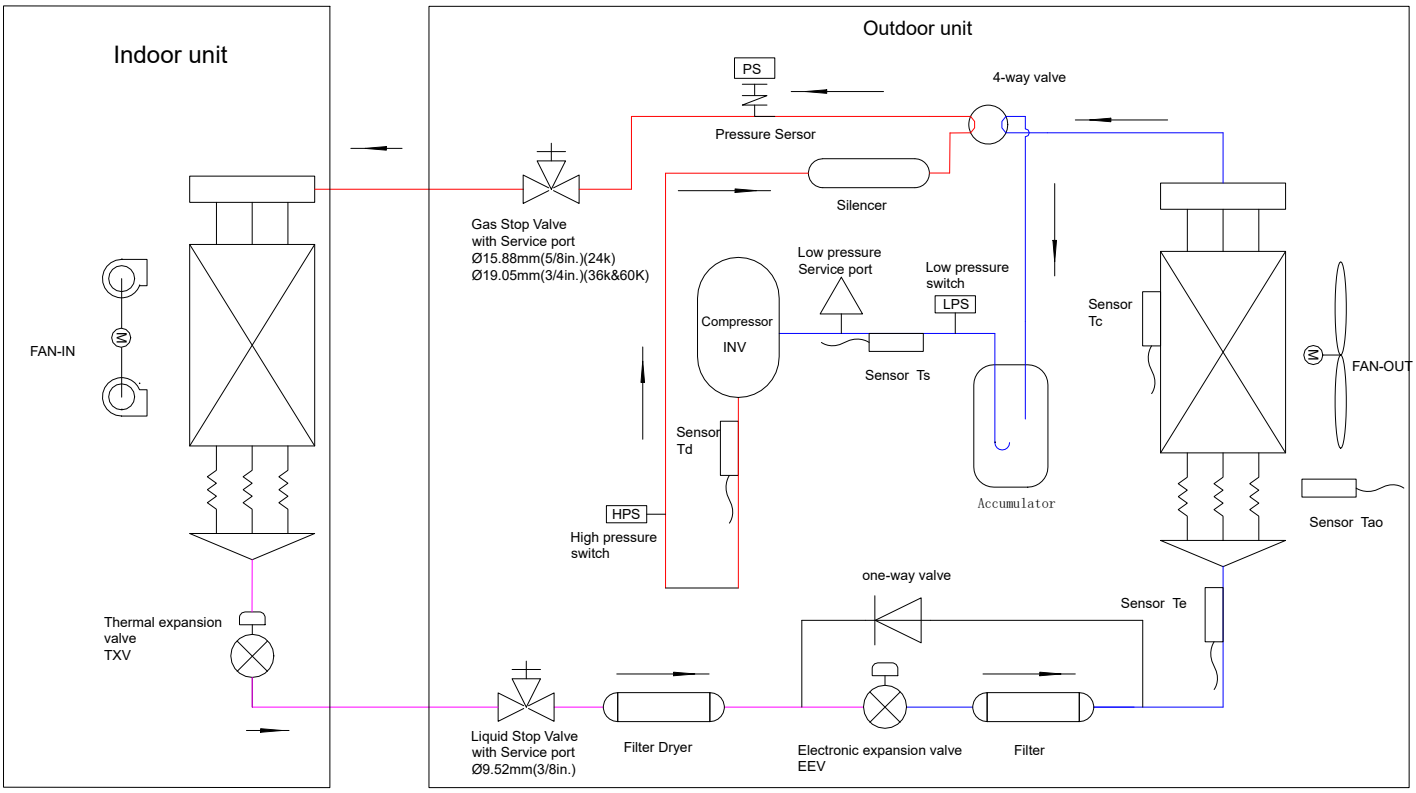
6 Presssure Transducer Ps(Refrigerant pressure)

During cooling, the low pressure is detected and converted to the saturation temperature of the refrigerant, which is compared with the target temperature and used to control the compressor frequency

Heating Mode Sequence of Operation

Heating mode When the outdoor unit receives the heating start signal Y1 or Y2 from the thermostat, if the compressor downtime meets the minimum standby time, the four-way valve will be powered on until the compressor starts, and the four-way valve will be reversed after the external fan starts. The minimum standby time is 5 minutes, and the initial power-on is 3 minutes.
With the compressor operating, refrigerant will begin to flow throughout the refrigeration circuit.
The operating frequency of the compressor will be displayed on the Service Monitor Board.

Heating



High temperature and pressure gas

High temperature and pressure liquid

Low temperature and pressure gas

Heating Mode Sequence of Operation

1 Temperature Sensor Td (Compressor discharge sensor)

The temperature of the compressor discharge hot gas will be monitored by the Discharge Temperature Sensor. If the sensor reads too hot or cool, the frequency/status of the operation will be adjusted as needed.

The hot gas will leave the compressor and enter the 4-way valve. The 4-way valve will direct the hot gas to ALL of the indoor coils.

2 Temperature Sensor Tc(Outdoor coil temperature sensor)

The temperature of Tc should now be cool. This will indicate the 4-way valve is directing hot gas to the indoor coils. If it is not, there is a problem with the 4-way valve. The PCB will detect the temperature difference and generate an Error Code.

The outdoor coil temperature will be sensed by the Defrost Sensor. The sensor will use this temperature to to adjust EEV open position and to calculate when a defrost cycle is necessary.

3 Temperature Sensor Tao (Outdoor air temperature)

This sensor monitors the temperature of the refrigerant liquid returning from the EEV.

4 Temperature Sensor Te(Outdoor coil out temperature)

The outdoor coil temperature will be sensed by the Defrost Sensor. The sensor will use this temperature to to adjust the EEV position and to calculate when a defrost cycle is necessary.

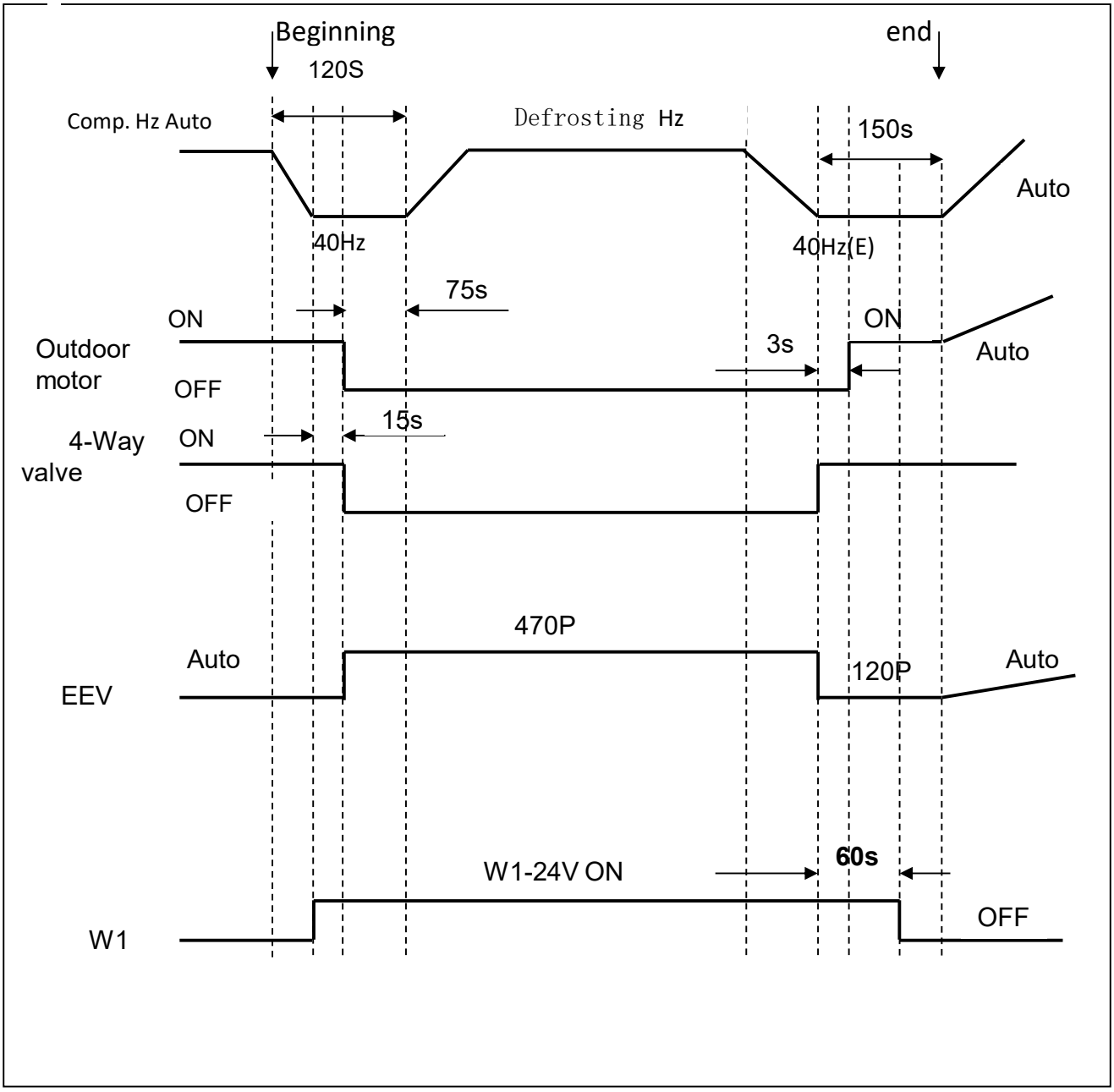
5 Temperature Sensor Ts(Compressor suction temperature)

The temperature of the suction gas entering the compressor is monitored by the Suction Temperature Sensor. The sensor will use this temperature to to adjust the EEV position.

6 Presssure Transducer Ps(Refrigerant pressure)

During Heating, the high pressure is detected and converted to the saturation temperature of the refrigerant, which is compared with the target temperature and used to control the compressor frequency.

Defrost Cycle Sequence of Operation



Operating Parameters

Electronic Expansion Valve (EEV) Control

Electronic characteristics

Max. position	470 pulses
Driving speed	PPS

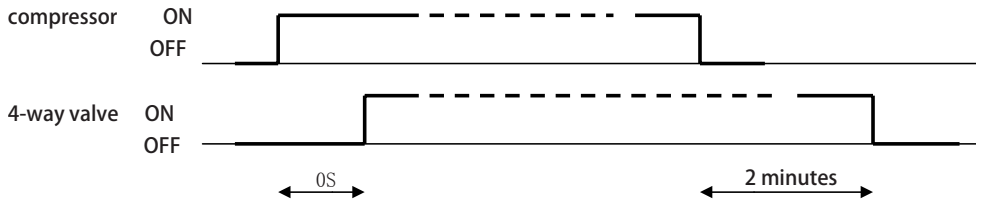
Position limitation of EEV

	Unit stop	Max. open angle	Thermostat OFF	Min. open angle
Cool/dehum	5 pulses	470 pulses	470 pulses	80 pulses
Heat	5pulses	470 pulses	200 pulses	76 pulses

The EEV routinely opens and closes to maintain the compressor discharge temperature within an acceptable range.

4-Way Valve Heating Control

When the compressor starts in the heating mode, there is a 20s delay before power is applied to the 4-way valve to switch the fow of hot refrigerant to the indoor coil. When the call for heat is satisfed and the compressor shuts of, a 2-minut delay will occur before the 4-way valve is powered down and switches back to the at-rest (cooling) position.



If the 4-way valve does not switch into the heating mode, after 10 minutes of compressor run time and Tc is greater than 81°F/27°C, the compressor will stop and the unit will display a 17-fash error code on the outdoor PCB.

Compressor Sump Heater

The crankcase (sump) heater keeps refrigerant at a higher temperature than the coldest part of the system. This prevents refrigerant from mixing with the compressor oil and also dries condensed refrigerant inside the sump. The sump heater will be energized when the ambient temperature is below 37°F/3°C and will be of when the ambient is 41°F/5°C.

	Heater OFF	Heater ON*min
Tao<37℉(3℃) &Comp. OFF	40min	60min
Tao>41℉(5℃)	/	0

Operating Parameters

1: Default Defrost Control

In the heating mode and along with the ambient sensor, the defrost sensor monitors the temperature of the outdoor coil to determine if defrost is needed. If the compressor has been running for 10 minutes continuously and for 55 minutes overall, the diference between the ambient sensor (Ta) and the defrost sensor (min(Te,Tc)) will be checked. The system will initiate the defrost cycle if the following conditions can be met for 5 continuous minutes:

Te ≤ C x Ta-A
Te: Defrost temperature sensor
Ta: Ambient temperature
C: 0.80 if Ta < 32°F/0°C 0.60 if Ta ≥ 32°F/0°C
A: 8, moderate climate (factory setting) 6, severe climate (alternate setting)
Defrost comp. Hz =24K 60Hz 36k&60K 70Hz

End defrosting: If the defrost sensor (Te) detects the temperature of the outdoor coil is above 44°F(7°C) for 60 seconds or is above 54°F(12°C) for 30 seconds, the defrost cycle will terminate. If these temperatures cannot be reached, the defrost cycle will automatically terminate in 10 minutes.

2:Strong Defrost Control

In the heating mode and along with the ambient sensor, the defrost sensor monitors the temperature of the outdoor coil to determine if defrost is needed. If the compressor has been running for 10 minutes continuously and for 55 minutes overall, the diference between the ambient sensor (Ta) and the defrost sensor (min(Te,Tc)) will be checked. The system will initiate the defrost cycle if the following conditions can be met for 5 continuous minutes:

Te ≤ C x Ta-A
Te: Defrost temperature sensor
Ta: Ambient temperature
C: 0.80 if Ta < 32°F/0°C 0.60 if Ta ≥ 32°F/0°C
A: 6, moderate climate (factory setting) 6, severe climate (alternate setting)

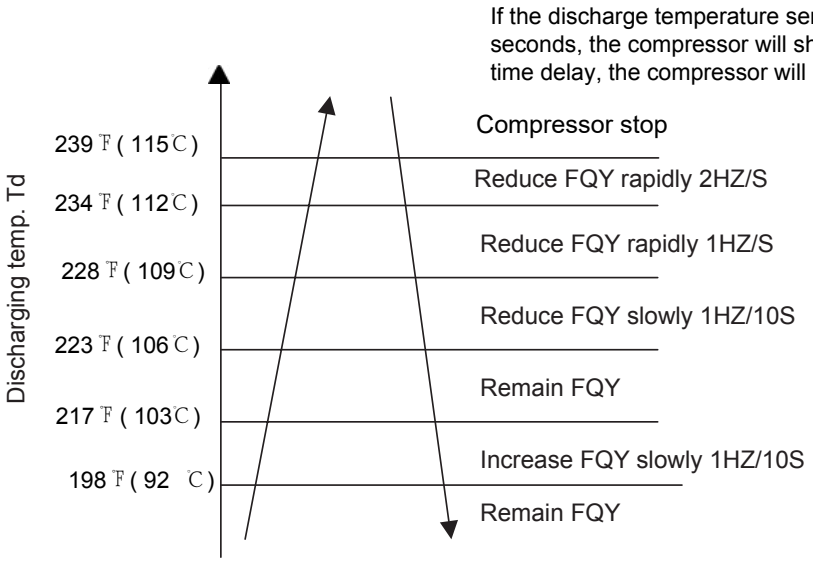
Defrost comp. Hz =24K 70Hz 36k&60K 80Hz

End defrosting: If the defrost sensor (Te) detects the temperature of the outdoor coil is above 44°F(7°C) for 60 seconds or is above 54°F(12°C) for 30 seconds, the defrost cycle will terminate. If these temperatures cannot be reached, the defrost

Operating Parameters

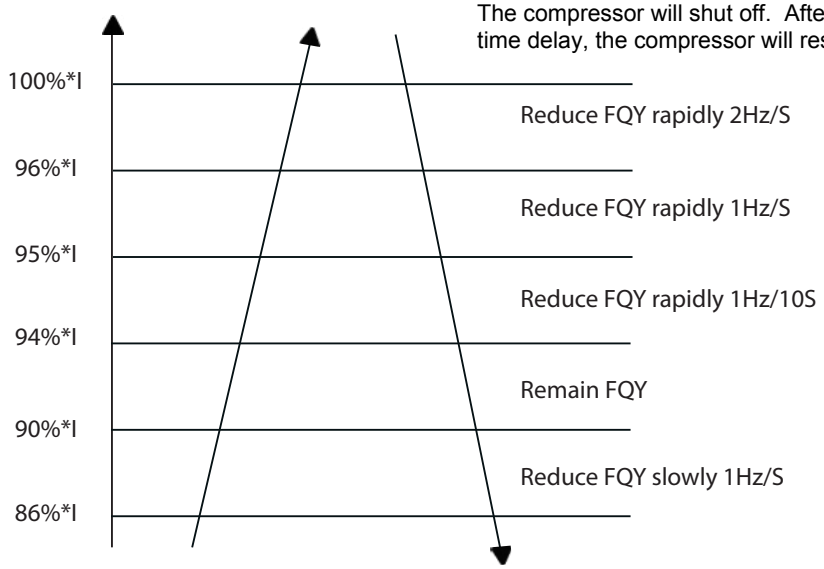
Discharge Sensor Protection

If the discharge temperature is higher than normal, the compressor will slow down to lower the temperature.



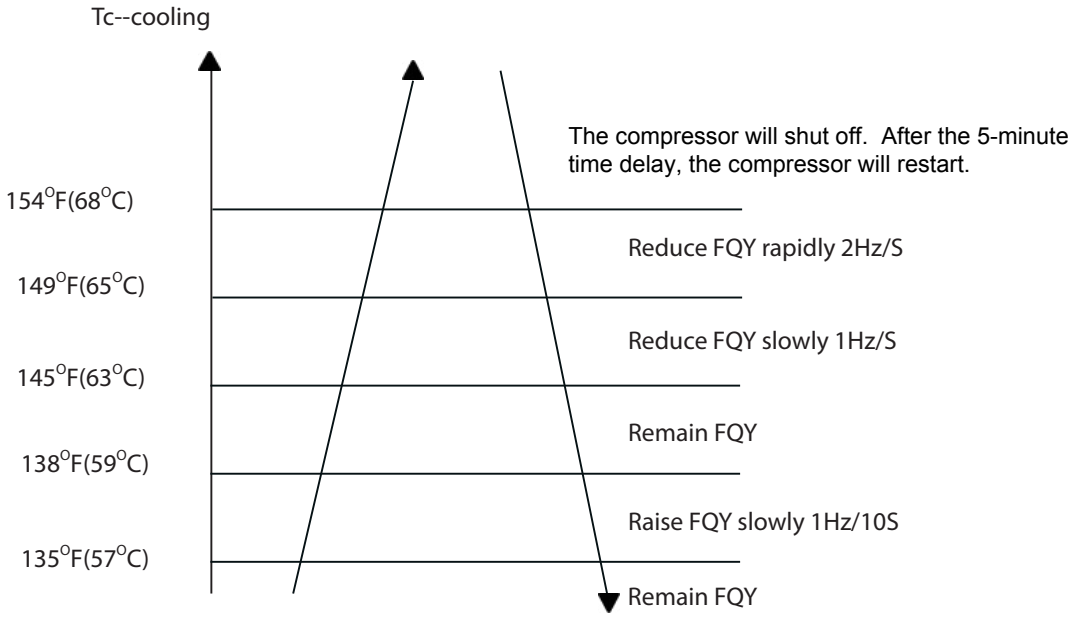
High Current Protection

The below table is the outdoor unit protection current and compressor current.



High Pressure Protection

High Pressure Protection in Cooling



Low Pressure Protection

With the compressor running, if the low pressure switch opens for 1 minute, the compressor will stop.
If this condition occurs 3 times in an hour, the compressor will lock out and a low pressure error code will be displayed at the indoor unit.
If the compressor is not running and the switch opens for 30 seconds, a low pressure error code will be displayed.

The low pressure switch does not stop compressor operation or signal an error code during the following conditions:
The first 8 minutes of run time when the compressor starts a new cycle
During defrost
When the ambient temperature is below 32°F/0°C
Following the termination of an oil return cycle

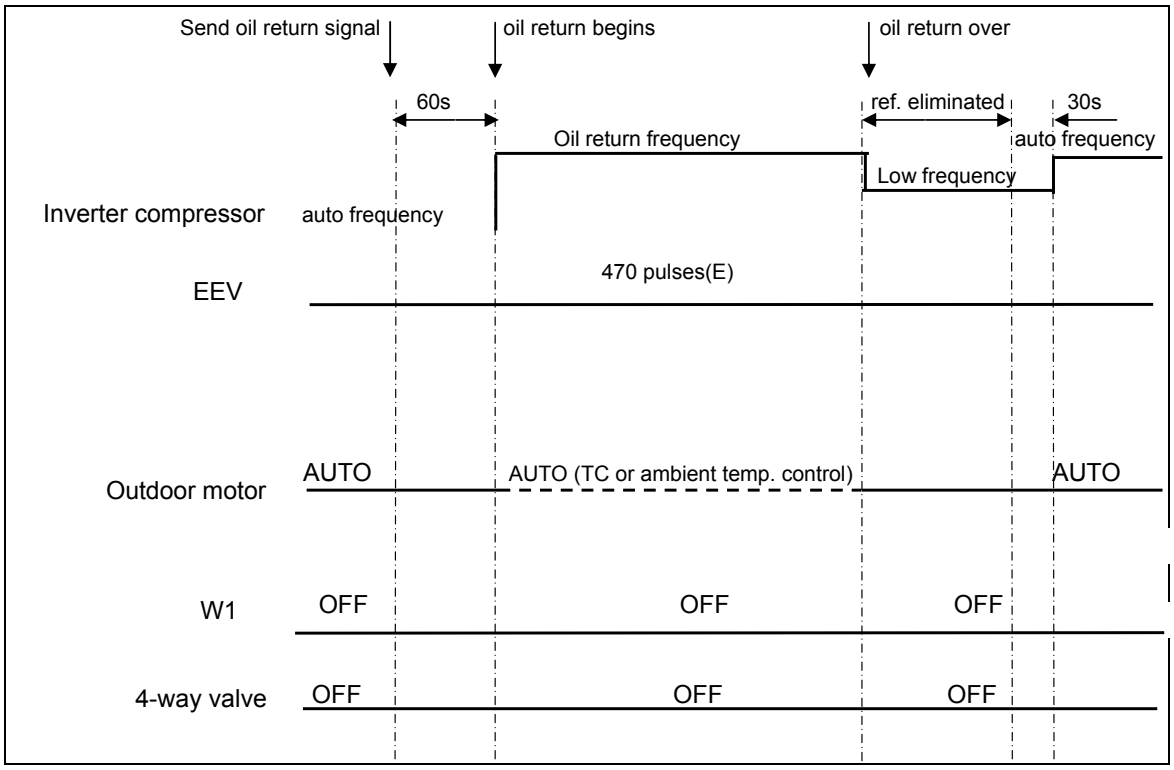
Oil Return Cycle

When the compressor is operating at low load conditions, or the operating frequency has been below AHz continuously for 4 hours, the system will enter the oil return cycle. This ensures that oil which may be trapped within the system at low loads will return to the compressor crankcase.

If a 4-hour low speed run time has occurred, the oil return procedure initiates by automatically ramping up the compressor speed to at least BHz for a pre-set time, up to a 9-minute maximum. The higher speed will wick hiding oil into the now faster-moving refrigera t and deposit it in the compressor crankcase. To avoid occupant discomfort when the oil return cycle is active, the indoor fan shuts off.

Should an error code result in a system shutdown, the oil return cycle timing will resume when the error code has been cleared. Minimum oil return time: 3 minutes.

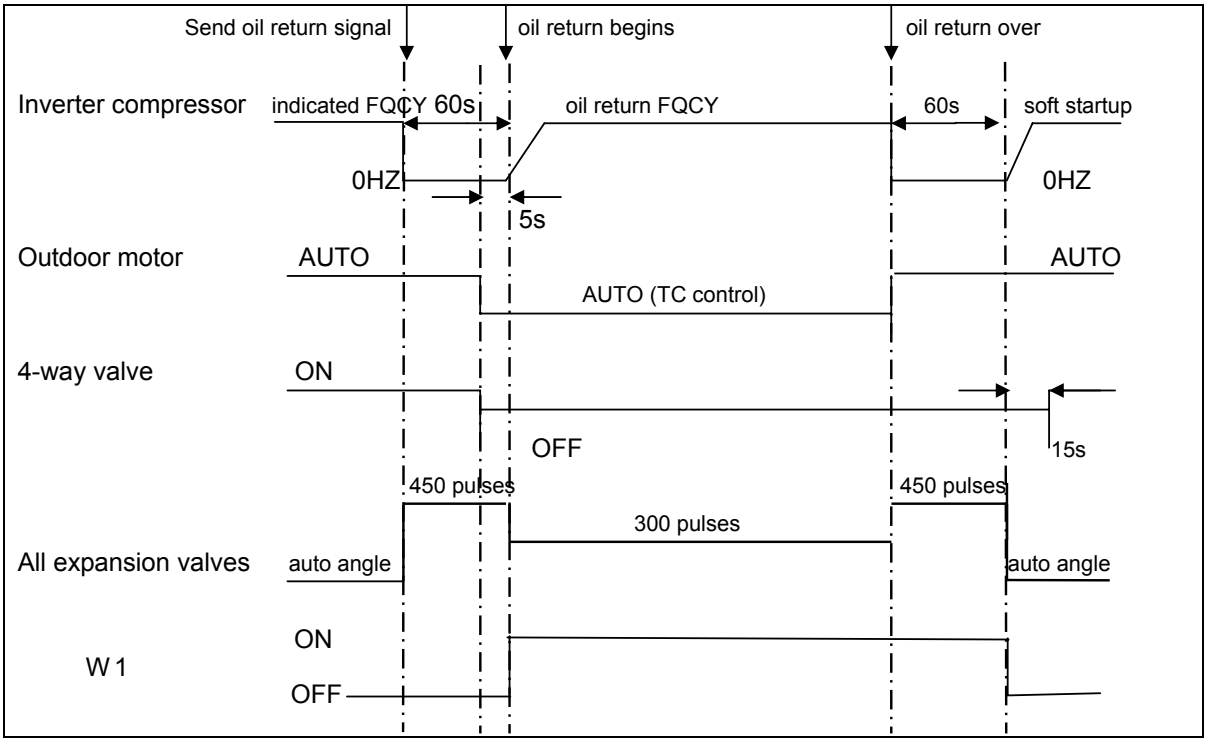
Oil Return in Cooling Mode



Operating Parameters

Oil Return in Heating Mode

Oil Return in Heating Mode



Model	Sound Power1 (Low)	Estimated Sound Pressure (dBA)2 Approximate Distance3			Sound Power1 (High)	Estimated Sound Pressure (dBA)2 Approximate Distance3		
		One Meter (3.3 feet)	Two Meters (6.6 feet)	Three Meters (9.8 feet)		One Meter (3.3 feet)	Two Meters (6.6 feet)	Three Meters (9.8 feet)
EL18KSLV-024	54	46	40	36	69	61	55	51
EL18KSLV-036	57	49	43	39	75	67	61	57
EL18KSLV-060	62	54	48	44	78	70	64	60

1. Rated in accordance with AHRI standard 270 (2015)
2. Rated in accordance with AHRI standard 275 (2010).
3. Based only on distance factor; other factors may change this value such as:

Unit location (reflective surfaces adjacent to the unit)

Barrier shielding sources

Sound path/elevation

Outside noise sources

Outdoor Fan Motor

Check that the wiring and plug connections are in good condition.

If the outdoor unit fan motor does not run, or the Service Monitor Board indicates an error code of 09, check the following voltages at connector CN11 on the outdoor unit PCB. Set the meter to read DC volts with a minimum voltage range of 350 volts. All voltage values are approximate. Initiate forced cooling.

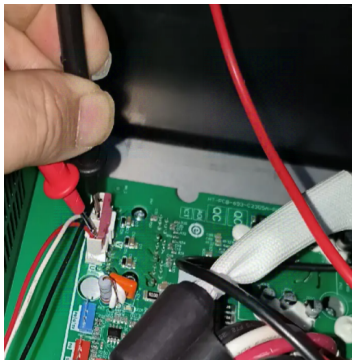
1. DC voltage between the Red and Black wires should read 310 ~ 334VDC.
This is the main voltage for powering the fan motor.

2. DC voltage between the White and Black wires should read 310~334VDC.
This is the main voltage for powering the fan motor.

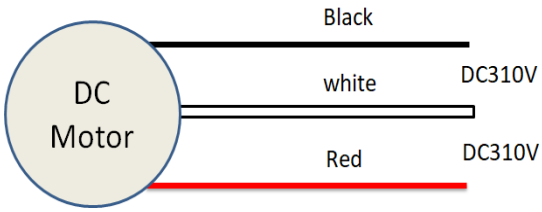
3. DC voltage between the Red and White wires should read 310~334VDC.
This is the main voltage for powering the fan motor.

If the outdoor fan initially runs, increases speed then stops, and the Service Monitor Board indicates an error code of 09, the feedback circuit is not functioning. Check that the wiring and plug connections are in good condition.

1



PCB design may vary by model number



P

Temperature Sensor

The temperature sensors are negative coefficient thermistors, in which resistance decreases as temperature rises. Should the sensors fail, the PCB will generate an appropriate error code.

To check the calibration of the sensors:

1. Shut off power to the outdoor unit.

2. Disconnect the sensor at the circuit board plug.

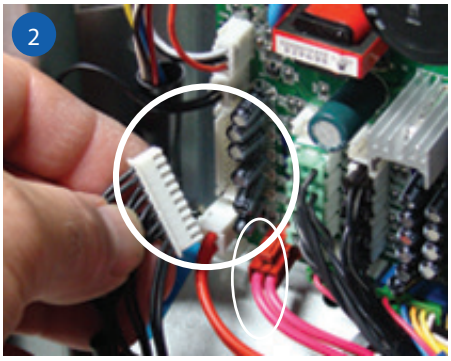
3.Measure the temperature of the air surrounding the sensor.

4. Measure the electrical resistance of the sensor using needle probes. Do not force standard probes into the sensor plug.

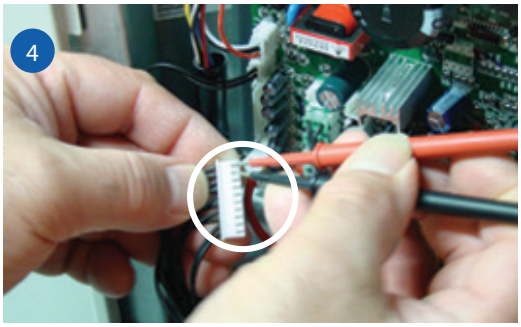
5. Compare the measured resistance of the sensor against the resistance/ temperature specifications (refer to Reference Information section for sensor tables).

6. If the sensor resistance is outside of the specification tolerances shown on the resistance/temperature table, replace the sensor.

2



4

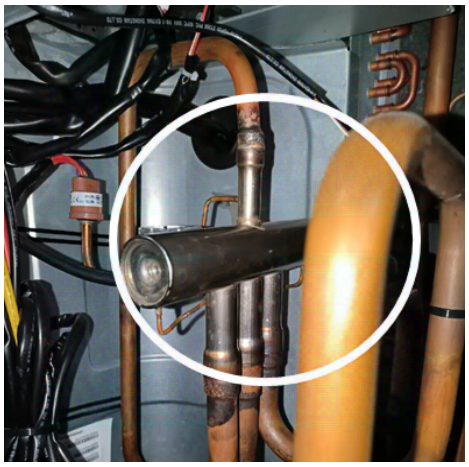


PCB design may vary by model number

Component Testing

4-Way Valve

The 4-way valve will control the direction of hot gas discharge via an internal slide assembly. The valve has a line voltage solenoid that is energized in heat mode. The solenoid will direct the internal slide to send the hot gas to the indoor coil. During cooling mode de-energized operation, the internal slide will direct compressor hot gas to the outdoor coil.



4-way valves may have a failure of the electrical solenoid that prevents the valve from shifting, or they may become stuck due to debris lodging inside the valve body. If the valve fails to direct the hot gas in the proper direction, temperature sensors within the outdoor unit will detect the problem and generate an error code.

If the valve fails to shift the hot gas to the proper coil, or it only partially shifts, perform the following:

1. Check for correct refrigerant charge, and that all other operating parameters have been met.

2. In the heating mode, the solenoid will shift after a short time delay. Check for line voltage to the solenoid coil.

3. If the valve has voltage but fails to shift the hot gas to the indoor coil, shut the system down and unplug the 4-way valve from the PCB plug.

4. Use an ohmmeter to check continuity through the solenoid coil. If the coil resistance does not match the chart in this manual, or if a winding shows open or shorted, the solenoid coil will have to be replaced.

5. If the coil resistance is within the tolerance, use a strong magnet along the valve body to determine the location of the piston. If one end of the piston is against the end of the valve body, it is stuck and the valve must be replaced.

6. Partial shifting of the valve can be detected by measuring the temperature of the suction gas where it enters the reversing valve and then comparing that temperature to the temperature of the suction gas exiting the 4-way valve. There should be no more than 3F difference. Excessive temperature rise through the suction gas path is an indication of a stuck piston. If the piston will not become free by switching from heating to cooling several times, a slight tapping on the valve body, or by using a powerful magnet, the valve will require replacement.

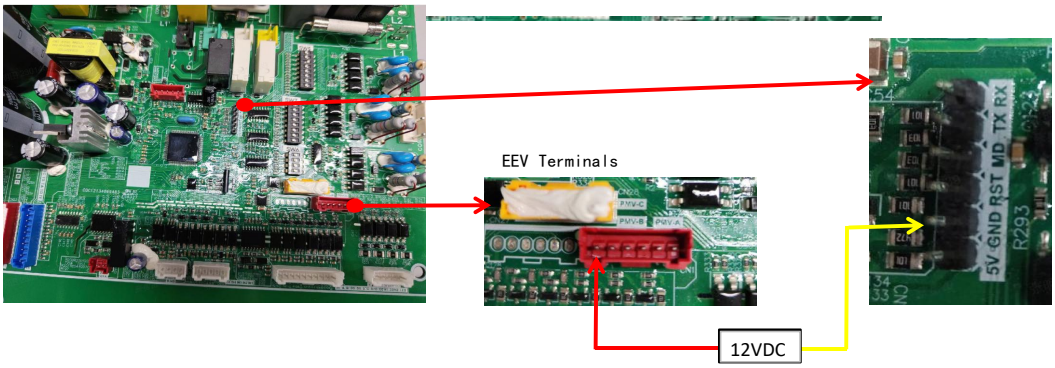
Electronic Expansion Valve (EEV)

1. Check to see if the Electronic expansion valve (EEV) connector is correctly and firmly inserted in the PCB.

2. Turn the power off and back on again,

3. Check to see whether the EEV have a reposition sound. This sound will start after approx 2 min. If the EEV doesn't have noise, please disconnect the connector and check the resistance (refer to resistance tables below).

4. If the resistance is OK, The PCB may be at fault.



24K
EEV(6-pin, 6 wire)

	Red	Brown	Blue	Orange	Yellow	White
Red	-	OL	46	OL	46	OL
Brown	-	-	OL	46	OL	46
Blue	-	-	-	OL	92	OL
Orange	-	-	-	-	OL	92
Yellow	-	-	-	-	-	OL
White	-	-	-	-	-	-

36K&60K
EEV(6-pin, 6 wire)

	Blue	Grey	Orange	Red	Yellow	Black
Blue	-	OL	46	OL	46	OL
Grey	-	-	OL	46	OL	46
Orange	-	-	-	OL	92	OL
Red	-	-	-	-	OL	92
Yellow	-	-	-	-	-	OL
Black	-	-	-	-	-	-

Filter Drier

The factory-installed filter dryer is very important for system reliability. The filter dryer should be replaced before re-charging the unit with refrigerant if the unit needs to have refrigerant evacuated for repair. The specification of the filter dryer can be found in the Table below.

ODF	Temperature Range	MWP	Compatible Refrigerant
3/8	-40°C~120°C	4.5M Pa/650 Psig	R-454B

1. Recycle the outdoor unit refrigerant and keep the stop valve open.
2. The filter dryer is located at the outlet side of the outdoor unit.
3. The two ends of the filter dryer need to be brazed, and the filter dryer is bidirectional.
4. Remove sensors, wiring harnesses and other flammable materials around the filter before brazing.
5. Brazing qualified professionals are required to perform brazing operations in a safe environment.

Crankcase heater

1. Crankcase heater normal, please refer to the following table.

2. The PCB is normal but the crankcase heater does not work, and if there is no resistance value measured, the crankcase heater is damaged.

Model	Resistance
EL18KSLV-024	1793Ω ± 7%
EL18KSLV-036	1793Ω ± 7%
EL18KSLV-060	2057Ω ± 9%

Reactor

1. The reactor is in normal state and PCB runs normally.

2. The reactor is damaged and the lamp board does not display.

3. The internal circuit of the reactor is broken, and the multimeter buzzer is used to judge.

Component Testing

Pressure transducer.

1. Refrigerant pressure is detected during operation by a pressuree sensor.

2. Compressor frequencies are controlled by an algorithm from input of the pressure transducer and other sensor and inputs.

3. Reads high pressure in the heating mode/ low pressure inthe cooling mode.

Black wire = common/ground
Red wire = 5V DC input
White wire = 0.5V to 3.5V DC output

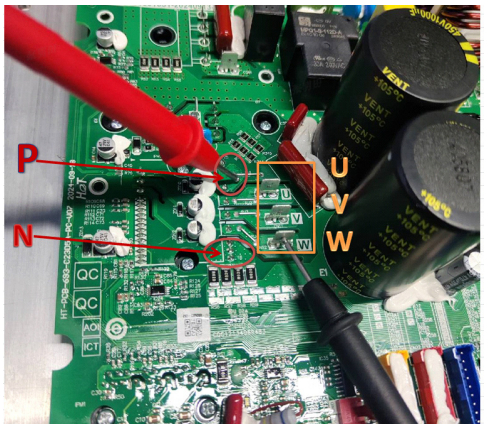
Voltage DC	Pressure PSI	Voltage DC	Pressure PSI
0.5	0	2.1	321
0.6	20	2.2	341
0.7	40	2.3	361
0.8	60	2.4	381
0.9	80	2.5	401
1	100	2.6	421
1.1	120	2.7	441
1.2	140	2.8	461
1.3	160	2.9	481
1.4	181	3	501
1.5	201	3.1	522
1.6	221	3.2	542
1.7	241	3.3	562
1.8	261	3.4	582
1.9	281	3.5	602
2	301		

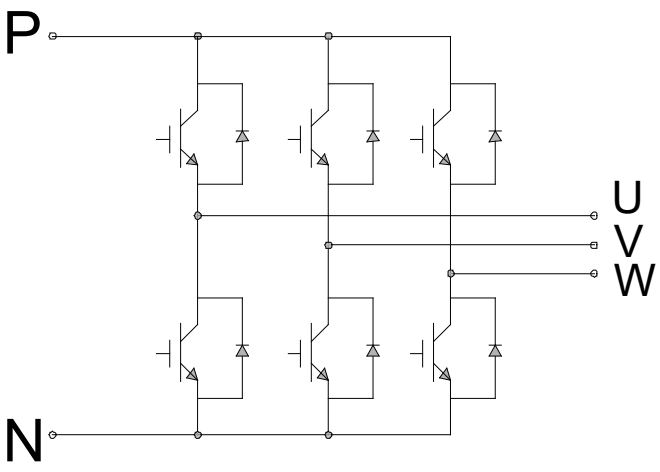
IGBT Test

Need to pull the U,V,W leads off the control board

Remember,the leads are polarity sensitive .

	Test 1	Test 2	Test 3	Test 4
Meter lead	control board+	UVW	control board-	UVW
Meter lead	UVW	control board+	UVW	control board-
Good	Several KΩ to Several MΩ			
Faulty	0Ω or OL			





Insulate-Gate Bipolar Transistor

Charge Mode Operation with a Conventional 24VAC Heat Pump Thermostat.

Charge Mode Display Message

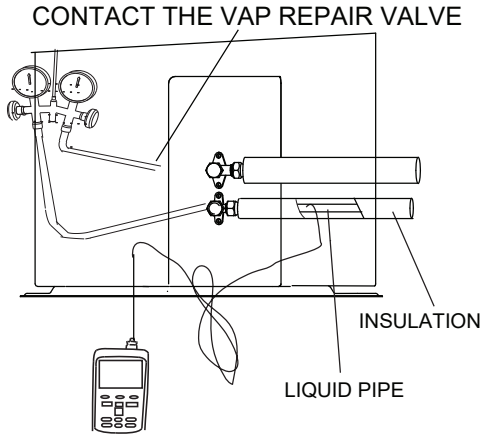
When unit is in the cooling charge mode, 2 -segment display displays the current Subcooling.

Charge Mode DIP Operation in the Cooling Mode

The operation mode of DIP switch SW1 on the display board is shown in **Table 8**. After the system is started, the system needs to be stabilized for 10 minutes. Compare the subcooling value that is displayed after 10 minutes with the target subcooling value in **Table 9**.

Charge Mode DIP Operation in the Heating Mode

To test the supercooling degree in heating mode, an external pressure gauge and thermometer need to be connected, and the pressure and measurement temperature are connected as shown in the **Figure 23**. The saturation temperature of the refrigerant is checked through **Table 10**, and the current supercooling degree is obtained by using the temperature measured by the saturation temperature minus the thermometer, and the target supercooling degree is compared with that in **Table 9**.



Indoor Unit Matches and Subcooling Charge Levels (TXV System) and Additional Charge (15 ft. Line set)

Indoor Matchup	Subcool		Additional Charge
	Heat(±3℉)	cool(±1℉)	Lbs/oz
2 Ton HP			
CBK45UHP-018	4.0	6.0	1 lb 2 oz
CBK45UHV-018	4.0	6.0	1 lb 2 oz
CBK45UHP-024	4.0	6.0	1 lb 5 oz
CBK45UHE-024	4.0	6.0	1 lb 5 oz
CBK45UHV-024	4.0	6.0	1 lb 5 oz
CBK45UHP-030	6.0	6.0	1 lb 9 oz
CBK45UHE-030	6.0	6.0	1 lb 9 oz
CBK45UHV-030	6.0	6.0	1 lb 9 oz
CBK47UHE-024	6.0	5.0	0 lb 14 oz
CBK47UHE-030	6.0	5.0	0 lb 14 oz
CBK48MV-018/024	6.0	5.0	0 lb 14 oz
CBK48MV-030	4.0	11.0	1 lb 12 oz
CK40CT-24B	4.0	5.0	1 lb 2 oz
CK40CT-30A	4.0	6.0	1 lb 9 oz
CK40CT-30B	4.0	6.0	1 lb 9 oz
CK40CT-36A	4.0	11.0	1 lb 12 oz
CK40CT-36B	4.0	11.0	1 lb 12 oz
CK40HT-18A	4.0	7.0	0 lb 0 oz
CK40HT-24A	4.0	5.0	0 lb 7 oz
CK40HT-24B	4.0	5.0	0 lb 7 oz
CK40HT-30A	4.0	5.0	0 lb 11 oz
CK40HT-30B	4.0	5.0	1 lb 9 oz
CK40DT-24A	5.0	6.0	1 lb 2 oz
CK40DT-24B	5.0	6.0	1 lb 2 oz
3 Ton HP			
CBK45UHP-036	6.0	13.0	1 lb 5 oz
CBK45UHE-036	6.0	13.0	1 lb 5 oz
CBK45UHV-036	6.0	13.0	1 lb 5 oz
CBK45UHP-042	6.0	13.0	1 lb 5 oz
CBK45UHE-042	6.0	13.0	1 lb 5 oz
CBK45UHV-042	6.0	13.0	1 lb 5 oz
CBK47UHE-036	7.0	11.0	1 lb 2 oz
CBK47UHE-042	7.0	11.0	1 lb 2 oz
CBK48MV-036	7.0	11.0	1 lb 2 oz
CBK48MV-042	6.0	11.0	2 lb 0 oz
CK40CT-30A	10.0	12.0	0 lb 14 oz
CK40CT-30B	10.0	12.0	0 lb 14 oz
CK40CT-36A	10.0	11.0	1 lb 2 oz
CK40CT-36B	10.0	11.0	1 lb 2 oz
CK40HT-30A	8.0	7.0	0 lb 4 oz
CK40HT-30B	10.0	12.0	1 lb 2 oz
CK40HT-36A	8.0	10.0	0 lb 11 oz
CK40HT-36B	8.0	7.0	0 lb 0 oz
CK40HT-36C	8.0	10.0	0 lb 14 oz
CK40DT-30/36B	10.0	12.0	1 lb 0 oz
CK40DT-42B	7.0	9.0	2 lb 0 oz

Indoor Matchup	Subcool		Additional Charge
	Heat(±3℉)	cool(±1℉)	Lbs/oz
4 Ton HP			
CBK45UHP-042	13.0	7.0	0 lb 11 oz
CBK45UHE-042	13.0	7.0	0 lb 11 oz
CBK45UHV-042	13.0	7.0	0 lb 11 oz
CBK45UHE-048	14.0	7.0	0 lb 11 oz
CBK45UHV-048	14.0	7.0	0 lb 11 oz
CBK47UHE-042	12.0	7.0	0 lb 6 oz
CBK47UHE-048	14.0	7.0	0 lb 11 oz
CBK48MV-042	14.0	7.0	0 lb 11 oz
CBK48MV-048	14.0	7.0	0 lb 11 oz
CK40CT-48B	15.0	5.0	0 lb 6 oz
CK40CT-48C	15.0	5.0	0 lb 6 oz
CK40CT-49C	14.0	5.0	0 lb 7 oz
CK40HT-42B	6.0	4.0	1 lb 9 oz
CK40HT-42C	8.0	2.0	0 lb 0 oz
CK40HT-48B	15.0	5.0	0 lb 7 oz
CK40HT-48C	13.0	5.0	0 lb 7 oz
CK40DT-42B	6.0	5.0	0 lb 11 oz
CK40DT-48C	6.0	5.0	0 lb 13 oz
5 Ton HP			
CBK45UHE-060	6.0	4.0	0 lb 11 oz
CBK45UHV-060	6.0	4.0	0 lb 11 oz
CBK47UHE-060	6.0	4.0	1 lb 11 oz
CBK48MV-060	6.0	4.0	1 lb 11 oz
CK40CT-50/60C	6.0	4.0	0 lb 5 oz
CK40CT-60C	6.0	4.0	0 lb 7 oz
CK40CT-60D	6.0	4.0	0 lb 7 oz
CK40HT-51/61C	6.0	4.0	0 lb 11 oz
CK40HT-60D	6.0	4.0	1 lb 9 oz
CK40DT-50/60C	6.0	6.0	0 lb 7 oz
CK40DT-60D	6.0	6.0	0 lb 7 oz

Table 9. Indoor Unit Matches and Sub-cooling Charge Levels (TXV System) and Additional Charge (15 ft. Line set)

NOTE: Please check **GEApplaincesAirandWater.com** for the latest AHRI listed match technical data.

°F	Psig	°F	Psig	°F	Psig	°F	Psig	°F	Psig	°F	Psig	°F	Psig	°F	Psig
31	94	46	126	61	164	76	210	91	264	106	328	121	401	136	486
32	96	47	128	62	167	77	213	92	268	107	332	122	406	137	492
33	98	48	130	63	170	78	217	93	272	108	337	123	412	138	498
34	100	49	133	64	173	79	220	94	276	109	341	124	417	139	505
35	102	50	135	65	176	80	224	95	280	110	346	125	423	140	511
36	104	51	138	66	179	81	227	96	284	111	351	126	428	141	517
37	106	52	140	67	182	82	231	97	288	112	356	127	434	142	524
38	108	53	143	68	185	83	234	98	293	113	361	128	439	143	530
39	110	54	145	69	188	84	238	99	297	114	365	129	445	144	537
40	112	55	148	70	191	85	241	100	301	115	370	130	451	145	543
41	114	56	151	71	194	86	245	101	305	116	375	131	456	146	550
42	117	57	153	72	197	87	249	102	310	117	380	132	462	147	557
43	119	58	156	73	200	88	253	103	314	118	386	133	468	148	563
44	121	59	159	74	203	89	256	104	319	119	391	134	474	149	570
45	123	60	161	75	207	90	260	105	323	120	396	135	480	150	577

Table 10. HFC-454B Temperature (°F) Pressure (Psig)

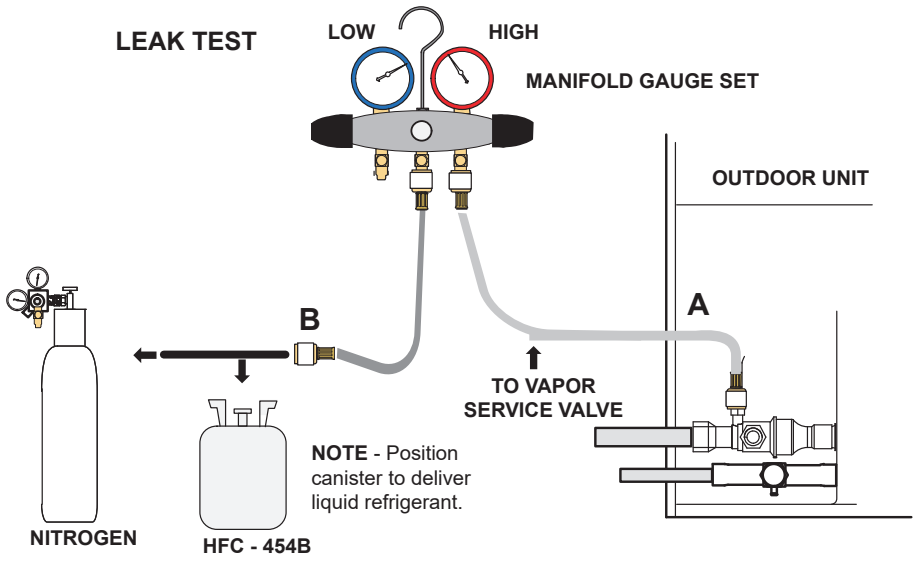
Operating and Temperature Pressures (All Builds)

Minor variations in these pressures may be expected due to differences in installations. Significant differences could mean that the system is not properly charged or that a problem exists with some component in the system.

°F (°C)	24K			36k			60k		
	Liq.(PSI)	Vap.(PSI)	IDU SCFM	Liq.(PSI)	Vap.(PSI)	IDU SCFM	Liq.(PSI)	Vap.(PSI)	IDU SCFM
Heating Operation									
20(-7)	248	61	800	243	63	1050	254	59	1600
30(-1)	259	74		261	76		268	73	
35(2)	268	83		365	82		274	79	
40(4)	274	86		271	91		278	85	
50(10)	290	105		286	110		291	98	
60(16)	308	120		300	124		299	107	
Cooling Operation									
65(18)	202	137	800	224	133	1050	408	142	1600
70(21)	221	137		244	133		379	141	
75(24)	240	138		265	134		362	139	
80(27)	261	139		286	135		336	138	
85(29)	275	138		306	134		312	137	
90(32)	298	140		324	136		289	135	
95(35)	322	142		351	138		267	133	
100(38)	349	144		375	140		254	132	
105(41)	374	145		402	141		234	129	
110(43)	394	146		420	142		215	127	
115(46)	420	147		449	143		199	126	
NOTE: Table 11 is the pressure under the Charge Mode, not the normal operation pressure.									

Table 11. Charge Mode Operating Pressure − Liquid ±10 and Vapor ±5 psig

Leak Test and Evacuation



1. CONNECT GAUGE SET

A - Connect the high pressure hose of an HFC-454B manifold gauge set to the vapor valve service port.

NOTE - Normally, the high pressure hose is connected to the liquid line port. However, connecting it to the vapor port better protects the manifold gauge set from high pressure damage.

B - With both manifold valves closed, connect the nitrogen container to the center port of the manifold gauge set.

2. TEST FOR LEAKS

After the line set has been connected to the indoor and outdoor units, check the line set connections and indoor unit for leaks. Use the following procedure to test for leaks:.

A - With both manifold valves closed, connect the nitrogen container to the center port of the manifold gauge set.

B - Open the high pressure side of the manifold to allow HFC-454B into the line set and indoor unit. Weigh in a trace amount of HFC-454B. [A trace amount is a maximum of two ounces (57 g) refrigerant or three pounds (31 kPa) pressure.] Close the valve on the HFC-454B cylinder and the valve on the high pressure side of the manifold gauge set. Disconnect the HFC-454B cylinder.

C - Connect a cylinder of nitrogen with a pressure regulating valve to the center port of the manifold gauge set.

D - Adjust nitrogen pressure to 150 psig (1034 kPa). Open the valve on the high side of the manifold gauge set in order to pressurize the line set and the indoor unit.

E - After a few minutes, open one of the service valve ports and verify that the refrigerant added to the system earlier is measurable with a leak detector.

2. TEST FOR LEAKS (cont)

F - After leak testing, disconnect gauges from service ports.

NOTE - Service valve cores remain removed for the following evacuation procedure.

3. CONNECT GAUGE SET

NOTE - Remove cores from service valves (if not already done).

A - Connect low side of manifold gauge set with 1/4 SAE in-line tee to vapor line service valve

B - Connect high side of manifold gauge set to liquid line service valve

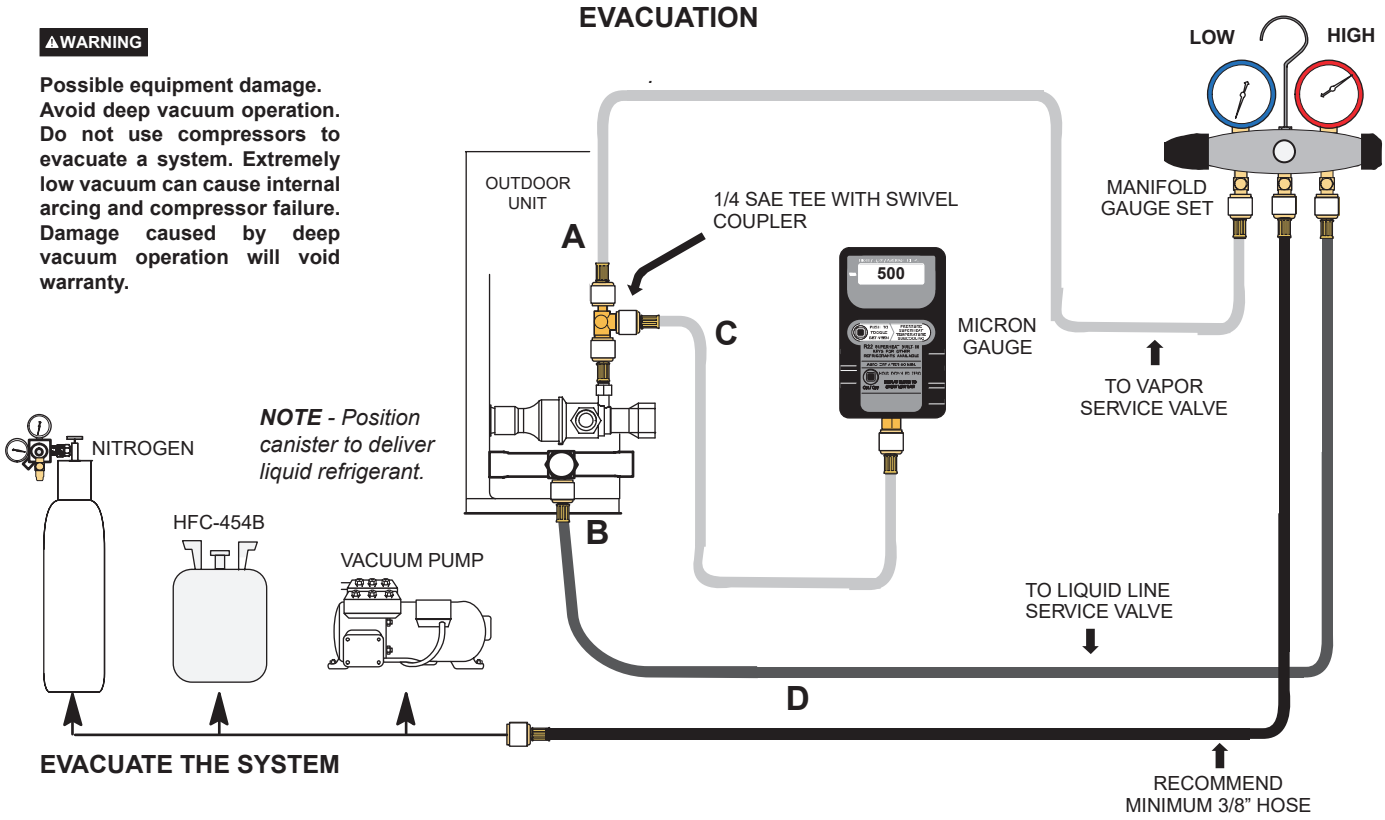
C - Connect available micron gauge connector on the 1/4 SAE in-line tee.

D - Connect the vacuum pump (with vacuum gauge) to the center port of the manifold gauge set. The center port line will be used later for both the HFC-454B and nitrogen containers.

Leak Test and Evacuation (cont)

⚠WARNING

Possible equipment damage. Avoid deep vacuum operation. Do not use compressors to evacuate a system. Extremely low vacuum can cause internal arcing and compressor failure. Damage caused by deep vacuum operation will void warranty.



Leak Test and Evacuation (cont)

4. EVACUATE THE SYSTEM

A - Open both manifold valves and start the vacuum pump.

B - Evacuate the line set and indoor unit until a slight vacuum is indicated on the micron gauge (approximately 23,000 microns or 29.01 inches of mercury).

NOTE - During the early stages of evacuation, it is desirable to close the manifold gauge valve at least once. A rapid rise in pressure indicates a relatively large leak. If this occurs, repeat the leak testing procedure.

NOTE - The term absolute pressure means the total actual pressure above absolute zero within a given volume or system. Absolute pressure in a vacuum is equal to atmospheric pressure minus vacuum pressure.

C - When the absolute pressure reaches 23,000 microns (29.01 inches of mercury), perform the following:

- Close manifold gauge valves.
- Close valve on vacuum pump.
- Turn off vacuum pump.
- Disconnect manifold gauge center port hose from vacuum pump.
- Attach manifold center port hose to a nitrogen cylinder with pressure regulator set to 150 psig (1034 kPa) and purge the hose.
- Open manifold gauge valves to break the vacuum in the line set and indoor unit.
- Close manifold gauge valves.

D - Shut off the nitrogen cylinder and remove the manifold gauge hose from the cylinder. Open the manifold gauge valves to release the nitrogen from the line set and indoor unit.

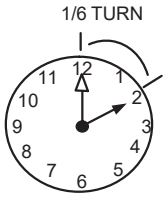
E - Reconnect the manifold gauge to the vacuum pump, turn the pump on, and continue to evacuate the line set and indoor unit until the absolute pressure does not rise above 500 microns (29.9 inches of mercury) within a 20-minute period after shutting off the vacuum pump and closing the manifold gauge valves.

F - When the absolute pressure requirement above has been met, disconnect the manifold hose from the vacuum pump and connect it to a cylinder of HFC-454B positioned to deliver liquid refrigerant. Open the manifold gauge valve 1 to 2 psig in order to release the vacuum in the line set and indoor unit.

G - Perform the following:

- Close manifold gauge valves.
- Shut off HFC-454B cylinder.
- Reinstall service valve cores by removing manifold hose from service valve. Quickly install cores with core
- tool while maintaining a positive system pressure.
- Replace stem caps and finger tighten them, then tighten an additional one-sixth (1/6) of a turn as illustrated.

H - Open suction service valve first before liquid valve to release the unit charge into the system. Replace valve caps and tighten (8 ft. lb.). Caps are the primary seal.



Standard Line Set Installation: Pipe Connection

• Attach the flare nuts to the outdoor Service Valve, Torque the fittings according to the specifications shown in the torque chart below.

NOTE: Forced fastening without careful centering may damage the threads and cause a refrigerant leak.

Pipe Diameter(ǿ)	Fastening torque
Liquid side 6.35mm(1/4”)	18N.m/13.3Ft.lbs
Liquid/Gas side 9.52mm(3/8”)	42 N.m/30.1Ft.lbs
Gas side 12.7mm(1/2”)	55N.m/40.6Ft.lbs
Gas side 15.88mm(5/8”)	60 N.m/44.3Ft.lbs
Gas side 19.05mm(3/4”)	100N.m/73.8Ft.lbs

• Add additional refrigerant charge if needed before you open outdoor service valves

• Record the amount of refrigerant added in permanent ink at the line set length location entered earlier.

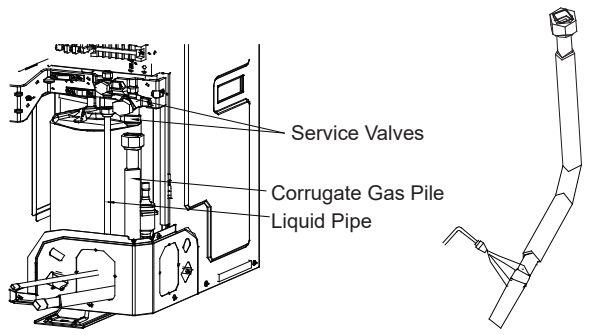


Figure 12.

• Two wrenches are required to join the flare connection; one standard wrench and one torque wrench adjusted to the proper settings.

• Repeat the process for attaching the other end of the line set.

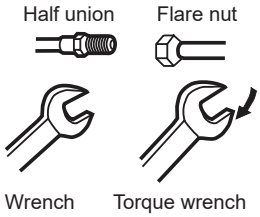


Figure 13.

Pipe Matching Capabilities of Pipe Extensions

Model	Extension	Extension Type	Extension Length (in)	Line Set Receiving End Pipe Diameter (in)	Flared End Pipe Diameter (in)	Line Set Connection Type
24K	Suction Extension	Flexible	7-3/4	3/4	5/8	Braze and Mechanical
	Liquid Extension			3/8	3/8	Braze and Mechanical
36K	Suction Extension	Flexible	33-1/2	3/4	3/4	Braze and Mechanical
				7/8	3/4	Braze
	Liquid Extension			3/8	3/8	Braze and Mechanical
60K	Suction Extension	Flexible	35-3/8	3/4	3/4	Braze and Mechanical
				7/8	3/4	Braze
	Liquid Extension			3/8	3/8	Braze and Mechanical

IMPORTANT: A 5/16” female by 1/4” male adapter will be required to connect traditional gauge hoses to the service valves.

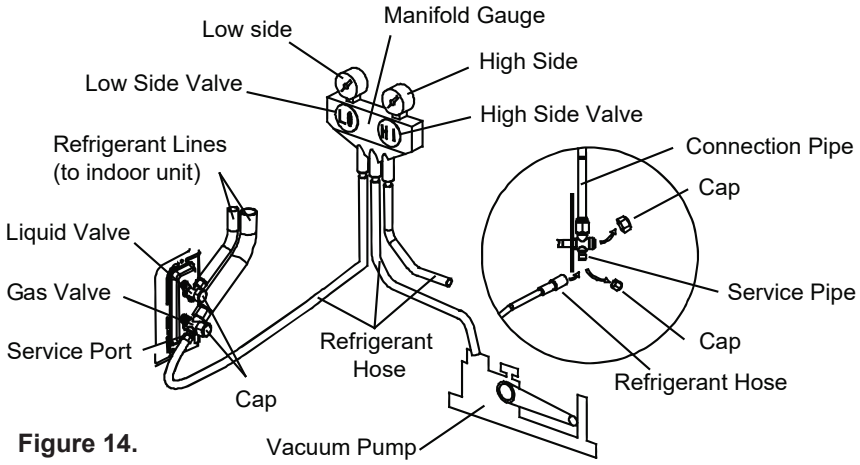
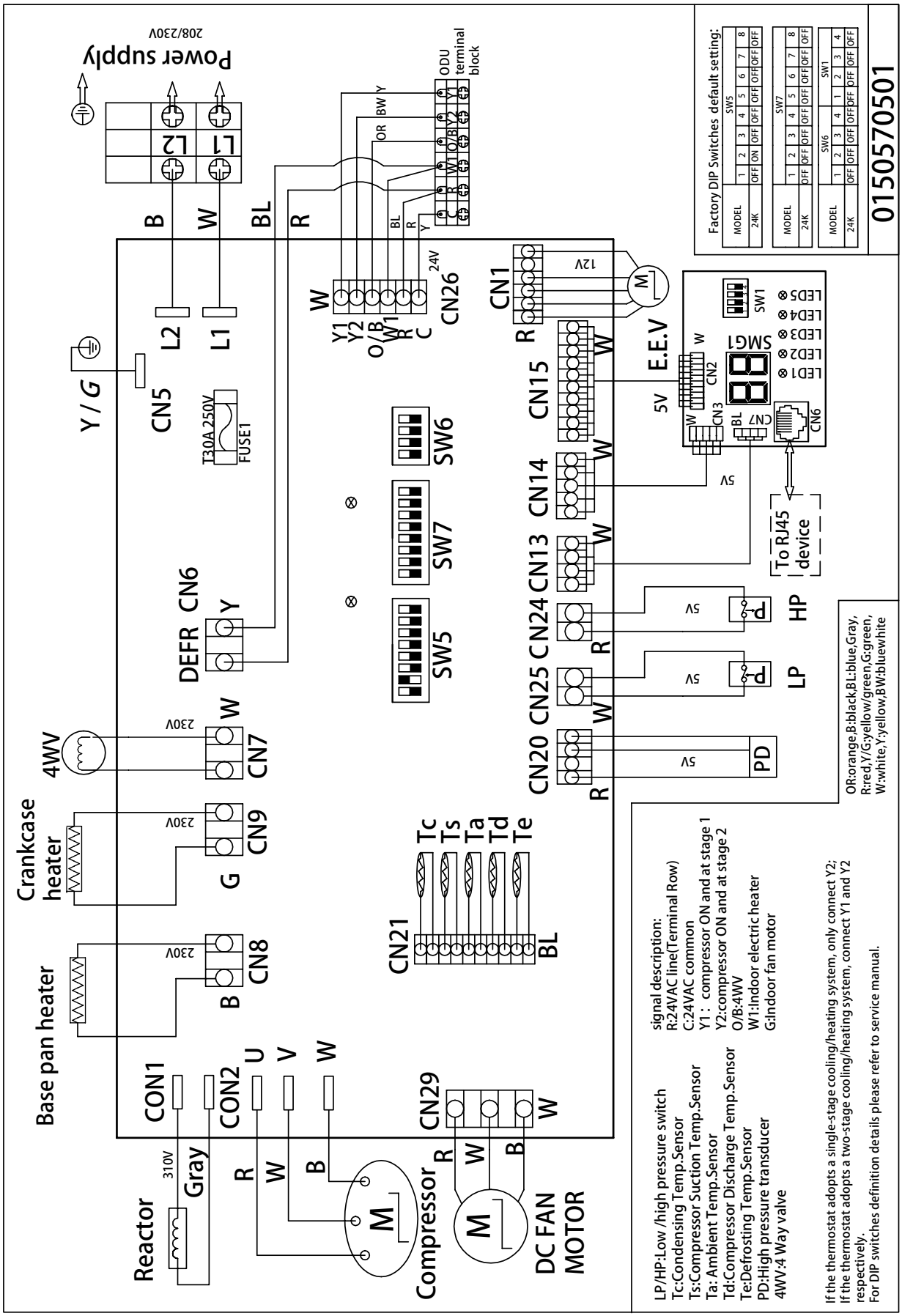


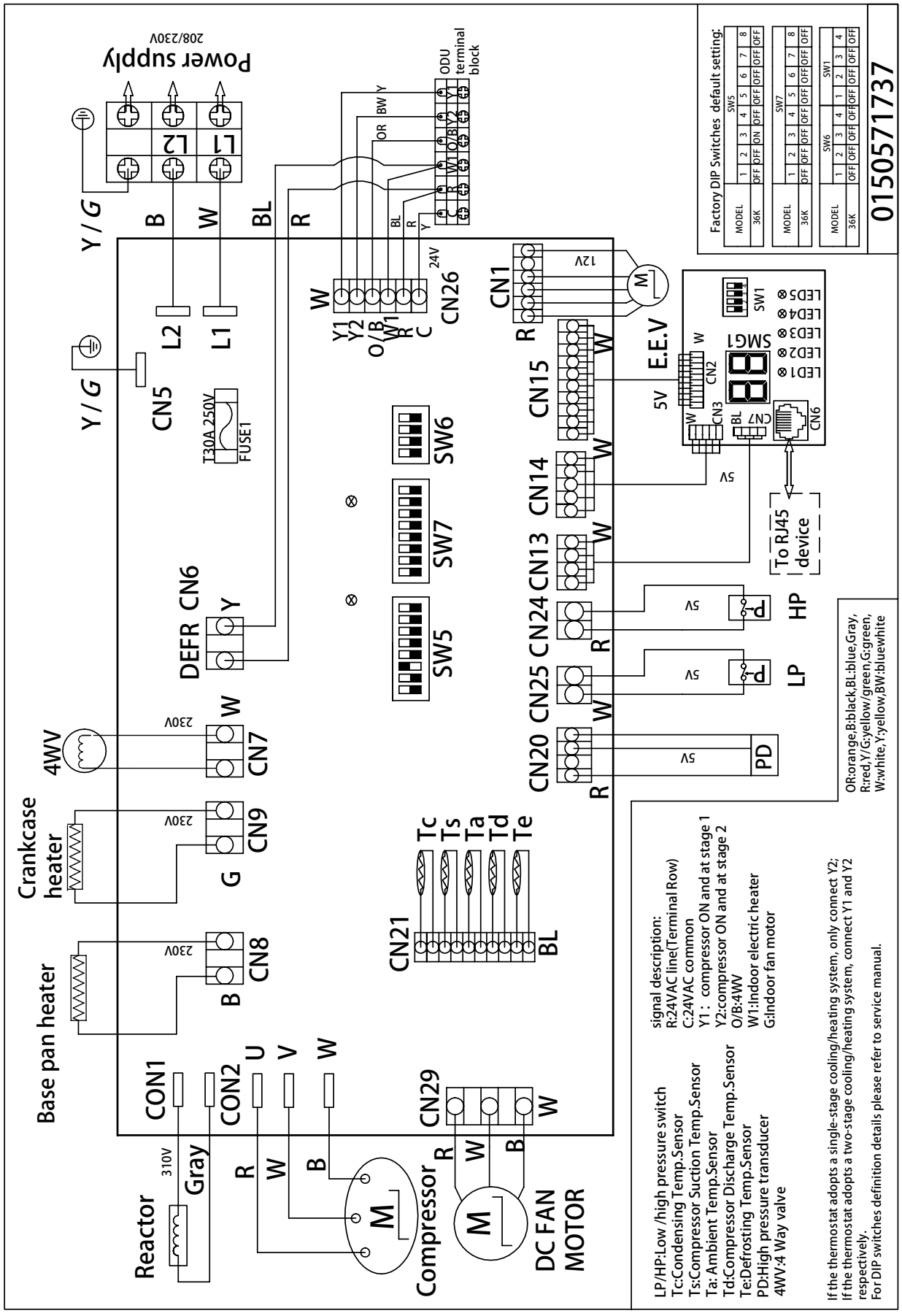
Figure 14.

NOTE: It shows the gauge connection will need to have the high side gauge hose connected to the high side liquid valve so both lines can be evacuated and leak checked.

EL18KSLV-024-230

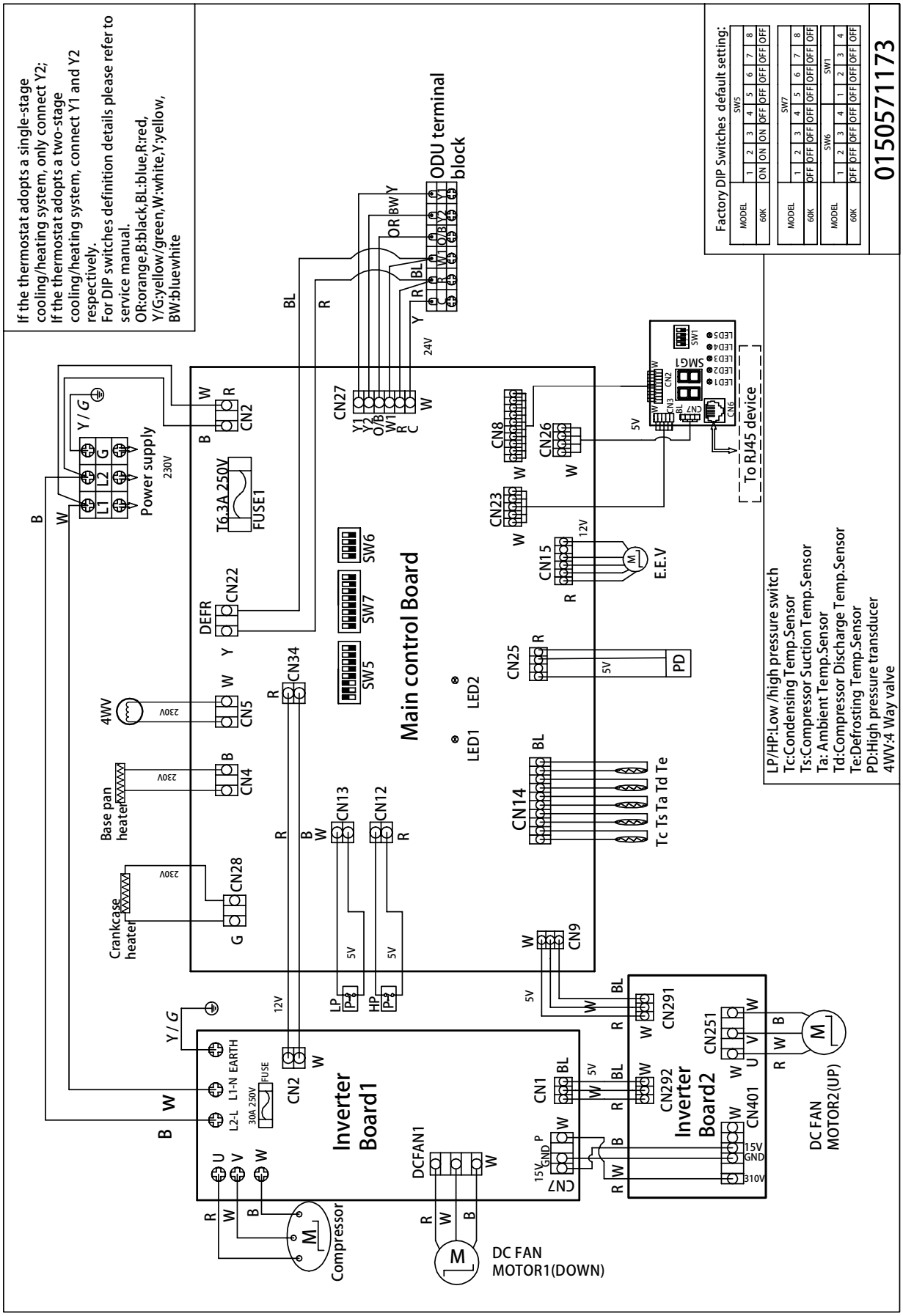


EL18KSLV-036-230



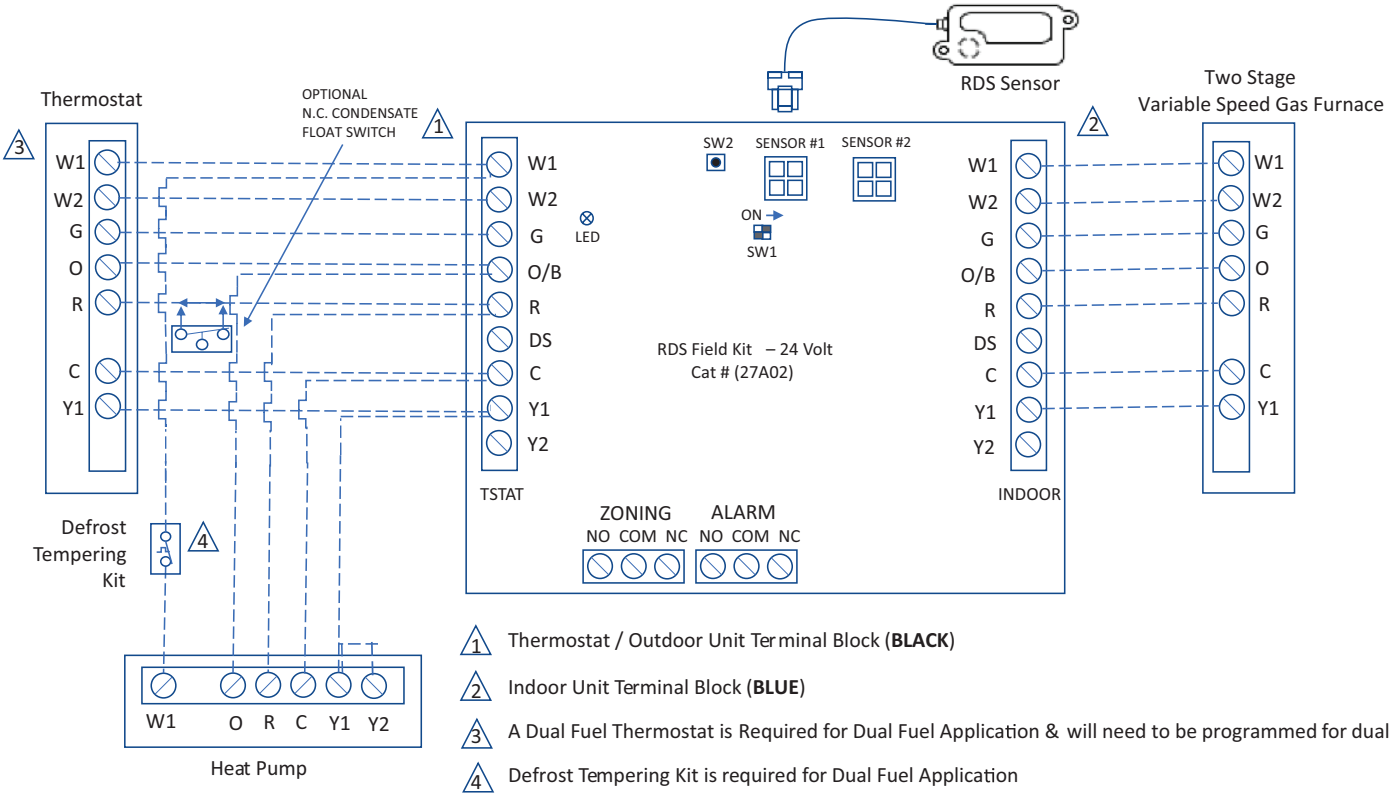
Wiring Diagrams

EL18KSLV-060-230

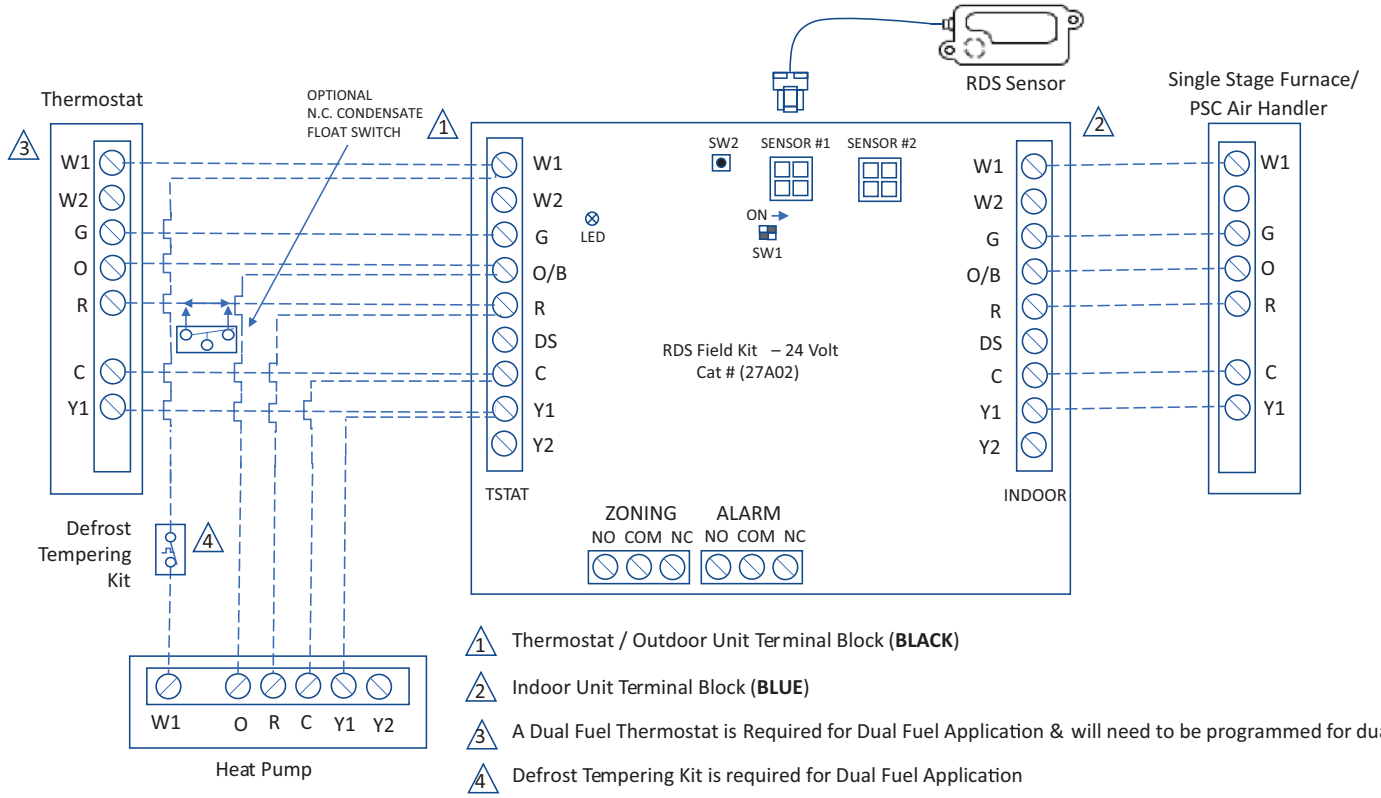


RDS Wiring Diagrams for Heat Pumps

RDS Wiring Diagrams for Single Stage Heat Pump with Air Handler

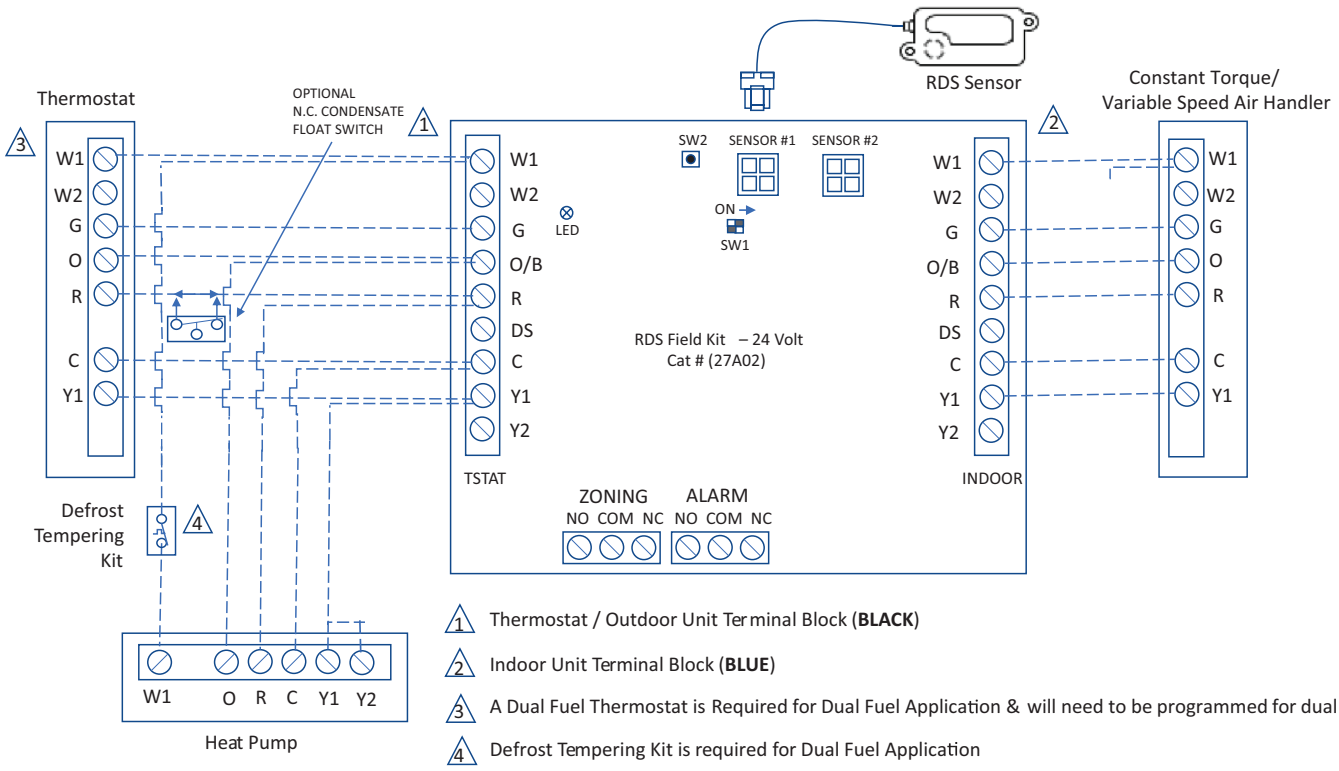


1. Thermostat / Outdoor Unit Terminal Block (**BLACK**)
2. Indoor Unit Terminal Block (**BLUE**)
3. A Dual Fuel Thermostat is Required for Dual Fuel Application & will need to be programmed for dual fuel
4. Defrost Tempering Kit is required for Dual Fuel Application



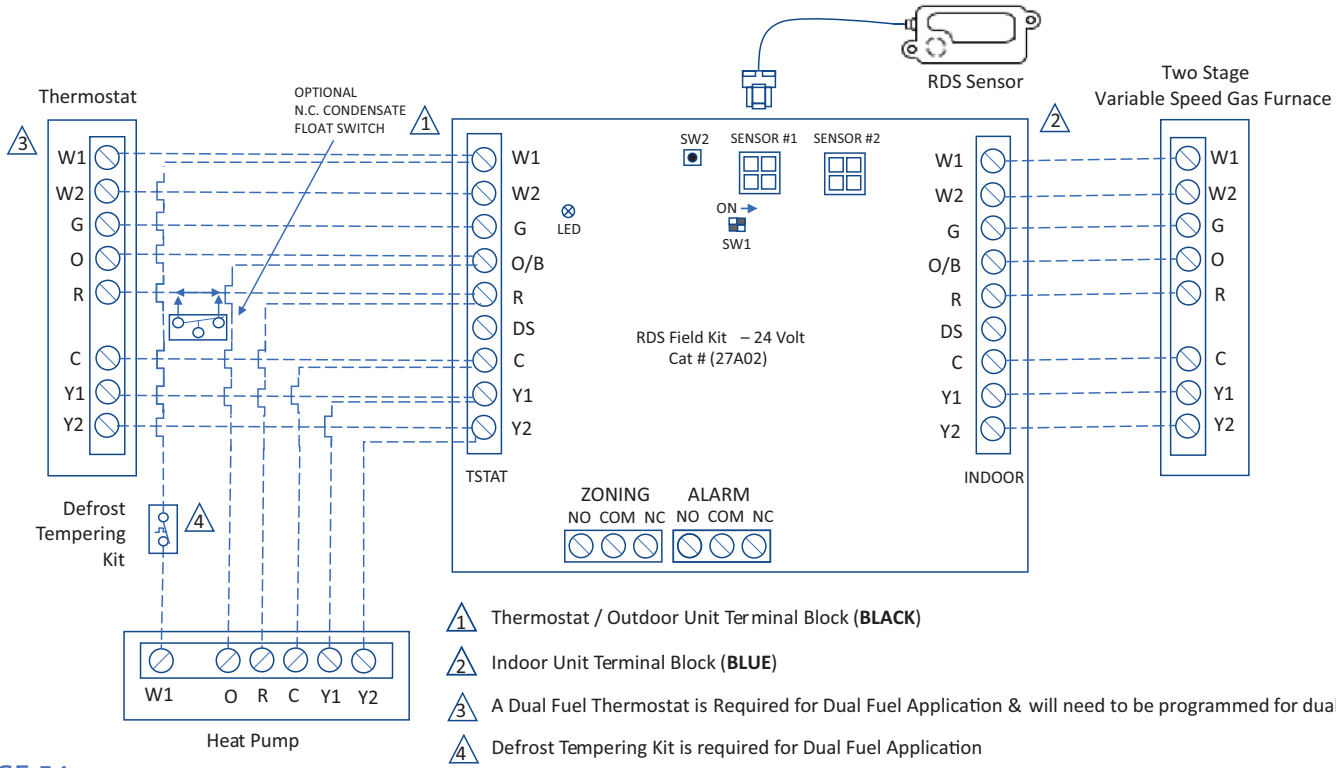
1. Thermostat / Outdoor Unit Terminal Block (**BLACK**)
2. Indoor Unit Terminal Block (**BLUE**)
3. A Dual Fuel Thermostat is Required for Dual Fuel Application & will need to be programmed for dual fuel
4. Defrost Tempering Kit is required for Dual Fuel Application

Outdoor/Indoor Wiring Connections



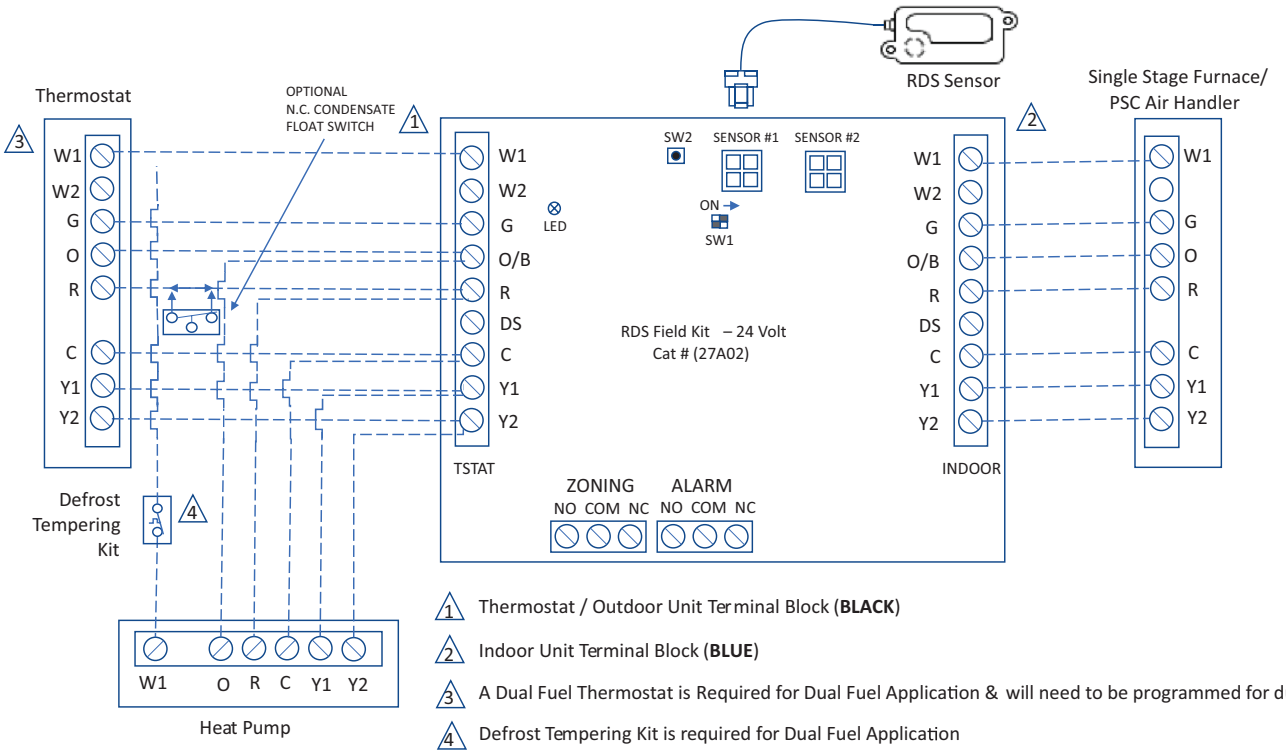
1. Thermostat / Outdoor Unit Terminal Block (**BLACK**)
2. Indoor Unit Terminal Block (**BLUE**)
3. A Dual Fuel Thermostat is Required for Dual Fuel Application & will need to be programmed for dual fuel
4. Defrost Tempering Kit is required for Dual Fuel Application

RDS Wiring Diagrams for Two Stage Heat Pump with Two Stage Furnace/Air Handler

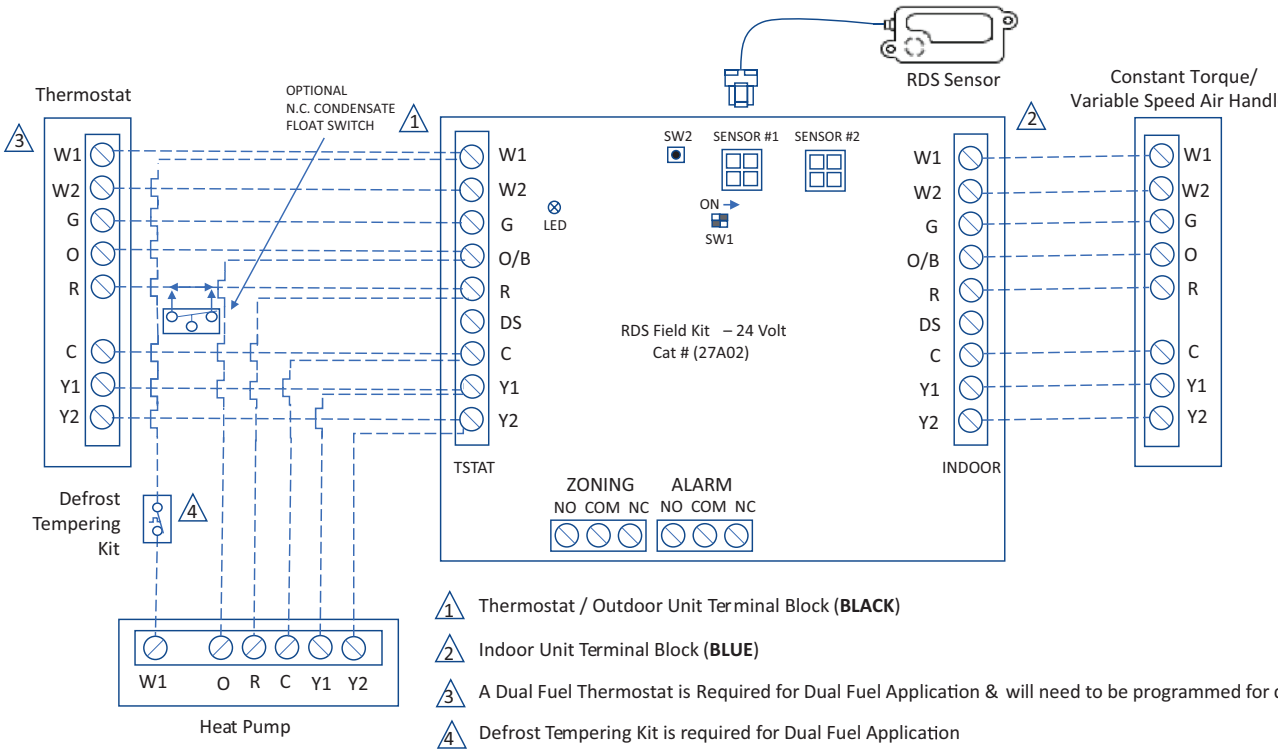


1. Thermostat / Outdoor Unit Terminal Block (**BLACK**)
2. Indoor Unit Terminal Block (**BLUE**)
3. A Dual Fuel Thermostat is Required for Dual Fuel Application & will need to be programmed for dual fuel
4. Defrost Tempering Kit is required for Dual Fuel Application

Outdoor/Indoor Wiring Connections



1. Thermostat / Outdoor Unit Terminal Block (**BLACK**)
2. Indoor Unit Terminal Block (**BLUE**)
3. A Dual Fuel Thermostat is Required for Dual Fuel Application & will need to be programmed for dual fuel
4. Defrost Tempering Kit is required for Dual Fuel Application



1. Thermostat / Outdoor Unit Terminal Block (**BLACK**)
2. Indoor Unit Terminal Block (**BLUE**)
3. A Dual Fuel Thermostat is Required for Dual Fuel Application & will need to be programmed for dual fuel
4. Defrost Tempering Kit is required for Dual Fuel Application

Sensor Resistance Tables

Model	Outdoor Ambient Temperature Sensor	
	Resistance Value	Spare Part Number
1U24T3PS1HE	TE B25/50= 3700K ±3%, R25= 10KΩ ±3% TD B25/80= 4450K ±3%, R80= 50KΩ ±3% Tao B25/50= 3700K ±3%, R25= 10KΩ ±3% TS B25/50= 3700K ±3%, R25= 10KΩ ±3% TC B25/50= 3700K ±3%, R25= 10KΩ ±3%	0150403772C
1U36T3PC1HE	TE B25/50= 3700K ±3%, R25= 10KΩ ±3% TD B25/80= 4450K ±3%, R80= 50KΩ ±3% Tao B25/50= 3700K ±3%, R25= 10KΩ ±3% TS B25/50= 3700K ±3%, R25= 10KΩ ±3% TC B25/50= 3700K ±3%, R25= 10KΩ ±3%	0150403772C
1U60T3PE1HE	TE B25/50= 3700K ±3%, R25= 10KΩ ±3% TD B25/80= 4450K ±3%, R80= 50KΩ ±3% Tao B25/50= 3700K ±3%, R25= 10KΩ ±3% TS B25/50= 3700K ±3%, R25= 10KΩ ±3% TC B25/50= 3700K ±3%, R25= 10KΩ ±3%	0150403772CA

Model	PCB	Fuse
EL18KSLV-024	0151801031	pin T30A250VAC ceramic tube package
EL18KSLV-036	0151801031A	pin T30A250VAC ceramic tube package
EL18KSLV-060	0151801003A	T6.3A250VAC anti-explosion(main control board) pin 30A250VAC ceramic explosion-proof(inverter board)

Sensor Resistance Tables

B(25/50)=3700K±3%，R25=10kΩ±3%				
Temp		Resistance（kΩ）		
℃	℉	Rmax	R(t)Normal	Rmin
-30	-22	144.35	134.907	125.464
-29	-20.2	136.519	127.675	118.831
-28	-18.4	129.381	121.081	112.781
-27	-16.6	122.638	114.849	107.06
-26	-14.8	116.268	108.958	101.648
-25	-13	110.249	103.388	96.527
-24	-11.2	104.563	98.123	91.683
-23	-9.4	99.19	93.144	87.098
-22	-7.6	94.111	88.435	82.759
-21	-5.8	89.311	83.982	78.653
-20	-4	84.518	79.529	74.54
-19	-2.2	80.484	75.785	71.086
-18	-0.4	76.428	72.015	67.602
-17	1.4	72.591	68.447	64.303
-16	3.2	68.963	65.071	61.179
-15	5	65.53	61.874	58.218
-14	6.8	62.283	58.848	55.413
-13	8.6	59.21	55.983	52.756
-12	10.4	56.3	53.269	50.238
-11	12.2	53.547	50.699	47.851
-10	14	50.94	48.264	45.588
-9	15.8	48.472	45.957	43.442
-8	17.6	46.134	43.77	41.406
-7	19.4	43.918	41.697	39.476
-6	21.2	41.819	39.731	37.643
-5	23	39.83	37.868	35.906
-4	24.8	37.944	36.1	34.256
-3	26.6	36.157	34.423	32.689
-2	28.4	34.462	32.832	31.202
-1	30.2	32.854	31.322	29.79
0	32	31.362	29.92	28.478
1	33.8	29.881	28.527	27.173
2	35.6	28.507	27.234	25.961
3	37.4	27.202	26.006	24.81
4	39.2	25.965	24.84	23.715
5	41	24.788	23.731	22.674
6	42.8	23.672	22.678	21.684
7	44.6	22.61	21.676	20.742
8	46.4	21.601	20.723	19.845
9	48.2	20.642	19.817	18.992
10	50	19.73	18.955	18.18
11	51.8	18.864	18.135	17.406
12	53.6	18.039	17.354	16.669
13	55.4	17.254	16.611	15.968

14	57.2	16.507	15.903	15.299
15	59	15.797	15.229	14.661
16	60.8	15.12	14.587	14.054
17	62.6	14.476	13.975	13.474
18	64.4	13.862	13.392	12.922
19	66.2	13.277	12.836	12.395
20	68	12.72	12.306	11.892
21	69.8	12.189	11.801	11.413
22	71.6	11.683	11.319	10.955
23	73.4	11.2	10.858	10.516
24	75.2	10.739	10.419	10.099
25	77	10.3	10	9.7
26	78.8	9.894	9.6	9.306
27	80.6	9.505	9.217	8.929
28	82.4	9.134	8.852	8.57
29	84.2	8.779	8.503	8.227
30	86	8.441	8.17	7.899
31	87.8	8.116	7.851	7.586
32	89.6	7.805	7.546	7.287
33	91.4	7.509	7.255	7.001
34	93.2	7.225	6.976	6.727
35	95	6.953	6.71	6.467
36	96.8	6.692	6.454	6.216
37	98.6	6.443	6.21	5.977
38	100.4	6.204	5.976	5.748
39	102.2	5.976	5.753	5.53
40	104	5.756	5.538	5.32
41	105.8	5.546	5.333	5.12
42	107.6	5.345	5.136	4.927
43	109.4	5.151	4.947	4.743
44	111.2	4.967	4.767	4.567
45	113	4.788	4.593	4.398
46	114.8	4.618	4.427	4.236
47	116.6	4.455	4.268	4.081
48	118.4	4.298	4.115	3.932
49	120.2	4.147	3.968	3.789
50	122	4.004	3.829	3.654
51	123.8	3.863	3.692	3.521
52	125.6	3.729	3.562	3.395
53	127.4	3.601	3.438	3.275
54	129.2	3.478	3.318	3.158
55	131	3.359	3.203	3.047
56	132.8	3.246	3.093	2.94
57	134.6	3.136	2.987	2.838
58	136.4	3.031	2.885	2.739
59	138.2	2.93	2.787	2.644
60	140	2.833	2.693	2.553

61	141.8	2.739	2.602	2.465
62	143.6	2.649	2.515	2.381
63	145.4	2.562	2.431	2.3
64	147.2	2.478	2.35	2.222
65	149	2.398	2.273	2.148
66	150.8	2.32	2.198	2.076
67	152.6	2.246	2.126	2.006
68	154.4	2.174	2.057	1.94
69	156.2	2.104	1.99	1.876
70	158	2.038	1.926	1.814
71	159.8	1.974	1.864	1.754
72	161.6	1.912	1.805	1.698
73	163.4	1.853	1.748	1.643
74	165.2	1.795	1.692	1.589
75	167	1.739	1.639	1.539
76	168.8	1.686	1.588	1.49
77	170.6	1.634	1.538	1.442
78	172.4	1.585	1.491	1.397
79	174.2	1.537	1.445	1.353
80	176	1.49	1.4	1.31
81	177.8	1.445	1.357	1.269
82	179.6	1.402	1.316	1.23
83	181.4	1.361	1.276	1.191
84	183.2	1.321	1.238	1.155
85	185	1.281	1.2	1.119
86	186.8	1.244	1.165	1.086
87	188.6	1.209	1.131	1.053
88	190.4	1.173	1.097	1.021
89	192.2	1.14	1.065	0.99
90	194	1.107	1.034	0.961
91	195.8	1.076	1.004	0.932
92	197.6	1.045	0.975	0.905
93	199.4	1.016	0.947	0.878
94	201.2	0.987	0.92	0.853
95	203	0.96	0.894	0.828
96	204.8	0.934	0.869	0.804
97	206.6	0.907	0.844	0.781
98	208.4	0.883	0.821	0.759
99	210.2	0.859	0.798	0.737
100	212	0.836	0.776	0.716
101	213.8	0.814	0.755	0.696
102	215.6	0.791	0.734	0.677
103	217.4	0.771	0.715	0.659
104	219.2	0.75	0.695	0.64
105	221	0.731	0.677	0.623

Sensor Resistance Tables

B25/80=4450K±3%，R80=50kΩ±3%				
Temp		Resistance（kΩ）		
℃	℉	Rmax	R(t)Normal	Rmin
-40	-40	23982.342	21280.977	18579.613
-39	-38.2	22397.462	19890.917	17384.372
-38	-36.4	20925.744	18599.155	16272.567
-37	-34.6	19558.506	17398.211	15237.916
-36	-32.8	18287.777	16281.212	14274.647
-35	-31	17106.237	15241.843	13377.45
-34	-29.2	16007.159	14274.298	12541.437
-33	-27.4	14984.359	13373.234	11762.109
-32	-25.6	14032.148	12533.735	11035.322
-31	-23.8	13145.291	11751.273	10357.255
-30	-22	12318.968	11021.678	9724.388
-29	-20.2	11551.311	10343.407	9135.504
-28	-18.4	10835.229	9710.234	8585.239
-27	-16.6	10167.003	9118.935	8070.867
-26	-14.8	9543.2	8566.532	7589.865
-25	-13	8960.652	8050.276	7139.901
-24	-11.2	8416.43	7567.624	6718.818
-23	-9.4	7907.828	7116.224	6324.62
-22	-7.6	7432.345	6693.901	5955.457
-21	-5.8	6987.666	6298.642	5609.618
-20	-4	6571.65	5928.583	5285.516
-19	-2.2	6187.164	5586.374	4985.585
-18	-0.4	5826.712	5265.313	4703.915
-17	1.4	5488.692	4964.004	4439.315
-16	3.2	5171.616	4681.148	4190.68
-15	5	4874.1	4415.539	3956.978
-14	6.8	4594.858	4166.054	3737.249
-13	8.6	4332.694	3931.647	3530.6
-12	10.4	4086.494	3711.346	3336.198
-11	12.2	3855.222	3504.244	3153.266
-10	14	3637.915	3309.498	2981.082
-9	15.8	3433.673	3126.321	2818.969
-8	17.6	3241.661	2953.98	2666.299
-7	19.4	3061.098	2791.79	2522.482
-6	21.2	2891.257	2639.114	2386.971
-5	23	2731.46	2495.357	2259.253
-4	24.8	2581.076	2359.962	2138.848
-3	26.6	2439.514	2232.412	2025.31
-2	28.4	2306.222	2112.221	1918.22
-1	30.2	2180.688	1998.938	1817.187
0	32	2094.972	1921.993	1749.014
1	33.8	1975.099	1813.265	1651.431
2	35.6	1863.127	1711.646	1560.165
3	37.4	1758.449	1616.593	1474.737
4	39.2	1660.513	1527.611	1394.709
5	41	1568.817	1444.25	1319.683
6	42.8	1482.897	1366.096	1249.295

7	44.6	1402.336	1292.773	1183.21
8	46.4	1326.746	1223.935	1121.124
9	48.2	1255.774	1159.265	1062.756
10	50	1189.098	1098.474	1007.85
11	51.8	1126.419	1041.293	956.167
12	53.6	1067.463	987.477	907.491
13	55.4	1011.977	936.799	861.621
14	57.2	959.732	889.052	818.372
15	59	910.51	844.042	777.574
16	60.8	864.114	801.59	739.066
17	62.6	820.361	761.533	702.705
18	64.4	779.081	723.717	668.353
19	66.2	740.117	688.001	635.885
20	68	703.323	654.254	605.185
21	69.8	668.565	622.355	576.145
22	71.6	635.715	592.189	548.663
23	73.4	604.657	563.651	522.645
24	75.2	575.282	536.644	498.006
25	77	547.49	511.076	474.662
26	78.8	521.186	486.862	452.538
27	80.6	496.281	463.922	431.563
28	82.4	472.693	442.182	411.671
29	84.2	450.344	421.572	392.8
30	86	429.165	402.028	374.891
31	87.8	409.087	383.489	357.891
32	89.6	390.047	365.898	341.749
33	91.4	371.986	349.201	326.416
34	93.2	354.85	333.349	311.848
35	95	338.586	318.295	298.004
36	96.8	323.147	303.995	284.843
37	98.6	308.485	290.407	272.329
38	100.4	294.559	277.493	260.427
39	102.2	281.328	265.216	249.104
40	104	268.753	253.541	238.329
41	105.8	256.801	242.437	228.073
42	107.6	245.438	231.873	218.308
43	109.4	234.63	221.82	209.01
44	111.2	224.35	212.252	200.154
45	113	214.569	203.142	191.715
46	114.8	205.26	194.467	183.674
47	116.6	196.399	186.204	176.009
48	118.4	187.963	178.333	168.703
49	120.2	179.929	170.832	161.735
50	122	172.275	163.682	155.089
51	123.8	164.984	156.866	148.748
52	125.6	158.036	150.367	142.698
53	127.4	151.412	144.168	136.924
54	129.2	145.099	138.255	131.411
55	131	139.078	132.613	126.148
56	132.8	133.336	127.229	121.122

Sensor Resistance Tables

57	134.6	127.858	122.089	116.32
58	136.4	122.63	117.181	111.732
59	138.2	117.641	112.494	107.347
60	140	112.879	108.018	103.157
61	141.8	108.332	103.741	99.15
62	143.6	103.989	99.654	95.319
63	145.4	99.841	95.748	91.655
64	147.2	95.879	92.014	88.149
65	149	92.091	88.443	84.795
66	150.8	88.472	85.028	81.584
67	152.6	85.011	81.761	78.511
68	154.4	81.703	78.636	75.569
69	156.2	78.538	75.645	72.752
70	158	75.51	72.781	70.052
71	159.8	72.614	70.04	67.466
72	161.6	69.842	67.415	64.988
73	163.4	67.189	64.901	62.613
74	165.2	64.649	62.493	60.337
75	167	62.216	60.185	58.154
76	168.8	59.886	57.973	56.06
77	170.6	57.653	55.852	54.051
78	172.4	55.515	53.82	52.125
79	174.2	53.465	51.87	50.275
80	176	51.5	50	48.5
81	177.8	49.684	48.206	46.728
82	179.6	47.94	46.484	45.028
83	181.4	46.267	44.832	43.397
84	183.2	44.659	43.246	41.833
85	185	43.114	41.723	40.332
86	186.8	41.629	40.26	38.891
87	188.6	40.203	38.856	37.509
88	190.4	38.831	37.506	36.181
89	192.2	37.513	36.209	34.905
90	194	36.244	34.962	33.68
91	195.8	35.025	33.764	32.503
92	197.6	33.851	32.612	31.373
93	199.4	32.722	31.504	30.286
94	201.2	31.636	30.439	29.242
95	203	30.59	29.413	28.236
96	204.8	29.583	28.427	27.271
97	206.6	28.614	27.478	26.342
98	208.4	27.68	26.564	25.448
99	210.2	26.781	25.685	24.589
100	212	25.914	24.838	23.762
101	213.8	25.08	24.023	22.966
102	215.6	24.275	23.237	22.199
103	217.4	23.5	22.481	21.462
104	219.2	22.753	21.752	20.751
105	221	22.031	21.049	20.067
106	222.8	21.336	20.372	19.408

107	224.6	20.667	19.72	18.773
108	226.4	20.02	19.091	18.162
109	228.2	19.397	18.485	17.573
110	230	18.795	17.9	17.005
111	231.8	18.215	17.337	16.459
112	233.6	17.655	16.793	15.931
113	235.4	17.114	16.268	15.422
114	237.2	16.593	15.763	14.933
115	239	16.09	15.275	14.46
116	240.8	15.603	14.804	14.005
117	242.6	15.133	14.349	13.565
118	244.4	14.681	13.911	13.141
119	246.2	14.243	13.488	12.733
120	248	13.821	13.08	12.339
121	249.8	13.412	12.685	11.958
122	251.6	13.019	12.305	11.591
123	253.4	12.638	11.938	11.238
124	255.2	12.271	11.584	10.897
125	257	11.917	11.242	10.567
126	258.8	11.573	10.911	10.249
127	260.6	11.243	10.593	9.943
128	262.4	10.923	10.285	9.647
129	264.2	10.614	9.988	9.362
130	266	10.315	9.701	9.087
131	267.8	10.028	9.425	8.822
132	269.6	9.75	9.158	8.566
133	271.4	9.481	8.9	8.319
134	273.2	9.222	8.651	8.08
135	275	8.972	8.411	7.85
136	276.8	8.731	8.18	7.629
137	278.6	8.498	7.957	7.416
138	280.4	8.273	7.741	7.209
139	282.2	8.055	7.533	7.011
140	284	7.846	7.333	6.82
141	285.8	7.628	7.125	6.621
142	287.6	7.417	6.923	6.429
143	289.4	7.213	6.728	6.243
144	291.2	7.014	6.538	6.062
145	293	6.822	6.355	5.888
146	294.8	6.636	6.178	5.719
147	296.6	6.455	6.006	5.556
148	298.4	6.28	5.839	5.398
149	300.2	6.111	5.678	5.244
150	302	5.946	5.521	5.096

Dip Switch

SW1		1	2	3	4		
		Dehum. 1	Dehum. 2	Heating	Defrost	COOLING	HEATING
MODE	ON					DEFAULT COOLING	DEFAULT HEATING+DEFAULT DEFROST
	OFF	■	■	■	■		
	ON				■	DEFAULT COOLING	DEFAULT HEATING+STRONG DEFROST
	OFF	■	■	■			
	ON			■		DEFAULT COOLING	COMFORT HEATING OR FULL-LOAD AIRFLOW RATE <300 SCFM/TON+DEFAULT DEFROST
	OFF	■	■		■		
	ON			■	■	DEFAULT COOLING	COMFORT HEATING OR FULL-LOAD AIRFLOW RATE <300 SCFM/TON+STRONG DEFROST
	OFF	■	■				
	ON	■				DEHUM. 1 OR FULL-LOAD AIRFLOW RATE <300 SCFM/TON	DEFAULT HEATING+DEFAULT DEFROST
	OFF		■	■	■		
	ON	■			■	DEHUM. 1 OR FULL-LOAD AIRFLOW RATE <300 SCFM/TON	DEFAULT HEATING+STRONG DEFROST
	OFF		■	■			
	ON	■		■		DEHUM. 1 OR FULL-LOAD AIRFLOW RATE <300 SCFM/TON	COMFORT HEATING OR FULL-LOAD AIRFLOW RATE <300 SCFM/TON+DEFAULT DEFROST
	OFF		■		■		
	ON	■		■	■	DEHUM. 1 OR FULL-LOAD AIRFLOW RATE <300 SCFM/TON	COMFORT HEATING OR FULL-LOAD AIRFLOW RATE <300 SCFM/TON+STRONG DEFROST
	OFF		■				
	ON		■			DEHUM. 2 OR FULL-LOAD AIRFLOW RATE <300 SCFM/TON	DEFAULT HEATING+DEFAULT DEFROST
	OFF	■		■	■		
	ON		■		■	DEHUM. 2 OR FULL-LOAD AIRFLOW RATE <300 SCFM/TON	DEFAULT HEATING+STRONG DEFROST
	OFF	■		■			
	ON		■	■		DEHUM. 2 OR FULL-LOAD AIRFLOW RATE <300 SCFM/TON	COMFORT HEATING OR FULL-LOAD AIRFLOW RATE <300 SCFM/TON+DEFAULT DEFROST
	OFF	■			■		
	ON		■	■	■	DEHUM. 2 OR FULL-LOAD AIRFLOW RATE <300 SCFM/TON	COMFORT HEATING OR FULL-LOAD AIRFLOW RATE <300 SCFM/TON+STRONG DEFROST
	OFF	■					
FORCED & CHARGE MODE	ON	■	■			Forced Defrost Test Off	
	OFF			■	■		
	ON	■	■		■	Forced Defrost Test Off	
	OFF			■			
	ON	■	■	■		CHARGE MODE FOR HEATING	
	OFF				■		
	ON	■	■	■	■	CHARGE MODE FOR COOLING	
	OFF						

FUNC-TION DESC-RIPTION	1.When dehum. mode 1 is effective, it reduces the unit's target evaporation temperature by 2~5 ° F; When dehum. mode 2 is effective, it reduces the unit's target evaporation temperature by 5~7 ° F.
	2.When the comfortable heating mode is selected, it increases the unit's target condensation temperature by 2 ~ 5 ° F.
	3.SW1-4 perform manual defrosting from off to on (only the heating mode is valid, the exit conditions refer to normal defrosting, each dip switch from OFF to ON only enters once, the next time you enter must meet the dip switch from OFF to ON, after manual defrosting, the dip switch is still ON, enter the strong defrosting mode).
	4.When strong defrosting is effective, the unit defrosting interval will be shorter, and the defrosting time will be increased, which is suitable for areas with high humidity.

Dip Switch

SW5							
SW5_1_2_3	ODU Ton		[1]	[2]	[3]	Outdoor Unit Size	
		ON		▮		24K	
		OFF	▮		▮		
		ON			▮	36K	
		OFF	▮	▮			
		ON		▮	▮	48K	
		OFF	▮				
		ON	▮	▮	▮	60K	
		OFF					
SW5_4	Communication Mode	ON				Reserved	
		OFF				24V Control	
SW5_5_6 **LEAVE AS FACTORY DEFAULT**	24V Control Energy Efficiency Testing and Actual Use of Internal Machine Selection	[5]		[6]		24V control indoor unit set	
		OFF		OFF		IDU 1	For AHU Test & Use
		OFF		ON		IDU 2	For Coil+Furnace Test & Use
		ON		OFF		IDU 3	For A-coil Test
		ON		ON		IDU 4	Reserved
SW5_7	24V Control Heat Pump Changeover Valve	ON				Heating changeover valve: Use this setting if your thermostat heating is “B”	
		OFF				Cooling changeover valve: Use this setting if your thermostat cooling is “O”.	
SW5_8	Reserved	ON				Reserved	
		OFF				Reserved	

Operating Mode		
Mode	Condition 1	Condition 2
Dehum.1	Areas in need of dehumidification	Full-load airflow rate <300 scfm/ton
Dehum.2	When still humid and need further dehumidfication after Dehum.1	Full-load airflow rate <300 scfm/ton
Comfort heating	Default heating cannot meet the indoor temperature requirement	Full-load airflow rate <300 scfm/ton
Strong defrost	An area with high outdoor humidity during the heating season such as houses near river/lake, etc	When still frost left after default defrost operated

OUTDOOR UNIT TROUBLE SHOOTING			
Error code	Malfunction description	Diagnosis and Analysis	Remark
1	EEPROM malfunction	EEPROM chip damaged or data wrong or related circuit damaged	resumeable
2	Compressor drive module hardware over current	IPM over current been detected by compressor drive module hardware	6 times lock
3	Compressor drive module AC input over current	AC Input over current been detected by compressor drive module or input current higher than main board setting.	6 times lock
4	Communication abnormal with compressor drive module	Communication abnormal between main control board and compressor drive module	resumeable
5	Compressor overload -drive module	compressor current or input current been detected by compressor drive module software (seconds level)	resumeable
6	DC voltage or AC voltage high	Over voltage been detected by compressor drive module (AC voltage high or DC BUS voltage high)	resumeable
8	Discharge temperature too high protection	Compressor discharge temperature over 115 ℃, error clear within 3 minutes if temperature goes down	resumeable
9	DC fan motor abnormal	DC fan motor blocked or damage or not connected or related circuit broken .	4 times lock
10	Outdoor defrosting temperature sensor Te abnormal	Sensor short circuit or open circuit	resumeable
11	Suction temperature sensor Ts abnormal		
12	Outdoor ambient temperature sensor Ta abnormal		
13	Discharging temperature sensor Td abnormal	Sensor short circuit or open circuit	resumeable
16	Lack of refrigerant or discharging pipe blocked	Discharge & suction temperatureTd-Ts⩾80℃after compressor started 10 minutes.	resumeable
17	4-way vavle converse abnormal	Outdoor defrost sensor Tc>28℃ and after compressor start 10 minutes	resumeable
18	Compressor motor desynchronizing	Rotor desynchronizing occured ,caused by overload or load sharply fluctuating or compressor current sensor cicuit abnormal or one of the inverter' s gate drive signal missing.	resumeable
20	DC voltage or AC voltage low	Low voltage been detected by compressor drive module (AC voltage low or DC BUS voltage low)	6 times lock
23	Temperature too high for compressor driver module	Compressor drive module temperature too high,detected by module itself or temperature over main board setting.	resumeable
24	Compressor overcurrent -main board	compressor over current been detected by main control board software(EEPROM setting)	6 times lock
25	Compressor momentary overcurrent -compressor module inverter side	Compressor momentary overcurrent, detecte by compressor module inverter side (ms level)	resumeable
26	Compressor drive module power supply failure or MCU abnormal reset	Compressor drive module power supply failure or MCU reset occurs when compressor is running	resumeable
27	Current sampling circuit fault of compressor drive module	inverter side or convert side current sampling circuit fault of compressor drive module	resumeable
39	Outdoor unit mid-condenser temp. sensor TC abnormal	Sensor short circuit or open circuit	resumeable
42	High pressure switch abnormal	After compressor running for 3 minutes, switch open circuit and last 30 seconds	resumeable
43	Low pressure switch abnormal	After compressor running for 3 minutes, switch open circuit and last 60 seconds or open circuit for 30seconds at standby mode	3 times lock
44	Outdoor condenser temperature TC too high protection	The maximum temperature value of Tc and Te is over 65 ℃,	resumeable
45	System low pressure protection	The minimum temperature of indoor pipe Tm and outdoor Ts <-45 ℃ at cooling mode or minimum temperature outdoor Tc and outdoor Te <-50℃ at heating mode	3 times lock
46	Compressor driver module heat sink sensor abnormal	The Compressor driver module heat sink sensor temperature detected is not within the range of -25℃to 150 ℃	resumeable
51	High pressure sensor malfunction	Continuous detection of AD value below 11 or above 1012 for 30 seconds	resumeable
LE	Pattern error	When cooling, there is a "w", please check the thermostat wiring	resumeable

Notes:

1. Do not change any switch settings unless directed to do so.

* PCB: Printed Circuit Board
* IPM: Inverter Power Module

Error Codes

When the system generates an error code, it will be displayed on the Service Monitor Board, the number of flashes on the PCB.

Temperature Sensor Error Codes

The easiest problems to solve will involve codes that are related to potential failure of temperature sensors. Common problems may include loose connections, open or shorted, and out of calibration. Checking the condition of the sensors requires a temperature probe and an ohmmeter.

The Reference Section of this manual contains temperature resistance tables that can be used to check the calibration of the sensors. The measured resistance must be within the tolerances located in the tables.

Error Code 10

This code indicates an electrical failure of the sensor that is used to sense the temperature of the outdoor coil during defrost. This sensor is connected to the PCB via a connection at Plug CN-21(24K&36K),CN-14(48K&60K).

Error Code 11

This code indicates an electrical failure of Ts that is used to sense the temperature of the suction gas that enters the compressor. The sensor is connected to the PCB via two wires at Plug CN-21(24K&36K),CN-14(48K&60K).

Error Code 12

This code indicates an electrical failure of Tao that is used to sense the temperature of the outdoor air. The sensor is connected to the PCB via two wires at Plug CN-21(24K&36K),CN-14(48K&60K).

Error Code 13

This code indicates an electrical failure of Td that is used to sense the temperature of the compressor hot gas discharge line. The sensor is connected to the PCB via two wires at Plug CN-21(24K&36K),CN-14(48K&60K).

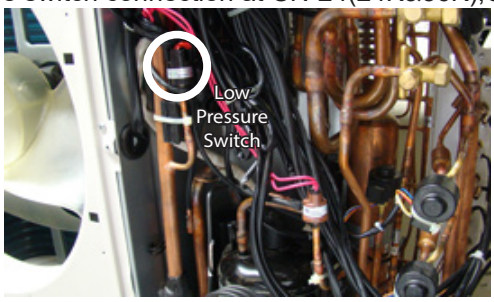
Error Code 39

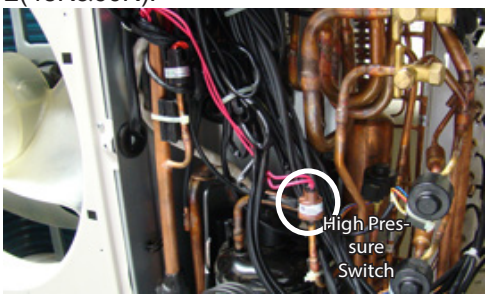
This code indicates an electrical failure of Tc that is used to sense the condensing temperature of the outdoor coil. The sensor is connected to the PCB via two wires at Plug CN-21(24K&36K),CN-14(48K&60K).

Error Codes

Pressure-Related Error Codes

To protect the compressor, the PCB has a low pressure switch connection at CN25(24K&36K), CN13(48K&60K), and a high pressure switch connection at CN-24(24K&36K),CN12(48K&60K).





The illustrated position is for reference only.

Error Code 42 & 43

The low pressure switch will generate an Error Code 43 if open. An open high pressure switch will show an Error Code 42.

Testing Procedure
If the system generates either of these two codes, check the continuity of the switch to ensure it is not open or shorted. High or low pressures are usually related to dirt in the coils, dirt in the air filter, or incorrect refrigerant charge.

There are no pressure ports that can be accessed to measure low pressure in heat mode nor high pressure in cool mode. If the system trips on one of these errors, it will be necessary to remove the refrigerant and re-charge to confirm low or high charge is not causing the problem.

Error Code 44

The system is operating at excessive refrigerant pressure. If the system is a new installation, it is likely that the charge is too high. Note the Weigh-In Method is the ONLY way to charge this system.

Typical Causes of High Pressure in Cooling Mode:
- Overcharge
- Dirty outdoor coil
- Restriction

Typical Causes of High Pressure in Heating Mode:
- Overcharge
- Undersized refrigerant lines or excessive length
- Restriction

Note: If the refrigerant pressures are correct, yet the system does not close the error reporting pressure switch, replace the defective pressure switch.

Error Code 45

This code is indicating that system pressure is too low.

Typical Causes of Low Pressure in Cooling Mode:
- Lack of charge
- Low Heat on Indoor coil
- Restrictions, air flow, or dirt
- Low indoor load

Typical Causes of Low Pressure in Heating Mode:
- Cold outdoor air
- Lack of charge
- Restriction

Communication Error Code

Error Code 51

This code indicates an electrical failure of the sensor that is used to sense the refrigerant pressure of the system. The sensor is connected to the PCB via three wires at Plug CN-20(24K&36K),CN-21(48K&60K).

Error Codes Caused by Abnormal Refrigerant Circuit Conditions

Error Code 8

This code indicates the temperature of the compressor hot gas is too high. This error occurs after the PCB has attempted to correct high temperature by reducing the compressor speed, adjusting the fan speed,
Causes of this type of condition are typically a lack of refrigerant in the system, excessive heat in the conditioned space, or a restriction in the refrigeration circuit.

Error Code 16

This error code indicates the system may lack refrigerant. Recover and check the system charge.

Error Code LE

There can be no "w" signal when cooling, please check the thermostat and unit wiring.

Error Code 1

The EEPROM of the PCB cannot read or write data. Replace the PCB.

Error Codes Related to the IPM

Error Code 2

The IPM has either failed or has detected excessive current. Before replacing the IPM, check these potential causes of high current:

- Overcharge
- Dirty outdoor coil
- Hot conditioned space
- High temperature or excessive load
- Refrigeration circuit restriction
- Seized compressor
- Faulty wiring or wiring connections

Error Code 4

This code indicates the IPM is not communicating with the PCB. Check the wiring and the connections CN34 on the PCB and CN2 on the IPM. If the connections are good, yet the boards do not communicate and the code will not clear, check for correct voltage at the IPM CN2 connection. If the communication voltage is correct and the high voltage input is present, replace the IPM. If the communication voltage is not correct, replace the PCB.

Error Code 5

The IPM is protecting the compressor from overload, which can be caused by low building power supply, restrictions, a non-condensible in the system, a plugged coil, an excessive load, or a refrigerant overcharge.

Error Code 6

This code indicates the operating voltage of the system is either too high or too low. Check line voltage for proper limits. The line voltage supplied to the outdoor unit should be no lower than 187VAC when the compressor starts. The running voltage should be no lower than 197VAC. The incoming line voltage to the outdoor unit should never be higher than 253VAC. If improper voltage is present, check the supply voltage circuit from the building for correct wire size and good connections. If the voltage is still outside operating limits, contact the power company to have the service corrected.

If the line voltage from the power company is correct, check the output voltage of the Power Filter. This voltage connects to the IPM at terminals ACL and ACN.
If the voltage is not within specifications shown above, replace the PFB.

Error Code 18

There is a loss of synchronization among the U, V, and W compressor windings during frequency changes as they slow down or speed up the compressor.

Possible causes include:

- Unstable power supply
- Internal compressor fault
- IPM fault
- Compressor terminal wiring incorrect
- Poor wiring condition
- Loose compressor wiring connection

Error Codes

Error Code 23

This code indicates an IPM thermal overload. This error was generated by a temperature sensor located in the IPM heat sink. Causes of overheating are typically overcharge of refrigerant, excessively plugged coil, sensor open or shorted, or a non-condensable in system.

Error Code 26

Module reset indicates possible PCB power anomalies. This usually occurs when low line voltage conditions are present.

Error Code 27

The IPM has detected that the compressor current is too high.

Possible Causes:

- Overcharge
- Dirty outdoor coil
- Hot conditioned space temperature or high load
- Refrigeration circuit restriction
- Seized compressor
- Defective IPM

Error Codes Related to Compressor, Outdoor Fan & 4-Way Valve

Error Code 9

This code indicates the outdoor fan motor is not running. The fault is detected very quickly by the PCB. The system will shut off and display this error code. If this error occurs, refer to the outdoor fan motor test procedure.

Error Code 17

This error code indicates that the 4-way valve is not directing hot gas to the proper coil. Refer to the 4-way valve testing procedure.

Error Code 24

This error code indicates the compressor failed to start when a call for operation occurred. Refer to the compressor testing procedure.

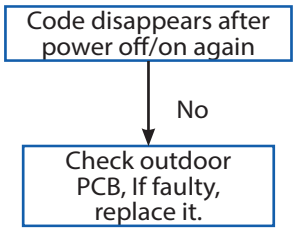
Troubleshooting

[1] Outdoor EEPROM malfunction

EEPROM communication error; EEPROM data check error (model ID, checksum, etc.); EEPROM data logic error (wider data range, wrong order, etc.)

Possible causes:

- EEPROM is bad
- Loose EEPROM wiring

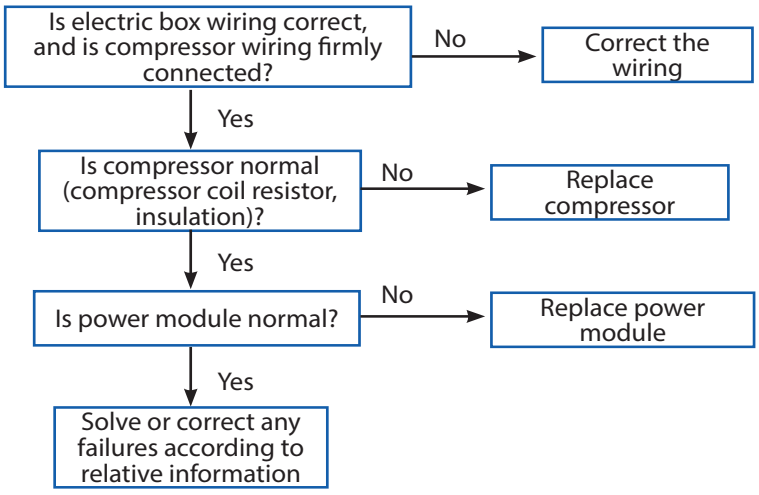


[2] Outdoor IPM over current or short circuit

Input over current detected by PIM's hardware.

Possible causes:

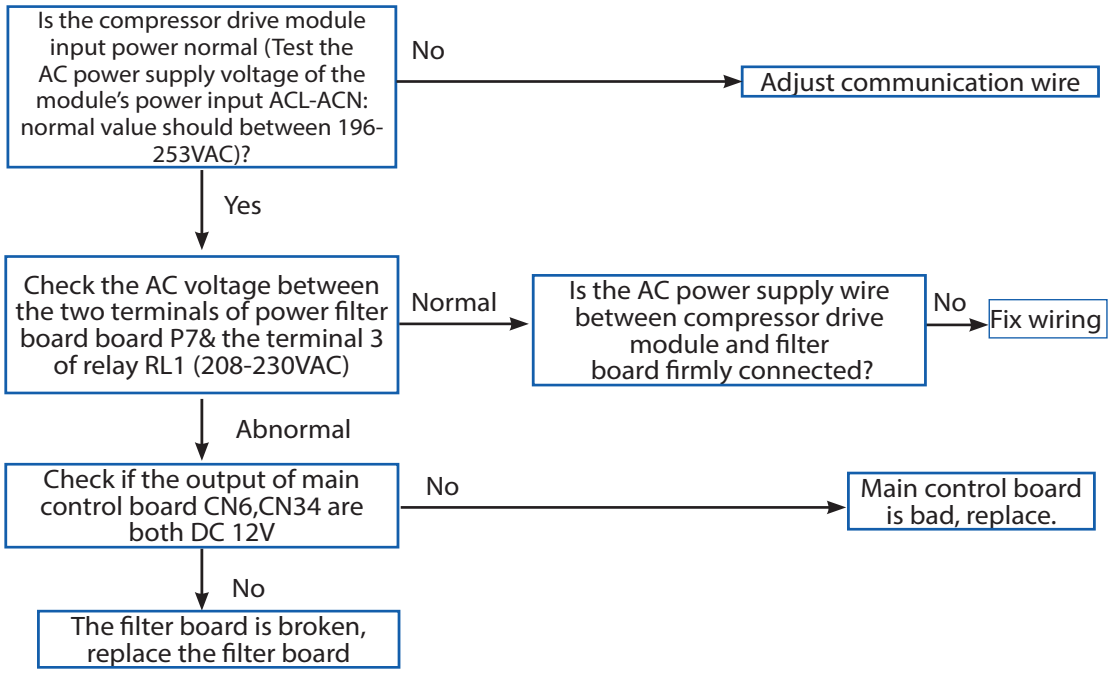
- The IPM is bad
- Loose compressor wire
- The compressor is bad



[4] Communication abnormal between PCB and IPM

Control board can not communicate with the compressor driver module for over 4 minutes

Possible causes:
- The communication wire is bad
- The PCB is bad
- The power module is bad



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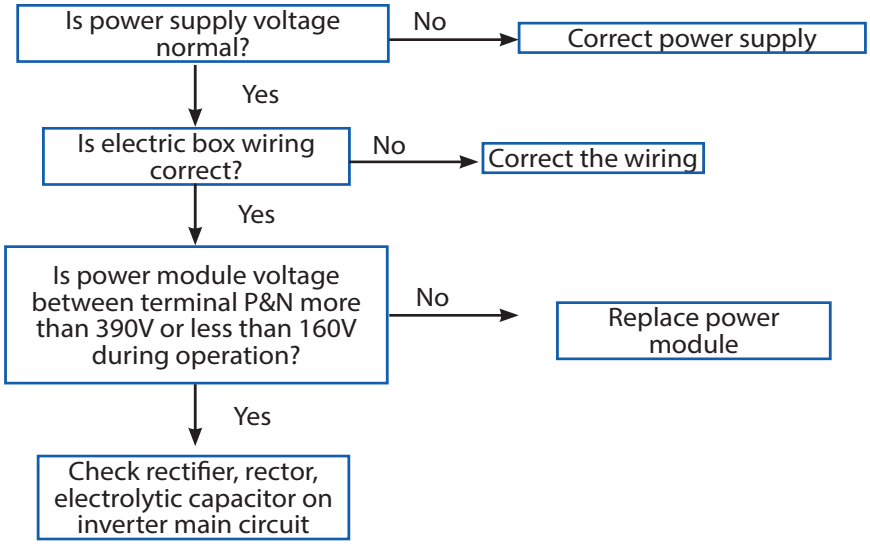
[6] DC voltage or AC voltage high

Driver module AC power supply voltage over 280VAC, or driver module DC-BUS voltage over 390VDC.

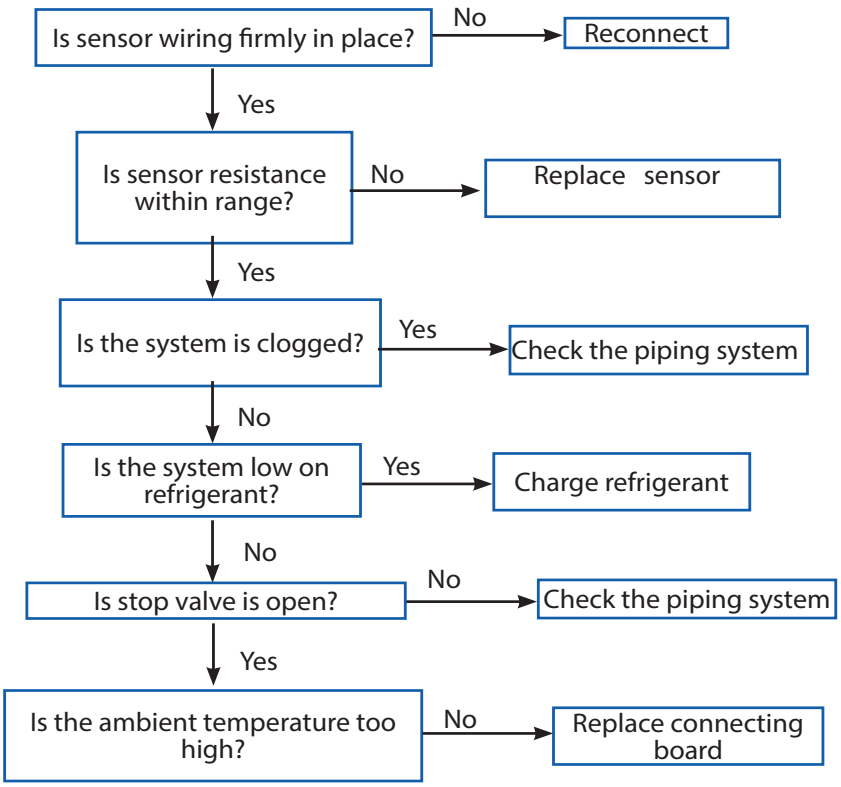
Possible causes:
- The power supply is abnormal
- Incorrect wiring
- Power module is bad



[8] Discharge temperature too high protection

Compressor discharge temperature over 115°C. Error clears within 3 minutes if temperature lowers below 115°C.

Possible causes:
- The sensor is bad or fixed bad
- The system is clogged
- The system lack of refrigerant
- The valve opening is wrong



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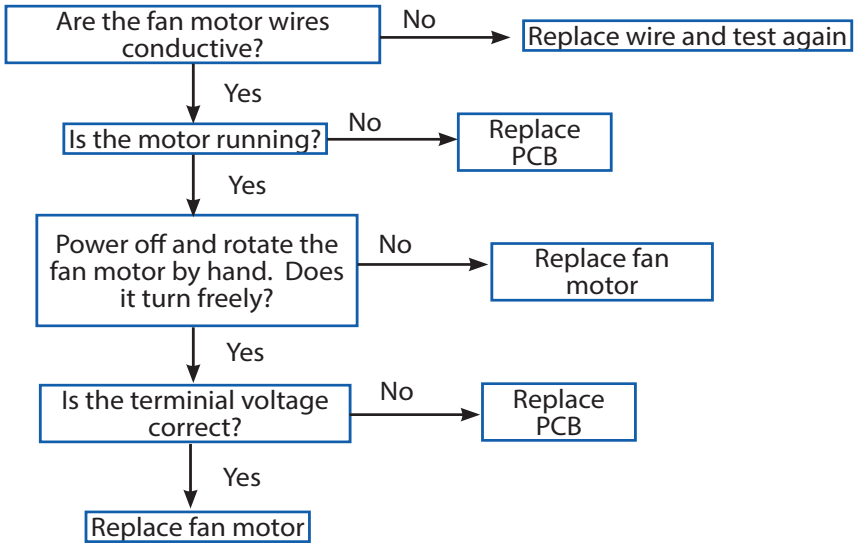
[9] DC fan motor fault

DC fan motor damaged, not connected, or related circuit broken. Error status confirms and locks if occurs 4 times within 60 minutes.

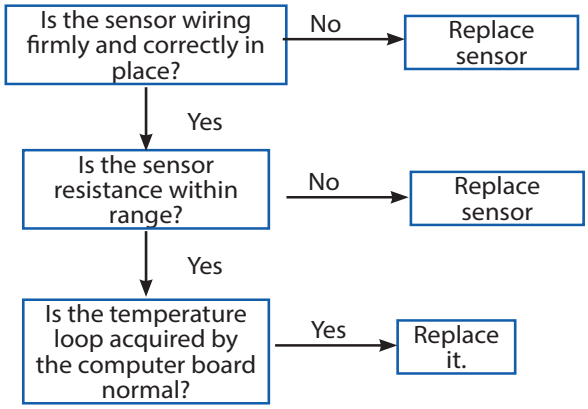
Possible causes:
- Loose motor wiring
- The motor is bad
- The PCB is bad



[10] Outdoor defrosting temp. sensor Te abnormal
[11] Suction temp.sensor Ts abnormal
[12] Outdoor ambient temp. sensor Tao abnormal
[13] Discharging temp. sensor Td abnormal

Sensor temperature has been detected below or higher than expected, or has been detected as a shorted or open circuit (for expected temperature, refer to part failure code)

Possible causes:
- Bad sensor connection
- The sensor is bad
- Sensor resistance drift
- The temperature acquired by PCB is not accurate



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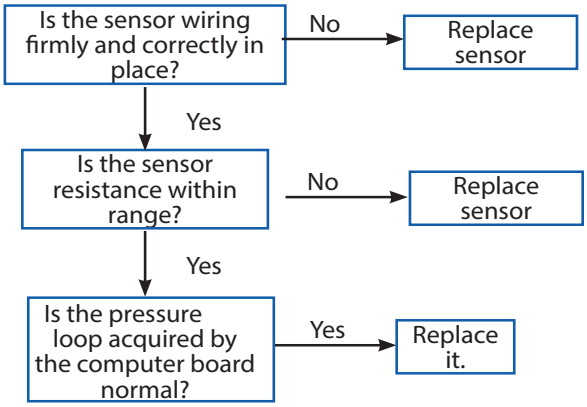
[51] High pressure sensor malfunction

Has been detected as a shorted or open circuit

Possible causes:
- Bad sensor connection
- The sensor is bad
- Sensor resistance drift
- The pressure acquired by PCB is not accurate

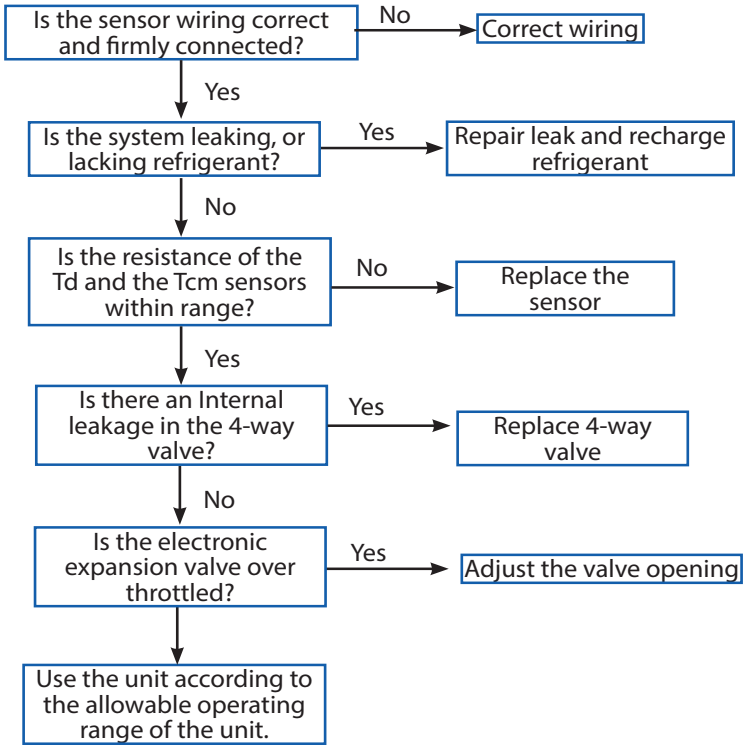


Troubleshooting

[16] Lack of refrigerant or discharging pipe blocked

Discharge & suction temperature Td-Ts≥80°C 10 minutes after compressor start.

Possible causes:
- Wrong sensor connection
- Lack of refrigerant
- The senor is bad
- The 4-way valve is bad
- The electronic expansion valve is bad
- Out of the operating range



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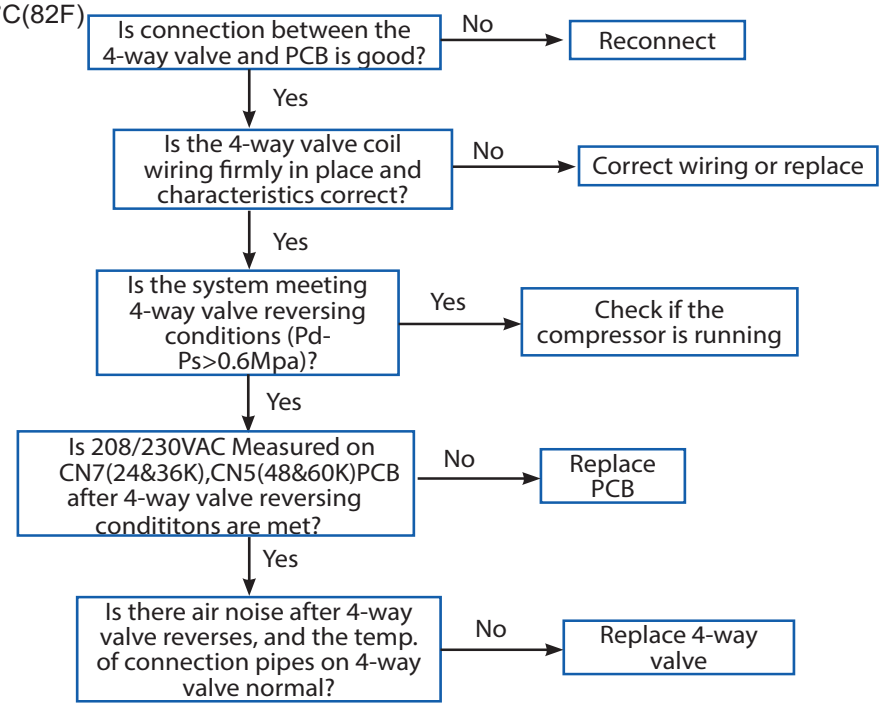
[17] 4-way valve reversing failure

Indoor pipe & indoor ambient temperature TC≥28°C(82F) 10 minutes after compressor started.

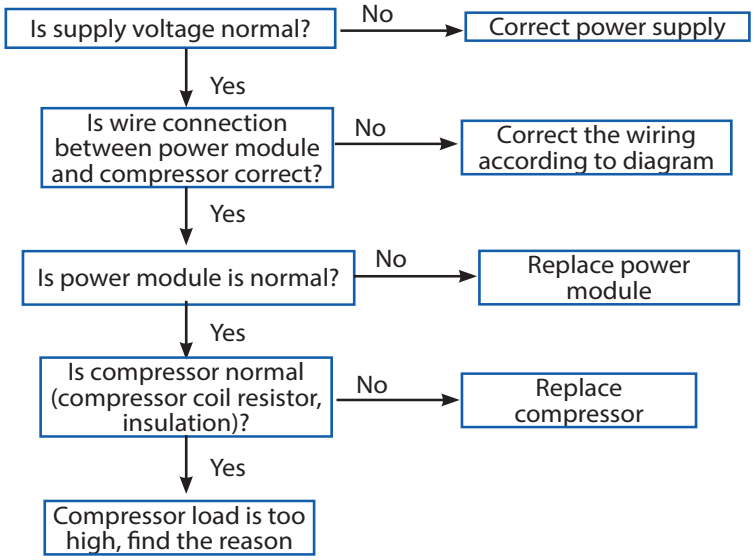
Possible causes:
- The 4-way valve is bad
- The PCB is bad
- The 4-way valve coil connection is bad
- The system pressure difference is too small.



[18] Compressor motor desynchronizing

Motor desynchronizing occurred. Caused by overload, load sharply fluctuating, abnormal compressor current sensor circuit, or one of the inverter gate drive signals is missing.

Possible causes:
- The power supply is abnormal
- Incorrect compressor wiring
- The power module is bad
- The compressor is bad
- The system is overload



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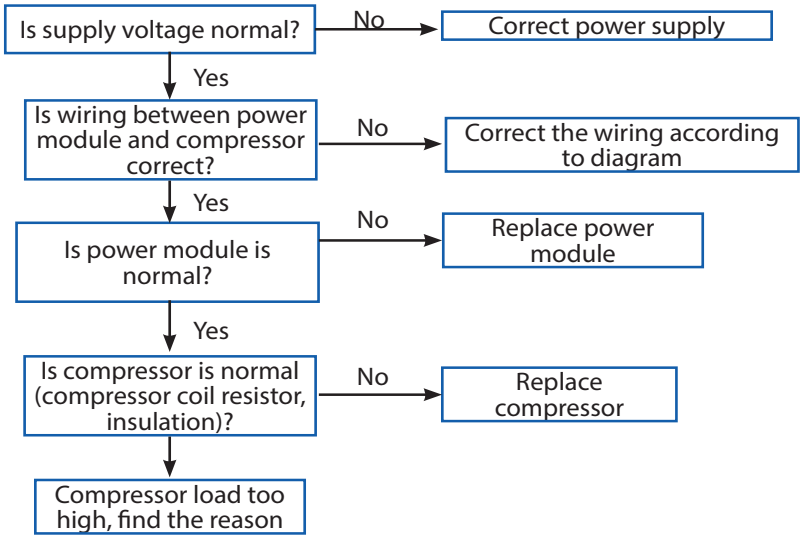
[24] Compressor startup failure

Compressor start failure has been detected by driver module.

Possible causes:
- The power supply is abnormal
- Incorrect compressor wiring
- The power module is bad
- The compressor is bad
- System overload



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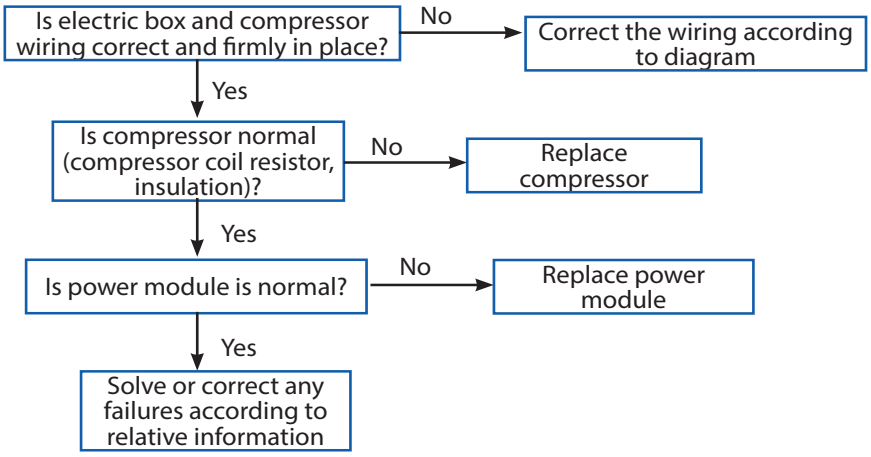
[25] Input overcurrent of the drive module

Compressor drive module input current higher than 30A (48&60k), or 15A (24k),or18A (36K)

Possible causes:
- Incorrect compressor wiring
- The power module is bad
- The compressor is bad

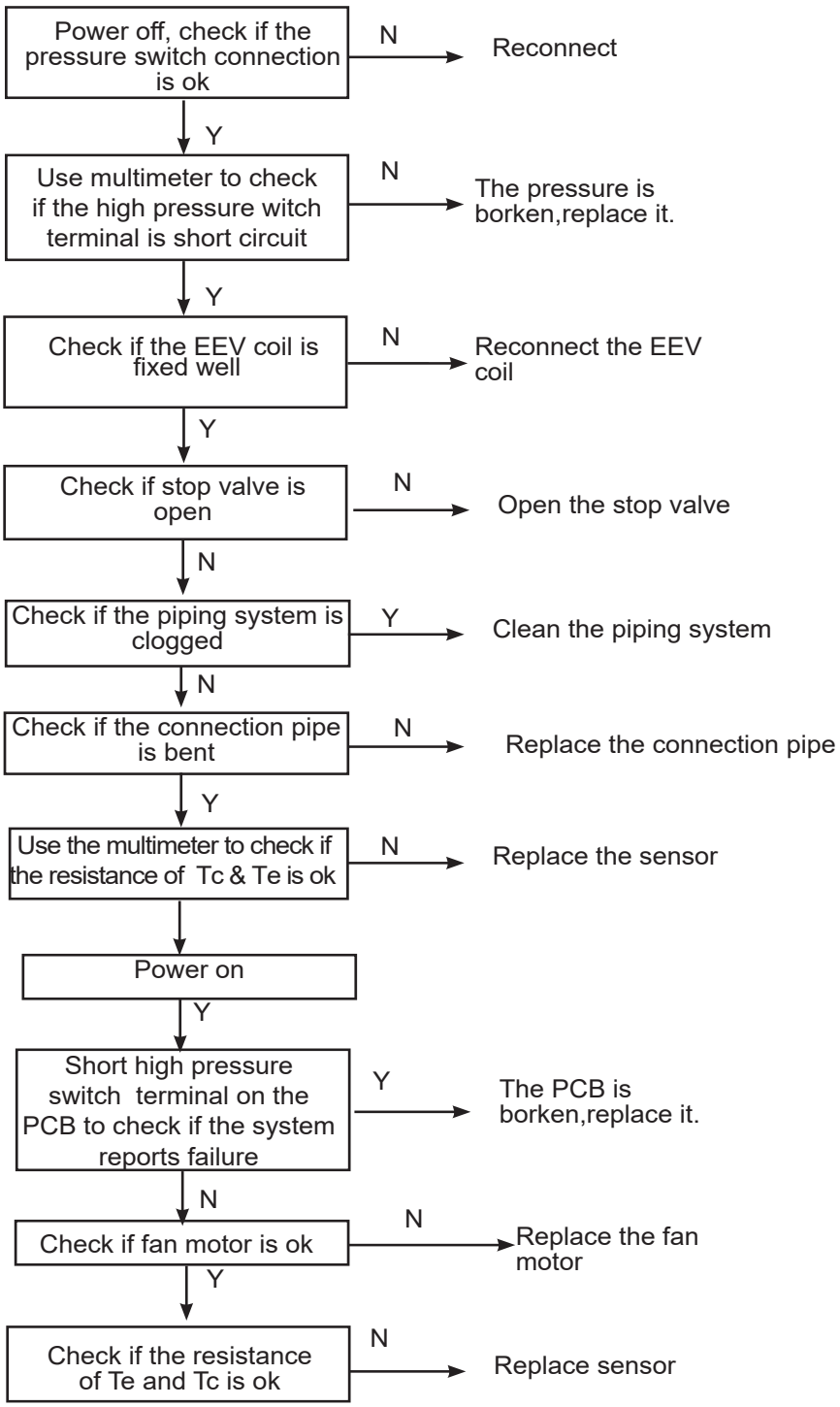


[42] Open high pressure switch

High pressure switch: Switch circuit has been detected open for 30 seconds (after 5 minute of compressor run time).

Possible causes:

- Incorrect pressure switch wiring
- Abnormal system pressure
- System is clogged
- Incorrect refrigerant charge
- Bad valve
- Pressure switch is bad
- PCB is bad

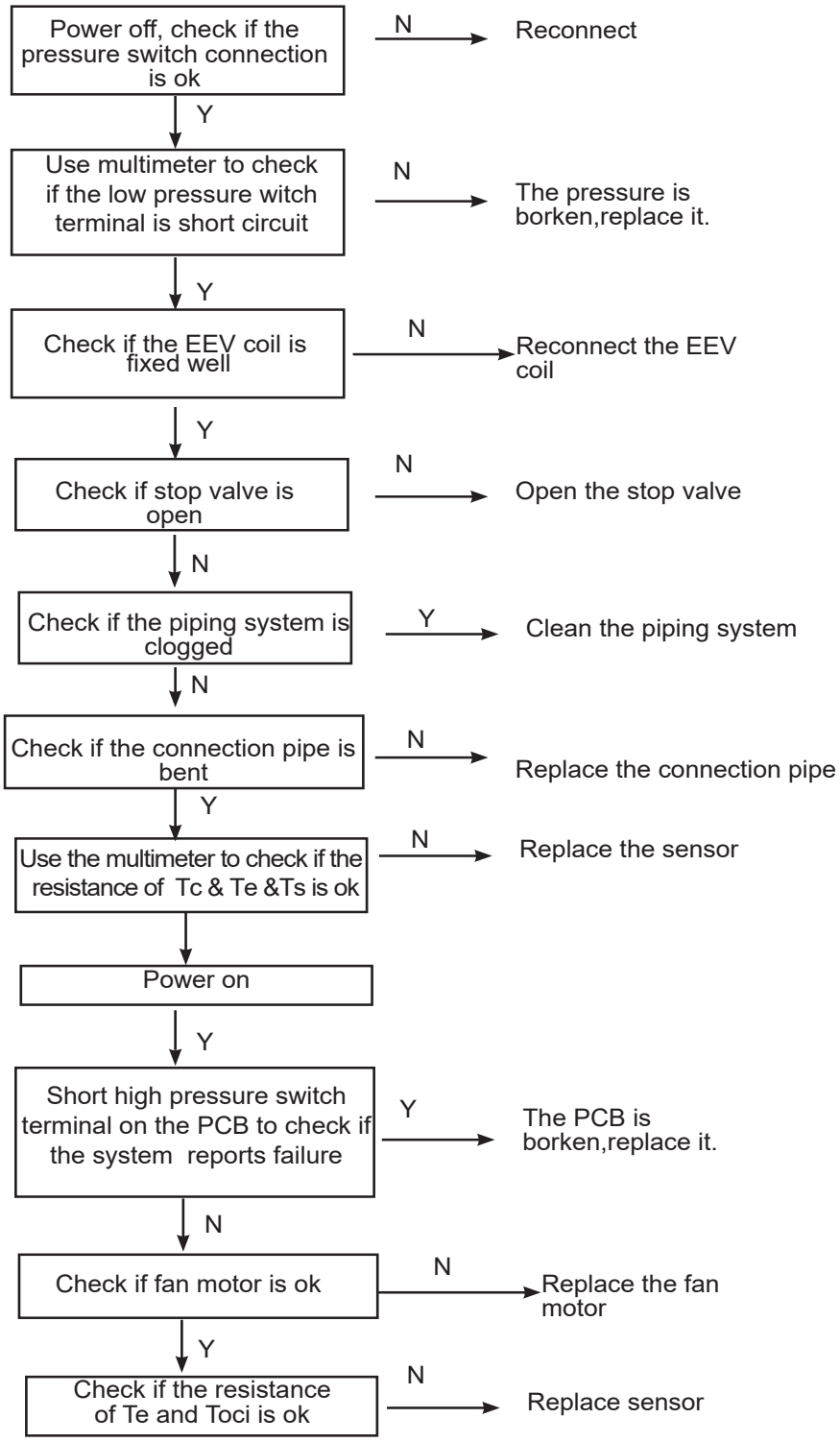


[43] Open low pressure switch

Low pressure switch: Switch has been detected open for 60 seconds (after 5 minute of compressor run time) or open for 30 seconds during standby.

Possible causes:

- Incorrect pressure switch wiring
- Abnormal system pressure
- System is clogged
- Incorrect refrigerant charge
- Bad valve
- Pressure switch is bad
- PCB is bad



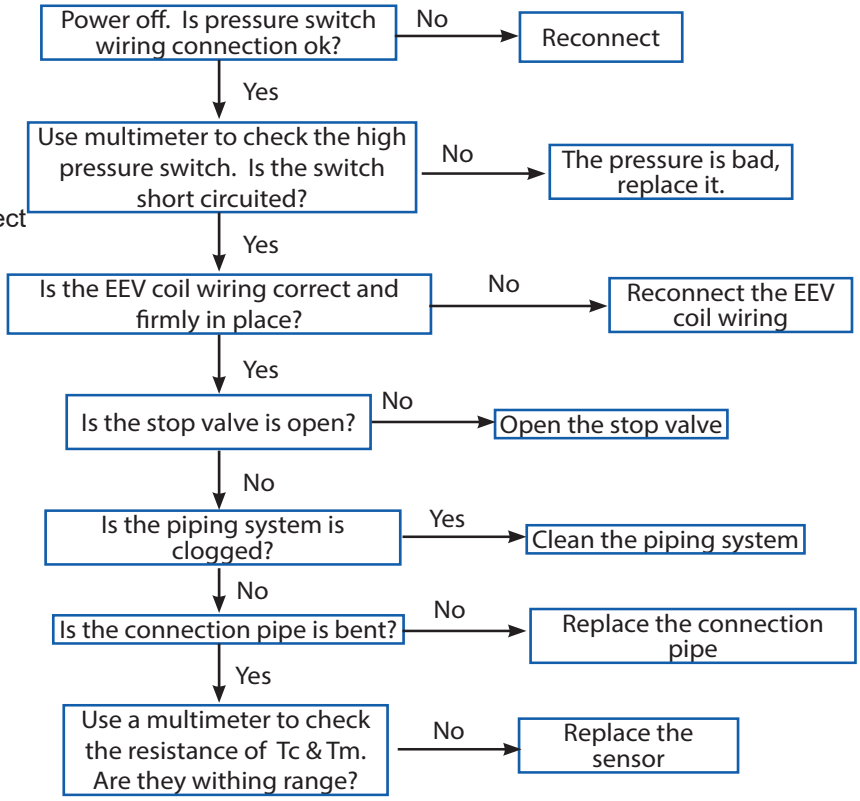
Troubleshooting

[44] High pressure detected in system

Outdoor TC sensor temperature >65°C(149F) during cooling.

Possible causes:

- High pressure transducer detection value is incorrect
- Refrigerant overcharge
- Blocked liquid line piping
- The outdoor unit cannot be turned on normally due to failure to open outdoor heat exchanger electronic expansion valve when heating.
- The operation environment is beyond the allowed range.



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[45] Low pressure detected in system

The minimum temperature value of outdoor Ts is lower than -45 °C during cooling mode, or minimum temperature value of outdoor Tc and outdoor Te is lower than -45 °C.

Possible causes:

- Low pressure sensor detection value is incorrect
- Low refrigerant charge
- System air leakage
- Blocked low pressure or liquid line piping
- The outdoor unit cannot be turned on normally due to failure to open outdoor heat exchanger electronic expansion valve when heating.
- The operation environment is beyond the allowed range.