Service and Troubleshooting

DC6 Commercial Split System 7.5 and 10 ton Condensing Units, DH6 Commerical Split System 7.5 and 10 ton Heat Pumps, DAQ Indoor Units with R-32 Refrigerant & Accessories

WARNING

ONLY PERSONNEL THAT HAVE BEEN TRAINED TO INSTALL, ADJUST, SERVICE, MAINTENANCE OR REPAIR (HEREINAFTER, "SERVICE") THE EQUIPMENT SPECIFIED IN THIS MANUAL SHOULD SERVICE THE EQUIPMENT.

THIS EQUIPMENT IS NOT INTENDED FOR USE BY PERSONS (INCLUDING CHILDREN) WITH REDUCED PHYSICAL, SENSORY OR MENTAL CAPABILITIES, OR LACK OF EXPERIENCE AND KNOWLEDGE, UNLESS THEY HAVE BEEN GIVEN SUPERVISION OR INSTRUCTION CONCERNING USE OF THE APPLIANCE BY A PERSON RESPONSIBLE FOR THEIR SAFETY.

CHILDREN SHOULD BE SUPERVISED TO ENSURE THAT THEY DO NOT PLAY WITH THE EQUIPMENT.

THE MANUFACTURER WILL NOT BE RESPONSIBLE FOR ANY INJURY OR PROPERTY DAMAGE ARISING FROM IMPROPER SUPERVISION, SERVICE OR SERVICE PROCEDURES. IF YOU SERVICE THIS UNIT, YOU ASSUME RESPONSIBILITY FOR ANY INJURY OR PROPERTY DAMAGE WHICH MAY RESULT. IN ADDITION, IN JURISDICTIONS THAT REQUIRE ONE OR MORE LICENSES TO SERVICE THE EQUIPMENT SPECIFIED IN THIS MANUAL, ONLY LICENSED PERSONNEL SHOULD SERVICE THE EQUIPMENT. IMPROPER SUPERVISION, INSTALLATION, ADJUSTMENT, SERVICING, MAINTENANCE OR REPAIR OF THE EQUIPMENT SPECIFIED IN THIS MANUAL, OR ATTEMPTING TO INSTALL, ADJUST, SERVICE OR REPAIR THE EQUIPMENT SPECIFIED IN THIS MANUAL WITHOUT PROPER SUPERVISION OR TRAINING MAY RESULT IN PRODUCT DAMAGE, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

This manual is to be used by qualified, professionally trained HVAC technicians only. Daikin does not assume any responsibility for property damage or personal injury due to improper service procedures or services performed by an unqualified person.

WARNING

Do not bypass safety devices.

WARNING

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.

WARNING

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 RELEASEDTO 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.

RSD6512301
November 2024

IMPORTANT INFORMATION

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IMPORTANT NOTICES

RECOGNIZE SAFETY SYMBOLS, WORDS AND LABELS

WARNING

TO PREVENT THE RISK OF PROPERTY DAMAGE, PERSONAL INJURY, OR DEATH, DO NOT STORE COMBUSTIBLE MATERIALS OR USE GASOLINE OR OTHER FLAMMABLE LIQUIDS OR VAPORS IN THE VICINITY OF THIS APPLIANCE.

WARNING

HIGH VOLTAGE
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

WARNING

THIS UNIT SHOULD NOT BE CONNECTED TO, OR USED IN CONJUNCTION WITH, ANY DEVICES THAT ARE NOT DESIGN CERTIFIED FOR USE WITH THIS UNIT OR HAVE NOT BEEN TESTED AND APPROVED BY THE MANUFACTURER. SERIOUS PROPERTY DAMAGE OR PERSONAL INJURY, REDUCED UNIT PERFORMANCE AND/OR HAZARDOUS CONDITIONS MAY RESULT FROM THE USE OF DEVICES THAT HAVE NOT BEEN APPROVED OR CERTIFIED BY THE MANUFACTURER.

SAFE REFRIGERANT HANDLING

While these items will not cover every conceivable situation, they should serve as a useful guide.

WARNING

Refrigerants are heavier than air. They can "push out" the oxygen in your lungs or in any enclosed space. To avoid possible difficulty in breathing or death:

- **Never purge refrigerant into an enclosed room or space. By law, all refrigerants must be reclaimed.**
- **If an indoor leak is suspected, thoroughly ventilate the area before beginning work.**
- **Liquid refrigerant can be very cold. To avoid possible frostbite or blindness, avoid contact with refrigerant and wear gloves and goggles. If liquid refrigerant does contact your skin or eyes, seek medical help immediately.**
- **Always follow EPA regulations. Never burn refrigerant, as poisonous gas will be produced.**

OUTSIDE THE U.S., **call 1-713-861-2500**.
(Not a technical assistance line for dealers.) Your telephone company will bill you for the call.

IMPORTANT INFORMATION

WARNING

TO AVOID POSSIBLE INJURY, EXPLOSION OR DEATH, PRACTICE SAFE HANDLING OF REFRIGERANTS.

WARNING

THE COMPRESSOR POE OIL FOR R-32 UNITS IS EXTREMELY SUSCEPTIBLE TO MOISTURE ABSORPTION AND COULD CAUSE COMPRESSOR FAILURE. DO NOT LEAVE SYSTEM OPEN TO ATMOSPHERE ANY LONGER THAN NECESSARY FOR INSTALLATION.

WARNING

TO AVOID POSSIBLE EXPLOSION:

- NEVER APPLY FLAME OR STEAM TO A REFRIGERANT CYLINDER. IF YOU MUST HEAT A CYLINDER FOR FASTER CHARGING, PARTIALLY IMMERSE IT IN WARM WATER.
- NEVER FILL A CYLINDER MORE THAN 80% FULL OF LIQUID REFRIGERANT.
- NEVER ADD ANYTHING OTHER THAN R-22 TO AN R-22 CYLINDER OR R-410A TO AN R-410A CYLINDER. THE SERVICE EQUIPMENT USED MUST BE LISTED OR CERTIFIED FOR THE TYPE OF REFRIGERANT USED.
- STORE CYLINDERS IN A COOL, DRY PLACE. NEVER USE A CYLINDER AS A PLATFORM OR A ROLLER.

WARNING

TO AVOID POSSIBLE EXPLOSION, USE ONLY RETURNABLE (NOT DISPOSABLE) SERVICE CYLINDERS WHEN REMOVING REFRIGERANT FROM A SYSTEM.

- ENSURE THE CYLINDER IS FREE OF DAMAGE WHICH COULD LEAD TO A LEAK OR EXPLOSION.
- ENSURE THE HYDROSTATIC TEST DATE DOES NOT EXCEED 5 YEARS.
- ENSURE THE PRESSURE RATING MEETS OR EXCEEDS 400 LBS.

WHEN IN DOUBT, DO NOT USE CYLINDER.

The manual contains specific information for service personnel

Checks to the area
Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the REFRIGERATING SYSTEM the following procedures must be completed prior to conducting work on the system.

Work procedure
Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.

General work area
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.

Checking for presence of refrigerant
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.

No ignition sources
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.

Checks to the refrigerating equipment
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. When replacing electrical components “intrinsically safe components” must be used as replacements. The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

- the actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed;
- the ventilation machinery and outlets are operating adequately and are not obstructed;
- if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
- 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 anysubstance which may corrode refrigerant containing-components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

SYSTEM OPERATION

Checks to electrical devices
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. exposed while charging, recovering or purging the system;

Presence of fire extinguisher
If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.

Initial safety checks shall include:
- that no live electrical components and wiring are exposed while charging, recovering or purging the system;
- that there is continuity of earth bonding.

OUTDOOR PRODUCT IDENTIFICATION

NOMENCLATURE

D	C	6	T	E	090	3	0	A	A
1	2	3	4	5	6,7,8	9	10	11	12

Brand

D - Daikin

Type

C: Condenser R32

H: HP R-32

IEER

6: 16.0 - 16.4

Compressor

T: Two Stage

Feature Set

E - Base

Tonnage Nominal

090 - 7½ tons

120 - 10 tons

Electrical

3 - 208/230V Three-Phase 60Hz

4 - 460V Three-Phase 60HZ

Varation

Major Revision

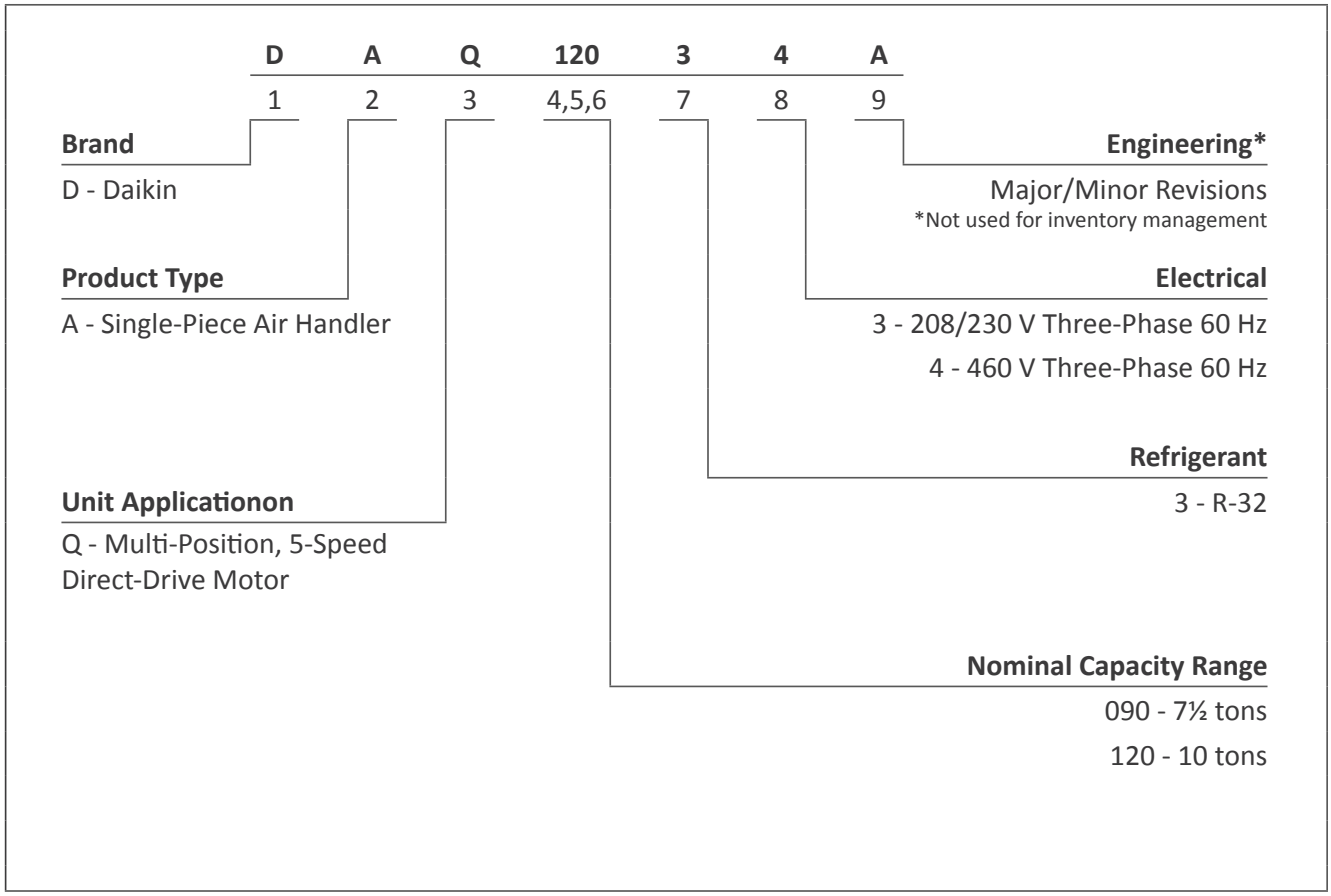
A: Initial Release

Minor Rev

A: Initial Release

INDOOR PRODUCT IDENTIFICATION

NOMENCLATURE



PRODUCT IDENTIFICATION

Commercial Splits R-32 Outdoor Units	
Model/Rev	**Description**
DC6TE090	7.5 Ton AC Tandem Compressors
DC6TE120	10 Ton AC Tandem Compressors
DH6TE090	7.5 Ton HP tandem Compressors
DH6TE120	10 Ton HP Tandem Compressors

Commercial Splits R-32 Air Handler	
Model/Rev	**Description**
DAQ090	7.5 Ton Air Handler
DAQ120	10 Ton Air Handler

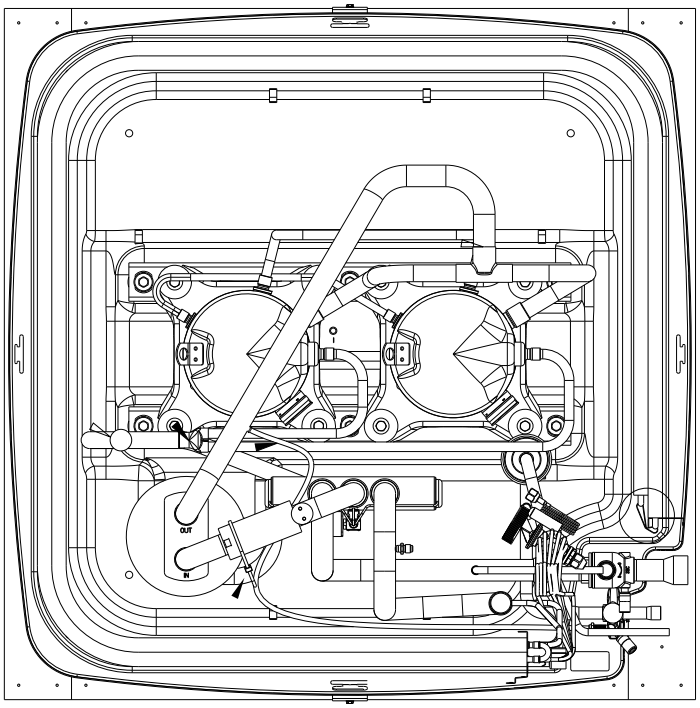
PRODUCT DESIGN

This section gives a basic description of cooling unit operation, it's various components and their basic operation. Ensure your system is properly sized for heat gain and loss according to methods of the Air Conditioning Contractors Association (ACCA) or equivalent.

Condensing Unit
The condenser air is pulled through the condenser coil by a direct drive propeller fan. This condenser air is then discharged out of the top of the cabinet. These units are designed for free air discharge, so no additional resistance, like duct work, shall be attached.

The suction and liquid line connections on present models are of the sweat type for field piping with refrigerant type copper. Front seating valves are factory installed to accept the field run copper. A holding charge of 110 oz is factory installed in the condensing unit.
New R32 models DC6, and DH6 units are available in 7.5 and 10 ton sizes . They are designed for208/230 and 460 volt three phase applications.

DC6, and DH6 R32 model units use the Copeland external duct static pressure.
YPT**K1 R32 tandem scroll compressors which are specifically designed for R32 refrigerant.



R32 compressors use "POE" or polyolester oil which is NOT compatible with mineral oil based lubricants like 3GS. "POE" oil must be used if additional oil is required. Use Lubrizol, Icematic NXG 5020 (IBC) 999-5171-63 or equivalent.

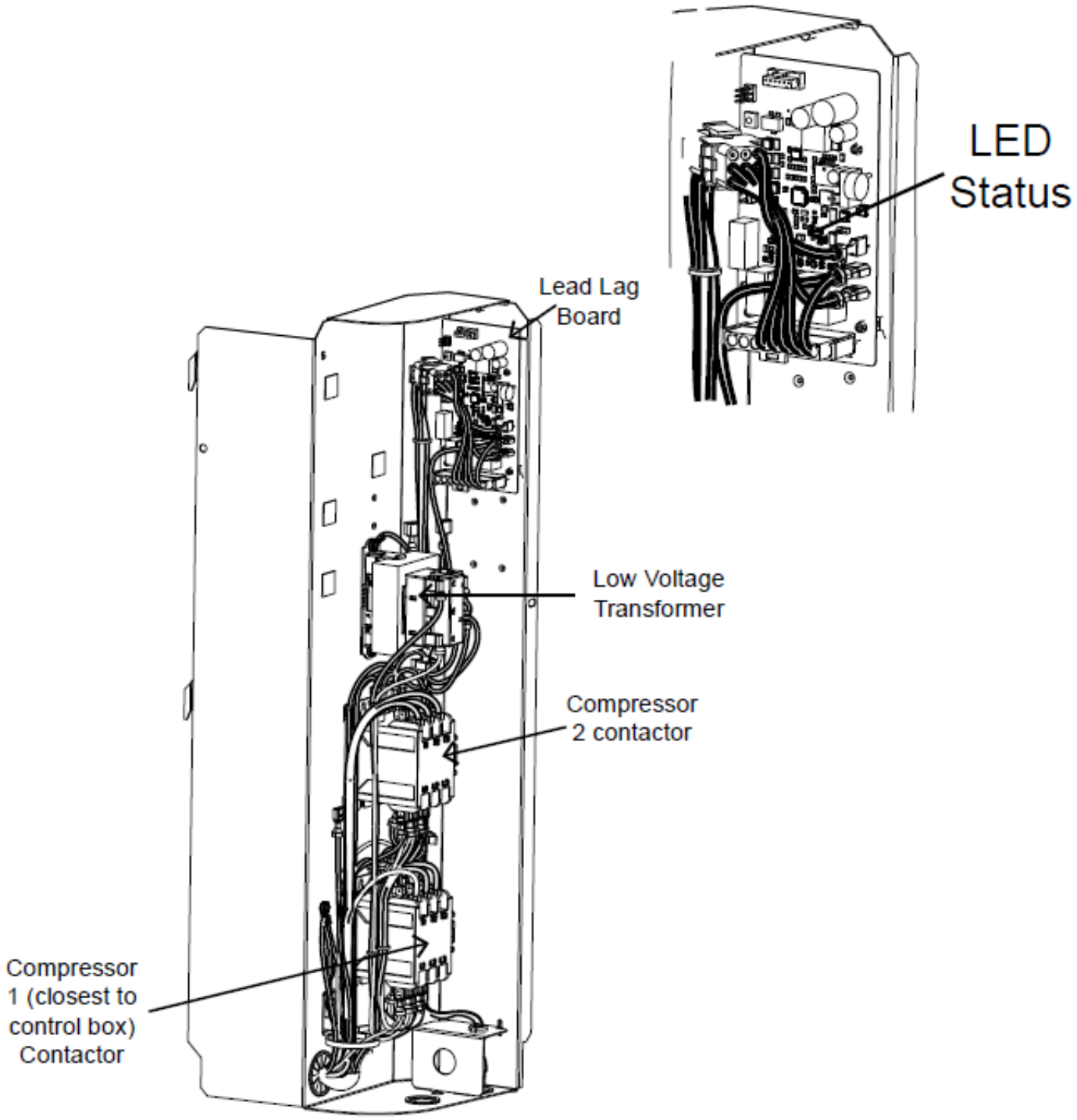
Lead/Lag Control Board (See next 2 pages)
The Lead/Lag board will provide control logic to the compressors. The boards features are Staggered Start, Oil Return, swapping of which compressor is tied to Y1, and Anti Short Cycle timers for each compressor output. The outputs from the control board will be overridden by R-32 mitigation controls.

DAQ
Multi-Position Air Handler
These one-piece multi-position air handlers are available in 7.5 to 10 ton sizes with optional 15, 20, and 30 kW electric heat kits for field installation. Units use an ECM blower motor and are compatible with heat pump and cooling applications.

This appliance can be installed in the vertical or horizontal position. The horizontal right position requires product modification. This product is designed for zero inches (0 inches) clearance; however, adequate access for service or replacement must be considered without removing permanent structure. This unit can be installed on a platform when deemed necessary.

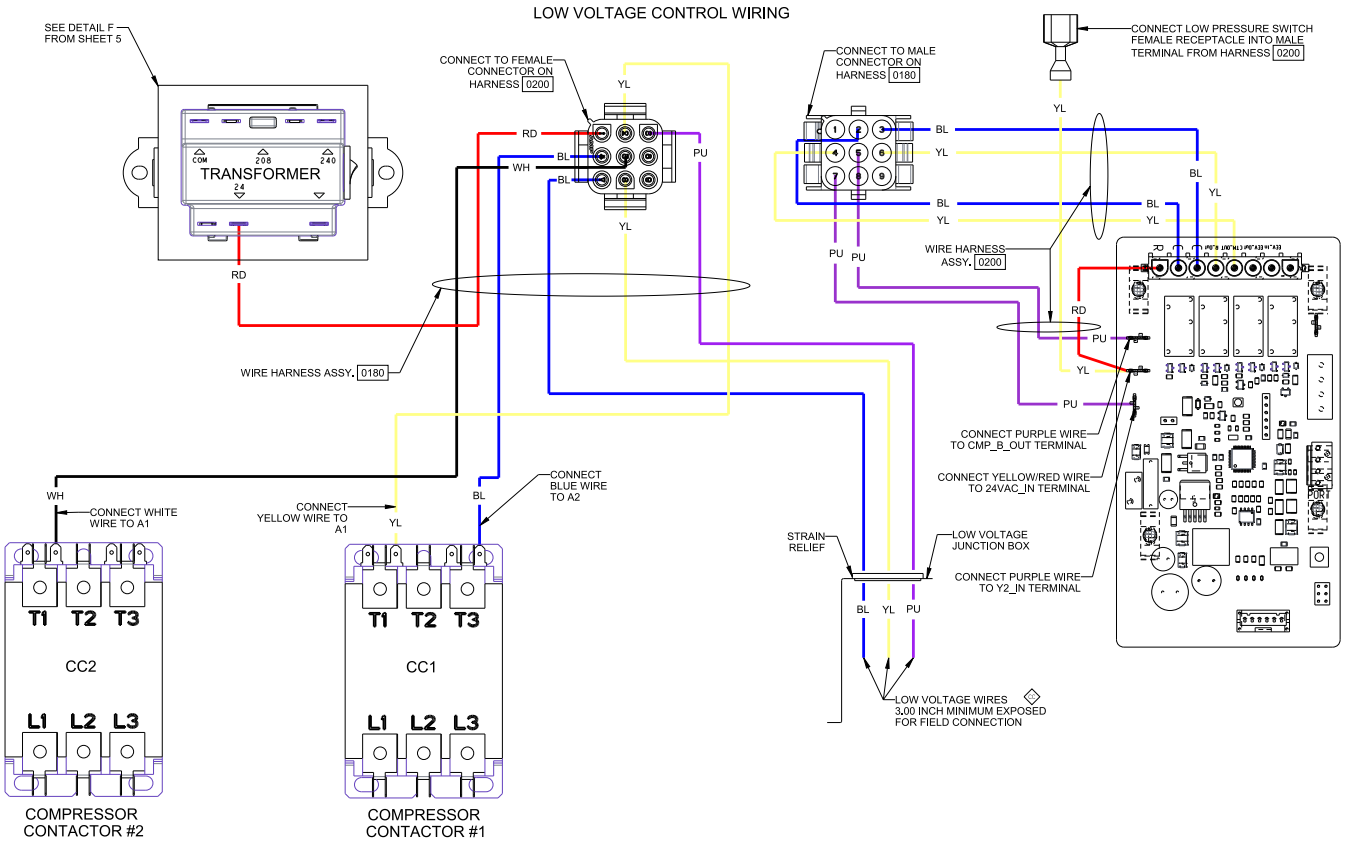
In an attic installation a secondary drain pan must be provided by the installer and placed under the entire unit with a separate drain line properly sloped and terminated in an area visible to the owner. This secondary drain pan is required in the event that there is a leak or main drain blockage. Closed cell insulation should be applied to the drain lines in unconditioned spaces where sweating may occur.
NOTE: Single piece air handlers are factory-sealed to achieve a 2% or less leakage rate at 1.0" water gauge DC6, and DH6 R32 model units use the Copeland external duct static pressure.

CONTROL BOX COMPONENTS



RED LED'S STATUS FLASHING PATTERNS		
	MODE	FLASHING PATTERN
1	Normal Mode (with oil return enabled)	Continuous Blink LED (Default)
2	Normal Mode (with oil return disabled)	Solid LED

SYSTEM OPERATION



SYSTEM OPERATION

Cooling Cycle

For legacy room thermostat: When the room thermostat calls for cool, the contacts of the room thermostat close making terminals R to Y1 & G (if thermostat calls for low stage cool), or R to Y1, Y2 & G (if thermostat calls for high stage cool), the low voltage circuit of the transformer is completed. Current now flows through the magnetic holding coils of the compressor and fan contactors.

This draws in the normally open compressor contactor, starting either both compressor or just one commpressor, depending on the demand and the outdoor fan motor. At the same time, G Thermostat call starts the indoor fan motor.When the thermostat is satisfied, it opens its contacts, breaking the low voltage circuit, causing the compressor contactors and indoor fan relay to open, shutting down the system.

If the room thermostat fan selector switch should be set on the “on” position, then the indoor blower would run continuously rather than cycling with the compressor. R32 heat pump models energize the reversing valve thorough the “O” circuit in the room thermostat. Therefore, the reversing valve remains energized as long as the thermostat subbase is in the cooling position. The only exception to this is during defrost.

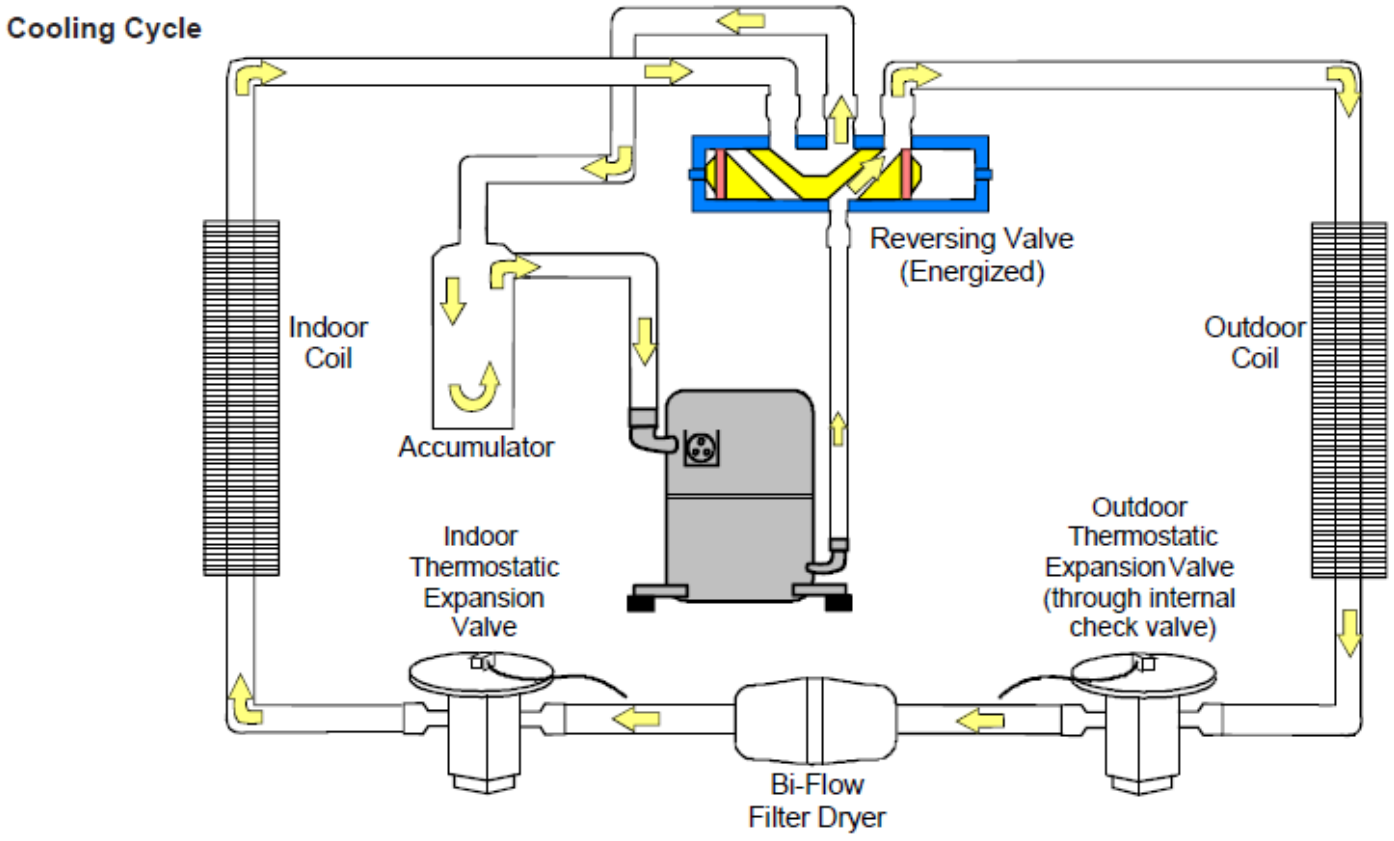
For heat pumps, during cooling cycle the reversing valve is energized as the room thermostat closes “O” terminal to R and the defrost board responds to such a condition by energizing the solenoid coil on the reversing valve.

Defrost Cycle

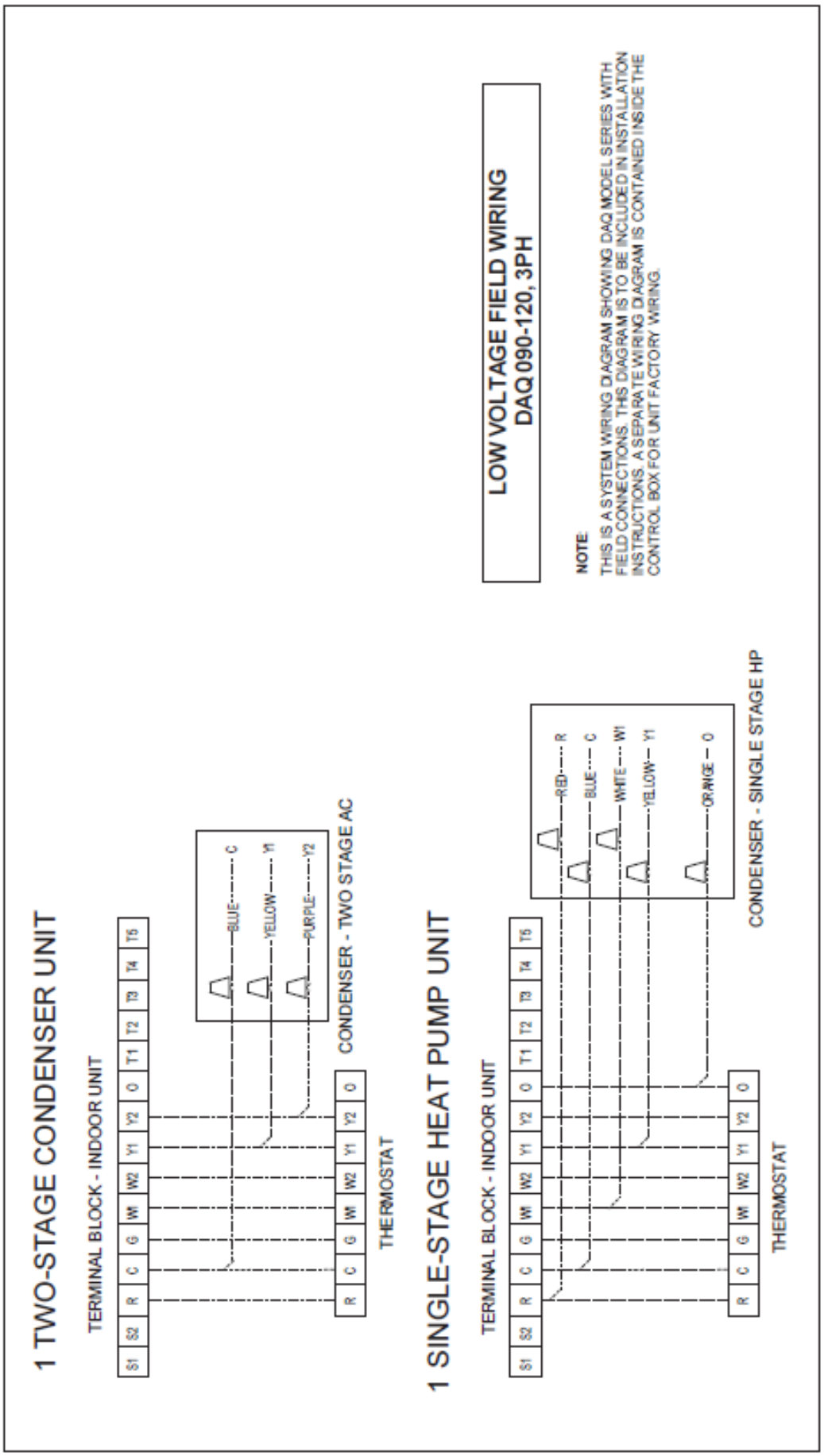
The defrosting of the outdoor coil is jointly controlled by the defrost control board and the defrost thermostat.

Solid State Defrost Control

During operation the power to the circuit board is controlled by a temperature sensor, which is clamped to a return bend in the outdoor coil. Defrost timing periods of 30, 60, or 90 minutes may be selected by connecting the circuit board jumper to 30, 60, or 90 respectively. Accumulation of time for the timing period selected starts when the sensor closes (approximately 30°F), and when the room thermostat calls for heat. At the end of the timing period, the unit’s defrost cycle will be initiated provided the sensor remains closed. When the sensor opens (approximately 60°F), the defrost cycle is terminated and the timing period is reset. If the defrost cycle is not terminated due to the sensor temperature, a ten minute override interrupts the unit’s defrost period.



SPLITS LOW VOLTAGE DIAGRAM



SYSTEM OPERATION

Heating Cycle

The reversing valve on the models is energized in the cooling cycle through the “O” terminal on the room thermostat.

These models have a 24 volt reversing valve coil. When the thermostat selector switch is set in the cooling position, the “O” terminal on the thermostat is energized all the time.

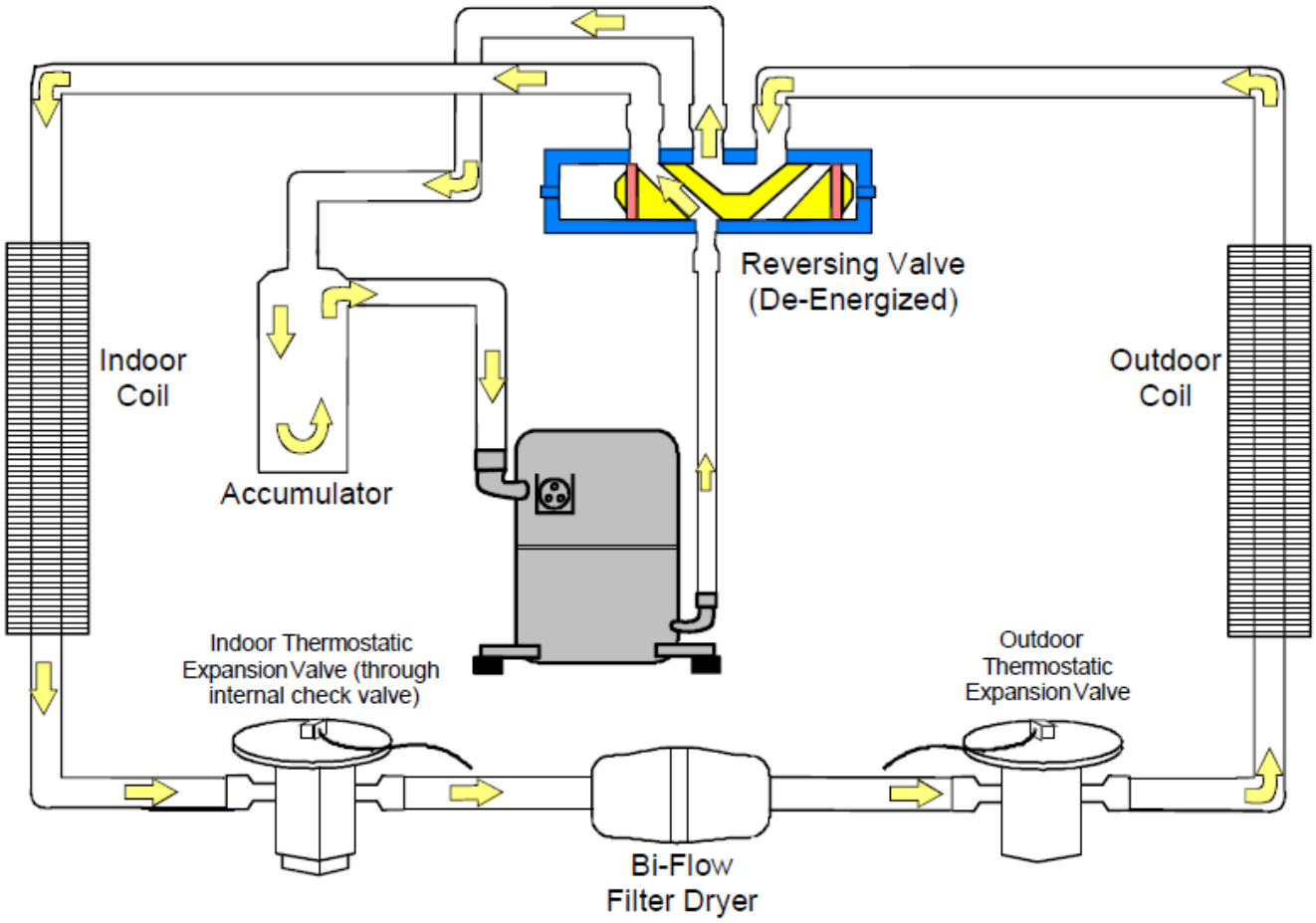
Care must be taken when selecting a room thermostat. Refer to the installation instructions shipped with the product for approved thermostats.

When the room thermostat calls for heat, the contacts of theroom thermostat close making terminals R to Y1, Y2 & G, the low voltage circuit of the transformer is completed. Current now flows through the magnetic holding coils of the compressor contactors and fan relay.

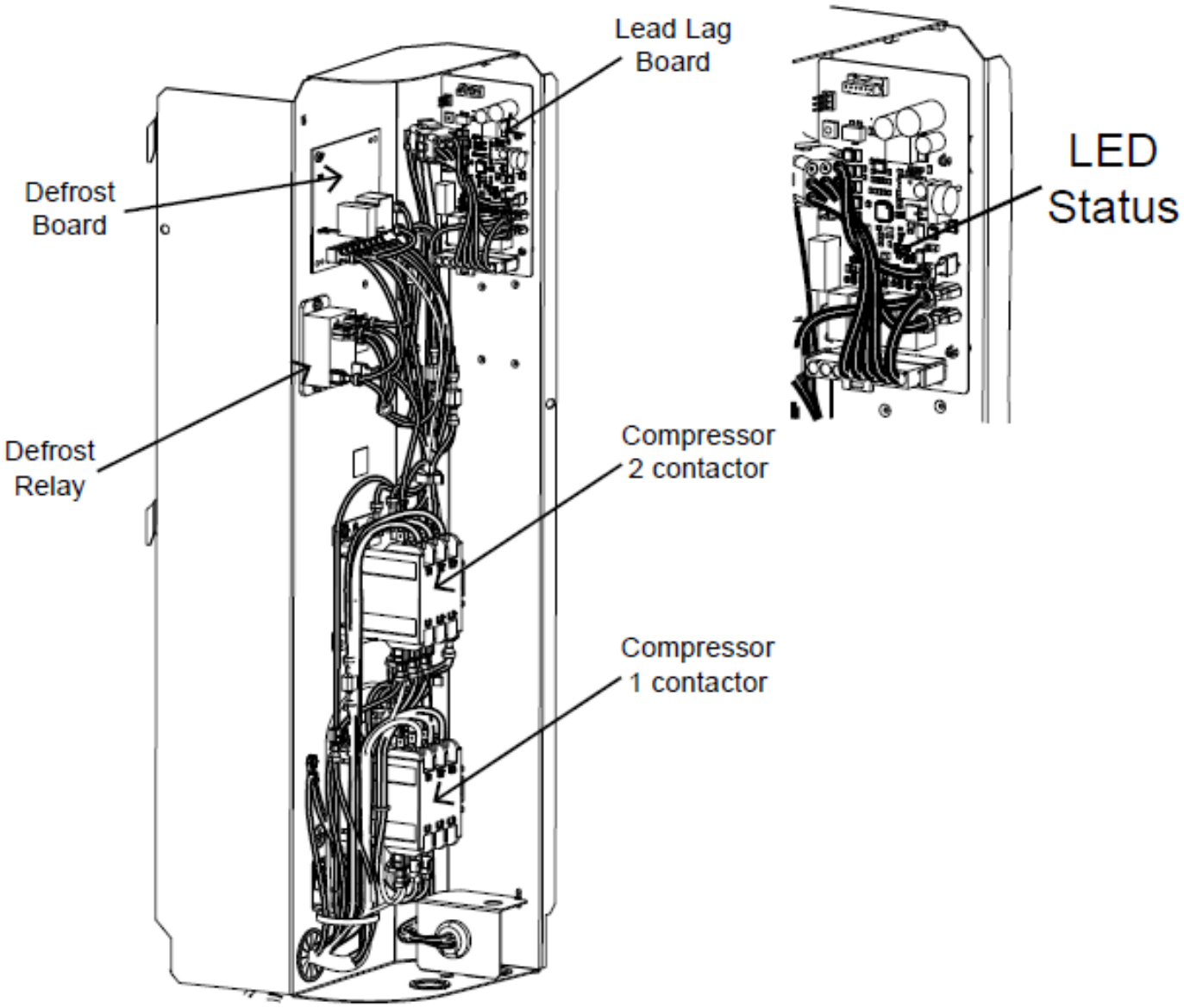
This draws in the normally open contactors, starting the compressors and condenser fan motors.

When the thermostat is satisfied, it opens its contacts, breaking the low voltage circuit, causing the compressor contactors and indoor fan relay to open, shutting down the system. The indoor fan is de-energized is the fan selector is set to the off position.

If the room thermostat fan selector switch should be set to the “on” position, then the indoor blower would run continuously rather than cycling with the compressor.



CONTROL BOX COMPONENTS



RED LED'S STATUS FLASHING PATTERNS		
	MODE	FLASHING PATTERN
1	Normal Mode (with oil return enabled)	Continuous Blink LED (Default)
2	Normal Mode (with oil return disabled)	Solid LED

SERVICING

S-1 CHECKING VOLTAGE

1. Remove outer case, control panel cover, etc., from unit being tested.

With power ON:

WARNING

LINE VOLTAGE NOW PRESENT.

2. Using a voltmeter, measure the voltage across terminals L1 and L2 of the contactor for the condensing unit or at the field connections for the air handler or heaters.
3. No reading - indicates open wiring, open fuse(s) no power or etc., from unit to fused disconnect service. Repair as needed.
4. With ample voltage at line voltage connectors, energize the unit.
5. Measure the voltage with the unit starting and operating, and determine the unit Locked Rotor Voltage. **NOTE**: If checking heaters, be sure all heating elements are energized.
   Locked Rotor Voltage is the actual voltage available at the compressor during starting, locked rotor, or a stalled condition. Measured voltage should be above minimum listed in chart below.
   To measure Locked Rotor Voltage attach a voltmeter to the run "R" and common "C" terminals of the compressor, or to the T1 and T2 terminals of the contactor. Start the unit and allow the compressor to run for several seconds, then shut down the unit. Immediately attempt to restart the unit while measuring the Locked Rotor Voltage.
6. Locked rotor voltage should read within the voltage tabulation as shown. If the voltage falls below the minimum voltage, check the line wire size. Long runs of undersized wire can cause low voltage. If wire size is adequate, notify the local power company in regard to either low or high voltage.

Unit Supply Voltage		
Voltage	Min.	Max
208/230	197	253
460	414	506

NOTE: When operating electric heaters on voltages other than 240 volts, refer to the System Operation section on electric heaters to calculate temperature rise and air flow.

Low voltage may cause insufficient heating.

S-2 CHECKING WIRING

WARNING

HIGH VOLTAGE
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

1. Check wiring visually for signs of overheating, damaged insulation and loose connections.
2. Use an ohmmeter to check continuity of any suspected open wires.
3. If any wires must be replaced, replace with comparable gauge and insulation thickness.

S-3A THERMOSTAT AND WIRING

WARNING

LINE VOLTAGE NOW PRESENT.

With power ON, thermostat calling for cooling

1. Use a voltmeter to check for 24 volts at thermostat wires C and Y in the condensing unit control panel.
2. No voltage indicates trouble in the thermostat, wiring or external transformer source.
3. Check the continuity of the thermostat and wiring. Repair or replace as necessary.

INDOOR BLOWER MOTOR

With power ON:

WARNING

LINE VOLTAGE NOW PRESENT.

1. Set fan selector switch at thermostat to "ON" position.
2. With voltmeter, check for 24 volts at wires C and G.
3. No voltage indicates the trouble is in the thermostat or wiring.
4. Check the continuity of the thermostat and wiring. Repair or replace as necessary.

THE FOLLOWING INSTRUCTIONS ARE MANDATORY FOR A2LSYSTEMS AND SUPERSEDE OTHER INSTRUCTIONS

WARNING

ONLY BRAZING TECHNIQUES APPROVED MECHANICAL JOINTS SHOULD BE USED TO CONNECT REFRIGERANT TUBING CONNECTIONS. NON-APPROVED MECHANICAL CONNECTORS AND OTHER METHODS ARE NOT PERMITTED IN THIS SYSTEM CONTAINING A2L REFRIGERANT. APPROVED MECHANICAL JOINTS WILL BE DETAILED IN THE PRODUCT'S SPECIFICATION SHEETS.

STANDING PRESSURE TEST/LEAK DETECTION METHOD

Using dry nitrogen or dry helium, pressurize the system to 450 PSIG. allow the pressure to stabilize and hold for 15 minuts (minimum). The system is considered leak-free if the pressure does not drop below 450 PSIG. If, after 15 minutes, the pressure drops below 450 PSIG, it implies a leak in the system. Proceed with identifying and sealing the leak and repeating the Standing Pressure Test. Leak test the system using dry nitrogen or dry helium and soapy water to identify leaks. No refrigerant shall be used for pressure testing to detect leaks. Proceed to system evacuation usint the Deep Vacuum Method.

DEEP VACUUM METHOD

The Deep Vacuum Method requires a vacuum pump rated for 500 microns or less. This method effectively and efficiently ensures the system is free of non-condensable air and moisture. The Triple Evacuation Method is detailed in the Service Manual for this product model as an alternative. To expedite the evacuation procedure, it is recommended that the Schrader Cores be removed from the service valves using a core-removal tool.

1. Connect the vacuum pump, micron gauge, and vacuum-rated hoses to both service valves. Evacuation must use both service valves to eliminate system mechanical seals.
2. Evacuate the system to less than 500 microns.
3. Isolate the pump from the system and hold the vacuum for 10 minutes (minimum). Typically, pressure will rise slowly during this period. If the pressure rises to less than 1000 microns and remains steady, the system is considered leak-free; proceed to system charging and startup.
4. If pressure rises above 1000 microns but holds steady below 2000 microns, non-condensable air or moisture may remain, or a small leak may be present. Return to step 2: If the same result is achieved, check for leaks and repair. Repeat the evacuation procedure.
5. If pressure rises above 2000 microns, a leak is present. Check for leaks and repair them. Then, repeat the evacuation procedure.

WARNING

ALL ACCESSORIES THAT MAY BECOME A POTENTIAL IGNITION SOURCE IF INSTALLED. SUCH AS ELECTRONIC AIR CLEANERS, MUST ONLY BE POWERED THROUGH OUR ACCESSORY CONTROL BOARD KIT. IF AN ELECTRONIC AIR CLEANER IS ALREADY INSTALLED IN THE DUCT WORK AND NOT CONNECTED TO THE ACCESSORY CONTROL BOARD. IT WILL HAVE TO BE DISABLED OR REMOVED. ENSURE THAT ANY ADDITIONAL WIRING FROM THE INDOOR UNIT TO THE ACCESSORY CONTROL BOARD IS ROUTED AND PROTECTED FROM DAMAGE WEAR, AVOIDING THE FLUE PIPE AND ANY JOINTS THAT MAY NEED BRAZED OR DISCONNECTED FOR SERVICE. REFER TO THE PRODUCT SPECIFICATION SHEET FOR THE ACCESSORY CONTROL BOARD KIT PART NUMBER.

WARNING

A TRIPPED CIRCUIT BREAKER OR BLOWN FUSE MAY INDICATE THAT AN ELECTRICAL PROBLEM EXISTS.
DO NOT RESET A CIRCUIT BREAKER OR REPLACE FUSES WITHOUT FIRST PERFORMING THOROUGH ELECTRICAL TROUBLESHOOTING AND TESTING PROCEDURES.

SYSTEM SERVICE AND DECOMMISSIONING

Should repairs requiring recovery of the refrigerant become necessary, special considerations must be made when breaking into systems with flammable refrigerants. These repairs shall only be performed by qualified service personnel and in compliance with local and national regulations.

The refrigerant charge shall only be recovered into a cylinder labeled for use with R-32. Ensure that the refrigerant cylinder(s) are capable of holding the total system charge. Cylinders shall be complete with a pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs. 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.

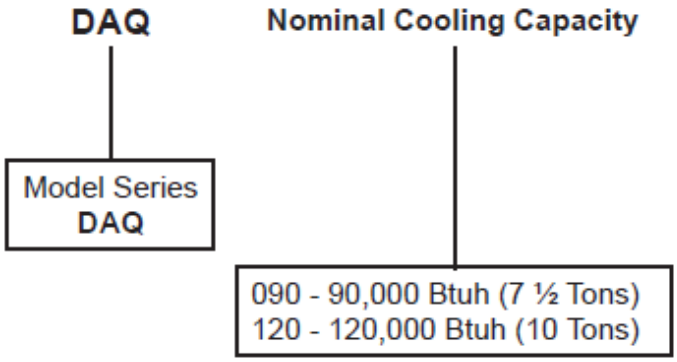
All best practices for refrigerant recovery must be followed, including use of a recovery machine designated safe for use with A2L refrigerants. Isolate the system electrically prior to recovery. Insure that all electric sources are disconnect and lockedout/tageout. Ensure that all personal protective equipment is being applied correctly. Ensure that the recovery process is supervised at all times by a qualified servicer. Situate the R-32 cylinder on the scale before recovery takes place. Start the recovery machine and operate in accordance with its instructions. Do not overfill cylinders by more than 80% volume of its allowed liquid charge.

Markings and warnings on the unit shall continue to be visible and legible after installation and service. Correct any markings and warnings that are made illegible.
When decommissioning a system, all previously mentioned precautions regarding safe refrigerant handling must be followed. Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked. Equipment must be labeled, dated, and signed stating that it has been decommissioned and emptied of refrigerant.

WARNING

PARTIAL UNITS SHALL ONLY BE CONNECTED TO APPLIANCE SUITABLE FOR THE SAME REFRIGERANT.

PRODUCT IDENTIFICATION



PRODUCT DESCRIPTION

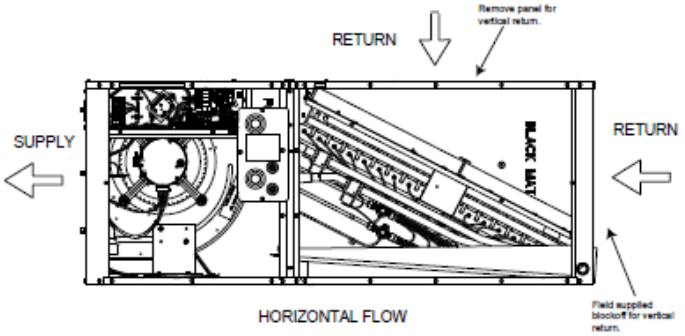
When matched with DC6TE and DH6TE condensers, this system complies with the minimum efficiency requirements found in ASHRAE 90.1-2019. See the Daikin DC6TE and DH6TE specification sheets for details on these condensers. For other Daikin condenser(s) that can be matched with this air handler to obtain ASHRAE 90.1-2019 compliance, consult with your local distributor.
The DAQ series is intended for use with a room thermostat. This thermostat is not supplied with this equipment. Only thermostats that use 24 VAC control circuitry are to be used.

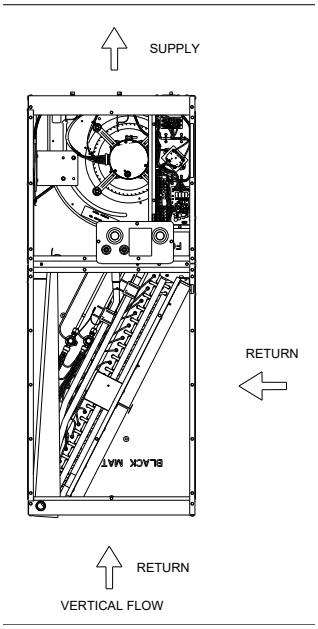
	DAQ0903	DAQ1203
Net Weight (Lbs.)	400	400
Shipping Weight (Lbs.)	430	430
Refrigerant	R-32	R-32
Blower Wheel (Dia x Width)	11x10	11x10
Blower Wheel Quantity	2	2
Motor Type	Direct Drive	Direct Drive
Motor Qty	2	2
Motor (HP)	1	1
Motor (RPM)	1200	1200
Evaporator Coil Material	Copper Tubes /Al Fins	
Face Area (Ft^2)	10.0	10.0
Number of Rows	4	4
Suction Line Quantity	2	2
Suction Line Connection (in)*	1 1/8	1 1/8
Liquid Line Quantity	2	2
Liquid Line Connection (in)*	3/8	3/8
Metering Device	Thermal Expansion Valve	
TXV Type	Adjustable (factory installed)	
TXV Quantity	2	2

***NOTE:** Consult with the condenser specifications for suction and liquid line sizing on the next page.

	DC6TE09030A	DC6TE09040A	DC6TE12030A	DC6TE12040
Outdoor Sound				
Decibels (dB)	83.9	83.9	85.9	85.9
Condenser Fan Motor (Qty 1)				
Horsepower	1	1	1	1
Refrigeration System				
Liquid Connection Valve Size (O.D.)	⅜"	⅜"	⅜"	⅜"
Suction Connection Valve Size (O.D.)	1⅛"	1⅛"	1⅛"	1⅛"
Valve Type	Sweat	Sweat	Sweat	Sweat
Refrigerant Shipping Charge (oz.)	110	110	110	110
Electrical Data				
AC Volts	208/230	460	208/230	460
Hz / Phase	60 Hz/3	60 Hz/3	60 Hz/3	60 Hz/3
Min / Max Volts	197/253	414/506	197/253	414/506
Electrical Conduit Size	½" or ¾"	½" or ¾"	½" or ¾"	½" or ¾"
Ship Weight (lbs)	381	381	381	381

	DH6TE09030A	DH6TE09040A	DH6TE12030A	DH6TE12040
Outdoor Sound				
Decibels (dB)	83.9	83.9	85.9	85.9
Condenser Fan Motor (Qty 1)				
Horsepower	1	1	1	1
Refrigeration System				
Liquid Connection Valve Size (O.D.)	⅜"	⅜"	⅜"	⅜"
Suction Connection Valve Size	1⅛"	1⅛"	1⅛"	1⅛"
Valve Type	Sweat	Sweat	Sweat	Sweat
Refrigerant Charge (oz.)*	110	110	110	110
Electrical Data				
AC Volts	208/230	460	208/230	460
Hz / Phase	60 Hz/3	60 Hz/3	60 Hz/3	60 Hz/3
Min / Max Volts	197/253	414/506	197/253	414/506
Electrical Conduit Size	½" or ¾"	½" or ¾"	½" or ¾"	½" or ¾"
Ship Weight (lbs)	417	417	417	417





When installing this air handler, consideration is to be given to minimize the length of refrigerant tubing. Refer to TP-111 Long Line Set Applications for further guidance. Also, do not install the air handler in a location either above or below the condenser that violates the instructions provided with the condenser.

The clearance from a combustible surface to the unit may be 0”. However, service clearance is to take precedence. In addition allow a minimum of 36” in front of the unit for service clearance. Allow sufficient clearance to remove the heater elements for service or replacement in heat kits when utilized in application. Motor replacement requires 12” from the side. Blower housing removal requires 22” from the top in the horizontal position.

When installing in an area directly over a finished ceiling (such as an attic), an emergency drain pan is required directly under the unit. See local and state codes for additional requirements.

When installing this unit in an area that may become wet, elevate the unit with a sturdy, non-porous material.

In installations that may lead to physical damage (warehouse, industrial sites, etc.), it is advised to install a protective barrier to prevent such damage.

NOTE: The maximum altitude shall not exceed 8,000 ft under normal operating conditions.

Ductwork

This DAQ air handler is designed for a complete supply and return ductwork system.

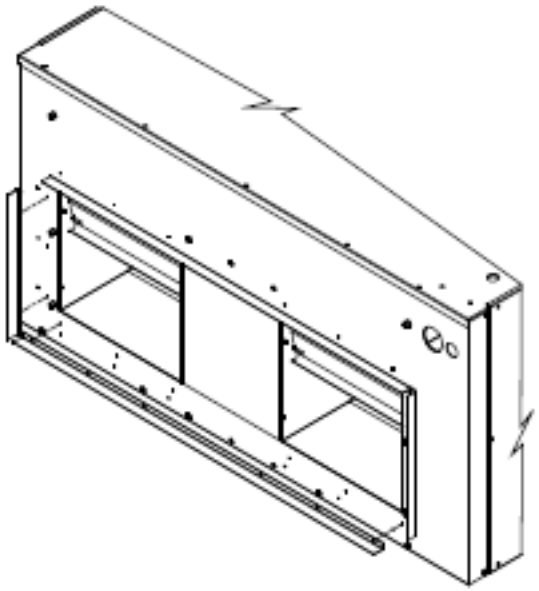
CAUTION

DO NOT OPERATE THIS PRODUCT WITHOUT ALL THE DUCTWORK ATTACHED.

In order to ensure optimum system performance, it is recommended that the ductwork is to be sized to accommodate 375-425 CFM per ton of cooling with the total external static pressure not to exceed .8” WC. Inadequate duct work that restricts airflow can result in improper performance and compressor or heater failure. Ductwork is to be constructed in a manner that limits restrictions and maintains suitable air velocity. Ductwork is to be sealed to the unit in a manner that will prevent leakage.

SUPPLY DUCTWORK AND FLANGES

The supply ductwork flanges are shipped loose and required to be field installed. See the following sketch for further details: Dimensions are approximately 40” x 13-1/8”.



RETURN DUCTWORK

DO NOT TERMINATE THE RETURN DUCTWORK IN AN AREA THAT CAN INTRODUCE TOXIC, OR OBJECTIONABLE FUMES/ODORS INTO THE DUCTWORK.

RETURN AIR FILTERS

Each installation must include a return air filter. This unit is factory equipped with disposable return air filters. To ensure optimum performance, frequent filter replacement is advised. See the following table for the factory installed filter sizes.

Model	Filter Size (in)	Qty.
DAQ090 and DAQ120	16 x 20 x 2	2
	20 x 20 x 2	2

ELECTRIC HEAT

Refer to this manual in combination with the instructions provided with the heat kit for the correct installation procedure.

The electrical characteristics of the air handler, the electric heat kit, and the building power supply must agree.

The air handlers listed in this manual do not have factory installed electric heat. Electric heat is available as an accessory. If installing this option, the ONLY heat kits that can be used are the AHKD series

AHKD MODEL NUMBER	NOMINAL KW	ELECTRICAL CHARACTERISTICS	STAGES
AHKD15-3A	15	208-240/3/60	1
AHKD15-4A	15	480/3/60	1
AHKD20-3A	20	208-240/3/60	2
AHKD20-4A	20	480/3/60	2
AHKD30-3A	30	208-240/3/60	2
AHKD30-4A	30	480/3/60	2

For all supply voltages, use the correction factors in the following tables, multiplied by KW and (or) temperature rise to have corrected results

KW Correction Factors (-3A Models)

Supply Voltage	240	230	220	210	208
Correction Factor	1	0.92	0.84	0.77	0.75

KW Correction Factors (-4A Models)

Supply Voltage	480	460	440	415	380
Correction Factor	1	0.92	0.84	0.75	0.63

The heating mode temperatures rise is dependent upon the system airflow, the supply voltage, and the heat kit size (KW) selected. Use the following table to determine the temperature rise (°F).

DAQ090 Temperature Rise Table (°F)

DAQ090 Temperature Rise Table (°F) - 7.5Ton				
KW	CFM	208	240	480
15	2800	12	16	16
15	2900	12	16	16
15	3000	11	15	15
15	3100	11	15	15
15	3200	10	14	14
20	2800	16	22	22
20	2900	16	21	21
20	3000	16	21	21
20	3100	16	20	20
20	3200	15	20	20
30	2800	24	32	32
30	2900	23	31	31
30	3000	23	30	30
30	3100	21	29	29
30	3200	21	29	29

DAQ120 Temperature Rise Table (°F)

DAQ120 Temperature Rise Table (°F) - 10Ton				
KW	CFM	208	240	480
15	3800	9	12	12
15	3900	9	12	12
15	4000	9	12	12
15	4100	9	12	12
15	4200	8	11	11
20	3800	12	17	17
20	3900	12	16	16
20	4000	12	16	16
20	4100	12	15	15
20	4200	11	15	15
30	3800	19	25	25
30	3900	18	24	24
30	4000	18	24	24
30	4100	17	23	23
30	4200	17	23	23

NOTE: Temperature rise tables are calculated with both stages of electric heat engaged (2 stage heat systems).

ELECTRICAL SUPPLY WIRE AND MOP

CAUTION

FIRE HAZARD!
TO AVOID THE RISK OF PROPERTY DAMAGE, PERSONAL INJURY OR FIRE, USE ONLY COPPER CONDUCTORS.

WARNING

HIGH VOLTAGE
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

WARNING

HIGH VOLTAGE!
TO AVOID PROPERTY DAMAGE, PERSONAL INJURY OR DEATH DUE TO ELECTRICAL SHOCK, THIS UNIT MUST HAVE AN UNINTERRUPTED, UNBROKEN ELECTRICAL GROUND. THE ELECTRICAL GROUND CIRCUIT MAY CONSIST OF AN APPROPRIATELY SIZED ELECTRICAL WIRE CONNECTING THE GROUND LUG IN THE UNIT CONTROL BOX TO THE BUILDING ELECTRICAL SERVICE PANEL. OTHER METHODS OF GROUNDING ARE PERMITTED IF PERFORMED IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE (NEC) / AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) / NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 70 AND LOCAL/STATE CODES. IN CANADA, ELECTRICAL GROUNDINGS IS TO BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE (CSA) C22.1.

BUILDING ELECTRICAL SERVICE INSPECTION

This unit is designed for 3-phase operation. DO NOT OPERATE ON A SINGLE PHASE POWER SUPPLY. SEE THE PRECEDING WARNING. Measure the power supply to the unit. The supply voltage must be in agreement with the unit nameplate power requirements and with the unit nameplate power requirements and within the range shown below:

Nominal Voltage	Minimum Supply Voltage	Maximum Supply Voltage
208 / 230	197	253
460	414	506

Voltage Balance: The supply voltage shall be unbalance (phase to phase) within 2%. To calculate the percentage of voltage unbalance use the following formula:

$$\text{Percentage Voltage Unbalance} = 100 \times \frac{\text{Max Voltage Deviation From Average}}{\text{Average Voltage}}$$

Example:
L1 – L2 = 220 V
L2 – L3 = 216 V
L1 – L3 = 213 V

Avg. Voltage: *= (220+216+213) / 3*
= 649 / 3
= 216

Max. Deviation from Avg. = 220 – 216 = 4

% Voltage Unbalance = 100 x (4 / 216)
= 400 / 216
= 1.8%

Determine Wire Size: The selection of the appropriate supply wire size is important to the operation of the equipment. When selecting the wire size the following are important elements of the decision:
• The wire size is adequately sized to carry the Minimum Circuit Ampacity (MCA). Refer to the NEC (USA) or CSA (Canada) for wire sizing. The unit MCA for the air handler and the optional electric heat kit can be found on the equipment S&R plate and the following table.

Air handler	VOLTAGE	HEAT KIT	MCA
DAQ090 and DAQ120	208 / 230	None	15.5 / 15.5
		AHKD15-3A	54.8 / 60.6
		AHKD20-3A	67.3 / 75.0
		AHKD30-3A	92.3 / 104
	460	None	5.2
		AHKD15-4A	27.3
		AHKD20-4A	34.6
		AHKD30-4A	49.1

WIRE SIZING

Wire size is important to the operation of your equipment. Use the following check list when selecting the appropriate wire size for your unit.
• Wire size must carry the Minimum Circuit Ampacity (MCA).
• Refer to the NEC (USA) or CSA (Canada) for wire sizing. The unit MCA for the air handler and the optional electric heat kit can be found on the unit Series and Rating Plate.
• Wire size allows for no more than a 2% voltage drop from the building breaker/fuse panel to the unit.
Refer to the latest edition of the National Electric Code or in Canada the Canadian Electric Code when determining the correct wire size. The following table shows the current carrying capabilities for copper conductors rated at 75°C with a 2% voltage drop. Use this table determine the voltage drop per foot of various conductors.

MAXIMUM ALLOWABLE LENGTH IN FEET TO LIMIT VOLTAGE DROP TO 2%

Wire Size	Minimum Circuit Ampacity (MCA)							
(AWG)	10	15	20	25	30	35	40	45
14	77	51	38	NR	NR	NR	NR	NR
12	122	81	61	49	NR	NR	NR	NR
10	193	129	97	77	64	55	NR	NR
8	307	205	154	123	103	88	77	68
6	489	326	244	195	163	140	122	109

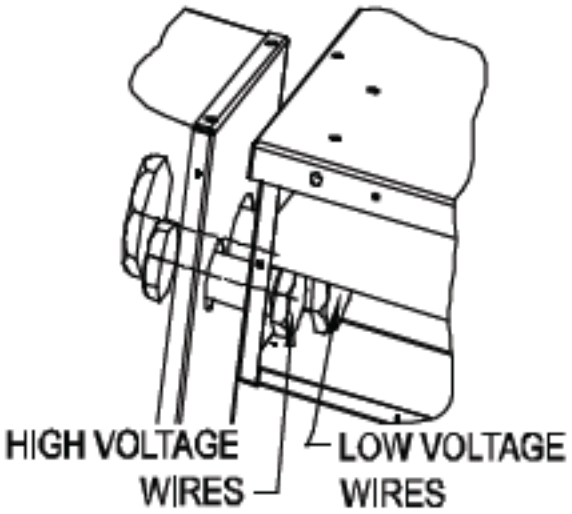
Maximum Overcurrent Protection (MOP)
Every installation must include an NEC (USA) or CEC (Canada) approved overcurrent protection device. Also, check with local or state codes for any special regional requirements.
Full disconnection from the supply mains having contact separation in all poles equivalent to overvoltage III category must be installed in the fixed wiring in accordance with national wiring regulations.
Protection can be in the form of fusing or HACR style circuit breakers. The Series and Rating Plate can be used as a guide for selecting the MAXIMUM overcurrent device or reference the following table.
NOTE: Fuses or circuit breakers are to be sized larger than the equipment MCA but not to exceed the MOP.

Air handler	VOLTAGE	HEAT KIT	MOP
DAQ090 and DAQ120	208 / 230	None	20 / 20
		AHKD15-3A	60 / 70
		AHKD20-3A	70 / 80
		AHKD30-3A	100 / 110
	460	None	15
		AHKD15-4A	30
		AHKD20-4A	35
		AHKD30-4A	50

Electrical Connections

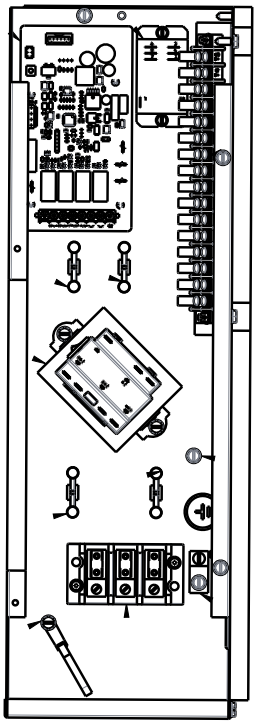
Supply Voltage
USE COPPER CONDUCTORS ONLY.
A single point supply voltage termination is provided in the air handler control box (non-heat kit models) or heat kit control box (heat kit models). This termination is common to both the air handler, and if equipped, heat kit. The wire is to be sized in accordance with the “Electrical Wire and MOP” section of this manual. Reference wiring diagram provided with the unit and this manual for supply voltage connections.

Air Handler Only (Non-Heat Kit Models)
Supply wire is to be routed through conduit from the service disconnect box to the unit. The air handler is equipped with a knockout suitable for ¾” conduit. The following diagram illustrates the supply voltage hook-up.

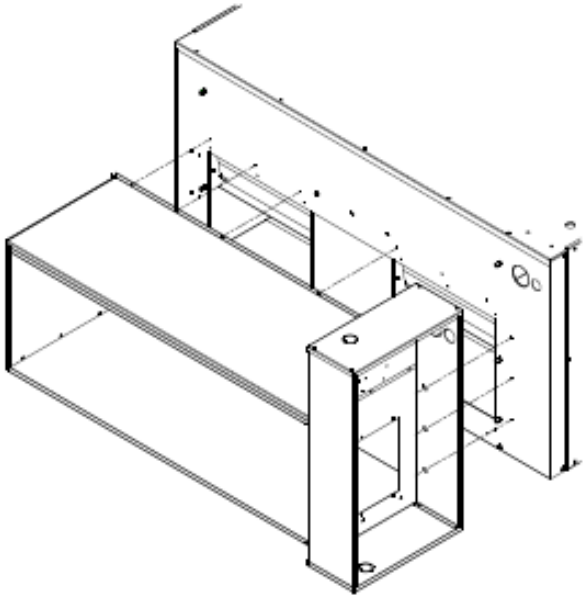


Heater Kit Models
When a heater kit is used the system uses a single point wiring hook-up. The supply wire is to be routed through conduit from the service disconnect box to the heater kit. The heat kit is equipped with a knockout suitable for ½” or ¾” conduit dependent on the KW. The supply voltage is to be installed on the terminal block located in the heater kit control box.
The heater kit is factory equipped with the supply and low voltage wires for the air handler. The low voltage connection from the heater kit is provided through a multipin plug which connects to a mating plug in the air handler.
The high voltage connections are to be made at the air handler contactor. These wires are to be routed through the pipe nipples supplied with the heater kit as shown in the illustration:


[symbol ISO 7000-0790 (2004-01)]
read operator's manual
[symbol IEC 60417-5180 (2003-02)]
Class III appliance



Low Voltage Connections
The 24V-control voltage connects the air handler to the room thermostat and condenser. These models are designed for use with a two-stage thermostat. Low voltage wiring is to be copper conductors, and be a minimum of 18AWG. A provision on the cabinet side to accept the low voltage wiring is provided. See the system wiring diagram for typical low voltage connections.
Heat Kit Installation
Inspect for Shipping Damage. The heat kit is an optional accessory that is shipped separately from the air handler. Inspect the heat kit for damage and report any damage to the carrier and/or distributor. Do not install this accessory if it is determined that the integrity or safety has been compromised by freight damage.
Check the Nameplate. From the heat kit nameplate check the following:
• The model number agrees with the approved models (see the “Electric Heat” section of this manual).
• The correct size (kW)
• Electric characteristics, voltage and phase, agree with the building electrical supply.
• Attaching the Heat Kit: The heat kit attaches directly to the top panel (when viewed in the upflow position) of the air handler. Do not screw the heat kit into the duct flanges. See the following drawing for details:



The wires from the heat kit are to be routed through the pipe nipple into the air handler electrical compartment. See the “Electrical Connection” section of this manual for wiring details.

Refrigerant Lines

WARNING

THIS PRODUCT IS FACTORY-SHIPPED UNDER PRESSURE. FOLLOW THESE INSTRUCTIONS TO PREVENT INJURY.

WARNING

A QUENCHING CLOTH IS STRONGLY RECOMMENDED TO PREVENT SCORCHING OR MARRING OF THE EQUIPMENT FINISH WHEN WELDING CLOSE TO THE PAINTED SURFACES. USE BRAZING ALLOY OF 5% MINIMUM SILVER CONTENT.

Tubing Preparation
All cut ends are to be round, burr free, and clean. Failure to follow this practice increases the chances for refrigerant leaks. The suction line is spun closed and requires pipe cutters to remove the closed end.

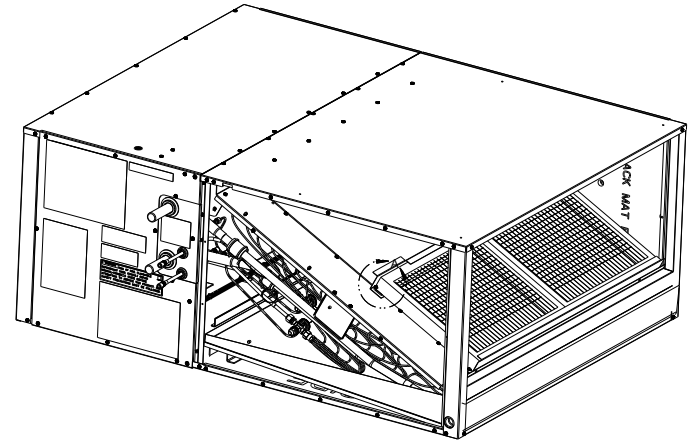
Post Brazing
Quench all welded joints with water or a wet rag.
The maximum allowable pressure shall be considered when connecting to a condenser or evaporator units.

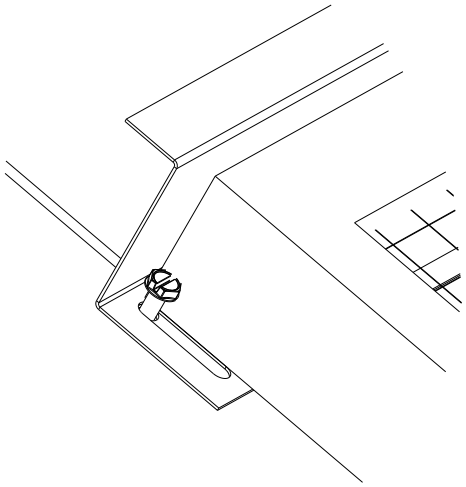
Piping Size
For the correct tubing size, follow the specification for the condenser/heat pump in TP-111 Long Line Set Application R-32.

The suction and liquid lines must be manifolded together. See the DAQ Instalation Manual for additional details

If these few precautions are observed and maintained, this air handler can provide years of trouble free service.

Clean Indoor Coil (Qualified Servicer Only)
Before cleaning the indoor coil, A2L sensor must be removed from the unit to avoid damage and contamination. Air filters should also be removed before performing maintenance. The coil with the filtered air flowing over it should be inspected and cleaned as frequently as necessary to keep the finned areas free of debris. Any air blowing or water rinsing should be performed from inside-out (opposite operating airflow direction) to prevent damage to the tube, fin coil and any other components. Prior to resuming unit operation, ensure to reinstall the A2L sensor.





Refrigerant Detection System (RDS)

RDS Function
The mitigation system is a stationary device that detects the presence of R-32 refrigerant above 25% LFL using refrigerant sensors and then initiates mitigation actions. The mitigation system's primary function is to reduce the concentration of leaked R-32 refrigerant to prevent serious safety hazards. The mitigation actions are accomplished by halting HVAC operation and continuing indoor blower operation to provide airflow. Once refrigerant concentration reaches below a safe threshold, the unit will remain in mitigation mode for five minutes to evacuate any remaining R-32 refrigerant within the unit. Upon completion, the unit will resume its normal operation.

RDS Operation
The mitigation system is controlled by a refrigerant sensor(s), which is secured to a designated location(s) for active monitoring. If a leak is detected, HVAC operation is disabled and the indoor blower fan is activated, providing airflow at or above the minimum required airflow to evacuate excess concentration. If a Zone Control system is installed in the ductwork attached to this system, the Zone controller must be powered through a Daikin Zoning/ Accessory PCB to ensure that the Zoning Dampers open during mitigation mode to provide ventilation throughout all ducting. If the unit is installed with a communicating thermostat, the thermostat will display relevant alerts/ information concerning mitigation mode. Once sensors read concentration levels below a safe threshold, a five minute timer will initiate. Once the time is over, the unit will resume its normal operation. If the sensors detect another concentration excess, the unit will go back into mitigation mode and will repeat the same process.

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 labeled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressurere-lief 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 the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders. If compressors or compressor oils are to be removed,ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The compressor body shall not be heated by an open

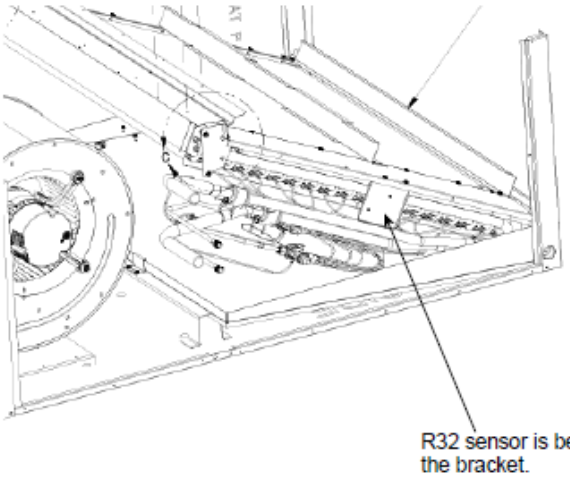
flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

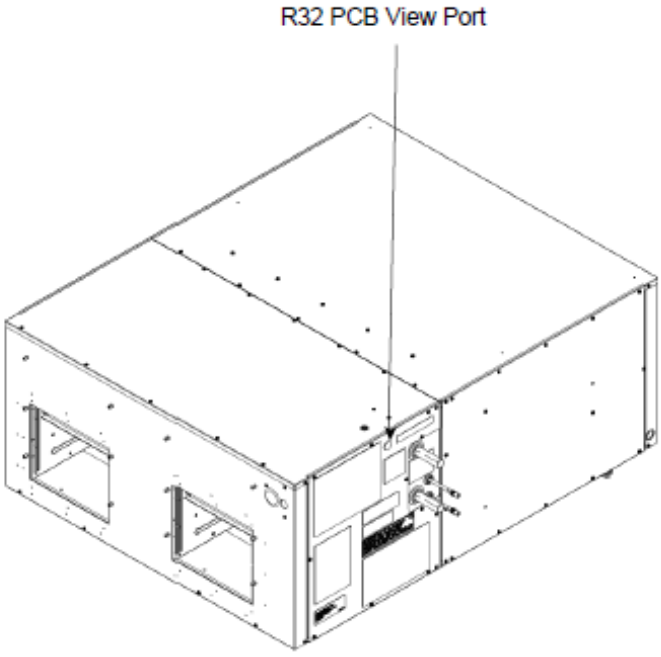
Servicing Measures for the Refrigerant Detection System:

Before servicing, identify the mode of operation of the system by reading the LED flashing pattern through the view port in the cabinet panel and matching the LED flashing pattern with mode of operation in the REFRIGERANT DETECTION SYSTEM TROUBLESHOOTING GUIDE RDS PCB Fault Code table) After identifying the mode of operation, take recommended actions as specified in the Recommended Actions for PCB LED Flashing Codes table.

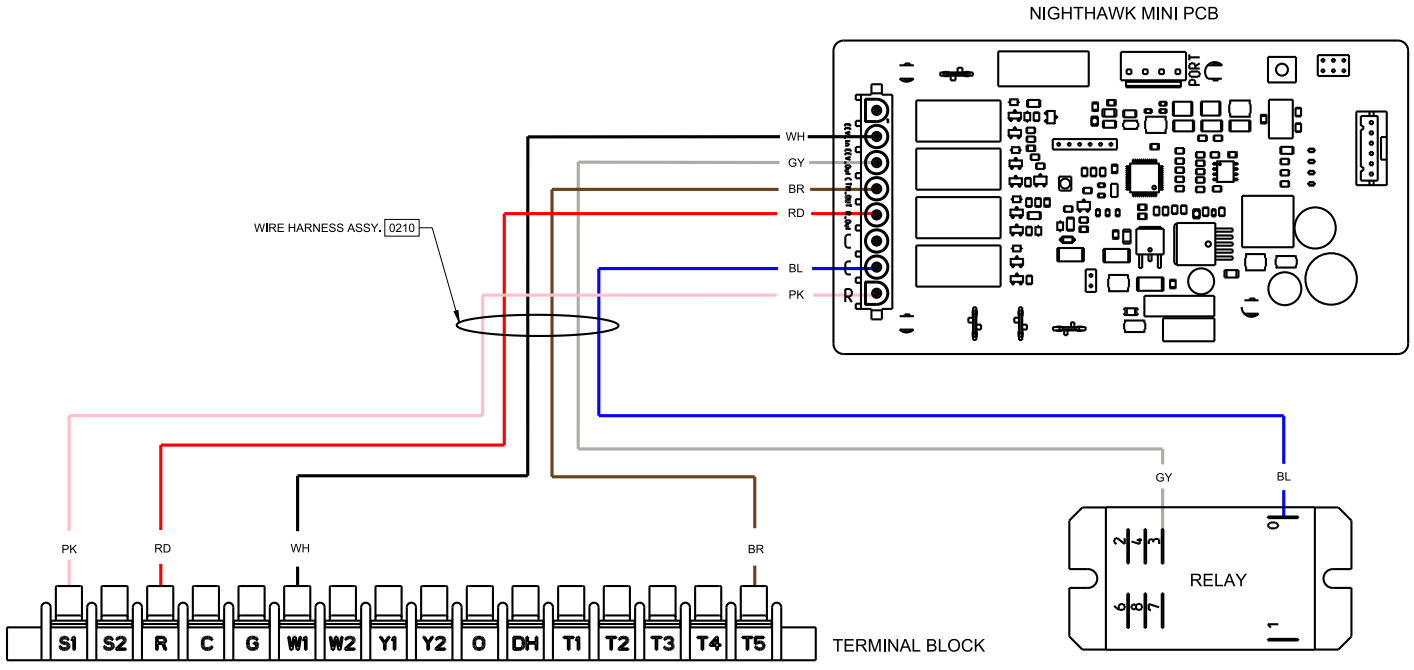
LED STATUS	
MODE	**LED FLASHING PATTERN**
NORMAL OPERATION	SLOW LED FLASHING PATTERN (2 SECONDS ON 2 SECONDS OFF)
R-32 LEAK ALARM	FAST LED FLASHING PATTERN
DELAY MODE	LED WILL BE ON CONTINUOUSLY
SYSTEM VERIFICATION MODE	FAST LED FLASHING PATTERN
CONTROL BOARD INTERNAL FAULT	LED WILL FLASH 2 TIMES AND THEN BE OFF FOR 5 SECONDS
R32 SENSOR COMMUNICATION FAULT	LED WILL FLASH 3 TIMES AND THEN BE OFF FOR 5 SECONDS
R32 SENSOR FAULT	LED WILL FLASH 4 TIMES AND THEN BE OFF FOR 5 SECONDS

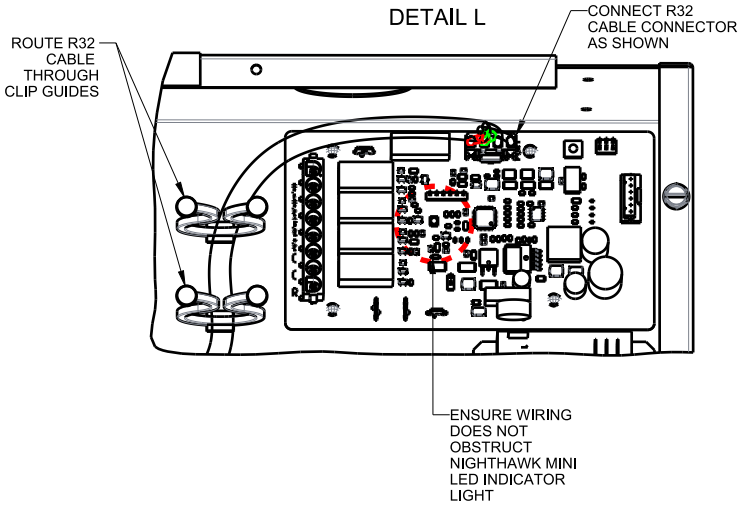
RDS PCB Fault Code Table

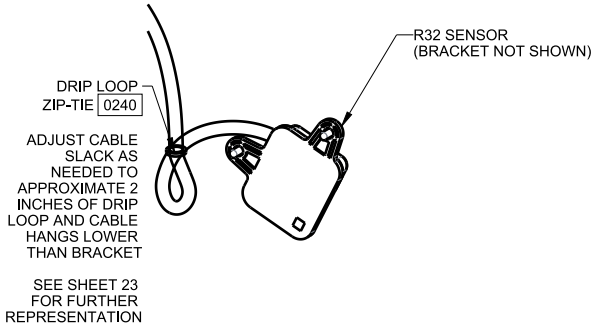




24VAC LOW VOLTAGE CONTROL WIRING







TROUBLESHOOTING CODE

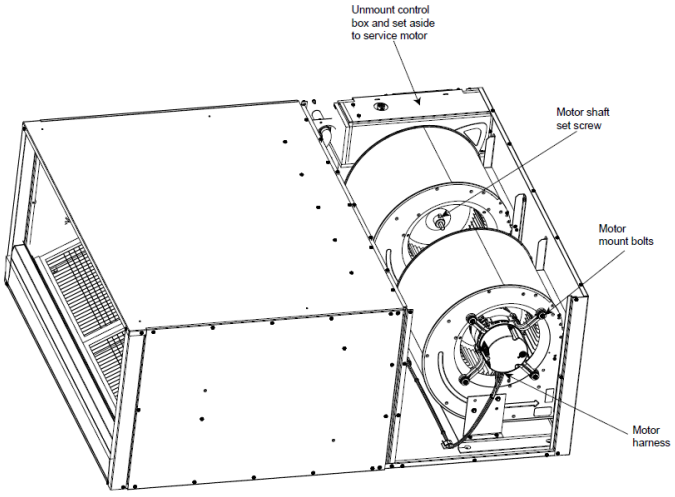
LED TROUBLESHOOT STATUS					
	MODE	DEFINITION	LED FLASHING PATTERN	RECOMMENDED ACTIONS	NOTES
1	Normal Operation	No faults to report.	Slow LED flashing pattern (2 seconds on and 2 seconds off)	No actions needed.	
2	R32 Leak Alarm	R32 leak is currently being detected.	Fast LED Flashing Pattern	A technician will need to find where the refrigerant leak and address it. Unit shall be thawed before servicing.	In terms of the controls, no action is needed. The controls and sensor are working fine.
3	Delay Mode	After R32 leak or alarm has been cleared, the unit will remain in alarm mode for 5 minutes before returning to normal operation.	LED will be on continuously	No action needed - If the system was previously experiencing an actual R32 Leak, the refrigerant can no longer be detected by the sensor meaning it's either gone and the system won't work anymore or there was a false alarm. If the system was experiencing a Fault, the fault is gone and the system will return to normal operation in 5 min.	After any alarm or fault, it is required to remain in R32 mitigation mode for 5 minutes.
4	System Verification Mode	Manual test run by contractor to simulate R32 Leak Alarm (test will last for 5 minutes max).	Fast LED Flashing Pattern	No actions needed.	To enter system verification test mode, press the button on the control 2 times within 5 seconds. The control will enter a simulated R32 Leak Alarm state and remain in that mode for 5 minutes. After 5 minutes, the control will return to Normal Operation automatically. If the contractor wants to end the test early they need to press the button one time.
5	Control Board Internal Fault	Control board has detected an issue with the R32 detection system.	LED will flash 2 times and then be off for 5 seconds, before repeating pattern	1) Unplug and plug the R32 sensor back in. Cycle power to the system. 2) If the control is in "Normal Operation" or "Delay Mode", there is no more issue. If not, continue with diagnostics 3) Unplug R32 sensor and leave unplugged. Cycle power to the system 4) If the control still displays "Control Board Internal Fault" (2 flash pattern), replace the control. If the control now displays "R32 Sensor Communication Fault" (3 flash pattern), replace the sensor.	This error could indicate an on board relay failure or a short with the sensor communications. A sensor communication short could occur on the board itself or external to the board. These steps will determine if the error is on the board or external to the board.
6	R32 Sensor Communication Fault	Control board does not have communications with R32 sensor.	LED will flash 3 times and then be off for 5 seconds, before repeating pattern	1) Unplug and plug the R32 sensor back in. Cycle power to the system. 2) If control is in "Normal Operation" or "Delay Mode", there is no more issue. If not, continue with diagnostics. 3) If the control still displays "R32 Sensor Communication Fault" (3 flash pattern), replace both the sensor and the PCB.	If the control cannot talk to the sensor there could be a problem with the sensor, a problem with the sensor harness or a problem internal to the control. The field will not be able to measure anything to reliably fix this error assuming the connector is properly secured to the control. Replacing both is the only option.
7	R32 Sensor Fault	R32 Sensor has reported an internal issue.	LED will flash 4 times and then be off for 5 seconds, before repeating pattern	Replace R32 sensor.	Communications to the sensor are perfectly fine. The sensor itself is reporting an internal fault.

	warning; flammable materials
	service indicator; read technical manual
	operator's manual; operating instructions
	warning; low burning velocity material
	UN GHS flame symbol

MARKING SYMBOL TABLE

MOTOR REMOVAL

NOTE: Disconnect and lockout/tagout any power source before performing motor/blower replacement.
To service the motor:
1. Remove the split panel exposing the top of the blower housing.
2. Remove the panel on the side which the motor is being serviced.
3. Loosen the setscrew on the motor shaft. Center blower wheel in housing
and torque setscrew to 170 in-lbs on reinstall.
4. Remove the four mounting bolts and harness plug. Torque to 40 in-lbs on
reinstall.
5. Slide the motor out.
6. Reverse steps 5 through 6 with new motor.



Checking Transformer And Control Circuit

WARNING

HIGH VOLTAGE
Disconnect ALL power before servicing or installing this unit. Multiple power sources may be present. Failure to do so may cause property damage, personal injury or death.

A step-down transformer (208/240 volt primary to 24 volt secondary) is provided with each indoor unit. This allows ample capacity for use with resistance heaters. The outdoor sections do not contain a transformer (see note below).

WARNING

Disconnect ALL power before servicing.

1. Remove control panel cover, or etc., to gain access to transformer.

With power ON:

WARNING

Line voltage now present.

2. Using a voltmeter, check voltage across secondary voltage side of transformer (R to C).
3. No voltage indicates faulty transformer, bad wiring, or bad splices.
4. Check transformer primary voltage at incoming line voltage connections and/or splices.
5. If line voltage available at primary voltage side of transformer and wiring and splices good, transformer is inoperative. Replace.

S-8 CHECKING CONTACTOR CONTACTS

WARNING

Disconnect ALL power before servicing.

SINGLE PHASE:

1. Disconnect the wire leads from the terminal (T) side of the contactor.
2. With power ON, energize the contactor.

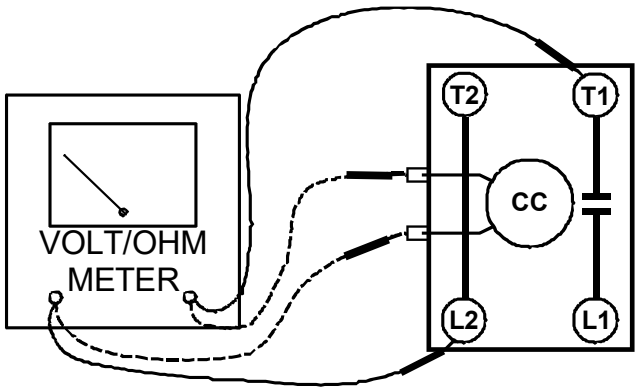
WARNING

Line voltage now present.

3. Using a voltmeter, test across terminals.
   D. L2 - T1 - No voltage indicates CC1 contacts open.

If a no voltage reading is obtained - replace the contactor.

SERVICING

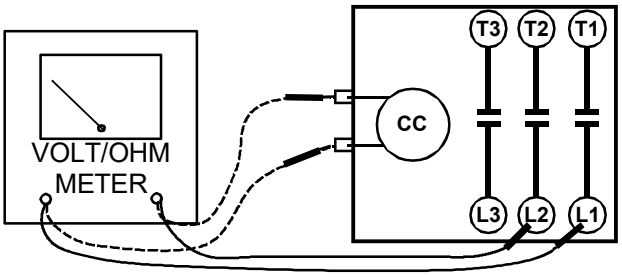


TESTING COMPRESSOR CONTACTOR (SINGLE PHASE)

THREE PHASE

Using a voltmeter, test across terminals:

A. L1-L2, L1-L3, and L2-L3 - If voltage is present, proceed to B. If voltage is not present, check breaker or fuses on main power supply.
B. T1-T2, T1-T3, and T2-T3 - If voltage readings are not the same as in "A", replace contactor.



TESTING COMPRESSOR CONTACTOR (THREE-PHASE)

S-12 CHECKING HIGH PRESSURE CONTROL

WARNING

HIGH VOLTAGE
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

The high pressure control capillary senses the pressure in the compressor discharge line. If abnormally high condensing pressures develop, the contacts of the control open, breaking the control circuit before the compressor motor overloads. This control is automatically reset.

Test 1. Testing High Pressure Control in Cooling Mode
1. Connect refrigerant gages to unit.
2. Disconnect power to outdoor unit.
3. Remove control panel cover.
4. Disconnect black wire from condenser fan motor (single stage units) or remove plug from control board on 2 stage units. NOTE: Tape or isolate black wire to prevent possible short.
5. Apply power to unit and set thermostat to heat and set for call for heat.
6. High pressure switch should open at 660 PSIG +/- 10 PSIG and close at 420 PSIG +/- 25 PSIG.
7. If high pressure switch does not operate in these parameters replace switch.

Test 2. Testing High Pressure Control in Heating Mode
1. Connect refrigerant gages to unit.
2. Disconnect power to indoor unit.
3. Remove control panel cover.
4. Disconnect black wire from evaporator fan motor (single stage units) or remove plug from control board on 2 stage units. NOTE: Tape or isolate black wire to prevent possible short.
5. Apply power to unit and set thermostat to heat and set for call for heat.

WARNING

LINE VOLTAGE NOW PRESENT.

With power ON:

6. High pressure switch should open at 660 PSIG +/- 10 PSIG and close at 420 PSIG +/- 25 PSIG.
7. If high pressure switch does not operate in these parameters replace switch.

S-12 CHECKING LOW PRESSURE CONTROL

Test 1. Testing Low Pressure Control in Cooling Mode
1. Connect refrigerant gages to unit.
2. Disconnect power to indoor unit.
3. Remove control panel cover.
4. Disconnect black wire from evaporator fan motor (single stage units) or remove plug from control board on 2 stage units. NOTE: Tape or isolate black wire to prevent possible short.

SERVICING

WARNING

HIGH VOLTAGE
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

5. Apply power to unit and set thermostat to cool and set for a call for cool.
6. The low pressure switch should open at 55 PSIG, and auto reset (close) at approximately 95 PSIG for cooling units only. For heat pumps the low pressure switch should open at 22 PSIG, and auto reset (close) at approximately 50 PSIG
7. If low pressure switch does not operate in these parameters replace switch.

Test 2. Testing Low Pressure Control in Cooling Mode
1. Connect refrigerant gages to unit.
2. Disconnect power to indoor unit.
3. Remove control panel cover.
4. Disconnect black wire from evaporator fan motor (single stage units) or remove plug from control board on 2 stage units. NOTE: Tape or isolate black wire to prevent possible short.

WARNING

HIGH VOLTAGE
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

5. Apply power to unit and set thermostat to cool and set for a call for cool.
6. The low pressure switch should open at 55 PSIG, and auto reset (close) at approximately 95 PSIG for cooling units only. For heat pumps the low pressure switch should open at 22 PSIG, and auto reset (close) at approximately 50 PSIG
7. If low pressure switch does not operate in these parameters replace switch.

Note: Disconnect all line voltage and lock/tag out before replacing any electric components

Instruction to replace A2L PCB (See pg 26 for wiring):
Take off the blower access panel, disconnect the PCB harness and R32 sensor wire connected to the PCB, detach the defective PCB from the 4 plastic standoffs, install new PCB on 4 plastic standoffs which is installed on metal bracket, re-connect the PCB harness and R32 sensor wire to the new PCB per wiring instruction as attached to the equipment, reassemble the blower access panel to the unit.

Instruction to replace R32 sensor:
Take off the blower access panel, coil access panel, and control box cover. Disconnect the R32 sensor wire from the A2L PCB, take off sensor bracket assembly from the coil end plate. Remove screw and non-functioning R32 sensor from the sensor bracket, install new R32 sensor and screws to sensor bracket, re-install A2L sensor bracket. Connect the sensor wires to the A2L PCB and re-install the panels.

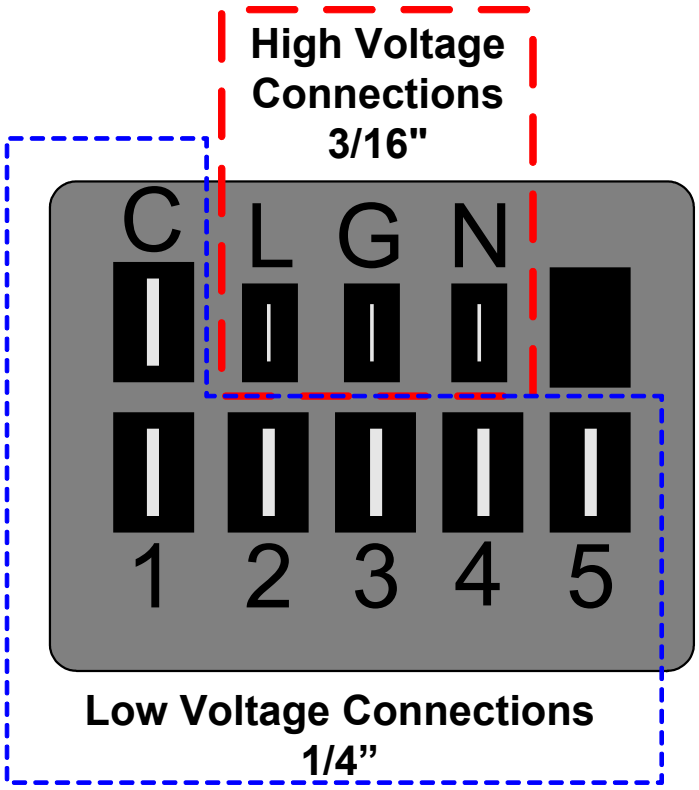
IMPORTANT NOTE: The R32 Sensor shall only be replaced with sensors specified by the appliance manufacturer.

Checking High Efficiency Motors
The motor is a one piece, fully encapsulated, 3 phase brushless DC (single phase AC input) motor with ball bearing construction.

1. Using a voltmeter, check for 230 or 460 volts (depending on unit voltage) to the motor connections L and N. If 230/460 volts is present, proceed to step 2. If 230/460 volts is not present, check the line voltage circuit to the motor.
2. Using a voltmeter, check for 24 volts from terminal C to either terminal 1, 2, 3, 4, or 5, depending on which tap is being used, at the motor. If voltage present, proceed to step 3. If no voltage, check 24 volt circuit to motor.
3. If voltage was present in steps 1 and 2, the motor has failed and will need to be replaced.

NOTE: When replacing motor, ensure the belly band is between the vents on the motor and the wiring has the proper drip loop to prevent condensate from entering the motor.

SERVICING



MOTOR CONNECTIONS

S-17 CHECKING COMPRESSOR

WARNING

HERMETIC COMPRESSOR ELECTRICAL TERMINAL VENTING CAN BE DANGEROUS. WHEN INSULATING MATERIAL WHICH SUPPORTS A HERMETIC COMPRESSOR OR ELECTRICAL TERMINAL SUDDENLY DISINTEGRATES DIE TO PHYSICAL ABUSE OR AS A RESULT OF AN ELECTRICAL SHORT BETWEEN THE TERMINAL AND THE COMPRESSOR HOUSING, THE TERMINAL MAY BE EXPELLED, VENTING THE VAPOR AND LIQUID CONNECTS OF THE COMPRESSOR HOUSING AND SYSTEM.

If the compressor terminal PROTECTIVE COVER and gasket (if required) are not properly in place and secured, there is a remote possibility if a terminal vents, that the vaporous and liquid discharge can be ignited, spouting flames several feet, causing potentially severe or fatal injury to anyone in its path.

This discharge can be ignited external to the compressor if the terminal cover is not properly in place and if the discharge impinges on a sufficient heat source.

Ignition of the discharge can also occur at the venting terminal or inside the compressor, if there is sufficient contaminant air present in the system and an electrical arc occurs as the terminal vents.

Ignition cannot occur at the venting terminal without the presence of contaminant air, and cannot occur externally from the venting terminal without the presence of an external ignition source.

Therefore, proper evacuation of a hermetic system is essential at the time of manufacture and during servicing.

To reduce the possibility of external ignition, all open flame, electrical power, and other heat sources should be extinguished or turned off prior to servicing a system.

S-17A RESISTANCE TEST

Each compressor is equipped with an internal overload.

The line break internal overload senses both motor amperage and winding temperature. High motor temperature or amperage heats the disc causing it to open, breaking the common circuit within the compressor on single phase units.

Heat generated within the compressor shell, usually due to recycling of the motor, high amperage or insufficient gas to cool the motor, is slow to dissipate. Allow at least three to four hours for it to cool and reset, then retest.

Fuse, circuit breaker, ground fault protective device, etc. has not tripped.

WARNING

HIGH VOLTAGE
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

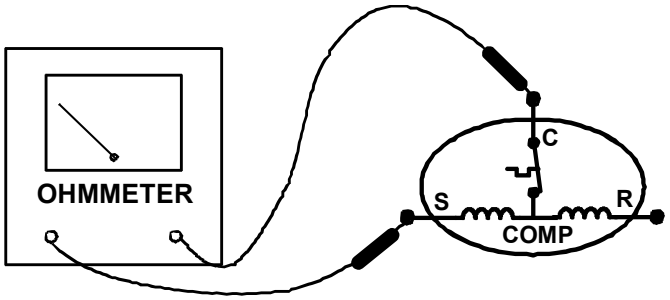
1. Remove the leads from the compressor terminals.

WARNING

SEE WARNINGS S-17 BEFORE REMOVING COMPRESSOR TERMINAL COVER.

2. Using an ohmmeter, test continuity between terminals S-R, C-R, and C-S, on single phase units or terminals T2, T2 and T3, on 3 phase units.

SERVICING



TESTING COMPRESSOR WINDINGS

If either winding does not test continuous, replace the compressor.

NOTE: If an open compressor is indicated, allow ample time for the internal overload to reset before replacing compressor.

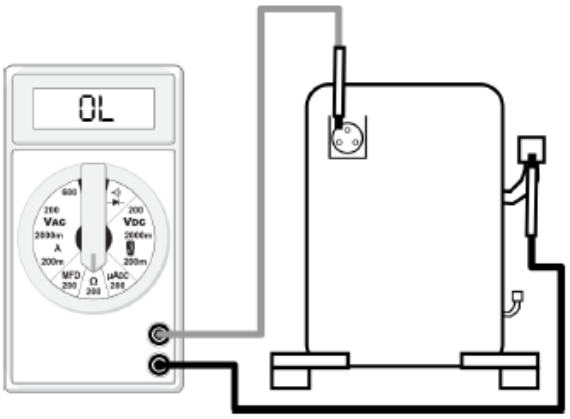
S-17B GROUND TEST

If fuse, circuit breaker, ground fault protective device, etc., has tripped, this is a strong indication that an electrical problem exists and must be found and corrected. The circuit protective device rating must be checked, and its maximum rating should coincide with that marked on the equipment nameplate.

With the terminal protective cover in place, it is acceptable to replace the fuse or reset the circuit breaker ONE TIME ONLY to see if it was just a nuisance opening. If it opens again, DO NOT continue to reset.

Disconnect all power to unit, making sure that **all** power legs are open.

1. DO NOT remove protective terminal cover. Disconnect the three leads going to the compressor terminals at the nearest point to the compressor.
2. Identify the leads and using an ohmmeter on the R x 10,000 scale or the highest resistance scale on your ohmmeter check the resistance between each of the three leads separately to ground (such as an unpainted tube on the compressor).
3. If a ground is indicated, then carefully remove the compressor terminal protective cover and inspect for loose leads or insulation breaks in the lead wires.
4. If no visual problems indicated, carefully remove the leads at the compressor terminals.
5. Carefully retest for ground, directly between compressor terminals and ground.
6. If ground is indicated, replace the compressor. The resistance reading should be infinity. If there is any reading on meter, there is some continuity to ground and compressor should be considered defective.



COMPRESSOR GROUND TEST

WARNING

DAMAGE CAN OCCUR TO THE GLASS EMBEDDED TERMINALS IF THE LEADS ARE NOT PROPERLY REMOVED. THIS CAN RESULT IN TERMINAL AND HOT OIL DISCHARGING.

S-18 TESTING CRANKCASE HEATER (OPTIONAL ITEM)

The crankcase heater must be energized a minimum of four (4) hours before the condensing unit is operated.

Crankcase heaters are used to prevent migration or accumulation of refrigerant in the compressor crankcase during the off cycles and prevents liquid slugging or oil pumping on start up.

A crankcase heater will not prevent compressor damage due to a floodback or over charge condition.

WARNING

DISCONNECT ALL POWER BEFORE SERVICING.

1. Disconnect the heater lead in wires.
2. Using an ohmmeter, check heater continuity - should test continuous. If not, replace.

The condition of the scroll flanks is checked in the following manner.

1. Attach gauges to the high and low side of the system.
2. Start the system and run a “Cooling Performance Test.

If the test shows:

A. Below normal high side pressure.
B. Above normal low side pressure.
C. Low temperature difference across coil.
D. Low amp draw at compressor.

And the charge is correct. The compressor is faulty - replace the compressor.

S-21 Checking Reversing Valve And Solenoid

Occasionally the reversing valve may stick in the heating or cooling position or in the mid-position.

When stuck in the mid-position, part of the discharge gas from the compressor is directed back to the suction side, resulting in excessively high suction pressure. An increase in the suction line temperature through the reversing valve can also be measured. Check operation of the valve by starting the system and switching the operation from COOLING to HEATING cycle.

If the valve fails to change its position, test the voltage (24V) at the valve coil terminals, while the system is on the COOLING cycle.

If no voltage is registered at the coil terminals, check the operation of the thermostat and the continuity of the connecting wiring from the “O” terminal of the thermostat to the unit.

If voltage is registered at the coil, tap the valve body lightly while switching the system from HEATING to COOLING, etc. If this fails to cause the valve to switch positions, remove the coil connector cap and test the continuity of the reversing valve solenoid coil. If the coil does not test continuous - replace it.

If the coil test continuous and 24 volts is present at the coil terminals, the valve is inoperative - replace it.

TROUBLESHOOTING THE REVERSING VALVE FORELECTRICAL FAILURE

1. Place unit into the cooling mode. Test for 24 volts at the Solenoid. If there is no voltage present at coil, check The control voltage.
2. If voltage is present, loosen the nut on the top of the Coil. Remove the coil, there should be slight resistance.
3. If the slight resistance is felt, remove the coil. As you Remove the coil listen carefully, an audible click should Be detected. The clicking is due to the movement of the Pilot valve plunger. The absence of a clicking sound Indicates the plunger is stuck.

Troubleshooting Mechanical Failures on a Reversing Valve by Pressure

1. Troubleshooting the reversing valve can be done by pressure and temperature readings

2. Raise the head pressure. In the cooling mode block the fan exhaust. Once head pressure has been raised, cycle between cooling and heating and see if the piston can be freed.

Troubleshooting Mechanical Failures on a Reversing Valve by Temperature

1. When operating properly the valve contains refrigerant gases at certain temperatures.
2. The discharge line should be the same temperature after the valves discharge line.
3. The true suction should be the same as the suction line after the valve. If there is more than a 4-degree difference, valve is leaking

When stuck in the mid-position, part of the discharge gas from the compressor is directed back to the suction side, resulting in excessively high suction pressure. An increase in the suction line temperature through the reversing valve can also be measured. Check operation of the valve by starting the system and switching the operation from COOLING to HEATING cycle.
If the valve fails to change its position, test the voltage (24V) at the valve coil terminals, while the system is on the COOLING cycle.

If no voltage is registered at the coil terminals, check the operation of the thermostat and the continuity of the connecting wiring from the “O” terminal of the thermostat to the unit.

If voltage is registered at the coil, switch the system from HEATING to COOLING several times. If this fails to cause the valve to switch positions, remove the coil connector cap and test the continuity of the reversing valve solenoid coil. If the coil does not test continuous - replace it.

If the coil test continuous and 24 volts is present at the coil terminals, the valve is inoperative - replace it.

S-24 Testing Defrost Control

To check the defrost control for proper sequencing, proceed as follows: With power ON; unit not running.

1. Jumper defrost thermostat by placing a jumper wire across the terminals “DFT” and “R” at defrost control board.
2. Connect jumper across test pins on defrost control board.
3. Set thermostat to call for heating. System should go into defrost within 21 seconds.
4. Immediately remove jumper from test pins.

5. Using VOM check for voltage across terminals “C & O”. Meter should read 24 volts.
6. Using VOM check for voltage across fan terminals DF1 and DF2 on the board. You should read line voltage (208-230 VAC) indicating the relay is open in the defrost mode.
7. Using VOM check for voltage across “W2 & C” terminals on the board. You should read 24 volts.
8. If not as above, replace control board.
9. Set thermostat to off position and disconnect power before removing any jumpers or wires.

NOTE: Remove jumper across defrost thermostat before returning system to service.

S-25 Testing Defrost Thermostat

1. Install a thermocouple type temperature test lead on the tube adjacent to the defrost control. Insulate the lead point of contact.
2. Check the temperature at which the control closes its contacts by lowering the temperature of the control. On 2 and 2.5 ton units, it should close at 34°F ± 5°F. On 3 thru 5 ton units, it should close at 31°F ± 3°F.
3. Check the temperature at which the control opens its contacts by raising the temperature of the control. On 2 and 2.5 ton units, it should open at 60°F ± 5°F. On 3 thru 5 ton units, it should open at 75°F ± 6°F.
4. If not as above, replace control.

TROUBLESHOOTING

THE FOLLOWING INFORMATION IS FOR USE BY QUALIFIED SERVICE AGENCY ONLY: OTHERS SHOULD NOT ATTEMPT TO SERVICE THIS EQUIPMENT.

Common Causes of Unsatisfactory Operation of Heat Pump on the Heating Cycle.

CHECKING HEATER ELEMENTS

Optional electric heaters may be added, in the quantities shown in the spec sheet for each model unit, to provide electric resistance heating. Under no condition shall more heaters than the quantity shown be installed.

WARNING

HIGH VOLTAGE
Disconnect ALL power before servicing or installing this unit. Multiple power sources may be present. Failure to do so may cause property damage, personal injury or death.

1. Disassemble and remove the heating element(s).
2. Visually inspect the heater assembly for any breaks in the wire or broken insulators.
3. Using an ohmmeter, test the element for continuity - no reading indicates the element is open. Replace as necessary.

CHECKING HEATER LIMIT CONTROL(S)
(OPTIONAL ELECTRIC HEATERS)

Each individual heater element is protected with an automatic rest limit control connected in series with each element to prevent overheating of components in case of low airflow. This limit control will open its circuit at approximately 150°F. to 160°F and close at approximately 110°F.

WARNING

Disconnect ALL power before servicing.

1. Remove the wiring from the control terminals.
2. Using an ohmmeter test for continuity across the normally closed contacts. No reading indicates the control is open - replace if necessary. Make sure the limits are cool before testing.

IF FOUND OPEN - REPLACE - DO NOT WIRE AROUND.

CHECKING HEATER FUSE LINK (OPTIONAL ELECTRIC HEATERS)

Each individual heater element is protected with a one time fuse link which is connected in series with the element. The fuse link will open at approximately 333°.

WARNING

Disconnect ALL power before servicing.

1. Remove heater element assembly so as to expose fuse link.
2. Using an ohmmeter, test across the fuse link for continuity - no reading indicates the link is open. Replace as necessary.

   NOTE: The link is designed to open at approximately 333°F. DO NOT WIRE AROUND - determine reason for failure.

REFRIGERATION REPAIR PRACTICE

SERVICING

DANGER

ALWAYS REMOVE THE REFRIGERANT CHARGE IN A PROPER MANNER BEFORE APPLYING HEAT TO THE SYSTEM,

When repairing the refrigeration system:

WARNING

HIGH VOLTAGE
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

1. Never open a system that is under vacuum. Air and moisture will be drawn in.
2. Plug or cap all openings.
3. Remove all burrs and clean the brazing surfaces of the tubing with sand cloth or paper. Brazing materials do not flow well on oxidized or oily surfaces.
4. Clean the inside of all new tubing to remove oils and pipe chips.
5. When brazing, sweep the tubing with dry nitrogen to prevent the formation of oxides on the inside surfaces.
6. Complete any repair by replacing the liquid line drier in the system, evacuate and charge.

BRAZING MATERIALS

IMPORTANT NOTE: Torch heat required to braze tubes of various sizes is proportional to the size of the tube. Tubes of smaller size require less heat to bring the tube to brazing temperature before adding brazing alloy. Applying too much heat to any tube can melt the tube. Service personnel must use the appropriate heat level for the size of the tube being brazed.

NOTE: The use of a heat shield when brazing is recommended to avoid burning the serial plate or the finish on the unit. Heat trap or wet rags should be used to protect heat sensitive components such as service valves and TXV valves.

Copper to Copper Joints - Sil-Fos used without flux (alloy of 15% silver, 80% copper, and 5% phosphorous). Recommended heat 1400°F.

Copper to Steel Joints - Silver Solder used without a flux (alloy of 30% silver, 38% copper, 32% zinc). Recommended heat - 1200°F.

S-101 LEAK TESTING (NITROGEN OR NITROGEN-TRACED)

WARNING

TO AVOID THE RISK OF FIRE OR EXPLOSION, NEVER USE OXYGEN, HIGH PRESSURE AIR OR FLAMMABLE GASES FOR LEAK TESTING OF A REFRIGERATION SYSTEM.

WARNING

TO AVOID POSSIBLE EXPLOSION, THE LINE FROM THE NITROGEN CYLINDER MUST INCLUDE A PRESSURE REGULATOR AND A PRESSURE RELIEF VALVE. THE PRESSURE RELIEF VALVE MUST BE SET TO OPEN AT NO MORE THAN 450 PSIG.

Pressure test the system using dry nitrogen and soapy water to locate leaks. If you wish to use a leak detector, charge the system to 10 psi using the appropriate refrigerant (see Serial Data Plate for refrigerant identification). Do not use an alternative refrigerant. Using dry nitrogen finish charging the system to 450 PSIG. Apply the leak detector to all suspect areas.
When leaks are discovered, repair the leaks, and repeat the pressure test. If leaks have been eliminated proceed to system evacuation.

System Evacuation
Condensing unit liquid and suction valves are closed to contain the charge within the unit. The unit is shipped with the valve stems closed and caps installed. Do not open valves until the system is evacuated.

WARNING

REFRIGERANT UNDER PRESSURE!
FAILURE TO FOLLOW PROPER PROCEDURES MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

NOTE: Scroll compressors should never be used to evacuate or pump down a heat pump or air conditioning system.

SERVICING

Charging

WARNING

REFRIGERANT UNDER PRESSURE!
- **Do not overcharge system with refrigerant.**
- **Do not operate unit in a vacuum or at negative pressure.**

Failure to follow proper procedures may cause property damage, personal injury or death.

CAUTION

Use refrigerant certified to AHRI standards. Used refrigerant may cause compressor damage and is not covered under the warranty. Most portable machines cannot clean used refrigerant to meet AHRI standards.

CAUTION

Damage to the unit caused by operating the compressor with the suction valve closed is not covered under the warranty and may cause serious compressor damage.

Charge the system with the exact amount of refrigerant detailed in the Installation Manual or TP-111. An inaccurately charged system will cause future problems.

NOTE: The outdoor temperature should be 60°F or higher when charging the unit. Charge should always be checked using subcooling when using TXV equipped indoor coil to verify proper charge.

When opening valves with retainers, open each valve only until the top of the stem is 1/8" from the retainer. To avoid loss of refrigerant, DO NOT apply pressure to the retainer. When opening valves without a retainer remove service valve cap and insert a hex wrench into the valve stem and back out the stem by turning the hex wrench counterclockwise. Open the valve until it contacts the

NOTE: These are not back-seating valves. It is not necessary to force the stem tightly against the rolled lip.

Break vacuum by fully opening liquid service valve. After the refrigerant charge has bled into the system, open the suction service valve. The service valve cap is the secondary seal for the valves and must be properly tightened to prevent leaks. Make sure cap is clean and apply refrigerant oil to threads and sealing surface on inside of cap. Tighten cap finger-tight and then tighten additional 1/6 of a turn (1 wrench flat), or to the following specification, to properly seat the sealing surfaces.

If line set exceeds 25 feet in length, refrigerant should be added at the amount specified in the below table based on suction and liquid tube diameters.

NOTE:
1. For any additional charge over 20 lbs add 0.3 oz of compressor oil for each additional lb. of refrigerant
2. Polyol Ester (POE) Oil is used in the scroll compressors. Use Lubrizol, Icematic NXG 5020 (IBC) 999-5171-63 or equivalent.

Be sure to fill out the refrigerant charge label on the lower access panel of the unit. Using a durable marking instrument, fill in the factory charge found on the serial plate of the unit in the first box labeled FACTORY CHARGE. In the next box labeled FIELD CHARGE fill in the amount of charge added to the system. NOTE: The field charge amount may not be finalized until final adjustment. In the third box labeled TOTAL CHARGE add the two amounts in the boxes above.

Line Set Combinations	Refrig. Charge per lineal foot- Liquid & Gas (Oz)	R32 Refrigerant Charge (Oz) for Lineal Line Set Length - (Ft)							
		25	50	75	100	125	150	175	200
5/8 Liquid Line + 1-1/8 Suction Line	1.54	38.5	77.0	115.5	154.0	192.6	231.1	269.6	308.1
5/8 Liquid Line + 1-3/8 Suction Line	1.62	40.4	80.9	121.3	161.7	202.1	242.6	283.0	323.4
5/8 Liquid Line + 1-5/8 Suction Line	1.71	42.7	85.5	128.2	171.0	213.7	256.5	299.2	342.0
Not Recommended									

SERVICING

NOTE: Charge should always be checked using superheat when using a piston and subcooling when using TXV equipped indoor coil to verify proper charge.

Do not introduce liquid refrigerant from the cylinder into the crankcase of the compressor as this may damage the compressor.
1. Break vacuum by fully opening liquid and suction base valves.
2. Set thermostat to call for cooling. Check indoor and outdoor fan operation and allow system to stabilize for 10 minutes for fixed orifices and 10-15 minutes for expansion valves.

Final Charge Adjustment
Airflow and Total Static Pressure for the indoor unit should be verified before attempting to charge system.

1. Total static pressure is .8” WC or less.
2. Airflow is correct for installed unit.
3. Airflow tables are in the installation manual and Spec Sheet for Indoor Unit.
4. Complete charging information are in Service Manual

NOTE: Superheat adjustments should not be made until indoor ambient conditions have stabilized. This could take up to 24 hours depending on indoor temperature and humidity. Before checking superheat run the unit in cooling for 10-15 minutes or until refrigerant pressures stabilize. Use the following guidelines and methods to check unit operation and ensure that the refrigerant charge is within limits. The outdoor temperature must be 60°F or higher. Set the room thermostat to COOL, fan switch to AUTO, and set the temperature control well below room temperature.

Superheat on indoor coils with adjustable TXV valves are factory set and no adjustment is normally required during startup. Only in unique applications due to refrigerant line length, differences in height between the indoor and outdoor unit and refrigerant tubing sizes or poor performance should Superheat setting require adjustment. These adjustments should only be performed by qualified service personnel. For detailed charge and TXV adjustments refer to the appropriate Service Manual.

SATURATED SUCTION PRESSURE TEMPERATURE CHART	
SUCTION PRESSURE	SATURATED SUCTION TEMPERATURE °F
PSIG	R-32
40	-7
42	-6
44	-4
48	-1
50	1
52	2
54	4
56	5
58	6
60	8
62	9
64	10
66	12
68	13
70	14
72	15
74	17
76	18
78	19
80	20
85	23
90	25
95	28
100	30
105	33
110	35
115	37
120	40
125	42
130	44
135	46
140	48
145	50
150	52
155	53
160	55

SATURATED LIQUID PRESSURE TEMPERATURE CHART	
LIQUID PRESSURE	SATURATED SUCTION TEMPERATURE °F
PSIG	R-32
200	68
210	71
220	74
230	77
240	80
250	82
260	85
270	87
280	90
290	92
300	94
310	97
320	99
330	101
340	103
350	105
360	107
370	109
380	111
390	113
400	115
410	117
420	118
430	120
440	122
450	124
460	125
470	127
480	128
490	130
500	132
525	135
550	139
575	143
600	146
625	150

SERVICING

Expansion Valve System
NOTE: Units matched with indoor coils equipped with a TXV should be charged by Subcooling only.
SUBCOOLING FORMULA = SATURATED LIQUID LINE TEMPERATURE - LIQUID LINE TEMPERATURE

NOTE: for two-stage models, unit will need to be charged at high stage.

1. Purge gauge lines. Connect service gauge manifold to base-valve service ports. Run system at least 10 minutes to allow pressure to stabilize.
2. Clamp a pipe clamp thermometer on the liquid line near the liquid line service valve and 4-6” from the compressor on the suction line.
a. Ensure the thermometer makes adequate contact to obtain the best possible readings.
b. The temperature read with the thermometer should be lower than the saturated condensing temperature.
3. The difference between the measured saturated condensing temperature and the liquid line temperature is the liquid Subcooling value.
4. TXV-based systems should have a Subcooling value of 14°F +/- 1°F.
5. Add refrigerant to increase Subcooling and remove refrigerant to decrease Subcooling.

NOTE: Units matched with indoor coils equipped with a TXV should be charged by Subcooling only. Superheat can also be utilized to best verify charge levels with an adjustable TXV and make adjustments when needed in unique applications due to refrigerant line length, differences in height between the indoor and outdoor unit and refrigerant tubing sizes. These adjustments should only be performed by qualified service personnel.

Superheat Adjustment
NOTE: Units matched with indoor coils equipped with a TXV should be charged by Subcooling only.
SUPERHEAT FORMULA = SUCTION LINE TEMPERATURE - SATURATED SUCTION TEMPERATURE

NOTE: for two-stage models, unit will need to be charged at high stage.

1. Clamp a pipe clamp thermometer near the suction line 4-6” after it leaves the indoor unit and before it tees together
a. Ensure the thermometer makes adequate contact for the best possible readings.
b. The temperature read with the thermometer should be higher than the saturated suction temperature.
2. The difference between the measured saturated suction temperature and the suction line temperature is the Superheat value.
3. TXV-based systems should have a Superheat value as shown in the table below.
4. Adjust Superheat by turning the TXV valve stem clockwise to increase and counterclockwise to decrease.
a. If Subcooling and Superheat are low, adjust the TXV to the superheat setting specified in the table below and then check Subcooling.
b. If Subcooling is low and Superheat is high, add charge to raise Subcooling to 10°F +/- 1°F then check Superheat.
c. If Subcooling and Superheat are high, adjust the TXV valve to the superheat specified in the table below then check the Subcooling value.
d. If Subcooling is high and Superheat is low, adjust the TXV valve to the superheat specified in the table below and remove charge to lower the Subcooling to 14°F +/- 1°F.
NOTE: DO NOT adjust the charge based exclusively on suction pressure unless for general charging in the case of a gross undercharge.
NOTE: Check the Schrader ports for leaks and tighten valve cores if necessary. Install caps finger-tight.

Heat Pump - Heating Cycle
The proper method of charging a heat pump in the heat mode is by weight with the additional charge adjustments for line size, line length, and other system components. For best results, on outdoor units with TXVs, superheat should be 8°F +/- 1°F at 4-6” from the compressor. Make final charge adjustments in the cooling cycle. Ensure the charge label has been filled out when final charging is complete. Follow directions in the System Startup section. A final leak test is recommended before leaving the site of installation. When servicing is complete, the red valve caps that are supplied on the valves must be reinstalled finger-tight on the liquid valve, vapor valve, and access port.

Checking Compressor Efficiency
The reason for compressor inefficiency is broken or damaged scroll flanks on Scroll compressors, reducing the ability of the compressor to pump refrigerant vapor.
The condition of the scroll flanks is checked in the following manner.
1. Attach gauges to the high and low side of the system.
2. Start the system and run a “Cooling Performance Test.
If the test shows:
a. Below normal high side pressure.
b. Above normal low side pressure.
c. Low temperature difference across coil.
d. Low amp draw at compressor.
And the charge is correct. The compressor is faulty - replace the compressor.

SERVICING

Overfeeding
Overfeeding by the expansion valve results in high suction pressure, cold suction line, and possible liquid slugging of the compressor

If these symptoms are observed:
1. Check for an overcharged unit by referring the cooling performance charts in the unit specifications.
2. Check the operation of the power element in the valve as explained in Checking Expansion Valve Operation.
3. Check for restricted or plugged equalizer tube.

Underfeeding
Underfeeding by the expansion valve results in low system capacity and low suction pressures.
If these symptoms are observed:
1. Check for a restricted liquid line or drier. A restriction will be indicated by a temperature drop across the drier.
2. Check the operation of the power element of the valve as described in Checking Expansion Valve Operation.
Checking Expansion Valve Operation
1. Remove the remote bulb of the expansion valve from the suction line.
2. Start the system and cool the bulb in a container of ice water, closing the valve. As you cool the bulb, the suction pressure should fall and the suction temperature will rise.
3. Next warm the bulb in your hand. As you warm the bulb, the suction pressure should rise and the suction temperature will fall.
4. If a temperature or pressure change is noticed, the expansion valve is operating. If no change is noticed, the valve is restricted, the power element is faulty, or the equalizer tube is plugged.
5. Capture the charge, replace the valve and drier, evacuate and recharge.

Checking Restricted Liquid Line
When the system is operating, the liquid line is warm to the touch. If the liquid line is restricted, a definite temperature drop will be noticed at the point of restriction. In severe cases, frost will form at the restriction and extend down the line in the direction of the flow.
Discharge and suction pressures will be low, giving the appearance of an undercharged unit. However, the unit will have normal to high subcooling.
Locate the restriction, replace the restricted part, replace drier, evacuate and recharge.
Overcharge Of Refrigerant
An overcharge of refrigerant is normally indicated by an excessively high head pressure.
An evaporator coil, using an expansion valve metering device, will basically modulate and control a flooded evaporator and prevent liquid return to the compressor.

If this system is observed:
1. Start the system.
2. Remove and capture small quantities of gas from the suction line dill valve until the head pressure is reduced to normal.
3. Observe the system while running a cooling performance test. If a shortage of refrigerant is indicated, then the system contains non-condensables.

Non-Condensables
If non-condensables are suspected, shut down the system and allow the pressures to equalize. Wait at least 15 minutes. Compare the pressure to the temperature of the coldest coil since this is where most of the refrigerant will be. If the pressure indicates a higher temperature than that of the coil temperature, non-condensables are present. Non-condensables are removed from the system by first removing the refrigerant charge, replacing and/or installing liquid line drier, evacuating and recharging.

Compressor Burnout
When a compressor burns out, high temperature develops causing the refrigerant, oil and motor insulation to decompose forming acids and sludge.

If a compressor is suspected of being burned-out, attach a refrigerant hose to the liquid line dill valve and properly remove and dispose of the refrigerant.
NOTICE: Violation of EPA regulations may result in fines or other penalties.
Now determine if a burn out has actually occurred. Confirm by analyzing an oil sample using a Sporlan Acid Test Kit, AK-3 or its equivalent.
Remove the compressor and obtain an oil sample from the suction stub. If the oil is not acidic, either a burnout has not occurred or the burnout is so mild that a complete clean-up is not necessary.
If acid level is unacceptable, the system must be cleaned by using the clean-up drier method.

CAUTION

DO NOT ALLOW THE SLUDGE OR OIL TO CONTACT THE SKIN. SEVERE BURNS MAY RESULT.

A burn-out requires the entire tandem assembly to be replaced.

Suction Line Drier Clean-Up Method
The POE oils used with R32 refrigerant is an excellent solvent. In the case of a burnout, the POE oils will remove any burnout residue left in the system. If not captured by the refrigerant filter, they will collect in the compressor or other system components, causing a failure of the replacement compressor and/or spread contaminants throughout the system, damaging additional components. Install a field supplied suction line drier. This drier should

be installed as close to the compressor suction fitting as possible. The filter must be accessible and be rechecked for pressure drop after the system has operated for a time. It may be necessary to use new tubing and form as required.
NOTE: At least twelve (12) inches of the suction line immediately out of the compressor stub must be discarded due to burned residue and contaminates.

1. Remove the liquid line drier and expansion valve.
2. Purge all remaining components with dry nitrogen or carbon dioxide until clean.
3. Install new components including liquid line drier.
4. Braze all joints, leak test, evacuate, and recharge system.
5. Start up the unit and record the pressure drop across the drier.
6. Continue to run the system for a minimum of twelve (12) hours and recheck the pressure drop across the drier. Pressure drop should not exceed 6 PSIG.
7. Continue to run the system for several days, repeatedly checking pressure drop across the suction line drier. If the pressure drop never exceeds the 6 PSIG, the drier has trapped the contaminants. Remove the suction line drier from the system.
8. If the pressure drop becomes greater, then it must be replaced and steps 5 through 8 repeated until it does not exceed 6 PSIG.

NOTICE: Regardless, the cause for burnout must be determined and corrected before the new compressor is started.

Refrigerant Piping
The piping of a refrigeration system is very important in relation to system capacity, proper oil return to compressor, pumping rate of compressor and cooling performance of the evaporator.

POE oils maintain a consistent viscosity over a large temperature range which aids in the oil return to the compressor; however, there will be some installations which require oil return traps. These installations should be avoided whenever possible, as adding oil traps to the refrigerant lines also increases the opportunity for debris and moisture to be introduced into the system. Avoid long running traps in horizontal suction line.

Duct Static Pressures
The minimum and maximum allowable duct static pressure for the indoor sections are found in the specifications section.

Tables are also provided for each coil, listing quantity of air (CFM) versus static pressure drop across the coil.
Too great an external static pressure will result in insufficient air that can cause icing of the coil. Too much air can cause poor humidity control and condensate to be pulled off the evaporator coil causing condensate leakage. Too much air can also cause motor overloading and in many cases this constitutes a poorly designed system.

Air Handler External Static
To determine proper airflow, proceed as follows:
1. Using a Inclined Manometer or Magnehelic gauge, measure the static pressure of the return duct at the inlet of the air handler, this will be a negative pressure (For Example: .30” wc).
2. Measure the static pressure of the supply duct at the outlet of the air handler, this should be a positive pressure (For Example: .20” wc).
3. Add the two readings together (For Example: .30” wc + .20” wc = .50” wc total external static pressure).
NOTE: Both readings may be taken simultaneously and read directly on the manometer if so desired.
4. Consult proper air handler airflow chart for quantity of air (CFM) at the measured external static pressure.

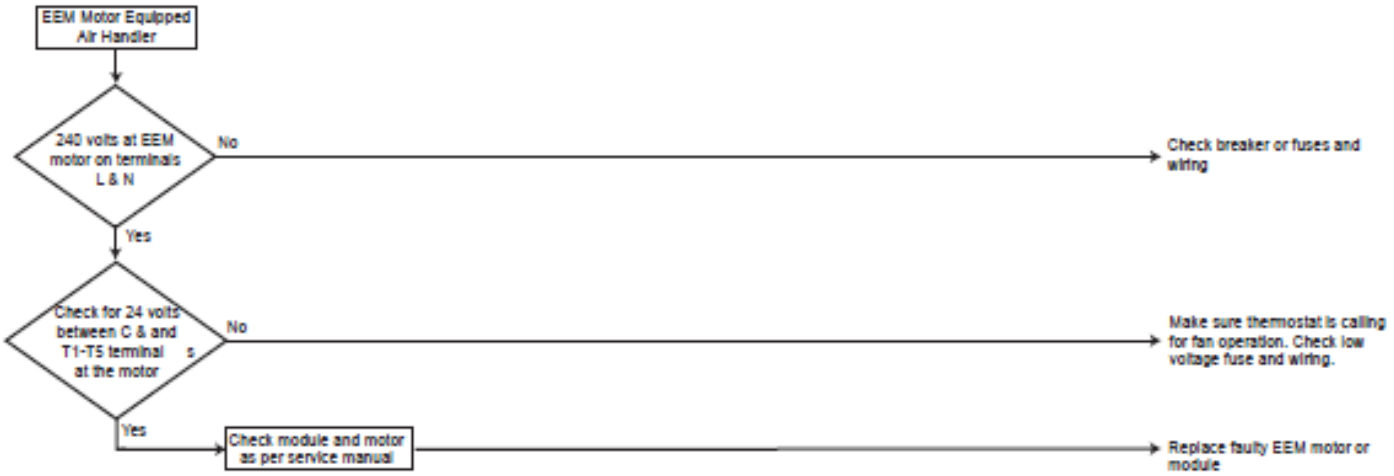
Servicing Outdoor Fan Blade
1. Check balance weights on fan blade.
2. Check fan blade setscrew for tightness.

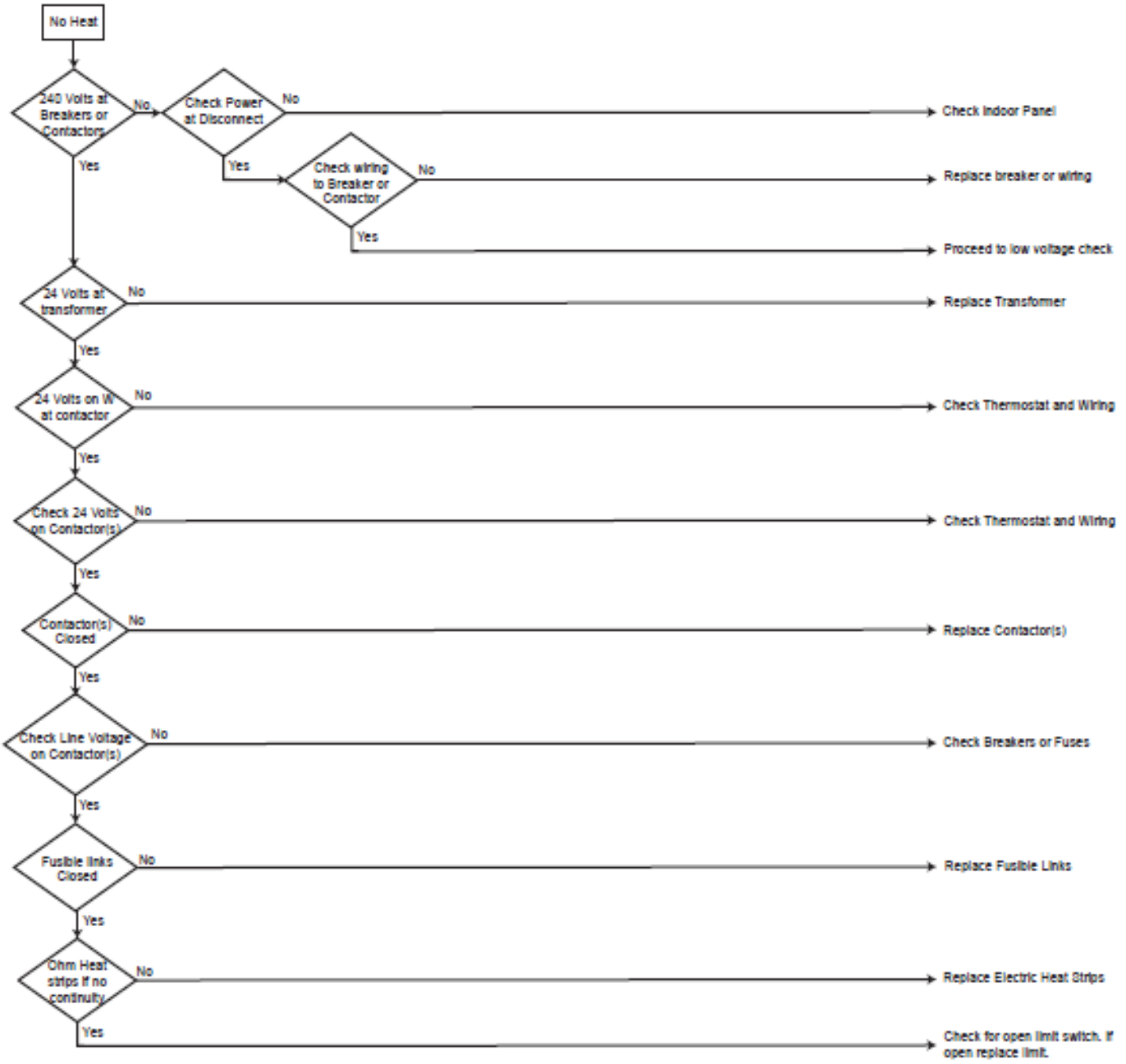
Electrical Controls and Wiring
1. Disconnect power to both outdoor and indoor units.
2. Check all electrical connections for tightness.
3. Tighten all screws on electrical connections.
4. Connections that appear to be burned or smoky should be disassembled and cleaned all parts
5. Wire connections that appear burned and corroded should be replaced and crimp tightly to assure they do not overheat.
6. Reconnect electrical power to indoor and outdoor units and check for proper operation.
System Service and Decommissioning
Should repairs requiring recovery of the refrigerant become necessary, special considerations must be made when breaking into systems with flammable refrigerants. These repairs shall only be performed by qualified service personnel and in compliance with local and national regulations.
The refrigerant charge shall only be recovered into a cylinder labeled for use with R-32. Ensure that the refrigerant cylinder(s) are capable of holding the total system charge. Cylinders shall be complete with a pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs. 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.
All best practices for refrigerant recovery must be followed, including use of a recovery machine designated safe for use with A2L refrigerants. Isolate the system electrically prior to recovery. Ensure that all personal protective equipment is being applied correctly. Ensure that the recovery process is supervised at all times by the qualified

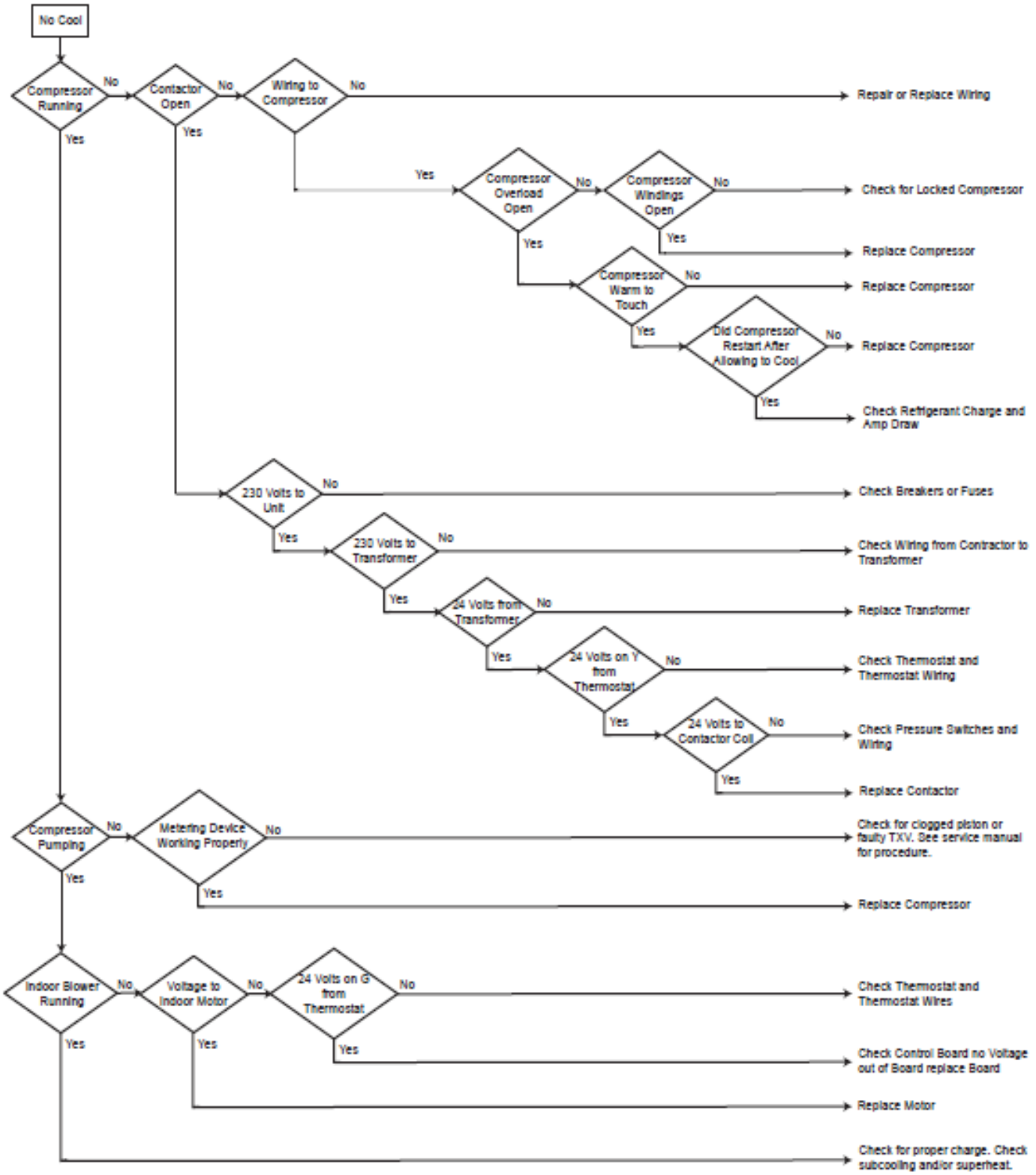
servicer. Situate the R-32 cylinder on the scale before recovery takes place. Start the recovery machine and operate in accordance with its instructions. Do not overfill cylinders by more than 80% volume of its allowed liquid charge.
Should electrical components need to be replaced, ensure that the original equipment manufacturer's part or equivalent is used.

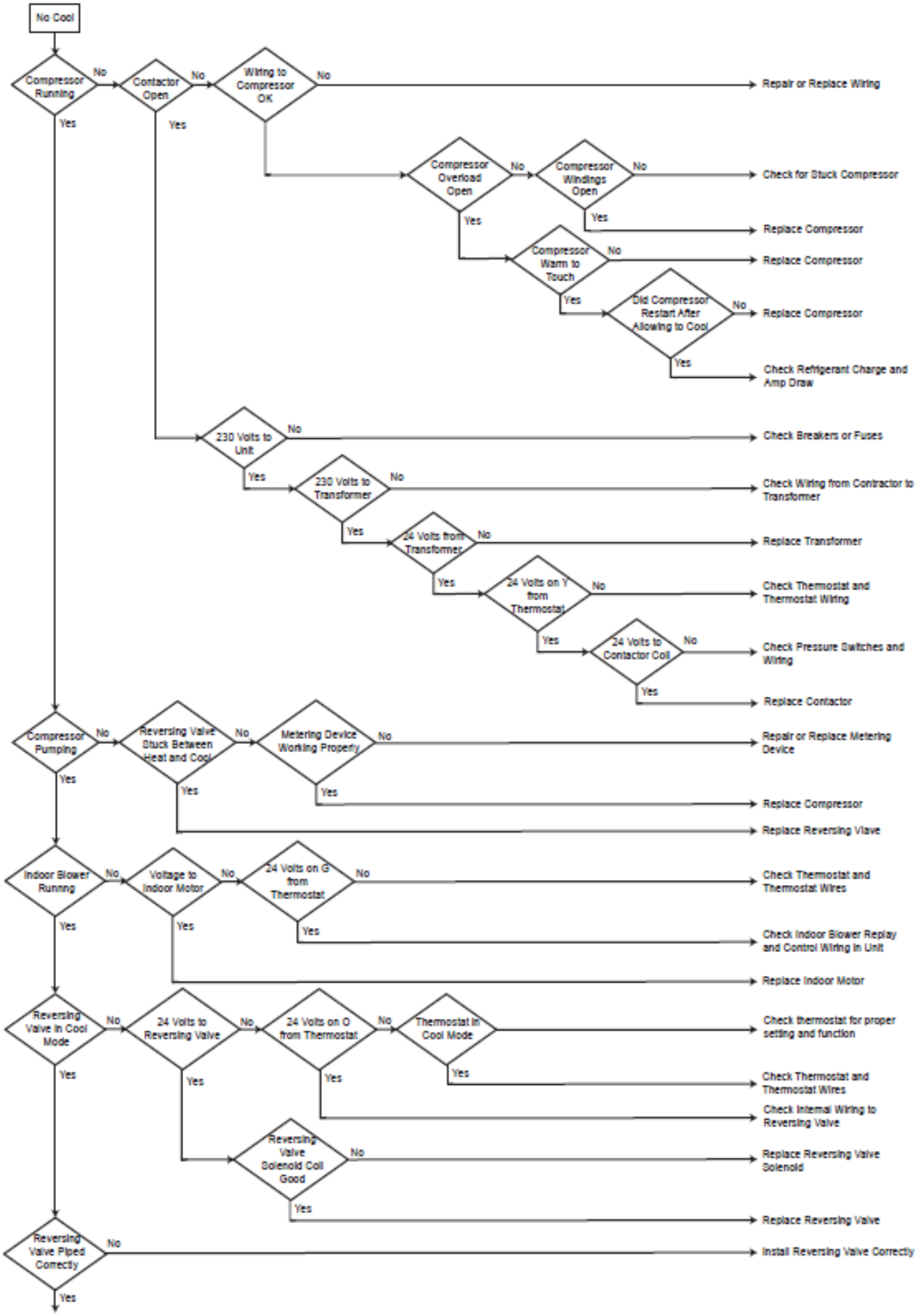
Markings and warnings on the unit shall continue to be visible and legible after installation and service. Correct any markings and warnings that are made illegible.
When decommissioning a system, all previously mentioned precautions regarding safe refrigerant handling must be followed. Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked. Equipment must be labeled, dated, and signed stating that it has been decommissioned and emptied of refrigerant.
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.
a. Become familiar with the equipment and its operation.
b. Isolate system electrically.
c. Before attempting the procedure, ensure that:
• mechanical handling equipment is available, if required, for handling refrigerant cylinders;
• all personal protective equipment is available and being used correctly;
• the recovery process is supervised at all times by a competent person;
• recovery equipment and cylinders conform to the appropriate standards.
d. Pump down refrigerant system, if possible.
e. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
f. Make sure that cylinder is situated on the scales before recovery takes place.
g. Start the recovery machine and operate in accordance with instructions.
h. Do not overfill cylinders (no more than 80 % volume liquid charge).
i. Do not exceed the maximum working pressure of the cylinder, even temporarily.
j. When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
k. Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

Labelling of Equipment
Equipment shall be labelled stating that it has been decommissioned
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 REFRIGERANT.

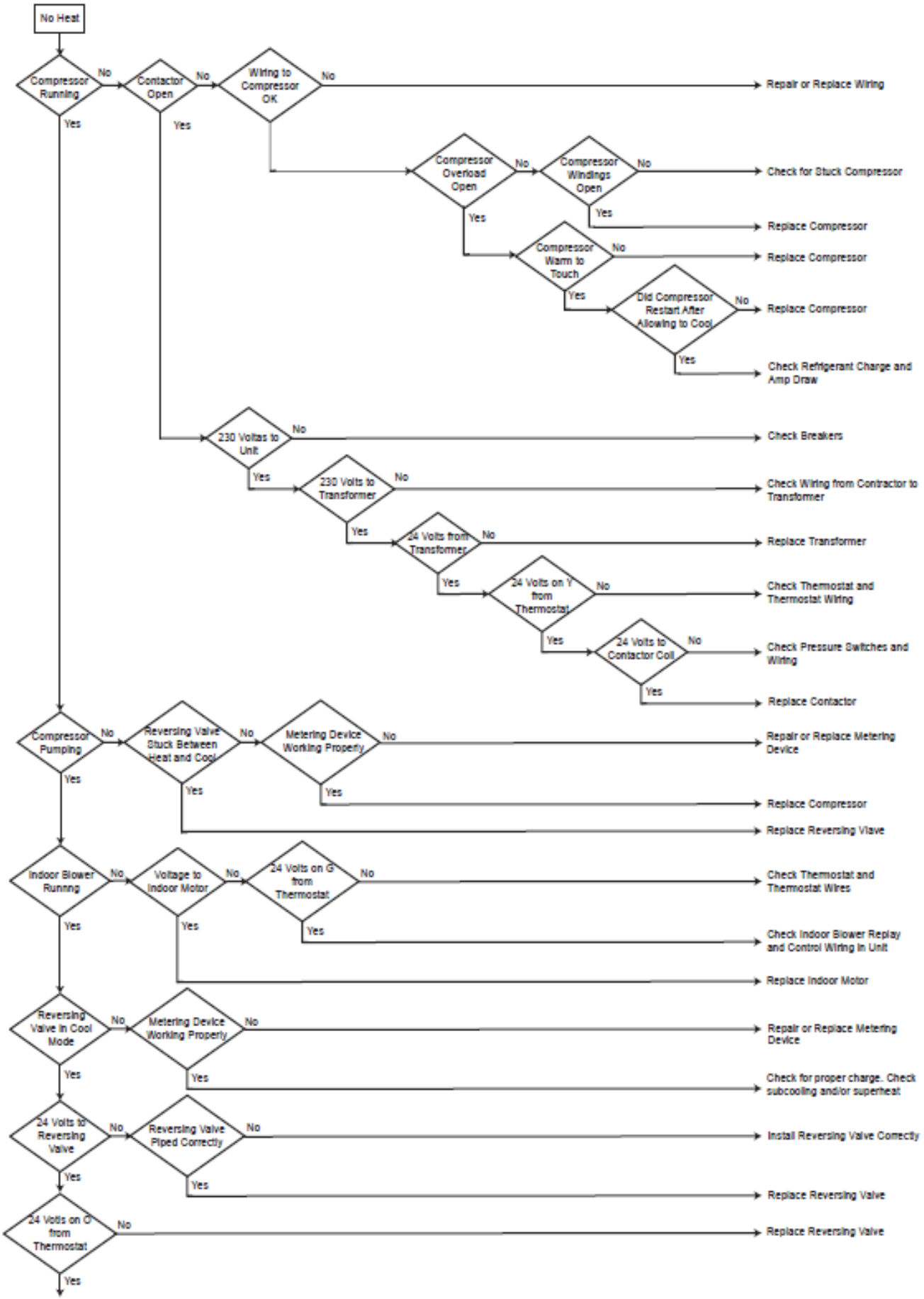

EEM Motor Equipped Air Handler
240 volts at EEM motor on terminals L & N
No
Check breaker or fuses and wiring
Yes
Check for 24 volts between C & and T1-T5 terminal s at the motor
No
Make sure thermostat is calling for fan operation. Check low voltage fuse and wiring.
Yes
Check module and motor as per service manual
Replace faulty EEM motor or module

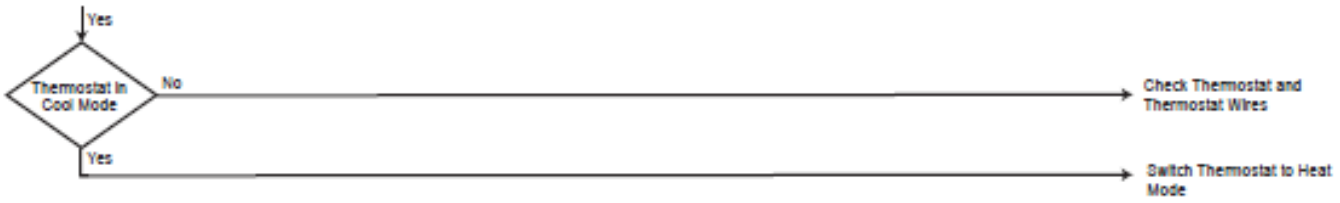

No Heat
240 Volts at Breakers or Contactors
No
Check Power at Disconnect
No
Check Indoor Panel
Yes
Check wiring to Breaker or Contactor
No
Replace breaker or wiring
Yes
Proceed to low voltage check
Yes
24 Volts at transformer
No
Replace Transformer
Yes
24 Volts on W at contactor
No
Check Thermostat and Wiring
Yes
Check 24 Volts on Contactor(s)
No
Check Thermostat and Wiring
Yes
Contactor(s) Closed
No
Replace Contactor(s)
Yes
Check Line Voltage on Contactor(s)
No
Check Breakers or Fuses
Yes
Fusible links Closed
No
Replace Fusible Links
Yes
Ohm Heat strips if no continuity
No
Replace Electric Heat Strips
Yes
Check for open limit switch. If open replace limit.


No Cool
Compressor Running
No
Yes
Contactor Open
No
Yes
Wiring to Compressor
No
Repair or Replace Wiring
Yes
Compressor Overload Open
No
Compressor Windings Open
No
Check for Locked Compressor
Yes
Replace Compressor
Yes
Compressor Warm to Touch
No
Replace Compressor
Yes
Did Compressor Restart After Allowing to Cool
No
Replace Compressor
Yes
Check Refrigerant Charge and Amp Draw
230 Volts to Unit
No
Check Breakers or Fuses
Yes
230 Volts to Transformer
No
Check Wiring from Contractor to Transformer
Yes
24 Volts from Transformer
No
Replace Transformer
Yes
24 Volts on Y from Thermostat
No
Check Thermostat and Thermostat Wiring
Yes
24 Volts to Contactor Coil
No
Check Pressure Switches and Wiring
Yes
Replace Contactor
Compressor Pumping
No
Yes
Metering Device Working Properly
No
Check for clogged piston or faulty TXV. See service manual for procedure.
Yes
Replace Compressor
Indoor Blower Running
No
Yes
Voltage to Indoor Motor
No
Yes
24 Volts on G from Thermostat
No
Check Thermostat and Thermostat Wires
Yes
Check Control Board no Voltage out of Board replace Board
Replace Motor
Check for proper charge. Check subcooling and/or superheat.


No Cool
Compressor Running
No
Yes
Contactor Open
No
Yes
Wiring to Compressor OK
No
Repair or Replace Wiring
Compressor Overload Open
No
Yes
Compressor Windings Open
No
Check for Stuck Compressor
Yes
Replace Compressor
Compressor Warm to Touch
No
Replace Compressor
Yes
Did Compressor Restart After Allowing to Cool
No
Replace Compressor
Yes
Check Refrigerant Charge and Amp Draw
230 Volts to Unit
No
Check Breakers or Fuses
Yes
230 Volts to Transformer
No
Check Wiring from Contactor to Transformer
Yes
24 Volts from Transformer
No
Replace Transformer
Yes
24 Volts on Y from Thermostat
No
Check Thermostat and Thermostat Wiring
Yes
24 Volts to Contactor Coil
No
Check Pressure Switches and Wiring
Yes
Replace Contactor
Compressor Pumping
No
Yes
Reversing Valve Stuck Between Heat and Cool
No
Yes
Metering Device Working Properly
No
Repair or Replace Metering Device
Yes
Replace Compressor
Replace Reversing Vlave
Indoor Blower Running
No
Yes
Voltage to Indoor Motor
No
Yes
24 Volts on G from Thermostat
No
Check Thermostat and Thermostat Wires
Yes
Check Indoor Blower Replay and Control Wiring in Unit
Replace Indoor Motor
Reversing Valve In Cool Mode
No
Yes
24 Volts to Reversing Valve
No
Yes
24 Volts on O from Thermostat
No
Thermostat in Cool Mode
Check thermostat for proper setting and function
Yes
Check Thermostat and Thermostat Wires
Yes
Check Internal Wiring to Reversing Valve
Reversing Valve Solenoid Coil Good
No
Replace Reversing Valve Solenoid
Yes
Replace Reversing Valve
Reversing Valve Piped Correctly
No
Install Reversing Valve Correctly
Yes

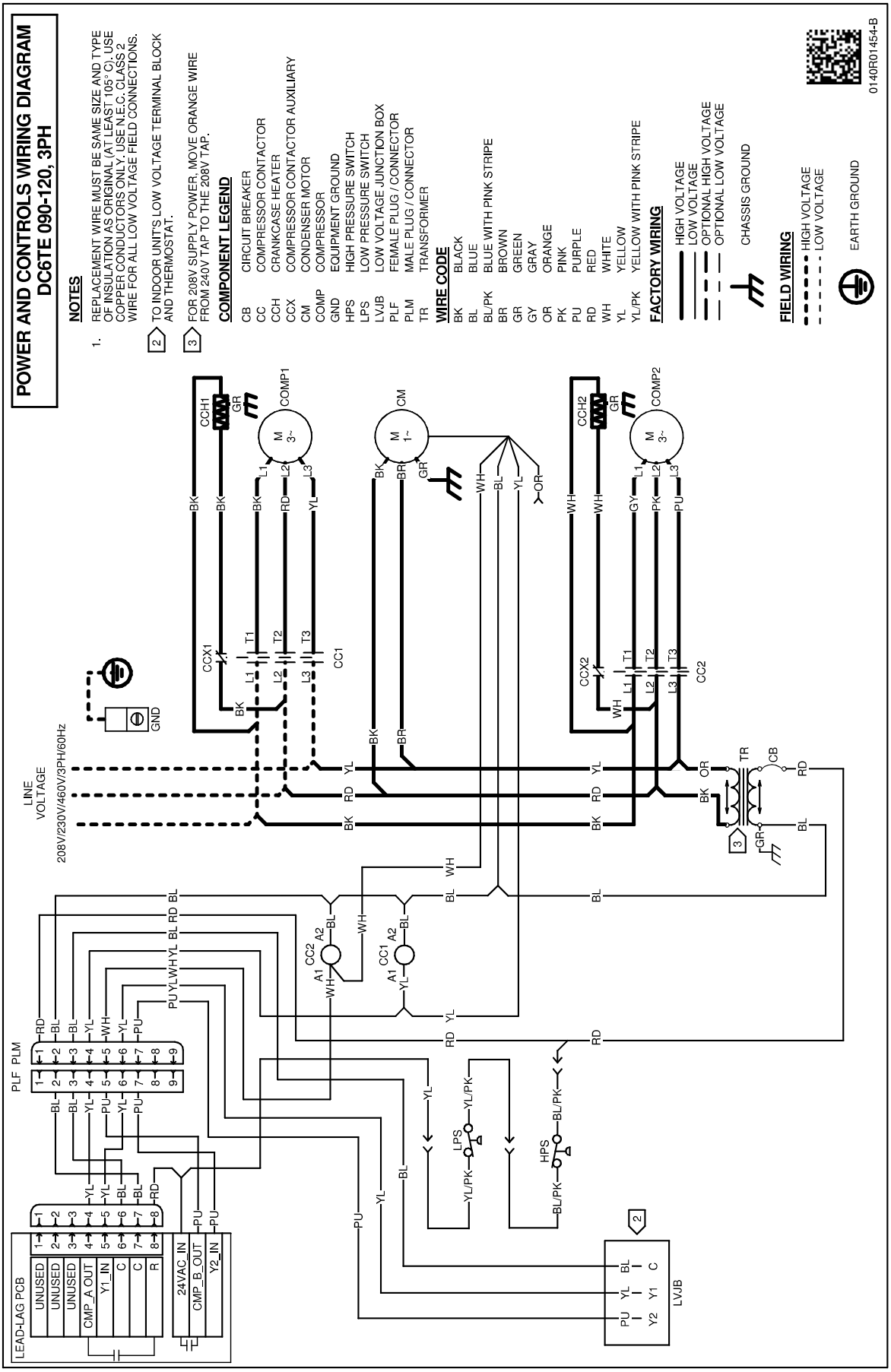

Yes
Metering Device Working Properly
No
Repair or replace Metering Device
Yes
Check for proper charge. Check subcooling and/or superheat


No Heat
Compressor Running
No
Yes
Contactor Open
No
Yes
Wiring to Compressor OK
No
Repair or Replace Wiring
Compressor Overload Open
No
Yes
Compressor Windings Open
No
Yes
Check for Stuck Compressor
Replace Compressor
Compressor Warm to Touch
No
Yes
Replace Compressor
Did Compressor Restart After Allowing to Cool
No
Yes
Replace Compressor
Check Refrigerant Charge and Amp Draw
230 Voltas to Unit
No
Yes
Check Breakers
230 Volts to Transformer
No
Yes
Check Wiring from Contractor to Transformer
24 Volts from Transformer
No
Yes
Replace Transformer
24 Volts on Y from Thermostat
No
Yes
Check Thermostat and Thermostat Wiring
24 Volts to Contactor Coil
No
Yes
Check Pressure Switches and Wiring
Replace Contactor
Compressor Pumping
No
Yes
Reversing Valve Stuck Between Heat and Cool
No
Yes
Metering Device Working Properly
No
Yes
Repair or Replace Metering Device
Replace Compressor
Replace Reversing Vlave
Indoor Blower Running
No
Yes
Voltage to Indoor Motor
No
Yes
24 Volts on G from Thermostat
No
Yes
Check Thermostat and Thermostat Wires
Check Indoor Blower Replay and Control Wiring in Unit
Replace Indoor Motor
Reversing Valve in Cool Mode
No
Yes
Metering Device Working Properly
No
Yes
Repair or Replace Metering Device
Check for proper charge. Check subcooling and/or superheat
24 Volts to Reversing Valve
No
Yes
Reversing Valve Piped Correctly
No
Yes
Install Reversing Valve Correctly
Replace Reversing Valve
24 Volts on O from Thermostat
No
Yes
Replace Reversing Valve


Yes
Thermostat In Cool Mode
No
Check Thermostat and Thermostat Wires
Yes
Switch Thermostat to Heat Mode

WARNING

HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

WIRING DIAGRAMS

WARNING

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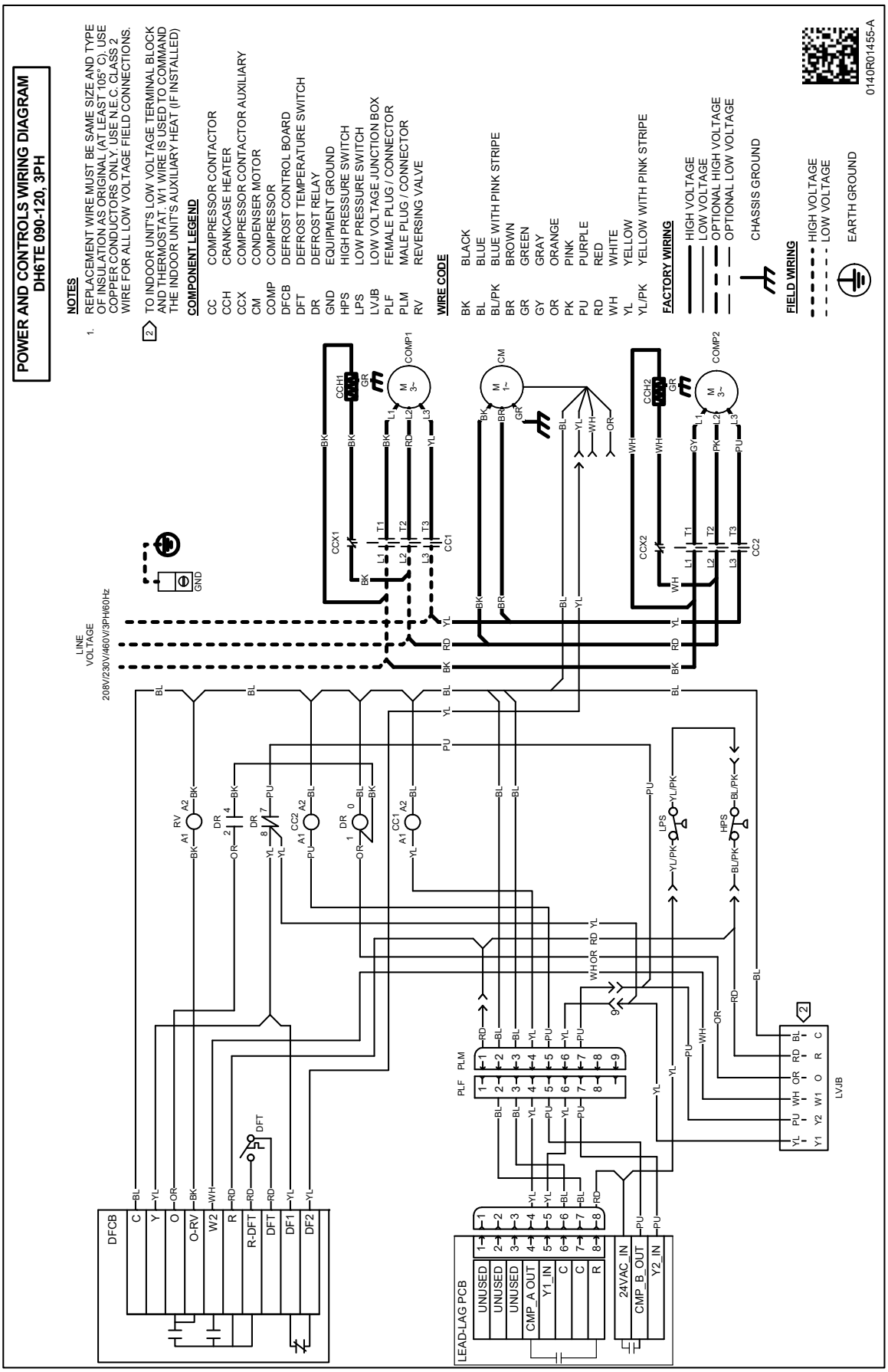

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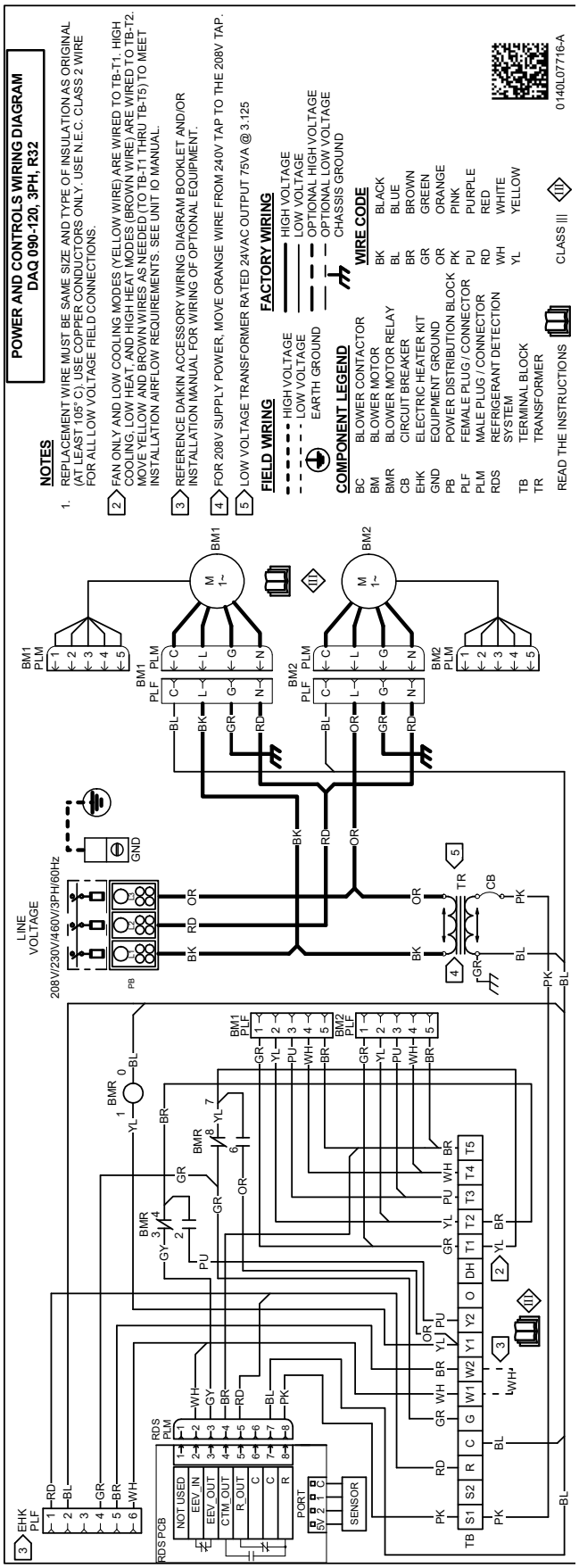

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