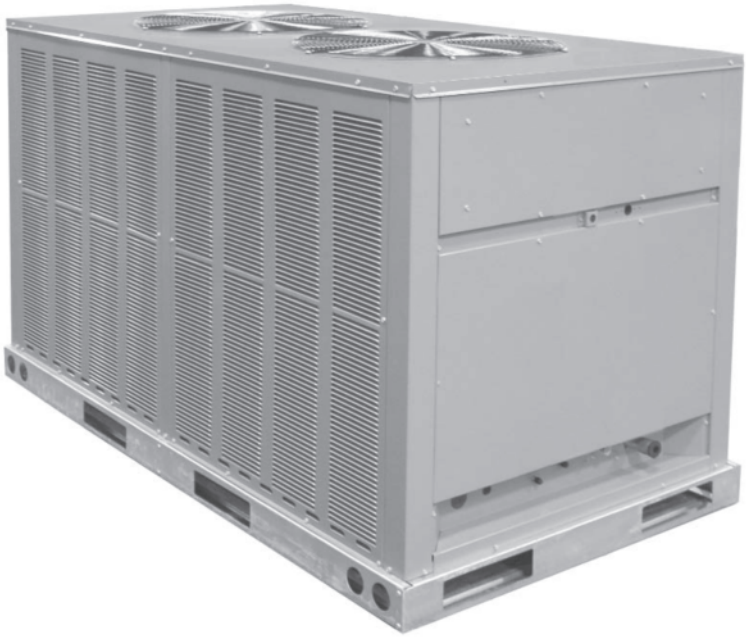
INSTALLATION INSTRUCTIONS

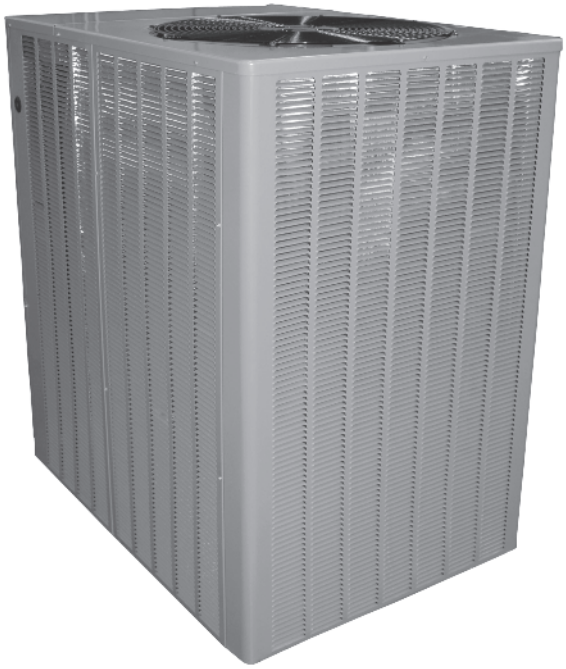
FOR HIGH EFFICIENCY REMOTE HEAT PUMPS

FEATURING EARTH-FRIENDLY R-410A

RPWL-090 AND -120 UNITS

7.5 & 10 NOMINAL TONS [26 & 35 kW]





RECOGNIZE THIS SYMBOL AS AN INDICATION OF IMPORTANT SAFETY INFORMATION!

⚠ WARNING

THESE INSTRUCTIONS ARE INTENDED AS AN AID TO QUALIFIED, LICENSED SERVICE PERSONNEL FOR PROPER INSTALLATION, ADJUSTMENT AND OPERATION OF THIS UNIT. READ THESE INSTRUCTIONS THOROUGHLY BEFORE ATTEMPTING INSTALLATION OR OPERATION. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN IMPROPER INSTALLATION, ADJUSTMENT, SERVICE OR MAINTENANCE POSSIBLY RESULTING IN FIRE, ELECTRICAL SHOCK, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

AHRI CERTIFIED™ www.ahridirectory.org Unitary Large HP AHRI Standard 340/360 Certification applies only when the complete system is listed with AHRI.

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Accredited by the RvA

ABS Quality Evaluations, Inc. Management System Certification

ANAB ACCREDITED

ISO 9001:2000

Certificate Number: 30164

DO NOT DESTROY THIS MANUAL

PLEASE READ CAREFULLY AND KEEP IN A SAFE PLACE FOR FUTURE REFERENCE BY A SERVICEMAN

[ ] INDICATES METRIC CONVERSIONS

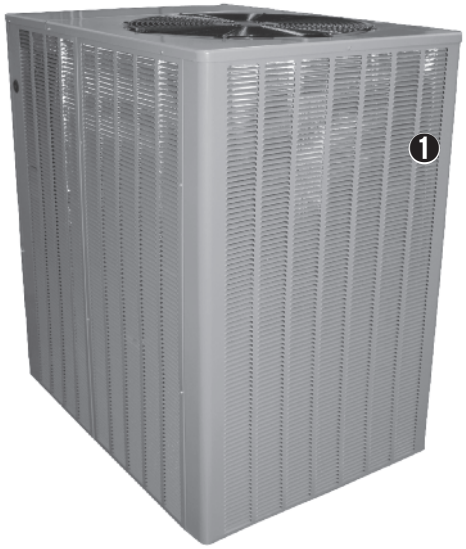
92-103191-01-01

SUPERSEDES 92-103191-01-00

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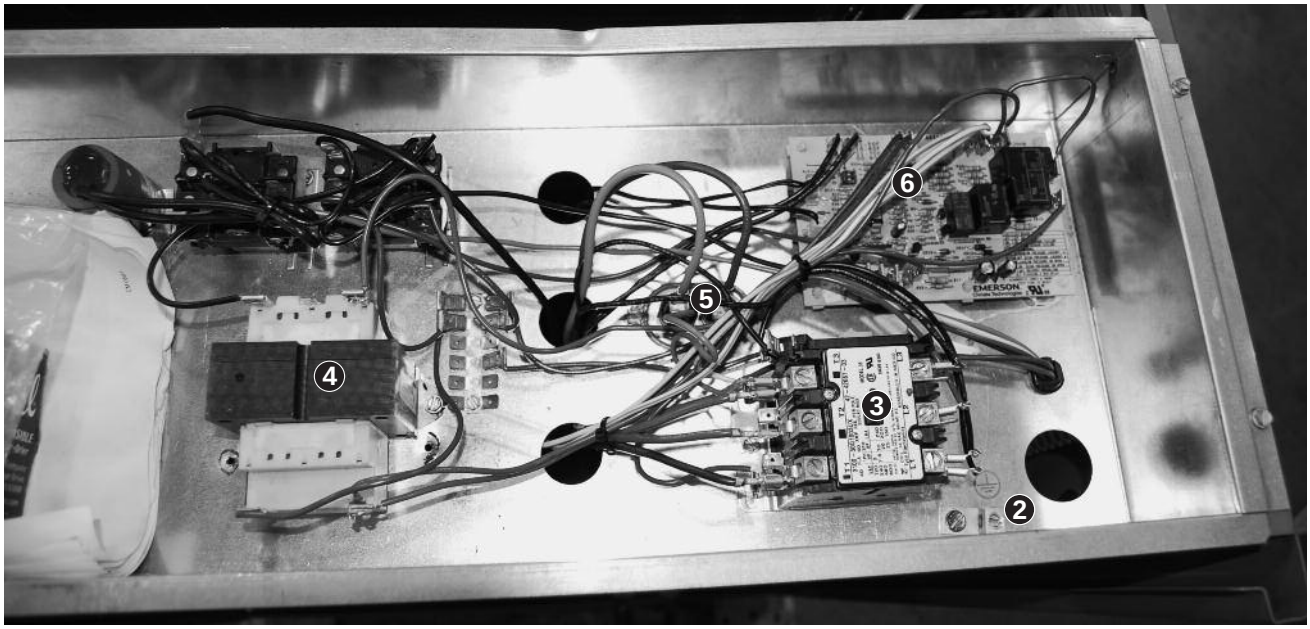
STANDARD UNIT FEATURES



7.5 TON FEATURES & BENEFITS

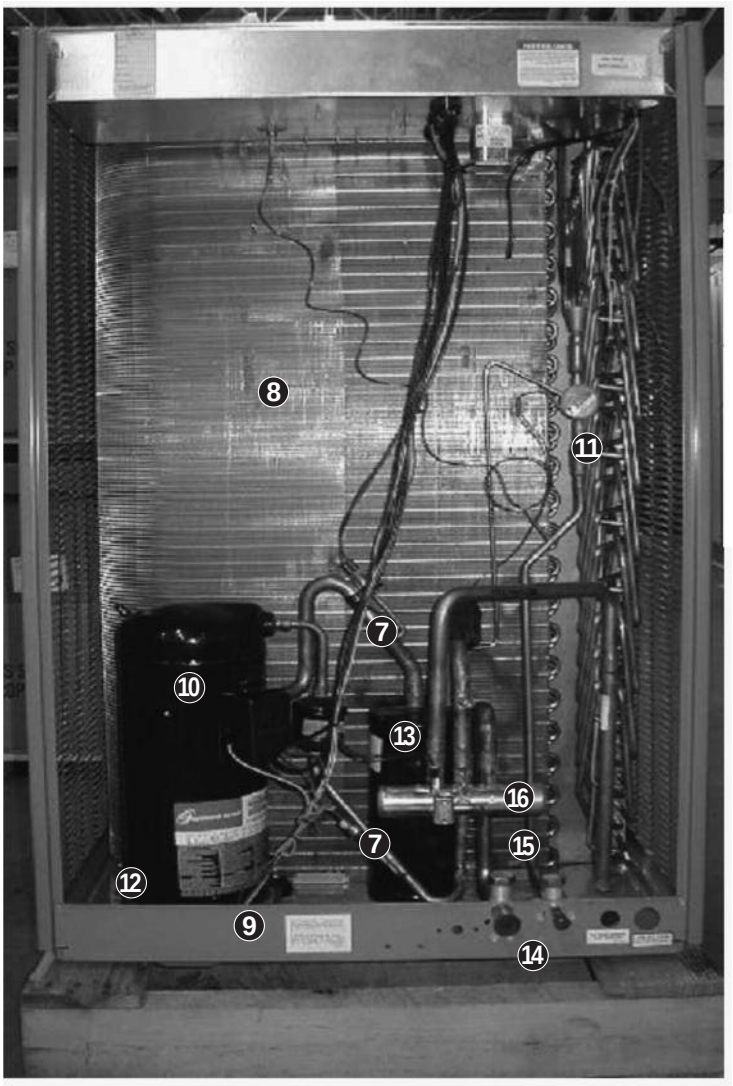
1. **CABINET**—Galvanized steel with powder coat paint finish. The powder coat paint finish is high gloss, durable and capable of withstanding a 1000-hour salt spray test per ASTM B 117. All access panels can be opened or removed without affecting the structural strength of the unit. Stamped louvered panels offer 100% protection for the condenser coil.
2. **EQUIPMENT GROUND**—Lug for field connection of ground wire.
3. **CONTACTOR**—The contactor is an electrical switch which operates the compressor and outdoor fans. Its 24 volt coil is activated on a call for cooling or heating.

CONTROL BOX



4. **TRANSFORMER**—75 VA step-down type, from Line to 24 volts with resetable circuit breaker.
5. **CAPACITOR**—Help provide starting torque necessary to boost the condenser fan motor to operating speed by directing their stored energy to the starter winding in step with the running winding.
6. **DEMAND DEFROST CONTROL**—Used when unit is in heating mode to defrost outdoor coil.
7. **AUTO-RESET HIGH PRESSURE CONTROL, AND AUTO-RESET LOW PRESSURE CONTROL**—To provide compressor protection under abnormally high head pressure conditions (outdoor fan failure, restriction, dirty coil, etc.) or abnormally low suction pressure conditions (restrictions, TEV failure, loss of charge, indoor blower failure, etc.) while eliminating nuisance tripping sometimes experienced with conventional control systems.

7.5 TON
FEATURES & BENEFITS

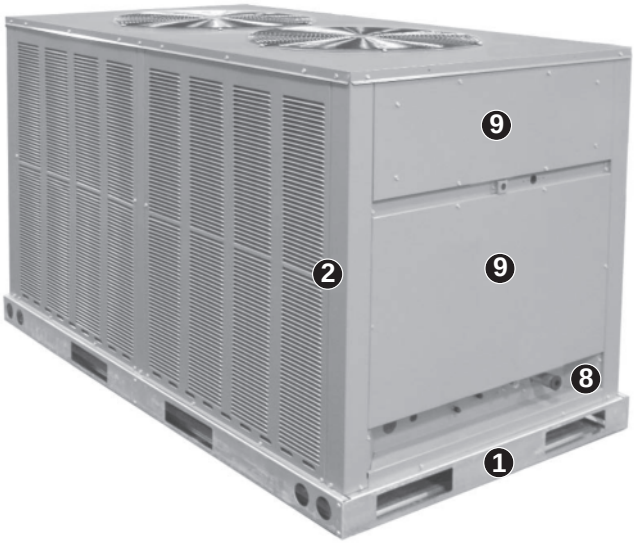


8. **COIL**—Constructed with copper tubes and aluminum fins mechanically bonded to tubes for maximum heat transfer capabilities. All coil assemblies are leak tested up to 550 PSIG (3792 kPa) internal pressure.

   SERVICE ACCESS—Control box with separate line and control voltages, as well as compressor and other refrigerant controls are accessible through access panels. An electrical access cover may be opened or removed without affecting normal operation of the unit. Condenser fan motors are equipped with molded plugs for easy removal. Louver panels and end access panel can be removed for coil cleaning.

9. **BASE PAN**—Galvanized steel with powder coat paint finish.
10. **COMPRESSOR**—The Scroll Compressor is hermetically sealed with internal high temperature protection, and durable insulation on motor windings. The entire compressor is mounted on rubber grommets top reduce vibration and noise.
11. **TX VALVE**—Used when unit is in heating mode and outdoor coil functions as evaporator.
12. **CRANKCASE HEATER**—Minimizes refrigerant migration to compressor cump.
13. **SUCTION LINE ACCUMULATOR**—To prevent liquid slugginig of compressor.
14. **REFRIGERANT CONNECTIONS**—All field sweat joints are made external of the unit and are located close to the ground for a neat looking installation.
15. **SERVICE VALVES**—Standard on liquid line and vapor line.
16. **REVERSING VALVE**—Sized for maximum capacity and efficiency, 24V coil, energized in heating.

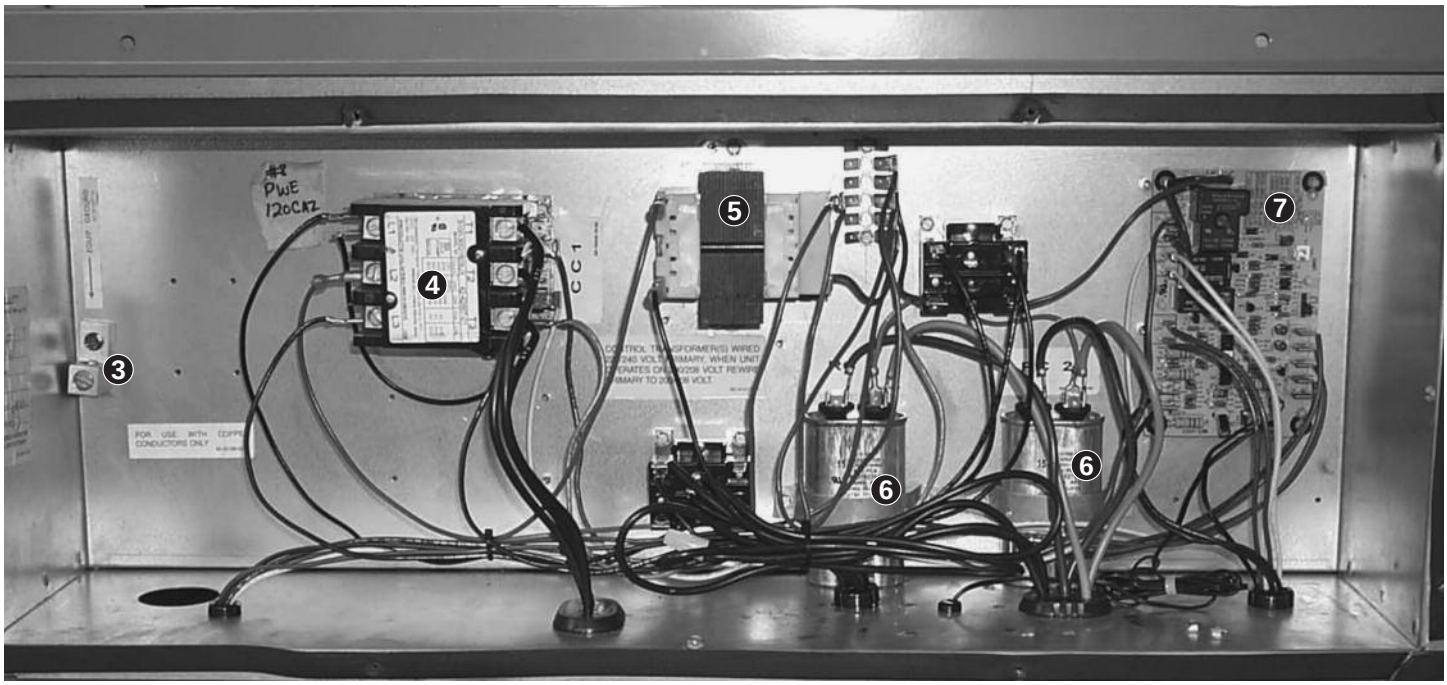
STANDARD UNIT FEATURES



10 TON FEATURES & BENEFITS

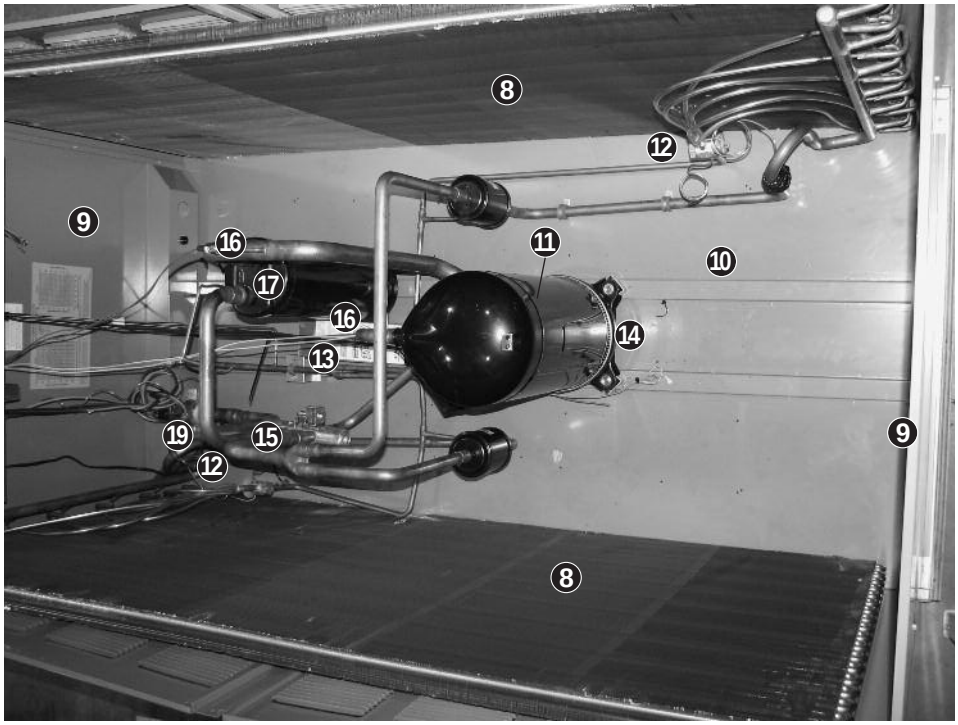
1. **BASE RAILS**—Commercial grade base rails for handling any rigging.
2. **CABINET**—Galvanized steel with powder coat paint finish. The powder coat paint finish is high gloss, durable and capable of withstanding a 1000-hour salt spray test per ASTM B 117. All access panels can be opened or removed without affecting the structural strength of the unit. Stamped louvered panels offer 100% protection for the condenser coil.

CONTROL BOX



3. **EQUIPMENT GROUND**—Lug for field connection of ground wire.
4. **CONTACTOR**—The contactor is an electrical switch which operates the compressor and outdoor fans. Its 24 volt coil is activated on a call for cooling or heating.
5. **TRANSFORMER**—75 VA step-down type, from Line to 24 volts with resetable circuit breaker.
6. **CAPACITORS**—Help provide starting torque necessary to boost the condenser fan motors to operating speed by directing their stored energy to the starter winding in step with the running winding.
7. **DEMAND DEFROST CONTROL**—Used when unit is in heating mode to defrost outdoor coil.
8. **COILS**—Constructed with copper tubes and aluminum fins mechanically bonded to tubes for maximum heat transfer capabilities. All coil assemblies are leak tested up to 550 PSIG [3792 kPa] internal pressure.

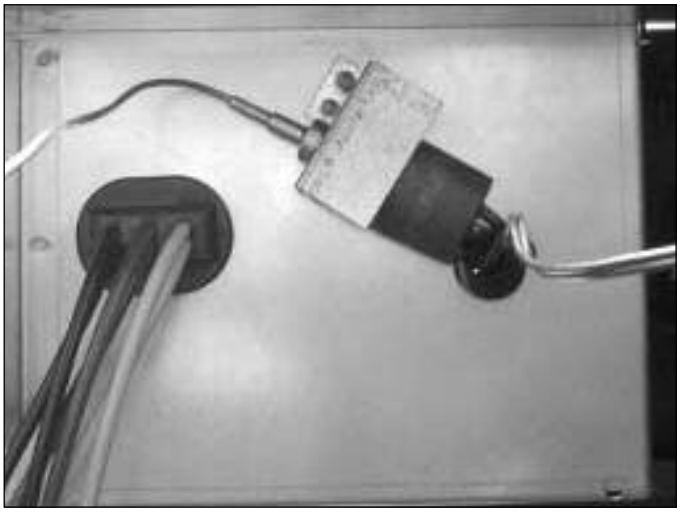
STANDARD UNIT FEATURES (cont.) – 10 TON FEATURES & BENEFITS
UNIT INTERIOR-TOP VIEW



9. **SERVICE ACCESS**—Control box with separate line and control voltages, as well as compressor and other refrigerant controls are accessible through access panels. An electrical access cover may be opened or removed without affecting normal operation of the unit. Condenser fan motors are equipped with molded plugs for easy removal. Louver panels and end access panel can be removed for coil cleaning.
10. **BASE PAN**—Galvanized steel with powder coat paint finish.
11. **COMPRESSOR**—The Scroll Compressor is hermetically sealed with internal high temperature protection, and durable insulation on motor windings. The entire compressor is mounted on rubber grommets to reduce vibration and noise.
12. **TX VALVE**—Used when unit is in heating mode and outdoor coil functions as evaporator.
13. **FILTER DRIER**—Field installed in liquid line.
14. **CRANKCASE HEATER**—Minimizes refrigerant migration to compressor sump.
15. **REVERSING VALVE**—Sized for maximum capacity and efficiency, 24V coil, energized in heating.
16. **AUTO-RESET HIGH PRESSURE CONTROL, AND AUTO-RESET LOW PRESSURE CONTROL**—To provide compressor protection under abnormally high head pressure conditions (outdoor fan failure, restriction, dirty coil, etc.) or abnormally low suction pressure conditions (restrictions, TEV failure, loss of charge, indoor blower failure, etc.) while eliminating nuisance tripping sometimes experienced with conventional control systems.
17. **SUCTION LINE ACCUMULATOR**—To prevent liquid slugging of compressor.
18. **REFRIGERANT CONNECTIONS**—All field sweat joints are made external of the unit and are located close to the ground for a neat looking installation.
19. **SERVICE VALVE**—Standard on liquid line, and vapor line.



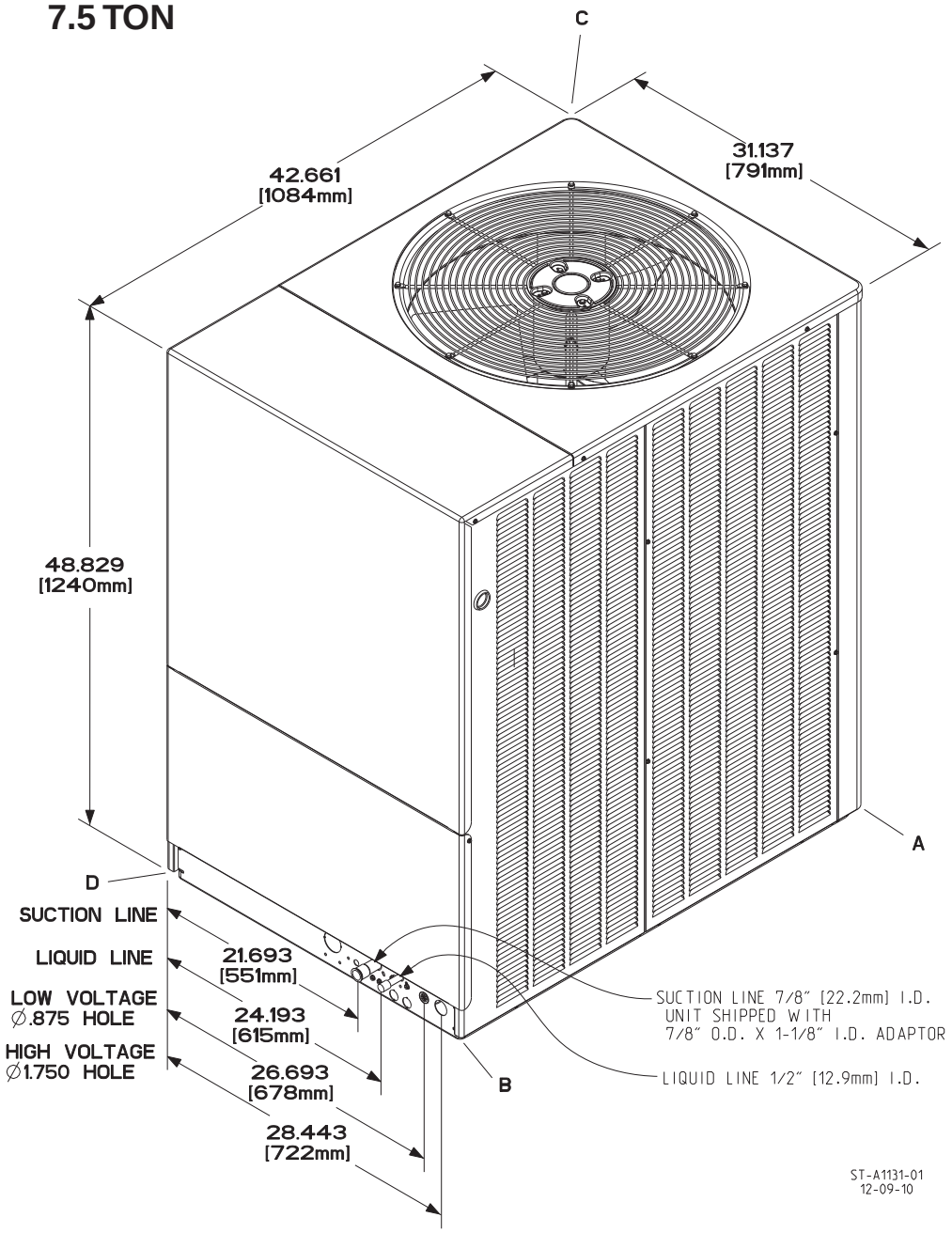
CONDENSER FAN MOTORS—Direct drive, single-phase permanently lubricated “PSC” motors with inherent overload protection.



LOW AMBIENT CONTROL—A pressure sensitive fan cycling control allows cooling operation of unit down to 0°F [-18°C].

UNIT DIMENSIONS & WEIGHTS

7.5 TON



7.5 TON [26.38 kW]

CORNER WEIGHTS (LBS.) [kg]

MODEL	TOTAL WEIGHT LBS. [KG]	Corner Weights, Lbs. [kg]			
		A	B	C	D
RPWL-090	398 [180.5]	67 [30.4]	102 [46.3]	92 [41.7]	137 [62.1]

UNIT DIMENSIONS & WEIGHTS
10 TON

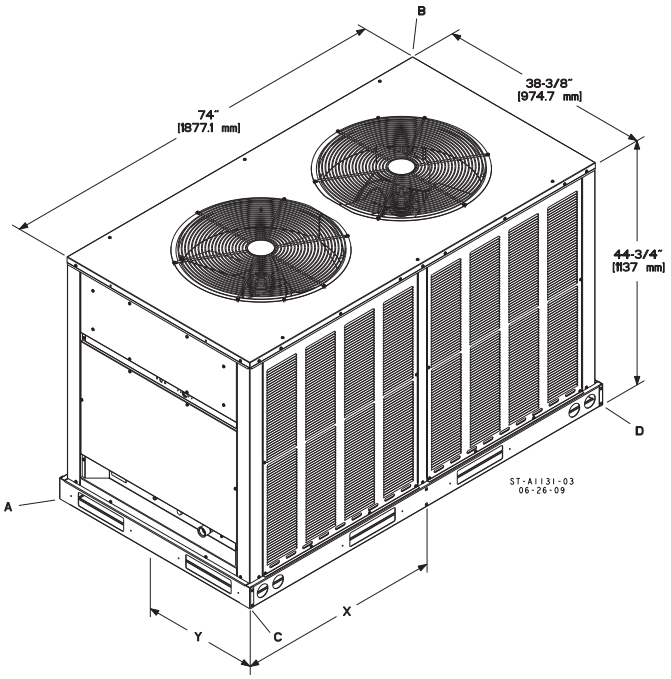
CORNER WEIGHTS (PERCENTAGE)

MODEL	A	B	C	D
(-)PWL-120	26%	24%	26%	24%

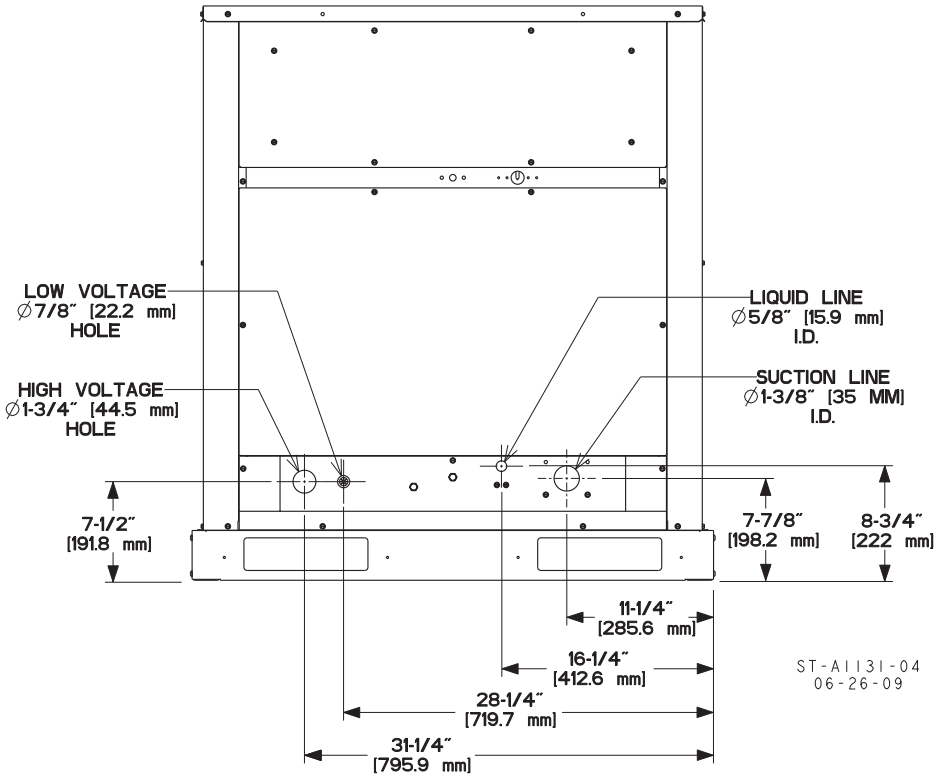
CORNER WEIGHTS (LBS.) [kg]

MODEL	A	B	C	D
(-)PWL-120	167 [75.7]	160 [72.6]	160 [72.6]	167 [75.7]
TOTAL WEIGHT, 120 = 654 LBS. [296.6 kg]				

FIGURE 2
UNIT DIMENSIONS



MODEL	X"	Y"
(-)PWL-120	31.2	18.9



Performance Data @ ARI Standard Conditions

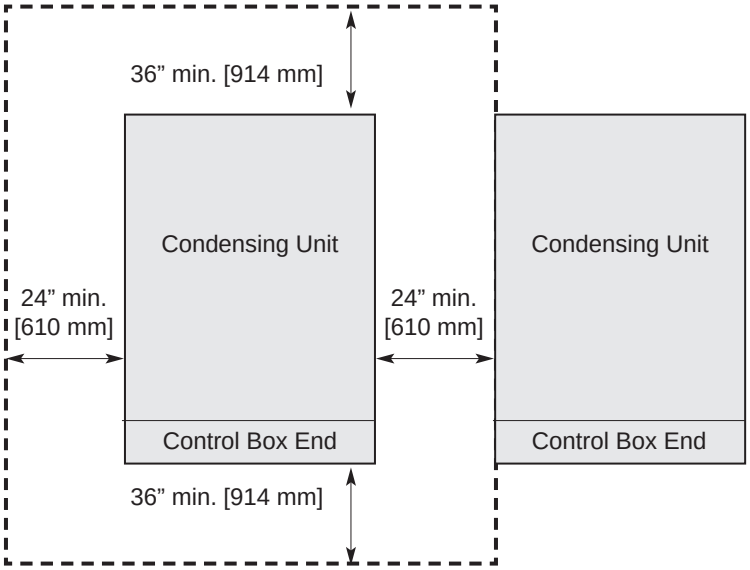
Note: Only these combinations of indoor/outdoor units are approved and any other combination should not be used.

Model Numbers		ARI Cooling Performance						ARI Heating Performance (70°F [21°C] Indoor)			
		80°F [26.5°C] DB / 67°F [19.5°C] WB Indoor Air 95°F [35°C] DB Outdoor Air						Outdoor Air 47°F [8.5°C] DB 43°F [6°C] WB DOE High Temp.		Outdoor Air 17°F [8-.5°C] DB 15°F [-9.5°C] WB DOE Low Temp.	
Outdoor Unit RPWL-	Indoor Coil and/or Air Handler	Total Capacity BTU/H [kW]	Net Sensible BTU/H [kW]	Net Latent BTU/H [kW]	EER	Sound Rating dB	Indoor CFM [L/s]	BTU/H [kW]	COP	BTU/H [kW]	COP
Revised 6/3/2009											
090CAZ	RHGM-090Z#	86000 [25.2]	67400 [19.7]	18600 [5.4]	11	82	3000	90000 [1416]	3.3 [26.4]	55000	2.2 [16.1]
	RHGM-090ZK	86000 [25.2]	67400 [19.7]	18600 [5.4]	11	82	3000	90000 [1416]	3.3 [26.4]	55000	2.2 [16.1]
	RHGM-090ZL	86000 [25.2]	67400 [19.7]	18600 [5.4]	11	82	3000	90000 [1416]	3.3 [26.4]	55000	2.2 [16.1]
	RHGM-090ZM	86000 [25.2]	67400 [19.7]	18600 [5.4]	11	82	3000	90000 [1416]	3.3 [26.4]	55000	2.2 [16.1]
090DAZ	RHGM-090Z #	86000 [25.2]	67400 [19.7]	18600 [5.4]	11	82	3000	90000 [1416]	3.3 [26.4]	55000	2.2 [16.1]
	RHGM-090ZK	86000 [25.2]	67400 [19.7]	18600 [5.4]	11	82	3000	90000 [1416]	3.3 [26.4]	55000	2.2 [16.1]
	RHGM-090ZL	86000 [25.2]	67400 [19.7]	18600 [5.4]	11	82	3000	90000 [1416]	3.3 [26.4]	55000	2.2 [16.1]
	RHGM-090ZM	86000 [25.2]	67400 [19.7]	18600 [5.4]	11	82	3000	90000 [1416]	3.3 [26.4]	55000	2.2 [16.1]
120CAZ	RHGM-120Z #	116000 [34.0]	87100 [25.5]	28900 [8.5]	11	88	3750	120000 [1770]	3.3 [35.2]	68000	2.2 [19.9]
	RHGM-120ZK	116000 [34.0]	87100 [25.5]	28900 [8.5]	11	88	3750	120000 [1770]	3.3 [35.2]	68000	2.2 [19.9]
	RHGM-120ZL	116000 [34.0]	87100 [25.5]	28900 [8.5]	11	88	3750	120000 [1770]	3.3 [35.2]	68000	2.2 [19.9]
	RHGM-120ZM	116000 [34.0]	87100 [25.5]	28900 [8.5]	11	88	3750	120000 [1770]	3.3 [35.2]	68000	2.2 [19.9]
120DAZ	RHGM-120Z #	116000 [34.0]	87100 [25.5]	28900 [8.5]	11	88	3750	120000 [1770]	3.3 [35.2]	68000	2.2 [19.9]
	RHGM-120ZK	116000 [34.0]	87100 [25.5]	28900 [8.5]	11	88	3750	120000 [1770]	3.3 [35.2]	68000	2.2 [19.9]
	RHGM-120ZL	116000 [34.0]	87100 [25.5]	28900 [8.5]	11	88	3750	120000 [1770]	3.3 [35.2]	68000	2.2 [19.9]
	RHGM-120ZM	116000 [34.0]	87100 [25.5]	28900 [8.5]	11	88	3750	120000 [1770]	3.3 [35.2]	68000	2.2 [19.9]

Electrical and Physical Data

Model Number RPWL-	Electrical							Physical					
	Phase Frequency (Hz) Voltage (Volts)	Compressor		Fan Motor Full Load Amperes (FLA)	Minimum Circuit Ampacity Amperes	Fuse or HACR Circuit Breaker		Outdoor Coil			Refrig. Per Circuit Oz. [g]	Weight	
		Rated Load Amperes (RLA)	Locked Rotor Amperes (LRA)			Minimum Amperes	Maximum Amperes	Face Area Sq. Ft. [m^2]	No. Rows	CFM [L/s]		Net Lbs. [kg]	Shipping Lbs. [kg]
Rev. 6/3/2009													
090CAZ	3-60-208/230	25/25	190	4.2	36/36	45/45	60/60	34.5 [3.21]	2	5000 [2360]	372 [10546]	398 [180.5]	448 [203.2]
090DAZ	3-60-460	12.8	100	2.3	19	25	30	34.5 [3.21]	2	5000 [2360]	372 [10546]	398 [180.5]	448 [203.2]
120CAZ	3-60-208/230	30.1/30.1	225	4.8	43/43	50/50	70/70	32.88 [3.05]	2	7400 [3492]	436 [12361]	646 [293]	686 [311.2]
120DAZ	3-60-460	16.7	114	2.2	24	30	35	32.88 [3.05]	2	7400 [3492]	436 [12361]	646 [293]	686 [311.2]

CLEARANCES – 7.5 & 10 TON



RIGGING

RPWL 090 MODELS

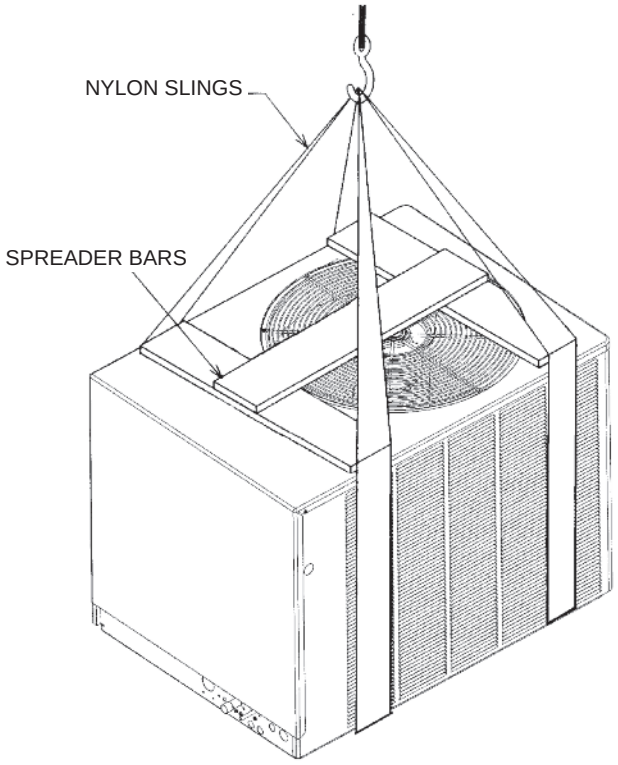
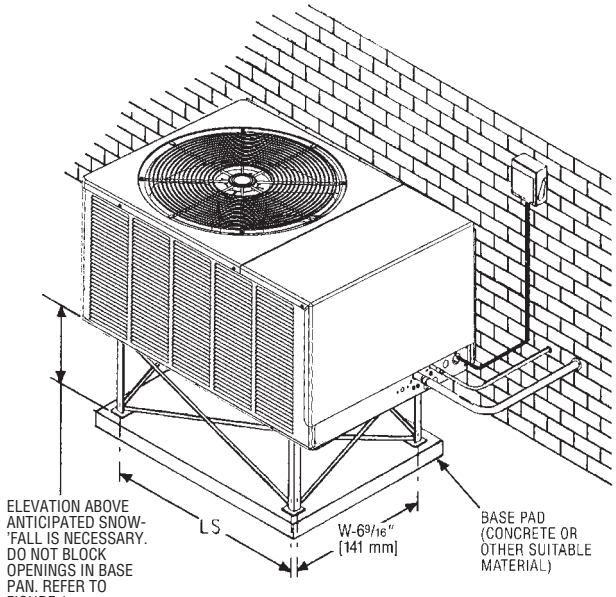


FIGURE 3
RECOMMENDED ELEVATED INSTALLATION



INSTALLATION

IMPORTANT MESSAGE TO OWNER

The manufacturer assumes no responsibility for equipment installed in violation of any code or regulation. The operation portion of this manual gives instructions as to the service and care of the unit. It is recommended that the installer go over the operational portion of this manual with the owner so that there is a full understanding of the equipment and how it is intended to function.

These instructions should be read and kept for future reference. It is suggested that this booklet be affixed to or adjacent to the indoor equipment. It is addressed to your dealer and serviceman, but we highly recommend that you read it–paying particular attention to the section titled “MAINTENANCE.”

INSPECTION AND HANDLING

Inspect exterior of unit for evidence of rough handling in shipment. If damage is found, enter claim at once. Unpack carefully after moving unit to approximate location. Any damage should be reported immediately to the transportation company.

Material in this shipment was inspected at the factory and released to the common carrier with no known damage.

ORDER PARTS

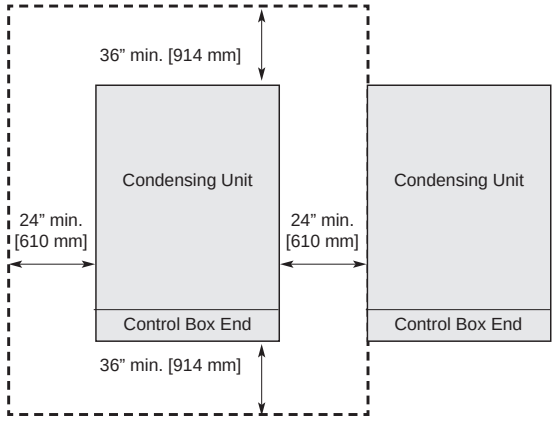
When reporting shortages or damaged parts, or when ordering repair parts, give the complete unit model and serial numbers which are stamped on the Unit Rating Plate.

INSTALLATION – GENERAL

Install the heat pump unit outdoors. It should be located as near as possible to the indoor section to keep connecting refrigerant tubing lengths to a minimum. The unit must be installed to allow unrestricted air flow to the outdoor coils.

If several units are installed adjacent to each other, care must be taken to avoid recirculation of air from one outdoor unit to another. In all installations, adequate space must be provided for installation and servicing. Multiple units should be located at least 36” [914.4 mm] apart.

FIGURE 4
CLEARANCES – 10 TON



The unit must not be connected to any duct work. Do not locate unit under a roof drip; if necessary, install gutters, etc., to prevent water run-off from hitting the unit. To prevent air recirculation, it is recommended that the unit not be installed under an overhang, but if necessary **allow a minimum of 60 inches [25.4 mm] above the unit for air discharge.**

CORROSIVE ENVIRONMENT

The metal parts of this unit may be subject to rust or deterioration if exposed to a corrosive environment. This oxidation could shorten the equipment‘s useful life. Corrosive elements include salt spray, fog or mist in seacoast areas, sulphur or chlorine from lawn watering systems, and various chemical contaminants from industries such as paper mills and petroleum refineries.

If the unit is to be installed in an area where contaminants are likely to be a problem, special attention should be given to the equipment location and exposure.

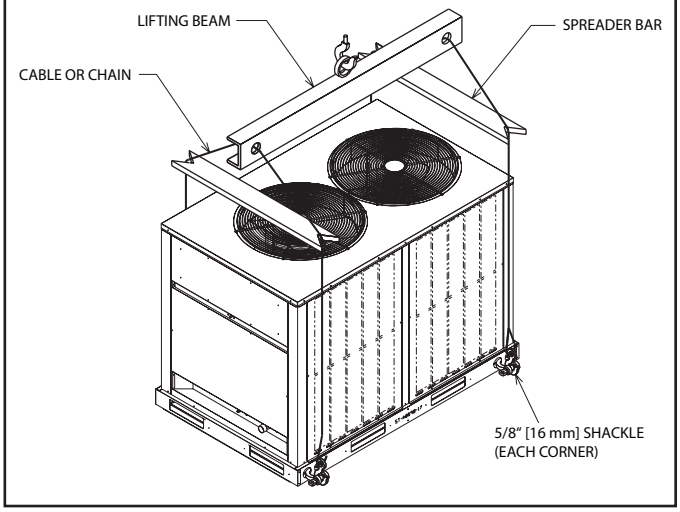
- Avoid having lawn sprinkler heads spray directly on the unit cabinet.
- In coastal areas, locate the unit on the side of the building away from the waterfront.
- Shielding provided by a fence or shrubs may give some protection.
- Elevating the unit off its slab or base enough to allow air circulation will help avoid holding water against the basepan.

Regular maintenance will reduce the buildup of contaminants and help to protect the unit‘s finish.

ROOFTOP INSTALLATION

If rooftop installation is required, make certain that the building construction is adequate for the weight of the unit. (Refer to physical data chart.) Before placing the unit on the roof, make certain that the nylon rigging slings are of sufficient length to maintain equilibrium of the unit when lifting. Under no circumstances should the unit be lifted by only one corner for rooftop installation. See Figure 5.

FIGURE 5
RIGGING — ALL MODELS



LOCATING UNIT

Consult local building codes or ordinances for special installation requirements. When selecting a site to locate the outdoor unit, consider the following:

It is essential to provide for defrost condensate drainage and possible refreezing of condensation. Provide a base pad for mounting the unit which is slightly pitched away from the structure. Route condensate off base pad to an area which will not become slippery and result in personal injury.

IMPORTANT: Do not obstruct condensate drain openings in bottom of the unit.

The length of refrigerant piping and wiring should be as short as possible to avoid capacity losses and increased operating costs.

IMPORTANT: Where snowfall is anticipated, the unit must be elevated above the base pad to prevent ice buildup and coil damage. Mount unit high enough to be above the average accumulated area snowfall.

REFRIGERANT PIPING DATA

GENERAL INFORMATION

1. Vertical risers are not to exceed 60 feet [18.29 m].
2. Locate the remote heat pump unit and indoor air handler as close together as possible to minimize piping runs.
3. Remote heat pump units are shipped with a nitrogen holding charge. Evacuate remote heat pump unit before charging with refrigerant.
4. Runs between remote heat pump and indoor air handler are not to exceed 90 feet [27.43 m] linear length.

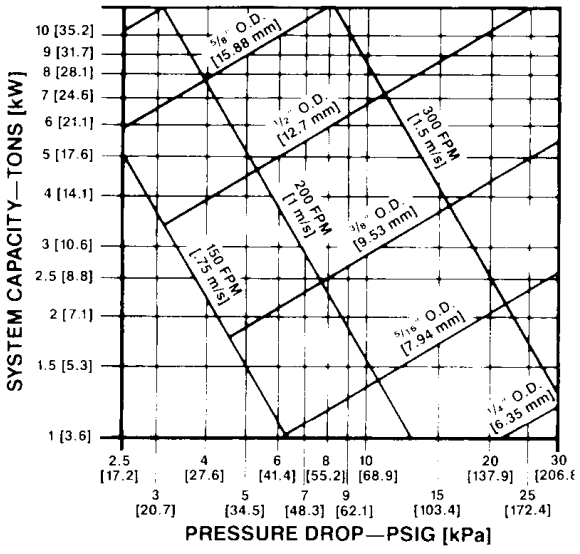
EQUIVALENT LENGTH (FT.) [m] OF STRAIGHT TYPE "L" TUBING FOR NON-FERROUS VALVES & FITTINGS (BRAZED)

TUBE SIZE INCHES [mm] O.D.	ANGLE VALVE	SHORT RADIUS ELL	LONG RADIUS ELL	TEE LINE FLOW
1/2 [12.7]	24 [7.32]	4.7 [1.43]	3.2 [0.98]	1.7 [0.52]
5/8 [15.88]	25 [7.62]	5.7 [1.74]	3.9 [1.19]	2.3 [0.70]
3/4 [19.05]	25 [7.62]	6.5 [1.98]	4.5 [1.37]	2.9 [0.88]
7/8 [22.23]	28 [8.53]	7.8 [2.38]	5.3 [1.62]	3.7 [1.13]
1 1/8 [28.58]	29 [8.84]	2.7 [0.82]	1.9 [0.58]	5.2 [1.59]
1 3/8 [34.93]	33 [10.06]	3.2 [0.98]	2.2 [0.67]	6.9 [2.10]

⚠WARNING

Do not use oxygen to purge lines or pressure system for leak test. Oxygen reacts violently with oil, which can cause an explosion resulting in severe personal injury or death.

FIGURE 6
LIQUID LINE PRESSURE DROP PER 100 FEET [30.48 m] EQUIVALENT LENGTH (TYPE L COPPER TUBING)



NOTES:

1. When indoor coil is above outdoor unit, the pressure drop due to vertical lift (.5 PSIG per foot of lift) [22.62 kPa per meter] **must** be added to the pressure drop derived from this curve.
2. Size liquid line for **no more** than 10°F [-12°C] loss (approximately 30 PSIG [206.8 kPa] total pressure drop).
3. **Do not oversize liquid line.** Oversized liquid lines add significantly to the amount of refrigerant required to charge the system.
4. The maximum recommended velocity with solenoid valves or other quick closing devices in the liquid line is 300 FPM.

INSTALLATION OF PIPING

Once located, the outdoor unit is ready to be interconnected with the indoor unit using ONLY refrigeration grade dehydrated tubing. The following should be considered when connecting the tubing.

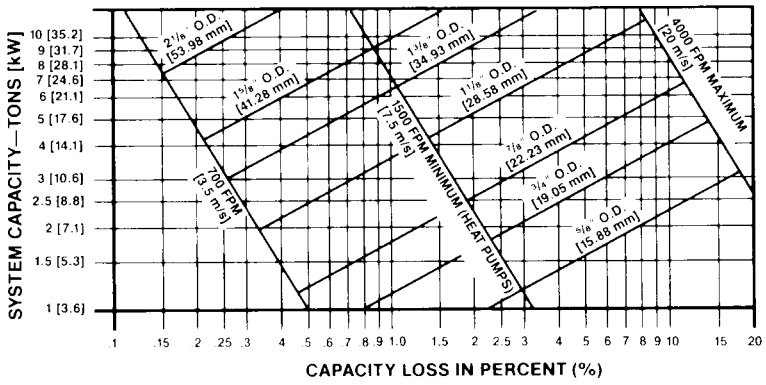
1. Pitch the vapor line toward the compressor approximately 1/2 inch [13 mm] every 10 feet [3 m] to facilitate oil return.
2. It is recommended that a bi-flow filter drier be installed in the liquid line just prior to the indoor coil.
3. Silver solder (such as silfos, Easy Flow, etc.) should be used for all refrigerant joints.
4. Thoroughly clean all joints before fluxing. **DO NOT USE ACID FLUX.**
5. When fluxing, limit the application of paste to the minimum and always apply flux to the male portion of the connection.
6. Vapor lines should be insulated to prevent condensate drip and capacity loss. Use insulation of at least 3/8 inch [10 mm] wall thickness. The insulation should be installed on the tubing prior to making the sweat connections.
7. Insulate the liquid line whenever the heat pick-up or transfer can affect the sub-cooling.
8. Care should be taken to avoid transmission of noise or vibration to building structure.

REQUIRED OZS. R-410A - CHARGE PER FT. [m] OF TUBING

TUBE SIZE O.D. (IN.) [mm]	LIQUID (OZ.) [g]	VAPOR (OZ.) [g]
1/2 [12.7]	1.06 [30.0]	.04 [1.13]
5/8 [15.89]	1.65 [46.7]	.07 [1.98]
3/4 [19.05]	2.46 [69.7]	.10 [2.83]
7/8 [22.23]	3.28 [92.9]	.13 [3.68]
1 1/8 [28.58]		.22 [6.23]
1 3/8 [34.93]		.34 [9.63]
1 5/8 [41.28]		.48 [13.60]
2 1/8 [53.98]		.84 [23.81]

Quantities based on 110°F liquid and 45°F vapor.

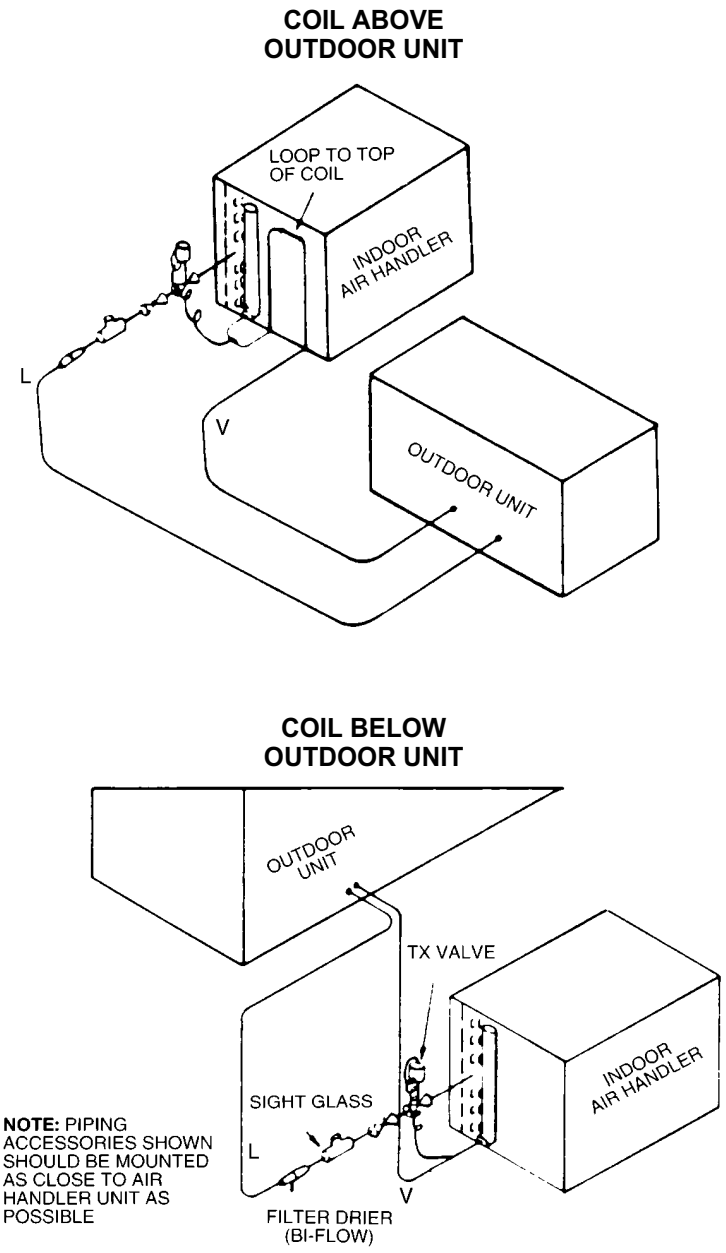
FIGURE 7
VAPOR LINE SYSTEM CAPACITY LOSS IN PERCENT PER 100 FEET [30.48 m] EQUIVALENT LENGTH (TYPE L COPPER TUBING)



NOTES:

1. The minimum velocity line (1500 FPM) [7.5 m/s] is recommended.
2. With the outdoor unit located below the indoor air handler, all vertical vapor lines must not exceed 1 1/8" [28.57 mm] O.D.
3. For suction pressure drop (PSIG), multiply percent (%) loss by 1.18.
4. Size vapor lines for no more than a 3 PSIG [20.7 kPa] pressure drop (2.54% capacity loss) which corresponds to approximately 2°F [-16.7°C] loss
5. All vertical vapor lines, 3 feet [.91 m] or more in length, must have a short radius oil trap at the bottom of the riser.
6. All vertical vapor lines, 30 feet [9.14 m] or more in length, must have short radius oil traps every 15 to 20 feet [4.57 to 6.10 m] of run.

FIGURE 7



RECOMMENDED VAPOR AND LIQUID LINE SIZES FOR VARIOUS LENGTHS OF RUN				
LINEAR LENGTH (FT.) [m]	LIQUID LINE O.D. SIZES (IN.) [mm]		VAPOR LINE O.D. SIZES (IN.) [mm]	
	090	120	090	120
0-40 [0-12.9]	1/2 [12.7]	5/8 [15.88]	1 1/8 [28.58]	1 3/8 [34.93]
41-90 [12.5-27.43]	1/2 [12.7]	5/8 [15.88]	1 1/8 [34.93]*	1 3/8 [34.93]*

NOTE: Runs between outdoor coil and indoor coil not to exceed 90' [27.43 m] linear length.

NOTE: With the outdoor unit located below the indoor air handler, all vertical vapor lines must not exceed 1 1/8" [28.58 mm] O.D.

ELECTRICAL WIRING

NOTE: Field wiring must comply with the National Electric Code (CEC in Canada) and any local ordinance that may apply.

ELECTRICAL POWER

It is important that proper electrical power is available at the unit. Voltage must not vary more than 10% of that stamped on the rating plate (see Electrical Data Table for minimum and maximum voltage). Interphase voltage variation on three-phase units must not be more than 3%. Contact local power company for correction of improper voltage or phase unbalance.

POWER WIRING

Power wiring should be run in grounded rain-tight conduit. See Electrical Data Table for wire ampacity and proper wire size.

WIRE ROUTING

POWER WIRING MUST BE RUN IN CONDUIT. Conduit must be run through the connector panel below the service cover and attached to the bottom of the control box.

⚠WARNING

THIS UNIT MUST BE PERMANENTLY GROUNDED. A GROUND LUG IS PROVIDED NEAR THE CONTACTOR FOR A GROUND WIRE. FAILURE TO PROPERLY GROUND THE UNIT CAN RESULT IN FIRE, PERSONAL INJURY OR DEATH.

If low (extra-low in Canada) voltage control wire is run in conduit with power supply, Class I insulation is required. If run separate, Class II is required. Low voltage wiring may be run through the insulated bushing provided in the 7/8" [22 mm] hole in the connector panel then route to the control box.

⚠WARNING

AFTER COMPLETION OF WIRING CHECK ALL ELECTRICAL CONNECTIONS, INCLUDING FACTORY WIRING WITHIN THE UNIT, AND MAKE SURE ALL CONNECTIONS ARE TIGHT, REPLACE AND SECURE ALL ELECTRICAL BOX COVERS AND ACCESS DOORS BEFORE LEAVING UNIT OR TURNING ON POWER TO UNIT. FAILURE TO DO SO CAN RESULT IN PERSONAL INJURY OR DEATH.

GROUNDING

WARNING: The unit must be permanently grounded.

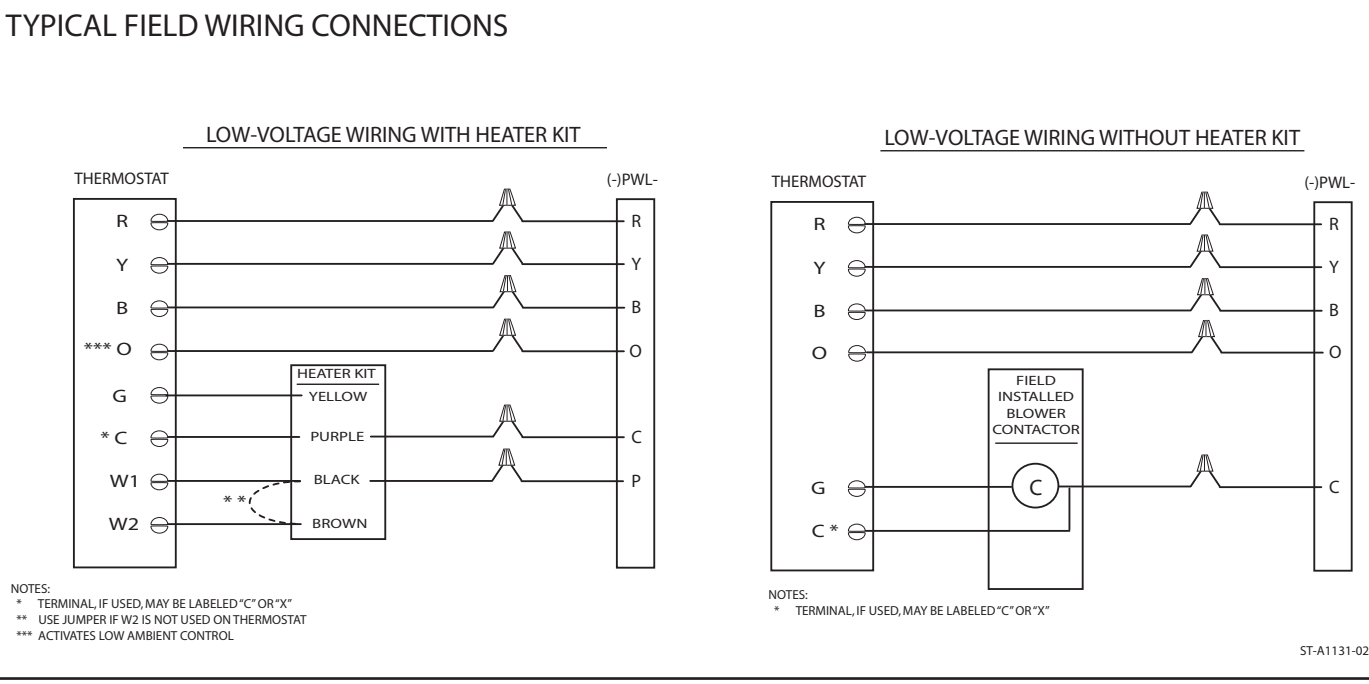
A grounding lug is provided in control box for a ground wire.

Grounding may be accomplished by grounding the power line conduit to the unit.

THERMOSTAT

A single-stage cooling, two-stage heating (if auxiliary heat is used) thermostat should be mounted on an inside wall about five feet above the floor in a location where it will not be affected by the sun or drafts, from open doors or other sources. Install, level, and after installation check the thermostat calibration and recalibrate if necessary.

FIGURE 9
TYPICAL FIELD WIRING CONNECTIONS



FIELD WIRE SIZE FOR 24 VOLT THERMOSTAT CIRCUITS							
		SOLID COPPER WIRE - AWG					
Thermostat Load - Amps	3.0	16	14	12	10	10	10
	2.5	16	14	12	12	10	10
	2.0	18	16	14	12	12	10
		50 [15.24]	100 [30.48]	150 [45.72]	200 [60.96]	250 [76.20]	300 [91.44]
		Length of Run - Feet [m] (1)					

(1) Wire length equals twice the run distance.

VOLTAGE DROP 1%

CIRCUIT AMPACITY	COPPER WIRE GAUGE*				
	DISTANCE IN FEET [m]				
	100 [30.48]	150 [45.72]	200 [60.96]	250 [76.20]	300 [91.44]
40	6	4	3	2	1
45	4	3	2	1	1/0
50	4	3	2	1	1/0
60	4	2	1	1/0	2/0
70	3	2	1/0	2/0	3/0
80	3	1	1/0	2/0	3/0
90	2	1/0	2/0	3/0	4/0
100	2	1/0	2/0	3/0	4/0
110	1	2/0	3/0	4/0	250
125	1	2/0	3/0	4/0	250

*75°C Insulation

LEAK TESTING

Pressurize line set and coil through service fitting with dry nitrogen to 150 PSIG [1034 kPa] maximum. Leak test all joints using liquid detergent. If a leak is found, release the dry-nitrogen pressure and repair.

EVACUATION AND CHARGING

The evacuation of any system component that has been exposed to atmosphere or lost its charge is essential before charging. Never attempt to operate a system while it is under a vacuum.

NOTE: The unit is shipped with a holding charge of dry nitrogen which must be purged from the unit before evacuation.

1. Since the outdoor unit itself must be evacuated, open the optional vapor and liquid shut-off valves.
2. Use a refrigeration type vacuum pump capable of evacuation in the 500 micron range.
3. Connect the vacuum pump to the service manifold assembly with a pressure gauge that will read 30 inches [762 mm] vacuum. Connect the service manifold to the vapor line schrader valve port.
4. With an accurate scale, 1/2 oz. [14 g], set refrigerant tank up so its weight can be measured while in a position to charge liquid. (Unit must be off.)
5. Connect to the liquid shut-off valve port. Shut off tank and evacuate the system. The pressure gauge should read at least 29.5” [749 mm] of vacuum.
6. Triple evacuate the system.
7. The refrigerant system will now be free of noncondensibles.
8. Remove vacuum pump from 3-way valve.
9. Install refrigerant tank (liquid charging) to liquid service valve. (See note below.)
10. Note weight of refrigerant tank.
11. Open refrigerant tank valve. Allow pressure in tank and unit to equalize.
12. Close off service valve to liquid port and note weight of refrigerant tank.
13. Position tank for gas charging.
14. Close main disconnect switch and turn thermostat to lowest setting.
15. Charge unit per charts located on pages 13 and 14.
16. Adjust refrigerant charge to obtain pressures indicated in the temperature/pressure chart.
17. Note weight of refrigerant tank.
18. Close service ports on vapor and liquid valves. Remove service gauges.
19. Replace service port caps and valve stem caps. These caps must be replaced to prevent leaks.
20. Record total charge quantity on rating plate.

FINAL LEAK TESTING

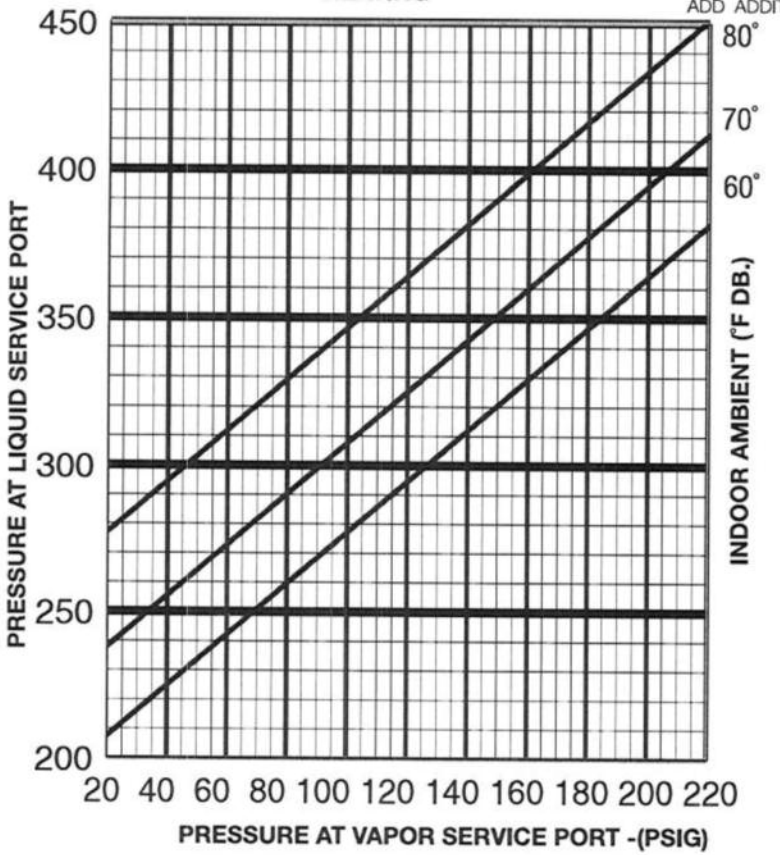
After the unit has been properly evacuated and charged, halogen leak detector should be used to detect leaks in the system. All piping within the heat pump, indoor coil, and interconnecting tubing should be checked for leaks. If a leak is detected, the refrigerant should be recovered before repairing the leak. The Clean Air Act prohibits releasing refrigerant into the atmosphere.

SPLIT SYSTEM HEAT PUMP 7-1/2 TONS

SYSTEM CHARGE CHART - REFRIGERANT 410A
BASIC SYSTEM CHARGE WITH 0 FEET OF TUBING = 372 OZ.
ADD ADDITIONAL AMOUNT AS SHOWN IN TABLE BELOW

REQUIRED OUNCES R-410A CHARGE PER FOOT OF TUBING		
TUBE SIZE O. D. IN.	LIQUID TUBE	VAPOR TUBE
1/2	1.15	
5/8	1.86	
1-1/8		.34
1-3/8		.52

HEATING

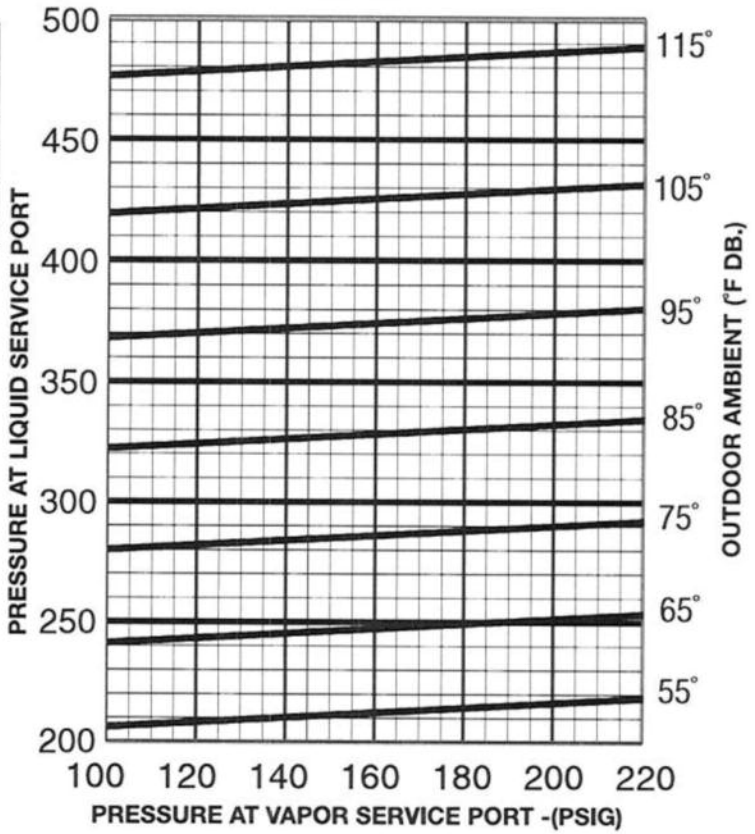


CAUTION: NO ICE ON OUTDOOR COILS, RETURN AIR TEMPERATURE MUST BE BETWEEN 70° & 75° BEFORE FINAL REFRIGERANT CHECK.

INSTRUCTIONS:

1. CONNECT PRESSURE GAUGES TO VAPOR AND LIQUID PORTS AT OUTDOOR UNIT.
2. MEASURE AIR TEMPERATURE TO THE UNIT (INDOOR DRY BULB AMBIENT).
3. PLACE AN "X" ON THE CHART WHERE THE VAPOR AND LIQUID PRESSURE CROSS.
4. IF "X" IS BELOW INDOOR TEMPERATURE LINE, ADD CHARGE AND REPEAT 3.
5. IF "X" IS ABOVE INDOOR TEMPERATURE LINE, RECOVER EXCESS CHARGE AND REPEAT 3.

COOLING



CAUTION: RETURN AIR TEMPERATURE MUST BE BETWEEN 70° & 75° BEFORE FINAL REFRIGERANT CHECK.

INSTRUCTIONS:

1. CONNECT PRESSURE GAUGES TO VAPOR AND LIQUID PORTS AT OUTDOOR UNIT.
2. MEASURE AIR TEMPERATURE TO THE UNIT (OUTDOOR DRY BULB AMBIENT).
3. PLACE AN "X" ON THE CHART WHERE THE VAPOR AND LIQUID PRESSURE CROSS.
4. IF "X" IS BELOW OUTDOOR TEMPERATURE LINE, ADD CHARGE AND REPEAT 3.
5. IF "X" IS ABOVE OUTDOOR TEMPERATURE LINE, RECOVER EXCESS CHARGE AND REPEAT 3.

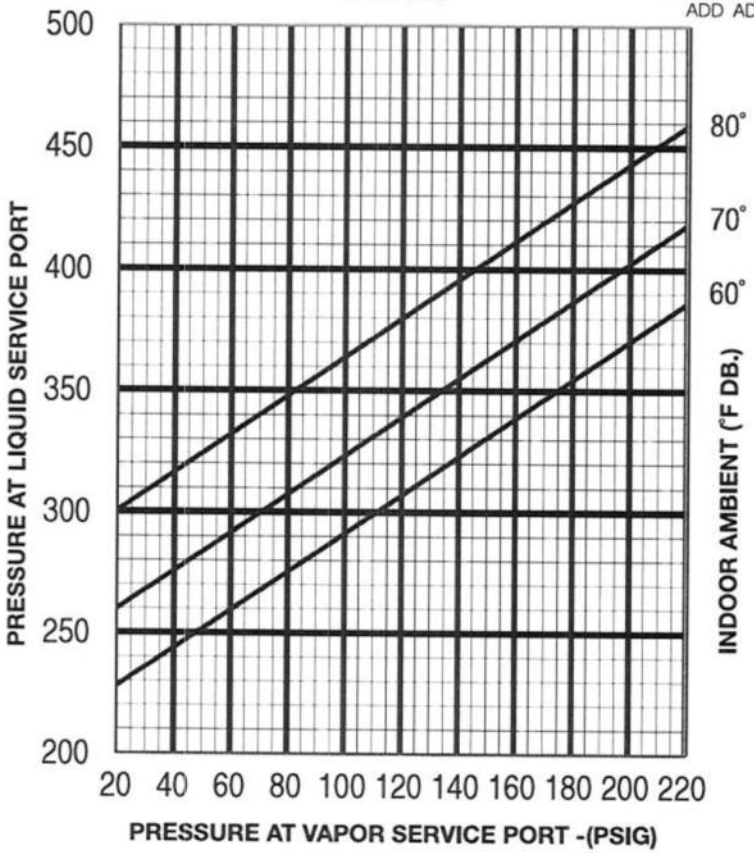
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SPLIT SYSTEM HEAT PUMP 10 TONS

SYSTEM CHARGE CHART - REFRIGERANT 410A
BASIC SYSTEM CHARGE WITH 0 FEET OF TUBING = 436 OZ.
ADD ADDITIONAL AMOUNT AS SHOWN IN TABLE BELOW

REQUIRED OUNCES R-410A CHARGE PER FOOT OF TUBING		
TUBE SIZE O. D. IN.	LIQUID TUBE	VAPOR TUBE
1/2	1.15	
5/8	1.86	
1-1/8		.34
1-3/8		.52

HEATING

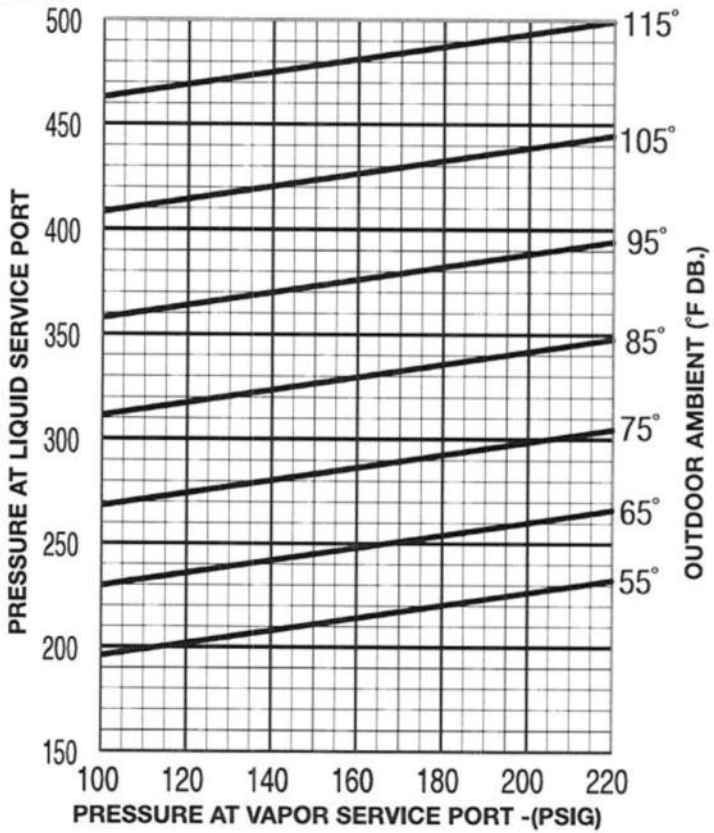


CAUTION: NO ICE ON OUTDOOR COILS, RETURN AIR TEMPERATURE MUST BE BETWEEN 70° & 75° BEFORE FINAL REFRIGERANT CHECK.

INSTRUCTIONS:

1. CONNECT PRESSURE GAUGES TO VAPOR AND LIQUID PORTS AT OUTDOOR UNIT.
2. MEASURE AIR TEMPERATURE TO THE UNIT (INDOOR DRY BULB AMBIENT).
3. PLACE AN "X" ON THE CHART WHERE THE VAPOR AND LIQUID PRESSURE CROSS.
4. IF "X" IS BELOW INDOOR TEMPERATURE LINE, ADD CHARGE AND REPEAT 3.
5. IF "X" IS ABOVE INDOOR TEMPERATURE LINE, RECOVER EXCESS CHARGE AND REPEAT 3.

COOLING



CAUTION: RETURN AIR TEMPERATURE MUST BE BETWEEN 70° & 75° BEFORE FINAL REFRIGERANT CHECK.

INSTRUCTIONS:

1. CONNECT PRESSURE GAUGES TO VAPOR AND LIQUID PORTS AT OUTDOOR UNIT.
2. MEASURE AIR TEMPERATURE TO THE UNIT (OUTDOOR DRY BULB AMBIENT).
3. PLACE AN "X" ON THE CHART WHERE THE VAPOR AND LIQUID PRESSURE CROSS.
4. IF "X" IS BELOW OUTDOOR TEMPERATURE LINE, ADD CHARGE AND REPEAT 3.
5. IF "X" IS ABOVE OUTDOOR TEMPERATURE LINE, RECOVER EXCESS CHARGE AND REPEAT 3.

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MAINTENANCE AND OPERATION

1. All access panels must be in place when unit is in operation.
2. For maximum efficiency, the outdoor coil must be kept clean. Periodic inspections, depending on local conditions are recommended. If it is necessary to clean the outdoor coil, use a common garden hose.
3. Never operate the unit without filters installed in the air handler.

CONTACTOR (CC)

The contactor is an electrical switch which operates the compressor and outdoor fans. Its 24 volt coil is activated by the room thermostat.

HIGH PRESSURE SWITCH (HPC)

Opens the contactor circuit on high refrigerant pressure–Manual Reset–check for cause of tripping before putting unit back in service.

HOT GAS SENSOR (HGS) (Discharge Line Thermostat)

Acts as safety against loss of refrigerant.

PRE-START CHECK

1. Is outdoor unit properly located and level?
2. Is air free to travel to and from outdoor unit?
3. Is the wiring correct and according to the unit wiring diagram?
4. Are wiring connections tight? (Including those in unit and compressor electrical box.)
5. Is the unit properly grounded?
6. Is circulating air blower correctly wired?
7. Is outdoor unit properly fused?
8. Is the thermostat level, correctly wired and in a good location?
9. Is the ductwork correctly sized, run, taped and insulated?
10. Is refrigerant tubing neatly run and vapor line thoroughly insulated?
11. Is condensate drain line properly sized, run, trapped and pitched?
12. Are refrigerant connections tight and leak tested?
13. Is filter clean and in place?
14. Does the outdoor fan turn free without rubbing?
15. Is the fan tight on the fan shaft?
16. Are all covers and access panels in place to prevent air loss?
17. Are refrigerant valves open for full flow?

SEQUENCE OF OPERATION

COOLING MODE

1. With thermostat in the cool mode, fan auto and the room temperature higher than the thermostat setting:
   a. Indoor blower contactor (BC) is energized through thermostat contact (G) (See Indoor Air Handler).
   b. Compressor contactor (CC) is energized through thermostat contact (Y) and high pressure control (HPC).
   c. Room thermostat locks out the defrost relay (DR), defrost control (DFC) and reversing valve (RV).
   d. The system will continue in the cooling operation as long as all safety controls are closed until the thermostat is satisfied.
      1. The reversing valve remains in the cooling mode when the thermostat is satisfied.

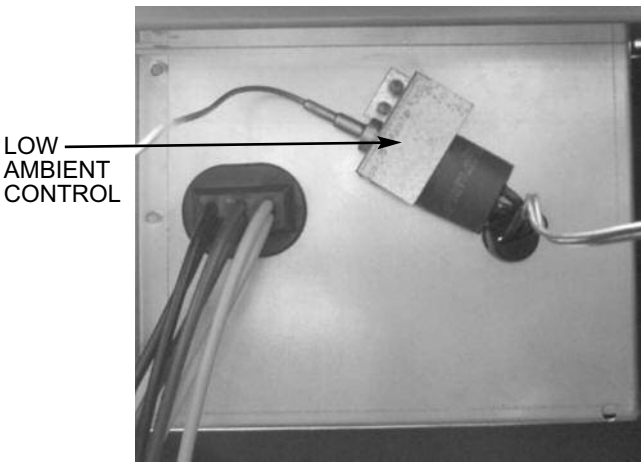
HEATING MODE

1. With the thermostat in the heat mode, fan auto and the room temperature lower than the thermostat setting.
   a. Indoor blower contactor (BC) is energized through thermostat contact (G) (See Indoor Air Handler).
   b. Compressor contactor (CC) is energized through thermostat contact (Y) and high pressure control (HPC).
   c. Defrost control (DFC) energized.
      1. Reversing valve (RV) and defrost control (DFC) are energized through room thermostat contact (B).
      2. The defrost control (DFC) will energize the defrost relay (DR) on a demand basis as required.
   d. Should the heat requirement be more than the heat pump can supply, a portion of the electric heat accessory (if supplied) is energized through room thermostat contact (W2). (See electric heat kit accessory section.)
   e. The system will continue the heating operation as long long as all safety controls are closed until the thermostat is satisfied.
      1. The reversing valve remains in the heating mode when the thermostat is satisfied.
   f. The unit will function in a defrost mode, reversing the refrigerant flow to cooling and energizing the electric heat kit (if supplied), as required through the defrost relay (DR).
   g. If the refrigerant system becomes inoperable during a need for heating, the room thermostat may be set to “emergency heat” which will energize the remaining portion of the electric heat kit (if supplied).

ACCESSORIES

SIGHT GLASS – Allows viewing of the refrigerant. The color indicator shows relative moisture saturation of the refrigerant. Its inclusion in the refrigerant piping is recommended. A minimum of 12 hours after installation is required before attempting to determine if a moisture condition within the system exists.

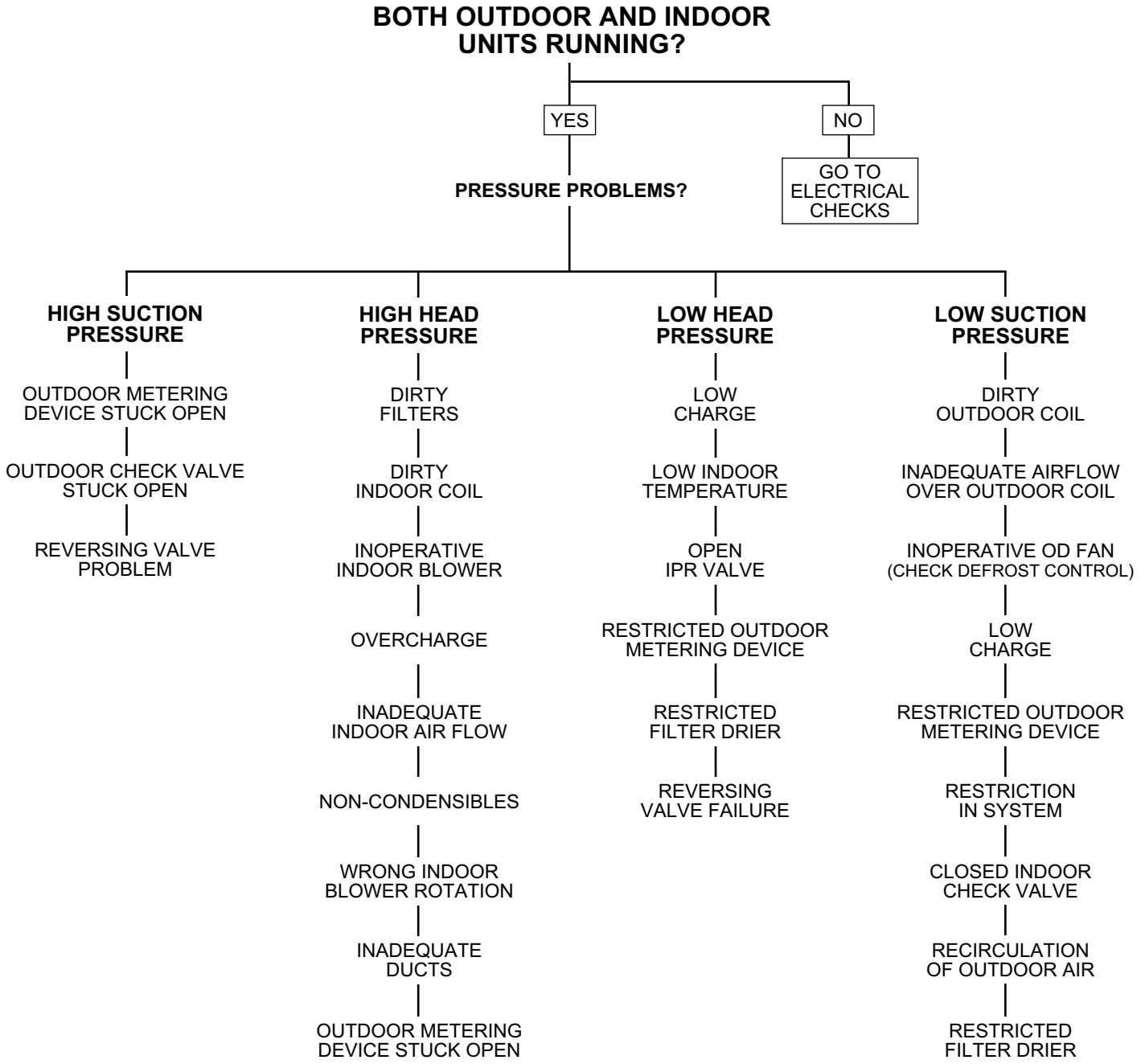
FIGURE 10
LOW AMBIENT KIT



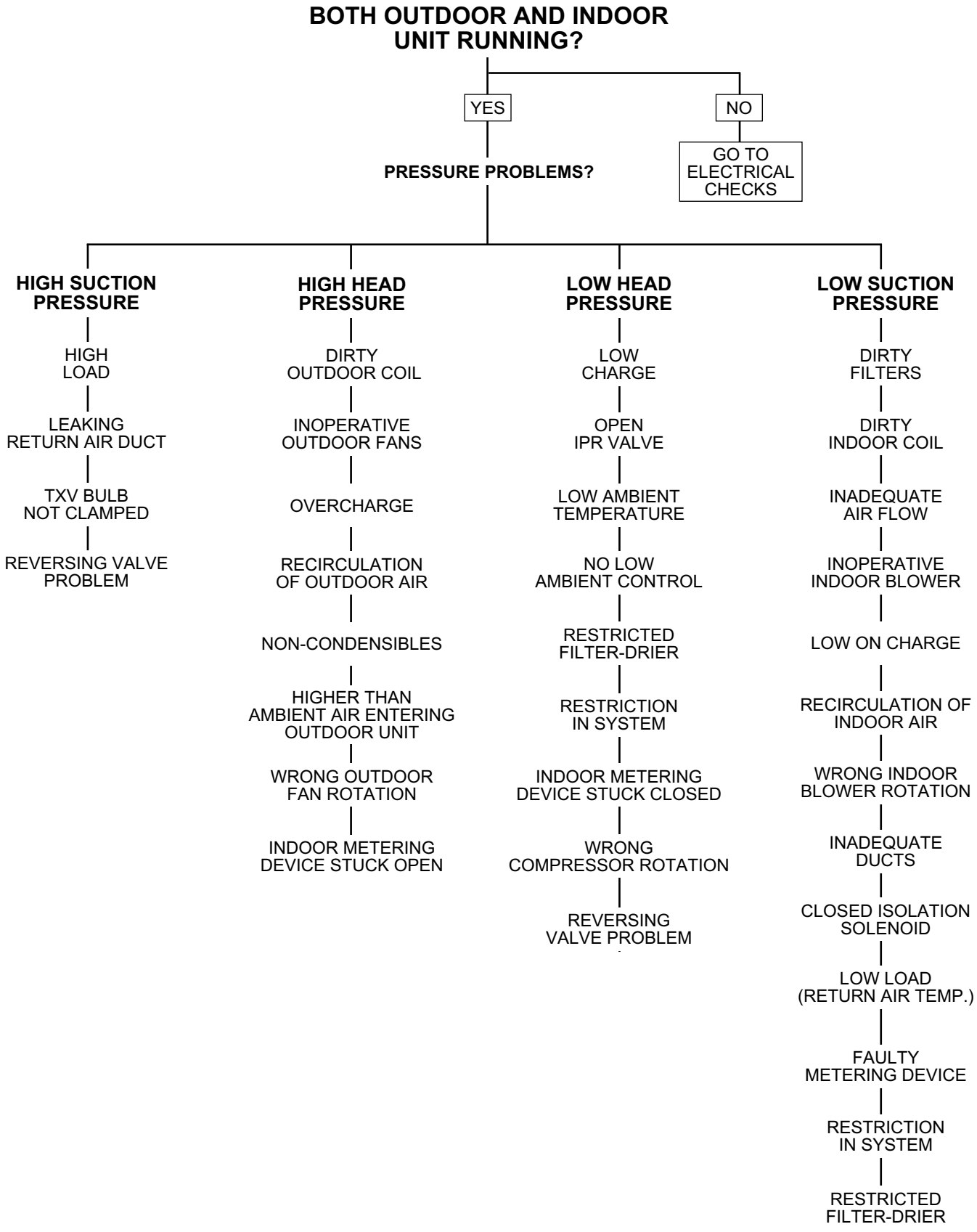
TROUBLE SHOOTING FLOW CHARTS

The following flow charts are designed to aid technicians in troubleshooting common installation problems with (-)PWE heat pumps. The charts are designed in a “most-common problem” to “least-common problem” format, so that the item at the top of each list is the most common cause of problems.

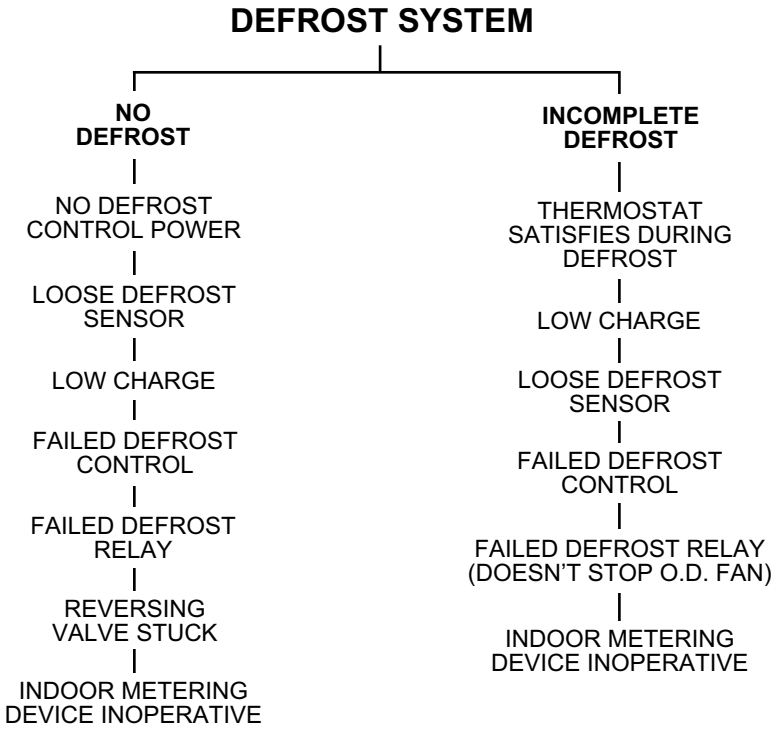
MECHANICAL CHECKS FLOW CHART (HEATING MODE)



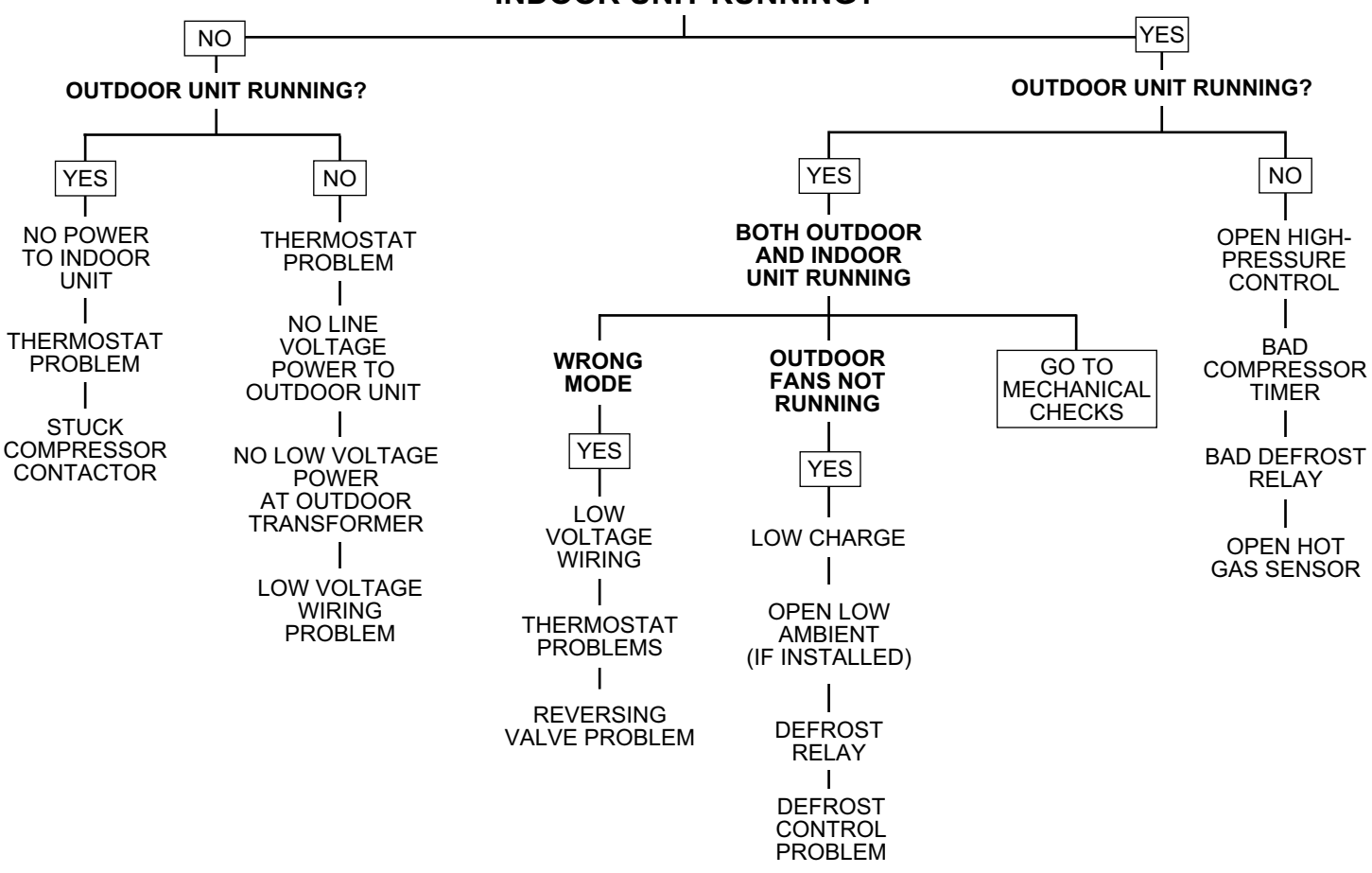
MECHANICAL CHECKS FLOW CHART (COOLING MODE)

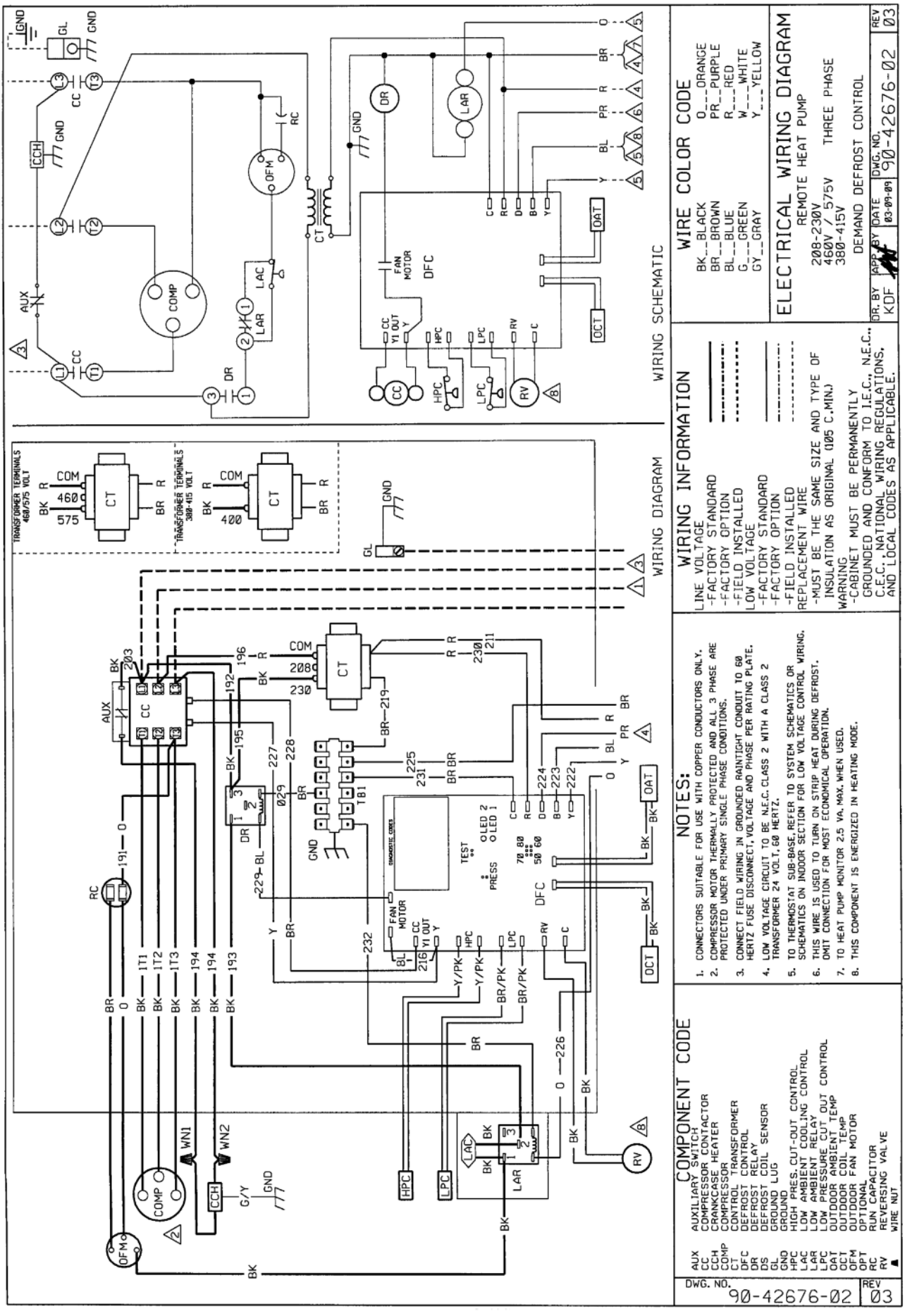


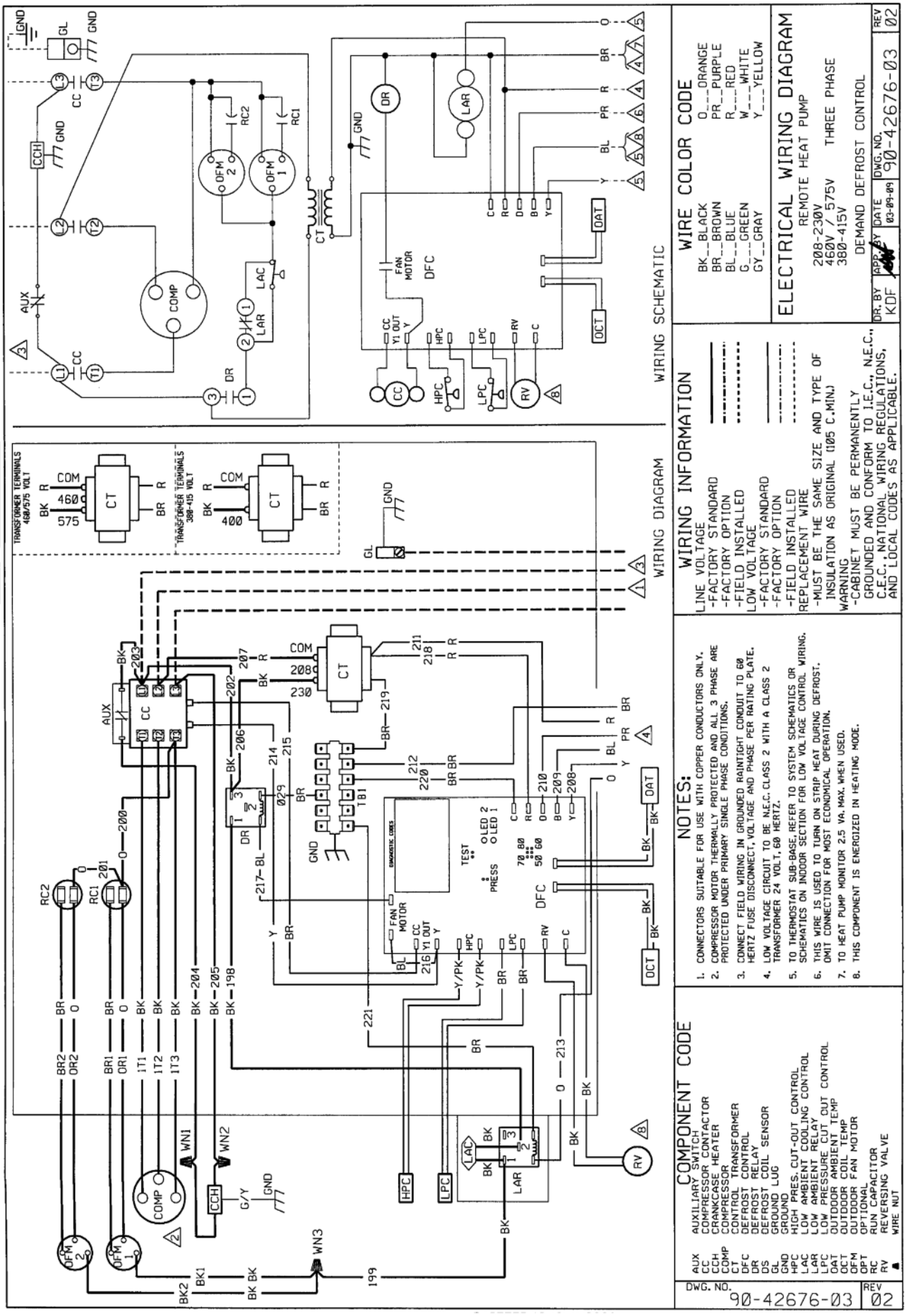
MECHANICAL CHECKS FLOW CHART (DEFROST SYSTEM)



ELECTRICAL CHECKS FLOW CHART




WIRING SCHEMATIC
WIRING DIAGRAM
WIRE COLOR CODE
BK--BLACK
BR--BROWN
BL--BLUE
G---GREEN
GY--GRAY
O---ORANGE
PR--PURPLE
R---RED
W---WHITE
Y---YELLOW
ELECTRICAL WIRING DIAGRAM
REMOTE HEAT PUMP
208-230V
460V / 575V THREE PHASE
380-415V
DEMAND DEFROST CONTROL
DR. BY KDF
APP. BY
DATE 03-09-09
DWG. NO. 90-42676-02
REV 03
WIRING INFORMATION
LINE VOLTAGE
-FACTORY STANDARD
-FACTORY OPTION
-FIELD INSTALLED
LOW VOLTAGE
-FACTORY STANDARD
-FACTORY OPTION
-FIELD INSTALLED
REPLACEMENT WIRE
-MUST BE THE SAME SIZE AND TYPE OF INSULATION AS ORIGINAL (105 C.MIN.)
WARNING
-CABINET MUST BE PERMANENTLY GROUNDED AND CONFORM TO I.E.C., N.E.C., C.E.C.; NATIONAL WIRING REGULATIONS, AND LOCAL CODES AS APPLICABLE.
NOTES:
1. CONNECTORS SUITABLE FOR USE WITH COPPER CONDUCTORS ONLY.
2. COMPRESSOR MOTOR THERMALLY PROTECTED AND ALL 3 PHASE ARE PROTECTED UNDER PRIMARY SINGLE PHASE CONDITIONS.
3. CONNECT FIELD WIRING IN GROUNDED RAINTIGHT CONDUIT TO 60 HERTZ FUSE DISCONNECT, VOLTAGE AND PHASE PER RATING PLATE.
4. LOW VOLTAGE CIRCUIT TO BE N.E.C. CLASS 2 WITH A CLASS 2 TRANSFORMER 24 VOLT, 60 HERTZ.
5. TO THERMOSTAT SUB-BASE. REFER TO SYSTEM SCHEMATICS OR SCHEMATICS ON INDOOR SECTION FOR LOW VOLTAGE CONTROL WIRING.
6. THIS WIRE IS USED TO TURN ON STRIP HEAT DURING DEFROST. OMIT CONNECTION FOR MOST ECONOMICAL OPERATION.
7. TO HEAT PUMP MONITOR 2.5 VA. MAX. WHEN USED.
8. THIS COMPONENT IS ENERGIZED IN HEATING MODE.
COMPONENT CODE
AUX AUXILIARY SWITCH
CC COMPRESSOR CONTACTOR
CCH CRANKCASE HEATER
COMP COMPRESSOR
CT CONTROL TRANSFORMER
DFC DEFROST CONTROL
DR DEFROST RELAY
DS DEFROST COIL SENSOR
GL GROUND LUG
GND GROUND
HPC HIGH PRES. CUT-OUT CONTROL
LAC LOW AMBIENT COOLING CONTROL
LAR LOW AMBIENT RELAY
LPC LOW PRESSURE CUT OUT CONTROL
OAT OUTDOOR AMBIENT TEMP
OCT OUTDOOR COIL TEMP
OFM OUTDOOR FAN MOTOR
OPT OPTIONAL
RC RUN CAPACITOR
RV REVERSING VALVE
WN WIRE NUT
DWG. NO. 90-42676-02
REV 03


ELECTRICAL WIRING DIAGRAM
REMOTE HEAT PUMP
208-230V
460V / 575V THREE PHASE
380-415V
DEMAND DEFROST CONTROL
DWG. NO. 90-42676-03
REV 02
WIRE COLOR CODE
BK--BLACK O--ORANGE
BR--BROWN PR--PURPLE
BL--BLUE R--RED
G--GREEN W--WHITE
GY--GRAY Y--YELLOW
WIRING INFORMATION
LINE VOLTAGE
-FACTORY STANDARD
-FACTORY OPTION
-FIELD INSTALLED
LOW VOLTAGE
-FACTORY STANDARD
-FACTORY OPTION
-FIELD INSTALLED
REPLACEMENT WIRE
-MUST BE THE SAME SIZE AND TYPE OF INSULATION AS ORIGINAL (105 C.MIN.)
WARNING
-CABINET MUST BE PERMANENTLY GROUNDED AND CONFORM TO I.E.C., N.E.C., C.E.C. NATIONAL WIRING REGULATIONS, AND LOCAL CODES AS APPLICABLE.
NOTES:
1. CONNECTORS SUITABLE FOR USE WITH COPPER CONDUCTORS ONLY.
2. COMPRESSOR MOTOR THERMALLY PROTECTED AND ALL 3 PHASE ARE PROTECTED UNDER PRIMARY SINGLE PHASE CONDITIONS.
3. CONNECT FIELD WIRING IN GROUNDED RAINTIGHT CONDUIT TO 60 HERTZ FUSE DISCONNECT, VOLTAGE AND PHASE PER RATING PLATE.
4. LOW VOLTAGE CIRCUIT TO BE N.E.C. CLASS 2 WITH A CLASS 2 TRANSFORMER 24 VOLT, 60 HERTZ.
5. TO THERMOSTAT SUB-BASE. REFER TO SYSTEM SCHEMATICS OR SCHEMATICS ON INDOOR SECTION FOR LOW VOLTAGE CONTROL WIRING.
6. THIS WIRE IS USED TO TURN ON STRIP HEAT DURING DEFROST. OMIT CONNECTION FOR MOST ECONOMICAL OPERATION.
7. TO HEAT PUMP MONITOR 2.5 VA. MAX. WHEN USED.
8. THIS COMPONENT IS ENERGIZED IN HEATING MODE.
COMPONENT CODE
AUX AUXILIARY SWITCH
CC COMPRESSOR CONTACTOR
CCH CRANKCASE HEATER
COMP COMPRESSOR
CT CONTROL TRANSFORMER
DFC DEFROST CONTROL
DR DEFROST RELAY
DS DEFROST COIL SENSOR
GL GROUND LUG
GND GROUND
HPC HIGH PRES. CUT-OUT CONTROL
LAC LOW AMBIENT COOLING CONTROL
LAR LOW AMBIENT RELAY
LPC LOW PRESSURE CUT OUT CONTROL
OAT OUTDOOR AMBIENT TEMP
OCT OUTDOOR COIL TEMP
OFM OUTDOOR FAN MOTOR
OPT OPTIONAL
RC RUN CAPACITOR
RV REVERSING VALVE
WN WIRE NUT
WIRING DIAGRAM
WIRING SCHEMATIC
TRANSFORMER TERMINALS 460/575 VOLT
TRANSFORMER TERMINALS 380-415 VOLT
DR. BY KDF
APP. BY
DATE 03-09-09
DWG. NO. 90-42676-03
REV 02