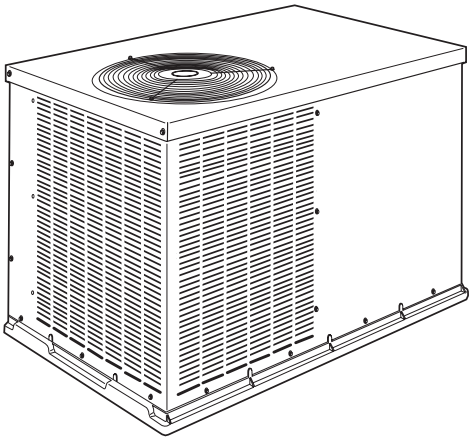
Installation Instructions

WTA3 & PAT3 Series

PACKAGED AIR CONDITIONER



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International Comfort Products, LLC
Lewisburg, TN. 37091

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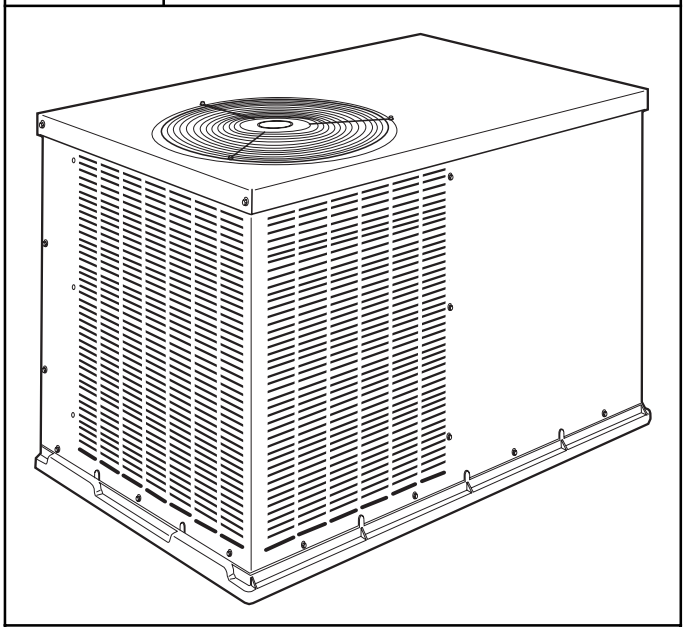
SAFE INSTALLATION REQUIREMENTS

FIGURE 1 PACKAGED AIR CONDITIONER



Installation and servicing of this equipment can be hazardous due to mechanical and electrical components. Only trained and qualified personnel should install, repair, or service this equipment.

Untrained personnel can perform basic maintenance functions such as cleaning and replacing air filters. All other operations must be performed by trained service personnel. When working on this equipment, observe precautions in the literature, on tags, and on labels attached to or shipped with the unit and other safety precautions that may apply.

Follow all safety codes. Installation must be in compliance with local and national building codes. Wear safety glasses, protective clothing, and work gloves. Have fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit.

⚠ CAUTION

CUT HAZARD

Failure to follow this caution may result in personal injury.

Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing and gloves when handling parts.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Before installing or servicing system, always turn off main power to system. There may be more than one disconnect switch. Turn off accessory heater power switch if applicable. TAG DISCONNECT SWITCH WITH LOCKOUT TAG.

Recognize safety information. This is the safety-alert symbol ⚠. When you see this symbol in instructions or manuals, be alert to the potential for personal injury.

Understand the signal words **DANGER**, **WARNING**, **CAUTION**, and **NOTE**. These words are used with the safety-alert symbol. **DANGER** identifies the most serious hazards which **will** result in serious injury or death. **WARNING** signifies a hazard which **could** result in serious injury or death. **CAUTION** is used to identify unsafe practices which **may** result in minor personal injury or product and property damage. **NOTE** is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

INTRODUCTION

The packaged unit is a fully self-contained air conditioner designed for outdoor installation (see Figure 3 for unit dimensions). All unit sizes have return and discharge openings for horizontal airflow.

Units may be installed either on a rooftop, ground level cement slab, or directly on the ground if local codes allow.

RECEIVING AND INSTALLATION

STEP 1 — Check Equipment

Identify Unit

The unit model number and serial number are stamped on the unit information plate. Check this information against shipping papers.

Inspect Shipment

Inspect for shipping damage while unit is still on shipping pallet. If unit appears to be damaged or is torn loose from its anchorage, have it examined by transportation inspectors before removal. Forward claim papers directly to transportation company. Manufacturer is not responsible for any damage incurred in transit. Check all items against shipping list. Immediately notify the nearest equipment distribution office if any item is missing. To prevent loss or damage, leave all parts in original packages until installation.

STEP 2 — Provide Unit Support

For hurricane tie downs, contact distributor for details and PE (Professional Engineering) Certificate, if required.

Slab Mount

Place the unit on a solid, level concrete pad that is a minimum of 4" (102mm) thick with 2" (51mm) above grade. The slab should extend approximately 2" (51mm) beyond the casing on all 4 sides of the unit. Do not secure the unit to the slab *except* when required by local codes.

A 6" (152mm) wide gravel apron should be used around the flat surface to prevent airflow blockage by grass or shrubs. The unit should be level within ¼". This is necessary for the unit drain to function properly.

Ground Mount

The unit may be installed either on a slab or placed directly on the ground, if local codes permit. Place the unit on level ground prepared with gravel for condensate discharge.

STEP 3 — Provide Clearances

The required minimum operating and service clearances are shown in Figure 3. Adequate ventilation and condenser air must be provided.

NOTE: Do not restrict outdoor airflow. An air restriction at either the outdoor-air inlet or the fan discharge may be detrimental to compressor life.

The condenser fan pulls air through the condenser coil and discharges it through the top grille. Be sure that the fan discharge does not recirculate to the condenser coil. Do not locate the unit in either a corner or under an overhead obstruction. The minimum clearance under a partial overhang (such as a normal house overhang) is 48" (1219mm). above the unit top. The maximum horizontal extension of a partial overhang must not exceed 48" (1219mm).

Do not place the unit where water, ice, or snow from an overhang or roof will damage or flood the unit. Do not install the unit on carpeting or other combustible materials. Slab-mounted units should be at least 4" (102mm) above the highest expected water and runoff levels. Do not use unit if it has been under water.

STEP 4 — Install Duct Connections

The design and installation of the duct system must be in accordance with the standards of the NFPA for installation of non-residence type air conditioning and ventilating systems, NFPA 90A or residence type, NFPA 90B and/or local codes and ordinances.

Select and size ductwork, supply air registers, and return air grilles according to ASHRAE (American Society of Heating, Refrigeration, and Air Conditioning Engineers) recommendations.

Use the duct flanges provided on the supply and return openings on the side of the unit. See Figure 3 for connection sizes and locations. The 14" (356mm) round duct collars are shipped inside the unit attached to the base pan in the indoor blower compartment. They are for field installation and must be removed from the indoor blower compartment prior to start-up, even if they are not used for installation.

Adhere to the following criteria when selecting, sizing, and installing the duct system:

1. All units should have field-supplied filters installed in the return-air side of the unit. Recommended sizes for filters are shown in Table 1.
2. Avoid abrupt duct size increases and reductions. Abrupt change in duct size adversely affects air performance.
3. Size ductwork for cooling air quantity (CFM). The minimum air quantity for proper electric heater operation is listed in Table 10. Heater limit switches may trip at air quantities below those recommended.
4. Seal, insulate, and weatherproof all external ductwork. Seal, insulate and cover with a vapor barrier all ductwork passing through conditioned spaces. Follow latest Sheet Metal and Air Conditioning Contractors National Association (SMACNA) and Air Conditioning Contractors Association (ACCA) minimum installation standards for residential heating and air conditioning systems.
5. Secure all ducts to building structure. Flash, weatherproof, and vibration-isolate duct openings in wall or roof according to good construction practices.
6. Flash, weatherproof, and vibration isolate all openings in building structure in accordance with local codes and good building practices.

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in damage to unit components.

When connecting ductwork to unit, do not drill deeper than ¾" (19mm) in shaded area shown in Figure 2 or coil may be damaged.

FIGURE 2 Do Not Drill Shaded Area Deeper Than ¾" (19mm)

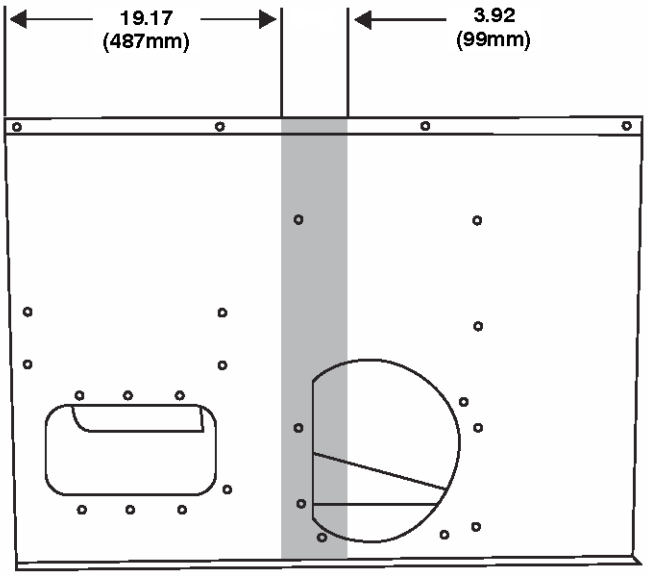
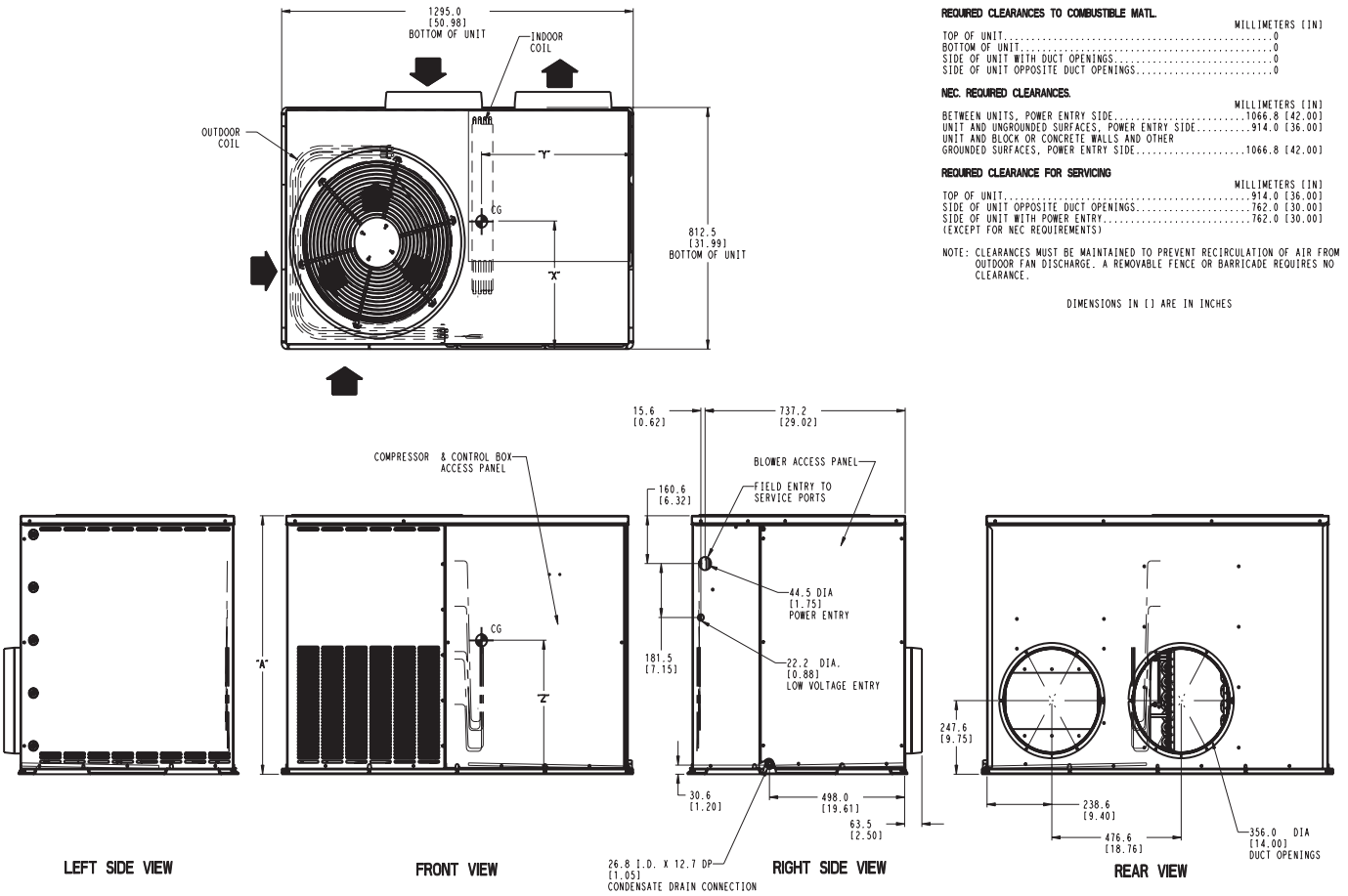


FIGURE 3 | **UNIT DIMENSIONS**



Model Size	ELECTRICAL CHARACTERISTICS	UNIT WEIGHT		UNIT HEIGHT in. [mm] "A"	CENTER OF GRAVITY inches [mm]		
		lbs	kg		X	Y	Z
24	208/230-1-60	268	121.6	30.13 [765]	14.0 [356]	19.0 [483]	15.0 [381]
30	208/230-1-60	299	135.6	34.13 [867]	14.0 [356]	19.0 [483]	16.0 [406]
36	208/230-1-60	352	159.7	42.13 [1070]	14.0 [356]	19.0 [483]	19.8 [503]
42	208/230-1-60	364	165.1	42.13 [1070]	14.0 [356]	19.0 [483]	21.9 [556]
48	208/230-1-60	359	162.8	42.13 [1070]	14.0 [356]	19.0 [483]	19.8 [503]
60	208/230-1-60	408	185.1	42.13 [1070]	14.0 [356]	19.0 [483]	21.9 [556]

Table 1—Filter Data - Throw-away Type

MODEL SIZE:	24, 30, 36	42, 48, 60
RETURN-AIR FILTER* inches (mm)	24x24x1 (610x610x25)	30x30x1 (762x762x25)

***** Required filter sizes shown are based on the larger of the ARI (Air Conditioning and Refrigeration Institute) rated cooling airflow or the heating airflow velocity of 300 feet per minute for throwaway type or 450 feet per minute for high-capacity type. Air filter pressure drop for non-standard filters must not exceed 0.08 inches water column.

STEP 5 — Connect Condensate Drain

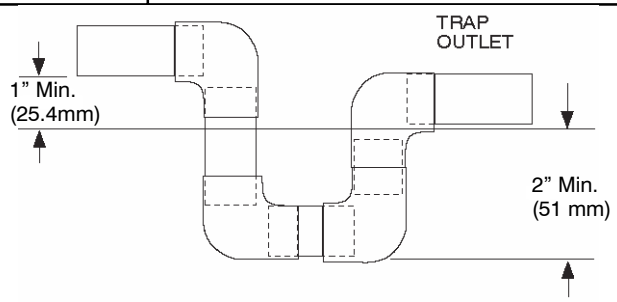
NOTE: When installing condensate drain connection be sure to comply with local codes and restrictions.

The packaged unit disposes of condensate water through a w" NPT fitting which exits through the base on the evaporator coil access side. See Figure 3 for location.

Condensate water can be drained directly onto the roof in rooftop installations (where permitted) or onto a gravel apron in ground level installations. Install a field-supplied 2" (51mm) condensate trap at the end of condensate connection to ensure proper drainage. Make sure that the outlet of the trap is at least 1" (25mm) lower than the drain-pan condensate connection to prevent the pan from overflowing (see Figure 4). Prime the trap with water. When using a gravel apron, make sure it slopes away from the unit.

Connect a drain tube using a minimum of w" PVC or w" copper pipe (all field-supplied) at the outlet end of the 2" (51mm) trap. Do not undersize the tube. Pitch the drain tube downward at a slope of at least 1" (25mm). for every 10 feet (3.0m) of horizontal run. Be sure to check the drain tube for leaks.

FIGURE 4 **Condensate Drain**



STEP 6 — Install Electrical Connections

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

The unit cabinet must have an uninterrupted, unbroken electrical ground. This ground may consist of an electrical wire connected to the unit ground screw in the control compartment, or conduit approved for electrical ground when installed in accordance with NEC, NFPA 70 National Fire Protection Association (latest edition) (in Canada, Canadian Electrical Code CSA C22.1) and local electrical codes.

⚠ CAUTION

UNIT COMPONENT DAMAGE HAZARD

Failure to follow this caution may result in damage to the unit being installed.

1. Make all electrical connections in accordance with NEC NFPA 70 (latest edition) and local electrical codes governing such wiring. In Canada, all electrical connections must be in accordance with CSA standard C22.1 Canadian Electrical Code Part 1 and applicable local codes. Refer to unit wiring diagram.
2. Use only copper conductor for connections between field-supplied electrical disconnect switch and unit. DO NOT USE ALUMINUM WIRE.
3. Be sure that high-voltage power to unit is within operating voltage range indicated on unit rating plate. Consult local power company for correction of improper voltage and/or phase imbalance.
4. Insulate low-voltage wires for highest voltage contained within conduit when low-voltage control wires are in same conduit as high-voltage wires.
5. Do not damage internal components when drilling through any panel to mount electrical hardware, conduit, etc.

High Voltage Connections

The unit must have a separate electrical service with a field-supplied, waterproof disconnect switch mounted at, or within sight from, the unit. Refer to the unit rating plate, NEC and local codes for maximum fuse/circuit breaker size and minimum circuit amps (ampacity) for wire sizing.

The field-supplied disconnect switch box may be mounted on the unit over the high-voltage inlet hole when the standard power and low-voltage entry points are used (see Figure 3 and 5 for acceptable location).

When routing power leads into unit, use only copper wire between disconnect and unit. The high voltage leads should be in a conduit until they enter the duct panel; conduit termination at the duct panel must be watertight.

See unit wiring label and Figures 10 - 13 for reference when making high voltage connections. Proceed as follows to complete the high-voltage connections to the unit.

Single-phase units:

1. Run the high-voltage (L1, L2) and ground lead into the control box.
2. Connect ground lead to chassis ground connection.
3. Locate the black and yellow wires connected to the line side of the contactor.
4. Connect field L1 to black wire on connection 11 of the compressor contactor.
5. Connect field wire L2 to yellow wire on connection 23 of the compressor contactor.

Special Procedures For 208 Volt Operation

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Before installing or servicing system, always turn off main power to system. with disconnect switch open, move black wire from transformer (x"") terminal marked 230 to terminal marked 208. This re-taps transformer to primary voltage of 208 VAC.

Control Voltage Connections

Do not use any type of power-stealing thermostat. Unit control problems may result.

Use no. 18 American Wire Gage (AWG) color-coded, insulated (35°C minimum) wires to make the control voltage connections between the thermostat and the unit. If the thermostat is located more than 100 feet from the unit (as measured along the control voltage wires), use no. 16 AWG color-coded, insulated (35°C minimum) wires.

Standard Connection

Form a drip-loop with the thermostat leads before routing them into the unit. Route the thermostat leads through grommeted hole provided in unit into unit control box (see Figure 8). Connect thermostat leads and unit power leads as shown in Figures 7, 8, and 9.

The unit transformer supplies 24 VAC power for the complete system including accessory electrical heater. Transformer is factory wired for 230 Volt operation.

Accessory Electric Heat Wiring

Refer to accessory electric heat installation instructions for information on installing accessory electric heat. Accessory electric heat wiring is shown in Figure 12.

FIGURE 5 Electrical Entry Locations

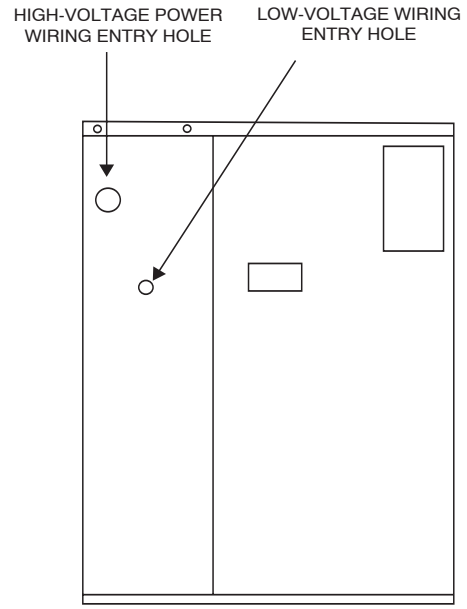


FIGURE 6 Control Box Wiring

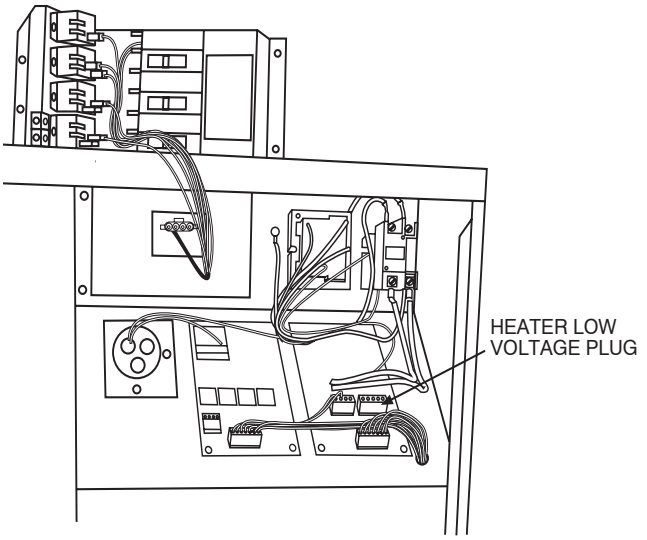


FIGURE 7 High Voltage (Line) Connections

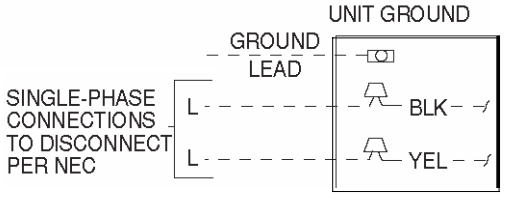


FIGURE 8 **Low Voltage (Control) Connections, Model Sizes 24, 30, 36, 42, 48**

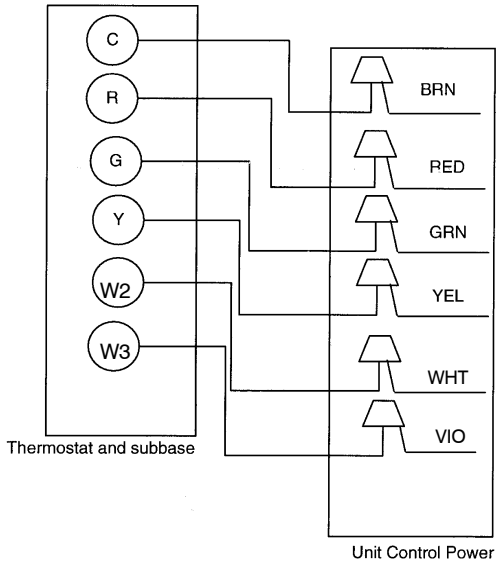


FIGURE 9 **Low Voltage (Control) Connections, Model Size 60**

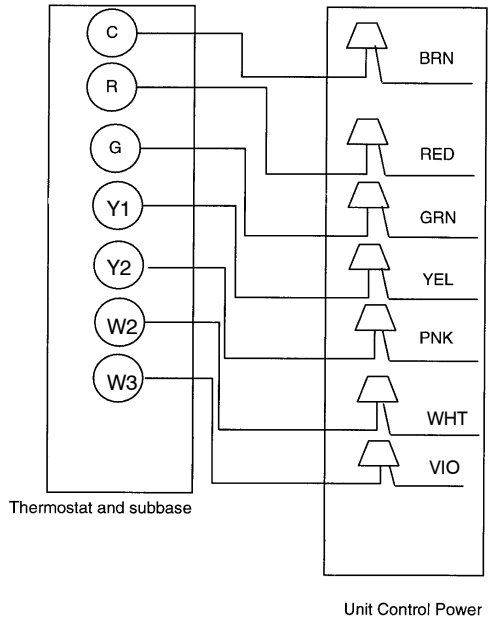
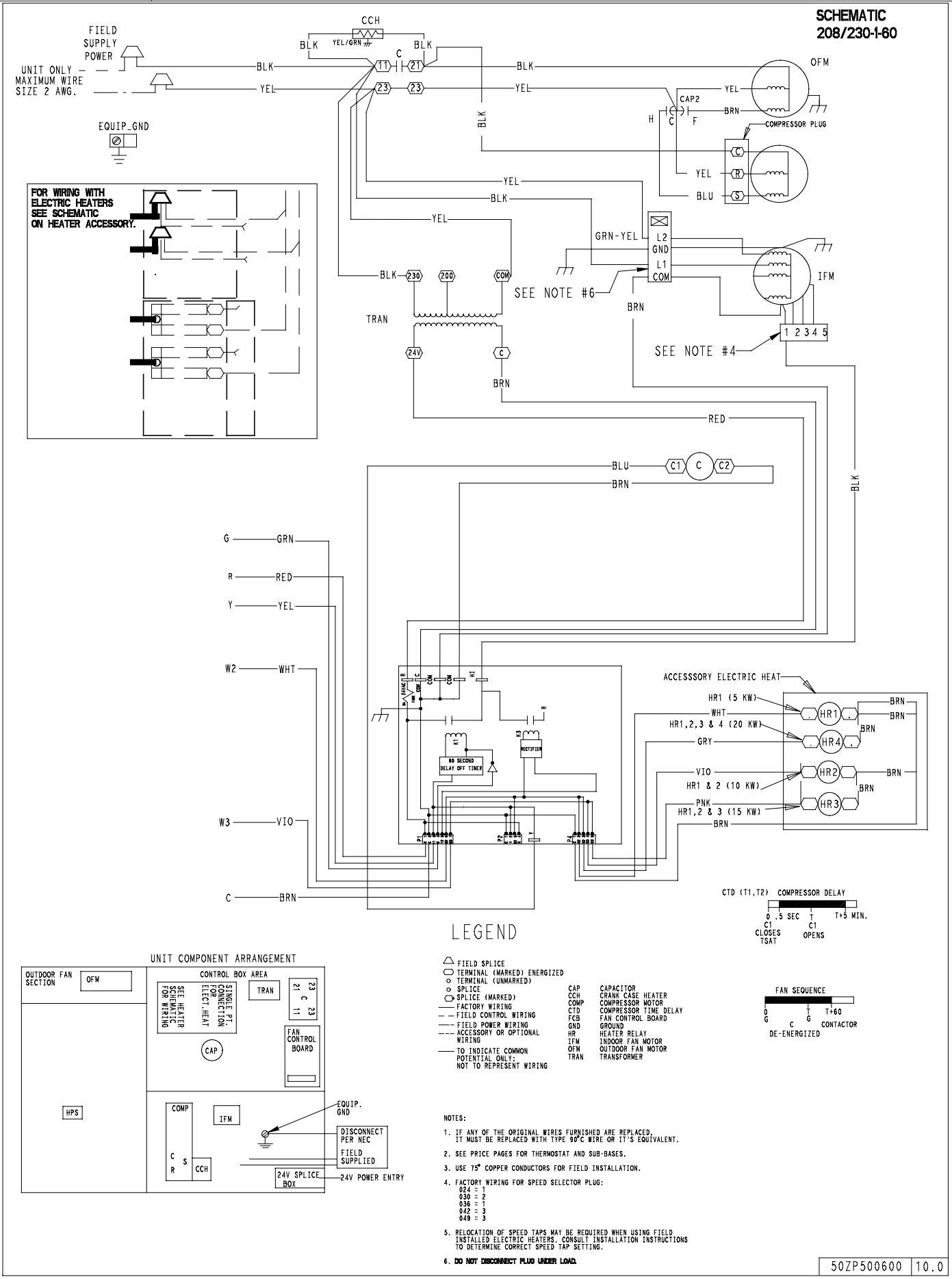


FIGURE 10	208/230 – 1 – 60 WIRING DIAGRAM, MODEL SIZES 24, 30, 36, 42, 48



CTD (T1,T2) COMPRESSOR DELAY

0 .5 SEC T C1 CLOSES TSAT — T C1 OPENS — T+5 MIN.

LEGEND

UNIT COMPONENT ARRANGEMENT

- FIELD SPLICE
- TERMINAL (MARKED) ENERGIZED
- TERMINAL (UNMARKED)
- SPLICE
- SPLICE (MARKED)
- FACTORY WIRING
- FIELD CONTROL WIRING
- FIELD POWER WIRING
- ACCESSORY OR OPTIONAL WIRING
- TO INDICATE COMMON POTENTIAL ONLY; NOT TO REPRESENT WIRING

CAP	CAPACITOR
CCH	CRANK CASE HEATER
COMP	COMPRESSOR MOTOR
CTD	COMPRESSOR TIME DELAY
FCB	FAN CONTROL BOARD
GND	GROUND
HR	HEATER RELAY
IFM	INDOOR FAN MOTOR
OFM	OUTDOOR FAN MOTOR
TRAN	TRANSFORMER

FAN SEQUENCE

D T T+60 — G G — C CONTACTOR — DE-ENERGIZED

NOTES:

1. IF ANY OF THE ORIGINAL WIRES FURNISHED ARE REPLACED, IT MUST BE REPLACED WITH TYPE 90°C WIRE OR IT'S EQUIVALENT.
2. SEE PRICE PAGES FOR THERMOSTAT AND SUB-BASES.
3. USE 75° COPPER CONDUCTORS FOR FIELD INSTALLATION.
4. FACTORY WIRING FOR SPEED SELECTOR PLUG:
   024 = 1
   030 = 2
   036 = 1
   042 = 3
   049 = 3
5. RELOCATION OF SPEED TAPS MAY BE REQUIRED WHEN USING FIELD INSTALLED ELECTRIC HEATERS. CONSULT INSTALLATION INSTRUCTIONS TO DETERMINE CORRECT SPEED TAP SETTING.
6. **DO NOT DISCONNECT PLUG UNDER LOAD.**

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FIGURE 11	208/230 – 1 – 60 WIRING DIAGRAM, MODEL SIZE 60

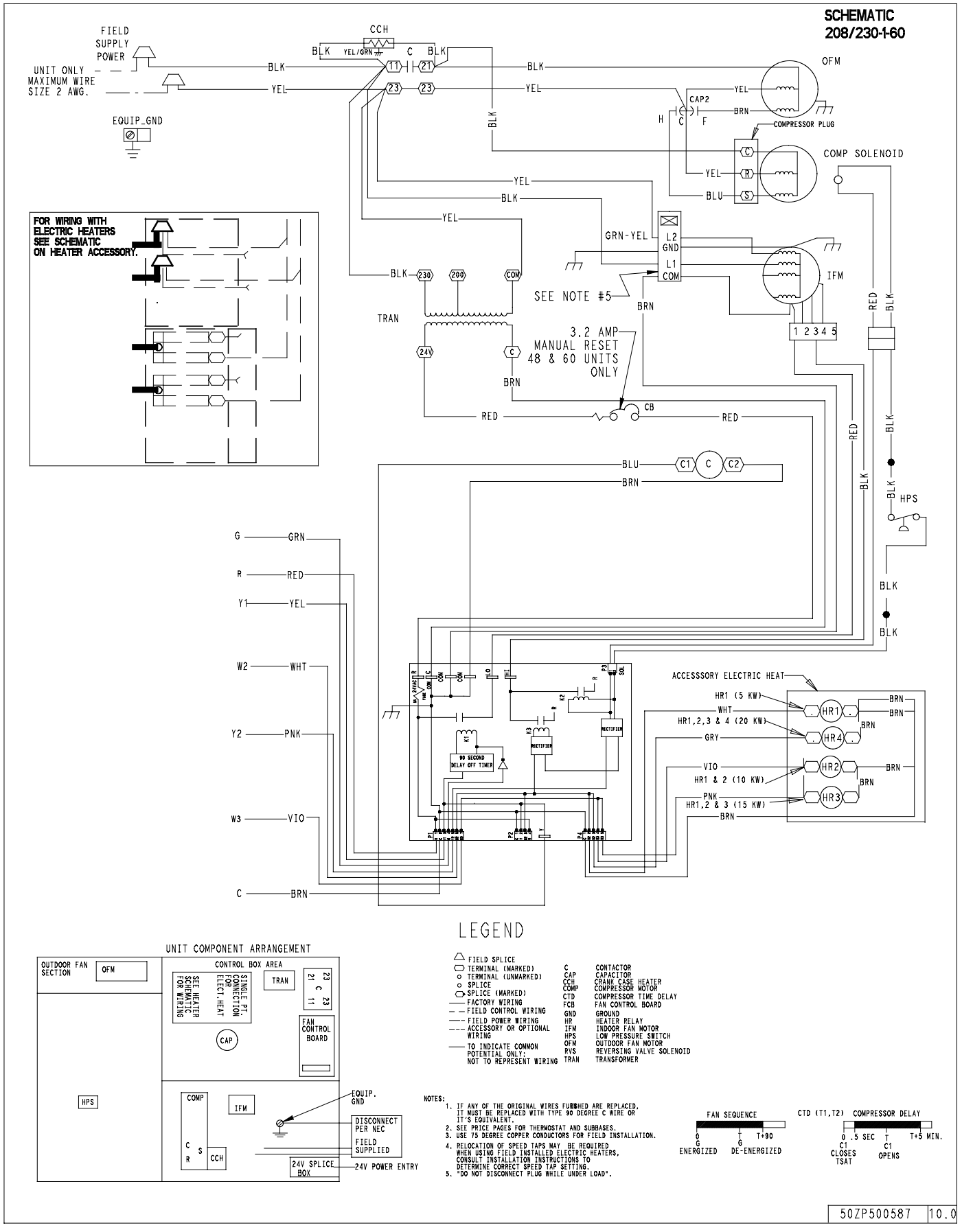
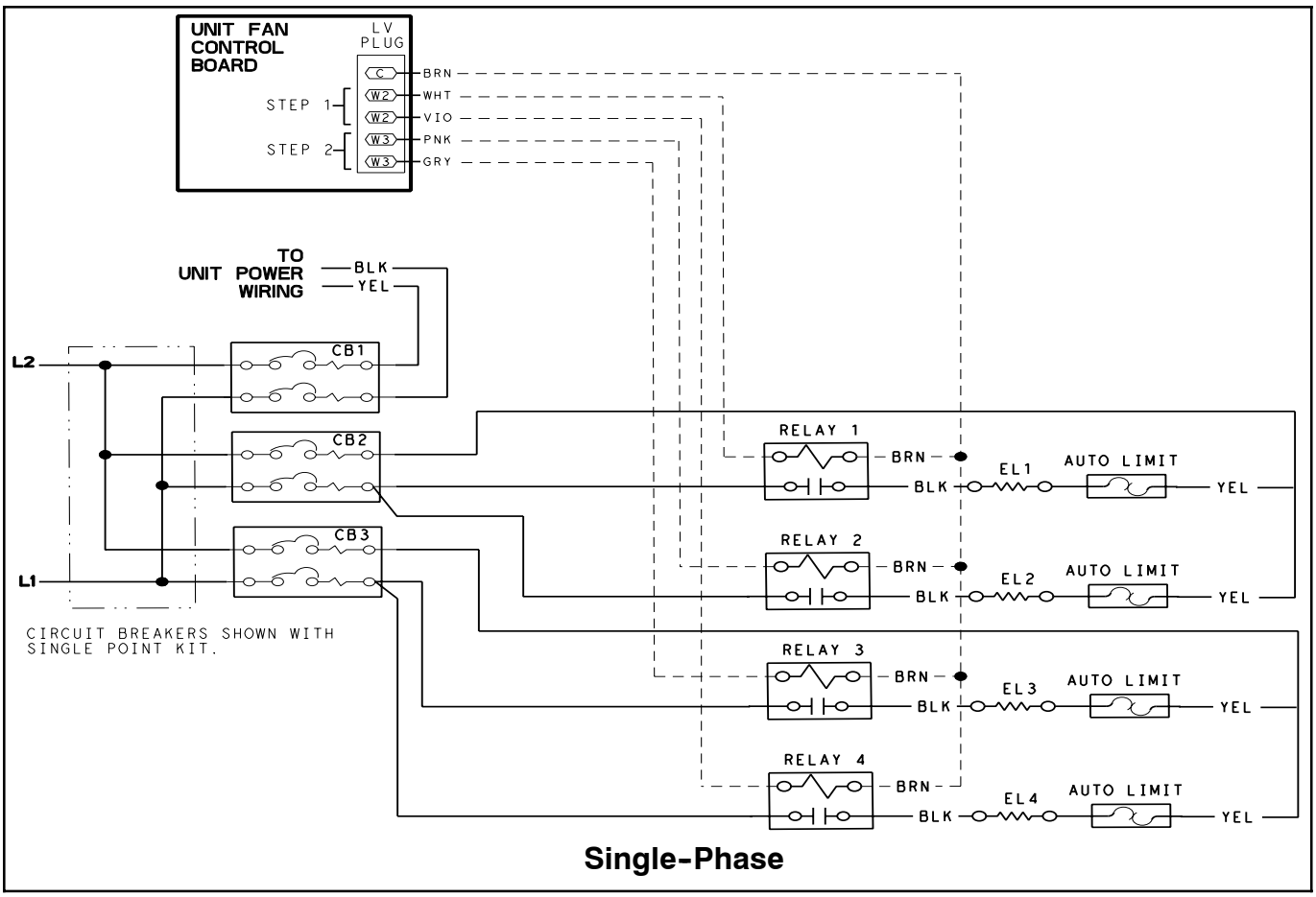


FIGURE 12	ACCESSORY ELECTRIC HEATER WIRING DIAGRAM



Single-Phase

PRE-STARTUP

⚠ WARNING

ENVIRONMENTAL, FIRE, EXPLOSION, ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death and/or property damage.

1. Follow recognized safety practices and wear protective goggles when checking or servicing refrigerant system.
2. Relieve and recover all refrigerant from system before touching or disturbing anything inside terminal box if refrigerant leak is suspected around compressor terminals.
3. Never attempt to repair soldered connection while refrigerant system is under pressure.
4. Do not use torch to remove any component. System contains oil and refrigerant under pressure.
5. To remove a component, wear protective goggles and proceed as follows:
   a. Shut off electrical power to unit and install lockout tag.
   b. Relieve and reclaim all refrigerant from system using both high- and low-pressure ports.
   c. Cut component connecting tubing with tubing cutter and remove component from unit.
   d. Carefully unsweat remaining tubing stubs when necessary. Oil can ignite when exposed to torch flame.

Use the Start-Up Checklist supplied at the end of this book and proceed as follows to inspect and prepare the unit for initial start-up:

1. Remove all access panels.
2. Read and follow instructions on all DANGER, WARNING, CAUTION, and INFORMATION labels attached to, or shipped with unit.
3. Make the following inspections:
   a. Inspect for shipping and handling damage, such as broken lines, loose parts, disconnected wires, etc.
   b. Inspect for oil at all refrigerant tubing connections and on unit base. Detecting oil generally indicates a refrigerant leak.
   c. Leak-test all refrigerant tubing connections using electronic leak detector, or liquid-soap solution. If a refrigerant leak is detected, see following Check for Refrigerant Leaks section.
   d. Inspect all field- and factory-wiring connections. Be sure that connections are completed and tight.
   e. Ensure wires do not touch refrigerant tubing or sharp sheet metal edges.
   f. Inspect coil fins. If damaged during shipping and handling, carefully straighten fins with a fin comb.
4. Verify the following conditions:
   a. Ensure fan hub is positioned correctly with respect to motor housing.
   b. Make sure that air filter(s) is in place.
   c. Make sure that condensate drain trap is filled with water to ensure proper drainage.
   d. Make sure that all tools and miscellaneous loose parts have been removed.

STARTUP

STEP 1 — Check for refrigerant leaks

Proceed as follows to locate and repair a refrigerant leak and to charge the unit:

1. Locate leak and make sure that refrigerant system pressure has been relieved and reclaimed from both high- and low-pressure ports.
2. Repair leak following accepted practices.

NOTE: Install a filter drier whenever the system has been opened for repair.

3. Add a small charge of R-22 refrigerant vapor to system and leak-test unit.
4. Recover refrigerant from refrigerant system and evacuate to 500 microns if no additional leaks are found.
5. Charge unit with R-22 refrigerant, using a volumetric charging cylinder or accurate scale. Refer to unit rating plate for required charge. Be sure to add extra refrigerant to compensate for internal volume of filter drier.

STEP 2 — Start-up cooling and make adjustments

Complete the required procedures given in the Pre-Start-Up section before starting the unit. Do not jumper any safety devices when operating the unit. Do not operate the compressor when the outdoor temperature is below 40° F (4.4° C). Do not rapid-cycle the compressor. Allow 5 minutes between on cycles to prevent compressor damage.

⚠ WARNING

EXPLOSION AND ENVIRONMENTAL HAZARD

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

System under pressure. Relieve pressure and recover all refrigerant before system repair or final unit disposal. Use all service ports and open all flow-control devices, including solenoid valves.

Check Cooling Control Operation

Start and check the unit for proper cooling control operation as follows:

1. Place room thermostat SYSTEM switch in OFF position. Observe that blower motor starts when FAN switch is placed in ON position and shuts down when FAN switch is placed in AUTO position.
2. Place SYSTEM switch in COOL position and FAN switch in AUTO position. Set cooling control below

room temperature. Observe that compressor, condenser fan, and evaporator blower motors start. Observe that cooling cycle shuts down when control setting is satisfied. The evaporator fan will continue to run for 30 seconds.

Checking and Adjusting Refrigerant Charge

The refrigerant system is fully charged with R-22 refrigerant and is tested and factory sealed.

NOTE:Adjustment of the refrigerant charge is not required unless the unit is suspected of not having the proper R-22 charge.

An accurate thermocouple or thermistor type thermometer and a gauge manifold are required when using the subcooling charging method for evaluating the unit charge. Do not use mercury or small dial-type thermometers because they are not adequate for this type of measurement**.**

NOTE: Allow system to operate a minimum of 15 minutes before checking or adjusting charge.

Model Sizes 24, 30, 36, 42, and 48:

Model Sizes 24, 30, 36, 42, and 48 have an orifice type expansion device. Charge must be set using the superheat method.

1. Remove cap from low-pressure service fittings.
2. Using hose with valve core depressor, attach low-pressure gauge hose to low-pressure service fitting.
3. Start unit in Cooling Mode and let unit run until system pressures stabilize.
4. Measure and record the following:
   a. Outdoor ambient-air temperature (dry bulb).
   b. Suction (low-side) pressure (psig).
   c. Suction line temperature.
5. Locate the measured suction line pressure in the top row of Table 2 and the measured outdoor ambient temperature in the left column of the table. Based on the two values, determine the required suction line temperature.
6. If the measured suction line temperature is greater than the tabulated temperature, add charge to the system. If the measured suction line temperature is lower than the tabulated temperature, remove charge from the system.

Model Size 60:

Model Size 60 has a TXV expansion device. Charge must be set using the subcooling method.

A subcooling charging chart is attached to the outside of the service access panel. The chart includes the required liquid line temperature at given discharge line pressures and outdoor ambient temperatures.

Proceed as follows:

1. Remove cap from high and low-pressure service fittings.
2. Using hoses with valve core depressors, attach high and low-pressure gauge hose to high and low-pressure service fittings.
3. Start unit in Cooling Mode and let unit run until system pressures stabilize.
4. Measure and record the following:
   a. Outdoor ambient-air temperature (dry bulb).
   b. Liquid line temperature.
   c. Discharge (high-side) pressure (psig).
   d. Suction (low-side) pressure (psig) - for reference only.
5. Using "Sub-Cooling Charging Charts," compare outdoor-air temperature (dry bulb) with the discharge line pressure (psig) to determine desired system operating liquid line temperature (see Tables 3 and 4).
6. Compare actual liquid line temperature with desired liquid line temperature. Using a tolerance of +/- 2° F (+/- 1.1° C), add refrigerant if actual temperature is higher than proper liquid line temperature, or remove refrigerant if actual temperature is lower than desired liquid line temperature.

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in unit damage.

When evaluating the refrigerant charge, an indicated adjustment to the specified factory charge must always be very minimal. If a substantial adjustment is indicated, an abnormal condition exists somewhere in the cooling system, such as insufficient airflow across either coil or both coils.

NOTE: If the problem causing the inaccurate readings is a refrigerant leak, refer to the Check for Refrigerant Leaks section.

Table 2 - Superheat Method, Sizes 24, 30 ,36, 42, and 48

Outdoor Temperature (°F)	Measured Suction Line Pressure (PSIG)														
	52	54	56	59	61	64	67	70	73	76	79	82	85	89	92
	REQUIRED SUCTION LINE TEMPERATURE (°F)														
45	51	55	60	64	69	—	—	—	—	—	—	—	—	—	—
55	—	—	53	57	62	66	70	—	—	—	—	—	—	—	—
65	—	—	—	—	53	57	62	66	71	75	—	—	—	—	—
75	—	—	—	—	—	—	—	56	61	66	71	76	—	—	—
85	—	—	—	—	—	—	—	—	53	58	63	67	72	—	—
95	—	—	—	—	—	—	—	—	—	50	54	58	62	66	—
105	—	—	—	—	—	—	—	—	—	—	50	53	57	60	64
115	—	—	—	—	—	—	—	—	—	—	49	52	55	58	61
125	—	—	—	—	—	—	—	—	—	—	—	50	53	56	59
Outdoor Temperature (°C)	Measured Suction Line Pressure (kPa)														
	361	370	387	405	423	442	462	482	502	523	544	566	589	612	636
	REQUIRED SUCTION LINE TEMPERATURE (°C)														
7	11	13	15	18	21	—	—	—	—	—	—	—	—	—	—
13	—	—	12	14	16	19	21	—	—	—	—	—	—	—	—
18	—	—	—	—	12	14	17	19	21	24	—	—	—	—	—
24	—	—	—	—	—	—	—	13	16	19	22	24	—	—	—
29	—	—	—	—	—	—	—	—	12	14	17	20	22	—	—
35	—	—	—	—	—	—	—	—	—	10	12	14	17	19	—
41	—	—	—	—	—	—	—	—	—	—	10	12	14	16	18
46	—	—	—	—	—	—	—	—	—	—	9	11	13	14	16
52	—	—	—	—	—	—	—	—	—	—	—	10	11	13	15

Table 3 – Subcooling Method, Size 60

Model Size	Outdoor Ambient Temperature °F (°C)				
	75 (24)	82 (28)	85 (29)	95 (35)	105 (41)
	REQUIRED SUBCOOLING °F (°C)				
60	21 (11.7)	20.5 (11.4)	20 (11.1)	19 (10.6)	16 (8.9)

Table 4 – Required Liquid Line Temperature

REQUIRED LIQUID LINE TEMPERATURE FOR A SPECIFIC SUBCOOLING (R-22)									
Pressure (psi)	Required Subcooling (°F)				Pressure (kPa)	Required Subcooling (°C)			
	5	10	15	20		3	6	8	11
134	71	66	61	56	924	24	22	19	16
141	74	69	64	59	972	26	23	21	18
156	80	75	70	65	1075	30	27	24	21
163	83	78	73	68	1124	31	28	26	23
170	86	81	76	71	1172	33	30	27	24
177	89	84	79	74	1220	34	31	29	26
184	91	86	81	76	1268	36	33	30	27
191	94	89	84	79	1317	37	34	31	29
198	96	91	86	81	1365	38	36	33	30
205	98	93	88	83	1413	40	37	34	31
213	101	96	91	86	1468	41	38	36	33
221	104	99	94	89	1524	43	40	37	34
229	106	101	96	91	1579	44	41	38	36
237	108	103	98	93	1634	45	42	40	37
245	111	106	101	96	1689	47	44	41	38
253	113	108	103	98	1744	48	45	42	40
262	116	111	106	101	1806	49	46	44	41
271	118	113	108	103	1868	51	48	45	42
280	121	116	111	106	1930	52	49	46	44
289	123	118	113	108	1992	53	51	48	45
298	125	120	115	110	2054	55	52	49	46
307	128	123	118	113	2116	56	53	50	48
317	130	125	120	115	2185	57	54	52	49
327	132	127	122	117	2254	59	56	53	50
337	135	130	125	120	2323	60	57	54	52
347	137	132	127	122	2392	61	58	56	53
357	139	134	129	124	2461	62	60	57	54
367	142	137	132	127	2530	64	61	58	55
280	121	116	111	106	1930	52	49	46	44
289	123	118	113	108	1992	53	51	48	45
298	125	120	115	110	2054	55	52	49	46
307	128	123	118	113	2116	56	53	50	48
317	130	125	120	115	2185	57	54	52	49
327	132	127	122	117	2254	59	56	53	50
337	135	130	125	120	2323	60	57	54	52
347	137	132	127	122	2392	61	58	56	53
357	139	134	129	124	2461	62	60	57	54
367	142	137	132	127	2530	64	61	58	55

Indoor Airflow and Airflow Adjustments

NOTE: For cooling operation, the recommended airflow is 350 to 450 CFM for each 12,000 BTU/h of rated cooling capacity.

Table 6 shows cooling airflows at various external static pressures. Refer to this table to determine the airflow for the system being installed.

NOTE: Be sure that all supply and return-air grilles are open, free from obstructions, and adjusted properly.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Disconnect electrical power to the unit and install lockout tag before changing blower speed.

Airflow can be changed by changing the lead connections at the blower motor. To change motor speeds, reposition wire at fan motor speed terminals labeled 1-2-3-4 (refer to Figure 13).

Remove the speed tap connector labeled 1 through 5 on the motor. While looking at the connector end that is inserted into the motor, gently pry the locking tab outward and remove the wire from the connector. Insert the wire into the desired tap until it locks into place. Be sure new airflow meets the range noted above and minimum electric heat CFM, if equipped. Refer to table 6 and table 10.

All model sizes are factory wired for rated airflow operation.

Figure 13 Motor Speed Selection

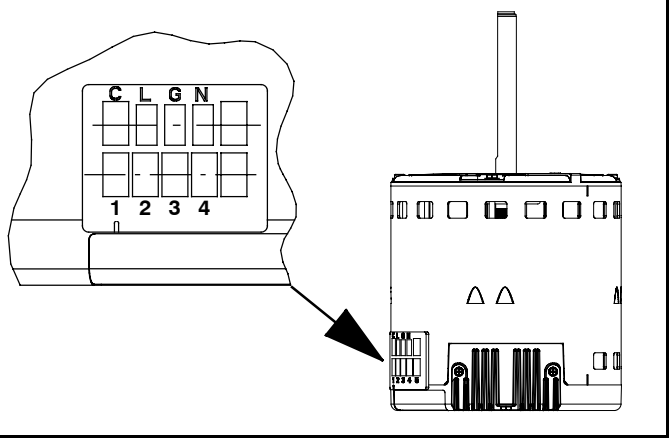


Table 5 - Motor Speed Taps

SIZE	RATED AIRFLOW	HIGH AIRFLOW
24	Tap 1	Tap 3
30	Tap 2	Tap 4
36	Tap 1	Tap 3
42	Tap 2	Tap 4
48	Tap 3	Tap 4

SIZE	RATED AIRFLOW		HIGH AIRFLOW	
	Low Stage	High Stage	Low Stage	High Stage
60	Tap 1	Tap 3	Tap 2	Tap 4

STEP 3 — Unit Controls

All units have the following factory installed or internal-protection controls.

Compressor High Pressure Relief Valve

This internal valve opens when the pressure differential between the low and high side becomes excessive.

Loss of Charge Switch

Located on the outdoor liquid line is a low-pressure switch which functions as a loss-of-charge switch. This switch contains a Schrader core depressor. This switch opens at 7 psig and closes at 22 psig. No adjustment is necessary.

Compressor Overload

This internal overload interrupts power to the compressor when either the current or internal temperature become excessive, and automatically resets when the internal temperature drops to a safe level.

This overload may require up to 60 minutes (or longer) to reset. If the internal overload is suspected of being open, disconnect the electrical power to the unit and check the circuit through the overload with an ohmmeter or continuity tester.

STEP 4 — Sequence of Operation

Fan Operation

The FAN switch on the thermostat controls indoor fan operation. When the FAN switch is placed in the ON position, the IFR (indoor-fan relay) is energized through the G terminal on the thermostat. The normally-open contacts close, which then provide power to the indoor (evaporator) fan motor (IFM). The IFM will run continuously when the FAN switch is set to ON.

When the FAN switch is set to AUTO, the thermostat energizes the IFR only when there is a call for cooling or, if the unit is equipped with accessory electric heat, the indoor-fan motor will also run while the accessory electric heat is energized.

NOTE: Some units are equipped with a time-delay relay. On these units, the indoor fan remains on for 30 seconds after G or Y is de-energized.

Cooling Operation (model sizes 24, 30, 36, 42, 48)

With a call for cooling (Y/Y2), the indoor fan and contactor energize immediately, starting the compressor and the outdoor fan motor. When the cooling demand is met, Y/Y2 de-energizes, shutting off the compressor, indoor fan, and the outdoor fan.

Cooling Operation (model size 60)

This unit requires a 2-stage indoor thermostat. With a first (low) stage call for cooling (Y1), the indoor fan (low stage speed) and contactor energize immediately, starting the compressor (low stage) and the outdoor fan motor. If the first (low) stage operation cannot satisfy the cooling demand, the second (high) stage cooling (Y2) energizes. The compressor is switched into high stage cooling (internal solenoid valve inside the compressor) and the indoor fan switches to high stage speed. When second stage cooling is satisfied, Y2 de-energizes switching the

compressor and indoor fan back to low stage cooling/speed. When the low stage cooling demand is met, Y1 de-energizes, shutting off the compressor, indoor fan, and outdoor fan.

Continuous Fan

With the continuous Indoor fan option selected on the thermostat, G is continuously energized. For model sizes 24, 30, 36, 42 and 48 the selected airflow setting is provided. For model size 60, the system runs low stage (Y1) airflow for continuous fan operation.

Electric Resistance Heating

Electric heaters are available as accessories and must be field installed. On a call for "Emergency Heat" the thermostat energizes W which energizes the heater relay and in turn energizes the electric heaters. The IFR is energized which starts the indoor-fan motor. If the heaters are staged, W2 is energized when the second stage of heating is required. When the need for heating is satisfied, the heater and IFM are de-energized.

MAINTENANCE

⚠ WARNING

PERSONAL INJURY AND UNIT DAMAGE HAZARD

Failure to follow this warning could result in personal injury or death and unit component damage.

The ability to properly perform maintenance on this equipment requires certain expertise, mechanical skills, tools and equipment. If you do not possess these, do not attempt to perform any maintenance on this equipment, other than those procedures recommended in the Owner's Manual.

To ensure continuing high performance and to minimize the possibility of premature equipment failure, periodic maintenance must be performed on this equipment. This unit should be inspected at least once each year by a qualified service person. To troubleshoot unit, refer to Table 11 – Troubleshooting Guide.

NOTE TO EQUIPMENT OWNER: Consult your local dealer about the availability of a maintenance contract.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow these warnings could result in personal injury or death:

1. Turn off electrical power to the unit before performing any maintenance or service on this unit. Install lock-out tag.
2. Use extreme caution when removing panels and parts.
3. Never place anything combustible either on or in contact with the unit.

⚠ CAUTION

UNIT OPERATION HAZARD

Failure to follow this caution may result in improper operation.

Errors made when reconnecting wires may cause improper and dangerous operation. Label all wires prior to disconnecting when servicing.

The minimum maintenance requirements for this equipment are as follows:

1. Inspect air filter(s) each month. Clean or replace when necessary.
2. Inspect indoor coil, drain pan, and condensate drain each cooling season for cleanliness. Clean when necessary.
3. Inspect blower motor and wheel for cleanliness at the beginning of each cooling season. Clean when necessary.
4. Check electrical connections for tightness and controls for proper operation each cooling season. Service when necessary.
5. Ensure electric wires are not in contact with refrigerant tubing or sharp metal edges.

Air Filter

NOTE: Never operate the unit without a suitable air filter in the return-air duct system. Always replace the filter with the same dimensional size and type as originally installed. See Table 1 for recommended filter sizes.

Inspect air filter(s) at least once each month and replace (throwaway-type) or clean (cleanable-type) at least twice during each cooling season or whenever the filter becomes clogged with dust and lint.

Unit Top Removal (Outdoor-Coil Side)

NOTE: When performing maintenance or service procedures that require removal of the unit top, be sure to perform all of the routine maintenance procedures that require top removal, including coil inspection and cleaning, and condensate drain pan inspection and cleaning.

Only qualified service personnel should perform maintenance and service procedures that require unit top removal.

Refer to the following top removal procedures:

1. Remove screws on unit top cover surface. (Save all screws.)
2. Remove screws on unit top cover flange. (Save all screws.)
3. Lift top from unit carefully. Set top on edge and make sure that top is supported by unit side that is opposite duct (or plenum) side.
4. Carefully replace and secure unit top to unit, using screws removed in Steps 1 and 2, when maintenance and/or service procedures are completed.

Indoor Motor and Blower

NOTE: All motors are pre-lubricated. Do not attempt to lubricate these motors.

For longer life, operating economy, and continuing efficiency, clean accumulated dirt and grease from the blower wheel and motor annually.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Disconnect and tag electrical power to the unit before cleaning and lubricating the blower motor and wheel.

To clean the blower motor and wheel:

1. Remove the blower housing:
   a. Remove the screws on the external side of the duct panel that fasten the housing to the duct panel assembly.
   b. Remove the side access panel and unscrew the mounting bracket that fastens the blower housing to the internal partition panel fo the control box assembly.
   c. Make sure that the blower housing is supported by hand before completely removing the mounting bracket.
   d. Slide the blower housing from the rails of the duct panel and place it outside the unit.
2. Remove the blower wheel from the housing:
   a. Loosen the set screw which secures the wheel to the motor shaft.
   b. Loosen the three mounting legs of the motor by removing the bolts that fasten themounting legs to the housing.
   c. Slide out the motor assembly (motor, belly band and the 3 mounting legs) from the hub of the wheel.
   d. Remove the filler panel at the discharge end of the blower housing by removing the two screws that fasten it to the housing.
   e. Remove the wheel form the housing.
3. Remove the caked on dirt from the wheel and the motor using a brush.
4. Remove lint and dirt accumulations from the wheel and housing with a vacuum cleaner, using a soft brush attachment.
5. Remove grease and oil with a mild solvent.
6. Reassemble
   a. Slip the wheel back in the housing with the hub set screw parented in the correct direction.
   b. Install the filler panel.
   c. Reinsert the motor assembly in the wheel hub and align the mounting legs with the housing mounting hold locations.
   d. Tighten the mounting bolts to fasten the motor assembly with the housing.
   e. Center the wheel in the housing by sliding it, align the flat end of the shaft with the set screw and tighten the set screw.
   f. Slide back the blower housing into the mounting rails in the duct panel and install the mounting bracket back in its position.
   g. Install the screws on the external side of the duct panel to fasten duct panel with the housing.
   h. Replace the side access panel.

Outdoor Coil, Indoor Coil, and Condensate Drain Pan

Inspect the condenser coil, evaporator coil, and condensate drain pan at least once each year.

The coils are easily cleaned when dry; therefore, inspect and clean the coils either before or after each cooling season. Remove all obstructions, including weeds and shrubs, that interfere with the airflow through the condenser coil.

Straighten bent fins with a fin comb. If coated with dirt or lint, clean the coils with a vacuum cleaner, using the soft brush attachment. Be careful not to bend the fins. If coated with oil or grease, clean the coils with a mild detergent and water solution. Rinse coils with clear water, using a garden hose. Be careful not to splash water on motors, insulation, wiring, or air filter(s). For best results, spray condenser coil fins from inside to outside the unit. On units with an outer and inner condenser coil, be sure to clean between the coils. Be sure to flush all dirt and debris from the unit base.

Inspect the drain pan and condensate drain line when inspecting the coils. Clean the drain pan and condensate drain by removing all foreign matter from the pan. Flush the pan and drain trough with clear water. Do not splash water on the insulation, motor, wiring, or air filter(s). If the drain trough is restricted, clear it with a “plumbers snake” or similar probe device.

Outdoor Fan

⚠ CAUTION

UNIT OPERATION HAZARD

Failure to follow this caution may result in damage to unit components.

Keep the condenser fan free from all obstructions to ensure proper cooling operation. Never place articles on top of the unit.

1. Remove 6 screws holding discharge grille and motor to top cover.
2. Turn motor/grille assembly upside down on top cover to expose fan blade.
3. Inspect the fan blades for cracks or bends.
4. If fan needs to be removed, loosen setscrew and slide fan off motor shaft.
5. When replacing fan blade, position blade so that the hub is 8” (3.2mm) away from the motor end (8” (3.2mm) of motor shaft will be visible).
6. Ensure that setscrew engages the flat area on the motor shaft when tightening.
7. Replace grille.

Electrical Controls and Wiring

Inspect and check the electrical controls and wiring annually. Be sure to turn off the electrical power to the unit.

Remove access panel to locate all the electrical controls and wiring. Check all electrical connections for tightness. Tighten all screw connections. If any smoky or burned connections are noticed, disassemble the connection, clean all the parts, re-strip the wire end and reassemble the connection properly and securely.

After inspecting the electrical controls and wiring, replace all the panels. Start the unit, and observe at least one complete cooling cycle to ensure proper operation. If discrepancies are observed in operating cycle, or if a suspected malfunction has occurred, check each electrical component with the proper electrical instrumentation. Refer to the unit wiring label when making these checks.

NOTE: Refer to the Cooling Sequence of Operation in this document to understand proper control operation.

Refrigeration Circuit

Annually inspect all refrigerant tubing connections and the unit base for oil accumulations. Detecting oil generally indicates a refrigerant leak.

If oil is detected or if low cooling performance is suspected, leak-test all refrigerant tubing using an electronic leak-detector, halide torch, or liquid-soap solution. If a refrigerant leak is detected, refer to the Check for Refrigerant Leaks section.

If no refrigerant leaks are found and low cooling performance is suspected, refer to the Checking and Adjusting Refrigerant Charge section.

⚠ WARNING

EXPLOSION, SAFETY AND ENVIRONMENTAL HAZARD

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

System under pressure. Relieve pressure and recover all refrigerant before system repair or final unit disposal. Use all service ports and open all flow-control devices, including solenoid valves.

Evaporator Airflow

The heating and/or cooling airflow does not require checking unless improper performance is suspected. If a problem exists, be sure that all supply- and return-air grilles are open and free from obstructions, and that the air filter is clean. When necessary, refer to the Indoor Airflow and Airflow Adjustments section to check the system airflow.

Metering Devices

Model sizes 24, 30, 36, and 42 use an orifice type metering device.

Model sizes 48 and 60 use a hard shutoff, balance port TXV. The TXV maintains a constant superheat at the evaporator exit.

Liquid Line Strainers

The liquid line strainers (to protect metering devices) are made of wire mesh and are located in the liquid lines on the inlet side of the metering devices.

High Flow Valves

High flow valves are located on the compressor hot gas and suction tubes. Large black plastic caps distinguish these valves from the smaller service valves. These valves can not be accessed for service in the field. Ensure the plastic caps are in place and tight or the possibility of refrigerant leakage could occur.

TROUBLESHOOTING

Use the Troubleshooting Guide (see Table 11) if problems occur with these units.

STARTUP CHECKLIST

Use Start-Up checklist to ensure proper start-up procedures are followed.

Table 6 – Dry Coil Air Delivery*

Model Size	Motor Speed Tap		External Static Pressure (Inches Water Column)									
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
24	1	Watts	—	99	100	118	130	142	—	—	—	—
		CFM	—	848	793	757	698	632	—	—	—	—
	2	Watts	—	—	—	—	—	222	233	244	257	260
		CFM	—	—	—	—	—	970	918	861	795	729
30	2	Watts	—	155	146	157	170	—	—	—	—	—
		CFM	—	1108	995	951	884	—	—	—	—	—
	3	Watts	—	—	—	—	—	261	275	286	291	315
		CFM	—	—	—	—	—	1117	1053	1014	980	877
36	1	Watts	180	166	179	191	204	216	—	—	—	—
		CFM	1344	1215	1172	1136	1095	1051	—	—	—	—
	2	Watts	—	—	—	261	276	290	301	316	329	342
		CFM	—	—	—	1343	1304	1272	1234	1190	1148	1100
42	3	Watts	269	283	305	321	336	349	360	—	—	—
		CFM	1440	1404	1369	1333	1301	1273	1239	—	—	—
	4	Watts	—	—	418	432	450	465	480	490	503	518
		CFM	—	—	1572	1543	1504	1475	1441	1418	1380	1332
48	1	Watts	—	204	209	216	229	236	249	—	—	—
		CFM	—	1129	1087	1027	994	932	881	—	—	—
	2	Watts	—	—	233	245	254	266	276	289	—	—
		CFM	—	—	1164	1122	1066	1025	954	906	—	—
	3	Watts	386	398	409	418	425	435	438	441	451	—
		CFM	1680	1652	1625	1583	1555	1515	1477	1444	1403	—
	4	Watts	—	440	448	457	462	469	477	480	485	486
		CFM	—	1745	1717	1684	1651	1612	1573	1537	1508	1470
60	1	Watts	224	235	251	266	277	291	298	—	—	—
		CFM	1334	1288	1259	1224	1181	1157	1117	—	—	—
	2	Watts	—	—	286	301	311	325	333	344	370	—
		CFM	—	—	1333	1296	1261	1232	1199	1170	1062	—
	3	Watts	608	626	643	660	668	685	697	—	—	—
		CFM	1931	1900	1878	1844	1817	1789	1755	—	—	—
	4	Watts	737	755	770	787	799	817	826	812	782	—
		CFM	2093	2061	2028	2001	1971	1934	1899	1850	1757	—

* Air delivery values are without air filter and are for dry coil (See Wet Coil Pressure Drop table). Deduct field-supplied air filter pressure drop and wet coil pressure drop to obtain external static pressure available for ducting.

Notes:

1. Do not operate the unit at a cooling airflow that is less than 350 cfm for each 12,000 Btuh of rated cooling capacity. Evaporator coil frosting may occur at airflows below this point.
2. Dashes indicate portions of table that are beyond the blower motor capacity or are not recommended.

Table 7 – Wet Coil Pressure Drop

MODEL SIZE	STANDARD CFM (S.C.F.M.)														
	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
	Pressure Drop (inches water column)														
24	.027	.034	040	.047	.053	–	–	–	–	–	–	–	–	–	–
30	–	.036	.042	.050	.055	.063	.072	.081	–	–	–	–	–	–	–
36	–	–	–	.050	.055	.063	.072	.081	.090	.097	–	–	–	–	–
42	–	–	–	–	.042	.049	.052	.059	.065	.071	.078	.085	.091	–	–
48	–	–	–	–	–	–	.072	.081	.090	.097	.108	.120	.129	.139	–
60	–	–	–	–	–	–	–	–	–	.071	.078	.085	.091	.098	.114

Table 8 – Filter Pressure Drop Table

FILTER SIZE	CFM																		
	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
	Pressure Drop (inches water column)																		
24 x 24 x 1	0.06	0.07	0.08	0.08	0.09	0.09	0.09	0.10	0.11	0.12	0.14	0.15	—	—	—	—	—	—	—
30 x 30 x 1	—	—	—	—	—	—	—	—	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18

Table 9 – Accessory Electric Heater Pressure Drop Table

HEATER kW	CFM								
	600	800	1000	1200	1400	1600	1800	2000	2200
	Pressure Drop (inches water column)								
5 – 20	0.06	0.08	0.10	0.13	0.15	0.18	0.20	0.23	0.25

Table 10 – Minimum Airflow for Safe Electric Heater Operation

Unit Size	5 kW	7.5 kW	10 kW	15 kW	20 kW
	Minimum Airflow (CFM)				
24	400	550	650	---	---
30	450	600	800	850	---
36	450	600	800	850	900
42	450	600	800	850	900
48	450	600	800	850	900
60	450	600	800	850	900

Table 11 - Troubleshooting Guide

SYMPTOM	CAUSE	REMEDY
Compressor and condenser fan will not start.	Power failure	Call power company
	Fuse blown or circuit breaker tripped	Replace fuse or reset circuit breaker
	Defective contactor, transformer, or high-pressure, loss-of-charge or low-pressure switch	Replace component
	Insufficient line voltage	Determine cause and correct
	Incorrect or faulty wiring	Check wiring diagram and rewire correctly
	Thermostat setting too high	Lower Thermostat temperature setting below room temperature
Compressor will not start but condenser fan runs	Faulty wiring or loose connections in compressor circuit	Check wiring and repair or replace
	Compressor motor burned out, seized, or internal overload open	Determine cause Replace compressor
	Defective run/start capacitor, overload, start relay	Determine cause and replace
	Low input voltage	Determine cause and correct
Compressor cycles (other than normally satisfying thermostat)	Refrigerant overcharge or undercharge	Recover refrigerant, evacuate system, and recharge to capacities shown on rating plate
	Defective compressor	Replace and determine cause
	Insufficient line voltage	Determine cause and correct
	Blocked outdoor coil	Determine cause and correct
	Defective run/start capacitor	Determine cause and replace
	Faulty outdoor fan motor or capacitor	Replace
	Restriction in refrigerant system	Locate restriction and remove
Compressor operates continuously	Dirty air filter	Replace filter
	Unit undersized for load	Decrease load or increase unit size
	Thermostat temperature set too low	Reset Thermostat
	Low refrigerant charge	Locate leak, repair, and recharge
	Air in system	Recover refrigerant, evacuate system, and recharge
	Outdoor coil dirty or restricted	Clean coil or remove restriction
Excessive head pressure	Dirty air filter	Replace filter
	Dirty condenser coil	Clean coil
	Refrigerant overcharged	Recover excess refrigerant
	Air in system	Recover refrigerant, evacuate system, and recharge
	Condenser air restricted or air short-cycling	Determine cause and correct
Head pressure too low	Low refrigerant charge	Check for leaks, repair, and recharge.
	Restriction in liquid tube	Remove restriction
Excessive suction pressure	High heat load	Check for source and eliminate
	Compressor valves leaking	Replace compressor
	Refrigerant overcharged	Recover excess refrigerant
Suction pressure too low	Dirty air filter	Replace filter
	Low refrigerant charge	Check for leaks, repair and recharge
	Metering device or low side restricted	Remove source of restriction
	Insufficient evaporator airflow	Increase air quantity Check filter–replace if necessary
	Temperature too low in conditioned area	Reset Thermostat
	Outdoor ambient below 55°F (12.7°C)	Install low-ambient kit
	Filter drier restricted	Replace filter

START-UP CHECKLIST
(Remove and Store in Job File)

1. Preliminary Information

Model Number:_____

Serial Number:_____

Date:_____

Technician:_____

2. Pre-Start-Up

____ Verify that all packing materials have been removed from unit

____ Check all electrical connections and terminals for tightness

____ Check that the indoor (evaporator) air filter is clean and in place

____ Verify that the unit installation is level

____ Check blower (indoor) and propeller (outdoor) for location in housing/orifice (no rubs) and set screw tightness

3. Start-Up

Electrical

Supply Voltage (measured):_____

Compressor Amps (measured):_____

Indoor (evaporator) motor amps:_____

Temperatures

Outdoor (condenser) air temperature (dry bulb): _____

Indoor return air temperature: (dry bulb)_____(wet bulb):_____

Indoor supply air - cooling: (dry bulb)_____(wet bulb):_____

Pressures

Refrigerant suction pressure during cooling (psi):_____

Refrigerant discharge pressure during cooling (psi):_____

____ Verify proper refrigerant charge using charging chart