WeatherMaster® 50GEQ*07-12, 3-Stage Models
Single Package Rooftop Heat Pump
with Puron® Advance (R-454B) Refrigerant
6.0 to 10.0 Nominal Tons

Service and Maintenance Instructions

CONTENTS

Catalog No. 04-53500536-01 Printed in U.S.A. Form No. 50GEQ3-7-12-01SM Pg 1 5-26 Replaces: New

SAFETY CONSIDERATIONS

Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air-conditioning equipment. Untrained personnel can perform the basic maintenance functions of replacing filters. Trained service personnel should perform all other operations.

When working on air-conditioning equipment, observe precautions in the literature, tags and labels attached to the unit, and other safety precautions that may apply. Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguishers available for all brazing operations.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for brazing operations. Have fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions attached to the unit. Consult local building codes and National Electrical Code (NEC) for special requirements.

Recognize safety information. This is the safety ALERT symbol ⚠. When you see this symbol on the unit and in instructions or manuals, be aware of the potential for physical injury hazards.

Understand the signal words **DANGER**, **WARNING**, and **CAUTION**. These words are used with the safety ALERT symbol. **DANGER** indicates a hazardous situation which, if not avoided, will result in death or severe personal injury. **WARNING** indicates a hazardous situation which, if not avoided, could result in death or personal injury. **CAUTION** indicates a hazardous situation which, if not avoided, could result in minor to moderate injury or product and property damage. **IMPORTANT** is used to address practices not related to physical injury. **NOTE** is used to highlight suggestions which will result in enhanced installation, reliability, or operation.

⚠ WARNING

UNIT OPERATION AND SAFETY HAZARD

Failure to follow this warning could cause personal injury, death and/or equipment damage.

R-454B is an A2L refrigerant. All service equipment or components must be A2L refrigerant rated. Do not use non-A2L rated equipment or components on R-454B refrigerant equipment.

⚠ WARNING

PERSONAL INJURY AND ENVIRONMENTAL HAZARD

Failure to follow this warning could cause personal injury or death.

Relieve pressure and recover all refrigerant before system repair or final unit disposal.

Wear safety glasses and gloves when handling refrigerants. Keep torches and other ignition sources away from refrigerants and oils.

⚠ WARNING

Use caution when servicing compressor terminal pins. System or compressor abnormalities can dislodge pins allowing oil and refrigerant to vent under pressure.

⚠ AVERTISSEMENT

Soyez prudent lors de l'entretien des bornes du compresseur. Les anomalies du système ou du compresseur peuvent déloger les bornes, permettant à l'huile et au réfrigérant de s'évacuer sous pression.

⚠ WARNING

FIRE, EXPLOSION HAZARD

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

Never use non-certified refrigerants in this product. Non-certified refrigerants could contain contaminates that could lead to unsafe operating conditions. Use ONLY refrigerants that conform to AHRI Standard 700.

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in reduced unit performance or unit shutdown.

High velocity water from a pressure washer, garden hose, or compressed air should never be used to clean a coil. The force of the water or air jet will bend the fin edges and increase airside pressure drop.

⚠ WARNING

ELECTRICAL OPERATION HAZARD

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

Units with convenience outlet circuits may use multiple disconnects. Check convenience outlet for power status before opening unit for service. Locate its disconnect switch, if appropriate, and open it. Lock-out and tag-out this switch, if necessary.

IMPORTANT: Lockout/tag-out is a term used when electrical power switches are physically locked preventing power to the unit. A placard is placed on the power switch alerting service personnel that the power is disconnected.

The following symbols may be seen on the equipment:

SYMBOL	CODE	MEANING
	GHS02: Flammable	Flammable gas
	ISO 7000-0790 (2004-01)	Read operator's manual.
	ISO 7000-1659 (2004-01)	Service indicator: read technical manual.
	ISO 7000-1641 (2004-01)	Operator's manual: operating instructions

⚠ DANGER

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

Before performing installation, service, or maintenance on this unit, turn off the main power disconnect to the unit and install lock and lockout tag. Some equipment may have multiple power disconnects.

⚠ ADVERTISSEMENT

RISQUE DE CHOC ÉLECTRIQUE

Le non-respect de cet avertissement pourrait entraîner des blessures corporelles, voire la mort.

Avant d'effectuer l'installation, l'entretien ou la maintenance de cet appareil, coupez l'alimentation principale de l'appareil et installez des verrous et des étiquettes de verrouillage. Certains équipments peuvent avoir plusieurs alimentations de courant.

⚠ WARNING

This equipment is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

⚠ ADVERTISSEMENT

Cet équipement n'est pas destiné à être utilisé par des personnes (y compris des enfants) ayant des capacités physiques, sensorielles ou mentales réduites, ou un manque d'expérience et de connaissances, à moins qu'elles n'aient reçu une supervision ou des instructions concernant l'utilisation de l'appareil par une personne responsable de leur sécurité. Les enfants doivent être surveillés pour s'assurer qu'ils ne jouent pas avec l'appareil.

⚠ CAUTION

PERSONAL INJURY 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, safety glasses and gloves when handling parts and servicing air conditioning equipment.

⚠ ADVERTISSEMENT

RISQUE DE BLESSURE CORPORELLE

Le non-respect de cette mise en garde peut entraîner des blessures corporelles.

Les pièces en tôle peuvent présenter des bords tranchants ou des bavures. Soyez prudent et portez des vêtements de protection appropriés, des lunettes de sécurité et des gants lors de la manipulation des pièces et de l'entretien des équipements de climatisation.

UNIT ARRANGEMENT AND ACCESS

General

Figures 1 and 2 show general unit arrangement and access locations.

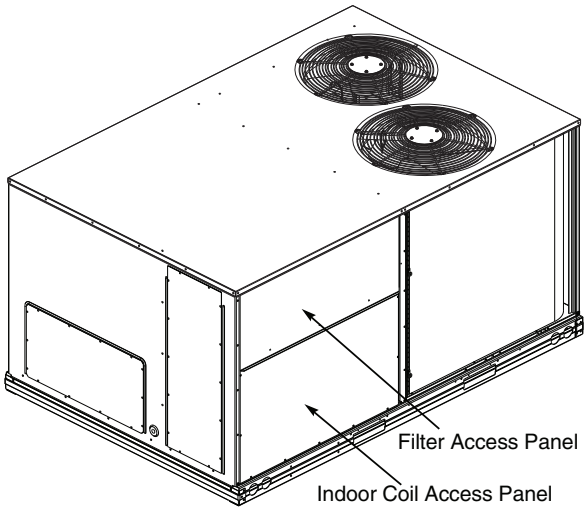


Fig. 1 — Typical Access Panel Locations

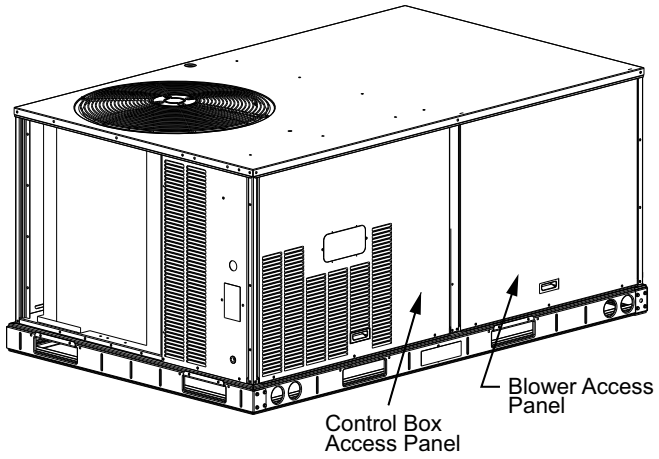


Fig. 2 — Blower Access Panel Location

Routine Maintenance

These items should be part of a routine maintenance program, to be checked every month or two, until a specific schedule for each can be identified for this installation:

QUARTERLY INSPECTION (AND 30 DAYS AFTER INITIAL START)

- Return air filter replacement
- Outdoor hood inlet filters cleaned
- Condenser coil cleanliness checked
- Condensate drain checked

SEASONAL MAINTENANCE

These items should be checked at the beginning of each season (or more often if local conditions and usage patterns dictate):

Air Conditioning

- Ensure outdoor fan motor mounting bolts are tight
- Ensure compressor mounting bolts are tight
- Inspect outdoor fan blade positioning
- Ensure control box is clean
- Check control box wiring condition
- Ensure wire terminals are tight
- Check refrigerant charge level
- Ensure indoor coils are clean
- Check supply blower motor amperage

Electric Heating

- Inspect power wire connections
- Ensure fuses are operational
- Ensure manual reset limit switch is closed

Economizer or Outside Air Damper

- Check inlet filters condition
- Check damper travel (economizer)
- Check gear and dampers for debris and dirt

Air Filters and Screens

Each unit is equipped with return air filters. If the unit has an economizer, it will also have an outside air screen. If a manual outside air damper is added, an inlet air screen will also be present.

Each of these filters and screens will need to be periodically replaced or cleaned.

Filters

RETURN AIR FILTERS

⚠ CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this CAUTION can result in premature wear and damage to equipment.

DO NOT OPERATE THE UNIT WITHOUT THE RETURN AIR FILTERS IN PLACE.

Dirt and debris can collect on heat exchangers and coils possibly resulting in a small fire. Dirt buildup on components can cause excessive current used resulting in motor failure.

Return air filters are disposable fiberglass media type. Access to the filters is through the small lift-out panel located on the rear side of the unit, above the evaporator/return air access panel. (See Fig. 3.)

To remove the filters:

1. Grasp the bottom flange of the upper panel.
2. Lift up and swing the bottom out until the panel disengages and pulls out.
3. Reach inside and extract the filters from the filter rack.
4. Replace these filters as required with similar replacement filters of same size.

To re-install the access panel:

1. Slide the top of the panel up under the unit top panel.
2. Slide the bottom into the side channels.
3. Push the bottom flange down until it contacts the top of the lower panel (or economizer top).

OUTSIDE AIR HOOD

Outside air hood inlet screens are permanent aluminum-mesh type filters. Check these for cleanliness. Remove the screens when cleaning is required. Clean by washing with hot low-pressure water and soft detergent and replace all screens before restarting the unit. Observe the flow direction arrows on the side of each filter frame.

ECONOMIZER INLET AIR SCREEN

This air screen is retained by filter clips under the top edge of the hood. (See Fig. 3.)

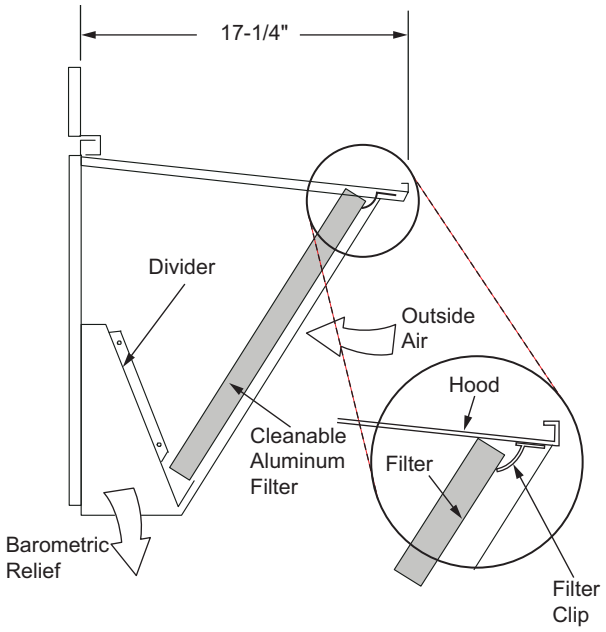


Fig. 3 — Filter Installation

To remove the filter, open the filter clips. Re-install the filter by placing the frame in its track, then closing the filter clips.

MANUAL OUTSIDE AIR HOOD SCREEN

This inlet screen is secured by a retainer angle across the top edge of the hood. (See Fig. 4.)

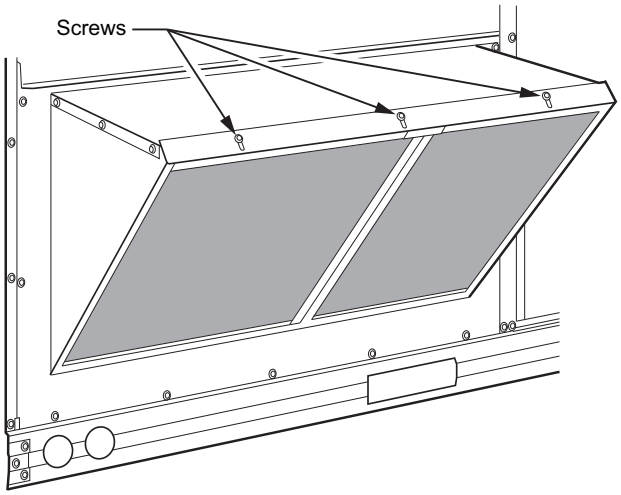


Fig. 4 — Screens Installed on Outdoor-Air Hood

To remove the screen, loosen the screws in the top retainer and slip the retainer up until the filter can be removed. Re-install by placing the frame in its track, rotating the retainer back down, and tightening all screws.

SUPPLY FAN (BLOWER) SECTION

⚠ WARNING

ELECTRICAL OPERATION HAZARD

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

Before performing service or maintenance operations on unit, LOCKOUT/TAGOUT the main power switch to unit. Electrical shock and rotating equipment could cause severe injury.

Supply Fan (Direct-Drive)

All 50GEQ units have the EcoBlue™ direct drive vane axial fan system. The fan is driven by an ECM motor with speed that is user set through the SystemVu controller. Speeds are fully configurable from 30% to 100% of motor's maximum speed. See Fig. 5 and 6.

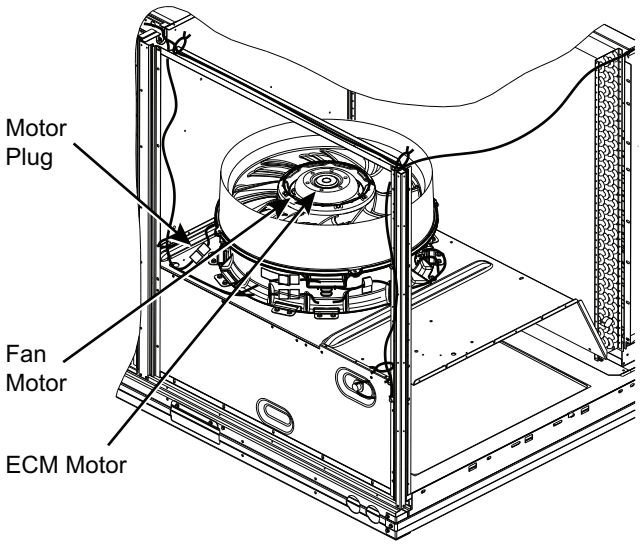


Fig. 5 — Direct-Drive Supply Fan Assembly

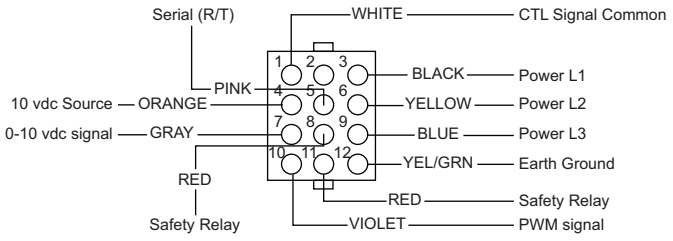


Fig. 6 — ECM Motor Plug Connectors

EVALUATING MOTOR SPEED

The direct drive ECM blower motor uses a constant speed design. Motor speed is controlled by a 0-10 vdc signal, where 10 vdc is equal to motor's maximum rpm.

All units come factory set for 78% of the motor's maximum speed. Fan speed should be set per job specification cfm (cubic feet per minute) and ESP (external static pressure) required and per Fan Speed Set Up label included on the unit's high voltage cover. If the unit was previously installed, refer to the Control Set Point and Configuration Log on file. Otherwise see detailed instructions below.

SELECTING FAN SPEED

Fan Speed settings are accessed through the SystemVu interface.

1. Check the job specifications for the cfm (cubic feet per minute) and ESP (external static pressure) required.
2. Using the chart on the Fan Speed Set Up labels (see Fig. 7), calculate the RPM from the cfm and ESP for the base unit.
3. If installing any accessories listed at the bottom of the Set Up Label, add accessory RPM to base unit RPM in upper portion of label. For electric heaters use only one adder. (ex. 2 stage heater uses only 2 stage adder, not 1 stage plus 2 stage).

   NOTE: The Fan Speed Set Up labels are located on the High Voltage cover in the Control Box.
4. Press any key on the SystemVu interface to activate the display backlight and then press the MENU key.
5. Using the UP and DOWN arrow keys highlight SETTINGS and then press ENTER.
6. Use the DOWN arrow key highlight the UNIT CONFIGURATIONS menu then press ENTER.
7. Highlight UNIT CONFIGURATIONS then press ENTER.
8. Highlight INDOOR FAN and then press ENTER.
9. Refer to the job specifications to set the following, determining the values per the RPM Calculator label (see Fig. 7). Use the UP and DOWN arrow keys and the BACK key to set the values. Press ENTER after setting each value to continue to the next selection.

- IDF VENT SPD
- IDF HEAT SPD
- IDF HIGH SPD
- IDF FREE COOL SPD

For further details see the *FEQ/GEQ/QE Series Single Package Rooftop Units with SystemVu Controller Controls, Start-up, Operation and Troubleshooting* manual.

SystemVu™

FAN SPEED SETUP (RPM)

MAIN MENU:

SETTINGS

→ UNIT CONFIGURATIONS

→ INDOOR FAN

- → IDF VENT SPD -RPM
- → IDF HEAT SPD -RPM
- → IDF HIGH COOL SPD -RPM
- → IDF FREE COOL SPD -RPM

↓ DETERMINE RPM FROM BELOW ↓

48TC003136 REV. A

RPM Calculator

UNIT MODEL NUMBER / CFM	ESP in. wg 0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0
1500	1301	1477	1639	1788	1925	2054	2174	2289		
1625	1381	1544	1699	1843	1976	2101	2220	2332		
1750	1463	1615	1763	1902	2031	2152	2268	2378		
1875	1548	1688	1828	1962	2087	2206	2318			
2000	1633	1764	1897	2025	2146	2262	2372			
2125	1720	1842	1967	2090	2208	2320				
2250	1808	1921	2040	2157	2271	2380				
2375	1897	2003	2115	2227	2336					
2500	1987	2068	2191	2298						
Field Accessories:										
Economizer	66	66	66	66	66	66	66	66		
1 Stage E Heat	80	80	80	80	80	80	80	80		
2 Stage E Heat	107	107	107	107	107	107	107	107		

NOTE: Values in the Field Accessories section are RPM adders.

Fig. 7 — Example of Fan Speed Set Up Labels for SystemVu™ Controls

TROUBLESHOOTING THE ECM MOTOR

EcoBlue™ motors are designed with several built-in protections included in the motor software. If the motor detects a fault it will safely shut down. For temperature related faults the motor requires a line voltage reset to continue operation. For all others, the motor will resume operation automatically as soon as the fault condition is cleared. See Table 1 for a complete list.

Table 1 — Fault Condition/Reset Trigger

FAULT CONDITION	RESET TRIGGER	DESCRIPTION
Phase Failure	Automatic	One phase is missing or imbalanced. In this case the motor will come to a stop and then automatically restart when all phases are present.
Locked/ Blocked Rotor	Automatic	The rotor is blocked. Once the locking mechanism has been removed, the motor will automatically restart.
Motor Over Heated	Manual	The motor will stop in the event the motor over heats. In this case there has to be a manual restart.
Power Module Over Heated	Manual	The motor will stop in the event the electronics over heat. In this case there has to be a manual restart.
Line under-voltage	Automatic	Once the line voltage returns within permitted operating range, the fan will automatically restart.
Communication Error	Automatic	Internal communication error of the fan's electronics. The fan will restart automatically, if error is cleared.

Troubleshooting the motor requires a voltmeter.

1. Disconnect main power to the unit.
2. Disconnect motor plug in supply section of the unit.
3. Restore main unit power.
4. Check for proper line voltage at motor power leads Black (PL1-1), Yellow (PL1-2), and Blue (PL1-3). See the following table.

50GE UNIT VOLTAGE	MOTOR VOLTAGE	MINIMUM-MAXIMUM VOLTS
208/230	230	187-253
460	460	414-506
575	575	518-633

5. Check for Control voltage. YEL (PL1-9) to BRN (PL1-7) should be 10-20 vdc with no commanded speed.
6. Verify the J10 plug at the SystemVu board is wired per Fig. 8, connected tight, and wires are secured in the plug
7. Disconnect main power.
8. Reconnect motor plug in supply section of unit.
9. Restore main power.
10. Use SystemVu test mode to control the motor. Press the TEST button. Turn the TEST MODE to on, enter the SERVICE TEST menu, and then enter the FAN TEST menu.
11. Verify with IDF SPEED TEST set to 0% the LED6 on the board (to the left of the J10 plug) is off. Verify when the IDF SPEED TEST is set to 10% or higher the LED6 turns on green.
12. Verify there are no alarms active on SystemVu controller.
13. If all above is verified and the motor does not start and run, remove the fan assembly and replace the motor with one having the same part number. Do not substitute with an alternate design motor as the voltage/speed programming will not be the same as that on an original factory motor.

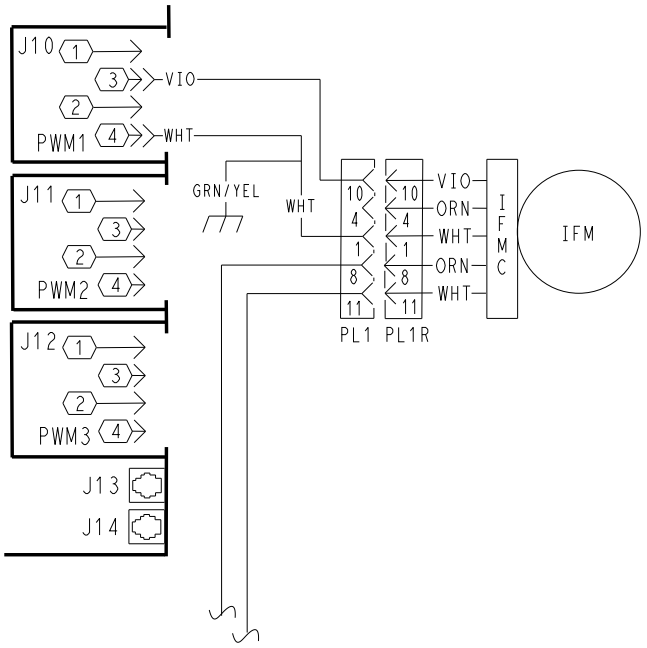


Fig. 8 — Supply Fan Control Wiring Diagram

Removing the Motor and Fan Assembly

NOTE: Due to press fit design of composite Rotor on Motor, it is highly recommended that any time a motor is replaced the fan rotor is replaced as well. The rest of the assembly may be reused.

See Fig. 9.

1. Unplug motor harness from control box harness and cut wire tie at the fan deck.
2. Unplug connectors from stator temperature limit switch.
3. Remove eight screws at front of stator on fan deck.
4. Slide fan assembly forward a couple of inches to clear rear brackets and lift assembly out.

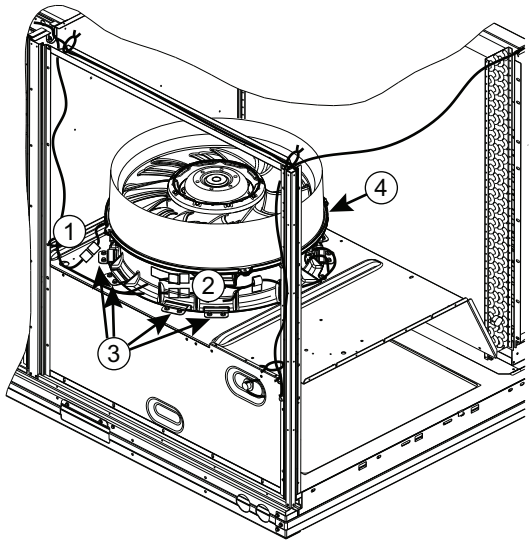


Fig. 9 — Fan Assembly Removal

Disassembling Standard/Medium Motor and Fan Assembly

See Fig. 10.

NOTE: Refer to "Model Number Nomenclature" on page 51, position 10 for specific unit requirements.

1. Remove 4 screws from U-clips in fan casing.
2. Remove casing from assembly.
3. Remove 3 screws connecting rotor to motor flange.
4. Remove rotor from motor.
5. Remove 4 screws connecting motor to stator.
6. Remove stator from motor.
7. If required, remove fan limit switch from stator.

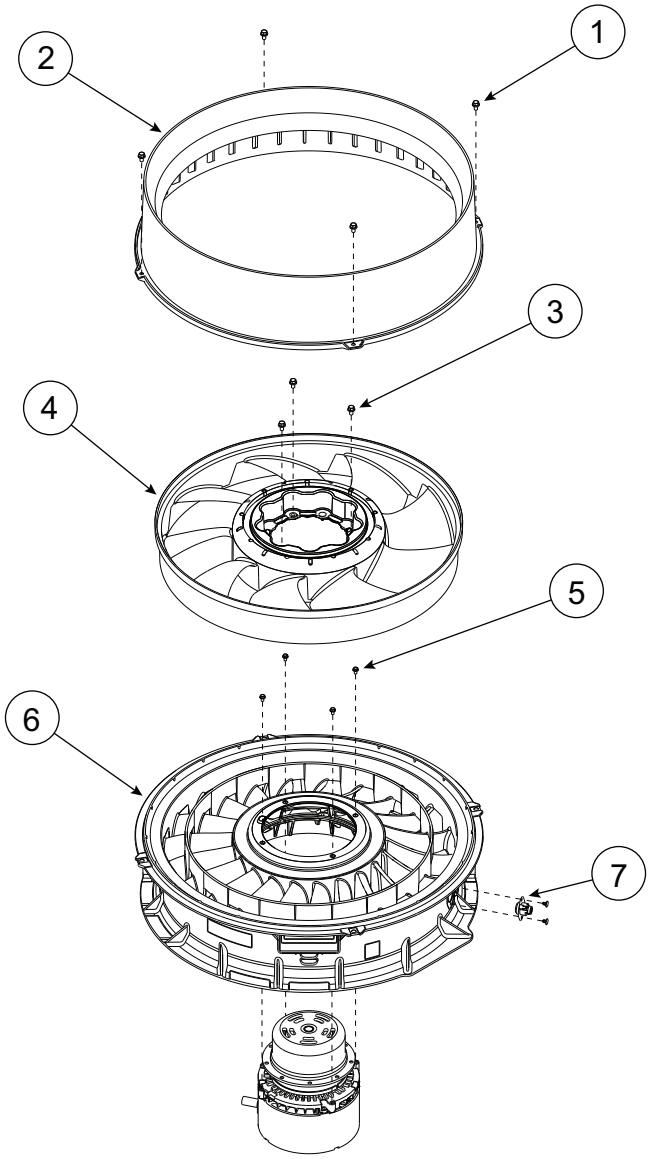


Fig. 10 — Disassembling Standard or Medium Static Motor and Fan Assembly

Disassembling High Static Motor and Fan Assembly

See Fig. 11.

NOTE: Refer to "Model Number Nomenclature" on page 51, position 10 for specific unit requirements.

1. Remove 4 screws from U-clips in fan casing.
2. Remove casing from assembly.
3. Remove 3 screws connecting rotor to motor flange.
4. Remove rotor from motor.
5. Remove 6 screws connecting motor to stator.
6. Remove motor from stator.
7. If required, remove fan limit switch from stator.

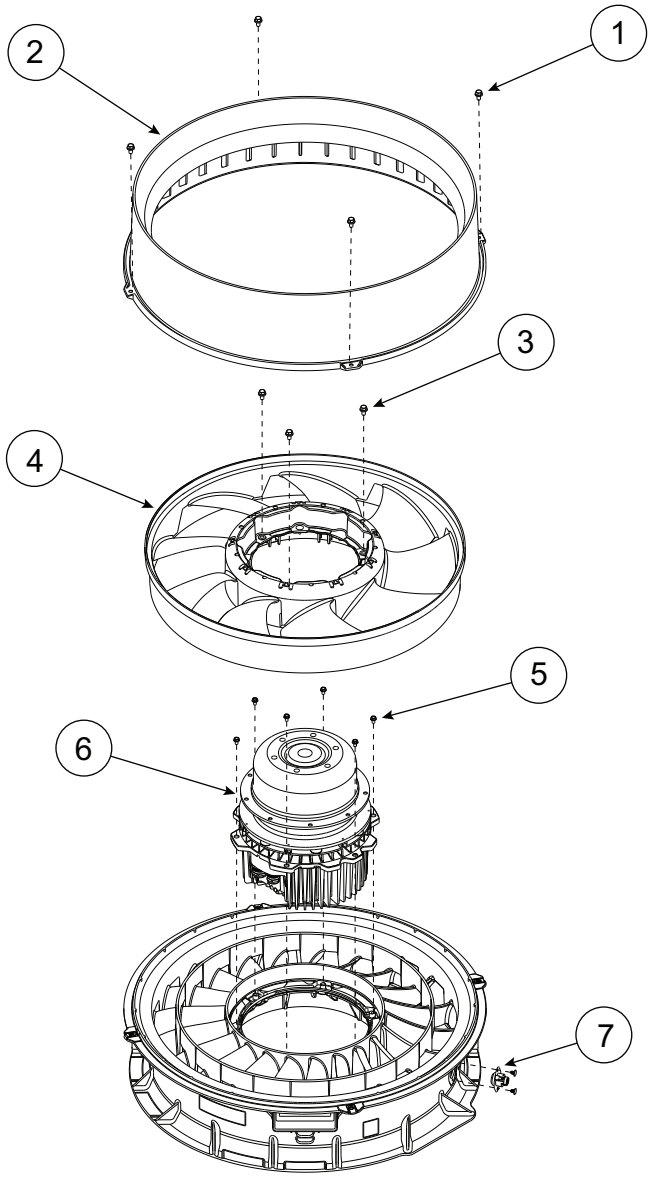


Fig. 11 — Disassembling High Static Motor and Fan Assembly

Reassembly of Standard/Medium Motor and Fan Assembly

See Fig. 12.

NOTE: Refer to "Model Number Nomenclature" on page 51, position 10 for specific unit requirements.

1. Place motor on flat surface.
2. If required, reinstall limit switch on stator with two plastic fastener plugs (48TM005675).
3. Line up keying features on stator and motor and set stator onto motor. Install four 1/4-20 x 1-in. screws (AC67AP170) to attach stator to motor. Tighten to 50 in.-lb (5.65 Nm).
4. Set rotor onto motor flange. Install three 1/4-20 x 1-in. screws (AC67AP170) to attach rotor to motor. Tighten to 50 in.-lb (5.65 Nm).
5. Set casing onto stator. Install four #10-16 x 3/4-in. screws (AP13AD128) through U-Clips in casing. Tighten to 14 in.-lb (1.58 Nm).
6. Pull motor harness out through guide feature in stator if not already completed.

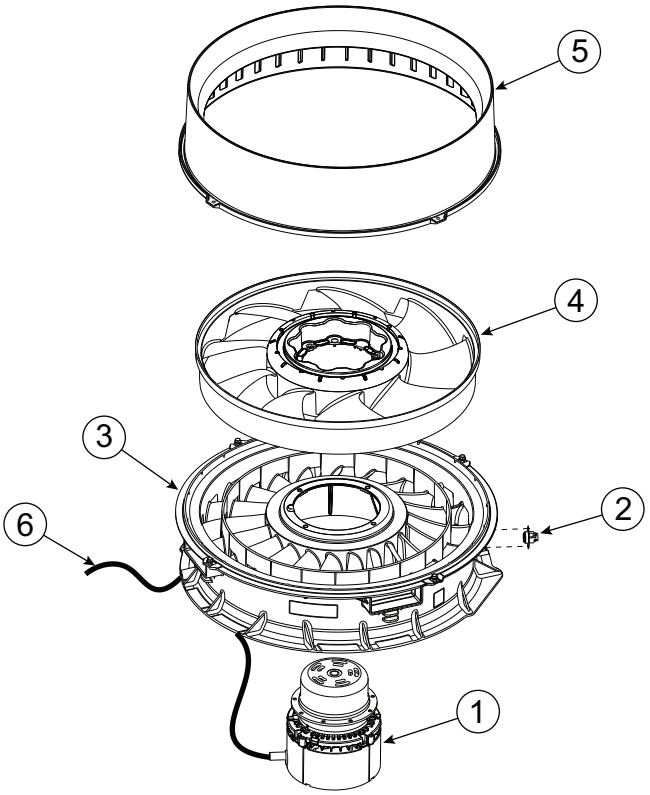


Fig. 12 — Standard/Medium Fan System Re-Assembly

Reassembly of High Static Motor and Fan Assembly

See Fig. 13.

NOTE: Refer to "Model Number Nomenclature" on page 51, position 10 for specific unit requirements.

1. Place stator on flat surface.
2. If required, reinstall limit switch on stator with two plastic fastener plugs (48TM005675).
3. Line up keying features on stator and motor and set motor onto stator. Motor wire Harness should align with guide feature in stator. Install six 1/4-20 x 1-in. screws (AC67AP170) to attach stator to motor. Tighten to 30 in.-lb (3.39 Nm).
4. Set rotor onto motor flange. Install three 1/4-20 x 1-in. screws (AC67AP170) to attach rotor to motor. Tighten to 50 in.-lb (5.65 Nm).
5. Set casing onto stator. Install four #10-16 x 3/4-in. screws (AP13AD128) through U-Clips in casing. Tighten to 14 in.-lb (1.58 Nm).
6. Pull motor harness out through guide feature in stator if not already completed.

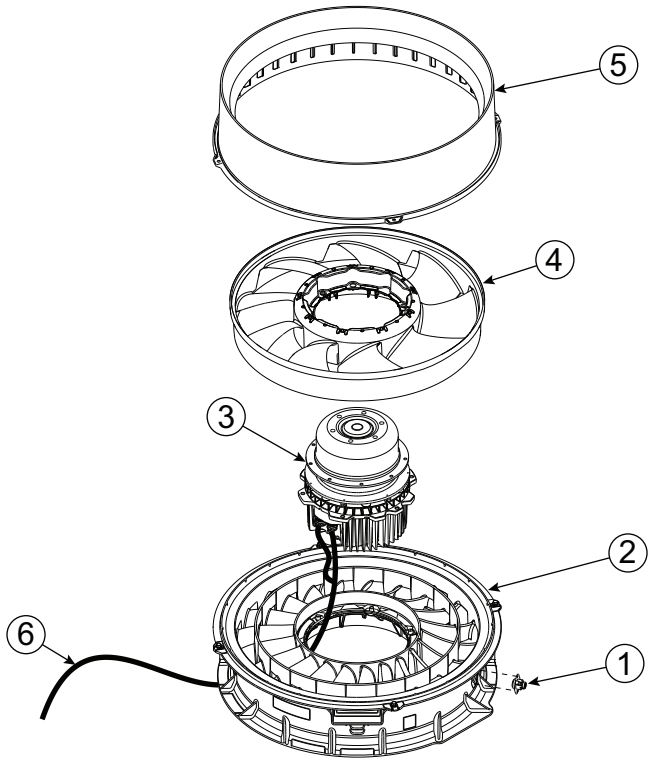


Fig. 13 — High Static Fan System Re-Assembly

Reinstalling Motor and Fan Assembly

See Fig. 14.

1. Align motor harness/grommet at ~7 o'clock (facing installer) and align the bottom flats on right and left sides of fan stator with fan deck ribs. Drop fan assembly down into fan deck opening and slide back until stator is under the rear fan deck brackets.
2. Align (if necessary) two front holes and fasten stator to fan deck with 8 #10 x 5/8-in. hex head screws (P/N: AL48AM217). Tighten to 50 in.-lb (5.65 Nm).
3. Reconnect wires for stator temperature limit switch.
4. Pull motor harness tight through grommet and plug it in to the control box harness and secure in the corner with snap-in wire tie.

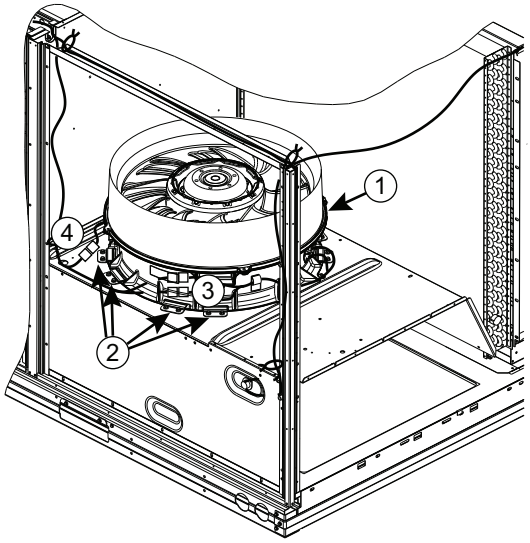


Fig. 14 — Fan Assembly Installation

Staged Air Volume

All 50GEQ units with EcoBlue™ technology come factory set to automatically adjust the indoor fan motor speed in sequence with the unit's ventilation, cooling, and heating operation. See Table 2 for fan operation for various modes.

Table 2 — Percentage of vdc Setting

UNIT	HIGH COOL	HEAT	MED COOL	LOW COOL	VENT
50GEQ*07	100%	100%	60%	40%	40%
50GEQ*08	100%	100%	60%	40%	40%
50GEQ*09	100%	100%	60%	40%	40%
50GEQ*12	100%	100%	60%	40%	40%

COOLING

⚠ WARNING

UNIT OPERATION AND SAFETY HAZARD

Failure to follow this warning could cause personal injury, death and/or equipment damage.

R-454B is an A2L refrigerant. All service equipment or components must be A2L refrigerant rated. Do not use non-A2L rated equipment or components on R-454B refrigerant equipment.

Condenser Coil (Outdoor)

The condenser coil is fabricated with round tube copper hairpins and plate fins of various materials and/or coatings (see Model Number Nomenclature in Appendix A to identify the materials provided in this unit). The coil may be one-row or composite-type two-row. Composite two-row coils are two single-row coils fabricated with a single return bend end tubesheet.

Evaporator Coil (Indoor)

The evaporator coil is traditional round-tube, plate-fin technology. Tube and fin construction is of various optional materials and coatings. (See "Model Number Nomenclature" on page 51.) Coils are multiple-row.

Condenser Coil Maintenance and Cleaning Recommendation

Routine cleaning of coil surfaces is essential to maintain proper operation of the unit. Elimination of contamination and removal of harmful residues will greatly increase the life of the coil and extend the life of the unit. The following maintenance and cleaning procedures are recommended as part of the routine maintenance activities to extend the life of the coil.

REMOVE SURFACE LOADED FIBERS

Surface loaded fibers or dirt should be removed with a vacuum cleaner. If a vacuum cleaner is not available, a soft non-metallic bristle brush may be used. In either case, the tool should be applied in the direction of the fins. Coil surfaces can be easily damaged (fin edges can be easily bent over and damage to the coating of a protected coil) if the tool is applied across the fins.

NOTE: Use of a water stream, such as a garden hose, against a surface loaded coil will drive the fibers and dirt into the coil. This will make cleaning efforts more difficult. Surface loaded fibers must be completely removed prior to using low velocity clean water rinse.

PERIODIC CLEAN WATER RINSE

A periodic clean water rinse is very beneficial for coils that are applied in coastal or industrial environments. However, it is very important that the water rinse is made with a very low velocity water stream to avoid damaging the fin edges. Monthly cleaning as described below is recommended. Rinsing coils in the opposite direction of airflow is recommended.

ROUTINE CLEANING OF COIL SURFACES

Periodic cleaning with Totaline® coil cleaner is essential to extend the life of coils. This cleaner is available from Replacement Components as part number P902-0301 for a one gallon container, and part number P902-0305 for a 5 gallon container. It is recommended that all coils, including standard aluminum, pre-coated, copper/copper or e-coated coils be cleaned with the Totaline coil cleaner as described below. Coil cleaning should be part of the unit's regularly scheduled maintenance procedures to ensure long life of the coil. Failure to clean the coils may result in reduced durability in the environment.

Avoid use of:

- coil brighteners
- acid cleaning prior to painting
- high pressure washers
- poor quality water for cleaning

Totaline coil cleaner is nonflammable, hypo-allergenic, non-bacterial, and a USDA accepted biodegradable agent that will not harm the coil or surrounding components such as electrical wiring, painted metal surfaces, or insulation. Use of non-recommended coil cleaners is strongly discouraged since coil and unit durability could be affected.

Clean coil as follows:

1. Turn off unit power, tag disconnect.

2. Remove all screws from the top panel except the screws securing the condenser fan to the top panel. (See Fig. 15.)

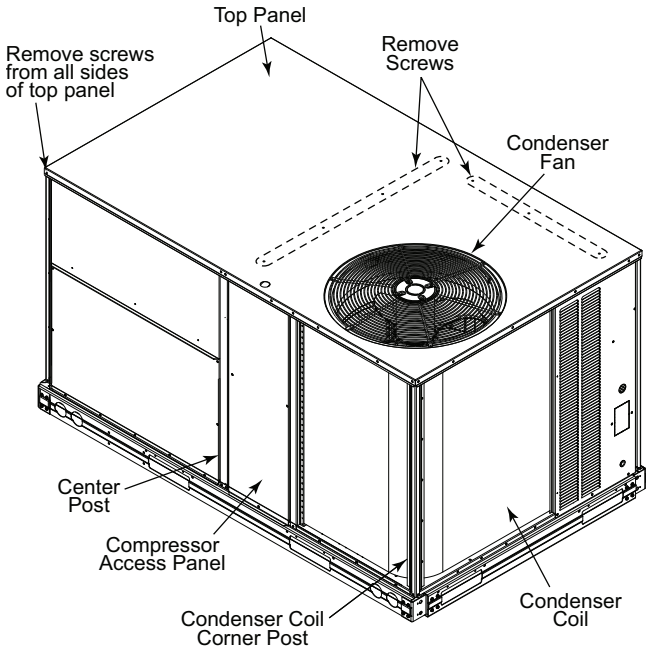


Fig. 15 — Location of Screws and Coil Corner Post

3. Lift and rotate the top panel at the condenser fan end and rotate the panel 90 degrees. Support the top panel so it remains level while resting on the condenser fan as shown in Fig. 16.
4. Remove the compressor access panel to access the lower coil clip. The condenser coil corner post may also be removed.
5. Remove the screws from both sides of the 4 coil retaining clips on the hairpin end of the coil tube sheets. (See Fig. 17.)
6. Remove the 4 retaining clips.

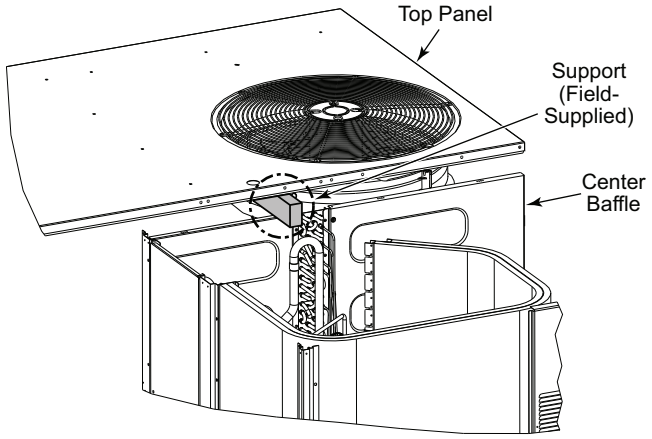


Fig. 16 — Top Panel Position

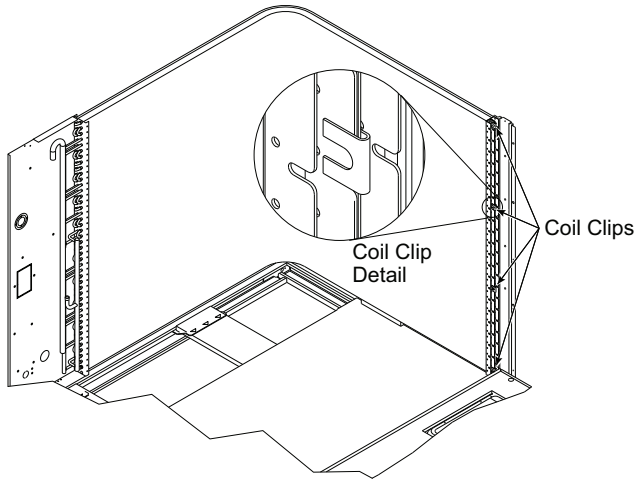


Fig. 17 — Condenser Coil Clips

7. Draw the inner coil inward to separate the coils for cleaning.
8. Insert a spacer (field-supplied) between the tube sheets to hold the coils apart. (See Fig. 18.)

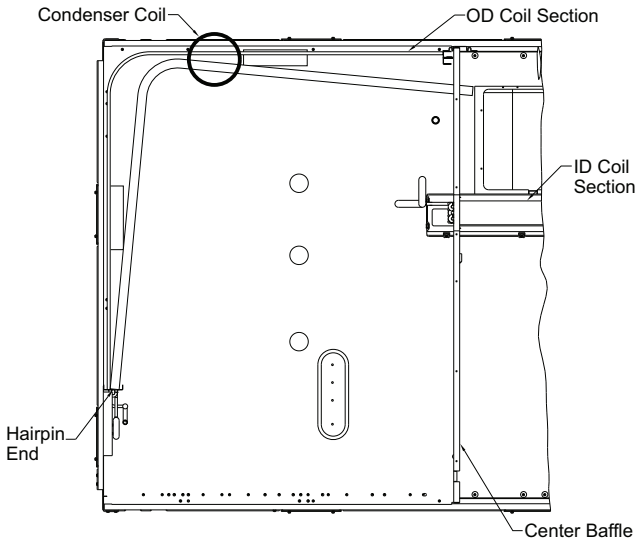


Fig. 18 — Separating Coil Sections (Top View)

9. Clean the outer coil surface to remove surface loaded fibers or dirt. See “Remove Surface Loaded Fibers” on page 10 for details.
10. Use a water hose or other suitable equipment to flush down between the 2 coil sections to remove dirt and debris. If a coil cleaner is used be sure to rinse the coils completely before reassembly.
11. Move the inner coil back into position. Reinstall the 4 coil clips. Reinstall the top panel and replace all screws.

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in reduced unit performance or unit shutdown.

High velocity water from a pressure washer, garden hose, or compressed air should never be used to clean a coil. The force of the water or air jet will bend the fin edges and increase airside pressure drop.

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in accelerated corrosion of unit parts.

Harsh chemicals, household bleach or acid or basic cleaners should not be used to clean outdoor or indoor coils of any kind. These cleaners can be very difficult to rinse out of the coil and can accelerate corrosion at the fin/tube interface where dissimilar materials are in contact. If there is dirt below the surface of the coil, use approved coil cleaner.

Totaline Coil Cleaner Application Instructions

1. Proper eye protection such as safety glasses is recommended during mixing and application.
2. Remove all surface loaded fibers and dirt with a vacuum cleaner as described above.
3. Thoroughly wet finned surfaces with clean water and a low velocity garden hose, being careful not to bend fins.
4. Mix Totaline coil cleaner in a 2-1/2 gallon garden sprayer according to the instructions included with the cleaner. The optimum solution temperature is 100°F.

   NOTE: Do NOT USE water in excess of 130°F, as the enzymatic activity will be destroyed.
5. Thoroughly apply Totaline coil cleaner solution to all coil surfaces including finned area, tube sheets and coil headers.
6. Hold garden sprayer nozzle close to finned areas and apply cleaner with a vertical, up-and-down motion. Avoid spraying in horizontal pattern to minimize potential for fin damage.
7. Ensure cleaner thoroughly penetrates deep into finned areas. Interior and exterior finned areas must be thoroughly cleaned. Finned surfaces should remain wet with cleaning solution for 10 minutes. Ensure surfaces are not allowed to dry before rinsing. Reapply cleaner as needed to ensure 10-minute saturation is achieved.
8. Thoroughly rinse all surfaces with low velocity clean water using downward rinsing motion of water spray nozzle. Protect fins from damage from the spray nozzle.

Evaporator Coil

CLEANING THE EVAPORATOR COIL:

1. Turn unit power off. Install lockout tag. Remove evaporator coil access panel.
2. If economizer or two-position damper is installed, remove economizer by disconnecting Molex[1] plug and removing mounting screws.
3. Slide filters out of unit.
4. Clean coil using a commercial coil cleaner or dishwasher detergent in a pressurized spray canister. Wash both sides of coil and flush with clean water. For best results, backflush toward return-air section to remove foreign material. Flush condensate pan after completion.
5. Reinstall economizer and filters.
6. Reconnect wiring.
7. Replace access panels.

Typical Unit Piping

Each heat pump system includes two compressors, a reversing valve, dual-function outdoor and indoor coils, a common liquid line with bi-flow TXV, and dedicated cooling and heating TXVs. 50GEQ*07 and 08 unit outdoor coils contain a vapor header check valve. 50GEQ*09-12 unit indoor coils contain a vapor header check valve. See Fig. 19-26 and Tables 3-11 for typical unit piping schematic of parallel coil circuits during evaporator-function operation and converging coil circuits during the condenser-function operation.

Table 3 — 50GEQ*07-08 – Cooling Mode

COMPONENT	STATUS/POSITION
Reversing Valve	Energized
Check Valve A	Closed
Check Valve B	Open
Check Valve C	Open
Check Valve D	Open
Check Valve E	Closed
Check Valve F	Closed

Table 4 — 50GEQ*07-08 – Heating Mode

COMPONENT	STATUS/POSITION
Reversing Valve	De-energized
Check Valve A	Open
Check Valve B	Closed
Check Valve C	Closed
Check Valve D	Closed
Check Valve E	Open
Check Valve F	Open

Table 5 — 50GEQ*07-08 – Defrost Mode

COMPONENT	STATUS/POSITION
Defrost Thermostat	Closed
Outdoor Fan(s)	Off
Reversing Valve	Energized
Check Valve A	Closed
Check Valve B	Open
Check Valve C	Open
Check Valve D	Open
Check Valve E	Closed
Check Valve F	Closed

Table 6 — 50GEQ*09 – Cooling Mode

COMPONENT	STATUS/POSITION
Reversing Valve	Energized
Check Valve A	N/A
Check Valve B	Open
Check Valve C	Open
Check Valve D	Open
Check Valve E	Closed
Check Valve F	Closed

1. Third-party trademarks and logos are the property of their respective owners.

Table 7 — 50GEQ*09 – Heating Mode

COMPONENT	STATUS/POSITION
Reversing Valve	De-energized
Check Valve A	N/A
Check Valve B	Closed
Check Valve C	Closed
Check Valve D	Closed
Check Valve E	Open
Check Valve F	Open

Table 8 — 50GEQ*09 – Defrost Mode

COMPONENT	STATUS/POSITION
Defrost Thermostat	Closed
Outdoor Fan(s)	Off
Reversing Valve	Energized
Check Valve A	N/A
Check Valve B	Open
Check Valve C	Open
Check Valve D	Open
Check Valve E	Closed
Check Valve F	Closed

Table 9 — 50GEQ*12 — Cooling Mode

COMPONENT	STATUS/POSITION
Reversing Valve	Energized
Check Valve A	Closed
Check Valve B	Open
Check Valve C	Open
Check Valve D	Open
Check Valve E	Open
Check Valve F	Closed
Check Valve G	Closed

Table 10 — 50GEQ*12 — Heating Mode

COMPONENT	STATUS/POSITION
Reversing Valve	De-energized
Check Valve A	Open
Check Valve B	Closed
Check Valve C	Closed
Check Valve D	Closed
Check Valve E	Closed
Check Valve F	Open
Check Valve G	Open

Table 11 — 50GEQ*12 — Defrost Mode

COMPONENT	STATUS/POSITION
Defrost Thermostat	Closed
Outdoor Fan(s)	Off
Reversing Valve	Energized
Check Valve A	Closed
Check Valve B	Open
Check Valve C	Open
Check Valve D	Open
Check Valve E	Open
Check Valve F	Closed
Check Valve G	Closed

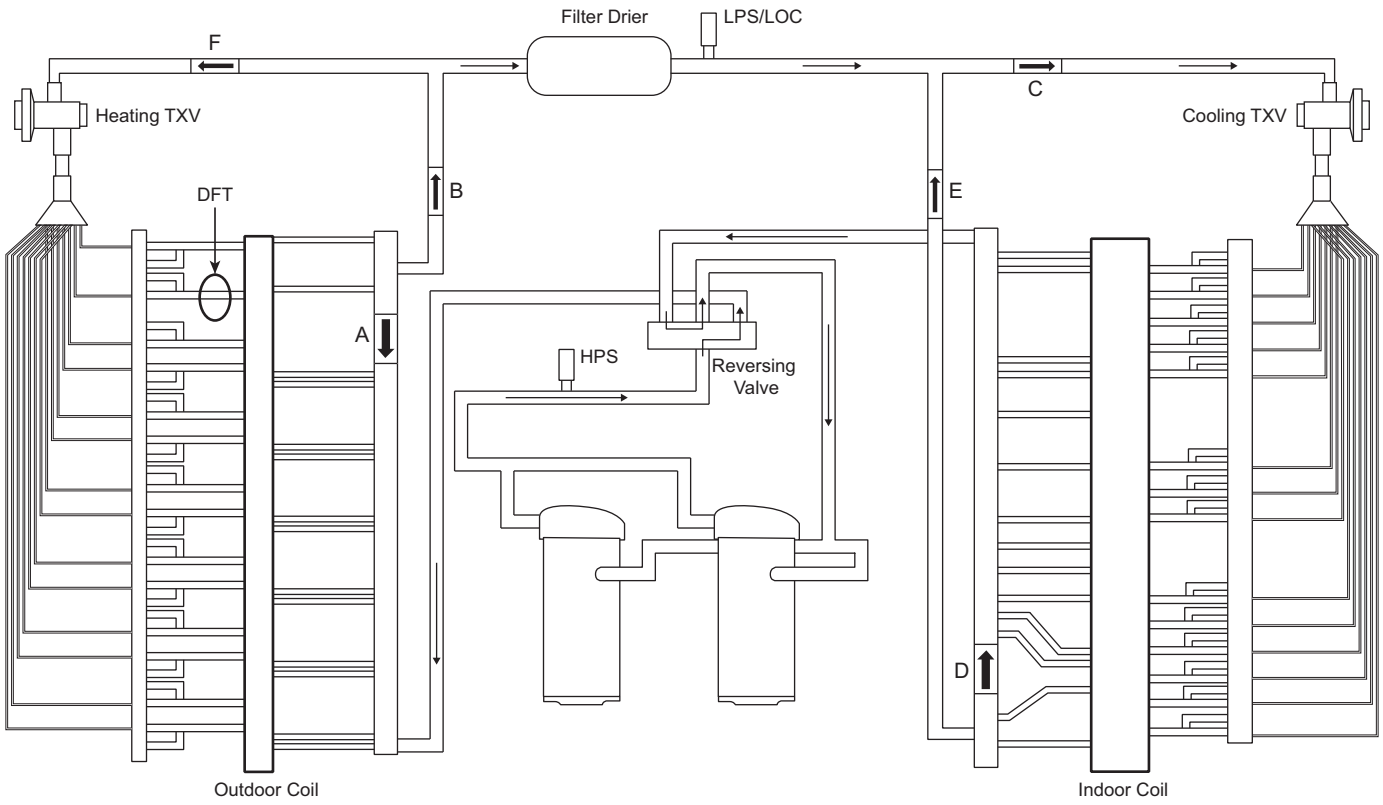


Fig. 19 — Piping Schematic — 50GEQ*07 Cooling Mode

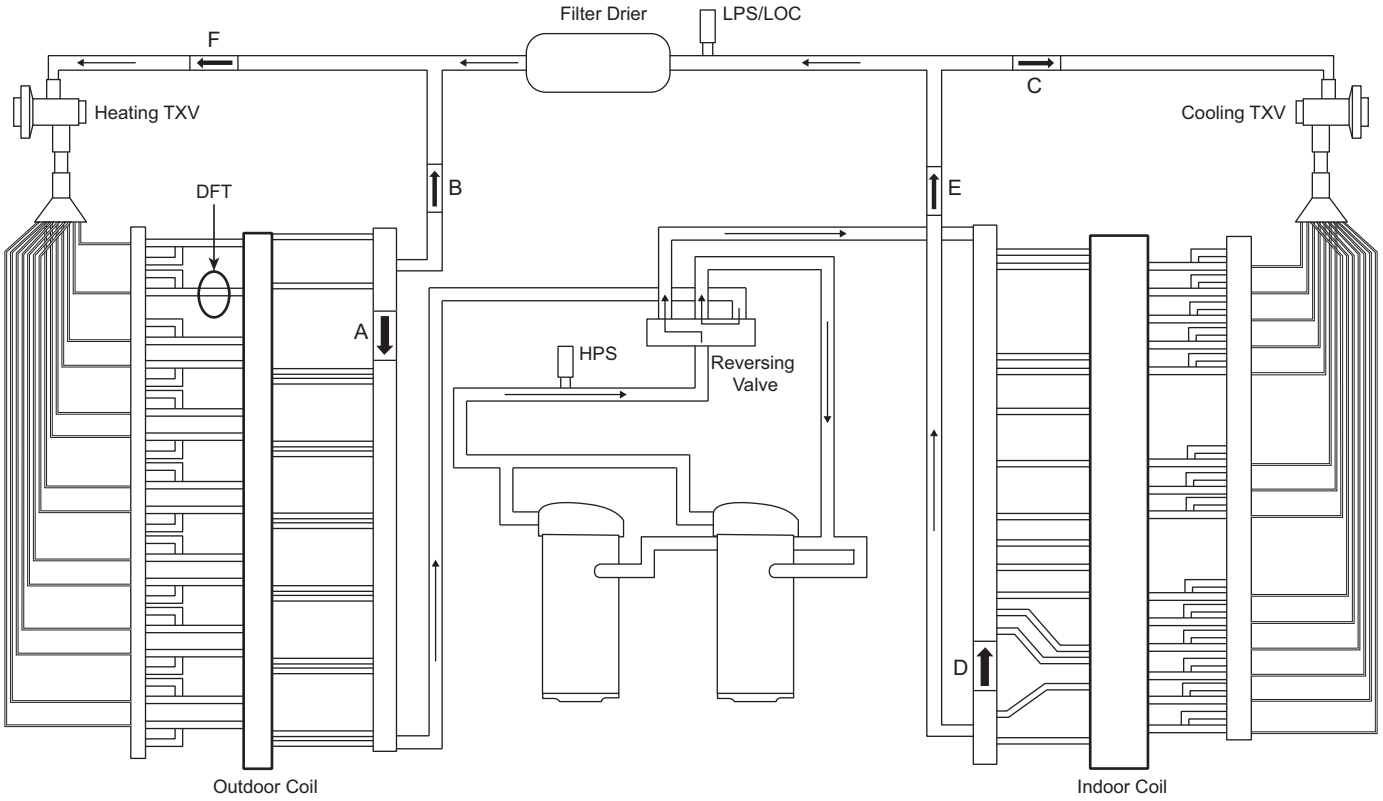


Fig. 20 — Piping Schematic — 50GEQ*07 Heating Mode

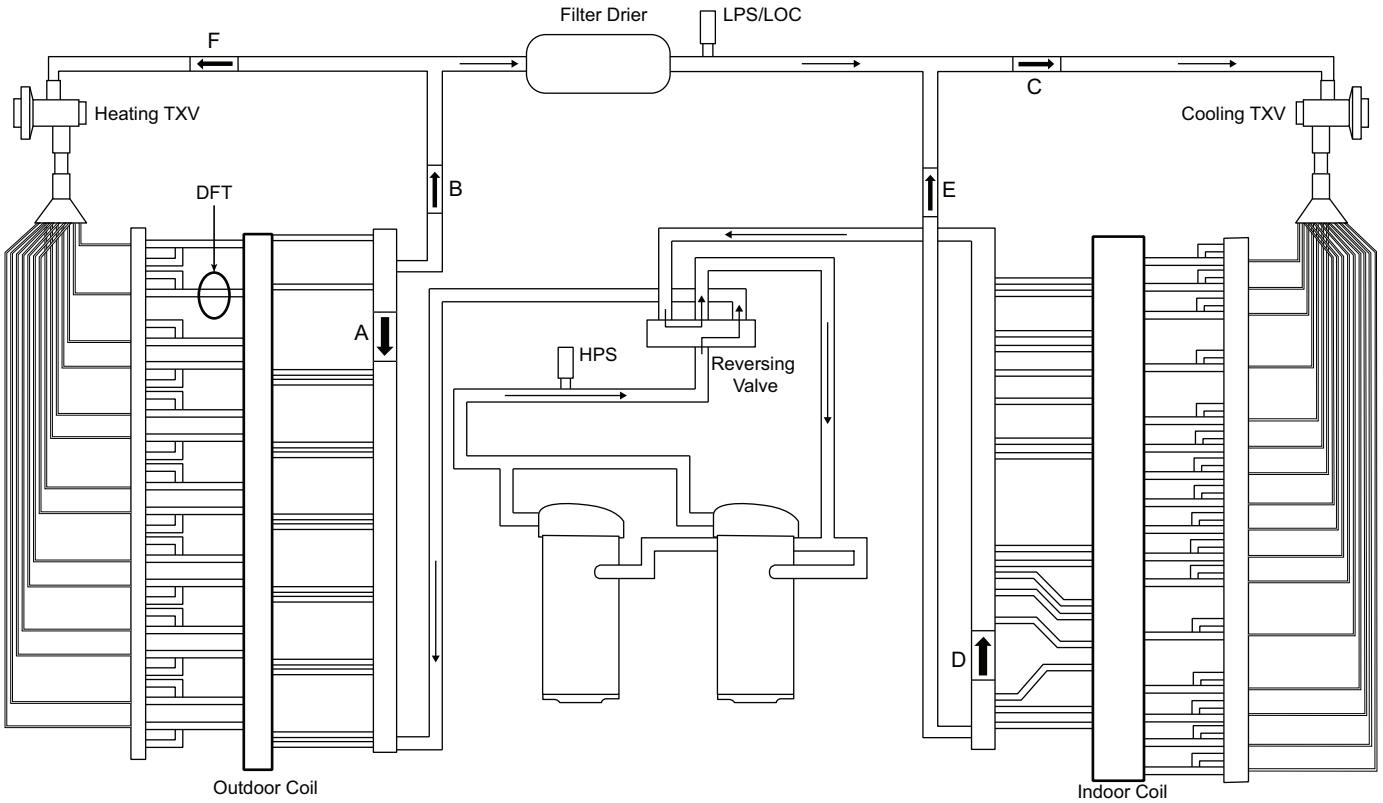


Fig. 21 — Piping Schematic — 50GEQ*08 Cooling Mode

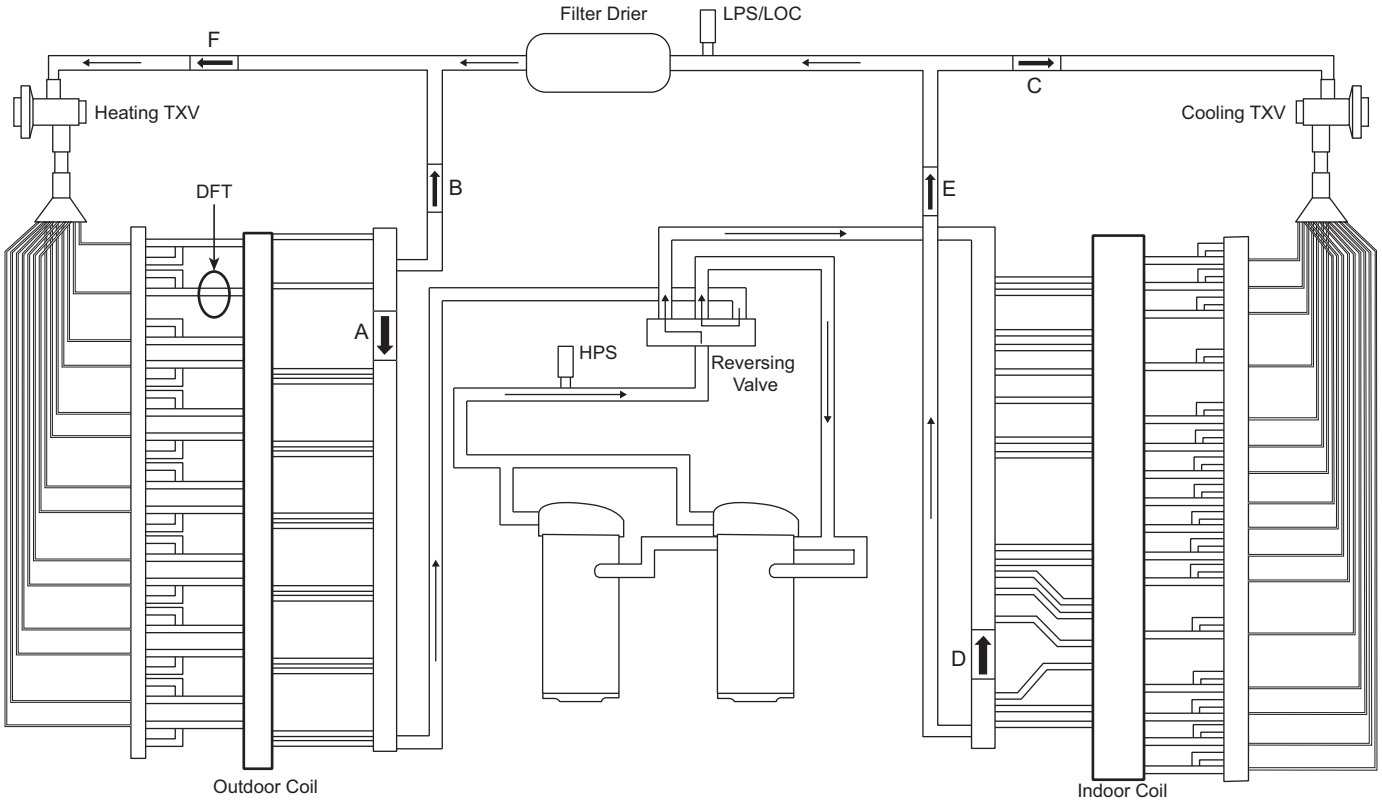


Fig. 22 — Piping Schematic — 50GEQ*08 Heating Mode

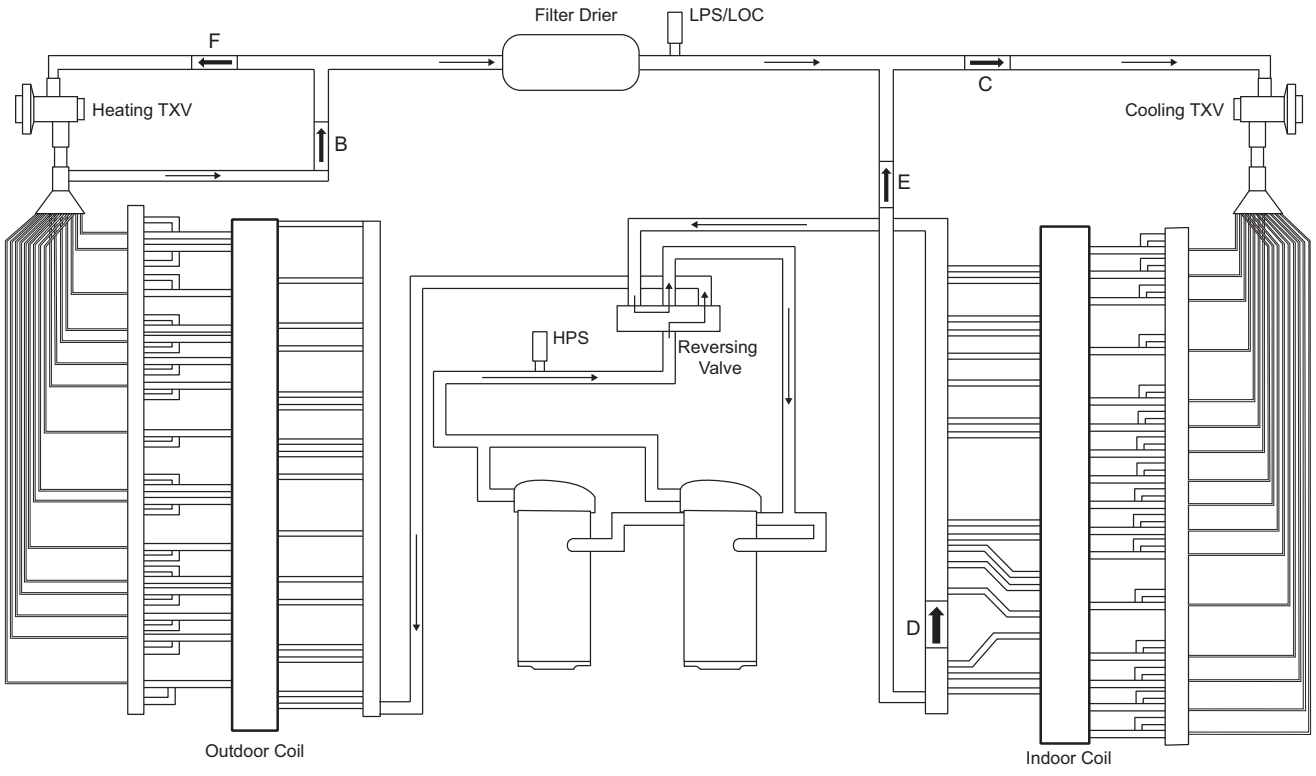


Fig. 23 — Piping Schematic — 50GEQ*09 Cooling Mode

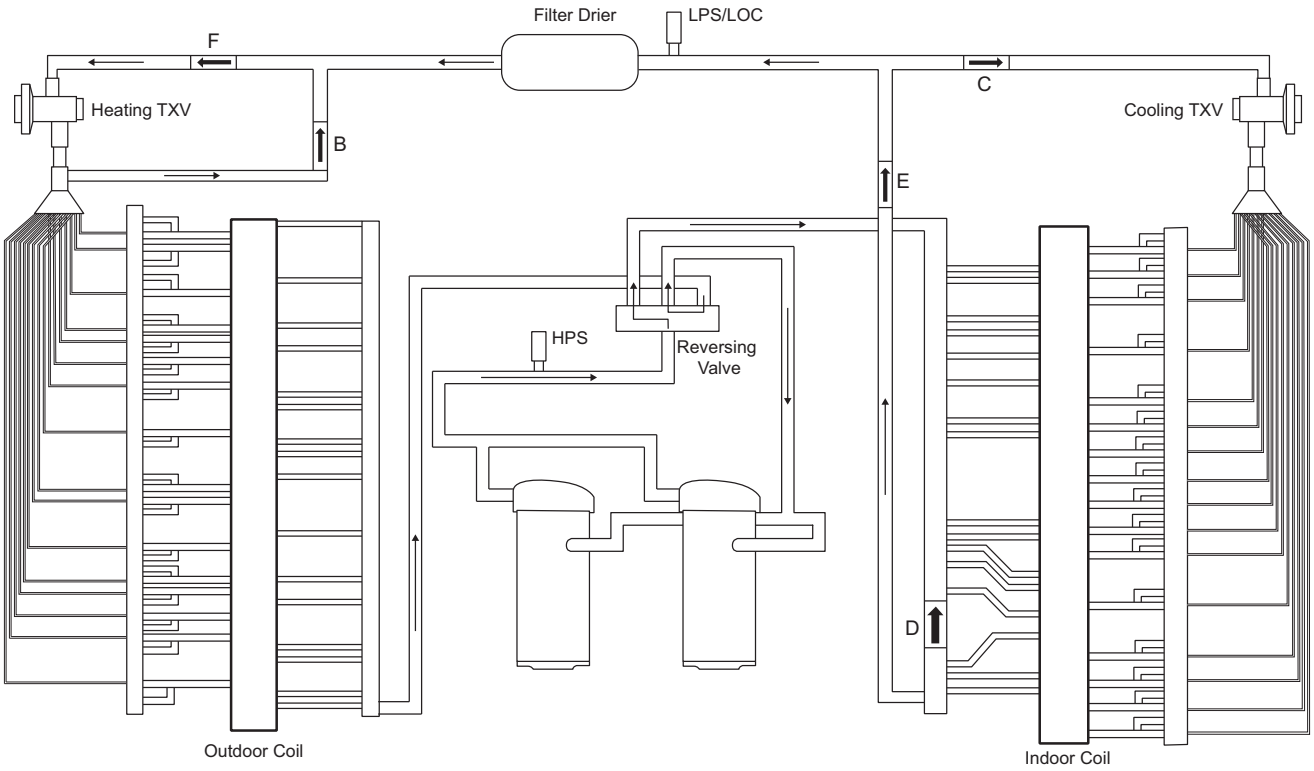


Fig. 24 — Piping Schematic — 50GEQ*09 Heating Mode

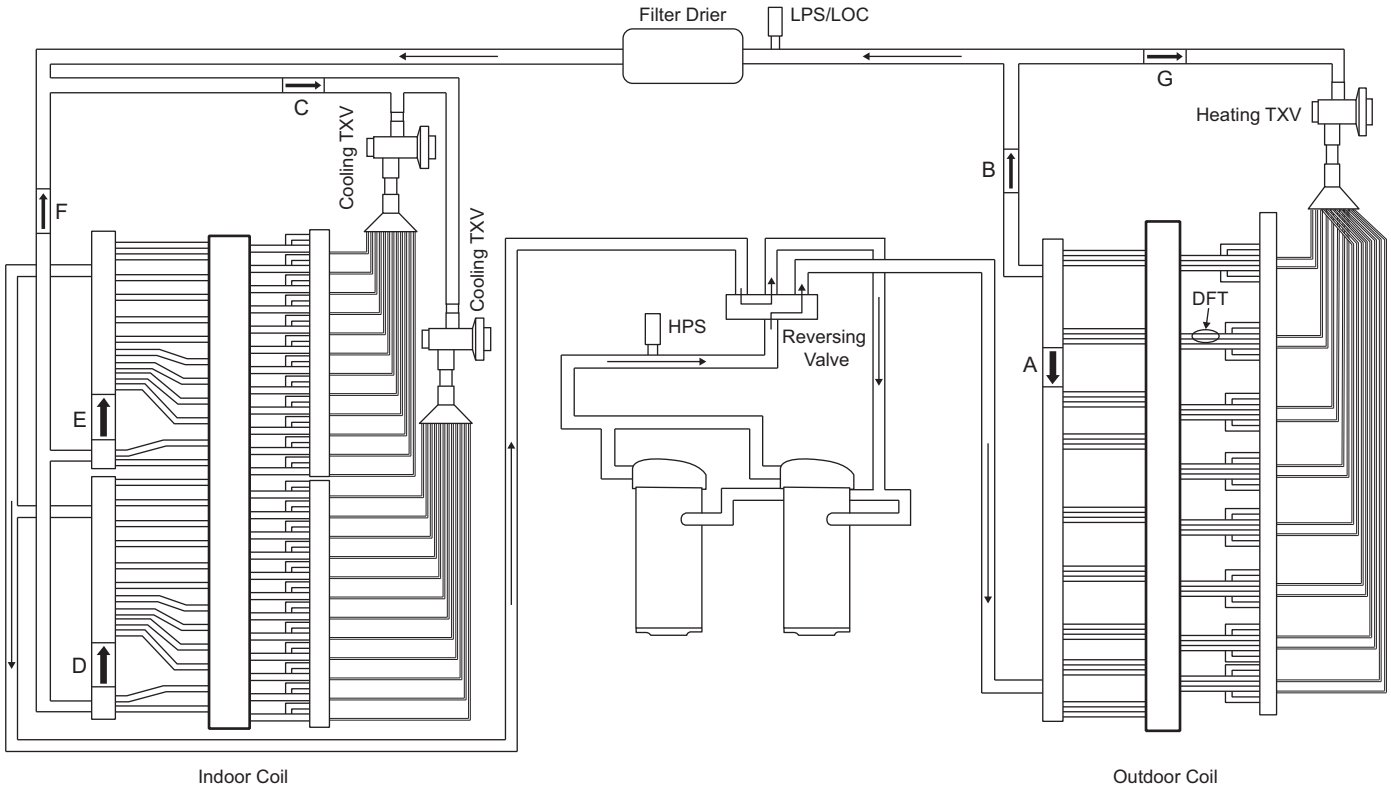


Fig. 25 — Piping Schematic — 50GEQ*12 Cooling Mode

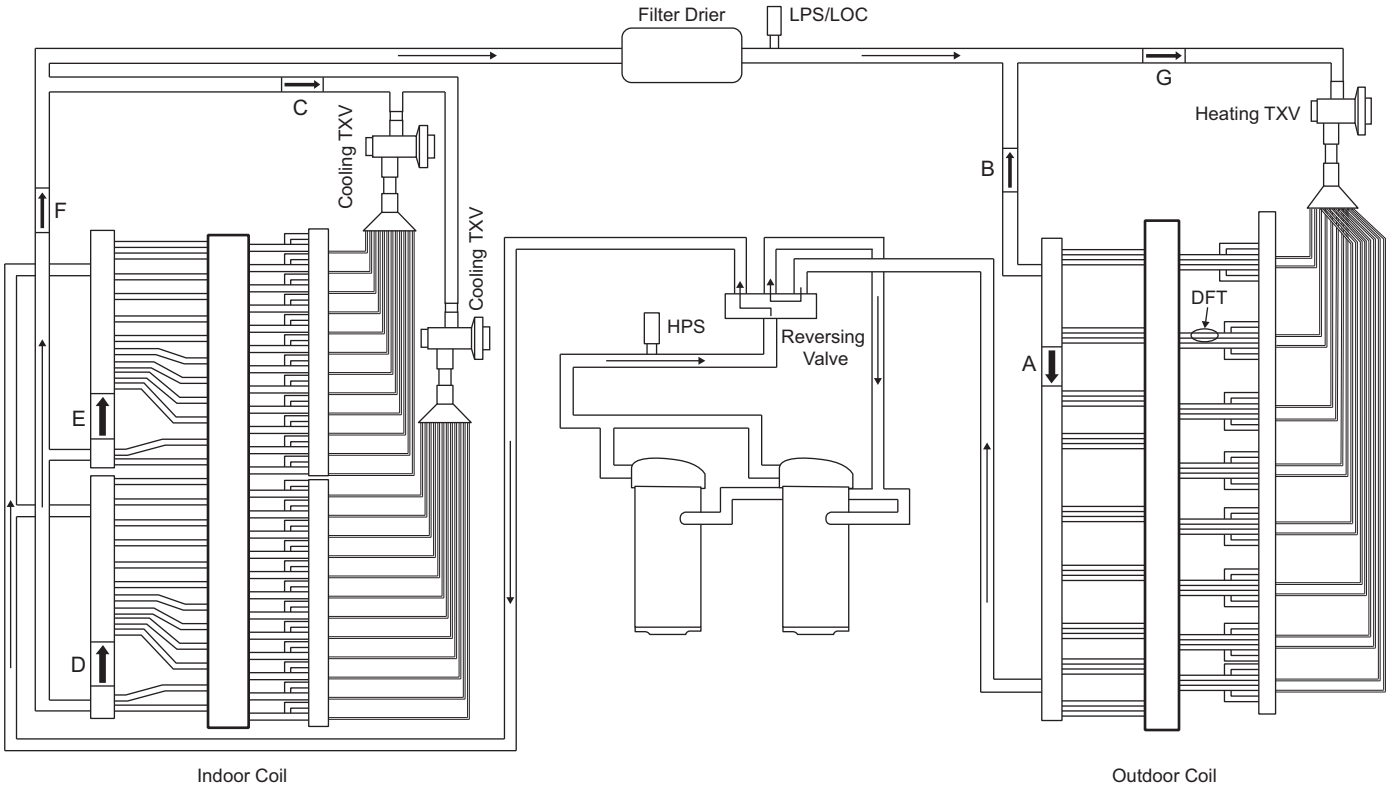


Fig. 26 — Piping Schematic — 50GEQ*12 Heating Mode

THERMOSTATIC EXPANSION VALVE (TXV)

All 50GEQ*07-12 units include TXV control. The TXV is a bi-flow, bleed port expansion valve with an external equalizer. The TXVs are specifically designed to operate with Puron Advance™ (R-454B) refrigerant. Use only factory-authorized TXVs.

TXV Operation

The TXV is a metering device that is used in air conditioning and heat pump systems to adjust to the changing load conditions by maintaining a preset superheat temperature at the outlet of the evaporator coil.

The volume of refrigerant metered through the valve seat is dependent upon the following:

1. Superheat temperature is sensed by cap tube sensing bulb on suction tube at outlet of evaporator coil. This temperature is converted into pressure by refrigerant in the bulb pushing downward on the diaphragm, which opens the valve using the push rods.
2. The suction pressure at the outlet of the evaporator coil is transferred through the external equalizer tube to the underside of the diaphragm.
3. The pin is spring loaded, which exerts pressure on the underside of the diaphragm. Therefore, the bulb pressure works against the spring pressure and evaporator suction pressure to open the valve. If the load increases, the temperature increases at the bulb, which increases the pressure on the top side of the diaphragm. This opens the valve and increases the flow of refrigerant. The increased refrigerant flow causes the leaving evaporator temperature to decrease. This lowers the pressure on the diaphragm and closes the pin. The refrigerant flow is effectively stabilized to the load demand with negligible change in superheat.

Replacing TXV

1. Recover refrigerant.
2. Remove TXV support clamp using a 5/16-in. nut driver.
3. Remove TXV by either reheating the fitting or by using a wrench. If mechanical, use an additional wrench on the connections to prevent damage to tubing.
4. Remove equalizer tube from suction line of coil. Use file or tubing cutter to cut brazed equalizer line approximately 2 inches above suction tube.
5. Remove bulb from vapor tube inside cabinet.
6. Install the new TXV either by using a wrench and an additional wrench on connections to prevent damage to tubing while attaching TXV to distributor, or by brazing if there is a sweat fitting.
7. Route equalizer tube through suction connection opening (large hole) in fitting panel and install fitting panel in place.
8. Sweat the inlet of TXV marked “IN” to the liquid line. Avoid excessive heat which could damage the TXV valve. Use quenching cloth when applying heat anywhere on TXV.
9. Attach the equalizer tube to the suction line. If the coil has a mechanical connection, then use a wrench and an additional wrench on connections to prevent damage. If the coil has a brazed connection, use a file or a tubing cutter to remove the mechanical flare nut from the equalizer line. Then use a new coupling to braze the equalizer line to the stub (previous equalizer line) in suction line.
10. Attach TXV bulb in the same location where the original (in the sensing bulb indent) was when it was removed, using the supplied bulb clamps. See Fig. 27.

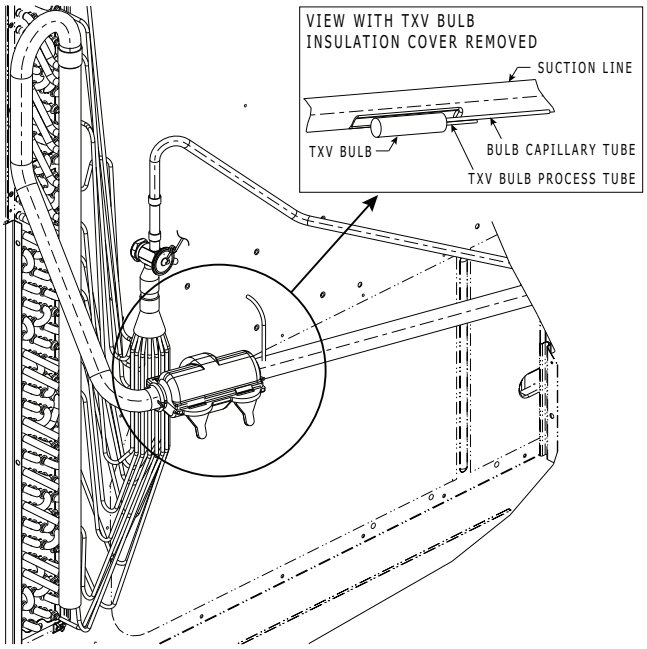


Fig. 27 — TXV Valve and Sensing Bulb Location

Refrigerant System Pressure Access Ports

There are two access ports in the system: on the suction tube near the compressor and on the discharge tube near the compressor. These are brass fittings with black plastic caps. The hose connection fittings are standard 1/4-in. SAE male flare couplings.

The brass fittings are two-piece high flow valves, with a receptacle base brazed to the tubing and an integral spring-closed check valve core screwed into the base. See Fig. 28. This check valve is permanently assembled into this core body and cannot be serviced separately; replace the entire core body if necessary. Service tools are available from RCD that allow the replacement of the check valve core without having to recover the entire system refrigerant charge. Apply compressor refrigerant oil to the check valve core's bottom o-ring. Install the fitting body with 96 ±10 in.-lb (10.85 ±1.1 Nm) of torque; do not over-tighten.

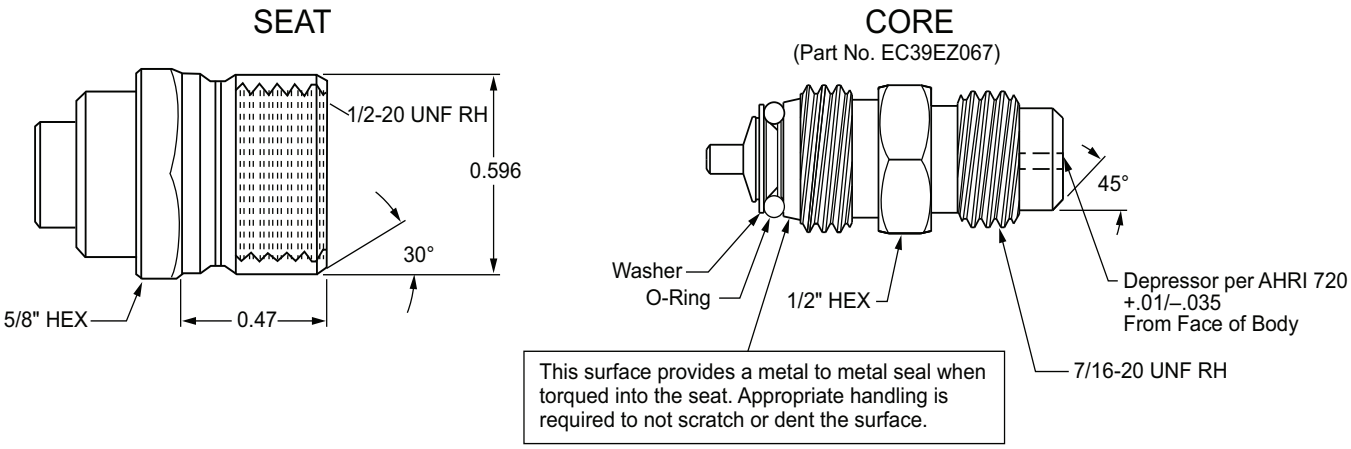


Fig. 28 — CoreMax®[1] Access Port Assembly

1. Third-party trademarks and logos are the property of their respective owners.

PURON ADVANCE™ (R-454B) REFRIGERANT

This unit is designed for use with Puron Advance (R-454B) refrigerant. Do not use any other refrigerant in this system.

Puron Advance (R-454B) refrigerant is provided in gray cylinders with a red band near the top. Pay close attention to the cylinder labels to verify that the cylinder contains the correct refrigerant. These cylinders are available with and without dip tubes; cylinders with dip tubes will have a label indicating this feature. For a cylinder with a dip tube, place the cylinder in the upright position (access valve at the top) when removing liquid refrigerant for charging. For a cylinder without a dip tube, invert the cylinder (access valve on the bottom) when removing liquid refrigerant.

Because Puron Advance (R-454B) refrigerant is a zeotropic blend, it is strongly recommended that refrigerant always be removed from the cylinder as a liquid. Admit liquid refrigerant into the system in the discharge line. If adding refrigerant into the suction line, use a commercial metering/expansion device at the gauge manifold; remove liquid from the cylinder, pass it through the metering device at the gauge set and then pass it into the suction line as a vapor. Do not remove Puron Advance (R-454B) refrigerant from the cylinder as a vapor. For further details see A2L REFRIGERATION INFORMATION starting on page 43.

Refrigerant Charge

Amount of refrigerant charge is listed on the unit's nameplate. Refer to *Carrier GTAC2-5 Charging, Recovery, Recycling and Reclamation* training manual and the following procedures.

Unit panels must be in place when unit is operating during the charging procedure.

NO CHARGE

Use standard evacuating techniques. After evacuating system, weigh in the specified amount of refrigerant.

LOW-CHARGE COOLING

Using Cooling Charging Charts, Fig. 29-36, vary refrigerant until the conditions of the appropriate chart are met.

NOTE: The charging charts are different from type normally used. Charts are based on charging the units to the correct sub-cooling for the various operating conditions. Accurate pressure gauge and temperature sensing device are required. Connect the pressure gauge to the service port on the discharge line. Mount the temperature sensing device on the outdoor coil leaving line and insulate it so that outdoor ambient temperature does not affect the reading. Indoor-air cfm must be within the normal operating range of the unit.

50GEQ SIZE DESIGNATION	NOMINAL TONS REFERENCE
07	6.0
08	7.5
09	8.5
12	10.0

EXAMPLE:

Model. 50GEQ*07

Discharge Pressure . . . . . 300 psig (2028 kPa)

Outdoor Leaving Coil Temperature should be . . . . . 86°F (30°C)

USING COOLING CHARGING CHARTS

Take the outdoor coil leaving temperature and read the discharge pressure gauge. Refer to chart to determine what the outdoor coil leaving temperature should be. If the outdoor coil leaving temperature is low, carefully recover some of the charge. If the outdoor coil leaving temperature is high, add refrigerant. Recheck the discharge pressure as charge is adjusted.

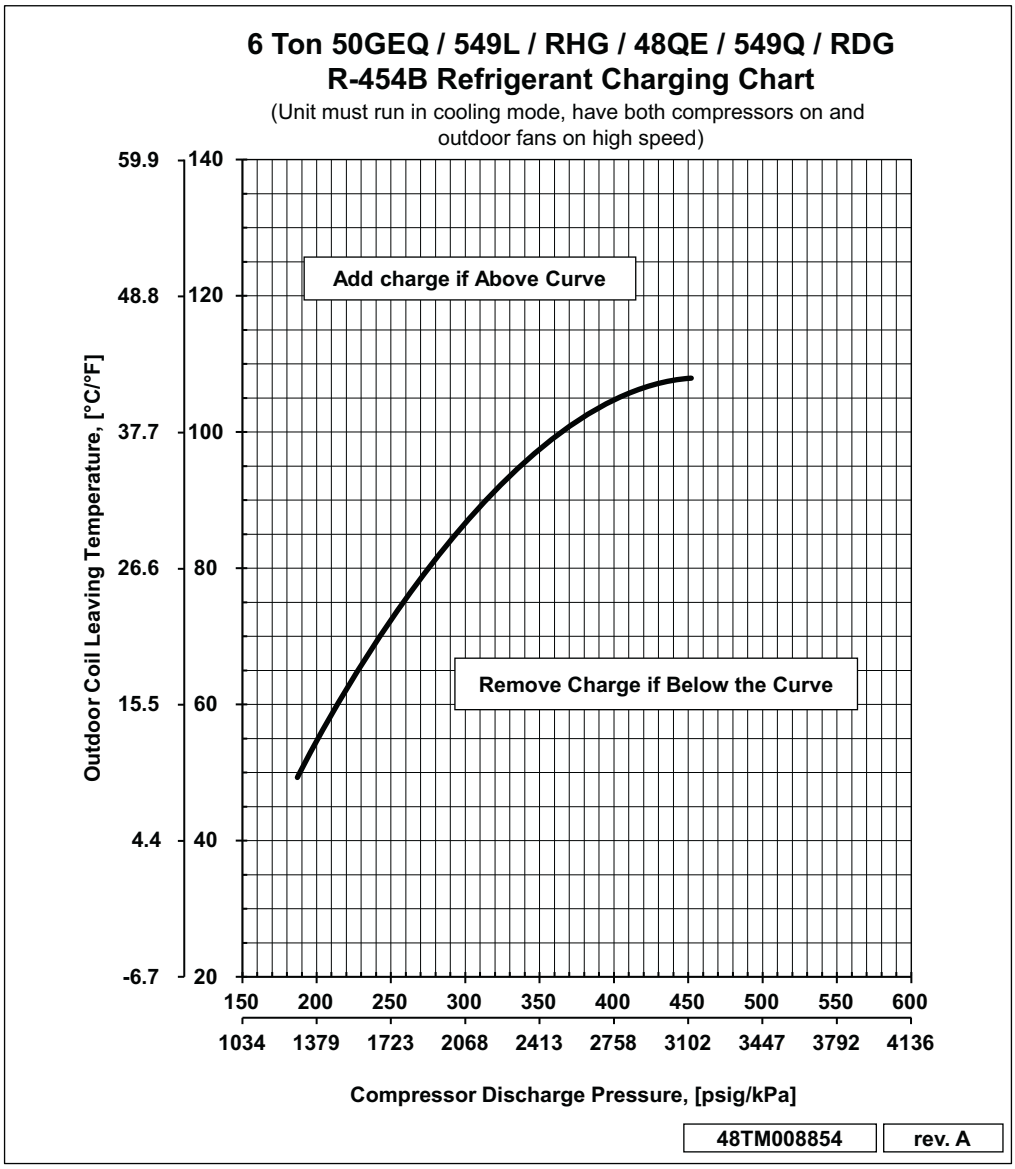


Fig. 29 — Cooling Charging Chart - 6.0 Ton

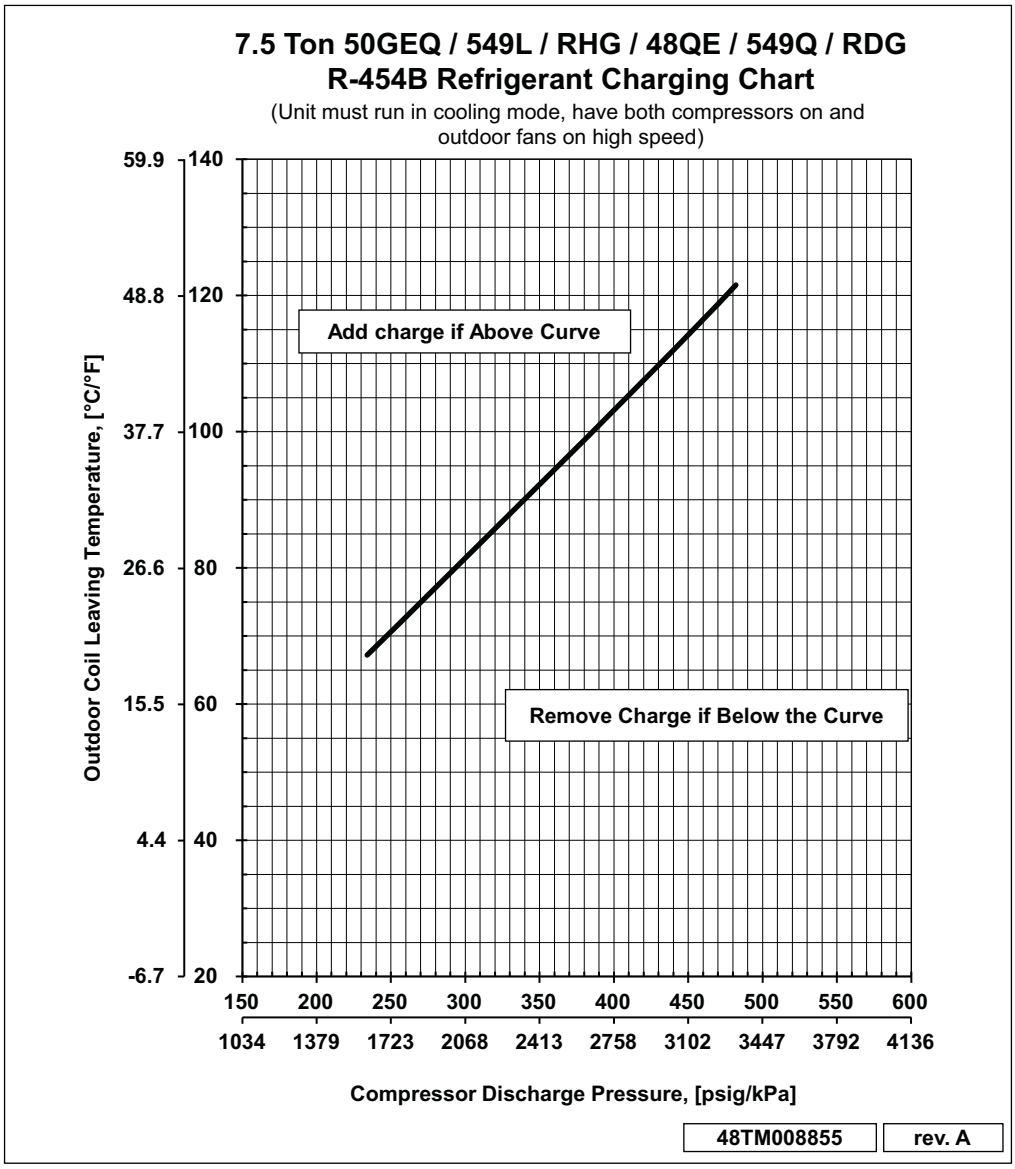


Fig. 30 — Cooling Charging Chart - 7.5 Ton

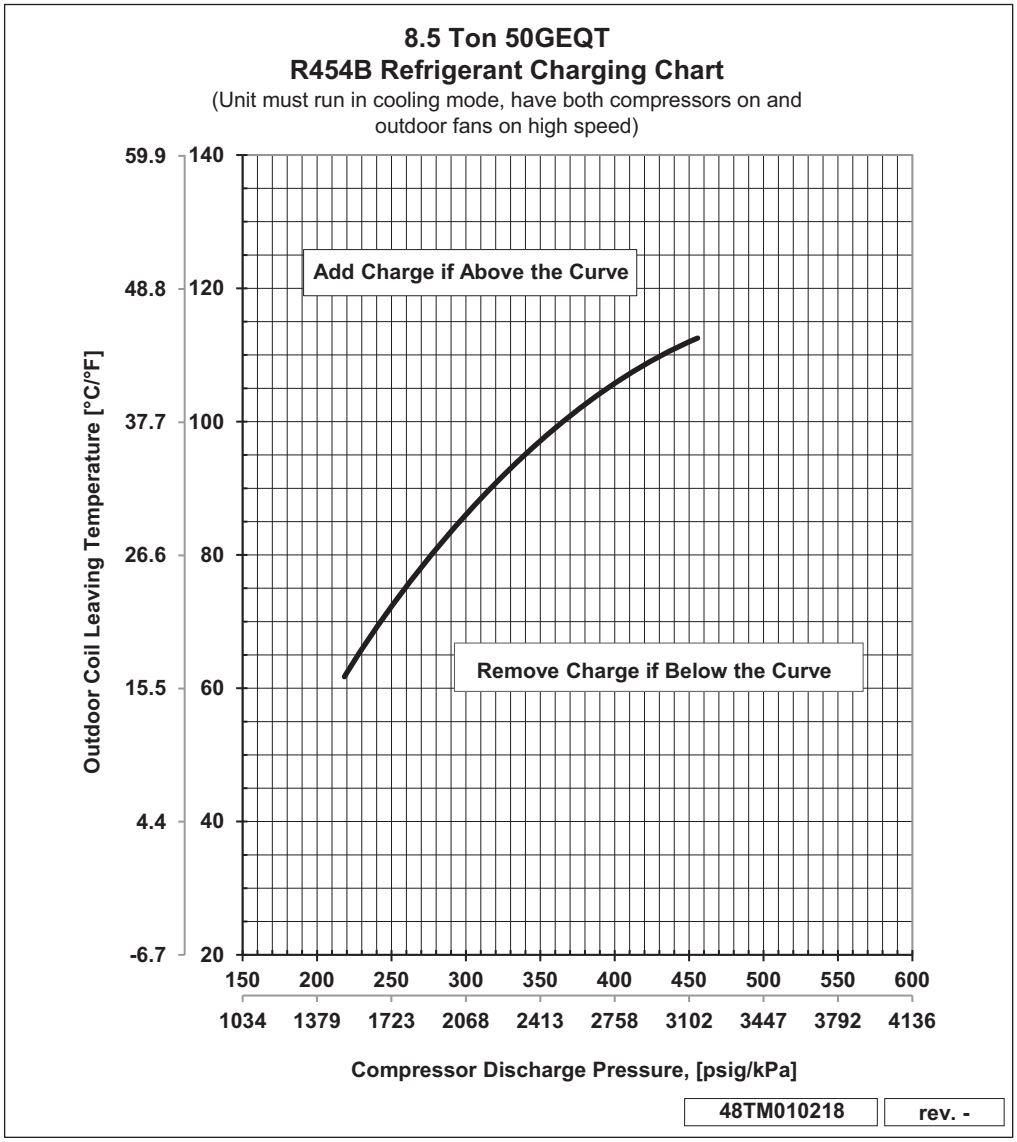


Fig. 31 — Cooling Charging Chart - 8.5 Ton

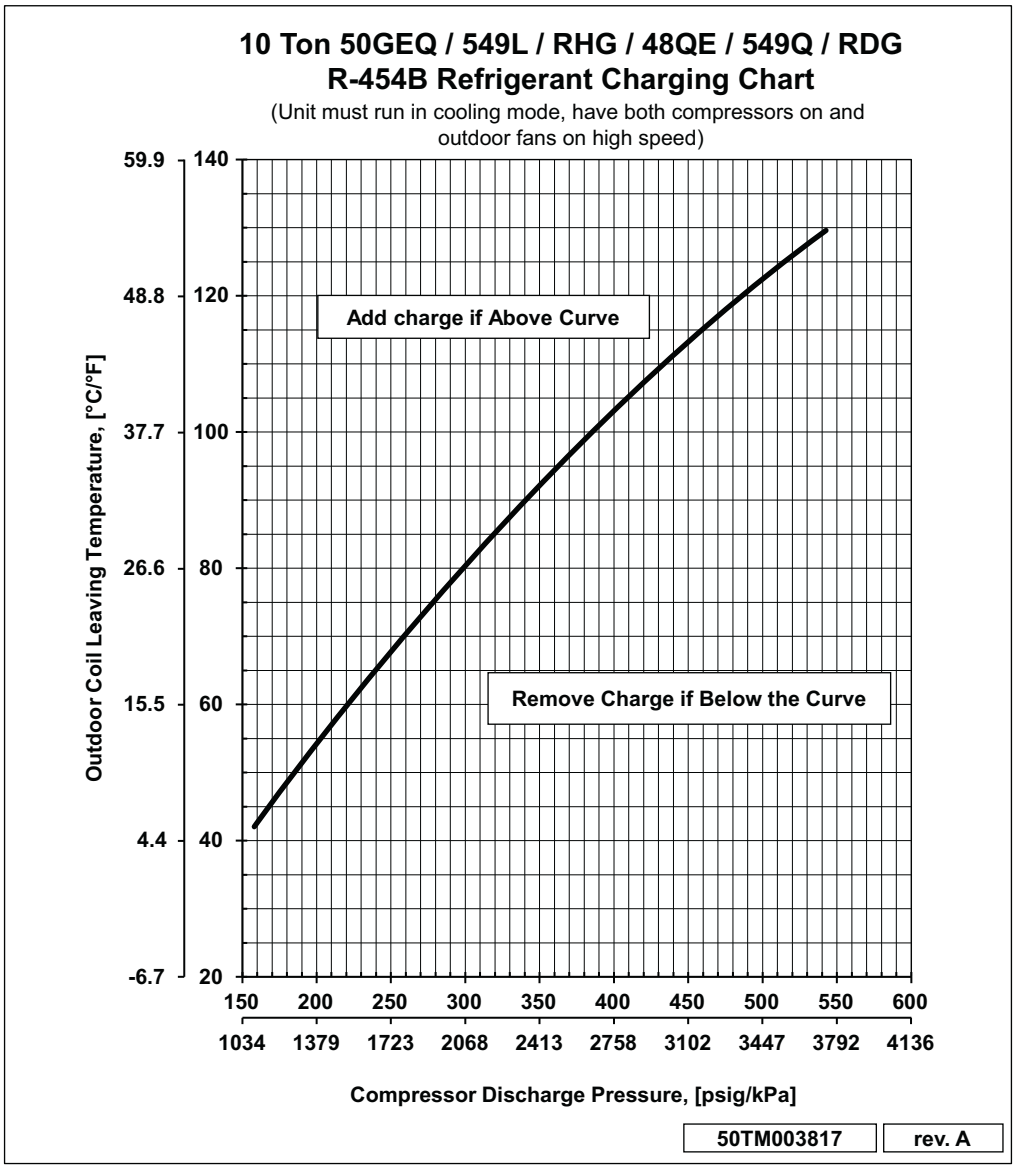


Fig. 32 — Cooling Charging Chart - 10.0 Ton

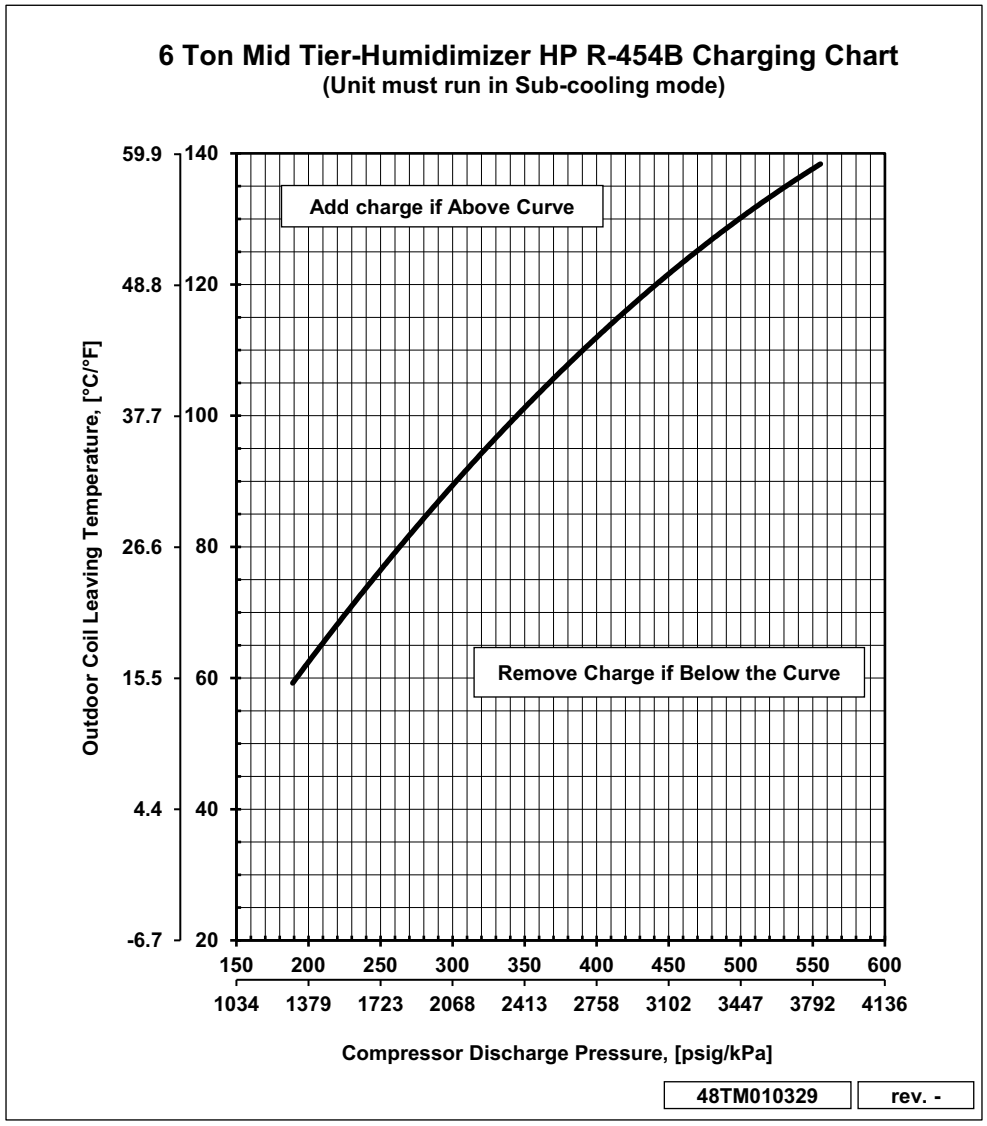


Fig. 33 — Cooling Charging Chart - 6.0 Ton with Humidi-MiZer® System

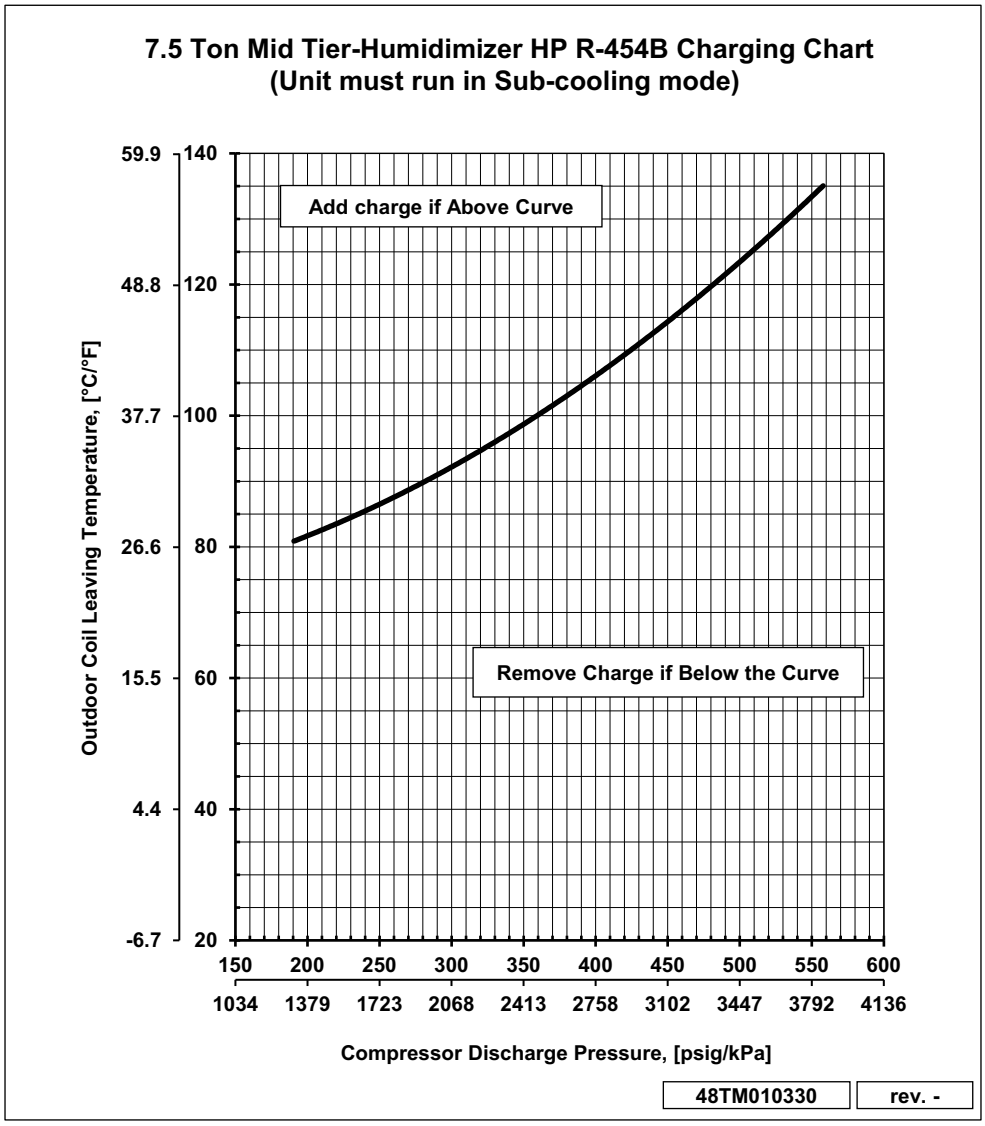


Fig. 34 — Cooling Charging Chart - 7.5 Ton with Humidi-MiZer System

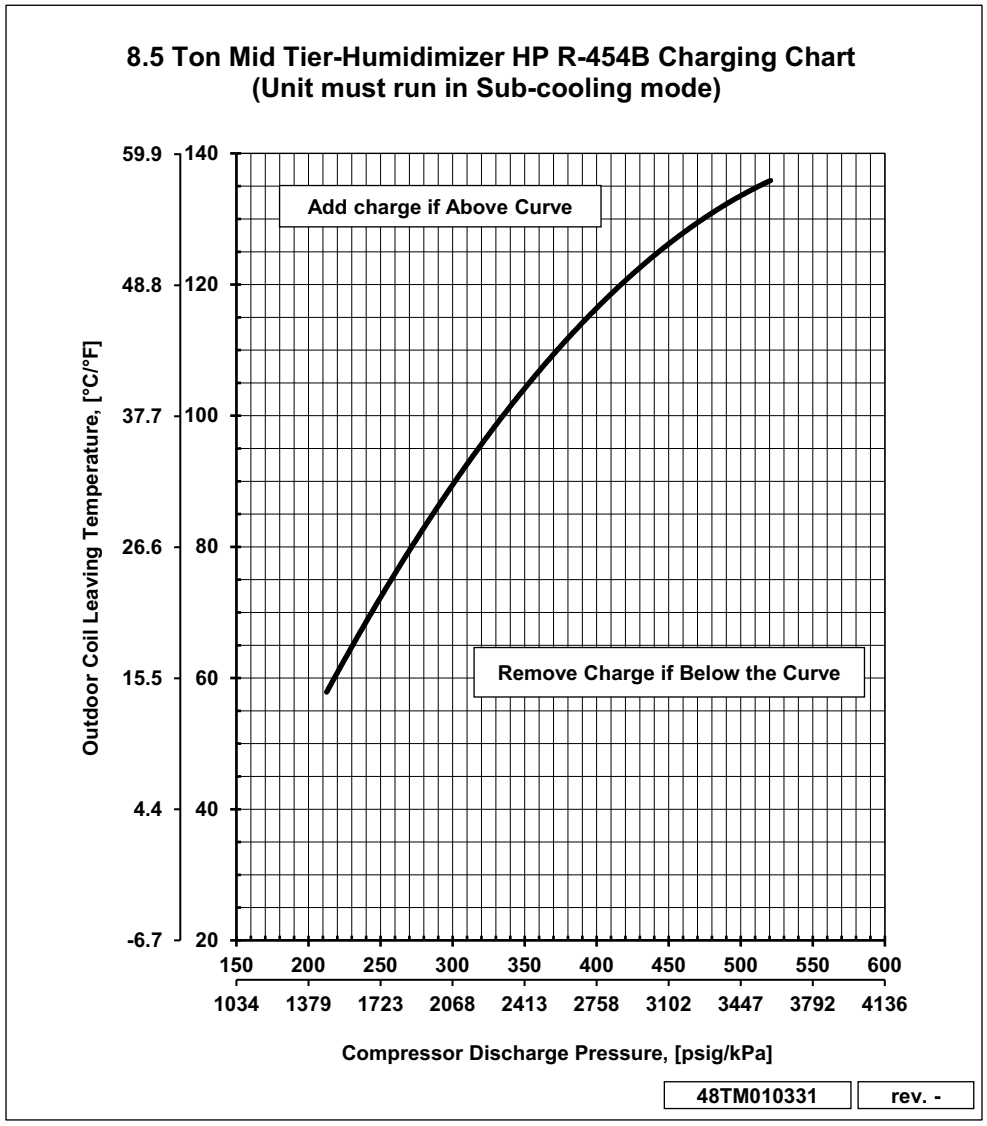


Fig. 35 — Cooling Charging Chart - 8.5 Ton with Humidi-MiZer System

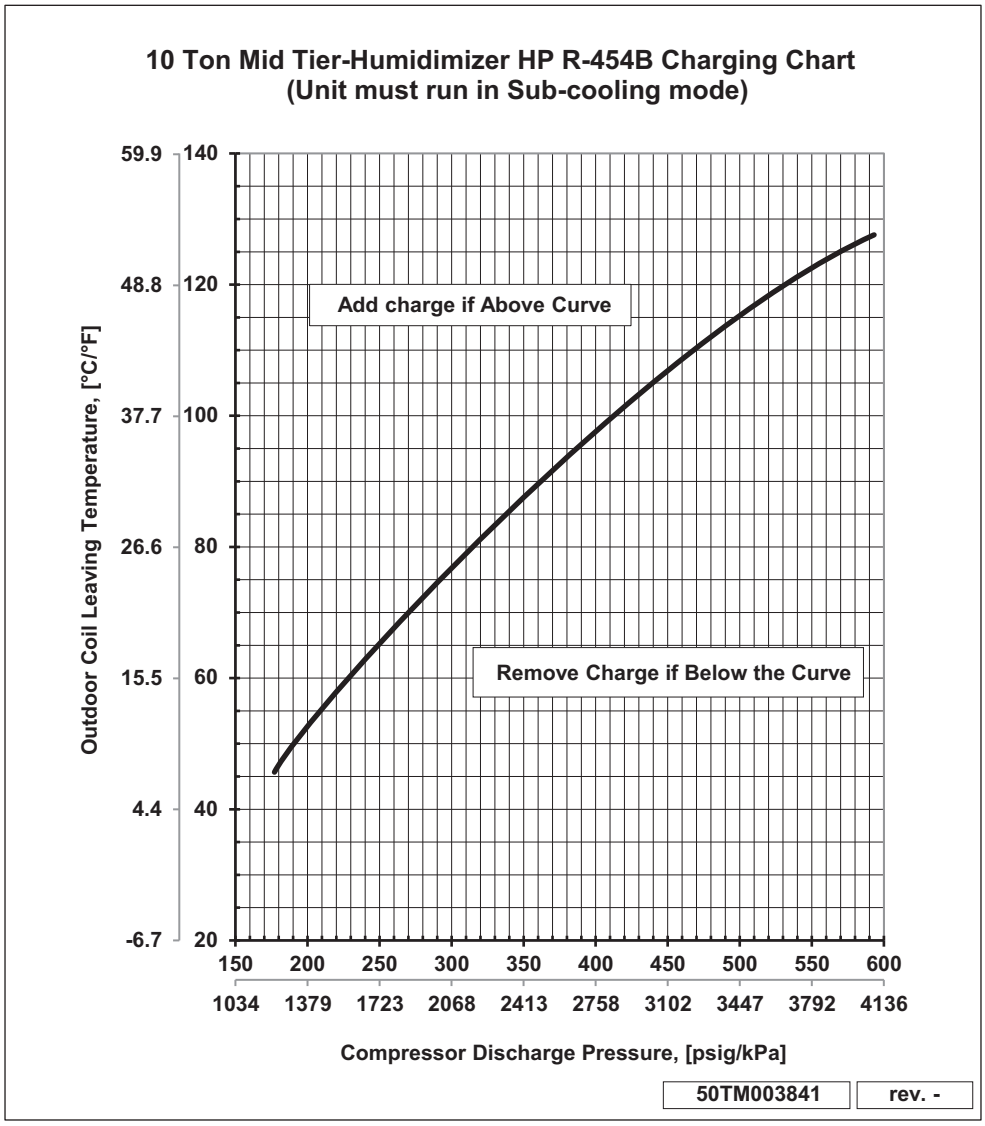


Fig. 36 — Cooling Charging Chart - 10.0 Ton with Humidi-MiZer System

COMPRESSOR

Lubrication

The compressor is charged with the correct amount of oil at the factory.

⚠ CAUTION

UNIT DAMAGE HAZARD

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

The compressor is in a R-454B refrigerant system and uses a polyolester (POE) oil. This oil is extremely hygroscopic, meaning it absorbs water readily. POE oils can absorb 15 times as much water as other oils designed for HCFC and CFC refrigerants. Avoid exposure of the oil to the atmosphere.

⚠ WARNING

FIRE, EXPLOSION HAZARD

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

Never use air or gases containing oxygen for leak testing or for operating refrigerant compressors. Pressurized mixtures of air or gases containing oxygen can lead to an explosion.

⚠ WARNING

FIRE, EXPLOSION HAZARD

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

Never use non-certified refrigerants in this product. Non-certified refrigerants could contain contaminates that could lead to unsafe operating conditions. Use ONLY refrigerants that conform to AHRI Standard 700.

Replacing Compressor

NOTE: Only factory-trained service technicians should remove and replace compressor units.

⚠ CAUTION

INSTALLATION SITE DAMAGE

Failure to follow this caution can result in damage to equipment location site.

R-454B refrigerant contains polyolester (POE) oil that can damage the roof membrane. Caution should be taken to prevent POE oil from spilling onto the roof surface.

The factory also recommends that the suction and discharge lines be cut with a tubing cutter instead of using a torch to remove brazed fittings.

Compressor Rotation

⚠ CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution can result in premature wear and damage to equipment.

Scroll compressors can only compress refrigerant if rotating in the right direction. Reverse rotation for extended times can result in internal damage to the compressor. Scroll compressors are sealed units and cannot be repaired on site location.

NOTE: When the compressor is rotating in the wrong direction, the unit makes an elevated level of noise and does not provide cooling.

On 3-phase units with scroll compressors, it is important to be certain compressor is rotating in the proper direction. To determine whether or not compressor is rotating in the proper direction:

1. Connect service gauges to suction and discharge pressure fittings.
2. Energize the compressor.
3. The suction pressure should drop and the discharge pressure should rise, as is normal on any start-up.

   NOTE: If the suction pressure does not drop and the discharge pressure does not rise to normal levels, the evaporator fan is probably also rotating in the wrong direction.
4. Turn off power to the unit.
5. Reverse any two of the three unit power leads.
6. Reapply electrical power to the compressor. The suction pressure should drop and the discharge pressure should rise which is normal for scroll compressors on start-up.
7. Replace compressor if suction/discharge pressures are not within specifications for the specific compressor.

The suction and discharge pressure levels should now move to their normal start-up levels.

Filter Drier

Replace whenever refrigerant system is exposed to atmosphere. Only use factory specified liquid-line filter driers with working pressures no less than 650 psig (4482 kPa).

⚠ CAUTION

EQUIPMENT DAMAGE

Failure to follow this caution can result in equipment damage.

Do not install a suction-line filter drier in liquid line. A liquid-line filter drier designed for use with R-454B refrigerant is required on every unit.

Condenser-Fan Adjustment

1. Shut off unit power supply. Install lockout tag.
2. Remove condenser-fan assembly (grille, motor, and fan). (See Fig. 37.)
3. Loosen fan hub setscrews.
4. Adjust fan height by pushing fan until it stops on the fan shaft.
5. Tighten set screw to 60 in.-lb (6.78 Nm).
6. Replace condenser-fan assembly.

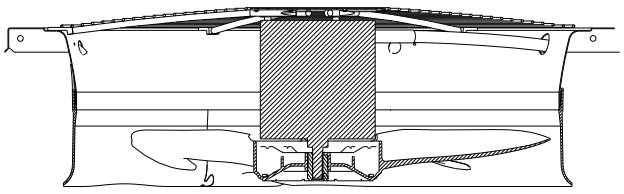


Fig. 37 — Condenser Fan Adjustment

Troubleshooting Cooling System

Refer to Table 12 for additional troubleshooting topics.

Table 12 — Troubleshooting

SYMPTOM	CAUSE	SOLUTION
Compressor and Outdoor Fan Will Not Start	Power failure.	Call power company.
	Fuse blown or circuit breaker tripped.	Replace fuse or reset circuit breaker. Determine root cause.
	Defective thermostat, contactor, transformer. control relay, or capacitor.	Replacement component.
	Insufficient line voltage.	Determine cause and correct.
	Incorrect or faulty wiring.	Check wiring diagram and rewire correctly.
	Thermostat setting too high.	Lower thermostat setting below room temperature.
	High pressure switch tripped.	See problem “Excessive head pressure.”
Compressor Will Not Start but Outdoor 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 or allow enough time for internal overload to cool and reset.
	Defective run/start capacitor, overload, start relay.	Determine cause. Replace compressor or allow enough time for internal overload to cool and reset.
	One leg of 3-phase power dead.	Replace fuse or reset circuit breaker. Determine cause.
Compressor Cycles (Other Than Normally Satisfying Thermostat)	Refrigerant overcharge or undercharge.	Recover refrigerant, evacuate system, and recharge to nameplate.
	Defective compressor.	Replace and determine cause.
	Insufficient line voltage.	Determine cause and correct.
	Blocked outdoor coil or dirty air filter.	Determine cause and correct.
	Defective Run/Start capacitor, overload, start relay.	Determine cause and correct.
	Defective thermostat.	Replace thermostat.
	Faulty outdoor-fan (cooling) or indoor-fan (heating) motor or capacitor.	Replace faulty part.
	Restriction in refrigerant system.	Locate restriction and remove.
	Defective loader plug.	Determine cause and replace.
Compressor Operates Continuously	Dirty air filter.	Replace filter.
	Unit undersized for load.	Decrease load or increase unit size.
	Thermostat set too low (cooling).	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.
Compressor Makes Excessive Noise	Compressor rotating in the wrong direction.	Reverse the 3-phase power leads as described in Start-Up.
Excessive Head Pressure	Dirty outside.	Replace filter.
	Dirty outdoor coil (cooling).	Clean coil.
	Refrigerant overcharged.	Recover excess refrigerant.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Condensing air restricted or air short-cycling.	Determine cause and correct.
Head Pressure Too Low	Low refrigerant charge.	Check for leaks; repair and recharge.
	Compressor scroll plates defective.	Replace compressor.
	Restriction in liquid tube.	Remove restriction.
Excessive Suction Pressure	High heat load.	Check for source and eliminate.
	Compressor scroll plates defective.	Replace compressor.
	Refrigerant overcharge.	Recover excess refrigerant.
Suction Pressure Too Low	Dirty air filter (cooling).	Replace filter.
	Dirt or heavily iced outdoor coil (heating).	Clean outdoor coil. Check defrost cycle operation.
	Low refrigerant charge.	Check for leaks; repair and recharge.
	Metering device or low side restricted	Remove source of restriction.
	Insufficient indoor airflow (cooling mode).	Increase air quantity. Check filter and replace if necessary.
	Temperature too low in conditioned area.	Reset thermostat.
	Field-installed filter drier restricted.	Replace.
	Outdoor ambient temperature below 25°F (cooling).	Install low-ambient kit.
	Outdoor fan motor(s) not operating (heating).	Check fan motor operation.

CONVENIENCE OUTLETS

⚠ WARNING

ELECTRICAL OPERATION HAZARD

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

Units with convenience outlet circuits may use multiple disconnects. Check convenience outlet for power status before opening unit for service. Locate its disconnect switch, if appropriate, and open it. Lock-out and tag-out this switch, if necessary.

Convenience Outlets

Two types of convenience outlets are offered on 50GEQ models: non-powered and unit-powered. Both types provide a 125 vac ground-fault circuit-interrupt (GFCI) duplex receptacle rated at 15A behind a hinged waterproof access cover, located on the end panel of the unit. (See Fig. 38.)

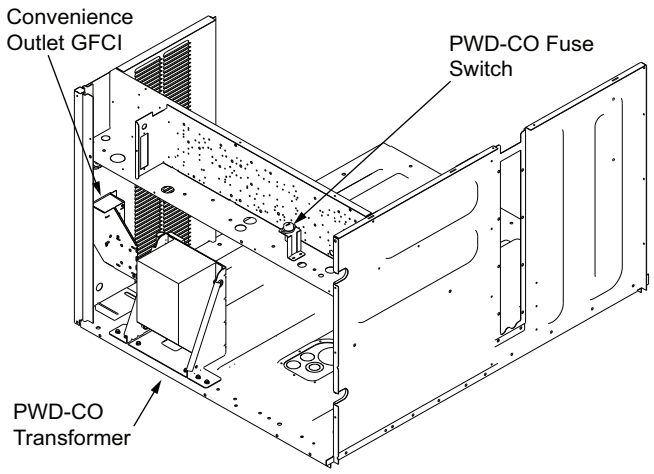


Fig. 38 — Convenience Outlet Location

Installing Weatherproof Cover

A weatherproof while-in-use cover for the factory installed convenience outlets is now required by UL standards. This cover cannot be factory-mounted due to its depth. The cover must be installed at unit installation. For shipment, the convenience outlet is covered with a blank cover plate.

The weatherproof cover kit is shipped in the unit's control box. The kit includes the hinged cover, a backing plate and gasket.

NOTE: DISCONNECT ALL POWER TO UNIT AND CONVENIENCE OUTLET. Use approved lockout/tag-out procedures.

1. Remove the blank cover plate at the convenience outlet; discard the blank cover.
2. Loosen the two screws at the GFCI duplex outlet, until approximately 1/2-in. (13 mm) under screw heads is exposed.
3. Press the gasket over the screw heads. Slip the backing plate over the screw heads at the keyhole slots and align with the gasket; tighten the two screws until snug (do not over-tighten).
4. Mount the weatherproof cover to the backing plate as shown in Fig. 39.
5. Remove two slot fillers in the bottom of the cover to permit service tool cords to exit the cover.
6. Check cover installation for full closing and latching.

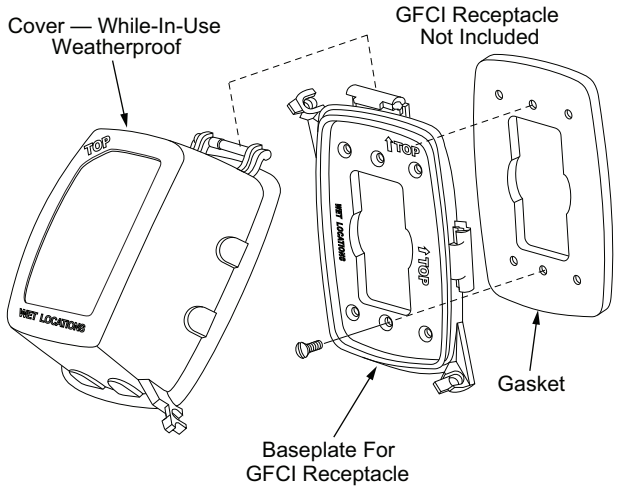


Fig. 39 — Weatherproof Cover Installation

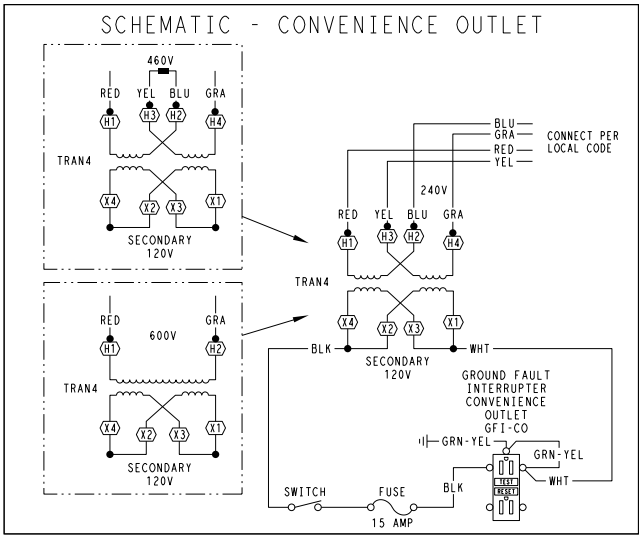
Non-Powered Type

This type requires the field installation of a general-purpose 125-v 15-A circuit powered from a source elsewhere in the building. Observe national and local codes when selecting wire size, fuse or breaker requirements and disconnect switch size and location. Route 125-v power supply conductors into the bottom of the utility box containing the duplex receptacle.

Unit-Powered Type

A unit-mounted transformer is factory-installed to step-down the main power supply voltage to the unit to 115-v at the duplex receptacle. This option also includes a manual switch with fuse, located in a utility box and mounted on a bracket behind the convenience outlet; access is through the unit's control box access panel. (See Fig. 38.)

The primary leads to the convenience outlet transformer are not factory-connected. Selection of primary power source is a customer option. If local codes permit, the transformer primary leads can be connected at the line-side terminals on a unit-mounted non-fused disconnect or Heating, Air Conditioning and Refrigeration (HACR) breaker switch; this will provide service power to the unit when the unit disconnect switch or HACR switch is open. Other connection methods will result in the convenience outlet circuit being de-energized when the unit disconnect or HACR switch is open. (See Fig. 40.)



UNIT VOLTAGE	CONNECT AS	PRIMARY CONNECTIONS	TRANSFORMER TERMINALS
208, 230	240	L1: RED +YEL L2: BLU + GRA	H1 + H3 H2 + H4
460	480	L1: RED Splice BLU + YEL L2: GRA	H1 H2 + H3 H4
575	600	L1: RED L2: GRA	H1 H2

Fig. 40 — Powered Convenience Outlet Wiring

Duty Cycle

The unit-powered convenience outlet has a duty cycle limitation. The transformer is intended to provide power on an intermittent basis for service tools, lamps, etc; it is not intended to provide 15A loading for continuous duty loads (such as electric heaters for overnight use). Observe a 50% limit on circuit loading above 8A (i.e., limit loads exceeding 8A to 30 minutes of operation every hour).

Maintenance

Periodically test the GFCI receptacle by pressing the TEST button on the face of the receptacle. This should cause the internal circuit of the receptacle to trip and open the receptacle. Check for proper grounding wires and power line phasing if the GFCI receptacle does not trip as required. Press the RESET button to clear the tripped condition.

Fuse on Powered Type

The factory fuse is a Bussmann Fusetron[1] T-15, non-renewable screw-in (Edison base) type plug fuse.

USING UNIT-MOUNTED CONVENIENCE OUTLETS

Units with unit-mounted convenience outlet circuits will often require that two disconnects be opened to de-energize all power to the unit. Treat all units as electrically energized until the convenience outlet power is also checked and de-energization is confirmed. Observe National Electrical Code Article 210, Branch Circuits, for use of convenience outlets.

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ELECTRIC HEATERS (UNITS 50GEQ*07-09)

IMPORTANT: The following instructions are for the 50GEQ*07-09 size units. Refer to your model number nomenclature to verify the correct size of your equipment. Instructions for size 12 start on page 34.

The 50GEQ units can be equipped with field-installed accessory electric heaters. The heaters are modular in design, with heater frames holding open coil resistance wires strung through ceramic insulators and control contactor(s), using a combination of 24-v control side break/auto-reset or line-break/auto-reset limit switches and a pilot-circuit/manual reset limit switch to protect the unit against over-temperature situations. All 50GEQ Model electric heaters are one module containing either one or two banks of electric heat coils.

Heater modules are installed in the compartment below the indoor (supply) fan outlet. Access is through the indoor access panel. Heater modules slide into the compartment on tracks along the bottom of the heater opening. (See Fig. 41-43.)

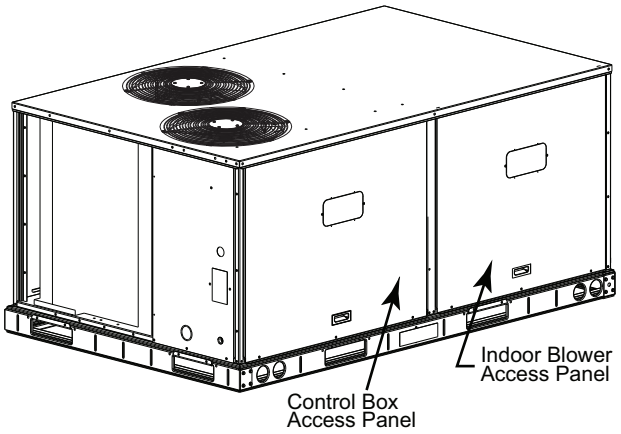


Fig. 41 — Typical Access Panel Location

Not all available heater modules can be used in every unit. Use only those heater modules that are UL listed for use in a specific size unit. Refer to the label on the unit cabinet regarding approved heaters.

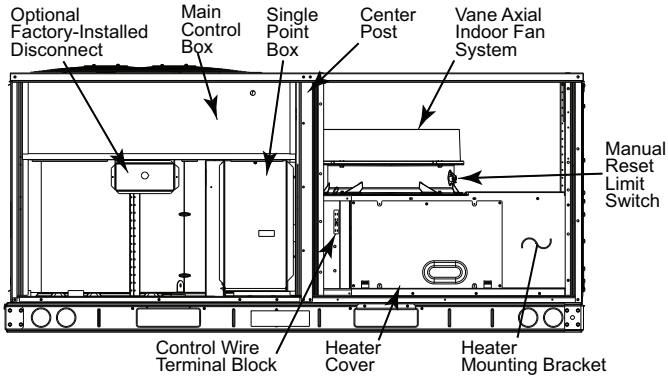


Fig. 42 — Typical Component Location

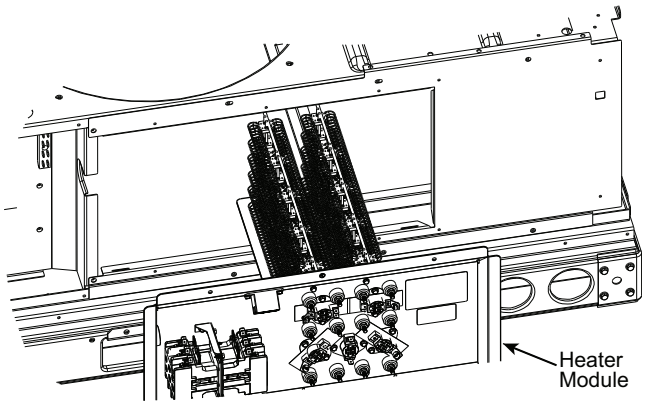


Fig. 43 — Typical Module Installation

Single Point Boxes and Supplementary Fuses

When the unit MOCP device value exceeds 60A, unit-mounted supplementary fuses are required for each heater circuit. These fuses are included in accessory single point boxes, with power distribution and fuse blocks. The single point box will be installed directly under the unit control box, just to the left of the partition separating the indoor section (with electric heaters) from the outdoor section. The single point box has a hinged access cover. (See Fig. 44.)

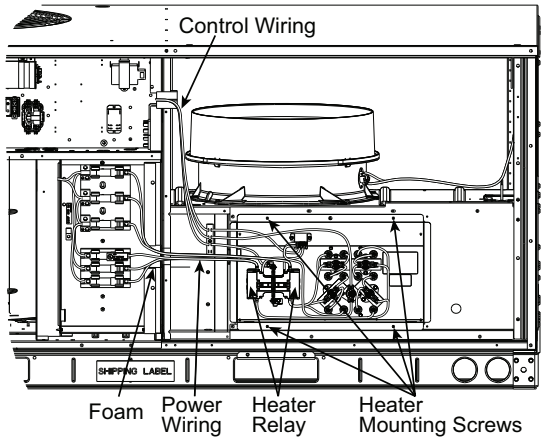


Fig. 44 — Typical Single Point Installation

On 50GEQ units, all fuses are 60A. Single point boxes containing fuses for 208/230-v applications use UL Class RK5 250-v fuses (Bussmann FRNR 60 or Shawmut TR 60R). Single point boxes for 460-v and 575-v applications use UL Class T 600-v fuses (Bussmann JJS 60 or Shawmut A6T 60).

NOTE: All heaters are qualified for use with a 60A fuse, regardless of actual heater ampacity, so only 60A fuses are necessary.

Safety Devices

CRHEATER411A00 - CRHEATER428A00 electric heater applications use a combination of 24-v control side break/auto-reset, line-break/non-resettable “one shot” limit switches and a fan stator/manual reset limit switch to protect the unit against over-temperature situations.

Line-break/auto-reset limit switches, 24-v control side break/auto-reset and line-break/non-resettable “one shot” limit switches are mounted on the base plate of each heater module. See Fig. 45. These are accessed through the indoor access panel. Remove the switch by removing two screws into the base plate and extracting the existing switch.

Fan stator/manual reset limit switch is located in the side plate of the indoor (supply) fan housing. (See Fig. 45.)

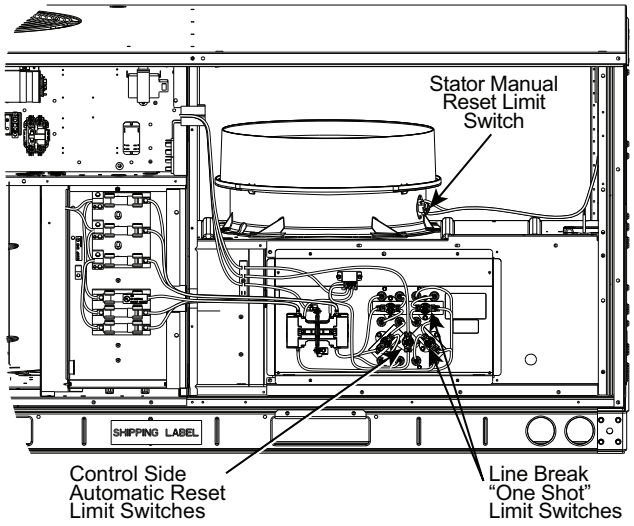


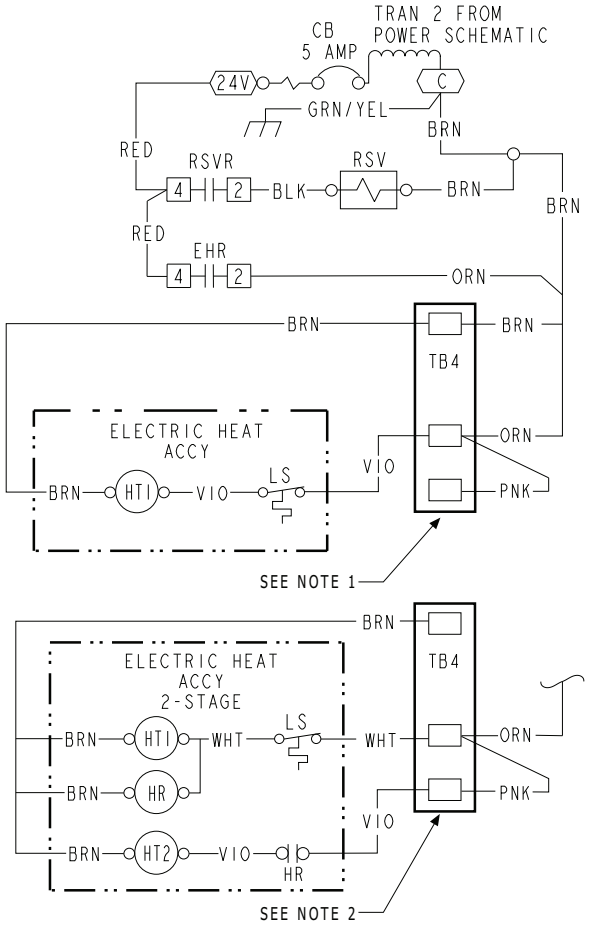
Fig. 45 — Typical Location of Heater Limit Switches (3-phase heater shown)

Field Power Connections

Tap conductors must be installed between the base unit's field power connection lugs and the single point box (with or without fuses). See Fig. 46. Refer to unit wiring schematic. Use copper wire only. For connection using the single point box without fuses, connect the field power supply conductors to the heater power leads and the field-supplied tap conductors inside the single point box. Use UL-approved pressure connectors (field-supplied) for these splice joints.

Low-Voltage Control Connections

Pull the low-voltage control leads from the heater module(s) — ORN, VIO and BRN — to the 4-pole terminal board TB4 located on the heater bulkhead to the left of heater 1. Connect the ORN lead to terminal TB4-1. Connect the VIO lead to terminal TB4-2. Connect the BRN lead to terminal TB4-3. (See Fig. 46.)



NOTE(S):
1. TB4 LOCATED IN HEAT SECTION.
2. TO CONVERT TO A SINGLE STAGE HEATER MOVE THE VIOLET WIRE AT TB4 TO CONNECT WITH WHITE WIRE.

Fig. 46 — Accessory Electric Heater Control Connections

Control and Power Wiring Diagrams

To reference the wiring diagrams for the correct unit configuration, refer to the Wiring Diagram Table on page 71.

ELECTRIC HEATERS (UNIT 50GEQ*12)

IMPORTANT: The following instructions are for the 50GEQ*12 size units. Refer to your model number nomenclature to verify the correct size of your equipment. Instructions for sizes 07-09 start on page 32.

The 50GEQ size 12 units may be equipped with field-installed accessory electric heaters. The heaters are modular in design, with heater frames holding open coil resistance wires strung through ceramic insulators, line-break limit switches and a control contactor.

Heater modules are installed in the compartment below the indoor (supply) fan outlet. Access is through the electric heat access panel. (See Fig. 47-49.)

Not all available heater modules may be used in every unit. Use only those heater modules that are UL listed for use in a specific size unit. Refer to the label on the unit cabinet for the list of approved heaters.

Refer to the *Small Roof Top Units Accessory Electric Heater and Single Point Box* installation instructions for further details.

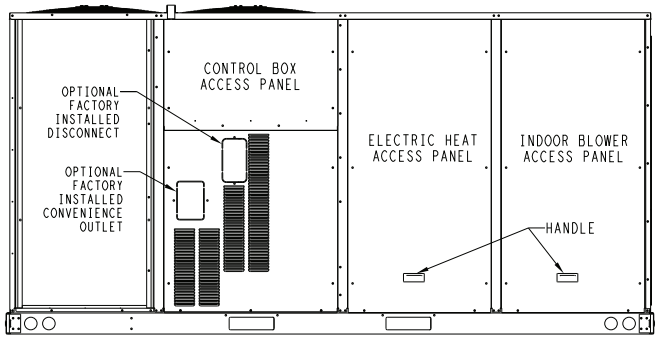


Fig. 47 — Access Panel Location

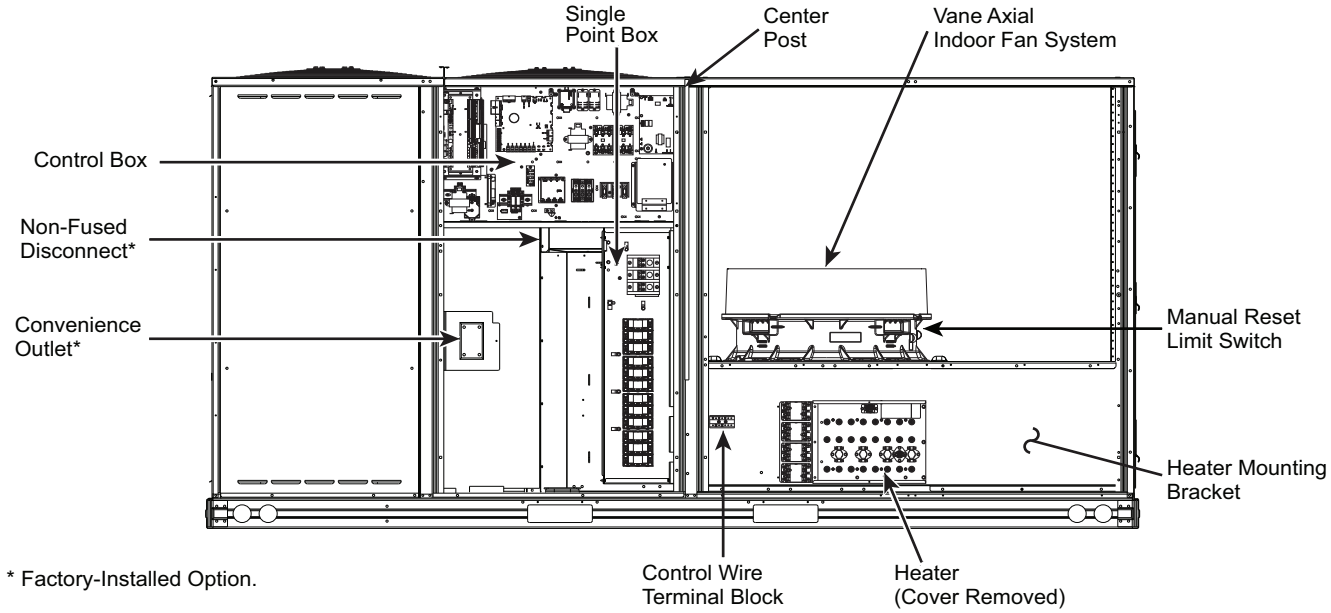


Fig. 48 — Component Location

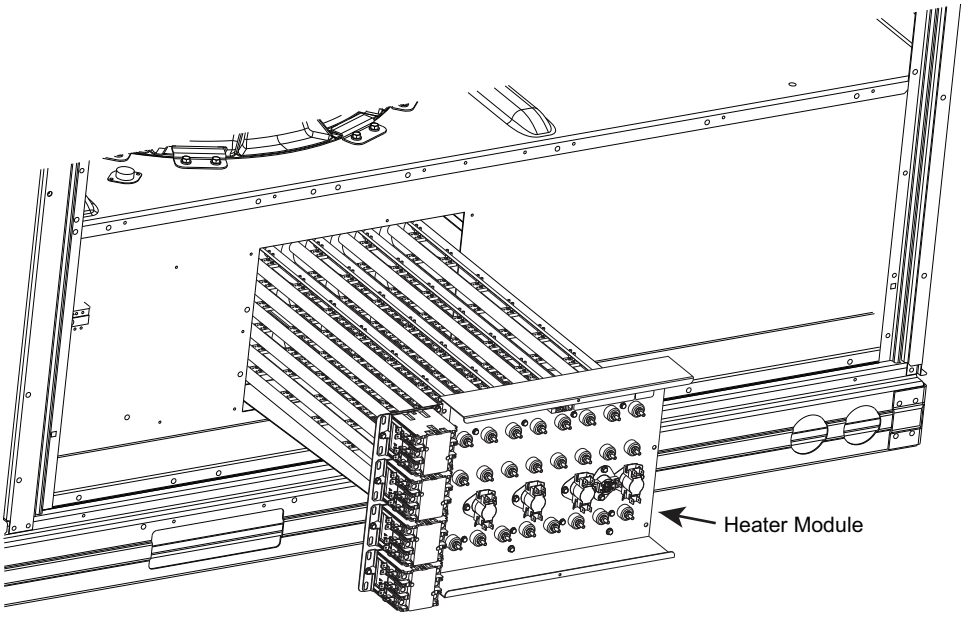


Fig. 49 — Heater Module Installation

Single Point Boxes and Supplementary Fuses

When the unit MOCP device value exceeds 60-A, unit-mounted supplementary fuses are required for each heater circuit. These fuses are included in accessory single point boxes, with power distribution and fuse blocks. The single point box will be installed directly under the unit control box, just to the left of the partition separating the indoor section (with electric heaters) from the outdoor section. The single point box has a hinged access cover. See Fig. 51. The single point box also includes a set of power taps and pigtails to complete the wiring between the single point box and the unit's main control box terminals. Refer to the Small Roof Top Units Accessory Electric Heater and single point box installation instructions for details on tap connections.

All fuses on 50GEQ units are 60-A. (Note that all heaters are qualified for use with a 60-A fuse, regardless of actual heater ampacity, so only 60-A fuses are necessary.)

Single Point Boxes without Fuses

Unit heater applications not requiring supplemental fuses require a special single point box without any fuses. The accessory single point boxes contain a set of power taps and pigtails to complete the wiring between the single point box and the unit's main control box terminals. Refer to accessory heater and single point box installation instructions for details on tap connections.

Low-Voltage Control Connections

Pull the low-voltage control leads from the heater module — WHT, VIO and BRN to the 4-pole terminal board TB4 located on the heater bulkhead to the left of the Heater module. Connect the WHT lead from Heater circuit #1 to terminal TB4-1. For 2 stage heating, connect the VIO lead from Heater circuit #2 to terminal TB4-2. Connect the BRN lead(s) to terminal TB4-3. (See Fig. 50.)

Safety Devices

CRHEATER411A00 - CRHEATER428A00 electric heater applications use a combination of 24-v control side break/auto-reset, line-break/non-resettable "one shot" limit switches and a fan stator/manual reset limit switch to protect the unit against over-temperature situations.

Line-break/auto-reset limit switches, 24-v control side break/auto-reset and line-break/non-resettable "one shot" limit switches are mounted on the base plate of each heater module. See Fig. 48. These are accessed through the indoor access panel. Remove the switch by removing two screws into the base plate and extracting the existing switch.

Fan stator/manual reset limit switch is located in the side plate of the indoor (supply) fan housing. (See Fig. 48.)

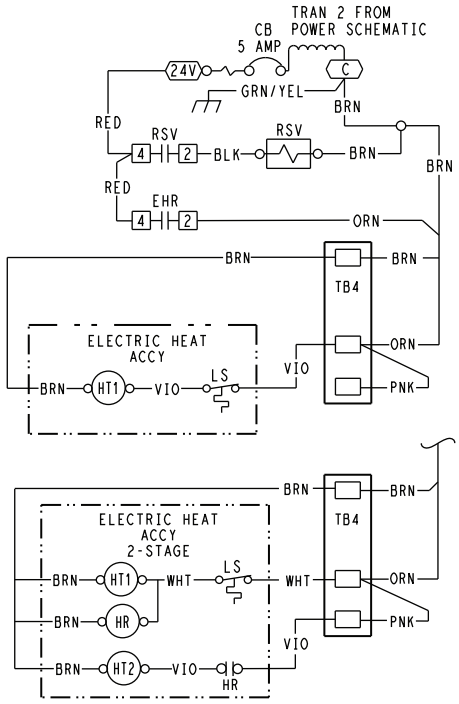


Fig. 50 — Accessory Electric Heater Control Connections

Control and Power Wiring Diagrams

To reference the wiring diagrams for the correct unit configuration, refer to the Wiring Diagram Table on page 71.

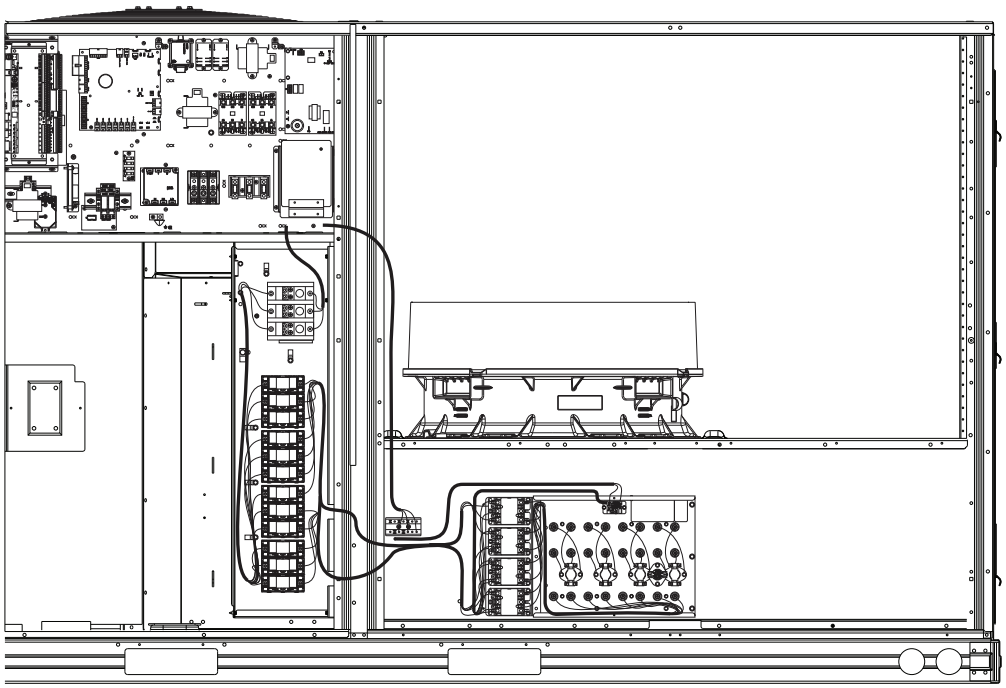


Fig. 51 — Typical Single Point Installation

SMOKE DETECTORS

Smoke detectors are available as factory-installed options on 50GEQ models. Smoke detectors may be specified for supply air only, for return air without or with economizer, or in combination of supply air and return air. Return air smoke detectors are arranged for vertical return configurations only. All components necessary for operation are factory-provided and mounted. The unit is factory-configured for immediate smoke detector shutdown operation; additional wiring or modifications to unit terminal board may be necessary to complete the unit and smoke detector configuration to meet project requirements.

System

The smoke detector system consists of a four-wire controller and one or two sensors. Its primary function is to shut down the rooftop unit in order to prevent smoke from circulating throughout the building. It is not to be used as a life saving device.

Controller

The controller (see Fig. 52) includes a controller housing, a printed circuit board, and a clear plastic cover. The controller can be connected to one or two compatible duct smoke sensors. The clear plastic cover is secured to the housing with a single captive screw for easy access to the wiring terminals. The controller has three LEDs (for Power, Trouble and Alarm) and a manual test/reset button (on the cover face).

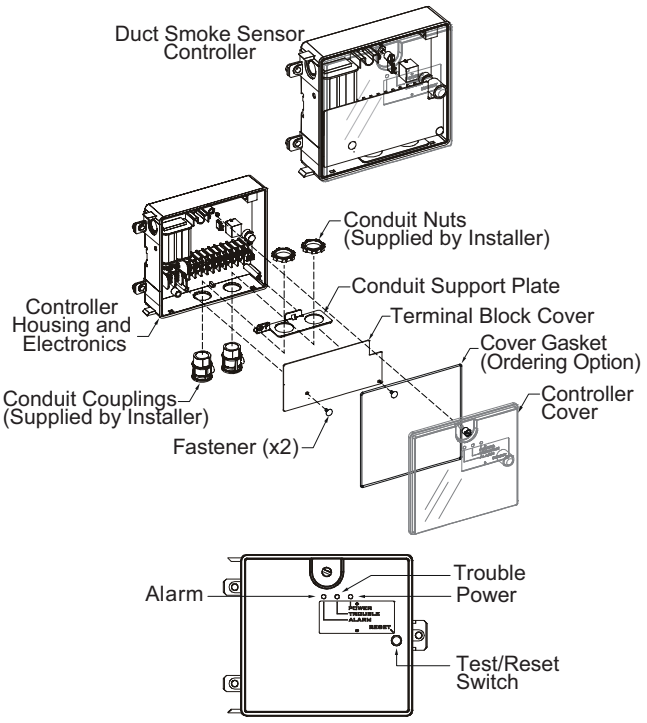


Fig. 52 — Controller Assembly

Smoke Detector Sensor

The smoke detector sensor (see Fig. 53) includes a plastic housing, a printed circuit board, a clear plastic cover, a sampling tube inlet and an exhaust tube. The sampling tube (when used) and exhaust tube are attached during installation. The sampling tube varies in length depending on the size of the rooftop unit. The clear plastic cover permits visual inspections without having to disassemble the sensor. The cover attaches to the sensor housing using four captive screws and forms an airtight chamber around the sensing electronics. Each sensor includes a harness with an RJ45 terminal for connecting to the controller. Each sensor has four LEDs (for Power, Trouble, Alarm and Dirty) and a manual test/reset button (on the left-side of the housing).

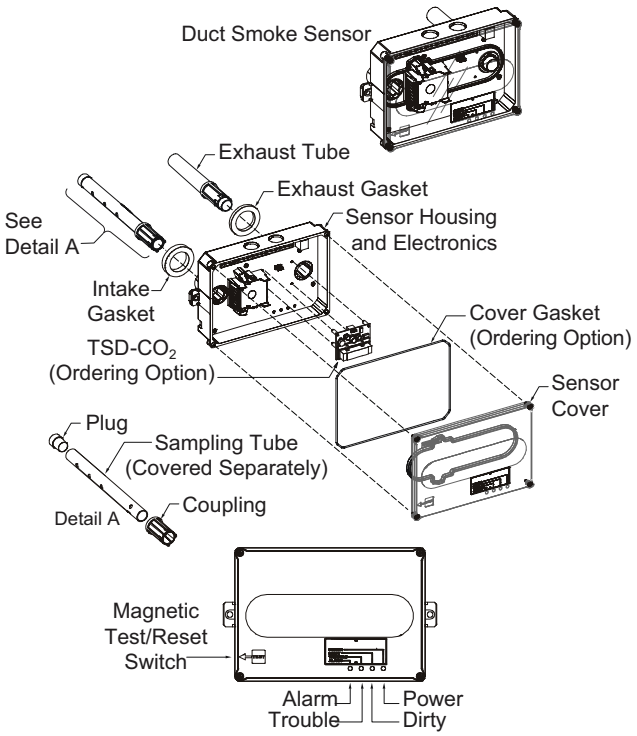


Fig. 53 — Smoke Detector Sensor

Air is introduced to the duct smoke detector sensor's sensing chamber through a sampling tube that extends into the HVAC duct and is directed back into the ventilation system through a (shorter) exhaust tube.

The difference in air pressure between the two tubes pulls the sampled air through the sensing chamber. When a sufficient amount of smoke is detected in the sensing chamber, the sensor signals an alarm state and the controller automatically takes the appropriate action to shut down fans and blowers, change over air handling systems, notify the fire alarm control panel, etc.

The sensor uses a process called differential sensing to prevent gradual environmental changes from triggering false alarms. A rapid change in environmental conditions, such as smoke from a fire, causes the sensor to signal an alarm state but dust and debris accumulated over time does not.

The difference in air pressure between the two tubes pulls the sampled air through the sensing chamber. When a sufficient amount of smoke is detected in the sensing chamber, the sensor signals an alarm state and the controller automatically takes the appropriate action to shut down fans and blowers, change over air handling systems, notify the fire alarm control panel, etc.

For installations using two sensors, the duct smoke detector does not differentiate which sensor signals an alarm or trouble condition.

Smoke Detector Locations

SUPPLY AIR

The supply air smoke detector sensor is located to the right of the unit's indoor (supply) fan. See Fig. 54. Access is through the fan access panel. The sampling tube inlet extends through the fan deck (into a high pressure area). The controller is located on a bracket to the right of the return filter, accessed through the lift-off filter panel.

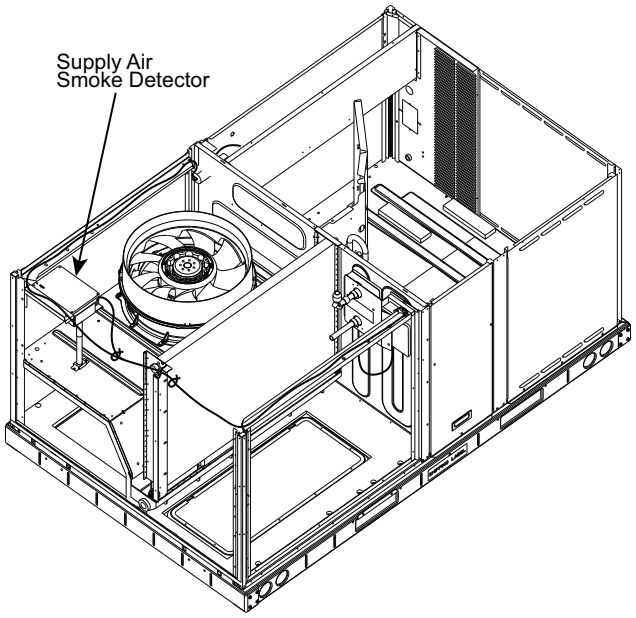


Fig. 54 — Typical Supply Air Smoke Detector Sensor Location

RETURN AIR SMOKE DETECTOR SENSOR WITHOUT ECONOMIZER

The sampling tube is located across the return air opening on the unit basepan. See Fig. 55. The holes in the sampling tube face downward, into the return air stream. The sampling tube is connected through tubing to the return air sensor that is mounted on a bracket high on the partition between return filter and controller location.

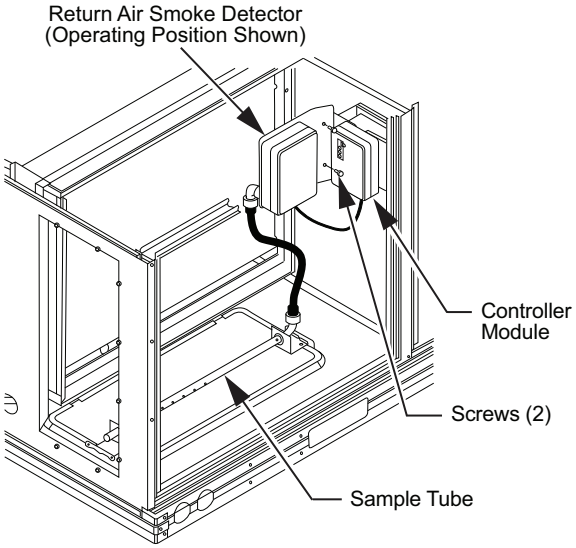


Fig. 55 — Return Air Smoke Detector Operating Position

RETURN AIR SMOKE DETECTOR SENSOR WITH ECONOMIZER

The sampling tube is inserted through the side plates of the economizer housing, placing it across the return air opening on the unit basepan. See Fig. 56. The holes in the sampling tube face downward, into the return air stream. The sampling tube is connected using tubing to the return air sensor mounted on a bracket high on the partition between return filter and controller location. The sensor is shipped in a flat-mounting location. Installation requires the sensor be relocated to its operating location and the tubing to the sampling tube be connected.

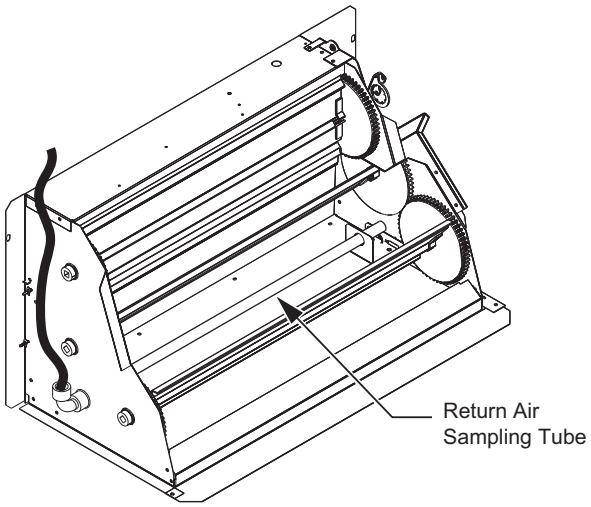


Fig. 56 — Return Air Sampling Tube Location (View reoriented to show opposite side for clarity.)

FIOP Smoke Detector Wiring and Response

ALL UNITS

The FIOP smoke detector is configured to automatically shut down all unit operations when a smoke condition is detected. See Fig. 57, Smoke Detector Wiring.

Highlight A

Smoke detector NO contact set will close on smoke alarm condition, de-energizing the WHT conductor.

Highlight B

24-v power signal using the WHT lead is removed at the smoke detector input on J5; all unit operations cease immediately.

ADDITIONAL APPLICATION DATA

Refer to the application data document “Factory Installed Smoke Detectors for Small and Medium Rooftop Units 2 to 25 Tons” for discussions on additional control features of these smoke detectors including multiple unit coordination.

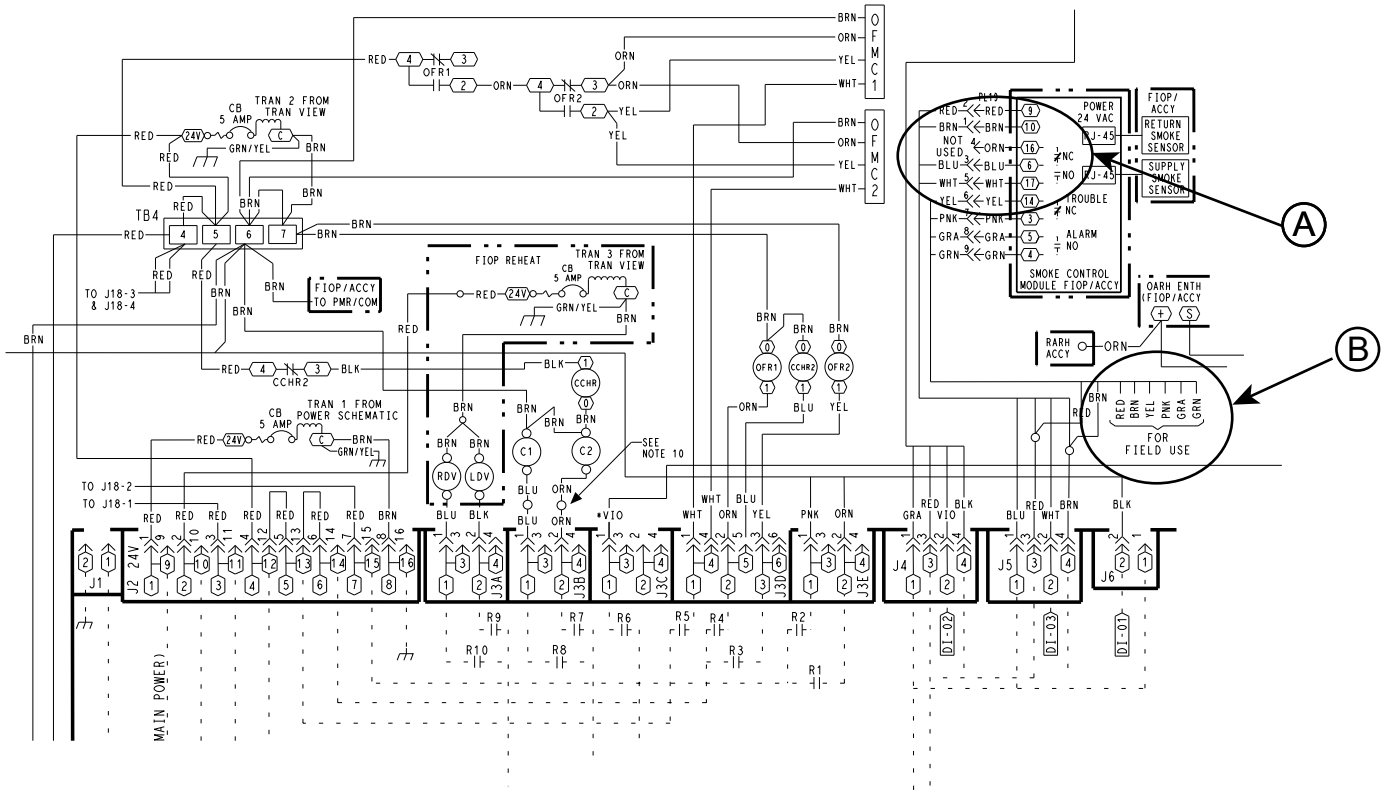


Fig. 57 — Typical Smoke Detector System Wiring

SENSOR AND CONTROLLER TESTS

Sensor Alarm Test

The sensor alarm test checks a sensor's ability to signal an alarm state. This test requires use of a field provided SD-MAG test magnet.

IMPORTANT: Failure to follow this ALERT can result in an unnecessary evacuation of the facility.
This test places the duct detector into the alarm state. Unless part of the test, disconnect all auxiliary equipment from the controller before performing the test. If the duct detector is connected to a fire alarm system, notify the proper authorities before performing the test.

SENSOR ALARM TEST PROCEDURE

1. Hold the test magnet where indicated on the side of the sensor housing for seven seconds.
2. Verify that the sensor's Alarm LED turns on.
3. Reset the sensor by holding the test magnet against the sensor housing for two seconds.
4. Verify that the sensor's Alarm LED turns off.

Controller Alarm Test

The controller alarm test checks the controller's ability to initiate and indicate an alarm state.

CONTROLLER ALARM TEST PROCEDURE

1. Press the controller's test/reset switch for seven seconds.
2. Verify that the controller's Alarm LED turns on.
3. Reset the sensor by pressing the test/reset switch for two seconds.
4. Verify that the controller's Alarm LED turns off.

IMPORTANT: Failure to follow this ALERT can result in an unnecessary evacuation of the facility.
This test places the duct detector into the alarm state. Unless part of the test, disconnect all auxiliary equipment from the controller before performing the test. If the duct detector is connected to a fire alarm system, notify the proper authorities before performing the test.

Dirty Controller Test

The dirty controller test checks the controller's ability to initiate a dirty sensor test and indicate its results.

IMPORTANT: Failure to follow this ALERT can result in an unnecessary evacuation of the facility.
Pressing the controller's test/reset switch for longer than seven seconds will put the duct detector into the alarm state and activate all automatic alarm responses.

DIRTY CONTROLLER TEST PROCEDURE

1. Press the controller's test/reset switch for two seconds.
2. Verify that the controller's Trouble LED flashes.

Dirty Sensor Test

The dirty sensor test provides an indication of the sensor's ability to compensate for gradual environmental changes. A sensor that can no longer compensate for environmental changes is considered 100% dirty and requires cleaning or replacing. A field provided SD-MAG test magnet must be used to initiate a sensor dirty test. The sensor's Dirty LED indicates the results of the dirty test as shown in Table 13.

IMPORTANT: Failure to follow this ALERT can result in an unnecessary evacuation of the facility.
Holding the test magnet against the sensor housing for more than seven seconds will put the duct detector into the alarm state and activate all automatic alarm responses.

Table 13 — Dirty LED Test

FLASHES	DESCRIPTION
1	0-25% dirty. (Typical of a newly installed detector)
2	25-50% dirty
3	51-75% dirty
4	76-99% dirty

DIRTY SENSOR TEST PROCEDURE

1. Hold the test magnet where indicated on the side of the sensor housing for two seconds.
2. Verify that the sensor's Dirty LED flashes.

IMPORTANT: Failure to follow this ALERT can result in an unnecessary evacuation of the facility.
Changing the dirty sensor test operation will put the detector into the alarm state and activate all automatic alarm responses. Before changing dirty sensor test operation, disconnect all auxiliary equipment from the controller and notify the proper authorities if connected to a fire alarm system.

Changing the Dirt Sensor Test

By default, sensor dirty test results are indicated by:

- The sensor's Dirty LED flashing.
- The controller's Trouble LED flashing.
- The controller's supervision relay contacts toggle.

The operation of a sensor's dirty test can be changed so that the controller's supervision relay is not used to indicate test results. When two detectors are connected to a controller, sensor dirty test operation on both sensors must be configured to operate in the same manner.

TO CONFIGURE THE DIRTY SENSOR TEST OPERATION

1. Hold the test magnet where indicated on the side of the sensor housing until the sensor's Alarm LED turns on and its Dirty LED flashes twice (approximately 60 seconds).
2. Reset the sensor by removing the test magnet then holding it against the sensor housing again until the sensor's Alarm LED turns off (approximately 2 seconds).

Remote Station Test

The remote station alarm test checks a test/reset station's ability to initiate and indicate an alarm state.

IMPORTANT: Failure to follow this ALERT can result in an unnecessary evacuation of the facility.
This test places the duct detector into the alarm state. Unless part of the test, disconnect all auxiliary equipment from the controller before performing the test. If the duct detector is connected to a fire alarm system, notify the proper authorities before performing the test.

SD-TRM4 Remote Alarm Test Procedure

1. Hold the test magnet to the target area for seven seconds.
2. Verify that the test/reset station's Alarm LED turns on.
3. Reset the sensor by holding the test magnet to the target area for 2 seconds.
4. Verify that the test/reset station's Alarm LED turns off.

Remote Test/Reset Station Dirty Sensor Test

The test/reset station dirty sensor test checks the test/reset station's ability to initiate a sensor dirty test and indicate the results. It must be wired to the controller as shown in Fig. 58 and configured to operate the controller's supervision relay. For more information, see "Dirty Sensor Test" on page 39.

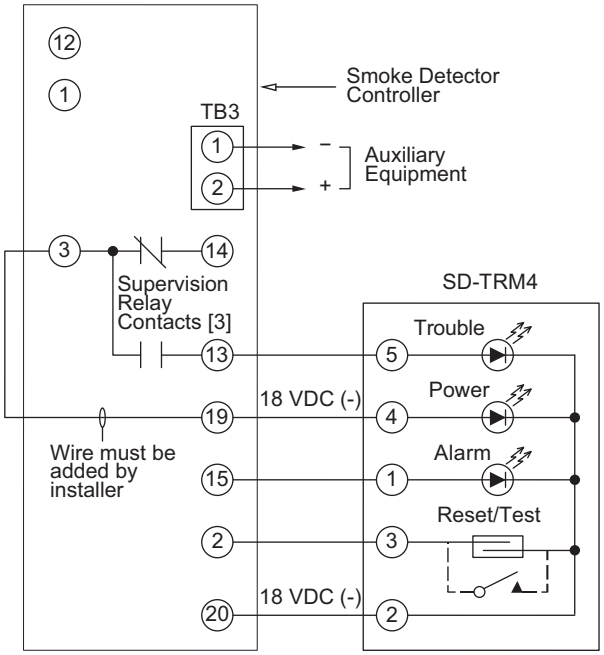


Fig. 58 — Remote Test/Reset Station Connections

IMPORTANT: Failure to follow this ALERT can result in an unnecessary evacuation of the facility.
If the test/reset station's key switch is left in the RESET/TEST position for longer than seven seconds, the detector will automatically go into the alarm state and activate all automatic alarm responses.

IMPORTANT: Failure to follow this ALERT can result in an unnecessary evacuation of the facility.
Holding the test magnet to the target area for longer than seven seconds will put the detector into the alarm state and activate all automatic alarm responses.

Dirty Sensor Test Using an SD-TRM4

1. Hold the test magnet where indicated on the side of the sensor housing for two seconds.
2. Verify that the test/reset station's Trouble LED flashes.

Detector Cleaning

CLEANING THE SMOKE DETECTOR

Clean the duct smoke sensor when the Dirty LED is flashing continuously or sooner, if conditions warrant.

IMPORTANT: OPERATIONAL TEST ALERT
Failure to follow this ALERT can result in an unnecessary evacuation of the facility.
If the smoke detector is connected to a fire alarm system, first notify the proper authorities that the detector is undergoing maintenance then disable the relevant circuit to avoid generating a false alarm.

1. Disconnect power from the duct detector then remove the sensor's cover. (See Fig. 59.)

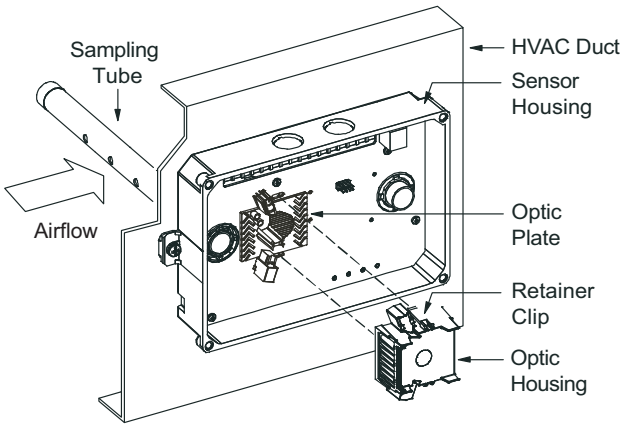


Fig. 59 — Sensor Cleaning Diagram

2. Using a vacuum cleaner, clean compressed air, or a soft bristle brush, remove loose dirt and debris from inside the sensor housing and cover. Use isopropyl alcohol and a lint-free cloth to remove dirt and other contaminants from the gasket on the sensor's cover.
3. Squeeze the retainer clips on both sides of the optic housing.
4. Lift the housing away from the printed circuit board.
5. Gently remove dirt and debris from around the optic plate and inside the optic housing.
6. Replace the optic housing and sensor cover.
7. Connect power to the duct detector then perform a sensor alarm test.

Indicators

NORMAL STATE

The smoke detector operates in the normal state in the absence of any trouble conditions and when its sensing chamber is free of smoke. In the normal state, the Power LED on both the sensor and the controller are on and all other LEDs are off.

ALARM STATE

The smoke detector enters the alarm state when the amount of smoke particulate in the sensor's sensing chamber exceeds the alarm threshold value. (See Table 14.) Upon entering the alarm state:

- The sensor's Alarm LED and the controller's Alarm LED turn on.
- The contacts on the controller's two auxiliary relays switch positions.
- The contacts on the controller's alarm initiation relay close.
- The controller's remote alarm LED output is activated (turned on).
- The controller's high impedance multiple fan shutdown control line is pulled to ground.

Table 14 — Detector Indicators

CONTROL OR INDICATOR	DESCRIPTION
Magnetic test/ reset switch	Resets the sensor when it is in the alarm or trouble state. Activates or tests the sensor when it is in the normal state.
Alarm LED	Indicates the sensor is in the alarm state.
Trouble LED	Indicates the sensor is in the trouble state.
Dirty LED	Indicates the amount of environmental compensation used by the sensor (flashing continuously = 100%)
Power LED	Indicates the sensor is energized.

TROUBLE STATE

The SuperDuct™[1] duct smoke detector enters the trouble state under the following conditions:

- A sensor's cover is removed and 20 minutes pass before it is properly secured.
- A sensor's environmental compensation limit is reached (100% dirty).
- A wiring fault between a sensor and the controller is detected.
- An internal sensor fault is detected.

Upon entering the trouble state:

- The contacts on the controller's supervisory relay switch positions. (See Fig. 60.)
- If a sensor trouble, the sensor's Trouble LED and the controller's Trouble LED turn on.
- If 100% dirty, the sensor's Dirty LED turns on and the controller's Trouble LED flashes continuously.
- If a wiring fault between a sensor and the controller, the controller's Trouble LED turns on but not the sensor's.

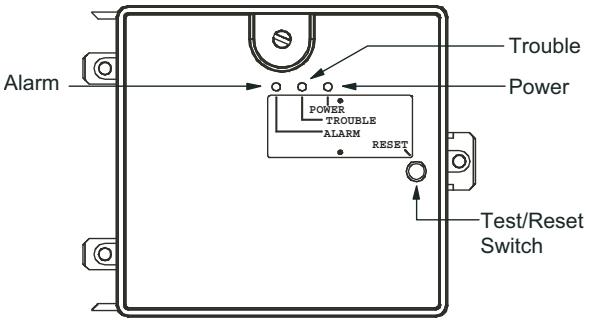


Fig. 60 — Controller Assembly

NOTE: All troubles are latched by the duct smoke detector. The trouble condition must be cleared and then the duct smoke detector must be reset in order to restore it to the normal state.

RESETTING ALARM AND TROUBLE CONDITION TRIPS

Manual reset is required to restore smoke detector systems to Normal operation. For installations using two sensors, the duct smoke detector does not differentiate which sensor signals an alarm or trouble condition. Check each sensor for Alarm or Trouble status (indicated by LED). Clear the condition that has generated the trip at this sensor. Then reset the sensor by pressing and holding the reset button (on the side) for 2 seconds. Verify that the sensor's Alarm and Trouble LEDs are now off. At the controller, clear its Alarm or Trouble state by pressing and holding the manual reset button (on the front cover) for 2 seconds. Verify that the controller's Alarm and Trouble LEDs are now off. Replace all panels.

Troubleshooting

CONTROLLER'S TROUBLE LED IS ON

1. Check the Trouble LED on each sensor connected to the controller. If a sensor's Trouble LED is on, determine the cause and make the necessary repairs.
2. Check the wiring between the sensor and the controller. If wiring is loose or missing, repair or replace as required.

CONTROLLER'S TROUBLE LED IS FLASHING

1. One or both of the sensors is 100% dirty.
2. Determine which Dirty LED is flashing then clean that sensor assembly as described in the detector cleaning section.

SENSOR'S TROUBLE LED IS ON

1. Check the sensor's Dirty LED. If it is flashing, the sensor is dirty and must be cleaned.
2. Check the sensor's cover. If it is loose or missing, secure the cover to the sensor housing.
3. Replace sensor assembly.

SENSOR'S POWER LED IS OFF

1. Check the controller's Power LED. If it is off, determine why the controller does not have power and make the necessary repairs.
2. Check the wiring between the sensor and the controller. If wiring is loose or missing, repair or replace as required.

CONTROLLER'S POWER LED IS OFF

1. Make sure the circuit supplying power to the controller is operational. If not, make sure JP2 and JP3 are set correctly on the controller before applying power.
2. Verify that power is applied to the controller's supply input terminals. If power is not present, replace or repair wiring as required.

REMOTE TEST/RESET STATION'S TROUBLE LED DOES NOT FLASH WHEN PERFORMING A DIRTY TEST, BUT THE CONTROLLER'S TROUBLE LED DOES

1. Verify that the remote test/station is wired as shown in Fig. 58. Repair or replace loose or missing wiring.
2. Configure the sensor dirty test to activate the controller's supervision relay. See "Dirty Sensor Test" on page 39.

SENSOR'S TROUBLE LED IS ON, BUT THE CONTROLLER'S TROUBLE LED IS OFF

Remove JP1 on the controller.

PROTECTIVE DEVICES

Compressor Protection

OVERCURRENT

The compressor has internal line-break motor protection.

OVERTEMPERATURE

The compressor has an internal protector to protect it against excessively high discharge gas temperatures.

HIGH PRESSURE SWITCH

The system is provided with a high pressure switch mounted on the discharge line. The switch is stem-mounted and brazed into the discharge tube. Trip setting is 630 psig ±10 psig (4344 ±69 kPa) when hot. Reset is automatic at 505 psig (3482 kPa).

SUPPLY (INDOOR) FAN MOTOR PROTECTION

Disconnect and lockout power when servicing fan motor.

The standard supply fan motor is equipped with internal overcurrent and over-temperature protection. Protection devices reset automatically.

The high static option supply fan motor is equipped with a pilot-circuit Thermix combination over-temperature/over-current protection device. This device resets automatically. Do not bypass this switch to correct trouble. Determine the cause and correct it.

CONDENSER FAN MOTOR PROTECTION

The condenser fan motor is internally protected against overtemperature.

Refrigerant Leak Protection

These units are equipped with a factory installed R-454B leak dissipation system to ensure safe operation in the event of a

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refrigerant leak. See Leak Dissipation System on starting on page 44 for details.

Relief Device

A soft solder joint at the suction service access port provides pressure relief under abnormal temperature and pressure conditions (i.e., fire in building). Protect this joint during brazing operations near this joint.

Control Circuit, 24-V

The control circuit is protected against overcurrent conditions by a circuit breaker mounted on control transformer TRAN. Reset is manual.

SYSTEMVU CONTROL SYSTEM

The SystemVu™ control is a comprehensive unit-management system. The control system is easy to access, configure, diagnose and troubleshoot.

The SystemVu control system is fully communicating and cable-ready for connection to the Carrier Comfort Network® (CCN), Carrier i-Vu®, and Third Party BACnet®[1] building management systems. The control provides high-speed communications for remote monitoring via the Internet. Multiple units can be linked together (and to other Direct Digital Control (DDC) equipped units) using a 3-wire communication bus.

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The SystemVu control system is easy to access through the use of a integrated display module. A computer is not required for start-up. Access to control menus is simplified by the ability to quickly select from 7 main menu items. An expanded readout provides detailed explanations of control information. Only six buttons are required to maneuver through the entire controls menu. The display readout is designed to be visible even in bright sunlight. (See Fig. 61.)

SystemVu Interface

This integrated device is the keypad interface used to access the control information, read sensor values, and test the unit. The interface is located in the main control box.

Through the SystemVu interface, the user can access all of the inputs and outputs to check on their values and status, configure operating parameters, and evaluate the current decision status for operating modes. The control also includes an alarm history which can be accessed from the display. The user can access a built-in test routine that can be used at start-up commissioning and troubleshooting.

Additional SystemVu Installation and Troubleshooting

Additional installation, wiring and troubleshooting information for the SystemVu Controller can be found in the following manual: “50FEQ 04-28, 50GEQ 04-28, 48QE 04-28 Single Package Rooftop Heat Pump and Hybrid Heat Units with SystemVu™ Controls Version X.X Controls, Start-Up and Troubleshooting.”

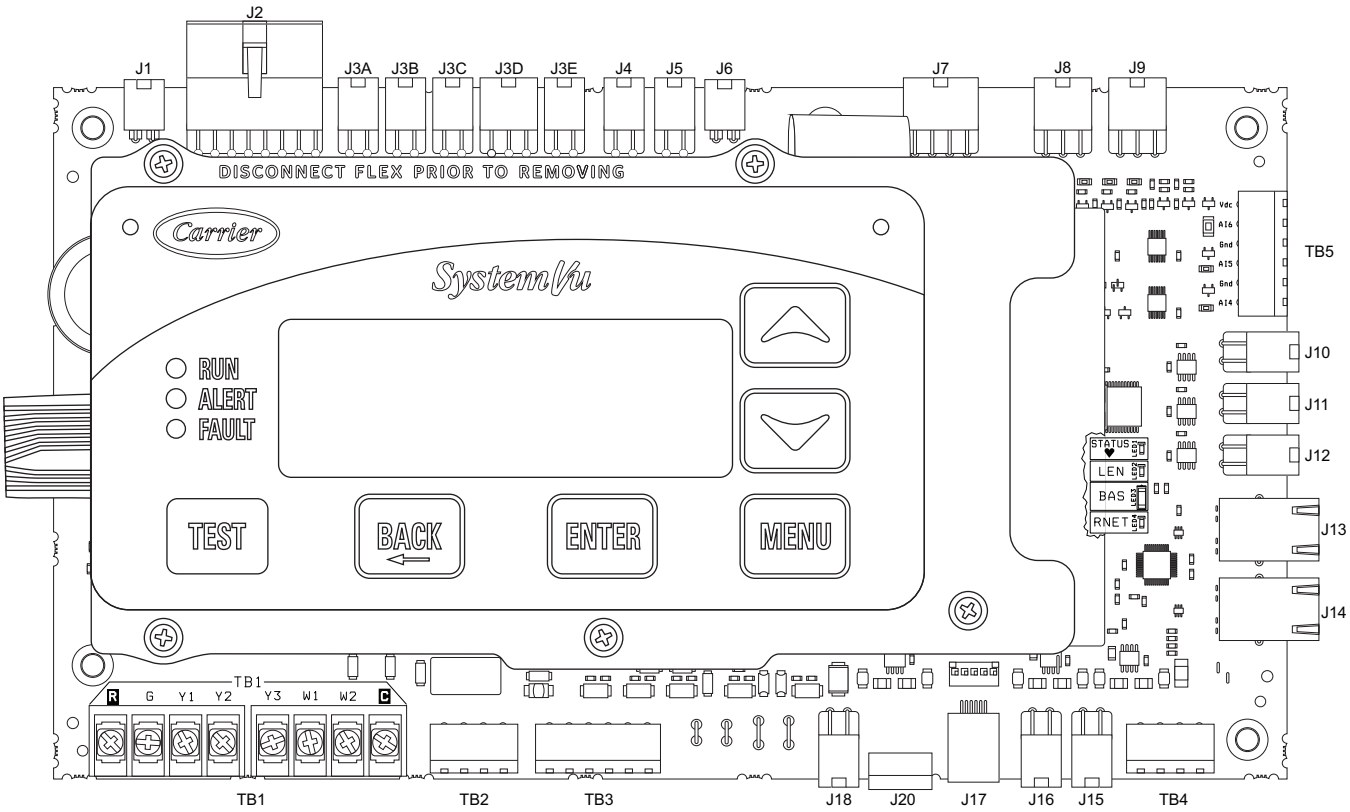

Fig. 61 — SystemVu Control

A2L REFRIGERATION INFORMATION

This equipment contains R-454B, a mildly flammable refrigerant classified as A2L (see Fig. 62). Read all instructions prior to transporting, storing, installing, or servicing this equipment.

Fig. 62 — A2L Refrigerant Safety Group Warning Label

⚠ WARNING

Only use equipment and components that are designed for use with R-454B refrigerant.

⚠ ADVERTISSEMENT

Utilisez uniquement les équipements et les composants conçus pour être utilisés avec le réfrigérant R-454B.

Servicing

Prior to, and during the work being performed on a unit containing A2L refrigerant, the area must be checked with an appropriate refrigerant detector to ensure that the person or persons performing work are aware of a potentially toxic or flammable atmosphere. The area must also be surveyed to ensure there are no flammable hazards or ignition risks. “No Smoking” signs shall be displayed.

Should any hot work need to be performed on the refrigerant system, or associated parts, appropriate fire extinguishing equipment shall be available nearby. Have a dry powder or CO_2 fire extinguisher adjacent to the charging area.

All maintenance staff and others working in the local area shall also be instructed on the nature of work being carried out. Work in confined spaces shall be avoided wherever possible.

Minimum Conditioned Space Area

The space area served by ducted equipment with A2L refrigerant is restricted by building code based on refrigerant volume that the releasable to the conditioned space served by the duct system.

Determine the conditioned space area by calculating the floor area (room length x room width) of all spaces served by a common duct system and adding them all together to get the total conditioned space area.

Compare the calculated total conditioned space area to the minimum conditioned space area (TA_{min}) listed in Table 15, based on the unit size and configuration (with or without Humidi-MiZer).

Table 15 — Minimum Conditioned Space Area (MCSA or TA_{min})

UNIT	(TA_{MIN})[a]	
	Sq Ft	Sq Meter
50GEQT07	441	41
50GEQT08	491	46
50GEQT09	617	58
50GEQT12	602	56
50GEQU07	466	44
50GEQU08	699	65
50GEQU09	822	77
50GEQU12	1013	95

NOTE(S):

a. TA_{min} is based on a minimum ceiling height of 7.2 ft (2.2 m) and the worst-case unit refrigerant charge.

If the space area is above the minimum conditioned space area listed in Table 15 based on unit size and configuration, no action is needed.

If the conditioned space area is below the minimum conditioned space area listed in Table 15 based on unit size and configuration, then additional ventilation may be required. Refer to local code, UL-60335-2-40, or ASHRAE®[1] standard 15.

⚠ CAUTION

Do not install an ignition source or potential ignition source in a space where the total conditioned area is below the minimum total conditioned area (TA_{min}), unless a flame arresting device has been installed.

⚠ ADVERTISSEMENT

N'installez pas de source d'inflammation ou de source d'inflammation potentielle dans un espace où la surface totale conditionnée est inférieure à la surface totale conditionnée minimale (TA_{min}), à moins qu'un dispositif pare-flamme n'ait été installé.

Detection of Flammable Refrigerants

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

The following leak detection methods are deemed acceptable for all refrigerant systems.

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

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

If a leak is suspected, all naked flames shall be removed/extinguished.

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

Evacuation, Removal, and Recovery

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

The following procedure shall be adhered to:

- Safely remove refrigerant following local and national regulations
  - Evacuate refrigerant.
  - Purge the circuit with inert gas (optional for A2L refrigerants).
  - Continuously flush or purge with inert gas when using flame to open circuit.
  - Open the circuit.

For appliances containing flammable refrigerants, purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process may need to be repeated several times until the system is free from refrigerant. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labeled for that refrigerant. Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible cooled before recovery occurs.

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

The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer not arranged.

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

IMPORTANT: Do not mix refrigerants in recovery units, and especially not in cylinders.

IMPORTANT: At no point during this process should the outlet for the vacuum pump be close to any potential ignition sources, and ventilation shall be available.

Decommissioning

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

1. Become familiar with the equipment and its operation.
2. Isolate the system electrically.
3. Before attempting the procedure, ensure that:
   a. Mechanical handling equipment is available, if required for handling refrigerant cylinders.
   b. All personal protective equipment is available and being used correctly.
   c. The recovery process is supervised at all times by a competent person.
   d. Recovery equipment and cylinders conform to the appropriate standards.
4. Pump down refrigerant system, if possible.
5. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
6. Make sure that the cylinder is situated on the scales before recovery takes place.
7. Start the recovery machine and operate in accordance with instructions.
8. Do not overfill cylinders (no more than 80% of volume liquid charge).
9. Do not exceed the maximum working pressure of the cylinder, even temporarily.
10. When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from the site promptly and all isolation valves on the equipment are closed off.
11. Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.

Equipment shall be labeled that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For units containing flammable refrigerants, affix labels on the equipment stating the equipment contains flammable refrigerant.

Leak Dissipation System

50GEQ units use R-454B refrigerant. These units are equipped with a factory installed R-454B leak dissipation system to ensure safe operation in the event of a refrigerant leak. This systems consists of an A2L sensor (Fig. 63) and the refrigerant dissipation board (RDB), see Fig. 64, which are located in the indoor coil section of the unit (see the Control Box Access Panel section of the unit, Fig. 1 on page 4). The A2L sensor is located between the indoor coil and the air filters.

The A2L detection sensor communicates via a wiring harness to the RDB. The sensor harness is routed on the bottom of the filter rack towards the unit bulkhead and secured with wire ties. The sensor harness then runs through the pass-through at the bottom of the control box and connects to the RDB.

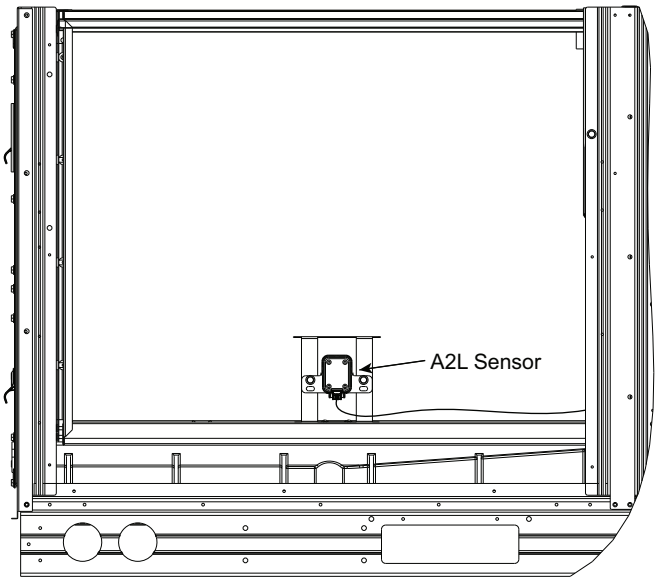


Fig. 63 — Location of AL2 Sensor

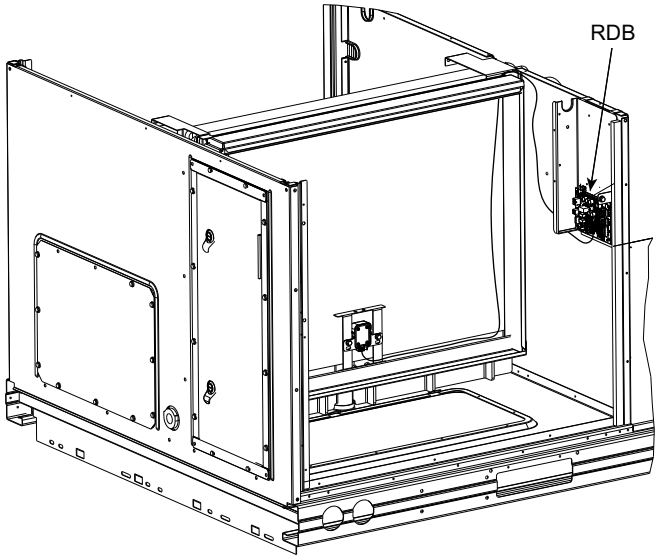


Fig. 64 — Location of Refrigeration Dissipation Board (RDB) (shown with dust cover removed)

NOTE: The drain wire must be properly connected to the ground lug on the RDB via the quick connect and ground harness. Failure of proper sensor harness grounding can lead to false dissipation events.

SEQUENCE OF OPERATION

The control functions as an R-454B refrigerant dissipation system. If the refrigerant detection sensor sends a signal indicating a refrigerant leak, the RDB will prevent heating and cooling operation and begin dissipating the sensed refrigerant with a blower request. The RDB will display a flash code from the yellow status LED (see Fig. 65) indicating the sensor that detected the refrigerant. See Fig. 67 — on page 47 for the full text on the Dissipation Control Status label.

When the sensor signal indicates the refrigerant has dissipated, the RDB yellow status LED will display a flash code 3 and return to its normal state and allow unit operations after a 5 minute delay.

VVT AND VAV ZONING APPLICATIONS

For applications where this unit will be integrated with a zoning system, including VAV dampers, VVT dampers, and series or parallel fan powered boxes, the building zone damper(s) must open to allow the system to meet the minimum dissipation circulation rate during A2L dissipation mode. See Table 17 for minimum dissipation circulation rate (Qmin) by unit size and configuration. Electric reheat in zone boxes and duct heaters must be turned off during A2L dissipation mode. For fan powered air terminal boxes, the terminal fan may be used during A2L dissipation mode.

CARRIER OPEN AIRSIDE LINKAGE

For applications using only Carrier Open zoning controls configured for Airside Linkage, the Linkage mode is set to Off when A2L dissipation is active. Off mode sets the terminal damper to 70% and disables the terminal fan and heater.

CARRIER CCN LINKAGE CONTROLS

For applications using only Carrier CCN zoning controls configured for Airside Linkage, the Linkage mode is set to Off when A2L dissipation is active. Off mode sets the terminal damper to 70% and disables the terminal fan and heater.

ALL OTHER CONTROLS

For applications using all other zoning controls, including Carrier controls not configured for Linkage, the zoning controls must be configured to open the zone dampers to achieve the minimum dissipation airflow and disable electric duct heaters when A2L dissipation mode is active. This unit provides the alarm relay on the RDB (see Fig. 64) and on SystemVu™ units the BACnet point BV:9095 to indicate when A2L dissipation is active. The alarm relay on J2 of the RDB is a dry contact and can be wired as normally open or normally closed.

LEAK DISSIPATION SYSTEM SELF-TEST

Power on the unit and verify proper functioning of equipment. The yellow Status LED on the RDB should be steady (see Fig. 65). If flash codes are present, see Troubleshooting on page 47.

NOTE: Operation of the Test Mode is only possible if no faults exist on the dissipation board.

Remove the control box access panel to access the RDB and Test button (see Fig. 66). The Test button is located above the COMM LED.

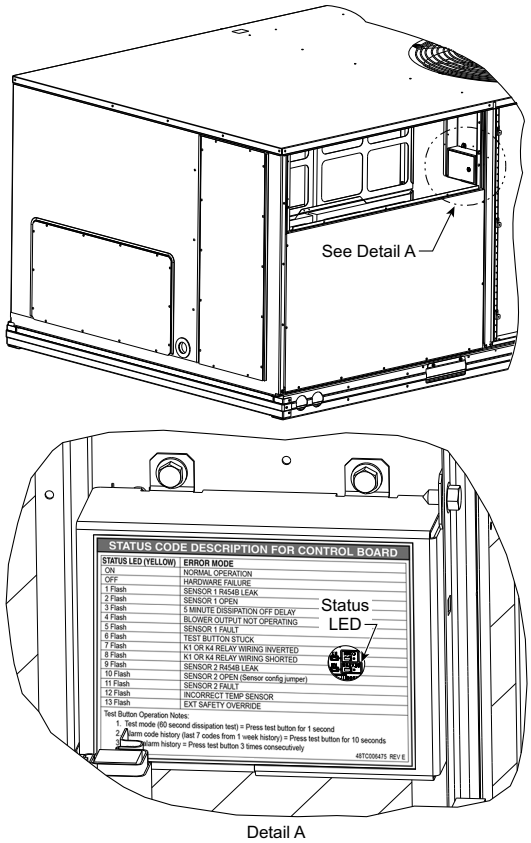


Fig. 65 — Yellow STATUS LED

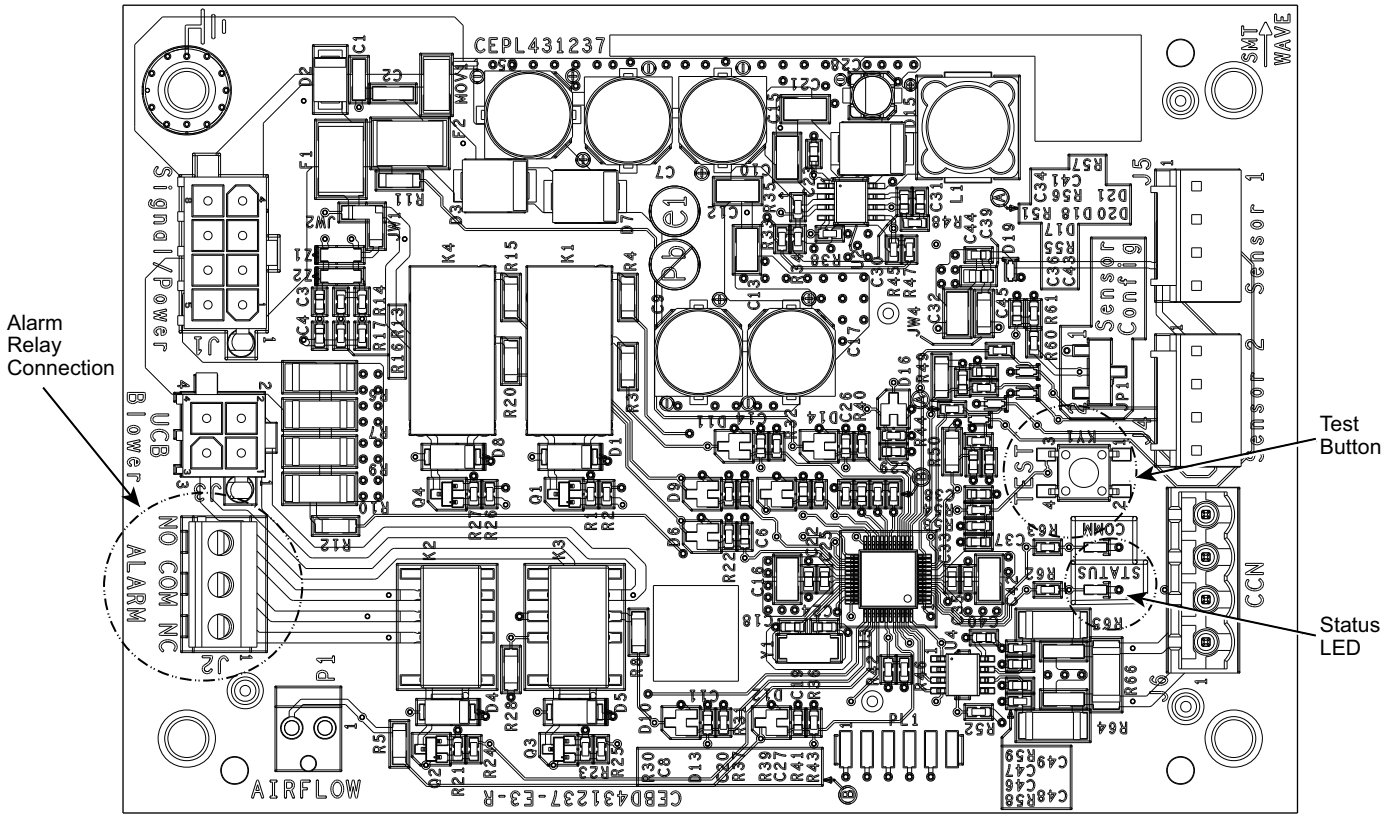


Fig. 66 — Refrigeration Dissipation Board (RDB) — shown without dust cover

Press the Test button on the RDB to ensure proper dissipation system operation under each test condition listed below. After pressing the Test button, system will enter Dissipation Mode for 60 seconds to help verify correct operation.

IMPORTANT: Press the Test button for roughly ONE SECOND to enter Test Mode. Pressing the Test button for a longer periods enables different functions (see Table 16).

Table 16 — Refrigeration Dissipation Board Test Button Functions

HOLD BUTTON TIME (SEC)	FUNCTION
1-4	Dissipation Mode for 60 seconds
5-29	Display flash code history
30+	Flash code 6
3 Rapid Presses	Clear flash code history

DISSIPATION AIR FLOW

Ensure that the unit is able to meet the minimum required dissipation mode airflows. These required minimum airflow rates during Dissipation Mode are listed in Table 17. They are based on the total system refrigerant charge quantity.

Table 17 — Minimum Dissipation Air Flows

MINIMUM DISSIPATION AIR FLOW (cfm)	
UNIT	**cfm**
50GEQT07	410
50GEQT08	450
50GEQT09	570
50GEQT12	550
50GEQU07	430
50GEQU08	640
50GEQU09	760
50GEQU12	930

Table 18 details the required operational checks to ensure proper dissipation system function.

Table 18 — Dissipation System Required Operational Checks

NORMAL OPERATION				
TEST NO.	**UNIT DEMAND**	**COMPRESSOR**	**INDOOR FAN**	**ELECTRIC/ GAS HEAT**
1	None	Off	Off	Off
2	Cool	On	On	Off
3	Heat	On	On	On
DISSIPATION ACTIVATED				
4	None	Off	On	Off
5	Cool	Off	On	Off
6	Heat	Off	On	Off

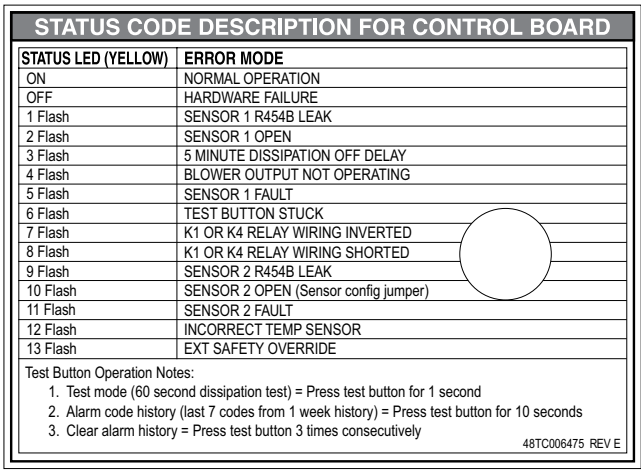
Figure 67 shows the flash codes displayed on the RDB.

TROUBLESHOOTING

For all flash codes, first try power cycling the system to remove the code.

No Power

Verify the wiring to/from pins 1 and 8 on the power harness plug. Check the 24V system wiring from the transformer.



STATUS CODE DESCRIPTION FOR CONTROL BOARD

STATUS LED (YELLOW)	ERROR MODE
ON	NORMAL OPERATION
OFF	HARDWARE FAILURE
1 Flash	SENSOR 1 R454B LEAK
2 Flash	SENSOR 1 OPEN
3 Flash	5 MINUTE DISSIPATION OFF DELAY
4 Flash	BLOWER OUTPUT NOT OPERATING
5 Flash	SENSOR 1 FAULT
6 Flash	TEST BUTTON STUCK
7 Flash	K1 OR K4 RELAY WIRING INVERTED
8 Flash	K1 OR K4 RELAY WIRING SHORTED
9 Flash	SENSOR 2 R454B LEAK
10 Flash	SENSOR 2 OPEN (Sensor config jumper)
11 Flash	SENSOR 2 FAULT
12 Flash	INCORRECT TEMP SENSOR
13 Flash	EXT SAFETY OVERRIDE

Test Button Operation Notes:

1. Test mode (60 second dissipation test) = Press test button for 1 second
2. Alarm code history (last 7 codes from 1 week history) = Press test button for 10 seconds
3. Clear alarm history = Press test button 3 times consecutively

48TC006475 REV E

Fig. 67 — Dissipation Control Status Label

See Table 19 for details on the operating status and troubleshooting of the Dissipation system for the various flash codes.

Table 19 — Status LED Troubleshooting Table

STATUS LED	REASON	CONTROL VERBIAGE	MODE
1 Flash	Sensor 1 ≥ 20% LFL	REFRIG DISSIPATION ACTIVE	Dissipation in Process
2 Flash	Sensor 1 Open	REFRIG SENSOR OPEN	Dissipation in Process
3 Flash	5 Minute Blower Operating, Sensor < 20% LFL and sensors are not opened (done after fault 1, 2, 9 and 10)	DISSIPATION OFF DELAY ACTIVE	Dissipation in Process
4 Flash	0 VAC sensed on G output.	BLOWER OUTPUT NOT OPERATING	Dissipation in Process
5 Flash	Fault with the A2L digital sensor	REFRIG SENSOR FAULT	Dissipation in Process
6 Flash	If KY1 is stuck pressed for more than 30 seconds.	TEST BUTTON STUCK	To prevent a shorted KY1 to keep the dissipation running continuously.
7 Flash	Y out switched with Y in or W out switched with W in	Y (K4) OR W (K1) WIRING INVERTED	Normal mode
8 Flash	Y or W shorted (relay detects both sides are high)	Y (K4) OR W (K1) OUTPUT SHORTED TO Y (K4) OR W (K1) INPUT	Normal mode
9 Flash[a]	Sensor 2 ≥ 20% LFL	SENSOR 2 DISSIPATION ACTIVE	Dissipation in Process
10 Flash[a]	Sensor 2 Open	SENSOR 2 OPEN	Dissipation in Process
11 Flash[a]	Fault with the second A2L digital sensor	SENSOR 2 FAULT	Dissipation in Process
12 Flash	High temperature sensor attached on commercial	OVERCURRENT INCORRECT SENSOR	Normal mode
13 Flash	G input signal is lost. Indicates another unit safety will override dissipation.	EXT SAFETY OVERRIDE	Normal mode

NOTE(S):

a. There is only one sensor mounted in these units. This table represents the standard label being put on all commercial equipment. The hardware changes only allow one sensor to be connected to the board; the software remains the same for a one or two sensor board. Although unlikely these flash codes may appear if the board malfunctions.

LEGEND

LFL — Lower Flammable Limit

ECONOMIZER SYSTEMS

The unit may be equipped with a factory-installed or accessory (field-installed) economizer system. The EconoMi$er®2 is controlled by the SystemVu controller. See Fig. 68 for component locations. See Fig. 69 for control wiring.

Economizers use direct-drive damper actuators.

NOTE: Please refer to the SystemVu controls book for more information.

IMPORTANT: Any economizer that meets the economizer requirements as laid out in California's Title 24 mandatory section 120.2 (fault detection and diagnostics) and/or prescriptive section 140.4 (life-cycle tests, damper leakage, 5 year warranty, sensor accuracy, etc), will have a label on the economizer. Any economizer without this label does not meet California's Title 24. The five year limited parts warranty referred to in section 140.4 only applies to factory installed economizers. Please refer to your economizer on your unit.

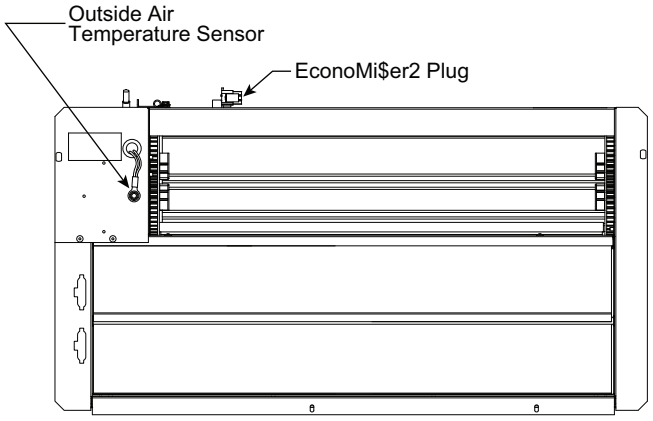


Fig. 68 — EconoMi$er2 Component Locations

EconoMi$er2

IMPORTANT: Economizer installation, wiring and troubleshooting information for the SystemVu™ Controller: "50FEQ 04-28, 50GEQ 04-28, 48QE 04-28 Single Package Rooftop Heat Pump and Hybrid Heat Units with SystemVu™ Controls Version X.X Controls, Start-Up and Troubleshooting." Have a copy of this manual available at unit start-up.

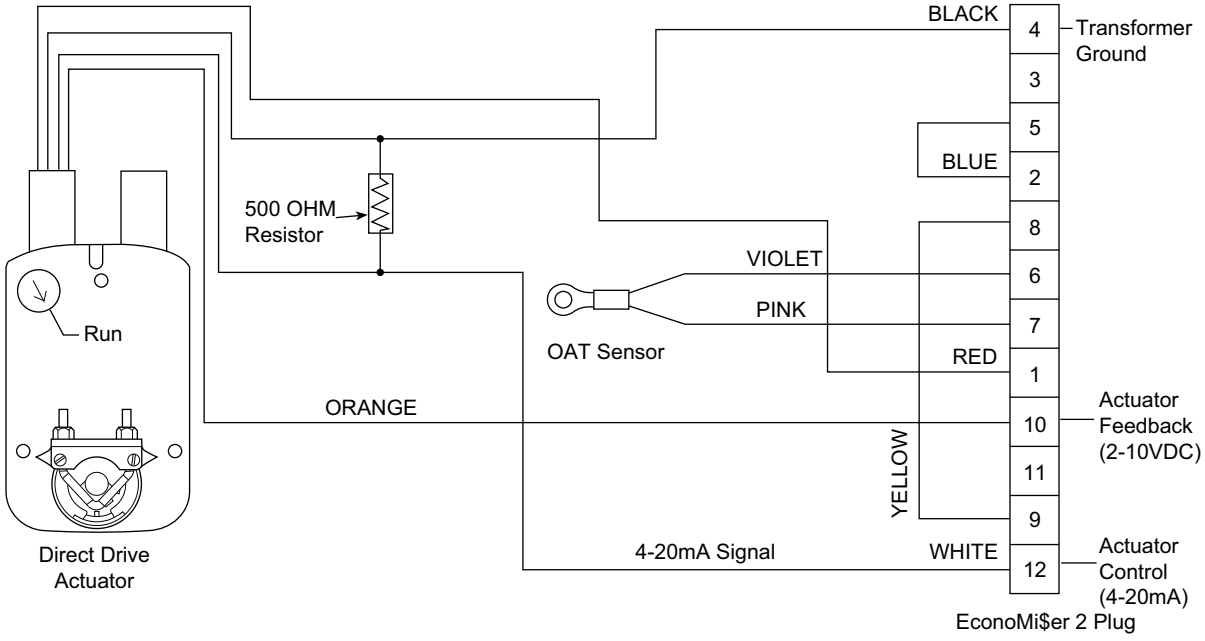


Fig. 69 — EconoMi$er2 with 4 mA to 20 mA Control Wiring

PRE-START-UP/START-UP

⚠ WARNING

PERSONAL INJURY HAZARD

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

1. Follow recognized safety practices and wear approved Personal Protective Equipment (PPE), including safety glasses and gloves when checking or servicing refrigerant system.
2. Do not use a torch to remove any component. System contains oil and refrigerant under pressure. To remove a component, wear PPE and proceed as follows:
   a. Shut off all electrical power to unit. Apply applicable lockout/tag-out procedures.
   b. Recover refrigerant to relieve all pressure from system using both high-pressure and low pressure ports.
   c. Do not use a torch. Cut component connection tubing with tubing cutter and remove component from unit.
   d. Carefully un-sweat remaining tubing stubs when necessary. Oil can ignite when exposed to torch flame.
3. Do not operate compressor or provide any electric power to unit unless compressor terminal cover is in place and secured.
4. Do not remove compressor terminal cover until all electrical power is disconnected and approved lockout/tag-out procedures are in place.
5. Relieve all pressure from system before touching or disturbing anything inside terminal box whenever refrigerant leak is suspected around compressor terminals.
6. Never attempt to repair a soldered connection while refrigerant system is under pressure.

⚠ WARNING

ELECTRICAL OPERATION HAZARD

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

The unit must be electrically grounded in accordance with local codes and NEC ANSI/NFPA 70 (American National Standards Institute/National Fire Protection Association).

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 WARNING, CAUTION, and INFORMATION labels attached to, or shipped with, unit.
3. Make the following inspections:
   a. Inspect for shipping and handling damages such as broken lines, loose parts, or disconnected wires, etc.
   b. Inspect for oil at all refrigerant tubing connections and on unit base. Detecting oil generally indicates a refrigerant leak. Leak-test all refrigerant tubing connections using electronic leak detector, halide torch, or liquid-soap solution.
   c. Inspect all field-wiring and factory-wiring connections. Be sure that connections are completed and tight. Be sure that wires are not in contact with refrigerant tubing or sharp edges.
   d. Inspect coil fins. If damaged during shipping and handling, carefully straighten fins with a fin comb.
4. Verify the following conditions:
   a. Make sure that condenser-fan blade are correctly positioned in fan orifice. See Condenser Fan Adjustment section for more details.
   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.

START-UP, GENERAL

Unit Preparation

Make sure that unit has been installed in accordance with installation instructions and applicable codes.

In addition to the base unit start-up, there are a few steps needed to properly start-up units with SystemVu Controls. The Service Test function should be used to assist in the base unit start-up and also allows verification of output operation. Controller configuration is also part of start-up. This is especially important when field accessories have been added to the unit. The factory pre-configures options installed at the factory. There may also be additional installation steps or inspection required during the start-up process. Refer to the SystemVu Controls, Start-Up, Operation and Troubleshooting Instructions manual.

Additional Installation/Inspection

Inspect the field-installed accessories for proper installation, making note of which ones do or do not require configuration changes. Inspect the SystemVu Alarms for initial insight to any potential issues. Refer to the SystemVu Controls, Start-up, Operation and Troubleshooting Instructions manual. Inspect the SAT sensor for relocation as intended during installation. Inspect special wiring as directed below.

Return-Air Filters

Ensure correct filters are installed in unit. (see Appendix B on page 52.) Do not operate unit without return-air filters.

Outdoor-Air Inlet Screens

Outdoor-air inlet screen must be in place before operating unit.

Compressor Mounting

Compressors are internally spring mounted. Do not loosen or remove compressor hold down bolts.

Internal Wiring

Check all electrical connections in unit control boxes. Tighten as required.

Refrigerant Service Ports

Each unit system has two 1/4-in. SAE flare (with check valves) service ports: one on the suction line, and one on the compressor discharge line. Be sure that caps on the ports are tight.

Compressor Rotation

⚠ CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution can result in premature wear and damage to equipment.

Scroll compressors can only compress refrigerant if rotating in the right direction. Reverse rotation for extended times can result in internal damage to the compressor. Scroll compressors are sealed units and cannot be repaired on site location.

On 3-phase units with scroll compressors, it is important to be certain compressor is rotating in the proper direction. To determine whether or not compressor is rotating in the proper direction:

1. Connect service gauges to suction and discharge pressure fittings.
2. Energize the compressor.
3. The suction pressure should drop and the discharge pressure should rise, as is normal on any start-up.

If the suction pressure does not drop and the discharge pressure does not rise to normal levels:

1. Note that the evaporator fan is probably also rotating in the wrong direction.
2. Turn off power to the unit and install lockout tag.
3. Reverse any two of the unit power leads.
4. Re-energize to the compressor. Check pressures.

The suction and discharge pressure levels should now move to their normal start-up levels.

NOTE: When the compressor is rotating in the wrong direction, the unit will make an elevated level of noise and will not provide cooling.

Refrigerant Service Ports

Each system has two 1/4-in. SAE flare (with check valves) service ports: one on the suction line, and one on the compressor discharge line. Be sure that caps on the ports are tight.

Cooling

Set space thermostat to OFF position. To start unit, turn on main power supply. Set system selector switch at COOL position and fan switch at AUTO. position. Adjust thermostat to a setting below room temperature. Compressor starts on closure of contactor.

Check unit charge. Refer to Refrigerant Charge section on page 19.

Reset thermostat at a position above room temperature. Compressor will shut off. Evaporator fan will shut off after a 30-second delay.

To shut off unit, set system selector switch at OFF position. Resetting thermostat at a position above room temperature shuts unit off temporarily until space temperature exceeds thermostat setting.

Heating

To start unit, turn on main power supply. Set system selector switch to the HEAT position and set thermostat at a setting above room temperature. Set fan to AUTO position.

First stage of thermostat energizes compressors. Second stage of thermostat energizes the electric heaters (if installed). Check heating effects at air supply grille(s).

If electric heaters do not energize, reset limit switch (located on supply-fan scroll) by pressing button located between terminals on the switch.

To shut unit off, set system selector switch to the OFF position. Resetting thermostat at a position below room temperature temporarily shuts unit off until space temperature falls below thermostat setting.

Defrost

The defrost control mode is a time/temperature sequence. There are two time components: The continuous run period and the test/defrost cycle period. The temperature component is provided by Defrost Thermostat 1 and 2 (DFT1 and DFT2) mounted on the outdoor coil. These are wired in series as an input to the SystemVu Controller.

The continuous run period is a fixed time period between the end of the last defrost cycle (or start of the current Heating cycle) during which no defrost will be permitted. This period can be set from 30 to 120 minutes through the SystemVu User Display.

If one or both of the Defrost Thermostats are closed, the unit will enter Defrost until both DFTs are open or the 10 minute defrost cycle limit is reached. Refer to Controls, Start-Up, Operation and Troubleshooting manual for more information.

Ventilation (Continuous Fan)

Set fan and system selector switches at ON and OFF positions, respectively. Evaporator fan operates continuously to provide constant air circulation.

FASTENER TORQUE VALUES

Heat shield screws	30 in.-lb (3.4 Nm) ±2 in.-lb (0.2 Nm)
Stator motor mounting screws	23 in.-lb (2.6 Nm) ±2 in.-lb (0.2 Nm)
Fan rotor mounting screws	23 in.-lb (2.6 Nm) ±2 in.-lb (0.2 Nm)
Limit switch screws	50 in.-lb (5.7 Nm) ±5 in.-lb (0.6 Nm)
Fan Deck bracket screws	50 in.-lb (5.7 Nm) ±5 in.-lb (0.6 Nm)
Condenser fan motor mounting screws	30 in.-lb (3.4 Nm) ±3 in.-lb (0.3 Nm)
Condenser fan hub set screw	60 in.-lb (6.8 Nm) ±5 in.-lb (0.6 Nm)
Compressor mounting bolts	65 in.-lb (7.3 Nm) +10 in.-lb (1.2 Nm)

START-UP, SYSTEMVU CONTROLS

IMPORTANT: SET-UP INSTRUCTIONS

Installation, wiring and troubleshooting information for the SystemVu™ Controller: "50FEQ 04-28, 50GEQ 04-28, 48QE 04-28 Single Package Rooftop Heat Pump Units with SystemVu™ Controls Version X.X Controls, Start-Up and Troubleshooting." Have a copy of this manual available at unit start-up.

APPENDIX A — Model Number Nomenclature

Position:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Example:	5	0	G	E	Q	T	0	7	A	2	A	5	-	3	A	0	A	0

Unit Type
50 – Cooling Packaged Rooftop

Model Series
GE – Mid Tier Puron Advance™

Heat Size
Q = Heat Pump
(Field-Installed Electric Heat)

Refrigerant Systems Options
R = Three Stage Cooling, Single Circuit with Chicago Code Relief Valve[a]
S = Three Stage Cooling, Single Circuit with Humidi-MiZer® System and Chicago Code Relief Valve[a]
T = Three Stage Cooling, Single Circuit
U = Three Stage Cooling, Single Circuit with Humidi-MiZer® System

Tonnage
07 = 6.0 tons
08 = 7.5 tons
09 = 8.5 tons
12 = 10 tons

Sensor Options
A = None
B = Return Air Smoke Detector (RA)[b]
C = Supply Air Smoke Detector (SA)
D = RA + SA Smoke Detector[b]
J = Condensate Overflow Switch (COFS)
K = Condensate Overflow Switch + RA Smoke Detector[b]
L = Condensate Overflow Switch + RA and SA Smoke Detectors[b]
M = Condensate Overflow Switch + SA Smoke Detector

Fan Options
2 = Standard/Medium Static – EcoBlue Vane Axial Fan
3 = High Static – EcoBlue Vane Axial Fan
5 = Standard/Medium Static – EcoBlue Vane Axial Fan and Filter Status Switch
6 = High Static – EcoBlue Vane Axial Fan and Filter Status Switch

RTPF Coil Options – (Outdoor - Indoor - Hail Guard)
A = Al/Cu - Al/Cu
B = Precoat Al/Cu - Al/Cu
C = E-coat Al/Cu - Al/Cu
D = E-coat Al/Cu - E-coat Al/Cu
M = Al/Cu - Al/Cu — Louvered Hail Guard
N = Precoat Al/Cu - Al/Cu — Louvered Hail Guard
P = E-coat Al/Cu - Al/Cu — Louvered Hail Guard
Q = E-coat Al/Cu - E-coat Al/Cu — Louvered Hail Guard
R = Cu/Cu - Al/Cu — Louvered Hail Guard
S = Cu/Cu - Cu/Cu — Louvered Hail Guard

Voltage
1 = 575/3/60
5 = 208-230/3/60
6 = 460/3/60

Design Revision
- = Factory Assigned

Base Unit Controls
3 = SystemVu™ Controller

Intake / Exhaust Options
A = None
B = Standard Leak Economizer with Barometric Relief
F = Standard Leak Enthalpy Economizer with Barometric Relief
L = ULL (Ultra Low Leak) Temperature Economizer with Barometric Relief and CO_2 Sensor
M = ULL Enthalpy Economizer with Barometric Relief and CO_2 Sensor
U = ULL Temperature Economizer with Barometric Relief
W = ULL Enthalpy Economizer with Barometric Relief

Service Options
0 = None
1 = Unpowered Convenience Outlet (NPCO)
2 = Powered Convenience Outlet (PCO)
3 = Hinged Panels (HP)
4 = Hinged Panels + NPCO
5 = Hinged Access Panels + PCO
6 = MERV-13 Filters (M13)
7 = NPCO + MERV-13 Filters
8 = PCO + MERV-13 Filters
9 = Hinged Panels + MERV-13 Filters
A = HP + NPCO + MERV-13 Filters
B = HP + PCO + MERV-13 Filters
C = Foil Faced Insulation (FF)
D = Foil Faced Insulation + NPCO
E = Foil Faced Insulation + PCO
F = Foil Faced Insulation + Hinged Panels
G = FF + HP + NPCO
H = FF + HP + PCO
J = Foil Faced Insulation + MERV-13 Filters
K = FF + NPCO + MERV-13 Filters
L = FF + PCO + MERV-13 Filters
M = FF + HP + MERV-13 Filters
N = FF + HP + NPCO + MERV-13 Filters
P = FF + HP + PCO + MERV-13 Filters

Electrical Options
A = None
B = HACR Breaker
C = Non-Fused Disconnect (NFDC)
D = Thru-The-Base Connections (TTB)
E = HACR +TTB
F = NFDC + TTB
N = Phase Monitor Protection (PMR)
P = PMR + HACR
Q = PMR + NFDC
R = PMR + TTB
S = PMR + HACR + TTB
T = PMR + NFDC + TTB
1 = HSCCR[c] (High Short Circuit Current Rating)
2 = HSCCR[c] + TTB

Packaging & Seismic Compliance
0 = Standard

NOTE(S):
a. Size 12 units only.
b. Vertical airflow installaton only.
c. Not available on the following models/options:
50GEQ*09 (8.5 ton units), Phase Loss Monitor, Non-Fused Disconnect, HACR, Powered Convenience Outlet

Fig. A — Model Number Nomenclature

APPENDIX B — PHYSICAL DATA

50GEQ 6 to 7.5 Ton Physical Data

50GEQ UNIT	50GEQT07	50GEQU07	50GEQT08	50GEQU08
NOMINAL TONS	6.0	6.0	7.5	7.5
BASE UNIT OPERATING WT (lb)[a]	776	776	812	812
REFRIGERATION SYSTEM				
No. Circuits/No. Compressors/Type	1/2/Scroll	1/2/Scroll	1/2/Scroll	1/2/Scroll
Puron Advance™ (R-454B) Charge (lb-oz)	15-0	15-14	16-11	23-13
Cooling Metering Device	TXV	TXV	TXV	TXV
Heating Metering Device	TXV	TXV	TXV	TXV
High-press. Trip / Reset (psig)	630/505	630/505	630/505	630/505
Loss of Charge Trip / Reset (psig)	27/44	27/44	27/44	27/44
EVAPORATOR COIL				
Material	Cu/Al	Cu/Al	Cu/Al	Cu/Al
Coil Type	3/8" RTPF	3/8" RTPF	3/8" RTPF	3/8" RTPF
Rows / FPI	3/15	3/15	4/15	4/15
Total Face Area (ft^2)	11.1	11.1	11.1	11.1
Condensate Drain Conn. Size	3/4"	3/4"	3/4"	3/4"
CONDENSER COIL				
Material	Cu/Al	Cu/Al	Cu/Al	Cu/Al
Coil type	5/16" RTPF	5/16" RTPF	5/16" RTPF	5/16" RTPF
Rows / FPI	2/18	2/18	2/18	2/18
Total Face Area (ft^2)	25.1	25.1	25.1	25.1
HUMIDI-MIZER COIL				
Material	—	Cu/Al	—	Cu/Al
Coil Type	—	5/16" RTPF	—	5/16" RTPF
Rows / FPI	—	2/18	—	2/18
Total Face Area (ft^2)	—	8	—	8
EVAPORATOR FAN AND MOTOR				
Standard/Medium Static 3 Phase				
Motor Qty / Drive Type	1 / Direct	1 / Direct	1 / Direct	1 / Direct
Max Cont BHP	2.4	2.4	2.4	2.4
Rpm Range	250 - 2000	250 - 2000	250 - 2000	250 - 2000
Fan Qty / Type	1 / Vane Axial	1 / Vane Axial	1 / Vane Axial	1 / Vane Axial
Fan Diameter (in.)	22"	22"	22"	22"
High Static 3 Phase				
Motor Qty / Drive Type	1 / Direct	1 / Direct	1 / Direct	1 / Direct
Max Cont BHP	3	3	3	3
RPM Range	250 - 2200	250 - 2200	250 - 2200	250 - 2200
Fan Qty / Type	1 / Vane Axial	1 / Vane Axial	1 / Vane Axial	1 / Vane Axial
Fan Diameter (in.)	22"	22"	22"	22"
CONDENSER FAN AND MOTOR				
Qty / Motor Drive Type	2 / direct	2 / direct	2 / direct	2 / direct
Motor HP / RPM	1/3 / 1050/770/450/350/265	1/3 / 1050/770/450/350/265	1/3 / 1050/770/450/350/265	1/3 / 1050/770/450/350/265
Fan Diameter (in.)	22	22	22	22
FILTERS				
RA Filter Qty / Size (in.)	4 / 20 x 20 x 2	4 / 20 x 20 x 2	4 / 20 x 20 x 2	4 / 20 x 20 x 2
OA Inlet Screen Qty / Size (in.)	1 / 20 x 24 x 1	1 / 20 x 24 x 1	1 / 20 x 24 x 1	1 / 20 x 24 x 1

NOTE(S):

a. Base unit operating weight does not include weight of options.

LEGEND

bhp — Brake Horsepower
FPI — Fins Per Inch
OA — Outdoor Air
RA — Return Air

APPENDIX B — PHYSICAL DATA (cont)

50GEQ 8.5 to 10 Ton Physical Data

50GEQ UNIT	50GEQT09	50GEQU09	50GEQT12	50GEQU12
NOMINAL TONS	8.5	8.5	10.0	10.0
BASE UNIT OPERATING WT (lb)[a]	947	947	1219	1219
REFRIGERATION SYSTEM				
No. Circuits/No. Compressors/Type	1/2/Scroll	1/2/Scroll	1/2/Scroll	1/2/Scroll
Puron Advance™ (R-454B) Charge (lb-oz)	21-0	28-0	20-8	34-8
Cooling Metering Device	TXV	TXV	TXV	TXV
Heating Metering Device	TXV	TXV	TXV	TXV
High-press. Trip / Reset (psig)	630/505	630/505	630/505	630/505
Loss of Charge Trip / Reset (psig)	27/44	27/44	27/44	27/44
EVAPORATOR COIL				
Material	Cu/Al	Cu/Al	Cu/Al	Cu/Al
Coil Type	3/8" RTPF	3/8" RTPF	3/8" RTPF	3/8" RTPF
Rows / FPI	4/15	4/15	3/15	3/15
Total Face Area (ft^2)	11.1	11.1	17.5	17.5
Condensate Drain Conn. Size	3/4"	3/4"	3/4"	3/4"
CONDENSER COIL				
Material	Cu/Al	Cu/Al	Cu/Al	Cu/Al
Coil Type	5/16" RTPF	5/16" RTPF	5/16" RTPF	5/16" RTPF
Rows / FPI	3/18	3/18	2/18	2/18
Total Face Area (ft^2)	25.1	25.1	36.1	36.1
HUMIDI-MIZER COIL				
Material	—	Cu/Al	—	Cu/Al
Coil Type	—	5/16" RTPF	—	5/16" RTPF
Rows / FPI	—	2/18	—	2/18
Total Face Area (ft^2)	—	8	—	8
EVAPORATOR FAN AND MOTOR				
Standard/Medium Static 3 Phase				
Motor Qty / Drive Type	1 / Direct	1 / Direct	1 / Direct	1 / Direct
Max Cont BHP	2.4	2.4	2.4	2.4
RPM Range	250 - 2000	250 - 2000	250 - 2000	250 - 2000
Fan Qty / Type	1 / Vane Axial	1 / Vane Axial	1 / Vane Axial	1 / Vane Axial
Fan Diameter (in.)	22"	22"	22"	22"
High Static 3 Phase				
Motor Qty / Drive Type	1 / Direct	1 / Direct	1 / Direct	1 / Direct
Max Cont BHP	3	3	5	5
RPM Range	250 - 2200	250 - 2200	250 - 2200	250 - 2200
Fan Qty / Type	1 / Vane Axial	1 / Vane Axial	1 / Vane Axial	1 / Vane Axial
Fan Diameter (in.)	22"	22"	22"	22"
CONDENSER FAN AND MOTOR				
Qty / Motor Drive Type	1 / direct	1 / direct	3 / Direct	3 / Direct
Motor HP / RPM	1 / 1050/770/450/350/265	1 / 1050/770/450/350/265	1/3 / 1050/770/450/350/265	1/3 / 1050/770/450/350/265
Fan Diameter (in.)	30	30	22	22
FILTERS				
RA Filter Qty / SIZE (in.)	4 / 20 x 20 x 2	4 / 20 x 20 x 2	6 / 18 x 24 x 2	6 / 18 x 24 x 2
OA Inlet Screen Qty / Size (in.)	1 / 20 x 24 x 1	1 / 20 x 24 x 1	V 2 / 24 x 27 x 1 H 1 / 30 x 39 x1	V 2 / 24 x 27 x 1 H 1 / 30 x 39 x1

NOTE(S):

a. Base unit operating weight does not include weight of options.

LEGEND

bhp — Brake Horsepower
FPI — Fins Per Inch
OA — Outdoor Air
RA — Return Air

APPENDIX C — FAN PERFORMANCE

General Fan Performance Notes

1. Interpolation is permissible. Do not extrapolate.
2. External static pressure is the static pressure difference between the return duct and the supply duct plus the static pressure caused by any FIOPs or accessories.
3. Tabular data accounts for pressure loss due to clean filters, unit casing, and wet coils.
4. Factory options and accessories may effect static pressure losses. Selection software is available, through your salesperson, to help you select the best motor/drive combination for your application.
5. The fan performance tables offer motor/drive recommendations. In cases when two motor/drive combinations would work, the lower horsepower option is recommended.
6. For information on the electrical properties of the fan motors, please see the Electrical information section of the product specifications book.
7. For more information on the performance limits of the fan motors, see the application data section of the product specifications book.
8. The EPACT (Energy Policy Act of 1992) regulates energy requirements for specific types of indoor fan motors. Motors regulated by EPACT include any general purpose, T-frame (three-digit, 143 and larger), single-speed, foot mounted, polyphase, squirrel cage induction motors of NEMA (National Electrical Manufacturers Association) design A and B, manufactured for use in the United States. Ranging from 1 to 200 Hp, these continuous-duty motors operate on 230 and 460 volt, 60 Hz power. If a motor does not fit into these specifications, the motor does not have to be replaced by an EPACT compliant energy-efficient motor. Variable-speed motors are exempt from EPACT compliance requirements.

APPENDIX C — FAN PERFORMANCE (cont)

50GEQT07 — 6 Ton Vertical Supply (rpm - bhp)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
1800	796	0.19	940	0.32	1064	0.46	1174	0.61	1274	0.79
1950	840	0.22	977	0.35	1097	0.50	1205	0.66	1303	0.84
2100	886	0.26	1016	0.39	1132	0.54	1237	0.71	1334	0.89
2250	932	0.30	1056	0.44	1168	0.59	1271	0.77	1365	0.95
2400	980	0.35	1098	0.49	1206	0.65	1306	0.83	1398	1.01
2550	1029	0.40	1141	0.55	1245	0.71	1342	0.89	1432	1.08
2700	1078	0.46	1185	0.61	1285	0.78	1379	0.96	1467	1.16
2850	1128	0.52	1230	0.68	1327	0.85	1418	1.04	1504	1.24
3000	1178	0.59	1276	0.75	1369	0.93	1458	1.12	1541	1.32

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
1800	1365	0.97	1451	1.16	1530	1.36	1606	1.57	1678	1.80
1950	1393	1.02	1478	1.22	1557	1.43	1631	1.64	1702	1.86
2100	1423	1.08	1506	1.28	1584	1.49	1658	1.71	1728	1.94
2250	1453	1.15	1535	1.35	1612	1.56	1685	1.79	1755	2.02
2400	1484	1.21	1565	1.42	1641	1.64	1714	1.87	1783	2.10
2550	1517	1.29	1596	1.50	1671	1.72	1743	1.95	1811	2.19
2700	1550	1.36	1628	1.58	1703	1.81	1773	2.04	1841	2.29
2850	1585	1.45	1661	1.67	1735	1.90	1804	2.14	1871	2.38
3000	1620	1.53	1696	1.76	1768	1.99	1836	2.23	1902	2.48

Std/Med Static 796-2000 rpm, 2.4 Max bhp

High Static 796-2200 rpm, 3.0 Max bhp

50GEQT07 — Standard/Medium Static — 6 Ton Vertical Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
1800	796	3.8	940	4.5	1064	5.2	1174	5.8	1274	6.3
1950	840	4.0	977	4.7	1097	5.4	1205	5.9	1303	6.4
2100	886	4.3	1016	4.9	1132	5.5	1237	6.1	1334	6.6
2250	932	4.5	1056	5.1	1168	5.7	1271	6.3	1365	6.7
2400	980	4.8	1098	5.4	1206	5.9	1306	6.4	1398	6.9
2550	1029	5.0	1141	5.6	1245	6.1	1342	6.6	1432	7.1
2700	1078	5.3	1185	5.8	1285	6.3	1379	6.8	1467	7.3
2850	1128	5.5	1230	6.0	1327	6.5	1418	7.0	1504	7.4
3000	1178	5.8	1276	6.3	1369	6.8	1458	7.2	1541	7.6

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
1800	1365	6.7	1451	7.2	1530	7.6	1606	8.0	1678	8.3
1950	1393	6.9	1478	7.3	1557	7.7	1631	8.1	1702	8.5
2100	1423	7.0	1506	7.5	1584	7.9	1658	8.2	1728	8.6
2250	1453	7.2	1535	7.6	1612	8.0	1685	8.4	1755	8.7
2400	1484	7.3	1565	7.8	1641	8.2	1714	8.5	1783	8.9
2550	1517	7.5	1596	7.9	1671	8.3	1743	8.7	1811	9.0
2700	1550	7.7	1628	8.1	1703	8.5	1773	8.8	1841	9.2
2850	1585	7.9	1661	8.3	1735	8.6	1804	9.0	1871	9.3
3000	1620	8.0	1696	8.4	1768	8.8	1836	9.2	1902	9.5

Std/Med Static 796-2000 rpm, 2.4 Max bhp

APPENDIX C — FAN PERFORMANCE (cont)

50GEQT07 — High Static — 6 Ton Vertical Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
1800	796	3.5	940	4.2	1064	4.8	1174	5.3	1274	5.7
1950	840	3.7	977	4.4	1097	4.9	1205	5.4	1303	5.9
2100	886	3.9	1016	4.5	1132	5.1	1237	5.6	1334	6.0
2250	932	4.1	1056	4.7	1168	5.2	1271	5.7	1365	6.1
2400	980	4.4	1098	4.9	1206	5.4	1306	5.9	1398	6.3
2550	1029	4.6	1141	5.1	1245	5.6	1342	6.0	1432	6.5
2700	1078	4.8	1185	5.3	1285	5.8	1379	6.2	1467	6.6
2850	1128	5.1	1230	5.5	1327	6.0	1418	6.4	1504	6.8
3000	1178	5.3	1276	5.7	1369	6.2	1458	6.6	1541	7.0

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
1800	1365	6.1	1451	6.5	1530	6.9	1606	7.3	1678	7.6
1950	1393	6.3	1478	6.7	1557	7.0	1631	7.4	1702	7.7
2100	1423	6.4	1506	6.8	1584	7.2	1658	7.5	1728	7.8
2250	1453	6.6	1535	6.9	1612	7.3	1685	7.6	1755	7.9
2400	1484	6.7	1565	7.1	1641	7.4	1714	7.8	1783	8.1
2550	1517	6.8	1596	7.2	1671	7.6	1743	7.9	1811	8.2
2700	1550	7.0	1628	7.4	1703	7.7	1773	8.0	1841	8.3
2850	1585	7.2	1661	7.5	1735	7.9	1804	8.2	1871	8.5
3000	1620	7.3	1696	7.7	1768	8.0	1836	8.3	1902	8.6

High Static 796-2200 rpm, 3.0 Max bhp

APPENDIX C — FAN PERFORMANCE (cont)

50GEQT08 — 7.5 Ton Vertical Supply (rpm - bhp)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
2250	941	0.31	1064	0.45	1176	0.61	1279	0.79	1373	0.98
2440	1000	0.37	1116	0.52	1223	0.69	1322	0.87	1414	1.06
2625	1059	0.44	1169	0.59	1271	0.76	1366	0.95	1456	1.15
2815	1120	0.52	1224	0.68	1322	0.85	1413	1.04	1500	1.25
3000	1181	0.60	1279	0.77	1372	0.95	1461	1.14	1544	1.35
3190	1244	0.70	1337	0.87	1426	1.06	1511	1.26	1592	1.47
3375	1306	0.80	1395	0.98	1480	1.17	1561	1.37	1640	1.59
3565	1370	0.92	1455	1.10	1536	1.29	1614	1.50	1690	1.72
3750	1433	1.04	1514	1.23	1592	1.43	1667	1.64	1740	1.86

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
2250	1460	1.17	1542	1.38	1619	1.60	1692	1.83	1761	2.06
2440	1499	1.26	1580	1.48	1655	1.70	1727	1.93	1796	2.17
2625	1539	1.36	1618	1.58	1692	1.80	1763	2.04	1831	2.28
2815	1581	1.46	1658	1.68	1732	1.92	1802	2.16	1869	2.41
3000	1624	1.57	1699	1.80	1771	2.04	1840	2.29	1906	2.54
3190	1669	1.69	1743	1.93	1813	2.17	1881	2.42	1946	2.68
3375	1714	1.82	1787	2.06	1856	2.31	1922	2.56	1986	2.83
3565	1763	1.96	1833	2.20	1900	2.45	1965	2.71	2028	2.98
3750	1811	2.10	1879	2.34	1945	2.60	2008	2.86	2070	3.13

Std/Med Static 941-2000 rpm, 2.4 Max bhp

High Static 941-2200 rpm, 3.0 Max bhp

50GEQT08 — Standard/Medium Static — 7.5 Ton Vertical Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
2250	941	4.6	1064	5.2	1176	5.8	1279	6.3	1373	6.8
2440	1000	4.9	1116	5.5	1223	6.0	1322	6.5	1414	7.0
2625	1059	5.2	1169	5.7	1271	6.3	1366	6.7	1456	7.2
2815	1120	5.5	1224	6.0	1322	6.5	1413	7.0	1500	7.4
3000	1181	5.8	1279	6.3	1372	6.8	1461	7.2	1544	7.7
3190	1244	6.1	1337	6.6	1426	7.0	1511	7.5	1592	7.9
3375	1306	6.4	1395	6.9	1480	7.3	1561	7.7	1640	8.1
3565	1370	6.8	1455	7.2	1536	7.6	1614	8.0	1690	8.4
3750	1433	7.1	1514	7.5	1592	7.9	1667	8.3	1740	8.7

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
2250	1460	7.2	1542	7.6	1619	8.0	1692	8.4	1761	8.8
2440	1499	7.4	1580	7.8	1655	8.2	1727	8.6	1796	9.0
2625	1539	7.6	1618	8.0	1692	8.4	1763	8.8	1831	9.1
2815	1581	7.8	1658	8.2	1732	8.6	1802	9.0	1869	9.3
3000	1624	8.1	1699	8.5	1771	8.8	1840	9.2	1906	9.5
3190	1669	8.3	1743	8.7	1813	9.0	1881	9.4	—	—
3375	1714	8.5	1787	8.9	1856	9.3	—	—	—	—
3565	1763	8.8	1833	9.1	1900	9.5	—	—	—	—
3750	1811	9.0	1879	9.4	—	—	—	—	—	—

Std/Med Static 941-2000 rpm

APPENDIX C — FAN PERFORMANCE (cont)

50GEQT08 — High Static — 7.5 Ton Vertical Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
2250	941	4.2	1064	4.8	1176	5.3	1279	5.7	1373	6.2
2440	1000	4.5	1116	5.0	1223	5.5	1322	5.9	1414	6.4
2625	1059	4.7	1169	5.2	1271	5.7	1366	6.2	1456	6.6
2815	1120	5.0	1224	5.5	1322	5.9	1413	6.4	1500	6.8
3000	1181	5.3	1279	5.7	1372	6.2	1461	6.6	1544	7.0
3190	1244	5.6	1337	6.0	1426	6.4	1511	6.8	1592	7.2
3375	1306	5.9	1395	6.3	1480	6.7	1561	7.1	1640	7.4
3565	1370	6.2	1455	6.6	1536	6.9	1614	7.3	1690	7.6
3750	1433	6.5	1514	6.8	1592	7.2	1667	7.5	1740	7.9

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
2250	1460	6.6	1542	7.0	1619	7.3	1692	7.7	1761	8.0
2440	1499	6.8	1580	7.1	1655	7.5	1727	7.8	1796	8.1
2625	1539	6.9	1618	7.3	1692	7.7	1763	8.0	1831	8.3
2815	1581	7.1	1658	7.5	1732	7.8	1802	8.2	1869	8.5
3000	1624	7.3	1699	7.7	1771	8.0	1840	8.3	1906	8.6
3190	1669	7.5	1743	7.9	1813	8.2	1881	8.5	1946	8.8
3375	1714	7.8	1787	8.1	1856	8.4	1922	8.7	1986	9.0
3565	1763	8.0	1833	8.3	1900	8.6	1965	8.9	2028	9.2
3750	1811	8.2	1879	8.5	1945	8.8	2008	9.1	2070	9.4

High Static 941-2200 rpm

APPENDIX C — FAN PERFORMANCE (cont)

50GEQT09 — 8.5 Ton Vertical Supply (rpm - bhp)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
2550	1035	0.41	1147	0.56	1251	0.73	1348	0.91	1438	1.11
2765	1104	0.50	1209	0.65	1308	0.83	1401	1.02	1488	1.22
2975	1173	0.59	1272	0.76	1365	0.93	1454	1.13	1538	1.34
3190	1244	0.70	1337	0.87	1426	1.06	1511	1.26	1592	1.47
3400	1314	0.82	1402	0.99	1487	1.19	1568	1.39	1646	1.61
3615	1387	0.95	1470	1.13	1551	1.33	1629	1.54	1703	1.76
3825	1458	1.09	1538	1.28	1615	1.48	1689	1.69	1761	1.92
4040	1532	1.24	1608	1.44	1681	1.64	1752	1.86	1822	2.09
4250	1605	1.41	1677	1.60	1747	1.81	1815	2.03	1882	2.27

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
2550	1522	1.32	1602	1.53	1677	1.76	1749	2.00	1817	2.24
2765	1570	1.43	1647	1.65	1721	1.89	1792	2.13	1859	2.38
2975	1618	1.56	1693	1.78	1766	2.02	1835	2.27	1901	2.52
3190	1669	1.69	1743	1.93	1813	2.17	1881	2.42	1946	2.68
3400	1721	1.84	1792	2.07	1861	2.32	1927	2.58	1991	2.84
3615	1776	2.00	1845	2.24	1912	2.49	1976	2.75	2039	3.02
3825	1831	2.16	1898	2.40	1963	2.66	2026	2.92	2087	3.20
4040	1889	2.33	1954	2.58	2017	2.84	2078	3.11	—	—
4250	1947	2.51	2010	2.76	2071	3.02	—	—	—	—

Std/Med Static 1035-2000 rpm, 2.4 Max bhp

High Static 1035-2200 rpm, 3.0 Max bhp

50GEQT09 — Standard/Medium Static — 8.5 Ton Vertical Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
2550	1035	5.0	1147	5.6	1251	6.1	1348	6.6	1438	7.1
2765	1104	5.4	1209	5.9	1308	6.4	1401	6.9	1488	7.4
2975	1173	5.7	1272	6.3	1365	6.7	1454	7.2	1538	7.6
3190	1244	6.1	1337	6.6	1426	7.0	1511	7.5	1592	7.9
3400	1314	6.5	1402	6.9	1487	7.4	1568	7.8	1646	8.2
3615	1387	6.8	1470	7.3	1551	7.7	1629	8.1	1703	8.5
3825	1458	7.2	1538	7.6	1615	8.0	1689	8.4	1761	8.8
4040	1532	7.6	1608	8.0	1681	8.4	1752	8.7	1822	9.1
4250	1605	8.0	1677	8.3	1747	8.7	1815	9.0	1882	9.4

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
2550	1522	7.5	1602	8.0	1677	8.3	1749	8.7	1817	9.1
2765	1570	7.8	1647	8.2	1721	8.6	1792	8.9	1859	9.3
2975	1618	8.0	1693	8.4	1766	8.8	1835	9.2	1901	9.5
3190	1669	8.3	1743	8.7	1813	9.0	1881	9.4	—	—
3400	1721	8.6	1792	8.9	1861	9.3	—	—	—	—
3615	1776	8.8	1845	9.2	1912	9.5	—	—	—	—
3825	1831	9.1	1898	9.5	—	—	—	—	—	—
4040	1889	9.4	—	—	—	—	—	—	—	—
4250	1947	9.7	—	—	—	—	—	—	—	—

Std/Med Static 1035-2000 rpm

APPENDIX C — FAN PERFORMANCE (cont)

50GEQT09 — High Static — 8.5 Ton Vertical Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
2550	1035	4.6	1147	5.1	1251	5.6	1348	6.1	1438	6.5
2765	1104	4.9	1209	5.4	1308	5.9	1401	6.3	1488	6.7
2975	1173	5.3	1272	5.7	1365	6.1	1454	6.6	1538	6.9
3190	1244	5.6	1337	6.0	1426	6.4	1511	6.8	1592	7.2
3400	1314	5.9	1402	6.3	1487	6.7	1568	7.1	1646	7.4
3615	1387	6.2	1470	6.6	1551	7.0	1629	7.4	1703	7.7
3825	1458	6.6	1538	6.9	1615	7.3	1689	7.6	1761	8.0
4040	1532	6.9	1608	7.3	1681	7.6	1752	7.9	1822	8.3
4250	1605	7.3	1677	7.6	1747	7.9	1815	8.2	1882	8.5

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
2550	1522	6.9	1602	7.2	1677	7.6	1749	7.9	1817	8.2
2765	1570	7.1	1647	7.4	1721	7.8	1792	8.1	1859	8.4
2975	1618	7.3	1693	7.7	1766	8.0	1835	8.3	1901	8.6
3190	1669	7.5	1743	7.9	1813	8.2	1881	8.5	1946	8.8
3400	1721	7.8	1792	8.1	1861	8.4	1927	8.7	1991	9.0
3615	1776	8.0	1845	8.4	1912	8.7	1976	9.0	2039	9.3
3825	1831	8.3	1898	8.6	1963	8.9	2026	9.2	2087	9.5
4040	1889	8.6	1954	8.9	2017	9.2	2078	9.4	—	—
4250	1947	8.8	2010	9.1	2071	9.4	—	—	—	—

High Static 1035-2200 rpm

APPENDIX C — FAN PERFORMANCE (cont)

50GEQT12 — 10 Ton Vertical Supply (rpm - bhp)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
3000	1099	0.55	1202	0.72	1302	0.91	1397	1.13	1486	1.36
3250	1173	0.66	1270	0.84	1363	1.04	1453	1.26	1539	1.49
3500	1249	0.79	1339	0.97	1427	1.17	1512	1.40	1594	1.64
3750	1325	0.93	1410	1.11	1493	1.32	1573	1.55	1652	1.79
4000	1403	1.08	1482	1.27	1560	1.48	1637	1.71	1711	1.96
4250	1480	1.24	1556	1.44	1630	1.65	1702	1.88	1773	2.13
4500	1559	1.41	1630	1.61	1700	1.83	1769	2.06	1837	2.30
4750	1638	1.58	1705	1.79	1772	2.01	1838	2.24	1903	2.48
5000	1717	1.76	1781	1.97	1845	2.19	1908	2.42	1970	2.66

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
3000	1570	1.60	1649	1.86	1723	2.12	1794	2.39	1860	2.67
3250	1620	1.74	1698	2.00	1771	2.27	1841	2.55	1907	2.84
3500	1673	1.89	1748	2.16	1820	2.44	1889	2.72	1954	3.01
3750	1727	2.05	1800	2.32	1871	2.61	1938	2.90	2003	3.20
4000	1784	2.22	1855	2.49	1923	2.78	1989	3.07	2052	3.37
4250	1843	2.39	1911	2.66	1977	2.95	2041	3.24	2103	3.55
4500	1904	2.56	1969	2.84	2033	3.12	2095	3.42	2156	3.72
4750	1966	2.74	2029	3.01	2091	3.29	2151	3.59	—	—
5000	2031	2.92	2091	3.19	2150	3.46	—	—	—	—

Std/Med Static 1100-2000 rpm, 2.4 Max bhp

High Static 1100-2200 rpm, 5.0 Max bhp

50GEQT12 — Standard/Medium Static — 10 Ton Vertical Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
3000	1099	5.4	1202	5.9	1302	6.4	1397	6.9	1486	7.4
3250	1173	5.7	1270	6.2	1363	6.7	1453	7.2	1539	7.6
3500	1249	6.1	1339	6.6	1427	7.1	1512	7.5	1594	7.9
3750	1325	6.5	1410	7.0	1493	7.4	1573	7.8	1652	8.2
4000	1403	6.9	1482	7.3	1560	7.7	1637	8.1	1711	8.5
4250	1480	7.3	1556	7.7	1630	8.1	1702	8.5	1773	8.8
4500	1559	7.7	1630	8.1	1700	8.5	1769	8.8	1837	9.2
4750	1638	8.1	1705	8.5	1772	8.8	1838	9.2	1903	9.5
5000	1717	8.5	1781	8.9	1845	9.2	1908	9.5	—	—

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
3000	1570	7.8	1649	8.2	1723	8.6	1794	8.9	—	—
3250	1620	8.0	1698	8.4	1771	8.8	—	—	—	—
3500	1673	8.3	1748	8.7	1820	9.1	—	—	—	—
3750	1727	8.6	1800	9.0	—	—	—	—	—	—
4000	1784	8.9	1855	9.3	—	—	—	—	—	—
4250	1843	9.2	—	—	—	—	—	—	—	—
4500	—	—	—	—	—	—	—	—	—	—
4750	—	—	—	—	—	—	—	—	—	—
5000	—	—	—	—	—	—	—	—	—	—

Std/Med Static 1100-2000 rpm

APPENDIX C — FAN PERFORMANCE (cont)

50GEQT12 — High Static — 10 Ton Vertical Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
3000	1099	4.9	1202	5.4	1302	5.9	1397	6.3	1486	6.7
3250	1173	5.3	1270	5.7	1363	6.1	1453	6.6	1539	6.9
3500	1249	5.6	1339	6.0	1427	6.4	1512	6.8	1594	7.2
3750	1325	6.0	1410	6.4	1493	6.7	1573	7.1	1652	7.5
4000	1403	6.3	1482	6.7	1560	7.0	1637	7.4	1711	7.7
4250	1480	6.7	1556	7.0	1630	7.4	1702	7.7	1773	8.0
4500	1559	7.0	1630	7.4	1700	7.7	1769	8.0	1837	8.3
4750	1638	7.4	1705	7.7	1772	8.0	1838	8.3	1903	8.6
5000	1717	7.8	1781	8.1	1845	8.4	1908	8.7	1970	8.9

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
3000	1570	7.1	1649	7.5	1723	7.8	1794	8.1	1860	8.4
3250	1620	7.3	1698	7.7	1771	8.0	1841	8.3	1907	8.6
3500	1673	7.6	1748	7.9	1820	8.2	1889	8.6	1954	8.9
3750	1727	7.8	1800	8.2	1871	8.5	1938	8.8	2003	9.1
4000	1784	8.1	1855	8.4	1923	8.7	1989	9.0	2052	9.3
4250	1843	8.4	1911	8.7	1977	9.0	2041	9.3	2103	9.6
4500	1904	8.6	1969	8.9	2033	9.2	2095	9.5	2156	9.8
4750	1966	8.9	2029	9.2	2091	9.5	2151	9.8	—	—
5000	2031	9.2	2091	9.5	2150	9.8	—	—	—	—

High Static 1100-2200 rpm

APPENDIX C — FAN PERFORMANCE (cont)

50GEQT07 — 6 Ton Horizontal Supply (rpm - bhp)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
1800	742	0.16	897	0.27	1033	0.42	1150	0.58	1255	0.75
1950	780	0.18	927	0.30	1059	0.45	1175	0.61	1279	0.79
2100	820	0.21	959	0.33	1086	0.48	1200	0.65	1303	0.83
2250	861	0.24	993	0.37	1115	0.52	1227	0.69	1329	0.88
2400	904	0.27	1028	0.40	1146	0.56	1255	0.73	1355	0.92
2550	947	0.31	1065	0.45	1178	0.60	1284	0.78	1382	0.97
2700	991	0.36	1103	0.49	1212	0.65	1314	0.83	1410	1.03
2850	1036	0.40	1143	0.54	1246	0.70	1345	0.88	1439	1.08
3000	1082	0.46	1183	0.60	1282	0.76	1378	0.94	1469	1.14

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
1800	1349	0.93	1436	1.13	1518	1.33	1594	1.54	1666	1.76
1950	1373	0.98	1460	1.18	1541	1.38	1617	1.60	1689	1.82
2100	1397	1.02	1484	1.23	1565	1.44	1641	1.66	1712	1.89
2250	1422	1.07	1508	1.28	1589	1.50	1664	1.72	1736	1.95
2400	1447	1.12	1533	1.34	1613	1.56	1689	1.79	1760	2.02
2550	1473	1.18	1558	1.39	1638	1.62	1713	1.85	1784	2.09
2700	1499	1.23	1583	1.45	1663	1.68	1738	1.92	1809	2.17
2850	1527	1.29	1610	1.52	1688	1.75	1763	1.99	1834	2.24
3000	1555	1.36	1637	1.58	1715	1.82	1789	2.07	1859	2.32

Std/Med Static 742-2000 rpm, 2.4 Max bhp

High Static 742-2200 rpm, 3.0 Max bhp

50GEQT07 — Standard/Medium Static — 6 Ton Horizontal Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
1800	742	3.5	897	4.3	1033	5.0	1150	5.6	1255	6.2
1950	780	3.7	927	4.5	1059	5.2	1175	5.8	1279	6.3
2100	820	3.9	959	4.6	1086	5.3	1200	5.9	1303	6.4
2250	861	4.1	993	4.8	1115	5.4	1227	6.0	1329	6.5
2400	904	4.4	1028	5.0	1146	5.6	1255	6.2	1355	6.7
2550	947	4.6	1065	5.2	1178	5.8	1284	6.3	1382	6.8
2700	991	4.8	1103	5.4	1212	5.9	1314	6.5	1410	7.0
2850	1036	5.0	1143	5.6	1246	6.1	1345	6.6	1439	7.1
3000	1082	5.3	1183	5.8	1282	6.3	1378	6.8	1469	7.3

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
1800	1349	6.7	1436	7.1	1518	7.5	1594	7.9	1666	8.3
1950	1373	6.8	1460	7.2	1541	7.6	1617	8.0	1689	8.4
2100	1397	6.9	1484	7.3	1565	7.8	1641	8.2	1712	8.5
2250	1422	7.0	1508	7.5	1589	7.9	1664	8.3	1736	8.6
2400	1447	7.2	1533	7.6	1613	8.0	1689	8.4	1760	8.8
2550	1473	7.3	1558	7.7	1638	8.1	1713	8.5	1784	8.9
2700	1499	7.4	1583	7.9	1663	8.3	1738	8.7	1809	9.0
2850	1527	7.6	1610	8.0	1688	8.4	1763	8.8	1834	9.1
3000	1555	7.7	1637	8.1	1715	8.5	1789	8.9	1859	9.3

Std/Med Static 742-2000 rpm

APPENDIX C — FAN PERFORMANCE (cont)

50GEQT07 — High Static — 6 Ton Horizontal Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
1800	742	3.3	897	4.0	1033	4.6	1150	5.2	1255	5.6
1950	780	3.4	927	4.1	1059	4.7	1175	5.3	1279	5.7
2100	820	3.6	959	4.3	1086	4.9	1200	5.4	1303	5.9
2250	861	3.8	993	4.4	1115	5.0	1227	5.5	1329	6.0
2400	904	4.0	1028	4.6	1146	5.1	1255	5.6	1355	6.1
2550	947	4.2	1065	4.8	1178	5.3	1284	5.8	1382	6.2
2700	991	4.4	1103	4.9	1212	5.4	1314	5.9	1410	6.4
2850	1036	4.6	1143	5.1	1246	5.6	1345	6.1	1439	6.5
3000	1082	4.8	1183	5.3	1282	5.8	1378	6.2	1469	6.6

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
1800	1349	6.1	1436	6.5	1518	6.9	1594	7.2	1666	7.5
1950	1373	6.2	1460	6.6	1541	7.0	1617	7.3	1689	7.6
2100	1397	6.3	1484	6.7	1565	7.1	1641	7.4	1712	7.7
2250	1422	6.4	1508	6.8	1589	7.2	1664	7.5	1736	7.9
2400	1447	6.5	1533	6.9	1613	7.3	1689	7.6	1760	8.0
2550	1473	6.6	1558	7.0	1638	7.4	1713	7.8	1784	8.1
2700	1499	6.8	1583	7.2	1663	7.5	1738	7.9	1809	8.2
2850	1527	6.9	1610	7.3	1688	7.6	1763	8.0	1834	8.3
3000	1555	7.0	1637	7.4	1715	7.8	1789	8.1	1859	8.4

High Static 742-2200 rpm

APPENDIX C — FAN PERFORMANCE (cont)

50GEQT08 — 7.5 Ton Horizontal Supply (rpm - bhp)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
2250	882	0.26	1014	0.39	1135	0.55	1246	0.73	1346	0.92
2440	935	0.31	1058	0.44	1174	0.61	1281	0.79	1380	0.98
2625	988	0.36	1104	0.50	1214	0.67	1318	0.85	1414	1.05
2815	1044	0.42	1153	0.57	1257	0.73	1357	0.92	1450	1.13
3000	1100	0.49	1202	0.64	1301	0.81	1397	1.00	1487	1.21
3190	1157	0.56	1254	0.72	1348	0.89	1439	1.08	1527	1.30
3375	1214	0.65	1305	0.80	1395	0.98	1483	1.18	1567	1.39
3565	1273	0.74	1359	0.90	1445	1.08	1529	1.28	1610	1.49
3750	1330	0.83	1413	1.00	1495	1.18	1575	1.38	1653	1.60

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
2250	1439	1.12	1524	1.34	1604	1.56	1679	1.79	1750	2.02
2440	1471	1.19	1556	1.41	1635	1.64	1710	1.87	1782	2.12
2625	1504	1.27	1588	1.49	1667	1.72	1741	1.96	1812	2.21
2815	1538	1.34	1621	1.57	1699	1.81	1773	2.06	1844	2.32
3000	1573	1.43	1655	1.66	1732	1.91	1805	2.16	1875	2.42
3190	1611	1.52	1690	1.76	1766	2.00	1839	2.26	1908	2.53
3375	1648	1.62	1726	1.86	1801	2.11	1872	2.37	1941	2.64
3565	1689	1.72	1764	1.96	1837	2.21	1908	2.48	1975	2.75
3750	1729	1.83	1803	2.07	1874	2.33	1943	2.59	2010	2.87

Std/Med Static 882-2000 rpm, 2.4 Max bhp

High Static 882-2200 rpm, 3.0 Max bhp

50GEQT08 — Standard/Medium Static — 7.5 Ton Horizontal Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
2250	882	4.3	1014	4.9	1135	5.6	1246	6.1	1346	6.6
2440	935	4.5	1058	5.2	1174	5.8	1281	6.3	1380	6.8
2625	988	4.8	1104	5.4	1214	6.0	1318	6.5	1414	7.0
2815	1044	5.1	1153	5.6	1257	6.2	1357	6.7	1450	7.2
3000	1100	5.4	1202	5.9	1301	6.4	1397	6.9	1487	7.4
3190	1157	5.7	1254	6.2	1348	6.6	1439	7.1	1527	7.6
3375	1214	6.0	1305	6.4	1395	6.9	1483	7.3	1567	7.8
3565	1273	6.3	1359	6.7	1445	7.1	1529	7.6	1610	8.0
3750	1330	6.6	1413	7.0	1495	7.4	1575	7.8	1653	8.2

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
2250	1439	7.1	1524	7.6	1604	8.0	1679	8.3	1750	8.7
2440	1471	7.3	1556	7.7	1635	8.1	1710	8.5	1782	8.9
2625	1504	7.4	1588	7.9	1667	8.3	1741	8.7	1812	9.0
2815	1538	7.6	1621	8.1	1699	8.5	1773	8.8	1844	9.2
3000	1573	7.8	1655	8.2	1732	8.6	1805	9.0	1875	9.4
3190	1611	8.0	1690	8.4	1766	8.8	1839	9.2	1908	9.5
3375	1648	8.2	1726	8.6	1801	9.0	1872	9.3	—	—
3565	1689	8.4	1764	8.8	1837	9.2	1908	9.5	—	—
3750	1729	8.6	1803	9.0	1874	9.4	—	—	—	—

Std/Med Static 882-2000 rpm

APPENDIX C — FAN PERFORMANCE (cont)

50GEQT08 — High Static — 7.5 Ton Horizontal Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
2250	882	3.9	1014	4.5	1135	5.1	1246	5.6	1346	6.1
2440	935	4.2	1058	4.7	1174	5.3	1281	5.8	1380	6.2
2625	988	4.4	1104	4.9	1214	5.4	1318	5.9	1414	6.4
2815	1044	4.7	1153	5.2	1257	5.6	1357	6.1	1450	6.5
3000	1100	4.9	1202	5.4	1301	5.9	1397	6.3	1487	6.7
3190	1157	5.2	1254	5.6	1348	6.1	1439	6.5	1527	6.9
3375	1214	5.4	1305	5.9	1395	6.3	1483	6.7	1567	7.1
3565	1273	5.7	1359	6.1	1445	6.5	1529	6.9	1610	7.3
3750	1330	6.0	1413	6.4	1495	6.7	1575	7.1	1653	7.5

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
2250	1439	6.5	1524	6.9	1604	7.2	1679	7.6	1750	7.9
2440	1471	6.6	1556	7.0	1635	7.4	1710	7.7	1782	8.1
2625	1504	6.8	1588	7.2	1667	7.5	1741	7.9	1812	8.2
2815	1538	6.9	1621	7.3	1699	7.7	1773	8.0	1844	8.4
3000	1573	7.1	1655	7.5	1732	7.8	1805	8.2	1875	8.5
3190	1611	7.3	1690	7.6	1766	8.0	1839	8.3	1908	8.7
3375	1648	7.5	1726	7.8	1801	8.2	1872	8.5	1941	8.8
3565	1689	7.6	1764	8.0	1837	8.3	1908	8.7	1975	9.0
3750	1729	7.8	1803	8.2	1874	8.5	1943	8.8	2010	9.1

High Static 882-2200 rpm

50GEQT09 — 8.5 Ton Horizontal Supply (rpm - bhp)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
2550	967	0.34	1085	0.48	1198	0.64	1303	0.83	1400	1.02
2765	1030	0.40	1140	0.55	1246	0.72	1346	0.90	1441	1.11
2975	1092	0.48	1195	0.63	1295	0.80	1391	0.99	1482	1.20
3190	1157	0.56	1254	0.72	1348	0.89	1439	1.08	1527	1.30
3400	1222	0.66	1312	0.81	1402	0.99	1489	1.19	1573	1.40
3615	1288	0.76	1374	0.92	1458	1.10	1541	1.30	1621	1.52
3825	1354	0.87	1435	1.04	1515	1.22	1594	1.42	1671	1.64
4040	1422	1.00	1498	1.16	1575	1.35	1650	1.55	1724	1.77
4250	1488	1.12	1561	1.29	1634	1.48	1706	1.69	1776	1.90

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
2550	1490	1.23	1575	1.46	1654	1.69	1729	1.93	1800	2.18
2765	1529	1.32	1612	1.55	1691	1.79	1765	2.04	1835	2.29
2975	1568	1.42	1650	1.65	1727	1.89	1801	2.15	1871	2.41
3190	1611	1.52	1690	1.76	1766	2.00	1839	2.26	1908	2.53
3400	1654	1.63	1731	1.87	1806	2.12	1877	2.38	1945	2.65
3615	1699	1.75	1775	1.99	1847	2.24	1917	2.51	1985	2.79
3825	1746	1.87	1819	2.12	1890	2.37	1958	2.64	2024	2.92
4040	1796	2.00	1866	2.25	1935	2.51	2001	2.77	2066	3.05
4250	1846	2.14	1914	2.38	1980	2.64	2045	2.91	2108	3.18

Std/Med Static 967-2000 rpm, 2.4 Max bhp

High Static 967-2200 rpm, 3.0 Max bhp

50GEQT09 — Standard/Medium Static — 8.5 Ton Horizontal Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
2550	967	4.7	1085	5.3	1198	5.9	1303	6.4	1400	6.9
2765	1030	5.0	1140	5.6	1246	6.1	1346	6.6	1441	7.1
2975	1092	5.3	1195	5.9	1295	6.4	1391	6.9	1482	7.3
3190	1157	5.7	1254	6.2	1348	6.6	1439	7.1	1527	7.6
3400	1222	6.0	1312	6.5	1402	6.9	1489	7.4	1573	7.8
3615	1288	6.3	1374	6.8	1458	7.2	1541	7.6	1621	8.1
3825	1354	6.7	1435	7.1	1515	7.5	1594	7.9	1671	8.3
4040	1422	7.0	1498	7.4	1575	7.8	1650	8.2	1724	8.6
4250	1488	7.4	1561	7.7	1634	8.1	1706	8.5	1776	8.8

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
2550	1490	7.4	1575	7.8	1654	8.2	1729	8.6	1800	9.0
2765	1529	7.6	1612	8.0	1691	8.4	1765	8.8	1835	9.2
2975	1568	7.8	1650	8.2	1727	8.6	1801	9.0	1871	9.3
3190	1611	8.0	1690	8.4	1766	8.8	1839	9.2	1908	9.5
3400	1654	8.2	1731	8.6	1806	9.0	1877	9.4	—	—
3615	1699	8.5	1775	8.8	1847	9.2	1917	9.6	—	—
3825	1746	8.7	1819	9.1	1890	9.4	—	—	—	—
4040	1796	9.0	1866	9.3	1935	9.7	—	—	—	—
4250	1846	9.2	1914	9.6	—	—	—	—	—	—

Std/Med Static 967-2000 rpm

APPENDIX C — FAN PERFORMANCE (cont)

50GEQT09 — High Static — 8.5 Ton Horizontal Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
2550	967	4.3	1085	4.9	1198	5.4	1303	5.9	1400	6.3
2765	1030	4.6	1140	5.1	1246	5.6	1346	6.1	1441	6.5
2975	1092	4.9	1195	5.4	1295	5.8	1391	6.3	1482	6.7
3190	1157	5.2	1254	5.6	1348	6.1	1439	6.5	1527	6.9
3400	1222	5.5	1312	5.9	1402	6.3	1489	6.7	1573	7.1
3615	1288	5.8	1374	6.2	1458	6.6	1541	7.0	1621	7.3
3825	1354	6.1	1435	6.5	1515	6.8	1594	7.2	1671	7.6
4040	1422	6.4	1498	6.8	1575	7.1	1650	7.5	1724	7.8
4250	1488	6.7	1561	7.1	1634	7.4	1706	7.7	1776	8.0

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
2550	1490	6.7	1575	7.1	1654	7.5	1729	7.8	1800	8.2
2765	1529	6.9	1612	7.3	1691	7.7	1765	8.0	1835	8.3
2975	1568	7.1	1650	7.5	1727	7.8	1801	8.2	1871	8.5
3190	1611	7.3	1690	7.6	1766	8.0	1839	8.3	1908	8.7
3400	1654	7.5	1731	7.8	1806	8.2	1877	8.5	1945	8.8
3615	1699	7.7	1775	8.0	1847	8.4	1917	8.7	1985	9.0
3825	1746	7.9	1819	8.2	1890	8.6	1958	8.9	2024	9.2
4040	1796	8.1	1866	8.5	1935	8.8	2001	9.1	2066	9.4
4250	1846	8.4	1914	8.7	1980	9.0	2045	9.3	2108	9.6

High Static 967-2200 rpm

APPENDIX C — FAN PERFORMANCE (cont)

50GEQT12 — 10 Ton Horizontal Supply (rpm - bhp)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
3000	1098	0.55	1200	0.72	1299	0.91	1394	1.12	1485	1.36
3250	1173	0.66	1268	0.83	1360	1.03	1450	1.25	1536	1.48
3500	1248	0.79	1337	0.97	1424	1.17	1509	1.39	1591	1.63
3750	1325	0.93	1409	1.11	1490	1.32	1571	1.54	1648	1.78
4000	1402	1.08	1481	1.27	1558	1.48	1634	1.70	1708	1.94
4250	1480	1.24	1555	1.43	1628	1.65	1699	1.87	1770	2.12
4500	1558	1.41	1629	1.61	1699	1.82	1767	2.05	1834	2.29
4750	1637	1.58	1705	1.79	1771	2.00	1836	2.23	1900	2.47
5000	1716	1.76	1781	1.97	1844	2.19	1906	2.41	1967	2.65

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
3000	1570	1.60	1651	1.86	1728	2.14	1800	2.42	1869	2.70
3250	1619	1.74	1698	2.00	1773	2.28	1844	2.57	1913	2.87
3500	1670	1.88	1747	2.15	1820	2.44	1890	2.73	1958	3.03
3750	1724	2.04	1798	2.31	1869	2.60	1937	2.89	2004	3.20
4000	1780	2.20	1851	2.48	1920	2.76	1987	3.06	2051	3.37
4250	1839	2.37	1907	2.65	1973	2.93	2038	3.23	2101	3.54
4500	1900	2.55	1965	2.82	2029	3.10	2092	3.40	2153	3.71
4750	1963	2.73	2025	2.99	2087	3.28	2147	3.57	—	—
5000	2028	2.91	2087	3.17	2146	3.44	—	—	—	—

Std/Med Static 1100-2000 rpm, 2.4 Max bhp

High Static 1100-2200 rpm, 5.0 Max bhp

50GEQT12 — Standard/Medium Static — 10 Ton Horizontal Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
3000	1098	5.4	1200	5.9	1299	6.4	1394	6.9	1485	7.4
3250	1173	5.7	1268	6.2	1360	6.7	1450	7.2	1536	7.6
3500	1248	6.1	1337	6.6	1424	7.0	1509	7.5	1591	7.9
3750	1325	6.5	1409	7.0	1490	7.4	1571	7.8	1648	8.2
4000	1402	6.9	1481	7.3	1558	7.7	1634	8.1	1708	8.5
4250	1480	7.3	1555	7.7	1628	8.1	1699	8.5	1770	8.8
4500	1558	7.7	1629	8.1	1699	8.5	1767	8.8	1834	9.1
4750	1637	8.1	1705	8.5	1771	8.8	1836	9.2	1900	9.5
5000	1716	8.5	1781	8.9	1844	9.2	1906	9.5	—	—

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
3000	1570	7.8	1651	8.2	1728	8.6	1800	9.0	—	—
3250	1619	8.0	1698	8.4	1773	8.8	—	—	—	—
3500	1670	8.3	1747	8.7	1820	9.1	—	—	—	—
3750	1724	8.6	1798	9.0	—	—	—	—	—	—
4000	1780	8.9	1851	9.2	—	—	—	—	—	—
4250	1839	9.2	—	—	—	—	—	—	—	—
4500	1900	9.5	—	—	—	—	—	—	—	—
4750	—	—	—	—	—	—	—	—	—	—
5000	—	—	—	—	—	—	—	—	—	—

Std/Med Static 1100-2000 rpm

APPENDIX C — FAN PERFORMANCE (cont)

50GEQT12 — High Static — 10 Ton Horizontal Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
3000	1098	4.9	1200	5.4	1299	5.8	1394	6.3	1485	6.7
3250	1173	5.3	1268	5.7	1360	6.1	1450	6.5	1536	6.9
3500	1248	5.6	1337	6.0	1424	6.4	1509	6.8	1591	7.2
3750	1325	6.0	1409	6.3	1490	6.7	1571	7.1	1648	7.5
4000	1402	6.3	1481	6.7	1558	7.0	1634	7.4	1708	7.7
4250	1480	6.7	1555	7.0	1628	7.4	1699	7.7	1770	8.0
4500	1558	7.0	1629	7.4	1699	7.7	1767	8.0	1834	8.3
4750	1637	7.4	1705	7.7	1771	8.0	1836	8.3	1900	8.6
5000	1716	7.8	1781	8.1	1844	8.4	1906	8.6	1967	8.9

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
3000	1570	7.1	1651	7.5	1728	7.8	1800	8.2	1869	8.5
3250	1619	7.3	1698	7.7	1773	8.0	1844	8.4	1913	8.7
3500	1670	7.6	1747	7.9	1820	8.2	1890	8.6	1958	8.9
3750	1724	7.8	1798	8.1	1869	8.5	1937	8.8	2004	9.1
4000	1780	8.1	1851	8.4	1920	8.7	1987	9.0	2051	9.3
4250	1839	8.3	1907	8.6	1973	9.0	2038	9.3	2101	9.5
4500	1900	8.6	1965	8.9	2029	9.2	2092	9.5	2153	9.8
4750	1963	8.9	2025	9.2	2087	9.5	2147	9.8	—	—
5000	2028	9.2	2087	9.5	2146	9.8	—	—	—	—

High Static 1100-2200 rpm

APPENDIX D — Wiring Diagrams

50GEQ*07-12 — Wiring Diagrams — Standard SCCR

UNIT	VOLTAGE	CONTROL	PAGE	POWER	PAGE
50GEQ*07-08 with SystemVu™ Controller	208/230-3-60	48TM010321	72	48TM010322	79
	460-3-60				
	575-3-60			48TM010323	80
50GEQ*09 with SystemVu™ Controller	208/230-3-60	48TM008818	73	48TM005988	81
	460-3-60			48TM005987	82
	575-3-60				
50GEQ*12 with SystemVu™ Controller	208/230-3-60	50TM004190	74	50TM004192	83
	460-3-60				
	575-3-60			50TM004193	84
50GEQ*07-08 with SystemVu™ Controller and Humidi-MiZer Option	208/230-3-60	48TM010426	75	48TM010322	79
	460-3-60				
	575-3-60			48TM010323	80
50GEQ*09 with SystemVu™ Controller and Humidi-MiZer Option	208/230-3-60	48TM010349	76	48TM005988	81
	460-3-60			48TM005987	82
	575-3-60				
50GEQ*12 with SystemVu™ Controller and Humidi-MiZer Option	208/230-3-60	50TM004190	77	50TM004192	83
	460-3-60				
	575-3-60			50TM004193	84

50GEQ*07-12 — Wiring Diagrams — High SCCR[a]

UNIT	VOLTAGE	CONTROL	PAGE	POWER	PAGE
50GEQ*07-08 with SystemVu™ Controller	208/230-3-60	48TM010321	72	48TM010324	85
	460-3-60				
50GEQ*12 with SystemVu™ Controller	208/230-3-60	50TM004190	74	50TM004194	86
	460-3-60				
50GEQ*07-08 with SystemVu™ Controller and Humidi-MiZer Option	208/230-3-60	48TM010426	75	48TM010324	85
	460-3-60				
50GEQ*12 with SystemVu™ Controller and Humidi-MiZer Option	208/230-3-60	50TM004255	78	50TM004194	86
	460-3-60				

NOTE(S):

a. HSCCR not available for 8.5 ton units (size 09).

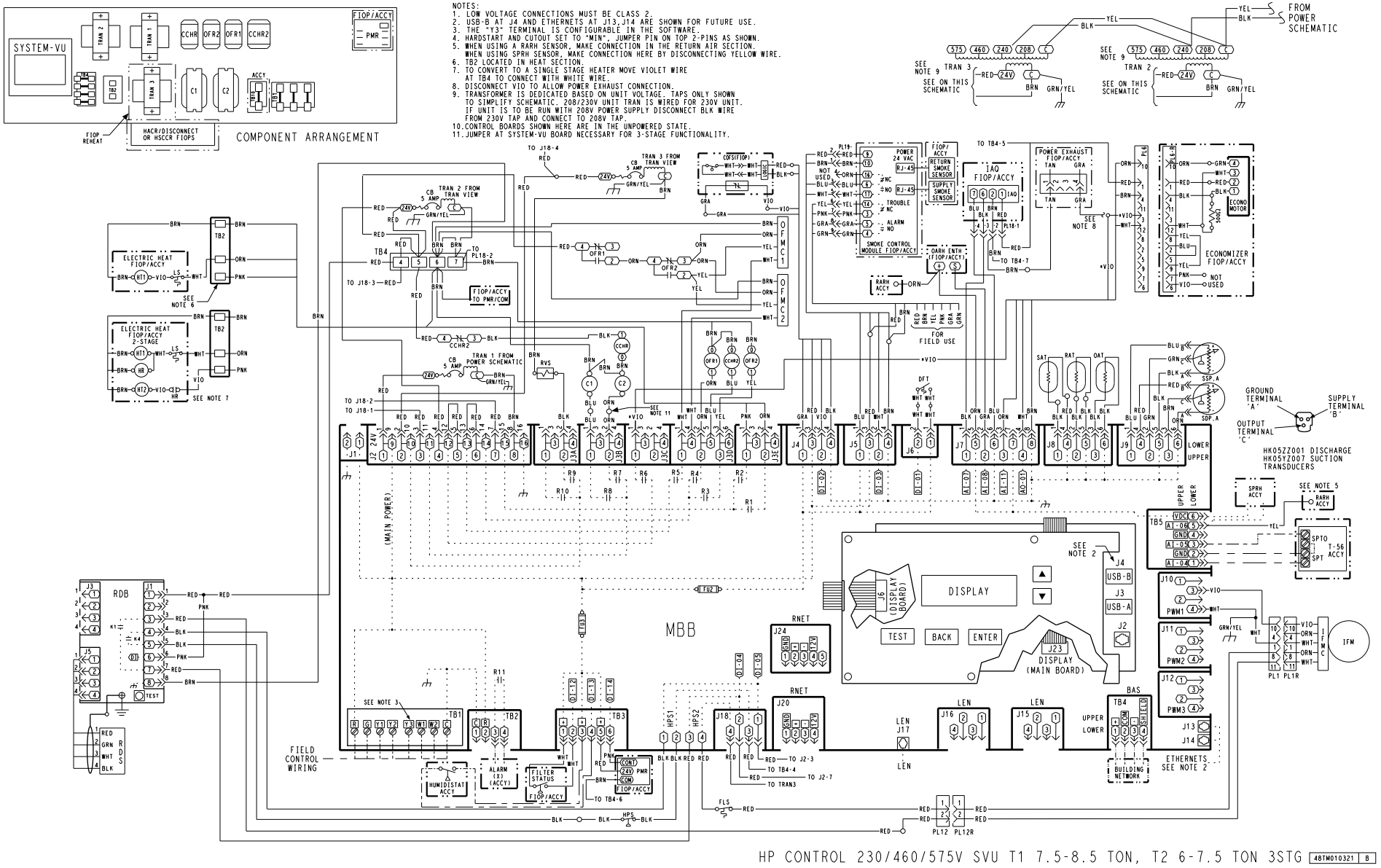


Fig. B — Typical 50GEQ*07-08 Control Wiring Diagram — SystemVu™ Controller (Standard or High SCCR)

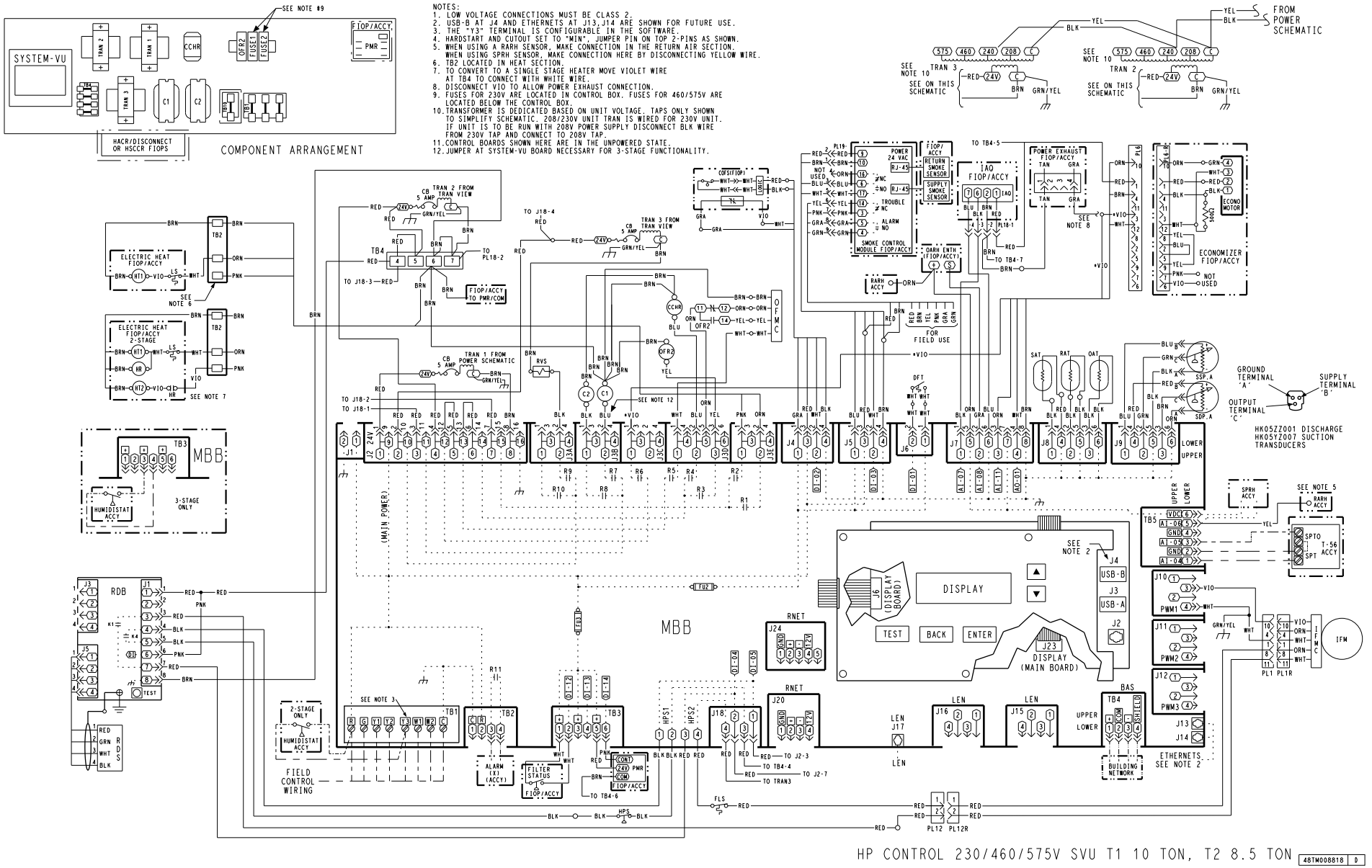


Fig. C — Typical 50GEQ*09 Control Wiring Diagram — SystemVu™ Controller (Standard SCCR)

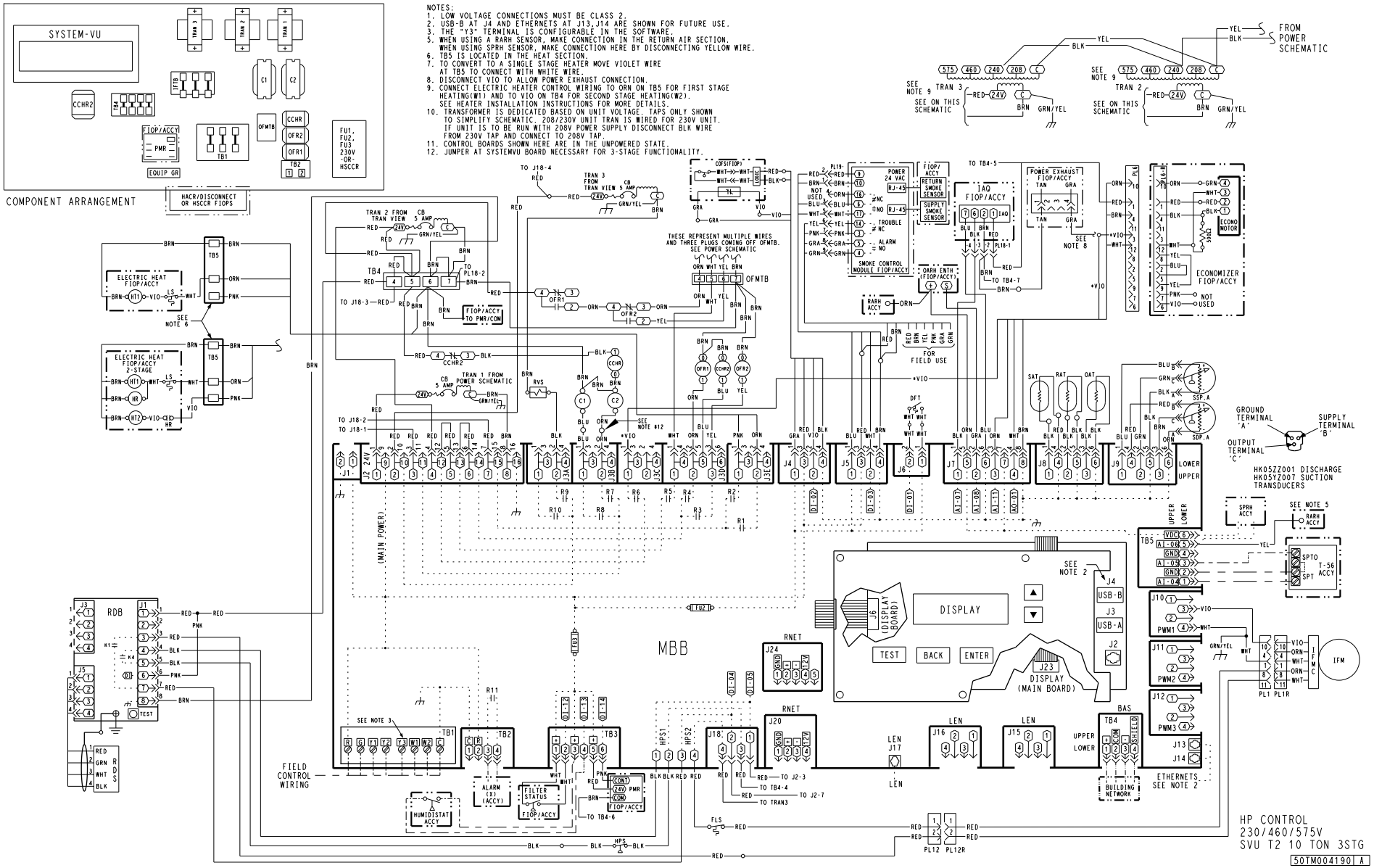


Fig. D — Typical 50GEQ*12 Control Wiring Diagram — SystemVu™ Controller (Standard or High SCCR)

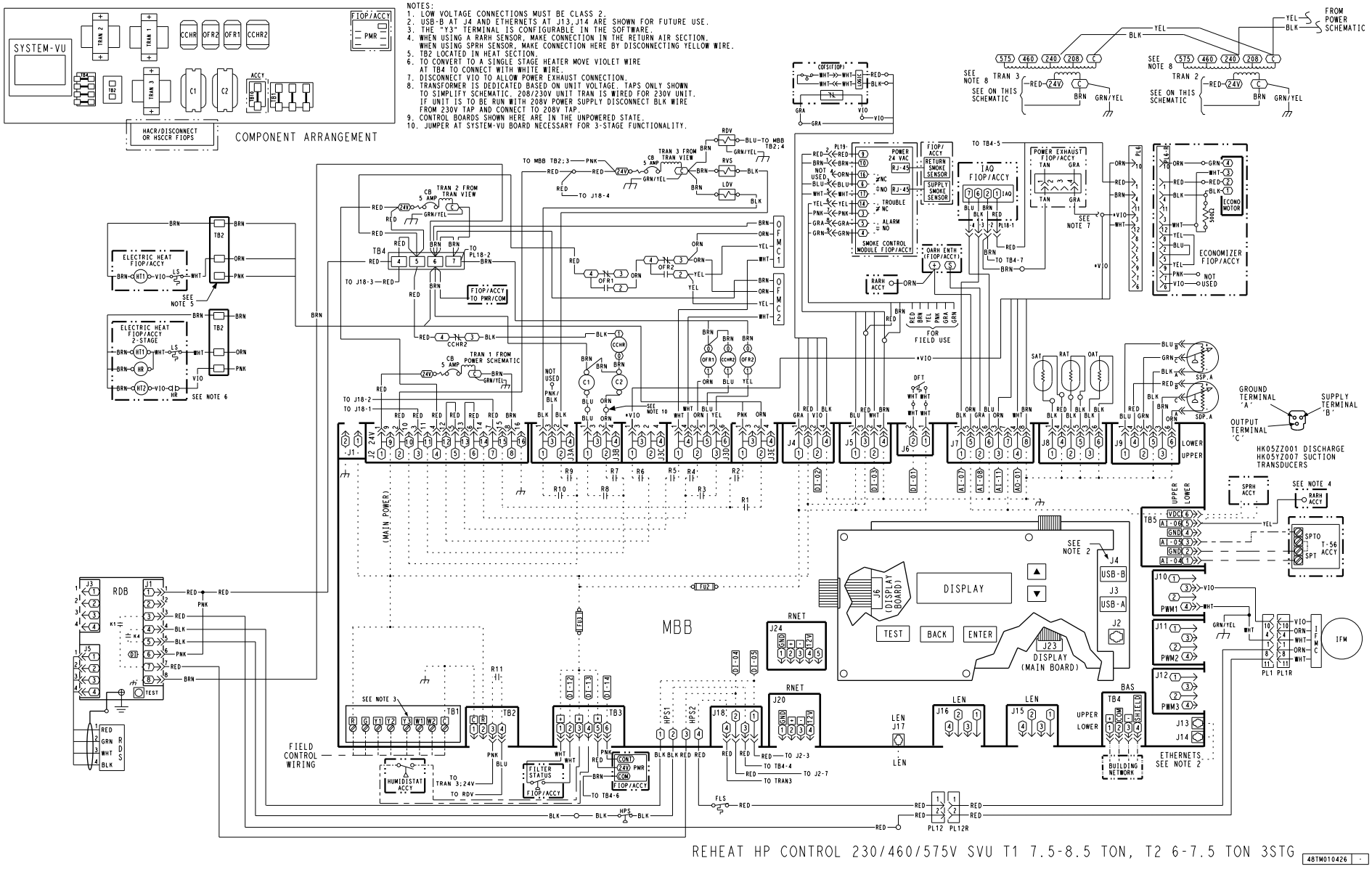


Fig. E — Typical 50GEQ*07-08 Control Wiring Diagram — SystemVu™ Controller with Humidi-MiZer Option (Standard or High SCCR)

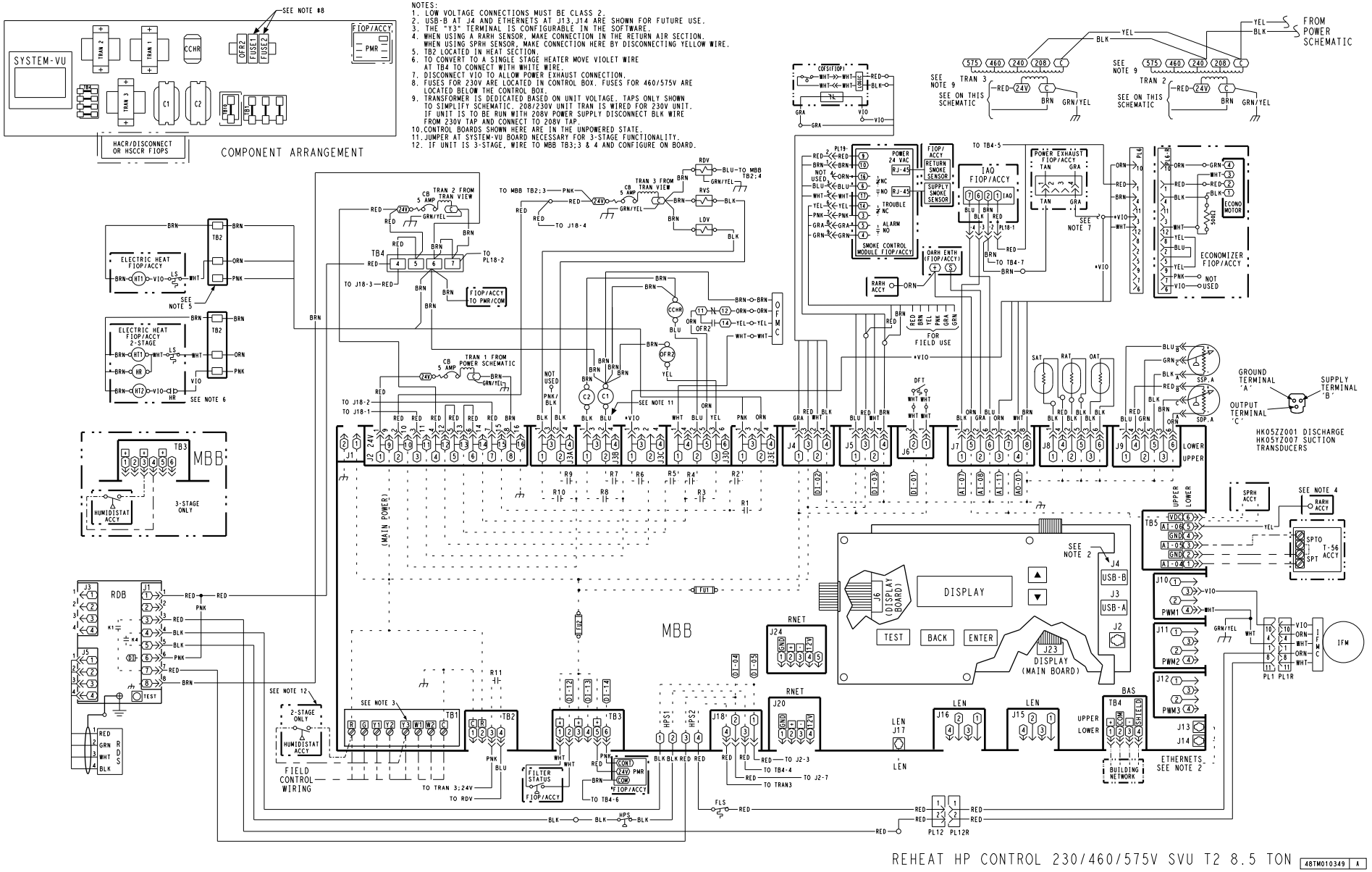


Fig. F — Typical 50GEQ*09 Control Wiring Diagram — SystemVu™ Controller with Humidi-MiZer Option (Standard SCCR)

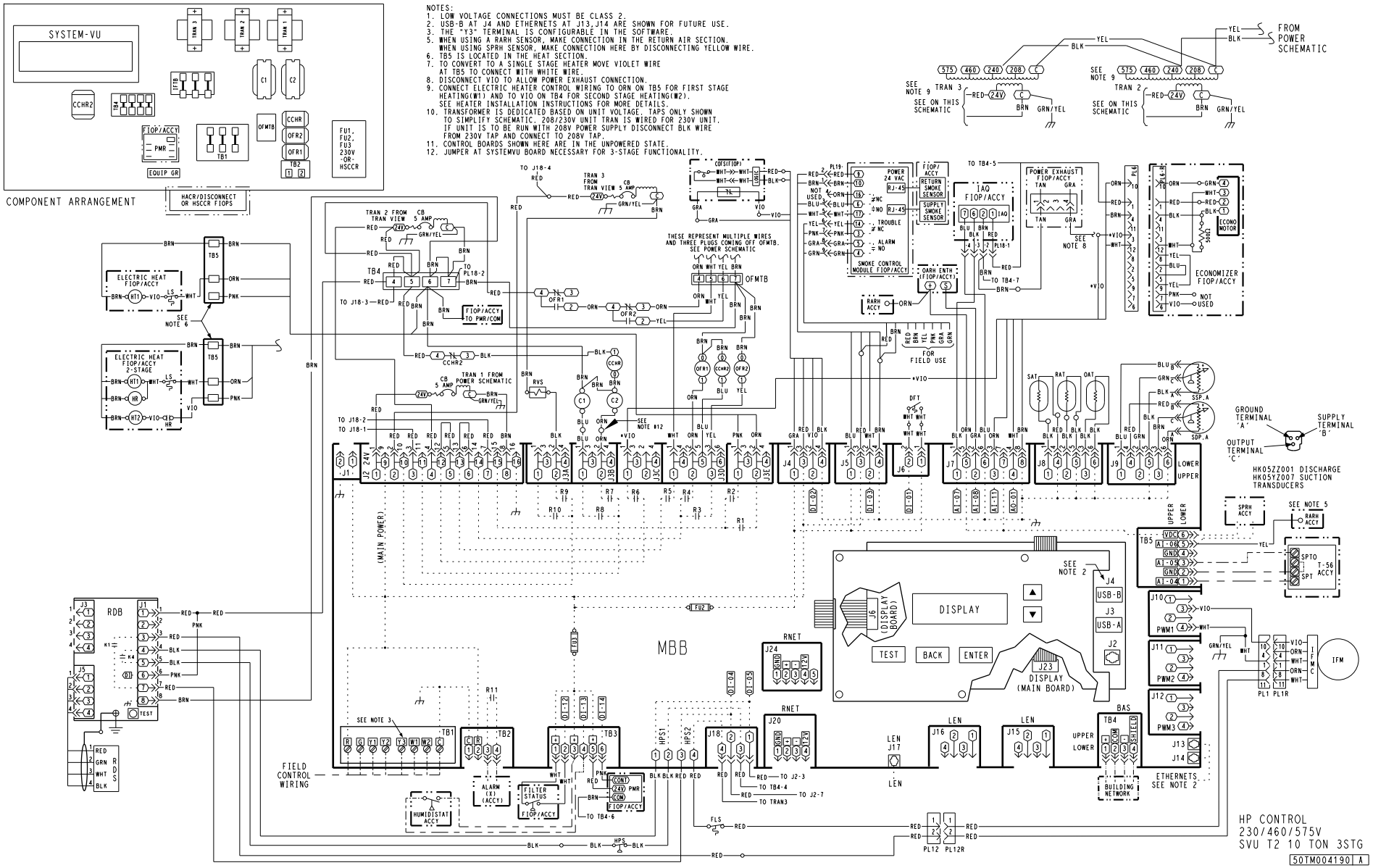


Fig. G — Typical 50GEQ*12 Control Wiring Diagram — SystemVu™ Controller with Humidi-MiZer Option (Standard SCCR)

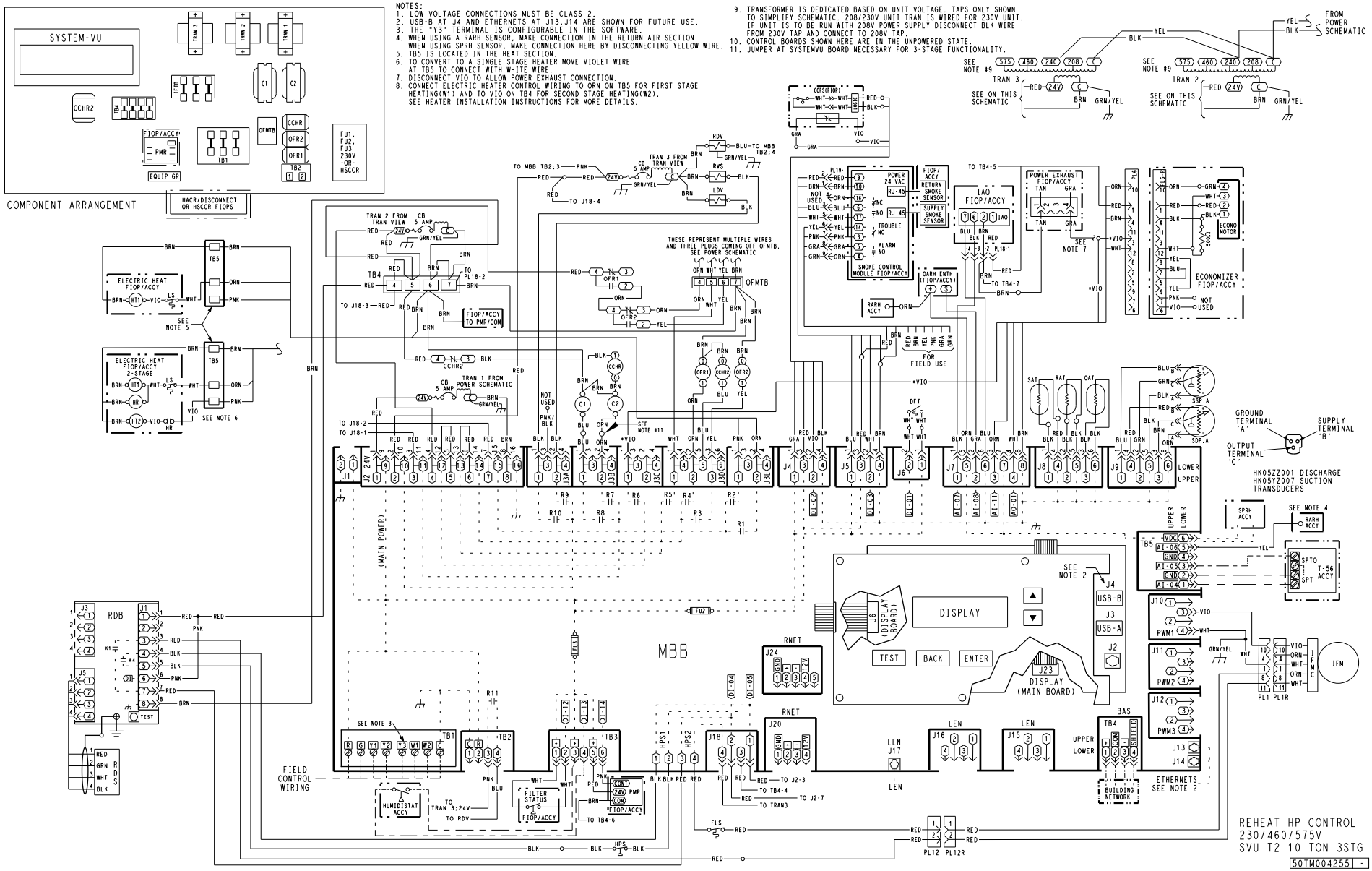
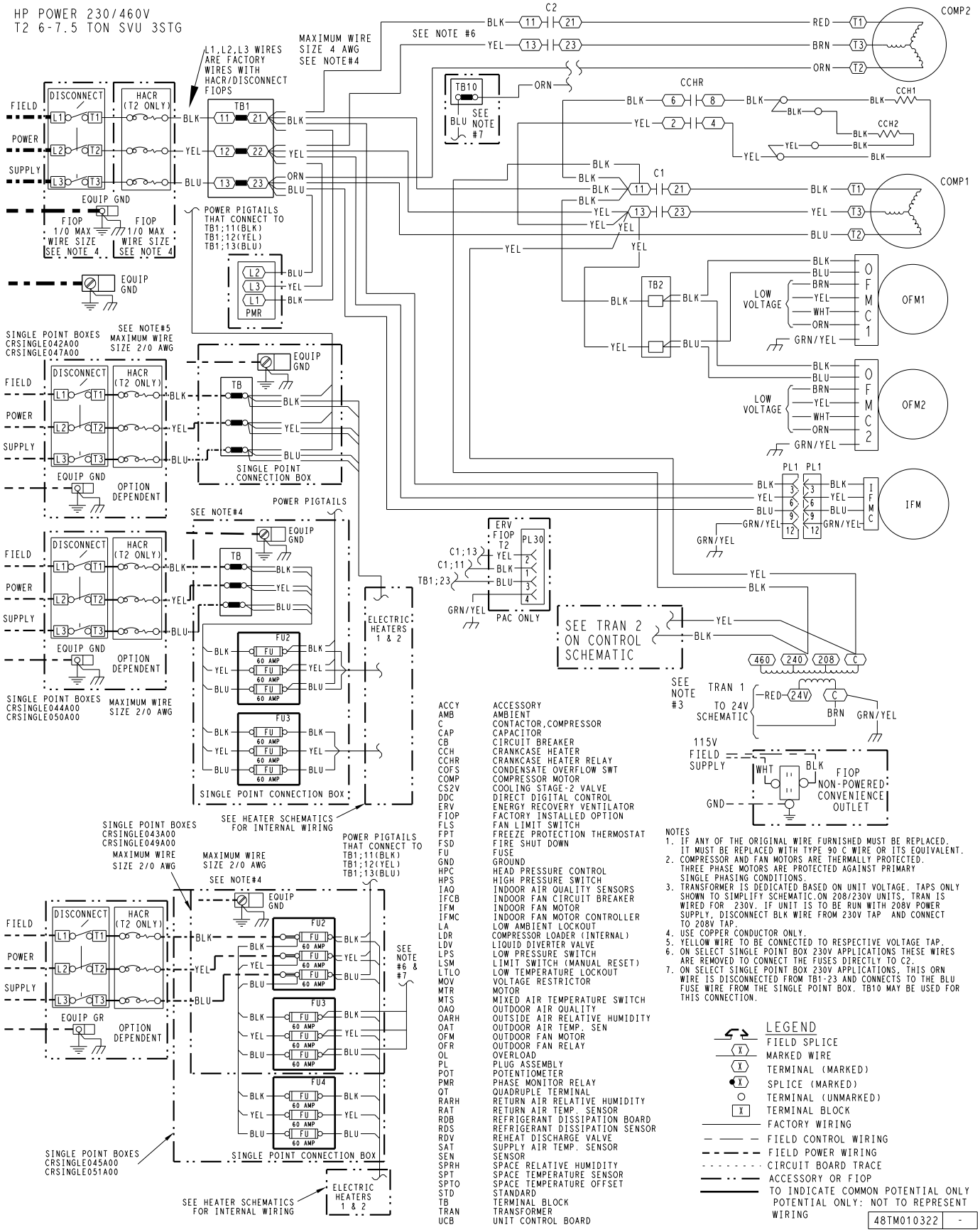


Fig. H — Typical 50GEQ*12 Control Wiring Diagram — SystemVu™ Controller with Humidi-MiZer Option (High SCCR)



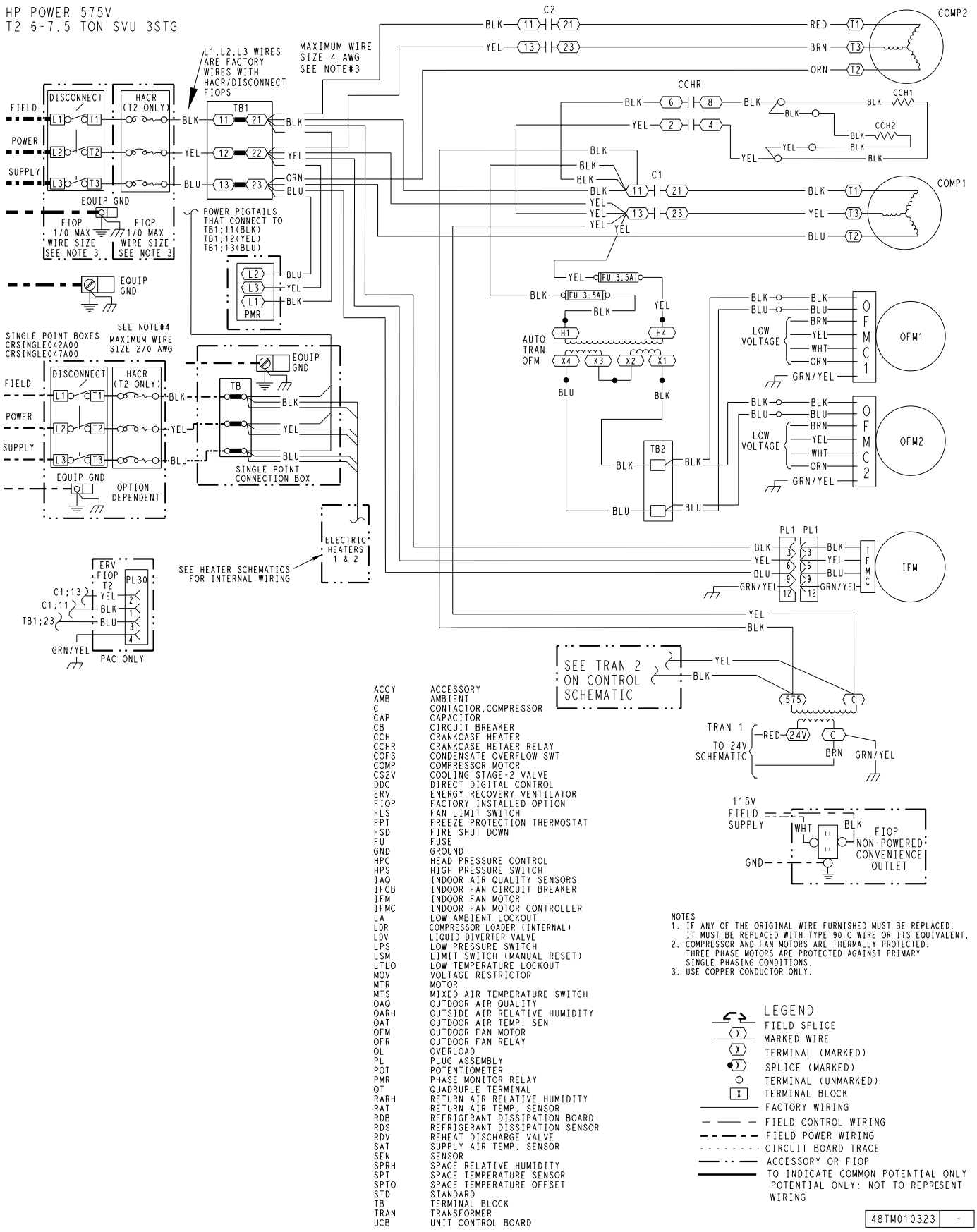
ACCY	ACCESSORY
AMB	AMBIENT
C	CONTACTOR,COMPRESSOR
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CCH	CRANKCASE HEATER
CCHR	CRANKCASE HEATER RELAY
COFS	CONDENSATE OVERFLOW SWT
COMP	COMPRESSOR MOTOR
CS2V	COOLING STAGE-2 VALVE
DDC	DIRECT DIGITAL CONTROL
ERV	ENERGY RECOVERY VENTILATOR
FIOP	FACTORY INSTALLED OPTION
FLS	FAN LIMIT SWITCH
FPT	FREEZE PROTECTION THERMOSTAT
FSD	FIRE SHUT DOWN
FU	FUSE
GND	GROUND
HPC	HEAD PRESSURE CONTROL
HPS	HIGH PRESSURE SWITCH
IAQ	INDOOR AIR QUALITY SENSORS
IFCB	INDOOR FAN CIRCUIT BREAKER
IFM	INDOOR FAN MOTOR
IFMC	INDOOR FAN MOTOR CONTROLLER
LA	LOW AMBIENT LOCKOUT
LDR	COMPRESSOR LOADER (INTERNAL)
LDV	LIQUID DIVERTER VALVE
LPS	LOW PRESSURE SWITCH
LSM	LIMIT SWITCH (MANUAL RESET)
LTLO	LOW TEMPERATURE LOCKOUT
MOV	VOLTAGE RESTRICTOR
MTR	MOTOR
MTS	MIXED AIR TEMPERATURE SWITCH
OAQ	OUTDOOR AIR QUALITY
OARH	OUTSIDE AIR RELATIVE HUMIDITY
OAT	OUTDOOR AIR TEMP. SEN
OFM	OUTDOOR FAN MOTOR
OFR	OUTDOOR FAN RELAY
OL	OVERLOAD
PL	PLUG ASSEMBLY
POT	POTENTIOMETER
PMR	PHASE MONITOR RELAY
QT	QUADRUPLE TERMINAL
RARH	RETURN AIR RELATIVE HUMIDITY
RAT	RETURN AIR TEMP. SENSOR
RDB	REFRIGERANT DISSIPATION BOARD
RDS	REFRIGERANT DISSIPATION SENSOR
RDV	REHEAT DISCHARGE VALVE
SAT	SUPPLY AIR TEMP. SENSOR
SEN	SENSOR
SPRH	SPACE RELATIVE HUMIDITY
SPT	SPACE TEMPERATURE SENSOR
SPTO	SPACE TEMPERATURE OFFSET
STD	STANDARD
TB	TERMINAL BLOCK
TRAN	TRANSFORMER
UCB	UNIT CONTROL BOARD

NOTES
1. IF ANY OF THE ORIGINAL WIRE FURNISHED MUST BE REPLACED, IT MUST BE REPLACED WITH TYPE 90 C WIRE OR ITS EQUIVALENT.
2. COMPRESSOR AND FAN MOTORS ARE THERMALLY PROTECTED. THREE PHASE MOTORS ARE PROTECTED AGAINST PRIMARY SINGLE PHASING CONDITIONS.
3. TRANSFORMER IS DEDICATED BASED ON UNIT VOLTAGE. TAPS ONLY SHOWN TO SIMPLIFY SCHEMATIC.ON 208/230V UNITS, TRAN IS WIRED FOR 230V. IF UNIT IS TO BE RUN WITH 208V POWER SUPPLY, DISCONNECT BLK WIRE FROM 230V TAP AND CONNECT TO 208V TAP.
4. USE COPPER CONDUCTOR ONLY.
5. YELLOW WIRE TO BE CONNECTED TO RESPECTIVE VOLTAGE TAP.
6. ON SELECT SINGLE POINT BOX 230V APPLICATIONS THESE WIRES ARE REMOVED TO CONNECT THE FUSES DIRECTLY TO C2.
7. ON SELECT SINGLE POINT BOX 230V APPLICATIONS, THIS ORN WIRE IS DISCONNECTED FROM TB1-23 AND CONNECTS TO THE BLU FUSE WIRE FROM THE SINGLE POINT BOX. TB10 MAY BE USED FOR THIS CONNECTION.

LEGEND
- FIELD SPLICE
- MARKED WIRE
- TERMINAL (MARKED)
- SPLICE (MARKED)
- TERMINAL (UNMARKED)
- TERMINAL BLOCK
- FACTORY WIRING
- FIELD CONTROL WIRING
- FIELD POWER WIRING
- CIRCUIT BOARD TRACE
- ACCESSORY OR FIOP
- TO INDICATE COMMON POTENTIAL ONLY POTENTIAL ONLY: NOT TO REPRESENT WIRING

48TM010322 -

Fig. I — Typical 50GEQ*07-08 Power Wiring Diagram — with SystemVu Controller, with or without Humidi-MiZer Option — 208/230, 460-3-60 Units



ACCY	ACCESSORY
AMB	AMBIENT
C	CONTACTOR,COMPRESSOR
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CCH	CRANKCASE HEATER
CCHR	CRANKCASE HETAER RELAY
COFS	CONDENSATE OVERFLOW SWT
COMP	COMPRESSOR MOTOR
CS2V	COOLING STAGE-2 VALVE
DDC	DIRECT DIGITAL CONTROL
ERV	ENERGY RECOVERY VENTILATOR
FIOP	FACTORY INSTALLED OPTION
FLS	FAN LIMIT SWITCH
FPT	FREEZE PROTECTION THERMOSTAT
FSD	FIRE SHUT DOWN
FU	FUSE
GND	GROUND
HPC	HEAD PRESSURE CONTROL
HPS	HIGH PRESSURE SWITCH
IAQ	INDOOR AIR QUALITY SENSORS
IFCB	INDOOR FAN CIRCUIT BREAKER
IFM	INDOOR FAN MOTOR
IFMC	INDOOR FAN MOTOR CONTROLLER
LA	LOW AMBIENT LOCKOUT
LDR	COMPRESSOR LOADER (INTERNAL)
LDV	LIQUID DIVERTER VALVE
LPS	LOW PRESSURE SWITCH
LSM	LIMIT SWITCH (MANUAL RESET)
LTLO	LOW TEMPERATURE LOCKOUT
MOV	VOLTAGE RESTRICTOR
MTR	MOTOR
MTS	MIXED AIR TEMPERATURE SWITCH
OAQ	OUTDOOR AIR QUALITY
OARH	OUTSIDE AIR RELATIVE HUMIDITY
OAT	OUTDOOR AIR TEMP. SEN
OFM	OUTDOOR FAN MOTOR
OFR	OUTDOOR FAN RELAY
OL	OVERLOAD
PL	PLUG ASSEMBLY
POT	POTENTIOMETER
PMR	PHASE MONITOR RELAY
QT	QUADRUPLE TERMINAL
RARH	RETURN AIR RELATIVE HUMIDITY
RAT	RETURN AIR TEMP. SENSOR
RDB	REFRIGERANT DISSIPATION BOARD
RDS	REFRIGERANT DISSIPATION SENSOR
RDV	REHEAT DISCHARGE VALVE
SAT	SUPPLY AIR TEMP. SENSOR
SEN	SENSOR
SPRH	SPACE RELATIVE HUMIDITY
SPT	SPACE TEMPERATURE SENSOR
SPTO	SPACE TEMPERATURE OFFSET
STD	STANDARD
TB	TERMINAL BLOCK
TRAN	TRANSFORMER
UCB	UNIT CONTROL BOARD

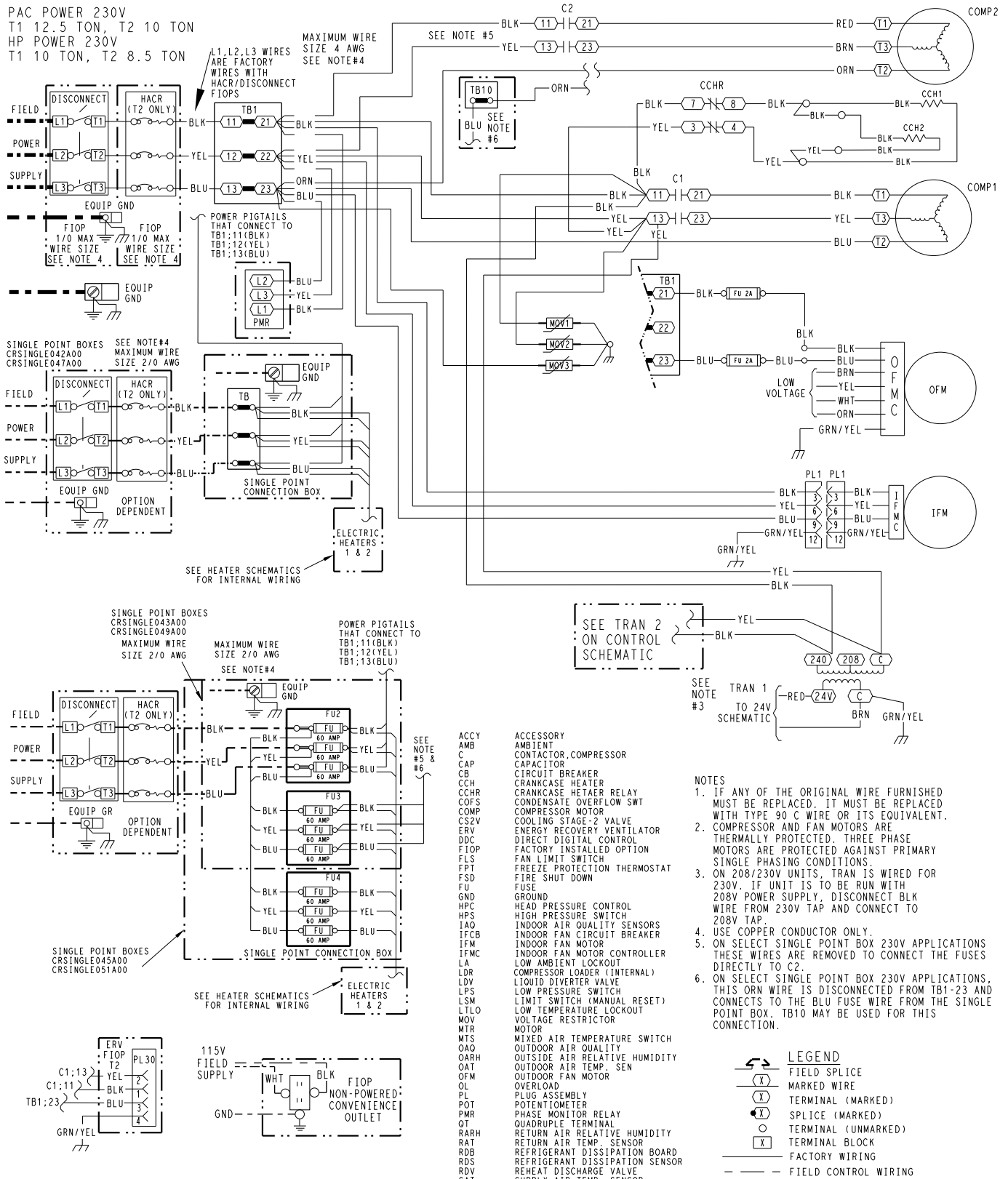
NOTES
1. IF ANY OF THE ORIGINAL WIRE FURNISHED MUST BE REPLACED, IT MUST BE REPLACED WITH TYPE 90 C WIRE OR ITS EQUIVALENT.
2. COMPRESSOR AND FAN MOTORS ARE THERMALLY PROTECTED. THREE PHASE MOTORS ARE PROTECTED AGAINST PRIMARY SINGLE PHASING CONDITIONS.
3. USE COPPER CONDUCTOR ONLY.

LEGEND

	FIELD SPLICE
X	MARKED WIRE
X	TERMINAL (MARKED)
X	SPLICE (MARKED)
	TERMINAL (UNMARKED)
X	TERMINAL BLOCK
	FACTORY WIRING
	FIELD CONTROL WIRING
	FIELD POWER WIRING
	CIRCUIT BOARD TRACE
	ACCESSORY OR FIOP
	TO INDICATE COMMON POTENTIAL ONLY POTENTIAL ONLY: NOT TO REPRESENT WIRING

48TM010323 -

Fig. J — Typical 50GEQ*07-08 Power Wiring Diagram — with SystemVu Controller, with or without Humidi-MiZer Option — 575-3-60 Units



ACCY	ACCESSORY
AMB	AMBIENT
C	CONTACTOR,COMPRESSOR
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CCH	CRANKCASE HEATER
CCHR	CRANKCASE HETAER RELAY
COFS	CONDENSATE OVERFLOW SWT
COMP	COMPRESSOR MOTOR
CS2V	COOLING STAGE-2 VALVE
ERV	ENERGY RECOVERY VENTILATOR
DDC	DIRECT DIGITAL CONTROL
FIOP	FACTORY INSTALLED OPTION
FLS	FAN LIMIT SWITCH
FPT	FREEZE PROTECTION THERMOSTAT
FSD	FIRE SHUT DOWN
FU	FUSE
GND	GROUND
HPC	HEAD PRESSURE CONTROL
HPS	HIGH PRESSURE SWITCH
IAQ	INDOOR AIR QUALITY SENSORS
IFCB	INDOOR FAN CIRCUIT BREAKER
IFM	INDOOR FAN MOTOR
IFMC	INDOOR FAN MOTOR CONTROLLER
LA	LOW AMBIENT LOCKOUT
LDR	COMPRESSOR LOADER (INTERNAL)
LDV	LIQUID DIVERTER VALVE
LPS	LOW PRESSURE SWITCH
LSM	LIMIT SWITCH (MANUAL RESET)
LTLO	LOW TEMPERATURE LOCKOUT
MOV	VOLTAGE RESTRICTOR
MTR	MOTOR
MTS	MIXED AIR TEMPERATURE SWITCH
OAQ	OUTDOOR AIR QUALITY
OARH	OUTSIDE AIR RELATIVE HUMIDITY
OAT	OUTDOOR AIR TEMP. SEN
OFM	OUTDOOR FAN MOTOR
OL	OVERLOAD
PL	PLUG ASSEMBLY
POT	POTENTIOMETER
PMR	PHASE MONITOR RELAY
QT	QUADRUPLE TERMINAL
RARH	RETURN AIR RELATIVE HUMIDITY
RAT	RETURN AIR TEMP. SENSOR
RDB	REFRIGERANT DISSIPATION BOARD
RDS	REFRIGERANT DISSIPATION SENSOR
RDV	REHEAT DISCHARGE VALVE
SAT	SUPPLY AIR TEMP. SENSOR
SEN	SENSOR
SPRH	SPACE RELATIVE HUMIDITY
SPT	SPACE TEMPERATURE SENSOR
SPTO	SPACE TEMPERATURE OFFSET
STD	STANDARD
TB	TERMINAL BLOCK
TRAN	TRANSFORMER
UCB	UNIT CONTROL BOARD

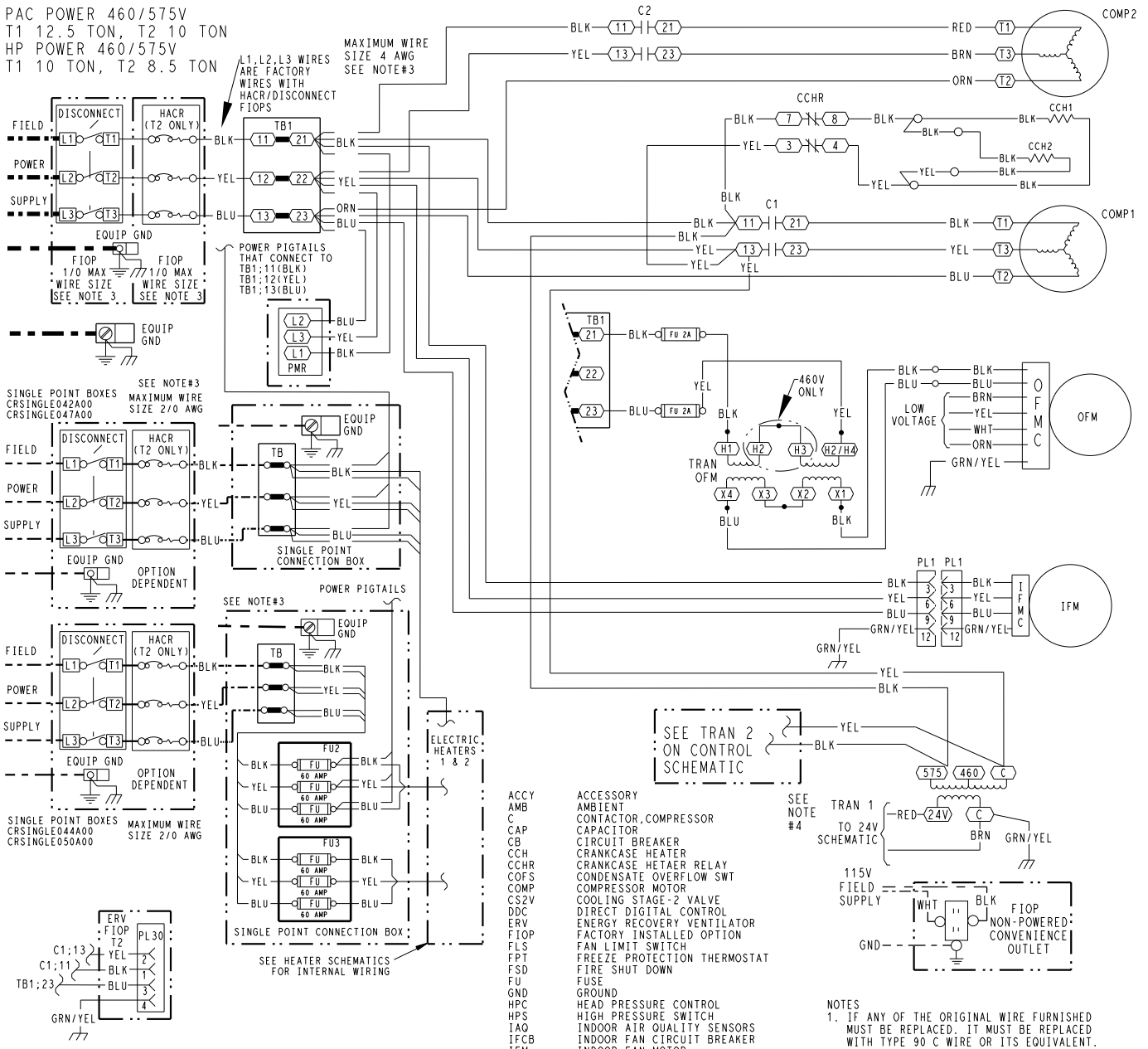
NOTES
1. IF ANY OF THE ORIGINAL WIRE FURNISHED MUST BE REPLACED. IT MUST BE REPLACED WITH TYPE 90 C WIRE OR ITS EQUIVALENT.
2. COMPRESSOR AND FAN MOTORS ARE THERMALLY PROTECTED. THREE PHASE MOTORS ARE PROTECTED AGAINST PRIMARY SINGLE PHASING CONDITIONS.
3. ON 208/230V UNITS, TRAN IS WIRED FOR 230V. IF UNIT IS TO BE RUN WITH 208V POWER SUPPLY, DISCONNECT BLK WIRE FROM 230V TAP AND CONNECT TO 208V TAP.
4. USE COPPER CONDUCTOR ONLY.
5. ON SELECT SINGLE POINT BOX 230V APPLICATIONS THESE WIRES ARE REMOVED TO CONNECT THE FUSES DIRECTLY TO C2.
6. ON SELECT SINGLE POINT BOX 230V APPLICATIONS, THIS ORN WIRE IS DISCONNECTED FROM TB1-23 AND CONNECTS TO THE BLU FUSE WIRE FROM THE SINGLE POINT BOX. TB10 MAY BE USED FOR THIS CONNECTION.

LEGEND

	FIELD SPLICE
(X)	MARKED WIRE
(X)	TERMINAL (MARKED)
(X)	SPLICE (MARKED)
	TERMINAL (UNMARKED)
[X]	TERMINAL BLOCK
	FACTORY WIRING
	FIELD CONTROL WIRING
	FIELD POWER WIRING
	CIRCUIT BOARD TRACE
	ACCESSORY OR FIOP
	TO INDICATE COMMON POTENTIAL ONLY POTENTIAL ONLY: NOT TO REPRESENT WIRING

48TM005988 | F

Fig. K — Typical 50GEQ*09 Power Wiring Diagram — with SystemVu Controller, with or without Humidi-MiZer Option — 208/230 Units



ACCY	ACCESSORY
AMB	AMBIENT
C	CONTACTOR,COMPRESSOR
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CCH	CRANKCASE HEATER
CCHR	CRANKCASE HETAER RELAY
COFS	CONDENSATE OVERFLOW SWT
COMP	COMPRESSOR MOTOR
CS2V	COOLING STAGE-2 VALVE
DDC	DIRECT DIGITAL CONTROL
ERV	ENERGY RECOVERY VENTILATOR
FIOP	FACTORY INSTALLED OPTION
FLS	FAN LIMIT SWITCH
FPT	FREEZE PROTECTION THERMOSTAT
FSD	FIRE SHUT DOWN
FU	FUSE
GND	GROUND
HPC	HEAD PRESSURE CONTROL
HPS	HIGH PRESSURE SWITCH
IAQ	INDOOR AIR QUALITY SENSORS
IFCB	INDOOR FAN CIRCUIT BREAKER
IFM	INDOOR FAN MOTOR
IFMC	INDOOR FAN MOTOR CONTROLLER
LA	LOW AMBIENT LOCKOUT
LDR	COMPRESSOR LOADER (INTERNAL)
LDV	LIQUID DIVERTER VALVE
LPS	LOW PRESSURE SWITCH
LSM	LIMIT SWITCH (MANUAL RESET)
LTLO	LOW TEMPERATURE LOCKOUT
MOV	VOLTAGE RESTRICTOR
MTR	MOTOR
MTS	MIXED AIR TEMPERATURE SWITCH
OAQ	OUTDOOR AIR QUALITY
OARH	OUTSIDE AIR RELATIVE HUMIDITY
OAT	OUTDOOR AIR TEMP. SEN
OFM	OUTDOOR FAN MOTOR
OL	OVERLOAD
PL	PLUG ASSEMBLY
POT	POTENTIOMETER
PMR	PHASE MONITOR RELAY
QT	QUADRUPLE TERMINAL
RARH	RETURN AIR RELATIVE HUMIDITY
RAT	RETURN AIR TEMP. SENSOR
RDB	REFRIGERANT DISSIPATION BOARD
RDS	REFRIGERANT DISSIPATION SENSOR
RDV	REHEAT DISCHARGE VALVE
SAT	SUPPLY AIR TEMP. SENSOR
SEN	SENSOR
SPRH	SPACE RELATIVE HUMIDITY
SPT	SPACE TEMPERATURE SENSOR
SPTO	SPACE TEMPERATURE OFFSET
STD	STANDARD
TB	TERMINAL BLOCK
TRAN	TRANSFORMER
UCB	UNIT CONTROL BOARD

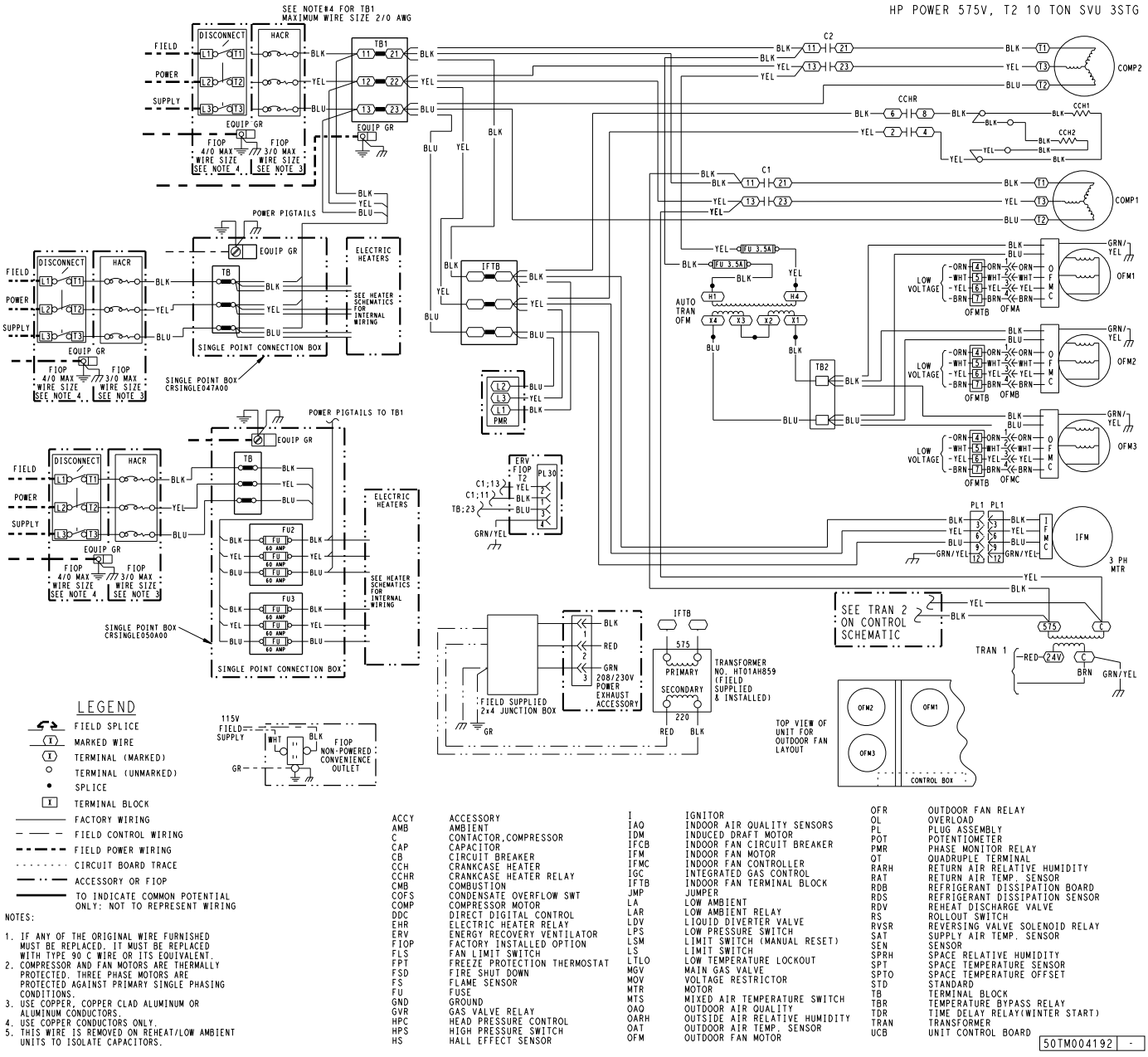
NOTES
1. IF ANY OF THE ORIGINAL WIRE FURNISHED MUST BE REPLACED, IT MUST BE REPLACED WITH TYPE 90 C WIRE OR ITS EQUIVALENT.
2. COMPRESSOR AND FAN MOTORS ARE THERMALLY PROTECTED. THREE PHASE MOTORS ARE PROTECTED AGAINST PRIMARY SINGLE PHASING CONDITIONS.
3. USE COPPER CONDUCTOR ONLY.
4. TRANSFORMER IS DEDICATED BASED ON UNIT VOLTAGE. TAPS ONLY SHOWN TO SIMPLIFY SCHEMATIC.

LEGEND

	FIELD SPLICE
X	MARKED WIRE
X	TERMINAL (MARKED)
X	SPLICE (MARKED)
	TERMINAL (UNMARKED)
X	TERMINAL BLOCK
	FACTORY WIRING
	FIELD CONTROL WIRING
	FIELD POWER WIRING
	CIRCUIT BOARD TRACE
	ACCESSORY OR FIOP
	TO INDICATE COMMON POTENTIAL ONLY POTENTIAL ONLY: NOT TO REPRESENT WIRING

48TM005987 | F

Fig. L — Typical 50GEQ*09 Power Wiring Diagram — with SystemVu Controller, with or without Humidi-MiZer Option — 460 and 575-3-60 Units



NOTES:

1. IF ANY OF THE ORIGINAL WIRE FURNISHED MUST BE REPLACED, IT MUST BE REPLACED WITH TYPE 90 C WIRE OR ITS EQUIVALENT.
2. COMPRESSOR AND FAN MOTORS ARE THERMALLY PROTECTED. THREE PHASE MOTORS ARE PROTECTED AGAINST PRIMARY SINGLE PHASING CONDITIONS.
3. USE COPPER, COPPER CLAD ALUMINUM OR ALUMINUM CONDUCTORS.
4. USE COPPER CONDUCTORS ONLY.
5. THIS WIRE IS REMOVED ON REHEAT/LOW AMBIENT UNITS TO ISOLATE CAPACITORS.

ACCY	ACCESSORY
AMB	AMBIENT
C	CONTACTOR,COMPRESSOR
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CCH	CRANKCASE HEATER
CCHR	CRANKCASE HEATER RELAY
CMB	COMBUSTION
COFS	CONDENSATE OVERFLOW SWT
COMP	COMPRESSOR MOTOR
DDC	DIRECT DIGITAL CONTROL
EHR	ELECTRIC HEATER RELAY
ERV	ENERGY RECOVERY VENTILATOR
FIOP	FACTORY INSTALLED OPTION
FLS	FAN LIMIT SWITCH
FPT	FREEZE PROTECTION THERMOSTAT
FSD	FIRE SHUT DOWN
FS	FLAME SENSOR
FU	FUSE
GND	GROUND
GVR	GAS VALVE RELAY
HPC	HEAD PRESSURE CONTROL
HPS	HIGH PRESSURE SWITCH
HS	HALL EFFECT SENSOR
I	IGNITOR
IAQ	INDOOR AIR QUALITY SENSORS
IDM	INDUCED DRAFT MOTOR
IFCB	INDOOR FAN CIRCUIT BREAKER
IFM	INDOOR FAN MOTOR
IFMC	INDOOR FAN CONTROLLER
IGC	INTEGRATED GAS CONTROL
IFTB	INDOOR FAN TERMINAL BLOCK
JMP	JUMPER
LA	LOW AMBIENT
LAR	LOW AMBIENT RELAY
LDV	LIQUID DIVERTER VALVE
LPS	LOW PRESSURE SWITCH
LSM	LIMIT SWITCH (MANUAL RESET)
LS	LIMIT SWITCH
LTLO	LOW TEMPERATURE LOCKOUT
MGV	MAIN GAS VALVE
MOV	VOLTAGE RESTRICTOR
MTR	MOTOR
MTS	MIXED AIR TEMPERATURE SWITCH
OAQ	OUTDOOR AIR QUALITY
OARH	OUTSIDE AIR RELATIVE HUMIDITY
OAT	OUTDOOR AIR TEMP. SENSOR
OFM	OUTDOOR FAN MOTOR
OFR	OUTDOOR FAN RELAY
OL	OVERLOAD
PL	PLUG ASSEMBLY
POT	POTENTIOMETER
PMR	PHASE MONITOR RELAY
QT	QUADRUPLE TERMINAL
RARH	RETURN AIR RELATIVE HUMIDITY
RAT	RETURN AIR TEMP. SENSOR
RDB	REFRIGERANT DISSIPATION BOARD
RDS	REFRIGERANT DISSIPATION SENSOR
RDV	REHEAT DISCHARGE VALVE
RS	ROLLOUT SWITCH
RVSR	REVERSING VALVE SOLENOID RELAY
SAT	SUPPLY AIR TEMP. SENSOR
SEN	SENSOR
SPRH	SPACE RELATIVE HUMIDITY
SPT	SPACE TEMPERATURE SENSOR
SPTO	SPACE TEMPERATURE OFFSET
STD	STANDARD
TB	TERMINAL BLOCK
TBR	TEMPERATURE BYPASS RELAY
TDR	TIME DELAY RELAY(WINTER START)
TRAN	TRANSFORMER
UCB	UNIT CONTROL BOARD

50TM004192 -

Fig. M — Typical 50GEQ*12 Power Wiring Diagram — with SystemVu Controller, with or without Humidi-MiZer Option — 208/230, 460-3-60 Units

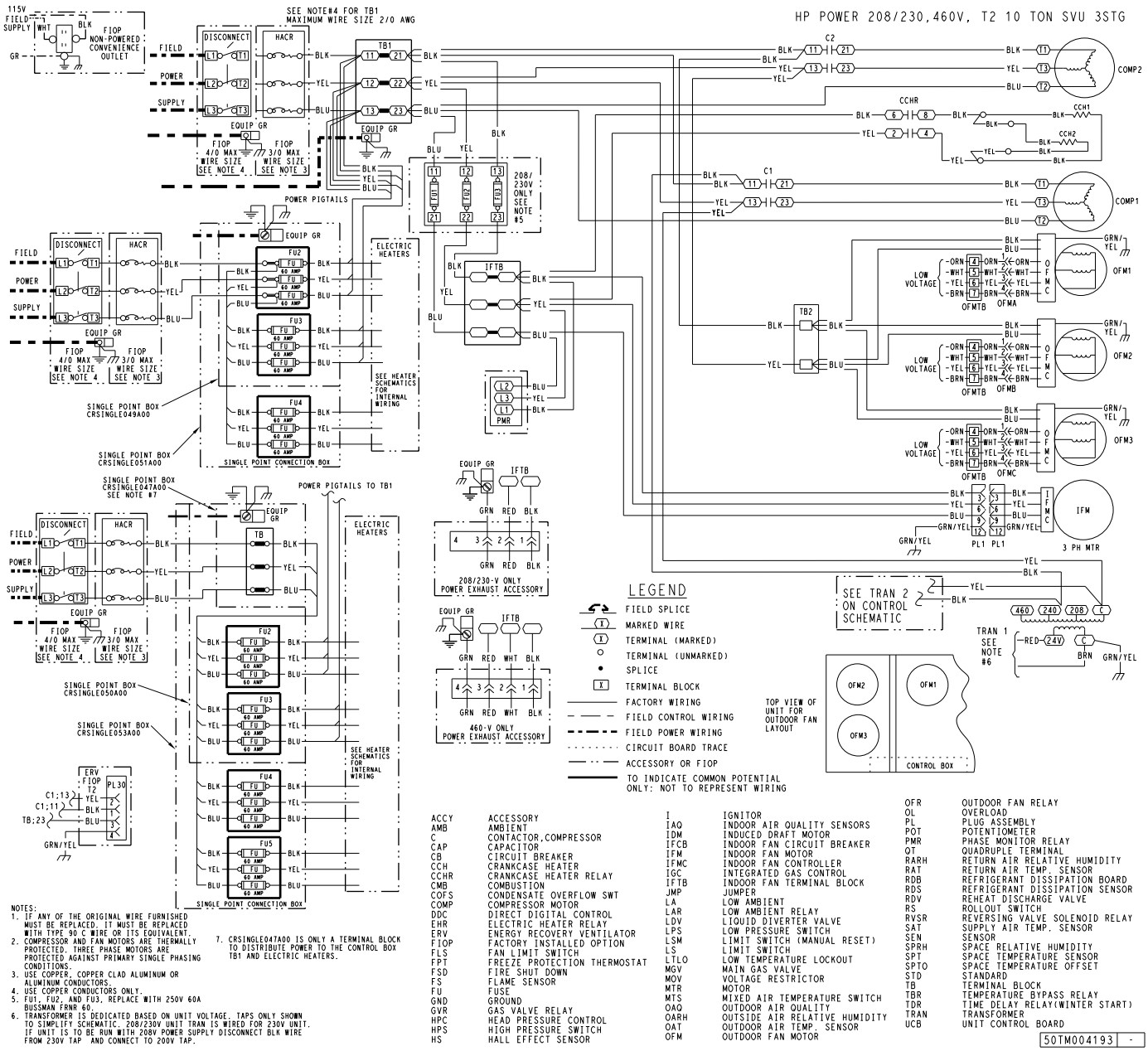
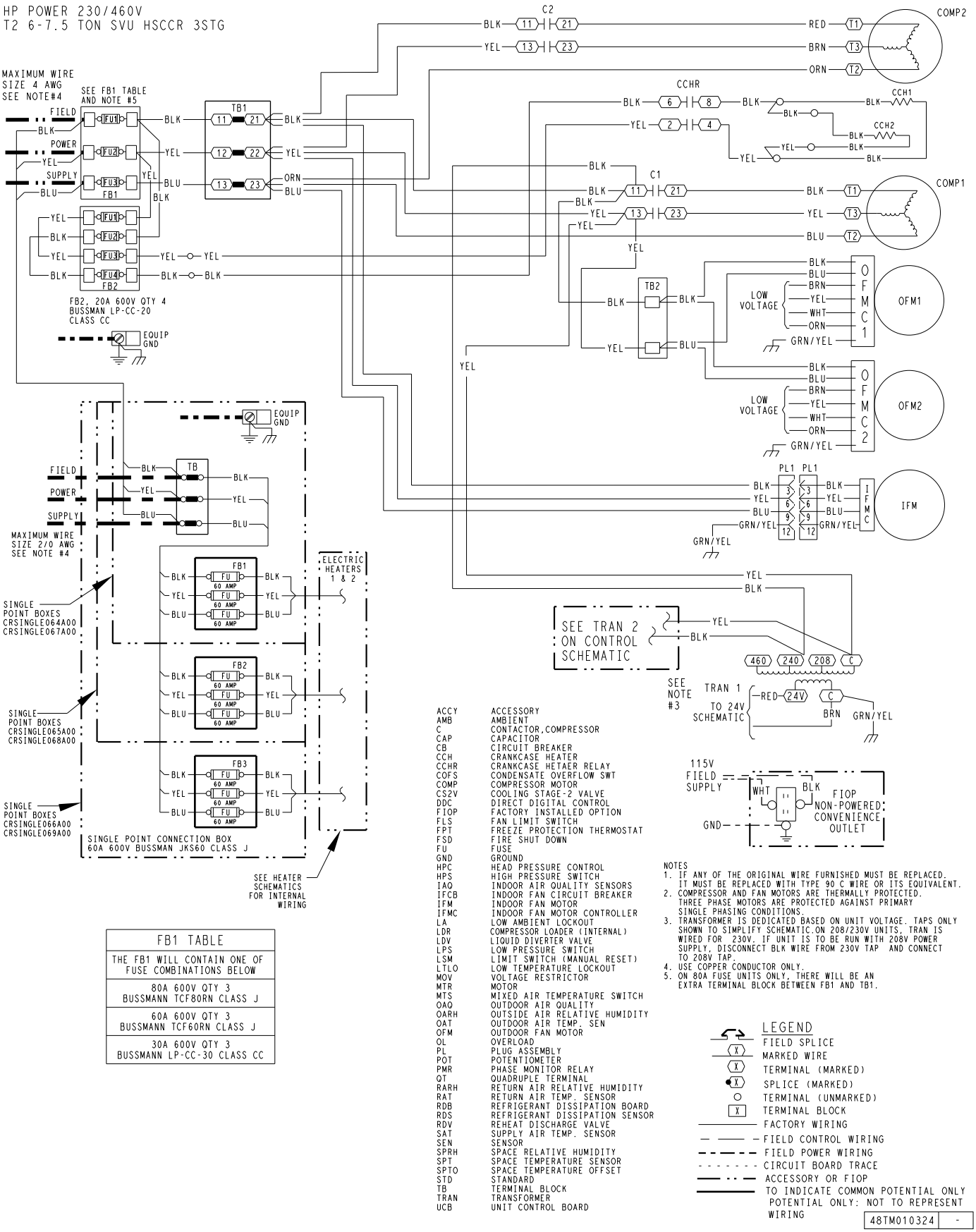


Fig. N — Typical 50GEQ*12 Power Wiring Diagram — with SystemVu Controller, with or without Humidi-MiZer Option — 575-3-60 Units



FB1 TABLE
THE FB1 WILL CONTAIN ONE OF FUSE COMBINATIONS BELOW
80A 600V QTY 3 BUSSMANN TCF80RN CLASS J
60A 600V QTY 3 BUSSMANN TCF60RN CLASS J
30A 600V QTY 3 BUSSMANN LP-CC-30 CLASS CC

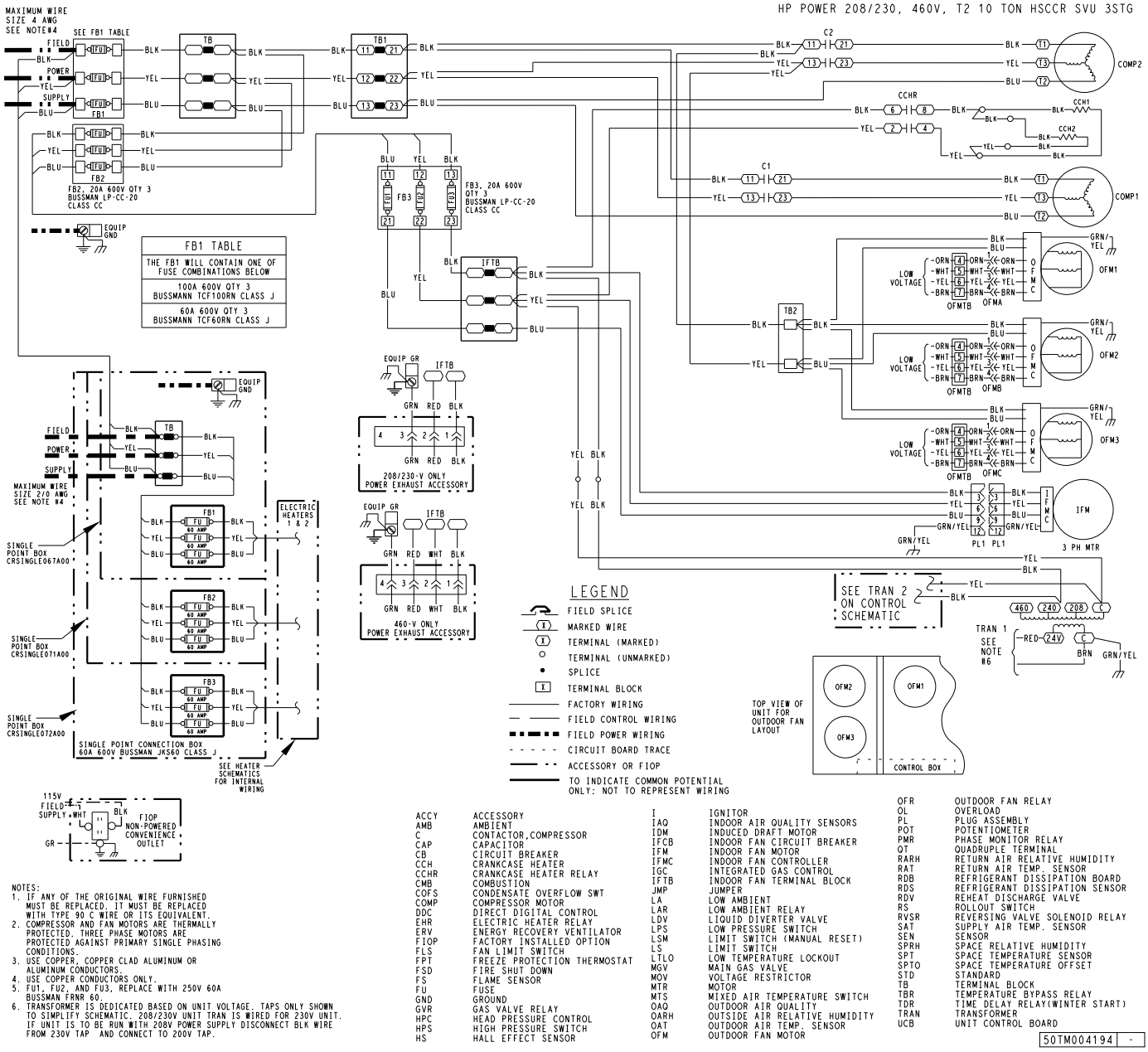
ACCY	ACCESSORY
AMB	AMBIENT
C	CONTACTOR,COMPRESSOR
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CCH	CRANKCASE HEATER
CCHR	CRANKCASE HETAER RELAY
COFS	CONDENSATE OVERFLOW SWT
COMP	COMPRESSOR MOTOR
CS2V	COOLING STAGE-2 VALVE
DDC	DIRECT DIGITAL CONTROL
FIOP	FACTORY INSTALLED OPTION
FLS	FAN LIMIT SWITCH
FPT	FREEZE PROTECTION THERMOSTAT
FSD	FIRE SHUT DOWN
FU	FUSE
GND	GROUND
HPC	HEAD PRESSURE CONTROL
HPS	HIGH PRESSURE SWITCH
IAQ	INDOOR AIR QUALITY SENSORS
IFCB	INDOOR FAN CIRCUIT BREAKER
IFM	INDOOR FAN MOTOR
IFMC	INDOOR FAN MOTOR CONTROLLER
LA	LOW AMBIENT LOCKOUT
LDR	COMPRESSOR LOADER (INTERNAL)
LDV	LIQUID DIVERTER VALVE
LPS	LOW PRESSURE SWITCH
LSM	LIMIT SWITCH (MANUAL RESET)
LTLO	LOW TEMPERATURE LOCKOUT
MOV	VOLTAGE RESTRICTOR
MTR	MOTOR
MTS	MIXED AIR TEMPERATURE SWITCH
OAQ	OUTDOOR AIR QUALITY
OARH	OUTSIDE AIR RELATIVE HUMIDITY
OAT	OUTDOOR AIR TEMP. SEN
OFM	OUTDOOR FAN MOTOR
OL	OVERLOAD
PL	PLUG ASSEMBLY
POT	POTENTIOMETER
PMR	PHASE MONITOR RELAY
QT	QUADRUPLE TERMINAL
RARH	RETURN AIR RELATIVE HUMIDITY
RAT	RETURN AIR TEMP. SENSOR
RDB	REFRIGERANT DISSIPATION BOARD
RDS	REFRIGERANT DISSIPATION SENSOR
RDV	REHEAT DISCHARGE VALVE
SAT	SUPPLY AIR TEMP. SENSOR
SEN	SENSOR
SPRH	SPACE RELATIVE HUMIDITY
SPT	SPACE TEMPERATURE SENSOR
SPTO	SPACE TEMPERATURE OFFSET
STD	STANDARD
TB	TERMINAL BLOCK
TRAN	TRANSFORMER
UCB	UNIT CONTROL BOARD

NOTES
1. IF ANY OF THE ORIGINAL WIRE FURNISHED MUST BE REPLACED. IT MUST BE REPLACED WITH TYPE 90 C WIRE OR ITS EQUIVALENT.
2. COMPRESSOR AND FAN MOTORS ARE THERMALLY PROTECTED. THREE PHASE MOTORS ARE PROTECTED AGAINST PRIMARY SINGLE PHASING CONDITIONS.
3. TRANSFORMER IS DEDICATED BASED ON UNIT VOLTAGE. TAPS ONLY SHOWN TO SIMPLIFY SCHEMATIC.ON 208/230V UNITS, TRAN IS WIRED FOR 230V. IF UNIT IS TO BE RUN WITH 208V POWER SUPPLY, DISCONNECT BLK WIRE FROM 230V TAP AND CONNECT TO 208V TAP.
4. USE COPPER CONDUCTOR ONLY.
5. ON 80A FUSE UNITS ONLY, THERE WILL BE AN EXTRA TERMINAL BLOCK BETWEEN FB1 AND TB1.

LEGEND
- FIELD SPLICE
- MARKED WIRE
- TERMINAL (MARKED)
- SPLICE (MARKED)
- TERMINAL (UNMARKED)
- TERMINAL BLOCK
- FACTORY WIRING
- FIELD CONTROL WIRING
- FIELD POWER WIRING
- CIRCUIT BOARD TRACE
- ACCESSORY OR FIOP
- TO INDICATE COMMON POTENTIAL ONLY POTENTIAL ONLY: NOT TO REPRESENT WIRING

48TM010324 -

Fig. O — Typical 50GEQ*07-08 Power Wiring Diagram — SystemVu Controller — 208/230, 460-3-60 Units — High SCCR



NOTES:
1. IF ANY OF THE ORIGINAL WIRE FURNISHED MUST BE REPLACED, IT MUST BE REPLACED WITH TYPE 90 C WIRE OR ITS EQUIVALENT.
2. COMPRESSOR AND FAN MOTORS ARE THERMALLY PROTECTED. THREE PHASE MOTORS ARE PROTECTED AGAINST PRIMARY SINGLE PHASING CONDITIONS.
3. USE COPPER, COPPER CLAD ALUMINUM OR ALUMINUM CONDUCTORS.
4. USE COPPER CONDUCTORS ONLY.
5. FU1, FU2, AND FU3, REPLACE WITH 250V 60A BUSSMAN FRNR 60.
6. TRANSFORMER IS DEDICATED BASED ON UNIT VOLTAGE. TAPS ONLY SHOWN TO SIMPLIFY SCHEMATIC. 208/230V UNIT TRAN IS WIRED FOR 230V UNIT. IF UNIT IS TO BE RUN WITH 208V POWER SUPPLY DISCONNECT BLK WIRE FROM 230V TAP AND CONNECT TO 200V TAP.

ACCY	ACCESSORY
AMB	AMBIENT
C	CONTACTOR,COMPRESSOR
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CCH	CRANKCASE HEATER
CCHR	CRANKCASE HEATER RELAY
CMB	COMBUSTION
COFS	CONDENSATE OVERFLOW SWT
COMP	COMPRESSOR MOTOR
DDC	DIRECT DIGITAL CONTROL
EHR	ELECTRIC HEATER RELAY
ERV	ENERGY RECOVERY VENTILATOR
FIOP	FACTORY INSTALLED OPTION
FLS	FAN LIMIT SWITCH
FPT	FREEZE PROTECTION THERMOSTAT
FSD	FIRE SHUT DOWN
FS	FLAME SENSOR
FU	FUSE
GND	GROUND
GVR	GAS VALVE RELAY
HPC	HEAD PRESSURE CONTROL
HPS	HIGH PRESSURE SWITCH
HS	HALL EFFECT SENSOR
I	IGNITOR
IAQ	INDOOR AIR QUALITY SENSORS
IDM	INDUCED DRAFT MOTOR
IFCB	INDOOR FAN CIRCUIT BREAKER
IFM	INDOOR FAN MOTOR
IFMC	INDOOR FAN CONTROLLER
IGC	INTEGRATED GAS CONTROL
IFTB	INDOOR FAN TERMINAL BLOCK
JMP	JUMPER
LA	LOW AMBIENT
LAR	LOW AMBIENT RELAY
LDV	LIQUID DIVERTER VALVE
LPS	LOW PRESSURE SWITCH
LSM	LIMIT SWITCH (MANUAL RESET)
LS	LIMIT SWITCH
LTLO	LOW TEMPERATURE LOCKOUT
MGV	MAIN GAS VALVE
MOV	VOLTAGE RESTRICTOR
MTR	MOTOR
MTS	MIXED AIR TEMPERATURE SWITCH
OAQ	OUTDOOR AIR QUALITY
OARH	OUTSIDE AIR RELATIVE HUMIDITY
OAT	OUTDOOR AIR TEMP. SENSOR
OFM	OUTDOOR FAN MOTOR
OFR	OUTDOOR FAN RELAY
OL	OVERLOAD
PL	PLUG ASSEMBLY
POT	POTENTIOMETER
PMR	PHASE MONITOR RELAY
QT	QUADRUPLE TERMINAL
RARH	RETURN AIR RELATIVE HUMIDITY
RAT	RETURN AIR TEMP. SENSOR
RDB	REFRIGERANT DISSIPATION BOARD
RDS	REFRIGERANT DISSIPATION SENSOR
RDV	REHEAT DISCHARGE VALVE
RS	ROLLOUT SWITCH
RVSR	REVERSING VALVE SOLENOID RELAY
SAT	SUPPLY AIR TEMP. SENSOR
SEN	SENSOR
SPRH	SPACE RELATIVE HUMIDITY
SPT	SPACE TEMPERATURE SENSOR
SPTO	SPACE TEMPERATURE OFFSET
STD	STANDARD
TB	TERMINAL BLOCK
TBR	TEMPERATURE BYPASS RELAY
TDR	TIME DELAY RELAY(WINTER START)
TRAN	TRANSFORMER
UCB	UNIT CONTROL BOARD

50TM004194 -

Fig. P — Typical 50GEQ*12 Power Wiring Diagram — SystemVu Controller — 208/230, 460-3-60 Units — High SCCR

START-UP CHECKLIST

50GEQ*07-12 Single Package Rooftop Heat Pump Units

(Remove and use for job file)

NOTE: To avoid injury to personnel and damage to equipment or property when completing the procedures listed in this start-up checklist, use good judgment, follow safe practices, and adhere to the safety considerations/information as outlined in preceding sections of this service and maintenance document.

I. PRELIMINARY INFORMATION

MODEL NO. _____
JOB NAME _____
SERIAL NO. _____
ADDRESS _____
START-UP DATE _____
TECHNICIAN NAME _____
ADDITIONAL ACCESSORIES _____
_____

II. PRE-START-UP

Verify that all packaging materials have been removed from unit	(Y/N) _____
Verify installation of outdoor air hood	(Y/N) _____
Verify that condensate connection is installed per instructions	(Y/N) _____
Verify that all electrical connections and terminals are tight	(Y/N) _____
Verify ground integrity with a continuity test	(Y/N) _____
Check that indoor-air filters are clean and in place	(Y/N) _____
Check that outdoor air inlet screens are in place	(Y/N) _____
Verify that unit is level	(Y/N) _____
Verify that fan assembly is free of obstructions and rotor spins freely	(Y/N) _____
Verify that scroll compressors are rotating in the correct direction	(Y/N) _____
Verify installation of thermostat	(Y/N) _____

III. START-UP

ELECTRICAL

Supply Voltage	L1-L2_____	L2-L3_____	L3-L1_____
Compressor Amps 1	L1 _____	L2 _____	L3 _____
Compressor Amps 2	L1 _____	L2 _____	L3 _____
Supply Fan Amps	L1 _____	L2 _____	L3 _____
Outdoor Fan Amps	L1 _____	L2 _____	

TEMPERATURES

Outdoor-air Temperature	_____ °F DB (Dry Bulb)	
Return-air Temperature	_____ °F DB	_____ °F WB (Wet Bulb)
Cooling Supply Air Temperature	_____ °F	

PRESSURES

Refrigerant Suction	STAGE 1	_____ PSIG	
	STAGE 2	_____ PSIG	
	STAGE 3	_____ PSIG	
Refrigerant Discharge	STAGE 1	_____ PSIG	
	STAGE 2	_____ PSIG	
	STAGE 3	_____ PSIG	

Verify Refrigerant Charge using Charging Charts. (Y/N) _____

GENERAL

Economizer minimum vent and changeover settings to job requirements (if equipped) (Y/N) _____

Verify smoke detector unit shutdown by utilizing magnet test (Y/N) _____

IV. HUMIDI-MIZER® SYSTEM START-UP

STEPS

1. Use Service Test mode to turn on maximum cooling.
   a. Turn on Cool A1 test under Cool Test menu (Y/N) _____
   b. Turn on Cool A2 Test under Cool Test Menu (Y/N) _____

OBSERVE AND RECORD

a. Suction pressure	_____ PSIG	_____ PSIG	
b. Discharge pressure	_____ PSIG	_____ PSIG	
c. Entering air temperature	_____ °F	_____ °F	
d. Liquid temperature at outlet or reheat coil	_____ °F	_____ °F	

   e. Confirm correct rotation for compressor (Y/N) _____
   f. Check for correct ramp-up of outdoor fan motor as condenser coil warms (Y/N) _____
2. Check unit charge per charging chart. (Y/N) _____
3. Switch unit to HIGH-LATENT mode (SUBCOOL) by turning Humidi-MiZer test to SUBCOOL under the COOL TEST menu. (Y/N) _____

OBSERVE

   a. Reduction in suction pressure (5 to 7 psi expected) (Y/N) _____
   b. Discharge pressure unchanged (Y/N) _____
   c. Liquid temperature drops to 50 to 55°F range (Y/N) _____
   d. LDV solenoid energized (valve switches to reheat coil flow) (Y/N) _____
4. Switch unit to DEHUMID (REHEAT) by turning Humidi-MiZer test to REHEAT under the COOL TEST menu. (Y/N) _____

OBSERVE

   a. Suction pressure increases to normal cooling level (Y/N) _____
   b. Discharge pressure decreases 30 to 50 PSI (Y/N) _____
   c. Liquid temperature returns to normal cooling level (Y/N) _____
   d. LDV solenoid energized (valve switches to reheat coil flow) (Y/N) _____
   e. RDV solenoid energized, valve opens for flow (Y/N) _____
5. Switch unit to OFF by turning Humidi-MiZer test to OFF under the COOL TEST menu. Compressor and outdoor fan stop, RDV or LDV solenoids de-energized. (Y/N) _____

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE