



Service and Maintenance Instructions

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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 alert to the potential for personal injury.

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

WARNING

ELECTRICAL SHOCK HAZARD

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

Before performing service or maintenance operations on unit, turn off main power switch to unit. Electrical shock and rotating equipment could cause injury.

WARNING

UNIT OPERATION AND SAFETY HAZARD

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

Puron (R-410A) refrigerant systems operate at higher pressures than standard R-22 systems. Do not use R-22 service equipment or components on Puron refrigerant equipment.

WARNING

FIRE, EXPLOSION HAZARD

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

Refer to the User's Information Manual provided with this unit for more details.

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

What to do if you smell gas:

DO NOT try to light any appliance.

DO NOT touch any electrical switch, or use any phone in your building.

IMMEDIATELY call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.

If you cannot reach your gas supplier, call the fire department.

⚠ WARNING

FIRE, EXPLOSION HAZARD

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

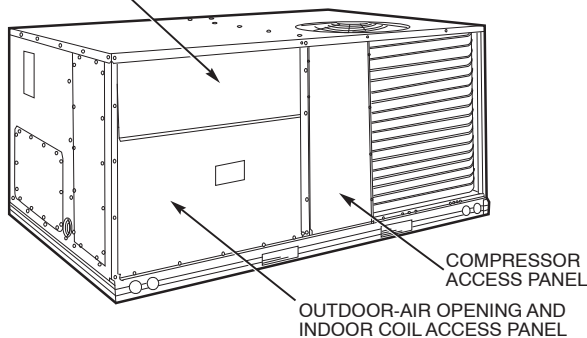
Disconnect gas piping from unit when pressure testing at pressure greater than 0.5 psig. Pressures greater than 0.5 psig will cause gas valve damage resulting in hazardous condition. If gas valve is subjected to pressure greater than 0.5 psig, it *must* be replaced before use. When pressure testing field-supplied gas piping at pressures of 0.5 psig or less, a unit connected to such piping must be isolated by closing the manual gas valve(s).

UNIT ARRANGEMENT AND ACCESS

General

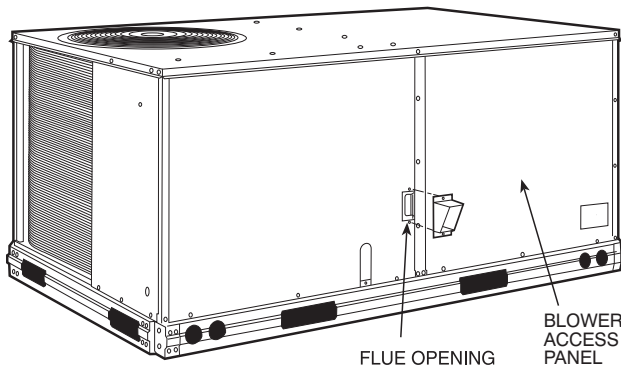
Fig. 1 and 2 show general unit arrangement and access locations.

FILTER ACCESS PANEL



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Fig. 1 - Typical Access Panel Locations



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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
- Belt tension checked

- Belt condition checked
- Pulley alignment checked
- Fan shaft bearing locking collar tightness checked
- 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

- Condenser Fan motor mounting bolts tightness
- Compressor mounting bolts
- Condenser fan blade positioning
- Control box cleanliness and wiring condition
- Wire Terminal tightness
- Refrigerant charge level
- Evaporator coil cleaning
- Evaporator Blower Motor Amperage

Heating

- Heat exchanger flue passageways cleanliness
- Gas burner condition
- Gas Manifold pressure
- Limit Switch operation
- Heating Temperature Rise

Economizer or Outside Air Damper

- 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.

Return Air Filters

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. 1.)

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).

IMPORTANT: DO NOT OPERATE THE UNIT WITHOUT THESE FILTERS!

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 spring clips under the top edge of the hood. (See Fig. 3.)

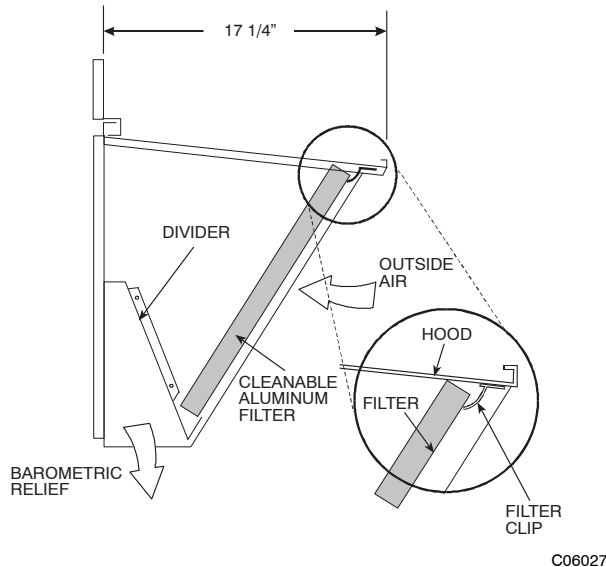


Fig. 3 - Filter Installation

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

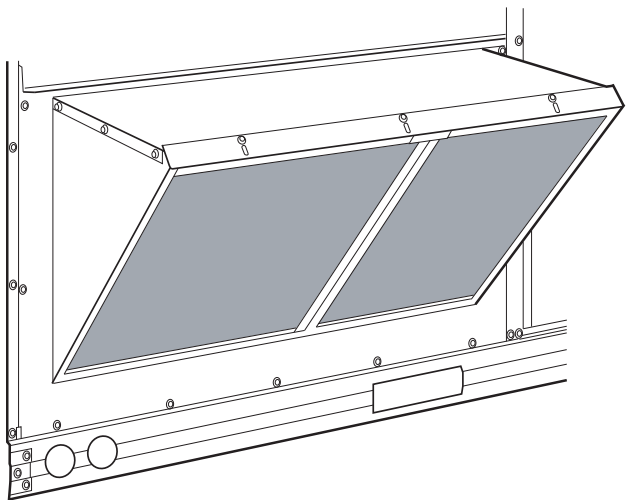


Fig. 4 - Screens Installed on Outdoor-Air Hood
(Sizes 7-1/2 to 12-1/2 Tons Shown)

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 tighten all screws.

SUPPLY FAN (BLOWER) SECTION

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

Before performing service or maintenance operations on the fan system, shut off all unit power and tag-out the unit disconnect switch. Do not reach into the fan section with power still applied to unit.

Supply Fan (Belt-Drive)

The supply fan system consists of a forward-curved centrifugal blower wheel on a solid shaft with two concentric type bearings, one on each side of the blower housing. A fixed-pitch driven pulley is attached to the fan shaft and an adjustable-pitch driver pulley is on the motor. The pulleys are connected using a "V" type belt. (See Fig. 5.)

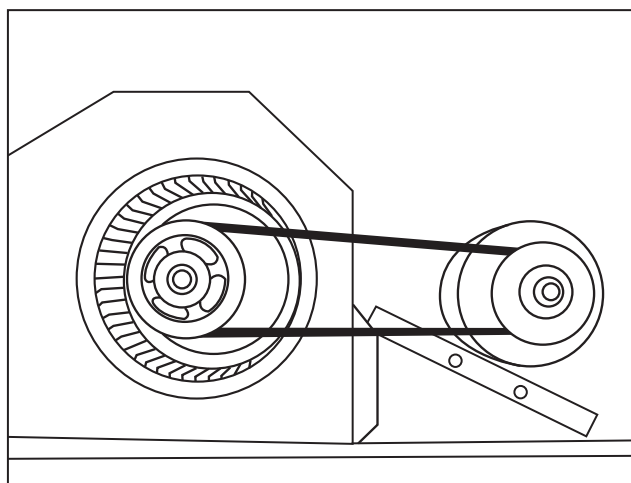


Fig. 5 - Belt Drive Motor Mounting

Belt

Check the belt condition and tension quarterly. Inspect the belt for signs of cracking, fraying or glazing along the inside surfaces. Check belt tension by using a spring-force tool (such as Browning's Part Number "Belt Tension Checker" or equivalent tool); tension should be 6-lbs at a 5/8-in. deflection when measured at the centerline of the belt span. This point is at the center of the belt when measuring the distance between the motor shaft and the blower shaft.

NOTE: Without the spring-tension tool, place a straight edge across the belt surface at the pulleys, then deflect the belt at mid-span using one finger to a 1/2-in. deflection.

Adjust belt tension by loosening the motor mounting plate front bolts and rear bolt and sliding the plate toward the fan (to reduce tension) or away from fan (to increase tension). Ensure the blower shaft and the motor shaft are parallel to each other (pulleys aligned). Tighten all bolts when finished.

To replace the belt:

1. Use a belt with same section type or similar size. Do not substitute a "FHP" type belt. When installing the new belt, do not use a tool (screwdriver or pry-bar) to force the belt over the pulley flanges, this will stress the belt and cause a reduction in belt life.
2. Loosen the motor mounting plate front bolts and rear bolts.

3. Push the motor and its mounting plate towards the blower housing as close as possible to reduce the center distance between fan shaft and motor shaft.
4. Remove the belt by gently lifting the old belt over one of the pulleys.
5. Install the new belt by gently sliding the belt over both pulleys and then sliding the motor and plate away from the fan housing until proper tension is achieved.
6. Check the alignment of the pulleys, adjust if necessary.
7. Tighten all bolts.
8. Check the tension after a few hours of runtime and re-adjust as required.

Adjustable-Pitch Pulley on Motor

The motor pulley is an adjustable-pitch type that allows a servicer to implement changes in the fan wheel speed to match as-installed ductwork systems. The pulley consists of a fixed flange side that faces the motor (secured to the motor shaft) and a movable flange side that can be rotated around the fixed flange side that increases or reduces the pitch diameter of this driver pulley. (See Fig. 6.)

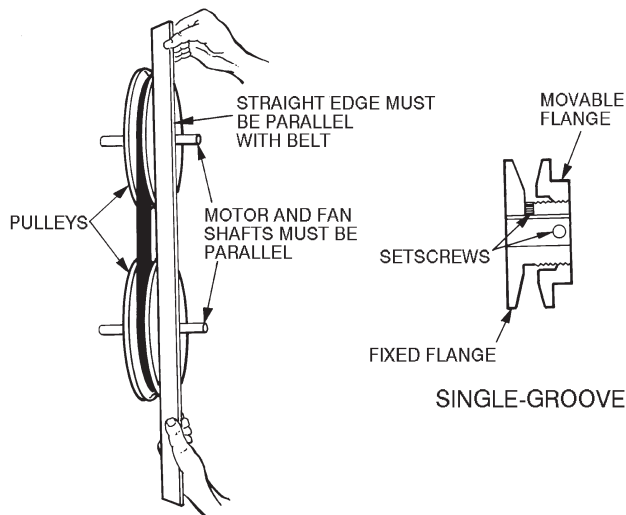


Fig. 6 - Supply-Fan Pulley Adjustment

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As the pitch diameter is changed by adjusting the position of the movable flange, the centerline on this pulley shifts laterally (along the motor shaft). This creates a requirement for a realignment of the pulleys after any adjustment of the movable flange. Also reset the belt tension after each realignment.

Check the condition of the motor pulley for signs of wear. Glazing of the belt contact surfaces and erosion on these surfaces are signs of improper belt tension and/or belt slippage. Pulley replacement may be necessary.

To change fan speed:

1. Shut off unit power supply.
2. Loosen belt by loosening fan motor mounting nuts. (See Fig. 5.)
3. Loosen movable pulley flange setscrew. (See Fig. 6.)

4. Screw movable flange toward fixed flange to increase speed and away from fixed flange to decrease speed. Increasing fan speed increases load on motor. Do not exceed maximum speed specified.
5. Set movable flange at nearest keyway of pulley hub and tighten setscrew to torque specifications.

To align fan and motor pulleys:

1. Loosen fan pulley setscrews.
2. Slide fan pulley along fan shaft. Make angular alignment by loosening motor from mounting.
3. Tighten fan pulley setscrews and motor mounting bolts to torque specifications.
4. Recheck belt tension.

Bearings

This fan system uses bearings with eccentric locking collars. The direction of tightening of these bearing collars is critical to the long-term success of these bearings. The locking collar must be tightened in the same rotational direction as its shaft rotates. (See Fig. 7.) If the motor is ever started backwards, the bearings collar may loosen. The correct fan rotation direction is stamped on the side of the blower housing. After correcting for fan wheel rotation, both (inside and outside) bearing collars must be retightened.

NOTE: Since the bearings are on opposite side of the fan, the direction of rotation on opposite sides will differ. If the pulley side rotation is counterclockwise, then the rotation direction of the collar on the opposite side bearing will be clockwise.

Use a drift pin and small hammer to tighten the locking collars. Loosen the locking collar set screw; engage the drift pin's punch end into the collar's socket and tap in the appropriate direction to tighten. Tighten the locking collar set screw to 60 +/- 6 in-lbs. Repeat on opposite side bearing.

Motor

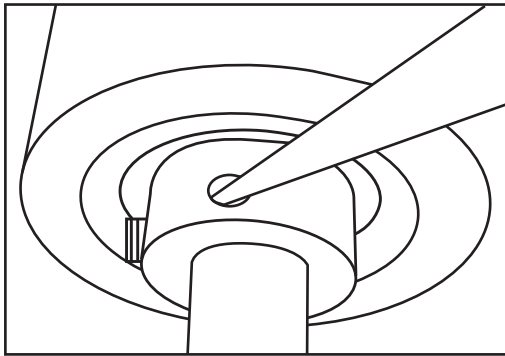
When replacing the motor, also replace the external-tooth lock washer (star washer) under the motor mounting base; this is part of the motor grounding system. Ensure the teeth on the lock washer are in contact with the motor's painted base. Tighten motor mounting bolts to 120 +/- 12 in-lbs.

Changing fan wheel speed by changing pulleys. The horsepower rating of the belt is primarily dictated by the pitch diameter of the smaller pulley in the drive system (typically the motor pulley in these units). Do not install a replacement motor pulley with a smaller pitch diameter than provided on the original factory pulley. Change fan wheel speed by changing the fan pulley (larger pitch diameter to reduce wheel speed, smaller pitch diameter to increase wheel speed) or select a new system (both pulleys and matching belt(s)).

Before changing pulleys to increase fan wheel speed, check the fan performance at the target speed and airflow rate to determine new motor loading (bhp). Use the fan performance tables or use the Packaged Rooftop Builder software program. Confirm that the motor in this unit is capable of operating at the new operating condition. Fan shaft loading increases dramatically as wheel speed is increased.

To reduce vibration, replace the motor's adjustable pitch pulley with a fixed pitch pulley (after the final airflow balance adjustment). This will reduce the amount of vibration generated by the motor/belt-drive system.

Pulley side:
Counterclockwise



Opposite Pulley side:
Clockwise

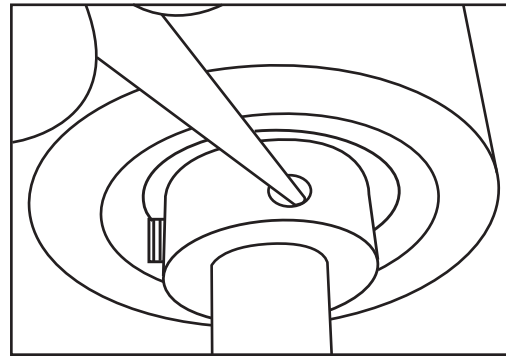


Fig. 7 - Tightening Locking Collar

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COOLING

⚠ WARNING

UNIT OPERATION AND SAFETY HAZARD

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

This system uses Puron® refrigerant which has higher pressures than R-22 and other refrigerants. No other refrigerant may be used in this system. Gauge set, hoses, and recovery system must be designed to handle Puron refrigerant. If unsure about equipment, consult the equipment manufacturer.

Condenser Coil

The condenser coil in this unit is a MicroChannel Heat Exchanger (MCHX) surface. The MCHX is an all-aluminum construction with fins over a single-depth crosstube. The crosstubes have multiple small passages through which the refrigerant passes from header to header on each end. (See Fig. 8.) The all-aluminum construction provides increased resistance to corrosion over aluminum fins on copper tubes in normal and mild marine applications; do not use in severe coastal or industrial environments.

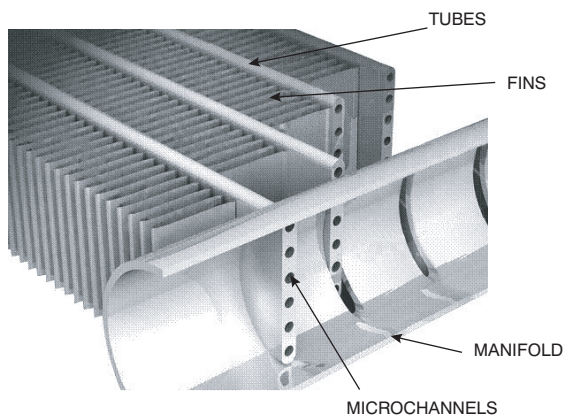


Fig. 8 - Microchannel Coils

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MCHX 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.

Routine Cleaning of Coil Surfaces

Monthly cleaning with Totaline® environmentally sound coil cleaner is essential to extend the life of coils. This cleaner is available from Carrier Replacement Components Division 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 environmentally sound 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 environmentally sound 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.

Totaline Environmentally Sound Coil Cleaner Application Equipment

- 2-1/2 gallon garden sprayer
- Water rinse with low velocity spray nozzle

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 the Totaline environmentally sound coil cleaner.

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.

Totaline Environmentally Sound 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 environmentally sound 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 environmentally sound 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.
8. Interior and exterior finned areas must be thoroughly cleaned.
9. Finned surfaces should remain wet with cleaning solution for 10 minutes.
10. Ensure surfaces are not allowed to dry before rinsing. Reapplying cleaner as needed to ensure 10-minute saturation is achieved.
11. 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.

Repairing Tube Leaks

RCD offers service repair kits for repairing tube leaks in the crosstubes. These kits include flame shields, flux and filler materials, braze gas tank and miscellaneous materials and instructions.

Replacing the MCHX Coil

The service replacement coil is preformed and is equipped with transition joints with copper stub tubes. When brazing the connection joints to the unit tubing, use a wet cloth around the aluminum tube at the transition joint. Avoid applying torch flame directly onto the aluminum tubing.

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 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, back-flush 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.

Evaporator Coil Metering Devices

The metering devices are multiple fixed-bore devices (Acutrol™) wedged into the horizontal outlet tubes from the liquid header, located at the entrance to each evaporator coil circuit path. These are non-adjustable. Service requires replacing the entire liquid header assembly.

To check for possible blockage of one or more of these metering devices, disconnect the supply fan contactor (IFC) coil, then start the compressor and observe the frosting pattern on the face of the evaporator coil. A frost pattern should develop uniformly across the face of the coil starting at each horizontal header tube. Failure to develop frost at an outlet tube can indicate a plugged or a missing orifice.

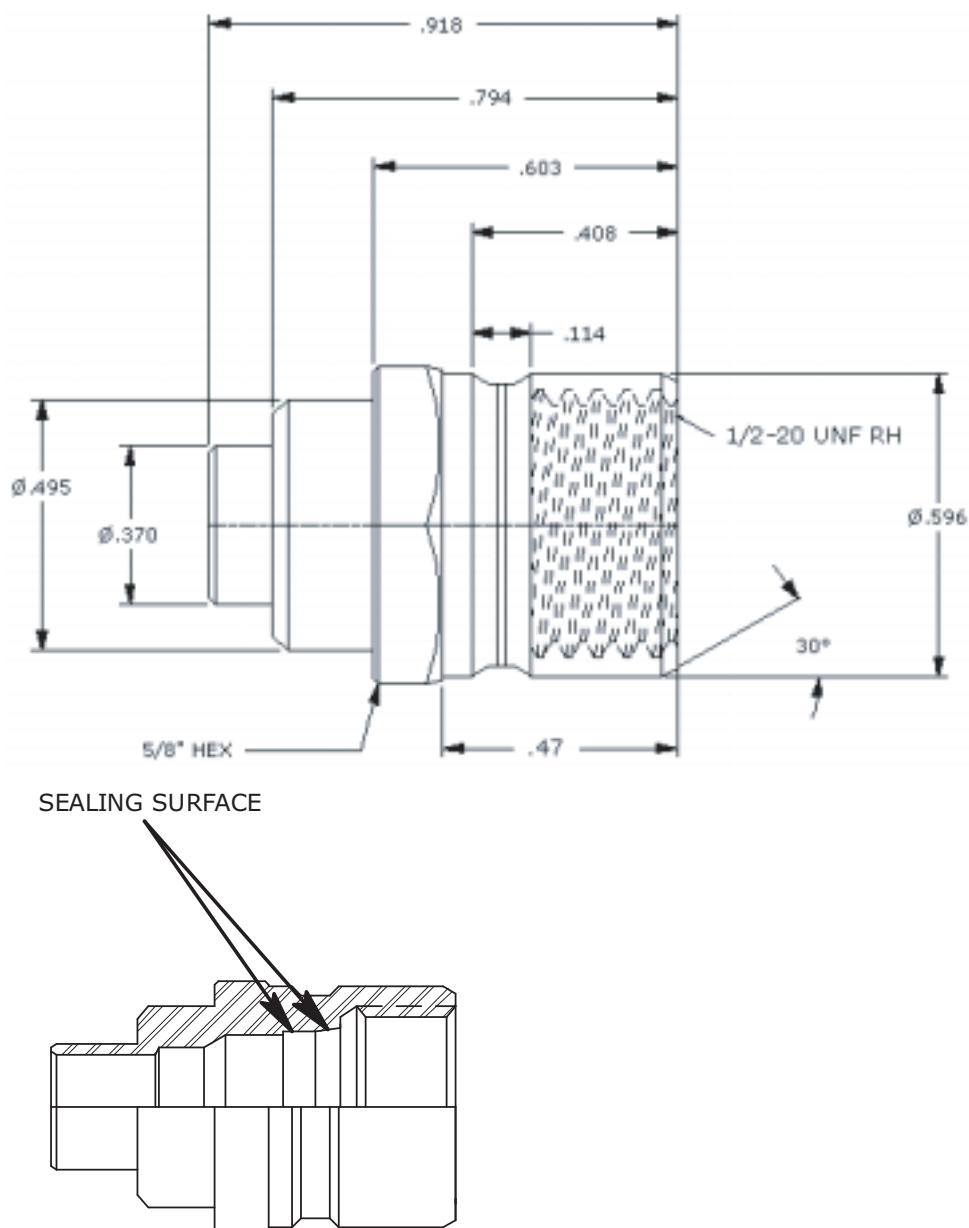


Fig. 9 - CoreMax Access Port Assembly

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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 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. 9.) 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-lbs of torque; do not overtighten.

PURON® (R-410A) REFRIGERANT

This unit is designed for use with Puron (R-410A) refrigerant. Do not use any other refrigerant in this system.

Puron (R-410A) is provided in pink (rose) colored cylinders. 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 (R-410A) is a 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 (R-410A) from the cylinder as a vapor.

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.

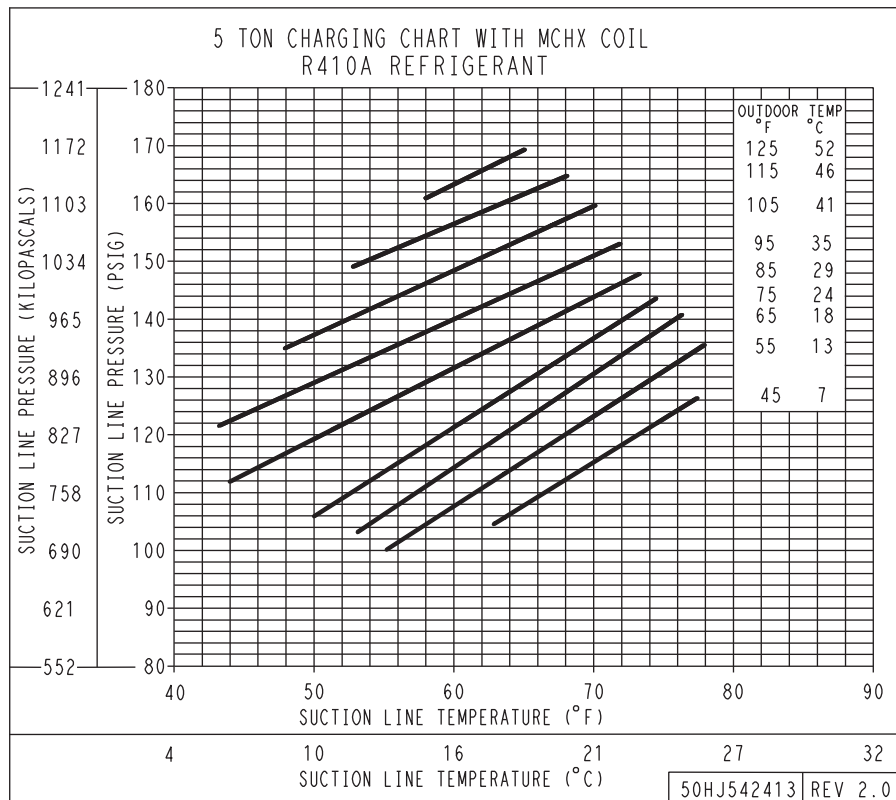


Fig. 10 - Cooling Charging Chart

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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 Chart, Fig. 10, 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 superheat for the various operating conditions. Accurate pressure gauge and temperature sensing device are required. Connect the pressure gauge to the service port on the suction line. Mount the temperature sensing device on the suction 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.

To Use Cooling Charging Charts

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

EXAMPLE:

Outdoor Temperature. 85°F
Suction Pressure 130 psig
Suction Temperature should be 58.5°F

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 Puron® 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.

Replacing Compressor

The compressor used with Puron refrigerant contains a POE oil. This oil has a high affinity for moisture. Do not remove the compressor's tube plugs until ready to insert the unit suction and discharge tube ends.

Compressor mounting bolt torque is 65-75 ft-lbs.

Compressor Rotation

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:

- Note that the evaporator fan is probably also rotating in the wrong direction.
- Turn off power to the unit.
- Reverse any two of the unit power leads.
- Reapply power to the compressor.

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 makes an elevated level of noise and does not provide cooling.

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

Condenser-Fan Location

See Fig. 11.

- Shut off unit power supply. Install lockout tag.
- Remove condenser-fan assembly (grille, motor, and fan).
- Loosen fan hub setscrews.
- Adjust fan height as shown in Fig. 11.
- Tighten setscrews.
- Replace condenser-fan assembly.

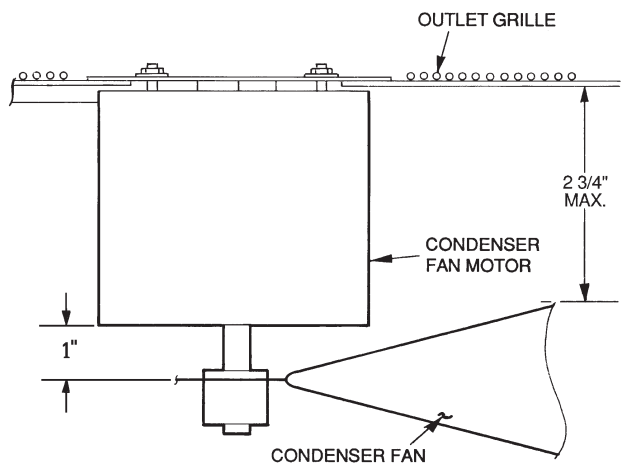


Fig. 11 - Condenser Fan Adjustment

Troubleshooting Cooling System

Refer to Table 1 for additional troubleshooting topics.

PROTECTIVE DEVICES

Compressor Protection

Overcurrent

The compressor has internal linebreak 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 when hot. Reset is automatic at 505 psig.

Loss-of-Charge Switch

The system is protected against a loss of charge condition by a switch mounted on the liquid line. The switch is stem-mounted and brazed into the liquid line. Trip setting is 27 psig +/- 3 psig. Reset is automatic at 44 psig.

Evaporator Freeze Protection

The system is protected against evaporator coil frosting and low temperature conditions by a temperature switch mounted on the evaporator coil hairpin. Trip setting is 30°F +/- 5°F. Reset is automatic at 45°F.

Supply (Indoor) Fan Motor Protection

Disconnect and lockout power when servicing fan motor.

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

The High Static option supply fan motor is equipped with a pilot-circuit Thermix combination overtemperature/overcurrent 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.

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 5-A fuse located on the Low Voltage Terminal Block.

Table 1 – Cooling Service Analysis

PROBLEM	CAUSE	REMEDY
Compressor and Condenser Fan Will Not Start.	Power failure.	Call power company.
	Fuse blown or circuit breaker tripped.	Replace fuse or reset circuit breaker.
	Defective thermostat, contactor, transformer, or con-trol relay.	Replace component.
	Insufficient line voltage.	Determine cause and correct.
	Incorrect or faulty wiring.	Check wiring diagram and rewire correctly.
Compressor Will Not Start But Condenser Fan Runs.	Thermostat setting too high.	Lower thermostat setting below room temperature.
	Faulty wiring or loose connections in compressor circuit.	Check wiring and repair or replace.
	Compressor motor burned out, seized, or internal overload open.	Determine cause. Replace compressor.
	Defective run/start capacitor, overload, start relay.	Determine cause and replace.
	One leg of three-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 condenser.	Determine cause and correct.
	Defective run/start capacitor, overload, or start relay.	Determine cause and replace.
	Defective thermostat.	Replace thermostat.
	Faulty condenser – fan motor or capacitor.	Replace.
	Restriction in refrigerant system.	Locate restriction and remove.
	Dirty air filter.	Replace filter.
	Unit undersized for load.	Decrease load or increase unit size.
Compressor Operates Continuously.	Thermostat set too low.	Reset thermostat.
	Low refrigerant charge.	Locate leak; repair and recharge.
	Leaking valves in compressor.	Replace compressor.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Condenser coil dirty or restricted.	Clean coil or remove restriction.
Excessive Head Pressure.	Dirty air filter.	Replace filter.
	Dirty condenser coil.	Clean coil.
	Refrigerant overcharged.	Recover excess refrigerant.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Condenser air restricted or air short – cycling.	Determine cause and correct.
Head Pressure Too Low.	Low refrigerant charge.	Check for leaks; repair and recharge.
	Compressor valves leaking.	Replace compressor.
	Restriction in liquid tube.	Remove restriction.
Excessive Suction Pressure.	High head load.	Check for source and eliminate.
	Compressor valves leaking.	Replace compressor.
	Refrigerant overcharged.	Recover excess refrigerant.
Suction Pressure Too Low.	Dirty air filter.	Replace filter.
	Low refrigerant charge.	Check for leaks; repair and recharge.
	Metering device or low side restricted.	Remove source of restriction.
	Insufficient evaporator airflow.	Increase air quantity. Check filter and replace if necessary.
	Temperature too low in conditioned area.	Reset thermostat.
	Outdoor ambient below 25 F.	Install low – ambient kit.
Evaporator Fan Will Not Shut Off.	Time off delay not finished.	Wait for 30-second off delay.
Compressor Makes Excessive Noise.	Compressor rotating in wrong direction.	Reverse the 3-phase power leads.

GAS HEATING SYSTEM (48TM)

General

The heat exchanger system consists of a gas valve feeding multiple inshot burners off a manifold. The burners fire into matching primary tubes. The primary tubes discharge into combustion plenum where gas flow converges into secondary tubes. The secondary tubes exit into the induced draft fan wheel inlet. The induced fan wheel discharges into a flue passage and flue gases exit out a flue hood on the side of the unit. The induced draft fan motor includes a Hall Effect sensor circuit that establishes wheel speed via the Integrated Ignition Control (IGC) board. Safety switches include a Rollout Switch (at the top of the burner compartment) and a limit switch (mounted through the fan deck, over the tubes). (See Fig. 12 and 13.)

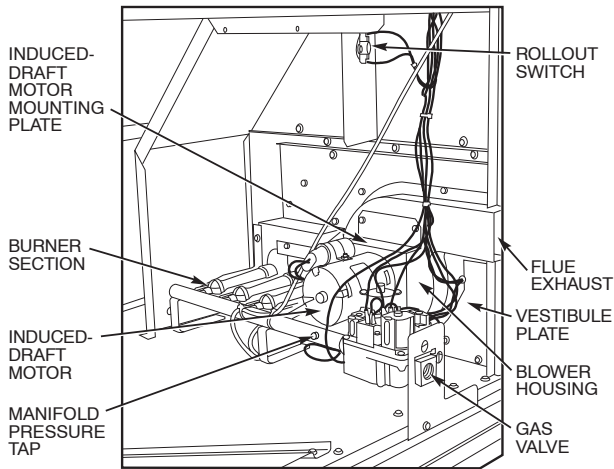


Fig. 12 - Burner Section Details

C06152

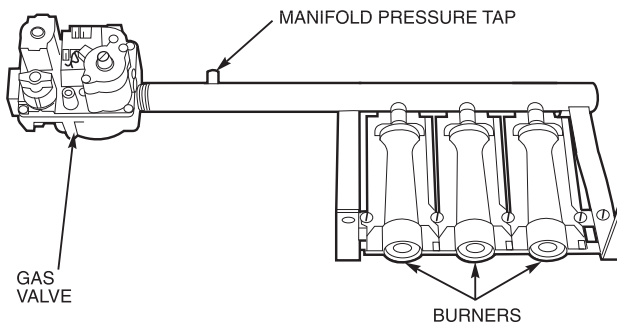


Fig. 13 - Burner Tray Details

C06153

Flue Gas Passageways

To inspect the flue collector box and upper areas of the heat exchanger:

1. Remove the combustion blower wheel and motor assembly according to directions in Combustion-Air Blower section.
2. Remove the flue cover to inspect the heat exchanger.
3. Clean all surfaces as required using a wire brush.

Combustion-Air Blower

Clean periodically to assure proper airflow and heating efficiency. Inspect blower wheel every fall and periodically during heating season. For the first heating season, inspect blower wheel bi-monthly to determine proper cleaning frequency.

To access burner section, slide the sliding burner partition out of the unit.

To inspect blower wheel, shine a flashlight into draft hood opening. If cleaning is required, remove motor and wheel as follows:

1. Slide burner access panel out.
2. Remove the 7 screws that attach induced-draft motor housing to vestibule plate. (See Fig. 15.)
3. The blower wheel can be cleaned at this point. If additional cleaning is required, continue with Steps 4 and 5.
4. To remove blower from the motor shaft, remove 2 setscrews.
5. To remove motor, remove the 4 screws that hold the motor to mounting plate. Remove the motor cooling fan by removing one setscrew. Then remove nuts that hold motor to mounting plate.
6. To reinstall, reverse the procedure outlined above.

Burners and Igniters

Main Burners

To access burners, remove burner access panel and slide out burner partition. At the beginning of each heating season, inspect for deterioration or blockage due to corrosion or other causes. Observe the main burner flames and adjust, if necessary.

⚠ CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

When working on gas train, do not hit or plug orifice spuds.

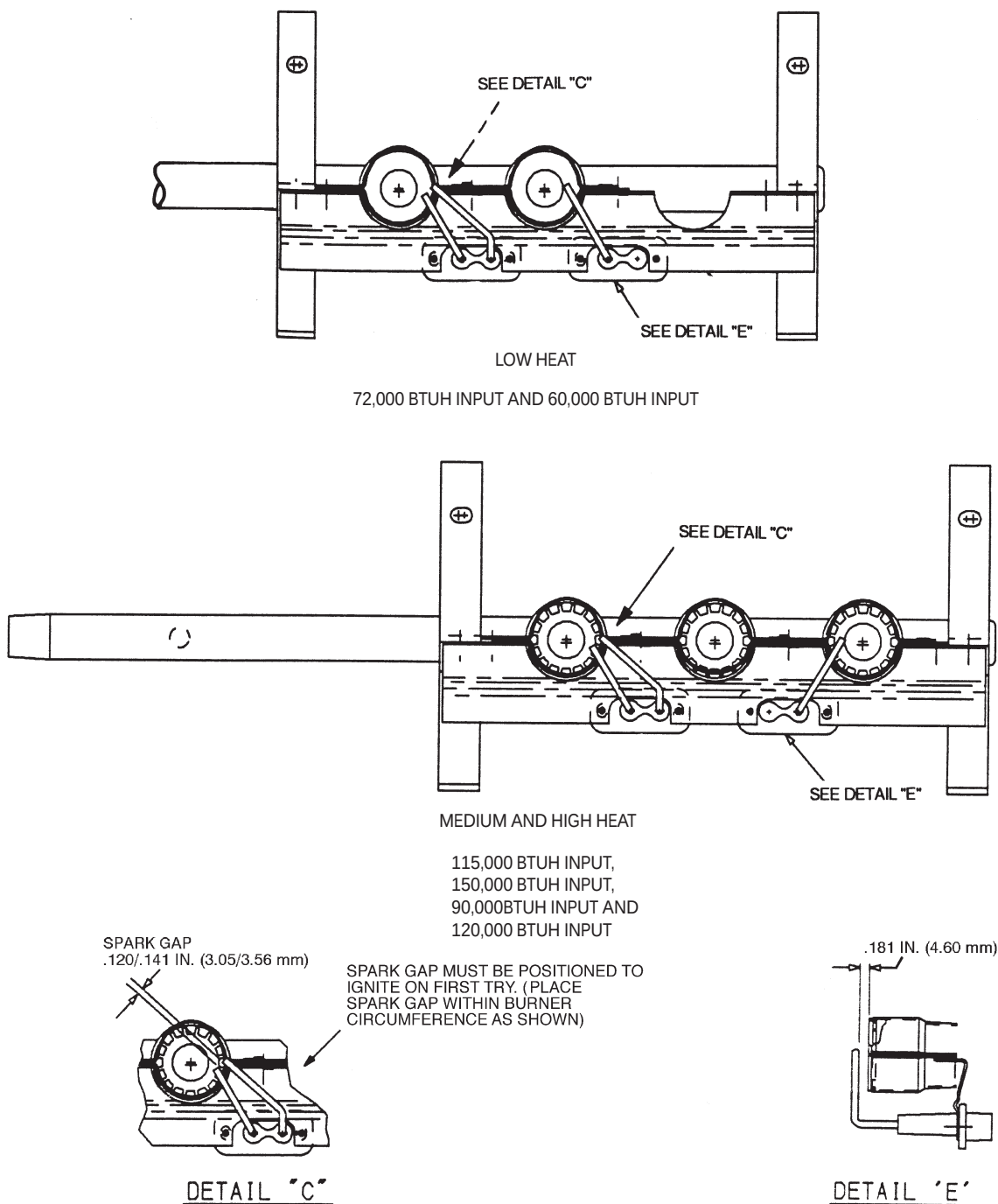


Fig. 14 - Spark Adjustment

C06154

Removal and Replacement of Gas Train (Fig. 12-14)

1. Shut off manual gas valve.
2. Shut off power to unit.
3. Slide out burner partition.
4. Disconnect gas piping at unit gas valve.
5. Remove wires connected to gas valve. Mark each wire.
6. Remove igniter wires and sensor wires at the Integrated Gas Unit Controller (IGC). (See Fig. 15.)
7. Remove the 2 screws that attach the burner rack to the vestibule plate (Fig. 12).
8. Slide the burner tray out of the unit (Fig. 13).
9. To reinstall, reverse the procedure outlined above.

Cleaning and Adjustment

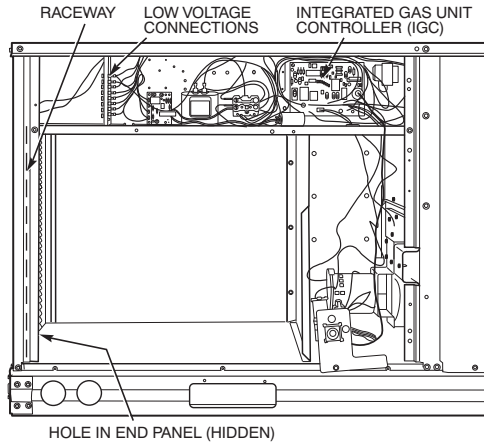
1. Remove burner rack from unit as described in Removal and Replacement of Gas Train section, above.
2. Inspect burners; if dirty, remove burners from rack.
3. Use a soft brush to clean burners and cross-over port as required.
4. Adjust spark gap. (See Fig. 14.)
5. Reinstall burners on rack.
6. Reinstall burner rack as described in Removal and Replacement of Gas Train section, above.

Limit Switch

Remove blower access panel. Limit switch is located on the fan deck.

Burner Ignition

Unit is equipped with a direct spark ignition 100% lockout system. Integrated Gas Unit Controller (IGC) is located in the control box. The IGC contains a self-diagnostic LED (light-emitting diode). A single LED on the IGC provides a visual display of operational or sequential problems when the power supply is uninterrupted. When a break in power occurs, the IGC will be reset (resulting in a loss of fault history) and the indoor (evaporator) fan ON/OFF times will be reset. The LED error code can be observed through the viewport. During servicing refer to the label on the control box cover or Table 2 for an explanation of LED error code descriptions. If lockout occurs, unit may be reset by interrupting power supply to unit for at least 5 seconds.



C07083

Fig. 15 - Unit Control Box/IGC Location

Table 2 – LED Error Code Description*

LED INDICATION	ERROR CODE DESCRIPTION
ON	Normal Operation
OFF	Hardware Failure
1 Flash†	Evaporator Fan On/Off Delay Modified
2 Flashes	Limit Switch Fault
3 Flashes	Flame Sense Fault
4 Flashes	4 Consecutive Limit Switch Faults
5 Flashes	Ignition Lockout Fault
6 Flashes	Induced-Draft Motor Fault
7 Flashes	Rollout Switch Fault
8 Flashes	Internal Control Fault
9 Flashes	Software Lockout

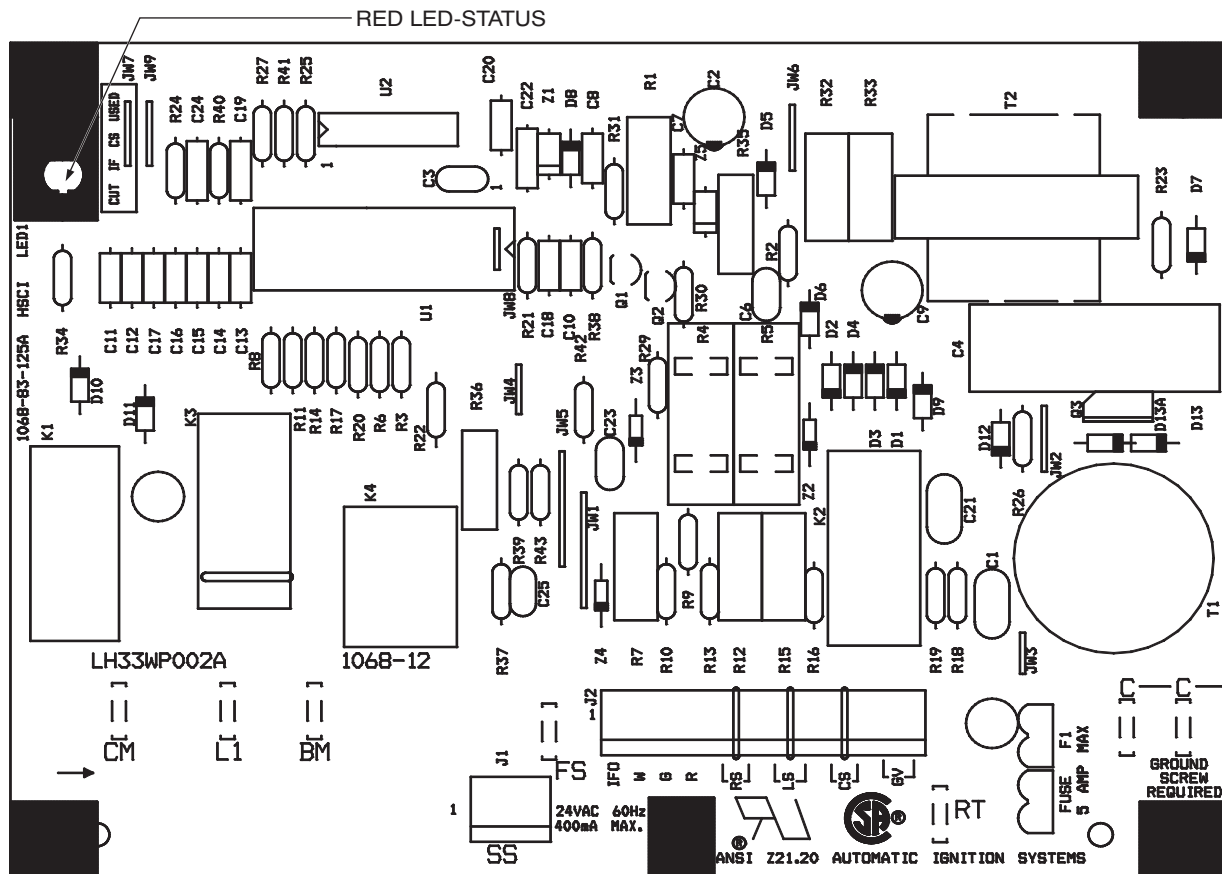
LEGEND

LED – Light Emitting Diode

* A 3-second pause exists between LED error code flashes. If more than one error code exists, all applicable codes will be displayed in numerical sequence.

† Indicates a code that is not an error. The unit will continue to operate when this code is displayed.

IMPORTANT: Refer to Troubleshooting Table 7 and 8 for additional information.



C07028

Fig. 16 - Integrated Gas Control (IGC) Board

Table 3 – IGC Connections

TERMINAL LABEL	POINT DESCRIPTION	SENSOR LOCATION	TYPE OF I/O	CONNECTION PIN NUMBER
INPUTS				
RT, C	Input power from TRAN 1	control box	24 VAC	—
SS	Speed sensor	gas section	analog input	J1, 1-3
FS, T1	Flame sensor	gas section	switch input	—
W	Heat stage 1	MBB	24 VAC	J2, 2
RS	Rollout switch	gas section	switch input	J2, 5-6
LS	Limit switch	gas section	switch input	J2, 7-8
CS	Centrifugal switch (not used)	—	switch input	J2, 9-10
OUTPUTS				
L1, CM	Induced draft combustion motor	gas section	line VAC	
IFO	Indoor fan	MBB	relay	J2, 1
GV	Gas valve (heat stage 1)	gas section	relay	J2, 11-12

Orifice Replacement

This unit uses orifice type LH32RFnnn (where nnn indicates orifice reference size). When replacing unit orifices, order the necessary parts via Carrier RCD. See Table 4 for available orifice sizes. See Table 5 and 6 for orifice sizes for Natural Gas and LP fuel usage at various elevations above sea level.

Table 4 – Orifice Sizes

Orifice Drill Size	Carrier Part Number	Drill Dia (in.)
#30	LH32RF129	0.1285
1/8	LH32RF125	0.1250
#31	LH32RF120	0.1200
#32	LH32RF116	0.1160
#33	LH32RF113	0.1130
#34	LH32RF111	0.1110
#35	LH32RF110	0.1100
#36	LH32RF105	0.1065
#37	LH32RF104	0.1040
#38	LH32RF102	0.1015
#39	LH32RF103	0.0995
#40	LH32RF098	0.0980
#41	LH32RF096	0.0960
#42	LH32RF094	0.0935
#43	LH32RF089	0.0890
#44	LH32RF086	0.0860
#45	LH32RF082	0.0820
#46	LH32RF080	0.0810
#47	LH32RF079	0.0785
#48	LH32RF076	0.0760
#49	LH32RF073	0.0730
#50	LH32RF070	0.0700
#51	LH32RF067	0.0670
#52	LH32RF065	0.06495
#53	LH32RF060	0.0595
#54	LH32RF055	0.0550

Table 5 – Altitude Compensation* - Standard Units

ELEVATION (ft)	72,000, 74,000 AND 115,000 BTUH NOMINAL INPUT		150,000 BTUH NOMINAL INPUT	
	Natural Gas Orifice Size†	Liquid Propane Orifice Size†	Natural Gas Orifice Size†	Liquid Propane Orifice Size†
0–2,000	33	43	30	37
2,000	36	44	31	39
3,000	36	45	31	40
4,000	37	45	32	41
5,000	38	46	32	42
6,000	40	47	34	43
7,000	41	48	35	43
8,000	42	49	36	44
9,000	43	50	37	45
10,000	44	50	39	46
11,000	45	51	41	47
12,000	46	52	42	48
13,000	47	52	43	49
14,000	48	53	44	50

*As the height above sea level increases, there is less oxygen per cubic foot of air. Therefore, heat input rate should be reduced at higher altitudes.

† Orifices available through your Carrier distributor.

Table 6 – Altitude Compensation* - Low NOx Units

ELEVATION (ft)	60,000 AND 90,000 BTUH NOMINAL INPUT		120,000 BTUH NOMINAL INPUT	
	Natural Gas Orifice Size†	Liquid Propane Orifice Size†	Natural Gas Orifice Size	Liquid Propane Orifice Size†
0–2,000	38	45	32	42
2,000	40	47	33	43
3,000	41	48	35	43
4,000	42	49	36	44
5,000	43	49	37	45
6,000	43	50	38	45
7,000	44	50	39	46
8,000	45	51	41	47
9,000	46	52	42	48
10,000	47	52	43	49
11,000	48	53	44	50
12,000	49	53	44	51
13,000	50	54	46	52
14,000	51	54	47	52

*As the height above sea level increases, there is less oxygen per cubic foot of air. Therefore, heat input rate should be reduced at higher altitudes.

† Orifices available through your Carrier distributor.

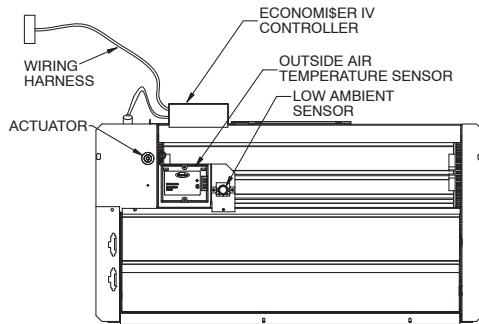
Troubleshooting Heating System

Refer to Table 7 and 8 for additional troubleshooting topics.

ECONOMIZER SYSTEMS

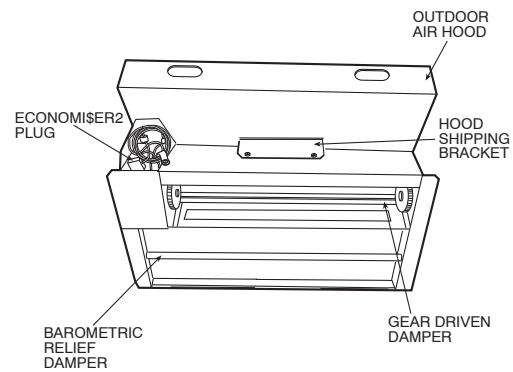
The 48/50TM-P units may be equipped with a factory-installed or accessory (field-installed) economizer system. Two types are available: with a logic control system (EconoMi\$er IV) and without a control system (EconoMi\$er2, for use with external control systems such as PremierLink™). See Fig 17 and 18 for component locations on each type. See Fig. 19 and 20 for economizer section wiring diagrams.

Both economizers use direct-drive damper actuators.



C06021

Fig. 17 - EconoMi\$er IV Component Locations



C06022

Fig. 18 - EconoMi\$er2 Component Locations

Table 7 – Heating Service Analysis

PROBLEM	CAUSE	REMEDY
Burners Will Not Ignite.	Misaligned spark electrodes.	Check flame ignition and sensor electrode positioning. Adjust as needed.
	No gas at main burners.	Check gas line for air, purge as necessary. After purging gas line of air, allow gas to dissipate for at least 5 minutes before attempting to relight unit. Check gas valve.
	Water in gas line.	Drain water and install drip leg to trap water.
	No power to furnace.	Check power supply, fuses, wiring, and circuit breaker.
	No 24 v power supply to control circuit.	Check transformer. Transformers with internal overcurrent protection require a cool down period before resetting.
	Miswired or loose connections.	Check all wiring and wire nut connections.
	Burned-out heat anticipator in thermostat.	Replace thermostat.
	Broken thermostat wires.	Run continuity check. Replace wires, if necessary.
Inadequate Heating.	Dirty air filter.	Clean or replace filter as necessary.
	Gas input to unit too low.	Check gas pressure at manifold. Clock gas meter for input. If too low, increase manifold pressure, or replace with correct orifices.
	Unit undersized for application.	Replace with proper unit or add additional unit.
	Restricted airflow.	Clean filter, replace filter, or remove any restrictions.
	Blower speed too low.	Use high speed tap, increase fan speed, or install optional blower, as suitable for individual units.
	Limit switch cycles main burners.	Check rotation of blower, thermostat heat anticipator settings, and temperature rise of unit. Adjust as needed.
	Too much outdoor air.	Adjust minimum position. Check economizer operation.
Poor Flame Characteristics.	Incomplete combustion (lack of combustion air) results in: Aldehyde odors, CO, sooting flame, or floating flame.	Check all screws around flue outlets and burner compartment. Tighten as necessary.
		Cracked heat exchanger.
		Overfired unit — reduce input, change orifices, or adjust gas line or manifold pressure.
		Check vent for restriction. Clean as necessary.
		Check orifice to burner alignment.
Burners Will Not Turn Off.	Unit is locked into Heating mode for a one minute minimum.	Wait until mandatory one-minute time period has elapsed or reset power to unit.

Table 8 – IGC Board LED Alarm Codes

LED FLASH CODE	DESCRIPTION	ACTION TAKEN BY CONTROL	RESET METHOD	PROBABLE CAUSE
On	Normal Operation	—	—	—
Off	Hardware Failure	No gas heating.	—	Loss of power to the IGC. Check 5 amp fuse on IGC, power to unit, 24V circuit breaker, transformer, and wiring to the IGC.
1 Flash	Indoor Fan On/Off Delay Modified	5 seconds subtracted from On delay. 5 seconds added to Off delay (3 min max).	Power reset.	High temperature limit switch opens during heat exchanger warm-up period before fan-on delay expires. High temperature limit switch opens within 10 minutes of heat call (W) Off. See Limit Switch Fault.
2 Flashes	Limit Switch Fault	Gas valve and igniter Off. Indoor fan and inducer On.	Limit switch closed, or heat call (W) Off.	High temperature limit switch is open. Check the operation of the indoor (evaporator) fan motor. Ensure that the supply-air temperature rise is within the range on the unit nameplate. Check wiring and limit switch operation.
3 Flashes	Flame Sense Fault	Indoor fan and inducer On.	Flame sense normal. Power reset for LED re-set.	The IGC sensed a flame when the gas valve should be closed. Check wiring, flame sensor, and gas valve operation.
4 Flashes	Four Consecutive Limit Switch Fault	No gas heating.	Heat call (W) Off. Power reset for LED re-set.	4 consecutive limit switch faults within a single call for heat. See Limit Switch Fault.
5 Flashes	Ignition Fault	No gas heating.	Heat call (W) Off. Power reset for LED re-set.	Unit unsuccessfully attempted ignition for 15 minutes. Check igniter and flame sensor electrode spacing, gaps, etc. Check flame sense and igniter wiring. Check gas valve operation and gas supply.
6 Flashes	Induced Draft Motor Fault	If heat off: no gas heating. If heat on: gas valve Off and inducer On.	Inducer sense normal, or heat call (W) Off.	Inducer sense On when heat call Off, or inducer sense Off when heat call On. Check wiring, voltage, and operation of IGC motor. Check speed sensor wiring to IGC.
7 Flashes	Rollout Switch Lockout	Gas valve and igniter Off. Indoor fan and inducer On.	Power reset.	Rollout switch has opened. Check gas valve operation. Check induced-draft blower wheel is properly secured to motor shaft.
8 Flashes	Internal Control Lockout	No gas heating.	Power reset.	IGC has sensed internal hardware or software error. If fault is not cleared by resetting 24 v power, replace the IGC.
9 Flashes	Temporary Software Lockout	No gas heating.	1 hour auto reset, or power reset.	Electrical interference is disrupting the IGC software.

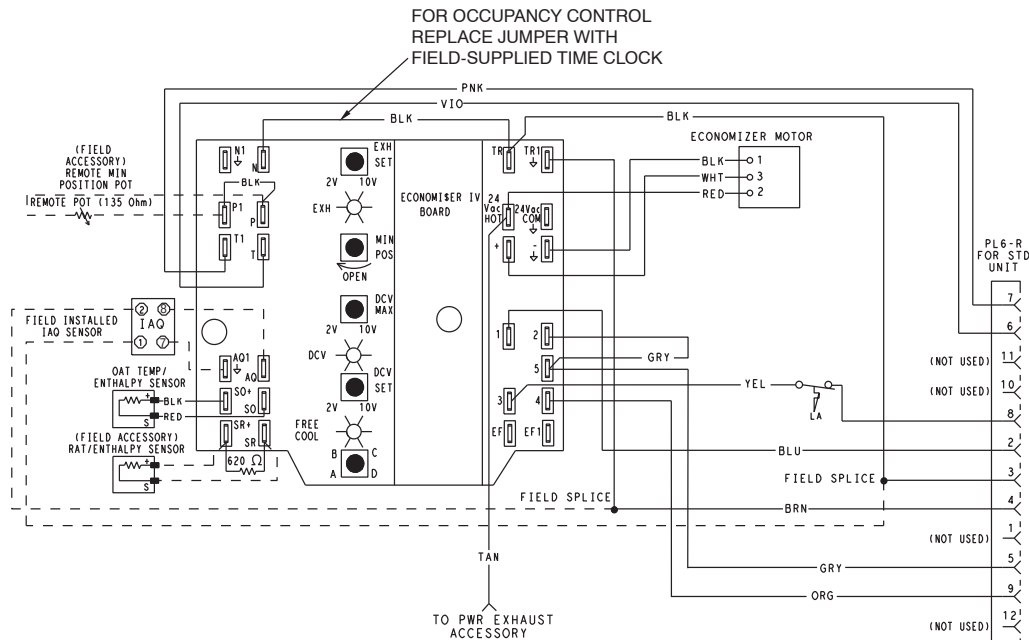
LEGEND

IGC — Integrated Gas Unit Control

LED — Light-Emitting Diode

NOTES:

1. There is a 3-second pause between alarm code displays.
2. If more than one alarm code exists, all applicable alarm codes will be displayed in numerical sequence.
3. Alarm codes on the IGC will be lost if power to the unit is interrupted.



LEGEND

DCV — Demand Controlled Ventilation
IAQ — Indoor Air Quality
LA — Low Ambient Lockout Device
OAT — Outdoor-Air Temperature
POT — Potentiometer
RAT — Return-Air Temperature

Potentiometer Defaults Settings:
Power Exhaust Middle
Minimum Pos. Fully Closed
DCV Max. Middle
DCV Set Middle
Enthalpy C Setting

NOTES:

1. 620 ohm, 1 watt 5% resistor should be removed only when using differential enthalpy or dry bulb.
2. If a separate field-supplied 24 v transformer is used for the IAQ sensor power supply, it cannot have the secondary of the transformer grounded.
3. For field-installed remote minimum position POT, remove black wire jumper between P and P1 and set control minimum position POT to the minimum position.

Fig. 19 - EconoMiSer IV Wiring

C06028

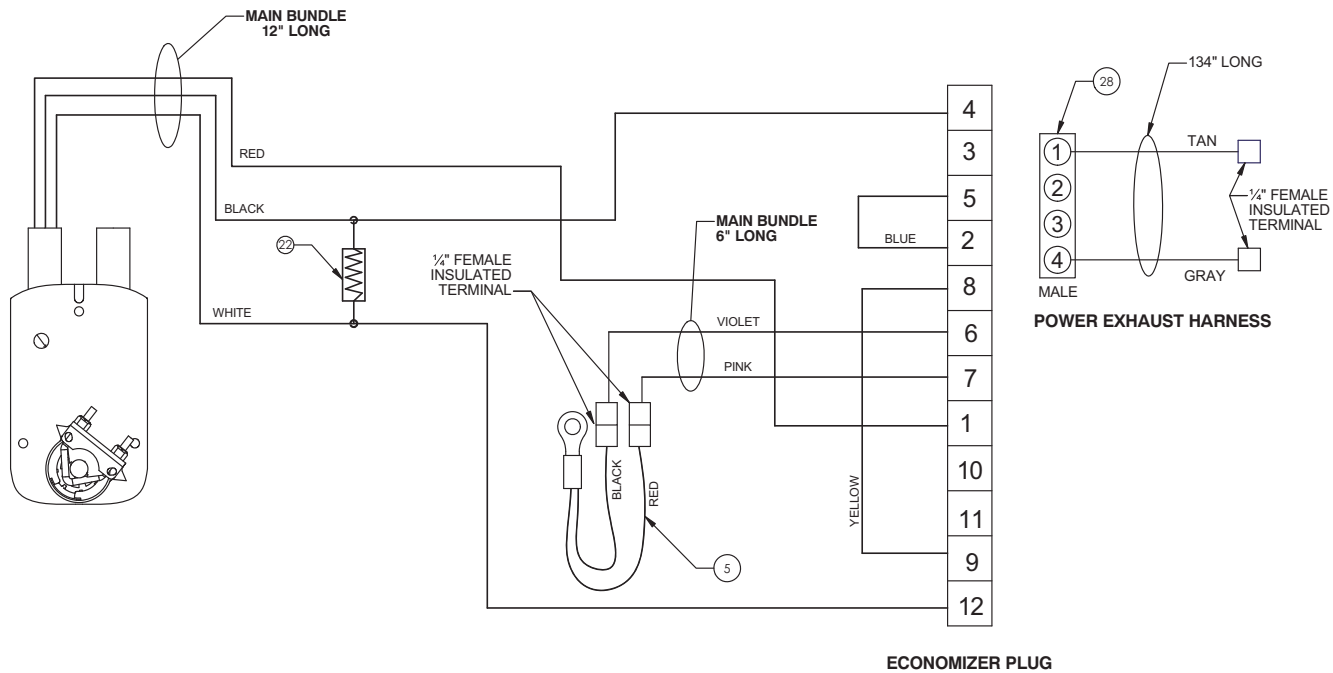


Fig. 20 - EconoMiSer2 with 4 to 20 mA Control Wiring

C07309

EconoMiSer IV

Troubleshooting instructions are enclosed.

A functional view of the EconoMiSer is shown in Fig. 21. Typical settings, sensor ranges, and jumper positions are also shown. An EconoMiSer IV simulator program is available from Carrier to help with EconoMiSer IV training and troubleshooting.

EconoMiSer IV Preparation

This procedure is used to prepare the EconoMiSer IV for troubleshooting. No troubleshooting or testing is done by performing the following procedure.

NOTE: This procedure requires a 9-v battery, 1.2 kilo-ohm resistor, and a 5.6 kilo-ohm resistor which are not supplied with the EconoMiSer IV.

IMPORTANT: Be sure to record the positions of all potentiometers before starting troubleshooting.

1. Disconnect power at TR and TR1. All LEDs should be off. Exhaust fan contacts should be open.
2. Disconnect device at P and P1.
3. Jumper P to P1.
4. Disconnect wires at T and T1. Place 5.6 kilo-ohm resistor across T and T1.
5. Jumper TR to 1.
6. Jumper TR to N.
7. If connected, remove sensor from terminals SO and +. Connect 1.2 kilo-ohm 4074EJM checkout resistor across terminals SO and +.
8. Put 620-ohm resistor across terminals SR and +.
9. Set minimum position, DCV set point, and exhaust potentiometers fully CCW (counterclockwise).
10. Set DCV maximum position potentiometer fully CW (clockwise).
11. Set enthalpy potentiometer to D.
12. Apply power (24 vac) to terminals TR and TR1.

Differential Enthalpy

To check differential enthalpy:

1. Make sure EconoMiSer IV preparation procedure has been performed.
2. Place 620-ohm resistor across SO and +.
3. Place 1.2 kilo-ohm resistor across SR and +. The Free Cool LED should be lit.
4. Remove 620-ohm resistor across SO and +. The Free Cool LED should turn off.
5. Return EconoMiSer IV settings and wiring to normal after completing troubleshooting.

Single Enthalpy

To check single enthalpy:

1. Make sure EconoMiSer IV preparation procedure has been performed.
2. Set the enthalpy potentiometer to A (fully CCW). The Free Cool LED should be lit.
3. Set the enthalpy potentiometer to D (fully CW). The Free Cool LED should turn off.
4. Return EconoMiSer IV settings and wiring to normal after completing troubleshooting.

DCV (Demand Controlled Ventilation) and Power Exhaust

To check DCV and Power Exhaust:

1. Make sure EconoMiSer IV preparation procedure has been performed.
2. Ensure terminals AQ and AQ1 are open. The LED for both DCV and Exhaust should be off. The actuator should be fully closed.
3. Connect a 9-v battery to AQ (positive node) and AQ1 (negative node). The LED for both DCV and Exhaust should turn on. The actuator should drive to between 90 and 95% open.
4. Turn the Exhaust potentiometer CW until the Exhaust LED turns off. The LED should turn off when the potentiometer is approximately 90%. The actuator should remain in position.

- Turn the DCV set point potentiometer CW until the DCV LED turns off. The DCV LED should turn off when the potentiometer is approximately 9-v. The actuator should drive fully closed.
- Turn the DCV and Exhaust potentiometers CCW until the Exhaust LED turns on. The exhaust contacts will close 30 to 120 seconds after the Exhaust LED turns on.
- Return EconoMi\$er IV settings and wiring to normal after completing troubleshooting.

DCV Minimum and Maximum Position

To check the DCV minimum and maximum position:

- Make sure EconoMi\$er IV preparation procedure has been performed.
- Connect a 9-v battery to AQ (positive node) and AQ1 (negative node). The DCV LED should turn on. The actuator should drive to between 90 and 95% open.
- Turn the DCV Maximum Position potentiometer to midpoint. The actuator should drive to between 20 and 80% open.
- Turn the DCV Maximum Position potentiometer to fully CCW. The actuator should drive fully closed.
- Turn the Minimum Position potentiometer to midpoint. The actuator should drive to between 20 and 80% open.
- Turn the Minimum Position Potentiometer fully CW. The actuator should drive fully open.
- Remove the jumper from TR and N. The actuator should drive fully closed.
- Return EconoMi\$er IV settings and wiring to normal after completing troubleshooting.

Supply-Air Sensor Input

To check supply-air sensor input:

- Make sure EconoMi\$er IV preparation procedure has been performed.
- Set the Enthalpy potentiometer to A. The Free Cool LED turns on. The actuator should drive to between 20 and 80% open.
- Remove the 5.6 kilo-ohm resistor and jumper T to T1. The actuator should drive fully open.
- Remove the jumper across T and T1. The actuator should drive fully closed.
- Return EconoMi\$er IV settings and wiring to normal after completing troubleshooting.

EconoMi\$er IV Troubleshooting Completion

This procedure is used to return the EconoMi\$er IV to operation. No troubleshooting or testing is done by performing the following procedure.

- Disconnect power at TR and TR1.
- Set enthalpy potentiometer to previous setting.
- Set DCV maximum position potentiometer to previous setting.
- Set minimum position, DCV set point, and exhaust potentiometers to previous settings.
- Remove 620-ohm resistor from terminals SR and +.
- Remove 1.2 kilo-ohm checkout resistor from terminals SO and +. If used, reconnect sensor from terminals SO and +.
- Remove jumper from TR to N.
- Remove jumper from TR to 1.
- Remove 5.6 kilo-ohm resistor from T and T1. Reconnect wires at T and T1.
- Remove jumper from P to P1. Reconnect device at P and P1.
- Apply power (24 vac) to terminals TR and TR1.

Table 9 – EconoMi\$er IV Input/Output Logic

INPUTS					OUTPUTS			
Demand Control Ventilation (DCV)	Enthalpy*		Y1	Y2	Compressor		N Terminal†	
	Outdoor	Return			Stage	Stage	Occupied	Unoccupied
					1	2	Damper	
Below set (DCV LED Off)	High (Free Cooling LED Off)	Low	On	On	On	On	Minimum position	Closed
			On	Off	On	Off		
			Off	Off	Off	Off		
	Low (Free Cooling LED On)	High	On	On	On	Off	Modulating** (between min. position and full-open)	Modulating** (between closed and full-open)
			On	Off	Off	Off		
			Off	Off	Off	Off		
Above set (DCV LED On)	High (Free Cooling LED Off)	Low	On	On	On	On	Modulating†† (between min. position and DCV maximum)	Modulating†† (between closed and DCV maximum)
			On	Off	On	Off		
			Off	Off	Off	Off		
	Low (Free Cooling LED On)	High	On	On	On	Off	Modulating***	Modulating†††
			On	Off	Off	Off		
			Off	Off	Off	Off		

*For single enthalpy control, the module compares outdoor enthalpy to the ABCD set point.

† Power at N terminal determines Occupied/Unoccupied setting: 24 vac (Occupied), no power (Unoccupied).

**Modulation is based on the supply-air sensor signal.

†† Modulation is based on the DCV signal.

***Modulation is based on the greater of DCV and supply-air sensor signals, between minimum position and either maximum position (DCV) or fully open (supply-air signal).

††† Modulation is based on the greater of DCV and supply-air sensor signals, between closed and either maximum position (DCV) or fully open (supply-air signal).

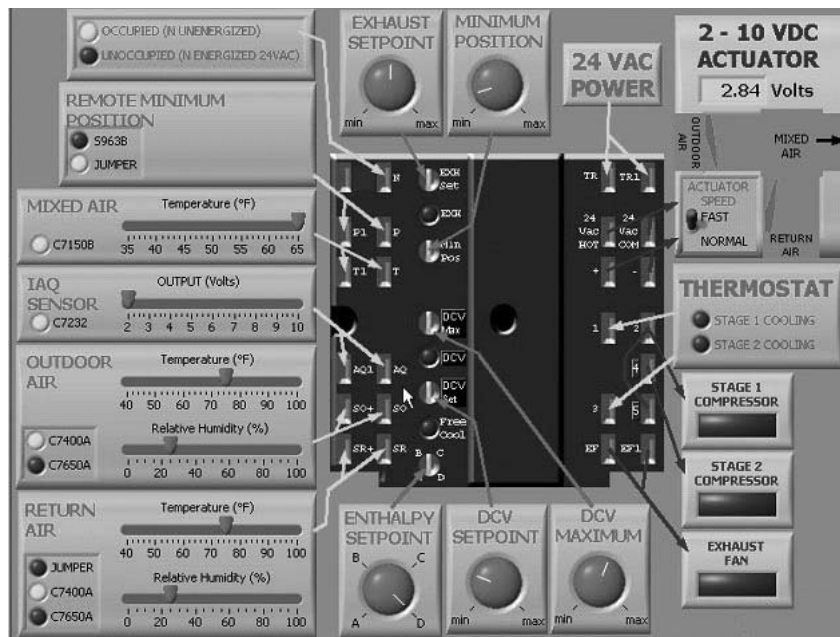


Fig. 21 - EconoMi\$er IV Functional View

C06053

48/50TM--P

WIRING DIAGRAMS

See Fig. 22-25 for unit wiring diagrams.

FASTENER TORQUE VALUES

See Table 10 for torque values.

Table 10 – Torque Values

Supply fan motor mounting	120 +/- 12 in-lbs
Supply fan motor adjustment plate	120 +/- 12 in-lbs
Motor pulley setscrew	72 +/- 5 in-lbs
Fan pulley setscrew	72 +/- 5 in-lbs
Blower wheel hub setscrew	72 +/- 5 in-lbs
Bearing locking collar setscrew	60 +/- 6 in-lbs
Compressor mounting bolts	65–75 in-lbs
Condenser fan motor mounting bolts	20 +/- 2 in-lbs
Condenser fan hub setscrew	84 +/- 12 in-lbs



Fig. 22 - 48TM-P Unit Wiring Diagram - 208/230-3-60

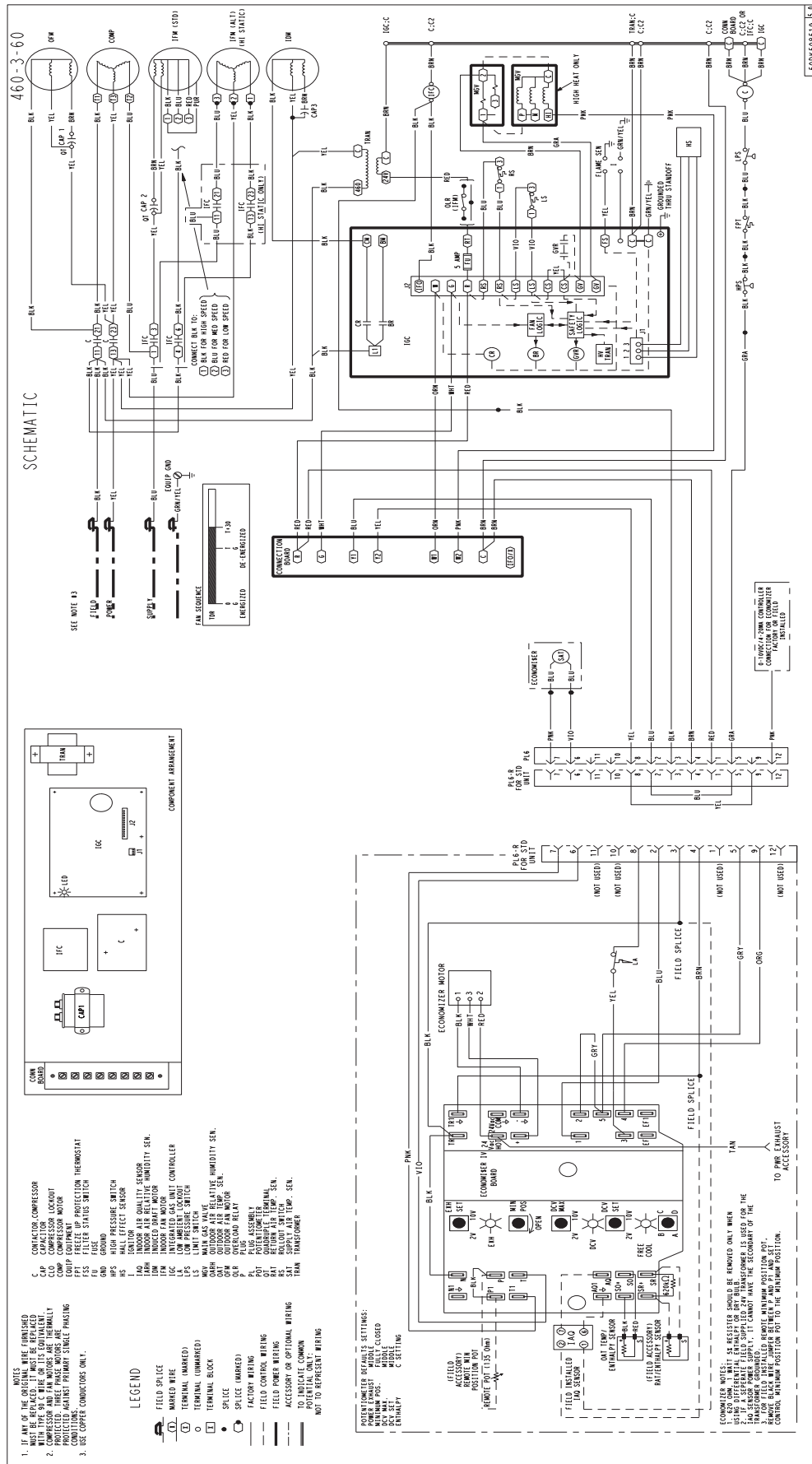
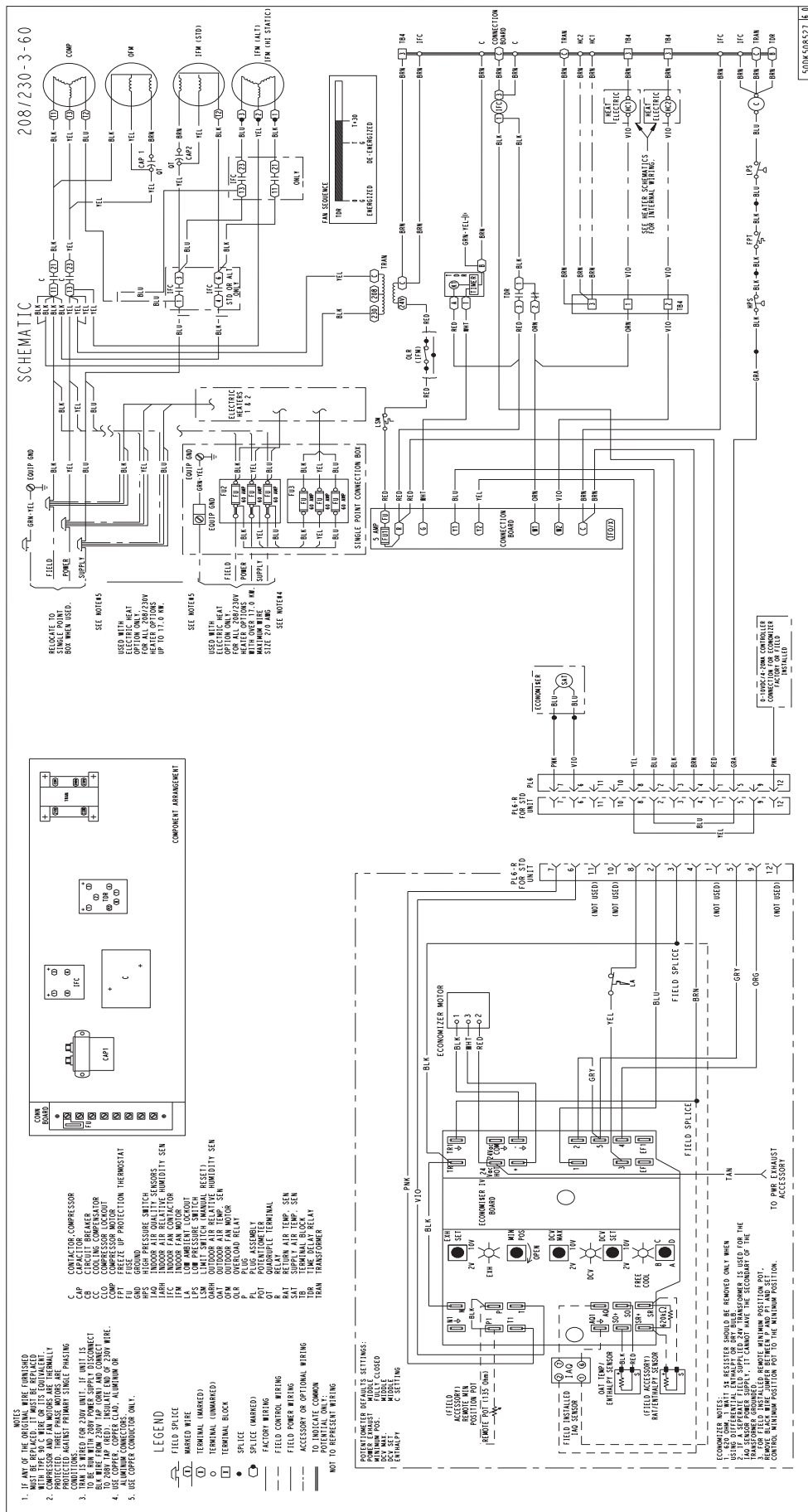


Fig. 23 - 48TM-P Unit Wiring Diagram - 460-3-60



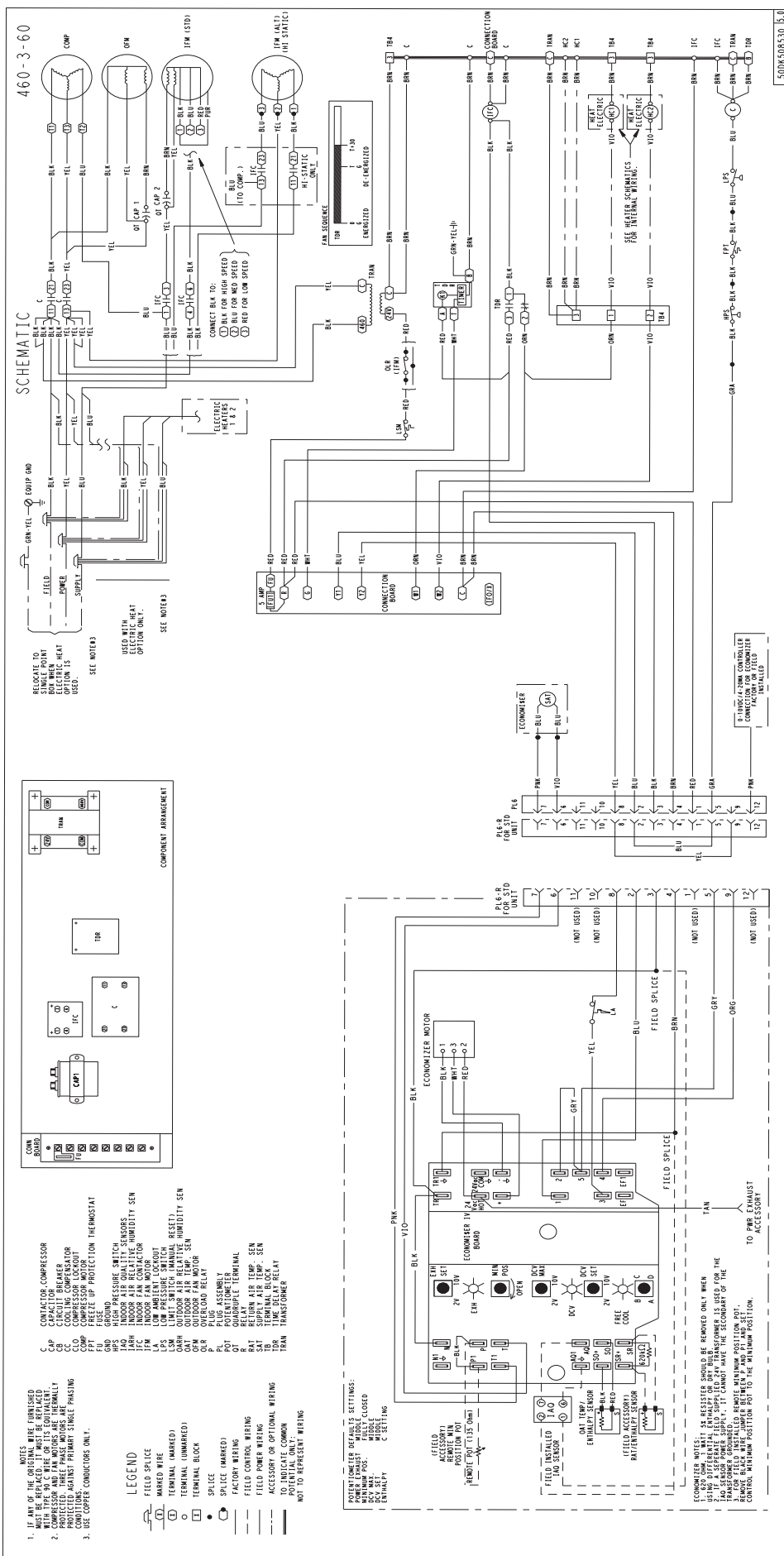


Fig. 25 - 50TM-P Unit Wiring Diagram - 460-3-60

