



REZNOR *Thomas & Betts*

Gas-Fired, Indoor, Vertical (Upflow), Separated-Combustion Power-Vented Heater

OPERATION/MAINTENANCE/SERVICE
FORM RZ 405OMS (Version A)
Obsoletes Form RGM 405-OMS

APPLIES TO: Model CAUA

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REFERENCES: Installation Manual for Model CAUA, Form RZ 405
 Installation Manual for Model ACU Cased Cooling Coil, Form RZ 405-CC
 Replacement Parts , Form RZ 706
 Gas Conversion, Form RZ 405-GC

FOR YOUR SAFETY

What to do if you smell gas:

- Do not try to light any appliance.
- Do not touch any electrical switch; do not 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 your fire department.

WARNING: Improper installation, adjustment, alteration, service, or maintenance can cause property damage, injury, or death. Refer to this manual. For assistance or additional information, consult a qualified installer, service agency, or the gas supplier.

FOR YOUR SAFETY

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

KEEP THIS BOOKLET FOR MAINTENANCE AND SERVICE REFERENCE.

WARNING: Gas-fired appliances are not designed for use in hazardous atmospheres containing flammable vapors or combustible dust. See Hazard Levels, Page 1.

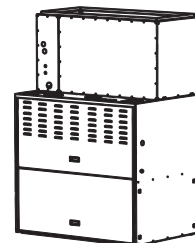
HAZARD INTENSITY LEVELS

1. **DANGER:** Failure to comply will result in severe personal injury or death and/or property damage.
2. **WARNING:** Failure to comply could result in severe personal injury or death and/or property damage.
3. **CAUTION:** Failure to comply could result in minor personal injury and/or property damage.

GENERAL

The operation/maintenance/service instructions in this manual apply to Reznor® Model CAUA upflow, separated-combustion, gas-fired heater. As with any gas-burning equipment, regular maintenance procedures are required to ensure continued safety, reliability, and efficiency of the installation.

If service is required, this heater should be serviced only by a qualified service technician. Service information in this booklet is intended as a guideline for a qualified gas-fired equipment service technician.



**Model CAUA
with Cased
Cooling Coil**

MAINTENANCE

WARNING: If you turn off the power supply, turn off the gas. See Hazard Levels, Page 1.

This unit will operate with a minimum of maintenance. To ensure long life and satisfactory performance, a heater that is operated under normal conditions should be inspected and cleaned at the start of each heating season. If the heater is operating in an area where an unusual amount of dust, soot, or other impurities are present in the air, more frequent maintenance is recommended.

The paragraphs that follow discuss the components and systems that require routine inspection/maintenance. At the beginning of each section, there is a code indicating the main reason why that maintenance procedure is necessary. The legend for that code is shown in the table below.

Maintenance

Codes	Reason for Maintenance
S	= Safety (to avoid personal injury and/or property damage)
R	= Continued Reliability
E	= Efficient Operation

Maintenance Schedule

The following procedures should be carried out at least annually. Follow the instructions in Paragraphs 1 - 7.

- Clean the blower and motor. If equipped with a belt drive, check the belt.
- Check the filters.
- Check the burners for scale, dust, or lint accumulation.
- Check the ignitor
- Clean the venter
- Clean the heat exchanger both internally and externally.
- Check the vent or vent/combustion air system
- Check the wiring for any damaged wires. Replace damaged wiring.
- If equipped with a cooling coil, check the drain lines. Clean as needed.

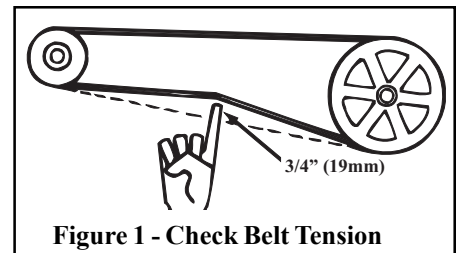
NOTE: Use only factory-authorized replacement parts.

R 1. Blower and Blower Motor

Remove dirt and grease from the motor and the blower. Use care when cleaning to prevent causing misalignment or imbalance.

If the unit is equipped with a belt drive, check the belt for signs of wear. Replace if needed. Check the belt tension. Proper belt tension is important to the long life of the belt and motor.

A loose belt will cause wear and slippage. Too much tension will cause excessive motor and blower bearing wear. Adjust the belt tension by turning the adjusting screw on the motor base until the belt can be depressed 3/4" (19mm). (See Figure 1.) After correct tension is achieved, re-tighten the locknut on the adjustment screw. Be sure that the belt is aligned in the pulleys.



E **R** 2. Filters (applies to a heater with either an optional return air filter cabinet; an outside air/return air mixing box with optional filters; or an inlet base with optional filters)

Check the filters quarterly. Clean or replace as needed. Replacement P/N's are:

2" Pleated Filters 16x16, P/N 104109 12x32, P/N 114324 16x20, P/N 104110	2" Permanent Filters 16x16, P/N 104103 12x16, P/N 114325 16x20, P/N 101620
1" x 16" x 25" Filters for Inlet Base only (Size 350 and 400 only) Disposable - P/N 16447 Permanent - P/N 101609 Pleated - P/N 104107	

If using field-replacement filters, replace with same size and type.

Sizes and Quantities of Filters (1" only) Used in the Optional Inlet Base (Option AVA2 for Sizes 350 and 400 only)

Each base requires eight filters (or only six if one side is blocked off). Filters are 1" x 16" x 25"; P/N's are listed above.

Sizes and Quantities of Filters (2" Permanent or 2" Pleated only) and Blockoff Plates Used in the Optional Outside Air/Return Air Mixing Box

To replace filters, select replacement P/N's (left column) for type and size of filters.

Size	Filters - (Qty) Size
150	(2) 16 x 16
	(2) 16 x 20
	Filter Blockoff Plate - (1) P/N 123226
200	(2) 16 x 16
	(2) 16 x 20
	Filter Blockoff Plate - (1) P/N 123226
250	(6) 16 x 16
	Filter Blockoff Plates - (2) P/N 114337
300	(6) 16 x 16
	Filter Blockoff Plates - (2) P/N 114337
350	(6) 16 x 16
	Filter Blockoff Plates - (2) P/N 114337
400	(6) 16 x 16
	Filter Blockoff Plates - (2) P/N 114337

Sizes and Quantities of Filters Used in the Return Air Filter Cabinet - 2" Pleated or 2" Permanent

To replace filters, select replacement P/N's (page 3) for type and size of filters.

Filter Cabinet on *Either Side of Heater - "V" Filter Arrangement*

Size	CFM	FPM	Filters - (Qty) Size
150	1800	281	(4) 16 x 16
	2400	375	(4) 16 x 16
	3000	469	(4) 16 x 16
200	2400	375	(4) 16 x 16
	3000	469	(4) 16 x 16
250	3000	469	(4) 16 x 16
	*4000	625	(4) 16 x 16
	**5000	781	(4) 16 x 16
			(4) 16 x 16
300	3000	469	(4) 16 x 16
	*4000	625	(4) 16 x 16
	**5000	781	(4) 16 x 16
			(4) 16 x 16
350	4300	448	(6) 16 x 16
	5000	521	(6) 16 x 16
	*6000	625	(6) 16 x 16
400	4300	448	(6) 16 x 16
	5000	521	(6) 16 x 16
	*6000	625	(6) 16 x 16

Filter Cabinet *Rear of Heater - "V" Filter Arrangement*

Size	CFM	FPM	Filters - (Qty) Size
150	1800	281	(4) 16 x 16
	2400	375	(4) 16 x 16
	3000	469	(4) 16 x 16
200	2400	375	(4) 16 x 16
	3000	469	(4) 16 x 16
250	3000	313	(6) 16 x 16
	4000	417	(6) 16 x 16
	5000	521	(6) 16 x 16
			(6) 16 x 16
300	3000	313	(6) 16 x 16
	4000	417	(6) 16 x 16
	5000	521	(6) 16 x 16
350	4300	448	(6) 16 x 16
	5000	521	(6) 16 x 16
	*6000	625	(6) 16 x 16
400	4300	448	(6) 16 x 16
	5000	521	(6) 16 x 16
	*6000	625	(6) 16 x 16

Smaller Filter Cabinet on *Either Side or Rear of Heater - "V" Filter Arrangement*

Size	CFM	FPM	2" Filters - (Qty) Size	
			Pleated	Permanent
150	1800	375	(2) 12 x 32	(4) 12 x 16
	2400	500	(2) 12 x 32	(4) 12 x 16
	*3000	625	--	(4) 12 x 16
200	2400	500	(2) 12 x 32	(4) 12 x 16
	*3000	625	--	(4) 12 x 16

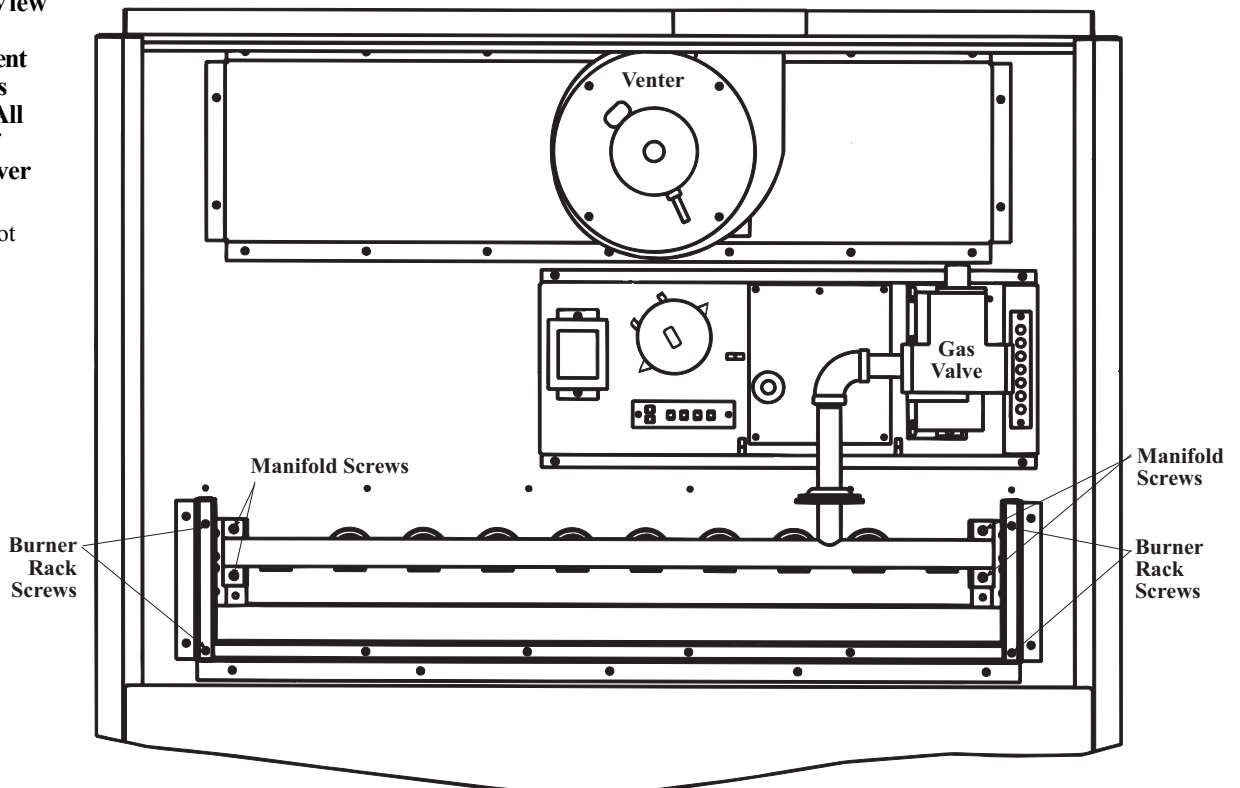
NOTES:

* Requires 2" permanent filters.

** If using side inlets, two cabinets must be installed, one on each side.

Figure 2 - View of Control Compartment with Access Panel and All Sections of Burner Cover Removed

(Wires are not illustrated.)



S

3. Burner Maintenance

WARNING: Excessive dirt buildup on and inside the burner ports could cause fuel gas to spill out of the back of the burner tube causing gas odor inside the building. If uncorrected, fuel spilling out of the back of the burner tube could cause a fire or explosion. To prevent fuel gas from spilling from the back of the burners, check the burner ports at least annually and clean if necessary.

MAINTENANCE (cont'd)

3. Burner Maintenance (cont'd)

Instructions for Burner Rack Removal (See Figure 2)

1. Shut the gas supply off upstream of the combination valve.
2. Turn off the electric supply.
3. Remove the burner compartment door.
4. Disconnect the union and remove the gas pipe from the inlet of the gas valve.
5. Mark and disconnect the electrical wires to the gas valve. Disconnect the flame sensor wire, the flame rollout switch wires, and the ignitor wire at the burner box cover. Mark and disconnect the ignitor ground wire at the terminal board.
6. Disconnect the silicone tubing from the static tap on the burner box cover.
7. Remove **all** burner cover sections. Depending on when the unit was manufactured, there will be either two or three sections. If two, there will be a right and left section which extend over the front. If three, there will be right, left, and a separate front section.
8. Remove the screws that attach the manifold to the burner rack. Slide the manifold from the burner rack. Remove the screws at the ends of the burner rack that attach it to the cabinet. Carefully pull the burner rack away from the heater.

Clean the Burner Rack and Manifold (requires a wire brush, cleaning cloth, an automotive type aerosol degreaser or refrigerant coil cleaner, and compressed air)

CAUTION: Use of eye protection is recommended.

Excessive dirt buildup on and inside the ports on a burner could cause fuel gas to spill out of the back of the burner tube. Fuel gas spilling out of the back of a burner tube will cause gas odor inside the building, and if not corrected, could eventually cause a fire/explosion hazard. To prevent fuel gas spilling from the back of a burner tube, check the burner ports at least annually and clean if necessary. Remove any soot deposits from the burners with a wire brush. Clean the ports with an aerosol degreaser and/or compressed air. Wipe the inside of the burner tubes clean. (Cleaning the burners with an aerosol degreaser is highly recommended as the degreaser will retard future buildup of dirt.)

Inspect the cleaned burner rack for any damage or deterioration. If a burner has any damage or signs of deterioration, replace it.

Clean the burner orifices with air pressure. Do not ream orifices.

Re-assemble the heater and test for proper operation.

R 4. Ignition System

To access the ignition system, follow Steps 1-3 in Paragraph 3.

Ignitor - On the right side of the burner rack, locate the ignitor. Disconnect the wire; remove the screw and the ignitor. Clean the ignitor assembly with an emery cloth.

Spark gap must be maintained to 1/8". See Figure 4, page 6.

IMPORTANT: When re-assembling, the brown ground wire must remain attached to the ignitor.

CAUTION: Due to high voltage on the spark wire and electrode, do not touch when energized. See Hazard Levels, Page 1.

Flame Sensor - On the left side of the burner rack, locate the flame sensor. Disconnect the wire; remove the screw and the flame sensor. Clean with an emery cloth.

Ignition Control - The integrated ignition control module monitors the operation of the heater including ignition. Do not attempt to disassemble the ignition control module. However, each heating season the lead wires should be checked for insulation deterioration and good connections.

Proper operation of the direct spark ignition system requires a minimum flame signal of 1.0 microamps as measured by a microammeter.

Additional information and testing procedures on the direct spark ignition system can be found in the manufacturer's control operating instructions supplied with the heater.

R 5. Venter Motor and Wheel

Remove dirt and grease from the motor housing. The venter motor is permanently lubricated; do not lubricate. Carefully clean the venter wheel assembly, being cautious not to bend the wheel.

E 6. Cleaning the Heat Exchanger

To clean the outer surfaces (circulating air side) of the heat exchanger, gain access by removing the inspection panels in the ductwork or removing the ductwork. Use a brush and/or an air hose to remove accumulated dust and grease deposits.

CAUTION: Eye protection is recommended.

The inner surfaces of the heat exchanger can be reached for cleaning with the burner, turbulators and venter assembly removed. Follow instructions in Paragraph 3 to remove the burner (See Figure 2).

Remove the turbulators (Turbulators are the metal strips inside the heat exchanger tubes). Clean the inside of the tubes with a long furnace brush or a heavy wire to which steel wool has been attached. Brush inside each heat exchanger tube until all foreign material is removed. A flashlight is helpful in examining the inside of the tubes. Clean turbulator strips, slide into end of tubes, and re-attach using the screws removed.

If operating with natural gas, there should be no soot deposits. For operation with propane gas, if sooting exists, check for improper gas manifold pressure and for obstructions in the vent.

If the unit is installed as a power vent (drawing combustion air from inside the building) and dirt is found in the tubes indicating a dirty environment, installation of a separated combustion/venting system should be considered.

S 7. Vent or Vent/Combustion Air System

R Check at least once a year. Inspection should include all joints, seams, and the terminal caps. Clean any screens and grills. Replace any defective parts.

E 8. Burner Condensate Drain

R If the heater is equipped with a burner condensate drain line (required when used with a cooling coil), check the line. Clean or replace as needed.

SERVICE SECTION - Control Location, Operation, and Service

WARNING: Service work on this heater should only be done by a qualified gas service technician. The service information and the troubleshooting guides are intended as an aid to a qualified service technician.

WARNING: Should overheating occur, or the gas supply fail to shut off, turn off the manual gas valve to the appliance before shutting off the electrical supply.

WARNING: Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and replace any gas control which has been under water.

WARNING: If you turn off the power supply, turn off the gas. See Hazard Levels, Page 1.

To service this heater, it is necessary to understand the normal operating functions of the heater controls. Refer to Figure 3 to identify and locate the controls.

9. Operating Gas Valve

Function: The gas valve automatically controls the gas flow to the main burners and regulates the gas pressure.



WARNING: All components of a gas supply system must be leak tested prior to placing equipment in service. NEVER TEST FOR LEAKS WITH AN OPEN FLAME. Failure to comply could result in personal injury, property damage or death.

Service: The valve has no field-repairable parts.

Manifold or Orifice Pressure Settings

Before attempting to measure or adjust manifold gas pressure, the supply pressure must be within the specific range for the gas being used, both when the heater is in operation and on standby. Incorrect inlet gas pressure could cause excessive manifold pressure immediately or at some future time.

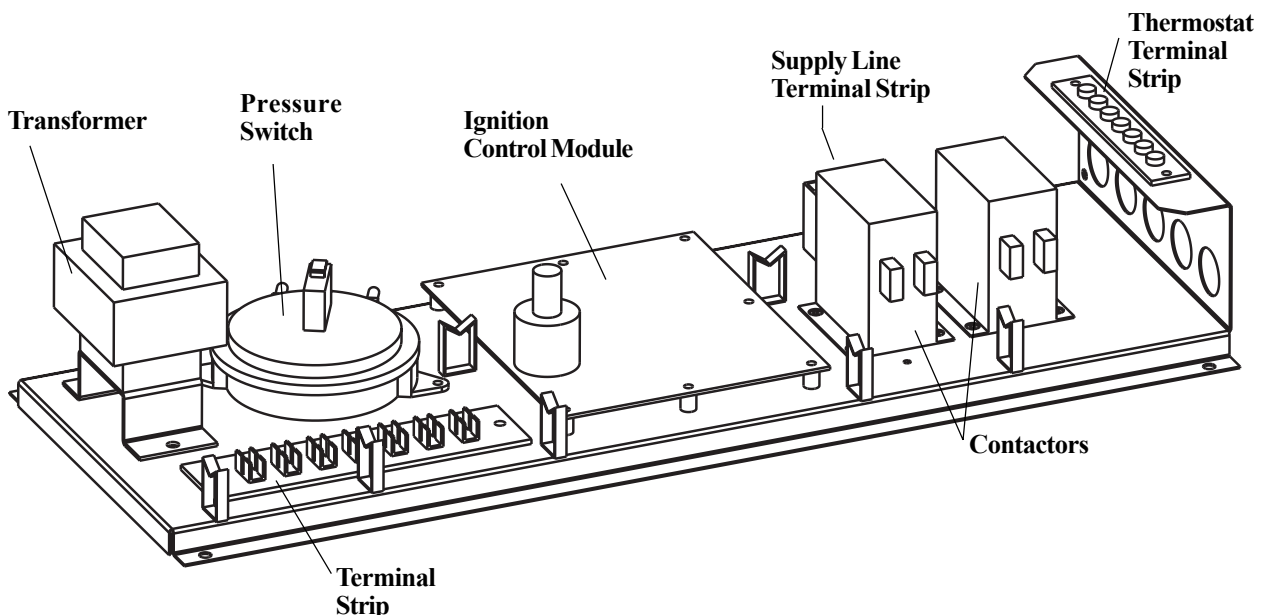
With the manual valve on the combination valve positioned to prevent flow to the main burners The following warnings and instructions apply.

WARNING: Manifold gas pressure must never exceed 3.5" w.c. for natural gas and 10" w.c. for propane gas.

For Natural Gas: Manifold gas pressure is regulated by the combination valve to 3.5" w.c. Inlet pressure to the valve must be a minimum of 5" w.c. or as noted on the rating plate and a maximum of 14" w.c.

For Propane Gas: Manifold gas pressure is regulated by the combination valve to 10" w.c. Inlet pressure to the valve must be a minimum of 11" w.c. and a maximum of 14" w.c.

Figure 3 - Control Locations in the Electrical Compartment (Remove the control compartment access panel)



SERVICE SECTION - Control Location, Operation, and Service (cont'd)

9. Operating Gas Valve (cont'd)

Before attempting to measure or adjust manifold gas pressure, check to verify that the inlet (supply) pressure is within the specified range for the gas being used both when the heater is in operation and on standby. Incorrect inlet pressure could cause excessive manifold gas pressure immediately or at some future time.

Instructions to Check Manifold Pressure:

1) With the manual valve positioned to prevent flow to the main burners, connect a manometer to the 1/8" pipe outlet pressure tap in the valve. NOTE: A manometer (fluid-filled gauge) is recommended rather than a spring type gauge due to the difficulty of maintaining calibration of a spring type gauge.

2) Open the valve and operate the heater. Measure the gas pressure to the manifold. Normally adjustments should not be necessary to the factory preset regulator.

If adjustment is necessary, set pressure to correct settings by turning the regulator screw IN (clockwise) to increase pressure. Turn regulator screw OUT (counterclockwise) to decrease pressure.

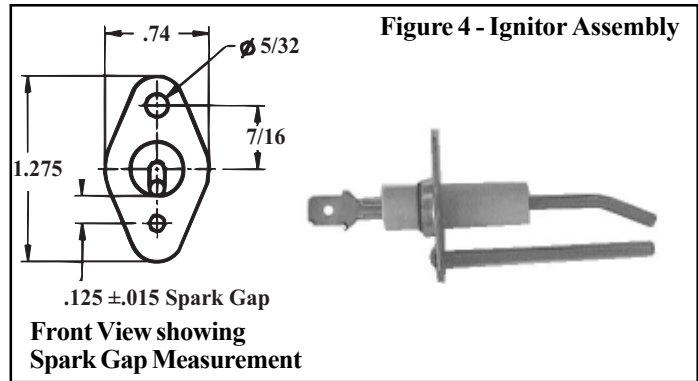
WARNING: The operating valve is the primary safety shutoff. All gas supply lines must be free of dirt or scale before connecting to the unit to ensure positive closure. See Hazard Levels, page 1.

10. Ignition System

Function: The heater is equipped with a direct-spark integrated control system. The system monitors the safety devices and controls the operation of the blower and venter motors and the gas valve.

Control Module: The control module is an integrated board located in the control compartment. Supply and control wiring connects into the control module. The module has an LED troubleshooting light which identifies operating problems. The control module also acts as a fan control energizing the fan 30 seconds after ignition and delaying fan shutdown for 180 seconds after the gas valve closes. See Figure 5 for LED codes and fan delay dip switch settings.

Ignitor: The ignitor is located on the right side of the burner assembly. Cleaning and checking the ignitor is included in the Maintenance Section. The spark gap shown in Figure 4 must be maintained.



Flame Sensor: The flame sensor is located on the left side of the burner assembly. Cleaning and checking the flame sensor is included in the Maintenance Section.

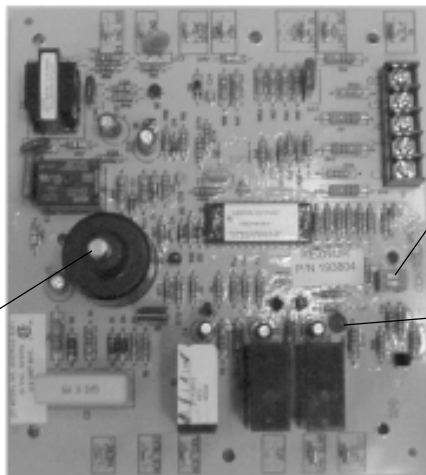
Service: If it is determined that any of the components of the ignition system require replacing, use only the factory-authorized replacement parts that are designed for this heater.

11. Limit Control

Limit Control			
Sizes	P/N	Sensor	°F
150, 200,	148588	60"	270
350, 400			
250, 300	164792	54"	300

Function: The limit control is a temperature sensitive safety device that will shut down the gas valve if a temperature above the setpoint is sensed. The limit control is an automatic reset type with a capillary sensor. When

Figure 5 - Integrated Ignition Control Module, P/N 193804, in the Control Compartment



Ignitor Connection

Fan Delay to OFF Switch (DIP Switch Settings)

(selected prior to call for heat)

SW1		Fan Delay
1	2	To OFF (seconds)
OFF	OFF	90
OFF	ON	120
ON	OFF	180 (Factory Preset)
ON	ON	240

Ignition Control Module LED Codes

- Slow Flash** Normal Operation, No call for heat
- Fast Flash** Normal Operation, Call for heat
- 2 Flashes** System Lockout, Failed to detect or sustain flame
- 3 Flashes** Pressure Switch Held in Open or Closed Position
- 4 Flashes** High Limit or Flame Rollout Switch Open
- 5 Flashes** Flame Sensed and Gas Valve not energized
- Steady On** Internal Failure - Replace the ignition control module

the temperature drops below the setpoint, the limit control deactivates allowing operation of the heater. The capillary sensor extends across the heat exchanger section of the unit sensing the temperature of the discharge air.

Service: If it is determined that the limit control needs replacing, use only the factory-authorized replacement part that is designed for the size of heater. The limit control is accessible in the control compartment. The capillary sensor can only be reached by removing the ductwork. For approximate limit location, see Figure 3.

12. Combustion Air Proving Switch

Function: The combustion air proving switch is a pressure sensitive switch that monitors air pressure to ensure that proper combustion air flow is available. The switch is single pole/double throw with the normally open contacts closing when a decreasing pressure is sensed in the system.

On start-up when the heater is cold, the sensing pressure is at the most negative level, and as the heater and flue system warm up, the sensing pressure becomes less negative. After the system has reached equilibrium (about 20 minutes), the sensing pressure levels off.

If a restriction or excessive flue length or turns cause the sensing pressure to be outside the switch setpoint, the pressure switch will function to shut off the main burners. The main burners will remain off until the system has cooled and/or the flue system resistance is reduced. The table below lists the approximate water column negative pressure readings and switch setpoints for sea level operating conditions.



Model Size	Start-Up Cold	Equilibrium	Set Point "OFF"	Set Point "ON"
150	1.45	1.05	.75	.90
200	1.50	1.05	.75	.90
250	1.55	1.10	.75	.90
300	1.60	1.15	.75	.90
350	1.30	1.05	.75	.90
400	1.20	1.00	.75	.90

Service: Check the tubing that connects the pressure switch and the venter. If the tubing is blocked or deteriorated, clean or replace. Be sure that the connections are tight.

If it is determined that the pressure switch needs replacing, use only the factory-authorized replacement part that is designed for this heater. For location, see Figure 3. Never bypass pressure switch; see **DANGER** below.

DANGER: Safe operation requires proper venting flow. NEVER bypass the combustion air proving switch or attempt to operate the unit without the venter running and the proper flow in the vent system. Hazardous conditions could result. See Hazard Levels, Page 1.

13. Flame Rollout Switch

Function: The flame rollout switch is a temperature-activated manually reset, limit switch. The switch is mounted on the side of the burner box in a position that senses temperature in a central horizontal location at the rear of the burner assembly.

If the flame rollout switch activates to shut-down the heater, the cause must be corrected.

Service: If it is determined that the flame rollout switch needs replacing, use only the factory-authorized replacement part that is designed for use on this heater.

Flame Rollout Switch		
Size	P/N	Set-ting
150-200	112752	225°F
250-300	121275	275°F

14. Venter Motor and Wheel Assembly

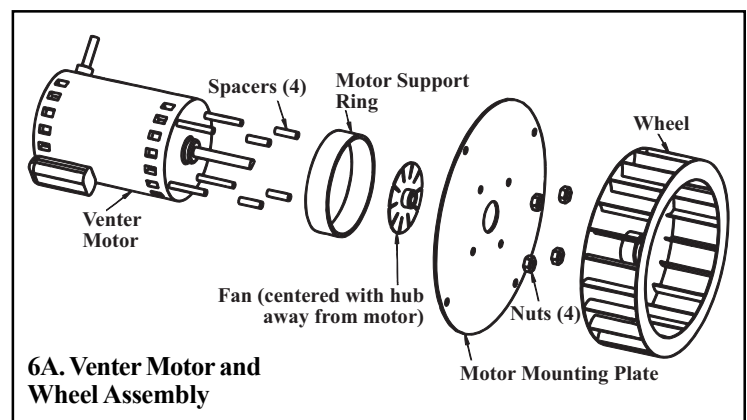
Function: The venter assembly provides a metered flow of combustion air to the burner and exhausts the products of combustion to the outside atmosphere.

Service: If it is determined that the venter motor or wheel needs replacing, use only the factory-authorized replacement part that is designed for use on this heater.

Follow these instructions for replacement of the venter motor (Refer to Figures 6A and 6B). Keep all hardware removed to be used in re-assembling and installing the replacement parts.

1. If the heater is installed, turn off the gas and the electric power.
2. Remove the control door panel.
3. Disconnect the three venter motor wires at their terminal block connections.
4. Holding the motor, remove the screws (3 or 4) that attach the venter motor mounting plate to the venter housing. Remove the motor and wheel assembly from the heater.
5. Refer to Figure 6A and follow steps to disassemble the motor and wheel assembly:
 - a) With a hex allen wrench, loosen the venter wheel set screw. Slide the venter wheel off the shaft.
 - b) Remove the four nuts holding the motor mounting plate. Remove the mounting plate.
 - c) Slid over each bolt is a cylindrical spacer; remove the four spacers.
 - d) Loosen the set screw and remove the small fan blade.

Venter Motor and Wheel Assembly
Sizes 150-300,
P/N 162895
Sizes 350-400,
P/N 164542

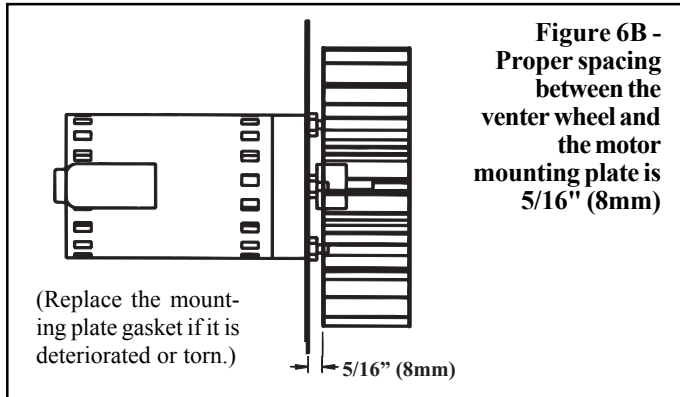


6. Re-assemble with the replacement venter motor (NOTE: Check the gasket on the motor mounting plate; if the gasket is deteriorated or torn, replace it.):
 - a) With the blade side closest to the motor (hub away from motor), slide the small fan blade on to the shaft. Position the blade so that it does not hit the motor and tighten the set screw to the flat side of the motor shaft.

SERVICE SECTION - Control Location, Operation, and Service (cont'd)

14. Venter Motor and Wheel Assy (cont'd)

- b) Put a spacer over each bolt and slide the motor support ring over all the bolts. Position the mounting plate with the side with the gasket away from the motor. Secure the plate with the nuts (hand tighten with a nut driver; do not use a power tool). Rotate the fan to check for clearance. If required, loosen the set screw and adjust the position of the fan blade.
- c) With the "closed" side toward the motor, slide the venter wheel over the end of the shaft. Position the wheel with the spacing shown in Figure 6B. Tighten the set screw to the flat side of the motor shaft. Check for proper balance. If the wheel is damaged or does not turn properly, replace it.



- 7. Install the assembled venter motor and wheel. Follow the wiring diagram to connect the venter wires. Close the access panel.

15. Transformer

Function: The 40VA transformer reduces the supply voltage to a 24-volt circuit in order to operate the 24-volt controls.

Transformer Check (requires a volt meter): To verify the 24-volt circuit, check the operation of the transformer. Set the thermostat to above room temperature. Using a voltmeter, check the voltage between Terminal R on the thermostat terminal strip and the ground terminal on the ignition controller. If there is no voltage in this circuit, the transformer is not functioning. The service of a transformer is like that of a light bulb; it is either good or bad and when bad, it must be replaced.

Service: If replacement of the transformer is necessary, do not substitute any other transformer. Use replacement transformer IDENTICAL to the factory-installed models.

IMPORTANT NOTE: Do not short the "hot" side of the transformer to ground when servicing the heater. Doing so will cause the transformer to fail.

40VA Transformer in the Heater Electrical Box, P/N 164328



40VA Transformer in the Optional Mixing Box, P/N 103497



16. Blower Motor and Drive

Location/Function: The blower motor and blower are located in the blower compartment at the bottom of the heater. NOTE: The blower compartment door is equipped with a safety switch. If the door is not closed, the heater will not operate.

The function of the motor and drive is to provide airflow through the heat exchanger and supply air to the space. Model CAUA units are equipped either with a direct-drive or a belt-drive blower and motor. Size 150 and 200 heaters equipped with direct-drive have one 1HP blower motor. A Size 150 has a 12-9 blower and a Size 200 has a 12-12 blower. Sizes 250-400 have dual 1HP blower motors and dual 12-9 blowers.

Sizes 150-200 with belt-drive have a single motor and blower; sizes 250-400 have a single motor and dual blowers. Motors range in size from 1/4 to 5 HP.

Motor and Starter for Belt-Drive: Most blower motors are equipped with thermal overload protection of the automatic reset type. If motor is not equipped with thermal overload protection, the unit will be equipped with a starter. The adjustable setting on the starter will be factory set to match the amp draw of the motor and sealed. No change should be made to the starter setting unless the original motor is replaced. Starters are equipped with a manual reset. If an overload condition is experienced, the condition must be corrected and the starter must be manually reset.

Check the amp draw of the motor. Amps may be adjusted downward by reducing the blower speed or by increasing the duct system static pressure. The temperature rise must be within the range specified on the unit rating plate.

Adjusting Blower Speed

The blower speed may be adjusted to achieve the desired outlet temperature, as long as the adjustment is within the temperature rise and the static pressure limits shown on the heater rating plate. Direct drive motors are factory set at medium speed for heating and high speed for cooling (if ordered). Belt drive motors are factory set between maximum and minimum blower speeds.

If the duct resistance is low, the blower may deliver too high an air volume. If the resistance is very low, the blower may deliver excess air to overload the motor, causing the overload protector to activate. Reducing the blower speed will correct these conditions. If ductwork is added to an installation, it may be necessary to increase the blower speed. Decreasing blower speed will increase outlet temperature; increasing blower speed will decrease outlet temperature.

Direct drive motors have multi-speed taps for speed adjustment. If your installation requires an adjustment of the blower speed, the motor may be re-wired to an alternate tap by following these instructions.

1. Turn off the gas and electric power
2. Remove the blower door panel.
3. Consult the wiring diagram on the heater and follow the chart below to choose the wiring for the desired adjustment. Units are wired at high speed for cooling (if ordered) and medium speed for heating.

Model Sizes	Speed	Use these two motor wires:
150, 200, 250, 350	High	White and Black
	Medium	White and Blue
	Low	White and Red
300 and 400	High	White and Black
	Medium	White and Blue

4. Cut the crimped cap from the end of the wire that you intend to use and strip the insulation.
5. Disconnect the factory-wired connection and re-wire, using the newly stripped wire.
6. Put a wire nut on the end of the blower motor wire that was disconnected.
7. Replace the heater door panel. Turn on the gas and electric. Check for proper operation.

Optional belt drives have an adjustable pulley which permits adjustment of the blower speed. Follow these instructions to adjust blower speed.

1. Turn off the gas and the electric power.
2. Loosen belt tension and remove the belt.
3. Loosen the set screw on the side of the pulley away from the motor.
4. **To increase the blower speed, decreasing outlet temperature**, turn the adjustable half of the pulley inward. **To decrease the blower speed, increasing the outlet temperature**, turn the adjustable half of the pulley outward. One turn of the pulley will change the speed 8-10%.
5. Tighten the set screw on the flat portion of the pulley shaft.
6. Replace the belt and adjust the belt tension. Adjust tension by turning the adjusting screw on the motor base until the belt can be depressed 3/4". (See Figure 1, page 2.) Re-tighten the lock nut on the adjusting screw. Be sure that the belts are aligned in the pulley grooves properly and are not angled from pulley to pulley.
7. Turn on the gas and electric. Light the heater following the instructions on the lighting instruction plate.
8. Check the motor amps with an amp meter. The maximum motor amp rating on the motor nameplate must not be exceeded.

When service is complete, check for proper operation.

Motor Amps

At final adjustment, amperes should not exceed motor nameplate amp rating. The installation must be adjusted to obtain a temperature rise within the range specified on the heater rating plate.

Use an amp meter to check motor amps. The following chart (page 8) lists full load amps for various HP's and voltages. Amps may be adjusted downward by reducing blower RPM or increasing duct system static pressure.

This chart can be used for sizing line wiring but should not be interpreted as the exact motor amps. See the motor rating plate for exact motor specifications.

Full Load Amps - Blower Motors (Open)									
HP	1/4	1/3	1/2	3/4	1	1-1/2	2	3	5
Direct-Drive Motors									
230V 1PH	--	--	--	--	6.3	--	--	--	--
Optional Belt Drive Motors									
208V 1 PH	2.1	3.2	5.1	6.3	7.5	8.3	10.0	--	--
230V 1PH	2.3	2.8	4.4	5.5	6.5	7.5	10.2	--	--
208V 3 PH	1.1	1.4	3.0	2.9	3.7	5.6	7.0	9.0	13.4
230V 3PH	1.4	1.6	2.5	2.6	3.2	5.0	6.6	8.6	13.2
460V 3PH	0.75	0.8	1.0	1.3	1.6	2.7	3.5	4.3	6.6
575V 3PH	--	--	--	--	1.1	1.6	2.1	3.6	5.4

CAUTION: An external duct system static pressure not within the limits shown on the rating plate, or improper motor pulley or belt adjustment, may overload the motor. See Hazard Levels, Page 1.

17. Blower Compartment Door Switch

Function: The blower compartment door is equipped with a safety switch. If the door is not closed securely, the heater will not operate.



Service: If it is determined that the blower compartment door switch needs replacing, use only the factory-authorized replacement part that is designed for use on this heater.

18. Inlet Air Dampers and Controls (Optional Outside Air/Return Air Mixing Box)

Location: Dampers and controls are located in the optional outside air/return air mixing box. (Potentiometer may be remotely located.)

Function: Dampers operate in response to controls.

Service: Clean dampers and controls of dust or dirt.

2-Position Damper Motor

Function: The 2-position damper motor opens and closes the dampers in response to an electrical control device.

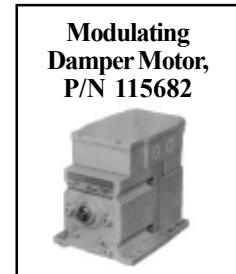
Service: There is no service required on this motor other than external cleaning. If the motor needs replaced, replace with an identical damper motor.



Modulating Damper Motor

Function: The modulating damper motor actuates the dampers in response to an electrical control device. Outside air dampers close when the heater shuts down.

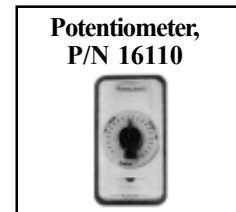
Service: There is no service required on this motor other than external cleaning. If the motor needs replaced, replace with an identical damper motor.



Potentiometer

Function: The potentiometer is a manually set switch used with modulating dampers to set a minimum outside air damper opening. It is either mounted in the mixing box or remotely located.

Service: If the potentiometer does not function properly, replace it with an identical switch.



Return Air Controller

Function: The return air controller (aka outside air controller) senses the temperature of the incoming return air. On a two-position outside air damper system, it activates the motor to open and close the outside air damper. On a modulating system, the return air controller maintains 100% return air until the set temperature is reached at which point the mixed air controller (with or without potentiometer) controls the dampers based on the mixed air control setting. When in the heating mode, the temperature of the "mixed" return and outside air entering the heater must always be 35°F or above.

Service: If the controller does not function properly, replace it with an identical control.



Mixed Air Controller

Function: The mixed air controller senses the temperature of the air entering the heater. It automatically operates the damper motor to modulate the outside and return air dampers based on the temperature setting. When in the heating mode, the temperature of the "mixed" return and outside air entering the heater must always be 35°F or above.

Service: If the controller does not function properly, replace it with an identical control.



19. Check/Test/Start-Up - Following Maintenance or Service

Check Installation and Start-Up

Check prior to start-up:

- Check any piping connections that were worked on during the service or maintenance procedure for leaks. If a leak is found and cannot be tightened, replace the parts.
- Close the blower compartment door securely. Heater will not operate if the blower compartment door is not closed.

Start-Up

WARNINGS: For your safety, read before operating. If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury, or loss of life.

- This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
- Before operating, smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

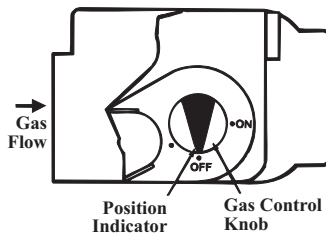
WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
 - Do not touch any electrical switch; do not 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 your fire department.
- Use only your hand to turn the gas control ON/OFF knob on the gas valve. Never use tools. If the valve ON/OFF knob will not turn by hand, do not try to repair it. Call a qualified service technician. Force or attempted repair may result in a fire or explosion.
 - Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

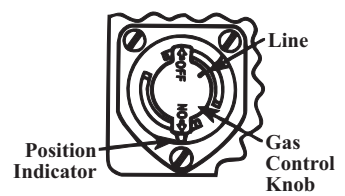
Operating Instructions and Operating Sequence

1. Set thermostat at lowest setting.
2. Turn off all electric power to the appliance.
3. This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand. Open the access door and locate the gas valve.
4. **Models CAUA 150 and 200** - Locate the gas control (ON/OFF) knob on the gas valve. Turn the gas control knob clockwise to "OFF".

Top View of Gas Valve used on CAUA 150 and 200



Control Knob on Top of Gas Valve used on CAUA 250 - 400



Models CAUA 250, 300, 350, and 400 - Locate the gas control (ON/OFF) knob on the gas valve. Turn knob clockwise to align the line on the knob with the position indicator. Depress knob and continue rotation to the "OFF" position.

5. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. **If you smell gas, STOP!** and follow the steps in the **WARNINGS** printed in the right column or on the Operating Label on the heater. If you do not smell gas, proceed to the next step.
6. **Models CAUA 150 and 200** - Turn the gas control knob counterclockwise to "ON".

Models CAUA 250, 300, 350, and 400 - Turn knob counterclockwise to align the line on the knob with the position indicator. Allow knob to "pop up", and continue rotation to the "ON" position.

7. Close the access door.
8. Turn on the electric power to the heater.
9. Set the thermostat to the desired setting.

NOTE: If the appliance does not operate, follow the instructions "To Turn Off Gas to the Appliance" printed below (and on the Operating Label on the heater). Call your service technician.

10. Thermostat calls for heat, energizing the venter motor.
11. Venter pressure switch closes, allowing the unit to fire.
12. Burner flame is sensed and in 30 seconds, the blower motor is energized.
13. If the flame is extinguished during the main burner operation, the integrated control system closes the main valve and must be reset by interrupting power to the control circuit. (See lighting instructions on the heater.).

TO TURN OFF GAS TO THE APPLIANCE

- 1) Set thermostat to lowest setting
- 2) If service is to be performed, turn off all electric power to the appliance.
- 3) Open the access door.
- 4) Turn the gas control knob to "OFF" (follow instructions in No. 4 above). Do not force control knob.
- 5) Close the access door.

Check installation after start-up:

Vent System Testing Procedure - Power Vent Units

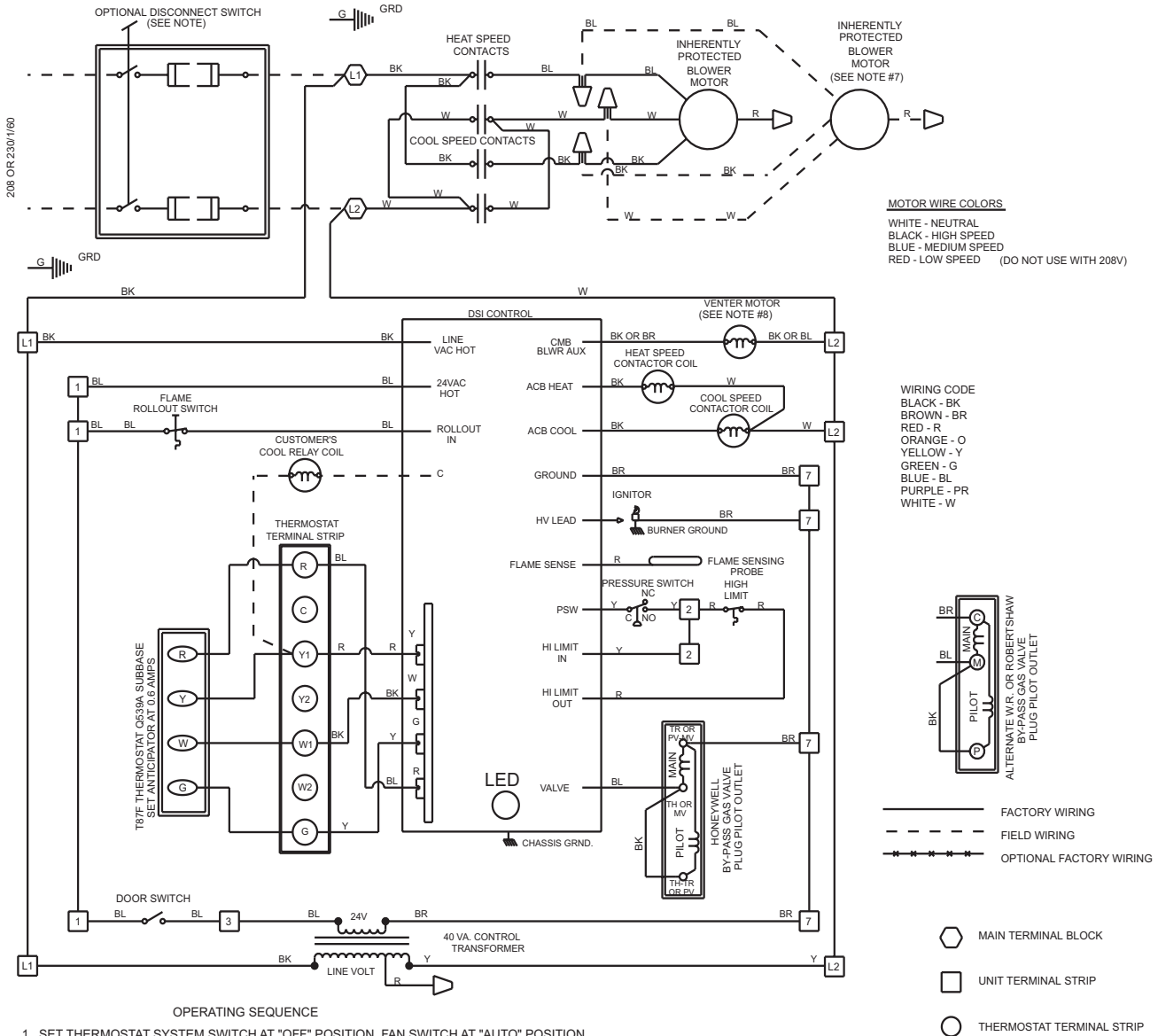
1. Seal any unused openings in the venting system.
 2. Inspect the venting system for proper size and horizontal pitch, as required in the National Fuel Gas Code, ANSI Z223.1 or CAN/CGA B149.1 and B149.2, Installation Code for Gas Burning Appliances and Equipment, and the heater installation manual. Determine that there is no blockage or restriction, leakage, corrosion and other deficiencies which could cause an unsafe condition.
 3. In so far as practical, close all building doors and windows and all doors between the space where the heater is and other spaces of the building. Turn on clothes dryers and exhaust fans, such as range hoods and bathroom exhausts, so they shall operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.
 4. Light the heater following the lighting instructions. Adjust the thermostat for continued operation. Verify that combustion products are venting properly. After determining that the heater vents properly, return doors, windows, exhaust fans, and fireplace dampers to their previous conditions. If improper venting is observed, the venting system must be corrected.
- With the unit in operation, measure manifold gas pressure. Manifold pressure for natural gas should be 3.5" w.c. and 10" w.c. for propane gas. See Paragraph 8.
- Turn the unit off and on, pausing two minutes between each cycle. Observe for smooth ignition.
- Place the "Owner's Envelope" containing the Limited Warranty, this booklet, the installation manual, and any control or optional information in an accessible location near the heater. Follow the instructions on the envelope.

DANGER: The gas burner in this gas-fired equipment is designed and equipped to provide safe and economically controlled complete combustion. However, if the installation does not permit the burner to receive the proper supply of combustion air, complete combustion may not occur. The result is incomplete combustion which produces carbon monoxide, a poisonous gas that can cause death. Safe operation of indirect-fired gas burning equipment requires a properly operating vent system which vents all flue products to the outside atmosphere. FAILURE TO PROVIDE PROPER VENTING WILL RESULT IN A HEALTH HAZARD WHICH COULD CAUSE SERIOUS PERSONAL INJURY OR DEATH.

If installed as a separated-combustion unit, install either the horizontal or vertical combustion air/vent system illustrated in Paragraph 7A using the concentric adapter supplied. Always comply with the combustion air requirements in the installation codes and instructions. Combustion air at the burner should be regulated only by manufacturer-provided equipment. NEVER RESTRICT OR OTHERWISE ALTER THE SUPPLY OF COMBUSTION AIR TO ANY HEATER. CHECK THE VENT SYSTEM FOR SOUNDNESS AND FUNCTION; MAINTAIN IT IN PROPER OPERATING CONDITION.

20. Typical Wiring Diagrams

Typical Wiring Diagram for Model CAUA with a Direct-Drive Blower Motor(s)



OPERATING SEQUENCE

1. SET THERMOSTAT SYSTEM SWITCH AT "OFF" POSITION, FAN SWITCH AT "AUTO" POSITION.
2. TURN ON MANUAL GAS VALVE.
3. TURN ON POWER TO UNIT.
4. SET THERMOSTAT SYSTEM SWITCH AT "HEAT" POSITION; FAN SWITCH AT "AUTO" POSITION.
5. THERMOSTAT CALLS FOR HEAT, ENERGIZING THE VENTER MOTOR.
6. VENTER PRESSURE SWITCH CLOSSES, FIRING UNIT.
7. BURNER FLAME IS SENSED, AND IN 30 SECONDS THE BLOWER MOTOR IS ENERGIZED.
8. IF THE FLAME IS EXTINGUISHED DURING MAIN BURNER OPERATION, THE INTEGRATED CONTROL SYSTEM CLOSSES THE MAIN VALVE AND MUST BE RESET BY INTERRUPTING POWER TO THE CONTROL CIRCUIT (SEE LIGHTING INSTRUCTIONS).
9. SET THERMOSTAT SYSTEM SWITCH AT "COOL" POSITION, FAN SWITCH AT "AUTO" POSITION.
 - (A) ON A CALL FOR COOLING, BLOWER MOTOR IS ENERGIZED AT HIGH SPEED AND COOLING CIRCUIT IS ENERGIZED.
10. WHEN BLOWER DOOR IS OPENED, THE UNIT IS SHUTDOWN.
11. SET THERMOSTAT SYSTEM SWITCH AT "OFF" POSITION, FAN SWITCH AT "AUTO" POSITION, FOR SHUTDOWN..

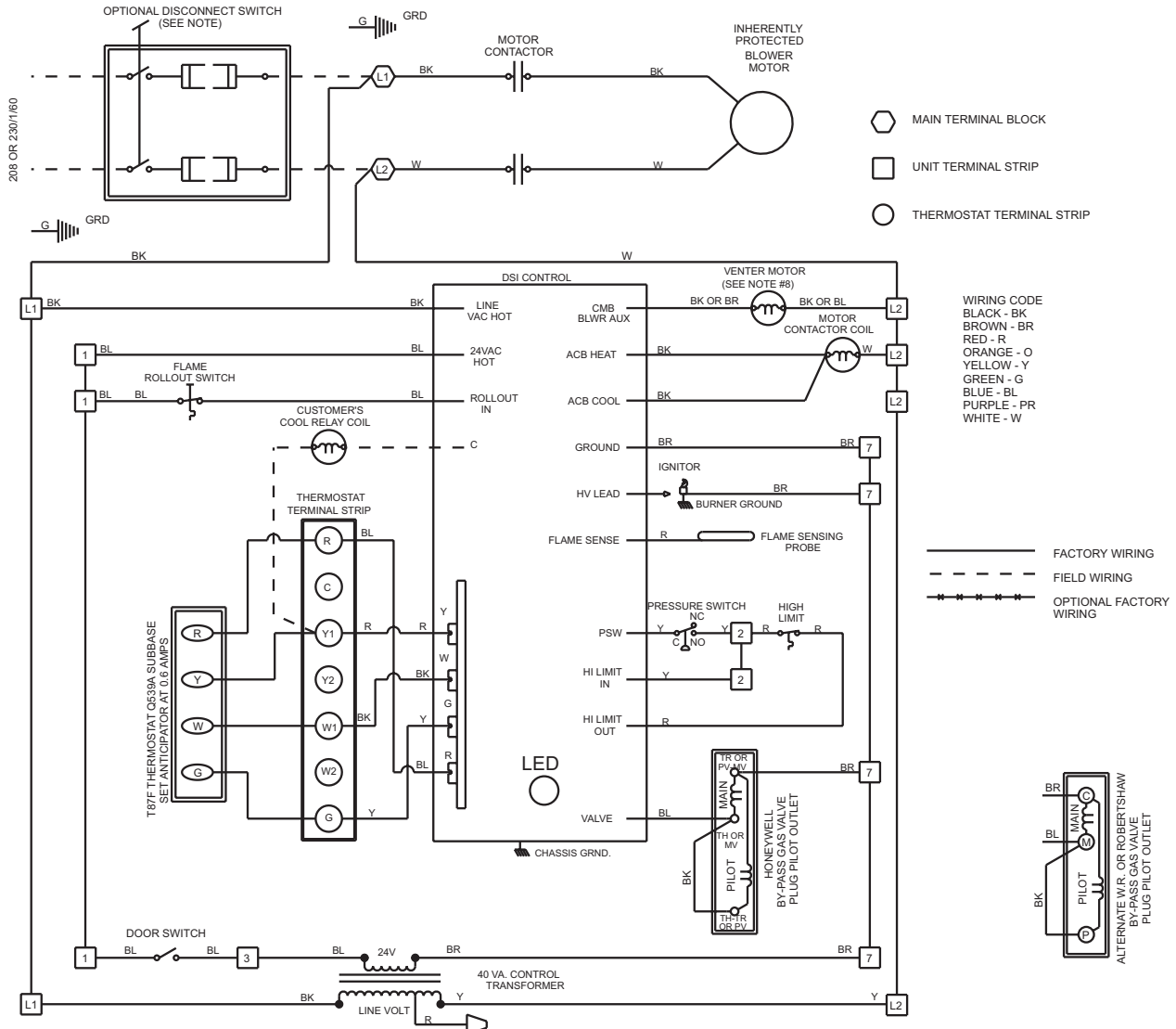
NOTES

1. THE FOLLOWING CONTROLS ARE FIELD INSTALLED OPTIONS: THERMOSTAT
2. DOTTED WIRING AND COOL RELAY COIL INSTALLED BY OTHERS.
3. CAUTION: IF ANY OF THE ORIGINAL WIRING AS SUPPLIED WITH THE APPLIANCE MUST BE REPLACED, IT MUST BE REPLACED WITH WIRING MATERIAL HAVING A TEMPERATURE RATING OF AT LEAST 105° C. EXCEPT FOR SENSOR LEAD WIRE WHICH MUST BE 150° C.
4. USE 18 GA. WIRE FOR CONTROL WIRING ON THE UNIT.
5. USE 14 GA. WIRE FOR LINE AND MOTOR WIRING ON UNIT.
6. LINE AND FAN MOTOR BRANCH WIRE SIZES SHOULD BE OF A SIZE TO PREVENT VOLTAGE DROPS BEYOND 5% OF SUPPLY LINE VOLTAGE.
7. SECOND BLOWER MOTOR ON 250-400 UNITS ONLY.
8. VENTER MOTOR ON 350-400 UNITS HAS BROWN AND BLUE WIRES.
9. ON 208/230V. UNITS THE CONTROL TRANSFORMER HAS A DUAL VOLTAGE PRIMARY. FOR 230V. UNITS USE BLACK AND YELLOW LEADS (CAP RED). FOR 208V. UNITS USE BLACK AND RED LEADS (CAP YELLOW).
10. WHEN PROVIDING OR REPLACING FUSES IN THE FUSIBLE DISCONNECT SWITCH USE DUAL ELEMENTS TIME DELAY FUSES AND SIZE ACCORDING TO TIMES THE MAXIMUM TOTAL INPUT AMPS.

FIELD CONTROL WIRING

TOTAL WIRE LENGTH	DISTANCE FROM UNIT TO CONTROL	MIN. RECOMMENDED WIRE GAUGE
150'	75'	#18 GA. WIRE
250'	125'	#16 GA. WIRE
350'	175'	#14 GA. WIRE

Typical Wiring Diagram for Model CAUA with a Belt-Drive Blower Motor



OPERATING SEQUENCE

1. SET THERMOSTAT SYSTEM SWITCH AT "OFF" POSITION; FAN SWITCH AT "AUTO" POSITION.
2. TURN ON MANUAL GAS VALVE.
3. TURN ON POWER TO UNIT.
4. SET THERMOSTAT SYSTEM SWITCH AT "HEAT" POSITION; FAN SWITCH AT "AUTO" POSITION.
5. THERMOSTAT CALLS FOR HEAT, ENERGIZING THE VENTER MOTOR.
6. VENTER PRESSURE SWITCH CLOSURES, FIRING UNIT.
7. BURNER FLAME IS SENSED, AND IN 30 SECONDS THE BLOWER MOTOR IS ENERGIZED.
8. IF THE FLAME IS EXTINGUISHED DURING MAIN BURNER OPERATION, THE INTEGRATED CONTROL SYSTEM CLOSURES THE MAIN VALVE AND MUST BE RESET BY INTERRUPTING POWER TO THE CONTROL CIRCUIT (SEE LIGHTING INSTRUCTIONS).
9. SET THERMOSTAT SYSTEM SWITCH AT "COOL" POSITION, FAN SWITCH AT "AUTO" POSITION.
(A) ON A CALL FOR COOLING, BLOWER MOTOR IS ENERGIZED AND COOLING CIRCUIT IS ENERGIZED.
10. WHEN BLOWER DOOR IS OPENED, THE UNIT IS SHUTDOWN.
11. SET THERMOSTAT SYSTEM SWITCH AT "OFF" POSITION, FAN SWITCH AT "AUTO" POSITION, FOR SHUTDOWN.

NOTES

1. THE FOLLOWING CONTROLS ARE FIELD INSTALLED OPTIONS: THERMOSTAT
2. DOTTED WIRING AND COOL RELAY COIL INSTALLED BY OTHERS.
3. CAUTION: IF ANY OF THE ORIGINAL WIRING AS SUPPLIED WITH THE APPLIANCE MUST BE REPLACED, IT MUST BE REPLACED WITH WIRING MATERIAL HAVING A TEMPERATURE RATING OF AT LEAST 105° C. EXCEPT FOR SENSOR LEAD WIRE WHICH MUST BE 150° C.
4. USE 18 GA. WIRE FOR CONTROL WIRING ON THE UNIT.
5. USE 14 GA. WIRE FOR LINE AND MOTOR WIRING ON UNIT.
6. LINE AND FAN MOTOR BRANCH WIRE SIZES SHOULD BE OF A SIZE TO PREVENT VOLTAGE DROPS BEYOND 5% OF SUPPLY LINE VOLTAGE.
7. ON 208/230V. UNITS THE CONTROL TRANSFORMER HAS A DUAL VOLTAGE PRIMARY. FOR 230V. UNITS, USE BLACK AND YELLOW LEADS (CAP RED). FOR 208V. UNITS, USE BLACK AND RED LEADS (CAP YELLOW).
8. VENTER MOTOR ON 350-400 UNITS HAS BROWN AND BLUE WIRES.
9. WHEN PROVIDING OR REPLACING FUSES IN THE FUSIBLE DISCONNECT SWITCH USE DUAL ELEMENTS TIME DELAY FUSES AND SIZE ACCORDING TO 1.25 TIMES THE MAXIMUM TOTAL INPUT AMPS.

LED CODES

- SLOW FLASH NORMAL OPERATION - NO CALL FOR HEAT
 FAST FLASH NORMAL OPERATION - CALL FOR HEAT
 2 FLASHES SYSTEM LOCKOUT - FAILED TO DETECT OR SUSTAIN FLAME
 3 FLASHES PRESSURE SWITCH OPEN OR CLOSED
 4 FLASHES HIGH LIMIT OPEN
 5 FLASHES FLAME SENSED AND GAS VALVE NOT ENERGIZED
 STEADY ON INTERNAL FAILURE (MICRO-CONTROLLER FAILURE: SELF CHECK)

FIELD CONTROL WIRING

TOTAL WIRE LENGTH	DISTANCE FROM UNIT TO CONTROL	MIN. RECOMMENDED WIRE GAUGE
150'	75'	#18 GA. WIRE
250'	125'	#16 GA. WIRE
350'	175'	#14 GA. WIRE

21. Troubleshooting

Check the Ignition Control Module - The integrated ignition control module monitors the operation of the heater and includes an LED signal that indicates normal operation and various abnormal conditions. If the heater fails to operate properly, check this signal to determine the cause and/or to eliminate certain causes.

Ignition control module LED Codes

- Slow Flash** Normal Operation, No call for heat
- Fast Flash** Normal Operation, Call for heat
- 2 Flashes** System Lockout, Failed to detect or sustain flame
- 3 Flashes** Pressure Switch Held in Open or Closed Position
- 4 Flashes** High Limit or Flame Rollout Switch Open
- 5 Flashes** Flame Sensed and Gas Valve not energized
- Steady On** Internal Failure - Replace the ignition control module

PROBLEM	PROBABLE CAUSE	REMEDY
Venter motor will not start	<ol style="list-style-type: none"> 1. No power to unit. 2. No 24 volt power to venter relay. 3. Integrated ignition control module defective. 4. Defective venter motor. 	<ol style="list-style-type: none"> 1. Turn on power, check supply fuses or circuit breaker. 2. Turn up thermostat; check control transformer output. 3. Replace integrated ignition control module. DO NOT ATTEMPT TO REPAIR IGNITION CONTROL MODULE; IT HAS NO FIELD REPLACEABLE COMPONENTS. 4. Replace venter motor.
Burners will not light	<ol style="list-style-type: none"> 1. Manual valve not open. 2. Air in the gas line. 3. Door switch open. 4. Gas pressure is too high or too low. 5. No Spark: <ol style="list-style-type: none"> a) Loose wire connections b) Transformer failure c) Incorrect spark gap. d) Spark cable shorted to ground. e) Spark electrode shorted to ground f) Burners not grounded g) Ignition control module not grounded. h) Faulty integrated ignition control module 6. Lockout device interrupting control circuit by above causes. 7. Faulty combustion air proving switch. 8. Main valve not operating <ol style="list-style-type: none"> a) Defective valve b) Loose wire connections 9. Integrated ignition control module does not power main valve. <ol style="list-style-type: none"> a) Loose wire connections b) Flame sensor grounded c) Incorrect gas pressure d) Cracked ceramic at sensor 10. Flame rollout switch open <ol style="list-style-type: none"> a) Air blockage through the unit b) Faulty flame rollout switch 	<ol style="list-style-type: none"> 1. Open manual valve. 2. Bleed gas line. 3. Close blower compartment door. If door is closed, replace switch. 4. Set supply pressure at 5" w.c. to 14" w.c. for natural gas and 11" w.c. to 14" w.c. for propane gas. 5. <ol style="list-style-type: none"> a) Be certain all wire connections are solid. b) Be sure 24 volts is available. c) Maintain spark gap at 1/8". d) Replace worn or grounded spark cable. e) Replace if ceramic spark electrode is cracked or grounded. f) Make certain ignition control module is grounded to the igniter. g) Make certain ignition control module is grounded to the furnace chassis. h) If 24-volt is available to the integrated ignition control module and all other causes have been eliminated, replace module. DO NOT ATTEMPT TO REPAIR IGNITION CONTROL MODULE; IT HAS NO FIELD REPLACEABLE COMPONENTS. 6. Reset lockout by interrupting control at the thermostat or main power. 7. Replace combustion air proving switch. 8. <ol style="list-style-type: none"> a) If 24 volt is measured at the valve connections and valve remains closed, replace valve. b) Check and tighten all wiring connections. 9. <ol style="list-style-type: none"> a) Check and tighten all wiring connections. b) Be certain flame sensor lead is not grounded or insulation or ceramic is not cracked. Replace as required. c) Set supply pressure at 5" w.c. to 14" w.c. for natural gas and 11" w.c. to 14" w.c. for propane gas. d) Replace sensor. 10. <ol style="list-style-type: none"> a) Check for heat exchanger or vent pipe blockage. b) Replace flame roll out switch.
Burners cycle on and off	<ol style="list-style-type: none"> 1. Gas pressure is too high or too low. 2. Burners not grounded 3. Ignition control module not grounded. 4. Faulty integrated ignition control module 5. Faulty combustion air proving switch. 6. Flame sensor grounded 7. Cracked ceramic at sensor 	<ol style="list-style-type: none"> 1. Set supply pressure at 5" w.c. to 14" w.c. for natural gas and 11" w.c. to 14" w.c. for propane gas. 2. Make certain ignition control module is grounded to the igniter. 3. Make certain ignition control module is grounded to the furnace chassis. 4. If 24 volt is available to the integrated ignition control module and all other causes have been eliminated, replace module. DO NOT ATTEMPT TO REPAIR IGNITION CONTROL MODULE; IT HAS NO FIELD REPLACEABLE COMPONENTS. 5. Replace combustion air proving switch. 6. Be certain flame sensor lead is not grounded or insulation or ceramic is not cracked. Replace as required. 7. Replace sensor

PROBLEM (cont'd)	PROBABLE CAUSE (cont'd)	REMEDY (cont'd)
No heat (Heater Operating)	<ol style="list-style-type: none"> 1. Incorrect manifold pressure or orifices. 2. Cycling on limit control. 3. Improper thermostat location or adjustment. 	<ol style="list-style-type: none"> 1. Check manifold pressure (See Paragraph 9). 2. Check airflow. 3. See thermostat manufacturer's instructions.
Cold air delivered	<ol style="list-style-type: none"> 1. Incorrect manifold pressure. 	<ol style="list-style-type: none"> 1. Check manifold pressure (See Paragraph 9).
Blower motor will run	<ol style="list-style-type: none"> 1. Circuit open. 2. Defective integrated ignition control module. 3. Defective motor. 	<ol style="list-style-type: none"> 1. Check wiring and connections. 2. Replace module. DO NOT ATTEMPT TO REPAIR IGNITION CONTROL MODULE; IT HAS NO FIELD REPLACEABLE COMPONENTS. 3. Replace motor.
Blower motor turns on and off while the burner is operating (See below)	<ol style="list-style-type: none"> 1. Motor overload device cycling on and off. 2. 3-phase motor rotating in opposite direction 	<ol style="list-style-type: none"> 1. Check motor load against motor rating plate. Replace motor if needed. 2. Interchange two legs of supply connections
Blower motor cuts out on overload	<ol style="list-style-type: none"> 1. Low or high supply voltage. 2. Defective motor. 3. Static pressure incompatibility. 4. Defective bearing 	<ol style="list-style-type: none"> 1. Correct electric supply. 2. Replace motor. 3. Adjust blower speed or ductwork. 4. Replace motor.

22. Heater Rating Plate

The heater rating plate is a quick reference for information about a heater and its installation requirements. In addition, the Serial No. on the rating plate identifies components used in manufacturing that specific heater. The serial number is coded to identify the gas valve and ignition type that was installed on the heater at the time of manufacture. This information is required if service and/or replacement parts are required.

Follow the example below to decode the heater Serial No.

Example: Heater Serial No. AXF71T9N12345

BAA	77	Q3	N	12345
Month and Year of Manufacture	Safety Pilot Code (Type of Ignition)	Type of Valve	Type of Gas*	Consecutive Number

* N = Natural Gas; L = Propane Gas

IMPORTANT: The serial number code can only identify the original equipment. Before installing or servicing, check for a gas conversion label. When inquiring about replacement parts, always provide the complete Model No. and Serial No. In addition to the rating plate, each heater has a "Replacement Parts Label" attached that identifies parts specific to that heater, as well as the Model and Serial No. of the heater.

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FOR SERVICE OR REPAIR, FOLLOW THESE STEPS IN ORDER:

FIRST:	Contact the Installer	
	Name	_____
	Address	_____

	Phone	_____
SECOND:	Contact the nearest distributor (See telephone yellow pages.) If no listing, contact Authorized Factory Representative, 1-800-695-1901 (Press 1)	
THIRD:	Contact REZNOR®/ Thomas & Betts Corporation	
	150 McKinley Avenue	
	Mercer, PA 16137	
	Phone: (724) 662-4400	
	Model No.	_____
	Unit Serial No.	_____
	Date of Installation	_____



Thomas & Betts