Operation, Maintenance, and Service

Applies to: **Model CAUA Gas-Fired Indoor Vertical (Upflow), Power-Vented Heater**

Model CAUA with Optional Cased Cooling Coil and Optional Mixing Box

⚠ WARNING:

FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in serious injury, death, or property damage.

Be sure to read and understand the installation, operation, and service instructions in this manual.

Improper installation, adjustment, alteration, service, or maintenance can cause serious injury, death, or property damage.

— **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; do not use any phone in your building.**
- **Leave the building immediately.**
- **Immediately call your gas supplier from a phone remote from the building. Follow the gas supplier's instructions.**
- **If you cannot reach your gas supplier, call the fire department.**

— **Installation and service must be performed by a qualified installer, service agency, or the gas supplier.**

KEEP THIS BOOKLET FOR MAINTENANCE AND SERVICE REFERENCE.

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1.0 General

The operation/maintenance/service instructions in this manual apply to this 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 is this booklet is intended as a guideline for a qualified gas-fired equipment service technician.

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.**

2.0 MAINTENANCE

WARNING

If you turn off the power supply, turn off the gas. See Hazard Levels, Page 2.

A Model CAUA 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. If the system includes a cooling coil, the coil and condensate drains should be checked at the beginning of the cooling season.

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 on the left.

2.1 Maintenance Schedule

NOTE: Use only factory-authorized replacement parts.

The following procedures should be carried out at least annually. Follow the instructions in Paragraph 2.2.

☐ Clean the blower and motor. If equipped with a belt drive, check the belt.
☐ Check the filters.
☐ Check the gas valve to ensure that gas flow is being shutoff completely.
☐ 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.

2.2 Maintenance Procedures

Code **Reason for Maintenance**

S = Safety (to avoid personal injury and/or property damage)

R = Continued Reliability

E = Efficient Operation

2.2.1 Blower and Blower Motor

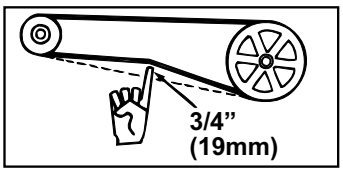


FIGURE 1 - Check Belt Tension

R 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 and recheck belt alignment.

2.2.2 Filters

(Applies to a heater with either an optional return air filter cabinet; an outside air/return air mixing box with filters; or an inlet base with filters.)

R **E** Check the filters quarterly. Clean or replace as needed. Replacement P/N's for filters are listed here with application by size listed below.

2" Pleated Filters	2" Permanent Filters	2" Disposable Filters
16x16, **P/N 104109**	16x16, **P/N 104103**	(Btm Filter Cabinet only)
12x32, **P/N 114324**	12x16, **P/N 114325**	16x16, **P/N 104101**
16x20, **P/N 101620**	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**		

Sizes & Quantities of Filters Used in <u>Return Air Filter Cabinet</u>

To replace filters, select replacement P/N's from the list above for type and size of filters. If using field-replacement filters, replace with same size and type.

TABLE 1A - Replacement Filters for Return Air Filter Cabinet

For **Full Size** Filter Cabinet on **Either Side** of the Heater	
Size	**Permanent or Pleated**
150, 200, 250, 300	(4) 16x16 - 2" Filters
350, 400	(6) 16x16 - 2" Filters
For **Full Size** Filter Cabinet on **Rear** of Heater	
Size	**Permanent or Pleated**
150, 200	(4) 16x16 - 2" Filters
250, 300, 350, 400	(6) 16x16 - 2" Filters
For Filter Cabinet on **Bottom** of Heater	
Size	**Permanent, Pleated, or Disposable Filters**
150, 200	(6) 16x16 - 2" Filters
250, 300	(8) 16x16 - 2" Filters
350, 400	(12) 16x16 - 2" Filters

For **Small** Filter Cabinet on Either **Side or Rear** of Heater				
Size	**CFM**	**FPM**	**2" Filters**	
			Pleated	**Permanent**
150	1800	375	(2) 12x32	(4) 12x16
	2400	500	(2) 12x32	(4) 12x16
	*3000	625	--	(4) 12x16
200	2400	500	(2) 12x32	(4) 12x16
	*3000	625	--	(4) 12x16
*Application requires 2" permanent; do not use pleated filters.				

Sizes and Quantities of Filters (*1" only*) Used in the <u>Optional Inlet Base</u> (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 for each type of filter are listed in the table above.

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

To replace filters, select replacement P/N's from the list on page 3 for type and size of filters in **TABLE 1B**. If using field-replacement filters, replace with same size and type.

TABLE 1B - Replacement Filters and Blockoff Plates for Mixing Box

TABLE 1B - Replacement Filter Quantity and Sizes for Mixing Box

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

2.0 Maintenance (cont'd)

2.2 Maintenance Procedures (cont'd)

2.2.3 Gas Valve

WARNING

The operating valve is the prime 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 2.

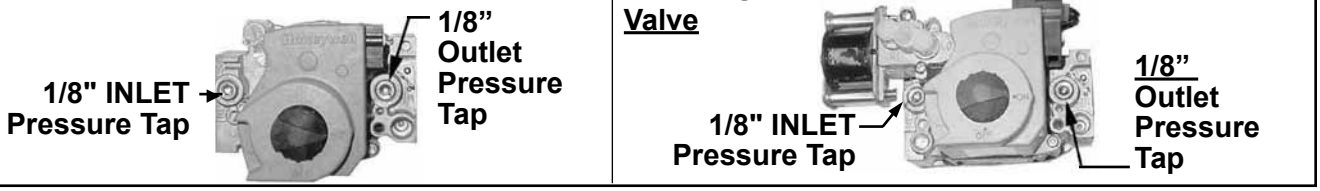
S Remove external dirt accumulation and check wiring connections.

The combination gas valve must be checked annually to ensure that the valve is shutting off gas flow completely.

Instructions:

1) Locate the 1/8" FPT **INLET** pressure tap on the combination valve (**FIGURE 2).**

FIGURE 2



2) With the manual valve turned off to prevent flow to the gas valve, connect a manometer to the 1/8" inlet pressure tap in the valve. **NOTE:** A manometer (fluid-filled gauge) with an inches water column scale is recommended.

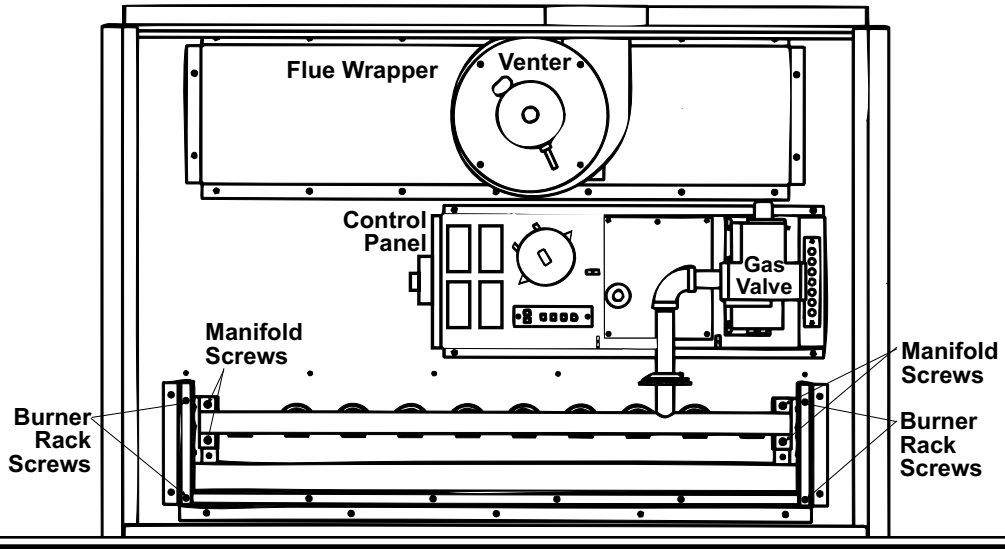
3) With the field-installed manual valve remaining closed, turn the thermostat up to fire the unit and allow the unit to got through one trail for ignition. Reset the thermostat to shut the unit off. Observe the manometer for two to three minutes for an indication of gas pressure. No pressure should be indicated on the manometer. **If the manometer indicates a gas pressure**, the field-installed manual gas valve must be replaced or repaired before the combination gas valve can be checked.

4) If the manometer does not indicate gas pressure, slowly open the field-installed manual gas valve. After the manometer's indicated gas pressure has reached equilibrium, close the manual shutoff valve. Observe the gas pressure. There should be no loss of gas pressure on the manometer. If the manometer indicates a loss of pressure, replace the combination gas valve before placing the heater in operation.

2.2.4 Burner Maintenance

S **Instructions for Burner Rack Removal (See FIGURE 3.)**

FIGURE 3 - View of Control Compartment with Access Panel and All Sections of the Burner Cover Removed (Wires and tubing are not illustrated.)



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.

CAUTION: Use of eye protection is recommended.

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)

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.

2.2.5 Ignition System

R This heater is equipped with a direct spark integrated control system. The ignition board monitors the safety devices and controls the operation of the blower and venter motors and the gas valve.

Ignition System Operating Sequence

On a call for heat from the thermostat, the system energizes the venter motor and goes through a 10-second prepurge. The system verifies that the pressure switch has changed states closing the normally open contactor and that the high limit is in the closed state.

The gas valve is then energized, and the ignition system provides the high voltage spark to the electrode to ignite the main burner gas. Burner flame is electronically sensed by the control (minimum 1.0 microamps) upon carryover of all burners. (A separate solid metal probe is used as the flame sensing function. A low voltage electrical signal is imposed on the metal probe which is electrically isolated from ground. When the flame impinges on the flame sensing probe, the flame acts as a conduction path to ground. The flame rectifies and completes the DC circuit, and the ignition system acknowledges the flame.)

The blower motor is energized after 30 seconds of flame sensing.

After the thermostat has been satisfied, the system de-energizes the gas valve, the venter motor goes through a 45-second post-purge, and the blower motor remains energized for an additional 135 seconds.

NOTE: This is a three trial system. The unit will lockout for one hour before initiating another trial for ignition. If the unit fails after one recycle interval, the unit will go into hard lockout and must be reset by interrupting power or resetting the thermostat. To initiate another trial for ignition before the one hour interval, either reset the thermostat or interrupt power to the unit for 30 seconds.

Maintenance: To access the ignition system, follow Steps 1-3 in Paragraph 2.2.4.

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 6**, page 9.

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

2.0 Maintenance (cont'd)

2.2 Maintenance Procedures (cont'd)

CAUTION: Due to high voltage on the spark wire and electrode, do not touch when energized. See Hazard Levels, Page 2.

2.2.5 Ignition System (cont'd)

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 microampmeter.

2.2.6 Cleaning the Heat Exchanger

CAUTION: Eye protection is recommended.

E 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.

The inner surfaces of the heat exchanger can be reached for cleaning with the burner, turbulators and venter assembly removed. Follow instructions in Paragraph 2.2.4 to remove the burner (See **FIGURE 3**).

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.

2.2.7 Venter Motor and Wheel

R 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.

2.2.8 Vent or Vent/ Combustion Air System

S **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.

2.2.9 Condensate Drain

E **R** If the installation has condensate drains (burner, cooling coil, and/or flue wrapper). Clean or replace parts as needed. Fill traps.

3.0 SERVICE - 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.

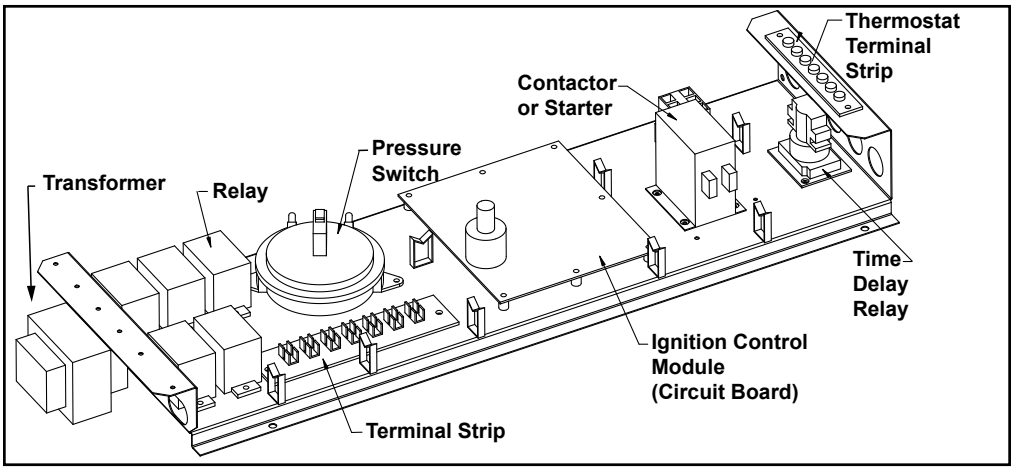
WARNING

If you turn off the power supply, turn off the gas. See Hazard Levels, Page 2.

3.1 Control Locations

To service this heater, it is necessary to understand the normal operating functions of the heater controls. Refer to **FIGURE 4** to identify and locate the controls.

FIGURE 4 - Control Locations in the Electrical Compartment (Remove the control compartment access panel)



3.2 Heater Rating Plate

NOTE: 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.

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. BIC78Q3N12345

BIC	**78**	**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 servicing, check for a gas conversion label. When inquiring about replacement parts, always provide the complete Model No. and Serial No.

3.3 Service Procedures

Gas Valve

3.3.1 Operating Gas Valve

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

Service: The valve has no field-repairable parts. Carefully remove external dirt accumulation from the valve and check wiring connections.

Refer to Form I-CAUA, Paragraph 6.1, for instructions on checking manifold pressure.

The gas valve must be checked annually to ensure that the valve is shutting off gas flow completely; see Maintenance Paragraph 2.2.3.

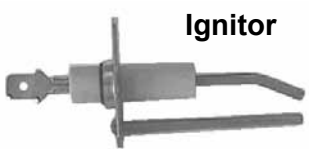
3.3.2 Ignition System

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.

NOTE: This control is on units manufactured beginning 3/09. To replace an ignition controller on a unit manufactured prior to 3/09, order kit **P/N 258251**.

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 160 seconds after the gas valve closes. See **FIGURE 6,** page 8, for LED codes and fan delay dip switch settings.

Ignitor

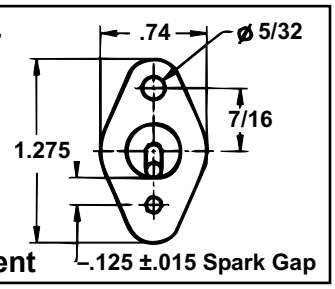


Ignitor: The ignitor is located on the right side of the burner assembly. Instructions for cleaning and checking the ignitor are included in the Paragraph 2.2.5. The spark gap shown inches in **FIGURE 5** must be maintained.

Flame Sensor: The flame sensor is located on the left side of the burner assembly. Instructions for cleaning and checking the flame sensor are in Paragraph 2.2.5.

FIGURE 5 - Spark Gap

Front View of Ignitor showing Spark Gap Measurement

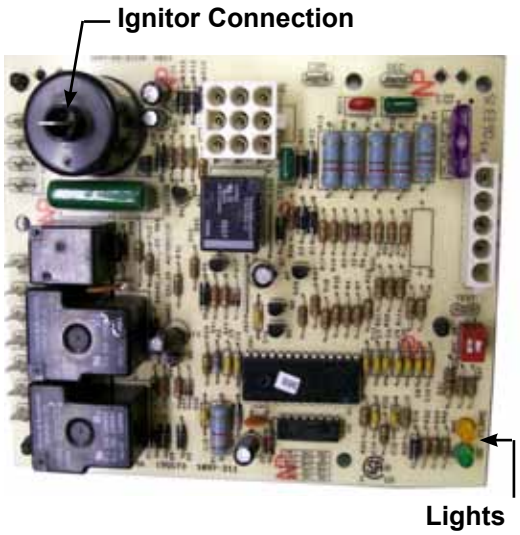


3.0 SERVICE - Control Location, Operation, and Service (cont'd)

3.3 Service Procedures (cont'd)

3.3.2 Ignition System (cont'd)

FIGURE 5 - Integrated Ignition Control Module, P/N 195573



Control Status - Green LED	
Steady ON	Normal Operation, No call for heat
Fast Flash	Normal Operation, Call for heat
1 Flash	System Lockout, Failed to detect or sustain flame
2 Flashes	Pressure Switch in Open Position
3 Flashes	High Limit or Flame Rollout Switch Open
4 Flashes	Pressure Switch is closed before venter is energized
Steady Off	Internal Failure - Replace the ignition control module
Flame Status - Yellow LED	
Steady On	Flame is sensed
Slow Flash	Weak Flame
Fast Flash	Undesired Flame

Fan Delay to OFF Switch (DIP Switch Settings - selected prior to call for heat)	SW1	SW2	Fan Delay To OFF (seconds)
	OFF	OFF	120
	OFF	ON	90
	ON	OFF	160 (Factory Preset)
	ON	ON	45

Service: The direct spark integrated circuit board is polarity sensitive. If burners cycle on and off, try switching the power supply leads. The supply connection made to "L1" on the circuit board must be the "hot" wire.

The only replaceable component of the control module is the 3 amp Type ATC or ATO fuse.

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.

Normal Heat Cycle Operating Sequence

1) Call for Heat - The heating/cooling system controller calls for heat. The ignition system circuit board checks to see that the limit switch is closed and the pressure switch is open. If the limit switch is open, the circuit board responds as defined in the “Abnormal Heat Cycle, Limit Switch Operation”. If the pressure switch is closed, the circuit board will do four flashes on the green LED and wait indefinitely for the pressure switch to open. If the pressure switch is open, the circuit board proceeds to prepurge.

2) Prepurge - The circuit board energizes the venter motor and waits for the pressure switch to close. If the pressure switch does not close within 30 seconds of the venter motor energizing, the circuit board will do two flashes on the green LED. The circuit board will leave the venter motor energized indefinitely as long as the call for heat remains and the pressure switch is open.

When the pressure switch is proven closed, the circuit board begins the prepurge time. If flame is present any time while in prepurge, the prepurge time is restarted. If flame is present long enough to cause lockout, the circuit board responds as defined in “Fault Modes, Undesired Flame”.

The ignition system circuit board runs the venter motor for a 20 second prepurge time, then proceeds to the ignition trial period.

3) Ignition Trial Period - The ignition system circuit board energizes the spark and main gas valve. The venter remains energized. If flame is sensed during the first 16 seconds, the spark is de-energized. If flame has not been sensed during the first 16 seconds, the control de-energizes the spark output and keeps the gas valve energized for an additional one second flame proving period. If flame is not present after the flame proving period, the control de-energizes the gas valve and proceeds with ignition re-tries as specified in “Abnormal Heat Cycle, Ignition Retry”. If flame is present, the circuit board proceeds to steady heat.

4) Steady Heat - Circuit board inputs are continuously monitored to ensure limit and pressure switches are closed, flame is established (sensor on both burner sections), and the system controller call for heat remains. When the call for heat is removed, the ignition system circuit board de-energizes the gas valve and begins postpurge timing.

5) Post Purge - The venter motor output remains on for a 45 second postpurge period after the system controller is satisfied.

Abnormal Heat Cycle Functions

Interrupted Call for Heat - If the system controller call for heat is removed before the flame is recognized, the circuit board will run the venter motor for the post purge period and de-energize all outputs.

If the call for heat is removed after successful ignition, the circuit board will de-energize the gas valve and run the venter motor through post purge.

Ignition Retry - If flame is not established on the first trial for ignition period, the ignition system circuit board de-energizes the gas valve, and the venter motor remains energized for an inter-purge period of 10 seconds. The spark and gas valve are then re-energized, and the circuit board initiates another trial for ignition.

If flame is not established on the second trial for ignition, the circuit board de-energizes the gas valve and venter motor remains energized. The spark and gas valve are re-energized and the circuit board initiates another trial for ignition.

If flame is not established on the third trial for ignition period, the circuit board de-energizes the gas valve, and the venter motor remains energized for an inter-purge period of 10 seconds. The circuit board then re-energizes the gas valve and spark and initiates another trial for ignition.

If flame is not established on the fourth trial for ignition (initial try plus 3 re-tries), the circuit board de-energizes the gas valve and goes into lockout. The circuit board goes to one flash on the green LED to indicate ignition failure lockout.

Limit Switch Operation - The limit switch is ignored unless a call for heat is present (W energized). If the limit switch is open and a call for heat is present, the control de-energizes the gas valve, runs the blower motor on heat speed, and runs the induced draft (venter) motor. The control will be in soft lockout and flashing fault code “3”, before returning to normal operation.

When the limit switch re-closes or the call for heat is lost, the control runs the induced draft motor through post purge and runs the blower through the selected fan off delay.

Pressure Switch - If the pressure switch opens before the trial for ignition period, the venter motor will run through the pressure switch recognition delay (2 seconds), the gas valve will be de-energized, and the venter motor will run through the postpurge time. The ignition system circuit board will re-start the heat cycle at the pressure switch proving state if the call for heat still exists.

Pressure switch opening for less than 2 seconds during the trial for ignition period shall not interrupt the heat cycle. (Gas valve will de-energize while the pressure switch is open.)

If the pressure switch opens after a successful ignition, the circuit board will de-energize the gas valve. If flame is lost before the end of the 2 second pressure switch recognition delay, the circuit board will respond to the loss of flame. If the pressure switch remains open for 2 seconds and the flame remains, the circuit board de-energizes the gas valve and the venter motor runs through postpurge.

Power interruptions of less than 80mS shall not cause the circuit board to change operating states. Power interruptions greater than 80mS may cause the circuit board to interrupt the current operating cycle and re-start.

Ignition System Fault Modes

Undesired Flame - If flame is sensed longer than 20 seconds while the gas valve is de-energized, the circuit board shall energize the venter motor. When flame is no longer sensed, the venter motor will run through postpurge. The circuit board will do a soft lockout, but will still respond to open limit and flame. The FLAME (yellow) LED shall flash rapidly when lockout is due to undesired flame.

Gas Valve Relay Fault - If the circuit board senses the gas valve as energized for more than one second when the circuit board is not attempting to energize the gas valve, or the gas valve is sensed as not energized when it is supposed to be energized, then the circuit board will lockout with the green LED off. The control assumes either the contacts of the relay driving the gas valve have welded shut, or the sensing circuit has failed. The venter motor is forced off to open the pressure switch to stop gas flow unless flame is present.

If the gas valve was sensed as closed when it should be open, and has not de-energized after the venter motor was shutoff for 15 seconds, then the venter motor is re-energized to vent the unburned gas.

Soft Lockout - The circuit board shall not initiate a call for heat while in lockout. The circuit board will still respond to an open limit and undesired flame. Lockout shall auto-

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

3.3 Service Procedures (cont'd)

3.3.2 Ignition System (cont'd)

matically reset after one hour. Lockout may be manually reset by removing power from the circuit board for more than one second or removing the call for heat for more than one and less than 20 seconds.

Hard Lockout - If the circuit board detects a fault on the board, the status LED will be de-energized, and the circuit board will lockout as long as the fault remains. A hard lockout will automatically reset if the hardware fault clears.

Power Interruption - During a momentary power interruption or at voltage levels below the minimum operating voltage (line voltage or low voltage) the ignition system will self-recover without lockout when voltage returns to the operating range.

Power interruptions of less than 80mS shall not cause the circuit board to change operating states. Power interruptions greater than 80mS may cause the circuit board to interrupt the current operating cycle and re-start.

3.3.3 Combustion Air Proving Switch

Pressure 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.

TABLE 2 - Pressure Switch Setpoints (sea level)

Model Size	Start-Up Cold	Equilibrium	Setpoint "OFF"	Setpoint "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

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 2.

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 4**, page 8. **Never bypass** the pressure switch.

3.3.4 Limit Control

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 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.

TABLE 3 - Limit Controls	For CAUA Sizes	P/N	Length	Setpoint
	150, 200, 350, 400	**148588**	60" (1524mm)	270°F
	250, 300	**164792**	54" (1372mm)	300°F

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 (see P/N's above). The limit control is accessible in the control compartment. The capillary sensor can only be reached by removing the ductwork.

3.3.5 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 shutdown 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 (see P/N's in the **TABLE 4**).

TABLE 4 -Flame Rollout Switch

CAUA Size	P/N	Setting
150-200	**112752**	225°F
250-300	**121275**	275°F
350-400	**112752**	225°F

3.3.6 Venter Motor and Wheel Assembly

Complete Venter Motor and Wheel Assembly

Size 150**, P/N 174010**

Sizes 200, 250, 300, **P/N 162895**

Sizes 350 and 400, **P/N 164542**

Refer to Parts Form P-CAUA for components.

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

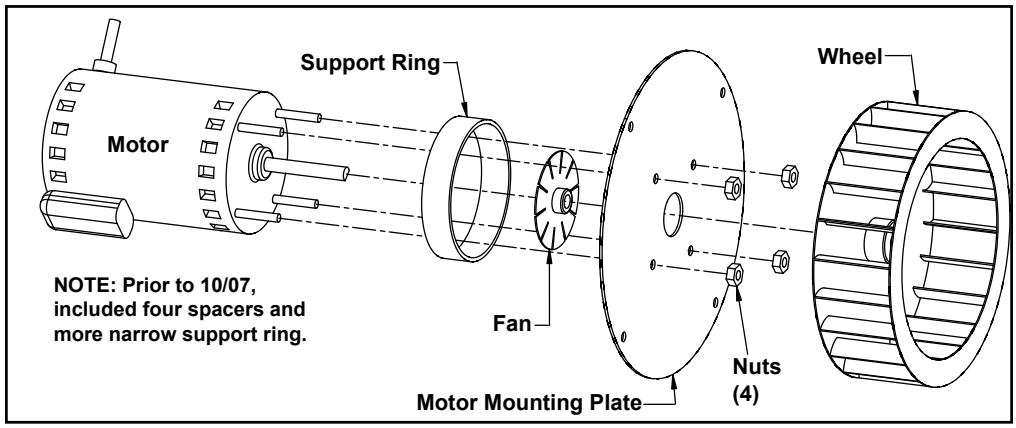
Service: If it is determined that the venter motor or wheel needs replacing, use only the factory-authorized replacement part that is designed for use on this heater.

Venter Motor Replacement Instructions

Follow these instructions for replacement of the venter motor (Refer to **FIGURES 7A and 7B**). 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 the 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 7A** and follow steps to disassemble the motor and wheel assembly.

FIGURE 7A - Venter Motor and Wheel Assembly



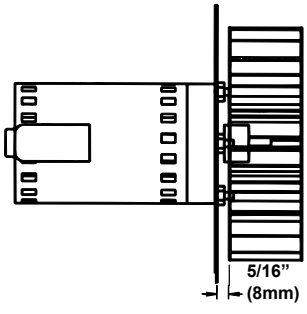
a) With a hex allen wrench, loosen the venter wheel setscrew. Slide the venter wheel off the shaft.

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. Remove the support ring.

d) Loosen the setscrew and remove the small fan blade.

FIGURE 7B - Spacing between the venter wheel and motor mounting plate



6. Re-assemble with the replacement venter motor (**NOTE**: Check the gasket on the motor mounting plate; if 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; tighten the set screw to the flat side of the motor shaft.
   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 7B**. 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.

3.3.7 Transformer

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

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

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.

3.3.8 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. Motor ranges in size from 1/4 to 5 HP.

For information on how to adjust the blower speed, see Form I-CAUA, Paragraph 6.5.

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 2.

For information on replacing a belt, see Maintenance Section, Paragraph 2.2.1.

3.3.9 Blower Compartment Door Switch

Door Switch, P/N 116023

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.

3.3.10 Inlet Air Dampers and Controls

Inlet Air Dampers

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. See controls below and application by option in **TABLE 5**, page 14.

Service: Clean dampers and controls of dust or dirt.

2-Position Damper Motor

2-Position Damper Motor

Function: The 2-position damper motor opens and closes the dampers. Damper position is either on when the unit is operating or is determined by a two-position enthalpy control.

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

Modulating Damper Motor

Modulating Damper Motor

Function: The modulating damper motor actuates the dampers in response to a potentiometer or a mixed air controller. 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.

Modulating Damper Motor, P/N 196302 with Logic Module

Modulating Damper Motor with Logic Module

Function: The modulating damper motor actuates the dampers in response to enthalpy controls for cooling or a mixed air controller for heating. Outside air dampers close when the heater shuts down.

Service: There is no service required other than external cleaning. If the motor or module needs replaced, replace with identical parts.

Potentiometer

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 needs replaced, replace it with an identical switch.

Return Air Controller

Return Air Controller

Function: The return 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 a standard Model CAUA heater must always be 35°F or above. Only when the heater is factory equipped with makeup air Option AD4 can the entering air temperature be below 35°F.

Service: If the controller needs replaced, replace it with an identical control.

Mixed Air Controller

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 a standard Model CAUA heater must always be 35°F or above. Only when the heater is factory equipped with makeup air Option AD4 can the entering air temperature be below 35°F.

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

2-Position Enthalpy Control

Enthalpy Sensor for 2-Position Control

Function: The enthalpy control senses the enthalpy (heat content in a lb of air) of the outside air entering the heater. When the enthalpy is low, the control activates the motor to open the outside air damper; when high, it closes the outside air damper.

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

Modulating Enthalpy Sensor and Thermistor Sensor

Enthalpy Sensors for Modulating Control

Function: There are two enthalpy sensors, one for outside air and one for return air. Input from the two enthalpy sensors and the thermistor sensor to the logic module on the motor allow the motor to modulate the dampers to maintain the set temperature and control the moisture of the air entering the heater.

Service: If the controls do not function properly, replace with an identical control.

TABLE 5 - Application of Inlet Air Damper Controls by Option Codes (page 14)

IMPORTANT NOTE: The standard Model CAUA is designed for a maximum temperature rise of 75°F. Above 35°F (2°C) outside air temperature, any percentage of outside air is permitted. For optimum operation and to prevent condensation, the mixed air temperature going to the heat exchanger must not be below 35°F (2°C).

The inlet air temperature restriction does not apply to a Model CAUA ordered with makeup air Option AD4. A CAUA unit equipped with makeup air Option AD4 includes stainless steel components and a flue wrapper condensate drain to permit inlet air temperature below 35°F (2°C).

3.0 SERVICE - Control Location, Operation, and Service (cont'd)
3.3 Service Procedures (cont'd)

Mixing Box Option	Motor Option	Control Option on W.D.	Description	Operating Mode	Application
GA1, GA2, GA3, GA4, GA5, GA6, GA7, GA8, and GA9	GB2	None	2-Position Damper Motor	Heating only or Heating and Cooling	When the unit is operating, the outside air damper is open.
		GC3C	2-Position Damper Motor with 2-Position Enthalpy Control	Cooling only	To minimize cooling energy consumption and equipment cycling, when the sensor detects a low enthalpy (heat content in a lb of air) in the outside air, the control will open the outside air damper. When the control senses a high enthalpy in the outside air, the control will close the outside air damper. Factory setpoint for opening the outside air damper is 75°F/40% humidity.
		GC3C and GC4			Same as above (GC3C only) plus a delay based on return air temperature. Control delays the opening of the outside air damper to provide faster cool down of the supply air.
GA4, GA5, GA6, GA7, GA8, and GA9	GB3	GC1A or GC1B	Modulating Damper Motor with Manual Potentiometer Mounted in the Mixing Box (GC1A) or Remote (GC1B)	Heating only or Heating and Cooling	To control mixture of inlet air, manually set the potentiometer to the desired minimum position of the outside air damper. (See IMPORTANT NOTE left.)
		GC1A or GC1B with GC3A			Same as above (GC1A or GC1B only) plus in heating mode the dampers are modulated in response to a control sensing the mixed inlet air temperature. The adjustable control has a range of 0-100°F; factory setpoint is 35°F. (See IMPORTANT NOTE left.)
		GC1A or GC1B with GC4			Same as above (GC1A or GC1B only) plus a delay based on return air temperature. Control delays the opening of the outside air damper to provide faster cool down (cooling mode) or warm up (heating mode) of the supply air.
		GC1A or GC1B with both GC3A and GC4			Includes all of the control functions listed in this section - a potentiometer (GC1A or GC1B) with both the mixed air controller (GC3A) and the delay (GC4).
		GC3A	Modulating Damper Motor with Mixed Air Controller	Heating only	Dampers are modulated in response to a control sensing the mixed inlet air temperature. The adjustable control has a range of 0-100°F; factory setpoint is 35°F. (See IMPORTANT NOTE left.)
		GC3A and GC4			Above plus a delay based on return air temperature. Control delays the opening of the outside air damper to provide faster warm up of the supply air.
	GB4	GC3B	Modulating Damper Motor with a Logic Module and Dual Setpoint Modulating Enthalpy Control	Cooling and Heating	In cooling mode, damper modulation is controlled by a modulating enthalpy control. With one sensor measuring the enthalpy of the outside air and another sensing the return air, dampers will modulate in response to the control to maintain the most economic mix in the inlet air (normally set to maintain between 50-56°F). With two enthalpy setpoints, damper operation can be interlocked with a time clock or other device to provide different mix depending on occupancy or other determining factor. In the heating mode, damper modulation is controlled by a mixed air temperature sensor. (See IMPORTANT NOTE left.)
		GC3B and GC4			Above (GC3B only) plus a delay based on return air temperature. Control delays the opening of the outside air damper to provide faster cool down (cooling mode) or warm up (heating mode) of the supply air.

3.3.11 Ductstat used in Makeup Air Gas Control Option AG3 (available only with Option AD4)

Function: The ductstat with attached capillary tube senses the discharge air temperature and operates the two stage valve to maintain the temperature within a fixed differential of 2-1/2°F. Adjustable factory setting is 70°F.

Service: If the ductstat does not operate properly, replace with an identical control.

Ductstat, P/N 41700

3.4 Troubleshooting

Lights

Check the Ignition Control Module - The integrated ignition control module monitors the operation of the heater and includes LED signals that indicate 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.

The integrated circuit board monitors the operation of the heater and includes two LED signal lights that indicate 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. Open the door panel to view the LED lights.

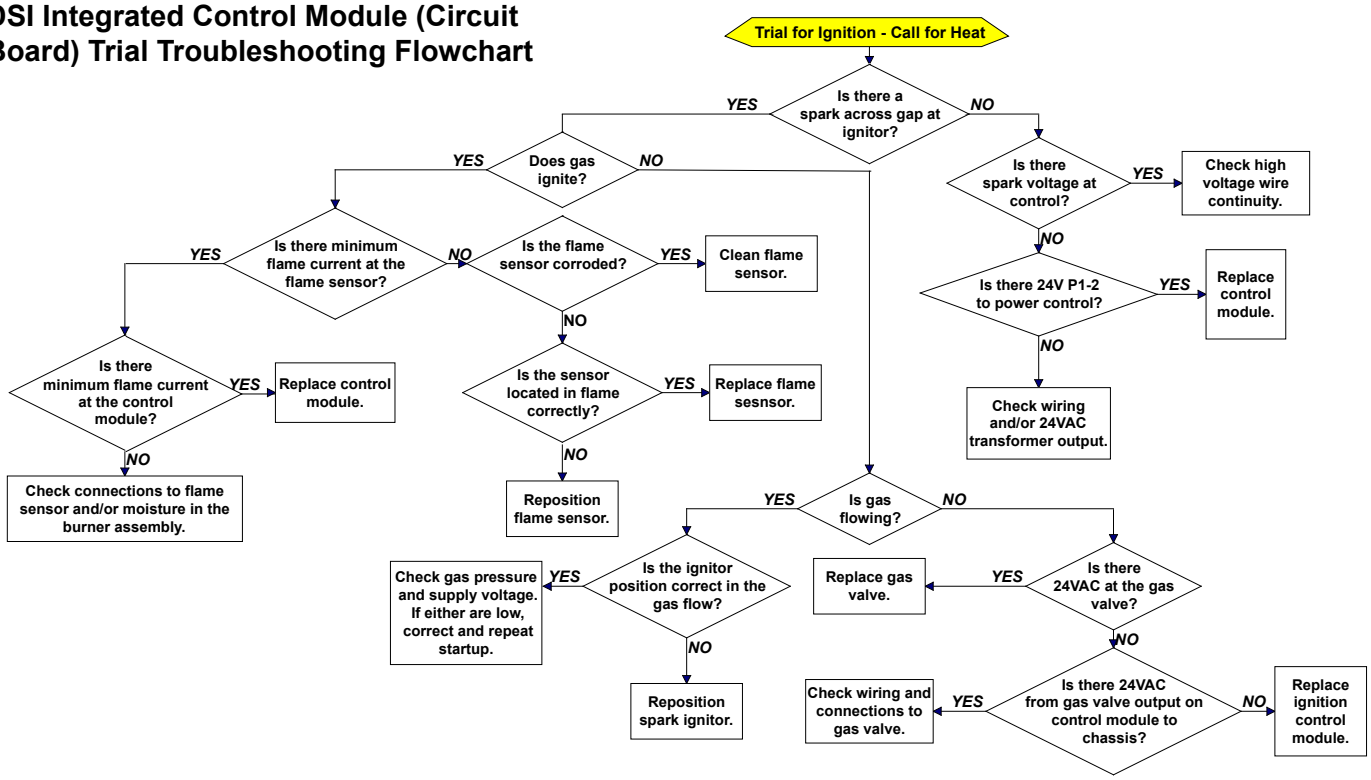
Do not attempt to repair the DSI integrated control module; the only field replaceable component is the fuse.

Control Status - Green LED Codes
Steady ON.... Normal Operation, No call for heat
Fast Flash..... Normal Operation, Call for heat
1 Flash..... System Lockout, Failed to detect or sustain flame
2 Flashes..... Pressure Switch Did Not Close within 30 Seconds of Venter Motor
3 Flashes..... High Limit Switch Open
4 Flashes..... Pressure switch is closed before venter motor is energized
Steady OFF .. Blown Fuse, No Power, or Defective Board

Flame Status - Yellow LED Codes
Steady ON.... Flame is sensed
Slow Flash.... Weak flame (current below 1.0 microamps ±50%)
Fast Flash..... Undesired Flame (valve open and no call for heat)

IMPORTANT: When using a multimeter to troubleshoot the 24 volt circuit, place the meter's test leads into the 5 or 9 pin connectors located on the ignition control. Do not remove connectors or terminals from the electrical components. Doing so can result in misinterpreted readings due to the ignition control board's fault mode monitoring circuits.

DSI Integrated Control Module (Circuit Board) Trial Troubleshooting Flowchart



General Troubleshooting

PROBLEM	PROBABLE CAUSE	REMEDY
Venter motor will not start	**1.** No power to unit.	**1.** Turn on power, check supply fuses or circuit breaker.
	2. No 24 volt power to venter relay.	**2.** Turn up thermostat; check control transformer output.
	3. Integrated ignition control module defective.	**3.** Replace integrated ignition control module. **DO NOT ATTEMPT TO REPAIR CONTROL MODULE; IT HAS NO FIELD REPLACEABLE COMPONENTS.**
	4. Defective venter motor.	**4.** Replace venter motor.
Burners will not light	**1.** Manual valve not open.	**1.** Open manual valve.
	2. Air in the gas line.	**2.** Bleed gas line.
	3. Door switch open.	**3.** Close blower compartment door. If door is closed, replace switch.
	4. Gas pressure is too high or too low.	**4.** Set supply pressure at 5" to 14" w.c. for natural gas and 11" to 14" w.c. for propane.
	5. No Spark:	**5.**
	a) Loose wire connections	a) Be certain all wire connections are solid.
	b) Transformer failure	b) Be sure 24 volts is available.
	c) Incorrect spark gap.	c) Maintain spark gap at 1/8".
	d) Spark cable shorted to ground.	d) Replace worn or grounded spark cable.
	e) Spark electrode shorted to ground	e) Replace if ceramic spark electrode is cracked or grounded.
	f) Burners not grounded	f) Make certain ignition control module is grounded to the ignitor.
	g) Ignition control module not grounded.	g) Make certain ignition control module is grounded to the furnace chassis.
	h) Faulty integrated ignition control module	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. Lockout device interrupting control circuit by above causes.	**6.** Reset lockout by interrupting control at the thermostat or main power.
	7. Faulty combustion air proving switch.	**7.** Replace combustion air proving switch.
	8. Main valve not operating.	**8.**
	a) Defective valve	a) If 24 volt is measured at the valve connections and valve remains closed, replace valve.
	b) Loose wire connections	b) Check and tighten all wiring connections.
	9. Ignition module does not power the valve.	**9.**
	a) Loose wire connections	a) Check and tighten all wiring connections.
	b) Flame sensor grounded	b) Be certain flame sensor lead is not grounded or insulation/ceramic is not cracked. Replace as required.
	c) Incorrect gas pressure	c) Set supply pressure at 5" to 14" w.c. for natural gas and 11" to 14" w.c. for propane.
	d) Cracked ceramic at sensor	d) Replace sensor.
	10. Flame rollout switch open	**10.**
	a) Air blockage through the unit	a) Check for heat exchanger or vent pipe blockage.
	b) Faulty flame rollout switch	b) Replace flame roll out switch.
Burners cycle on and off	**1.** Gas pressure is too high or too low.	**1.** Set supply pressure at 5" to 14" w.c. for natural gas and 11" to 14" w.c. for propane.
	2. Burners not grounded	**2.** Make certain ignition control module is grounded to the ignitor.
	3. Ignition control module not grounded.	**3.** Make certain ignition control module is grounded to the furnace chassis.

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

General Troubleshooting (cont'd)

PROBLEM	PROBABLE CAUSE	REMEDY
Burners cycle on and off (cont'd)	**4.** Faulty integrated ignition control module	**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. Faulty combustion air proving switch.	**5.** Replace combustion air proving switch.
	6. Flame sensor grounded	**6.** Be certain flame sensor lead is not grounded or insulation or ceramic is not cracked. Replace as required.
	7. Cracked ceramic at sensor	**7.** Replace sensor
	8. Incorrect polarity.	**8.** Reverse 115V line connections at ignition control module.
No heat (Heater Operating)	**1.** Incorrect manifold pressure or orifices.	**1.** Check manifold pressure (See Form I-CAUA, Paragraph 6.1).
	2. Cycling on limit control.	**2.** Check airflow.
	3. Improper thermostat location or adjustment.	**3.** See thermostat manufacturer's instructions.
Cold air delivered	**1.** Incorrect manifold pressure.	**1.** Check manifold pressure (See Form I-CAUA, Paragraph 6.1).
Blower motor will not run	**1.** Circuit open. **2.** Defective integrated ignition control module (circuit board). **3.** Defective motor.	**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	**1.** Motor overload device cycling on and off. (See below.) **2.** 3-phase motor rotating in opposite direction.	**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	**1.** Low or high supply voltage. **2.** Defective motor. **3.** Static pressure incompatibility. **4.** Defective bearing.	**1.** Correct electric supply. **2.** Replace motor. **3.** Adjust blower speed or ductwork. **4.** Replace motor.

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Description	Form
Model CAUA **Installation Manual**	I-CAUA
Model ACU or Option C **Cased Cooling Coil Installation**	I-CAUA-CC
Optional **Discharge Plenum Installation Instructions**	I-CAUA-DP
Optional **Filter Cabinet Installation Instructions**	I-CAUA-FC
Optional **Inlet Air Mounting Base Installation Instructions**	I-CAUA-IB
Optional **Mixing Box Installation Instructions**	I-CAUA-MB
Gas Conversion Instructions	CP-CAUA-GC
Ignition Control Replacement Kit Instructions	CP-CAUA-IGN
Replacement Parts	P-CAUA

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