Rinnai Direct Vent Wall Furnace Training Program

Level III – Service Fundamentals



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Rinnai Service and Support (*800-621-9419*)

- **CRC – Consumer Response Center – general calls, consumer questions, etc.**

  Available from 8 a.m. to 8 p.m. EST**,** Monday – Friday.

- **Parts Department – parts orders.**

  Available from 8 a.m. to 8 p.m. EST, Monday – Friday.

- **Warranty Department – warranty claim issues.**

  Available from 8 a.m. to 5 p.m. EST, Monday- Friday.

- **Technical Support Department – technical issues related to the function and repair of Rinnai products.**

  Available in the office from 8 a.m. to 8 p.m. EST, Monday – Friday AND **24/7/365** on call support for technicians who are at the service location. **Technicians only, call 1-888-RINNAIS (888-746-6247)**

- **Engineering / Applications Department – calls related to product use and applications including sizing.**

  Available from 8 a.m. to 5 p.m. EST, Monday - Friday.

Rinnai America also provides the following websites for support:

- www.rinnai.us **–for installation manuals, product specifications and supporting documents. More technical information is available in the "Partner Portal" section of the website. Registration is required for access.**
- **www.trainingevents.rinnai.us – to register for Rinnai product training live and online classes and videos. Service manuals, installation manuals and other technical documents are available under the "Resources" section of the site.**

Product model and serial number locations:

The model & serial numbers will be located on both sides of the product.

The serial number will also be located on the back of the cabinet for some models.



Rinnai Model Number

Factory Model Number

Serial Number

Label from the back of cabinet.



Serial number format:

- First two letters – Year & Month of Manufacture.
- Second two letters – Product category & manufacturing facility.
- Last six numbers – Production sequence number.

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Primary Service Tools:

For service, troubleshooting, and component replacement, the following primary service tools will be needed (other tools could be needed on occasion).



#2 Phillips Head (magnetic) and Small Phillips Head Screw Drivers



U-Tube or Digital Manometer





3/16” Allen Wrench



Multimeter (Volt/Ohm Meter)

Should you need to contact Rinnai technical support please have these tools available to speed up the troubleshooting process. Also Rinnai needs to know the full model and serial number, have the front cover removed from the product, provide any relevant information such as gas pressures, set temperatures, error codes etc. as well as have utilized the tech sheet and/or service manual to troubleshoot the product as much as possible prior to the call.

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PRODUCT DISASSEMBLY AND COMPONENT REVIEW

The following procedures are for

EX17CT / EX22CT

Service Procedures for other models will vary.

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Disassembly:

1. Remove the toe kick panel from the bottom of the cabinet by pressing inward on the latches on the left and right sides.





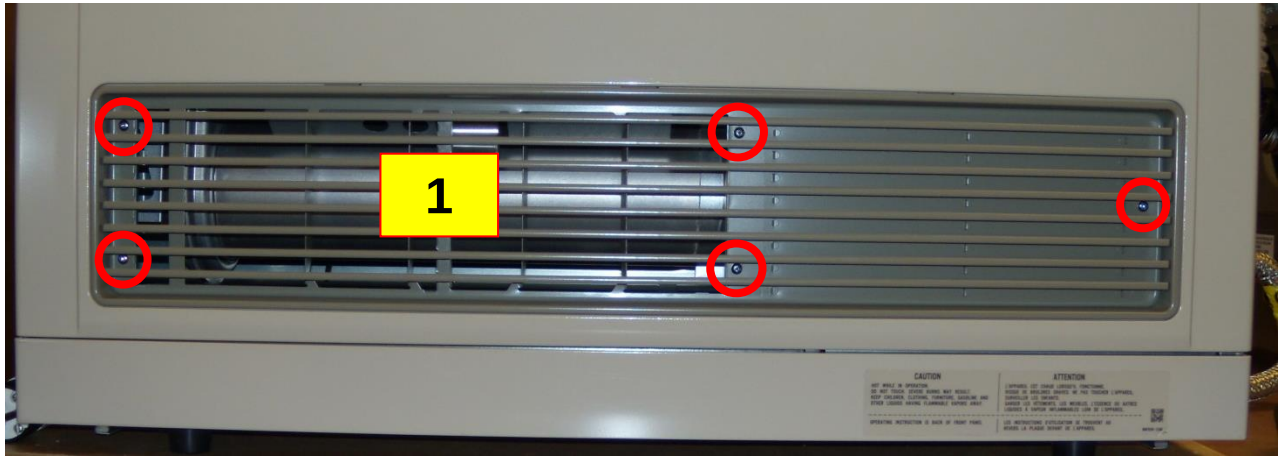
2. Slide the humidifier tray out from the bottom of the cabinet. The tray can be completely removed.

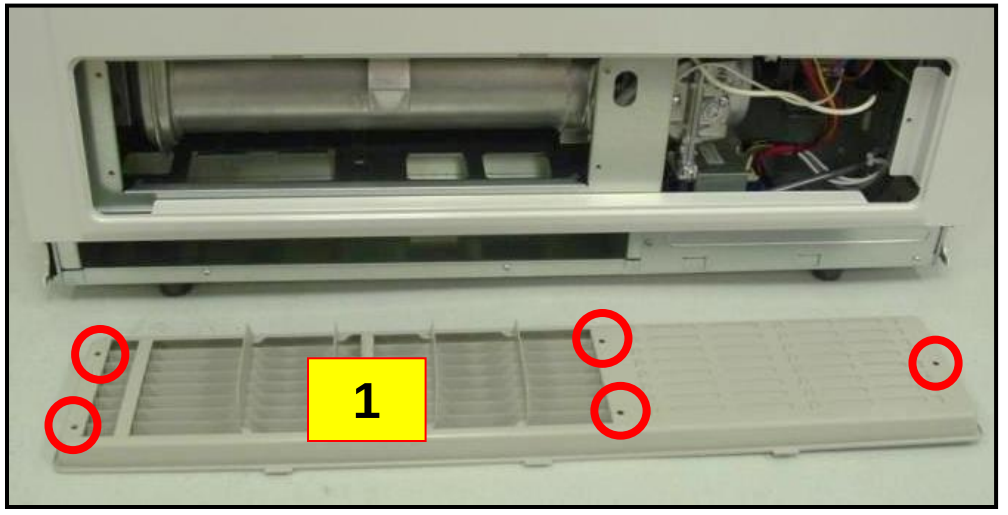
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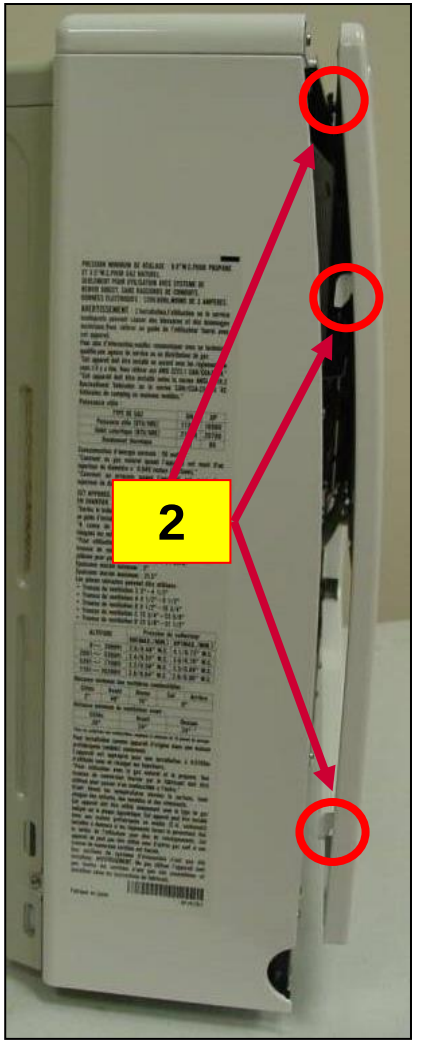
Front cover removal:

1. Remove 5 screws from the louver plate on the front cover.





2. Slide the front panel upwards to free the side and top mounting tabs.



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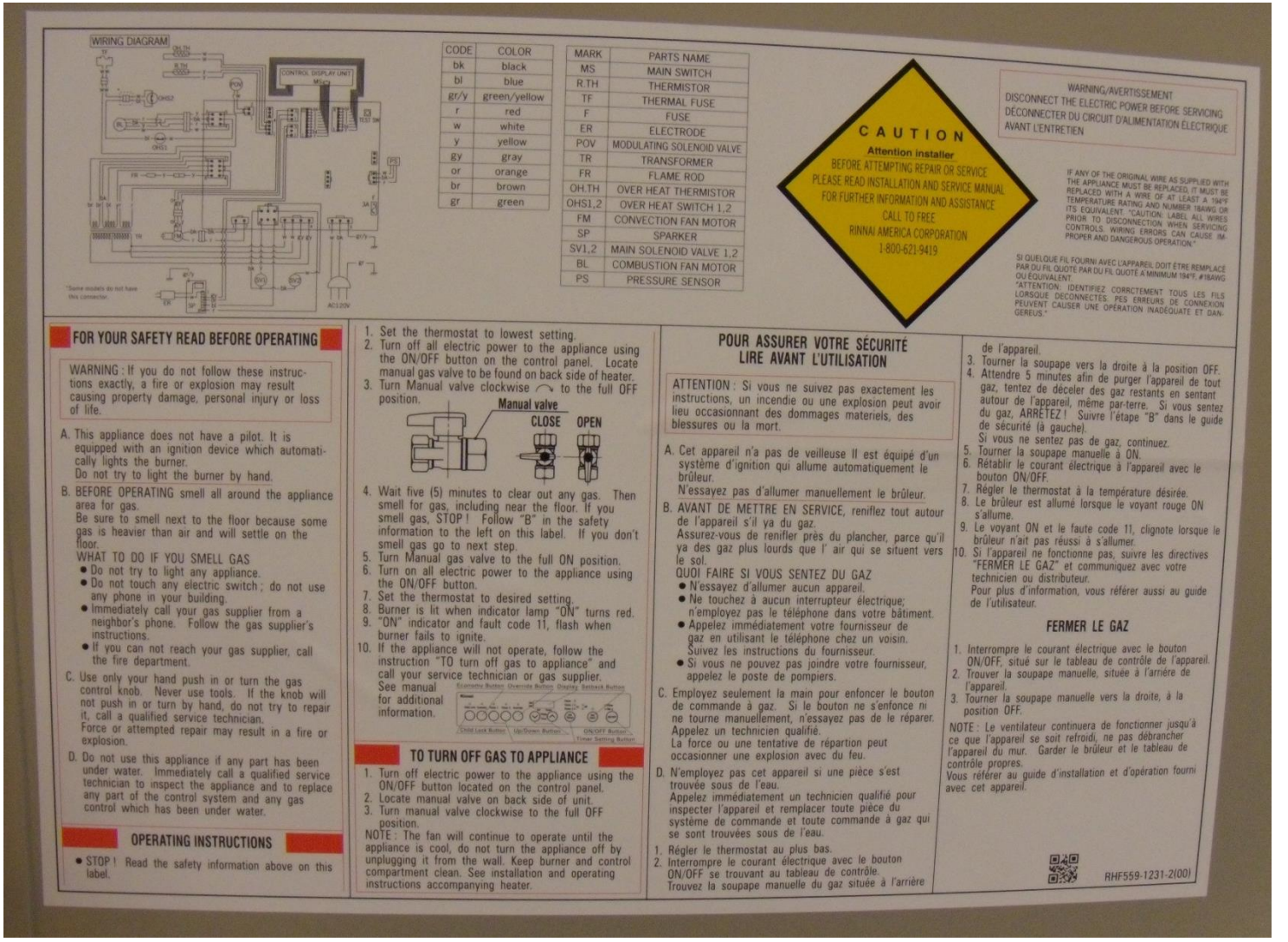
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Inside front cover:

Inside the front cover is a ------

a. Wiring diagram.
b. Part name chart.
c. Wire color code chart.
d. Basic operating and safety information.

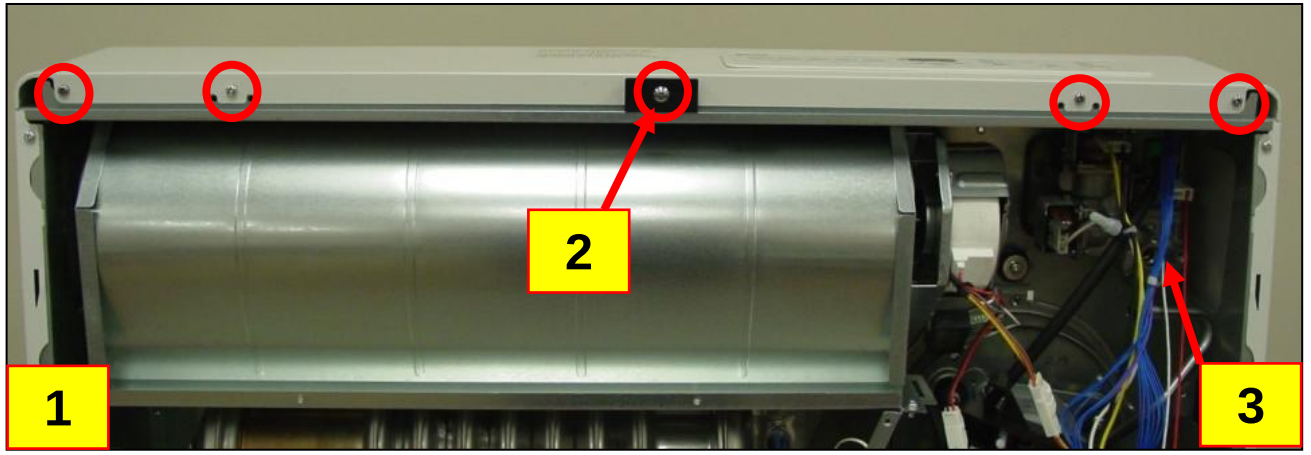
Should you need to call Rinnai tech support for assistance you can also record any case number or other important data inside the cover.

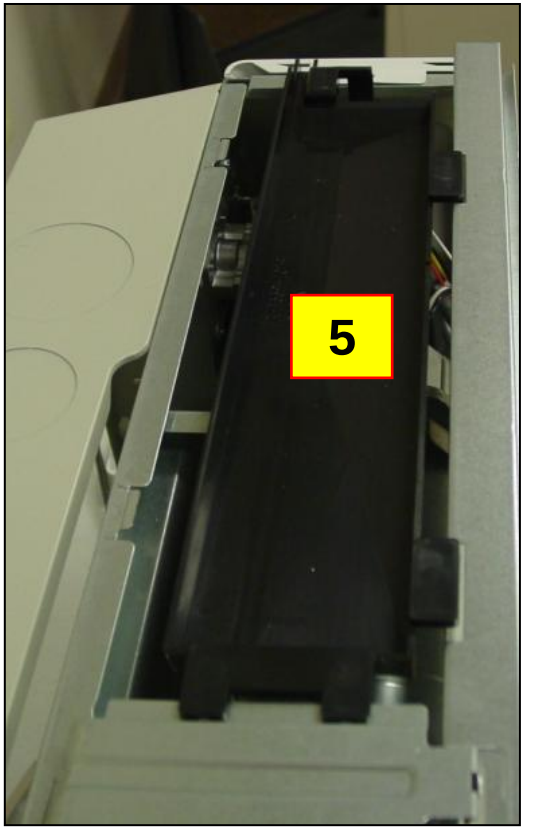


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Control Panel / top panel removal:





1. Remove the 5 top panel screws.
2. Note the black plastic alignment piece on the center screw (some models may have three alignment pieces on the three middle screws).
3. Disconnect control panel wiring from PCB.
4. Pull forward, then up on the top panel to release the tabs and to remove the panel.



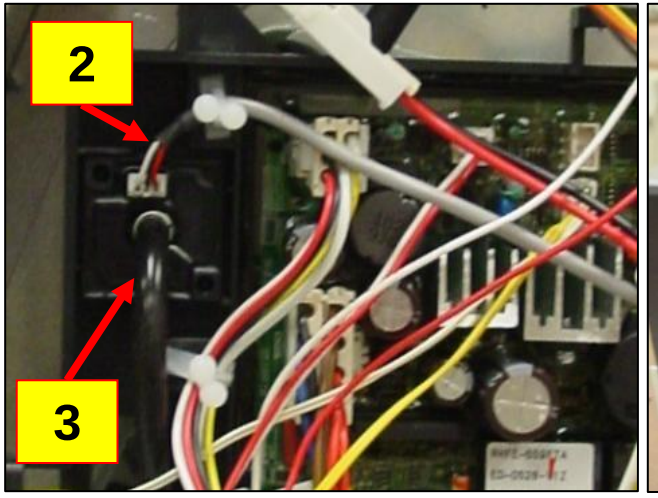
5. The control panel has a plastic drip pan underneath it to protect the PCB from spills on top of unit.

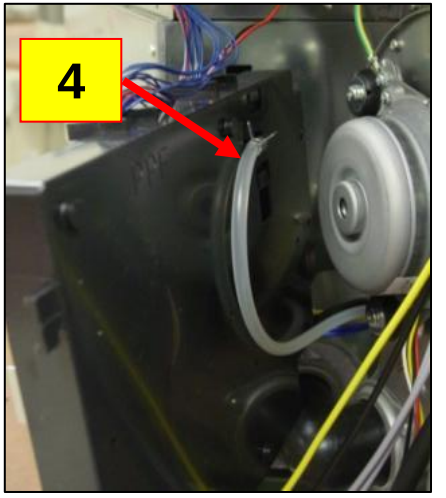
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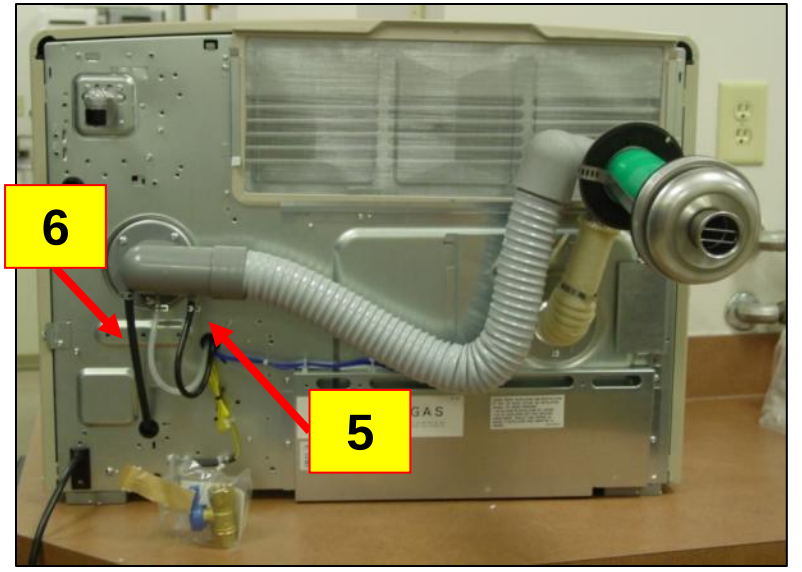
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Pressure Sensor:

1. All current models use a pressure sensor to ensure there is proper air movement through the burner, heat exchanger, and vent system.
2. The pressure sensor snaps into the PCB case. A pressure sensor is not included with a replacement PCB. The existing sensor should be moved to the new PCB's casing if it is replaced.
3. The black pressure hose connects on the front of the sensor.
4. The clear pressure hose connects on the back of the sensor.
5. On the back of the unit, these hoses connect to the intake of the vent system—the black hose connection is labeled, "BLK".
6. NOTE: Do not confuse the pressure sensor hose with the gas valve pressure balancing hose. The gas valve hose is a thicker/heavier hose.





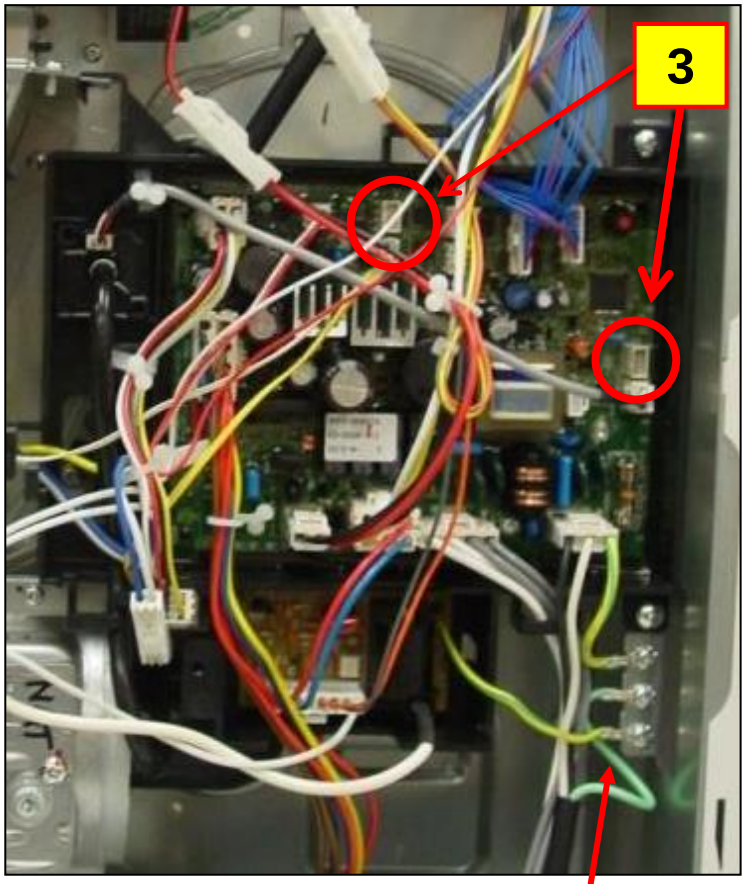


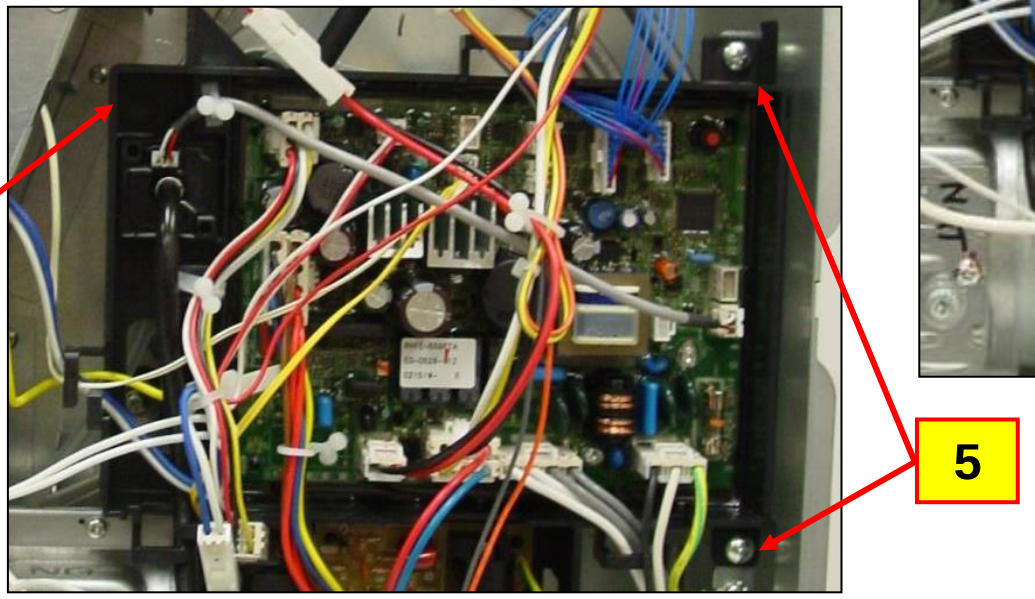
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PC Board Removal:

1. Disconnect the unit from the electrical power source.
2. Remove all wire harness connectors from the PCB. All connectors will have a latch. The latch will need to be released in order to remove the connector.
3. For ease of reassembly mark any connections on the board that may not be used.
4. Remove ground wires from the right lower side of the unit.
5. Remove two screws on right of PCB assembly.
6. Lift up on PCB and unhook tab on left side freeing PCB from unit.



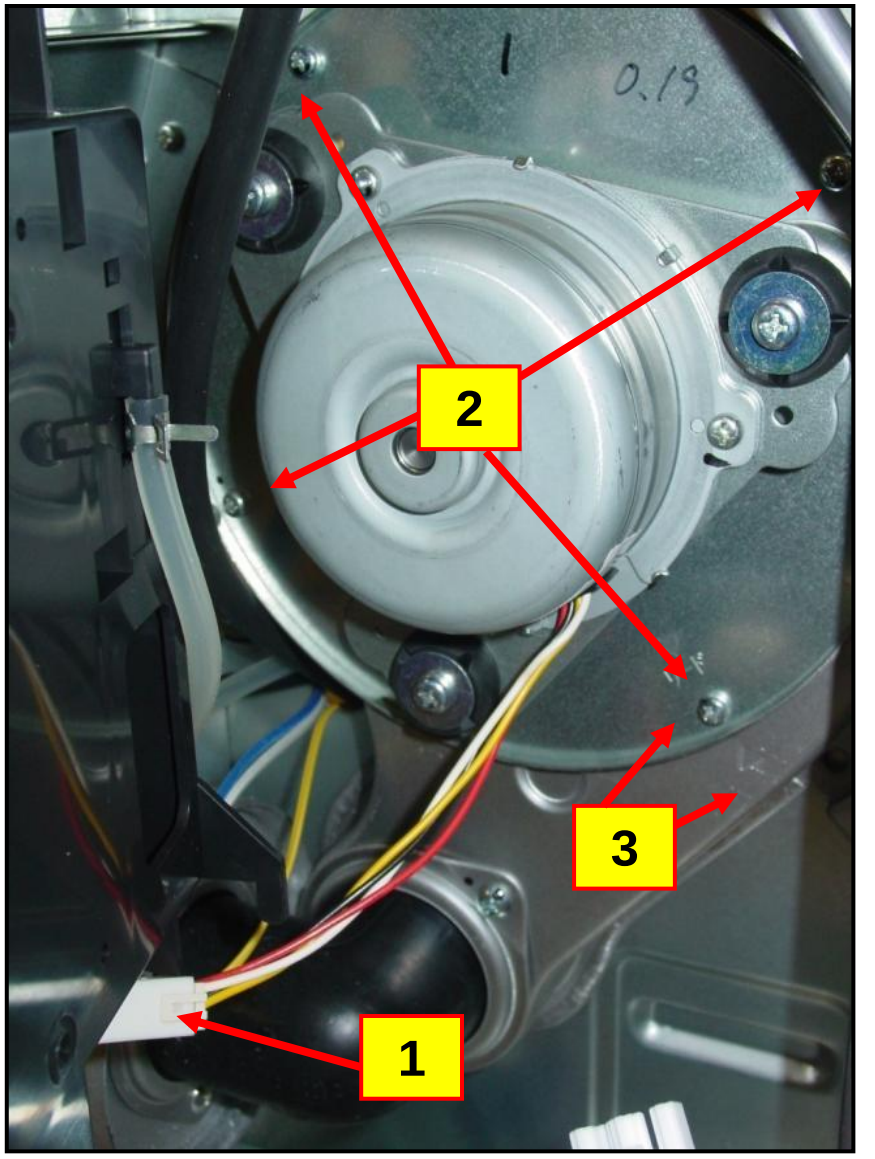


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Combustion Fan Removal:

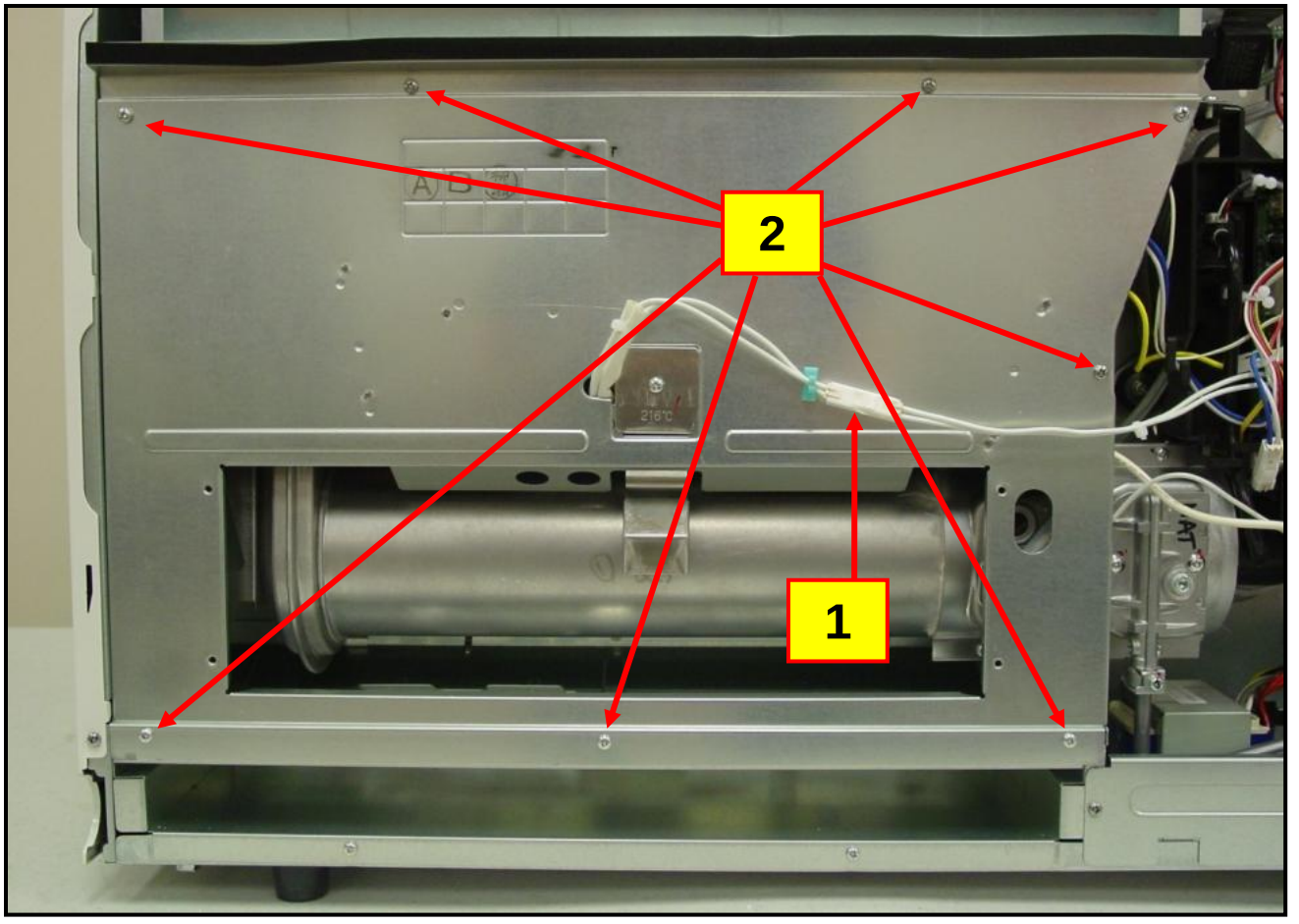
1. Disconnect the unit from the electrical power source. Otherwise the fan feedback circuitry could be damaged. An inoperative combustion fan will post a code 61 on the control panel display.
2. Disconnect the electrical connector in the fan wiring harness.
3. Remove the four screws on the combustion motor mounting plate.
4. Note the fan alignment indicator marks at the 5:00 o'clock position.
5. The fan assembly should now pull out from the combustion air inlet assembly and free of the cabinet.

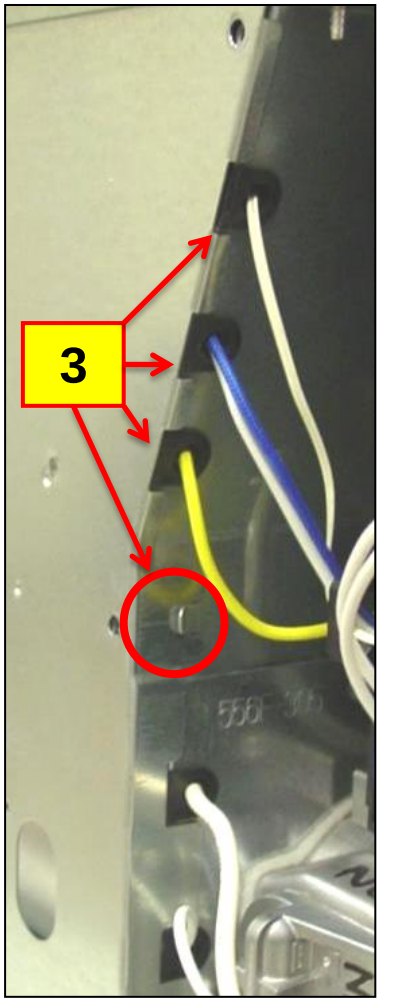


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Inside Panel Removal:



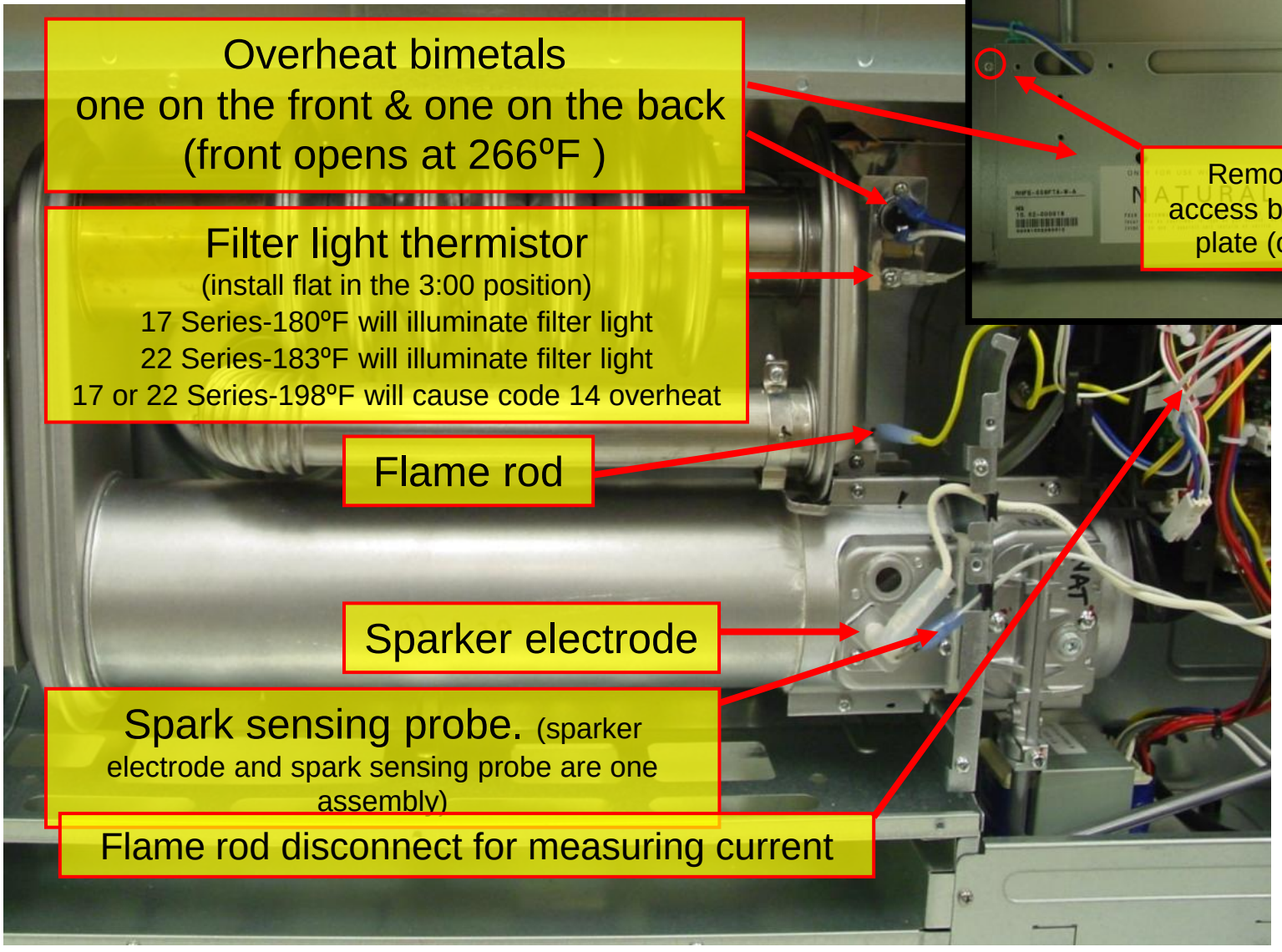


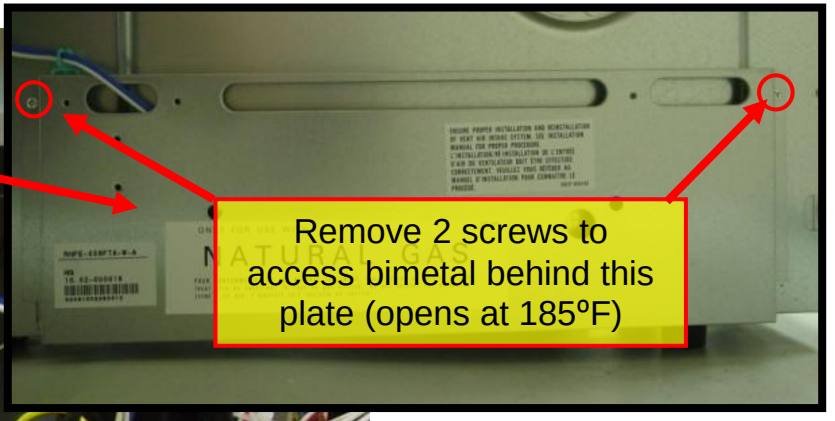
1. Disconnect the overheat thermal fuse connector.
2. Remove the 8 screws that secure the heat shield panel to the frame.
3. For reassembly purposes make note of any tabs used to help secure the panel and note the position of any wire protection grommets.

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Heat exchanger component review:





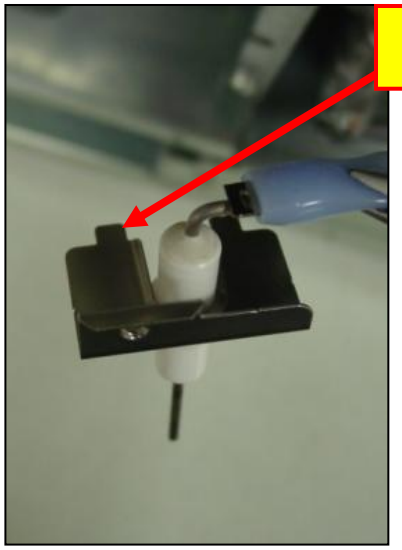
All bimetal switches are installed in series with the thermal fuse assembly. Any open or break in this circuit will cause an overheat code.
NOTE: The thermal fuse is located on the inside panel (see previous slide) and will open at 421ºF.

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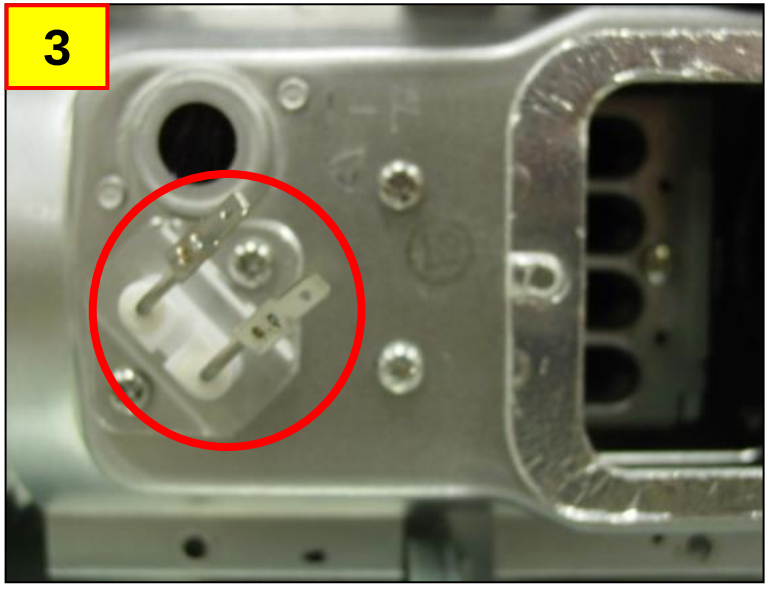
Component Review (cont.):







1. The flame rod has a single screw accessible from the front.
2. This flame rod is held in place by a metal plate. The plate has two tabs at the back that must seat into corresponding slots on heat exchanger.
3. The sparker and spark sensing connectors are the same. Interchanging these wires will not affect performance.
4. The sparker and spark sensing wires are both white.



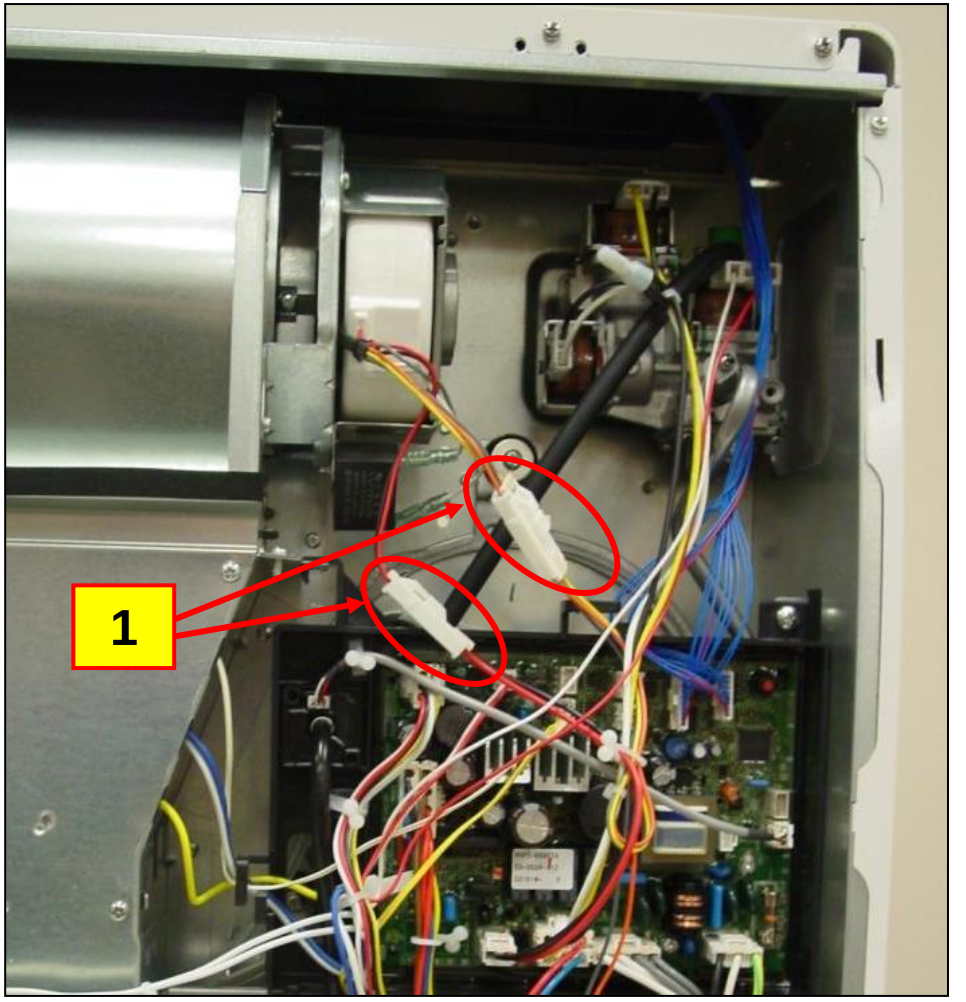
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Convection Fan Removal:

1. Note: Ensure electrical power is removed from the unit before connecting or disconnecting the fan assembly. Otherwise the fan feedback circuitry could be damaged.

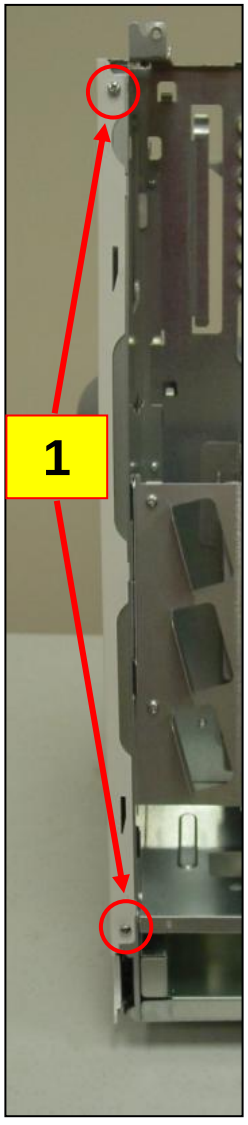
   The fan assembly provides a feedback signal to the main circuit board. Should there be a problem with the operation of the fan or if it is disconnected an error code 62 will be displayed.

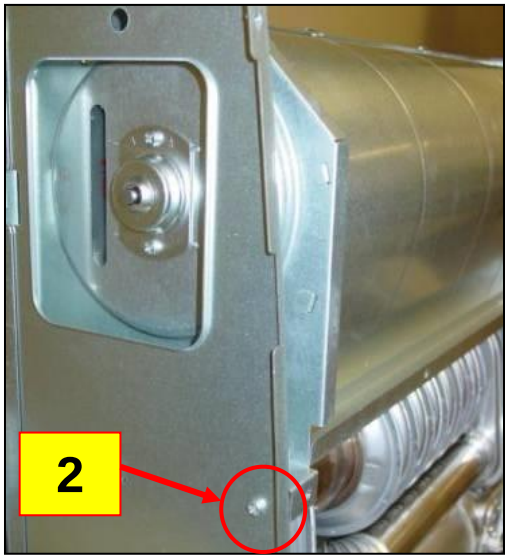


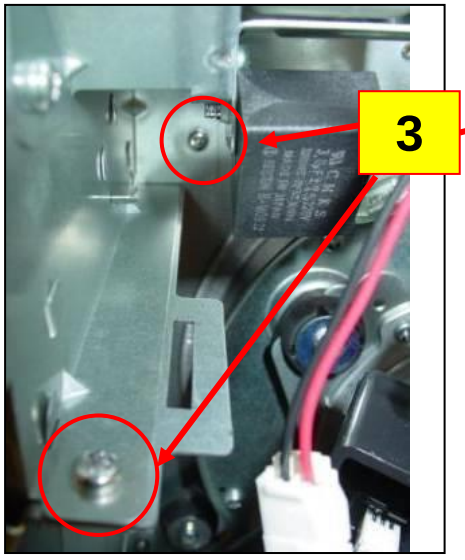
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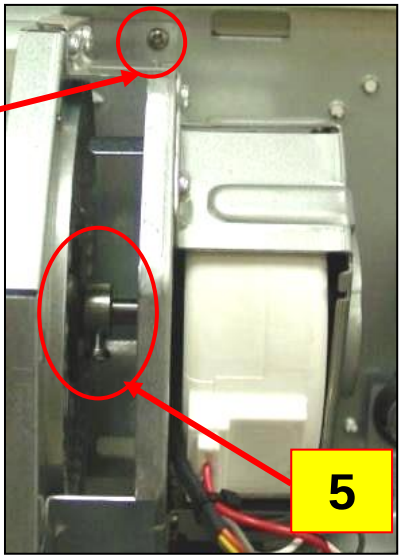
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Convection Fan Removal:









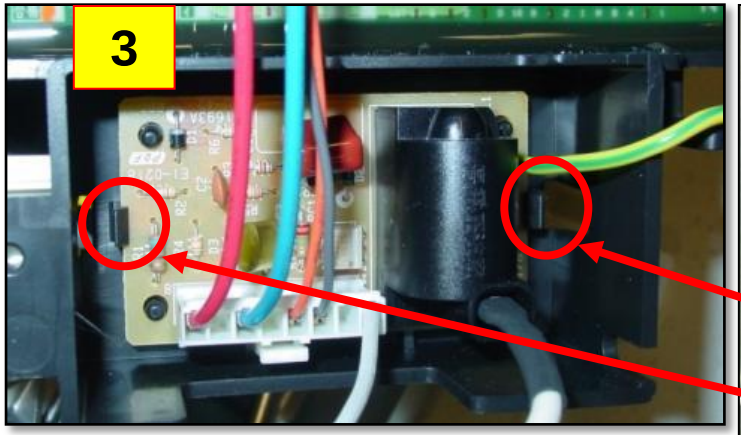
1. Remove the top control panel (shown in a previous slide), remove 2 screws securing the left side cabinet panel to the frame. Slide the panel forward to remove.
2. Once the side panel is removed you can access the single screw securing the left side of fan assembly to the frame (on some models this single screw is installed from the inside and does not require side panel removal).
3. Remove the 3 screws securing the fan to the right side (one is located toward the front of the cabinet, the other two are at the back of the cabinet with one above and one below the fan motor). Now the complete fan assembly can be removed from the unit.
4. If necessary the motor can be removed from the fan assembly. To accomplish this, loosen the set screw on motor shaft and remove the 4 screws holding the motor to the housing. Individual fan parts can be replaced at this time.

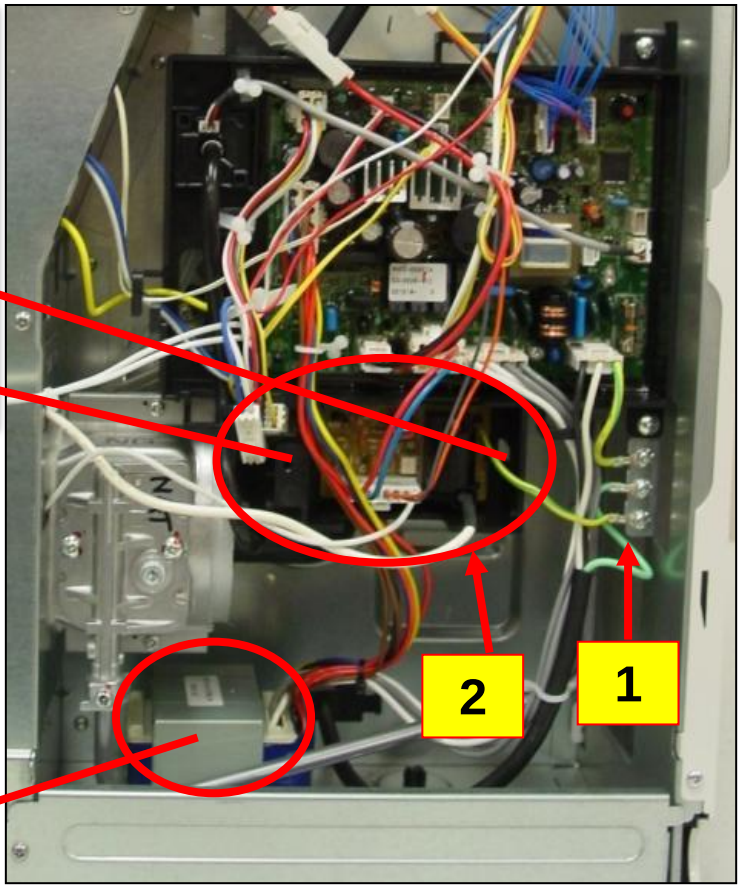
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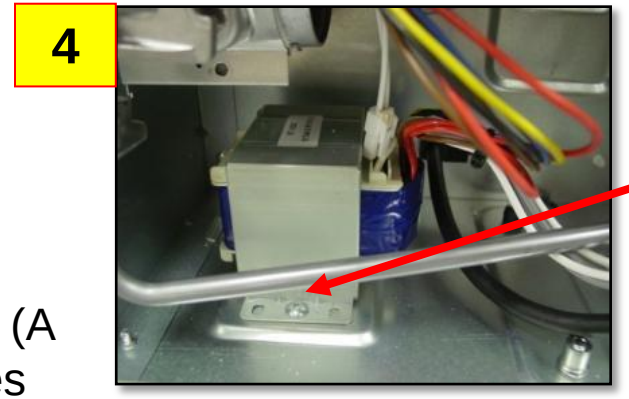
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Spark Module / Transformer Removal:

1. Ensure all power, gas and grounding screws are removed.
2. The spark module is attached to the PCB casing.
3. To remove, release the two tabs securing the module sub PCB to the plastic casing and disconnect the wire connectors.
4. To remove the transformer, remove the single screw securing transformer to the frame (A tab fitted into slot secures the rear of transformer) and disconnect the wiring from the PCB.





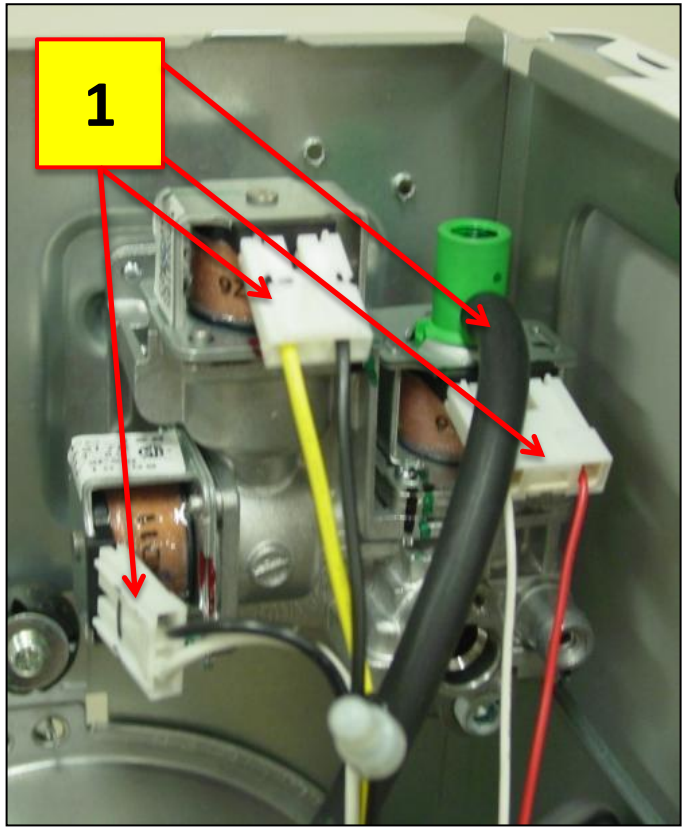


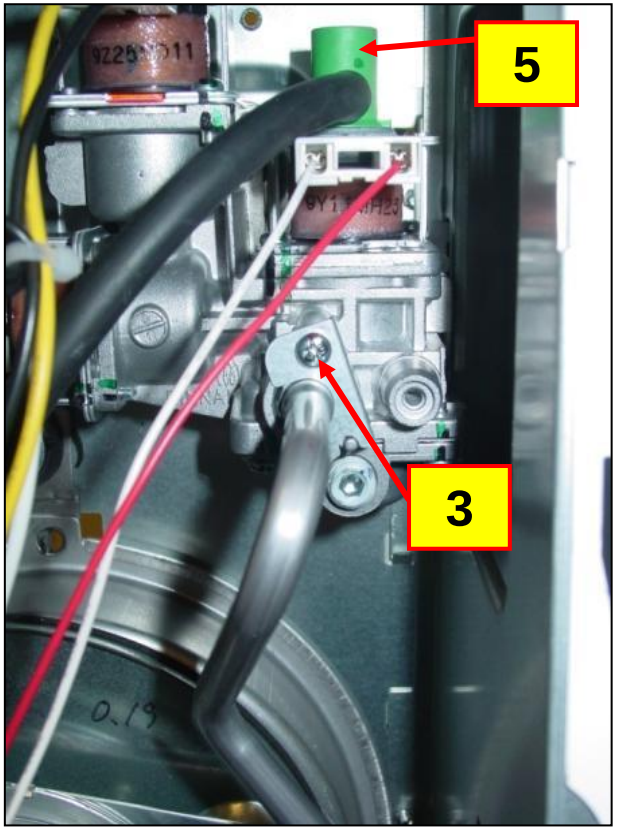
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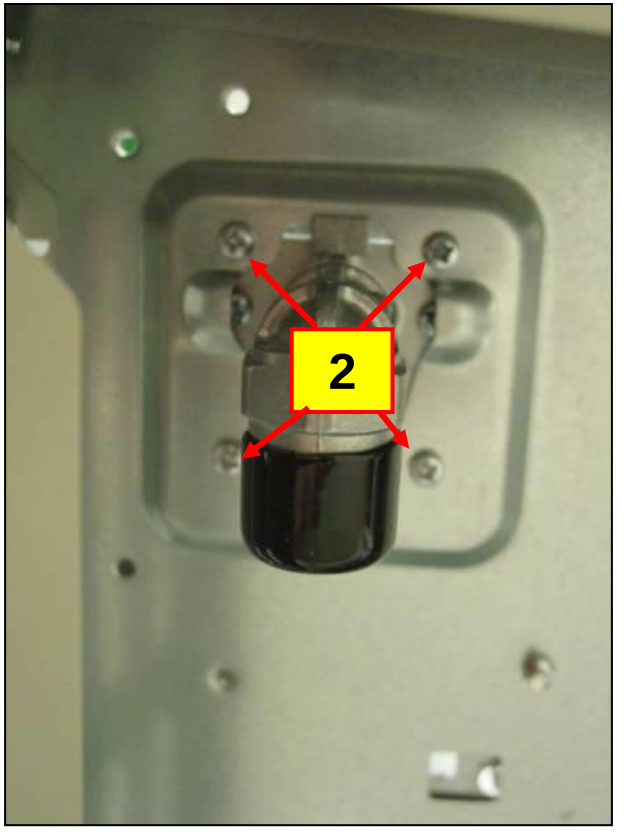
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Gas Valve Assembly Removal:

1. Turn off power and gas. Disconnect the gas supply, vent tube and electrical connectors.
2. Remove the single screw securing the gas tube to the valve assembly.
3. Remove the 4 screws securing the gas vale to the back of the cabinet.
4. Ensure gaskets and o-rings remain intact and replace if necessary.
5. NOTE: POV screw should ONLY be adjusted during replacement or under Rinnai direction.



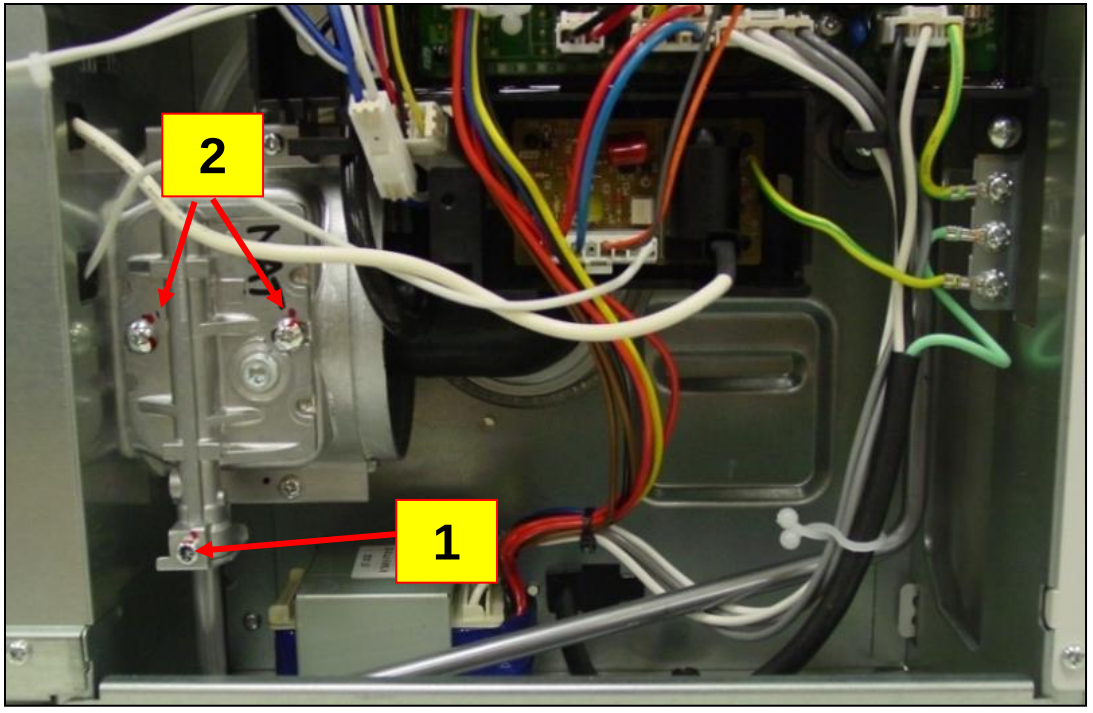


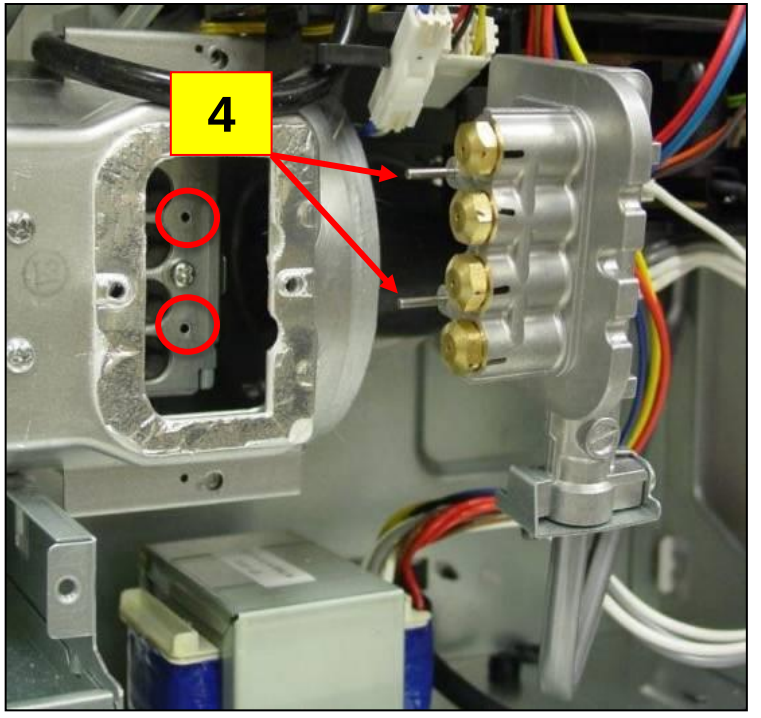


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Gas Manifold Removal:





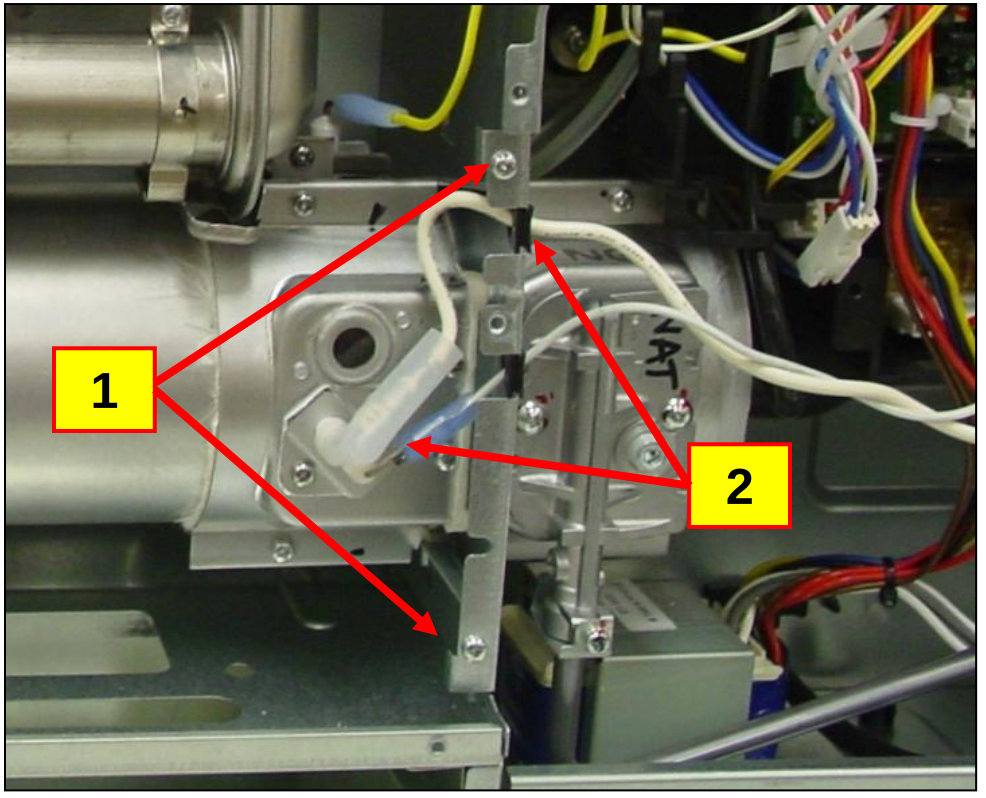
1. Remove the single screw that secures the gas tube to the manifold. Ensure o-ring remains intact. Note: the gas tube can be disconnected from the gas valve also (previous slide #2) if necessary for ease of manifold removal.
2. Remove the two screws securing the manifold to the burner area of the heat exchanger.
3. Gently pull manifold out for access to the burner openings and orifices.
4. For reassembly, ensure alignment pins are seated correctly.
5. For flame related errors, blow out the burners with high air pressure. This will help remove any spider webs or debris that may have gotten into the openings. Ensure the gas tube is clear. Also the gas orifices can be removed and cleaned if necessary.

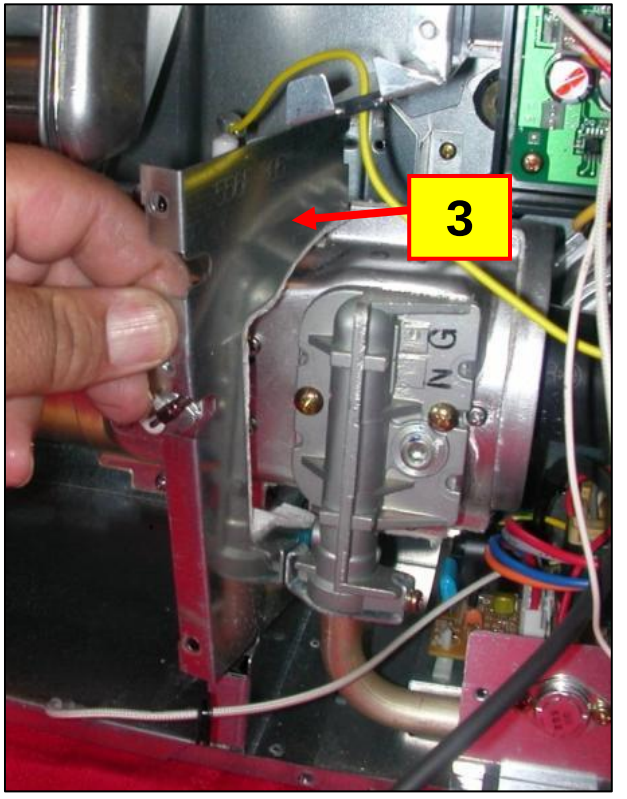
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Warm Air Seal Panel Removal:

1. Remove 2 screws from the air seal panel.
2. Disconnect the sparker electrode and spark sensor wiring and remove the wires and rubber grommets from the panel.
3. Pull panel free.
4. Panel gasket must remain intact. Replace if the gasket has been compromised in any way.





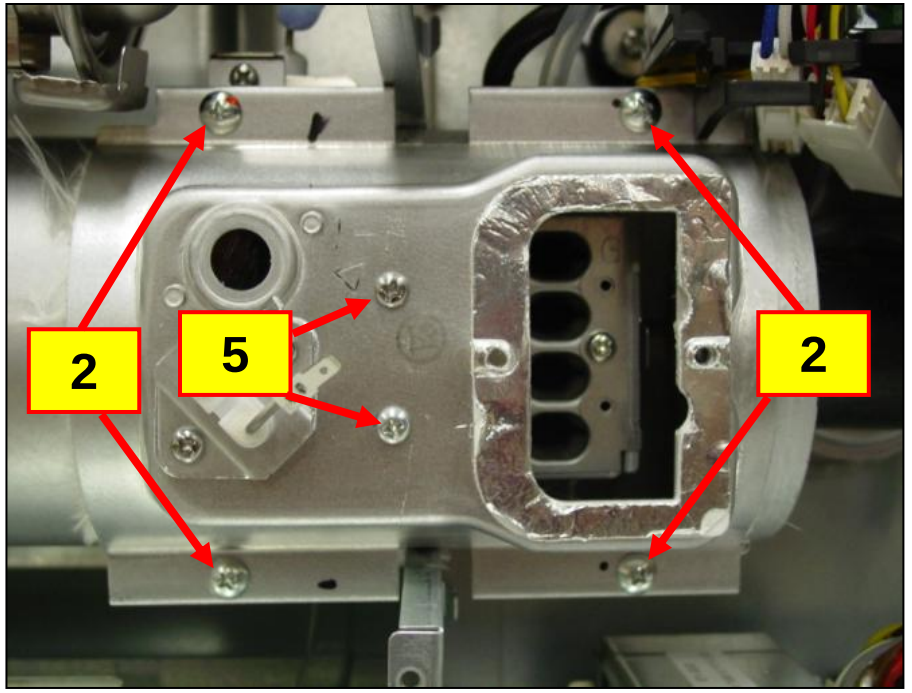


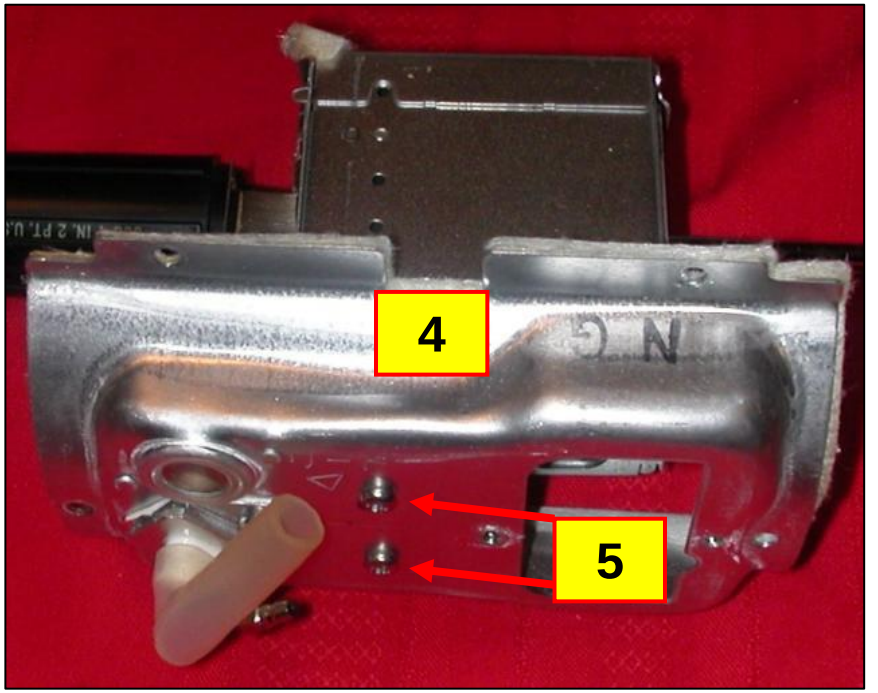
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Burner Box and Cover Plate Removal:

1. To remove the burner cover plate, the warm air seal shown on the previous slide must be removed first.
2. Remove four screws on cover plate (models prior to 2009 had six screws).
3. **NOTE:** If the burner box and cover are removed, their fiber gaskets MUST be replaced with new gaskets.
4. Cover and burner box can now be removed (the assembly will slide out).
5. Burner box can be separated from the cover by removing the two front screws.





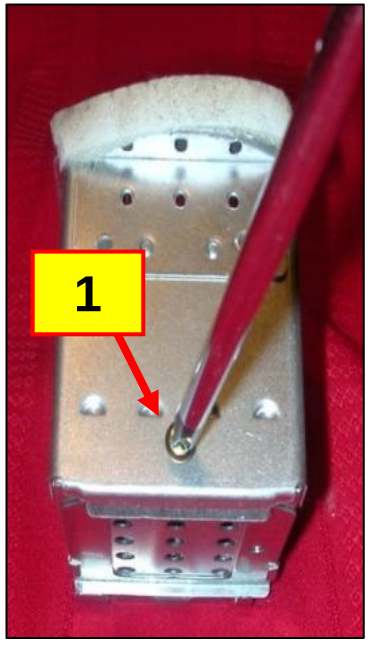
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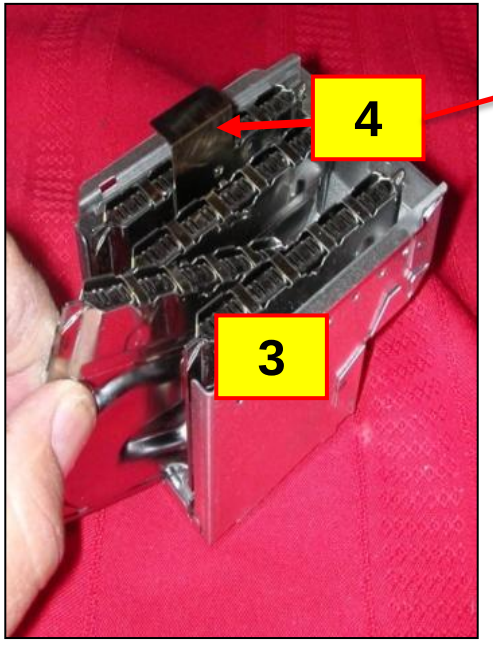
Burner Box Disassembly:

Burner box can be disassembled for inspection or cleaning.

1. Remove single screw on back of burner.
2. Remove plate on back of burner.
3. Individual burners will come free.
4. NOTE: If equipped, the burner with the flame capture plate must be installed in the top position (For 2009 and newer models the flame rod has been lengthened and the flame capture plate eliminated. For those models all burners are identical and can be interchanged).







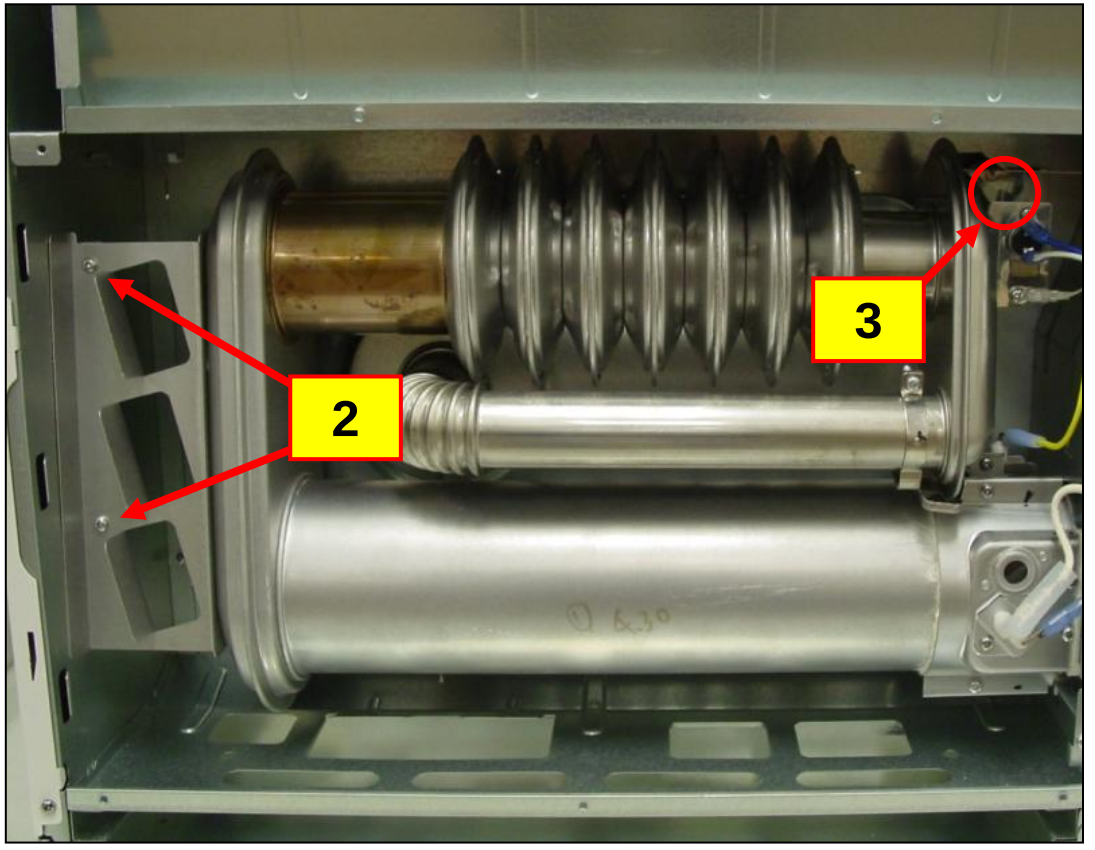


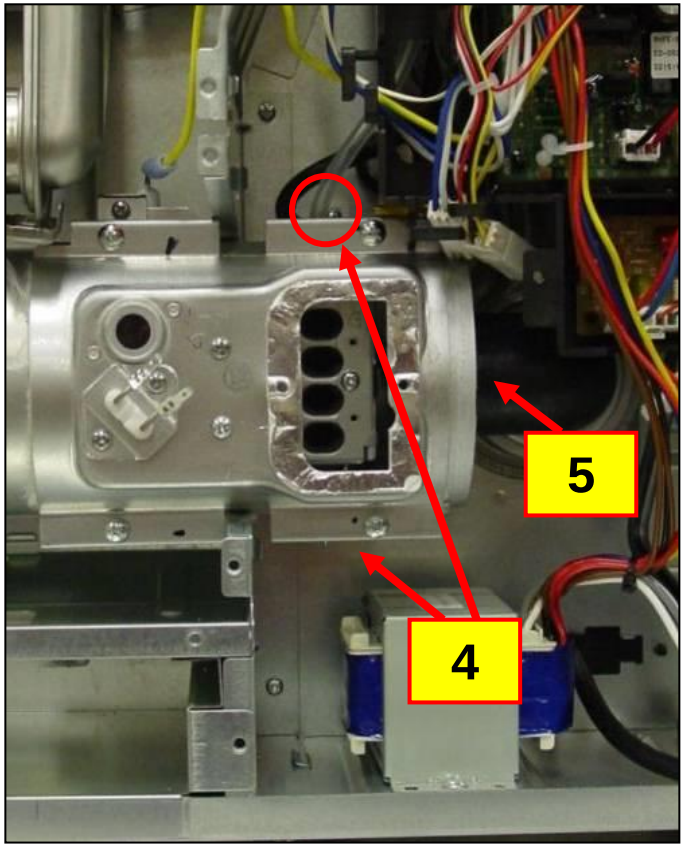
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Heat Exchanger Removal:

1. If not previously accomplished, remove the front cover, inside panel, warm air seal panel, burner box assembly, flame rod, and, if needed, the convection fan assembly.
2. Remove two screws on left of heat exchanger.
3. Remove single screw behind overheat bimetal and filter thermistor.
4. Remove two screws behind right side of heat exchanger (above and below the burner area).
5. Remove single screw attaching rubber air intake boot to heat exchanger.





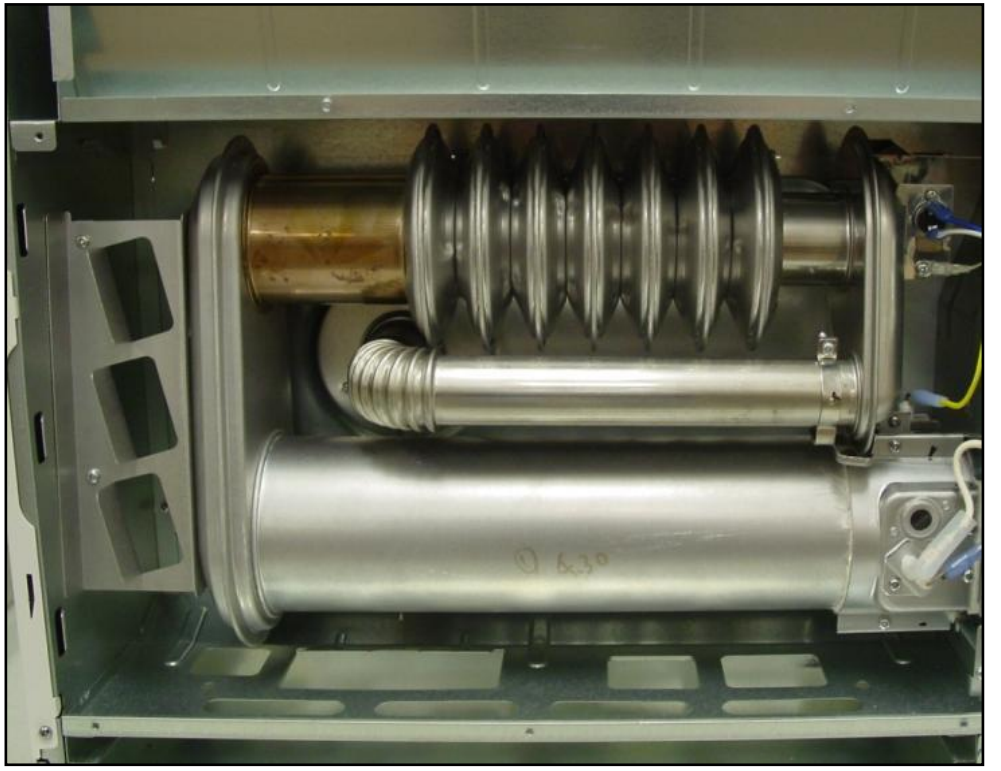
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Heat Exchanger Removal (continued):

1. Remove the three screws holding the exhaust elbow to the unit. NOTE: Ensure the O-ring inside the elbow is intact
2. At this point the heat exchanger assembly can be lifted free and removed from the cabinet.





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Reassembly can be accomplished in the reverse order of disassembly.

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Electrical Diagnostic Points:

When verifying electrical values of individual components, the tests must be conducted correctly and safely. It is important to know how to use your test equipment and the specifications of the component to be tested.

Key points when troubleshooting electrical values:

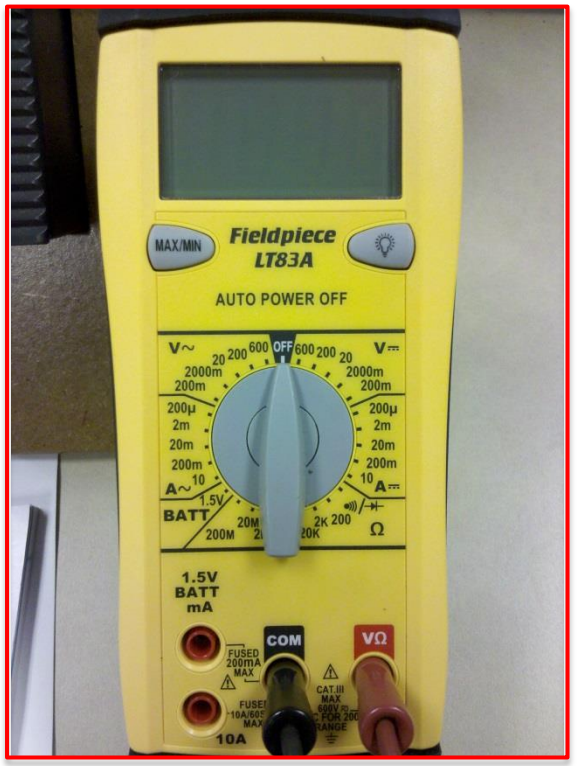
- **<u>Insert test probes into the back of electrical connections where possible to prevent damage to connection pin contacts.</u>**
- Ensure volt meter probes are solidly contacting metal.
- Know your meter and how to set it for each type of measurement.
  - Ω= Ohms or resistance
  - VAC or V~ = AC voltage
  - A = amps or current.
  - VDC or V- = DC voltage.
  - Always set meter to the next range above your anticipated test value.
  - A "μ" indicates micro or the scale is X. 000001 (6μA = 6 micro amps = .000006 amps).
  - A "K" indicates Kilo or the scale is X 1000 (6KΩ = 6000 ohms).
- When measuring resistance, ensure the component is disconnected from the circuit AND power is removed.
- When measuring a solenoid's resistance, place the meter probes on the solenoid's lugs (connection points) with the wires disconnected.
  - ➢ A correct resistance reading from a solenoid or transformer coil is not a guarantee that the component is good since the windings can open up when subjected to an electrical load. On the other hand an incorrect value is a very good indication that the component is defective.

For metering values, reference Rinnai's Tankless Water Heater Service Manual —the "Electrical Diagnostic Points" section (model dependent) or each unit's technical data sheet located inside the front cover.

ENSURE YOU ARE REFERING TO THE CORRECT PAGE FOR YOUR MODEL!

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Example multimeter settings:





Meter setting for measuring 120 VAC.

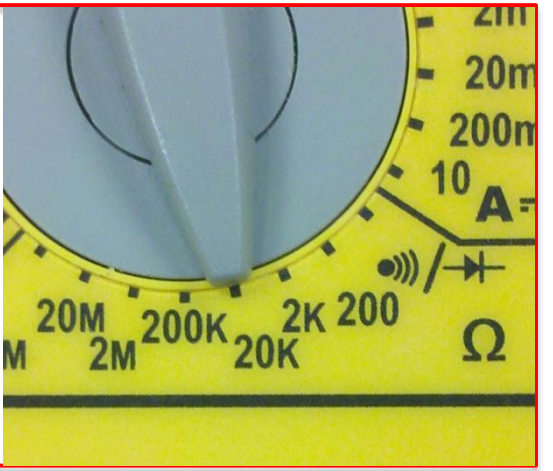


Meter setting for measuring 12 VDC.



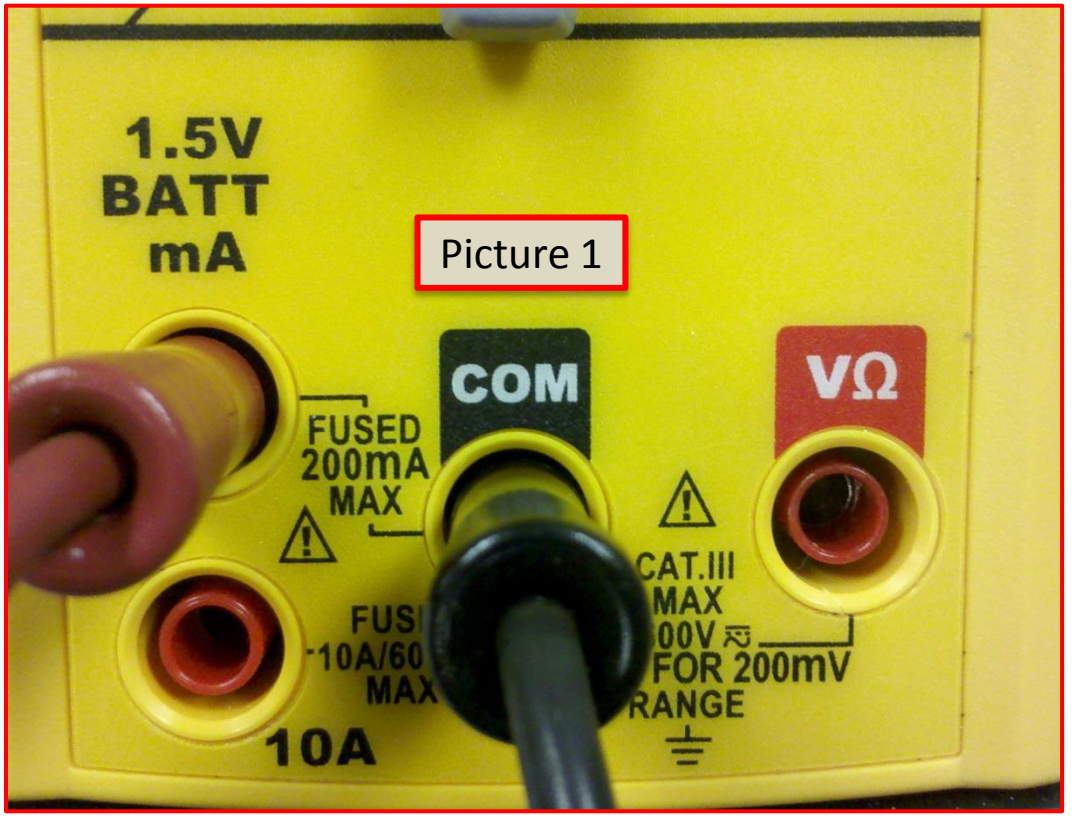
Probe configuration for measuring Volts or Ohms.

Meter setting for measuring less than 20,000 Ohms (20KΩ) but more than 2,000 Ohms (2KΩ).

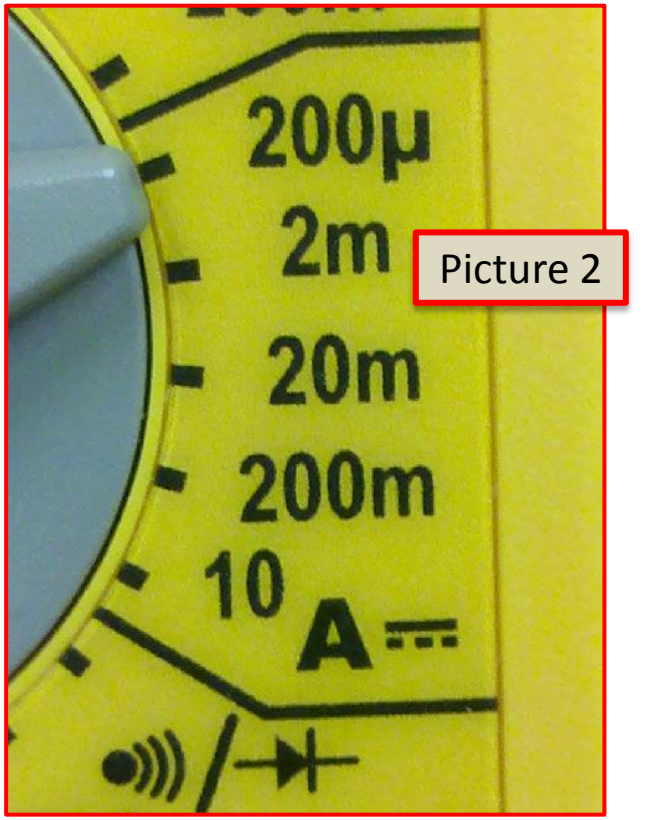


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Example multimeter settings:



Picture 1



Picture 2

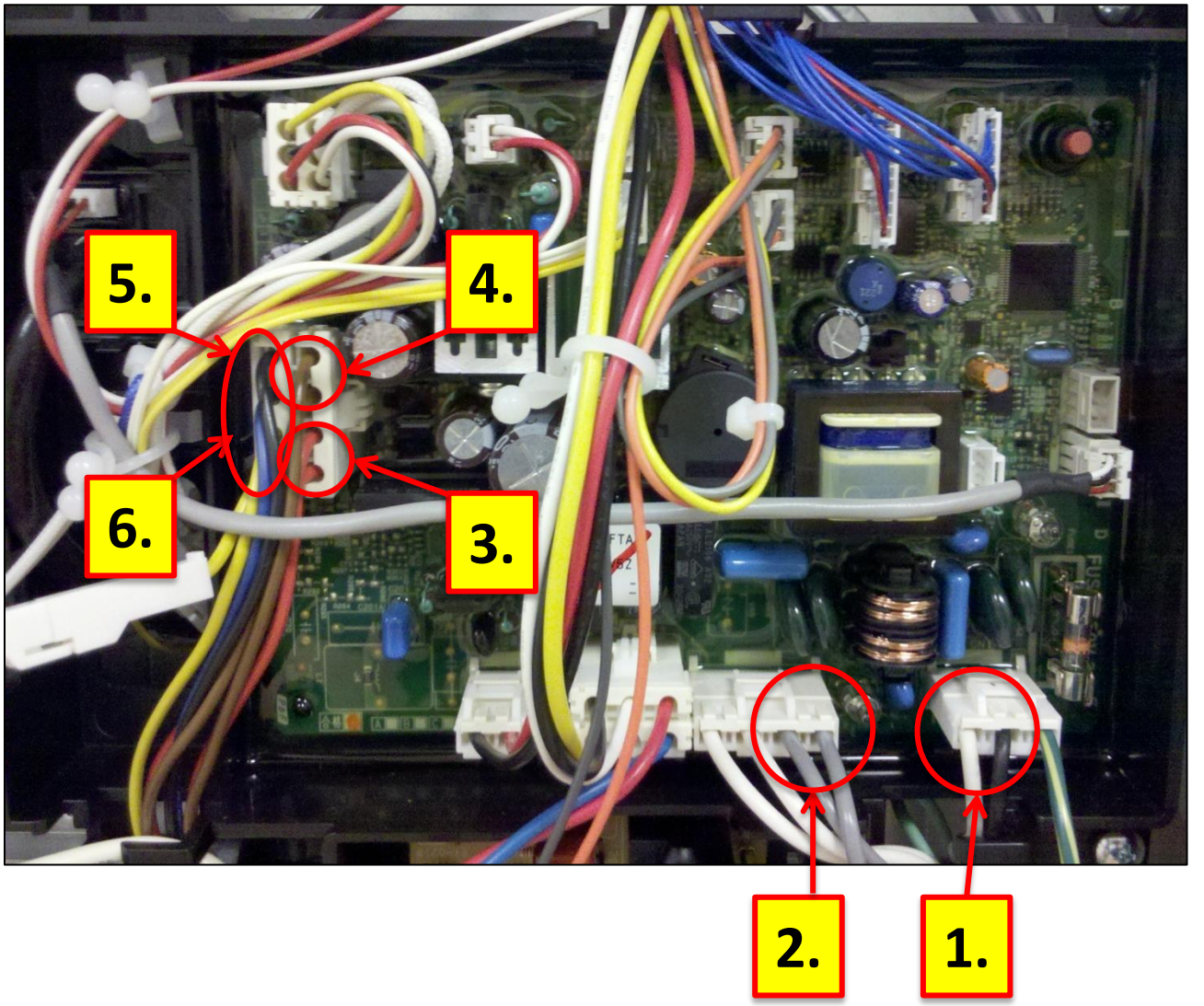
Flame rod current is measured in µA (micro amps). To take this measurement first reconfigure the meter test lead connections to measure current – the red probe is moved from the VΩ connection to the 200mA Max (mili amps) connection (see picture 1), then set the meter to the correct range (Flame rod current will be measured in DC µA, see picture 2).

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Electrical diagnostic points:

1. Measure incoming voltage on the Black – White wires.
2. Measure output voltage from PCB to the transformer on the Grey – Grey wires.
3. Measure output voltage from the transformer to the PCB on the Red – Red wires.
4. Measure output voltage from the transformer to the PCB on the Brown – Brown wires.
5. Measure output voltage from the transformer to the PCB on the Black – Blue wires.
6. Measure output voltage from the transformer to the PCB on the Black – Yellow wires.

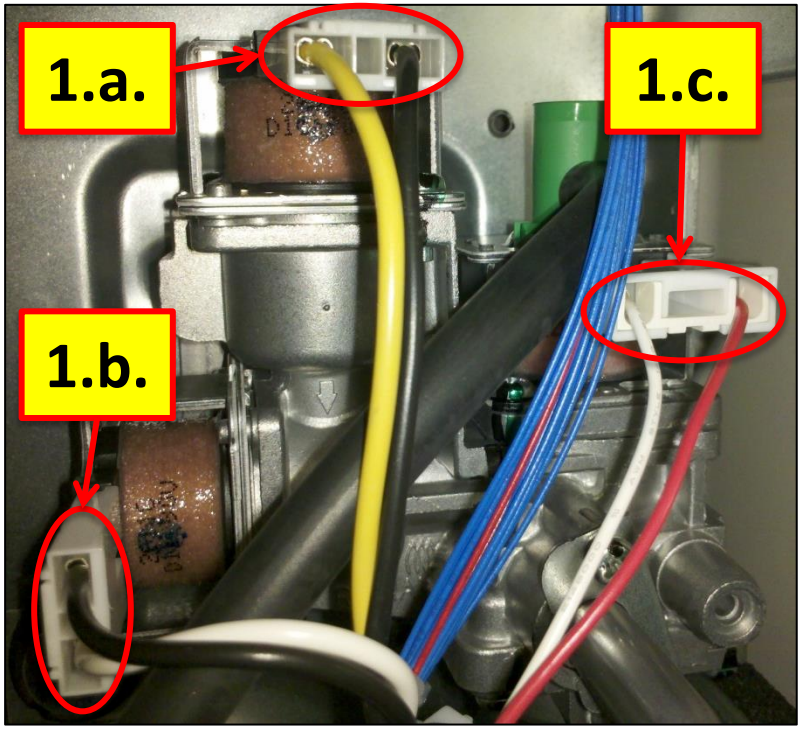


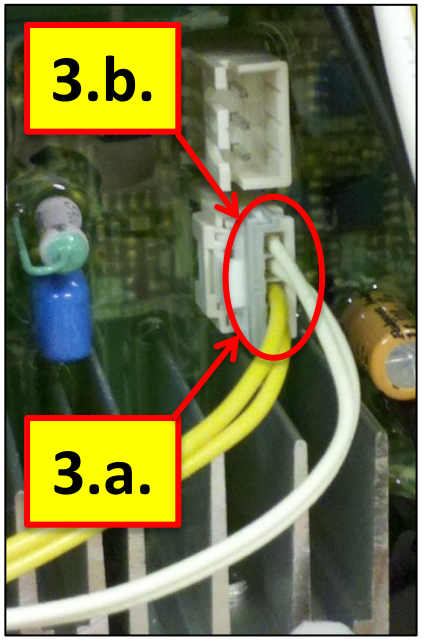
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Electrical diagnostic points:

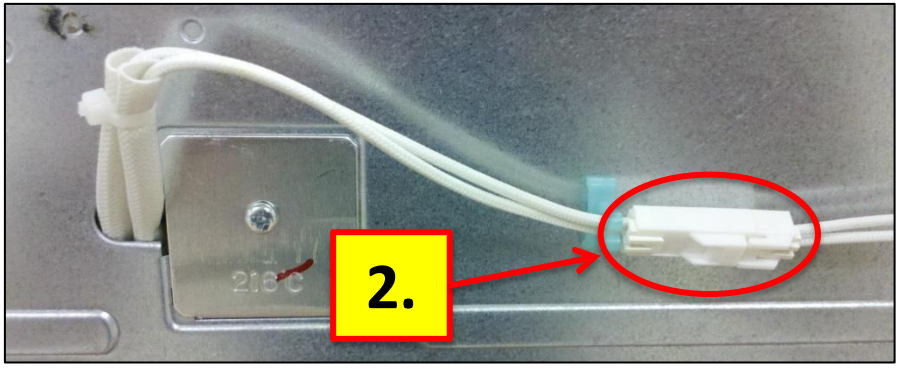
1. Measure the resistance of the gas valve solenoids (disconnect first):
   a. SV1, Black – Yellow wires.
   b. SV2, Black – White wires.
   c. Modulating solenoid, Red – White wires.





2. Measure continuity through the heat exchanger Thermal Fuse (disconnect first): White – White wires.

3. Measure resistance of the thermistors. (disconnect from the PCB first).
   a. Room temperature thermistor, Yellow – Yellow wires.
   b. Overheat thermistor, White – White wires.



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FAULT CODE DIAGNOSTICS

- **All current model direct vent furnaces have fault codes that can be displayed if the unit isn't operating to specifications.**
- **If a fault code is shown on the display, the flame indication lamp will be flashing red.**
- **The last nine error codes can be retrieved by pressing the Economy and the Up/Down Temperature buttons together while the unit is OFF.**
- **Refer to each model's operation and installation manual or service manual for more information on error codes and their remedy.**

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Fault Codes:

- **A fault code will flash on the display panel when a fault occurs. Turn the unit OFF then back ON to reset (except code 11).**

CODE	DECRIPTION	COMMENTS
PF or Dashes	Power Failure	Power supply failure. Need to reset clock.
11	Ignition Failure	No ignition or Flame Failure. Unit will attempt to restart (see Restart Feature)
14	Overheat Safety	Overheat safety bimetal(s), OH thermistor or thermal fuse has activated
16	Room Overheat, High temperature cut off	Room temperature is sensed as being above 104°F for longer than 10 minutes
30	Overheat temperature sensor #2 disconnect.	(EX38C only) #2 Overheat temperature sensor open circuit.
31	Room temperature sensor disconnect	Room temperature sensor open circuit
32	Room temperature sensor short circuit	Room temperature sensor short circuit
33	Overheat temperature sensor disconnect	#1 Overheat temperature sensor open circuit
34	Overheat temperature sensor short circuit	#1 Overheat temperature sensor short circuit
35	Overheat temperature sensor #2 short circuit	(EX38C only) #2 Overheat temperature sensor short circuit
49	Pressure sensor disconnect or breakdown	Pressure sensor / sensor circuit failure
53	Abnormal spark sensed	Spark not sensed correctly
61	Combustion fan failure	Combustion fan speed not achieved within time or goes over speed
62	Convection fan failure	Convection fan speed not achieved within time or goes over speed
70	ON/OFF switch or Setback switch failure	ON/OFF switch or Setback switch contacts closed for more than 15 seconds
71	Solenoid valve check	Solenoid valve(s) (SV1 & SV2) signal and response signal are different
72	Flame rod failure	Flame sensing circuit failure
73	Communication failure	Data transfer within PCB fails
81	Solenoid valve failure	Solenoid valve circuit failure
99	Flue block or venting disconnect	Check intake and exhaust inside and outside for blockage or freezing

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Fault Codes: Digital code & analog equivalent

- **Fault codes for older Rinnai Direct Vent furnaces with analog temperature display panels and the equivalent digital fault code.**
- **N/A indicates codes not applicable to models with analog display.**

DIGITAL CODE	EQUIVALENT ANALOG CODE	DESCRIPTION
PF or Dashes (in display)	LO – HI	Power Failure / Clock needs to be set (if equipped)
11	60	Ignition Failure
12	LO	Flame Failure
14	68	Overheat Safety
16	HI	Room Overheat, High temperature cut off
30	N/A	Overheat temperature sensor #2 disconnect.
31	72 - 76	Room temperature sensor disconnect
32	76 - 80	Room temperature sensor short circuit
33	64 – 68 – 72	Overheat temperature sensor disconnect
34	68 – 72 – 76	Overheat temperature sensor short circuit
35	N/A	Overheat temperature sensor #2 short circuit
49	N/A	Pressure sensor disconnect or breakdown
53	LO – 60 – 64	Abnormal spark sensed
61	60 – 64 - 68	Combustion fan failure
62	N/A	Convection fan failure
70	64 – 68	ON/OFF switch or Setback switch failure
71	LO – 60	Solenoid valve check
72	80	Flame rod failure
73	72 – 76 – 80 – HI	Communication failure
81	N/A	Solenoid valve failure
99	60 – 64 – 68 – 72 - 76	Flue block or venting disconnect

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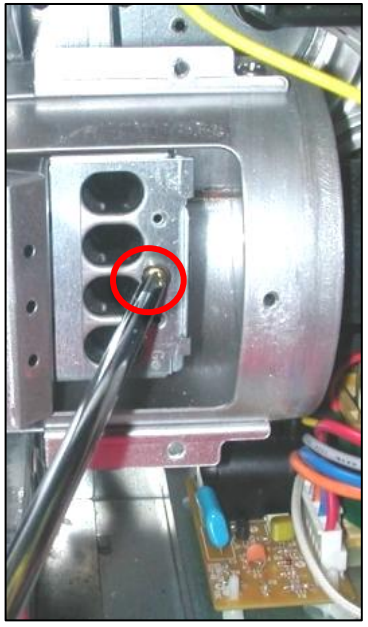
Gas Pressure Settings / Gas Conversion:

- Conversion kits are available for each model:
  - Conversion kits are an accessory for the EX and ES models and must be purchased separately.
  - The kit will include:
    - New gas type rating plate.
    - New gas orifices.
    - Primary and secondary air dampers (model dependent).
    - Instructions for conversion including gas pressure settings.
- Gas pressure must be verified if one of the following occur:
    - The gas valve is replaced.
    - The PCB is replaced.
    - The model's gas type is converted.
- Gas pressure setting instructions are in the Direct Vent Service Manual and the unit's conversion manual.

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Gas Pressure Settings / Gas Conversion:



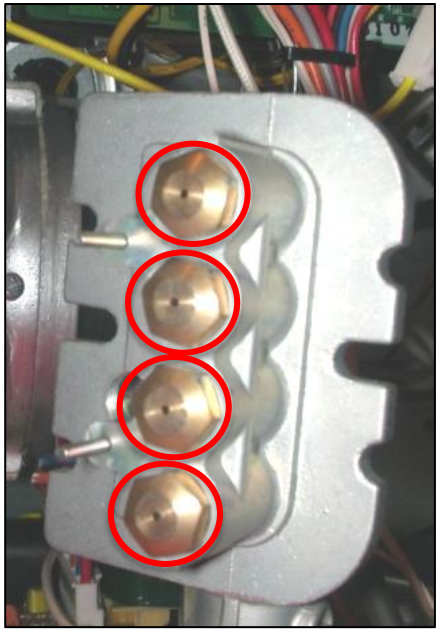
Remove the manifold assembly for access to the burners. Then remove the burner air damper screw. NOTE: The burner cover does not have to be removed for conversion.



After the screw is removed, remove the primary air damper.



After the primary air damper is removed, remove the secondary air damper.



Replace the orifices installed in the manifold. Each orifice is marked for size and are threaded for easy replacement.

Install new air dampers (if required) in the reverse order.

NOTE: Conversion parts will vary by model and gas type. See each model's conversion procedure!

After the conversion parts have been changed, high and low fire gas pressures MUST be reset. This is accomplished from the main circuit board and control panel. Follow each model's specific conversion procedure as outlined in the conversion manual.

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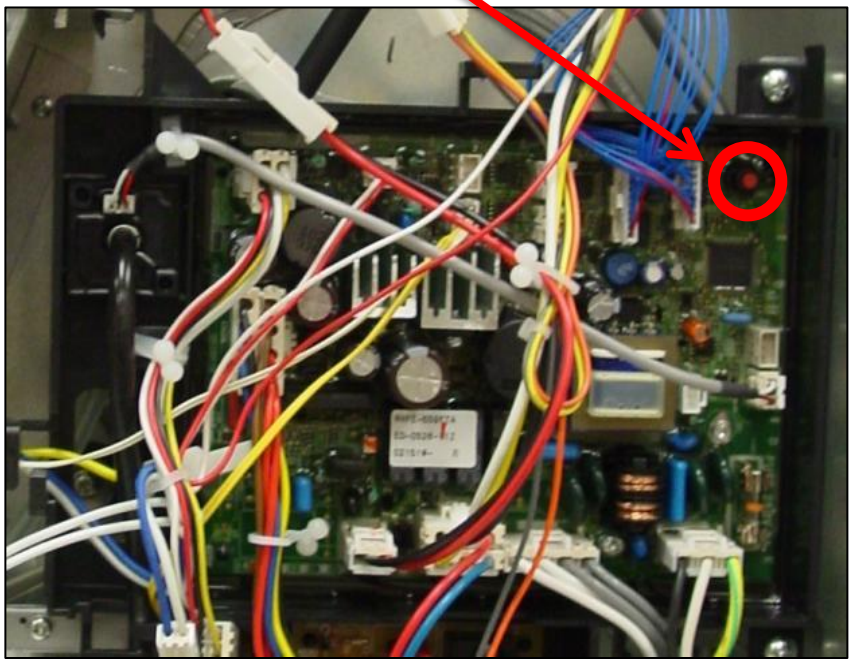
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Fault Code Flag Function “FF”

- C-Series models include a feature allowing a service technician to insert an “FF” code into the fault code history. This creates a flag or marker for future reference.
- This flag can be used after maintenance or service in order to monitor for fault codes that may have been posted since the last service visit.

- To insert “FF” into the memory, with the unit off, press the “Economy” button and the PCB test button at the same time and in that order.
- The “FF” will then be recorded as the most recent fault code.
- The FF code cannot be erased.





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Temperature display adjustment:

- C-Series Direct Vent Furnace models have the ability to adjust the temperature display.
- This can be useful when a temperature display, other than the display on the furnace, is used as a reference to set room temperature - to ensure the two readings match more closely, if necessary.
- To adjust the display, with the unit turned off but power applied, press the PCB test button twice.
- A number between -12 and +12 will appear. “0” is the factory setting.
- Each increment is equal to +/- 0.6ºF (0.33ºC). See the chart below.
- Once the adjustment is made, press the PCB test button once again to record the new value.

A value of :	Will make the control panel room temp read higher by:	A value of :	Will make the control panel room temp read lower by:
-12	7.2°F (4.0°C)	12	7.2°F (4.0°C)
-11	6.6°F (3.66°C)	11	6.6°F (3.66°C)
-10	6.0°F (3.33°C)	10	6.0°F (3.33°C)
-9	5.4°F (3.0°C)	9	5.4°F (3.0°C)
-8	4.8°F (2.66°C)	8	4.8°F (2.66°C)
-7	4.2°F (2.33°C)	7	4.2°F (2.33°C)
-6	3.6°F (2.0°C)	6	3.6°F (2.0°C)
-5	3.0°F (1.66°C)	5	3.0°F (1.66°C)
-4	2.4°F (1.33°C)	4	2.4°F (1.33°C)
-3	1.8°F (1.0°C)	3	1.8°F (1.0°C)
-2	1.2°F (0.66°C)	2	1.2°F (0.66°C)
-1	0.6°F (0.33°C)	1	0.6°F (0.33°C)



A negative value will make the room temp read higher

A positive value will make the room temp read lower



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Remote Thermostat:

- A remote thermostat may be installed on Rinnai DV furnaces (Only for models ending with the letter “T”. For example” EX38CT)
- The Rinnai Remote Thermostat Installation Kit must be utilized and the furnace placed in the Remote Thermostat Mode.

To place the furnace in the Remote Thermostat mode:

1. With power applied but with the unit in the Off mode, press and HOLD the ECONOMY button, the UP button and the SET TIMES button at the same time for 2.5 seconds (EX38CT uses the PROGRAM button in place of the SET TIMES button).
2. The display will show a “00“.
3. Press the UP button and the display will show a “01”.
4. Press the ON/OFF button and the display will go blank.
   - The unit will now be in the Remote Thermostat Mode.
     - **NOTE:** Do not unplug the furnace within two hours of making the adjustment. If power is disconnected within two hours the unit will revert back to the default Control Panel mode.
   - The remote thermostat will not power the furnace On or Off. This must be done manually by using the On/Off button on the unit.
   - When in the Remote Thermostat Mode most control panel functions will be disabled and control will be given to the remote thermostat.
     - In the remote thermostat mode the ON/OFF button, FILTER indicator and the ON indicator will remain active. The digital display will show any fault codes should one occur.

- If you wish to return the unit to the control panel mode, follow the step #1 - 4 above and select function “02”. Control will then be returned to the DV Furnace control panel.

NOTE: The unit will not operate if a remote thermostat is connected and the furnace is not in the remote thermostat mode.

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Convection Fan Overrun Time:

- **After the burner turns off the convection fan will operate for a predetermined length of time in order to cool down the heat exchanger** (due to reaching set temperature, timer event ends or the unit is manually turned off).
- **This overrun time is based on the stage of burner operation when the burners turn off.**

Number of Seconds for Convection Fan Post Purge Time					
	EX08CT	**EX11CT**	**EX17CT**	**EX22CT**	**EC38CT**
Within the first 40 seconds of ignition	120	120	120	120	120
Combustion Stage – 1	210	210	210	210	150
Combustion Stage – 2	210	210	210	210	160
Combustion Stage – 3	210	210	210	210	170
Combustion Stage – 4	210	210	210	210	180
Combustion Stage – 5	210	210	210	210	190
Combustion Stage – 6	210	210	210	255	200
Combustion Stage – 7	255	255	210	255	240

If the furnace posts a code 14, the convection fan will run 255 seconds regardless of the combustion stage when the fault occurred.

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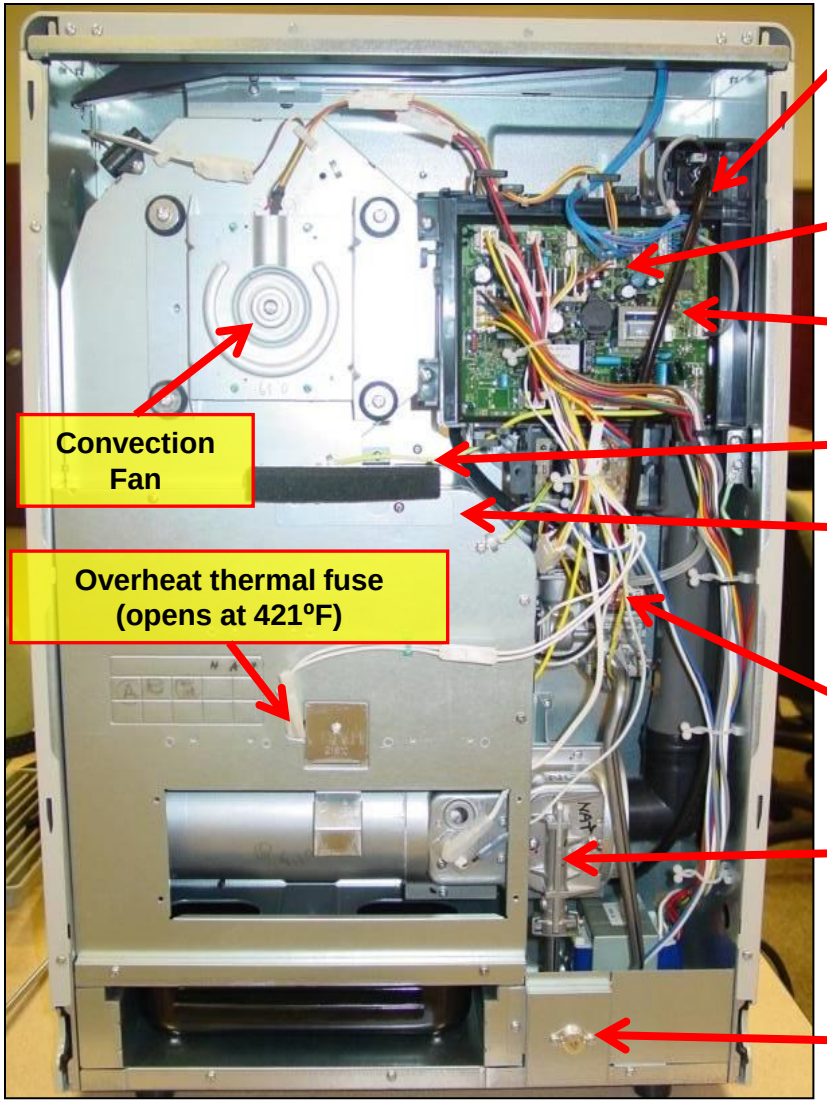
SPECIAL NOTES -

EX08CT and EX11CT Models

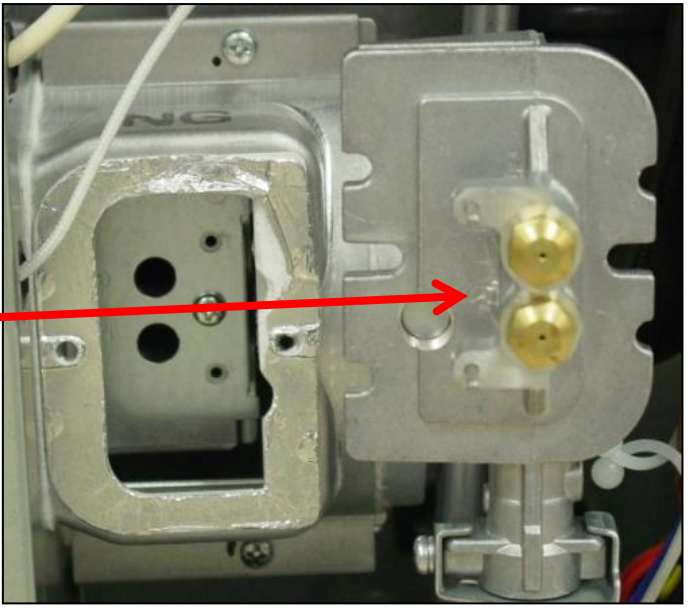
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EX 08/11 Series Overview:



1. These units are very similar to the EX 17/22 series and have the same sequence of operation.
2. The primary differences are in the size and positioning of some of the components.
3. Note the there are only two orifices and burners (compared to 4).



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APPENDIX A

MODEL QUICK REFERENCE GUIDE

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Quick Reference Guide:

MODEL NUMBER CHANGES		
2008 Model	**2009 Model**	**2010 Model**
RHFE-201RFA	ES08	EX08C
RHFE-263RFA	ES11	EX11C
RHFE-431RFA	ES17	EX17C
RHFE-431RWTA	EX17	
RHFE-556RFA	ES22	EX22C
RHFE-556RWTA	EX22	
RHFE-556RWTA-W	EX22W	EX22CW
RHFE-1004RFA	ES38	ES38
RHFE-1004RFA-W	ES38W	ES38W

AFUE CHANGES			
Model #	**Gas Type**	**Prv AFUE**	**New AFUE**
EX08C	NG	80.60%	82%
	LP	83.40%	83%
EX11C	NG	80%	81%
	LP	80%	82%
EX17C	NG	80%	81%
	LP	80.80%	82%
EX22C / W	NG	80.60%	81%
	LP	81%	82%
ES38 / W	NG	80.60%	80.60%
	LP	82%	82%

Physical Specifications				
Model Number	**Dimensions (W x H x D)**	**Weight***	**Notes**	
RHFE-201RFA	16 3/4" x 26 5/8" x 9 7/8"	39	The EX08C and EX11C have the same dimensions and weight	
ES08				
EX08C	18 1/4" x 27 3/8" x 10 1/8"	46		
RHFE-263RFA	16 3/4" x 26 5/8" x 9 7/8"	37		
ES11				
EX11C	18 1/4" x 27 3/8" x 10 1/8"	46		
RHFE-431RFA(WTA)	29 1/2" x 21 13/16" x 9 7/8"	51	The EX17C and EX22C (W) have the same dimensions and weight	
ES17, EX17		53		
EX17C	29 7/8" x 22 7/8" x 10 1/8"	57		
RHFE-556RFA(WTA)†	29 1/2" x 21 13/16" x 9 7/8"	51		
ES22, EX22		53		
EX22C	29 7/8" x 22 7/8" x 10 1/8"	57		
RHFE-1004RFA†	36 5/8" x 26 3/8" x 13"	90	No Changes	** Product weight*
ES38				*† Includes white models*

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Quick Reference Guide:

ENERGYSAVER MODEL SPECIFICATIONS - PRODUCT COMPARISON			
Specifications	**RHFE Models**	**R Series Models**	**C Series Models**
Cabinet Design	 *ES08, ES11, ES17, EX17, ES22, EX22(W), ES38(W)*		 *EX08C, EX11C, EX17C, and EX22C(W)* *ES38(W) does not change*
Control Panel	*ES08, ES11, ES17, ES22* 		 *EX08C, EX11C, EX17C, and EX22C*
	EX17, EX22(W) 		*ES38 does not change - not C series* 
Packaging - Label Changes	  *Cartons were color coded by model and gas type - label includes model number and serial number*		  *Gas type and model numbers are now located on label - cartons no longer color coded*

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ENERGYSAVER MODEL SPECIFICATIONS - PRODUCT COMPARISON (continued)			
Specifications	**RHFE Models**	**R Series Models**	**C Series Models**
Restart Function *(power and gas outage)*	No	Yes	Yes
Manual Shut-off	Integrated shutoff	1/2" valve included	1/2" valve included
Conversion Kit	In Box	In Box	As Accessory
Beeping Indicator for Restricted Filter	No	Yes	Yes
Standby Power < 1 Watt	No	No	Yes
Temperature Settings	F° and C° from PCB	F° and C° from PCB	F° and C° from Control Panel
Installation Template	Paper Template in Box - doesn't work with C series models	Paper Template in Box - doesn't work with C series models	On Outside of Box - doesn't work with previous models
Timers	Weekly - WTA Models Only	Weekly - WTA Models Only	Daily - C Series Models Only
High Altitude	2000'	Up to 10,200'	Up to 10,200'
Setback Function	No	No	Yes (includes frost protection)
Display Dimmer	No	No	Yes
Combustion and Convection fan validation	Combustion Fan Only	Combustion Fan Only	Both - new code 62 for convection fan related issues
FOT-201	N/A	N/A	New extension kit - replaces FOT-190 and includes intake hose
Maximum Temperature Setting	Special Order - or from PCB	From Control Panel	From Control Panel

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Quick Reference Guide

ENERGYSAVER Major Technical Differences			
Specifications	**RHFE Models**	**R Series Models**	**C Series Models**
Convection fan feedback signal (to ensure proper operation)	No	No	Yes
Pressure Sensor (to ensure proper operation)	No*	Yes	Yes
Long vent terminal and jumper (17/22 series only)	Yes*	No	No (No longer needed due to addition of pressure sensor)
Flame Rod Assembly (17/22 series only)	Screw accessible from top of assembly		Screw accessible from front of assembly
Thermistor Calibration	No	No	Yes
Ability to insert a flag into the error code bank (FF code)	No	No	Yes
Plastic tray under control panel for accidental spills (to protect PCB, etc)	No	No	Yes
Gas valve pressure balancing tube (17/22 series only)	No*	Yes	Yes (To ensure pressure balance between vent and gas valve)
Gas valve-to-manifold interconnection tube	Connects to bottom of gas valve		Connect to front of gas valve
PCB Differences (17/22 series only)	DIP switches and test buttons*	No DIP switches; Single test button for all settings	
Number of overheat bimetals (17/22 series only)	3*	3	2 (PCB bimetal eliminated due to redundancy)
Activation temp of overheat safety components (front bimetal(s) are unchanged; rear bimetals are on 17/22 series only	Thermal fuse: 314°F Rear HEX bimetal: 266°F		Thermal fuse: 421°F Rear HEX bimetal: 185°F
	The location of these components were altered creating the need to alter the activation temperature		
*These changes were implemented on the 08/11 series several years ago			

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APPENDIX B

2000 - 2008 RETROFIT PROGRAM

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What is this program about?



MODELS AFFECTED:

RHFE 431 FAIII
RHFE 431WTA
RHFE 556 FAIII
RHFE 556 WTA

There was a potential safety issue with two specific (previously manufactured) models of the Direct Vent Furnace products (Model RHFE 431 and RHFE 556 manufactured 2000-2007). Under certain rare circumstances a gasket used to seal the burner cover plate assembly and the heat exchanger may not perform as intended, resulting in the potential for release of trace amounts of carbon monoxide into the space being heated by the product.

While there have been no reports of serious injury or death, as part of Rinnai's continuing effort to ensure a safe and efficient product for our customers, we are implementing a Voluntary Corrective Action Plan to locate and retrofit affected product with a different gasket and burner cover plate.

Because this issue presents a potential safety concern, Rinnai voluntarily reported the matter to the Consumer Product Safety Commission (CPSC). CPSC monitored the program's inception and rapid progress; and, has recently closed their portion of oversight. Rinnai will of course continue to be proactive in retrofitting as many products as possible at our expense.

Please contact Rinnai customer service (800-621-9419) for more information.

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This completes the Rinnai Direct Vent Furnace Training Program.

Level III Service Fundamentals.

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