



# Oil Miser 148, 180 - 3 Second Warning Lamp

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## **WARNING**

*Rural Energy Enterprises, Inc. does not accept liability for the improper use of this information. Installation, service, and maintenance of heating equipment should be performed by a qualified technician. Improper installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury, or loss of life.*

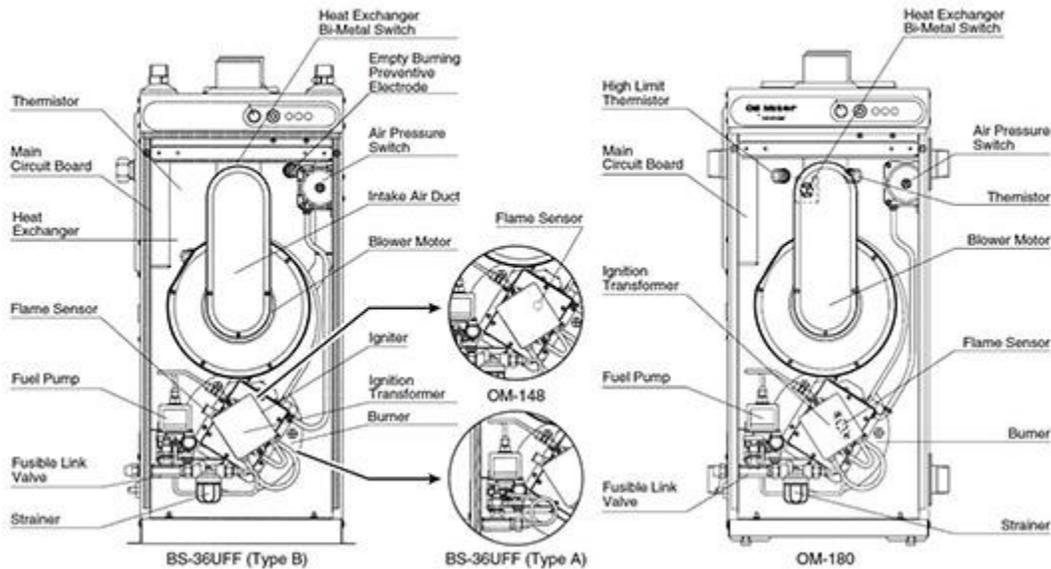
**Most of warning light problems can be resolved by performing routine maintenance. See technical documents “How to Clean the Heat Exchanger,” “Burner Service-Setting Electrodes,” and “Setting Fuel Pump Pressure. “**

**The 3-second warning light is caused by one of the following devices or conditions:**

- **Empty Burning Preventive Electrode (EBPE)** (BS36UFF and OM-148A only) part #20476407
- **Flame Sensor** (BS36UFF part #20476411, OM-148/180 part #20476711)
- **Temperature Selector Rheostat** (part #20476476)
- **“A” Thermistor** (part #20476473)
- **Transformer** (part #20476417)
- **Main Circuit Board (MCB)** (BS36UFF & OM-148 part #20476412, OM-180 part #20476712)
- **Faulty external control device** connected to “timer” loop (L) on main circuit board (OM-180 only) – to test this, remove external control and restore jumper wire on (L) connector.
- **Low fuel pump pressure**

- Insufficient oxygen to flame
- Electrodes out of adjustment

### CONSTRUCTION



### OM-148/BS-36UFF only:

1. **Are the hot and cold water lines connected correctly** When facing the heater, the incoming cold water should connect at the front-right of the heat exchanger (COLD), the outgoing heated water should connect at the left-rear (HOT).
2. **Is the heat exchanger full of water?** Turn on a hot water faucet to remove air from the top of the heat exchanger.
3. **Empty Burn Preventative Electrode**, or EBPE and wiring: Disconnect (B) plug from main circuit board (MCB). With the heat exchanger full of water and your meter on Ohms ( $\Omega$ ), you should have approximately  $0\Omega$  between the white wire and the chassis of the heater. If not, the EBPE needs to be removed and cleaned with a wire brush or replaced. Unplug the EBPE before removing it so that the wires can move freely, as twisting the wires will break them. Drain the heat exchanger before removing the EBPE. After replacing the EBPE, plug (B) connector back into place on MCB, and refill the heat exchanger.

### OM-180 only:

1. **Is the heat exchanger full of fluid?** Outgoing piping should not turn immediately downward. Piping should facilitate air elimination.
2. **Faulty external controller wired to “timer” plug (L) on MCB:** If the OM-180 is being controlled by an external thermostat, aquastat, etc. and that device is not opening/closing the circuit cleanly, it can cause the 3 second warning light. To test this, restore the factory jumper wire to the (L) connection on the MCB.

### All models:

1. **Are all wiring connections secured and making good contact?** Verify that all wiring connections are secure, and make sure that no wires have been pinched, esp. those wires that can be pinched when the burner assembly is installed into the heat exchanger. The plastic wire connectors are designed to plug into the MCB only one way... if they don't snap into place easily, make sure that you have them turned the right way. Forcing them into place can damage the MCB.
2. **Grounding:** Put one test lead behind connector (B), right alongside the green wire (keep B connector plugged in to MCB). Put your other lead to the chassis. With your meter on Ohms ( $\Omega$ ), you should have zero resistance. If not, secure grounding.
3. **Flame sensor:** Remove (D) connector from MCB. With your meter on Ohms ( $\Omega$ ) and no light on the flame sensor, you should read greater than 180k $\Omega$  through the flame sensor. If your meter will not read resistances higher than 200k $\Omega$ , you will probably get “OL” for over limit. With light on the flame sensor, you should get less than 30k $\Omega$ . If either of these values are out of the specified range, replace the flame sensor.
4. **“A Thermistor”:** Unplug (A) connector from MCB. Resistance will vary with the fluid temperature inside the heat exchanger. Verify that the thermistor resistance is within the range specified below. If the resistance is out of the specified range, replace the thermistor. (OM-180: The “{T} thermistor, high-limit”

should be tested the same way)

Water Temp.	50	68	86	95	104	113	122	131	140	149	158	167	176
	°F												
	10°C	20°C	30°C	35°C	40°C	45°C	50°C	55°C	60°C	65°C	70°C	75°C	80°C
Thermistor sensing resistance (kΩ)	86	54	35	29	23	19	16	13	11	9.3	7.8	6.7	5.6
	~	~	~	~	~	~	~	~	~	~	~	~	~
	106	65	45	34	27	22	18	15	13	10	8.7	7.4	6.3

5. **Transformer:** Primary is (J1) on MCB. Secondaries are (J2). You should have ~120VAC on the primary. If not, test power back to the wall. The secondaries should read 13.6VAC blue to blue, 12VAC orange to orange. If you have a variance of greater than ±10%, replace the transformer.
  
6. **Temperature Selector Rheostat:** Unplug the temperature selector/indicator lamp assembly from the MCB (marked “remote controller” on MCB). With your meter on Ohms (Ω), test between the yellow and brown wires. You should be able to get your test leads in the back side of the connector enough to make contact (where the wire enters). Turn the temperature selector and watch the resistance value on your meter change. It should vary smoothly from 0 to 50kΩ. If the reading does not change smoothly, or if there are any dead spots, replace the indicator lamp circuit board assembly. ALTERNATE TESTING METHOD (FOR TROUBLESHOOTING PURPOSES ONLY - HEATER WILL FIRE TO MAXIMUM OPERATING TEMPERATURE - SCALD HAZARD): Snip the yellow and brown wires, strip the ends, and twist them together on the MCB side. This will take the temperature selector rheostat out of the equation. If the unit no longer goes to warning light, you know that the temperature selector was the problem. **DO NOT LEAVE THE HEATER WITH THE TEMPERATURE SELECTOR BYPASSED.** If the rheostat passes the test, use in-line splices or small wire nuts to reconnect the wiring. Be sure to make good connections... the circuit is resistance-sensitive.
  
7. **Low fuel pump pressure** can result in residual fuel still burning when heater fires again. Test by unplugging the flame sensor (D) from the MCB, firing the heater, and plugging the flame sensor back in immediately after the burner lights (heat on stack). If the heater does not go to the 3 second warning light, you know that the flame sensor is seeing light when it shouldn't. See technical document “Setting Fuel Pump Pressure “.

8. **Insufficient oxygen to flame:** Plugged heat exchanger, bad flue, faulty combustion blower – Insufficient oxygen to the flame can result in residual fuel still burning when heater fires again. Test by unplugging the flame sensor (D) from the MCB, firing the heater, and plugging the flame sensor back in immediately after the burner lights (heat on stack). If the heater does not go to the 3 second warning light, you know that the flame sensor is seeing light when it shouldn't. See technical document "How to Clean the Heat Exchanger".
9. **Electrodes out of adjustment:** If the electrodes are not correctly spaced, the excess light of the spark can be picked up by the flame sensor before the heater fires, and, thinking that there is flame when there shouldn't be, the heater will go to warning light. Test by unplugging the flame sensor (D) from the MCB, firing the heater, and plugging the flame sensor back in immediately after the burner lights (heat on stack). If the heater does not go to the 3 second warning light, you know that the flame sensor is seeing light when it shouldn't. See technical document "Burner Service-Setting Electrodes".
10. If you have made it this far without finding the problem, the MCB may need to be replaced. Verify all tests before purchasing a new MCB.