



Routine Burner Service

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.

Applies to models Oil Miser 148, 180 and Toyotomi BS36UFF:

1. Unplug the unit and shut off the oil supply line.
2. Inspect the filter at the oil tank and fuel lines. (Filter should be changed annually.)
3. Remove the front panel and the circuit board cover on left hand side.
4. Remove and inspect the fuel strainer cartridge. Replace cartridge if signs of water and/or sludge are present. Part numbers for the cartridges are as follows:

BS-36UFF (Type A)	part# 20476484 (fuel strainer cartridge)
BS-36UFF (Type B) & OM-148/180	part# 17185384 (fuel strainer cartridge)

5. Unplug the following connections from the main circuit board: Blower Motor (G), Ignition Transformer (H), Fuel Pump (F) and Flame Sensor (D). On the OM-148 & OM-180 also unplug the Temperature Fuse (Q)
6. Remove the 2 screws holding the pressure switch to the cabinet (right hand side) and the ground wire from the base of the unit. (right hand side)



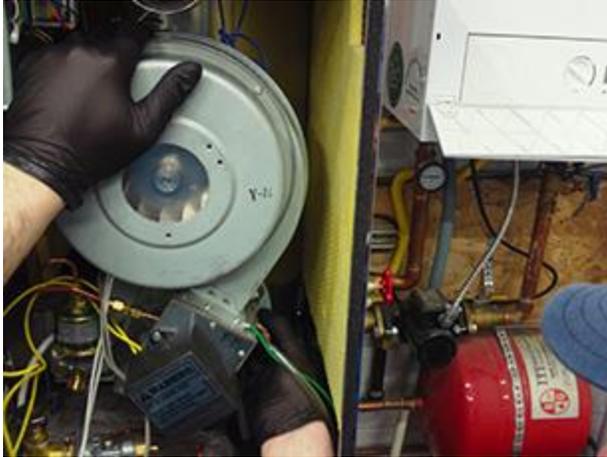
7. Remove the oil line section going between the fuel strainer and the fuel pump. (17mm on pump, 14mm on strainer, & 12mm on fuel line). Use a backup wrench as pictured.



8. Remove the 3 short screws holding the combustion air intake tube from the burner assembly.

There are 3 large nuts holding the burner assembly to the heat exchanger. Loosen the one at 3 o'clock. Remove the other two (at 7 o'clock and 11 o'clock). With your left hand holding the top of the burner assembly (top of blower motor), remove the remaining loose nut.

9. Pull burner assembly from unit. (Be careful of the wires.)

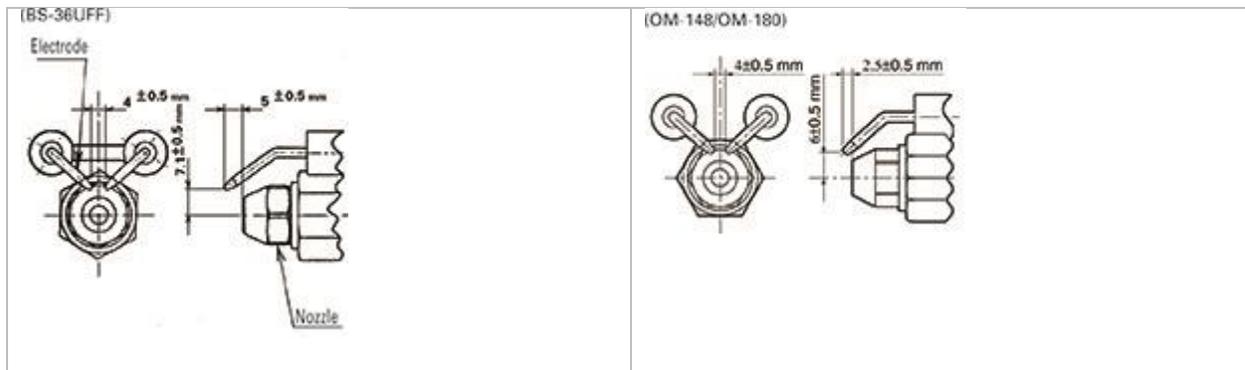


10. Lay burner on a work station.
11. Remove the 3 screws holding the burner top and pull off.
12. Mark the bottom burner top holder with a felt pen/marker from the ring to the faceplate. Remove the 4 screws on the faceplate edge and the 3 screws (not all models had this) to bracket of the nozzle assembly.
13. Clean burner top, paying special attention to the combustion air holes. Make sure they are free of carbon, soot and dust. Replace burner top if necessary.
14. Remove and replace the fuel nozzle.

BS-36UFF	part# 20476426 Delavan 1.10 gph, 60-degree, type A
OM-148 & OM-180	part# 20476626 Delavan 0.85 gph, 60-degree, type XA

15. Inspect the electrodes, if pitted or worn, replace. Electrodes can be bent a little bit to close the gap, but if a lot of bending is required, replace the electrodes. To help ensure the best gap possible use electrodes setting tool part # 10005027 only for models OM-148 & OM-180

BS-36UFF	OM-148 & OM-180
part# 20476425 electrodes (set of 2)	part# 20476625 electrodes (set of 2).



16. Reinstall the burner top holder, matching the mark on the base faceplate with the felt pen mark, then the burner top.
17. Turn over burner assembly to access flame sensor.
18. On the BS-36UFF pull the flame sensor from housing and clean lens. On the OM-148/180, the ignition transformer and backing plate will need to be removed for access to the sensor. Remove (snaps out) and clean the flame sensor, reinstall, (note the ridge on the sensor) to make sure it snaps into place properly, reinstall the back plate and ignition transformer.
19. Vacuum out the burn chamber; inspect the inside to make sure it is clean, no warping or leaking of the heat exchanger. If there is heavy soot and carbon inside burn chamber area, the top of the heat exchanger and baffles will need to be inspected. See page # 44-45 of the service manual for instructions. Pull out and inspect baffles; if ends are burned off or broken, replace the baffles. If the muffler assembly (top of heat exchanger) needs to be removed, the heat exchanger gasket (part# 20476393) will have to be replaced, and high temperature silicone sealant used to complete the seal. If servicing a BS-36UFF or an older OM-148, now is a good time to shut off the water and drain about 1 gallon of water. Pull the empty burning preventive electrode. Clean probe with cloth (do not use sandpaper, steel wool, or other abrasive material) and wire connection. Reinstall and turn water back on. If probe is pitted or wire connection is corroded replace the electrode. Part# 20476407

Setting the Electrodes – BS36UFF, OM-148, OM-180

Observing the Spark

The best way to ensure proper electrode setting is to watch the spark in action. After removing and servicing the burner assembly, remove the combustion air intake from top of unit and place the complete burner assembly on top of the unit with the burner top facing the front-left corner of the unit. With the air intake removed, the assembly can lean back stably at an angle. Ensure that the burner assembly is stable before continuing... you don't want it to fall.



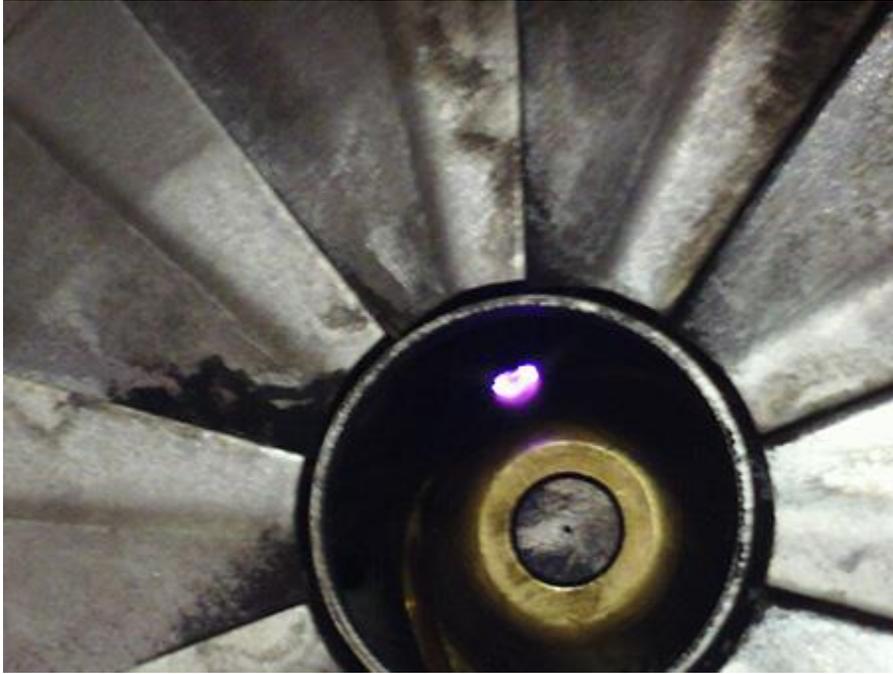
Plug the following wires into the main circuit board: Blower Motor (G), Ignition Transformer (H), Thermal Fuse (Q). ENSURE THAT THE FUEL PUMP (F) IS DISCONNECTED. Plug the unit in and press the power button. The blower motor and ignition transformer should now engage, allowing you to observe the spark. WHEN THE BLOWER ENGAGES, DEBRIS MAY BE BLOWN OUT OF THE BURNER. WEAR EYE PROTECTION. ALSO, BE CAREFUL TO PREVENT ANYTHING FROM BEING SUCKED INTO THE INTAKE OF THE BLOWER. ALWAYS UNPLUG THE UNIT BEFORE ANY ADJUSTMENTS ARE MADE. If the spark is a bright whitish/blue with only a little purplish color, the electrodes are spaced too closely together, and should be adjusted. The spark should have a nice light purple hue to it, and it should blow out towards the fuel spray. However, if the electrodes are set too far apart, the spark will lick out and touch the fuel

nozzle and/or burner top, and the electrode spacing will have to be reduced. There are metal rings on the electrodes that prevent them from being set too close to the fuel nozzle. In most cases, sliding the electrodes down until these rings touch is the proper spacing from the fuel nozzle. However, in some cases you may need to raise the electrodes a bit to prevent the spark from touching the fuel nozzle.

Good spark - nice light purple color



Too close – less purple, more of the bright blue-white arc:



Too wide – arcing to nozzle and/or burner top:



20. Reinstall the burner assembly. Be careful not to pinch any of the wires between the burner assembly and heat exchanger.

21. Reconnect wires to the proper circuit board connections.

22. Reinstall the oil line.
23. Remove the union and put fuel pump pressure gauge (part #10005089) in oil line after the pump. Open a hot water faucet. Plug in the unit and turn on. Unit should fire right away.
24. Set pump pressure as follows:

BS-36UFF (Type A) (Chimney or Flue Pipe Vent)		
Altitude Range	Fuel Pump Pressure	Notes
0 - 4,992 FT	95 PSI	Some BS-36 (A) have been set at 99 PSI before being shipped out from the manufacturer, this will cause no problems.
5,250-5,577 FT	91 PSI	
5,578-6,233 FT	85 PSI	
6,234-6,561 FT	81 PSI	
6,562-6,890 FT	77 PSI	

BS-36UFF (Type B & C) (Chimney or Flue Pipe Vent)		
Altitude Range	Fuel Pump Pressure	Notes
0 - 4,992 FT	107 PSI	Some BS-36 (B, C) have been set to 114 PSI before being shipped out from the manufacturer, this will cause no problems.
5,250-5,577 FT	101 PSI	

5,578-6,233 FT	97 PSI	
6,234-6,561 FT	91 PSI	
6,562-6,890 FT	87 PSI	

OM-148/180 (Flue Pipe Vent)	
Altitude Range	Fuel Pump Pressure
0 - 1,640 FT	192 PSI
1,641-3,280 FT	171 PSI
3,281-4,920 FT	149 PSI

OM-148/180 (Chimney Vent)	
Altitude Range	Fuel Pump Pressure
0 - 3,280 FT	192 PSI
3,281-4,920 FT	171 PSI

25. While unit is still burning, perform smoke test. Smoke test should read zero smoke. If smoke test is higher than zero, then adjust pump pressure down to decrease smoke. Fuel pump pressures listed above are approximate values to get close to zero smoke point test. Actual fuel pump pressure with zero smoke may vary depending on chimney or flue pipe length, and installation conditions. Turn off hot water faucet.

26. Turn off hot water faucet.
27. Remove pump pressure gauge and reinstall union.
28. Install front panel and circuit board cover.
29. Clean water heater cabinet and area.