

Perform the following steps when replacing a nozzle.

WARNING Correct Nozzle and Flow Rate Required



Incorrect nozzles and flow rates could result in impaired combustion, under-firing, over-firing, sooting, puff-back of hot gases, smoke and potential fire or asphyxiation hazards.

Use only nozzles having the brand, flow rate (gph), spray angle and pattern specified by the appliance manufacturer or Beckett Residential Burner OEM Spec Guide, Part #6711.

Follow the appliance manufacturer's specifications for the required pump outlet pressure for the nozzle, since this affects the flow rate.

- Nozzle manufacturers calibrate nozzle flow rates at 100 psig.
- This burner utilizes pressures higher than 100 psig, so the actual nozzle flow rate will be greater than the gph stamped on the nozzle body. (Example: A 1.00 gph nozzle @ 140 psig = 1.18 gph)

For typical nozzle flow rates at various pressures see accompanying chart.

1. Remove the nozzle line assembly to gain access to the nozzle.
2. Use a 3/4" open-end wrench to hold the nozzle adapter. DO NOT attempt to remove or replace the nozzle without securing the adapter, as nozzle alignment could be seriously affected. Refer to Figure 1.
3. Do not squeeze the electrodes when handling the nozzle line assembly. Excessive force could change the electrode tip settings or damage the ceramic electrode insulators.
4. Use a 5/8" open-end wrench to carefully remove the existing nozzle.
5. Inspect the nozzle adapter before installing the new nozzle. If it is grooved or scratched on the sealing surface, replace the nozzle line assembly. If the surface is damaged, oil could leak at the nozzle to adapter joint, causing serious combustion problems.
6. Protect the nozzle orifice and strainer when installing. If the orifice gets dirt in it or is scratched, the nozzle will not function properly.
7. To install a new nozzle, place a 3/4" open-end wrench on the nozzle adapter. Insert the nozzle into the adapter and secure finger tight. Finish tightening with a 5/8" open-end

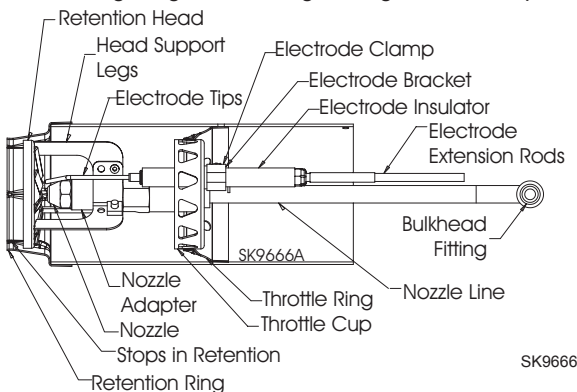


Figure 1 – Air Tube Assembly

CAUTION Protect Nozzle from Damage

A damaged nozzle could cause impaired combustion, sooting, puffback of hot gases, smoke, oil leakage and potential fire or asphyxiation hazards.

- Use care when handling, removing and installing oil nozzles.
- Carefully follow the guidelines provided in this section.

wrench. Use care to avoid bending the burner head support legs or electrodes.

8. Do not over-torque the nozzle when installing. This will cause deep grooves in the nozzle adapter, preventing a seal when a new nozzle is installed.
9. Carefully check and realign the electrode tips after replacing a nozzle, ensuring the electrode settings comply with Figure 2.
10. If the head was removed when replacing the nozzle, carefully reconnect the head to the nozzle adapter. Make sure to align the key in the support leg with the keyway in the nozzle adapter and to butt the head support to the nozzle adapter shoulder, see Figure 1.

Check/Adjust Electrodes

Check the electrode tip settings, as shown in Figure 2. If necessary, adjust by loosening the electrode clamp screw (Figure 1) and slide/rotate the electrodes as necessary. When the adjustment is complete, securely tighten the clamp screw.

Note that if the throttle cup is moved be sure to reposition it with no gap between the nozzle adapter and hub.

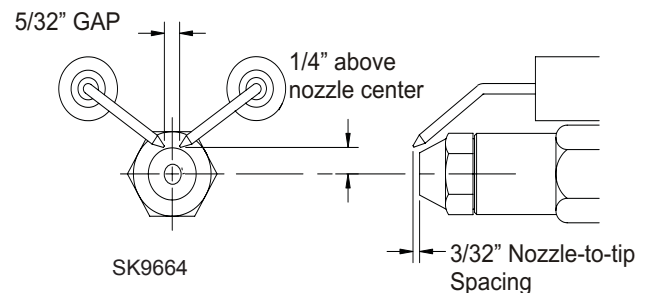


Figure 2 – Electrode Tip Gap Setting

Check Retention Head Alignment and Cad Cell Sighting

The cad cell sighting holes in both the throttle cup and the retention head must be aligned to allow the cad cell to detect the flame. Make sure the stamped key in the retention head collar lines up with the keyway in the nozzle adapter when mounting the retention head (Figure 3).

Check/Adjust "Zero" Calibration

On burners with factory-installed air tubes, the zero calibration has been factory set. Make sure the retention head (Figure 1) is securely against the stops in the retention ring when the adjustment plate pointer is at "0" (Figure 4a or 4b).

If the zero calibration has not been set, perform the following procedure:

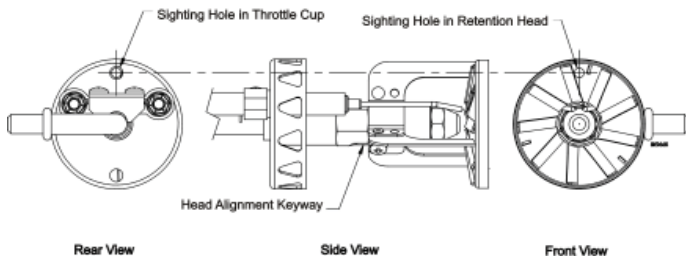


Figure 3 – Retention Head/Throttle Cup Alignment

1. Install the nozzle line, with the adjustment plate assembly attached, into the burner.
2. Install and tighten the rear door to hold the air adjustment plate assembly in position.
3. Slightly loosen the upper acorn nut, the splined nut, and the lower acorn nut.
4. Turn the air adjustment screw clockwise to adjust the plate with the pointer to the zero position.
5. Referring to Figure 1, slide the nozzle line assembly forward until the retention head engages the fixed stops in the retention ring at the end of the air tube.
6. Tighten the upper acorn nut securely.
7. The rear door must be kept tightly closed. The adjustment screw may now be turned to adjust the head/air setting.
8. Turn the adjusting screw to a setting $\frac{1}{2}$ number lower than the proper set point as indicated in Table 1. Then turn the adjusting screw counterclockwise to the proper setting.
9. Tighten the splined nut and lower acorn nut after the head/air setting has been adjusted.

Initial Settings

1. Open the shutoff valves in the oil supply line to the burner.
2. Referencing Figure 5 verify and/or set the Head/Air Adjustment Pointer to the value specified by the Appliance Manufacturer. If the Appliance Manufacturer's values are not available, refer to Table 3a or 3b. (**This is an initial air setting for the pump bleeding procedure only.**) Calibrated test instruments must be used for the final head/air adjustment.
3. Adjust the thermostat or temperature controller to call for heat. (*Note: return controller(s) to the original settings upon completion of burner installation.*)
4. Close the line voltage switch to start the burner. If the burner does not start within the 3 to 10 second safety start check timing, you may have to reset the safety switch on the burner primary control.

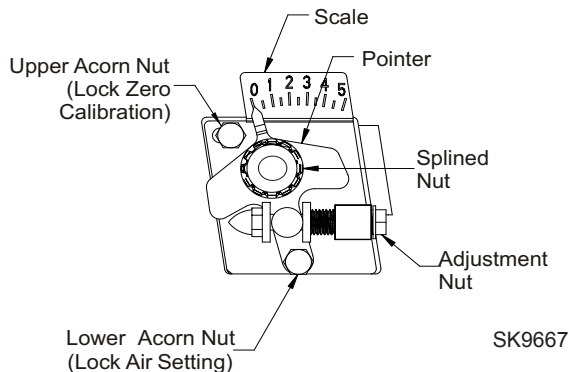


Figure 4a – Older Style Head/Air Adjustment Plate

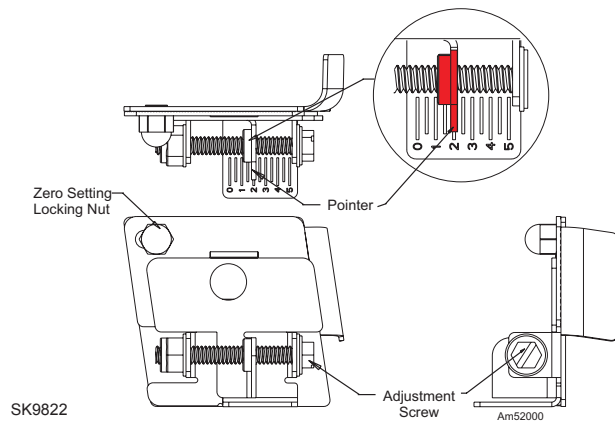


Figure 4b – Newer Style Head/Air Adjustment Plate

5. Bleed the air from the fuel pump as soon as the burner motor begins rotating.
6. Prepare for combustion tests by drilling a $\frac{1}{4}$ " sampling hole in the flue pipe between the appliance and the barometric draft regulator. Seal this hole when testing is complete. (See appliance manufacturer's instructions for location.)
7. Loosen the splined nut and lower acorn nut approximately one turn. (DO NOT loosen the upper acorn nut. This is used only for setting the zero adjustment.) (See Figure 4a or 4b.)
8. A $\frac{5}{16}$ " nut driver or flat blade screwdriver can be used to turn the adjustment screw for head/air setting.

Set Combustion with Test Instruments

1. Allow the burner to run for approximately 5 to 10 minutes.
2. Set the stack or over-fire draft to the level specified by the appliance manufacturer.
 - **Natural Draft Applications;** typically over-fire draft is -0.01 " or -0.02 " w.c.
 - **Direct Venting;** typically may not require draft adjustment.
 - **High Efficiency/Positive Pressure Appliances;** also vary from traditional appliances (see manufacturer's recommendations).
3. Follow these five steps to properly adjust the burner:
 - Step 1:** Adjust the head/air until a trace of smoke is achieved. This can be accomplished by turning the screw on the head/air adjustment plate assembly to increase air (CCW) or decrease air (CW).
 - Step 2:** At the trace of smoke level, measure the CO₂ (or O₂) . This is the vital reference point for further adjustments. Example: 13.5% CO₂ (2.6% O₂)
 - Step 3:** Increase the air to reduce the CO₂ by 1.5 to 2 percentage points. (O₂ will be increased by approximately 2.0 to 2.7 percentage points.) Example: Reduce CO₂ from 13.5% to 11.5% (2.6% to 5.3% O₂).

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