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WARNING

The burners covered in this Guide are designed to mix fuel with air and burn the resulting mixture. All fuel burning devices are capable of producing explosions and fires when improperly applied, installed, adjusted, controlled, or maintained. This Guide will provide information for using these burners for their limited design purpose. Do not deviate from any instructions or application limits in this Guide without written advice from the Eclipse Combustion, Inc. Read this entire Guide before attempting to light burners. If you do not understand any part of the information in this Guide, contact your local Eclipse representative or Eclipse Combustion, Inc., before proceeding further.

Important Notices About Safe Burner Operation

Store the burner inside. Exposure to the elements can damage the burner.

Adjustment, maintenance, and troubleshooting of the mechanical parts of this unit should be done by people with good mechanical aptitude and experience with combustion equipment.

Order replacement parts from Eclipse Combustion, Inc., only. Any customer-supplied valves or switches should carry UL, FM, CSA, and/or CGA approval where applicable.

The best safety precaution is an alert and competent operator. Thoroughly instruct new operators so they demonstrate an adequate understanding of the equipment and its operation. Regular retraining must be scheduled to maintain a high degree of proficiency. The operator must have easy access to this Information Guide at all times.

1.0 Burner Operating Parameters & Requirements



WARNING

Do not operate Ratiomatic burners with less gas inlet pressure than the minimum listed in Figure 1.

Lower gas inlet pressures may cause the proportionator to remain fully open as the burner turns down from high fire, causing excess fuel operation and the possible accumulation of unburned fuel in the chamber. In extreme cases, this may cause explosions or fires.

Chamber Temperatures

Cast Head & Alloy Firing Tube: 1500° F. maximum. (816° C)

Alloy Head & Refractory Block: 1800° F. maximum. (982° C)

Temperatures shown are for average installations. Depending on conditions, higher operating temperatures can be obtained. Contact Eclipse for specific information for your application.

Capacities & Pressures

See Figure 1.

Process Air Velocity

3000 fpm (15.24 m/s) maximum past the burner.

Electrical

Blower Motor: Check motor nameplate ratings.

Control Motor: Check motor nameplate ratings.

Ignition: 6000 volts AC minimum at the ignition plug.

Burner Environment

Ambient Temperature Limits: As determined by monitoring and control equipment such as UV scanners, automatic fuel shut-off valves and electrical wiring.

Weather Protection: Protect burners from the weather.

Combustion Air: Must be free of contaminants. Eclipse strongly recommends use of a combustion air filter to remove airborne particles. If corrosive fumes or materials are present in the air, supply the blower with fresh, clean air from an uncontaminated area of the plant.

Room Openings: To admit fresh combustion air from outdoors, provide at least one square inch of opening in the room for every 4000 Btu/hr (1.2 kW) of burner firing rate.

Access: Provide access to the burner for inspection and maintenance.

Figure 1–Operating Parameters, Ratiomatics with Standard Blower & Motor
 For natural gas, .65 s.g. Contact your Eclipse representative for propane data.

Capacities may be increased by 20% if sufficient secondary air is available to complete combustion.

English Units

Burner Size		50	100	150	200	300	400	500	600	750	1000	1250	1500	2000	2500	
Maximum Input, Btu/hr. In Millions	Chamber Pressure Inches w.c.	-5.0	0.70	1.40	2.10	2.90	3.67	4.67	5.50	7.00	9.30	12.50	14.60	17.70	23.20	27.60
		-3.0	0.65	1.25	1.90	2.50	3.42	4.59	5.50	6.60	8.60	11.60	13.80	16.70	22.00	26.60
		-1.0	0.55	1.10	1.65	2.20	3.15	4.20	5.19	6.20	7.90	10.50	12.90	15.60	20.70	25.50
		0.0	0.50	1.00	1.5	2.00	3.00	4.00	5.00	6.00	7.50	10.00	12.50	15.00	20.00	25.00
		+1.0	0.45	0.90	1.35	1.80	2.85	3.80	4.80	5.75	7.10	9.40	12.00	14.40	19.30	24.40
		+2.0	0.40	0.80	1.20	1.60	2.68	3.58	4.60	5.50	6.70	8.80	11.50	13.70	18.60	23.85
Minimum Input, Btu/hr. In 1000's ¹		40	25	30	30	65	65	65	65	75	100	125	150	200	250	
Turndown		12:1	40:1	50:1	67:1	46:1	73:1	77:1	92:1	100:1	100:1	100:1	100:1	100:1	100:1	
High Fire Gas ΔP, ² "w.c.	Chamber Pressure Inches w.c.	-5.0	4.5	5.5	4.9	6.1	7.3	7.5	4.5	7.4	8.1	9.8	12.0	9.1	8.7	12.3
		-3.0	3.9	4.4	4.0	4.5	6.4	7.2	4.5	6.5	7.0	8.5	10.7	8.1	7.9	11.4
		-1.0	2.8	3.4	3.0	3.5	5.4	6.1	4.0	5.8	5.9	6.9	9.4	7.0	7.0	10.5
		0.0	2.3	2.8	2.5	2.9	4.9	5.5	3.7	5.4	5.3	6.3	8.8	6.5	6.5	10.1
		+1.0	1.9	2.3	2.0	2.3	4.4	5.0	3.4	5.0	4.7	5.6	8.1	6.0	6.1	9.6
		+2.0	1.5	1.8	1.6	1.9	3.9	4.4	3.1	4.5	4.2	4.9	7.4	5.4	5.6	9.2
Gas Inlet Press. ³	Minimum " w.c.	7	8	11	16	12	17	14	20	12	14	20	22	30	38	
	Maximum psig ⁴	1	1	1	1	2	2	2	2	2	2	2	2	2	2	
Min. Pilot Gas Press., " w.c. ⁵		6	6	6	6	6	6	6	6	6	6	6	6	6	6	
High Fire Flame Length, Inches ⁶		24	30	32	36	54	54	60	66	96	124	144	144	150	170	
Blower Motor HP		1/3	1/2	3/4	3/4	1-1/2	2	3	5	5	7-1/2	10	15	20	30	

Metric Units

Burner Size		50	100	150	200	300	400	500	600	750	1000	1250	1500	2000	2500	
Maximum Input, kW	Chamber Pressure mbar	-12.5	205	410	616	850	1076	1369	1612	2052	2726	3664	4279	5188	6800	8090
		-7.5	191	366	557	733	1002	1345	1612	1934	2521	3400	4045	4895	6448	7800
		-2.5	161	322	484	645	924	1231	1521	1817	2315	3107	3781	4572	6067	7474
		0.0	147	293	440	586	879	1172	1466	1759	2198	2931	3664	4397	5862	7328
		+2.5	132	264	396	528	835	1112	1407	1685	2081	2755	3517	4221	5657	7152
		+5.0	117	234	352	469	786	1049	1348	1612	1964	2579	3371	4015	5452	6990
Minimum Input, kW ¹		11.7	7.3	8.8	8.8	19.1	16.1	19.1	19.1	22.0	29.3	36.6	44.0	58.6	73.3	
Turndown		12:1	40:1	50:1	67:1	46:1	73:1	77:1	92:1	100:1	100:1	100:1	100:1	100:1	100:1	
High Fire Gas ΔP, ² mbar	Chamber Pressure mbar	-12.5	11.2	13.7	12.2	15.2	18.2	18.7	11.2	18.4	20.2	24.4	29.9	22.7	21.7	30.6
		-7.5	9.7	11.0	10.0	11.2	15.9	17.9	11.2	16.2	17.4	21.2	26.7	20.2	19.7	28.4
		-2.5	7.0	8.5	7.5	8.7	13.5	15.2	10.0	14.4	14.7	17.2	23.4	17.4	17.4	26.2
		0.0	5.7	7.0	6.2	7.2	12.2	13.7	9.2	13.5	13.2	15.7	21.9	16.2	16.2	25.2
		+2.5	4.7	5.7	5.0	5.7	11.0	12.5	8.5	12.5	11.7	14.0	20.2	14.9	15.2	23.9
		+5.0	3.7	4.5	4.0	4.7	9.7	11.0	7.7	11.2	10.5	12.2	18.4	13.5	14.0	22.9
Gas Inlet Press. ³	Minimum mbar	17	20	27	40	30	42	35	50	30	35	50	55	75	95	
	Maximum mbar ⁴	69	69	69	69	138	138	138	138	138	138	138	138	138	138	
Min. Pilot Gas Press., mbar ⁵		15	15	15	15	15	15	15	15	15	15	15	15	15	15	
High Fire Flame Length, m ⁶		0.61	0.76	0.81	0.91	1.37	1.37	1.52	1.68	2.44	3.15	3.66	3.66	3.81	4.32	
Blower Motor HP		1/3	1/2	3/4	3/4	1-1/2	2	3	5	5	7-1/2	10	15	20	30	

¹ With neutral chamber. Will be slightly higher with negative chamber pressure.

² Measured between tap "B" and the combustion chamber as shown on page 11.

³ At the inlet to the proportionator.

⁴ Under certain conditions, up to 5 psig (345 mbars) is allowable on RM 300 and larger burners; contact the factory for details.

⁵ At the inlet to the pilot cock.

⁶ High fire flame length measured from the end of the firing tube, firing parallel to air flow with neutral chamber pressure. When firing perpendicular to air flow, flame length will be shorter. Contact your local Eclipse representative for details.

2.0 Burner Operation and Controls



WARNING

Failure to use suitable flame sensing devices and automatic fuel shut-off valves can cause explosions and fires. The owner/user and/or his insurance underwriter is responsible for providing, using, and maintaining suitable limit controls, flame supervision, and other safety devices for this burner, and for properly interfacing all electrical equipment and sequencing burner operation.

Turndown Method

Ratiomatic burners are designed to operate with either two-position or modulating temperature control systems. Gas-air ratio control is performed by a ratio regulator as shown in Figure 2.

Control Motor Requirements

Stroke: 90°. For applications with unusually high backpressures or drafts, motor travel may need to be restricted to less than 90°. Eclipse recommends adjustable stroke motors or motors with travel-limiting auxiliary switches for these jobs.

Timing: 15 seconds minimum.

Mounting: Can be mounted on either side of the burner. However, if an air inlet filter is used, the control motor must be mounted on the side opposite the filter.

Piloting

A spark ignited pilot is an integral part of each burner. An adjustment cock is included for pilot adjustment.

The customer must provide a pilot gas valve train that includes a pilot gas regulator and a solenoid valve.

If combustion chamber pressure is likely to be more than ± 1 "w.c. (2.5 mbars) or if it is expected to fluctuate during operation, cross-connect the pilot regulator vent to the chamber.

Flame Monitoring

50 thru 600 sizes: A flame rod is included with the burner; UV scanners and mounting kits are available as options.

750 thru 2500 sizes: UV scanner only; must be ordered separately.

Main Gas Valve Train

Gas should be supplied to the burner inlet through a valve train which complies with NFPA Standards and all applicable local codes.

When multiple burners are fed from the same valve train, a check valve must be installed in the gas line as close as possible to the proportionator inlet to prevent uneven flows at low fire. Main regulator pressure may need to be increased to compensate for the check valve pressure drop.

CAUTION: Customer supplied main gas regulators for inlet pressures greater than 1 psig (70 mbars) for 50-200 Ratiomatics or 5 psig (350 mbars) for 300-2500 Ratiomatics must be capable of tight shut-off to prevent leakage and subsequent proportionator damage.

Limit Controls

Limit controls and safety equipment should comply with current NFPA Standard 86 and all applicable local codes and/or standards. NFPA Standards are available from:

National Fire Protection Association

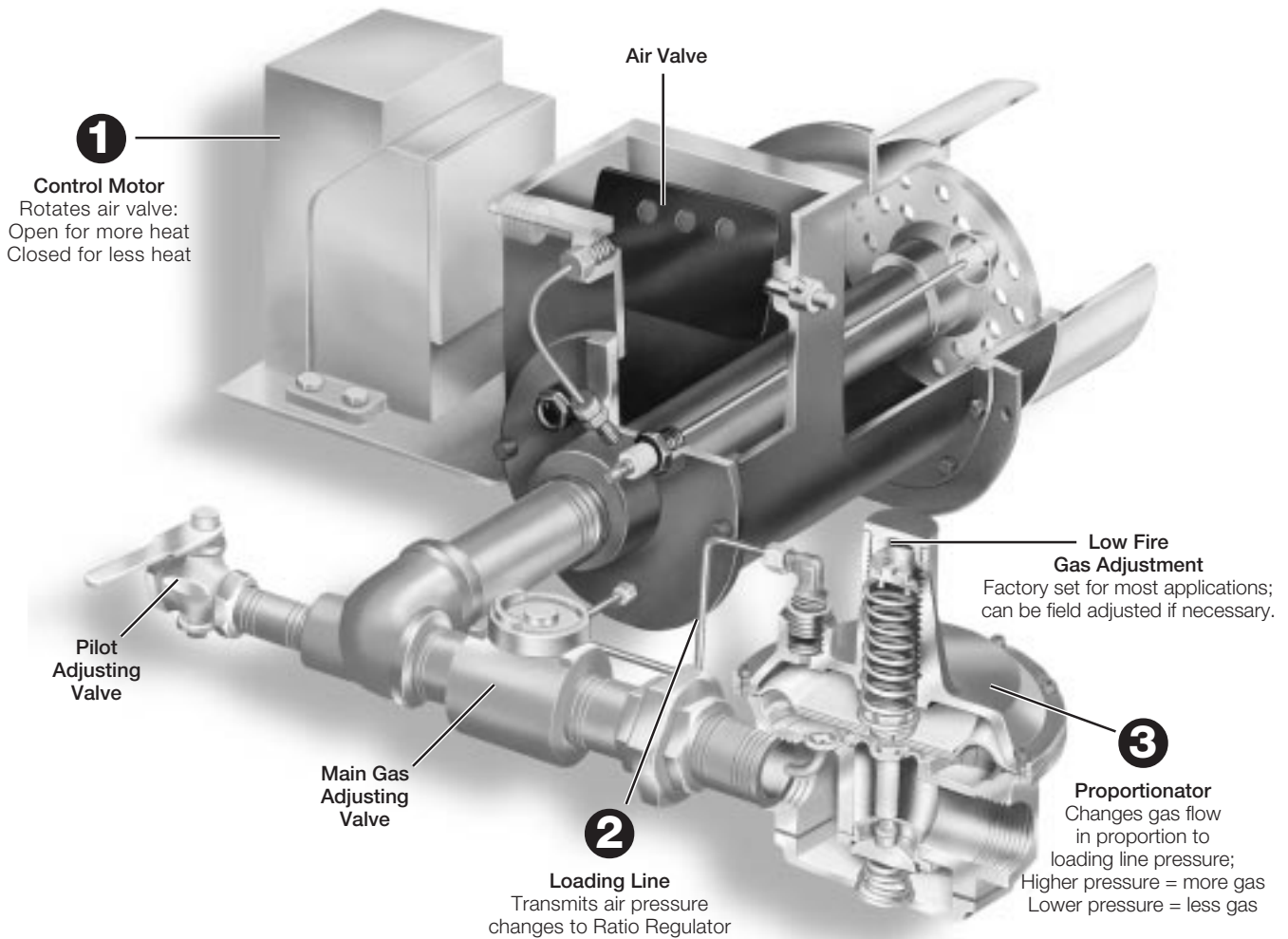
Batterymarch Park

Quincy, Massachusetts 02269

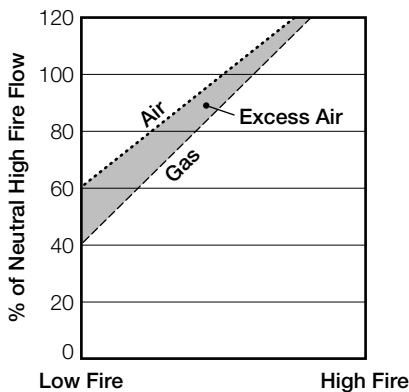
Blower Shut-Off

During shutdown, the blower must not be turned off until the chamber temperature has dropped below 250° F (121° C). This is to prevent hot gases from flowing back through the burner and blower and damaging them.

Figure 2-Ratiomatic Operation



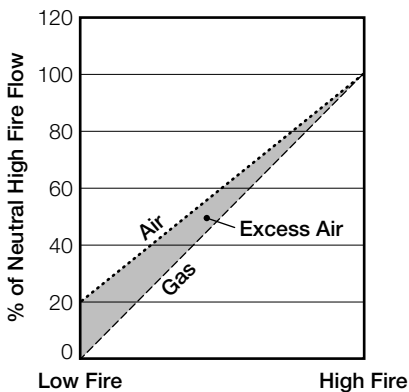
Set-Up & Operation Against a Draft (Negative Chamber Pressure)



- Air Valve Settings:**
- Factory Set—fully open at high fire, fully closed at low fire.
- Results:**
- High fire is increased.
 - Low fire is increased.
 - Turndown ratio is unaffected.
 - To reduce high fire, use an end limit switch to reduce motor travel.

← **OR**

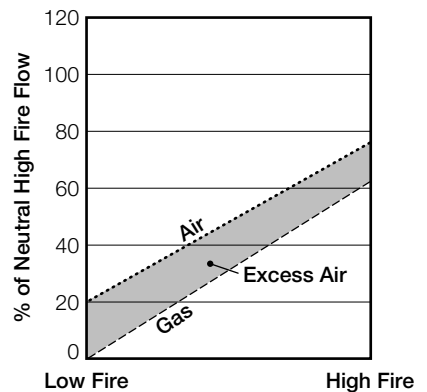
Set-Up & Operation Against a Draft (Neutral Chamber Pressure)



- Air Valve Settings:**
- Factory Set—fully open at high fire, fully closed at low fire.
- Results:**
- Normal high fire.
 - Normal low fire.
 - Normal turndown.

OR →

Set-Up & Operation Against Back Pressure (Positive Chamber Pressure)



- Air Valve Settings:**
- Factory Set—fully open at high fire, fully closed at low fire.
- Results:**
- High fire is increased.
 - Low fire is normal.
 - Turndown ratio is decreased.
 - To limit air valve overtravel at high fire, use an end limit switch to reduce motor travel.

3.0 Installation

Burner Mounting	<p>See Figure 3 for installing a Ratiomatic with an alloy firing tube.</p> <p>The flange will support only the weight of the burner assembly. Support burner supply piping independently of the burner.</p> <p>Reinforce the oven wall as required to support the burner's weight.</p> <p>Gas flow through the proportionator must be horizontal with the stem pointing up.</p>
Blower Wiring	<p>Be sure the motor is wired to rotate in the proper direction.</p>
Control Motors	<p>Factory mounted when ordered with the burner. Motors and mounting kits ordered separately include installation drawings.</p>
Combustion Air Filters	<p>Factory mounted when ordered with the burner. Filters ordered separately include installation drawings. See Figure 6 for filter element replacement.</p>
Low/High Fire Limit Switches	<p>Factory mounted when ordered with the burner. Switches ordered separately include installation drawings.</p>
Air Flow Switch	<p>Shipped loose for remote mounting. Connect with tubing to Tap "D," Figure 4.</p>
Main Gas Valve Trains	<p>Valve trains ordered from Eclipse are shipped loose for installation at the job site. They must be mounted with horizontal flow and the actuators of the automatic fuel shut-off valves pointing up.</p> <p>Locate the main gas valve train as close as possible to the burner and connect it with a straight run of pipe of the same pipe size as the valve train. If a reducing nipple is necessary, install it at the inlet to the burner proportionator. Do not use a reducing bushing in the proportionator inlet.</p> <p>Be certain that piping losses between the valve train and burner are low enough to provide the required gas supply pressures listed in Figure 1.</p>
Pilot Valve Trains	<p>The pilot gas valve train should be connected as close as possible to the pilot adjusting cock.</p>
Flame Rod and U.V. Scanner	<p>See Figure 4. When mounting a UV scanner, use short pipe nipples to insure the best possible field of view. A cooling air supply is not normally required.</p>
Spark Plug	<p>Figure 4 shows the spark plug port. Do not use pipe dope on spark plug threads.</p>
General Piping Suggestions	<p>Install all valves so that the arrow on the side of the valve body points in the direction of flow. Install removable gas cock handles so that when the valve is in the "off" position, the handle is 90° or at a right angle to the line of flow through the valve.</p> <p>Gas piping must comply with American National Standard "National Fuel Gas Code"* (NFPA No. 54 or ANSI Z223.1), or must be acceptable to the authority having jurisdiction.</p>
General Wiring Suggestions	<p>Electrical wiring must comply with the National Electric Code*, (NFPA Std. 70 or ANSI-CI 1981), or must be acceptable to the authority having jurisdiction.</p>

*Available from:

National Fire Protection Association
Batterymarch Park
Quincy, Massachusetts 02269

American National Standard Institute
1430 Broadway
New York, New York 10018

Figure 3–Burner Mounting for Ratiomatics with Alloy Firing Tube

For installation of Ratiomatics with blocks and holders, refer to Eclipse Installation 295.

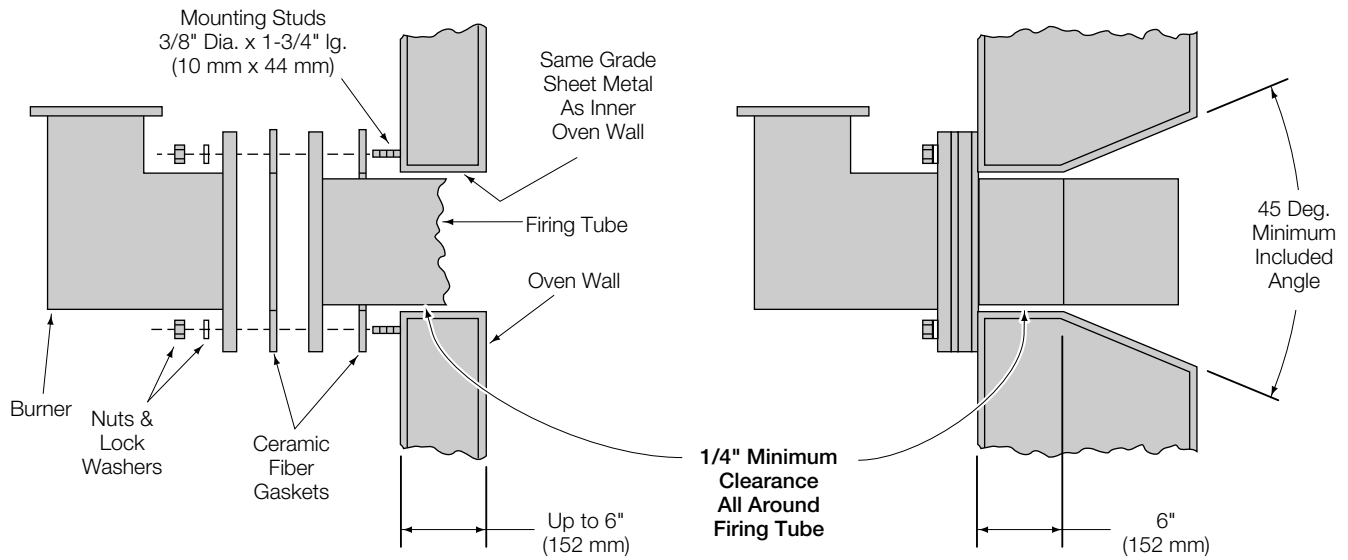


Figure 4–Flame Monitoring, Spark Plug & Air Flow Switch Locations

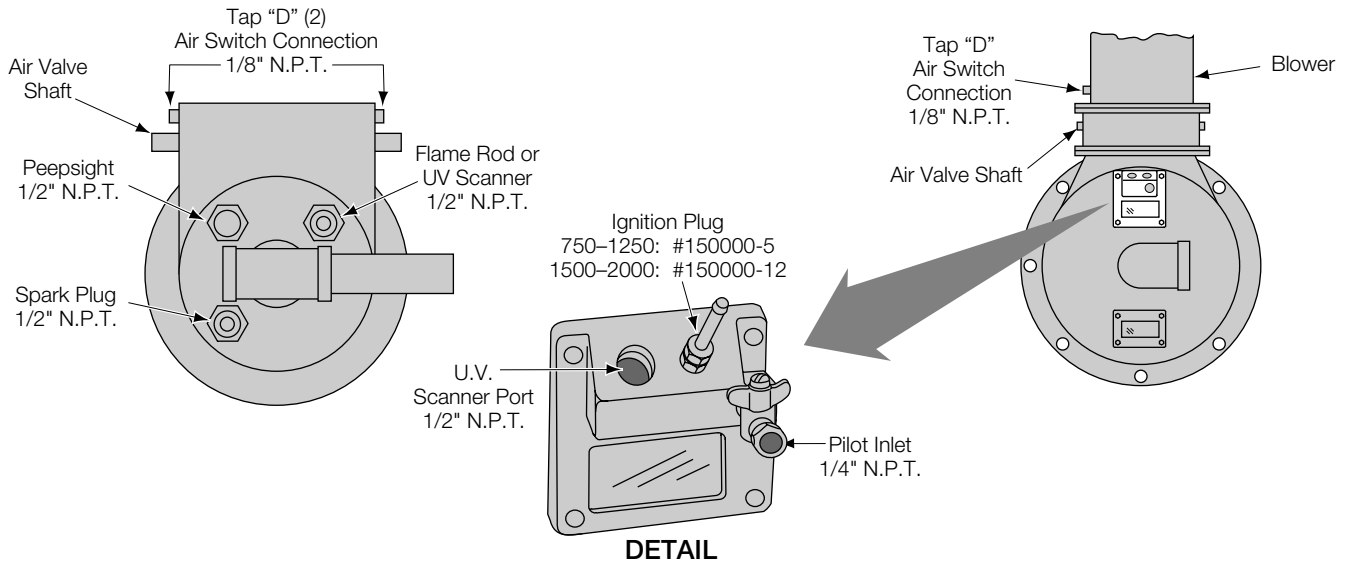
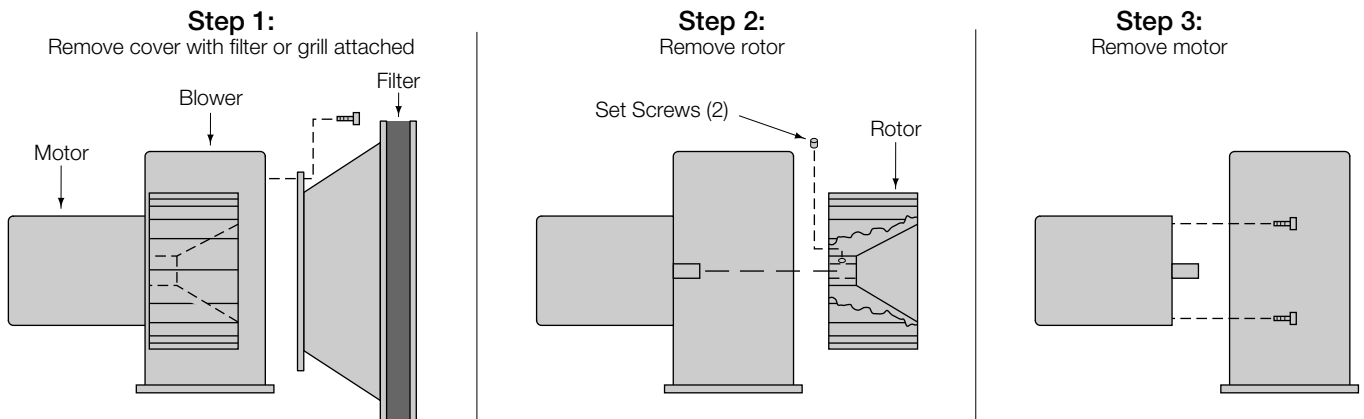


Figure 5–Blower Motor Replacement



4.0 Start-Up And Adjustment

Step 1: Initial Settings

NOTE: Use the following set-up procedure when factory settings have been disturbed, or when chamber pressures are outside the range of +1" to -1" w.c. (+2.5 to -2.5 mbars).

Factory Settings

The following parameters are set at the factory: 1) Pilot input, 2) Low and high fire air flow, and 3) Low fire gas flow. Because of this, the burners should ignite and burn reasonably well at low fire, but the high fire gas setting will need to be adjusted as described below under Step 4.

Control Panel Settings

Pilot Adjustment: Some provision should be made to operate only the pilot during pilot adjustment. See the literature included with the flame monitoring relay and/or control panel for information on operation with pilot only. Eclipse flame monitoring relays have a front panel pilot test button that will hold the start-up sequence on pilot during pilot adjustment.

High/Low Fire Control: During burner adjustment, you will need to drive the control motor to high and low fire several times. You may do this with the process temperature control, setting it to a higher temperature for high fire or a lower temperature for low fire; or your equipment may be fitted with a manual override attached to the control motor. Before attempting to adjust the burner, determine how you will control the motor position and become familiar with the method.

Regulator Settings

The main and pilot gas regulators must be adjusted to supply the minimum gas pressures listed in Figure 1.



WARNING

Do not operate Ratiomatic burners with less gas inlet pressure than the minimum listed in Figure 1.

Lower gas inlet pressures may cause the proportionator to remain fully open as the burner turns down from high fire, causing excess fuel operation and the possible accumulation of unburned fuel in the chamber. In extreme cases, this may cause explosions or fires.

Gas Valves

Close all manual and automatic gas valves, including the main gas butterfly and the pilot gas cock.

Combustion Air Blower

Start the blower and check the impeller for correct rotation. If it's running backwards, have a qualified electrician change the motor wiring.

Duct or Circulating Fan

If the burner is to fire into a duct or chamber with a circulating fan, start the fan to produce full process air flow past the burner.

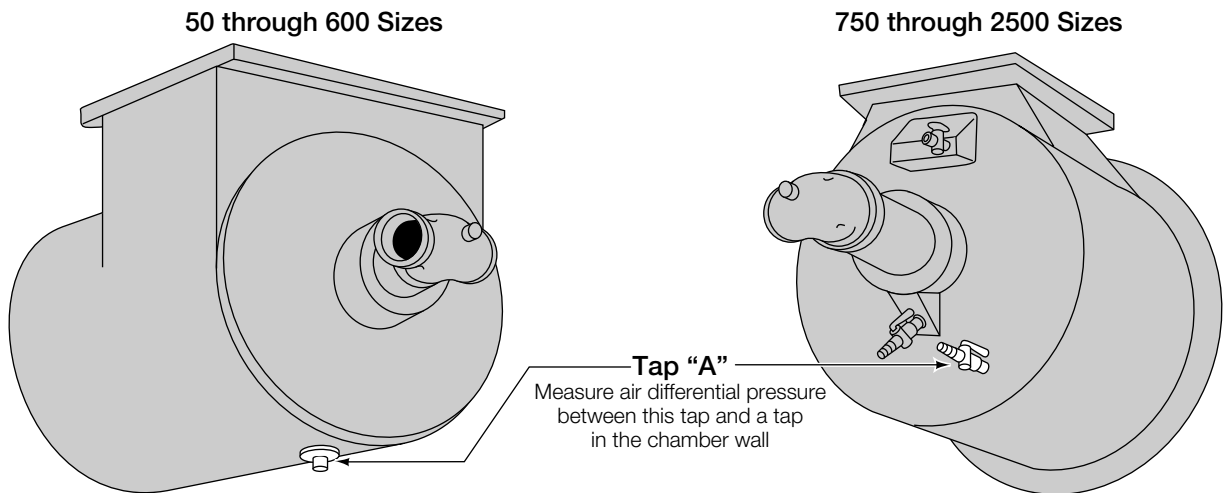
4.0 Start-Up And Adjustment *(continued)*

Step 2: Adjust Low Fire Air Setting

Measure differential air pressure as shown below.

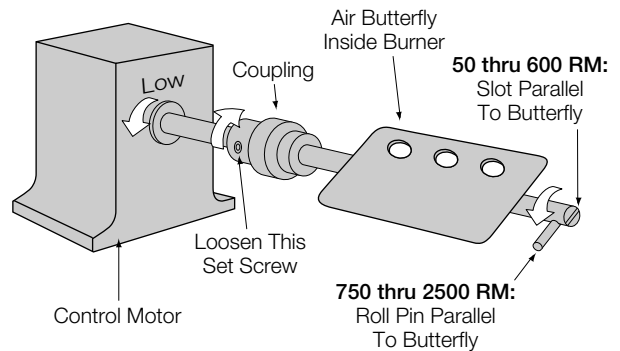
Low Fire Air Differential Pressure Must be a minimum of 0.2" w.c. (0.5 mbar), which is obtained with the air butterfly valve in the fully closed position under neutral conditions.

Cycle the control motor several times, checking high and low fire differential pressures. If they don't repeat, check for a loose valve shaft coupling or binding of the motor or valve.



Low Fire Air Adjustment

1. Drive the control motor to fully closed or 1" w.c. (2.5 mbars).
50-600 Sizes: The slot on the end of the shaft is parallel to the plane of the butterfly.
750-2500 Sizes: A roll pin embedded in the shaft is parallel to the plane of the butterfly.
2. Loosen the setscrew on the motor side of the flexible coupling.
3. Measure air differential pressure as shown above. Differential pressure will be approximately 0.2" w.c. (0.5 mbar) with neutral chamber pressure. Differential pressure will vary with changes in chamber pressure, but should never be less than 0.1" w.c. (0.25 mbar).
4. Hold the shaft firmly in place and tighten the setscrew. To avoid backlash in two-piece couplings, put slight pressure on the motor side of the coupling in the direction shown by the arrow before tightening the setscrew.



Note: Arrows apply to motors which rotate counterclockwise to low fire. Reverse all arrows for clockwise motors.

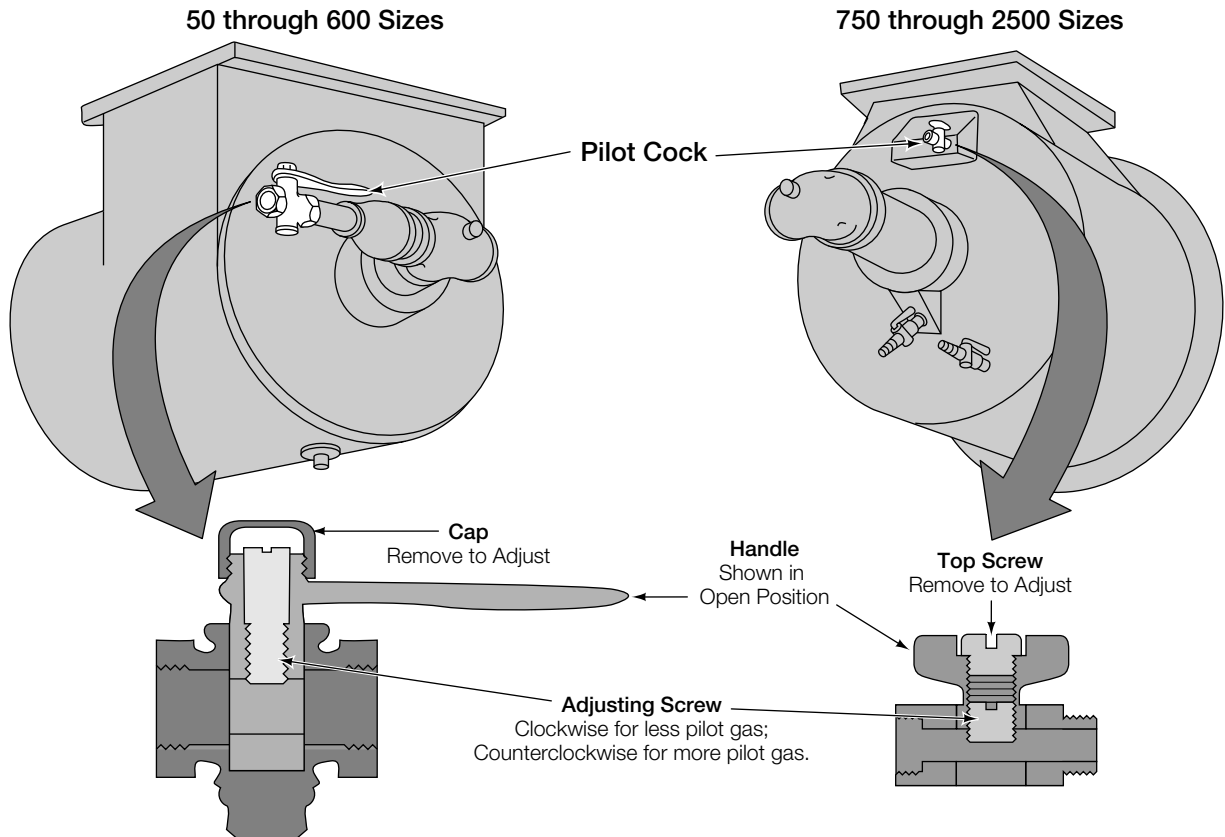
4.0 Start-Up And Adjustment *(continued)*

Step 3: Adjust Pilot

Drive the control motor to low fire and set the system to operate on pilot only.

Turn the handle of the pilot adjusting cock open to light the pilot.

Turn the internal screw shown below counterclockwise to increase flow, clockwise to decrease flow, until the pilot gives reliable ignition and a steady flame signal with minimum pilot gas flow.



4.0 Start-Up And Adjustment *(continued)*

Step 4: Set High Fire Gas

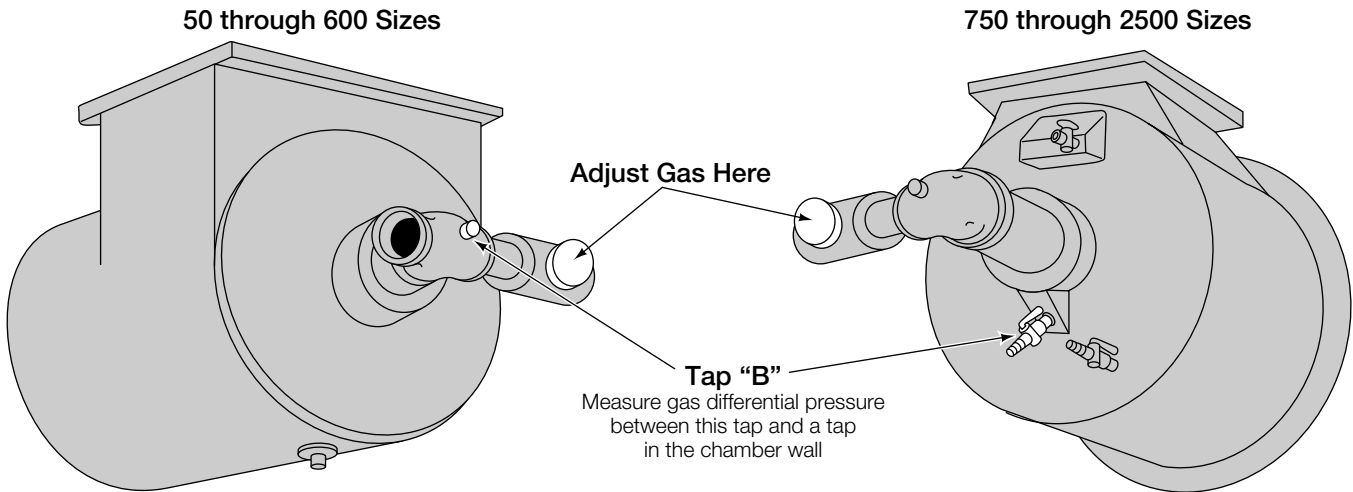
With the pilot lit and the control motor in the low fire position, open the main gas shut-off valve. The main flame should light.

Drive the control motor to its high fire position.

Measure the gas differential pressure as shown below.

High Fire Gas Differential Pressure See Figure 1.

If necessary, adjust the gas flow with the butterfly valve. The flame should be clear blue as shown on the cover of this manual. If the flame is yellow, see Section 5.0, "Troubleshooting."



4.0 Start-Up And Adjustment *(continued)*

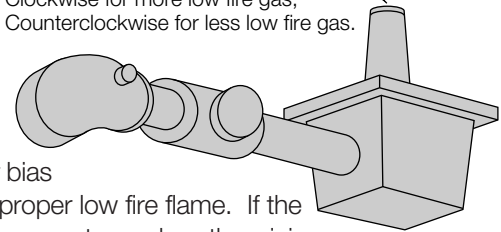
Step 5: Adjust Low Fire Flame

Return the control motor to the low fire position.

Check the combustion air differential pressure as discussed in Step 2.

Gas pressure drop across the burner will be too low to read reliably, but the flame should be clear blue as shown on the cover of this manual, entirely within the firing tube, and tight on the burner head.

Remove Cover & Turn Screw
 Clockwise for more low fire gas,
 Counterclockwise for less low fire gas.



If necessary, adjust the ratio regulator bias screw as shown below to obtain the proper low fire flame. If the flame cannot be viewed, adjust the bias screw to produce the minimum gas flow that will generate a steady flame detector signal of sufficient strength.

After adjusting low fire flame, return to high fire and check gas differential pressure as described in Step 4.

Step 6: Check Settings & Shut Down

Cycle the burner from high to low several times to check repeatability of settings.

To make it easier to set up and troubleshoot the burner in the future, record your setup data below.

Do not turn the blower off until the chamber temperature is below 250° F (121°C). This will prevent hot gases from flowing back through the burner and blower and damaging them.

Burner Model _____

	Low Fire	High Fire
Combustion Air Pressure Drop between Tap "A" & Chamber, "w.c.		
Gas Pressure Drop between Tap "B" & Chamber, "w.c.		
Gas Pressure into Proportionator, "w.c.		
Gas Pressure into Pilot Gas Cock, "w.c.		
Flame Signal		

5.0 Trouble-shooting



CAUTION

Trouble-shooting of panels and electrical circuits should be done by qualified plant electricians, technicians, or engineers experienced in all facets of this type of combustion equipment.

PROBLEM	CAUSE(S)
<p>Pilot fails to light.</p>	<ol style="list-style-type: none"> 1. On initial start-up, gas line may be filled with air. Repeat ignition trial several times to purge. 2. No power to ignition transformer or pilot solenoid. 3. Open circuit between ignition transformer and spark plug. 4. Spark plug needs cleaning. 5. Spark plug center electrode grounded against burner. 6. Spark plug improperly grounded. Do not use pipe dope on ignition plug threads. 7. Pilot gas cock screw closed. 8. Insufficient gas pressure into or out of pilot regulator.
<p>Main flame fails to light or goes out as burner cycles to high fire.</p>	<ol style="list-style-type: none"> 1. Pilot set too lean, becoming unstable as air increases. 2. Insufficient pressure into or out of main gas regulator. 3. Main gas adjusting valve not open enough. 4. Marginal air pressure switch setting. 5. Suction or backpressure in chamber fluctuates, upsetting pilot stability. Cross-connect pilot regulator vent to the combustion chamber, but not via the burner air pressure tap.
<p>Low fire flame is weak or unstable.</p>	<ol style="list-style-type: none"> 1. Gas flow is insufficient. Open pilot gas cock adjusting screw or increase pressure out of pilot gas regulator.
<p>Burner behaves erratically, does not respond to adjustment.</p>	<ol style="list-style-type: none"> 1. Burner internals loose, dirty or burned out. If any of these problems exist, contact your Eclipse representative or the Eclipse factory for service.
<p>Main flame too long & yellow at high fire.</p>	<ol style="list-style-type: none"> 1. Gas flow is too high. Gas butterfly valve is open too far, or main gas regulator spring is screwed in too far.
<p>Main flame too short at high fire.</p>	<ol style="list-style-type: none"> 1. Gas flow is too low. Gas butterfly valve is closed too far, or main gas regulator spring is screwed out too far.
<p>Low fire (pilot) flame is long, soft or yellow.</p>	<ol style="list-style-type: none"> 1. Too much gas flow. Main gas proportionator spring is set for too much flow, or pilot gas cock adjustment is open too far. 2. Insufficient air flow due to dirty blower filter or impeller.

6.0 Maintenance

Maintenance Program

A sound preventative maintenance program, carried out by qualified individuals, will greatly increase equipment reliability and productivity. Frequency of maintenance checks should reflect the duty cycle of the heating equipment and conditions such as dirt and temperature. Any maintenance program should include at least the following steps:

Check Pressure Settings

Check burner high and low fire air and gas settings.

Check Filters

Examine and, if necessary, clean or replace air and gas filter elements.

Check Pipes for Leaks

Check all piping connections for leaks.

Check Flame Supervision Equipment

Check the ability of the flame supervision system to function properly by simulating system failures:

Simulate burner flame-out by manually shutting off the gas.

Trip out pressure switches and other limit interlocks.

Try to light the burner before the purge and other timers have finished their cycles.

If simulated limit or flame failures do not shut down the fuel system within an acceptably short period of time, immediately take the equipment out of service and correct the problem.

Leak test automatic and manual reset fuel valves per insurance company procedures.

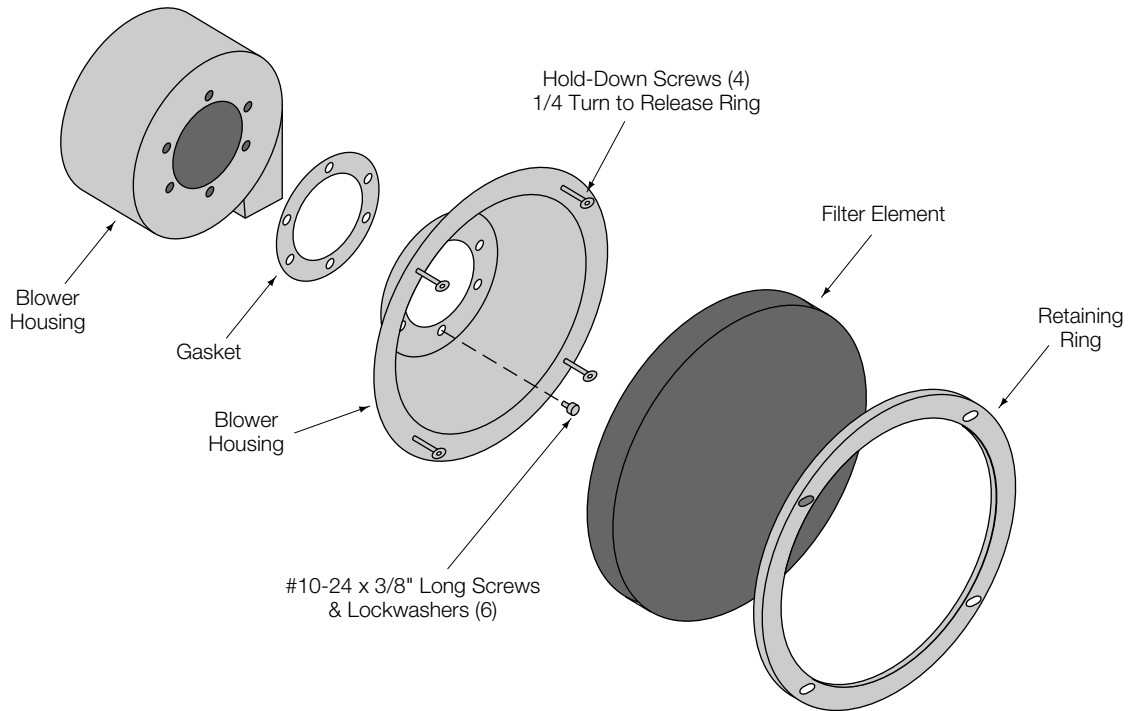
Check Bolts & Screws

Check all bolts and screws for tightness.

Check for Overheating

Check the area around the burner mounting flange for signs of overheating. Gasket or insulation replacement may be necessary.

Figure 6–Filter Element Replacement



7.0 Servicing

Blower Motor Replacement

See Figure 5 for blower motor replacement. Replacement motors must have the same nameplate ratings as the original motor.

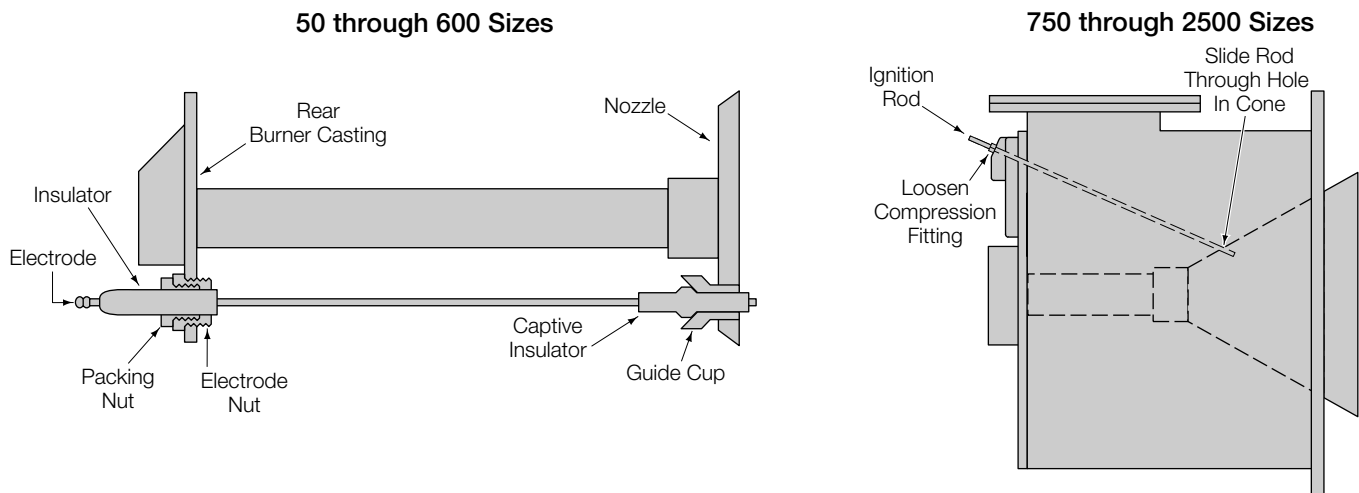
Filter Element Replacement

See Figure 6 for filter element replacement.

Spark Plug & Flame Rod Replacement

Ignition plugs and flame rods wear out over long periods of normal burner operation. For Ratiomatic burners, the part number used as the ignition plug is the same as that used for the flame rod. Eclipse recommends that the user keep at least one of these in stock at all times to prevent nuisance shutdowns. See Figure 7 for plug and rod replacement.

Figure 7–Ignition Plug & Flame Rod Replacement



The ignition plug and flame rod for sizes 50 through 600 are identical parts:

- **Sizes 50 thru 200:**
 - #13581 for burners fitted with alloy tubes
 - #13837 for burners fitted with refractory blocks
- **Sizes 300 thru 600:**
 - #13581 for burners with tube or block

To remove them:

1. Unscrew the electrode nut and draw the electrode with insulators out of the burner housing.

To replace them:

1. Loosen the packing nut.
2. Insert the electrode with insulators through the threaded connection on the back of the housing and slide the captive insulator into the guide cup in the burner head until the insulator bottoms out.
3. Tighten the electrode nut into the burner housing.
4. Tighten the packing nut.

The ignition rod for sizes over 600 are as follows:

Ignition rod:

- #150000-5 for 750 through 1250 sizes
- #150000-12 for 1500 through 2500 sizes

To remove it:

1. Loosen the compression fitting and draw the electrode out of the burner housing.

To replace it:

1. Insert the electrode through the fitting and through the hole in the nozzle cone.
2. Be sure the rod extends through the nozzle so that the spark occurs in front of, or to the oven side of the nozzle. If the spark occurs behind the nozzle, the pilot gas may not ignite and may accumulate to dangerous levels after several unsuccessful trials for ignition.
3. Tighten the compression fitting. Do not over-tighten, or you may crack the ceramic insulator and ruin the ignition rod.