Eclipse ThermJet Burners for Preheated Combustion Air

Models TJPCA0015 – TJPCA2000

Version 2
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About this manual

AUDIENCE

This manual has been written for people who are already familiar with all aspects of a nozzle-mix burner and its add-on components, also referred to as “the burner system.” These aspects are:

- Installation
- Use
- Maintenance

The audience is expected to have had previous experience with this kind of equipment.

THERMJet DOCUMENTS

Installation Guide No. 206
- This document

Data Sheet No. 206-1 through 206-13
- Available for individual TJPCA models
- Required to complete installation

Design Guide No. 206
- Used with Data Sheets to design the burner system

Price List No. 205
- Used to order burners

RELATED DOCUMENTS

- EFE 825 (Combustion Engineering Guide)
- Eclipse bulletins and Info Guides:
  610, 710, 720, 730, 742, 744, 760, 930, I-354.

Purpose

The purpose of this manual is to make sure that you carry out the installation of a safe, effective and trouble-free combustion system.
There are several special symbols in this document. You must know their meaning and importance.

The explanation of these symbols follows below. Please read it thoroughly.

**Danger:**
Indicates hazards or unsafe practices which WILL result in severe personal injury or even death.

Only qualified and well trained personnel are allowed to carry out these instructions or procedures.

Act with great care and follow the instructions.

**Warning:**
Indicates hazards or unsafe practices which could result in severe personal injury or damage.

Act with great care and follow the instructions.

**Caution:**
Indicates hazards or unsafe practices which could result in damage to the machine or minor personal injury, act carefully.

**Note:** Indicates an important part of the text. Read thoroughly.

If you need help, contact your local Eclipse representative.
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The ThermJet PCA (preheated combustion air) is a nozzle-mix burner designed to fire an intense stream of hot gases through a combustor using preheated combustion air temperatures up to 1000° F. (Models TJPCA0500 through TJPCA1000 are rated for use with preheated combustion air temperatures up to 700° F.)

The high velocity of the gases improves temperature uniformity, product quality and system efficiency. ThermJet PCA burners use medium velocity TJ combustors providing velocities from 250 ft/s to 750 ft/s depending on the temperature of the preheated combustion air.

**Figure 1.1: The ThermJet PCA Burner**
In this section you will find important notices about safe operation of a burner system. Read this entire manual before you attempt to start the system. If you do not understand any part of the information in this manual, then contact your local Eclipse representative or Eclipse before you continue.

Danger:

The burners covered in this manual are designed to mix fuel with air and burn the resulting mixture. All fuel burning devices are capable of producing fires and explosions when improperly applied, installed, adjusted, controlled or maintained.

Do not bypass any safety feature. You can cause fires and explosions.

Never try to light the burner if the burner shows signs of damage or malfunctioning.

Warning:

The burner is likely to have HOT surfaces. Always wear protective clothing when approaching the burner.

Note:

This manual gives information for the use of these burners for their specific design purpose. Do not deviate from any instructions or application limits in this manual without written advice from Eclipse.
**SAFETY (CONTINUED)**

**Warning:**
Eclipse products are designed to minimize the use of materials that contain crystalline silica. Examples of these chemicals are: respirable crystalline silica from bricks, cement or other masonry products and respirable refractory ceramic fibers from insulating blankets, boards, or gaskets. Despite these efforts, dust created by sanding, sawing, grinding, cutting, and other construction activities could release crystalline silica. Crystalline silica is known to cause cancer, and health risks from the exposure to these chemicals vary depending on the frequency and length of exposure to these chemicals. To reduce this risk, limit exposure to these chemicals, work in a well-ventilated area and wear approved personal protective safety equipment for these chemicals.

**Capabilities**

Adjustment, maintenance and troubleshooting of the mechanical and the electrical parts of this system should be done by qualified personnel with good mechanical aptitude and experience with combustion equipment.

**Operator Training**

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.

**Replacement Parts**

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

In this section you will find the information and instructions needed to install the burner and system components.

Handling
1. Make sure the area is clean.
2. Protect the components from weather, damage, dirt and moisture.
3. Protect the components from excessive temperatures and humidity.

Storage
1. Make sure the components are clean and free of damage.
2. Store the components in a cool, clean, dry room.
3. After making sure everything is present and in good condition, keep the components in original packages as long as possible.

Position of Components
The position and amount of components are determined by the kind of control method chosen. All the control methods can be found in Design Guide 206, Chapter 3 “System Design.” Use the schematics in that chapter to build your system.

Approval of Components
Limit controls and safety equipment
All limit controls and safety equipment must comply with the current following standards:
- NFPA Standard 86
- NFPA Standard 86C
- UL
- FM
- CGA
- EN 746-2
- All applicable local codes and/or standards
**Approval of Components (Continued)**

**Electrical wiring**
All the electrical wiring must comply with one of these standards:
- NFPA Standard 70
- ANSI-CI1981
- EN 746-2
The electrical wiring must also be acceptable to the local authority having jurisdiction.

**Gas Piping**
All the gas piping must comply with one of these standards:
- NFPA Standard 54
- ANSI Z223
- EN 746-2
The gas piping must also be acceptable to the local authority with jurisdiction.

**Where To Get the Standards**
The NFPA Standards are available from:
National Fire Protection Agency
Batterymarch Park
Quincy, MA 02269

The ANSI Standards are available from:
American National Standard Institute
1430 Broadway
New York, NY 10018

The UL Standards are available from:
333 Pfingsten Road
Northbrook, IL 60062

The FM Standards are available from:
1 151 Boston-Providence Turnpike
PO. Box 9102
Norwood, MA 02062

The CGA Standards are available from:
55 Scarsdale Road
Toronto, Ontario
Canada M3B 2R3

Information on the EN standards and where to get them is available from:
Comité Européen de Normalisation
Stassartstraat 36
B-1050 Brussels
Phone: +32-25196811
Fax: +32-25196819

Comité Européen de Normalisation Electronique
Stassartstraat 36
B-1050 Brussels
Phone: +32-25196871
Fax: +32-25196919
**CHECKLIST BEFORE INSTALLATION**

**Intake**
To admit fresh combustion air from outdoors, provide an opening in the room of at least one square inch per 4000 Btu/hr. If there are corrosive fumes or materials in the air, then supply the burner with clean air from an uncontaminated area.

**Exhaust**
Do not allow exhaust gases to accumulate in the work area. Provide some positive means for exhausting them from the furnace and the building.

**Access**
Make sure that you install the burner in such a way that you can get easy access for inspection and maintenance.

**Environment**
Make sure that the local environment matches the original operating specifications. Check the following items:
- Voltage, frequency and stability of the electrical power
- Type and supply pressure of the fuel
- Availability of enough fresh, clean combustion air
- Humidity, altitude and temperature of air
- Presence of damaging corrosive gases in the air
Several components must be installed to a burner before it can operate. Installation instructions follow:

It is possible to change the relative position of the gas inlet with respect to the air inlet. This can be convenient for the routing of the piping.

**Rotate the rear cover (optional)**

To rotate the rear cover, do the following:

1. Disconnect the piping at a union in the piping or the inlet flanges provided on the burner.

   **Note:**
   - Be careful not to lose or damage the orifice plate or the O-rings.

2. Remove the four bolts.
3. Remove the rear cover from the burner housing.
4. Rotate the rear cover to the position that you want.
5. Put the rear cover in position against the burner housing.
6. Install the four bolts.
7. Reconnect the piping. Make sure that the O-rings show no signs of damage.
Installing the Flame Sensor
1. Install the flame sensor into the 1/2” NPT opening in the rear cover.
2. Make sure that you connect the flame sensor of a burner to the electrical circuit of that burner.

Danger:
If you connect the flame sensor of a burner to the electrical circuit of the wrong burner, then you can cause fires and explosions.

U.V. Scanner
All ThermJet PCA burners operate with UV Scanners only. A U.V. scanner can be used with all combustor types. You can find U.V. scanner information in:
- Info Guide 852; 90° U.V. scanner
- Info Guide 854; straight U.V. scanner
- Instruction Manual 855; Solid State UV/IR scanner

Note:
Ambient temperature limits for the scanners are likely to be exceeded. An insulated coupling, heat block seal or scanner cooler may be required. See Bulletins 832 and 834.

Installing the Spark Plug
Install the spark plug into the opening in the rear cover.

Note:
Do not apply any grease to the threads of the spark plug. You can cause bad grounding of the spark plug if you apply grease to it. Bad grounding of the spark plug results in a weak spark.
Burner Installation

Dimensions
The burner attaches to the wall of the chamber with bolts through holes “C”. For full information on the dimensions, refer to specific data sheets.

Figure 3.1: Burner attachment

Chamber wall
Make sure that the wall of the chamber is strong enough to carry the weight of the burner. If necessary, reinforce the area where you plan to install the burner to support the weight of the burner.

Avoid losses
To make sure that heat does not go back to the casing of the chamber, it is important that the radial clearance around the firing tube is filled with ceramic fiber.

Figure 3.2: Firing Tubes and Combustion Blocks – Installation

1. Make sure the gasket is installed between the burner and the chamber wall.
2. Make sure that gasket does not leak.
3. Check the size of the clearance. If the gap around the firing tube is larger than 1/2”, then pack the gap with ceramic fiber, as stated above.

Alloy

1. Make sure the gasket is installed between the burner flange and chamber wall.
2. Make sure that gasket is installed between SiC tube and flange.
3. Make sure neither gasket nor leaks.
4. Check the size of the clearance. If the gap around the firing tube is larger than 1/2”, then pack the gap with ceramic fiber, as stated above.

Silicon Carbide
Refractory Block
1. Be sure the gasket 1 is installed between the burner 4 and the block holder 7.
2. Be sure the gasket 6 is installed between the block holder 7 and the chamber wall 2.
3. Support the weight of the refractory block 9 with hard brick work 10. Fill space around the block 9 with soft gasket material 11.

Vertical Down Firing Blocks
1. Down firing blocks may be suspended by customer-supplied hangers 2 attached to the burner body mounting bolts.
2. Hangers should be attached to structural support 1.

Layout
Install the piping as shown in the schematics. Refer to Chapter 3 of the ThermJet Design Guide No. 205.

Support the piping
Use brackets or hangers to support the gas piping. If you have questions, consult your local gas company.

Straight run of pipe before a metering orifice

Note:
There must be a run of pipe with a straight length of at least 10 pipe diameters before the burner metering orifice. If you do not do this, the pressure readings will be inaccurate.

Pipe connections
1. Install a pipe union in the gas line to the burner. This simplifies removal of the burner.
2. The use of flexible pipe nipples in the gas line to the burner is optional. Flexible nipples can absorb stress due to heat expansion and slight misalignment.

Note:
Flexible pipe nipples will cause inaccurate metering orifice readings and may cause higher pressure drops than equivalent standard pipe. Consider this when you size the gas lines.

Avoid large pressure drops

Note:
The pressure drop of the gas in the piping is a critical parameter. Make sure that the size of all the piping is large enough to prevent excessive pressure losses.
**Valve Installation**

**Valve orientation**
Install all the valves in such a way that the arrow (if present) on the valve body points in the direction of flow.

**Gas cocks**
Make sure that the handle of a gas cock is at a right angle to the valve body when the valve is in the closed position. This is an important position indicator. If you do not do this, somebody may think that the gas cock is in the closed position, while it is actually in the open position.

**Gas balancing valves**
A gas balancing valve is typically the same as a manual butterfly valve. For more information, refer to the section below.

**Manual butterfly valves**
1. Install manual butterfly valves in the gas line to the burner in accordance with Bulletin/Info Guide 720.
2. Install manual hot air butterfly valves in the air line in accordance with Bulletin 722 or manufacturer’s instructions.

*Note:*
It is recommended that there is a run of pipe with a length of at least 10 pipe diameters between any flow altering device and the metering orifice on the burner.

**Automatic butterfly valve**
An automatic butterfly is driven by an actuator (actuator and mounting bracket not illustrated). Install the control valve in accordance with Bulletin/Info Guide 720.

**Ratio regulator**
1. Connect an impulse line to the ratio regulator and to the air supply line.
2. Install the ratio regulator in accordance with manufacturer’s instructions.
CRS valve
Install the CRS valve in accordance with Bulletin/Info Guide 744.

To verify proper system installation, do the following:

1. Make sure that there are no leaks in the gas lines and the air lines.
2. Make sure all the components of the flame monitoring control system are properly installed. This includes verifying that all switches are installed in correct locations and all wiring, pressure and impulse lines are properly connected.
3. Make sure components of spark ignition system are installed and functioning properly.
4. Make sure that the blower rotates in the correct direction. If incorrect, then have a qualified electrician rewire the blower to reverse its rotation.
5. Make sure all valves are installed in proper location and correctly oriented relative to the gas or air flow direction.

After installation of the burner system components is complete, the following steps should be followed in order to prepare for adjustment:

1. Set the air pressure switch so that it drops out at 4” w.c. (10 mbar) below the pressure rating of the blower.
2. Set the low gas pressure switch at 4” w.c. (10 mbar) below the gas pressure measured at the inlet to the main gas valve train.
3. Set the high gas pressure switch so that it comes on at 4” w.c. (10 mbar) above the gas pressure measured at the inlet to the main gas valve train.
4. Close all the burner gas cocks.
5. Try to light a burner before the purge and other timers have finished their cycles. Make sure that the flame monitoring system indicates a flame failure.
6. Trip out pressure switches and other limit interlocks. Make sure that the main gas valve train closes.

Danger:
If simulated limits or simulated flame failures do not shut down the fuel system within the required failure response time, immediately correct the problem before proceeding.
In this chapter you will find instructions on how to adjust a system, and how to start and stop a system. The chapter starts with general instructions that are useful for adjustment.

**Danger**

Do not bypass any safety feature. You can cause fires and explosions.

Obey the safety precautions in Chapter 2, Safety.

If you adjust an on-ratio system for the first time, you must follow these steps (Refer to Figure 3.1 in the ThermJetPCA Design Guide No. 206):

1. Reset the system
2. Set high fire air
3. Set low fire air
4. Verify the air settings
5. Ignite the burners
6. Set high fire gas
7. Set low fire gas
8. Verify the gas settings.

**Step 1: Reset the system**

1. Close the automatic gas valves and the gas cocks.
2. Fully open the manual air butterfly valve at each burner.
   a. Drive the automatic zone air control valve to high fire.
   b. Adjust the automatic zone air control valve so that it is fully open. The automatic zone air control valve can be either a butterfly valve or a CRS valve.
3. Start the blower.

**Caution**

Make sure that the blower rotates in the correct direction. If incorrect, have a qualified electrician rewire the blower to reverse its rotation.
Step 2: Set high fire air

4. Adjust the eductor flow valve to set the flow measured across the orifice to the flow specified by Eclipse engineering for your application.

1. Set the system to high fire, but DO NOT ignite the burner(s).
2. Use the orifice flow data (provided by orifice manufacturer) to determine the pressure drop across the orifice necessary for high fire air flow.

Note
If using single diaphragm ratio regulator control, set air flow to 35% excess air to account for temperature changes in combustion air.

3. Set high fire air using the manual combustion air butterfly to achieve the pressure differential determined in Step 2.

Note
A pressure tap is open when the screw inside the tap is unscrewed approximately half a turn.

Burner System:

a. Open all pressure tap(s) A.

b. Measure and note the static pressure at Tap A for all the burners.

c. If all the measured static pressures are within 0.3” w.c. (0.75 mbar) of each other, then proceed to the next section. If the variation is greater than 0.3” w.c. (0.75 mbar) it will be necessary to adjust the manual air butterfly valve at each burner to improve the balance.

d. Make sure that all the pressure taps are closed.

4. Repeat the proceeding for other zones (if any).
**Step 3: Set low fire air**

1. Set the system to low fire.
2. Connect the manometer to tap A (air inlet pressure tap).
3. Adjust the automatic zone air control valve until the low-fire static air pressure is 0.2” w.c. This is the initial setting only. Further adjustment may be required.
4. Repeat 2 and 3 for the other zones (if any).

**Step 4: Verify the air settings**

1. Make sure all the settings are still the same after you cycle the system several times between high and low fire.

**Warning:**

This procedure assumes that a flame monitoring control system is installed and is serviceable. It also assumes that normal low fire start is being used.

If low fire gas is too low to be used for ignition, refer to options in “Set the bypass pilot gas (optional)” on page 25.

1. Drive the combustion air automatic control valve to low fire.
2. Make sure the combustion air blower is running.
3. Set the manual gas butterfly valve at each burner to 50% open.
4. Adjust the ratio regulator as required for low fire.
5. Open manual gas cock at each burner.
6. Initiate the ignition sequence through the flame monitoring control system.
7. Check that all the burners in the zone have ignited. If all the burners have ignited, drive the combustion air butterfly valve to high fire. Verify flame is present at each burner. If burners do not light, increase the gas flow by adjusting the ratio regulator, repeat step 6.
8. Recheck the high fire air settings.

**Note**

As application temperature increases, pressure will change. Depending on control method, readjustment of the manual combustion air butterfly valve may be necessary.
Step 6: Set high fire gas

1. Use the gas curve from the appropriate ThermJet Data Sheet for the gas being used to find the differential gas pressure needed at high fire. This is the target value for high fire.
2. Connect the manometer to taps B and D (across the gas orifice).
3. Measure the high fire differential gas pressure for the first burner.
4. Adjust the gas butterfly valve at the burner until the gas flow is at the target value.
5. Repeat 3 and 4 for the other burners in the zone.
6. Check the gas pressure at the inlet to the zone ratio regulator. This should be at least 5”w.c. (12.5 mbar) higher than the loading line pressure. It should not exceed the maximum pressure rating of the ratio regulator.

Warning:
Insufficient gas inlet pressure may cause the proportionator to remain fully open as the burner system 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.

Step 7: Set low fire gas

1. Drive the system to low fire.
2. Use the gas curve from the appropriate ThermJet Data Sheet for the gas being used to determine the differential gas pressure required for low fire. This is your target value for low fire.
3. Measure the gas pressure at the first burner.
4. Adjust the ratio regulator until the gas flow is on the target value.

Note:
It is very difficult to measure the very low pressures experienced at low fire, and it may be necessary to rely on visual inspection. This is especially true when gas turndowns in excess of 10 to 1 are being used. The main intent is to provide a clean stable flame with a good flame signal that will not cause the furnace temperature to overshoot.

If the pressure required is too low to be measured, then adjust the ratio regulator until a gas flow is obtained that will provide a clean stable flame with a strong flame signal.

Step 8: Verify the gas settings

Make sure that all settings are still the same after cycling the system several times between high and low fire.

Step 9: Readjust settings

1. As application temperature increases, setting may vary. Re-check and readjust as temperatures increase.

Note
When final adjustments have been made and application is at temperature, mark the position of the indicator on the butterfly valve to indicate valve position.
**SET THE BYPASS PILOT GAS (OPTIONAL)**

**Warning:**
Before you perform this procedure, make sure the flame monitoring control system is working.

3. Use the flame monitoring control system to start the ignition and the bypass pilot gas for all the burners in the zone.
4. Adjust the manual butterfly valve in the bypass line until you obtain reliable ignition within the required trial for ignition time limit.
5. Repeat 4 for all the other burners and zones (if any).

1. Start the blower.
2. Open all the gas cocks.
3. Start the ignition sequence.
4. Verify that flame is present at each burner.

**START PROCEDURE**

**Danger:**
If a burner does not light, and the system does not shut down automatically, then you must close the main gas cock. An uncontrolled flow of gas can cause fires and explosions.

Do not touch the ignition plug or the ignition wire when the ignition is on. You will get a shock.

**STOP PROCEDURE**

1. Close the following valves:
   - The manual gas cock for each burner or zone
   - The manual gas cock at the main control valve
   - All the manual shut-off valves in the gas line upstream of the burner gas cock.
2. Let the burners cool down. Keep the blower on until the chamber temperature is less than 1000° F (500° C) and then stop the blower.

**Note:**
Keeping the blower on after the burner is off, protects the burner and the other components from hot gases that flow back through the burner.
This section is divided into two parts:
- The first part describes the maintenance procedures.
- The second part helps identify problems that may occur, and gives advice on how to solve these problems.

Preventive maintenance is the key to a reliable, safe and efficient system. The core of any preventive maintenance program is a list of periodic tasks.

Following are suggestions for a monthly list and a yearly list.

**Note:**
The monthly list and the yearly list are an average interval. If your environment is dirty, then the intervals may be shorter.

1. Inspect flame-sensing devices for good condition and cleanliness.
2. Check for proper inlet air/gas ratios.
3. Test all the alarm systems for proper signals.
4. Check ignition spark plugs and check proper gap.
5. Check valve motors and control valves for free, smooth action and adjustment.
6. Check for proper operation of the ventilating equipment.
7. Test the interlock sequence of all safety equipment; manually make each interlock fail, noting that related equipment closes or stops as specified by the manufacturer.
8. Test flame monitoring control system by manually shutting off gas to burner.
9. Test main fuel hand-valves for operation.
10. Clean or replace the combustion air blower filter.
## Yearly Checklist

1. Test (leak test) safety shut-off valves for tightness of closure.
2. Test air pressure switch settings by checking switch movements against pressure settings and comparing with actual impulse pressure.
3. Visually check ignition cable and connectors.
4. Inspect impulse piping for leaks.
5. Remove, clean and inspect all the burners.
6. Make sure that the following components are not damaged or distorted:
   - The burner nozzle
   - The spark plugs
   - The flame sensors
   - The flame tube or combustion block
7. If applicable, remove and clean all the orifice plates.

## Troubleshooting Guide

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannot initiate start sequence</td>
<td>• Air pressure switch has not made contact</td>
<td>Check air-pressure switch adjustment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check air filter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check blower rotation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check outlet pressure from blower</td>
</tr>
<tr>
<td></td>
<td>• High gas pressure switch has tripped</td>
<td>Check incoming gas pressure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adjust gas pressure if necessary</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check pressure switch setting and operation</td>
</tr>
<tr>
<td></td>
<td>• Low gas pressure switch has tripped</td>
<td>Check incoming gas pressure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adjust gas pressure if necessary</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check pressure switch setting and operation</td>
</tr>
<tr>
<td>• Malfunction of flame monitoring control system such as shorted out flame sensor or electrical noise in the sensor line</td>
<td>Have a qualified electrician investigate and rectify</td>
<td></td>
</tr>
<tr>
<td>• Purge cycle not completed</td>
<td></td>
<td>Check flame monitoring control system, or purge timer</td>
</tr>
<tr>
<td>• Main power is off</td>
<td></td>
<td>Make sure power is on to control system</td>
</tr>
<tr>
<td>• No power to control unit</td>
<td></td>
<td>Call qualified electrician to investigate</td>
</tr>
</tbody>
</table>
## Troubleshooting Guide (Continued)

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
</table>
| Start-up sequence runs but burner does not light | No ignition:  
• There is no power to the ignition transformer | Restore power to the ignition transformer |
| | No ignition:  
• Open circuit between the ignition transformer and the spark plug | Repair or replace the wiring to the spark plug |
| | No ignition:  
• The spark plug needs cleaning | Clean the spark plug |
| | No ignition:  
• The spark plug is not correctly grounded to the burner | Clean the threads of the spark plug and the burner  
Do not apply grease to the thread of the spark plug |
| | Too much gas:  
• Improper gas valve train sequence. | Verify solenoid valve is downstream of proportionator |
| | Too much gas:  
• Manual gas butterfly valves have been opened too far | Check pressures and settings against start-up report and adjust as necessary |
| | Too much gas:  
• Gas pressure out of the main gas pressure regulator is too high | Check start-up setting  
If necessary, remove regulator and investigate |
| | Not enough gas:  
• The gas pressure out of the main gas pressure regulator is too low | Check start-up setting  
Check regulator & adjust if necessary |
| | Not enough gas:  
• Start gas solenoid valve does not open | Check solenoid valve coil for proper operation. Replace if necessary |
| | Not enough gas:  
• Gas valve not open | Check wiring to the automatic gas shut-off valve |
| | Not enough gas:  
• Air in the gas line | Check output from the flame safeguard  
Open gas cock  
Purge gas line |
# Troubleshooting Guide (Continued)

<table>
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<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Solution</th>
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<tr>
<td>The low fire flame is weak or unstable</td>
<td>• Low fire adjusted too low&lt;br&gt;• Not enough gas&lt;br&gt;• Not enough air</td>
<td>Increase low fire gas setting&lt;br&gt;Check start-up settings and adjust to increase gas flow&lt;br&gt;Check start-up settings. Investigate any change, i.e. blocked filter, loose connections</td>
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<tr>
<td>The burner goes off when it cycles to high fire</td>
<td>• Insufficient air (flame too rich)</td>
<td>Check start-up settings&lt;br&gt;Check air filter, clean or replace if required</td>
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<tr>
<td>The burner is erratic and does not respond to adjustment</td>
<td>• Flame signal weak&lt;br&gt;• Internal damage to the burner. Some parts inside the burner may be loose or dirty</td>
<td>Check condition of flame monitoring device&lt;br&gt;Contact your Eclipse representative or the Eclipse factory</td>
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<tr>
<td>The burner is unstable or produces soot or smoke</td>
<td>• The air/gas ratio is out of adjustment</td>
<td>Measure all the gas pressures and air pressures. Compare to initial start-up settings, and adjust them where necessary</td>
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<tr>
<td>Cannot achieve full capacity</td>
<td>• Air filter is blocked&lt;br&gt;• Gas pressure is too low into the main gas pressure regulator&lt;br&gt;• Increased furnace/chamber pressures&lt;br&gt;• Poor piping practices</td>
<td>Clean or replace the air filter&lt;br&gt;Adjust gas pressure&lt;br&gt;Re-check setup pressures&lt;br&gt;Contact factory</td>
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## Appendix

### Conversion Factors

#### Metric to English.

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<tr>
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<tr>
<td>cubic meter (m³)</td>
<td>cubic foot (ft³)</td>
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<tr>
<td>cubic meter/hour (m³/h)</td>
<td>cubic foot/hour (cfh)</td>
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<td>degrees Celsius (°C)</td>
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<td>(°C x 1.8) + 32</td>
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<tr>
<td>kilogram (kg)</td>
<td>pound (lb)</td>
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<td>kilowatt (kW)</td>
<td>Btu/hr</td>
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<td>foot (ft)</td>
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<td>inches water column (&quot;wc&quot;)</td>
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<td>millimeter (mm)</td>
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#### Metric to Metric.

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#### English to Metric.

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**Eclipse ThermJet PCA Installation Guide No. 206, 3/5/07**
Offered By:
Power Equipment Company
2011 Williamsburg Road
Richmond, VA 23231
Phone: 804-236-3800 Fax: 804-236-3882

www.peconet.com