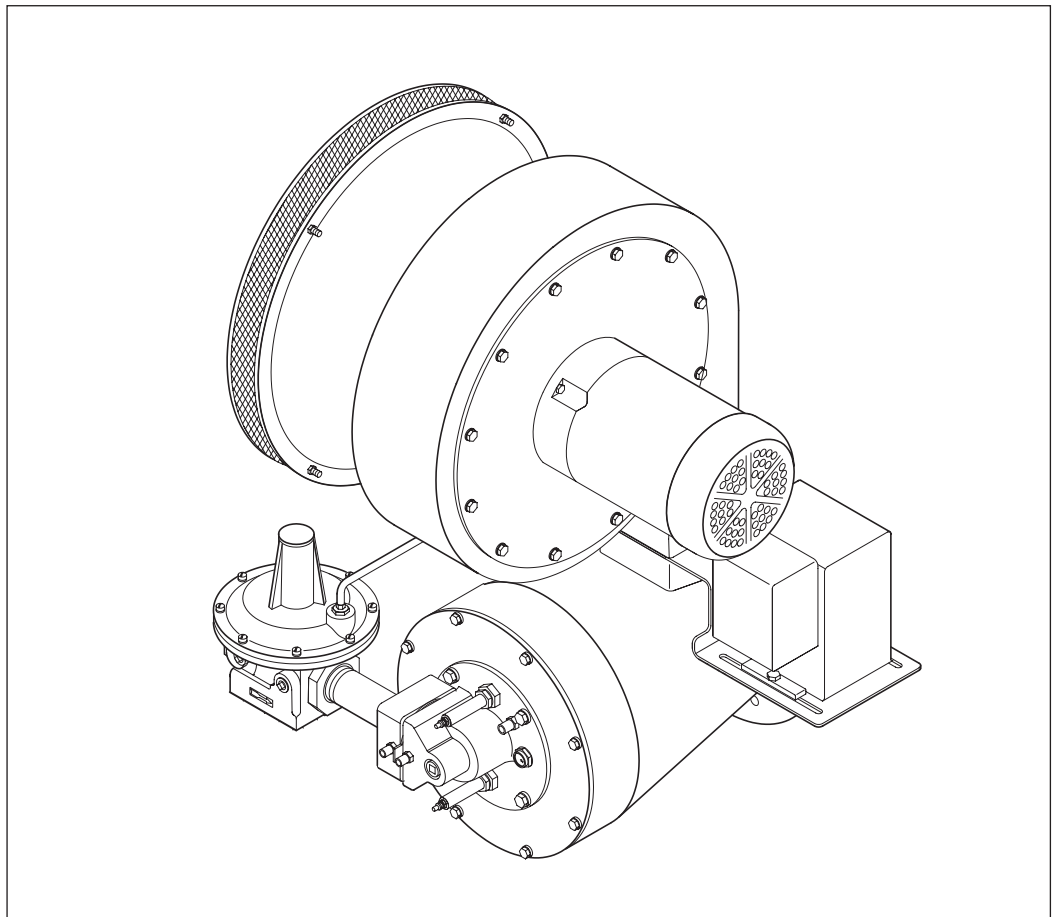




Immersion Burners

ImmersoJet Series
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 an immersion 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 experience with this kind of equipment.

IMMERSOJET DOCUMENTS

Installation Guide No. 330

- This document

Data Sheet No. 330-2, 330-3, 330-4, 330-6, 330-7, 330-8

- Available for individual IJ models
- Required to complete installation in this guide

Design Guide No. 330

- Used with Data Sheet to design burner system

Price List No. 330

- Used to order burners

RELATED DOCUMENTS

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

Purpose

The purpose of this manual is to make sure that the design of a safe, effective and trouble-free combustion system is carried out.

DOCUMENT CONVENTIONS

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.

HOW TO GET HELP

If you need help, contact your local Eclipse Combustion representative.



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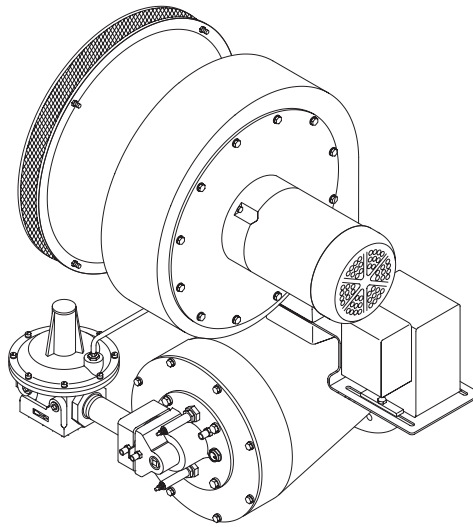
Introduction

1

PRODUCT DESCRIPTION

The Immersojet (IJ) is a nozzle-mix tube-firing burner that is designed to fire at high velocities through small diameter immersion tubes. The standard burner includes a packaged blower, actuator control motor, integral butterfly valve, ratio regulator, burner body, combustion chamber, nozzle (specific to fuel used), rear cover, spark and flame rods, and gas orifice (also specific to fuel used).

The Immersojet Burner



FEATURES

The combustion gases from the burner scrub the inner tube surface and produce high heat transfer rates. This, in combination with the high velocity flow through the smaller diameter tubes allows for system efficiencies in excess of 80%.

The smaller IJ tubes also have smaller bends which means less tank space is occupied by the tubes. With a combustion chamber that is integral to the burner body, the new version of the Immersojet can sit lower on the tank than previous IJ models.



2

INTRODUCTION

SAFETY

In this section you will find important notices about safe operation of a burner system.



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 Combustion.

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 Combustion before you continue.

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 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

3

INTRODUCTION

HANDLING AND STORAGE

POSITION OF COMPONENTS

APPROVAL OF COMPONENTS

Limit controls and safety equipment

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.

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 330, Chapter 3 “System Design.” Use the schematics in that chapter to build your system.

All limit controls and safety equipment must comply with the current following standards:

- NFPA Standard 86
- NFPA Standard 86C

All devices must be listed, certified or approved by the following agencies:

- UL
- FM
- CGA

Electrical wiring

All the electrical wiring must comply with one of these standards:

- NFPA Standard 70
- ANSI-C11981
- 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 having 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:
1151 Boston-Providence Turnpike
P.O.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 the standards 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 building.

Access

Make sure the burner is installed in such a way that it is easily accessed 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.
- prevent direct exposure to water.

Configuration

Verify the configuration of the ImmersoJet burner package:

- Make sure piping orientation is correct. See page 12 of this manual for guidance on changing the orientation.
- Make sure spark plug is installed and adjusted correctly.
- Make sure flame sensor is installed. It may be either a flame rod or a U.V. scanner, depending on the type of flame monitoring control system being used.

For detailed information on how to install and connect a flame rod, refer to:

- Bulletin / Info guide 832.

For detailed information on how to install and connect a U.V. scanner, refer to:

- straight U.V. scanner; Bulletin / Info Guide 854
- 90° U.V. scanner; Bulletin / Info Guide 852
- self-check U.V. scanner; Bulletin / Info Guide 856.
- solid state U.V. I.R. scanner; Bulletin / Info Guide 855.

PREPARE THE BURNER

ImmersoJet burners are designed to be easily installed under a variety of conditions. Some minor preparation may be required to install the new ImmersoJet into specific systems.

Burner Piping

The burner is factory assembled and shipped as ordered.

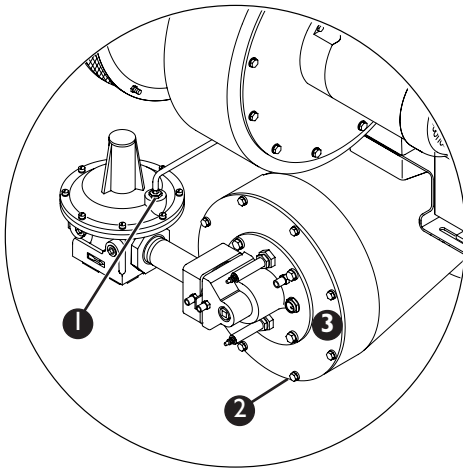


Note:

It is not recommended to redirect piping. If necessary, be sure the:

- ratio regulator spring column ❶ is pointing up.
- arrow on the ratio regulator points in the direction of gas flow.
- integral fuel orifice and o-rings ❷ are re-installed.
- same straight runs of pipe ❸ remains between the ratio regulator and the burner .

Redirecting Piping



Component Locations

To redirect piping, rotate the rear cover plate assembly:

1. Disconnect loading line at ratio regulator. ❶
2. Remove outer bolts. ❷
3. Rotate rear cover plate assembly ❸ to desired position.
4. Reinstall outer bolts. ❷



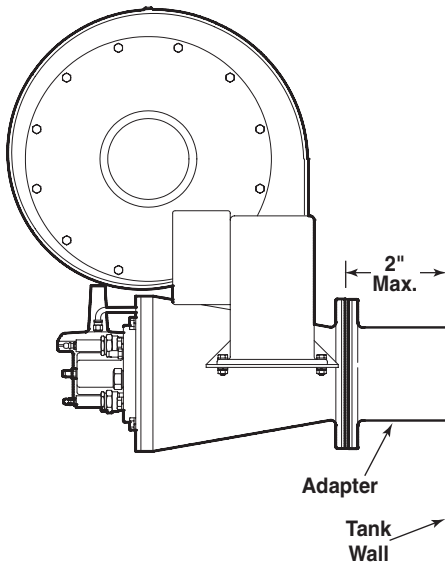
Caution

The rear cover is connected to the combustion housing which slides into the burner housing on the tube mounting end. Be certain the combustion housing seats in the burner housing as indicated by no gap between the rear cover and the housing. Do not use the bolts to seat the cover.

5. Position the ratio regulator with the spring housing in a vertical upright position.
6. Reconnect loading line at ratio regulator ❶. If necessary, connect loading line to the burner pressure tap connection on opposite side of air inlet.

INSTALLATION

Burner



Piping

Dimensions

Bolt the burner to the immersion tank wall or immersion tube flange. For bolt hole patterns, see the Data Sheet for your ImmersoJet model.



Caution

If adapters are used, burner flange should not be spaced farther than 2" from tank wall.

Tank wall

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



Caution

Burner body surface temperature near the flange can exceed 200 deg. F (100 deg. C) If an adapter flange is used, higher temperatures may occur. Allow a free, convective flow of air around the burner and do not cover with insulation.

Layout

Install all the piping as shown in the system schematics found in Chapter 3 of IJ Design Guide 330.

Supply Piping

Install the piping using the following steps:

- Locate the valve train close to the burner. The gas must reach the burner during the fixed trial for ignition.
- Sufficiently size shut off valves in the valve train.
- Make sure piping is large enough.
- Minimize piping elbows.

Pipe Connections

- Installation of a pipe union in the gas line is recommended to simplify burner removal.
- Use of flexible pipe is optional.



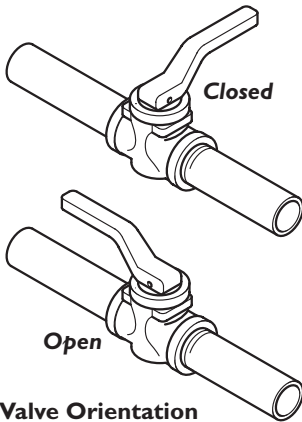
Note:

Flexible pipe causes higher pressure drops than standard pipe. Consider this when sizing your gas lines.

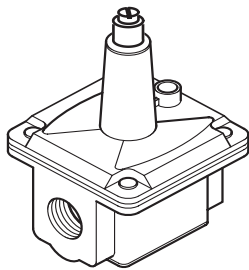
Support the piping

Use brackets or hangers to support the piping; don't let burner support the weight of the piping. If you have questions, consult your local gas company.

Valves

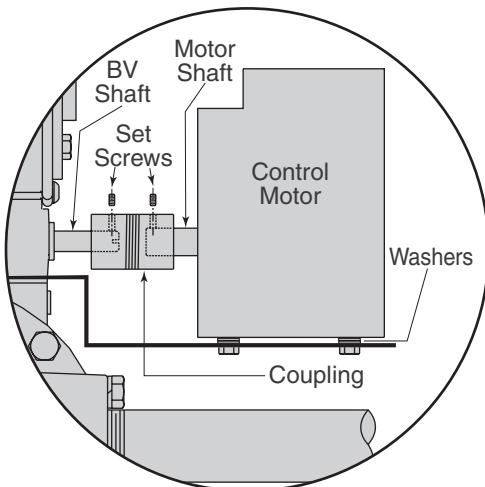


Valve Orientation



Ratio Regulator

Flame monitoring control system



Control Motor



Note:

The pressure drop of the gas and the air in the piping is a critical parameter. Make sure that the size of all the piping is large enough to prevent excessive pressure losses. Refer to Eclipse Engineering Guide EFE 825, page 13 for details.

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.

Ratio regulator

The ratio regulator is installed on the burner at the factory. When mounting the burner, be sure that gas flow through the regulator is horizontal and the spring housing points upward.

For information, refer to the Bulletins of the flame monitoring control system:

- Veriflame; Bulletin 818
- Multiflame; Bulletin 820
- Bi-Flame; Bulletin 826.

Control Motor

Install a control motor to modulate the air butterfly valve if not previously installed on the burner.



Note:

Be sure the control motor shaft and air butterfly valve shaft are aligned properly. If using an Eclipse Actuator Mounting Parts Kit, the supplied washers may be used as shims (stacked 0, 1, or 2 high) to ensure proper alignment. Additionally, a flexible coupling can be used to handle minor misalignment.

CHECKLIST AFTER INSTALLATION

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, 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.

Adjustment, Start & Stop

4

INTRODUCTION

In this chapter, you will find instructions on how to adjust, start, and stop the burner system. Become familiar with burner control methods before attempting to make adjustments.



Danger:

The ImmersoJet burners, described herein, are designed to mix fuel with air and burn the resulting mixture. All fuel burning devices are capable of producing fires and explosions if improperly applied, installed, adjusted, controlled, or maintained.

Do not bypass any safety feature; fire or explosion could result.

Never try to light a burner if it shows signs of damage or malfunction.

ADJUSTMENT PROCEDURE

If you are adjusting the system for the first time, follow these steps.

1. Reset the system
2. Verify air flow
3. Set low fire air
4. Ignite the burner
5. Verify settings

STEP I RESET THE SYSTEM

1. Set the air pressure switch so that it drops out at 4" w.c. (10 mbar) below the air inlet pressure listed in the appropriate IJ Data Sheet.
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 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.



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.

5. Start the combustion air blower.
6. Try to light the burner to be sure that the flame monitoring system indicates a flame failure.
7. Activate pressure switches and other limit interlocks. Make sure that the main gas valve train closes.
8. Adjust main gas inlet pressure to the ratio regulator within the range specified in the appropriate data sheet.



Warning:

Gas inlet pressures must stay within the specified range. Pressure above the specified range can damage the ratio regulator.



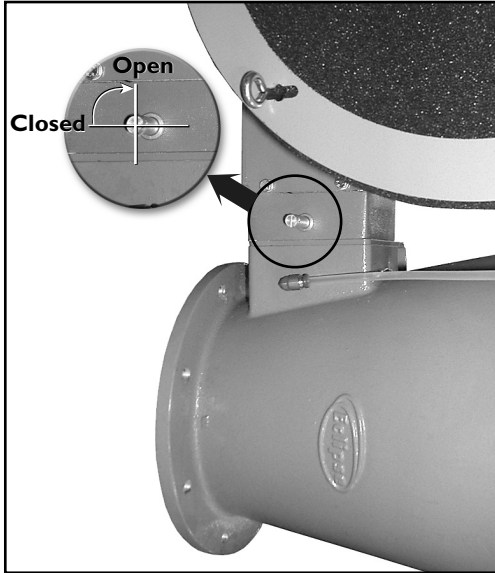
Warning:

Pressure below the specified range can impair the ability of the ratio regulator to control the gas flow.

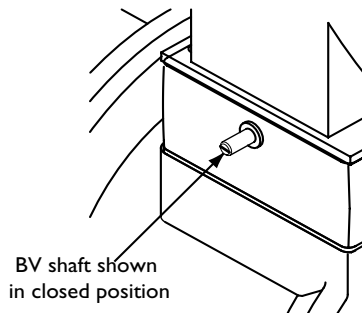
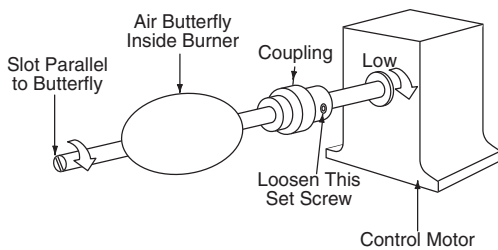
Operating the system outside the specified range can cause excess fuel consumption and the possible accumulation of unburned fuel in the tube.

In extreme cases, this accumulation of unburned fuel may cause fires or explosions.

Step 2 Verify Air Flow



Step 3 Set Low Fire Air



Air BV Shaft

1. With manual and automatic gas valves remaining closed, set the system to high fire. **DO NOT** ignite the burner(s).



Note:

The slot on the end of the butterfly valve shaft is parallel to the plane of the butterfly. This can be used as a visual indication of valve position.

2. Start the combustion air blower.
3. Use the data from the appropriate ImmersoJet Data Sheet to find the static air pressure at high fire. This is now the target value for high fire.



Note

Tube back pressure may limit the burner from reaching the data sheet value.



Note

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

- a. Make sure that pressure tap "A" is open.
- b. Connect the manometer to tap "A" .
- c. Verify target value from step 3 above.

Packaged Blower: Verify that the slot on the end of the butterfly valve shaft (if applicable) is parallel to flow (fully open). If necessary, adjust the control motor travel for high fire.

Remote blower: Adjust the manual butterfly valve to achieve the target value.

1. Start combustion air blower.
2. Drive control motor to low fire position.
3. Set low fire air.

Packaged Blower:

- a. Loosen the set screw on burner side of coupling.



Note:

The BV is closed when the shaft slot is perpendicular to the direction of air flow through the BV.

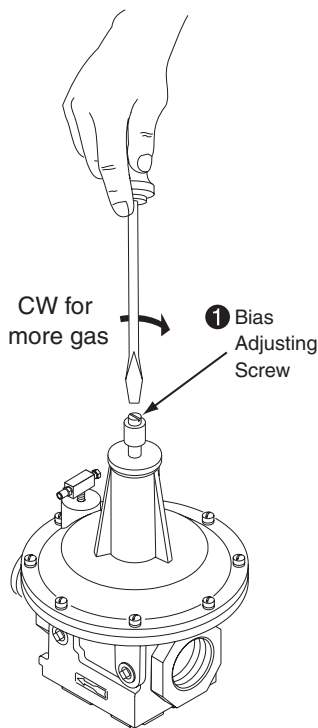
- b. Rotate air BV shaft to fully closed position. (Holes in BV damper will supply low fire air.)
- c. Hold BV shaft firmly in place and tighten set screw .

Remote Blower:

- a. Adjust automatic butterfly position for low fire air.
4. Check the pressure at tap "A". It should be .1" w.c. to .4" w.c. The low fire butterfly valve position can be adjusted to change the pressure.

Step 3 Set Low Fire Air (Cont.)

Step 4 Ignite the Burner



Ratio Regulator



Note:

The pressure at tap "A" without the blower on is a pressure that must be overcome to ignite the burner. The pressure measured in step four should be approximately two times higher.

5. Cycle the control motor several times, checking high and low fire positions. If they don't repeat, check for a loose valve shaft coupling or binding of the motor or valve.
6. Close the pressure taps.



Warning:

This procedure is written with the assumption the burner has a flame monitoring control system installed and operating. A proper purge cycle must be part of the system and purge timing should not be bypassed.

1. Drive the air butterfly valve to low fire.
2. Be sure combustion air blower is running.
3. Verify bias adjusting screw ① on ratio-regulator spring column is six full clockwise turns ($360^\circ \times 6$) down from the top (initial setting).
4. Open main gas manual shut off valves.
5. Set system control to stay at low fire during and after ignition sequence.
6. Attempt to ignite burner.
7. If burner does not ignite:
 - a. Attempt to ignite burner again to purge air from the gas piping.
 - b. If burner still does not ignite, turn bias adjusting screw ① a half turn clockwise to increase gas flow.
 - c. Attempt to ignite burner.
 - d. Repeat steps b and c until burner ignites. If necessary, refer to Chapter 5 for troubleshooting tips.
8. Flame signal strength:

Adjust gas flow with bias adjusting screw ① for lowest gas flow that maintains a stable flame signal and provides reliable ignition:

 - clockwise, for more fuel
 - counterclockwise, for less fuel.

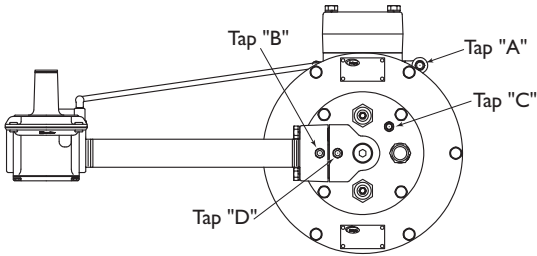


Note:

If viewing the flame, it should be blue with flashes of yellow. When firing propane or butane, a proper low fire flame may have sustained flashes of yellow.

9. Verify low fire flame:
 - a. Shut off gas. Allow process to cool.
 - b. Verify repeatability of ignition and low fire flame signal at cold conditions.

Step5: Verify Settings



Pressure Tap Locations

1. With burner lit, go to high fire. Make sure the burner stays lit.
2. Wait for the process to reach normal operating conditions.
3. Measure high fire fuel differential pressure between tap "D" and tap "B". Compare this to the "Fuel Orifice ΔP vs. Input" graph in the data sheet for your burner.



Note:

Adjustment of the control motor to set high fire gas to the desired input efficiency calculated for your process may be necessary.

4. Measure high fire air ΔP between tap "A" and tap "C". Compare this pressure to the Data Sheet for your burner. Check O_2 levels at maximum burner input. O_2 should 2.5% to 5%.
5. Go to low fire and verify low fire flame signal and flame appearance (if viewing).



Note:

Gas pressure at low fire will be too low to measure and verify the fuel settings.

6. Cycle burner from high to low several times to check repeatability of settings.
7. Readjust burner if the settings do not repeat as expected. If necessary, refer to Chapter 5, Maintenance & Troubleshooting.
8. Record all setup data as an aid for future troubleshooting and setup operations.



Caution:

Do not turn the combustion air blower off immediately. Allow time for the process to cool. This will prevent hot gases from back flowing into the burner and blower causing damage to the burner.

9. Stop the burner.

Maintenance & Troubleshooting

5

INTRODUCTION

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.

MAINTENANCE

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. Other standards may take precedence for your particular application.

Monthly Checklist

1. Inspect flame-sensing & ignition devices for good condition and cleanliness.
2. Test all the alarm systems for proper signals.
3. Check valve motors and control valves for free, smooth action and adjustment.
4. 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.
5. Test main fuel hand-valves for operation.
6. Clean or replace the combustion air blower filter.

Yearly Checklist

• Perform all monthly checks plus:

1. Leak test shut-off valves for tightness of closure.
2. Inspect loading lines for leaks.
3. Make sure that the following components are not damaged or distorted:
 - the burner nozzle
 - the spark plug
 - the flame sensor
4. Inspect the immersion tube for leaks and excessive corrosion.

TROUBLESHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE	SOLUTION
Cannot initiate start sequence	• Main power is off	Make sure power is on to control system
	• No power to control	Call qualified electrician to investigate
	• Air pressure switch has not made contact	Check air-pressure switch adjustment Check air filter Check blower rotation Check outlet pressure from blower Check tubing and electrical connections to pressure switches
	• High gas pressure switch has tripped	Check incoming gas pressure Adjust gas pressure if necessary Check pressure switch setting and operation
	• Low gas pressure switch has activated	Check incoming gas pressure Adjust gas pressure if necessary Check pressure switch setting and operation
	• Malfunction of flame monitoring control system such as shorted out flame sensor or electrical noise in the sensor line	Have a qualified electrician investigate and rectify
	• Purge cycle not completed	Check flame monitoring control system, purge timer, interlocks and limit switches

PROBLEM	POSSIBLE CAUSE	SOLUTION
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 Check flame monitor control
	No ignition: • Open circuit between the ignition transformer and the spark plug	Repair or replace the wiring and connectors to the spark plug Check ground connection to the transformer
	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: • Wrong orifice or no orifice installed or wrong nozzle	Check orifice size for fuel type Check nozzle number for fuel type
	Too much gas: • Damaged ratio regulator	Replace ratio regulator
	Too much gas: • Gas pressure out of the main gas pressure regulator is too high	Adjust main gas regulator If necessary, remove regulator and investigate
	Not enough gas: • Gas valve not open	Check all manual valves Check wiring to automatic gas shut-off valve
	Not enough gas: • Start gas solenoid valve does not open	Check solenoid valve coil for proper operation. Replace if necessary
	Not enough gas: • Air in the gas line	Open gas cock Purge gas line
	Not enough gas: • Damaged or missing ratio regulator loading line	Inspect and replace as required
	Not enough gas: • Damaged ratio regulator	Inspect and replace as required
	Not enough gas: • Improper orifice	Check orifice size for fuel type
	Not enough gas: • The gas pressure out of the main gas pressure regulator is too low	Adjust main gas regulator If necessary, remove regulator and investigate
Not enough gas: • Wrong nozzle for fuel type	Check nozzle number for fuel type	

PROBLEM	POSSIBLE CAUSE	SOLUTION
The low fire flame is weak or unstable	• Low fire adjusted too low	Increase low fire gas setting
	• Not enough gas	Check gas adjustment and modify to increase gas flow
	• Not enough air	Check air adjustment Investigate any change, i.e. blocked filter, loose connections
The burner goes off when it cycles to high fire	• Insufficient air (flame too rich)	Check air adjustment Check air filter, clean or replace if required Check ratio regulator and loading line
	• Insufficient gas	Check ratio regulator and loading line Check main gas regulator
The burner is erratic and does not respond to adjustment	• Flame signal weak	Check condition of flame monitoring device
	• Internal damage to the burner. Some parts inside the burner may be loose or dirty	Contact your Eclipse Combustion representative or the Eclipse factory
The burner is unstable or produces soot or smoke	• The air/gas ratio is out of adjustment	Check adjustments, ratio regulator and loading lines
Cannot achieve full capacity	• Air filter is blocked	Clean or replace the air filter
	• Gas pressure is too low into the main gas pressure regulator	Adjust gas pressure
	• Increased tube pressures	Check for blockage
	• Poor piping practices	Contact factory



Appendix

CONVERSION FACTORS

Metric to English.

FROM	TO	MULTIPLY BY
cubic meter (m ³)	cubic foot (ft ³)	35.31
cubic meter/hour (m ³ /h)	cubic foot/hour (cfh)	35.31
degrees Celsius (°C)	degrees Fahrenheit (°F)	(°C × 1.8) + 32
kilogram (kg)	pound (lb)	2.205
kilowatt (kW)	Btu/hr	3414
meter (m)	foot (ft)	3.28
millibar (mbar)	inches water column ("wc)	0.401
millibar (mbar)	pounds/sq in (psi)	14.5 × 10 ⁻³
millimeter (mm)	inch (in)	3.94 × 10 ⁻²

Metric to Metric.

FROM	TO	MULTIPLY BY
kiloPascals (kPa)	millibar (mbar)	10
meter (m)	millimeter (mm)	1000
millibar (mbar)	kiloPascals (kPa)	0.1
millimeter (mm)	meter (m)	0.001

English to Metric.

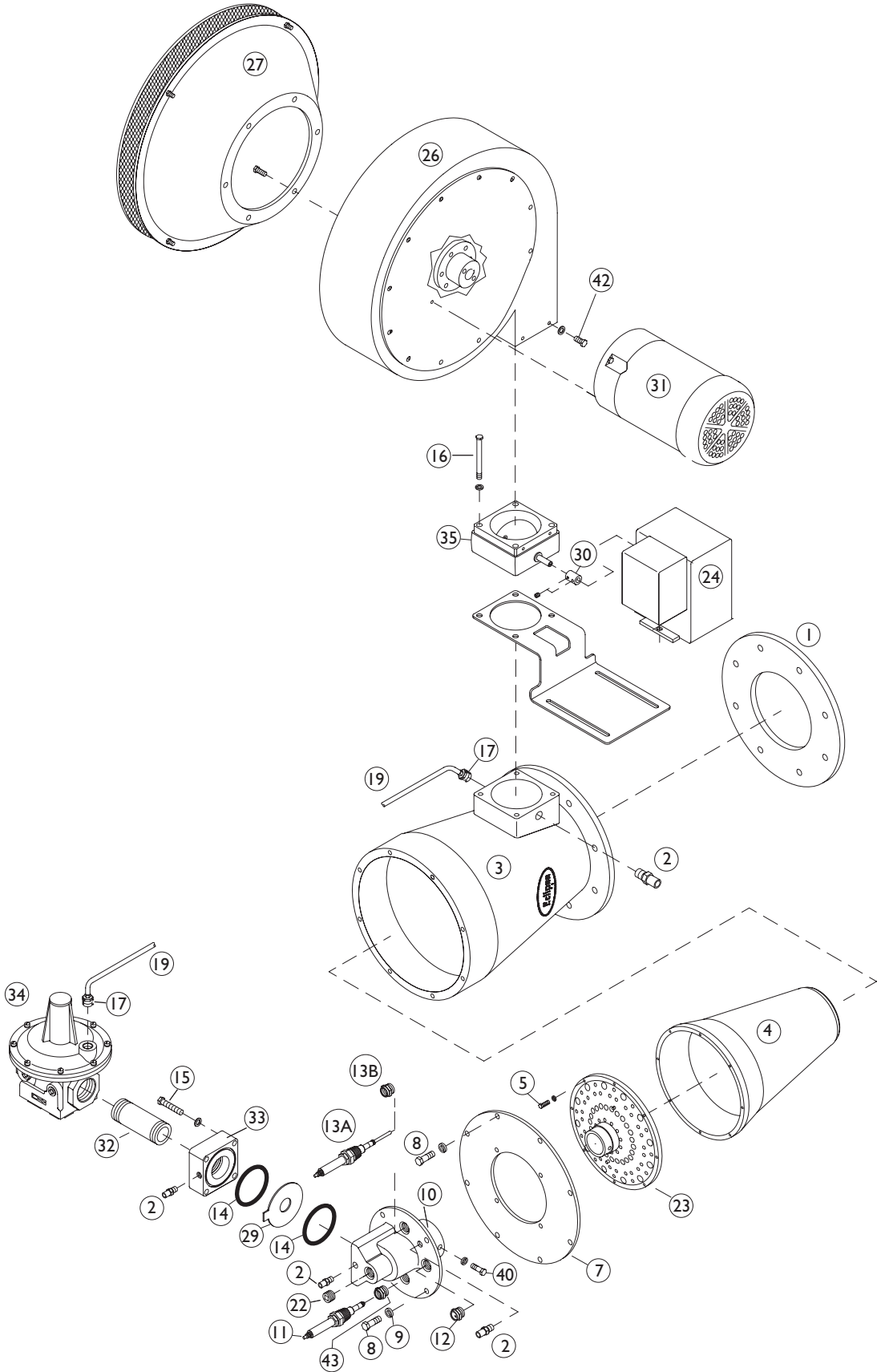
FROM	TO	MULTIPLY BY
Btu/hr	kilowatt (kW)	0.293 × 10 ⁻³
cubic foot (ft ³)	cubic meter (m ³)	2.832 × 10 ⁻²
cubic foot/hour (cfh)	cubic meter/hour (m ³ /h)	2.832 × 10 ⁻²
degrees Fahrenheit (°F)	degrees Celsius (°C)	(°F – 32) ÷ 1.8
foot (ft)	meter (m)	0.3048
inches (in)	millimeter (mm)	25.4
inches water column ("wc)	millibar (mbar)	2.49
pound (lb)	kilogram (kg)	0.454
pounds/sq in (psi)	millibar (mbar)	68.95

Part Numbers ImmersoJet Series Version 2

Pos.	Qty.	Description	IJ-Size-2	IJ-Size-3	IJ-Size-4	IJ-Size-6	IJ-Size-8
1	1	Drawing, packaged with blower	200782	200792	200787	101227	10001637
		Gasket, mounting	20256	20265	20258	20337	20337
2	4	P.F. plug test, 1/8" NPT	13445	13445	13445	13445	13445
3	1	Body	7102-1	7113-1	7043-1	7121-1	7121-2***
4	1	Chamber, combustion	7105-1	7112-1	7109-1	7120-1	7120-1
5	*	Screw, M4 x 16	4 x 20241	6 x 20241	8 x 20241	9 x 20242 (M6)	9 x 20242 (M6)
7	1	Plate, adapter, RC	20104	20266	19988	20320	20320
8	*	Screw, M8 x 22	4 x 15886	10 x 15886	12 x 15886	12 x 15886	12 x 15886
10	1	Cover, rear	7103-1	7107-1	7013-1	7013-1	7013-1
11 [△]	1	Spark rod, 1/2" NPT	150000-44	150000-44	150000-41	150000-41	150000-41
12	1	Peepsight	11737	11737	11737	11737	11737
13A	1	Flamerod, 1/2" NPT	20212	20212	20212	20212	20212
13B	1	UV scanner adapter	10033	10033	10033	10033	10033
14	2	Seal, O'Ring, Viton	14777	17037	14778	14778	14778
15	4	Screw, hex head, M8 x 45, gas inlet block	15893	15893	15893	15893	15893
16	*	Screw, socket head, M8 x 50 (BV Only)	4 x 20246	4 x 20270	4 x 16015	2 x 20257	2 x 20257
17	2	Fitting, tube, Prestolok	14689	14689	14689	14689	14689
19	1	Tube, nylon	34505	34505	34505	34505	34505
**	1	Nameplate, ImmersoJet burner	20729	20729	20729	20729	20729
**	4	Screw, drive, nameplate	18933	18933	18933	18933	18933
22	1	Plug, 3/4" NPT	18880	18880	18883	18883	18883
23	1	Nozzle, machined, Natural Gas	7104-6	7114-11	7042-9	7119-7	7119-7
23	1	Nozzle, machined, Propane/Butane	7104-5	7114-12	7042-10	7119-7	7119-7
24	1	Actuator, EMP-423-5	22755	22755	22755	22755	22755
24	1	Actuator, EMP-424-5	22735	22735	22735	22735	22735
24	1	Honeywell M9174-C-7284	15273-4	15273-4	15273-4	15273-4	15273-4
24	1	Actuator, EMA-418-1	10912	10912	10912	10912	10912
24	1	Actuator, Eclipse Rotary		Varies with configuration of actuator			
26	1	Blower		Varies with configuration of burner system			
27	1	Filter	200758	200757	200757	200756	200756
27	1	Grille	10514	10515	10515	10515	10515
27	1	Filter/silencer	15405	20505	20505	15407	15407
29	1	Plate, orifice, Natural Gas	14191-23	14934-4	14188-21	14188-1	14188-3***
29	1	Plate, orifice, Propane	14191-14	14934-13	14188-7	14188-6	14188-33***
29	1	Plate, orifice, Butane	14191-3	14934-12	14188-14	14188-4	14188-9***
30	1	Coupling	21134	21134	21134	21134	21134
31	1	Motor, blower		Varies with configuration of burner system			
32	1	Nipple, NPT	20488	18778	18808	18808	14791***
32	1	Nipple, BSP	20487	20421	20607	20607	20823***
33	1	Block, inlet, gas - NPT	3974-2	7001-1	3973-3	3973-3	3973-2***
33	1	Block, inlet, gas - Rc	3974-1	7001-3	3973-1	3973-1	3973-10***
34	1	Regulator, ratio, NPT	19997	15939	20312	20312	10315***
34	1	Regulator, ratio, BSP	19998	19999	20311	20311	19990***
35	1	Butterfly valve, packaged blower	102246	102267	102278	102277	102277
37	1	Block, inlet, air - NPT, remote blower	3973-5	7108-2	3996-1	100041	100041
37	1	Block, inlet, air - BSP, remote blower	3973-7	7108-3	3996-2	100041-1	100041-1
40	1	Screw, hexhead, M4 x 12	20394	20394	20849	20242 (M6)	20242 (M6)
42	4	Screw, buttonhead, M6 x 12	15881	15881	15881	15891 (hex)	15891 (hex)
43	1	Bushing	18505	18505	18505	18505	18505
**	1	Actuator mounting kit - Honeywell	100256	100260	100264	100268	100268
**	1	Actuator mounting kit - Eclipse	100257	100261	100265	100269	100269
**	1	Actuator mounting kit - Eclipse Rotary with blower	100317	100317	100317	100317	100317
**	1	Actuator mounting kit - Eclipse Rotary less blower	100318	100320	100322	100324	100324
**	1	Switch, air	20475	20475	20475	20475	20475
**	1	Kit, air switch mounting	101146	101146	101146	101146	101146
**	1	Screw, M6 x 12	15894	15894	15894	15894	15894
**	1	Plug	20605	20605	20605	20605	20605

* Quantity varies with product configuration
 ** Not Illustrated
 *** Applies to remote blower models.
 Packaged blower models are same as IJ-6
[△] Need item 43 to install in burner

Illustrated Parts View
ImmersoJet Series Version 2





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