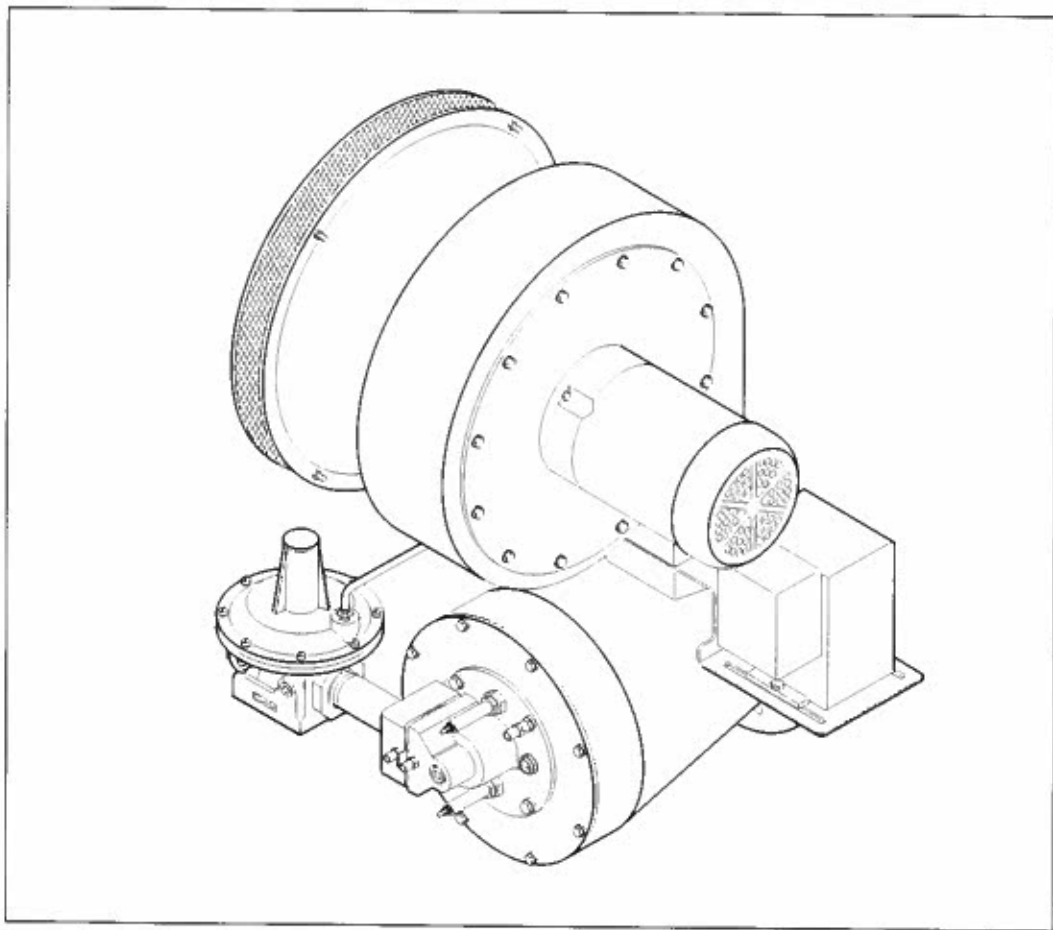




# ***Immersion Burners***

***ImmersoJet Series***

***version 2.20***



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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, 330-8***

- 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, you can contact your local Eclipse Combustion representative. You can also contact Eclipse Combustion at any of the addresses listed on the back of this document.

# Table of Contents

	<b>About this manual .....</b>	<b>3</b>
	<b>Table of contents .....</b>	<b>5</b>
<b>1</b>	<b>Introduction .....</b>	<b>6</b>
	Product description .....	6
<b>2</b>	<b>Safety .....</b>	<b>7</b>
	Safety .....	7
	Capabilities.....	8
	Operator Training .....	8
	Replacement Parts .....	8
<b>3</b>	<b>Installation .....</b>	<b>9</b>
	Handling and storage .....	9
	Position of components .....	9
	Approval of components .....	9
	Where to get the standards .....	10
	Checklist before installation .....	11
	Prepare the burner .....	12
	Installation .....	13
	Checklist after installation .....	15
<b>4</b>	<b>Adjustment, Start &amp; Stop .....</b>	<b>16</b>
	Air adjustment.....	18
	Gas adjustment .....	19
	Start/Stop procedure .....	20
<b>5</b>	<b>Maintenance &amp; Troubleshooting .....</b>	<b>21</b>
	Maintenance .....	21
	Monthly checklist .....	21
	Yearly checklist .....	21
	Troubleshooting guide .....	22
	<b>Appendix .....</b>	<b>25</b>
	Conversion Factors .....	25
	Parts list .....	26
	Illustration .....	27

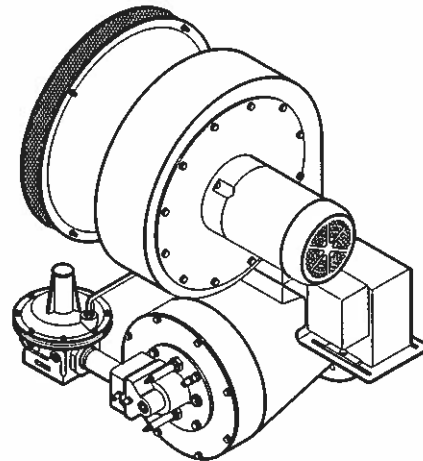
# Introduction

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).

**Figure 1.1 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.

# Safety

# 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, N Y 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.

### **Configuration**

Verify the configuration of the ImmersoJet burner package:

- Make sure piping orientation is correct. See page 3-4 of this manual for guidance on changing the orientation.
- Make sure spark plug is installed.
- 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.

## 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.

### Component Positions

It is possible to change the relative position of the gas inlet to the air inlet. This can be convenient for the routing of the piping. The following procedure illustrates how to rotate the rear cover plate assembly:



#### Caution

The ratio regulator must be installed with the spring housing in a vertical upright position. The burner system will not operate properly if the ratio regulator is not correctly installed. If the rear cover plate assembly is rotated, make sure the ratio regulator is positioned properly. Adding pipe lengths can increase pressure drop and effect performance.

### Rotate the rear cover plate assembly (optional)

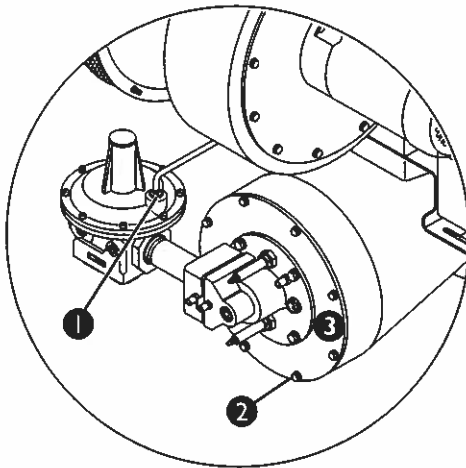


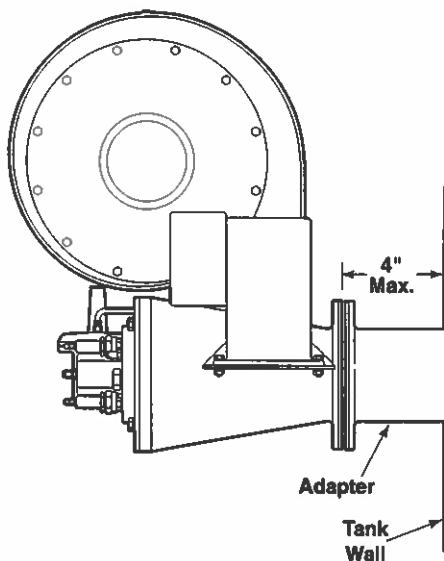
Figure 3.1 Component Locations

To rotate the rear cover plate assembly:

1. Disconnect loading line at ratio regulator ①
2. Remove outer bolts ②
3. Rotate rear cover plate assembly ③ to desired position.
4. Reinstall outer bolts ②
5. Reconnect loading line at ratio regulator ①. If necessary, connect loading line to the burner pressure tap connection on opposite side of air inlet.
6. Position the ratio regulator with the spring housing in a vertical upright position.

## 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 4" 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.

## 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.

## Pipe connections

1. Install a pipe union in the line to each burner. This simplifies removal of the burner.

---

**Avoid piping configurations that could cause high pressure drops. Read the following notes and contact Eclipse Combustion with any questions.**

---



### Note:

*Flexible pipe nipples may cause higher pressure drops than equivalent standard pipes. Consider that when sizing the lines.*



### Note:

*The pressure drop of the gas and the air in the piping is a*

## Valves

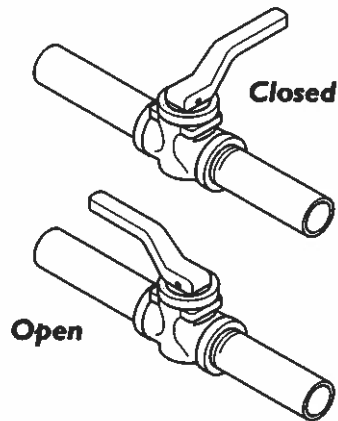


Figure 3.2 Valve Orientation

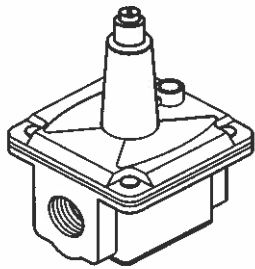


Figure 3.3 Ratio Regulator

## Flame monitoring control system

*critical parameter. Make sure that the size of all the piping is large enough to prevent excessive pressure losses. Refer to Eclipse Engineering Guide 825, section 1.12 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. If you do not do that, somebody may think that the gas cock is in the closed position, while it is actually in the open position.

### 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.

## **CHECKLIST AFTER INSTALLATION**

To verify proper system installation, do the following:

1. Make sure that there are no leaks in the gas lines or 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.

# Adjustment, Start & Stop

# 4

## INTRODUCTION

In this chapter you will find instructions on how to adjust a system, and how to start and stop a system.



### **Danger:**

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

**Obey the safety precautions in Chapter 2 "Safety".**

Read all of this chapter before starting your system.

## ADJUSTMENTS

### **Preparation**

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.
5. Try to light the burner to be sure that the flame monitoring system indicates a flame failure.
6. Activate 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.**



## **ADJUSTMENTS (CONTINUED)**

### **Control Panel Settings**

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 gas regulator must be adjusted to supply minimum fuel pressure at the ratio regulator inlet per the data sheet. Higher gas pressures may be required for operation at firing rates greater than 1,000,000 Btu/hr. See the appropriate Data Sheet 330 for your burner. Maximum fuel pressure at the ratio regulator is dependent on the regulator model. See Bulletin 742 for additional information.

## Air Adjustment

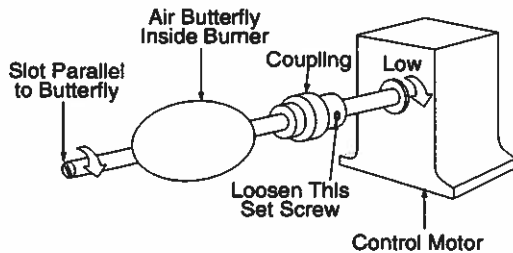


Figure 4.1 Air Adjustment

## Gas Valves

Close all manual and automatic gas valves.

## Packaged Blower—Low Fire Air



### Note:

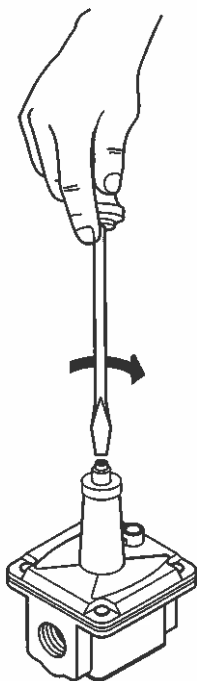
The slot on the end of the butterfly valve shaft is parallel to the plane of the butterfly. This can be used as a visual indication of valve position.

1. Drive the control motor to the low fire position.
2. Loosen the setscrew on the motor side of the flexible coupling.
3. Adjust the air butterfly valve until the slot is perpendicular to the air flow.
4. Hold the shaft firmly in place and tighten the setscrew.

## Packaged Blower—High Fire Air

1. Drive the control motor to the high fire position (fully open).
2. Verify that the slot on the end of the butterfly valve shaft is parallel to air flow (fully open). If necessary, adjust the control motor travel for high fire.
3. 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.

## Gas Adjustment



### High Fire Gas Adjustment

High fire gas flow requires no adjustment. The size of the integral gas orifice is selected based on the fuel (natural gas, propane or butane) specified at the time the burner is ordered.



#### Note:

*Ratio regulator is used only to adjust low fire gas. Adjustment will NOT affect high fire gas.*

### Low Fire Gas Adjustments


Low fire gas adjustment is factory set for most applications. It can be field adjusted if necessary:

1. Drive the air butterfly valve to low fire.
2. Make sure the combustion air blower is running.
3. Open manual gas cock.
4. Start the ignition sequence through the flame monitoring control system.



#### Danger:

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

5. If burner does not light, turn the adjusting screw on the ratio regulator  $1/2$  turn clockwise  and repeat step 4.




#### Note:

*Initially it may be necessary to repeat step 4 two or three times to purge all the air out of the gas pipework.*

6. After the burner is ignited, drive the air butterfly valve to high fire. Make sure the burner stays lit.

## START PROCEDURE

1. Open all the manual gas cocks to the burner.
2. Start the control system (steps may be manual or automatic):
  - Start the blower (if controlled separately)
  - Allow time to purge tube
  - Initiate low fire start
  - Start the flame monitoring system and ignition sequence
3.  Verify that flame is present at the burner.

---

### **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. Stop the control system:
  - Stop the flame monitoring system
  - Stop the blower (if controlled separately)
  - For extended shutdown periods, shut off the main power to the control system
2. Close all the manual gas cocks to the burner.
3. For extended shutdown periods, shut off the manual valves in the burner gas line upstream of the main gas regulator.

# 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 <sup>3</sup> )	cubic foot (ft <sup>3</sup> )	35.31
cubic meter/hour (m <sup>3</sup> /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 <sup>-3</sup>
millimeter (mm)	inch (in)	3.94 × 10 <sup>-2</sup>

### 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 <sup>-3</sup>
cubic foot (ft <sup>3</sup> )	cubic meter (m <sup>3</sup> )	2.832 × 10 <sup>-2</sup>
cubic foot/hour (cfh)	cubic meter/hour (m <sup>3</sup> /h)	2.832 × 10 <sup>-2</sup>
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

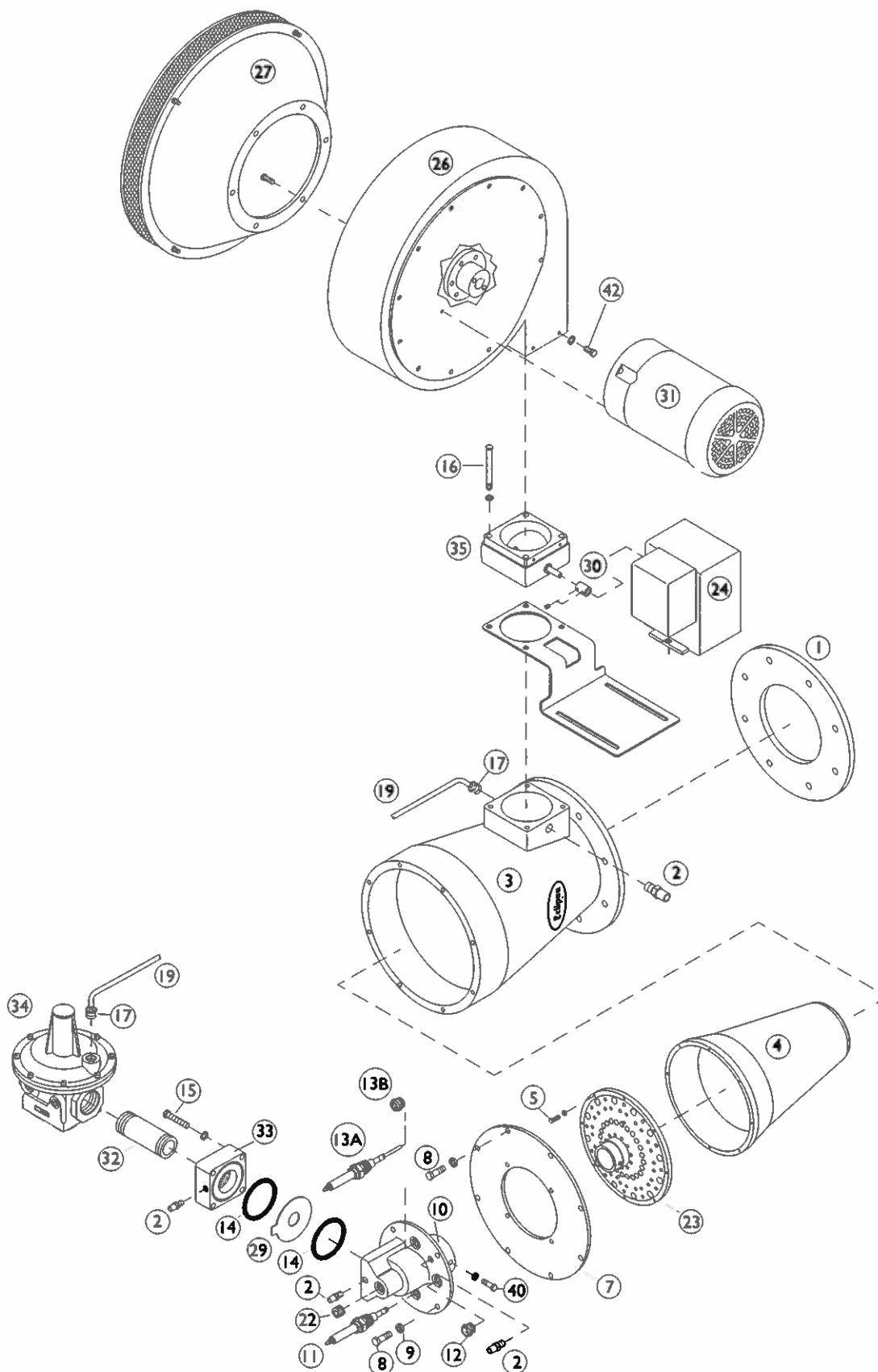
## Part Numbers ImmersoJet Series version 2.00

Pos.	Qty.	Description	IJ-Size-2	IJ-Size-3	IJ-Size-4	IJ-Size-6
		Drawing, packaged with blower	200782	200792	200787	101227
1	1	Gasket, mounting	20256	20265	20258	20337
2	4	P.F. plug test, 1/8" NPT	13445	13445	13445	13445
3	1	Body	7102-1	7113-1	7043-1	7121-1
4	1	Chamber, combustion	7105-1	7112-1	7109-1	7120-1
5	*	Screw, M4 x 16	4 x 20241	6 x 20241	8 x 20241	9 x 20242 (M6)
7	1	Plate, adapter, RC	20104	20266	19988	20320
8	*	Screw, M8 x 22	4 x 15886	10 x 15886	12 x 15886	12 x 15886
10	1	Cover, rear	7103-1	7107-1	7013-1	7013-1
11	1	Spark rod, 1/2" NPT	20211	20211	20211	20211
12	1	Peepsight	11737	11737	11737	11737
13	1	Flamerod, 1/2" NPT	20212	20212	20212	20212
13	1	UV scanner adapter	10033	10033	10033	10033
14	2	Seal, O'Ring, Viton	14777	17037	14778	14778
15	4	Screw, hex head, M8 x 45, gas inlet block	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
17	2	Fitting, tube, Prestolok	14689	14689	14689	14689
19	1	Tube, nylon	34505	34505	34505	34505
**	1	Nameplate, ImmersoJet burner	20729	20729	20729	20729
**	4	Screw, drive, nameplate	18933	18933	18933	18933
22	1	Plug, 3/4" NPT	18880	18880	18883	18883
23	1	Nozzle, machined, Natural Gas	100226 (7104)	100231 (7114)	100227 (7042)	102126 (7119)
23	1	Nozzle, machined, Propane/Butane	100229	100230	100228	102126
24	1	Actuator, EMP-423-4	15616-6	15616-6	15616-6	15616-6
24	1	Actuator, EMP-424-4	15616-4	15616-4	15616-4	15616-4
24	1	Honeywell M9174-C-7284	15273-4	15273-4	15273-4	15273-4
24	1	Actuator, EMA-418-1	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
27	1	Grille	10514	10515	10515	10515
27	1	Filter/silencer	15405	20505	20505	15407
29	1	Plate, orifice, Natural Gas	14191-23	14934-4	14188-21	14188-1
29	1	Plate, orifice, Propane	14191-14	14934-13	14188-7	14188-6
29	1	Plate, orifice, Butane	14191-3	14934-12	14188-14	14188-4
30	1	Coupling	21134	21134	21134	21134
31	1	Motor, blower		Varies with configuration of burner system		
32	1	Nipple, NPT	18748	18768	18801	18807
32	1	Nipple, BSP	20406	20407	20408	20319
33	1	Block, inlet, gas - NPT	3974-2	7001-1	3973-3	3973-3
33	1	Block, inlet, gas - Rc	3974-1	7001-3	3973-1	3973-1
34	1	Regulator, ratio, NPT	19997	15939	20312	20312
34	1	Regulator, ratio, BSP	19998	19999	20311	20311
35	1	Butterfly valve, packaged blower	102246	102267	102278	102277
37	1	Block, inlet, air - NPT, remote blower	3973-5	7108-2	3996-1	100041
37	1	Block, inlet, air - BSP, remote blower	3973-7	7108-3	3996-2	100041-1
40	1	Screw, hexhead, M4 x 12	20394	20394	20849	20242 (M6)
42	4	Screw, buttonhead, M6 x 12	15881	15881	15881	15891 (hex)
**	1	Actuator mounting kit - Honeywell	100256	100260	100264	100268
**	1	Actuator mounting kit - Eclipse	100257	100261	100265	100269
**	1	Actuator mounting kit - Eclipse Rotary with blower	100317	100317	100317	100317
**	1	Actuator mounting kit - Eclipse Rotary less blower	100318	100320	100322	100324
**	1	Switch, air	20475	20475	20475	20475
**	1	Kit, air switch mounting	101146	101146	101146	101146
**	1	Screw, M6 x 12	15894	15894	15894	15894
**	1	Plug	20605	20605	20605	20605

\* Quantity varies with product configuration

\*\* Not Illustrated

# **Illustrated Parts View** **ImmersoJet Series version 2.00**





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