Honeywell
ECLIPSE

Winnox nozzle-mix, low-emissions air heating burner

OPERATING INSTRUCTIONS

Version 3 · Edition 10.24 · 32-00057-03 · EN

CONTENTS

1 SAFETY

1.1 Disclaimer Notice

In accordance with the manufacturer's policy of continual product improvement, the product presented in this brochure is subject to change without notice or obligation.

The material in this manual is believed adequate for the intended use of the product. If the product is used for purposes other than those specified herein, confirmation of validity and suitability must be obtained. Honeywell-Eclipse warrants that the product itself does not infringe upon any United States patents. No further warranty is expressed or implied.

1.2 Liability and Warranty

We have made every effort to make this manual as accurate and complete as possible. Should you find errors or omissions, please bring them to our attention so that we may correct them. In this way we hope to improve our product documentation for the benefit of our customers. Please send your corrections and comments to our Marketing Communications Manager.

It must be understood that Honeywell's liability for its product, whether due to breach of warranty, negligence, strict liability, or otherwise is limited to the furnishing of replacement parts and Honeywell-Eclipse will not be liable for any other injury, loss, damage or expenses, whether direct or consequential, including but not limited to loss of use, income, or damage to material arising in connection with the sale, installation, use of, inability to use, or the repair or replacement of Honeywell-Eclipse's products.

Any operation expressly prohibited in this manual, any adjustment, or assembly procedures not recommended or authorized in these instructions shall void the warranty.

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EAC

1.3 Document Conventions

There are several special symbols in this document. You must know their meaning and importance.

1 2 3 a b c ... = Action

➔ = Instruction/Note

1.4 Audience and Purpose

This manual has been written for people who are already familiar with all aspects of a gas 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 previous experience with this type of equipment.

The purpose of this manual is to make sure that you carry out the installation of a safe, effective, and trouble-free system.

Further documents

For further information about this product see Technical Information

1.5 Safety instructions

Information that is relevant for safety is indicated in the instructions as follows:

⚠ DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

All interventions may only be carried out by qualified gas technicians. Electrical interventions may only be carried out by qualified electricians.

1.6 Safety

Important notices which help provide safe burner operation will be found in this section. To avoid personal injury and damage to the property or facility, the following warnings must be observed. All involved personnel should read this entire manual carefully before attempting to start or operate this system. If any part of the information in this manual is not understood, contact Honeywell before continuing.

⚠ DANGER

The burners covered in this manual are designed to mix fuel with oxygen 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; fire or explosion could result.
– Never try to light the burner if it shows signs of damage or malfunction.

⚠ WARNING

– The burner is likely to have HOT surfaces. Always wear protective clothing when approaching the burner.
– Honeywell 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 the risk, limit exposure to these chemicals, work in a well-ventilated area and wear approved personal protective safety equipment for these chemicals.

⚠ CAUTION

– 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 Honeywell.

Capabilities

Only qualified personnel, with good mechanical aptitude and experience with combustion equipment, should adjust, maintain, or troubleshoot any mechanical or electrical part of this system.

Operator Training

The best safety precaution is an alert and trained operator. Train new operators thoroughly and have them demonstrate an adequate understanding of the equipment and its operation. A regular retraining schedule should be administered to ensure operators maintain a high degree of proficiency.

Replacement Parts

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

Winnox · Edition 10.24

2 PRODUCT DESCRIPTION

The Winnox is a nozzle-mix, low-emissions burner designed for direct and indirect air heating, as well as oven applications up to 1800°F (980°C).
The burner package includes a combustion air blower and ratio regulator to fire over a wide gas turndown range at a controlled ratio.
The wide variety of options and configurations are available due to the modular design of the burner.
The burner is designed for:

- Low NO_X and CO emissions
- Efficient ratio controlled combustion
- Reliable burner operation
- Simple burner adjustment
- Direct spark ignition
- Multiple fuel capability

3 INTRODUCTION

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

3.1 Handling and Storage

Handling

➔ Make sure the area is clean.
➔ Protect the components from weather, damage, dirt and moisture.
➔ Protect the components from excessive temperatures and humidity.

Storage

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

3.2 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 here: Technical Information - System Design. Use the schematics in that chapter to build your system.

3.3 Approval of Components

Limit Controls and Safety Equipment

All limit controls and safety equipment must comply with all applicable local codes and/or standards and must be listed for combustion safety by an independent testing agency. Typical application examples include:

- American: NFPA 86 with listing marks from UL, FM, CSA
- European: EN 746-2 with CE mark from TuV, Gastec, Advantica

Electrical Wiring

All the electrical wiring must comply with all applicable local codes and/or standards such as:

- NFPA Standard 70
- IEC 60364
- CSA C22
- BS7671

Gas Piping

All the gas piping must comply with all applicable local codes and/or standards such as

- NFPA Standard 54
- ANSI Z223
- EN 746-2

Where to Get the Standards?

The NFPA Standards are available from:
National Fire Protection Agency
Batterymarch Park
Quincy, MA 02269
www.nfpa.org

The ANSI Standards are available from
American National Standard Institute
1430 Broadway
New York, NY 10018
www.ansi.org

The UL Standards are available from
333 Pfingsten Road
Northbrook, IL 60062
www.ul.com

The FM Standards are available from
1151 Boston-Providence Turnpike
PO Box 9102
Norwood, MA 02062
www.fmglobal.com/approvals

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
www.cen.eu

Comité Européen de Normalisation Electronique
Stassartstraat 36
B-1050 Brussels
Phone: +32-25196871
Fax: +32-25196919
www.cenelec.org

3.4 Checklist before installation

Intake

Provide an opening in the burner room of at least one square inch per 4000 BTU/h (1,17 kW) to supply the burner intake with fresh, outdoor, combustion air.
If there are corrosive fumes or materials in the surrounding air, find an uncontaminated source to supply air to the burner, or provide a sufficient air filtering system.

Exhaust

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

Access

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

Environment

Make sure the local environment matches the original operating specifications. Check the following items:

- Voltage, frequency and stability of the electrical power
- Fuel 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

4 INSTALL 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

- Connecting the flame sensor of a burner to the electrical circuit of the wrong burner can result in a fire or explosion.

There are two different types of flame sensors; UV scanner and flame rod.

UV Scanner

➔ The UV scanner must be compatible to the flame monitoring control that is used. Refer to the manual of your selected control for proper selection of the scanner.

Flame Rod

NOTE: Only specific burner sizes with alloy or silicon carbide combustors can use a flame rod, see Technical Information Winnox.

➔ For detailed information on how to install and connect a flame rod, refer to Eclipse ignition components technical literature.

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 or bad grounding of the spark plug may occur, resulting in a weak spark.

➔ If flame monitoring controls other than those recommended in the Design Guide are used contact Eclipse to determine how the burner performance may be affected, adjustments may vary from Eclipse published values. Consult with the engineer who specified the alternate control for limitations.

5 INSTALL BURNER

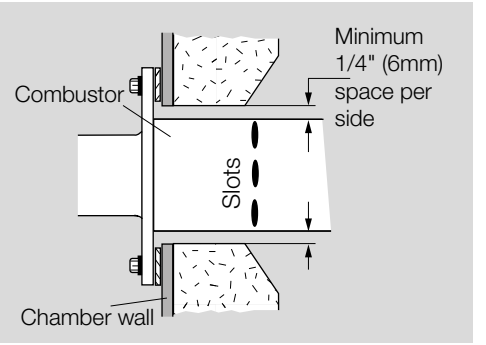
Chamber Opening

1 Provide an opening in the chamber wall at least 1/2" (12 mm) larger in diameter than the outside diameter of the combustor (1/4"–6 mm per side).

➔ The combustor diameter can be found here: .

2 Provide an accessible pressure tap on the chamber wall to measure the pressure inside the firing chamber.

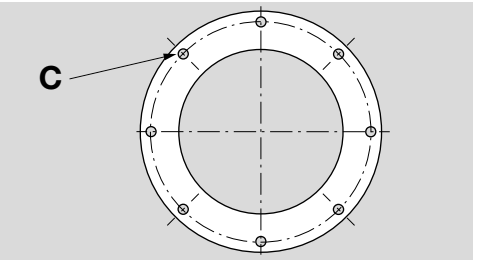
➔ The pressure tap should be located near the burner.



Chamber opening

Mounting pattern

3 Attach eight mounting bolts to the chamber wall. Position these bolts to match the clearance holes (**C**) on the burner mounting flange.



Chamber mounting pattern

➔ More information can be found here: .

Tube shrouding considerations

➔ Applications in which there is process air flow perpendicular to and across the Winnox combustor greater than 1000 ft/min (5 m/s) may cause flame instability and/or high production of CO emissions.

4 In these applications a shroud may be required to shield the combustor. Contact Eclipse for more information.

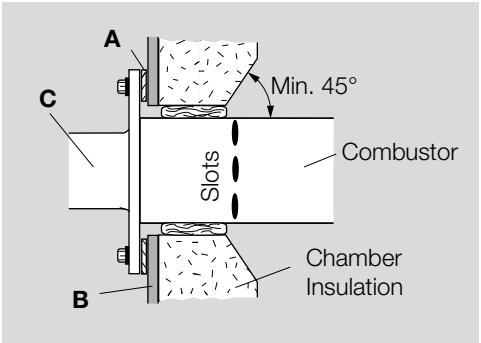
Chamber wall

➔ Make sure the chamber wall **B** is strong enough to support the weight of the burner **C**.

5 If necessary, reinforce the mounting area. See figure "Chamber wall".

Note: The slots in the combustor must not be covered with insulation.

6 If necessary, taper the chamber insulation at a minimum of 45° to provide clearance for the combustor slots. Slot dimensions can be found here: .



Chamber wall

Burner mounting

7 Mount the burner to the chamber wall using eight (8) customer supplied nuts and lock washers.

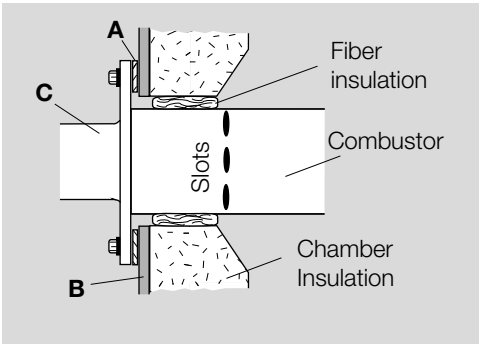
Alloy combustion tube

8 Be sure gasket **A** is installed between burner **C** and chamber wall **B**. See figure "Alloy combustion tube".

⚠ CAUTION

– Placing insulation over combustor slots will impede burner performance and decrease combustor life.

9 Pack fiber insulation around the tube to a depth not beyond the combustor slot position, as shown in figure "Alloy combustion tube".



Alloy combustion tube

6 GAS PIPING

Burner piping

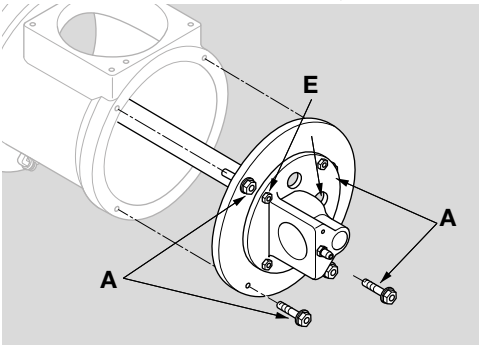
➔ The burner is factory assembled and shipped as ordered.

Note: If you have to realign the pipes, please observe the following!

⚠ CAUTION

– Do not attempt to redirect piping by removing the inner circle bolts**E**. Internal burner parts will be damaged.

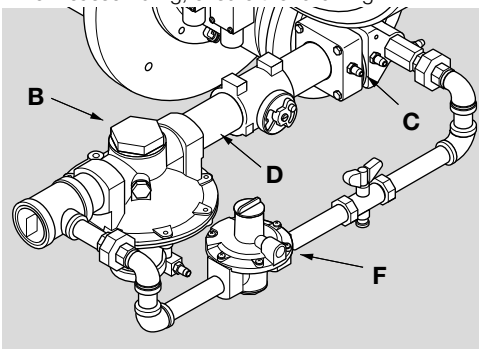
1 Remove the outer **A** four bolts only.



Redirect piping

2 Rotate the rear cover and replace bolts.

When reassembling, ensure the following.



Burner piping

3 The ratio regulator spring column **B** is pointing down.

4 The bypass regulator spring column is pointing up **F**.

5 The arrow on the ratio regulator points in the direction of gas flow.

6 Integral fuel orifice and o-rings **C** are reinstalled.

7 The same straight run of pipe **D** remains between the ratio regulator and the burner.

⚠ CAUTION

– Do not alter the bypass regulator. The NFPA requires that the bypass regulator **F** be appropriately vented and protected.

– For applications in which the Winnox is operating indoors, a vent limiting device is installed in the bypass regulator.
– For applications in which the Winnox is operating outdoors, an insect/rain protector is installed in the bypass regulator.

Supply piping

➔ Inlet pressure to the ratio regulator must stay within specified limits. More information can be found here: .

8 Locate the valve train close to the burner. The gas must reach the burner during the fixed trial for ignition period.

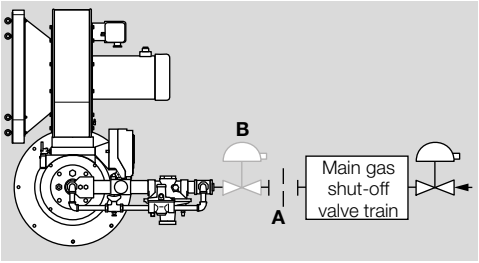
9 Sufficiently size the shut off valve in the valve train.

10 Make sure piping is large enough to accommodate flow required to meet burner input.

11 Minimize piping elbows.

12 Install fuel flow measurement device **A** upstream from the burner inlet.

13 If necessary to maintain inlet pressures to the burner (see datasheet for your burner), install a gas pressure regulator **B** upstream of the burner inlet and downstream of the valve train and fuel measurement device **A**.



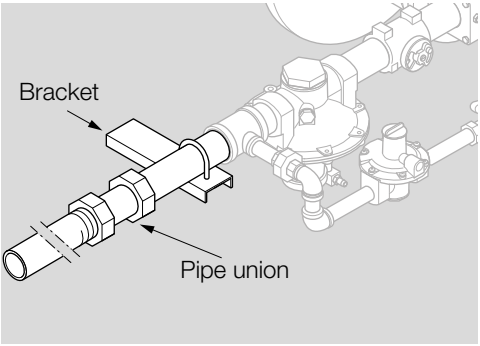
Supply piping

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.



Pipe connections

Piping support

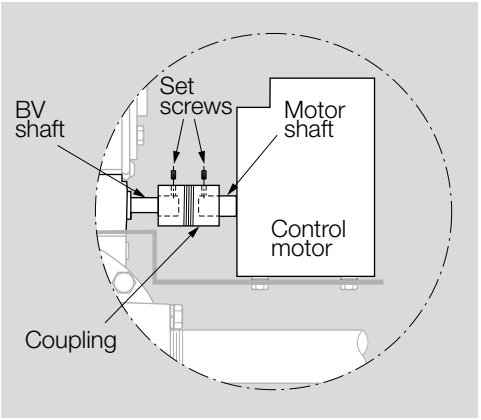
➔ Use brackets or hangers to support the gas piping.

➔ If you have questions, consult your local gas company.

Control motor

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

Note: Be sure the control motor shaft and air butterfly valve shaft are aligned properly.



Control motor

7 CHECKLIST AFTER INSTALLATION

To verify proper system installation, do the following:

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

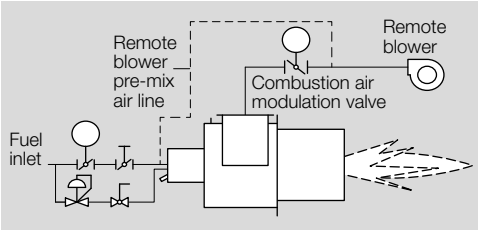
4 Make sure that the blower rotates in the correct direction. If incorrect, have a qualified electrician rewire the blower to reverse its rotation.

5 Make sure all valves are installed in the proper location and correctly oriented relative to the gas or air flow direction.

8 INSTALL AIR PRE-MIX LINE WITH REMOTE BLOWER (WX0850 ONLY)

When using a remote blower instead of the packaged blower on the WX0850, the low fire air pre-mix line must be installed to the combustion air line. 1/4" diameter braided hose is recommended, located as shown in figure "Air pre-mix line".

Note: A 24" length of 1/4" diameter braided hose is included with the burner.



Air pre-mix line

9 ADJUSTMENT, START AND STOP

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 Winnox burners 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.

9.1 Step 1 - Reset the system

1. Set the low gas pressure switch to 20% below the “Fuel Inlet Pressure” range as specified in the appropriate datasheet.
2. Set the high gas pressure switch to 20% above the “Main Gas Inlet Pressure” range as specified in the appropriate datasheet.
3. Close all the burner gas valves - manual and automatic.
4. Try to ignite the burner; be sure the flame monitoring system indicates a flame failure.
5. Activate the pressure switches and other limit interlocks. Be sure the switches fail as intended in the event of a power failure.

⚠ DANGER

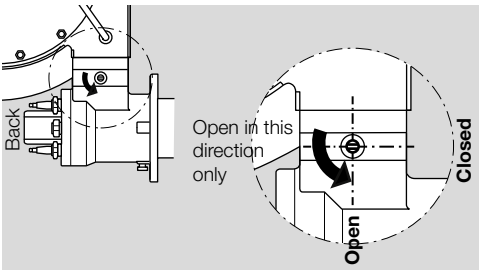
- If simulated limits or simulated flame failure do not shut down the fuel system within the required failure response time, immediately correct the problem before proceeding. Refer to .

6. If the burner is firing into a duct or chamber with a circulating fan, start the fan to produce full process air flow past the burner.
7. Adjust main gas inlet pressure to the ratio regulator within the range specified in the appropriate datasheet.

⚠ WARNING

- Gas inlet pressures must stay within the specified range. Pressure above the specified range can damage the ratio regulator.
- 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 chamber.
- In extreme cases, this accumulation of unburned fuel may cause fires or explosions.

8. Verify the actuator opens the air butterfly valve towards the back of the burner as shown in figure "Air butterfly valve open direction". If it doesn’t, refer to the actuator’s literature for instructions on how to reverse the direction.

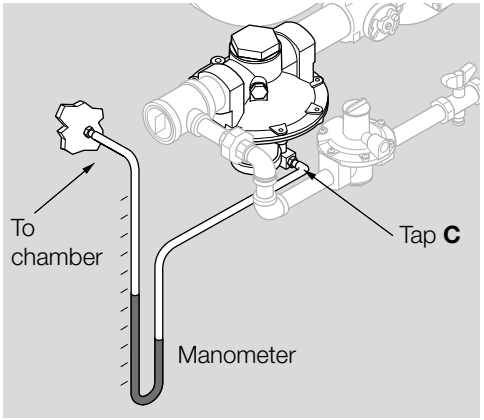


Air butterfly valve open direction

9.2 Step 2 - Set low fire air

1. Start combustion air blower.
2. Drive control motor to low fire position.
3. Measure the air differential pressure between tap **C** and the combustion chamber.

Note: The pressure tap is in the open position when the screw inside the tap is unscrewed approximately 1/2 turn. Do not remove the screw. Be sure to tighten the pressure tap screw clockwise to the closed position after pressure measurements have been taken.



Air differential pressure

4 Set low fire air.

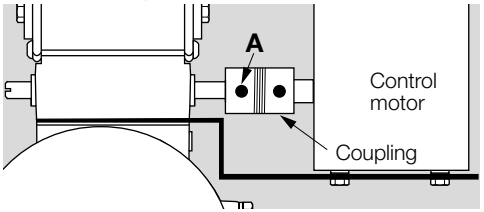
a Loosen the set screw **A** on the burner side of coupling. There is a slot in the end of the butterfly valve shaft that is parallel to the air damper. This slot is used for visual indication of the butterfly valve position. The butterfly valve is closed when the shaft slot is perpendicular to the direction of air flow through the butterfly valve.

b Rotate the air butterfly valve shaft to a fully closed position. (Holes in the butterfly valve will supply low fire air.)

c When firing into a positive chamber pressure, rotate the air butterfly valve from the closed position in the direction of actuator travel to obtain a minimum 0.3" w.c. (0,8 mbar) air differential pressure.

d Hold the butterfly valve shaft firmly in place and tighten set screw **2**.

→ High fire air adjustment is not required if the burner is firing into a neutral pressure chamber and a 90° travel control motor is used. It may be necessary to limit control motor stroke to less than 90° if firing into a large negative chamber. Contact Eclipse for further information.



Air butterfly valve adjustment

5 Verify high fire air:

a Drive control motor to high fire, full open.

b Compare the high fire air differential pressure between Tap **C** and the combustion chamber to the approximate datasheet chart “Air Δp vs. Input”. If high fire air is insufficient, refer to .

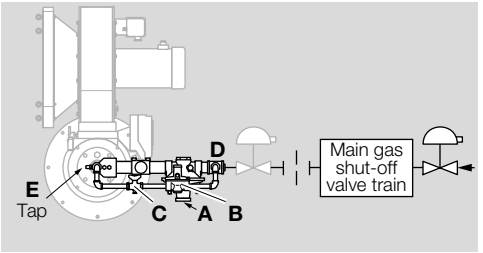
6 Return the control motor to the low fire position.

7 Close the pressure taps.

Air butterfly valve shaft

9.3 Step 3 - Ignite the burner

Low fire start



Low fire start

Legend:
A Adjusting screw on the ratio regulator
B Bypass pressure regulator
C Adjustable limiting orifice
D Burner gas inlet

⚠ WARNING

– These procedures are 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 control motor to low fire.

2 Be sure combustion air blower is running.

3 Open main gas manual shut off valves.

4 With pressure taps open, connect the manometer between Tap **E** and the chamber.

5 Set system control to stay at low fire during and after ignition sequence.

6 Attempt to ignite burner.

7 During trial for ignition, adjust bypass pressure regulator **B** and adjustable limiting orifice **C** to achieve the appropriate Δp between Tap **E** and the chamber as listed in the appropriate datasheet.

Note: If viewing the flame, it should be blue with flashes of yellow. The flame should be completely within the combustion tube. When firing propane or butane, a proper low fire flame may have sustained flashes of yellow.

8 If burner does not ignite:

a Shut off gas.

b When chamber temperature is below 250°F (121°C), shut off combustion air blower.

c Restart combustion air blower, drive through purge cycle and ignite the burner.

d Measure low fire gas pressure to the burner gas inlet **D**. Verify pressure at **D** is within the range specified here: .

9 After ignition, verify low fire flame:

a Shut off gas.

b When chamber temperature is below 250°F (121°C), shut off combustion air blower.

c Restart combustion air blower and ignite burner.

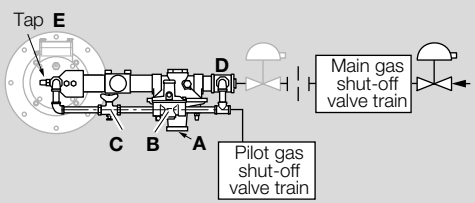
d Measure low fire gas pressure to the burner gas inlet **D**. Verify pressure at **D** is within the range specified on the datasheet for your burner.

e Verify repeatability of ignition and low fire flame signal.

NOTE: If the flame signal is too low, use the bypass regulator **B** and/or the adjustable limiting orifice **C** to increase the pressure at Tap **E** and provide better flame signal. However, this can have a negative impact on emissions and/or nozzle life.

10 Close all pressure taps.

Pilot start option



Low fire start with pilot start option

⚠ WARNING

– These procedures are 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 control motor to low fire.

2 Be sure combustion air blower is running.

3 Open pilot gas manual shut off valve.

Note: Be sure main gas manual shut off valves are closed.

4 With pressure taps open, connect a manometer between Tap **E** and the chamber.

5 Set system control to stay at low fire during and after ignition sequence.

6 Attempt to ignite burner.

7 During trial for ignition, adjust bypass pressure regulator **B** and adjustable limiting orifice **C** to achieve the appropriate Δp between Tap **E** and the chamber as listed in the appropriate datasheet.

Note: If viewing the flame, it should be blue with flashes of yellow. The flame should be completely within the combustion tube. When firing propane or butane, a proper low fire flame may have sustained flashes of yellow.

8 If burner does not ignite:

a Attempt to ignite the burner again to purge air from the gas piping.

b If burner still does not ignite, adjust bypass pressure regulator **B** a half turn clockwise to increase gas flow.

c Repeat until burner ignites. If necessary, refer to .

9 After ignition, verify bypass flame:

a Shut off gas. When chamber temperature is below 250°F (121°C), shut off combustion air blower.

b Restart combustion air blower, drive through purge cycle, and ignite burner.

c Measure low fire gas pressure to the burner gas inlet **D**. Verify pressure at **D** is within the range specified on the datasheet for your burner.

d Verify repeatability of ignition and low fire flame signal.

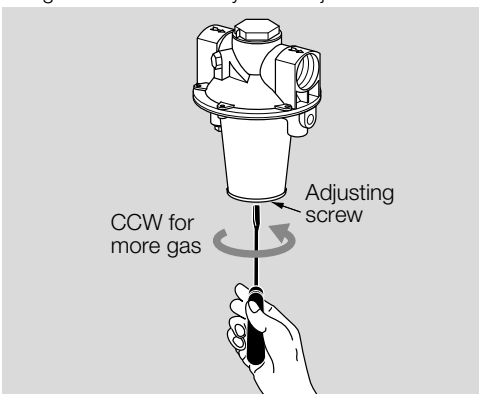
10 Close all pressure taps.

9.4 Step 4 - Set low fire gas

⚠ 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 Set manual gas butterfly valve to 75% open. See figure "Manual butterfly valve adjustment".



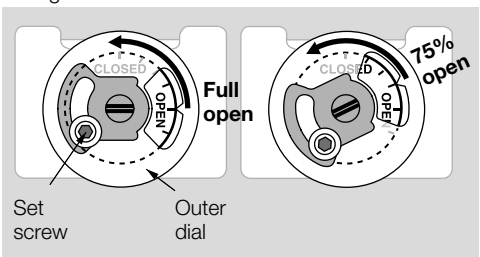
Ratio regulator adjustment

Note: To adjust manual butterfly valve:

a Loosen set screw.

b Turn dial.

c Tighten set screw.



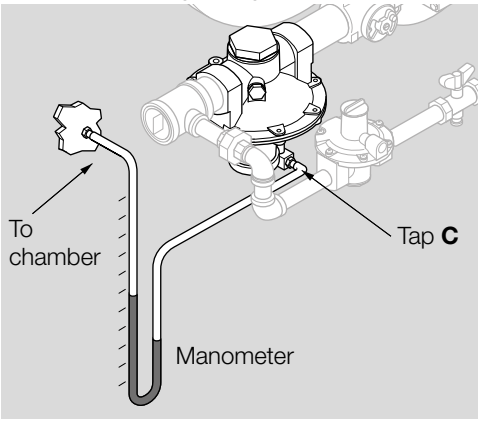
Manual butterfly valve adjustment

2 Open all manual gas shut off valves.
3 Set system control to stay at low fire during and after ignition sequence.
4 With taps open, connect manometer between Tap **C** and the combustion chamber.
5 Ignite the burner.

Note: If viewing the flame, it should be blue with flashes of yellow. The flame should be completely within the combustion tube. When firing propane or butane, a proper low fire flame may have sustained flashes of yellow.

6 Verify low fire flame.
a Drive control motor from low fire and back. Verify low fire and stable flame signal are repeated.
b Turn the burner off and repeat the ignition sequence. Verify low fire and stable flame signal are repeated.
7 Close all pressure taps.

9.5 Step 5 - Set high fire gas



High fire gas adjustment

1 Set manual gas butterfly valve to 75% open. See step 4, figure "Manual butterfly valve adjustment".

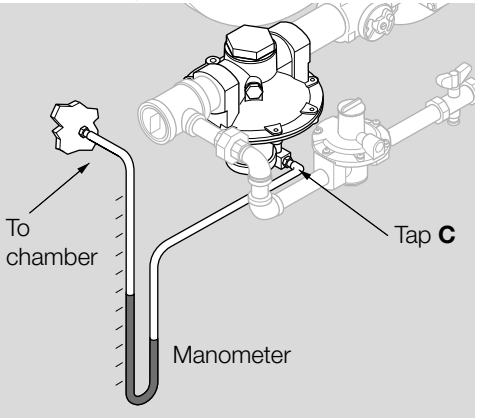
Note: To adjust manual butterfly valve:
a Loosen set screw.
b Turn dial.
c Tighten set screw.
2 With burner lit, drive control motor to high fire position.
3 Measure air loading line pressure from tap **C** to the chamber. See step 2, figure "Air differential pressure".
4 Refer here: . Find your measured high fire air Δp "w.c. (mbar) on vertical axis at left and plot the intersection point it makes with performance curve in center of chart. Follow chart straight down from this intersection point to confirm the desired high fire burner input Btu/h (kW) charted on horizontal axis across the bottom.
5 Calculate the required gas flow scf/h (m^3/h) for the desired high fire burner input Btu/h (kW).
➔ Example: (500,000 Btu/h input) x (1 scf Natural Gas/1000 Btu) = 500 scf/h of Natural Gas.
6 Measure existing gas Δp "w.c. (mbar) across customer supplied in-line fuel orifice meter, and using the manufacturer's conversion flow chart for the fuel orifice meter, calculate* the existing gas flow scf/h (m^3/h) through orifice.

(= making the manufacturer's prescribed corrections for Fuel Type, Temperature, and Elevation.)*

7 If the required gas flow scf/h (m^3/h) from step 5 does not correspond with the existing gas flow scf/h (m^3/h) from step 6, adjust existing gas flow using manual butterfly valve (refer to step 1 for adjustment procedure) to match required gas flow for the desired high fire burner input.
8 If required gas flow cannot be achieved, refer to .

9.6 Step 6 - Verify settings

1 With burner lit, drive control motor to high fire.
2 Wait for the chamber to reach normal operating conditions (e.g. chamber temperature, process flows, etc.).
3 Measure high fire fuel using fuel flow measurement device. Compare this to the rated high fire which can be found in the .
4 Measure high fire air differential pressure between Tap **C** and the chamber.



Verify pressure settings

5 Compare this pressure to the chart: .
6 Drive the control motor to low fire and verify low fire flame signal and flame appearance (if viewing).
7 Cycle burner from high to low several times to check repeatability of settings.
8 Readjust burner if the settings do not repeat as expected. If necessary, refer to .
9 Use the System Schematics, see Technical Information Winnox, to record all setup data as an aid for future troubleshooting and setup operations.

⚠ CAUTION

– Do not turn the combustion air blower off until the chamber temperature is below 250°F (121°C). This will prevent hot gases from back flowing into the burner and blower causing damage to the burner.

10 Stop the burner.

10 MAINTENANCE

Preventive maintenance is the key to a reliable, safe and efficient system. The core of any preventive maintenance system is a list of periodic tasks. The following are suggestions for a monthly list and a yearly list.

➔ The monthly list and yearly lists are an average interval. If your environment is dirty, the intervals may be shorter. Other standards may take precedence for your particular application.

10.1 Monthly 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. Clean and inspect all the burners.
6. Make sure that the following components are not damaged or distorted:

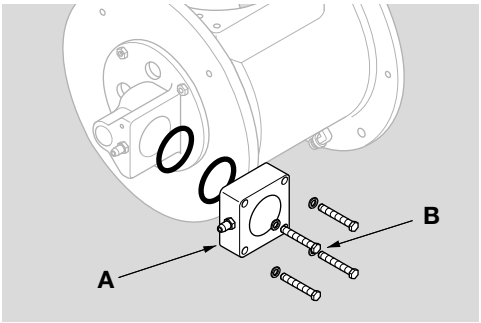
– burner nozzle
– spark plugs
– flame sensors
– flame tube or combustion block

7. If applicable, remove and clean all the orifice plates.

10.2 Yearly checklist

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 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.
11. Inspect and clean the combustion air blower rotor.

10.3 Burner nozzle



Component inspection

The nozzle can be inspected without removing the burner from the chamber wall or entering the chamber. See the figures and perform the following:

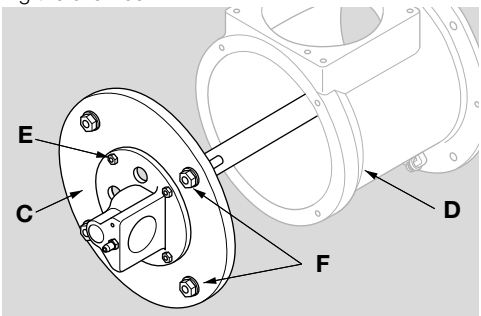
1. Shut the burner off and manually close the main gas shut off cocks.
2. Allow the chamber temperature to cool down to 250°F (121°C).
3. Disconnect the gas piping at a union or the gas inlet flange **A** provided on the burner.
4. Remove the four bolts **B**.

⚠ CAUTION

– Do not attempt to remove the rear cover by removing the inner circle bolts **E**. Internal burner parts will be damaged.

5. Remove bolts **F**.
6. Remove the rear cover / nozzle assembly **C** from the burner housing **D**.
7. To reassemble, follow this sequence in the reverse order.

Note: The combustor can be inspected only by removing the burner from the chamber wall or entering the chamber.



Nozzle inspection

11 SPARE PARTS

The PartDetective web app for selecting spare parts is available at www.adlatus.org.

12 ASSISTANCE IN THE EVENT OF MALFUNCTION

➔ Faults may be cleared only using the measures described below.

⚠ CAUTION

Please note the following to avoid damage:

– Fault-clearance must only be undertaken by authorized trained personnel.

➔ If these measures do not help to rectify the fault: remove the unit and return it to the manufacturer for inspection.

Faults

! Cause
- Remedy

12.1 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 igniter.
- Repair or replace the wiring to the igniter.

! No ignition: The igniter needs cleaning.
- Clean the igniter.

! No ignition: The igniter is not correctly grounded to the burner.
- Clean the threads of the igniter and the burner. **Note:** Do not apply grease to the thread of the igniter.

! No ignition. Igniter insulator is broken. Igniter is grounding out.
- Inspect the igniter. Replace if broken.

! Igniter grounds out, igniter is bent.
- Inspect ignitor by removing nozzle and rear cover. Check if gaps exist, readjust if needed.

! Not enough gas. The gas pressure into the ratio regulator is too low.
- Check the start-up setting. Measure the gas pressures and adjust where necessary.

! Not enough gas. The impulse line to the ratio regulator is leaking.
- Repair any leaks.

! Not enough gas. The adjustable orifice valve is not open far enough.
- Adjust bypass or low fire gas.

! Not enough gas. Start gas solenoid valve does not open.
- Check the solenoid valve coil for proper operation. Replace it if necessary.

! Not enough gas. Gas valve does not open.
- Check the wiring to the automatic gas shutoff valve. Check the output from the flame safeguard. Open manual gas cock.

! Not enough gas. Ratio regulator is incorrectly set.
- Adjust the ratio regulator to the proper setting.

! No flame signal. Broken flame rod and/or dirty UV scanner lens.
- Inspect and clean sensor. Replace if necessary.

! Too much gas. Gas butterfly valve too far open.
- Check for proper setting.

12.2 The low fire flame is weak or unstable

! Not enough gas flowing to the burner.
- Adjust the ratio regulator or bypass fuel adjustable orifice valve to increase the gas flow.

! Not enough air.
- Check for proper blower rotation. Check air filter for blockage. Compensate for chamber by opening the low fire air butterfly valve position.

12.3 The burner goes out when it cycles to high fire

! Not enough gas pressure into the ratio regulator.
- Check the start-up settings. Measure the gas pressures and adjust them where necessary. Check for valve train pressure loss.

! Loading line to the ratio regulator is leaking.
- Repair the leak in the loading line.

! Not enough gas flowing to the burner.
- Adjust the ratio regulator to increase the gas flow.

! Fuel bypass line is not set correctly.
- Set fuel bypass pressure per technical data. More information can be found here: . Additional minor adjustments to the fuel bypass ALO valve may be required to achieve a stable flame through the transition between low and high fire.

12.4 The burner is erratic and does not respond to adjustment

! Internal damage to the burner. Some parts inside the burner are loose, dirty or burned out.
- Contact Eclipse for further information.

12.5 The burner is unstable or produces soot, smoke, or excessive carbon monoxide

! The air/gas ratio is out of adjustment.
- Measure all the gas pressures and air pressures. Compare these pressures to the documented initial start-up settings and adjust them where necessary.

12.6 The burner cannot achieve full capacity

! Air filter is blocked.
- Clean or replace the air filter.

! Gas pressure going into the ratio regulator is too low.
- Adjust the gas pressure.

12.7 Cannot initiate a start sequence

! Air pressure switch has not made contact.
- Check air pressure switch adjustment. Check air filter. Check blower rotation. Check outlet pressure from blower.

! High or low gas pressure switch has activated.
- Check incoming gas pressure. Adjust gas pressure if necessary. Check pressure switch setting and operation.

! Malfunction of the flame safeguard system (e.g. shorted-out flame sensor or electrical noise in the sensor line).
- Have a qualified electrician troubleshoot and correct the problem.

! No power to the control unit.
- Have a qualified electrician troubleshoot and correct the problem.

! Main power is off.
- Be sure the main power to the system is switched to the “On” position.

13 TECHNICAL DATA

13.1 Input of packaged blower

All information is based on laboratory testing. Different chamber conditions will affect the data.
Eclipse reserves the right to change the construction and/or configurations of our products at any time without being obliged to adjust earlier supplies accordingly.

Packaged blower nominal value (60 Hz)

Maximum input, kBTU/h (kW)*), depending on the chamber pressures, "WC (mbar)

	chamber pressures "WC (mbar)				
Model	**-5 (-12.5)**	**-3 (-7.5)**	**-0 (0)**	**1 (2.5)**	**2 (5)**
WX0050	620 (181)	580 (171)	550 (161)	510 (149)	470 (137)
WX0100	1130 (333)	1080 (316)	1000 (293)	970 (284)	940 (275)
WX0200	2270 (667)	2170 (634)	2000 (586)	1940 (568)	1880 (551)
WX0300	3360 (980)	3220 (940)	3000 (880)	2930 (860)	2850 (830)
WX0400	4460 (1310)	4290 (1260)	4000 (1170)	3910 (1150)	3810 (1120)
WX0500	5560 (1630)	5340 (1560)	5000 (1470)	4880 (1430)	4760 (1390)
WX0600	6690 (1960)	6430 (1880)	6000 (1760)	5870 (1720)	5720 (1680)
WX0850	9700 (2840)	9200 (2694)	8500 (2490)	8200 (2416)	7980 (2337)

**) Maximum inputs for packaged blower versions are given for the standard combustion air blower without an inlet air filter.*

Minimum input On-Ratio, BTU/h (kW)*)

Model	Minimum, kBTU/h (kW)
WX0050	75 (22)
WX0100	143 (42)
WX0200	300 (90)
WX0300 WX0400	340 (100)
WX0500	570 (170)
WX0600	550 (160)
WX0850 Natural gas Propane, Butane	 500 (146) 600 (175)

**) All imperial inputs based upon gross calorific values (HHV): one atmosphere, 70°F (21°C). All metric inputs based upon net calorific values (LHV). For lower inputs, contact Honeywell Eclipse.*

Gas inlet pressure*)

Fuel pressure at ratio regulator inlet

Model	Maximum "WC (mbar)	Minimum "WC (mbar)
WX0050, WX0100	27.7 (70)	22.0 (55)
WX0200	40 (100)	23 (58)
WX0300	55 (137)	30 (75)
WX0400	60 (150)	35 (87)
WX0500	55 (138)	38 (95)
WX0600	61 (152)	33 (83)
WX0850	82 (207)	27.7 (69)

**) For proper performance, this pressure must be kept constant across the burner operating range.*

Packaged blower motor power (60 Hz)

Model	hp (PS)	kW
WX0050	0.75	0.37
WX0100	1.5	1.1
WX0200	3	2.2
WX0300, WX0400	5	3.7
WX0500, WX0600	7.5	5.5
WX0850	15	11

13.2 Input of remote blower

All information is based on laboratory testing. Different chamber conditions will affect the data.
Eclipse reserves the right to change the construction and/or configurations of our products at any time without being obliged to adjust earlier supplies accordingly.

WX0050: Pressure at air inlet 9 "WC (22.5 mbar)
WX0100–WX0600: Pressure at air inlet 1 psig (70 mbar)
WX0850: Pressure at air inlet 1.5 psig (100 mbar)

Maximum input, kBTU/h (kW), depending on the chamber pressures, "WC (mbar)

	chamber pressure "WC (mbar)				
Model	-5 (-12.5)	-3 (-7.5)	-0 (0)	1 (2.5)	2 (5)
WX0050	650 (190)	630 (183)	590 (173)	560 (163)	520 (152)
WX0100	1300 (381)	1260 (371)	1200 (352)	1180 (346)	1150 (338)
WX0200	2610 (765)	2520 (740)	2400 (703)	2350 (690)	2310 (677)
WX0300	4080 (1200)	3910 (1150)	3630 (1060)	3540 (1040)	3430 (1010)
WX0400	5520 (1620)	5280 (1550)	4900 (1430)	4760 (1400)	4620 (1350)
WX0500	6720 (1970)	6440 (1890)	5990 (1760)	5830 (1710)	5670 (1660)
WX0600	8280 (2420)	7920 (2320)	7340 (2150)	7140 (2090)	6930 (2030)
WX0850	13,600 (3985)	13,200 (3868)	12,500 (3660)	12,200 (3575)	12,000 (3516)

Minimum input On-Ratio, kBTU/h (kW)*)

Model	Minimum, BTU/h (kW)
WX0050	75 (22)
WX0100	143 (42)
WX0200	300 (90)
WX0300 WX0400	340 (100)
WX0500	570 (170)
WX0600	550 (160)
WX0850 Natural gas Propane, butane	 500 (146) 600 (175)

**) All imperial inputs based upon gross calorific values (HHV): one atmosphere, 70°F (21°C). All metric inputs based upon net calorific values (LHV). For lower inputs, contact Honeywell Eclipse.*

Gas inlet pressure*)

Fuel pressure at ratio regulator inlet

Model	Maximum "WC (mbar)	Minimum "WC (mbar)
WX0050, WX0100	27.7 (70)	26.0 (65)
WX0200	40 (100)	30 (75)
WX0300	70 (175)	45 (112)
WX0400	80 (200)	55 (137)
WX0500	69 (172)	42 (103)
WX0600	75 (186)	47 (117)
WX0850	82 (207)	55.4 (138)

**) For proper performance, this pressure must be kept constant across the burner operating range.*

13.3 General

Turndown: 8:1.
Burner style:
WX0050–WX0600: upright or inverted, right or left hand piping,
WX0850: upright, right-hand or left-hand piping.
Fuel types:
WX0050: natural gas,
WX0100–WX0200: natural gas, propane,
WX0300–WX0850: natural gas, propane, butane.
High fire visible flame length: Flame is inside tube at all times.
Excess air at high fire: 40–70%.
Piping connection: NPT or BSP threaded connections are available.
Flame detection: flame rod or UV scanner.

Temperatures

Maximum process temperature: 1800°F (982°C).
Recommended maximum chamber temperature:

Model	Standard alloy tube	High temperature alloy tube
WX0100–WX0600	1300°F (704°C)	1550°F (843°C)
WX0850	1300°F (704°C)	1400°F (760°C)

Tube temperatures should be reduced 150°F (65°C) when using propane or butane.

Weight

All weights are approximate.
Burner with packaged blower:

Model	Weight lbs (kg)
WX0050	146 (66)
WX0100	192 (87)
WX0200	262 (119)
WX0300	351 (159)
WX0400	347 (158)
WX0500	505 (229)
WX0600	456 (207)
WX0850	1435 (651)

Burner without blower:

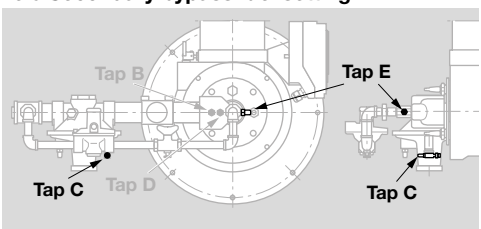
Model	Weight lbs (kg)
WX0050	107 (49)
WX0100	124 (56)
WX0200	180 (82)
WX0300	228 (104)
WX0400	224 (102)
WX0500	338 (153)
WX0600	289 (131)
WX0850	1135 (515)

13.4 Fuel type, HHV, WOBBE Index

Fuel	Symbol	Gross heating value (HHV)	Specific gravity	WOBBE Index
Natural gas	CH_4 90% +	1000 BTU/ft³ (11,1 kWh/m³)	0.60	1290 BTU/ft³
Propane	C_3H_8	2525 BTU/ft³ (28,11 kWh/m³)	1.55	2028 BTU/ft³
Butane	C_4H_{10}	3330 BTU/ft³ (37,14 kWh/m³)	2.09	2303 BTU/ft³

BTU/ft³ at standard conditions (kWh/m³ at normal conditions)

13.5 Secondary bypass fuel setting



Measuring taps

WX0050:

Fuel	Flame detection	Δp "WC (mbar)[1)]
Natural gas	UV scanner	0.5 (1.2)
Natural gas	Flame rod	1.5 (3.7)

WX0100–WX0850:

Model	Natural gas	Propane	Butane
	Δp "WC (mbar)[1)]		
WX0100	4.0 (10.0)	1.0 (2.5)	–
WX0200	4.0 (10.0)	7.4 (18.4)	–
WX0300	4.5 (11.3)	1.5 (3.8)	2.5 (6.3)
WX0400	8.0 (20.0)	8.5 (21.6)	3.5 (8.9)
WX0500	8.0 (20.0)	2.0 (5.1)	2.0 (5.1)
WX0600	8.0 (20.0)	8.0 (20.0)	8.0 (20.0)
WX0850	4.0 (10.0)	4.0 (10.0)	4.0 (10.0)

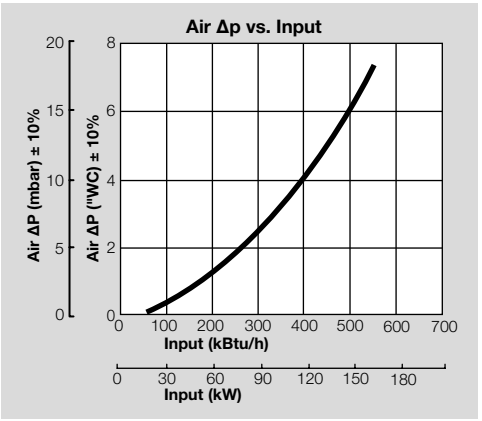
1) Measured between Tap "E" and the chamber at low fire.

NOTE: Input at low fire changes with ratio regulator adjustment.

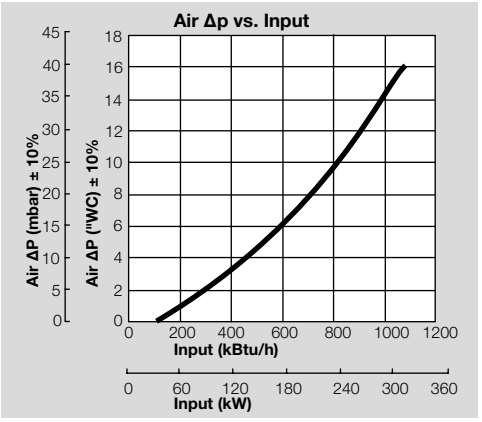
13.6 Performance graphs

13.6.1 Air ΔP vs. Input

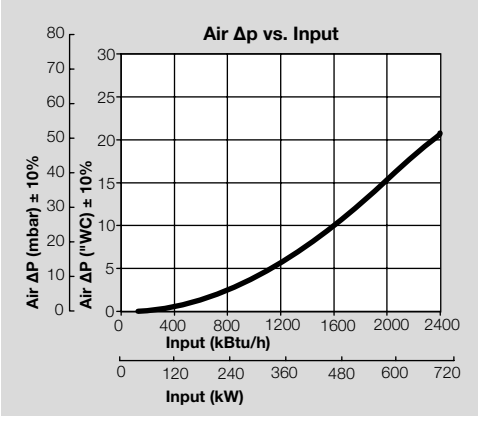
Δp measured between Tap **C** and the chamber with the burner firing



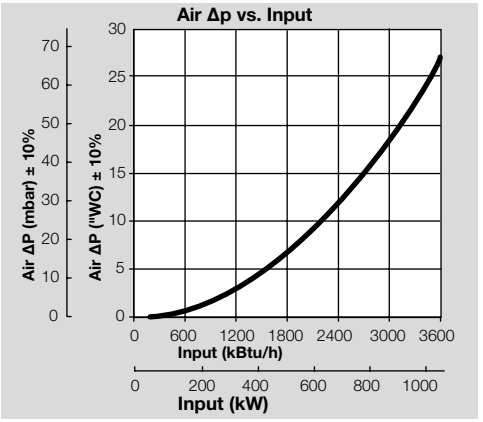
WX0050



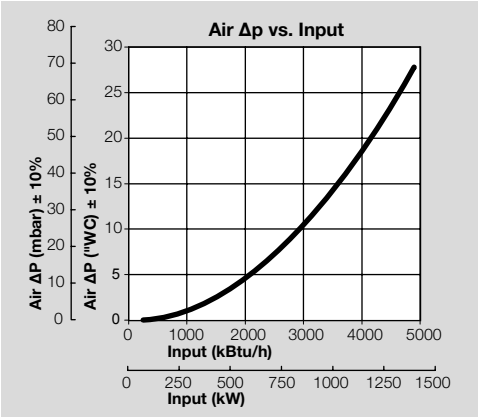
WX0100



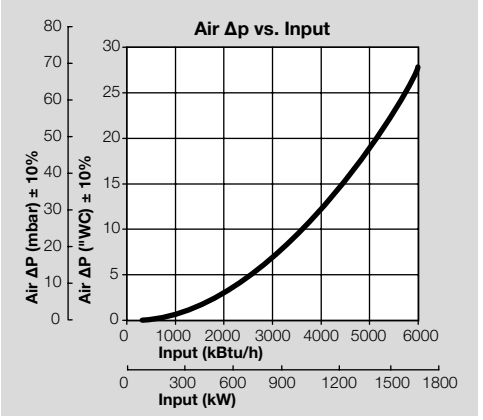
WX0200



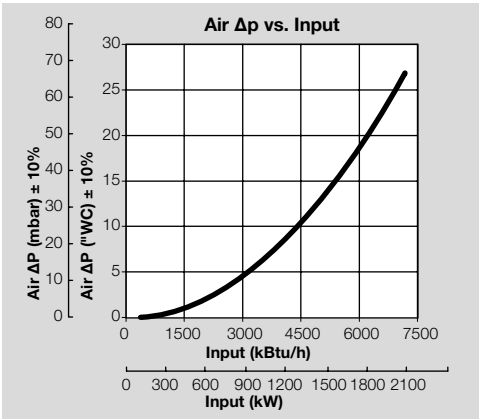
WX0300



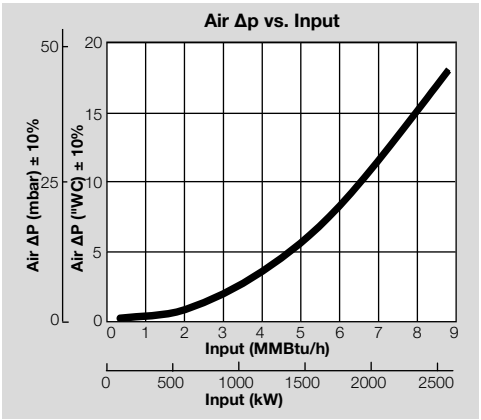
WX0400



WX0500



WX0600



WX0850

13.6.2 NO_X and excess air

NO_X emission data is given for:

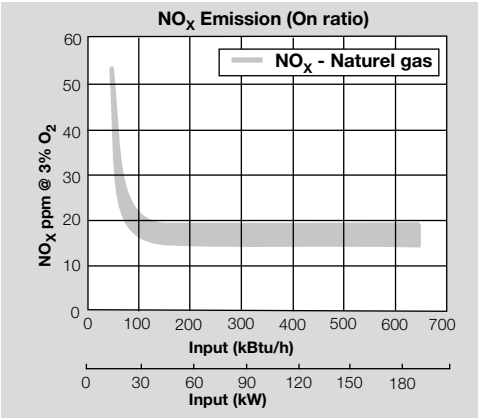
- Ambient combustion air (~70°F, 21°C)
- Less than 1000°F (540°C) firing chamber
- Minimal process air velocity
- Low fire input adjusted to minimum input On-Ratio, see
- Neutral chamber pressure

Emissions from the burner are influenced by:

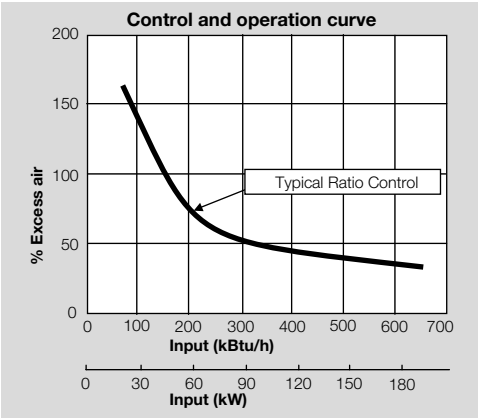
- Chamber conditions
- Fuel type
- Firing rate
- Ratio regulator adjustments
- Combustion air temperature

CO emission is largely influenced by chamber conditions.

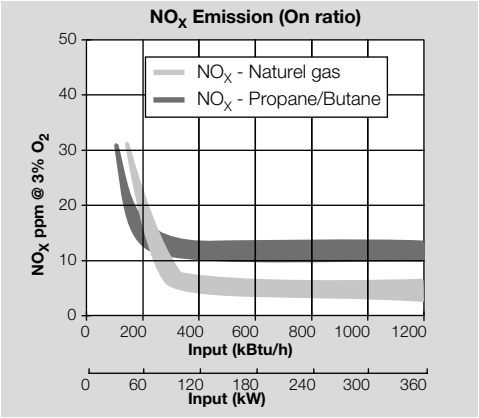
Contact your Honeywell representative for an estimate of CO emission on your application.



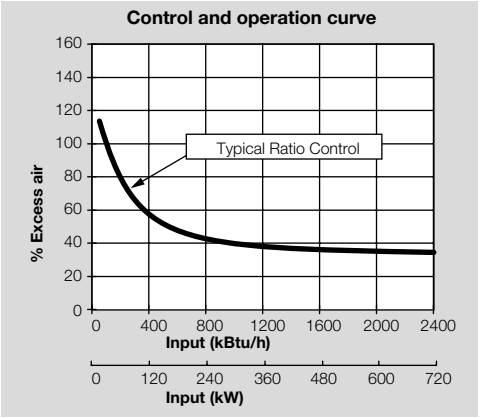
WX0050



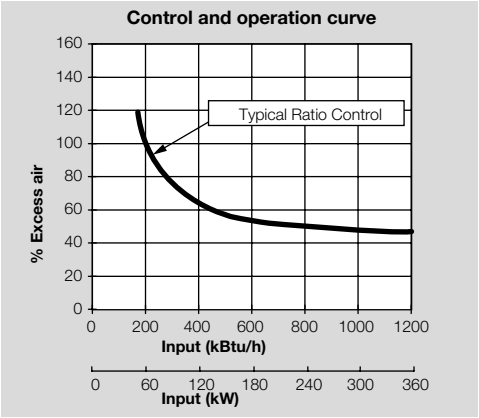
WX0050



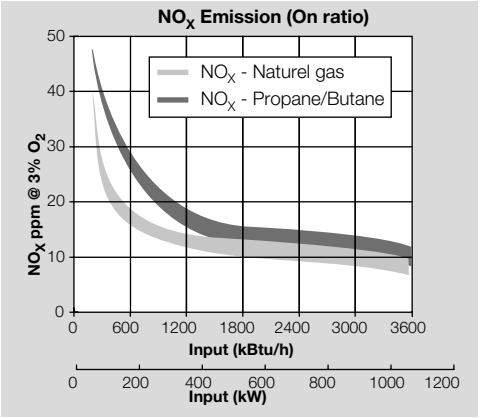
WX0100



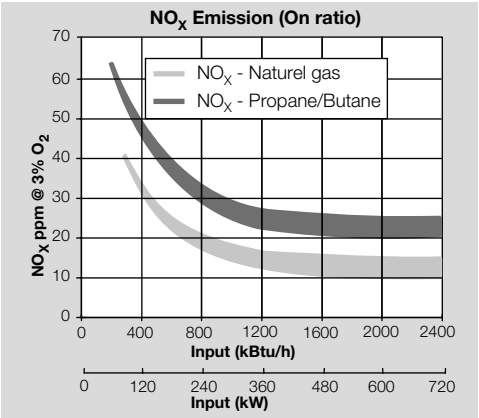
WX0200



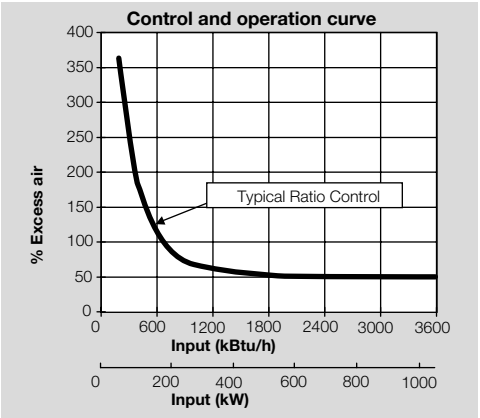
WX0100



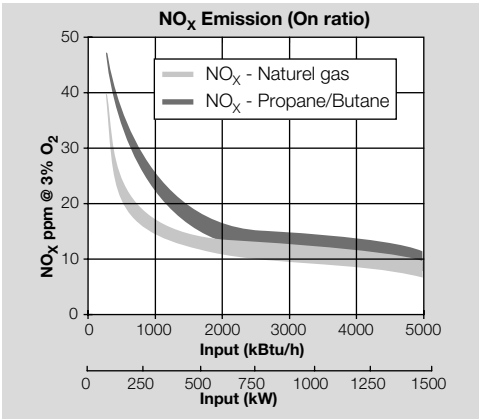
WX0300



WX0200



WX0300



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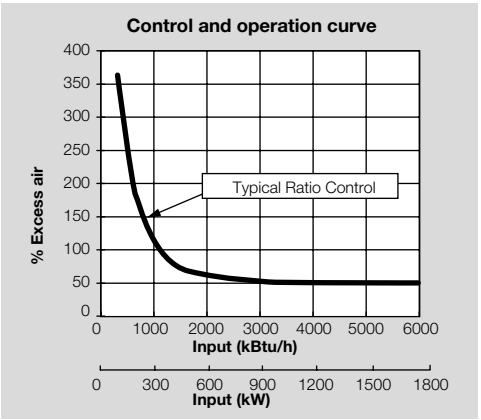
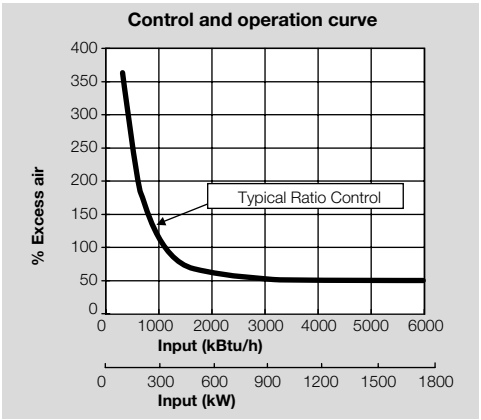


WX0500



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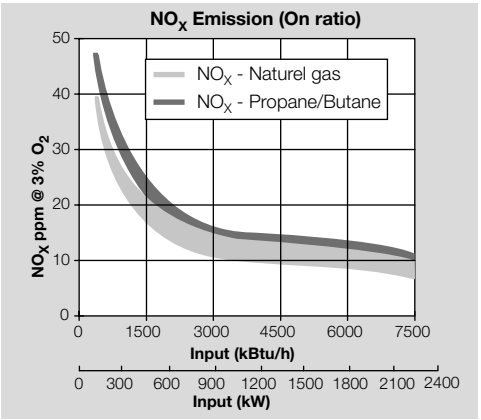

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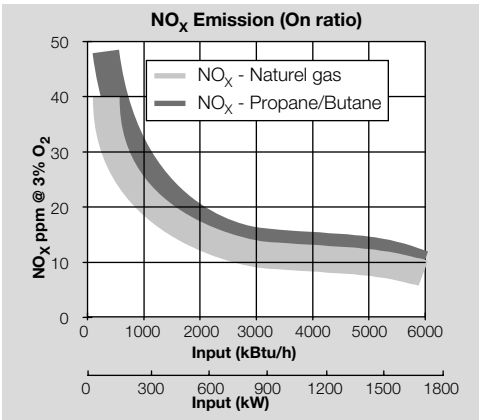

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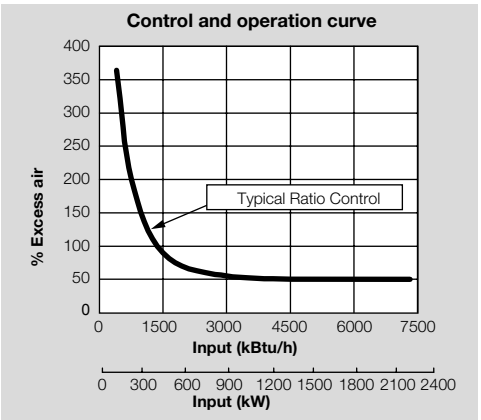

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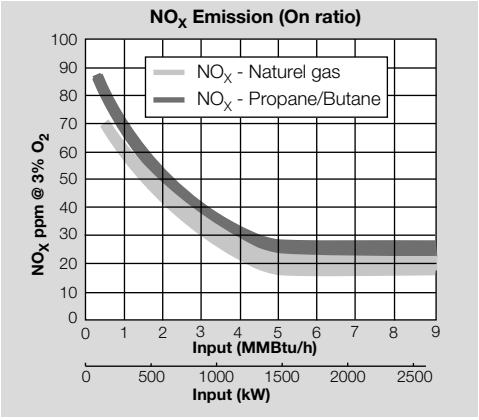
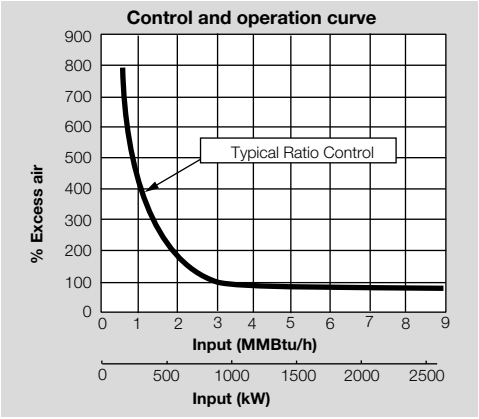


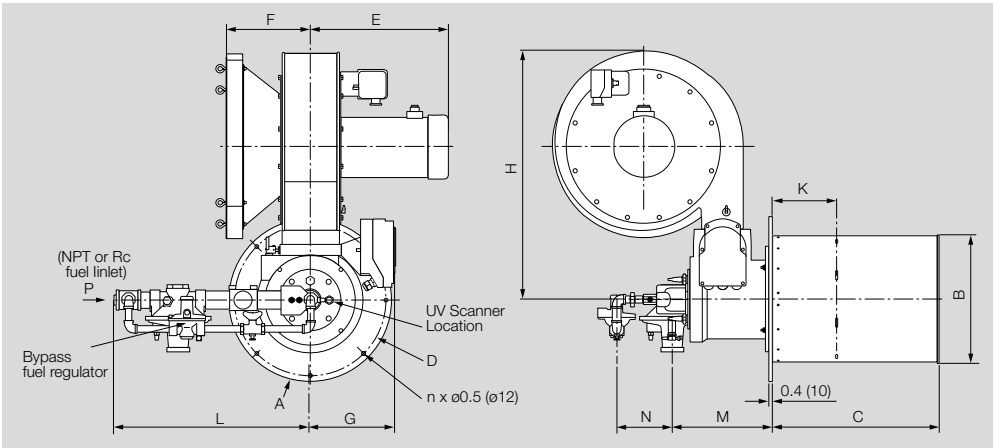
WX0850



WX0850

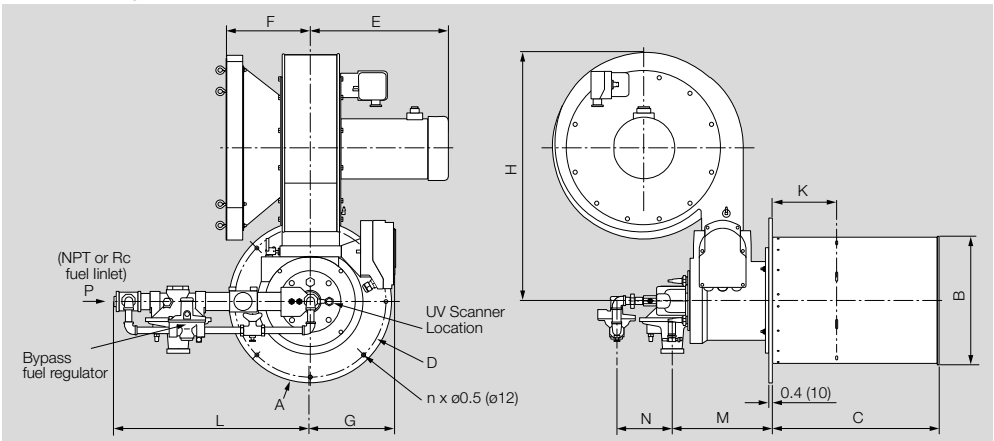
13.7 Dimensions

13.7.1 Packaged blower (inch)



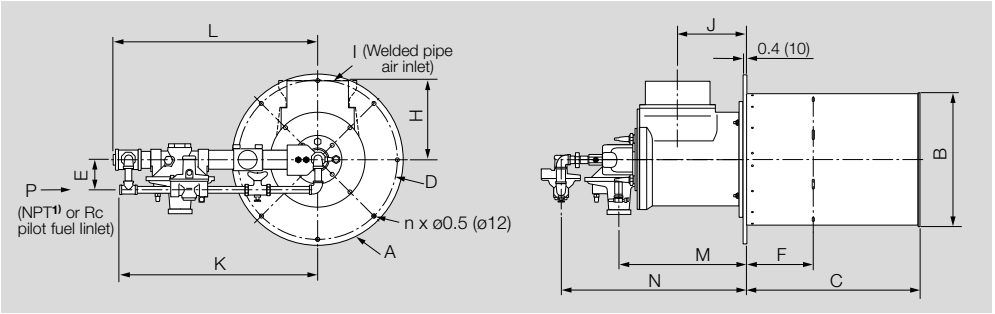
Model	A	B	C	D	E	F	G	H	K	L	M	N	n	P NPT/ Rc
WX0050	ø13.4	ø9.6	15	ø11.8	11.7	9	8.5	20.4	7	20.8	8.2	6.1	4	3/4
WX0100	ø15.2	ø11.8	17.3	ø13.6	12.4	8.9	8.5	26.4	7	20	8.2	6.1	4	1
WX0200	ø18.1	ø14.8	20.3	ø16.5	15.1	9.6	9.5	27.6	7	21.6	11.2	6.1	8	1-1/2
WX0300, WX0400	ø19.7	ø16.3	22	ø18.1	21.6	11.2	11.2	35.7 (50 Hz) 36 (60 Hz)	7.3	23.6	13.6	6.1	8	1-1/2
WX0500, WX0600	ø23.6	ø20.3	26	ø22	21.5	12.1	14	38.9 (50 Hz) 35.1 (60 Hz)	7.3	24.1	16.5	6.1	8	2
WX0850	ø33.3	ø30.1	35.6	ø32	24.4	23.4	20.4	40.8	7.8	39.9	27.5	9.3	8	3

13.7.2 Packaged blower (mm)



Model	A	B	C	D	E	F	G	H	K	L	M	N	n	P NPT/ Rc
WX0050	ø340	ø245	381	ø300	298	229	217	518	178	528	209	156	4	3/4
WX0100	ø385	ø300	440	ø345	316	227	217	670	178	509	209	156	4	1
WX0200	ø460	ø375	515	ø420	384	244	242	700	178	549	284	156	8	1-1/2
WX0300, WX0400	ø500	ø415	560	ø460	548	286	285	906 (50 Hz) 856 (60 Hz)	185	599	345	156	8	1-1/2
WX0500 WX0600	ø600	ø515	660	ø560	545	307	356	988 (50 Hz) 891 (50 Hz)	185	613	420	156	8	2
WX0850	ø845	ø765	905	ø814	619	595	518	1036	199	1014	699	235	8	3

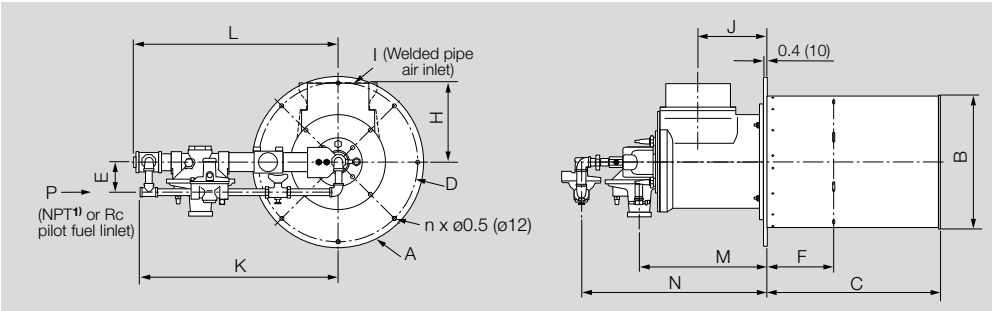
13.7.3 Remote blower (inch)



Model	A	B	C	D	E	F	H	I	J	K	L	M	N	n	P NPT/ Rc
WX0050	ø13.4	ø9.6	15	ø11.8	3.2	7	5.4	3	4.1	20.8	20.8	8.2	14.4	4	1/2
WX0100	ø15.2	ø11.8	17.3	ø13.6	3.2	7	5.4	3	4.1	20	20	8.2	14.4	4	1/2
WX0200	ø18.1	ø14.8	20.3	ø16.5	3.4	7	7.2	4	5.6	21.3	21.6	11.2	17.4	8	1/2
WX0300, WX0400	ø19.7	ø16.3	22	ø18.1	3.4	7.3	10.3	6	6.8	23.3	23.6	13.6	19.7	8	1/2[1)]
WX0500	ø23.6	ø20.3	26	ø22	6.2	7.3	11.2	8	9.2	24.1	24.5	16.5	22.7	8	1/2
WX0600	ø23.6	ø20.3	26	ø22	6.2	7.3	11.27	8	9.18	23.9	24.1	16.5	22.7	8	1/2
WX0850	ø33.3	ø30.1	35.6	ø32	4.7	7.8	19	12	12.9	39.3	39.9	27.5	36.8	8	1/2

1) WX0300, WX0400 = BPT or Rc

13.7.4 Remote blower (mm)



Model	A	B	C	D	E	F	H	I	J	K	L	M	N	n	P NPT/RC
WX0050	ø340	ø245	381	ø300	81	178	138	76	105	528	528	209	365	4	1/2
WX0100	ø385	ø300	440	ø345	81	178	138	76	105	509	509	209	365	4	1/2
WX0200	ø460	ø375	515	ø420	86	178	182	102	141	541	549	285	441	8	1/2
WX0300, WX0400	ø500	ø415	560	ø460	86	185	261.7	152	173.3	591	599	345	501	8	1/2[1)]
WX0500	ø600	ø515	660	ø560	157	185	284	203	233	607	614	419	576	8	1/2
WX0600	ø600	ø515	660	ø560	157	185	284	203	233	612	622	419	576	8	1/2
WX0850	ø845	ø765	905	ø814	119	199	483	305	327	998	1014	699	935	8	1/2

1) WX0300, WX0400 = BPT or Rc

14 DISPOSAL

Devices with electronic components:
WEEE Directive 2012/19/EU – Waste Electrical and Electronic Equipment Directive

At the end of the product life (number of operating cycles reached), dispose of the packaging and product in a corresponding recycling centre. Do not dispose of the unit with the usual domestic refuse. Do not burn the product.
On request, old units may be returned carriage paid to the manufacturer in accordance with the relevant waste legislation requirements.

FOR MORE INFORMATION

The Honeywell Thermal Solutions family of products includes Honeywell Combustion Safety, Eclipse, Exothermics, Hauck, Kromschröder and Maxon. To learn more about our products, visit ThermalSolutions.honeywell.com or contact your Honeywell Sales Engineer.

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201 E 18th Street
Muncie, IN 47302
USA
ThermalSolutions.honeywell.com

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