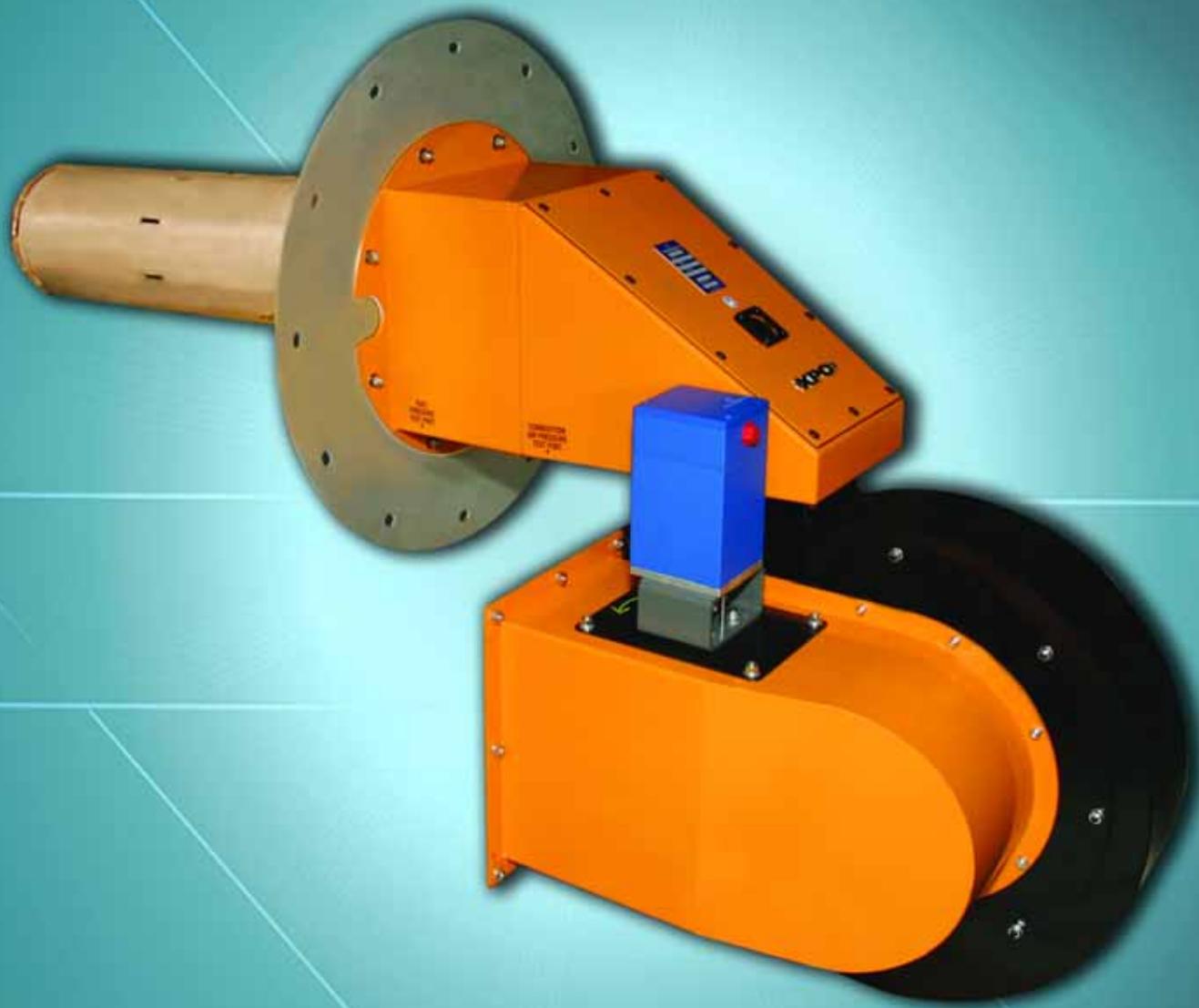


**MAXON XPO™**  
Ultra low NOx indirect burner

**Honeywell**



**Technical Catalog**

# TABLE OF CONTENTS

Features & benefits .....	1
Product description .....	1
Typical applications .....	2
Typical emissions .....	2
Intelligent model numbers .....	3
Specifications of XPO™ ultra low NOx burners .....	4
Packaged versions (PB) .....	4
External blower versions (EB) .....	5
Materials of construction .....	6
Selection criteria .....	7
Application details .....	7
Fire tube sizing .....	8
Air valve and air actuator positions .....	9
Dimensions.....	10
XPO™ 1 PB (packaged) burner .....	10
XPO™ 2 & 3 PB (packaged) burner .....	12
XPO™ 4 & 5 PB (packaged) burner .....	14
XPO™ 3 EB (external blower) burner .....	16
XPO™ 5 EB (external blower) burner .....	18
Spark ignitor pilot tube assembly for sizes XPO 1, 2 and 3 .....	20
Spark ignitor for sizes XPO 1, 2, 3, 4 & 5 .....	20
Installation and operating instructions for XPO™ burners .....	21
Application requirements .....	21
Installation instructions .....	22
Burner assembly instructions .....	22
Burner mounting instructions .....	25
Start-up instructions for XPO™ burners .....	26
Maintenance and inspection instructions .....	26

## FEATURES & BENEFITS

- Low temperature burner for use with clean fuel gases
- Single digit NOx emissions at 30% excess air
- High efficiency with low excess air requirements
- Capacities up to 8 MBtu/h with a least 3:1 turndown ratio
- For use in indirect fired solution backed heaters

## PRODUCT DESCRIPTION

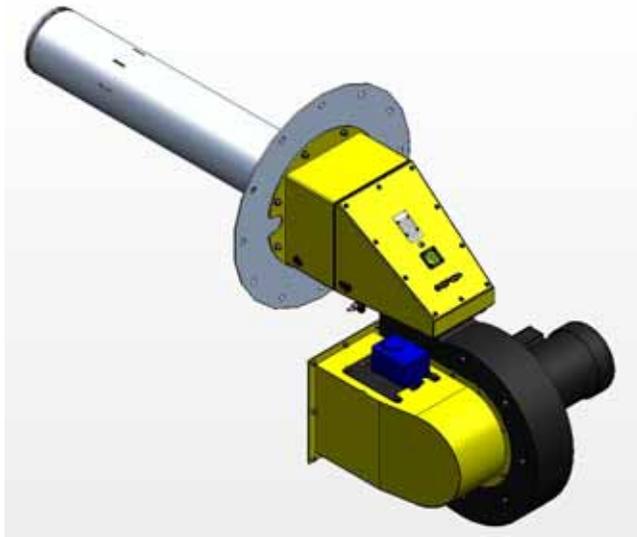
Maxon XPO™ burners are low temperature burners for use in liquid backed applications. They provide high efficiency operation with low excess air requirements and are designed for ease of retrofitting into existing liquid backed applications.

XPO™ burners are available in two basic versions:

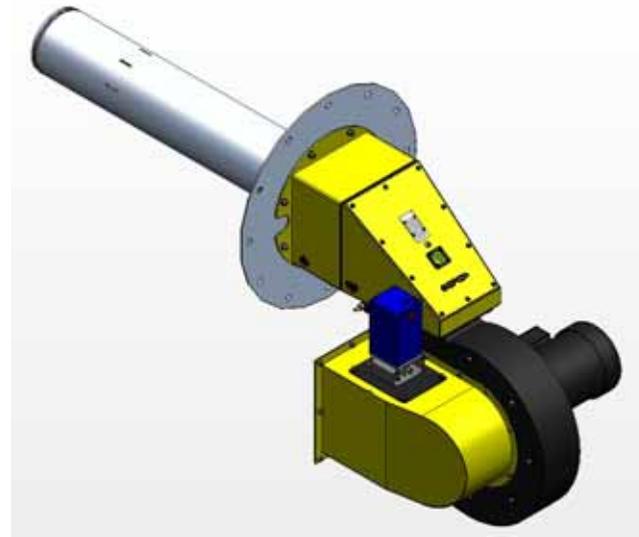
- Packaged (PB) with integral combustion air blower
- External blower (EB) for use with an external combustion air source for extended capacities

Both packaged (PB) and external blower (EB) versions include two different choices for blast tube lengths. A 2 foot or 4 foot long blast tube is available. Blast tube length should be selected based on the wall penetration depth or non-liquid cooled portion of fire tube.

The packaged (PB) version also includes a choice of blower voltage and a choice of air/fuel ratio control actuators. MAXON requires the use of parallel positioning control systems. For indoor, general purpose installations, use Honeywell ControlLink™ or equivalent system. For outdoor or hazardous duty service installations, use MAXON SMARTLINK® MRV control systems.



XPO™ burner with  
Honeywell ControlLink™



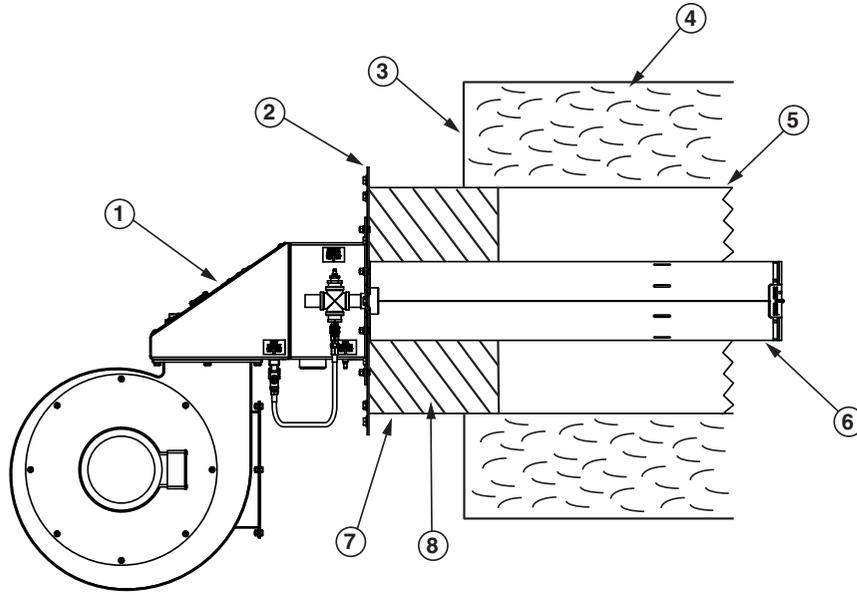
XPO™ burner with  
MAXON SMARTLINK®

## TYPICAL APPLICATIONS

MAXON XPO™ burners are low temperature burners for use in liquid backed applications, including:

- Water back heater
- Fire tube boiler
- Thermal oil heater
- Direct contact water heater
- Solution heating/tanks
- Snow melters

- 1) XPO™ burner
- 2) Mounting flange
- 3) Unit wall
- 4) Liquid solution
- 5) Fire tube
- 6) Burner blast tube
- 7) Non-cooled fire tube wall
- 8) Customer-supplied insulation\*



\*All non-liquid cooled surfaces **must be insulated** as shown above.

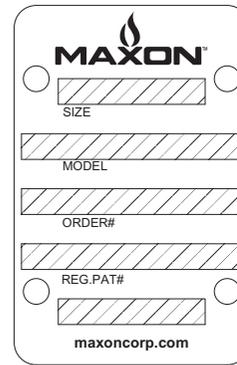
## TYPICAL EMISSIONS

XPO™ burner will achieve ultra low NOx emissions while operating at 30% excess air level.

Exact emissions performance may vary in your application. Contact MAXON for information on installation specific estimates or guarantees. No guarantee of emissions is intended or implied without specific written guarantee from MAXON.

# INTELLIGENT MODEL NUMBERS

A coded model number is provided on the nameplate of all XPO™ burners to provide a simple method to identify the configuration of the product. This model number ensures accuracy in identifying your product, ordering replacement parts or communicating capabilities.



Burner series	Size	Blower options	Blast tube length	Voltage	Control method	Flame detection	Air pressure switch	Actuator	Mounting flange gasket	Air valve position	Air actuator position
XPO	1	PB	2	1	B	3	N	Y	Y	L	T

**Burner series**

XPO

**Size**

- 1 = Blast tube #1
- 2 = Blast tube #2
- 3 = Blast tube #3
- 4 = Blast tube #4
- 5 = Blast tube #5

**Blower options**

- PB = packaged burner (blower included)
- EB = external blower (blower not included)

**Blast tube length**

- 2 = 2 feet
- 4 = 4 feet [3]

**Voltage**

- 1 = 230/460/3/60
- 2 = 575/3/60 [2]
- 3 = 115/230/1/60 [1]
- \* = for external blowers (N/A)

**Control method**

- B = SMARTLINK MRV
- C = Honeywell ControlLink
- \* = for external blowers

**Flame detection**

- 3 = Standard UV scanner provision
- 4 = Hazardous location UV scanner provision

**Air pressure switch**

- A = Antunes
- H = Honeywell
- N = None

**Actuator**

- Y = included with burner
- N = Not included
- \* = external blowers

**Mounting flange gasket**

- Y = included with burner
- N = not included

**Air valve position**

- L = Left hand
- R = Right hand

**Air actuator position**

- B = Bottom of air valve
- T = Top of air valve

[1] Only choice available for size #1, #2 and #3 blast tubes

[2] Only available in size #1

[3] Only choice available for size #4 and #5 blast tubes

# SPECIFICATIONS OF XPO™ ULTRA LOW NOX BURNERS

## Packaged versions (PB)

Typical burner data											
Fuel: natural gas at 60°F with 1000 Btu/ft <sup>3</sup> (st) HHV - sg = 0.6 [1]											
Combustion air: 60°F - 21% O <sub>2</sub> - 50% humidity - sg = 1.0 [1]											
Stated pressures are indicative. Actual pressures are a function of air humidity, altitude, type of fuel and gas quality.											
		XPO 1 PB 2 XPO 1 PB 4		XPO 2 PB 2 XPO 2 PB 4		XPO 3 PB 2 XPO 3 PB 4		XPO 4 PB 4		XPO 5 PB 4	
		15% excess air	30% excess air	15% excess air	30% excess air	15% excess air	30% excess air	15% excess air	30% excess air	15% excess air	30% excess air
Maximum burner capacity [4]	MBtu/h	1.2	1.0	2.35	2.1	3.3	3.0	5.0	4.5	6.6	6.0
Minimum burner capacity [2]	MBtu/h	0.3	0.3	0.59	0.59	0.66	0.66	1.0	1.0	1.0	1.0
Turndown ratio [3]		4:1	3.3:1	4:1	3.6:1	5:1	4.5:1	5:1	4.5:1	6.6:1	6:1
Maximum air flow	cfm	220	207	431	435	605	621	917	931	1202	1235
Advised pilot capacity	MBtu/h	0.06	0.06	0.08	0.08	0.10	0.10	0.10	0.10	0.10	0.10
Advised pilot pressure [6]	"wc	2	2	4	4	6	6	9	9	9	9
Fan horsepower		1	1	3	3	5	5	7.5	7.5	7.5	7.5
Blast tube OD	inches	6	6	6	6	6	6	8	8	8	8
Air pressure [5] [6]	"wc	9.0	6.6	14.0	14.0	15.0	12.0	16.4	16.4	15.5	15.5
Air pressure minimum [3] [5]	"wc	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.7	0.7	0.5	0.5
Gas pressure [5] [6]	"wc	9.0	6.6	14.0	13.8	14.8	12.0	16.0	16.0	15.0	14.5
Fire tube size (inside diameter)	inches	14 to 18		16 to 22		18 to 24		22 to 32		22 to 34	

[1] sg (specific gravity) = relative density to air (density air = 0.0763 lb/ft<sup>3</sup> (st))

[2] Minimum burner capacity will be affected by fuel and applications parameters (heat flux).

[3] Will vary depending on the application heat flux. Lower heat flux (<8000 Btu/in<sup>2</sup>) will result with lower turndown ratios and increase in minimum air pressure.

[4] Capacity displayed assumes blower operation on 60Hz electrical supply. Gross output will be reduced by 17% if operated on 50Hz. Fuel and air pressure should be reduced by 30% while motor power will reduce 40% with 50Hz operation. Turndown ratio will be reduced in kind with minimum capacity remaining fixed.

[5] Measured as differential to chamber port.

[6] Measured with scanner cooling air valve closed.

Note: For proper burner adjustment, MAXON advises the use of an oxygen content meter. Optimal oxygen level in the exhaust stack should read between 3 and 6 vol. % dry when measured with burner operating at maximum capacity firing rate.

## External blower versions (EB)

Typical burner data					
Fuel: natural gas at 60°F with 1000 Btu/ft <sup>3</sup> (st) HHV - sg = 0.6 [1]					
Combustion air: 60°F - 21% O <sub>2</sub> - 50% humidity - sg = 1.0 [1]					
Stated pressures are indicative. Actual pressures are a function of air humidity, altitude, type of fuel and gas quality.					
		XPO 3 EB 2 XPO 3 EB 4		XPO 5 EB 4	
		15% excess air	30% excess air	15% excess air	30% excess air
Maximum burner capacity [4]	MBtu/h	4.5	4.2	8.8	8.0
Minimum burner capacity [2]	MBtu/h	0.75	0.75	1.5	1.5
Turndown ratio [3]		6:1	5.6:1	5.9:1	5.3:1
Maximum air flow	cfm	825	870	1600	1647
Advised pilot capacity	MBtu/h	0.10	0.10	0.10	0.10
Advised pilot pressure [6]	"wc	6	6	8	8
Blast tube OD	inches	6	6	8	8
Air pressure [5] [6]	"wc	32	32	27	27
Air pressure minimum [3] [5]	"wc	0.5 - 1.0	0.5 - 1.0	0.7	0.7
Gas pressure [5] [6]	"wc	36	34	27.6	27.3
Fire tube size (inside diameter)	inches	16 to 28		22 to 36	

[1] sg (specific gravity) = relative density to air (density air = 0.0763 lb/ft<sup>3</sup> (st))

[2] Minimum burner capacity will be affected by fuel and applications parameters (heat flux).

[3] Will vary depending on the application heat flux. Lower heat flux (<8000 Btu/in<sup>2</sup>) will result with lower turndown ratios and increase in minimum air pressure.

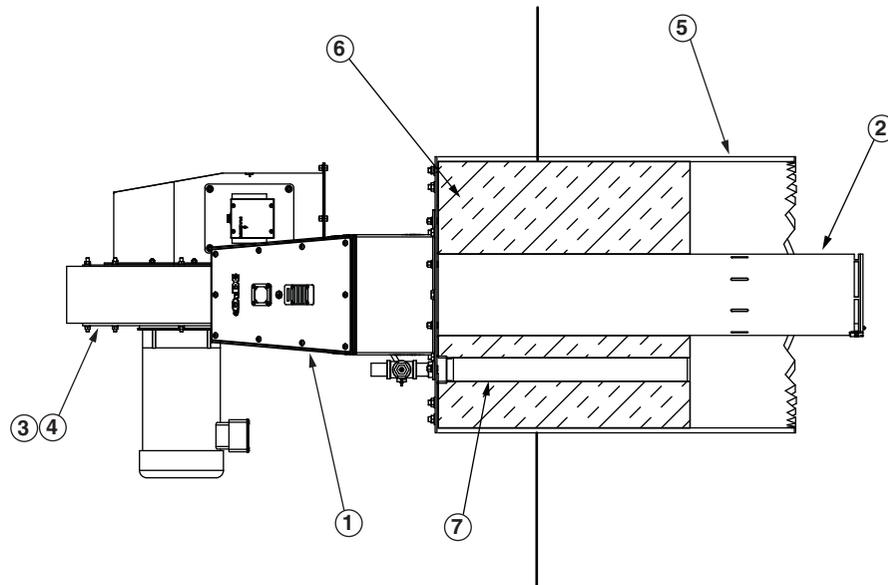
[4] Capacity displayed assumes blower operation on 60Hz electrical supply. Gross output will be reduced by 17% if operated on 50Hz. Fuel and air pressure should be reduced by 30% while motor power will reduce 40% with 50Hz operation. Turndown ratio will be reduced in kind with minimum capacity remaining fixed.

[5] Measured as differential to chamber port.

[6] Measured with scanner cooling air valve closed.

Note: For proper burner adjustment, MAXON advises the use of an oxygen content meter. Optimal oxygen level in the exhaust stack should read between 3 and 6 vol. % dry when measured with burner operating at maximum capacity firing rate.

## MATERIALS OF CONSTRUCTION



Item number	Burner part	Material
1	Burner housing	1010 steel (1.1121)
2	Blast tube	304 stainless steel (1.4301)
3	Fan case	1010 steel (1.1121)
4	Fan impeller (inside fan case)	Aluminum
5	Fire tube (customer supplied)	Stainless steel (recommended)
6	Insulation (customer supplied)	Soft insulation material 2000°F temperature rating
7	Guide tube (customer supplied)	Stainless steel (recommended)

## SELECTION CRITERIA

### Application details

XPO™ burners can be used in all indirect fire tube liquid backed solution heater applications. They combine flexibility and stability with low NOx emissions.

#### PROCESS TEMPERATURE

The XPO™ burner is engineered for installation in moderate temperature (less than 1600°F), liquid backed fire tubes. Protect the burner from high temperatures during a burner stop (purge to avoid back flow of hot process air).

#### PILOTING AND IGNITION

All XPO™ burners are equipped with an independent pilot design. Pilots shall be used only for ignition of the main flame (interrupted). Use of a standing (continuous) pilot is not recommended. Use minimally 5000 V/200 VA ignition transformers for sparking of the spark ignitor.

Start the burner at low fire setting only. Direct spark ignition of standard XPO™ burners is possible. Locate one pilot gas valve as close as possible to the pilot burner gas inlet to have fast ignition of the pilot burner.

#### TYPICAL IGNITION SEQUENCE

- Pre-purge of burner and installation, according to the applicable codes and the installation's requirements.
- Combustion air control valve shall be in the minimum position to allow minimum combustion air flow to the burner.
- Pre-ignition (typically 2 seconds sparking in air).
- Open pilot gas and continue to spark the ignitor (typically 5 seconds).
- Stop sparking, continue to power the pilot gas valves and start flame check. Trip burner if no flame from here on.
- Check pilot flame stability (typically 5 seconds to prove stable pilot).
- Open main gas valves and allow enough time to have main gas in the burner (typically 5 seconds + time required to have main gas in the burner).
- Close the pilot gas valves.
- Release to modulation (allow modulation of the burner).

Above sequence shall be completed to include all required safety checks during the start-up of the burner (process and burner safeties).

#### RATIO CONTROL

Accurate air/fuel ratio control can be accomplished with MAXON SMARTLINK® or Honeywell ControlLink™ actuators. Precise ratio control will yield optimal emissions and efficiency performance.

#### FLAME SUPERVISION

XPO™ burner flames shall be supervised by the use of a UV or IR scanner.

#### PIPING

Follow all applicable codes including regional codes, local directives, standards and recommendations of your insurance carrier when designing and installing XPO™ burners. Installation should only be undertaken by qualified gas contractors licensed for any regional or local requirements.

Piping weight should be independently supported. Do not use the burner as a piping support or hang weight from the burner's flange connections.

#### FUELS

XPO™ burners are designed for firing of clean fuel gases such as natural gas or LPG.

**EXPECTED EMISSIONS**

The XPO™ burner will achieve ultra low NOx emissions while operating at 30% excess air level. The burner provides higher combustion efficiency and lower emissions without the use of expensive FGR or exotic/fragile materials.

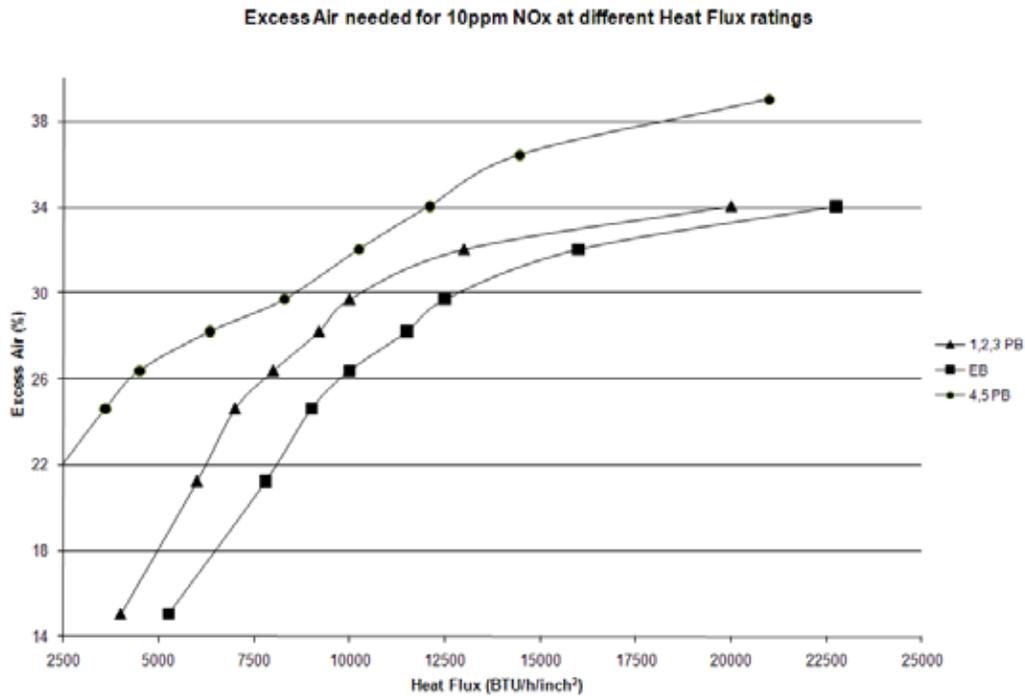
Exact emissions performance may vary in your application. Contact MAXON for information on installation-specific estimates and guaranteed values. No guarantee of emissions is intended or implied without specific, written guarantee from MAXON.

**Fire tube sizing**

See the table below for ideal fire tube size. The burner should be sized within the range of the suggested heat flux. For best emission performance, the burner should be fired into a fire tube with the lowest suggested heat flux.

**HEAT FLUX = BURNER INPUT / FIRE TUBE AREA**

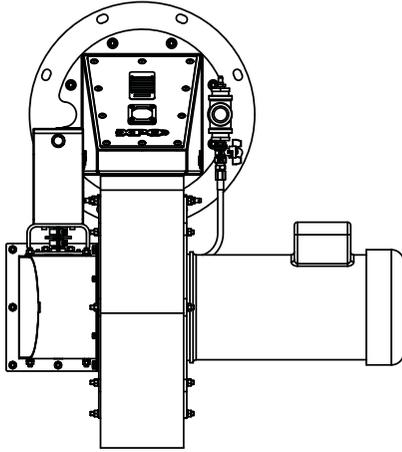
Burner input MBtu/h	Burner size	Heat flux	Fire tube size (iD)												
			14 inch	16 inch	18 inch	20 inch	22 inch	24 inch	26 inch	28 inch	30 inch	32 inch	34 inch	36 inch	
1.0	XPO 1 PB	Btu/inch <sup>2</sup>	6500	5000	3900										
2.0	XPO 2 PB			9900	7900	6400	5300								
3.0	XPO 3 PB				11800	9500	7900	6600							
4.25	XPO 3 EB				21100	16700	13500	11200	9400	8000	6900				
4.5	XPO 4 PB							11800	9900	8500	7300	6400	5600		
6.0	XPO 5 PB							15800	13300	11300	9700	8500	7500	6600	
8.0	XPO 5 EB							21000	17700	15100	13000	11300	9900	8800	7900



Below 8000 Btu/in<sup>2</sup> burner turndown will be limited to <3 to 1.

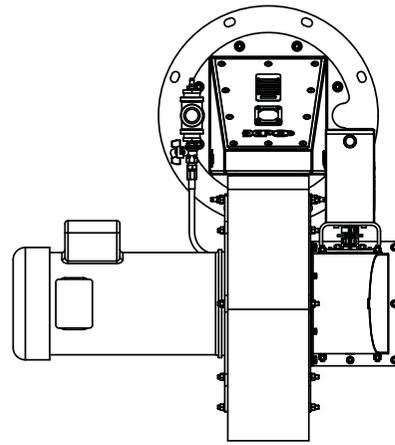
### Air valve and air actuator positions

XPO™ burners may be ordered with your choice of air valve position and air actuator position as shown in the drawings below. These drawings below depict XPO™ burners with MAXON SMARTLINK® actuators.



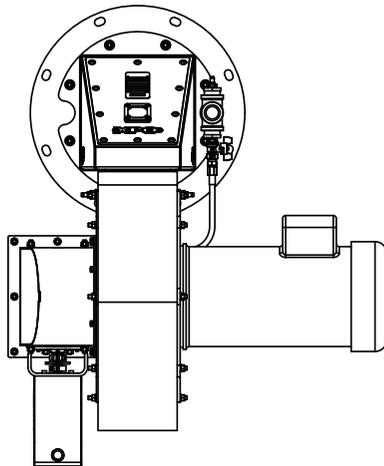
Air valve position: (L) left hand  
Actuator position: (T) top of air valve

Actuator rotation for configuration shown above	
SMARTLINK® actuator	Counter-clockwise
General purpose actuator	Clockwise



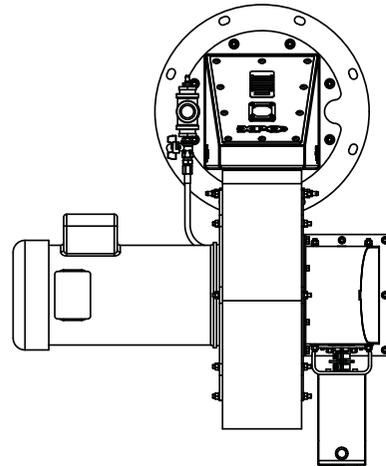
Air valve position: (R) right hand  
Actuator position: (T) top of air valve

Actuator rotation for configuration shown above	
SMARTLINK® actuator	Clockwise
General purpose actuator	Counter-clockwise



Air valve position: (L) left hand  
Actuator position: (B) bottom of air valve

Actuator rotation for configuration shown above	
SMARTLINK® actuator	Clockwise
General purpose actuator	Counter-clockwise

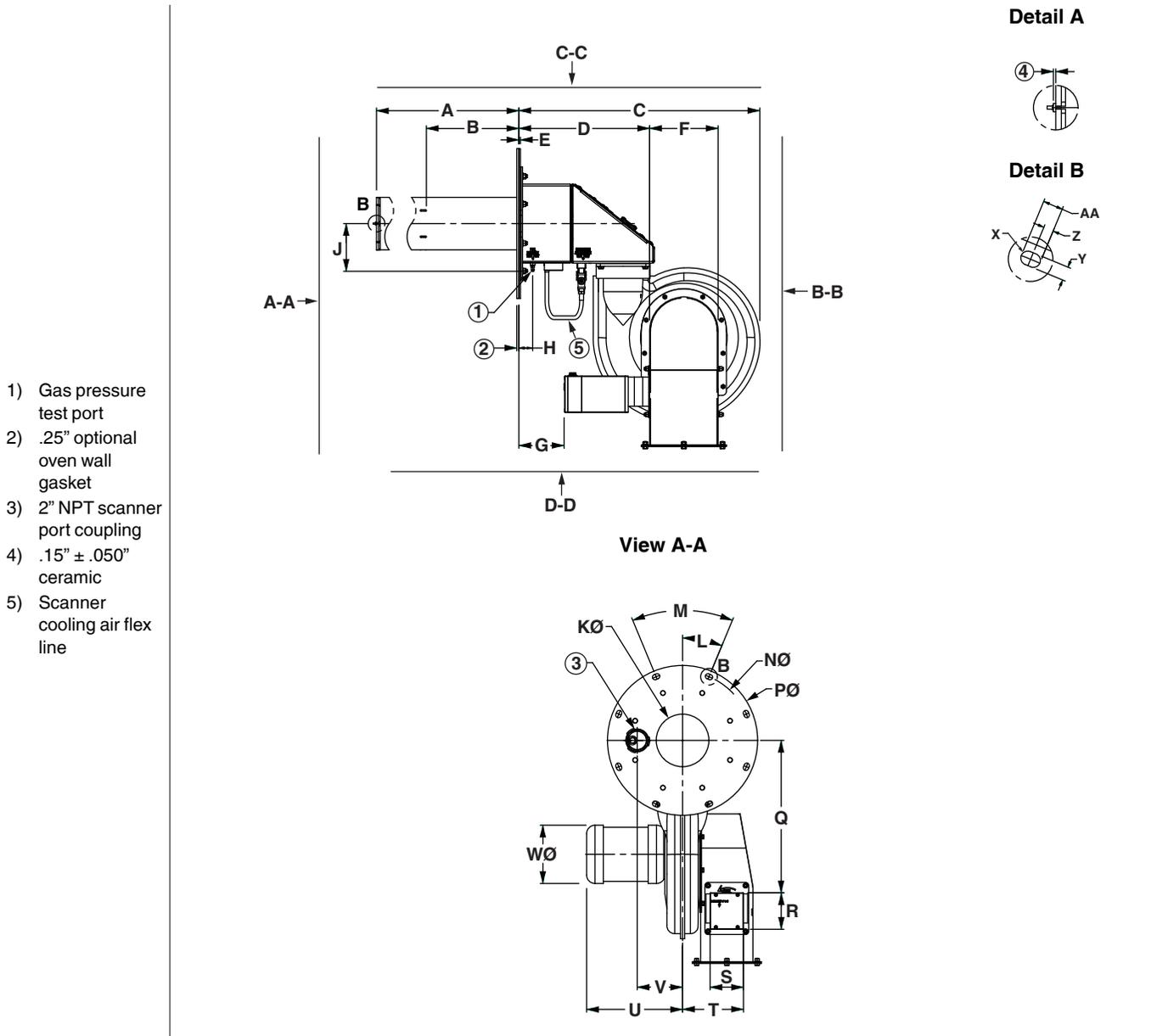


Air valve position: (R) right hand  
Actuator position: (B) bottom of air valve

Actuator rotation for configuration shown above	
SMARTLINK® actuator	Counter-clockwise
General purpose actuator	Clockwise

# DIMENSIONS

## XPO™ 1 PB (packaged) burner



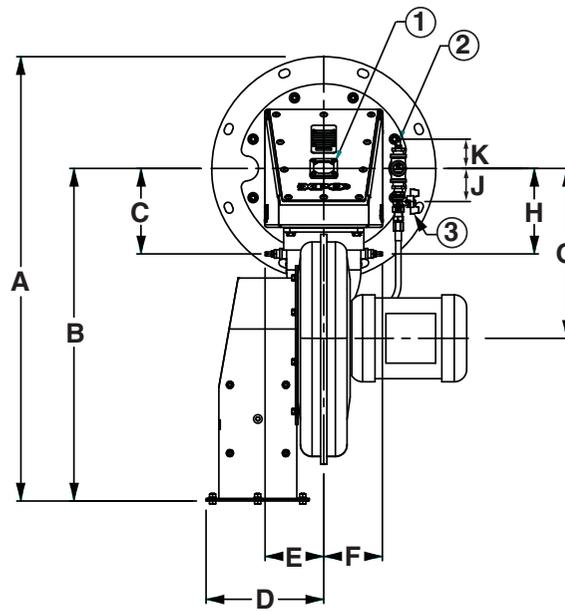
Dimensions in inches unless stated otherwise												
Burner size	A	B	C	D	E	F	G	H	J	K Ø	L	M
XPO 1 PB 2	23.3	11.1	28.9	15.7	.19	8.2	5.42	1.65	5.73	6.3	22.5°	45°
XPO 1 PB 4	45.1	33.4										

Burner size	N Ø	P Ø	Q	R	S	T	U	V	W Ø	X	Y	Z	AA
XPO 1 PB 2	16.56	18	18.31	4.38	4	7.3	11.5	5.44	7	.312	.625	.45	.9
XPO 1 PB 4													

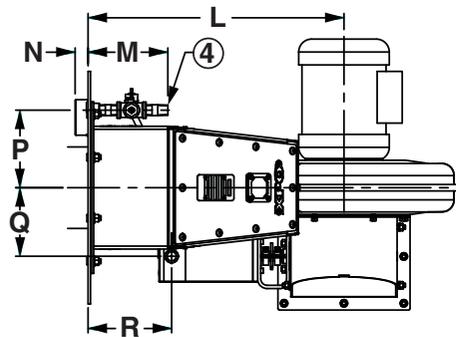
# XPO™ 1 PB (packaged) burner

- 1) Observation window
- 2) Chamber pressure test port
- 3) Scanner cooling air valve
- 4) 1" NPT scanner port
- 5) Combustion air pressure test port
- 6) 1/2" NPT S-O ignition wire connection
- 7) Main gas inlet 1-1/2" NPT
- 8) 3/8" NPT pilot gas connection
- 9) Pilot gas pressure test port

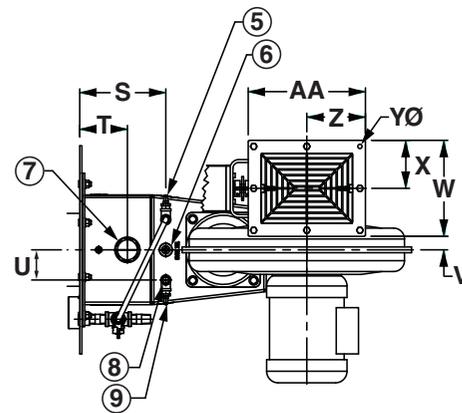
View B-B



View C-C



View D-D



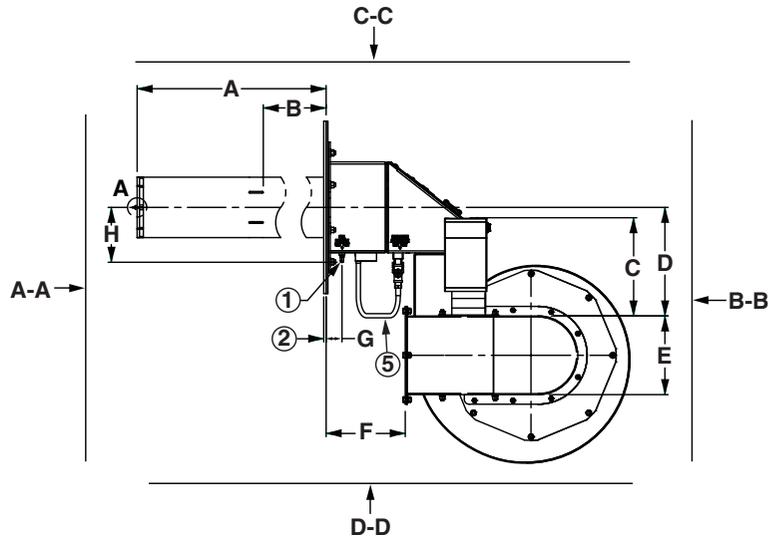
Dimensions in inches unless stated otherwise

Burner size	A	B	C	D	E	F	G	H	J	K	L	M	N
XPO 1 PB	35.79	26.79	6.89	9.47	4.72	4.72	13.69	6.89	2.67	2.36	19.78	6.16	1.0

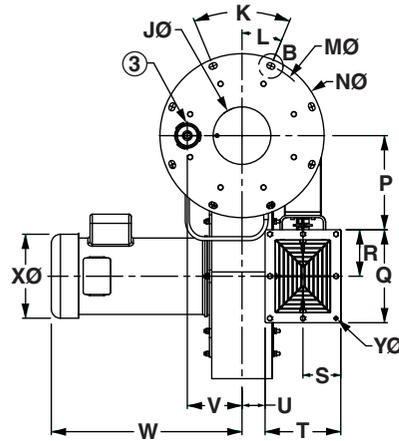
Burner size	P	Q	R	S	T	U	V	W	X	YØ	Z	AA
XPO 1 PB	6.0	5.3	6.46	7.5	4.15	2.61	1.17	8.3	4.15	.375	5.1	10.21

# XPO™ 2 & 3 PB (packaged) burner

- 1) Gas pressure test port
- 2) .25" optional oven wall gasket
- 3) 2" NPT scanner port coupling
- 4) .15" ± .050 ceramic
- 5) Scanner cooling air flex line



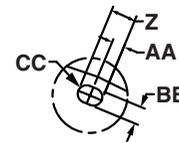
View A-A



Detail A



Detail B



Dimensions in inches unless stated otherwise

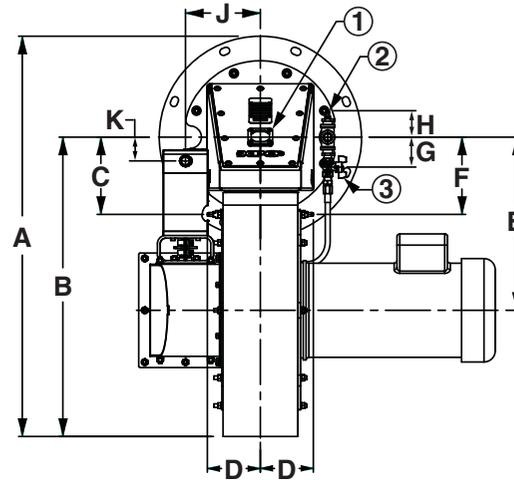
Burner size	A	B	C	D	E	F	G	H	JØ	K	L	MØ	NØ	P
XPO 2 PB 2	23.3	10.6	10.3	11.33	8.21	8.25	1.65	5.73	6.3	45°	22.5°	16.56	18	10.33
XPO 2 PB 4	45.1	33.0												
XPO 3 PB 2	23.3	10.2												
XPO 3 PB 4	45.1	31.9												

Burner size	Q	R	S	T	U	V	W	XØ	Y	Z	AA	BB	CC
XPO 2 PB	10.21	5.1	4.15	8.3	2.53	6	17.5	8.6	.375	.9	.45	.625	.312
XPO 3 PB							20.9	9.22					

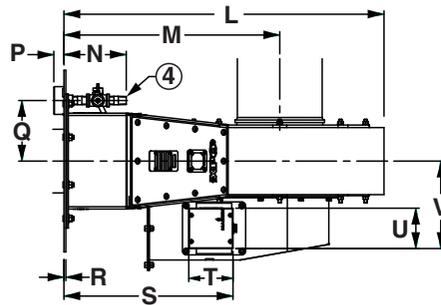
# XPO™ 2 & 3 PB (packaged) burner

- 1) Observation window
- 2) Chamber pressure test port
- 3) Scanner cooling air valve
- 4) 1" NPT scanner port
- 5) Combustion air pressure test port
- 6) 1/2" NPT S-O ignition wire connection
- 7) Main gas inlet 1-1/2" NPT
- 8) 3/8" NPT pilot gas connection
- 9) Pilot gas pressure test port

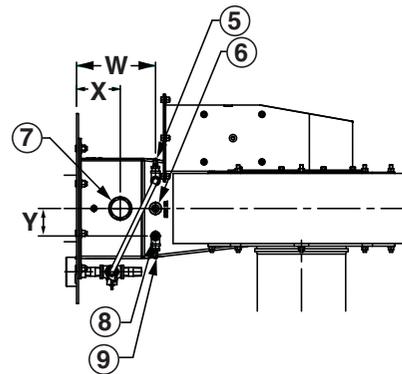
View B-B



View C-C



View D-D

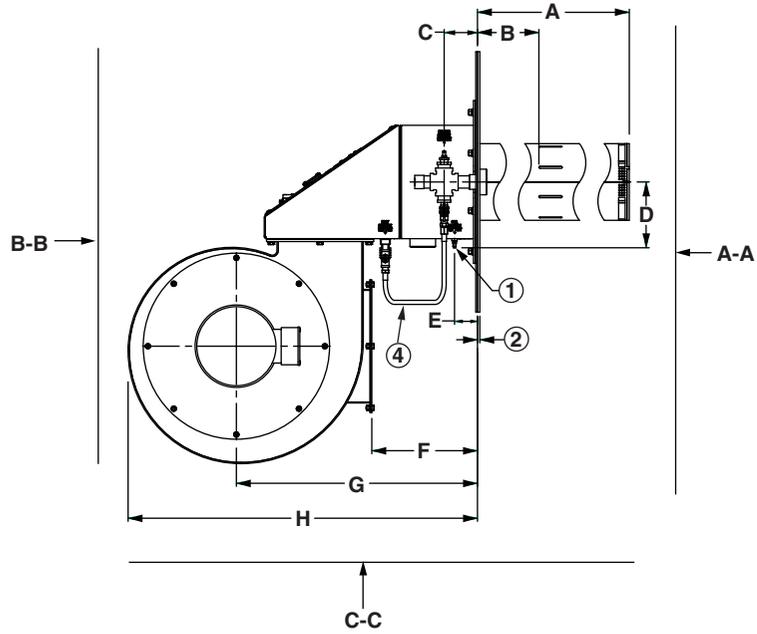


Dimensions in inches unless stated otherwise

Burner size	A	B	C	D	E	F	G	H	J	K	L	M
XPO 2 PB	35.69	26.69	6.89	4.72	15.44	6.89	2.67	2.36	6.67	2.12	31.7	21.36
XPO 3 PB												

Burner size	N	P	Q	R	S	T	U	V	W	X	Y
XPO 2 PB	6.16	1.0	6.0	.19	16.7	4.38	4.0	8.67	7.5	4.15	2.61
XPO 3 PB											

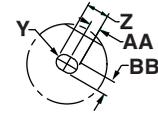
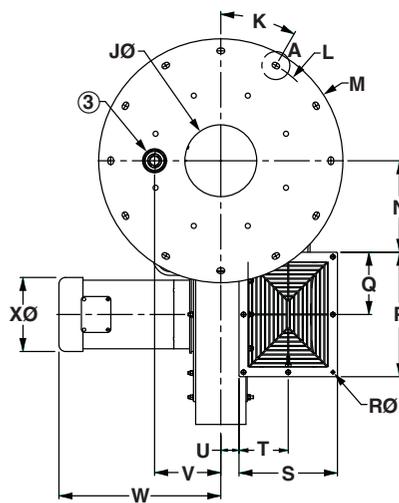
# XPO™ 4 & 5 PB (packaged) burner



- 1) Gas pressure test port
- 2) .25" optional oven wall gasket
- 3) 2-1/2" NPT scanner port coupling
- 4) Scanner cooling air flex line

View A-A

Detail A



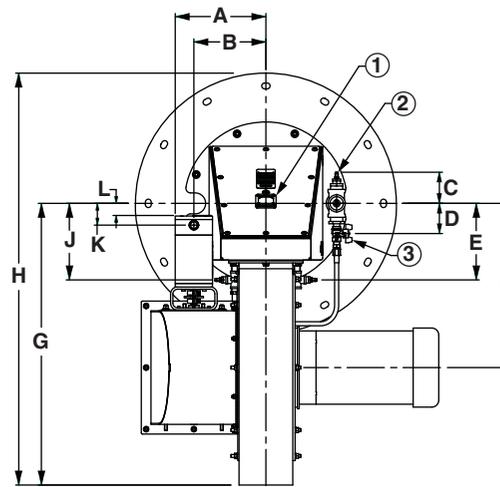
Dimensions in inches unless stated otherwise													
Burner size	A	B	C	D	E	F	G	H	J Ø	K	L Ø	N	
XPO 4 PB	43.14	29.76	8.41	7.07	2.46	11.34	25.88	37.51	8.24	30°	25.25	28	10.51
XPO 5 PB		29.01											

Burner size	P	Q	R Ø	S	T	U	V	W	X Ø	Y	Z	AA	BB
XPO 4 PB	14.29	7.14	.375	11.29	5.65	2.09	8.5	18.56	8.5	.312	.90	.45	.625
XPO 5 PB													

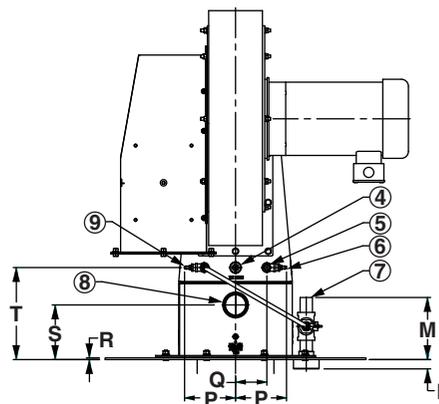
# XPO™ 4 & 5 PB (packaged) burner

- 1) Observation window
- 2) Chamber pressure test port
- 3) Scanner cooling air valve
- 4) 1/2" NPT S-O ignition wire connection
- 5) 3/8" NPT pilot gas connection
- 6) Pilot gas pressure test port
- 7) 1" NPT scanner port
- 8) 2" NPT main gas inlet
- 9) Combustion air pressure test port

View B-B



View C-C

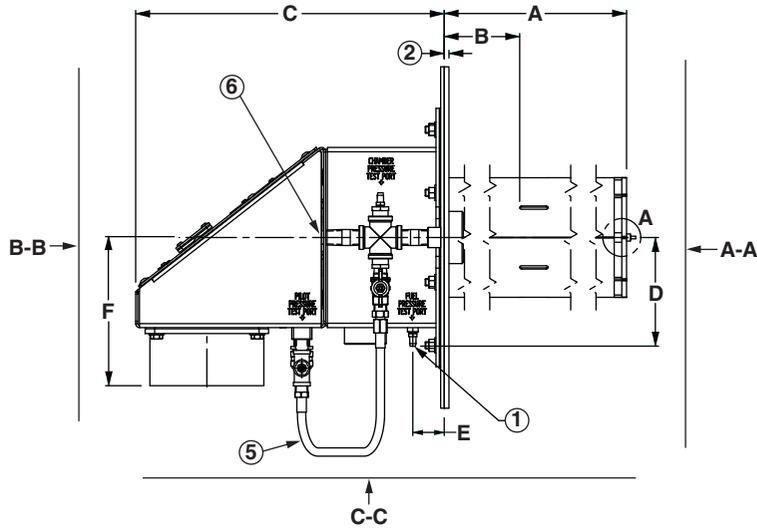


Dimensions in inches unless stated otherwise									
Burner size	A	B	C	D	E	F	G	H	J
XPO 4 PB	9.73	7.73	3.35	3.24	8.23	17.65	30.28	44.28	8.23
XPO 5 PB									

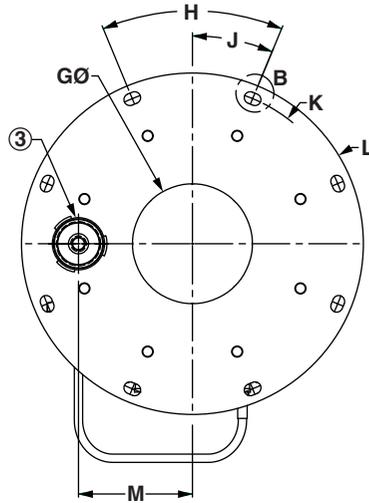
Burner size	K	L	M	N	P	Q	R	S	T
XPO 4 PB	2.34	1.3	11.28	1.72	5.47	3.36	.19	5.87	9.89
XPO 5 PB									

**XPO™ 3 EB (external blower) burner**

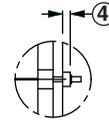
- 1) Gas pressure test port
- 2) .25" optional oven wall gasket
- 3) 2" NPT scanner port coupling
- 4) .15" ± .050 ceramic
- 5) Scanner cooling air flex line
- 6) 1" NPT scanner port



View A-A



Detail A



Detail B



**Dimensions in inches unless stated otherwise**

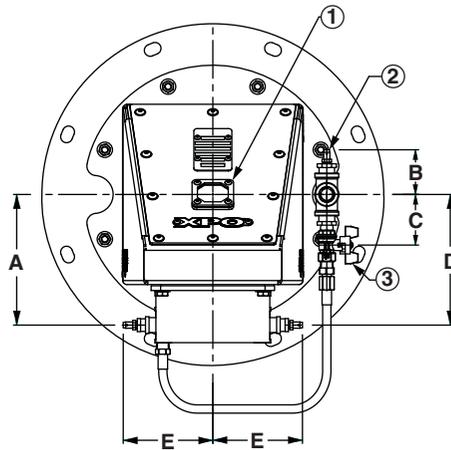
Burner size	A	B	C	D	E	F	G Ø	H
XPO 3 EB 2	23.28	10.2	16.25	5.73	1.65	7.86	6.3	45°
XPO 3 EB 4	45.1	31.9						

Burner size	J	K	L	M	N	P	Q	R
XPO 3 EB 2	22.5°	16.56	18	6.0	.312	.90	.45	.625
XPO 3 EB 4								

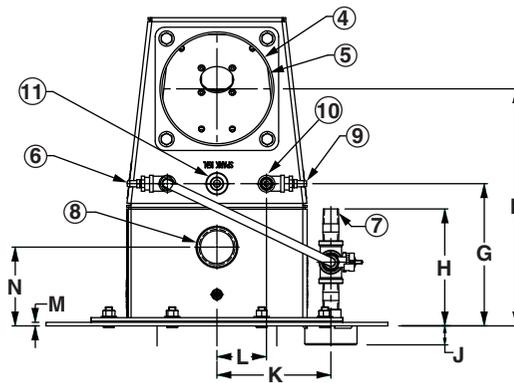
# XPO™ 3 EB (external blower) burner

- 1) Observation window
- 2) Chamber pressure test port
- 3) Scanner cooling air valve
- 4) Ø 6.0" outside combustion air inlet
- 5) Ø 5.79" inside combustion air inlet
- 6) Combustion air pressure test port
- 7) 1" NPT scanner port
- 8) Main gas inlet 1-1/2" NPT
- 9) Pilot gas pressure test port
- 10) 3/8" NPT pilot gas connection
- 11) 1/2" NPT S-O ignition wire connector

View B-B



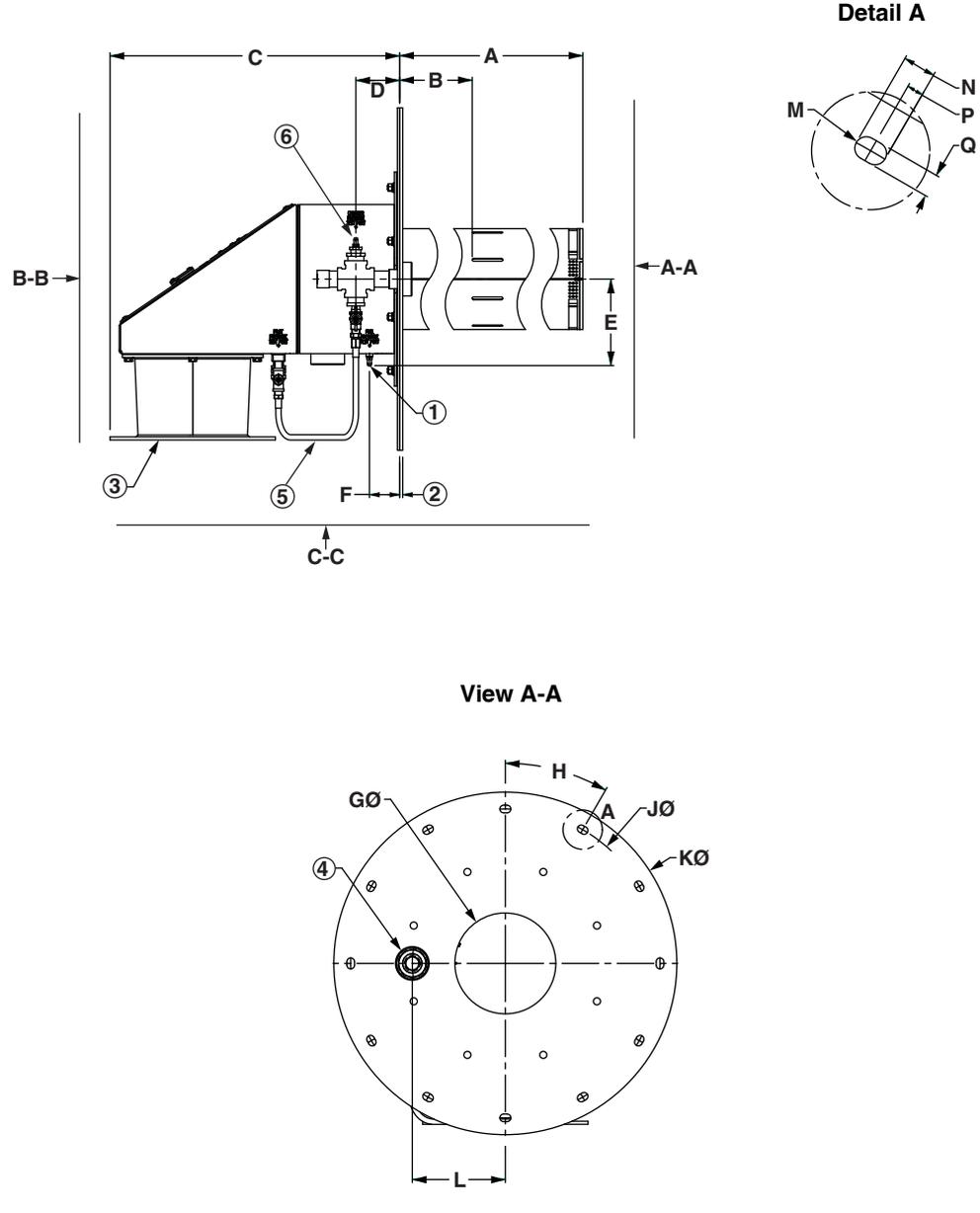
View C-C



Dimensions in inches unless stated otherwise							
Burner size	A	B	C	D	E	F	G
XPO 3 EB 2	6.89	2.36	2.67	6.89	4.72	12.5	7.5
XPO 3 EB 4							

Burner size	H	J	K	L	M	N
XPO 3 EB 2	6.16	1.0	6.0	2.61	.19	4.15
XPO 3 EB 4						

# XPO™ 5 EB (external blower) burner



- 1) Gas pressure test port
- 2) .25" optional oven wall gasket
- 3) Combustion air inlet
- 4) 2-1/2" NPT scanner port coupling
- 5) Scanner cooling air flex line
- 6) Chamber pressure test port

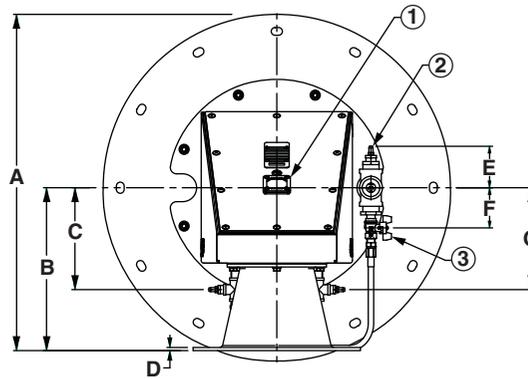
Dimensions in inches unless stated otherwise								
Burner size	A	B	C	D	E	F	G Ø	H
XPO 5 EB	43.14	29.01	23.64	8.41	7.07	2.46	8.24	30°

Burner size	J Ø	K Ø	L	M	N	P	Q
XPO 5 EB	25.25	28	8.5	.312	.90	.45	.625

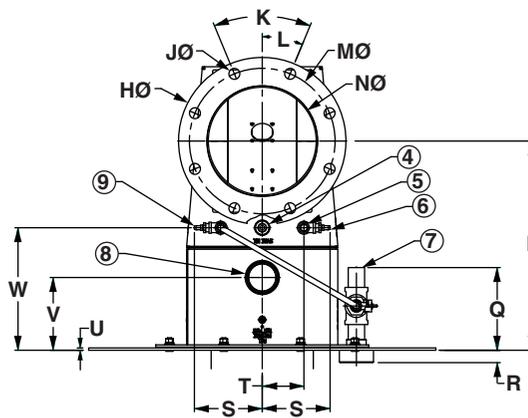
# XPO™ 5 EB (external blower) burner

- 1) Observation window
- 2) Chamber pressure test port
- 3) Scanner cooling air valve
- 4) 1/2" NPT S-O ignition wire connector
- 5) 3/8" NPT pilot gas connection
- 6) Pilot gas pressure test port
- 7) 1" NPT scanner port
- 8) Main gas inlet 2" NPT
- 9) Combustion air pressure test port

View B-B



View C-C

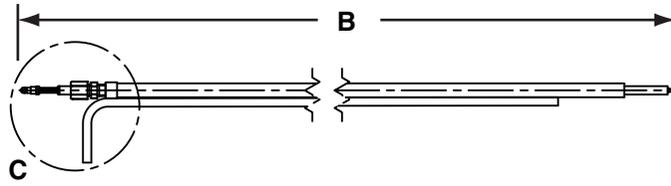


Dimensions in inches unless stated otherwise											
Burner size	A	B	C	D	E	F	G	H Ø	J Ø	K	L
XPO 5 EB	27.15	13.15	8.23	.25	3.35	3.24	8.23	13.5	.88	45°	22.5°

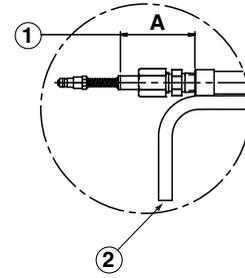
Burner size	M Ø	N Ø	P	Q	R	S	T	U	V	W
XPO 5 EB	11.75	8.71	16.89	11.28	1.72	5.47	3.36	.19	5.87	9.89

### Spark ignitor pilot tube assembly for sizes XPO 1, 2 and 3

- 1) Spark ignitor set-up dimension
- 2) 3/8" pilot gas tubing



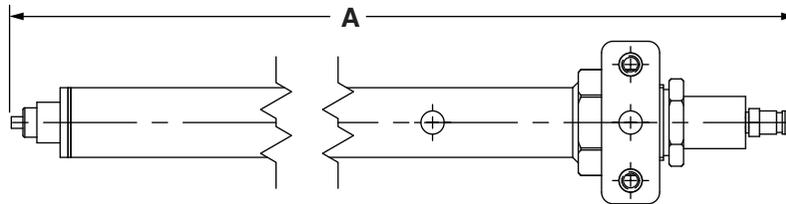
Detail C



Dimensions in inches unless stated otherwise		
Burner size	A	B
XPO 1 PB 2	2.05	34.08
XPO 2 PB 2		
XPO 3 PB 2		
XPO 3 EB 2		
XPO 1 PB 4	2.05	56.0
XPO 2 PB 4		
XPO 3 PB 4		
XPO 3 EB 4		

Note: Valid for burners shipped prior to 8/12/2012.

### Spark ignitor for sizes XPO 1, 2, 3, 4 & 5



Dimensions in inches unless stated otherwise	
Burner size	A
XPO 1 PB 2	32.21
XPO 2 PB 2	
XPO 3 PB 2	
XPO 3 EB 2	
XPO 1 PB 4	54.14
XPO 2 PB 4	
XPO 3 PB 4	
XPO 3 EB 4	
XPO 4 PB 4	
XPO 5 PB 4	
XPO 5 EB 4	

# INSTALLATION AND OPERATING INSTRUCTIONS FOR XPO™ BURNERS



Please read the operating and mounting instructions before using the equipment. Install the equipment in compliance with the prevailing regulations.

Bedrijfs- en montagehandleiding voor gebruik goed lezen! Apparaat moet volgens de geldende voorschriften worden geïnstalleerd.

Lire les instructions de montage et de service avant utilisation! L'appareil doit impérativement être installé selon les réglementations en vigueur.

Betriebs- und Montageanleitung vor Gebrauch lesen! Gerät muß nach den geltenden Vorschriften installiert werden.

## Application requirements

### VIEW PORT

A view port to observe burner flame is helpful to inspect flame aspect. Locate the view port downstream of the flame, looking back to the burner. Make sure the complete flame can be evaluated.

### SUPPORT BURNER AIR AND GAS PIPING

The XPO™ burner shall not be used as support for the piping to the burner. Gas and air piping shall be supported in such a way that no additional loads will be created on the burner.

### BURNER MOUNTING FLANGE LOADS

Check burner weight and reinforce burner mounting flange or combustion chamber/furnace back wall if necessary to take complete burner weight.

## INSTALLATION INSTRUCTIONS

### STORAGE OF XPO™ BURNERS

XPO™ burners shall be stored dry (inside).

### HANDLING OF XPO™ BURNERS

Handle burners with care during unpacking, transport, lifting and installation. Use proper equipment. Any impact on the burner could result in damage.

## Burner assembly instructions

Packaged burners will be shipped with blowers, blast tubes and fuel valves removed. Burner requires assembly prior to installation.

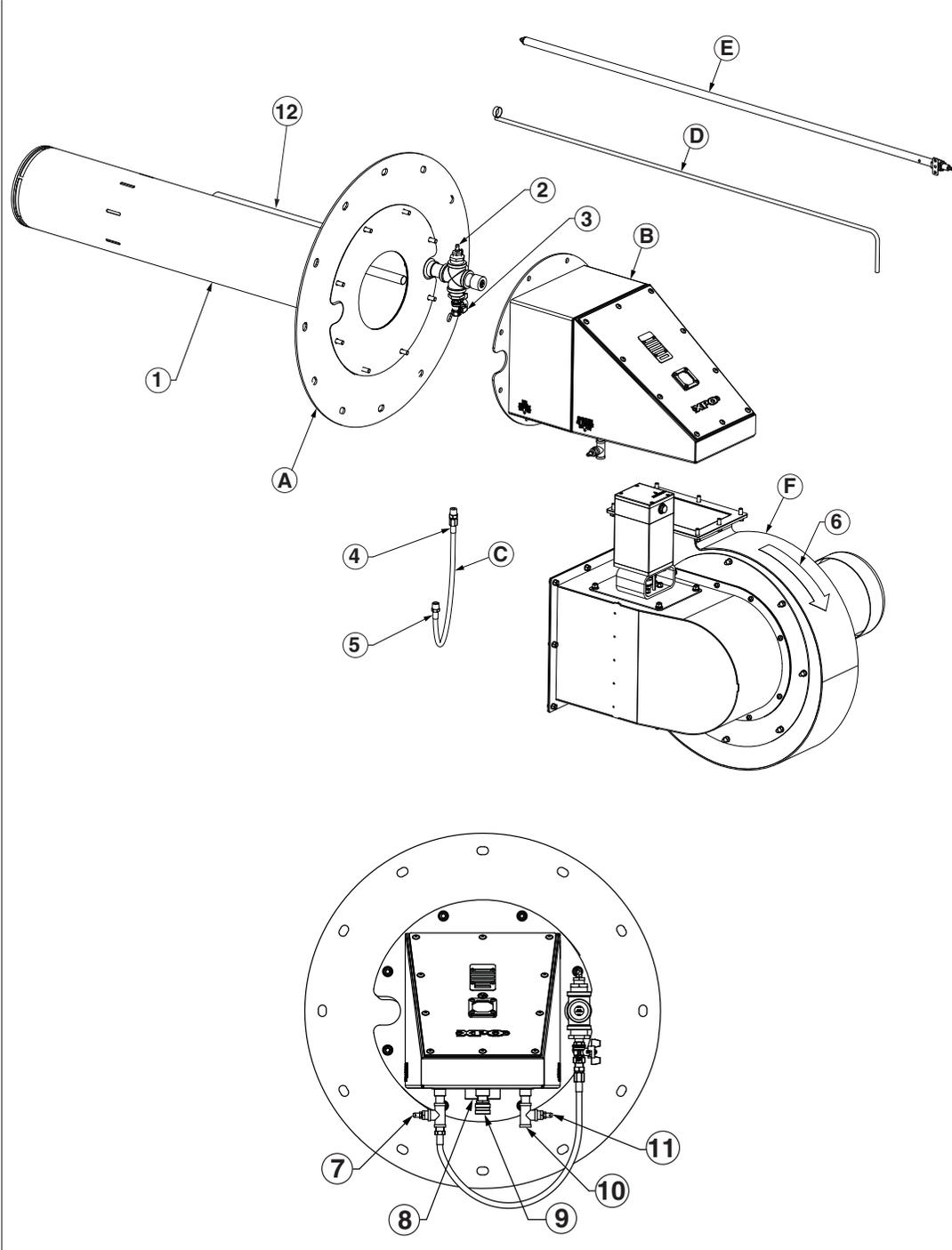
The following components will be included in the shipping carton:

- Housing and manifold assembly (B)
- Blower and air valve assembly (packaged versions only) (F)
- Fuel valve assembly
- Blast tube assembly (A)
- Scanner cooling air flex hose (C)

Assemble burner components using the instructions and diagrams below and on the following pages as a guide.

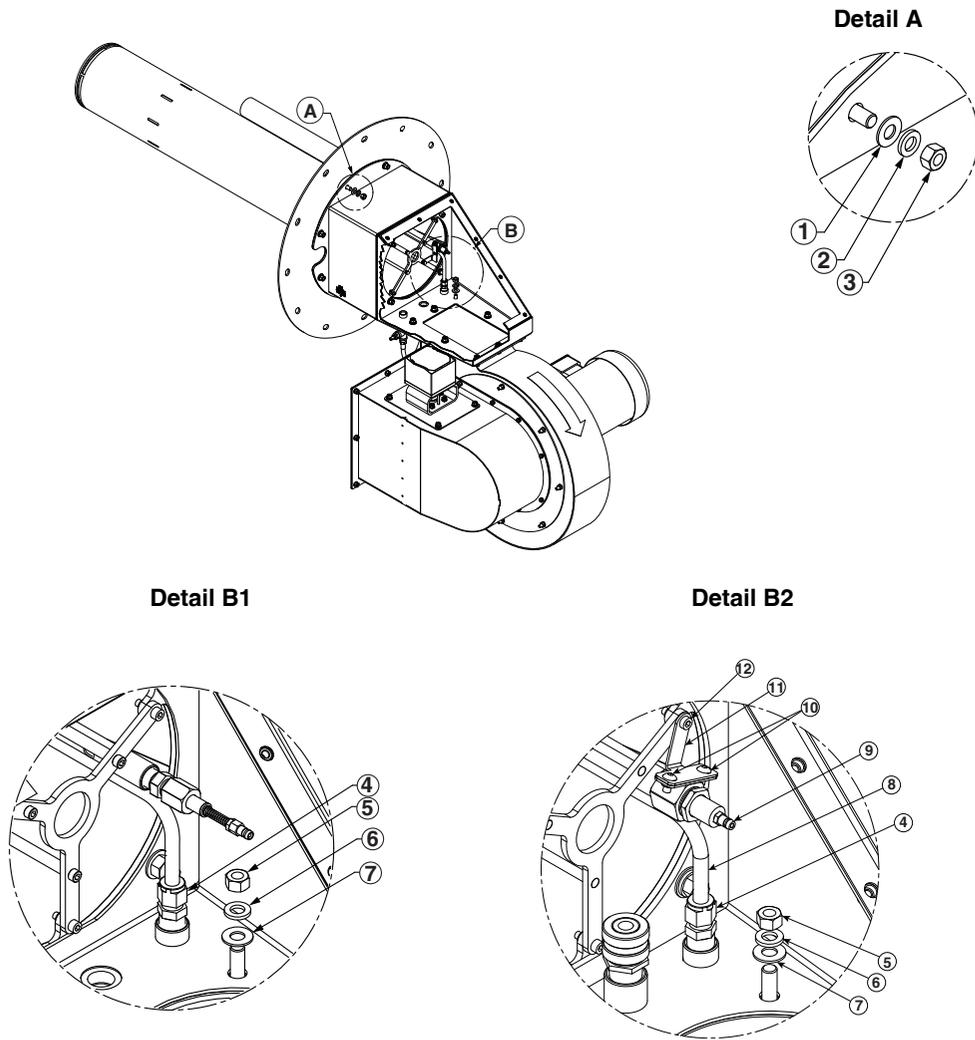
- Insulate and install blast tube assembly (A) according to catalog instructions.
- Pipe fuel line and control valve to burner assembly.
- Pipe pilot gas line and connect ignition wire to manifold assembly (B).
- Attach blower and air valve assembly (F) for packaged burners or EB adapter for external blower.

- 1) Blast tube (insulation not shown)
- 2) Chamber pressure test connection
- 3) Scanner cooling air valve
- 4) Attach swivel end of flex hose to scanner cooling air valve
- 5) Attach fixed end of flex hose to combustion air pressure connection
- 6) Impeller rotation
- 7) Combustion air test connection
- 8) Main fuel inlet
- 9) Ignition wire S-O cord connector
- 10) Pilot gas inlet
- 11) Pilot gas test connection
- 12) Customer-supplied scanner tube



**INSTALLATION OF IGNITOR AND PILOT GAS LINE**

- 1) 3/8" flat washer
- 2) 3/8" split lock washer
- 3) 3/8" -16 nut
- 4) Pilot gas tube nut
- 5) 3/8" -16 nut
- 6) 3/8" split lock washer
- 7) 3/8" flat washer
- 8) Pilot gas tubing
- 9) Ignitor
- 10) Two 10-24 ignitor screws
- 11) Spark ignitor bracket
- 12) 10-24 socket head cap screw



**DETAIL B1 - FOR SIZES XPO 1-3 (SHIPPED PRIOR TO 8/12/2012):**

- Insert spark ignitor into blast tube's ignitor tube. (Mixing disc and tripod assembly inside manifold may need to be rotated for clearance.)
- Connect pilot tube to manifold.
- Confirm spark ignitor set-up dimension as shown in catalog literature.
- Tighten all hardware, noting that O-ring must be present between nut and ceramic and the spark ignitor nut needs only be hand tight plus 1/4 turn to prevent cracking ceramic.
- Connect ignition wire to spark ignitor.

**DETAIL B2 - FOR SIZES XPO 1-3 (SHIPPED AFTER 8/12/2012) AND XPO 4 & 5:**

- Remove acorn nut from mixing disc portion of manifold assembly.
- Slide pilot gas tube ring over blast tube's ignitor tube.
- Connect pilot tubing to manifold.
- Insert spark ignitor into blast tube ignitor tube and shoulder spark ignitor into blast tube disc.
- Attach spark ignitor bracket using acorn nut previously removed.
- Tighten the two ignitor bracket screws.
- Tighten all hardware.
- Connect ignition wire to spark ignitor.

## Burner mounting instructions

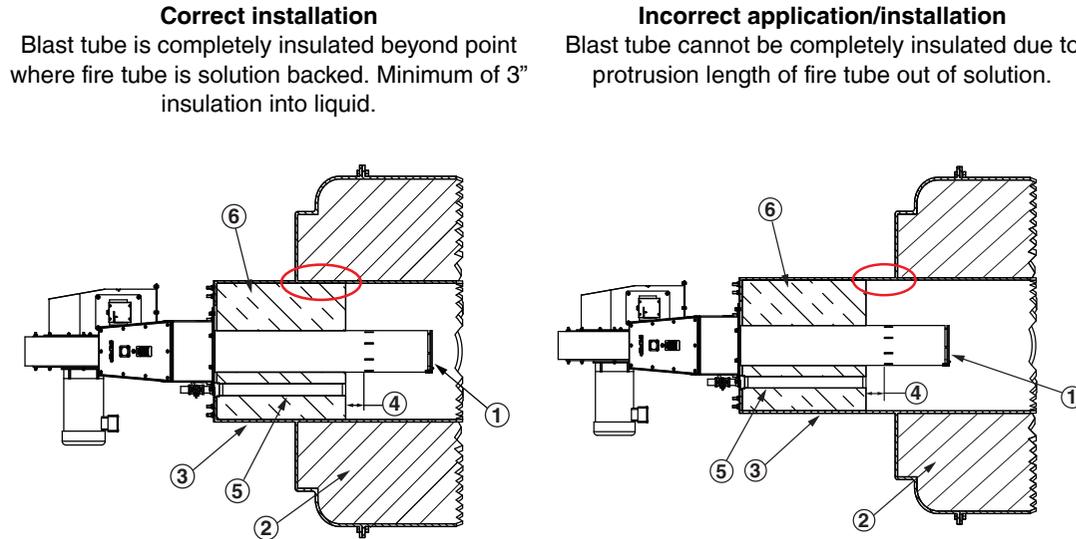
### FLANGE THE BURNER TO THE INSTALLATION

Bolt the burner to the installation's burner mounting flange. Use proper gasketing. Tighten the flange bolting with correct torque. Retighten all bolts after first firing and regularly after commissioning.

All non-liquid cooled surfaces must be insulated as shown in burner mounting diagram. **Area(s) between fire tube wall and outside of burner blast tube must be completely filled with insulation as shown below.** Customer-supplied scanner tube must not extend beyond the blast tube insulation.

### BURNER MOUNTING

- 1) Blast tube
- 2) Liquid solution
- 3) Fire tube
- 4) 6" gap required from insulation to slots
- 5) Customer-supplied scanner tube
- 6) Customer-supplied insulation (minimum 6" depth from blast tube flange)\*



\*Recommended insulation properties: minimum density of 8 pcf or greater with minimum thermal conductivity of 7.05 Btu/hr-ft<sup>2</sup> at 1800°F .

Follow all applicable codes including regional codes, local directives, standards and recommendations of your insurance carrier when designing and installing XPO™ burners. Installation should only be undertaken by qualified gas contractors licensed for any regional or local requirements.

Piping weight should be independently supported. Do not use the burner as a piping support or hang weight from the burner's flange connections.

XPO™ burners should be used in liquid backed applications. All non-liquid cooled surfaces must be insulated as shown above.

Both packaged (PB) and external blower (EB) versions include two different choices for blast tube length. A 2 foot or 4 foot long blast tube is available. Blast tube length should be selected based on the wall penetration depth or non-liquid cooled portion of fire tube.

# START-UP INSTRUCTIONS FOR XPO™ BURNERS

Instructions provided by the company or individual responsible for the manufacture and/or overall installation of a complete system incorporating MAXON burners take precedence over the installation and operating instructions provided by MAXON. If any of the instructions provided by MAXON are in conflict with local codes or regulations, please contact MAXON before initial start-up of equipment.



**Read the combustion system manual carefully before initiating the start-up and adjustment procedure. Verify that all of the equipment associated with and necessary to the safe operation of the burner system has been installed correctly, that all pre-commissioning checks have been carried out successfully and that all safety-related aspects of the installation are properly addressed.**

Initial adjustment and light-off should be undertaken only by a trained commissioning engineer.

Do not operate the burner without the burner cover and observation window securely attached and sealed to the burner air housing.

## CHECKS DURING AND AFTER START-UP

During and after start-up, check the integrity of the system. Check all bolted connections after first firing (first time on temperature) and retighten if necessary.

## PILOT IGNITION

Before ignition of the pilot, adjust the combustion air to the minimum burner air flow. Pilot will not ignite if too high an air flow exists. Set pilot gas flow to the correct value before pilot ignition attempt.

## MAIN BURNER IGNITION

Set correct gas flow for burner minimum capacity before attempt of main burner ignition. After ignition of main burner, allow some time on minimum capacity to allow the burner parts to heat up slowly.

## ADJUST AIR/GAS RATIO, SET MAXIMUM CAPACITY

Once the main flame is ignited, adjust air/gas ratio of the burner to have the required combustion quality and slowly increase capacity. Do not increase capacity too fast to avoid damage to burner parts or furnace due to excessive temperature gradient. Stack O<sub>2</sub> should be used to do final set-up of air/fuel ratio.

# MAINTENANCE AND INSPECTION INSTRUCTIONS

## SAFETY REQUIREMENTS

Regular inspection, testing and recalibration of combustion equipment according to the installation manual is an integral part of its safety. Inspection activities and frequencies shall be carried out as specified in the installation manual.

## VISUAL INSPECTIONS

Regular visual inspection of all connections (air and gas piping to the burner, bolting of the burner to the furnace) and burner flame size and aspect are essential.

## SPARE PARTS

Keep local stock of spark ignitor. It is not recommended to keep local stock of other burner parts. Consult installation manual for burner spare parts and system accessories.



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