

WX nozzle-mix, low-emissions air heating burner

TECHNICAL INFORMATION

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



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1 Application



The WX 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.

WX is designed to comply with global emissions regulations. Easy to set up and operate, the low NO_x WX burner is ideal for air heating and oven applications. WX features an intense, short, swirled flame that is completely contained within the firing tube. The nozzle creates an intense mixing of air and fuel, resulting in extremely low emissions.

More features are

- low NO_x and CO emissions
- efficient ratio controlled combustion
- reliable burner operation
- simple burner adjustment
- direct spark ignition
- multiple fuel capability

Typical applications: dry-off and curing ovens, incinerators, indirect air heating, textile drying, food processing/baking, annealing, aluminium homogenizing.

2 Certification

2.1 Eurasian Customs Union



The products WX Burner meet the technical specifications of the Eurasian Customs Union.

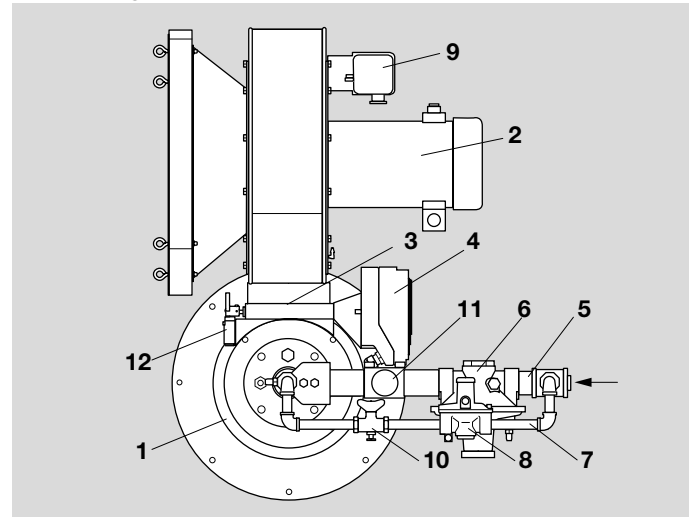
3 System design

Designing a burner system is a straight-forward exercise of combining modules that add up to a reliable and safe system.

The design process is divided into the following steps:

- Burner model selection
- Blower model selection
- Control methodology
- Ignition system
- Flame monitoring system
- Main gas shut-off valve train
- Chamber verification

Part designations



Legend:

- 1** Burner
- 2** Combustion air blower
- 3** Integral air BV
- 4** Control motor
- 5** Main fuel line
- 6** Ratio regulator
- 7** Minimum fuel bypass line
- 8** Bypass fuel regulator
- 9** Pressure switch
- 10** Pilot trim valve
- 11** Main gas trim valve
- 12** High/Low fire limit switches

3.1 Burner model/size

Consider the following when selecting the burner size and see [the chapter] page 7 (4 Burner model selection) for burner model.

Heat input

Calculate the required heat input to achieve the required heat balance. The burner air supply option selected will affect available heat output from the burner.

Power supply frequency

Burner capacity will vary with power supply frequency (50 Hz or 60 Hz power), see page 25 (7 Technical data).

Altitude

The maximum burner capacity is reduced by approximately 3% each 1000 feet (300 meters) above sea level.

Combustion chamber pressure

Consider the effects that large or varying chamber pressures have on burner performance.

Fuel type

Variation in calorific value and density will affect burner performance. Nominal burner performance is based on fuel properties, see page 9 (4.3.1 Fuel type, HHV, WOBBE Index).

Which burner type may be operated with which gas type, see page 25 (7 Technical data).

3.2 Calculating gas mixtures and combustion values

A web app for calculating gas mixtures and for calculating combustion values is available at www.adlatus.org.

3.3 Capacity data

As far as the capacity data are concerned, it should be noted that the capacities in kW and the energy densities in kWh/m³ relate to the lower heating value LHV (H_i , H_u). Capacities quoted in BTU/h and energy densities in BTU/ft³ relate to the higher heating value HHV (H_s , H_o).

Units	Relative to
kW	Lower heating value LHV
kWh/m ³	Lower heating value LHV
BTU/h	Higher heating value HHV
BTU/ft ³	Higher heating value HHV

3.4 Firing position (burner orientation)

- Vertical down firing
- Vertical up firing
- Horizontal firing

4 Burner model selection

4.1 Capacity

Type	Max. capacity	
	kBTU/h ¹⁾	kW ²⁾
WX0050	550–590	161–173
WX0100	1000–1201	293–352
WX0200	2000–2399	586–703
WX0300	3000–3630	879–1064
WX0400	587–4900	172–1436
WX0500	5000–5990	1465–1755
WX0600	6000–7340	1758–2151
WX0850	8500–12500	2491–3663

1) Capacities in BTU/h refer to the higher heating value HHV (gross calorific value).

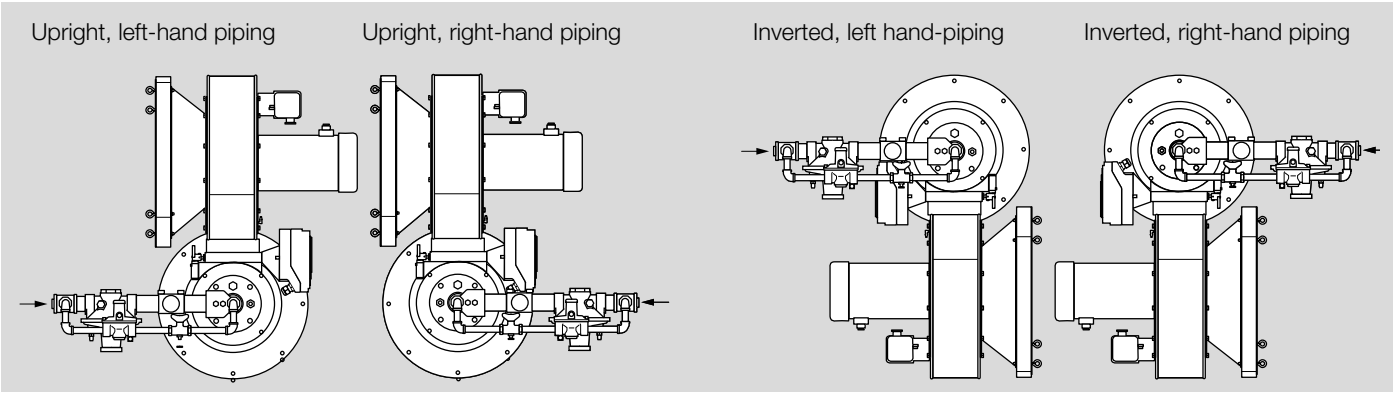
2) Capacities in kW/h refer to the lower heating value LHV.

4.2 Burner orientation and style

Description	Code	WX0050	WX0100	WX0200	WX0300	WX0400	WX0500	WX0600	WX0850	Condition
Firing position										
Vertical down firing	D	•	•	•	•	•	•	•		
Vertical up firing	U				•	•	•	•		
Horizontal firing	H	•	•	•	•	•	•	•	•	
Burner style										
Upright, right-hand piping	B	•	•	•	•	•	•	•	•	
Upright, left-hand piping	C	•	•	•	•	•	•	•	•	
Inverted, right-hand piping	D	•	•	•	•	•	•	•		
Inverted, left-hand piping	E	•	•	•	•	•	•	•		

4.2.1 Burner style

Blower and piping orientation choice



4.3 Fuel type

Description	Code	WX0050	WX0100	WX0200	WX0300	WX0400	WX0500	WX0600	WX0850	Condition
Butane	B				•	•	•	•	•	
Natural gas	N	•	•	•	•	•	•	•	•	
Propane	P		•	•	•	•	•	•	•	

4.3.1 Fuel type, HHV, WOBBE Index

Fuel	Symbol	Gross heating value (HHV)	Specific gravity	WOBBE Index
Natural gas	CH ₄ 90% +	1000 BTU/ft ³ (11,1 kWh/m ³)	0.60	1290 BTU/ft ³
Propane	C ₃ H ₈	2525 BTU/ft ³ (28,11 kWh/m ³)	1.55	2028 BTU/ft ³
Butane	C ₄ H ₁₀	3330 BTU/ft ³ (37,14 kWh/m ³)	2.09	2303 BTU/ft ³

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

4.4 Pilot configuration

WX burners are equipped with a standard integral bypass pilot. No additional hookups are required to operate this pilot. All bypass regulators are supplied with a vent limiting orifice or a vent protector. For additional configurations, contact your Heatflam Sales Engineer.

Description	Code	WX0050	WX0100	WX0200	WX0300	WX0400	WX0500	WX0600	WX0850	Condition
Standard integral bypass, indoor	A	•	•	•	•	•	•	•	•	
Pilot ready, indoor	P	•	•	•	•	•	•	•	•	

4.5 Combustor type

Select a combustor type based on the application.
Please also note the recommended maximum chamber temperature. See page 25 (7 Technical data).

Description	Code	WX0050	WX0100	WX0200	WX0300	WX0400	WX0500	WX0600	WX0850	Condition
Low temperature alloy tube	A	•	•	•	•	•	•	•	•	
High temperature alloy tube	B	•	•	•	•	•	•	•	•	

4.6 Air supply

Select either a combustion air blower mounted directly to the burner body, or a pipe connection type for remote blower operation. See page 25 (7 Technical data).

Description	Code	WX0050	WX0100	WX0200	WX0300	WX0400	WX0500	WX0600	WX0850	Condition
Integral packaged blower	B	•	•	•	•	•	•	•	•	
Threaded air inlet, less butterfly valve	T	•	•							
Welded air inlet, less butterfly valve	W			•	•	•	•	•	•	

4.7 Control motor

Select a control motor. Standard control motor options include various models, provided mounted to the burner. WX burners can be ordered with control motor bracket and mounting hardware only. Customer supplied control motors must conform to these specifications:

- rotation not to exceed 2 rpm (1/min)
- minimum torque of 25 inch-lb (2.8 Nm)
- 90° stroke
- continuous modulating or high/low modulating control
- reversible direction of rotation

- certain applications may require control motors with a limit switch or switches if:
 - the burner capacity is to be limited to fit an application
 - the chamber is to be fired with positive or negative pressure
 - the chamber pressure is outside the range -1 "WC to +1 "WC (-2.5 to 2.5 mbar)
 - there is a need to indicate a high and/or low fire air butterfly valve position

For detailed information on the actuators, see the Technical Information for Actuator IC at www.docuthek.com.

Description	Code	WX0050	WX0100	WX0200	WX0300	WX0400	WX0500	WX0600	WX0850	Condition
IC 20, 3-position step, 120 V	F	•	•	•	•	•				Air supply only with integral packaged blower
IC 20, electronic, 120 V	G	•	•		•	•				Air supply only with integral packaged blower
IC 20, 3-position step, 230 V	H	•	•	•	•	•				Air supply only with integral packaged blower
IC 20, electronic, 230 V	I	•	•	•	•	•				Air supply only with integral packaged blower
Bracket only (Siemens)	K	•	•	•	•	•	•	•	•	Air supply only with integral packaged blower
Bracket only (Kromschroeder IC 20/IC 40)	L	•	•	•	•	•				Air supply only with integral packaged blower
Bracket only (Heatflam)	N	•	•	•	•	•	•	•	•	Air supply only with integral packaged blower
M7284 C 1000	R	•	•	•	•	•	•	•	•	Air supply only with integral packaged blower
Less control motor, less bracket	X	•	•	•	•	•	•	•	•	

4.8 Limit switch

Limit switches monitor the position of the integral air butterfly valve. Select high, low, high and low, or no limit switch option. Proper selection is based on preference, control system, and local code.

Description	Code	WX0050	WX0100	WX0200	WX0300	WX0400	WX0500	WX0600	WX0850	Condition
High and low air limit switch	A	•	•	•	•	•	•	•	•	
High air limit switch only	B	•	•	•	•	•	•	•	•	Air supply only with integral pack-aged blower
Low air limit switch only	C	•	•	•	•	•	•	•	•	Air supply only with integral pack-aged blower
Less air limit switch	X	•	•	•	•	•	•	•	•	

4.9 Loading line type

All WX burners have the option of plastic, flexible braided stainless steel or rigid stainless tubing loading line. Selection depends on application and environment.

Description	Code	WX0050	WX0100	WX0200	WX0300	WX0400	WX0500	WX0600	WX0850	Condition
Braided stainless steel	B	•	•	•	•	•	•	•	•	
Plastic tubing	P	•	•	•	•	•	•	•		
Stainless steel tubing	S	•	•	•	•	•	•	•	•	

4.10 Air switch

The air pressure switch provides a signal to the monitoring system when there is not enough air pressure from the blower. If a switch is selected, it will be factory mounted.

WARNING! Heatflam-Eclipse supports the NFPA regulation requiring, as a minimum standard for main gas shut-off systems, the use of an air pressure switch in conjunction with other system components.

For detailed information on air pressure switches, see the Technical Information Pressure switch for air DL at www.docuthek.com.

Description	Code	WX0050	WX0100	WX0200	WX0300	WX0400	WX0500	WX0600	WX0850	Condition
Air switch DL 50AT (1.0–20 "WC)	C	•	•	•	•	•	•	•	•	Air supply only with integral packaged blower.
Air switch DL 50K-3 (2.5–50 mbar)	G	•	•	•	•	•	•	•	•	Air supply only with integral packaged blower. Plastic tubing.
Less air pressure switch	X	•	•	•	•	•	•	•	•	

4.11 Piping connection

Select the gas pipe connection thread type. The piping, burner gas inlet, and fuel train components are threaded using the customer selected pipe thread option.

Description	Code	WX0050	WX0100	WX0200	WX0300	WX0400	WX0500	WX0600	WX0850	Condition
Piping connection BSP threaded	B	•	•	•	•	•	•	•	•	
Piping connection NPT threaded	N	•	•	•	•	•	•	•	•	

4.12 Flame supervision

Select a flame rod or an ultraviolet (UV) scanner. Both are available on all WX burners. If a flame rod is selected, it will be factory mounted in the burner. If a UV scanner is selected, it must be ordered separately. See page 21 (5.9 Flame monitoring system).

Description	Code	WX0050	WX0100	WX0200	WX0300	WX0400	WX0500	WX0600	WX0850	Condition
Flame rod	F	•	•	•	•	•	•	•	•	Natural gas and propane only
Standard UV scanner adapter, 1/2" thread	G	•	•	•	•	•	•	•	•	
Standard UV scanner adapter, 3/4" thread	H	•	•	•	•	•	•	•	•	
Extended UV scanner adapter, 3/4", self-check scanners	S	•	•	•	•	•	•	•	•	
Extended UV scanner adapter, 1", self-check scanners	T	•	•	•	•	•	•	•	•	
Less flame sensor	X	•	•	•	•	•	•	•	•	

4.13 Order example for burner model

WX0200HBNABBGBCNH

5 Blower model selection

5.1 Blower size

Description	Code	WX0050	WX0100	WX0200	WX0300	WX0400	WX0500	WX0600	WX0850	Condition
Blower model										
Size 4 blower	4	•	•							Air supply only with integral packaged blower
Size 5 blower	5			•						Air supply only with integral packaged blower
Size 6 blower	6				•	•				Air supply only with integral packaged blower
Size 7 blower	7								•	Air supply only with integral packaged blower
Size 8 blower	8				•	•	•	•		Air supply only with integral packaged blower
Less blower	X	•	•	•	•	•	•	•	•	Threaded and welded air inlet (less butterfly valve) only
Power supply										
Power supply 60 Hz	1	•	•	•	•	•	•	•	•	Air supply only with integral packaged blower
Power supply 50 Hz	2				•	•	•	•		Air supply only with integral packaged blower
Not applicable	X	•	•	•	•	•	•	•	•	Less blower

5.2 Pressure and flow

Eclipse integral packaged blowers are designed to provide the required pressure and flow in standard conditions. For information regarding non-standard conditions, see page 25 (7 Technical data).

Description	Code	WX0050	WX0100	WX0200	WX0300	WX0400	WX0500	WX0600	WX0850	Condition
6 "WC and 22,000 ft ₃ /h 15 mbar and 623 m ₃ /h	4B	•								Not available: less blower
15 "WC and 16,500 ft ₃ /h 37 mbar and 467 m ₃ /h	4G		•							Not available: less blower
15 "WC and 33,000 ft ₃ /h 37 mbar and 935 m ₃ /h	5C									Not available: less blower
15 "WC and 55,000 ft ₃ /h 37 mbar and 1558 m ₃ /h	6C				•					Not available: less blower
15 "WC and 66,000 ft ₃ /h 37 mbar and 1869 m ₃ /h	6C					•				Not available: less blower
15 "WC and 82,500 ft ₃ /h 37 mbar and 2336 m ₃ /h	7A						•			Not available: less blower
Power supply										
15 "WC and 110,000 ft ₃ /h 37 mbar and 3115 m ₃ /h	7B							•		Not available: less blower
15 "WC and 190,000 ft ₃ /h 37 mbar and 5381 m ₃ /h	8B								•	Not available: less blower
Less blower	XX	•	•	•	•	•	•	•	•	

5.3 Blower motor type

Motor types include various options: voltages, single or three phase, TEFC or automotive duty enclosures.

Description	Code	WX0050	WX0100	WX0200	WX0300	WX0400	WX0500	WX0600	WX0850	Condition
Motor type 115-208/230/1 TEFC	AA	•								60 Hz only
Motor type 208-230/460/3 TEFC	AB	•	•	•	•	•	•	•		60 Hz only
Motor type 575/3 TEFC (NEMA)	AC	•								60 Hz only
Motor type 230/460/3 TEFC	AF								•	60 Hz only
Motor type 230/460/3 auto TEFC	BA	•								60 Hz only
Motor type 460/3 auto TEFC	BB		•	•	•	•	•	•		WX0100–WX0600: 60 Hz only WX0500–WX0600: Horizontal firing only
Motor type 220240/380–415/3 IEC	CA					•	•	•	•	50 Hz only
Less motor	XX	•	•	•	•	•	•	•	•	

5.4 Blower inlet

When selecting an inlet, consider the following:

- Amount and size of particles in the air
- Sound requirements
- Space limitations
- Cleanliness requirements of the process

Description	Code	WX0050	WX0100	WX0200	WX0300	WX0400	WX0500	WX0600	WX0850	Condition
Integral grille only	A	•	•	•	•	•	•	•	•	Not available: less blower
Standard filter	B	•	•	•	•	•	•	•	•	Not available: less blower
Square filter auto	C	•	•	•	•	•	•	•		Not available: less blower
Less blower	X	•	•	•	•	•	•	•	•	

5.5 Blower configuration

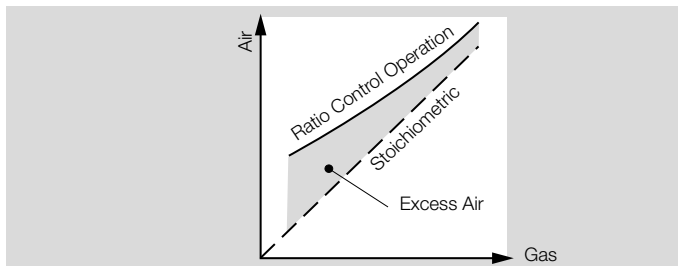
Right-hand blower motor is the standard blower configuration. If left-hand blower motor is required, contact factory, see page 8 (4.2.1 Burner style).

Description	Code	WX0050	WX0100	WX0200	WX0300	WX0400	WX0500	WX0600	WX0850	Condition
Right-hand motor	R	•	•	•	•	•	•	•	•	Not available: less blower
No motor orientation	X	•	•	•	•	•	•	•	•	Less blower

5.6 Order example for blower model

515CABAR

5.7 Control methodology



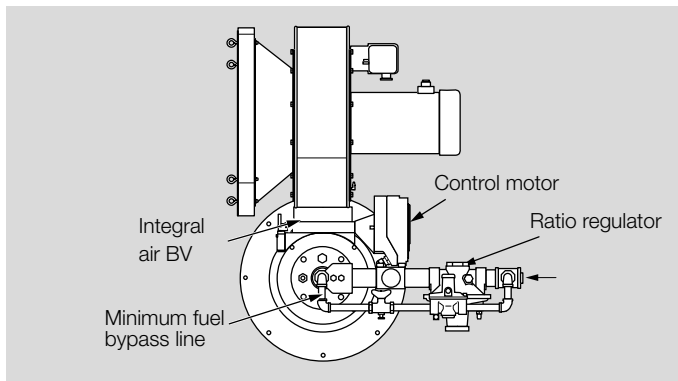
Air/gas flow

All standard WX burners are designed for

- air/gas ratio controlled combustion
- 40–70% excess air at high fire
- higher excess air at low fire

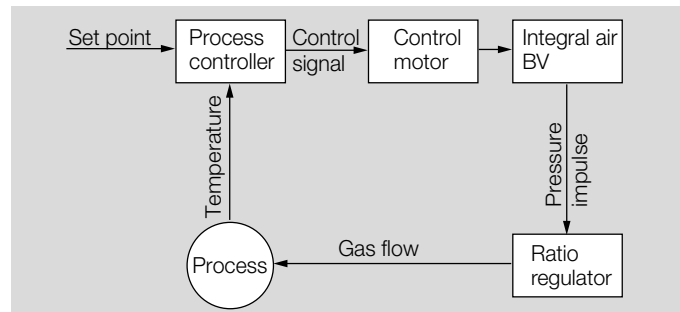
Burner control

WX burners come with a ratio regulator that maintains the air/gas ratio. An integral minimum fuel bypass line is used to maintain and control a reliable low fire input flow.



Basic burner components

A control signal is sent from a process temperature controller (sold separately) to the control motor. (Contact Eclipse for further information on temperature controllers.)



Basic control loop

The control motor modulates the integral air butterfly valve which controls the combustion air flow.

Air pressure in the burner body sends an impulse through the loading line to the ratio regulator.

The ratio regulator controls the gas flow in proportion to the air flow.

WARNING! Do not use other control methods, such as a fixed-air control, and do not alter the ratio regulator or burner piping without prior approval from Eclipse.

5.8 Ignition system

For the ignition system, use a transformer with

- secondary voltage 6,000 to 8,000 VAC
- minimum secondary current 0.02 amps continuous
- full wave output

Do not use

- twin outlet
- distributor type
- half wave output

Trial for ignition

The burner may only be lit with low fire settings.

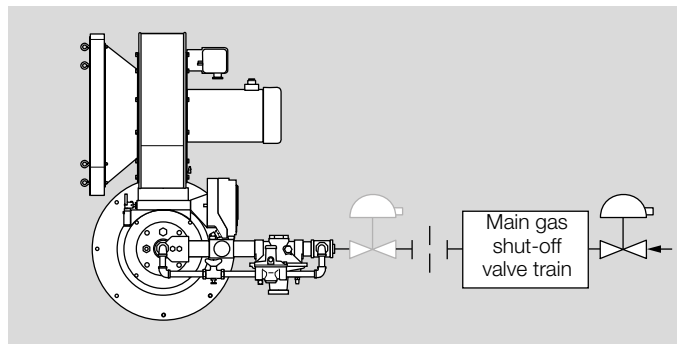
Most local safety codes and insurance requirements limit the maximum trial for ignition time (the time it takes for a burner to ignite). These requirements vary from one location to another; check your local codes and comply to the strictest codes applicable.

The time it takes for a burner to ignite depends on the following:

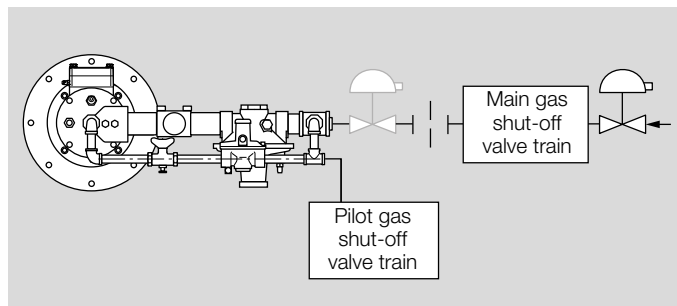
- Distance between the gas shut-off valve and the burner.
- Air/gas ratio.
- Gas flow conditions at start-up

Ignition gas piping

WX burners are capable of ignition with either low fire or bypass start gas.



Low fire start



Pilot start (optional)

Piping for pilot start option needs to be sized to accommodate low fire gas flows. See page 25 (7 Technical data) and page 43 (10 System Schematics).

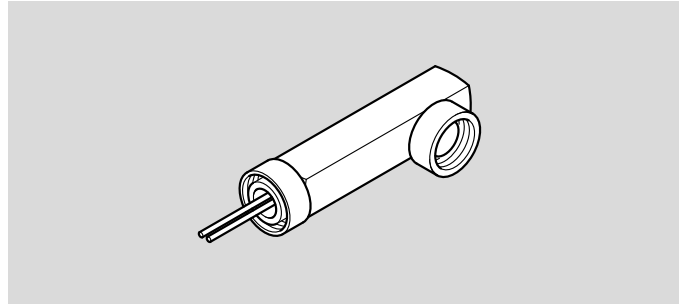
5.9 Flame monitoring system

A flame monitoring system consists of two main parts:

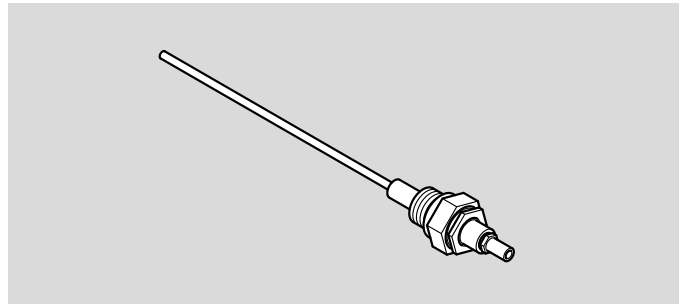
- Flame sensor
- Flame monitoring control

Flame sensor

There are two types that you can use for a WX burner:



UV scanner



Flame rod

You can find information about compatible flame rods and UV scanners in:

- [Flame Safety and Ignition Components - Technical Information](#)
- [UV sensors UVS - Technical Information](#)
- [C7XXX Flame Detectors and Industrial Flame Monitoring - HTS Combustion Catalog](#)

Flame monitoring control

The flame monitoring control processes the signal from the flame sensor and controls the start-up and shut-down sequences.

If other controls are considered, contact Heatflam to determine how burner performance may be affected. Flame monitoring controls that have lower sensitivity flame detecting circuits may limit burner turndown and change the requirements for ignition. Flame monitoring controls that stop the spark as soon as a signal is detected may prevent establishment of flame, particularly when using UV scanners. The flame monitoring control must maintain the spark for a fixed time interval that is long enough for ignition.

DO NOT USE the following:

- Flame monitoring relays which interrupt the trial for ignition when the flame is detected
- Flame sensors which supply a weak signal
- Flame monitoring relays with low sensitivity

NOTE: A UV scanner can possibly detect another burner's flame if it is in the line of sight, and falsely indicate flame presence. Use a flame rod in this situation. This helps prevent accumulation of unburned fuel which, in extreme situations, could cause a fire or an explosion.

5.10 Main gas shut-off valve train selection

Component selection

Eclipse can help in the design of or provide a main gas shut-off valve train that satisfies the customer and complies with all local safety standards and codes set by the authorities within that jurisdiction. Contact your Heatflam representative for further information.

NOTE: Heatflam supports NFPA regulations (two gas shut-off valves as a minimum standard for main gas shut-off systems).

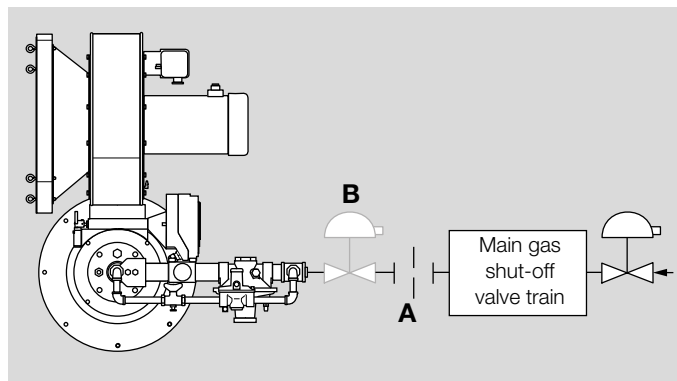
Fuel flow measurement

Eclipse requires a fuel flow measurement device **A** to ensure proper operation of the WX burner.

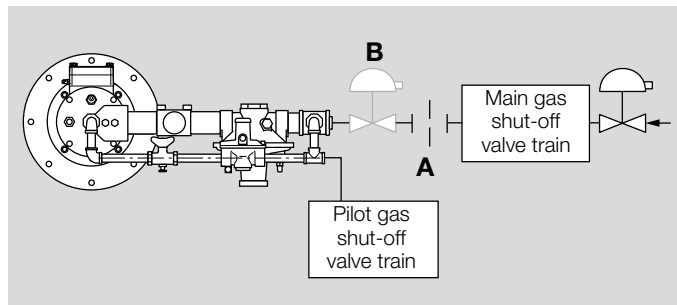
Valve train size

Note: Do not operate WX burners with gas inlet pressures less than the minimum gas inlet pressures. See page 24 (6 Project planning information).

Fuel pressure supplied to the ratio regulator inlet must be within the range specified on page 25 (7 Technical data). The valve train should be sized sufficiently to provide the specified pressure. A second main gas pressure regulator **B** immediately upstream from the burner gas inlet might be necessary to maintain the inlet pressure to the burner.



Low fire start



Pilot start option

5.11 Verify chamber

Firing chamber dimensions

The WX is a low-emissions burner that might require a larger firing chamber than a standard burner.

Chamber dimensions are a function of chamber temperature, process air volume and burner input.

Contact your Heatflam representative to review your chamber design.

Flame shielding

In applications where process air may be flowing perpendicular over the combustor, a metal shroud should be installed around the combustor that is 20% larger than the combustor diameter and with a length that covers the combustor slots by 100 mm (4").

Slot dimensions can be found on page 37 (7.6 Dimensions).

6 Project planning information

Combustion air supply

Combustion air should be fresh (20.9% O₂) and clean (without particles or corrosives).

Combustion air temperature

Changes in air supply temperature can affect the burner capacity. The combustion air supply temperature should not exceed 250°F.

Inlet pressure

Note: Do not operate WX burners with a gas inlet pressure less than the minimum listed on page 25 (7 Technical data). Lower gas inlet pressures may cause the ratio regulator to remain fully open at lower inputs as the burner transitions from low to high fire. This could result in the possible accumulation of unburned fuel in the burner which, in extreme situations, could cause a fire or an explosion.

Ignition

The burner may only be lit with low fire settings.

Most local safety codes and insurance requirements limit the maximum trial for ignition time (the time it takes for a burner to ignite). These requirements vary from one location to another; check your local codes and comply to the strictest codes applicable.

7 Technical data

7.1 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)

Model	chamber pressures "WC (mbar)				
	-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 Heatflam 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

7.2 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)

Model	chamber pressure "WC (mbar)				
	-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 Heatflam 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.*

7.3 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.

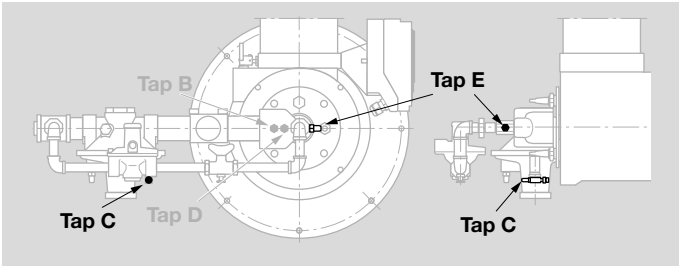
Burner with packaged blower:

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)

7.4 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)

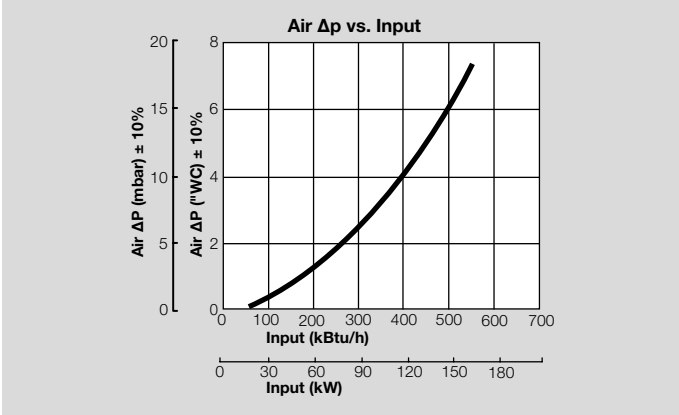
1) Measured between Tap “E” and the chamber at low fire.

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

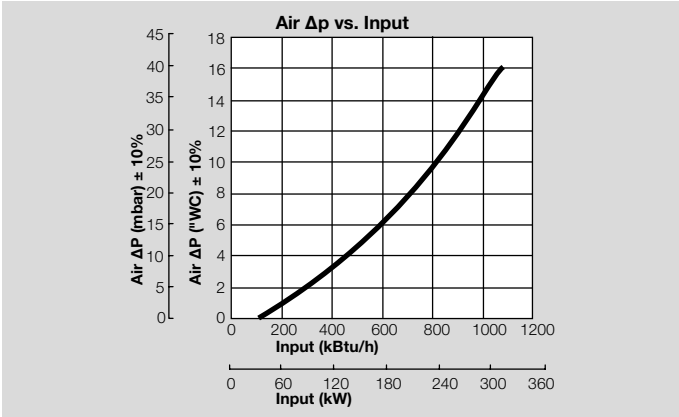
7.5 Performance graphs

7.5.1 Air ΔP vs. Input

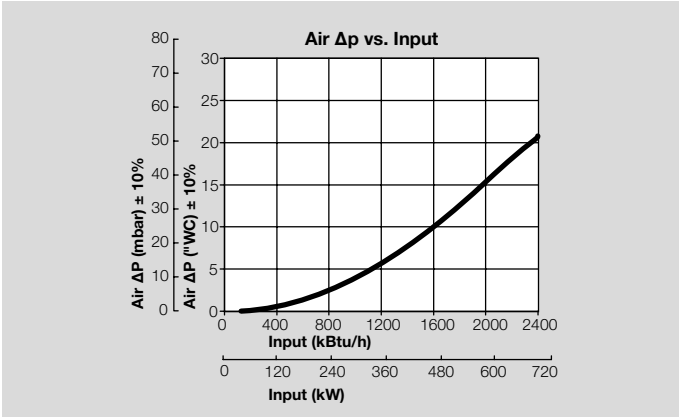
Δp measured between Tap **C** and the chamber with the burner firing



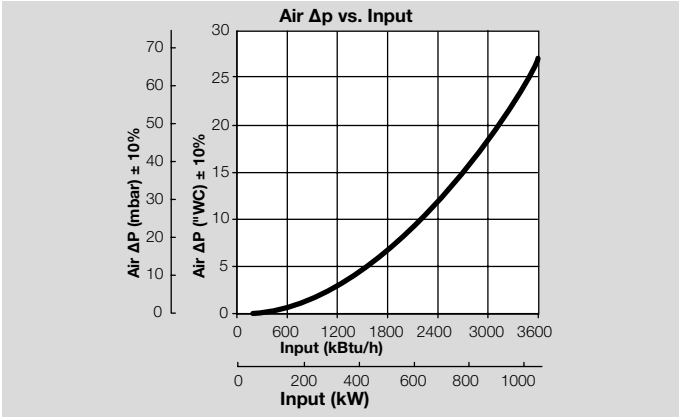
WX0050



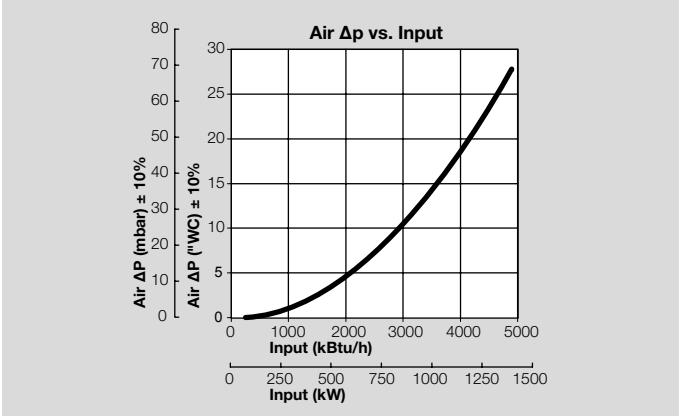
WX0100



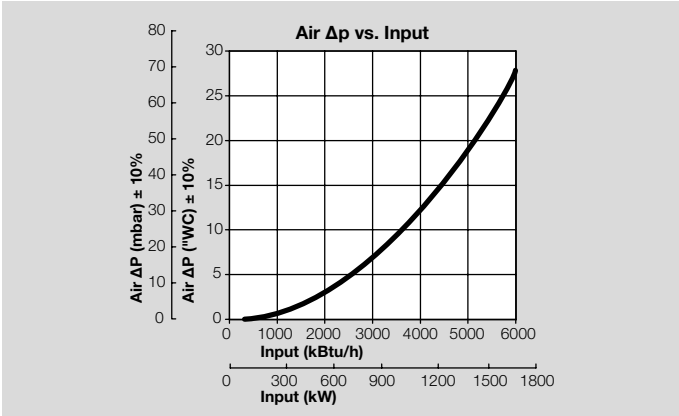
WX0200



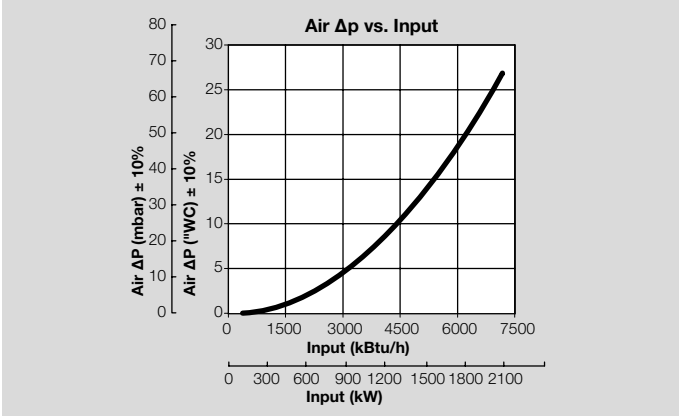
WX0300



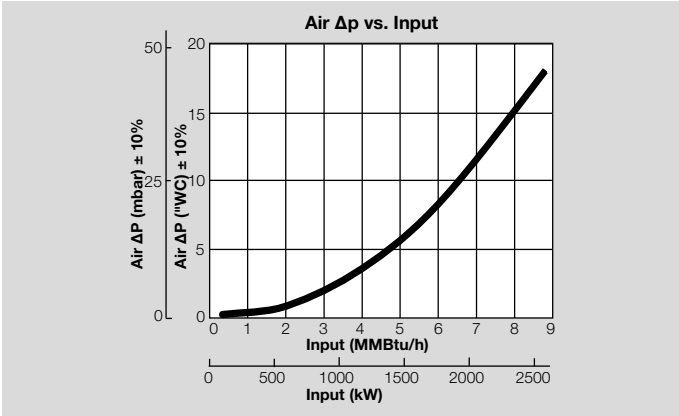
WX0400



WX0500



WX0600



WX0850

7.5.2 NO_x and excess air

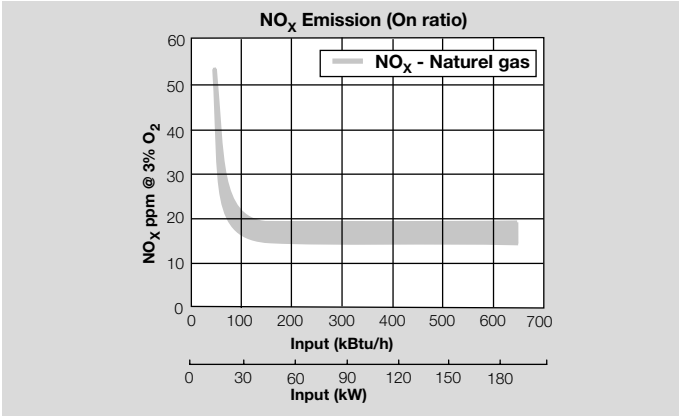
NO_x emission data is given for:

- 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 page 27 (7.2 Input of remote blower)
- Neutral chamber pressure

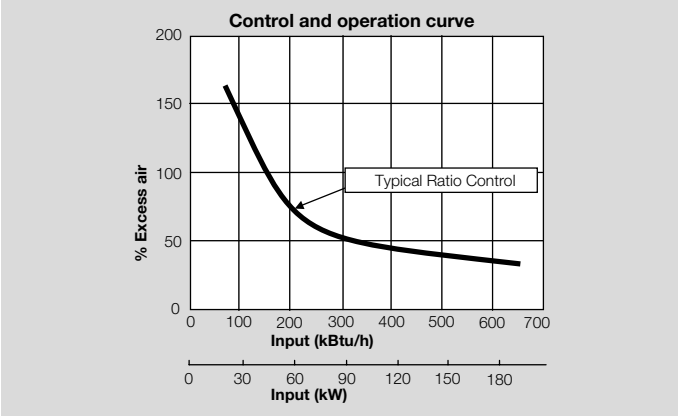
Emissions from the burner are influenced by:

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

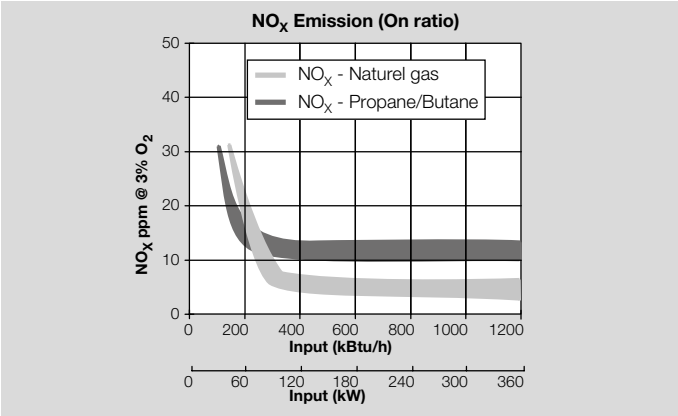
CO emission is largely influenced by chamber conditions.
Contact your Heatflam representative for an estimate of CO emission on your application.



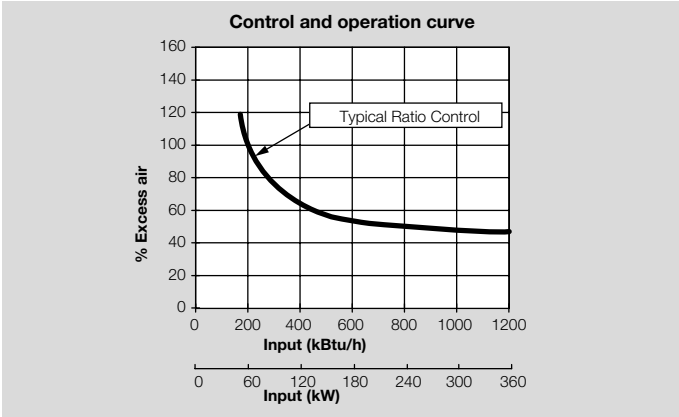
WX0050



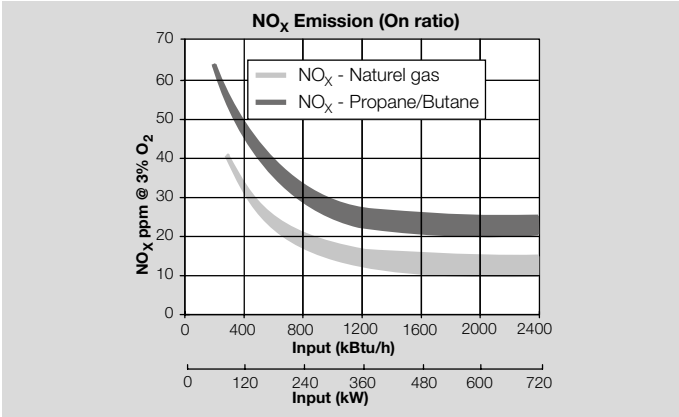
WX0050



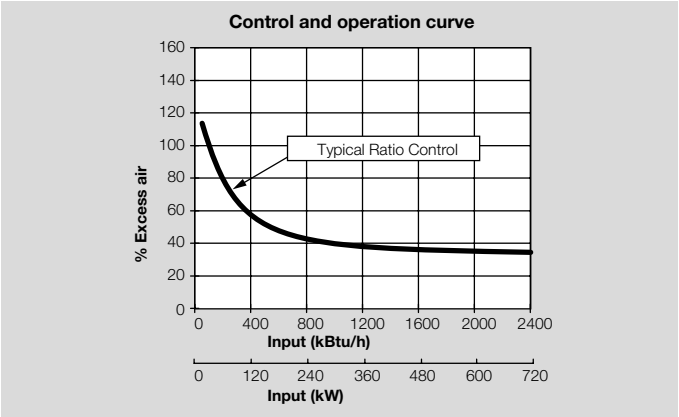
WX0100



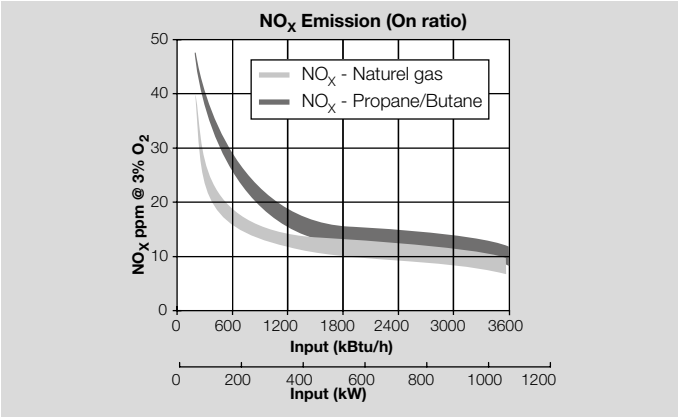
WX0100



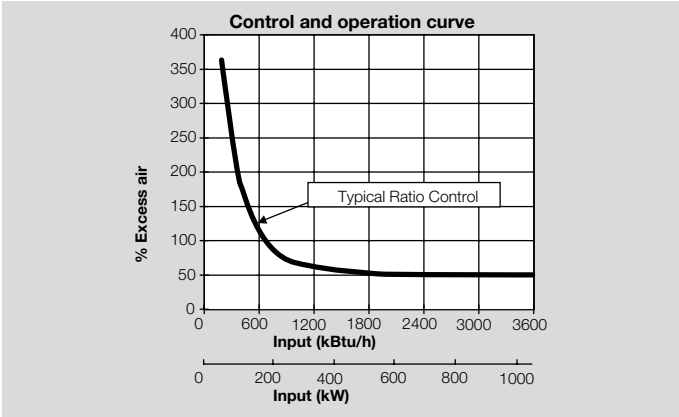
WX0200



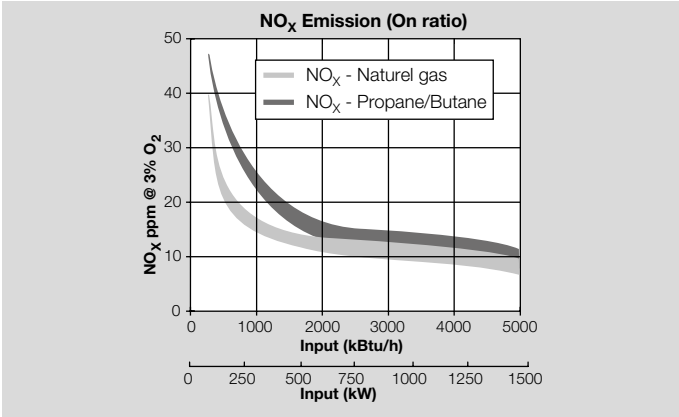
WX0200



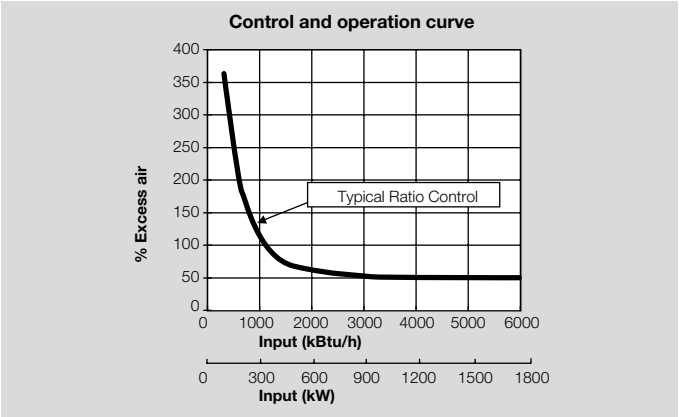
WX0300



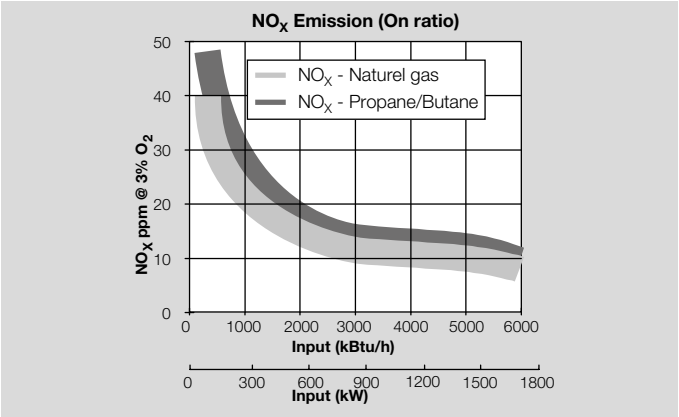
WX0300



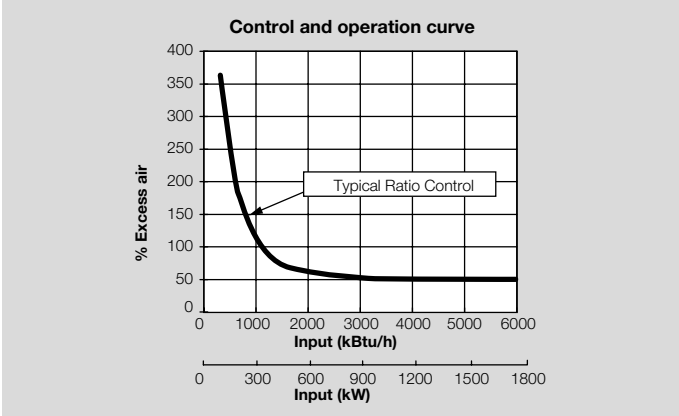
WX0400



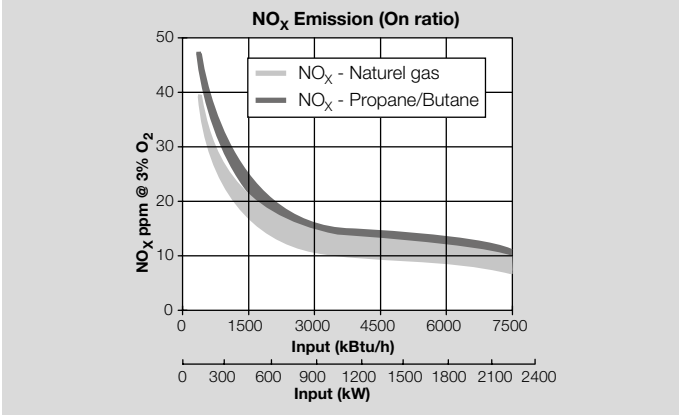
WX0400



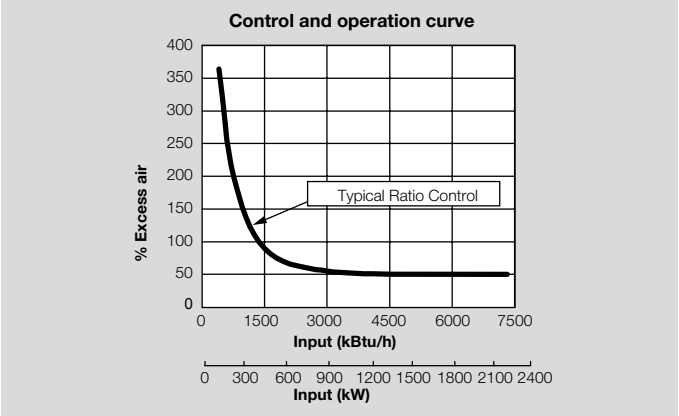
WX0500



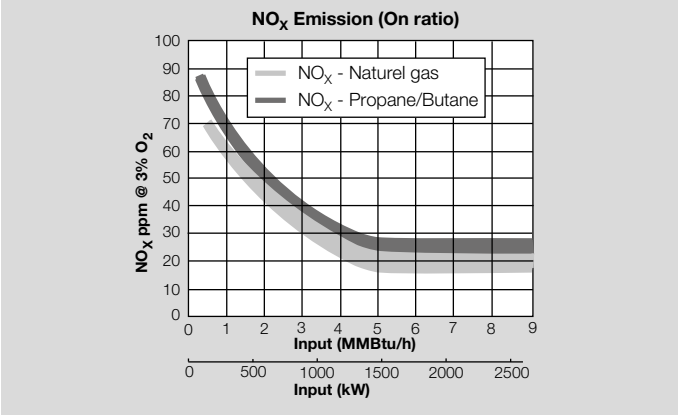
WX0500



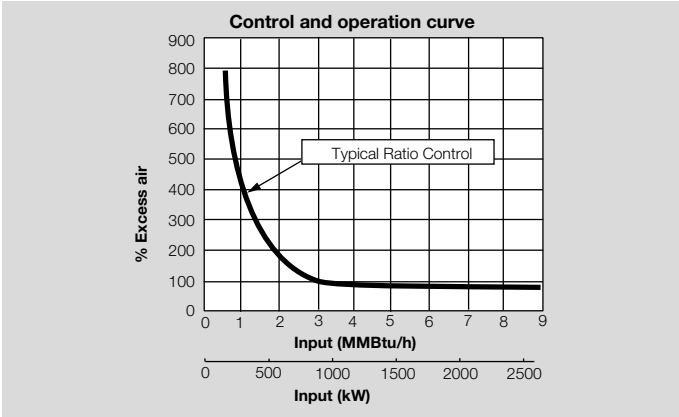
WX0600



WX0600



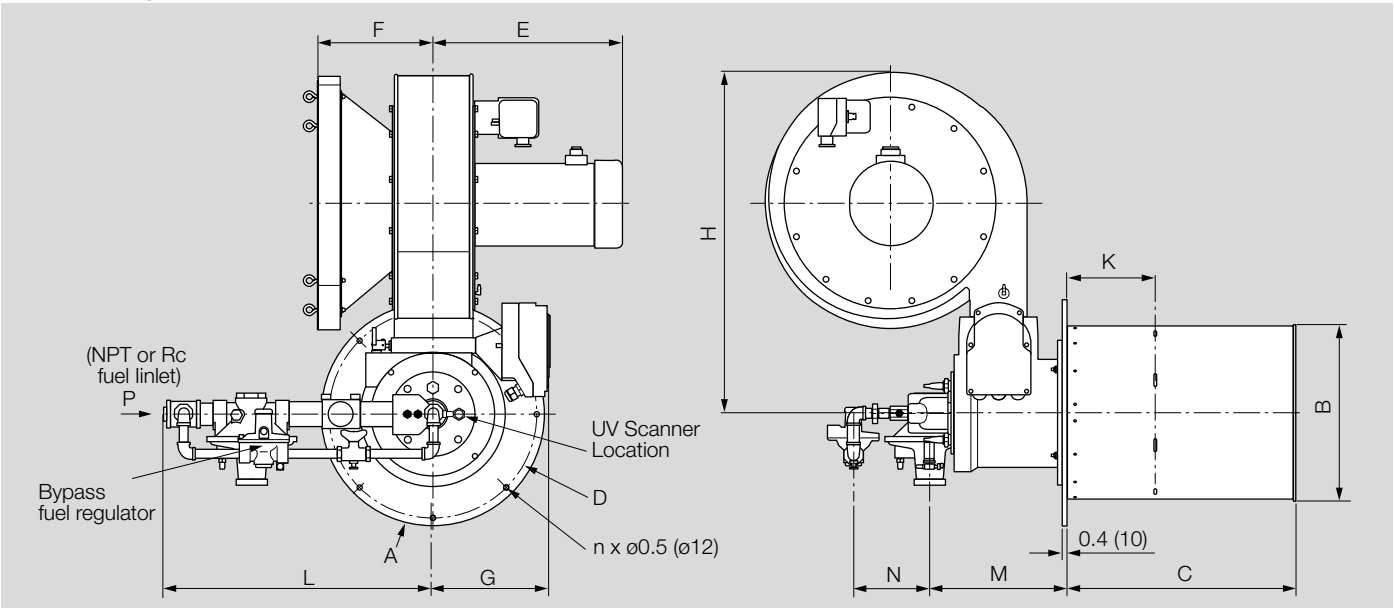
WX0850



WX0850

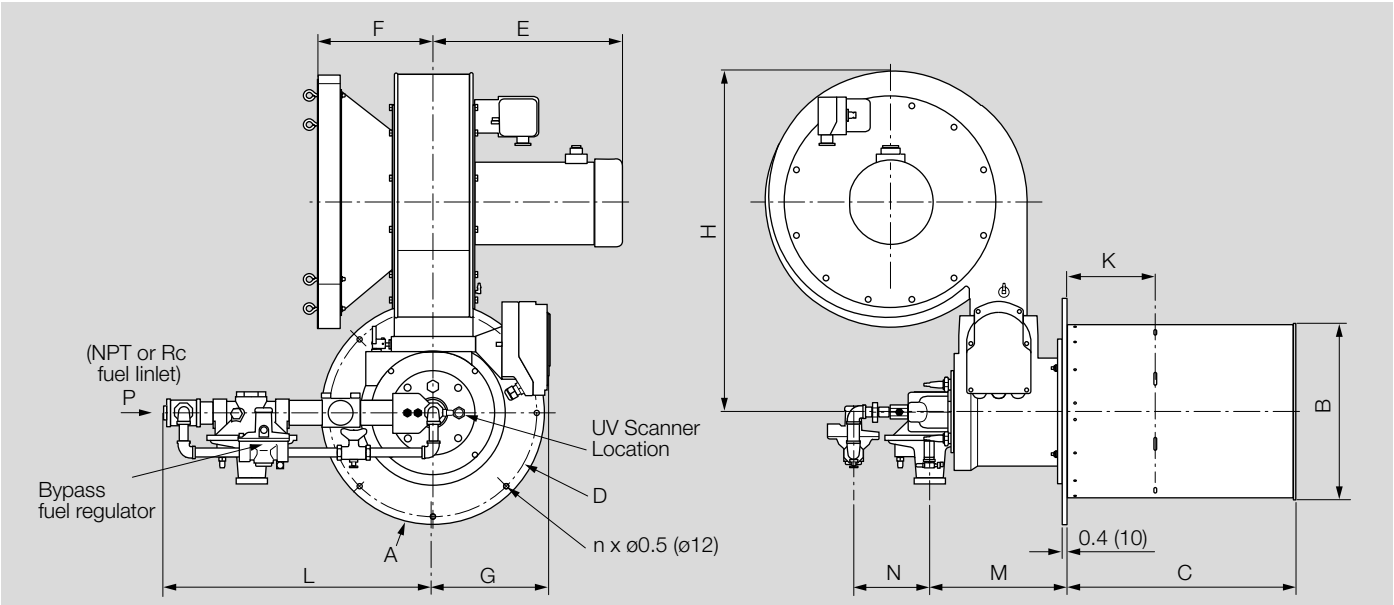
7.6 Dimensions

7.6.1 Packaged blower (inch)



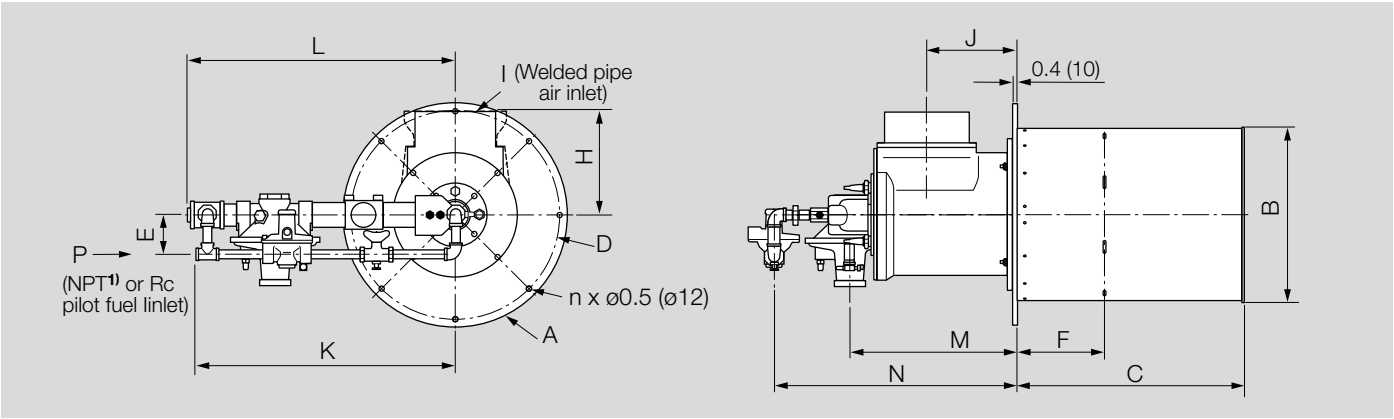
Model	A	B	C	D	E	F	G	H	K	L	M	N	n	P NPT/Rc
WX0050	ø13.4	ø9.6	15	ø11.8	11.7	9	8.5	20.4	7	20.8	8.2	6.1	4	3/4
WX0100	ø15.2	ø11.8	17.3	ø13.6	12.4	8.9	8.5	26.4	7	20	8.2	6.1	4	1
WX0200	ø18.1	ø14.8	20.3	ø16.5	15.1	9.6	9.5	27.6	7	21.6	11.2	6.1	8	1-1/2
WX0300, WX0400	ø19.7	ø16.3	22	ø18.1	21.6	11.2	11.2	35.7 (50 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

7.6.2 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

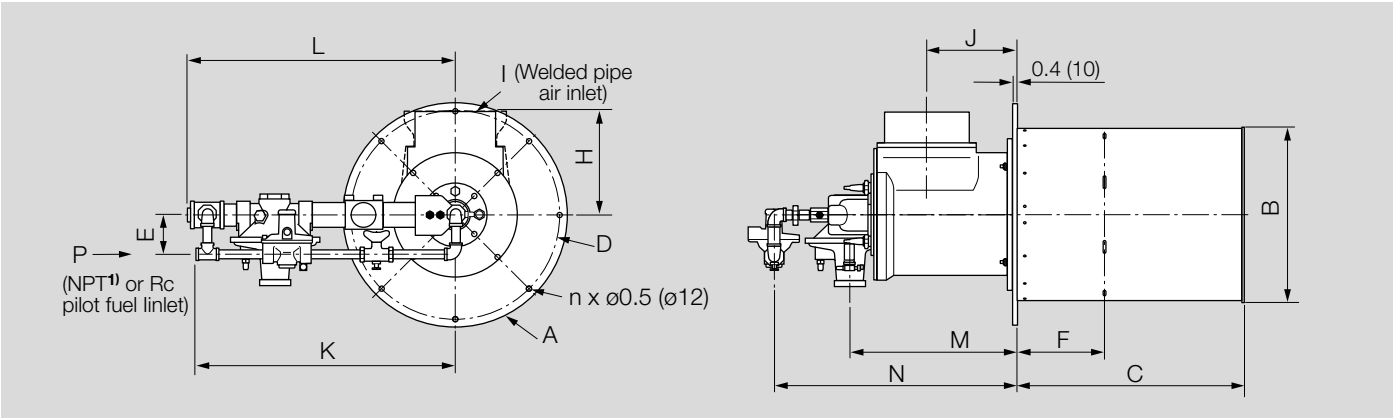
7.6.3
Remote blower (inch)



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

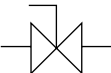
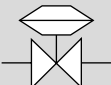
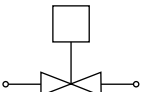
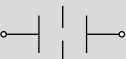
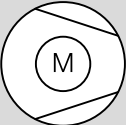
7.6.4 Remote blower (mm)

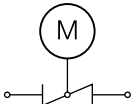
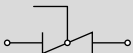
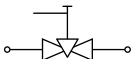
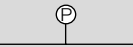
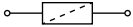


Model	A	B	C	D	E	F	H	I	J	K	L	M	N	n	P NPT/RC
WX0050	ø340	ø245	381	ø300	81	178	138	76	105	528	528	209	365	4	1/2
WX0100	ø385	ø300	440	ø345	81	178	138	76	105	509	509	209	365	4	1/2
WX0200	ø460	ø375	515	ø420	86	178	182	102	141	541	549	285	441	8	1/2
WX0300, WX0400	ø500	ø415	560	ø460	86	185	261.7	152	173.3	591	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

8 System Schematics

Symbol	Name	Remarks
	Gas Cock	Gas cocks are used to manually shut off the gas supply.
	Ratio Regulator	A ratio regulator is used to control the air/gas ratio. The ratio regulator is a sealed unit that adjusts the gas flow in ratio with the air flow. To do this, it measures the air pressure with a pressure sensing line, the impulse line. This impulse line is connected between the top of the ratio regulator and the air supply line. The cap must stay on the ratio regulator after adjustment.
Main Gas Shut-Off Valve Train	Main Gas Shut-Off Valve Train	Heatflam strongly endorses NFPA 756 as a minimum.
Pilot Gas Shut-Off Valve Train	Pilot Gas Shut-Off Valve Train	Heatflam strongly endorses NFPA 756 as a minimum.
	Automatic Shut-Off Valve	Shut-off valves are used to automatically shut off the gas supply on a gas system or a burner.
	Orifice Meter	Orifice meters are used to measure flow.
	Combustion Air Blower	The combustion air blower provides the combustion air to the burner(s).
	Hermetic Booster	Booster is used to increase gas pressure.

Symbol	Name	Remarks
	Automatic Butterfly Valve	Automatic butterfly valves are typically used to set the output of the system.
	Manual Butterfly Valve	Manual butterfly valves are used to balance the air or gas flow at each burner.
	Adjustable Limiting Orifice	Adjustable limiting orifices are used for fine adjustment of gas flow.
	Pressure Switch	A switch activated by rise or fall in pressure. A manual reset version requires pushing a button to transfer the contacts when the pressure set point is satisfied.
	Pressure Gauge	A device to indicate pressure
	Check Valve	A check valve permits flow only in one direction and is used to prevent back flow of gas.
	Strainer	A strainer traps sediment to prevent blockage of sensitive components downstream.
	Flexible Connector	Flexible connectors isolate components from vibration, mechanical, and thermal stresses.
	Heat Exchanger	Heat exchangers transfer heat from one medium to another.
	Pressure Taps	Pressure taps measure static pressure. The schematics show the advised positions of the pressure taps.