

## XP

### **XB-1000 through XB-3400**

### FEATURES

The A. O. Smith high efficiency condensing XP Boiler utilizes a state-of-the-art heat exchanger and control technology to meet the rigorous demands of today's hydronic heating applications. The XP Boiler's all stainless steel water tube heat exchanger construction allows the XP Boiler to operate in a continuous condensing mode while maximizing longevity and delivering exceptional energy-saving performance. Low temperature applications such as heat pump and snow melting systems can see thermal efficiencies as high as 99%, a major savings over non-condensing competitive systems.

A unique multi-burner design is control sequenced and modulated to produce turndown rates of up to 20:1. Precise temperature control and accurate load matching results in smooth system operation and eliminates wasteful short cycling and temperature overshooting.

#### **ADVANCED MULTI-BURNER, LOW NO<sub>x</sub> COMBUSTION TECHNOLOGY**

- Venturi-mixing gas/air ratio system - works with variable speed blower to precisely mix gas and air throughout firing range
- Fully modulating capability prevents energy-stealing short cycling and provides smooth system operation with higher overall system efficiencies

#### **LOW NO<sub>x</sub> OPERATION**

- Complies with SCAQMD Rule 1146.2 for XB1000 through XB2000 and Rule 1146.1 for XB2600 and XB3400, and other air quality management districts with similar requirements for low NO<sub>x</sub> emissions

#### **ADVANCED SOLA CONTROL**

- Large touch screen user interface
- Direct MODBUS protocol connections
- The latest in energy saving algorithms
- Outdoor reset is standard and includes remote outdoor temperature sensor - modulates the boiler to maintain desired system temperature within +/-1 degree
- Boiler output control features 20:1 turndown ratio on models 2 million btuh and up, 10:1 turndown ratio on models 1.7 million btuh and down

#### **FACTORY-MOUNTED SECONDARY PUMP(S) (optional)**

- Recommended for primary/secondary piping systems
- Integrally mounted, wired, and controlled by the boiler control
- Factory-sized for proper flow through the boiler
- Allow up to 50 equivalent feet of piping between the boiler and the primary heating system

#### **MULTI-PASS/MULTI-BURNER CONDENSING STAINLESS STEEL HEAT EXCHANGER**

- Utilizes leading-edge multi-pass water tube heat exchanger to maximize heat transfer
- Designed for fully condensing operation throughout the heating range
- All heating surfaces are 316L stainless steel to provide a long and trouble-free service life
- Saves fuel and operating cost with every heating cycle
- Impervious to thermal shock

#### **DIRECT VENT FLEXIBILITY**

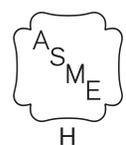
- Direct vent up to 100 equivalent feet of pipe
- Sidewall or vertical
- Lower installation cost with approved CPVC/PVC venting material – uses CPVC for first 10 feet and PVC thereafter.
- Approved for use with UL approved AL29-4C® stainless steel venting materials

#### **FACTORY START-UP INCLUDED**

- Required for activating warranty and assuring maximum operating performance. Contact your local sales representative or Authorized Start-Up Agent to arrange a FREE certified start-up.



**CRN**





# Hydronic Heating Boilers

## CATEGORY IV LISTED

- Approved for use with CPVC/PVC venting material – uses CPVC for first 10 feet then PVC thereafter or a UL approved AL 29-4C Stainless Steel venting material

## PROFESSIONAL START-UP SERVICE INCLUDED

- Assures optimum performance for each installation

## MEETS THERMAL EFFICIENCY OR COMBUSTION EFFICIENCY REQUIREMENTS OF THE U. S. DEPARTMENT OF ENERGY AND CURRENT EDITION ASHRAE/IESNA 90.1

## 10-YEAR HEAT EXCHANGER WARRANTY

- For complete information, consult written warranty or contact A. O. Smith

## OTHER XP BOILER FEATURES:

- 93% thermal efficiency (AHRI certified)
- Certified to ANSI Z21.13-CSA 4.9
- Honeywell sola control with color touch screen LCD display
  - Inlet/outlet and remote loop temperature display
  - Onboard modbus communications
  - Logs faults, run time, cycles
  - Redundant flow and low water protection - factory-installed LWCO and flow switch(s)
  - Multi-burner sequencing models 2 million btuh and up have 4 burners; models 1.7 million btuh and down have 2 burners
  - Redundant ignition controls – should one burner fail remaining burners continue to heat
  - Alarm buzzer
  - Outdoor temperature sensor included
- 20:1 turndown models 2 million btuh and up, 10:1 turndown models 1.7 million btuh and down
- Horizontal and vertical direct and sidewall vent options up to 100 equivalent feet of piping
- Approved for CPVC/PVC plastic vent materials
- Meets ASME CSD-1/GE gap codes – factory standard
- Direct spark ignition
- Factory-installed electrical disconnect
- 316L Stainless steel heat exchanger
- ASME 160# working pressure
- ASME rated pressure relief valve – 50 PSI

## XP BOILER OPTIONS:

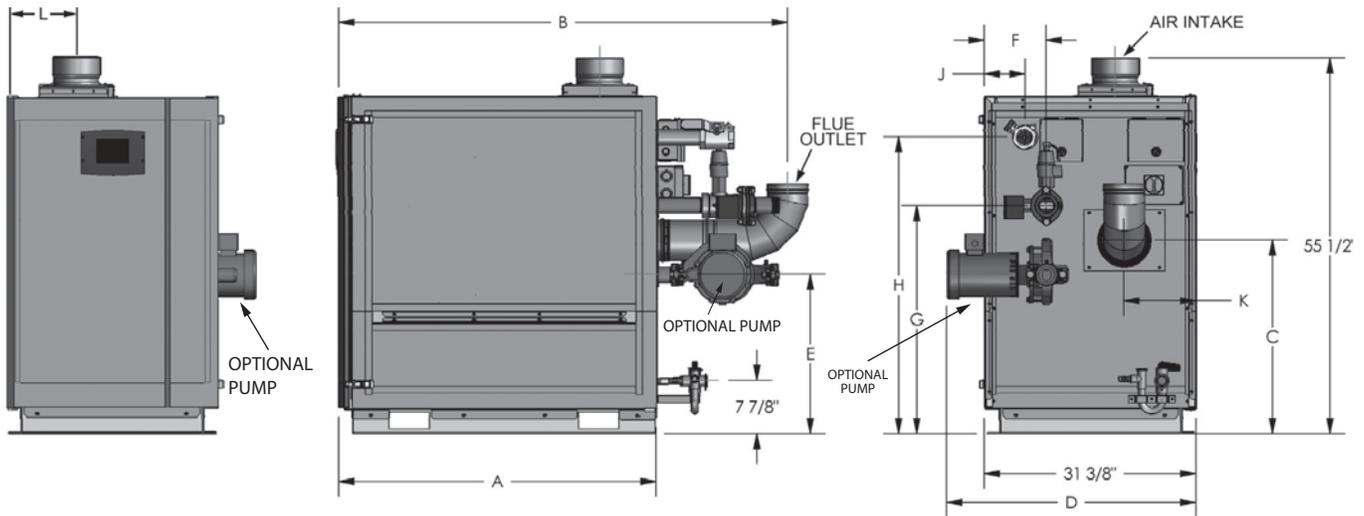
- Factory-mounted secondary pump (recommended for primary/secondary piping systems)
- Condensate neutralization kit
- Vent termination kits
- Skid mounted systems



XB MODELS - FLOW, HEAD AND TEMPERATURE RISE								
Models	Input (Btu/hr)	Output (Btu/hr)	Water Flow	Temperature Rise - $\Delta T$ °F			Flow Rate	
				20	30	40	Maximum	Minimum
XB-1000	920,000	855,600	GPM	86	57	43	86	43
			LPM	324	216	162	324	162
			$\Delta P$ FT	26	12	7	26	7
			$\Delta P$ M	7.9	3.7	2.1	8	2.1
XB-1300	1,300,000	1,209,000	GPM	121	81	60	121	60
			LPM	458	305	229	458	229
			$\Delta P$ FT	32.5	15	8	32.5	8
			$\Delta P$ M	9.9	4.6	2.4	9.9	2.4
XB-1700	1,700,000	1,581,000	GPM	158	105	79	158	79
			LPM	598	399	299	598	299
			$\Delta P$ FT	35	14	8	35	8
			$\Delta P$ M	10.7	4.3	2.4	10.7	2.4
XB-2000	1,999,900	1,859,907	GPM	186	124	93	186	93
			LPM	704	469	352	704	352
			$\Delta P$ FT	26	12	7	26	7
			$\Delta P$ M	7.9	3.7	2.1	7.9	2.1
XB-2600	2,600,000	2,418,000	GPM	242	161	121	242	121
			LPM	915	610	458	915	458
			$\Delta P$ FT	32.5	15	8	33	8
			$\Delta P$ M	9.9	4.6	2.4	9.9	2.4
XB-3400	3,400,000	3,162,000	GPM	316	211	158	316	158
			LPM	1197	798	598	1197	598
			$\Delta P$ FT	35	14	8	35	8
			$\Delta P$ M	10.7	4.3	2.4	11	2.4

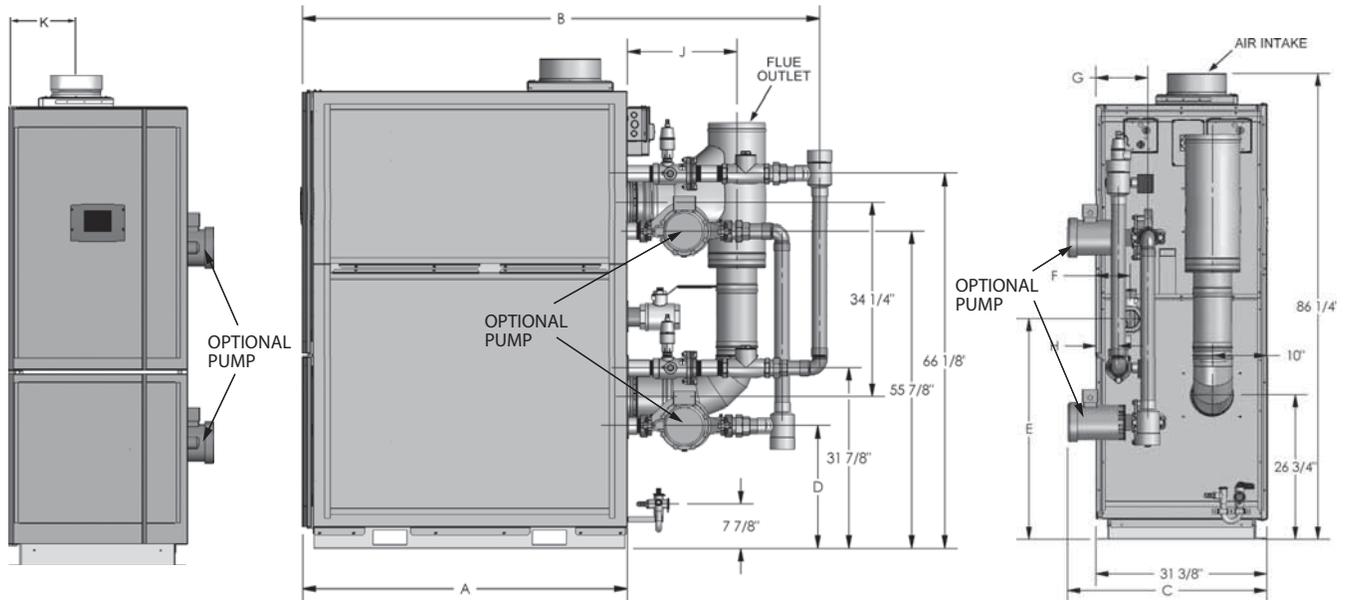
Note: Head Loss shown is through the boiler only and allows for no additional piping.

A. O. Smith Corporation reserves the right to make product changes or improvements without prior notice.



**SINGLE HEAT EXCHANGER BOILER  
Rough In Dimensions (Single)**

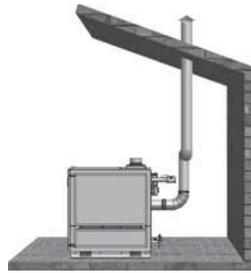
Models	XB-1000		XB-1300		XB-1700	
	Inches	mm	Inches	mm	Inches	mm
Flue Outlet Diameter	6	152	8	152	8	203
Air Intake Diameter	6	152	6	152	8	203
Water Inlet	2 inch NPT				2 1/2 inch NPT	
Water Outlet	2 inch NPT				2 1/2 inch NPT	
Gas Inlet	2 inch NPT				2 inch NPT	
A	47	1199	49	1245	57	1448
B	67	1702	68	1727	76	1930
C	29	737	29	737	29	737
D	37	940	38	965	37	940
E	23	584	23	584	24	610
F	9	229	9	229	9	229
G	34	864	34	864	34	864
H	44	1118	45	1143	45	1143
J	6	152	6	152	6	152
K	11	279	11	279	11	279
L	12	305	11	279	12	305



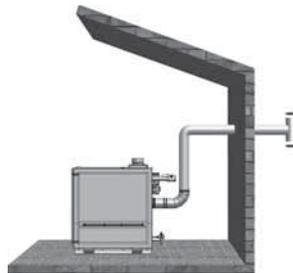
**DOUBLE HEAT EXCHANGER BOILER**  
**Rough In Dimensions (Double)**

Models	XB-2000		XB-2600		XB-3400	
	Inches	mm	Inches	mm	Inches	mm
Flue Outlet Diameter	8	203	8	203	10	254
Air Intake Diameter	8	203	8	203	10	254
Water Inlet	3 inch NPT				4 inch NPT	
Water Outlet	3 inch NPT				4 inch NPT	
Gas Inlet	2 inch NPT				3 inch NPT	
A	47	1194	49	1245	57	1448
B	78	1981	80	2032	91	2311
C	36	914	37	940	37	940
D	22	559	22	559	22	559
E	40	1016	41	1041	41	1041
F	7	178	6	152	6	152
G	10	254	10	254	10	254
H	4	102	4	102	4	102
J	20	508	19	483	19	483
K	12	305	12	305	13	330

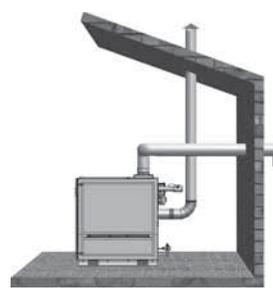
### VERSATILE MULTI-VENTING CONFIGURATIONS



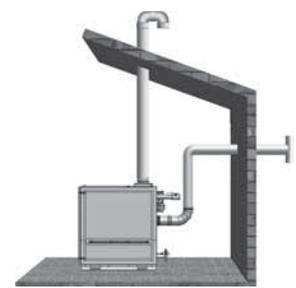
VERTICAL VENTING



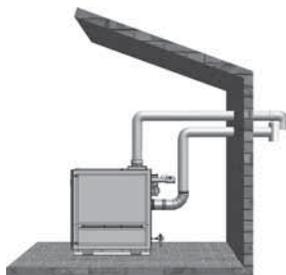
HORIZONTAL VENTING



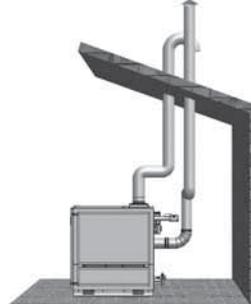
DIRECT VENT, VERTICAL VENT HORIZONTAL INTAKE



DIRECT VENT, HORIZONTAL VENT VERTICAL INTAKE



DIRECT VENT HORIZONTAL



DIRECT VENT VERTICAL

Direct or sidewall vent for up to 100 equivalent feet of pipe. Lower installation cost with approved CPVC/PVC venting material – uses CPVC for first 10 feet and PVC thereafter. Also approved for use with UL approved AL29-4C stainless steel venting materials. For the detailed venting instructions review the XP Boiler Instruction Manual at [www.hotwater.com](http://www.hotwater.com).

### APPROVED VENT AND AIR INTAKE FITTINGS

EXHAUST/VENT TERMINATIONS (PVC)			
Models	Pipe Size	Vertical (PVC Rain Cap)	Horizontal (PVC Tee w/Screens)
XB 1000	6"		
XB 1300	8"	320884-001	321765-001
XB 1700			
XB 2000			
XB 2600	10"	320884-002	321765-002
XB 3400			

AIR INTAKE TERMINATION (PVC)		
Models	Pipe Size	Combustion Air Intake (Elbow)
XB 1000	6"	
XB 1300		
XB 1700	8"	321764-001
XB 2000		
XB 2600	10"	321764-002
XB 3400		

Please note: When direct or sidewall venting, the boiler's CSA Certification requires that only the above approved vent and combustion air intake terminations be used.

### GAS PRESSURE REQUIREMENTS

Models (XB)	Type of Gas	Maximum Supply Pressure		Minimum Supply Pressure	
		Inches W. C.	kPa	Inches W. C.	kPa
1000, 1300, 1700, 2000, 2500, 3400	Natural	14.0	3.49	4.0	1.0
	Propane	14.0	3.49	4.0	2.0

### ELECTRICAL REQUIREMENTS

Model	Supply Voltage (Volts)	Frequency (Hz)	Current (Amps)	Electrical Notes:
XB-1000	120V	60	30	A dedicated, single phase, 30/60 amp circuit breaker with a grounded neutral should be provided to supply power to the boiler.
XB-1300	120V	60	30	
XB-1700	120V	60	30	
XB-2000	120V	60	60	A dedicated, single phase, 60/60 amp circuit breaker with a grounded neutral should be provided to supply power to the boiler.
XB-2600	120V	60	60	
XB-3400	120V	60	60	

## XB SUGGESTED SPECIFICATION

The gas-fired boiler(s) shall be A. O. Smith XP Boiler model XB \_\_\_\_\_ having an input rating of \_\_\_\_\_ BTU/hr and capable of supplying no less than \_\_\_\_\_ GPH at a 100°F temperature rise when fired with (Natural/Propane) gas. 1) The boiler shall be capable of full modulation with a turndown ratio of \_\_\_\_\_:1 (use 10:1 XB models 1000 thru 1700, use 20:1 XB models 2000 thru 3400). 2) The boiler shall bear the ASME "H" stamp and shall be National Board registered (CRN in Canada) for 160 PSI working pressure. 3) The boiler(s) shall be equipped with a factory-installed 125# PSIG ASME Pressure Relief Valve. 4) The boiler(s) shall be design-tested and certified to the ANSI Z21.13 - CSA 4.9 Standards and approved by CSA International. 5) The boiler shall operate at a minimum of 93% thermal efficiency at full fire as certified with AHRI. 6) All models shall operate up to 99% thermal efficiency when operating at low temperature applications. 7) The boiler shall be certified for indoor installation and approved for installation on combustible floors.

The heat exchanger(s): 1) Shall be a dual burner multi-pass design with three sets of helical wound 316L stainless steel water tubes that completely encircle dual combustion chambers for maximum efficiency. 2) There shall be no bolts, gaskets or "O" rings in the header configuration. 3) The heat exchanger shall be removable and replaceable as a single component. 4) The fully condensing heat exchanger shall be designed to allow all condensate to be drained from the bottom of the heat exchanger to ensure that condensation does not collect or interfere with good boiler operation due to long periods of operation in the condensing mode. 5) The low water volume heat exchanger shall be immune to thermal shock. 6) The entire heat exchanger shall carry a Ten (10) year warranty.

Burners: 1) The boiler shall have (two/four) modulating burners capable of infinitely modulating between 20% and 100% fire while providing smooth starts and clean combustion. 2) Each burner shall be a premix design, constructed of high temperature stainless steel and utilize a woven metal fiber mesh covering, be warranted for 5 years, and fire in a radial 360-degree flame pattern. 3) Burner ignition shall be by direct spark with flame monitoring via a flame sensor.

Boiler Controls: 1) The boiler shall feature the Sola control with a multi-colored LCD touch screen display. 2) The control shall provide intuitive user operation and setup of the boiler. 3) The control will cascade/sequence, rotate and modulate the boiler's multiple burners providing an overall turndown rate of (20/10):1. 4) The control shall display current inlet, outlet, and tank temperatures along with current firing rate for each burner. 5) Data logging with run time/number of cycles and all faults shall be recorded. 6) The boiler shall be BMS ready with factory standard with onboard MODBUS protocol connections and have an optional BacNet interface available. 7) A remote outdoor temperature sensor shall be shipped loose with the unit to be field installed outdoors if outdoor reset control is desired. 8) The boiler's set point and set point differential shall be adjustable and shall be maintained within +/-1 degree. 9) Night temperature setback shall be standard. 10) Redundant flow and low water protection shall be provided with factory-installed and wired LWCO and flow switch(s). 11) Redundant ignition controls (one per burner) shall allow individual burner operation. 12) Factory-installed Alarm Buzzer will be provided along with dry contacts for remote alarm if desired.

Frame and Jacket Design: 1) The boiler shall be constructed of a rugged all welded extruded aluminum alloy frame with heavy gauge steel removable jacket panels that allow easy access and service. 2) The jacket panels shall be painted on both sides with a high quality powder coating that is approved for outdoor use. 3) Primary/main service access shall be provided by a latched and hinged stainless steel access door(s) that provides access to most electrical and serviceable components from the front of the unit.

Venting: 1) The boiler shall be certified for direct horizontal through-the-wall venting or direct vertical venting; in addition to sidewall or conventional vertical venting. 2) The boiler shall be capable of horizontal sidewall or direct venting up to 100 equivalent feet without the aid of any optional sidewall vent fans or blowers. 3) The boiler shall be CSA approved for venting with CPVC or a combination of CPVC and PVC venting materials using CPVC for first the 10 feet and PVC thereafter. In addition the boiler shall be approved for use with UL approved AL29-4C stainless steel venting materials where local codes may require.

Standards: 1) The boiler shall have an independent laboratory rating for Oxides of Nitrogen (NOx) to meet the requirements of South Coast Air Quality Management District in Southern California and the requirements of Texas Commission on Environmental Quality. 2) The boiler shall be built to and meet the ASME – CSD-1 code requirements as factory standard. 3) The boiler shall be compliant with California Code, Factory Mutual, Massachusetts Code and Kentucky Codes and standards.

Factory Start-Up: 1) The boiler manufacturer shall furnish, at no additional charge, the complete certified factory start-up that is required for activating the warranty and ensuring maximum operating performance.

Optional Boiler Pump for Primary/Secondary Piping Systems: 1) The boiler(s) shall be supplied with a factory-sized and wired all bronze circulating pump(s). 2) The pump(s) shall be interfaced with and managed by the boiler's control and cycled as needed for most efficient operation. 3) The boiler pump(s) shall be sized to maintain the proper flow through the boiler and allow for up to 50 equivalent feet of piping between the boiler and the primary heating loop.