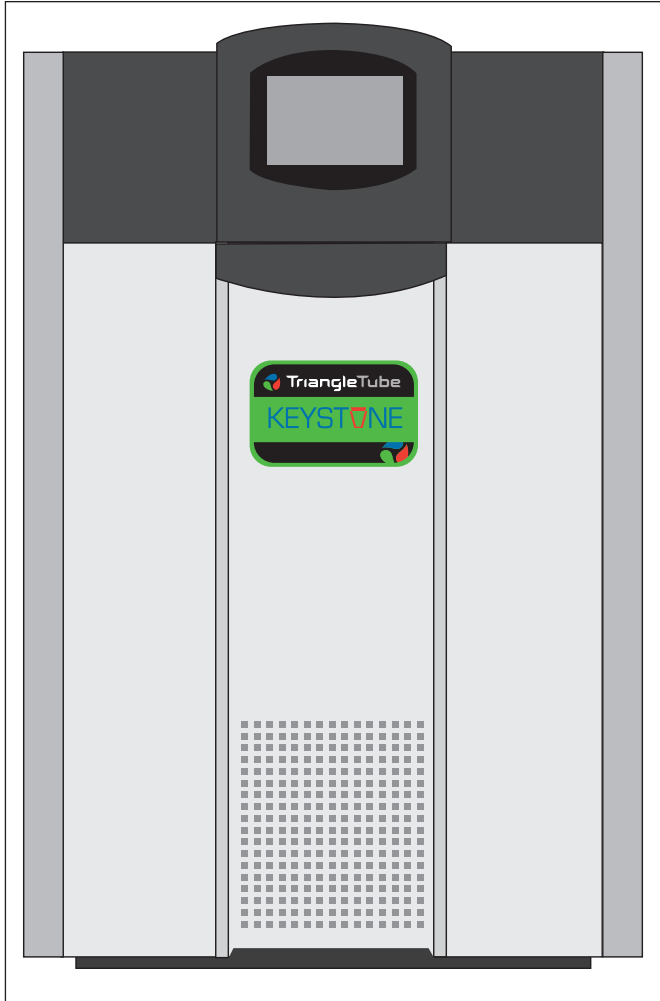


# Engineering Submittal

## Keystone Boiler KS 399 - 850



### Engineering Submittal Data

- High efficiency condensing boiler
- Electronic PID modulating control with large color touchscreen display
- Displays holds, alerts, and errors in clear text
- Complete diagnostics for analog and digital inputs
- Accepts external analog modulation signal
- Built-in cascade function for up to eight Keystone boilers
- Multiple circulator control of boiler, system and domestic circulators, with delay
- Outdoor reset with customizable reset curves, domestic hot water priority and warm weather shutdown
- Modulation down to 20% of full fire (5:1 turndown)
- Sealed combustion chamber
- Pre-mix stainless steel burner
- Low NOx - 2012 SCAQMD certified
- Horizontal or vertical direct vent
- Horizontal vent and air terminals
- Vent and combustion air pipe lengths of up to 100'
- Built-in condensate trap
- Vent temperature cutoff feature
- Direct spark ignition system
- 160 psi maximum working pressure
- Stainless steel heat exchanger with welded construction (no gaskets)
- ASME "H" stamp
- 75 psi (517 kPa) ASME Rated pressure relief valve
- Water flow switch
- Temperature & pressure gauge
- Drain valve
- Alarm output
- Outdoor temperature sensor
- On/off service switch
- Manual reset high temperature limit
- Burner site glass
- Zero clearance to combustible surfaces
- 10 year limited warranty on heat exchanger



<b>Project / Location</b> _____	<b>Date</b> _____
<b>Consulting Engineer/ Architect</b> _____	
<b>Mechanical Contractor</b> _____	
<b>Notes</b> _____	

**Sizing Data**

Model	Input MBH [kW]	Output MBH [kW]	Thermal Efficiency %	Combustion Efficiency %	Gas Conn. Size Inches	Water Conn. Sizes Inches	Shipping Weight Lbs [Kg]
KS 399	399 [117.2]	386 [113.1]	96.5	96.5	3/4 NPT	1 1/4 NPT	364 [165]
KS 500	500 [146.4]	475 [139.2]	95.0	95.0	1 NPT	1 1/2 NPT	419 [190]
KS 600	600 [175.7]	572 [167.6]	95.3	96.0	1 NPT	1 1/2 NPT	426 [193]
KS 750	750 [219.8]	724 [212.1]	96.6	96.6	1 1/2 NPT	2 NPT	481 [218]
KS 850	850 [248.9]	813 [238.2]	95.7	95.7	1 1/2 NPT	2 NPT	503 [228]

**Vent System Data**

Model	Intake (Air) Pipe	Exhaust (Vent) Pipe	Maximum Allowable Equivalent Length* Ft [m]
KS 399	4"	4"	100 [30]
KS 500	4"	4"	100 [30]
KS 600	4"	4"	40 [12]
	6"***	6"***	100** [30]**
KS 750	4"	4"	40 [12]
	6"	6"	100 [30]
KS 850	4"	4"	40 [12]
	6"	6"	100 [30]

Installations in the U.S. require exhaust vent pipe that is a combination of PVC & CPVC complying with ANSI/ASTM D1785 F441, polypropylene pipe that complies with ULC S636, or stainless steel complying with UL1738. Installations in Canada require exhaust vent pipe that is certified to ULC S636.

Intake (air) pipe may be ABS, PVC, CPVC or galvanized material.

Installer must comply fully with manufacturer's installation instructions, including use of minimum exhaust length CPVC, to maintain ANSI Z21.13 safety certification.

Closest and alcove installations do not allow the use of PVC under any circumstances

\* To calculate max equivalent length, measure the linear feet of the pipe, and add 5 feet (1.5m) for each elbow used.

\*\* Allowed only if the vent pipe is no more than 20 equivalent feet longer than the air pipe.

**Water Flow Requirements**

Model	Temperature Rise in °F [°C]									
	20°F [11°C]		25°F [14°C]		30°F [17°C]		35°F [19°C]		40°F [22°C]	
	Flow gpm [lpm]	H/L feet [m]	Flow gpm [lpm]	H/L feet [m]	Flow gpm [lpm]	H/L feet [m]	Flow gpm [lpm]	H/L feet [m]	Flow gpm [lpm]	H/L feet [m]
KS 399	38 [144]	28 [8.5]	31 [116]	20 [6.1]	25 [96]	14.5 [4.4]	22 [83]	11 [3.4]	19 [72]	9 [2.7]
KS 500	48 [180]	24 [7.3]	38 [144]	16 [4.9]	32 [120]	12 [3.7]	27 [103]	9 [2.7]	24 [90]	8 [2.4]
KS 600	58 [218]	44 [13.4]	46 [174]	31 [9.4]	38 [145]	22 [6.7]	33 [125]	18 [5.5]	29 [109]	15 [4.6]
KS 750	72 [274]	37 [11.3]	58 [219]	23 [7.0]	48 [182]	17 [5.2]	41 [156]	13 [4]	36 [137]	10 [3]
KS 850	81 [307]	33 [10.1]	65 [246]	22 [6.7]	54 [205]	15 [4.6]	46 [175]	10 [3]	41 [154]	8 [2.4]

**Clearance and Electrical Data**

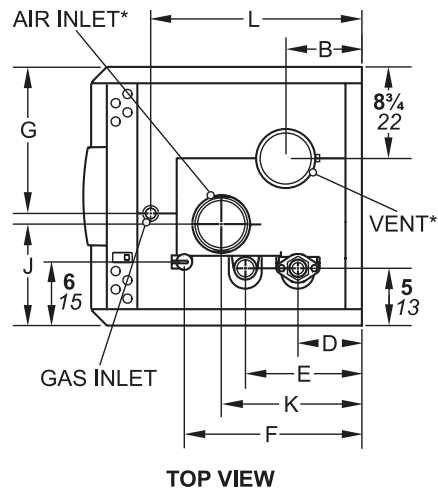
Appliance Surface	Suggested Service Access Clearance inches [cm]
Left Side	1 [2.5]
Right Side	12 [31]
Top	24 [61]
Back	6 [15]
Closet, Front	6 [15]
Alcove, Front	24 [61]
Vent	N/A

Certified by CSA for zero clearance to combustible materials on all sides

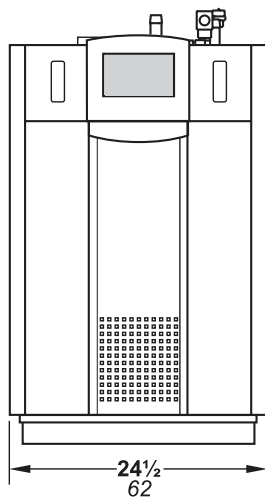
Models	Volts	Phase	Amps	Pump Connections Ratings
KS 399-850	120	Single	2*	Max 7.4A FLA

\*Minimum 15A circuit required

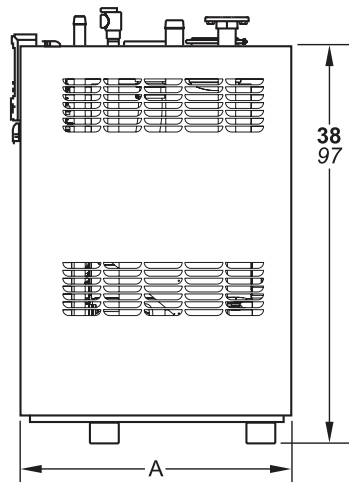
Dimensional Data - KS 399 & 500



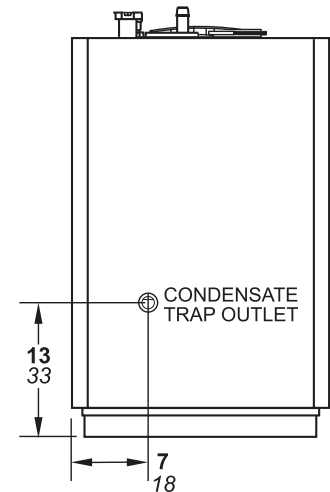
Dimensions shown in inches cm.



FRONT VIEW



RIGHT SIDE VIEW

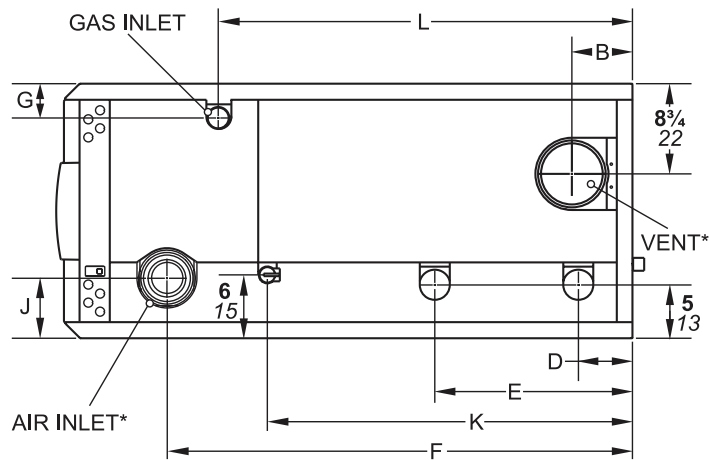


BACK VIEW

Model	A in [cm]	B in [cm]	D in [cm]	E in [cm]	F in [cm]	G in [cm]	J in [cm]	K in [cm]	L in [cm]	Inlet in [cm]	Vent in [cm]
KS 399	31 1/2 [80]	5 1/4 [13]	4 1/4 [11]	14 1/2 [37]	21 1/2 [55]	19 1/4 [49]	8 1/4 [21]	18 1/2 [47]	25 [64]	4 [11]	4 [11]
KS 500	37 3/4 [96]	5 1/4 [13]	4 1/4 [11]	15 [38]	26 [66]	20 1/2 [52]	5 3/4 [15]	20 [51]	27 1/4 [69]	4 [11]	4 [11]

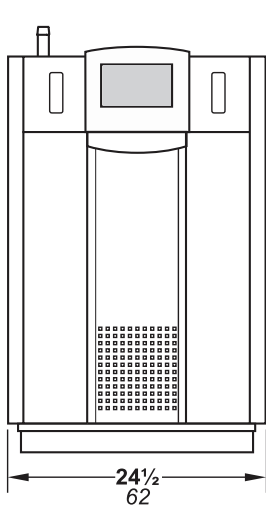
\*Dimensions are nominal

Dimensional Data - KS 600 - 850

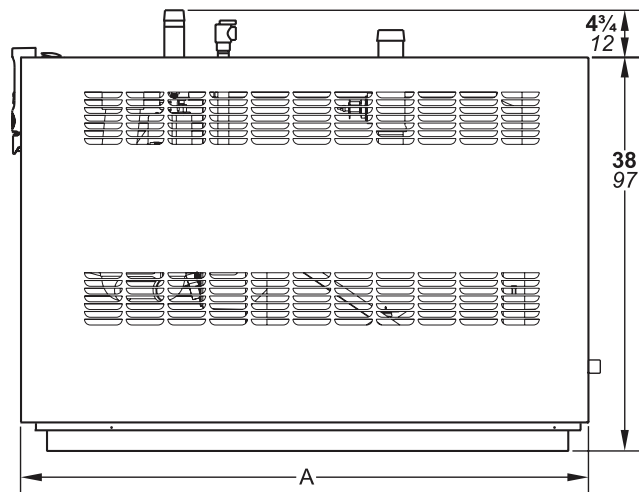


TOP VIEW

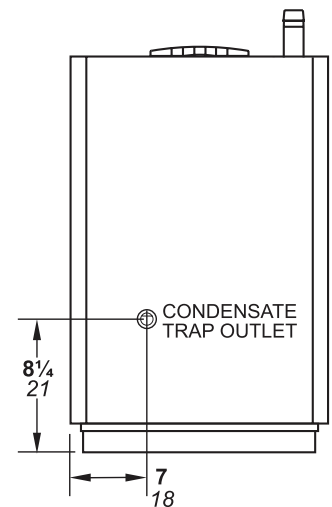
Dimensions shown in inches cm.



FRONT VIEW



RIGHT SIDE VIEW



BACK VIEW

Model	A in [cm]	B in [cm]	D in [cm]	E in [cm]	F in [cm]	G in [cm]	J in [cm]	K in [cm]	L in [cm]	Inlet in [cm]	Vent in [cm]
KS 600	37 3/4 [96]	5 [13]	4 1/4 [11]	15 [38]	20 [51]	3 [8]	5 3/4 [15]	26 [66]	29 3/4 [76]	4 [11]	4 [11]
KS 750	51 [130]	6 [13]	5 1/4 [13]	19 [48]	40 1/2 [103]	3 1/4 [8]	5 3/4 [15]	30 1/2 [77]	35 1/2 [90]	4 [11]	6 [17]
KS 850	55 1/4 [140]	6 [13]	5 1/4 [13]	19 [48]	44 1/2 [113]	3 1/2 [9]	5 3/4 [15]	35 [89]	39 3/4 [101]	4 [11]	6 [17]

\*Dimensions are nominal