

**HIGH EFFICIENCY COMMERCIAL
CONDENSING BOILERS**



5 MODELS FROM 399,000
TO 800,000 BTU/HR

94% THERMAL EFFICIENCY

5:1 TURNDOWN RATIO

STAINLESS STEEL WATERTUBE
HEAT EXCHANGER

 **SMART SYSTEM**
W/CASCADING SEQUENCER

 **CONXUS**
REMOTE CONNECT CAPABLE



**A SMART CHOICE
FOR CONDENSING BOILER
PERFORMANCE**

DESIGNED ★ ENGINEERED ★ ASSEMBLED

USA



THE LOCHINVAR DIFFERENCE



**BROADEST LINE OF
WATER HEATING SOLUTIONS
IN THE INDUSTRY**



**INDUSTRY-LEADING TRAINING
ON CAMPUS AND
ONLINE AT LOCHINVARU.COM**



**A WORLD-CLASS RESEARCH &
DEVELOPMENT DEPARTMENT THAT
CONTINUOUSLY INTRODUCES NEW
AND INNOVATIVE TECHNOLOGY**



**A COMMITMENT TO IN-DEPTH
SERVICE BEFORE, DURING AND
AFTER EVERY SALE**

NO ONE BRINGS IT ALL TOGETHER LIKE LOCHINVAR

Lochinvar is the industry leader that other leading companies call upon for the most advanced and efficient water heating products in the world. For that reason, Lochinvar is trusted to go beyond the call of duty to find a solution for every project, no matter the size. You will not find a water heating company that works harder or cares more.

That's why no one brings it all together quite like Lochinvar.

A HISTORY OF INNOVATION

For nearly 80 years, Lochinvar, an American company, has been a leader of innovation and high-efficiency water heating. Through Lochinvar's pride in leadership and commitment to excellence, the company has continually improved year after year.

Today, Lochinvar touts the broadest line of high-efficiency water heating solutions, a world-class research & development department, comprehensive service with every sale and industry-leading training through Lochinvar University.



AN INDUSTRY LEADER IN THE MAKING, 1954.

DESIGNED ★ ENGINEERED ★ ASSEMBLED
USA



A SMART CHOICE FOR CONDENSING BOILER PERFORMANCE

The KNIGHT XL[®], engineered with Lochinvar's exclusive SMART SYSTEM[™] control and an array of other innovative features, places it far ahead of any commercial heating boiler in its class. It promises and delivers ultimate ease of installation and maintenance. With up to 94% thermal efficiency, low-NOx emissions and a fully modulating burner, it is the best "green choice" for today's environmentally focused market.

Five modulating/condensing stainless steel KNIGHT XL boilers are available with 399,000–800,000 Btu/hr inputs and remarkably small space-saving footprints. All are equipped for direct-vent installation with air intake and exhaust runs up to 100 feet using PVC, CPVC, Polypropylene or AL29-4C vent materials. This range of choices is ideal for light-duty applications such as small hotels, schools and office buildings. For higher-demand applications, up to eight KNIGHT XL units can be installed utilizing the built-in cascading sequencer to deliver up to 6.4 million Btu/hr heating capacity.

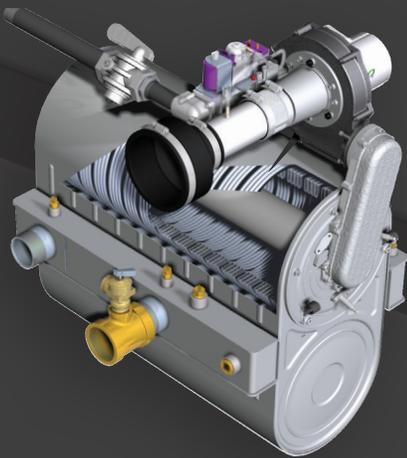
THE KNIGHT XL BOILER reflects Lochinvar's constant commitment to providing all the options you need to serve every application.

ADVANCED NEGATIVE REGULATION TECHNOLOGY

KNIGHT XL safely and reliably operates with supply gas pressure as low as 4 inches water column. Negative Regulation (Neg/Reg) technology automatically adjusts fan speed that ensures the correct volume and mix of fuel and air throughout the firing range.

TWO-IN-ONE STAINLESS STEEL HEAT EXCHANGER

A primary heat exchanger combined with a secondary heat exchanger captures flue gas heat and condenses to utilize available latent energy. The stainless steel, pH-tolerant design features a weld-sealed assembly with no O-rings or gaskets and does not require special glycol. ASME Section IV approved and stamped.



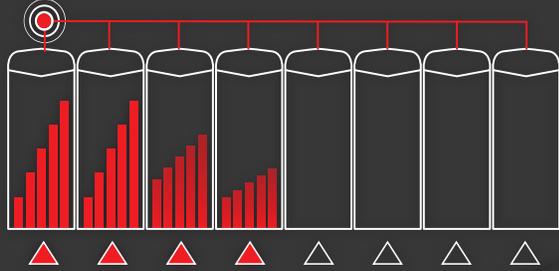
FULLY MODULATING BURNER

The SMART SYSTEM allows fully modulating combustion with 5:1 turndown. The burner can fire as low as 20% of maximum input and modulates the firing rate up to 100% as demand increases. The burner is a single stainless steel assembly covered with woven steel mesh and fires in a 360° pattern along the entire length of the primary heat exchanger. This allows the compact KNIGHT XL to exceed the capacity of units with larger multiple burners.

SELECTABLE CASCADE OPTIONS

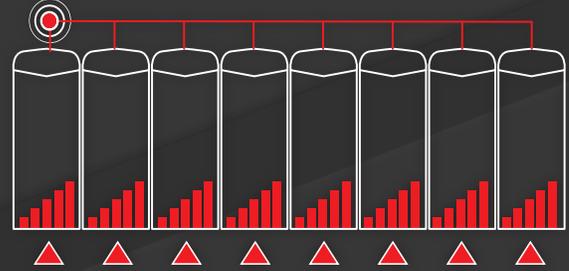
When multiple KNIGHT XL boilers are installed together, the SMART SYSTEM built-in sequencer can be set for “Lead-Lag” cascade or “Efficiency Optimized” cascade operation.

LEAD-LAG CASCADE



The “lead” boiler modulates with demand to capacity. As demand increases, additional boilers fire and modulate to capacity. This continues, with additional boilers firing and modulating to capacity until all units are operating. Every 24 hours, the SMART SYSTEM automatically shifts the lead boiler role to the next in the sequence, distributing lead-lag runtimes equally.

EFFICIENCY OPTIMIZED CASCADE



This feature optimizes the modulation capabilities of the boiler plant while evenly distributing run time across all cascaded boilers. Every 24 hours the SMART SYSTEM automatically shifts the 1st boiler on role to the next in the sequence, distributing run time equally.

SMART SYSTEM Cascade option allows 2 - 8 boilers to be sequenced.

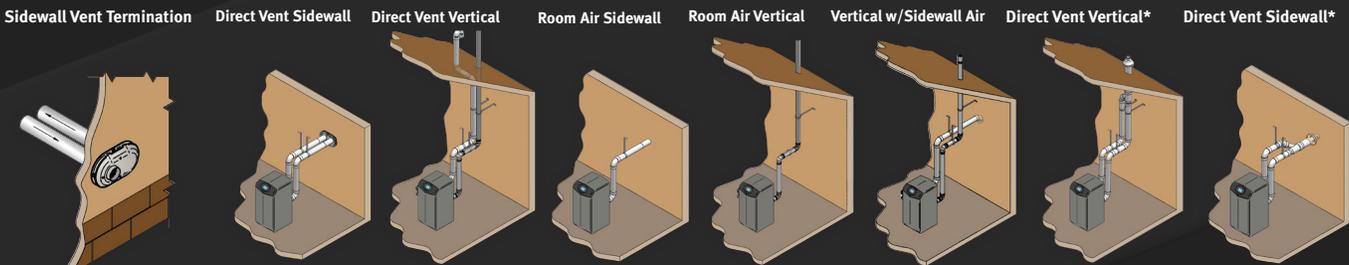
DIRECT VENTING UP TO 100 FEET



SIDEWALL VENT TERMINATION

KNIGHT XL offers 7 venting options and tremendous flexibility for placement of units within the building, because it permits direct-vent air intake and exhaust runs up to 100 equivalent feet using either PVC, CPVC, Polypropylene or AL29-4C stainless steel vent pipe. A sidewall vent termination kit is shipped standard with every KNIGHT boiler.

7 FLEXIBLE VENTING OPTIONS



**Optional Concentric Vent Kit Sold Separately (for 400-601 Models)*



REFINED DESIGN PUTS MORE CONTROL AND INFORMATION AT YOUR FINGERTIPS

Advanced features include:

- Multi-Color Graphic LCD Display
- Navigation Dial
- USB Port
- Ability to control up to three different setpoint temperatures
- Compatibility with Copper-Fin II Non-Condensing Boiler to Create a Front-End Loading System
- Boilers with Different Inputs can be Cascaded Together to Maximize Boiler Plant Turndown
- Modbus Capability (Optional)
- DHW Modulation Limiting
- DHW Night Setback
- 0-10 VDC Boiler Rate Output
- 0-10 VDC Signal to control variable speed boiler pump
- 0-10 VDC System Pump Signal Input
- Heat Demand from 0-10V Input
- Installer Can Program Name and Number into the Boiler
- Installer Adjustable Freeze Protection Parameters
- Separately adjustable SH/DHW Switching times
- Installer access to BMS and ramp delay settings



AT-A-GLANCE COLOR CODING



BLUE SCREEN
Normal system operation.



YELLOW SCREEN
Maintenance due - shows the installer's name and number on the display.



RED SCREEN
Lockout mode.

BOILER CONTROL FROM ANYWHERE



The industry's most advanced boiler control system now includes the CON-X-US Remote Connect option. See next page for a complete list of SMART SYSTEM™ functions and features.

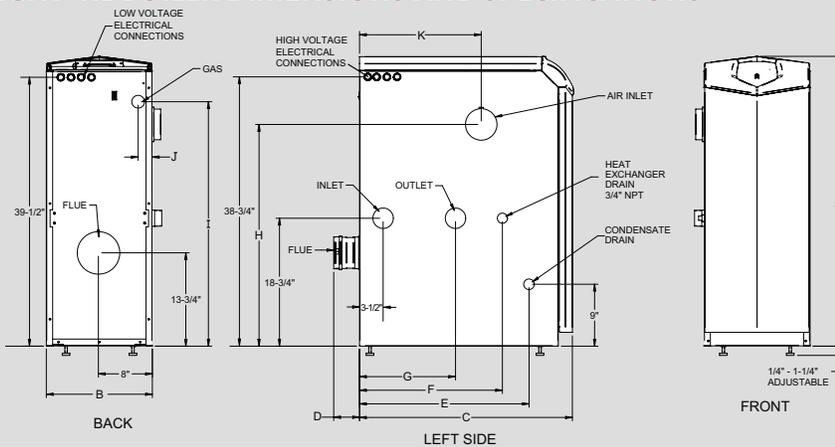
From wherever you are, the CON-X-US option lets you use any internet-capable device to link up with the SMART SYSTEM on an unlimited number of KNIGHT XL boilers. With CON-X-US, you're always in touch and in control. Optional CON-X-US control board is sold separately.



- » DO REGULAR CON-X-US CHECKS FOR ALL YOUR KNIGHT XL CUSTOMERS, AND LET THEM KNOW YOU'RE MONITORING THEIR BOILER'S PERFORMANCE.
- » ADJUST SETPOINTS, DOMESTIC HOT WATER, RESET CURVES, PUMP DELAYS AND MORE, USING THE CON-X-US INTERACTIVE DISPLAY.
- » STATUS ALERTS VIA TEXT OR E-MAIL LET YOU KNOW WHEN A KNIGHT XL BOILER NEEDS ATTENTION.



KNIGHT® XL BOILER DIMENSIONS AND SPECIFICATIONS



Model Number Guide			
KB	N	701	M13
Knight XL	Natural Gas	Blu/hr Input	Firing Controls

KNIGHT XL HEATING BOILER						DIMENSIONS AND SPECIFICATIONS															
Model Number	Input		Thermal Efficiency	Gross Output MBH	Net AHRI Rating MBH	A	B	C	D	E	F	G	H	I	J	K	Gas Conn.	Water Conn.	Air Inlet	Vent Size	Shipping Wt. (lbs.)
	Min MBH	Max MBH				Gas Conn.	Water Conn.	Air Inlet	Vent Size	Shipping Wt. (lbs.)											
KBN400	79	399	94.0%	375	326	42-1/2"	15-1/2"	27-3/4"	3-3/4"	20-3/4"	21"	14"	34"	34"	2"	18-3/4"	1"	1-1/2"	4"	4"	280
KBN501	100	500	94.0%	470	409	42-1/2"	15-1/2"	31-1/2"	3-3/4"	25-1/2"	21"	14"	32-1/2"	36"	2"	18"	1"	1-1/2"	4"	4"	310
KBN601	120	600	94.0%	564	490	42-1/2"	15-1/2"	36-1/4"	3-3/4"	25"	21"	14"	36"	32-3/4"	5-1/2"	19-1/2"	1"	2"	4"	4"	340
KBN701	140	700	94.0%	658	572	42-1/2"	15-1/2"	40-1/4"	3-3/4"	29"	23"	17"	36"	32-3/4"	3-1/4"	23-1/2"	1"	2"	4"	6"	370
KBN801	160	800	94.0%	752	654	42-1/2"	15-1/2"	45-1/4"	3-3/4"	33-1/4"	23"	17"	36"	32-3/4"	3-1/4"	27-3/4"	1"	2"	4"	6"	405

Notes: Indoor installation only. All information subject to change. Change "N" to "L" for LP gas models. *The Net AHRI Water Ratings shown are based on a piping and pickup allowance of 1.15.

STANDARD FEATURES

- ▶ **94% Thermal Efficiency**
- ▶ **Modulating Burner with 5:1 Turndown**
 - Direct-Spark Ignition
 - Low NOx Operation
 - Sealed Combustion
 - Low Gas Pressure Operation
- ▶ **ASME Stainless Steel Heat Exchanger**
 - ASME Certified, "H" Stamped
 - Gasketless Heat Exchanger
 - 160 psi Working Pressure
 - Highly efficient, condensing design
- ▶ **Vertical & Horizontal Direct-Vent**
 - Category IV up to 100 feet PVC, CPVC, Polypropylene or AL29-4C Vent
 - Factory Supplied Sidewall Vent Termination
- ▶ **Smart System Control**
- ▶ **Other Features**
 - On/Off Switch
 - Adjustable High Limit w/ Manual Reset
 - Automatic Reset High Limit
 - Flow Switch
 - 50 psi ASME Relief Valve
 - Flue Temperature Sensor
 - Low Air Pressure Switch
 - Temperature & Pressure Gauge
 - Adjustable Leveling Legs
 - Condensate Trap
 - Zero Clearances to Combustible Material
 - 10 Year Limited Warranty (See Warranty)
 - 1 Year Warranty on Parts (See Warranty)

OPTIONAL EQUIPMENT

- Alarm Bell
- Condensate Neutralization Kit
- Concentric Vent Kit (KB400-KB601)
- BMS Gateway to LON or BACnet IP
- High & Low Gas Pressure Switches w/ Manual Reset (KB501-KB801)
- Variable Speed Boiler Circulation Pump
- MODBUS Communication
- Multi Temperature Loop Control
- Low Water Cutoff w/Manual Reset & Test
- Constant Speed Boiler Circulation Pump
- Stainless Steel Vent Kits (KB701-KB801)
- Stack Frame
- CON-X-US
- BACnet MSTP

SMART SYSTEM FEATURES

- ▶ **SMART SYSTEM Digital Operating Control**
 - Multi-Color Graphic LCD Display w/ Navigation Dial
- ▶ **Three Reset Temperature Inputs with curves for three set point temperature inputs**
- ▶ **Built in Cascading Sequencer for up to 8 Boilers**
 - Multiple Size Boiler Cascade
 - Front end loading capability with Copper Fin II Lead Lag
 - Efficiency Optimization
- ▶ **Outdoor Reset Control with Outdoor Air Sensor**
- ▶ **Programmable System Efficiency Optimizers**
 - Night Setback
 - DHW Night Setback
 - Anti-Cycling
 - Outdoor Air Reset Curve
 - Ramp Delay
 - Boost Temperature & Time
- ▶ **Three Pump Control**
 - System Pump With Parameter for Continuous Operation
 - Boiler Pump With Variable Speed Pump Control
 - Domestic Hot Water Pump
- ▶ **Domestic Hot Water Prioritization**
 - DHW tank piped with priority in the boiler loop
 - DHW tank piped as a zone in the system with the pumps controlled by the Smart System
 - DHW Modulation Limiting
 - Separately Adjustable SH/DHW Switching Times
- ▶ **Building Management System Integration**
 - 0-10 VDC Input to Control Modulation or Set Point
 - 0-10 VDC Input Signal from Variable Speed System Pump
 - 0-10 VDC Modulation Rate Output
 - 0-10 VDC Input to Enable/Disable call for heat
 - Access to BMS Settings through Display
- ▶ **High Voltage Terminal Strip**
 - 120 VAC / 60 Hertz / 1 Phase Power Supply
 - Three sets of Pump Contacts with Pump Relays
- ▶ **Low Voltage Terminal Strip**
 - Device Relay Contacts
 - Proving Switch Contacts
 - Flow Switch Contacts
 - Alarm on Any Failure Contacts
 - Runtime Contacts

- DHW Thermostat Contacts
- 3 Space Heat Thermostat Contacts
- System Sensor Contacts
- DHW Tank Sensor Contacts
- Outdoor Air Sensor Contacts
- Cascade Contacts
- 0-10 VDC BMS External Control Contact
- 0-10 VDC Boiler Rate Output Contacts
- 0-10 VDC Variable Speed System Pump Signal Input
- 0-10 VDC Signal to Control Variable Speed Boiler Pump
- Modbus Contacts
- ▶ **Time Clock**
- ▶ **Data Logging**
 - Hours Running, Space Heating
 - Hours Running, Domestic Hot Water
 - Ignition Attempts
 - Last 10 Lockouts
- ▶ **Other Features**
 - Low Water Flow Safety Control & Indication
 - Password Security
 - Inlet & Outlet Temperature Readout
 - Customizable Freeze Protection Parameters
 - Custom Maintenance Reminder with Contractor Info

FIRING CODES

M9	Standard Construction
M7	California Code
M13	CSD1 / FM / GE Gap (KB501-KB801)

*Lochinvar should be consulted before selecting a boiler for installations having unusual piping and pickup requirements, such as intermittent system operation, extensive piping systems, etc. *The ratings have been determined under the provisions governing forced draft burners.



Lochinvar, LLC
300 Maddox Simpson Parkway
Lebanon, Tennessee 37090
P: 615.889.8900 / F: 615.547.1000
Lochinvar.com

Registered Under
U.S. Patents
#7824178 and
7506617

