

# HIGH EFFICIENCY RESIDENTIAL BOILERS



**CON-X-US®** REMOTE CONNECT CAPABLE

**LOCH-N-LINK®** USB DRIVE SETUP

3 SETPOINTS WITH OUTDOOR RESET CURVES

DHW RECIRCULATION PUMP CONTROL

7 MODELS: 55,000 – 399,999 BTU/HR

TOP AND BOTTOM WATER CONNECTIONS\*\*

UP TO 10:1 TURNDOWN RATIO\*\*

WALL MOUNT DESIGN



**95%**  **AFUE EFFICIENCY\*\***  
See back page for efficiency by model



DESIGNED ★ ENGINEERED ★ ASSEMBLED  
**USA**  
[Lochinvar.com](http://Lochinvar.com)





## MONEY-SAVING 95% EFFICIENCY AND EASIER THAN EVER TO INSTALL

The KNIGHT wall mount fire tube boiler allows for a more flexible installation with top and bottom water connections\*\*. Multiple water connection locations add flexibility by allowing boiler connections to be as close as possible to the system piping, reducing installation cost, complexity and the amount of piping needed for a job.

The KNIGHT fire tube boiler operates with low pressure drop. The design incorporates a small volume of water in the heat exchanger allowing the boiler to be installed in a primary/secondary or a full-flow piped system. There is no need to change the piping to accommodate the boiler. The boiler adapts to the system. This flexibility allows for a faster, more cost-effective boiler upgrade. \*\* Not included on WHN400

### UPDATED SMART SYSTEM™ CONTROL

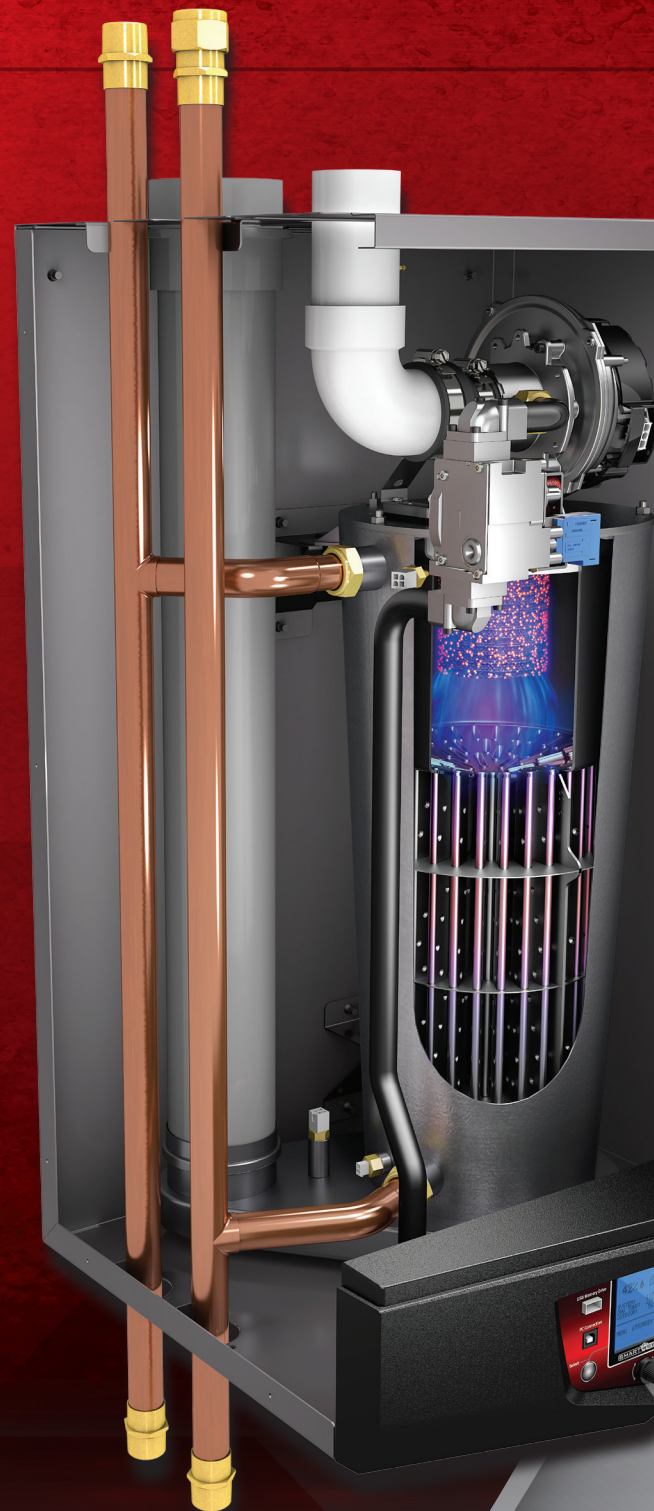
Newest version of the SMART SYSTEM allows for easier setup and navigation of parameters. New features include DHW recirculation pump control, LOCK-N-LINK USB programming, larger user interface, cascade leader redundancy and modulation factor for fine tuning aggressiveness.

### 10:1 TURNDOWN RATIO OPTIMIZES PERFORMANCE

Modulation turndown up to 10:1 means the firing rate automatically changes as the heat load varies. A WHN111 KNIGHT boiler fires at its maximum 110,000 Btu/hr rate when load is highest, then “turns down” to as low as 10% (11,000 Btu/hr) as load decreases. A modulating boiler runs smoothly and efficiently, without frequent on/off cycling. \*\* Not included on WHN400

### SUPERIOR DIRECT-VENTING FLEXIBILITY

KNIGHT boilers can be installed with direct-vent air intake and exhaust runs up to 100 equivalent feet, using PVC, CPVC, polypropylene or AL29-4C stainless steel vent pipe.



### FLOOR-STANDING FIRE TUBE MODELS AVAILABLE

6 Inputs from 55,000 to 285,000 Btu/hr. See KNIGHT fire tube boiler literature (KHN) for more details.





## BOILER CONTROL, FROM ANYWHERE.

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 boilers.

- › **Do regular CON-X-US checks for all your KNIGHT 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** lets you know when a KNIGHT boiler needs attention.

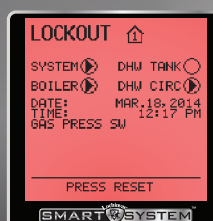
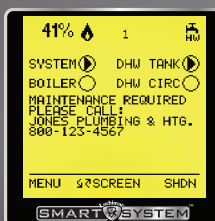
With CON-X-US, you're always in touch and in control. Optional CON-X-US control board is sold separately.



## THE ULTIMATE IN BOILER CONTROL & MONITORING

The industry's most advanced boiler control system now includes the CON-X-US Remote Connect option and LOCH-N-LINK USB Programming feature. See back cover for a complete list of SMART SYSTEM functions and features.

### COLOR-CODED LCD DISPLAY



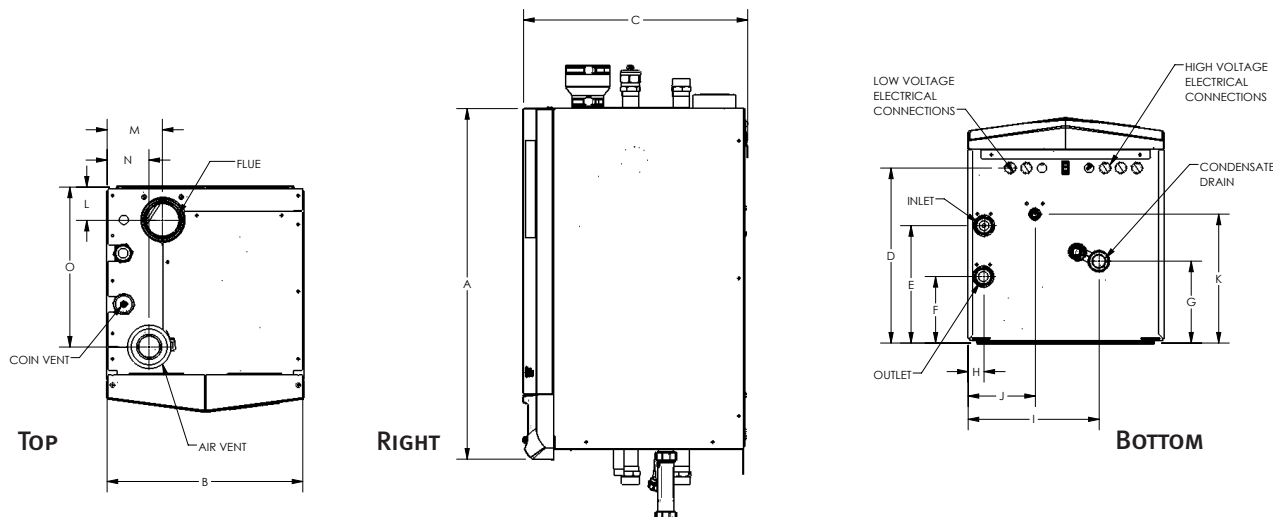
**Blue Screen** Normal system operation  
**Yellow Screen** Maintenance due shows installer name & number  
**Red Screen** Lockout mode



### LOCH-N-LINK EASY USB PROGRAMMING

Use a USB drive to name, store and easily manage multiple proven parameter sets. Quickly upload them via the front panel port, reducing installation and programming time.

## KNIGHT BOILER DIMENSIONS AND SPECIFICATIONS



### KNIGHT BOILER



Model Number	Input Max. MBH	Min. MBH	AFUE %	Heating Capacity MBH	Net AHRI Rating MBH
WHN056	55	8.3	95	51	44
WHN086	85	8.5	95	79	69
WHN111	110	11	95	102	89
WHN156	155	15.5	95	144	125
WHN200	199.9	19.9	95	185	161
WHN286	285	28.5	95	264	229
WHN400	399	80	94.4*	377#	328

\*Thermal Efficiency%  
# Gross Output MBH

### DIMENSIONS AND SPECIFICATIONS

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Gas Conn.	Water Conn.	Air Inlet	Vent Size	Shipping Wt. (lbs.)
33-1/4"	18-1/2"	16"	11-3/4"	9"	3-1/2"	3-3/4"	1-1/2"	3"	6-1/8"	7-1/4"	3-3/4"	6-1/2"	4-1/2"	8-1/2"	1/2"	1"	2"	2"	139
33-1/4"	18-1/2"	16"	11-3/4"	9"	3-1/2"	3-3/4"	1-1/2"	3"	6-1/8"	7-1/4"	3-3/4"	8-1/2"	4-1/2"	8-1/2"	1/2"	1"	2"	2"	142
33-1/4"	18-1/2"	19"	14-1/2"	8-3/2"	5"	7-3/4"	1-1/8"	12-3/8"	4-1/4"	11-1/4"	3"	5-1/4"	5-1/8"	10"	1/2"	1"	3"	3"	159
33-1/4"	18-1/2"	19"	14-1/2"	8-1/2"	5"	7-3/4"	1-1/8"	12-3/8"	4-1/4"	11-1/4"	3"	5-1/4"	5-1/8"	10"	1/2"	1"	3"	3"	166
33-1/4"	18-1/2"	19"	14-1/2"	11"	6-1/4"	7-3/4"	1-1/2"	12-3/8"	4-1/4"	9-1/2"	3"	5-1/4"	5-1/2"	10-3/4"	1/2"	1-1/4"	3"	3"	175
33-1/4"	18-1/2"	21-3/4"	16-1/2"	11-1/8"	6-1/4"	7-3/4"	1-1/2"	12-3/8"	16-3/8"	12-1/4"	3-1/8"	5-1/4"	4"	15-1/8"	1/2"	1-1/4"	3"	3"	184
35-1/2"	25"	21-3/4"	17-1/2"	12-1/2"	9-1/4"	9-1/2"	2-1/4"	13-1/4"	21-1/2"	9"	4-3/4"	4"	22-1/2"	3-3/4"	3/4"	1-1/2"	4"	4"	213

\*\*10:1 Turndown ratio and top and bottom water connections are not included on WHN400. WHN400 operates with a 5:1 turndown.

Information subject to change without notice. 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. 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.

### SMART SYSTEM FEATURES

- ▶ **Smart System Digital Operating Control**  
Multi-Color Graphic LCD Display w/Navigation Dial, Soft Keys and Loch-N-Link USB programming
- ▶ **Three Boiler Setpoint Temperature Inputs**  
Plus Domestic Hot Water Prioritization
- ▶ **Built-in Cascading Sequencer for up to 8 Boilers, with Cascade Redundancy**  
Multiple Size Boiler Cascade  
Lead Lag  
Efficiency Optimization  
Front End Loading Capability
- ▶ **Outdoor Reset Control with Outdoor Air Sensor**  
Programmable for Three Reset Temperature Inputs
- ▶ **Programmable System Efficiency Optimizers**  
SH Night Setback  
DHW Night Setback  
Anti-Cycling  
Outdoor Air Reset Curve  
Ramp Delay  
Modulation Factor Control  
Boost Temperature & Time
- ▶ **Four Pump Control**  
System Pump with Parameter for Continuous Operation  
Boiler Pump with Variable Speed Control  
Domestic Hot Water Pump  
Domestic Hot Water Recirculation
- ▶ **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 Space Heat/DHW Switching Times
- ▶ **Building Management System Integration**  
0-10 VDC Input to Control Modulation or Setpoint  
0-10 VDC Modulation Rate Output  
0-10 VDC Input to Enable/Disable Call for Heat

- ▶ **Access to BMS Settings through Graphic LCD Display**
- ▶ **High-Voltage Terminal Strip**  
120 VAC / 60 Hertz / 1 Phase Power Supply  
Three Sets of Pump Contacts
- ▶ **Low-Voltage Terminal Strip**  
DHW Recirculation Pump Start/Stop  
24 VAC Device Relay  
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
- ▶ **Maintenance Reminder**  
Custom Maintenance Reminder with Contractor Contact Information  
Installer Ability to De-activate Service Reminder
- ▶ **Low-Water Flow Safety Control & Indication**
- ▶ **Password Security**
- ▶ **Customizable Freeze Protection Parameters**

\*\*Not included on WHN400

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### STANDARD FEATURES

- ▶ **95% DOE AFUE Efficiency (56-286)**
- ▶ **Modulating Burner with up to 10:1 Turndown\*\***  
Direct Spark Ignition  
Low NOx Operation
- ▶ **ASME Stainless Steel Heat Exchanger**  
30 PSI ASME Relief Valve
- ▶ **Top and bottom water connections (MNPT)\*\***
- ▶ **Vertical & Horizontal Direct Vent**  
PVC, CPVC, Polypropylene or SS Venting up to 100 feet
- ▶ **SMART SYSTEM Control**
- ▶ **Condensate Trap**
- ▶ **Other Features**  
Automatic Reset High Limit  
Adjustable High Limit w/Manual Reset  
Boiler Circulating Pump  
Zero Clearances to Combustible Materials  
15-Year Limited Warranty (See Warranty for Details)  
5-Year Limited Parts Warranty

### OPTIONAL EQUIPMENT

- CON-X-US Remote Connectivity
- Modbus Communication
- BACnet MSTP
- Flow Switch
- Low-Water Cutoff w/Manual Reset & Test
- Alarm Bell
- Concentric Vent Kit
- Condensate Neutralization Kit
- BMS Gateway to LON or BACnet IP
- Multi-Temperature Loop Control
- Sidewall Vent Termination
- Wireless Outdoor Sensor
- LP Gas Conversion Kit
- ▶ **Firing Codes**  
M9 Standard Construction  
M7 California Code



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