

HIGH EFFICIENCY RESIDENTIAL BOILERS



SMART  **SYSTEM**™

CON-X-US® REMOTE CONNECT CAPABLE

LOCH-N-LINK™ USB DRIVE SETUP

3 SETPOINTS WITH OUTDOOR RESET CURVES

DHW RECIRCULATION PUMP CONTROL

FLOOR-STANDING FIRE TUBE DESIGN

6 MODELS: 55,000 – 285,000 BTU/HR

UP TO 10:1 TURNDOWN RATIO

DIRECT-VENT FLEXIBILITY TO 100 FEET



95%  **AFUE EFFICIENCY**



DESIGNED ★ ENGINEERED ★ ASSEMBLED

USA

Lochinvar.com



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

The KNIGHT® floor-standing fire tube-boiler features reduced installation footprint for flexibility in boiler placement. Plus, all connections are on the top and left side, so KNIGHT is an easy drop-in replacement for older, less efficient boilers. Six models offer inputs from 55,000 to 285,000 Btu/hr.

USE EXISTING PIPING TO REDUCE COSTS

The KNIGHT fire tube boiler operates with low pressure drop. The design incorporates a small volume of water in the heat exchanger. This allows 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.

10:1 TURNDOWN RATIO OPTIMIZES PERFORMANCE

Modulation turndown up to 10:1 means the firing rate automatically changes as the heat load varies. A KHN110 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.

SAFE, RELIABLE NEG/REG TECHNOLOGY

KNIGHT boilers can operate with low gas supply pressure. **Negative Regulation** uses a pre-mix gas system instead of relying on utility pressure through the gas valve. The result is steady operation in low gas pressure systems or when gas demand is highest. Automatic fan control fine-tunes the air/fuel ratio, providing superior combustion throughout the operating range.

SUPERIOR DIRECT-VENTING FLEXIBILITY

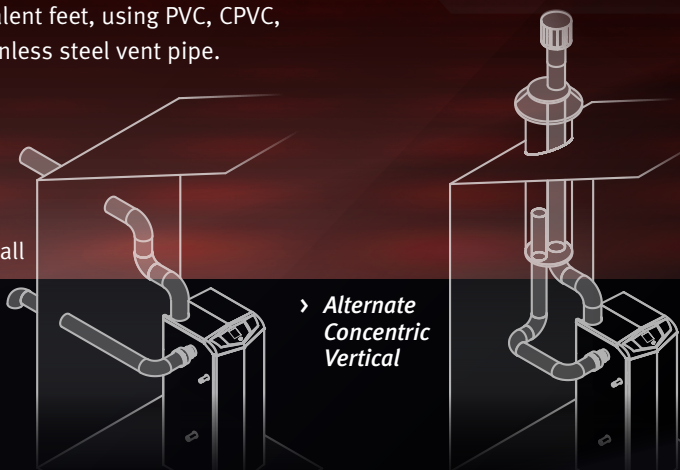
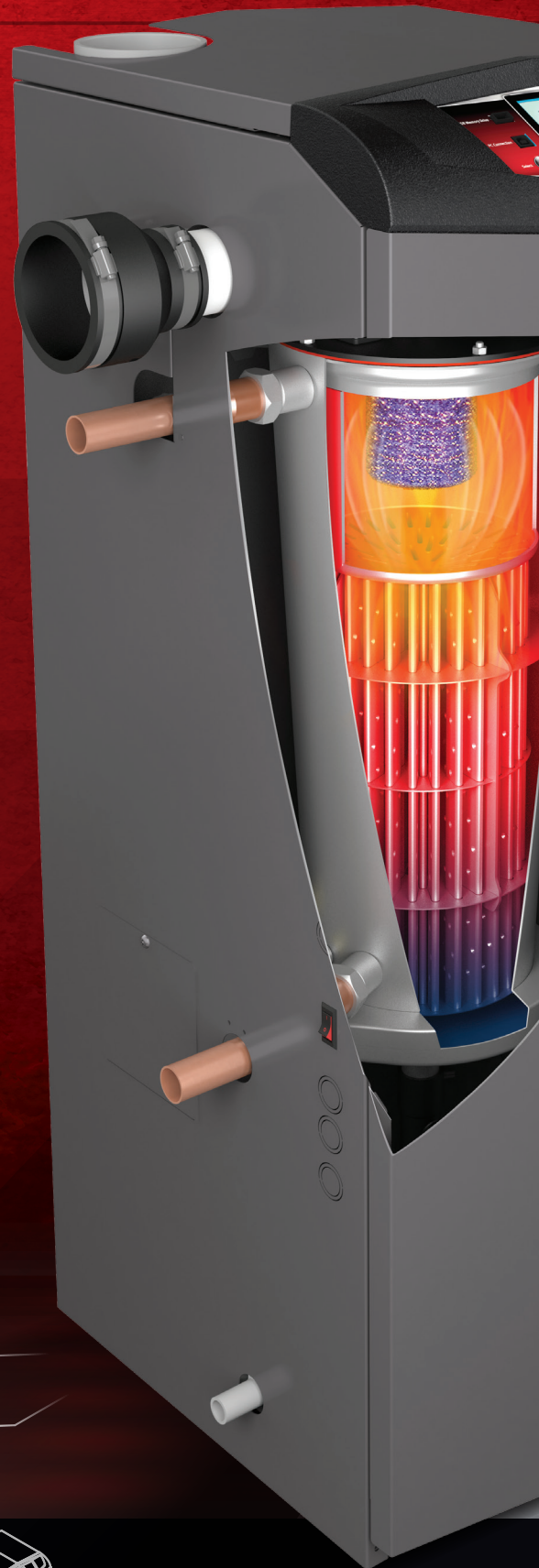
KNIGHT boilers can be installed with direct-vent air intake and exhaust runs up to 100 equivalent feet, using PVC, CPVC, polypropylene or AL29-4C stainless steel vent pipe.

Venting Options

- › Direct Vent Vertical
- › Vertical w/Sidewall Air
- › Concentric Direct Vent Sidewall
- › **Direct Vent Sidewall**

- › **Alternate Concentric Vertical**

Consult Installation & Operations manual for complete KNIGHT venting information.





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** let you know when a KNIGHT boiler needs attention.

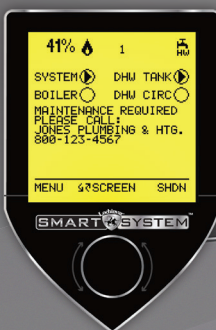
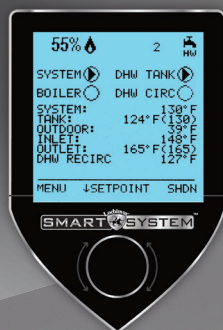
With CON-X-US, you're always in touch and in control. Optional CON-X-US control board is sold separately.



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™ Flash 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

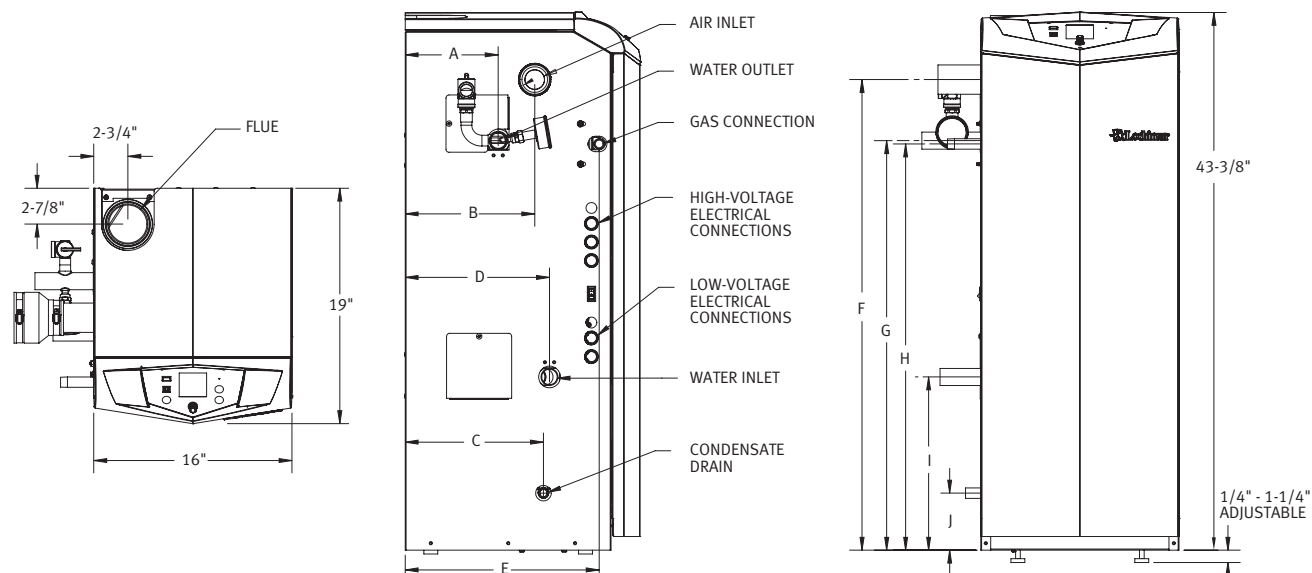
Red Screen Lockout mode



LOCH-N-LINK™ EASY USB FLASH 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



DIMENSIONS AND SPECIFICATIONS

Model Number	Input MBH		AFUE%	Heating Capacity MBH	Net AHRI Rating MBH	Dimensions (inches)										Connections				
	Min	Max				A	B	C	D	E	F	G	H	I	J	Gas Connect.	Water Connect.	Air Inlet	Vent Size	Shipping Weight
KHN055	8.3	55	95	51	44	6"	8-3/8"	11-1/8"	10-1/2"	13-1/4"	37-1/2"	32-5/8"	32-1/4"	13-1/4"	3-3/8"	1/2"	1"	2"	2"	160
KHN085	8.5	85	95	79	69	6"	8-3/8"	11-1/8"	10-1/2"	13-1/4"	37-1/2"	32-5/8"	32-1/4"	13-1/4"	3-3/8"	1/2"	1"	2"	2"	165
KHN110	11	110	95	102	89	7-3/8"	9-3/4"	11-1/8"	10-5/8"	14-5/8"	37-3/4"	33"	32-1/2"	14"	4-5/8"	1/2"	1"	3"	3"	170
KHN155	15.5	155	95	144	125	7-3/8"	9-3/4"	11-1/8"	10-5/8"	14-5/8"	37-3/4"	33"	32-1/2"	14"	4-5/8"	1/2"	1"	3"	3"	175
KHN199	19.9	199.9	95	185	161	7-1/2"	10-1/2"	11-1/8"	11-5/8"	15-3/8"	38"	33"	32-3/4"	14"	4-5/8"	1/2"	1-1/4"	3"	3"	195
KHN285	28.5	285	95	264	229	7-1/2"	10-1/2"	11-1/8"	11-5/8"	15-3/8"	38"	33"	32-3/4"	14"	4-5/8"	1/2"	1-1/4"	3"	3"	205

*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**

STANDARD FEATURES

- ▶ **ENERGY STAR Most Efficient Product**
- ▶ **95% DOE AFUE Efficiency**
- ▶ **Modulating Burner with up to 10:1 Turndown**
Direct Spark Ignition
Low NOx Operation
- ▶ **ASME Stainless Steel Heat Exchanger**
30 PSI ASME Relief Valve
- ▶ **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
12-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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