



**HIGH EFFICIENCY  
RESIDENTIAL BOILERS**



FIFTEEN YEAR HEAT EXCHANGER  
**15/5**  
FIVE YEAR PARTS WARRANTY

# THE BEST KNIGHT EVER

95% AFUE Efficiency

Lochinvar  
SMART SYSTEM™

CONXUS®  
Capable

DESIGNED ★ ENGINEERED ★ ASSEMBLED

**USA**

 **Lochinvar®**

## 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**

# ALWAYS LEADING THE CHARGE

Introduced in 2005, the KNIGHT® boiler was a major step forward for Lochinvar. Designed for both new construction and replacement applications, the KNIGHT quickly became recognized by the industry as the gold standard for installation flexibility and ease of serviceability.

In 2008, the KNIGHT boiler line was broadened to reach up to 800,000 BTU/hr with the introduction of the KNIGHT XL residential and light commercial boiler, and in 2010 a new and innovative SMART SYSTEM™ control was added to both the KNIGHT and KNIGHT XL boiler products to enhance their feature set.

The SMART SYSTEM control makes the setup and operation of KNIGHT boilers easier through its large display, color-coded screens, soft keys and navigation dial used for transitioning from screen to screen quickly.

With over 100,000 units sold to date, the KNIGHT boiler line has continued to benefit from Lochinvar's commitment to perpetual innovation with four model generations and a host of design, efficiency and installation enhancements.

## KNIGHT PRODUCT TIMELINE





Lochinvar

**KHB**

**KNIGHT FLOOR MOUNT**

# THE BEST KNIGHT EVER

Lochinvar is proud to introduce the new, improved KNIGHT fire tube boiler—delivering ultimate ease of installation, unmatched operational reliability and serviceability.

Recent upgrades keep KNIGHT at the head of the class, allowing it to continue to lead the charge as the industry-leading high-efficiency residential boiler. With more adjustable parameters than any other competitor, KNIGHT is the most flexible residential boiler you can install.

Today, the new KNIGHT boiler family is available in 13 model options—six floor mounts and seven wall mounts. It also offers a broader range of heating capacity from 55,000 to 399,999 BTU/hr—while continuing to work at 95% AFUE efficiency.

## INDUSTRY-LEADING FEATURES

KNIGHT boilers now feature a universal vent connector, making installation easier than ever. It comes with many standard features that allows PVC, CPVC, polypropylene or stainless steel connections directly to the boiler.

We've added a variable speed ECM pump as standard equipment, helping to push day-to-day operational efficiency even further. We've also redesigned the trap height for the condensate pump to make installation a snap.

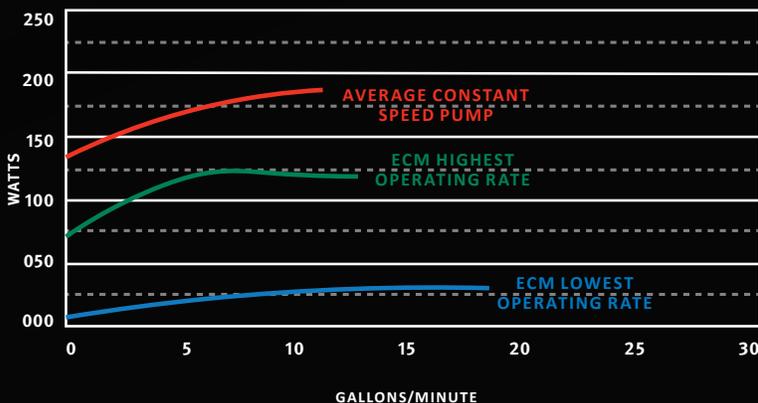
Every KNIGHT boiler comes with a built-in 110V convenience outlet. Use this handy standard feature to power your lighting or installation equipment—or for powering the condensate pump.

As in past generations, Lochinvar's KNIGHT boiler continues to raise the bar for installation flexibility. With our latest product enhancements, we've pushed the KNIGHT boiler's capabilities and value to levels the industry has never seen before.

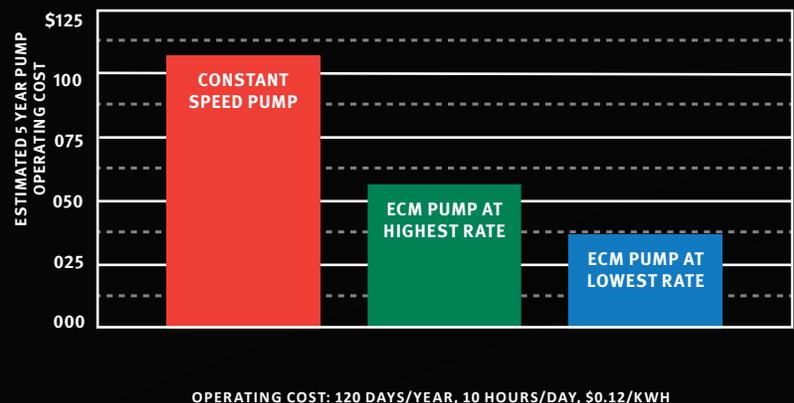
## ECM PUMP STANDARD EQUIPMENT

ECM pump technology saves electricity & lowers operating costs. Lochinvar now includes this money saving technology as standard equipment on all WHB & KHB boilers. Using the Smart System to continuously match the target Delta T at all modulation rates this technology makes variable speed pump integration simple and easy. Push your savings further by taking advantage of local rebate programs for ECM variable speed pumps. Check with your local utilities company for details.

PUMP ENERGY USAGE

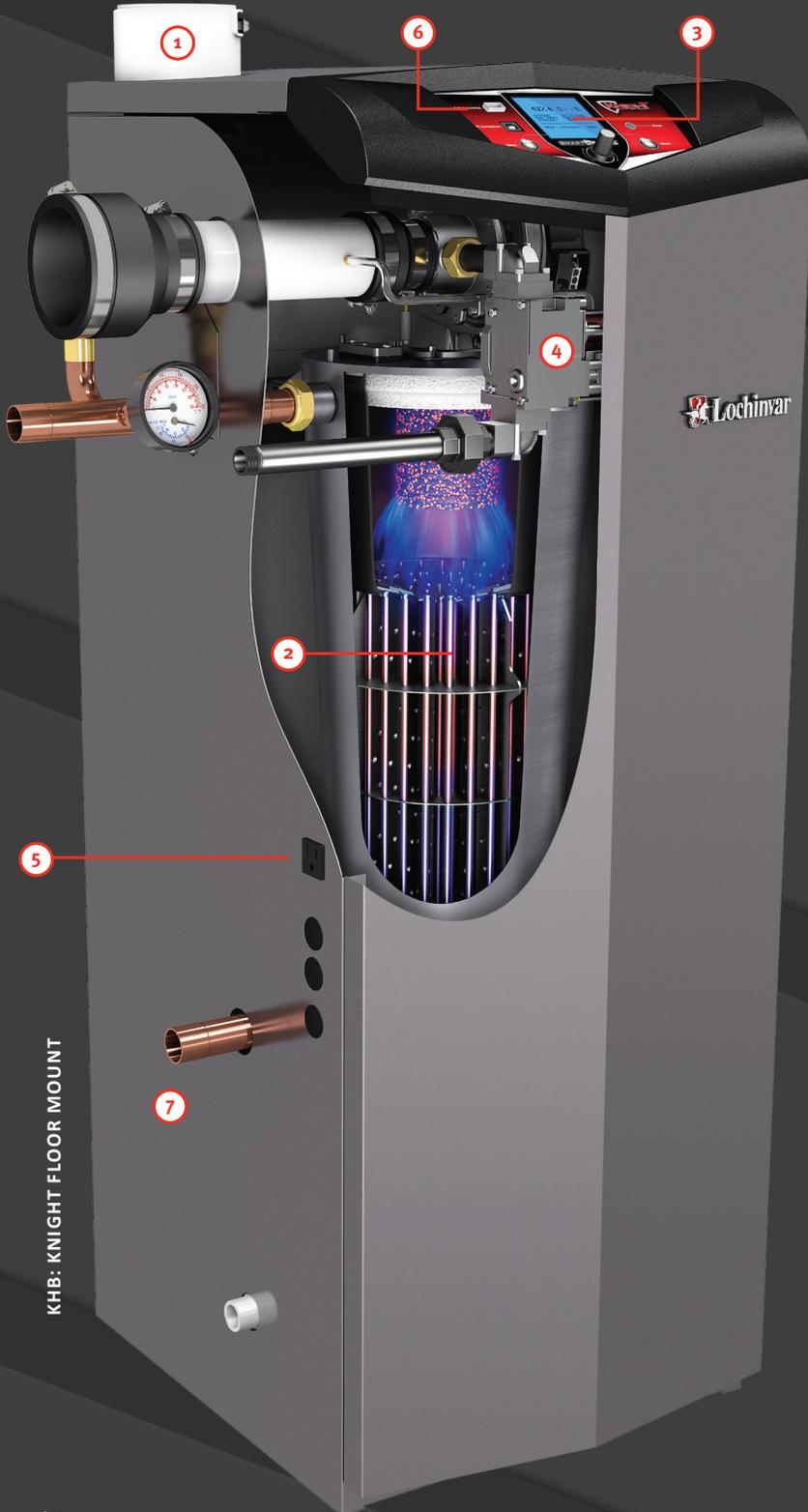


OPERATING COST



# KNIGHT<sup>®</sup>

FIRE TUBE BOILER



KHB: KNIGHT FLOOR MOUNT



WHB: KNIGHT WALL MOUNT

## KNIGHT FEATURES

### 1 UNIVERSAL VENT CONNECTOR

Allows for easy installation of multiple vent materials.

### 2 FIRE-TUBE HEAT EXCHANGER

Low pressure drop saves on pump operation costs and provides installation flexibility, while stainless steel fights off corrosion.

### 3 SMART SYSTEM USER INTERFACE

A plain English, code free interface with multicolor diagnostic display.

### 4 10:1 MODULATION TURNDOWN

Saves money on fuel cost.

### 5 ELECTRICAL OUTLET (not shown on WHB)

Plug available for work light or condensate pump.

### 6 LOCH-N-LINK<sup>®</sup> USB PROGRAMMING

Allows for saving of parameters onto a USB drive for use at a different job site.

### 7 INSTALLATION FLEXIBILITY

Top and bottom water connection for the WHB. Top and left side utility connections for the KHB for easy retro-fitting, such as a cast iron efficiency upgrade.



# BOILER CONTROL FROM ANYWHERE

The industry's most advanced boiler control system now includes the CON-X-US® Remote Connect option and Loch-N-Link® USB drive programming feature. 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 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 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.



# THE ULTIMATE IN BOILER CONTROL AND MONITORING

The backlit, user-friendly LCD display provides diagnostic information and system status in real words, not codes including:



## SET-UP WIZARD

For fast and easy programming.

## RAMP DELAY

Six steps of modulation to extend runtime and reduce cycling.

## LOCH-N-LINK

Save parameters on a USB drive and take them with you for future use.

## VACATION MODE

Tell your boiler when you are out of town to save energy.

## OUTDOOR RESET WITH BOOST

Automatically change the set-point according to weather conditions.

## MODULATION FACTOR

Fine tune boiler performance to be more or less aggressive depending on the application.

## VARIABLE SPEED BOILER PUMP CONTROL

Keep the same Delta T at all firing rates to save electricity and increase performance.



# THE BEST JUST GOT BETTER

New features include:

SET-UP WIZARD

VARIABLE SPEED ECM PUMP

UNIVERSAL VENT CONNECTOR WITH ANALYZER PORT

110V CONVENIENCE OUTLET

PARTS COMPATIBILITY BETWEEN FLOOR AND WALL MODELS

AUTOMATIC PARAMETER RESTORATION WHEN CONTROL IS REPLACED



**WHB**

**KNIGHT WALL MOUNT**

## SMART SYSTEM™ FUNCTIONS AND FEATURES

### 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

Space Heat Night Setback

Domestic Hot Water 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

Domestic Hot Water Recirculation Pump Start/Stop

24 VAC Device Relay

Configurable Proving Contacts

Flow Switch Contacts

Alarm on Any Failure Contacts

Runtime Contacts

DHW Thermostat Contacts

3 Space Heat Thermostat Contacts

System Sensor Contacts

Domestic Hot Water 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 (WHB 55-285)

#### » Modulating Burner with up to 10:1 Turndown

Direct Spark Ignition

Low NOx Operation

#### » ASME Stainless Steel Heat Exchanger

30 PSI ASME Relief Valve

#### » MNPT Top and Bottom Water Connections

(WHB 55-285 only)

#### » Vertical & Horizontal Direct Vent

PVC, CPVC, Polypropylene or SS Venting up to 100 feet

#### » Universal Vent Adapter

Built-in Combustion Analyzer Port

#### » Smart System Control

#### » Condensate Trap

#### » ECM Variable Speed Boiler Circulating Pump

#### » 110V Convenience Outlet

#### » High Altitude Models Available

#### » 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

#### » Firing Codes

M9 Standard Construction

M7 California Code

### 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

SMART SYSTEM™ PC Software

Condensate Neutralization Kit

BMS Gateway to LON or BACnet IP

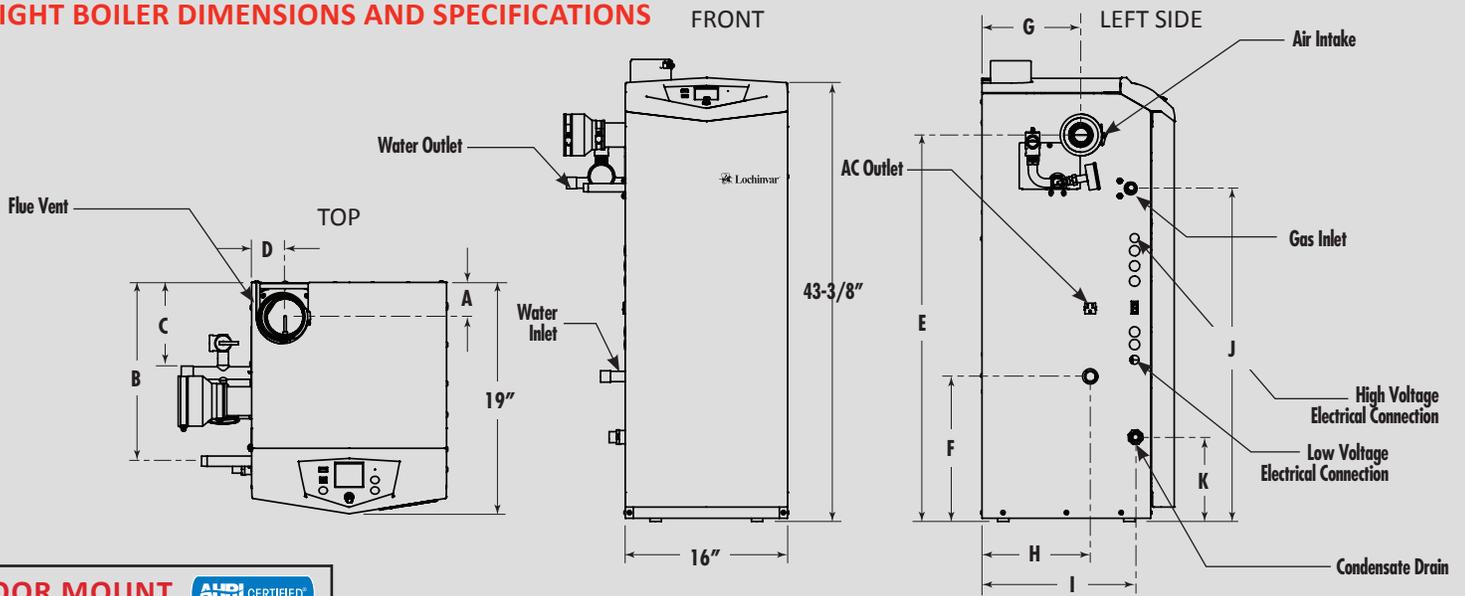
Multi-Temperature Loop Control

Sidewall Vent Termination

Wireless Outdoor Sensor

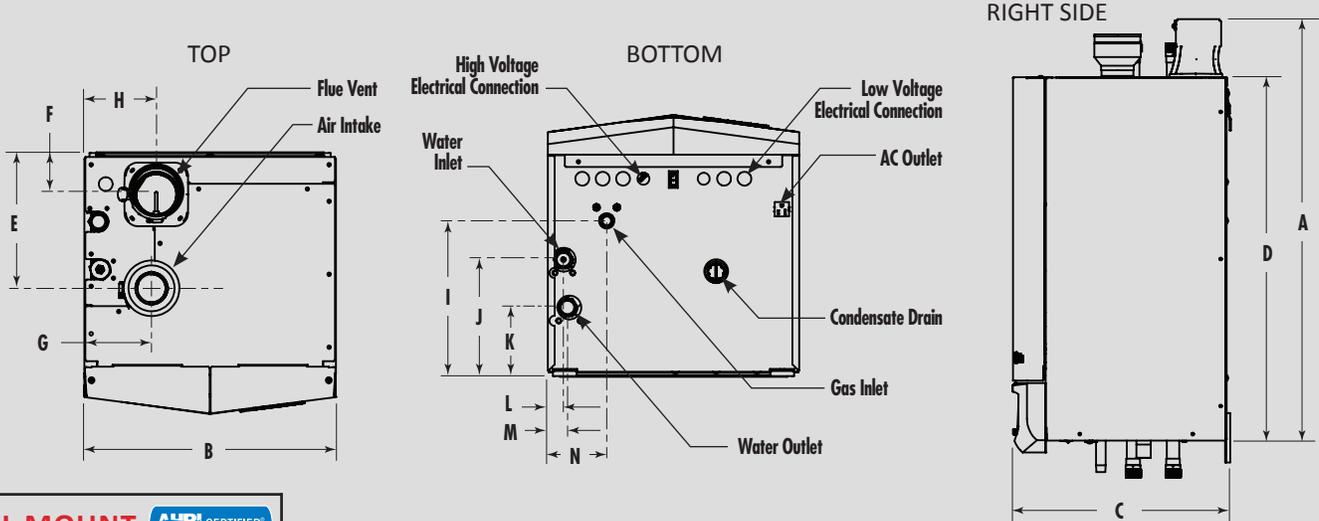
LP Conversion Kit

# KNIGHT BOILER DIMENSIONS AND SPECIFICATIONS



## FLOOR MOUNT

Model Number	Input MBH			Heating Capacity MBH	Net MBH	A	B	C	D	E	F	G	H	I	J	K	Gas Conn.	Water Conn.	Air Inlet	Vent Size	Shipping Wt. (lbs.)
	Max	Min	AFUE%																		
KHB055N	55	8.3	95.0	51	44	3-1/2"	13-3/4"	6"	2-3/4"	37-2/3"	13-1/2"	8-1/3"	10-1/2"	15"	32-1/2"	8-1/3"	1/2"	1"	2"	2"	160
KHB085N	85	8.5	95.0	79	69	3-1/2"	13-1/4"	6"	2-3/4"	37-2/3"	13-1/2"	8-1/3"	10-1/2"	15"	32-1/2"	8-1/3"	1/2"	1"	2"	2"	165
KHB110N	110	11	95.0	102	89	2-3/4"	14-3/4"	7-1/2"	2-3/4"	38"	14-1/3"	9-3/4"	10-1/2"	15"	33"	8-1/3"	1/2"	1"	3"	3"	170
KHB155N	155	15.5	95.0	144	125	2-3/4"	14-3/4"	7-1/2"	2-1/2"	38"	14-1/3"	9-3/4"	10-1/2"	15"	33"	8-1/3"	1/2"	1"	3"	3"	175
KHB199N	199.9	19.9	95.0	185	161	3"	15-1/2"	7-1/2"	2-1/2"	38-1/3"	14-1/3"	10-1/2"	11-1/2"	15"	33"	8-1/3"	1/2"	1-1/4"	3"	3"	195
KHB285N	285	28.5	95.0	264	229	3"	15-1/2"	7-1/2"	2-1/2"	38-1/3"	14-1/3"	10-1/2"	11-1/2"	15"	33"	8-1/3"	1/2"	1-1/4"	3"	3"	205



## WALL MOUNT

Model Number	Input MBH			Heating Capacity MBH	Net MBH	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Gas Conn.	Water Conn.	Air Inlet	Vent Size	Shipping Wt. (lbs.)
	Max	Min	AFUE%																					
WHB055N	55	8.3	95.0	51	44	40"	18-3/4"	16"	31-1/8"	8-1/2"	3-3/4"	4-1/2"	6-1/2"	7-1/4"	8-7/8"	3-1/2"	1-1/2"	1-1/2"	6"	1/2"	1"	2"	2"	139
WHB085N	85	8.5	95.0	79	69	39-3/4"	18-3/4"	16"	31-1/8"	8-1/2"	3-3/4"	4-1/2"	6-1/2"	7-1/4"	8-7/8"	3-1/2"	1-1/2"	1-1/2"	6"	1/2"	1"	2"	2"	142
WHB110N	110	11	95.0	102	89	41-1/4"	18-3/4"	19"	31-1/8"	10"	2-3/4"	5"	5-1/4"	11-1/2"	8-1/2"	5"	1"	1"	4-1/2"	1/2"	1"	3"	3"	159
WHB155N	155	15.5	95.0	144	125	41-1/4"	18-3/4"	19-1/8"	31-1/8"	10"	2-3/4"	5"	5-1/4"	11-1/2"	8-1/2"	5"	1"	1"	4-1/2"	1/2"	1"	3"	3"	166
WHB199N	199.9	19.9	95.0	185	161	41-1/4"	18-3/4"	19-1/8"	31-1/8"	10-1/2"	3"	5-1/4"	6"	11"	9-1/2"	6-1/4"	1-1/2"	1-1/2"	4-1/2"	1/2"	1-1/4"	3"	3"	175
WHB285N	285	28.5	95.0	264	229	41-3/4"	18-3/4"	21-1/8"	31-1/8"	15"	3"	3-3/4"	5-1/4"	12-1/4"	11"	6-1/4"	1-1/2"	1-1/2"	6-1/2"	1/2"	1-1/4"	3"	3"	184
WHB399N**399	80	94.0*	94.0*	377#	328	43-1/4"	25-1/4"	21-7/8"	34"	3-1/2"	4-1/4"	22-1/2"	3-7/8"	8-7/8"	12-1/2"	9-1/4"	2"	2"	21-1/2"	3/4"	1-1/2"	4"	4"	213

\*Thermal Efficiency%  
# Gross Output MBH

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.

\*\*10:1 Turndown ratio and top and bottom water connections are not included on WHB399. WHB399 operates with a 5:1 turndown.



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