

GreenStar 9800® Series

High-Efficiency, Ultra-Low NO_x
WATER HEATERS



Modulating with 7.5 to 1 turndown

Condensing with up to 98% efficiency

Less than 20ppm NO_x

AcidArmor™ coated heat exchanger



GREEN BOILER TECHNOLOGIES

GreenStar 9800® Series

“Best-in-Class” Water Heating Technology

Since 1931, Green Boiler Technologies has engineered industry recognized and time tested, energy efficient water heating equipment. That tradition continues with our **GreenStar 9800® Series** of modulating and condensing water heaters.

We surveyed the market. We observed our competition. We tested... over and over again. Since the beginning, our design approach for the GreenStar 9800® Series has been to choose “**best-in-class**” features because we didn’t have preconceived notions from an existing product. Our customers will see the difference this simple, methodical approach brings.

In the end, we are pleased to offer the GreenStar 9800® Series as one of the most environmentally-friendly, efficient, economical and reliable water heaters available on the market today.

The Bottom Line on What Makes the GreenStar 9800® Series of Gas-Fired Water Heaters Out-Shine the Competition

World-Class Efficiency

- Up to 98% thermal efficiency
- Modulation capable of 7.5 to 1 turndown
- Lead-lag connect up to 8 units for modulation capabilities of 60 to 1 turndown

Environmentally Friendly, Ultra-Low NOx

- Meets SCAQMD and TCEQ emission requirements
- Less than 20ppm NO_x (standard)
- Less than 10ppm NO_x (optional)

Thoughtful Design Reflects Lessons Learned in the Field

- Standard design features prevent common problems in the field – not sold as “extras”
- Capable of operating in a wide variety of field conditions

Service Friendly Design

- Easy front and rear access to components and controls
- Touch screen color LCD display provides status and diagnostics in plain language, not codes
- Non-proprietary components

Competitively Priced

- Enhances payback period and ROI

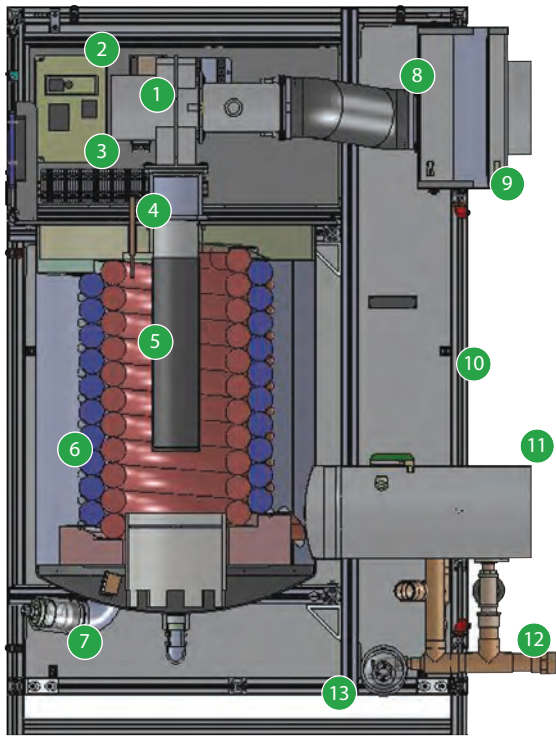


Honeywell Sola
S7999B Display



High-Efficiency, Ultra-Low NO_x WATER HEATERS

The GreenStar9800® Series is available in 2.0mm, 1.5mm, 1.0mm and 0.65mm BTU input sizes; all with 7.5 to 1 turndown and ultra-low NO_x emissions.



1. VARIABLE SPEED BLOWER
2. ELECTRIC POWER FILTER
3. HONEYWELL SOLA CONTROL
4. SILICON-NITRIDE IGNITER
5. PRE-MIX LOW NO_x BURNER
6. POLYMER COATED COPPER-FIN HEAT EXCHANGER
7. ACIDIC CONDENSATE NEUTRALIZER
8. INLET AIR FILTER
9. COMBUSTION AIR INLET
10. POWER AND WATER CONNECTIONS
11. EXHAUST OUTLET
12. CONDENSATE DRAIN OUTLET
13. CABINET INSTALLED CIRCULATION PUMP

FEATURES and CONTROLS

STANDARD

- Fully condensing with thermal efficiencies up to 98%
- Modulating controls capable of 7.5 to 1 turndown
- Less than 20ppm NO_x
- Natural gas or propane
- Copper-fin heat exchanger
 - Coated with AcidArmor™ proprietary polymer
 - Large diameter (1.25" I.D.) prevents scaling
 - 10-year heat exchanger warranty
- Easy change-out acidic condensate neutralizer
- Easy change-out air filter
- Non-proprietary components
- Non-corrosive cabinet jacket with a stainless steel appearance
- Silicon nitride hot surface igniter
 - Heavy-duty, non-brittle reliable ignition
- Minimum gas pressure of 4.0" inches W.C.
- Factory installed pumps and connections for "plug-and-play" installation
- Honeywell Sola controller (R7910A)
- Honeywell Sola display (S7999B)
 - Color touch screen LCD display
 - Operation status and diagnostics in plain language
 - Capable of remote monitoring
- Slide-out vertical electronic control panel for easy access and serviceability
- Electrical power filter
 - Eliminates most electrical noise
- Multiple venting options using Category 4 venting
 - Up to 100 equivalent feet
- Power requirements
 - 120/60/1
- ASME 160 PSI design working pressure

OPTIONS

- Capable of controlling up to 8 units in lead-lag configuration
- Less than 10ppm NO_x optional with factory modulation setting of 4 to 1 turndown
- Equipment available to communicate with most Building Management Systems including BACnet, MODBUS and LonWorks

Proactive Design Features

Green Boiler Technologies designed the GreenStar 9800® Series to resolve common problems found with existing equipment in the marketplace as well as handle the wide range of operating conditions that can be experienced in the field.

The GreenStar 9800® Series proactive design comes from lessons learned in the industry:

Not All Gas Pressure Is Created Equal

Problem: Gas pressure throughout the U.S. and internationally is not necessarily equal at the point of delivery. Many locations have pipeline pressure drops due to small diameter pipe distribution or appliance overload.

Solution: *The GreenStar 9800® Series is designed to operate on a minimal gas pressure as low as 4.0" W.C.*

Air Is Not Always Clean

Problem: Combustion makeup air varies greatly from site to site. Air, with a significant amount of particulate, can clog the burner and lead to performance failure.

Solution: *The GreenStar 9800® Series comes standard with an easy change-out filtration system which uses a common "off-the-shelf" filter. A status alarm alerts the user if air flow is inadequate and the filter needs to be replaced.*

Electricity Can Be "Dirty"

Problem: Electrical distortion from undesired harmonics and other spurious signals is increasingly common in today's complex boiler room. This phenomena, often referred to as "dirty electricity", causes faulty signals which disrupt boiler and water heater equipment controls.

Solution: *The GreenStar 9800® Series comes standard with an electric power filter which will eliminate all but the most extreme "dirty" electrical conditions.*

Protect Your Heat Exchanger Inside and Out

Problem: Acidic condensate corrodes the surface of heat exchangers when the unit condenses. In addition, mineral deposits adhere to the inside wall of the heat exchanger causing decreased water flow over time.

Solution: *The GreenStar 9800® Series uses a proprietary polymer-based coating, AcidArmor™, which is baked onto the outside of the heat exchanger and acts as a barrier between the acidic condensate and the copper metal. Moreover, the large diameter (1.25" I.D.) used in the heat exchanger, combined with high water velocities, virtually eliminates the likelihood of mineral deposit build-up. The heat exchanger is backed by a 10-year warranty.*

Proven and Reliable Ignition Is Critical

Problem: Ceramic igniters have limited durability and require constant replacement. Certain ignition detection sensors are unreliable and pose safety risks.

Solution: *The GreenStar 9800® Series uses standard heavy-duty silicon nitride igniters which have proven durability and strength. Moreover, the GreenStar 9800® Series uses a reliable UV sensor to prove ignition.*

Maintenance Should Be Easy

Problem: When a unit requires maintenance, internal components and controls are not easily accessible or require replacement with proprietary factory components. Maintenance becomes difficult, frustrating and potentially expensive.

Solution: *The GreenStar 9800® Series does not use proprietary components. We have carefully tested and selected components that are available from a variety of well established vendors. All components are easily accessed from the front panels, including an eye level slide-out vertical panel which contains all of the electronic controls.*

Equipment Should Provide Information in Plain Language and Not Code

Problem: Many similar boilers and water heaters use antiquated controls which require a code book to translate status or diagnostic information into plain language.

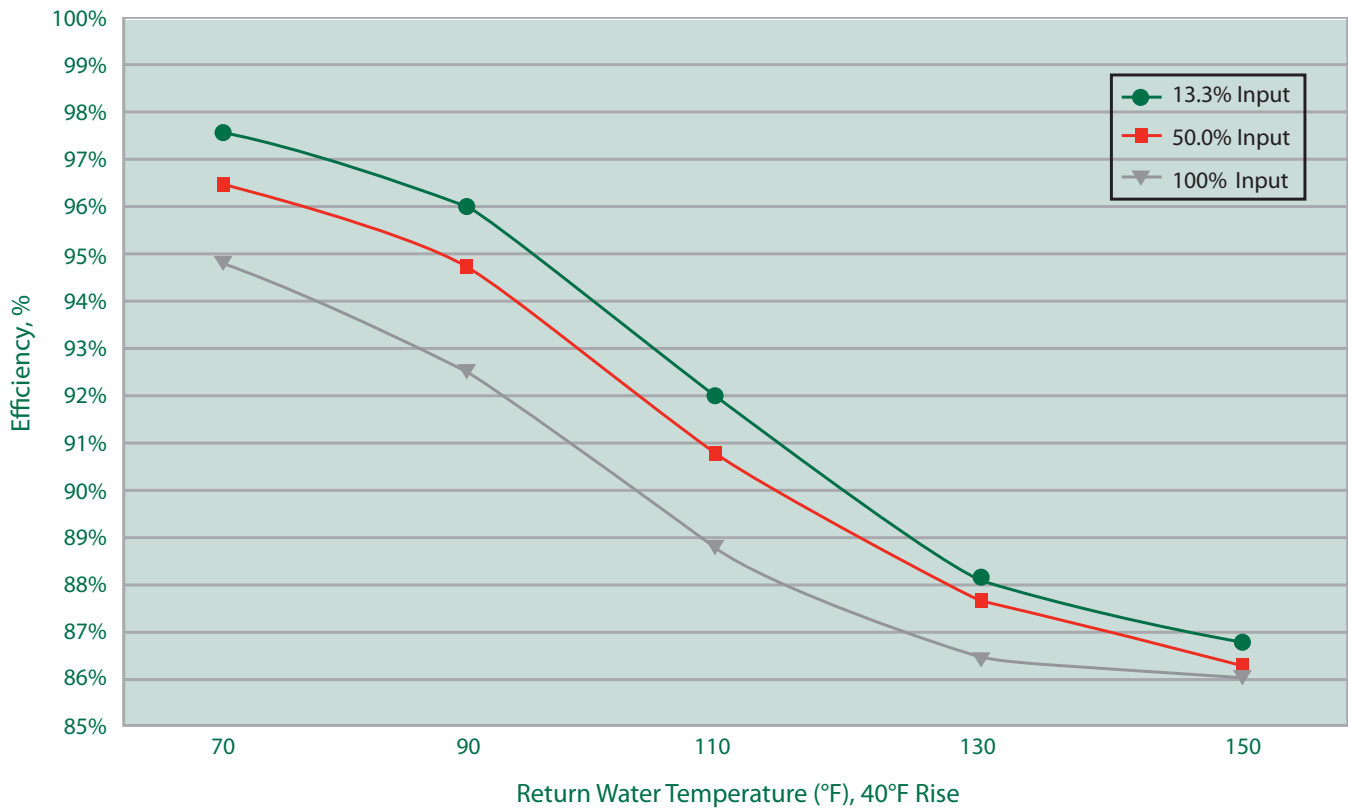
Solution: *The GreenStar 9800® Series uses the Honeywell Sola display as standard on all models. The color touch screen LCD display provides operating status and diagnostics instantly and in plain language.*

Performance Data & Product Dimensions

PERFORMANCE DATA

Model	GreenStar 9800-650	GreenStar 9800-1000	GreenStar 9800-1500	GreenStar 9800-2000
Input @ full rate (btu/hr)	650,000	1,000,000	1,500,000	2,000,000
Output @ full rate (btu/hr)	598,000	920,000	1,380,000	1,840,000
Maximum efficiency (%)	98%	98%	98%	98%
Turndown ratio	7.5 : 1.0	7.5 : 1.0	7.5 : 1.0	7.5 : 1.0

GreenStar 9800® Series Thermal Efficiency Chart



PRODUCT DIMENSIONS

Model	GreenStar 9800-650	GreenStar 9800-1000	GreenStar 9800-1500	GreenStar 9800-2000
Width (in.)	30.3	30.3	34.3	34.3
Height (in.)	63.0	63.0	77.5	77.5
Depth (in.)	40.0	40.0	47.8	47.8
Approximate shipping weight (lb.)	720	720	1,170	1,170



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WATER HEATERS

Ideal for a variety of end market applications



Hospitals • Schools • Prisons • Office Buildings • Retail • Assisted Living • Government & Military Facilities • Amusement/Recreation • Multi-family Housing • Industrial & Manufacturing



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