

NeoTherm[®] Water Heater With Pump

Date:

Bid Date:

Project #:

Location:

Project Name:

Engineer:

Contractor:

Prepared By:

Model NTV 500 Indoor

Specification

Contractor shall supply and install Qty.: _____ Laars Model No. NTV500 _____ modulating, pump-mounted water heater(s).

The heater shall be a Laars NeoTherm Model NTV500 _____, rated at the input and output shown on the schedule. The heater shall modulate 20-100% of full fire. The unit(s) shall be design-certified to comply with the current edition of the Harmonized ANSI Z21.10.3 / CSA 4.3 Standard for Gas Water Heaters. The unit(s) shall be designed and constructed in accordance with the ASME Boiler & Pressure Vessel Code, Section IV requirements for 160 psi (1103 kPa) maximum working pressure, and shall bear the ASME "H" Stamp and be listed by the National Board. The unit(s) shall be constructed to comply with the efficiency requirements of the latest edition of ASHRAE Standard 90.1. Minimum thermal efficiency shall be 96%. The heater shall be equipped with an ASME certified pressure relief valve set at 125psi (861kPa). Optional pressure relief valves with settings of 30psi (207kPa), 50psi (345 kPa), 60psi (413 kPa), 75psi (517 kPa) or 150psi (1034 kPa) shall be available.

The water tube heat exchanger shall be stainless steel, rated for 160 psi (1103 kPa) working pressure. The heat exchanger shall be a low water volume design, welded construction, with no gaskets, o-rings or bolts in the header. Heat exchanger shall be accessible for visual inspection and cleaning of all surfaces of the flue side of the heat exchanger. The heater shall be fully condensing design with built-in condensate drain and trap. The heat exchanger shall have a limited five-year warranty.

Each heater shall be fully test fired, (with water, gas, and venting connected), and all safety components tested, at the factory.

The heater shall be sealed combustion, and removal of jacket panels shall not affect the combustion seal. The heater jacket shall be a unitized shell finished with acrylic thermo-set paint baked at not less than 325°F (163°C). The frame shall be constructed of galvanized steel for strength and protection. Chamber shall include a sight glass for viewing flame. Heater shall be certified for zero clearance to combustible surfaces.

All water, gas, vent and air connections shall be on the top of the heater, and the top jacket panels shall be split, such that they are removable without disconnecting the water, gas, vent or air pipes.

The heater shall be shipped with a pump that has conduit, wiring and terminals wired to the pump. The heater shall have a flanged inlet water connection that allows the pump to be connected directly to the top of the heater in the field. The pump shall be capable of serving the heater's heat exchanger and 30 feet of piping that is the same size as the heater's water connections, with a normal number of pipe fittings.

Heater shall operate on 4-13" w.c. gas pressure, and shall need no component changes to operate at high altitude, up to 10,000 feet.

The heater shall use a premix burner with a stainless steel woven metal fiber wrap, and a negative pressure gas valve to burn cleanly, with NOx emissions not exceeding 10ppm. The heater shall meet the emissions requirements of SCAQMD 2012.

The heater shall be designed for vertical or horizontal Category IV venting, up to 100 equivalent feet, with 4" diameter PVC, CPVC or stainless steel vent material. Air may be taken from the room, or ducted directly to the heater, using up to 100 equivalent feet of 4" diameter ABS, PVC, CPVC or galvanized pipe. The heater shall be shipped with PVC sidewall vent and air terminals, for use with horizontal systems. The first section of CPVC vent pipe shall be shipped with each heater.

Unit shall be 120VAC, single phase, 8 Amps (including pump) for connection to a 15A breaker. The control circuit shall be 24VAC.

The heater control shall be an integrated electronic PID temperature and ignition control with LCD and touchpad and shall control the heater operation and firing rate. The control shall have three menu structures for user mode, set-up mode, and diagnostic model. The heater display shall be visible without the removal of any jacket panels or control panels.

When a display or control is field-replaced, the device shall have the ability to read parameter setpoints from the original set-up, so the system does not have to be re-programmed.

The control shall have the ability to control the heater pump with delay features. The control shall be able to cascade and lead-lag with other NeoTherm controllers, without additional system controllers. An optional display that is full-color, high definition LCD with touch-screen shall be available, to allow for additional communication ports.

The control shall have the ability to recognize a domestic water sensor or closure from a tank stat on the same terminals. The heater shall be shipped with the domestic water heater sensor, as standard equipment.

The control shall have the ability to accept a 4-20mA or 0-10VDC input connection from an external control or building automation system, to modulate the flame. The control shall have dry alarm contacts for ignition failure.

The control shall monitor flue gas temperature and shall stop the heater from firing if temperature is excessive.

The control shall have a display button that allows a user to choose one of six menus, including: Login; Display Setup; Quick Start; Advanced Setup; Test; Diagnostics. The display button shall be active at all times, regardless of what menu the control is showing.

Login shall allow an installer to adjust password-protected parameters.

A Display Setup menu shall allow the user to adjust the LCD contrast, and to customize the display's homescreen. The user shall be able to choose five of the following parameters to display on the homescreen – domestic hot water setpoint, operating temperature, outlet temperature, outlet temperature, inlet temperature, heater temperature rise (delta T), lead-lag operating temperature, lead-lag system setpoint, fan speed, flame signal, firing rate, stack temperature, and 4-20mA input level. The homescreen shall also indicate the heater name, what firing state the heater is in, if there is a demand on the heater, if the system is in password-level status, and shall show any holds, alerts, or lockouts that are present. The homescreen shall be accessible at any time by pressing a homescreen button on the display.

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A Quick Start menu shall present only the select few parameters that are needed for a simple, single heater installation.

The Advanced Setup menu shall give the installer access to all adjustable parameters, for more complex installations, including; all lead-lag set up parameters, boiler high limit, boiler temperature setpoint and on/off differentials, domestic water temperature setpoint and on/off differentials, domestic water priority time, heater stack temperature limit, pump delay and exercise values, PID parameters, automatic remote signal detection, anti-short-cycle feature adjustment, and °F or °C display.

The control shall have a Test menu that allows the user to force the heater into minimum or maximum firing rate for 10 minutes, for set-up purposes. The test menu shall also allow the burner to be turned on or off, and the pump to be set to on or auto, for testing purposes. The control shall show a count-down timer, enabling the user to see how much time is left for the test segment.

A Diagnostics menu shall allow the user to see analog inputs, digital inputs, and the history of alerts and lockouts. Analog inputs shall include – outlet temperature, inlet temperature, temperature rise (delta T), domestic water temperature, stack temperature, fan speed, flame signal, firing rate, 4-20mA input level. Digital inputs shall include – main valve state, alarm status, demand status, safety chain status, and interlock status. The control shall display information about holds, alerts, and errors in both text form, and with codes numbers for further analysis.

Standard features shall include:

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| • High condensing efficiency | • Horizontal vent and air terminals | welded construction (no gaskets) | • Alarm output |
| • Modulation down to 20% of full fire (5:1 turndown) | • Vent and air pipe lengths of up to 100 equivalent feet (each) | • ASME "H" stamp | • Accepts external (4-20mA or 0-10V) modulation signal |
| • Sealed combustion chamber | • Built-in condensate trap | • 125 psi (861 kPa) ASME rated pressure relief valve | • On/off toggle switch |
| • Pre-mix stainless steel burner | • Vent temperature cutoff feature | • Water flow switch | • Manual reset high limit |
| • Low NOx system exceeds the most stringent regulations for air quality - less than 10ppm NOx | • Direct spark ignition system | • Temperature & pressure gauge | • Burner site glass |
| • Horizontal or vertical direct vent | • Sensor for domestic water tank | • Drain valve | • Zero clearance to combustible surfaces |
| | • 160 psi maximum working pressure | • Electronic PID modulating control | • 5 year limited warranty |
| | • Stainless steel heat exchanger with | • Large user-interface and display | |