Date: Bid Date:

Project #: Location:

Project Name: Engineer:

Contractor: Prepared By:

NEOTHERM Water Heater with Pump

Model NTV 285-600 Outdoor

Specification

LAARS Heating Systems Company

Contractor shall supply and install Qty.: Laars Model No. NTV modulating, water heater(s) with pump(s).

The heater shall be a Laars NeoTherm Model NTV_____, 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, and shall include certification for outdoor installation. 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. The water heater shall have minimum thermal efficiencies of 94%,

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 internal surfaces. The heater shall have NSF/ANSI-372 Low Lead Content Certification. The heater shall be fully condensing design with built-in condensate drain and trap. The heat exchanger shall have a limited eight-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 and a conduit. The wiring and terminals shall be 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 design-certified as a high efficiency Category IV unit, and shall include a short section of vent pipe with adapter and bird screen for outdoor installation.

Unit shall be 120VAC, single phase. The control circuit shall be 24VAC.

The heater control shall be an integrated electronic PID temperature and ignition control with large color touchscreen display and shall control the heater operation and firing rate. 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.

The control shall have the ability to control the domestic water pump, with a time delay and exercise feature.

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 easily allow the user to force the heater into minimum or maximum firing rate, for setup and diagnostic purposes, and shall have a cleaning mode that allows the user to wipe the screen without activating any functions from the touchscreen.

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.

Allowable control adjustments shall include: heater temperature setpoint; domestic water temperature setpoint; automatic high limit: °F or °C display; DHW setpoint for time of day input; DHW PID gain parameters; manual firing rate control; pump delay time; pump exercise interval; automatic remote signal detection; anti-short cycle feature enable/disable.

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The control shall have installer-level password, and verification feature to ensure that safety-related parameters are not altered by mistake.

The control shall be able to cascade and lead-lag with other NeoTherm controllers, for a total of eight NeoTherm heaters, without additional system controllers.

In multiple heater systems the heaters shall be controlled to keep each one in the lowest firing rate possible, based on system demand, to maximize efficiency. For example, the master control shall choose to bring on all heaters at low firing rates, instead of one heater at a high rate, to meet the system needs.

A control that is chosen as master in a system with multiple controllers shall display an icon of each of the controls that it is controlling. The color of the icon shall indicate if the control is in normal operation, in lockout, in standby mode, in a hold state, or if there is a communication error. In addition to adjustable parameters, the master display shall also be able to show information about the following for each heater it is monitoring: domestic hot water; burner control; demand and modulation; inlet temperature; fan; domestic water pump; flame detection; statistics; stack limit.

The control shall graphically depict the firing rate of each heater in system, if the controller is the master of other NeoTherm heaters in a multiple heater system.

The controller shall be able to send information through a modbus connection, including (but not limited to) inlet and outlet water temperatures, stack temperature, DHW temperature, status of sensors, fan speed, setpoints, remote control input, burner status, lockout codes, alarm reasons, domestic water pump status.

Control diagnostics shall include, at a minimum, the following: ignition failure, grounded flame rod, safety chain interrupt, heater high limit exceeded, domestic water high limit exceeded, temperature rise limit exceeded, stack limit exceeded, pressure sensor fault, combustion pressure fault, blocked air intake, sensor errors (open or shorted), 24VAC voltage low or high, modulation fault, pump fault, AC input phases reversed, and fan speed proving rate failure.

The control shall have a clock with a battery backup and will allow the user to access the burner run time, and cycle counts for the burner and DHW pump.

The control shall differentiate between a lockout, a hold, or an alert. If an issue occurs, the system will display a brief description of the issue on the control screen. The user shall be able to tap the display to be presented with a more detailed explanation of the issue.

Standard features shall include:

- Electronic PID modulating control with large color touchscreen display
- Built-in cascade function for multiple units, up to 8 total
- Password-protected parameters for installer use
- Test feature allows forced min or max firing
- Complete diagnostics for analog and digital inputs
- Domestic water sensor
- Shipped with heater pump
- Displays holds, alerts and errors in clear text form
- Dry alarm contacts for ignition failure
- High condensing efficiency
- Modulation down to 20% of full fire (5:1 turndown)
- Sealed combustion chamber
- Pre-mix stainless steel burner
- Low NOx system exceeds the most stringent regulations for air quality - less than 10ppm NOx
- Built-in condensate trap
- Vent temperature cutoff feature
- Direct spark ignition system
- 160 psi maximum working pressure
- Stainless steel heat exchanger with welded construction (no gaskets)
- ASME "H" stamp
- Meets NSF/ANSI-372 Low Lead Content Certification
- 125 psi (861 kPa) ASME rated pressure relief valve
- Water flow switch (399-850 only)
- Temperature & pressure gauge
- Drain valve
- Alarm output
- Accepts external 4-20mA (0-10V with optional convertor) modulation signal
- On/off toggle switch
- Manual reset high limit
- Burner site glass
- Zero clearance to combustible surfaces
- 8 year limited heat exchanger warranty

LAARS® Heating Systems Company

Customer Service and Product Support: **800.900.9276 • Fax 800.559.1583**

Headquarters: **20 Industrial Way, Rochester, NH 03867 • 603.335.6300 • Fax 603.335.3355**

9 Brigden Gate, Halton Hills, Ontario, Canada L7G 0A3 (905) 203-0600 Fax: (905) 636-0666

www.Laars.com

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