Date: Bid Date:

Project #: Location:

Project Name: Engineer:

Contractor: Prepared By:

OMNITHERM Water Heater

OCV, Indoor/Outdoor

Models 1250, 1500, 1750, 2000, 2500, 3000.

Specification

LAARS Heating Systems Company

Contractor shall supply and install Qty.: Laars Model No. OCV modulating near-condensing water heater(s).

The heater shall be a Laars OmniTherm Model OCV , rated at BTU/hr input and BTU/hr output. The heater shall modulate a minimum 20-100% of full fire, for a minimum 5:1 turndown. 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, shall bear the ASME "HLW" Stamp and be listed by the National Board. The heater shall meet NSF/ANSI-372 Low Lead Content certification.

The heater shall be listed with AHRI (Air Conditioning, Heating and Refrigeration Institute). The heater shall have minimum thermal efficiency of 87%. The unit(s) shall be constructed to comply with the efficiency requirements of the latest edition of ASHRAE Standard 90.1.

The heater shall be sealed combustion, and 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 that meet the most stringent requirements in the U.S.. The heater shall meet the emissions requirements of SCAQMD.

The heater shall be certified for placement indoors and outdoors.

The heater shall be designed and certified for Category II venting, and for vertical or horizontal Category IV venting, up to 100 equivalent feet, with 6" (1250-1500), 8" (1750-2500), or 10” (3000) diameter stainless steel vent material. Air may be taken from the room, or ducted directly to the heater using up to 100 equivalent feet of 6" (1250-1500), 8" (1750-2500), or 10" (3000) diameter of polypropylene, ABS, PVC, CPVC or galvanized pipe.

The water tube heat exchanger shall be stainless steel, and shall be a low water volume design with micro-fin tubing, welded construction, and no gaskets, o-rings or bolts in the header. The heat exchanger shall be accessible for visual inspection and cleaning of all internal surfaces. The heater shall be near condensing design with built-in condensate drain and trap. The heat exchanger shall have a limited ten-year warranty.

The heater shall be equipped with an ASME certified pressure relief valve set at 125psi (861 kPa). Optional pressure relief valves with settings of 30psi (207kPa), 50psi (345 kPa), 60psi (413 kPa), 75psi 5171 kPa), or 150psi (1034 kPa) shall be available.

The heater shall operate at gas pressures of 4-10.5" w.c.(natural gas) and shall need no component changes to operate at high altitude, up to 10,000 feet.

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.

The heater shall have an integrated temperature / ignition control and valve control that work together to ensure heater operation, safety and combustion functions are harmonized. The gas/air system shall allow the heater to modulate and remain stable throughout the modulation range.

The temperature / ignition control shall be an integrated electronic PID control with large touchscreen and color display. The heater display shall be visible without the removal of any jacket panels or control panels. The control shall display using icons and words, for clarity. The control's home page shall display security level, quick start access, configuration menu access, service menu access, messages, an indication of which demands are active, a navigation bar, date, and time. In addition, the home screen shall display all set points, actual and target firing rates, flame signal, flue temperature, heater inlet and outlet temperatures, domestic water temperature (when DHW sensor is used), and status of all pumps.

The control shall have a quick-start menu, configuration menu, and service menu. The quick start menu shall allow configuration of basic functionality and the most common settings, without the need to access all parameters that are available. The configuration menu shall hold all settable/changeable parameters. The service menu shall allow for access to information that will help setup and troubleshoot the heater.

The control shall have three levels of access, each with a unique password; user, installer and OEM. A verification feature shall be present, to ensure that safety-related parameters are not altered by mistake. The control shall have a lockout feature, so that changes cannot be made without entering the password. The user shall be able to choose how long the control will remain unlocked after user interaction has stopped.

The control shall have two independent domestic water (DHW) setpoint, each with adjustable differentials. The heater shall come equipped with a DHW sensor, but the control shall be able to recognize a call for DHW via this sensor or a closure from a tank stat on the same terminals. The user shall be able to choose the priority of all demands. It shall have the ability to control two domestic water pumps, each with delay and exercise features.

The control shall be able to cascade and lead-lag with up to eight other OmniTherm OCV heaters. The control system shall allow the user to choose the rotation method that is desired. In the event of a loss of communication with the lead heater, the user shall be able to choose to run the system from the lead heater’s internal set point, or choose another unit to assume lead responsibility. A control that is chosen as master in a system with multiple controllers shall display an icon of each of the controls in the system. The color of the icon shall indicate if the control is in normal operation, in standby mode, in a hold state, locked out, or if there is a communication error.

The control shall have the ability to accept a 4-20mA or 0-10VDC input connection from an external control or building automation system. The control shall allow the user to choose to use this external signal as a temperature setpoint or a modulation signal.

The controller shall be able to send and receive information through a Modbus or BACnet MSTP connection, including (but not limited to) inlet and outlet water temperatures, stack temperature, DHW temperature, frost protection, status of sensors, fan speed, setpoints, remote control input, burner status, lockout codes, alarm reasons, and domestic water pump status. Gateways shall be available for additional communication protocols.

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The control's service menu shall include access to turn burner on and off, valve information, history, factory default reset, and the ability to recalibrate the touchscreen / display. 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. Heater history shall be accessible via the service menu, and shall have information on demand cycle counts, burner cycles, pump cycles, recent lockout conditions, heater temperature statistics and firing time statistics.

The control shall easily allow the user to force the heater into minimum or maximum firing rate, for setup and diagnostic purposes. 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 message icon on the display to be presented with a more detailed explanation of the issue.

Digital inputs accessible in the service menu shall include on/off status of the flow switch, low water cutoff, manual reset high limit, thermal cutout, high gas pressure switch, low gas pressure switch, condensate level, and calls for DHW. Digital outputs accessible in the service menu shall include on/off status of heater run, alarm, safety satisfied, valve enabled, valve reset, DHW pump, auxiliary power output, and auxiliary dry contact. Analog inputs accessible in the service menu shall include inlet water temperature, outlet water temperature, flue temperature, and DHW temperature. Analog outputs accessible in the service menu shall include percentage depictions for pump speed, fan speed, mixing valve, and auxiliary.

The heater control shall have a USB port that allows parameter sets to be uploaded from the controller and downloaded from the controller, for diagnostic purposes, and to allow a parameter set to be copied from one heater to another. The USB port shall also allow runtime data and history to be captured in a tab-deliminated text file for use with spreadsheet programs.

Auto and manual reset high limit settings with reset differential shall be programmable, and the control shall have an anti-short-cycle setting that allows the user to choose how long the heater will wait to fire after a heat demand is satisfied. PID parameters (on hysteresis, off hysteresis, proportional gain, integral time, derivative time) and minimum / maximum delta T (temperature difference) between which the heater will modulate shall be user-programmable for times when such tuning would be beneficial.

The control shall monitor flue gas temperature and shall reduce heater input as the maximum flue gas temperature is approached, with manual reset stop if temperature exceeds maximum setting.

To assist in avoiding freeze-up conditions, the user shall be able to set a heater inlet water temperature that will activate an anti-frost mode. The user shall be able to choose if a pump, multiple pumps, or pump(s) and burner will be energized when the heater enters this mode.

The control shall have dry alarm contacts for ignition failure.

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

Standard features shall include:

- ASME "HLW" stamp
- 160 psi maximum working pressure
- Meets NSF/ANSI-372 Low Lead Content certification
- Certified for Category II & IV vent
- Indoor / outdoor
- Low NOx system exceeds the most stringent NOx regulations
- Sophisticated gas/air valve allows for constant control of combustion
- Sealed combustion chamber
- Stainless steel heat exchanger with welded construction
- Pre-mix stainless steel burner
- Electronic PID modulating control with large touchscreen and color display
- Multiple independent heat demands
- Controller cascades with up to eight OmniTherm OCV heaters
- Accepts 4-20ma or 0-10VDC external modulation or external set point control
- Modbus RTU & BACnet MSTP on board
- Domestic water pump control with time delay
- Sensor for DHW tank
- Cat IV vent & air pipe lengths of up to 100 equivalent feet (each)
- High and low gas pressure switches
- Vent temperature cutoff
- Normally open alarm contact
- Air filter
- Water flow switch
- Temperature & pressure gauge
- Low water cutoff
- 125 psi (861kPa) ASME rated pressure relief valve
- Groove lock fittings (optional flange adapter)
- Burner site glass
- 10-Year limited warranty