

# Mascot II Condensing Boiler and Water Heater Combination

Date: Bid Date:  
Project #: Location:  
Project Name: Engineer:  
Contractor: Prepared By:

Model LMC 125 Indoor

## Specification

Contractor shall supply and install Qty.: \_\_\_\_\_ Laars Model No. LMC 125 modulating, combination boiler(s) with indirect water heating.

The boiler shall be a Laars Mascot II Model LMC 125, rated at the input and output shown on the schedule. The boiler shall modulate 20-100% of full fire. The unit(s) shall be design-certified to comply with the current edition of the Harmonized ANSI Z21.13 / CSA 4.9 Standard for Gas-Fired Low Pressure Steam and Hot Water Boilers. The unit(s) shall be designed and constructed in accordance with the ASME Boiler & Pressure Vessel Code, Section IV requirements for 30 psi (207 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 boiler shall be equipped with an ASME certified pressure relief valve set at 30psi (207kPa).

The boiler shall be listed with the U.S. Department of Energy as an Energy Star appliance. The boiler shall be listed with AHRI (Air Conditioning, Heating and Refrigeration Institute). The boiler shall have a minimum AFUE of 95%.

The water tube heat exchanger shall be stainless steel, rated for 30 psi (207 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 boiler shall be fully condensing design with built-in condensate drain and trap. The heat exchanger shall have a limited twelve-year warranty.

Boiler(s) shall provide 3.1 gpm of domestic hot water, at 75°F temperature rise, through a stainless steel domestic water heat exchanger. Domestic water heating shall have priority over the hydronic heating requirements. A flow switch shall initiate the call for domestic water.

Boiler shall be completely packaged with mounted and wired pump, domestic water heat exchanger and expansion tank inside the boiler jacket.

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

The boiler shall be sealed combustion, and opening of lower panel shall not affect the combustion seal. The boiler jacket shall be a unitized shell finished with acrylic thermo-set paint baked at not less than 325°F (163°C). Front cover shall be high quality textured plastic. The frame shall be constructed of galvanized steel for strength and protection. Chamber shall include a sight glass for viewing flame. Boiler shall be certified for zero clearance to combustible surfaces.

Boiler shall have a condensate trap that does not need to be primed and will not allow flue gases to pass back through unit.

Boiler 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, or to convert from Natural Gas to LP (or vice versa).

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

The boiler shall be designed for vertical or horizontal Category IV venting, up to 40 equivalent feet with 2" diameter PVC, CPVC or stainless steel vent material, or up to 40 equivalent feet, with 3"/5" stainless steel concentric vent material. Air may be taken from the room, or ducted directly to the boiler, using up to 40 equivalent feet with 2" diameter ABS, PVC, CPVC or galvanized pipe or up to 40 equivalent feet through a 3"/5" concentric vent system. The boiler shall be shipped with PVC sidewall vent and air terminals, for use with split vent/air systems. PVC adapters shall be shipped with each boiler.

Unit shall be 120VAC, single phase, 1.5 Amps (including mounted pump) for connection to a 15A breaker. The control circuit shall be 24VAC. A 3 ft. length 14 AWG plug-in line cord is included for connection to 120VAC/15A receptable.

The boiler control shall be an integrated electronic PID temperature and ignition control with LCD and touchpad and shall control the boiler operation and firing rate. The boiler display shall be visible without the removal of any jacket panels or control panels.

The control shall have the ability to control the boiler pump, system pump and indirect domestic water pump, each with delay features. The control shall be able to cascade and lead-lag with other Mascot II controllers, without additional system controllers.

The control shall have built-in outdoor reset feature with customizable reset curves, based on the outdoor temperature and desired system water temperature. The boiler shall be shipped with the outdoor reset 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 boiler from firing if temperature is excessive.

The control shall easily allow the user to force the boiler into minimum or maximum firing rate, for boiler setup and diagnostic purposes.

Control shall have 3 menu structures for user mode, setup mode and diagnostic mode.

Allowable control adjustments shall include: boiler temperature setpoint; domestic water temperature setpoint; °F or °C display; outdoor reset selection; low boiler setpoint temperature (for outdoor reset operation); boiler temperature at high outdoor temperature (for outdoor reset operation); boiler setpoint at low outdoor temperature (for outdoor reset operation); and automatic remote signal selection.

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In addition to the adjustable parameters, the control shall display the boiler's inlet water temperature, boiler temperature rise (delta-T), stack temperature, outdoor air temperature, firing rate indication in %, boiler high limit setpoint, flame sense signal, control alerts and control lockouts.

Control diagnostics shall include, at a minimum, the following: ignition failure, grounded flame rod, safety chain interrupt, boiler high limit exceeded, sensor errors (open or shorted), and fan speed proving rate failure.

*Standard features shall include:*

- 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 – 10ppm NOx
- Horizontal or vertical direct vent
- Vent and air pipe lengths of up to 40 equivalent feet (each)
- Horizontal vent and air terminals
- Stainless steel heat exchanger with welded construction
- ASME 30 psi (207kPa) working pressure heat exchanger
- ASME "H" stamp
- 30 psi (207kPa) ASME pressure relief valve
- Stainless Steel brazed-plate DHW heat exchanger with priority for on-demand hot water
- Boiler pump, wired and mounted inside jacket
- Expansion tank piped and mounted inside jacket
- Built-in condensate trap and drain, priming not required
- Automatic air vent
- Temperature and pressure gauge
- Boiler water pressure switch
- Blocked vent pressure switch
- Blocked condensate pressure switch
- Burner site glass
- Electronic PID modulating control
- Direct spark ignition
- Multiple pump control for boiler pump and system pump, each with delay
- Large user-interface and display
- Alarm output
- Accepts external (4-20mA or 0-10VDC) modulation signal
- Outdoor reset (sensor included)
- Vent temp auto turn-down before lockout
- Manual reset high limit
- Lighted on/off toggle switch
- Wall-mount template
- Field convertible between natural gas and propane
- Zero clearance to combustible surfaces
- 12-Year limited warranty