

# Laars Modulating Control

Date: Bid Date:  
Project #: Location:  
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Model MC4

## Specification

**General:** The control shall operate on 120 VAC, with a maximum power of 40 watts. The control shall operate between 20° and 130°F with an operating humidity of 20 to 80% RH (non condensing) with a storage temperature of no less than -4° to 180°F.

**Display:** The control shall have a four line by twenty character VFD display capable of displaying both numbers and characters. The display shall be visible with no ambient light. All control operation information shall be available for display. During times of inactivity, or 15 minutes after last user entry, the display shall enter a lower power mode. In this mode, the display shall reduce visible light output. The control shall exit this mode whenever button or digital encoder activity is sensed.

**User Information Entry:** The control shall use five push buttons and one rotary digital encoder for user parameter entry. User parameter entry shall be accomplished using a menu system.

**Network / Communications Capability:** The control shall have the option of being ordered with one of two alternate CPUs and communication boards, which will allow the user to control the MC4 through a BACNET or internet connection.

**Sensors:** Temperature sensors shall be of the thermistor type. Standard operating range shall be -30 to 250°F.

**External Shutdown:** The control shall accept a dry contact input to shut all boiler stages down. The control shall keep any boilers being shut down in low fire for 45 seconds before opening the limit circuit relay. The control shall accept a 4-20mA signal to change the temperature set point from a remote source. The range of the set point or reset point shall be adjustable from 100° to 240°F.

**Boiler Lockout Inputs:** The control shall be capable of accepting four dry closure type boiler lockout inputs.

**Hydronic Outdoor Reset:** The control shall be capable of resetting the temperature of heating water based on the outside temperature when an optional outdoor sensor is installed. All the following shall be user adjustable:

**Reset Ratio:** The control shall provide adjustable reset ratios from 4:1 (Outdoor Temperature:Water Temperature) to 1:4

**Offset:** The control shall provide an integral offset adjustment to parallel shift the selected reset curve. The range of settings shall be -40°F to 40°F.

**Outdoor Cutoff:** The control shall provide an adjustable outdoor temperature cutoff. The range of settings shall be -30°F to 75°F with two additional settings, ON and OFF.

**Minimum Water Temperature:** The control shall provide a minimum water temperature set point to limit the computed water temperature. The range of settings shall be 70°F to 180°F.

**Interface to Weather Actuated Controls:** The control shall be capable of connecting to the Heat-Timer HWR for hydronic water heating applications.

**Outputs:** The control shall have four normally open contacts that can be used to start/stop the burner. These outputs shall have a minimum current carrying capability of 5amps. The relays controlling these outputs shall be field replaceable. The control shall have four modulating outputs. These outputs shall be modules with two outputs per module. The control shall have the capability to operate modules having 0 – 5 volts, 0 – 10 volts, and 4 – 20 mA outputs. The control shall be capable of operating two different output groups. The control shall be capable of identifying the output module types and adjusting control methods accordingly. Where practical, the output modules shall be protected from accidental incorrect connection. Should damage occur, where practical, damage shall be confined to the output module.

**Additional Outputs:** The control must be able to accept an extension module to increase the capacity by an additional 8 stages. All of the functions of the extension module will be displayed on the main control.

**System Prove:** The control shall be capable of accepting a dry closure type system prove input. This shall prevent any stages from activating until the contact is closed.

**System Output:** The control shall have a set of N.O. contacts that shall close when the MC4 requires output. These contacts will remain closed for an adjustable period of time after the last stage is turned off.

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**User Parameters:** The control shall have the following user adjustable parameters:

**Sensor Set Point:** The control shall provide an integral sensor set point adjustment. The set point shall be adjustable in 1°F increments.

**Ignition Start Point:** Adjustable from 1 to 50%. This setting shall determine the position of the firing rate (fully modulating) motor at the time the burner is energized or de-energized. There shall be an independent adjustment of this setting for each burner.

**Modulation Start Point:** Adjustable from 0 to 100%. This setting shall determine the percent modulation a stage must achieve before the next stage is activated. There shall be an independent adjustment of this setting for each burner.

**Purge Timer:** Adjustable from 0- 10.0 minutes. This setting shall determine the delay time between a stage being energized and the beginning of modulation.

**Lag Stage Delay:** Adjustable from 0 to 60 minutes. The next stage in the rotation shall not be fired until the previous stage has remained in high fire for the period of time set by the Lag Stage delay.

**Setback:** Setback shall be adjustable from 0 to 75°F. This setting shall determine the °F drop from the primary set point whenever the setback mode is activated. The setback mode shall be activated by an external switch closure.

**Standby Timer:** Adjustable from 1 to 60 minutes. This setting shall determine the delay period that must elapse before any designated standby stages are activated. The timing sequence shall begin when all active stages reach 100% firing rate.

**System Delay:** Adjustable from 0 to 60 minutes. This timer shall start after the last stage has turned off. The System contacts will remain energized until the time period has ended.

**Rotation Mode:** The control shall be capable of the following rotations:

- Manual rotation
- Automatic rotation adjustable in one-hour increments from 1 hour to 7 days
- First on/First off

**Parallel Modulation Mode:** The control shall be capable of operating stages such that all active stages modulate at the same rate.

**Process Mode:** The control shall be capable of accepting a throttling range around the set point.

**Battery:** A lithium "coin" type battery shall be included to maintain all system parameters in the event of a power failure. Storage capacity shall be 100 days.