

HYDRONIC MODULATING SEQUENCING CONTROLS

With

- Modulate 4-Boilers using PID Logic
- Sequence Boilers based on Reset or Set Point
- Outputs 4-20mA, 0-10V, 0-5V, 2-10V, and 1-5V Signals

- Parallel or Normal Modulation
- Domestic Hot Water with Priority Option
- Add more Boilers using Mini-Extensions up to 16 Boilers

Mini-MOD and Mini-Extension

Description:

A Multiple-Boiler Modulating Control for Hydronic Heating Systems Based on Outdoor Reset or a Set Point. The Mini-MOD Control provides buildings with comfortable, even heat, while maximizing fuel savings. In addition, it incorporates many additional features and flexibilities that can be customized to each application's unique characteristics.

- **Hydronic Heating using Outdoor Reset or Set Point.** The Mini-MOD control is designed to modulate multiple hot water boilers. It can operate based on Outdoor Reset or a Set Point. Each of the options has a set of pre configured, but adjustable settings to meet the precise needs of each heating application.
- **Multiple Rotation Options.** The Mini-MOD can rotate the lead boiler to promote even wear on each boiler. It has three rotation options; Timed rotation that is adjustable from One hour to 60 Days, Manual rotation, and Last-On/Last-Off.
- **Current Voltage Signal Modulation.** Each of the outputs can be configured independently. That is, a single Mini-MOD can control multiple boilers different modulation requirements.
- **Adding Boilers.** The Mini-MOD controls up to four boilers. However, it can be connected to up to two additional Mini-Extension panels, each with 6 stages. This allows the Mini-MOD to modulate and manage up to 16 total boilers.
- **Parallel or Normal Modulation.** An advanced PID logic has been developed to provide an efficient, smooth, and adjustable modulation that can fit most applications whether the boilers are to sequence normally, one after the other, or in parallel. With numerous configurable parameters like; Last Stage Hold and Soft-Off to eliminate the lead boiler short cycling; Lag Delay to eliminate lag boilers short cycling. The PID logic can be adjusted to meet your specific heating application.
- **System Output with Adjustable Run-On Delay.** The Mini-MOD has a System Output relay the can be configured to run a system pump or combustion air damper. The relay can be adjusted to operate during boiler operation or when below a specified Outdoor Cutoff.
- **Digital Display.** The Mini-MOD's bright graphical digital display names each system parameter in plain English and shows its precise value. The easy to follow menu system allows



users to quickly make changes to any system setting without having to learn any codes or keyboard commands. The new brightly lit LCD display can be viewed from a distance in dimly lit boiler rooms.

- **Communicate with EMS (Energy Management Systems)** The Mini-MOD with its built-in Shutdown and Prove inputs, is capable of connecting to and being controlled by an EMS or other controller.
- **Day and Night Schedule.** The control has an adjustable Night Setback setting to help reduce fuel consumption. The built-in schedule can be used to customize the operation for even further temperature control and fuel savings.
- **Boost.** To bring a building quickly back to comfortable temperatures after the cooler night period, the control has a built-in Boost feature. The Boost allows the system to rise to an increased temperature for a period of time.
- **Standby Boilers.** Each boiler can be set individually to be automatically operated, fully on, manually adjusted, off, or be considered a Standby boiler. The Standby boiler option puts the boiler in as a backup with an adjustable standby delay. This feature is great for less efficient boilers that can be used in periods of high demand.
- **Domestic Hot Water.** It can be configured with Domestic Hot Water call option. It will increase system water temperature when Domestic Hot Water is needed. In addition, it allows for optional priority of the domestic hot water over heating.

Features:

- **Built-in Outdoor Reset or Set Point** - That, combined with the PID sequencing makes the Mini-MOD the control of choice for a variety of Hydronic applications.
- **Minimum and Maximum System Temperature Adjustment** - Another safety feature that adds to boiler and system protection. The Minimum Temperature should be set to manufacturer's suggested minimum boiler temperature. When in Reset Mode, the Maximum Temperature is to protect system components from excessive heat.
- **Multiple Rotation Options** - The Mini-MOD will rotate boilers using a variety of options. Either based on Time; ranging from 1 hour to 60 days in one hour increments, Last-On rotation; allows for the first boiler to fire to be the first boiler to turn off, and finally, manual rotation.
- **Standby Boiler with Delay** - Now you can set individual boilers to be either continuously On, Off, or adjusted manually to a specific modulation percent in addition to the Automatic option. In addition to the capability of Standby boiler, the Mini-MOD includes an adjustable Standby Delay.
- **Adjustable Pump Delay.** - Allows the System Pump an additional Run-On time to disburse residual heat in boilers.
- **Normal and Parallel Modulation** - Depending on the types of boilers the Mini-MOD is to control, it allows for two modes of modulation. Normal modulation will add boilers as more energy is needed. However, Parallel modulation will benefit high turndown ratio and lower water content boilers.
- **External Setback/Scheduling** - External Setback signal acceptance has been provided as an option for applications that are not to follow a predetermined schedule. In addition, an adjustable Day/Night schedule has been provided primarily for building heating.
- **Individual Boiler Modulation Adjustment** - Each Boiler controlled by the Mini-MOD has a set of configurable settings that allows it to respond differently from the rest. A very beneficial feature when controlling different sizes or models of boilers.
- **Domestic Hot Water Priority Option** - On a DHW Call the Mini-MOD will increase system temperature. Depending on the Priority setting, the Mini-MOD will either dedicate all output to domestic hot water alone or in addition to heat (leaving system pump running during DHW call).
- **Featured Adjustments:**
 - **Lag Delay** - Helpful in reducing lag boiler short cycling, it allows the lag boiler an adjustable period of time before starting.
 - **Last Stage Hold** - A temperature add-on to the Set Point that is applied only to the lead boiler to eliminate its short cycling. A helpful when one boiler at low fire is too large in light load conditions.
 - **Soft-Off Delay** - Providing an additional on period of time to boilers before turning off, this feature help stabilize operation output.
 - **Purge Delay** - An adjustment to match boiler pre-purge for better control.
- **Built-in Prove and Shutdown** - The Prove can be used to check the status of other equipment, such as the end switch on a combustion air damper prior to firing the boilers. Furthermore, Shutdown can be activated from any safety control feed back.
- **Security** - The Mini-MOD has an integral programming switch that can only be accessed when wiring cover has been unlocked and removed.

Item Description

Part

Mini-MOD

926710-00

Mini-Extension

926712-00

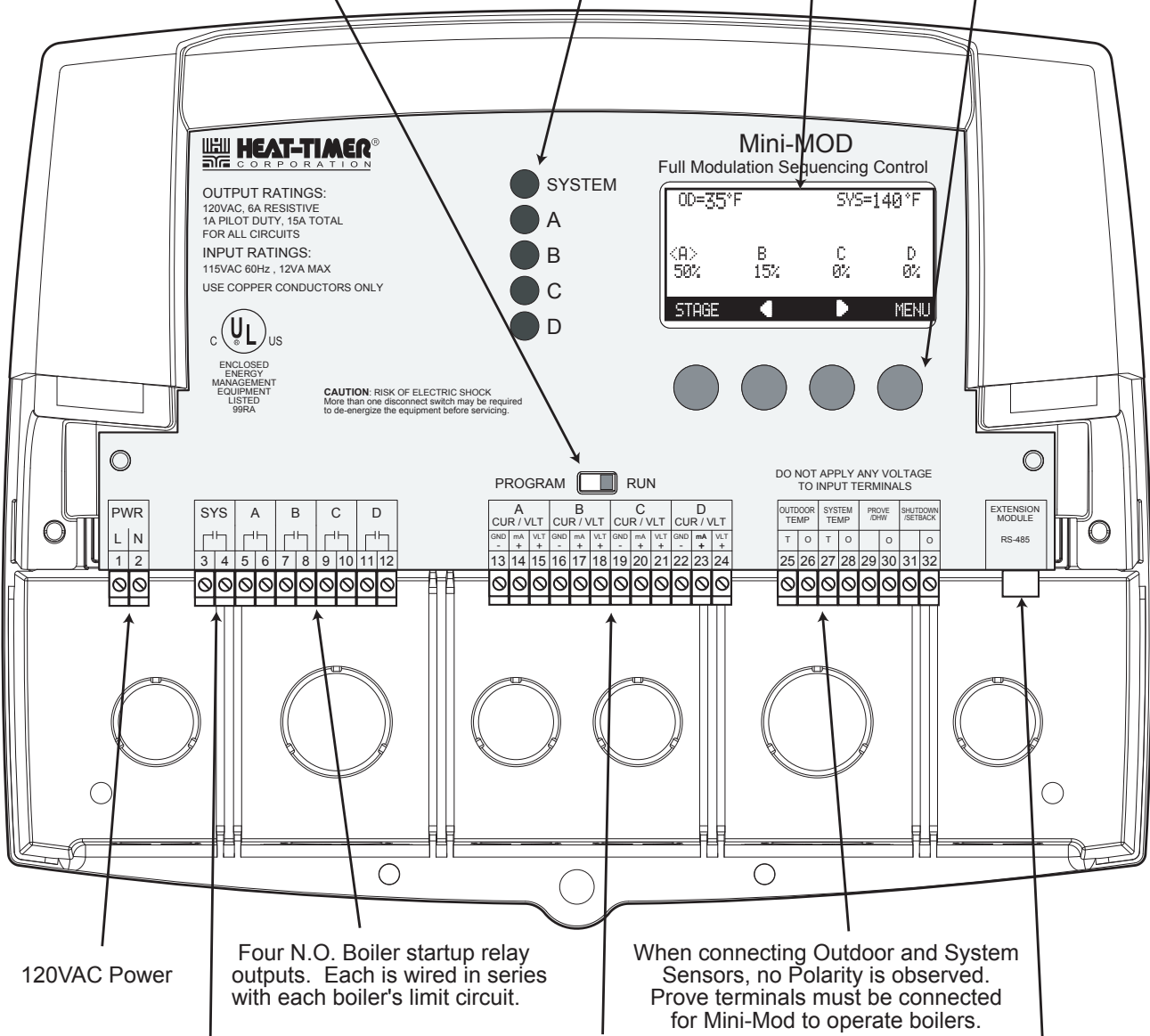
MINI-MOD PANEL

Program Switch to restrict access to function changes. This switch is covered with Wiring Enclosure.

The digital display shows the system status, set point, lead stage <in brackets>, and status of each stage. To view and adjust settings, press the appropriate buttons.

LED indicates the associated relay status.

Buttons function is presented on Bottom Row of display.



120VAC Power

Four N.O. Boiler startup relay outputs. Each is wired in series with each boiler's limit circuit.

When connecting Outdoor and System Sensors, no Polarity is observed. Prove terminals must be connected for Mini-Mod to operate boilers.

System Output controls pumps, valves, or other system components.

Four modulation outputs can be 0-5V, 0-10V, 1-5V, 2-10V, or 4-20ma. Go to Startup Menu to determine the type of output for each stage.

Connect Extension panels to add additional stages using a 6 pin phone line only (cable provided with Mini-Extension).

ISO 9001:2000
CERTIFIED

Specifications:

Voltage Input:	120 VAC 60 Hz
Power Consumption:	12 VA Max
Operating Temperature:	20°F to 130°F
Operating Humidity:	20% to 80%
Dimensions:	11"W x 9" H x 3 ¾"
Weight:	2.5 pounds

Mini-MOD Specifications:

Lead Stage Rotation:	Time (1 to 1440 Hours (60 days)), Manual, Last-On
Pump Output:	1 N.O. S.P.S.T
Boiler Modes:	Auto, Manual, Standby, On, Off
Standby Time:	1 to 60 minutes
Modulating Output Types:	.4-20mA, 0-5V, 0-10V, 1-5V, 2-10V
Output Relay Ratings:	1 Amp inductive, 6Amp resistive at 120 VAC 60 Hz, 15A total for all circuits
Add-On Mini-Extension Panels:	up two Mini-Extension Panels using RS485
Ignition Point %:	1 to 50%
Modulation Start Point %:	0 to 100%
Modulation Modes:	Normal or Parallel
Temperature Display:	Fahrenheit or Celsius.
Display:	Graphical Alphanumeric (7 rows x 21 char. each)
LED:	1 System Output relay, 4 Boiler Output relays
Sensor Ranges:	Outdoor temperature sensor - minus 35°F to 250°F Heating system sensor - minus 35°F to 250°F
Outdoor Cutoff Range:	20°F to 100°F, ON and OFF
Reset Ratio Range:	(1:4) to (4:1) (Outdoor : System Water)
Offset Adjustment:	minus -40°F to plus 40°F
Minimum Water Temperature:	70°F to 170°F
Maximum Water Temperature:	90°F to 240°F
Domestic Hot Water:	with Priority or without Priority
Pump Run-On:	0 to 60 minutes
Purge Delay:	0.0 to 10.0 minutes
Lag Delay:	0 to 60 minutes
Last Stage Hold:	0 to 30°F
Schedules:	1 Day and 1 Night (Setback) settings per day
Night Setback:	0°F to 75°F
Power Backup:	Lithium coin battery, 100 days minimum 5 year replacement (Maintains Clock in power outages).
External Inputs:	Shutdown Input, and Prove Input. (Dry Contacts Only)
Season:	Winter and Summer.

Mini-Extension Specifications:

Extension Numbering:	Toggle Switch A or B
LED:	1 Power (Dual Color Red/Green), 1 Communication, 6 Boiler Output relays(Dual Color Red/Green)
Boiler Outputs:	6 N.O. S.P.S.T.
Modulating Output Types:	.4-20mA, 0-5V, 0-10V, 1-5V, 2-10V
Output Relay Ratings:	1 Amp inductive, 6Amp resistive at 120 VAC 60 Hz, 15A total for all circuits
Connection to Mini-MOD and another Mini-Extension:	Two RS485