

Engineered for Raypak® Boilers & Water Heaters

# Electronic Temperature Controllers



The Hot Water Management Experts

# Y-200

## Multi-Stage Sequencer

Designed for use with single or multiple space heating or hot water supply systems, the Y-200 is offered in 4- and 8-stage configurations and is available loose or factory-mounted on **Hi Delta** or **Raytherm** boilers, and loose on **MVB** boilers. It is expandable up to 40 stages using an 8-stage master control with up to four 8-stage slave controls. It monitors and displays supply temperature on all applications including outdoor temperature when the appropriate reset mode is selected. In addition, Y-200 offers state-of-the-art PID logic and selectable lead-lag, manual override and outdoor reset.

Options include a build-in modem, remote set point and LonWorks® module that controls multiple boilers with one LonWorks control interface. Housed in a NEMA 3R enclosure, the Y-200 is suitable for outdoor installations.



### Features

- 4 or 8 boilers/stages, expandable to 40
- Selectable P or PID logic
- LCD display
- NEMA 3R enclosure
- System water and outdoor air sensors
- 365-day time clock
- Auto/manual lead-lag and enable/disable functions
- Manual override
- Password protection
- 120 VAC, 60 Hz, 0.5A supply power requirement
- Relay Ratings - 10A @ 250 VAC
- Lockable enclosure
- UL and cUL approved

### Options

- Remote setpoint (2-10 VDC or 4-20 mA)
  - Modem
  - Auxiliary contacts
  - Alarm bell
  - LonWorks® module
- Only multi-boiler sequencer LonMark® certified for LonWorks protocol interoperability. Proper order for Standard Network Variable Types (SNVT\_) tags ensures smooth implementation. No external gateway required.

### Programmable Functions

- Adjustable outdoor reset ratio (0.01:1 to 20:1)
- Min. system water temperature (40 °F)
- Max. system water temperature (235 °F)
- Automatic/manual lead-lag (0 to 100 hrs.)
- Control band (0.5 to 10 °F)
- Initial setpoint (40 to 235 °F)
- Outdoor cutoff (32 to 200 °F)
- Outdoor cutoff deadband (1 to 10 °F)
- Morning boost
- Alternate setpoint
- Night setback
- Adjustable PID
- Boiler-on delay (0 to 5 min.)
- Stage-on delay (0 to 60 sec.)
- System pump-off delay (0 to 10 min.)
- Temperature measurement (°F or °C)

#### Ordering Information

Option No.	Description
Y-241	4-stages
Y-281	8-stages



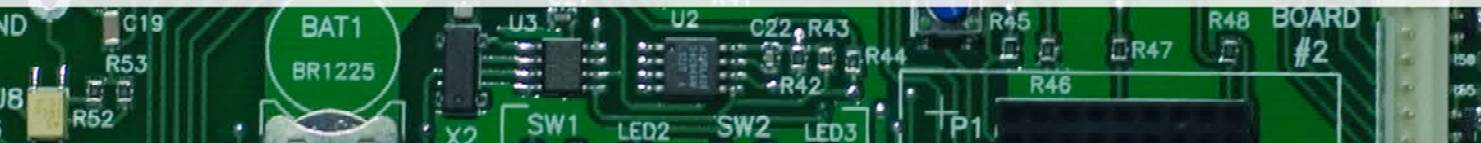
# Electronic Temperature Controllers

Engineered for Raypak® Boilers & Water Heaters

## Leading-Edge Controllers

For over 60 years, Raypak's low-mass, high-recovery designs have set the standard for hot water space heating/supply boilers. To optimize performance and take full advantage of its boilers' many benefits, Raypak developed its own specialized controllers whenever standard commercial versions were not adequate. In the 1950s, Raypak led the way in load-tracking modulation, utilizing the ModuSnap controller with its Raytherm boilers. In the early 1980s, Raypak introduced the B-6000, the first true electronic central boiler/BMS system for modulating boilers.

Today, Raypak's array of temperature controllers offers such state-of-the-art features as: sequence-control of up to 40 boilers; PID technology (see below); optimized approach to outdoor reset; LonWorks or Building Management System interfacing; modulation or stage-firing control; and other energy-saving functions. **Unlike off-the-shelf controllers, Raypak's five controller models have been specially designed to maximize the performance of its leading-edge boiler systems.**



## The Right Boiler for the Right Application

### Raytherm® series



Rugged, outdoor proven even in the toughest environments, offers exceptional value while being the simplest unit to commission and maintain. With its atmospheric-burner, horizontal water-tube design and standard Category I (B-vent) venting for indoor applications, installation is familiar and trouble free.

### Hi Delta® series



Also with a horizontal water-tube design, the unit features 100% fan-assisted combustion in on-off or multi-stage configurations. With multiple venting options and efficiencies that range from 84% to 87%, Raypak has you covered. Full onboard diagnostics in real English. Low NOx compliant in all 50 states.

### MVB® series



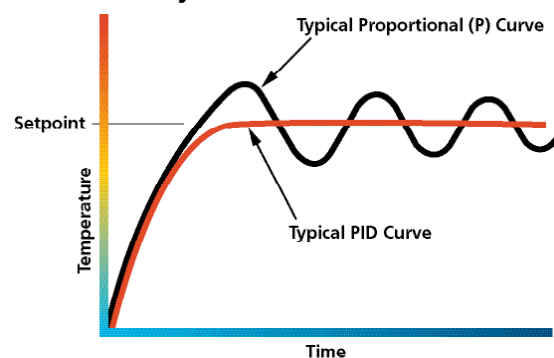
A vertical-tube boiler with a modulating (4:1), fan-assisted burner offers the smallest (5.4 square feet) installed footprint of its kind and efficiencies of 84% (Cat I) or 87% (Cat IV). Full onboard diagnostics in real English, storing up to 16 reported faults. Low NOx compliant in all 50 states. Lowest required minimum inlet temp 120°F. Fits through a 30" door.

### XTherm™ and XFyre™ series



XTherm™ vertical condensing boiler and XFyre™ mod-con style boilers offer efficiencies up to 99% as well as PVC venting options. CSA outdoor and indoor rated. True modulation 4:1 XTherm and 5:1 XFyre. Low NOx compliant in all 50 states. XFyre has built-in cascade control for up to 8 units. Full onboard diagnostics in real English

## Using PID Technology to Maximize Performance and Efficiency



Raypak controllers feature state-of-the-art PID technology, an application of Proportional, Integral and Derivative functions in varying algorithms to optimize system performance. Other controllers on the market either do not utilize PID technology or use only the Proportional (P) function (the component that controls output in proportion to how far the monitored point is from the target temperature). Raypak's controller series also makes use of the Integral (I) function which factors in the time it takes to reach the target temperature and enhances the proportional response accordingly. Add to this the Derivative (D) function which monitors how quickly the monitored point is approaching or drifting away from the target temperature. With all three functions, a properly designed PID-based control achieves set point quickly and levels off at the target temperature with minimal over- or under-shooting. The result is maximum system efficiency and performance.

## Controller Applications & Boiler Compatibility At-A-Glance:

Controller	Applications		Boilers/Water Heaters			
	Space Heating	Hot Water Supply	MVB	Hi Delta	Raytherm	XTherm
TempTracker	●	●		●	●	
TempTracker Mod	●	●	●		●	●
TempTracker Mod+ Hybrid	●	●	●	●	●	●
Y-200	●	●	●	●	●	●
RayTemp		●	●	●	●	●

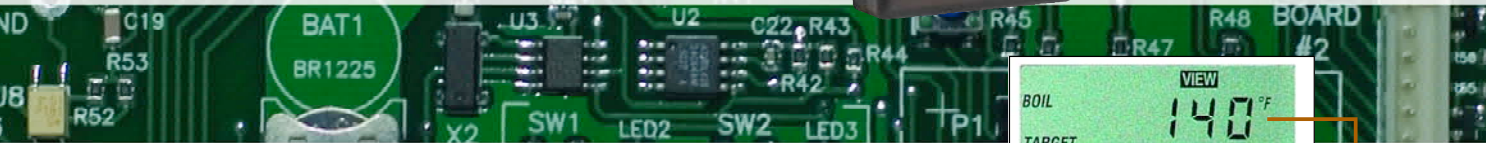
# TempTracker | TempTracker Mod

## Multi-Stage Controller | Modulating Boiler Controller

TempTracker stage-controllers are designed to sequence multiple boilers up to four total stages, whether it's one to four on/off boilers, two two-stage boilers, or one boiler with up to four stages. They are available factory-mounted or loose on **Hi Delta** boilers, and loose on **Raytherm** boilers.

TempTracker Mod is a single-boiler modulating control that is integral to the **MVB** and **XTherm**, optional on **Raytherm**.

Both controls can be used for space heating and hot water supply with eight application-specific modes to meet various applications, including outdoor reset for heating systems. The controls monitor and display inlet and outlet temperatures on all applications as well as monitor outdoor temperature when an outdoor reset mode is selected.

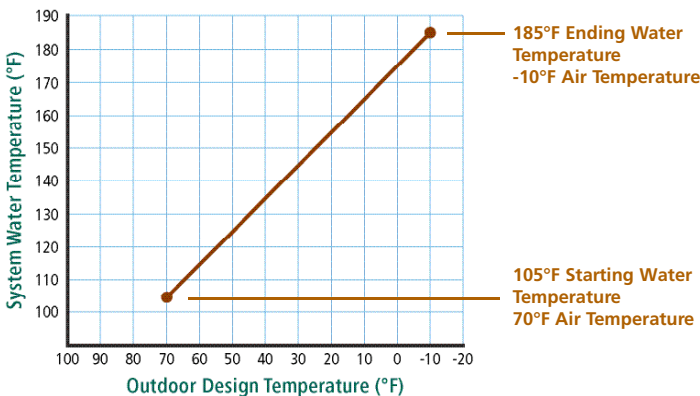


## Features

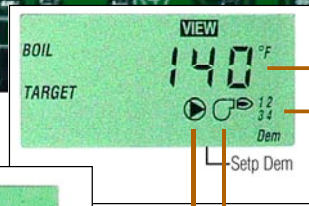
- TempTracker - 1-4 boilers/stages
- TempTracker Mod - 1 MVB (modulating) boiler, XTherm and Raytherm
- Selectable P or PID logic
- LCD display
- NEMA 1 enclosure
- Boiler inlet and outlet water sensors
- System water sensor
- Outdoor air sensor optional
- Alarm ready (pilot duty)
- CSA approved
- 24 VAC, 60 Hz, 3 VA supply power requirement
- Relay Ratings
  - Stage 1: 5A @ 120 VAC
  - Stages 2 to 4: 3A @ 120 VAC
- Limp-Along Feature- Ability to operate with as few as 1 of the 3 water sensors. Provides service indication when a sensor fails.
- BMS 0-10VDC setpoint control
- BMS 0-10VDC firing rate control

## Fully Adjustable Outdoor Reset Slope

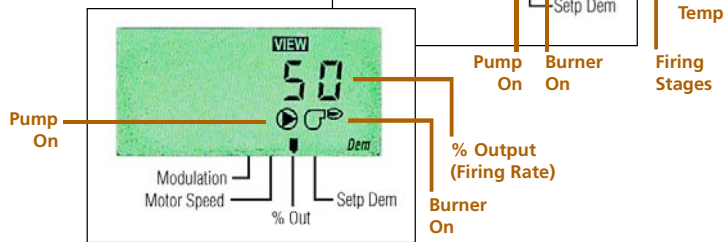
Raypak's custom software allows for complete adjustment of the outdoor reset slope start and end points.



At right: TempTracker, Target Temperature View



Current Target Temperature



Above: TempTracker Mod, % Output View

## Programmable Functions

- 8 programming modes for TempTracker and TempTracker Mod
- Adjustable outdoor reset ratio
- Min. system water temperature (70 °F)
- Max. system water temperature
  - Heating: 220 °F
  - DHW: 190 °F
- Temperature differential (2 to 42 °F)
- Boiler target (70 to 220 °F)
- Outdoor cutoff (35 to 85 °F)
- Boiler mass (low, med, high)
- Stage-on delay (P mode) (10 sec. to 8 min.)
- System pump-off delay (0 to 20 min.) Stage Control only
- Temperature measurement (°F or °C)
- Boiler pump off delay (0 to 20 min.) Mod Control

## Ordering Information (TempTracker)

Option No.	Description
B-26	2-stage setpoint
B-27	2-stage outdoor reset
B-21	4-stage setpoint
B-23	4-stage outdoor reset
B-40	Raytherm Mod
B-41	Raytherm Mod outdoor reset

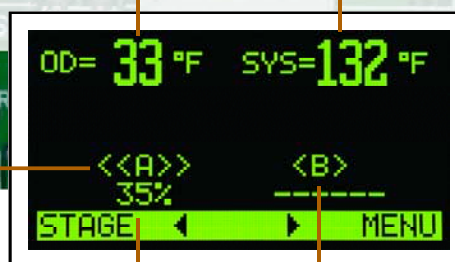
# TempTracker Mod+ Hybrid

## Multi-Boiler Modulating Controller

The TempTracker MOD+ Hybrid is available as a loose option and controls up to four MVB, XTherm, XFyre and Raytherm boilers for precise load tracking of space heating and hot water supply systems. Expand the control to 16 boilers by adding up to two six-boiler expansion modules. TempTracker Mod+ monitors and displays supply water temperatures on all applications including outdoor temperature when outdoor reset mode is selected. As an added feature, this model offers PID logic as well as automatic or manually selectable lead-lag boiler operation. During boiler servicing or in the event of a controller problem, a manual override feature can be activated to bypass programmed operation.



Outdoor Temperature      System Temperature



Boiler      Firing Rate      Lead Boiler  
(Indicated by parenthesis)

At right: TempTracker Mod+, Standard View

## Features

- 1-4 boilers, expandable to 16 with optional expansion modules
- Selectable P or PID logic
- LCD display
- NEMA 1 enclosure
- System water and outdoor air sensors
- 365-day time clock
- Auto/manual lead-lag and enable/disable functions
- Manual override
- DHW override
- Lockable enclosure
- UL and cUL approved
- 120 VAC, 60 Hz, 12 VA supply power requirement
- Relay ratings - 1A inductive; 6A @ 120 VAC 15A total for all circuits
- Remote Setpoint (4-20 mA)
- Raypak has highly customized the TempTracker Mod+Hybrid to maximize the overall system efficiency when used with our boilers and water heaters.
- Hybrid control function for multi boiler installations using condensing and non-condensing boilers.

## Programmable Functions

- Selectable modulating outputs (4-20 mA, or 0-10 VDC)
- Adjustable outdoor reset ratio (1:4 to 4:1)
- Min. system water temperature (70 to 180 °F)
- Max. system water temperature (90 to 240 °F)
- Automatic/manual lead-lag (1 to 1440 hrs.)
- Initial setpoint (70 to 240 °F)
- Outdoor cutoff (20 to 100 °F)
- Morning boost (30 min.)
- Night setback (0 to 75 °F)
- DHW override (with or without priority)
- System sensor gain (-5 to +5 °F)
- Outdoor sensor offset adjustment (-5 to +5 °F)
- Boiler gain (-10 to +10 °F)
- Boiler-on delay (0 to 60 min)
- System pump-off delay (0 to 360 min)
- Standby boiler delay (1 to 60 min)
- Temperature measurement (°F or °C)



Hybrid system using 2-MVB's and 1-XTherm

## Ordering Information

Option No.	Description
B-36	4 boilers
B-37	10 boilers
B-38	16 boilers
B-39	Remote setpoint module

# RayTemp™

## Demand-Based DHW Controller

RayTemp is a demand-based stage set point reset controller for use with single or multiple Raytherm, Hi Delta and MVB hot water supply heaters and is available factory-mounted and -wired in Hi Delta units or loose for remote-mounting in single or multiple Hi Delta, MVB or Raytherm systems. RayTemp adjusts water temperature based on system demand to minimize energy consumption during off-peak times. It monitors daily and weekly hot water usage, modifying supply water temperature based upon the most recent history. As a result, unnecessary standby losses, the biggest contributor to energy waste, are eliminated. RayTemp also provides data logging capability for viewing and the ability to download up to 12 months of performance history.

Consult your local utility for possible rebates applicable to demand-based controllers, such as RayTemp.

All RayTemp models are eligible for the maximum California Energy Rebates.



## Features

- 2 or 4 heaters/stages
- PID logic
- LCD display
- NEMA 1 enclosure
- Tank and building return sensors
- Demand profile memory
- Data logging and downloads
- Password protection
- Lockable enclosure
- Supply power requirements  
Heater-mounted: 24 VAC, 50/60 Hz, 0.8 A  
Wall-mounted: 120 VAC, 50/60 Hz, 0.17 A
- Relay ratings - 1.5A @ 24 VAC

## Programmable Functions

- Up to 4 stages of control
- Lead/Lag
- Morning boost and night setback
- 7-day learning cycle

### Ordering Information

Option No.	Description
B-24	2-stages
B-25	4-stages

## Options

- Modem for remote monitoring and fault notification  
4-Stage model only (B-25)



**Raypak, Inc.**  
2151 Eastman Avenue  
Oxnard, CA 93030  
(805) 278-5300 • phone  
(805) 872-9725 • fax

[www.raypak.com](http://www.raypak.com)