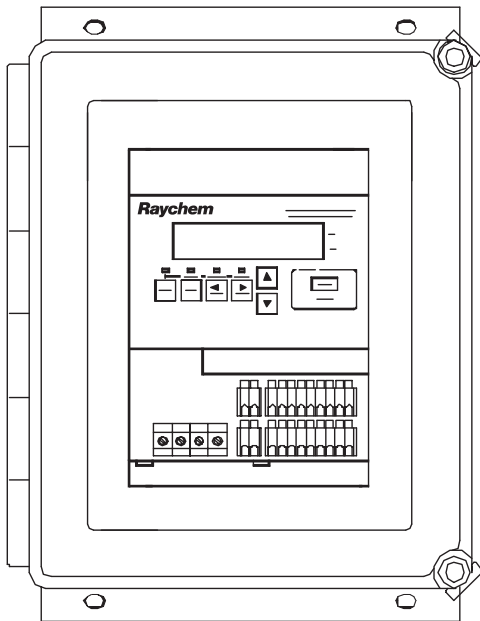


SINGLE-POINT HEAT-TRACING CONTROL SYSTEM



910*E1FWL*SSR2

PRODUCT OVERVIEW

The nVent RAYCHEM 910 is a compact, full-featured, microprocessor-based, single-point heat-tracing control system. The 910 provides control and monitoring of electrical heat-tracing circuits for both freeze protection and temperature maintenance, and can be set to monitor and alarm for high and low temperature, high and low current, ground-fault level, and voltage.

The RAYCHEM 910 controller is available with two output types: an electromechanical relay (EMR) for use in nonhazardous locations, and a solid-state relay (SSR) for use in nonhazardous and Class I Div. 2 / Zone 2 hazardous locations. Communications modules are available for remote control and configuration, complete with RAYCHEM Supervisor software capability.

Control

The RAYCHEM 910 measures temperature with one or two 3-wire 100-ohm platinum RTD(s) connected directly to the unit. The controller may be used in line-sensing, ambient-sensing, proportional ambient-sensing, and power-limiting modes.

Monitoring

A variety of parameters are measured, including ground fault, temperature, and current to ensure system integrity. The system can be set to periodically check the heating cable for faults, alerting maintenance personnel of a heat-tracing problem.

Both an isolated solid-state triac relay and a dry contact relay are provided for alarm annunciation back to a distributed control system (DCS).

Ground-fault protection

National electrical codes require ground-fault equipment protection on all heat-tracing circuits. The RAYCHEM 910 controllers incorporate the ground-fault sensing, alarm, and trip functionality internally. Heat-tracing circuits equipped with RAYCHEM 910 controllers do not require additional ground-fault detection equipment, simplifying installation and reducing costs.

Installation







The RAYCHEM 910 unit comes ready to install right from the box, eliminating the need for custom panel design or field assembly. The TYPE 4X-rated FRP or stainless steel enclosure is approved for use in indoor and outdoor locations. Wiring is as simple as connecting the incoming and outgoing power wiring (up to 277 Vac) and an RTD.

The RAYCHEM 910 operator interface includes LED displays and function keys that make it easy to use and program. No additional handheld programming devices are needed. Alarm conditions and programming settings are easy to interpret on the full-text front panel. Settings are stored in nonvolatile memory in the event of power failure.

Communications

RAYCHEM 910 units may be networked to a host PC running Windows®-based RAYCHEM Supervisor software for central programming, status review, and alarm annunciation. RAYCHEM 910 units support the Modbus® protocol and may be ordered with an RS-485 communications interface.

GENERAL

Area of use	Nonhazardous locations (EMR versions) Nonhazardous and Division 2 hazardous locations (SSR versions)				
Approvals	<table><tr><td>Nonhazardous locations (SSR and EMR versions)</td><td>Hazardous locations (SSR versions only)</td></tr><tr><td></td><td> Class I, Div. 2, Groups A, B, C, D Ex nA IIC T-code: T4</td></tr></table>	Nonhazardous locations (SSR and EMR versions)	Hazardous locations (SSR versions only)		 Class I, Div. 2, Groups A, B, C, D Ex nA IIC T-code: T4
Nonhazardous locations (SSR and EMR versions)	Hazardous locations (SSR versions only)				
	 Class I, Div. 2, Groups A, B, C, D Ex nA IIC T-code: T4				
Supply voltage	100 Vac to 277 Vac, +5 / -10%, 50/60 Hz Common supply for controller and heat-tracing circuit				

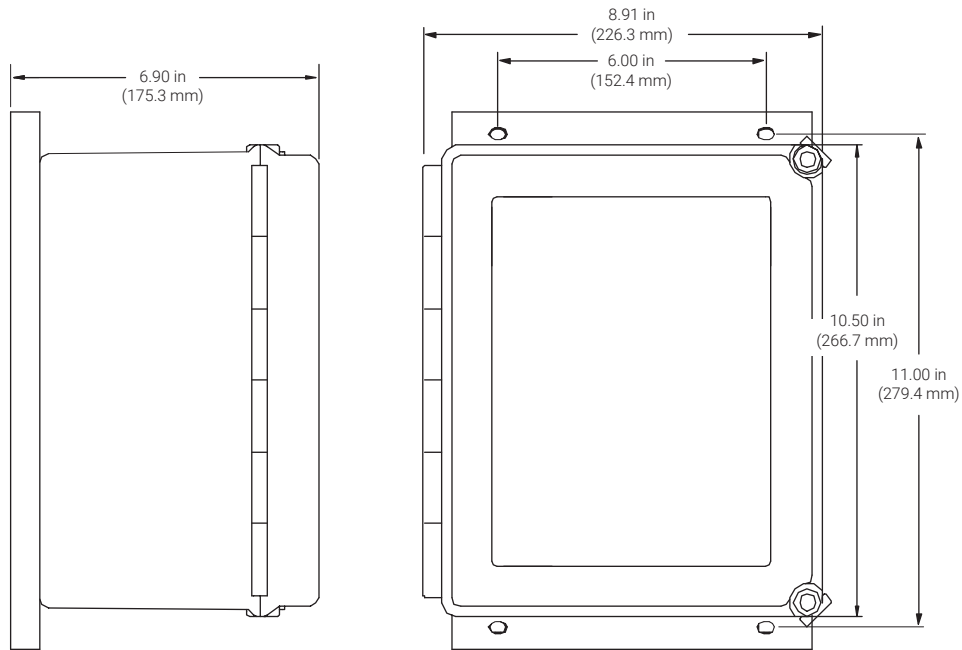
ENCLOSURE

Protection	TYPE 4X
Materials	FRP or stainless steel
Ambient operating temperature range	-40°F to 140°F (-40°C to 60°C)
Ambient storage temperature range	-40°F to 185°F (-40°C to 85°C)
Relative humidity	0% to 90%, noncondensing

CONTROL

Relay type	Double-pole, mechanical (EMR versions) Double-pole, solid-state, normally open (SSR versions)
Voltage, maximum	277 Vac nominal, 50/60 Hz
Current, maximum	30 A @ 104°F (40°C) derated to 20 A @ 140°F (60°C) (EMR) 30 A @ 104°F (40°C) derated to 15 A @ 140°F (60°C) (SSR)
Control algorithms	EMR: Line sensing on/off, proportional ambient SSR: Line sensing on/off, proportional, proportional ambient, power limiting, soft start
Control range	-76°F to 1058°F (-60°C to 570°C)

TYPICAL ENCLOSURE DIMENSIONS



910*E1FWL*SSR2 shown

MONITORING

Temperature	Low alarm range	-76°F to 1058°F (-60°C to 570°C) or OFF
	High alarm range	-76°F to 1058°F (-60°C to 570°C) or OFF
Ground fault	Alarm range	20 mA to 250 mA or OFF
	Trip range	20 mA to 250 mA or OFF
Current	Low alarm range	0.3 Amps to 100 Amps or OFF
	High alarm range	0.3 Amps to 100 Amps or OFF
	Power limit	3 W to 33 kW
Voltage	Low alarm range	10 V to 330 V or OFF
	High alarm range	10 V to 330 V or OFF
Resistance	Low resistance range	1% to 100% of deviation from nominal
	High resistance range	1% to 250% of deviation from nominal
Autocycle	Diagnostic test interval adjustable from 1 to 240 minutes or 1 to 240 hours	

TEMPERATURE SENSOR INPUTS

Quantity	Two inputs standard
Types	100 Ω platinum RTD, 3-wire, $\alpha = 0.00385$ ohms/ohm/°C Can be extended with a 3-conductor shielded cable of 20 Ω maximum per conductor 100 Ω Ni-Fe RTD, 2-wire

ALARM OUTPUTS

AC relay	Isolated solid-state triac, SPST, 0.75 A maximum, 100 Vac to 277 Vac nominal
Dry contact relay	Pilot duty only, 48 Vac/dc, 500 mA maximum, 10 VA maximum resistive switching

Note: Outputs are configurable as "open on alarm" or "close on alarm"

PROGRAMMING AND SETTING

Method	Programmable keypad
Units	°F or °C
Digital display	Actual temperature, control temperature, heater current, voltage, resistance, ground fault, programming parameter values, alarm values
LEDs	Current mode, heater on, alarm condition, receive / transmit data
Memory	Nonvolatile, restored after power loss, checksum data checking
Stored parameters (measured)	Minimum and maximum process temperature, maximum ground-fault current, maximum heater current, power accumulator, contactor cycle count, time in use
Alarm conditions	Low / high temperature, low / high current, low / high voltage, low / high resistance Ground-fault alarm, trip RTD failure, loss of programmed values, or EMR or SSR failure
Other	Multi-language support Password protection

CONNECTION TERMINALS

Power supply input	Screw terminals, 22–8 AWG
Heating cable output	Screw terminals, 22–8 AWG
Ground	Two box lugs, 14–6 AWG
RTD/alarm/communications	28–12 AWG spring clamp terminals

MOUNTING

FRP enclosure	Surface mounting with four fixing holes on 6.0 in x 11.0 in (152 mm x 279 mm) centers. Hole diameter: 0.31 in (8 mm)
SS enclosure	Surface mounting with four fixing holes on 5.31 in x 11.4 in (135 mm x 290 mm) centers. Hole diameter: 0.25 in (6.4 mm)

COMMUNICATIONS (OPTIONAL)

Protocol	Modbus RTU or ASCII / HTCSbus
Topology	Multidrop, daisy chain
Cable	Single shielded twisted pair, 26 AWG or larger
Length	1.7 miles (2.7 km) maximum @ 9600 baud
Quantity	Up to 32 devices without repeater
Address	Programmable

ORDERING DETAILS

RAYCHEM 910 Single-point Heat-Tracing Control System

Description	Catalog number	Part number	Weight/lbs
RAYCHEM 910 controller in an 8 in x 10 in FRP enclosure with window. 2-pole 30 A EMR. Controls a single circuit with a 2-pole electromechanical relay. (Approved for nonhazardous locations only)	910*E1FWL*EMR2	10170-001	15
RAYCHEM 910 controller in an 8 in x 10 in FRP enclosure with window. 2-pole 30 A EMR. Controls a single circuit with a 2-pole electromechanical relay. Includes an isolated 2-wire RS-485 communication option. (Approved for nonhazardous locations only)	910*E1FWL*EMR2*485	10170-015	15
RAYCHEM 910 controller in an 8 in x 10 in FRP enclosure with window. 2-pole 30 A 277 V SSR. Controls a single circuit with a 2-pole solid-state relay. (Approved for Class I, Div. 2 locations)	910*E1FWL*SSR2	10170-002	20
RAYCHEM 910 controller in an 8 in x 10 in FRP enclosure with window. 2-pole 30 A 277 V SSR. Controls a single circuit with a 2-pole solid-state relay. Includes an isolated 2-wire RS-485 communication option. (Approved for Class I, Div. 2 locations)	910*E1FWL*SSR2*485	10170-016	20
RAYCHEM 910 controller in an 8 in x 10 in stainless steel enclosure with window. 2-pole 30 A EMR. Controls a single circuit with a 2-pole electromechanical relay. (Approved for nonhazardous locations only)	910*E1SW*EMR2	10170-003	20
RAYCHEM 910 controller in an 8 in x 10 in stainless steel enclosure with window. 2-pole 30 A EMR. Controls a single circuit with a 2-pole electromechanical relay. Includes an isolated 2-wire RS-485 communication option. (Approved for nonhazardous locations only)	910*E1SW*EMR2*485	10170-017	20
RAYCHEM 910 controller in an 8 in x 10 in stainless steel enclosure with window. 2-pole 30 A 277 V SSR. Controls a single circuit with a 2-pole solid-state relay. (Approved for Class I, Div. 2 locations)	910*E1SW*SSR2	10170-004	25
RAYCHEM 910 controller in an 8 in x 10 in stainless steel enclosure with window. 2-pole 30 A 277 V SSR. Controls a single circuit with a 2-pole solid-state relay. Includes an isolated 2-wire RS-485 communication option. (Approved for Class I, Div. 2 locations)	910*E1SW*SSR2*485	10170-018	25
RAYCHEM – Supervisor Software	Available for download at nVent.com		

RTD SENSORS

100-ohm platinum RTD with 10 foot stainless steel corrugated sheath	RTD10CS	RTD10CS	1.0
RTD, ambient, cable style	RTD-200	254741	0.1
C1D1 RTD, -100°F to 900°F, pipe mounted	RTD7AL	RTD7AL	2.0
RTD, -100°F to 900°F, pipe mounted	RTD4AL	RTD4AL	1.2

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