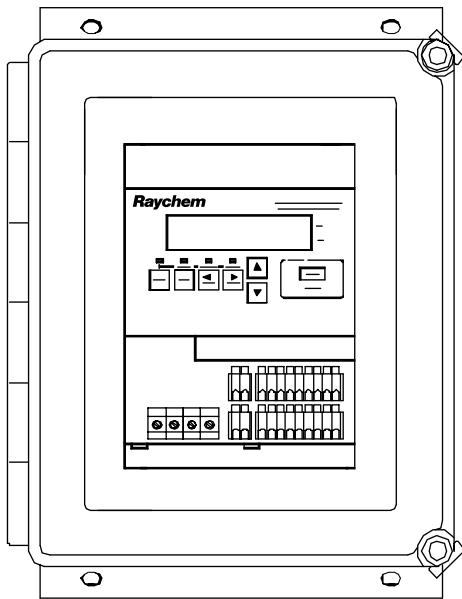


Raychem 910 SERIES

SINGLE-POINT HEAT-TRACING CONTROL SYSTEM

910*E1FWL*SSR2



PRODUCT OVERVIEW

The 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.

910 SERIES

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 | 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

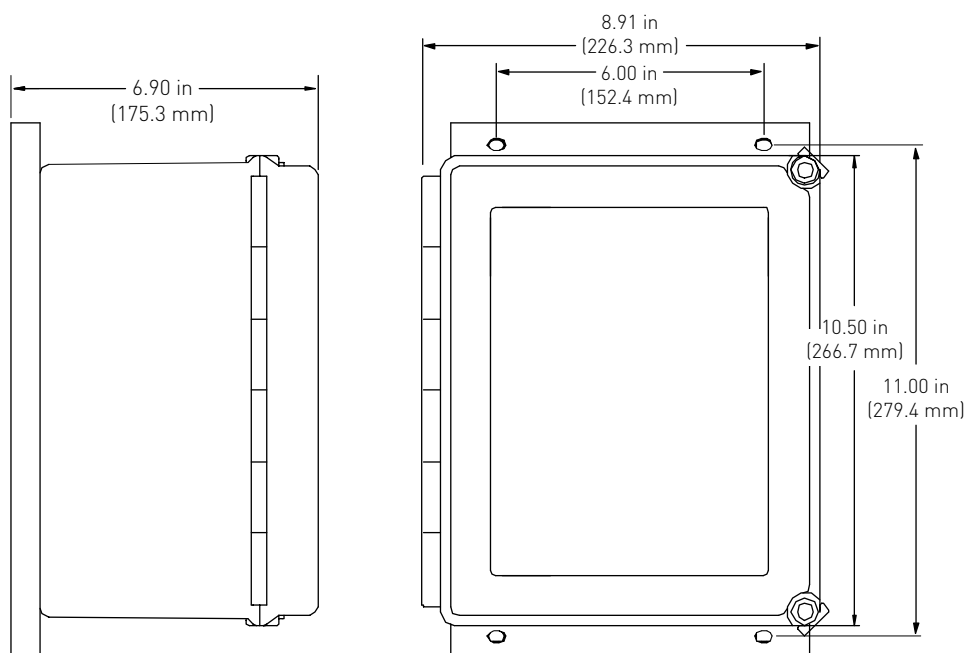
| | |
|-------------------------------------|--------------------------------|
| Protection | TYPE 4X |
| Materials | FRP or stainless steel |
| Ambient operating temperature range | -40°F to 140°F (-40°C to 60°C) |
| Ambient storage temperature range | -40°F to 185°F (-40°C to 85°C) |
| Relative humidity | 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 / HTCBus |
| 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 www.pentairthermal.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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