

CONNECT AND PROTECT

## Single-point electronic controller for heat tracing systems

### PRODUCT OVERVIEW



The nVent RAYCHEM 460 is a c-UL-us Listed single-point heat tracing controller designed for pipe freeze protection, flow maintenance and heat loss replacement applications. It includes a 5" inch color touch screen display for intuitive set up and programming right out of the box. The 460 controller may be used with line-sensing or ambient-sensing and Proportional Ambient-Sensing Control (PASC) modes. It measures temperatures with one 2 KOhm / 77°F (25°C), 2-wire Thermistor connected directly to the unit (optional second sensor - to be ordered separately). The controller can also measure ground fault current to ensure system integrity. The controller includes ground fault current sensing and relaying equipment compliant with UL1053 standard.

### FEATURES

- 5" color touch screen for easy set-up and programming
- Easy to install push-in cage-clamp wire terminals
- Standalone unit that can be DIN Rail mounted
- Ground fault equipment protection (GFEP) compliant with UL1053
- User-defined settings for ground fault alarm and trip levels
- User-defined high temperature cut-out setting
- User-defined auto-cycle feature to automatically and regularly test the system for any problems
- Energy efficient PASC mode available
- Alarm relay for remote alarm annunciation
- One temperature sensor that can be used for ambient and line sensing
- Programmable in advance in power-off mode by using external power bank/charger and USB connection

### GENERAL

Area of use            Non-hazardous locations

Approvals           

### GROUND FAULT PROTECTION

Built-in GFEP. A Heat tracing circuit equipped with the 460 controller does not require additional ground fault protection equipment, simplifying installation and reducing costs. It automatically tests the integrity of the integrated ground fault circuitry, ensuring protection in the event of a ground fault.

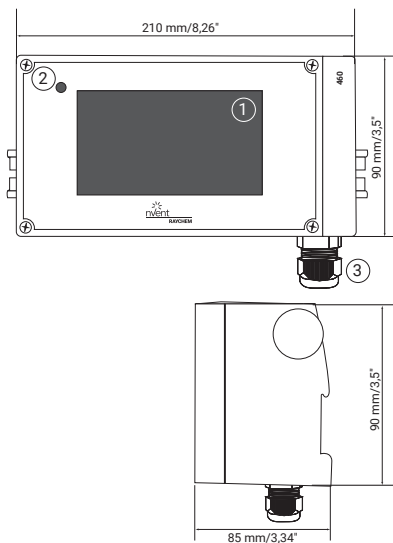
## ELECTRICAL PROPERTIES

|                                     |                                                                                                                    |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Supply voltage                      | 120/208/240/277 VAC, 50/60 Hz                                                                                      |
| Ambient operating temperature range | 32°F (0°C) to 105°F (40°C)                                                                                         |
| Ambient storage temperature range   | -4°F (-20°C) to 122°F (50°C)                                                                                       |
| Internal power consumption          | 9 W maximum                                                                                                        |
| Output relay switching capacity     | Double pole single throw relay, 24 A @ 120/208/240/277 +/-10% Vac; 50/60 Hz                                        |
| Alarm relay                         | Single pole double throw relay, volt-free; maximum switching capacity (resistive load only) 1 A/24 VDC, 1 A/24 VAC |
| Circuit breaker                     | 30 A maximum                                                                                                       |
| Ground fault                        | 30 mA, complies with UL 1053 standard                                                                              |
| Real time clock                     | Automatic daylight saving time and leap year correction                                                            |
| Clock accuracy                      | +/-10 minutes per year                                                                                             |
| Keylock                             | Password protection for parameter settings                                                                         |
| USB port                            | For pre-setup in power off mode; for firmware upgrades                                                             |

## ENCLOSURE

|                          |                                                                                                      |
|--------------------------|------------------------------------------------------------------------------------------------------|
| Dimensions               | 210 mm x 90 mm x 85 mm / 8.26" x 3.5" x 3.34"                                                        |
| Ingress protection class | TYPE 12 – indoor use only                                                                            |
| Enclosure material       | Polycarbonate                                                                                        |
| Mounting option          | Mountable DIN RAIL, 35 mm                                                                            |
| Conduit entries          | Two each-1/2 in conduit entries                                                                      |
| Cable gland              | 3 -hole grommet for temperature sensors maximum cable size<br>-2 wire: 20 AWG (0,5 mm <sup>2</sup> ) |
| Flammability class       | DIN EN 60730/VDE 0631-1                                                                              |

## TYPICAL DIMENSIONS AND MODULE LAYOUT



1. Touch screen: size 5" resistive
2. LED Green: Normal operation, heater on: 1.5 sec on/0.5 sec off  
Normal operation, heater off: 1.0 sec on/1 sec off  
Alarm condition: 0.2 sec on/1.8 sec off
3. M20 Gland: Sensor ambient/sensor pipe/external alarm

## PROGRAMMING

|                               |                            |
|-------------------------------|----------------------------|
| Maintain temperature setpoint | 32°F (0°C) to 176°F (80°C) |
|-------------------------------|----------------------------|

## SENSOR

|                          |                                                               |
|--------------------------|---------------------------------------------------------------|
| Temperature sensor type  | Thermistor 2 KOhm / 77°F (25°C), 2-wire                       |
| Sensor tip dimensions    | Ø 0.2" (5 mm); length 0.8" (20 mm)                            |
| Sensor cable length      | 10 ft (3 m) cable extension up to 328 ft (100 m) / 2 x 16 AWG |
| Sensor temperature range | -40°F (-40°C) to 194°F (90°C)                                 |

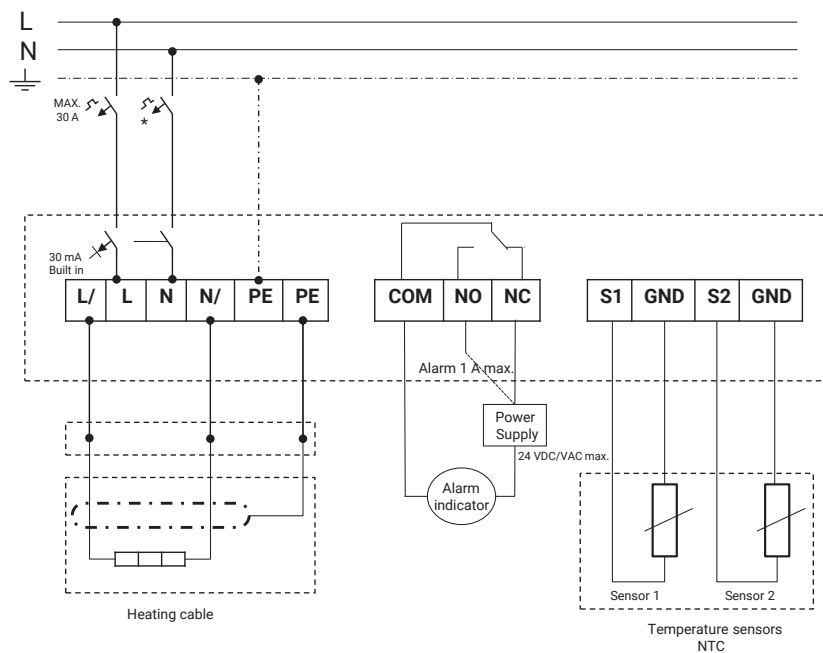
## MONITORING

|                                                                                       |                                                                                              |                                |
|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------|
| Temperature                                                                           | Low alarm range:                                                                             | -40°F to 190°F (-40°C to 88°C) |
|                                                                                       | High alarm range:                                                                            | 32°F to 190°F (0°C to 88°C)    |
| Ground fault                                                                          | Alarm range:                                                                                 | 20 – 200 mA                    |
|                                                                                       | Trip range:                                                                                  | 20 – 200 mA                    |
| Autocycle                                                                             | Daily/Weekly/Monthly/Never                                                                   |                                |
| Alarm Relay                                                                           | The alarm relay is used to provide external alarm for any of the following alarm conditions: |                                |
|                                                                                       | 1. Ground fault current                                                                      |                                |
|                                                                                       | 2. Low system temperature                                                                    |                                |
|                                                                                       | 3. High system temperature                                                                   |                                |
|                                                                                       | 4. Temperature sensor failure                                                                |                                |
|                                                                                       | 5. Internal error                                                                            |                                |
|                                                                                       | 6. Loss of continuity                                                                        |                                |
|                                                                                       | 7. Loss of incoming supply voltage                                                           |                                |
| Audio (buzzer) and visual alarm (LED light, screen display) for any alarm conditions. |                                                                                              |                                |

## MEMORY

|                    |                                                                       |
|--------------------|-----------------------------------------------------------------------|
| Parameters         | All parameters are stored in nonvolatile memory, except date and time |
| Clock back-up time | 10 days                                                               |

## ELECTRICAL SCHEME



|                              |                                        |
|------------------------------|----------------------------------------|
| Size power supply terminals  | 3 x 6 mm <sup>2</sup> maximum/10 AWG   |
| Size heating cable terminals | 3 x 6 mm <sup>2</sup> maximum/10 AWG   |
| Size alarm terminals         | 3 x 1.5 mm <sup>2</sup> maximum/16 AWG |
| Size sensor terminal - pipe  | 2 x 1.5 mm <sup>2</sup> maximum/16 AWG |

## ORDERING DETAILS

| Description                                                        | Catalog         | Part Number | Weight         |
|--------------------------------------------------------------------|-----------------|-------------|----------------|
| Single-point heat tracing controller for pipe heat tracing systems | 460 Controller  | P000002338  | 2.3 lbs/1050 g |
| 2K NTC Sensor 10 m long                                            | SENSOR-NTC-10M  | 1244-015847 | 0.2 lbs/90 g   |
| Power bank                                                         | R-PB-Powersmart | 1244-020365 | 0.33 lbs/150 g |

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