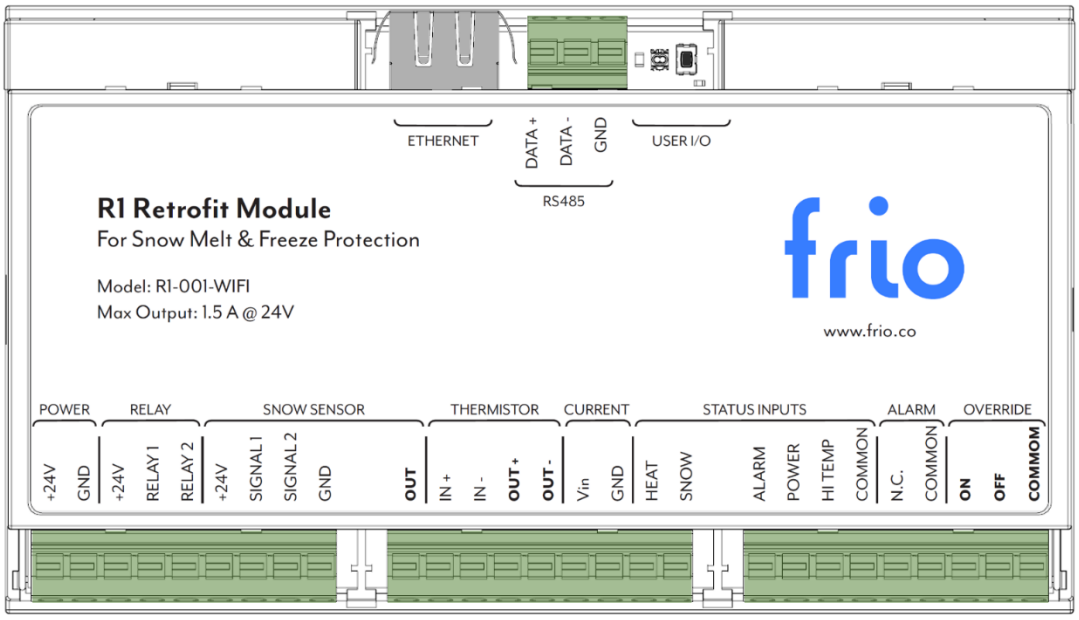
# R1 - Smart Heat Trace Control Module

The first IoT heat trace control module designed for snowmelt, freeze protection, and temperature maintenance applications




The R1 is a DIN rail mount IoT capable heat trace controller for use in snow melting, freeze protection and temperature maintenance applications. The device can drive up to two contactors to control electric heat trace or hydronic heating systems. In a retrofit configuration, the R1 can activate existing heat trace controllers by mimicking a temperature sensor or a snow sensor. In a retrofit configuration, the existing sensors can be left in place and connected to the R1 temperature sensor and snow sensor inputs.

WiFi, Ethernet, and optional Cellular capability allow the R1 to connect to the Frio cloud platform via the internet, enabling smart, cloud-based control. When connected to the cloud, the R1 will upload system status and receive operational commands. The Frio cloud platform integrates weather data, system feedback, and proprietary control algorithms to automatically maximize the effectiveness and efficiency of your system.

The cloud connection enables advanced monitoring and notification of your heating system. Data on key performance characteristics are monitored over time and anomalies or excursions are flagged and reported. The Frio cloud platform offers customizable SMS and email notifications so that the user can be alerted immediately if there are any issues with the system. Users can connect to their R1 device remotely via the Frio cloud platform to check status, activate the system or run a system diagnostic test, eliminating the need to physically check the heater control system.

If a connection to the internet is not available, the R1 can operate in a stand-alone configuration. As stand-alone device, the R1 can be configured to use a temperature sensor or snow sensor to activate the heating system, allowing for automatic snow melt, freeze protection, or temperature maintenance control.

To install the R1 device, simply download the Frio app and follow the step by step instructions. The app allows you to choose the system configuration and set control and notification preferences that can be changed anytime via the Frio cloud.

**Control Modes**

- Smart Snow Melting: - Uses weather data to activate the heating system, includes optional preheating, the ability to ignore light storms, and dynamic heating after the storm, all to improve overall system performance and reduce energy use and operating cost (For use on snow melting and gutter systems)
- Snow/ice sensor – Connects to a snow or ice sensor (this mode can be used as an offline back up to smart snow melting).
- Temperature Sensor – Connects to a thermistor to maintain system temperature (For use on freeze protection and process temperature maintenance systems)
- Ambient Temperature: Uses an ambient temperature (local sensor or cloud-based temperature) signal to activate the device (For freeze protection systems)

**Installation**

- Download the Frio App for installation instructions

**Wiring Diagram**

**Inputs:**

- Temperature Sensor Thermistor (2 wire)
- Snow Sensor (up to 2 sensors)
- Status and alarms (Up to 5 inputs)

**Outputs**

- Temperature Sensor (Pass through)
- Snow Sensor (Pass through)
- Relay Driver Circuit (up to two circuits, 1A at 24V)
- Dry Contact (configurable)

**Connectivity**

- WIFI 802.11 Dual Band 2.4GHz & 5GHz
- Ethernet (RJ45 Plug Cat 5 or 6)
- Cellular (optional with external modem)
- RS485

**Power Requirement**

- 24V DC or AC

**Enclosure/Environment**

- Indoor rated (NEMA 4X with external enclosure)
- Operating Temperature -30C to 70C