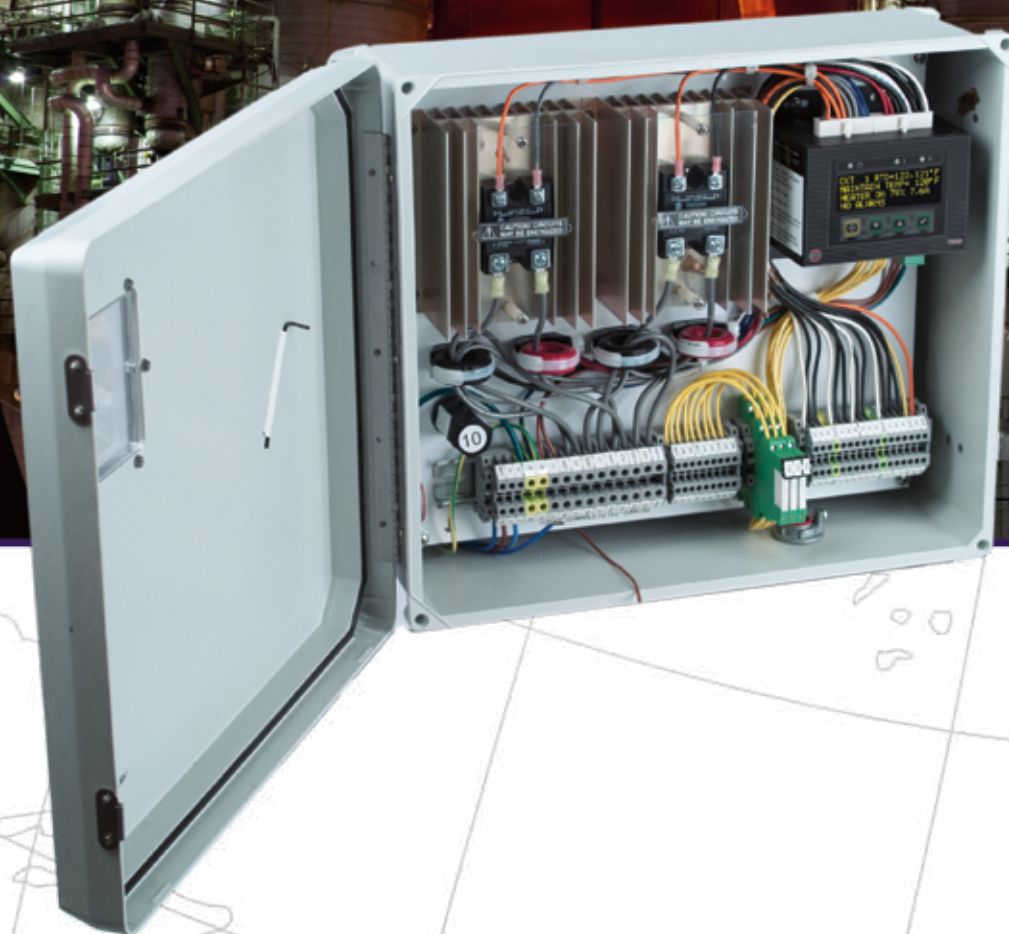


TraceNet™ TCM2

CONTROL AND MONITORING SYSTEM



Specification Guide



TraceNet™ TCM2

CONTROL AND MONITORING SYSTEM

APPLICATION OVERVIEW

Control and monitoring systems play an essential role in heat tracing applications which range from freeze protecting water lines to maintaining critical process temperatures. While mechanical thermostats have been used successfully for many heat tracing applications, a more complete control and monitoring solution is necessary for most industrial heat tracing applications. Advancements in technology have made modern control and monitoring units both cost effective and reliable. Thermon electronic control and monitoring systems ensure accurate temperature measurements, conserve energy and extend system life.


A versatile electric heat tracing control and monitoring network is key to reducing operating cost in plants. Research has shown that the following features are a prerequisite within many industrial heat tracing applications:


- Monitor electric heat trace circuit operating and ground/earth leakage currents
- Selectable control method (On/Off, On/Off With Soft Start, Proportional, Ambient Proportional) on a per circuit basis
- Programmable alarm set points, with alarm acknowledgment and reset capability
- Programmable trip set-points for each circuit
- Temperature sensor status indication
- Communication to host computer via RS485 serial communication.
- "Push to Test" ground/earth leakage test feature on a per circuit basis
- Ground/earth leakage interruption capability

TCM2 PANEL CERTIFICATIONS/APPROVALS¹


TraceNet TCM2 control and monitoring systems are approved/certified for installation and operation in Ordinary and Hazardous locations.

Ordinary Locations:

 ANSI/UL 61010-1
CAN/CSA-C22.2 No. 61010-1

 EN61010-1

Hazardous Locations (Classified)²:

 CL I, Div 2, Gp BCD T4
ANSI/ISA 12.12.01
CSA C22.2 No. 213

Note:

1. For equipment in explosive atmospheres, to avoid electrostatic discharge, clean the viewing window with a damp cloth only. If the equipment is not installed and operated within the specifications and limitations indicated by Thermon, then the protection provided by the equipment may be voided.
2. Refer to installation/operating instructions for maximum ambient temperature rating relative to the allowable current carrying ampere ratings.

TRACENET TCM2 SYSTEM SPECIFICATIONS

Environmental:

Hazardous Locations,

- Indoor and Outdoor- Solid State Relays

Ordinary Locations,

- Indoor and Outdoor- Power Distribution and Mechanical Relays and/or Solid State Relays

Enclosures: Type 4, 4X, IP54 *

TraceNet Module Supply Voltage: 100-240 Vac, 50/60 Hz

Heat Tracing Voltages: 100-600 Vac

User Interface: 3" (76mm) x 1" (25mm) OLED 4 line, 20 character display

Standard Number of Circuits: Two within one control panel

Temperature Sensors per Circuit: Up to two 100 Ω Platinum, 3-wire RTD's

Current Switching Devices:

Solid State Relay:

Refer to Table 1

Mechanical Relay:

Per design requirements

Control Methods:

Process Sensing:

On/Off, On/Off With Soft Start, Proportional

Ambient Sensing:

On/Off, On/Off With Soft Start, Ambient

Proportional

(APC and APCM)

Control Temperature Range: -200°F (-129°C) to 1112°F (600°C)

Alarm Settings (per circuit):

Low/High Temperature

Low/High Current

High Ground/Earth Leakage Current

RTD and Circuit Faults

Secondary Alarm Settings (with trip option):

High Temperature, High Heater Current,

Ground / Earth Leakage Current

Network Communications:

RS-485

Ethernet/Wireless (requires optional communication module)

Auxiliary Internal Output Power: 9 Watts at 24 Vdc

Alarm Outputs:

Three dry contacts rated 24V DC or 120/240V AC, 6A

* Additional panel types are available. Contact Thermon for details.

TraceNet™ TCM2

CONTROL AND MONITORING MODULE

TCM2 CONTROL AND MONITORING MODULE

The TCM2 is a temperature control and monitoring module developed specifically for heat tracing applications. The module provides control and monitoring capabilities via digital information display for one or two heat tracing circuits with input from up to two RTDs per circuit.

TCM2 RATINGS/SPECIFICATIONS

Control and monitoring capacity....Two heat tracing circuits
Module supply voltage.....100 to 240 Vac
Power consumption.....95 VA max
Controlled output voltage.....2x24 Vdc, 100 mA or
2x12 Vdc, 100 mA (user selectable)
Storage ambient.....-40°F to 176°F
(-40°C to 80°C)
Power clamp function.....programmable from 20% to 100%
Temperature input.....up to two, 3-wire platinum
100 Ohm RTDs per circuit
Temperature control range.....-200°F to 1112°F
(-129°C to 600°C)
Control band.....programmable in increments of 1 degree
Module dimensions (HxWxD).....4.65 x 4.7 x 3.25 inch
(118 x 119 x 83 mm)
High operating current alarm/trip.....1 to 300 Amps¹
Low operating current alarm.....0 to 30 Amps¹
Ground/earth leakage alarm/trip.....30 to 250 mA
Alarm outputs.....three 24 Vdc, rated to 100 mA max
Self-test frequency.....programmable from 2 to 99 hours
Communication.....Modbus ASCII/RTU via RS485²
Communication rate.....up to 57600 Baud
Auxiliary power output.....9 W @ 24 Vdc

TCM2 CERTIFICATIONS/APPROVALS

When housed in a Type 4/4X (IP54) enclosure and equipped with solid-state relays³, the TCM2 module is approved for use in ordinary and hazardous (classified) areas.

Ordinary Locations:



ANSI/UL 61010-1

CAN/CSA-C22.2 No. 61010-1



EN61010-1

Hazardous Locations (Classified)⁴:



CL I, Div 2, Gp BCD T4

ANSI/ISA 12.12.01

CSA C22.2 No. 213

-40°C ≤ Ta ≤ 60°C

Notes

1. For higher amperage ratings, contact factory.
2. Ethernet or wireless communication via optional accessory modules.
3. Mechanical relay options are approved for ordinary location installations.
4. When used within Thermon TraceNet TCM2 control panels.



TCM2 PRODUCT FEATURES

A TCM2 control and monitoring module offers the following features:

Reduces Man-hours: With the simplified, 4-button user interface, operators can quickly program the TCM2. The new TCM2 wiring harness allows maintenance personnel to swiftly install, remove, and conduct troubleshooting of the system.

Improved Control Methods: The TCM2 utilizes multiple control methods, similar to the Thermon TCM18 (On/Off, Soft-Start, Proportional) and features the upgraded Ambient Proportional Control (APC and APCM) that employs the energy saving method of Ambient Proportional Control with the higher current capacity of the mechanical relay.

Upgraded Communications: The TCM2 can network with any Thermon Controller to TraceNet™ Command or any plant DCS system via RS-485 in either MODBUS ASCII or RTU. In the panel, the TCM2 can employ a converter to offer MODBUS TCP/IP Ethernet.

TCM2 CONTROL METHODS

Heat tracing circuits are typically controlled with the TCM2 via zero-crossing solid state relays or mechanical relays, which will allow any of four modes of operation:

- On-Off Control - The TCM2 delivers heat to hold the heated object above the programmed maintain temperature and within the programmed control band. It uses minimal switching to maximize the life of mechanical relays.
- On-Off Control with Soft Start- The TCM2, upon turn-on, ramps from zero power to 100 % power over a period of 3 minutes. This reduces the effects of high in-rush current on a cold power start. It then continues in the On-Off Control mode.
- Proportional- The TCM2, upon reaching the maintenance temperature, begins to reduce power until a level is attained that results in holding the maintenance temperature at a steady level with minimal control overshoot.
- Ambient Proportional Control (APC or APCM) - The TCM2 senses the ambient temperature and applies 100% power at the minimum ambient set point. Then it linearly reduces power to a level of 20%, and turns off at the temperature at which heating is no longer required. With mechanical relays the APC becomes APCM, allowing a 20, 25, or 33 minute cycle time to be selected.

TCM2 CURRENT RATING

The ambient operating conditions, enclosure size, number of circuits, and the relay heat sink style all affect the current ratings. Table1 below provides current ratings for typical design configurations. Note that the 40°F (4°C) ambient ratings are used for freeze protection applications where the heater circuits would be de-energized above 40°F (4°C).

TABLE1: MAXIMUM HEATER CURRENT THROUGH EACH SOLID STATE RELAY SWITCH

| Enclosure Option | Module Type | SSR30A | | SSR15A | | SSR30B | | SSR15B | | SSR50C ⁽¹⁾ | | SSR30B/2R | |
|------------------|-------------|------------------------------------|--------------|------------------------------------|--------------|------------------------------------|---------------------|------------------------------------|--------------|---|--------------------------------------|------------------------------------|--------------|
| | | (single pole relay) ⁽⁴⁾ | | (double pole relay) ⁽⁴⁾ | | (single pole relay) ⁽⁴⁾ | | (double pole relay) ⁽⁴⁾ | | Up to 3 single pole Relays ⁽³⁾ | | (single pole relay) ⁽⁴⁾ | |
| | | 40°F (4°C) | 104°F (40°C) | 40°F (4°C) | 104°F (40°C) | 40°F (4°C) | 104°F (40°C) | 40°F (4°C) | 104°F (40°C) | 40°F (4°C) | 104°F (40°C) | 40°F (4°C) | 104°F (40°C) |
| P2 SS2 | TCM2-1 | 30 | 19 | 22 | 9 | 30 | 30 | 24 | 15 | --- | --- | 30 | 25 |
| P3 SS3 | TCM2-1 | 30 | 24 | 24 | 12 | 30 | 30 | 24 | 15 | --- | --- | 30 | 30 |
| | TCM2-2 | 30 | 12 | 19 | 6 | 30 | 30 | 24 | 14.75 | --- | --- | --- | --- |
| SS3 | TCM2-1 | --- | --- | --- | --- | 46 ^(1,2) | 46 ^(1,2) | --- | --- | --- | --- | --- | --- |
| SS4 | TCM2-1 | 30 | 24 | 24 | 12 | 30 | 30 | 24 | 15 | 60 ⁽²⁾ /50 ⁽²⁾ | 60 ⁽²⁾ /50 ⁽²⁾ | 30 | 28 |
| | TCM2-2 | 30 | 24 | 24 | 12 | 30 | 30 | 24 | 15 | 60 ⁽²⁾ /50 ⁽²⁾ | 60 ⁽²⁾ /50 ⁽²⁾ | --- | --- |

The following notes apply to the table above.

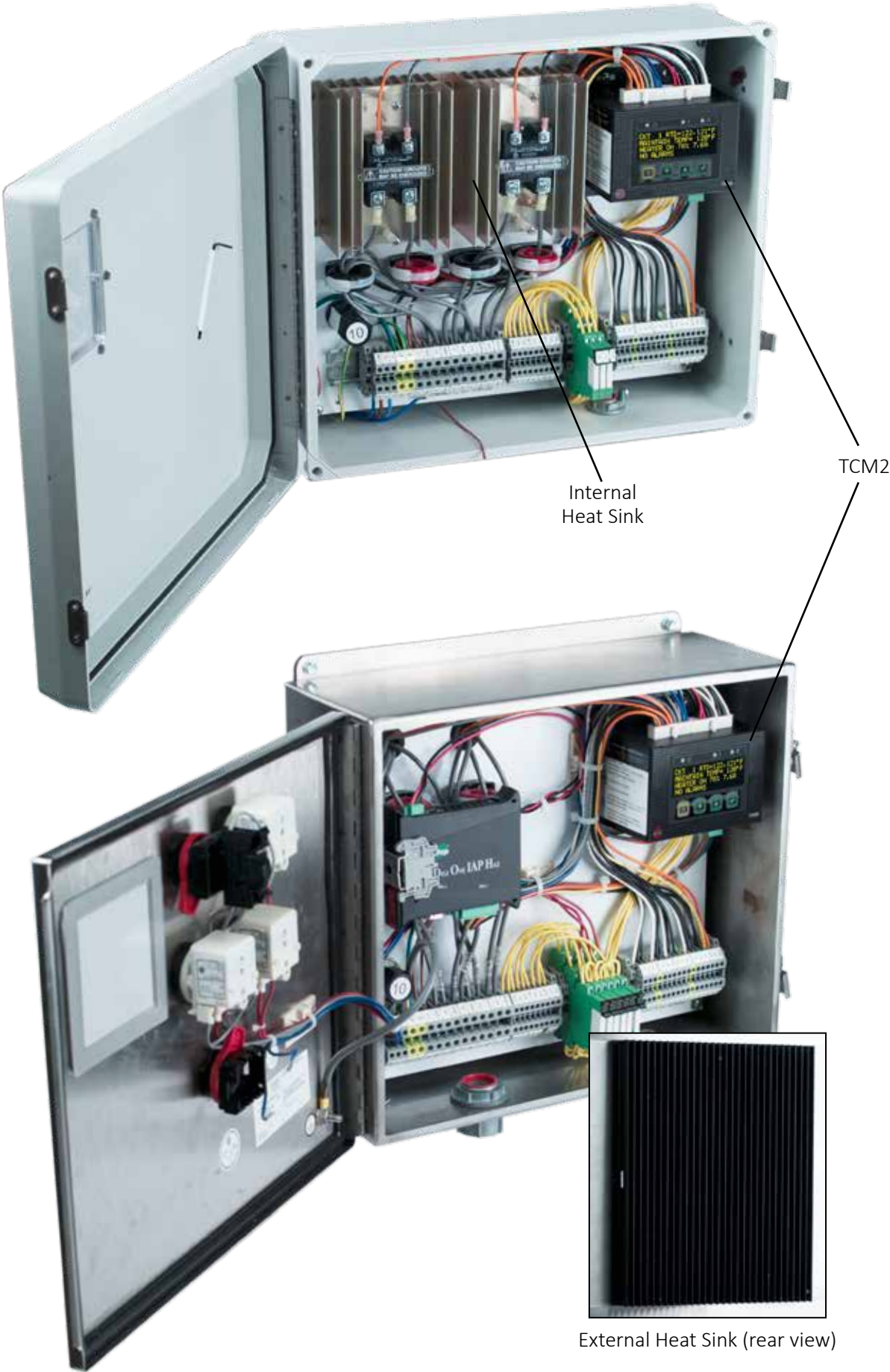
(1) Relays in separate enclosure from control module.

(2) Amperage values over 30 only apply to higher amperage relays such as HD60125.

(3) 60 Amps applicable w/only 1 or 2 relays.

(4) A double-pole relay or 2 single-pole relays per circuit are required for 208VAC and 240VAC Heat Trace to break both power legs.

Typical Thermon **TraceNet™ TCM2** Systems



TRACENET COMMAND

The TCM2 communicates via Modbus RTU or ASCII protocol through its RS485 port at programmable rates up to 57600 Baud to the Thermo TraceNet Command electric tracing circuit monitoring software. TraceNet Command provides centralized electric tracing information such as:

- Heat tracing circuit status
- Temperatures, heater operating and earth/ground current alarm/trip events
- Event history
- Data trending
- Maintenance and troubleshooting guidance

TraceNet Command additionally provides the operator the ability to:

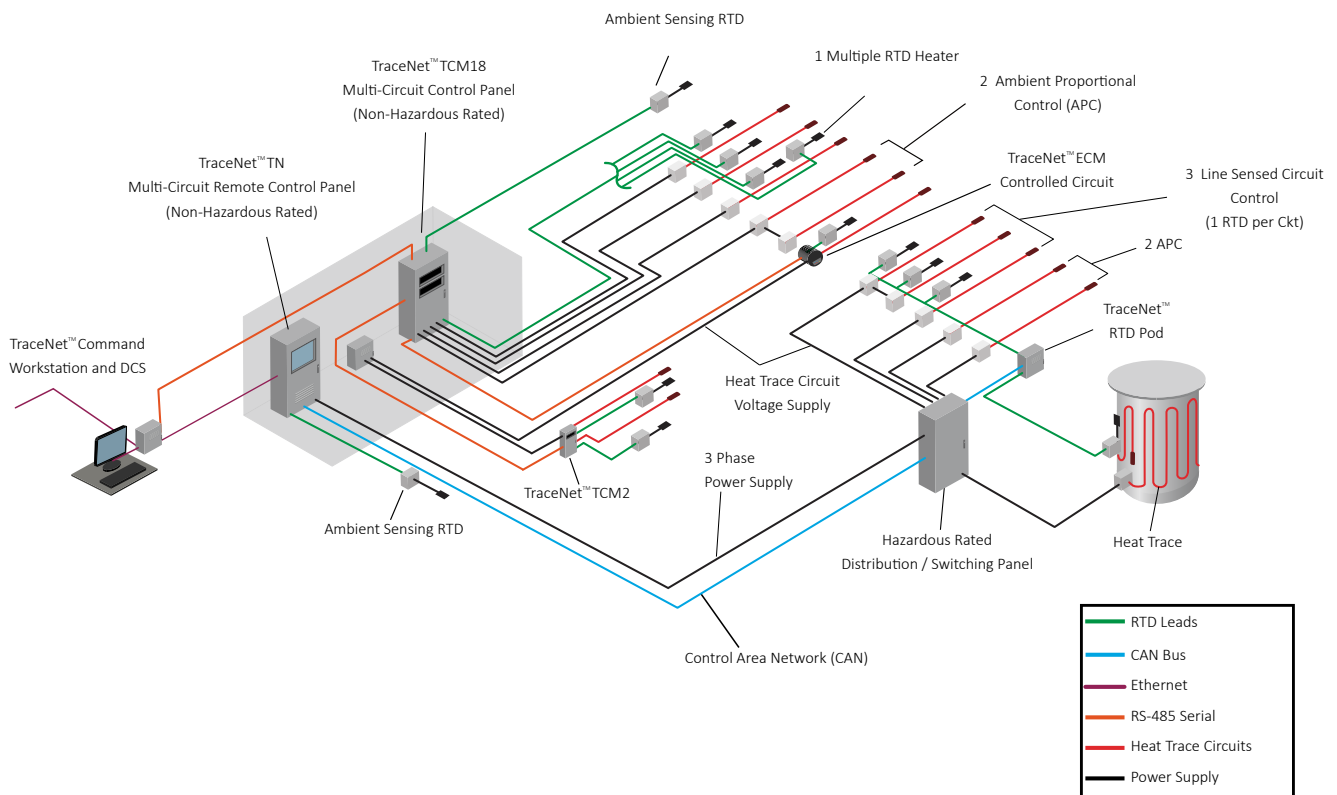
- Change set points as well as alarm and trip values
- Reconfigure system control parameters
- Provide heat tracing management reports
- Load shed circuits on a priority level basis



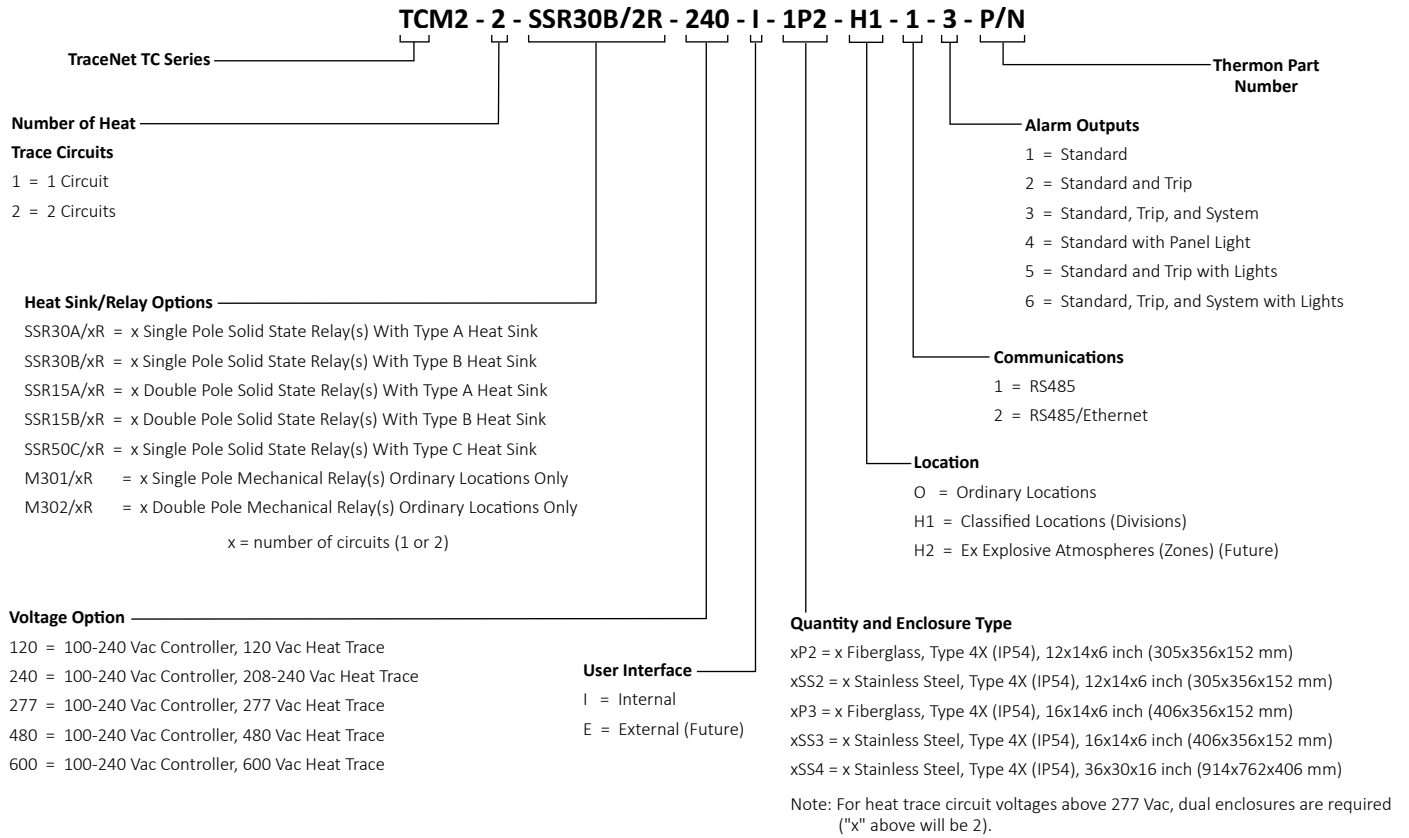
DCS COMMUNICATIONS

The TCM2 can also communicate via Modbus RTU or ASCII protocol through its RS485 ports at programmable rates up to 57600 Baud to the plant DCS. The same operating data and control capabilities that are available through TraceNet Command are also accessible in the plant control room at the DCS.

Centralized/Distributed Control and Monitoring Systems



PRODUCT REFERENCE LEGEND



OFFICES WORLDWIDE

UNITED STATES • CANADA • MEXICO • NETHERLANDS
UNITED KINGDOM • FRANCE • SPAIN • SOUTH KOREA
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