TRACENET™ TCM18

CONTROL AND MONITORING SYSTEM

DATASHEET

TRACENET™ TCM18 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 microprocessor-based technology have made electronic control and monitoring units both cost effective and reliable. 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[1]:

- Monitor electric heat trace circuit operating and ground/earth leakage currents
- Selectable control method (On/Off, On/Off With Soft Starr, 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
- Unique circuit identifier
- 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

Note:

1. For equipment in explosive atmospheres, to avoid elctrostatic 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.

TRACENET TCM18 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

Operating Ambient Range: -40°C to 55°C

Enclosures: IP54

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

Heat Tracing Voltages: 100-600 Vac

User Interface: 44 mm x 127 mm backlit LCD display

Maximum Number of Circuits: 72 within one TC series control panel

Temperature Sensors per Circuit: One or Two 100 W Platinum, 3-wire RTD's

Current Switching Devices:

- Solid State Relay*:
  1-pole up to 30 Amps
  2-pole up to 15 Amps per pole
- 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)
- Control Temperature Range: -129°C to 600°C

Alarm Settings (per circuit)**:**

- Low/High Temperature
- Low/High Current
- High Ground/Earth Leakage Current
- RTD and Relay Faults
- Loss of Communication

Secondary Alarm Settings (with trip option):
High Temperature, High Heater Current, Ground/Earth Leakage Current

Networking Communications:

- Dual RS 485
- Ethernet/Bluetooth/Wireless (requires optional communication module)

Auxiliary Output Power: 24 Vdc at 0.5 Amp

External Alarm Relays:

- Three sealed dry contacts rated @ 0.4 Amp, 24 Vdc
- Two solid state rated at 350 mA (24 Vdc) per PM6

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

** Rating based on heat sinks installed external to panel. Relay ratings have a reduced rating when sinks are used internal to panel. Multiple single pole relays may be used for phase to phase and three phase circuits. Higher voltage rating relays are also available as an option.

TYPICAL THERMON TRACENET TCM18 SYSTEM

(See Page Numbers Listed Below for Additional Information on Each Component)

TRACENET™ TCM18 CONTROL AND MONITORING SYSTEM

TCM18 CONTROL AND MONITORING MODULE

The TCM18 is a multicircuit microprocessor-based temperature control and monitoring module developed specifically for heat tracing. This module provides control and monitoring capabilities via digital information display for a maximum of eighteen heat trace circuits. This module can be configured for either process sensing control (with either one or two RTD inputs for each circuit) and/or ambient sensing control (with the option of one or two RTD inputs).

The TCM18 provides circuit information and programming capability through the LCD digital display and a dedicated touchpad on the front of each module.

TCM18 COMMUNICATION

The TCM18 has two RS485 ports which communicate via Modbus ASCII or RTU protocol. One port can communicate to TraceView Network Explorer or to compatible DCS system. The second port is provided for an auxiliary RS485 communication to an optional Ethernet or wireless communication module.

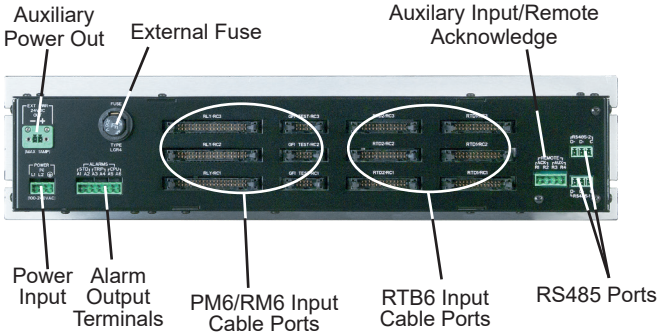
TCM18 RATINGS/SPECIFICATIONS

Control and monitoring capacity.....18 heat tracing circuits
Nominal module supply voltage.....120-240 Vac 50/60Hz
Input current.....1.5 Amp max.
Power consumption.....70 watts
Mimimum ambient temperature.....-40°C
Storage ambient temperature.....-40°C to 85°C
Data retention.....non-volatile EEPROM
Power clamp function.....programmable from 20% to 100%
Temperature input.....up to 36 3-wire platinum 100 Ω RTDs
Temperature control range.....-129°C to 600°C
Control band.....programmable in increments of 1 degree
High operating current alarm and trips.....0.1 to 100 Amps
Low operating current alarm.....0.1 to 100 Amps
Ground leakage alarm and trips.....20 to 225 mA (in 1 mA increments)

Alarm relays
Three sealed dry contacts, rated @ 0.4-amps resistive at 24 Vdc/Vac

Auxiliary output power.....24 Vdc at 0.5 Amps
Self-test frequency.....programmable from 2 to 99 hours
Communication.....Modbus ASCII/RTU via Dual RS 485 ports
Communication rate.....up to 57600 Baud
Certifications.....ATEX
Pollution category.....2

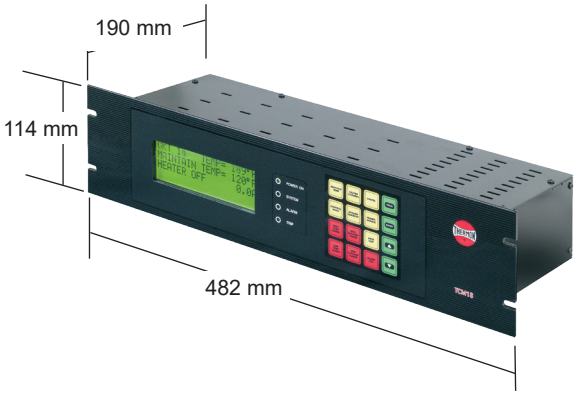
TCM18 CONNECTION PORTS



TCM18 PRODUCT FEATURES

- Module operates in a wide range of ambient conditions.
- Each heat tracing circuit allows input from single or dual RTD inputs.
- User friendly four line heated LCD display for circuit and alarm information with input from a dedicated touchpad.
- Conformally coated electronics for use in panels in indoor and outdoor locations.
- Low and high temperature alarm and additional programmable high temperature trip functions.
- Low and high heater current alarm and trip functions.
- High ground/earth leakage current alarm and trip functions
- Internal test functions for ground/earth leakage functionality.
- Includes On-Off, On-Off with Soft Start, Proportional, and APC (Ambient Proportional Control) modes.
- Auxiliary 24 Vdc output for powering optional communication modules or other auxiliary devices.
- Equipment has been evaluated and found suitable for Overvoltage Category II over the stated range of module supply voltage, in accordance with IEC-61010-1:2010.

TCM18 DIMENSIONAL DATA



PM6 POWER MODULE

The PM6 serves as the power switching module, using solid state relays and links the heat tracing power circuit to the TCM18 control and monitoring module via ribbon cable.

PM6 PRODUCT FEATURES

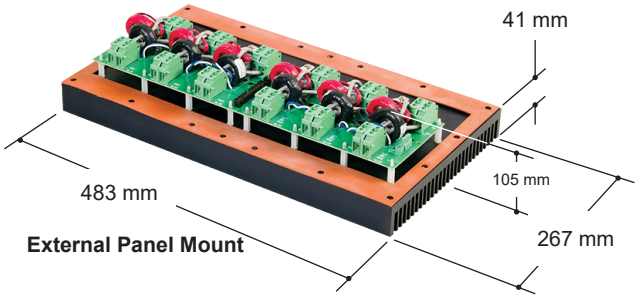
- Operates in a wide range of ambient conditions.
- Single or dual pole solid state switching.
- Nickel plated terminal construction.
- Black anodized aluminum heat sink capable of dissipating the heat generated for up to a total of 180 Amps continuous.
- Standardly supplied with polycarbonate touch safe cover for increased operator touch safety.
- Includes a ground/earth leakage circuit test loop which allows the operator to conduct a functionality test on each circuit.
- Measures ground/earth leakage and heater operating currents.

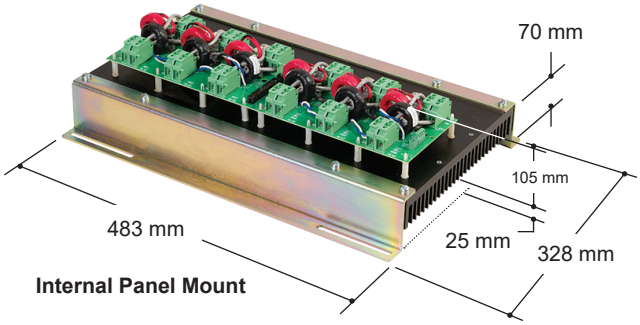
PM6 COMPONENT SPECIFICATIONS

Circuit control capacity ..... up to six heat trace circuits
Single pole relay switching capacity ..... 30 Amps at 240 Vac*
Dual pole relay switching capacity ..... 15 Amps at 240 Vac*
Relay power connection ..... 40-Pin header ribbon cable
Ground/earth leakage test connection ..... 10-Pin header ribbon cable
Maximum storage temperature ..... 85°C
Minimum storage temperature ..... -40°C
Oper. ambient temp. range ..... -40°C to 70°C
Power terminal connections ..... 0.5 to 10 mm^2, 630Vac
Printed circuit board ..... conformally coated
Alarm ..... two 24 Vdc @ 350 mA each

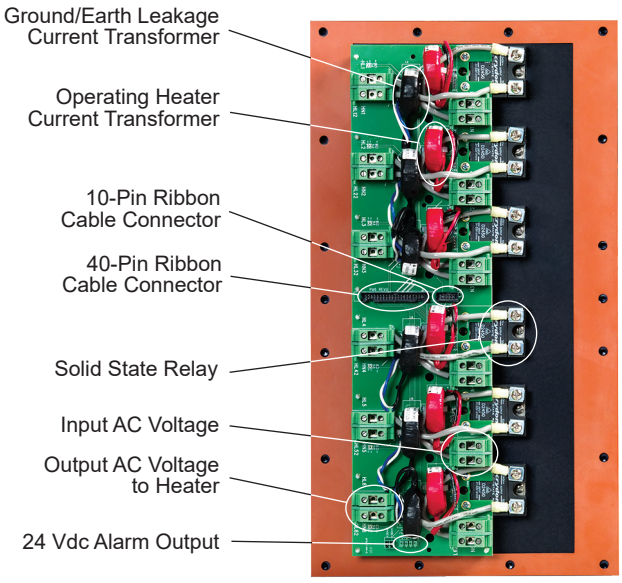
* Rating based on heat sinks installed external to panel. Relay ratings have a reduced rating when sinks are used internal to panel. Higher voltage rating relays are also available as an option.

PM6 DIMENSIONAL DATA



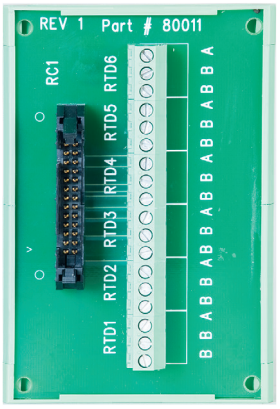


PM6 CONNECTION DIAGRAM

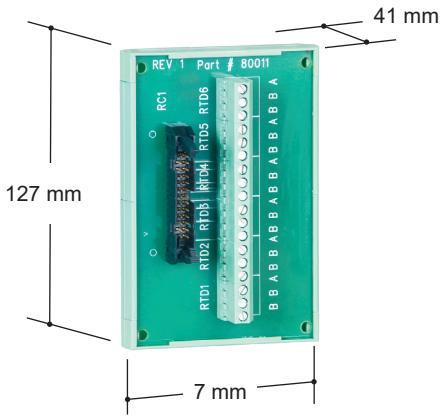


RTB6 RTD INTERFACE MODULE

The RTB6 is a DIN rail mountable six RTD sensor input module which links the field RTD wiring to the TCM18 control and monitoring module via ribbon cable.



RTB6 DIMENSIONAL DATA



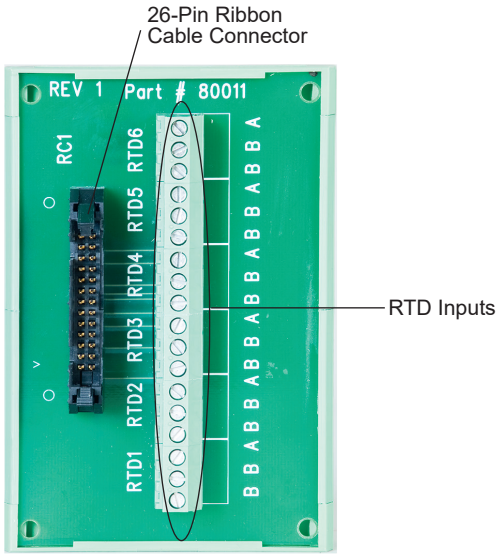
RTB6 PRODUCT FEATURES

- Operates in a wide range of ambient conditions.
- DIN rail mountable.
- Conformally coated printed circuit board for use in panels located in indoor and outdoor environments.

RTB6 COMPONENT SPECIFICATIONS

Maximum storage temperature	85°C
Minimum storage temperature	-40°C
Oper. ambient temp. range	-40°C to 70°C
Terminal connections	up to 2.5 mm^2
Maximum RTD capacity	6

RTB6 CONNECTION DIAGRAM



RM6 RELAY INTERFACE MODULE

The RM6 is a DIN rail mountable six circuit relay interface module for linking individual solid state or mechanical relays via ribbon cable to the TCM18 module. The RM6 comes with individual terminal strips which allow the interconnection of individually mounted ground/earth leakage and heater operating current sensing transformers as well as the ground/earth leakage circuit fault test loop.

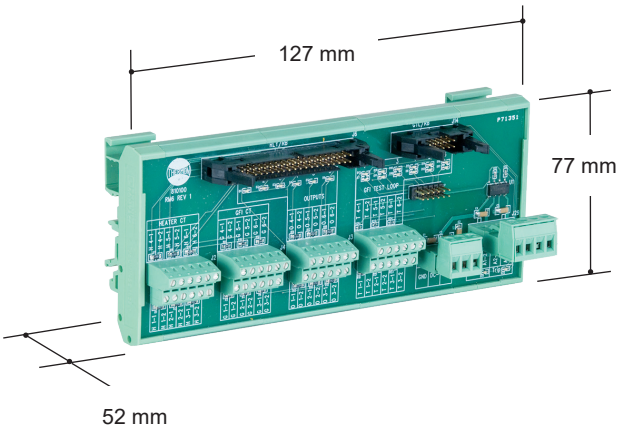
RM6 PRODUCT FEATURES

- Operates in a wide range of ambient conditions.
- DIN rail mountable.
- Conformally coated printed circuit board for use in panels located in indoor and outdoor environments.

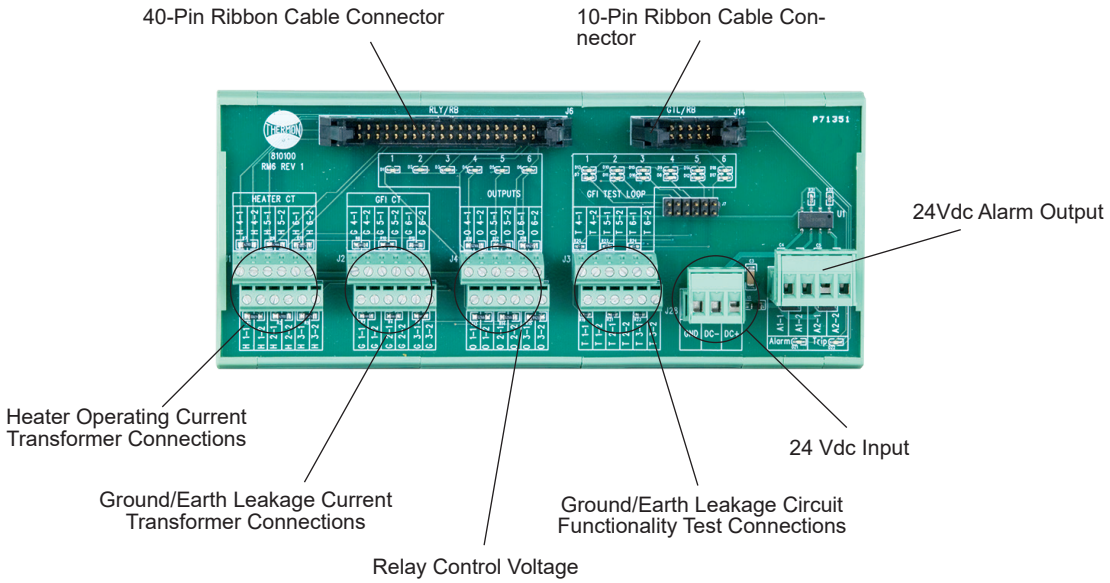
RM6 COMPONENT SPECIFICATIONS

Maximum storage temperature	85°C
Minimum storage temperature	-40°C
Oper. ambient temp. range	-40°C to 70°C
Terminal connections	up to 2. 5 mm^2
Earth leakage test connection	10-Pin header ribbon cable
Relay connection	40-Pin header ribbon cable

RM6 DIMENSIONAL DATA



RM6 CONNECTION DIAGRAM



TRACENET TVNE

The TCM18 communicates via Modbus RTU or ASCII protocol through its RS485 ports at programmable rates up to 57600 Baud to the Thermon TVNE electric tracing circuit monitoring software. TVNE provides centralized electric tracing information such as:

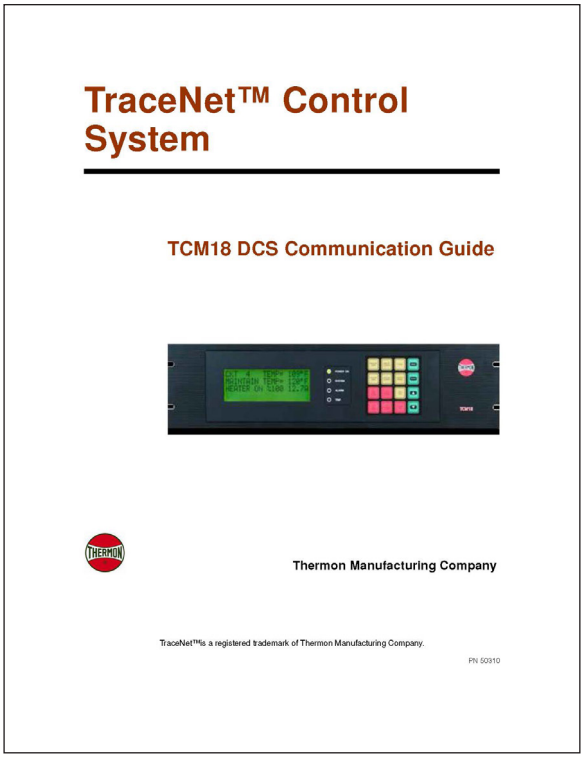
- Heat tracing circuit status
- Temperatures, heater operating and earth/ground current alarm/trip events
- Event history
- Data trending
- Maintenance and troubleshooting guidance

TVNE 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
- View up to ten (10) files (.dwg or .pdf) for isometric drawings, sketches, and/or identifying photos as well as operator notes fore each controller circuit.

DCS COMMUNICATIONS

The TCM18 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 TVNE are also accessible in the plant control room at the DCS.



PRODUCT REFERENCE LEGEND

TCM - 1836YU - SSD - 120S130 - H2 - ND - P/N

TraceNet TC Series [1]

Monitoring and Control Module(s)
- M = Standard Control Module
- MN = Nuclear Control Module

Heat Trace Circuits
- 18
- 36
- 54
- 72

RTD Inputs
- 18
- 36
- 54
- 72
- 108
- 144

Panels
- A = Ambient Sensing Panels Only
- P = Process Sensing Panels Only
- Y = Ambient and Process Sensing Panels

Alarm Relays
- U = 24 Vdc/Vac @ 0.5 Amps Rated for Ordinary and Ex Explosive Atmospheres

Enclosure Type
- SS = Stainless Steel Type 4X/IP54
- PS = Painted Steel Type 4/IP54
- SSP = Stainless Steel Type 4X/IP54 (with purge)
- PSP = Painted Steel Type 4/IP54 (with purge)
- X = Custom [2]

Enclosure Size
mm H x mm W x mm D
- A = 914 x 762 x 406
- B = 1219 x 914 x 406
- C = 1524 x 914 x 406
- D = 1524 x 914 x 610
- E = 1524 x 1219 x 610
- F = 1829 x 914 x 406
- G = 1829 x 914 x 610
- H = 1829 x 1524 x 610
- I = 1829 x 1829 x 610
- X = Custom [2]

Trace Heater Voltages
- 100 Vac
- 120 Vac
- 200 Vac
- 208 Vac
- 220 Vac
- 230 Vac
- 240 Vac
- 277 Vac
- 480 Vac
- 600 Vac

Heat Trace Relays
- S1 = Solid State Single Pole
- S2 = Solid State Two Pole
- M1 = Mechanical Single Pole
- M2 = Mechanical Double Pole

Amperage Rating for Relays

Location
- O = Ordinary Locations
- H2 = Ex Explosive Atmospheres

Distribution
- ND = No Distribution
- MBx/BF y/z = Main Breaker/Breaker Frame/Number of Breakers

Thermon Part Number

Notes:

1. Other accessory modules from the TraceNet TN Series, such as the TSM1/TSM1L and PS70, may be available for use in TC Series panels. Contact the manufacturer for details.
2. Contact Thermon for additional information.

THERMON

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