

TraceNet™ TN Series



CONTROL AND MONITORING SYSTEM SPECIFICATION GUIDE



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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 comprehensive 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. Industry 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, 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
- Circuit identifier along with power supply point and process system/location information
- Circuit priority assignment for load shedding
- Communication to host computer via Ethernet
- "Push to Test" ground/earth leakage test feature on a per circuit basis
- Ground/earth leakage interruption capability

TRACENET TN SERIES

SYSTEM SPECIFICATIONS

Environmental:

Hazardous and Ordinary Locations,

- Indoor and Outdoor-Solid State Relays

Ordinary Locations,

- Indoor and Outdoor- Power Distribution and Mechanical Relays

Operating Ambient Range: -40°F (-40°C) to 131°F (55°C)

Enclosures: Type 4, 4X, IP 54 *

TraceNet Supply Voltage: 100-277 Vac, 50/60 Hz

Heat Tracing Voltages: 100-600 Vac

User Interface: 5-1/4" (133 mm) x 4" (101 mm) touch screen

Maximum Number of Circuits: 180 within one CAN bus network

Temperature Sensors per Circuit: Up to six 100 Ω 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 Soft Start, Proportional

Ambient Sensing:

On/Off, Ambient Proportional (APC)

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

Alarm Settings:

Low/High Temperature 1 and High Temperature 2

Low/High Current 1 and High Current 2

High Ground/Earth Leakage Current

RTD and Relay Faults

Loss of Communication

Trip Settings:

High Temperature/Heater Current/Ground / Earth Leakage Current

Networking Communications:

Internal and External: CAN Bus

External: Ethernet

External Alarm Relays:

Three, solid state rated @ .75 Amp resistive (20-277 Vac)

Two, solid state rated at 350 mA (24 Vdc)

* 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 or when operated in panel interiors exceeding 140°F (60°C). 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.

CERTIFICATIONS/APPROVALS

TraceNet TN control and monitoring systems are approved/certified for use in ordinary and hazardous (classified) locations.



IEC/EN/UL/CSA 61010-1

Class I, Div 2, Gp BCD T4;

Class I, Zone 2, AEx nA IIC T4 Gc;

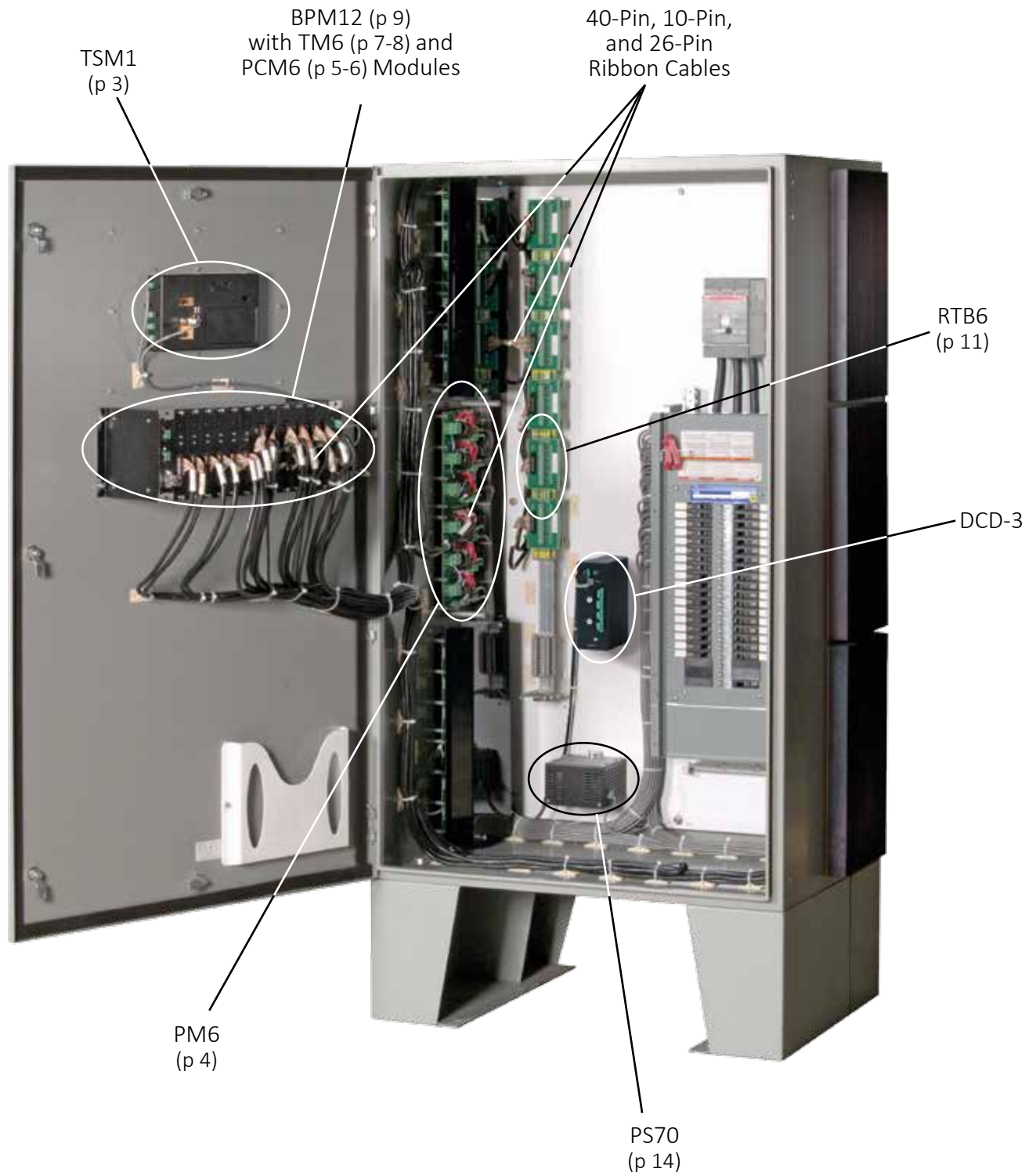
Ex nA IIC T4 Gc;

CE II 3 G Ex nA IIC T4 Gc;

IECEx Ex nA IIC T4 Gc

Typical Thermon **TraceNet™ TN Series** System

(Page Number Listed Below for Additional Information on Each Component)



System shown illustrates a TraceNet TN series control and monitoring system with power distribution installed in an ordinary location.



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TSM1 CENTRAL MONITORING MODULE

The TSM1 serves as the central monitoring and interrogation point for a TraceNet™ network of heat tracing control modules. Through its touch screen monitor, the TSM1 allows the operator to access operating control parameters and operating conditions throughout the heat tracing system network.

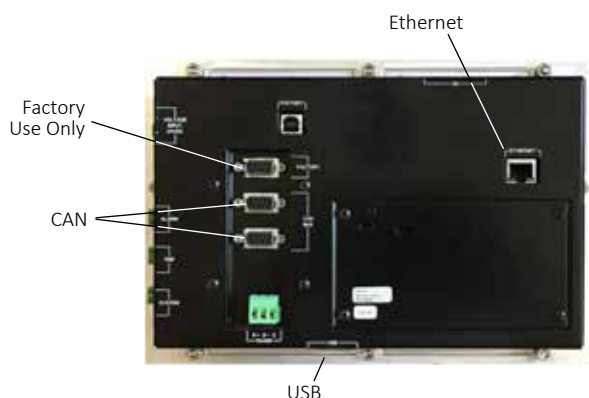
The TSM1 is provided with a CAN bus port to communicate with the family of TraceNet control and monitoring modules over a CAN Bus communication cable. The TSM1 typically communicates via CAN through the Thermon DCD (Data Communication Device), which then communicates to TraceNet Command and DCS systems through its Ethernet port. Optionally, the TSM1 can communicate with the TraceNet Control and Monitoring Modules over a CAN BUS communication cable, and directly with DCS systems through an Ethernet port.



TSM1 PRODUCT FEATURES

- Module operates in a wide range of ambient conditions.
- Color display utilizes LED backlighting to maximize service life and is additionally programmable for “sleep mode” operation.
- Utilizes resistive touch screen for user input functions.
- Intuitive graphical friendly user interface.
- Supports external peripheral devices such as keyboard, track ball mouse, and USB data storage.
- Type 4/4X/IP54 panel mount enclosure which may be installed on panel with access door or inside on panel swingout.

TSM1 CONNECTION PORTS



TSM1 SPECIFICATIONS

Operating supply voltage	24 Vdc
Power consumption	8 Watts
	(up to 41 watts when display heater operating)
Clock speed	200 MHZ
Processor	32 bit
User hardware interface	resistive touchscreen
	5-1/4" (133 mm) x 4" (101 mm)
	640 x 480 VGA LCD TFT display with LED backlight
Input/Output ports	Ethernet/USB
Maximum storage temperature	185°F (85°C)
Minimum storage temperature	-40°F (-40°C)
Operating ambient temperature range	-40°F (-40°C) to 158°F (70°C)
Alarm outputs	three solid state relays rated at 75 mA (20-277 Vac)

TSM1 DIMENSIONAL DATA



TSM1 MONITORING CAPACITY

A TSM1 can be interconnected in a CAN bus network having up to 30 PCM6 modules and/or up to 90 TM6 modules. A single TSM1 can monitor up to 180 tracing circuits with a maximum of 540 RTD sensors (3 RTD per circuit) or 102 circuits with a maximum of 612 RTD sensors (6 RTD per circuit) or other circuit/RTD combinations.

TRACENET COMMUNICATION DISTANCE

The TSM1 can be interconnected to TraceNet™ modules in a CAN bus network having total cumulative distance of up to 1000 feet (305 m). A CAN repeater module is available for extending network distance and isolation if necessary.

The TSM1 communicates via CAN with the Thermon DCD-3 data communication device.

PM6 POWER MODULE WITH SOLID STATE RELAYS

The PM6 serves as the power switching module, using solid state relays for a TraceNet™ network of heat tracing control modules.

PM6 PRODUCT FEATURES

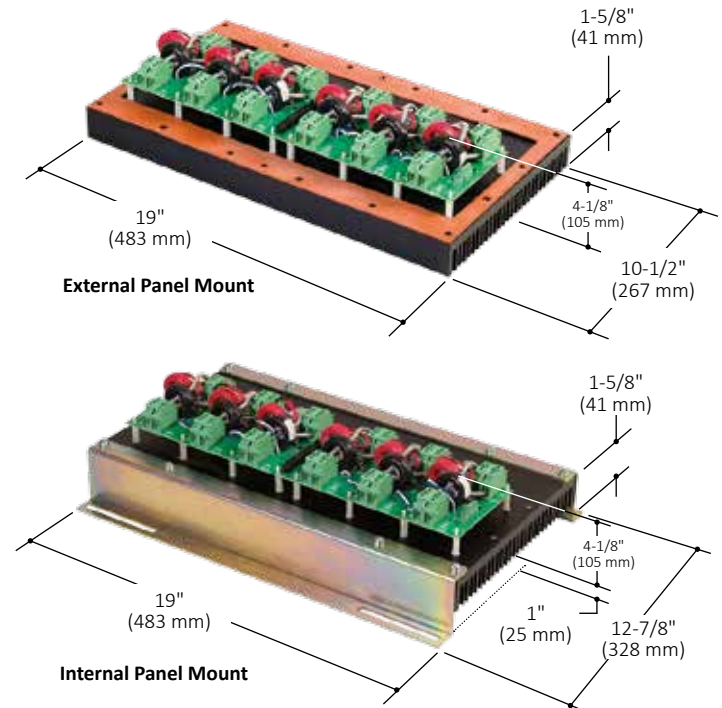
- Operates in a wide range of ambient conditions.
- Single or dual pole solid state switching.
- Nickel plated terminal construction.
- Black anodized aluminum heat sink capable of dissipating the heat generated by a total of 180 Amps continuous.
- Standardly supplied with polycarbonate touch safe cover 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

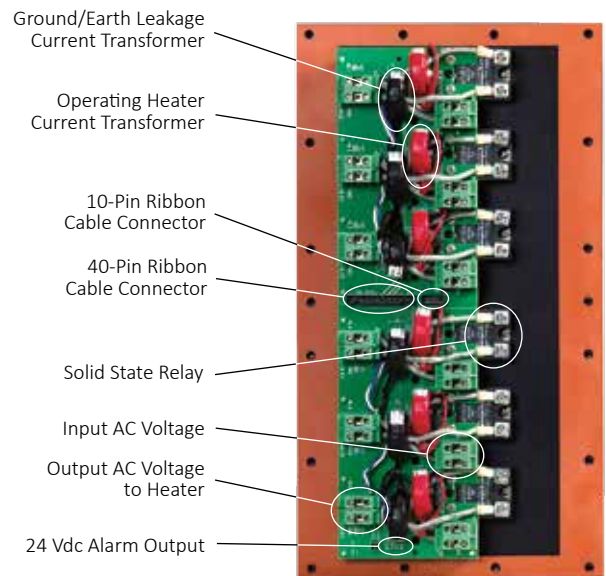
Circuit Control Capacity..... up to six heat trace circuits
Single pole relay switching capacity30 Amperes at 240 Vac*
Dual pole relay switching capacity.. 15 Amperes at 240 Vac*
Maximum power consumptionless than 3 Watts
Relay power connection 40-Pin header ribbon cable
Ground/earth leakage test connection...10-Pin header ribbon cable
Maximum storage temperature 185°F (85°C)
Minimum storage temperature-40°F (-40°C)
Oper. ambient temp. range .-40°F (-40°C) to 158°F (70°C)
Power terminal connections... 20 to 6 AWG (0.5 to 10mm²), 630V
Printed circuit boardconformally 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 or when operated in panel interiors exceeding 140°F (60°C). Higher voltage rating relays are also available as an option.

PM6 DIMENSIONAL DATA



PM6 CONNECTION DIAGRAM





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PCM6RM POWER CONTROL MODULE

The PCM6RM module serves as the primary power control module for a TraceNet™ network of heat tracing control modules. Powered by a 24 VDC power supply, the PCM6RM delivers the control signals to the PM6 or RM6 power modules and sends current and ground/earth leakage current transformer information on to the CAN bus data stream. The PCM6RM receives RTD information from CAN bus data stream and controls heat tracing power based on the RTD reading.

The PCM6RM communicates to the TSM1, DCD, and TM6RM/TM6DR modules through the CAN bus data link.



PCM6RM PRODUCT FEATURES

- Operates in a wide range of ambient conditions.
- Conformally coated for use in panels located in indoor or outdoor environments.
- When connected to an RM6 module, it controls up to six individual mechanical or solid state relays.
- When connected to a PM6 module, it controls up to six solid state relays.
- The PCM6RM module has the following control modes:
 1. On-Off
 2. On-Off with Soft-Start (solid state relays only)
 3. Proportional (solid state relays only)
 4. Ambient Proportional (solid state relays only)
- Activates test functions including:
 1. Ground/Earth Leakage Fault Circuit Test
 2. Loss of Heater Current Test
- Activates programmed control function based on the temperature values provided by up to 6 RTD's.
- Monitors ground/earth leakage and heater operating current in heat tracing circuits.

PCM6RM COMPONENT SPECIFICATIONS

Operating supply voltage 24 Vdc
Maximum power consumption 1.4 Watts
Input/Output communication CAN bus ports
(operating at 125 Kbps)
Maximum storage temperature 185°F (85°C)
Minimum storage temperature -40°F (-40°C)
Oper. ambient temp. range . -40°F (-40°C) to 158°F (70°C)
CAN bus 9-pin D-SUB
Ground/Earth leakage circuit fault test connection
10-Pin header ribbon cable
Relay power connections 40-Pin header ribbon cable

PCM6RM MOUNTING

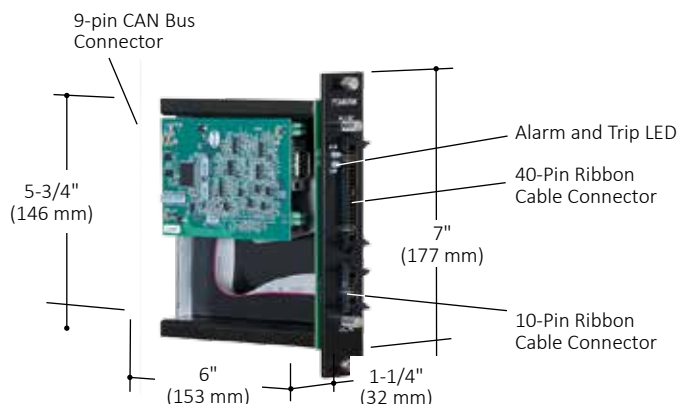
The PCM6RM comes in a ready-to-install rack mount enclosure. The PCM6RM minimizes space requirements and provides an easy and efficient method for installation.

A maximum of 12 PCM6RM modules can be installed into a BPM12 back plane and rack module which can be linked via ribbon cable to other TraceNet modules. Refer to the BPM12 section of this guide for more details.

PCM6RM DIMENSIONAL DATA AND CONNECTION DIAGRAM



PCM6RM Rack Mount



PCM6DR POWER CONTROL MODULE

The PCM6DR module serves as an alternate DIN rail mounted power control module for a TraceNet™ network of heat tracing control modules. Powered by a 24 VDC power supply, the PCM6DR delivers the control signal to the PM6 and/or RM6 power modules sends ground/earth leakage and heater current operating information to a CAN bus data stream. The PCM6DR receives RTD information from the CAN bus data stream and controls heat tracing power based on the RTD reading.



The PCM6DR communicates to the TSM1, DCD, and TM6RM/TM6DR modules through the CAN bus data link.

PCM6DR PRODUCT FEATURES

- Operates in a wide range of ambient conditions.
- Conformally coated for use in panels located in indoor or outdoor environments.
- When connected to an RM6 module, it controls up to six individual mechanical or solid state relays.
- When connected to a PM6 module, it controls up to six solid state relays.
- The PCM6DR module has the following control modes:
 1. On-Off
 2. On-Off with Soft-Start (solid state relays only)
 3. Proportional (solid state relays only)
 4. Ambient Proportional (solid state relays only)
- Activates test functions including:
 1. Ground/Earth Leakage Fault Circuit Test
 2. Loss of Heater Current Test
- Activates programmed control function based on the temperature values provided by up to 6 RTD's.
- Monitors ground/earth leakage and heater operating current in heat tracing circuits.

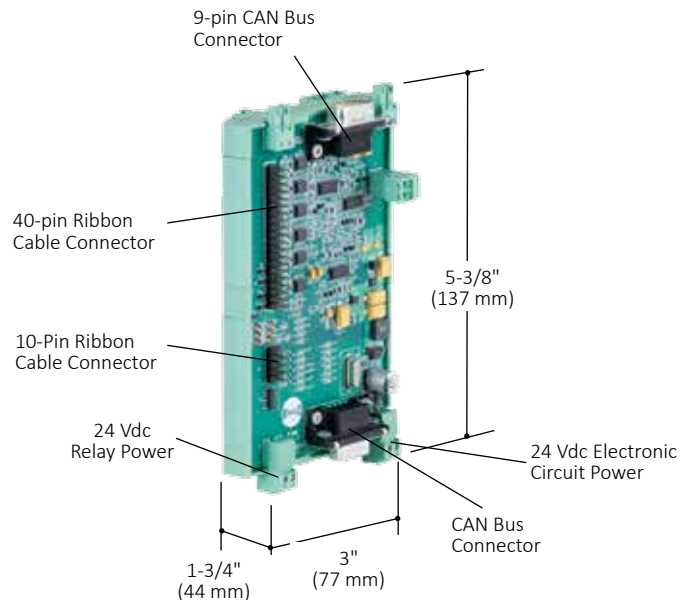
PCM6DR COMPONENT SPECIFICATIONS

Operating supply voltage 24 Vdc
Maximum power consumption 1.4 Watts
Input/Output communication CAN bus ports
(operating at 125 Kbps)
Maximum storage temperature 185°F (85°C)
Minimum storage temperature -40°F (-40°C)
Oper. ambient temp. range.... -40°F (-40°C) to 158°F (70°C)
CAN bus..... 9-pin D-SUB
Ground/Earth leakage circuit fault test connection
10-Pin header ribbon cable
Relay power connections..... 40-Pin header ribbon cable

PCM6DR MOUNTING

The PCM6DR is provided in a DIN rail mount configuration and is most often used in heat tracing control systems of eighteen circuits or less.

PCM6DR DIMENSIONAL DATA AND CONNECTION DIAGRAM





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TM6RM TEMPERATURE MONITORING MODULE

The TM6RM serves as the temperature sensing component for a TraceNet™ system of heat tracing control modules. The TM6RM receives temperature sensor information via a ribbon cable from the RTB6. Powered by 24 Vdc, the TM6RM sends a CAN bus stream of communications which identifies the RTD's and the values of each temperature being measured to the TSM1, DCD, PCM6RM, and PCM6DR modules.



TM6RM PRODUCT FEATURES

- Operates in a wide range of ambient conditions.
- Pluggable type terminal blocks allowing ease of installation of field wiring to terminals.
- Conformal coated for use in panels located in indoor or outdoor environments.

TM6RM COMPONENT SPECIFICATIONS

Operating supply voltage 24 Vdc
Maximum power consumption 0.7 Watts
Input/Output communication CAN bus port
(operating at 125 Kbps)
Maximum storage temperature 185°F (85°C)
Minimum storage temperature -40°F (-40°C)
Oper. ambient temp. range -40°F (-40°C) to 158°F (70°C)
CAN bus 9-Pin D-SUB
Temp. sensor connection 26-Pin header ribbon cable

TM6RM MOUNTING

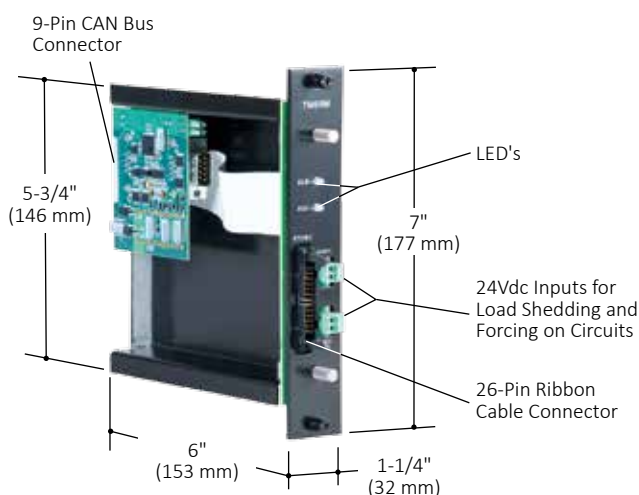
The TM6RM comes in a ready-to-install rack mount enclosure. The TM6RM minimizes space requirements and provides an easy and efficient method for installation.

A maximum of 12 TM6RM modules can be installed into a BPM12 back plane and rack module linked via ribbon cable to other TraceNet modules. Refer to the BPM12 section of this guide for more details.

TM6RM DIMENSIONAL DATA AND CONNECTION DIAGRAM



TM6RM Rack Mount



TM6DR TEMPERATURE MONITORING MODULE

The TM6DR serves as an alternate DIN rail mounted temperature sensing module for a TraceNet™ system of heat tracing control modules. The TM6DR receives temperature sensor information directly from RTD's. Powered by 24 Vdc, the TM6DR sends a CAN bus stream of communications which identifies the RTD's and the values of each temperature being measured to the TSM1, DCD, PCM6RM, and PCM6DR modules.



TM6DR PRODUCT FEATURES

- Operates in a wide range of ambient conditions.
- Pluggable type terminal blocks allowing ease of installation of field wiring to terminals.
- Conformal coated for use in panels located in indoor or outdoor environments.

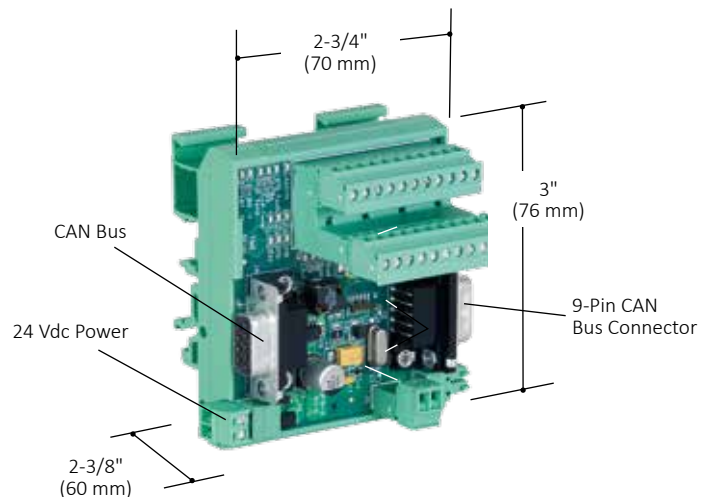
TM6DR COMPONENT SPECIFICATIONS

Operating supply voltage..... 24 Vdc
Maximum power consumption 0.7 Watts
Input/Output communication CAN bus ports
(operating at 125 Kbps)
Maximum storage temperature 185°F (85°C)
Minimum storage temperature -40°F (-40°C)
Oper. ambient temp. range... -40°F (-40°C) to 158°F (70°C)
CAN bus..... 9-Pin D-SUB

TM6DR MOUNTING

The TM6DR is provided in a DIN rail mount configuration and is most often used in heat tracing control systems having eighteen circuits or less. The TM6DR is also used in remote temperature sensing pods.

TM6DR DIMENSIONAL DATA AND CONNECTION DIAGRAM





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BPM12 BACK PLANE RACK MODULE

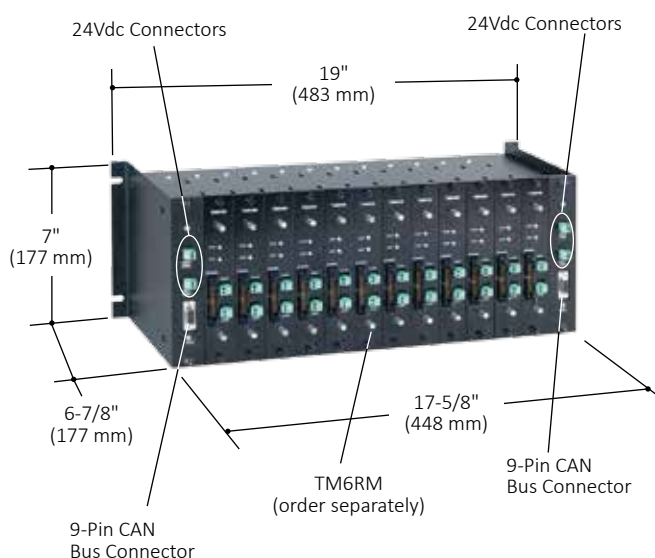
The BPM12 is a twelve space back plane board and a rack mounting enclosure system. It is specifically designed to house PCM6RM and TM6RM heat tracing control and temperature sensing modules.

The BPM12 allows for the convenient installation of up to twelve PCM6RM and/or TM6RM modules. For example, in an ambient sensing configuration with sixty six heat trace circuits, a BPM12 is configured with one TM6RM and eleven PCM6RM modules.

In a typical process control configuration, a BPM12 is configured with six TM6RM and six PCM6RM modules.



BPM12 DIMENSIONAL DATA AND CONNECTION DIAGRAM



BPM12 PRODUCT FEATURES

- Operates in a wide range of ambient conditions.
- Black powder coated alodine aluminum construction.

BPM12 COMPONENT SPECIFICATIONS

Operating supply voltage.....24 Vdc
Input /Output communication CAN bus ports
(operating at 125 Kbps)
Maximum storage temperature 185°F (85°C)
Minimum storage temperature -40°F (-40°C)
Oper. ambient temp. range.... -40°F (-40°C) to 158°F (70°C)
CAN bus..... 9-Pin D-SUB
Supply power connections..... screw terminal type
28 to 16 AWG (0.14 to 1.5 mm²)
Printed circuit board conformally coated

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 a PCM6RM/DR 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.

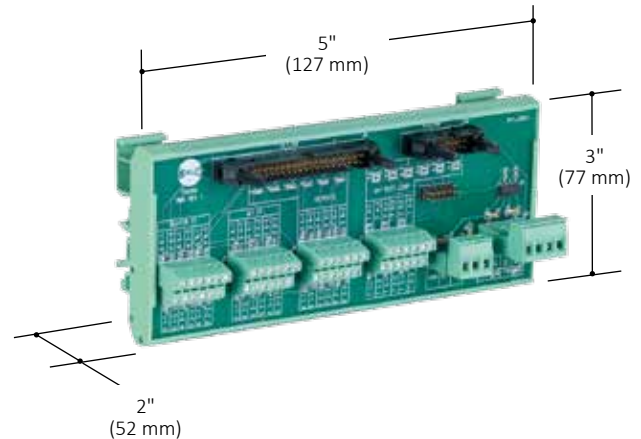
RM6 PRODUCT FEATURES

- 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.

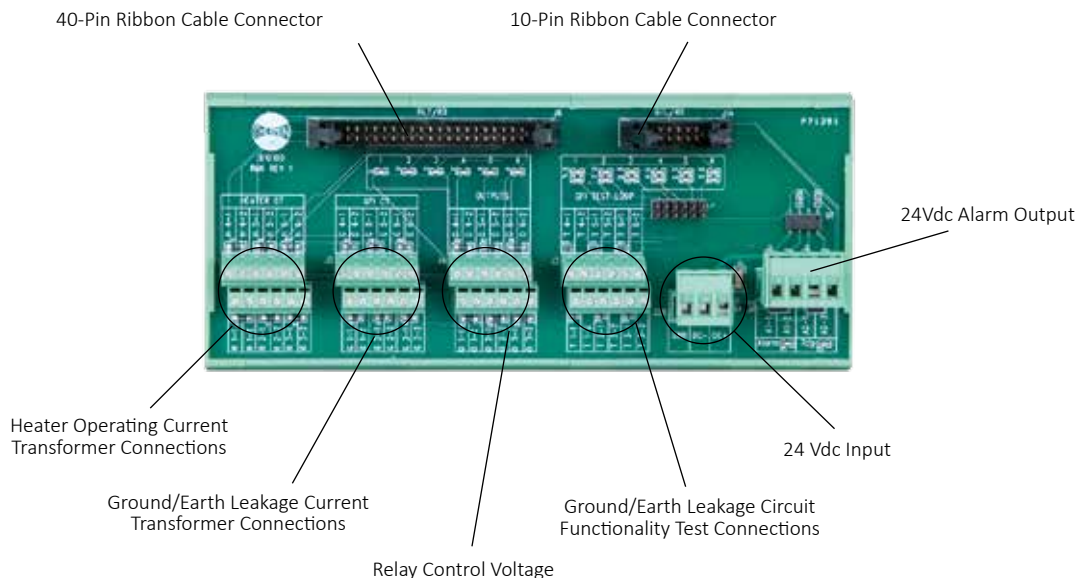
RM6 COMPONENT SPECIFICATIONS

Maximum storage temperature185°F (85°C)
 Minimum storage temperature -40°F (-40°C)
 Oper. ambient temp. range .-40°F (-40°C) to 158°F (70°C)
 Terminal connections..... 28-12 Awg (0.14 to 2.5 mm²)
 Earth leakage test connection10-Pin header ribbon cable
 Relay connection40-Pin header ribbon cable

RM6 DIMENSIONAL DATA



RM6 CONNECTION DIAGRAM





TraceNet™ TN Series

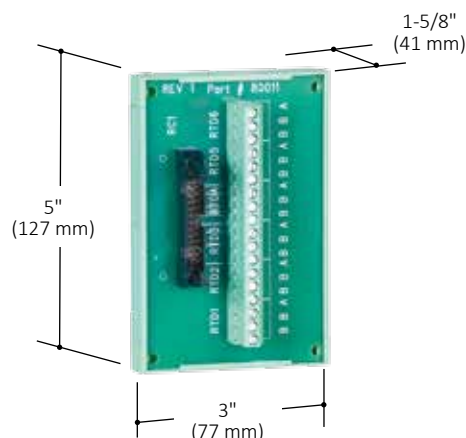
CONTROL AND MONITORING SYSTEM SPECIFICATION GUIDE

RTB6 RTD INTERFACE MODULE

The RTB6 is a DIN rail mountable six RTD sensor input module which links the field RTD wiring to the TM6RM via ribbon cable.



RTB6 DIMENSIONAL DATA



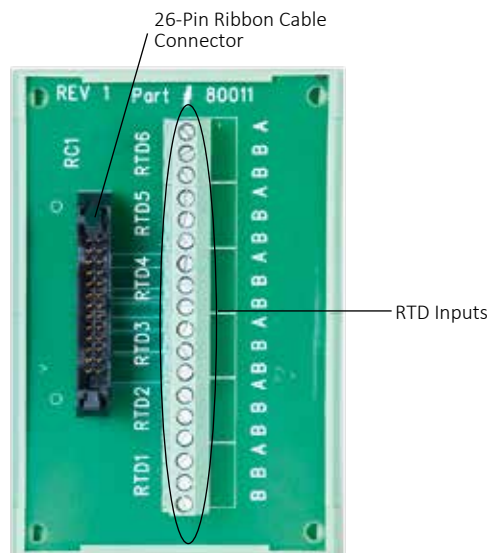
RTB6 PRODUCT FEATURES

- 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 temperature185°F (85°C)
Minimum storage temperature -40°F (-40°C)
Oper. ambient temp. range.....-40°F (-40°C) to 158°F (70°C)
Terminal connections..... 28-12 Awg (0.14 to 2.5 mm²)
Maximum RTD capacitysix

RTB6 CONNECTION DIAGRAM

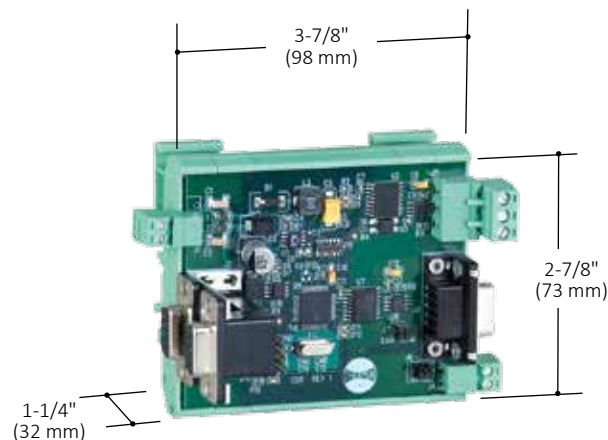


CIM1 INTERFACE MODULE

The CIM1 CAN interface module is designed to accept a CAN bus communication input and repeat the communication as received. The CIM1 will isolate the upstream panel communications from potential downstream field disturbances. By repeating the incoming communication in this manner, it is possible to extend the maximum communication distances beyond the 300m(1000 ft) recommended values at 125 Kbps.



CIM1 DIMENSIONAL DATA



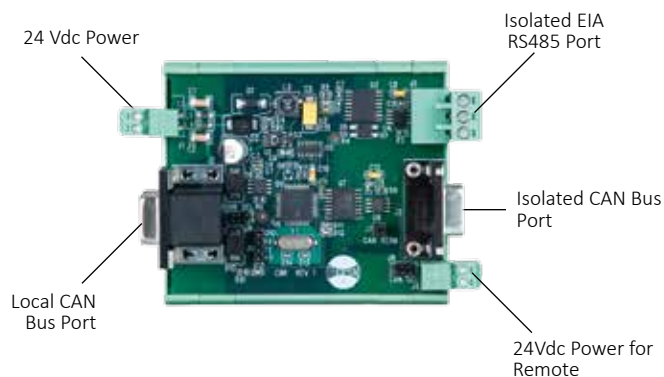
CIM1 PRODUCT FEATURES

- 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.

CIM1 COMPONENT SPECIFICATIONS

Nominal voltage 24 Vdc
Power consumption..... 1.3 Watts
Maximum storage temperature 185°F(85°C)
Minimum storage temperature -40°F (-40°C)
Oper. ambient temp. range..... -40°F (-40°C) to 158°F (70°C)
RS485 Port Connection 28-12 AWG (0.14 to 2.5 mm²)
nickel plated terminals, 5000 Vrms isolation
Local CAN Ports..... two ports 9 pin D-SUB connectors
(one port for daisy chain or bus termination with a CBTM)
Isolated CAN Port..... one port, 9 pin D-SUB Connector,
5000 Vrms isolation

CIM1 CONNECTION DIAGRAM





PS70 POWER SUPPLY MODULE

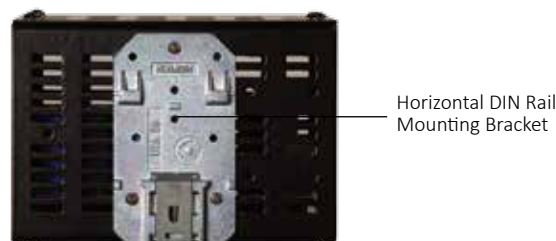
PS70 SPECIFICATIONS

Nominal input voltage100 to 240 Vac
Nominal output..... 24 VDC at 2.92 amps
Rated power loading..... 70 Watts at 140°F (60°C)
Minimum ambient temperature-40°F (-40°C)
Enclosure.....powder coated alodine aluminum NEMA 1/IP10
Mounting DIN rail mount
 in vertical (-V) or horizontal (-H) mounting
Printed circuit boardconformally coated

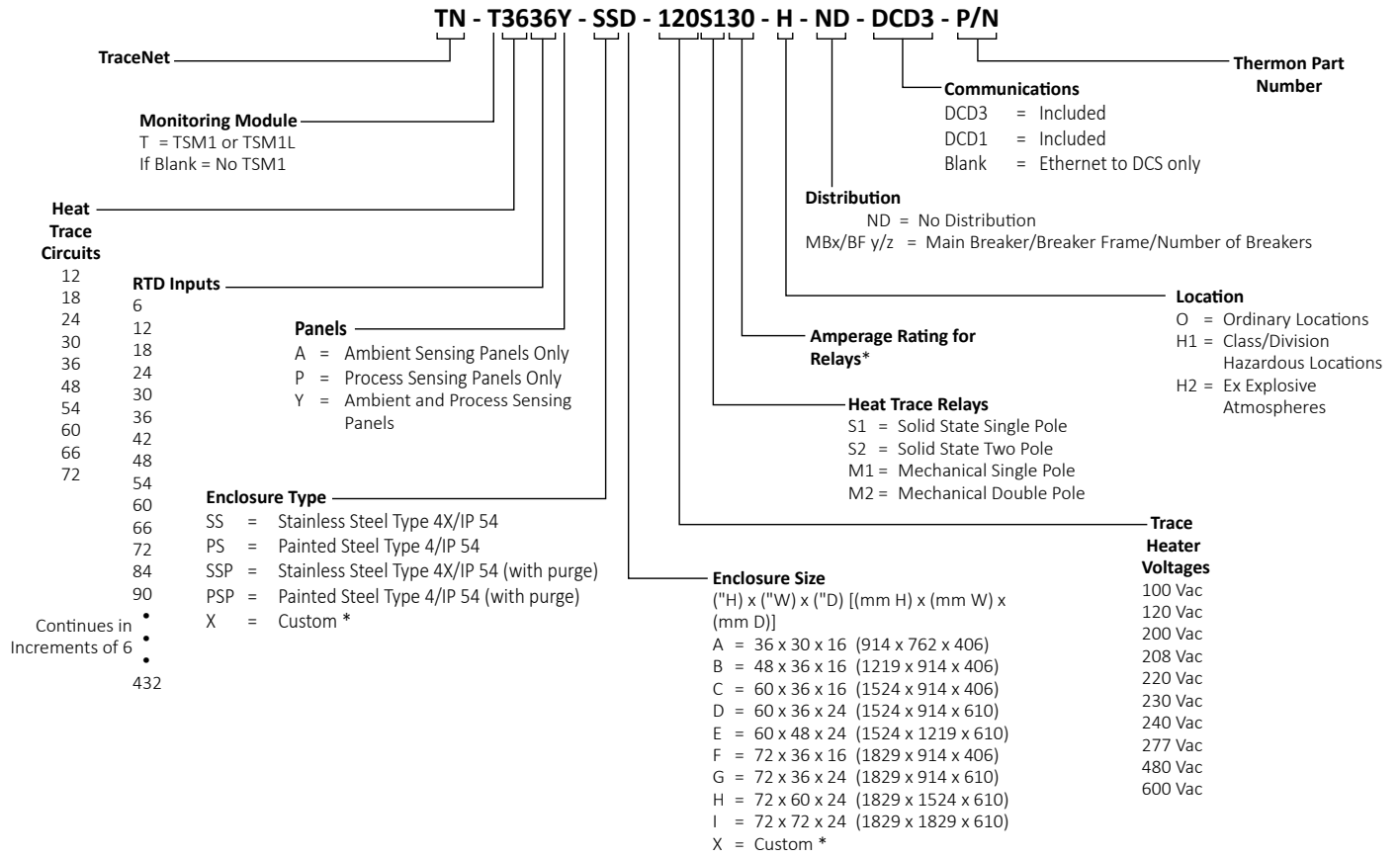
PS70 DIMENSIONAL DATA



PS70 MOUNTING OPTIONS



PRODUCT REFERENCE LEGEND



* Contact Thermon for additional information.

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