APPLICATION OVERVIEW
Control and monitoring systems can play an essential role in heat tracing applications which range from freeze protecting water lines to maintaining elevated process temperatures. While mechanical thermostats have been used successfully for many heat tracing applications, a more complete control and monitoring solution can be necessary for critical heat tracing applications. Advancements in technology have made electronic control and monitoring units both cost effective and more reliable. These systems conserve energy, extend system life, and ensure accurate temperatures are maintained, for reduced operating cost and increased plant reliability.

TraceNet Genesis’ key features include:
- Monitor electric heat trace circuit load currents
- Selectable control methods (On/Off, On/Off with Soft Start, Proportional, Ambient Proportional) for each individual circuit
- Programmable alarm set points, with time delay and remote alarm acknowledgment and reset capabilities
- Programmable "trip" set-points for each circuit
- Temperature sensor status indication
- Unique circuit identifier (48 characters maximum)
- Communication to host computer via Ethernet communications
- Adjustable ground/earth leakage "trip" and/or alarm capabilities
- Addressable RTD Temperature Sensors- up to twenty (20) per circuit
- Up to 6 months history to aid in troubleshooting
- ISO drawing in png format for viewing on Genesis HMI

GENESIS SYSTEM APPROVALS
- Nonhazardous Locations
  - ETL Listed Conforms to: UL STD. 508A
  - Certified to: CSA STD. C22.2 NO. 14

- Hazardous Locations (Purge)
  - ETL Listed Conforms to: UL STD. 508A. NFPA STD. 496
  - Certified to: CSA STD. C22.2 NO. 14

GENESIS COMPONENT APPROVALS
TraceNet systems are certified for nonhazardous locations, hazardous locations, and Purge for hazardous locations

IEC/EN/UL/CSA 61010-1
Ex ec IIC T4 Gc; II 3 Ex ec IIC T4 Gc
Class I, Division 2, Groups ABCD T4; Class I, Zone 2 Group IIC T4

CONTROL AND MONITORING SYSTEM

TRACENET GENESIS PANEL
SYSTEM SPECIFICATIONS (Based on lowest rating of all components)
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°C (-40°F) to 60°C (140°F)
- Enclosures: Type 4X, IP 66 *
- TraceNet Supply Voltage: 100-240 Vac, 50/60 Hz
- Heat Tracing Voltages: 100-600 Vac
- User Interface: 231 mm x 139 mm (10.6” x 5.5”) LVDS TFT LCD glove touch panel
- Maximum Number of Circuits: Seventy-two (72)
- Temperature Sensors per Circuit: Up to twenty (20) 100\W Platinum, 3 wire RTD's
- Current Switching Device Options:
  - Solid State Relay **
    1-pole
    2-pole
  - Mechanical Relay:
    Per design requirements
- Control Methods:
  - Process Sensing:
    On/Off, On/Off Soft Start, Proportional
  - Ambient Sensing:
    Proportional, Ambient Proportional-Mechanical (APCM), APC
  - Control Temperature Range: -129°C (-200°F) to 600°C (1112°F)
- Alarm Settings:
  - Low, High Temperature, and High Temperature Trip
  - Low, High Current, and High Current Trip
  - High Ground/Earth Leakage Current
  - RTD and Relay Faults
  - Loss of Communication
  - Programming Error
- Trip Settings:
  - High Temperature, Heater Current, Ground or Earth Leakage Current
- Networking Communications:
  - External: Ethernet
- External Alarm Relays:
  - Up to seven mechanical, 6 A @ 250 Vac or Vdc

* Additional cabinet types are available. Contact Thermon for details.
** Rating based on extended heat sinks. Multiple single pole relays may be used for two and three phase circuits. Higher voltage rated relays are also available as an option.
**HMI (HUMAN MACHINE INTERFACE)**

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

The HMI communicates directly with TraceNet Command and DCS systems through its Ethernet port.

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**HMI SPECIFICATIONS**

- Operating supply voltage .................................................. 24 Vdc
- Max Power consumption ................................................. 30 Watts
- Clock speed ................................................................. 1.5 GHZ
- Processor ................................................................. 32 Bit Arm Cortex A15
- IP Rating ................................................................. Type 4X, IP66
- Brightness ................................................................. 1000 cd/m²
- Input/Output ports .................................................. Ethernet/USB
- Maximum storage temperature ........................................ 85°C (185°F)
- Minimum storage temperature ......................................... -40°C (-40°F)
- Operating ambient temperature range ....................... -40°C (-40°F) to 70°C (158°F)

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**HMI DIMENSIONAL DATA**

- Circuit History For Trending
- Circuit Dashboard
- Circuit Isometric Drawing
- "Glove Touch" User Interface

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**HMI PRODUCT FEATURES**

- TraceNet Genesis HMI Is IP66
- Module operates in a wide range of ambient conditions
- Multi-language capability
- Color display utilizes LED backlighting to maximize service life and is additionally programmable for “sleep mode” operation
- Utilizes projected capacitive touch screen for user input functions
- Intuitive user friendly graphical interface
- Type 4X, IP66 panel mount enclosure which may be installed on panel with access door or inside on panel swingout
- Optically bonded display for bright sunlight visibility

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**THERMON.COM**
DCM (DISTRIBUTED CONTROL MODULE)
The DCM serves as the power switching module, using solid state relays for a TraceNet™ network of heat tracing control modules.

DCM 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
• Includes a ground/earth leakage circuit test loop which allows the operator to conduct a functionality test on each circuit
• The DCM 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)
  5. Ambient Proportional- Mechanical
• 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 20 RTD’s per circuit
• Monitors ground/earth leakage and heater operating current in heat tracing circuits

DCM COMPONENT SPECIFICATIONS
Circuit control capacity ...................... up to six heat trace circuits
Storage ambient temp. range....... -40°C (-40°F) to 105°C (221°F)
Operating ambient temp. range... -40°C (-40°F) to 100°C (212°F)
Power terminal connections1
  0.5 to 10 mm² (20 to 6 AWG), 630 Vac
Printed circuit board............................... conformal coated
Heat sink .............................................. Type 4X, IP66

DCM DIMENSIONAL DATA

1. DIN-rail mounted terminal blocks for line voltage to be off PC board.
DTM (DISTRIBUTED TEMPERATURE MODULE)
The DTM is a DIN rail mountable six RTD sensor input module which links the field RTD wiring to the DCM module via CANBus. Any RTD sensor may be mapped to any heater circuit on the CANBus network.

DTM DIMENSIONAL DATA

DTM PRODUCT FEATURES
- Up to six RTD sensors that can be independently addressed to one or more heat trace circuits
- DIN rail mountable
- Conformal coated printed circuit board for use in panels located in indoor and outdoor environments

DTM COMPONENT SPECIFICATIONS
Storage ambient temp. range.........-40°C (-40°F) to 105°C (221°F)
Operating ambient temp. range. -40°C (-40°F) to 100°C (212°F)\(^1\)
Terminal connections.................. up to 2.5 mm\(^2\) (28-12 Awg)
Maximum RTD capacity .................................................. 6

1. For designs that allow operation in ambient conditions below -40°F (-40°C) contact Thermon.

DTM CONNECTION DIAGRAM

IOM (INPUT OUTPUT MODULE)
The IOM is a DIN rail mountable input/output module with 6 individually configurable input/output channels and one dedicated system fault alarm output. Outputs may be configured to signal a variety of conditions such as trips, low temperature alarms, ground/earth leakage alarms, etc. Inputs may be used to trigger a variety of events such as load shed or forcing on circuits.

IOM DIMENSIONAL DATA

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

IOM COMPONENT SPECIFICATIONS
Storage ambient temp. range.........-40°C (-40°F) to 105°C (221°F)
Operating ambient temp. range. -40°C (-40°F) to 100°C (212°F)\(^1\)
Terminal connections.................. up to 2.5 mm\(^2\) (28-12 Awg)

1. For designs that allow operation in ambient conditions below -40°F (-40°C) contact Thermon.

IOM CONNECTION DIAGRAM
TRACENET™ GENESIS

TRACENET COMMAND
Genesis Systems communicate via Ethernet to the Thermon TraceNet Command electric tracing circuit monitoring software. TraceNet Command provides centralized electric tracing information for all panels in a facility, 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 also gives the operator the ability on all panels from a single location 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 (DISTRIBUTED CONTROL SYSTEMS) COMMUNICATIONS
Genesis Systems communicate via Ethernet 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.
PRODUCT REFERENCE LEGEND

TraceNet Genesis Series

Heat Trace Control Relays

- RTD Inputs
  - 18
  - 36
  - 54
  - 72

Heat Trace Control Relays

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

Distribution

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

Location

- O = Ordinary Locations
- H1 = Class/Division Hazardous Locations (NonAm Norms)
- H2 = Ex Explosive Atmospheres (ATEX or IECEx)

Amperage Rating for Control Relays

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

Trace Heater Operating Voltage(s)

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

Enclosure Type

- SS = Stainless Steel Type 4X/IP66
- PS = Painted Steel Type 4/IP66
- SSP = Stainless Steel Type 4X/IP66 (with purge)
- PSP = Painted Steel Type 4/IP66 (with purge)
- X = Custom

Enclosure Size

- ([H] x [W] x [D]) [(mm H) x (mm W) x (mm D)]
  - A = 36 x 30 x 16 (914 x 762 x 406)
  - B = 48 x 36 x 16 (1219 x 914 x 406)
  - C = 60 x 36 x 16 (1524 x 914 x 406)
  - D = 60 x 36 x 24 (1524 x 914 x 610)
  - E = 60 x 48 x 24 (1524 x 1219 x 610)
  - F = 72 x 36 x 16 (1829 x 914 x 406)
  - G = 72 x 36 x 24 (1829 x 914 x 610)
  - H = 72 x 48 x 24 (1829 x 1219 x 610)
  - I = 72 x 72 x 24 (1829 x 1829 x 610)
  - X = Custom

Notes:

1. Other options for the TraceNet, such as installations in conditions below -40°F (-40°C).
2. Contact Thermon for additional information.