NELSON

Microprocessor Based Heater Cable Monitoring System

Specification – Application Information

Type CM-1

Voltage:
85 VAC to 300 VAC

Current:
50mA to 30A

Ambient Temperature:
-40°F to 130°F

Standard Versions:
12 Circuit Maximum
24 Circuit Maximum
48 Circuit Maximum

Description of Cable Monitoring System

This heater cable monitoring system (referenced to as "CM-1") continually monitors the status of both series and parallel styles of electric heat tracing cables and panels. This system monitors the supply voltage and current flow to each heating device. With the addition of continuity monitoring devices (referenced to as "CMD"), this system monitors both bus wires in parallel styles of heating cable. When used in conjunction with ground fault branch breakers, the CM-1 serves as an automatic alarm system for any ground fault condition.

Description of System Components

The cable monitoring system is mounted in a NEMA 4 or 4X enclosure that can be wall or rack mounted. The unit is normally located in close proximity to the breaker panel feeding the heat tracing system. The system is available in configurations up to 48 circuits and is environmentally hardened for use in various plant locations. All standard versions of the CM-1 can be installed in Division 2 hazardous locations without any special considerations. Individual CM-1 systems thoughout a facility can be connected to a central PC running RS-485 host communications software. Alarm status and alarm acknowledgement can be accessed from the central location.

Scanner Board

The system is controlled by a microprocessor-based scanner that systematically interrogates all circuit parameters and compares actual vs programmed data. The scanner board is environmentally hardened to allow the system to be installed in operating sections of the facility subject to high ambient temperatures. The scanner receives data from the sensor cards via a data bus connection. Output information is continually displayed through the door of the enclosure by the display unit. Each scanner board can handle from 4 to 24 circuits.

Display Unit

The display unit is visible through a protective Plexiglas panel in the door of the assembly. All indicators are LED to provide visibility in all light conditions. The unit displays the circuit being monitored on 0.5 inch read outs and heater system status of each circuit on large easy-to-see bar lights.

Sensor Cards

The sensor cards monitor the electrical parameters of each heating circuit. Each sensor card monitors up to 4 circuits for voltage, current and continuity. An adjustable potentiometer allows the low current alarm level to be set for each circuit. Heater power wiring is connected to 30 amp terminal blocks mounted directly on each sensor card. Each individual circuit is designed to operate on voltages from 120 through 277VAC.

Continuity Monitoring Device

For continuity monitoring, parallel types of heating cables require the attachment of a bus monitor device at the end of each heater circuit. This device is totally passive and generates no electrical noise or signals that might interfere with other equipment located in the same general area. The scanner board looks for this device on each scan cycle to verify bus wire integrity over the entire length of cable.

EGS Electrical Group NELSON HEAT TRACE

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SPECIFICATIONS

Ambient Temperature:
-40° to +55°C (-40° to +130°F)

Relative Humidity:
0-95% maximum, non-condensing, PC boards are conformal coated and special connectors are used.

Enclosures:
NEMA 4, powder coated steel
NEMA 4X, Stainless Steel

Display:
Single line numeric LED circuit indication. LED bar indicators for Alarm status

Power Input:
120VAC, 1.0A

Voltage Range:
85 to 300VAC

Current Range:
0.05 to 30.0A

Continuity:
Requires additional CMD device for each monitored circuit

Alarm Output Rating:
AC/DC Contact, 12-120V @ 0.1A maximum

Control Input:
Requires Dry Contact from control device(s) or -V Control Input

Communications:
RS-485, Modbus® Protocol

User-Definable Options:
Alarm Silence Timeout
Adjustable, 20 min to 24 hrs
Alarm Reset Function:
Selectable, Manual or Automatic
Alarm Delay Function:
Adjustable, 5 sec to 5 min
Cable Monitor Function:
Selectable, Current or Continuity Mode
Monitor Status:
Selectable, Thermostat or Voltage Priority
Voltage Frequency:
Selectable, 60Hz or 50Hz
Scanning Speed:
Selectable, Normal or Fast

Options:
-V Control Input
Specified for systems without available dry contact from control device(s)
CMD Devices
PLT-CMD
NEMA 4X, non-metallic enclosure
ALT-CMD
NEMA 4, metallic enclosure
D1-CMD
NEMA 4, 7, 9 for Division 1 Hazardous areas

SELECTION TABLE

The selection table below allows for the proper specifying of the standard systems (example: CM-1-04-N4).

CM-1 — Product Family

YY — Number of Circuits (Groups of 4)
- 12X (04X to 12X Circuit Max)
- 24 (04 to 24 Circuit Max)
- 48 (04 to 48 Circuit Max)

ZZ — Type of enclosure
- N4 = NEMA 4
- SS = Stainless Steel

V — Voltage Input Option

APPROVALS

FM
Ordinary Locations
Hazardous (Classified) Locations
Class I, Division 2, Groups A, B, C, D
Class II, Division 2, Group E

CSA
Ordinary Locations
Hazardous (Classified) Locations
Class I, Division 2, Groups A, B, C, D

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NELSON HEAT TRACING SYSTEMS
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