

# NELSON™

## Microprocessor Based Heater Cable Monitoring System

### Specification – Application Information

#### Type CM-1



Alarm Silence Switch

Alarm Reset

NEMA 4 or 4X  
Enclosure

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 throughout 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.

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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).

<b>CM-1</b> Product Family	<b>YY</b> Number of Circuits (Groups of 4) 12X (04X to 12X Circuit Max) 24 (04 to 24 Circuit Max) 48 (04 to 48 Circuit Max)	<b>ZZ</b> Type of enclosure N4 = NEMA 4 SS = Stainless Steel	<b>V</b> Voltage Input Option
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### APPROVALS

<p><b>FM</b> Ordinary Locations Hazardous (Classified) Locations Class I, Division 2, Groups A, B, C, D Class II, Division 2, Group E</p> 	<p><b>CSA</b> Ordinary Locations Hazardous (Classified) Locations Class I, Division 2, Groups A, B, C, D</p> 
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**NELSON HEAT TRACING SYSTEMS**

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