



2 Line, 32 Character  
LCD Display

Unit Can Be Wall  
or Rack Mounted

NEMA 4X Enclosures

Ambient Temperature  
-40°F to +122°F  
-40°C to + 50°C

Current Monitoring  
0.1 to 30A

Ground Leakage Monitoring  
10 to 1000mA

Power Handling  
85VAC to 280VAC Capability

### 1.1 Description of Circuit Management System

This circuit management system (referenced to as “CM-2001”) is a microprocessor based digital control and monitoring system that has been specifically designed for stand-alone or networked electric heat tracing applications. This system provides temperature control and heater cable monitoring while communicating additional information to operations personnel such as temperature alarms, voltage and current alarms, ground fault leakage, sensor failures and communications failures.

### 1.2 Description of System Components

The circuit management system is housed in a NEMA 4X coated steel or stainless steel enclosure that can be wall or rack mounted. The system is available in single or dual pole solid-state heater switching and is environmentally hardened for use in various plant locations. The standard versions of the CM-2001 can be installed in Division 2 hazardous locations without special requirements. Up to 32 individual systems can be connected to a single RS-485 data highway allowing communications to a host device. The CM-2001 is fully compatible with Nelson’s CM.comm PC based communications software or can communicate with any Modbus® compatible device. All alarm and control functions can be accessed from the central location.

### 1.3 Description of Key Features

- **Easy to Use Interface**

The 2 line, 32 character, alphanumeric LCD display enables the use of English language prompts for setpoint entry and operation. There are no cryptic codes or key press combinations to remember.

- **On/Off or Proportional Control**

The desired control mode can be easily selected via the front panel user interface.

- **Ground Fault Alarm and Trip Settings**

Separate alarm and trip settings for ground leakage current allow alarming of developing faults prior to circuit interruption.

- **Dual RTD Input**

The optional second RTD can easily be configured in a variety of ways, including Backup and High Temperature Cutout.

- **Programmable Auto Test Cycle**

The user can select an interval from 1 to 24 hours to have the unit automatically check the heater operating current and ground fault conditions. This allows problems to be detected and fixed before the heating system is actually needed.

- **Host Communications**

The RS-485 MODBUS® communications capability is included as a standard feature. There are no expensive “daughter boards” or firmware updates required.

## Specifications

### Temperature Input

Range:	-50 to +500°C (-58 to 932°F)
Accuracy:	±2°C
Repeatability:	±1°C
RTD:	100 ohm platinum, 3-wire RTD, 20 ohms maximum lead resistance.
RTD Configuration:	Single, Backup, Highest, Lowest, Average or High Temperature Cutout
RTD Fail-safe:	Heater ON or Heater OFF

### Heater Switching

Configuration:	Single-pole or Two-pole, dual SCR per phase, 800 amp, 1 cycle inrush
Ratings:	85-280Vac, 30A continuous
Line Frequency:	50 or 60Hz
Current Measurement:	0.1 to 30A 3%±0.2A
GF Measurement:	10 to 1000mA 5%±2mA
Voltage Measurement:	0 to 300Vac 3%±2V

### Control Power

Power Requirement:	Control power from heater voltage 85-280VAC, 10VA max. Protected by a 2A fuse
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### Communications

Port:	(1) RS-485
Protocol:	Modbus® RTU
Transmission Rate:	600,1200, 2400, 4800, 9600 baud
Wiring:	2-wire, shielded, twisted pair
Max. Wiring Run:	4,000 feet without repeater
Modules per Network:	32

### Measured Values

Temperature:	-50 to 500°C (-58 to 932°F)
Minimum Temperature:	-50 to 500°C (-58 to 932°F)
Maximum Temperature:	-50 to 500°C (-58 to 932°F)
Heater Current:	0.1 to 60A
Ground Fault Current:	10 to 1000mA
Min. Heater Voltage:	85 to 300Vac
Max. Heater Voltage:	85 to 300Vac

### User Interface

Display:	16-character x 2-line LCD Alphanumeric display. Contrast adjustable by potentiometer.
Keypad:	9 tactile keys, polyester faceplate <ul style="list-style-type: none"> <li>• Setpoint, actual, status</li> <li>• Message Up, Message Down</li> <li>• Value Up, Value Down</li> <li>• Reset</li> <li>• Enter</li> </ul>
Panel Indicators:	Power On Heater On Serial communication active System failure Process alarm
Security:	Controller parameters password protected

#### Environment

Approvals:	CSA NRTL/C and FM Class I, Div. 2, Groups A, B, C, D Class I, Zone 2, Groups IIC Class II, Div. 1, Groups E, F and G Class III
Operating Temperature:	-40°C to +50°C
Conformal Coating:	Boards conformal coated for hostile Environments.

#### Enclosure

Type:	NEMA-4X coated steel or stainless steel, painted black
Size:	10"Hx8"Wx6"D
Features:	Quick release latches to open door. Flat aluminum plate acts as heatsink and mounting flange for mounting on Uni-Strut. One 3/4" conduit entry hole for power and three 1/2" conduit entry holes for RTD and signal wiring.

#### Alarm Output

Alarm:	Programmable for NO or NC contacts One DC opto-isolated contact One AC triac contact
Alarm Rating:	DC contact: 30Vdc/0.1A, 500mW max AC contact: 12-240Vac@0.5A max
Alarm Output:	LED Indicator: 5Vdc/50mA

#### Alarm Function

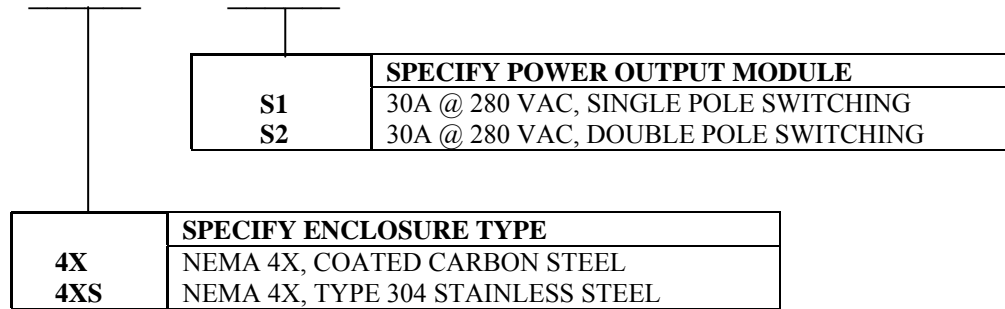
Temperature:	High Temperature Alarm Low Temperature Alarm
Current:	Low Current Alarm High Current Alarm
Ground Fault Current:	Ground Fault Current Alarm Ground Fault Current Trip
Voltage:	High Voltage Alarm Low Voltage Alarm
Hardware:	Self-Check Failure Switch Shorted RTD Failure

#### User-Definable Options

Heater Name or Tag:	16 Character Alphanumeric
Temperature Units:	°C or °F
Control Method:	ON/OFF with deadband or Proportional
Deadband:	1 to 50°C (2 to 90°F)
PowerLimit:	0.1 to 30A, off
SoftStart:	10 to 999s, off
Auto Check:	1 to 24hrs, off
Temperature Setpoint:	-50 to 500°C (-58 to 932°F), off, none
High Temp Alarm:	-50 to 500°C (-58 to 932°F), off
Low Temp Alarm:	-50 to 500°C (-58 to 932°F), off
High Current Alarm:	0.1 to 30A, off
Low Current Alarm:	0.1 to 30A, off
Ground Fault Alarm:	10 to 1000mA, off
Ground Fault Trip:	10 to 1000mA
High Voltage Alarm:	85V to 300V, off
Low Voltage Alarm:	85V to 300V, off
Override:	On or Off
Alarm Contacts:	Solid State - NO or NC for each contact

Nelson's CM-2001 Circuit Management System is available in multiple configurations of enclosure ratings and power ratings. The selection tables below allow for the proper specifying of the standard systems (example: CM2001-4X-S1). For custom configurations or modifications, consult factory.

**CM-2001 - -**



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