



Series N7

Installation Manual



Time and Temperature Controller



ISO 9001



Registered Company
Winona, Minnesota USA

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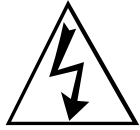
Made in the U.S.A.

\$15.00

Safety Information



**CAUTION or
WARNING**



**Electrical
Shock Hazard**


CAUTION or WARNING


We use note, caution and warning symbols throughout this book to draw your attention to important operational and safety information.

A “NOTE” marks a short message to alert you to an important detail.

A “CAUTION” safety alert appears with information that is important for protecting your equipment and performance. Be especially careful to read and follow all cautions that apply to your application.

A “WARNING” safety alert appears with information that is important for protecting you, others and equipment from damage. Pay very close attention to all warnings that apply to your application.

The safety alert symbol,  (an exclamation point in a triangle) precedes a general CAUTION or WARNING statement.

The electrical hazard symbol,  (a lightning bolt in a triangle) precedes an electric shock hazard CAUTION or WARNING safety statement.

Warranty

The Series N7 is manufactured by ISO 9001-registered processes and is backed by a three-year warranty.

Return Material Authorization (RMA)

1. Call Watlow Customer Service, (507) 454-5300, for a Return Material Authorization (RMA) number before returning any item for repair. We need this information:

- Ship to address
- Contact name
- Method of return shipment
- Detailed description of the problem
- Name and phone number of person returning the product.
- Bill-to address
- Phone number
- Your P.O. number
- Any special instructions

2. Prior approval and an RMA number, from the Customer Service Department, is needed when returning any unused product for credit. Make sure the RMA number is on the outside of the carton, and on all paperwork returned. Ship on a Freight Prepaid basis.

3. After we receive your return, we will examine it and determine the cause for your action.

4. In cases of manufacturing defect, we will enter a repair order, replacement order or issue credit for material returned.

5. To return products that are not defective, goods must be in new condition, in the original boxes and they must be returned within 120 days of receipt. A 20% restocking charge is applied for all returned stock controls and accessories.

6. If the unit is unrepairable, it will be returned to you with a letter of explanation. Repair costs will not exceed 50 percent of the original cost.

7. Watlow reserves the right to charge for no trouble found (NTF) returns, not to exceed 20% of the original net price.

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Series N7 Controller

Watlow's Series N7 temperature controller provides ample flexibility for use in a broad range of applications. The Series N7 delivers up to four zones of on-off or PID control, that can be sensed with thermocouples (types J, K and E), 2-wire RTDs and 3-wire RTDs. Voltage or process inputs are also available.

The Series N7 offers a wide variety of outputs. The base model has six switched dc outputs, with a nominal output voltage of 5V and a maximum current of 30 mA. Two additional switched dc outputs can be added, for a total of eight possible outputs. An optional high-voltage board provides up to six high-voltage outputs, in place of the switched dc outputs.

The base output module has two solid-state relays; an option of four additional solid-state relays is available. The solid-state relays have a maximum operating current of 0.4 amps. Other available options offer either two or four electromechanical relays, or four no-arc relays. The electromechanical relays and no-arc relays each have a maximum operating current of 8 amps. The maximum operating voltage for all high-voltage options is 250V~ (ac).

Because the Series N7 can operate different types of equipment, it can replace other controllers, which simplifies inventory and manufacturing, and reduces your supplier base. The Series N7 can operate under many rigorous environmental conditions with an 80°C (176°F) ambient rating and a superior immunity to electrical interference.

The controller is tested to UL and CE standards.

Features and Benefits

Custom Firmware

- Allows you to customize multiple applications in one controller.

Custom Overlay

- Customize your interface with up to 32 keys and 32 indicator lights.

Multiple Inputs and Outputs

- Enough inputs and outputs to run most applications.
- Up to four loops of control, control temperatures and times.
- Machine functions.

Communications

- Capable of flash downloading firmware, and of Modbus and PC communications.

Ethernet Communications Add-on Board

- NAFEM Protocol and development of additional memory

Mounting Options

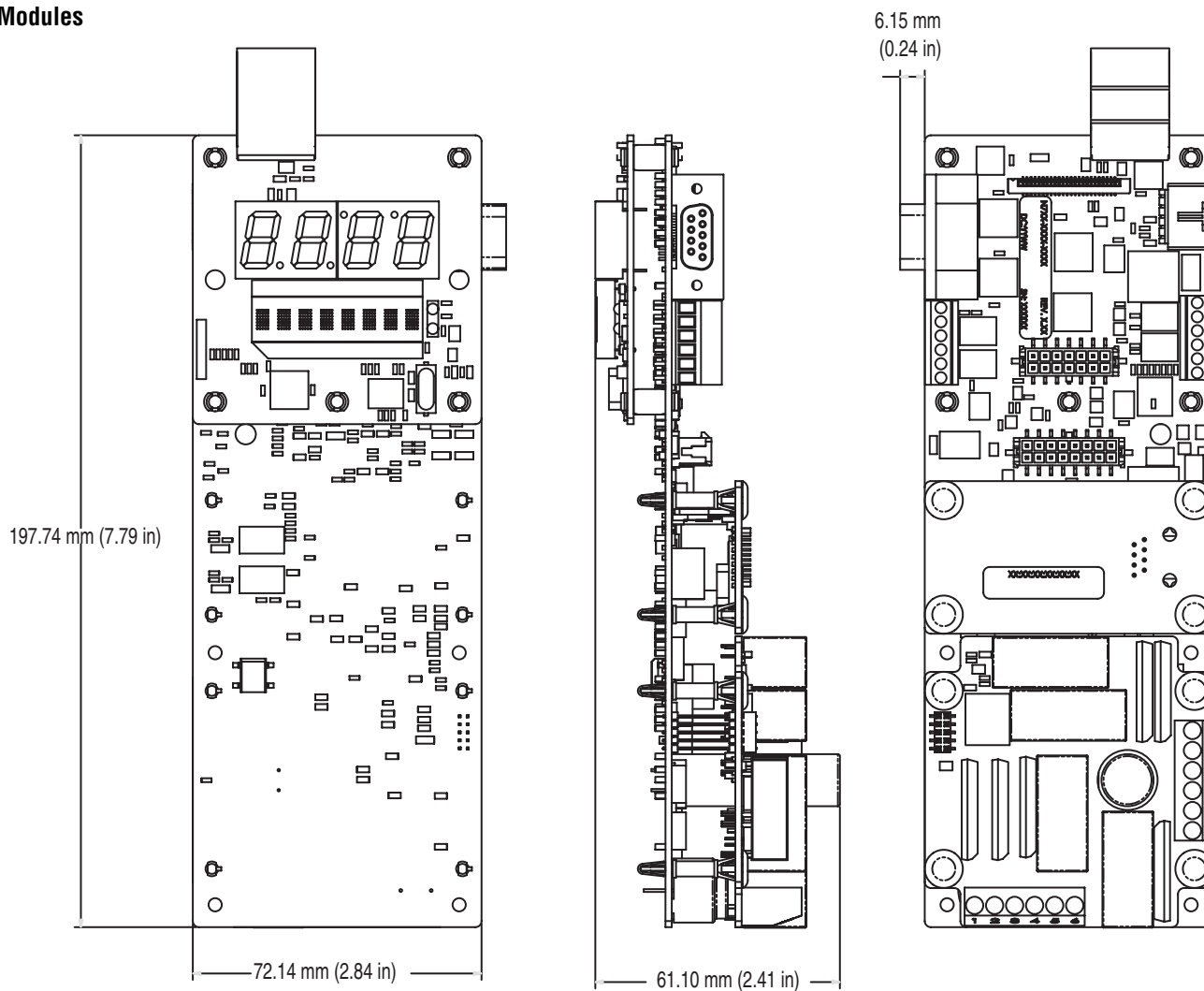
- The Series N7 mounts either vertically or horizontally to fit your equipment.

2

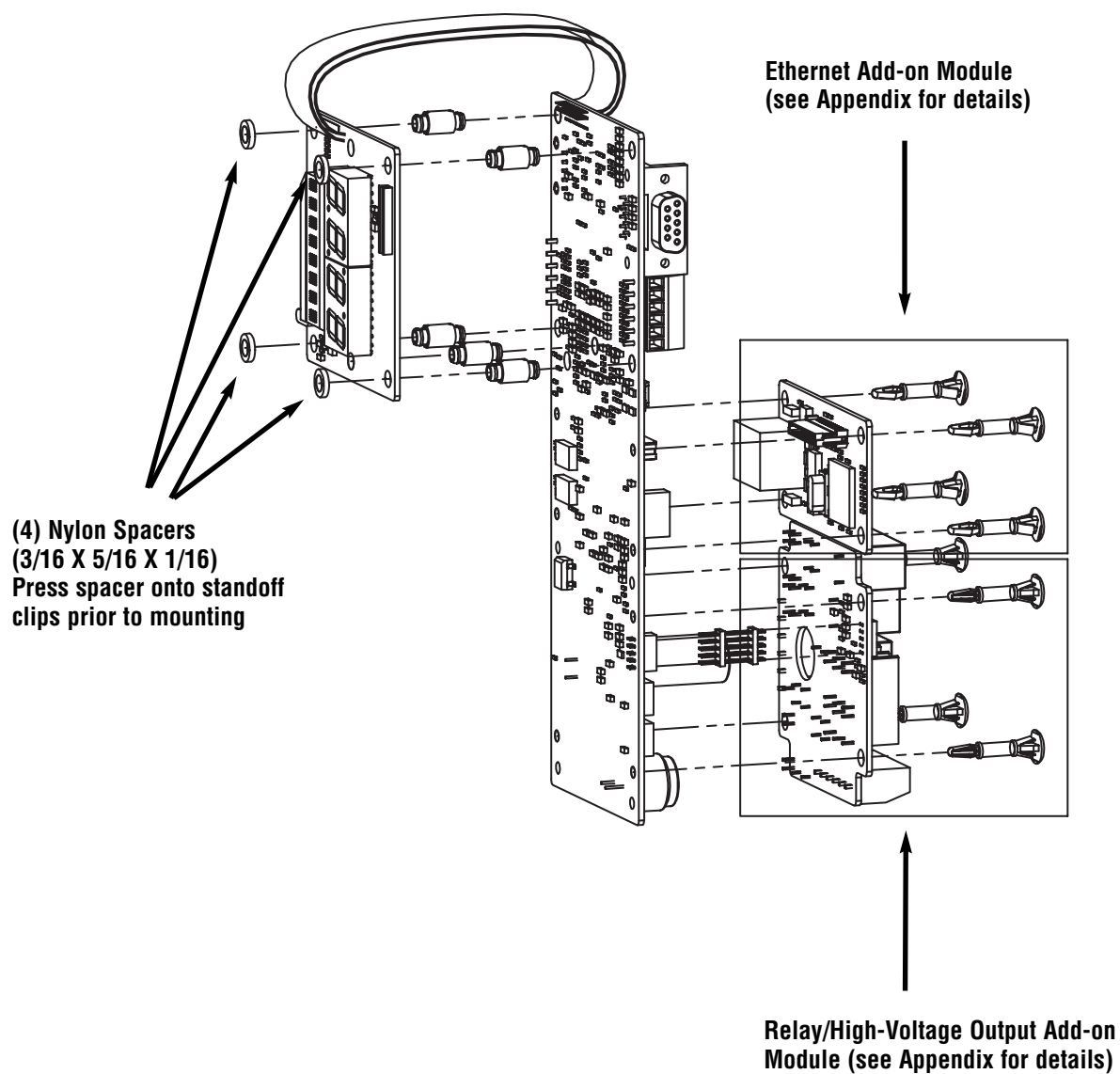
Install and Wire

Series N7 Controller Dimensions

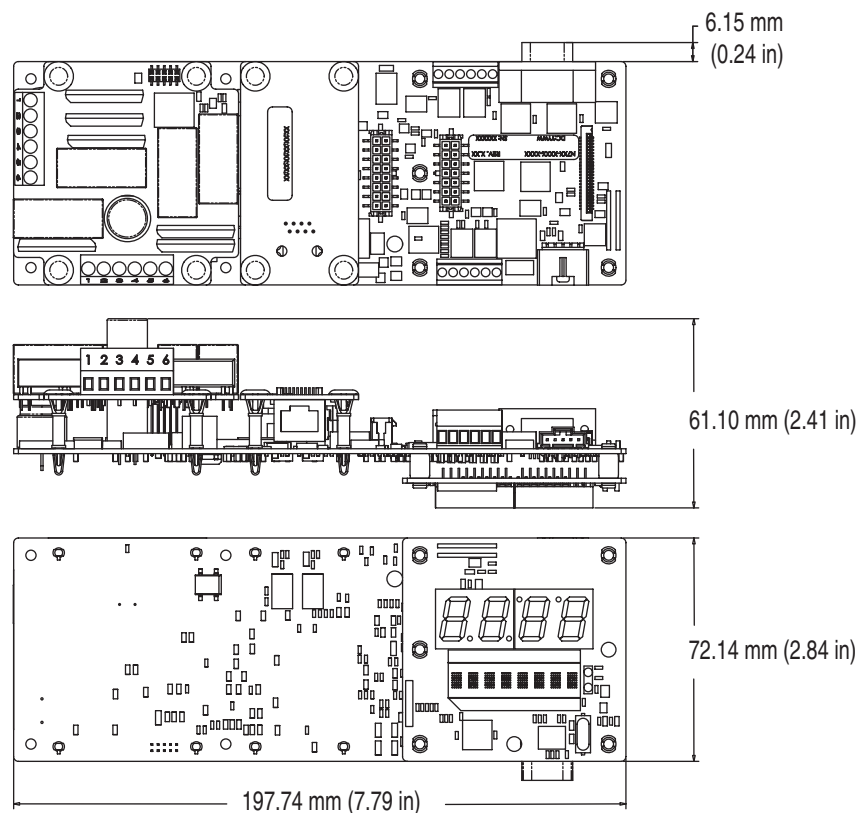
Vertical
Dimensions
with Add-on
Modules



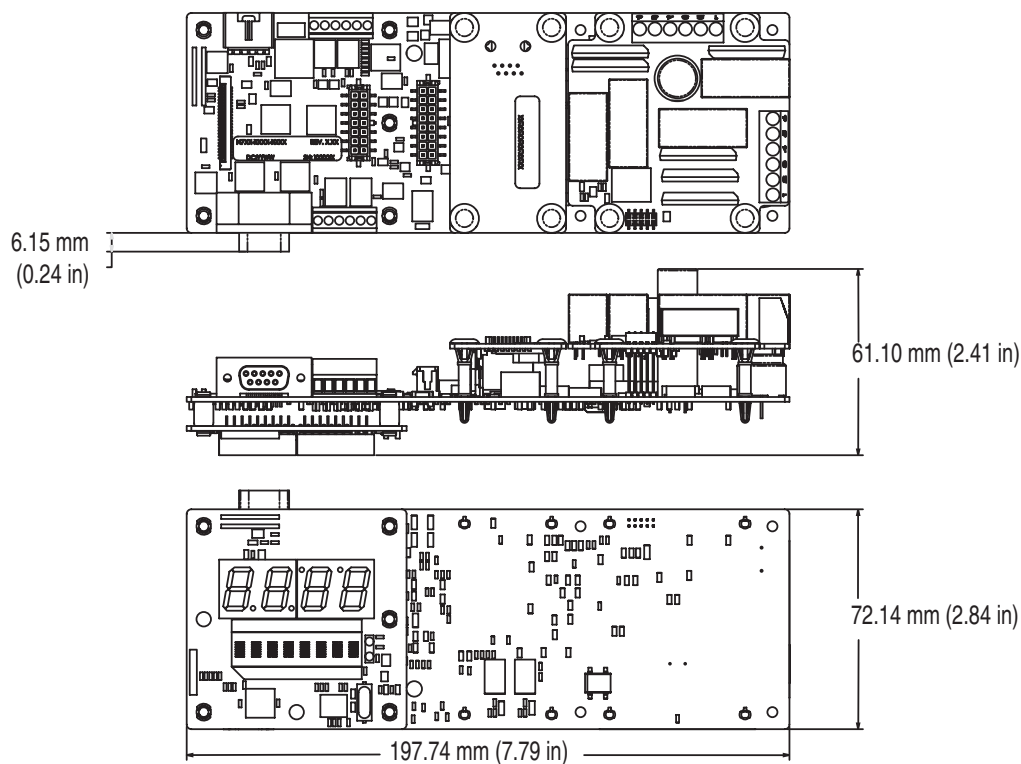
Vertical View with Add-on Modules (exploded view)



Horizontal Right



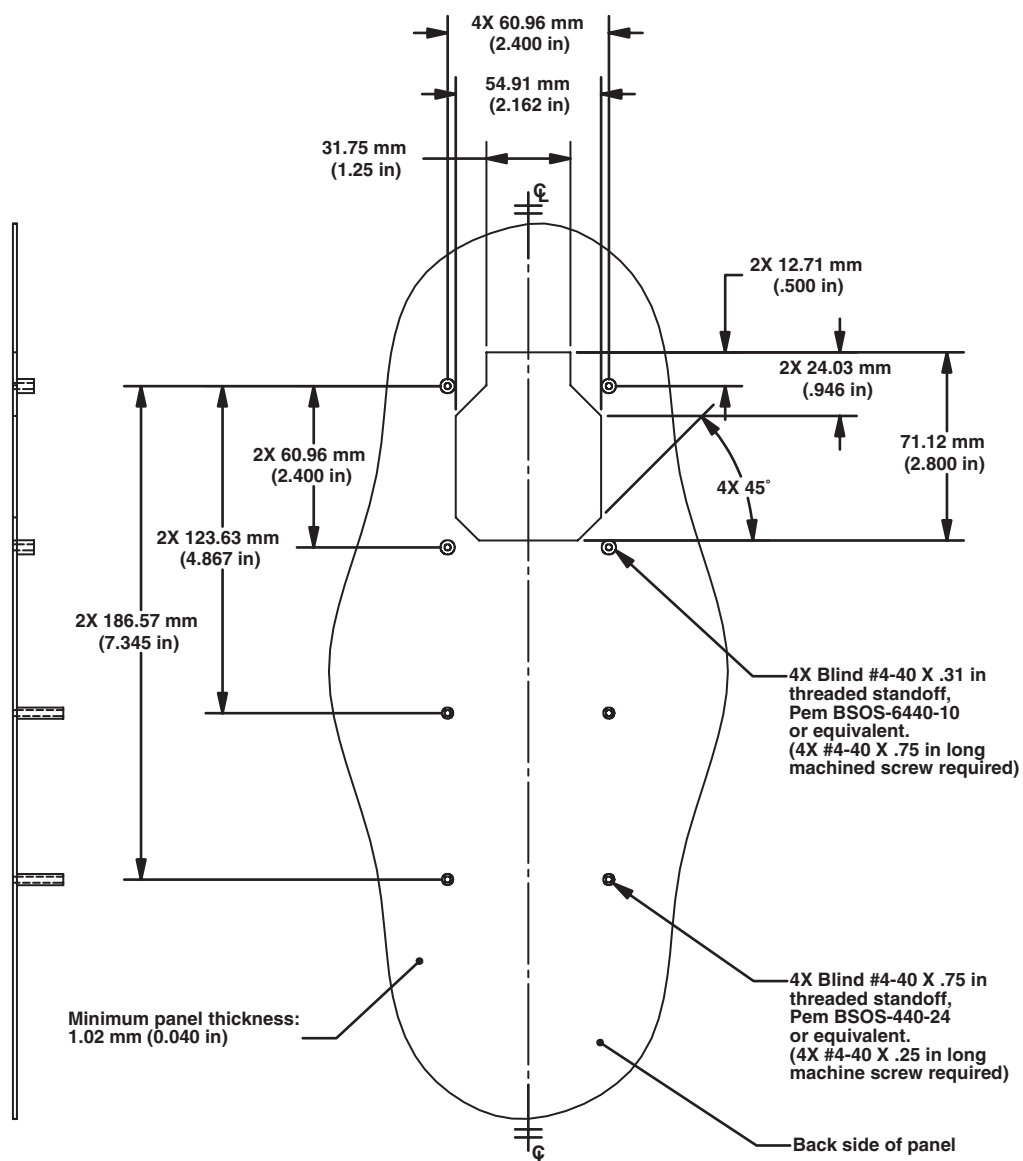
Horizontal Left



Cutout Standoff -Vertical

For Horizontal Left, rotate 90° counter-clockwise.

For Horizontal Right, rotate 90° clockwise.



Location of Pins and Ports for Inputs and Outputs

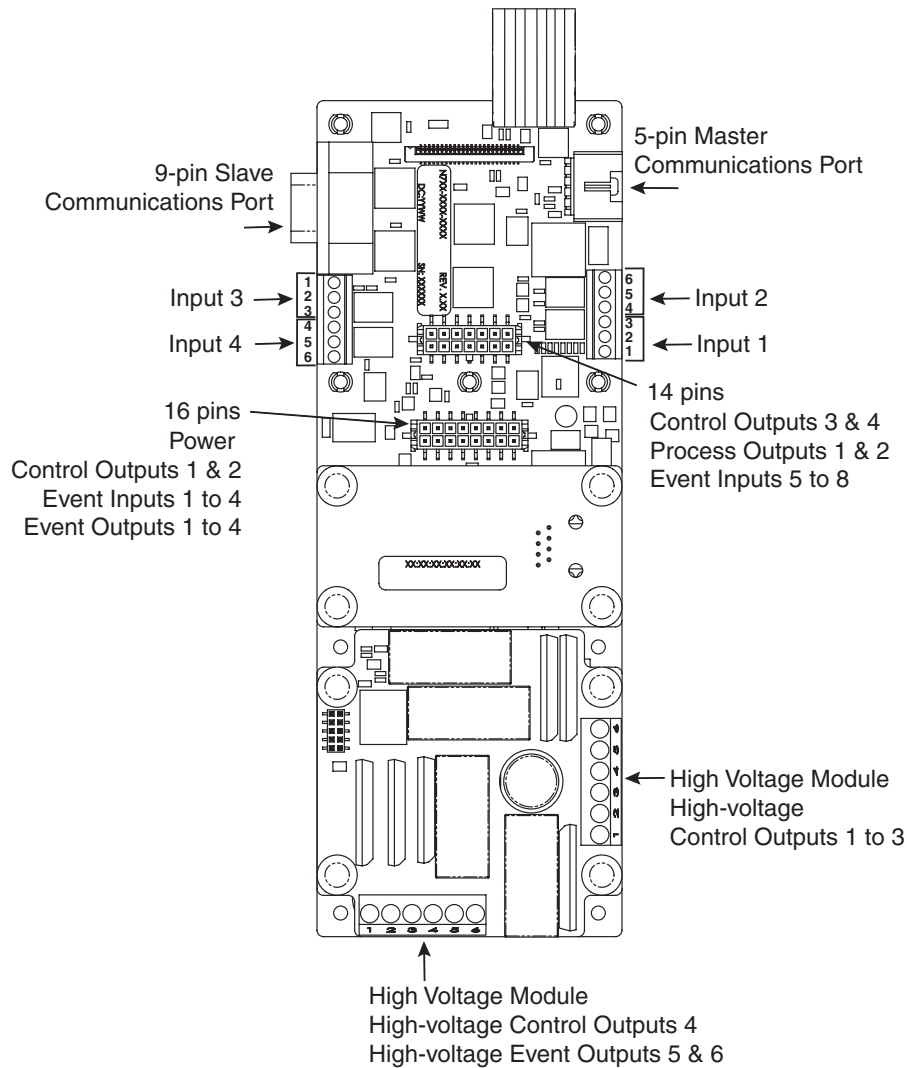
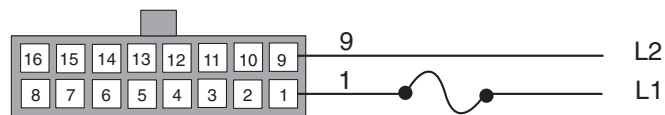


Figure 9a — **Power Wiring**

- Nominal voltage: 24V~ (ac)
- Class 2 power source required.



Warning: Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.



Warning: If high voltage is applied to the 24V~ (ac) input, irreversible damage will occur.

Note:

To prevent ground loops, maintain isolation from input to output when using switched dc or analog process outputs. Use ungrounded thermocouples.

Thermocouple

- J and K: -46 to 316°C (-50 to 600°F)
- Input impedance: $>100\text{ k}\Omega$

Figure 10a — Input 1

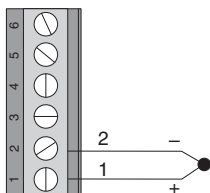


Figure 10b — Input 2

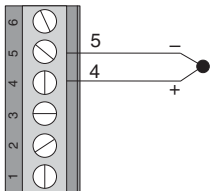


Figure 10c — Input 3

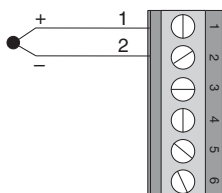
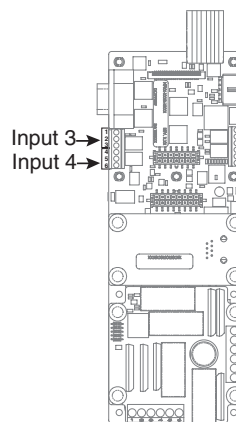
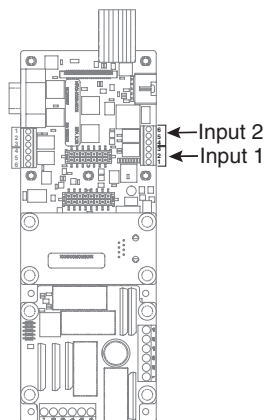
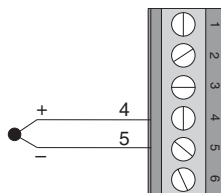


Figure 10d — Input 4



Warning: Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

To prevent ground loops, maintain isolation from input to output when using switched dc or analog process outputs. Use ungrounded thermocouples.

2-wire or 3-wire RTD

- 100 Ω : -46 to 316°C (-50 to 600°F)
- DIN curve: 0.00385 ohms/ohms/°C
- <700 μ A excitation

Figure 11a — Input 1

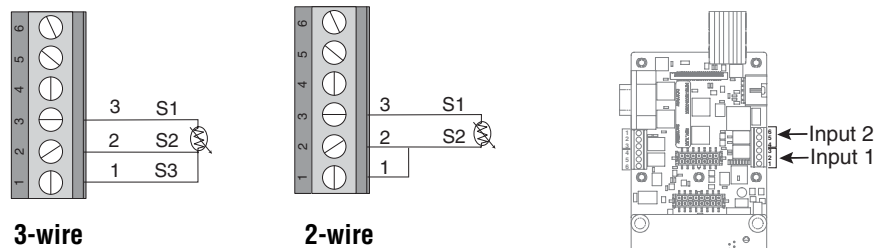


Figure 11b — Input 2

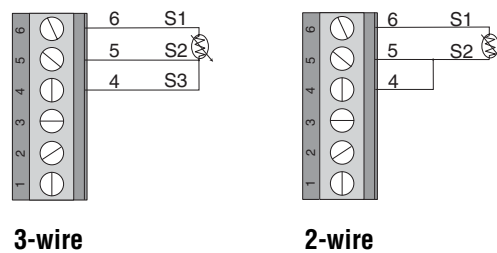


Figure 11c — Input 3

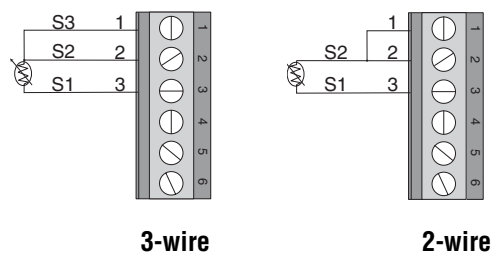
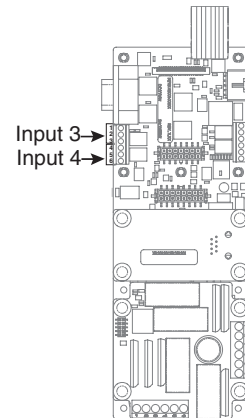
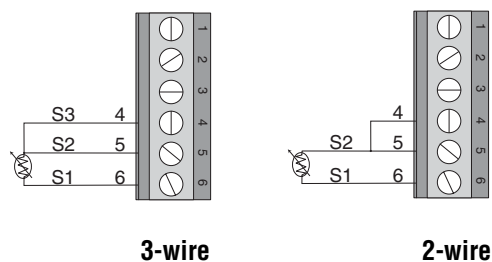


Figure 11d — Input 4



Warning: Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

To prevent ground loops, maintain isolation from input to output when using switched dc or analog process outputs. Use ungrounded thermocouples.

Process Inputs

- Voltage: 0 to 10V_{DC} (dc)
- Current: 0 to 20 mA
- Voltage input impedance: 50 k Ω
- Current input impedance: 100 Ω

Figure 12a — Input 1

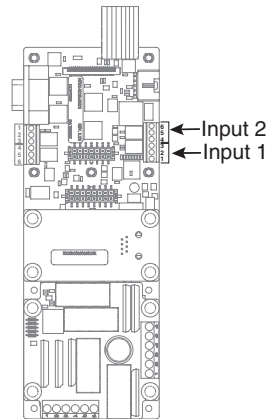
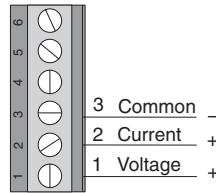


Figure 12b — Input 2

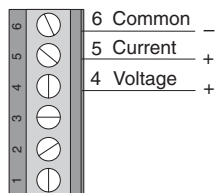


Figure 12c — Input 3

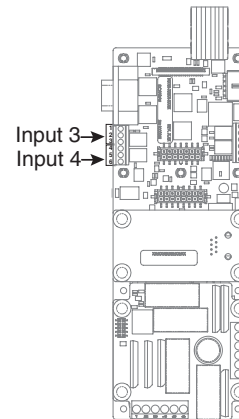
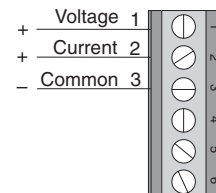
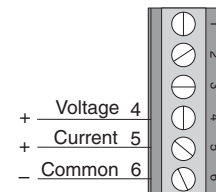


Figure 12d — Input 4



Warning: Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

To prevent ground loops, maintain isolation from input to output when using switched dc or analog process outputs. Use ungrounded thermocouples.

Process Outputs

Current

- 0 to 20 mA at 20V maximum
- Load: 1 k Ω maximum

Volts

- 0 to 10V $\overline{=}$ (dc) at 20 mA maximum
- Load: 500 Ω minimum

Figure 13a — Process Output 1

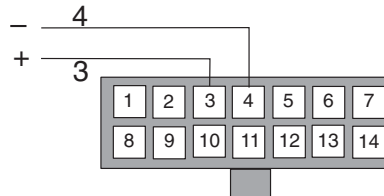
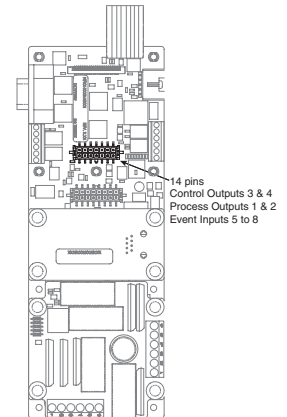
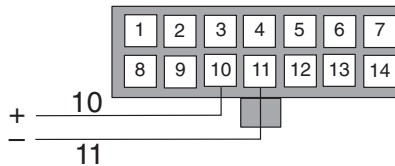


Figure 13b — Process Output 2



Warning: Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

To prevent ground loops, maintain isolation from input to output when using switched dc or analog process outputs. Use ungrounded thermocouples.

Control Outputs

If the high voltage output module is installed, the state of each high-voltage control output mirrors the state of the corresponding control output.

- Switched dc
- Current: 30 mA at 5V_{dc} nominal

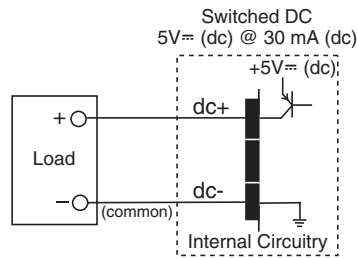


Figure 14a — Switched DC

Figure 14b — Control Output 1

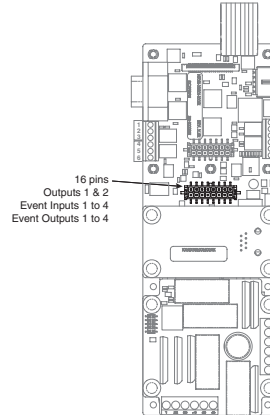
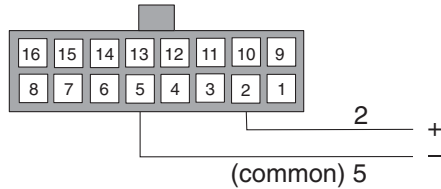
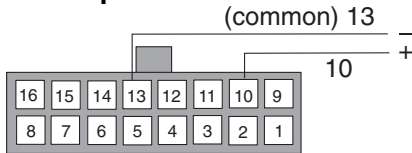


Figure 14c — Control Output 2



NOTE: Terminals 5, 6, 13 or 14 can be used for the common connection.

Figure 14d — Control Output 3

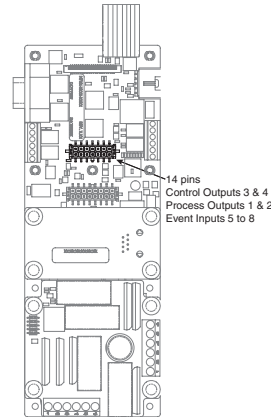
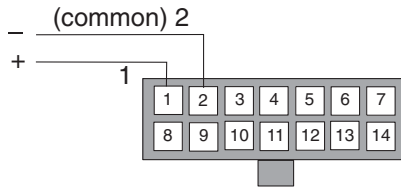
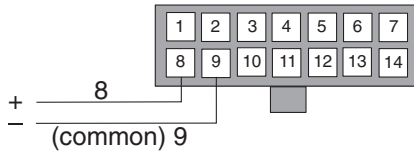


Figure 14e — Control Output 4



NOTE: Terminals 2, 5, 9 or 12 can be used for the common connection.



Warning: Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

To prevent ground loops, maintain isolation from input to output when using switched dc or analog process outputs. Use ungrounded thermocouples.

High-voltage Control Outputs

The state of each high-voltage control output mirrors the state of the corresponding control output.

- Operating temperature: 0 to 80° C
- Contact type: normally open
- Maximum current: 8 amps
- Maximum voltage: 250V~ (ac)

	HV Control Out 1	HV Control Out 2	HV Control Out 3	HV Control Out 4
N7_ _ _ _ _ - 2 _ _ _	mechanical relay	mechanical relay	mechanical relay	mechanical relay
N7_ _ _ _ _ - 3 _ _ _	solid-state relay	solid-state relay	solid-state relay	solid-state relay
N7_ _ _ _ _ - 4 _ _ _	mechanical relay	solid-state relay	mechanical relay	solid-state relay
N7_ _ _ _ _ - 5 _ _ _	no-arc relay	no-arc relay	no-arc relay	no-arc relay

Figure 15a — High-voltage Control Output 1

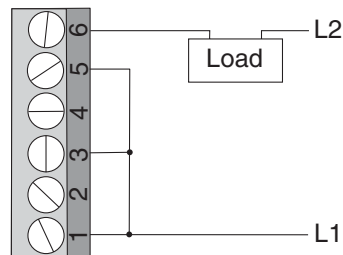


Figure 15b — High-voltage Control Output 2

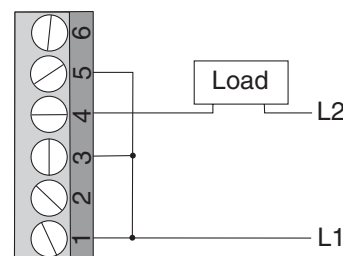


Figure 15c — High-voltage Control Output 3

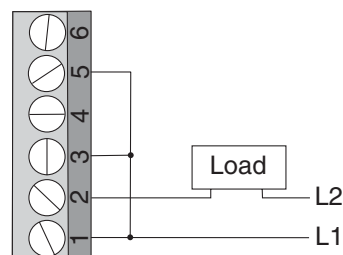
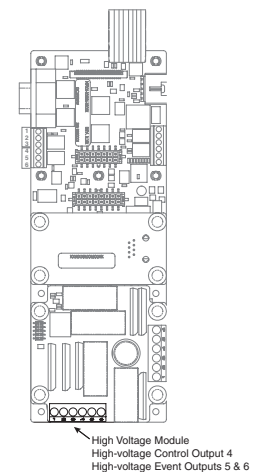
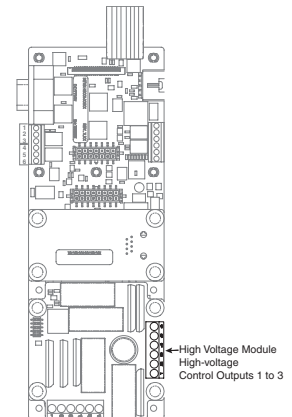
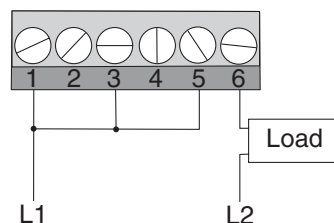


Figure 15d — High-voltage Control Output 4



Warning: Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.



Warning: All high-voltage outputs must be powered by the same source (phase), as shown in the example above.

Event Inputs

- Voltage input
 - 0.5 to +0.5V \approx (dc), event input low (closed)
 - 3 to 30V \approx (dc), event input high (open)
- Contact closure
 - less than 250 Ω , event input low (closed)
 - more than 10 k Ω , event input high (open)

Figure 16a — Event Input 1

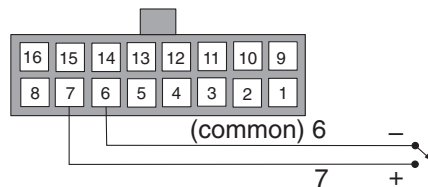


Figure 16b — Event Input 2

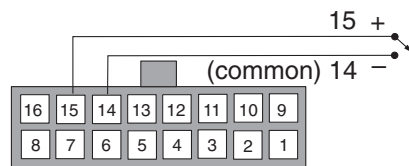


Figure 16c — Event Input 3

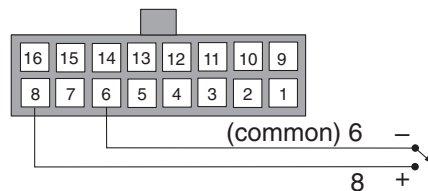
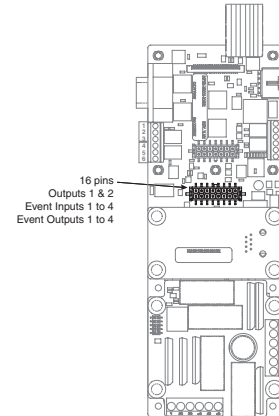
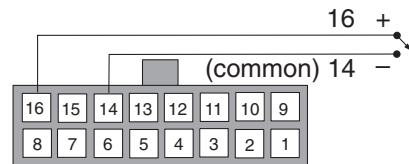


Figure 16d — Event Input 4



Note: Terminals 5, 6, 13 or 14 can be used for the common connection.



Warning: Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

To prevent ground loops, maintain isolation from input to output when using switched dc or analog process outputs. Use ungrounded thermocouples.

Figure 17a — Event Input 5

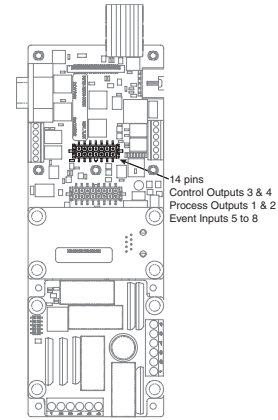
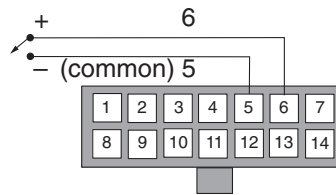


Figure 17b — Event Input 6

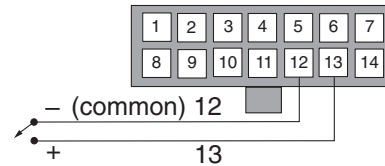


Figure 17c — Event Input 7

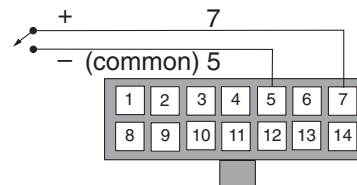
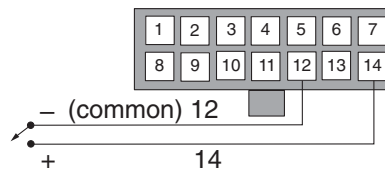


Figure 17d — Event Input 8



Note: Terminals 2, 5, 9 or 12 can be used for the common connection.



Warning: Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

To prevent ground loops, maintain isolation from input to output when using switched dc or analog process outputs. Use ungrounded thermocouples.

Event Outputs

- Switched dc
- 30 mA at 5V_{DC} nominal

Figure 18a — **Switched DC**

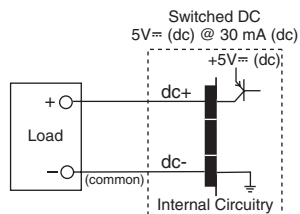


Figure 18b — **Event Output 1**

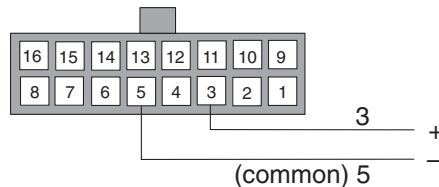


Figure 18c — **Event Output 2**

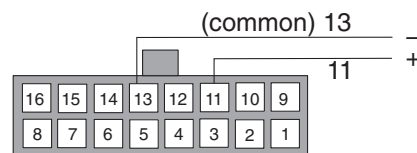


Figure 18d — **Event Output 3**

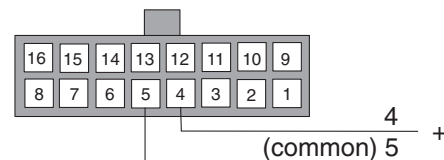
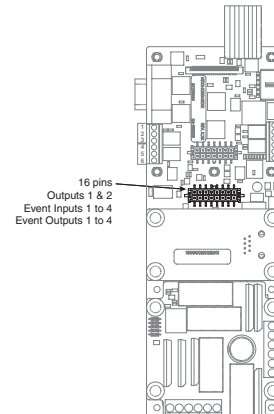
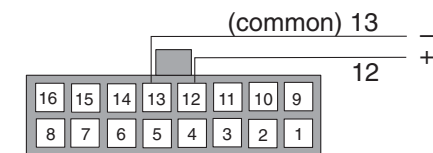


Figure 18e — **Event Output 4**



NOTE: Terminals 5, 6, 13 or 14 can be used for the common connection.



Warning: Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

To prevent ground loops, maintain isolation from input to output when using switched dc or analog process outputs. Use ungrounded thermocouples.

High-voltage Event Outputs

- Solid-state relay
- Operating temperature: 0 to 80° C
- Contact type: normally open
- Maximum operating current: 0.4 amps
- Maximum operation voltage: 250V~ (ac)

Figure 19a — High-voltage Event Output 5

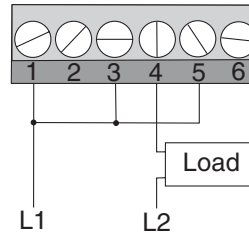
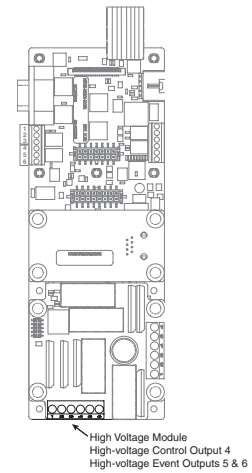
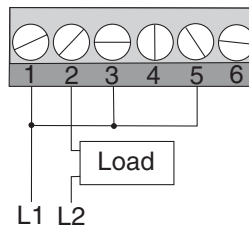


Figure 19b — High-voltage Event Output 6



Warning: Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.



Warning: All high-voltage outputs must be powered by the same source (phase), as shown in the example above.

Communications using an EIA/TIA-232 to EIA/TIA-485 Converter

The circuit board illustration on page 9 shows the location of the master and slave ports.

Slave communications

The Series N7 can only respond to communications on this port, as in the case of several N7s networked to a Modbus master or a PC connected to this port to monitor or adjust settings and process values. This is how most Watlow controllers communicate.

Figure 20a — **Master, B&B Converter**

- 19,200 baud
- 0 to 16 nodes
- RS-485

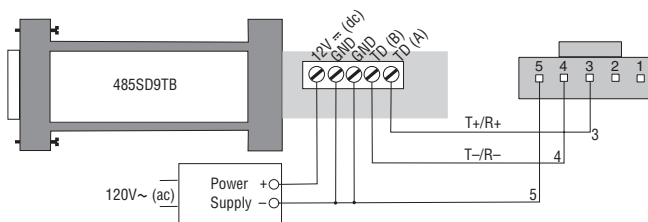


Figure 20b — **Slave, B&B Converter**

- RS-232: 19,200 or 9,600 baud
- RS-485: 9,600 baud
- 0 to 16 nodes

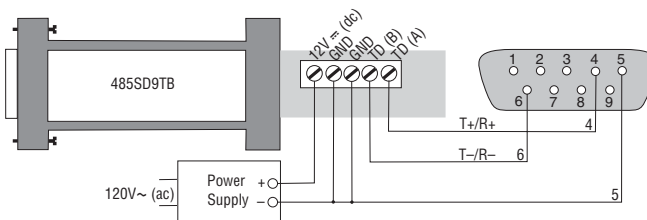


Figure 20c — **Master, CMC Converter**

- 19,200 baud
- 0 to 16 nodes
- RS-485

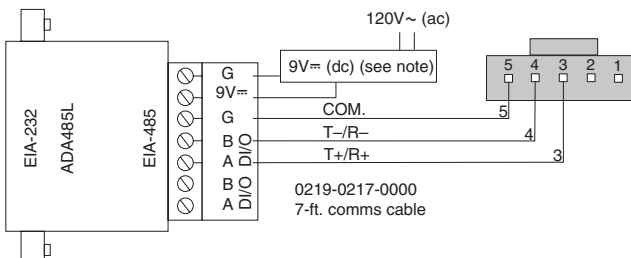
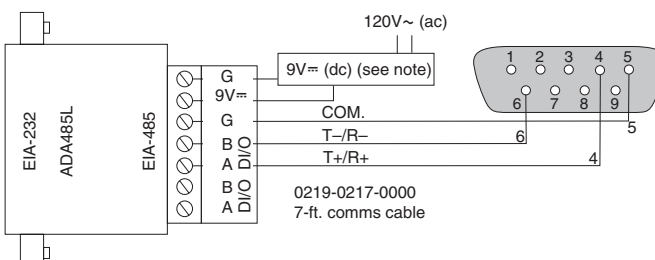


Figure 20d — **Slave, CMC Converter**

- RS-232: 19,200 or 9,600 baud
- RS-485: 9,600 baud
- 0 to 16 nodes



Warning: Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

To prevent ground loops, maintain isolation from input to output when using switched dc or analog process outputs. Use ungrounded thermocouples.

A

Appendix

Specifications

Controller

- Up to four sensor inputs, eight switched dc outputs, eight dc inputs, two process outputs
- Battery backed, real-time clock
- One non-isolated slave communications channel
- One non-isolated master communications channel
- Optional ethernet communications module
- Optional high-voltage output module

Operator Interface

- Four-character, 0.56-inch, seven-segment display
- Eight-character, 0.2 inch, alphanumeric display
- Overlay interface supports up to 32 keys and LED indicator lights

Overlay interface

- Switch closed input < 100 Ω
- Switch open input > 100 k Ω
- LED current limiting resistor: 200 Ω
- LED supply voltage: 5V

Operating Environment

- 0 to 80°C (32 to 176°F) @ 0 to 90% RH, non-condensing

Standard Conditions For Specifications

- Ambient temperature 25°C (77°F) $\pm 3^\circ\text{C}$, 24V~ (ac), 50 to 60 Hz

Configured Sensor Inputs

- Update rate: 5Hz

Thermocouple

- Multiple channel applications require at least one ungrounded thermocouple.
- Input current: 0.5 nA
- Maximum source resistance: 20 Ω
- Accuracy: $\pm 1.1^\circ\text{C}$ (2°F)
- Drift: $\pm 0.10^\circ\text{C}/^\circ\text{C}$ ($\pm 0.10^\circ\text{F}/^\circ\text{F}$)
- Input ranges:
 - Type J: -46 to 316°C (-50 to 600°F)
 - Type K: -46 to 316°C (-50 to 600°F)

RTD

- 2- or 3-wire platinum
- DIN curve (.00385 curve)
- 700 μA maximum excitation current
- Accuracy: $\pm 1.1^\circ\text{C}$ (2°F)
- Drift: $\pm 0.10^\circ\text{C}/^\circ\text{C}$ ($\pm 0.10^\circ\text{F}/^\circ\text{F}$)
- Range: -46 to 316°C (-50 to 600°F)

Voltage

- Input impedance 60 k Ω
- Input range: 0 to 12V
- Accuracy: ± 25 mV
- Drift: ± 5 mV/F

Current

- Input impedance 100 Ω
- Input range: 0 to 22mA
- Accuracy: ± 40 μA
- Drift: ± 5 $\mu\text{A}/^\circ\text{F}$

Event Input

- Input high: 3 to 30V or >10 k Ω
- Input low: -0.5 to 0.5V or < 250 Ω

Outputs

Switched DC Outputs

- 5V at 30mA maximum

Voltage Output

- Range: 0 to 12V at 20 mA maximum
- Minimum: load impedance 500 Ω
- Accuracy: ± 100 mV
- Drift: ± 2.1 mV/F

Current Output

- Range 0 to 22mA at 20V maximum
- Maximum load impedance 1,000 Ω
- Accuracy: ± 100 μA
- Drift: ± 4.3 $\mu\text{A}/^\circ\text{F}$

Agency

- UL 60730, c-UL File E43684
- EU LV Directive 72/23/EEC EN 60730
- EU EMC Directive 89/336/EEC
 - emissions
 - immunity
- NSF Option, File 49660-0003-000
- NAFEM Communications/Evaluate proper listing
- CSA standard E60730-2-9

Power/Line Voltage

- 24 V~ (ac) power input (20.4 to 26.4~ (ac)), Class 2 power source required
- 47 to 63 Hz
- 15VA maximum
- Program retention upon power failure via non-volatile memory
- Battery/real time clock option: six-year lithium battery, provides power upon backup power failure, operation resumption after power recovery, ability to display time.

Audible Alarm

- Internal audible alarm, 85 dB @ 10cm @ 2 KHz. Output frequencies supported: 250, 500, 1,000, 2,000, 4,000 Hz.

Storage Temperature

- -40 to 80°C (-40 to 176°F)

Optional High-Voltage Board

- Optional high-voltage board will have six outputs, either solid-state relay, electromechanical relay or no-arc relay

Relay Specification:

Contact type: normally open
Maximum operating current: 8 A
Maximum operating voltage: 250V~ (ac)
Pilot duty: 250 VA

SSR Specification

Contact type: normally open
Maximum operating current: 0.4 A
Maximum operating voltage: 250V~ (ac)
Pilot duty: 100 VA

No Arc Specification

Contact type: normally open
Maximum operating current: 8 A
Maximum operating voltage: 250V~ (ac)

Note: These specifications are subject to change without prior notice.

High-Voltage Modules Ordering Information

- A007-2660-0000 - 2 solid-state relays (0.4 A)
- A007-2660-0001 - 2 solid-state relays (0.4 A) and 4 mechanical relays (8 A)
- A007-2660-0002 - 6 solid-state relays (0.4 A)
- A007-2660-0003 - 4 solid-state relays (0.4 A) and 2 mechanical relays (8 A)
- A007-2660-0004 - 2 solid-state relays (0.4 A) and 4 no-arc relays*

Customer-Supplied Connectors

Standard I/O 16-pin connector housing - Molex part no. 43025-1600
Optional I/O 14-pin connector housing - Molex part no. 43025-1400
Pins - Molex part no. 43030-0007

***No-Arc Relay Definition:**

A thyristor carries the load current for a brief period before the relay contacts close. The voltage across the relay contacts prior to closing is only a volt or two (the voltage drops across the thyristor). When the relay contacts close, the load current flows through the relay contacts, and the thyristor turns off. When it's time to turn the load off, the thyristor is gated ON just prior to the relay contacts opening. As the relay contacts begin to separate and the line voltage crosses zero, the thyristor again goes into conduction and extinguishes the arcing between the relay contacts. This great reduction in contact arcing (mainly on relay opening) minimizes contact erosion and extends the switch life of the relay.

Ordering Information and Model Numbers

N 7	
Customer Name	
Inputs 1 & 2	
1 Input 1 & Input 2 thermocouple 2 Input 1 thermocouple, Input 2 process 3 Input 1 thermocouple, Input 2 RTD 4 Input 1 & Input 2 process 5 Input 1 RTD, Input 2 process 6 Input 1 & Input 2 RTD	
Inputs 3 & 4	
0 none 1 Input 3 & Input 4 thermocouple 2 Input 3 process, Input 4 thermocouple 3 Input 3 RTD, Input 4 thermocouple 4 Input 3 & Input 4 process 5 Input 3 RTD, Input 4 process 6 Input 3 & Input 4 RTD	
Note: The thermocouple options for Inputs 3 and 4 need thermocouple population for Input 1.	
Process Outputs 1 & 2, Event Inputs 5 to 8, Control Outputs 3 & 4	
0 none 1 3 & 4 switched dc control outputs, event inputs 2 1 current output, 3 & 4 switched dc control outputs, event inputs 3 1 & 2 current outputs, 3 & 4 switched dc control outputs, event inputs 4 1 current output, 2 volts output, 3 & 4 switched dc control outputs, event inputs 5 1 volts output, 3 & 4 switched dc control outputs, event inputs 6 1 & 2 volts outputs, 3 & 4 switched dc control outputs, event inputs 7 1 volts output, 2 current output, event inputs	
Ethernet Add-on Module	
0 none 1 Ethernet	
High-voltage Add-on Module	
0 none 1 2 solid-state relays 2 4 mechanical relays and 2 solid-state relays 3 6 solid-state relays 4 2 mechanical relays; 4 solid-state relays 5 4 no-arc relays*; 2 solid-state relays	
Horizontal or Vertical Display	
1 vertical 2 horizontal left 3 horizontal right	
Software and Customer Options	

Install or Replace the Relay/High Voltage Output Module (Z100-0817-000X)

1. Remove power from the controller.
2. Pre-assemble the circuit board spacers onto the Relay/High Voltage Output circuit board.
 - Insert the pointed end of a circuit board spacer into one of the four mounting holes of the Relay/High Voltage Output circuit board from the side of the circuit board that has the output terminal blocks.
 - Using firm pressure, seat the circuit board spacer's "head" onto the surface of the Relay/High Voltage Output circuit board.
 - Repeat with the remaining three circuit board spacers.
3. Pre-assemble the board stacking header onto the Relay/High Voltage Output circuit board.
 - Align the pins of the board stacking header to the socket on the Relay/High Voltage Output circuit board. Make sure all pins are aligned properly.
 - Using firm pressure insert the board stacking header into the socket.
 - Make sure all pins of the board stacking header are seated properly.
4. Install the Relay/High Voltage Output circuit board.
 - Align the pins of the board stacking header to the socket on the main circuit board. Make sure all pins are aligned properly.
 - Align the pointed end of the four circuit board spacers with the four mounting holes on the main circuit board.
 - While maintaining alignment of the pins of the board stacking header and the circuit board spacers, firmly press the Relay/High Voltage Output circuit board onto the main circuit board.
 - Verify that all pins of the board stacking header and the circuit board spacers are seated properly.
5. Verify Output Wiring.
 - Install wiring to the appropriate output terminals.
6. Test the Controller.
 - Reapply power to the controller and test.

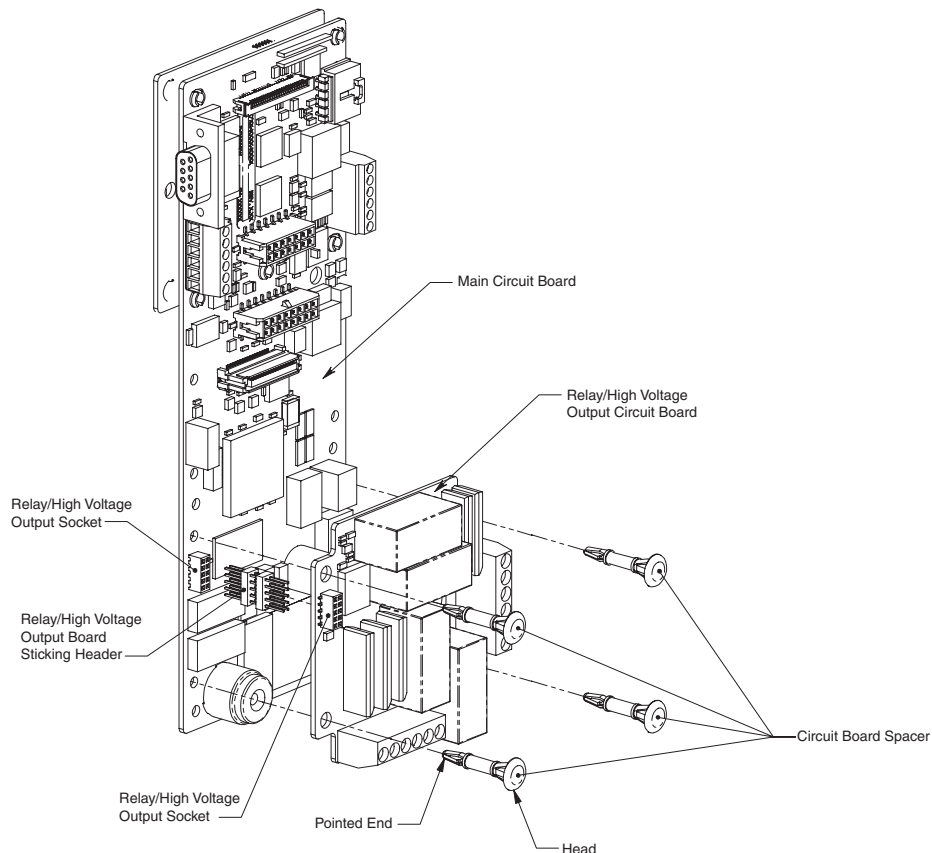


Figure 24 — Install the Relay/High Voltage Output Module.

Install or Replace the Ethernet Module (Z100-0816-0000)

1. Remove power from the controller.
2. Pre-assemble the circuit board spacers onto the Ethernet circuit board.
 - Insert the pointed end of a circuit board spacer into one of the four mounting holes of the Ethernet circuit board from the side of the circuit board that has the label on it.
 - Using firm pressure seat the circuit board spacer until the head of the spacer is flush with the surface of the Ethernet circuit board.
 - Repeat with the remaining three circuit board spacers.
3. Install the Ethernet circuit board.
 - Align the Ethernet connector with the Ethernet module connector.
 - Align the pointed ends of the four circuit board spacers with the four mounting holes on the main circuit board.
 - While maintaining alignment of the Ethernet connectors and the circuit board spacers, firmly press the Ethernet circuit board onto the main circuit board.
 - Verify that the Ethernet connector and the circuit board spacers are seated properly.
4. Verify Output Wiring.
 - Install RJ-485 Ethernet connector.
5. Test the Controller.
 - Reapply power to the controller and test.

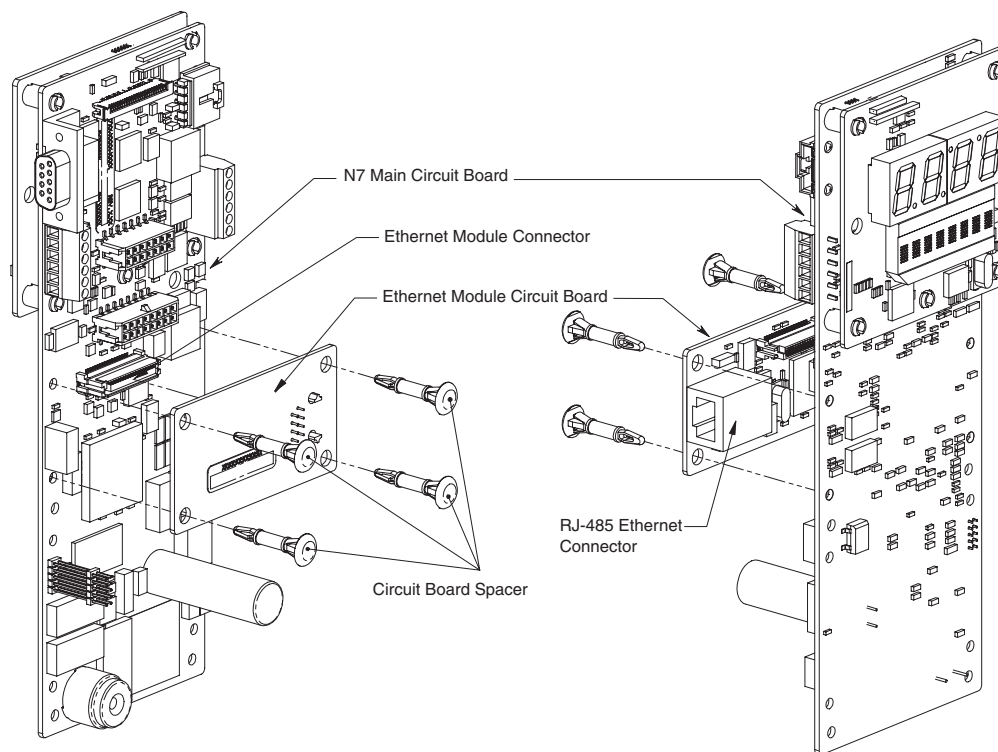


Figure 25 — Install the Ethernet Module.

Notes:

Declaration of Conformity

Series N7

Watlow Winona, Inc.
1241 Bundy Blvd.
Winona, MN 55987 USA

Declares that the following product:

Designation: **Series N7**
Model Numbers: N7 (any two letters or numbers) - (1 to 6) (0 to 6) (0 to 7) (0 or 1) - (0 to 5)
(1, 2 or 3) (any two letters or numbers)
Classification: Temperature control, Installation Category II, Pollution degree 2
Rated Voltage: 24 V~ ac
Rated Frequency: 50 or 60 Hz
Rated Power Consumption: 15VA maximum

Meets the essential requirements of the following European Union Directives by using the relevant standards shown below to indicate compliance.

89/336/EEC Electromagnetic Compatibility Directive

EN 60730-1:1995 with A1, 2, 3, 4 and 5	Automatic electrical controls for household and similar use - Part 1 General requirements. Clause H.26 EMC requirements Immunity, Clause H.23 Class B* Emissions
EN 61000-4-2: 1996 With A1, 1998:	Electrostatic Discharge Immunity
EN 61000-4-3: 1997:	Radiated Field Immunity
EN 61000-4-4: 1995:	Electrical Fast-Transient / Burst Immunity
EN 61000-4-5: 1995 With A1, 1996:	Surge Immunity
EN 61000-4-6: 1996:	Conducted Immunity
EN 61000-4-11: 1994:	Voltage Dips, Short Interruptions and Voltage Variations Immunity
EN 61000-3-2: ED.2. 2000:	Harmonic Current Emissions
EN 61000-3-3: 1995 With A1:1998:	Voltage Fluctuations and Flicker

***Class B emissions contingent upon use of a Steward Ferrite (28A2029-0A0) to Ethernet cable on main board.**

73/23/EEC Low-Voltage Directive

EN 60730-1:1995 with A1, 2, 3, 4 and 5	Automatic electrical controls for household and similar use - Part 1 General requirements and Part 2-9:1995 - Temperature sensing controls.
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Raymond D. Feller, III

Name of Authorized Representative

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Place of Issue

General Manager

Title of Authorized Representative

February 2004

Date of Issue



Signature of Authorized Representative

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