

# E1 Plus Overload Relay Specifications

Bulletin Number 193, 592

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## Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Industrial Automation Wiring and Grounding Guidelines, publication <a href="#">1770-4.1</a>	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, <a href="http://www.ab.com">http://www.ab.com</a>	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at <http://www.rockwellautomation.com/literature/>. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.



Bulletin	193-ED	193-EE
Type	E1 Plus Electronic Overload Relay	E1 Plus Electronic Overload Relay
Rated Current (Range)	0.1...45 A	0.1...800 A
NEMA Operating Voltage, Nominal	—	600V
IEC Operating Voltage, Nominal	690V	690/1000V
Overload Type	Electronic Overload	Electronic Overload
Trip Class (Fixed)	10	—
Trip Class (Adjustable)	—	10, 15, 20, 30
Ambient Temperature Compensated	✓	✓
Reset Type	Manual Only	Automatic and Manual
Adjustment Range	5:1	5:1
Phase Loss	3 s	3 s
Ground (Earth) Fault	—	Optional
Overcurrent (Jam) Detection	—	Optional
Stall Detection	—	—
Underload Detection	—	—
Current Imbalance	—	—
PTC Thermistor Monitoring	—	Optional
Warning Settings	—	—
N.C. Trip Contact	✓	✓
N.O. Alarm Contact	✓	✓
No. of Outputs	—	—
No. of Inputs	—	—
ODVA (DeviceNet) Conformance	—	Optional
Variable Frequency Drive (VFD) Compatible	—	—

**Standards Compliance**

IEC/EN 60947-4-1  
 IEC/EN 60947-5-1  
 CSA 22.2 No. 14  
 UL 508

**Certifications**

CE  
 cULus Listed  
 C-Tick  
 CCC

## Accurate, Reliable Performance

### Current measurement-based protection

While electromechanical overload relays pass motor current through heating elements to provide an indirect simulation of motor heating, the E1 Plus Overload Relay directly measures motor current. Current measurement-based overload protection more accurately models a motor's thermal condition. Furthermore, ambient temperature does not impact the performance of current measurement-based designs over the specified temperature operating range.

### Electronic design

Thermal modeling is performed electronically with precision solid-state components, where at the heart of the E1 Plus Overload Relay is an application-specific integrated circuit (ASIC). The ASIC continually processes motor current data to accurately maintain the time-current status of the motor thermal capacity utilization value.

### Thermal memory

A thermal memory circuit allows the E1 Plus Overload Relay to model the heating and cooling effects of motor on and off periods. This ensures accurate protection for both hot and cold motors.

### Enhanced phase loss protection

A separate phase loss detection circuit incorporated into the E1 Plus Overload Relay allows it to respond quickly to phase loss conditions; typical reaction time is 3 seconds.

## Easy to Select and Apply

### Straightforward installation

The self-powered design means that the E1 Plus Overload Relay installs in the same manner as traditional overload relays. Device setup is accomplished by simply dialing the setting potentiometer to the motor FLA rating. The low energy consumption of the electronic design minimizes temperature rise issues inside control cabinets.

### Wide adjustment range

A wide 5:1 adjustment range results in the need for half as many catalog numbers as the bimetallic alternative in order to cover the same current range. This helps to reduce inventory carrying costs and affords greater installation flexibility for dual voltage machines. Evenly spaced setting tick marks enhance the ease of installation setup.

## Rugged Construction

### Over-molded power connections

The unique line-side over-molded power connections make for a sturdy two-component starter assembly that is unmatched in the industry. The pre-formed power connections allow easy starter assembly — every time.

### Current transformers

The current transformers are secured separately in the overload housing to ensure the greatest degree of resistance to shock and vibration conditions. Varnished laminations ensure consistent performance and provide additional protection against corrosion.

### Latching relay

The robust design of the bi-polar latching relay provides reliable trip and reset performance for the most demanding of applications. The self-enclosed relay offers additional environmental protection for use in industrial applications.

## Application Flexibility

### Isolated Contacts

The isolated contact configuration allows the N.C. and N.O. contacts to be applied in circuits operating at different voltage levels and without polarity restrictions. The B600 contact rating affords application in circuits rated to 600V.

### DIP switch settings

Bul. 193-EE devices offer DIP switch settings to select the trip class (10, 15, 20 or 30) and the reset mode (manual or automatic), making these devices extremely versatile.

## Pass-Thru Option

The E1 Plus Pass-Thru consumes 48% less panel space compared to a standard E1 Plus mounted in a panel mount adapter. The design provides an integrated DIN Rail mount and panel mounting holes and is intended for the following applications: DIN Rail and Panel Mount Applications, Bulletin 100-K mini contactor, external current transformers, and for use with non Allen-Bradley Contactors. The E1 Plus Pass-Thru Electronic Overload Relay provides all of the same expandable protection & communication capabilities as a standard E1 Plus, and eliminates the need for a separate panel mount adapter, which saves money and valuable panel space.

## Side-Mount Expansion Modules

Through the use of optional side-mount expansion modules, functionality of the E1 Plus overload relays can be cost effectively expanded and machine operation and protection enhanced. Direct mounting to the left side of the 193-EE and 592-EE E1 Plus overload relays means that only 18 mm is added to the overall product width. The side-mounted accessory modules electronically interface with the E1 Plus overload relay so that all control circuit connections are made at the E1 Plus overload relay terminals.

### E1 Plus DeviceNet™ Communication Module

The Bul. 193-EDN DeviceNet Communication Side-Mount Module provides a cost-effective, seamless deployment of motor starters onto the Integrated Architecture™ as an accessory for the E1 Plus electronic overload relay. The DeviceNet module provides Integrated I/O (2 inputs and 1 output) providing local connection of motor starter-related I/O. The DeviceNet module offers expanded protective functions including overload warning, jam protection, and underload warning. The DeviceNet module also allows access to average motor current (percentage of FLA setting), percentage of thermal capacity usage, device status, trip & warning identification, and trip history which allows continual monitoring of motor performance.

### E1 Plus Remote Reset Module

The Bul. 193-ERR Remote Reset Module is available for applications that require remote reset of the E1 Plus overload relays after a trip occurs.

### E1 Plus Jam Protection Module with Remote Reset

The Bul. 193-EJM Jam Protection Module provides front-accessible DIP switches which offers flexibility to provide jam protection to match application requirements. Selections are available for enabling or disabling the jam protection function and remote reset operation. Jam trip level settings are available at 150%, 200%, 300%, and 400% of full load current setting. Trip delay settings of 1/2, 1, 2, and 4 seconds are available to minimize nuisance tripping in applications where intermittent short-duration overloading is permissible.

### E1 Plus Ground Fault Module with Remote Reset

The Bul. 193-EGF Ground Fault Protection Module offers front-accessible DIP switches providing flexibility to configure ground fault protection to match application requirements. Selections are available for enabling or disabling the ground fault protection function and remote reset operation. Ground fault trip level settings are available in four ranges: 20...100 mA (resistive loads only, for motor loads consult your local Rockwell Automation sales office or Allen-Bradley distributor), 100...500 mA, 0.2...1 A, and 1...5 A. Within each range, the specific ground fault trip level can be set (20%, 35%, 50%, 65%, 80%, 90%, or 100% of the maximum ground fault setting). Trip delay is fixed at 50 ms ± 20 ms.

**E1 Plus Ground Fault/Jam Module with Remote Reset**

The Bul. 193-EGJ Ground Fault/Jam Protection Module offers front-accessible DIP switches to provide flexibility to configure ground fault and jam protection to match application requirements. The ground fault selections are the same as the Bul. 193-EGF Ground Fault Protection Module. In addition to ground fault, this module offers selectable fixed jam protection. The user can enable or disable jam protection from the DIP switches. The jam protection is fixed at 400% of the full load current setting with a 0.5 second trip delay.

**E1 Plus PTC Module with Remote Reset**

The Bul. 193-EPT PTC Side-Mount Module provides two terminals for the connection of positive temperature coefficient (PTC) thermistor sensors. PTC sensors are commonly embedded in the motor stator windings to monitor winding temperature. PTC sensors react to actual temperature, so enhanced motor protection can be provided to address conditions like obstructed cooling and high ambient temperature.

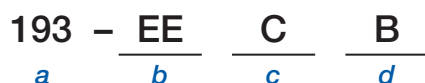
**E1 Plus EtherNet/IP Module**

The Bul. 193-ETN EtherNet/IP network communication module delivers seamless control and direct access to motor performance and diagnostic data on an Ethernet-based network. It supports I/O and explicit messaging for data access by a programmable automation controller, and contains predefined ControlLogix® style tags for direct software access. The integrated web and e-mail server contains a web server to allow users to read information and configure parameters via a web browser. The device also uses a simple mail transfer protocol (SMTP) server to send e-mail or text messages in the event of a warning or trip condition.

**E1 Plus PROFIBUS Module**

The Bul. 193-EPRB PROFIBUS network communication module delivers direct access to motor performance and diagnostic data on a field bus based network in addition to seamless control. The PROFIBUS communication module supports both PROFIBUS DP-V0 and DP-V1. Protective functions include overload warning, jam protection, and underload warning. The PROFIBUS network communication module monitors the motor current by electronically interfacing to the E1 Plus overload relay's current-sensing circuit. As a result, the side-mount module is able to identify the cause of the trip and provides warnings for overload, underload, phase loss, and jam. The module continuously monitors the motor's performance for average motor current, thermal capacity usage, and device status, and also provides a trip history for the five previous trips. Integrated I/O provides convenient local termination of motor-related inputs and outputs, simplifying the control architecture.

**Catalog Number Explanation**



*a*

Bulletin Number	
Code	Description
193	IEC Three-Phase
193S	IEC Single-Phase
592	NEMA Three-Phase
592S	NEMA Single-Phase

*b*

Type	
Code	Description
ED1‡	Fixed Trip Class 10
EE	Selectable Trip Class

‡ Bulletin 193 overload relays only

*c*

Adjustment Range [A]			
Three-Phase		Single-Phase	
Code	Description	Code	Description
A	0.1...0.5	P	1.0...5.0
B	0.2...1.0	R	3.2...16
C	1.0...5.0	S	5.4...27
D	3.2...16	T	9...45
E	5.4...27	U	18...90
F	9...45	V	60...120
G	18...90	—	—
H	30...150	—	—
J	40...200	—	—
K	60...300	—	—
L	100...500	—	—
M	120...600	—	—
N	160...800	—	—

*d*





Bulletin 100 Contactor Size	
Code	Description
B	C09...C23
D	C30...C43
E	C60...C85, C60...C97
F	D95...D180, D115...D180
G	D210...D420
H	D630...D860
Bulletin 500 NEMA Contactor Size	
Code	Description
T	Size 00
C	Size 0...2
D	Size 3
Panel/DIN Rail Mount	
Code	Description
P	Integrated panel mount and pass-through wiring
Z	Panel mount with external current transformers

Function	E1 Plus§ (Cat. No. 193/592-EE_)	E1 Plus w/ Jam Module (Cat. No. 193-EJM)	E1 Plus w/ Ground Fault Module★ (Cat. No. 193-EGF)	E1 Plus w/ Ground Fault/Jam Module★ (Cat. No. 193-EGJ)	E1 Plus w/ PTC Module (Cat. No. 193-EPT)	E1 Plus w/ Remote Reset Module (Cat. No. 193-ERR)	E1 Plus w/ DeviceNet Module (Cat. No. 193-EDN)	E1 Plus w/ EtherNet/IP Module (Cat. No. 193-ETN)	E1 Plus w/ Profibus Module (Cat. No. 193-EPRB)	
Manual/Automatic Reset	X	X	X	X	X	X	X	X	X	
Selectable Trip Class	10	X	X	X	X	X	X	X	X	
	15	X	X	X	X	X	X	X	X	
	20	X	X	X	X	X	X	X	X	
	30	X	X	X	X	X	X	X	X	
Jam Protection	On or Off	—	X	—	X	—	—	X	X	
	Trip Level	—	Adjustable 150/200/300/400%	—	Fixed @ 400%	—	—	Adjustable 150...600% FLA	Adjustable 150...600% FLA	Adjustable 150...600% FLA
	Trip Delay	—	Adjustable 0.5/1.0/2.0/4.0 s	—	Fixed @ 0.5 s	—	—	Adjustable 0.5...25 s	Adjustable 0.5...25 s	Adjustable 0.5...25 s
	Inhibit	—	Dynamic Inhibit§	—	Dynamic Inhibit§	—	—	Dynamic Inhibit§	Dynamic Inhibit§	Dynamic Inhibit§
Ground Fault Protection	Type	—	—	Core-Balanced Ground Fault Protection★	Core-Balanced Ground Fault Protection★	—	—	—	—	
	On or Off	—	—	X	X	—	—	—	—	
	Trip Level	—	—	Adjustable 20 mA...5 A&	Adjustable 20 mA...5 A&	—	—	—	—	
	Trip Delay	—	—	Fixed @ 50 ms ± 20 ms	Fixed @ 50 ms ± 20 ms	—	—	—	—	
	Inhibit	—	—	Dynamic Inhibit§	Dynamic Inhibit§	—	—	—	—	
PTC Protection	PTC Overtemperature Trip	—	—	—	—	X	—	—	—	
	PTC Open Circuit	—	—	—	—	X	—	—	—	
	PTC Short Circuit	—	—	—	—	X	—	—	—	
Remote Reset Capability	—	X	X	X	X	X	X	X	X	
Fault Indication	—	—	X	X	X	—	X	X	X	

§ Dynamic Inhibit: Protective function is enabled after the motor current goes above 150% and then falls to below 125%.

★ Requires use of an external ground fault sensor, **Cat. No. 193-CBCT\_**.

& From 20...100 mA for resistive loads only.

		Cat. No. 193-ED1_B, 193-EE_B, and 592-EE_T	Cat. No. 193-EE_D, and 592-EE_C	Cat. No. 193-EE_E, and 592-EE_D	Cat. No. 193-EE_F§	Cat. No. 193-EE_G	Cat. No. 193-EE_H
<b>Main Circuits</b>							
Rated Insulation Voltage (U <sub>i</sub> )		690V AC			1000V AC		
Rated Impulse Strength (U <sub>imp</sub> )		6 kV AC			6 kV AC		
Rated Operating Voltage (U <sub>e</sub> ) IEC/UL		690V AC/600V AC			1000V AC/600V AC		
Rated Operating Frequency		50/60 Hz (sinusoidal)			50/60 Hz (sinusoidal)		
Terminal Cross-Sections	Terminal Type						
	Terminal Screws	M5		M8		Lug	
Flexible-Stranded with Ferrule	Single Conductor Torque	2.5...16 mm <sup>2</sup> 2.5 N•m	2.5...16 mm <sup>2</sup> 2.5 N•m	4...35 mm <sup>2</sup> 24 N•m	—	—	—
	Two Conductor Torque	2.5...10 mm <sup>2</sup> ‡ 3.4 N•m	2.5...10 mm <sup>2</sup> ‡ 3.4 N•m	4...25 mm <sup>2</sup> 4 N•m	—	—	—
Coarse-Stranded/Solid	Single Conductor Torque	2.5...25 mm <sup>2</sup> 2.5 N•m	2.5...25 mm <sup>2</sup> 2.5 N•m	4...50 mm <sup>2</sup> 4 N•m	16...150 mm <sup>2</sup> 28 N•m	—	—
	Two Conductor Torque	6...16 mm <sup>2</sup> ‡ 3.4 N•m	6...16 mm <sup>2</sup> ‡ 3.4 N•m	4...35 mm <sup>2</sup> 4 N•m	—	25...185 mm <sup>2</sup> 28 N•m	70...240 mm <sup>2</sup> 45 N•m
	Four Conductor Torque	6...16 mm <sup>2</sup> ‡ 3.4 N•m	6...16 mm <sup>2</sup> ‡ 3.4 N•m	4...35 mm <sup>2</sup> 4 N•m	—	—	70...240 mm <sup>2</sup> 45 N•m
Stranded/Solid	Single Conductor Torque	14...6 AWG 22 lb•in	14...6 AWG 22 lb•in	12...1 AWG 35 lb•in	6...300 MCM 250 lb•in	—	—
	Two Conductor Torque	14...6 AWG‡ 30 lb•in	14...6 AWG‡ 30 lb•in	6...2 AWG 35 lb•in	—	4...350 MCM 250 lb•in	2/0...500 MCM 400 lb•in
	Four Conductor Torque	14...6 AWG‡ 30 lb•in	14...6 AWG‡ 30 lb•in	6...2 AWG 35 lb•in	—	—	2/0...500 MCM 400 lb•in
Poizdriv Screwdriver Size		2	2	—	—	—	—
Slotted Screwdriver (mm)		1 x 6	1 x 6	—	—	—	—
Hexagon Socket Size (mm)		—	—	4	8	8	8
<b>Control Circuits</b>							
Rated Insulation Voltage (U <sub>i</sub> )		690V AC					
Rated Impulse Strength (U <sub>imp</sub> )		6 kV AC					
Rated Operating Voltage (U <sub>e</sub> ) IEC/UL		690V AC / 600V AC					
Rating Designation		B600					
Rated Operating Current I <sub>e</sub>		N.O./N.C.					
AC-15	12...120V	3/2					
	220...240V	1.5/1.5					
	380...480V	0.75/0.75					
	500...600V	0.6/0.6					
Thermal Current I <sub>the</sub>		5 A					
Contact Reliability		17V, 5 mA					
Screw Terminal Cross Sections	Terminal Screw	M3					
	Single Conductor Torque	0.5...2.5 mm <sup>2</sup> 0.55 N•m					
Flexible-Stranded with Ferrule	Two Conductor Torque	0.25...1.5 mm <sup>2</sup> 0.55 N•m			0.2...0.75 mm <sup>2</sup> 0.55 N•m		
	Single Conductor Torque	0.5...4 mm <sup>2</sup> 0.55 N•m					
Coarse-Stranded/Solid	Two Conductor Torque	0.2...2.5 mm <sup>2</sup> 0.55 N•m			0.2...1.5 mm <sup>2</sup> 0.55 N•m		
	Single Conductor Torque	24...10 AWG 5 lb•in					
Stranded/Solid	Two Conductor Torque	24...12 AWG 5 lb•in			22...16 AWG 5 lb•in		
	Screwdriver Size (mm)	#1 Pozidriv/0.6 x 3.5 slotted					
<b>Cage Clamp Cross-Sections</b>							
Flexible-Stranded with Ferrule		0.25...1 mm <sup>2</sup>					
Coarse-Stranded/Solid		0.2...1.5 mm <sup>2</sup>					
Stranded/Solid		24...14 AWG					

‡ For multiple conductor applications, the same style and size of wire must be used.

§ Cat. Nos. 193-EEGF and 193-EEVF follow Cat. No. 193-EE\_E specifications.

## 3-Pole Terminal Blocks

Cat. No. 100-DTB180	Cat. No. 100-DTB420
(A) 6...1/0 AWG, 16...50 mm <sup>2</sup> (B) 6 AWG...250 MCM, 16...120 mm <sup>2</sup> 90...110 lb•in, 10...12 N•m	(2) 4 AWG...600 MCM, 25...240 mm <sup>2</sup> 180...220 lb•in, 20...25 N•m

## Terminal Lug Kits

Cat. No. 100-DLE110	Cat. No. 100-DL180	Cat. No. 100-DL420	Cat. No. 100-DL630	Cat. No. 100-DL860
Lug: 6...2/0 AWG, 16...70 mm <sup>2</sup> 90...110 lb•in, 10...12 N•m Terminal: 13/32 in., 10 mm 150 lb•in, 17 N•m	Lug: 6 AWG...250 MCM, 16...120 mm <sup>2</sup> 90...110 lb•in, 10...12 N•m Terminal: 1/2 in., 13 mm 275 lb•in, 16 N•m	Lug: 2 AWG...350 MCM, 375 lb•in, 42 N•m Terminal: 11/16 in., 17 mm 140 lb•in, 16 N•m	Lug: 2/0 AWG...500 MCM, 70...240 mm <sup>2</sup> 400 lb•in, 45 N•m Terminal: 3/4 in., 19 mm 600 lb•in, 68 N•m	Lug: 2/0 AWG...500 MCM, 70...240 mm <sup>2</sup> 400 lb•in, 45 N•m Terminal: 3/4 in., 19 mm 600 lb•in, 68 N•m

## Environmental Ratings

Ambient Temperature	Storage Operating	-40...+85 °C (-40...+185 °F) -20...+60 °C (-4...+140 °F)
Humidity	Operating Damp Heat	5...95% Non-condensing per IEC 68-2-3 and IEC 68-2-30
Vibration (per IEC 68-2-6)		3 G
Shock (per IEC 68-2-27)		30 G
Max. Altitude		2000 m
Pollution Environment		Pollution Degree 3
Degree of Protection		IP20

## Protection

Type of Relay		Ambient Compensated, Time Delay, Phase Loss Sensitive
Nature of Relay		Solid-State
Trip Rating		120% FLA
Trip Class	Type ED	10
	Type EE	10, 15, 20, 30
Reset Mode	Type ED	Manual
	Type EE	Automatic or Manual
Electromagnetic Compatibility		
Electrostatic Discharge Immunity	Test Level	8 kV Air Discharge, 6 kV Contact Discharge
	Performance Level	1 §‡
RF Immunity	Test Level	10 V/m
	Performance Level	1 §‡
Electrical Fast Transient/Burst Immunity	Test Level	4 kV
	Performance Level	1 §‡
Surge Immunity	Test Level	2 kV (L-E), 1 kV (L-L)
	Performance Level	1 §‡

§ Performance Criteria 1 requires the device under test (DUT) to experience no degradation or loss of performance.

‡ Environment 2.

## General

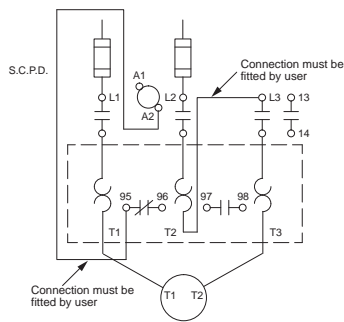
	Cat. No. 193-ED1_B, 193-EE_B	Cat. No. 193-EE_D	Cat. No. 193-EE_E
Standards	UL508, CSA C22.2 No. 14, NEMA ICS 2-1993 Part 4, EN 60947-4-1, EN 60947-5-1		
Certifications	CE, cULus, C-Tick, CCC		
Approximate Weights (unpacked)	0.25 kg (0.55 lb)	0.25 kg (0.55 lb)	0.52 kg (1.06 lb)

**External Current Transformers (for use with cat. nos. 193-EE\_Z)**

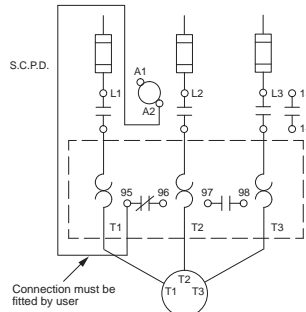
The user shall provide one current transformer (CT) for each motor phase, and shall connect the CT's secondary leads to the appropriate E1 Plus overload relay power terminals, as shown in current transformer's wiring diagrams. The CT shall have the appropriate ratio (refer to the product nameplate or product description). Additionally, the CT shall be selected to be capable of providing the required VA to the secondary load, which includes the E1 Plus overload relay burden at the rated secondary current and the wiring burden. Finally, the CT shall be rated for protective relaying to accommodate the high inrush currents associated with motor startup, and shall have an accuracy of  $\pm 2\%$  over its normal operating range. Typical CT ratings include (Instrument Transformers, Inc. — Model #23 or equivalent):

<b>ANSI (USA)</b>	<b>Class C5B0.1</b>
<b>CSA (Canada)</b>	<b>Class 10L5</b>
<b>IEC (Europe)</b>	<b>5 VA Class 5P10</b>

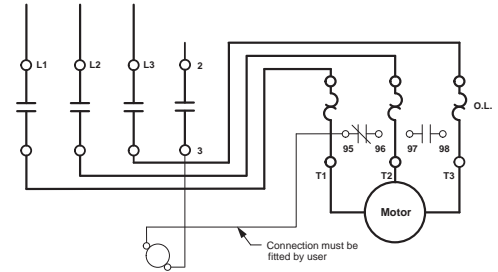
**Wiring Schematic**



*Typical Wiring for 1-Phase IEC Applications*



*Typical Wiring for 3-Phase IEC Applications*



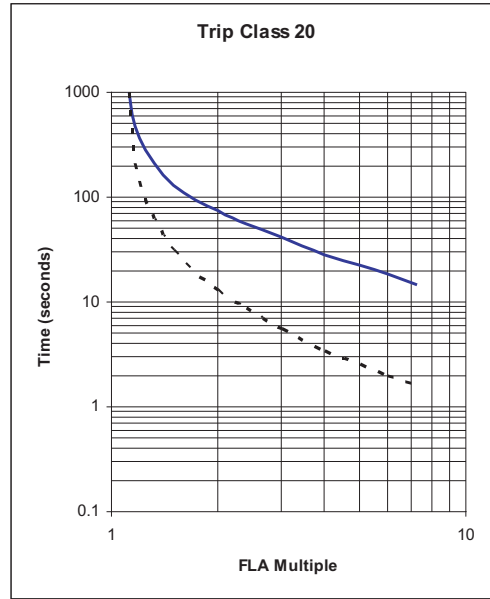
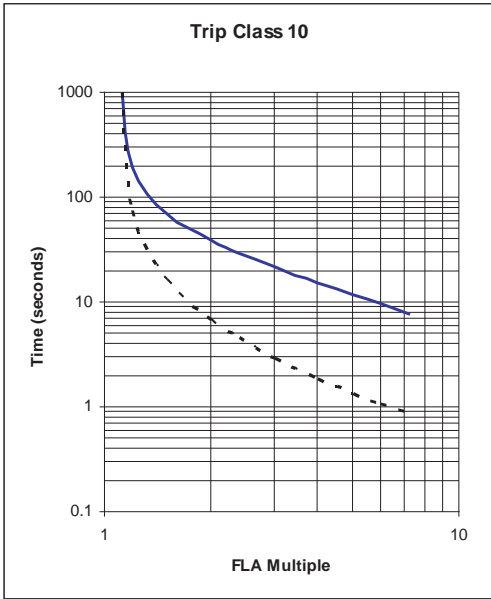
*Typical Wiring for NEMA Applications*



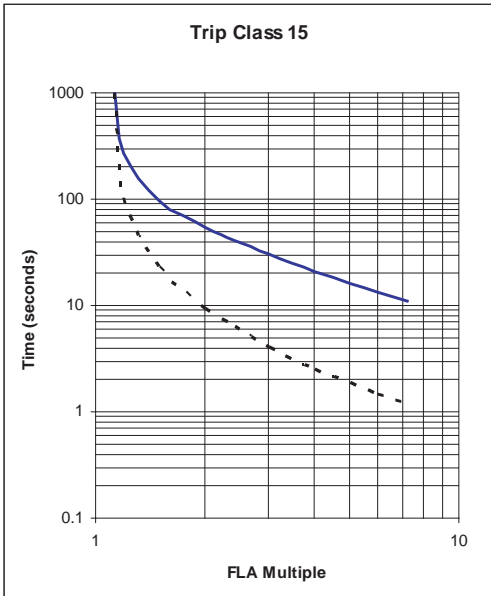
**Trip Curves**

Typical reset time for 193-EE devices set to automatic reset mode is 120 seconds.

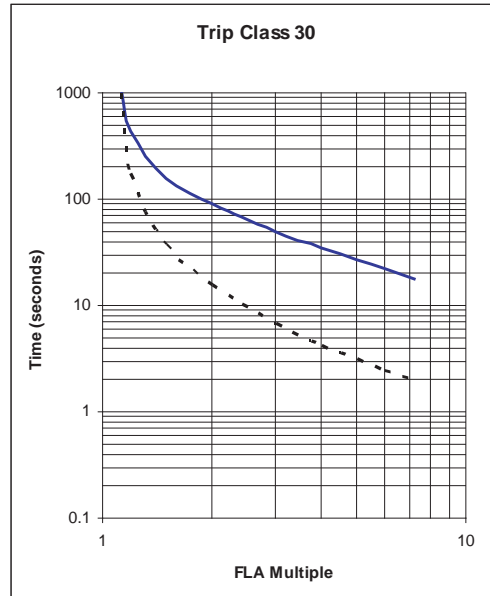
**Trip Class 10**



**Trip Class 15**



**Trip Class 30**

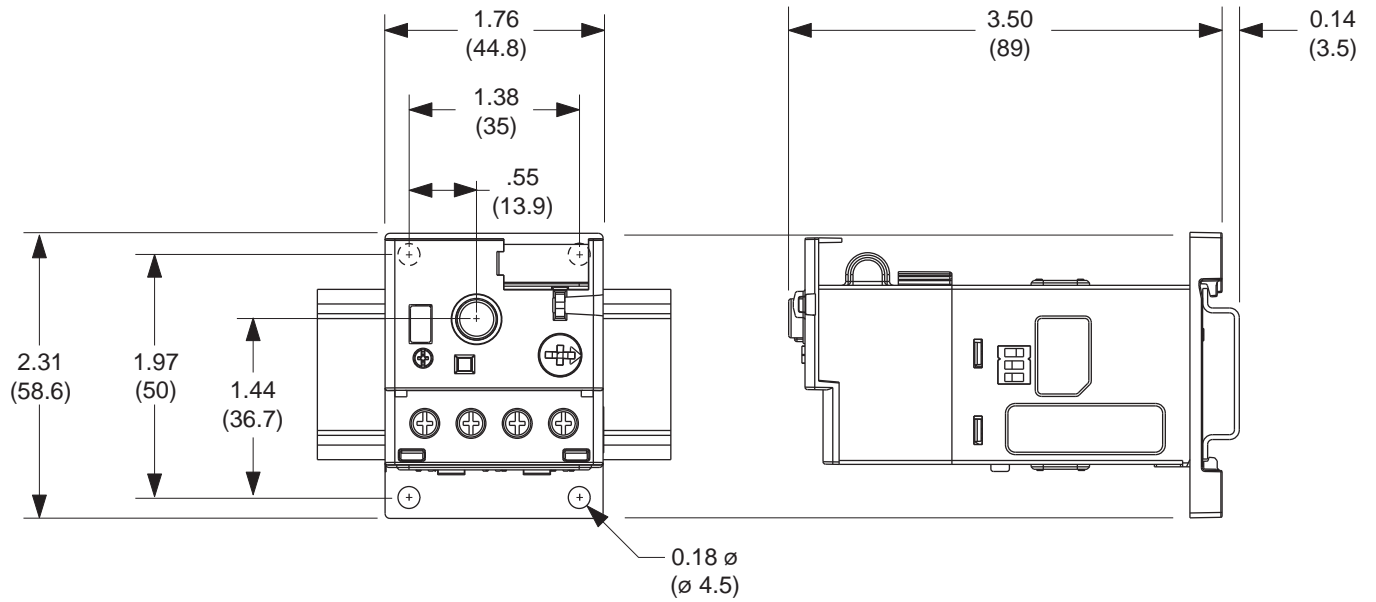


**Trip Class 20**

**Trip Curve Legend:** Cold Trip ———  
Hot Trip - - - - -

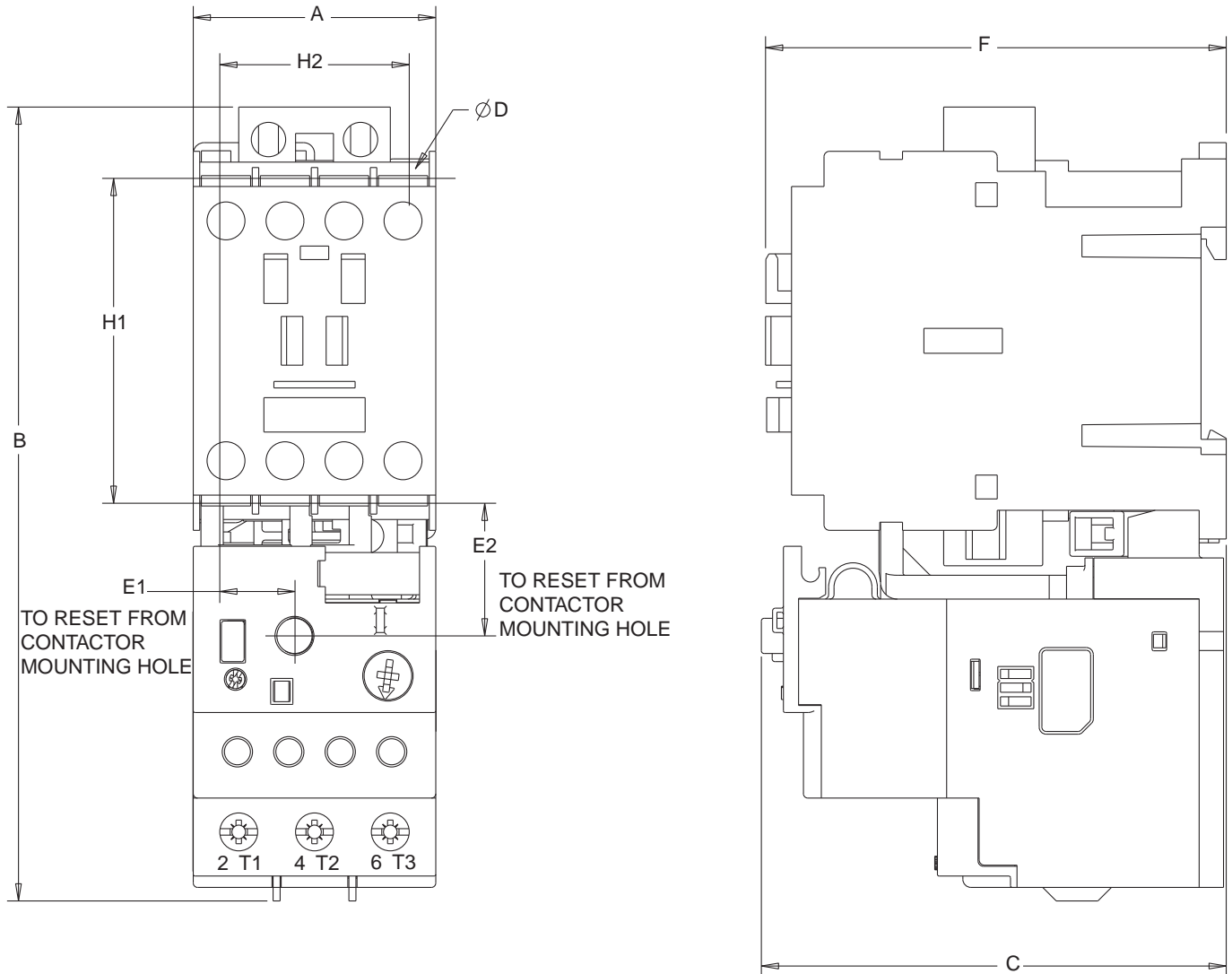
Approximate dimensions are shown in millimeters (inches). Dimensions are not to be used for manufacturing purposes.

E1 Plus Pass-thru Style



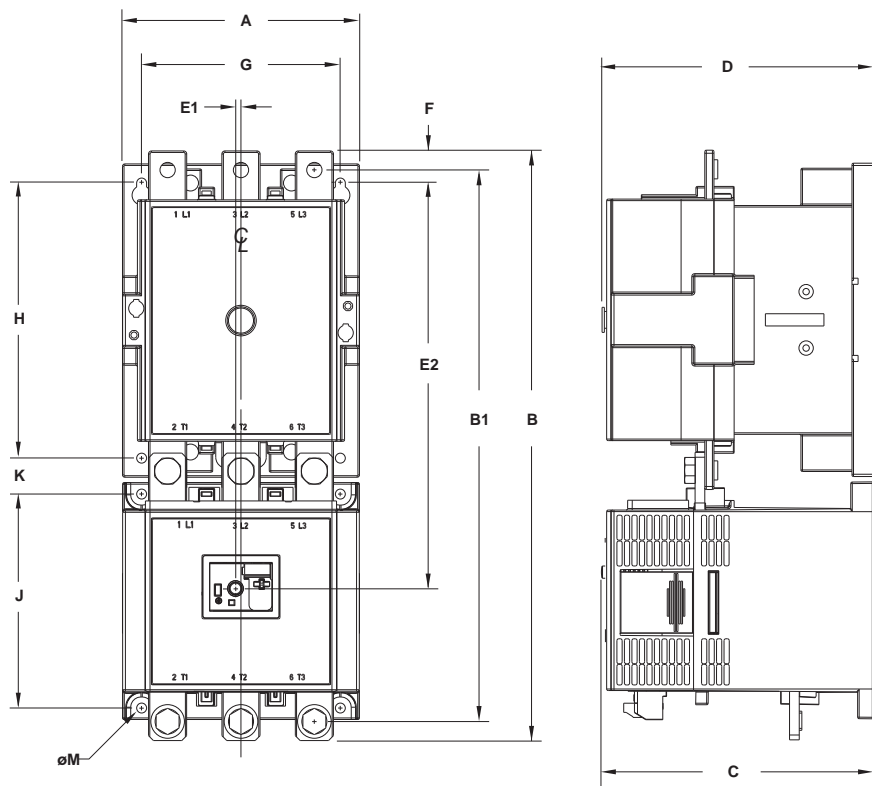
Approximate dimensions are shown in millimeters (inches). Dimensions are not to be used for manufacturing purposes.

Bulletin 100-C Contactor Mounted



Overload Cat. No.	Contactor Cat. No.	Width A	Height B	Depth C	D	E1	E2	F	H1	H2
193-ED_B 193-EE_B 193R-EE_B 193S-EE_B	100-C09, -C12, -C16, -C23	45 (1-25/32)	146.6 (5-25/32)	85.2 (3-23/64)	4.5 (3/16)	13.9 (35/64)	24.5 (31/32)	86.5 (3-13/32)	60 (2-23/64)	35 (1-3/8)
193-EE_D 193R-EE_D 193S-EE_D	100-C30, -C37	45 (1-25/32)	146.6 (5-25/32)	101.2 (3-63/64)	4.5 (3/16)	13.9 (35/64)	24.5 (31/32)	104 (4-3/32)	60 (2-23/64)	35 (1-3/8)
193-EE_D 193R-EE_D 193S-EE_D	100-C43	54 (2-1/8)	146.6 (5-25/32)	101.2 (3-63/64)	4.5 (3/16)	18.9 (3/4)	24.5 (31/32)	104 (4-3/32)	60 (2-23/64)	45 (1-25/32)
193-EE_E 193R-EE_E 193S-EE_E	100-C60, -C72, -C85	72 (2-53/64)	192.3 (7-37/64)	120.4 (4-3/4)	5.4 (7/32)	23.8 (15/16)	29 (1-9/64)	125.5 (4-15/16)	100 (3-15/16)	55 (2-11/64)

Bulletin 100-D Contactor Mounted

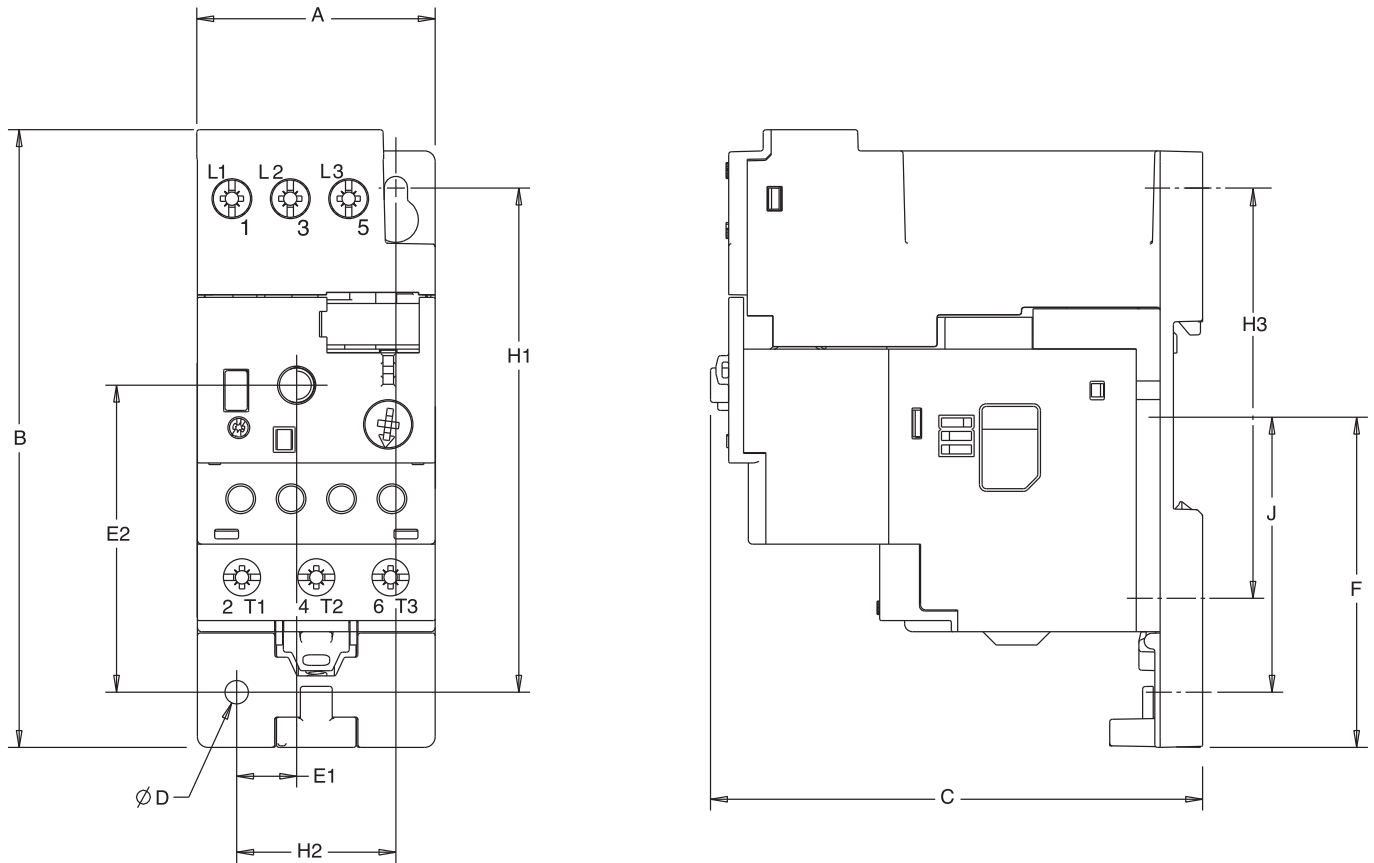


Overload Cat. No.	Contactor Cat. No.	Width A	Height B		Height B1	Depth C (Reset)	D	E1	E2
			Without Terminal Covers	With Terminal Covers					
193-EE_F	100-D95, -D110	120 (4.72)	336.3 (13.24)	418 (16.46)	311.8 (12.27)	152.7 (6.01)	156 (6.14)	3.6 (0.14)	226.3 (8.91)
193-EE_F	100-D140, -D180	120 (4.72)	339.8 (13.38)	418 (16.46)	317.8 (12.51)	152.7 (6.01)	156 (6.14)	3.6 (0.14)	226.3 (8.91)
193-EE_G	100-D210, -D250, -D300, -D420	155 (6.10)	385.8 (15.19)	487.4 (19.19)	360.8 (14.2)	176.5 (6.95)	180 (7.09)	3.6 (0.14)	265.2 (10.44)
193-EE_H	100-D630, -D860	255 (10.04)	552 (21.73)	915 (36.02)	508 (20)	269.3 (10.6)	270.7 (10.66)	3.6 (0.14)	384.1 (15.12)

Overload Cat. No.	Contactor Cat. No.	F	G	H	J	K	øM
193-EE_F	100-D95, -D110	45 (1-25/32)	100 (3.94)	145 (5.71)	135 (5.31)	22.3 (0.88)	8 - 5.6 (8 - 0.22)
193-EE_F	100-D140, -D180	45 (1-25/32)	100 (3.94)	145 (5.71)	135 (5.31)	22.3 (0.88)	8 - 5.6 (8 - 0.22)
193-EE_G	100-D210, -D250, -D300, -D420	54 (2-1/8)	130 (5.12)	180 (7.09)	140 (5.51)	23.5 (0.93)	8 - 6.5 (8 - 0.26)
193-EE_H	100-D630, -D860	52.5 (2.07)	226 (8.90)	230 (9.06)	108 (4.25)	109 (4.29)	8 - 13 (8 - 0.51)

Panel Adapter Mounted

Approximate dimensions are shown in millimeters (inches). Dimensions are not to be used for manufacturing purposes.



Panel Adapter Cat. No.	Overload Cat. No.	Width A	Height B	Depth C	D	E1	E2	F	H1	H2	H3	J
193-EPB	193-ED_B	45 (1-25/32)	116.5 (4-19/16)	92.7 (3-21/32)	4.4 (11/64)	11.4 (0.45)	57.9 (2-9/32)	62.5 (2-15/32)	95 (3-3/4)	30 (1-3/16)	75 (2-31/32)	52.1 (2-3/64)
	193-EE_B											
	193R-EE_B											
	193S-EE_B											
193-EPD	193-EE_D	45 (1-25/32)	112.4 (4-7/16)	108.7 (4-9/32)	4.4 (11/64)	11.4 (0.45)	57.9 (2-9/32)	62.5 (2-15/32)	95 (3-3/4)	30 (1-3/16)	75 (2-31/32)	52.1 (2-3/64)
	193R-EE_D											
	193S-EE_D											
193-EPE	193-EE_E	72 (2-53/64)	107.4 (4-15/64)	127 (5/32)	5.5 (5/32)	26.4 (1-1/32)	54.5 (2-9/64)	48.3 (1-29/32)	90 (3-23/64)	60 (2-23/64)	—	43.3 (1-45/64)
	193R-EE_E											
	193S-EE_E											

DIN Rail / Panel Adapter - Terminal Cross Sections

		Cat. No. 193-EPB ‡	Cat. No. 193-EPD ‡	Cat. No. 193-EPE
Flexible-Stranded with Ferrule	Single Conductor	1.0...4.0 mm <sup>2</sup>	2.5...16 mm <sup>2</sup>	4.0...35 mm <sup>2</sup>
	Torque	1.8 N•m	2.3 N•m	4.0 N•m
	Two Conductor	1.0...4.0 mm <sup>2</sup>	2.5...10 mm <sup>2</sup>	4.0...25 mm <sup>2</sup>
	Torque	1.8 N•m	2.3 N•m	4.0 N•m
Coarse-Stranded/Solid	Single Conductor	1.5...6.0 mm <sup>2</sup>	2.5...25 mm <sup>2</sup>	4.0...50 mm <sup>2</sup>
	Torque	1.8 N•m	2.3 N•m	4.0 N•m
	Two Conductor	1.5...6.0 mm <sup>2</sup>	2.5...16 mm <sup>2</sup>	4.0...35 mm <sup>2</sup>
	Torque	1.8 N•m	2.3 N•m	4.0 N•m
Stranded/Solid	Single Conductor	14...8 AWG	16...6 AWG	12...1 AWG
	Torque	16 lb•in	20 lb•in	35 lb•in
	Two Conductor	14...10 AWG	16...6 AWG	12...2 AWG
	Torque	16 lb•in	20 lb•in	35 lb•in

‡ For multiple conductor applications, the same size and style wire must be used.

## Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

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