



E100 Electronic Overload Relay Specifications

Bulletins 193, 592

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Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

Topic	Page
Added Cat. No. 592-1EFHE-X1	7

Introduction

The E100 Electronic Overload Relay is the next generation basic-tier electronic overload relay. It has enhanced features to better safeguard your motor protection investments, including increased accuracy and repeatability, a self-powered design with lower heat dissipation, and the certifications to comply with many applications.

The E100 portfolio is available in two offerings: a Basic (Cat. No. 193-1EE) and Advanced (Cat. No. 193-1EF, 592-1EF) version, supporting both single- and three-phase operation in a single component. The Basic version allows adjustable trip current, manual trip reset, and limited trip class selection. The Advanced version offers the same adjustable trip current, manual and automatic trip reset, a larger selection of trip classes, and the ability to connect additional accessory modules.

This section gives you an overview of the Bimetallic, E100, E200, and E300™ lines of overload relays and their respective features.

Relay Type	Bimetallic ⁽¹⁾	E100	E200 ⁽²⁾	E300 ⁽²⁾
Protection Features				
Overload	✓	✓	✓	✓
Phase Loss	–	✓	✓	✓
Ground Fault	–	✓	✓	✓
Current Imbalance	✓		✓	✓
Jam	–	✓	✓	✓
Over/ Under Voltage	–	–	✓	✓
Voltage Imbalance	–	–	✓	✓
Over/ Under Power	–	–	✓	✓
Diagnostics Features				
% Full Load Amperes (FLA)	–	✓	✓	✓
% Thermal Capacity Utilization (TCU)	–	✓	✓	✓
Voltage	–	–	✓	✓
Power	–	–	✓	✓
Energy	–	–	✓	✓
Network Integration Features				
DeviceLogix™	–	–	✓	✓
Logix Controller	–	–		✓
Connected Components Workbench™ Software	–	–	✓	–
EtherNet/IP™	–	–	–	Embedded (dual-port)
DeviceNet™	–	–	–	Embedded (single-port)
Local Programming Method	–	–	USB Type B ⁽³⁾	EtherNet/IP or DeviceNet ⁽³⁾

(1) See publication [193-TD010](#) for more information.

(2) See publication [193-TD006](#) for more information.

(3) You can also configure E300/E200 devices using an optional expansion operator diagnostic station.

Features

The E100 relay provides the following features:

- Electronic overload detection
- Simple configuration
- Selectable trip class
- Adjustable trip current
- Direct mounting for both IEC and NEMA contactors
- Test and reset buttons
- Automatic (193/592-1EF only)/manual reset selection
- RMS current sensing (50/60 Hz)
- External current transformer configurations for high-current applications
- Pass-thru wiring option

The E100 relay lets you connect accessory modules, some of which interface through the front-mounted communication port. Accessories include:

- Ground fault/jam protection module (193/592-1EF only)
- Remote reset solenoid
- Anti-tamper shield
- Electronic remote indication display (ERID), with or without reset (193/592-1EF only)
- External reset adapter
- DIN Rail/Panel adapter

Throughout this publication, we also refer to the E100 Electronic Overload Relay as the E100 overload relay and E100 relay. These terms are interchangeable. For more information on how to operate and maintain this product, see the user manual, publication [193-UM013](#).

Overload Performance

Feature	Description
Current Measurement-based Protection	Current measurement-based overload protection models a motor's thermal condition more accurately than eutectic alloy or bimetallic options.. Ambient temperature over the specified temperature operating range does not impact the performance of current measurement-based designs.
Electronic Design	Thermal modeling is performed electronically with precision solid-state components, using a state-of-the-art microprocessor. The microprocessor continually processes motor current data to accurately maintain the time-current status of the motor thermal capacity utilization (% TCU) value.
Thermal Memory	A thermal memory design lets the E100 Overload Relay model the heating and cooling effects of motor on and off periods. This model achieves accurate protection for both hot and cold operation.
Phase Loss Protection	Phase loss detection is incorporated into the E100 Overload Relay, allowing it to respond quickly to this condition.

Rugged Construction

Feature	Description
Self-powered Design	The E100 relay base unit does not require additional auxiliary control power. The low energy consumption of the electronic design minimizes temperature rise issues inside industrial control cabinets.
Wide Adjustment Range	A wide 5:1 current adjustment range requires fewer catalog numbers than bimetallic overload alternatives to cover the same current range. This helps to reduce inventory carrying costs and affords greater installation flexibility for various applications.
IEC and NEMA Direct-mount Power Connections	Unique line-side over-molded power connections yield a sturdy two-component starter assembly that is unmatched in the industry. The pre-formed power connections simplify starter assembly.
Internal Current Transformers (CTs)	The current transformers are secured separately in the overload housing to deliver the greatest degree of resistance to shock and vibration conditions. Varnished laminations deliver consistent performance and provide additional protection against corrosion.

Versatile and Expandable

Feature	Description
Pass-thru Design	The E100 relay Pass-thru option consumes less panel space than a standard E100 relay that is configured with a panel-mount adapter. The Pass-thru design provides integrated DIN Rail mount and panel mounting holes. The Pass-thru design provides greater flexibility for installing components in tight spaces.
Adjustable Trip Class and Reset Modes	The Basic E100 relay (Cat. No. 193-1EE) offers Trip Class 10 and 20 with manual reset only. The Advanced E100 relay (Cat. No. 193/592-1EF) offers Trip Class 10, 15, 20, and 30 with manual or automatic reset.
Remote Reset Capability	The E100 relay offers optional remote reset capabilities by using an electromechanical reset solenoid or an electronic remote reset accessory (Cat. No. 193-1ERR) module. ⁽¹⁾
Ground Fault and Jam Protection ⁽¹⁾	The E100 relay offers optional ground fault and jam protection by using an accessory (Cat. No. 193-1EGJ) module. The ground fault current detection level is configurable via a mechanical rotary dial from 0.02...5 A. Jam protection is configurable via two mechanical rotary dials, current level from 125...600% FLA, and delay from 0.1...10 seconds. The ground fault module also supports remote reset capability.
External CTs ⁽¹⁾	For motor overload protection applications above 100 A in current sensing capability, the E100 relay offers functionality with external CT configurations up to 800 A maximum capacity (Cat. No. 193-1EF_Z).

(1) 193/592-1EF (advanced) devices only.

This section provides catalog number explanations and product selection information for the E100 overload relays and accessories.

Catalog Number Explanation

Examples that are given in this section are for reference purposes. This basic explanation should not be used for product selection; not all combinations produce a valid catalog number.

193
-
1
-
EE
-
C
-
B
-
X1

a
b
c
d
e

a	
Bulletin Number	
Code	Description
193	IEC Overload Relay
592	NEMA Overload Relay

b	
Type	
Code	Description
EE ⁽¹⁾	Basic
EF	Advanced

c	
Adjustment Range (A)	
Code	Description
A	0.1...0.5
B	0.2...1.0
C	1.0...5.0
D	3.2...16
E	5.4...27
F	11...55
G	20...100
H	30...150
J	40...200
K	60...300
L	100...500
M	120...600
N	160...800
Q	13.2...66
W	80...400

d	
Compatible Contactor/Mounting	
Bulletin 100 IEC Contactors	
Code	Description
B	100-C09...C23
D	100-C30...C55
E	100-C60...C97
F	100-E09...E16
G	100-E26...E38
H	100-E40...E65
J	100-E80...E96
Bulletin 300 NEMA Energy-saving Contactor Size	
Code	Description
F	Size 00...0
G	Size 1
H	Size 2
J	Size 3
Bulletin 500 NEMA Contactor Size	
Code	Description
T	Size 00
C	Size 0...2
D	Size 3
E	Size 4
F	Size 5
DIN Rail/Panel Mount	
Code	Description
P	Integrated panel mount and pass-thru wiring
Z	Panel mount with external current transformers

e	
Standoff Height	
Code	Description
Blank	Standard height
X1	Reduced Height ⁽²⁾

(1) Bulletin 193 devices only.

(2) Reduced standoff height of 1-9/16 in (39.7 mm) designed for use with height restricted Explosion proof Type 7 & 9 enclosures or other height-restricted applications.

Overload Relays

Bulletin 193-1EE – Single- and Three-phase Devices (Trip Class 10, 20; Manual Reset Only)

	Mounting Options	Current Range [A]	For Use With	Cat. No.
	IEC Contactors	0.1...0.5	100-C09...C23	193-1EEAB
		0.2...1.0		193-1EEBB
		1.0...5.0		193-1EECB
		3.2...16		193-1EEDB
		5.4...27		193-1EEEB
		5.4...27	100-C30...C55	193-1EEED
		11...55		193-1EEFD
		20...100	100-C60...C97	193-1EEGE
		0.1...0.5	100-E09...E16, Bul. 300 Size 00...0	193-1EEAF
		0.2...1.0		193-1EEBF
		1.0...5.0		193-1EECF
		3.2...16		193-1EEDF
		5.4...27		193-1EEEF
		1.0...5.0	100-E26...E38, Bul. 300 Size 1	193-1EECG
		5.4...27		193-1EEEG
		11...55		193-1EEFG
		13.2...66	100-E40...E65, Bul. 300 Size 2	193-1EEQH
		20...100	100-E80...E96, Bul. 300 Size 3	193-1EEGJ
	Integrated panel/DIN Rail Mount and Pass-thru • Built-in current transformer; no external current transformer required	1.0...5.0	All contactors	193-1EECP
		3.2...16		193-1EEDP
		5.4...27		193-1EEEP
		11...55		193-1EEFP
		20...100		193-1EEGP

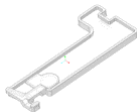
Bulletin 193-1EF – Single- and Three-phase Devices (Trip Class 10, 15, 20, 30; Manual or Automatic Reset)

	Mounting Options	Current Range [A]	For Use With	Cat. No.
	IEC Contactors External current transformer must be customer supplied, if needed	0.1...0.5	100-C09...C23	193-1EFAB
		0.2...1.0		193-1EFBB
		1.0...5.0		193-1EFCB
		3.2...16		193-1EFDB
		5.4...27		193-1EFEB
		5.4...27	100-C30...C55	193-1EFED
		11...55		193-1EFFD
		20...100	100-C60...C97	193-1EFGE
		0.1...0.5	100-E09...E16, Bul. 300 Size 00...0	193-1EFAF
		0.2...1.0		193-1EFBF
		1.0...5.0		193-1EFCF
		3.2...16		193-1EFDF
		5.4...27		193-1EFEF
		1.0...5.0	100-E26...E38, Bul. 300 Size 1	193-1EFCG
		5.4...27		193-1EFEG
		11...55		193-1EFFG
		13.2...66	100-E40...E65, Bul. 300 Size 2	193-1EFQH
		20...100	100-E80...E96, Bul. 300 Size 3	193-1EFGJ
		30...150	All contactors and external current transformers. External CT is required.	193-1EFHZ
		40...200		193-1EFJZ
		60...300		193-1EFKZ
		100...500		193-1EFLZ
		120...600		193-1EFMZ
		160...800		193-1EFNZ
		80...400		193-1EFWZ
	Integrated panel/DIN Rail Mount and Pass-thru Built-in current transformer; no external current transformer required	1.0...5.0	All contactors	193-1EFCP
		3.2...16		193-1EFDP
		5.4...27		193-1EFEP
		11...55		193-1EFFP
		20...100		193-1EFGP

Bulletin 592-1EF – Single- and Three-phase Devices (Trip Class 10, 15, 20, 30; Manual or Automatic Reset)

	Mounting Options	Current Range [A]	For Use With	Cat. No.
	NEMA-rated Overload Relays • For use with NEMA contactors • NEMA Size 4 devices are also available with a reduced standoff height (-X1 suffix) - 1-9/16 in (39.7 mm) - designed for use with height restricted Explosion proof Type 7 & 9 enclosures or other height-restricted applications	0.1...0.5	NEMA Size 00	592-1EFAT
		0.2...1.0		592-1EFBT
		1.0...5.0		592-1EFCT
		3.2...16		592-1EFDT
		0.2...1.0	NEMA Size 0...2	592-1EFBC
		1.0...5.0		592-1EFCC
		3.2...16		592-1EFDC
		5.4...27		592-1EFEC
		11...55		592-1EFFC
		20...100	NEMA Size 3	592-1EFGD
		30...150	NEMA Size 4	592-1EFHE
				592-1EFHE-X1
		60...300	NEMA Size 5	592-1EFKF

Accessories

Description			For Use With	Pkg. Qty.	Cat. No.
	Base Unit Anti-Tamper Shield		193-1EE, 193/592-1EF	10	193-1BC8
	External Reset Adapter			1	193-1ERA
	Remote Reset Solenoid	240V AC		1	193-1EMRA
		120V AC		1	193-1EMRD
		24V DC	1	193-1EMRZ	
	DIN Rail/Panel Adapter	Frames B, F, and G	193-1EE, 193-1EF	1	193-1EPB
		Frames D and H		1	193-1EPD
		Frames E and J		1	193-1EPE
	Universal Protection Module (ground fault/jam) • Includes adapters for compatible contactors		193/592-1EF	1	193-1EGJ
	Protection Accessory Anti-Tamper Shield		193-1EGJ	25	193-1EMC
	Reset Adapter (electronic remote reset) • Includes adapters for compatible contactors		193/592-1EF	1	193-1ERR
	Electronic Remote Indication Display	with reset	193-1ERR	1	193-ERID
		no reset		1	193-1ERIDN
Panel/DIN Mounting Kit (includes spare communication cable)			193-1EGJ, 193-1ERR	1	193-1EIKIT1
Accessory Installation Kit and Spare Terminal Blocks (includes spare communication cable)				1	193-1EIKIT2

This section contains specifications, wiring diagrams, and certification information for the E100 Electronic Overload Relay and its accessories.

Standards Compliance and Certifications

Standards Compliance	Certifications
- CSA22.2, No. 60947-4-1 - EN 60947-4-1 - UL 60947-4-1 - GB/T 14048.4-2010 - SJ/T 11364, GB/T 26572, SJ/Z 11388	- cULus Listed - File No. E14840 - CE Marked - RCM (formerly C-Tick) - ABS - RINA - DNV/GL - CCC - KC - EAC - Environmental Protection Use Period 25 (China RoHS) - Morocco Regulatory Certification

Wiring Diagrams

Figure 1 - 3-Phase, Full-voltage Direct-on-line Starter, NEMA Symbology

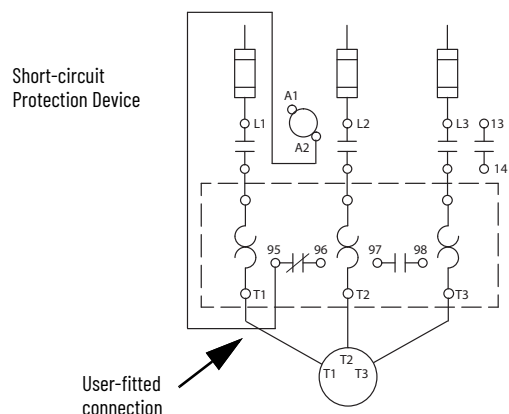


Figure 2 - 3-Phase, Full-voltage Direct-on-line Starter, IEC Symbology

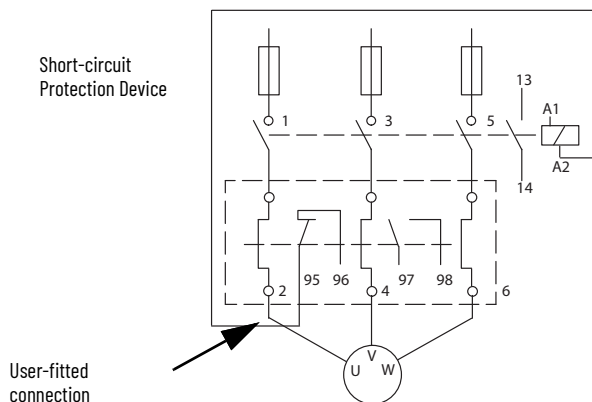


Figure 3 - 1-Phase, Full-voltage Direct-on-line Starter, NEMA Symbology

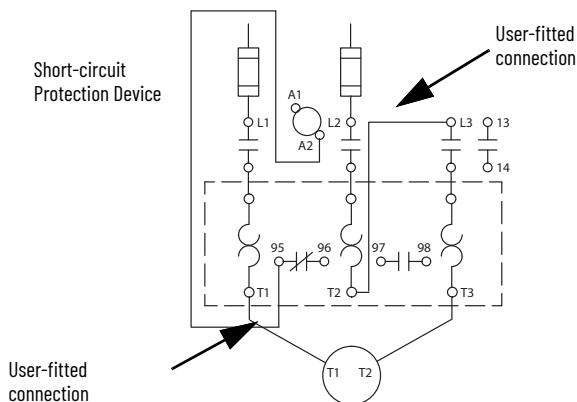


Figure 4 - 1-Phase, Full-voltage Direct-on-line Starter, IEC Symbology

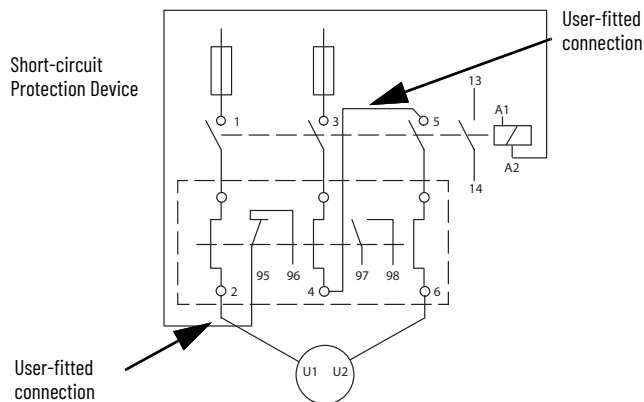
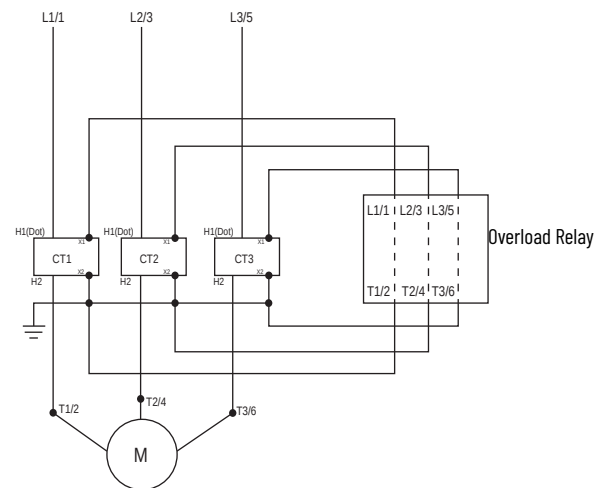
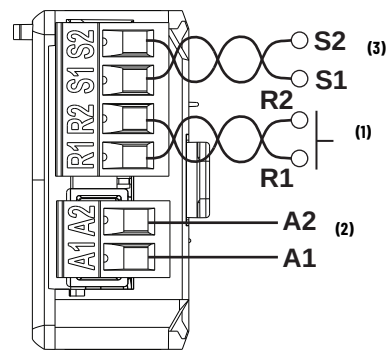


Figure 5 - E100 Overload Relay (Cat. No. 193-1EF_Z) with External Current Transformer



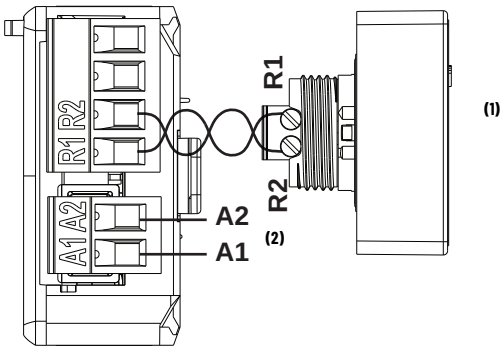
For more information about how to install an external Current Transformer, see publication [193-IN047](#) and publication [193-IN084](#).

Figure 6 - Cat. No. 193-1EGJ Universal Protection Expansion Module Wiring



Note Number	Information
1	Terminals R1 and R2 are used with 193-ERID and 193-1ERIDN modules.
2	External power must be user supplied. 24...240V, 47...63 Hz or DC.
3	Reserved for 193-CBCT external ground fault current sensor.

Figure 7 - Cat. No. 193-1ERR Electronic Reset and Indication Display Module Wiring



Note Number	Information
1	Terminals R1 and R2 are used with 193-ERID and 193-1ERIDN modules.
2	External power must be user supplied. 24...240V, 47...63 Hz or DC.

Electrical Specifications

Table 1 - Motor/Load Ratings

Attribute	Rating
Terminals	1/L1, 3/L2, 5/L3, 2/T1, 4/T2, 6/T3
Terminal Style Devices	
Rated Insulation Voltage U_i	690V AC
Rated Operating Voltage U_e , IEC	690V AC
Rated Operating Voltage U_e , UL	600V AC
Pass-thru Style Devices	
Rated Insulation Voltage U_i	1000V AC
Rated Operating Voltage U_e , IEC	1000V AC
Rated Operating Voltage U_e , UL	600V AC
Rated Impulse Voltage (U_{imp})	6 kV AC
Rated Operating Current I_e	See page 6
Rated Frequency	45...65 Hz

Table 2 - Control Relay Ratings

Attribute	Rating
Relay N.O. / N.C.	
Type of Contacts	AgNi
Rated Thermal Current (I_{the})	B600: 5.0 A; C600: 2.5 A; R300: 1.0 A
Contact Reliability	17V, 5 mA
Rated Insulation Voltage (U_i)	690V AC
Rated Operating Voltage (U_e) IEC	690V AC
Rated Operating Voltage (U_e) UL	600V AC
Rated Operating Current (I_e)	B600: 3 A (@120V AC), 1.5 A (@240V AC)
	C600: 1.5 A (@120V AC), 0.75 A (@240V AC)
	R300: 0.22 A (@125V DC), 0.11 A (@250V DC)
Minimum Operating Current	10 mA @ 5V DC
Rating Designation	N.O. C600 / N.C. B600 (AC) N.O. / N.C. R300 (DC)
Utilization Category	AC-15/DC-13
B600 VA Rating	3600VA make / 360VA break
C600 VA Rating	1800VA make / 180VA break
R300 VA Rating	28VA make / 28VA break

Rated Number of Mechanical Operations

Relay N.O./N.C.	10,000
with 100-C09...100-C37	13,000,000
with 100-C43...100-C55	12,000,000
with 100-C60...100-C97	6,000,000
with 100-E09...E16, Bul. 300 Size 00...0	10,000,000
with 100-E26...E38, Bul. 300 Size 1	10,000,000
with 100-E40...E65, Bul. 300 Size 2	4,000,000
with 100-E80...E96, Bul. 300 Size 3	4,000,000
with Bul. 500 NEMA Size 00...2	10,000,000
with Bul. 500 NEMA Size 3	5,000,000
with Bul. 500 NEMA Size 4	5,000,000
with Bul. 500 NEMA Size 5	5,000,000

Table 3 - Expansion Accessory Ratings (193-1EGJ/1ERR)

Attribute	Rating
Rated Insulation Voltage U_i	264V (AC/DC)
Rated Operating Voltage U_e , IEC	24...240V (AC/DC)
Rated Frequency	45...65 Hz
Power Consumption	0.8 W @ 24V AC; 1.0 W @ 240V AC

Environmental Specifications

Table 4 - Environmental Specifications

Attribute	Overload Rating	Accessory Rating
Ambient Temperature		
Storage	-40...+85 °C (-40...+185 °F)	
Operating (open) ⁽¹⁾	-20...+65 °C (-4...+149 °F)	
Operating (enclosed)	-20...+50 °C (-4...+122 °F)	-20...+55 °C (-4...+131 °F)
Humidity		
Operating	5...95% noncondensing; 92% relative humidity	
Damp Heat - Steady State (per IEC 60068-2-78)	93% relative humidity, 40 °C (104 °F), 56 days	
Damp Heat - Cyclic (per IEC 60068-2-30)	93% relative humidity, 25 °C/40 °C (77 °F/104 °F), 21 Cycles	
Cooling Method	Natural convection	
Vibration (per IEC 68-2-6), operating	Operating 3 G	
Shock (per IEC 68-2-27), operating	Operating 30 G	
Maximum Altitude	2000 m (6561 ft)	
Pollution Environment	Pollution Degree 3	
Degree of Protection	IP20 (front of panel)	IP20

(1) Specified ambient operating temperature per ABS rules and standards.

Electromagnetic Compatibility Specifications

Table 5 - Immunity and Emissions

Attribute	Overload Rating	Accessory Rating
Electrostatic Discharge Immunity		
IEC 61000-4-2, IEC 60533	6 kV Contact Discharge, 8 kV Air Discharge (Performance Criterion "B")	8 kV Contact Discharge, 8 kV Air Discharge (Performance Criterion "B")
Radio Frequency Immunity		
IEC 61000-4-3	10V/m; 80 MHz...6.0 GHz (Performance Criterion "A")	
	3V/m; 1.4 GHz...2.0 GHz	
	1V/m; 2.0 GHz...2.7 GHz	
IEC 60533	10V/m; 80 MHz...2.0 GHz (Performance Criterion "A")	
Electrical Fast Transient / Burst Immunity		
IEC 61000-4-4, IEC 60533	4 kV (3-phase Power); 2 kV (Control Power and Communication I/O when 193-1ERR or 193-1EGJ accessory installed); Performance Criterion "A"	
Surge Immunity		
IEC 61000-4-4, IEC 60533	2 kV (L-N); 1 kV (L-L); Performance Criterion "B"	
Radiated Emissions		
CISPR11 Environment A	30 MHz...1.0 GHz	
IEC 60533	150 KHz...2.0 GHz	
Conducted Emissions		
CISPR11 Environment A	150 KHz...30 MHz	
IEC 60533	10 KHz...30 MHz (general power distribution only)	
Conducted Immunity		
IEC 61000-4-6, IEC 60533	Modulation 80% AM at 1 KHz; 10V RMS (150 KHz...80 MHz)	
Power Frequency Magnetic Field Immunity		
IEC 60947-1, IEC 61000-4-8	30 A/m; 50 Hz	
Voltage Variation Immunity		
IEC 61000-4-11, IEC 60533	—	Control Power 40...240V (AC/DC)

Protection

Table 6 - General Protection

Protection Type	Cat. No. 193-1EE		Cat. No. 193-1EF, 592-1EF	
	Trip	Warning	Trip ⁽¹⁾	Warning ⁽¹⁾
Overload	Yes	No	Yes	Yes
Phase Loss	Yes	No	Yes	Yes
Ground Fault ⁽²⁾	No	No	Yes	Yes
Jam ⁽²⁾	No	No	Yes	Yes

(1) Trip/Warning indication also available using the 193-1ERR/1EGJ and 193-ERID/1ERIDN accessory modules.

(2) Ground fault and jam protection accessory 193-1EGJ required.

Table 7 - Overload Protection

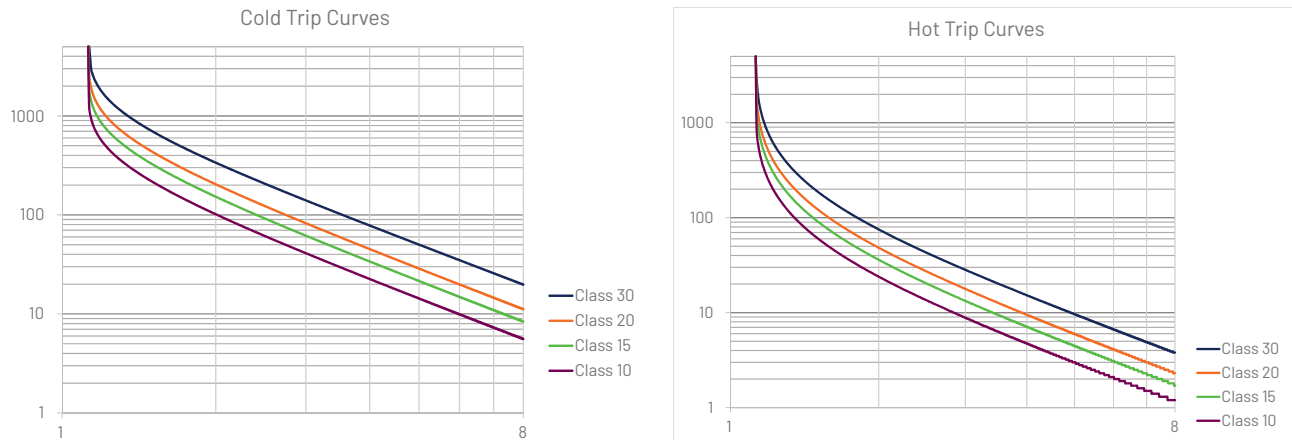
Attribute	Rating	
	Cat. No. 193-1EE	Cat. No. 193-1EF, 592-1EF
Type of Relay	Ambient Compensated Time-Delay Phase Loss Sensitive	
Nature of Relay	Solid-state	
FLA Setting	Rotary Dial	
Trip Rating	120% FLA	
Trip Class	10, 20	10, 15, 20, 30
Reset Mode	Manual	Automatic or Manual
Overload Reset Level	Auto Reset occurs at 70% TCU when accessory powered, after approximately 2 minutes when self powered. Manual Reset can occur any time by pressing the manual reset button. Electronic Reset (ERID input) can only occur below 70% TCU.	

Table 8 - Ground Fault Protection

Attribute	Rating—Cat. No. 193-1EF, 592-1EF Only
Type	Core Balanced
Intended Use	Equipment Protection
Classification (Per UL 1053)	Evaluated to UL 1053 but not listed as such
Internal Protection Range	0.02...5.0 A
Trip and Warning Time Delay	Fixed at 100 ms ± 20 ms

Overload Trip Curves

Typical reset time for 193/592-1EF devices set to automatic reset mode is dependent upon overload trip class. Typical reset time for Trip Class 10 is 90 seconds, Trip Class 15 is 135 seconds, Trip Class 20 is 180 seconds, and Trip Class 30 is 270 seconds.



Wiring Specifications

Table 9 - Wiring Specifications for 193-1E__B, 193-1E__D, and 193-1E__E

Wire Type	No. of Wires	Control Wiring		Power Wiring					
		All		193-1E B		193-1E D		193-1E E	
		Range	Torque	Range	Torque	Range	Torque	Range	Torque
Flexible Stranded w/ Ferrule	1 wire	0.75...2.5 mm ² (18...14 AWG)	1.4 N•m (12 lb•in)	2.5...16 mm ² (14...6 AWG)	2.5 N•m (22 lb•in)	2.5...16 mm ² (14...6 AWG)	2.5 N•m (22 lb•in)	4...35 mm ² (12...1 AWG)	4.6 N•m (40 lb•in)
	2 wires ⁽¹⁾			2.5...10 mm ² (14...8 AWG)	3.4 N•m (30 lb•in)	2.5...10 mm ² (14...8 AWG)	3.6 N•m (32 lb•in)	4...25 mm ² (12...4 AWG)	
Stranded/Solid	1 wire	0.75...4.0 mm ² (18...12 AWG)	1.4 N•m (12 lb•in)	2.5...16 mm ² (14...6 AWG)	2.5 N•m (22 lb•in)	2.5...16 mm ² (14...6 AWG)	2.5 N•m (22 lb•in)	4...35 mm ² (12...1 AWG)	4.6 N•m (40 lb•in)
				25 mm ² (4 AWG)	3.4 N•m (30 lb•in)	25 mm ² (4 AWG)	3.4 N•m (30 lb•in)		
	2 wires ⁽¹⁾			2.5...16 mm ² (14...6 AWG)		2.5...16 mm ² (14...6 AWG)	3.6 N•m (32 lb•in)	4...35 mm ² (12...2 AWG)	

(1) For multiple conductor applications, you must use the same size and style of wire.

Table 10 - Wiring Specifications for 193-1E__F, 193-1E__G, 193-1E__H, and 193-1E__J

Wire Type	No. of Wires	Control Wiring		Power Wiring							
		All		193-1E__F		193-1E__G		193-1E__H		193-1E__J	
		Range	Torque	Range	Torque	Range	Torque	Range	Torque	Range	Torque
Flexible Stranded w/ Ferrule	1 wire	0.75...2.5 mm ² (18...14 AWG)	1.4 N•m (12 lb•in)	0.75...6 mm ² (16...10 AWG)	1.5 N•m (13 lb•in)	1.5...10 mm ² (14...8 AWG)	2.5 N•m (22 lb•in)	4...35 mm ² (12...1 AWG)	4 N•m (35 lb•in)	6...50 mm ² (6...1 AWG)	6 N•m (53 lb•in)
	2 wires ⁽¹⁾										
Stranded/Solid	1 wire	0.75...4.0 mm ² (18...12 AWG)	1.4 N•m (12 lb•in)	1...6 mm ² (16...10 AWG)	1.5 N•m (13 lb•in)	2.5...10 mm ² (14...8 AWG)	2.5 N•m (22 lb•in)	6...35 mm ² (12...1 AWG)	4 N•m (35 lb•in)	6...70 mm ² (6...1 AWG)	6 N•m (53 lb•in)
	2 wires ⁽¹⁾									6...50 mm ² (6...1 AWG)	

(1) For multiple conductor applications, you must use the same size and style of wire.

Table 11 - Wiring Specifications for 592-1EF_T, 592-1EF_C, and 592-1EFGD

Wire Type	No. of Wires	Control Wiring		Power Wiring					
		All		592-1EF_T		592-1EF_C		592-1EFGD	
		Range	Torque	Range	Torque	Range	Torque	Range	Torque
Flexible Stranded w/ Ferrule	1 wire	0.75...2.5 mm ² (18...14 AWG)	1.4 N•m (12 lb•in)	2.5...16 mm ² (14...6 AWG)	2.5 N•m (22 lb•in)	2.5...16 mm ² (14...6 AWG)	2.5 N•m (22 lb•in)	4.0...35 mm ² (12...1 AWG)	4.6 N•m (40 lb•in)
	2 wires ⁽¹⁾			2.5...10 mm ² (14...8 AWG)	3.4 N•m (30 lb•in)	2.5...10 mm ² (14...8 AWG)	3.6 N•m (32 lb•in)		
Stranded / Solid	1 wire	0.75...4.0 mm ² (18...12 AWG)	1.4 N•m (12 lb•in)	2.5...16 mm ² (14...6 AWG)	2.5 N•m (22 lb•in)	2.5...16 mm ² (14...6 AWG)	2.5 N•m (22 lb•in)	4.0...35 mm ² (12...1 AWG)	4.6 N•m (40 lb•in)
				25 mm ² (4 AWG)	3.4 N•m (30 lb•in)	25 mm ² (4 AWG)	3.4 N•m (30 lb•in)		
	2 wires ⁽¹⁾			2.5...16 mm ² (14...6 AWG)		2.5...16 mm ² (14...6 AWG)	3.6 N•m (32 lb•in)	4.0...35 mm ² (12...2 AWG)	

(1) For multiple conductor applications, you must use the same size and style of wire.

Table 12 - Wiring Specifications for 592-1EFHE, 592-1EFHE-X1, and 592-1EFKF

Wire Type	No. of Wires	Control Wiring		Power Wiring			
		All		592-1EFHE, 592-1EFHE-X1		592-1EFKF	
		Range	Torque	Range	Torque	Range	Torque
Flexible Stranded w/ Ferrule	1 wire	0.75...2.5 mm ² (18...14 AWG)	1.4 N•m (12 lb•in)	—	—	—	—
	2 wires ⁽¹⁾						
Stranded / Solid	1 wire	0.75...4.0 mm ² (18...12 AWG)	1.4 N•m (12 lb•in)	6...4/0 AWG	275 lb•in	4 AWG...500 MCM	375 lb•in
	2 wires ⁽¹⁾			—	—	—	—

(1) For multiple conductor applications, you must use the same size and style of wire.

Table 13 - Wiring Specifications for 193-1EGJ and 193-1ERR Accessories

Wire Type	No. of Wires	Range	Torque
Stranded/Solid/Flexible Stranded w/ Ferrule	1 Wire	0.2...2.5 mm ² (24...14 AWG)	0.55 N•m (5 lb•in)
	2 Wires ⁽¹⁾	0.2...2.5 mm ² (24...14 AWG)	

(1) For multiple conductor applications, you must use the same size and style of wire. Recommended use of twisted pair for remote reset and ground fault, 24 AWG minimum.

Table 14 - Wiring Specifications for 193-1EPB, 193-1EPD, and 193-1EPE

Wire Type	No. of Wires	193-1EPB		193-1EPD		193-1EPE	
		Range	Torque	Range	Torque	Range	Torque
Flexible Stranded w/ Ferrule	1 Wire	2.5...6.0 mm ² (14...10 AWG)	1.8 N•m (16 lb•in)	1.5...16 mm ² (16...6 AWG)	2.3 N•m (20 lb•in)	4.0...35 mm ² (12...2 AWG)	4.6 N•m (40 lb•in)
	2 Wires ⁽¹⁾			1.5...10 mm ² (16...8 AWG)		4.0...25 mm ² (12...4 AWG)	
Stranded / Solid	1 Wire	2.5...10 mm ² (14...8 AWG)		1.5...16 mm ² (16...6 AWG)		4.0...35 mm ² (12...2 AWG)	
	2 Wires ⁽¹⁾	2.5...6.0 mm ² (14...10 AWG)		1.5...10 mm ² (16...8 AWG)		4.0...35 mm ² (12...2 AWG)	

(1) For multiple conductor applications, you must use the same size and style of wire.

Approximate Dimensions

Dimensions are given in millimeters (inches). Dimensions are not intended to be used for manufacturing.

Overload Relays

Figure 8 - Cat. No. 193-1EE_B IEC Basic Version, Frame B

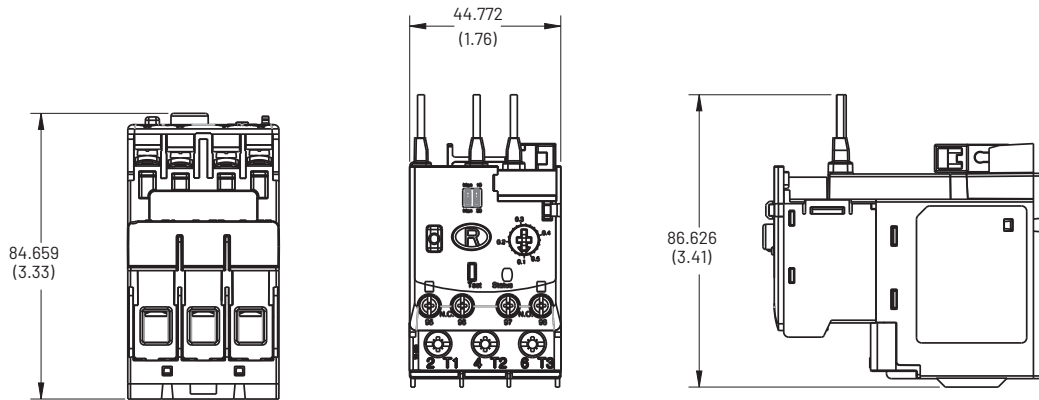


Figure 9 - Cat. No. 193-1EF_B IEC Advanced Version, Frame B

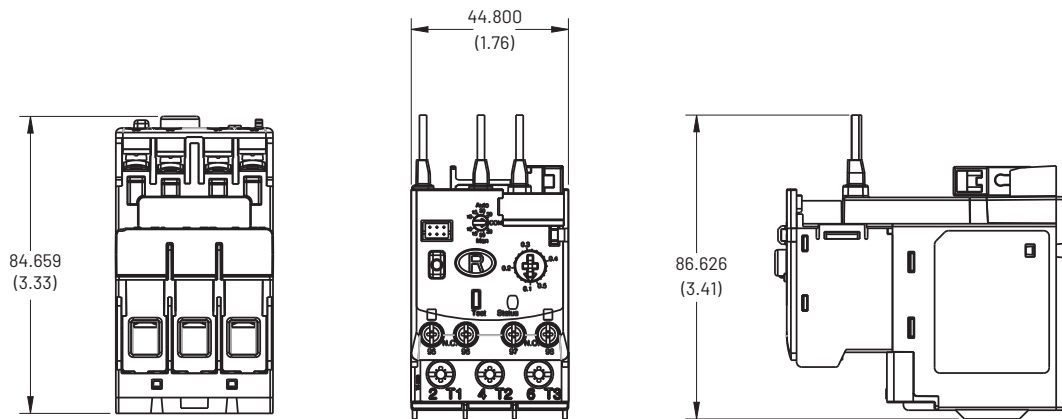


Figure 10 - Cat. No. 193-1EF_Z Advanced Version, Panel-mounted with External Current Transformer

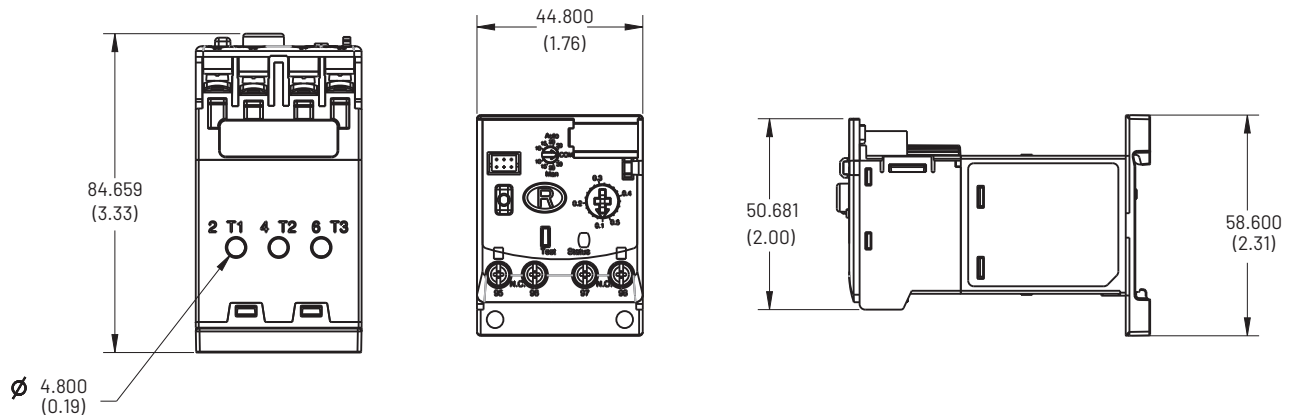


Figure 11 - 193-1EE_P IEC Basic Version, Pass-thru Frame B

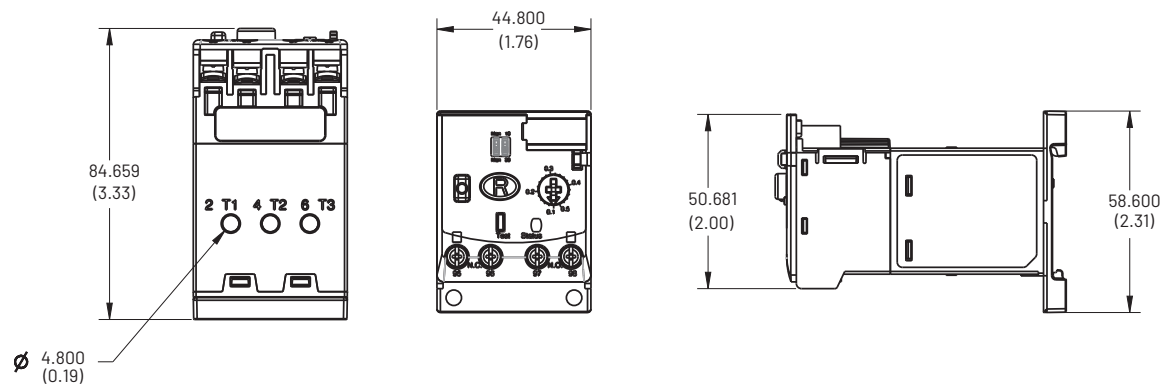


Figure 12 - 193-1EF_P IEC Basic Version, Pass-thru Frame B

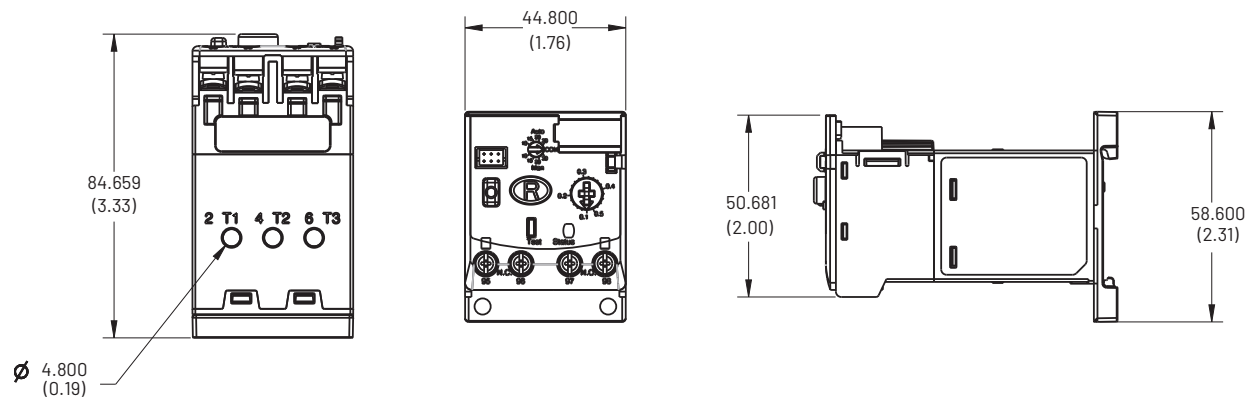


Figure 13 - 193-1EE_D IEC Basic Version, Frame D

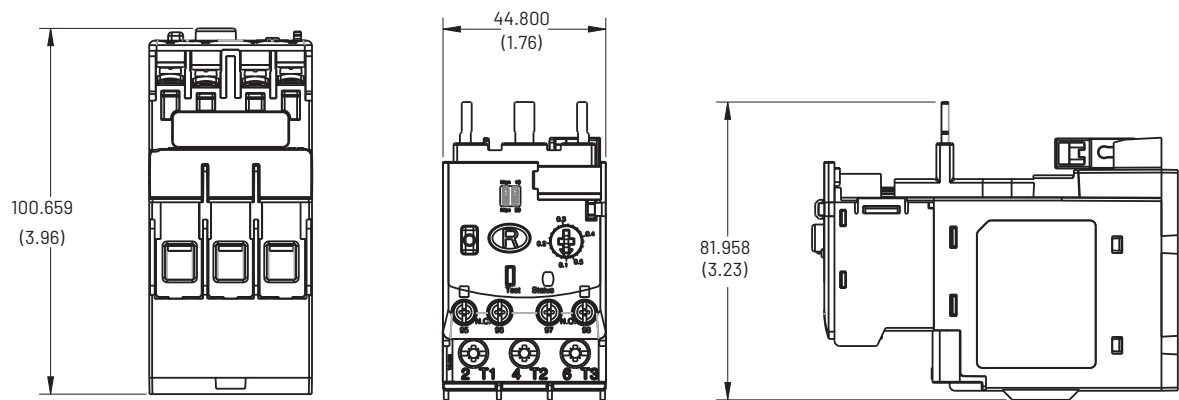


Figure 14 - 193-1EF_D IEC Advanced Version, Frame D

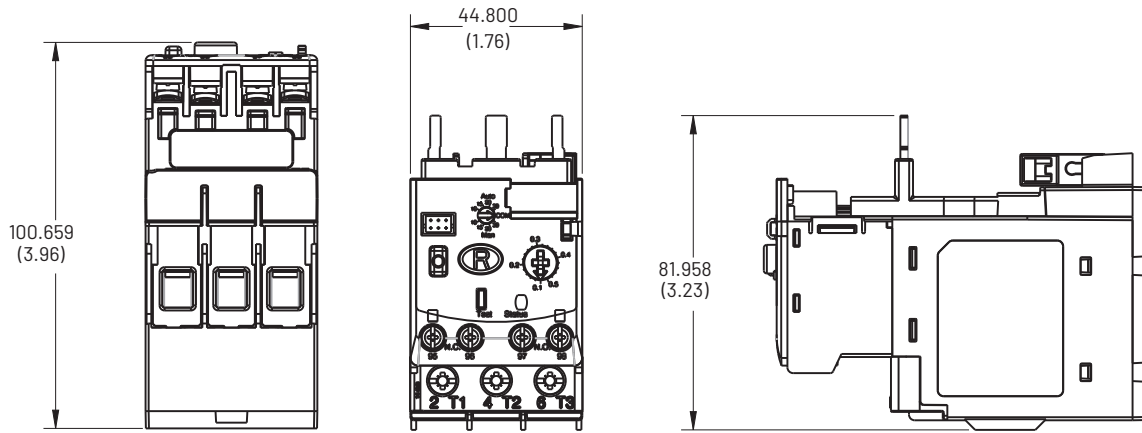


Figure 15 - 193-1EE_P IEC Basic Version, Pass-thru Frame D

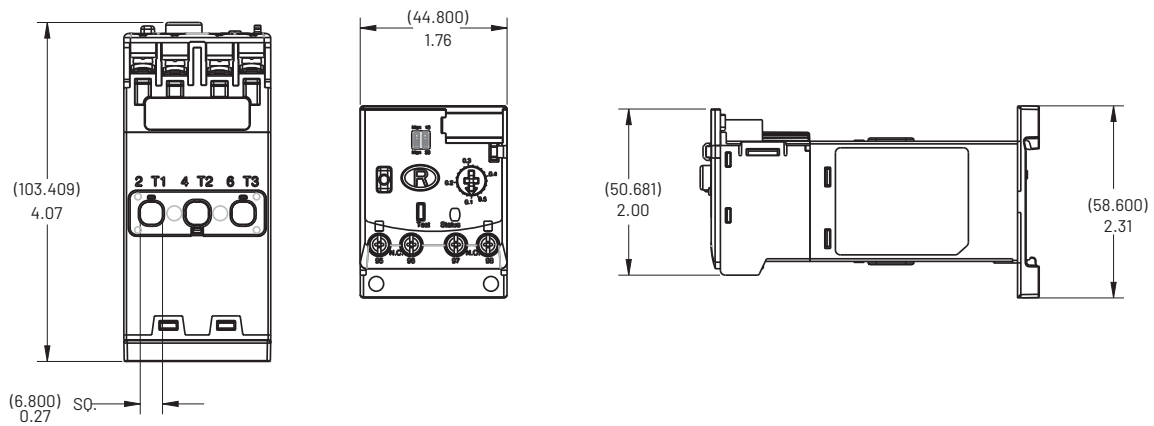


Figure 16 - 193-1EF_P IEC Advanced Version, Pass-thru Frame D

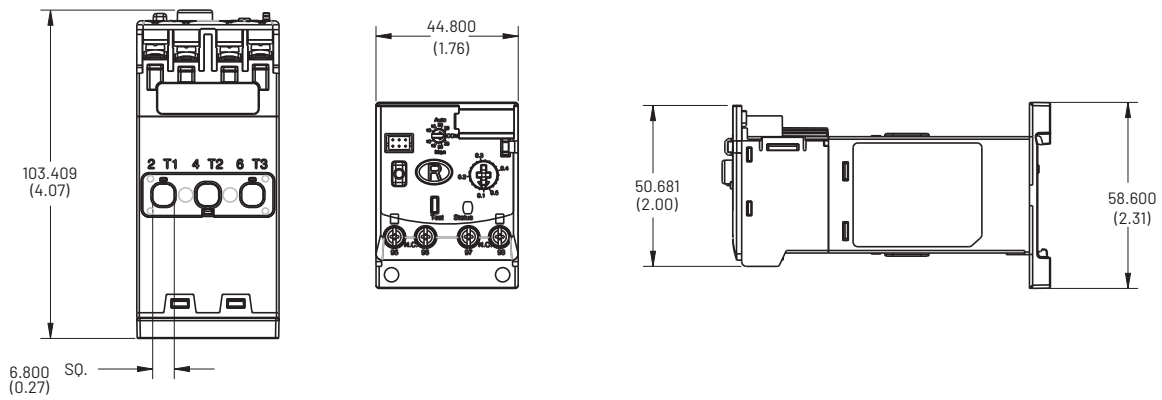


Figure 17 - 193-1EE_E IEC Basic Version, Frame E

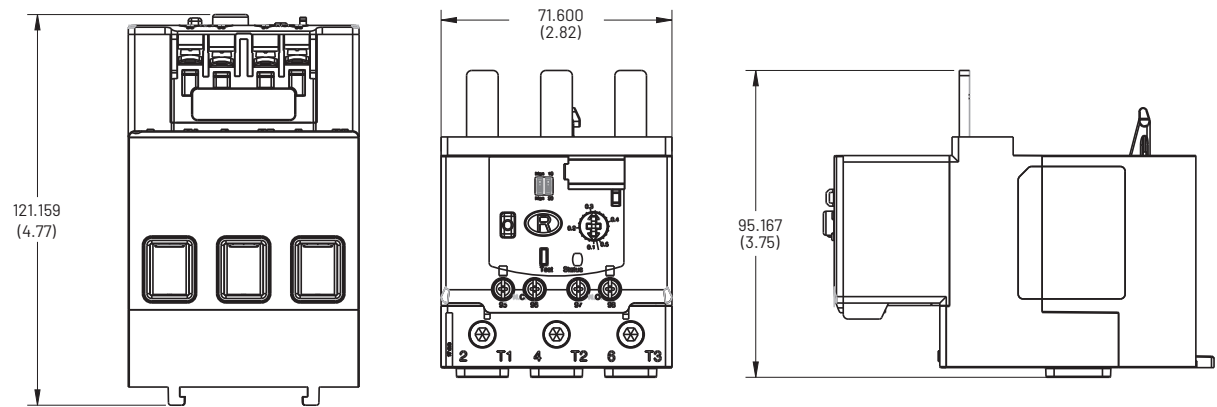


Figure 18 - 193-1EF_E IEC Basic Version, Frame E

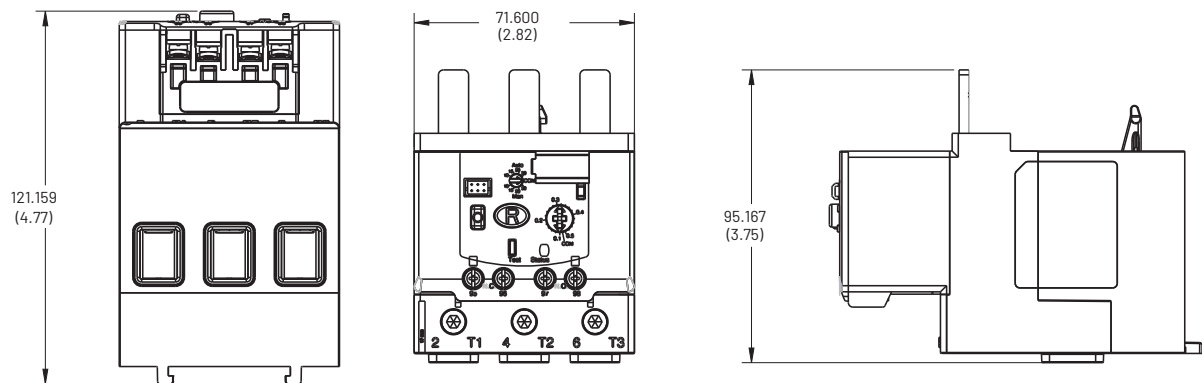


Figure 19 - 193-1EE_P IEC Basic Version, Pass-thru Frame E

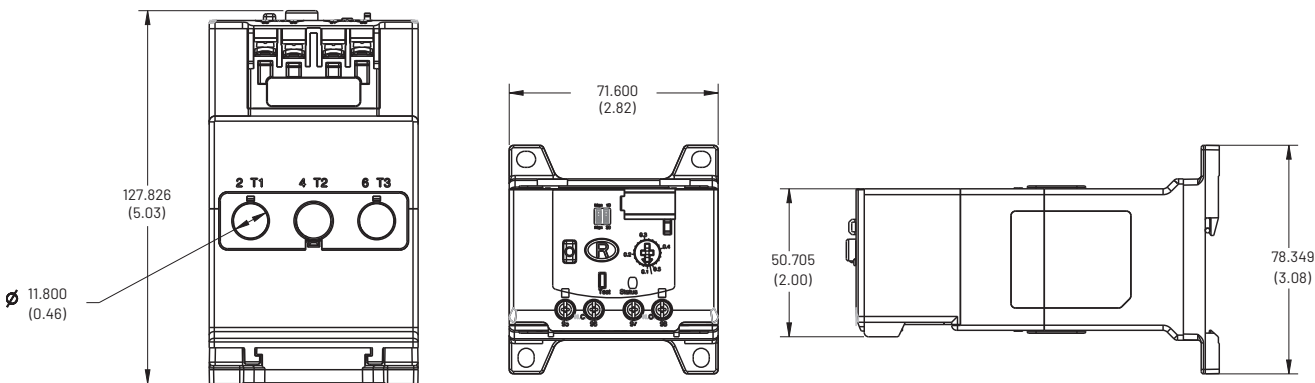


Figure 20 - 193-1EF_P IEC Advanced Version, Pass-thru Frame E

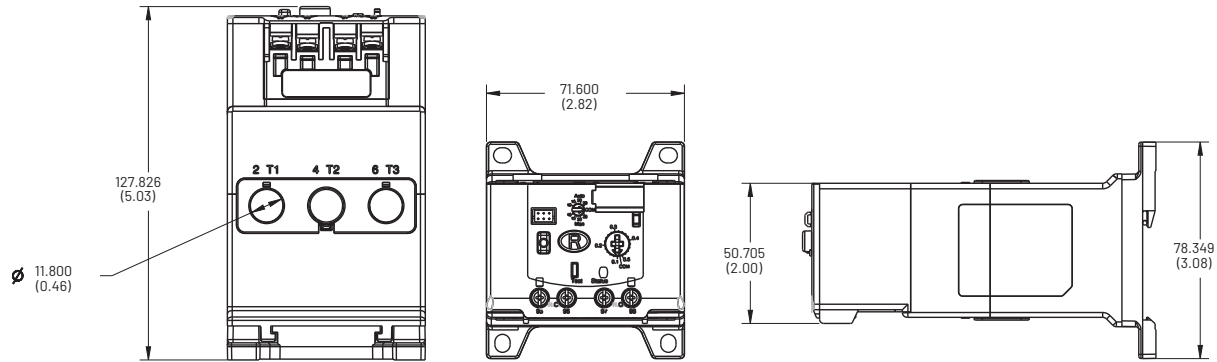


Figure 21 - 193-1EF_Z IEC/NEMA Energy-saving Advanced Version, Frame F

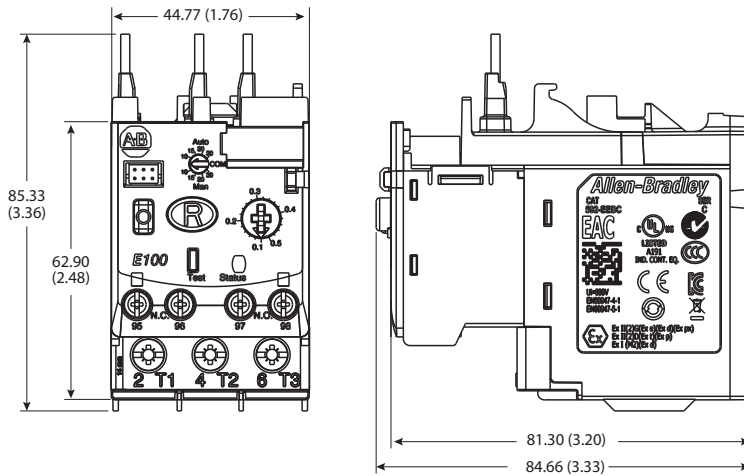


Figure 22 - 193-1EF_Z IEC/NEMA Energy-saving Advanced Version, Frame G

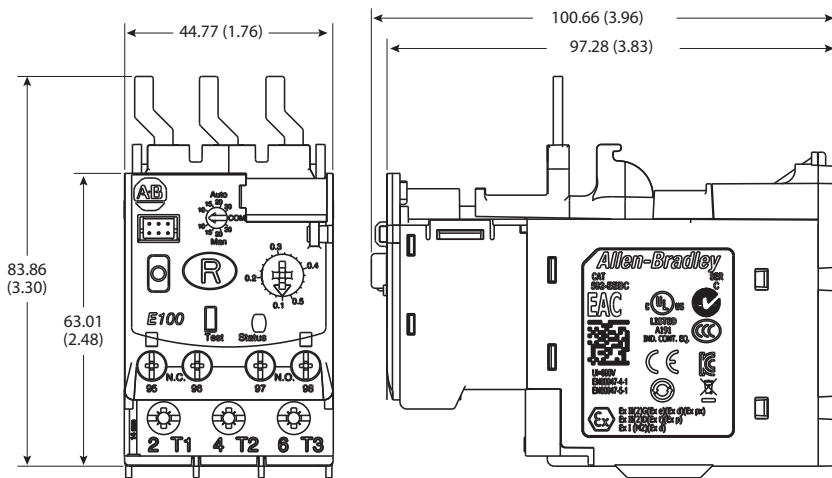


Figure 23 - 193-1EF_Z IEC/NEMA Energy-saving Advanced Version, Frame H

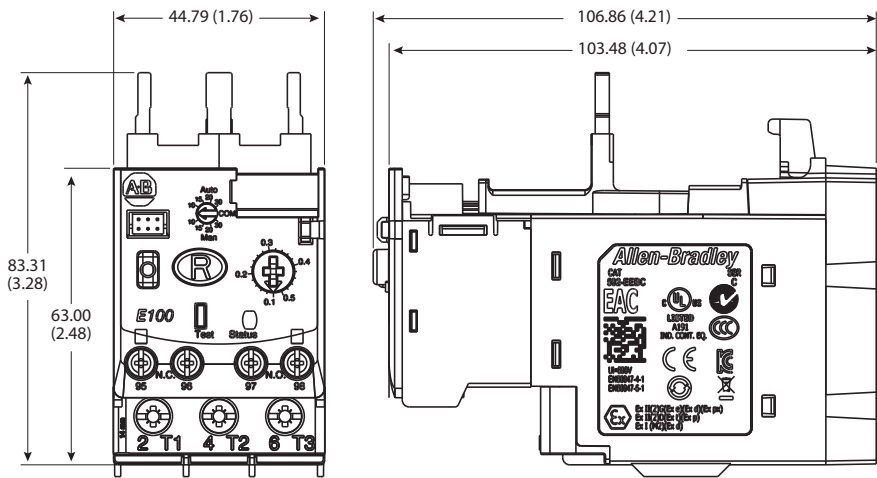


Figure 24 - 193-1EF_Z IEC/NEMA Energy-saving Advanced Version, Frame J

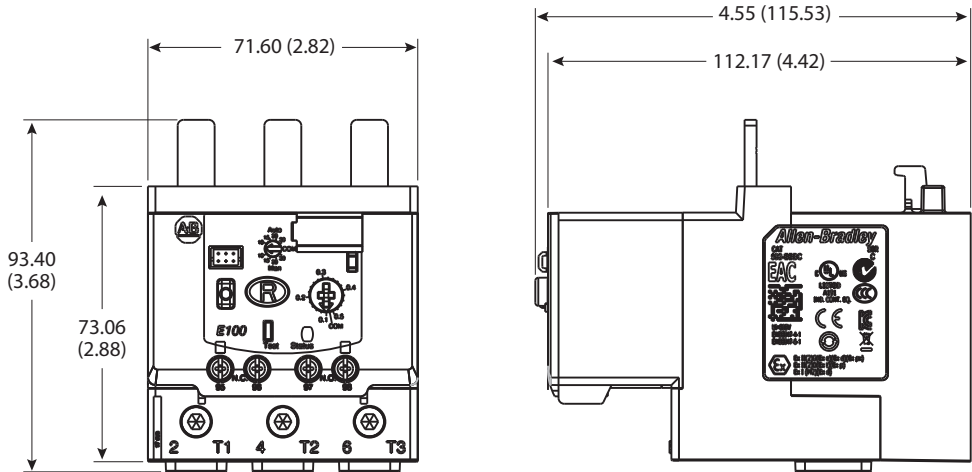


Figure 25 - 592-1EF_T NEMA Size 00

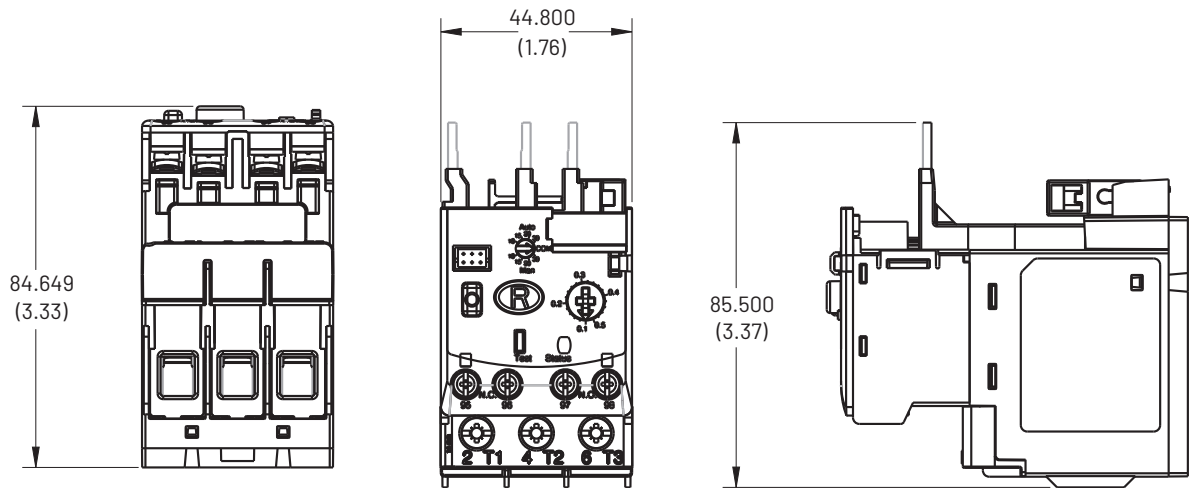


Figure 26 - 592-1EF_C NEMA Size 0-2

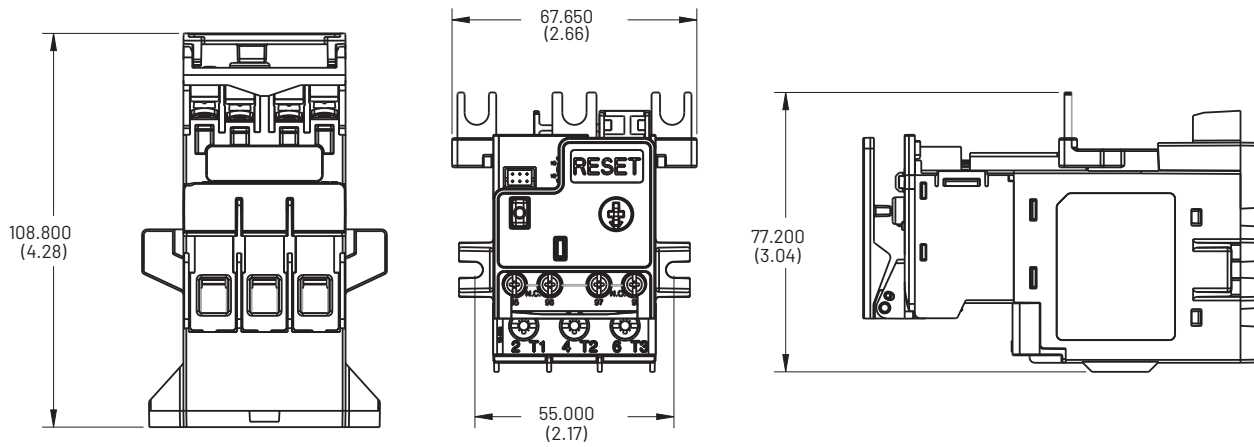


Figure 27 - 592-1EF_D NEMA Size 3

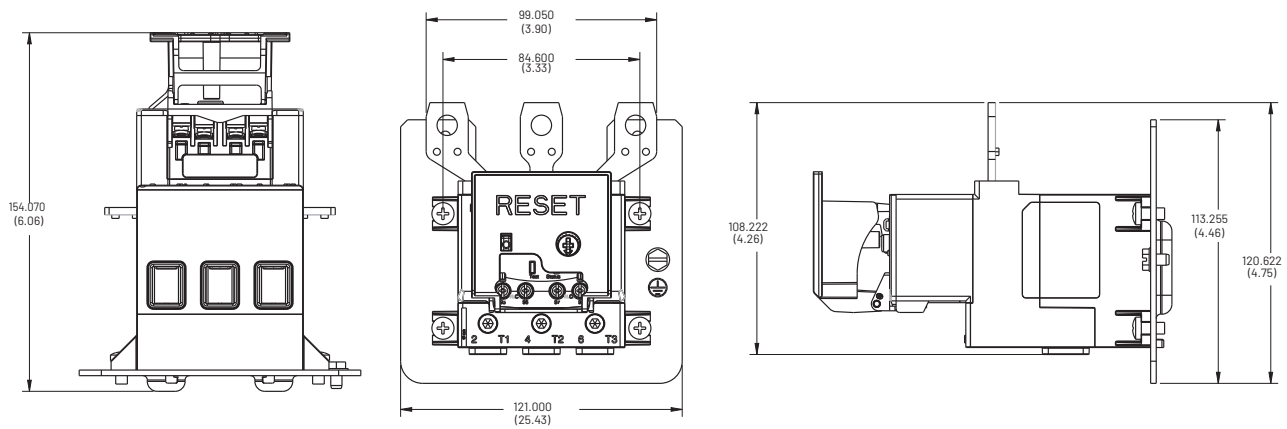


Figure 28 - 592-1EF_E NEMA Size 4

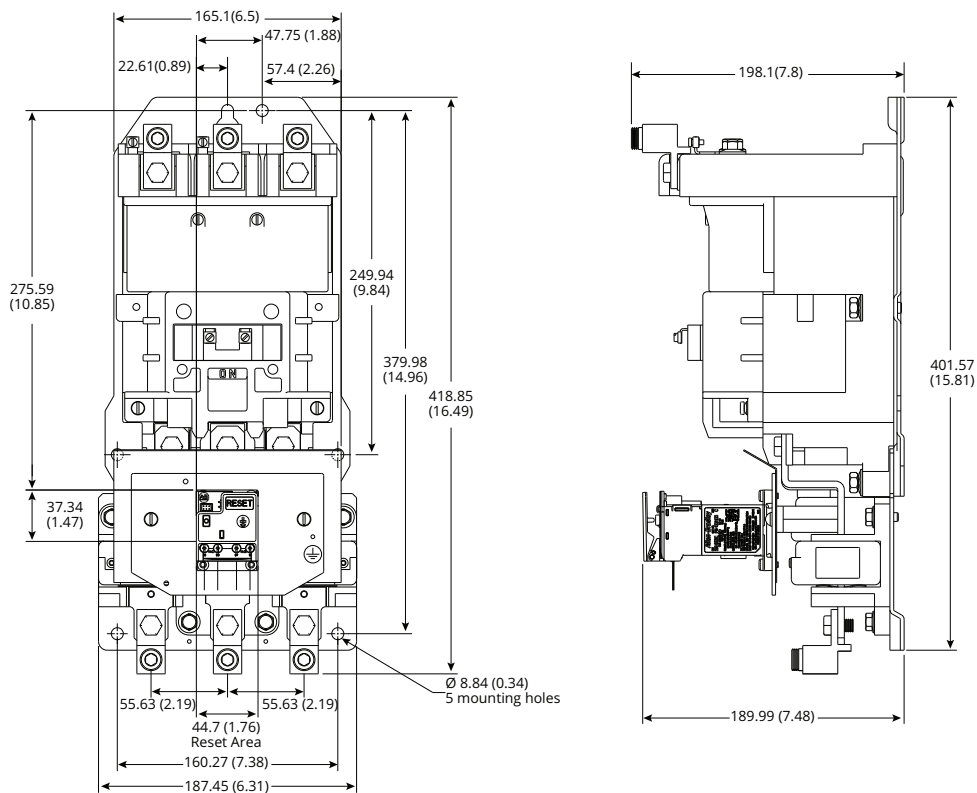
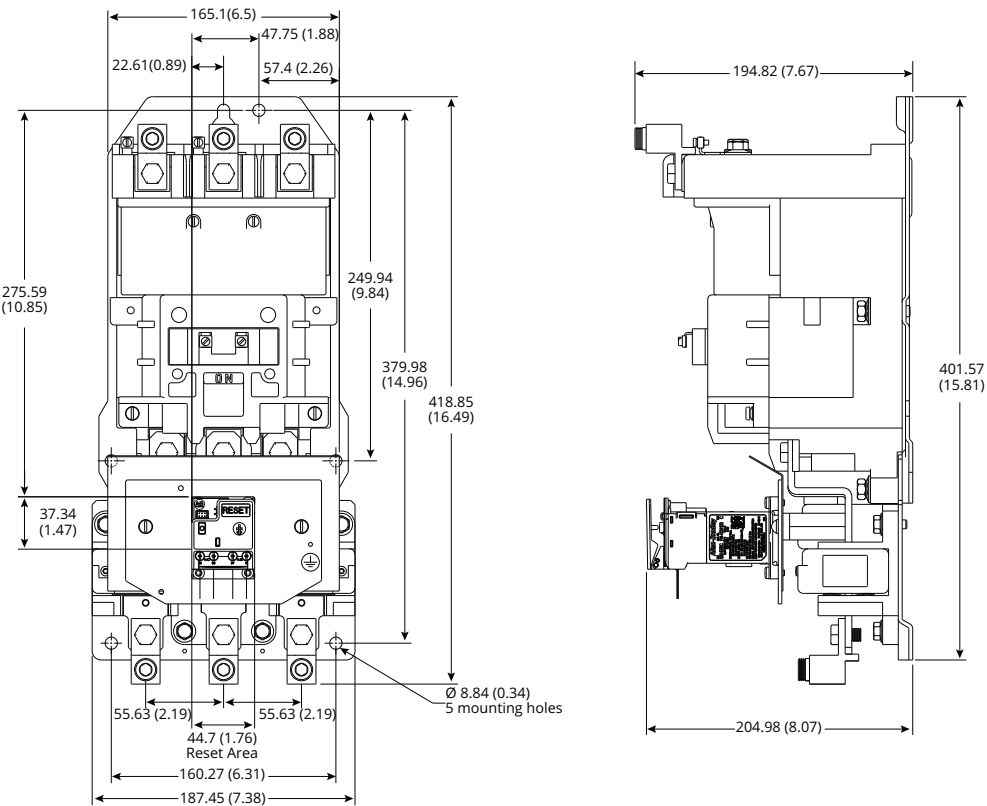


Figure 29 - 592-1EF_F NEMA Size 5



Accessories

Ground Fault Protection Module

Figure 30 - Cat. No. 193-1EGJ Ground Fault Protection Module, Contactor Mount

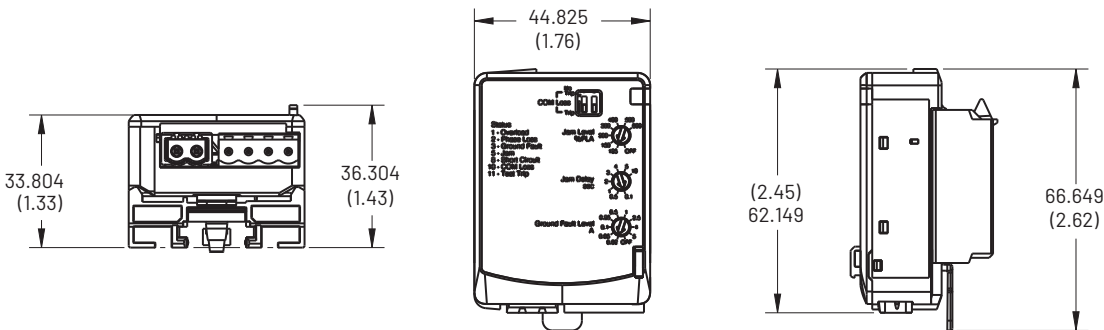
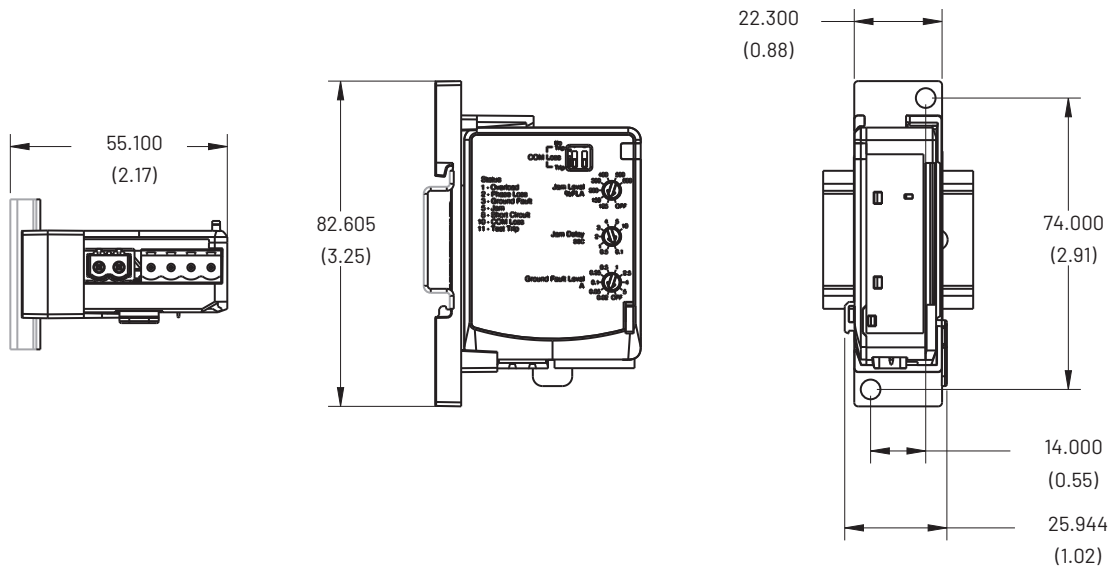


Figure 31 - Cat. No. 193-1EGJ Ground Fault Protection Module, Panel Mount



DIN Rail/Panel Adapters

Figure 32 - Cat. No. 193-1EPB DIN Rail/Panel Adapter, Panel Mount

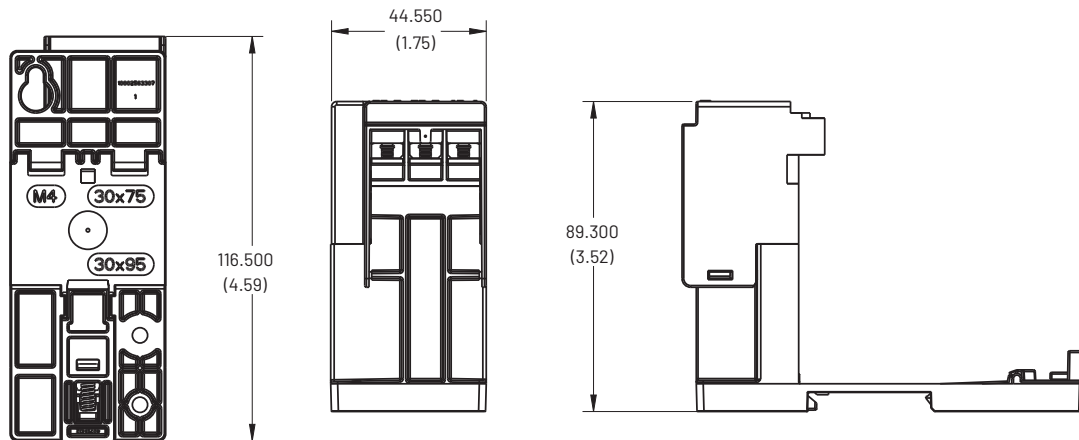


Figure 33 - Cat. No. 193-1EPB DIN Rail/Panel Adapter, Panel Mount with Overload

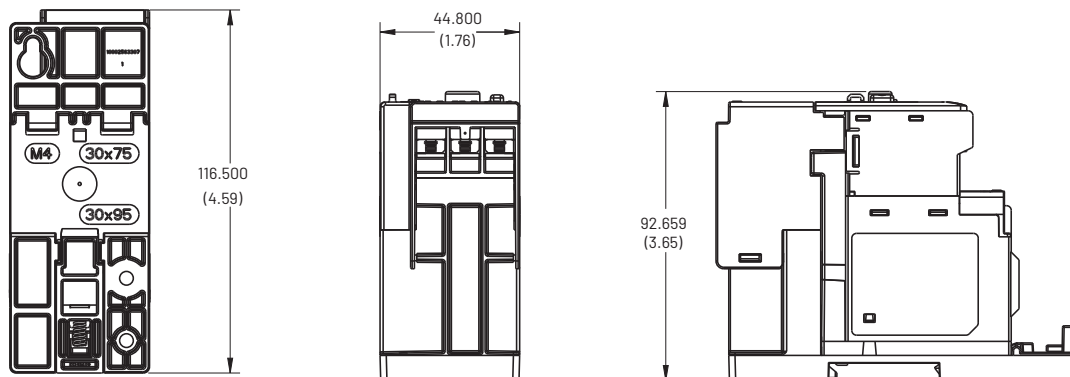


Figure 34 - Cat. No. 193-1EPD DIN Rail/Panel Adapter, Panel Mount

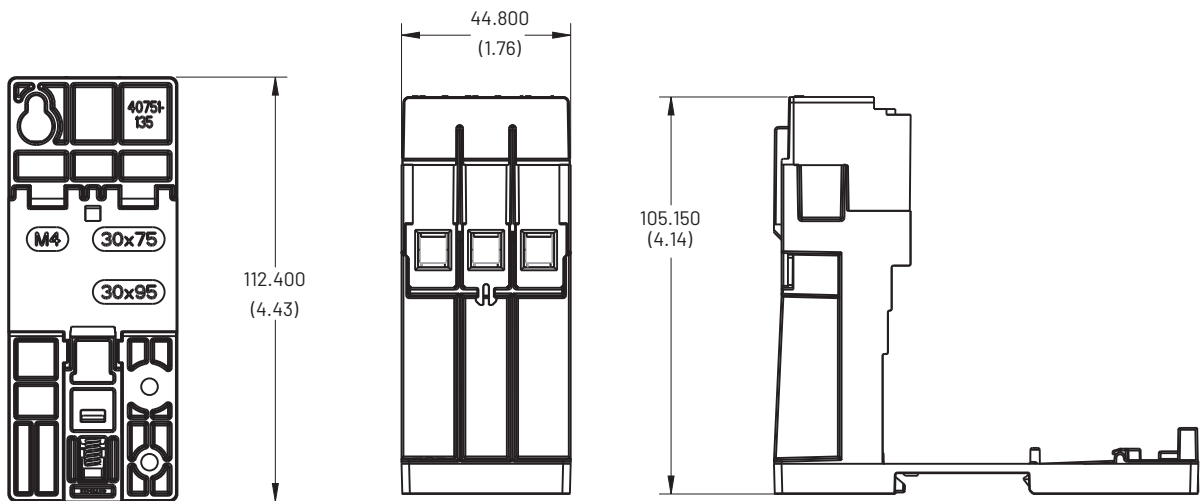


Figure 35 - Cat. No. 193-1EPD DIN Rail/Panel Adapter, Panel Mount with Overload

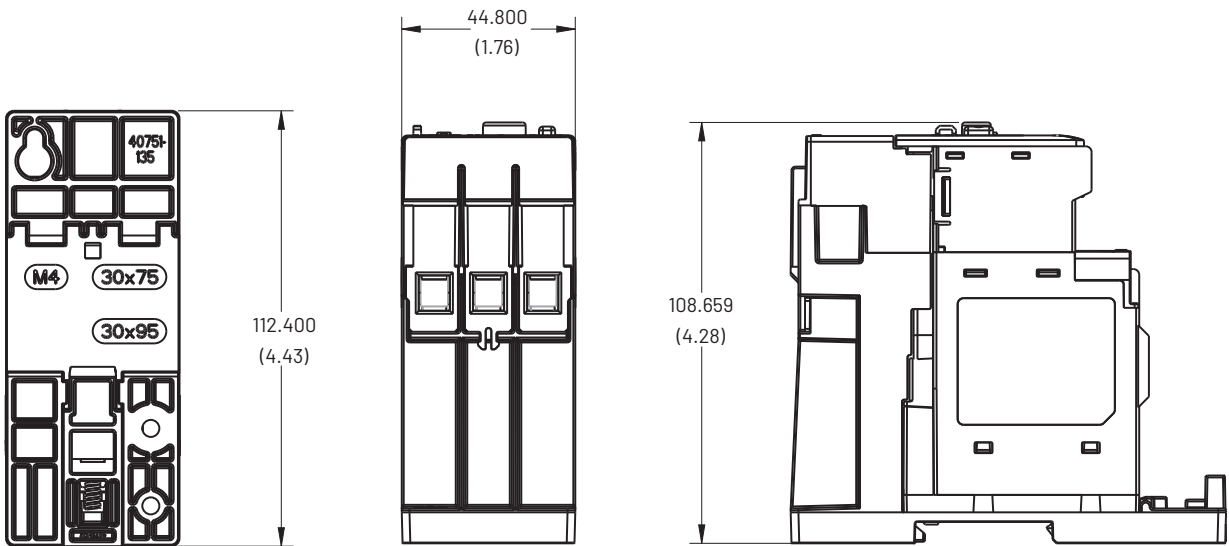


Figure 36 - Cat. No. 193-1EPE DIN Rail/Panel Adapter, Panel Mount

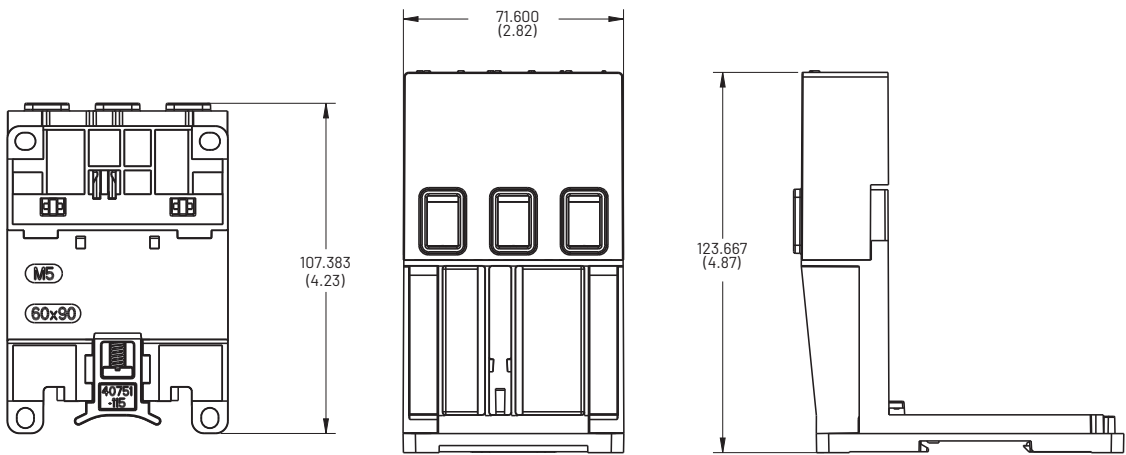
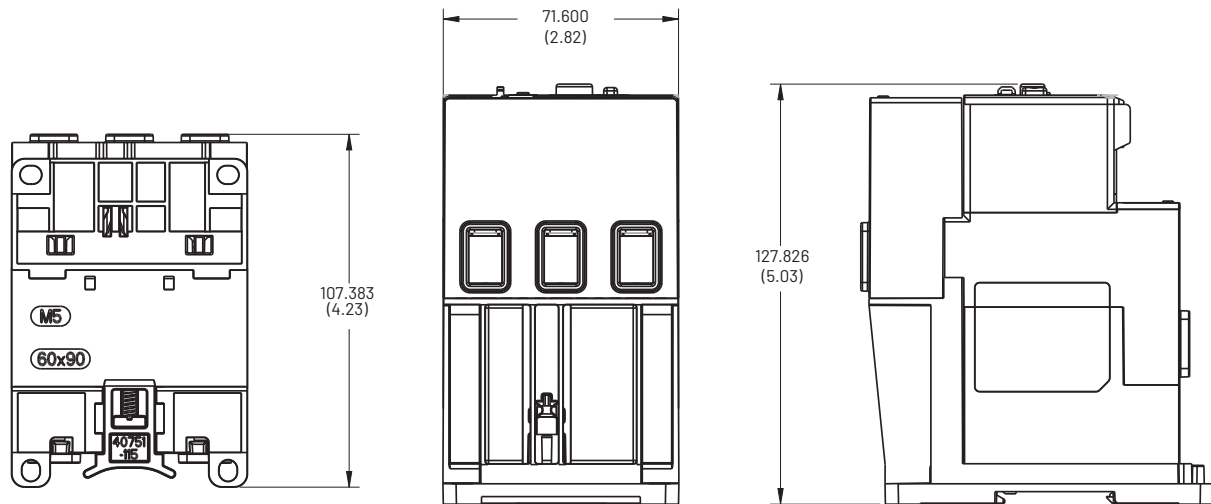


Figure 37 - Cat. No. 193-1EPE DIN Rail/Panel Adapter, Panel Mount with Overload



Reset Accessories

Figure 38 - Cat. Nos. 193-1EMRZ, 193-1EMRD, and 193-1EMRA Remote Reset Solenoids

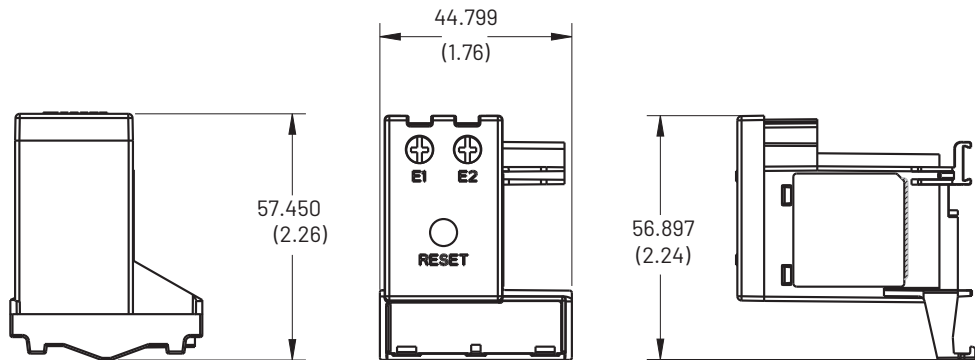


Figure 39 - Cat. No. 193-1ERR Reset Adapter, Contactor Mount

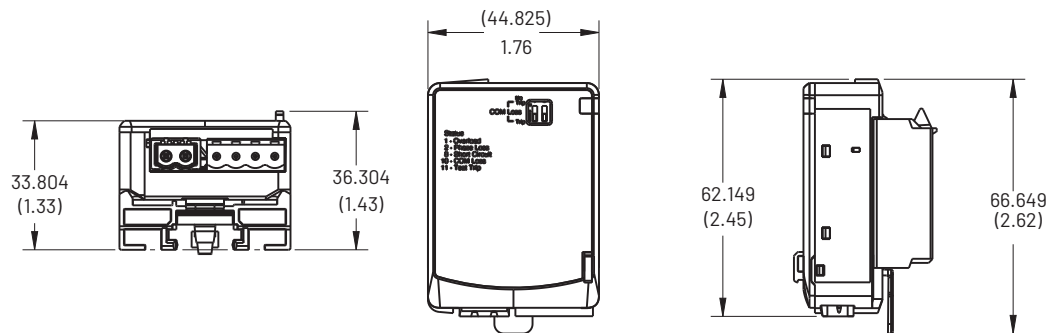


Figure 40 - Cat. No. 193-1ERR Reset Adapter, Panel Mount

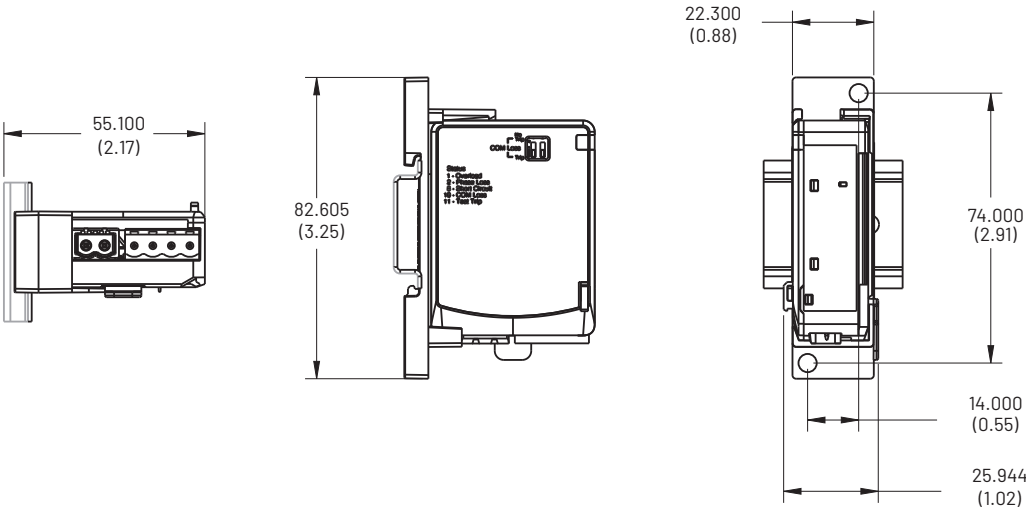


Figure 41 - Cat. No. 193-ERID Electronic Remote Indication Display with Reset

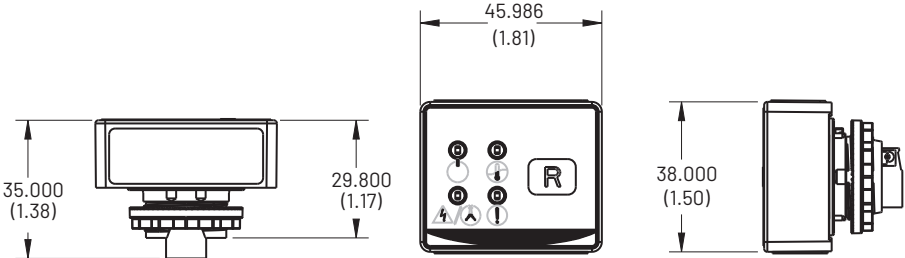
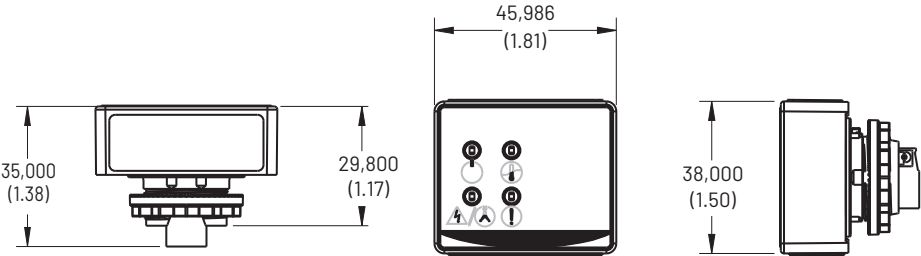


Figure 42 - Cat. No. 193-1ERIDN Electronic Remote Indication Display without Reset



Additional Resources

These documents contain additional information concerning related products from Rockwell Automation. You can view or download publications at rok.auto/literature.

Resource	Description
E100 Electronic Overload Relay User Manual, publication 193-UM013	Provides user information for the E100 Electronic Overload Relay.
Bulletin 193 Core Balanced Ground Fault Sensor Application and Installation Instructions, publication 193-IN047	Provides instruction about how to install and apply 193-CBCT core balanced ground fault sensors.
E100 Overload Relay Application and Installation Instructions (IEC), publication 193-IN081	Provides instruction about how to install the E100 Overload Relay onto 100-C contactors.
E100 Ground Fault/Jam and Remote Reset Module Application and Installation, publication 193-IN082	Provides instruction about how to install and apply the ground fault/jam and remote reset module.
E100 Overload Relay with Pass-thru Wiring Application and Installation Instructions, publication 193-IN083	Provides instruction about how to install the E100 Overload Relay with the pass-thru wiring option.
E100 External Current Transformer Overload Relay Application and Installation Instructions, publication 193-IN084	Provides instruction about how to install the Advanced E100 Overload Relay.
E100 Overload Relay Remote Reset Installation, publication 193-IN085	Provides instruction about how to install and set up the remote reset module.
E100 DIN Rail or Panel Adapter Installation, publication 193-IN086	Provides instruction about how to install the E100 relay onto DIN Rail or the panel adapter.
E100 Remote Indication Display Application and Installation, publication 193-IN087	Provides instruction about how to install and set up the remote status indication module.
Bulletin 193 E100 Overload Relay Application and Installation, publication 193-IN089	Provides instruction about how to install the E100 Overload Relay onto 100-E contactors.
E100 Overload Relay Application and Installation Instructions (NEMA), publication 592-IN021	Provides instruction about how to install the E100 Overload Relay onto 500 line contactors.
Bulletin 592 E100 Overload Relay Application and Installation, publication 592-IN024	Provides instruction about how to install the E100 Overload Relay onto 500 line contactors.
E200/E300 Overload Relay Specifications, publication 193-TD006	Provides complete specifications for the E300/E200 Electronic Overload Relays.
Bimetallic Overload Relay Specifications, publication 193-TD010	Provides complete specifications for bimetallic overload relays.
EtherNet/IP Network Devices User Manual, ENET-UM006	Describes how to configure and use EtherNet/IP devices to communicate on the EtherNet/IP network.
Ethernet Reference Manual, ENET-RM002	Describes basic Ethernet concepts, infrastructure components, and infrastructure features.
UL Standards Listing for Industrial Control Products, publication CMPNTS-SR002	Assists original equipment manufacturers (OEMs) with construction of panels, to help ensure that they conform to the requirements of Underwriters Laboratories.
American Standards, Configurations, and Ratings: Introduction to Motor Circuit Design, publication IC-AT001	Provides an overview of American motor circuit design based on methods that are outlined in the NEC.
Industrial Components Preventive Maintenance, Enclosures, and Contact Ratings Specifications, publication IC-TD002	Provides a quick reference tool for Allen-Bradley industrial automation controls and assemblies.
Safety Guidelines for the Application, Installation, and Maintenance of Solid-state Control, publication SGI-1.1	Designed to harmonize with NEMA Standards Publication No. ICS 1.1-1987 and provides general guidelines for the application, installation, and maintenance of solid-state control in the form of individual devices or packaged assemblies incorporating solid-state components.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
ProposalWorks™ configuration software, rok.auto/systemtools	Helps configure complete, valid catalog numbers and build complete quotes based on detailed product information.
Product Compatibility and Download Center at rok.auto/pcdc	Download the most current version of the Add-on Profile.
Rockwell Automation Global SCCR tool, rok.auto/sccr	Provides coordinated high-fault branch circuit solutions for motor starters, soft starters, and component drives.
Product Certifications website, rok.auto/certifications	Provides declarations of conformity, certificates, and other certification details.

Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, Knowledgebase, and product notification updates.	rok.auto/support
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Technical Documentation Center	Quickly access and download technical specifications, installation instructions, and user manuals.	rok.auto/techdocs
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

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