



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)






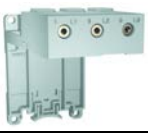

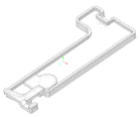



| | Mounting Options | Current Range [A] | For Use With | Cat. No. |
|--|---|-------------------|-------------------------------------|-----------|
|  | IEC Contactors | 0.1...0.5 | 100-C09...C23 | 193-1EEAB |
| | | 0.2...1.0 | | 193-1EEBB |
| | | 1.0...5.0 | | 193-1EECB |
| | | 3.2...16 | | 193-1EEDB |
| | | 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. |
|---|------------------|-------------------|--|------------|
|  <p>IEC Contactors</p> <ul style="list-style-type: none"> 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 | | 193-1EFD B |
| | | 5.4...27 | | 193-1EFE B |
| | | 5.4...27 | 100-C30...C55 | 193-1EFED |
| | | 11...55 | | 193-1EFFD |
| | | 20...100 | | 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 | | 193-1EFD F |
| | | 5.4...27 | | 193-1EFE F |
| | | 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 | | | |
|  <p>Integrated panel/DIN Rail Mount and Pass-thru</p> <ul style="list-style-type: none"> 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. |
|--|------------------|-------------------|-----------------|--------------|
|  <p>NEMA-rated Overload Relays</p> <ul style="list-style-type: none"> For use with NEMA contactors NEMA Size 4 devices are also available with a reduced standoff height (-X1 suffix) <ul style="list-style-type: none"> - 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 | | 592-1EFC C |
| | | 3.2...16 | | 592-1EFD C |
| | | 5.4...27 | | 592-1EFE C |
| | | 11...55 | | 592-1EFF C |
| | | 20...100 | NEMA Size 3 | 592-1EFGD |
| | | 30...150 | NEMA Size 4 | 592-1EFHE |
| | | | | 592-1EFHE-X1 |
| 60...300 | NEMA Size 5 | 592-1EFKF | | |

| 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 | 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 | 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 |
|---|--|
| <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • 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

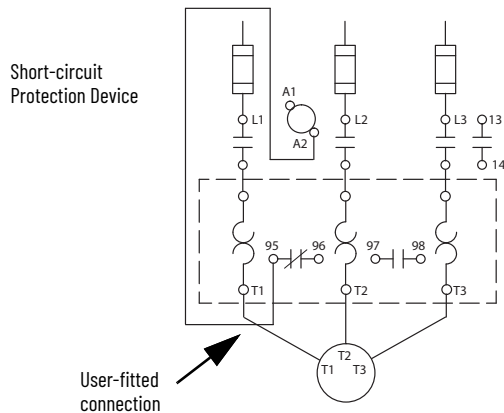


Figure 3 - 1-Phase, Full-voltage Direct-on-line Starter, NEMA Symbology

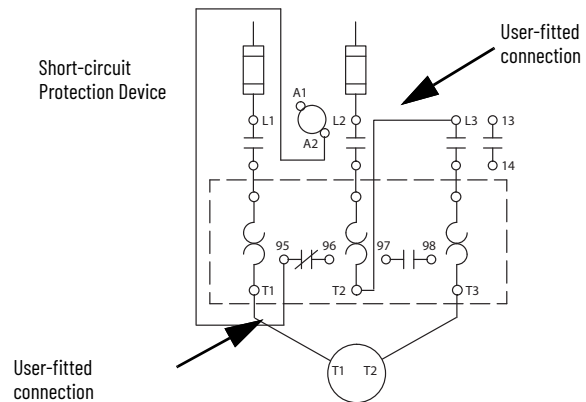


Figure 2 - 3-Phase, Full-voltage Direct-on-line Starter, IEC Symbology

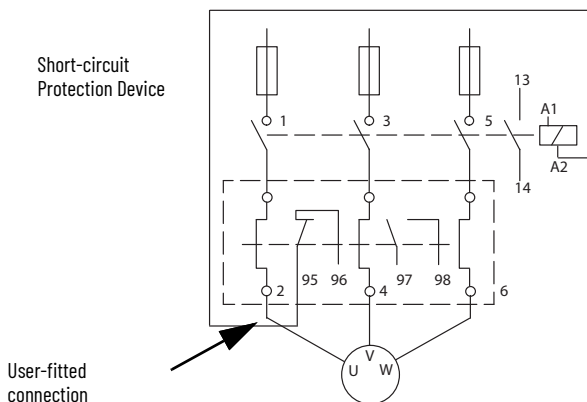


Figure 4 - 1-Phase, Full-voltage Direct-on-line Starter, IEC Symbology

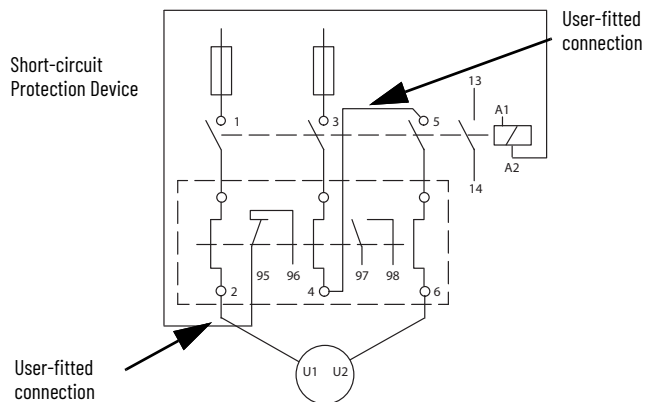
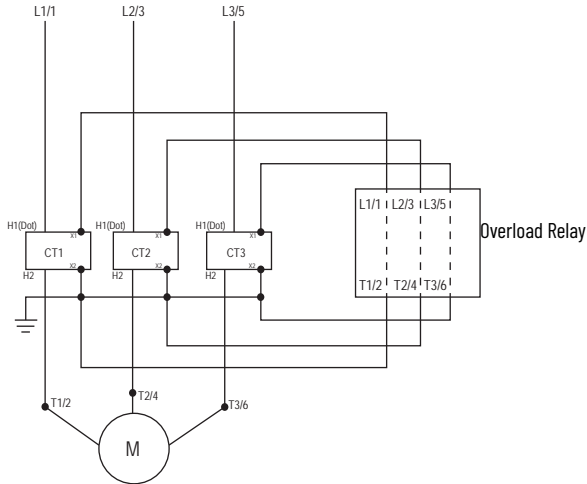
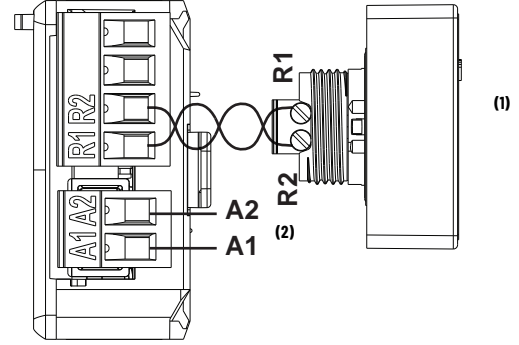


Figure 5 - E100 Overload Relay (Cat. No. 193-1EF_Z) with External Current Transformer



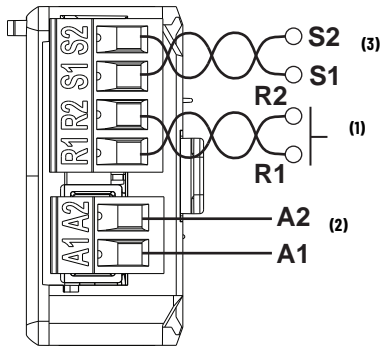
For more information about how to install an external Current Transformer, see publication [193-IN047](#) and publication [193-IN084](#).

Figure 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. |

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. |

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

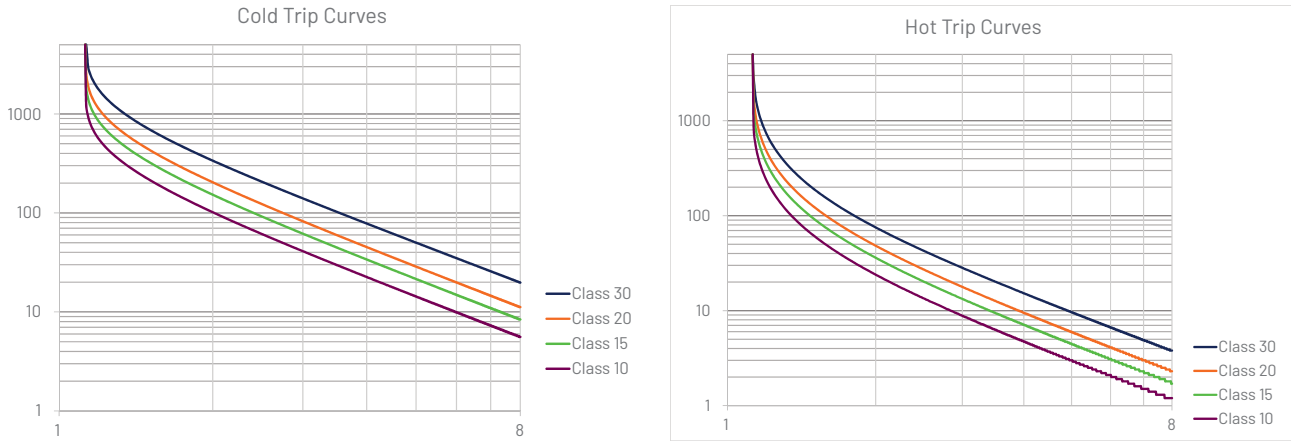
| Attribute | Rating | |
|----------------------|--|---------------------------|
| | Cat. No. 193-1EE | Cat. No. 193-1EF, 592-1EF |
| Type of Relay | Ambient Compensated Time-Delay Phase Loss Sensitive | |
| Nature of Relay | Solid-state | |
| FLA Setting | Rotary Dial | |
| Trip Rating | 120% FLA | |
| 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) |
| | 2 wires ⁽¹⁾ | | | 25 mm ² (4 AWG) | 3.4 N•m (30 lb•in) | 25 mm ² (4 AWG) | 3.4 N•m (30 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 N•m (22 lb•in) | 2.5...16 mm ² (14...6 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.

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

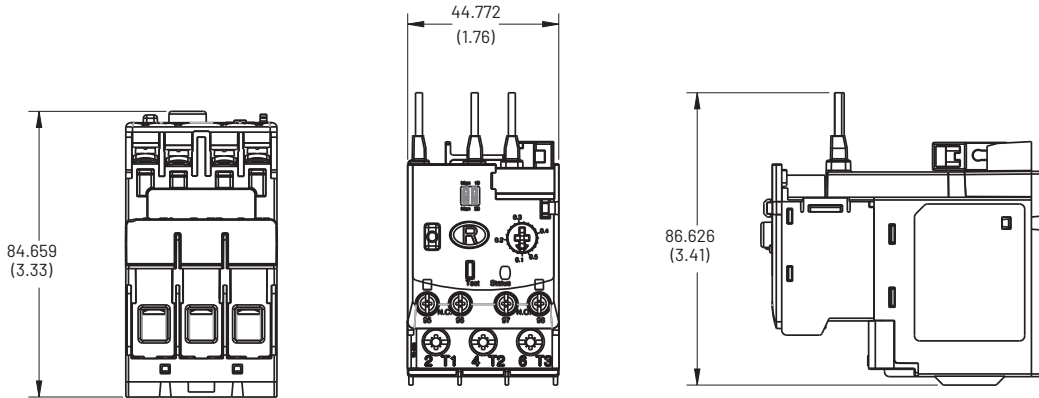


Figure 9 - Cat. No. 193-1EF_B IEC Advanced Version, Frame B

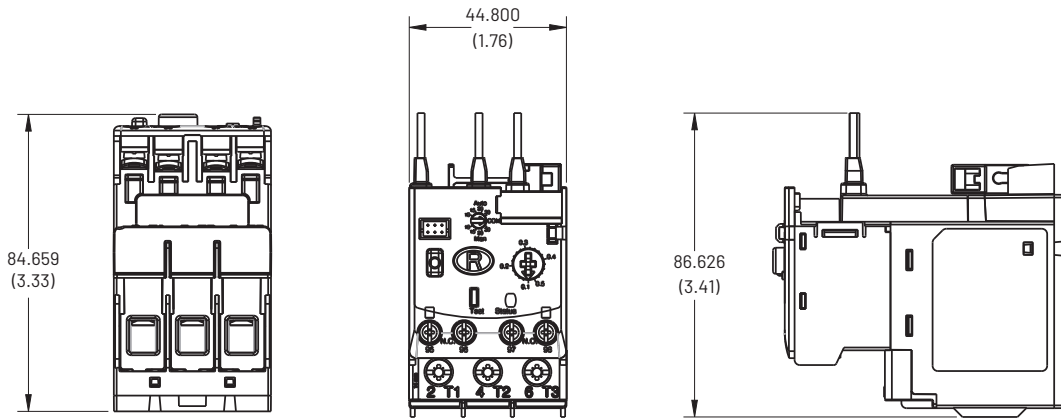


Figure 10 - Cat. No. 193-1EF_Z Advanced Version, Panel-mounted with External Current Transformer

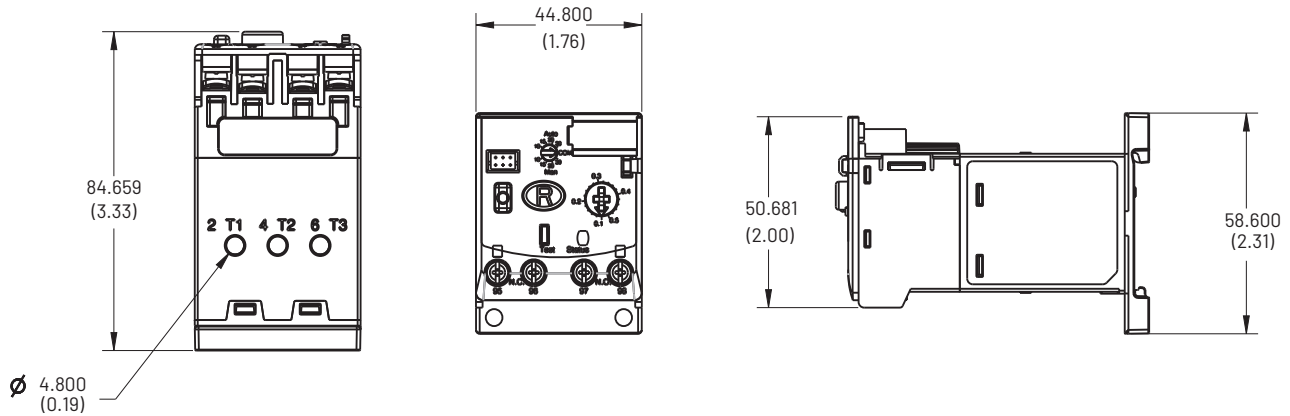


Figure 11 - 193-1EE_P IEC Basic Version, Pass-thru Frame B

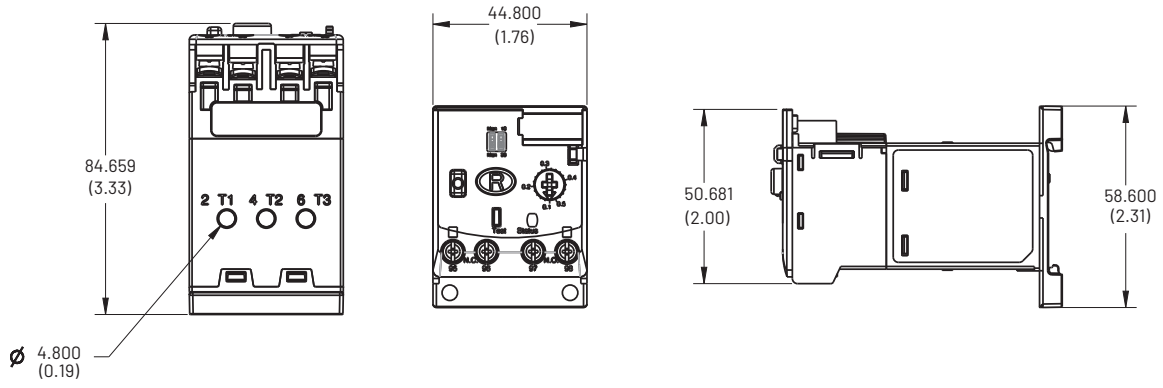


Figure 12 - 193-1EF_P IEC Basic Version, Pass-thru Frame B

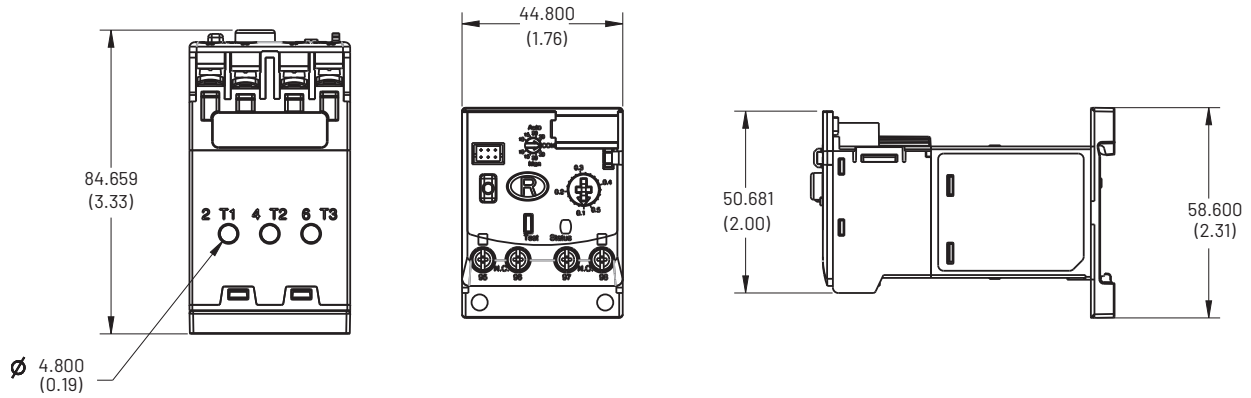


Figure 13 - 193-1EE_D IEC Basic Version, Frame D

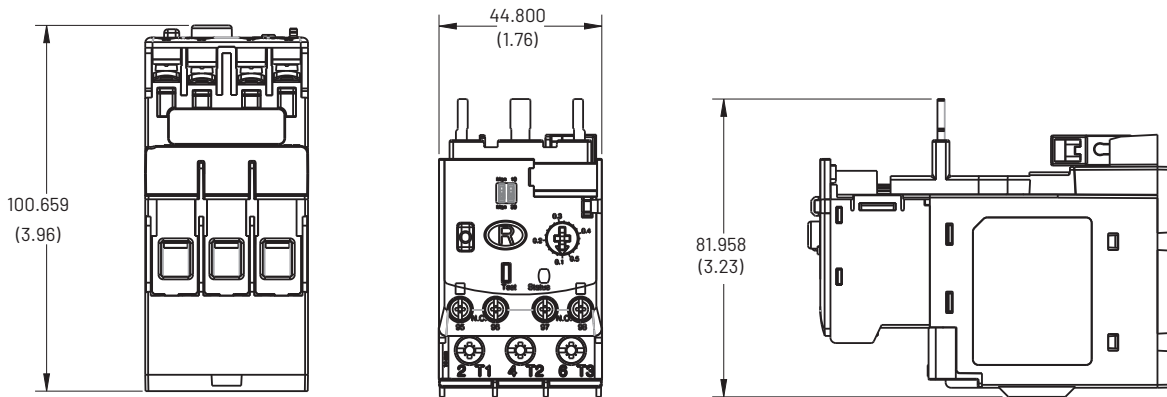


Figure 14 - 193-1EF_D IEC Advanced Version, Frame D

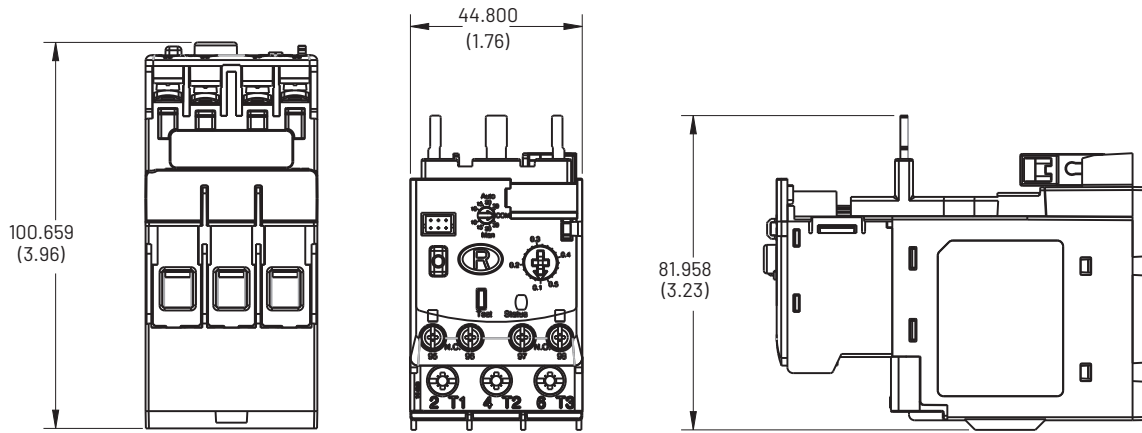


Figure 15 - 193-1EE_P IEC Basic Version, Pass-thru Frame D

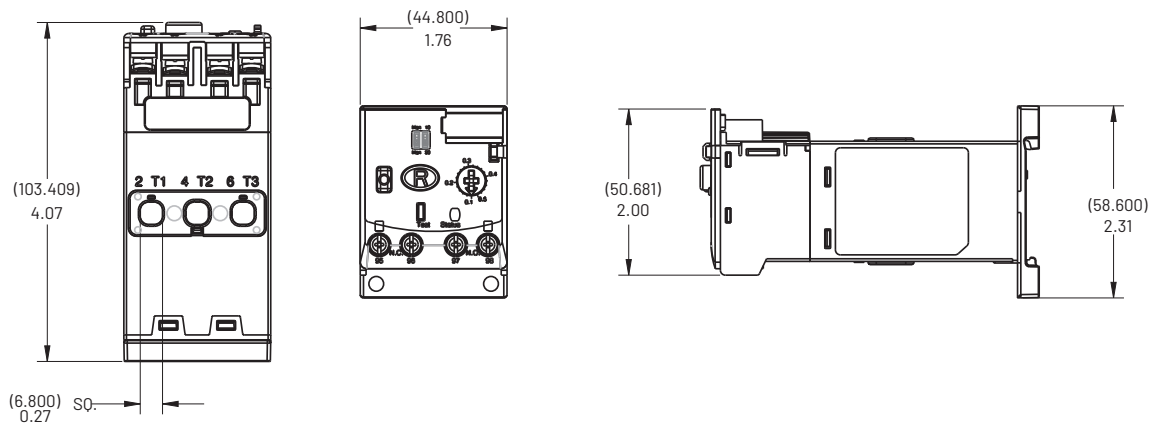


Figure 16 - 193-1EF_P IEC Advanced Version, Pass-thru Frame D

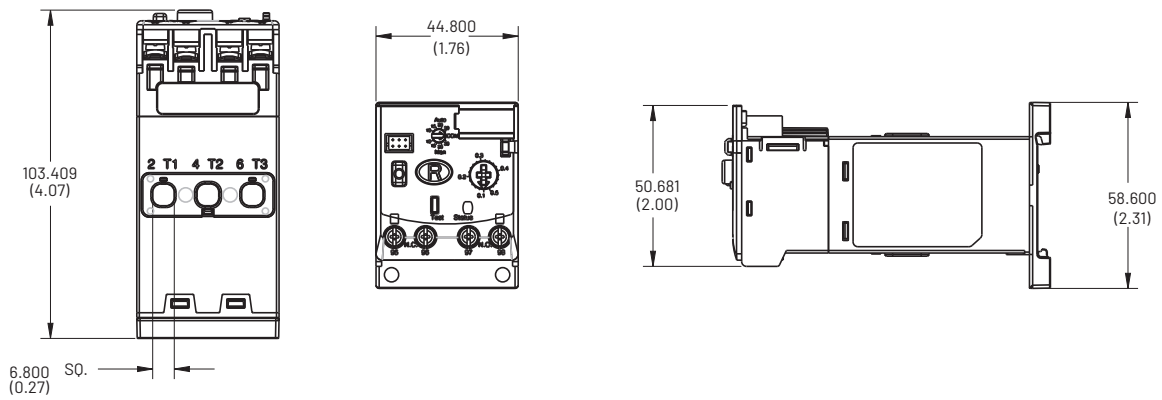


Figure 17 - 193-1EE_E IEC Basic Version, Frame E

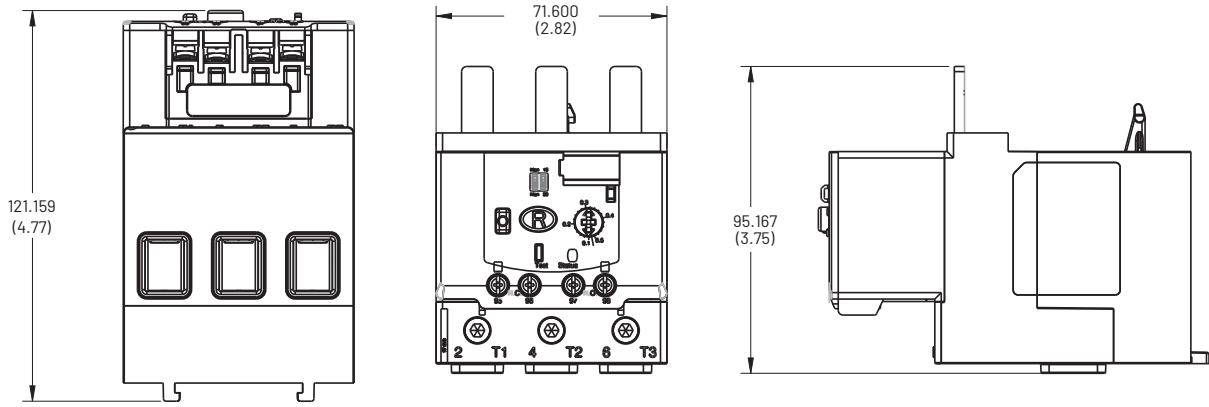


Figure 18 - 193-1EF_E IEC Basic Version, Frame E

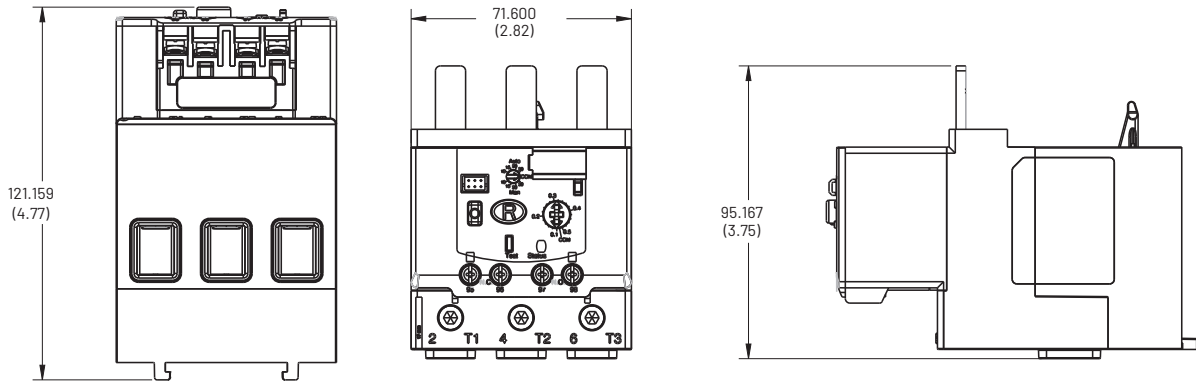


Figure 19 - 193-1EE_P IEC Basic Version, Pass-thru Frame E

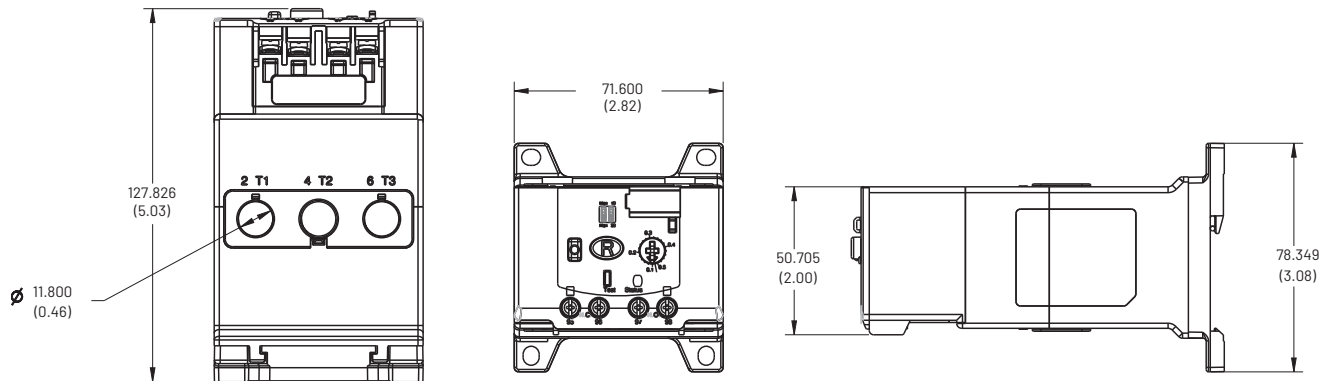


Figure 20 - 193-1EF_P IEC Advanced Version, Pass-thru Frame E

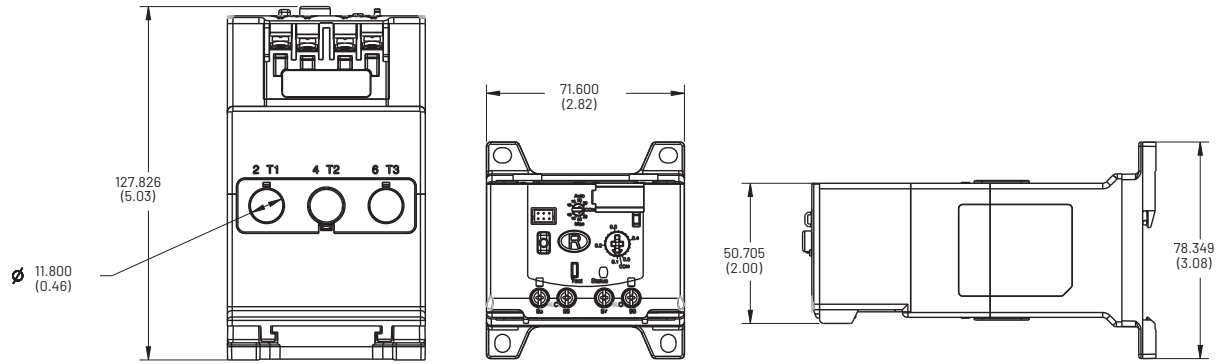


Figure 21 - 193-1EF_Z IEC/NEMA Energy-saving Advanced Version, Frame F

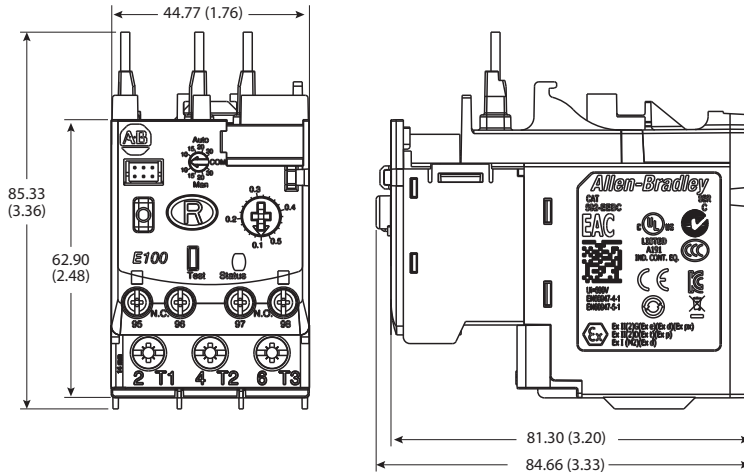


Figure 22 - 193-1EF_Z IEC/NEMA Energy-saving Advanced Version, Frame G

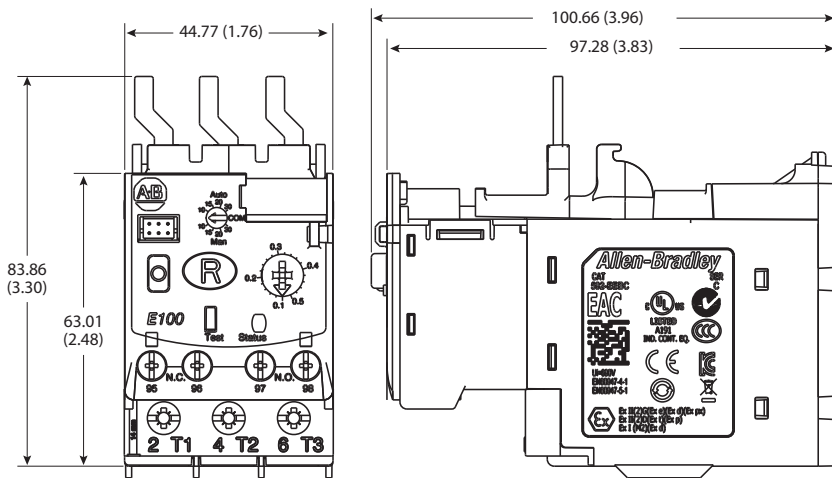


Figure 23 - 193-1EF_Z IEC/NEMA Energy-saving Advanced Version, Frame H

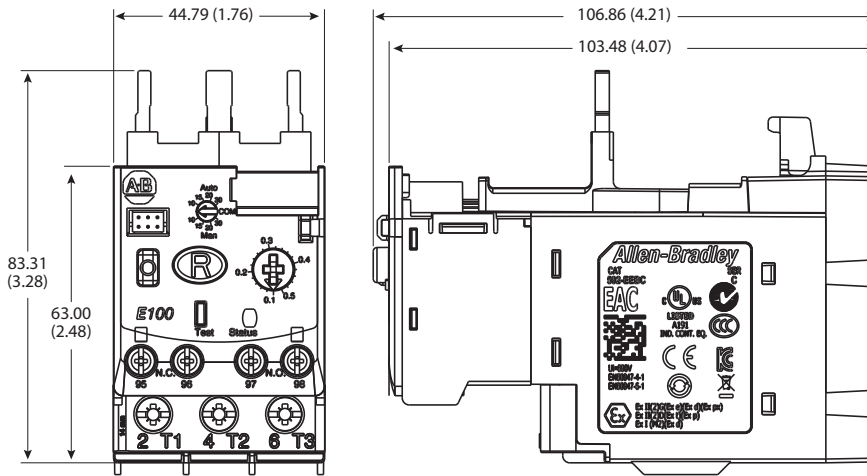


Figure 24 - 193-1EF_Z IEC/NEMA Energy-saving Advanced Version, Frame J

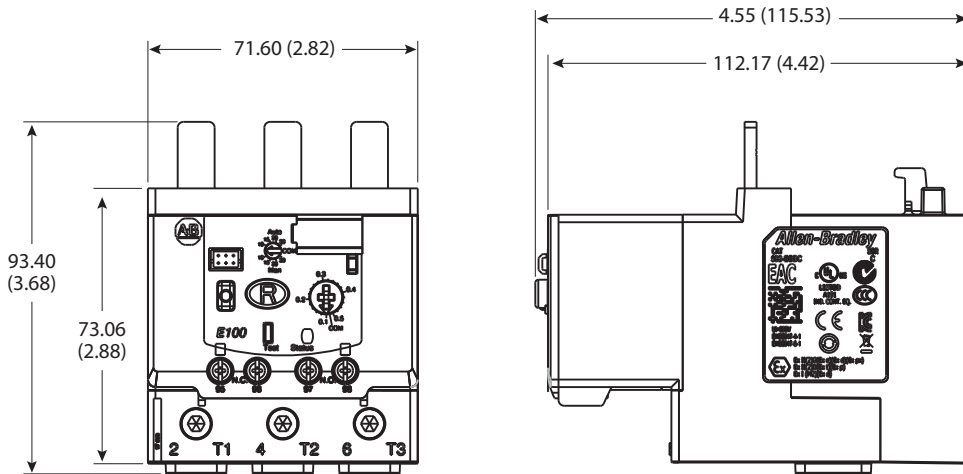


Figure 25 - 592-1EF_T NEMA Size 00

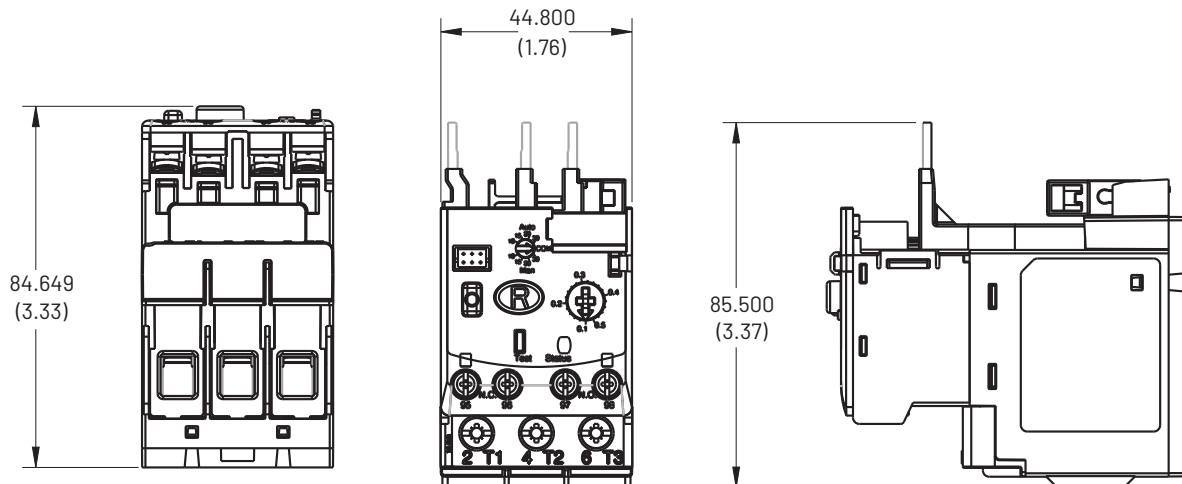


Figure 26 - 592-1EF_C NEMA Size 0-2

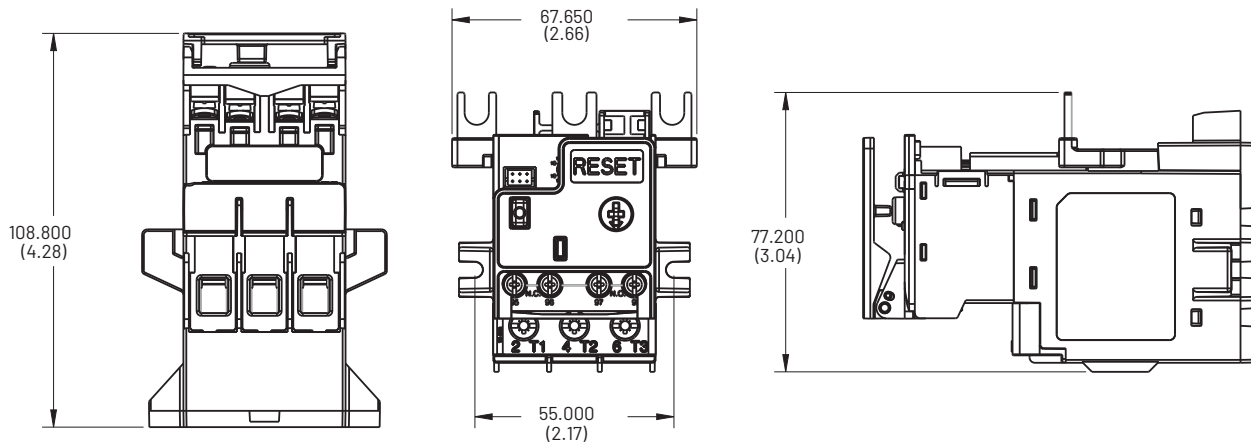


Figure 27 - 592-1EF_D NEMA Size 3

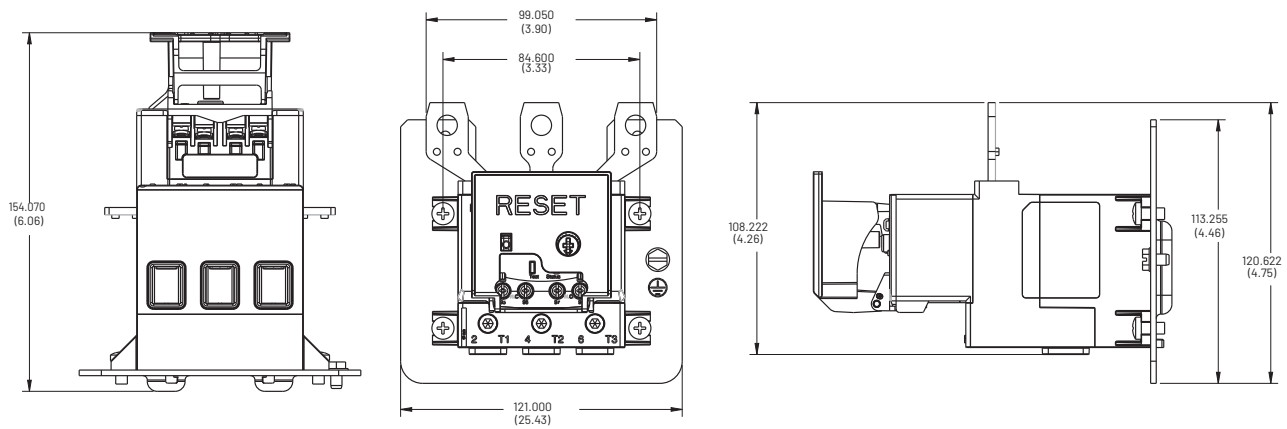


Figure 28 - 592-1EF_E NEMA Size 4

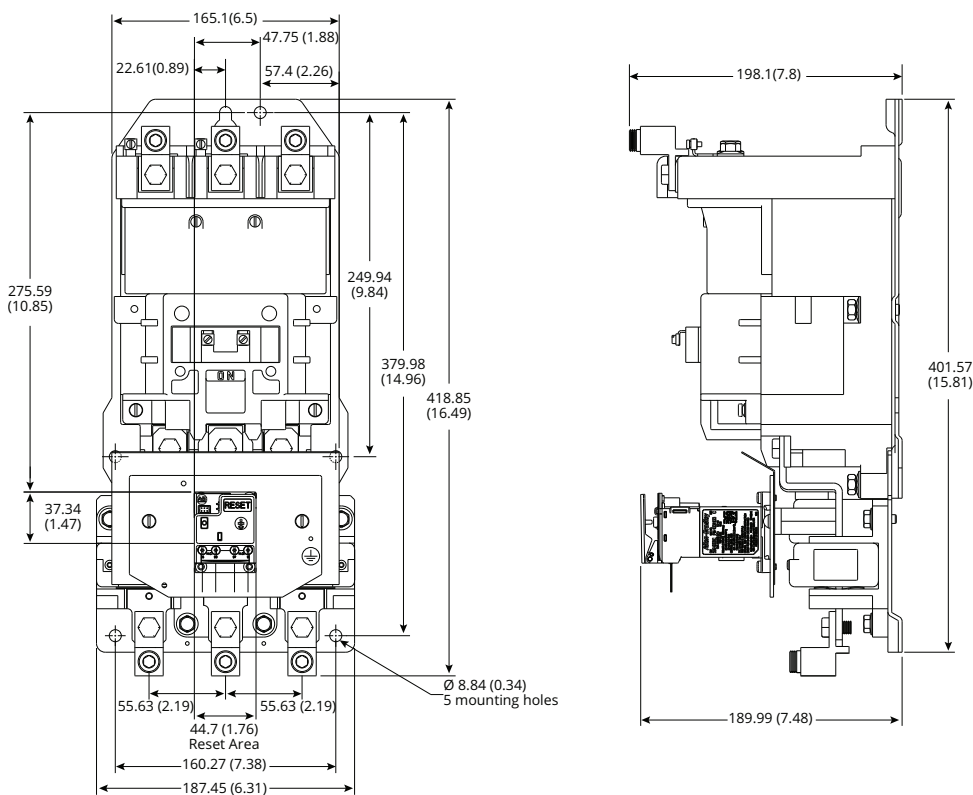
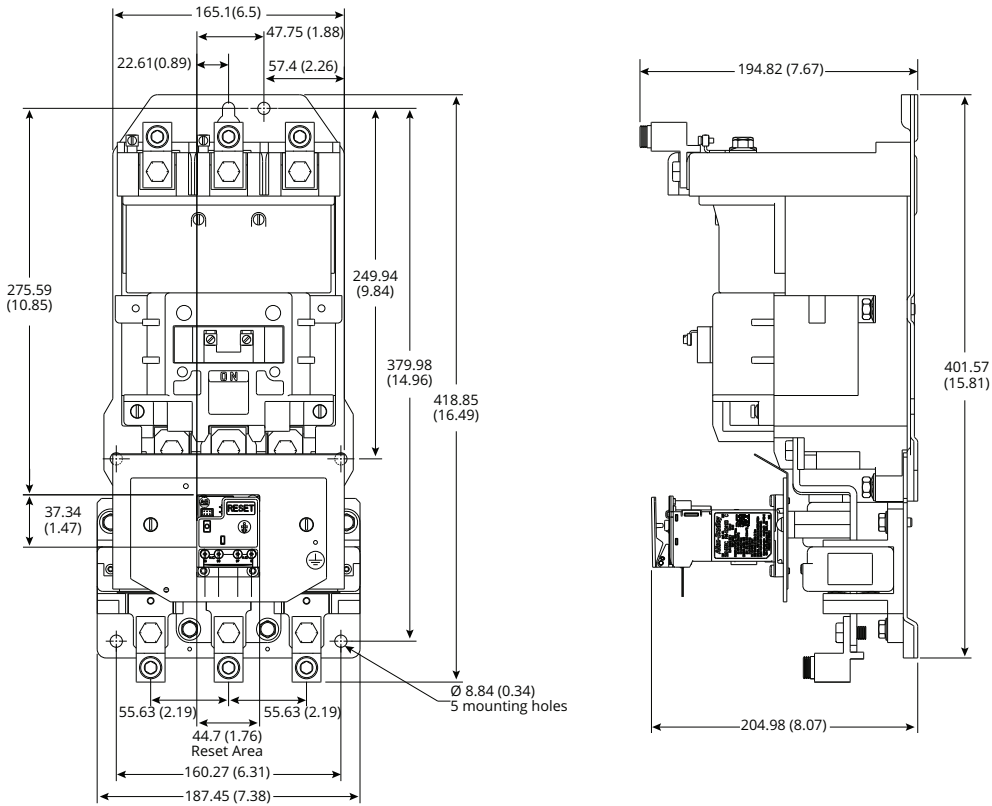


Figure 29 - 592-1EF_F NEMA Size 5



Accessories

Ground Fault Protection Module

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

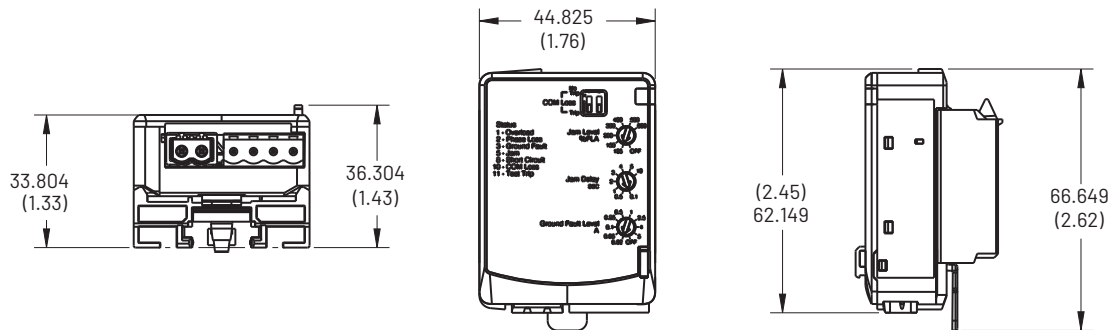
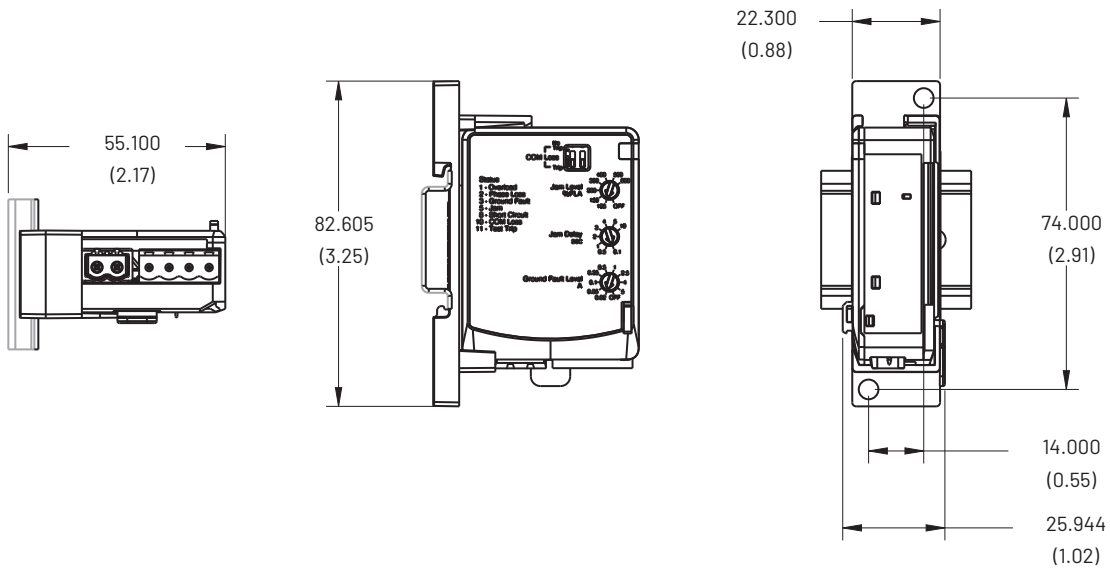


Figure 31 - Cat. No. 193-1EGJ Ground Fault Protection Module, Panel Mount



DIN Rail/Panel Adapters

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

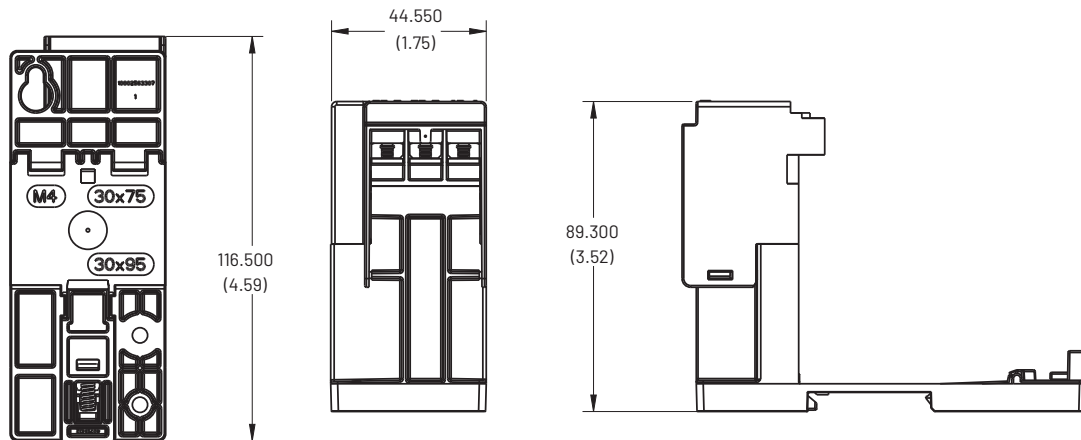


Figure 33 - Cat. No. 193-1EPB DIN Rail/Panel Adapter, Panel Mount with Overload

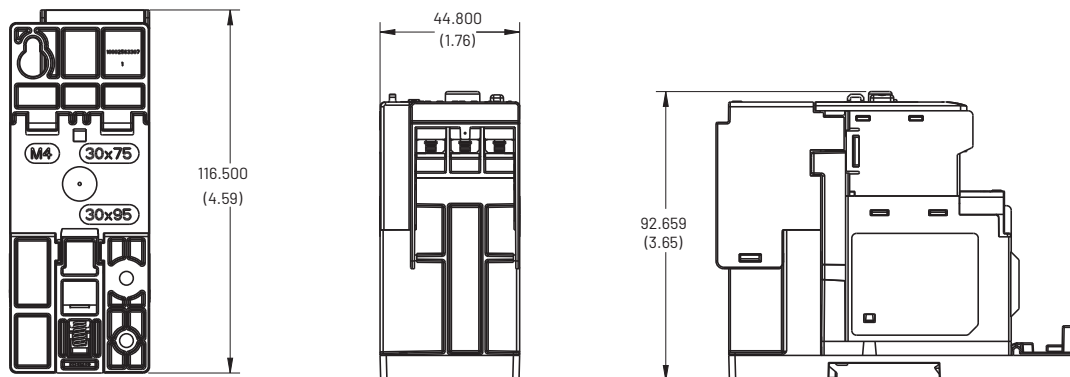


Figure 34 - Cat. No. 193-1EPD DIN Rail/Panel Adapter, Panel Mount

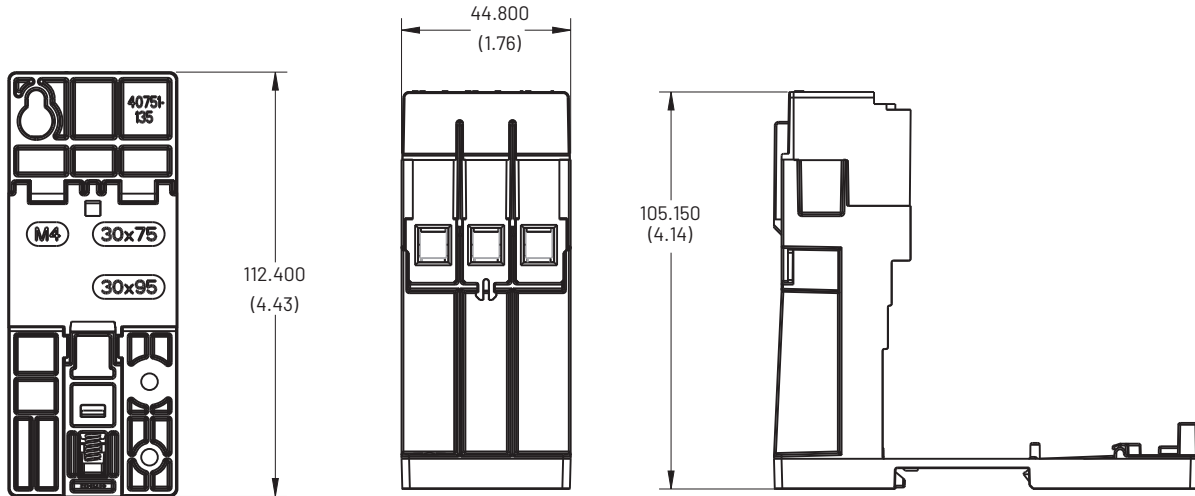


Figure 35 - Cat. No. 193-1EPD DIN Rail/Panel Adapter, Panel Mount with Overload

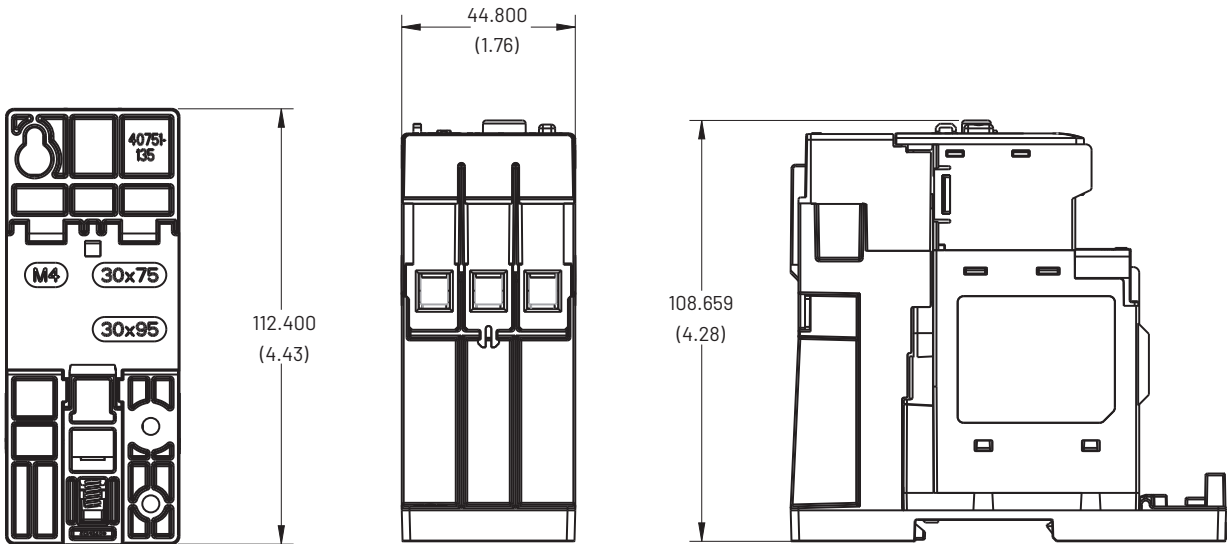


Figure 36 - Cat. No. 193-1EPE DIN Rail/Panel Adapter, Panel Mount

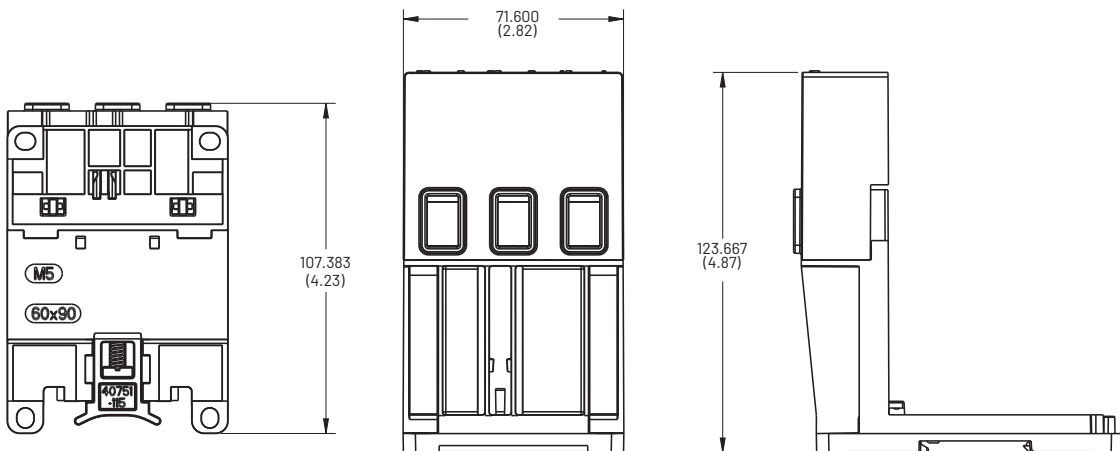
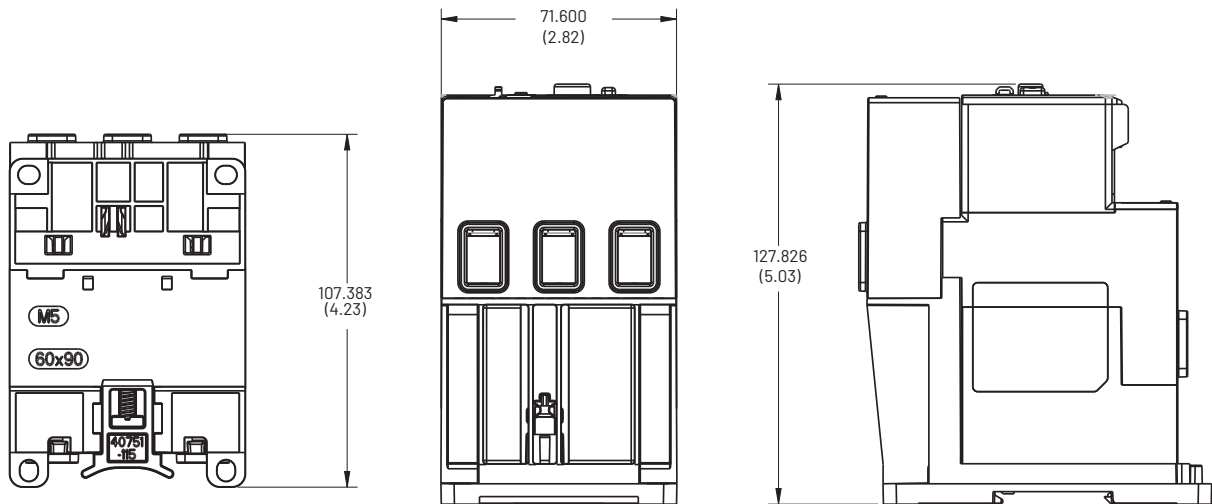


Figure 37 - Cat. No. 193-1EPE DIN Rail/Panel Adapter, Panel Mount with Overload



Reset Accessories

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

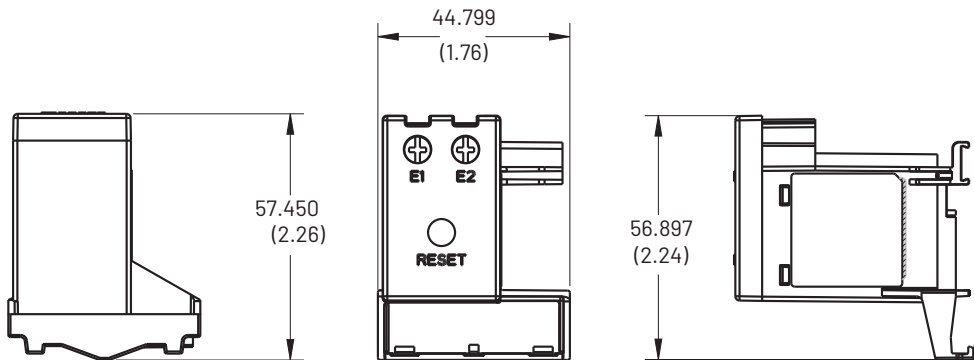


Figure 39 - Cat. No. 193-1ERR Reset Adapter, Contactor Mount

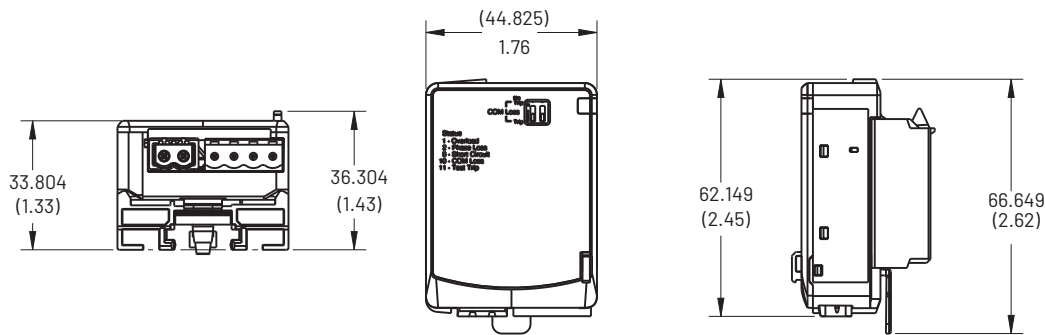


Figure 40 - Cat. No. 193-1ERR Reset Adapter, Panel Mount

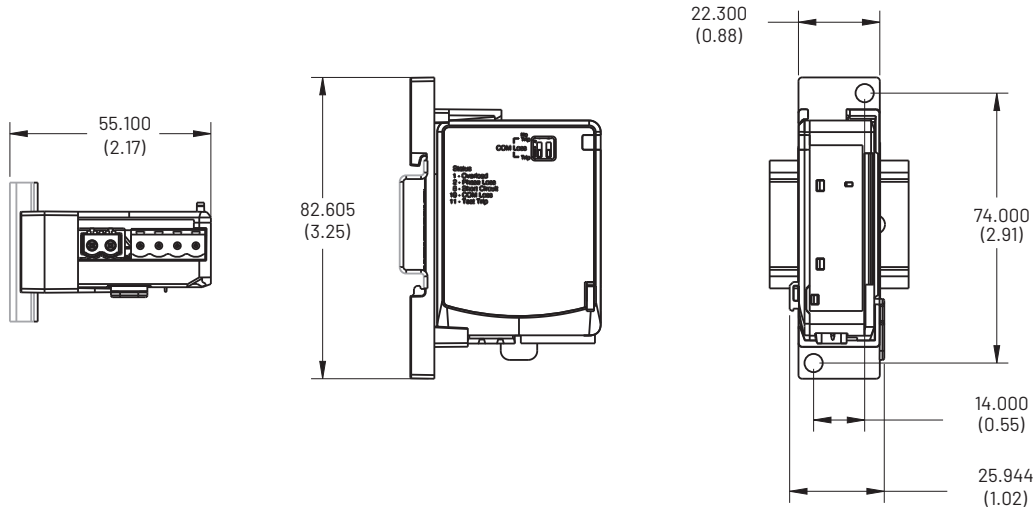


Figure 41 - Cat. No. 193-ERID Electronic Remote Indication Display with Reset

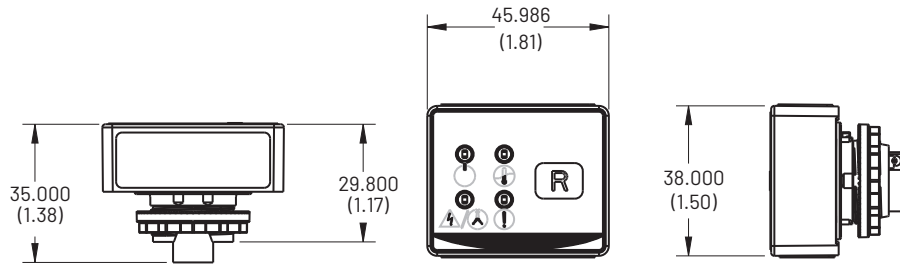
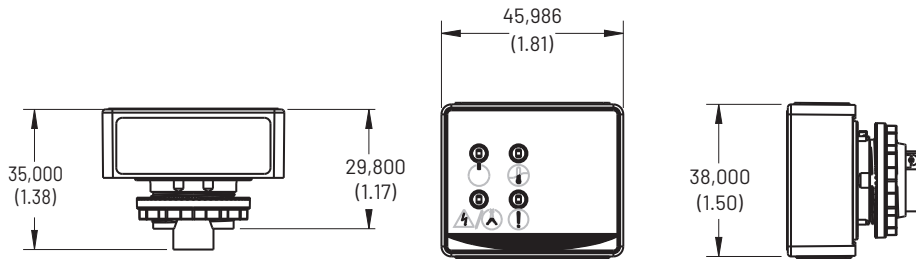


Figure 42 - Cat. No. 193-1ERIDN Electronic Remote Indication Display without Reset



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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