Migration Solutions

Allen-Bradley by ROCKWELL AUTOMATION

E1 Plus to E100 Electronic Overload Relay

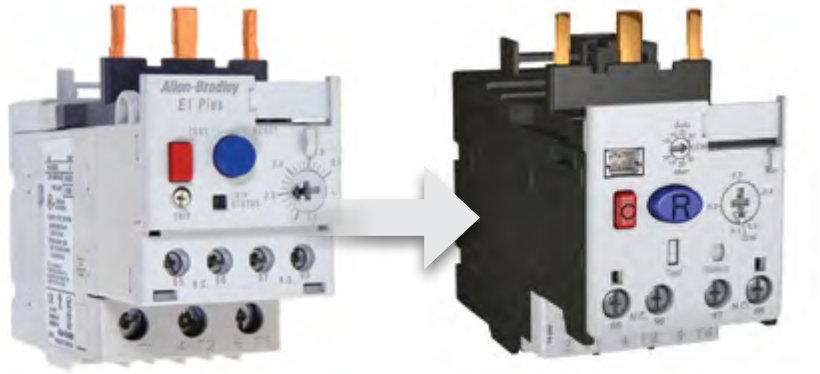
Why Upgrade or Migrate

While the E1 Plus Overload Relay™ has been a valuable part of our portfolio for the past 18 years, this product will no longer be available for sale after April 2021.* Now is the time to migrate to the E100™ Electronic Overload Relay. The E100 is the next generation basic-tier electronic overload relay. It has enhanced features to better safeguard your motor investments, including increased accuracy and repeatability, a self-powered design with lower heat dissipation, and an aggressive component certification strategy.

E100 Basic Product Overview

- 193-1EE: Trip Class 10 and 20, manual reset only
- 193/592-1EF: Trip Class 10, 15, 20, 30, manual or automatic reset
- 5:1 wide current adjustment range to cover a variety of motor applications
- Supports both single- and three-phase operation in a single component
- A variety of accessories for enhanced protection
  - Ground fault/jam
  - Remote reset and/or indication
  - Anti-tamper shields
  - DIN rail/panel mounting
  - External CT configurations
- Current measurement-based protection
- Electronic design and thermal memory
- Phase loss protection
- Self-powered and direct-mount design with IEC and NEMA style contactors

Discontinued date may be subject to change.



E1 Plus Electronic Overload Relay *E100 Electronic Overload Relay*

Why Upgrade or Migrate?

Rockwell Automation understands that your overload relays are a critical asset in your automation system, and we support that by providing you with the latest technology to maximize your investment. New technologies can improve and extend the operation of existing equipment and provide an immediate boost to productivity. By migrating from your legacy E1 Plus Overload to a new E100 Electronic Overload Relay, you can help to decrease downtime, increase speed to market, and optimize operations well into the future.

We will help you to meet ever changing industry demands to innovate by proactively planning and managing your transition every step of the way to help you get the highest possible return on your automation investment.

***ACTIVE:** Most current offering within a product category.

ACTIVE MATURE: Product is fully supported, but a newer product or family exists. Gain value by migrating.

END OF LIFE: Discontinued date announced – actively execute migrations and last time buys. Product generally orderable until the discontinued date.[1]

DISCONTINUED: New product no longer manufactured or procured.[2] Repair/exchange services may be available.

[1] *Outages on specific items may occur prior to the Discontinued date.*
[2] *Limited stock may be available in run-out mode, regionally.*

Rockwell Automation

Migration Options & Application

The E100 Electronic Overload Relay was designed with migration in mind for customers looking to upgrade from a legacy E1 Plus solution.

- E100 improves application coverage with adjustable Trip Class 10 and 20 for the basic 193-1EE model
- Identical mounting footprint to E1 Plus for direct-mount configurations with Bulletin 100-C (IEC) and 500 (NEMA) contactors
- Equivalent overload performance, features, and wiring as compared to E1 Plus
- E100 offers optional accessory modules which can be front-mounted on Bulletin 100-C contactors for ease-of-access & minimizing panel space

				
Bulletin	**E1 Plus Overload Types**		**E100 Overload Types**	
	193-ED1	**193/592-EE; 193S/592S-EE**	**193-1EE**	**193/592-1EF**
Model	E1 Plus™ Electronic Overload Relay	E1 Plus™ Electronic Overload Relay	E100™ Electronic Overload Relay	E100™ Electronic Overload Relay
Type	Basic	Advanced	Basic	Advanced
Rated Current (Range)	0.1...45 A	0.1...800 A	0.1...100 A (Single- or Three-Phase)	0.1...800 A (Single- or Three-Phase)
NEMA Operating Voltage, Nominal	600V AC	600V AC	600V AC	600V AC
IEC Operating Voltage, Nominal	690V AC	690/1000V AC	690/1000V AC	690/1000V AC
Rated Operating Frequency	50/60 Hz (sinusoidal)	50/60 Hz (sinusoidal)	45...65 Hz	45...65 Hz
Operating Temperature (open)	-20...+60 °C (-4...+140 °F)		-20...+65 °C (-4...+149 °F)	
Overload Type	Electronic	Electronic	Electronic	Electronic
Trip Class (Fixed)	10	–	–	–
Trip Class (Adjustable)	–	10, 15, 20, 30	10, 20	10, 15, 20, 30
Reset Type	Manual Only	Automatic or Manual	Manual Only	Automatic or Manual
Adjustment Range	5:1	5:1	5:1	5:1
Rated Impulse Strength	6kV AC	6kV AC	6kV AC	6kV AC
Phase Loss Protection	Yes	Yes	Yes	Yes
Phase Imbalance Protection	Yes	Yes	Yes	Yes
Overcurrent (Jam) Protection	No	With Accessory	No	With Protection Accessory
Ground (Earth) Protection	No	With Accessory	No	With Protection Accessory
N.C. Trip Contact	Yes	Yes	Yes	Yes
N.O. Alarm Contact	Yes	Yes	Yes	Yes
Contact Rating	N.O./N.C. B600	N.O./N.C. B600	N.O. C600 / N.C. B600 (AC) N.O. / N.C. R300 (DC)	N.O. C600 / N.C. B600 (AC) N.O. / N.C. R300 (DC)
Available Mounting Types	Direct and Pass-Thru	Direct and Pass-Thru	Direct and Pass-Thru	Direct and Pass-Thru

Migration Options & Application

The E100 Electronic Overload Relay is the newest technology for overload protection and supports both single- and three-phase operation in a single component.

Bulletin 193, 1EE Model	
Current Range	0.1...100 A
Trip Class	10, 20 Adjustable
Reset Mode	Manual Only
Accessories	Reset Adapter, Anti-Tamper Shield, Remote Reset Solenoid, DIN Rail/Panel Adapter

Ideal Applications

- Conveyors
- Pumps
- Fans
- Process

Bulletin 193/592, 1EF Model	
Current Range	0.1...800 A
Trip Class	10, 15, 20, 30 Adjustable
Reset Mode	Automatic and Manual
Accessories	Reset Adapter, Anti-Tamper Shield, Remote Reset Solenoid, DIN Rail/Panel Adapter, Electronic Remote Reset Accessory, GF and Jam Accessory

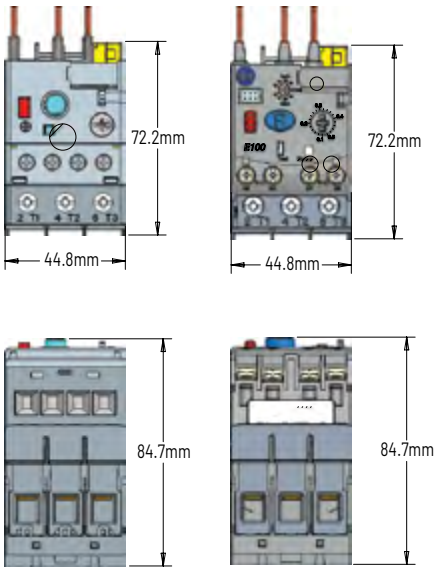
Usability

- Multiple trip class options
- Selectable reset modes
- Wide current range
- Additional modules for enhanced functionality

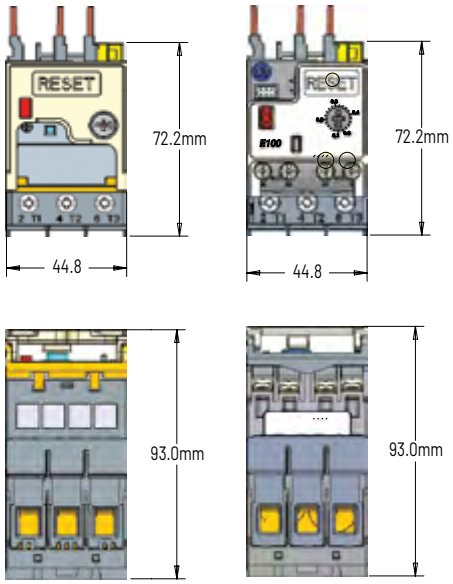
Dimensional Comparison of E1 Plus to E100

The mounting footprint of the E1 Plus as compared to the E100 is **identical** for direct-mount configurations with bulletin 100-C (IEC) and 500 (NEMA) contactors. The mounting footprint of the E1 Plus and E100 pass-thru versions is also relatively the same however the E100 offers an extended current sensing range by comparison. In addition, the E100 offers its own dedicated selection of DIN rail/panel-mount adapters.

E1 Plus vs E100 (IEC) – Frame B

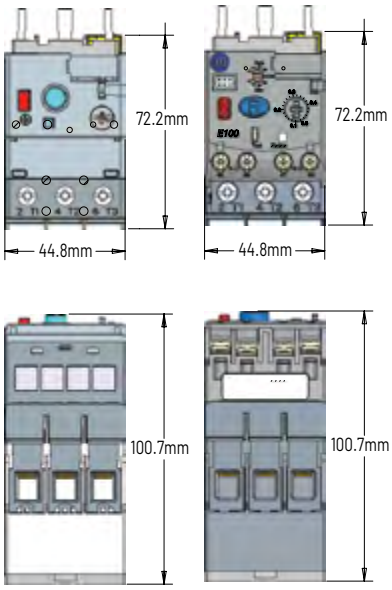


E1 Plus vs E100 (NEMA) – Frame B

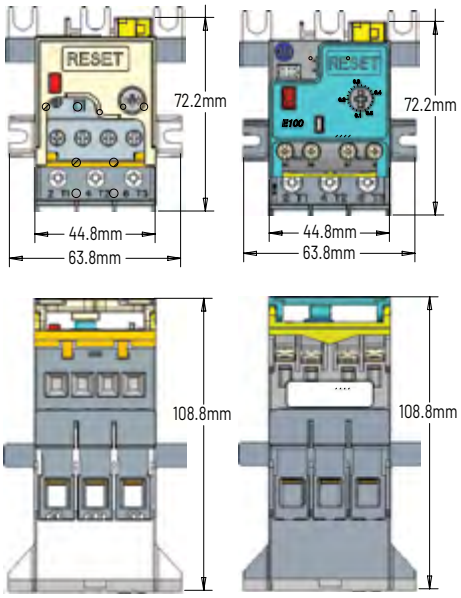


Dimensional Comparison of E1 Plus to E100

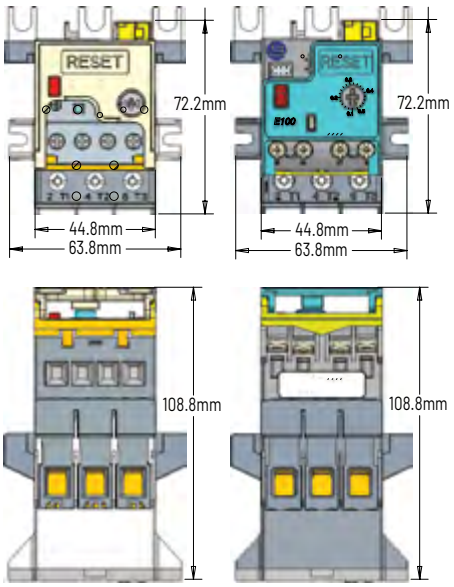
E1 Plus vs E100 (IEC) – Frame D



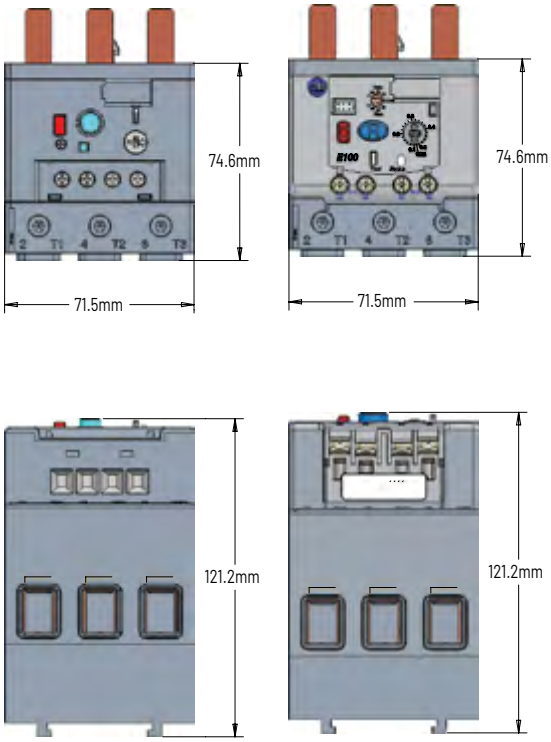
E1 Plus vs E100 (NEMA) – Frame D



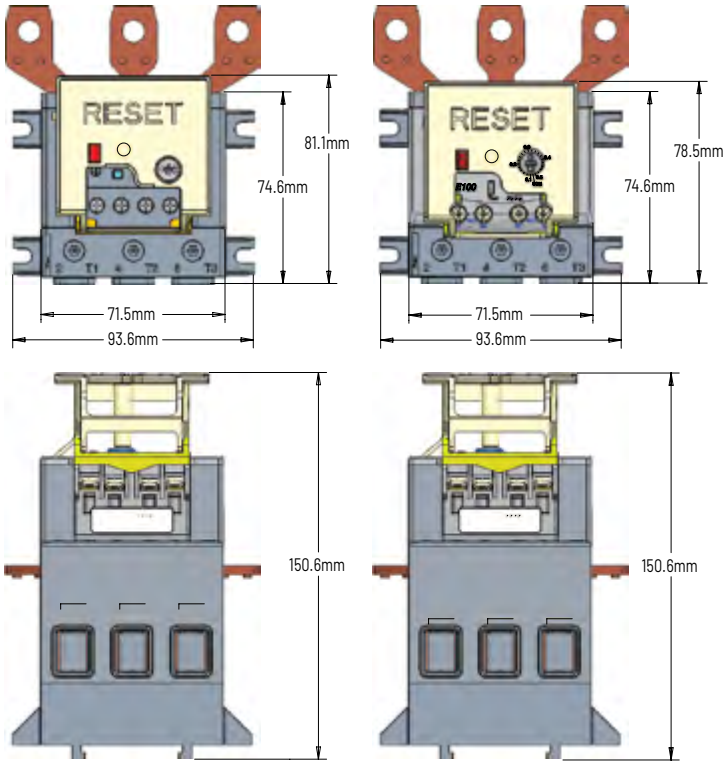
E1 Plus vs E100 (NEMA) – Frame D



E1 Plus vs E100 (IEC) – Frame E



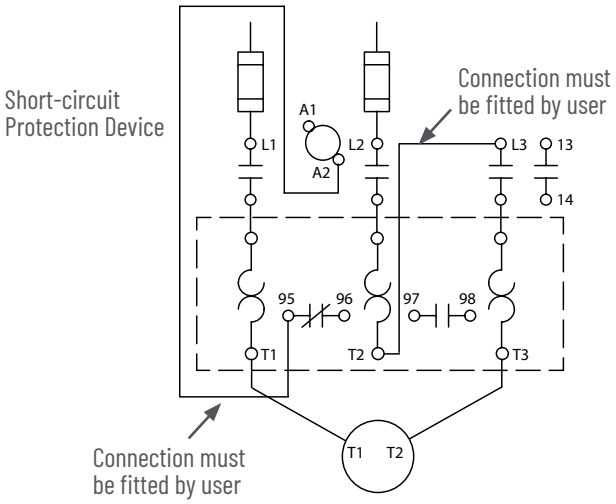
E1 Plus vs E100 (NEMA) – Frame E



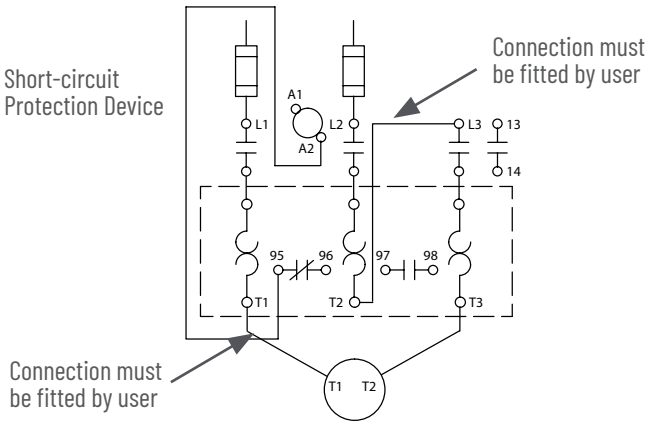
Electrical Comparison of E1 Plus to E100

The terminal layout of the E100 is **identical** to that of the E1 Plus overload. In addition, the E100 offers a front-mounted communication port to connect optional accessory modules.

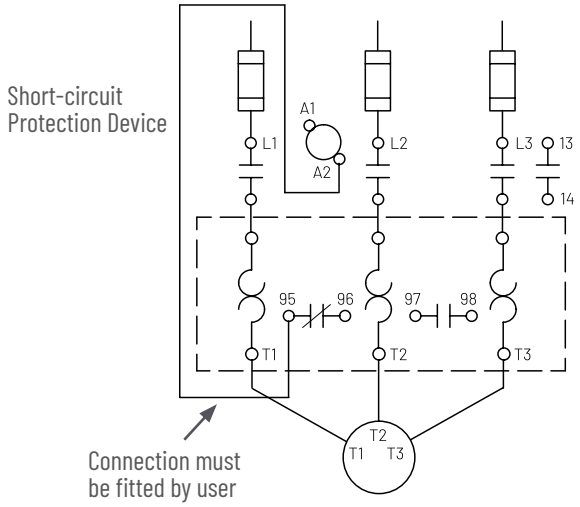
E1 Plus Typical Wiring for 1-Phase Application



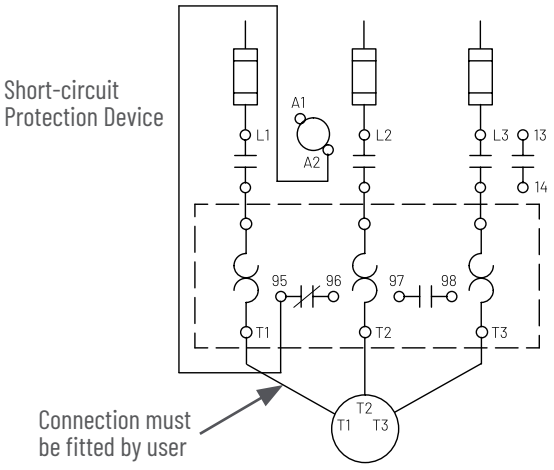
E100 Typical Wiring for 1-Phase Application



E1 Plus Typical Wiring for 3-Phase Application



E100 Typical Wiring for 3-Phase Application

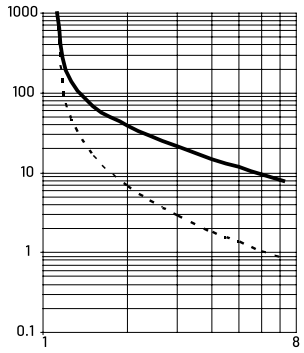


Like the E1 Plus, the E100 incorporates a self-powered design. Meaning when connected to the target application, once the motor is energized and current is detected, the E100 overload will activate and initiate protection. The two optional E100 expansion accessories (193-1EGJ or 193-1ERR; requires 193/592-1EF overload) require external power to be supplied (24...240V AC/DC) so in the event a fault is detected, the LED status indicator will remain operational.

Electrical Comparison of E1 Plus to E100

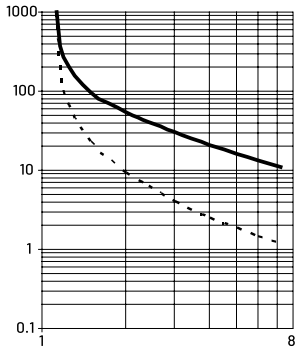
E1 Plus Overload Trip Curves	E100 Overload Trip Curves

Trip Class 10



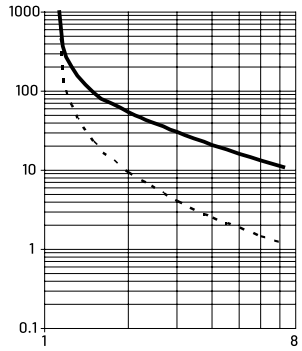
FLA Multiple

Trip Class 15



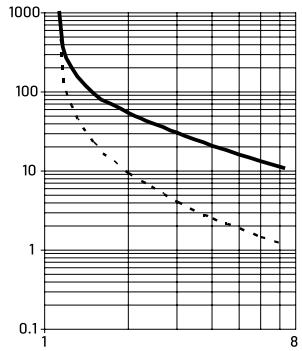
FLA Multiple

Trip Class 20



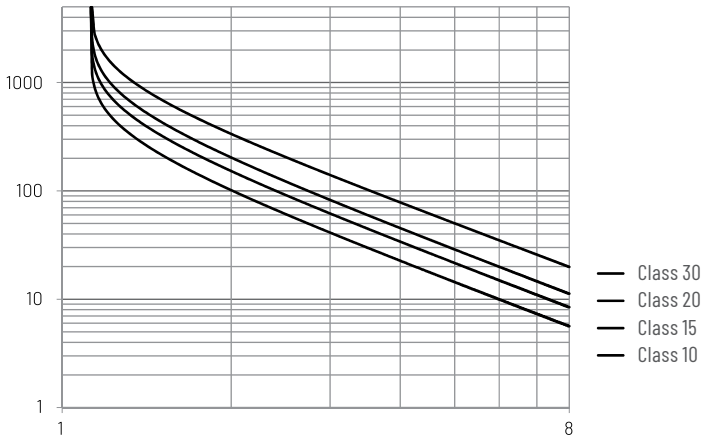
FLA Multiple

Trip Class 30

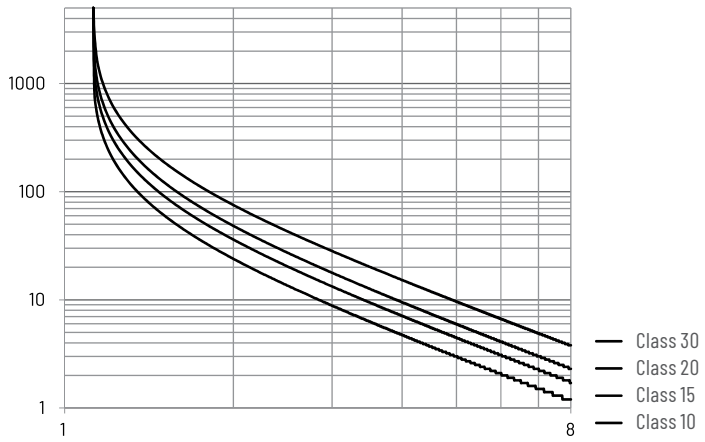


FLA Multiple

Cold Trip Curves



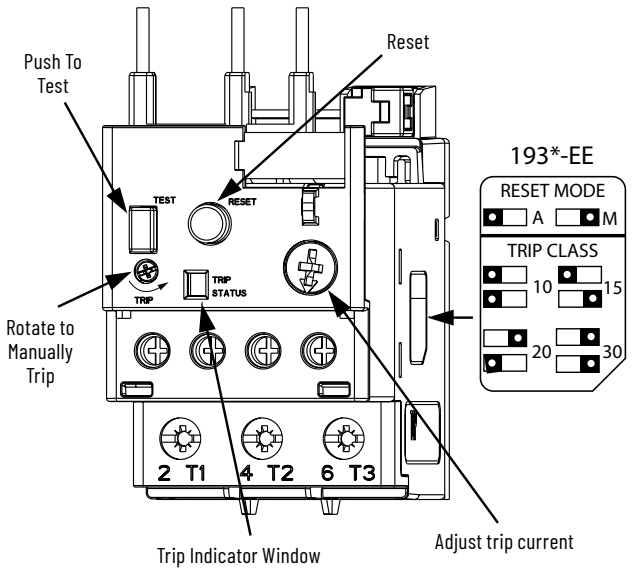
Hot Trip Curves



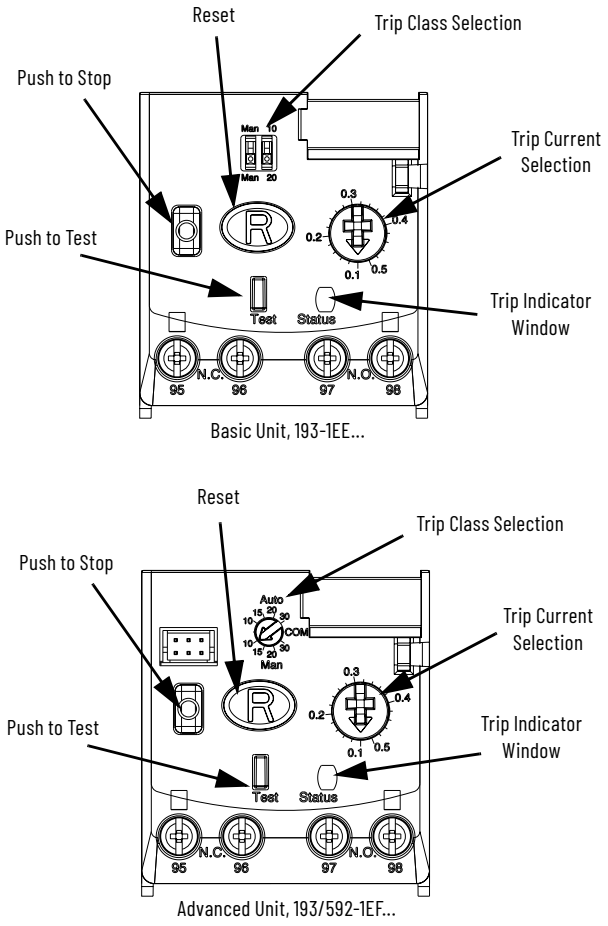
Configuration Comparison of E1 Plus to E100

E1 Plus to E100 Device Settings Layout

E1 Plus



E100



The E100 Overload Relay used with either the optional 193-1EGJ ground fault/jam or 193-1ERR electronic remote reset accessory modules offer a diagnostic LED status indicator. Which can provide the operating state of the E100 relay and also fault/status blink codes (note: the referenced accessory modules require externally supplied power so in the event of a fault condition, the LED status indicator will remain operational).

Status Indicator Color	Solid/Flashing	Description	Solution
Green	Flashing	Module powered	–
	Solid	Module powered and motor current present	–
Amber	Flashing	Warning	–
Red	Flashing	Fault detected and overload relay tripped	–
	Solid	Hardware fault; internal hardware fault detected and overload relay trip attempted	• Recover fault by cycling overload relay accessory supply voltage • Verify that the supply voltage is within limits • Verify the wiring to the terminals is correct • Verify that the pins that connected the accessory to the overload relay are not damaged or misaligned • Verify the operating temperature of the devices is within specification limits

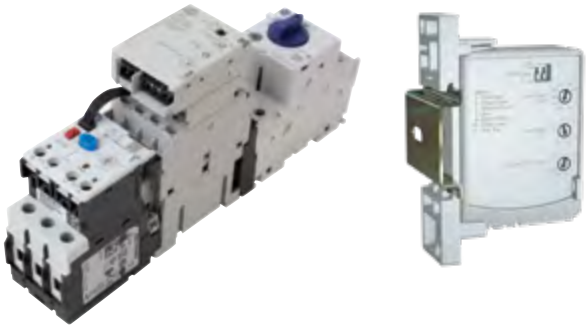
The status LED indicates the module status by flashing a red trip code. The number of flashes followed by a pause identifies the specific trip code as shown in the table.

** If you experience repeated COM Loss trips, this may be due to a damaged communication interface cable. To test whether this is the case, unplug the communication interface cable from the communication port and wait at least 3 seconds before re-connecting. If the issue persists, consider replacing the communication interface cable.*

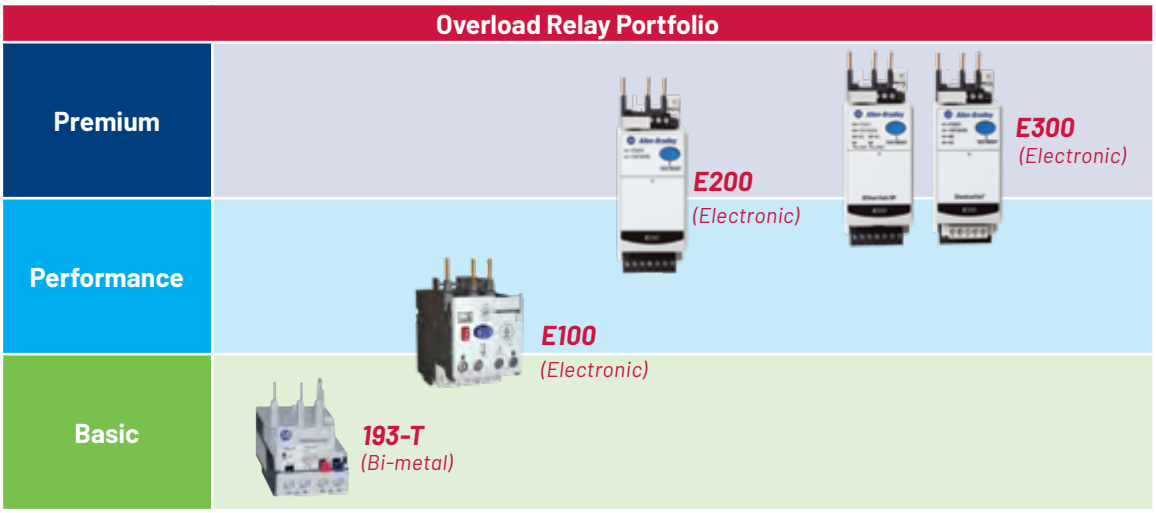
No. of Flashes	Trip Type
1	Overload Trip
2	Phase Loss
3	Ground Fault
5	Jam
8	Short Circuit
10	COM Loss *
11	Test Trip

E1 Plus to E100 Networking Options

The E1 Plus product family (193/592-EE version) included side-mount accessory modules that offered the following communication protocols: EtherNet/IP (193-ETN), DeviceNet (193-EDN), and PROFIBUS (193-EPRB). For customers seeking a Rockwell Automation overload solution that supports networked communication, please consider the E300™ electronic overload relay product family.



The E300 Electronic Overload Relay provides a flexible design and advanced intelligence. With real-time motor diagnostic information to proactively indicate when a motor is having a problem allowing you to efficiently troubleshoot. The E300 Electronic Overload Relay offers EtherNet/IP (or DeviceNet) connectivity which can be effectively adapted to those applications using a legacy E1 Plus networked overload solution. The figure below provides a high-level overview of Rockwell Automation's global tiered overload portfolio offering.



Component Cross-reference Information

For this particular component migration, there are two types of replacement categories as classified by Rockwell Automation. The following table references both replacement categories depending on the overload configuration. Examples of both categories are also provided below but are for reference only. Other configurations can and will vary by application.

Direct Replacement: a product that can be used in place of an earlier product without any user modifications or adjustments. A direct replacement provides backwards compatible form, fit, and function by emulating the earlier product.

Engineered Replacement: a product or family that can be used to migrate an earlier product or family and requires engineering changes to existing applications. An engineered replacement means that there is a form, fit or function change of the application that is not backward compatible and that does not emulate the earlier product.

Example #1 – E1 Plus/E100 Direct-Mount to Bulletin 500 NEMA Size 1 Contactor

DIRECT REPLACEMENT

Example #2 – E1 Plus/E100 Direct- Mount to Bulletin 100-C IEC Contactor (C23)

DIRECT REPLACEMENT

Example #3 – E1 Plus Mounted to Bulletin 100-D210 Contactor/E100 Pass-Thru Overload Requiring External CTs

ENGINEERED REPLACEMENT

Component Cross-reference Table

Discontinued Part Number	E1 Plus Contactor Mounting/Description	E1 Plus FLA Range	Recommended E100 Replacement Part (or suggested alternative)	Replacement Category	Conversion Notes
193-ED1AB	100-C09...100-C23	0.1 - 0.5A	193-1EEAB	Direct	Direct contactor mounting available with E100
193-ED1BB	100-C09...100-C23	0.2 - 1.0A	193-1EEBB	Direct	Direct contactor mounting available with E100
193-ED1CB	100-C09...100-C23	1 - 5A	193-1EECB	Direct	Direct contactor mounting available with E100
193-ED1CP	Integrated panel/DIN Rail mount and pass-thru wiring	1 - 5A	193-1EECP	Direct	
193-ED1DB	100-C09...100-C23	3.2 - 16A	193-1EEDB	Direct	Direct contactor mounting available with E100
193-ED1DP	Integrated panel/DIN Rail mount and pass-thru wiring	3.2 - 16A	193-1EEDP	Direct	
193-ED1EB	100-C09...100-C23	5.4 - 27A	193-1EEEB	Direct	Direct contactor mounting available with E100
193-ED1ED	100-C30...100-C43	5.4 - 27A	193-1EEED	Direct	Direct contactor mounting available with E100
193-ED1EP	Integrated panel/DIN Rail mount and pass-thru wiring	5.4 - 27A	193-1EEEP	Direct	
193-ED1FD	100-C30...100-C43	9 - 45A	193-1EEFD	Direct	Direct contactor mounting available with E100
193-EEAB	100-C09...100-C23	0.1 - 0.5A	193-1EFAB	Direct	Direct contactor mounting available with E100
193-EEBB	100-C09...100-C23	0.2 - 1.0A	193-1EFBB	Direct	Direct contactor mounting available with E100
193-EECB	100-C09...100-C23	1 - 5A	193-1EFCB	Direct	Direct contactor mounting available with E100
193-EECD	100-C30...100-C55	1 - 5A	193-1EFCP	Engineered	No direct contactor mounting is available in E100 line
193-EECP	Integrated panel/DIN Rail mount and pass-thru wiring	1 - 5A	193-1EFCP	Direct	
193-EEDB	100-C09...100-C23	3.2 - 16A	193-1EFDB	Direct	Direct contactor mounting available with E100
193-EEDD	100-C30...100-C55	3.2 - 16A	193-1EFDP	Engineered	No direct contactor mounting is available in E100 line
193-EEDP	Integrated panel/DIN Rail mount and pass-thru wiring	3.2 - 16A	193-1EFDP	Direct	
193-EEEB	100-C09...100-C23	5.4 - 27A	193-1EFEB	Direct	Direct contactor mounting available with E100
193-EEED	100-C30...100-C55	5.4 - 27A	193-1EFED	Direct	Direct contactor mounting available with E100
193-EEEE	100-C60...100-C97	5.4 - 27A	193-1EFEP	Engineered	No direct contactor mounting is available in E100 line
193-EEEP	Integrated panel/DIN Rail mount and pass-thru wiring	5.4 - 27A	193-1EFEP	Direct	
193-EEFD	100-C30...100-C55	9 - 45A	193-1EFFD	Direct	Direct contactor mounting available with E100
193-EEFE	100-C60...100-C97	9 - 45A	193-1EFFP	Engineered	No direct contactor mounting is available in E100 line
193-EEGE	100-C60...100-C97	18 - 90A	193-1EFGE	Direct	Direct contactor mounting available with E100
193-EEGF	100-D115...100-D180	18 - 90A	193-1EFGP	Engineered	No direct contactor mounting is available in E100 line
193-EEHF	100-D115...100-D180	30 - 150A	193-1EFHZ	Engineered	No direct contactor mounting is available in E100 line
193-EEHJ	100-E116...100-E205	30 - 150A	193-1EFHZ	Engineered	No direct contactor mounting is available in E100 line
193-EEHZ	For use with External CTs	30 - 150A	193-1EFHZ	Direct	
193-EEJF	100-D115...100-D180	40 - 200A	193-1EFJZ	Engineered	No direct contactor mounting is available in E100 line
193-EEJG	100-D210...100-D420	40 - 200A	193-1EFJZ	Engineered	No direct contactor mounting is available in E100 line
193-EEJJ	100-E116...100-E205	40 - 200A	193-1EFJZ	Engineered	No direct contactor mounting is available in E100 line
193-EEJZ	For use with External CTs	40 - 200A	193-1EFJZ	Direct	
193-EEKG	100-D210...100-D420	60 - 300A	193-1EFKZ	Engineered	No direct contactor mounting is available in E100 line
193-EEKZ	For use with External CTs	60 - 300A	193-1EFKZ	Direct	
193-EELG	100-D210...100-D420	100 - 500A	193-1EFLZ	Engineered	No direct contactor mounting is available in E100 line
193-EELZ	For use with External CTs	100 - 500A	193-1EFLZ	Direct	
193-EEMH	100-D630...100-D860	120 - 600A	193-1EFMZ	Engineered	No direct contactor mounting is available in E100 line
193-EEMZ	For use with External CTs	120 - 600A	193-1EFMZ	Direct	
193-EENH	100-D630...100-D860	160 - 800A	193-1EFNZ	Engineered	No direct contactor mounting is available in E100 line
193-EENZ	For use with External CTs	160 - 800A	193-1EFNZ	Direct	
193-EEQD	100-C30...100-C55	11 - 55A	193-1EFFD	Direct	Direct contactor mounting available with E100

Component Cross-reference Table continued

Discontinued Part Number	E1 Plus Contactor Mounting/Description	E1 Plus FLA Range	Recommended E100 Replacement Part (or suggested alternative)	Replacement Category	Conversion Notes
193-EEVE	100-C60...100-C97	60 - 120A	193-1EFGE or 193-1EFHZ	Engineered	
193-EEVF	100-D115...100-D180	55 - 110A	193-1EFGE or 193-1EFHZ	Engineered	
193-EEWZ	For use with External CTs	80 - 400A	193-1EFWZ	Direct	
193S-EEPB	Single-Phase; 100-C09...100-C23	1 - 5A	193-1EFCB	Direct	Direct contactor mounting available with E100
193S-EERB	Single-Phase; 100-C09...100-C23	3.2 - 16A	193-1EFDB	Direct	Direct contactor mounting available with E100
193S-EESB	Single-Phase; 100-C09...100-C23	5.4 - 27A	193-1EFEB	Direct	Direct contactor mounting available with E100
193S-EETD	Single-Phase; 100-C30...100-C43	9 - 45A	193-1EFFD	Direct	Direct contactor mounting available with E100
193S-EEUE	Single-Phase; 100-C60...100-C85	18 - 90A	193-1EFGE	Direct	Direct contactor mounting available with E100
193S-EEPP	Single-Phase; Integrated panel/DIN Rail mount and pass-thru wiring	1 - 5A	193-1EFCP	Direct	
193S-EERP	Single-Phase; Integrated panel/DIN Rail mount and pass-thru wiring	3.2 - 16A	193-1EFDP	Direct	
193S-EESP	Single-Phase; Integrated panel/DIN Rail mount and pass-thru wiring	5.4 - 27A	193-1EFEP	Direct	
193-BC8	193-ED, 193-EE, 592-EE Current Adjustment Shield	Accessory	193-1BC8 (exclusive to E100)	Direct	
193-EGF	E1 Plus Ground Fault Protection Module	Accessory	193-1EGJ (exclusive to E100)	Direct	
193-EGJ	E1 Plus Ground Fault and Jam Module	Accessory	193-1EGJ (exclusive to E100)	Direct	
193-EJM	E1 Plus Jam Protection Module	Accessory	193-1EGJ (exclusive to E100)	Direct	
193-EMC	E1 Plus Adjustment Cover	Accessory	193-1EMC (exclusive to E100)	Direct	
193-EMRA	E1 Plus 240V AC Remote Reset Solenoid	Accessory	193-1EMRA (exclusive to E100)	Direct	
193-EMRD	E1 Plus 120V AC Remote Reset Solenoid	Accessory	193-1EMRD (exclusive to E100)	Direct	
193-EMRJ	E1 Plus 24V AC Remote Reset Solenoid	Accessory	193-1EMRD (exclusive to E100)	Engineered	
193-EMRZ01	E1 Plus 115V DC Remote Reset Solenoid	Accessory	193-1EMRZ (exclusive to E100)	Engineered	
193-EMRZ24	E1 Plus 24V DC Remote Reset Solenoid	Accessory	193-1EMRZ (exclusive to E100)	Direct	
193-EMRZ48	E1 Plus 48V DC Remote Reset Solenoid	Accessory	193-1EMRZ (exclusive to E100)	Engineered	
193-EPB	E1 Plus Panel Mount Adapter Frame B	Accessory	193-1EPB (exclusive to E100)	Direct	
193-EPD	E1 Plus Panel Mount Adapter Frame D	Accessory	193-1EPD (exclusive to E100)	Direct	
193-EPE	E1 Plus Panel Mount Adapter Frame E	Accessory	193-1EPE (exclusive to E100)	Direct	
193-ETN	E1 Plus EtherNet/IP Communication Module	Accessory	193-ECM-ETR (also requires sensing & ctrl modules)	Engineered	
193-EDN	E1 Plus DeviceNet Communication Module	Accessory	193-ECM-DNT (also requires sensing & ctrl modules)	Engineered	
193-EPRB	E1 Plus PROFIBUS Communication Module	Accessory	No Direct Replacement	N/A	
193-EPT	E1 Plus PTC Module	Accessory	193-EIOGP-xx-xxx (also requires sensing & comm. modules)	Engineered	
193-ERA	E1 Plus External Reset Adapter	Accessory	193-1ERA (exclusive to E100)	Direct	
193-ERID	E1 Plus Electronic Remote Indication Display (ERID)	Accessory	193-ERID (or new 193-1ERIDN)	Direct	
193-ERR	E1 Plus Remote Reset Module	Accessory	193-1ERR (exclusive to E100)	Direct	
592-EEAT	500 Size 00	0.1 - 0.5A	592-1EFAT	Direct	
592-EEBC	500 Size 0...2	0.2 - 1.0A	592-1EFBC	Direct	
592-EEBT	500 Size 00	0.2 - 1.0A	592-1EFBT	Direct	
592-EECC	500 Size 0...2	1 - 5A	592-1EFCC	Direct	
592-EECT	500 Size 00	1 - 5A	592-1EFCT	Direct	
592-EEDC	500 Size 0...2	3.2 - 16A	592-1EFDC	Direct	

Component Cross-reference Table continued

Discontinued Part Number	E1 Plus Contactor Mounting/Description	E1 Plus FLA Range	Recommended E100 Replacement Part (or suggested alternative)	Replacement Category	Conversion Notes
592-EEDT	500 Size 00	3.2 - 16A	592-1EFDT	Direct	
592-EEEC	500 Size 0...2	5.4 - 27A	592-1EFEC	Direct	
592-EEFC	500 Size 0...2	9 - 45A	592-1EFFC	Direct	
592-EEFD	500 Size 3	9 - 45A	193-1EFFP	Engineered	
592-EEGD	500 Size 3	18 - 90A	592-1EFGD	Direct	
592-EEHE	500 Size 4	30 - 150A	193-1EFHZ	Engineered	
592-EEKF	500 Size 5	60 - 300A	193-1EFKZ	Engineered	
592-EEMG	500 Size 6	120 - 600A	193-1EFMZ	Engineered	
592S-EEPT	Single-Phase; 500 Size 00	1 - 5A	592-1EFCT	Direct	
592S-EERT	Single-Phase; 500 Size 00	3.2 - 16A	592-1EFDT	Direct	
592S-EEST	Single-Phase; 500 Size 00	5.4 - 27A	193-1EFEP	Engineered	
592S-EEPC	Single-Phase; 500 Size 0...2	1 - 5A	592-1EFCC	Direct	
592S-EERC	Single-Phase; 500 Size 0...2	3.2 - 16A	592-1EFDC	Direct	
592S-EESC	Single-Phase; 500 Size 0...2	5.4 - 27A	592-1EFEC	Direct	
592S-EETC	Single-Phase; 500 Size 0...2	9 - 45A	592-1EFFC	Direct	
592S-EEUD	Single-Phase; 500 Size 3	18 - 90A	592-1EFGD	Direct	

Helpful Links and Other Resources

E100 Tech Data

E100 User Manual

E100 Product Profile

E100 Electronic Overload Relay FAQs (Knowledge Base Article 1092397)

Motor Protection Solutions Brochure

UL Listing Considerations when Modifying an MCC (Knowledge Base Article 64042)

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Publication MIGRAT-PP046A-EN-P- March 2020