

E1 Plus Overload Relay Specifications

Bulletin Numbers 193, 592

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Summary of Changes

This publication contains new and updated information as indicated in the following table.

Topic	Pages
Corrected Cat. Nos. for 100-E-compatible 3-phase devices	6



Product Overview

		
Bulletin	193-ED	193/592-EE
Type	E1 Plus™ Electronic Overload Relay	E1 Plus Electronic Overload Relay
Rated Current (Range)	0.1...45 A	0.1...800 A
NEMA Operating Voltage, Nominal	—	600V
IEC Operating Voltage, Nominal	690V	690/1000V
Overload Type	Electronic Overload	Electronic Overload
Trip Class (Fixed)	10	—
Trip Class (Adjustable)	—	10, 15, 20, 30
Ambient Temperature Compensated		
Reset Type	Manual Only	Automatic and Manual
Adjustment Range	5:1	5:1
Phase Loss	3 s	3 s
Ground (Earth) Fault	—	Optional
Overcurrent (Jam) Detection	—	Optional
Stall Detection	—	—
Underload Detection	—	—
Current Imbalance	—	—
PTC Thermistor Monitoring	—	Optional
Warning Settings	—	—
N.C. Trip Contact		
N.O. Alarm Contact		
No. of Outputs	—	—
No. of Inputs	—	—
ODVA (DeviceNet) Conformance	—	Optional
Variable Frequency Drive (VFD) Compatible	—	—

Standards Compliance and Certifications

Standards Compliance
EN 60947-4-1
EN 60947-5-1
CSA 22.2, No. 14
UL 508

Certifications
c-UL-us Listed
CE Marked
RCM
C-Tick

Features

Accurate, Reliable Performance

Current measurement-based protection

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

Electronic design

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

Thermal memory

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

Enhanced phase loss protection

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

Easy to Select and Apply

Straightforward installation

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

Wide adjustment range

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

Rugged Construction

Over-molded power connections

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

Current transformers

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

Latching relay

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

Application Flexibility

Isolated Contacts

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

DIP Switch settings

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

Pass-thru Option

The E1 Plus Pass-thru consumes 48% less panel space than a standard E1 Plus mounted in a panel mount adapter. The design provides an integrated DIN Rail mount and panel mounting holes and is intended for the following applications: DIN Rail and Panel Mount Applications, Bulletin 100-K mini contactor, external current transformers, and for use with non Allen-Bradley contactors. The E1 Plus Pass-thru Electronic Overload Relay provides the same expandable protection and communication capabilities as a standard E1 Plus, but does not require a separate panel mount adapter, which saves money and valuable panel space.

Side-mount Expansion Modules

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

E1 Plus DeviceNet® Communication Module

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

E1 Plus remote reset module

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

E1 Plus jam protection module with remote reset

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

E1 Plus ground fault module with remote reset

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

E1 Plus ground fault/jam module with remote reset

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

E1 Plus PTC module with remote reset

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

E1 Plus EtherNet/IP™ module

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

E1 Plus PROFIBUS™ module

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

Catalog Number Explanation

Examples that are given in this section are not intended to be used for product selection. Not all combinations produce a valid catalog number.

$\frac{193}{a} - \frac{EE}{b} \frac{C}{c} \frac{B}{d}$

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

b	
Type	
Code	Description
ED1 ⁽¹⁾	Fixed Trip Class 10
EE	Selectable Trip Class

c			
Adjustment Range			
Three-phase		Single-phase	
Code	Description	Code	Description
A	0.1...0.5	P	1.0...5.0
B	0.2...1.0	R	3.2...16
C	1.0...5.0	S	5.4...27
D	3.2...16	T	9...45
E	5.4...27	U	18...90
F	9...45	V	60...120
G	18...90	—	—
H	30...150	—	—
J	40...200	—	—
K	60...300	—	—
L	100...500	—	—
M	120...600	—	—
N	160...800	—	—
M	120...600		
N	160...800		
W	80...400		
Q	11...55		

d	
Bulletin 100 IEC Contactor Size	
Code	Description
B	C09...C23
D	C30...C43
E	C60...C97
F	D115...D180
G	D210...D420
H	D630...D860
J	E116...E205
Bulletin 500 NEMA Contactor Size	
Code	Description
T	Size 00
C	Size 0...2
D	Size 3
E	Size 4
F	Size 5
G	Size 6
Panel/DIN rail mount	
Code	Description
P	Integrated panel mount and pass-through wiring
Z	Panel mount with external current transformers

(1) Bulletin 193 overload relays only.

Product Selection

Bulletin 193-ED – Three-phase Devices

- Fixed Trip Class 10
- Manual Reset
- Screw-type Control Terminals

Mounts to Contactor	Adjustment Range [A]	Cat. No.
100-C09...100-C23	0.1...0.5	193-ED1AB
	0.2...1.0	193-ED1BB
	1.0...5.0	193-ED1CB
	3.2...16	193-ED1DB
	5.4...27	193-ED1EB
Integrated panel/DIN Rail mount and pass-thru wiring	1.0...5.0	193-ED1CP
	3.2...16	193-ED1DP
	5.4...27	193-ED1EP

Bulletin 193S-EE – Single-phase Devices

- Selectable Trip Class (10, 15, 20, 30)
- Selectable Manual/Auto-Manual Reset
- Screw-type Control Terminals

Mounts to Contactor	Adjustment Range [A]	Cat. No.
100-C09...100-C23	1.0...5.0	193S-EEPB
	3.2...16	193S-EERB
	5.4...27.0	193S-EESB
100-C30...100-C43	9...45	193S-EETD
100-C60...100-C85	18...90	193S-EEUE
Integrated panel/DIN Rail mount and pass-thru wiring	1.0...5.0	193-EEPP
	3.2...16	193-EERP
	5.4...27	193-EESP

Bulletin 193-EE – Three-phase Devices

- Selectable Trip Class (10, 15, 20, 30)
- Selectable Manual/Auto-Manual Reset
- Screw-type Control Terminals

Mounts to Contactor	Adjustment Range [A]	Cat. No.
100-C09...100-C23	0.1...0.5	193-EEAB
	0.2...1.0	193-EEBB
	1.0...5.0	193-EECB
	3.2...16	193-EEDB
	5.4...27	193-EEEB
100-C30...100-C55	1.0...5.0	193-EECD
	3.2...16	193-EEDD
	5.4...27	193-EEED
	9...45	193-EEFD
100-C60...100-C97	11...55	193-EEQD
	5.4...27	193-EEEE
	18...90	193-EEGE
100-E116...E146	30...150	193-EEHJ ⁽¹⁾
100-E190...E205	40...200	193-EEJ ⁽¹⁾
100-D115...100-D180	30...150	193-EEHF ⁽¹⁾
	40...200	193-EEJF ⁽¹⁾
100-D210...100-D420	40...200	193-EEJG ⁽¹⁾
	60...300	193-EEKG ⁽¹⁾
	100...500	193-EELG ⁽¹⁾
100-D630...100-D860	120...600	193-EEMH ⁽¹⁾
	160...800	193-EENH ⁽¹⁾
Integrated panel/DIN Rail mount and pass-thru wiring	1.0...5.0	193-EECP
	3.2...16	193-EEDP
	5.4...27	193-EEEP

(1) Does not include terminal lugs. See [page 7](#).

Bulletin 193 Panel Mount Devices for use with External Current Transformers

- Selectable Trip Class (10, 15, 20, 30)
- Selectable Manual/Auto Manual Reset

CT Ratio ⁽¹⁾	Adjustment Range [A]	Cat. No. ⁽²⁾
150:5	30...150	193-EEHZ
200:5	40...200	193-EEJZ
300:5	60...300	193-EEKZ
400:5	80...400	193-EEWZ
500:5	100...500	193-EELZ
600:5	120...600	193-EEMZ
800:5	160...800	193-EENZ

(1) Current Transformers are supplied by customer, refer to [page 8](#) for proper current transformer selection.

(2) Order panel adapter, Cat. No. 193-EPB separately.