

# Motor Protection Solutions



Protecting Your Investments



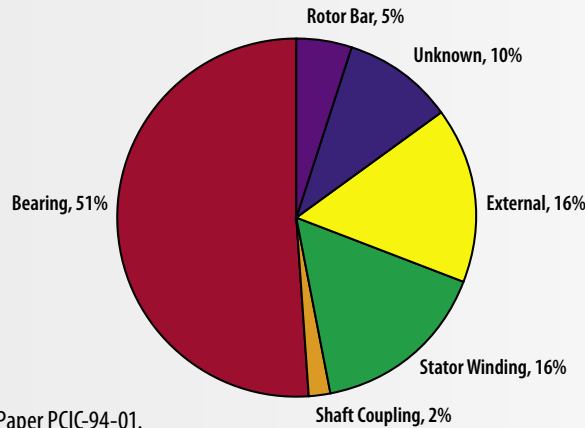
# Motor Protection Solutions

The Allen-Bradley® line of motor protection devices encompasses a range of simple, single purpose protection to the newer overload technologies featuring diagnostics and Logix integration.

## Importance of Motor Protection

Electric motors are the backbone of today's modern industry providing the mechanical energy needed for most manufacturing processes. Push too hard, too often, and there is the potential for unforeseen downtime while the affected motor shuts down and awaits reset.

## Causes of Motor Failures



*75% of motor failures can be prevented by appropriate protection measures*

Source . . . IEEE Petro-Chemical Paper PCIC-94-01.



## MachineAlert™ Monitoring Relays

### Key Features:

- Programmable latching or inhibit at set level
- Adjustable time delay settings
- Three-phase devices are powered by the measuring circuit
- Adjustable measurement set points



## Bimetallic Overload Relays

### Key Features:

- Ambient temperature compensation for consistency
- Rated for DC and variable frequency drives applications up to 400 Hz
- Optional remote reset solenoid and external reset accessories



## E100™ Electronic Overload Relay

### Key Features:

- Current measurement-based protection
- Self powered
- Optional jam and ground fault protection
- Optional remote reset



## E300™ and E200™ Electronic Overload Relays

### Key Features:

- Provide critical motor protection functions
- Communication and diagnostics provide detailed logs and control from relay to motor
- Can simplify control architecture



## 857 Motor/Feeder Protection Relay

### Key Features:

- Suitable for any system voltage to 450,000V
- Configurable interlocking schemes offering basic logic functions
- All settings, events, and indications are in a non-volatile memory

## Feature Comparison

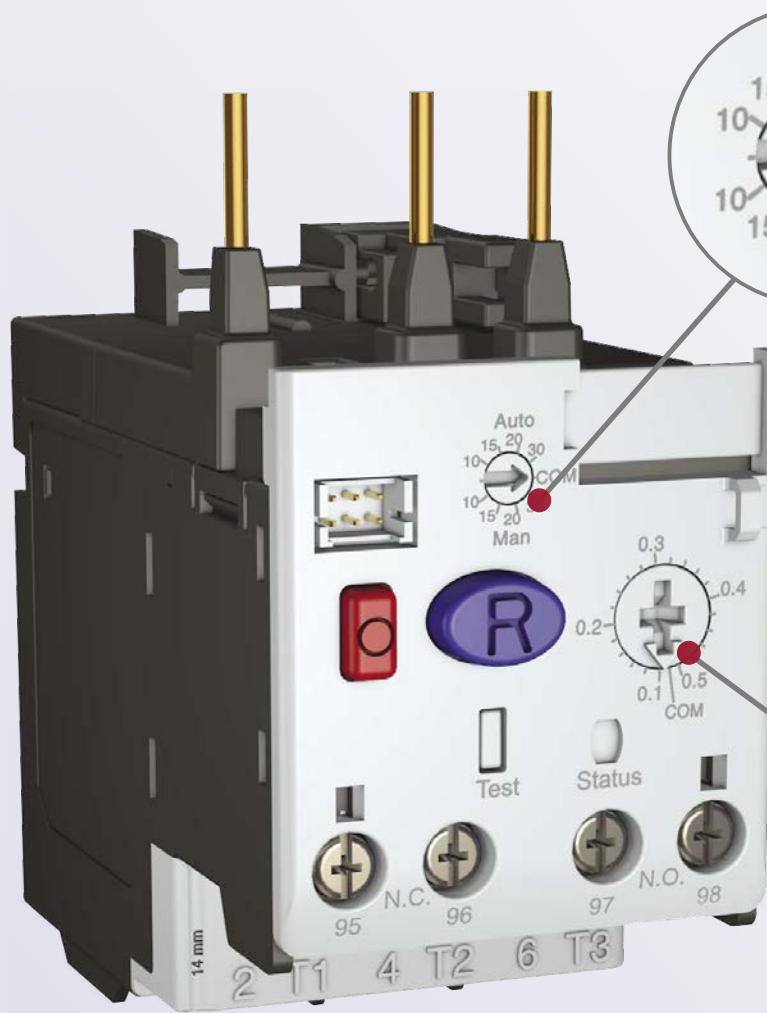
	MachineAlert	Bimetallic	E100	E200	E300	857
<b>Protection Features</b>						
Overload		✓	✓	✓	✓	✓
Phase loss	✓		✓	✓	✓	✓
Ground fault			✓	✓	✓	✓
Current imbalance		✓		✓	✓	✓
Jam	✓		✓	✓	✓	✓
Over/under voltage	✓			✓	✓	✓
Voltage imbalance	✓			✓	✓	✓
Over/under power	✓			✓	✓	✓
<b>Diagnostics Features</b>						
% Full load amperes			✓	✓	✓	✓
% Thermal capacity utilization			✓	✓	✓	✓
Voltage				✓	✓	✓
Power				✓	✓	✓
Energy				✓	✓	✓
<b>Integration Features</b>						
DeviceLogix™				✓	✓	
Logix controller					✓	✓

# E100 Electronic Overload Relay

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 an aggressive component certification strategy.

## Optional Accessories

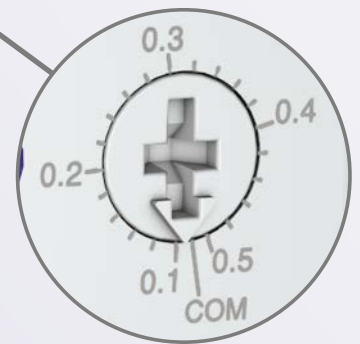
- Ground fault/jam
- Remote reset and/or indication
- Anti-tamper shields
- DIN rail/panel mounting
- External CT configurations



E100-EF shown

## Selectable Trip Class & Reset Mode

- 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 Current Range

- Wide FLA range

## Customizable

The E100 is divided into two offerings, a basic and advanced version, allowing you to customize the device to your application's specific needs.



Reset Adapter



Ground Fault and Jam Protection Accessory



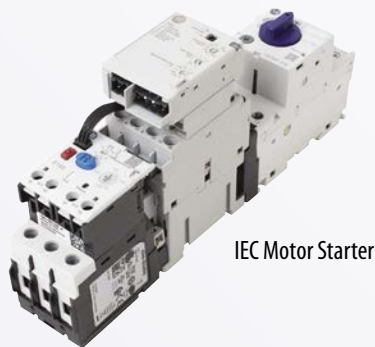
Electronic Remote Reset Accessory

## Model Specifications

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

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

## Mounting Options



## Features



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

### Accurate, Reliable Performance

- Current measurement-based protection
- Electronic design
- Thermal memory
- Enhanced phase loss protection

### Easy to Select and Apply

- Straightforward installation
- Wide adjustment range

### Rugged Construction

- Over-molded power connections
- Current transformers
- Latching relay

### Application Flexibility

- Isolated contacts
- DIP switch settings

### Pass-thru Option

## E100 Supported Remote Reset Methods



Electro-Mechanical Solenoid (240V AC, 120V AC, 24V DC)



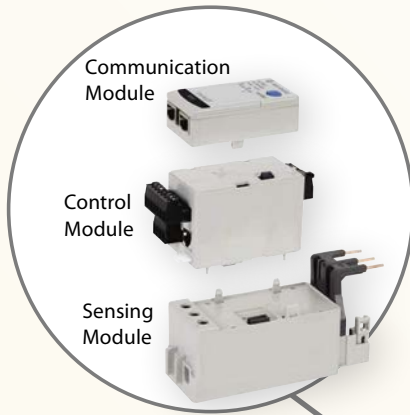
Electrical Reset & Indication Display (ERID) Module (requires ERR or EGJ)



Electrical Indication Display without Reset Module (requires ERR or EGJ)

# E300/E200 Electronic Overload Relay

The E300/E200 Electronic Overload Relays provide a flexible design and advanced intelligence. Real-time diagnostics are transformed into actionable information – maximizing your up-time and protecting your assets.



## Modular Design

The modular design of the E300/E200 overload relays allow customers to tailor the device for their application's exact needs.

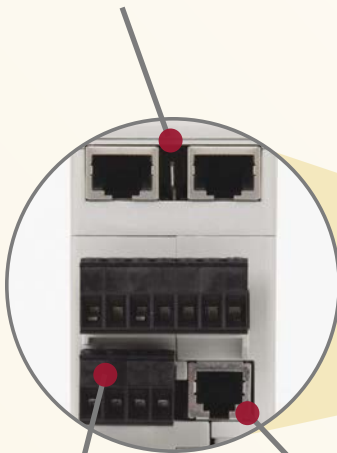
## On-Device Settings

- Network address configuration
- Restore factory default settings
- Enable security settings



## Dual Port EtherNet/IP

- Supports device level ring



## Removable Terminal Blocks

## Expansion Port

- Expansion I/O
- Operator station



## Customizable

Multiple accessory options allow for the E300/E200 overload relay to be customized to fit your application needs. Customers can expand out to 4 of the available Digital I/O modules, plus 4 Analog I/O modules along with a power supply and operator interface.



## Expansion Digital I/O

- 4 inputs/ 2 outputs
- 24V DC
- 120V AC
- 240V AC

# Module Specifications

Communication Module					
193-ECM	<b>Features</b> <ul style="list-style-type: none"> <li>• EtherNet/IP</li> <li>• DeviceNet</li> <li>• E200/Parameter Configuration Module (PCM)</li> </ul> <i>Includes Single USB Type B interface port</i>				
Control Module					
193-EIO	Control Voltage	I/O		I/O and Protection	
		Inputs	Relay Outputs	Inputs	Relay Outputs
	110...120V AC 50/60 Hz	4	3	2	2
		2	2	-	-
	220...240V AC 50/60 Hz	4	3	2	2
		2	2	-	-
24V DC	6	3	4	2	
	2	2	-	-	
Sensing Module					
592/193-ESM	<b>Sensing Options:</b> <ul style="list-style-type: none"> <li>• Voltage/Current/Ground Fault</li> <li>• Current/Ground Fault</li> <li>• Current</li> </ul>		<b>Current Range:</b> <ul style="list-style-type: none"> <li>• 0.5...30 A</li> <li>• 6...60 A</li> <li>• 10...100 A</li> <li>• 20...200 A</li> </ul> <i>Current transformer solutions available for applications above 200 A</i>		

# Mounting Options



IEC Motor Starter



NEMA Motor Starter



DIN Rail Mount Motor Starter

# Diagnostics

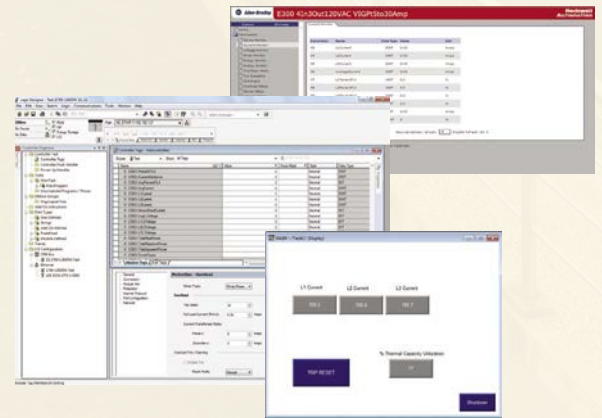


The E300/E200 overload relay provides real-time motor diagnostic information to proactively indicate when a motor is having a problem allowing you to efficiently troubleshoot. This information includes:

- Current
- Ground fault current
- Voltage
- Power
- Energy
- % thermal capacity utilization
- Time to trip
- Time to reset
- Trip history
- Trip snapshot

The communication options of the E300/E200 overload relay allow users to view this diagnostic information using the following methods:

- Logix add-on profile
- Embedded web browser
- FactoryTalk® View
- Pre-configured Operator Faceplate Objects
- Connected Component Workbench™ software (E200 only)



## Expansion Analog I/O

- 3 universal inputs/ 1 output
- 4 – 20 mA
- 0 – 10V
- RTD
- NTC



## Expansion Power Supply

- 120/240V AC
- 24V DC



22 mm push button cutout

## Expansion Operator Station

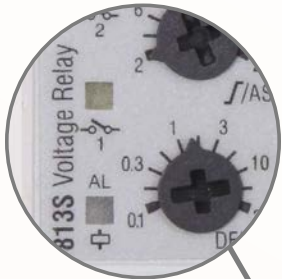
- Diagnostic station
- Control station

*Both support copycat feature*

# MachineAlert Monitoring Relays

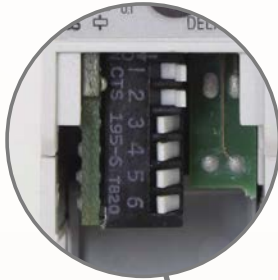
The MachineAlert family of dedicated function motor protection relays offers supplementary protective functions that are easily added to your motor control circuits.

*Provides supplemental protection in conjunction with Bimetallic and Electronic Overload Relays*



### Status LED

- Relay
- Alarm
- Power



### DIP Switch Configuration\*

- Protective functions
- Inhibit mode
- Start-up delay

\*Based on model



### Adjustable Fault Delay



**817S Thermistor Monitoring Relay**  
Protects Equipment from overtemperature conditions

**814S Power (kW) Monitoring Relay**  
Monitors for under and over active power as well as power direction

**809S Current Monitoring Relay**  
Provides under and overcurrent detection

**813S Voltage Monitoring Relay**  
Guards against the damaging effects of phase loss, under and overvoltage, phase imbalance, and voltage quality of incoming power line



## Ideal Applications

- Protects against single phasing during start-up and run-time in motor applications
- Detects incorrect phase sequence to keep the motor from starting
- Detects no-load conditions indicating absence of water in water lubricated pumps
- Protects motors from over temperature conditions



# Bimetallic Overload Relays

The bimetallic thermal overload relays compensate for ambient temperature while providing overload protection and phase-loss sensitivity. They are a cost-effective way to protect your electrical equipment investment.



## Visible Trip Indication



### 193-T Bimetallic

The 193-T bimetallic overload relays are designed for use with the 100-C contactors and 104-C reversing contactors.



## Reset Modes

- Selectable reset switch – manual or automatic
- Remote reset solenoid option



### 193-K Bimetallic

The 193-K bimetallic overload relays are designed for use with the 100-K miniature contactors and 104-K miniature reversing contactors.

*Offers basic motor protection at an economic price*



## Ideal Applications

Ideal for light industry and low critical process

- Conveyors
- Fans
- Pumps
- VFD-controlled motors
- DC motors

# 857 Motor/Feeder Protection Relay

The 857 medium/high-voltage motor and feeder protection relay contains the essential protection functions needed to protect feeders, and motors in distribution networks of utilities, heavy industries, power plants and offshore applications.

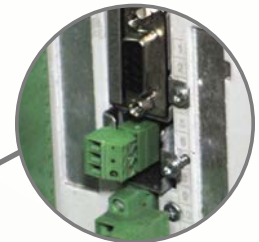


## Load Protection

- Two optional 12 channel RTD Scanners
- Fiber optic connection



## Configurable Front Display



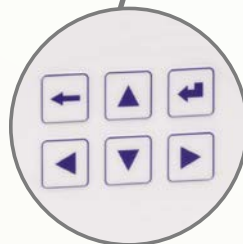
## Three Communications Ports

Multiple protocol support

- EtherNet/IP
- IEC 61850
- Modbus
- DNP3
- Profibus
- EC 101/103
- DeviceNet



*Protect your motor investment with increased system monitoring and functionality in a protection relay*



## Motor or Feeder Protection

- Configurable via a single parameter



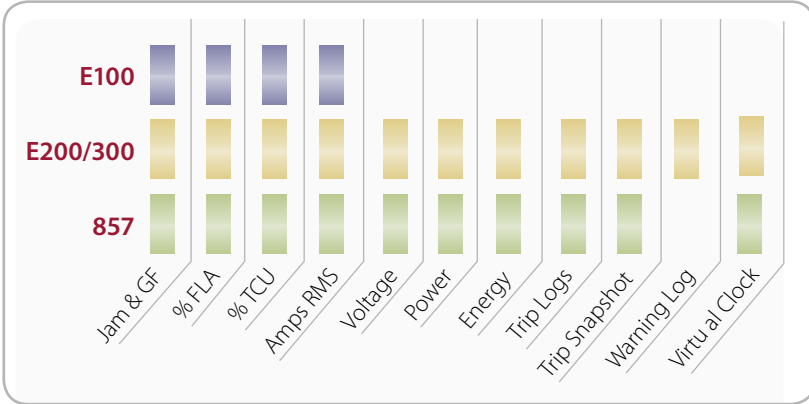
## Functions

This device also includes many programmable functions for various protection and communication situations:

- Ultra-fast arc protection (optional)
- Power quality assessment
- Trip circuit supervision
- Circuit breaker protection
- Complete protection and control

# Product Selection Attributes

## Diagnostics



## Usability



### Bimetallic

- Selectable reset mode
- Built-in test/reset button
- Manual trip



### E100

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



### E200

- Wide current range
- Advanced performance and diagnostics
- Modularity
- Multiple expansion options



### E300

- Wide current range
- Advanced performance and diagnostics
- Modularity
- Multiple expansion options
- Embedded communications

## Performance

- Protection
- Diagnostics
- Networks and Integration
- Embedded Logic and I/O
- Scalable



**Prevent motor failures,  
protect your investments**

### Local Distributor

Visit our website to find your local Distributor.  
[www.rockwellautomation.com/distributor](http://www.rockwellautomation.com/distributor)



### Online Product Directory

Our portfolio of motor protection devices are designed to protect your manufacturing investments.  
<https://ab.rockwellautomation.com/allenbradley/productdirectory.page>



### The Connected Enterprise

Learn more about how The Connected Enterprise transforms real-time data, from intelligent assets and multi-disciplined control from a plant, or a remote site into actionable information.  
<https://www.rockwellautomation.com/global/capabilities/connected-enterprise/overview.page>



### Product Selection Toolbox

Our powerful range of product selection and system configuration tools assist you in choosing and applying our products.  
<https://www.rockwellautomation.com/global/support/product-selection-configuration/overview.page>



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