Motor Protection Solutions

Allen-Bradley

Protecting Your Investments

LISTEN.
THINK.
SOLVE.®

Allen-Bradley • Rockwell Software

Rockwell Automation

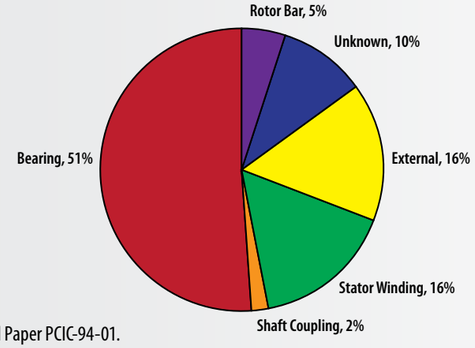
Motor Protection Solutions

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



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

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

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

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

E1 Plus™ Electronic Overload Relay

Key Features:
- Current measurement-based protection
- Low energy consumption
- Side-mount expansion modules provide adjustable levels of protection and communication

E300™ Electronic Overload Relay

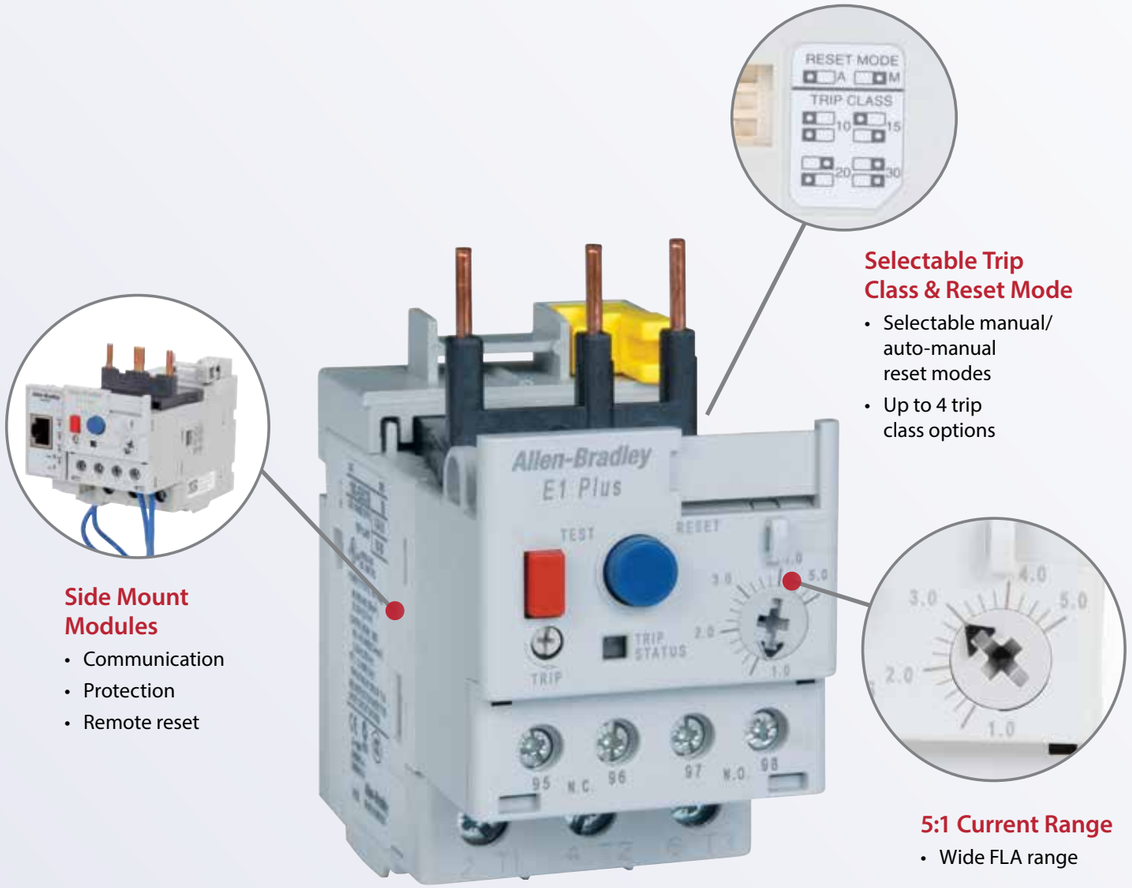
Key Features:
- Provides critical motor protection functions
- Communication and diagnostics provides detailed logs and control from relay to motor
- Can simplify control architecture

Feature Comparison

	MachineAlert	Bimetallic	E1 Plus, EE Model	E300	857
Protection Features					
Overload		✔	✔	✔	✔
Phase loss	✔		✔	✔	✔
Ground fault			✔	✔	✔
Current imbalance		✔		✔	✔
Jam	✔		✔	✔	✔
Over/under voltage	✔			✔	✔
Voltage imbalance	✔			✔	✔
Over/under power	✔			✔	✔
Diagnostics Features					
% Full load amperes			✔	✔	✔
% Thermal capacity utilization			✔	✔	✔
Voltage				✔	✔
Power				✔	✔
Energy				✔	✔
Integration Features					
DeviceLogix™				✔	
Logix controller			✔	✔	✔

E1 Plus™ Electronic Overload Relay

The solid-state design of the E1 Plus overload relay, offered in two models, provides ambient temperature compensation, thermal and phase loss protection and a wide 5:1 adjustment range. The ED model provides fixed protection while the EE model provides selectable and expandable protection.



193-EE Shown

Selectable Trip Class & Reset Mode

- Selectable manual/ auto-manual reset modes
- Up to 4 trip class options

Side Mount Modules

- Communication
- Protection
- Remote reset

5:1 Current Range

- Wide FLA range

Model Specifications

Bulletin 193, ED Model	
Current Range	0.1…45 A
Trip Class	10 Fixed
Reset Mode	Manual Only
Side Mount Modules	—

Bulletin 193/592, EE Model	
Current Range	0.1…800 A
Trip Class	10, 15, 20, 30 Adjustable
Reset Mode	Automatic and Manual
Side Mount Modules	Communication, Protection, Reset

Mounting Options

IEC Motor Starter

NEMA Motor Starter

DIN Rail Mount with Pass-thru

Diagnostics

The E1 Plus communication side-mount modules provide a cost-effective transformation of real-time data into your control architecture.

- DeviceNet
- EtherNet/IP
- PROFIBUS

Advantages

- Includes integrated I/O
  - Provides convenient local termination of motor-related inputs (2) and outputs (1), simplifying the control architecture
- Provides operational and diagnostic data
  - Average motor current
  - Percentage of thermal capacity usage
  - Device status
  - Trip and warning identification
  - Trip history (5 previous trips)
- Expands protective functions
  - Overload warning
  - Jam protection
  - Underload warning

Customizable

The optional side mount modules* for the E1 Plus overload relays allow you to customize the device to your application's specific needs.

* Side mount modules only available for EE model

Communication Modules

- EtherNet/IP
- DeviceNet
- ProfiBus

Protection Modules

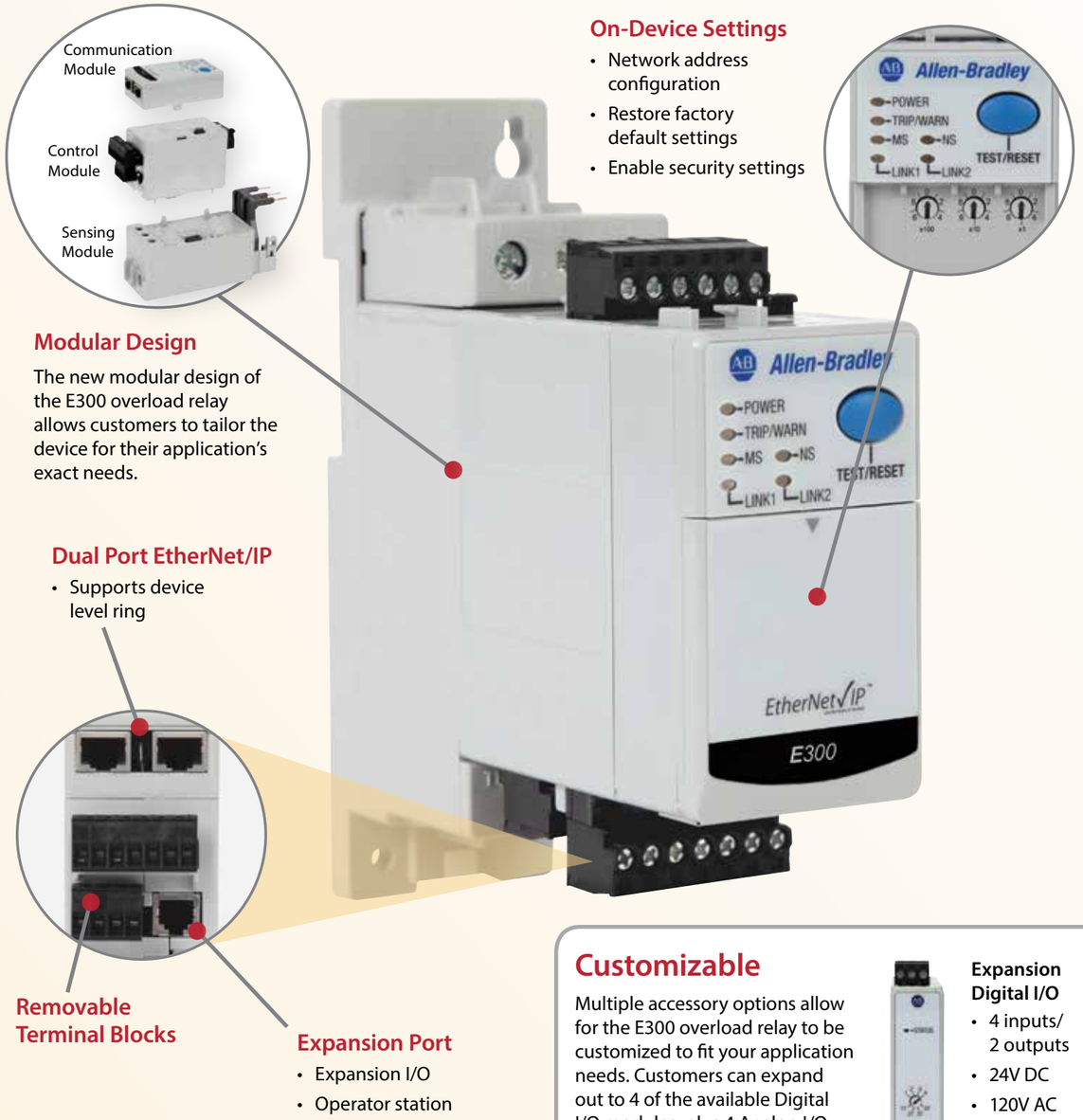
- Ground fault
- Jam protection
- Ground fault/ jam protection
- PTC module

Reset Modules

- Remote reset
- Remote indicator

E300™ Electronic Overload Relay

The E300 Electronic Overload Relay provides 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 new modular design of the E300 overload relay allows 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

Module Specifications

Communication Module					
193-ECM*	Features • EtherNet/IP • DeviceNet				
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	4	2	2
	220…240V AC 50/60 Hz	4	3	2	2
	24V DC	6	3	4	2
Sensing Module					
592/193-ESM*	Sensing Options: • Voltage/Current/Ground Fault • Current/Ground Fault • Current	Current Range: • 0.5…30 A • 6…60 A • 10…100 A • 20…200 A			

Mounting Options

IEC Motor Starter

NEMA Motor Starter

DIN Rail Mount Motor Starter

Diagnostics

The E300 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 overload relay allow users to view this diagnostic information using the following methods:

- Logix add-on profile
- Web browser
- FactoryTalk® View
- Faceplates

Customizable

Multiple accessory options allow for the E300 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

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

Expansion Power Supply
- 120/240V AC
- 24V DC

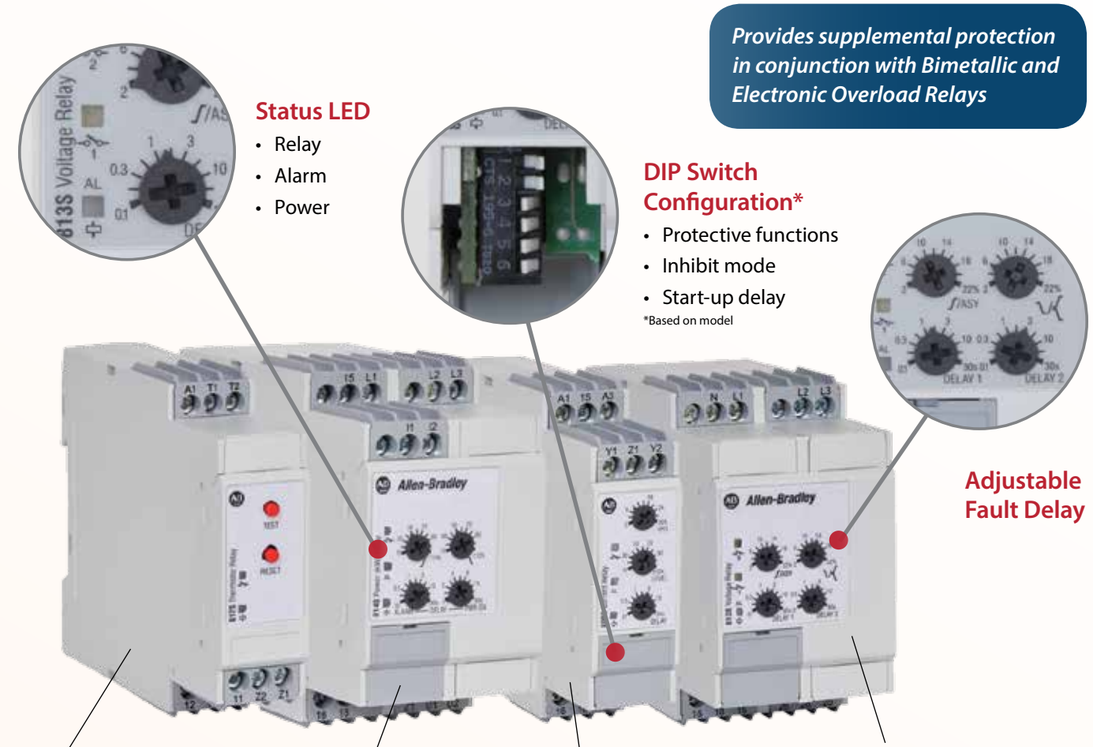
22 mm push button cutout

Expansion Operator Station
- Diagnostic station
- Control station

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 cost-effective ways to protect your electrical equipment investment.

Visible Trip Indication

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

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

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

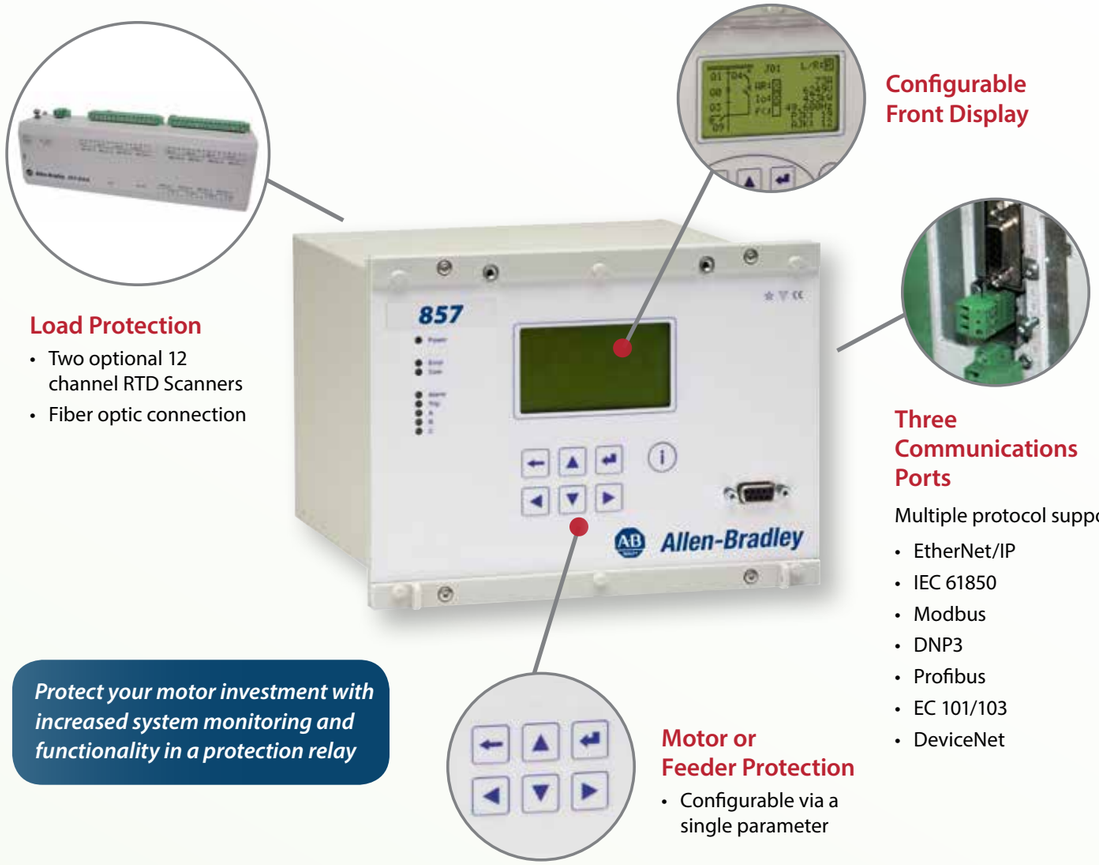
Offers basic motor protection at an economic price

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

Motor or Feeder Protection

- Configurable via a single parameter

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

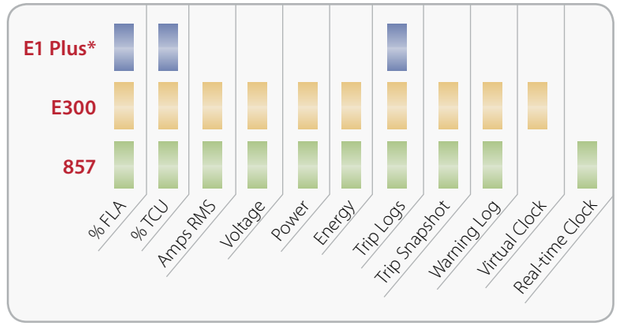
Functions

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

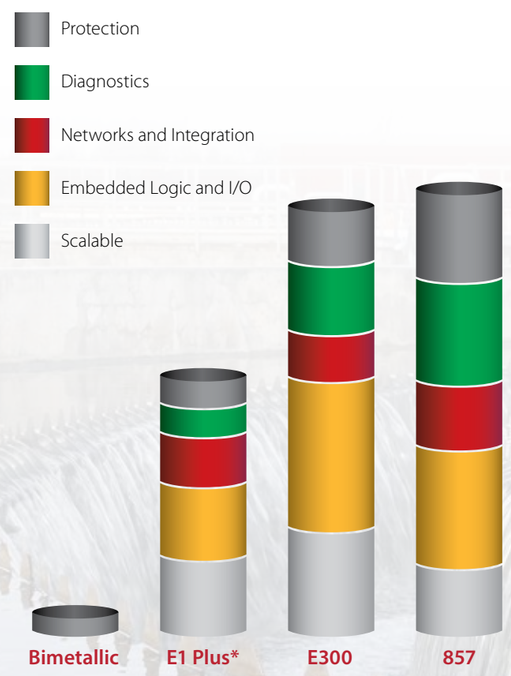
- Ultra-fast arc protection (optional)
- Power quality assessment
- Trip circuit supervision
- Circuit breaker protection
- Complete protection and control

Product Selection Attributes

Diagnostics



Performance



* E1 Plus, EE model used in comparison charts.

Usability

Bimetallic

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

E1 Plus*

- Multiple trip class options
- Selectable reset modes
- Wide current range
- Additional modules for communications and protection

E300

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

857

- Highly configurable
- Motor and feeder protection in one unit
- Multiple communication interfaces and protocols
- Extensive diagnostic capabilities
- Suitable for all system voltages to 450,000V

Prevent motor failures, protect your investments

Local Distributor

Visit our website to find your local Distributor.
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On-Line Product Directory

Our portfolio of motor protection devices are designed to protect your manufacturing investments.
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The Connected Enterprise

Learn more about the Connected Enterprise transforms real-time data, from intelligent assets and multi-disciplined control from a plant, or a remote site into actionable information.
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Product Selection Toolbox

Our powerful range of product selection and system configuration tools assist you in choosing and applying our products.
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