E300™ Electronic Overload Relay
Intelligent Motor Control
E300 Electronic Overload Relay

The E300™ Electronic Overload Relay is the latest technology for motor protection that will help reduce your motor control investment and keep your plant running

- Scalable Solutions
  - Modularity in the design provides the right solution for your specific needs

- Diagnostic Information
  - Motor diagnostics to reduce unplanned downtime

- Intelligent Motor Control
  - Native EtherNet/IP connectivity with easy commissioning, control, and monitoring.
The modular design allows users to have choices in each of the sensing, control, and communications modules with additional accessories to tailor the E300 overload relay or exact needs of the application:

- Multiple Sensing Capabilities *(Current, Ground Fault Current, and Voltage and Power)*
- Simplified Control Wiring *(120V AC, 240V AC, and 24V DC)*
- Wide Current Range *(10:1 and Higher)*
- Expansion I/O *(Digital and Analog I/O)*
- Operator Interfaces *(Multiple Languages)*
- Stocked Modules for Fast Replacement
E300 Sensing Modules

- Consists of 3 Styles
  - Voltage / Current / Ground Fault (VIG)
  - Current / Ground Fault Current (IG)
  - Current (I)

- Each has 4 Current Ranges
  - 0.5 – 30A
  - 6 – 60A
  - 10 – 100A
  - 20 – 200A
E300 Control Modules

- **I/O Only**
  - 4 Inputs 240V AC / 3 Outputs
  - 4 Inputs 120V AC / 3 Outputs
  - 6 Inputs 24V DC / 3 Outputs

- **I/O and Protection**
  - 2 Inputs 240V AC / 2 Outputs / PTC / GF
  - 2 Inputs 120V AC / 2 Outputs / PTC / GF
  - 4 Inputs 24V DC / 2 Outputs / PTC / GF
E300 Communication Modules

- Consists of 3 Styles
  - EtherNet/IP
  - DeviceNet
  - Parameter Configuration

Legend
- Available Now
- Future Release
E300 Expansion Modules

- **Digital I/O (4 In / 2 Out – Add up to 4)**
  - AC (120V)
  - AC (240V)
  - DC (24V)

- **Universal Analog I/O (3 In / 1 Out – Add up to 4)**
  - 0-10V DC
  - 0-20mA DC
  - RTD Sensors

- **Power Supply**
  - Supplemental power for the expansion bus

- **Operator Stations**
  - Control Station
  - Diagnostic Station (Multiple Languages)
Motor Diagnostics

- The E300 provides a wide variety of diagnostic information to monitor motor performance and proactively alert users to possible motor issues.
- This information can trigger either manual or automatic intervention before the occurrence of an unplanned shutdown.
  - Voltage, Current, and Energy
  - CIP Energy Enabled
  - Trip / Warning Histories
  - % Thermal Capacity Utilization
  - Motor Winding Temperature
  - Trip Snap Shot
  - Time to Trip
  - Time to Reset
  - Operational Hours
  - Number of Starts
Reduced Wiring and Installation Costs

E300 Overload Relay modules easily snap together and are secured with tabs.

Simplified wiring between E300 Overload Relay and 100-C Contactor

Operating Stations feature a 22 mm push button cutout
The E300 can be applied to three styles of motor starters

- Panel / DIN Rail
- 100-C IEC Contactors
- 300/500 NEMA Contactors
E300 vs. E3 Plus (Size)

<table>
<thead>
<tr>
<th></th>
<th>E300</th>
<th>E3 Plus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>148 mm</td>
<td>126 mm</td>
</tr>
<tr>
<td>Width</td>
<td>45 mm</td>
<td>115 mm</td>
</tr>
</tbody>
</table>
E300 vs. E3 Plus (DeviceLogix)

- **E3 Plus™ Supports DeviceLogix v1.0**
  - 5–10% E3 Plus users implement a program
  - Used mainly in the Process and Water/Waste Water industries
  - Common applications
    - Hands/Off/Auto control when network is disrupted
    - Controlled motor shutdown when network is disrupted

- **E300 Supports DeviceLogix v5.0**
  - The main control engine for E300 Operating Modes (embedded DeviceLogix programs)
  - Key control technology for motor control applications that are standalone (non-networked)
Intelligent Motor Control

The E300 is fully integrated into the Integrated Architecture®

- Network connectivity - *Native EtherNet/IP reduces hardware and engineering cost*
- Integrated into Logix – *Device profiles and faceplates reduce engineering time and project development*
- Automatic Device Configuration – *Reduces time to repair*

**Simultaneous real-time control, configuration, and data acquisition**
Easy Integration Into Logix

The E300 has an Add-on Profile for RSLogix 5000® and Studio 5000 Logix Designer® software.

- Creates meaningful tag names
- Configures the E300 (supports ADC)
- Tested to v16 of RSLogix 5000
Easy Integration Into Logix

The E300 has an Add-on Profile for RSLogix 5000® and Studio 5000 Logix Designer® software.

- Supports the selection of embedded DeviceLogix™ programs (Operating Modes)
- Simplifies programming and wiring of traditional Hands/Auto or Local/Remote control
Easy Integration Into Logix

The E300 has an Add-on Profile for RSLogix 5000® and Studio 5000 Logix Designer® software.

- Output duration timer for redundant control applications
- User selectable input tags
- Enable/disable Automatic Device Configuration
Easy Integration Into Logix

Operating Modes (embedded DeviceLogix programs) allow the Control Station or Diagnostic Station to be used as an operator interface for Hands / Auto (Local / Remote) motor control with no ladder logic.
Network Connectivity

- Two Ethernet ports that operate as an Ethernet switch
  - Star Topology
  - Linear Topology
  - Ring Topology (DLR)
- Embedded web server
- Supports SMTP messaging

E300 Overload Relay has detected a Trip

bsmith to: whmartin

Trip Type: OverloadTrip
Trip Info: Motor current overload condition
Device Name: E300 Overload Relay
Device Description: Chiller Pump 2
Device Location: 6-U29
Contact Info: Bob Smith x555
EtherNet/IP IntelliCENTER MCC
LVMCC Standard Linear / Star Topology

- Linear / Star topology
  - Easily expandable up to 10 switches before an additional uplink is required
  - Flexible and future proof
  - Easily configured
  - Maintainable & serviceable

- Network performance maintained without impacting Intelligent MCC benefits
  - Testing validated switch count, IMC device count, & Ethernet cable type

Refer to Publication MCC-RM001 for details
What does Network High Availability mean & why do our customers want it?

“High Availability refers to the ability of the system to carry out the user's intended task and to allow the user to access the system, whether to submit new work, update or alter existing work, or collect the results of previous work all the while the control system is doing its intended function which in our case is running the user application.”

High Availability is MORE than network redundancy or fault tolerance!
High Availability
What does a High Availability MCC look like?

- **MCC Serviceability**
  - Move, swap, replace IMC devices

- **Network and Device Configuration**
  - Expandable network
  - Easily configure devices and switches

- **Network Fault Tolerance**
  - Network communications remains throughout:
    - Device failure
    - Device powered down
    - Communication cable disconnect or failure break
EtherNet/IP IntelliCENTER MCC
High Availability – Standard Linear / Star Topology

✅ MCC Serviceability
- Move, swap, replace IMC devices

✅ Network and Device Configuration
- Expandable network
- Easily configured devices and switches

❌ Network Fault Tolerance
- Switch-to-switch Ethernet cable break could impact a large percentage of the MCC
**EtherNet/IP IntelliCENTER MCC**

High Availability – Device Level Ring Topology at the MCC Unit Level

- Device Level Ring (DLR) is typically implemented at the machine level
  - Provides single fault tolerance at the device

**MCC Serviceability**

- Removing or powering down multiple MCC devices can impact the entire MCC network

**Network and Device Configuration**

- Requires dual port Ethernet communications
- Device count limits – 50 nodes

**Network Fault Tolerance**

- Provides fault tolerance but significantly degrades MCC serviceability & network configuration

*Device Level Ring at the unit level does not provide a highly available MCC solution*
EtherNet/IP IntelliCENTER MCC

High Availability - Switch Level Ring Topology w/ Resilient Ethernet Protocol

- Today’s recommended MCC High Availability offering is a switch level ring using Resilient Ethernet Protocol (REP)

✅ MCC Serviceability
  - Device-level Star topology remains -- no impact

✅ Network and Device Configuration
  - Implemented through software in standard Stratix 5700

✅ Network Fault Tolerance
  - Provides single fault tolerance at the switch level in a ring topology
  - 10 switch limit

Same benefits as Linear / Star topology with added benefit of network fault tolerance
EtherNet/IP IntelliCENTER MCC
High Availability – REP Design Consideration: Requested Packet Interval

- Understand the process control requirements
  - Requested Packet Interval (RPI) required for each device
    - Configured in Logix AOP for each device
    - Sets device ↔ controller communication rate
      - If communication is disrupted, device timeout may occur
    - Typical MCC applications leverage RPI's ~100ms
  - Customer may need to engage their controls engineers to provide answer

Device RPI settings can limit the possible network architectures
Automatic Device Replacement

Field Device + Controller + EtherNet/IP

LOWER TIME TO REPAIR

Configuration stored in .ACD

IP address

3:00 AM
Automatic Device Configuration

**DHCP Port Persistence**
- Stratix switch acts as a DHCP server
- Automatically assigns a specific IP address to a particular port

**Firmware Supervisor**
- Local and remote modules can be flashed in Program / Run mode
- Firmware images stored on controller SD card
- Modules must have Electronic key parameter set to “Exact Match”

**Automatic Device Configuration**
- ADC downloads project drive parameters to new drive once firmware update completes
- Drive configuration settings stored in project .ACD file
- No software required to commission new drive
E300 Electronic Overload Relay

The newest member of Intelligent Motor Control

Learn more with the E300 Electronic Overload Relay Virtual Brochure