User Manual

Original Instructions

Allen-Bradley

E300 Electronic Overload Relay

Bulletin Numbers 193, 592

Allen-Bradley • Rockwell Software

Rockwell Automation

Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

IMPORTANT Identifies information that is critical for successful application and understanding of the product.

Labels may also be on or inside the equipment to provide specific precautions.

SHOCK HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.

BURN HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.

ARC FLASH HAZARD: Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

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Notes:

This manual describes how to install, configure, operate, and troubleshoot the E300™ Electronic Overload Relay.

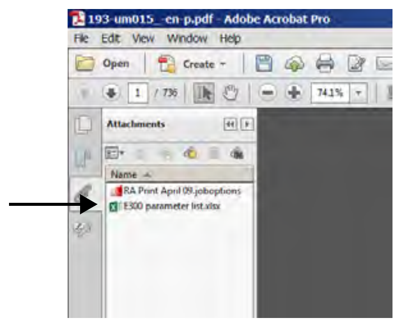
Summary of Changes

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

Topic	Page
Parameter listing and descriptions	Moved to PDF attachment
Accessory information	Moved to Technical Data, publication 193-TD006
DeviceNet Communications Module setup and configuration	page 187

Access Relay Parameters

The spreadsheet that is attached to this PDF details the E300 parameters. To access this file, click the Attachments link (the paper clip) and double-click the file.



Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
E300 Electronic Overload Relay Installation Instructions, publication 193-IN080	Provides complete user information for the E300 Electronic Overload Relay.
E300 Electronic Overload Relay Specifications, publication 193-TD006	Provides complete specifications for the E300 Electronic Overload Relay.
DeviceLogix System User Manual, publication RA-UM003	Provides user information for the DeviceLogix system.
Ethernet Design Considerations Reference Manual, publication ENET-RM002	Provides information about Ethernet basics.
Logix5000 Controllers Messages Programming Manual, publication 1756-PM012	Provides information on Logix controller message MSG instructions.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, http://www.rockwellautomation.com/global/certification/overview.page	Provides declarations of conformity, certificates, and other certification details.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, http://www.ab.com	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at http://www.rockwellautomation.com/global/literature-library/overview.page. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

Notes:

Overview

The E300™ Electronic Overload Relay is the newest technology for overload protection. Its modular design, communication options, diagnostic information, simplified wiring, and integration into Logix technology make this the ideal overload for motor control applications in an automation system.

E300 Electronic Overload Relays provide the following benefits:

- Intelligent motor control (EtherNet/IP™ and DeviceNet™ enabled)
- Scalable solution
- Diagnostic Information
- Integrated I/O
- Adjustable trip class 5…30
- Wide current range
- Test/Reset button
- Programmable trip and warning settings
- True RMS current/voltage sensing (50/60 Hz)
- Protection for single- and three-phase motors

The E300 relay consists of three modules: sensing, control and communications. You have choices in each of the three with additional accessories to tailor the electronic overload for your application's exact needs.

Module Descriptions

This section gives a brief overview of the E300 modules.

Sensing Module

Sensing Options

- Voltage/current/ground fault
- Current/ground fault
- Current

Current Range [A]

- 0.5…30
- 6…60
- 10…100
- 20…200

Control Module

Control Voltage	I/O		I/O and Protection(1)	
	Inputs	Relay Outputs	Inputs	Relay Outputs
110…120V AC, 50/60 Hz	4	3	2	2
220…240V AC, 50/60 Hz	4	3	2	2
24V DC	6	3	4	2

(1) Includes PTC thermistor and external ground fault.

Communication Modules

- EtherNet/IP
- DeviceNet

Expansion Digital I/O

You can add up to four additional expansion digital modules to the E300 relay expansion bus.

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

Expansion Analog I/O

You can add up to four additional expansion analog modules to the E300 relay expansion bus.

- 3 universal analog inputs/1 analog output
- 0...10V
- 0...5V
- 1...5V
- 0...20 mA
- 4...20 mA
- RTD (2-wire or 3-wire)
- 0...150 Ω
- 0...750 Ω
- 0...3000 Ω
- 0...6000 Ω (PTC/NTC)

Expansion Power Supply

When more than one expansion digital module and one operator station are added to the E300 relay expansion bus, you need an expansion power supply to supplement power for the additional modules. One expansion power supply powers a fully loaded E300 relay expansion bus.

- 120/240V AC
- 24V DC

Expansion Operator Station

You can add one operator station to the E300 relay expansion bus to be used as a user interface device. The operator stations provide E300 relay status LEDs and function keys for motor control. The operator stations also support CopyCat™, which allows you to upload and download E300 relay configuration parameters. See publication 193-061D for more information about using the CopyCat feature.

- Control station
- Diagnostic station

Features

Thermal Overload

Thermal Utilization

The E300 Electronic Overload Relay provides overload protection through true RMS current measurement of the individual phase currents of the connected motor. Based on this information, it calculates a thermal model that simulates the actual heating of the motor. Percent of thermal capacity utilization (%TCU) reports this calculated value and is read via a communications network. An overload trip occurs when the value reaches 100%.

Adjustable Settings

Set up thermal overload protection by programming the motor's full load current (FLC) rating and the desired trip class (5…30). Programming of the actual values through software programming confirms the accuracy of the protection.

Thermal Memory

The E300 Electronic Overload Relay includes a thermal memory circuit that is designed to approximate the thermal decay for a Trip Class 20 setting. This means that the thermal model of the connected motor is always maintained, even if the supply power is removed.

Reset Modes

This flexibility allows you to select between manual and automatic reset for an overload trip, allowing for broad application. The point of reset is adjustable from 1…100% TCU.

Time to Trip

During an overload condition, the E300 Electronic Overload Relay provides an estimated time to trip that is accessible via a communications network. This allows you to take corrective action so that production may continue uninterrupted.

Time to Reset

Following an overload trip, the E300 Electronic Overload Relay does not reset until the calculated percentage of thermal capacity utilization falls below the reset level. As this value decays, the time to reset, which is accessible via a communications network, is reported.

Thermal Warning

The E300 Electronic Overload Relay provides the capability to alert in the event of an impending overload trip. A thermal warning bit is set in the Current Warning Status when the calculated percentage of thermal capacity utilization exceeds the programmed thermal warning level, which has a setting range of 0…100% TCU.

Two-Speed Protection

The E300 Electronic Overload Relay offers a second FLA setting for 2-speed motor protection. What used to require two separate overload relays - one for each set of motor windings - is now accomplished with one device. Improved protection is delivered as thermal utilization is maintained in one device during operation in both speeds.

Overtemperature Protection (PTC and RTD)

The E300 Electronic Overload Relay provides motor overtemperature protection with the added provision for monitoring embedded positive temperature coefficient (PTC) thermistors with the E300 Control Module and resistance temperature detectors (RTD) with the E300 Analog Expansion Module. When the monitored PTC thermistors or RTD sensors exceed the programmed resistance level, the E300 Electronic Overload Relay can issue a Trip and/or Warning event.

Phase Loss

The E300 Electronic Overload Relay offers configurable phase loss protection, allowing you to enable or disable the function plus set a time delay setting, adjustable from 0.1…25.0 seconds. The trip level is factory set at a current imbalance measurement of 100%.

Ground (Earth) Fault

The E300 Electronic Overload Relay incorporates zero sequence (core balance) sensing into its design for low level (arcing) ground fault detection. Trip and warning settings are adjustable from 20 mA…5.0 A. For devices rated greater than 200 A and for ground fault detection less than 0.5 A, the external core balance current transformer accessory is required. Class I and Class II protection are provided as defined by UL1053. The E300 Electronic Overload Relay provides a max. trip-inhibit setting, offering flexibility to prevent tripping when the ground fault current magnitude exceeds 6.5 A. This can be useful to guard against the opening of the controller when the fault current could potentially exceed the controller's interrupting capacity rating.

Note: The E300 Electronic Overload Relay is not a Ground Fault Circuit Interrupter for personnel protection (or Class I) as defined in article 100 of the U.S. National Electric Code.

IMPORTANT	For applications that require ground fault detection and use the pass-through sensing module, this feature is only active when native motor current is present in the pass-through apertures; that is, no external step-down current transformers (CTs). You must use an external ground fault sensor for any applications that require external step-down CTs.

Stall

"Stall" is defined as a condition where the motor is not able to reach full-speed operation in the appropriate amount of time that is required by the application. This can cause the motor to overheat, because current draw exceeds the motor's full load current rating. The E300 Electronic Overload Relay provides user-adjustable stall protection. The trip setting has a range of 100…600% FLA, and the enable time is adjustable up to 250 seconds.

Jam (Overcurrent)

The E300 Electronic Overload Relay can respond quickly to take a motor off-line in the event of a mechanical jam, reducing the potential for damage to the motor and the power transmission components. Trip adjustments include a trip setting that is adjustable from 50…600% FLA and a trip delay time with a range of 0.1…25.0 seconds. A separate warning setting is adjustable from 50…600% FLA.

Underload (Undercurrent)

A sudden drop in motor current can signal conditions such as:

- Pump cavitation
- Tool breakage
- Belt breakage

For these instances, rapid fault detection can help minimize damage and aid in reducing production downtime.

Additionally, monitoring for an underload event can provide enhanced protection for motors that are coded by the medium handled (for example, submersible pumps that pump water). Such motors can become overheated despite being underloaded. This can result from an absence or an insufficient amount of the medium (for example, due to clogged filters or closed valves).

The E300 Electronic Overload Relay offers underload trip and warning settings adjustable from 10…100% FLA. The trip function also includes a trip delay time with a range of 0.1…25.0 seconds.

Current Imbalance (Asymmetry)

The E300 Electronic Overload Relay offers current imbalance trip and warning settings adjustable from 10…100%. The trip function also includes a trip delay time with a range of 0.1…25.0 seconds.

Remote Trip

The remote trip function allows an external device (such as a vibration sensor) to induce the E300 Electronic Overload Relay to trip. External device relay contacts are wired to the E300 Electronic Overload Relay discrete inputs. These discrete inputs are configurable with an option for assigning the remote trip function.

Voltage Protection

The E300 sensing module with voltage, current, and ground fault current provides you with enhanced current-based motor protection with the addition of voltage protection. With this option, you can protect against voltage issues (such as undervoltage, voltage imbalance, phase loss, frequency, and phase rotation).

Power Protection

While the motor is powering a load, the E300 sensing module with voltage, current, and ground fault current, also protects the motor based on power. This option monitors and protects for both excessive and low real power (kW), reactive power (kVAR), apparent power (kVA), and power factor for a specific application (such as pump applications).

Analog Protection

The E300 analog expansion module allows you to protect against over-analog readings from analog-based sensors (such as overtemperature, overflow, or overpressure)

Current Monitoring Functions

The E300 Electronic Overload Relay allows you to monitor the following operational data over a communications network:

- Individual phase currents — in amperes
- Individual phase currents — as a percentage of motor FLC
- Average current — in amperes
- Average current — as a percentage of motor FLC
- Percentage of thermal capacity utilized
- Current imbalance percentage
- Ground fault current

Voltage, Power, and Energy Monitoring

The E300 sensing module with voltage, current, and ground fault current can be included in a company's energy management system. This option provides voltage, current, power (kW, kVAR, and kVA), energy (kWh, kVARh, kVAh, kW Demand, kVAR Demand, and kVA Demand), and power quality (power factor, frequency, and phase rotation) information down at the motor level.

Diagnostic Functions

The E300 Electronic Overload Relay allows you to monitor the following diagnostic information over a communications network:

- Device status
- Trip status
- Warning status
- Time to an overload trip
- Time to reset after an overload
- History of past five trips
- History of past five warnings
- Hours of operation
- Number of starts
- Trip snapshot trip

Status Indicators

The E300 Electronic Overload Relay provides the following LED indicators:

- Power — This green/red LED indicates the status of the overload relay.
- TRIP/WARN — This LED flashes a yellow code under a warning condition and a red code when tripped.

Inputs/Outputs

Inputs allow the connection of such devices as contactor and disconnect auxiliary contacts, pilot devices, limit switches, and float switches. Input status can be monitored via the network and mapped to a controller's input image table. Inputs are rated 24V DC, 120V AC, or 240V AC and are current sinking. Power for the inputs is sourced separately with convenient customer sources at terminal A1. Relay contact outputs can be controlled via the network or DeviceLogix function blocks for performing such tasks as contactor operation.

Test/Reset Button

The Test/Reset button, which is located on the front of the E300 Electronic Overload Relay, allows you to perform the following:

- Test — The trip relay contact opens if the E300 Electronic Overload Relay is in an untripped condition and the Test/Reset button is pressed for 2 seconds or longer.
- Reset — The trip relay contact closes if the E300 Electronic Overload Relay is in a tripped condition, supply voltage is present, and the Test/Reset button is pressed.

Single/Three-Phase Operation

The E300 Electronic Overload Relay can be applied to three-phase and single-phase applications. A programming parameter is provided for selection between single- and three-phase operation. Straight-through wiring is available in both cases.

EtherNet/IP Communications

The E300 EtherNet/IP communication module has two RJ45 ports that act as an Ethernet switch to support a star, linear, and ring topology and supports the following:

- 2 concurrent Class 1 connections [1 exclusive owner + (1 input only or 1 listen only)]
- 6 simultaneous Class 3 connections (explicit messaging)
- Embedded web server
- SMTP server for trip and warning events (email and text messaging)
- Embedded EDS file
- RSLogix 5000 add-on profile

DeviceNet Communications

The E300 DeviceNet communication module has one 5-pin DeviceNet connector and supports the following:

- Read and Write of configuration parameters and real-time information via DeviceNet using RSNetWorx™ at communication rates of 125 kb, 250 kb, and 500 kb
- Communication of 16 bytes of data for I/O (Implicit) Messaging to a DeviceNet scanner
- Mechanical means to select the node address of the device
- LED status indication for device power, trip/warning status, and communication status
- Same DeviceNet objects as the existing E3 Plus electronic overload relay
- E3 Plus emulation mode that lets you reuse configuration parameters when using tools such as ADR, DeviceNet Configuration Terminal (193-DNCT or CEP7-DNCT), and RSNetWorx for DeviceNet

Modular Design

You can select the specific options that you need for your motor starter application. the E300 relay consists of three modules: sensing, control, and communication. You can customize each of the three with accessories to tailor the electronic motor overload for your application's exact needs.

- Wide current range
- Sensing capabilities (Current, Ground Fault Current, and/or Voltage)
- Expansion I/O
- Operator interfaces

Communication Options

You can select from multiple communication options that integrate with Logix-based control systems. Developers can easily add the E300 relay to Logix-based control systems that use Integrated Architecture tools like Add-on Profiles, Add-on Instructions, and Faceplates.

- EtherNet/IP Device Level Ring (DLR)
- DeviceNet

Diagnostic Information

The E300 relay provides a wide variety of diagnostic information to monitor motor performance, proactively alert you to possible motor issues, or identify the reason for an unplanned shutdown. Information includes:

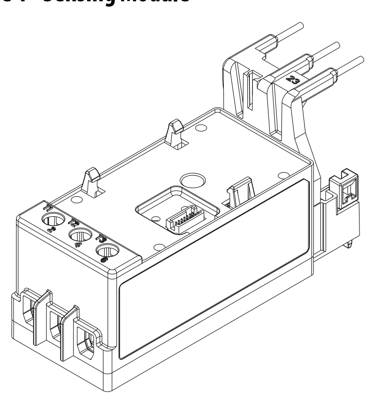
- Voltage, Current, and Energy
- Trip / Warning Histories
- % Thermal Capacity Utilization
- Time to Trip
- Time to Reset
- Operational Hours
- Number of Starts
- Trip Snapshot

Simplified Wiring

The E300 relay provides an easy means to mount to both IEC and NEMA Allen-Bradley® contactors. A contactor coil adapter is available for the 100-C contactor, which allows you to create a functional motor starter with only two control wires.

Sensing Module

Figure 1 - Sensing Module



The sensing module electronically samples data about the current, voltage, power, and energy that are consumed by the electric motor internal to the module. You can choose from one of three varieties of the sensing modules depending on the motor diagnostic information that is needed for the motor protection application:

- Current Sensing
- Current and Ground Fault Current Sensing
- Current, Ground Fault Current, Voltage, and Power Sensing

The current ranges for each of three varieties of sensing module are as follows:

- 0.5…30 A
- 6…60 A
- 10…100 A
- 20…200 A

You can choose how the sensing module mechanically mounts inside the electrical enclosure. The following mounting mechanisms are available for the sensing module.

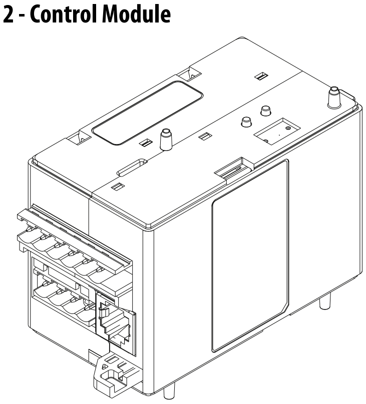
- Mount to the load side of an Allen-Bradley Bulletin 100 IEC Contactor
- Mount to the load side of an Allen-Bradley Bulletin 300 NEMA Contactor
- Mount to the load side of an Allen-Bradley Bulletin 500 NEMA Contactor
- DIN Rail / Panel Mount with power terminals
- Replacement DIN Rail / Panel Mount with power terminals for an Allen-Bradley E3 Plus panel mount adapter
- DIN Rail / Panel Mount with pass-thru power conductors

You can use the E300 relay sensing module with external current transformers. The following application guidelines should be adhered to when using an external CT configuration:

- You must mount the E300 Overload Relay a distance equal to or greater than six times the cable diameter (including insulation) from the nearest current-carrying conductor.
- For applications that use multiple conductors per phase, the diameter of each cable should be added and multiplied by six to determine the proper placement distance for the E300 Overload Relay.

Control Module

Figure 2 - Control Module



The control module is the heart of the E300 relay and can attach to any sensing module. The control module performs all protection and motor control algorithms and contains the native I/O for the system. The control module has two varieties:

- I/O only
- I/O and protection (PTC and External Ground Fault Current Sensing)

The control module is offered in three control voltages:

- 110…120V AC, 50/60Hz
- 220…240V AC, 50/60Hz
- 24V DC

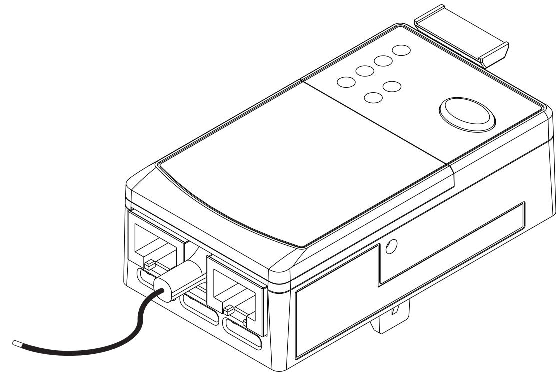
External control voltage is required to power the E300 relay and activate the digital inputs.

Communication Modules

The communication module allows the E300 relay to be integrated into an automation system, and it can attach to any control module. All communication modules allow you to set the node address with rotary turn dials, and it provides diagnostic status indicators to provide system status at the panel.

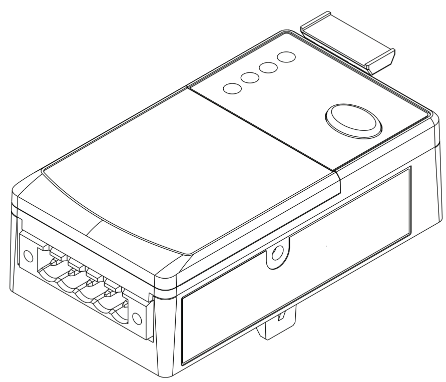
The E300 EtherNet/IP Communication Module has two RJ45 connectors that function as a switch. You can daisy chain multiple E300 relays with Ethernet cable, and the module supports a Device Level Ring (DLR).

Figure 3 - EtherNet/IP Communication Module



The E300 DeviceNet Communication Module has a single 5-pin DeviceNet connector that allows the E300 relay to be integrated into a DeviceNet network.

Figure 4 - DeviceNet Communication Module



Optional Add-On Modules

Optional Expansion I/O

The E300 relay lets you add more digital and analog I/O to the system via the E300 relay Expansion Bus if the native I/O count is not sufficient for the application on the base relay. You can add any combination of up to four Digital I/O Expansion Modules that have four inputs (120V AC, 240V AC, or 24V DC) and two relay outputs.

You can also add up to four Analog I/O Expansion Modules, which have three independent universal analog inputs and one isolated analog output. The Analog I/O

Expansion Modules require Control Module firmware v3.000 or higher. The independent universal analog inputs can accept the following signals:

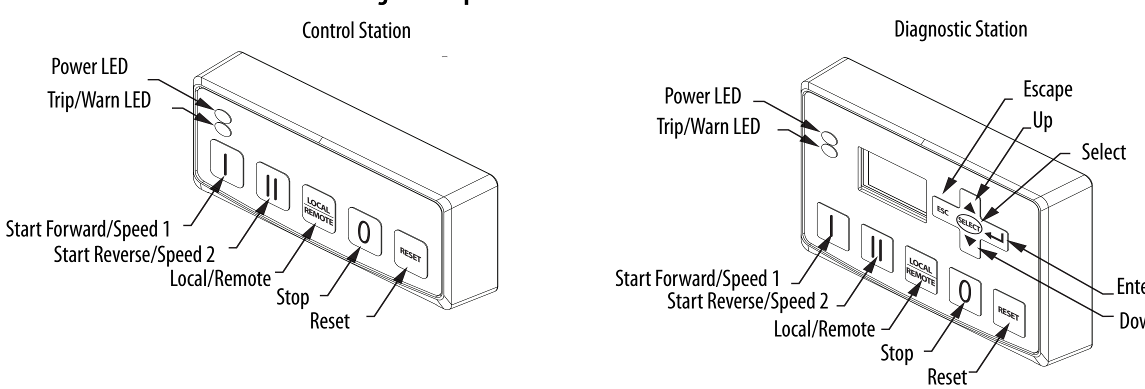
- 4…20 mA
- 0…20 mA
- 0…10V DC
- 1…5V DC
- 0…5V DC
- RTD Sensors (Pt 385, Pt 3916, Cu 426, Ni 618, Ni 672, and NiFe 518)
- Resistance (150 Ω, 750 Ω, 3000 Ω, and 6000 Ω)

The isolated analog output can be programmed to reference a traditional analog signal (4…20 mA, 0…20 mA, 0…10V DC, 1…5V, or 0…10V) to represent the following diagnostic values:

- Average %FLA
- %TCU
- Ground Fault Current
- Current Imbalance
- Average L-L Voltage
- Voltage Imbalance
- Total kW
- Total kVAR
- Total kVA
- Total Power Factor
- User-defined Value

Optional Operator Station

Figure 5 - Operator Stations



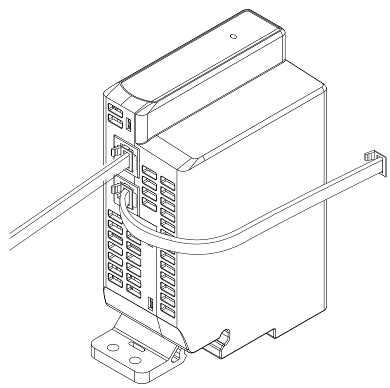
The E300 relay lets you add one operator interface to the Expansion Bus. You can choose between two types of operator stations: Control Station or a Diagnostic Station. Both types of operator stations mount into a standard 22 mm push button knockout, and they provide diagnostic status indicators that allow you to view the status of the E300 relay from the outside of an electrical enclosure. Both operator stations provide push buttons that can be used for motor control logic, and they both can be used to upload and download parameter configuration data from the base relay.

The Diagnostic Station contains a display and navigation buttons that allows you to view and edit parameters in the base relay. The Diagnostic Station requires Control Module firmware v3.000 or higher.

Optional Expansion Bus Power Supply

The E300 relay expansion bus provides enough current to operate a system that has (1) Digital Expansion Module and (1) Operator Station. An E300 relay system that contains more expansion modules needs supplemental current for the Expansion Bus. the E300 relay offers you two types of Expansion Bus Power Supplies: AC (110…240V AC, 50/60 Hz) and DC (24V DC). One Expansion Bus Power Supply supplies enough current for a fully loaded E300 relay Expansion Bus (four Digital Expansion Modules, four Analog Expansion Modules, and one Operator Station). You can use either Expansion Bus Power Supply with any combination of Digital and Analog Expansion Modules.

Figure 6 - Expansion Bus Power Supply



Protection Features

The numbers in parentheses in this section represent specific device functions as they relate to the respective protection measures provided. These protection functions correlate to ANSI standard device numbers as defined by ANSI/IEEE C37.2 Standard—Standard for Electrical Power System Device Function Numbers, Acronyms, and Contact Designations.

Standard Current-based Protection

All versions of the E300 relay provide the following motor protection functions.

- Thermal Overload (51)
- Phase Loss
- Current Imbalance (46)
- Undercurrent – load loss (37)
- Overcurrent – load jam (48)
- Overcurrent – load stall
- Start Inhibit (66)

Ground Fault Current-based Protection

The E300 relay sensing modules and control modules with a ground fault current option provides the following motor protection function:

- Ground Fault – zero sequence method (50 N)

Voltage- and Power-based Protection

The E300 relay sensing modules with voltage sensing provides the following motor protection functions:

- Undervoltage (27)
- Overvoltage (59)
- Phase Reversal (47) – voltage-based
- Over and Under Frequency (81) – voltage-based
- Voltage Imbalance (46)
- Over and Under Power (37)
- Over and Under Leading/Lagging Power Factor (55)
- Over and Under Reactive Power Generated
- Over and Under Reactive Power Consumed
- Over and Under Apparent Power

Thermal-based Protection

The E300 relay provides the following thermal-based motor protection functions:

- Thermistor – PTC (49)
- Stator Protection – RTD (49)
- Bearing Protection – RTD (38)

Applications

You can use the E300 relay with the following across the line starter applications:

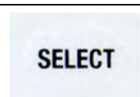
- Non-reversing starter
- Reversing starter
- Wye (Star) / Delta starter
- Two-speed motors
- Low and medium voltage with two or three potential transformers
- With or without Phase current transformers
- With or without zero-sequence core balanced current transformer

Diagnostic Station

The E300™ Electronic Overload Relay supports a Diagnostic Station on the E300 Expansion Bus (requires Control Module firmware v3.000 and higher). The Diagnostic Station allows you to view any E300 relay parameter and edit any configuration parameter. This chapter explains the navigation keys on the Diagnostic Station, how to view a parameter, how to edit a configuration parameter, and the Diagnostic Station programmable display sequence.

Navigation Keys

The E300 Diagnostic Station has five navigation keys that are used to navigate through the display menu system and edit configuration parameters.

Key	Name	Description
	Up Arrow Down Arrow	• Scroll through the display parameters or groups. • Increment or decrement values.
	Escape	• Back one step in the navigation menu. • Cancel a change to a configuration parameter value
	Select	• Select the next bit when viewing a bit enumerated parameter. • Select the next digit when editing a configuration value. • Select the next bit when editing a bit enumerated parameter.
	Enter	• Start the navigation menu. • Advance one step in the navigation menu. • Display the description for a bit enumerated parameter. • Edit a configuration parameter value. • Save the change to the configuration parameter value.

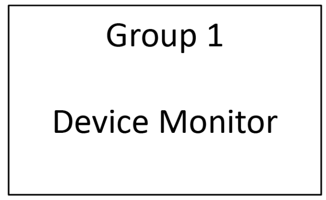
Displaying a Parameter

The E300 Diagnostic Station allows you to view parameters by using a group menu system or by a linear list. To start the navigation menu, press the  key. The menu prompts you to view parameters by groups, parameters in a linear list, or E300 relay system information.

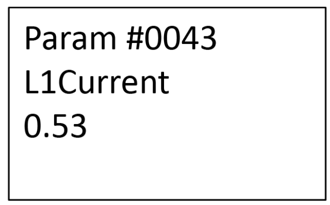
Parameter Group Navigation

To start the navigation menu, press the  key. Use the  or  keys to select the Groups navigation method and press  .

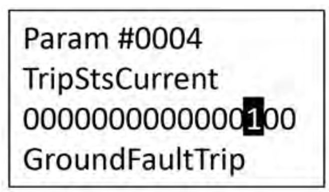
Use the ▲ or ▼ keys to select the parameter group to display and press ↵ .



Use the ▲ or ▼ keys to view the parameters that are associated with that group.



When viewing a bit enumerated parameter, press ↵ to view the description of each bit. Press SELECT to view the next bit. Press ESC to return to the parameter.



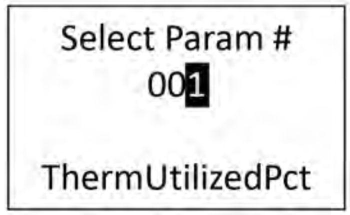
Press ESC to return to the parameter group navigation system.

If you do not press any navigation keys for a period that Display Timeout (Parameter 436) defines, the Diagnostic Station automatically returns to the programmable display sequence.

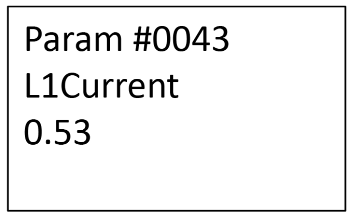
Linear List Navigation

To start the navigation menu, press the ↵ key. Use the ▲ or ▼ keys to select the Linear List navigation method and press ↵ .

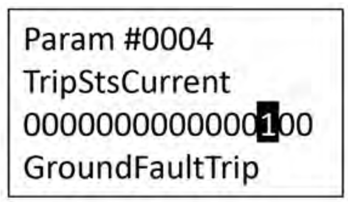
Use the ▲ or ▼ and SELECT keys to select the parameter number to display and press ↵ .



Use the ▲ or ▼ keys to view the next sequential parameter.



When viewing a bit enumerated parameter, press ↵ to view the description of each bit. Press SELECT to view the next bit. Press ESC to return to the parameter.



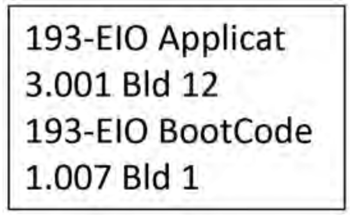
Press ESC to return to the linear list navigation system.

If you do not press any navigation keys for a period that Display Timeout (Parameter 436) defines, the E300 Diagnostic Station automatically returns to the programmable display sequence.

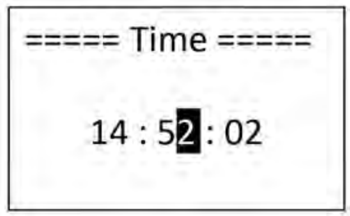
System Info

The E300 Diagnostic Station can display firmware revision information, view the time and date of the E300 relay virtual clock, and edit the time and date of the E300 relay virtual clock. To view E300 relay system information, start the navigation menu by pressing ↵ key. Use the ▲ or ▼ keys to select System Info and press ↵ .

Use the ▲ or ▼ keys to view the E300 relay system information.



To edit the system date or time, press ↵ to modify the value. Use the ▲ or ▼ keys to select the new value. Press SELECT to select the next system value. Press ↵ to save the new system values or press ESC to cancel the modification and restore the previous system values.



Press ESC to return to the navigation menu.

If you do not press any navigation keys for a period that Display Timeout (Parameter 436) defines, the E300 Diagnostic Station automatically cancels the modification, restores the previous value, and returns to its programmable display sequence.

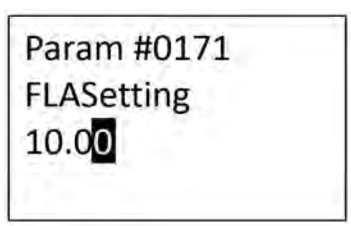
Editing Parameters

Editing a Configuration Parameter

The E300 Diagnostic Station allows you to edit configuration parameters by using a group menu system or by a linear list. To start the navigation menu, press the ↵ key. You are prompted to view parameters by groups, parameters in a linear list, or E300 relay system information. Choose the appropriate method and navigate to the parameter to be modified.

Editing a Numeric Parameter

To edit a configuration parameter, press the ↵ key to modify the value. Use the ▲ or ▼ keys to select the new value. Press ↵ to save the new system values or press ESC to cancel the modification and restore the previous value.

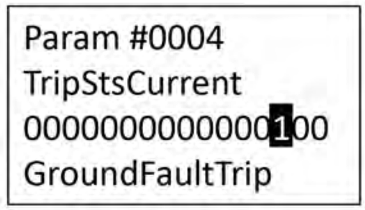


Press ESC to return to the navigation menu.

If you do not press any navigation keys for a period that Display Timeout (Parameter 436) defines, the E300 Diagnostic Station automatically cancels the modification, restores the previous value, and returns to its programmable display sequence.

Editing a Bit Enumerated Parameter

When editing a bit enumerated parameter, press the ↵ key to view the description of each bit. Use the ▲ or ▼ keys to select the new bit value. Press SELECT to edit the next bit. Press ↵ to save the new value or press ESC to cancel the modification and restore the previous value.



Press ESC to return to the navigation menu.

If you do not press any navigation keys for a period that Display Timeout (Parameter 436) defines, the Diagnostic Station automatically cancels the modification, restores the previous value, and returns to its programmable display sequence.

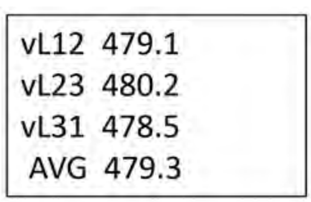
Programmable Display Sequence

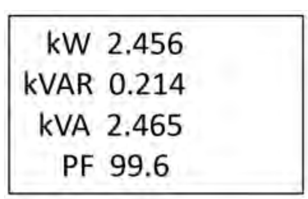
Display Sequence

The Diagnostic Station of the E300 relay sequentially displays up to seven screens every 5 seconds.

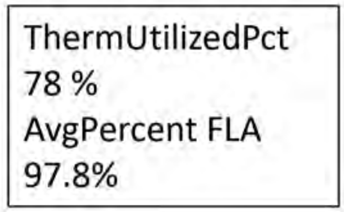
- Three-phase current
- Three-phase voltage
- Total power
- User-defined screen 1
- User-defined screen 2
- User-defined screen 3
- User-defined screen 4

The three-phase voltage and total power screens are only included in the sequence when the E300 relay has a voltage, current, and ground fault current (VIG)-based Sensing Module.





The user-defined screens allow you to select up to two parameters per screen. See Diagnostic Station User-defined Screens on page 41 to configure the Screen# and Parameter# (Parameters 428…435).



If you do not press any navigation keys for a period that Display Timeout (Parameter 436) defines, the Diagnostic Station automatically cancels any editing modifications, restores the previous value, and returns to its programmable display sequence.

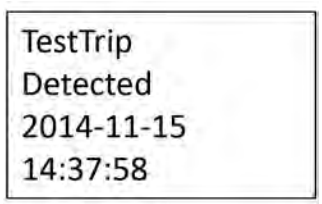
Stopping the Display Sequence

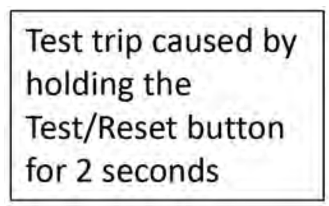
To stop the display sequence, press SELECT. Use the ▲ or ▼ keys to manually sequence through the displays. Press ESC to return to the automatic display sequence.

If you do not press any navigation keys for a period that Display Timeout (Parameter 436) defines, the Diagnostic Station automatically returns to the programmable display sequence.

Automatic Trip and Warning Screens

When the E300 relay is in a trip or warning state, the E300 Diagnostic Station automatically displays the trip or warning event.





Press any of the navigation keys (ESC , SELECT , ↵ , ▲ , or ▼) to return to the automatic display sequence.

When the trip or warning event clears, the E300 Diagnostic Station automatically returns to the programmable display sequence.

If another parameter is displayed and you do not press any navigation keys for a period that Display Timeout (Parameter 436) defines, the Diagnostic Station automatically returns to the trip or warning screen if the trip or warning event is not cleared.

System Operation and Configuration

This chapter provides instructions about how to operate and configure an E300™ Electronic Overload Relay system. This chapter includes settings for Device Modes, Option Match, Security Policy, I/O Assignments, Expansion Bus Fault, Emergency Start, and an introduction to Operating Modes.

This chapter shows you the parameters required to program the device; see page 9 for information about the complete parameter spreadsheet that is attached to this PDF.

Device Modes

The E300 relay has five device modes to validate configuration of the device and limit when you can configure the E300 relay, perform a firmware update, and issue commands.

- Administration Mode
- Ready Mode
- Run Mode
- Test Mode
- Invalid Configuration Mode

Administration Mode

Administration Mode is a maintenance mode for the E300 relay that allows you to configure parameters, modify security policies, enable web servers, perform firmware updates, and issue commands.

Follow these steps to enter into Administration Mode:

1. Set the rotary dials on the E300 Communication Module to the following values
   - For EtherNet/IP set the rotary dials to 0-0-0
   - For DeviceNet set the rotary dials to 7-7
2. Cycle power on the E300 relay

After you complete commissioning activities and maintenance tasks, return the E300 relay back to Ready or Run Mode by setting the rotary dials of the E300 communication module back to its previous positions and then cycle power.

Ready Mode

Ready Mode is a standby mode for the E300 relay in which the relay is ready to help protect an electric motor and no electrical current has been detected. You can modify configuration parameters, update firmware, and issue commands if the appropriate security policies are enabled. The Power LED on the Communication Module and Operator Stations flash green and bit 14 in Device Status 0 (Parameter 20) is set to 1 when the device is in Ready Mode.

Run Mode

Run Mode is an active mode for the E300 relay in which the relay is sensing electrical current and is actively protecting an electric motor. Only non-motor protection configuration parameters can be modified if the appropriate security policies are enabled. The Power LED on the Communication Module and Operator Stations is solid green and bits 3, 4, and/or 5 in Device Status 0 (Parameter 20) are set to 1 when the device is in Run Mode.

Test Mode

Test Mode is used by installers of motor control centers who are testing and commissioning motor starters with an automation system. A digital input of the E300 relay is assigned to monitor the Test position of the motor control center enclosure. The Input Assignments (Parameters 196…201) are described later in this chapter.

Anyone who commissions motor starters in an automation system can put their motor control center enclosure into the Test position to activate Test Mode and verify that the digital inputs and relay outputs of the E300 relay are operating properly with the motor starter without energizing power to the motor. If the E300 relay senses current or voltage in Test Mode, it generates a Test Mode Trip.

Invalid Configuration Mode

Invalid Configuration Mode is an active mode for the E300 relay in which the relay is in a tripped state due to invalid configuration data. Invalid Configuration Parameter (Parameter 38) indicates the parameter number that is causing the fault. Invalid Configuration Cause (Parameter 39) identifies the reason for Invalid Configuration Mode.

The Trip/Warn LED on the Communication Module and Operator Stations flashes a pattern of red, 3 long and 8 short blinks, and bits 0 and 2 in Device Status 0 (Parameter 20) are set to 1 when the device is in Invalid Configuration Mode.

To return to Ready/Run Mode, place a valid configuration value in the parameter that is identified by Invalid Configuration Parameter (Parameter 38) and Invalid Configuration Cause (Parameter 39). Reset the trip state of the E300 relay by pressing the blue reset button on the Communication Module, via network communication, with the internal web server of the EtherNet/IP communication module, or by an assigned digital input.

Option Match

Due to the modular nature of the E300 relay, you can enable the Option Match feature to verify that the options that you expect for the motor protection application are the ones that are present on the E300 relay system. You can configure an option mismatch to cause a protection trip or provide a warning within the E300 relay.

Enable Option Match Protection Trip (Parameter 186)

To enable the Option Match feature to cause a protection trip in the event of an option mismatch, place a (1) in bit position 8 of Parameter 186 (Control Trip Enable). You can select the specific option match features to cause a protection trip in Parameter 233 (Option Match Action).

Enable Option Match Protection Warning (Parameter 192)

To enable the Option Match feature to cause a warning in the event of an option mismatch, place a (1) in bit position 8 of Parameter 192 (Control Warning Enable).

You can select the specific option match features to cause a warning in Parameter 233 (Option Match Action).

Control Module Type (Parameter 221)

The E300 relay offers six different control modules. Place the value of the expected control module into Parameter 221. A value of (0) disables the Option Match feature for the control module.

Sensing Module Type (Parameter 222)

The E300 relay offers 12 different sensing modules. Place the value of the expected sensing module into Parameter 222. A value of (0) disables the Option Match feature for the sensing module.

Communication Module Type (Parameter 223)

The E300 relay offers two different communication modules. Place the value of the expected communication module into Parameter 223. A value of (0) disables the Option Match feature for the communication module.

Operator Station Type (Parameter 224)

The E300 relay offers two different types of operator stations. Place the value of the expected operator station into Parameter 224. A value of (0) disables the Option Match feature for the operator station. A value of (1), *"No Operator Station"*, makes the operator station not allowed on the Expansion Bus and prevents you from connecting an operator station to the E300 relay system.

Digital I/O Expansion Modules

Module 1 Type (Parameter 225)

The E300 relay supports up to four additional Digital I/O expansion modules. This parameter configures the Option Match feature for the Digital I/O expansion module set to Digital Module 1. There are three different types of Digital I/O expansion modules. Place the value of the expected Digital I/O expansion module set to Digital Module 1 into Parameter 225. A value of (0) disables the Option Match feature for this Digital I/O expansion module. A value of (1), *"No Digital I/O Expansion Module"*, makes the Digital I/O expansion module set to Digital Module 1 not allowed on the Expansion Bus and prevents you from connecting a Digital I/O expansion module set to Digital Module 1 to the E300 relay system.

Module 2 Type (Parameter 226)

The E300 relay supports up to four additional Digital I/O expansion modules. This parameter configures the Option Match feature for the Digital I/O expansion module set to Digital Module 2. There are three different types of Digital I/O expansion modules. Place the value of the expected Digital I/O expansion module set to Digital Module 2 into Parameter 226. A value of (0) disables the Option Match feature for this Digital I/O expansion module. A value of (1),*"No Digital I/O Expansion Module"*, makes the Digital I/O expansion module set to Digital Module 2 not allowed on the Expansion Bus and prevents you from connecting a Digital I/O expansion module set to Digital Module 2 to the E300 relay system.

Module 3 Type (Parameter 227)

The E300 relay supports up to four additional Digital I/O expansion modules. This parameter configures the Option Match feature for the Digital I/O expansion module set to Digital Module 3. There are three different types of Digital I/O expansion modules. Place the value of the expected Digital I/O expansion module set to Digital Module 3 into Parameter 227. A value of (0) disables the Option Match feature for this Digital I/O expansion module. A value of (1),*"No Digital I/O Expansion Module"*, makes the Digital I/O expansion module set to Digital Module 3 not allowed on the Expansion Bus and prevents you from connecting a Digital I/O expansion module set to Digital Module 3 to the E300 relay system.

Module 4 Type (Parameter 228)

The E300 relay supports up to four additional Digital I/O expansion modules. This parameter configures the Option Match feature for the Digital I/O expansion module set to Digital Module 4. There are three different types of Digital I/O expansion modules. Place the value of the expected Digital I/O expansion module set to Digital Module 4 into Parameter 228. A value of (0) disables the Option Match feature for this Digital I/O expansion module. A value of (1), *"No Digital I/O Expansion Module "*, makes the Digital I/O expansion module set to Digital Module 4 not allowed on the Expansion Bus and prevents you from connecting a Digital I/O expansion module set to Digital Module 4 to the E300 relay system.

Analog I/O Expansion Modules

Module 1 Type (Parameter 229)

The E300 relay supports up to four additional Analog I/O expansion modules. This parameter configures the Option Match feature for the Analog I/O expansion module set to Analog Module 1. There is one type of Analog I/O expansion module. Place the value of the expected Analog I/O expansion module set to Analog Module 1 into Parameter 229. A value of (0) disables the Option Match feature for this Analog I/O expansion module. A value of (1), *"No Analog I/O Expansion Module"*, makes the Analog I/O expansion module set to Analog Module 1 not allowed on the Expansion Bus and prevents you from connecting an Analog I/O expansion module set to Analog Module 1 to the E300 relay system.

Module 2 Type (Parameter 230)

The E300 relay supports up to four additional Analog I/O expansion modules. This parameter configures the Option Match feature for the Analog I/O expansion module set to Analog Module 2. There is one type of Analog I/O expansion module. Place the value of the expected Analog I/O expansion module set to Analog Module 2 into Parameter 230. A value of (0) disables the Option Match feature for this Analog I/O expansion module. A value of (1), *"No Analog I/O Expansion Module"*, makes the Analog I/O expansion module set to Analog Module 2 not allowed on the Expansion Bus and prevents you from connecting an Analog I/O expansion module set to Analog Module 2 to the E300 relay system.

Module 3 Type (Parameter 231)

The E300 relay supports up to four additional Analog I/O expansion modules. This parameter configures the Option Match feature for the Analog I/O expansion module set to Analog Module 3. There is one type of Analog I/O expansion module. Place the value of the expected Analog I/O expansion module set to Analog Module 3 into

Parameter 231. A value of (0) disables the Option Match feature for this Analog I/O expansion module. A value of (1), *"No Analog I/O Expansion Module"*, makes the Analog I/O expansion module set to Analog Module 3 not allowed on the Expansion Bus and prevents you from connecting an Analog I/O expansion module set to Analog Module 3 to the E300 relay system.

Module 4 Type (Parameter 232)

The E300 relay supports up to four additional Analog I/O expansion modules. This parameter configures the Option Match feature for the Analog I/O expansion module set to Analog Module 4. There is one type of Analog I/O expansion module. Place the value of the expected Analog I/O expansion module set to Analog Module 4 into Parameter 232. A value of (0) disables the Option Match feature for this Analog I/O expansion module. A value of (1), *"No Analog I/O Expansion Module"*, makes the Analog I/O expansion module set to Analog Module 4 not allowed on the Expansion Bus and prevents you from connecting an Analog I/O expansion module set to Analog Module 4 to the E300 relay system.

Option Match Action (Parameter 233)

The Option Match feature for the E300 relay allows you to specify an action when there is an option mismatch—Protection Trip or Warning. Place a (0) in the appropriate bit position for a warning, and place a (1) in the appropriate bit position to cause a protection trip if there is an option mismatch.

Security Policy

The E300 relay has a security policy that can be used to prevent anyone with malicious intent to potentially damage a motor or piece of equipment. By default, you can only modify the security policy when the E300 relay is in Administration Mode (see page 31 to learn how to enable Administration Mode).

Table 1 - Security Policy Types

Policy Type	Description
Device Configuration	• allows you to send external message instructions via a communication network to write values to configuration parameters • when this policy is disabled, all external message instructions with configuration data return a communication error when the E300 relay is in Ready Mode or Run Mode
Device Reset	• allows you to send external message instruction via a communication network to perform a soft device reset when the E300 relay is in Ready Mode • when this policy is disabled, all external reset message instructions return a communication error when the E300 relay is in Ready Mode or Run Mode
Firmware Update	• allows you to update the internal firmware of the communication module and control module via ControlFlash when the E300 relay is in Ready Mode • when this policy is disabled, firmware updates return a communication error when the E300 relay is in Ready Mode or Run Mode
Security Configuration	• allows you to modify the Security Policy of the E300 relay in Ready Mode • when this policy is disabled, it can only be modified when the E300 relay is in Administration Mode

I/O Assignments

The E300 relay has native digital inputs and relay outputs in the Control Module. This I/O can be assign to dedicated functions. The following sections list the function assignments for the available Control Module I/O.

Input Assignments

You can assign digital inputs via the following parameters:

- Input Pt00 Assignment (Parameter 196)

- Input Pt01 Assignment (Parameter 197)
- Input Pt02 Assignment (Parameter 198)
- Input Pt03 Assignment (Parameter 199)
- Input Pt04 Assignment (Parameter 200)
- Input Pt05 Assignment (Parameter 201)

Output Assignments

You can assign relay outputs via the following parameters:

- Output Pt00 Assignment (Parameter 202)
- Output Pt01 Assignment (Parameter 203)
- Output Pt02 Assignment (Parameter 204)

Output Relay Configuration States

When assigned as a Normal/General Purpose Relay or Control/Control & Trip Relay, you can configure the E300 relay's output relays to go to a specific safe state when one of following events occur:

- Protection Fault Mode - when a trip event occurs
- Communication Fault Mode - when network communication is lost or an error occurs
- Communication Idle Mode - when a network scanner changes to Idle mode or a PLC changes to Program mode

IMPORTANT It is important that you fully understand the use of these parameters and the order of their priority under the conditions of a protection trip, communication fault, and communication idle event.

The default setting for these three modes is to Open/de-energize all E300 output relays that are assigned as a Normal/General Purpose Relay or Control/Control & Trip Relay.

The E300 output relay states when assigned as a Normal/General Purpose Relay or Control/Control & Trip Relay follow this priority order:

Table 2 - Output Relay Priority

Priority	Normal/General Purpose Relay	Control/Control & Trip Relay
1	Output Protection Fault State	Output Communication Fault State
2	Output Communication Fault State	Output Final Fault State
3	Output Final Fault State	Output Communication Idle State
4	Output Communication Idle State	

The optional eight output relays on the digital expansion I/O modules operate as a Normal/General Purpose relay with the same E300 relay safe state settings. There are two relays per module with maximum of four modules.

Output Relay Protection Fault Modes

When the E300 relay has a trip event, you can configure the E300 output relays to go to a specific state (Open or Closed) or ignore the trip event and continue to operate as normal. The parameters that are listed in Table 3 configure the Protection Fault Mode for each E300 output relay.

Table 3 - Protection Fault Mode Parameters

Fault Name	Parameter No.	Description
Output Relay 0 Protection Fault Action	304	• defines how Output Relay 0 when assigned as a Normal/General Purpose Relay responds when a trip event occurs
Output Relay 0 Protection Fault Value	305	• defines which state Output Relay 0 should go to when a trip event occurs
Output Relay 1 Protection Fault Action	310	• defines how Output Relay 1 responds when a trip event occurs when this parameter is assigned as a Normal/General Purpose Relay
Output Relay 1 Protection Fault Value	311	• defines which state Output Relay 1 should go to when a trip event occurs
Output Relay 2 Protection Fault Action	316	• defines how Output Relay 2 responds when a trip event occurs when this parameter is assigned as a Normal/General Purpose Relay.
Output Relay 2 Protection Fault Value	317	• defines which state Output Relay 2 should go to when a trip event occurs
Digital Expansion Module 1 Output Relay Protection Fault Action	322	• defines how both output relays on Digital Expansion Module 1 responds when a trip event occurs
Digital Expansion Module 1 Output Relay Protection Fault Value	323	• defines which state both output relays should go to when a trip event occurs
Digital Expansion Module 2 Output Relay Protection Fault Action	328	• defines how both output relays on Digital Expansion Module 2 responds when a trip event occurs
Digital Expansion Module 2 Output Relay Protection Fault Value	329	• defines which state both output relays should go to when a trip event occurs
Digital Expansion Module 3 Output Relay Protection Fault Action	334	• defines how both output relays on Digital Expansion Module 3 responds when a trip event occurs
Digital Expansion Module 3 Output Relay Protection Fault Value	335	• defines which state both output relays should go to when a trip event occurs
Digital Expansion Module 4 Output Relay Protection Fault Action	340	• defines how both output relays on Digital Expansion Module 4 responds when a trip event occurs
Digital Expansion Module 4 Output Relay Protection Fault Value	341	• defines which state both output relays should go to when a trip event occurs

Output Relay Communication Fault Modes

When the E300 relay loses communication, experiences a communication bus fault, or has a duplicate node address, you can configure the E300 output relays with the Communication Fault Mode parameters to go to a specific state (Open or Closed) or hold the last state.

An E300 relay with firmware revision v5.000 or higher supports the Fault Mode Output State Duration feature, which can be used with redundant network scanners or control systems. The Fault Mode Output State Duration is the time that the E300 output relays can go to a temporary state (Open, Closed, or Hold Last State) when a communication fault occurs. Configure this temporary state by using the Communication Fault Mode parameters.

If communication between the E300 relay and a network scanner or control system is not restored within the Fault Mode Output State Duration time (Parameter 561), the E300 output relays go to a final fault state (Open or Closed), which you configure by using the Final Fault Mode parameters.

If communication between the E300 relay and a network scanner or control system is restored within the Fault Mode Output State Duration time (Parameter 561), the E300 output relays resume with the state commanded by the network scanner or control system.

The parameters that are listed in Table 4 configure the Configuration Fault Mode for each E300 output relay.

Table 4 - Configuration Fault Mode Parameters

Fault Name	Parameter No.	Description
Fault Mode Output State Duration[1]	561	• defines the amount of time (s) that the E300 relay remains in the Communication Fault Mode state when a communication fault occurs. 0 = forever • If communication between the E300 relay and a network scanner or control system is not restored within the Fault Mode Output State Duration time the E300 output relays go to the final fault state (configured by using Final Fault Mode Parameters
Output Relay 0 Communication Fault Action	306	• defines how Output Relay 0 responds when a communication fault occurs when this parameter is assigned as a Normal/General Purpose Relay or Control/Control & Trip Relay
Output Relay 0 Communication Fault Value	307	• defines which state Output Relay 0 should go to when a communication fault occurs
Output Relay 0 Final Fault Value[1]	562	• defines which state Output Relay 0 should go to when communication is not restored with the time defined in Fault Mode Output State Duration (Parameter 561)
Output Relay 1 Communication Fault Action	312	• defines how Output Relay 1 responds when a communication fault occurs when this parameter is assigned as a Normal/General Purpose Relay or Control/Control & Trip Relay
Output Relay 1 Communication Fault Value	313	• defines which state Output Relay 1 should go to when a communication fault occurs
Output Relay 1 Final Fault Value[1]	563	• defines which state Output Relay 1 should go to when communication is not restored with the time defined in Fault Mode Output State Duration (Parameter 561)
Output Relay 2 Communication Fault Action	317	• defines how Output Relay 2 responds when a communication fault occurs when this parameter is assigned as a Normal/General Purpose Relay or Control/Control & Trip Relay
Output Relay 2 Communication Fault Value	319	• defines which state Output Relay 2 should go to when a communication fault occurs
Output Relay 2 Final Fault Value[1]	564	• defines which state Output Relay 2 should go to when communication is not restored with the time defined in Fault Mode Output State Duration (Parameter 561)
Digital Expansion Module 1 Output Relay Communication Fault Action	324	• defines how both output relays on Digital Expansion Module 1 responds when a communication fault occurs
Digital Expansion Module 1 Output Relay Communication Fault Value	325	• defines which state both output relays should go to when a communication fault occurs
Digital Expansion Module 1 Output Relay Final Fault Value[1]	565	• defines which state both output relays should go to when communication is not restored with the time defined in Fault Mode Output State Duration (Parameter 561)
Digital Expansion Module 2 Output Relay Communication Fault Action	330	• defines how both output relays on Digital Expansion Module 2 responds when a communication fault occurs
Digital Expansion Module 2 Output Relay Communication Fault Value	331	• defines which state both output relays should go to when a communication fault occurs
Digital Expansion Module 2 Output Relay Final Fault Value[1]	566	• defines which state both output relays should go to when communication is not restored with the time defined in Fault Mode Output State Duration (Parameter 561)
Digital Expansion Module 3 Output Relay Communication Fault Action	336	• defines how both output relays on Digital Expansion Module 3 responds when a communication fault occurs
Digital Expansion Module 3 Output Relay Communication Fault Value	337	• defines which state both output relays should go to when a communication fault occurs
Digital Expansion Module 3 Output Relay Final Fault Value[1]	567	• defines which state both output relays should go to when communication is not restored with the time defined in Fault Mode Output State Duration (Parameter 561)
Digital Expansion Module 4 Output Relay Communication Fault Action	342	• defines how both output relays on Digital Expansion Module 4 responds when a communication fault occurs
Digital Expansion Module 4 Output Relay Communication Fault Value	343	• defines which state both output relays should go to when a communication fault occurs
Digital Expansion Module 4 Output Relay Final Fault Value[1]	568	• defines which state both output relays should go to when communication is not restored with the time defined in Fault Mode Output State Duration (Parameter 561)

(1) Available in E300 relay firmware v5.000 and higher.

Output Relay Communication Idle Modes

When a network scanner goes into Idle mode or a PLC goes into Program mode while communicating with an E300 relay, you can configure the E300 output relays to go to a specific state (Open or Close) or hold the last state. The parameters that are listed in Table 5 configure the Communication Idle Mode for each E300 output relay.

Table 5 - Communication Idle Mode Parameters

Fault Name	Parameter No.	Description
Output Relay 0 Communication Idle Action	308	• defines how Output Relay 0 when assigned as a Normal/General Purpose Relay or Control/ Control & Trip Relay responds when a network scanner goes into Idle Mode or a programmable logic controller (PLC) goes into Program Mode
Output Relay 0 Communication Idle Value	309	• defines which state Output Relay 0 should go to when a network scanner goes into Idle Mode or a PLC goes into Program Mode
Output Relay 1 Communication Idle Action	314	• defines how Output Relay 1 when assigned as a Normal/General Purpose Relay or Control/ Control & Trip Relay responds when a network scanner goes into Idle Mode or a PLC goes into Program Mode
Output Relay 1 Communication Idle Value	315	• defines which state Output Relay 1 should go to when a network scanner goes into Idle Mode or a PLC goes into Program Mode
Output Relay 2 Communication Idle Action	320	• defines how Output Relay 2 when assigned as a Normal/General Purpose Relay or Control/ Control & Trip Relay responds when a network scanner goes into Idle Mode or a PLC goes into Program Mode
Output Relay 2 Communication Idle Value	321	• defines which state Output Relay 2 should go to when a network scanner goes into Idle Mode or a PLC goes into Program Mode
Digital Expansion Module 1 Output Relay Communication Idle Action	326	• defines how both output relays on Digital Expansion Module 1 responds when a network scanner goes into Idle Mode or a PLC goes into Program Mode
Digital Expansion Module 1 Output Relay Communication Idle Value	327	• defines which state both output relays should go to when a network scanner goes into Idle Mode or a PLC goes into Program Mode
Digital Expansion Module 2 Output Relay Communication Idle Action	332	• defines how both output relays on Digital Expansion Module 2 responds when network scanner goes into Idle Mode or a PLC goes into Program Mode
Digital Expansion Module 2 Output Relay Communication Idle Value	333	• defines which state both output relays should go to when a network scanner goes into Idle Mode or a PLC goes into Program Mode
Digital Expansion Module 3 Output Relay Communication Idle Action	338	• defines how both output relays on Digital Expansion Module 3 responds when a network scanner goes into Idle Mode or a PLC goes into Program Mode
Digital Expansion Module 3 Output Relay Communication Idle Value	339	• defines which state both output relays should go to when a network scanner goes into Idle Mode or a PLC goes into Program Mode
Digital Expansion Module 4 Output Relay Communication Idle Action	344	• defines how both output relays on Digital Expansion Module 4 responds when a network scanner goes into Idle Mode or a PLC goes into Program Mode
Digital Expansion Module 4 Output Relay Communication Idle Value	345	• defines which state both output relays should go to when a network scanner goes into Idle Mode or a PLC goes into Program Mode

Expansion Bus Fault

The expansion bus of the E300 relay can be used to expand the I/O capabilities of the device with the addition of digital and analog expansion I/O modules. The Expansion Bus Fault allows you to have the E300 relay go into a Trip or Warning state when established Expansion Bus communication is disrupted between the Control Module and any digital and analog expansion I/O modules.

The Expansion Bus Fault is used when the Option Match feature is not enabled for the digital and/or analog expansion I/O modules. The Expansion Bus Fault only monitors for communication disruptions between the Control Module and digital and/or analog expansion I/O modules. Expansion bus communication disruptions between the Control Module and Operator Station do not affect the Expansion Bus fault.

Table 6 - Expansion Bus Fault Functions

Function Name	How to Enable	Setting Parameter No.	Description	Trip/Warn Module Blink Pattern	To Return to Ready/Run Mode:
Expansion Bus Trip	Set Control Trip Enable bit 10 to 1	186	• When communication is disrupted between the Control Module and digital and/or analog expansion I/O modules, the E300 relay goes into a tripped state	• Red 3 long and 11 short	• Verify that the expansion bus cables are properly plugged into the Bus In and Bus Out ports of all expansion modules • When all expansion I/O modules' status LEDs are solid green, reset the trip state of the E300 relay by pressing the blue reset button on the Communication Module, via network communication, with the internal web server of the EtherNet/IP communication module, or by an assigned digital input
Expansion Bus Warning	Set Control Warning Enable bit 10 to 1	192	• When communication is disrupted between the Control Module and digital and/or analog expansion I/O modules, the E300 relay goes into a warning state	• Yellow 3 long and 11 short	• Verify that the expansion bus cables are properly plugged into the Bus In and Bus Out ports of all expansion modules • When all expansion I/O modules' status LEDs are solid green, the warning state of the E300 relay automatically clears

Emergency Start

In an emergency, it may be necessary to start a motor even if a protection fault or a communication fault exists. The trip condition may be the result of a thermal overload condition or the number of starts exceeded its configuration. These conditions can be overridden using the Emergency Start feature of the E300 relay.

IMPORTANT Activating Emergency Start inhibits overload and blocked start protection. Running in this mode can cause equipment overheating and fire.

To enable the Emergency Start feature in the E300 relay, set the Emergency Start Enable (Parameter 216) to Enable.

Table 7 - Emergency Start (Parameter 216)

Value	Description
0	Disable
1	Enable

Configure one of the Ptxx Input Assignments (Parameters 196…201) to Emergency Start and activate the corresponding digital input.

Table 8 - Emergency Start Input PTXX Assignment (Parameters 196…201)

Value	Assignment	Description
0	Normal	Function as a digital input
1	Trip Reset	Reset the E300 relay when it is in a tripped state
2	Remote Trip	Force the E300 relay to go into a tripped state
3	Activate FLA2	Use the value in FLA2 Setting (Parameter 177) for the current-based protection algorithms
4	Force Snapshot	Force the E300 relay to update its Snapshot log
5	Emergency Start	Issue an Emergency Start command

You can also use a network command to activate the Emergency Start feature. For the EtherNet/IP communication module, you would set the Emergency Start bit to 1 in Output Assembly 144. See Common Industrial Protocol (CIP) Objects on page 227 for more information on EtherNet/IP communication.

When the Emergency Start feature is active, the following actions occur in the E300 relay:

- Protection trips are ignored
- Output relays configured as Trip Relays are put into closed state
- Normal operation resumes with any Normal or Control Relay assigned output relay
- The Emergency Start Active bit is set to 1 in Device Status 0 (Parameter 20) bit 6

Language

The E300 relay with firmware v5.000 and higher supports multiple languages for its Diagnostic Station and web server. Parameter text is displayed in the selected language.

Language (Parameter 212) displays the E300 relay parameter text is displayed in the selected language.

Diagnostic Station User-defined Screens

The Diagnostic Station has four user-defined screens that are part of the its display sequence, in which you can define up to two parameters per screen.

Table 9 - User-defined Screen Parameters

Name	Parameter No.	Description(1)
User-defined Screen 1 – Parameter 1	428	• the E300 parameter number to display for the first parameter in user-defined screen 1
User-defined Screen 1 – Parameter 2	429	• the E300 parameter number to display for the second parameter in user-defined screen 1
User-defined Screen 2 – Parameter 1	430	• he E300 parameter number to display for the first parameter in user-defined screen 2
User-defined Screen 2 – Parameter 2	431	• the E300 parameter number to display for the second parameter in user-defined screen 2
User-defined Screen 3 – Parameter 1	432	• the E300 parameter number to display for the first parameter in user-defined screen 3
User-defined Screen 3 – Parameter 2	433	• the E300 parameter number to display for the second parameter in user-defined screen 3
User-defined Screen 4 – Parameter 1	434	• the E300 parameter number to display for the first parameter in user-defined screen 4
User-defined Screen 4 – Parameter 2	435	• the E300 parameter number to display for the second parameter in user-defined screen 4

(1) You can select one of the 560 available E300 relay parameters.

Display Timeout

Display Timeout (Parameter 436) defines the time duration in which there is no display navigation activity, and the E300 Diagnostic Station returns to its normal display sequence. Any configuration parameters that were left in an edit state are canceled. A value of zero disables the display timeout function.

Analog I/O Expansion Modules

The E300 relay supports up to four Analog I/O Expansion Modules on the E300 Expansion Bus. The E300 Analog Expansion Module has three independent universal inputs and one analog output.

Analog Input Channels

The universal analog inputs can accept the following analog signals:

- Current
  - 4…20 mA
  - 0…20 mA
- Voltage
  - 0…10V DC
  - 1…5V DC
  - 0…5V DC
- 2-Wire or 3-Wire RTD Sensors
  - 100 Ω, 200 Ω, 500 Ω, 1000 Ω Pt 385
  - 100 Ω, 200 Ω, 500 Ω, 1000 Ω Pt 3916
  - 10 Ω Cu 426
  - 100 Ω Ni 618
  - 120 Ω Ni 672
  - 604 Ω NiFe 518
- Resistance
  - 0…150 Ω
  - 0…750 Ω
  - 0…3000 Ω
  - 0…6000 Ω (PTC and NTC Sensors)

The analog inputs can report data in four different formats. Table 10 through Table 13 display the data ranges for all available analog input types for the four available data formats.

Table 10 - Analog Input Data Format for Current Input Type

Input Range	Input Value	Condition	Engineering Units	Engineering Units x 10	Raw / Proportional	PID
4…20 mA	21.00 mA	High Limit	21000	2100	32767	17407
	20.00 mA	High Range	20000	2000	32767	16383
	4.00 mA	Low Range	4000	400	-32768	0
	3.00 mA	Low Limit	3000	300	-32768	-1024
0…20 mA	21.00 mA	High Limit	21000	2100	32767	17202
	20.00 mA	High Range	20000	2000	32767	16383
	0.00 mA	Low Range	0	0	-32768	0
	0.00 mA	Low Limit	0	0	-32768	0

Table 11 - Analog Input Data Format for Voltage Input Type

Input Range	Input Value	Condition	Engineering Units	Engineering Units x 10	Raw / Proportional	PID
0…10 V DC	10.50V DC	High Limit	10500	1050	32767	17202
	10.00V DC	High Range	10000	1000	32767	16383
	0.00V DC	Low Range	0	0	-32768	0
	0.00V DC	Low Limit	0	0	-32768	0
1…5 V DC	5.25V DC	High Limit	5250	525	32767	17407
	5.00V DC	High Range	5000	500	32767	16383
	1.00V DC	Low Range	1000	100	-32768	0
	0.50V DC	Low Limit	500	50	-32768	-2048
0…5V DC	5.25V DC	High Limit	5250	525	32767	17202
	5.00V DC	High Range	5000	500	32767	16383
	0.00V DC	Low Range	0	0	-32768	0
	0.00V DC	Low Limit	0	0	-32768	0

Table 12 - Analog Input Data Format for RTD Input Type

Input Range	Input Value	Condition	Engineering Units	Engineering Units x 10	Raw / Proportional	PID
RTD 100 Ω, 200 Ω, 500 Ω, 1000 Ω Pt 385	850.0 °C	High Limit	8500	850	32767	16383
	850.0 °C	High Range	8500	850	32767	16383
	-200.0 °C	Low Range	-2000	-200	-32768	0
	-200.0 °C	Low Limit	-2000	-200	-32768	0
	1562.0 °F	High Limit	15620	1562	32767	16383
	1562.0 °F	High Range	15620	1562	32767	16383
	-328.0 °F	Low Range	-3280	-328	-32768	0
	-328.0 °F	Low Limit	-3280	-328	-32768	0
RTD 100 Ω, 200 Ω, 500 Ω, 1000 Ω Pt 3916	630.0 °C	High Limit	6300	630	32767	16383
	630.0 °C	High Range	6300	630	32767	16383
	-200.0 °C	Low Range	-2000	-200	-32768	0
	-200.0 °C	Low Limit	-2000	-200	-32768	0
	1166.0 °F	High Limit	11660	1166	32767	16383
	1166.0 °F	High Range	11660	1166	32767	16383
	-328.0 °F	Low Range	-3280	-328	-32768	0
	-328.0 °F	Low Limit	-3280	-328	-32768	0
RTD 10 Ω Cu 426	260.0 °C	High Limit	2600	260	32767	16383
	260.0 °C	High Range	2600	260	32767	16383
	-100.0 °C	Low Range	-1000	-100	-32768	0
	-100.0 °C	Low Limit	-1000	-100	-32768	0
	500.0 °F	High Limit	5000	500	32767	16383
	500.0 °F	High Range	5000	500	32767	16383
	-148.0 °F	Low Range	-1480	-148	-32768	0
	-148.0 °F	Low Limit	-1480	-148	-32768	0

Input Range	Input Value	Condition	Engineering Units	Engineering Units x 10	Raw / Proportional	PID
RTD 100 Ω Ni 618	260.0 °C	High Limit	2600	260	32767	16383
	260.0 °C	High Range	2600	260	32767	16383
	-100.0 °C	Low Range	-1000	-100	-32768	0
	-100.0 °C	Low Limit	-1000	-100	-32768	0
	500.0 °F	High Limit	5000	500	32767	16383
	500.0 °F	High Range	5000	500	32767	16383
	-148.0 °F	Low Range	-1480	-148	-32768	0
	-148.0 °F	Low Limit	-1480	-148	-32768	0
RTD 120 Ω Ni 672	260.0 °C	High Limit	2600	260	32767	16383
	260.0 °C	High Range	2600	260	32767	16383
	-80.0 °C	Low Range	-800	-80	-32768	0
	-80.0 °C	Low Limit	-800	-80	-32768	0
	500.0 °F	High Limit	5000	500	32767	16383
	500.0 °F	High Range	5000	500	32767	16383
	-112.0 °F	Low Range	-1120	-112	-32768	0
	-112.0 °F	Low Limit	-1120	-112	-32768	0
RTD 100 Ω NiFe 518	200.0 °C	High Limit	2000	200	32767	16383
	200.0 °C	High Range	2000	200	32767	16383
	-100.0 °C	Low Range	-1000	-100	-32768	0
	-100.0 °C	Low Limit	-1000	-100	-32768	0
	392.0 °F	High Limit	3920	392	32767	16383
	392.0 °F	High Range	3920	392	32767	16383
	-148.0 °F	Low Range	-1480	-148	-32768	0
	-148.0 °F	Low Limit	-1480	-148	-32768	0

Table 13 - Analog Input Data Format for Resistance Input Type

Input Range	Input Value	Condition	Engineering Units	Engineering Units x 10	Raw / Proportional	PID
Resistance 0…50 Ω	150.00 Ω	High Limit	15000	1500	32767	16383
	150.00 Ω	High Range	15000	1500	32767	16383
	0.00 Ω	Low Range	0	0	-32768	0
	0.00 Ω	Low Limit	0	0	-32768	0
Resistance 0…750 Ω	750.0 Ω	High Limit	7500	750	32767	16383
	750.0 Ω	High Range	7500	750	32767	16383
	0.0 Ω	Low Range	0	0	-32768	0
	0.0 Ω	Low Limit	0	0	-32768	0
Resistance 0…3000 Ω	3000.0 Ω	High Limit	30000	3000	32767	16383
	3000.0 Ω	High Range	30000	3000	32767	16383
	0.0 Ω	Low Range	0	0	-32768	0
	0.0 Ω	Low Limit	0	0	-32768	0
Resistance 0…6000 Ω (PTC / NTC)	6000 Ω	High Limit	6000	600	32767	16383
	6000 Ω	High Range	6000	600	32767	16383
	0 Ω	Low Range	0	0	-32768	0
	0 Ω	Low Limit	0	0	-32768	0

The performance for the input channels of the E300 Analog I/O Expansion Module is dependent on the filter setting for each channel. The total scan time for the input channels of the module is determined by adding the conversion time for all enabled input channels.

Table 14 - Analog Input Channel Conversion Time

Input Type	Filter Frequency	Conversion Time
Current, Voltage, 2-Wire RTD, Resistance	17 Hz	153 ms
	4 Hz	512 ms
	62 Hz	65 ms
	470 Hz	37 ms
3-Wire RTD	17 Hz	306 ms
	4 Hz	1024 ms
	62 Hz	130 ms
	470 Hz	74 ms

Example:

- Channel 00 is configured for a 3-wire RTD and 4 Hz filter (conversion time = 1024 ms).
- Channel 01 is configured for 17 Hz voltage (conversion time = 153 ms).
- Channel 02 is configured for 62 Hz current (conversion time = 65 ms).

The E300 Analog I/O Expansion Module input channel scan time is 1242 ms (1024+153+65).

Analog Output Channel

The isolated analog output can be programmed to provide one of the following analog output signal types:

- Current
  - 4…20 mA
  - 0…20 mA
- Voltage
  - 0…10V DC
  - 1…5V DC
  - 0…5V DC

The analog outputs can report data as a percent of range. Table 15 and Table 16 display the data ranges for all available analog output types.

Table 15 - Analog Output Data Format for Current Output Type

Output Range	Output Signal	Condition	% Range
4…20 mA	21.000 mA	High Limit	106.25%
	20.000 mA	High Range	100.00%
	4.000 mA	Low Range	0.00%
	3.000 mA	Low Limit	-6.25%
0…20 mA	21.00 mA	High Limit	105.00%
	20.00 mA	High Range	100.00%
	0.00 mA	Low Range	0.00%
	0.00 mA	Low Limit	0.00%

Table 16 - Analog Output Data Format for Voltage Output Type

Output Range	Output Value	Condition	% Range
0…10 V DC	10.50V DC	High Limit	105.00%
	10.00V DC	High Range	100.00%
	0.00V DC	Low Range	0.00%
	0.00V DC	Low Limit	0.00%
1…5 V DC	5.25V DC	High Limit	106.25%
	5.00V DC	High Range	100.00%
	1.00V DC	Low Range	0.00%
	0.50V DC	Low Limit	-6.25%
0…5 V DC	5.25V DC	High Limit	105.00%
	5.00V DC	High Range	100.00%
	0.00V DC	Low Range	0.00%
	0.00V DC	Low Limit	0.00%

The analog output can be used to communicate E300 diagnostic information via an analog signal to distributed control systems, programmable logic controllers, or panel-mounted analog meters. The analog output can represent one of the following E300 diagnostic parameters:

- Average %FLA
- %TCU
- Ground Fault Current
- Current Imbalance
- Average L-L Voltage
- Voltage Imbalance
- Total kW
- Total kVAR
- Total kVA
- Total Power Factor
- User-defined Value

Table 17 - Analog Output Selection Type

Output Selection	Low Range	High Range
Average % FLA	0%	100%
Scaled Average % FLA	0%	200%
% TCU	0%	100%
Ground Fault Current		
Internal, 0.50…5.00 A	0.50 A	5.00 A
External, 0.02…0.10 A	0.02 A	0.10 A
External, 0.10…0.50 A	0.10 A	0.50 A
External, 0.20…1.00 A	0.20 A	1.00 A
External, 1.00…5.00 A	1.00 A	5.00 A
Current Imbalance	0%	100%
Average L-L Voltage	0V	(PT Primary) V
Voltage Imbalance	0%	100%
Total kW	0 kW	(FLA1 x PT Primary x 1.732) V
Total kVAR	5.25V DC	(FLA1 x PT Primary x 1.732) V
Total kVA	5.00V DC	(FLA1 x PT Primary x 1.732) V
Total Power Factor	-50% (Lagging)	+50% (Leading)
User-defined Value	-32768	32767

The E300 Analog I/O Expansion Module output channel update rate is 10 ms.

Analog Modules

Table 18 - Analog Module 1 Channel Descriptions

Name	Parameter No.	Description
Input Channel 00 Type	437	• defines the type of analog signal that Input Channel 00 of Analog Module 1 monitors
Input Channel 00 Format	438	• defines the data format for how the analog reading is reported
Input Channel 00 Temperature Unit	439	• defines the temperature unit for RTD sensor readings
Input Channel 00 Filter Frequency	440	• defines update rate for the input channels of the analog module
Input Channel 00 Open Circuit State	441	• defines what the input channel reports when the input channel has an open circuit(1)
Input Channel 00 RTD Type Enable	442	• defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor
Input Channel 01 Type	446	• defines the type of analog signal that Input Channel 01 of Analog Module 1 monitors
Input Channel 01 Format	447	• defines the data format for how the analog reading is reported
Input Channel 01 Temperature Unit	448	• defines the temperature unit for RTD sensor readings
Input Channel 01 Filter Frequency	449	• defines update rate for the input channels of the analog module
Input Channel 01 Open Circuit State	450	• defines what the input channel reports when the input channel has an open circuit(1)
Input Channel 01 RTD Type Enable	451	• defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor
Input Channel 02 Type	455	• defines the type of analog signal that Input Channel 02 of Analog Module 1 monitors
Input Channel 02 Format	456	• defines the data format for how the analog reading is reported
Input Channel 02 Temperature Unit	457	• defines the temperature unit for RTD sensor readings
Input Channel 02 Filter Frequency	458	• defines update rate for the input channels of the analog module
Input Channel 02 Open Circuit State	459	• defines what the input channel reports when the input channel has an open circuit(1)
Input Channel 02 RTD Type Enable	460	• defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor
Output Channel 00 Type	464	• defines the type of analog signal that Output Channel 00 of Analog Module 1 provides
Output Channel 00 Selection	465	• defines the E300 relay parameter that Output Channel 00 represents
Output Channel 00 Expansion Bus Fault Action	466	• defines the value that Output Channel 00 provides when there is an E300 Expansion Bus fault
Output Channel 00 Protection Fault Action	467	• defines the value that Output Channel 00 provides when the E300 is in a tripped state

(1) Open circuit detection is always enabled for this input channel.

Table 19 - Analog Module 2 Descriptions

Name	Parameter No.	Description
Input Channel 00 Type	468	• defines the type of analog signal that Input Channel 00 of Analog Module 2 monitors
Input Channel 00 Format	469	• defines the data format for how the analog reading is reported
Input Channel 00 Temperature Unit	470	• defines the temperature unit for RTD sensor readings
Input Channel 00 Filter Frequency	471	• defines update rate for the input channels of the analog module
Input Channel 00 Open Circuit State	472	• defines what the input channel reports when the input channel has an open circuit(1)
Input Channel 00 RTD Type Enable	473	• defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor
Input Channel 01 Type	477	• defines the type of analog signal that Input Channel 01 of Analog Module 2 monitors
Input Channel 01 Format	478	• defines the data format for how the analog reading is reported
Input Channel 01 Temperature Unit	479	• defines the temperature unit for RTD sensor readings
Input Channel 01 Filter Frequency	480	• defines update rate for the input channels of the analog module
Input Channel 01 Open Circuit State	481	• defines what the input channel reports when the input channel has an open circuit(1)
Input Channel 01 RTD Type Enable	482	• defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor
Input Channel 02 Type	486	• defines the type of analog signal that Input Channel 02 of Analog Module 2 monitors
Input Channel 02 Format	487	• defines the data format for how the analog reading is reported
Input Channel 02 Temperature Unit	488	• defines the temperature unit for RTD sensor readings
Input Channel 02 Filter Frequency	489	• defines update rate for the input channels of the analog module
Input Channel 02 Open Circuit State	490	• defines what the input channel reports when the input channel has an open circuit(1)
Input Channel 02 RTD Type Enable	491	• defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor
Output Channel 00 Type	464	• defines the type of analog signal that Output Channel 00 of Analog Module 2 provides
Output Channel 00 Selection	496	• defines the E300 relay parameter that Output Channel 00 represents
Output Channel 00 Expansion Bus Fault Action	497	• defines the value that the E300 Analog I/O Expansion Module Output Channel 00 provides when there is an E300 Expansion Bus fault
Output Channel 00 Protection Fault Action	498	• defines the value that the E300 Analog I/O Expansion Module Output Channel 00 provides when the E300 is in a tripped state

(1) Open circuit detection is always enabled for this input channel.

Table 20 - Analog Module 3 Channel Descriptions

Name	Parameter No.	Description
Input Channel 00 Type	499	• defines the type of analog signal that Input Channel 00 of Analog Module 3 monitors
Input Channel 00 Format	500	• defines the data format for how the analog reading is reported
Input Channel 00 Temperature Unit	501	• defines the temperature unit for RTD sensor readings
Input Channel 00 Filter Frequency	502	• defines update rate for the input channels of the analog module
Input Channel 00 Open Circuit State	503	• defines what the input channel reports when the input channel has an open circuit(1)
Input Channel 00 RTD Type Enable	504	• defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor
Input Channel 01 Type	508	• defines the type of analog signal that Input Channel 01 of Analog Module 3 monitors
Input Channel 01 Format	509	• defines the data format for how the analog reading is reported
Input Channel 01 Temperature Unit	510	• defines the temperature unit for RTD sensor readings
Input Channel 01 Filter Frequency	511	• defines update rate for the input channels of the analog module
Input Channel 01 Open Circuit State	512	• defines what the input channel reports when the input channel has an open circuit(1)
Input Channel 01 RTD Type Enable	513	• defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor
Input Channel 02 Type	517	• defines the type of analog signal that Input Channel 02 of Analog Module 3 monitors
Input Channel 02 Format	518	• defines the data format for how the analog reading is reported
Input Channel 02 Temperature Unit	519	• defines the temperature unit for RTD sensor readings
Input Channel 02 Filter Frequency	520	• defines update rate for the input channels of the analog module
Input Channel 02 Open Circuit State	521	• defines what the input channel reports when the input channel has an open circuit(1)
Input Channel 02 RTD Type Enable	522	• defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor
Output Channel 00 Type	526	• defines the type of analog signal that Output Channel 00 of Analog Module 3 provides
Output Channel 00 Selection	527	• defines the E300 relay parameter that Output Channel 00 represents
Output Channel 00 Expansion Bus Fault Action	528	• defines the value that the E300 Analog I/O Expansion Module Output Channel 00 provides when there is an E300 Expansion Bus fault
Output Channel 00 Protection Fault Action	529	• defines the value that the E300 Analog I/O Expansion Module Output Channel 00 provides when the E300 is in a tripped state

(1) Open circuit detection is always enabled for this input channel.

Table 21 - Analog Module 4 Channel Descriptions

Name	Parameter No.	Description
Input Channel 00 Type	530	• defines the type of analog signal that Input Channel 00 of Analog Module 4 monitors
Input Channel 00 Format	531	• defines the data format for how the analog reading is reported
Input Channel 00 Temperature Unit	532	• defines the temperature unit for RTD sensor readings
Input Channel 00 Filter Frequency	533	• defines update rate for the input channels of the analog module
Input Channel 00 Open Circuit State	534	• defines what the input channel reports when the input channel has an open circuit(1)
Input Channel 00 RTD Type Enable	535	• defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor
Input Channel 01 Type	539	• defines the type of analog signal that Input Channel 01 of Analog Module 4 monitors
Input Channel 01 Format	540	• defines the data format for how the analog reading is reported
Input Channel 01 Temperature Unit	541	• defines the temperature unit for RTD sensor readings
Input Channel 01 Filter Frequency	542	• defines update rate for the input channels of the analog module
Input Channel 01 Open Circuit State	543	• defines what the input channel reports when the input channel has an open circuit(1)
Input Channel 01 RTD Type Enable	544	• defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor
Input Channel 02 Type	548	• defines the type of analog signal that Input Channel 02 of Analog Module 4 monitors
Input Channel 02 Format	549	• defines the data format for how the analog reading is reported
Input Channel 02 Temperature Unit	550	• defines the temperature unit for RTD sensor readings
Input Channel 02 Filter Frequency	551	• defines update rate for the input channels of the analog module
Input Channel 02 Open Circuit State	552	• defines what the input channel reports when the input channel has an open circuit(1)
Input Channel 02 RTD Type Enable	556	• defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor
Output Channel 00 Type	557	• defines the type of analog signal that Output Channel 00 of Analog Module 4 provides
Output Channel 00 Selection	558	• defines the E300 relay parameter that Output Channel 00 represents
Output Channel 00 Expansion Bus Fault Action	559	• defines the value that the E300 Analog I/O Expansion Module Output Channel 00 provides when there is an E300 Expansion Bus fault
Output Channel 00 Protection Fault Action	560	• defines the value that the E300 Analog I/O Expansion Module Output Channel 00 provides when the E300 is in a tripped state

(1) Open circuit detection is always enabled for this input channel.

Network Start Configuration States

An E300 relay with firmware v5.000 and higher provides two start command bits in Output Assembly 144 (NetworkStart1/O.LogicDefinedPt00Data and NetworkStart2/O.LogicDefinedPt01Data) that is issued by a network scanner or control system and used by a Networked based Operating Mode (Parameter 195) to start and stop a motor through a communication network command. These networked based start commands can be configured to go to a specific state when one of following events occur:

- **Communication Fault Mode** – when network communication is lost or an error occurs
- **Communication Idle Mode** – when a network scanner changes to Idle mode or a PLC changes to Program mode

IMPORTANT It is important that you fully understand the use of these parameters and the order of their priority under the conditions of a communication fault and communication idle event.

The default setting for these modes is to issue a Stop command when a Networked based Operating Mode (Parameter 195) is configured. The Network Start Configuration States follow this priority order:

1. Network Start Communication Fault State
2. Network Start Final Fault State
3. Network Start Communication Idle State

Network Start Communication Fault Modes

When the E300 relay with firmware revision v5.000 or higher loses communication, experiences a communication bus fault, or has a duplicate node address, you can configure the E300 Network Start commands with the Network Start Communication Fault Mode parameters to go to a specific state (Stop or Start) or hold the last state.

An E300 relay with firmware revision v5.000 or higher supports the Fault Mode Output State Duration feature, which can be used with redundant network scanners or control systems. The Fault Mode Output State Duration is the time that the E300 Network Start commands can go to a temporary state (Stop, Start, or Hold Last State) when a communication fault occurs. Configure this temporary state by using the Network Start Communication Fault Mode parameters.

If communication between the E300 relay and a network scanner or control system is not restored within the Fault Mode Output State Duration time (Parameter 561), the E300 Network Start commands go to a final fault state (Stop or Start) which you configure using the Final Fault Mode parameters.

If communication between the E300 relay and a network scanner or control system is restored within the Fault Mode Output State Duration time (Parameter 561), the E300 Network Start commands resume with the state commanded by the network scanner or control system.

The parameters that are listed in Table 22configure the Network Start Configuration Fault Mode for both Network Start commands.

Table 22 - Network Start Configuration Fault Mode Parameters

Name	Parameter No.	Description
Fault Mode Output State Duration(1)	561	• defines the amount of time in seconds that the E300 remains in the Network Start Communication Fault Mode state when a communication fault occurs. 0 = forever • if communication between the E300 relay and a network scanner or control system is not restored within the Fault Mode Output State Duration time, the E300 Network Start command goes to the final fault state, which is configured using the Network Start Final Fault Mode parameters
Network Start Communication Fault Action	569	• defines how the Network Start commands respond when a communication fault occurs
Network Start Communication Fault Value	570	• defines which state the Network Start command should go to when a communication fault occurs
Network Start Final Fault Value(1)	573	• defines which state the Network Start command should go to when communication is not restored within the time defined in Fault Mode Output State Duration (Parameter 561)

(1) Available in E300 relay firmware v5.000 and higher.

Network Start Communication Idle Modes

When a network scanner goes into Idle Mode or a PLC goes into Program Mode while communicating with an E300 relay, you can configure the E300 Network Start commands to go to a specific state (Open or Close) or hold the last state. The parameters that are listed in Table 23 configure the Network Start Communication Idle Mode for the Network Start commands.

Table 23 - Network Start Communication Idle Mode Parameters

Name	Parameter No.	Description
Network Start Communication Idle Action	571	• defines how the Network Start commands respond when a network scanner goes into Idle mode or a PLC goes into Program mode
Network Start Communication Idle Value	572	• defines which state the Network Start commands should go to when a network scanner goes into Idle Mode or a PLC goes into Program Mode

Introduction to Operating Modes

The E300 relay supports a number of Operating Modes, which consist of configuration rules and logic to control typical full-voltage motor starters, including:

- Overload
- Non-Reversing Starter
- Reversing Starter
- Wye/Delta (Star/Delta) Starter
- Two-Speed Starter
- Monitor

The default Operating Mode (Parameter 195) for the E300 relay is Overload (Network) in which the E300 relay operates like a traditional overload relay in which one of the output relays is assigned as a Trip Relay or Control Relay. You can use network commands to control any output relays that are assigned as Normal output relays or Control Relays. For Control Module firmware v1.000 and v2.000, one output relay must be assigned as a Trip Relay. For Control Module firmware v3.000 and higher, one output relay must be configured as a Trip Relay or Control Relay. Invalid configuration of the output relays causes the E300 relay to go into Invalid Configuration Mode and trip on a configuration trip. Operating Modes on page 53 describes the functionality of the available Operating Modes for the E300 relay and their associated configuration rules.

Operating Modes

The E300™ Electronic Overload Relay supports up to 54 operating modes, which consist of configuration rules and logic to control typical full-voltage motor starters, including:

- Overload
- Non-reversing starter
- Reversing starter
- Wye/Delta (Star/Delta) starter
- Two-speed starter
- Monitoring device

This chapter explains the configuration rules, logic, and control wiring that is required for the available operating modes. The default Operating Mode (Parameter 195 or Drop-down menu using the E300 Add-on Profile in Studio 5000™) for the E300 relay is Overload (Network), where the E300 relay operates like a traditional overload relay in which one of the output relays is assigned as a Trip Relay or Control Relay. You can use network commands to control any output relays that are assigned as Normal output relays or Control Relays. For Control Module firmware v1.000 and v2.000, one output relay must be assigned as a Trip Relay. For Control Module firmware v3.000 and higher, one output relay must be configured as a Trip Relay or Control Relay. Invalid configuration of the output relays causes the E300 relay to go into Invalid Configuration Mode and trip on a configuration trip.

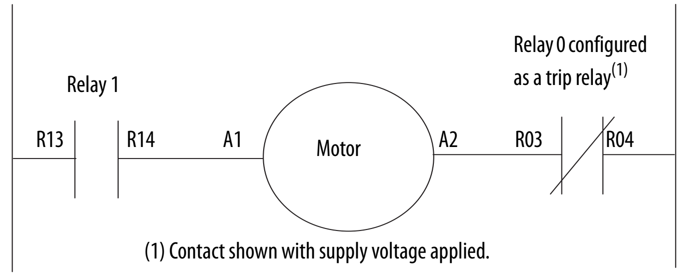
Overload Operating Modes

The overload-based operating modes of the E300 relay make the E300 operate as a traditional overload relay, in which it interrupts the control circuit of a contactor coil with a normally closed trip relay or a normally open control relay. There are four overload-based operating modes to choose from:

- Network
- Operator Station
- Local I/O
- Custom

The E300 relay is wired as a traditional overload relay with one of the output relays configured as a normally closed trip relay. Figure 7 is a wiring diagram of a non-reversing starter. Relay 0 is configured as a trip relay, and Relay 1 is configured as a normally open control relay, which receives commands from an automation controller to energize the contactor coil.

Figure 7 - Trip Relay Wiring Diagram



For Control Module firmware v3.000 and higher, you can also wire the E300 relay as a control relay so that the relay that is controlled by the communication network opens when a trip event occurs. Figure 8 is a wiring diagram of a non-reversing starter with Relay 0 configured as a control relay. Relay 0 receives control commands from an automation controller to energize or de-energize the contactor coil. Relay 0 also goes to an open state when there is a trip event.

Figure 8 - Control Relay Wiring Diagram

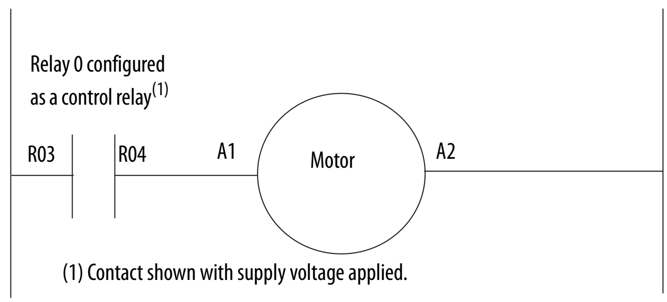
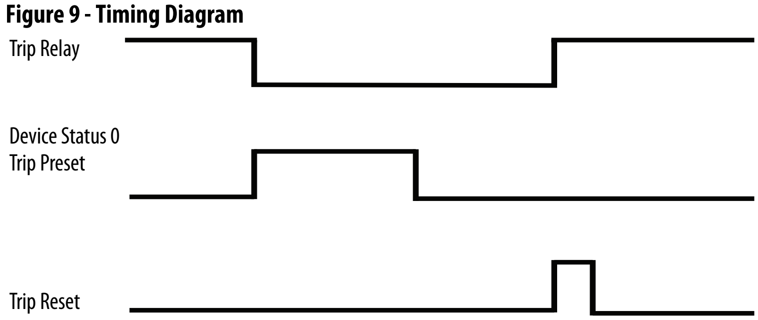


Figure 9 - Timing Diagram



Overload (Network)

The E300 relay's default Operating Mode (Parameter 195 = 2) is *Overload (Network)*, in which the E300 operates as a traditional overload relay with one output relay that is assigned as a normally closed trip relay or a normally open control relay. You can use network commands to control the control relay or any of the remaining output relays that are assigned as normal output relays.

The reset button of the E300 Operator Station is enabled for this operating mode.

Rules

1. For Control Module firmware v1.000 and v2.000, one output relay must be assigned as a trip relay. Set any of the Output Ptxx Assignments (Parameters 202…204) to Trip Relay.

2. For Control Module firmware v3.000 and higher, one output relay must be assigned as a trip relay or control relay. Set any of the Output Ptxx Assignments (Parameters 202…204) to Trip Relay or Control Relay.
3. Overload Trip must be enabled in TripEnableI (Parameter 183).

DeviceLogix™ Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 2

Overload (Operator Station)

The E300 relay's Operating Mode *Overload (Operator Station)* (Parameter 195 = 26) operates as a traditional overload relay with one output relay that is assigned as a normally closed trip relay or a normally open control relay. The Overload (Operator Station) operating mode is used when an automation controller uses the start and stop keys of the E300 Operator Station for its motor control logic. You can use network commands to control the control relay or any of the remaining output relays that are assigned as normal output relays.

The reset button of the E300 Operator Station is enabled, and the Local/Remote yellow LED is illuminated to indicate that the operator station is being used for local control.

Rules

1. Available for Control Module firmware v5.000 and higher.
2. One output relay must be assigned as a trip relay or control relay. Set any of the Output Ptxx Assignments (Parameters 202…204) to Trip Relay or Control Relay.
3. Overload Trip must be enabled in TripEnableI (Parameter 183).
4. Operator Station Trip must be disabled in TripEnableC (Parameter 186).
5. Operator Station Option Match Trip or Warning must be enabled.
   - Option Match Trip or must be enabled in TripEnableC (Parameter 186)
   - Operator Station must be enabled in Mismatch Action (Parameter 233)
   - An operator station must be selected in Operator Station Type (Parameter 224)

   Or
   - Option Match Warning must be enabled in WarningEnableC (Parameter 192)
   - Operator Station must be disabled in Mismatch Action (Parameter 233)
   - An operator station must be selected in Operator Station Type (Parameter 224)
6. Communication Fault & Idle Override (Parameter 346) must be enabled.
7. Network Fault Override (Parameter 347) must be enabled.

DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 26.

Overload (Local I/O)

The E300 relay's Operating Mode *Overload (Local I/O)* (Parameter 195 = 35) operates as a traditional overload relay with one output relay that is assigned as a normally closed trip relay or a normally open control relay. The Overload (Local I/O) operating mode is used for standalone applications or automation systems that do not use an E300 Operator Station. You can use the digital inputs of the E300 for the motor control logic of an automation controller. The automation controller can use network commands to control the control relay or any of the remaining output relays that are assigned as Normal output relays. The reset button of the E300 Operator Station is disabled, and a digital input that is assigned as a trip reset is required.

Rules

1. Available for Control Module firmware v5.000 and higher.
2. One output relay must be assigned as a trip relay or control relay. Set any of the Output Ptxx Assignments (Parameters 202…204) to Trip Relay or Control Relay.
3. Overload Trip must be enabled in TripEnableI (Parameter 183).
4. Operator Station Trip must be disabled in TripEnableC (Parameter 186).
5. Operator Station Option Match Trip or Warning must be enabled.
   - Option Match Trip or must be enabled in TripEnableC (Parameter 186)
   - Operator Station must be enabled in Mismatch Action (Parameter 233)
   - An operator station must be selected in Operator Station Type (Parameter 224)

   Or

   - Option Match Warning must be enabled in WarningEnableC (Parameter 192)
   - Operator Station must be disabled in Mismatch Action (Parameter 233)
   - An operator station must be selected in Operator Station Type (Parameter 224)
6. Communication Fault & Idle Override (Parameter 346) must be enabled.
7. Network Fault Override (Parameter 347) must be enabled.

DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 35.

Overload (Custom)

The E300 relay's Operating Mode *Overload (Custom)* (Parameter 195 = 49) operates as a traditional overload relay with one output relay that is assigned as a normally closed trip relay or a normally open control relay. The Overload (Custom) operating mode is used for applications that want customized DeviceLogix programs. This operating mode requires minimal configuration rules.

Rules

1. Available for Control Module firmware v5.000 and higher.

2. Set any of the Output Ptxx Assignments (Parameters 202…204) to Trip Relay or Control Relay.
3. Overload Trip must be enabled in TripEnableI (Parameter 183).

DeviceLogix Program

The last saved DeviceLogix program is executed in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 49.

Non-reversing Starter Operating Modes

The non-reversing starter-based operating modes of the E300 relay provide the control logic for a non-reversing full voltage starter. A normally open control relay controls the contactor coil. When a trip event occurs, the control relay remains open until the E300 receives a trip reset command. There are 15 non-reversing starter-based operating modes to choose from:

- Network
- Network with Feedback
- Operator Station
- Operator Station with Feedback
- Local I/O – Two-wire Control
- Local I/O with Feedback – Two-wire Control
- Local I/O – Three-wire Control
- Local I/O with Feedback – Three-wire Control
- Network & Operator Station
- Network & Operator Station with Feedback
- Network & Local I/O – Two-wire Control
- Network & Local I/O with Feedback – Two-wire Control
- Network & Local I/O – Three-wire Control
- Network & Local I/O with Feedback – Three-wire Control
- Custom

Non-reversing Starter (Network)

The E300 relay's Operating Mode *Non-Reversing Starter (Network)* (Parameter 195 = 3) uses the network tag *LogicDefinedPt00Data* in Output Assembly 144 to control Relay 0, which controls the contactor coil. LogicDefinedPt00Data is a maintained value, so the non-reversing starter remains energized when LogicDefinedPt00Data has a value of 1. You can program the appropriate state of the starter when communication is lost using the Network Communication Fault and Network Communication Idle parameters (Parameters 569 – 573) described in Chapter 3.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Non-reversing Starter (Network) operating mode uses the value in network tag *LogicDefinedPt00Data* to control the starter. When communication is restored between an automation controller and the E300 relay , the starter energizes if the value in LogicDefinedPt00Data is set to 1.

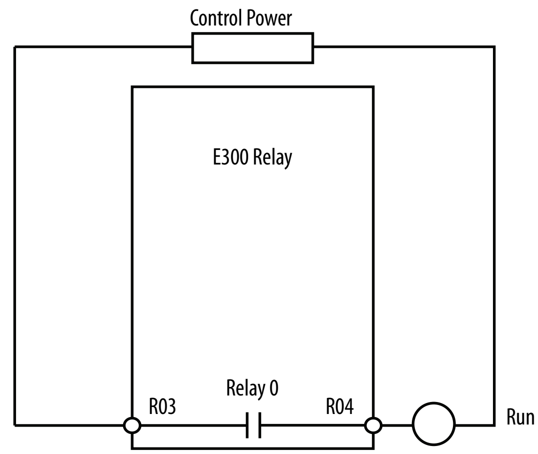
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Overload Trip must be enabled in TripEnableI (Parameter 183).

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay in which the relay is controlled by the communication network and opens when a trip event occurs. Figure 10 is a wiring diagram of a non-reversing starter with Output Relay 0 configured as a control relay.

Figure 10 - Non-reversing Starter (Network) Wiring Diagram

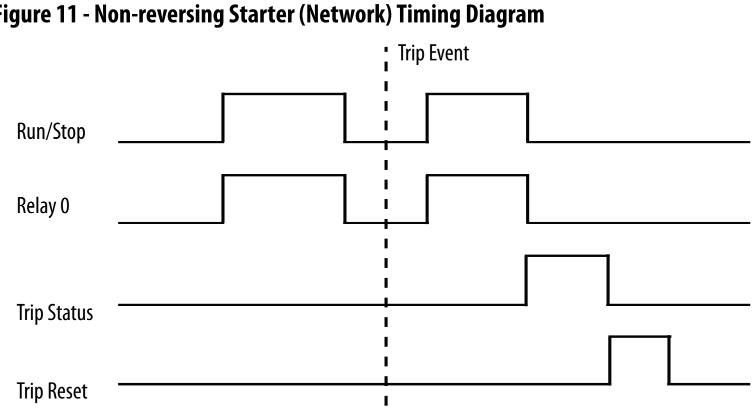


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 3.

Timing Diagram

Figure 11 - Non-reversing Starter (Network) Timing Diagram



Non-reversing Starter (Network) with Feedback

The E300 relay's Operating Mode *Non-Reversing Starter (Network) with Feedback* (Parameter 195 = 4) uses the network tag *LogicDefinedPt00Data* in Output Assembly 144 to control Relay 0, which controls the contactor coil. LogicDefinedPt00Data is a maintained value, so the non-reversing starter remains energized when LogicDefinedPt00Data has a value of 1. You can program the appropriate state of the starter when communication is lost using the Network Communication Fault and Network Communication Idle parameters (Parameters 569 – 573) described in Chapter 3.

The auxiliary contact from the contactor of the non-reversing starter is wired into Input 0. If a feedback signal is not received before the time identified in Feedback Timeout (Parameter 213), then the E300 relay issues a trip or warning event.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Non-reversing Starter (Network) operating mode uses the value in network tag *LogicDefinedPt00Data* to control the starter. When communication is restored between an automation controller and the E300 relay, the starter energizes if the value in LogicDefinedPt00Data is set to 1.

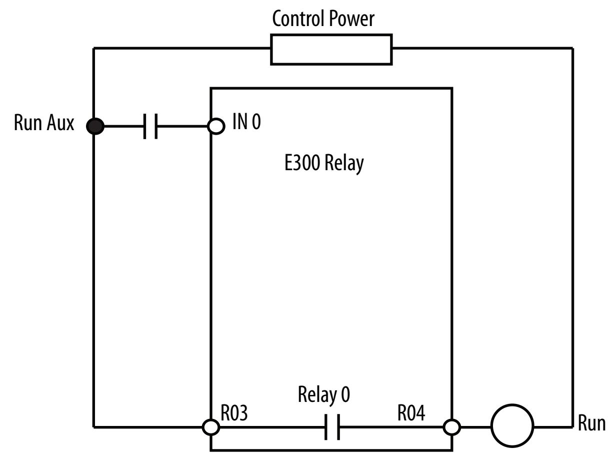
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Overload Trip must be enabled in TripEnableI (Parameter 183).
4. Feedback Timeout Trip in TripEnableC (Parameter 186) or Feedback Timeout Warning in WarningEnableC (Parameter 192) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay in which the relay is controlled by the communication network and opens when a trip event occurs. Figure 12 is a wiring diagram of a non-reversing starter with the contactor auxiliary wired to Input 0 and Output Relay 0 configured as a control relay.

Figure 12 - Non-reversing Starter (Network) with Feedback Wiring Diagram

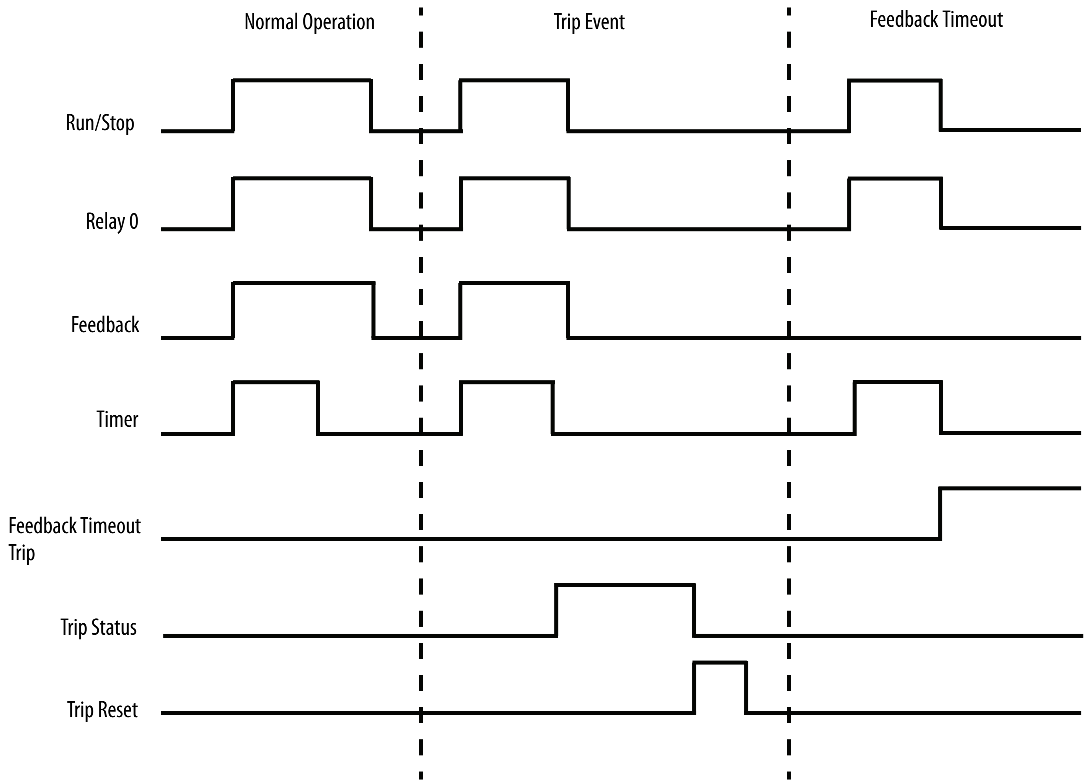


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 4.

Timing Diagram

Figure 13 - Non-reversing Starter (Network) with Feedback Timing Diagram



Non-reversing Starter (Operator Station)

The E300 relay's Operating Mode *Non-Reversing Starter (Operating Station)* (Parameter 195 = 27) uses the Operator Station's "I" and "0" keys to control Relay 0, which controls the contactor coil. These keys are momentary push buttons, so the non-reversing starter remains energized when you release the "I" button. The E300 relay issues a trip or warning event if the E300 Operator Station disconnects from the base relay.

The reset button of the E300 Operator Station is enabled, and the Local/Remote yellow LED is illuminated to indicate that the operator station is being used for local control.

Rules

1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Overload Trip must be enabled in TripEnableI (Parameter 183).
4. Operator Station Trip must be disabled in TripEnableC (Parameter 186).
5. Operator Station Option Match Trip or Warning must be enabled.
   - Option Match Trip or must be enabled in TripEnableC (Parameter 186)
   - Operator Station must be enabled in Mismatch Action (Parameter 233)
   - An operator station must be selected in Operator Station Type (Parameter 224)

Or

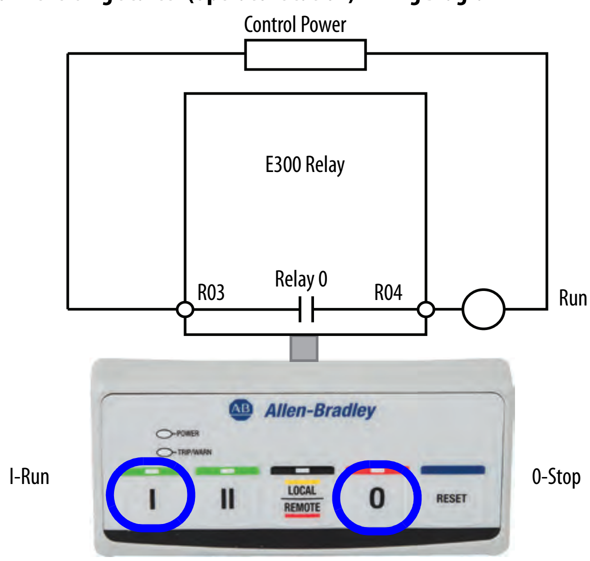
- Option Match Warning must be enabled in WarningEnableC (Parameter 192)
- Operator Station must be disabled in Mismatch Action (Parameter 233)
- An operator station must be selected in Operator Station Type (Parameter 224)

6. Communication Fault & Idle Override (Parameter 346) must be enabled.
7. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay, and it opens when a trip event occurs. Figure 14 is a wiring diagram of a non-reversing starter with Output Relay 0 configured as a control relay.

Figure 14 - Non-reversing Starter (Operator Station) Wiring Diagram

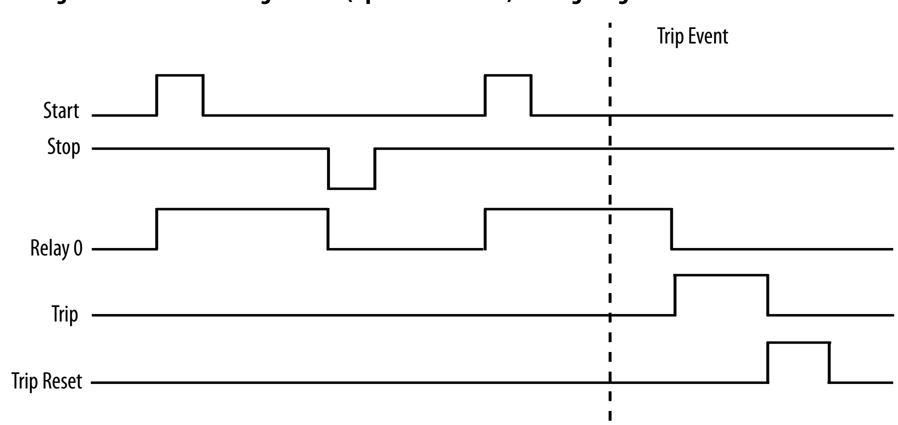


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 27.

Timing Diagram

Figure 15 - Non-reversing Starter (Operator Station) Timing Diagram



Non-reversing Starter (Operator Station) with Feedback

The E300 relay's Operating Mode *Non-Reversing Starter (Operator Station) with Feedback* (Parameter 195 = 28) uses the E300 Operator Station's "I" and "0" keys to control Relay 0, which controls the contactor coil. These keys are momentary push buttons, so the non-reversing starter remains energized when you release the "I" button. The E300 relay issues a trip or warning event if the E300 Operator Station disconnects from the base relay.

The auxiliary contact from the contactor of the non-reversing starter is wired into Input 0. If a feedback signal is not received before the time identified in Feedback Timeout (Parameter 213), then the E300 relay issues a trip or warning event.

The reset button of the E300 Operator Station is enabled, and the Local/Remote yellow LED is illuminated to indicate that the operator station is being used for local control.

Rules

1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Overload Trip must be enabled in TripEnableI (Parameter 183).
4. Operator Station Trip must be disabled in TripEnableC (Parameter 186).
5. Operator Station Option Match Trip or Warning must be enabled.
   - Option Match Trip or must be enabled in TripEnableC (Parameter 186)
   - Operator Station must be enabled in Mismatch Action (Parameter 233)
   - An operator station must be selected in Operator Station Type (Parameter 224)

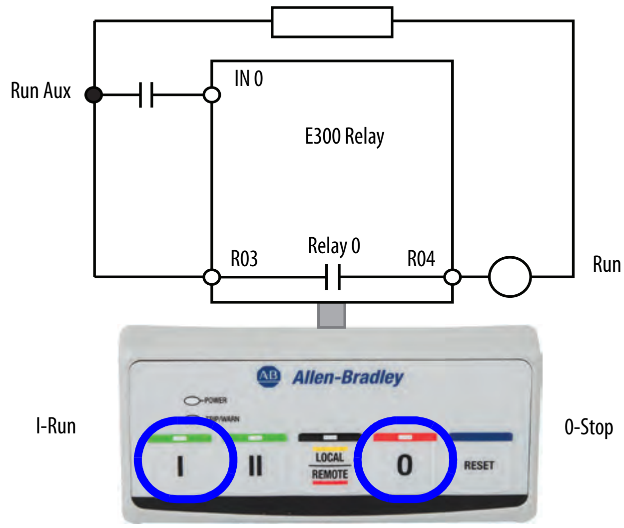
   Or

   - Option Match Warning must be enabled in WarningEnableC (Parameter 192)
   - Operator Station must be disabled in Mismatch Action (Parameter 233)
   - An operator station must be selected in Operator Station Type (Parameter 224)
6. Communication Fault & Idle Override (Parameter 346) must be enabled.
7. Network Fault Override (Parameter 347) must be enabled.
8. Feedback Timeout Trip in TripEnableC (Parameter 186) or Feedback Timeout Warning in WarningEnableC (Parameter 192) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay in which the relay is controlled by the communication network and opens when a trip event occurs. Figure 16 is a wiring diagram of a non-reversing starter with the contactor auxiliary wired to Input 0 and Output Relay 0 configured as a control relay.

Figure 16 - Non-reversing Starter (Operator Station) with Feedback Wiring Diagram

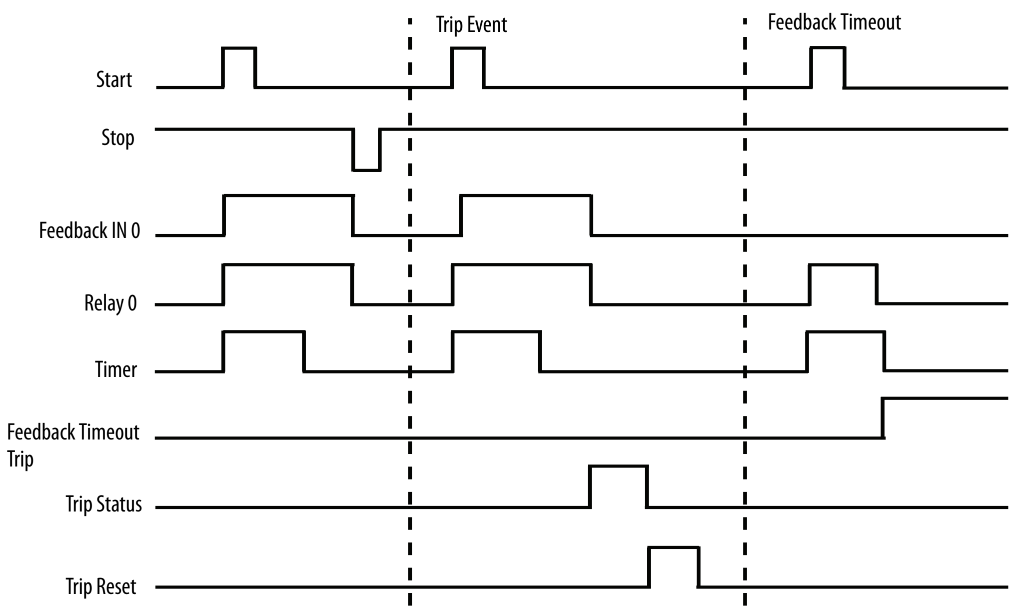


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 28.

Timing Diagram

Figure 17 - Non-reversing Starter (Operator Station) with Feedback Timing Diagram



Non-reversing Starter (Local I/O) – Two-wire Control

The E300 relay's Operating Mode *Non-Reversing Starter (Local I/O) – Two Wire Control* (Parameter 195 = 36) uses Input 0 to control Output Relay 0, which controls the contactor coil. Input 0 is a maintained value, so the non-reversing starter remains energized when Input 0 is active.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Non-reversing Starter (Local I/O) – Two-wire Control operating mode uses the signal from Input 0 to control the starter. When an E300 relay powers up, the starter energizes if Input 0 is active.

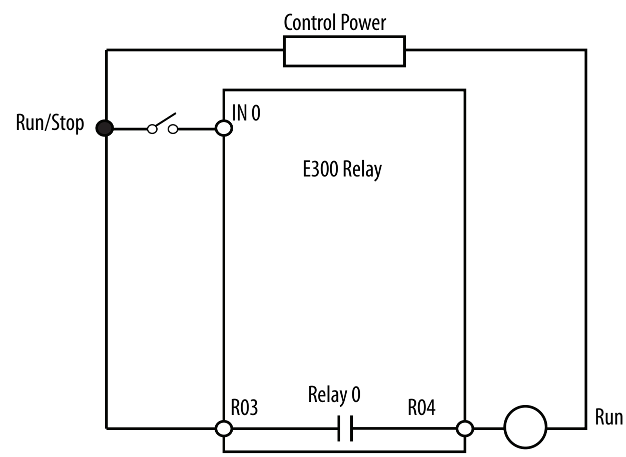
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Overload Trip must be enabled in TripEnableI (Parameter 183).
4. Communication Fault & Idle Override (Parameter 346) must be enabled.
5. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay in which the relay is controlled by the state of Input 0 and opens when a trip event occurs. Figure 18 is a wiring diagram of a non-reversing starter with Output Relay 0 configured as a control relay.

Figure 18 - Non-reversing Starter (Local I/O) – Two-wire Control Wiring Diagram

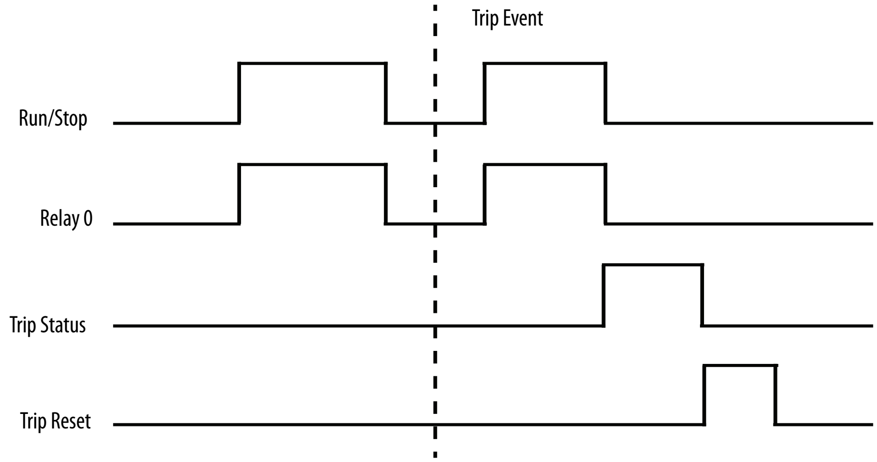


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 36.

Timing Diagram

Figure 19 - Non-reversing Starter (Local I/O) – Two-wire Control Timing Diagram



Non-reversing Starter (Local I/O) – Two-wire Control with Feedback

The E300 relay's Operating Mode *Non-Reversing Starter (Local I/O) – Two Wire Control with Feedback* (Parameter 195 = 37) uses the state of Input 1 to control Output Relay 0, which controls the contactor coil. Input 0 is a maintained value, so the non-reversing starter remains energized when Input 1 is active.

The auxiliary contact from the non-reversing starter's contactor is wired into Input 0. If a feedback signal is not received before the time identified in Feedback Timeout (Parameter 213), then the E300 relay issues a trip or warning event.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Non-reversing Starter (Local I/O) – Two-wire Control with Feedback operating mode uses the state of Input 1 to control the starter. When the E300 relay powers up, the starter energizes if Input 1 is active.

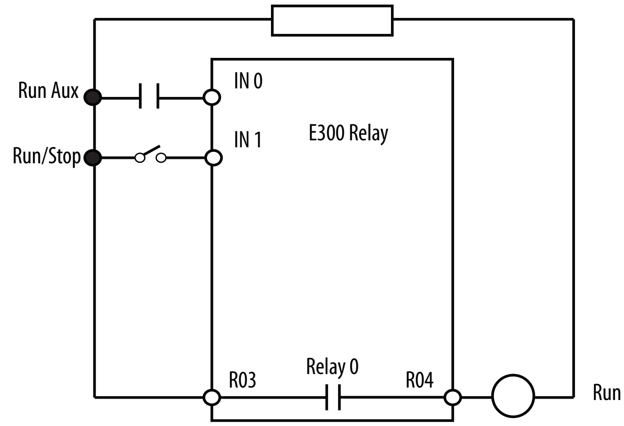
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Overload Trip must be enabled in TripEnableI (Parameter 183).
4. Feedback Timeout Trip in TripEnableC (Parameter 186) or Feedback Timeout Warning in WarningEnableC (Parameter 192) must be enabled.
5. Communication Fault & Idle Override (Parameter 346) must be enabled.
6. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay in which the relay is controlled by the state if Input 1 and opens when a trip event occurs. Figure 20 is a wiring diagram of a non-reversing starter with Output Relay 0 configured as a control relay.

Figure 20 - Non-reversing Starter (Local I/O) – Two-wire Control with Feedback Wiring Diagram

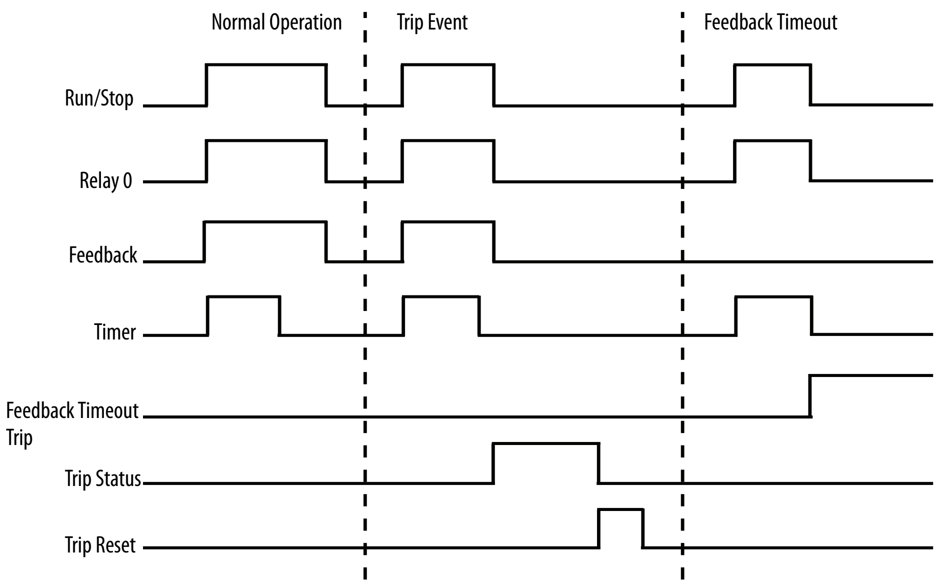


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 37.

Timing Diagram

Figure 21 - Non-reversing Starter (Local I/O) – Two-wire Control with Feedback Timing Diagram



Non-reversing Starter (Local I/O) – Three-wire Control

The E300 relay's Operating Mode *Non-Reversing Starter (Local I/O) – Three Wire Control* (Parameter 195 = 38) uses an active state in Input 1 (normally open momentary push button) to energize Output Relay 0, which controls the contactor coil, and a de-active state in Input 0 is used (normally closed push button) to de-energize Output Relay 0. Both Input 0 and Input 1 are momentary values, so the non-reversing starter only energizes if Input 0 is active and Input 1 is momentarily active.

The reset button of the E300 Operator Station is enabled for this operating mode.

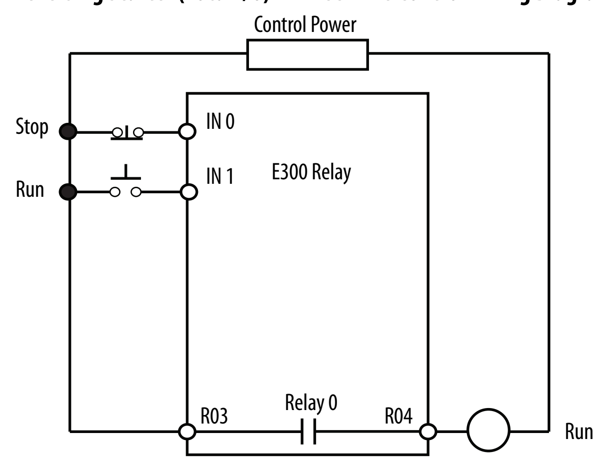
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Overload Trip must be enabled in TripEnableI (Parameter 183).
4. Communication Fault & Idle Override (Parameter 346) must be enabled.
5. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay in which the relay is energized when Input 0 is active and Input 1 is momentarily active. Output Relay 0 de-energizes when Input 0 is momentarily de-active or when a trip event occurs. Figure 22 is a wiring diagram of a non-reversing starter with three wire control and an Output Relay 0 configured as a control relay.

Figure 22 - Non-reversing Starter (Local I/O) – Three-wire Control Wiring Diagram

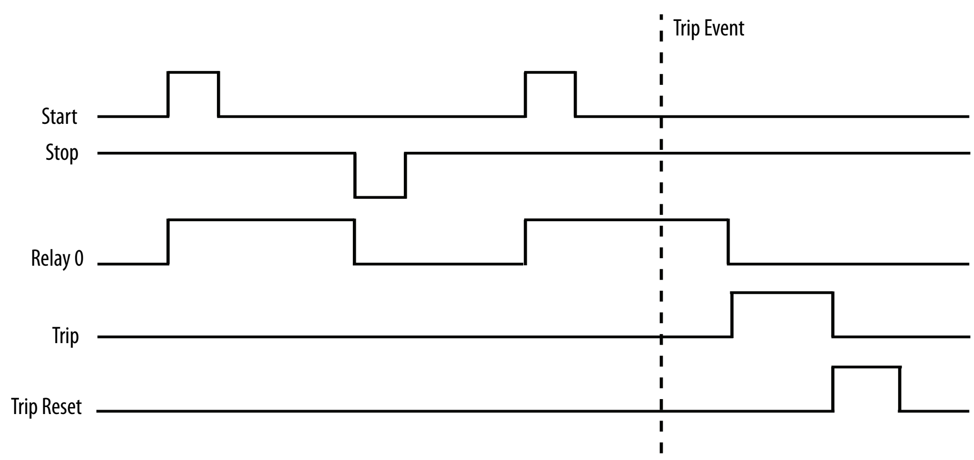


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 38.

Timing Diagram

Figure 23 - Non-reversing Starter (Local I/O) – Three-wire Control Timing Diagram



Non-reversing Starter (Local I/O) – Three-wire Control with Feedback

The E300 relay's Operating Mode *Non-Reversing Starter (Local I/O) – Three Wire Control with Feedback* (Parameter 195 = 39) uses an active state in Input 1 (normally open momentary push button) to energize Output Relay 0, which controls the contactor coil, and a de-active state in Input 2 is used (normally closed momentary push button) to de-energize Output Relay 0. Both Input 1 and Input 2 are momentary values, so the non-reversing starter only energizes if Input 2 is active and Input 1 is momentarily active.

The auxiliary contact from the non-reversing starter's contactor is wired into Input 0. If a feedback signal is not received before the time identified in Feedback Timeout (Parameter 213), then the E300 relay issues a trip or warning event.

The reset button of the E300 Operator Station is enabled for this operating mode.

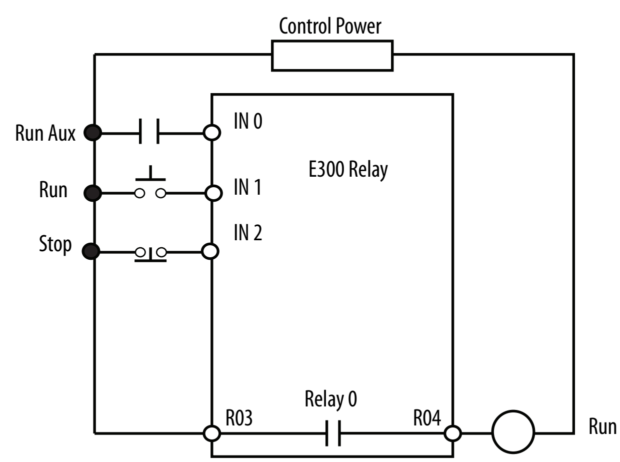
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Three digital inputs must be available on the Control Module
3. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
4. Overload Trip must be enabled in TripEnableI (Parameter 183).
5. Feedback Timeout Trip in TripEnableC (Parameter 186) or Feedback Timeout Warning in WarningEnableC (Parameter 192) must be enabled.
6. Communication Fault & Idle Override (Parameter 346) must be enabled.
7. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay in which the relay is controlled by the state if Input 1 and opens when a trip event occurs. Figure 24 is a wiring diagram of a non-reversing starter with three wire control and Output Relay 0 configured as a control relay.

Figure 24 - Non-reversing Starter (Local I/O) – Three-wire Control with Feedback Wiring Diagram

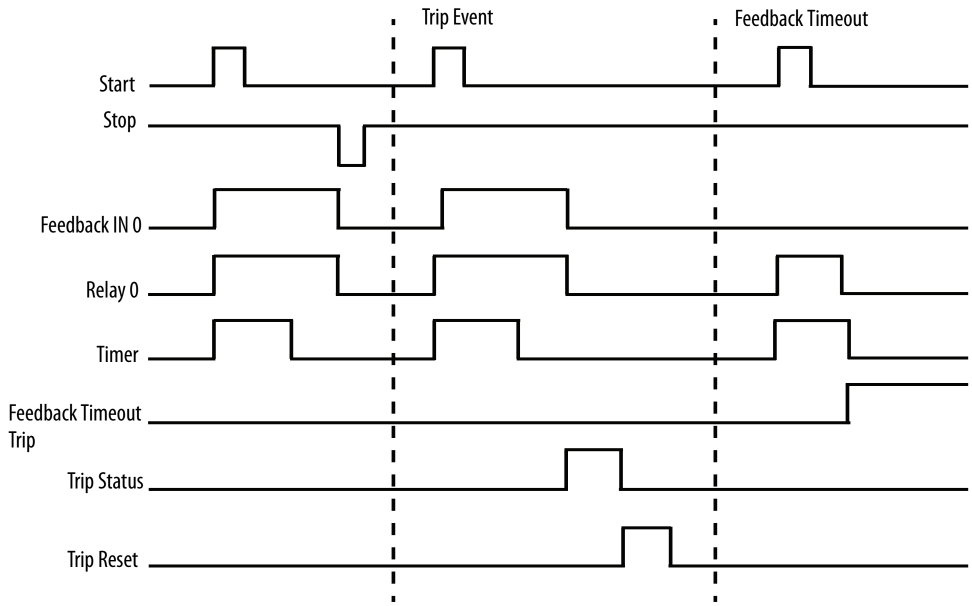


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on powerup or when Operating Mode (Parameter 195) is set to a value of 39.

Timing Diagram

Figure 25 - Non-reversing Starter (Local I/O) – Three-wire Control with Feedback Timing Diagram



Non-reversing Starter (Network & Operator Station)

The E300 relay's Operating Mode *Non-Reversing Starter (Network& Operator Station)* (Parameter 195 = 11) uses the network tag *LogicDefinedPt00Data* in Output Assembly 144 in Remote control mode and the E300 Operator Station's "I" and "0" keys in Local control mode to control Relay 0, which controls the contactor coil. LogicDefinedPt00Data is a maintained value, so the non-reversing starter remains energized when LogicDefinedPt00Data has a value of 1 in Remote control mode. You can program the appropriate state of the starter when communication is lost in Remote control mode by using the Network Communication Fault and Network Communication Idle parameters (Parameters 569 – 573) described in Chapter 3.

The E300 Operator Station's "I", "0", and "Local/Remote" keys are momentary push buttons. Press and release the "I" button in Local control mode to energize the starter. Press and release the "0" button in Local control mode to de-energize the starter.

To change between Local and Remote control mode press and release the "Local/Remote" button on the E300 Operator Station. The LED above "Local/Remote" button illuminates yellow in Local control mode and red in Remote control mode.

The E300 relay issues a trip or warning event if the E300 Operator Station disconnects from the base relay.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Non-reversing Starter (Network & Operator Station) operating mode uses the value in network tag *LogicDefinedPt00Data* to control the starter. When communication is restored between an automation controller and the E300 relay, the starter energizes if the value in LogicDefinedPt00Data is set to 1.

Rules

1. Available for Control Module firmware v5.000 and higher.

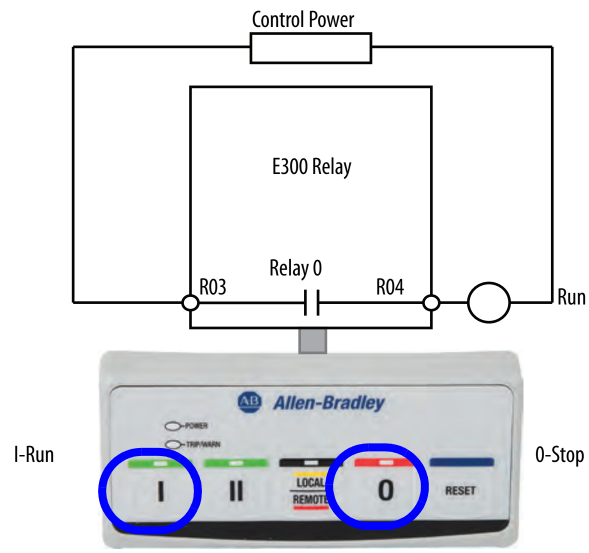
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Overload Trip must be enabled in TripEnableI (Parameter 183).
4. Operator Station Trip must be disabled in TripEnableC (Parameter 186).
5. Operator Station Option Match Trip or Warning must be enabled.
   - Option Match Trip or must be enabled in TripEnableC (Parameter 186)
   - Operator Station must be enabled in Mismatch Action (Parameter 233)
   - An operator station must be selected in Operator Station Type (Parameter 224)

   Or
   - Option Match Warning must be enabled in WarningEnableC (Parameter 192)
   - Operator Station must be disabled in Mismatch Action (Parameter 233)
   - An operator station must be selected in Operator Station Type (Parameter 224)
6. Communication Fault & Idle Override (Parameter 346) must be enabled.
7. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay in which the relay is controlled by the communication network and opens when a trip event occurs. Figure 26 is a wiring diagram of a non-reversing starter with Output Relay 0 configured as a control relay.

Figure 26 - Non-reversing Starter (Network & Operator Station) Wiring Diagram



DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 11.

Non-reversing Starter (Network & Operator Station) with Feedback

The E300 relay's Operating Mode *Non-Reversing Starter (Network& Operator Station) with Feedback* (Parameter 195 = 12) uses the network tag *LogicDefinedPt00Data* in Output Assembly 144 in Remote control mode and the E300 Operator Station's "I" and "0" keys in Local control mode to control Relay 0, which controls the contactor coil. LogicDefinedPt00Data is a maintained value, so the non-reversing starter remains energized when LogicDefinedPt00Data has a value of 1 in Remote control mode. You can program the appropriate state of the starter when communication is lost in Remote control mode by using the Network Communication Fault and Network Communication Idle parameters (Parameters 569 – 573) described in Chapter 3.

The E300 Operator Station's "I", "0", and "Local/Remote" keys are momentary push buttons. Press and release the "I" button in Local control mode to energize the starter. Press and release the "0" button in Local control mode to de-energize the starter.

To change between Local and Remote control mode press and release the "Local/Remote" button on the E300 Operator Station. The LED above "Local/Remote" button illuminates yellow in Local control mode and red in Remote control mode.

The auxiliary contact from the non-reversing starter's contactor is wired into Input 0. If a feedback signal is not received before the time identified in Feedback Timeout (Parameter 213), then the E300 relay issues a trip or warning event.

The E300 relay issues a trip or warning event if the E300 Operator Station disconnects from the base relay.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Non-reversing Starter (Network & Operator Station) operating mode uses the value in network tag *LogicDefinedPt00Data* to control the starter. When communication is restored between an automation controller and the E300 relay, the starter energizes if the value in LogicDefinedPt00Data is set to 1.

Rules

1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Overload Trip must be enabled in TripEnableI (Parameter 183).
4. Operator Station Trip must be disabled in TripEnableC (Parameter 186).
5. Operator Station Option Match Trip or Warning must be enabled.
   - Option Match Trip or must be enabled in TripEnableC (Parameter 186)
   - Operator Station must be enabled in Mismatch Action (Parameter 233)
   - An operator station must be selected in Operator Station Type (Parameter 224)

   Or

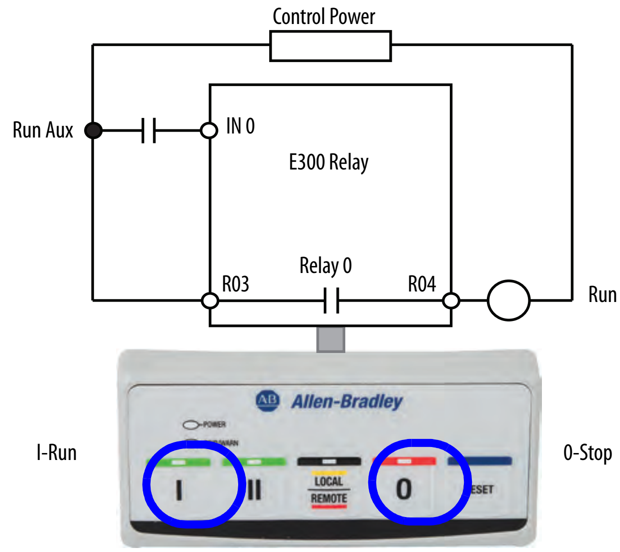
   - Option Match Warning must be enabled in WarningEnableC (Parameter 192)
   - Operator Station must be disabled in Mismatch Action (Parameter 233)
   - An operator station must be selected in Operator Station Type (Parameter 224)
6. Feedback Timeout Trip in TripEnableC (Parameter 186) or Feedback Timeout Warning in WarningEnableC (Parameter 192) must be enabled.
7. Communication Fault & Idle Override (Parameter 346) must be enabled.

8. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay in which the relay is controlled by the communication network and opens when a trip event occurs. Figure 27 is a wiring diagram of a non-reversing starter with the contactor auxiliary wired into Input 0 and Output Relay 0 configured as a control relay.

Figure 27 - Non-reversing Starter (Network & Operator Station) with Feedback Wiring Diagram



DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 12.

Non-reversing Starter (Network & Local I/O) – Two-wire Control

The E300 relay's Operating Mode *Non-Reversing Starter (Network & Local I/O) – Two Wire Control* (Parameter 195 = 16) uses the network tag *LogicDefinedPt00Data* in Output Assembly 144 in Remote control mode and Input 0 in Local control mode to control Relay 0, which controls the contactor coil. Input 1 determines if the motor starter is in Remote or Local control mode. LogicDefinedPt00Data is a maintained value, so the non-reversing starter remains energized when LogicDefinedPt00Data has a value of 1 in Remote control mode. You can program the appropriate state of the starter when communication is lost in Remote control mode by using the Network Communication Fault and Network Communication Idle parameters (Parameters 569 – 573) described in Chapter 3

In Local control mode, the state of Input 0 controls Output Relay 0, which controls the contactor coil. Input 0 is a maintained value, so the non-reversing starter remains energized when Input 0 is active.

Input 1 is used to select between Local and Remote control mode. Activate Input 1 to select Remote control mode. De-activate Input 1 to select Local control mode.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT The Non-reversing Starter (Network & Operator Station) operating mode uses the value in network tag *LogicDefinedPt00Data* to control the starter. When communication is restored between an automation controller and the E300 relay, the starter energizes if the value in LogicDefinedPt00Data is set to 1.

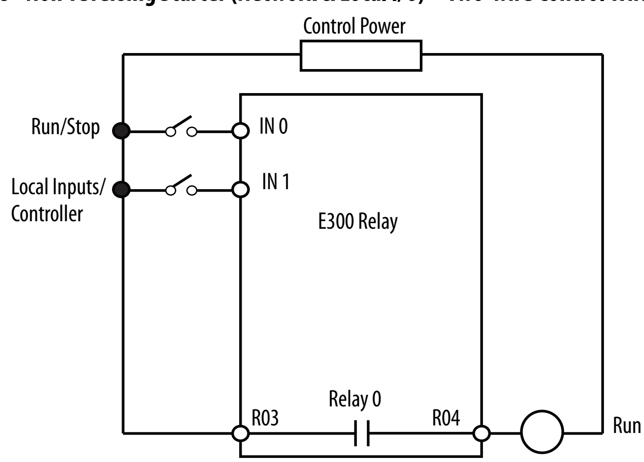
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Overload Trip must be enabled in TripEnableI (Parameter 183).
4. Communication Fault & Idle Override (Parameter 346) must be enabled.
5. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay in which the relay is controlled by the communication network and opens when a trip event occurs. Figure 28 is a wiring diagram of a non-reversing starter with Output Relay 0 configured as a control relay.

Figure 28 - Non-reversing Starter (Network & Local I/O) – Two-wire Control Wiring Diagram

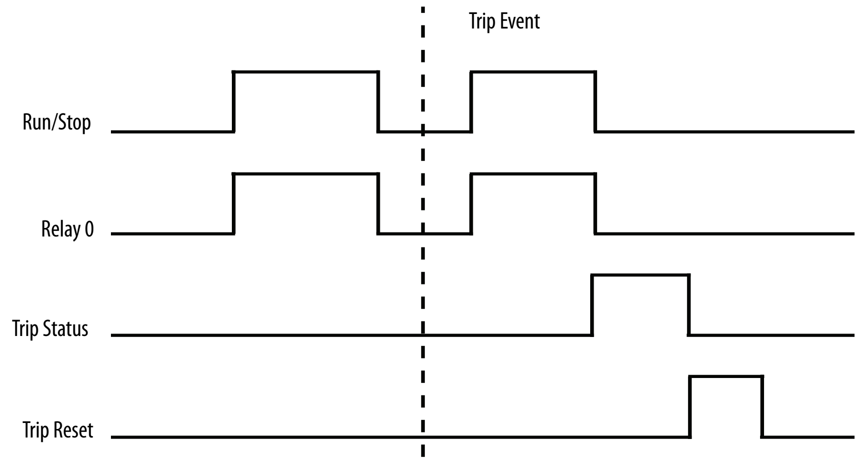


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 16.

Timing Diagram

Figure 29 - Non-reversing Starter (Network & Local I/O) – Two-wire Control Timing Diagram



Non-reversing Starter (Network & Local I/O) with Feedback – Two-wire Control

The E300 relay's Operating Mode *Non-Reversing Starter (Network & Local I/O) with Feedback – Two Wire Control* (Parameter 195 = 17) uses the network tag *LogicDefinedPt00Data* in Output Assembly 144 in Remote control mode and Input 2 in Local control mode to control Relay 0, which controls the contactor coil. Input 3 determines whether the motor starter is in Remote or Local control mode. LogicDefinedPt00Data is a maintained value, so the non-reversing starter remains energized when LogicDefinedPt00Data has a value of 1 in Remote control mode. You can program the appropriate state of the starter when communication is lost in Remote control mode by using the Network Communication Fault and Network Communication Idle parameters (Parameters 569 – 573) described in Chapter 3.

In Local control mode, the state of Input 2 controls Output Relay 0, which controls the contactor coil. Input 2 is a maintained value, so the non-reversing starter remains energized when Input 2 is active.

Input 3 is used to select between Local and Remote control mode. Activate Input 3 to select Remote control mode. De-activate Input 3 to select Local control mode.

The auxiliary contact from the non-reversing starter's contactor is wired into Input 0. If a feedback signal is not received before the time identified in Feedback Timeout (Parameter 213), then the E300 relay issues a trip or warning event.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Non-reversing Starter (Network & Operator Station) operating mode uses the value in network tag *LogicDefinedPt00Data* to control the starter. When communication is restored between an automation controller and the E300 relay, the starter energizes if the value in LogicDefinedPt00Data is set to 1.

Rules

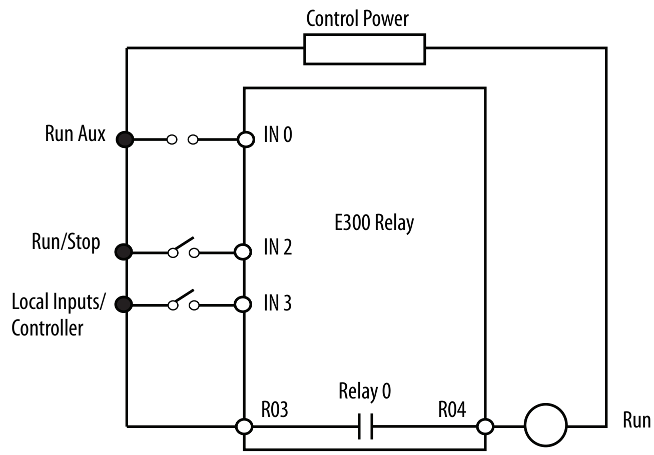
1. Available for Control Module firmware v5.000 and higher.
2. Three digital inputs must be available on the Control Module
3. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.

4. Overload Trip must be enabled in TripEnableI (Parameter 183).
5. Feedback Timeout Trip in TripEnableC (Parameter 186) or Feedback Timeout Warning in WarningEnableC (Parameter 192) must be enabled.
6. Communication Fault & Idle Override (Parameter 346) must be enabled.
7. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay in which the relay is controlled by the communication network and opens when a trip event occurs. Figure 30 is a wiring diagram of a non-reversing starter with Output Relay 0 configured as a control relay.

Figure 30 - Non-reversing Starter (Network & Local I/O) with Feedback – Two-wire Control Wiring Diagram

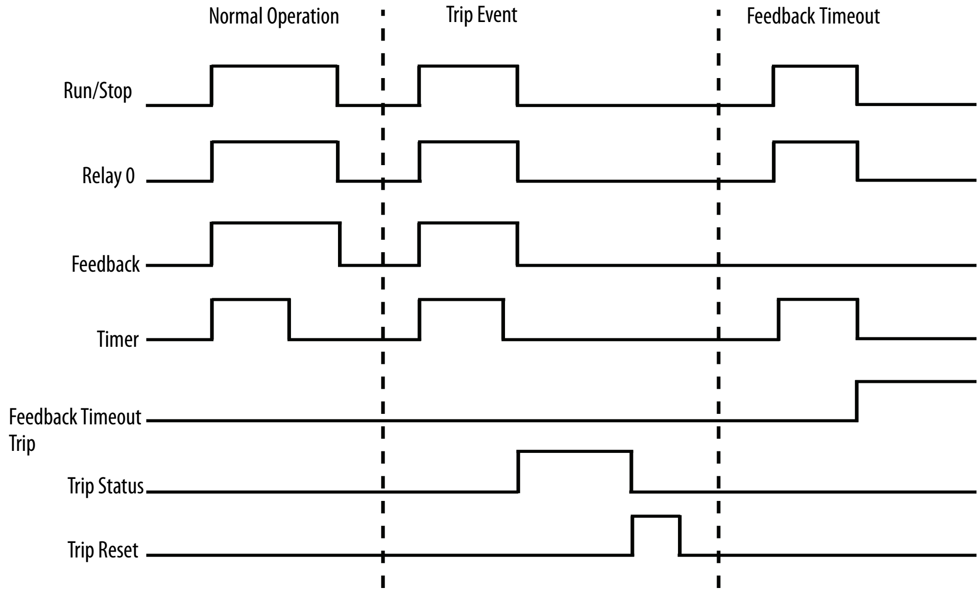


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 17.

Timing Diagram

Figure 31 - Non-reversing Starter (Network & Local I/O) with Feedback – Two-wire Control Timing Diagram



Non-reversing Starter (Network & Local I/O) – Three-wire Control

The E300 relay's Operating Mode *Non-Reversing Starter (Network& Operator Station) – Three Wire Control* (Parameter 195 = 18) uses the network tag *LogicDefinedPt00Data* in Output Assembly 144 in Remote control mode and Input 1 & Input 2 in Local control mode to control Relay 0, which controls the contactor coil. LogicDefinedPt00Data is a maintained value, so the non-reversing starter remains energized when LogicDefinedPt00Data has a value of 1 in Remote control mode. You can program the appropriate state of the starter when communication is lost in Remote control mode by using the Network Communication Fault and Network Communication Idle parameters (Parameters 569 – 573) described in Chapter 3.

Local control mode uses a normally open momentary push button that is wired to Input 1 to energize Output Relay 0, which controls the contactor coil. A normally closed momentary push button that is wired to Input 2 is used to de-energize Output Relay 0. The non-reversing starter only energizes if Input 2 is active and Input 1 is momentarily active.

Input 3 is used to select between Local and Remote control mode. Activate Input 3 to select Remote control mode. De-activate Input 3 to select Local control mode.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Non-reversing Starter (Network & Operator Station) operating mode uses the value in network tag *LogicDefinedPt00Data* to control the starter. When communication is restored between an automation controller and the E300 relay, the starter energizes if the value in LogicDefinedPt00Data is set to 1.

Rules

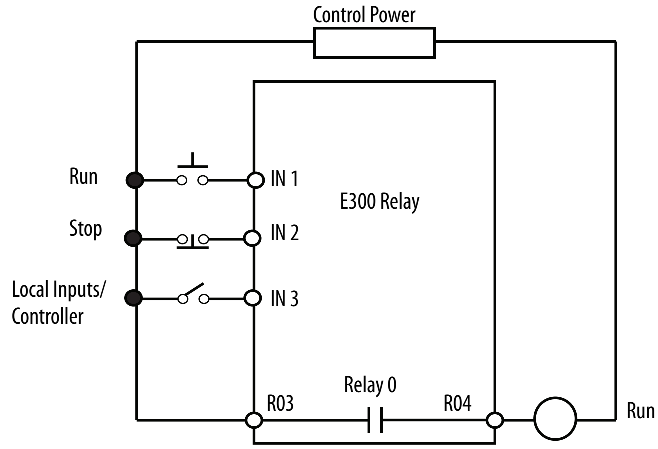
1. Available for Control Module firmware v5.000 and higher.
2. Three digital inputs must be available on the Control Module

3. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
4. Overload Trip must be enabled in TripEnableI (Parameter 183).
5. Communication Fault & Idle Override (Parameter 346) must be enabled.
6. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay in which the relay is controlled by the communication network and opens when a trip event occurs. Figure 32 is a wiring diagram of a non-reversing starter with Output Relay 0 configured as a control relay.

Figure 32 - Non-reversing Starter (Network & Local I/O) – Three-wire Control Wiring Diagram



DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 18.

Non-reversing Starter (Network & Local I/O) with Feedback – Three-wire Control

The E300 relay's Operating Mode *Non-Reversing Starter (Network& Operator Station) with Feedback – Three Wire Control* (Parameter 195 = 19) uses the network tag *LogicDefinedPt00Data* in Output Assembly 144 in Remote control mode and Input 1 & Input 2 in Local control mode to control Relay 0, which controls the contactor coil. LogicDefinedPt00Data is a maintained value, so the non-reversing starter remains energized when LogicDefinedPt00Data has a value of 1 in Remote control mode. You can program the appropriate state of the starter when communication is lost in Remote control mode by using the Network Communication Fault and Network Communication Idle parameters (Parameters 569 – 573) described in Chapter 3.

Local control mode uses a normally open momentary push button that is wired to Input 1 to energize Output Relay 0, which controls the contactor coil. A normally closed momentary push button that is wired to Input 2 is used to de-energize Output Relay 0. The non-reversing starter only energizes if Input 2 is active and Input 1 is momentarily active.

Input 3 is used to select between Local and Remote control mode. Activate Input 3 to select Remote control mode. De-activate Input 3 to select Local control mode.

The auxiliary contact from the non-reversing starter's contactor is wired into Input 0. If a feedback signal is not received before the time identified in Feedback Timeout (Parameter 213), then the E300 relay issues a trip or warning event.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Non-reversing Starter (Network & Operator Station) operating mode uses the value in network tag *LogicDefinedPt00Data* to control the starter. When communication is restored between an automation controller and the E300 relay, the starter energizes if the value in LogicDefinedPt00Data is set to 1.

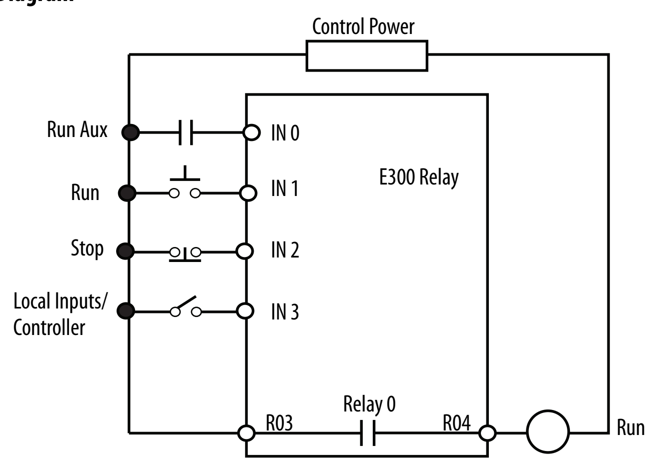
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Three digital inputs must be available on the Control Module
3. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
4. Overload Trip must be enabled in TripEnableI (Parameter 183).
5. Feedback Timeout Trip in TripEnableC (Parameter 186) or Feedback Timeout Warning in WarningEnableC (Parameter 192) must be enabled.
6. Communication Fault & Idle Override (Parameter 346) must be enabled.
7. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay in which the relay is controlled by the communication network and opens when a trip event occurs. Figure 33 is a wiring diagram of a non-reversing starter with Output Relay 0 configured as a control relay.

Figure 33 - Non-reversing Starter (Network & Local I/O) with Feedback – Three-wire Control Wiring Diagram



DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 19.

Non-reversing Starter (Custom)

The E300 relay's Operating Mode *Non-Reversing Starter (Custom)* (Parameter 195 = 50) operates as a non-reversing starter one output relay that is assigned as a normally open control relay. The Non-reversing Starter (Custom) operating mode is used for applications that want customized DeviceLogix programs. This operating mode requires minimal configuration rules.

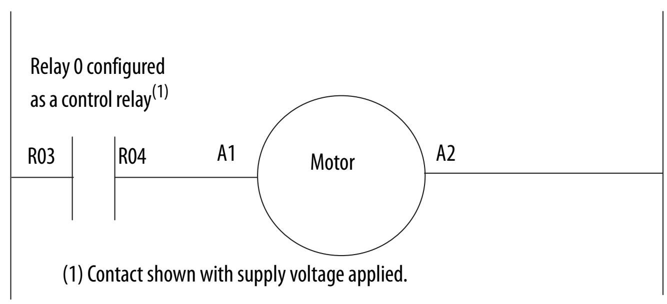
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Set any of the Output Ptxx Assignments (Parameters 202…204) to Control Relay.
3. Overload Trip must be enabled in TripEnableI (Parameter 183).

Wiring Diagram

The E300 relay can also be wired as a control relay so that the relay that is controlled by the communication network opens when a trip event occurs. Figure 34 is a wiring diagram of a non-reversing starter with Relay 0 configured as a control relay. Relay 0 receives control commands from an automation controller to energize or de-energize the contactor coil. Relay 0 also goes to an open state when there is a trip event.

Figure 34 - Control Relay Wiring Diagram

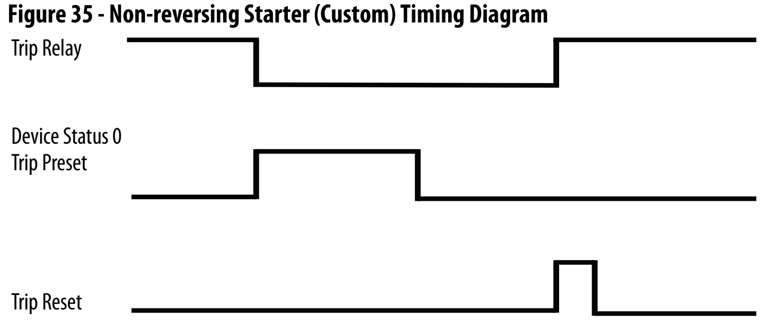


DeviceLogix Program

The last saved DeviceLogix program is executed in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 50.

Timing Diagram

Figure 35 - Non-reversing Starter (Custom) Timing Diagram



Reversing Starter Operating Modes

The non-reversing starter-based operating modes of the E300 relay provide the control logic for a reversing full voltage starter. Two normally open control relays control the forward and reverse contactor coils. When a trip event occurs, both control relays remain open until the E300 receives a trip reset command. There are 11 reversing starter-based operating modes to choose from:

- Network
- Network with Feedback
- Operator Station
- Operator Station with Feedback
- Local I/O – Two-wire Control
- Local I/O with Feedback – Two-wire Control
- Local I/O – Three-wire Control
- Network & Operator Station
- Network & Local I/O – Two-wire Control
- Network & Local I/O – Three-wire Control
- Custom

Reversing Starter (Network)

The E300 relay's Operating Mode *Reversing Starter (Network)* (Parameter 195 = 5) uses network tags *LogicDefinedPt00Data* in Output Assembly 144 to control Relay 0, which controls the forward contactor coil, and *LogicDefinedPt01Data* in Output Assembly 144 to control Relay 1, which controls the reversing contactor coil. Both LogicDefinedPt00Data and LogicDefinedPt01Data are maintained values, so the reversing starter remains energized when LogicDefinedPt00Data or LogicDefinedPt01Data has a value of 1. You can program the appropriate state of the starter when communication is lost using the Network Communication Fault and Network Communication Idle parameters (Parameters 569 – 573) described in Chapter 3.

InterlockDelay (Parameter 215) defines the minimum time delay when switching direction.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Reversing Starter (Network) operating mode uses the value in network tag *LogicDefinedPt00Data* or *LogicDefinedPt01Data* to control the starter. When communication between an automation controller and the E300 relay is restored, the starter energizes if the value in LogicDefinedPt00Data or *LogicDefinedPt01Data* is set to 1.

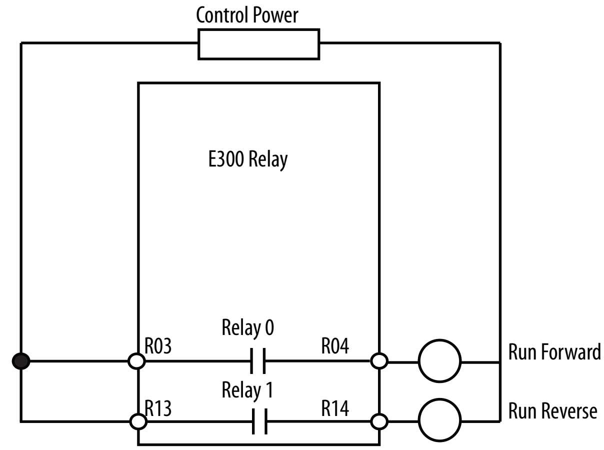
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Output Pt01 Assignment (Parameters 203) must be set to Control Relay.
4. Overload Trip must be enabled in TripEnableI (Parameter 183).

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay to the forward contactor and Output Relay 1 is wired as a control relay to the reversing contactor in which both relays are controlled by the communication network and open when a trip event occurs. Figure 36 is a wiring diagram of a reversing starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 36 - Reversing Starter (Network) Wiring Diagram

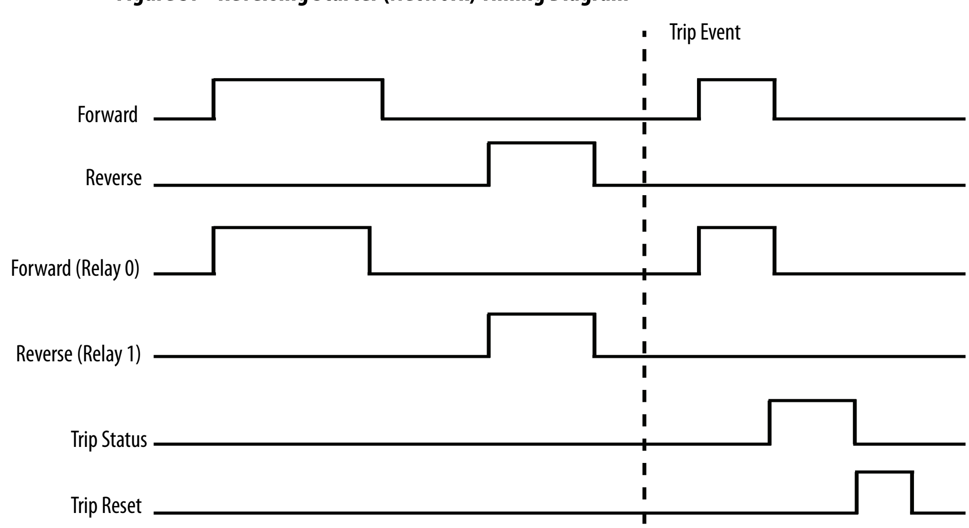


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 5.

Timing Diagram

Figure 37 - Reversing Starter (Network) Timing Diagram



Reversing Starter (Network) with Feedback

The E300 relay's Operating Mode *Reversing Starter (Network) with Feedback* (Parameter 195 = 6) uses network tags *LogicDefinedPt00Data* in Output Assembly 144 to control Relay 0, which controls the forward contactor coil, and *LogicDefinedPt01Data* in Output Assembly 144 to control Relay 1, which controls the reversing contactor coil. Both LogicDefinedPt00Data and LogicDefinedPt01Data are maintained values, so the reversing starter remains energized when LogicDefinedPt00Data or LogicDefinedPt01Data has a value of 1. You can program the appropriate state of the starter when communication is lost using the Network Communication Fault and Network Communication Idle parameters (Parameters 569 – 573) described in Chapter 3.

The auxiliary contact from the forward contactor is wired into Input 0, and the auxiliary contact from the reversing contactor is wired into Input 1. If a feedback signal is not received before the time identified in Feedback Timeout (Parameter 213), then the E300 relay issues a trip or warning event.

InterlockDelay (Parameter 215) defines the minimum time delay when switching direction.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Reversing Starter (Network) operating mode uses the value in network tag *LogicDefinedPt00Data* or *LogicDefinedPt01Data* to control the starter. When communication is restored between an automation controller and the E300 relay, the starter energizes if the value in LogicDefinedPt00Data or *LogicDefinedPt01Data* is set to 1.

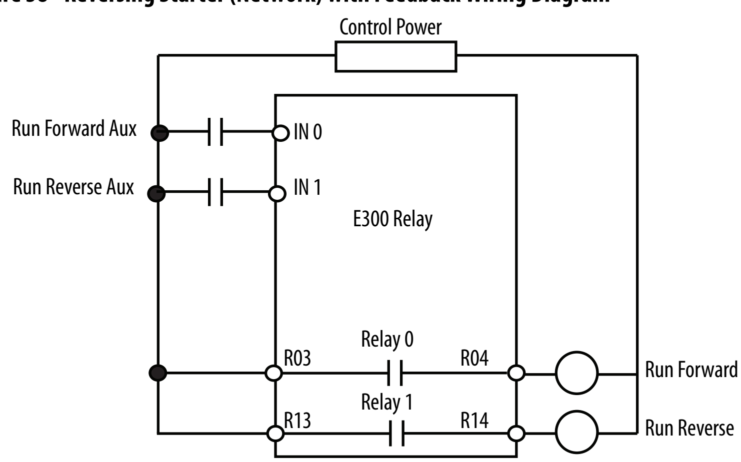
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Output Pt01 Assignment (Parameters 203) must be set to Control Relay.
4. Overload Trip must be enabled in TripEnableI (Parameter 183).
5. Feedback Timeout Trip in TripEnableC (Parameter 186) or Feedback Timeout Warning in WarningEnableC (Parameter 192) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay to the forward contactor and Output Relay 1 is wired as a control relay to the reversing contactor in which both relays are controlled by the communication network and open when a trip event occurs. Figure 38 is a wiring diagram of a reversing starter with Output Relay 0 and Output Relay 1 configured as control relays and the contactor auxiliary contacts wired to Input 0 and Input 1.

Figure 38 - Reversing Starter (Network) with Feedback Wiring Diagram

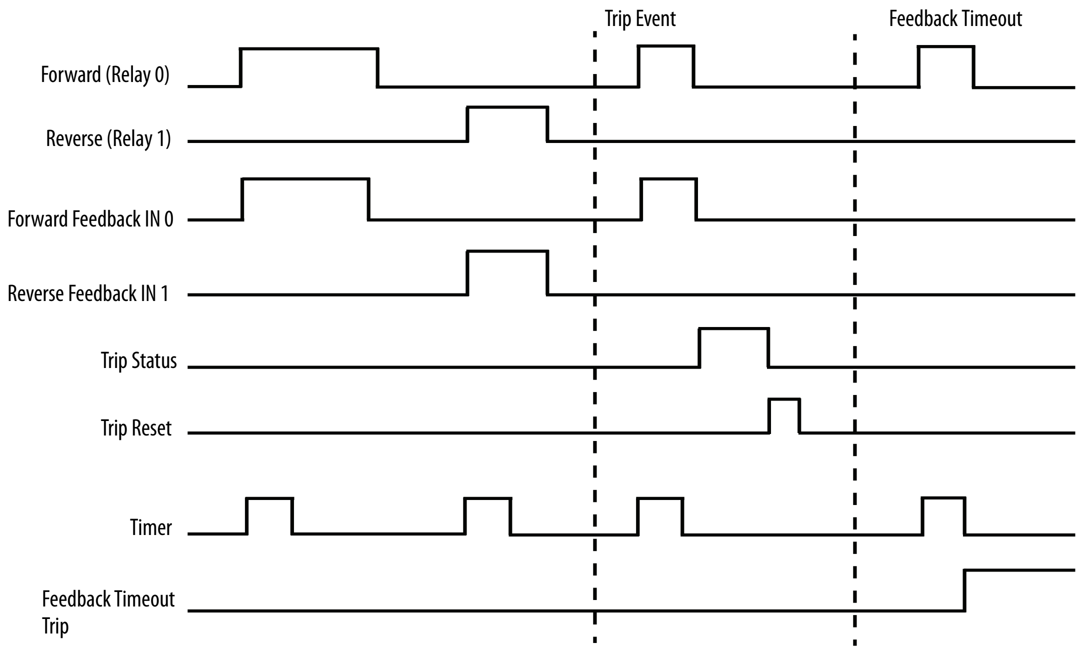


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 6.

Timing Diagram

Figure 39 - Reversing Starter (Network) with Feedback Timing Diagram



Reversing Starter (Operator Station)

The E300 relay's Operating Mode *Reversing Starter (Operating Station)* (Parameter 195 = 29) uses the E300 Operator Station's "I" key to control Output Relay 0, which controls the forward contactor coil. The "II" key controls Output Relay 1, which controls the reversing contactor coil. The "0" key is used to de-energize Output Relay 0 and Output Relay 1. These keys are momentary push buttons, so the reversing starter remains energized when you release the "I" or "II" button. The "0" button must be pressed before changing to another direction. The E300 relay issues a trip or warning event if the E300 Operator Station disconnects from the base relay.

The E300 Operator Station's Reset button is enabled, and the Local/Remote yellow LED is illuminated to indicate that the operator station is being used for local control.

InterlockDelay (Parameter 215) defines the minimum time delay when switching direction.

Rules

1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Output Pt01 Assignment (Parameters 203) must be set to Control Relay.
4. Overload Trip must be enabled in TripEnableI (Parameter 183).
5. Operator Station Trip must be disabled in TripEnableC (Parameter 186).
6. Operator Station Option Match Trip or Warning must be enabled.

- Option Match Trip must be enabled in TripEnableC (Parameter 186)
- Operator Station must be enabled in Mismatch Action (Parameter 233)
- An operator station must be selected in Operator Station Type (Parameter 224)

Or

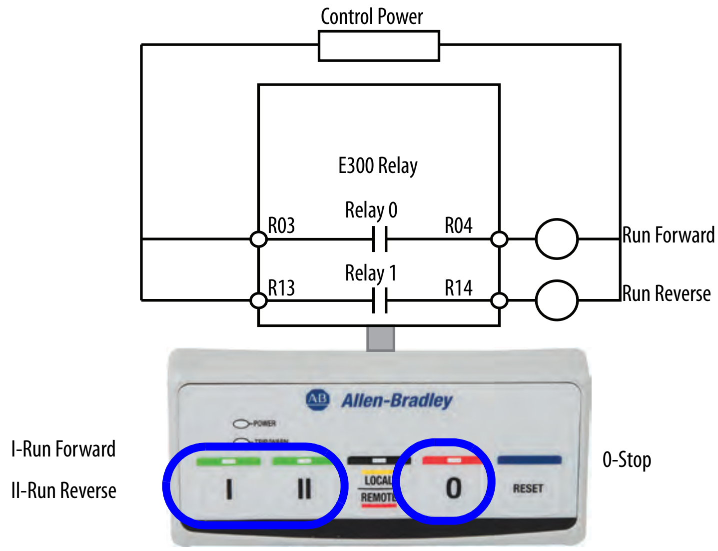
- Option Match Warning must be enabled in WarningEnableC (Parameter 192)
- Operator Station must be disabled in Mismatch Action (Parameter 233)
- An operator station must be selected in Operator Station Type (Parameter 224)

7. Communication Fault & Idle Override (Parameter 346) must be enabled.
8. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay to the forward contactor, and Output Relay 1 is wired as a control relay to the reversing contactor. Both relays open when a trip event occurs. Figure 40 is a wiring diagram of a reversing starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 40 - Reversing Starter (Operator Station) Wiring Diagram

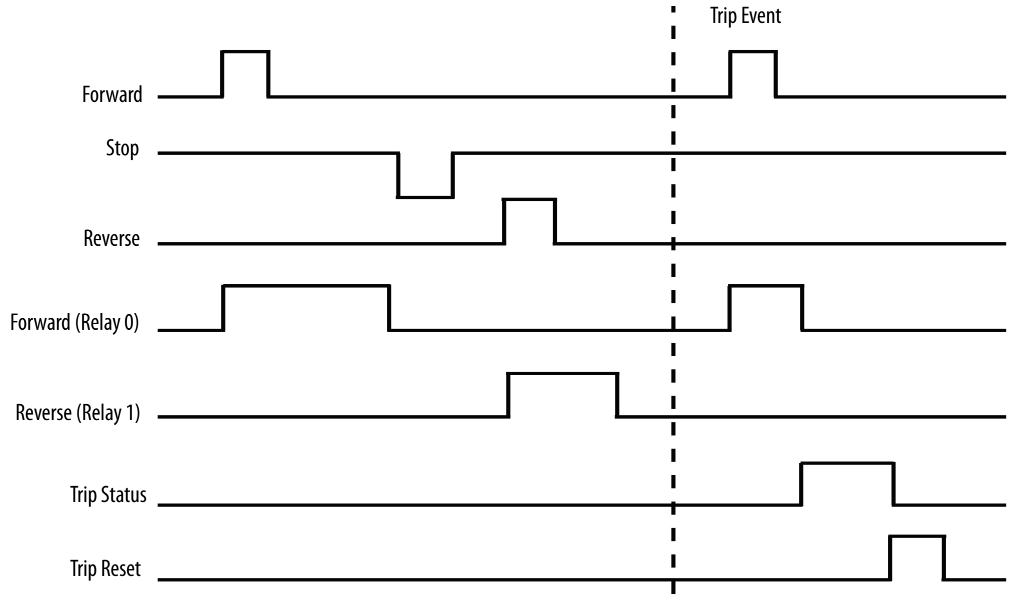


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 29.

Timing Diagram

Figure 41 - Reversing Starter (Operator Station) Timing Diagram



Reversing Starter (Operator Station) with Feedback

The E300 relay's Operating Mode *Reversing Starter (Operator Station) with Feedback* (Parameter 195 = 30) uses the E300 Operator Station's "I" and "0" keys to control Relay 0, which controls the contactor coil. These keys are momentary push buttons, so the reversing starter remains energized when you release the "I" button.The "0" button must be pressed before changing to another direction. The E300 relay issues a trip or warning event if the E300 Operator Station disconnects from the base relay.

The auxiliary contact from the reversing starter's contactor is wired into Input 0. If a feedback signal is not received before the time identified in Feedback Timeout (Parameter 213), then the E300 relay issues a trip or warning event.

InterlockDelay (Parameter 215) defines the minimum time delay when switching direction.

The E300 Operator Station's Reset button is enabled, and the Local/Remote yellow LED is illuminated to indicate that the operator station is being used for local control.

Rules

1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Output Pt01 Assignment (Parameters 203) must be set to Control Relay.
4. Overload Trip must be enabled in TripEnableI (Parameter 183).
5. Operator Station Trip must be disabled in TripEnableC (Parameter 186).
6. Operator Station Option Match Trip or Warning must be enabled.
   - Option Match Trip or must be enabled in TripEnableC (Parameter 186)
   - Operator Station must be enabled in Mismatch Action (Parameter 233)
   - An operator station must be selected in Operator Station Type (Parameter 224)

Or

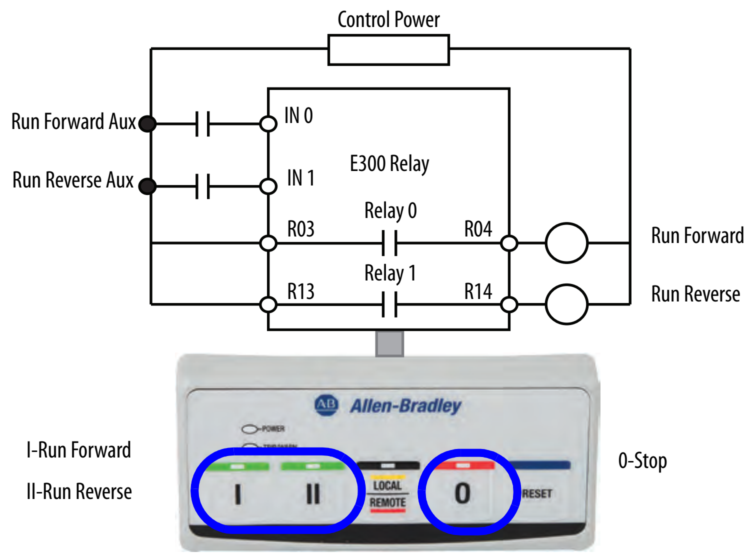
- Option Match Warning must be enabled in WarningEnableC (Parameter 192)
- Operator Station must be disabled in Mismatch Action (Parameter 233)
- An operator station must be selected in Operator Station Type (Parameter 224)

7. Communication Fault & Idle Override (Parameter 346) must be enabled.
8. Network Fault Override (Parameter 347) must be enabled.
9. Feedback Timeout Trip in TripEnableC (Parameter 186) or Feedback Timeout Warning in WarningEnableC (Parameter 192) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay to the forward contactor and Output Relay 1 is wired as a control relay to the reversing contactor. Both relays open when a trip event occurs. Figure 42 is a wiring diagram of a reversing starter with Output Relay 0 and Output Relay 1 configured as control relays and the contactor auxiliary contacts wired to Input 0 and Input 1.

Figure 42 - Reversing Starter (Operator Station) with Feedback Wiring Diagram

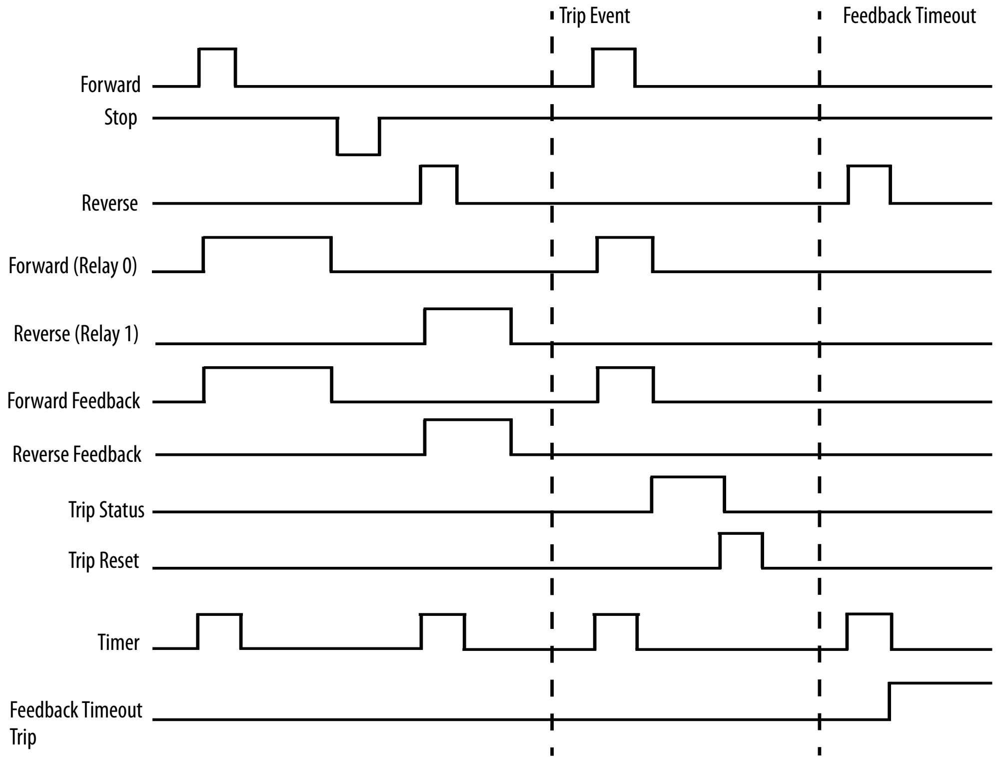


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 30.

Timing Diagram

Figure 43 - Reversing Starter (Operator Station) with Feedback Timing Diagram



Reversing Starter (Local I/O) – Two-wire Control

The E300 relay's Operating Mode *Reversing Starter (Local I/O) – Two Wire Control* (Parameter 195 = 40) uses Input 0 to control Output Relay 0, which controls the contactor coil of the forward contactor, and Input 1 to control Output Relay 1, which controls the contactor coil of the reversing contactor. Both Input 0 and Input 1 are maintained signals, so the reversing starter remains energized when either Input 0 or Input 1 is active. Both Input 0 and Input 1 must be in a de-active state before changing to another direction

InterlockDelay (Parameter 215) defines the minimum time delay when switching direction.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Reversing Starter (Local I/O) – Two-wire Control operating mode uses the signal from Input 0 or Input 1 to control the starter. When an E300 relay powers up, the starter energizes if either Input 0 or Input 1 is active.

Rules

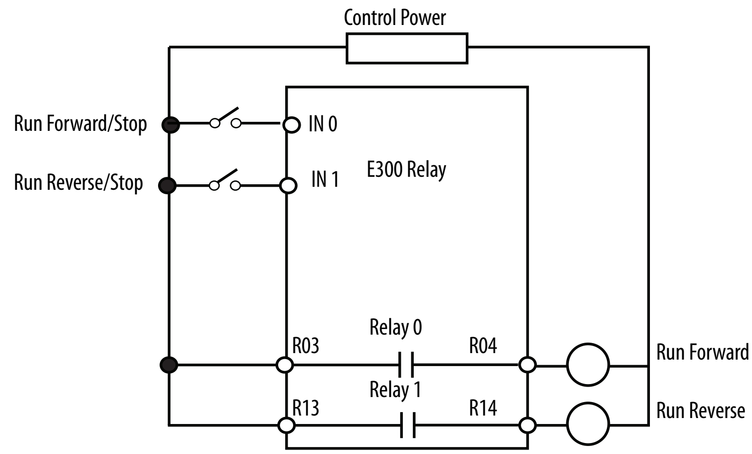
1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Output Pt01 Assignment (Parameters 203) must be set to Control Relay.
4. Overload Trip must be enabled in TripEnableI (Parameter 183).

5. Communication Fault & Idle Override (Parameter 346) must be enabled.
6. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay to the forward contactor and Output Relay 1 is wired as a control relay to the reversing contactor. Both relays open when a trip event occurs. Figure 44 is a wiring diagram of a reversing starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 44 - Reversing Starter (Local I/O) – Two-wire Control Wiring Diagram

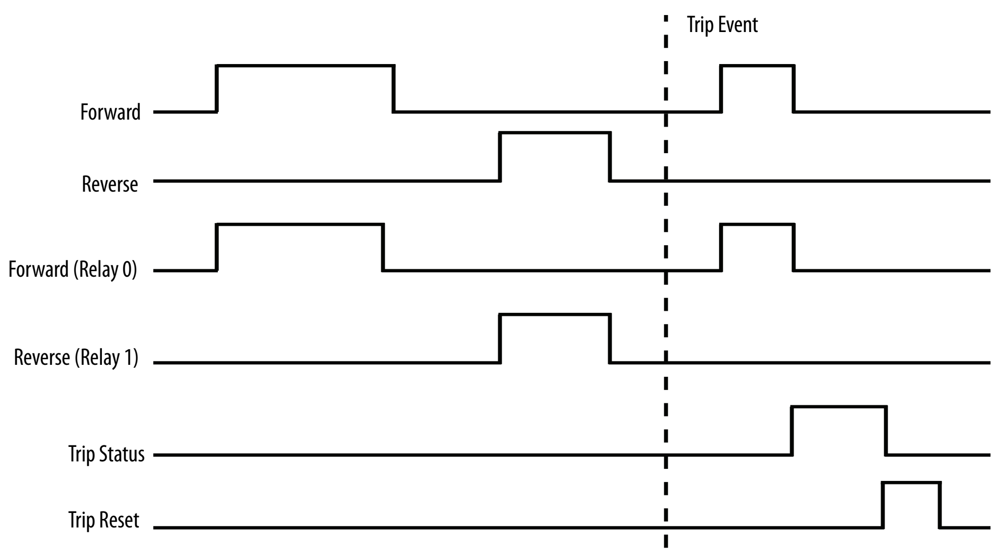


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 40.

Timing Diagram

Figure 45 - Reversing Starter (Local I/O) – Two-wire Control Timing Diagram



Reversing Starter (Local I/O) – Two-wire Control with Feedback

The E300 relay's Operating Mode *Reversing Starter (Local I/O) – Two Wire Control* (Parameter 195 = 41) uses Input 0 to control Output Relay 0, which controls the contactor coil of the forward contactor, and Input 1 to control Output Relay 1, which controls the contactor coil of the reversing contactor. Both Input 0 and Input 1 are maintained signals, so the reversing starter remains energized when either Input 0 or Input 1 is active. Both Input 0 and Input 1 must be in a de-active state before changing to another direction.

The auxiliary contact from the starter's forward contactor is wired into Input 0, and the auxiliary contact from the starter's reversing contactor is wired into Input 1. If a feedback signal is not received before the time identified in Feedback Timeout (Parameter 213), then the E300 relay issues a trip or warning event.

InterlockDelay (Parameter 215) defines the minimum time delay when switching direction.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Reversing Starter (Local I/O) – Two-wire Control operating mode uses the signal from Input 0 or Input 1 to control the starter. When an E300 relay powers up, the starter energizes if either Input 0 or Input 1 is active.

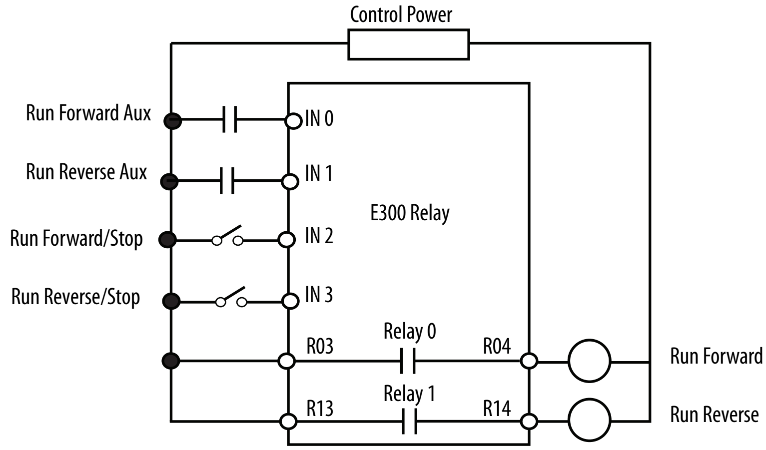
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Output Pt01 Assignment (Parameters 203) must be set to Control Relay.
4. Overload Trip must be enabled in TripEnableI (Parameter 183).
5. Feedback Timeout Trip in TripEnableC (Parameter 186) or Feedback Timeout Warning in WarningEnableC (Parameter 192) must be enabled.
6. Communication Fault & Idle Override (Parameter 346) must be enabled.
7. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay to the forward contactor and Output Relay 1 is wired as a control relay to the reversing contactor. Both relays open when a trip event occurs. Figure 46 is a wiring diagram of a reversing starter with Output Relay 0 and Output Relay 1 configured as control relays and the contactor auxiliary contacts wired to Input 0 and Input 1.

Figure 46 - Reversing Starter (Local I/O) – Two-wire Control with Feedback Wiring Diagram

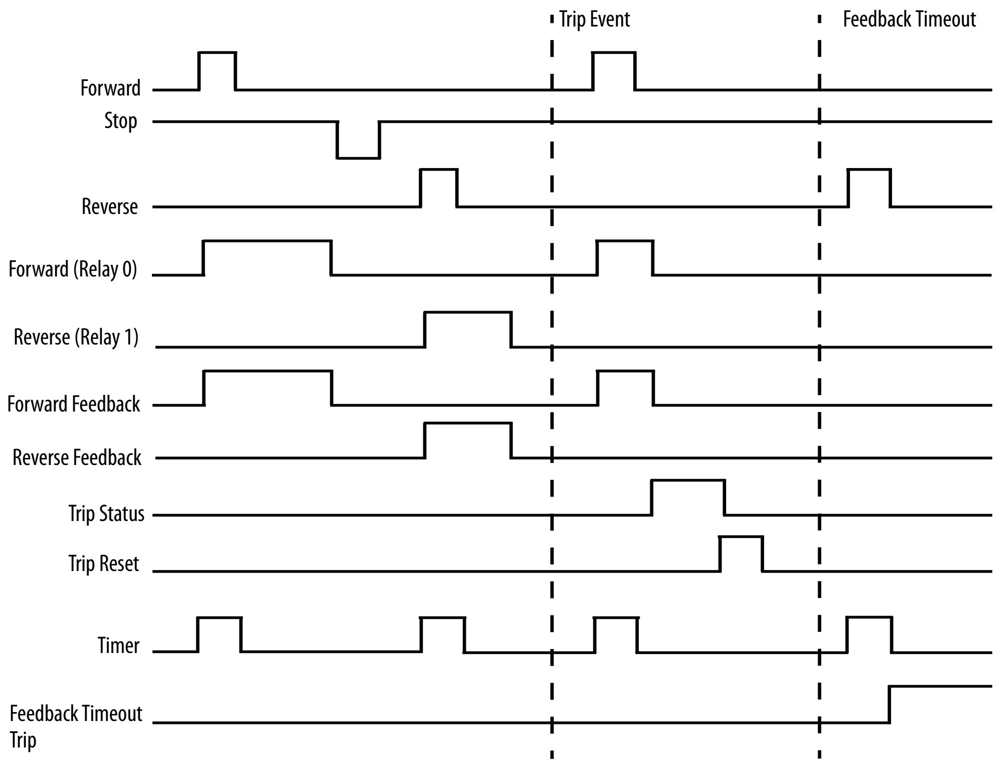


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 41.

Timing Diagram

Figure 47 - Reversing Starter (Operator Station) with Feedback Timing Diagram



Reversing Starter (Local I/O) – Three-wire Control

The E300 relay's Operating Mode *Reversing Starter (Local I/O) – Three Wire Control* (Parameter 195 = 42) uses a normally open momentary push button in Input 0 to energize Output Relay 0, which controls the forward contactor coil. A normally open momentary push button in Input 1 is used to energize Output Relay 1, which controls the reversing contactor coil. A normally closed push button in Input 2 is used to de-energize Output Relay 0 and Output Relay 1. Both Input 0, Input 1, and Input 2 are momentary signals, so the reversing starter only energizes if Input 2 is active and Input 0 or Input 1 is momentarily active.

Input 2 must be momentarily de-active before changing to another direction.

InterlockDelay (Parameter 215) defines the minimum time delay when switching direction.

The reset button of the E300 Operator Station is enabled for this operating mode.

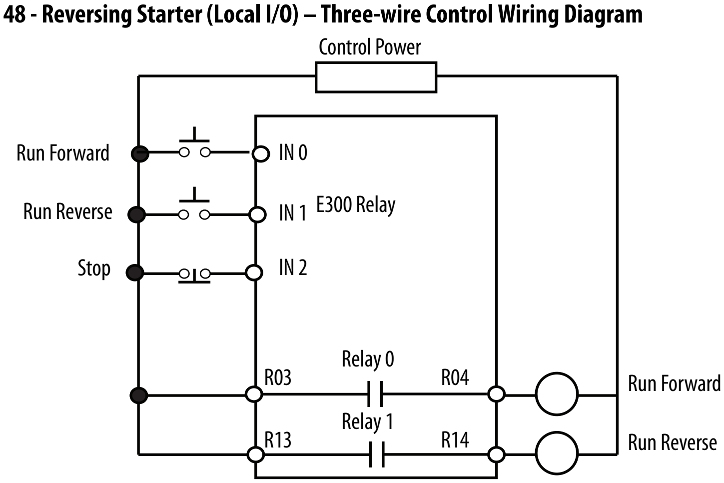
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Four digital inputs must be available on the Control Module
3. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
4. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
5. Overload Trip must be enabled in TripEnableI (Parameter 183).
6. Communication Fault & Idle Override (Parameter 346) must be enabled.
7. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

Figure 48 is a wiring diagram of a reversing starter with three wire control and Output Relay 0 and Output Relay 1 configured as control relays.

Figure 48 - Reversing Starter (Local I/O) – Three-wire Control Wiring Diagram

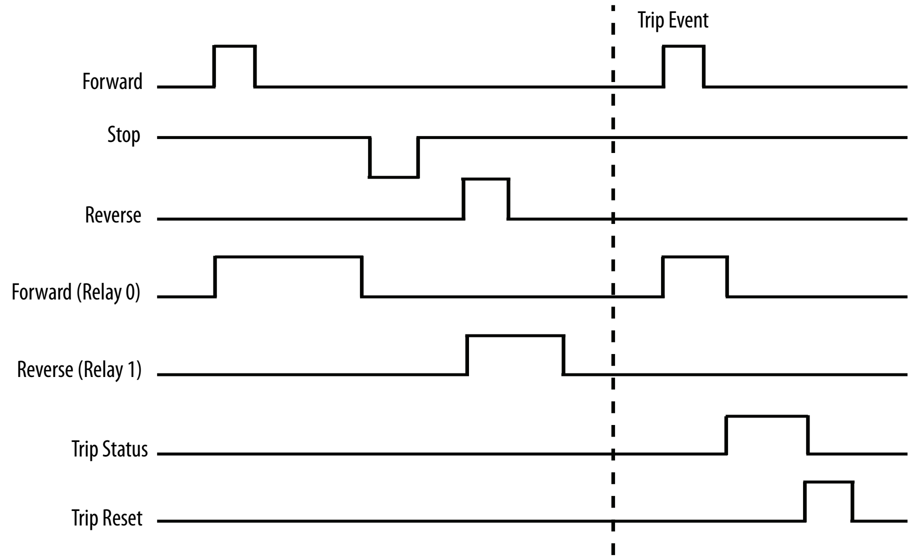


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 42.

Timing Diagram

Figure 49 - Reversing Starter (Local I/O) – Three-wire Control Timing Diagram



Reversing Starter (Network & Operator Station)

The E300 relay's Operating Mode *Reversing Starter (Network& Operator Station)* (Parameter 195 = 13) in Remote control mode uses network tags *LogicDefinedPt00Data* in Output Assembly 144 to control Relay 0, which controls the forward contactor coil, and *LogicDefinedPt01Data* in Output Assembly 144 to control Relay 1, which controls the reversing contactor coil. Both LogicDefinedPt00Data and LogicDefinedPt01Data are maintained values, so the reversing starter remains energized when LogicDefinedPt00Data or LogicDefinedPt01Data has a value of 1. You can program the appropriate state of the starter when communication is lost using the Network Communication Fault and Network Communication Idle parameters (Parameters 569 – 573) described in Chapter 3.

In Local control mode, the E300 Operator Station's "I" key is used to control Output Relay 0, which controls the forward contactor coil. The "II" key controls Output Relay 1, which controls the reversing contactor coil. The "0" key is used to de-energize Output Relay 0 and Output Relay 1. These keys are momentary push buttons, so the reversing starter remains energized when you release the "I" or "II" button. The "0" button must be pressed before changing to another direction.

To change between Local and Remote control mode press and release the "Local/ Remote" button on the E300 Operator Station. The LED above "Local/Remote" button illuminates yellow in Local control mode and red in Remote control mode.

InterlockDelay (Parameter 215) defines the minimum time delay when switching direction.

The E300 relay issues a trip or warning event if the E300 Operator Station disconnects from the base relay.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Reversing Starter (Network & Operator Station) operating mode uses the value in network tag *LogicDefinedPt00Data* to control the starter. When communication is restored between an automation controller and the E300 relay, the starter energizes if the value in LogicDefinedPt00Data or LogicDefinedPt01Data is set to 1.

Rules

1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Output Pt01 Assignment (Parameters 203) must be set to Control Relay.
4. Overload Trip must be enabled in TripEnableI (Parameter 183).
5. Operator Station Trip must be disabled in TripEnableC (Parameter 186).
6. Operator Station Option Match Trip or Warning must be enabled.
   - Option Match Trip or must be enabled in TripEnableC (Parameter 186)
   - Operator Station must be enabled in Mismatch Action (Parameter 233)
   - An operator station must be selected in Operator Station Type (Parameter 224)

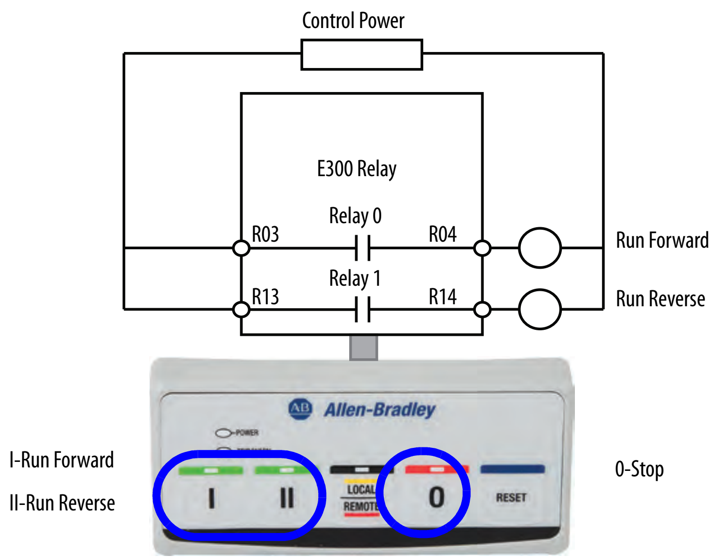
   Or

   - Option Match Warning must be enabled in WarningEnableC (Parameter 192)
   - Operator Station must be disabled in Mismatch Action (Parameter 233)
   - An operator station must be selected in Operator Station Type (Parameter 224)
7. Communication Fault & Idle Override (Parameter 346) must be enabled.
8. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 and Output Relay 1 are wired as a control relays in which the relay is controlled by the communication network or E300 Operator Station, and both output relays open when a trip event occurs. Figure 50 is a wiring diagram of a reversing starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 50 - Reversing Starter (Network & Operator Station) Wiring Diagram



DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 13.

Reversing Starter (Network & Local I/O) – Two-wire Control

The E300 relay's Operating Mode *Reversing Starter (Network& Operator Station)* (Parameter 195 = 20) in Remote control mode uses network tags *LogicDefinedPt00Data* in Output Assembly 144 to control Relay 0, which controls the forward contactor coil, and *LogicDefinedPt01Data* in Output Assembly 144 to control Relay 1, which controls the reversing contactor coil. Both LogicDefinedPt00Data and LogicDefinedPt01Data are maintained values, so the reversing starter remains energized when LogicDefinedPt00Data or LogicDefinedPt01Data has a value of 1. You can program the appropriate state of the starter when communication is lost using the Network Communication Fault and Network Communication Idle parameters (Parameters 569 – 573) described in Chapter 3.

In Local control mode, Input 0 is used to control Output Relay 0, which controls the contactor coil of the forward contactor, and Input 1 is used to control Output Relay 1, which controls the contactor coil of the reversing contactor. Both Input 0 and Input 1 are maintained signals, so the reversing starter remains energized when either Input 0 or Input 1 is active. Both Input 0 and Input 1 must be in a de-active state before changing to another direction.

Input 3 is used to select between Local and Remote control mode. Activate Input 3 to select Remote control mode. De-activate Input 3 to select Local control mode.

InterlockDelay (Parameter 215) defines the minimum time delay when switching direction.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Reversing Starter (Network & Operator Station) operating mode uses the value in network tag *LogicDefinedPt00Data* or *LogicDefinedPt01Data* to control the starter. When communication is restored between an automation controller and the E300 relay, the starter energizes if the value in LogicDefinedPt00Data or *LogicDefinedPt01Data* is set to 1.

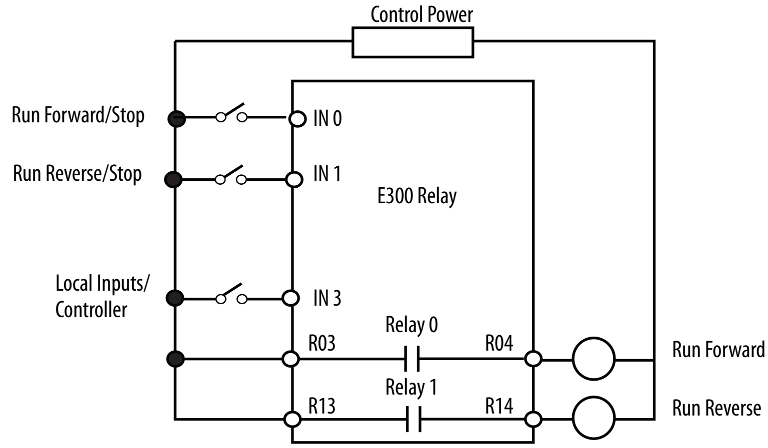
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Three digital inputs must be available on the Control Module
3. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
4. Output Pt01 Assignment (Parameters 203) must be set to Control Relay.
5. Overload Trip must be enabled in TripEnableI (Parameter 183).
6. Communication Fault & Idle Override (Parameter 346) must be enabled.
7. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 and Output Relay 1 are wired as a control relays in which the relay is controlled by the communication network or Input 0 & Input 1. Both output relays open when a trip event occurs. Figure 51 is a wiring diagram of a reversing starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 51 - Reversing Starter (Network & Local I/O) – Two-wire Control Wiring Diagram

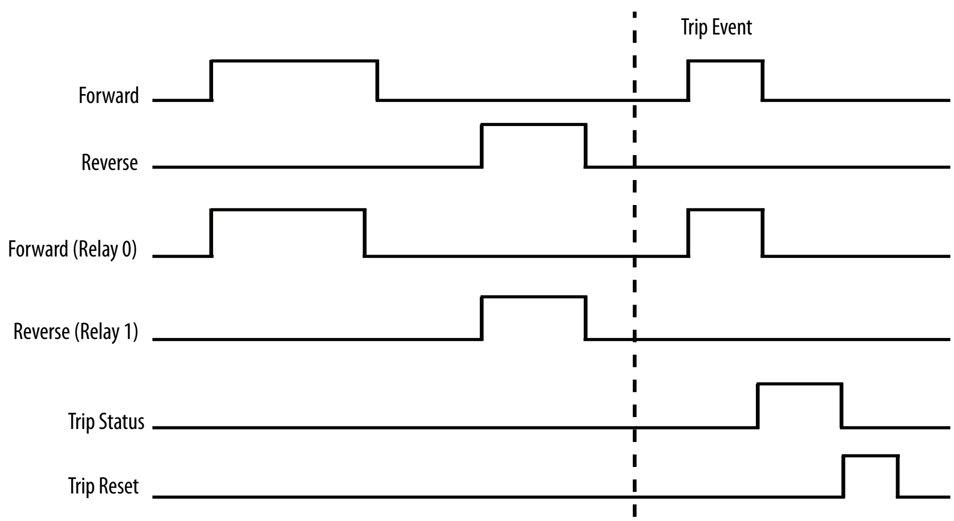


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 20.

Timing Diagram

Figure 52 - Reversing Starter (Network & Local I/O) – Two-wire Control Timing Diagram



Reversing Starter (Network & Local I/O) – Three-wire Control

The E300 relay's Operating Mode *Reversing Starter (Network& Operator Station)* (Parameter 195 = 21) in Remote control mode uses network tags *LogicDefinedPt00Data* in Output Assembly 144 to control Relay 0, which controls the forward contactor coil, and *LogicDefinedPt01Data* in Output Assembly 144 to control Relay 1, which controls the reversing contactor coil. Both LogicDefinedPt00Data and LogicDefinedPt01Data are maintained values, so the reversing starter remains energized when LogicDefinedPt00Data or LogicDefinedPt01Data has a value of 1. You can program the appropriate state of the starter when communication is lost using the Network Communication Fault and Network Communication Idle parameters (Parameters 569 – 573) described in Chapter 3.

Local control mode uses a normally open momentary push button in Input 0 to energize Output Relay 0, which controls the forward contactor coil. A normally open momentary push button in Input 1 is used to energize Output Relay 1, which controls the reversing contactor coil. A normally closed push button in Input 2 is used to de-energize Output Relay 0 and Output Relay 1. Both Input 0, Input 1, and Input 2 are momentary signals, so the reversing starter only energizes if Input 2 is active and Input 0 or Input 1 is momentarily active.

Input 2 must be momentarily de-active before changing to another direction.

Input 3 is used to select between Local and Remote control mode. Activate Input 3 to select Remote control mode. De-activate Input 3 to select Local control mode.

InterlockDelay (Parameter 215) defines the minimum time delay when switching direction.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Reversing Starter (Network & Operator Station) operating mode uses the value in network tag *LogicDefinedPt00Data* or *LogicDefinedPt01Data* to control the starter. When communication is restored between an automation controller and the E300 relay, the starter energizes if the value in LogicDefinedPt00Data or *LogicDefinedPt01Data* is set to 1.

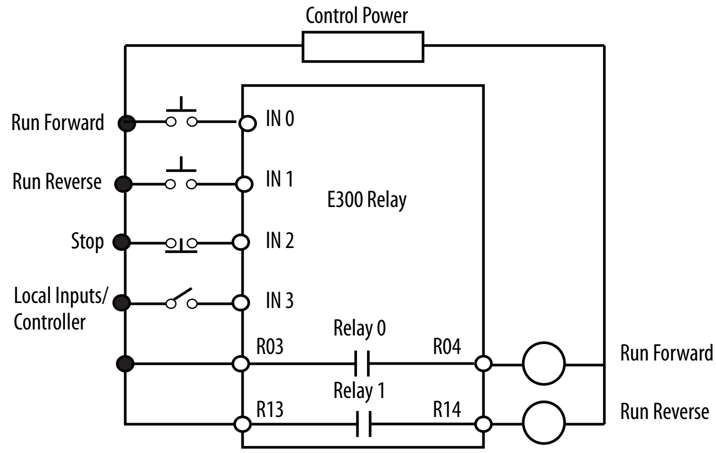
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Four digital inputs must be available on the Control Module
3. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
4. Output Pt01 Assignment (Parameters 203) must be set to Control Relay.
5. Overload Trip must be enabled in TripEnableI (Parameter 183).
6. Communication Fault & Idle Override (Parameter 346) must be enabled.
7. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 and Output Relay 1 are wired as a control relays in which the relay is controlled by the communication network or Input 0, Input 1, and Input 2. Both output relays open when a trip event occurs. Figure 53 is a wiring diagram of a reversing starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 53 - Reversing Starter (Network & Local I/O) – Three-wire Control Wiring Diagram



DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 21.

Reversing Starter (Custom)

The E300 relay's Operating Mode *Reversing Starter (Custom)* (Parameter 195 = 51) operates as a reversing starter with two output relays that are assigned as normally open control relays. The Reversing Starter (Custom) operating mode is used for applications that want customized DeviceLogix programs. This operating mode requires minimal configuration rules.

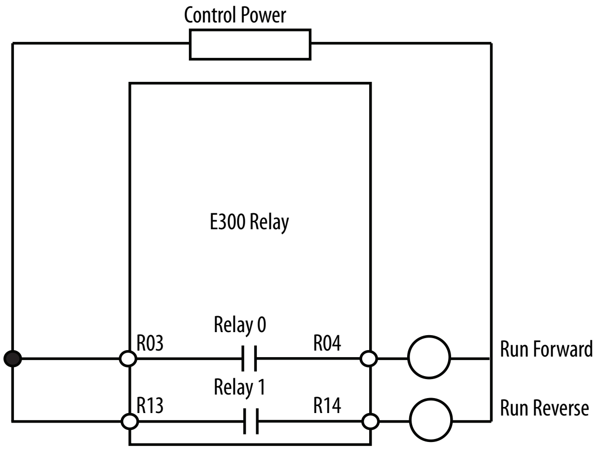
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Set two of the Output Ptxx Assignments (Parameters 202…204) to Control Relay.
3. Overload Trip must be enabled in TripEnableI (Parameter 183).

Wiring Diagram

Figure 54 is a wiring diagram of a reversing starter with Output Relay 0 and Output Relay 1 configured as control relays. Both Output Relay 0 and Output Relay 1 go to an open state when there is a trip event.

Figure 54 - Reversing Starter (Custom) Wiring Diagram

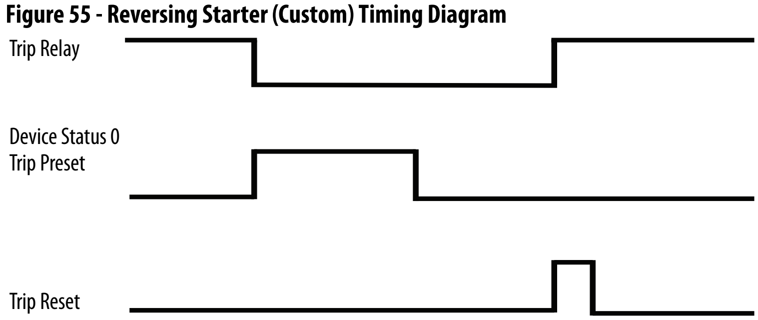


DeviceLogix Program

The last saved DeviceLogix program is executed in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 50.

Timing Diagram

Figure 55 - Reversing Starter (Custom) Timing Diagram



Two-speed Starter Operating Modes

The two-speed starter-based operating modes of the E300 relay provide the control logic for a two-speed full-voltage starter. Two normally open control relays control the high-speed and low-speed contactor coils. When a trip event occurs, both control relays remain open until the E300 receives a trip reset command. There are 11 two-speed starter-based operating modes to choose from:

- Network
- Network with Feedback
- Operator Station
- Operator Station with Feedback
- Local I/O – Two-wire Control
- Local I/O with Feedback – Two-wire Control
- Local I/O – Three-wire Control
- Network & Operator Station
- Network & Local I/O – Two-wire Control
- Network & Local I/O – Three-wire Control
- Custom

Two-speed Starter (Network)

The E300 relay's Operating Mode *Two Speed Starter (Network)* (Parameter 195 = 9) uses network tags *LogicDefinedPt00Data* in Output Assembly 144 to control Relay 0, which controls the high-speed contactor coil, and *LogicDefinedPt01Data* in Output Assembly 144 to control Relay 1, which controls the low-speed contactor coil. Both LogicDefinedPt00Data and LogicDefinedPt01Data are maintained values, so the two-speed starter remains energized when LogicDefinedPt00Data or LogicDefinedPt01Data has a value of 1. You can program the appropriate state of the starter when communication is lost using the Network Communication Fault and Network Communication Idle parameters (Parameters 569 – 573) described in Chapter 3.

InterlockDelay (Parameter 215) defines the minimum time delay when switching direction.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Two-speed Starter (Network) operating mode uses the value in network tag *LogicDefinedPt00Data* or *LogicDefinedPt01Data* to control the starter. When communication is restored between an automation controller and the E300 relay, the starter energizes if the value in LogicDefinedPt00Data or *LogicDefinedPt01Data* is set to 1.

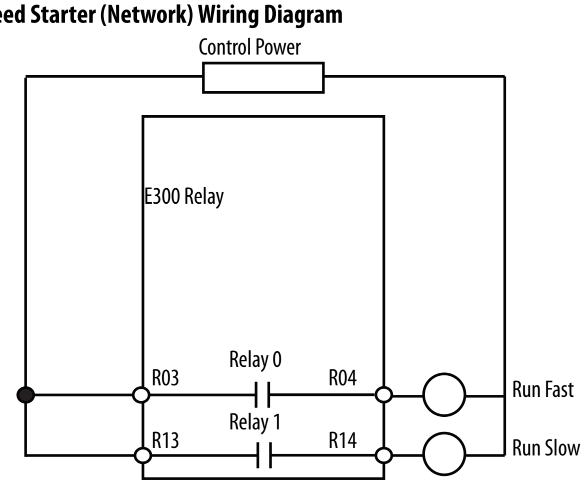
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Output Pt01 Assignment (Parameters 203) must be set to Control Relay.
4. Overload Trip must be enabled in TripEnableI (Parameter 183).

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay to the high-speed contactor and Output Relay 1 is wired as a control relay to the low-speed contactor. In this configuration, both relays are controlled by the communication network and open when a trip event occurs. Figure 56 is a wiring diagram of a two-speed starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 56 - Two-speed Starter (Network) Wiring Diagram

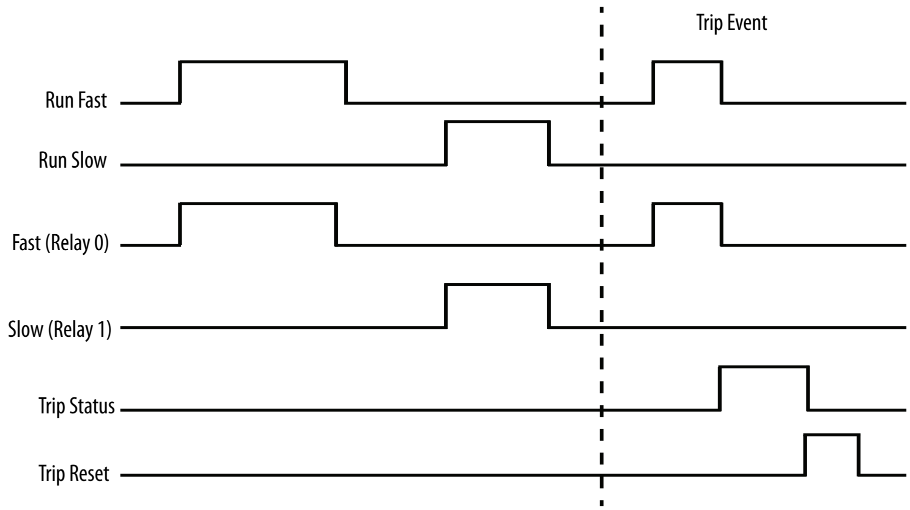


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 9.

Timing Diagram

Figure 57 - Two-speed Starter (Network) Timing Diagram



Two-speed Starter (Network) with Feedback

The E300 relay's Operating Mode *Two-speed Starter (Network) with Feedback* (Parameter 195 = 10) uses network tags *LogicDefinedPt00Data* in Output Assembly 144 to control Relay 0, which controls the high-speed contactor coil and *LogicDefinedPt01Data* in Output Assembly 144 to control Relay 1, which controls the low-speed contactor coil. Both LogicDefinedPt00Data and LogicDefinedPt01Data are maintained values, so the two-speed starter remains energized when LogicDefinedPt00Data or LogicDefinedPt01Data has a value of 1. You can program the appropriate state of the starter when communication is lost using the Network Communication Fault and Network Communication Idle parameters (Parameters 569 – 573) described in Chapter 3.

The auxiliary contact from the high-speed contactor is wired into Input 0, and the auxiliary contact from the low-speed contactor is wired into Input 1. If a feedback signal is not received before the time identified in Feedback Timeout (Parameter 213), then the E300 relay issues a trip or warning event.

InterlockDelay (Parameter 215) defines the minimum time delay when switching direction.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Two-speed Starter (Network) operating mode uses the value in network tag *LogicDefinedPt00Data* or *LogicDefinedPt01Data* to control the starter. When communication is restored between an automation controller and the E300 relay, the starter energizes if the value in LogicDefinedPt00Data or *LogicDefinedPt01Data* is set to 1.

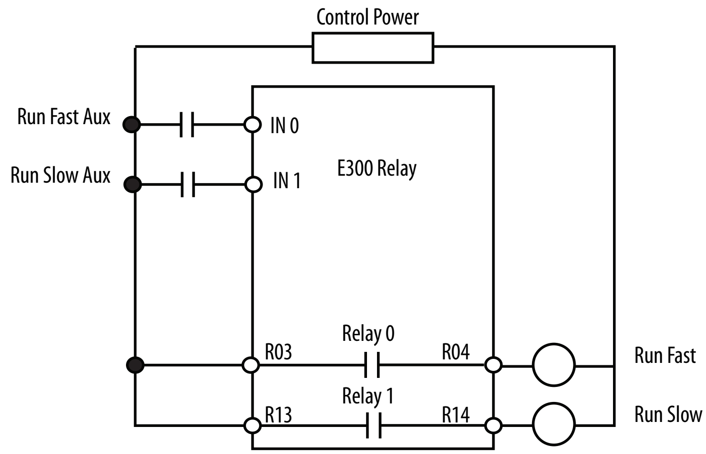
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Output Pt01 Assignment (Parameters 203) must be set to Control Relay.
4. Overload Trip must be enabled in TripEnableI (Parameter 183).
5. Feedback Timeout Trip in TripEnableC (Parameter 186) or Feedback Timeout Warning in WarningEnableC (Parameter 192) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay to the high-speed contactor and Output Relay 1 is wired as a control relay to the low-speed contactor. In this configuration, both relays are controlled by the communication network and open when a trip event occurs. Figure 58 is a wiring diagram of a Two-speed Starter with Output Relay 0 and Output Relay 1 configured as control relays and the contactor auxiliary contacts wired to Input 0 and Input 1.

Figure 58 - Two-speed Starter (Network) with Feedback Wiring Diagram

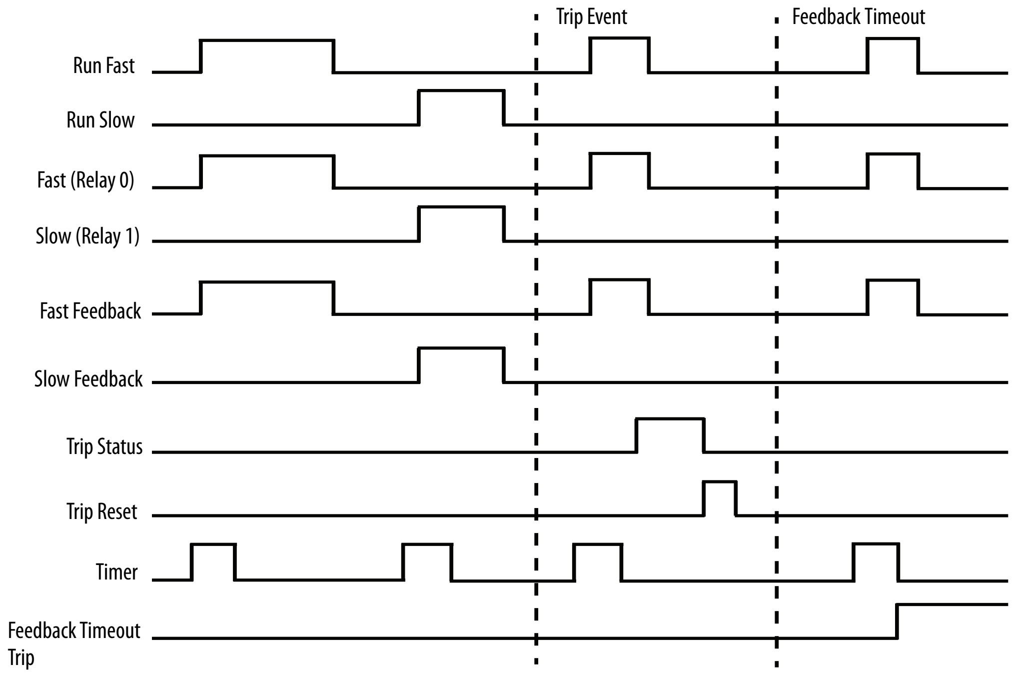


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 10.

Timing Diagram

Figure 59 - Two-speed Starter (Network) with Feedback Timing Diagram



Two-speed Starter (Operator Station)

The E300 relay's Operating Mode *Two Speed Starter (Operating Station)* (Parameter 195 = 33) uses the E300 Operator Station's "I" key to control Output Relay 0, which controls the high-speed contactor coil. The "II" key controls Output Relay 1, which controls the low-speed contactor coil. The "0" key is used to de-energize Output Relay 0 and Output Relay 1. These keys are momentary push buttons, so the two-speed starter remains energized when you release the "I" or "II" button.

InterlockDelay (Parameter 215) defines the minimum time delay when switching direction.

The E300 relay issues a trip or warning event if the E300 Operator Station disconnects from the base relay.

The E300 Operator Station's Reset button is enabled, and the Local/Remote yellow LED is illuminated to indicate that the operator station is being used for local control.

Rules

1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Output Pt01 Assignment (Parameters 203) must be set to Control Relay.
4. Overload Trip must be enabled in TripEnableI (Parameter 183).
5. Operator Station Trip must be disabled in TripEnableC (Parameter 186).

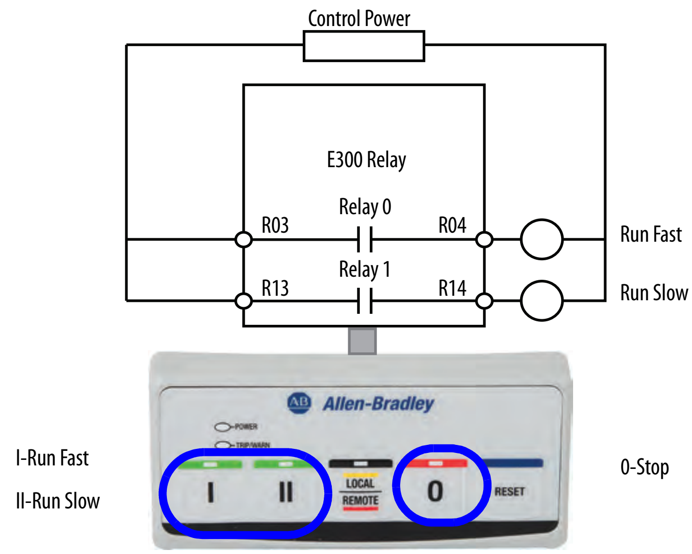
6. Operator Station Option Match Trip or Warning must be enabled.
   - Option Match Trip or must be enabled in TripEnableC (Parameter 186)
   - Operator Station must be enabled in Mismatch Action (Parameter 233)
   - An operator station must be selected in Operator Station Type (Parameter 224)

   Or
   - Option Match Warning must be enabled in WarningEnableC (Parameter 192)
   - Operator Station must be disabled in Mismatch Action (Parameter 233)
   - An operator station must be selected in Operator Station Type (Parameter 224)
7. Communication Fault & Idle Override (Parameter 346) must be enabled.
8. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay to the high-speed contactor, and Output Relay 1 is wired as a control relay to the low-speed contactor. Both relays open when a trip event occurs. Figure 60 is a wiring diagram of a two-speed starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 60 - Two-speed Starter (Operator Station) Wiring Diagram

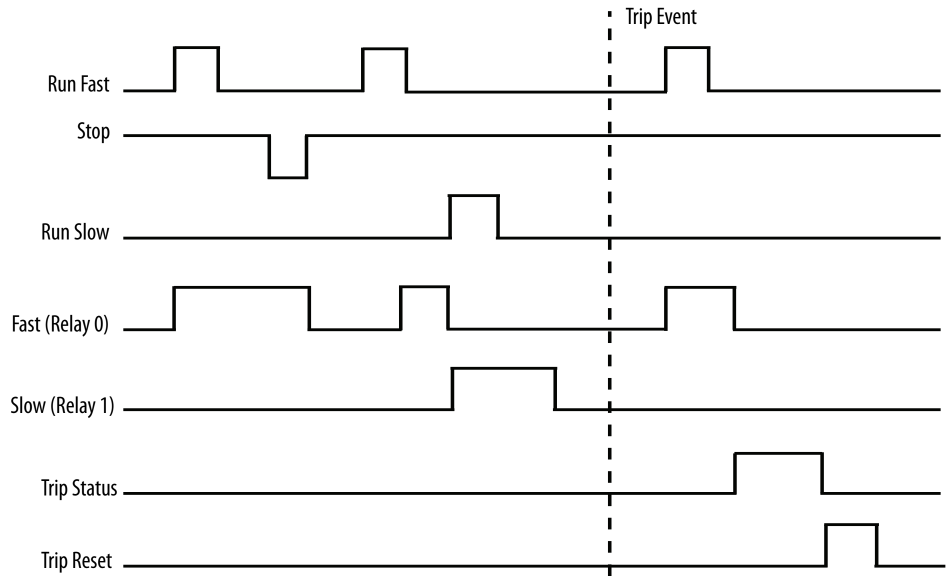


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 33.

Timing Diagram

Figure 61 - Two-speed Starter (Operator Station) Timing Diagram



Two-speed Starter (Operator Station) with Feedback

The E300 relay's Operating Mode *Two Speed Starter (Operator Station) with Feedback* (Parameter 195 = 34) uses the E300 Operator Station's "I" and "0" keys to control Relay 0, which controls the contactor coil. These keys are momentary push buttons, so the two-speed starter remains energized when you release the "I" button. The E300 relay issues a trip or warning event if the E300 Operator Station disconnects from the base relay.

The auxiliary contact from the two-speed starter's contactor is wired into Input 0. If a feedback signal is not received before the time identified in Feedback Timeout (Parameter 213), then the E300 relay issues a trip or warning event.

InterlockDelay (Parameter 215) defines the minimum time delay when switching direction.

The E300 Operator Station's Reset button is enabled, and the Local/Remote yellow LED is illuminated to indicate that the operator station is being used for local control.

Rules

1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Output Pt01 Assignment (Parameters 203) must be set to Control Relay.
4. Overload Trip must be enabled in TripEnableI (Parameter 183).
5. Operator Station Trip must be disabled in TripEnableC (Parameter 186).
6. Operator Station Option Match Trip or Warning must be enabled.
   - Option Match Trip or must be enabled in TripEnableC (Parameter 186)
   - Operator Station must be enabled in Mismatch Action (Parameter 233)
   - An operator station must be selected in Operator Station Type (Parameter 224)

Or

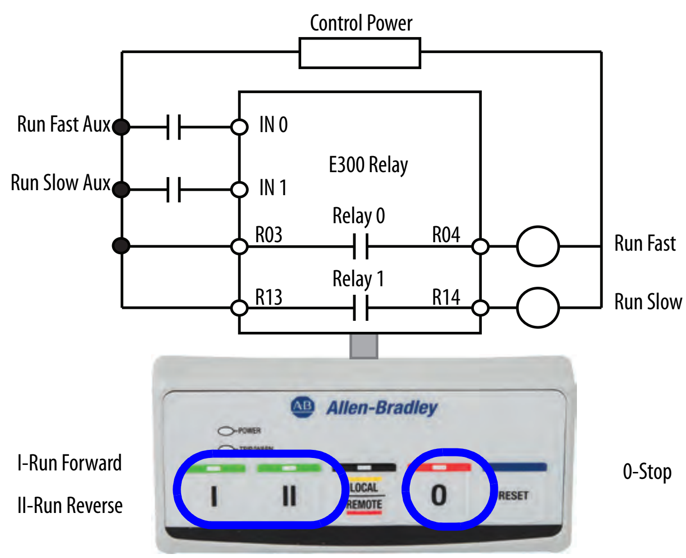
- Option Match Warning must be enabled in WarningEnableC (Parameter 192)
- Operator Station must be disabled in Mismatch Action (Parameter 233)
- An operator station must be selected in Operator Station Type (Parameter 224)

7. Communication Fault & Idle Override (Parameter 346) must be enabled.
8. Network Fault Override (Parameter 347) must be enabled.
9. Feedback Timeout Trip in TripEnableC (Parameter 186) or Feedback Timeout Warning in WarningEnableC (Parameter 192) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay to the high-speed contactor and Output Relay 1 is wired as a control relay to the low-speed contactor. Both relays open when a trip event occurs. Figure 62 is a wiring diagram of a two-speed starter with Output Relay 0 and Output Relay 1 configured as control relays and the contactor auxiliary contacts wired to Input 0 and Input 1.

Figure 62 - Two-speed Starter (Operator Station) with Feedback Wiring Diagram

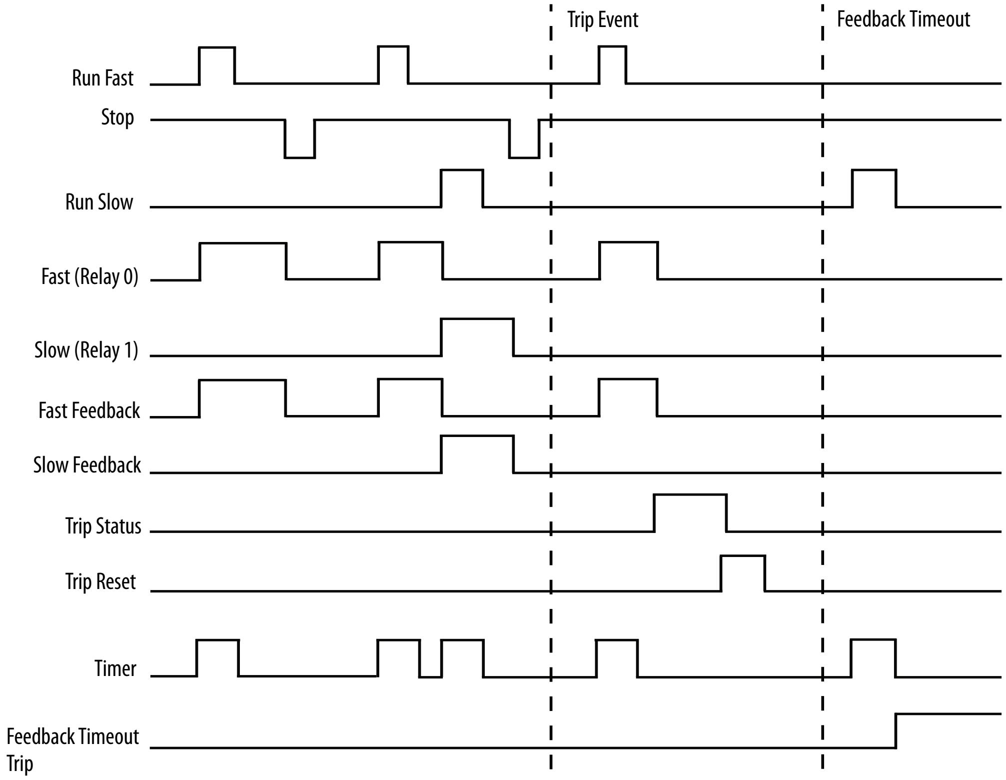


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 34.

Timing Diagram

Figure 63 - Two-speed Starter (Operator Station) with Feedback Timing Diagram



Two-speed Starter (Local I/O) – Two-wire Control

The E300 relay's Operating Mode *Two Speed Starter (Local I/O) – Two Wire Control* (Parameter 195 = 46) uses Input 0 to control Output Relay 0, which controls the contactor coil of the high-speed contactor, and Input 1 to control Output Relay 1, which controls the contactor coil of the low-speed contactor. Both Input 0 and Input 1 are maintained signals, so the two-speed starter remains energized when either Input 0 or Input 1 is active.

InterlockDelay (Parameter 215) defines the minimum time delay when switching direction.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Two-speed Starter (Local I/O) – Two-wire Control operating mode uses the signal from Input 0 or Input 1 to control the starter. When an E300 relay powers up, the starter energizes if either Input 0 or Input 1 is active.

Rules

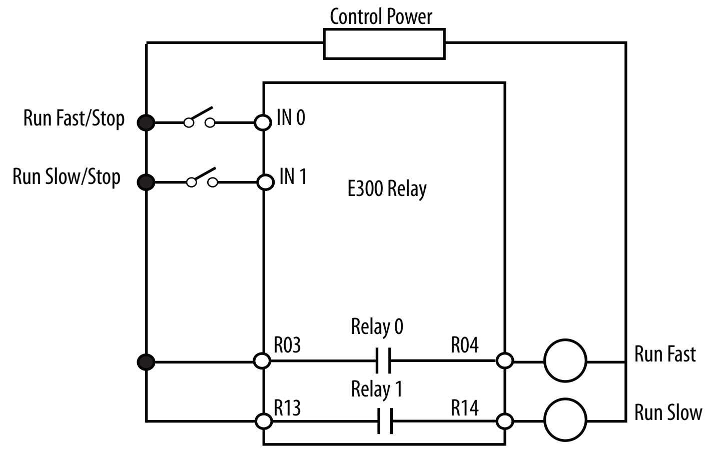
1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Output Pt01 Assignment (Parameters 203) must be set to Control Relay.
4. Overload Trip must be enabled in TripEnableI (Parameter 183).

5. Communication Fault & Idle Override (Parameter 346) must be enabled.
6. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay to the high-speed contactor and Output Relay 1 is wired as a control relay to the low-speed contactor. Both relays open when a trip event occurs. Figure 64 is a wiring diagram of a two-speed starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 64 - Two-speed Starter (Local I/O) – Two-wire Control Wiring Diagram

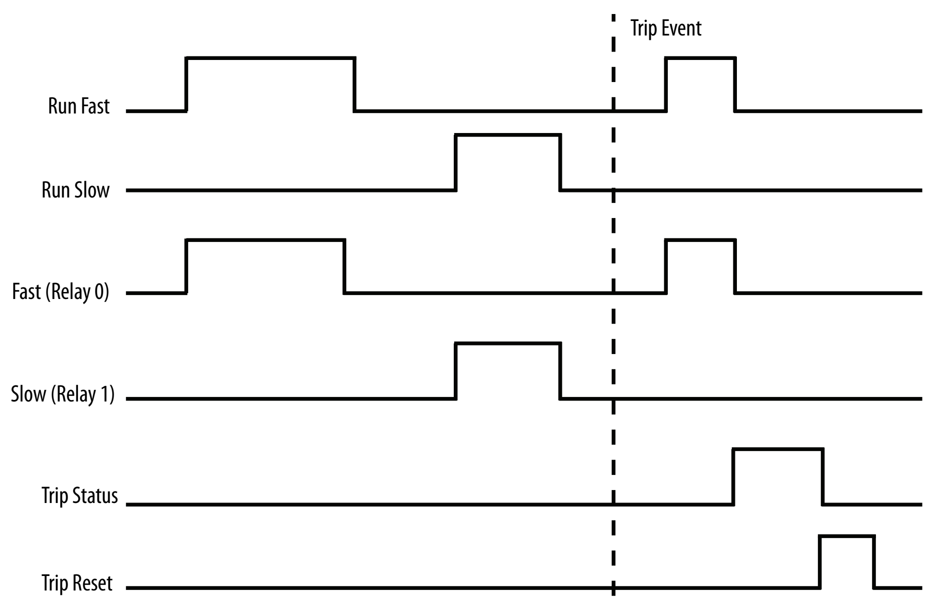


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 46.

Timing Diagram

Figure 65 - Two-speed Starter (Local I/O) – Two-wire Control Timing Diagram



Two-speed Starter (Local I/O) – Two-wire Control with Feedback

The E300 relay's Operating Mode *Two Speed Starter (Local I/O) – Two Wire Control* (Parameter 195 = 47) uses Input 0 to control Output Relay 0, which controls the contactor coil of the high-speed contactor and Input 1 to control Output Relay 1, which controls the contactor coil of the low-speed contactor. Both Input 0 and Input 1 are maintained signals, so the two-speed starter remains energized when either Input 0 or Input 1 is active.

The auxiliary contact from the starter's high-speed contactor is wired into Input 0, and the auxiliary contact from the starter's low-speed contactor is wired into Input 1. If a feedback signal is not received before the time identified in Feedback Timeout (Parameter 213), then the E300 relay issues a trip or warning event.

InterlockDelay (Parameter 215) defines the minimum time delay when switching direction.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Two-speed Starter (Local I/O) – Two-wire Control operating mode uses the signal from Input 0 or Input 1 to control the starter. When an E300 relay powers up, the starter energizes if either Input 0 or Input 1 is active.

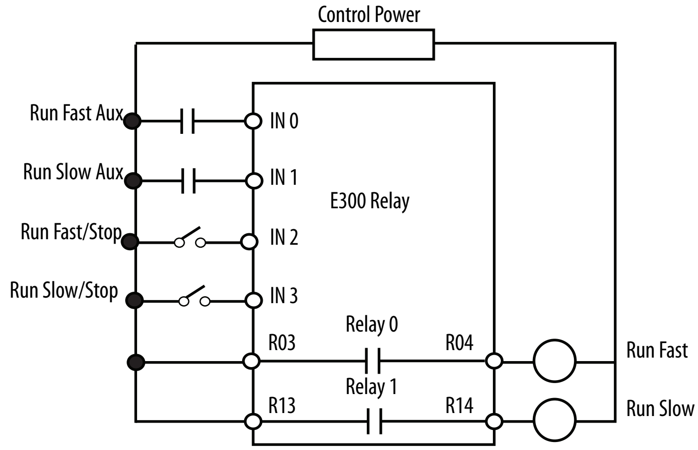
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Output Pt01 Assignment (Parameters 203) must be set to Control Relay.
4. Overload Trip must be enabled in TripEnableI (Parameter 183).
5. Feedback Timeout Trip in TripEnableC (Parameter 186) or Feedback Timeout Warning in WarningEnableC (Parameter 192) must be enabled.
6. Communication Fault & Idle Override (Parameter 346) must be enabled.
7. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 is wired as a control relay to the high-speed contactor and Output Relay 1 is wired as a control relay to the low-speed contactor. Both relays open when a trip event occurs. Figure 66 is a wiring diagram of a Two-speed Starter with Output Relay 0 and Output Relay 1 configured as control relays and the contactor auxiliary contacts wired to Input 0 and Input 1.

Figure 66 - Two-speed Starter (Local I/O) – Two-wire Control with Feedback Wiring Diagram

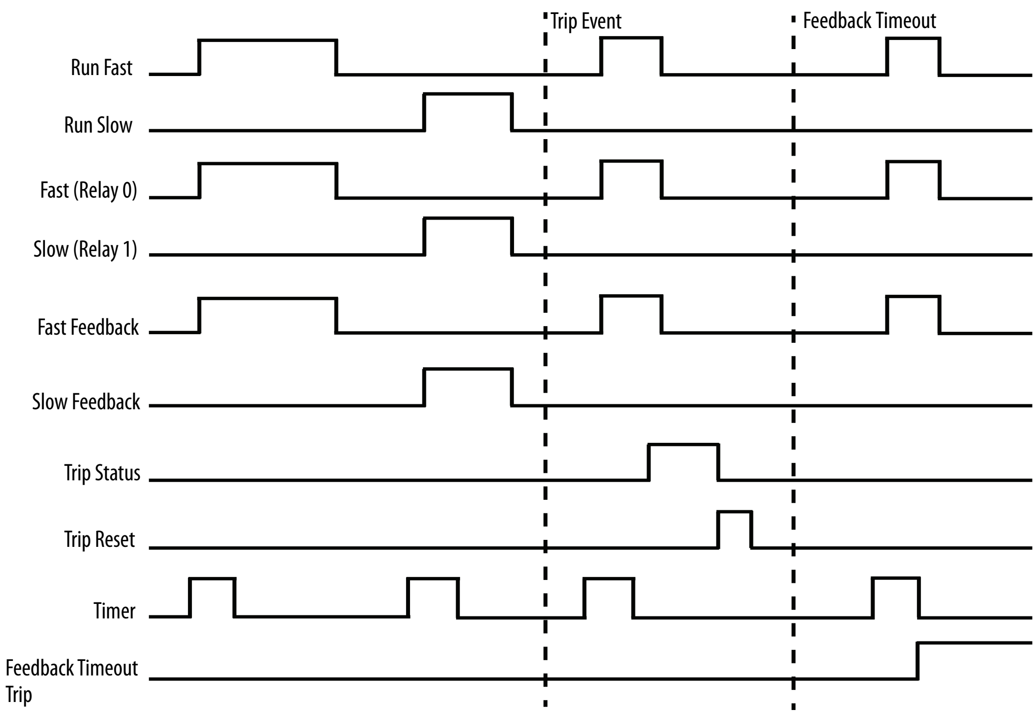


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 47.

Timing Diagram

Figure 67 - Two-speed Starter (Local I/O) – Two-wire Control with Feedback Timing Diagram



Two-speed Starter (Local I/O) – Three-wire Control

The E300 relay's Operating Mode *Two Speed Starter (Local I/O) – Three Wire Control* (Parameter 195 = 48) uses a normally open momentary push button in Input 0 to energize Output Relay 0, which controls the high-speed contactor coil. A normally open momentary push button in Input 1 is used to energize Output Relay 1, which controls the low-speed contactor coil. A normally closed push button in Input 2 is used to de-energize Output Relay 0 and Output Relay 1. Both Input 0, Input 1, and Input 2 are momentary signals, so the two-speed starter only energizes if Input 2 is active and Input 0 or Input 1 is momentarily active.

InterlockDelay (Parameter 215) defines the minimum time delay when switching direction.

The reset button of the E300 Operator Station is enabled for this operating mode.

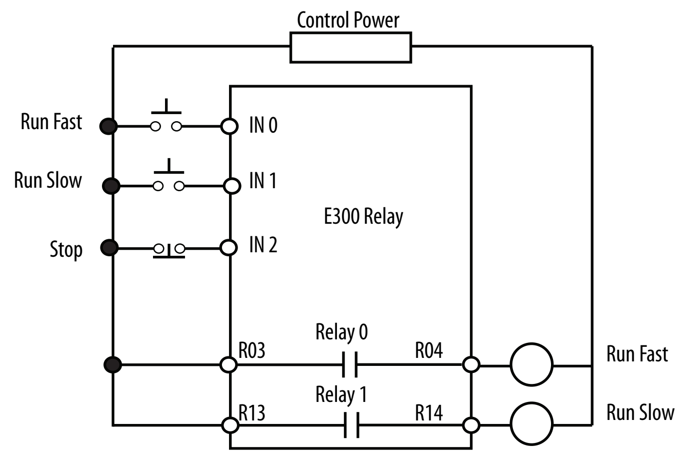
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Four digital inputs must be available on the Control Module
3. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
4. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
5. Overload Trip must be enabled in TripEnableI (Parameter 183).
6. Communication Fault & Idle Override (Parameter 346) must be enabled.
7. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

Figure 68 is a wiring diagram of a Two-speed Starter with three-wire control and Output Relay 0 and Output Relay 1 configured as control relays.

Figure 68 - Two-speed Starter (Local I/O) – Three-wire Control Wiring Diagram

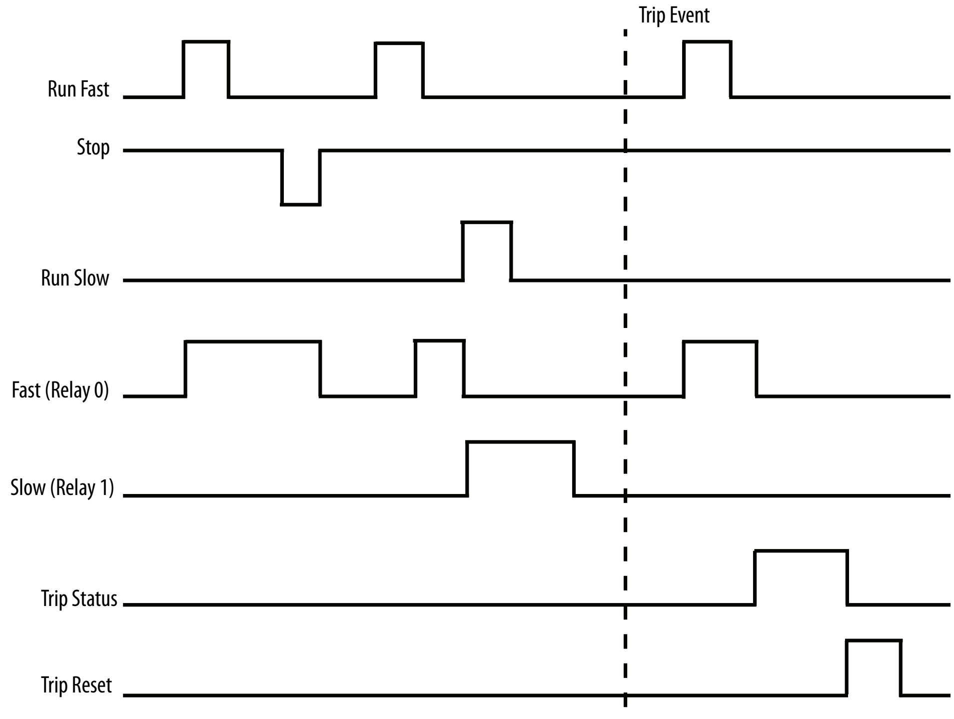


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 48.

Timing Diagram

Figure 69 - Two-speed Starter (Local I/O) – Three-wire Control Timing Diagram



Two-speed Starter (Network & Operator Station)

The E300 relay's Operating Mode *Two Speed Starter (Network& Operator Station)* (Parameter 195 = 15) in Remote control mode uses network tags *LogicDefinedPt00Data* in Output Assembly 144 to control Relay 0, which controls the high-speed contactor coil, and *LogicDefinedPt01Data* in Output Assembly 144 to control Relay 1, which controls the low-speed contactor coil. Both LogicDefinedPt00Data and LogicDefinedPt01Data are maintained values, so the two-speed starter remains energized when LogicDefinedPt00Data or LogicDefinedPt01Data has a value of 1. You can program the appropriate state of the starter when communication is lost using the Network Communication Fault and Network Communication Idle parameters (Parameters 569 – 573) described in Chapter 3.

In Local control mode, the E300 Operator Station's "I" key is used to control Output Relay 0, which controls the high-speed contactor coil. The "II" key controls Output Relay 1, which controls the low-speed contactor coil. The "0" key is used to de-energize Output Relay 0 and Output Relay 1. These keys are momentary push buttons, so the two-speed starter remains energized when you release the "I" or "II" button.

To change between Local and Remote control mode press and release the "Local/ Remote" button on the E300 Operator Station. The LED above "Local/Remote" button illuminates yellow in Local control mode and red in Remote control mode.

InterlockDelay (Parameter 215) defines the minimum time delay when switching direction.

The E300 relay issues a trip or warning event if the E300 Operator Station disconnects from the base relay.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Two-speed Starter (Network & Operator Station) operating mode uses the value in network tag *LogicDefinedPt00Data* to control the starter. When communication is restored between an automation controller and the E300 relay, the starter energizes if the value in LogicDefinedPt00Data or LogicDefinedPt01Data is set to 1.

Rules

1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Output Pt01 Assignment (Parameters 203) must be set to Control Relay.
4. Overload Trip must be enabled in TripEnableI (Parameter 183).
5. Operator Station Trip must be disabled in TripEnableC (Parameter 186).
6. Operator Station Option Match Trip or Warning must be enabled.
   - Option Match Trip or must be enabled in TripEnableC (Parameter 186)
   - Operator Station must be enabled in Mismatch Action (Parameter 233)
   - An operator station must be selected in Operator Station Type (Parameter 224)

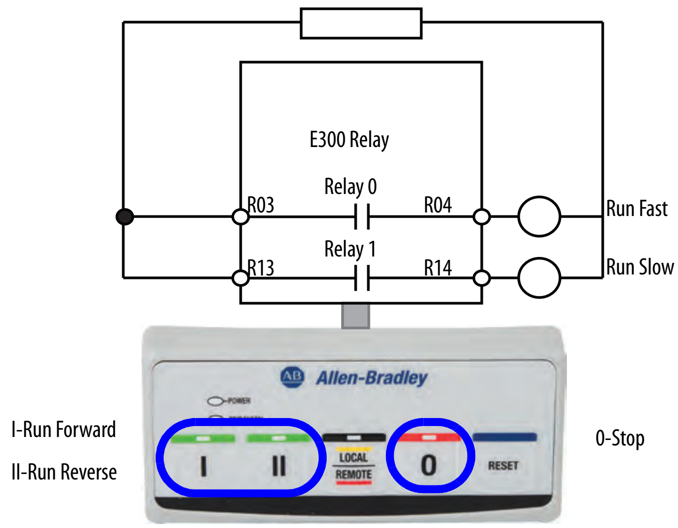
   Or

   - Option Match Warning must be enabled in WarningEnableC (Parameter 192)
   - Operator Station must be disabled in Mismatch Action (Parameter 233)
   - An operator station must be selected in Operator Station Type (Parameter 224)
7. Communication Fault & Idle Override (Parameter 346) must be enabled.
8. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 and Output Relay 1 are wired as a control relays in which the relay is controlled by the communication network or E300 Operator Station, and both output relays open when a trip event occurs. Figure 70 is a wiring diagram of a two-speed starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 70 - Two-speed Starter (Network & Operator Station) Wiring Diagram



DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 15.

Two-speed Starter (Network & Local I/O) – Two-wire Control

The E300 relay's Operating Mode *Two Speed Starter (Network& Operator Station)* (Parameter 195 = 24) in Remote control mode uses network tags *LogicDefinedPt00Data* in Output Assembly 144 to control Relay 0, which controls the high-speed contactor coil, and *LogicDefinedPt01Data* in Output Assembly 144 to control Relay 1, which controls the low-speed contactor coil. Both LogicDefinedPt00Data and LogicDefinedPt01Data are maintained values, so the two-speed starter remains energized when LogicDefinedPt00Data or LogicDefinedPt01Data has a value of 1. You can program the appropriate state of the starter when communication is lost using the Network Communication Fault and Network Communication Idle parameters (Parameters 569 – 573) described in Chapter 3.

In Local control mode, Input 0 is used to control Output Relay 0, which controls the contactor coil of the high-speed contactor, and Input 1 is used to control Output Relay 1, which controls the contactor coil of the low-speed contactor. Both Input 0 and Input 1 are maintained signals, so the two-speed starter remains energized when either Input 0 or Input 1 is active.

Input 3 is used to select between Local and Remote control mode. Activate Input 3 to select Remote control mode. De-activate Input 3 to select Local control mode.

InterlockDelay (Parameter 215) defines the minimum time delay when switching direction.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Two-speed Starter (Network & Operator Station) operating mode uses the value in network tag *LogicDefinedPt00Data* or *LogicDefinedPt01Data* to control the starter. When communication is restored between an automation controller and the E300 relay, the starter energizes if the value in LogicDefinedPt00Data or *LogicDefinedPt01Data* is set to 1.

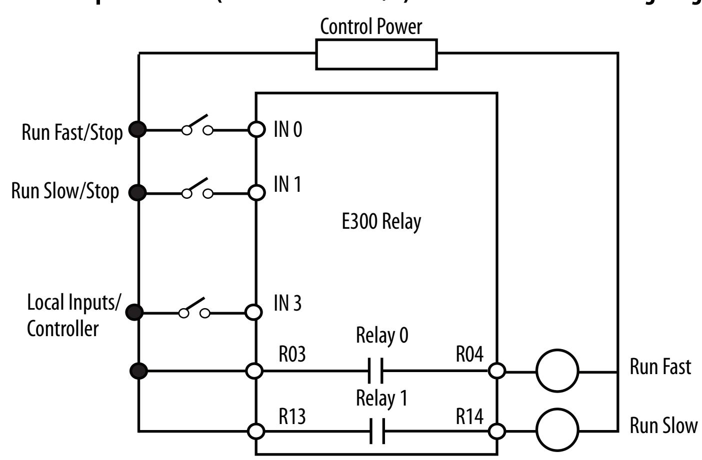
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Three digital inputs must be available on the Control Module
3. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
4. Output Pt01 Assignment (Parameters 203) must be set to Control Relay.
5. Overload Trip must be enabled in TripEnableI (Parameter 183).
6. Communication Fault & Idle Override (Parameter 346) must be enabled.
7. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 and Output Relay 1 are wired as a control relays in which the relay is controlled by the communication network or Input 0 & Input 1. Both output relays open when a trip event occurs. Figure 71 is a wiring diagram of a Two-speed Starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 71 - Two-speed Starter (Network & Local I/O) – Two-wire Control Wiring Diagram

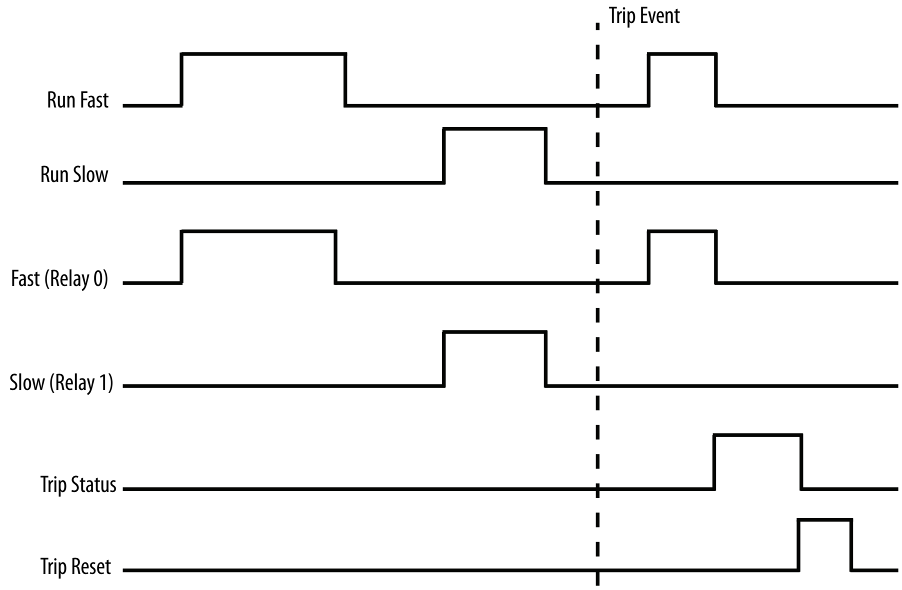


DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 24.

Timing Diagram

Figure 72 - Two-speed Starter (Network & Local I/O) – Two-wire Control Timing Diagram



Two-speed Starter (Network & Local I/O) – Three-wire Control

The E300 relay's Operating Mode *Two Speed Starter (Network& Operator Station)* (Parameter 195 = 25) in Remote control mode uses network tags *LogicDefinedPt00Data* in Output Assembly 144 to control Relay 0, which controls the high-speed contactor coil, and *LogicDefinedPt01Data* in Output Assembly 144 to control Relay 1, which controls the low-speed contactor coil. Both LogicDefinedPt00Data and LogicDefinedPt01Data are maintained values, so the two-speed starter remains energized when LogicDefinedPt00Data or LogicDefinedPt01Data has a value of 1. You can program the appropriate state of the starter when communication is lost using the Network Communication Fault and Network Communication Idle parameters (Parameters 569 – 573) described in Chapter 3.

Local control mode uses a normally open momentary push button in Input 0 to energize Output Relay 0, which controls the high-speed contactor coil. A normally open momentary push button in Input 1 is used to energize Output Relay 1, which controls the low-speed contactor coil. A normally closed push button in Input 2 is used to de-energize Output Relay 0 and Output Relay 1. Both Input 0, Input 1, and Input 2 are momentary signals, so the two-speed starter only energizes if Input 2 is active and Input 0 or Input 1 is momentarily active.

Input 3 is used to select between Local and Remote control mode. Activate Input 3 to select Remote control mode. De-activate Input 3 to select Local control mode.

InterlockDelay (Parameter 215) defines the minimum time delay when switching direction.

The reset button of the E300 Operator Station is enabled for this operating mode.

IMPORTANT	The Two-speed Starter (Network & Operator Station) operating mode uses the value in network tag *LogicDefinedPt00Data* or *LogicDefinedPt01Data* to control the starter. When communication is restored between an automation controller and the E300 relay, the starter energizes if the value in LogicDefinedPt00Data or *LogicDefinedPt01Data* is set to 1.

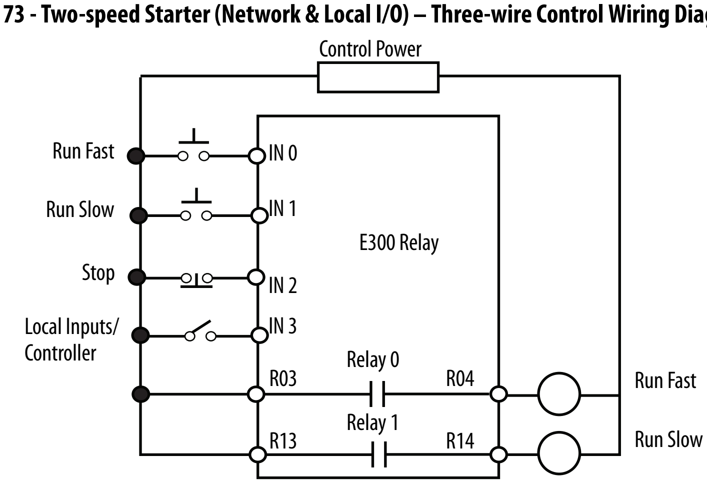
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Four digital inputs must be available on the Control Module
3. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
4. Output Pt01 Assignment (Parameters 203) must be set to Control Relay.
5. Overload Trip must be enabled in TripEnableI (Parameter 183).
6. Communication Fault & Idle Override (Parameter 346) must be enabled.
7. Network Fault Override (Parameter 347) must be enabled.

Wiring Diagram

The E300 relay's Output Relay 0 and Output Relay 1 are wired as a control relays in which the relay is controlled by the communication network or Input 0, Input 1, and Input 2. Both output relays open when a trip event occurs. Figure 73 is a wiring diagram of a two-speed starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 73 - Two-speed Starter (Network & Local I/O) – Three-wire Control Wiring Diagram



DeviceLogix Program

The DeviceLogix program is automatically loaded and enabled in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 25.

Two-Speed Starter (Custom)

The E300 relay's Operating Mode *Two Speed Starter (Custom)* (Parameter 195 = 53) operates as a two-speed starter with two output relays that are assigned as normally open control relays. The Two-speed Starter (Custom) operating mode is used for applications that want customized DeviceLogix programs. This operating mode requires minimal configuration rules.

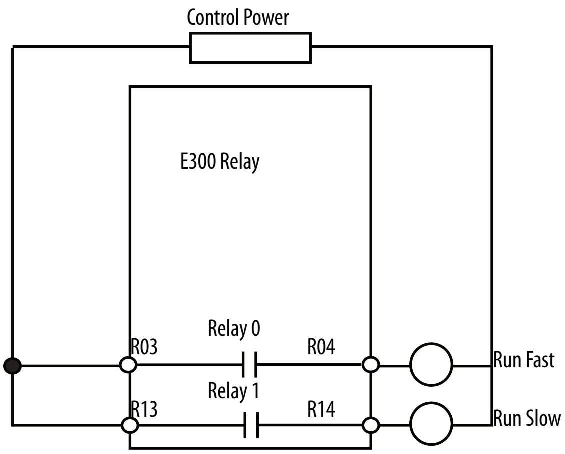
Rules

1. Available for Control Module firmware v5.000 and higher.
2. Set two of the Output Ptxx Assignments (Parameters 202…204) to Control Relay.
3. Overload Trip must be enabled in TripEnableI (Parameter 183).

Wiring Diagram

Figure 74 is a wiring diagram of a Two-speed Starter with Output Relay 0 and Output Relay 1 configured as control relays. Both Output Relay 0 and Output Relay 1 go to an open state when there is a trip event.

Figure 74 - Two-Speed Starter (Custom) Wiring Diagram

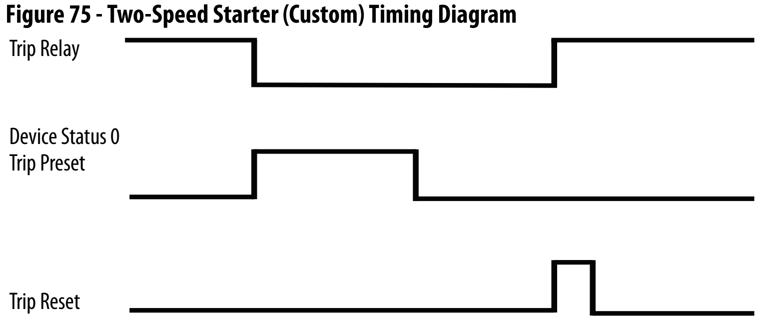


DeviceLogix Program

The last saved DeviceLogix program is executed in the E300 relay on power-up or when Operating Mode (Parameter 195) is set to a value of 53.

Timing Diagram

Figure 75 - Two-Speed Starter (Custom) Timing Diagram



Monitor Operating Mode

The E300 relay's monitor-based operating mode allows you to disable all protection features of the E300 relay. You can use the E300 relay as a monitoring device to report current, voltage, power, and energy information.

There is one monitor based operating mode – Custom.

Monitor (Custom)

The E300 relay's Operating Mode *Monitor (Custom)* (Parameter 195 = 54) allows you to use the E300 relay as a monitoring device. No configuration rules apply in this operating mode if all motor protection features are disabled.

Rules

1. If any protection trip events are enabled (excluding Configuration, NVS, and Hardware Fault trip), then set any of the Output Ptxx Assignments (Parameters 202…204) to the appropriate value of Trip Relay, Control Relay, Monitor Lx Trip Relay, or Monitor Lx Control Relay.

Wiring Diagram

Not Applicable

Protective Trip and Warning Functions

This chapter provides detailed information about the protective trip and warning functions of the E300 Electronic Overload Relay. The protective trip and warning functions are organized into five sections:

- Current-based
- Voltage-based
- Power-based
- Control-based
- Analog-based

This chapter explains the trip and warning protection features of the E300 relay and the associated configuration parameters.

Current Protection

The E300 relay digitally monitors the electrical current that is consumed by an electric motor. This electric current information is used for the following protective trip and warning functions:

- Overload Trip/Warning
- Phase Loss Trip
- Ground Fault Trip/Warning
- Stall Trip
- Jam Trip/Warning
- Underload Trip/Warning
- Current Imbalance Trip/Warning
- Line Under Current Trip/Warning
- Line Over Current Trip/Warning
- Line Loss Trip/Warning

Current Trip Enable (Parameter 183) and Current Warning Enable (Parameter 189) are used to enable the respective current-based protective trip and warning functions.

Current Trip Status (Parameter 4) and Current Warning Status (Parameter 10) are used to monitor the respective current-based protective trip and warning functions.

Current Trip

The E300 relay trips with an current-based indication if:

- No trip currently exists
- Overload trip protection is enabled
- Current is present
- % Thermal Capacity Utilized reaches 100%

If the E300 relay trips, the:

- TRIP/WARN LED status indicator flashes a red 5-short blink pattern
- Bit 4 in Current Trip Status (Parameter 4) sets to 1
- Bit 0 in Device Status 0 (Parameter 20) sets to 1
- Any relay outputs configured as a Trip Relay open
- Any relay outputs configured as a Control Relay open
- Any relay outputs configured as a Trip Alarm close
- Any relay outputs configured as a Normal Relay are placed in their Protection Fault state (if so programmed)

IMPORTANT The Protection Fault State of Relay 0, Relay 1, Relay 2, Digital Module 1 Output Relays, Digital Module 2 Output Relays, Digital Module 3 Output Relays, and Digital Module 4 Output Relays are defined by the respective parameters:

- Output PT00 Protection Fault Action (Parameter 304)
- Output PT00 Protection Fault Value (Parameter 305)
- Output PT01 Protection Fault Action (Parameter 310)
- Output PT01 Protection Fault Value (Parameter 311)
- Output PT02 Protection Fault Action (Parameter 316)
- Output PT02 Protection Fault Value (Parameter 317)
- Output Digital Module 1 Protection Fault Action (Parameter 322)
- Output Digital Module 1 Protection Fault Value (Parameter 323)
- Output Digital Module 2 Protection Fault Action (Parameter 328)
- Output Digital Module 2 Protection Fault Value (Parameter 329)
- Output Digital Module 3 Protection Fault Action (Parameter 334)
- Output Digital Module 3 Protection Fault Value (Parameter 335)
- Output Digital Module 4 Protection Fault Action (Parameter 340)
- Output Digital Module 4 Protection Fault Value (Parameter 342)

Current Warning

The E300 relay indicates an current-based warning if:

- No warning currently exists
- Overload warning is enabled
- Current is present
- % Thermal Capacity Utilized is equal to or greater than the warning level

When the overload warning conditions are satisfied, the:

- TRIP/WARN LED status indicator flashes a yellow short-1 blink pattern
- Bit 0 in Current Warning Status (Parameter 10) sets to 1
- Bit 1 in Device Status 0 (Parameter 20) sets to 1
- Any relay outputs configured as warning alarm close

Overload Protection

The E300 relay provides overload protection through true RMS current measurements of the individual phase currents of the connected motor. Based on the highest current measured, the programmed FLA Setting, and Trip Class, a thermal model that simulates the actual heating of the motor is calculated. Percent Thermal Capacity Utilized

(Parameter 1) reports this calculated value and can be read via the communication network

Parameter Number	Parameter Number	Description
Overload Trip	4 20	Indicate a trip
Full Load Amps Setting	171	Define the motor's full-load current rating.
	177	Define the high-speed FLA value in two-speed motor applications. Activating FLA2 is described in Chapter 3.
Trip Class	172	Trip Class is the second of two parameters that affect the E300 relay's thermal capacity utilization algorithm. Trip class is defined as the maximum time (in seconds) for an overload trip to occur when the motor's operating current is six times its rated current. The E300 relay offers an adjustable trip class range of 5…30. Enter the application trip class into Trip Class (Parameter 172).
Automatic/Manual Reset	173	Select the reset mode for the E300 relay after an overload or thermistor (PTC) trip. If an overload trip occurs and automatic reset mode is selected, the E300 relay automatically resets when the value stored in % Thermal Capacity Utilized (Parameter 1) falls below the value stored in Overload Reset Level (Parameter 174). If manual reset mode is selected, the E300 Overload Relay can be manually reset after the % Thermal Capacity Utilized is less than the OL Reset Level.
Overload Warning	10 20	Indicate a warning
Overload Warning Level	175	Define an alert for an impending overload trip and is adjustable from 0…100% TCU.
Time to Trip	2	When the measured motor current exceeds the trip rating of the E300 relay, Overload Time to Trip (Parameter 2) indicates the estimated time remaining before an overload trip occurs. When the measured current is below the trip rating, the Overload Time to Trip value is reported as 9,999 seconds.
Time to Reset	174	After an overload trip, the E300 relay reports the time remaining until the device can be reset through Overload Time to Reset (Parameter 3). When the % Thermal Capacity Utilized value falls to or below the Overload Reset Level (Parameter 174), the Overload Time to Reset value indicates zero until the overload trip is reset. After an overload trip is reset, the Overload Time to Reset value is reported as 0 seconds.
Nonvolatile Thermal Memory	1	The E300 relay includes a nonvolatile circuit to provide thermal memory. The time constant of the circuit corresponds to a Trip Class 20 setting. During normal operation, the thermal memory circuit is continuously monitored and updated to accurately reflect the thermal capacity utilization of the connected motor. If power is removed, the thermal memory of the circuit decays at a rate equivalent to the cooling of a Trip Class 20 application. When the power is re-applied, the E300 relay checks the thermal memory circuit voltage to determine the initial value of % Thermal Capacity Utilized (Parameter 1).

Full Load Current Guidelines

USA and Canada Guidelines

- Motor Service Factor ≥ 1.15: For motors with a service factor rating of 1.15 or greater, program the FLA setting to the full-load current rating on the printed nameplate.
- Motor Service Factor < 1.15: For motors with a service factor rating less than 1.15, program the FLA setting to 90% of the full-load current rating on the printed nameplate.
- Wye-Delta (Y-Δ) Applications: Follow the application's service factor instructions, except divide the full-load current rating on the printed nameplate by 1.73.

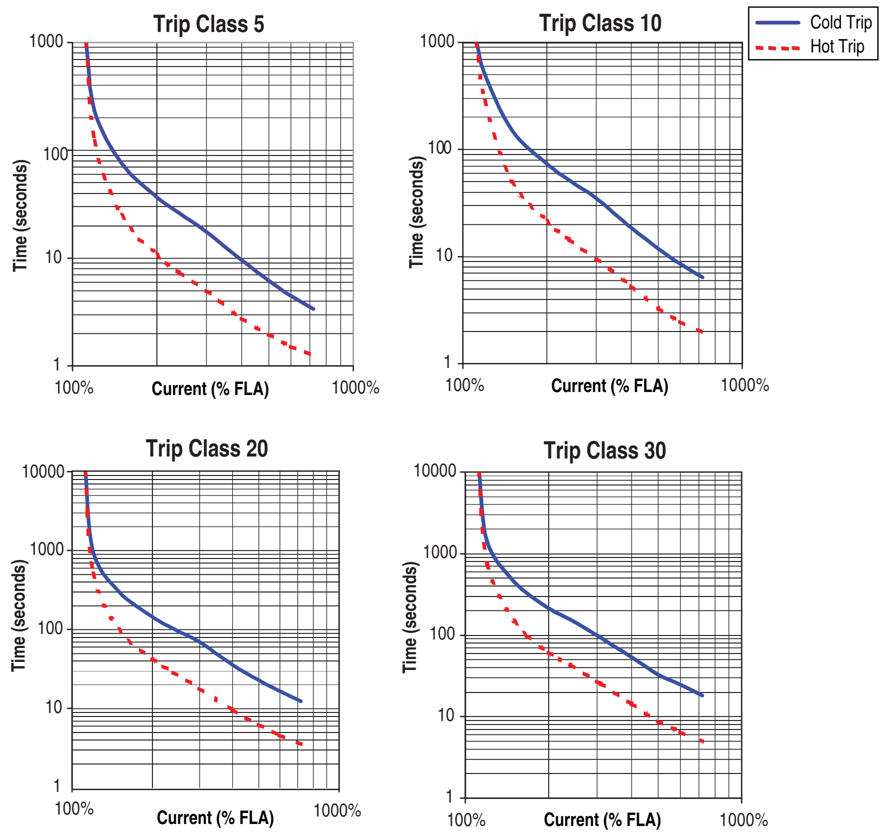
Outside USA and Canada Guidelines

- Maximum Continuous Rated (MCR) Motors: Program the FLA setting to the full-load current rating on the printed nameplate.
- Star-Delta (Y-Δ) Applications: Follow the MCR instructions, except divide the full-load current rating on the printed nameplate by 1.73.

Trip Curves

The following figures illustrate the E300 relay's time-current characteristics for trip classes 5, 10, 20, and 30.

Figure 76 - Time-Current Characteristics for Trip Classes 5, 10, 20, and 30



For trip class time-current characteristics other than 5, 10, 20, or 30, scale the Class 10 trip time according to the following table:

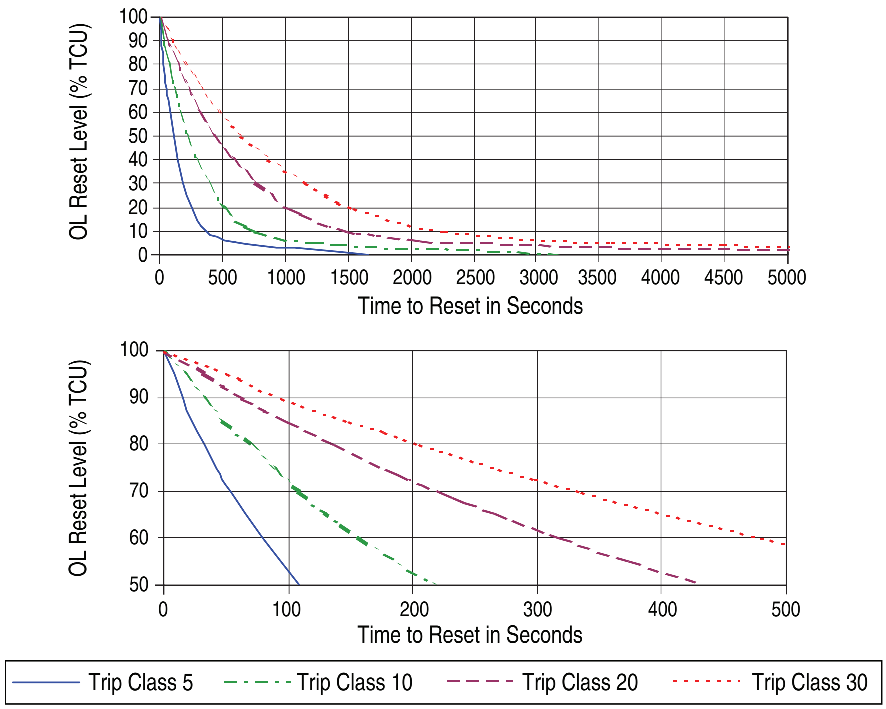
Table 24 - Time-Current Characteristic Scaling Factors

Trip Class	Trip Class 10 Multiplier	Trip Class	Trip Class 10 Multiplier	Trip Class	Trip Class 10 Multiplier
5	0.5	14	1.4	23	2.3
6	0.6	15	1.5	24	2.4
7	0.7	16	1.6	25	2.5
8	0.8	17	1.7	26	2.6
9	0.9	18	1.8	27	2.7
10	1.0	19	1.9	28	2.8
11	1.1	20	2.0	29	2.9
12	1.2	21	2.1	30	3.0
13	1.3	22	2.2		

Automatic/Manual Reset Times

Overload Reset Level (Parameter 174) is adjustable from 1 to 100% TCU. The following figures illustrate the typical overload reset time delay when Overload Reset Level is set to 75% TCU.

Figure 77 - Overload Reset Times



ATTENTION: In explosive environment applications, Overload Reset Mode (Parameter 173) must be set to Manual.

ATTENTION: In an explosive environment application, Overload Reset Level (Parameter 174) must be set as low as possible or in accordance with the motor thermal time constant.

Phase Loss Protection

A high current imbalance, or phase failure, can be caused by defective contacts in a contactor or circuit breaker, loose terminals, blown fuses, sliced wires, or faults in the motor. When a phase failure exists, the motor can experience an additional temperature rise or excessive mechanical vibration. This may result in a degradation of the motor insulation or increased stress on the motor bearings. Rapid phase loss detection helps to minimize the potential damage and loss of production.

Parameter Name	Parameter Number	Description
Phase Loss Trip	4 20	Indicate a trip
Phase Loss Inhibit Time	239	Inhibit a phase loss trip from occurring during the motor starting sequence. It is adjustable from 0…250 seconds. **IMPORTANT** The phase loss inhibit timer starts after the maximum phase of load current transitions from 0 A to 30% of the minimum FLA setting of the device. The E300 relay does not begin monitoring for a phase loss condition until the Phase Loss Inhibit Time expires.
Phase Loss Trip Delay	240	Define the time period for which a phase loss condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Ground Fault Current Protection

In isolated or high impedance-grounded systems, core-balanced current sensors are typically used to detect low-level ground faults caused by insulation breakdowns or entry of foreign objects. Detection of such ground faults can be used to interrupt the system to prevent further damage or to alert the appropriate personnel to perform timely maintenance.

The E300 relay provides core-balanced ground fault current detection capability, with the option of enabling Ground Fault Trip, Ground Fault Warning, or both. The ground fault detection method and range depends upon the catalog number of the E300 Sensing Module and Control Module ordered.

Table 25 - Ground Fault Capabilities

Catalog Number	Ground Fault Method	Ground Fault Trip/Warning Range
193-ESM-IG-__-__	Internal	0.5…5.0 A
592-ESM-IG-__-__		
193-ESM-VIG-__-__		
592-ESM-VIG-__-__		
193-EIOGP-22-___	External(1)	0.02…5.0 A
193-EIOGP-42-___		

(1) You must use one of the following Catalog Number 193-CBCT_ Core Balance Ground Fault Sensors :

1 — Ø 20 mm window
2 — Ø 40 mm window
3 — Ø 65 mm window
4 — Ø 85 mm window

ATTENTION: The E300 relay is not a ground fault circuit interrupter for personnel protection (or Class I) as defined in Article 100 of the NEC.

ATTENTION: The E300 relay is not intended to signal a disconnecting means to open the faulted current. A disconnecting device must be capable of interrupting the maximum available fault current of the system on which it is used.

Parameter Name	Parameter Number	Description
Ground Fault Trip	4 20	Indicate a trip
Ground Fault Type'	241	Select the internal option or the external option with the appropriate measurement range.
Ground Fault Maximum Inhibit	248	Inhibits a ground fault trip from occurring when the ground fault current exceeds the maximum range of the core-balance sensor (approximately 6.5 A). Ground faults can quickly rise from low-level arcing levels to short circuit magnitudes. A motor starting contactor may not have the necessary rating to interrupt a high magnitude ground fault. In these circumstances it is desirable for an upstream circuit breaker with the proper rating to interrupt the ground fault.

Parameter Name	Parameter Number	Description
Ground Fault Filter	131	An E300 relay can filter ground fault currents for High Resistance Grounded (HRG) systems from its current-based protection trip and warning functions, which include: • Thermal overload • Current imbalance • Jam • Stall The Ground Fault Filter is useful for smaller-sized motors that trip unexpectedly due to a controlled ground fault current that is significant relative to the current draw of the electric motor. This filter only disables the effects of the ground fault current from the current-based motor protection trip and warning functions. Current-based diagnostic data is reported unfiltered when this feature is enabled.
Ground Fault Inhibit Time	242	Inhibit a ground fault trip and warning from occurring during the motor starting sequence and is adjustable from 0…250 seconds. The ground fault inhibit time begins when the Current Present (bit 3) or Ground Fault Current Present (bit 4) is set in Device Status 0 (Parameter 20).
Ground Fault Trip Delay	243	Define the time period a ground fault condition must be present before a trip occurs and is adjustable from 0.0…25.0 s.
Ground Fault Trip Level	244	Ground Fault Trip Level (Parameter 244) allows you to define the ground fault current in which the E300 relay trips and is adjustable from: • 0.500…5.00 A (Internal) • 0.020…5.00 A (External) **IMPORTANT** The ground fault inhibit timer starts after the maximum phase load current transitions from 0 A to 30% of the minimum FLA rating of the device or the ground fault current is greater than or equal to 50% of the minimum ground fault current rating of the device. The E300 relay does not begin monitoring for a ground fault condition until the Ground Fault Current Inhibit Time expires.
Ground Fault Warning	10 20	Indicate a warning
Ground Fault Warning Level	246	Define the ground fault current at which the E300 relay indicates a warning and is adjustable from 0.20…5.00 A.
Ground Fault Warning Delay	245	Define the time period (adjustable from 0.0…25.0 s) for which a ground fault condition must be present before a warning occurs.

Stall Protection

A motor stalls when its inrush current lasts for a longer than normal period of time during its starting sequence. As a result, the motor heats up rapidly and reaches the temperature limit of its insulation. Rapid stall detection during the starting sequence can extend the motor's life, and minimize potential damage and loss of production. The E300 relay can monitor for this condition with its Stall Trip function and stop the motor before damage and loss of production can occur.

Parameter Name	Parameter Number	Description
Stall Trip	4 20	Indicate a trip
Stall Enabled Time	249	Adjust the time the E300 relay monitors for a stall condition during the motor starting sequence and is adjustable from 0…250 s.
Stall Trip Level	250	Define the locked rotor current and is adjustable from 100…600% of the FLA Setting (Parameter 171). **IMPORTANT** Stall Protection is only enabled during the motor starting sequence. If the maximum phase of load current falls below the programmed Stall Trip Level before the Stall Enabled Time elapses, the E300 relay disables Stall Protection until the next motor starting sequence. **IMPORTANT** The E300 relay considers a motor to have begun its starting sequence if the maximum phase of motor current transitions from 0A to approximately 30% of the minimum FLA setting of the device.

Jam Protection

A motor goes into a jam condition when a running motor begins to consume current greater than50% of the motor's nameplate rating. An example of this condition could be an overloaded conveyor or jammed gear. These conditions can result in the overheating of the motor and equipment damage. The E300 relay can monitor for this condition with its Jam Trip and Warning function to detect for a rapid jam fault to minimize damage and loss of production.

Parameter Name	Parameter Number	Description
Jam Trip	4 20	Indicate a trip
Jam Inhibit Time	251	Inhibit a jam trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 s.
Jam Trip Delay	252	Define the time period a jam condition must be present before a trip occurs. It is adjustable from 0.1…25.0 s.
Jam Trip Level	253	Define the current at which the E300 relay trips on a jam. It is user-adjustable from 50…600% of the FLA Setting (Parameter 171). **IMPORTANT** The Jam Inhibitor timer starts after the maximum phase of load current transitions from 0 A to 30% of the minimum fla SETTING of the device. The E300 relay does not begin monitoring for a jam condition until the Jam Inhibit Time expires.
Jam Warning	10 20	Indicate a warning
Jam Warn Level	254	Define the current at which the E300 relay indicates a warning. It is user-adjustable from 50…600% for the FLA Setting (Parameter 171). **IMPORTANT** The Jam Warning function does not include a time delay feature. Once the Jam Inhibit Time has expired, the Jam Warning indication is instantaneous.

Underload Protection

Motor current less than a specific level may indicate a mechanical malfunction in the installation, such as a torn conveyor belt, damaged fan blade, broken shaft, or worn tool. Such conditions may not harm the motor, but they can lead to loss of production. Rapid underload fault detection helps to minimize damage and loss of production.

The E300 relay can monitor for this condition with its Underload Trip and Warning function to detect for a rapid underload fault to minimize damage and loss of production.

Parameter Name	Parameter Number	Description
Underload Trip	4 20	Indicate a trip
Underload Inhibit Time	255	Inhibit an underload trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 s.
Underload Trip Delay	256	Define the time period an underload condition must be present before a trip occurs. It is adjustable from 0.1…25.0 s.

Parameter Name	Parameter Number	Description
Underload Trip Level	257	Define the current at which the E300 relay trips on an underload. It is user-adjustable from 10…100% of the FLA Setting (Parameter 171). **IMPORTANT** The Underload Inhibit Timer starts after the maximum phase of load current transitions from 0 A to 30% of the minimum fla SETTING of the device. The E300 relay does not begin monitoring for an underload condition until the Underload Inhibit Time expires. **IMPORTANT** For any given application, the practical limit of the Underload Trip Level (Parameter 246) is dependent on the FLA Setting and the lower limit of the E300 relay's current measurement capability.
Underload Warning	10 20	Indicate a warning
Underload Warning Level	258	Define the current at which the E300 relay indicates a warning. It is user-adjustable from 10…100% for the FLA Setting (Parameter 171). **IMPORTANT** The Underload Warning function does not include a time delay feature. Once the Underload Inhibit Time has expired, the Underload Warning indication is instantaneous.

Current Imbalance Protection

A current imbalance can be caused by an imbalance in the voltage supply, unequal motor winding impedance, or long and varying wire lengths. When a current imbalance exists, the motor can experience an additional temperature rise, resulting in degradation of the motor insulation and reduction of life expectancy. The E300 relay can monitor for this condition with its Current Imbalance Trip and Warning function to detect for a rapid current imbalance fault to minimize damage and loss of production.

Current Imbalance can be defined by the following equation:

$$\%CI = 100\% * (I_d/I_a)$$

where

$\%CI$ = Percent Current Imbalance
I_d = Maximum Deviation from the Average Current
I_a = Average Current

Parameter Name	Parameter Number	Description
Current Imbalance Trip	4 20	Indicate a trip
Current Imbalance Inhibit Time	259	Inhibit a current imbalance trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 s.
Current Imbalance Trip Delay	260	Define the time period a current imbalance condition must be present before a trip occurs. It is adjustable from 0.1…25.0 s.
Current Imbalance Trip Level	261	Current Imbalance Trip Level (Parameter 261) allows you to define the percentage at which the E300 relay trips on a current imbalance. It is user-adjustable from 10…100%. **IMPORTANT** The Current Imbalance Inhibit Timer starts after a phase of load current transitions from 0 A to 30% of the minimum FLA setting of the device. The E300 relay does not begin monitoring for a current imbalance condition until the Current Imbalance Inhibit Time expires.
Current Imbalance Warning	10 20	Indicate a warning
Current Imbalance Warning Level	262	Define the percentage at which the E300 relay indicates a warning. It is user-adjustable from 10…100%. **IMPORTANT** The Current Imbalance Warning function does not include a time delay feature. Once the Current Imbalance Inhibit Time has expired, the Current Imbalance Warning indication is instantaneous.

Line Undercurrent Protection

For non-motor applications, if the measured current is less than a specific level for a specific phase, it may indicate an electrical malfunction, such as bad resistive heater element or non-operating incandescent light bulb. Such conditions may not harm the power system, but it can lead to loss of production or certification noncompliance.

The E300 relay can monitor for an undercurrent condition per phase with its Line Under Current Trip and Warning function to detect for a rapid under current in a specific phase to minimize damage and loss of production.

Parameter Name	Parameter Number	Description
Under Current Trip	4 20	Indicate a trip for L1, L2, or L3
Under Current Inhibit Time	265	Inhibit an L1, L2, or L3 Under Current trip and warning from occurring during a load starting sequence. It is adjustable from 0…250 seconds.
L1 Under Current Trip Delay L2 Under Current Trip Delay L3 Under Current Trip Delay	266 269 272	Define the time period an L1 Under Current condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.
L1 Under Current Trip Level L2 Under Current Trip Level L3 Under Current Trip Level	267 270 273	Define the current at which the E300 relay trips on a L1 Under Current. It is user-adjustable from 10…100% of the FLA Setting (Parameter 171). **IMPORTANT** The Under Current Inhibit Timer starts after the maximum phase of load current transitions from 0 A to 30% of the minimum FLA setting of the device. The E300 relay does not begin monitoring for an undercurrent condition until the Under Current Inhibit Time expires. **IMPORTANT** For any given application, the practical limit of the L1 Under Current Trip Level (Parameter 267) is dependent on the FLA Setting and the lower limit of the E300 relay's current measurement capability
Under Current Warning	10 20	Indicate a warning
L1 Under Current Warning Level L2 Under Current Warning Level L3 Under Current Warning Level	268 271 274	Define the current at which the E300 relay indicates a L1 Under Current warning. It is user-adjustable from 10…100% for the FLA Setting (Parameter 171). **IMPORTANT** The Under Current Warning function does not include a time delay feature. Once the Under Current Inhibit Timer has expired, the L1 Under Current Warning indication is instantaneous.

Line Overcurrent Protection

For non-motor applications when the measured current is greater than a specific level for a specific phase may indicate an electrical malfunction, such as bad resistive heater element. Such conditions could harm the power system over time, which could lead to loss of production.

The E300 relay can monitor for an overcurrent condition per phase with its Line Over Current Trip and Warning function to detect for a rapid over current in a specific phase to minimize damage and loss of production.

Parameter Name	Parameter Number	Description
Over Current Inhibit Time	275	Over Current Inhibit Time (Parameter 275) allows you to inhibit an L1, L2, and L3 Over Current trip and warning from occurring during a load starting sequence. It is adjustable from 0…250 seconds.
Over Current Trip	4 20	Indicates a trip forL1, L2, or L3
L1 Over Current Trip Delay L2 Over Current Trip Delay L3 Over Current Trip Delay	276 279 282	Define the time period an L1 Over Current condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Parameter Name	Parameter Number	Description
L1 Over Current Trip Level L2 Over Current Trip Level L3 Over Current Trip Level	277 280 283	Define the current at which the E300 relay trips on a L1 Over Current. It is user-adjustable from 10…100% of the FLA Setting (Parameter 171). **IMPORTANT** The Over Current Inhibit Timer starts after the maximum phase of load current transitions from 0 A to 30% of the minimum FLA setting of the device. The E300 relay does not begin monitoring for an overcurrent condition until the Over Current Inhibit Time expires.
Over Current Warning	10 20	Indicate a warning
L1 Over Current Warning Level L2 Over Current Warning Level L3 Over Current Warning Level	278 281 284	Define the current at which the E300 relay indicates a L1 Over Current warning. It is user-adjustable from 10…100% for the FLA Setting (Parameter 171). **IMPORTANT** The L1 Over Current Warning function does not include a time delay feature. Once the Over Current Inhibit Timer has expired, the L1 Over Current Warning indication is instantaneous.

Line Loss Protection

For non-motor applications when the measured current is 0 amps a specific phase, this may indicate an electrical malfunction such as bad resistive heater element or non-operating incandescent light bulb. Such conditions may not harm the power system, but it can lead to loss of production or certification noncompliance.

The E300 relay can monitor for a current-based line loss per phase with its Line Loss Trip and Warning function to detect for a rapid line loss in a specific phase to minimize damage and loss of production.

Parameter Name	Parameter Number	Description
Line Loss Trip	4 20	Indicates a trip for L1, L2, or L3
Line Loss Inhibit Time	285	Inhibit an L1, L2, and L3 Line Loss trip and warning from occurring during a load starting sequence. It is adjustable from 0…250 seconds.
L1 Line Loss Trip Delay L2 Line Loss Trip Delay L3 Line Loss Trip Delay	286 287 288	L1 Line Loss Trip Delay (Parameter 276) allows you to define the time period an L1 Line Loss condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds. **IMPORTANT** The Line Loss Inhibit Timer starts when L1, L2, or L3 Line Loss protection is activated by a programmed digital input (see Input Assignment Parameters 196-201). The E300 relay does not begin monitoring for Line Loss condition until the Line Loss Inhibit Timer expires.
Line Loss Warning	4 20	Indicate a warning **IMPORTANT** The Line Loss Warning function does not include a time delay feature. Once the Line Loss Inhibit Timer has expired, the L1 Line Loss Warning indication is instantaneous.

Voltage Protection

The E300 relay can digitally monitor the voltage supplied to an electric motor to help protect against poor voltage quality. You can prevent a contactor from energizing if the voltage is either too high, too low, or wrong rotation. The following E300 Sensing Modules provide voltage monitoring capabilities.

Table 26 - Voltage Capabilities

Catalog Number	Measurement Method	L-L Voltage Trip/Warning Range
193-ESM-VIG-___-___	Internal	20…800V
592-ESM-VIG-___-___	Internal	20…800V
193-ESM-VIG-30A-CT	External	20…6500V

This voltage information is used for the following protective trip and warning functions:

- Undervoltage trip/warning
- Overvoltage trip/warning
- Voltage imbalance trip/warning
- Phase rotation mismatch trip
- Under frequency trip/warning
- Over frequency trip/warning

Voltage Trip Enable (Parameter 184) and Voltage Warning Enable (Parameter 190) are used to enable the respective voltage-based protective trip and warning functions.

Voltage Trip Status (Parameter 5) and Voltage Warning Status (Parameter 11) are used to view the status of the respective voltage-based protective trip and warning functions.

Voltage Trip

The E300 relay trips with a voltage indication if:

- No trip currently exists
- A voltage trip is enabled
- Voltage is present
- A voltage inhibit time has expired
- The minimum phase voltage is less than the trip level for a time period greater than the trip delay.

If the E300 relay trips on a voltage, the:

- TRIP/WARN LED status indicator flashes a red 1-long / 1-short blink pattern
- Bit 0 in Voltage Trip Status (Parameter 5) sets to 1
- Bit 0 in Device Status 0 (Parameter 20) sets to 1
- Any relay outputs configured as a Trip Relay open
- Any relay outputs configured as a Control Relay open
- Any relay outputs configured as a Trip Alarm close
- Any relay outputs configured as a Normal Relay are placed in their Protection Fault state (if so programmed)

IMPORTANT The Protection Fault State of Relay 0, Relay 1, Relay 2, Digital Module 1 Output Relays, Digital Module 2 Output Relays, Digital Module 3 Output Relays, and Digital Module 4 Output Relays are defined by the respective parameters:

- Output PT00 Protection Fault Action (Parameter 304)
- Output PT00 Protection Fault Value (Parameter 305)
- Output PT01 Protection Fault Action (Parameter 310)
- Output PT01 Protection Fault Value (Parameter 311)
- Output PT02 Protection Fault Action (Parameter 316)
- Output PT02 Protection Fault Value (Parameter 317)
- Output Digital Module 1 Protection Fault Action (Parameter 322)
- Output Digital Module 1 Protection Fault Value (Parameter 323)
- Output Digital Module 2 Protection Fault Action (Parameter 328)
- Output Digital Module 2 Protection Fault Value (Parameter 329)
- Output Digital Module 3 Protection Fault Action (Parameter 334)
- Output Digital Module 3 Protection Fault Value (Parameter 335)
- Output Digital Module 4 Protection Fault Action (Parameter 340)
- Output Digital Module 4 Protection Fault Value (Parameter 342)

Voltage Warning

The E300 relay indicates a voltage warning if:

- No warning currently exists
- A voltage warning is enabled
- Voltage is present
- A voltage condition exists
- Inhibit Time has expired

When the voltage warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 1-long / 1-short blink pattern
- Bit 0 in Voltage Warning Status (Parameter 11) sets to 1
- Bit 1 in Device Status 0 (Parameter 20) sets to 1
- Any relay outputs configured as a warning alarm close

Undervoltage Protection

Electric motors consume more electric current when the voltage supplied to the motor is lower than the motor nameplate rating. This can damage to an electric motor over an extended period of time. The E300 relay can monitor for this condition with its Under Voltage Trip and Warning function to detect for low voltage levels to minimize motor damage and loss of production.

Parameter Name	Parameter Number	Description
Under Voltage Trip	5 20	Indicate a trip
Under Voltage Inhibit Time	355	Inhibit an under voltage trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.
Under Voltage Trip Delay	356	Define the time period an under voltage condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Parameter Name	Parameter Number	Description
Under Voltage Trip Level	357	Define the voltage at which the E300 relay trips on an under voltage. It is user-adjustable from 0…6553.5 volts. **IMPORTANT** The Under Voltage Inhibit Time starts after a phase voltage transitions from 0V to 20V L-L. The E300 relay does not begin monitoring for an under voltage condition until the Under Voltage Inhibit Time expires.
Under Voltage Warning	11 20	Indicate a warning
Under Voltage Warn Level	358	Under Voltage Warn Level (Parameter 358) allows you to define the voltage at which the E300 relay indicates a warning. It is user-adjustable from 0…6553.5 volts. **IMPORTANT** The Under Voltage Warning function does not include a time delay feature. Once the Under Voltage Inhibit Time has expired, the Under Voltage Warning indication is instantaneous.

Overvoltage Protection

The winding insulation for electric motors degrades faster when more voltage is supplied to the motor than the motor nameplate rating. This can damage to an electric motor over an extended period of time. The E300 relay can monitor for this condition with its Over Voltage Trip and Warning function to detect for high voltage levels to minimize motor damage and loss of production.

Parameter Name	Parameter Number	Description
Over Voltage Trip	5 20	Indicate a trip
Over Voltage Inhibit Time	359	Inhibit an over voltage trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.
Over Voltage Trip Delay	360	Define the time period an over voltage condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.
Over Voltage Trip Level	361	Define the voltage at which the E300 relay trips on an over voltage. It is user-adjustable from 0…6553.5 volts. **IMPORTANT** The Over Voltage Inhibit Time starts after a phase voltage transitions from 0V to 20V L-L. The E300 relay does not begin monitoring for an over voltage condition until the Over Voltage Inhibit Time expires.
Over Voltage Warning	11 20	Indicate a warning
Over Voltage Warn Level	362	Define the voltage at which the E300 relay indicates a warning. It is user-adjustable from 0…6553.5 volts. **IMPORTANT** The Over Voltage Warning function does not include a time delay feature. Once the Over Voltage Inhibit Time has expired, the Over Voltage Warning indication is instantaneous.

Voltage Imbalance Protection

A voltage imbalance can be caused by poor power quality and unequal distribution of power. When a voltage imbalance exists, the motor can experience an additional temperature rise, resulting in degradation of the motor insulation and reduction of life expectancy. The E300 relay can monitor for this condition with its Voltage Imbalance Trip and Warning function to detect for a rapid voltage imbalance fault to minimize damage and loss of production.

Voltage Imbalance can be defined by the following equation:

$$\%V_{Imb} = 100\% * (V_d/V_a)$$

where

$\%V_{Imb}$ = Percent Voltage Imbalance

V_d = Maximum Deviation from the Average Voltage

V_a = Average Voltage

Parameter Name	Parameter Number	Description
Voltage Imbalance Trip	5 20	Indicate a trip
Voltage Imbalance Inhibit Time	365	Inhibit a voltage imbalance trip from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.
Voltage Imbalance Trip Delay	366	Define the time period a voltage imbalance condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.
Voltage Imbalance Trip Level	367	Define the percentage at which the E300 relay trips on a voltage imbalance. It is user-adjustable from 10…100%. **IMPORTANT** The Voltage Imbalance Inhibit Timer starts after a phase voltage transitions from 0V to 20V L-L. The E300 relay does not begin monitoring for a voltage imbalance condition until the Voltage Imbalance Inhibit Time expires.
Voltage Imbalance Warning	11 20	Indicate a warning
Voltage Imbalance Warning Level	368	Define the percentage at which the E300 relay indicates a warning. It is user-adjustable from 10…100%. **IMPORTANT** The Voltage Imbalance Warning function does not include a time delay feature. Once the Voltage Imbalance Inhibit Time has expired, the Voltage Imbalance Warning indication is instantaneous.

Phase Rotation Protection

Wiring of a three-phase voltage system can affect the rotational direction of an electric motor. The E300 relay can help protect against the improper phase rotation so that an electric motor rotates in the proper direction, ABC or ACB, to prevent equipment from being damaged.

Parameter Name	Parameter Number	Description
Phase Rotation Trip	5 20	Indicate a trip
Phase Rotation Inhibit Time	363	Inhibit a phase rotation mismatch trip and warning from occurring. It is adjustable from 0…250 seconds.
Phase Rotation Trip Type	364	Define the required voltage phase rotation for the motor application. E300 relay trips on a phase rotation mismatch when this parameter does not match the measured voltage phase rotation. It is user-adjustable, ABC or ACB. **IMPORTANT** The Phase Rotation Inhibit Time starts after a phase voltage transitions from 0V to 20V L-L. The E300 relay does not begin monitoring for a phase rotation mismatch condition until the Phase Rotation Inhibit Time expires.

Frequency Protection

The E300 relay has the capability to help protect against poor voltage quality by offering frequency-based protection. This protection is used when electric power is provided by stand-alone electric generators. You can prevent a contactor from energizing if the voltage frequency is either too high or too low. The E300 relay can monitor for this condition with its Over and Under Frequency Trip and Warning function, and it can detect for an improper voltage frequency to minimize motor damage and loss of production.

Parameter Name	Parameter Name	Description
Under Frequency Trip	5 20	Indicate a trip
Under Frequency Inhibit Time	369	Inhibit an under frequency trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.
Under Frequency Trip Delay	370	Define the time period an under frequency condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.
Under Frequency Trip Level	371	Define the frequency at which the E300 relay trips on an under frequency. It is user-adjustable from 46…65 Hz. **IMPORTANT** The Under Frequency Inhibit Time starts after a phase voltage transitions from 0V to 20V L-L. The E300 relay does not begin monitoring for an under frequency condition until the Under Frequency Inhibit Time expires.
Under Frequency Warning	11 20	Indicate a warning
Under Frequency Warn Level	372	Define the frequency at which the E300 relay indicates a warning. It is user-adjustable from 46…65 Hz. **IMPORTANT** The Under Frequency Warning function does not include a time delay feature. Once the Over Frequency Inhibit Time has expired, the Over Frequency Warning indication is instantaneous.

Parameter Name	Parameter Number	Description
Over Frequency Trip	5 20	Indicate a trip
Over Frequency Inhibit Time	373	Inhibit an over frequency trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.
Over Frequency Trip Delay	374	Define the time period an over frequency condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.
Over Frequency Trip Level	375	Define the frequency at which the E300 relay trips on an over frequency. It is user-adjustable from 46…65 Hz. **IMPORTANT** The Over Frequency Inhibit Time starts after a phase voltage transitions from 0V to 20V L-L. The E300 relay does not begin monitoring for an over frequency condition until the Over Frequency Inhibit Time expires.
Over Frequency Warning	11 20	Indicate a warning
Over Frequency Warn Level	376	Over Frequency Warn Level (Parameter 376) allows you to define the frequency at which the E300 relay indicates a warning. It is user-adjustable from 46…65 Hz. **IMPORTANT** The Over Frequency Warning function does not include a time delay feature. Once the Over Frequency Inhibit Time has expired, the Over Frequency Warning indication is instantaneous.

Power Protection

The E300 relay can digitally monitor the power that is supplied to an electric motor to help protect against poor power quality or alert you when power consumed by the motor differs from what is expected. This protection is useful for pump cavitation and pump material change detection. The following E300 Sensing Modules provide power monitoring capabilities.

Table 27 - Power Capabilities

Catalog Number	Measurement Method	L-L Voltage Trip/Warning Range
193-ESM-VIG-__-__	Internal	20…800V
592-ESM-VIG-__-__	Internal	20…800V
193-ESM-VIG-30A-CT	External	20…6500V

This power information is used for the following protective trip and warning functions:

- Under Real Power (kW) Trip/Warning
- Over Real Power (kW) Trip/Warning
- Under Reactive Power (kVAR) Trip/Warning
- Over Reactive Power (kVAR) Trip/Warning
- Under Apparent Power (kVA) Trip/Warning
- Over Apparent Power (kVA) Trip/Warning
- Under Power Factor Trip/Warning
- Over Power Factor Trip/Warning

Power Trip Enable (Parameter 185) and Power Warning Enable (Parameter 191) are used to enable the respective power-based protective trip and warning functions.

Power Trip Status (Parameter 6) and Power Warning Status (Parameter 12) are used to view the status of the respective power-based protective trip and warning functions.

Power Trip

The E300 relay trips with power indication if:

- No trip currently exists
- A power trip is enabled
- Current is present
- Voltage is present
- Power inhibit time has expired
- The total power is less than the trip level for a time period greater than the trip delay.

If the E300 relay trips on power, the:

- TRIP/WARN LED status indicator flashes a red 2-long / 1-short blink pattern
- Bit 0 in Power Trip Status (Parameter 6) sets to 1
- Bit 0 in Device Status 0 (Parameter 20) sets to 1
- Any relay outputs configured as a Trip Relay open
- Any relay outputs configured as a Control Relay open
- Any relay outputs configured as a Trip Alarm close
- Any relay outputs configured as a Normal Relay are placed in their Protection Fault state (if so programmed)

IMPORTANT	The Protection Fault State of Relay 0, Relay 1, Relay 2, Digital Module 1 Output Relays, Digital Module 2 Output Relays, Digital Module 3 Output Relays, and Digital Module 4 Output Relays are defined by the respective parameters: • Output PT00 Protection Fault Action (Parameter 304) • Output PT00 Protection Fault Value (Parameter 305) • Output PT01 Protection Fault Action (Parameter 310) • Output PT01 Protection Fault Value (Parameter 311) • Output PT02 Protection Fault Action (Parameter 316) • Output PT02 Protection Fault Value (Parameter 317) • Output Digital Module 1 Protection Fault Action (Parameter 322) • Output Digital Module 1 Protection Fault Value (Parameter 323) • Output Digital Module 2 Protection Fault Action (Parameter 328) • Output Digital Module 2 Protection Fault Value (Parameter 329) • Output Digital Module 3 Protection Fault Action (Parameter 334) • Output Digital Module 3 Protection Fault Value (Parameter 335) • Output Digital Module 4 Protection Fault Action (Parameter 340) • Output Digital Module 4 Protection Fault Value (Parameter 342)

Power Warning

The E300 relay indicates a power warning if:

- No warning currently exists
- A Power warning is enabled
- Current is present
- Voltage is present
- Power inhibit time has expired
- The power is equal to or less than the warning level

When the power warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 2-long / 1-short blink pattern
- Bit 0 in Power Warning Status (Parameter 12) sets to 1
- Bit 1 in Device Status 0 (Parameter 20) sets to 1
- Any relay outputs configured as a Warning Alarm close

Real Power (kW) Protection

The E300 relay has the capability to help protect against real power (kW) for specific applications that require the monitoring of both voltage and current. You can help protect or issue a warning if the real power (kW) consumption of an electric motor is either too high or too low.

Parameter Name	Parameter Number	Description
Under kW Trip	6 20	Indicate a trip
Under kW Inhibit Time	378	Inhibit an under real power (kW) trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.
Under kW Trip Delay	379	Define the time period an under real power (kW) condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Parameter Name	Parameter Number	Description
Under kW Trip Level	380	Define the real power (kW) at which the E300 relay trips on an under real power (kW). It is user-adjustable from 0…2,000,000 kW. **IMPORTANT** The Under kW Inhibit Time starts after a phase voltage transitions from 0V to 20V L-L and a phase of load current transitions from 0 A to 30% of the minimum FLA setting of the device. The E300 relay does not begin monitoring for an under real power (kW) condition until the Under kW Inhibit Time expires.
Under kW Warning	12 20	Indicate a warning
Under kW Warn Level	381	Define the real power (kW) at which the E300 relay indicates a warning. It is user-adjustable from 0…2,000,000 kW. **IMPORTANT** The Under kW Warning function does not include a time delay feature. Once the Under kW Inhibit Time has expired, the Under kW Warning indication is instantaneous.

Parameter Name	Parameter Number	Description
Over kW Trip	6 20	Indicate a trip
Over kW Inhibit Time	382	Inhibit an over real power (kW) trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.
Over kW Trip Delay	383	Define the time period an over real power (kW) condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.
Over kW Trip Level	384	Define the total real power (kW) at which the E300 relay trips on over real power (kW). It is user-adjustable from 0…2,000,000 kW. **IMPORTANT** The Over kW Inhibit Time starts after a phase voltage transitions from 0V to 20V L-L and a phase of load current transitions from 0 A to 30% of the minimum FLA setting of the device. The E300 relay does not begin monitoring for an over real power (kW) condition until the Over kW Inhibit Time expires.
Over kW Warning	12 20	Indicate a warning
Over kW Warn Level	385	Define the real power (kW) at which the E300 relay indicates a warning. It is user-adjustable from 0…2,000,000 kW. **IMPORTANT** The Over kW Warning function does not include a time delay feature. Once the Over kW Inhibit Time has expired, the Over kW Warning indication is instantaneous.

Reactive Power (kVAR) Protection

The E300 relay has the capability to help protect against reactive power (kVAR) for specific applications that require the monitoring of both voltage and current. You can help protect or issue a warning if the reactive power (kVAR) of an electric motor is either too high or too low.

Parameter Name	Parameter Number	Description
Under kVAR Consumed Trip	6 20	Indicate a trip
Under kVAR Consumed Inhibit Time	386	Inhibit an under reactive power (kVAR) consumed trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.
Under kVAR Consumed Trip Delay	387	Define the time period an under reactive power (kVAR) consumed condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.
Under kVAR Consumed Trip Level	388	Define the reactive power (kVAR) consumed at which the E300relay trips on an under reactive power (kVAR) consumed. It is user-adjustable from 0…2,000,000 kW. **IMPORTANT** The Under kVAR Consumed Inhibit Time starts after a phase voltage transitions from 0V to 20V L-L and a phase of load current transitions from 0 A to 30% of the minimum FLA setting of the device. The E300 relay does not begin monitoring for an under reactive power (kVAR) consumed condition until the Under kVAR Consumed Inhibit Time expires.

Parameter Name	Parameter Number	Description
Under kVAR Consumed Warning	12 20	Indicate a warning
Under kVAR Consumed Warn Level	389	Define the reactive power (kVAR) consumed at which the E300 relay indicates a warning. It is user-adjustable from 0…2,000,000 kW. **IMPORTANT** The Under kVAR Consumed Warning function does not include a time delay feature. Once the Under kVAR consumed Inhibit Time has expired, the Under kVAR Consumed Warning indication is instantaneous.
Under kVAR Generated Trip	6 20	Indicate a trip
Under kVAR Generated Inhibit Time	394	Inhibit Time (Parameter 394) allows you to inhibit an under power factor leading trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.
Under kVAR Generated Trip Delay	395	Define the time period an under reactive power (kVAR) generated condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.
Under kVAR Generated Trip Level	396	Define the reactive power (kVAR) generated at which the E300 relay trips on an under reactive power (kVAR) generated. It is user-adjustable from 0…2,000,000 kW. **IMPORTANT** The Under kVAR Generated Inhibit Time starts after a phase voltage transitions from 0V to 20V L-L and a phase of load current transitions from 0 A to 30% of the minimum FLA setting of the device. The E300 relay does not begin monitoring for an under reactive power (kVAR) generated condition until the Under kVAR Generated Inhibit Time expires.
Under kVAR Generated Warning	12 20	Indicate a warning
Under kVAR Generated Warn Level	397	Under kVAR Generated Warn Level (Parameter 397) allows you to define the reactive power (kVAR) generated at which the E300 relay indicates a warning. It is user-adjustable from 0…2,000,000 kW. **IMPORTANT** The Under kVAR Generated Warning function does not include a time delay feature. Once the Under kVAR generated Inhibit Time has expired, the Under kVAR Generated Warning indication is instantaneous.

Parameter Name	Parameter Number	Description
Over kVAR Consumed Trip	6 20	Indicate a trip
Over kVAR Consumed Inhibit Time	390	Inhibit an over reactive power (kVAR) consumed trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.
Over kVAR Consumed Trip Delay	391	Define the time period an over reactive power (kVAR) consumed condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.
Over kVAR Consumed Trip Level	392	Define the total reactive power (kVAR) consumed at which the E300 relay trips on over reactive power (kVAR) consumed. It is user-adjustable from 0…2,000,000 kW. **IMPORTANT** The Over kVAR Consumed Inhibit Time starts after a phase voltage transitions from 0V to 20V L-L and a phase of load current transitions from 0 A to 30% of the minimum FLA setting of the device. The E300 relay does not begin monitoring for an over reactive power (kVAR) consumed condition until the Over kVAR Consumed Inhibit Time expires.
Over kVAR Consumed Warning	12 20	Indicate a warning
Over kVAR Consumed Warn Level	393	Over kVAR Consumed Warn Level (Parameter 393) allows you to define the reactive power (kVAR) consumed at which the E300 relay indicates a warning. It is user-adjustable from 0…2,000,000 kW. **IMPORTANT** The Over kVAR Consumed Warning function does not include a time delay feature. Once the Over kVAR Consumed Inhibit Time has expired, the Over kVAR Consumed Warning indication is instantaneous.
Over kVAR Generated Trip	6 20	Indicate a trip
Over kVAR Generated Inhibit Time	398	Inhibit an over reactive power (kVAR) generated trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.
Over kVAR Generated Trip Delay	399	Define the time period an over reactive power (kVAR) generated condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Parameter Name	Parameter Number	Description
Over kVAR Generated Trip Level	400	Define the total reactive power (kVAR) generated at which the E300 relay trips on over reactive power (kVAR) generated. It is user-adjustable from 0…2,000,000 kW. **IIMPORTANT** The Over kVAR Generated Inhibit Time starts after a phase voltage transitions from 0V to 20V L-L and a phase of load current transitions from 0 A to 30% of the minimum FLA setting of the device. The E300 relay does not begin monitoring for an over reactive power (kVAR) generated condition until the Over kVAR Generated Inhibit Time expires.
Over kVAR Generated Warning	12 20	Indicate a warning
Over kVAR Generated Warn Level	401	Define the reactive power (kVAR) generated at which the E300 relay indicates a warning. It is user-adjustable from 0…2,000,000 kW. **IMPORTANT** The Over kVAR Generated Warning function does not include a time delay feature. Once the Over kVAR Generated Inhibit Time has expired, the Over kVAR Generated Warning indication is instantaneous.

Apparent Power (kVA) Protection

The E300 relay has the capability to help protect against apparent power (kVA) for specific applications that require the monitoring of both voltage and current. You can help protect or issue a warning if the apparent power (kVA) consumption of an electric motor is either too high or too low.

Parameter Name	Parameter Number	Description
Under kVA Trip	6 20	Indicate a trip
Under kVA Inhibit Time	402	Inhibit an under apparent power (kVA) trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.
Under kVA Trip Delay	403	Define the time period an under apparent power (kVA) condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.
Under kVA Trip Level	404	Under kVA Trip Level (Parameter 404) allows you to define the apparent power (kVA) at which the E300 relay trips on an under apparent power (kVA). It is user-adjustable from 0…2,000,000 kVA. **IMPORTANT** The Under kVA Inhibit Time starts after a phase voltage transitions from 0V to 20V L-L and a phase of load current transitions from 0 A to 30% of the minimum FLA setting of the device. The E300 relay does not begin monitoring for an under apparent power (kVA) condition until the Under kVA Inhibit Time expires.
Under kVA Warning	12 20	Indicate a warning
Under kVA Warn Level	405	Under kVA Warn Level (Parameter 405) allows you to define the apparent power (kVA) at which the E300 relay indicates a warning. It is user-adjustable from 0…2,000,000 kVA. **IMPORTANT** The Under kVA Warning function does not include a time delay feature. Once the Under kVA Inhibit Time has expired, the Under kVA Warning indication is instantaneous.

Parameter Name	Parameter Number	Description
Over kVA Trip	6 20	Indicate a trip
Over kVA Inhibit Time	406	Inhibit an over apparent power (kVA) trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.
Over kVA Trip Delay	407	Define the time period an over apparent power (kVA) condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Parameter Name	Parameter Number	Description
Over kVA Trip Level	408	Over kVA Trip Level (Parameter 408) allows you to define the total apparent power (kVA) at which the E300 relay trips on over apparent power (kVA). It is user-adjustable from 0…2,000,000 kVA. **IMPORTANT** The Over kVA Inhibit Time starts after a phase voltage transitions from 0V to 20V L-L and a phase of load current transitions from 0 A to 30% of the minimum FLA setting of the device. The E300 relay does not begin monitoring for an over apparent power (kVA) condition until the Over kVA Inhibit Time expires.
Over kVA Warning	12 20	Indicate a warning
Over kVA Warn Level	409	Over kVA Warn Level (Parameter 409) allows you to define the apparent power (kVA) at which the E300 relay indicates a warning. It is user-adjustable from 0…2,000,000 kVA. **IMPORTANT** The Over kVA Warning function does not include a time delay feature. Once the Over kVA Inhibit Time has expired, the Over kVA Warning indication is instantaneous.

Power Factor Protection

The E300 relay has the capability to help protect against power factor for specific applications that require the monitoring of both voltage and current. You can help protect or issue a warning if the power factor of an electric motor is either too high or too low.

Parameter Name	Parameter Number	Description
Under Power Factor Lagging Trip	6 20	Indicate a trip
Under Power Factor Lagging Inhibit Time	410	Inhibit an under power factor lagging trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.
Under Power Factor Lagging Trip Delay	411	Define the time period an under power factor lagging condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.
Under Power Factor Lagging Trip Level	412	Define the power factor lagging at which the E300 relay trips on an under power factor lagging. It is user-adjustable from 0…2,000,000 kW. **IMPORTANT** The Under Power Factor Lagging Inhibit Time starts after a phase voltage transitions from 0V to 20V L-L and a phase of load current transitions from 0 A to 30% of the minimum FLA setting of the device. The E300 relay does not begin monitoring for an under power factor lagging condition until the Under Power Factor Lagging Inhibit Time expires.
Under Power Factor Lagging Warning	12 20	Indicate a warning
Under Power Factor Lagging Warn Level	413	Define the power factor lagging at which the E300 relay indicates a warning. It is user-adjustable from 0…2,000,000 kW. IMPORTANT The Under Power Factor Lagging Warning function does not include a time delay feature. Once the Under Power Factor Lagging Inhibit Time has expired, the Under Power Factor Lagging Warning indication is instantaneous.
Under Power Factor Leading Trip	6 20	Indicate a trip
Under Power Factor Leading Inhibit Time	418	Inhibit an under power factor leading trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.
Under Power Factor Leading Trip Delay	419	Define the time period an under power factor leading condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Parameter Name	Parameter Number	Description
Under Power Factor Leading Trip Level	420	Define the power factor leading at which the E300 relay trips on an under power factor leading. It is user-adjustable from 0…2,000,000 kW. **IMPORTANT** The Under Power Factor Leading Inhibit Time starts after a phase voltage transitions from 0V to 20V L-L and a phase of load current transitions from 0 A to 30% of the minimum FLA setting of the device. The E300 relay does not begin monitoring for an under power factor leading condition until the Under Power Factor Leading Inhibit Time expires.
Under Power Factor Leading Warning	12 20	Indicate a warning
Under Power Factor Leading Warn Level	421	Define the power factor leading at which the E300 relay indicates a warning. It is user-adjustable from 0…2,000,000 kW. **IMPORTANT** The Under Power Factor Leading Warning function does not include a time delay feature. Once the Under Power Factor Leading Inhibit Time has expired, the Under Power Factor Leading Warning indication is instantaneous.

Parameter Name	Parameter Number	Description
Over Power Factor Lagging Trip	6 20	Indicate a trip
Over Power Factor Lagging Inhibit Time	414	Inhibit an over power factor lagging trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.
Over Power Factor Lagging Trip Delay	415	Define the time period an over power factor lagging condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.
Over Power Factor Lagging Trip Level	416	Define the total power factor lagging at which the E300 relay trips on over power factor lagging. It is user-adjustable from 0…2,000,000 kW. **IMPORTANT** The Over Power Factor Lagging Inhibit Time starts after a phase voltage transitions from 0V to 20V L-L and a phase of load current transitions from 0 A to 30% of the minimum FLA setting of the device. The E300 relay does not begin monitoring for an over power factor lagging condition until the Over Power Factor Lagging Inhibit Time expires.
Over Power Factor Lagging Warning	12 20	Indicate a warning
Over Power Factor Lagging Warn Level	417	Define the power factor lagging at which the E300 relay indicates a warning. It is user-adjustable from 0…2,000,000 kW. **IMPORTANT** The Over Power Factor Lagging Warning function does not include a time delay feature. Once the Over Power Factor Lagging Inhibit Time has expired, the Over Power Factor Lagging Warning indication is instantaneous.
Over Power Factor Leading Trip	6 20	Indicate a trip
Over Power Factor Leading Inhibit Time	422	Inhibit an over power factor leading trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.
Over Power Factor Leading Trip Delay	423	Define the time period an over power factor leading condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.
Over Power Factor Leading Trip Level	424	Define the total power factor leading at which the E300 relay trips on over power factor leading. It is user-adjustable from 0…2,000,000 kW. **IMPORTANT** The Over Power Factor Leading Inhibit Time starts after a phase voltage transitions from 0V to 20V L-L and a phase of load current transitions from 0 A to 30% of the minimum FLA setting of the device. The E300 relay does not begin monitoring for an over power factor leading condition until the Over Power Factor Leading Inhibit Time expires.
Over Power Factor Leading Warning	12 20	Indicate a warning
Over Power Factor Leading Warn Level	425	Define the power factor leading at which the E300 relay indicates a warning. It is user-adjustable from 0…2,000,000 kW. **IMPORTANT** The Over Power Factor Leading Warning function does not include a time delay feature. Once the Over Power Factor Leading Inhibit Time has expired, the Over Power Factor Leading Warning indication is instantaneous.

Control Protection

The E300 relay provides a number of control-based protection functions including:

- Test Trip
- Operator Station Trip
- Remote Trip
- Start Inhibit
- Preventive Maintenance
- Configuration Trip
- Option Match Trip/Warning
- Expansion Bus Trip/Warning
- Non Volatile Storage Trip
- Test Mode Trip

Control Trip Enable (Parameter 186) and Control Warning Enable (Parameter 192) are used to enable the respective control-based protective trip and warning functions.

Control Trip Status (Parameter 7) and Control Warning Status (Parameter 13) are used to monitor the respective current-based protective trip and warning functions.

Control Trip

The E300 relay trips with a control-based indication if:

- No trip currently exists
- A control-based protection is enabled
- You press the blue reset button on the Communication Module for more than 3 seconds.

If the E300 relay trips on a control, the following occurs:

- The TRIP/WARN LED flashes a red 3-long / 1-short blink pattern
- Bit 0 in Control Trip Status (Parameter 7) sets to 1
- Bit 0 in Device Status 0 (Parameter 20) sets to 1
- Any relay outputs configured as a Trip Relay open
- Any relay outputs configured as a Control Relay open
- Any relay outputs configured as a Trip Alarm close
- Any relay outputs configured as a Normal Relay are placed in their Protection Fault state (if so programmed)

Control Warning

The E300 relay provides a warning indication if:

- No trip currently exists
- Warning condition exists

If the E300 relay warns, the following occurs:

- The TRIP/WARN LED flashes a yellow 3-long / 2-short blink pattern
- Bit 1 in Control Warning Status (Parameter 13) sets to 1
- Bit 1 in Device Status 0 (Parameter 20) sets to 1
- Any relay outputs configured as a warning alarm closes

Test Trip

The E300 relay provides the capability to put the overload relay into a Test Trip state. You can implement this feature when commissioning a motor control circuit to verify the response of the E300 relay, its associated Expansion I/O modules, and the networked automation system.

Parameter Name	Parameter Number	Description
Test Trip	7 20	Indicate a trip

Thermistor (PTC) Protection

The following E300 relay control modules can accept up to 6 thermistors (PTC) temperature sensors wired in series to monitor the temperature of a motor's windings, rotor, and/or bearings.

- 193-EIOGP-42-24D
- 193-EIOGP-22-120
- 193-EIOGP-22-240

The thermistor (PTC) based temperature sensors connect to the IT1 and IT2 terminals of the E300 Control Module.If the E300 relay trips on a thermistor.

Parameter Name	Parameter Number	Description
Thermistor (PTC) Trip	7 20	Indicate a trip
Thermistor (PTC) Warning	13 20	Indicate a warning

DeviceLogix Protection

An E300 relay with firmware v5.000 or higher has a DeviceLogix logic engine. You can create custom logic programs for distributed motor control applications. See Chapter 8 for more information on DeviceLogix. DeviceLogix provides you with the capability to create a customized protection algorithm that can generate a trip or warning event.

Parameter Name	Parameter Number	Description
DeviceLogix Trip	7 20	Indicate a trip
DeviceLogix Warning	13 20	Indicate a warning

Operator Station Trip

The E300 relay provides the capability to plug and play its optional operator stations. The operator station protection feature trips the E300 relay when you press the red 0 (stop) button. This feature is a failsafe mechanism to allow you to de-energize a contactor coil anytime the red 0 (stop) button is pressed.

Operator Station Trip should be disabled when an operator station is being used to send start and stop signals to an automation control system.

Parameter Name	Parameter Number	Description
Operator Station Trip	7 20	Indicate a trip You can also press the red 0 button on an operator station to trigger a trip.

Remote Trip

The E300 relay provides the capability to remotely cause the E300 relay to trip via a network command or assigned digital input on the Control Module (see Chapter 3 for digital input assignments). This feature allows the capability of tripping the E300 relay from a remote source such as a vibration switch or external monitoring relay.

Parameter Name	Parameter Number	Description
Remote Trip	7 20	Indicate a trip A trip can also occur when a Control Module's digital input with a remote trip assignment is activated or the Communication Module receives a remote trip command from the communication network

Start Inhibit Protection

This protective function allows you to limit the number of starts in a given time period and limit the operating hours for an electric motor. A start is defined as the E300 relay sensing a transition in current from 0 A to 30% of the minimum FLA rating of the device. The Blocked Start protective function is set by Starts Per Hour (Parameter 205) and/or Starts Interval (Parameter 206).Time to Start

Parameter Name	Parameter Number	Description
Blocked Start Trip	7 20	Indicate a trip
Starts Per Hour	205	Number of starts within the last hour (60 minutes). This value is adjustable from 0…120 starts.
Starts Interval	206	Time that you must wait between starts. This value is adjustable from 0…3600 seconds.
Starts Available	30	Number of starts currently available based on the blocked start settings and the actual motor starting events.
Time to Start	31	Amount of the time remaining until a new start can be issued. If the Time to Start time has elapsed, this parameter reports zero until the next Blocked Start trip occurs.

Preventive Maintenance

The E300 relay offers preventive maintenance warnings based on the number of start cycles and the number of operating hours. These warnings can be used to alert you that the number of starts or number of operating hours has been reached, and it is time to perform preventive maintenance.

Parameter Name	Parameter Number	Description
Number of Starts Warning	13 20	Indicate a warning
Total Starts	207	Set the number of starts until the starts counter warning occurs.
Starts Counter	29	Number of times a motor has been started. This value can be reset to zero using the Clear Command (Parameter 165) function *Clear Operating Statistics*.
Operating Hours Warning	13 20	Indicate a warning
Total Operating Hours	208	Set the number operating hours that a motor can operate until the operating hours warning occurs.
Operating Time	28	Number hours that a motor has been running. This value can be reset to zero using the Clear Command (Parameter 165) function *Clear Operating Statistics*.

Hardware Fault

The E300 relay continuously monitors the status of the Control, Sensing, and Communication Modules. The E300 relay issues a hardware fault trip if there is an issue with the Control, Sensing, and Communication Modules or if one of the modules is missing or incompatible. The Hardware Fault Trip is always enabled.

Parameter Name	Parameter Number	Description
Hardware Fault Trip	7 20	Indicate a trip

Contactor Feedback Protection

An E300 relay with firmware v5.000 or higher has the capability to control motors using its Operating Modes. You can select one of the pre-programmed Operating Modes that monitor the feedback status of a contactor by wiring the auxiliary contacts of the contactor into one of the digital inputs of the E300 relay. See Chapter 4 for more information on Operating Modes.

Parameter Name	Parameter Number	Description
Feedback Timeout	213	Amount time in milliseconds a Feedback based Operating Mode waits to receive a contactor feedback signal after the contactor has been issued an energize command.
Contactor Feedback Trip	7 20	Indicate a trip
Contactor Feedback Warning	13 20	Indicate a warning

Nonvolatile Storage Fault

The E300 relay continuously monitors the status of its nonvolatile storage. The E300 relay issues a nonvolatile storage fault trip if there is an issue with its nonvolatile storage or if it becomes corrupt. The Nonvolatile Storage Fault Trip is always enabled.

Parameter Name	Parameter Number	Description
Nonvoltaile Storage Fault Trip	7 20	Indicate a trip

Test Mode Trip

Some motor control center enclosures include a Test Position in which the motor power is disconnected from the enclosure, but the control power is still active. This allows motor control center commissioning staff to verify that the motor starter is mechanically working and communication is established with the automation control system. The E300 relay provides the capability to put the overload relay into a Test Mode Trip state if motor control center enclosure is in a test position, and the E300 relay detects motor current and/or voltage is present.

Parameter Name	Parameter Number	Description
Test Mode Trip	7 20	Indicate a trip **IMPORTANT** Motor current is detected when a phase of load current transitions from 0 A to 30% of the minimum FLA setting of the device

Analog Protection

The E300 relay's Analog I/O Expansion Modules scan up to three analog signals per module. This information can be used to trigger an over analog level Trip or Warning. The analog-based protection features can be used with the following analog applications:

- Monitoring motor winding and bearing temperatures that are measured by RTD sensors
- Monitoring liquid, air, or steam flow
- Monitoring temperature
- Monitoring weight
- Monitoring levels
- Monitoring a potentiometer
- Monitoring PTC or NTC thermistor sensors

Analog Trip Enable (Parameter 187) and Analog Warning Enable (Parameter 193) are used to enable the respective analog-based protective trip and warning functions.

Analog Trip Status (Parameter 8) and Analog Warning Status (Parameter 14) are used to monitor the respective analog-based protective trip and warning functions.

Analog Trip

The E300 relay trips with an analog module trip indication if:

- No trip currently exists
- The trip is enabled
- The measured analog input signal is greater than the trip level for a time period greater than the level trip delay.

If the E300 relay trips on an analog module channel, the:

- TRIP/WARN LED status indicator flashes a red 4-long / 1-short blink pattern
- Bit 0 in Analog Trip Status (Parameter 8) sets to 1
- Bit 0 in Device Status 0 (Parameter 20) sets to 1
- Any relay outputs configured as a Trip Relay open
- Any relay outputs configured as a Control Relay open
- Any relay outputs configured as a Trip Alarm close
- Any relay outputs configured as a Normal Relay are placed in their Protection Fault state (if so programmed)

IMPORTANT The Protection Fault State of Relay 0, Relay 1, Relay 2, Digital Module 1 Output Relays, Digital Module 2 Output Relays, Digital Module 3 Output Relays, and Digital Module 4 Output Relays are defined by the respective parameters:

- Output PT00 Protection Fault Action (Parameter 304)
- Output PT00 Protection Fault Value (Parameter 305)
- Output PT01 Protection Fault Action (Parameter 310)
- Output PT01 Protection Fault Value (Parameter 311)
- Output PT02 Protection Fault Action (Parameter 316)
- Output PT02 Protection Fault Value (Parameter 317)
- Output Digital Module 1 Protection Fault Action (Parameter 322)
- Output Digital Module 1 Protection Fault Value (Parameter 323)
- Output Digital Module 2 Protection Fault Action (Parameter 328)
- Output Digital Module 2 Protection Fault Value (Parameter 329)
- Output Digital Module 3 Protection Fault Action (Parameter 334)
- Output Digital Module 3 Protection Fault Value (Parameter 335)
- Output Digital Module 4 Protection Fault Action (Parameter 340)
- Output Digital Module 4 Protection Fault Value (Parameter 342)

Analog Warning

The E300 relay indicates an analog warning if:

- No warning currently exists
- Analog Module 1 – Channel 00 Over Level Warning is enabled
- The maximum phase current is equal to or greater than the Analog Module 1 – Channel 00 Warning Level

When the warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 4-long / 1-short blink pattern
- Bit 0 in Analog Warning Status (Parameter 14) sets to 1
- Bit 1 in Device Status 0 (Parameter 20) sets to 1
- Any relay outputs configured as a Warning Alarm close

Analog Module

The E300 supports as many as 4 analog modules. Analog I/O Expansion Module scans up to three analog signals. An over level trip or warning can be configured for each input channel.

Parameter Name	Parameter Number	Description
Analog Module Over Level Trip	8 20	Indicate a trip
Analog Module 1 – Channel 00 Over Level Trip Delay Analog Module 1 – Channel 01 Over Level Trip Delay Analog Module 1 – Channel 02 Over Level Trip Delay Analog Module 2 – Channel 00 Over Level Trip Delay Analog Module 2 – Channel 01 Over Level Trip Delay Analog Module 2 – Channel 02 Over Level Trip Delay Analog Module 3 – Channel 00 Over Level Trip Delay Analog Module 3 – Channel 01 Over Level Trip Delay Analog Module 3 – Channel 02 Over Level Trip Delay Analog Module 4 – Channel 00 Over Level Trip Delay Analog Module 4 – Channel 01 Over Level Trip Delay Analog Module 4 – Channel 02 Over Level Trip Delay	443 452 461 474 483 492 505 514 523 536 545 554	Define the time period a l evel condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.
Analog Module 1 – Channel 00 Trip Level Analog Module 1 – Channel 01 Trip Level Analog Module 1 – Channel 02 Trip Level Analog Module 2 – Channel 00 Trip Level Analog Module 2 – Channel 01 Trip Level Analog Module 2 – Channel 02 Trip Level Analog Module 3 – Channel 00 Trip Level Analog Module 3 – Channel 01 Trip Level Analog Module 3 – Channel 02 Trip Level Analog Module 4 – Channel 00 Trip Level Analog Module 4 – Channel 01 Trip Level Analog Module 4 – Channel 02 Trip Level	444 453 462 475 484 493 506 515 524 537 546 555	Define the magnitude of the analog signal in which the E300 relay trips on a level trip. It is user-adjustable from -32768…+32767.
Analog Module Over Level Warning	14 20	Indicate a warning
Analog Module 1 – Channel 00 Warning Level Analog Module 1 – Channel 01 Warning Level Analog Module 1 – Channel 02 Warning Level Analog Module 2 – Channel 00 Warning Level Analog Module 2 – Channel 01 Warning Level Analog Module 2 – Channel 02 Warning Level Analog Module 3 – Channel 00 Warning Level Analog Module 3 – Channel 01 Warning Level Analog Module 3 – Channel 02 Warning Level Analog Module 4 – Channel 00 Warning Level Analog Module 4 – Channel 01 Warning Level Analog Module 4 – Channel 02 Warning Level	445 454 463 476 485 494 507 516 525 538 547 556	Define the magnitude of the analog signal in which the E300 relay trips on a warning. It is user-adjustable from -32768…+32767.

Chapter 6

Commands

This chapter provides detailed information about the reset, clear, and pre-configuration functions of the E300™ Electronic Overload Relay. The E300 relay provides three types of commands:

- Trip reset
- Configuration preset
- Clear command

Trip Reset

Trip Reset (Parameter 163) allows you to reset an E300 relay when it is in a tripped state. Trip Reset has the same functionality as pressing the blue reset button on E300 communication module and using the Trip Reset bit in the consumed output assemblies of a communication network.

A trip reset can only be performed when all conditions for the trip event have been cleared. For an overload trip event, the % Thermal Capacity Utilized (Parameter 1) must be below the value that is specified in Overload Reset Level (Parameter 174).

Configuration Preset

The E300 relay has a number of preset configurations that allow you to quickly configure all configuration parameters that are needed for a specific operating mode in one command. This also allows you to restore the factory default values for all configuration parameters in the E300 relay.

The following pages list the available configuration presets and the values for the associated pre-configured configuration values.

Factory Defaults

When the Factory Defaults configuration preset command is selected, the E300 relay restores all configuration parameters back to their original factory default values.

Figure 78 - Factory Default Values

No.	Parameter Name	Default Value	Units
139	TripHistoryMaskI	0xFFFF	
140	TripHistoryMaskV	0x003F	
141	TripHistoryMaskP	0x0FFF	
142	TripHistoryMaskC	0x27FF	
143	TripHistoryMaskA	0x0FFF	
145	WarnHistoryMaskI	0xFFFF	
146	WarnHistoryMaskV	0x003F	
147	WarnHistoryMaskP	0x0FFF	
148	WarnHistoryMaskC	0x1FFF	

No.	Parameter Name	Default Value	Units
304	OutPt00PrFltAct	Goto Value	
305	OutPt00PrFltVal	Open	
306	OutPt00ComFltAct	Goto Value	
307	OutPt00ComFltVal	Open	
308	OutPt00ComIdlAct	Goto Value	
309	OutPt00ComIdlVal	Open	
310	OutPt01PrFltAct	Goto Value	
311	OutPt01PrFltVal	Open	
312	OutPt01ComFltAct	Goto Value	

No.	Parameter Name	Default Value	Units
428	Screen1Param1	1	
429	Screen1Param2	50	
430	Screen2Param1	2	
431	Screen2Param2	3	
432	Screen3Param1	51	
433	Screen3Param2	52	
434	Screen4Param1	38	
435	Screen4Param2	39	
436	DisplayTimeout	300	Seconds

No.	Parameter Name	Default Value	Units
149	WarnHistoryMaskA	0x0FFF	
171	FLASetting	0.50	Amps
172	TripClass	10	
173	OLPTCResetMode	Automatic	
174	OLResetLevel	75	%TCU
175	OLWarningLevel	85	%TCU
176	SingleOrThreePh	Three Phase	
177	FLA2Setting	0.50	Amps
183	TripEnableI	0x0003	
184	TripEnableV	0	
185	TripEnableP	0	
186	TripEnableC	0x20C9	
187	TripEnableA	0	
189	WarningEnableI	0	
190	WarningEnableV	0	
191	WarningEnableP	0	
192	WarningEnableC	0	
193	WarningEnableA	0	
195	SetOperatingMode	Net Overload	
196	InPt00Assignment	Normal	
197	InPt01Assignment	Normal	
198	InPt02Assignment	Normal	
199	InPt03Assignment	Normal	
200	InPt04Assignment	Normal	
201	InPt05Assignment	Normal	
202	OutPt0Assignment *	Trip Relay	
203	OutPt1Assignment	Normal	
204	OutPt2Assignment	Normal	
205	StartsPerHour	2	
206	StartsInterval	600	Seconds
207	PMTotalStarts	0	
208	PMOperatingHours	0	Hrs
209	ActFLA2wOutput	Disable	
211	SecurityPolicy	0x801F	
212	Language	English	
213	FeedbackTimeout	500	
214	TransitionDelay	10000	
215	InterlockDelay	100	
216	EmergencyStartEn	Disable	
221	ControlModuleTyp	Ignore	
222	SensingModuleTyp	Ignore	
223	CommsModuleType	Ignore	
224	OperStationType	Ignore	
225	DigitalMod1Type	Ignore	
226	DigitalMod2Type	Ignore	
227	DigitalMod3Type	Ignore	
228	DigitalMod4Type	Ignore	
229	AnalogMod1Type	Ignore	

No.	Parameter Name	Default Value	Units
313	OutPt01ComFltVal	Open	
314	OutPt01ComIdlAct	Goto Value	
315	OutPt01ComIdlVal	Open	
316	OutPt02PrFltAct	Goto Value	
317	OutPt02PrFltVal	Open	
318	OutPt02ComFltAct	Goto Value	
319	OutPt02ComFltVal	Open	
320	OutPt02ComIdlAct	Goto Value	
321	OutPt02ComIdlVal	Open	
322	OutDig1PrFltAct	Goto Value	
323	OutDig1PrFltVal	Open	
324	OutDig1ComFltAct	Goto Value	
325	OutDig1ComFltVal	Open	
326	OutDig1ComIdlAct	Goto Value	
327	OutDig1ComIdlVal	Open	
328	OutDigp2PrFltAct	Goto Value	
329	OutDig2PrFltVal	Open	
330	OutDig2ComFltAct	Goto Value	
331	OutDig2ComFltVal	Open	
332	OutDig2ComIdlAct	Goto Value	
333	OutDig2ComIdlVal	Open	
334	OutDig3PrFltAct	Goto Value	
335	OutDig3PrFltVal	Open	
336	OutDig3ComFltAct	Goto Value	
337	OutDig3ComFltVal	Open	
338	OuDig3ComIdlAct	Goto Value	
339	OutDig3ComIdlVal	Open	
340	OutDig4PrFltAct	Goto Value	
341	OutDig4PrFltVal	Open	
342	OutDig4ComFltAct	Goto Value	
343	OutDig4ComFltVal	Open	
344	OutDig4ComIdlAct	Goto Value	
345	OutDig4ComIdlVal	Open	
346	CommOverride	Disable	
347	NetworkOverride	Disable	
350	PtDevOutCOSMask	0x0000	
352	VoltageMode	Delta	
353	PTPrimary	480	
354	PTSecondary	480	
355	UVInhibitTime	10	Seconds
356	UVTripDelay	1.0	Seconds
357	UVTripLevel	100.0	Volt
358	UVWarningLevel	400.0	Volt
359	OVInhibitTime	10	Seconds
360	OVTripDelay	1.0	Seconds
361	OVTripLevel	500.0	Volt
362	OVWarningLevel	490.0	Volt
363	PhRotInhibitTime	10	Seconds

No.	Parameter Name	Default Value	Units
437	InAnMod1Ch00Type	Disable	
438	InAMod1Ch0Format	Eng Units	
439	InAMod1C0TmpUnit	Degrees C	
440	InAMod1C0FiltFrq	17 Hz	
441	InAMod1C0OpCktSt	Upscale	
442	InAnMod1Ch0RTDEn	3-Wire	
443	InAMod1C0TripDly	1.0	Seconds
444	InAMod1C0TripLvl	0	
445	InAMod1C0WarnLvl	0	
446	InAnMod1Ch01Type	Disable	
447	InAMod1Ch1Format	Eng Units	
448	InAMod1C1TmpUnit	Degrees C	
449	InAMod1C1FiltFrq	17 Hz	
450	InAMod1C1OpCktSt	Upscale	
451	InAnMod1Ch1RTDEn	3-Wire	
452	InAMod1C1TripDly	1.0	Seconds
453	InAMod1C1TripLvl	0	
454	InAMod1C1WarnLvl	0	
455	InAnMod1Ch02Type	Disable	
456	InAMod1Ch2Format	Eng Units	
457	InAMod1C2TmpUnit	Degrees C	
458	InAMod1C2FiltFrq	17 Hz	
459	InAMod1C2OpCktSt	Upscale	
460	InAnMod1Ch2RTDEn	3-Wire	
461	InAMod1C2TripDly	1.0	Seconds
462	InAMod1C2TripLvl	0	
463	InAMod1C2WarnLvl	0	
464	OutAnMod1Type	Disable	
465	OutAnMod1Select	Ave %FLA	
466	OutAnMod1FltActn	Zero	
467	OutAnMod1IdlActn	Zero	
468	InAnMod2Ch00Type	Disable	
469	InAMod2Ch0Format	Eng Units	
470	InAMod2C0TmpUnit	Degrees C	
471	InAMod2C0FiltFrq	17 Hz	
472	InAMod2C0OpCktSt	Upscale	
473	InAnMod2Ch0RTDEn	3-Wire	
474	InAMod2C0TripDly	1.0	Seconds
475	InAMod2C0TripLvl	0	
476	InAMod2C0WarnLvl	0	
477	InAnMod2Ch01Type	Disable	
478	InAMod2Ch1Format	Eng Units	
479	InAMod2C1TmpUnit	Degrees C	
480	InAMod2C1FiltFrq	17 Hz	
481	InAMod2C1OpCktSt	Upscale	
482	InAnMod2Ch1RTDEn	3-Wire	
483	InAMod2C1TripDly	1.0	Seconds
484	InAMod2C1TripLvl	0	

No.	Parameter Name	Default Value	Units
230	AnalogMod2Type	Ignore	
231	AnalogMod3Type	Ignore	
232	AnalogMod4Type	Ignore	
233	MismatchAction	0x0000	
239	PLInhibitTime	0	Seconds
240	PLTripDelay	1	Seconds
241	GroundFaultType	Internal	
242	GFInhibitTime	10	Seconds
243	GFTripDelay	0.5	Seconds
244	GFTripLevel	2.50	Amps
245	GFWarningDelay	0	Seconds
246	GFWarningLevel	2.00	Amps
247	GFFilter	Disable	
248	GFMaxInhibit	Disable	
249	StallEnabledTime	10	Seconds
250	StallTripLevel	600	%FLA
251	JamInhibitTime	10	Seconds
252	JamTripDelay	5.0	Seconds
253	JamTripLevel	250	%FLA
254	JamWarningLevel	150	%FLA
255	ULInhibitTime	10	Seconds
256	ULTripDelay	5.0	Seconds
257	ULTripLevel	50	%FLA
258	ULWarningLevel	70	%FLA
259	CIInhibitTime	10	Seconds
260	CITripDelay	5.0	Seconds
261	CITripLevel	35	%
262	CIWarningLevel	20	%
263	CTPrimary	5	
264	CTSecondary	5	
265	UCInhibitTime	10	Seconds
266	L1UCTripDelay	1.0	Seconds
267	L1UCTripLevel	35	%
268	L1UCWarningLevel	40	%
269	L2UCTripDelay	1.0	Seconds
270	L2UCTripLevel	35	%
271	L2UCWarningLevel	40	%
272	L3UCTripDelay	1.0	Seconds
273	L3UCTripLevel	35	%
274	L3UCWarningLevel	40	%
275	OCInhibitTime	10	Seconds
276	L1OCTripDelay	1.0	Seconds
277	L1OCTripLevel	100	%
278	L1OCWarningLevel	90	%
279	L2OCTripDelay	1.0	Seconds
280	L2OCTripLevel	100	%
281	L2OCWarningLevel	90	%
282	L3OCTripDelay	1.0	Seconds
283	L3OCTripLevel	100	%
364	PhaseRotTripType	ABC	
365	VIBInhibitTime	10	Seconds
366	VIBTripDelay	1.0	Seconds
367	VIBTripLevel	15	%
368	VIBWarningLevel	10	%
369	UFInhibitTime	10	Seconds
370	UFTripDelay	1.0	Seconds
371	UFTripLevel	57	Hz
372	UFWarningLevel	58	Hz
373	OFInhibitTime	10	Seconds
374	OFTripDelay	1.0	Seconds
375	OFTripLevel	63	Hz
376	OFWarningLevel	62	Hz
377	PowerScale	kW	
378	UWInhibitTime	10	Seconds
379	UWTripDelay	1.0	Seconds
380	UWTripLevel	0.000	kW
381	UWWarningLevel	0.000	kW
382	OWInhibitTime	10	Seconds
383	OWTripDelay	1.0	Seconds
384	OWTripLevel	0.000	kW
385	OWWarningLevel	0.000	kW
386	UVARCInhibitTime	10	Seconds
387	UVARCTripDelay	1.0	Seconds
388	UVARCTripLevel	0.000	kVAR
389	UVARCWarnLevel	0.000	kVAR
390	OVARCInhibitTime	10	Seconds
391	OVARCTripDelay	1.0	Seconds
392	OVARCTripLevel	0.000	kVAR
393	OVARCWarnLevel	0.000	kVAR
394	UVARGInhibitTime	10	Seconds
395	UVARGTripDelay	1.0	Seconds
396	UVARGTripLevel	0.000	kVAR
397	UVARGWarnLevel	0.000	kVAR
398	OVARGInhibitTime	10	Seconds
399	OVARGTripDelay	1.0	Seconds
400	OVARGTripLevel	0.000	kVAR
401	OVARGWarnLevel	0.000	kVAR
402	UVAInhibitTime	10	Seconds
403	UVATripDelay	1.0	Seconds
404	UVATripLevel	0.000	kVA
405	UVAWarningLevel	0.000	kVA
406	OVAInhibitTime	10	Seconds
407	OVATripDelay	1.0	Seconds
408	OVATripLevel	0.000	kVA
409	OVAWarningLevel	0.000	kVA
410	UPFLagInhibTime	10	Seconds
411	UPFLagTripDelay	1.0	Seconds
412	UPFLagTripLevel	-90	%
485	InAMod2C1WarnLvl	0	
486	InAnMod2Ch02Type	Disable	
487	InAMod2Ch2Format	Eng Units	
488	InAMod2C2TmpUnit	Degrees C	
489	InAMod2C2FiltFrq	17 Hz	
490	InAMod2C2OpCktSt	Upscale	
491	InAnMod2Ch2RTDEn	3-Wire	
492	InAMod2C2TripDly	1.0	Seconds
493	InAMod2C2TripLvl	0	
494	InAMod2C2WarnLvl	0	
495	OutAnMod2Type	Disable	
496	OutAnMod2Select	Ave %FLA	
497	OutAnMod2FltActn	Zero	
498	OutAnMod2dlActn	Zero	
499	InAnMod3Ch00Type	Disable	
500	InAMod3Ch0Format	Eng Units	
501	InAMod3C0TmpUnit	Degrees C	
502	InAMod3C0FiltFrq	17 Hz	
503	InAMod3C0OpCktSt	Upscale	
504	InAnMod3Ch0RTDEn	3-Wire	
505	InAMod3C0TripDly	1.0	Seconds
506	InAMod3C0TripLvl	0	
507	InAMod3C0WarnLvl	0	
508	InAnMod3Ch01Type	Disable	
509	InAMod3Ch1Format	Eng Units	
510	InAMod3C1TmpUnit	Degrees C	
511	InAMod3C1FiltFrq	17 Hz	
512	InAMod3C1OpCktSt	Upscale	
513	InAnMod3Ch1RTDEn	3-Wire	
514	InAMod3C1TripDly	1.0	Seconds
515	InAMod3C1TripLvl	0	
516	InAMod3C1WarnLvl	0	
517	InAnMod3Ch02Type	Disable	
518	InAMod3Ch2Format	Eng Units	
519	InAMod3C2TmpUnit	Degrees C	
520	InAMod3C2FiltFrq	17 Hz	
521	InAMod3C2OpCktSt	Upscale	
522	InAnMod3Ch2RTDEn	3-Wire	
523	InAMod3C2TripDly	1.0	Seconds
524	InAMod3C2TripLvl	0	
525	InAMod3C2WarnLvl	0	
526	OutAnMod3Type	Disable	
527	OutAnMod3Select	Ave %FLA	
528	OutAnMod3FltActn	Zero	
529	OutAnMod3dlActn	Zero	
530	InAnMod4Ch00Type	Disable	
531	InAMod4Ch0Format	Eng Units	
532	InAMod3C0TmpUnit	Degrees C	
533	InAMod4C0FiltFrq	17 Hz	

No.	Parameter Name	Default Value	Units
284	L3OCWarningLevel	90	%
285	LineLossInhTime	10	Seconds
286	L1LossTripDelay	1.0	Seconds
287	L2LossTripDelay	1.0	Seconds
288	L3LossTripDelay	1.0	Seconds
291	Datalink0	0	
292	Datalink1	0	
293	Datalink2	0	
294	Datalink3	0	
295	Datalink4	0	
296	Datalink5	0	
297	Datalink6	0	
298	Datalink7	0	

No.	Parameter Name	Default Value	Units
413	UPFLagWarnLevel	-95	%
414	OPFLagInhibTime	10	Seconds
415	OPFLagTripDelay	1.0	Seconds
416	OPFLagTripLevel	-95	%
417	OPFLagWarnLevel	-90	%
418	UPFLeadInhibTime	10	Seconds
419	UPFLeadTripDelay	1.0	Seconds
420	UPFLeadTripLevel	90	%
421	UPFLeadWarnLevel	95	%
422	OPFLeadInhibTime	10	Seconds
423	OPFLeadTripDelay	1.0	Seconds
424	OPFLeadTripLevel	95	%
425	OPFLeadWarnLevel	90	%
426	DemandPeriod	15	Min
427	NumberOfPeriods	1	

No.	Parameter Name	Default Value	Units
534	InAMod4C0OpCktSt	Upscale	
535	InAnMod4Ch0RTDEn	3-Wire	
536	InAMod4C0TripDly	1.0	Seconds
537	InAMod4C0TripLvl	0	
538	InAMod4C0WarnLvl	0	
539	InAnMod4Ch01Type	Disable	
540	InAMod4Ch1Format	Eng Units	
541	InAMod4C1TmpUnit	Degrees C	
542	InAMod4C1FiltFrq	17 Hz	
543	InAMod4C1OpCktSt	Upscale	
544	InAnMod4Ch1RTDEn	3-Wire	
545	InAMod4C1TripDly	1.0	Seconds
546	InAMod4C1TripLvl	0	
547	InAMod4C1WarnLvl	0	
548	InAnMod4Ch02Type	Disable	
549	InAMod4Ch2Format	Eng Units	
550	InAMod4C2TmpUnit	Degrees C	
551	InAMod4C2FiltFrq	17 Hz	
552	InAMod4C2OpCktSt	Upscale	
553	InAnMod4Ch2RTDEn	3-Wire	
554	InAMod4C2TripDly	1.0	Seconds
555	InAMod4C2TripLvl	0	
556	InAMod4C2WarnLvl	0	
557	OutAnMod4Type	Disable	
558	OutAnMod4Select	Ave %FLA	
559	OutAnMod4FltActn	Zero	
560	OutAnMod4dlActn	Zero	
561	FnlFltValStDur	Zero	
562	OutPt00FnlFltVal	Open	
563	OutPt01FnlFltVal	Open	
564	OutPt02FnlFltVal	Open	
565	OutDig1FnlFltVal	Open	
566	OutDig2FnlFltVal	Open	
567	OutDig3FnlFltVal	Open	
568	OutDig4FnlFltVal	Open	
569	NetStrtComFltAct	Goto Value	
570	NetStrtComFltVal	Open	
571	NetStrtComIdlAct	Goto Value	
572	NetStrtComIdlVal	Open	
573	NetStrtFnlFltVal	Open	
574	VoltageScale	Volts	

Clear Command

Clear Command (Parameter 165) allows you to clear historical logs, operating statistics, and energy data within the nonvolatile memory of the E300 relay.

Table 28 - Clear Command Functions

Function Name	Parameter Name	Parameter No.	Description
Clear Operating Statistics	Operating Time	28	sets related parameters to a value of zero (0) when command is issued
	Starts Counter	29	
Clear History Logs	Trip History 0	127	sets related parameters to a value of zero (0) when command is issued
	Trip History 1	128	
	Trip History 2	129	
	Trip History 3	130	
	Trip History 4	131	
	Warning History 0	132	
	Warning History 1	133	
	Warning History 2	134	
	Warning History 3	135	
	Warning History 4	136	
Clear % TCU	Thermal Capacity Utilized	1	sets related parameters to a value of zero (0) when command is issued
Clear kWh	kWh x 10^9	80	sets related parameters to a value of zero (0) when command is issued
	kWh x 10^6	81	
	kWh x 10^3	82	
	kWh x 10^0	83	
	kWh x 10^{-3}	84	
Clear kVARh	kVARh Consumed x 10^9	85	sets related parameters to a value of zero (0) when command is issued
	kVARh Consumed x 10^6	86	
	kVARh Consumed x 10^3	87	
	kVARh Consumed x 10^0	88	
	kVARh Consumed x 10^{-3}	89	
	kVARh Generated x 10^9	90	
	kVARh Generated x 10^6	91	
	kVARh Generated x 10^3	92	
	kVARh Generated x 10^0	93	
	kVARh Generated x 10^{-3}	94	
	kVARh Net x 10^9	95	
	kVARh Net x 10^6	96	
	kVARh Net x 10^3	97	
	kVARh Net x 10^0	98	
	kVARh Net x 10^{-3}	99	
Clear kVAh	kVAh x 10^9	100	sets related parameters to a value of zero (0) when command is issued
	kVAh x 10^6	101	
	kVAh x 10^3	102	
	kVAh x 10^0	103	
	kVAh x 10^{-3}	104	
Clear Max. kW Demand	Max kW Demand	106	sets related parameters to a value of zero (0) when Clear %TCU command is issued
Clear Max kVAR Demand	Max kVAR Demand	108	sets related parameters to a value of zero (0) when Clear %TCU command is issued
Clear Max kVA Demand	Max kVA Demand	110	sets related parameters to a value of zero (0) when Clear %TCU command is issued

Function Name	Parameter Name	Parameter No.	Description
Clear All	% Thermal Capacity Utilized	1	sets related parameters to a value of zero (0) when command is issued
	Operating Time	28	
	Starts Counter	29	
	kWh x 10^9	80	
	kWh x 10^6	81	
	kWh x 10^3	82	
	kWh x 10^0	83	
	kWh x 10^{-3}	84	
	kVARh Consumed x 10^9	85	
	kVARh Consumed x 10^6	86	
	kVARh Consumed x 10^3	87	
	kVARh Consumed x 10^0	88	
	kVARh Consumed x 10^{-3}	89	
	kVARh Generated x 10^9	90	
	kVARh Generated x 10^6	91	
	kVARh Generated x 10^3	92	
	kVARh Generated x 10^0	93	
	kVARh Generated x 10^{-3}	94	
	kVARh Net x 10^9	95	
	kVARh Net x 10^6	96	
	kVARh Net x 10^3	97	
	kVARh Net x 10^0	98	
	kVARh Net x 10^{-3}	99	
	kVAh x 10^9	100	
	kVAh x 10^6	101	
	kVAh x 10^3	102	
	kVAh x 10^0	103	
	kVAh x 10^{-3}	104	
	Max kW Demand	106	
	Max kVAR Demand	108	
	Max kVA Demand	110	
	Trip History 0	127	
	Trip History 1	128	
	Trip History 2	129	
	Trip History 3	130	
	Trip History 4	131	
	Warning History 0	132	
	Warning History 1	133	
	Warning History 2	134	
	Warning History 3	135	
	Warning History 4	136	

Metering and Diagnostics

This chapter provides detailed information about the metering and diagnostic information that the E300™ Electronic Overload Relay generates. The metering and diagnostic functions are organized into seven sections:

- Device Monitor
- Current Monitor
- Voltage Monitor
- Power Monitor
- Energy Monitor
- Trip/Warning History
- Trip Snapshot

Device Monitor

The E300 relay's device monitor diagnostics provides information on the status of the device, which includes:

- Thermal overload protection
- Trip and warning protection functions
- Digital inputs and relay outputs
- Operator station
- Hardware options
- Time and date

Table 29 - Device Monitor Parameters

Parameter Name	Parameter No.	Description
Percent Thermal Capacity Utilized (%TCU)	1	• reports the calculated percent thermal capacity utilization of the motor that is being monitored • when the percent thermal capacity utilization equals 100%, the E300 relay issues an overload trip
Time to Trip	2	• overload Time to Trip indicates the estimated time remaining before an overload trip occurs when the measured motor current exceeds the trip rating of the E300 relay • when the measured current is below the trip rating, the value is reported as 9,999 seconds
Time To Reset	3	• reports the time remaining until the device can be reset after an overload trip • when the %TCU value falls to or below the Overload Reset Level (Parameter 174), the Overload Time to Reset value indicates zero until the overload trip is reset • after an overload trip is reset, the value is reported as 0 seconds
Current Trip Status	4	• reports the status of the current-based protective trip functions
Voltage Trip Status	5	• reports the status of the voltage-based protective trip functions
Power Trip Status	6	• reports the status of the voltage-based protective trip functions
Control Trip Status	7	• reports the status of the control-based protective trip functions
Current Warning Status	10	• reports the status of the current-based protective warning functions
Voltage Warning Status	11	• reports the status of the control-based protective warning functions
Power Warning Status	12	• reports the status of the control-based protective warning functions
Control Warning Status	13	• reports the status of the control-based protective warning functions
Input Status 0	16	• reports the state of the digital inputs on the E300 relay Control Module

Parameter Name	Parameter No.	Description
Input Status 1	17	• reports the state of the digital inputs on the E300 relay Digital Expansion Modules
Output Status	18	• reports the state of the relay outputs on the E300 relay Control Module and Digital Expansion Modules
Operator Station Status	19	• reports the state of the E300 relay Operator Station input buttons and output LEDs
Device Status 0	20	• reports the general status of the E300 relay and the sensing capabilities that are present • Device Status 0 bit 14, "Ready", is cleared under the following circumstances: – Device Status 0 bit 0, "Trip Present", is set – The E300 relay has not completed its power-up initialization – The processing of data in a configuration assembly is in progress – A CopyCat function is in progress – A Factory Defaults command has been invoked and is in progress.
Device Status 1	21	• reports the specific features of the E300 relay Control and Sensing Modules • reports which Expansion Digital Modules or Analog Modules are present on the E300 relay Expansion Bus
Firmware Revision Number	22	• reports the firmware revision number of the E300 relay system
Control Module ID	23	• identifies which specific Control Module is present in the E300 relay system
Sensing Module ID	24	• identifies which specific Sensing Module is present in the E300 relay system
Operator Station ID	25	• identifies which specific Operator Station is present on the Expansion Bus of the E300 relay system
Expansion Digital Module ID	26	• identifies which specific Expansion Digital Modules are present on the Expansion Bus of the E300 relay system
Expansion Analog Module ID	27	• identifies which specific Expansion Analog Modules are present on the Expansion Bus of the E300 relay system
Operating Time	28	• represents the number of hours that a motor has been running • you can reset this value can be reset to zero using the Clear Command (Parameter 165) function Clear Operating Statistics
Starts Counter	29	• represents the number of times a motor has been started • you can reset this value can be reset to zero using the Clear Command (Parameter 165) function Clear Operating Statistics
Starts Available	30	• reports the number of starts currently available based on the blocked start settings and the actual motor starting events
Time to Start	31	• reports the amount of time remaining until a new start can be issued • if the Time to Start time has elapsed, this parameter reports zero until the next Blocked Start trip occurs
Year	32	• reports the year in the virtual real-time clock of the E300 relay
Month	33	• reports the month in the virtual real-time clock of the E300 relay
Day	34	• reports the day in the virtual real-time clock of the E300 relay
Hour	35	• reports the hour in the virtual real-time clock of the E300 relay
Minute	36	• reports the minute in the virtual real-time clock of the E300 relay
Second	37	• reports the second in the virtual real-time clock of the E300 relay
Invalid Configuration Parameter	38	• reports the parameter number that is causing a configuration trip in the E300 relay • see Chapter 3 for more information about a configuration fault
Invalid Configuration Cause	39	• reports the reason for the configuration trip in the E300 relay • see Chapter 3 for more information about a configuration fault
Mismatch Status	40	• reports the module that is causing a mismatch trip or warning in the E300 relay • see Chapter 3 for more information about a mismatch fault

Current Monitor

The E300 relay current monitor diagnostics provides information on the current consumed by the load that the E300 relay is monitoring, and it provides diagnostics for a three-phase current system including imbalance and ground fault current.

Table 30 - Current Monitor Parameters

Parameter Name	Parameter No.	Description
L1 Current	43	• reports the current in Amperes flowing through the L1 and T1 power terminals of the E300 relay Sensing Module
L2 Current	44	• reports the current in Amperes flowing through the L2 and T2 power terminals of the E300 relay Sensing Module
L3 Current	45	• reports the current in Amperes flowing through the L3 and T3 power terminals of the E300 relay Sensing Module
Average Current	46	• reports the average current of the monitored current • When single or three phase (Parameter 176) is set to three-phase, average current is calculated as follows: – Average Current = (L1 Current + L2 Current + L3 Current) / 3 • When single or three phase (Parameter 176) is set to single phase, average current is calculated as follows: – Average Current = (L1 Current + L2 Current) / 2
L1 Percent FLA	47	• reports the L1 current in comparison to the active Full Load Amps programmed in FLA (Parameter 171) and FLA2 (Parameter 177) – L1 Percent FLA = L1 Current / Full Load Amp
L2 Percent FLA	48	• reports the L2 current in comparison to the active Full Load Amps programmed in FLA (Parameter 171) and FLA2 (Parameter 177) – L2 Percent FLA = L2 Current / Full Load Amps
L3 Percent FLA	49	• reports the L3 current in comparison to the active Full Load Amps programmed in FLA (Parameter 171) and FLA2 (Parameter 177) – L3 Percent FLA = L3 Current / Full Load Amps
Average Percent FLA	50	• reports the average current in comparison to the active Full Load Amps programmed in FLA (Parameter 171) and FLA2 (Parameter 177) – Average Percent FLA = Average Current / Full Load Amps
Ground Fault Current	51	• reports the ground fault current measured by the internal core balanced current transformer of the E300 relay Sensing Module or external core balanced current transformer
Current Imbalance	52	• reports the percentage of uneven current consumption in the monitored power system • Current Imbalance is defined by the following equation – Current Imbalance = 100% * (I_d/I_a) where I_d = Maximum Line Current Deviation from the Average Current; I_a = Average Current

Voltage Monitor

The E300 relay's voltage monitor diagnostics provides information on the voltage being supplied to the load. The voltage diagnostics include three-phase voltage, phase imbalance, phase rotation, and frequency.

Table 31 - Voltage Monitor Parameters

Parameter Name	Parameter No.	Description
L1-L2 Voltage	53	• reports the voltage in volts in reference to the T1 and T2 power terminals of the E300 relay Sensing Module
L2-L3 Voltage	54	• reports the voltage in volts in reference to the T2 and T3 power terminals of the E300 relay Sensing Module
L3-L1 Voltage	55	• reports the voltage in volts in reference to the T3 and T1 power terminals of the E300 relay Sensing Module
Average L-L Voltage	56	• reports the average voltage of the monitored L-L voltages • when Single or Three Phase (Parameter 176) is set to *Three Phase*, Average L-L Voltage is calculated as follows: – Average L-L Voltage = (L1-L2 Voltage + L2-L3 Voltage + L3-L1 Voltage) / 3 • When Single or Three Phase (Parameter 176) is set to *Single Phase*, Average L-L Voltage is calculated as follows: – Average L-L Voltage = (L1-L2 Voltage + L2-L3 Voltage) / 2
L1-N Voltage	57	• reports the voltage in volts in reference to the T1 power terminal of the E300 relay Sensing Module

Parameter Name	Parameter No.	Description
L2-N Voltage	58	• reports the voltage in volts in reference to the T2 power terminal of the E300 relay Sensing Module
L3-N Voltage	59	• reports the voltage in volts in reference to the T3 power terminal of the E300 relay Sensing Module
Average L-N Voltage	60	• reports the average voltage of the monitored L-N voltages • When Single or Three Phase (Parameter 176) is set to *Three Phase*, Average L-N Voltage is calculated as follows: – Average L-N Voltage = (L1-N Voltage + L2-N Voltage + L3-N Voltage) / 3 • When Single or Three Phase (Parameter 176) is set to *Single Phase*, Average L-N Voltage is calculated as follows: – Average L-N Voltage = (L1-N Voltage + L2-N Voltage) / 2
Voltage Imbalance	61	• reports the percentage of uneven voltage being supplied by the monitored power system • Voltage Imbalance is defined by the following equation: – Voltage Imbalance = 100% * (V_d/V_a); where V_d = Maximum L-L Voltage Deviation from the Average L-L Voltage, V_a = Average L-L Voltage
Frequency	62	• reports the voltage frequency in Hertz of the monitored power system from the E300 relay Sensing Module
Phase Rotation	63	• reports the voltage phase rotation as ABC or ACB of the monitored power system from the E300 relay Sensing Module.

Power Monitor

The E300 relay's power monitor diagnostics provides information on the power being supplied to the load. The power diagnostics include real power (kW), reactive power (kVAR), apparent power (kVA), and power factor.

Table 32 - Power Monitor Parameters

Parameter Name	Parameter No.	Description
Power Scale	377	• allows the E300 relay to display the values of Parameters 64…75 as Kilowatts or Megawatts – generally used for large medium voltage-based power systems,
L1 Real Power	64	• reports the real power for line 1 in kW or MW depending on the configuration value for Power Scale (Parameter 377) • when Voltage Mode (Parameter 352) is set to any *Delta* base setting, L1 Real Power is set to 0
L2 Real Power	65	• reports the real power for line 2 in kW or MW depending on the configuration value for Power Scale (Parameter 377) • when Voltage Mode (Parameter 352) is set to any *Delta* base setting, L2 Real Power is set to 0
L3 Real Power	66	• reports the real power for line 3 in kW or MW depending on the configuration value for Power Scale (Parameter 377) • when Voltage Mode (Parameter 352) is set to any *Delta* base setting, L3 Real Power is set to 0 • when Single or Three Phase (Parameter 176) is set to *Single Phase*, L3 Real Power is set to 0
Total Real Power	67	• reports the total real power of the monitored power conductors in kW or MW depending on the configuration value for Power Scale (Parameter 377) • when Single or Three Phase (Parameter 176) is set to *Three Phase*, Total Real Power is calculated as follows: – Total Real Power = (L1 Real Power + L2 Real Power + L3 Real Power) • when Single or Three Phase (Parameter 176) is set to *Single Phase*, Total Real Power is calculated as follows: – Total Real Power = (L1 Real Power + L2 Real Power)
L1 Reactive Power	68	• reports the reactive power for line 1 in kVAR or MVAR depending on the configuration value for Power Scale (Parameter 377) • when Voltage Mode (Parameter 352) is set to any *Delta* base setting, L1 Reactive Power is set to 0
L2 Reactive Power	69	• reports the reactive power for line 2 in kVAR or MVAR depending on the configuration value for Power Scale (Parameter 377) • when Voltage Mode (Parameter 352) is set to any *Delta* base setting, L2 Reactive Power is set to 0
L3 Reactive Power	70	• reports the reactive power for line 3 in kVAR or MVAR depending on the configuration value for Power Scale (Parameter 377) • when Voltage Mode (Parameter 352) is set to any *Delta* base setting, L3 Reactive Power is set to 0. • when Single or Three Phase (Parameter 176) is set to *Single Phase*, L3 Reactive Power is set to 0

Parameter Name	Parameter No.	Description
Total Reactive Power	71	• reports the total Reactive power of the monitored power conductors in kVAR or MVAR depending on the configuration value for Power Scale (Parameter 377) • when Single or Three Phase (Parameter 176) is set to *Three Phase*, Total Reactive Power is calculated as follows: – Total Reactive Power = (L1 Reactive Power + L2 Reactive Power + L3 Reactive Power) • when Single or Three Phase (Parameter 176) is set to *Single Phase*, Total Reactive Power is calculated as follows: – Total Reactive Power = (L1 Reactive Power + L2 Reactive Power)
L1 Apparent Power	72	• reports the apparent power for line 1 in kVA or MVA depending on the configuration value for Power Scale (Parameter 377) • when Voltage Mode (Parameter 352) is set to any *Delta* base setting, L1 Apparent Power is set to 0
L2 Apparent Power	73	• reports the apparent power for line 2 in kVA or MVA depending on the configuration value for Power Scale (Parameter 377) • when Voltage Mode (Parameter 352) is set to any *Delta* base setting, L2 Apparent Power is set to 0
L3 Apparent Power	74	• reports the apparent power for line 3 in kVA or MVA depending on the configuration value for Power Scale (Parameter 377) • when Voltage Mode (Parameter 352) is set to any *Delta* base setting, L3 Apparent Power is set to 0 • when Single or Three Phase (Parameter 176) is set to *Single Phase*, L3 Apparent Power is set to 0
Total Apparent Power	75	• reports the total apparent power of the monitored power conductors in kVA or MVA depending on the configuration value for Power Scale (Parameter 377) • when Single or Three Phase (Parameter 176) is set to *Three Phase*, Total Apparent Power is calculated as follows: – Total Apparent Power = (L1 Apparent Power + L2 Apparent Power + L3 Apparent Power) • when Single or Three Phase (Parameter 176) is set to *Single Phase*, Total Apparent Power is calculated as follows: – Total Apparent Power = (L1 Apparent Power + L2 Apparent Power)
L1 Power Factor	76	• reports the power factor for line 1 in percentage • when Voltage Mode (Parameter 352) is set to any *Delta* base setting, L1 Power Factor is set to 0
L2 Power Factor Power	77	• reports the power factor for line 2 in percentage • when Voltage Mode (Parameter 352) is set to any *Delta* base setting, L2 Power Factor is set to 0
L3 Power Factor	78	• reports the power factor for line 3 in percentage • when Voltage Mode (Parameter 352) is set to any *Delta* base setting, L3 Power Factor is set to 0 • when Single or Three Phase (Parameter 176) is set to *Single Phase*, L3 power factor is set to 0
Total Power Factor	79	• reports the total power factor of the monitored power conductors in percentage • when Single or Three Phase (Parameter 176) is set to *Three Phase*, Total Power Factor is calculated as follows: • Total Power Factor = (L1 Power Factor + L2 Power Factor + L3 Power Factor) / 3 • when Single or Three Phase (Parameter 176) is set to *Single Phase*, Total Power Factor is calculated as follows: – Total Power Factor = (L1 Power Factor + L2 Power Factor) / 2

Energy Monitor

The E300 relay's energy monitor diagnostics provides information on the electrical energy the load is consuming. The energy diagnostics include kWh, kVARh, kVAh, kW Demand, kVAR Demand, and kVA Demand.

Table 33 - Power Monitor Parameters

Parameter Name	Parameter No.	Description
kWh 10^9	80	• reports a component of total real energy (kWh) • multiply this value by 10^9 and add to the other kWh parameters – represents **XXX**,*000,000,000.000* kWh
kWh 10^6	81	• reports a component of total real energy (kWh) • multiply this value by 10^6 and add to the other kWh parameters – represents 000,XXX,000,000.000 kWh
kWh 10^3	82	• reports a component of total real energy (kWh) • multiply this value by 10^3 and add to the other kWh parameters – represents *000,000,***XXX**,*000.000* kWh
kWh 10^0	83	• reports a component of total real energy (kWh) • multiply this value by 10^0 and add to the other kWh parameters – represents *000,000,000,***XXX**.*000* kWh

Parameter Name	Parameter No.	Description
kWh 10^{-3}	84	• reports a component of total real energy (kWh) • multiply this value by 10^{-3} and add to the other kWh parameters – represents *000,000,000,000.* **XXX** kWh
kVARh Consumed 10^{9}	85	• reports a component of total reactive energy consumed (kVARh) • multiply this value by 10^{9} and add to the other kVARh Consumed parameters – represents **XXX**,*000,000,000.000* kVARh
kVARh Consumed 10^{6}	86	• reports a component of total reactive energy consumed (kVARh) • multiply this value by 10^{6} and add to the other kVARh Consumed parameters – represents *000,***XXX**,*000,000.000* kVARh
kVARh Consumed 10^{3}	87	• reports a component of total reactive energy consumed (kVARh) • multiply this value by 10^{3} and add to the other kVARh Consumed parameters – represents *000,000,***XXX**,*000.000* kVARh
kVARh Consumed 10^{0}	88	• reports a component of total reactive energy consumed (kVARh) • multiply this value by 10^{0} and add to the other kVARh Consumed parameters – represents *000,000,000,***XXX**.*000* kVARh
kVARh Consumed 10^{-3}	89	• reports a component of total reactive energy consumed (kVARh) • multiply this value by 10^{-3} and add to the other kVARh Consumed parameters – represents *000,000,000,000.* **XXX** kVARh
kVARh Generated 10^{9}	90	• reports a component of total reactive energy generated (kVARh) • multiply this value by 10^{9} and add to the other kVARh Generated parameters – represents **XXX**,*000,000,000.000* kVARh
kVARh Generated 10^{6}	91	• reports a component of total reactive energy generated (kVARh) • multiply this value by 10^{6} and add to the other kVARh Generated parameters – represents *000,***XXX**,*000,000.000* kVARh
kVARh Generated 10^{3}	92	• reports a component of total reactive energy generated (kVARh) • multiply this value by 10^{3} and add to the other kVARh Generated parameters – represents *000,000,***XXX**,*000.000* kVARh
kVARh Generated 10^{0}	93	• reports a component of total reactive energy generated (kVARh) • multiply this value by 10^{0} and add to the other kVARh Generated parameters – represents *000,000,000,***XXX**.*000* kVARh
kVARh Generated 10^{-3}	94	• reports a component of total reactive energy generated (kVARh) • multiply this value by 10^{-3} and add to the other kVARh Generated parameters – represents *000,000,000,000.* **XXX** kVARh
kVARh Net 10^{9}	95	• reports a component of total reactive energy net (kVARh) • multiply this value by 10^{9} and add to the other kVARh Net parameters – represents **XXX**,*000,000,000.000* kVARh
kVARh Net 10^{6}	96	• reports a component of total reactive energy net (kVARh) • multiply this value by 10^{6} and add to the other kVARh Net parameters – represents *000,***XXX**,*000,000.000* kVARh
kVARh Net 10^{3}	97	• reports a component of total reactive energy net (kVARh) • multiply this value by 10^{3} and add to the other kVARh Net parameters – represents *000,000,***XXX**,*000.000* kVARh
kVARh Net 10^{0}	98	• reports a component of total reactive energy net (kVARh) • multiply this value by 10^{0} and add to the other kVARh Net parameters – represents *000,000,000,***XXX**.*000* kVARh
kVARh Net 10^{-3}	99	• reports a component of total reactive energy net (kVARh) • multiply this value by 10^{-3} and add to the other kVARh Net parameters – represents *000,000,000,000.* **XXX** kVARh
kVAh 10^{9}	100	• reports a component of total apparent energy (kVAh) • multiply this value by 10^{9} and add to the other kVAh parameters – represents **XXX**,*000,000,000.000* kVAh
kVAh 10^{6}	101	• reports a component of total apparent energy (kVAh) • multiply this value by 10^{6} and add to the other kVAh parameters – represents *000,***XXX**,*000,000.000* kVAh
kVAh 10^{3}	102	• reports a component of total apparent energy (kVAh) • multiply this value by 10^{3} and add to the other kVAh parameters – represents *000,000,***XXX**,*000.000* kVAh
kVAh 10^{0}	103	• reports a component of total apparent energy (kVAh) • multiply this value by 10^{0} and add to the other kVAh parameters – represents *000,000,000,***XXX**.*000* kVAh
kVAh 10^{-3}	104	• reports a component of total apparent energy (kVAh) • multiply this value by 10^{-3} and add to the other kVAh parameters – represents *000,000,000,000.* **XXX** kVAh

Parameter Name	Parameter No.	Description
kW Demand	105	• reports the average real energy usage in kW over a defined period
Max. kW Demand	106	• reports the maximum kW Demand since the last Max kW Demand Reset command
kVAR Demand	107	• reports the average reactive energy usage in kVAR over a defined period
Max kVAR Demand	108	• reports the maximum kVAR Demand since the last Max kVAR Demand Reset command
kVA Demand	109	• reports the average reactive energy usage in kVA over a defined period
Max kVA Demand	110	• reports the maximum kVA Demand since the last Max kVA Demand Reset command

Analog Monitor

The E300 relay's Analog I/O Expansion Modules scan up to three analog signals per module. This information can be used to monitor the following analog applications:

- Motor winding and bearing temperatures that are measured by RTD sensors
- Liquid, air, or steam flow
- Temperature
- Weight
- Vessel level
- Potentiometer
- PTC or NTC thermistor sensors

Table 34 - Analog Monitor Parameters

Parameter Name	Parameter No.	Description
Analog Module 1 – Input Channel 00	111	• reports the monitored value of Analog Module 1 – Input Channel 00
Analog Module 1 – Input Channel 01	112	• reports the monitored value of Analog Module 1 – Input Channel 01
Analog Module 1 – Input Channel 02	113	• reports the monitored value of Analog Module 1 – Input Channel 02
Analog Module 1 Status	123	• reports the status of Analog Module 1
Analog Module 2 – Input Channel 00	114	• reports the monitored value of Analog Module 2 – Input Channel 00
Analog Module 2 – Input Channel 01	115	• reports the monitored value of Analog Module 2 – Input Channel 01
Analog Module 2 – Input Channel 02)	116	• reports the monitored value of Analog Module 2 – Input Channel 02
Analog Module 2 Status	124	• reports the status of Analog Module 2
Analog Module 3 – Input Channel 00	117	• reports the monitored value of Analog Module 3 – Input Channel 00
Analog Module 3 – Input Channel 01	118	• reports the monitored value of Analog Module 3 – Input Channel 01
Analog Module 3 – Input Channel 02	119	• reports the monitored value of Analog Module 3 – Input Channel 02
Analog Module 3 Status	125	• reports the status of Analog Module 3
Analog Module 4 – Input Channel 00	120	• reports the monitored value of Analog Module 4 – Input Channel 00
Analog Module 4 – Input Channel 01	121	• reports the monitored value of Analog Module 4 – Input Channel 01
Analog Module 4 – Input Channel 02	122	• reports the monitored value of Analog Module 4 – Input Channel 02
Analog Module 4 Status	126	• reports the status of Analog Module 4

Trip / Warning History

The E300 relay provides a trip and warning history in which the last five trips and last five warnings are recorded into nonvolatile storage. A mask is available to limit which trip and warning events are logged to the history's memory.

Trip History Codes

When the E300 relay issues a trip, the reason for the trip is recorded into the Trip History. Table 35 lists the codes that are available for the trip history records.

Table 35 - Trip History Codes

Trip History Code	Description
0	No Fault Conditions Detected
1	Motor current overload condition
2	Phase current Loss is detected in one of the motor phases
3	Power conductor or motor winding is shorting to ground
4	Motor has not reached full speed by the end of Stall Enable Time
5	Motor current has exceeded the programmed jam trip level
6	Motor current has fallen below normal operating levels
7	Phase to phase current imbalance detected
8	L1Current was below L1 Undercurrent Level longer than Trip Delay
9	L2Current was below L2 Undercurrent Level longer than Trip Delay
10	L3Current was below L3 Undercurrent Level longer than Trip Delay
11	L1 Current was over L1 Overcurrent Level longer than Trip Delay
12	L2 Current was over L2 Overcurrent Level longer than Trip Delay
13	L3 Current was over L3 Overcurrent Level longer than Trip Delay
14	L1 Current Lost for longer than the L1 Loss Trip Delay
15	L2 Current Lost for longer than the L2 Loss Trip Delay
16	L3 Current Lost for longer than the L3 Loss Trip Delay
17	Line to Line Under-Voltage condition detected
18	Line to Line Over-Voltage condition detected
19	Phase to phase voltage imbalance detected
20	The unit detects the supply voltage phases are rotated
21	Line voltage frequency is below trip level
22	Line voltage frequency has exceeded trip level
25	Sensing Module boot loader failed to load firmware
26	Sensing Module output enable open
27	Sensing Module missing interrupts
28	Sensing Module not calibrated
29	Sensing Module frame type failure
30	Sensing Module flash configuration failure
31	Sensing Module detected an overrun error
32	Sensing Module is not responding
33	Total Real Power (kW) is below trip level
34	Total Real Power (kW) has exceeded trip level
35	Under Total Reactive Power Consumed (+kVAR) condition detected
36	Over Total Reactive Power Consumed (+kVAR) condition detected
37	Under Total Reactive Power Generated (-kVAR) condition detected
38	Over Total Reactive Power Generated (-kVAR) condition detected
39	Total Apparent Power (VA or kVA or MVA) is below trip level
40	Total Apparent Power (VA or kVA or MVA) exceeded trip level
41	Under Total Power Factor Lagging (-PF) condition detected
42	Over Total Power Factor Lagging (-PF) condition detected
43	Under Total Power Factor Leading (+PF) condition detected
44	Over Total Power Factor Leading (+PF) condition detected
49	Test trip caused by holding the Test/Reset button for 2 seconds
50	PTC input indicates that the motor stator windings overheated
51	DeviceLogix defined trip was generated
52	The Stop button the Operator Station was pressed
53	Remote trip command detected

Trip History Code	Description
54	Maximum starts per hour exceeded
55	Hardware configuration fault. Check for shorts on input terminal
58	DeviceLogix Feedback Timeout Trip was detected
59	Control Module CAN0 initialization failure
60	Control Module CAN0 bus failure
61	Control Module CAN1 initialization failure
62	Control Module CAN1 bus failure
63	Control Module ADC0 failure
64	Control Module detected too many CRC errors
65	Input Channel 00 on Analog Module 1 exceeded its Trip Level
66	Input Channel 01 on Analog Module 1 exceeded its Trip Level
67	Input Channel 02 on Analog Module 1 exceeded its Trip Level
68	Input Channel 00 on Analog Module 2 exceeded its Trip Level
69	Input Channel 01 on Analog Module 2 exceeded its Trip Level
70	Input Channel 02 on Analog Module 2 exceeded its Trip Level
71	Input Channel 00 on Analog Module 3 exceeded its Trip Level
72	Input Channel 01 on Analog Module 3 exceeded its Trip Level
73	Input Channel 02 on Analog Module 3 exceeded its Trip Level
74	Input Channel 00 on Analog Module 4 exceeded its Trip Level
75	Input Channel 01 on Analog Module 4 exceeded its Trip Level
76	Input Channel 02 on Analog Module 4 exceeded its Trip Level
77	External NVS Chip has detected communication timeout error
78	External NVS Chip has detected a CRC error
79	External NVS Chip has detected data out of range
81	Digital Expansion Module 1 is not operating properly
82	Digital Expansion Module 2 is not operating properly
83	Digital Expansion Module 3 is not operating properly
84	Digital Expansion Module 4 is not operating properly
85	Analog Expansion Module 1 is not operating properly
86	Analog Expansion Module 2 is not operating properly
87	Analog Expansion Module 3 is not operating properly
88	Analog Expansion Module 4 is not operating properly
90	Control Module installed does not match the expected type
91	Sensing Module installed does not match the expected type
92	Comms Module installed does not match the expected type
93	Operator Station installed does not match expected type
94	Digital Module installed does not match the expected type
95	Analog Module installed does not match the expected type
96	Test Mode is engaged and current/voltage was detected
97	Heap memory could not be allocated
98	Vendor ID hardware fault

Trip History Parameters

Table 36 - Trip History Parameters

Parameter Name	Parameter No.	Description
Trip History 0	127	• reports the most recent trip event
Trip History 1	128	• reports the second most recent trip event
Trip History 2	129	• reports the third most recent trip event
Trip History 3	130	• reports the fourth most recent trip event
Trip History 4	131	• reports the fifth most recent trip event
Trip History Mask	You can decide which trip events are recorded into the E300 relay's trip history by using the Trip History Masks	
Current Trip History Mask	139	• allows you to select which current-based trip events are recorded in the trip history
Voltage Trip History Mask	140	• allows you to select which voltage-based trip events are recorded in the trip history
Power Trip History Mask	141	• allows you to select which power-based trip events are recorded in the trip history
Control Trip History Mask	142	• allows you to select which control-based trip events are recorded in the trip history
Analog Trip History Mask	143	• allows you to select which analog-based trip events are recorded in the trip history

Warning History

When the E300 relay issues a warning, the reason for the warning is recorded into the Warning History. Table 37 lists the codes that are available for the warning history records.

Table 37 - Warning History Codes

Warning History Code	Description
0	No Warning Conditions Detected
1	Approaching a motor current overload condition
3	Power conductor or motor winding is shorting to ground
5	Motor current has exceeded the programmed jam warning level
6	Motor current has fallen below normal operating levels
7	Phase to phase current imbalance detected
8	L1 Current was below L1 Undercurrent Warning Level
9	L2 Current was below L2 Undercurrent Warning Level
10	L3 Current was below L3 Undercurrent Warning Level
11	L1 Current was over L1 Overcurrent Warning Level
12	L2 Current was over L2 Overcurrent Warning Level
13	L3 Current was over L3 Overcurrent Warning Level
14	L1 Current Lost for longer than the L1 Loss Trip Delay
15	L2 Current Lost for longer than the L2 Loss Trip Delay
16	L3 Current Lost for longer than the L3 Loss Trip Delay
17	Line to Line Under-Voltage condition detected
18	Line to Line Over-Voltage condition detected
19	Phase to phase voltage imbalance detected
20	The unit detects the supply voltage phases are rotated
21	Line voltage frequency is below the warning level
22	Line voltage frequency has exceeded warning level
33	Total Real Power (kW) is below warning level
34	Total Real Power (kW) has exceeded warning level
35	Under Reactive Power Consumed (+kVAR) condition detected
36	Over Reactive Power Consumed (+kVAR) condition detected
37	Under Reactive Power Generated (-kVAR) condition detected

Warning History Code	Description
38	Over Reactive Power Generated (-kVAR) condition detected
39	Total Apparent Power (kVA) is below warning level
40	Total Apparent Power (kVA) exceeded warning level
41	Under Total Power Factor Lagging (-PF) condition detected
42	Over Total Power Factor Lagging (-PF) condition detected
43	Under Total Power Factor Leading (+PF) condition detected
44	Over Total Power Factor Leading (+PF) condition detected
50	PTC input indicates that the motor stator windings overheated
51	DeviceLogix defined warning was generated
56	Invalid parameter config. See parameters 38-39 for details
58	DeviceLogix Feedback Timeout Trip was detected
60	Number of Starts Warning Level Exceeded
61	Operating Hours Warning Level Exceeded
65	Input Channel 00 on Analog Module 1 exceeded its Warning Level
66	Input Channel 01 on Analog Module 1 exceeded its Warning Level
67	Input Channel 02 on Analog Module 1 exceeded its Warning Level
68	Input Channel 00 on Analog Module 2 exceeded its Warning Level
69	Input Channel 01 on Analog Module 2 exceeded its Warning Level
70	Input Channel 02 on Analog Module 2 exceeded its Warning Level
71	Input Channel 00 on Analog Module 3 exceeded its Warning Level
72	Input Channel 01 on Analog Module 3 exceeded its Warning Level
73	Input Channel 02 on Analog Module 3 exceeded its Warning Level
74	Input Channel 00 on Analog Module 4 exceeded its Warning Level
75	Input Channel 01 on Analog Module 4 exceeded its Warning Level
76	Input Channel 02 on Analog Module 4 exceeded its Warning Level
81	Digital Expansion Module 1 is not operating properly
82	Digital Expansion Module 2 is not operating properly
83	Digital Expansion Module 3 is not operating properly
84	Digital Expansion Module 4 is not operating properly
85	Analog Expansion Module 1 is not operating properly
86	Analog Expansion Module 2 is not operating properly
87	Analog Expansion Module 3 is not operating properly
88	Analog Expansion Module 4 is not operating properly
90	Control Module installed does not match the expected type
91	Sensing Module installed does not match the expected type
92	Comms Module installed does not match the expected type
93	Operator Station installed does not match expected type
94	Digital Module installed does not match the expected type
95	Analog Module installed does not match the expected type
98	A hardware fault condition was detected

Warning History Parameters

Table 38 - Warning History Parameters

Parameter Name	Parameter No.	Description
Warning History 0	133	• reports the most recent warning event
Warning History 1	134	• reports the second most recent warning event
Warning History 2	135	• reports the third most recent warning event
Warning History 3	136	• reports the fourth most recent warning event
Warning History 4	137	• reports the fifth most recent warning event
Warning History Mask	You can decide which warning events are recorded into the E300 relay's warning history by using the Warning History Masks	
Current Warning History Mask	145	• allows you to select which current-based warning events are recorded in the warning history
Voltage Warning History Mask	146	• allows you to select which voltage-based warning events are recorded in the warning history
Power Warning History Mask	147	• allows you to select which power-based warning events are recorded in the warning history
Control Warning History Mask	148	• allows you to select which control-based warning events are recorded in the warning history
Analog Warning History Mask	149	• allows you to select which control-based warning events are recorded in the warning history

Trip Snapshot

The trip snapshot populates the seven parameters within it, to offer some insight into the reason for the trip. This information is available until the unit trips/is tripped again, at which time it is overwritten. This includes doing a test trip.

Table 39 - Trip Snapshot Parameters

Parameter Name	Parameter No.	Description
Trip Snapshot L1-L2 Voltage	156	• reports the voltage in volts in reference to the T1 and T2 power terminals of the E300 relay Sensing Module at the time of the most recent trip event
Trip Snapshot L2-L3 Voltage	157	• reports the voltage in volts in reference to the T2 and T3 power terminals of the E300 relay Sensing Module at the time of the most recent trip event
Trip Snapshot L3-L1 Voltage	158	• reports the voltage in volts in reference to the T3 and T1 power terminals of the E300 relay Sensing Module at the time of the most recent trip event
Trip Snapshot Total Real Power	159	• reports the total real power of the monitored power conductors in kW at the time of the most recent trip event
Trip Snapshot Total Reactive Power	160	• reports the total Reactive power of the monitored power conductors in kVAR at the time of the most recent trip event
Trip Snapshot Total Apparent Power	161	• reports the total apparent power of the monitored power conductors in kVA at the time of the most recent trip event
Trip Snapshot Total Power Factor	162	• reports the total power factor of the monitored power conductors in percentage at the time of the most recent trip event

DeviceLogix™ Functionality

The E300™ Electronic Overload Relay with firmware v5.000 and higher supports DeviceLogix functionality, which is a logic engine that resides within the E300 relay. You can select one of the preprogrammed DeviceLogix programs (see Operating Modes on page 53) embedded in the E300 relay, or you can create a custom program in function block or ladder logic. You can use the E300 Add-on Profile in Studio 5000 software or RSNetWorx™ for DeviceNet™ software to program the device.

IMPORTANT	A DeviceLogix program only runs if the logic has been enabled, which can be done with E300 Add-on Profile in Studio 5000, RSNetWorx for DeviceNet, Connected Component Workbench software, or the DeviceNet Configuration Terminal (Cat. No. 193-DNCT).

Output Relay Overrides

You can use DeviceLogix functionality to provide specific output relay performance under specific communication or network conditions. You can use the following parameters to allow a DeviceLogix program to override the E300 output relay configuration states controlled by the Communication Fault Modes and Communication Idle Modes (see Output Relay Configuration States on page 36).

Table 40 - Output Relay Override Parameters

Parameter Name	Parameter No.	Description
Communication Fault & Idle Override	346	• defines whether or not DeviceLogix functionality controls the E300 output relays when either a communication fault (missing I/O connection) or communication idle (network scanner or programmable logic controller is not in Run mode) condition exists – If DeviceLogix functionality is enabled but Communication Fault & Idle Override is disabled, the operation of the E300 output relays is controlled by the Communication Fault Mode and Communication Idle Mode parameters if a communication fault or communication idle condition occurs. – If DeviceLogix functionality and Communication Fault & Idle Override are both enabled, the E300 outputs relays are controlled by the DeviceLogix program regardless of the Communication Fault Mode or Communication Idle Mode. – If DeviceLogix functionality is not enabled, the E300 output relays are controlled by the Communication Fault Mode or Communication Idle Mode parameters if a communication fault or communication idle condition occurs – regardless of the override configuration of the Communication Fault & Idle Override parameter. – If DeviceLogix functionality is transitioned from enable to disable, the E300 output relays immediately go to the appropriate Communication Fault Mode or Communication Idle Mode.
Network Fault Override	347	• defines whether or not DeviceLogix functionality controls the E300 output relays when either a duplicate node address is detected or a network bus off condition exists – If DeviceLogix functionality is enabled but Network Fault is disabled, the operation of the E300 output relays is controlled by the Communication Fault Mode parameters if a network fault condition occurs. – If DeviceLogix functionality and Network Fault are both enabled, the E300 outputs relays are controlled by the DeviceLogix program regardless of the Communication Fault Mode. – If DeviceLogix functionality is not enabled, the E300 output relays are controlled by the Communication Fault Mode parameters if a network fault condition occurs – regardless of the Network Fault Override configuration. – If DeviceLogix functionality is transitioned from enable to disable, the E300 output relays immediately go to the appropriate Communication Fault Mode.

DeviceLogix Programming

DeviceLogix functionality has many applications and the implementation is only limited to the imagination of the programmer. Remember that the application of DeviceLogix functionality is only designed to handle simple logic routines. Program DeviceLogix functionality by using simple Boolean math operators (such as AND, OR, NOT), timers, counters, and latches. Decision making is made by combining these Boolean operations with any of the available I/O. The inputs and outputs used to interface with the logic can come from the network or from the E300 digital inputs and output relays. There are many reasons to use the DeviceLogix functionality, but some of the most common are listed below:

- Increased system reliability
- Improved diagnostics and reduced troubleshooting
- Operation independent of PLC or Network status
- Continue to run process in the event of network interruptions
- Critical operations can be safely shut down through local logic

See publication RA-UM003 for more information about the capabilities of DeviceLogix functionality and how to use the DeviceLogix program editor[1]

(1) DeviceLogix programs have a maximum limit of 100 instructions.

Chapter 9

EtherNet/IP Communication

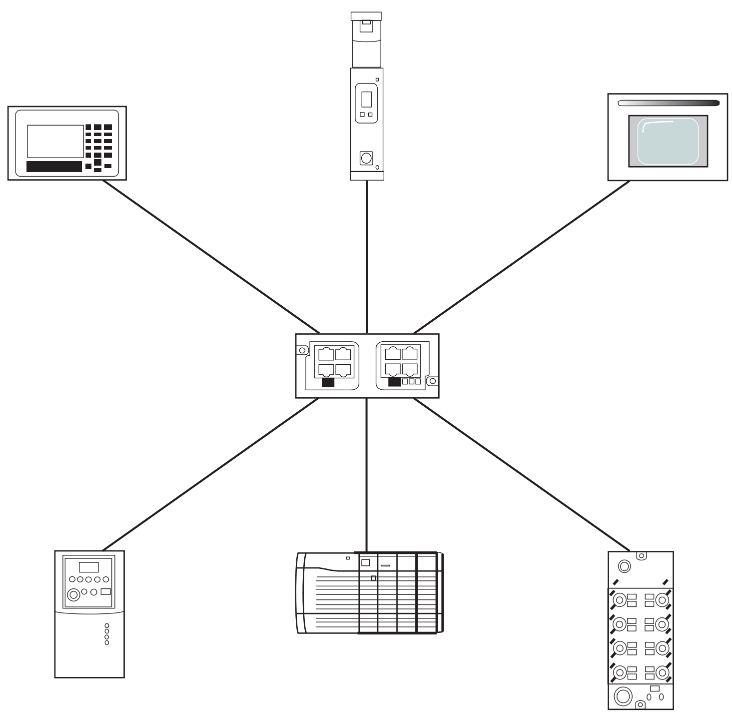
This chapter provides the necessary instructions to successfully connect the E300™ Electronic Overload Relay EtherNet/IP Communication Module (Catalog Number 193-ECM-ETR) to an Ethernet network and configure it to communicate to an EtherNet/IP scanner such as an Allen-Bradley Logix controller.

Network Design

The E300 relay EtherNet/IP Communication Module has dual Ethernet ports that function as an Ethernet switch with RJ45 ports to connect Ethernet cable CAT5 type or better to. Rockwell Automation offers a wide variety of Allen-Bradley Ethernet patch cables with its Bulletin 1585 line of Ethernet cables (http://ab.rockwellautomation.com/Connection-Devices/RJ45-Network-Media).

The E300 relay EtherNet/IP Communication Module supports a Star, Linear, and Ring Ethernet topology. Figure 79 shows an example of a Star Ethernet Topology, in which all Ethernet nodes wire back to a central Ethernet switch, hub, or router.

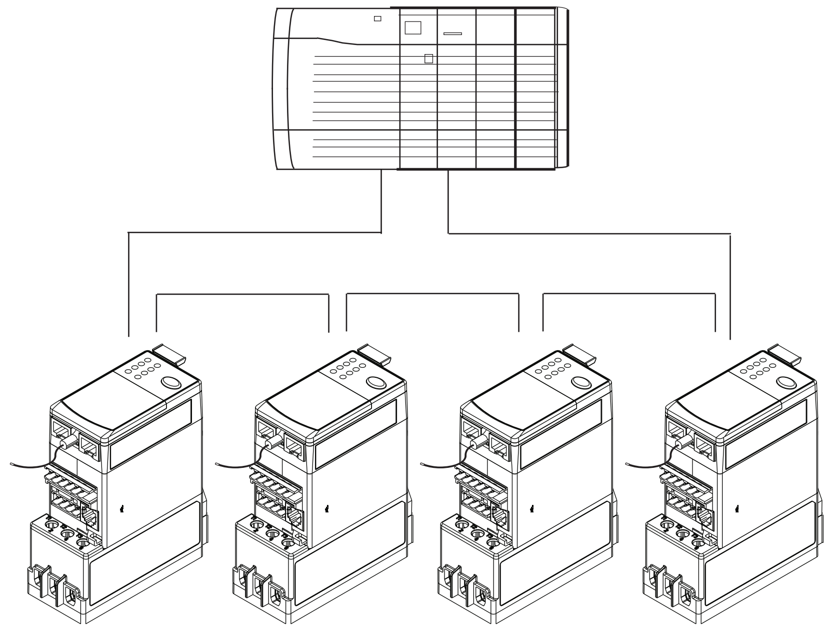
Figure 79 - Star Ethernet Topology



Rockwell Automation also offers a line of managed and unmanaged Allen-Bradley Ethernet Switches with its Stratix family of Ethernet switches. See http://ab.rockwellautomation.com/Networks-and-Communication/Ethernet-IP-Infrastructure for more information.

The E300 relay EtherNet/IP Communication Module also supports an Ethernet Ring topology in which all Ethernet nodes are wired in series with one another until a complete network ring is made as shown in Figure 80. The E300 relay EtherNet/IP Communication Module supports Rockwell Automation's Device Level Ring (DLR) topology as a slave device in which the EtherNet/IP network continues to communicate if one of the network chains is disrupted.

Figure 80 - Ring Ethernet Topology



For information on Ethernet basics, including the following features, see Ethernet Design Considerations Reference Manual, publication ENET-RM002.

- Set network parameters
- DNS addressing
- Duplicate IP address detection

Set the IP Address

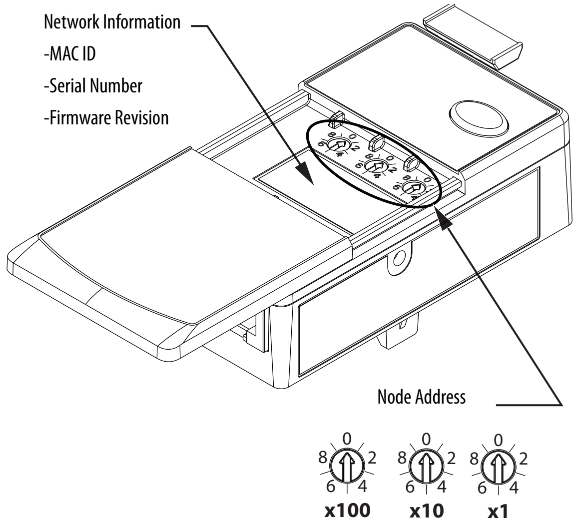
The E300 relay EtherNet/IP Communication Module ships with DHCP enabled. You can set the network Internet Protocol (IP) address by using:

- The EtherNet/IP node address selection switches
- A Bootstrap Protocol (BOOTP)/Dynamic Host Configuration Protocol (DHCP) server (for example, the Rockwell Automation BOOTP-DHCP Server Utility, which is included with Rockwell Software's RSLinx Classic software)
- A web browser and MAC scanner software

EtherNet/IP Node Address Selection Switches

The E300 relay EtherNet/IP Communication Module comes with three node address selection switches that allow you to select the last octet for the IP address 192.168.1.xxx.

Figure 81 - E300 Relay Node Addressing



Node Address	Function
001 - 254	Set IP Address to 192.168.1.xxx
255 - 887 889 - 999	Set IP Address via DHCP or use static IP Address
888	Reset to factory defaults
000	Administration mode

EXAMPLE When the left dial is set to 1, the middle dial is set to 2, and the right dial is set to 3, the resulting IP address is: 192.168.1.123.

When the node address selection switches are set to a value greater than 255 (excluding 888), the IP address is set to DHCP Enabled or programmed for a static IP address.A power cycle is required for any selection changes to take effect.

Assign Network Parameters via the BOOTP/ DHCP Utility

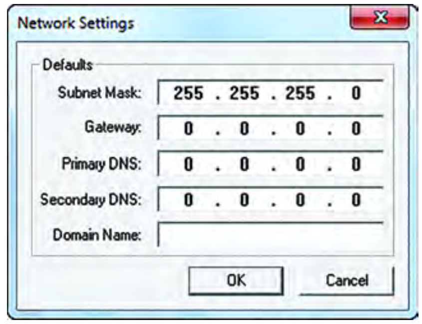
By default, the E300 relay EtherNet/IP Communication Module is DHCP Enabled. The BOOTP/DHCP utility is a standalone program that is located in the BOOTPDHCP Server folder accessed from the Start menu.

IMPORTANT Before starting the BOOTP/DHCP utility, make sure you have the hardware MAC ID of the module, which is printed on the front of the E300 relay EtherNet/IP Communication Module. The MAC ID has a format similar to: 00-0b-db-14-55-35.

This utility recognizes DHCP-enabled devices and provides an interface to configure a static IP address for each device. To assign network parameters via the BOOTP/ DHCP utility, perform this procedure:

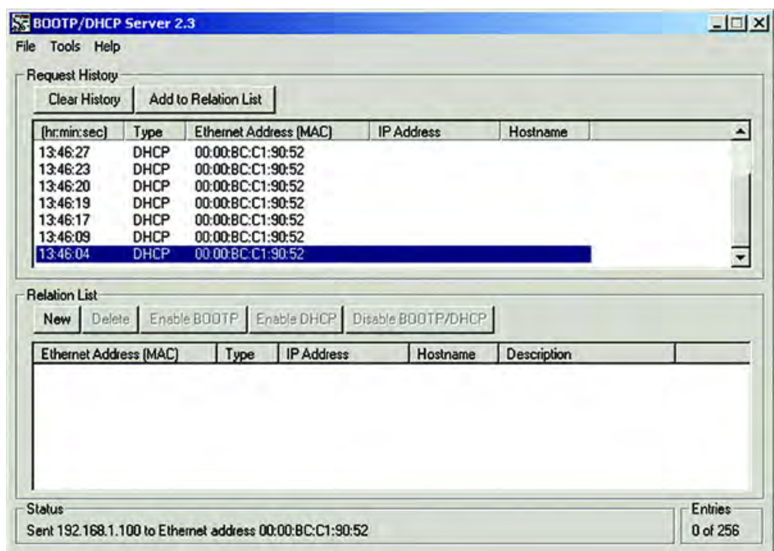
1. Execute the BOOTP/DHCP software.
2. Choose Tool >Network Settings.

3. If appropriate for the network, type the subnet mask, gateway address, primary/secondary server addresses, and domain name in their respective fields.

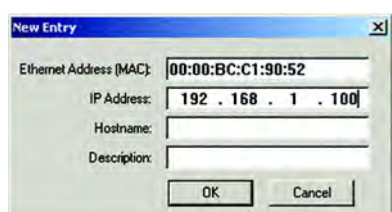


4. Click OK.
   The Request History panel displays the hardware addresses of modules issuing BOOTP or DHCP requests.
5. Double-click the MAC address of the module to be configured.

NOTE: The MAC address is printed underneath the sliding front cover of the E300 relay EtherNet/IP Communication Module. The format of the hardware address resembles: 00-0b-db-14-55-35



The New Entry window appears with the module's Ethernet Address (MAC).



6. Type the IP address, host name, and a module description.
7. Click OK.
8. Cycle power to the E300 relay EtherNet/IP Communication Module.
9. To permanently assign this configuration to the module: Select the module in the Relation List panel and click Disable BOOTP/DHCP.

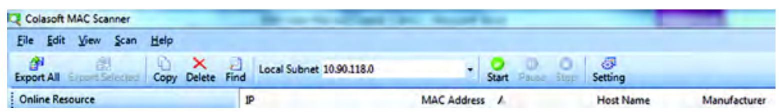
When module power is cycled, it uses the assigned configuration and does not issue a DHCP request.

If you do not click Disable BOOTP/DHCP, on a power cycle, the module clears the current IP configuration and again begins sending DHCP requests.

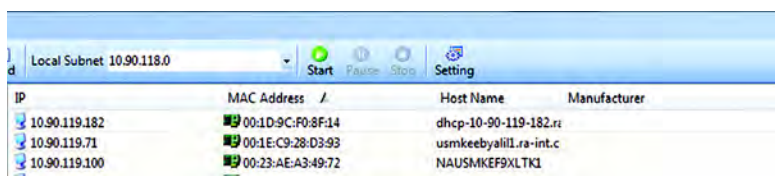
Assign Network Parameters Via a Web Browser and MAC Scanner Software

If you do not have access to a DHCP software utility, you can assign network parameters via a web browser (for example, Microsoft® Internet Explorer) and Media Access Control (MAC) scanner software (for example, MAC Scanner from Colasoft® - http://www.colasoft.com/). Follow these steps to configure the module using this method.

1. Locate and identify the MAC ID printed on the label of the E300 relay EtherNet/IP Communication Module. This address has a format that is similar to: 00-0b-db-14-55-35
2. Connect the E300 relay EtherNet/IP Communication Module to the same wide area network (WAN) as your personal computer.
3. Initiate the MAC scanner software.
4. Select the appropriate subnet to scan for available MAC addresses.



5. Scan the Subnet for all available MAC addresses



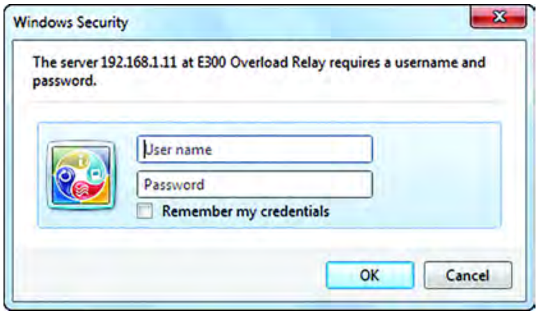
6. Identify the IP address assigned to the MAC ID of the E300 relay EtherNet/IP Communication Module. The IP address has a format that is similar to 192.168.0.100.

Web Server

As a security precaution, the embedded web server of the E300 relay EtherNet/IP Communication Module is disabled by default. To temporarily enable the web server or to make it permanently available, you must enter into Administration Mode. To do this, set the rotary dials that are located underneath the front cover of the E300 relay EtherNet/IP Communication Module to 000 and cycle power. The device then goes online with the IP Address used at the time of the previous startup.

Web Server Security and System Password

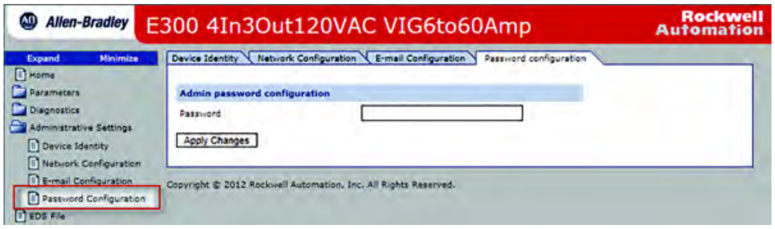
The E300 EtherNet/IP Communication Module's web server allows you to view any diagnostic and parameter information. Security measures are built into the web server to deter a malicious user from making any unwanted EtherNet/IP system changes and E300 configuration parameter edits. When you attempt to make an EtherNet/IP system change or E300 configuration parameter edit, you are prompted to enter a user name and password.



Field	Firmware Revision 1.003 and Earlier Default (case sensitive)	Firmware Revision 1.004 and Later Default (case sensitive)
User name	Administrator	Administrator
Password	<blank>	<serial number of EtherNet/IP communication module>

You can find the module serial number on the label of the EtherNet/IP communication module.

We recommend that you change the password for user name **Administrator**. you can change the password on the password configuration web page.



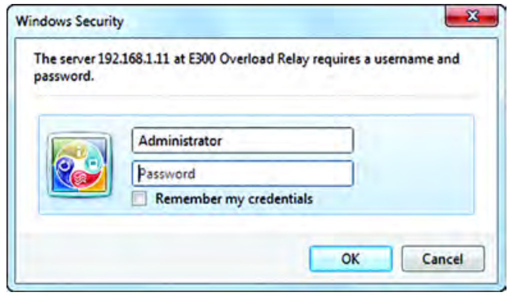
Reset the System Password

If you forget or misplace the password for user name **Administrator**, you can restore the password to the factory default value by turning the rotary dials on the E300 EtherNet/IP Communication Module to 8-8-8 and cycling power. This resets all EtherNet/IP communication settings and E300 configuration parameters back to the factory default values.

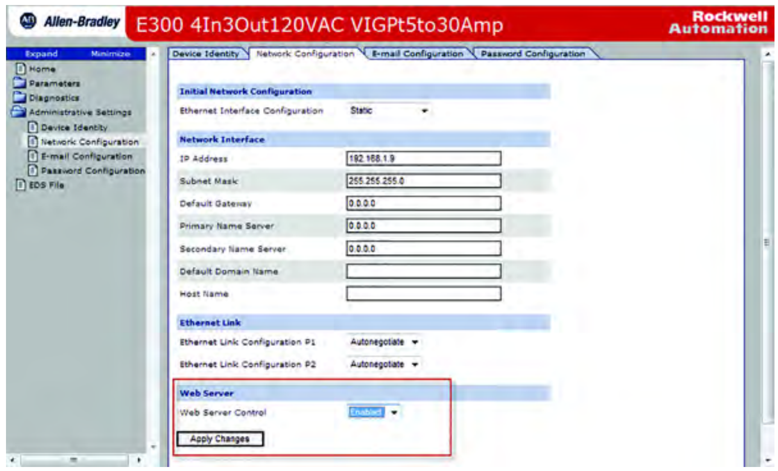
Permanently Enable the Web Server

In Administrative Mode, you can change any configuration parameter of the E300 relay, including permanently enabling the embedded web server, by following these steps:

1. Enter Administrative Mode by turning the rotary dials to 000 and cycle power on the E300 relay.
2. Access the web page.
3. Navigate to Administrative Settings->Network Configuration.
4. You are prompted for a user name and password. Enter "Administrator" for the user name, and enter the appropriate password.



5. Enable the Web Server Control and press Apply Changes.



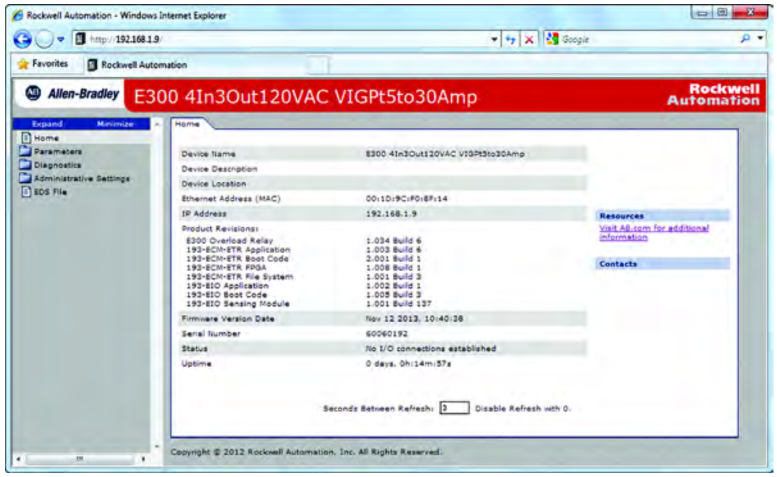
View and Configure Parameters via the Web Server

The web server in the E300 relay EtherNet/IP Communication Module, when enabled, can view and configure parameters for the E300 relay. You can use the web interface to edit parameters for E300 relay if it is not being scanned by an EtherNet/IP scanner.

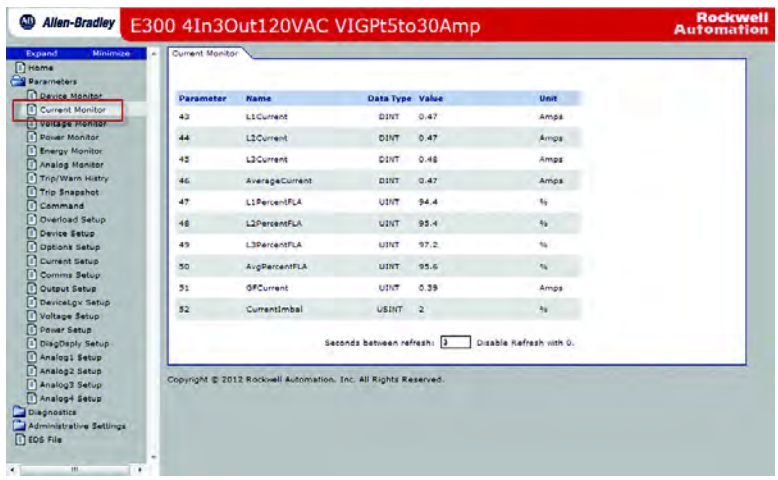
View Parameters

Follow the steps below to view parameters using the web interface of the E300 relay EtherNet/IP Communication Module.

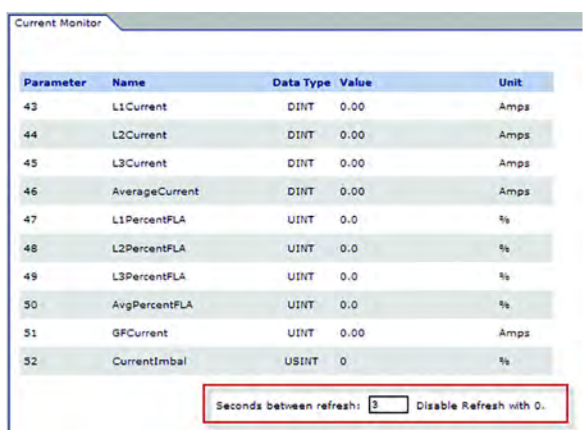
1. Using a web browser, open the web page of the E300 relay EtherNet/IP Communication Module by typing its IP address for the URL.



2. Navigate to the Parameters folder and select a parameter group. The example below shows the information from the Current Monitoring parameters.



3. To increase the update rate of the data being viewed, enter a faster update time in the refresh rate box shown below:

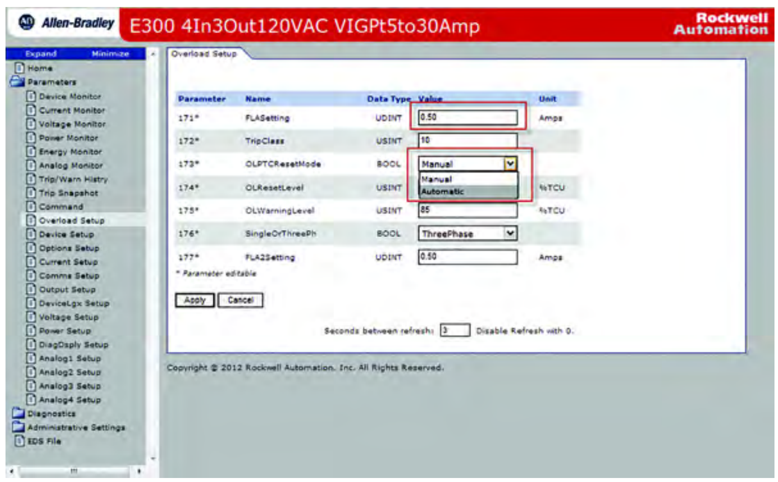


4. E300 relay EtherNet/IP Communication Module web page displays up to 17 parameters per web page. If more than 17 parameters exist for a parameter group, use the navigation arrows to display the other parameters.

Edit Parameters

Follow the steps below to edit configuration parameters using the web interface of the E300 relay EtherNet/IP Communication Module.

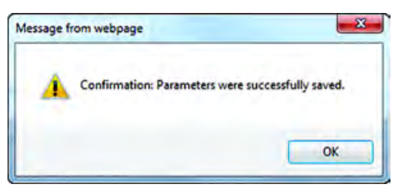
1. Select a parameter group that contains programmable parameters, then click the Edit button. The value options appears.



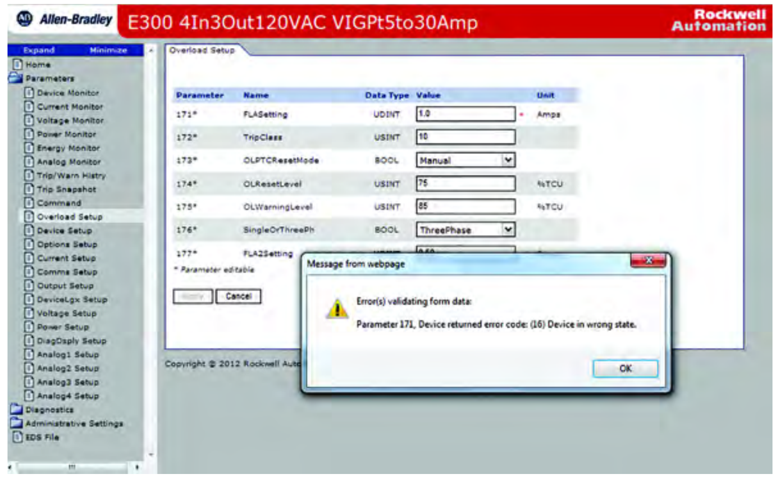
2. Click the down arrow on the pull-down boxes to adjust fixed values and/or enter numerical values in the fields without an arrow to adjust the values.

3. Click Apply once all parameter edits have been completed. The E300 relay EtherNet/IP Communication Module downloads the new parameter values to the device.

4. A confirmation window appears. Press OK.



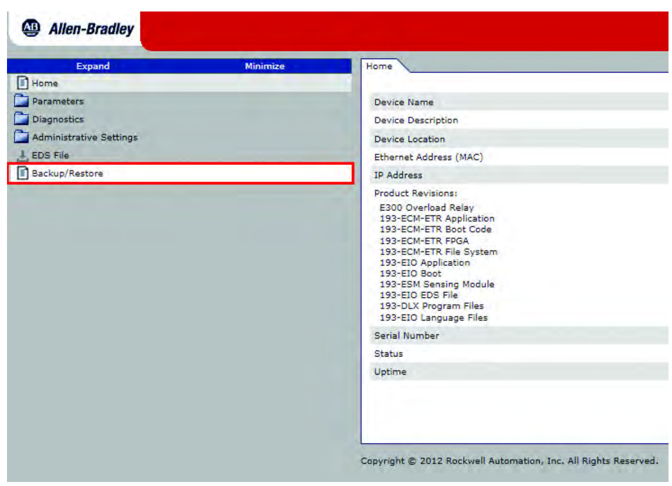
NOTE: If you attempt to edit a configuration parameter when a Class 1 EtherNet/IP connection exists between an EtherNet/IP scanner and the E300 relay EtherNet/IP Communication Module, a message similar to the one shown below appears when the Apply button is pressed.



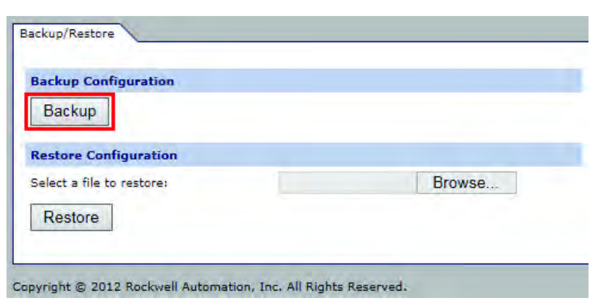
Back up/Restore Parameters

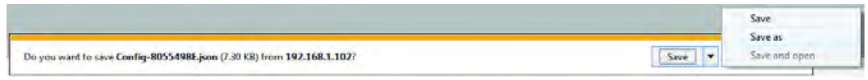
With an E300 Series B Control Module and v7.xxx firmware installed, you have the option to back up or restore the device configuration parameters through the E300 web server interface. (Note: the backup/restore feature does not include any administrative parameters or DeviceLogix programming). To use this feature, perform the following steps:

1. Navigate to the target E300 device web server and select the Backup/Restore option along the left-hand menu.

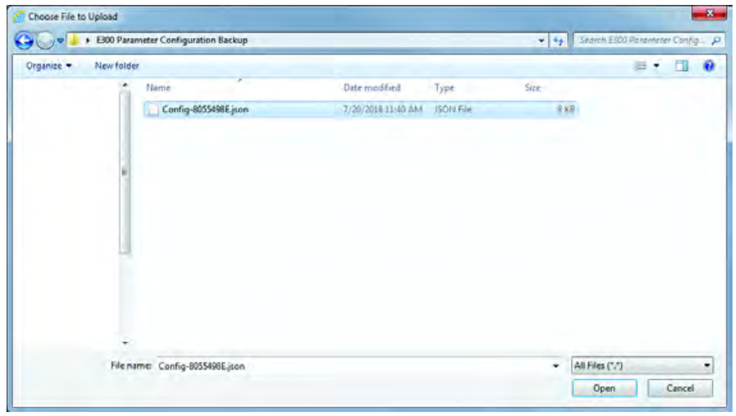


2. To back up the current E300 parameter configuration: select Backup. The Backup process completes in a few seconds and the web server then prompts you to save the corresponding *.JSON configuration file.





3. To restore a previous E300 parameter configuration: Browse to a valid E300 parameter configuration *.JSON file. Select Restore. The restoration process completes in a few seconds.



Integration with Logix-based Controllers

The E300 relay EtherNet/IP Communication Module supports two types of EtherNet/IP communication.

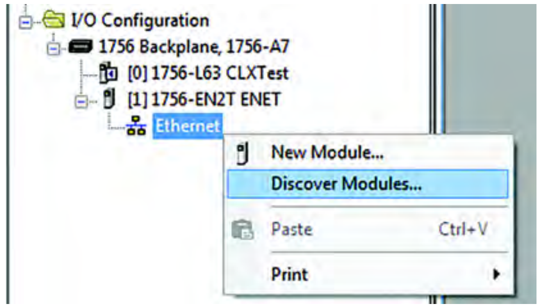
- I/O data - Used for deterministic, data control with Logix-based controllers. I/O tags are automatically assigned when you configure the E300 relay in a Logix project. The E300 relay also supports Automatic Device Configuration, in which the Logix-based controller manages device configuration parameters.
- Message (MSG) instructions - Used for non-deterministic data that is not critical for control. Use MSG instructions read and write data and have a lower priority than I/O data. For information on MSG instructions, see Logix5000 Controllers Messages Programming Manual, 1756-PM012.

Configure an E300 Relay in a Logix Project

Use the Studio 5000 Logix Designer application to configure an E300 relay in a Logix project. Download and install the Add-on Profile. Download firmware, associated files (such as AOP, DTM, and EDS), and access product release notes from only the Product Compatibility and Download Center at http://www.rockwellautomation.com/rockwellautomation/support/pcdc.page

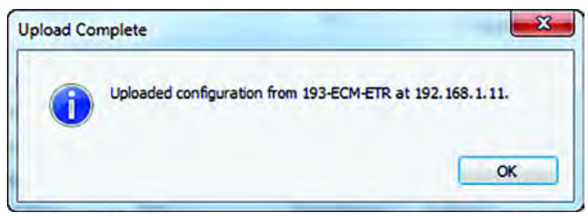
1. Go Online with the controller.

2. Right click on the Ethernet tree and select either Discover Modules or New Module.



Option	Description
Discover Modules	Module discovery identifies the available devices on the specific EtherNet/IP network. 1. Select the preconfigured E300 relay that is on the EtherNet/IP network 2. Click Create 3. Upload the configuration data
New Module	New module lets you manually add a E300 relay offline to a Logix project. 1. Search for an E300 relay 2. Click Create 3. Enter a name for the E300 relay 4. Upload the configuration data 5. Select the preconfigured E300 relay that is on the EtherNet/IP network

If the upload is successful, a display appears indicating the success of this command. Press OK to continue.

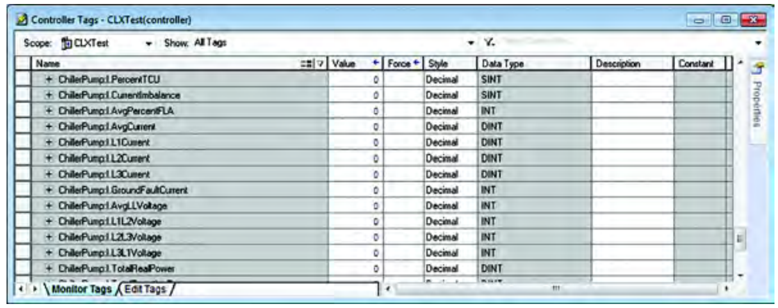


If the upload is not successful due to communication errors, a display appears indicating that there was an upload error and the device uses default settings. Click OK to continue. Identify and fix the reason for the communication error and press Upload again, or press Cancel to remove any module definition changes.

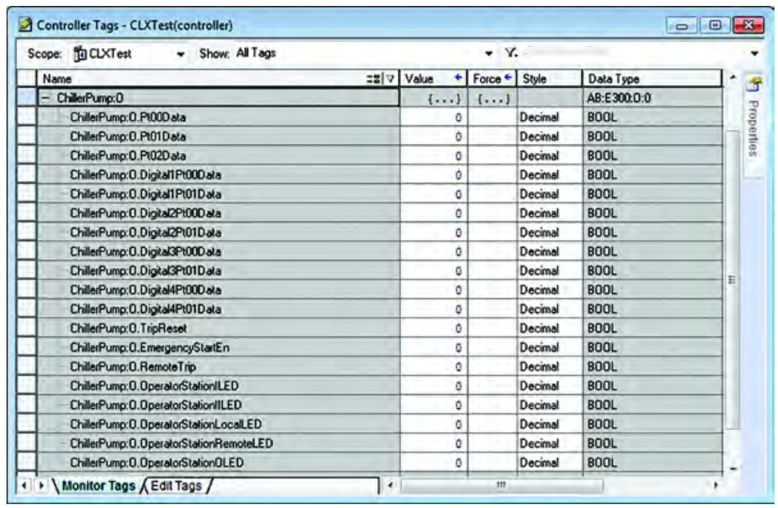
If the upload is not successful due to an E300 configuration trip, a display appears indicating that the profile is using its existing settings. Click OK to continue. Read parameters 38 and 39 from the E300 relay to determine the reason for the configuration trip. Fix the issue and press Upload again, or press Cancel to remove any module definition changes.

Access I/O Data

To access the data provided by the E300 relay EtherNet/IP Communication Module, navigate to the input tags.



To control the output relays or issue a remote reset command to the E300 relay, navigate to the output tags.



E-mail/Text

The E300 relay EtherNet/IP Communication Module can send e-mail messages and text notifications for different trip and warning events using a Simple Mail Transfer Protocol (SMTP) server.

The subject and body contents in the e-mail message is created from the:

- Type of trip or warning that is detected
- Device name
- Device description
- Device location
- Contact information

EXAMPLE	*E-mail Subject:* E300 Overload Relay has detected a fault *E-mail Body:* Fault Status: Device Name: E300 Overload Relay Device Description: Motor Starters Device Location: Bay 6-U29 Contact Info: Contact Person contactperson@thecontact.com

The first word in the e-mail subject is the device name. If a device name is not configured, then the product name attribute from the identity object is used.

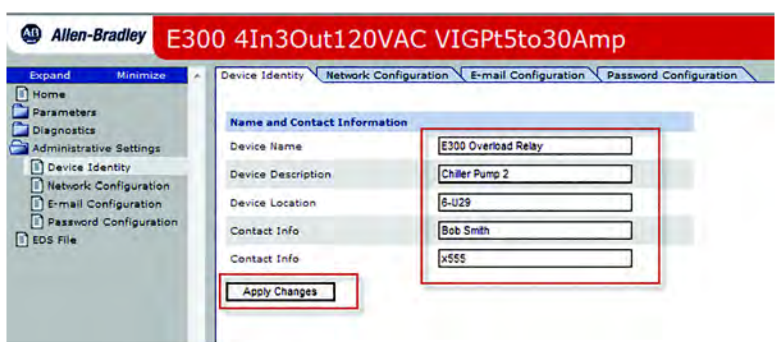
E-mail Configuration

To be able to send an e-mail, you must configure the IP address of the host name of a Simple Mail Transfer Protocol (SMTP) server and select notifications. Follow these steps to configure an e-mail notification.

1. In the web browser, enter the IP address of the E300 relay EtherNet/IP Communication Module URL of the web browser.

2. Select Administrative Settings>Device Identity

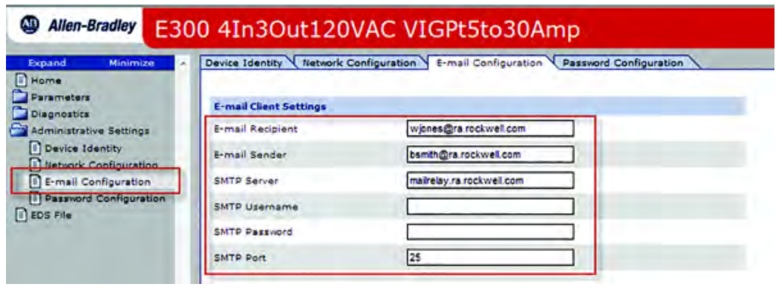
3. Type the Device Identity information into the fields as described below and press Apply.



Device Name	The name of the E300 relay.
Device Description	The description of the E300 relay.
Device Location	The location of the E300 relay.
Contact Information	The contact information for the E300 relay.

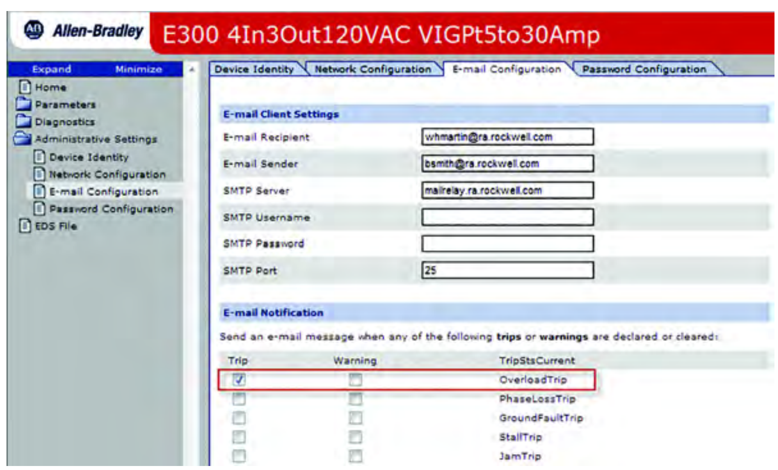
4. Select Administrative Settings>E-Mail Configuration

5. Type the information into the e-mail notification fields as stated below. Multiple e-mail addresses can be entered into the E-mail Recipient field by separating each e-mail address with a semicolon (;). The E-mail Recipient field is limited to 255 characters.

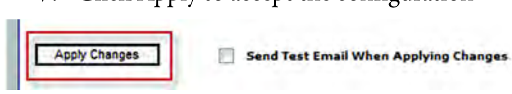


E-mail Recipient	The e-mail address of the person who receives the notifications.
E-Mail Sender	The e-mail address from which the notification is sent.
SMTP Server	Consult with the network administrator for the SMTP server address.
SMTP Username	Consult with the network administrator for the SMTP username.
SMTP Password	Consult with the network administrator for the SMTP password.
SMTP Port	Consult with the network administrator which SMTP port number to use. Port 25 is the most common SMTP port.

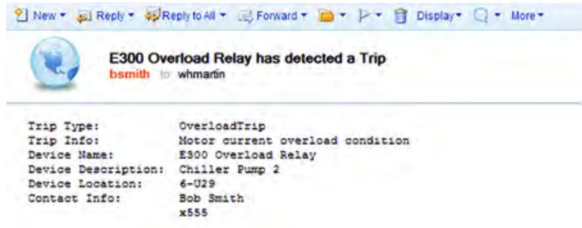
6. Check the desired notification time, fault conditions, and local conditions to be included in notification e-mails to the recipient. You can change these after the initial configurations.



7. Click Apply to accept the configuration



8. When an E300 relay event occurs, the e-mail message looks like the following:



Text Notifications

The E300 relay EtherNet/IP Communication Module can send a text message to a wireless phone by e-mailing the wireless phone's service provider. The format for the text message is provided by the service provider and looks similar to the example formats below.

- AT&T™: 10-digit wireless phone number@txt.att.net
- Sprint®: 10-digit wireless phone number@messaging.sprint.pcs.com

Limitations

Based on the functionality of the E300 relay EtherNet/IP Communication Module, there are some limitations on when the e-mails can be triggered.

- If two events occur at the same time, an e-mail is only sent for the most significant error.
- If the device has been configured to send an e-mail for a lower prioritized event and this event occurs at the same time as a higher prioritized event for which the device has not been programmed to send an e-mail, an e-mail is not sent for either event.
- The Clear e-mail is only sent when all events have been cleared and an event e-mail has previously been sent.

Notes:

DeviceNet Communication

This chapter provides the necessary instructions to connect the E300 Electronic Overload Relay DeviceNet Communication Module (Catalog Number 193-ECM-DNT) to a DeviceNet network and configure it to communicate to a DeviceNet master node such as an Allen-Bradley® 1756-DNB module.

The following recommendations are intended to deliver smooth startup and operation.

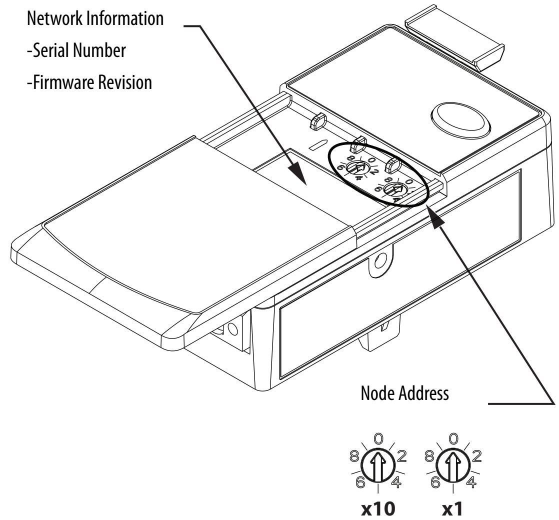
- Use the node commissioning tool in RSNetWorx™ when you modify the E300 Overload Relay node address.
- Verify that you have the most current configuration information before you save a RSNetWorx configuration file.
- If you intend to use the automatic device recovery (ADR) function of the DeviceNet scanner, verify that the device configuration is correct before saving it to memory.
- The "Restore Device Defaults" button in RSNetWorx resets the E300 Overload Relay node address setting to 63.

DeviceNet Node Commissioning

E300 Overload Relays are shipped with a default hardware node address (MAC ID) setting of 9-9 (node address 63) and the data rate set to Autobaud. Each device on a DeviceNet network must have a unique node address, which can be set to a value from 0 to 63. Most DeviceNet systems use address 0 for the master device (Scanner). Leave node address 63 vacant for introduction of new slave devices. You can change the node address and data rate for E300 Overload Relays by using software or by setting the hardware switches that are on the front of each unit. While both methods yield the same result, it is a good practice to choose one method and use it consistently throughout the system.

Setting the Hardware Switches

Figure 82 - E300 Overload Relay DeviceNet Node Addressing



Node Address	Function	Node Address	Function
00…63	Set node address to xx	88	Reset to factory defaults
64…76 78…98	Software sets node address	77	Administration mode

For example, when the left dial is set to 0 and the right dial is set to 1, the resulting DeviceNet node address is: 01.

For node address switch values in the range of 0 to 63, cycle power to the E300 Overload Relay to initialize the new setting.

Using RSNetWorx for DeviceNet

Follow these additional steps for node address switch settings in the range of 64…76 and 78…98. To begin the configuration of an E300 Overload Relay using software, execute the RSNetWorx software and complete the following procedure. You must use RSNetWorx for DeviceNet Revision 27.00.00 or later.

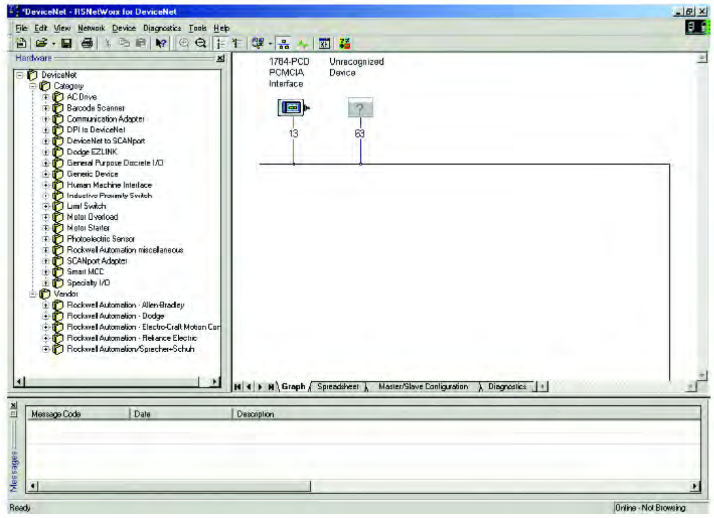
Recognizing the E300 Overload Relay Online

1. Launch the RSNetWorx software, then select Online from the Network pull-down menu.
2. Select the appropriate DeviceNet personal computer interface, then click OK.

TIP You must configure the E300 DeviceNet drivers using RSLinx before they available to RSNetWorx

3. If the RSNetWorx software gives notification to upload or download devices before viewing configuration, click OK to upload or download these devices.
4. RSNetWorx now browses the network and displays all nodes it has detected on the network. For some versions of RSNetWorx software, the E300 Overload Relay EDS files may not be included. In this event, the device is identified as an "Unrecognized Device".

If the screen appears as shown, continue with Building and Registering an EDS File.



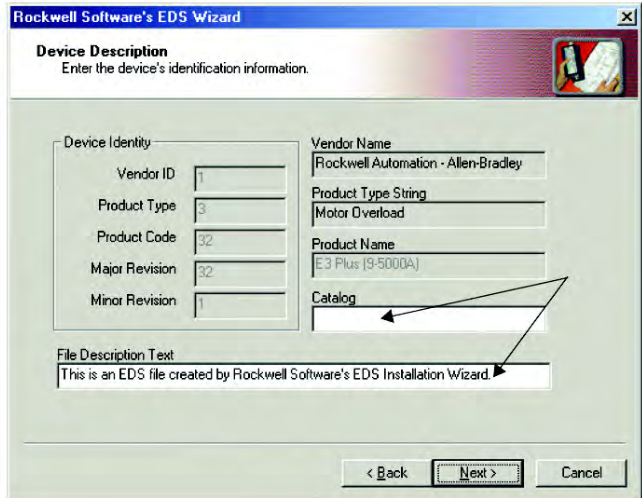
5. If RSNetWorx software recognizes the device as an E300 Overload Relay (or E3/E3 Plus in emulation mode), skip ahead to the following section – Using the Node Commissioning Tool of RSNetWorx for DeviceNet.

   You can also commission a node by using the DeviceNet Configuration Terminal, Cat. No. 193-DNCT.

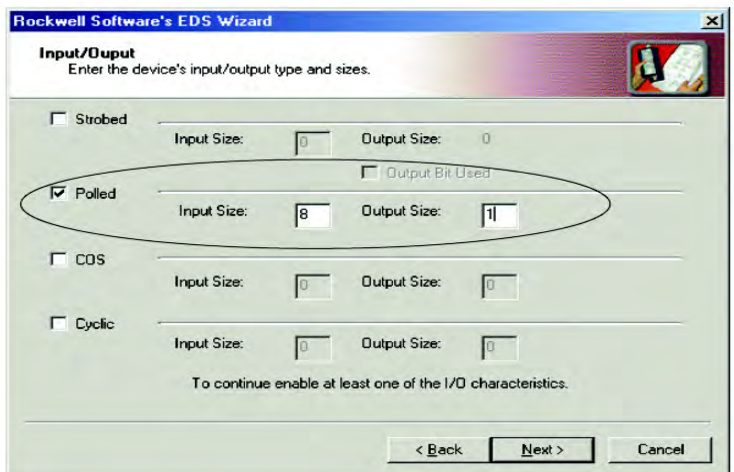
Building and Registering an EDS File

NOTE: If you are using DeviceLogix functionality, you must download the EDS file from https://www.rockwellautomation.com/global/support/networks/eds.page?
Perform the following steps to build and register the EDS file.

1. Right-click the Unrecognized Device icon. The Register Device menu appears.
2. Select Yes. The EDS Wizard appears.
3. Select Next, then Create an EDS File.
4. Select Next.
5. Select Upload EDS.
6. Select Next. The EDS Wizard screen appears:
7. (Optional) Type a value in the Catalog and File Description Text fields, then select Next.



8. On the input/output screen in the EDS Wizard, select the Polled checkbox, then enter a value of 8 for Input and 1 for Output.

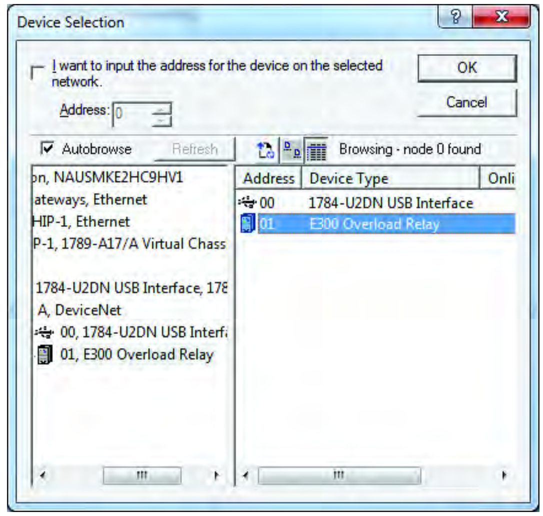


9. Select Next. RSNetWorx uploads the EDS file from the E300 Overload Relay.
10. Select Next to display the icon options for the node.
11. Select the E300 Overload Relay icon, then click Change Icon.
12. Select OK after selecting the desired icon.
13. Select Next.
14. Select Next when you are prompted to register this device.
15. Select Finish.

After a short time, the RSNetWorx software updates the online screen by replacing the Unrecognized Device with the name and icon given by the EDS file that you have registered.

Using the Node Commissioning Tool of RSNetWorx for DeviceNet

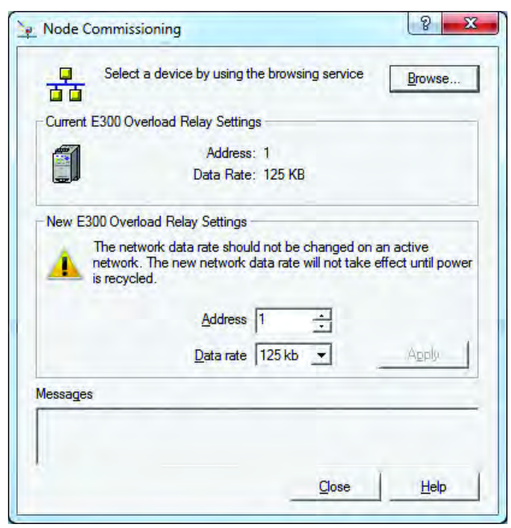
1. Select Node Commissioning from the Tools pull-down menu.
2. Select Browse.
3. Select the E300 Overload Relay that is located at node 01.



4. Select OK.

   The Node Commissioning screen shows Current Device Settings entries that are completed. It also provides the current network baud in the New E300 Overload Relay Settings area. **Do not change the baud setting unless you are sure it must be changed.**

5. Type the node address that you want in the New Device Settings section. In this example, the new node address is 01.

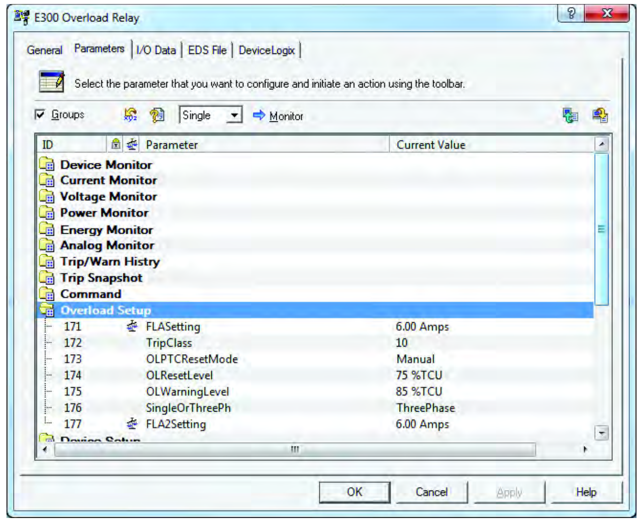


6. Select Apply.

   When the new node address is successfully applied, the Current Device Settings section of the window updates. If an error occurs, check to see if the device is properly powered up and connected to the DeviceNet network.

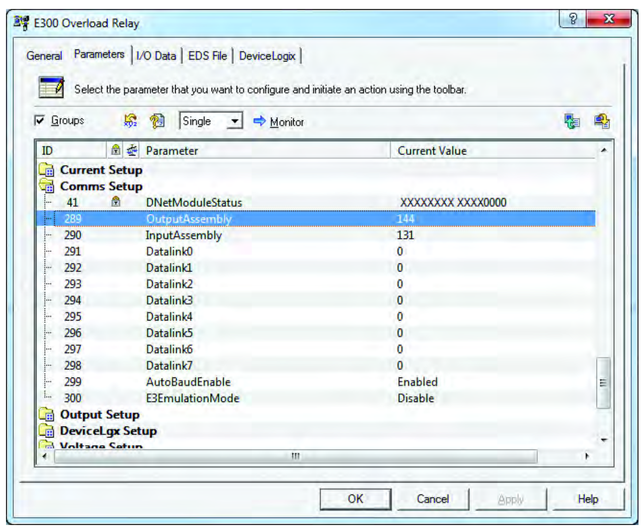
7. Select Close to close the Node Commissioning window.

8. Select Single Pass Browse from the Network pull-down menu to update the RSNetWorx software and verify that the node address is set correctly.



Produced and Consumed Assembly Configurations

The Input and Output Assembly format for the E300 Overload Relay is identified by the value in Output Assembly, Parameter 289, and Input Assembly, Parameter 290. These values determine the amount and arrangement of the information communicated to the master scanner.



Selection of Input and Output Assemblies (Produced and Consumed Assemblies) defines the format of I/O message data that is exchanged between the E300 Overload Relay and other devices on the DeviceNet network. The consumed information is used to command the state of the slave device outputs. Produced information typically contains the state of the inputs and current fault status of the slave device.

The default Consumed and Produced Assemblies are shown in Table 41 through Table 44. For additional formats, refer to Appendix C.

Table 41 - DeviceNet Input Assembly Instance 131

		Instance 131—Basic Overload																Member	Size	Param
INT	**DINT**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**			
0	0	Device Status 0																0	16	20
1		Device Status 1																1	16	21
2	1	Input Status 0																2	16	16
3		Input Status 1																3	16	17
4	2	Output Status																4	16	18
5		OpStation Status																5	16	19
6	3	Reserved								% Thermal Utilized								6	8	1
7		Average % FLA																7	16	50
8	4	Average Current																8	32	46
9																				

Table 42 - DeviceNet Input Assembly Instance 131 Attributes

Attribute ID	Access Rule	Member Index	Name	Data Type	Value
1	Get	—	Number of Members in Member List	UINT	10
	Get	—	Member List	Array of STRUCT	—
	Get	0	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 14 00
	Get	1	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 15 00
	Get	2	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 10 00
	Get	3	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 11 00
	Get	4	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 12 00
	Get	5	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 13 00
	Get	6	Member Data Description	UINT	8
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 01 00
	Get	7	Member Data Description	UINT	8
			Member Path Size	UINT	0
			Member Path	Packed EPATH	—
	Get	8	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 32 00
	Get	9	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 2E 00
3	Get	—	Data	UINT	See data format above
4	Get	—	Size	UINT	20
100	Get	—	Name	SHORT_STRING	“Basic Overload”

Table 43 - DeviceNet Output Assembly Instance 144

Instance 131—Default Consumed Assembly																		Member	Size	Path
INT	**DINT**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**			
0	0	Output Status 0																0	16	Param 18
1	0	NetworkStart 1															X	1	—	Symbolic
		NetworkStart2														X		2	—	Symbolic
		TripReset													X			3	—	Symbolic
		EmergencyStop												X				4	—	Symbolic
		RemoteTrip											X					5	—	Symbolic
		Reserved								X	X	X						6	—	—
									X	HMILED1Green								7	—	Symbolic
								X		HMILED2Green								8	—	Symbolic
							X			HMILED3Green								9	—	Symbolic
						X				HMILED3Red								10	—	Symbolic
					X					HMILED4Red								11	—	Symbolic
		X	X	X						Reserved								12	—	—
2	1	PtDeviceIns																13	16	Symbolic
3		AnDeviceIns																14		Symbolic

Table 44 - DeviceNet Output Assembly Instance 144 Attributes

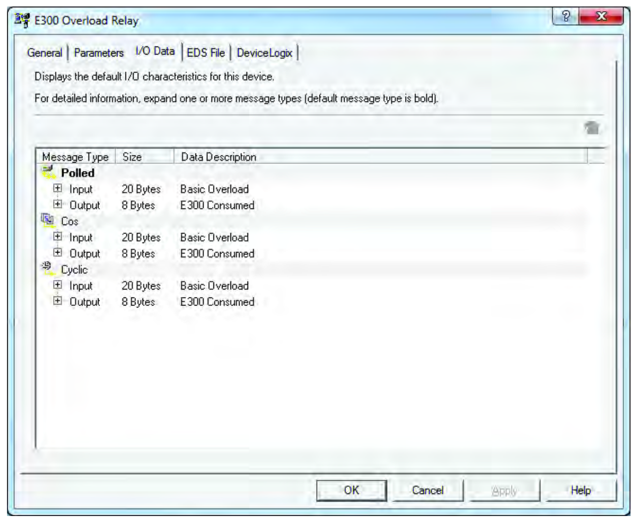
Attribute ID	Access Rule	Member Index	Name	Data Type	Value
1	Get	—	Number of Members in Member List	UINT	15
2	Get	—	Member List	Array of STRUCT	—
	Get	0	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	20 0F 00 25 12 00
	Get	1	Member Data Description	UINT	1
			Member Path Size	UINT	14
			Member Path	Packed EPATH	6DH & "NetworkStart1"
	Get	2	Member Data Description	UINT	1
			Member Path Size	UINT	14
			Member Path	Packed EPATH	6DH & "NetworkStart2"
	Get	3	Member Data Description	UINT	1
			Member Path Size	UINT	10
			Member Path	Packed EPATH	69H & "TripReset"
	Get	4	Member Data Description	UINT	1
			Member Path Size	UINT	14
			Member Path	Packed EPATH	6DH & "EmergencyStop"
	Get	5	Member Data Description	UINT	1
			Member Path Size	UINT	11
			Member Path	Packed EPATH	6AH & "RemoteTrip"
	Get	6	Member Data Description	UINT	3
			Member Path Size	UINT	0
			Member Path	Packed EPATH	—
	Get	7	Member Data Description	UINT	1
			Member Path Size	UINT	13
			Member Path	Packed EPATH	6CH & "HMILED1Green"
	Get	8	Member Data Description	UINT	1
			Member Path Size	UINT	13
			Member Path	Packed EPATH	6CH & "HMILED2Green"
	Get	9	Member Data Description	UINT	1
			Member Path Size	UINT	13
			Member Path	Packed EPATH	6CH & "HMILED3Green"
	Get	10	Member Data Description	UINT	1
			Member Path Size	UINT	11
			Member Path	Packed EPATH	6AH & "HMILED3Red"
	Get	11	Member Data Description	UINT	1
			Member Path Size	UINT	11
			Member Path	Packed EPATH	6AH & "HMILED4Red"
	Get	12	Member Data Description	UINT	3
			Member Path Size	UINT	0
			Member Path	Packed EPATH	—
	Get	13	Member Data Description	UINT	16
			Member Path Size	UINT	12
			Member Path	Packed EPATH	6BH & "PtDeviceIns"
	Get	14	Member Data Description	UINT	16
			Member Path Size	UINT	12
			Member Path	Packed EPATH	6BH & "AnDeviceIns"
3	Get	—	Data	UINT	See data format above
4	Get	—	Size	UINT	8
100	Get	—	Name	SHORT_STRING	"E300 Consumed"

Choose the size and format of the I/O data that is exchanged by the E300 Overload Relay by selecting Input and Output Assembly Instance numbers. Each assembly has a given size (in bytes). This instance number is written to the Input Assembly and Output Assembly parameters. The different instances/formats allow user programming flexibility and network optimization.

Mapping the Scanner to the Scan List

The Automap feature that is available in all Rockwell Automation scanners automatically maps the information. If you are not using the default I/O assemblies, you must change the values in the scan list.

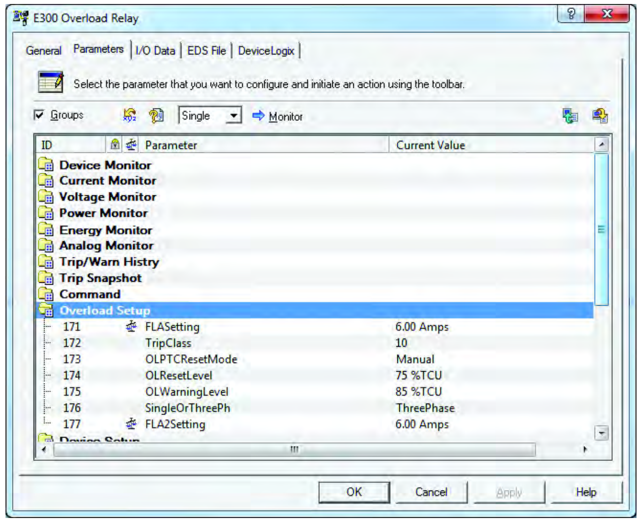
To change the values, right-click on the E300 device and select Properties. Once the configuration window opens, navigate to the I/O Data tab to view the present device configuration.



Commissioning the Protection Functions

This section describes the use of RSNetWorx for DeviceNet to configure the function settings of the E300 Overload Relay. The product should now be configured and communicating on the DeviceNet network. The last step is to program the overload setup parameters 171…177 according to the desired application requirements. You can do this by using software such as RSNetWorx for DeviceNet, another hand-held DeviceNet tool, or the E300 Diagnostic Station.

1. Using the RSNetWorx for DeviceNet software, right-click on the E300 device and select properties. Navigate to the Parameters tab to view the present device configuration. You can view the parameters as a linear list or grouped according to their respective functions.

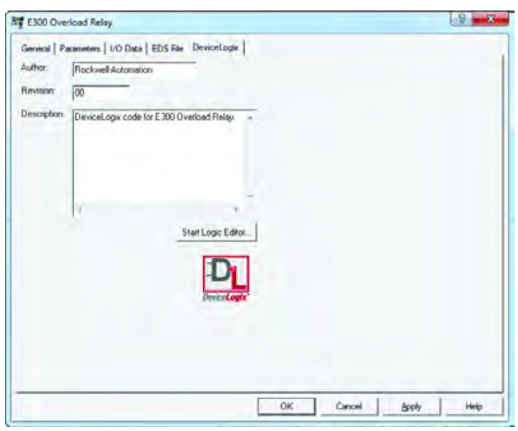


You can change editable parameters by selecting them and altering the value that is needed, based on the motor overload application.

2. Once you have programmed all necessary parameters, use the appropriate radio button to download the configuration to the E300 device. See page 9 for information about the complete parameter spreadsheet that is attached to this PDF, which contains a description of each programmable parameter and its intended function.

DeviceLogix Interface in RSNetWorx for DeviceNet

The DeviceLogix interface can be accessed from RSNetWorx. Right-click on the target E300 device and select properties. Navigate to the DeviceLogix tab to being using DeviceLogix. For additional details specific to DeviceLogix, DeviceLogix™ Functionality on page 167.

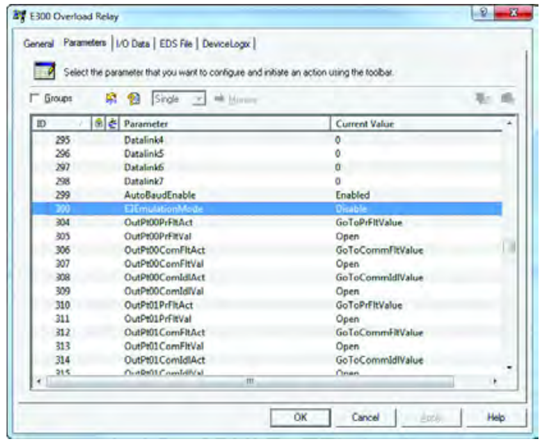


E3/E3 Plus Overload Emulation Mode

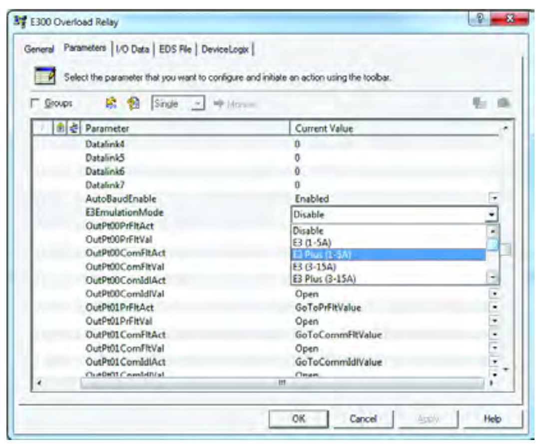
The E300 Overload Relay used with the Series B Control Module supports an E3 Plus™ overload relay emulation mode when it is attached to a DeviceNet communication module. This lets you reuse configuration parameters from the E3 Plus overload relay when you use configuration tools like ADR, the DeviceNet Configuration Terminal (193-DNCT), and RSNetWorx for DeviceNet.

To configure an E300 Overload Relay to operate in E3 Plus emulation mode, using RSNetWorx for DeviceNet, perform the following steps:

1. Right-click on the target E300 device and select properties. Navigate to the Parameters tab to view the present device configuration.
2. Select parameter 300 to enable emulation mode.



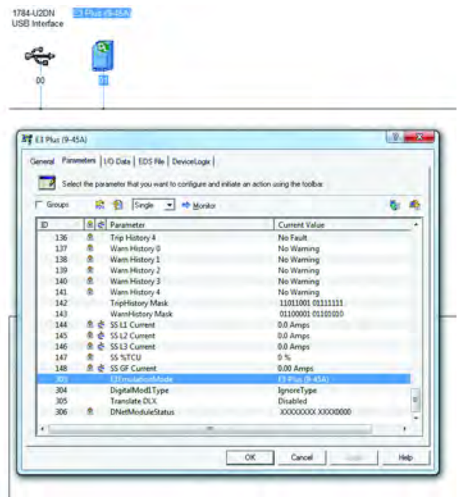
3. Select the E3/E3 Plus device that is appropriate for the target application. The E3/E3 Plus device selection must be compatible with the target hardware that is installed or a configuration error will be encountered (for example, a 1…5 A E3/E3 Plus overload relay cannot be selected with a 60 A sensing module installed).



4. Delete the E300 component and add the respective E3/E3 Plus device to the corresponding DeviceNet network and configure it.

   A single-pass browse of the DeviceNet network also detects the emulated E3/E3 Plus device.

5. The E300 Overload Relay's parameter set is now reduced considerably and is configurable as the selected E3/E3 Plus device (example shown is E3 Plus, 9…45 A).



To revert back to the native E300 device, note that the emulation mode parameter as an E3/E3 Plus device is parameter 303. Navigate to this parameter and select "disable" to return to E300 functionality. Then follow steps 4…5 to update the corresponding DeviceNet network accordingly.

You can also use the E300 Diagnostic Station to modify the parameters referenced in this section. Once E3/E3 Plus emulation mode is activated, it is reflected in the Diagnostic Station. In this mode, you cannot modify the full parameter set. This must be done using an appropriate DeviceNet interface such as RSNetWorx for DeviceNet.

Notes:

Firmware and EDS Files

This chapter provides detailed information about firmware compatibility among the various E300™ Electronic Overload Relay modules and provides instructions on how to update firmware for an E300 relay module.

Firmware Compatibility

The sensing, control, and communication modules of an E300 relay have their own firmware for the functionality of the module and its subsystems. You can update each module and its associated subsystems by using the ControlFLASH utility, which is the same utility that is used to download firmware into a Logix-based controller. The ControlFLASH kits for E300 firmware system revisions v1.085, v2.085, v3.083, v4.083, and v5.082 use one command to update all E300 relay modules and subsystems for that specific system release. Consult the Product Compatibility and Download Center to find the most current firmware revision.

Updating Firmware

Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes from the Product Compatibility and Download Center at http://www.rockwellautomation.com/rockwellautomation/support/pcdc.page.

After you have downloaded and installed the firmware, run the ControlFLASH application by selecting ControlFLASH from the Start menu.

Electronic Data Sheet (EDS) File Installation

Before the E300 relay EtherNet/IP Communication Module is configured to communicate on an EtherNet/IP network, it must be registered to the software that configures the network (for example, Rockwell Automation RSLinx Classic and RSNetWorx for EtherNet/IP software). Register the module by installing an EDS file. You need the EDS file for the E300 relay EtherNet/IP Communication Module and DeviceNet Communication Module. You can get the EDS files from one of two locations:

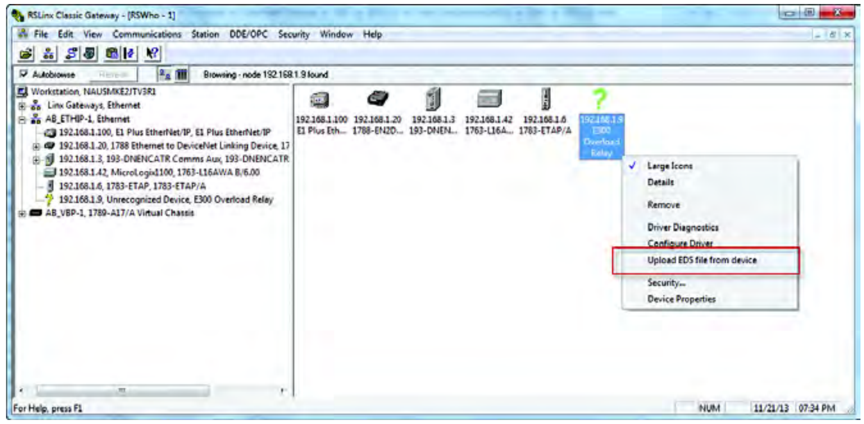
- Embedded in the module
- The Allen-Bradley EDS file download website.

Download the EDS File

Embedded in the Module

The EDS file for the E300 relay EtherNet/IP Communication Module is embedded within the module. Using RSLinx Classic, you can install the E300 relay EtherNet/IP Communication Module's EDS file from the RSLinx Classic RSWho screen using these steps:

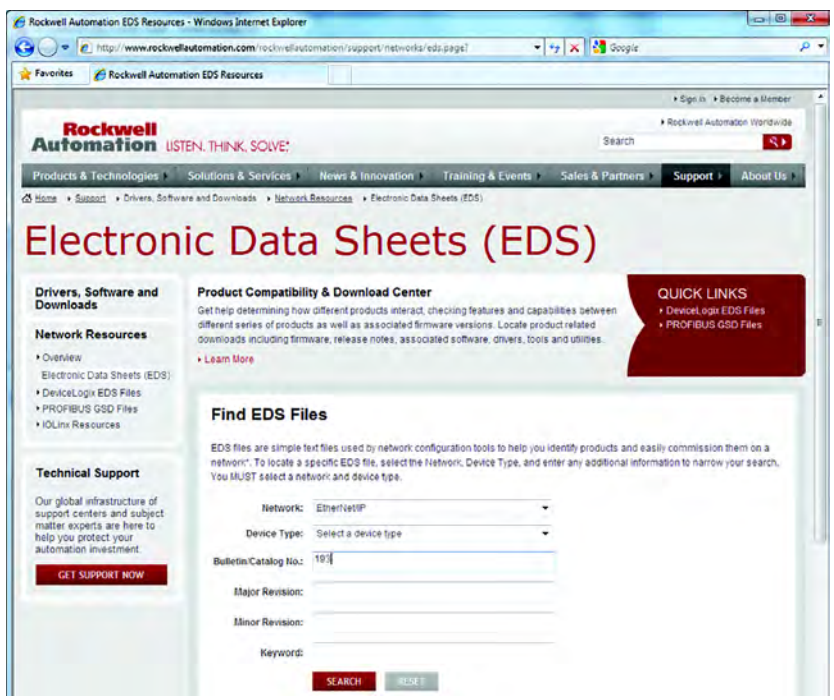
1. Open RSLinx Classic and browse the EtherNet/IP network that has the E300 relay. It is identified with a yellow question mark. Right click on the unrecognized device and select "Upload EDS File from Device".



From the EDS File Download Site

The EDS file for the E300 relay EtherNet/IP Communication Module can also be downloaded from the Allen-Bradley EDS File download site. Using a web browser on the personal computer that is connected to the internet, you can download the EDS file by following these steps:

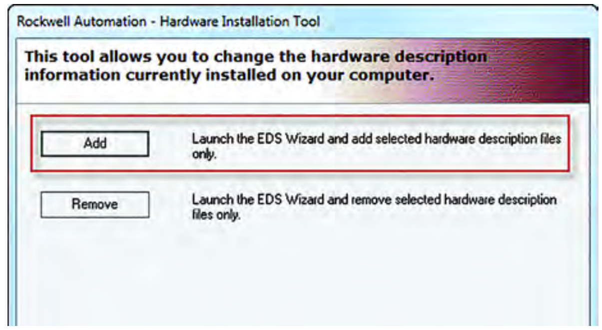
1. Type http://www.rockwellautomation.com/rockwellautomation/support/networks/eds.page? on the address line of the web browser.
2. Select EtherNet/IP as the network type, enter 193 for the Bulletin Number, and click Search.



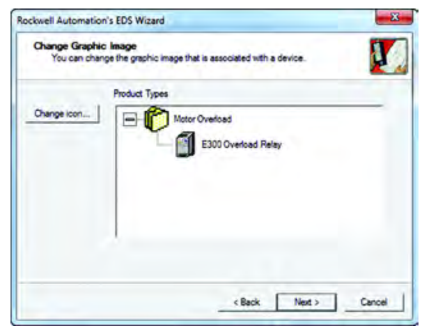
3. Locate the EDS file for the E300 relay EtherNet/IP Communication Module and download it to the personal computer.

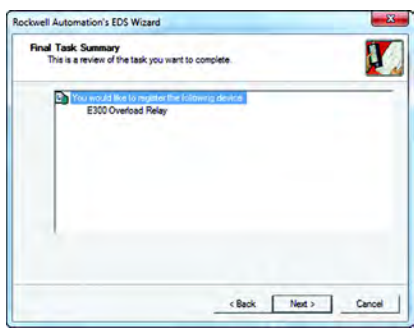
Install the EDS File

1. Start the EDS Hardware Installation Tool located at Start>Programs>Rockwell Software>RSLinx Tools and Add a new device

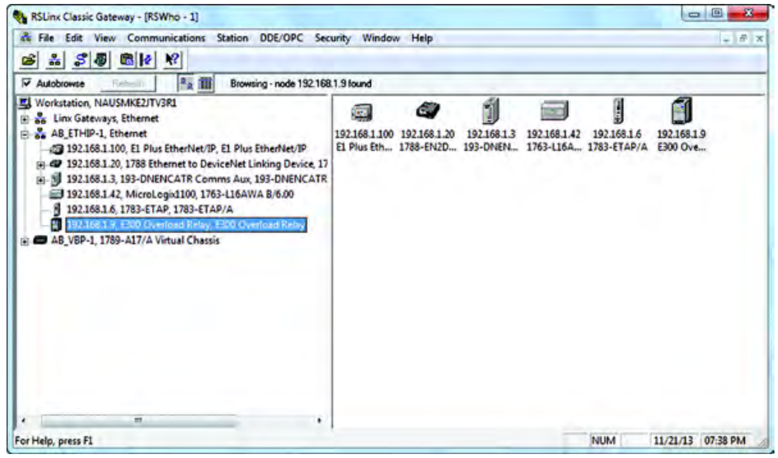


2. Using the EDS Wizard, install the downloaded E300 relay EtherNet/IP Communication Module EDS file.





3. When finished, RSLinx Classic recognizes the newly registered E300 relay EtherNet/IP Communication Module.


RSLinx Classic Gateway - [RSWho - 1]
File Edit View Communications Station DDE/OPC Security Window Help
Autobrowse
Refresh
Browsing - node 192.168.1.9 found
Workstation, NAUSMKE2JTV3R1
Linx Gateways, Ethernet
AB_ETHIP-1, Ethernet
192.168.1.100, E1 Plus EtherNet/IP, E1 Plus EtherNet/IP
192.168.1.20, 1788 Ethernet to DeviceNet Linking Device, 17
192.168.1.3, 193-DNENCATR Comms Aux, 193-DNENCATR
192.168.1.42, MicroLogix1100, 1763-L16AWA B/6.00
192.168.1.6, 1783-ETAP, 1783-ETAP/A
192.168.1.9, E300 Overload Relay, E300 Overload Relay
AB_VBP-1, 1789-A17/A Virtual Chassis
192.168.1.100 E1 Plus Eth...
192.168.1.20 1788-EN2D...
192.168.1.3 193-DNEN...
192.168.1.42 1763-L16A...
192.168.1.6 1783-ETAP/A
192.168.1.9 E300 Ove...
For Help, press F1
NUM
11/21/13
07:38 PM

Notes:

Troubleshooting

This chapter helps you troubleshoot the E300™ Electronic Overload Relay using its advisory LEDs and diagnostic parameters.

ATTENTION: Servicing energized industrial control equipment can be hazardous. Electrical shock, burns, or unintentional actuation of controlled industrial equipment may cause death or serious injury. For safety of maintenance personnel and others who may be exposed to electrical hazards associated with the maintenance activities, follow the local safety-related work practices (for example, the NFPA 70E, Part II, Electrical Safety for Employee Workplaces, in the United States) when working on or near energized equipment. Maintenance personnel must be trained in the safety practices, procedures, and requirements that pertain to their respective job assignments. Do not work alone on energized equipment.

ATTENTION: Do not attempt to defeat or override fault circuits. The cause of a fault indication must be determined and corrected before attempting operation. Failure to correct a control system or mechanical malfunction may result in personal injury and/or equipment damage due to uncontrolled machine system operation.

Status Indicators

All E300 relay Communication Modules and Operator Station have two diagnostic status indicators: Power LED and Trip/Warn LED. You can use these diagnostic status indicators to help identify the state of the E300 relay and the reason for the trip or warning event.

Power

The E300 relay Power LED identifies the state of the E300 relay system.

Table 45 - Power LED for EtherNet/IP and DeviceNet Communication Modules

Blinking Green	Device Ready/ Ready Mode
Solid Green	Device Active (Current Detected) / Run Mode
Solid Red	Device Error
Blinking Red(1)	Communication Error
Blinking Green/Red(1)	CopyCat in Progress

(1) Available on Operator Station.

Module Status (MS)

Table 46 explains the states of the Module Status (MS) LED of the E300 EtherNet/IP Communication Module.

Table 46 - EtherNet/IP Communication Module Status Troubleshooting

LED Color	State	Possible Cause	Corrective Action
None	—	The E300 EtherNet/IP Communication Module is not receiving power.	Check the control power connection on the A1 and A2 terminals of the E300 Control Module.
Green, Red, Not Illuminated	Flashing (once)	Normal	This is a normal power-up sequence.
Green	Flashing	The E300 EtherNet/IP Communication Module is not being scanned by the EtherNet/IP master.	Check the Ethernet scan list for the correct scanner configuration.
Green	Solid	Normal operating state, the E300 EtherNet/IP Communication Module is allocated to its master.	No action is required.
Red	Flashing	One or more EtherNet/IP connections timed out.	Reset the E300 EtherNet/IP Communication Module.
		The E300 Overload Relay is in a fault state.	Reset the E300 EtherNet/IP Communication Module or verify the validity of the data in the configuration assembly.
Red	Solid	Diagnostics test failed on power-up/reset.	Cycle power to the device. If the fault still exists, replace the device.

Table 47 explains the states of the Module Status (MS) LED of the E300 DeviceNet Communication Module.

Table 47 - DeviceNet Communication Module Status Troubleshooting

LED Color	State	Possible Cause	Corrective Action
None	—	The E300 DeviceNet Communication Module is not receiving power.	Check the DeviceNet control power on the A1 and A2 terminals of the E300 Control Module.
Green, Red, Not Illuminated	Flashing (once)	Normal	This is a normal power-up sequence.
Green	Flashing	Normal (Program / Non-Run Mode)	The E300 Module is in Program/Non-run Mode where no I/O connection exists or an I/O connection exists while not in Run Mode.
Green	Solid	Normal (Run Mode)	The E300 Module is in Run Mode where I/O connection(s) is in Run State.
Red	Flashing	Recoverable Fault State	The E300 Module has been mis-configured and results in a fault condition.
Red	Solid	Unrecoverable Fault State.	The E300 Module has become inoperable due to a defective and/or intermittent component within the unit. In most instances, activating the Trip/Reset button will not remove this fault condition and the only way to recover from this condition is to replace the E300 module or identify/replace the faulty component(s). In some scenarios, pressing the Trip/Reset button may clear this fault condition. In this case, the cause for the fault is most likely to be environmentally related and therefore component replacement is not required.

Network Status (NS)

Table 48 identifies possible causes and corrective actions when troubleshooting the E300 relay EtherNet/IP Communication Module.

Table 48 - EtherNet/IP Communication Module Network Status Troubleshooting

Status LED	Color	State	Possible Cause	Corrective Action
Network Status (NS)	None	—	The E300 EtherNet/IP Communication Module is not receiving power.	Verify that the proper control voltage exists between terminals A1 and A2 on the E300 Control Module.
	Green, Red, Not Illuminated	Flashing (once)	Normal	This is a normal power-up sequence.
	Green	Flashing	The E300 EtherNet/IP Communication Module is online, but with no connections established.	Check the EtherNet/IP master and its scan list for correct scanner configuration.
	Green	Solid	Normal operating state and the E300 EtherNet/IP Communication Module is allocated to a master.	No action is required.
	Red	Flashing	One or more EtherNet/IP connections timed out.	Reset the EtherNet/IP master device.
	Red	Solid	Diagnostics test failed on power-up/reset. An internal fault exists.	Cycle power to the unit. If the fault still exists, replace the unit.
			Duplicate EtherNet/IP module address exists. Two modules cannot have the same address.	Change the IP address to a valid setting and reset the device.
			A fatal communication error occurred.	Check Ethernet media for proper installation.
Link1 or Link2	None	—	The E300 EtherNet/IP Communication Module is not properly connected to an Ethernet network.	Check the Ethernet cabling to make sure it is properly installed.
	Green	Flashing	The Ethernet network is properly connected.	No action is required.
	Green	Solid	Communication is occurring on the Ethernet network.	No action is required.

Table 49 identifies possible causes and corrective actions when troubleshooting the E300 relay DeviceNet Communication Module.

Table 49 - DeviceNet Communication Module Network Status Troubleshooting

Status LED	Color	State	Possible Cause	Corrective Action
Network Status (NS)	None	—	The E300 DeviceNet Communication Module is not receiving power.	Check the DeviceNet control power on the A1 and A2 terminals of the E300 Control Module.
	Green, Red, Not Illuminated	Flashing (once)	Normal	This is a normal power-up sequence.
	Green	Flashing	The E300 DeviceNet Communication Module is online but has no connections established to other nodes.	The E300 Module may require commissioning due to configuration missing, incomplete, or incorrect.
	Green	Solid	Normal	The E300 DeviceNet Communication Module is allocated to a master.
	Red	Flashing	One or more DeviceNet I/O connections timed out.	Verify configuration and/or reset DeviceNet master.
	Red	Solid	The E300 DeviceNet Communication Module has detected an error that has rendered it incapable of communicating on the network.	Verify configuration and/or reset DeviceNet master. Cycle power to the E300 Module. If the fault still exists, identify/replace the faulty component(s). Change the node address to a valid setting and reset the E300 Module. Verify integrity of the DeviceNet network and corresponding cabling to ensure proper installation.

Trip/Warn

The E300 relay Power LED identifies the reason for the trip or warning event. The E300 relay displays a long and short blinking pattern to identify the reason for the trip or warning event.

Table 50 - Trip / Warn LED for EtherNet/IP and DeviceNet Communication Modules

Blinking Red	Trip Event
Blinking Yellow	Warning Event

Table 51 lists the blink patterns for the E300 relay trip and warning events.

Table 51 - Blink Patterns for Trip/Warn Events

	Code	Long Blink Pattern	Short Blink Pattern
Current	Overload	0	1
	Phase Loss	0	2
	Ground Fault Current	0	3
	Stall	0	4
	Jam	0	5
	Underload	0	6
	Current Imbalance	0	7
	L1 Under Current	0	8
	L2 Under Current	0	9
	L3 Under Current	0	10
	L1 Over Current	0	11
	L2 Over Current	0	12
	L3 Over Current	0	13
	L1 Line Loss	0	14
	L2 Line Loss	0	15
	L3 Line Loss	0	16
Voltage	Under Voltage	1	1
	Over Voltage	1	2
	Voltage Imbalance	1	3
	Phase Rotation Mismatch	1	4
	Under Frequency	1	5
	Over Frequency	1	6
Power	Under kW	2	1
	Over kW	2	2
	Under kVAR Consumed	2	3
	Over kVAR Consumed	2	4
	Under kVAR Generated	2	5
	Over kVAR Generated	2	6
	Under kVA	2	7
	Over kVA	2	8
	Under PF Lagging	2	9
	Over PF Lagging	2	10
	Under PF Leading	2	11
	Over PF Leading	2	12

	Code	Long Blink Pattern	Short Blink Pattern
Control	Test	3	1
	PTC	3	2
	DeviceLogix	3	3
	Operator Station	3	4
	Remote Trip	3	5
	Blocked Start	3	6
	Hardware Fault	3	7
	Configuration	3	8
	Option Match	3	9
	Feedback Timeout	3	10
	Expansion Bus	3	11
	Number Of Starts	3	12
	Operating Hours	3	13
	Nonvolatile Memory	3	14
	Test Mode	3	15
Analog	Analog Module 1 - Input Channel 00	4	1
	Analog Module 1 - Input Channel 01	4	2
	Analog Module 1 - Input Channel 02	4	3
	Analog Module 2 - Input Channel 00	4	4
	Analog Module 2 - Input Channel 01	4	5
	Analog Module 2 - Input Channel 02	4	6
	Analog Module 3 - Input Channel 00	4	7
	Analog Module 3 - Input Channel 01	4	8
	Analog Module 3 - Input Channel 02	4	9
	Analog Module 4 - Input Channel 00	4	10
	Analog Module 4 - Input Channel 01	4	11
	Analog Module 4 - Input Channel 02	4	12

Reset a Trip

ATTENTION: Resetting a trip does not correct the cause for the trip. Take corrective action before you reset the trip.

The E300 relay trip condition can be reset by taking one of the following actions:

- Actuating the Blue Trip/Reset button on the E300 relay Communication Module
- Actuating the Reset button on the E300 relay Operator Station
- Setting the Trip Reset bit in the E300 relay's Output Assembly via the communication network
- Actuating a reset signal to one of the assigned digital inputs
- Setting Overload Reset Mode (Parameter 173) to "Automatic" to allow the unit to automatically reset after an overload trip
- Setting Trip Reset (Parameter 163) to a value of 1, "Trip Reset"

IMPORTANT An overload trip cannot be reset until the value of Percent Thermal Capacity Utilized (Parameter 1) is below the value set in Overload Reset Level (Parameter 174).

Trip/Warn LED Troubleshooting

Trip Description	Possible Cause	Corrective Action
Test Trip	1. Operation of the Test/Reset	1. Operate the Test/Reset button to clear
Overload	1. Motor overloaded	1. Check and correct source of overload (load, mechanical transmission components, motor bearings).
	2. Improper parameter settings	2. Set parameter values to match the motor and application requirements.
Phase Loss	1. Missing supply phase	1. Check for open line (for example, blown fuse).
	2. Poor electrical connection	2. Check all power terminations from the branch circuit-protecting device down to the motor for proper tightness. Make sure that the overload connection to the contactor is secure.
	3. Contactor operation	3. Inspect contactor for proper operation.
	4. Improper parameter setting	4. Single-phase applications require that Single/Three Phase (Parameter 176) is set to “single phase”.
Ground Fault	1. Power conductor or motor winding is shorting to ground	1. Check power conductors and motor windings for low resistance to ground.
	2. Motor winding insulation is decayed	2. Check motor winding insulation for low resistance to ground.
	3. Foreign Object short	3. Check for foreign objects.
	4. External ground fault sensor (core balance current transformer) has improper connection	4. Check cable connections.
Stall	1. Motor has not reached full speed by the end of the Stall Enabld Time (Parameter 249)	1. Check for source of stall (for example, excessive load, or mechanical transmission component failure).
	2. Improper parameter settings	2. Stall Enabled Time (Parameter 249) is set too low for the application. Check to make sure that FLA Setting (Parameter 171) is set correctly.
Jam	1. Motor current has exceeded the programmed jam level	1. Check for the source of the jam (i.e., excessive load or mechanical transmission component failure).
	2. Improper parameter settings	2. Jam Trip Level (Parameter 253) is set too low for the application. Check to make sure that FLA Setting (Parameter 171) is set correctly.
PTC	1. Motor stator windings overheated	1. Check for source of motor overtemperature (for example, overload, obstructed cooling, high ambient temperature, excessive starts/hour).
	2. Thermistor leads short-circuited or broken	2. Inspect thermistor leads for short-circuit or open
Current Imbalance	1. Imbalance in incoming power	1. Check power system (for example, blown fuse).
	2. Motor winding imbalance	2. Repair motor, or if acceptable, raise value of Current Imbalance Trip Level (Parameter 261), CI Trip Level
	3. Motor idling	3. Raise value of Current Imbalance Trip Level (Parameter 261) to an acceptable level.
	4. Contactor or circuit breaker operation	4. Inspect contactor and circuit breaker for proper operation.
Nonvolatile Storage Fault	1. Firmware Downgrade corrupted: Nonvolatile memory	1.Execute the Clear Command to the operating Statistics, History Logs, and % TCU
	2. Internal product failure	2. Consult the factory.
Hardware Fault	1. Firmware of sensing module is not compatible with control module firmware	1. Verify firmware revisions of control module and sensing module 2. Update firmware of control module to v2.0 or higher
	2. Hardware configuration failure	3. Consult the factory. 4. Verify that the Sensing, Control, and Communication Module are connected properly. 5. Verify that connection pins between sensing module and control module are not bent.
Configuration Fault	1. Single/Three Phase (Parameter 176) is set to "Single Phase" and current is being sensed in phase L3 during motor operation.	1. For three-phase applications, Single/Three Phase (Parameter 176) should be set to “Three-Phase”; for single-phase applications, verify that current is flowing through L1 and L2 only.
	2. Operating Mode "Overload (Network)" does not have an assigned Trip Relay	2. Verify that one of the Output Assignments (Parameters 202…204) is configured as a "Trip Relay"
	3. Illegal configuration value	3. Review Invalid Configuration Parameter (Parameter 38) and Invalid Configuration Cause (Parameter 39) to identify which configuration parameter is illegal and the reason why.
Remote Trip	1. Contact closure of remote sensor (for example, vibration switch).	1. Take corrective action to address the issue that caused the sensor to actuate.
		2. Check sensor for proper operation.
		3. Check wiring.
Total Starts Warning	1. Starts Counter (Parameter 29) is equal to or greater than the value set in Total Starts (Parameter 207)	1. Set Clear Command (Parameter 165) to "Clear Operating Statistics" to reset Starts Counter (Parameter 29)

Trip Description	Possible Cause	Corrective Action
Total Operating Hours Warning	1. Operating Time (Parameter 28) is equal to or greater than the value set in Total Operating Hours (Parameter 208)	1. Clear Command (Parameter 165) to "Clear Operating Statistics" to reset Operating Time (Parameter 28)
Blocked Start	1. The number of starts count within the past hour period equals the value set in the Starts Per Hour (Parameter 205)	1. Check Time to Start (Parameter 31) and wait that amount of time, or change the configuration to allow more starts/hour.
	2. The time expired since the most recent start is less than the value set in the Starts Interval (Parameter 206)	2. Check Time to Start (Parameter 31) and wait that amount of time, or change the configuration to shorten the interval between starts.

Wiring Diagrams

E300 Wiring Configurations

The following pages illustrate various wiring configurations for the E300™ Electronic Overload Relay

Figure 83 - Delta Configuration with Two Potential Transformers (Open Delta)

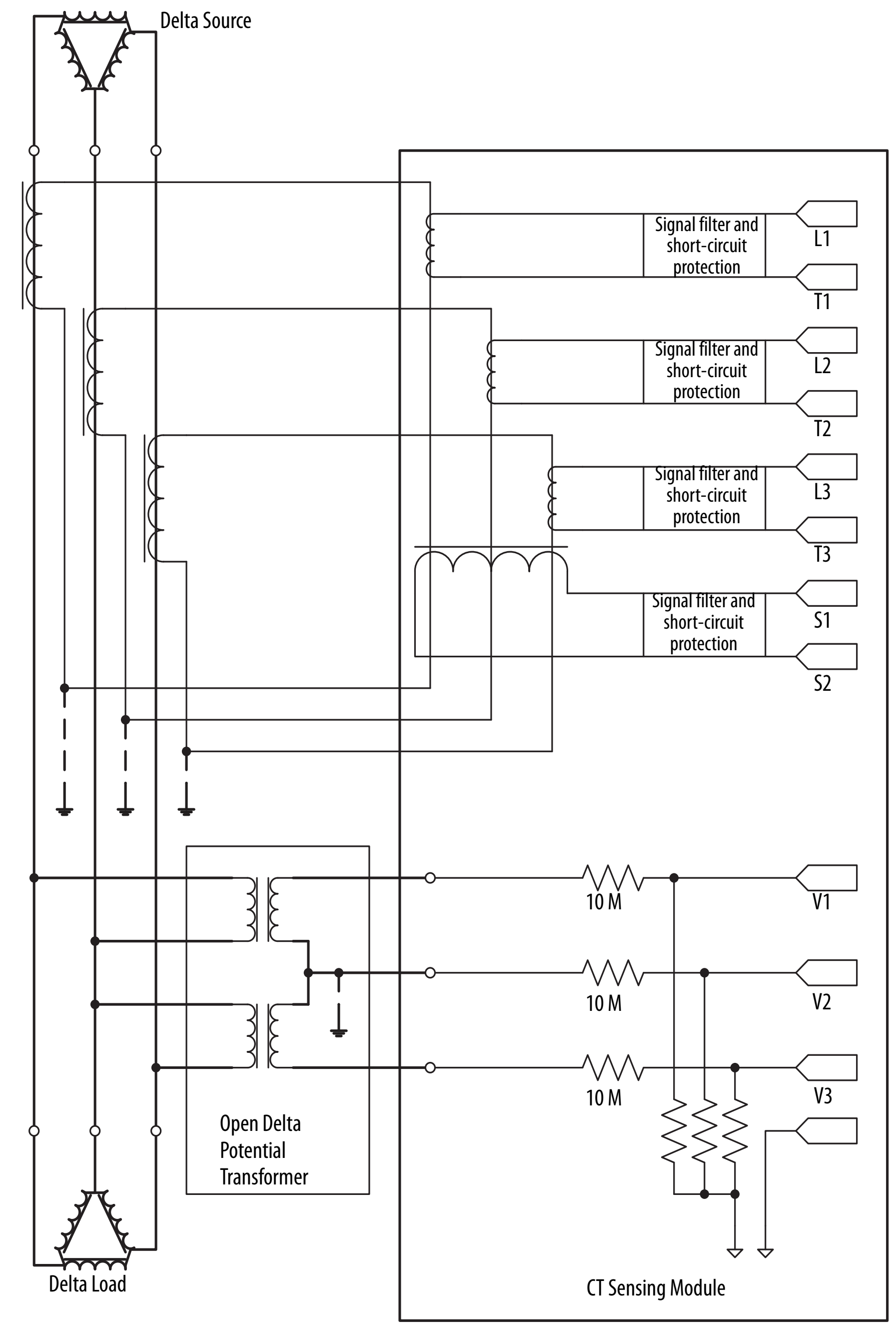


Figure 84 - Wye Configuration with Two Potential Transformers (Open Delta)

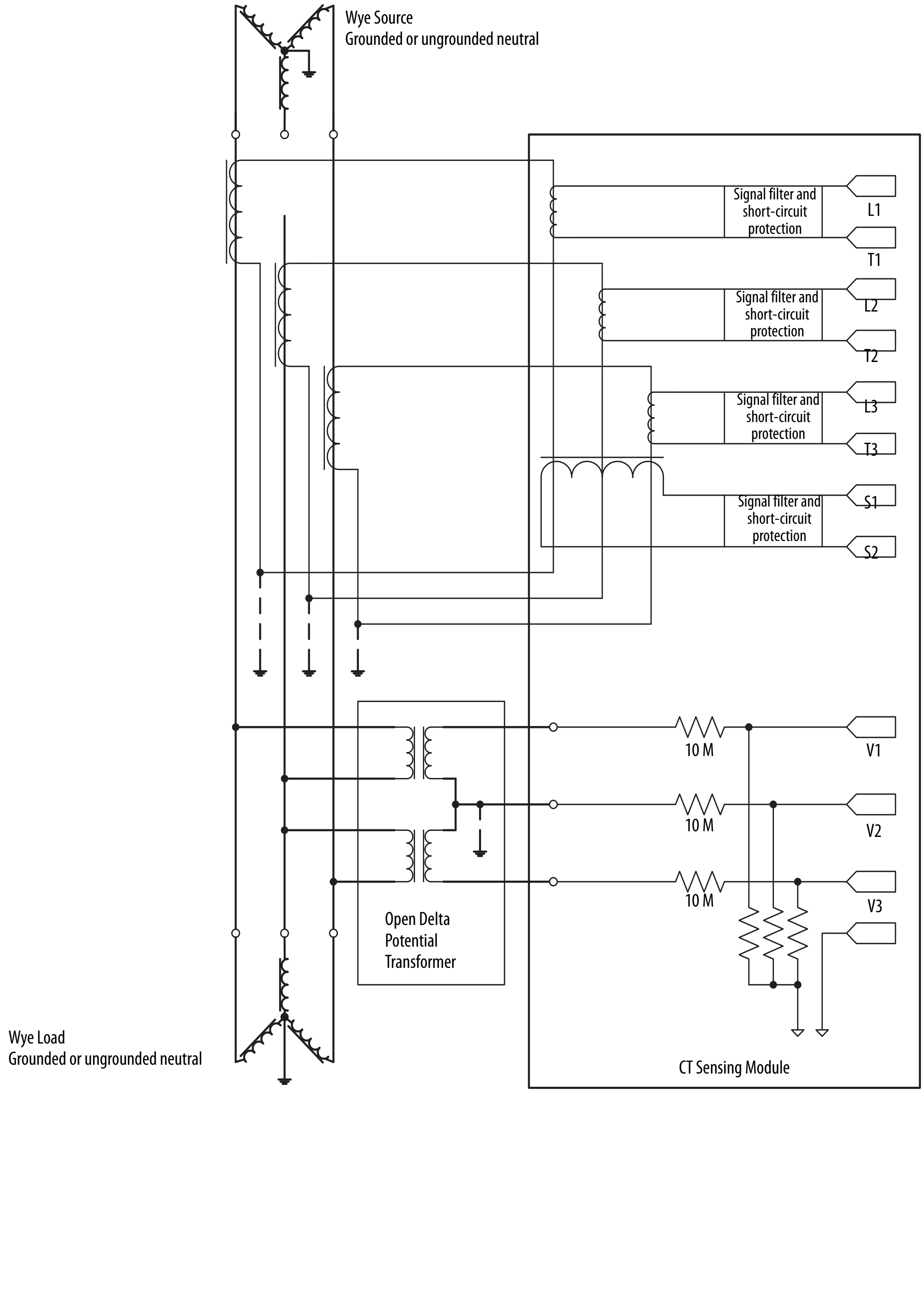


Figure 85 - Grounded B Phase Configuration With Two Potential Transformers (Open Delta)

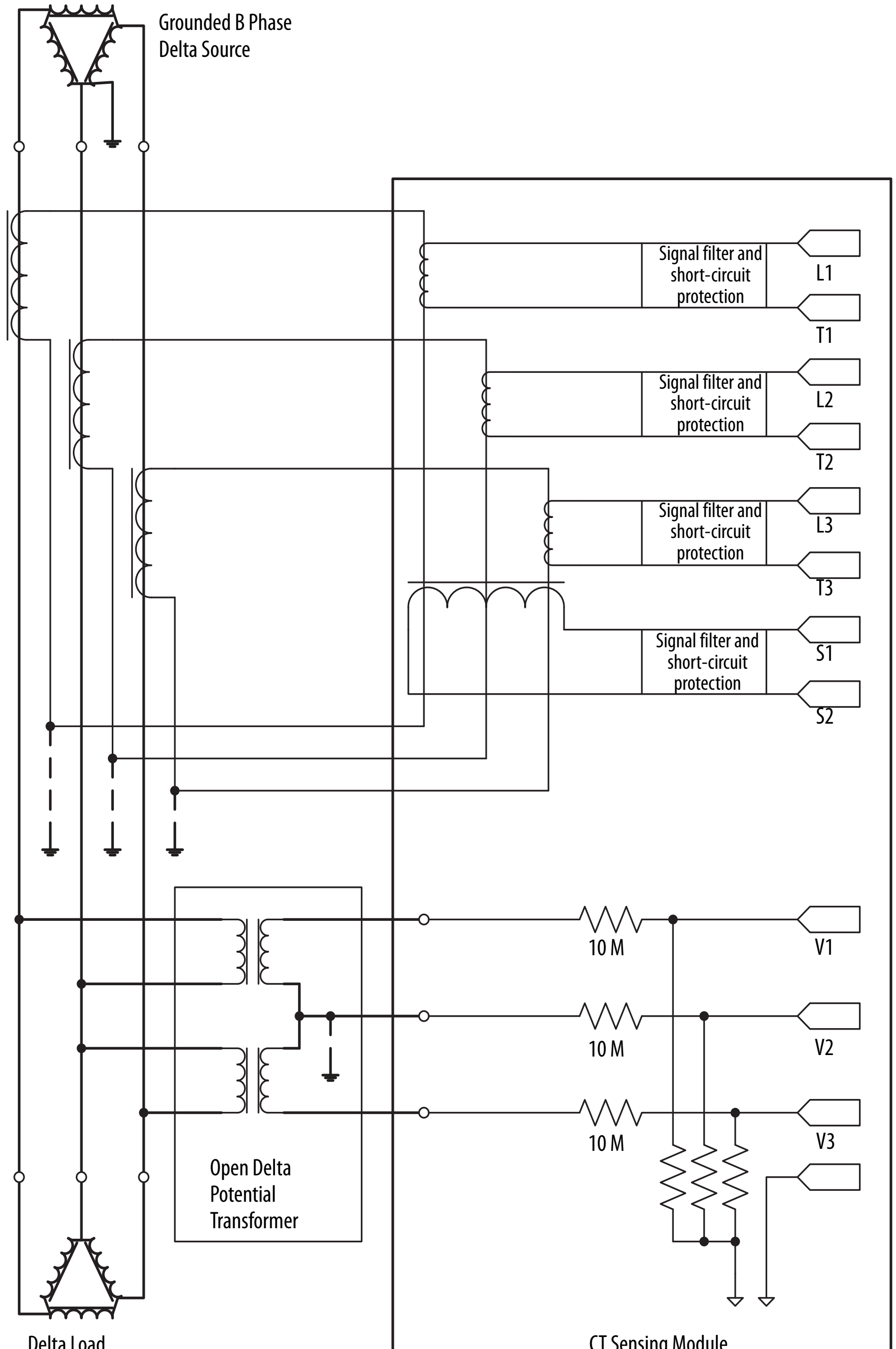


Figure 86 - Delta Configuration with Three Potential Transformers (Delta-to-Delta)

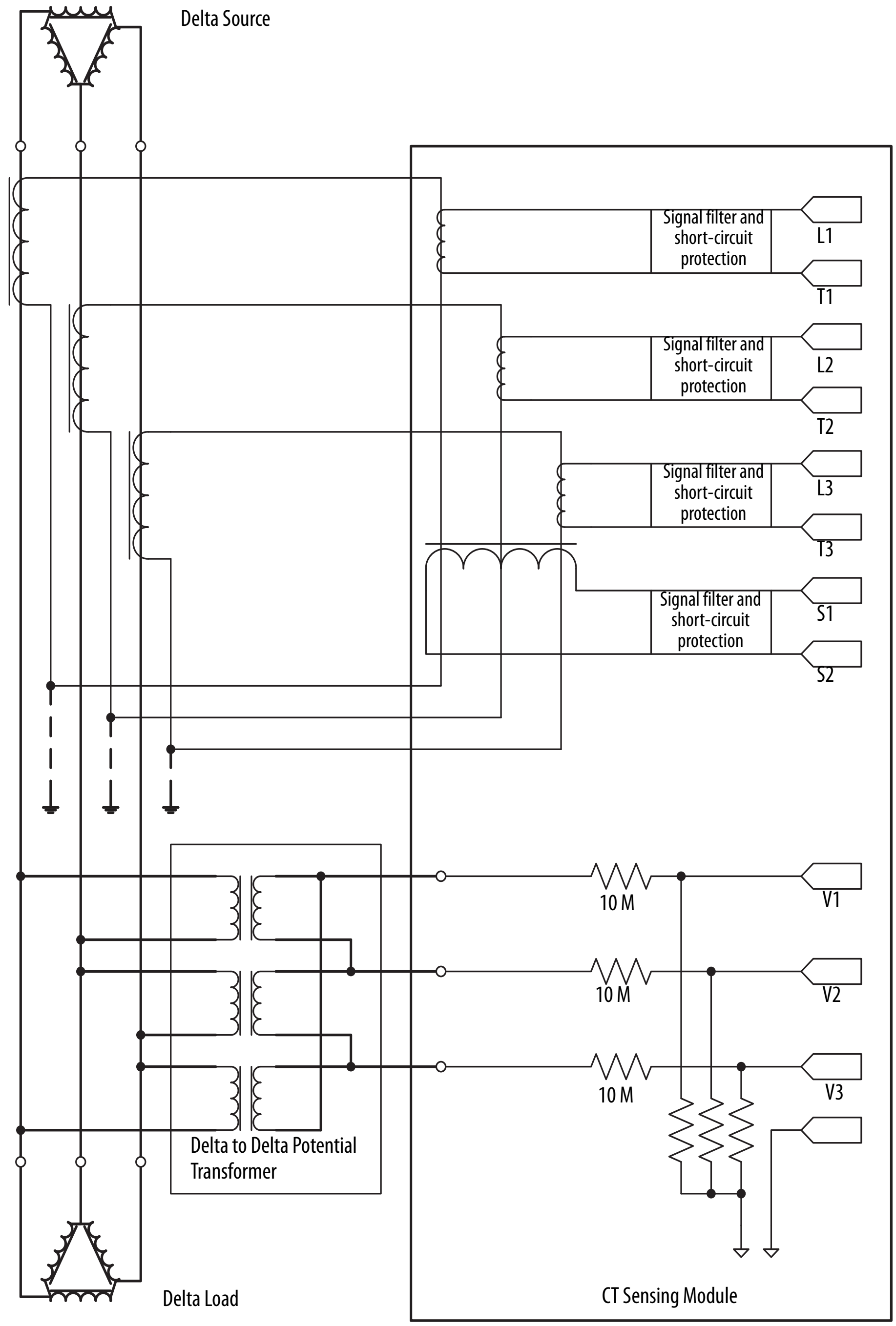


Figure 87 - Wye Configuration with Three Potential Transformers (Delta-to-Delta)

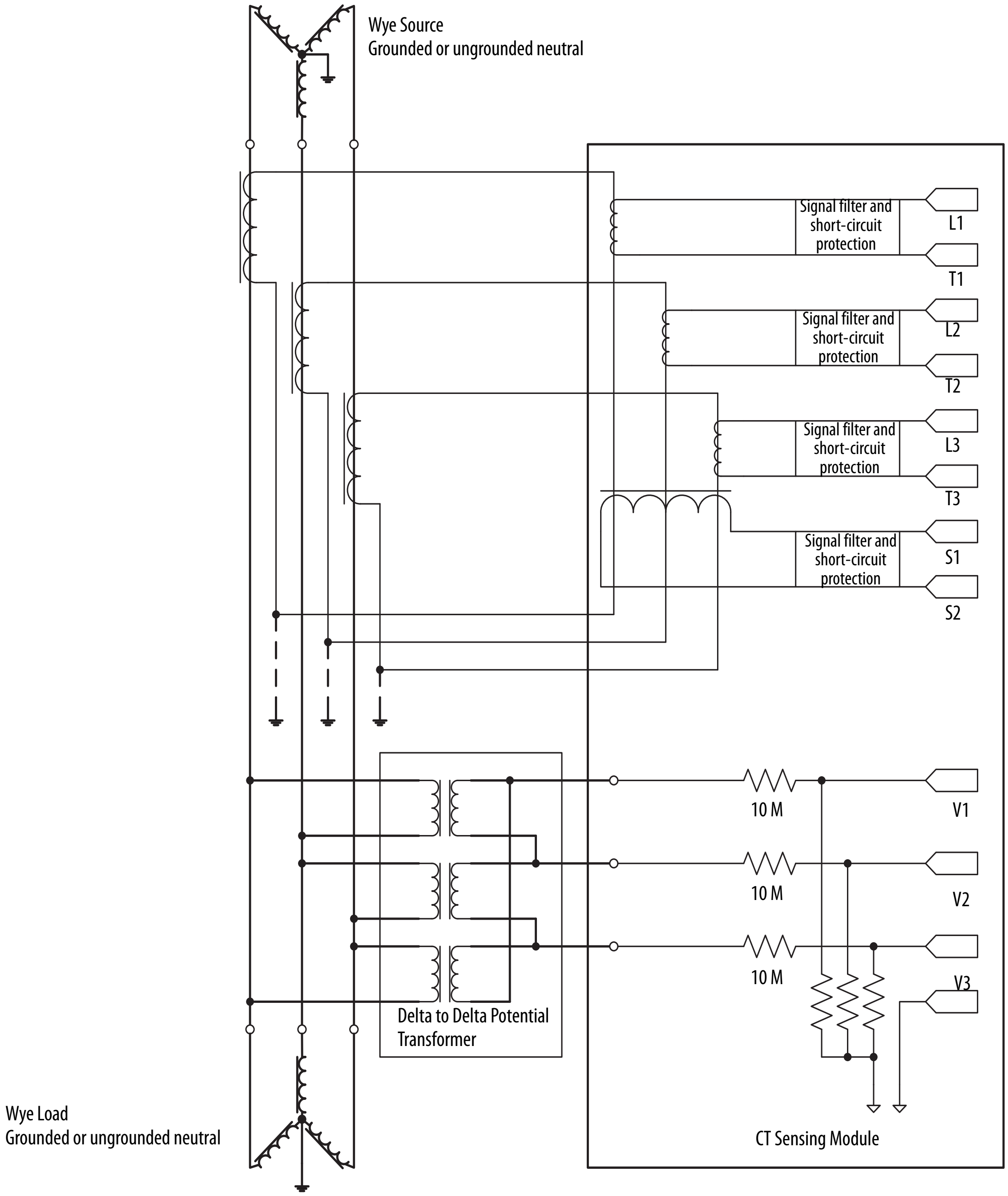


Figure 88 - Delta Configuration with Three Potential Transformers (Wye-to-Wye)

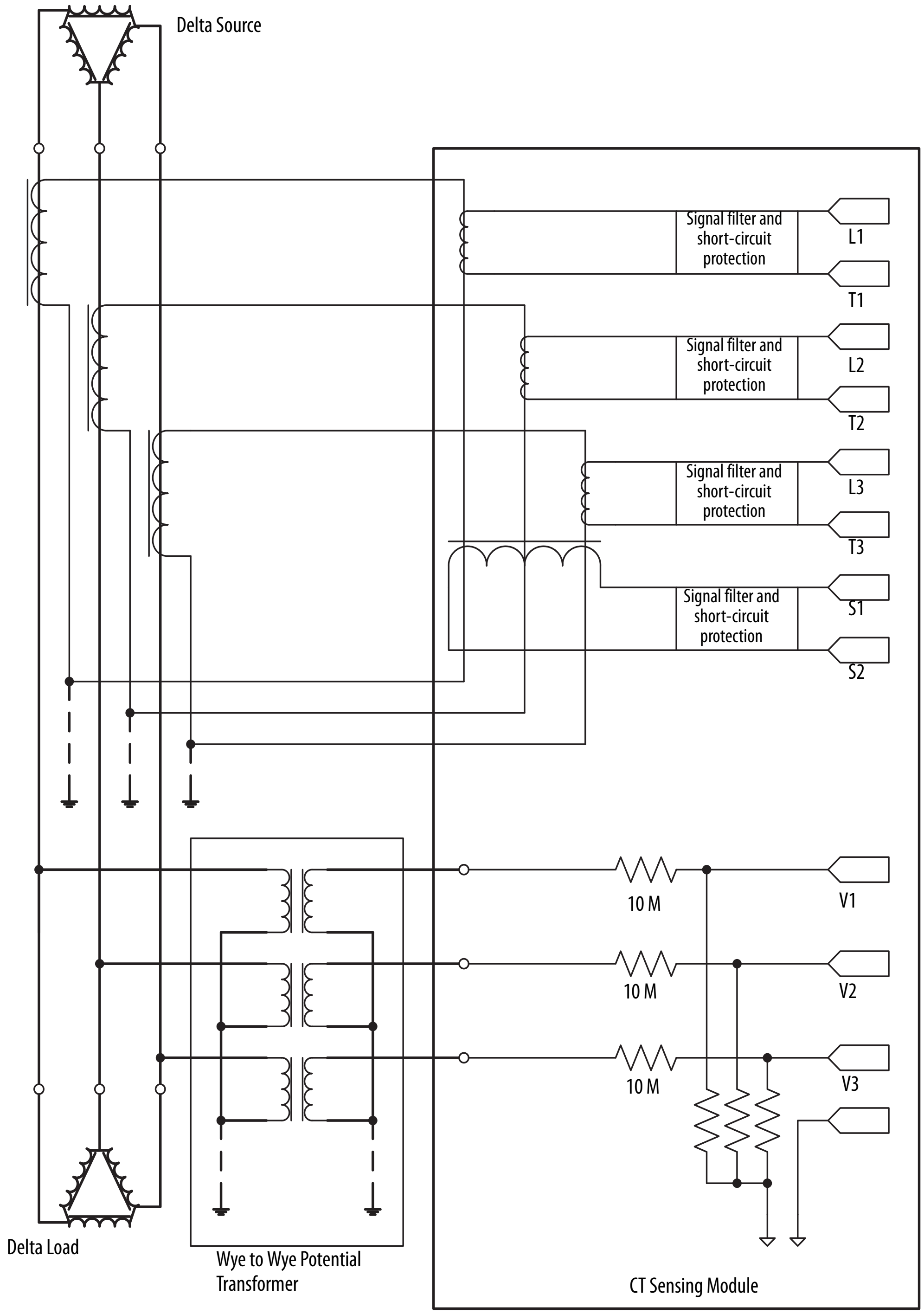


Figure 89 - Wye Configuration with Three Potential Transformers (Wye-to-Wye)

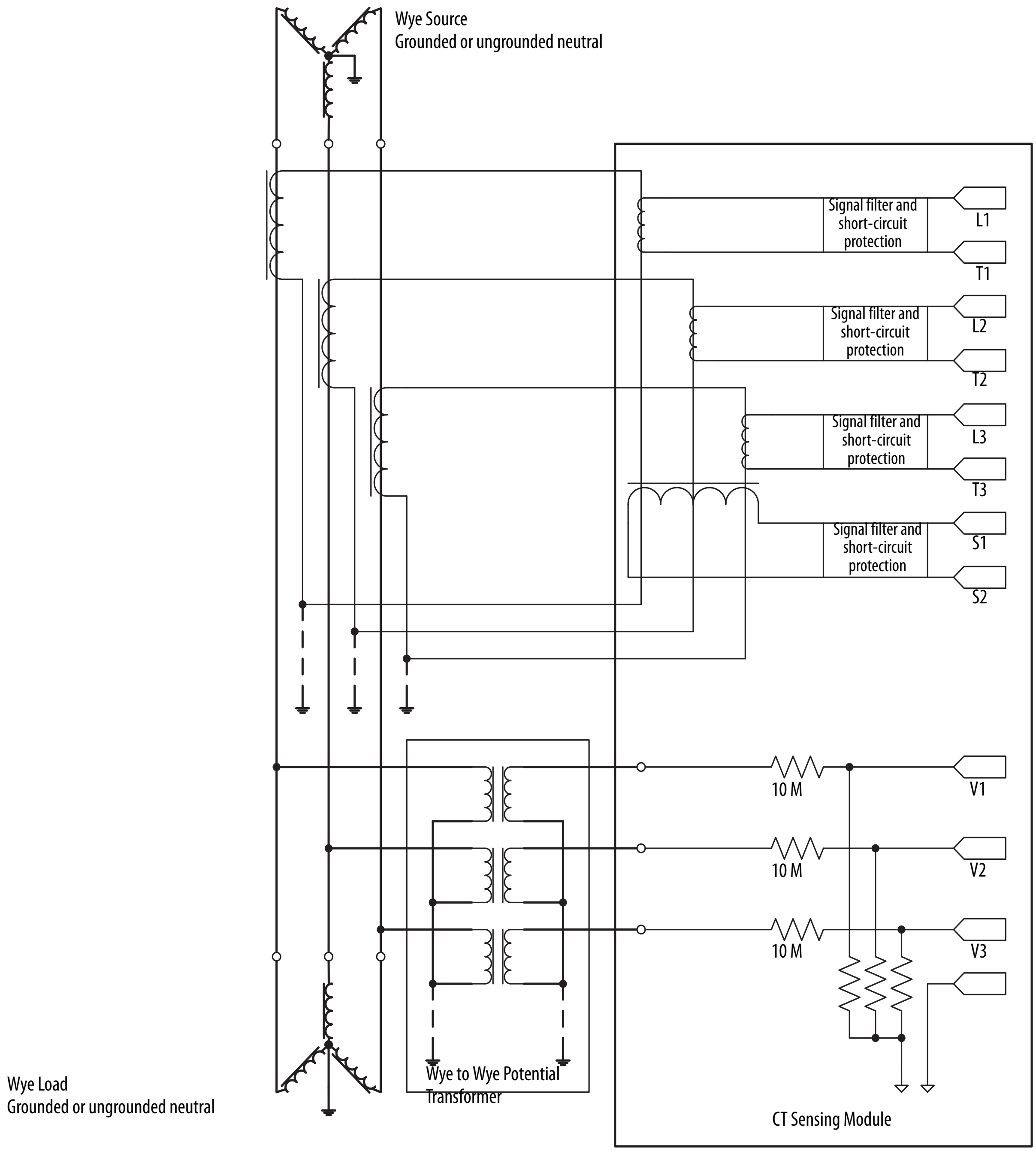


Figure 90 - Delta Configuration with Wye-to-Delta Potential Transformers

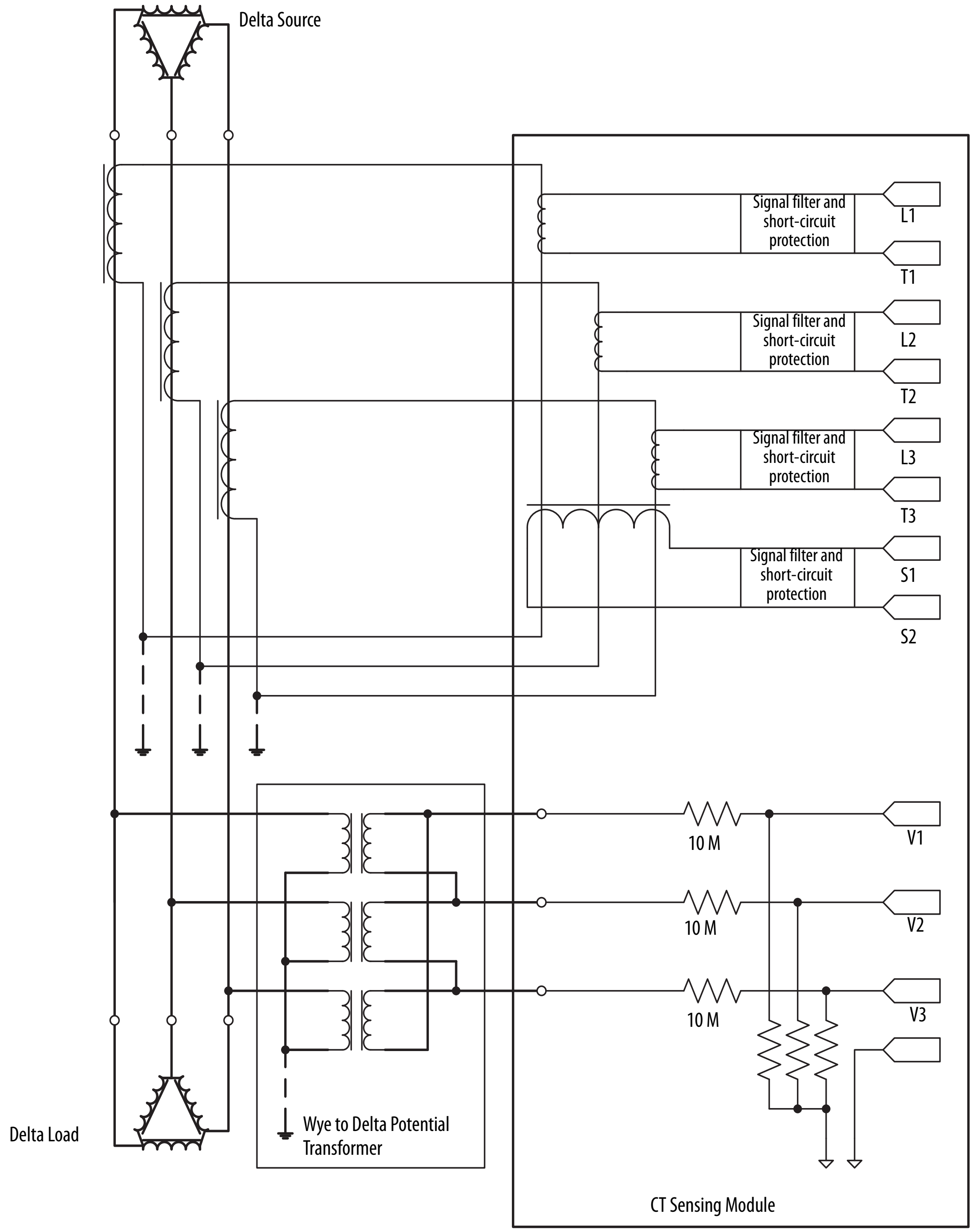


Figure 91 - Wye Configuration with Wye-to-Delta Potential Transformers

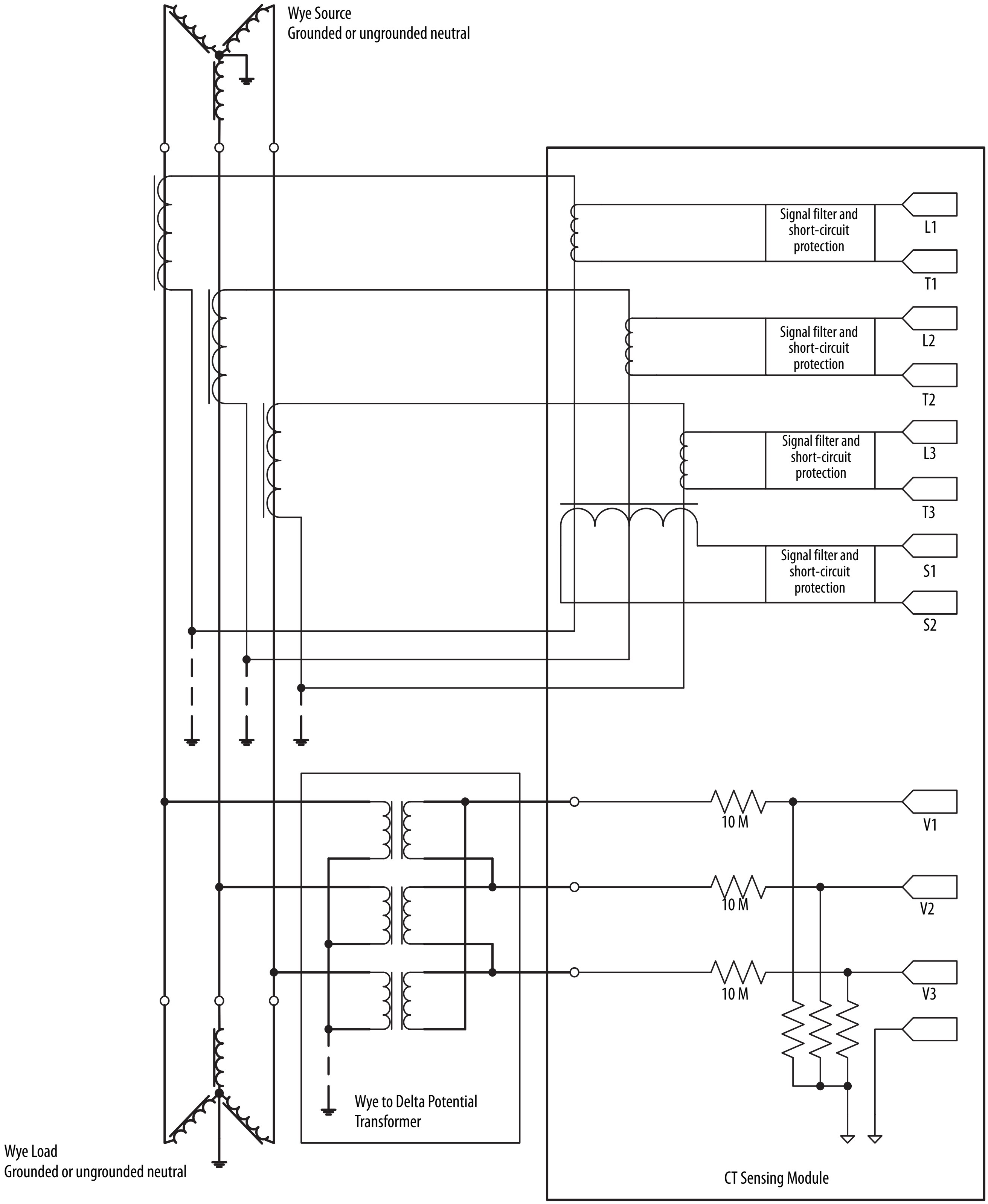


Figure 92 - Delta Configuration with Delta-to-Wye Potential Transformers

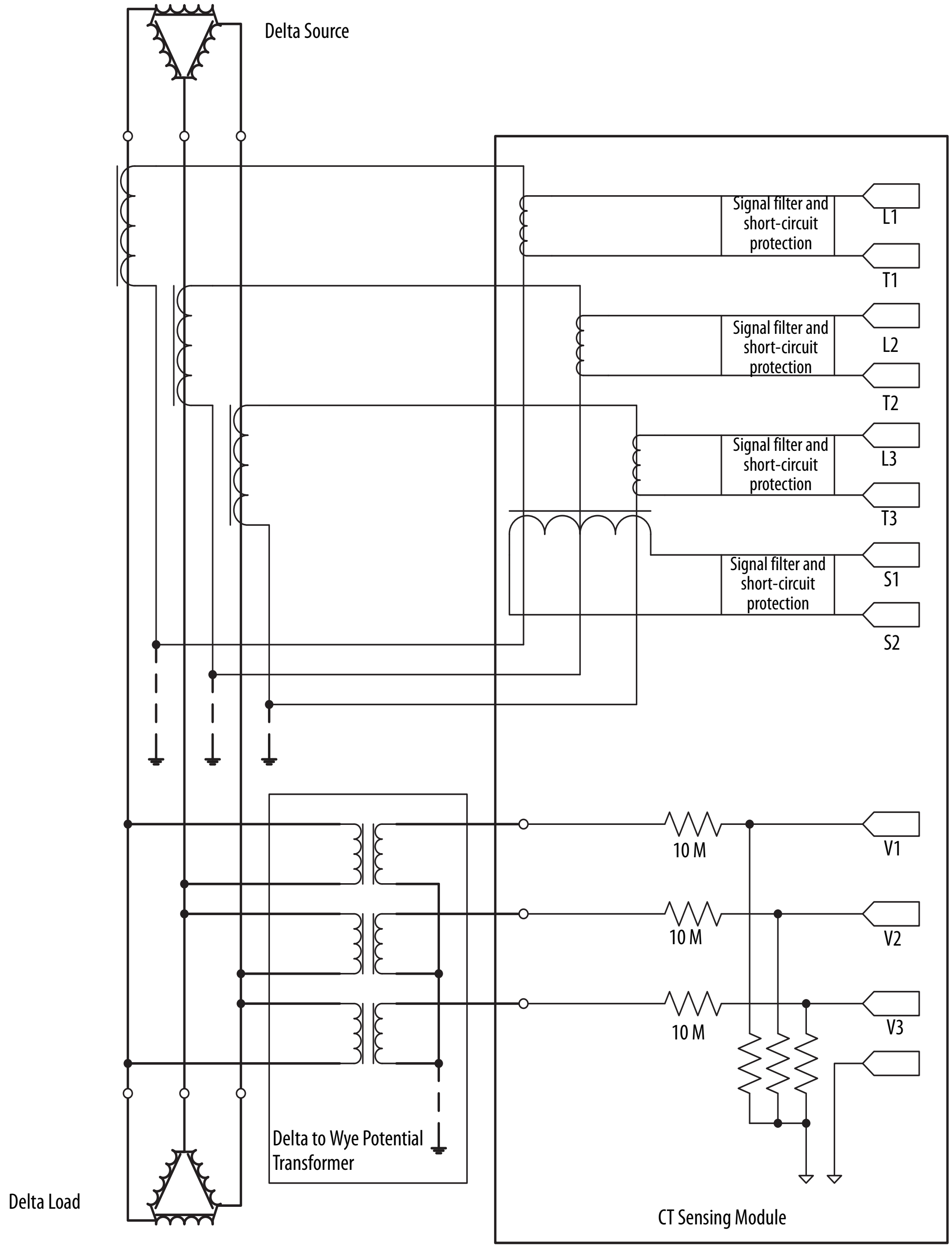
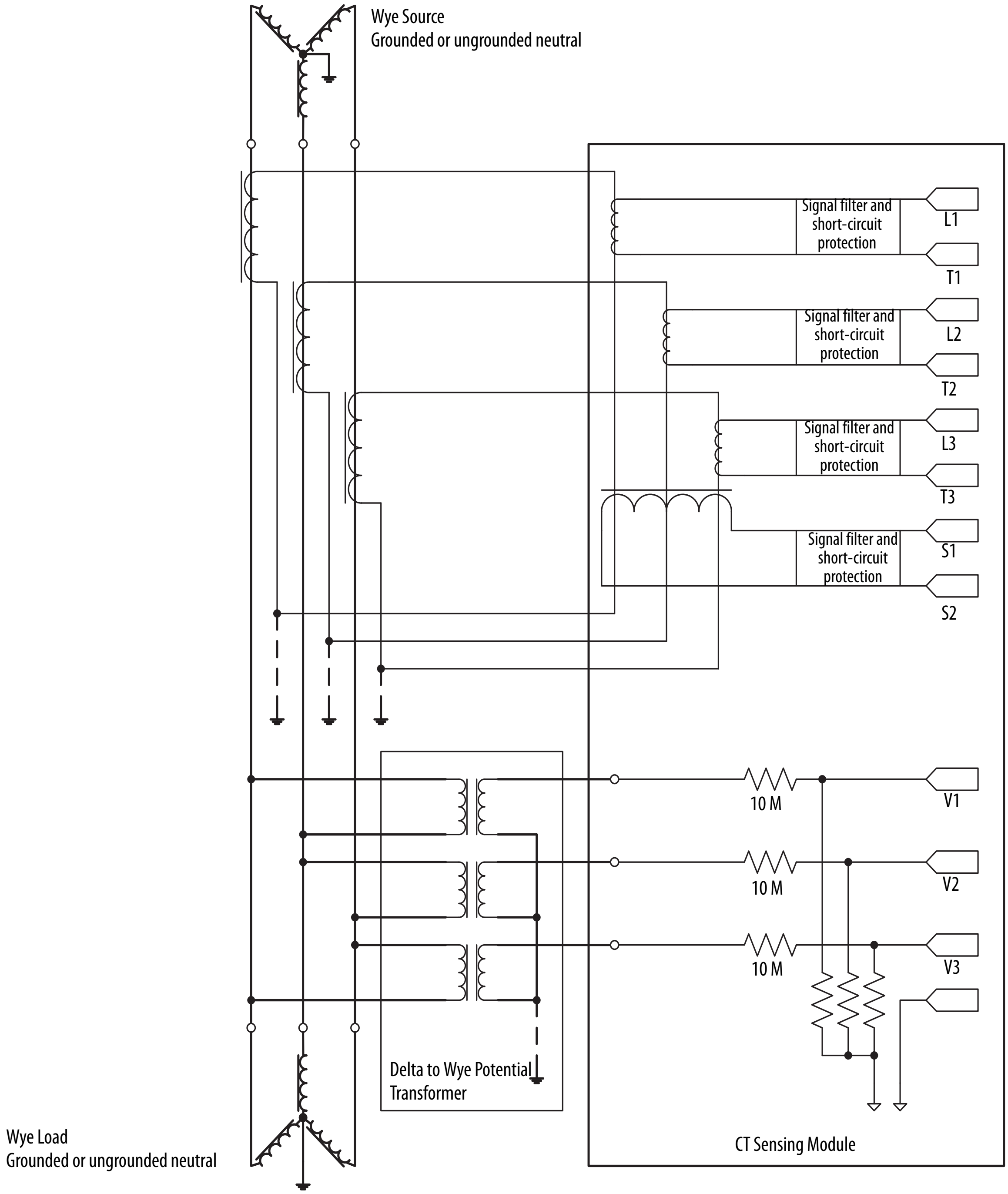


Figure 93 - Wye with Delta-to-Wye Potential Transformers



Notes:

Common Industrial Protocol (CIP) Objects

The E300™ Electronic Overload Relay's EtherNet/IP Communication Module supports the following Common Industrial Protocol (CIP).

Table 52 - CIP Object Classes

Class	Object
0x0001	Identity
0x0002	Message Router
0x0003	DeviceNet
0x0004	Assembly
0x0005	Connection
0x0008	Discrete Input Point
0x0009	Discrete Output Point
0x000A	Analog Input Point
0x000F	Parameter Object
0x0010	Parameter Group Object
0x001E	Discrete Output Group
0x0029	Control Supervisor
0x002B	Acknowledge Handler
0x002C	Overload Object
0x004E	Base Energy Object
0x004F	Electrical Energy Object
0x008B	Wall Clock Time Object
0x0097	DPI Fault Object
0x0098	DPI Warning Object
0x00C2	MCC Object

Identity Object — CLASS CODE 0x0001

The instances of the Identity Object in Table 53 are supported:

Table 53 - Identity Object Instances

Instance	Name	Revision Attribute
1	Operating System Flash	The firmware rev of the Control firmware stored in flash memory
2	Boot code Flash	The firmware rev of the Boot Code stored in flash memory
3	Sensing Module	The firmware rev of the Sensing Module firmware

The class attributes in Table 54 are supported for the Identity Object:

Table 54 - Identity Object Class Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Revision	UINT	1

Instance 1 of the Identity Object contains the attributes in Table 55 and Table 56:

Table 55 - Identity Object Instance 1 Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Vendor	UINT	1 = Allen-Bradley
2	Get	Device Type	UINT	3
3	Get	Product Code	UINT	651
4	Get	Revision Major Revision Minor Revision	Structure of: USINT USINT	Firmware revision of the Control firmware
5	Get	Status	WORD	Bit 0 – 0=not owned; 1=owned by master Bit 2 – 0=Factory Defaulted; 1=Configured Bits 4-7 – Extended Status (see Table 56) Bit 8 – Minor Recoverable fault Bit 9 – Minor Unrecoverable fault Bit 10 – Major Recoverable fault Bit 11 – Major Unrecoverable fault
6	Get	Serial Number	UDINT	unique number for each device
7	Get	Product Name String Length ASCII String	Structure of: USINT STRING	"193-EIO Application"
8	Get	State	USINT	See CIP Common Spec
9	Get	Configuration Consistency Value	UINT	16 bit CRC or checksum of all data included in the following data sets: Parameter included in the configuration assembly MCC Object configuration data DeviceLogix program data Base Energy Object attribute 16

Table 56 - Extended Device Status Field (bits 4-7) in "Status" Instance Attribute 5

Value	Description
0	Self-Testing or Unknown
1	Firmware Update in Progress
2	At least one faulted I/O connection
3	No I/O connections established
4	Nonvolatile Configuration bad
5	Major Fault – either bit 10 or bit 11 is true (1)
6	At least one I/O connection in run mode
7	At least one I/O connection established, all in idle mode

Instance 2 of the Identity Object contains the attributes in Table 57:

Table 57 - Identity Object Instance 2 Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Vendor	UINT	1 = Allen-Bradley
2	Get	Device Type	UINT	3
3	Get	Product Code	UINT	651
4	Get	Revision Major Revision Minor Revision	Structure of: USINT USINT	Firmware revision of the Boot Code
5	Get	Status	WORD	Bit 0 – 0=not owned; 1=owned by master Bit 2 – 0=Factory Defaulted; 1=Configured Bits 4-7 – Extended Status (see Table 56) Bit 8 – Minor Recoverable fault Bit 9 – Minor Unrecoverable fault Bit 10 – Major Recoverable fault Bit 11 – Major Unrecoverable fault
6	Get	Serial Number	UDINT	unique number for each device
7	Get	Product Name String Length ASCII String	Structure of: USINT STRING	"193-EIO Boot Code"
8	Get	State	USINT	See CIP Common Spec
9	Get	Configuration Consistency Value	UINT	16 bit CRC or checksum of all data included in the following data sets: Parameter included in the configuration assembly MCC Object configuration data DeviceLogix program data Base Energy Object attribute 16

Instance 3 of the Identity Object contains the attributes in Table 58:

Table 58 - Identity Object Instance 3 Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Vendor	UINT	1 = Allen-Bradley
2	Get	Device Type	UINT	3
3	Get	Product Code	UINT	651
4	Get	Revision Major Revision Minor Revision	Structure of: USINT USINT	Firmware revision of the Sensing Module firmware
5	Get	Status	WORD	Bit 0 – 0=not owned; 1=owned by master Bit 2 – 0=Factory Defaulted; 1=Configured Bits 4-7 – Extended Status (see Table 56) Bit 8 – Minor Recoverable fault Bit 9 – Minor Unrecoverable fault Bit 10 – Major Recoverable fault Bit 11 – Major Unrecoverable fault
6	Get	Serial Number	UDINT	unique number for each device
7	Get	Product Name String Length ASCII String	Structure of: USINT STRING	"193-EIO Sensing Module"
8	Get	State	USINT	See CIP Common Spec
9	Get	Configuration Consistency Value	UINT	16 bit CRC or checksum of all data included in the following data sets: Parameter included in the configuration assembly MCC Object configuration data DeviceLogix program data Base Energy Object attribute 16

The common services in Table 59 are implemented for the Identity Object.

Table 59 - Identity Object Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	No	Yes	Get_Attribute_Single
0x05	No	Yes	Reset

Message Router — CLASS CODE 0x0002

No class or instance attributes are supported. The message router object exists only to rout explicit messages to other objects.

Assembly Object — CLASS CODE 0x0004

The class attributes in Table 60 are supported for the Assembly Object:

Table 60 - Assembly Object Class Attributes

Attribute ID	Access Rule	Name	Data Type	Value
2	Get	Max. Instance	UINT	199

The static assembly instance attributes in Table 61 are supported for each assembly instance.

Table 61 - Assembly Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Number of Members in Member List	UINT	
2	Get	Member List	Array of STRUCT	Array of CIP paths
		Member Data Description	UINT	Size of Member Data in bits
		Member Path Size	UINT	Size of Member Path in bytes
		Member Path	Packed EPATH	Member EPATHs for each assembly instance
3	Conditional	Data	Array of BYTE	
4	Get	Size	UINT	Number of bytes in attribute 3
100	Get	Name String	STRING	

The services in Table 62 are implemented for the Assembly Object.

Table 62 - Assembly Object Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

Table 63 summarizes the instances of the Assembly Object that are implemented:

Table 63 - Assembly Object Instance Summary

Inst	Type	Name	Description
2	Consumed	Trip Reset Cmd	Required ODVA Consumed Instance
50	Produced	Trip Status	Required ODVA Produced Instance
100	Produced	DataLinks Object	8 Datalinks Produced Assembly
120	Config	Configuration	Configuration Assembly
144	Consumed	E300 Consumed	Default Consumed Assembly
198	Produced	Current Diags	Produced Assembly with Current Diagnostics Only
199	Produced	All Diags	Default Produced Assembly

Instance 2

Table 64 summarizes Attribute 3 Format. For additional information regarding I/O assemblies, see Appendix C.

Table 64 - Instance 2 — Basic Overload Output Assembly from ODVA Profile

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0						Fault Reset		

Table 65 - Instance 2 Attributes

Attribute ID	Access Rule	Member Index	Name	Data Type	Value
1	Get		Number of Members in Member List	UINT	2
2	Get		Member List	Array of STRUCT	
		0	Member Data Description	UINT	2
			Member Path Size	UINT	0
			Member Path	Packed EPATH	
		1	Member Data Description	UINT	1
			Member Path Size	UINT	12
			Member Path	Packed EPATH	6BH and “Fault Reset”
3	Set		Data	UINT	See data format above
4	Get		Size	UINT	1
100	Get		Name	SHORT_STRING	“Trip Reset Cmd”

Instance 50

Table 66 summarizes Attribute 3 Format:

Table 66 - Instance 50 — Basic Overload Input Assembly from ODVA Overload Profile

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0								Tripped

Table 67 - Instance 50 Attributes

Attribute ID	Access Rule	Member Index	Name	Data Type	Value
1	Get		Number of Members in Member List	UINT	1
2	Get		Member List	Array of STRUCT	
		0	Member Data Description	UINT	1
			Member Path Size	UINT	8
			Member Path	Packed EPATH	67H and “Tripped”
3	Get		Data	UINT	See data format above
4	Get		Size	UINT	1
100	Get		Name	SHORT_STRING	“Trip Status”

Instance 120 - Configuration Assembly Revision 2

Table 68 shows Attribute 3 Format and Attribute 2 Member List for revision 2 of the assembly.

Table 68 - Instance 120 — Configuration Assembly

<table>
<tr><th>INT</th><th>DINT</th><th>15</th><th>14</th><th>13</th><th>12</th><th>11</th><th>10</th><th>9</th><th>8</th><th>7</th><th>6</th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th><th>0</th><th>Size (bits)</th><th>Param</th></tr>
<tr><td>0</td><td rowspan="3">0</td><td colspan="8">ConfigAssyRev = 2</td><td colspan="8"></td><td>16</td><td>1100</td></tr>
<tr><td rowspan="2">1</td><td colspan="8"></td><td colspan="8">SetOperatingMode</td><td>8</td><td>195</td></tr>
<tr><td colspan="8">Reserved</td><td colspan="8"></td><td>8</td><td>1102</td></tr>
<tr><td>2</td><td rowspan="2">1</td><td colspan="16" rowspan="2">FLASetting</td><td rowspan="2">32</td><td rowspan="2">171</td></tr>
<tr><td>3</td></tr>
<tr><td>4</td><td rowspan="2">2</td><td colspan="16" rowspan="2">FLA2Setting</td><td rowspan="2">32</td><td rowspan="2">177</td></tr>
<tr><td>5</td></tr>
<tr><td rowspan="8">6</td><td rowspan="10">3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td colspan="8">TripClass</td><td>8</td><td>172</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>X</td><td colspan="8">OLPTCResetMode</td><td>1</td><td>173</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>X</td><td></td><td colspan="8">SingleOrThreePh</td><td>1</td><td>176</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>X</td><td></td><td></td><td colspan="8">GFFilter</td><td>1</td><td>247</td></tr>
<tr><td></td><td></td><td></td><td></td><td>X</td><td></td><td></td><td></td><td colspan="8">GFMaxInghibit</td><td>1</td><td>248</td></tr>
<tr><td></td><td></td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td colspan="8">PhaseRotTrip</td><td>1</td><td>364</td></tr>
<tr><td></td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td colspan="8">PowerScale</td><td>1</td><td>377</td></tr>
<tr><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td colspan="8">Reserved</td><td>2</td><td>1101</td></tr>
<tr><td rowspan="2">7</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td colspan="8">OLResetLevel</td><td>8</td><td>174</td></tr>
<tr><td colspan="8">OLWarningLevel</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>8</td><td>175</td></tr>
<tr><td>8</td><td rowspan="2">4</td><td colspan="16">TripEnableI</td><td>16</td><td>183</td></tr>
<tr><td>9</td><td colspan="16">WarningEnableI</td><td>16</td><td>189</td></tr>
<tr><td>10</td><td rowspan="2">5</td><td colspan="16">TripEnableV</td><td>16</td><td>184</td></tr>
<tr><td>11</td><td colspan="16">WarningEnableV</td><td>16</td><td>190</td></tr>
<tr><td>12</td><td rowspan="2">6</td><td colspan="16">TripEnableP</td><td>16</td><td>185</td></tr>
<tr><td>13</td><td colspan="16">WarningEnableP</td><td>16</td><td>191</td></tr>
<tr><td>14</td><td rowspan="2">7</td><td colspan="16">TripEnableC</td><td>16</td><td>186</td></tr>
<tr><td>15</td><td colspan="16">WarningEnableC</td><td>16</td><td>192</td></tr>
<tr><td>16</td><td rowspan="2">8</td><td colspan="16">TripEnableA</td><td>16</td><td>187</td></tr>
<tr><td>17</td><td colspan="16">WarningEnableA</td><td>16</td><td>193</td></tr>
<tr><td>18</td><td rowspan="2">9</td><td colspan="16">TripHistoryMaskI</td><td>16</td><td>139</td></tr>
<tr><td>19</td><td colspan="16">WarnHistoryMaskI</td><td>16</td><td>145</td></tr>
<tr><td>20</td><td rowspan="2">10</td><td colspan="16">TripHistoryMaskV</td><td>16</td><td>140</td></tr>
<tr><td>21</td><td colspan="16">WarnHistoryMaskV</td><td>16</td><td>146</td></tr>
<tr><td>22</td><td rowspan="2">11</td><td colspan="16">TripHistoryMaskP</td><td>16</td><td>141</td></tr>
<tr><td>23</td><td colspan="16">WarnHistoryMaskP</td><td>16</td><td>147</td></tr>
<tr><td>24</td><td rowspan="2">12</td><td colspan="16">TripHistoryMaskC</td><td>16</td><td>142</td></tr>
<tr><td>25</td><td colspan="16">WarnHistoryMaskC</td><td>16</td><td>148</td></tr>
<tr><td>26</td><td rowspan="2">13</td><td colspan="16">TripHistoryMaskA</td><td>16</td><td>143</td></tr>
<tr><td>27</td><td colspan="16">WarnHistoryMaskA</td><td>16</td><td>149</td></tr>
<tr><td>28</td><td rowspan="3">14</td><td colspan="16">MismatchAction</td><td>16</td><td>233</td></tr>
<tr><td rowspan="2">29</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td colspan="8">ControlModuleTyp</td><td>8</td><td>221</td></tr>
<tr><td colspan="7">SensingModuleTyp</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>8</td><td>222</td></tr>
</table>

INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Size (bits)	Param
30	15													OperStationType				4	224
											X	X	X	DigitalMod1Type				3	225
								X	X	X				DigitalMod2Type				3	226
					X	X	X							DigitalMod3Type				3	227
		X	X	X										DigitalMod4Type				3	228
31		AnalogMod1Type														X	X	2	229
		AnalogMod2Type												X	X			2	230
		AnalogMod3Type										X	X					2	231
		AnalogMod4Type								X	X							2	232
		Reserved																8	N/A
32	16													Language				4	212
										OutAAssignment								4	202
						OuBAssignment												4	203
		OutCAssignment																4	204
33														InPt00Assignment				4	196
										InPt01Assignment								4	197
						InPt02Assignment												4	198
		InPt03Assignment																4	199
34	17													InPt04Assignment				4	200
										InPt05Assignment								4	201
						ActFLA2wOutput												4	209
					X	EmergencyStartEn												4	216
		X	X	X	Reserved													4	N/A
35										StartsPerHour								8	205
		Reserved																8	N/A
36	18	StartsInterval																16	206
37		PMTotalStarts																16	207
38	19	PMOperatingHours																16	208
39		FeedbackTimeout																16	213
40	20	TransitionDelay																16	214
41		InterlockDelay																16	215
42	21									GroundFaultType								8	241
		GFInhibitTime																8	242
43										GFTripDelay								8	243
		GFWarningDelay																8	245
44	22	GFTripLevel																16	244
45		GFWarningLevel																16	246
46	23									PLInhibitTime								8	239
		PLTripDelay																8	240
47										StallEnabledTime								8	249
		Reserved																8	N/A
48	24	StallTripLevel																16	250
49										JamInhibitTime								8	251
		JamTripDelay																8	252
50	25	JamTripLevel																16	253
51		JamWarningLevel																16	254
52	26									ULInhibitTime								8	255
		ULTripDelay																8	256
53										ULTripLevel								8	257
		ULWarningLevel																8	258

INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Size (bits)	Param
54	27									CIInhibitTime								8	259
		CITripDelay																8	260
55										CITripLevel								8	261
		CIWarningLevel																8	262
56	28	CTPrimary																16	263
57		CTSecondary																16	264
58	29									UCInhibitTime								8	265
		L1UCTripDelay																8	266
59										L1UCTripLevel								8	267
		L1UCWarningLevel																8	268
60	30									L2UCTripDelay								8	269
		L2UCTripLevel																8	270
61										L2UCWarningLevel								8	271
		L3UCTripDelay																8	272
62	31									L3UCTripLevel								8	273
		L3UCWarningLevel																8	274
63										OCInhibitTime								8	275
		L1OCTripDelay																8	276
64	32									L1OCTripLevel								8	277
		L1OCWarningLevel																8	278
65										L2OCTripDelay								8	279
		L2OCTripLevel																8	280
66	33									L2OCWarningLevel								8	281
		L3OCTripDelay																8	282
67										L3OCTripLevel								8	283
		L3OCWarningLevel																8	284
68	34									LineLossInhTime								8	285
		L1LossTripDelay																8	286
69										L2LossTripDelay								8	287
		L3LossTripDelay																8	288
70	35	Datalink0																16	291
71		Datalink1																16	292
72	36	Datalink2																16	293
73		Datalink3																16	294
74	37	Datalink4																16	295
75		Datalink5																16	296
76	38	Datalink6																16	297
77		Datalink7																16	298

INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Size (bits)	Param
78	39	OutPt00PrFltAct															X	1	304
		OutPt00PrFltVal														X		1	305
		OutPt00ComFltAct													X			1	306
		OutPt00ComFltVal												X				1	307
		OutPt00ComIdlAct											X					1	308
		OutPt00ComIdlVal										X						1	309
		OutPt01PrFltAct									X							1	310
		OutPt01PrFltVal								X								1	311
									X	OutPt01ComFltAct								1	312
								X		OutPt01ComFltVal								1	313
							X			OutPt01ComIdlAct								1	314
						X				OutPt01ComIdlVal								1	315
					X					OutPt02PrFltAct								1	316
				X						OutPt02PrFltVal								1	317
			X							OutPt02ComFltAct								1	318
		X								OutPt02ComFltVal								1	319
79		OutPt02ComIdlAct															X	1	320
		OutPt02ComIdlVal														X		1	321
		OutDig1PrFltAct													X			1	322
		OutDig1PrFltVal												X				1	323
		OutDig1ComFltAct											X					1	324
		OutDig1ComFltVal										X						1	325
		OutDig1ComIdlAct									X							1	326
		OutDig1ComIdlVal								X								1	327
									X	OutDig2PrFltAct								1	328
								X		OutDig2PrFltVal								1	329
							X			OutDig2ComFltAct								1	330
						X				OutDig2ComFltVal								1	331
					X					OutDig2ComIdlAct								1	332
				X						OutDig2ComIdlVal								1	333
			X							OutDig3PrFltAct								1	334
		X								OutDig3PrFltVal								1	335
80	40	OutDig3ComFltAct															X	1	336
		OutDig3ComFltVal														X		1	337
		OutDig3ComIdlAct													X			1	338
		OutDig3ComIdlVal												X				1	339
		OutDig4PrFltAct											X					1	340
		OutDig4PrFltVal										X						1	341
		OutDig4ComFltAct									X							1	342
		OutDig4ComFltVal								X								1	343
									X	OutDig4ComIdlAct								1	344
								X		OutDig4ComIdlVal								1	345
							X			CommOverride								1	346
						X				NetworkOverride								1	347
		Reserved																4	N/A
81		PtDevOutCOSMask																16	350
82	41	PTPrimary																16	353
83		PTSecondary																16	354

INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Size (bits)	Param
84	42									VoltageMode								8	352
		PhRotInhibitTime																8	363
85										UVInhibitTime								8	355
		UVTripDelay																8	356
86	43	UVTripLevel																16	357
87		UVWarningLevel																16	358
88	44									OVInhibitTime								8	359
		OVTripDelay																8	360
89		OVTripLevel																16	361
90	45	OVWarningLevel																16	362
91										VUBInhibitTime								8	365
		VUBTripDelay																8	366
92	46									VUBTripLevel								8	367
		VUBWarningLevel																8	368
93										UFInhibitTime								8	369
		UFTripDelay																8	370
94	47									UFTripLevel								8	371
		UFWarningLevel																8	372
95										OFInhibitTime								8	373
		OFTripDelay																8	374
96	48									OFTripLevel								8	375
		OFWarningLevel																8	376
97										DemandPeriod								8	426
		NumberOfPeriods																8	427
98	49									UWInhibitTime								8	378
		UWTripDelay																8	379
99										OWInhibitTime								8	382
		OWTripDelay																8	383
100 101	50	UWTripLevel																32	380
102 103	51	UWWarningLevel																32	381
104 105	52	OWTripLevel																32	384
106 107	53	OWWarningLevel																32	385
108	54									UVARCInhibitTime								8	386
		UVARCTripDelay																8	387
109										OVARCInhibitTime								8	390
		OVARCTripDelay																8	391
110 111	55	UVARCTripLevel																32	388
112 113	56	UVARCWarnLevel																32	389
114 115	57	OVARCTripLevel																32	392
116 117	58	OVARCWarnLevel																32	393

INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Size (bits)	Param
118	59									UVARGInhibitTime								8	394
		UVARGTripDelay																8	395
119										OVARGInhibitTime								8	398
		OVARGTripDelay																8	399
120	60	UVARGTripLevel																32	396
121																			
122	61	UVARGWarnLevel																32	397
123																			
124	62	OVARGTripLevel																32	400
125																			
126	63	OVARGWarnLevel																32	401
127																			
128	64									UVAInhibitTime								8	402
		UVATripDelay																8	403
129										OVAInhibitTime								8	406
		OVATripDelay																8	407
130	65	UVATripLevel																32	404
131																			
132	66	UVAWarningLevel																32	405
133																			
134	67	OVATripLevel																32	408
135																			
136	68	OVAWarningLevel																32	409
137																			
138	69									UPFLagInhibTime								8	410
		UPFLagTripDelay																8	411
139										UPFLagTripLevel								8	412
		UPFLagWarnLevel																8	413
140	70									OPFLagInhibTime								8	414
		OPFLagTripDelay																8	415
141										OPFLagTripLevel								8	416
		OPFLagWarnLevel																8	417
142	71									UPFLeadInhibTime								8	418
		UPFLeadTripDelay																8	419
143										UPFLeadTripLevel								8	420
		UPFLeadWarnLevel																8	421
144	72									OPFLeadInhibTime								8	422
		OPFLeadTripDelay																8	423
145										OPFLeadTripDelay								8	424
		OPFLeadWarnLevel																8	425
146	73	Screen1Param1																16	428
147		Screen1Param2																16	429
148	74	Screen1Param3																16	430
149		Reserved																16	1103
150	75	Reserved																16	1103
151		Reserved																16	1103
152	76	Reserved																16	1103
153		Reserved																16	1103
154	77	Reserved																16	1103
155		Reserved																16	1103

INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Size (bits)	Param
156	78									InAMod1C0TripDly								8	443
		InAMod1C1TripDly																8	452
157										InAMod1C2TripDly								8	461
		Reserved																8	1102
158	79	InAMod1C0TripLvl																16	444
159		InAMod1C0WarnLvl																16	445
160	80	InAMod1C1TripLvl																16	453
161		InAMod1C1WarnLvl																16	454
162	81	InAMod1C2TripLvl																16	462
163		InAMod1C2WarnLvl																16	463
164	82												InAnMod1Ch00Type					5	437
								InAnMod1Ch01Type										5	446
			InAnMod1Ch02Type															5	455
		X	Reserved															1	1101
165										OutAnMod1Select								8	465
							X	X	X	InAMod1Ch0Format								3	438
				X	X	X				InAMod1C0FiltFrq								3	440
		X	X							InAMod1C0OpCktSt								2	441
166	83	InAMod1Ch1Format													X	X	X	3	447
		InAMod1C1FiltFrq										X	X	X				3	449
		InAMod1C1OpCktSt								X	X							2	450
							X	X	X	InAMod1Ch2Format								3	456
				X	X	X				InAMod1C2FiltFrq								3	458
		X	X							InAMod1C2OpCktSt								2	459
167		InAMod1C0TmpUnit															X	1	439
		InAnMod1Ch0RTDEn														X		1	442
		InAMod1C1TmpUnit													X			1	448
		InAnMod1Ch1RTDEn												X				1	451
		InAMod1C2TmpUnit											X					1	457
		InAnMod1Ch2RTDEn										X						1	460
		OutAnMod1FltActn								X	X							2	466
								X	X	OutAnMod1IdlActn								2	467
				X	X	X	X			OutAnMod1Type								4	464
		X	X							Reserved								2	1101
168	84									InAMod2C0TripDly								8	474
		InAMod2C1TripDly																8	483
169										InAMod2C2TripDly								8	492
		Reserved																8	1102
170	85	InAMod2C0TripLvl																16	475
171		InAMod2C0WarnLvl																16	476
172	86	InAMod2C1TripLvl																16	484
173		InAMod2C1WarnLvl																16	485
174	87	InAMod2C2TripLvl																16	493
175		InAMod2C2WarnLvl																16	494

INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Size (bits)	Param
176	88												InAnMod2Ch00Type					5	468
								InAnMod2Ch01Type										5	477
			InAnMod2Ch02Type															5	486
		X	Reserved															1	1101
177										OutAnMod2Select								8	496
							X	X	X	InAMod2Ch0Format								3	469
				X	X	X				InAMod2C0FiltFrq								3	471
		X	X							InAMod2C0OpCktSt								2	472
178	89	InAMod2Ch1Format													X	X	X	3	478
		InAMod2C1FiltFrq										X	X	X				3	480
		InAMod2C1OpCktSt								X	X							2	481
							X	X	X	InAMod2Ch2Format								3	487
				X	X	X				InAMod2C2FiltFrq								3	489
		X	X							InAMod2C2OpCktSt								2	490
179		InAMod2C0TmpUnit															X	1	470
		InAnMod2Ch0RTDEn														X		1	473
		InAMod2C1TmpUnit													X			1	479
		InAnMod2Ch1RTDEn												X				1	482
		InAMod2C2TmpUnit											X					1	488
		InAnMod2Ch2RTDEn										X						1	491
		OutAnMod2FltActn								X	X							2	497
								X	X	OutAnMod2dlActn								2	498
				X	X	X	X			OutAnMod2Type								4	495
		X	X							Reserved								2	1101
180	90									InAMod3C0TripDly								8	505
		InAMod3C1TripDly																8	514
181										InAMod3C2TripDly								8	523
		Reserved																8	1102
182	91	InAMod3C0TripLvl																16	506
183		InAMod3C0WarnLvl																16	507
184	92	InAMod3C1TripLvl																16	515
185		InAMod3C1WarnLvl																16	516
186	93	InAMod3C2TripLvl																16	524
187		InAMod3C2WarnLvl																16	525
188	94												InAnMod3Ch00Type					5	499
								InAnMod3Ch01Type										5	508
			InAnMod3Ch02Type															5	517
		X	Reserved															1	N/A
189										OutAnMod3Select								8	527
							X	X	X	InAMod3Ch0Format								3	500
				X	X	X				InAMod3C0FiltFrq								3	502
		X	X							InAMod3C0OpCktSt								2	503

INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Size (bits)	Param
190	95	InAMod3Ch1Format													X	X	X	3	509
		InAMod3C1FiltFrq										X	X	X				3	511
		InAMod3C1OpCktSt								X	X							2	512
							X	X	X	InAMod3Ch2Format								3	518
				X	X	X				InAMod3C2FiltFrq								3	520
		X	X							InAMod3C2OpCktSt								2	521
191		InAMod3C0TmpUnit															X	1	501
		InAnMod3Ch0RTDEn														X		1	504
		InAMod3C1TmpUnit													X			1	510
		InAnMod3Ch1RTDEn												X				1	513
		InAMod3C2TmpUnit											X					1	519
		InAnMod3Ch2RTDEn										X						1	522
		OutAnMod3FltActn								X	X							2	528
								X	X	OutAnMod3dlActn								2	529
				X	X	X	X			OutAnMod3Type								4	526
		X	X							Reserved								2	1101
192	96									InAMod4C0TripDly								8	536
		InAMod4C1TripDly																8	545
193										InAMod4C2TripDly								8	554
		Reserved																8	1102
194	97	InAMod4C0TripLvl																16	537
195		InAMod4C0WarnLvl																16	538
196	98	InAMod4C1TripLvl																16	546
197		InAMod4C1WarnLvl																16	547
198	99	InAMod4C2TripLvl																16	555
199		InAMod4C2WarnLvl																16	556
200	100												InAnMod4Ch00Type					5	530
								InAnMod4Ch01Type										5	539
			InAnMod4Ch02Type															5	548
		X	Reserved															1	1101
201										OutAnMod4Select								8	558
							X	X	X	InAMod4Ch0Format								3	531
				X	X	X				InAMod4C0FiltFrq								3	533
		X	X							InAMod4C0OpCktSt								2	534
202	101	InAMod4Ch1Format													X	X	X	3	540
		InAMod4C1FiltFrq										X	X	X				3	542
		InAMod4C1OpCktSt								X	X							2	543
							X	X	X	InAMod4Ch2Format								3	549
				X	X	X				InAMod4C2FiltFrq								3	551
		X	X							InAMod4C2OpCktSt								2	552
203		InAMod3C0TmpUnit															X	1	532
		InAnMod4Ch0RTDEn														X		1	535
		InAMod4C1TmpUnit													X			1	541
		InAnMod4Ch1RTDEn												X				1	544
		InAMod4C2TmpUnit											X					1	550
		InAnMod4Ch2RTDEn										X						1	553
		OutAnMod4FltActn								X	X							2	559
								X	X	OutAnMod4dlActn								2	560
				X	X	X	X			OutAnMod4Type								4	557
		X	X							Reserved								2	1001

Instance 120 - Configuration Assembly Revision 1

Table 69 shows Attribute 3 Format and Attribute 2 Member List for revision 1 of the assembly. This is a stripped down simple version of a config assembly.

Table 69 - Instance 120 — Configuration Assembly

INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Size (bits)	Param
0	0	ConfigAssyRev = 1								Reserved								16	1002
1		Reserved																16	N/A
2	1	FLASetting																32	171
3																			
4	3									TripClass								8	172
									X	OLPTCResetMode								1	173
								X		SingleOrThreePh								1	176
		X	X	X	X	X	X			Reserved								6	N/A
5										OLResetLevel								8	174
		OLWarningLevel																8	175

Instance 144 – Default Consumed Assembly

Table 70 - Instance 144 – Default Consumed Assembly

INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Size (bits)	Path
0	0	OutputStatus0																16	Param18
1		NetworkStart1 (O.LogicDefinedPt00Data)															X		Symbolic
		NetworkStart2 (O.LogicDefinedPt01Data)														X			Symbolic
		TripReset													X				Symbolic
		EmergencyStart												X					Symbolic
		RemoteTrip											X						Symbolic
		Reserved								X	X	X							N/A
									X	HMILED1Green									Symbolic
								X		HMILED2Green									Symbolic
							X			HMILED3Green									Symbolic
						X				HMILED3Red									Symbolic
					X					HMILED4Red									Symbolic
		X	X	X						Reserved									N/A
2	1	DLXPtDeviceIn																16	Symbolic
3		DLXAnDeviceIn																16	Symbolic

Instance 198 - Current Diagnostics Produced Assembly

Table 71 - Instance 198 – Current Diagnostics Produced Assembly

INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Size (bits)	Param
0	0	Reserved for Logix																32	1104
1																			
2	1	DeviceStaus0																16	20
3		DeviceStaus1																16	21
4	2	InputStatus0																16	16
5		InputStatus1																16	17

INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Size (bits)	Param
6	3	OutputStatus																16	18
7		OpStationStatus																16	19
8	4	TripStsCurrent																16	4
9		WarnStsCurrent																16	10
10	5	TripStsVoltage																16	5
11		WarnStsVoltage																16	11
12	6	TripStsPower																16	6
13		WarnStsPower																16	12
14	7	TripStsControl																16	7
15		WarnStsControl																16	13
16	8	TripStsAnalog																16	8
17		WarnStsAnalog																16	14
18	9	Reserved																16	1103
19		MismatchStatus																16	40
20	10									ThermUtilizedPct								8	1
		CurrentImbal																8	52
21		AvgPercentFLA																16	50
22	11	AverageCurrent																32	46
23																			
24	12	L1Current																32	43
25																			
26	13	L2Current																32	44
27																			
28	14	L3Current																32	45
29																			
30	15	GFCurrent																16	51
31		Reserved																16	1103
32	16	Datalink1																32	1291
33																			
34	17	Datalink2																32	1292
35																			
36	18	Datalink3																32	1293
37																			
38	19	Datalink4																32	1294
39																			
40	20	Datalink5																32	1295
41																			
42	21	Datalink6																32	1296
43																			
44	22	Datalink7																32	1297
45																			
46	23	Datalink8																32	1298
47																			
48	24	PtDeviceOuts																16	348
49		AnDeviceOuts																16	1105
50	25	InAnMod1Ch00																16	111
51		InAnMod1Ch01																16	112
52	26	InAnMod1Ch02																16	113
53		Reserved																16	1103

INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Size (bits)	Param
54	27	InAnMod2Ch00																16	114
55		InAnMod2Ch01																16	115
56	28	InAnMod2Ch02																16	116
57		Reserved																16	1103
58	29	InAnMod3Ch00																16	117
59		InAnMod3Ch01																16	118
60	30	InAnMod3Ch02																16	119
61		Reserved																16	1103
62	31	InAnMod4Ch00																16	120
63		InAnMod4Ch01																16	121
64	32	InAnMod4Ch02																16	122
65		Reserved																16	1103

Instance 199 - All Diagnostics Produced Assembly

Table 72 - Instance 199 - All Diagnostics Produced Assembly

INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Size (bits)	Param
0	0	Reserved for Logix																32	1104
1																			
2	1	DeviceStaus0																16	20
3		DeviceStaus1																16	21
4	2	InputStatus0																16	16
5		InputStatus1																16	17
6	3	OutputStatus																16	18
7		OpStationStatus																16	19
8	4	TripStsCurrent																16	4
9		WarnStsCurrent																16	10
10	5	TripStsVoltage																16	5
11		WarnStsVoltage																16	11
12	6	TripStsPower																16	6
13		WarnStsPower																16	12
14	7	TripStsControl																16	7
15		WarnStsControl																16	13
16	8	TripStsAnalog																16	8
17		WarnStsAnalog																16	14
18	9	Reserved																16	1104
19																		16	40
20	10									ThermUtilizedPct								8	1
		CurrentImbalance																8	52
21		AvgPercentFLA																16	50
22	11	AverageCurrent																32	46
23																			
24	12	L1Current																32	43
25																			
26	13	L2Current																32	44
27																			
28	14	L3Current																32	45
29																			

INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Size (bits)	Param
30	15	GFCurrent																16	51
31		Reserved																16	1103
32	16	AvgVoltageLtoL																16	56
33		L1toL2Voltage																16	53
34	17	L2toL3Voltage																16	54
35		L3toL1Voltage																16	55
36	18	TotalRealPower																32	67
37																			
38	19	TotalReactivePwr																32	71
39																			
40	20	TotalApparentPwr																32	75
41																			
42	21	TotalPowerFactor																32	79
43																			
44	22	Datalink0																32	1291
45																			
46	23	Datalink1																32	1292
47																			
48	24	Datalink2																32	1293
49																			
50	25	Datalink3																32	1294
51																			
52	26	Datalink4																32	1295
53																			
54	27	Datalink5																32	1296
55																			
56	28	Datalink6																32	1297
57																			
58	29	Datalink7																32	1298
59																			
60	30	PtDeviceOuts																16	348
61		AnDeviceOuts																16	1105
62	31	InAnMod1Ch00																16	111
63		InAnMod1Ch01																16	112
64	32	InAnMod1Ch02																16	113
65		Reserved																16	1103
66	33	InAnMod2Ch00																16	114
67		InAnMod2Ch01																16	115
68	34	InAnMod2Ch02																16	116
69		Reserved																16	1103
70	35	InAnMod3Ch00																16	117
71		InAnMod3Ch01																16	118
72	36	InAnMod3Ch02																16	119
73		Reserved																16	1103
74	37	InAnMod4Ch00																16	120
75		InAnMod4Ch01																16	121
76	38	InAnMod4Ch02																16	122
77		Reserved																16	1103

Connection Object — CLASS CODE 0x0005

No class attributes are supported for the Connection Object

Multiple instances of the Connection Object are supported, instances 1, 2 and 4 from the group 2 predefined master/slave connection set, and instances 5-7 are available explicit UCMM connections.

Instance 1 is the Predefined Group 2 Connection Set Explicit Message Connection. The instance 1 attributes in Table 73 are supported:

Table 73 - Connection Object — CLASS CODE 0x0005 Instance 1 Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	State	USINT	0=nonexistant 1=configuring 3=established 4=timed out
2	Get	Instance Type	USINT	0=Explicit Message
3	Get	Transport Class Trigger	USINT	0x83 - Server, Transport Class 3
4	Get	Produced Connection ID	UINT	10xxxxxx011 xxxxxx = node address
5	Get	Consumed Connection ID	UINT	10xxxxxx100 xxxxxx = node address
6	Get	Initial Comm Characteristics	USINT	0x22
7	Get	Produced Connection Size	UINT	0x61
8	Get	Consumed Connection Size	UINT	0x61
9	Get/Set	Expected Packet Rate	UINT	in milliseconds
12	Get	Watchdog Action	USINT	01 = auto delete 03 = deferred delete
13	Get	Produced Connection Path Length	UINT	0
14	Get	Produced Connection Path		Empty
15	Get	Consumed Connection Path Length	UINT	0
16	Get	Consumed Connection Path		Empty

Instance 2 is the Predefined Group 2 Connection Set Polled IO Message Connection. The instance 2 attributes in Table 74 are supported:

Table 74 - Connection Object — CLASS CODE 0x0005 Instance 2 Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	State	USINT	0=nonexistant 1=configuring 3=established 4=timed out
2	Get	Instance Type	USINT	1= I/O Connection
3	Get	Transport Class Trigger	USINT	0x82 - Server, Transport Class 2 (If alloc_choice != polled and ack suppression is enabled then value = 0x80)
4	Get	Produced Connection ID	UINT	01111xxxxxx xxxxxx= node address
5	Get	Consumed Connection ID	UINT	10xxxxxx101 xxxxxx= node address
6	Get	Initial Comm Characteristics	USINT	0x21
7	Get	Produced Connection Size	UINT	0 to 8
8	Get	Consumed Connection Size	UINT	0 to 8
9	Get/Set	Expected Packet Rate	UINT	in milliseconds
12	Get/Set	Watchdog Action	USINT	0=transition to timed out 1=auto delete 2=auto reset
13	Get	Produced Connection Path Length	UINT	8
14	Get/Set	Produced Connection Path		21 04 00 25 (assy inst) 00 30 03
15	Get	Consumed Connection Path Length	UINT	8
16	Get/Set	Consumed Connection Path		21 04 00 25 (assy inst) 00 30 03

Instance 4 is the Predefined Group 2 Connection Set Change of State / Cyclic I/O Message Connection. The instance 4 attributes in Table 75 are supported:

Table 75 - Connection Object — CLASS CODE 0x0005 Instance 4 Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	State	USINT	0=nonexistant 1=configuring 3=established 4=timed out
2	Get	Instance Type	USINT	1=I/O Connection
3	Get	Transport Class Trigger	USINT	0x00 (Cyclic, unacknowledged) 0x03 (Cyclic, acknowledged) 0x10 (COS, unacknowledged) 0x13 (COS, acknowledged)
4	Get	Produced Connection ID	UINT	01101xxxxxx xxxxxx= node address
5	Get	Consumed Connection ID	UINT	10xxxxxx101 xxxxxx= node address
6	Get	Initial Comm Characteristics	USINT	0x02 (acknowledged) 0x0F (unacknowledged)
7	Get	Produced Connection Size	UINT	0 to 8
8	Get	Consumed Connection Size	UINT	0 to 8
9	Get/Set	Expected Packet Rate	UINT	in milliseconds
12	Get	Watchdog Action	USINT	0=transition to timed out 1=auto delete 2=auto reset
13	Get	Produced Connection Path Length	UINT	8
14	Get	Produced Connection Path		21 04 00 25 (assy inst) 00 30 03
15	Get	Consumed Connection Path Length	UINT	8
16	Get/Set	Consumed Connection Path		21 04 00 25 (assy inst) 00 30 03

Instances 5 - 7 are available group 3 explicit message connections that are allocated through the UCMM. The attributes in Table 76 are supported:

Table 76 - Connection Object — CLASS CODE 0x0005 Instance 5…7 Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	State	USINT	0=nonexistant 1=configuring 3=established 4=timed out
2	Get	Instance Type	USINT	0=Explicit Message
3	Get	Transport Class Trigger	USINT	0x83 - Server, Transport Class 3
4	Get	Produced Connection ID	UINT	Depends on message group and Message ID
5	Get	Consumed Connection ID	UINT	Depends on message group and Message ID
6	Get	Initial Comm Characteristics	USINT	0x33 (Group 3)
7	Get	Produced Connection Size	UINT	0
8	Get	Consumed Connection Size	UINT	
9	Get/Set	Expected Packet Rate	UINT	in milliseconds
12	Get	Watchdog Action	USINT	01 = auto delete 03 = deferred delete
13	Get	Produced Connection Path Length	UINT	0
14	Get	Produced Connection Path		Empty
15	Get	Consumed Connection Path Length	UINT	0
16	Get	Consumed Connection Path		Empty

The services in Table 77 are implemented for the Connection Object.

Table 77 - Connection Object Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x05	No	Yes	Reset
0x0E	No	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

Discrete Input Point Object — CLASS CODE 0x0008

The class attributes in Table 78 are supported for the Discrete Input Point Object:

Table 78 - Discrete Input Point Object Class Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Revision	UINT	2
2	Get	Max. Instance	UINT	22

22 instances of the Discrete Input Point Object are supported.

Table 79 - Discrete Input Point Object Instances

Instance	Name	Description
1	InputPt00	Control Module Input 0
2	InputPt01	Control Module Input 1

3	InputPt02	Control Module Input 2
4	InputPt03	Control Module Input 3
5	InputPt04	Control Module Input 4
6	InputPt05	Control Module Input 5
7	InputDigMod1Pt00	Digital Expansion Module 1 Input 0
8	InputDigMod1Pt01	Digital Expansion Module 1 Input 1
9	InputDigMod1Pt02	Digital Expansion Module 1 Input 2
10	InputDigMod1Pt03	Digital Expansion Module 1 Input 3
11	InputDigMod2Pt00	Digital Expansion Module 2 Input 0
12	InputDigMod2Pt01	Digital Expansion Module 2 Input 1
13	InputDigMod2Pt02	Digital Expansion Module 2 Input 2
14	InputDigMod2Pt03	Digital Expansion Module 2 Input 3
15	InputDigMod3Pt00	Digital Expansion Module 3 Input 0
16	InputDigMod3Pt01	Digital Expansion Module 3 Input 1
17	InputDigMod3Pt02	Digital Expansion Module 3 Input 2
18	InputDigMod3Pt03	Digital Expansion Module 3 Input 3
19	InputDigMod4Pt00	Digital Expansion Module 4 Input 0
20	InputDigMod4Pt01	Digital Expansion Module 4 Input 1
21	InputDigMod4Pt02	Digital Expansion Module 4 Input 2
22	InputDigMod4Pt03	Digital Expansion Module 4 Input 3

All instances contain the attributes in Table 80.

Table 80 - Discrete Input Point Object Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Value
3	Get	Value	BOOL	0=OFF, 1=ON
115	Get/Set	Force Enable	BOOL	0=Disable, 1=Enable
116	Get/Set	Force Value	BOOL	0=OFF, 1=ON

The common services in Table 81 are implemented for the Discrete Input Point Object.

Table 81 - Discrete Input Point Object Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

Discrete Output Point Object — CLASS CODE 0x0009

The class attributes in Table 82 are supported for the Discrete Output Point Object:

Table 82 - Discrete Output Point Object Class Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Revision	UINT	1
2	Get	Max. Instance	UINT	11

11 instances of the Discrete Output Point Object are supported.

Table 83 - Discrete Output Point Object Instances

Instance	Name	Description
1	OutputPt00	Control Module Output 0
2	OutputPt01	Control Module Output 1
3	OutputPt02	Control Module Output 2
4	OutDigMod1Pt00	Digital Expansion Module 1 Output 0
5	OutDigMod1Pt01	Digital Expansion Module 1 Output 1
6	OutDigMod2Pt00	Digital Expansion Module 2 Output 0
7	OutDigMod2Pt01	Digital Expansion Module 2 Output 1
8	OutDigMod3Pt00	Digital Expansion Module 3 Output 0
9	OutDigMod3Pt01	Digital Expansion Module 3 Output 1
10	OutDigMod4Pt00	Digital Expansion Module 4 Output 0
11	OutDigMod4Pt01	Digital Expansion Module 4 Output 1

All instances contains the attributes in Table 84.

Table 84 - Discrete Output Point Object Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Value
3	Get/Set	Value	BOOL	0=OFF, 1=ON
5	Get/Set	Fault Action	BOOL	0=Fault Value attribute, 1=Hold Last State
6	Get/Set	Fault Value	BOOL	0=OFF, 1=ON
7	Get/Set	Idle Action	BOOL	0=Fault Value attribute, 1=Hold Last State
8	Get/Set	Idle Value	BOOL	0=OFF, 1=ON
113	Get/Set	Pr Fault Action	BOOL	0=Pr Fault Value attribute, 1=Ignore
114	Get/Set	Pr Fault Value	BOOL	0=OFF, 1=ON
115	Get/Set	Force Enable	BOOL	0=Disable, 1=Enable
116	Get/Set	Force Value	BOOL	0=OFF, 1=ON
117	Get/Set	Input Binding	STRUCT: USINT Array of USINT	Size of appendix I encoded path Appendix I encoded path: NULL path means attribute 3 drives the output. Otherwise, this is a path to a bit in an instance of the DeviceLogix Data Table.

The common services in Table 85 are implemented for the Discrete Output Point Object.

Table 85 - Discrete Output Point Object Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	No	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

Analog Input Point Object — CLASS CODE 0x000A

The class attributes in Table 86 are supported for the Analog Input Point Object:

Table 86 - Analog Input Point Object Class Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Revision	UINT	2
2	Get	Max. Instance	UINT	1

12 Instances of the Analog Input Point Object are supported. The raw analog value is scaled appropriately to the analog input configuration parameters and the scaled value are placed in the Value attribute.

Table 87 - Analog Input Point Object Instances

Instance	Name	Description
1	InAnMod1Ch00	Analog Expansion Module 1 Input Channel 0
2	InAnMod1Ch01	Analog Expansion Module 1 Input Channel 1
3	InAnMod1Ch02	Analog Expansion Module 1 Input Channel 2
4	InAnMod2Ch00	Analog Expansion Module 2 Input Channel 0
5	InAnMod2Ch01	Analog Expansion Module 2 Input Channel 1
6	InAnMod2Ch02	Analog Expansion Module 2 Input Channel 2
7	InAnMod3Ch00	Analog Expansion Module 3 Input Channel 0
8	InAnMod3Ch01	Analog Expansion Module 3 Input Channel 1
9	InAnMod3Ch02	Analog Expansion Module 3 Input Channel 2
10	InAnMod4Ch00	Analog Expansion Module 4 Input Channel 0
11	InAnMod4Ch01	Analog Expansion Module 4 Input Channel 1
12	InAnMod4Ch02	Analog Expansion Module 4 Input Channel 2

All instances contains the attributes in Table 88.

Table 88 - Analog Input Point Object Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Value
3	Get	Value	INT	Default = 0
8	Get	Value Data Type	USINT	0=INT
148	Get/Set	Force Enable	BOOL	0=Disable, 1=Enable
149	Get/Set	Force Value	INT	Default = 0

The common services in Table 89 are implemented for the Analog Input Point Object.

Table 89 - Analog Input Point Object Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

Parameter Object — CLASS CODE 0x000F

The class attributes in Table 90 are supported for the Parameter Object:

Table 90 - Parameter Object Class Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Revision	UINT	1
2	Get	Max Instance	UINT	560

Attribute ID	Access Rule	Name	Data Type	Value
8	Get	Parameter Class Descriptor	WORD	0x03
9	Get	Configuration Assembly Instance	UINT	0
10	Get	Native Language	UINT	1 = English

The instance attributes in Table 91 are implemented for all parameter attributes.

Table 91 - Parameter Object Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	Value	Specified in Descriptor	
2	Get	Link Path Size	USINT	08
3	Get	Link Path	Array of: BYTE EPATH	Path to specified object attribute.
4	Get	Descriptor	WORD	Parameter Dependent
5	Get	Data Type	EPATH	Parameter Dependent
6	Get	Data Size	USINT	Parameter Dependent
7	Get	Parameter Name String	SHORT_STRING	Parameter Dependent
8	Get	Units String	SHORT_STRING	Parameter Dependent
9	Get	Help String	SHORT_STRING	Parameter Dependent
10	Get	Minimum Value	Specified in Descriptor	Parameter Dependent
11	Get	Maximum Value	Specified in Descriptor	Parameter Dependent
12	Get	Default Value	Specified in Descriptor	Parameter Dependent
13	Get	Scaling Multiplier	UINT	01
14	Get	Scaling Divisor	UINT	01
15	Get	Scaling Base	UINT	01
16	Get	Scaling Offset	INT	00
17	Get	Multiplier Link	UINT	0
18	Get	Divisor Link	UINT	0
19	Get	Base Link	UINT	0
20	Get	Offset Link	UINT	0
21	Get	Decimal Precision	USINT	Parameter Dependent

The services in Table 92 are implemented for the Parameter Object.

Table 92 - Parameter Object Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

Parameter Group Object — CLASS CODE 0x0010

The class attributes in Table 93 are supported for the Parameter Object:

Table 93 - Parameter Object Class Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Revision	UINT	1
2	Get	Max Instance	UINT	23
8	Get	Native Language	USINT	1 = English

The instance attributes in Table 94 are supported for all parameter group instances and are implemented for all parameter attributes.

Table 94 - Parameter Group Object Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Group Name String	SHORT_STRING	
2	Get	Number of Members	UINT	
3	Get	1st Parameter	UINT	
4	Get	2nd Parameter	UINT	
n	Get	Nth Parameter	UINT	

The common services in Table 95 are implemented for the Parameter Group Object.

Table 95 - Parameter Group Object Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single

Discrete Output Group Object — CLASS CODE 0x001E

No class attributes are supported for the Discrete Output Group Object.

Five instances of the Discrete Output Group Object are supported.

Table 96 lists the attributes for Instance 1:

Table 96 - Discrete Output Group Object Instance 1 Attributes

Attribute ID	Access Rule	Name	Data Type	Value
3	Get	Number of Instances	USINT	11
4	Get	Binding	Array of UINT	1,2,3,4,5,6,7,8,9,10,11
6	Get/Set	Command	BOOL	0=idle; 1=run
104	Get/Set	Network Status Override	BOOL	0=No Override (go to safe state) 1=Override (run local logic)
105	Get/Set	Comm Status Override	BOOL	0=No override (go to safe state) 1=Override (run local logic)

Instances 2-5 each represent a single expansion module. They have the attributes listed in Table 97.

Table 97 - Discrete Output Group Object Instance 2…5 Attributes

Attribute ID	Access Rule	Name	Data Type	Value
3	Get	Number of Instances	USINT	2
4	Get	Binding	Array of UINT	Instance 2: 4, 5 Instance 3: 6, 7 Instance 4: 8, 9 Instance 5: 10, 11
6	Get/Set	Command	BOOL	0=idle; 1=run
7	Get/Set	Fault Action	BOOL	0=Fault Value Attribute, 1=Hold Last State
8	Get/Set	Fault Value	BOOL	0=OFF, 1=ON
9	Get/Set	Idle Action	BOOL	0=Idle Value Attribute, 1=Hold Last State

10	Get/Set	Idle Value	BOOL	0=OFF, 1=ON
113	Get/Set	Pr Fault Action	BOOL	0=Pr Fault Value Attribute, 1=Ignore
114	Get/Set	Pr Fault Value	BOOL	0=OFF, 1=ON

The common services in Table 98are implemented for the Discrete Output Group Object.

Table 98 - Discrete Output Group Object Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	No	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

Control Supervisor Object — CLASS CODE 0x0029

No class attributes are supported.

A single instance (instance 1) of the Control Supervisor Object is supported.

Table 99 - Control Supervisor Object Instance 1 Attributes

Attribute ID	Access Rule	Name	Data Type	Value
10	Get	Tripped	BOOL	0 = No Fault present 1 = Fault Latched
11	Get	Warning	BOOL	0 = No Warning present 1 = Warning present (not latched)
12	Get/Set	Fault Reset	BOOL	0->1 = Trip Reset otherwise no action

The common services in Table 100 are implemented for the Control Supervisor Object.

Table 100 - Control Supervisor Object Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	No	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

Overload Object — CLASS CODE 0x002c

No class attributes are supported for the Overload Object.

A single instance (instance 1) of the Overload Object is supported.

Table 101 - Overload Object Instance 1 Attributes

Attribute ID	Access Rule	Name	Data Type	Value
4	Get/Set	Trip Class	USINT	5…30
5	Get	Average Current	INT	xxx.x Amps (tenths of amps)
6	Get	%Phase Imbal	USINT	xxx% FLA
7	Get	% Thermal Utilized	USINT	xxx% FLA
8	Get	Current L1	INT	xxx.x Amps (tenths of amps)

Attribute ID	Access Rule	Name	Data Type	Value
9	Get	Current L2	INT	xxx.x Amps (tenths of amps)
10	Get	Current L3	INT	xxx.x Amps (tenths of amps)
11	Get	GF Current	INT	0.00 – 12.75 Amps

The common services in Table 102 are implemented for the Overload Object.

Table 102 - Overload Object Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	No	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

Base Energy Object — CLASS CODE 0x004E

The class attributes in Table 103are supported for the Base Energy Object.

Table 103 - Base Energy Object Class Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Object Revision	USINT	2

A single instance of the Base Energy Object is supported

Table 104 - Base Energy Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Energy/Resource Type	UINT	1 = Electrical
2	Get	Energy Object Capabilities	WORD	0x0001 = Energy Measured
3	Get	Energy Accuracy	UINT	500 = 5.00 percent of full scale reading
4	Get	Energy Accuracy Basis	UINT	1 = Percent of full scale reading
5	Get	Full Scale Power Reading	Real	x.xxx kW
7	Get	Consumed Energy Odometer	ODOMETER	Returns params 80-84 values.
9	Get	Total Energy Odometer	SIGNED ODOMETER	Returns params 80-84 values.
10	Get	Total Real Power	REAL	Param 67 value converted to a REAL
12	Get	Energy Type Specific Object Path	STRUCT of UINT Padded EPATH	03 00 21 00 4F 00 24 01
16	Set	Odometer Reset Enable	BOOL	0 = Disabled (Default) 1 = Enabled Enables resetting of Energy Odometers by Reset service

The services in Table 105 are implemented for the Base Energy Object.

Table 105 - Base Energy Object Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x01	No	Yes	GetAttributes_All
0x05	No	Yes	Reset
0x0E	No	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

Table 106 describes the Get_Attributes_All response.

Table 106 - Base Energy Object Class Attributes Get_Attributes_All Response

Attribute ID	Data Type	Name	Value
1	UINT	Energy/Resource Type	Attribute 1 value
2	WORD	Energy Object Capabilities	Attribute 2 value
3	UINT	Energy Accuracy	Attribute 3 value
4	UINT	Energy Accuracy Basis	Attribute 4 value
5	REAL	Full Scale Reading	Attribute 5 value
6	UINT	Data Status	0
7	ODOMETER	Consumed Energy Odometer	0Attribute 7 value
8	ODOMETER	Generated Energy Odometer	0,0,0,0,0
9	SIGNED ODOMETER	Total Energy Odometer	Attribute 9 value
10	REAL	Energy Transfer Rate	Attribute 10 value
11	REAL	Energy Transfer Rate User Setting	0.0
12	STRUCT of UINT, Padded EPATH	Energy Type Specific Object Path	Attribute 12 value
13	UINT	Energy Aggregation Path Array Size	0
14	Array of STRUCT of UINT, Padded EPATH [1]	Energy Aggregation Paths	Null
15	STRINGI	Energy Identifier	LanguageChar1 USINT ='e' LanguageChar2 USINT)='n' LanguageChar3 USINT) ='g' CharStringStruct USINT=0xD0 CharSet UINT = 0 = undefined InternationalString = null
16	BOOL	Odometer Reset Enable	Attribute 16 value
17	BOOL	Metering State	1

Electrical Energy Object — CLASS CODE 0x004F

No class attributes are supported for the Electrical Energy Object.

A single instance of the Electrical Energy Object is supported

Table 107 - Electrical Energy Object Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Real Energy Consumed Odometer	ODOMETER	Returns params 80-84 values.
3	Get	Real Energy Net Odometer	SIGNED ODOMEETER	Returns params 80-84 values.
4	Get	Reactive Energy Consumed Odometer	ODOMETER	Returns params 85-89 values.

Attribute ID	Access Rule	Name	Data Type	Value
5	Get	Reactive Energy Generated Odometer	ODOMETER	Returns params 90-94 values.
6	Get	Reactive Energy Net Odometer	SIGNED ODOMETER	Returns params 95-99 values.
7	Get	Apparent Energy Odometer	ODOMETER	Returns params 100-104 values.
9	Get	Line Frequency	REAL	Param 62 value converted to a REAL
10	Get	L1 Current	REAL	Param 43 value converted to a REAL
11	Get	L2 Current	REAL	Param 44 value converted to a REAL
12	Get	L3 Current	REAL	Param 45 value converted to a REAL
13	Get	Average Current	REAL	Param 46 value converted to a REAL
14	Get	Percent Current Unbalance	REAL	Param 52 value converted to a REAL
15	Get	L1 to N Voltage	REAL	Param 57 value converted to a REAL
16	Get	L2 to N Voltage	REAL	Param 58 value converted to a REAL
17	Get	L3 to N Voltage	REAL	Param 59 value converted to a REAL
18	Get	Avg Voltage L to N	REAL	Param 60 value converted to a REAL
19	Get	L1 to L2 Voltage	REAL	Param 53 value converted to a REAL
20	Get	L2 to L3 Voltage	REAL	Param 54 value converted to a REAL
21	Get	L3 to L1 Voltage	REAL	Param 55 value converted to a REAL
22	Get	Avg Voltage Lto N	REAL	Param 56 value converted to a REAL
23	Get	Percent Voltage Unbalance	REAL	Param 61 value converted to a REAL
24	Get	L1 Real Power	REAL	Param 64 value converted to a REAL
25	Get	L2 Real Power	REAL	Param 65 value converted to a REAL
26	Get	L3 Real Power	REAL	Param 66 value converted to a REAL
27	Get	Total Real Power	REAL	Param 67 value converted to a REAL
28	Get	L1 Reactive Power	REAL	Param 68 value converted to a REAL
29	Get	L2 Reactive Power	REAL	Param 68 value converted to a REAL
30	Get	L3 Reactive Power	REAL	Param 70 value converted to a REAL
31	Get	Total Reactive Power	REAL	Param 71 value converted to a REAL
32	Get	L1 Apparent Power	REAL	Param 72 value converted to a REAL
33	Get	L2 Apparent Power	REAL	Param 73 value converted to a REAL
34	Get	L3 Apparent Power	REAL	Param 74 value converted to a REAL
35	Get	Total Apparent Power	REAL	Param 75 value converted to a REAL
36	Get	L1 True Power Factor	REAL	Param 76 value converted to a REAL
37	Get	L2 True Power Factor	REAL	Param 77 value converted to a REAL
38	Get	L3 True Power Factor	REAL	Param 78 value converted to a REAL
39	Get	Three Phase True Power Factor	REAL	Param 79 value converted to a REAL
40	Get	Phase Rotation	UINT	Param 63 value
41	Get	Associated Energy Object Path	STRUCT of UINT Padded EPATH	03 00 21 00 4E 00 24 01

The services in Table 108 are implemented for the Electrical Energy Object.

Table 108 - Electrical Energy Object Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x01	No	Yes	GetAttributes_All
0x0E	No	Yes	Get_Attribute_Single

Table 109 describes the Get_Attributes_All response.

Table 109 - Electrical Energy Object Class Attributes Get_Attributes_All Response

Attribute ID	Data Type	Name	Value
1	Array[5] of INT	Real Energy Consumed Odometer	Attribute 1 Value
2	Array[5] of INT	Real Energy Generated Odometer	0.0.0.0.0
3	Array[5] of INT	Real Energy Net Odometer	Attribute 3 Value
4	Array[5] of INT	Reactive Energy Consumed Odometer	Attribute 4 Value
5	Array[5] of INT	Reactive Energy Generated Odometer	Attribute 5 Value
6	Array[5] of INT	Reactive Energy Net Odometer	Attribute 6 Value
7	Array[5] of INT	Apparent Energy Odometer	Attribute 7 Value
8	Array[5] of INT		0.0.0.0.0
9	REAL	Line Frequency	Attribute 9 Value
10	REAL	L1 Current	Attribute 10 Value
11	REAL	L2 Current	Attribute 11 Value
12	REAL	L3 Current	Attribute 12 Value
13	REAL	Average Current	Attribute 13 Value
14	REAL	Percent Current Unbalance	Attribute 14 Value
15	REAL	L1 to N Voltage	Attribute 15 Value
16	REAL	L2 to N Voltage	Attribute 16 Value
17	REAL	L3 to N Voltage	Attribute 17 Value
18	REAL	Avg Voltage L to N	Attribute 18 Value
19	REAL	L1 to L2 Voltage	Attribute 19 Value
20	REAL	L2 to L3 Voltage	Attribute 20 Value
21	REAL	L3 to L1 Voltage	Attribute 21 Value
22	REAL	Avg Voltage Lto N	Attribute 22 Value
23	REAL	Percent Voltage Unbalance	Attribute 23 Value
24	REAL	L1 Real Power	Attribute 24 Value
25	REAL	L2 Real Power	Attribute 25 Value
26	REAL	L3 Real Power	Attribute 26 Value
27	REAL	Total Real Power	Attribute 27 Value
28	REAL	L1 Reactive Power	Attribute 28 Value
29	REAL	L2 Reactive Power	Attribute 29 Value
30	REAL	L3 Reactive Power	Attribute 30 Value
31	REAL	Total Reactive Power	Attribute 31 Value
32	REAL	L1 Apparent Power	Attribute 32 Value
33	REAL	L2 Apparent Power	Attribute 33 Value
34	REAL	L3 Apparent Power	Attribute 34 Value
35	REAL	Total Apparent Power	Attribute 35 Value
36	REAL	L1 True Power Factor	Attribute 36 Value
37	REAL	L2 True Power Factor	Attribute 37 Value
38	REAL	L3 True Power Factor	Attribute 38 Value
39	REAL	Three Phase True Power Factor	Attribute 39 Value
40	UINT	Phase Rotation	Attribute 40 Value
41	STRUCT of UINT Padded EPATH	Associated Energy Object Path	Attribute 41 Value

Wall Clock Time Object — CLASS CODE 0x008B

The class attributes in Table 110are supported:

Table 110 - Wall Clock Time Object Class Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Object Revision	UINT	3
2	Get	Number of Instances	UINT	1

One instance is supported:

Table 111 - Wall Clock Time Object Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Value
2	Set	Time Zone	UINT	Time zone in which Current value is being used (Never been used)
3	Set / SSV	Offset from CSV	LINT	64-bit offset value in µS that when added to the CST value yields the Current_UTC_Value
4	Set	Local Time Adjustment	WORD	Set of flags for specific local time adjustments (Never been used)
5	Set / SSV	Date and Time (Local Time)	DINT[7] – Array of seven DINTs	Current adjusted time in human readable format. DINT[0] – year DINT[1] – month DINT[2] – day DINT[3] – hour DINT[4] – minute DINT[5] – second DINT[6] – µsec.
6	Set / SSV	Current UT value (UTC Time)	LINT	Current value of Wall Clock Time. 64-bit µs value referenced from 0000 hrs January 1, 1970
7	Set / SSV	UTC Date and Time (UTC Time)	DINT[7] – Array of seven DINTs	Current time in human readable format. DINT[0] – year DINT[1] – month DINT[2] – day DINT[3] – hour DINT[4] – minute DINT[5] – second DINT[6] – µsec.
8	Set / SSV	Time Zone String	Struct of UDINT SINT[Length]	This string specifies the time zone where the controller is located, and ultimately the adjustment in hours and minutes applied to the UTC value to generate the local time value. TimeZoneString can be specified in the following formats: o UTC+hh:mm <location> o UTC-hh:mm <location> hh:mm portion is used internally to calculate the local time, and the <location> portion is used to describe the time zone and is optional. GMT is also accepted Length of the Data array can be from 10 to 82. Examples: UTC-05:00 Eastern Time UTC+01:00 Coordinated Universal Time

Attribute ID	Access Rule	Name	Data Type	Value
9	Set / SSV	DST Adjustment	INT	The number of minutes to be adjusted for daylight saving time
10	Set / SSV	Enable DST	USINT	It specifies if we are in daylight saving time or not. Not internally set. Needs user action.
11	Set	Current value (local time)	LINT	Adjusted Local value of Wall Clock Time. 64-bit µS value referenced from 0000 hrs January 1, 1970

The services in Table 112 are implemented for the Wall Clock Time Object.

Table 112 - Wall Clock Time Object Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	Yes	Yes	GetAttributes_All
0x10	Yes	No	Set_Attribute_Single

DPI Fault Object — CLASS CODE 0x0097

This object provides access to fault information within the device.

The class attributes in Table 113 are supported:

Table 113 - DPI Fault Object Class Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Class Revision	UINT	1
2	Get	Number of Instances	UINT	8
3	Get/Set	Fault Cmd Write	USINT	0=NOP; 1=Clear Fault; 2=Clear Flt Queue
4	Get	Fault Instance Read	UINT	The instance of the Fault Queue Entry containing information about the Fault that tripped the Device
5	Get	Fault Data list	Struct of:	
		Number of Parameter Instances	UINT	The total number of parameters instances stored when a fault occurs
		Parameter Instances	UINT [x]	An array of parameters instance numbers
6	Get	Number of Recorded Faults	UINT	The number of Faults recorded in the Fault Queue

Five instances of the DPI Fault Object are supported.

Table 114 - DPI Fault Object Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Value
0	Get	Full / All Info	Struct of:	
		Fault Code	UINT	See Table 115
		Fault Source	Struct of:	
		DPI Port Number	USINT	0
		Device Object Instance	USINT	0x2c
		Fault Text	BYTE[16]	See Table 115
		Fault Time Stamp	Struct of:	
		Timer Value	ULINT	
		Timer Descriptor	WORD	
		Help Object Instance	UINT	
		Fault Data		
1	Get	Basic Info	Struct of:	
		Fault Code	UINT	See Table 116
		Fault Source	Struct of:	
		DPI Port Number	USINT	0
		Device Object Instance	USINT	0x2C
		Fault Time Stamp	Struct of:	
		Timer Value	ULINT	
		Timer Descriptor	WORD	
3	Get	Help Text	STRING	See Table 116

The common services in Table 115 are implemented for the DPI Fault Object.

Table 115 - DPI Fault Object Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	Yes	No	Set_Attribute_Single

Table 116 lists Fault Codes, Fault Text, and Fault Help Strings.

Table 116 - Fault Codes, Fault Text, and Fault Help Strings

Fault Code	Fault Text	Help Text
0	No Fault	No Fault Conditions Detected
1	OverloadTrip	Motor current overload condition
2	PhaseLossTrip	Phase current Loss detected in one of the motor phases
3	GroundFaultTrip	Power conductor or motor winding is shorting to ground
4	StallTrip	Motor has not reached full speed by the end of Stall Enable Time
5	JamTrip	Motor current has exceed the programmed jam trip level
6	UnderloadTrip	Motor current has fallen below normal operating levels
7	Current Imbal	Phase to phase current imbalance detected
8	L1UnderCurrTrip	L1Current was below L1 Undercurrent Level longer than Trip Delay
9	L2UnderCurrTrip	L2Current was below L2 Undercurrent Level longer than Trip Delay
10	L3UnderCurrTrip	L3Current was below L3 Undercurrent Level longer than Trip Delay
11	L1OverCurrenTrip	L1 Current was over L1 Overcurrent Level longer than Trip Delay
12	L2OverCurrenTrip	L2 Current was over L2 Overcurrent Level longer than Trip Delay

Fault Code	Fault Text	Help Text
13	L3OverCurrenTrip	L3 Current was over L3 Overcurrent Level longer than Trip Delay
14	L1LineLossTrip	L1 Current Lost for longer than the L1 Loss Trip Delay
15	L2LineLossTrip	L2 Current Lost for longer than the L2 Loss Trip Delay
16	L3LineLossTrip	L3 Current Lost for longer than the L3 Loss Trip Delay
17	UnderVoltageTrip	Line to Line Under-Voltage condition detected
18	OverVoltageTrip	Line to Line Over-Voltage condition detected
19	VoltageUnbalTrip	Phase to phase voltage imbalance detected
20	PhaseRotationTrp	The unit detects the supply voltage phases are rotated
21	UnderFreqTrip	Line voltage frequency is below trip level
22	OverFreqTrip	Line voltage frequency has exceeded trip level
23	Fault23	
24	Fault24	
25	Fault25	
26	Fault26	
27	Fault27	
28	Fault28	
29	Fault29	
30	Fault30	
31	Fault31	
32	Fault32	
33	UnderKWTrip	Total Real Power(kW)is below trip level
34	OverKWTrip	Total Real Power(kW)has exceeded trip level
35	UnderKVARConTrip	Under Total Reactive Power Consumed (+kVAR) condition detected
36	OverKVARConTrip	Over Total Reactive Power Consumed (+kVAR) condition detected
37	UnderKVARGenTrip	Under Total Reactive Power Generated (-kVAR) condition detected
38	OverKVARGenTrip	Over Total Reactive Power Generated (-kVAR) condition detected
39	UnderKVATrip	Total Apparent Power (VA or kVA or MVA) is below trip level
40	OverKVATrip	Total Apparent Power (VA or kVA or MVA) exceeded trip level
41	UnderPFLagTrip	Under Total Power Factor Lagging (-PF) condition detected
42	OverPFLagTrip	Over Total Power Factor Lagging (-PF) condition detected
43	UnderPFLeadTrip	Under Total Power Factor Leading (+PF) condition detected
44	OverPFLeadTrip	Over Total Power Factor Leading (+PF) condition detected
45	Fault45	
46	Fault46	
47	Fault47	
48	Fault48	
49	TestTrip	Test trip caused by holding the Test/Rest button for 2 seconds
50	PTCTrip	PTC input indicates that the motor stator windings overheated
51	DLXTrip	DeviceLogix defined trip was generated
52	OperStationTrip	The Stop button the Operator Station was pressed
53	RemoteTrip	Remote trip command detected
54	BlockedStartTrip	Maximum starts per hour exceeded
55	Trip55	Hardware configuration fault. Check for shorts on input terminal
56	ConfigTrip	Invalid parameter config. See parameters 38-39 for details
57	Trip57	
58	DLXFBTimeoutTrip	DeviceLogix Feedback Timeout Trip was detected
59	Trip59	
60	Trip60	
61	Trip61	
62	NVSTrip	NonVolatile Storage memory problem detected

Fault Code	Fault Text	Help Text
63	Trip63	
64	Trip64	
65	InAnMod1Ch00Trip	Input Channel 00 on Analog Module 1 exceeded its Trip Level
66	InAnMod1Ch01Trip	Input Channel 01 on Analog Module 1 exceeded its Trip Level
67	InAnMod1Ch02Trip	Input Channel 02 on Analog Module 1 exceeded its Trip Level
68	InAnMod2Ch00Trip	Input Channel 00 on Analog Module 2 exceeded its Trip Level
69	InAnMod2Ch01Trip	Input Channel 01 on Analog Module 2 exceeded its Trip Level
70	InAnMod2Ch02Trip	Input Channel 02 on Analog Module 2 exceeded its Trip Level
71	InAnMod3Ch00Trip	Input Channel 00 on Analog Module 3 exceeded its Trip Level
72	InAnMod3Ch01Trip	Input Channel 01 on Analog Module 3 exceeded its Trip Level
73	InAnMod3Ch02Trip	Input Channel 02 on Analog Module 3 exceeded its Trip Level
74	InAnMod4Ch00Trip	Input Channel 00 on Analog Module 4 exceeded its Trip Level
75	InAnMod4Ch01Trip	Input Channel 01 on Analog Module 4 exceeded its Trip Level
76	InAnMod4Ch02Trip	Input Channel 02 on Analog Module 4 exceeded its Trip Level
77	Trip77	
78	Trip78	
79	Trip79	
80	Trip80	
81	DigitalMod1Trip	Digital Expansion Module 1 is not operating properly
82	DigitalMod2Trip	Digital Expansion Module 2 is not operating properly
83	DigitalMod3Trip	Digital Expansion Module 3 is not operating properly
84	DigitalMod4Trip	Digital Expansion Module 4 is not operating properly
85	AnalogMod1Trip	Analog Expansion Module 1 is not operating properly
86	AnalogMod2Trip	Analog Expansion Module 2 is not operating properly
87	AnalogMod3Trip	Analog Expansion Module 3 is not operating properly
88	AnalogMod4Trip	Analog Expansion Module 4 is not operating properly
89	Trip89	
90	CtlModMismatch	Control Module installed does not match the expected type
91	SenseModMismatch	Sensing Module installed does not match the expected type
92	CommModMismatch	Comms Module installed does not match the expected type
93	OperStatMismatch	Operator Station installed does not match expected type
94	DigModMismatch	Digital Module installed does not match the expected type
95	AnModMismatch	Analog Module installed does not match the expected type
96	Trip96	
97	Trip97	
98	HardwareFltTrip	A hardware fault condition was detected
99	Trip99	

DPI Warning Object — CLASS CODE 0x0098

This object provides access to warning information within the device.

The class attributes in Table 117 are supported:

Table 117 - DPI Warning Object Class Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Class Revision	UINT	1
2	Get	Number of Instances	UINT	8

Attribute ID	Access Rule	Name	Data Type	Value
3	Get/Set	Warning Cmd Write	USINT	0=NOP 2=Clear Queue
4	Get	Warning Instance Read	UINT	The instance of the Warning Queue Entry containing information about the most recent warning
6	Get	Number of Recorded Faults	UINT	The number of Warning recorded in the Warning Queue

Four instances of the DPI Warning Object are supported.

Table 118 - DPI Warning Object Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Value
0	Get	Full / All Info	Struct of:	
		Warning Code	UINT	See Table 119
		Warning Source	Struct of:	
		DPI Port Number	USINT	0
		Device Object Instance	USINT	0x2c
		Warning Text	BYTE[16]	See Table 120
		Warning Time Stamp	Struct of:	
		Timer Value	ULINT	
		Timer Descriptor	WORD	
		Help Object Instance	UINT	
		Fault Data		
1	Get	Basic Info	Struct of:	
		Warning Code	UINT	See Table 120
		Warning Source	Struct of:	
		DPI Port Number	USINT	0
		Device Object Instance	USINT	0x2C
		Warning Time Stamp	Struct of:	
		Timer Value	ULINT	
		Timer Descriptor	WORD	
3	Get	Help Text	STRING	See Table 120

The common services in Table 119 are implemented for the DPI Warning Object.

Table 119 - DPI Warning Object Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	Yes	No	Set_Attribute_Single

Table 120 lists Warning Codes, Warning Text, and Warning Help Strings.

Table 120 - Warning Codes, Warning Text, and Warning Help Strings

Warning Code	Warning Text	Warning Help Text
0	No Warning	No Warning Conditions Detected
1	OverloadWarning	Approaching a motor current overload condition
2	Warning2	

Warning Code	Warning Text	Warning Help Text
3	Ground Fault	Power conductor or motor winding is shorting to ground
4	Warning4	
5	JamWarning	Motor current has exceed the programmed jam warning level
6	UnderloadWarning	Motor current has fallen below normal operating levels
7	Current ImbalWarn	Phase to phase current imbalance detected
8	L1UnderCurrWarn	L1Current was below L1 Undercurrent Warning Level
9	L2UnderCurrWarn	L2Current was below L2 Undercurrent Warning Level
10	L3UnderCurrWarn	L3Current was below L3 Undercurrent Warning Level
11	L1OverCurrenWarn	L1 Current was over L1 Overcurrent Warning Level
12	L2OverCurrenWarn	L2 Current was over L2 Overcurrent Warning Level
13	L3OverCurrenWarn	L3 Current was over L3 Overcurrent Warning Level
14	L1LineLossWarn	L1 Current Lost for longer than the L1 Loss Trip Delay
15	L2LineLossWarn	L2 Current Lost for longer than the L2 Loss Trip Delay
16	L3LineLossWarn	L3 Current Lost for longer than the L3 Loss Trip Delay
17	UnderVoltageWarn	Line to Line Under-Voltage condition detected
18	OvervoltageWarn	Line to Line Over-Voltage condition detected
19	VoltageUnbalWarn	Phase to phase voltage imbalance detected
20	PhaseRotationWrn	The unit detects the supply voltage phases are rotated
21	UnderFreqWarning	Line voltage frequency is below the warning level
22	OverFreqWarning	Line voltage frequency has exceeded warning level
23	Warning23	
24	Warning24	
25	Warning25	
26	Warning26	
27	Warning27	
28	Warning28	
29	Warning29	
30	Warning30	
31	Warning31	
32	Warning32	
33	UnderKWWarning	Total Real Power (kW) is below warning level
34	OverKWWarning	Total Real Power (kW) has exceeded warning level
35	UnderKVARConWarn	Under Reactive Power Consumed (+kVAR) condition detected
36	OverKVARConWarn	Over Reactive Power Consumed (+kVAR) condition detected
37	UnderKVARGenWarn	Under Reactive Power Generated (-kVAR) condition detected
38	OverKVARGenWarn	Over Reactive Power Generated (-kVAR) condition detected
39	Under Power kVA	Total Apparent Power (kVA) is below warning level
40	Over Power kVA	Total Apparent Power (kVA) exceeded warning level
41	Under PF Lagging	Under Total Power Factor Lagging (-PF) condition detected
42	Over PF Lagging	Over Total Power Factor Lagging (-PF) condition detected
43	Under PF Leading	Under Total Power Factor Leading (+PF) condition detected
44	Over PF Leading	Over Total Power Factor Leading (+PF) condition detected
45	Warning 45	
46	Warning 46	
47	Warning 47	
48	Warning 48	
49	Warning49	
50	PTC	PTC input indicates that the motor stator windings overheated
51	DLXWarning	DeviceLogix defined warning was generated

Warning Code	Warning Text	Warning Help Text
52	Warning52	
53	Warning53	
54	Warning54	
55	Warning55	
56	ConfigWarning	Invalid parameter config. See parameters 38-39 for details
57	Warning57	
58	DLXFBTimeoutWarn	DeviceLogix Feedback Timeout Trip was detected
59	Warning59	
60	PM Starts	Number of Starts Warning Level Exceeded
61	PM Oper Hours	Operating Hours Warning Level Exceeded
62	Warning62	
63	Warning63	
64	Warning64	
65	InAnMod1Ch00Warn	Input Channel 00 on Analog Module 1 exceeded its Warning Level
66	InAnMod1Ch01Warn	Input Channel 01 on Analog Module 1 exceeded its Warning Level
67	InAnMod1Ch02Warn	Input Channel 02 on Analog Module 1 exceeded its Warning Level
68	InAnMod2Ch00Warn	Input Channel 00 on Analog Module 2 exceeded its Warning Level
69	InAnMod2Ch01Warn	Input Channel 01 on Analog Module 2 exceeded its Warning Level
70	InAnMod2Ch02Warn	Input Channel 02 on Analog Module 2 exceeded its Warning Level
71	InAnMod3Ch00Warn	Input Channel 00 on Analog Module 3 exceeded its Warning Level
72	InAnMod3Ch01Warn	Input Channel 01 on Analog Module 3 exceeded its Warning Level
73	InAnMod3Ch02Warn	Input Channel 02 on Analog Module 3 exceeded its Warning Level
74	InAnMod4Ch00Warn	Input Channel 00 on Analog Module 4 exceeded its Warning Level
75	InAnMod4Ch01Warn	Input Channel 01 on Analog Module 4 exceeded its Warning Level
76	InAnMod4Ch02Warn	Input Channel 02 on Analog Module 4 exceeded its Warning Level
77	Warning77	
78	Warning 78	
79	Warning 79	
80	Warning 80	
81	DigitalMod1Warn	Digital Expansion Module 1 is not operating properly
82	DigitalMod2Warn	Digital Expansion Module 2 is not operating properly
83	DigitalMod3Warn	Digital Expansion Module 3 is not operating properly
84	DigitalMod4Warn	Digital Expansion Module 4 is not operating properly
85	AnalogMod1Warn	Analog Expansion Module 1 is not operating properly
86	AnalogMod2Warn	Analog Expansion Module 2 is not operating properly
87	AnalogMod3Warn	Analog Expansion Module 3 is not operating properly
88	AnalogMod4Warn	Analog Expansion Module 4 is not operating properly
89	Warning89	
90	CtlModMismatch	Control Module installed does not match the expected type
91	SenseModMismatch	Sensing Module installed does not match the expected type
92	CommModMismatch	Comms Module installed does not match the expected type
93	OperStatMismatch	Operator Station installed does not match expected type
94	DigModMismatch	Digital Module installed does not match the expected type
95	AnModMismatch	Analog Module installed does not match the expected type
96	Warning96	
97	Warning97	
98	HardwareFltWarn	A hardware fault condition was detected
99	Warning99	

MCC Object — CLASS CODE 0x00C2

A single instance (instance 1) of the MCC Object is supported:

Table 121 - MCC Object Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Range	Value
1	Get/Set	Mcc Number	USINT	0…255	0
2	Get/Set	Vertical Section Number	USINT	0…255	0
3	Get/Set	Starting Section Letter	USINT	0…255	65
4	Get/Set	Space Factors	USINT	0…255	0x3F
5	Get/Set	Cabinet Width	USINT	0…255	0
6	Get/Set	Mcc Number	USINT	0…255	0
7	Get	Number of Device Inputs	USINT		EC1=2 EC2=EC3=EC4=4 EC5=6
8	Get/Set	Devices Connected at Inputs	Array of USINT		00000000000000
9	Get	Number of Device Outputs	USINT		2
10	Get/Set	Devices Connected at Outputs	Array of USINT		0000

The common services in Table 122 are implemented for the MCC Object.

Table 122 - MCC Object Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	No	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single
0x18	No	Yes	Get_Member
0x19	No	Yes	Set_Member

DeviceNet I/O Assemblies

DeviceNet I/O Instances

The E300™ Electronic Overload Relay's DeviceNet Communication Module supports the following I/O Instances.

Table 123 - DeviceNet I/O Instances

Instance	Name	Page
51	Basic Overload Input Assembly	269
100	Datalinks Produced Assembly	270
120	Configuration Assembly - Large Configuration	271
120	Configuration Assembly	272
120	Configuration Assembly for Non-Logix users	281
144	Default Consumed Assembly	282
198	Current Diagnostics Produced Assembly	284
199	All Diagnostics Produced Assembly	289
131	Basic Overload	292
132	Starter Status	294
133	Short Datalink	295
171	DeviceLogix Status	295
172	Analog Input Status	297
186	Network Output Status	299

Table 124 - Instance 51—Basic Overload Input Assembly

Bit/Byte Number									Value
Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
								X	Tripped
							X		Warning
X									0

Table 125 - Instance 51 Attributes

Attribute ID	Access Rule	Member Index	Name	Data Type	Value
1	Get		Number of Members in Member List	UINT	2
2	Get		Member List	Array of STRUCT	
		0	Member Data Description	UINT	1
			Member Path Size	UINT	8
			Member Path	Packed EPATH	67H & "Tripped"
		1	Member Data Description	UINT	1
			Member Path Size	UINT	8
			Member Path	Packed EPATH	67H & "Warning"
3	Get		Data	UINT	See data format above
4	Get		Size	UINT	1
100	Get		Name	SHORT_STRING	"Trip Warn Status"

Table 126 - Instance 100—Datalinks Produced Assembly

Instance 100—Datalinks Produced Assembly																		Member	Size	Path
INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0			
0	0	Reserved for Logix																0	32	1104
1																				
2	1	Datalink0																1	32	291
3																				
4	2	Datalink1																2	32	292
5																				
6	3	Datalink2																3	32	293
7																				
8	4	Datalink3																4	32	294
9																				
10	5	Datalink4																5	32	295
11																				
12	6	Datalink5																6	32	296
13																				
14	7	Datalink6																7	32	297
15																				
16	8	Datalink7																8	32	298
17																				

Table 127 - Instance 100 Attributes

Attribute ID	Access Rule	Member Index	Name	Data Type	Value
1	Get		Number of Members in Member List	UINT	9
2	Get		Member List	Array of STRUCT	
		0	Member Data Description	UINT	32
			Member Path Size	UINT	9
			Member Path	Packed EPATH	68H & "Reserved"
		1	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 23 01
		2	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 24 01
		3	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 25 01
		4	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 26 01
		5	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 27 01
		6	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 28 01
		7	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 29 01
		8	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 2A 01
3	Get		Data	UDINT	See data format above
4	Get		Size	UINT	36
100	Get		Name	SHORT_STRING	"Datalink Profile"

Table 128 - Instance 120—Configuration Assembly - Large Configuration

Instance 120—Configuration Assembly - Large Configuration																		Member	Size
INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		
0	0	ConfigAssyRev = 3								Delivery Mechanism Header *								2-1	16
1		Reserved								Reserved								4-3	16
2	1	GUID																5	128
3																			
4	2																		
5																			
6	3																		
7																			
8	4																		
9																			

Table 129 - Instance 120—Configuration Assembly

Instance 120—Configuration Assembly																		Member	Size	Param
INT	**DINT**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**			
0	0	ConfigAssyRev =2								Delivery Mechanism Header *								2 - 1	16	1100
1										SetOperatingMode								3	8	195
		Reserved																4	8	1102
2	1	FLASetting																5	32	171
3																				
4	2	FLA2Setting																6	32	177
5																				
6	3									TripClass								7	8	172
									X	OLPTCResetMode								8	1	173
								X		SingleOrThreePh								9	1	176
							X			GFFilter								10	1	247
						X				GFMaxInghibit								11	1	248
				X	X					PhaseRotTrip								12	2	364
			X							PowerScale								13	1	377
		X								VoltageScale								14	1	574
7										OLResetLevel								15	8	174
		OLWarningLevel																16	8	175
8	4	TripEnableI																17	16	183
9		WarningEnableI																18	16	189
10	5	TripEnableV																19	16	184
11		WarningEnableV																20	16	190
12	6	TripEnableP																21	16	185
13		WarningEnableP																22	16	191
14	7	TripEnableC																23	16	186
15		WarningEnableC																24	16	192
16	8	TripEnableA																25	16	187
17		WarningEnableA																26	16	193
18	9	TripHistoryMaskI																27	16	139
19		WarnHistoryMaskI																28	16	145
20	10	TripHistoryMaskV																29	16	140
21		WarnHistoryMaskV																30	16	146
22	11	TripHistoryMaskP																31	16	141
23		WarnHistoryMaskP																32	16	147
24	12	TripHistoryMaskC																33	16	142
25		WarnHistoryMaskC																34	16	148
26	13	TripHistoryMaskA																35	16	143
27		WarnHistoryMaskA																36	16	149
28	14	MismatchAction																37	16	233
29										ControlModuleTyp								38	8	221
		SensingModuleTyp																39	8	222

Instance 120—Configuration Assembly

INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Member	Size	Param
30	15													OperStationType				40	4	224
											X	X	X	DigitalMod1Type				41	3	225
								X	X	X				DigitalMod2Type				42	3	226
					X	X	X							DigitalMod3Type				43	3	227
		X	X	X										DigitalMod4Type				44	3	228
31		AnalogMod1Type														X	X	45	2	229
		AnalogMod2Type												X	X			46	2	230
		AnalogMod3Type										X	X					47	2	231
		AnalogMod4Type								X	X							48	2	232
		Reserved																49	8	NA
32	16													Language				50	4	212
										OutAAssignment								51	4	202
						OuBAssignment												52	4	203
		OutCAssignment																53	4	204
33														InPt00Assignment				54	4	196
										InPt01Assignment								55	4	197
						InPt02Assignment												56	4	198
		InPt03Assignment																57	4	199
34	17													InPt04Assignment				58	4	200
										InPt05Assignment								59	4	201
						ActFLA2wOutput												60	4	209
					X	EmergencyStartEn												61	1	216
		X	X	X	Reserved													62	3	NA
35										StartsPerHour								63	8	205
									X	OutPt00FnlFltVal								64	1	562
								X		OutPt01FnlFltVal								65	1	563
							X			OutPt02FnlFltVal								66	1	564
						X				OutDig1FnlFltVal								67	1	565
					X					OutDig2FnlFltVal								68	1	566
				X						OutDig3FnlFltVal								69	1	567
			X							OutDig4FnlFltVal								70	1	568
		X								NetStrtFnlFltVal								71	1	573
36	18	StartsInterval																72	16	206
37		PMTotalStarts																73	16	207
38	19	PMOperatingHours																74	16	208
39		FeedbackTimeout																75	16	213
40	20	TransitionDelay																76	16	214
41		InterlockDelay																77	16	215
42	21									GroundFaultType								78	8	241
		GFInhibitTime																79	8	242
43										GFTripDelay								80	8	243
		GFWarningDelay																81	8	245
44	22	GFTripLevel																82	16	244
45		GFWarningLevel																83	16	246
46	23									PLInhibitTime								84	8	239
		PLTripDelay																85	8	240
47										StallEnabledTime								86	8	249
		FnlFltValStDur																87	8	561

Instance 120—Configuration Assembly																		Member	Size	Param
INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0			
48	24	StallTripLevel																88	16	250
49										JamInhibitTime								89	8	251
		JamTripDelay																90	8	252
50	25	JamTripLevel																91	16	253
51		JamWarningLevel																92	16	254
52	26									ULInhibitTime								93	8	255
		ULTripDelay																94	8	256
53										ULTripLevel								95	8	257
		ULWarningLevel																96	8	258
54	27									CIInhibitTime								97	8	259
		CITripDelay																98	8	260
55										CITripLevel								99	8	261
		CIWarningLevel																100	8	262
56	28	CTPrimary																101	16	263
57		CTSecondary																102	16	264
58	29									UCInhibitTime								103	8	265
		L1UCTripDelay																104	8	266
59										L1UCTripLevel								105	8	267
		L1UCWarningLevel																106	8	268
60	30									L2UCTripDelay								107	8	269
		L2UCTripLevel																108	8	270
61										L2UCWarningLevel								109	8	271
		L3UCTripDelay																110	8	272
62	31									L3UCTripLevel								111	8	273
		L3UCWarningLevel																112	8	274
63										OCInhibitTime								113	8	275
		L1OCTripDelay																114	8	276
64	32									L1OCTripLevel								115	8	277
		L1OCWarningLevel																116	8	278
65										L2OCTripDelay								117	8	279
		L2OCTripLevel																118	8	280
66	33									L2OCWarningLevel								119	8	281
		L3OCTripDelay																120	8	282
67										L3OCTripLevel								121	8	283
		L3OCWarningLevel																122	8	284
68	34									LineLossInhTime								123	8	285
		L1LossTripDelay																124	8	286
69										L2LossTripDelay								125	8	287
		L3LossTripDelay																126	8	288
70	35	Datalink0																127	16	291
71		Datalink1																128	16	292
72	36	Datalink2																129	16	293
73		Datalink3																130	16	294
74	37	Datalink4																131	16	295
75		Datalink5																132	16	296
76	38	Datalink6																133	16	297
77		Datalink7																134	16	298

Instance 120—Configuration Assembly																		Member	Size	Param
INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0			
78	39	OutPt00PrFltAct															X	135	1	304
		OutPt00PrFltVal														X		136	1	305
		OutPt00ComFltAct													X			137	1	306
		OutPt00ComFltVal												X				138	1	307
		OutPt00ComIdlAct											X					139	1	308
		OutPt00ComIdlVal										X						140	1	309
		OutPt01PrFltAct									X							141	1	310
		OutPt01PrFltVal								X								142	1	311
									X	OutPt01ComFltAct								143	1	312
								X		OutPt01ComFltVal								144	1	313
							X			OutPt01ComIdlAct								145	1	314
						X				OutPt01ComIdlVal								146	1	315
					X					OutPt02PrFltAct								147	1	316
				X						OutPt02PrFltVal								148	1	317
			X							OutPt02ComFltAct								149	1	318
		X								OutPt02ComFltVal								150	1	319
79		OutPt02ComIdlAct															X	151	1	320
		OutPt02ComIdlVal														X		152	1	321
		OutDig1PrFltAct													X			153	1	322
		OutDig1PrFltVal												X				154	1	323
		OutDig1ComFltAct											X					155	1	324
		OutDig1ComFltVal										X						156	1	325
		OutDig1ComIdlAct									X							157	1	326
		OutDig1ComIdlVal								X								158	1	327
									X	OutDig2PrFltAct								159	1	328
								X		OutDig2PrFltVal								160	1	329
							X			OutDig2ComFltAct								161	1	330
						X				OutDig2ComFltVal								162	1	331
					X					OutDig2ComIdlAct								163	1	332
				X						OutDig2ComIdlVal								164	1	333
			X							OutDig3PrFltAct								165	1	334
		X								OutDig3PrFltVal								166	1	335
80	40	OutDig3ComFltAct															X	167	1	336
		OutDig3ComFltVal														X		168	1	337
		OutDig3ComIdlAct													X			169	1	338
		OutDig3ComIdlVal												X				170	1	339
		OutDig4PrFltAct											X					171	1	340
		OutDig4PrFltVal										X						172	1	341
		OutDig4ComFltAct									X							173	1	342
		OutDig4ComFltVal								X								174	1	343
									X	OutDig4ComIdlAct								175	1	344
								X		OutDig4ComIdlVal								176	1	345
							X			CommOverride								177	1	346
						X				NetworkOverride								178	1	347
					X					NetStrtComFltAct								179	1	569
				X						NetStrtComFltVal								180	1	570
			X							NetStrtComIdlAct								181	1	571
		X								NetStrtComIdlVal								182	1	572
81		PtDevOutCOSMask																183	16	350

Instance 120—Configuration Assembly

INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Member	Size	Param
82	41	PTPrimary																184	16	353
83		PTSecondary																185	16	354
84	42									VoltageMode								186	8	352
		PhRotInhibitTime																187	8	363
85										UVInhibitTime								188	8	355
		UVTripDelay																189	8	356
86	43	UVTripLevel																190	16	357
87		UVWarningLevel																191	16	358
88	44									OVInhibitTime								192	8	359
		OVTripDelay																193	8	360
89		OVTripLevel																194	16	361
90	45	OVWarningLevel																195	16	362
91										VUBInhibitTime								196	8	365
		VUBTripDelay																197	8	366
92	46									VUBTripLevel								198	8	367
		VUBWarningLevel																199	8	368
93										UFInhibitTime								200	8	369
		UFTripDelay																201	8	370
94	47									UFTripLevel								202	8	371
		UFWarningLevel																203	8	372
95										OFInhibitTime								204	8	373
		OFTripDelay																205	8	374
96	48									OFTripLevel								206	8	375
		OFWarningLevel																207	8	376
97										DemandPeriod								208	8	426
		NumberOfPeriods																209	8	427
98	49									UWInhibitTime								210	8	378
		UWTripDelay																211	8	379
99										OWInhibitTime								212	8	382
		OWTripDelay																213	8	383
100	50	UWTripLevel																214	32	380
101																				
102	51	UWWarningLevel																215	32	381
103																				
104	52	OWTripLevel																216	32	384
105																				
106	53	OWWarningLevel																217	32	385
107																				
108	54									UVARCInhibitTime								218	8	386
		UVARCTripDelay																219	8	387
109										OVARCInhibitTime								220	8	390
		OVARCTripDelay																221	8	391
110	55	UVARCTripLevel																222	32	388
111																				
112	56	UVARCWarnLevel																223	32	389
113																				
114	57	OVARCTripLevel																224	32	392
115																				

Instance 120—Configuration Assembly																		**Member**	**Size**	**Param**
INT	**DINT**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**			
116	58	OVARCWarnLevel																225	32	393
117																				
118	59									UVARGInhibitTime								226	8	394
		UVARGTripDelay																227	8	395
119										OVARGInhibitTime								228	8	398
		OVARGTripDelay																229	8	399
120	60	UVARGTripLevel																230	32	396
121																				
122	61	UVARGWarnLevel																231	32	397
123																				
124	62	OVARGTripLevel																232	32	400
125																				
Instance 120 - Configuration Assembly																		Member	Size	Param
126	63	OVARGWarnLevel																233	32	401
127																				
128	64									UVAInhibitTime								234	8	402
		UVATripDelay																235	8	403
129										OVAInhibitTime								236	8	406
		OVATripDelay																237	8	407
130	65	UVATripLevel																238	32	404
131																				
132	66	UVAWarningLevel																239	32	405
133																				
134	67	OVATripLevel																240	32	408
135																				
136	68	OVAWarningLevel																241	32	409
137																				
138	69									UPFLagInhibTime								242	8	410
		UPFLagTripDelay																243	8	411
139										UPFLagTripLevel								244	8	412
		UPFLagWarnLevel																245	8	413
140	70									OPFLagInhibTime								246	8	414
		OPFLagTripDelay																247	8	415
141										OPFLagTripLevel								248	8	416
		OPFLagWarnLevel																249	8	417
142	71									UPFLeadInhibTime								250	8	418
		UPFLeadTripDelay																251	8	419
143										UPFLeadTripLevel								252	8	420
		UPFLeadWarnLevel																253	8	421
144	72									OPFLeadInhibTime								254	8	422
		OPFLeadTripDelay																255	8	423
145										OPFLeadTripDelay								256	8	424
		OPFLeadWarnLevel																257	8	425
146	73	Screen1Param1																258	16	428
147		Screen1Param2																259	16	429
148	74	Screen2Param1																260	16	430
149		Screen2Param2																261	16	431
150	75	Screen3Param1																262	16	432
151		Screen3Param2																263	16	433

		Instance 120—Configuration Assembly																Member	Size	Param
INT	**DINT**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**			
152	76	Screen4Param1																264	16	434
153		Screen4Param2																265	16	435
154	77	DisplayTimeout																266	16	436
155		Reserved																267	16	1103
156	78		26 8							InAMod1C0TripDly								268	8	443
		InAMod1C1TripDly								26 9								269	8	452
157										InAMod1C2TripDly								270	8	461
		Reserved																271	8	1102
158	79	InAMod1C0TripLvl																272	16	444
159		InAMod1C0WarnLvl																273	16	445
160	80	InAMod1C1TripLvl																274	16	453
161		InAMod1C1WarnLvl																275	16	454
162	81	InAMod1C2TripLvl																276	16	462
163		InAMod1C2WarnLvl																277	16	463
164	82												InAnMod1Ch00Type					278	5	437
								InAnMod1Ch01Type										279	5	446
			InAnMod1Ch02Type															280	5	455
		X	Reserved															281	1	1101
165										OutAnMod1Select								282	8	465
							X	X	X	InAMod1Ch0Format								283	3	438
				X	X	X				InAMod1C0FiltFrq								284	3	440
		X	X							InAMod1C0OpCktSt								285	2	441
166	83	InAMod1Ch1Format													X	X	X	286	3	447
		InAMod1C1FiltFrq										X	X	X				287	3	449
		InAMod1C1OpCktSt								X	X							288	2	450
							X	X	X	InAMod1Ch2Format								289	3	456
				X	X	X				InAMod1C2FiltFrq								290	3	458
		X	X							InAMod1C2OpCktSt								291	2	459
167		InAMod1C0TmpUnit															X	292	1	439
		InAnMod1Ch0RTDEn														X		293	1	442
		InAMod1C1TmpUnit													X			294	1	448
		InAnMod1Ch1RTDEn												X				295	1	451
		InAMod1C2TmpUnit											X					296	1	457
		InAnMod1Ch2RTDEn										X						297	1	460
		OutAnMod1EfltAct								X	X							298	2	466
								X	X	OutAnMod1PfltAct								299	2	467
				X	X	X	X			OutAnMod1Type								300	4	464
		X	X							Reserved								301	2	1101
168	84									InAMod2C0TripDly								302	8	474
		InAMod2C1TripDly																303	8	483
169										InAMod2C2TripDly								304	8	492
		Reserved																305	8	1102
170	85	InAMod2C0TripLvl																306	16	475
171		InAMod2C0WarnLvl																307	16	476
172	86	InAMod2C1TripLvl																308	16	484
173		InAMod2C1WarnLvl																309	16	485

Instance 120—Configuration Assembly																		Member	Size	Param
INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0			
174	87	InAMod2C2TripLvl																310	16	493
175		InAMod2C2WarnLvl																311	16	494
176	88												InAnMod2Ch00Type					312	5	468
								InAnMod2Ch01Type										313	5	477
			InAnMod2Ch02Type															314	5	486
		X	Reserved															315	1	1101
177										OutAnMod2Select								316	8	496
							X	X	X	InAMod2Ch0Format								317	3	469
				X	X	X				InAMod2C0FiltFrq								318	3	471
		X	X							InAMod2C0OpCktSt								319	2	472
178	89	InAMod2Ch1Format													X	X	X	320	3	478
		InAMod2C1FiltFrq										X	X	X				321	3	480
		InAMod2C1OpCktSt								X	X							322	2	481
							X	X	X	InAMod2Ch2Format								323	3	487
				X	X	X				InAMod2C2FiltFrq								324	3	489
		X	X							InAMod2C2OpCktSt								325	2	490
179		InAMod2C0TmpUnit															X	326	1	470
		InAnMod2Ch0RTDEn														X		327	1	473
		InAMod2C1TmpUnit													X			328	1	479
		InAnMod2Ch1RTDEn												X				329	1	482
		InAMod2C2TmpUnit											X					330	1	488
		InAnMod2Ch2RTDEn										X						331	1	491
		OutAnMod2EfltAct								X	X							332	2	497
								X	X	OutAnMod2PfltAct								333	2	498
				X	X	X	X			OutAnMod2Type								334	4	495
		X	X							Reserved								335	2	1101
180	90									InAMod3C0TripDly								336	8	505
		InAMod3C1TripDly																337	8	514
181										InAMod3C2TripDly								338	8	523
		Reserved																339	8	1102
182	91	InAMod3C0TripLvl																340	16	506
183		InAMod3C0WarnLvl																341	16	507
184	92	InAMod3C1TripLvl																342	16	515
185		InAMod3C1WarnLvl																343	16	516
186	93	InAMod3C2TripLvl																344	16	524
187		InAMod3C2WarnLvl																345	16	525
188	94												InAnMod3Ch00Type					346	5	499
								InAnMod3Ch01Type										347	5	508
			InAnMod3Ch02Type															348	5	517
		X	Reserved															349	1	NA
189										OutAnMod3Select								350	8	527
							X	X	X	InAMod3Ch0Format								351	3	500
				X	X	X				InAMod3C0FiltFrq								352	3	502
		X	X							InAMod3C0OpCktSt								353	2	503

		Instance 120—Configuration Assembly																Member	Size	Param
INT	**DINT**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**			
190	95	InAMod3Ch1Format													X	X	X	354	3	509
		InAMod3C1FiltFrq										X	X	X				355	3	511
		InAMod3C1OpCktSt								X	X							356	2	512
							X	X	X	InAMod3Ch2Format								357	3	518
				X	X	X				InAMod3C2FiltFrq								358	3	520
		X	X							InAMod3C2OpCktSt								359	2	521
191		InAMod3C0TmpUnit															X	360	1	501
		InAnMod3Ch0RTDEn														X		361	1	504
		InAMod3C1TmpUnit													X			362	1	510
		InAnMod3Ch1RTDEn												X				363	1	513
		InAMod3C2TmpUnit											X					364	1	519
		InAnMod3Ch2RTDEn										X						365	1	522
		OutAnMod3EfltAct								X	X							366	2	528
								X	X	OutAnMod3PfltAct								367	2	529
				X	X	X	X			OutAnMod3Type								368	4	526
		X	X							Reserved								369	2	1101
192	96									InAMod4C0TripDly								370	8	536
		InAMod4C1TripDly																371	8	545
193										InAMod4C2TripDly								372	8	554
		Reserved																373	8	1102
194	97	InAMod4C0TripLvl																374	16	537
195		InAMod4C0WarnLvl																375	16	538
196	98	InAMod4C1TripLvl																376	16	546
197		InAMod4C1WarnLvl																377	16	547
198	99	InAMod4C2TripLvl																378	16	555
199		InAMod4C2WarnLvl																379	16	556
200	100												InAnMod4Ch00Type					380	5	530
								InAnMod4Ch01Type										381	5	539
			InAnMod4Ch02Type															382	5	548
		X	Reserved															383	1	1101
201										OutAnMod4Select								384	8	558
							X	X	X	InAMod4Ch0Format								385	3	531
				X	X	X				InAMod4C0FiltFrq								386	3	533
		X	X							InAMod4C0OpCktSt								387	2	534

Instance 120—Configuration Assembly																		Member	Size	Param
INT	**DINT**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**			
202	101	InAMod4Ch1Format													X	X	X	388	3	540
		InAMod4C1FiltFrq										X	X	X				389	3	542
		InAMod4C1OpCktSt								X	X							390	2	543
							X	X	X	InAMod4Ch2Format								391	3	549
				X	X	X				InAMod4C2FiltFrq								392	3	551
		X	X							InAMod4C2OpCktSt								393	2	552
203		InAMod3C0TmpUnit															X	394	1	532
		InAnMod4Ch0RTDEn														X		395	1	535
		InAMod4C1TmpUnit													X			396	1	541
		InAnMod4Ch1RTDEn												X				397	1	544
		InAMod4C2TmpUnit											X					398	1	550
		InAnMod4Ch2RTDEn										X						399	1	553
		OutAnMod4EfltAct								X	X							400	2	559
								X	X	OutAnMod4PfltAct								401	2	560
				X	X	X	X			OutAnMod4Type								402	4	557
		X	X							Reserved								403	2	1001

[Table 130](#) shows a simplified version of Instance 120 of the Assembly. It is not included in the EDS file. This version is only available to non-Logix users.

Table 130 - Instance 120—Configuration Assembly (Non-Logix)

Instance 120—Configuration Assembly (Non-Logix)																		Member	Size	Param
INT	**DINT**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**			
0	0	ConfigAssyRev = 1								Reserved								1	16	1002
1		Reserved																2	16	NA
2	1	FLASetting																3	32	171
3																				
4	3									TripClass								4	8	172
									X	OLPTCResetMode								5	1	173
								X		SingleOrThreePh								6	1	176
		X	X	X	X	X	X			Reserved								7	6	NA
5										OLResetLevel								8	8	174
		OLWarningLevel																9	8	175

Table 131 - Instance 144—Default Consumed Assembly

Instance 144—Default Consumed Assembly																		Member	Size	Path
INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0			
0	0	OutputStatus0																0	16	Param18
1		NetworkStart1															X	1		Symbolic
		NetworkStart2														X		2		Symbolic
		TripReset													X			3		Symbolic
		EmergencyStop												X				4		Symbolic
		RemoteTrip											X					5		Symbolic
		Reserved								X	X	X						6		NA
									X	HMILED1Green								7		Symbolic
								X		HMILED2Green								8		Symbolic
							X			HMILED3Green								9		Symbolic
						X				HMILED3Red								10		Symbolic
					X					HMILED4Red								11		Symbolic
		X	X	X						Reserved								12		NA
2	1	PtDeviceIns																13	16	Symbolic
3		AnDeviceIns																14	16	Symbolic

Table 132 - Instance 144 Attributes

Attribute ID	Access Rule	Member Index	Name	Data Type	Value
1	Get		Number of Members in Member List	UINT	15
	Get		Member List	Array of STRUCT	
		0	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 12 00
		1	Member Data Description	UINT	1
			Member Path Size	UINT	14
			Member Path	Packed EPATH	6DH & "NetworkStart1"
		2	Member Data Description	UINT	1
			Member Path Size	UINT	14
			Member Path	Packed EPATH	6DH & "NetworkStart2"
		3	Member Data Description	UINT	1
			Member Path Size	UINT	10
			Member Path	Packed EPATH	69H & "TripReset"
		4	Member Data Description	UINT	1
			Member Path Size	UINT	14
			Member Path	Packed EPATH	6DH & "EmergencyStop"
		5	Member Data Description	UINT	1
			Member Path Size	UINT	11
			Member Path	Packed EPATH	6AH & "RemoteTrip"
		6	Member Data Description	UINT	3
			Member Path Size	UINT	0
			Member Path	Packed EPATH	
		7	Member Data Description	UINT	1
	Get		Member Path Size	UINT	13
			Member Path	Packed EPATH	6CH & "HMILED1Green"
		8	Member Data Description	UINT	1
			Member Path Size	UINT	13
			Member Path	Packed EPATH	6CH & "HMILED2Green"
		9	Member Data Description	UINT	1
			Member Path Size	UINT	13
			Member Path	Packed EPATH	6CH & "HMILED3Green"
		10	Member Data Description	UINT	1
			Member Path Size	UINT	11
			Member Path	Packed EPATH	6AH & "HMILED3Red"
		11	Member Data Description	UINT	1
			Member Path Size	UINT	11
			Member Path	Packed EPATH	6AH & "HMILED4Red"
		12	Member Data Description	UINT	3
			Member Path Size	UINT	0
			Member Path	Packed EPATH	
		13	Member Data Description	UINT	16
			Member Path Size	UINT	12
			Member Path	Packed EPATH	6BH & "PtDeviceIns"
		14	Member Data Description	UINT	16
			Member Path Size	UINT	12
			Member Path	Packed EPATH	6BH & "AnDeviceIns"

Attribute ID	Access Rule	Member Index	Name	Data Type	Value
3	Get		Data	UINT	See data format above
4	Get		Size	UINT	8
100	Get		Name	SHORT_STRING	"E300 Consumed"

Table 133 - Instance 198 Current Diagnostics Produced Assembly

Instance 198—Current Diagnostics Produced Assembly																		Member	Size	Path
INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0			
0	0	Reserved for Logix																0	32	1104
1																				
2	1	DeviceStaus0																1	16	20
3		DeviceStaus1																2	16	21
4	2	InputStatus0																3	16	16
5		InputStatus1																4	16	17
6	3	OutputStatus																5	16	18
7		OpStationStatus																6	16	19
8	4	TripStsCurrent																7	16	4
9		WarnStsCurrent																8	16	10
10	5	TripStsVoltage																9	16	5
11		WarnStsVoltage																10	16	11
12	6	TripStsPower																11	16	6
13		WarnStsPower																12	16	12
14	7	TripStsControl																13	16	7
15		WarnStsControl																14	16	13
16	8	TripStsAnalog																15	16	8
17		WarnStsAnalog																16	16	14
18	9	Reserved																17	16	1103
19		MismatchStatus																18	16	40
20	10									ThermUtilizedPct								19	8	1
		CurrentImbal																20	8	52
21		AvgPercentFLA																21	16	50
22	11	AverageCurrent																22	32	46
23																				
24	12	L1Current																23	32	43
25																				
26	13	L2Current																24	32	44
27																				
28	14	L3Current																25	32	45
29																				
30	15	GFCurrent																26	16	51
31		Reserved																27	16	1103
32	16	Datalink0																28	32	291
33																				
34	17	Datalink1																29	32	292
35																				
36	18	Datalink2																30	32	293
37																				
38	19	Datalink3																31	32	294
39																				
40	20	Datalink4																32	32	295
41																				

Instance 198—Current Diagnostics Produced Assembly																		Member	Size	Path
INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0			
42	21	Datalink5																33	32	296
43																				
44	22	Datalink6																34	32	297
45																				
46	23	Datalink7																35	32	298
47																				
48	24	PtDeviceOuts																36	16	348
49		AnDeviceOuts																37	16	1105
50	25	InAnMod1Ch00																38	16	111
51		InAnMod1Ch01																39	16	112
52	26	InAnMod1Ch02																40	16	113
53		AnalogMod1Status																41	16	123
54	27	InAnMod2Ch00																42	16	114
55		InAnMod2Ch01																43	16	115
56	28	InAnMod2Ch02																44	16	116
57		AnalogMod2Status																45	16	124
58	29	InAnMod3Ch00																46	16	117
59		InAnMod3Ch01																47	16	118
60	30	InAnMod3Ch02																48	16	119
61		AnalogMod3Status																49	16	125
62	31	InAnMod4Ch00																50	16	120
63		InAnMod4Ch01																51	16	121
64	32	InAnMod4Ch02																52	16	122
65		AnalogMod4Status																53	16	126

Table 134 - Instance 198 Attributes

Attribute ID	Access Rule	Member Index	Name	Data Type	Value
1	Get		Number of Members in Member List	UINT	54
	Get		Member List	Array of STRUCT	
		0	Member Data Description	UINT	32
			Member Path Size	UINT	9
			Member Path	Packed EPATH	68H & "Reserved"
		1	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 14 00
		2	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 15 00
		3	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 10 00
		4	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 11 00
		5	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 12 00
		6	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 13 00
		7	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 04 00
		8	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 0A 00
		9	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 05 00
		10	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 0B 00
		11	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 06 00
		12	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 0C 00
		13	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 07 00
		14	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 0D 00
		15	Member Data Description	UINT	16

Attribute ID	Access Rule	Member Index	Name	Data Type	Value
	Get		Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 08 00
		16	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 0E 00
		17	Member Data Description	UINT	16
			Member Path Size	UINT	0
			Member Path	Packed EPATH	
		18	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 28 00
		19	Member Data Description	UINT	8
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 01 00
		20	Member Data Description	UINT	8
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 34 00
		21	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 32 00
		22	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 2E 00
		23	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	32 0F 00 25 2B 00
		24	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 2C 00
		25	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 2D 00
		26	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 33 00
		27	Member Data Description	UINT	16
			Member Path Size	UINT	0
			Member Path	Packed EPATH	
		28	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 23 01
		29	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 24 01
		30	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 25 01
		31	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 26 01

Attribute ID	Access Rule	Member Index	Name	Data Type	Value
	Get	32	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 27 23 01
		33	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 28 01
		34	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 29 01
		35	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 2A 01
		36	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 5C 01
		37	Member Data Description	UINT	16
			Member Path Size	UINT	13
			Member Path	Packed EPATH	6CH & "AnDeviceOuts"
		38	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 6F 00
		39	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 70 00
		40	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 71 00
		41	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 7B 00
		42	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 72 00
		43	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 73 00
		44	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 74 00
		45	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 7C 00
		46	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 75 00
		47	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 76 00

Attribute ID	Access Rule	Member Index	Name	Data Type	Value
	Get	48	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 77 00
		49	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 7D 00
		50	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 78 00
		51	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 79 00
		52	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 7A 00
		53	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 7E 00
3	Get		Data	UINT	See data format above
4	Get		Size	UINT	132
100	Get		Name	SHORT_STRING	"Current Diags"

Table 135 - Instance 199—All Diagnostics Produced Assembly

Instance 199—All Diagnostics Produced Assembly																		Member	Size	Path
INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0			
0	0	Reserved for Logix																0	32	1104
1																				
2	1	DeviceStaus0																1	16	20
3		DeviceStaus1																2	16	21
4	2	InputStatus0																3	16	16
5		InputStatus1																4	16	17
6	3	OutputStatus																5	16	18
7		OpStationStatus																6	16	19
8	4	TripStsCurrent																7	16	4
9		WarnStsCurrent																8	16	10
10	5	TripStsVoltage																9	16	5
11		WarnStsVoltage																10	16	11
12	6	TripStsPower																11	16	6
13		WarnStsPower																12	16	12
14	7	TripStsControl																13	16	7
15		WarnStsControl																14	16	13
16	8	TripStsAnalog																15	16	8
17		WarnStsAnalog																16	16	14
18	9	Reserved																17	16	1104
19																		18	16	40
20	10									ThermUtilizedPct								19	8	1
		CurrentImbalance																20	8	52
21		AvgPercentFLA																21	16	50
22	11	AverageCurrent																22	32	46
23																				

<table>
<tr><th colspan="18">Instance 199—All Diagnostics Produced Assembly</th><th rowspan="2">Member</th><th rowspan="2">Size</th><th rowspan="2">Path</th></tr>
<tr><th>INT</th><th>DINT</th><th>15</th><th>14</th><th>13</th><th>12</th><th>11</th><th>10</th><th>9</th><th>8</th><th>7</th><th>6</th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th><th>0</th></tr>
<tr><td>24</td><td rowspan="2">12</td><td colspan="16" rowspan="2">L1Current</td><td rowspan="2">23</td><td rowspan="2">32</td><td rowspan="2">43</td></tr>
<tr><td>25</td></tr>
<tr><td>26</td><td rowspan="2">13</td><td colspan="16" rowspan="2">L2Current</td><td rowspan="2">24</td><td rowspan="2">32</td><td rowspan="2">44</td></tr>
<tr><td>27</td></tr>
<tr><td>28</td><td rowspan="2">14</td><td colspan="16" rowspan="2">L3Current</td><td rowspan="2">25</td><td rowspan="2">32</td><td rowspan="2">45</td></tr>
<tr><td>29</td></tr>
<tr><td>30</td><td rowspan="2">15</td><td colspan="16">GFCurrent</td><td>26</td><td>16</td><td>51</td></tr>
<tr><td>31</td><td colspan="16">Reserved</td><td>27</td><td>16</td><td>1103</td></tr>
<tr><td>32</td><td rowspan="2">16</td><td colspan="16">AvgVoltageLtoL</td><td>28</td><td>16</td><td>56</td></tr>
<tr><td>33</td><td colspan="16">L1toL2Voltage</td><td>29</td><td>16</td><td>53</td></tr>
<tr><td>34</td><td rowspan="2">17</td><td colspan="16">L2toL3Voltage</td><td>30</td><td>16</td><td>54</td></tr>
<tr><td>35</td><td colspan="16">L3toL1Voltage</td><td>31</td><td>16</td><td>55</td></tr>
<tr><td>36</td><td rowspan="2">18</td><td colspan="16" rowspan="2">TotalRealPower</td><td rowspan="2">32</td><td rowspan="2">32</td><td rowspan="2">67</td></tr>
<tr><td>37</td></tr>
<tr><td>38</td><td rowspan="2">19</td><td colspan="16" rowspan="2">TotalReactivePwr</td><td rowspan="2">33</td><td rowspan="2">32</td><td rowspan="2">71</td></tr>
<tr><td>39</td></tr>
<tr><td>40</td><td rowspan="2">20</td><td colspan="16" rowspan="2">TotalApparentPwr</td><td rowspan="2">34</td><td rowspan="2">32</td><td rowspan="2">75</td></tr>
<tr><td>41</td></tr>
<tr><td>42</td><td rowspan="2">21</td><td colspan="16">TotalPowerFactor</td><td rowspan="2">35</td><td rowspan="2">32</td><td rowspan="2">79</td></tr>
<tr><td>43</td><td colspan="16">Reserved</td></tr>
<tr><td>44</td><td rowspan="2">22</td><td colspan="16" rowspan="2">Datalink0</td><td rowspan="2">36</td><td rowspan="2">32</td><td rowspan="2">291</td></tr>
<tr><td>45</td></tr>
<tr><td>46</td><td rowspan="2">23</td><td colspan="16" rowspan="2">Datalink1</td><td rowspan="2">37</td><td rowspan="2">32</td><td rowspan="2">292</td></tr>
<tr><td>47</td></tr>
<tr><td>48</td><td rowspan="2">24</td><td colspan="16" rowspan="2">Datalink2</td><td rowspan="2">38</td><td rowspan="2">32</td><td rowspan="2">293</td></tr>
<tr><td>49</td></tr>
<tr><td>50</td><td rowspan="2">25</td><td colspan="16" rowspan="2">Datalink3</td><td rowspan="2">39</td><td rowspan="2">32</td><td rowspan="2">294</td></tr>
<tr><td>51</td></tr>
<tr><td>52</td><td rowspan="2">26</td><td colspan="16" rowspan="2">Datalink4</td><td rowspan="2">40</td><td rowspan="2">32</td><td rowspan="2">295</td></tr>
<tr><td>53</td></tr>
<tr><td>54</td><td rowspan="2">27</td><td colspan="16" rowspan="2">Datalink5</td><td rowspan="2">41</td><td rowspan="2">32</td><td rowspan="2">296</td></tr>
<tr><td>55</td></tr>
<tr><td>56</td><td rowspan="2">28</td><td colspan="16" rowspan="2">Datalink6</td><td rowspan="2">42</td><td rowspan="2">32</td><td rowspan="2">297</td></tr>
<tr><td>57</td></tr>
<tr><td>58</td><td rowspan="2">29</td><td colspan="16" rowspan="2">Datalink7</td><td rowspan="2">43</td><td rowspan="2">32</td><td rowspan="2">298</td></tr>
<tr><td>59</td></tr>
<tr><td>60</td><td rowspan="2">30</td><td colspan="16">PtDeviceOuts</td><td>44</td><td>16</td><td>348</td></tr>
<tr><td>61</td><td colspan="16">AnDeviceOuts</td><td>45</td><td>16</td><td>1105</td></tr>
<tr><td>62</td><td rowspan="2">31</td><td colspan="16">InAnMod1Ch00</td><td>46</td><td>16</td><td>111</td></tr>
<tr><td>63</td><td colspan="16">InAnMod1Ch01</td><td>47</td><td>16</td><td>112</td></tr>
<tr><td>64</td><td rowspan="2">32</td><td colspan="16">InAnMod1Ch02</td><td>48</td><td>16</td><td>113</td></tr>
<tr><td>65</td><td colspan="16">AnalogMod1Status</td><td>49</td><td>16</td><td>123</td></tr>
<tr><td>66</td><td rowspan="2">33</td><td colspan="16">InAnMod2Ch00</td><td>50</td><td>16</td><td>114</td></tr>
<tr><td>67</td><td colspan="16">InAnMod2Ch01</td><td>51</td><td>16</td><td>115</td></tr>
<tr><td>68</td><td rowspan="2">34</td><td colspan="16">InAnMod2Ch02</td><td>52</td><td>16</td><td>116</td></tr>
<tr><td>69</td><td colspan="16">AnalogMod2Status</td><td>53</td><td>16</td><td>124</td></tr>
<tr><td>70</td><td rowspan="2">35</td><td colspan="16">InAnMod3Ch00</td><td>54</td><td>16</td><td>117</td></tr>
<tr><td>71</td><td colspan="16">InAnMod3Ch01</td><td>55</td><td>16</td><td>118</td></tr>
</table>

Instance 199—All Diagnostics Produced Assembly																		
INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Member	Size	Path
72	36	InAnMod3Ch02																56	16	119
73		AnalogMod3Status																57	16	125
74	37	InAnMod4Ch00																58	16	120
75		InAnMod4Ch01																59	16	121
76	38	InAnMod4Ch02																60	16	122
77		AnalogMod4Status																61	16	126

Table 136 - Instance 199 Attributes

Attribute ID	Access Rule	Member Index	Name	Data Type	Value
1	Get		Number of Members in Member List	UINT	62
	Get		Member List	Array of STRUCT	
		0…27	Member Data Description	Save as members 0…27 in assembly instance 198	
			Member Path Size		
			Member Path		
		28	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 38 00
		29	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 35 00
		30	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 36 00
		31	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 37 00
		32	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 43 00
		33	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 47 00
		34	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 4B 00
		35	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 4F 00
		36…61	Member Data Description	Same as members 28…53 from assembly instance 198 above	
			Member Path Size		
			Member Path		
3	Get		Data	UINT	See data format above
4	Get		Size	UINT	156
100	Get		Name	SHORT_STRING	"All Diags"

Table 137 - Instance 131—Basic Overload

Instance 131—Basic Overload																		Member	Size	Path
INT	**DINT**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**			
0	0	Device Status0																0	16	20
1		Device Status1																1	16	21
2	1	Input Status 0																2	16	16
3		Input Status 1																3	16	17
4	2	Output Status																4	16	18
5		OpStation Status																5	16	19
6	3	Reserved								% Thermal Utilized								6	8	1
7		Average %FLA																7	16	50
8	4	Average Current																8	32	46
9																				

Table 138 - Instance 131 Attributes

Attribute ID	Access Rule	Member Index	Name	Data Type	Value
1	Get		Number of Members in Member List	UINT	10
2	Get		Member List	Array of STRUCT	
		0	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 14 00
		1	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 15 00
		2	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 10 00
		3	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 11 00
		4	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 12 00
		5	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 13 00
		6	Member Data Description	UINT	8
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 01 00
		7	Member Data Description	UINT	8
			Member Path Size	UINT	0
			Member Path	Packed EPATH	
		8	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 32 00
		9	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 2E 00
3	Get		Data	UINT	See data format above
4	Get		Size	UINT	20
100	Get		Name	SHORT_STRING	"Basic Overload"

Table 139 - Instance 132—Starter Status

INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Member	Size	Path
		Instance 132—Starter Status																		
0	0	Device Status0																0	16	20
1		Device Status1																1	16	21
2	1	Input Status 0																2	16	16
3		Input Status 1																3	16	17
4	2	L1 Current																4	32	43
5																				
6	3	L2 Current																5	32	44
7																				
8	4	L3 Current																6	32	45
9																				

Table 140 - Instance 132 Attributes

Attribute ID	Access Rule	Member Index	Name	Data Type	Value
1	Get		Number of Members in Member List	UINT	7
2	Get		Member List	Array of STRUCT	
		0	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 14 00
		1	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 15 00
		2	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 10 00
		3	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 11 00
		4	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 2B 00
		5	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 2C 00
		6	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 2D 00
3	Get		Data	UINT	See data format above
4	Get		Size	UINT	20 (0x14)
100	Get		Name	SHORT_STRING	"Basic Status"

Table 141 - Instance 133—Short Datalink

Instance 133—Short Datalink																	Member	Size	Path
INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		
0	0	Device Status0															0	16	20
1		DeviceStatus1															1	16	21
2	1	Datalink0															2	32	291
3																			
4	2	Datalink1															3	32	292
5																			
6	3	Datalink2															4	32	293
7																			
8	4	Datalink3															5	32	294
9																			

Table 142 - Instance 133 Attributes

Attribute ID	Access Rule	Member Index	Name	Data Type	Value
1	Get		Number of Members in Member List	UINT	6
	Get		Member List	Array of STRUCT	
		0	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 14 00
		1	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 15 00
		2	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 23 01
		3	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 24 01
		4	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 25 01
		5	Member Data Description	UINT	32
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 26 01
3	Get		Data	UINT	See data format above
4	Get		Size	UINT	20 (0x14)
100	Get		Name	SHORT_STRING	"Short Datalink"

Table 143 - Instance 171—DeviceLogix Status

Instance 171—DeviceLogix Status																	Member	Size	Path
INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		
0	0	Device Status0															0	16	20
1		Device Status1															1	16	21
2	1	Input Status 0															2	16	16
3		Input Status 1															3	16	17
4	2	Output Status															4	16	18
5		OpStation Status															5	16	19
6		Network Output															6	16	348

Table 144 - Instance 171 Attributes

Attribute ID	Access Rule	Member Index	Name	Data Type	Value
1	Get		Number of Members in Member List	UINT	7
	Get		Member List	Array of STRUCT	
		0	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 14 00
		1	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 15 00
		2	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 10 00
		3	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 11 00
		4	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 12 00
		5	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 13 00
		6	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 5C 01
3	Get		Data	UINT	See data format above
4	Get		Size	UINT	14 (0x0E)
100	Get		Name	SHORT_STRING	"DeviceLogix Stat"

Table 145 - Instance 172—Analog Input Status

<table>
<tr><th colspan="18">Instance 172—Analog Input Status</th><th rowspan="2">Member</th><th rowspan="2">Size</th><th rowspan="2">Path</th></tr>
<tr><th>INT</th><th>DINT</th><th>15</th><th>14</th><th>13</th><th>12</th><th>11</th><th>10</th><th>9</th><th>8</th><th>7</th><th>6</th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th><th>0</th></tr>
<tr><td>0</td><td rowspan="2">0</td><td colspan="16">Device Status0</td><td>0</td><td>16</td><td>20</td></tr>
<tr><td>1</td><td colspan="16">Device Status1</td><td>1</td><td>16</td><td>21</td></tr>
<tr><td>2</td><td rowspan="2">1</td><td colspan="16">Input Status 0</td><td>2</td><td>16</td><td>16</td></tr>
<tr><td>3</td><td colspan="16">Input Status 1</td><td>3</td><td>16</td><td>17</td></tr>
<tr><td>4</td><td rowspan="2">2</td><td colspan="16">Output Status</td><td>4</td><td>16</td><td>18</td></tr>
<tr><td>5</td><td colspan="16">OpStation Status</td><td>5</td><td>16</td><td>19</td></tr>
<tr><td>6</td><td rowspan="2">3</td><td colspan="16">AnalogStatus1</td><td>6</td><td>16</td><td>123</td></tr>
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<tr><td>16</td><td rowspan="2">8</td><td colspan="16">AnalogInput31</td><td>16</td><td>16</td><td>117</td></tr>
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<tr><td>21</td><td colspan="16">AnalogInput43</td><td>21</td><td>16</td><td>122</td></tr>
</table>

Table 146 - Instance 172 Attributes

Attribute ID	Access Rule	Member Index	Name	Data Type	Value
1	Get		Number of Members in Member List	UINT	22
	Get		Member List	Array of STRUCT	
		0	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 14 00
		1	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 15 00
		2	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 10 00
		3	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 11 00
		4	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 12 00
		5	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 13 00
		6	Member Data Description	UINT	16

Attribute ID	Access Rule	Member Index	Name	Data Type	Value
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 7B 00
		7	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 7C 00
		8	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 7D 00
		9	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 7E 00
		10	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 6F 00
		11	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 70 00
		12	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 71 00
		13	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 72 00
		14	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 73 00
		15	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 74 00
		16	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 75 00
		17	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 76 00
		18	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 77 00
		19	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 78 00
		20	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 79 00
		21	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 7A 00
3	Get		Data	UINT	See data format above
4	Get		Size	UINT	44 (0x2C)
100	Get		Name	SHORT_STRING	"Input Status"

Table 147 - Instance 186—Network Output Status

Instance 186—Network Output Status																		Member	Size	Path
INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0			
0	0	Device Status0																0	16	20
1		Device Status1																1	16	21
2		Network Output																2	16	348

Table 148 - Instance 186 Attributes

Attribute ID	Access Rule	Member Index	Name	Data Type	Value
1	Get		Number of Members in Member List	UINT	3
2	Get		Member List	Array of STRUCT	
		0	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 14 00
		1	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 15 00
		2	Member Data Description	UINT	16
			Member Path Size	UINT	6
			Member Path	Packed EPATH	21 0F 00 25 5C 01
3	Get		Data	UINT	See data format above
4	Get		Size	UINT	6
100	Get		Name	SHORT_STRING	"Network OutpSts"

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