User Manual

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.

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

Terminology

Throughout this manual, we may refer to the E300™ Electronic Overload Relay as "the E300 relay". This term may be used interchangeably with "E300 electronic overload relay"; they are synonymous.

Additional Resources

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

Resource	Description
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:

Product Overview

Overview

The E300™ Electronic Overload Relay is a microprocessor-based electronic overload relay that is designed to help protect three-phase or single-phase AC electric induction motors that are rated from 0.5…65,000 A. Its modular design, communication options, diagnostic information, simplified wiring, and integration into Logix make the E300 relay the ideal overload for motor control applications in an automation system. The E300 relay provides flexibility, reduces engineering time, and maximizes uptime for important motor starter applications.

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.

Catalog Number Explanation

E300 Electronic Overload Relay modules have their own catalog number.

Sensing Module

193 - ESM - VIG - 30A - C23
592

Bulletin Number

193	IEC Overload Relay
592	NEMA Overload Relay

Module Type

ESM	Sensing Module

Sensing Module Type

VIG	Current, Ground Fault Current, Voltage, and Power
IG	Current and Ground Fault Current
I	Current

Sensing Current Range

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

Sensing Module Mounting Style

C23	Mounts to 100-C09…-C23 Contactor
C55	Mounts to 100-C30…-C55 Contactor
C97	Mounts to 100-C60…-C97 Contactor
D180	Mounts to 100-D115…-D180 Contactor
S2	Mounts to Bulletin 500 NEMA Size 0…2 Contactor
S3	Mounts to Bulletin 500 NEMA Size 3 Contactor
S4	Mounts to Bulletin 500 NEMA Size 4 Contactor
T	DIN Rail / Panel Mount with Power Terminals
E3T	Replacement DIN Rail / Panel Mount with Power Terminals for an E3 Plus Panel Mount Adapter
P	DIN Rail / Panel Mount with Pass-thru Power Conductors
CT	DIN Rail / Panel Mount with Pass-thru Power Conductors (used with External CTs)

Control Module

193 - EIO - 43 - 120

Bulletin Number

193	IEC Overload Relay

Module Type

EIO	I/O Only Control Module
EIOGP	I/O and Protection Control Module (External Ground Fault Sensing and PTC)

I/O Count

63	6 Inputs / 3 Relay Outputs
43	4 Inputs / 3 Relay Outputs
42	4 Inputs / 2 Relay Outputs
22	2 Inputs / 2 Relay Outputs

Control Voltage

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

Communication Module

193 - ECM - ETR

Bulletin Number

193	IEC Overload Relay

Module Type

ECM	Communication Module

Communication Type

ETR	EtherNet/IP with Dual Ethernet Ports
DNT	DeviceNet
PCM	Parameter Configuration Module

Digital Expansion Module

193 - EXP - DIO - 42 - 120

Bulletin Number	Module Type	I/O Type	I/O Count	Communication Type
193 IEC Overload Relay	EXP Expansion Module	DIO Digital I/O	42 4 Inputs / 2 Relay Outputs	120 110…120V AC, 50/60 Hz Inputs
				240 220…240V AC, 50/60 Hz Inputs
				24D 24V DC Inputs

Analog Expansion Module

193 - EXP - AIO - 31

Bulletin Number	Module Type	I/O Type	I/O Count
193 IEC Overload Relay	EXP Expansion Module	AIO Analog I/O	31 3 Universal Analog Inputs / 1 Analog Output

Operator Station

193 - EOS - SCS

Bulletin Number	Module Type	I/O Type
193 IEC Overload Relay	EOS Operator Station	SCS Starter Control Station
		SDS Starter Diagnostic Station

Power Supply

193 - EXP - PS - AC

Bulletin Number	Module Type	Function Type	Supply Voltage
193 IEC Overload Relay	EXP Expansion Module	PS Expansion Bus Power Supply	AC 110-240V AC, 50/60Hz control voltage
			DC 24V DC control voltage

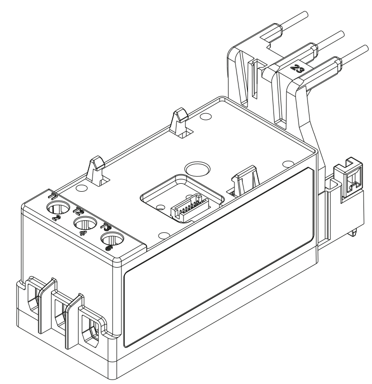
Module Description

The E300 relay is comprised of three modules. All three modules are required to make a functional overload relay.

- Sensing Module
- Control Module
- Communication Module

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:

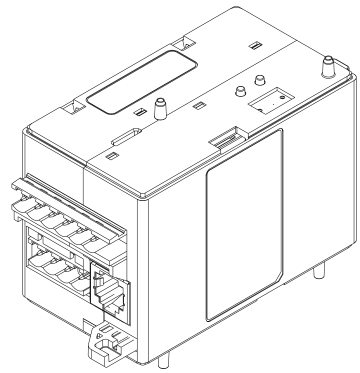
- 0.5…30 A
- 6…60 A
- 10…100 A
- 20…200 A

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 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

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)

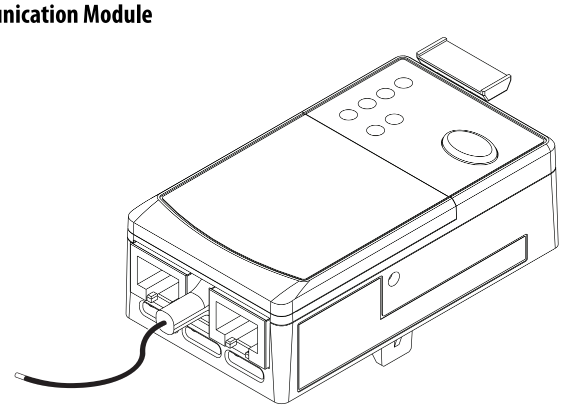
The control module is offered in three control voltages:

- 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 Module

Figure 3 - Communication Module



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 relay supports two network protocols:
- EtherNet/IP
- DeviceNet

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).

Optional Add-On Modules

Optional Expansion I/O

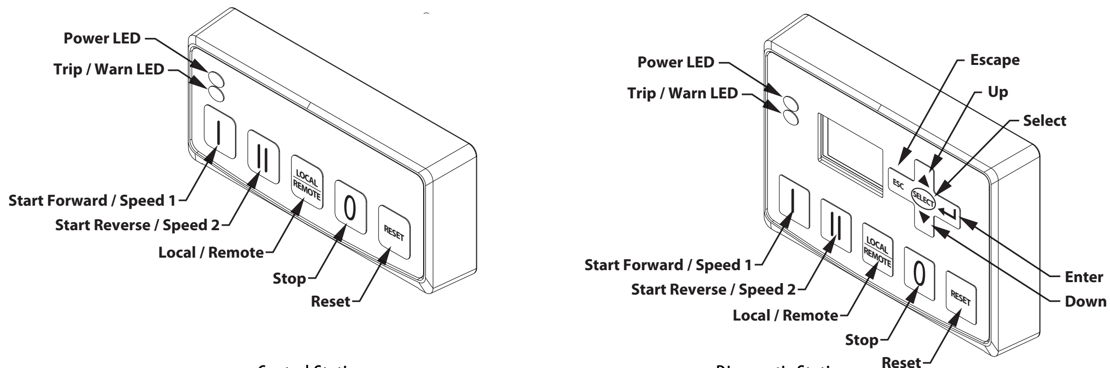
The E300 relay allows you to add more digital and analog I/O to the system via the E300 relay Expansion Bus if the native I/O count is not sufficient for the application on the base relay. You can add any combination of up to four Digital I/O Expansion Modules that have four inputs (120V AC, 240V AC, 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 4 - Operator Stations



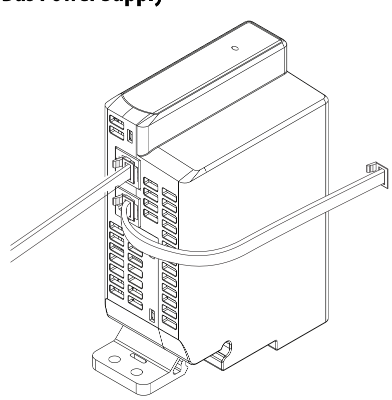
Control Station   Diagnostic Station

The E300 relay offers you the capability to 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

Figure 5 - 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.

Protection Features

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 (50N)

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

The E300 relay can be used 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

Installation and Wiring

Introduction

This chapter instructs you on how to receive, unpack, inspect, and store the E300™ Electronic Overload Relay. Assembly, installation, and wiring instructions for common applications are also included in this chapter.

Receiving

It is your responsibility to thoroughly inspect the equipment before accepting the shipment from the freight company. Check the items received against the purchase order. If any items are damaged, it is your responsibility not to accept delivery until the freight agent has noted the damage on the freight bill. If any concealed damage is found during unpacking, it is again your responsibility to notify the freight agent. The shipping container must be left intact and the freight agent should be requested to make a visual inspection of the equipment.

Unpacking/Inspecting

Remove all packing material from around the E300 relay. After you unpack it, check the item's nameplate catalog number against the purchase order.

Storing

Keep the E300 relay in its shipping container before installation. If you will not use the equipment immediately, you must store it according to the following instructions to maintain warranty coverage:

- Store in a clean, dry location.
- Store within an ambient temperature range of -40…+85 °C (-40…+185 °F).
- Store within a relative humidity range of 0…95%, non-condensing.
- Do not store where the device could be exposed to a corrosive atmosphere.
- Do not store in a construction area.

General Precautions

If the E300 relay is being deployed in an environment with an ambient temperature greater than 30 °C (86 °F), see the Environmental Specifications on page 626 for the appropriate temperature derating. In addition to the specific precautions listed throughout this manual, the following general statements must be observed.

To reduce electrical noise interference between the E300 relay and a contactor, you should use an RC surge suppressor on AC-based contactor coils. For Allen-Bradley® contactors, use the following RC surge suppressors.

Table 1 - Recommended Surge Suppressors

Contactor Type	Surge Suppressor Cat. No.
Bul. 100-C IEC Contactors	100-FSC280
Bul. 300 NEMA Contactors	100-FSC280
Bul. 500 NEMA Contactors	199-FSMA1

ATTENTION: The E300 relay contains electrostatic discharge (ESD) sensitive parts and assemblies. Status control precautions are required when installing, testing, servicing, or repairing this assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with static control procedures, see Allen-Bradley publication 8000-SB001_-en-p, "Guarding Against Electrostatic Damage", or any other applicable ESD protection handbook.

ATTENTION: An incorrectly applied or installed E300 relay can result in damage to the components or reduction in product life. Wiring or application errors (for example, incorrectly calculating the FLA setting, supplying incorrect or inadequate supply voltage, connecting an external supply voltage to the thermistor terminals, or operating or storing in excessive ambient temperatures) may result in malfunction of the E300 relay.

ATTENTION: Only personnel familiar with the E300 relay and associated machinery should plan to install, start up, and maintain the system. Failure to comply may result in personal injury or equipment damage.

ATTENTION: The purpose of this user manual is to serve as a guide for proper installation. The National Electrical Code (NEC) and any other governing regional or local code overrules this information. Rockwell Automation cannot assume responsibility for the compliance or proper installation of the E300 relay or associated equipment. A hazard of personal injury and/or equipment damage exists if codes are ignored during installation.

ATTENTION: The earth ground terminal of the E300 relay shall be connected to a solid earth ground via a low-impedance connection.

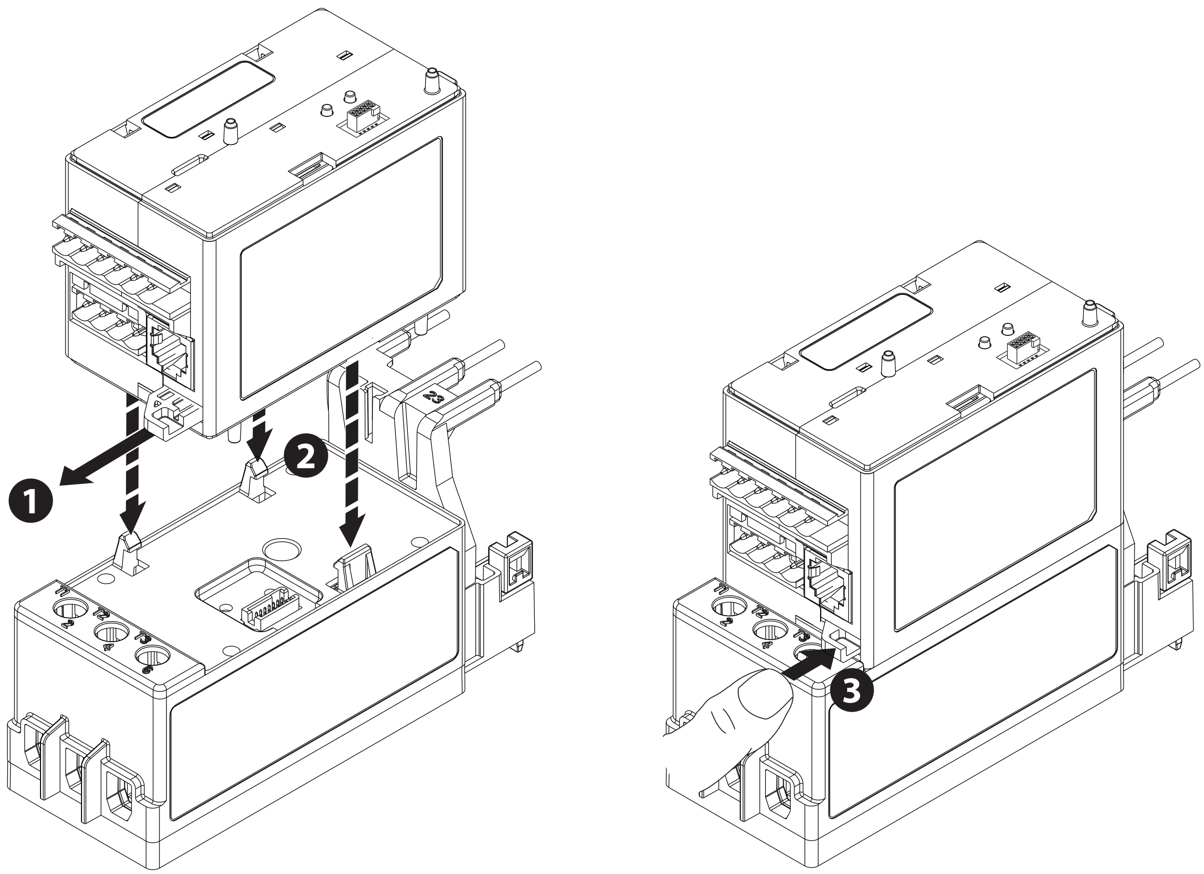
Base Relay Assembly

The following section illustrates the E300 relay base relay assembly instructions.

Control Module to Sensing Module Assembly

You can connect any E300 relay Control Module to any E300 relay Sensing Module. The following illustrations show the steps that are required to make this connection.

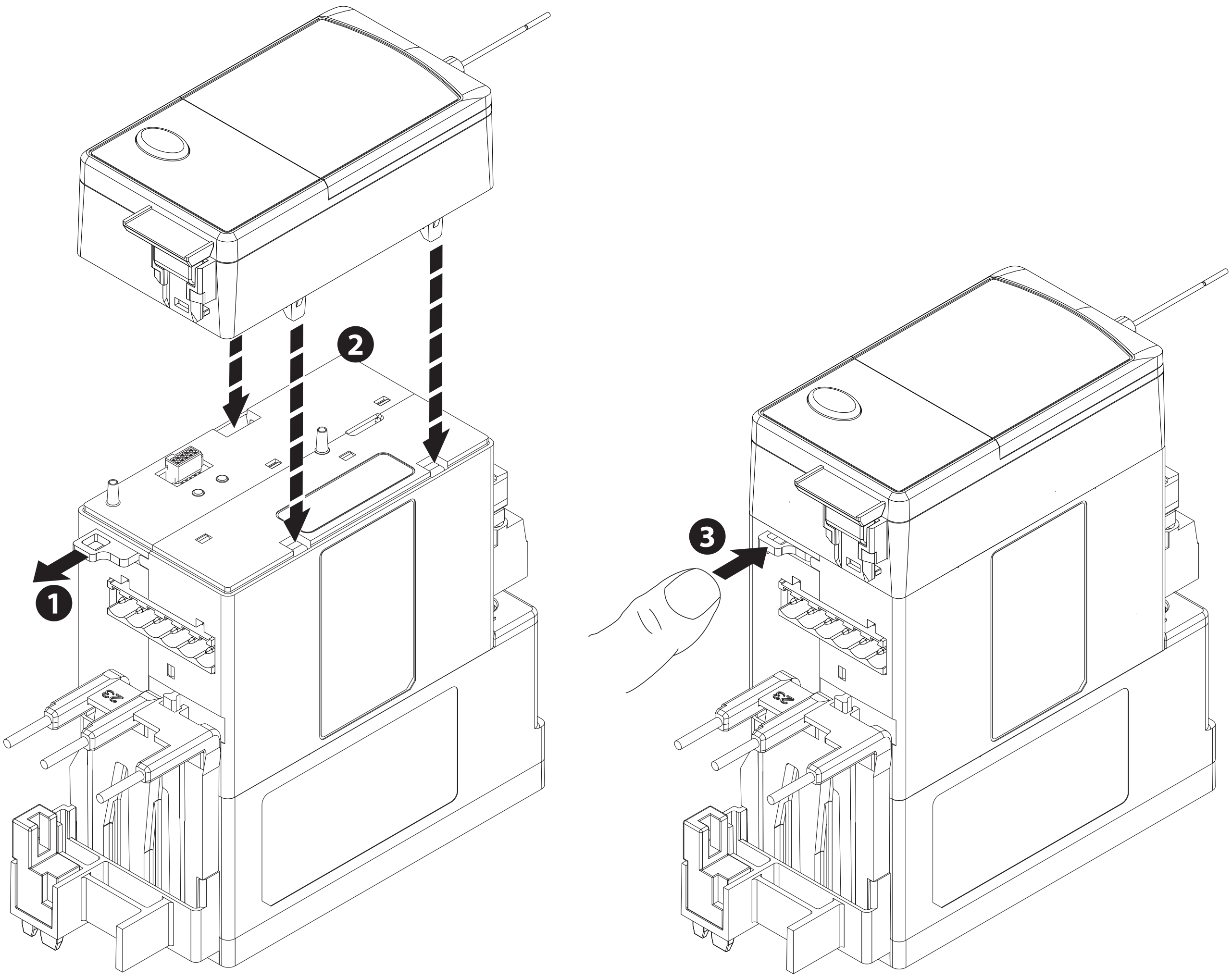
Figure 6 - Control Module to Sensing Module Assembly



Communication Module to Control Module Assembly

You can connect any E300 relay Communication Module to any E300 relay Control Module. Figure 7 shows the steps required to make this connection.

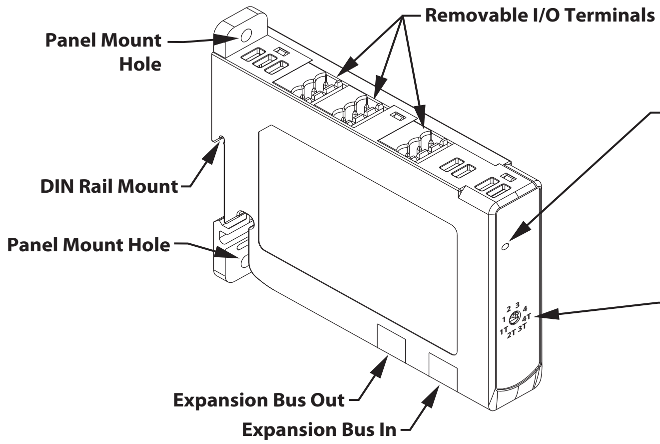
Figure 7 - Communication Module to Control Module Assembly



Expansion Bus Peripherals

The E300 relay offers a range of Expansion Digital and Analog I/O modules that simply connect to the E300 relay's Expansion Bus.

Figure 8 - Expansion Bus Peripherals



Status LED

Color	Description
Off	No power applied
Blinking Green	Module OK with no connection
Green	Module OK and active
Red	Error Detected

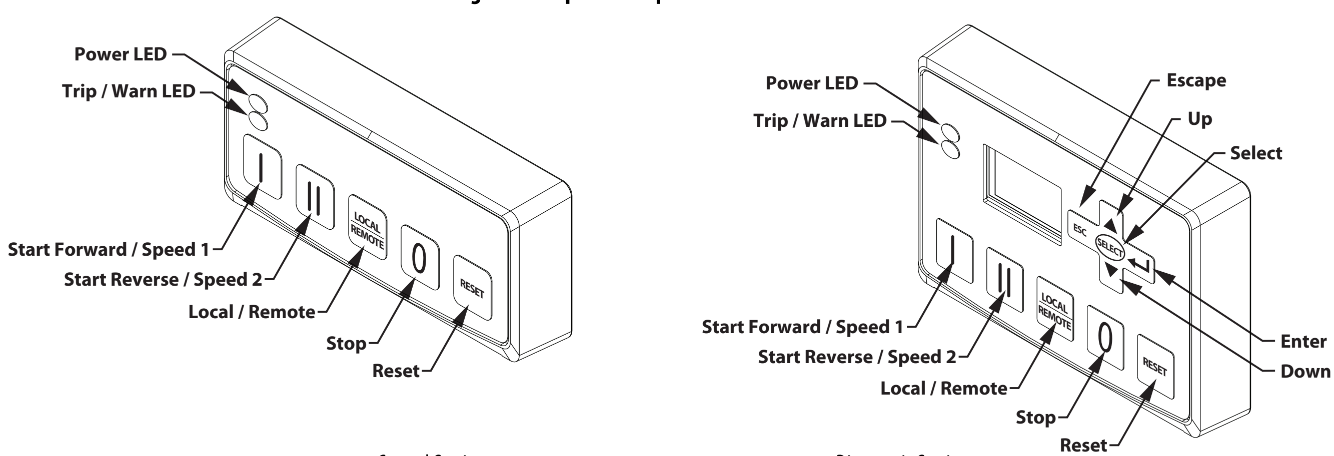
Module Number Selector

Number	Description
1 - 4	Module number
1T - 4T	Module number with expansion bus terminating resistor applied

Note: If the expansion bus does not have an operator station, then the last expansion module number must be set to terminated.

You can also add one of the two available operator stations to the end of the Expansion Bus.

Figure 9 - Expansion Operator Stations

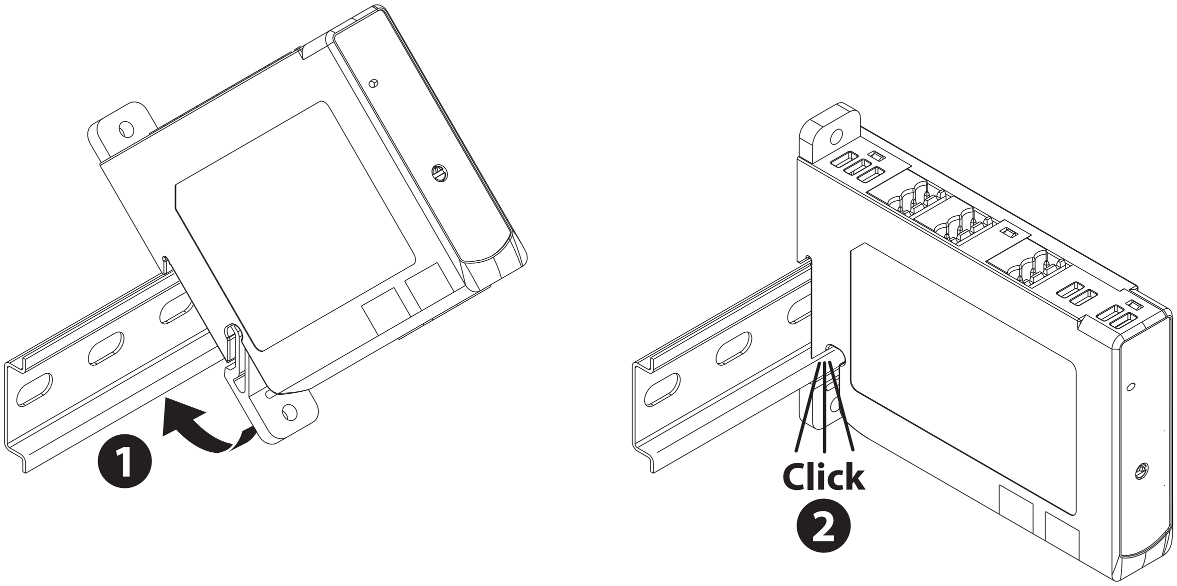


Control Station Diagnostic Station

Expansion Bus Digital and Analog I/O Modules and Power Supply Installation

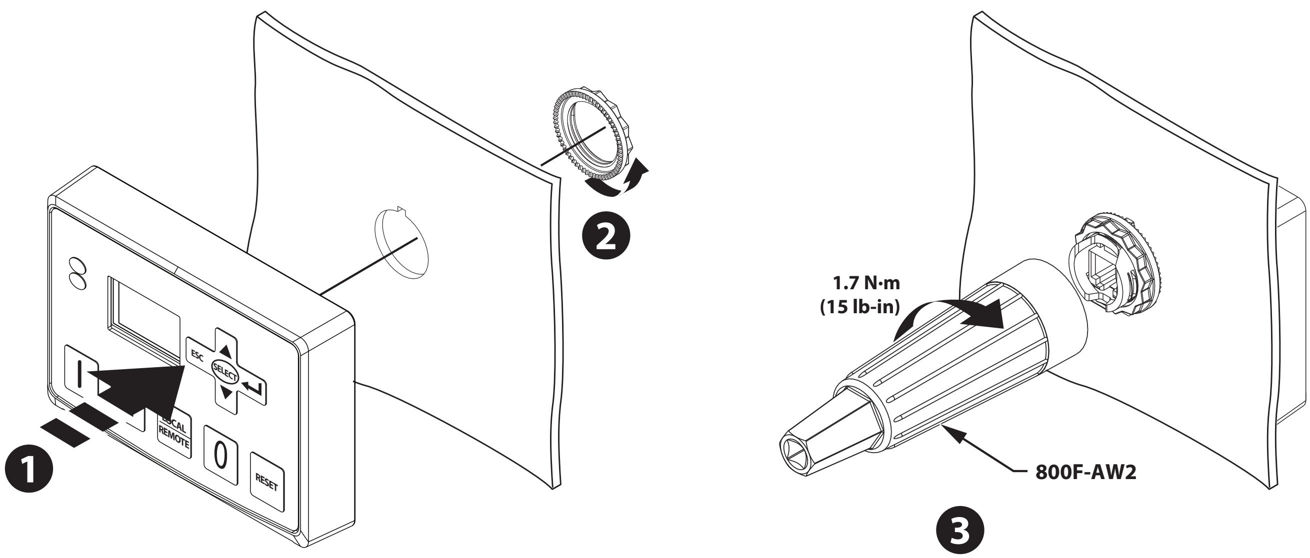
Figure 10 and Figure 11 show how to mount and connect the E300 relay expansion bus I/O modules, expansion power supplies, and operator stations.

Figure 10 - Expansion Bus Digital and Analog I/O Modules and Power Supply



Expansion Bus Operator Station Installation

Figure 11 - Expansion Bus Operator Station



Expansion Bus Network Installation

The E300 relay supports up to (4) Expansion Digital I/O modules, (4) Expansion Analog I/O modules, and (1) Operation Station. The E300 Base Relay can supply enough power for (1) Expansion Digital I/O module and (1)

Operator Station. Any other combination of E300relay Expansion Bus peripherals requires an Expansion Bus Power Supply, which connects as the first module on the Expansion Bus.

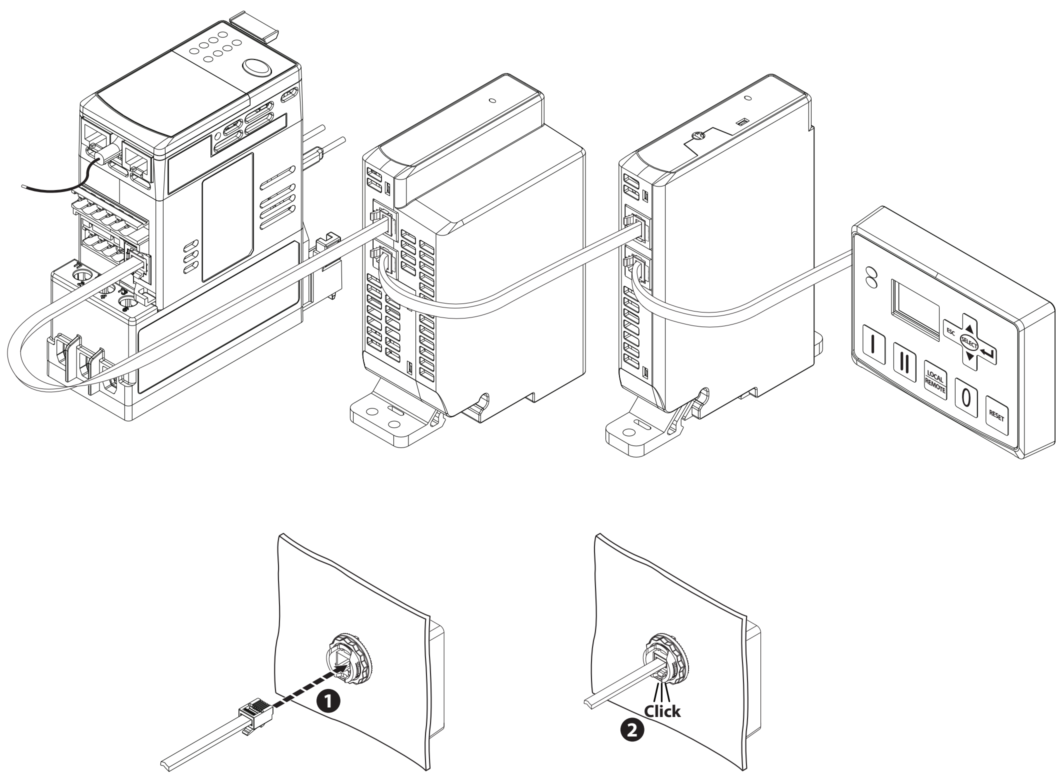
Set the module number dial of the Expansion Digital Module to a unique digital module number (D1-D4). If the Expansion Digital Module is the last device on the Expansion Bus, set the module number to the value that enables the internal terminating resistor (D1T-D4T). A power cycle is required when changes are made to the module number dial.

Set the module number dial of the Expansion Analog Module to a unique analog module number (A1-A4). If the Expansion Analog Module is the last device on the Expansion Bus, set the module number to the value that enables the internal terminating resistor (A1T-A4T). A power cycle is required when changes are made to the module number dial.

Connect the E300 Base Relay to the Expansion Module's Input Port using the supplied Expansion Bus cable. Add the next Expansion Module by connecting the supplied Expansion Bus cable to the Output Port of the previous Expansion Module and into the Input Port of the additional Expansion Module. The Operator Station is the last device on the E300 relay Expansion Bus; it only has an Input Port with an internal Expansion Bus terminating resistor.

If the user-supplied Expansion Bus cable is not long enough for the installation, 1-meter (Cat. No. 193-EXP-CBL-1M) and 3-meter (Cat. No. 193-EXP-CBL-3M) Expansion Bus cables are available as accessories. The E300 relay expansion bus can support a maximum distance of 5 meters (16 ft.).

Figure 12 - Expansion Bus Network Installation



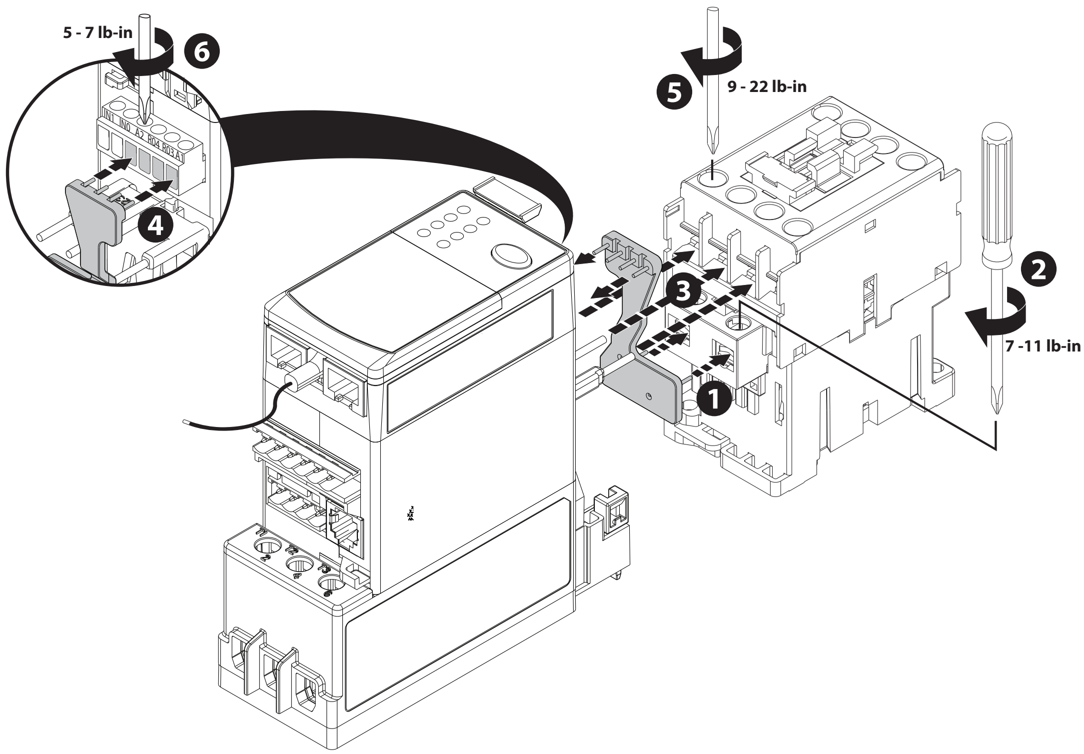
Starter Assembly

The following illustrations show how to assemble an E300 relay as a motor starter with an Allen-Bradley Bulletin 100-C contactor.

100-C09…-C55 Starter Assembly Installation

The starter assembly installation instructions are for use with E300 relay Sensing Module catalog numbers 193-ESM-___-___-C23 and 193-ESM-___-___-C55

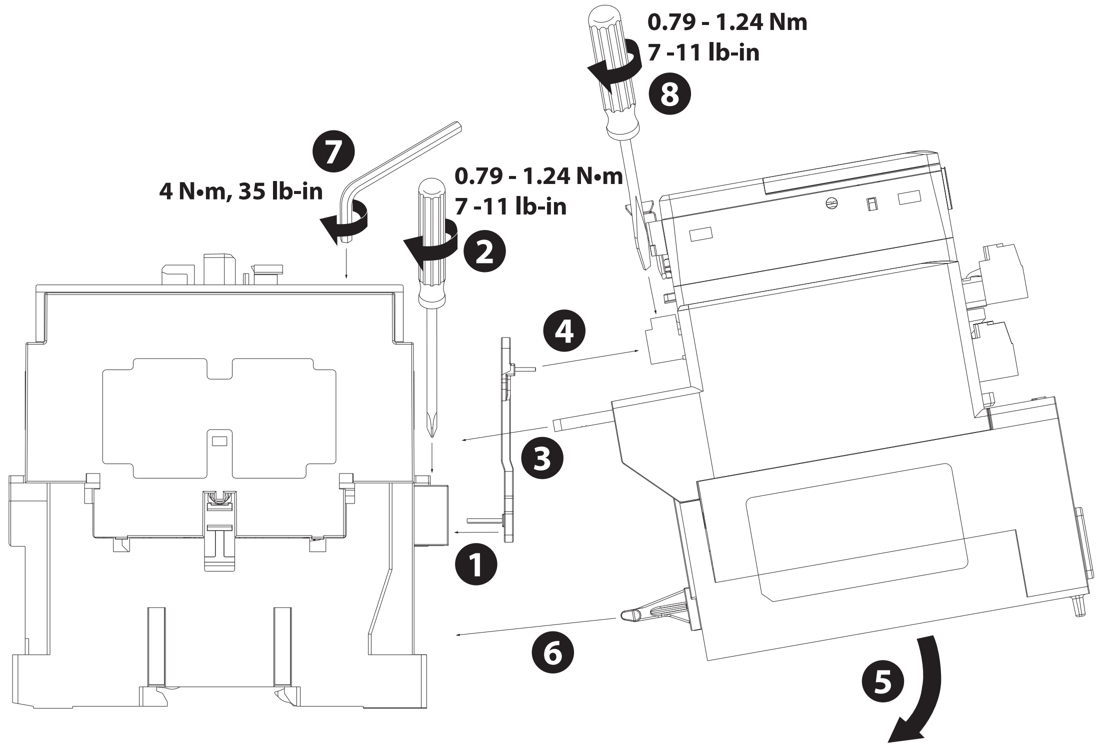
Figure 13 - 100-C09…-C55 Starter Assembly Installation



100-C60…-C97 Starter Assembly Installation

The starter assembly installation instructions are for use with E300 relay Sensing Module catalog numbers 193-ESM-___-___-C97

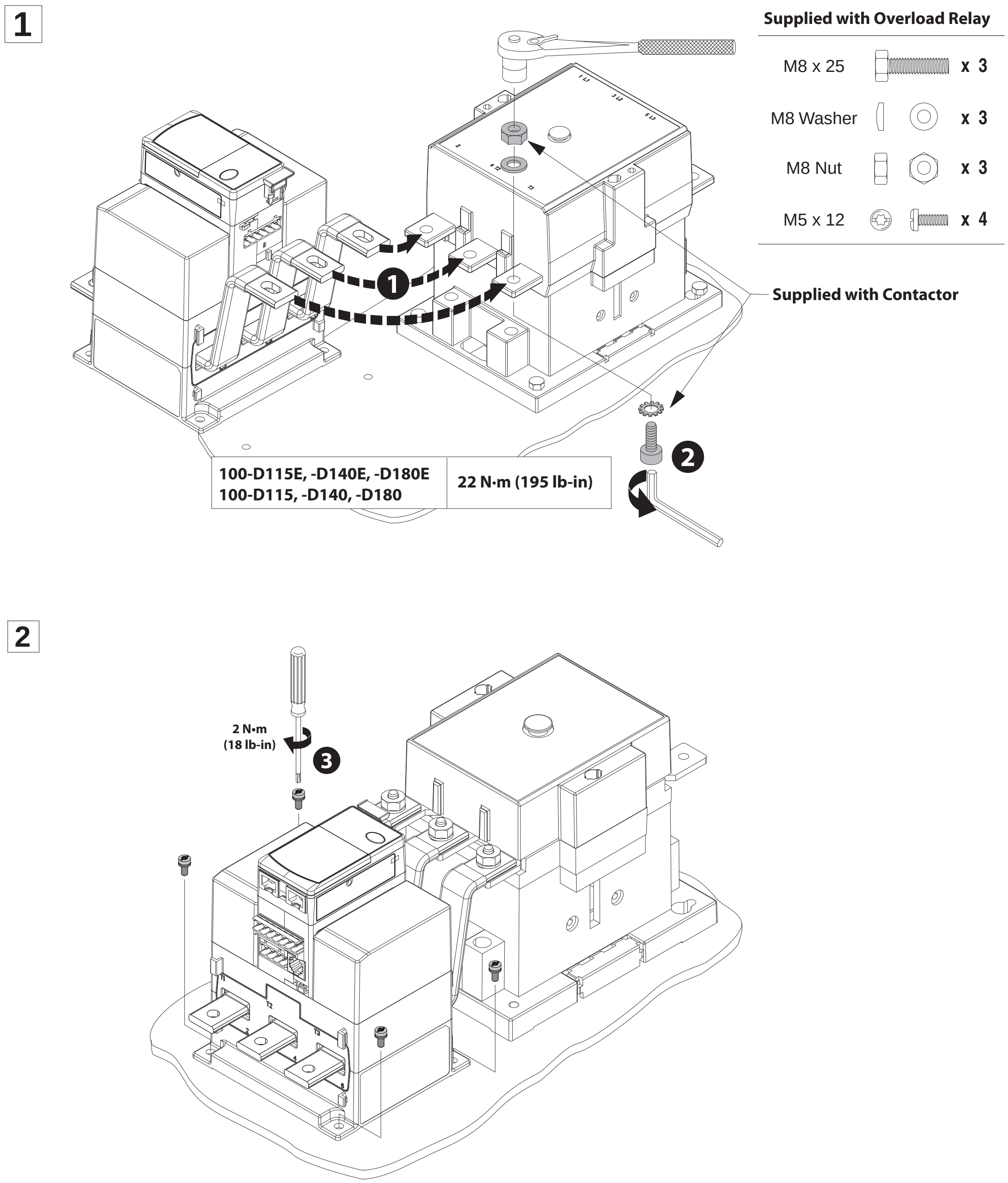
Figure 14 - 100-C60…-C97 Starter Assembly Installation



100-D115…-D180 Starter Assembly Installation

The starter assembly installation instructions are for use with E300 relay Sensing Module catalog numbers 193-ESM-___-___-D180

Figure 15 - 100-D115…-D180 Starter Assembly Installation



Starter Dimensions

Approximate dimensions are shown in millimeters (inches). Dimensions are not intended to be used for manufacturing purposes.

Figure 16 - E300 Sensing Module 193-ESM-___-__-C23 with 100-C09…-C23 Contactor

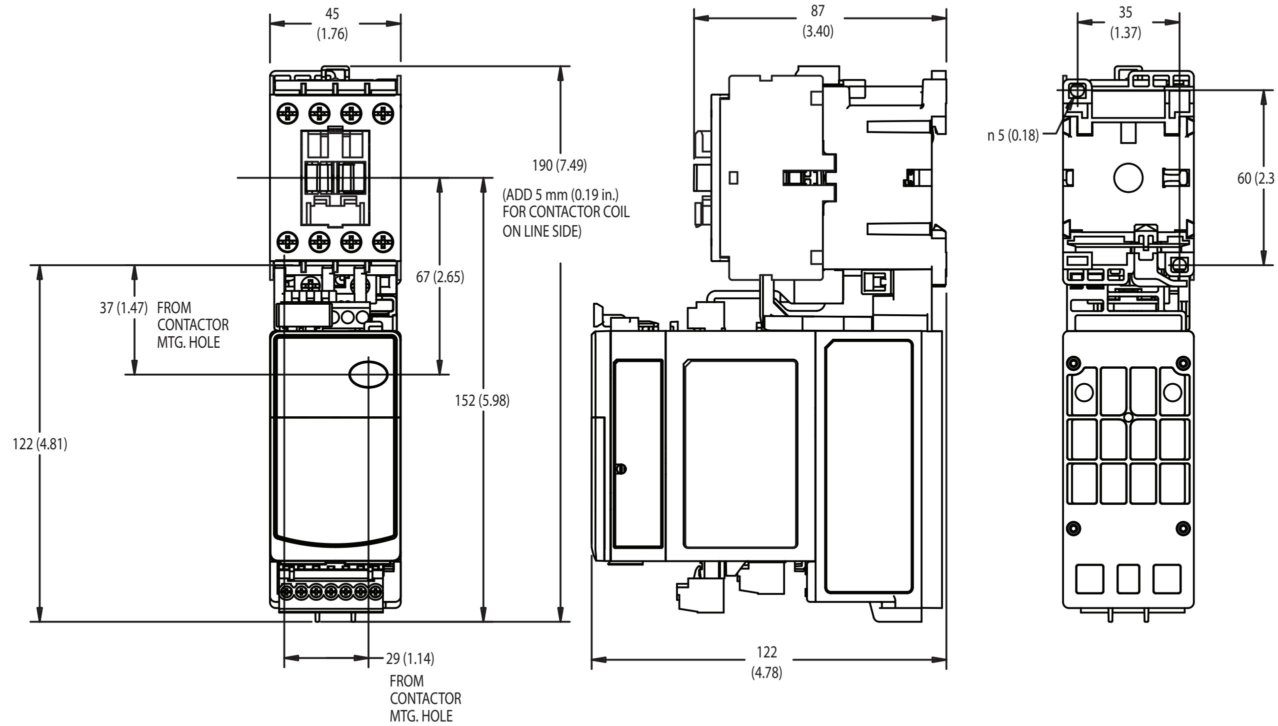


Figure 17 - E300 Sensing Module 193-ESM-___-__-C55 with 100-C30…-C37 Contactor

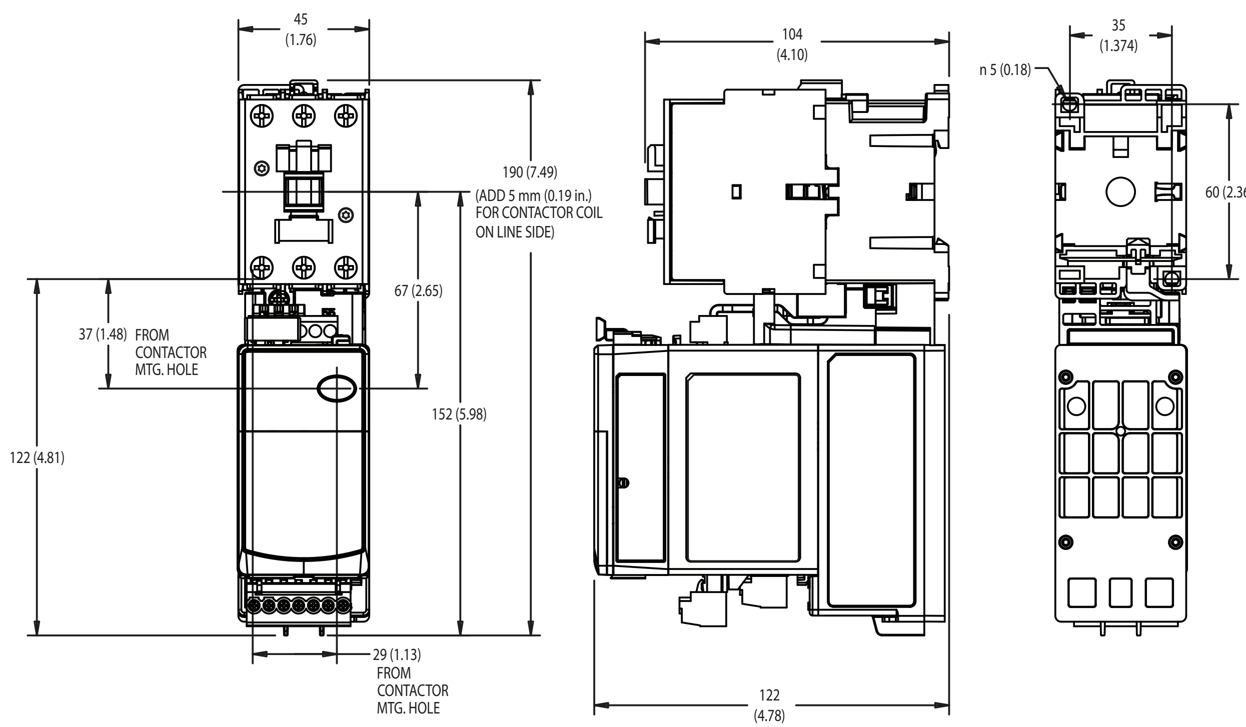


Figure 18 - E300 Sensing Module 193-ESM-___-__-C55 with 100-C43…-C55 Contactor

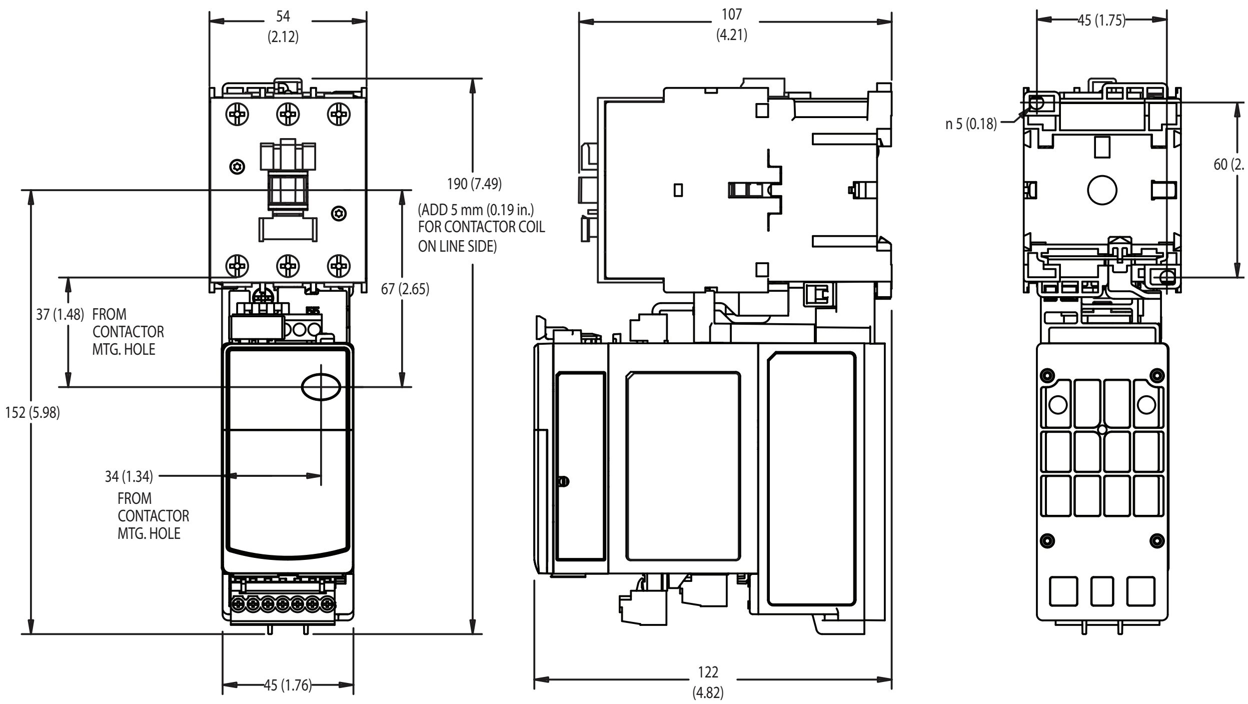


Figure 19 - E300 Sensing Module 193-ESM-___-__-C97 with 100-C60…-C97 Contactor

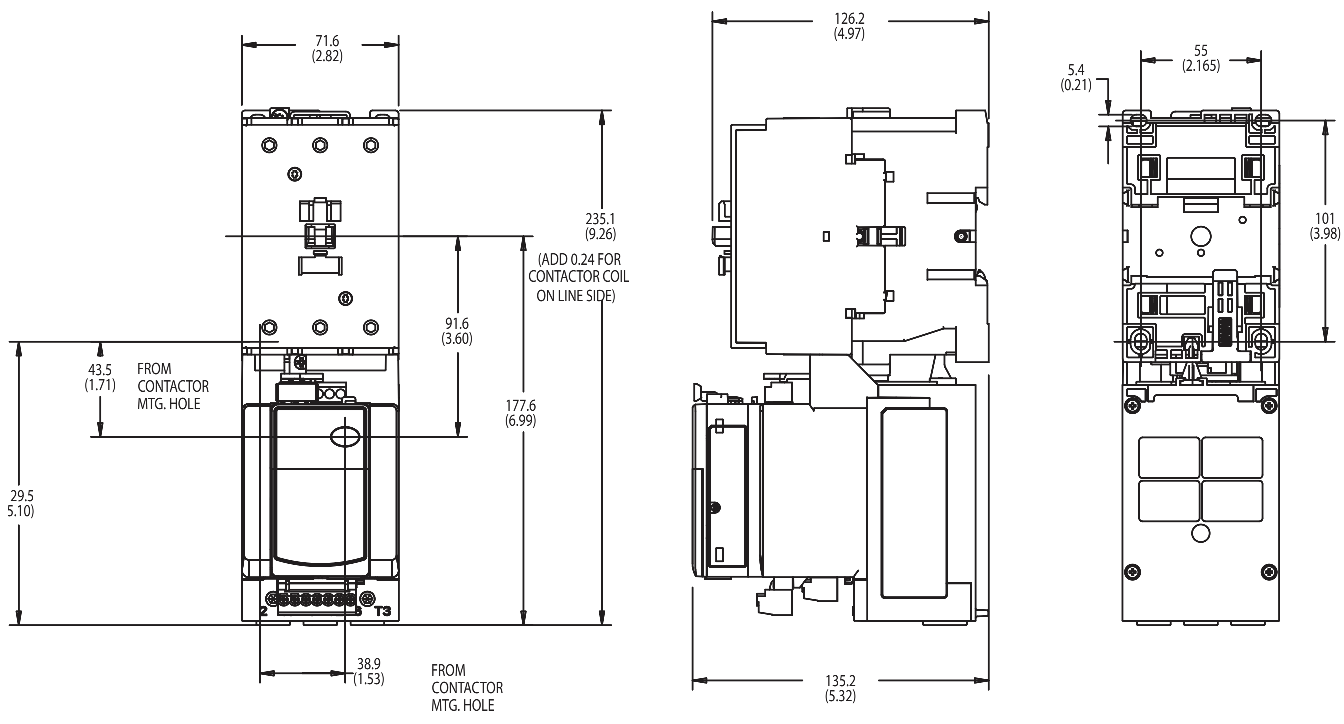


Figure 20 - E300 Sensing Module 193-ESM-___-__-D180 with 100-D115…-D180 Contactor

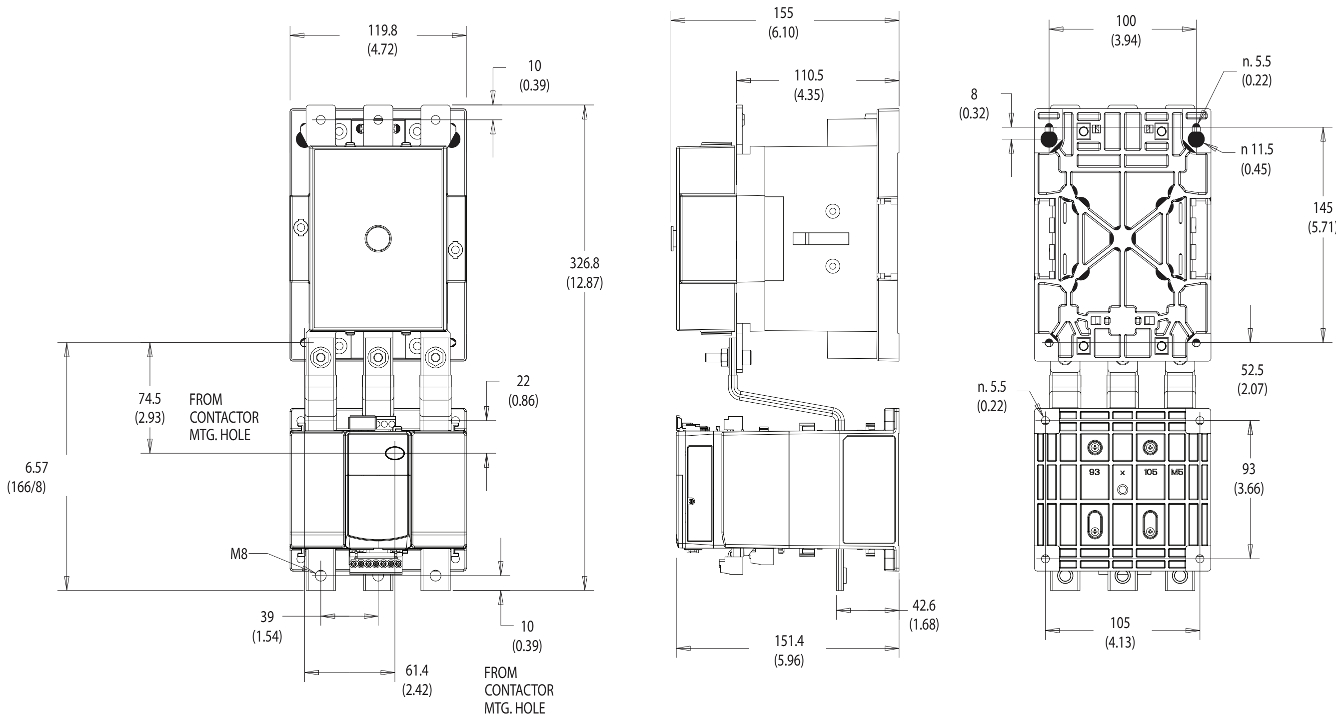


Figure 21 - E300 Sensing Module 193-ESM-___-__-D180 with 100-D115…-D180 Contactor and Terminal Covers

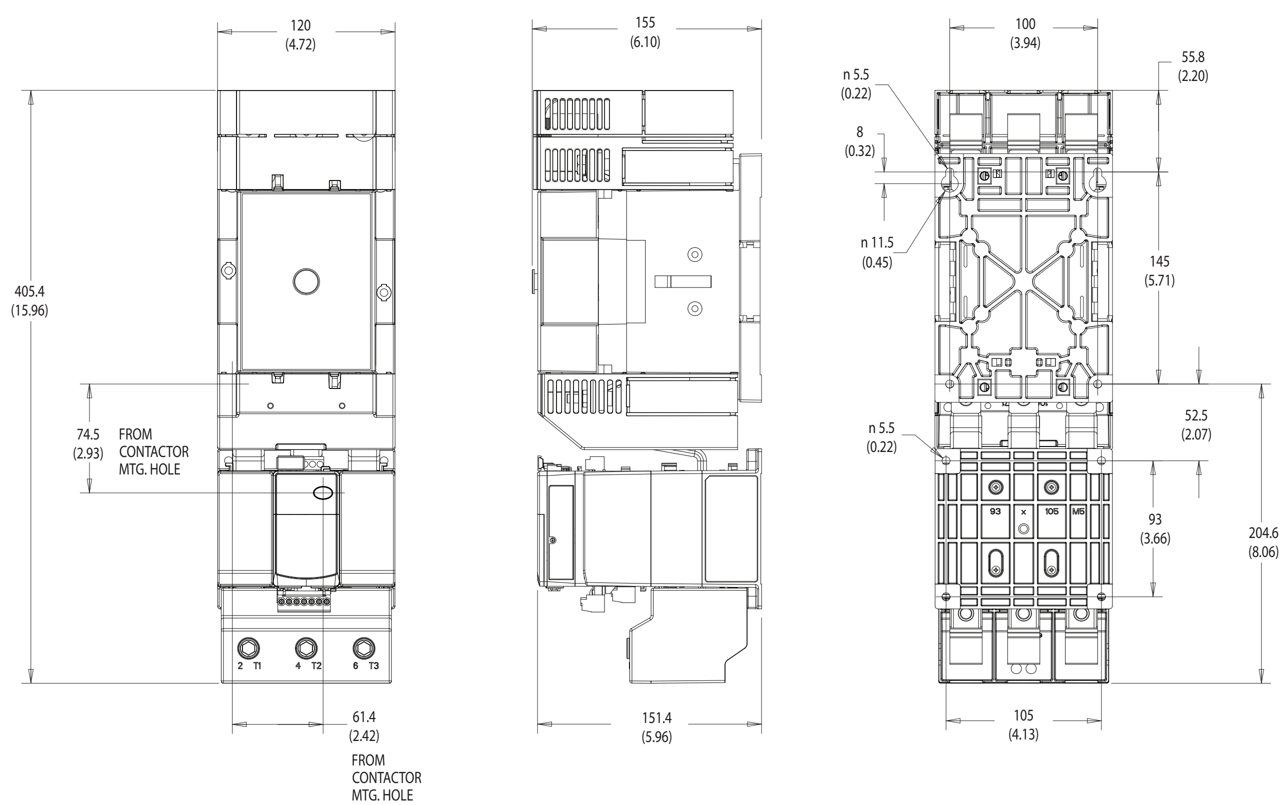


Figure 22 - E300 Sensing Module 592-ESM-___-__-S2 with NEMA Contactor Size 0 and Size 1

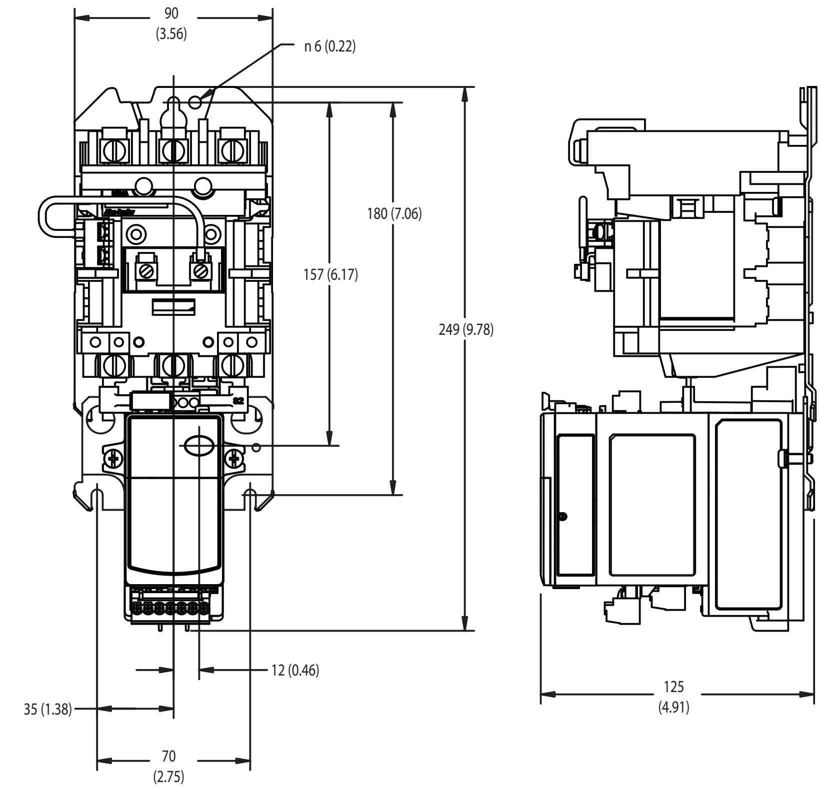


Figure 23 - E300 Sensing Module 592-ESM-___-__-S2 with NEMA Contactor Size 2

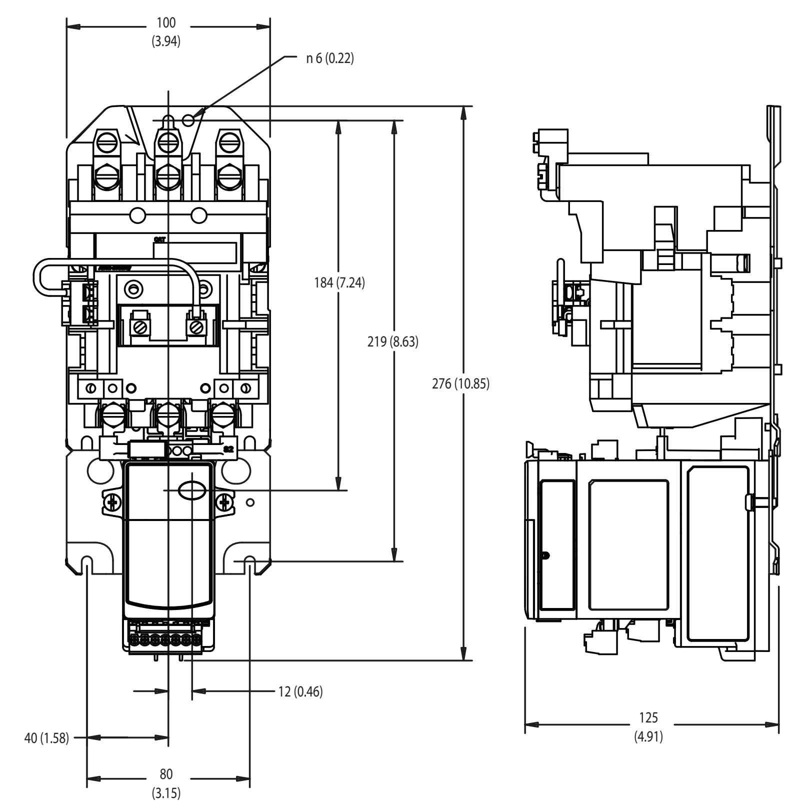


Figure 24 - E300 Sensing Module 592-ESM-___-__-S3 with NEMA Contactor Size 3

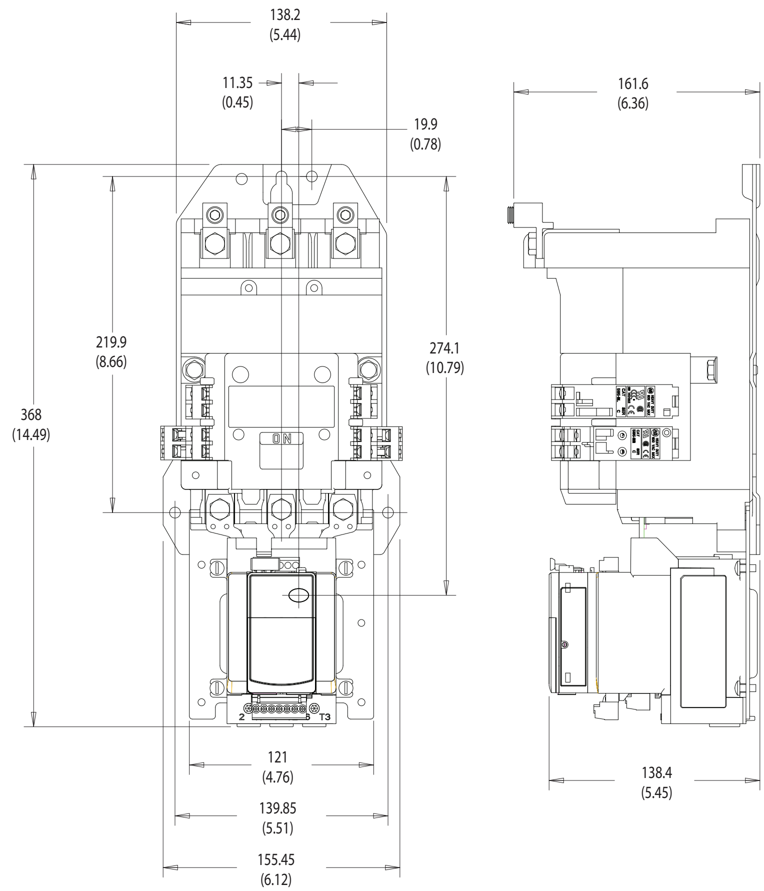
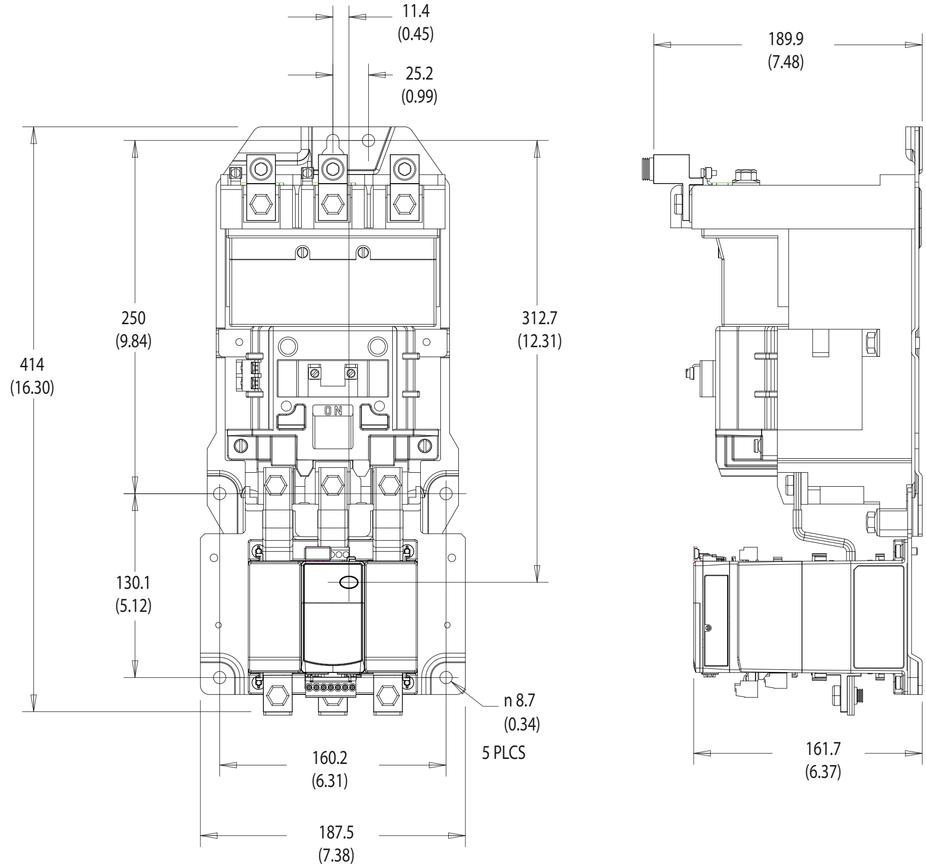


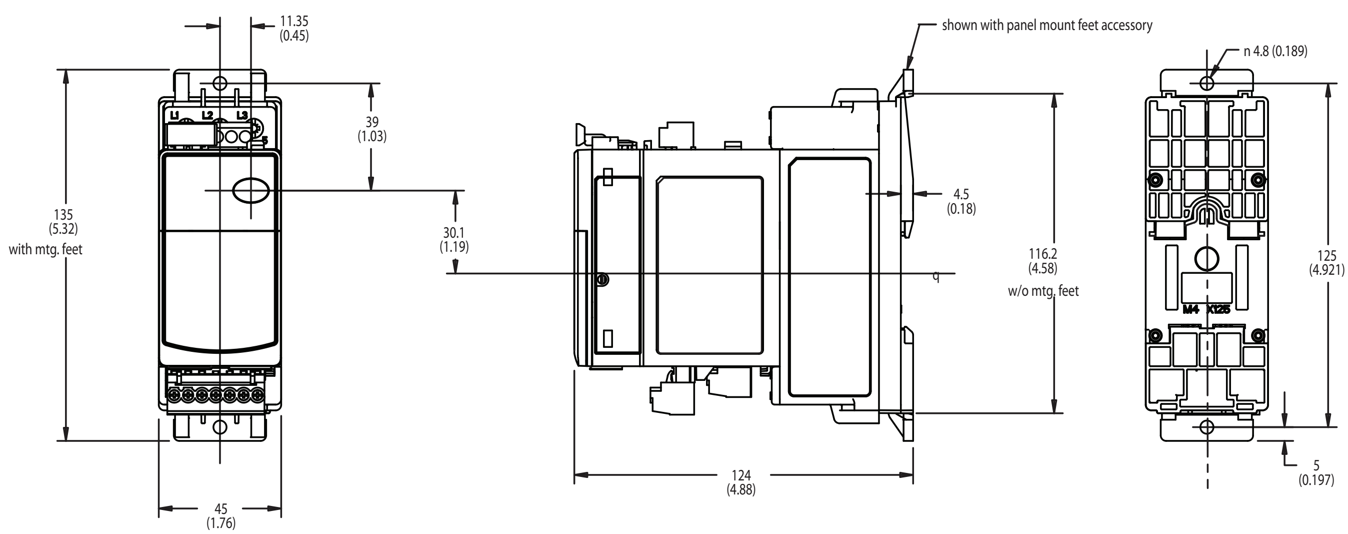
Figure 25 - E300 Sensing Module 592-ESM-___-__-S4 with NEMA Contactor Size 4



DIN Rail / Panel Mount Dimensions

Approximate dimensions are shown in millimeters (inches). Dimensions are not intended to be used for manufacturing purposes.

Figure 26 - E300 Sensing Module 193-ESM-___-30A-T and 193-ESM-___-60A-T



Mount feet accessory Cat. No.: 140M-C-N45

Figure 27 - E300 Sensing Module 193-ESM-___-30A-E3T and 193-ESM-___-60A-E3T

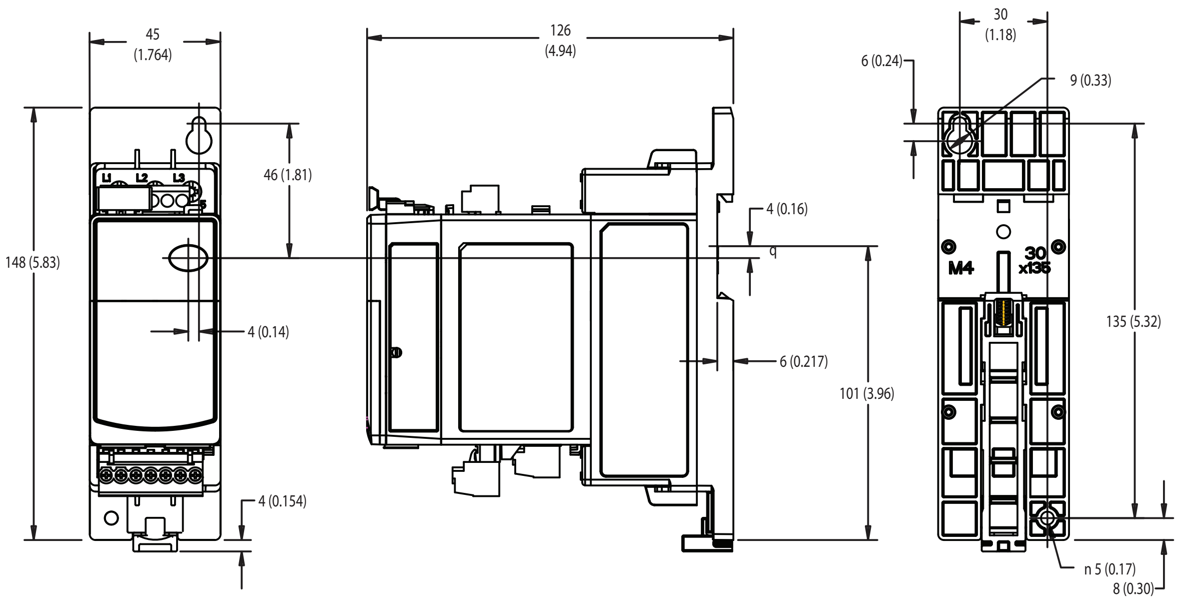


Figure 28 - E300 Sensing Module 193-ESM-___-100A-T

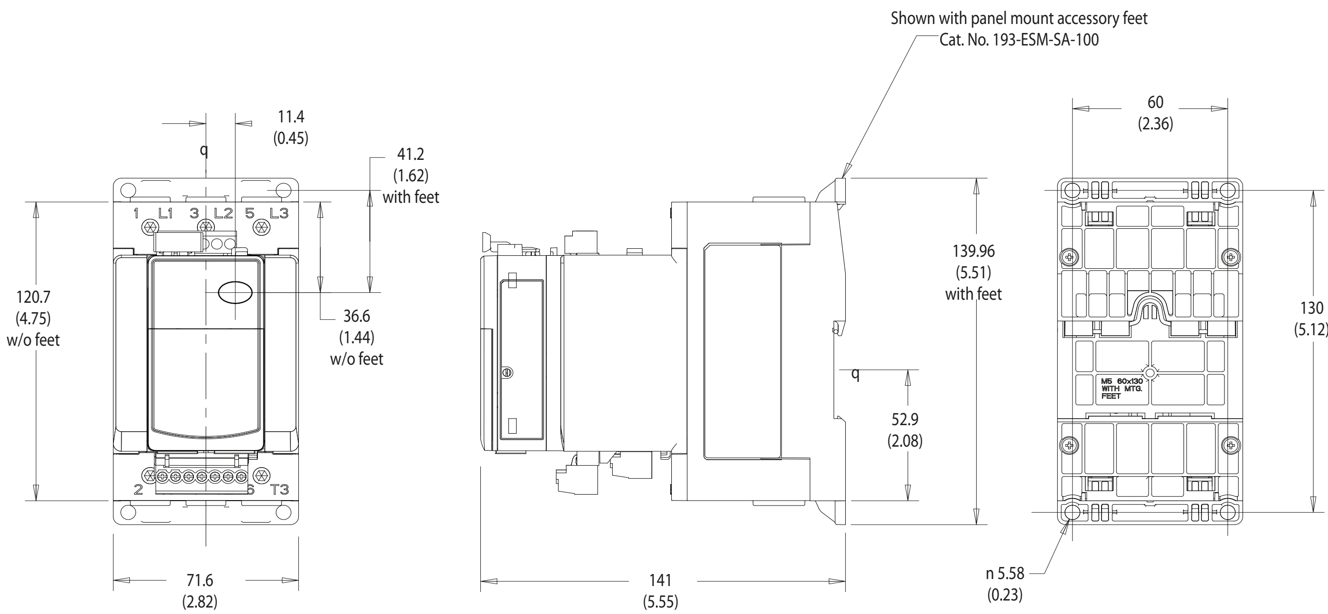


Figure 29 - E300 Sensing Module 193-ESM-____-100A-E3T

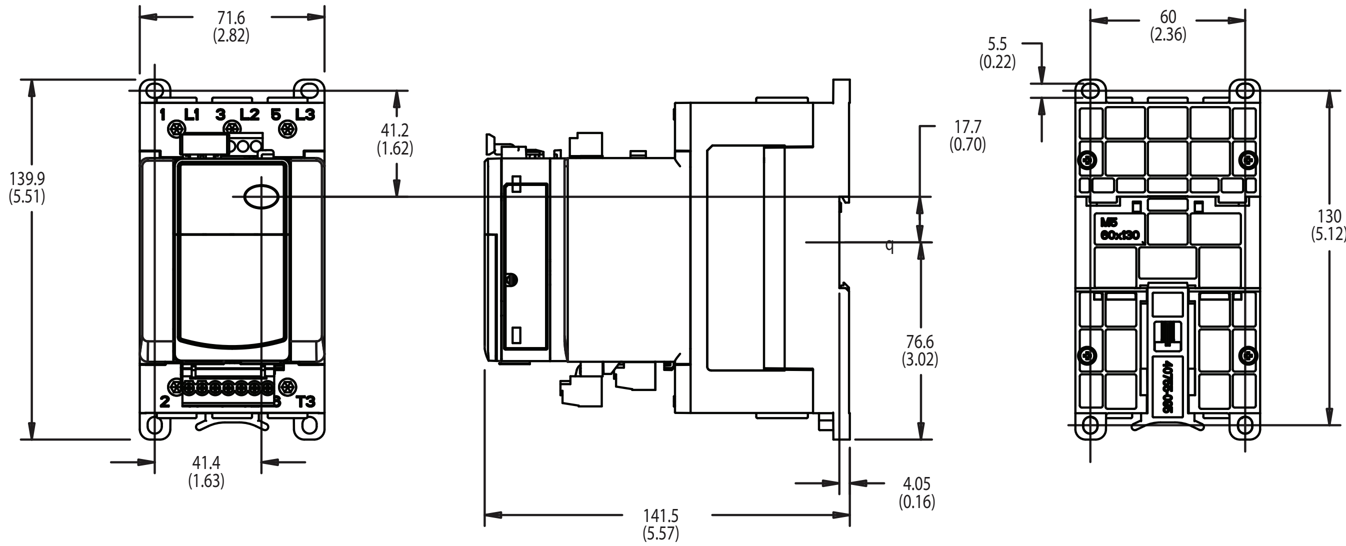


Figure 30 - E300 Sensing Module 193-ESM-____-200A-T

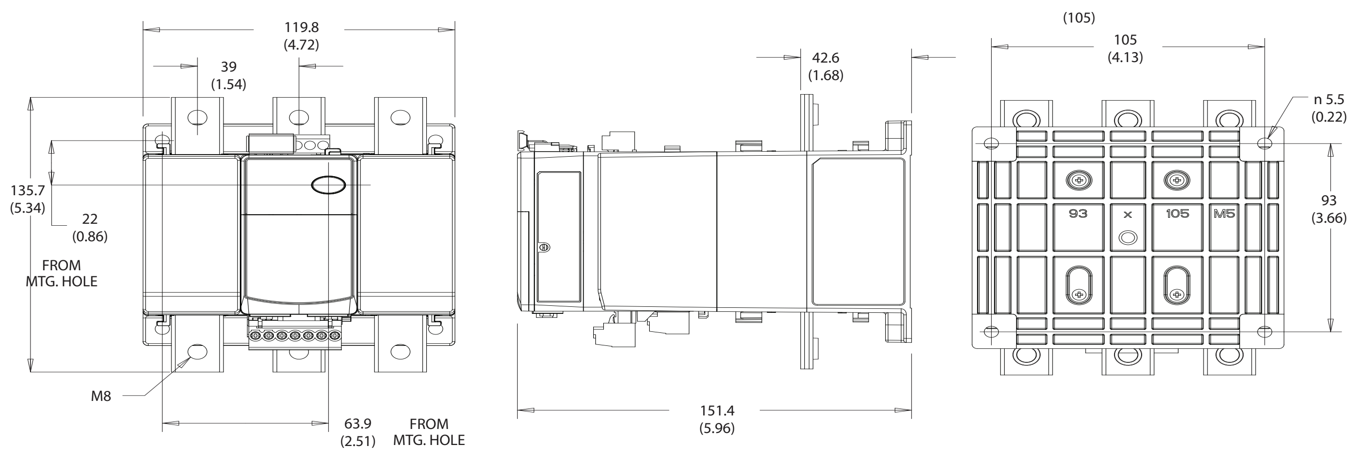
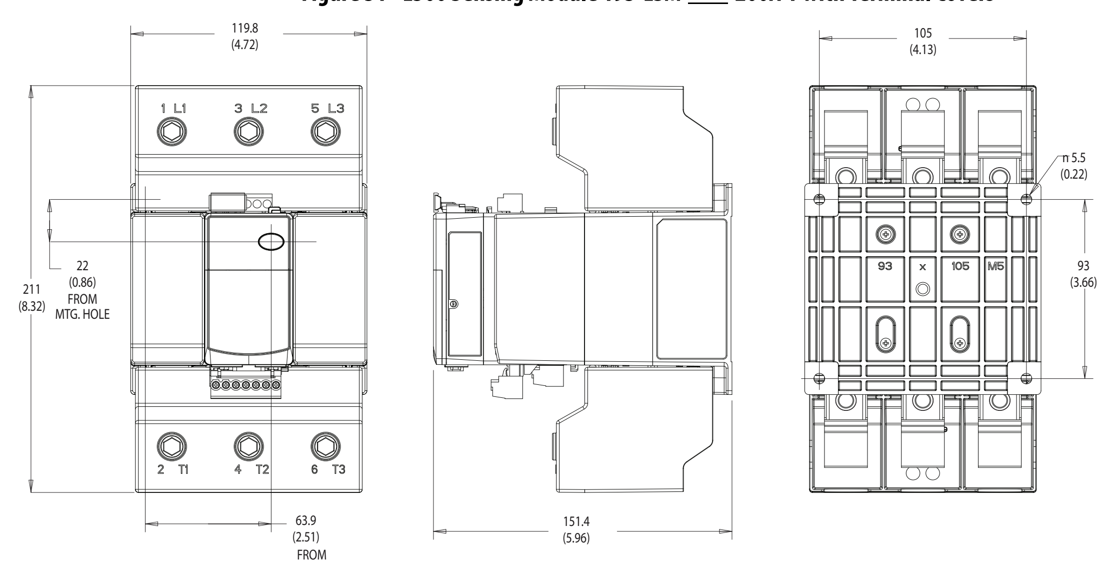


Figure 31 - E300 Sensing Module 193-ESM-____-200A-T with Terminal Covers



Pass-thru Modules Dimensions

Approximate dimensions are shown in millimeters. Dimensions are not intended to be used for manufacturing purposes.

Figure 32 - E300 Sensing Module 193-ESM-___-30A-P, 193-ESM-___-60A-P, and 193-ESM-VIG-30A-CT

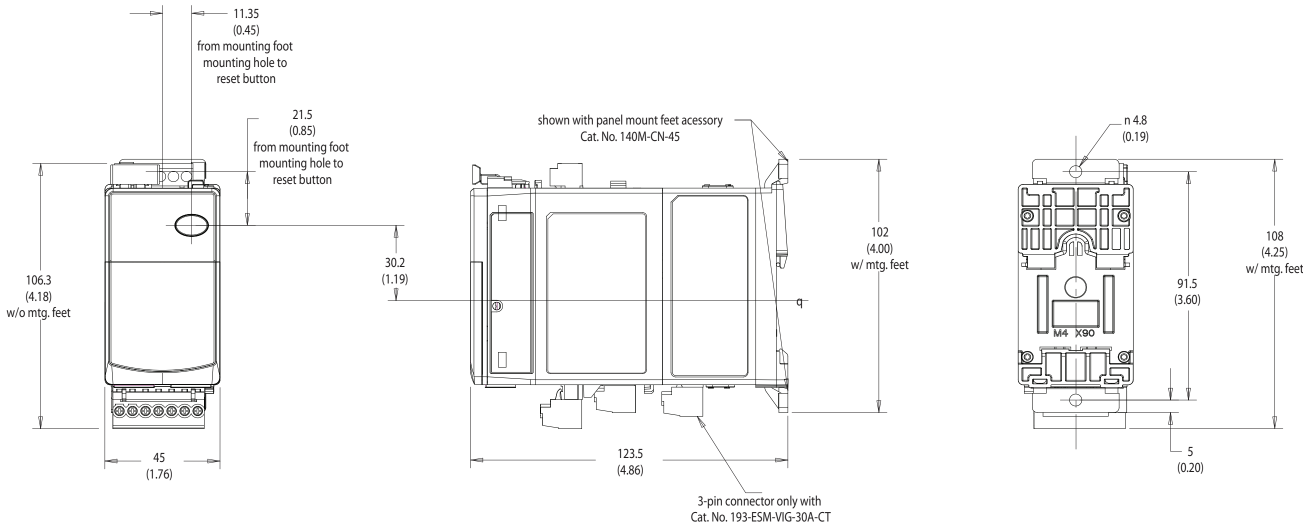


Figure 33 - E300 Sensing Module 193-ESM-___-100A-P

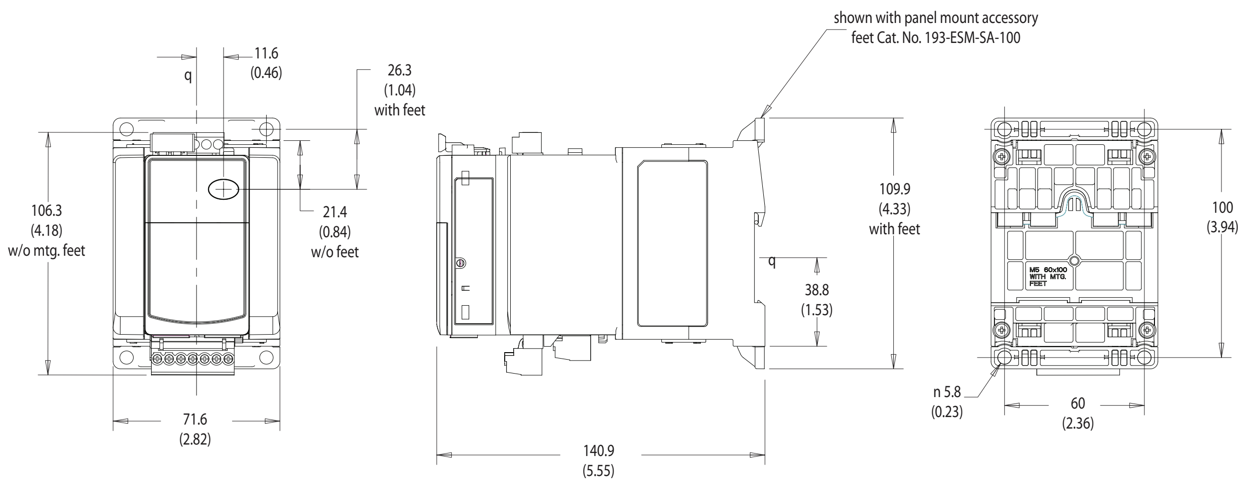
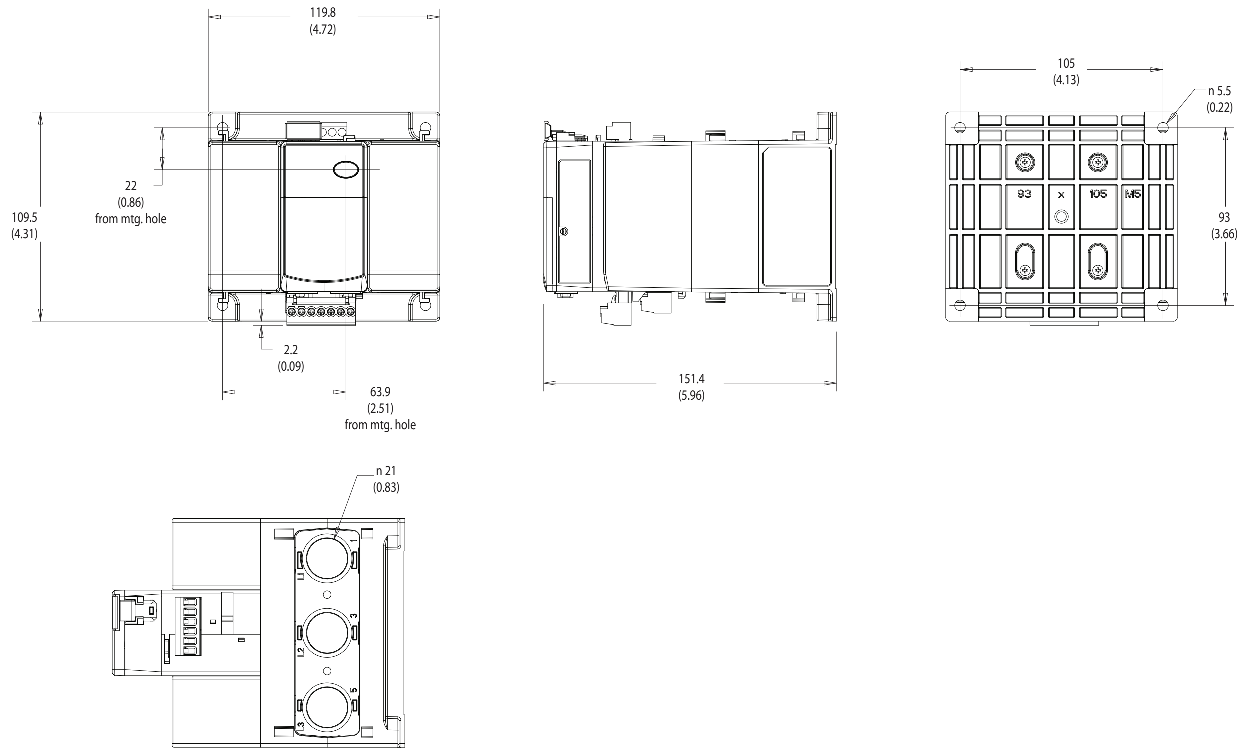


Figure 34 - E300 Sensing Module 193-ESM-___-200A-P



Expansion Bus Peripherals Dimensions

Approximate dimensions are shown in millimeters (inches). Dimensions are not intended to be used for manufacturing purposes.

Figure 35 - E300 Digital Expansion Module 193-EXP-DIO-___

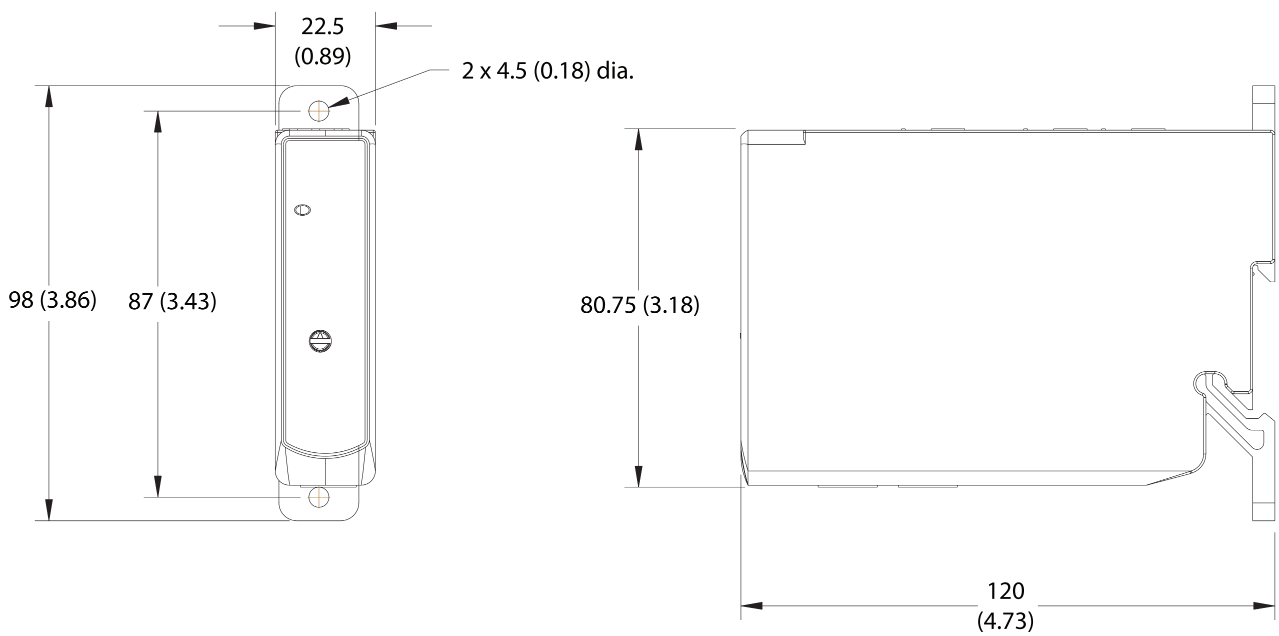


Figure 36 - E300 Expansion Analog Module 193-EXP-AIO

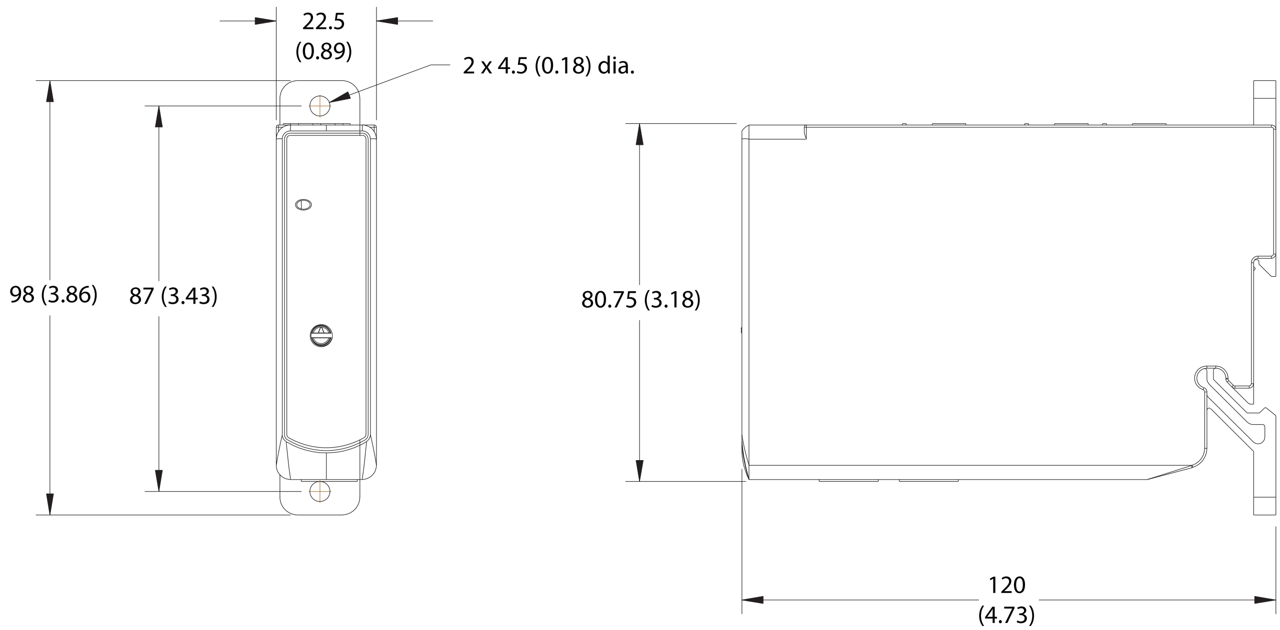


Figure 37 - E300 Expansion Power Supply 193-EXP-PS-____

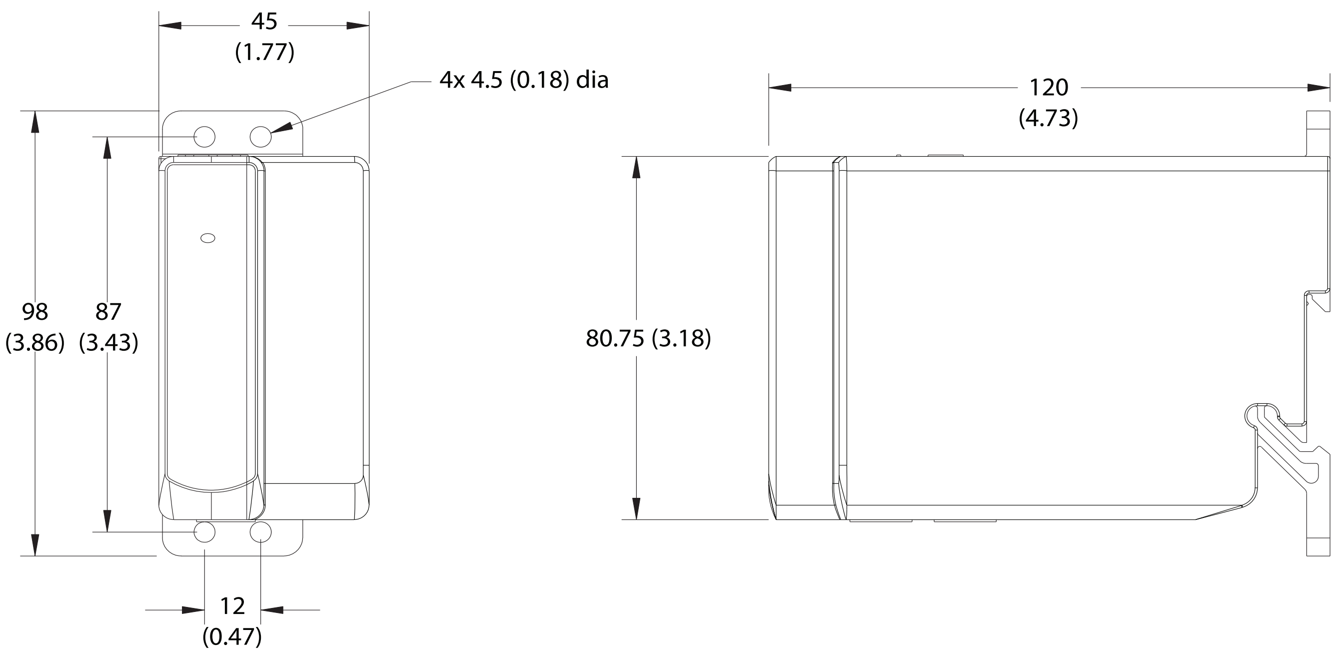


Figure 38 - E300 Starter Control Station 193-EOS-SCS

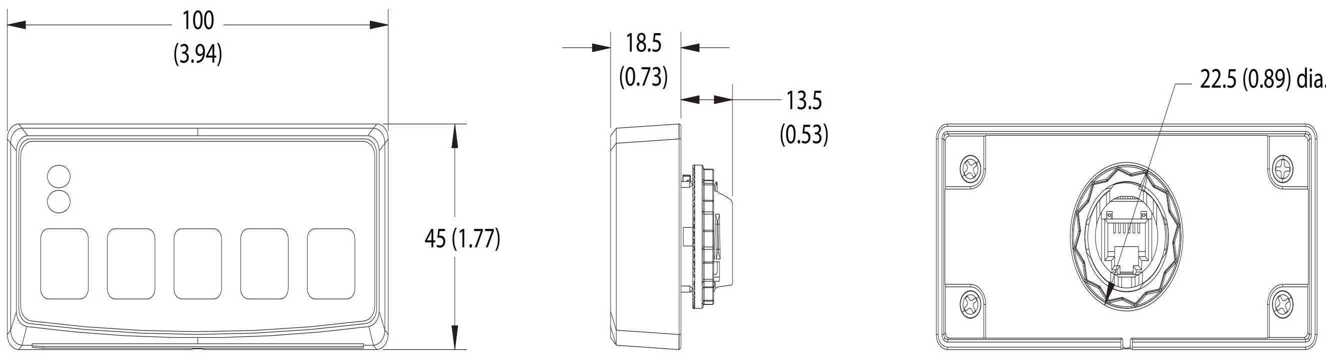
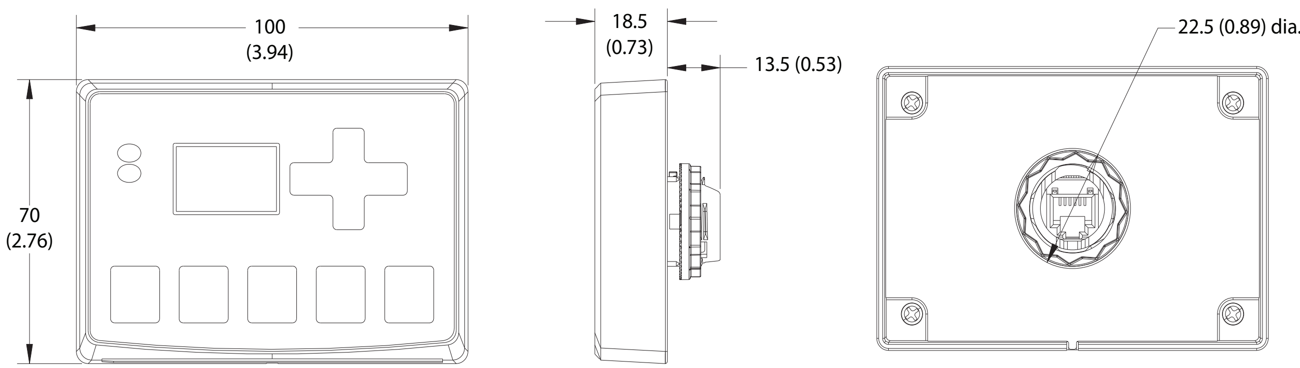


Figure 39 - E300 Starter Diagnostic Station 193-EOS-SDS



Terminals

Sensing Module

Table 2 - E300 Sensing Module Wire Size and Torque Specifications

Wire Type	Conductor Torque	Cat. No.	
		193-ESM-_ _ _-30A-_ _ _ **193-ESM-_ _ _-60A-_ _ _** **592-ESM-_ _ _-30A-_ _ _** **592-ESM-_ _ _-60A-_ _ _**	**193-ESM-_ _ _-100A-_ _ _** **592-ESM-_ _ _-100A-_ _ _**
Stranded/Solid [AWG]	Single	#14…6 AWG 22 lb-in.	#12…1 AWG 35 lb-in.
	Multiple	#10…6 AWG 30 lb-in.	#6…2 AWG 35 lb-in.
Flexible-Stranded with Ferrule Metric	Single	2.5…16 mm^2 2.5 N•m	4…35 mm^2 4 N•m
	Multiple	6…10 mm^2 3.4 N•m	4…25 mm^2 4 N•m
Coarse-Stranded/Solid Metric	Single	2.5…25 mm^2 2.5 N•m	4…50 mm^2 4 N•m
	Multiple	6…16 mm^2 3.4 N•m	4…35 mm^2 4 N•m

Table 3 - E300 Sensing Module Wire 3-Pole Terminal Block Specifications

3-Pole Terminal Block Cat. No.	Conductor Torque	Cat. No.
		193-ESM-_ _ _-200A-_ _ _
100-DTB180	Single	#6 AWG…250 MCM 90…110 lb.-in.
		16…120 mm^2 10…12 N•m
	Multiple	6…1/0 AWG 90…110 lb.-in.
		16…50 mm^2 10…12 N•m

Table 4 - E300 Sensing Module Terminal Lug Kit Specifications

Terminal Lug Kit Cat. No.	Conductor Torque	Cat. No.
		193-ESM-_ _ _-200A-_ _ _
100-DL180	Single	#6 AWG…250 MCM 90…110 lb.-in.
		16…120 mm^2 10…12 N•m

Control Module

Figure 40 - E300 Control Module Terminal Designations

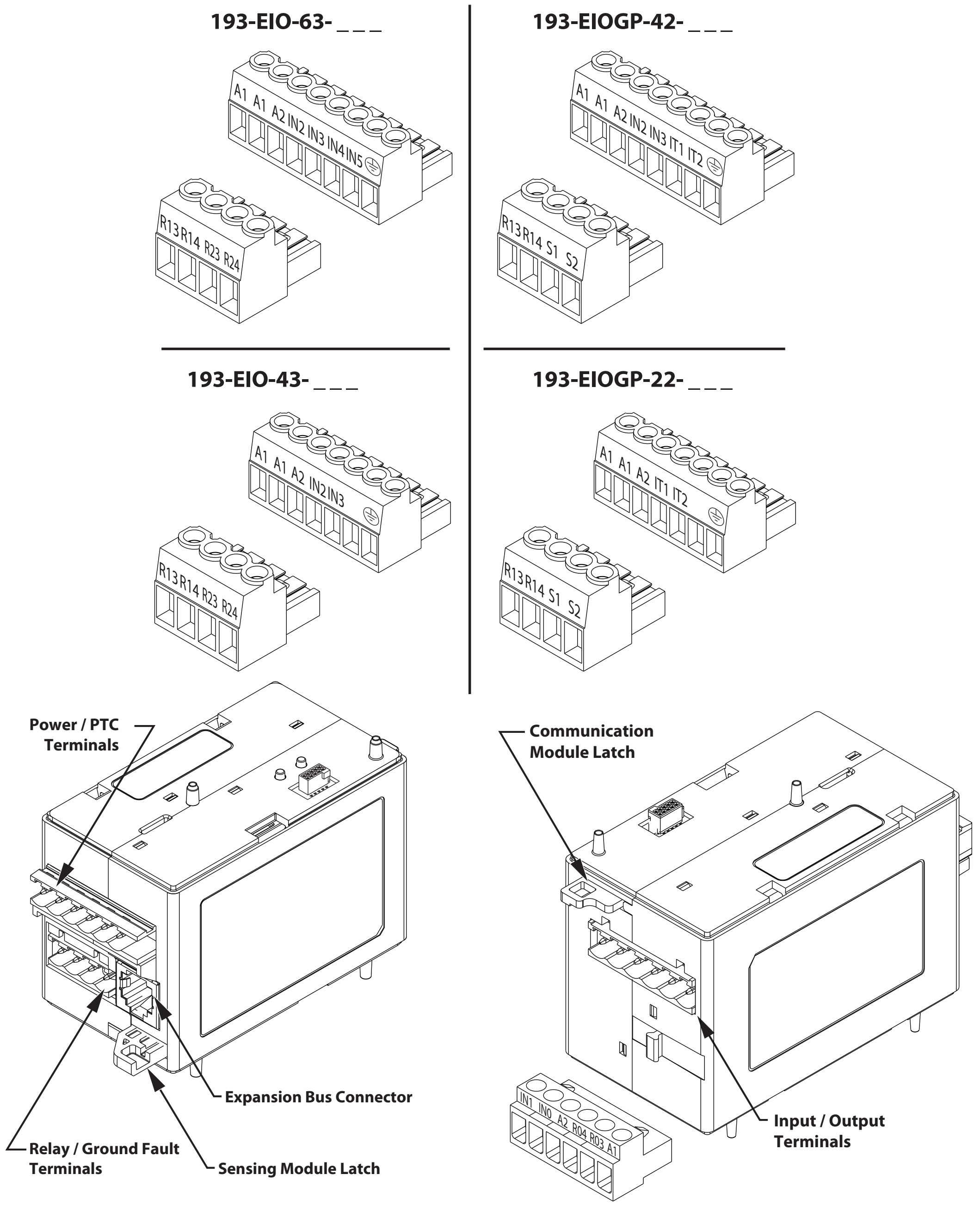
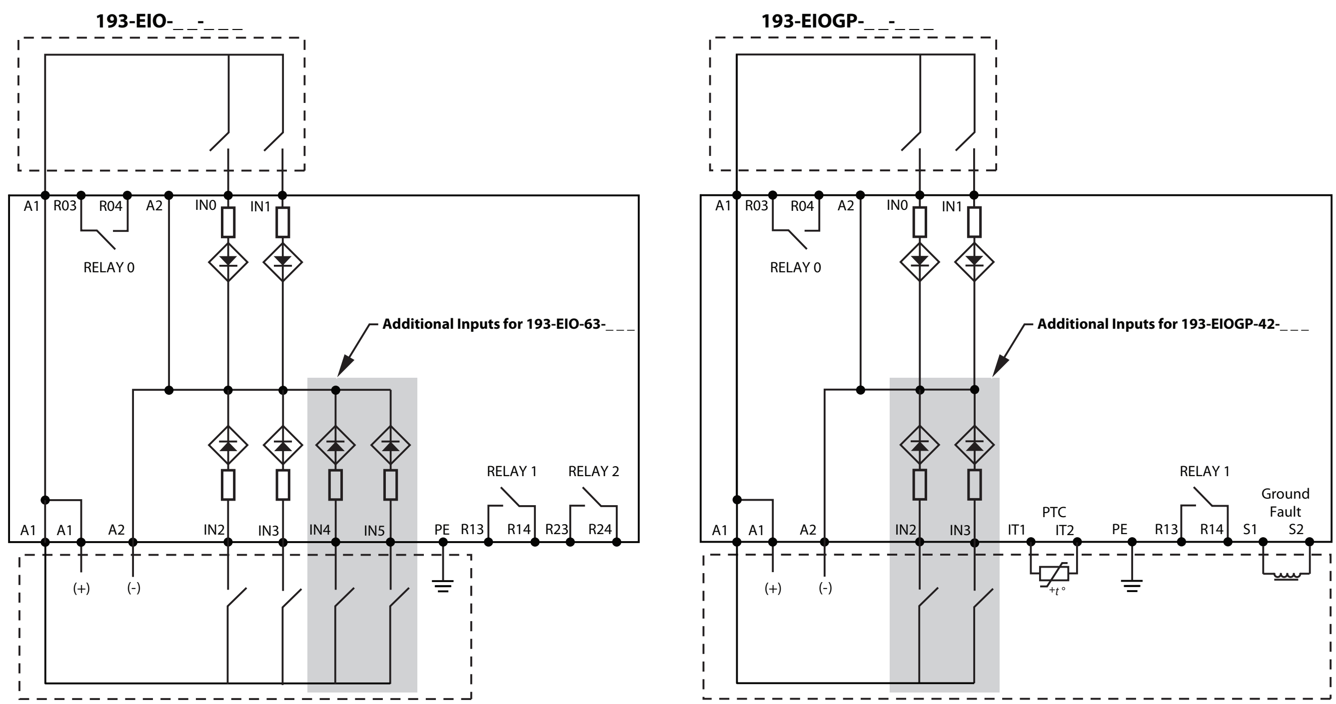


Table 5 - E300 Control Module Wire Size and Torque Specifications

Wire Type	Conductor Torque	Cat. No. 193-EIO-_ _-_ _ _ 193-EIOGP-_ _-_ _ _
Stranded/Solid [AWG]	Single	24...12 AWG 4lb-in
	Multiple (stranded only)	24...16 AWG 4 lb-in
Flexible-Stranded with Ferrule Metric	Single	0.25 . . . 2.5 mm^2 0.45 N•m
	Multiple	0.5...0.75 mm^2 0.45 N•m
Coarse-Stranded/Solid Metric	Single	0.2...2.5 mm^2 0.45 N•m
	Multiple	0.2...1.5 mm^2 0.45 N•m

Figure 41 - Control Module Wiring



Expansion Digital Module

Figure 42 - E300 Expansion Digital Module Terminal Designations

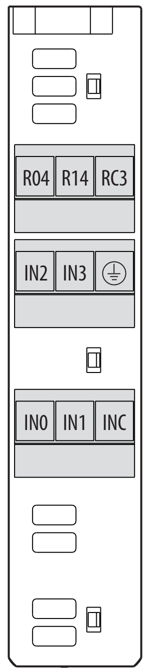
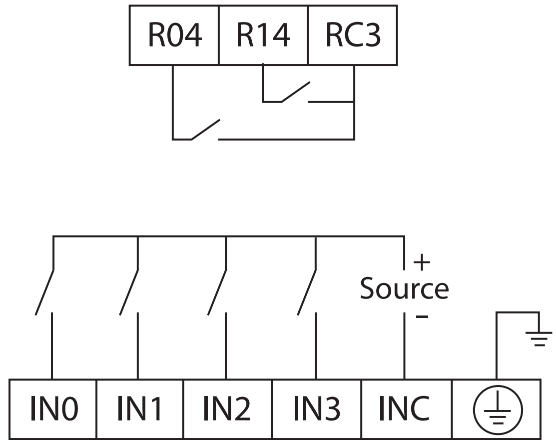


Table 6 - E300 Expansion Digital Module Wire Size and Torque Specifications

Wire Type	Conductor Torque	Cat. No. 193-EXP-DIO-42-_ _ _
Stranded/Solid [AWG]	Single	24...12 AWG 5 lb-in
	Multiple (stranded only)	24...16 AWG 5 lb-in
Flexible-Stranded with Ferrule Metric	Single	0.25…2.5 mm^2 0.55 N•m
	Multiple	0.5...0.75 mm^2 0.55 N•m
Coarse-Stranded/Solid Metric	Single	0.2...2.5 mm^2 0.55 N•m
	Multiple	0.2...1.5 mm^2 0.55 N•m

Figure 43 - E300 Expansion Digital Module Wiring Diagram



Expansion Analog Module

Figure 44 - E300 Expansion Analog Module Terminal Designations

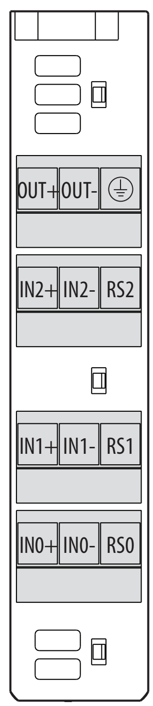
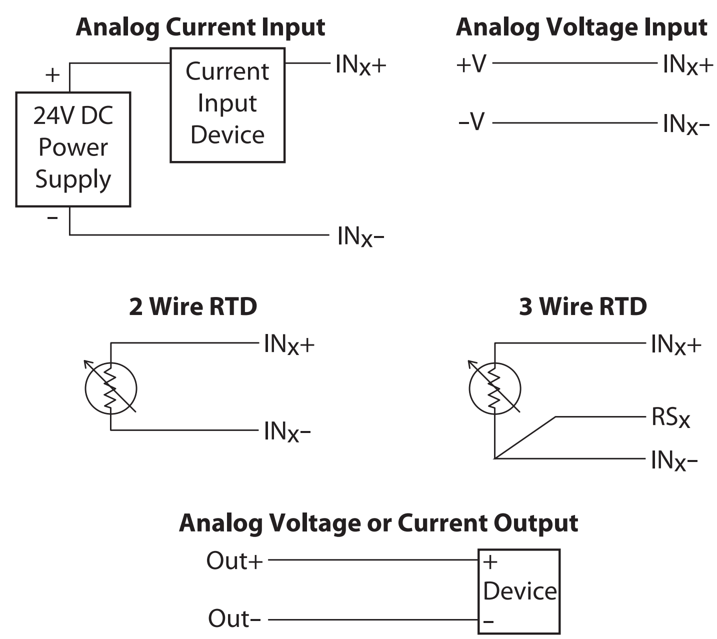


Table 7 - E300 Expansion Analog Module Wire Size and Torque Specifications

Wire Type	Conductor Torque	Cat. No. 193-EXP-AIO-31
Stranded/Solid [AWG]	Single	24…12 AWG 5 lb-in
	Multiple (stranded only)	24…16 AWG 5 lb-in
Flexible-Stranded with Ferrule Metric	Single	0.25…2.5 mm² 0.55 N•m
	Multiple	0.5…0.75 mm² 0.55 N•m
Coarse-Stranded/Solid Metric	Single	0.2…2.5 mm² 0.55 N•m
	Multiple	0.2…1.5 mm² 0.55 N•m

Figure 45 - E300 Expansion Analog I/O Modules 193-EXP-AIO-__



Expansion Power Supply

Figure 46 - E300 Expansion Power Supply Terminal Designations

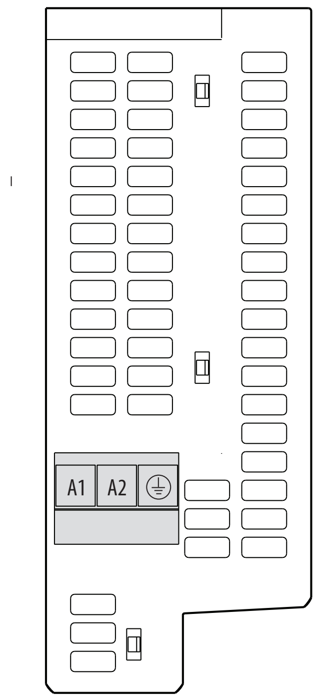
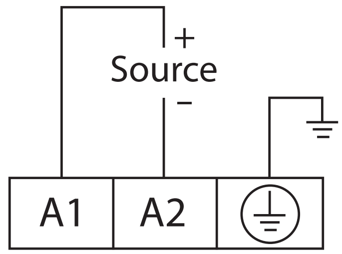


Table 8 - E300 Expansion Power Supply Wire Size and Torque Specifications

Wire Type	Conductor Torque	Cat. No. 193-EXP-PS-_ _
Stranded/Solid [AWG]	Single	24...12 AWG 5 lb-in
	Multiple (stranded only)	24...16 AWG 5 lb-in
Flexible-Stranded with Ferrule Metric	Single	0.25…2.5 mm^2 0.55 N•m
	Multiple (stranded only)	0.5...0.75 mm^2 0.55 N•m
Coarse-Stranded/Solid Metric	Single	0.2...2.5 mm^2 0.55 N•m
	Multiple (stranded only)	0.2...1.5 mm^2 0.55 N•m

Figure 47 - E300 Expansion Power Supply Wiring Diagram



Grounding

The following grounding recommendations are provided to help ensure EMC requirements during installation.

- The earth ground terminal of the E300 relay is a convenience terminal for the green shield wire of the Cat. No. 193-ECM-ETR. The E300 Control Module does not make an electrical connection to this terminal.
- Wire the green shield wire of the Cat. No. 193-ECM-ETR into the earth ground terminal of the E300 control module.
- Installations that employ an external ground fault sensor shall ground the cable shield at the sensor with no connection made at the E300 relay.
- The PTC thermistor cable shield shall be grounded at the E300 relay with no connection made at the opposite end.

Short-Circuit Ratings

The E300 relay is suitable for use on circuits capable of delivering not more than the RMS symmetrical amperes listed in the following tables.

Table 9 - Standard Fault Short Circuit Ratings per UL60947-4-1 and CSA 22.2 No. EN60947-4-1

Sensing Module Cat. No.	Contactor Cat. No.	Max. Starter FLC [A]	Max. Available Fault Current [A]	Max. Voltage [V AC]	Max. RKs non-time Delay Fuse Size [A]	Max. Listed Circuit Breaker Size [A]
193-ESM-____-30A-P	—	—	5000	600	110	110
193-ESM-VIG-30A-CT						
193-ESM-____-30A-T						
193-ESM-____-30A-E3T						
193-ESM-____-60A-P	—	—			225	225
193-ESM-____-60A-T						
193-ESM-____-60A-E3T						
193-ESM-____-30A-C23	100-C09	9			90	90
	100-C12	12				
	100-C16	16				
	100-C23	23				
193-ESM-____-30A-C55	100-C30	30			200	200
193-ESM-____-60A-C55	100-C37	37			200	200
	100-C43	43				
	100-C55	55				

Sensing Module Cat. No.	Contactor Cat. No.	Max. Starter FLC [A]	Max. Available Fault Current [A]	Max. Voltage [V AC]	Max. RKs non-time Delay Fuse Size [A]	Max. Listed Circuit Breaker Size [A]
592-ESM-____-30A-S2	500_-A_	18	5000	600	100	100
	500_-B_	27				
592-ESM-____-60A-S2	500_-C_	45			175	175
193-ESM-____-100A-P	—	—	10,000	600	400	400
193-ESM-____-100A-T						
193-ESM-____-100A-E3T						
193-ESM-____-100A-C97	100-C60	60			350	350
	100-C72	72				
	100-C85	85				
	100-C97	97				
592-ESM-____-100A-S3	500_-D_	90			350	350
193-ESM-____-200A-P	—	—			600	600
193-ESM-____-200A-T						
193-ESM-____-200A-D180	100-D115	115			300	250
	100-D140	140				
	100-D180	180				
592-ESM-____-200A-S4	500_-E_	135			400	175

Table 10 - Short Circuit Ratings per EN60947-4-1

Overload Relay with Sensing Module Cat. No.	Prospective Short-Circuit Current, I_r [A]	Conditional Short-Circuit Current, I_q [A]	Maximum Voltage [V]
193-ESM-____-30A-C23	3,000	100,000	690
193-ESM-____-30A-C55			
193-ESM-____-30A-E3T			
592-ESM-____-30A-S2			
193-ESM-____-60A-C55			
193-ESM-____-60A-E3T			
592-ESM-____-60A-S2			
193-ESM-____-30A-T			
193-ESM-____-60A-T			
193-ESM-____-30A-P			
193-ESM-____-60A-P			
193-ESM-VIG-30A-CT			
193-ESM-____-100A-C97	5,000	100,000	690
193-ESM-____-100A-E3T			
193-ESM-____-100A-P			
193-ESM-____-100A-T			
592-ESM-____-100A-S3			
193-ESM-____-200A-D180	10,000	100,000	690
193-ESM-____-200A-P			
193-ESM-____-200A-T			
592-ESM-____-200A-S4			

Table 11 - High Fault Short Circuit Ratings Using Standalone Overload Relays When Protected by Fuses per UL60947-4-1 and CSA 22.2 No. EN60947-4-1

Sensing Module Cat. No.	Max. Starter FLC [A]	Max. Available Fault Current [A]	Max. Voltage [V]	Class J or CC Fuse [A]
193-ESM-____-30A-P	30	100,000	600	60
193-ESM-VIG-30A-CT				
193-ESM-____-30A-T				
193-ESM-____-30A-E3T				
193-ESM-____-60A-P	60	100,000	600	100
193-ESM-____-60A-T				
193-ESM-____-60A-E3T				
193-ESM-____-100A-P	100	100,000	600	225
193-ESM-____-100A-T				
193-ESM-____-100A-E3T				
193-ESM-____-200A-P	200	100,000	600	400
193-ESM-____-200A-T				

Table 12 - High Fault Short Circuit Ratings per UL60947-4-1 and CSA 22.2 No. EN60947-4-1 with Bul. 100-C and 100-D IEC contactors that are protected by fuses

Sensing Module Cat. No.	Contactor Cat. No.	Max. Starter FLC [A]	Max. Available Fault Current [A]	Max. Voltage [V]	Class J or CC Fuse [A]
193-ESM-____-30A-C23	100-C09	9	100,000	600	20
	100-C12	12			20
	100-C16	16			30
	100-C23	23			30
193-ESM-____-30A-C55, 193-ESM-____-60A-C55	100-C30	30			50
	100-C37	37			50
	100-C43	43			70
	100-C55	55			80
193-ESM-____-100A-C97	100-C60	60			80
	100-C72	72			100
	100-C85	85			150
	100-C97	97			200
193-ESM-____-200A-D180	100-D115	115			200
	100-D140	140			250
	100-D180	180			300

Table 13 - Short Circuit Ratings per UL60947-4-1 and CSA 22.2 No. EN60947-4-1 with Bul. 100-C IEC contactors that are protected by Bul. 140U-D circuit breakers

Overload Relay with Sensing Module Cat. No.	Contactor Cat. No.	Max. Starter FLC[A]	Max. Available Fault Current [A]	Max. Voltage [V]	Max. Circuit Breaker Cat. No. 140U-D6D3-
193-ESM-____-30A-C23	100-C09	9	65,000	480Y/277V	C30 (30 A)
	100-C12	12			
	100-C16	16			
	100-C23	23			
193-ESM-____-30A-C23	100-C09	9	35,000	600Y/347V	C30 (30 A)
	100-C12	12			
	100-C16	16			
	100-C23	23			
193-ESM-____-30A-C23	100-C09	9	5,000	600Y/347V	C30 (30 A)
	100-C12	12			
	100-C16	16			
	100-C23	23			

Table 14 - High Fault Short Circuit Ratings using Bul. 140MG Circuit Protectors per UL60947-4-1 and CSA 22.2 No. EN60947-4-1

Sensing Module Cat. No.	Contactor Cat. No.	Max. Starter FLC [A]	Max. Available Fault Current [kA]		Circuit Protector Cat. No.	Max. Circuit Protector Current [A]	Min. Enclosure Size [in.]
			480V AC	600V AC			
193-ESM-____-30A-C55	100-C30	30	65	25	140MG-H8P-C50	50	24 x 20 x 8 with two hinges and two multi-turn screw-type latches
193-ESM-____-60A-C55	100-C37	37			140MG-H8P-C50	50	
	100-C43	43			140MG-H8P-C50	50	
	100-C55	55			140MG-H8P-C80	80	
193-ESM-____-100A-C97	100-C60	60			140MG-H8P-D12	125	24 x 20 x 8 with two hinges and two multi-turn screw-type latches
	100-C72	72			140MG-H8P-D12	125	
	100-C85	85			140MG-H8P-D12	125	
	100-C97	97			140MG-H8P-D12	125	

Table 15 - High Fault Short Circuit Ratings using listed Circuit Breakers per UL60947-4-1 and CSA 22.2 No. EN60947-4-1

Sensing Module Cat. No.	Contactor Cat. No.	Max. Starter FLC [A]	Max. Available Fault Current [A]	Max. Voltage [V AC]	Max. Listed Circuit Breaker Size [A]	Min. Enclosure Volume [in^3]
193-ESM-____-30A-P	—	—	100,000	600	100	1547
193-ESM-VIG-30A-CT						
193-ESM-____-30A-T						
193-ESM-____-30A-E3T						
193-ESM-____-60A-P	—	—				
193-ESM-____-60A-T						
193-ESM-____-60A-E3T						
193-ESM-____-30A-C23	100-C09	9				
	100-C12	12				
	100-C16	16				
	100-C23	23				
193-ESM-____-30A-C55	100-C30	30				
193-ESM-____-60A-C55	100-C37	37				
	100-C43	43				
	100-C55	55				
592-ESM-____-30A-S2	500_-A_	18				2142
	500_-B_	27				
592-ESM-____-60A-S2	500_-C_	45				

Table 16 - High Fault Short Circuit Ratings using Bul. 140G circuit breakers per UL60947-4-1 and CSA 22.2 No. EN60947-4-1

Sensing Module Cat. No.	Contactor Cat. No.	Max. Starter FLC [A]	Max. Available Fault Current [kA]		Circuit Breaker Cat. No.	Max. Circuit Breaker Current [A]
			480V	600V		
193-ESM-____-100A-C97	100-C60	60	65	25	140G-J6_3-D25	250
	100-C72	72				
	100-C85	85				
	100-C97	97				
193-ESM-____-200A-D180	100-D115	115	65	25	140G-J6_3-D25	225
	100-D140	140				
	100-D180	180				
592-ESM-____-200A-S4	500_-E_	135	22	14	140G-J6_3-D17	175

Table 17 - High Fault Short Circuit Ratings per UL60947-4-1 and CSA 22.2 No. EN60947-4-1 with Bul. 500 line NEMA contactors that are protected by fuses

Overload Relay with Sensing Module Cat. No.	Contactor Size	Max. Starter FLC [A]	Max. Available Fault Current [A]	Max. Voltage [V]	Max. UL Fuse [A]	
					R	J
592-ESM-____-30A-S2	00	9	100,000	600	—	20
592-ESM-____-30A-S2	0	18		240	30	30
				600	30	30
592-ESM-____-30A-S2	1	27		240	60	100
				600	30	50
592-ESM-____-60A-S2	2	45		240	100	200
				600	60	100
592-ESM-____-100A-S3	3	90		240	200	350
				600	100	200
592-ESM-____-200A-S4	4	135		240	300	500
				600	200	400

Fuse Coordination

The following tables list Type I and Type II Fuse Coordination when used with Bulletin 100-C and 100-D and Bulletin 500 NEMA Size 00… 4 Contactors.

ATTENTION: Select the motor branch circuit protection that complies with the NEC and any other governing regional or local codes.

Table 18 - Type 1 and Type II fuse coordination with Bul. 100-C and 100-D contactors per EN60947-4-1

Overload Relay with Sensing Module Cat. No.	Contactor Cat. No.	Max. Starter FLC[A]	Prospective Short-Circuit Current, I_r [A]	Conditional Short-Circuit Current, I_q [A]	Max. Voltage [V]	Type I Class J or CC Fuse [A]	Type II Class J or CC Fuse [A]
193-ESM-____-30A-C23	100-C09	9	1000	100,000	600	20	15
	100-C12	12				20	20
	100-C16	16				30	30
	100-C23	23	3,000			40	40
193-ESM-____-30A-C55, 193-ESM-____-60A-C55	100-C30	30				50	50
	100-C37	37				50	50
	100-C43	43				70	70
	100-C55	55				80	80
193-ESM-____-100A-C97	100-C60	60	5,000			80	80
	100-C72	72				100	100
	100-C85	85				150	150
	100-C97	97				200	200
193-ESM-____-200A-D180	100-D115	115	5,000	100,000	600	200	200
	100-D140	140	10,000			250	250
	100-D180	180				300	300

Table 19 - Type 1 and Type II fuse coordination with Bul. 500 NEMA contactors per EN60947-4-1

Overload Relay with Sensing Module Cat. No.	Contactor Size	Max. Starter FLC[A]	Prospective Short-Circuit Current, I_r [A]	Conditional Short-Circuit Current, I_q [A]	Max. Voltage [V]	Type I Class J Fuse [A]	Type II Class J Fuse [A]
592-ESM-____-30A-S2	0	18	3,000	100,000	600	30	30
592-ESM-____-30A-S2	1	27				30	30
592-ESM-____-60A-S2	2	45				60	60
592-ESM-____-100A-S3	3	90	5,000			200	200
592-ESM-____-200A-S4	4	135	10,000		240	500	500
					600	400	400

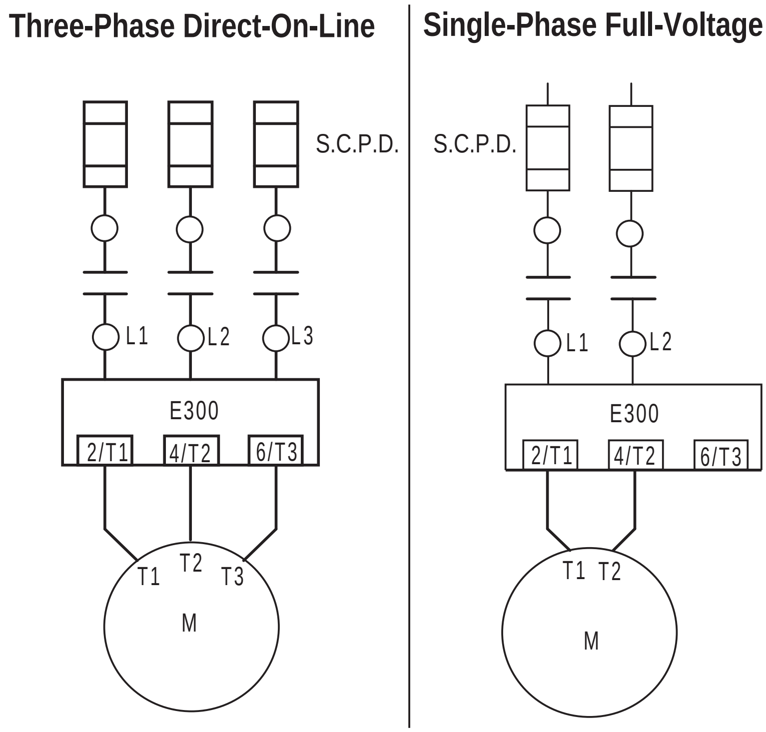
Typical Motor Connections

ATTENTION: When working on energized circuits, DO NOT rely on voltage and current information that is provided by the E300 relay for personal safety. Always use a portable voltage or current measurement device to measure the signal locally.

Three-Phase Direct On-Line (DOL) and Single-Phase Full-voltage

The following wiring diagram illustrates the E300 relay typical motor connections in a three-phase DOL and single-phase full-voltage applications.

Figure 48 - E300 DOL and Single-Phase Full-voltage Connections



External Line Current Transformer Application

Current Transformer Ratio

The following E300 relay sensing module catalog numbers can be used with step down current transformers:

- 193-ESM-IG-30A-E3T
- 193-ESM-IG-30A-T
- 193-ESM-IG-30A-P
- 193-ESM-I-30A-E3T
- 193-ESM-I-30A-T
- 193-ESM-I-30A-P
- 193-ESM-VIG-30A-CT

CT Primary (Parameter 263) and CT Secondary (Parameter 264) allows you to identify the turns ratio of the step down current transformers in use. Based on these two configuration parameters, the E300 relay automatically adjusts the measured current. Use the primary current for your FLA settings.

Table 20 - CT Primary (Parameter 263)

CT Primary (Parameter 263)	
Default Value	5
Minimum Value	1
Maximum Value	65535
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	Amps

Table 21 - CT Secondary (Parameter 264)

CT Secondary (Parameter 264)	
Default Value	5
Minimum Value	1
Maximum Value	65535
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	Amps

ATTENTION: Improper configuration of the CT Ratio parameters can make the E300 relay report inaccurate motor operational data and possible motor damage.

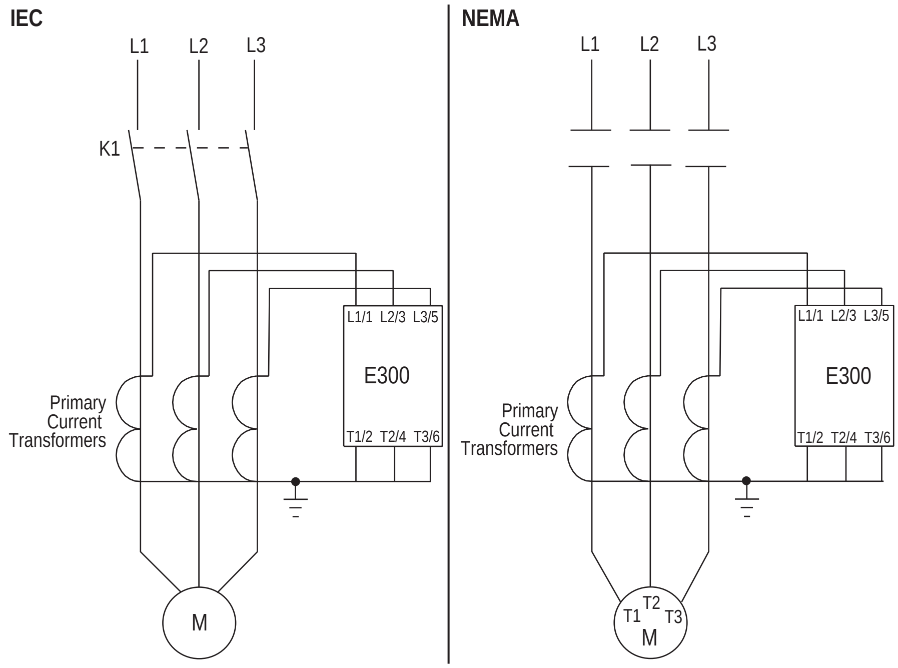
IMPORTANT The E300 relay trip on a configuration fault when the FLA setting is outside of the legal range of the selected CT Ratio settings. The TRIP/WARN LED status indicator flashes red 3-long, 8-short blinking pattern.

Provide one CT for each motor phase and connect the CT's secondary leads to the appropriate sensing module power terminals. Selected CTs must provide the required volt amperes to the secondary load, which includes the E300 Sensing Module burden of 0.1VA at the rated secondary current and the wiring burden. The CT must be rated for Protective Relaying to accommodate the high inrush currents associated with motor startup and must be accurate to within ≤±2% over its normal operating range. Typical CT ratings include the following:

- ANSI USA
- CSA (Canada)
- IEC (Europe)
- Class C5 BO.1
- Class 10L5
- 5VA Class SP10

> **ATTENTION:** The improper selection of a current transformer can result in the E300 relay reporting inaccurate motor operational data and possible motor damage. The selected current transformer must be rated for protective relaying applications.

Figure 49 - External Current Transformer Connection



The E300 relay voltage-based sensing modules support a wide variety of power systems. Table 22 lists the power systems supported by the specific sensing module.

Table 22 - Supported Power Systems

Catalog Number	Connection Type	Power System
193-ESM-VIG-___-___ 592-ESM-VIG-___-___	Direct	Single Phase Delta Wye Grounded B Phase Delta
193-ESM-VIG-30A-CT	Direct	Single Phase Delta Wye Grounded B Phase Delta
	3 PT	Delta Wye
	2 PT	Single Phase Open Delta

Voltage Mode

Voltage Mode (Parameter 252) determines the method for how voltage is monitored E300 relay. Select the connection type for the appropriate power system. See Appendix C for wiring diagrams when using step-down potential transformers with the 193-ESM-VIG-30A-CT sensing module.

Table 23 - Voltage Mode (Parameter 352)

Default Value	0 = Delta direct or with PTs
Range	0 = Delta direct or with PTs 1 = Wye direct or with PTs 2 = Delta with Delta to Wye PTs 3 = Wye with Delta to Wye PTs 4 = Delta with Wye to Delta PTs 5 = Wye with Wye to Delta PTs
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	

Potential (Voltage) Transformer Ratio

The E300 relay sensing module catalog number 193-ESM-VIG-30A-CT can be used with step down potential (voltage) transformers. PT Primary (Parameter 353) and PT Secondary (Parameter 354) allows you to identify the turns ratio of the step down potential (voltage) transformers in use. The E300 relay automatically adjusts the measured voltage based on these two configuration parameters. Use the primary voltage for your voltage protection settings.

Table 24 - PT Primary (Parameter 353)

Default Value	480
Minimum Value	1
Maximum Value	65535
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	Volts

Table 25 - PT Secondary (Parameter 354)

Default Value	480
Minimum Value	165535
Maximum Value	
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	Volts

Control Circuits

ATTENTION: Do not exceed the ratings of the E300 relay's output and trip relay. If the coil current or voltage of the contactor exceeds the overload relay's ratings, an interposing relay must be used.

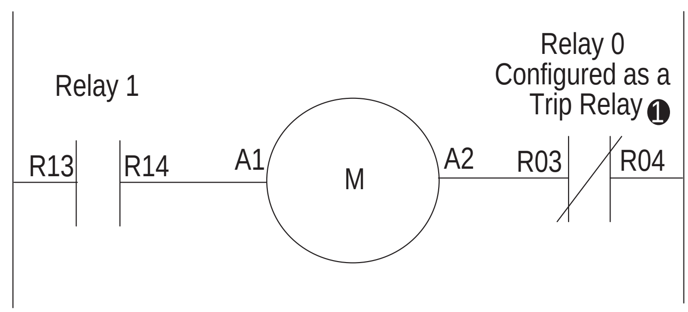
ATTENTION: When the power is applied to the E300 relay's A1 and A2 terminals, the N.O. relay contact that is assigned as a Trip Relay closes after approximately 2 seconds if no trip condition exists.

ATTENTION: More control circuit protection may be required. See the applicable electrical codes.

The E300 relay can provide motor control logic for many different types of motor starters (see Chapter 5 for more information on Operating Modes). By default, the E300 relay is configured for the Overload-Network operating mode. The following wiring diagrams are typical control circuits for Non-Reversing and Reversing Motor starters that use the Overload-Network operating mode when Relay 0 (terminals R03 and R04) is configured to be a normally closed Trip Relay.

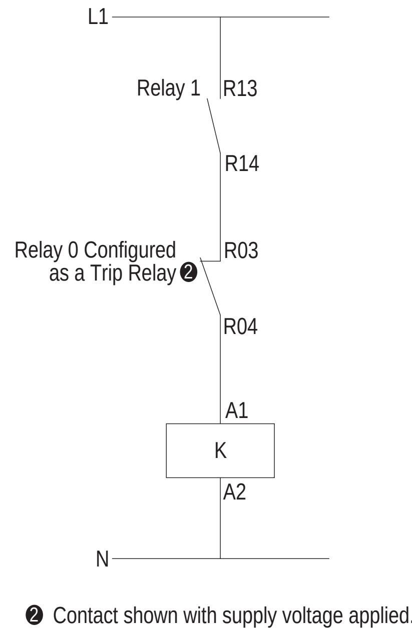
Full-voltage Non-reversing Starter (with Network Control)

Figure 50 - NEMA Nomenclature



❶ Contact shown with supply voltage applied.

Figure 51 - CENELEC Nomenclature



Full-Voltage Reversing Starter (with Network Control)

Figure 52 - NEMA Nomenclature

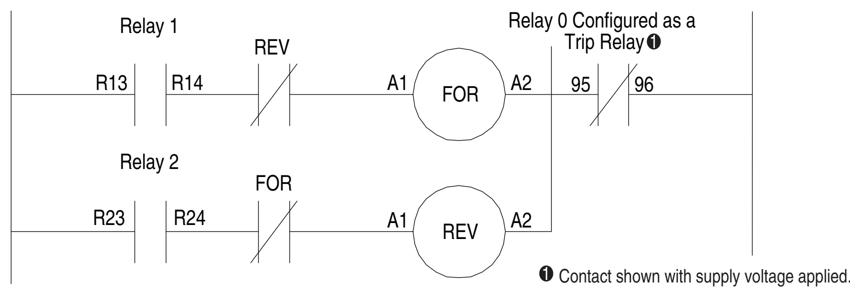
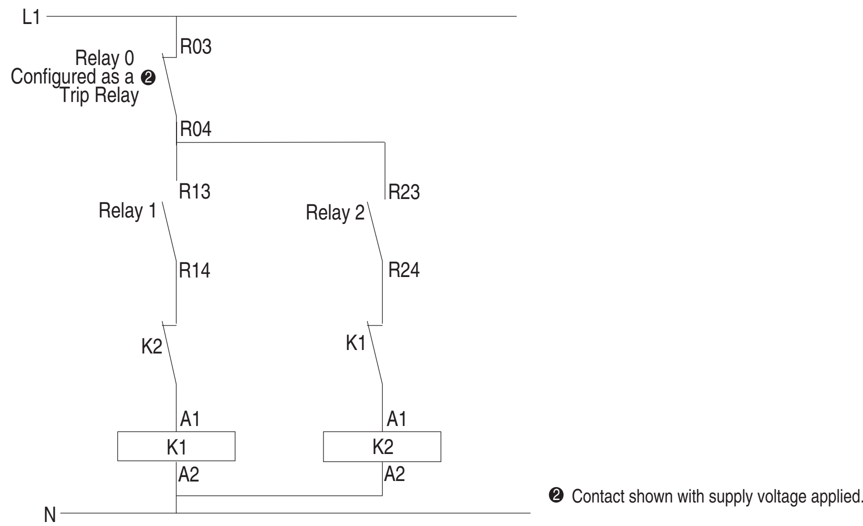


Figure 53 - CENELEC Nomenclature



Diagnostic Station

Introduction

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.
ESC	Escape	Back one step in the navigation menu. Cancel a change to a configuration parameter value
SELECT	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.

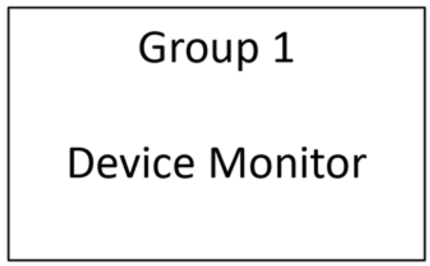
Displaying a Parameter

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.

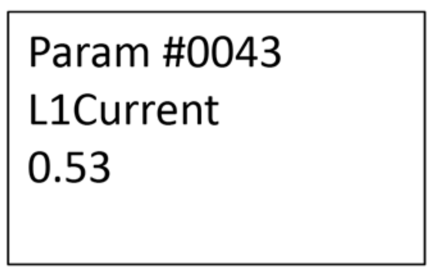
Parameter Group Navigation

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

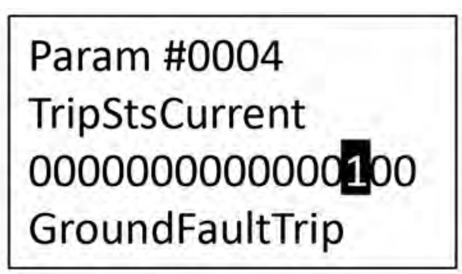
Use the ▲ or ▼ keys to select the parameter group to display and press ↵ .



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.



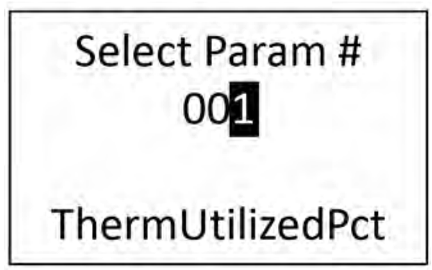
Press ESC to return to the parameter group navigation system.

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

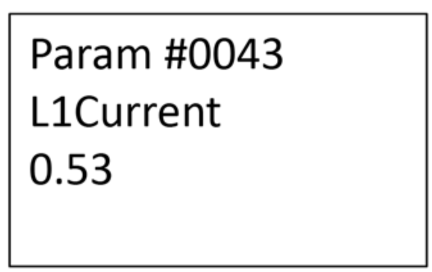
Linear List Navigation

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

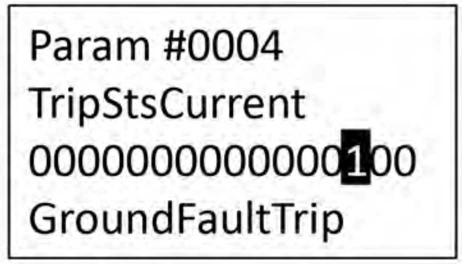
Use the ▲ or ▼ and SELECT keys to select the parameter number to display and press ↵ .



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.



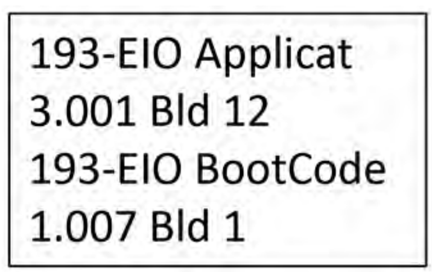
Press ESC to return to the linear list navigation system.

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

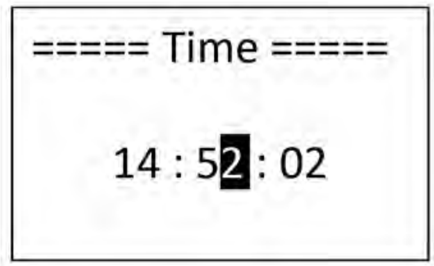
System Info

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.

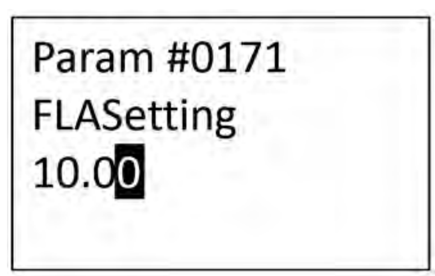
Editing Parameters

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.

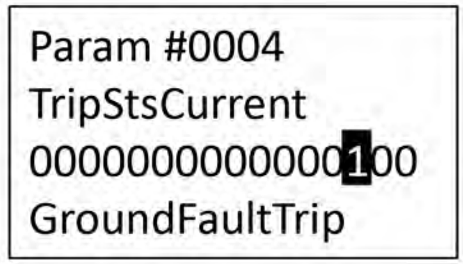


Press ESC to return to the navigation menu.

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.

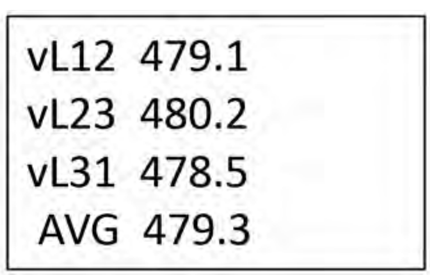
Programmable Display Sequence

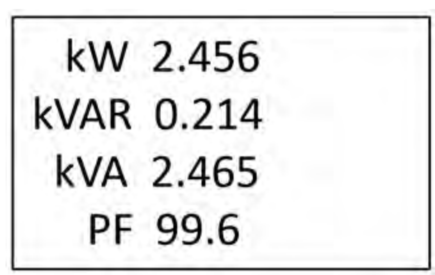
Display Sequence

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

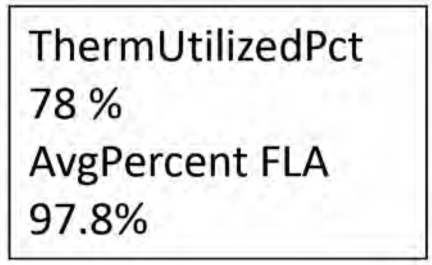
- Three-phase current
- Three-phase voltage
- Total power
- User-defined screen 1
- User-defined screen 2
- User-defined screen 3
- User-defined screen 4

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 114 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.

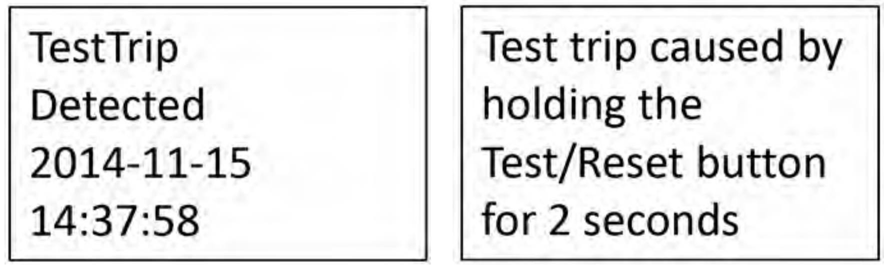
Stopping the Display Sequence

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 its 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 its 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

Introduction

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.

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 (see page 568 to enable the EtherNet/IP web server), 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 commissioning activities and maintenance tasks are completed, 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.

Table 26 - Ready Mode Bit Function Detail — Device Status 0 (Parameter 20)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Trip Present
														X		Warning Present
													X			Invalid Configuration
												X				Current Present
											X					GFCurrent Present
										X						Voltage Present
									X							Emergency Start Enabled
								X								DeviceLogix Enabled
							X									Feedback Timeout Enabled
						X										Operator Station Present
					X											Voltage Sensing Present
				X												Intern Ground Fault Sensing Present
			X													Extern Ground Fault Sensing Present
		X														PTC Sensing
	X															Ready
																Reserved

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.

Table 27 - Run Mode Bit Function Detail — Device Status 0 (Parameter 20)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Trip Present
														X		Warning Present
													X			Invalid Configuration
												X				Current Present
											X					GFCurrent Present
										X						Voltage Present
									X							Emergency Start Enabled
								X								DeviceLogix Enabled
							X									Feedback Timeout Enabled
						X										Operator Station Present
					X											Voltage Sensing Present
				X												Intern Ground Fault Sensing Present
			X													Extern Ground Fault Sensing Present
		X														PTC Sensing
	X															Ready
																Reserved

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.

Table 28 - Invalid Configuration Cause (Parameter 39)

Code	Description
0	No Error
1	Value over maximum value
2	Value under minimum value
3	Illegal value
4	L3 Current detected (for single-phase applications)
5	CopyCat error

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.

Table 29 - Invalid Configuration Mode Bit Function Detail — Device Status 0 (Parameter 20)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Trip Present
														X		Warning Present
													X			Invalid Configuration
												X				Current Present
											X					GFCurrent Present
										X						Voltage Present
									X							Emergency Start Enabled
								X								DeviceLogix Enabled
							X									Feedback Timeout Enabled
						X										Operator Station Present
					X											Voltage Sensing Present
				X												Intern Ground Fault Sensing Present
			X													Extern Ground Fault Sensing Present
		X														PTC Sensing
	X															Ready
																Reserved

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 ensure that the options that were expected 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).

Table 30 - Enable Option Match Protection Trip Bit Function Detail— Control Trip Enable (Parameter 186)

Bit																
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**
															X	Test Trip Enable
														X		PTC Trip Enable
													X			DeviceLogix Trip Enable
												X				Operator Station Trip Enable
											X					Remote Trip Enable
										X						Blocked Start Trip Enable
									X							Hardware Fault Trip Enable
								X								Configuration Trip Enable
							X									Option Match Trip Enable
						X										Feedback Timeout Trip Enable
					X											Expansion Bus Trip Enable
																Reserved
																Reserved
		X														Nonvolatile Memory Trip Enable
	X															Ready
																Reserved

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).

Table 31 - Enable Option Match Protection Warning Bit Function Detail— Control Warning Enable (Parameter 192)

Bit																
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**
																Reserved
																Reserved
													X			DeviceLogix Warning Enable
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
							X									Option Match Warning Enable
						X										Feedback Timeout Warning Enable
					X											Expansion Bus Warning Enable
				X												Number Of Starts Warning Enable
			X													Operating Hours Warning Enable
																Reserved

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.

Table 32 - Control Module Type (Parameter 221)

Code	Description	Control Module Cat. No.
0	Ignore	—
1	6 Inputs, 24V DC / 3 Relay Outputs	193-EIO-63-24D
2	4 Inputs, 110-120V AC 50/60Hz / 3 Relay Outputs	193-EIO-43-120
3	4 Inputs, 220-240V AC 50/60Hz / 3 Relay Outputs	193-EIO-43-240
4	4 Inputs, 24V DC / 2 Relay Outputs / External Ground Fault / PTC	193-EIOGP-42-24D
5	2 Inputs, 110-120V AC 50/60Hz / 2 Relay Outputs / External Ground Fault / PTC	193-EIOGP-22-120
6	2 Inputs, 220-240V AC 50/60Hz / 2 Relay Outputs / External Ground Fault / PTC	193-EIOGP-22-240

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.

Table 33 - Sensing Module Type (Parameter 222)

Code	Description	Sensing Module Cat. No.
0	Ignore	—
1	Voltage / Current 0.5…30 A / Ground Fault	193-ESM-VIG-30A-___ or 592-ESM-VIG-30A-___
2	Voltage / Current 6…60 A / Ground Fault	193-ESM-VIG-60A-___ or 592-ESM-VIG-60A-___
3	Voltage / Current 10…100 A / Ground Fault	193-ESM-VIG-100A-___ or 592-ESM-VIG-100A-___
4	Voltage / Current 20…200 A / Ground Fault	193-ESM-VIG-200A-___ or 592-ESM-VIG-200A-___
5	Current 0.5…30 A / Ground Fault	193-ESM-IG-30A-___ or 592-ESM-IG-30A-___
6	Current 6…60 A / Ground Fault	193-ESM-IG-60A-___ or 592-ESM-IG-60A-___
7	Current 10…100 A / Ground Fault	193-ESM-IG-100A-___ or 592-ESM-IG-100A-___
8	Current 20…200 A / Ground Fault	193-ESM-IG-200A-___ or 592-ESM-IG-200A-___
9	Current 0.5…30 A	193-ESM-I-30A-___ or 592--ESM-I-30A-___
10	Current 6…60 A	193-ESM-I-60A-___ or 592--ESM-I-60A-___
11	Current 10…100 A	193-ESM-I-100A-___ or 592--ESM-I-100A-___
12	Current 20…200 A	193-ESM-I-200A-___ or 592--ESM-I-200A-___

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.

Table 34 - Communication Module Type (Parameter 223)

Code	Description	Communication Module Cat. No.
0	Ignore	—
1	EtherNet/IP with Dual Port Switch supporting DLR	193-ECM-ETR
2	DeviceNet	193-ECM-DNT

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.

Table 35 - Operator Station Type (Parameter 224)

Code	Description	Operator Station Cat. No.
0	Ignore	—
1	No Operator Station (Operator Station Not Allowed)	—
2	Control Station	193-EOS-SCS
3	Diagnostic Station with LCD	193-EOS-SDS

Digital I/O Expansion 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.

Table 36 - Digital I/O Expansion Module 1 Type (Parameter 225)

Code	Description	Digital I/O Expansion Module Cat. No.
0	Ignore	—
1	No Digital I/O Expansion Module (Digital I/O Expansion Module Not Allowed)	—
2	4 Inputs, 24V DC / 2 Relay Outputs	193-EXP-DIO-42-24D
3	4 Inputs, 110-120V AC 50/60Hz / 2 Relay Outputs	193-EXP-DIO-42-120
4	4 Inputs, 220-240V AC 50/60Hz / 2 Relay Outputs	193-EXP-DIO-42-240

Digital I/O Expansion 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.

Table 37 - Digital I/O Expansion Module 2 Type (Parameter 226)

Code	Description	Digital I/O Expansion Module Cat. No.
0	Ignore	—
1	No Digital I/O Expansion Module (Digital I/O Expansion Module Not Allowed)	—
2	4 Inputs, 24V DC / 2 Relay Outputs	193-EXP-DIO-42-24D
3	4 Inputs, 110-120V AC 50/60Hz / 2 Relay Outputs	193-EXP-DIO-42-120
4	4 Inputs, 220-240V AC 50/60Hz / 2 Relay Outputs	193-EXP-DIO-42-240

Digital I/O Expansion 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.

Table 38 - Digital I/O Expansion Module 3 Type (Parameter 227)

Code	Description	Digital I/O Expansion Module Cat. No.
0	Ignore	—
1	No Digital I/O Expansion Module (Digital I/O Expansion Module Not Allowed)	—
2	4 Inputs, 24V DC / 2 Relay Outputs	193-EXP-DIO-42-24D
3	4 Inputs, 110-120V AC 50/60Hz / 2 Relay Outputs	193-EXP-DIO-42-120
4	4 Inputs, 220-240V AC 50/60Hz / 2 Relay Outputs	193-EXP-DIO-42-240

Digital I/O Expansion 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.

Table 39 - Digital I/O Expansion Module 4 Type (Parameter 228)

Code	Description	Digital I/O Expansion Module Cat. No.
0	Ignore	—
1	No Digital I/O Expansion Module (Digital I/O Expansion Module Not Allowed)	—
2	4 Inputs, 24V DC / 2 Relay Outputs	193-EXP-DIO-42-24D
3	4 Inputs, 110-120V AC 50/60Hz / 2 Relay Outputs	193-EXP-DIO-42-120
4	4 Inputs, 220-240V AC 50/60Hz / 2 Relay Outputs	193-EXP-DIO-42-240

Analog I/O Expansion 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.

Table 40 - Analog I/O Expansion Module 1 Type (Parameter 229)

Code	Description	Analog I/O Expansion Module Cat. No.
0	Ignore	—
1	No Analog I/O Expansion Module (Analog I/O Expansion Module Not Allowed)	—
2	3 Universal Analog Inputs / 1 Analog Output	193-EXP-AIO-31

Analog I/O Expansion 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.

Table 41 - Analog I/O Expansion Module 2 Type (Parameter 230)

Code	Description	Analog I/O Expansion Module Cat. No.
0	Ignore	—
1	No Analog I/O Expansion Module (Analog I/O Expansion Module Not Allowed)	—
2	3 Universal Analog Inputs / 1 Analog Output	193-EXP-AIO-31

Analog I/O Expansion 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.

Table 42 - Analog I/O Expansion Module 3 Type (Parameter 231)

Code	Description	Analog I/O Expansion Module Cat. No.
0	Ignore	—
1	No Analog I/O Expansion Module (Analog I/O Expansion Module Not Allowed)	—
2	3 Universal Analog Inputs / 1 Analog Output	193-EXP-AIO-31

Analog I/O Expansion 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.

Table 43 - Analog I/O Expansion Module 4 Type (Parameter 232)

Code	Description	Analog I/O Expansion Module Cat. No.
0	Ignore	—
1	No Analog I/O Expansion Module (Analog I/O Expansion Module Not Allowed)	—
2	3 Universal Analog Inputs / 1 Analog Output	193-EXP-AIO-31

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.

Table 44 - Option Match Action (Parameter 233) Bit Function Detail

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Control Module Mismatch Action
														X		Sensing Module Mismatch Action
													X			Communication Module Mismatch Action
												X				Operator Station Mismatch Action
											X					Digital Module 1 Mismatch Action
										X						Digital Module 2 Mismatch Action
									X							Digital Module 3 Mismatch Action
								X								Digital Module 4 Mismatch Action
							X									Analog Module 1 Mismatch Action
						X										Analog Module 2 Mismatch Action
					X											Analog Module 3 Mismatch Action
				X												Analog Module 4 Mismatch Action

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 77 to learn how to enable Administration Mode).

Table 45 - Security Policy (Parameter 211) Bit Function Detail

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Device Configuration Enable
														X		Device Reset Enable
													X			Firmware Update Enable
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
X																Security Policy Config Enable

Device Configuration Policy

The Device Configuration Policy 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 Policy

The Device Reset Policy 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 Policy

The Firmware Update Policy 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 Policy

The Security Configuration Policy allows you to modify the Security Policy of the E300 relay in Ready Mode. When this policy is disabled, the Security Policy 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 Pt00 Assignment (Parameter 196)

Input Pt00 Assignment (Parameter 196) allows you to assign this digital input for the following functions:

Table 46 - Input Pt00 Assignment (Parameter 196)

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
6	Test Mode	Enable Test Mode monitoring
7	L1 Line Loss Arm	Activate L1 Line Loss Protection
8	L2 Line Loss Arm	Activate L2 Line Loss Protection
9	L3 Line Loss Arm	Activate L3 Line Loss Protection
10	L1 L2 Line Loss Arm	Activate L1 and L2 Line Loss Protection
11	L2 L3 Line Loss Arm	Activate L2 and L3 Line Loss Protection
12	L1 L3 Line Loss Arm	Activate L1 and L3 Line Loss Protection
13	L1 L2 L3 Line Loss Arm	Activate L1, L2, and L3 Line Loss Protection

Input Pt01 Assignment (Parameter 197)

Input Pt01 Assignment (Parameter 197) allows you to assign this digital input for the following functions:

Table 47 - Input Pt01 Assignment (Parameter 197)

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
6	Test Mode	Enable Test Mode monitoring
7	L1 Line Loss Arm	Activate L1 Line Loss Protection
8	L2 Line Loss Arm	Activate L2 Line Loss Protection
9	L3 Line Loss Arm	Activate L3 Line Loss Protection
10	L1 L2 Line Loss Arm	Activate L1 and L2 Line Loss Protection
11	L2 L3 Line Loss Arm	Activate L2 and L3 Line Loss Protection
12	L1 L3 Line Loss Arm	Activate L1 and L3 Line Loss Protection
13	L1 L2 L3 Line Loss Arm	Activate L1, L2, and L3 Line Loss Protection

Input Pt02 Assignment (Parameter 198)

Input Pt02 Assignment (Parameter 198) allows you to assign this digital input for the following functions:

Table 48 - Input Pt02 Assignment (Parameter 198)

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
6	Test Mode	Enable Test Mode monitoring
7	L1 Line Loss Arm	Activate L1 Line Loss Protection
8	L2 Line Loss Arm	Activate L2 Line Loss Protection
9	L3 Line Loss Arm	Activate L3 Line Loss Protection
10	L1 L2 Line Loss Arm	Activate L1 and L2 Line Loss Protection
11	L2 L3 Line Loss Arm	Activate L2 and L3 Line Loss Protection
12	L1 L3 Line Loss Arm	Activate L1 and L3 Line Loss Protection
13	L1 L2 L3 Line Loss Arm	Activate L1, L2, and L3 Line Loss Protection

Input Pt03 Assignment (Parameter 199)

Input Pt03 Assignment (Parameter 199) allows you to assign this digital input for the following functions:

Table 49 - Input Pt03 Assignment (Parameter 199)

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
6	Test Mode	Enable Test Mode monitoring
7	L1 Line Loss Arm	Activate L1 Line Loss Protection
8	L2 Line Loss Arm	Activate L2 Line Loss Protection
9	L3 Line Loss Arm	Activate L3 Line Loss Protection
10	L1 L2 Line Loss Arm	Activate L1 and L2 Line Loss Protection
11	L2 L3 Line Loss Arm	Activate L2 and L3 Line Loss Protection
12	L1 L3 Line Loss Arm	Activate L1 and L3 Line Loss Protection
13	L1 L2 L3 Line Loss Arm	Activate L1, L2, and L3 Line Loss Protection

Input Pt04 Assignment (Parameter 200)

Input Pt04 Assignment (Parameter 200) allows you to assign this digital input for the following functions:

Table 50 - Input Pt04 Assignment (Parameter 200)

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
6	Test Mode	Enable Test Mode monitoring
7	L1 Line Loss Arm	Activate L1 Line Loss Protection
8	L2 Line Loss Arm	Activate L2 Line Loss Protection
9	L3 Line Loss Arm	Activate L3 Line Loss Protection
10	L1 L2 Line Loss Arm	Activate L1 and L2 Line Loss Protection
11	L2 L3 Line Loss Arm	Activate L2 and L3 Line Loss Protection
12	L1 L3 Line Loss Arm	Activate L1 and L3 Line Loss Protection
13	L1 L2 L3 Line Loss Arm	Activate L1, L2, and L3 Line Loss Protection

Input Pt05 Assignment (Parameter 201)

Input Pt05 Assignment (Parameter 201) allows you to assign this digital input for the following functions:

Table 51 - Input Pt05 Assignment (Parameter 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
6	Test Mode	Enable Test Mode monitoring
7	L1 Line Loss Arm	Activate L1 Line Loss Protection
8	L2 Line Loss Arm	Activate L2 Line Loss Protection
9	L3 Line Loss Arm	Activate L3 Line Loss Protection
10	L1 L2 Line Loss Arm	Activate L1 and L2 Line Loss Protection
11	L2 L3 Line Loss Arm	Activate L2 and L3 Line Loss Protection
12	L1 L3 Line Loss Arm	Activate L1 and L3 Line Loss Protection
13	L1 L2 L3 Line Loss Arm	Activate L1, L2, and L3 Line Loss Protection

Output Pt00 Assignment (Parameter 202)

Output Pt00 Assignment (Parameter 202) allows you to assign this relay output for the following functions:

Table 52 - Output Pt00 Assignment (Parameter 202)

Value	Assignment	Description
0	Normal	Function as a relay output
1	Trip Relay	Function as a normally closed contact until the E300 relay is in a tripped state in which the relay opens. The Trip Relay remains open until a trip reset is issued.
2	Control Relay	Function as a combination Normal and Trip Relay. The Control Relay is in a normally open state until the relay is commanded to close by communication or via a DeviceLogix program. When the E300 relay enters into a tripped state, the Control Relay opens and remains open until a trip reset is issued.
3	Trip Alarm	Function as a normally open contact until the E300 relay is in a tripped state in which the relay closes. The Trip Alarm remains closed until a trip reset is issued.
4	Warning Alarm	Function as a normally open contact until the E300 relay is in a protection warning state in which the relay closes. The Warning Alarm remains closed until the protection warning clears.
5	Monitor L1 Trip Relay(1)	Function as a normally closed contact until the E300 relay is in a tripped state for a L1 Under Current, L1 Over Current, or L1 Line Loss in which the relay opens. The Trip Relay remains open until a trip reset is issued.
6	Monitor L2 Trip Relay(1)	Function as a normally closed contact until the E300 relay is in a tripped state for a L2 Under Current, L2 Over Current, or L2 Line Loss in which the relay opens. The Trip Relay remains open until a trip reset is issued.
7	Monitor L3 Trip Relay(1)	Function as a normally closed contact until the E300 relay is in a tripped state for a L3 Under Current, L3 Over Current, or L3 Line Loss in which the relay opens. The Trip Relay remains open until a trip reset is issued.
8	Monitor L1 Control Relay(1)	Function as a combination Normal and Trip Relay. The Control Relay is in a normally open state until the relay is commanded to close by communication or via a DeviceLogix program. When the E300 relay is in a tripped state for a L1 Under Current, L1 Over Current, or L1 Line Loss, the relay opens. The Control Relay remains open until a trip reset is issued.
9	Monitor L2 Control Relay(1)	Function as a combination Normal and Trip Relay. The Control Relay is in a normally open state until the relay is commanded to close by communication or via a DeviceLogix program. When the E300 relay is in a tripped state for a L2 Under Current, L2 Over Current, or L2 Line Loss, the relay opens. The Control Relay remains open until a trip reset is issued.
10	Monitor L3 Control Relay(1)	Function as a combination Normal and Trip Relay. The Control Relay is in a normally open state until the relay is commanded to close by communication or via a DeviceLogix program. When the E300 relay is in a tripped state for a L3 Under Current, L3 Over Current, or L3 Line Loss, the relay opens. The Control Relay remains open until a trip reset is issued.

(1) Requires Control Module firmware v3.000 or higher

Output Pt01 Assignment (Parameter 203)

Output Pt01 Assignment (Parameter 203) allows you to assign this relay output for the following functions:

Table 53 - Output Pt01 Assignment (Parameter 203)

Value	Assignment	Description
0	Normal	Function as a relay output
1	Trip Relay	Function as a normally closed contact until the E300 relay is in a tripped state in which the relay opens. The Trip Relay remains open until a trip reset is issued.
2	Control Relay	Function as a combination Normal and Trip Relay. The Control Relay is in a normally open state until the relay is commanded to close by communication or via a DeviceLogix program. When the E300 relay enters into a tripped state, the Control Relay opens and remains open until a trip reset is issued.
3	Trip Alarm	Function as a normally open contact until the E300 relay is in a tripped state in which the relay closes. The Trip Alarm remains closed until a trip reset is issued.
4	Warning Alarm	Function as a normally open contact until the E300 relay is in a protection warning state in which the relay closes. The Warning Alarm remains closed until the protection warning clears.
5	Monitor L1 Trip Relay(1)	Function as a normally closed contact until the E300 relay is in a tripped state for a L1 Under Current, L1 Over Current, or L1 Line Loss in which the relay opens. The Trip Relay remains open until a trip reset is issued.
6	Monitor L2 Trip Relay(1)	Function as a normally closed contact until the E300 relay is in a tripped state for a L2 Under Current, L2 Over Current, or L2 Line Loss in which the relay opens. The Trip Relay remains open until a trip reset is issued.
7	Monitor L3 Trip Relay(1)	Function as a normally closed contact until the E300 relay is in a tripped state for a L3 Under Current, L3 Over Current, or L3 Line Loss in which the relay opens. The Trip Relay remains open until a trip reset is issued.
8	Monitor L1 Control Relay(1)	Function as a combination Normal and Trip Relay. The Control Relay is in a normally open state until the relay is commanded to close by communication or via a DeviceLogix program. When the E300 relay is in a tripped state for a L1 Under Current, L1 Over Current, or L1 Line Loss, the relay opens. The Control Relay remains open until a trip reset is issued.
9	Monitor L2 Control Relay(1)	Function as a combination Normal and Trip Relay. The Control Relay is in a normally open state until the relay is commanded to close by communication or via a DeviceLogix program. When the E300 relay is in a tripped state for a L2 Under Current, L2 Over Current, or L2 Line Loss, the relay opens. The Control Relay remains open until a trip reset is issued.
10	Monitor L3 Control Relay(1)	Function as a combination Normal and Trip Relay. The Control Relay is in a normally open state until the relay is commanded to close by communication or via a DeviceLogix program. When the E300 relay is in a tripped state for a L3 Under Current, L3 Over Current, or L3 Line Loss, the relay opens. The Control Relay remains open until a trip reset is issued.

(1) Requires Control Module firmware v3.000 or higher

Output Pt02 Assignment (Parameter 204)

Output Pt02 Assignment (Parameter 204) allows you to assign this relay output for the following functions:

Table 54 - Output Pt02 Assignment (Parameter 204)

Value	Assignment	Description
0	Normal	Function as a relay output
1	Trip Relay	Function as a normally closed contact until the E300 relay is in a tripped state in which the relay opens. The Trip Relay remains open until a trip reset is issued.
2	Control Relay	Function as a combination Normal and Trip Relay. The Control Relay is in a normally open state until the relay is commanded to close by communication or via a DeviceLogix program. When the E300 relay enters into a tripped state, the Control Relay opens and remains open until a trip reset is issued.
3	Trip Alarm	Function as a normally open contact until the E300 relay is in a tripped state in which the relay closes. The Trip Alarm remains closed until a trip reset is issued.
4	Warning Alarm	Function as a normally open contact until the E300 relay is in a protection warning state in which the relay closes. The Warning Alarm remains closed until the protection warning clears.
5	Monitor L1 Trip Relay(1)	Function as a normally closed contact until the E300 relay is in a tripped state for a L1 Under Current, L1 Over Current, or L1 Line Loss in which the relay opens. The Trip Relay remains open until a trip reset is issued.
6	Monitor L2 Trip Relay(1)	Function as a normally closed contact until the E300 relay is in a tripped state for a L2 Under Current, L2 Over Current, or L2 Line Loss in which the relay opens. The Trip Relay remains open until a trip reset is issued.
7	Monitor L3 Trip Relay(1)	Function as a normally closed contact until the E300 relay is in a tripped state for a L3 Under Current, L3 Over Current, or L3 Line Loss in which the relay opens. The Trip Relay remains open until a trip reset is issued.
8	Monitor L1 Control Relay(1)	Function as a combination Normal and Trip Relay. The Control Relay is in a normally open state until the relay is commanded to close by communication or via a DeviceLogix program. When the E300 relay is in a tripped state for a L1 Under Current, L1 Over Current, or L1 Line Loss, the relay opens. The Control Relay remains open until a trip reset is issued.
9	Monitor L2 Control Relay(1)	Function as a combination Normal and Trip Relay. The Control Relay is in a normally open state until the relay is commanded to close by communication or via a DeviceLogix program. When the E300 relay is in a tripped state for a L2 Under Current, L2 Over Current, or L2 Line Loss, the relay opens. The Control Relay remains open until a trip reset is issued.
10	Monitor L3 Control Relay(1)	Function as a combination Normal and Trip Relay. The Control Relay is in a normally open state until the relay is commanded to close by communication or via a DeviceLogix program. When the E300 relay is in a tripped state for a L3 Under Current, L3 Over Current, or L3 Line Loss, the relay opens. The Control Relay remains open until a trip reset is issued.

(1) Requires Control Module firmware v3.000 or higher

Table 55 - Activate FLA2 with Output Relay (Parameter 209)

Activate FLA2 with Output Relay (Parameter 209) allows you to activate the value in FLA2 Setting (Parameter 177) for the current-based protection algorithms when the assigned output relay is in an energized state.

Table 56 - Activate FLA2 with Output Relay (Parameter 209)

Value	Description
0	Disable
1	Pt00 Output
2	Pt01 Output
3	Pt02 Output

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 57 - 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	

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 on the following pages configure the Protection Fault Mode for each E300 output relay.

Output Relay 0 Protection Fault Action (Parameter 304)

Output Relay 0 Protection Fault Action (Parameter 304) defines how Output Relay 0 when assigned as a Normal/General Purpose Relay responds when a trip event occurs.

Table 58 - Output Relay 0 Protection Fault Action (Parameter 304)

Value	Assignment	Description
0	GoToPrFltValue	Set to Output Relay 0 Protection Fault Value (Parameter 305)
1	IgnoreIfPossible	Continue to operate as commanded via the network or DeviceLogix

Output Relay 0 Protection Fault Value (Parameter 305)

Output Relay 0 Protection Fault Value (Parameter 305) defines which state Output Relay 0 should go to when a trip event occurs.

Table 59 - Output Relay 0 Protection Fault Value (Parameter 305)

Value	Assignment	Description
0	Open	Open Output Relay 0
1	Closed	Close Output Relay 0

Output Relay 1 Protection Fault Action (Parameter 310)

Output Relay 1 Protection Fault Action (Parameter 310) defines how Output Relay 1 responds when a trip event occurs when this parameter is assigned as a Normal/General Purpose Relay.

Table 60 - Output Relay 1 Protection Fault Action (Parameter 310)

Value	Assignment	Description
0	GoToPrFltValue	Set to Output Relay 1 Protection Fault Value (Parameter 311)
1	IgnoreIfPossible	Continue to operate as commanded via the network or DeviceLogix

Output Relay 1 Protection Fault Value (Parameter 311)

Output Relay 1 Protection Fault Value (Parameter 311) defines which state Output Relay 1 should go to when a trip event occurs.

Table 61 - Output Relay 1 Protection Fault Value (Parameter 311)

Value	Assignment	Description
0	Open	Open Output Relay 1
1	Closed	Close Output Relay 1

Output Relay 2 Protection Fault Action (Parameter 316)

Output Relay 2 Protection Fault Action (Parameter 316) defines how Output Relay 2 responds when a trip event occurs when this parameter is assigned as a Normal/General Purpose Relay.

Table 62 - Output Relay 2 Protection Fault Action (Parameter 316)

Value	Assignment	Description
0	GoToPrFltValue	Set to Output Relay 2 Protection Fault Value (Parameter 317)
1	IgnoreIfPossible	Continue to operate as commanded via the network or DeviceLogix

Output Relay 2 Protection Fault Value (Parameter 317)

Output Relay 2 Protection Fault Value (Parameter 317) defines which state Output Relay 2 should go to when a trip event occurs.

Table 63 - Output Relay 2 Protection Fault Value (Parameter 317)

Value	Assignment	Description
0	Open	Open Output Relay 2
1	Closed	Close Output Relay 2

Digital Expansion Module 1 Output Relay Protection Fault Action (Parameter 322)

Digital Expansion Module 1 Output Relay Protection Fault Action (Parameter 322) defines how both output relays on Digital Expansion Module 1 responds when a trip event occurs.

Table 64 - Digital Expansion Module 1 Output Relay Protection Fault Action (Parameter 322)

Value	Assignment	Description
0	GoToPrFltValue	Set to Digital Expansion Module 1 Output Relay Protection Fault Value (Parameter 323)
1	IgnoreIfPossible	Continue to operate as commanded via the network or DeviceLogix

Digital Expansion Module 1 Output Relay Protection Fault Value (Parameter 323)

Digital Expansion Module 1 Output Relay Protection Fault Value (Parameter 323) defines which state both output relays should go to when a trip event occurs.

Table 65 - Digital Expansion Module 1 Output Relay Protection Fault Value (Parameter 323)

Value	Assignment	Description
0	Open	Open Digital Expansion Module 1 Output Relay 0 and Output Relay 1
1	Closed	Close Digital Expansion Module 1 Output Relay 0 and Output Relay 1

Digital Expansion Module 2 Output Relay Protection Fault Action (Parameter 328)

Digital Expansion Module 2 Output Relay Protection Fault Action (Parameter 328) defines how both output relays on Digital Expansion Module 2 responds when a trip event occurs.

Table 66 - Digital Expansion Module 2 Output Relay Protection Fault Action (Parameter 328)

Value	Assignment	Description
0	GoToPrFltValue	Set to Digital Expansion Module 2 Output Relay Protection Fault Value (Parameter 329)
1	IgnoreIfPossible	Continue to operate as commanded via the network or DeviceLogix

Digital Expansion Module 2 Output Relay Protection Fault Value (Parameter 329)

Digital Expansion Module 2 Output Relay Protection Fault Value (Parameter 329) defines which state both output relays should go to when a trip event occurs.

Table 67 - Digital Expansion Module 2 Protection Fault Value (Parameter 329)

Value	Assignment	Description
0	Open	Open Digital Expansion Module 2 Output Relay 0 and Output Relay 1
1	Closed	Close Digital Expansion Module 2 Output Relay 0 and Output Relay 1

Digital Expansion Module 3 Output Relay Protection Fault Action (Parameter 334)

Digital Expansion Module 3 Output Relay Protection Fault Action (Parameter 334) defines how both output relays on Digital Expansion Module 3 responds when a trip event occurs.

Table 68 - Digital Expansion Module 3 Output Relay Protection Fault Action (Parameter 334)

Value	Assignment	Description
0	GoToPrFltValue	Set to Digital Expansion Module 3 Output Relay Protection Fault Value (Parameter 335)
1	IgnoreIfPossible	Continue to operate as commanded via the network or DeviceLogix

Digital Expansion Module 3 Output Relay Protection Fault Value (Parameter 335)

Digital Expansion Module 3 Output Relay Protection Fault Value (Parameter 335) defines which state both output relays should go to when a trip event occurs.

Table 69 - Digital Expansion Module 3 Output Relay Protection Fault Value (Parameter 335)

Value	Assignment	Description
0	Open	Open Digital Expansion Module 3 Output Relay 0 and Output Relay 1
1	Closed	Close Digital Expansion Module 3 Output Relay 0 and Output Relay 1

Digital Expansion Module 4 Output Relay Protection Fault Action (Parameter 340)

Digital Expansion Module 4 Output Relay Protection Fault Action (Parameter 340) defines how both output relays on Digital Expansion Module 4 responds when a trip event occurs.

Table 70 - Digital Expansion Module 4 Output Relay Protection Fault Action (Parameter 340)

Value	Assignment	Description
0	GoToPrFltValue	Set to Digital Expansion Module 3 Output Relay Protection Fault Value (Parameter 341)
1	IgnoreIfPossible	Continue to operate as commanded via the network or DeviceLogix

Digital Expansion Module 4 Output Relay Protection Fault Value (Parameter 341)

Digital Expansion Module 4 Output Relay Protection Fault Value (Parameter 341) defines which state both output relays should go to when a trip event occurs.

Table 71 - Digital Expansion Module 4 Protection Fault Value (Parameter 341)

Value	Assignment	Description
0	Open	Open Digital Expansion Module 4 Output Relay 0 and Output Relay 1
1	Closed	Close Digital Expansion Module 4 Output Relay 0 and Output Relay 1

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 on the following pages configure the Configuration Fault Mode for each E300 output relay.

Fault Mode Output State Duration (Parameter 561)

Fault Mode Output State Duration (Parameter 561) is available in E300 relay firmware v5.000 and higher. This parameter defines the amount of time in seconds that the E300 relay remains in the Communication Fault Mode state when a communication fault occurs. A value of (0) represents 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, which you configure by using the Final Fault Mode parameters.

Table 72 - Fault Mode Output State Duration (Parameter 561)

Default Value	0
Minimum Value	0 = Forever
Maximum Value	127
Parameter Type	SINT
Size (Bytes)	1
Scaling Factor	1
Units	Sec

Output Relay 0 Communication Fault Action (Parameter 306)

Output Relay 0 Communication Fault Action (Parameter 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.

Table 73 - Output Relay 0 Communication Fault Action (Parameter 306)

Value	Assignment	Description
0	GoToCommFltValue	Set to Output Relay 0 Communication Fault Value (Parameter 307)
1	HoldLastState	Hold the last commanded state from the network or DeviceLogix

Output Relay 0 Communication Fault Value (Parameter 307)

Output Relay 0 Communication Fault Value (Parameter 307) defines which state Output Relay 0 should go to when a communication fault occurs.

Table 74 - Output Relay 0 Communication Fault Value (Parameter 307)

Value	Assignment	Description
0	Open	Open Output Relay 0
1	Closed	Close Output Relay 0

Output Relay 0 Final Fault Value (Parameter 562)

Output Relay 0 Final Fault Value (Parameter 562) is available in E300 relay firmware v5.000 and higher. This parameter 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).

Table 75 - Output Relay 0 Final Fault Value (Parameter 562)

Value	Assignment	Description
0	Open	Open Output Relay 0
1	Closed	Close Output Relay 0

Output Relay 1 Communication Fault Action (Parameter 312)

Output Relay 1 Communication Fault Action (Parameter 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.

Table 76 - Output Relay 1 Communication Fault Action (Parameter 312)

Value	Assignment	Description
0	GoToCommFltValue	Set to Output Relay 1 Communication Fault Value (Parameter 313)
1	HoldLastState	Hold the last commanded state from the network or DeviceLogix

Output Relay 1 Communication Fault Value (Parameter 313)

Output Relay 1 Communication Fault Value (Parameter 313) defines which state Output Relay 1 should go to when a communication fault occurs.

Table 77 - Output Relay 1 Communication Fault Value (Parameter 313)

Value	Assignment	Description
0	Open	Open Output Relay 1
1	Closed	Close Output Relay 1

Output Relay 1 Final Fault Value (Parameter 563)

Output Relay 1 Final Fault Value (Parameter 563) is available in E300 relay firmware v5.000 and higher. This parameter 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).

Table 78 - Output Relay 1 Final Fault Value (Parameter 563)

Value	Assignment	Description
0	Open	Open Output Relay 1
1	Closed	Close Output Relay 1

Output Relay 2 Communication Fault Action (Parameter 317)

Output Relay 2 Communication Fault Action (Parameter 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.

Table 79 - Output Relay 2 Communication Fault Action (Parameter 318)

Value	Assignment	Description
0	GoToCommFltValue	Set to Output Relay 2 Communication Fault Value (Parameter 319)
1	HoldLastState	Hold the last commanded state from the network or DeviceLogix

Output Relay 2 Communication Fault Value (Parameter 319)

Output Relay 2 Communication Fault Value (Parameter 319) defines which state Output Relay 2 should go to when a communication fault occurs.

Table 80 - Output Relay 2 Communication Fault Value (Parameter 319)

Value	Assignment	Description
0	Open	Open Output Relay 2
1	Closed	Close Output Relay 2

Output Relay 2 Final Fault Value (Parameter 564)

Output Relay 2 Final Fault Value (Parameter 564) is available in E300 relay firmware v5.000 and higher. This parameter 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).

Table 81 - Output Relay 2 Final Fault Value (Parameter 564)

Value	Assignment	Description
0	Open	Open Output Relay 2
1	Closed	Close Output Relay 2

Digital Expansion Module 1 Output Relay Communication Fault Action (Parameter 324)

Digital Expansion Module 1 Output Relay Communication Fault Action (Parameter 324) defines how both output relays on Digital Expansion Module 1 responds when a communication fault occurs.

Table 82 - Digital Expansion Module 1 Output Relay Communication Fault Action (Parameter 324)

Value	Assignment	Description
0	GoToCommFltValue	Set to Digital Expansion Module 1 Output Relay Communication Fault Value (Parameter 325)
1	HoldLastState	Hold the last commanded state from the network or DeviceLogix

Digital Expansion Module 1 Output Relay Communication Fault Value (Parameter 325)

Digital Expansion Module 1 Output Relay Communication Fault Value (Parameter 325) defines which state both output relays should go to when a communication fault occurs.

Table 83 - Digital Expansion Module 1 Output Relay Communication Fault Value (Parameter 325)

Value	Assignment	Description
0	Open	Open Digital Expansion Module 1 Output Relay 0 and Output Relay 1
1	Closed	Close Digital Expansion Module 1 Output Relay 0 and Output Relay 1

Digital Expansion Module 1 Output Relay Final Fault Value (Parameter 565)

Digital Expansion Module 1 Output Relay Final Fault Value (Parameter 565) is available in E300 relay firmware v5.000 and higher. This parameter 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).

Table 84 - Digital Expansion Module 1 Output Relay Final Fault Value (Parameter 565)

Value	Assignment	Description
0	Open	Open Digital Expansion Module 1 Output Relay 0 and Output Relay 1
1	Closed	Close Digital Expansion Module 1 Output Relay 0 and Output Relay 1

Digital Expansion Module 2 Output Relay Communication Fault Action (Parameter 330)

Digital Expansion Module 2 Output Relay Communication Fault Action (Parameter 330) defines how both output relays on Digital Expansion Module 2 responds when a communication fault occurs.

Table 85 - Digital Expansion Module 2 Output Relay Communication Fault Action (Parameter 330)

Value	Assignment	Description
0	GoToCommFltValue	Set to Digital Expansion Module 2 Output Relay Communication Fault Value (Parameter 331)
1	HoldLastState	Hold the last commanded state from the network or DeviceLogix

Digital Expansion Module 2 Output Relay Communication Fault Value (Parameter 331)

Digital Expansion Module 2 Output Relay Communication Fault Value (Parameter 331) defines which state both output relays should go to when a communication fault occurs.

Table 86 - Digital Expansion Module 2 Output Relay Communication Fault Value (Parameter 331)

Value	Assignment	Description
0	Open	Open Digital Expansion Module 2 Output Relay 0 and Output Relay 1
1	Closed	Close Digital Expansion Module 2 Output Relay 0 and Output Relay 1

Digital Expansion Module 2 Output Relay Final Fault Value (Parameter 566)

Digital Expansion Module 2 Output Relay Final Fault Value (Parameter 566) is available in E300 relay firmware v5.000 and higher. This parameter 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).

Table 87 - Digital Expansion Module 2 Output Relay Final Fault Value (Parameter 566)

Value	Assignment	Description
0	Open	Open Digital Expansion Module 2 Output Relay 0 and Output Relay 1
1	Closed	Close Digital Expansion Module 2 Output Relay 0 and Output Relay 1

Digital Expansion Module 3 Output Relay Communication Fault Action (Parameter 336)

Digital Expansion Module 3 Output Relay Communication Fault Action (Parameter 336) defines how both output relays on Digital Expansion Module 3 responds when a communication fault occurs.

Table 88 - Digital Expansion Module 3 Output Relay Communication Fault Action (Parameter 336)

Value	Assignment	Description
0	GoToCommFltValue	Set to Digital Expansion Module 3 Output Relay Communication Fault Value (Parameter 337)
1	HoldLastState	Hold the last commanded state from the network or DeviceLogix

Digital Expansion Module 3 Output Relay Communication Fault Value (Parameter 337)

Digital Expansion Module 3 Output Relay Communication Fault Value (Parameter 337) defines which state both output relays should go to when a communication fault occurs.

Table 89 - Digital Expansion Module 3 Output Relay Communication Fault Value (Parameter 337)

Value	Assignment	Description
0	Open	Open Digital Expansion Module 3 Output Relay 0 and Output Relay 1
1	Closed	Close Digital Expansion Module 3 Output Relay 0 and Output Relay 1

Digital Expansion Module 3 Output Relay Final Fault Value (Parameter 567)

Digital Expansion Module 3 Output Relay Final Fault Value (Parameter 567) is available in E300 relay firmware v5.000 and higher. This parameter 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).

Table 90 - Digital Expansion Module 3 Output Relay Final Fault Value (Parameter 567)

Value	Assignment	Description
0	Open	Open Digital Expansion Module 3 Output Relay 0 and Output Relay 1
1	Closed	Close Digital Expansion Module 3 Output Relay 0 and Output Relay 1

Digital Expansion Module 4 Output Relay Communication Fault Action (Parameter 342)

Digital Expansion Module 4 Output Relay Communication Fault Action (Parameter 342) defines how both output relays on Digital Expansion Module 4 responds when a communication fault occurs.

Table 91 - Digital Expansion Module 4 Output Relay Communication Fault Action (Parameter 342)

Value	Assignment	Description
0	GoToCommFltValue	Set to Digital Expansion Module 3 Output Relay Communication Fault Value (Parameter 343)
1	HoldLastState	Hold the last commanded state from the network or DeviceLogix

Digital Expansion Module 4 Output Relay Communication Fault Value (Parameter 343)

Digital Expansion Module 4 Output Relay Communication Fault Value (Parameter 343) defines which state both output relays should go to when a communication fault occurs.

Table 92 - Digital Expansion Module 4 Output Relay Communication Fault Value (Parameter 343)

Value	Assignment	Description
0	Open	Open Digital Expansion Module 4 Output Relay 0 and Output Relay 1
1	Closed	Close Digital Expansion Module 4 Output Relay 0 and Output Relay 1

Digital Expansion Module 4 Output Relay Final Fault Value (Parameter 568)

Digital Expansion Module 4 Output Relay Final Fault Value (Parameter 568) is available in E300 relay firmware v5.000 and higher. This parameter 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).

Table 93 - Digital Expansion Module 4 Output Relay Final Fault Value (Parameter 568)

Value	Assignment	Description
0	Open	Open Digital Expansion Module 4 Output Relay 0 and Output Relay 1
1	Closed	Close Digital Expansion Module 4 Output Relay 0 and Output Relay 1

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 on the following pages configure the Communication Idle Mode for each E300 output relay.

Output Relay 0 Communication Idle Action (Parameter 308)

Output Relay 0 Communication Idle Action (Parameter 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.

Table 94 - Output Relay 0 Communication Idle Action (Parameter 308)

Value	Assignment	Description
0	GoToCommFltValue	Set to Output Relay 0 Communication Idle Value (Parameter 309)
1	HoldLastState	Hold the last commanded state from the network or DeviceLogix

Output Relay 0 Communication Idle Value (Parameter 309)

Output Relay 0 Communication Idle Value (Parameter 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.

Table 95 - Output Relay 0 Communication Idle Value (Parameter 309)

Value	Assignment	Description
0	Open	Open Output Relay 0
1	Closed	Close Output Relay 0

Output Relay 1 Communication Idle Action (Parameter 314)

Output Relay 1 Communication Idle Action (Parameter 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.

Table 96 - Output Relay 1 Communication Idle Action (Parameter 314)

Value	Assignment	Description
0	GoToCommIdlValue	Set to Output Relay 1 Communication Idle Value (Parameter 315)
1	HoldLastState	Hold the last commanded state from the network or DeviceLogix

Output Relay 1 Communication Idle Value (Parameter 315)

Output Relay 1 Communication Idle Value (Parameter 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.

Table 97 - Output Relay 1 Communication Idle Value (Parameter 315)

Value	Assignment	Description
0	Open	Open Output Relay 1
1	Closed	Close Output Relay 1

Output Relay 2 Communication Idle Action (Parameter 320)

Output Relay 2 Communication Idle Action (Parameter 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.

Table 98 - Output Relay 2 Communication Idle Action (Parameter 320)

Value	Assignment	Description
0	GoToCommIdlValue	Set to Output Relay 2 Communication Idle Value (Parameter 321)
1	HoldLastState	Hold the last commanded state from the network or DeviceLogix

Output Relay 2 Communication Idle Value (Parameter 321)

Output Relay 2 Communication Idle Value (Parameter 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.

Table 99 - Output Relay 2 Communication Idle Value (Parameter 321)

Value	Assignment	Description
0	Open	Open Output Relay 2
1	Closed	Close Output Relay 2

Digital Expansion Module 1 Output Relay Communication Idle Action (Parameter 326)

Digital Expansion Module 1 Output Relay Communication Idle Action (Parameter 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.

Table 100 - Digital Expansion Module 1 Output Relay Communication Idle Action (Parameter 326)

Value	Assignment	Description
0	GoToCommIdlValue	Set to Digital Expansion Module 1 Output Relay Communication Idle Value (Parameter 327)
1	HoldLastState	Hold the last commanded state from the network or DeviceLogix

Digital Expansion Module 1 Output Relay Communication Idle Value (Parameter 327)

Digital Expansion Module 1 Output Relay Communication Idle Value (Parameter 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.

Table 101 - Output Relay 2 Communication Idle Value (Parameter 327)

Value	Assignment	Description
0	Open	Open Digital Expansion Module 1 Output Relay 0 and Output Relay 1
1	Closed	Close Digital Expansion Module 1 Output Relay 0 and Output Relay 1

Digital Expansion Module 2 Output Relay Communication Idle Action (Parameter 332)

Digital Expansion Module 2 Output Relay Communication Idle Action (Parameter 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.

Table 102 - Digital Expansion Module 2 Output Relay Communication Idle Action (Parameter 332)

Value	Assignment	Description
0	GoToCommIdlValue	Set to Digital Expansion Module 2 Output Relay Communication Idle Value (Parameter 333)
1	HoldLastState	Hold the last commanded state from the network or DeviceLogix

Digital Expansion Module 2 Output Relay Communication Idle Value (Parameter 333)

Digital Expansion Module 2 Output Relay Communication Idle Value (Parameter 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.

Table 103 - Digital Expansion Module 2 Output Relay Communication Idle Value (Parameter 333)

Value	Assignment	Description
0	Open	Open Digital Expansion Module 2 Output Relay 0 and Output Relay 1
1	Closed	Close Digital Expansion Module 2 Output Relay 0 and Output Relay 1

Digital Expansion Module 3 Output Relay Communication Idle Action (Parameter 338)

Digital Expansion Module 3 Output Relay Communication Idle Action (Parameter 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.

Table 104 - Digital Expansion Module 3 Output Relay Communication Idle Action (Parameter 338)

Value	Assignment	Description
0	GoToCommIdlValue	Set to Digital Expansion Module 3 Output Relay Communication Idle Value (Parameter 339)
1	HoldLastState	Hold the last commanded state from the network or DeviceLogix

Digital Expansion Module 3 Output Relay Communication Idle Value (Parameter 339)

Digital Expansion Module 3 Output Relay Communication Idle Value (Parameter 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.

Table 105 - Digital Expansion Module 3 Output Relay Communication Idle Value (Parameter 339)

Value	Assignment	Description
0	Open	Open Digital Expansion Module 3 Output Relay 0 and Output Relay 1
1	Closed	Close Digital Expansion Module 3 Output Relay 0 and Output Relay 1

Digital Expansion Module 4 Output Relay Communication Idle Action (Parameter 344)

Digital Expansion Module 4 Output Relay Communication Idle Action (Parameter 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.

Table 106 - Digital Expansion Module 4 Output Relay Communication Idle Action (Parameter 344)

Value	Assignment	Description
0	GoToCommIdlValue	Set to Digital Expansion Module 3 Output Relay Communication Idle Value (Parameter 345)
1	HoldLastState	Hold the last commanded state from the network or DeviceLogix

Digital Expansion Module 4 Output Relay Communication Idle Value (Parameter 345)

Digital Expansion Module 4 Output Relay Communication Idle Value (Parameter 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.

Table 107 - Digital Expansion Module 4 Output Relay Communication Idle Value (Parameter 345)

Value	Assignment	Description
0	Open	Open Digital Expansion Module 4 Output Relay 0 and Output Relay 1
1	Closed	Close Digital Expansion Module 4 Output Relay 0 and Output Relay 1

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.

Expansion Bus Trip

Expansion Bus Trip is enabled by setting Control Trip Enable (Parameter 186) bit 10 to 1. 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 in which the Trip/Warn LED on the Communication Module and Operator station blinks a red 3 long and 11 short blinking pattern.

Table 108 - Expansion Bus Trip Bit Function Detail— Control Trip Enable (Parameter 186)

Bit																
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**
															X	Test Trip Enable
														X		PTC Trip Enable
													X			DeviceLogix Trip Enable
												X				Operator Station Trip Enable
											X					Remote Trip Enable
										X						Blocked Start Trip Enable
									X							Hardware Fault Trip Enable
								X								Configuration Trip Enable
							X									Option Match Trip Enable
						X										Feedback Timeout Trip Enable
					X											Expansion Bus Trip Enable
																Reserved
																Reserved
		X														Nonvolatile Memory Trip Enable
	X															Ready
																Reserved

To return to Ready/Run Mode, verify that the expansion bus cables are properly plugged into the Bus In and Bus Out ports of all expansion modules. When all of the 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

Expansion Bus Warning is enabled by setting Control Warning Enable (Parameter 192) bit 10 to 1. 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 in which the Trip/Warn LED on the Communication Module and Operator station blinks a yellow 3 long and 11 short blinking pattern.

Table 109 - Expansion Bus Warning Bit Function Detail— Control Warning Enable (Parameter 192)

Bit																
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**
																Reserved
														X		PTC Warning Enable
													X			DeviceLogix Warning Enable
												X				Operator Station Warning Enable
																Reserved
																Reserved
																Reserved
																Reserved
							X									Option Match Warning Enable
						X										Feedback Timeout Warning Enable
					X											Expansion Bus Warning Enable
				X												Number Of Starts Warning Enable
			X													Operating Hours Warning Enable
																Reserved

To return to Ready/Run Mode, verify that the expansion bus cables are properly plugged into the Bus In and Bus Out ports of all expansion modules. When all of the 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 110 - 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 111 - 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 EtherNet/IP Communication on page 559 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

Table 112 - Emergency Start Bit Function Detail— Device Status 0 (Parameter 20)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Trip Present
														X		Warning Present
													X			Invalid Configuration
												X				Current Present
											X					GFCurrent Present
										X						Voltage Present
									X							Emergency Start Enabled
								X								DeviceLogix Enabled
							X									Feedback Timeout Enabled
						X										Operator Station Present
					X											Voltage Sensing Present
				X												Intern Ground Fault Sensing Present
			X													Extern Ground Fault Sensing Present
		X														PTC Sensing
	X															Ready
																Reserved

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)

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

Table 113 - Language (Parameter 212)

Value	Assignment	Description
0	English	Displays parameter text in English
1	Francais	Displays parameter text in French
2	Espanol	Displays parameter text in Spanish
3	Italiano	Displays parameter text in Italian
4	Deutsch	Displays parameter text in German
5	Portugues	Displays parameter text in Portuguese
6	Chinese	Displays parameter text in Chinese
7	Japanese	Displays parameter text in Japanese
8	Korean	Displays parameter text in Korean

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.

User-defined Screen 1

User-defined Screen 1 – Parameter 1

User-defined Screen 1 - Parameter 1 (Parameter 428) is the E300 parameter number to display for the first parameter in user-defined screen 1. You can select one of the 560 available E300 relay parameters.

Table 114 - Screen 1 - Parameter 1 (Parameter 428)

Default Value	1
Minimum Value	0
Maximum Value	560
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

User-defined Screen 1 – Parameter 2

User-defined Screen 1 - Parameter 2 (Parameter 429) is the E300 parameter number to display for the second parameter in user-defined screen 1. You can select one of the 560 available E300 relay parameters.

Table 115 - Screen 1 - Parameter 2 (Parameter 429)

Default Value	50
Minimum Value	0
Maximum Value	560
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

User-defined Screen 2

User-defined Screen 2 – Parameter 1

User-defined Screen 2 - Parameter 1 (Parameter 430) is the E300 parameter number to display for the first parameter in user-defined screen 2. You can select one of the 560 available E300 relay parameters.

Table 116 - Screen 2 - Parameter 1 (Parameter 430)

Default Value	2
Minimum Value	0
Maximum Value	560
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

User-defined Screen 2 – Parameter 2

User-defined Screen 2 - Parameter 2 (Parameter 431) is the E300 parameter number to display for the second parameter in user-defined screen 2. You can select one of the 560 available E300 relay parameters.

Table 117 - Screen 2 - Parameter 2 (Parameter 431)

Default Value	3
Minimum Value	0
Maximum Value	560
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

User-defined Screen 3

User-defined Screen 3 – Parameter 1

User-defined Screen 3 - Parameter 1 (Parameter 432) is the E300 parameter number to display for the first parameter in user-defined screen 3. You can select one of the 560 available E300 relay parameters.

Table 118 - Screen 3 - Parameter 1 (Parameter 432)

Default Value	51
Minimum Value	0
Maximum Value	560
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

User-defined Screen 3 – Parameter 2

User-defined Screen 3 - Parameter 2 (Parameter 433) is the E300 parameter number to display for the second parameter in user-defined screen 3. You can select one of the 560 available E300 relay parameters.

Table 119 - Screen 3 - Parameter 2 (Parameter 433)

Default Value	52
Minimum Value	0
Maximum Value	560
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

User-defined Screen 4

User-defined Screen 4 – Parameter 1

User-defined Screen 4 - Parameter 1 (Parameter 434) is the E300 parameter number to display for the first parameter in user-defined screen 4. You can select one of the 560 available E300 relay parameters.

Table 120 - Screen 4 - Parameter 1 (Parameter 434)

Default Value	38
Minimum Value	0
Maximum Value	560
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

User-defined Screen 4 – Parameter 2

User-defined Screen 4 - Parameter 2 (Parameter 435) is the E300 parameter number to display for the second parameter in user-defined screen 4. You can select one of the 560 available E300 relay parameters.

Screen 4 - Parameter 2 (Parameter 435)

Default Value	39
Minimum Value	0
Maximum Value	560
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

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.

Table 121 - Display Timeout (Parameter 436)

Default Value	300
Minimum Value	0
Maximum Value	65535
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	Seconds

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 122 through Table 125 display the data ranges for all of the available analog input types for the four available data formats.

Table 122 - 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 123 - 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 124 - 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
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

Input Range	Input Value	Condition	Engineering Units	Engineering Units x 10	Raw / Proportional	PID
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 125 - Analog Input Data Format for Resistance Input Type

Input Range	Input Value	Condition	Engineering Units	Engineering Units x 10	Raw / Proportional	PID
Resistance 0-150 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

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 126 and Table 127 display the data ranges for all available analog output types.

Table 126 - 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 127 - 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 128 - 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

Update Rate

Analog Input Channels

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

Analog Module 1

Analog Module 1 – Input Channel 00 Type

Analog Module 1 – Input Channel 00 Type (Parameter 437) defines the type of analog signal that Input Channel 00 of Analog Module 1 monitors.

Table 130 - Analog Module 1 – Input Channel 00 Type (Parameter 437)

Value	Assignment	Description
0	Disabled	Disable the analog input
1	4To20mA	Read an analog current signal from 4…20 mA
2	0To20mA	Read an analog current signal from 0…20 mA
3	0To10Volts	Read an analog voltage signal from 0…10 V DC
4	1To5Volts	Read an analog voltage signal from 1…5 V DC
5	0To5Volts	Read an analog voltage signal from 0…5 V DC
6	100Pt385	Read a 100 Ω Pt 385 RTD Sensor
7	200Pt385	Read a 200 Ω Pt 385 RTD Sensor
8	500Pt385	Read a 500 Ω Pt 385 RTD Sensor
9	1000Pt385	Read a 1000 Ω Pt 385 RTD Sensor
10	100Pt3916	Read a 100 Ω Pt 3916 RTD Sensor
11	200Pt3916	Read a 200 Ω Pt 3916 RTD Sensor
12	500Pt3916	Read a 500 Ω Pt 3916 RTD Sensor
13	1000Pt3916	Read a 1000 Ω Pt 3916 RTD Sensor
14	10Cu426	Read a 10 Ω Cu 426 RTD Sensor
15	100Ni618	Read a 100 Ω Ni 618 RTD Sensor
16	120Ni672	Read a 120 Ω Ni 672 RTD Sensor
17	604NiFe518	Read a 604 Ω NiFe 518 RTD Sensor
18	150ohm	Read a resistance signal from 0…150 Ω
19	750ohm	Read a resistance signal from 0…750 Ω
20	3000ohm	Read a resistance signal from 0…3000 Ω
21	6000ohm	Read a resistance signal from 0…6000 Ω. This setting can be used with PTC and NTC sensors.

Analog Module 1 – Input Channel 00 Format

Analog Module 1 – Input Channel 00 Format (Parameter 438) defines the data format for how the analog reading is reported.

Table 131 - Analog Module 1 – Input Channel 00 Format (Parameter 438)

Value	Assignment	Description
0	EngUnits	Engineering Units (mA, V, °C, °F, or Ω)
1	EngUnitsTimes10	Engineering Units x 10 (mA, V, °C, °F, or Ω)
2	RawProportional	Raw / Proportional (-32768…+32767)
3	ScaledForPID	Scaled for PID (0…16383)

Analog Module 1 – Input Channel 00 Temperature Unit

Analog Module 1 – Input Channel 00 Temperature Unit (Parameter 439) defines the temperate unit for RTD sensor readings.

Table 132 - Analog Module 1 – Input Channel 00 Temperature Unit (Parameter 439)

Value	Assignment	Description
0	DegreesC	Report RTD Temperature Data in °C
1	DegreesF	Report RTD Temperature Data in °F

Analog Module 1 – Input Channel 00 Filter Frequency

Analog Module 1 – Input Channel 00 Filter Frequency (Parameter 440) defines update rate for the input channels of the analog module.

Table 133 - Analog Module 1 – Input Channel 00 Filter Frequency (Parameter 440)

Value	Assignment	Description
0	17 Hz	Analog to Digital Conversion Update Frequency of 17 Hz
1	4 Hz	Analog to Digital Conversion Update Frequency of 4 Hz
2	62 Hz	Analog to Digital Conversion Update Frequency of 62 Hz
3	470 Hz	Analog to Digital Conversion Update Frequency of 470 Hz

Analog Module 1 – Input Channel 00 Open Circuit State

Analog Module 1 – Input Channel 00 Open Circuit State (Parameter 441) defines what the input channel reports when the input channel has an open circuit. Open circuit detection is always enabled for this input channel.

Table 134 - Analog Module 1 – Input Channel 00 Open Circuit State (Parameter 441)

Value	Assignment	Description
0	Upscale	Reports the high limit of the input channel type
1	Downscale	Reports the low limit of the input channel type
2	Zero	Reports zero

Analog Module 1 – Input Channel 00 RTD Type Enable

Analog Module 1 – Input Channel 00 RTD Type Enable (Parameter 442) defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor.

Table 135 - Analog Module 1 – Input Channel 00 RTD Type Enable (Parameter 442)

Value	Assignment	Description
0	3-Wire	Scan a 3-wire RTD sensor
1	2-Wire	Scan a 2-wire RTD sensor

Analog Module 1 – Input Channel 01 Type

Analog Module 1 – Input Channel 01 Type (Parameter 446) defines the type of analog signal that Input Channel 01 of Analog Module 1 monitors.

Table 136 - Analog Module 1 – Input Channel 01 Type (Parameter 446)

Value	Assignment	Description
0	Disabled	Disable the analog input
1	4To20mA	Read an analog current signal from 4…20 mA
2	0To20mA	Read an analog current signal from 0…20 mA
3	0To10Volts	Read an analog voltage signal from 0…10 V DC
4	1To5Volts	Read an analog voltage signal from 1…5 V DC
5	0To5Volts	Read an analog voltage signal from 0…5 V DC
6	100Pt385	Read a 100 Ω Pt 385 RTD Sensor
7	200Pt385	Read a 200 Ω Pt 385 RTD Sensor
8	500Pt385	Read a 500 Ω Pt 385 RTD Sensor
9	1000Pt385	Read a 1000 Ω Pt 385 RTD Sensor
10	100Pt3916	Read a 100 Ω Pt 3916 RTD Sensor
11	200Pt3916	Read a 200 Ω Pt 3916 RTD Sensor
12	500Pt3916	Read a 500 Ω Pt 3916 RTD Sensor
13	1000Pt3916	Read a 1000 Ω Pt 3916 RTD Sensor
14	10Cu426	Read a 10 Ω Cu 426 RTD Sensor
15	100Ni618	Read a 100 Ω Ni 618 RTD Sensor
16	120Ni672	Read a 120 Ω Ni 672 RTD Sensor
17	604NiFe518	Read a 604 Ω NiFe 518 RTD Sensor
18	150ohm	Read a resistance signal from 0…150 Ω
19	750ohm	Read a resistance signal from 0…750 Ω
20	3000ohm	Read a resistance signal from 0…3000 Ω
21	6000ohm	Read a resistance signal from 0…6000 Ω. This setting can be used with PTC and NTC sensors.

Analog Module 1 – Input Channel 01 Format

Analog Module 1 – Input Channel 01 Format (Parameter 447) defines the data format for how the analog reading is reported.

Table 137 - Analog Module 1 – Input Channel 01 Format (Parameter 447)

Value	Assignment	Description
0	EngUnits	Engineering Units (mA, V, °C, °F, or Ω)
1	EngUnitsTimes10	Engineering Units x 10 (mA, V, °C, °F, or Ω)
2	RawProportional	Raw / Proportional (-32768…+32767)
3	ScaledForPID	Scaled for PID (0…16383)

Analog Module 1 – Input Channel 01 Temperature Unit

Analog Module 1 – Input Channel 01 Temperature Unit (Parameter 448) defines the temperate unit for RTD sensor readings.

Table 138 - Analog Module 1 – Input Channel 01 Temperature Unit (Parameter 448)

Value	Assignment	Description
0	DegreesC	Report RTD Temperature Data in °C
1	DegreesF	Report RTD Temperature Data in °F

Analog Module 1 – Input Channel 01 Filter Frequency

Analog Module 1 – Input Channel 01 Filter Frequency (Parameter 449) defines update rate for the input channels of the analog module.

Table 139 - Analog Module 1 – Input Channel 01 Filter Frequency (Parameter 449)

Value	Assignment	Description
0	17 Hz	Analog to Digital Conversion Update Frequency of 17 Hz
1	4 Hz	Analog to Digital Conversion Update Frequency of 4 Hz
2	62 Hz	Analog to Digital Conversion Update Frequency of 62 Hz
3	470 Hz	Analog to Digital Conversion Update Frequency of 470 Hz

Analog Module 1 – Input Channel 01 Open Circuit State

Analog Module 1 – Input Channel 01 Open Circuit State (Parameter 450) defines what the input channel reports when the input channel has an open circuit. Open circuit detection is always enabled for this input channel.

Table 140 - Analog Module 1 – Input Channel 01 Open Circuit State (Parameter 450)

Value	Assignment	Description
0	Upscale	Reports the high limit of the input channel type
1	Downscale	Reports the low limit of the input channel type
2	Zero	Reports zero

Analog Module 1 – Input Channel 01 RTD Type Enable

Analog Module 1 – Input Channel 01 RTD Type Enable (Parameter 451) defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor.

Table 141 - Analog Module 1 – Input Channel 01 RTD Type Enable (Parameter 451)

Value	Assignment	Description
0	3-Wire	Scan a 3-wire RTD sensor
1	2-Wire	Scan a 2-wire RTD sensor

Analog Module 1 – Input Channel 02 Type

Analog Module 1 – Input Channel 02 Type (Parameter 455) defines the type of analog signal that Input Channel 02 of Analog Module 1 monitors.

Table 142 - Analog Module 1 – Input Channel 02 Type (Parameter 455)

Value	Assignment	Description
0	Disabled	Disable the analog input
1	4To20mA	Read an analog current signal from 4…20 mA
2	0To20mA	Read an analog current signal from 0…20 mA
3	0To10Volts	Read an analog voltage signal from 0…10 V DC
4	1To5Volts	Read an analog voltage signal from 1…5 V DC
5	0To5Volts	Read an analog voltage signal from 0…5 V DC
6	100Pt385	Read a 100 Ω Pt 385 RTD Sensor
7	200Pt385	Read a 200 Ω Pt 385 RTD Sensor
8	500Pt385	Read a 500 Ω Pt 385 RTD Sensor
9	1000Pt385	Read a 1000 Ω Pt 385 RTD Sensor
10	100Pt3916	Read a 100 Ω Pt 3916 RTD Sensor
11	200Pt3916	Read a 200 Ω Pt 3916 RTD Sensor
12	500Pt3916	Read a 500 Ω Pt 3916 RTD Sensor
13	1000Pt3916	Read a 1000 Ω Pt 3916 RTD Sensor
14	10Cu426	Read a 10 Ω Cu 426 RTD Sensor
15	100Ni618	Read a 100 Ω Ni 618 RTD Sensor
16	120Ni672	Read a 120 Ω Ni 672 RTD Sensor
17	604NiFe518	Read a 604 Ω NiFe 518 RTD Sensor
18	150ohm	Read a resistance signal from 0…150 Ω
19	750ohm	Read a resistance signal from 0…750 Ω
20	3000ohm	Read a resistance signal from 0…3000 Ω
21	6000ohm	Read a resistance signal from 0…6000 Ω. This setting can be used with PTC and NTC sensors.

Analog Module 1 – Input Channel 02 Format

Analog Module 1 – Input Channel 02 Format (Parameter 456) defines the data format for how the analog reading is reported.

Table 143 - Analog Module 1 – Input Channel 02 Format (Parameter 456)

Value	Assignment	Description
0	EngUnits	Engineering Units (mA, V, °C, °F, or Ω)
1	EngUnitsTimes10	Engineering Units x 10 (mA, V, °C, °F, or Ω)
2	RawProportional	Raw / Proportional (-32768…32767)
3	ScaledForPID	Scaled for PID (0 …16383)

Analog Module 1 – Input Channel 02 Temperature Unit

Analog Module 1 – Input Channel 02 Temperature Unit (Parameter 457) defines the temperate unit for RTD sensor readings.

Table 144 - Analog Module 1 – Input Channel 02 Temperature Unit (Parameter 457)

Value	Assignment	Description
0	DegreesC	Report RTD Temperature Data in °C
1	DegreesF	Report RTD Temperature Data in °F

Analog Module 1 – Input Channel 02 Filter Frequency

Analog Module 1 – Input Channel 02 Filter Frequency (Parameter 458) defines update rate for the input channels of the analog module.

Table 145 - Analog Module 1 – Input Channel 02 Filter Frequency (Parameter 458)

Value	Assignment	Description
0	17 Hz	Analog to Digital Conversion Update Frequency of 17 Hz
1	4 Hz	Analog to Digital Conversion Update Frequency of 4 Hz
2	62 Hz	Analog to Digital Conversion Update Frequency of 62 Hz
3	470 Hz	Analog to Digital Conversion Update Frequency of 470 Hz

Analog Module 1 – Input Channel 02 Open Circuit State

Analog Module 1 – Input Channel 02 Open Circuit State (Parameter 459) defines what the input channel reports when the input channel has an open circuit. Open circuit detection is always enabled for this input channel.

Table 146 - Analog Module 1 – Input Channel 02 Open Circuit State (Parameter 459)

Value	Assignment	Description
0	Upscale	Reports the high limit of the input channel type
1	Downscale	Reports the low limit of the input channel type
2	Zero	Reports zero

Analog Module 1 – Input Channel 02 RTD Type Enable

Analog Module 1 – Input Channel 02 RTD Type Enable (Parameter 460) defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor.

Table 147 - Analog Module 1 – Input Channel 02 RTD Type Enable (Parameter 460)

Value	Assignment	Description
0	3-Wire	Scan a 3-wire RTD sensor
1	2-Wire	Scan a 2-wire RTD sensor

Analog Module 1 – Output Channel 00 Type

Analog Module 1 – Output Channel 00 Type (Parameter 464) defines the type of analog signal that Output Channel 00 of Analog Module 1 provides.

Table 148 - Analog Module 1 – Output Channel 00 Type (Parameter 464)

Value	Assignment	Description
0	Disabled	Disable the analog input
1	4To20mA	Provide an analog current signal from 4…20 mA
2	0To20mA	Provide an analog current signal from 0…20 mA
3	0To10Volts	Provide an analog voltage signal from 0…10 V DC
4	1To5Volts	Provide an analog voltage signal from 1…5 V DC
5	0To5Volts	Provide an analog voltage signal from 0…5 V DC

Analog Module 1 – Output Channel 00 Selection

Analog Module 1 – Output Channel 00 Selection (Parameter 465) defines the E300 relay parameter that Output Channel 00 represents.

Table 149 - Analog Module 1 – Output Channel 00 Selection (Parameter 465)

Value	Assignment	Description
0	AveragePCTFLA	Average %FLA (0…100%)
1	ScaledAvgPctFLA	Scaled Average %FLA (0…200%)
2	PercentTCU	%TCU (0…100%)
3	GFCurrent	Ground Fault Current (Ground Fault Type Range)
4	CurrentImbalance	Current Imbalance (0…100%)
5	AvgLLVoltage	Average L-L Voltage (0…PT Primary)
6	VoltLLImbalance	Voltage Imbalance (0…100%)
7	TotalkW	Total kW (0…FLA x PT Primary x 1.732)
8	TotalkVA	Total kVA (0…FLA x PT Primary x 1.732)
9	Total kVAR	Total kVAR (0…FLA x PT Primary x 1.732)
10	TotalPF	Total Power Factor (-50% Lagging…+50% Leading)
11	UserDLXData	User-defined Value (-32768…32767)

Analog Module 1 – Output Channel 00 Expansion Bus Fault Action

Analog Module 1 – Output Channel 00 Expansion Bus Fault Action (Parameter 466) defines the value that the E300 Analog I/O Expansion Module Output Channel 00 provides when there is an E300 Expansion Bus fault.

Table 150 - Analog Module 1 – Output Channel 00 Expansion Bus Fault Action (Parameter 466)

Value	Assignment	Description
0	Zero	Provide an analog signal of zero
1	Maximum	Provide an analog signal equal to the high limit
2	Minimum	Provide an analog signal equal to the low limit
3	HoldLastState	Provide the last known analog signal

Analog Module 1 – Output Channel 00 Protection Fault Action

Analog Module 1 – Output Channel 00 Expansion Bus Fault Action (Parameter 467) defines the value that the E300 Analog I/O Expansion Module Output Channel 00 provides when the E300 is in a tripped state.

Table 151 - Analog Module 1 – Output Channel 00 Protection Fault Action (Parameter 467)

Value	Assignment	Description
0	Ignore	Continue providing the appropriate analog signal
1	Maximum	Provide an analog signal equal to the high limit
2	Minimum	Provide an analog signal equal to the low limit
3	HoldLastState	Provide the analog signal at the time of the fault

Analog Module 2

Analog Module 2 – Input Channel 00 Type

Analog Module 2 – Input Channel 00 Type (Parameter 468) defines the type of analog signal that Input Channel 00 of Analog Module 2 monitors.

Table 152 - Analog Module 2 – Input Channel 00 Type (Parameter 468)

Value	Assignment	Description
0	Disabled	Disable the analog input
1	4To20mA	Read an analog current signal from 4…20 mA
2	0To20mA	Read an analog current signal from 0…20 mA
3	0To10Volts	Read an analog voltage signal from 0…10 V DC
4	1To5Volts	Read an analog voltage signal from 1…5 V DC
5	0To5Volts	Read an analog voltage signal from 0…5 V DC
6	100Pt385	Read a 100 Ω Pt 385 RTD Sensor
7	200Pt385	Read a 200 Ω Pt 385 RTD Sensor
8	500Pt385	Read a 500 Ω Pt 385 RTD Sensor
9	1000Pt385	Read a 1000 Ω Pt 385 RTD Sensor
10	100Pt3916	Read a 100 Ω Pt 3916 RTD Sensor
11	200Pt3916	Read a 200 Ω Pt 3916 RTD Sensor
12	500Pt3916	Read a 500 Ω Pt 3916 RTD Sensor
13	1000Pt3916	Read a 1000 Ω Pt 3916 RTD Sensor
14	10Cu426	Read a 10 Ω Cu 426 RTD Sensor
15	100Ni618	Read a 100 Ω Ni 618 RTD Sensor
16	120Ni672	Read a 120 Ω Ni 672 RTD Sensor
17	604NiFe518	Read a 604 Ω NiFe 518 RTD Sensor
18	150ohm	Read a resistance signal from 0…150 Ω
19	750ohm	Read a resistance signal from 0…750 Ω
20	3000ohm	Read a resistance signal from 0…3000 Ω
21	6000ohm	Read a resistance signal from 0…6000 Ω. This setting can be used with PTC and NTC sensors.

Analog Module 2 – Input Channel 00 Format

Analog Module 2 – Input Channel 00 Format (Parameter 469) defines the data format for how the analog reading is reported.

Table 153 - Analog Module 2 – Input Channel 00 Format (Parameter 469)

Value	Assignment	Description
0	EngUnits	Engineering Units (mA, V, °C, °F, or Ω)
1	EngUnitsTimes10	Engineering Units x 10 (mA, V, °C, °F, or Ω)
2	RawProportional	Raw / Proportional (-32768 - 32767)
3	ScaledForPID	Scaled for PID (0 - 16383)

Analog Module 2 – Input Channel 00 Temperature Unit

Analog Module 2 – Input Channel 00 Temperature Unit (Parameter 470) defines the temperate unit for RTD sensor readings.

Table 154 - Analog Module 2 – Input Channel 00 Temperature Unit (Parameter 470)

Value	Assignment	Description
0	DegreesC	Report RTD Temperature Data in °C
1	DegreesF	Report RTD Temperature Data in °F

Analog Module 2 – Input Channel 00 Filter Frequency

Analog Module 2 – Input Channel 00 Filter Frequency (Parameter 471) defines update rate for the input channels of the analog module.

Table 155 - Analog Module 2 – Input Channel 00 Filter Frequency (Parameter 471)

Value	Assignment	Description
0	17 Hz	Analog to Digital Conversion Update Frequency of 17 Hz
1	4 Hz	Analog to Digital Conversion Update Frequency of 4 Hz
2	62 Hz	Analog to Digital Conversion Update Frequency of 62 Hz
3	470 Hz	Analog to Digital Conversion Update Frequency of 470 Hz

Analog Module 2 – Input Channel 00 Open Circuit State

Analog Module 2 – Input Channel 00 Open Circuit State (Parameter 472) defines what the input channel reports when the input channel has an open circuit. Open circuit detection is always enabled for this input channel.

Table 156 - Analog Module 2 – Input Channel 00 Open Circuit State (Parameter 472)

Value	Assignment	Description
0	Upscale	Reports the high limit of the input channel type
1	Downscale	Reports the low limit of the input channel type
2	Zero	Reports zero

Analog Module 2 – Input Channel 00 RTD Type Enable

Analog Module 2 – Input Channel 00 RTD Type Enable (Parameter 473) defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor.

Table 157 - Analog Module 2 – Input Channel 00 RTD Type Enable (Parameter 473)

Value	Assignment	Description
0	3-Wire	Scan a 3-wire RTD sensor
1	2-Wire	Scan a 2-wire RTD sensor

Analog Module 2 – Input Channel 01 Type

Analog Module 2 – Input Channel 01 Type (Parameter 477) defines the type of analog signal that Input Channel 01 of Analog Module 2 monitors.

Table 158 - Analog Module 2 – Input Channel 01 Type (Parameter 477)

Value	Assignment	Description
0	Disabled	Disable the analog input
1	4To20mA	Read an analog current signal from 4…20 mA
2	0To20mA	Read an analog current signal from 0…20 mA
3	0To10Volts	Read an analog voltage signal from 0…10 V DC
4	1To5Volts	Read an analog voltage signal from 1…5 V DC
5	0To5Volts	Read an analog voltage signal from 0…5 V DC
6	100Pt385	Read a 100 Ω Pt 385 RTD Sensor
7	200Pt385	Read a 200 Ω Pt 385 RTD Sensor
8	500Pt385	Read a 500 Ω Pt 385 RTD Sensor
9	1000Pt385	Read a 1000 Ω Pt 385 RTD Sensor
10	100Pt3916	Read a 100 Ω Pt 3916 RTD Sensor
11	200Pt3916	Read a 200 Ω Pt 3916 RTD Sensor
12	500Pt3916	Read a 500 Ω Pt 3916 RTD Sensor
13	1000Pt3916	Read a 1000 Ω Pt 3916 RTD Sensor
14	10Cu426	Read a 10 Ω Cu 426 RTD Sensor
15	100Ni618	Read a 100 Ω Ni 618 RTD Sensor
16	120Ni672	Read a 120 Ω Ni 672 RTD Sensor
17	604NiFe518	Read a 604 Ω NiFe 518 RTD Sensor
18	150ohm	Read a resistance signal from 0…150 Ω
19	750ohm	Read a resistance signal from 0…750 Ω
20	3000ohm	Read a resistance signal from 0…3000 Ω
21	6000ohm	Read a resistance signal from 0…6000 Ω. This setting can be used with PTC and NTC sensors.

Analog Module 2 – Input Channel 01 Format

Analog Module 2 – Input Channel 01 Format (Parameter 478) defines the data format for how the analog reading is reported.

Table 159 - Analog Module 2 – Input Channel 01 Format (Parameter 478)

Value	Assignment	Description
0	EngUnits	Engineering Units (mA, V, °C, °F, or Ω)
1	EngUnitsTimes10	Engineering Units x 10 (mA, V, °C, °F, or Ω)
2	RawProportional	Raw / Proportional (-32768…32767)
3	ScaledForPID	Scaled for PID (0…16383)

Analog Module 2 – Input Channel 01 Temperature Unit

Analog Module 2 – Input Channel 01 Temperature Unit (Parameter 479) defines the temperate unit for RTD sensor readings.

Table 160 - Analog Module 2 – Input Channel 01 Temperature Unit (Parameter 479)

Value	Assignment	Description
0	DegreesC	Report RTD Temperature Data in °C
1	DegreesF	Report RTD Temperature Data in °F

Analog Module 2 – Input Channel 01 Filter Frequency

Analog Module 2 – Input Channel 01 Filter Frequency (Parameter 480) defines update rate for the input channels of the analog module.

Table 161 - Analog Module 2 – Input Channel 01 Filter Frequency (Parameter 480)

Value	Assignment	Description
0	17 Hz	Analog to Digital Conversion Update Frequency of 17 Hz
1	4 Hz	Analog to Digital Conversion Update Frequency of 4 Hz
2	62 Hz	Analog to Digital Conversion Update Frequency of 62 Hz
3	470 Hz	Analog to Digital Conversion Update Frequency of 470 Hz

Analog Module 2 – Input Channel 01 Open Circuit State

Analog Module 2 – Input Channel 01 Open Circuit State (Parameter 481) defines what the input channel reports when the input channel has an open circuit. Open circuit detection is always enabled for this input channel.

Table 162 - Analog Module 2 – Input Channel 01 Open Circuit State (Parameter 481)

Value	Assignment	Description
0	Upscale	Reports the high limit of the input channel type
1	Downscale	Reports the low limit of the input channel type
2	Zero	Reports zero

Analog Module 2 – Input Channel 01 RTD Type Enable

Analog Module 2 – Input Channel 01 RTD Type Enable (Parameter 482) defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor.

Table 163 - Analog Module 2 – Input Channel 01 RTD Type Enable (Parameter 482)

Value	Assignment	Description
0	3-Wire	Scan a 3-wire RTD sensor
1	2-Wire	Scan a 2-wire RTD sensor

Analog Module 2 – Input Channel 02 Type

Analog Module 2 – Input Channel 02 Type (Parameter 486) defines the type of analog signal that Input Channel 02 of Analog Module 2 monitors.

Table 164 - Analog Module 2 – Input Channel 02 Type (Parameter 486)

Value	Assignment	Description
0	Disabled	Disable the analog input
1	4To20mA	Read an analog current signal from 4…20 mA
2	0To20mA	Read an analog current signal from 0…20 mA
3	0To10Volts	Read an analog voltage signal from 0…10 V DC
4	1To5Volts	Read an analog voltage signal from 1…5 V DC
5	0To5Volts	Read an analog voltage signal from 0…5 V DC
6	100Pt385	Read a 100 Ω Pt 385 RTD Sensor
7	200Pt385	Read a 200 Ω Pt 385 RTD Sensor
8	500Pt385	Read a 500 Ω Pt 385 RTD Sensor
9	1000Pt385	Read a 1000 Ω Pt 385 RTD Sensor
10	100Pt3916	Read a 100 Ω Pt 3916 RTD Sensor
11	200Pt3916	Read a 200 Ω Pt 3916 RTD Sensor
12	500Pt3916	Read a 500 Ω Pt 3916 RTD Sensor
13	1000Pt3916	Read a 1000 Ω Pt 3916 RTD Sensor
14	10Cu426	Read a 10 Ω Cu 426 RTD Sensor
15	100Ni618	Read a 100 Ω Ni 618 RTD Sensor
16	120Ni672	Read a 120 Ω Ni 672 RTD Sensor
17	604NiFe518	Read a 604 Ω NiFe 518 RTD Sensor
18	150ohm	Read a resistance signal from 0…150 Ω
19	750ohm	Read a resistance signal from 0…750 Ω
20	3000ohm	Read a resistance signal from 0…3000 Ω
21	6000ohm	Read a resistance signal from 0…6000 Ω. This setting can be used with PTC and NTC sensors.

Analog Module 2 – Input Channel 02 Format

Analog Module 2 – Input Channel 02 Format (Parameter 487) defines the data format for how the analog reading is reported.

Table 165 - Analog Module 2 – Input Channel 02 Format (Parameter 487)

Value	Assignment	Description
0	EngUnits	Engineering Units (mA, V, °C, °F, or Ω)
1	EngUnitsTimes10	Engineering Units x 10 (mA, V, °C, °F, or Ω)
2	RawProportional	Raw / Proportional (-32768 …32767)
3	ScaledForPID	Scaled for PID (0…16383)

Analog Module 2 – Input Channel 02 Temperature Unit

Analog Module 2 – Input Channel 02 Temperature Unit (Parameter 488) defines the temperate unit for RTD sensor readings.

Table 166 - Analog Module 2 – Input Channel 02 Temperature Unit (Parameter 488)

Value	Assignment	Description
0	DegreesC	Report RTD Temperature Data in °C
1	DegreesF	Report RTD Temperature Data in °F

Analog Module 2 – Input Channel 02 Filter Frequency

Analog Module 2 – Input Channel 02 Filter Frequency (Parameter 489) defines update rate for the input channels of the analog module.

Table 167 - Analog Module 2 – Input Channel 02 Filter Frequency (Parameter 489)

Value	Assignment	Description
0	17 Hz	Analog to Digital Conversion Update Frequency of 17 Hz
1	4 Hz	Analog to Digital Conversion Update Frequency of 4 Hz
2	62 Hz	Analog to Digital Conversion Update Frequency of 62 Hz
3	470 Hz	Analog to Digital Conversion Update Frequency of 470 Hz

Analog Module 2 – Input Channel 02 Open Circuit State

Analog Module 2 – Input Channel 02 Open Circuit State (Parameter 490) defines what the input channel reports when the input channel has an open circuit. Open circuit detection is always enabled for this input channel.

Table 168 - Analog Module 2 – Input Channel 02 Open Circuit State (Parameter 490)

Value	Assignment	Description
0	Upscale	Reports the high limit of the input channel type
1	Downscale	Reports the low limit of the input channel type
2	Zero	Reports zero

Analog Module 2 – Input Channel 02 RTD Type Enable

Analog Module 2 – Input Channel 02 RTD Type Enable (Parameter 491) defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor.

Table 169 - Analog Module 2 – Input Channel 02 RTD Type Enable (Parameter 491)

Value	Assignment	Description
0	3-Wire	Scan a 3-wire RTD sensor
1	2-Wire	Scan a 2-wire RTD sensor

Analog Module 2 – Output Channel 00 Type

Analog Module 2 – Output Channel 00 Type (Parameter 464) defines the type of analog signal that Output Channel 00 of Analog Module 2 provides.

Table 170 - Analog Module 2 – Output Channel 00 Type (Parameter 495)

Value	Assignment	Description
0	Disabled	Disable the analog input
1	4To20mA	Provide an analog current signal from 4…20 mA
2	0To20mA	Provide an analog current signal from 0…20 mA
3	0To10Volts	Provide an analog voltage signal from 0…10 V DC
4	1To5Volts	Provide an analog voltage signal from 1…5 V DC
5	0To5Volts	Provide an analog voltage signal from 0…5 V DC

Analog Module 2 – Output Channel 00 Selection

Analog Module 2 – Output Channel 00 Selection (Parameter 496) defines the E300 relay parameter that Output Channel 00 represents.

Table 171 - Analog Module 2 – Output Channel 00 Selection (Parameter 496)

Value	Assignment	Description
0	AveragePCTFLA	Average %FLA (0…100%)
1	ScaledAvgPctFLA	Scaled Average %FLA (0…200%)
2	PercentTCU	%TCU (0…100%)
3	GFCurrent	Ground Fault Current (Ground Fault Type Range)
4	CurrentImbalance	Current Imbalance (0…100%)
5	AvgLLVoltage	Average L-L Voltage (0… PT Primary)
6	VoltLLImbalance	Voltage Imbalance (0… 100%)
7	TotalkW	Total kW (0…FLA x PT Primary x 1.732)
8	TotalkVA	Total kVA (0…FLA x PT Primary x 1.732)
9	Total kVAR	Total kVAR (0…FLA x PT Primary x 1.732)
10	TotalPF	Total Power Factor (-50% Lagging…+50% Leading)
11	UserDLXData	User-defined Value (-32768… 32767)

Analog Module 2 – Output Channel 00 Expansion Bus Fault Action

Analog Module 2 – Output Channel 00 Expansion Bus Fault Action (Parameter 497) defines the value that the E300 Analog I/O Expansion Module Output Channel 00 provides when there is an E300 Expansion Bus fault.

Table 172 - Analog Module 2 – Output Channel 00 Expansion Bus Fault Action (Parameter 497)

Value	Assignment	Description
0	Zero	Provide an analog signal of zero
1	Maximum	Provide an analog signal equal to the high limit
2	Minimum	Provide an analog signal equal to the low limit
3	HoldLastState	Provide the last known analog signal

Analog Module 2 – Output Channel 00 Protection Fault Action

Analog Module 2 – Output Channel 00 Expansion Bus Fault Action (Parameter 498) defines the value that the E300 Analog I/O Expansion Module Output Channel 00 provides when the E300 is in a tripped state.

Table 173 - Analog Module 2 – Output Channel 00 Protection Fault Action (Parameter 498)

Value	Assignment	Description
0	Ignore	Continue providing the appropriate analog signal
1	Maximum	Provide an analog signal equal to the high limit
2	Minimum	Provide an analog signal equal to the low limit
3	HoldLastState	Provide the analog signal at the time of the fault

Analog Module 3

Analog Module 3 – Input Channel 00 Type

Analog Module 3 – Input Channel 00 Type (Parameter 499) defines the type of analog signal that Input Channel 00 of Analog Module 3 monitors.

Table 174 - Analog Module 3 – Input Channel 00 Type (Parameter 499)

Value	Assignment	Description
0	Disabled	Disable the analog input
1	4To20mA	Read an analog current signal from 4…20 mA
2	0To20mA	Read an analog current signal from 0…20 mA
3	0To10Volts	Read an analog voltage signal from 0…10 V DC
4	1To5Volts	Read an analog voltage signal from 1…5 V DC
5	0To5Volts	Read an analog voltage signal from 0…5 V DC
6	100Pt385	Read a 100 Ω Pt 385 RTD Sensor
7	200Pt385	Read a 200 Ω Pt 385 RTD Sensor
8	500Pt385	Read a 500 Ω Pt 385 RTD Sensor
9	1000Pt385	Read a 1000 Ω Pt 385 RTD Sensor
10	100Pt3916	Read a 100 Ω Pt 3916 RTD Sensor
11	200Pt3916	Read a 200 Ω Pt 3916 RTD Sensor
12	500Pt3916	Read a 500 Ω Pt 3916 RTD Sensor
13	1000Pt3916	Read a 1000 Ω Pt 3916 RTD Sensor
14	10Cu426	Read a 10 Ω Cu 426 RTD Sensor
15	100Ni618	Read a 100 Ω Ni 618 RTD Sensor
16	120Ni672	Read a 120 Ω Ni 672 RTD Sensor
17	604NiFe518	Read a 604 Ω NiFe 518 RTD Sensor
18	150ohm	Read a resistance signal from 0…150 Ω
19	750ohm	Read a resistance signal from 0…750 Ω
20	3000ohm	Read a resistance signal from 0…3000 Ω
21	6000ohm	Read a resistance signal from 0…6000 Ω. This setting can be used with PTC and NTC sensors.

Analog Module 3 – Input Channel 00 Format

Analog Module 3 – Input Channel 00 Format (Parameter 500) defines the data format for how the analog reading is reported.

Table 175 - Analog Module 3 – Input Channel 00 Format (Parameter 500)

Value	Assignment	Description
0	EngUnits	Engineering Units (mA, V, °C, °F, or Ω)
1	EngUnitsTimes10	Engineering Units x 10 (mA, V, °C, °F, or Ω)
2	RawProportional	Raw / Proportional (-32768…32767)
3	ScaledForPID	Scaled for PID (0 …16383)

Analog Module 3 – Input Channel 00 Temperature Unit

Analog Module 3 – Input Channel 00 Temperature Unit (Parameter 501) defines the temperate unit for RTD sensor readings.

Table 176 - Analog Module 3 – Input Channel 00 Temperature Unit (Parameter 501)

Value	Assignment	Description
0	DegreesC	Report RTD Temperature Data in °C
1	DegreesF	Report RTD Temperature Data in °F

Analog Module 3 – Input Channel 00 Filter Frequency

Analog Module 3 – Input Channel 00 Filter Frequency (Parameter 502) defines update rate for the input channels of the analog module.

Table 177 - Analog Module 3 – Input Channel 00 Filter Frequency (Parameter 502)

Value	Assignment	Description
0	17 Hz	Analog to Digital Conversion Update Frequency of 17 Hz
1	4 Hz	Analog to Digital Conversion Update Frequency of 4 Hz
2	62 Hz	Analog to Digital Conversion Update Frequency of 62 Hz
3	470 Hz	Analog to Digital Conversion Update Frequency of 470 Hz

Analog Module 3 – Input Channel 00 Open Circuit State

Analog Module 3 – Input Channel 00 Open Circuit State (Parameter 503) defines what the input channel reports when the input channel has an open circuit. Open circuit detection is always enabled for this input channel.

Table 178 - Analog Module 3 – Input Channel 00 Open Circuit State (Parameter 503)

Value	Assignment	Description
0	Upscale	Reports the high limit of the input channel type
1	Downscale	Reports the low limit of the input channel type
2	Zero	Reports zero

Analog Module 3 – Input Channel 00 RTD Type Enable

Analog Module 3 – Input Channel 00 RTD Type Enable (Parameter 504) defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor.

Table 179 - Analog Module 3 – Input Channel 00 RTD Type Enable (Parameter 504)

Value	Assignment	Description
0	3-Wire	Scan a 3-wire RTD sensor
1	2-Wire	Scan a 2-wire RTD sensor

Analog Module 3 – Input Channel 01 Type

Analog Module 3 – Input Channel 01 Type (Parameter 508) defines the type of analog signal that Input Channel 01 of Analog Module 3 monitors.

Table 180 - Analog Module 3 – Input Channel 01 Type (Parameter 508)

Value	Assignment	Description
0	Disabled	Disable the analog input
1	4To20mA	Read an analog current signal from 4…20 mA
2	0To20mA	Read an analog current signal from 0…20 mA
3	0To10Volts	Read an analog voltage signal from 0…10 V DC
4	1To5Volts	Read an analog voltage signal from 1…5 V DC
5	0To5Volts	Read an analog voltage signal from 0…5 V DC
6	100Pt385	Read a 100 Ω Pt 385 RTD Sensor
7	200Pt385	Read a 200 Ω Pt 385 RTD Sensor
8	500Pt385	Read a 500 Ω Pt 385 RTD Sensor
9	1000Pt385	Read a 1000 Ω Pt 385 RTD Sensor
10	100Pt3916	Read a 100 Ω Pt 3916 RTD Sensor
11	200Pt3916	Read a 200 Ω Pt 3916 RTD Sensor
12	500Pt3916	Read a 500 Ω Pt 3916 RTD Sensor
13	1000Pt3916	Read a 1000 Ω Pt 3916 RTD Sensor
14	10Cu426	Read a 10 Ω Cu 426 RTD Sensor
15	100Ni618	Read a 100 Ω Ni 618 RTD Sensor
16	120Ni672	Read a 120 Ω Ni 672 RTD Sensor
17	604NiFe518	Read a 604 Ω NiFe 518 RTD Sensor
18	150ohm	Read a resistance signal from 0…150 Ω
19	750ohm	Read a resistance signal from 0…750 Ω
20	3000ohm	Read a resistance signal from 0…3000 Ω
21	6000ohm	Read a resistance signal from 0…6000 Ω. This setting can be used with PTC and NTC sensors.

Analog Module 3 – Input Channel 01 Format

Analog Module 3 – Input Channel 01 Format (Parameter 509) defines the data format for how the analog reading is reported.

Table 181 - Analog Module 3 – Input Channel 01 Format (Parameter 509)

Value	Assignment	Description
0	EngUnits	Engineering Units (mA, V, °C, °F, or Ω)
1	EngUnitsTimes10	Engineering Units x 10 (mA, V, °C, °F, or Ω)
2	RawProportional	Raw / Proportional (-32768…32767)
3	ScaledForPID	Scaled for PID (0…16383)

Analog Module 3 – Input Channel 01 Temperature Unit

Analog Module 3 – Input Channel 01 Temperature Unit (Parameter 510) defines the temperate unit for RTD sensor readings.

Table 182 - Analog Module 3 – Input Channel 01 Temperature Unit (Parameter 510)

Value	Assignment	Description
0	DegreesC	Report RTD Temperature Data in °C
1	DegreesF	Report RTD Temperature Data in °F

Analog Module 3 – Input Channel 01 Filter Frequency

Analog Module 3 – Input Channel 01 Filter Frequency (Parameter 511) defines update rate for the input channels of the analog module.

Table 183 - Analog Module 3 – Input Channel 01 Filter Frequency (Parameter 511)

Value	Assignment	Description
0	17 Hz	Analog to Digital Conversion Update Frequency of 17 Hz
1	4 Hz	Analog to Digital Conversion Update Frequency of 4 Hz
2	62 Hz	Analog to Digital Conversion Update Frequency of 62 Hz
3	470 Hz	Analog to Digital Conversion Update Frequency of 470 Hz

Analog Module 3 – Input Channel 01 Open Circuit State

Analog Module 3 – Input Channel 01 Open Circuit State (Parameter 512) defines what the input channel reports when the input channel has an open circuit. Open circuit detection is always enabled for this input channel.

Table 184 - Analog Module 3 – Input Channel 01 Open Circuit State (Parameter 512)

Value	Assignment	Description
0	Upscale	Reports the high limit of the input channel type
1	Downscale	Reports the low limit of the input channel type
2	Zero	Reports zero

Analog Module 3 – Input Channel 01 RTD Type Enable

Analog Module 3 – Input Channel 01 RTD Type Enable (Parameter 513) defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor.

Table 185 - Analog Module 3 – Input Channel 01 RTD Type Enable (Parameter 513)

Value	Assignment	Description
0	3-Wire	Scan a 3-wire RTD sensor
1	2-Wire	Scan a 2-wire RTD sensor

Analog Module 3 – Input Channel 02 Type

Analog Module 3 – Input Channel 02 Type (Parameter 517) defines the type of analog signal that Input Channel 02 of Analog Module 3 monitors.

Table 186 - Analog Module 3 – Input Channel 02 Type (Parameter 517)

Value	Assignment	Description
0	Disabled	Disable the analog input
1	4To20mA	Read an analog current signal from 4…20 mA
2	0To20mA	Read an analog current signal from 0…20 mA
3	0To10Volts	Read an analog voltage signal from 0…10 V DC
4	1To5Volts	Read an analog voltage signal from 1…5 V DC
5	0To5Volts	Read an analog voltage signal from 0…5 V DC
6	100Pt385	Read a 100 Ω Pt 385 RTD Sensor
7	200Pt385	Read a 200 Ω Pt 385 RTD Sensor
8	500Pt385	Read a 500 Ω Pt 385 RTD Sensor
9	1000Pt385	Read a 1000 Ω Pt 385 RTD Sensor
10	100Pt3916	Read a 100 Ω Pt 3916 RTD Sensor
11	200Pt3916	Read a 200 Ω Pt 3916 RTD Sensor
12	500Pt3916	Read a 500 Ω Pt 3916 RTD Sensor
13	1000Pt3916	Read a 1000 Ω Pt 3916 RTD Sensor
14	10Cu426	Read a 10 Ω Cu 426 RTD Sensor
15	100Ni618	Read a 100 Ω Ni 618 RTD Sensor
16	120Ni672	Read a 120 Ω Ni 672 RTD Sensor
17	604NiFe518	Read a 604 Ω NiFe 518 RTD Sensor
18	150ohm	Read a resistance signal from 0…150 Ω
19	750ohm	Read a resistance signal from 0…750 Ω
20	3000ohm	Read a resistance signal from 0…3000 Ω
21	6000ohm	Read a resistance signal from 0…6000 Ω. This setting can be used with PTC and NTC sensors.

Analog Module 3 – Input Channel 02 Format

Analog Module 3 – Input Channel 02 Format (Parameter 518) defines the data format for how the analog reading is reported.

Table 187 - Analog Module 3 – Input Channel 02 Format (Parameter 518)

Value	Assignment	Description
0	EngUnits	Engineering Units (mA, V, °C, °F, or Ω)
1	EngUnitsTimes10	Engineering Units x 10 (mA, V, °C, °F, or Ω)
2	RawProportional	Raw / Proportional (-32768…32767)
3	ScaledForPID	Scaled for PID (0…16383)

Analog Module 3 – Input Channel 02 Temperature Unit

Analog Module 3 – Input Channel 02 Temperature Unit (Parameter 519) defines the temperate unit for RTD sensor readings.

Table 188 - Analog Module 3 – Input Channel 02 Temperature Unit (Parameter 519)

Value	Assignment	Description
0	DegreesC	Report RTD Temperature Data in °C
1	DegreesF	Report RTD Temperature Data in °F

Analog Module 3 – Input Channel 02 Filter Frequency

Analog Module 3 – Input Channel 02 Filter Frequency (Parameter 520) defines update rate for the input channels of the analog module.

Table 189 - Analog Module 3 – Input Channel 02 Filter Frequency (Parameter 520)

Value	Assignment	Description
0	17 Hz	Analog to Digital Conversion Update Frequency of 17 Hz
1	4 Hz	Analog to Digital Conversion Update Frequency of 4 Hz
2	62 Hz	Analog to Digital Conversion Update Frequency of 62 Hz
3	470 Hz	Analog to Digital Conversion Update Frequency of 470 Hz

Analog Module 3 – Input Channel 02 Open Circuit State

Analog Module 3 – Input Channel 02 Open Circuit State (Parameter 521) defines what the input channel reports when the input channel has an open circuit. Open circuit detection is always enabled for this input channel.

Table 190 - Analog Module 3 – Input Channel 02 Open Circuit State (Parameter 521)

Value	Assignment	Description
0	Upscale	Reports the high limit of the input channel type
1	Downscale	Reports the low limit of the input channel type
2	Zero	Reports zero

Analog Module 3 – Input Channel 02 RTD Type Enable

Analog Module 3 – Input Channel 02 RTD Type Enable (Parameter 522) defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor.

Table 191 - Analog Module 3 – Input Channel 02 RTD Type Enable (Parameter 522)

Value	Assignment	Description
0	3-Wire	Scan a 3-wire RTD sensor
1	2-Wire	Scan a 2-wire RTD sensor

Analog Module 3 – Output Channel 00 Type

Analog Module 3 – Output Channel 00 Type (Parameter 526) defines the type of analog signal that Output Channel 00 of Analog Module 3 provides.

Table 192 - Analog Module 3 – Output Channel 00 Type (Parameter 526)

Value	Assignment	Description
0	Disabled	Disable the analog input
1	4To20mA	Provide an analog current signal from 4…20 mA
2	0To20mA	Provide an analog current signal from 0…20 mA
3	0To10Volts	Provide an analog voltage signal from 0…10 V DC
4	1To5Volts	Provide an analog voltage signal from 1…5 V DC
5	0To5Volts	Provide an analog voltage signal from 0…5 V DC

Analog Module 3 – Output Channel 00 Selection

Analog Module 3 – Output Channel 00 Selection (Parameter 527) defines the E300 relay parameter that Output Channel 00 represents.

Table 193 - Analog Module 3 – Output Channel 00 Selection (Parameter 527)

Value	Assignment	Description
0	AveragePCTFLA	Average %FLA (0…100%)
1	ScaledAvgPctFLA	Scaled Average %FLA (0…200%)
2	PercentTCU	%TCU (0…100%)
3	GFCurrent	Ground Fault Current (Ground Fault Type Range)
4	CurrentImbalance	Current Imbalance (0…100%)
5	AvgLLVoltage	Average L-L Voltage (0…PT Primary)
6	VoltLLImbalance	Voltage Imbalance (0 …100%)
7	TotalkW	Total kW (0…FLA x PT Primary x 1.732)
8	TotalkVA	Total kVA (0…FLA x PT Primary x 1.732)
9	Total kVAR	Total kVAR (0…FLA x PT Primary x 1.732)
10	TotalPF	Total Power Factor (-50% Lagging…+50% Leading)
11	UserDLXData	User-defined Value (-32768 …+32767)

Analog Module 3 – Output Channel 00 Expansion Bus Fault Action

Analog Module 3 – Output Channel 00 Expansion Bus Fault Action (Parameter 528) defines the value that the E300 Analog I/O Expansion Module Output Channel 00 provides when there is an E300 Expansion Bus fault.

Table 194 - Analog Module 3 – Output Channel 00 Expansion Bus Fault Action (Parameter 528)

Value	Assignment	Description
0	Zero	Provide an analog signal of zero
1	Maximum	Provide an analog signal equal to the high limit
2	Minimum	Provide an analog signal equal to the low limit
3	HoldLastState	Provide the last known analog signal

Analog Module 3 – Output Channel 00 Protection Fault Action

Analog Module 3 – Output Channel 00 Expansion Bus Fault Action (Parameter 529) defines the value that the E300 Analog I/O Expansion Module Output Channel 00 provides when the E300 is in a tripped state.

Table 195 - Analog Module 3 – Output Channel 00 Protection Fault Action (Parameter 529)

Value	Assignment	Description
0	Ignore	Continue providing the appropriate analog signal
1	Maximum	Provide an analog signal equal to the high limit
2	Minimum	Provide an analog signal equal to the low limit
3	HoldLastState	Provide the analog signal at the time of the fault

Analog Module 4

Analog Module 4 – Input Channel 00 Type

Analog Module 4 – Input Channel 00 Type (Parameter 530) defines the type of analog signal that Input Channel 00 of Analog Module 4 monitors.

Table 196 - Analog Module 4 – Input Channel 00 Type (Parameter 530)

Value	Assignment	Description
0	Disabled	Disable the analog input
1	4To20mA	Read an analog current signal from 4…20 mA
2	0To20mA	Read an analog current signal from 0…20 mA
3	0To10Volts	Read an analog voltage signal from 0…10 V DC
4	1To5Volts	Read an analog voltage signal from 1…5 V DC
5	0To5Volts	Read an analog voltage signal from 0…5 V DC
6	100Pt385	Read a 100 Ω Pt 385 RTD Sensor
7	200Pt385	Read a 200 Ω Pt 385 RTD Sensor
8	500Pt385	Read a 500 Ω Pt 385 RTD Sensor
9	1000Pt385	Read a 1000 Ω Pt 385 RTD Sensor
10	100Pt3916	Read a 100 Ω Pt 3916 RTD Sensor
11	200Pt3916	Read a 200 Ω Pt 3916 RTD Sensor
12	500Pt3916	Read a 500 Ω Pt 3916 RTD Sensor
13	1000Pt3916	Read a 1000 Ω Pt 3916 RTD Sensor
14	10Cu426	Read a 10 Ω Cu 426 RTD Sensor
15	100Ni618	Read a 100 Ω Ni 618 RTD Sensor
16	120Ni672	Read a 120 Ω Ni 672 RTD Sensor
17	604NiFe518	Read a 604 Ω NiFe 518 RTD Sensor
18	150ohm	Read a resistance signal from 0…150 Ω
19	750ohm	Read a resistance signal from 0…750 Ω
20	3000ohm	Read a resistance signal from 0…3000 Ω
21	6000ohm	Read a resistance signal from 0…6000 Ω. This setting can be used with PTC and NTC sensors.

Analog Module 4 – Input Channel 00 Format

Analog Module 4 – Input Channel 00 Format (Parameter 531) defines the data format for how the analog reading is reported.

Table 197 - Analog Module 4 – Input Channel 00 Format (Parameter 531)

Value	Assignment	Description
0	EngUnits	Engineering Units (mA, V, °C, °F, or Ω)
1	EngUnitsTimes10	Engineering Units x 10 (mA, V, °C, °F, or Ω)
2	RawProportional	Raw / Proportional (-32768…+32767)
3	ScaledForPID	Scaled for PID (0…16383)

Analog Module 4 – Input Channel 00 Temperature Unit

Analog Module 4 – Input Channel 00 Temperature Unit (Parameter 532) defines the temperate unit for RTD sensor readings.

Table 198 - Analog Module 4 – Input Channel 00 Temperature Unit (Parameter 532)

Value	Assignment	Description
0	DegreesC	Report RTD Temperature Data in °C
1	DegreesF	Report RTD Temperature Data in °F

Analog Module 4 – Input Channel 00 Filter Frequency

Analog Module 4 – Input Channel 00 Filter Frequency (Parameter 533) defines update rate for the input channels of the analog module.

Table 199 - Analog Module 4 – Input Channel 00 Filter Frequency (Parameter 533)

Value	Assignment	Description
0	17 Hz	Analog to Digital Conversion Update Frequency of 17 Hz
1	4 Hz	Analog to Digital Conversion Update Frequency of 4 Hz
2	62 Hz	Analog to Digital Conversion Update Frequency of 62 Hz
3	470 Hz	Analog to Digital Conversion Update Frequency of 470 Hz

Analog Module 4 – Input Channel 00 Open Circuit State

Analog Module 4 – Input Channel 00 Open Circuit State (Parameter 534) defines what the input channel reports when the input channel has an open circuit. Open circuit detection is always enabled for this input channel.

Table 200 - Analog Module 4 – Input Channel 00 Open Circuit State (Parameter 534)

Value	Assignment	Description
0	Upscale	Reports the high limit of the input channel type
1	Downscale	Reports the low limit of the input channel type
2	Zero	Reports zero

Analog Module 4 – Input Channel 00 RTD Type Enable

Analog Module 4 – Input Channel 00 RTD Type Enable (Parameter 535) defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor.

Table 201 - Analog Module 4 – Input Channel 00 RTD Type Enable (Parameter 535)

Value	Assignment	Description
0	3-Wire	Scan a 3-wire RTD sensor
1	2-Wire	Scan a 2-wire RTD sensor

Analog Module 4 – Input Channel 01 Type

Analog Module 4 – Input Channel 01 Type (Parameter 539) defines the type of analog signal that Input Channel 01 of Analog Module 4 monitors.

Table 202 - Analog Module 4 – Input Channel 01 Type (Parameter 539)

Value	Assignment	Description
0	Disabled	Disable the analog input
1	4To20mA	Read an analog current signal from 4…20 mA
2	0To20mA	Read an analog current signal from 0…20 mA
3	0To10Volts	Read an analog voltage signal from 0…10 V DC
4	1To5Volts	Read an analog voltage signal from 1…5 V DC
5	0To5Volts	Read an analog voltage signal from 0…5 V DC
6	100Pt385	Read a 100 Ω Pt 385 RTD Sensor
7	200Pt385	Read a 200 Ω Pt 385 RTD Sensor
8	500Pt385	Read a 500 Ω Pt 385 RTD Sensor
9	1000Pt385	Read a 1000 Ω Pt 385 RTD Sensor
10	100Pt3916	Read a 100 Ω Pt 3916 RTD Sensor
11	200Pt3916	Read a 200 Ω Pt 3916 RTD Sensor
12	500Pt3916	Read a 500 Ω Pt 3916 RTD Sensor
13	1000Pt3916	Read a 1000 Ω Pt 3916 RTD Sensor
14	10Cu426	Read a 10 Ω Cu 426 RTD Sensor
15	100Ni618	Read a 100 Ω Ni 618 RTD Sensor
16	120Ni672	Read a 120 Ω Ni 672 RTD Sensor
17	604NiFe518	Read a 604 Ω NiFe 518 RTD Sensor
18	150ohm	Read a resistance signal from 0…150 Ω
19	750ohm	Read a resistance signal from 0…750 Ω
20	3000ohm	Read a resistance signal from 0…3000 Ω
21	6000ohm	Read a resistance signal from 0…6000 Ω. This setting can be used with PTC and NTC sensors.

Analog Module 4 – Input Channel 01 Format

Analog Module 4 – Input Channel 01 Format (Parameter 540) defines the data format for how the analog reading is reported.

Table 203 - Analog Module 4 – Input Channel 01 Format (Parameter 540)

Value	Assignment	Description
0	EngUnits	Engineering Units (mA, V, °C, °F, or Ω)
1	EngUnitsTimes10	Engineering Units x 10 (mA, V, °C, °F, or Ω)
2	RawProportional	Raw / Proportional (-32768…+32767)
3	ScaledForPID	Scaled for PID (0…16383)

Analog Module 4 – Input Channel 01 Temperature Unit

Analog Module 4 – Input Channel 01 Temperature Unit (Parameter 541) defines the temperate unit for RTD sensor readings.

Table 204 - Analog Module 4 – Input Channel 01 Temperature Unit (Parameter 541)

Value	Assignment	Description
0	DegreesC	Report RTD Temperature Data in °C
1	DegreesF	Report RTD Temperature Data in °F

Analog Module 4 – Input Channel 01 Filter Frequency

Analog Module 4 – Input Channel 01 Filter Frequency (Parameter 542) defines update rate for the input channels of the analog module.

Table 205 - Analog Module 4 – Input Channel 00 Filter Frequency (Parameter 542)

Value	Assignment	Description
0	17 Hz	Analog to Digital Conversion Update Frequency of 17 Hz
1	4 Hz	Analog to Digital Conversion Update Frequency of 4 Hz
2	62 Hz	Analog to Digital Conversion Update Frequency of 62 Hz
3	470 Hz	Analog to Digital Conversion Update Frequency of 470 Hz

Analog Module 4 – Input Channel 01 Open Circuit State

Analog Module 4 – Input Channel 01 Open Circuit State (Parameter 543) defines what the input channel reports when the input channel has an open circuit. Open circuit detection is always enabled for this input channel.

Table 206 - Analog Module 4 – Input Channel 01 Open Circuit State (Parameter 543)

Value	Assignment	Description
0	Upscale	Reports the high limit of the input channel type
1	Downscale	Reports the low limit of the input channel type
2	Zero	Reports zero

Analog Module 4 – Input Channel 01 RTD Type Enable

Analog Module 4 – Input Channel 01 RTD Type Enable (Parameter 544) defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor.

Table 207 - Analog Module 4 – Input Channel 01 RTD Type Enable (Parameter 544)

Value	Assignment	Description
0	3-Wire	Scan a 3-wire RTD sensor
1	2-Wire	Scan a 2-wire RTD sensor

Analog Module 4 – Input Channel 02 Type

Analog Module 4 – Input Channel 02 Type (Parameter 548) defines the type of analog signal that Input Channel 02 of Analog Module 4 monitors.

Table 208 - Analog Module 4 – Input Channel 02 Type (Parameter 548)

Value	Assignment	Description
0	Disabled	Disable the analog input
1	4To20mA	Read an analog current signal from 4…20 mA
2	0To20mA	Read an analog current signal from 0…20 mA
3	0To10Volts	Read an analog voltage signal from 0…10 V DC
4	1To5Volts	Read an analog voltage signal from 1…5 V DC
5	0To5Volts	Read an analog voltage signal from 0…5 V DC
6	100Pt385	Read a 100 Ω Pt 385 RTD Sensor
7	200Pt385	Read a 200 Ω Pt 385 RTD Sensor
8	500Pt385	Read a 500 Ω Pt 385 RTD Sensor
9	1000Pt385	Read a 1000 Ω Pt 385 RTD Sensor
10	100Pt3916	Read a 100 Ω Pt 3916 RTD Sensor
11	200Pt3916	Read a 200 Ω Pt 3916 RTD Sensor
12	500Pt3916	Read a 500 Ω Pt 3916 RTD Sensor
13	1000Pt3916	Read a 1000 Ω Pt 3916 RTD Sensor
14	10Cu426	Read a 10 Ω Cu 426 RTD Sensor
15	100Ni618	Read a 100 Ω Ni 618 RTD Sensor
16	120Ni672	Read a 120 Ω Ni 672 RTD Sensor
17	604NiFe518	Read a 604 Ω NiFe 518 RTD Sensor
18	150ohm	Read a resistance signal from 0…150 Ω
19	750ohm	Read a resistance signal from 0…750 Ω
20	3000ohm	Read a resistance signal from 0…3000 Ω
21	6000ohm	Read a resistance signal from 0…6000 Ω. This setting can be used with PTC and NTC sensors.

Analog Module 4 – Input Channel 02 Format

Analog Module 4 – Input Channel 02 Format (Parameter 549) defines the data format for how the analog reading is reported.

Table 209 - Analog Module 4 – Input Channel 02 Format (Parameter 549)

Value	Assignment	Description
0	EngUnits	Engineering Units (mA, V, °C, °F, or Ω)
1	EngUnitsTimes10	Engineering Units x 10 (mA, V, °C, °F, or Ω)
2	RawProportional	Raw / Proportional (-32768…+32767)
3	ScaledForPID	Scaled for PID (0…16383)

Analog Module 4 – Input Channel 02 Temperature Unit

Analog Module 4 – Input Channel 02 Temperature Unit (Parameter 550) defines the temperate unit for RTD sensor readings.

Table 210 - Analog Module 4 – Input Channel 02 Temperature Unit (Parameter 550)

Value	Assignment	Description
0	DegreesC	Report RTD Temperature Data in °C
1	DegreesF	Report RTD Temperature Data in °F

Analog Module 4 – Input Channel 02 Filter Frequency

Analog Module 4 – Input Channel 02 Filter Frequency (Parameter 551) defines update rate for the input channels of the analog module.

Table 211 - Analog Module 4 – Input Channel 02 Filter Frequency (Parameter 551)

Value	Assignment	Description
0	17 Hz	Analog to Digital Conversion Update Frequency of 17 Hz
1	4 Hz	Analog to Digital Conversion Update Frequency of 4 Hz
2	62 Hz	Analog to Digital Conversion Update Frequency of 62 Hz
3	470 Hz	Analog to Digital Conversion Update Frequency of 470 Hz

Analog Module 4 – Input Channel 02 Open Circuit State

Analog Module 4 – Input Channel 02 Open Circuit State (Parameter 552) defines what the input channel reports when the input channel has an open circuit. Open circuit detection is always enabled for this input channel.

Table 212 - Analog Module 4 – Input Channel 02 Open Circuit State (Parameter 552)

Value	Assignment	Description
0	Upscale	Reports the high limit of the input channel type
1	Downscale	Reports the low limit of the input channel type
2	Zero	Reports zero

Analog Module 4 – Input Channel 02 RTD Type Enable

Analog Module 4 – Input Channel 02 RTD Type Enable (Parameter 556) defines the type of RTD to monitor when the input channel type is configured to scan an RTD sensor.

Table 213 - Analog Module 4 – Input Channel 02 RTD Type Enable (Parameter 556)

Value	Assignment	Description
0	3-Wire	Scan a 3-wire RTD sensor
1	2-Wire	Scan a 2-wire RTD sensor

Analog Module 4 – Output Channel 00 Type

Analog Module 4 – Output Channel 00 Type (Parameter 557) defines the type of analog signal that Output Channel 00 of Analog Module 4 provides.

Table 214 - Analog Module 4 – Output Channel 00 Type (Parameter 557)

Value	Assignment	Description
0	Disabled	Disable the analog input
1	4To20mA	Provide an analog current signal from 4…20 mA
2	0To20mA	Provide an analog current signal from 0…20 mA
3	0To10Volts	Provide an analog voltage signal from 0…10 V DC
4	1To5Volts	Provide an analog voltage signal from 1…5 V DC
5	0To5Volts	Provide an analog voltage signal from 0…5 V DC

Analog Module 4 – Output Channel 00 Selection

Analog Module 4 – Output Channel 00 Selection (Parameter 558) defines the E300 relay parameter that Output Channel 00 represents

Table 215 - Analog Module 4 – Output Channel 00 Selection (Parameter 558)

Value	Assignment	Description
0	AveragePCTFLA	Average %FLA (0…100%)
1	ScaledAvgPctFLA	Scaled Average %FLA (0…200%)
2	PercentTCU	%TCU (0…100%)
3	GFCurrent	Ground Fault Current (Ground Fault Type Range)
4	CurrentImbalance	Current Imbalance (0…100%)
5	AvgLLVoltage	Average L-L Voltage (0…PT Primary)
6	VoltLLImbalance	Voltage Imbalance (0…100%)
7	TotalkW	Total kW (0…FLA x PT Primary x 1.732)
8	TotalkVA	Total kVA (0…FLA x PT Primary x 1.732)
9	Total kVAR	Total kVAR (0…FLA x PT Primary x 1.732)
10	TotalPF	Total Power Factor (-50% Lagging…+50% Leading)
11	UserDLXData	User-defined Value (-32768…32767)

Analog Module 4 – Output Channel 00 Expansion Bus Fault Action

Analog Module 4 – Output Channel 00 Expansion Bus Fault Action (Parameter 559) defines the value that the E300 Analog I/O Expansion Module Output Channel 00 provides when there is an E300 Expansion Bus fault.

Table 216 - Analog Module 4 – Output Channel 00 Expansion Bus Fault Action (Parameter 559)

Value	Assignment	Description
0	Zero	Provide an analog signal of zero
1	Maximum	Provide an analog signal equal to the high limit
2	Minimum	Provide an analog signal equal to the low limit
3	HoldLastState	Provide the last known analog signal

Analog Module 4 – Output Channel 00 Protection Fault Action

Analog Module 4 – Output Channel 00 Expansion Bus Fault Action (Parameter 560) defines the value that the E300 Analog I/O Expansion Module Output Channel 00 provides when the E300 is in a tripped state.

Figure 54 - Analog Module 4 – Output Channel 00 Protection Fault Action (Parameter 560)

Value	Assignment	Description
0	Ignore	Continue providing the appropriate analog signal
1	Maximum	Provide an analog signal equal to the high limit
2	Minimum	Provide an analog signal equal to the low limit
3	HoldLastState	Provide the analog signal at the time of the fault

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 on the following pages configure the Network Start Configuration Fault Mode for both Network Start commands.

Fault Mode Output State Duration (Parameter 561)

Fault Mode Output State Duration (Parameter 561) is available in E300 firmware v5.000 and higher. This parameter defines the amount of time in seconds that the E300 remains in the Network Start Communication Fault Mode state when a communication fault occurs. A value of (0) represents 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.

Table 217 - Fault Mode Output State Duration (Parameter 561)

Default Value	0
Minimum Value	0 = Forever
Maximum Value	255
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Sec

Network Start Communication Fault Action (Parameter 569)

Network Start Communication Fault Action (Parameter 569) defines how the Network Start commands respond when a communication fault occurs.

Table 218 - Network Start Communication Fault Action (Parameter 569)

Value	Assignment	Description
0	GoToCommFltValue	Set to Network Start Communication Fault Value (Parameter 570)
1	HoldLastState	Hold the last start command from the network

Network Start Communication Fault Value (Parameter 570)

Network Start Communication Fault Value (Parameter 570) defines which state the Network Start command should go to when a communication fault occurs.

Table 219 - Network Start Communication Fault Value (Parameter 570)

Value	Assignment	Description
0	Stop	Stop Network Start1 and Stop Network Start2
1	Start	Start Network Start1 and Stop Network Start2

Network Start Final Fault Value (Parameter 573)

Network Start Final Fault Value (Parameter 573) is available in E300 firmware v5.000 and higher. This parameter 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).

Table 220 - Network Start Final Fault Value (Parameter 573)

Value	Assignment	Description
0	Stop	Stop Network Start1 and Stop Network Start2
1	Start	Start Network Start1 and Stop Network Start2

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, the E300 Network Start commands can be configured to go to a specific state (Open or Close) or hold the last state. The parameters that are listed on the following pages configure the Network Start Communication Idle Mode for the Network Start commands.

Network Start Communication Idle Action (Parameter 571)

Network Start Communication Idle Action (Parameter 571) defines how the Network Start commands respond when a network scanner goes into Idle mode or a PLC goes into Program mode.

Table 221 - Network Start Communication Idle Action (Parameter 571)

Value	Assignment	Description
0	GoToCommIdlValue	Set to Network Start Idle Fault Value (Parameter 572)
1	HoldLastState	Hold the last start command from the network

Network Start Communication Idle Value (Parameter 572)

Network Start Communication Idle Value (Parameter 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.

Table 222 - Output Relay 0 Communication Idle Value (Parameter 309)

Value	Assignment	Description
0	Stop	Stop Network Start1 and Stop Network Start2
1	Start	Start Network Start1 and Stop Network Start2

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 155 describes the functionality of the available Operating Modes for the E300 relay and their associated configuration rules.

Operating Modes

Introduction

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 (Parameter 195). Failure to follow the configuration rules 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

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.

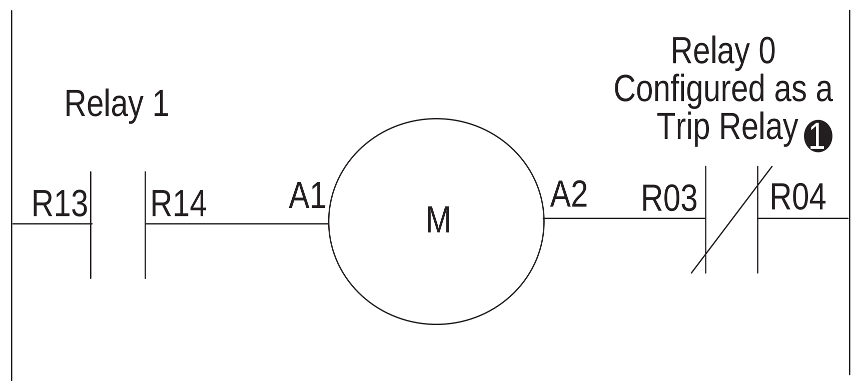
Rules

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).

Wiring Diagram

The E300 relay is wired as a traditional overload relay with one of the output relays configured as a normally closed trip relay. Figure 55 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.

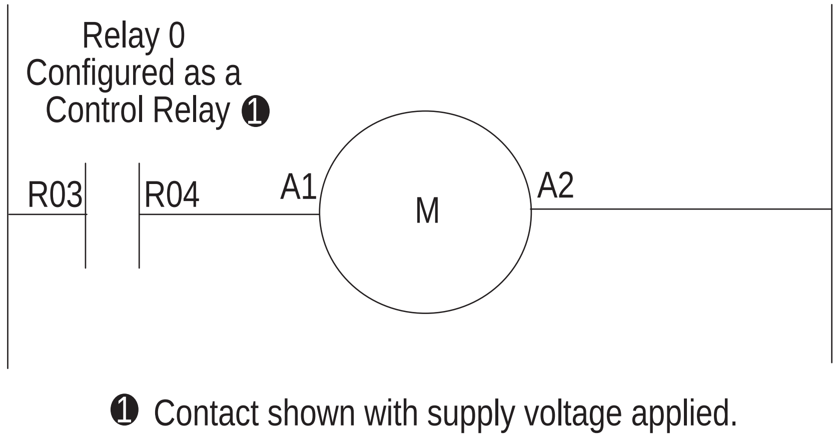
Figure 55 - Trip Relay Wiring Diagram



❶ Contact shown with supply voltage applied.

For Control Module firmware v3.000 and higher, 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 56 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.

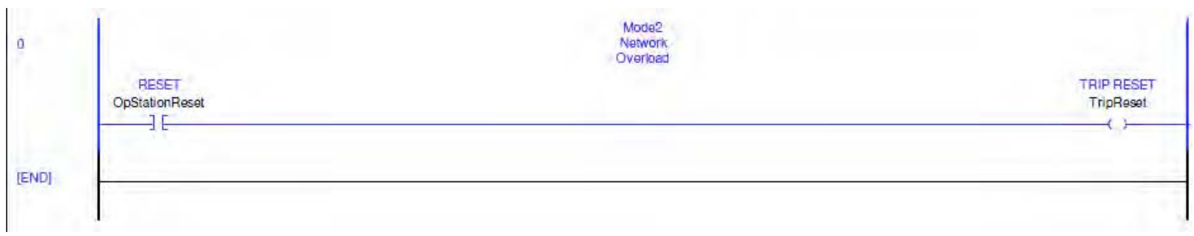
Figure 56 - Control Relay Wiring Diagram



DeviceLogix™ Program

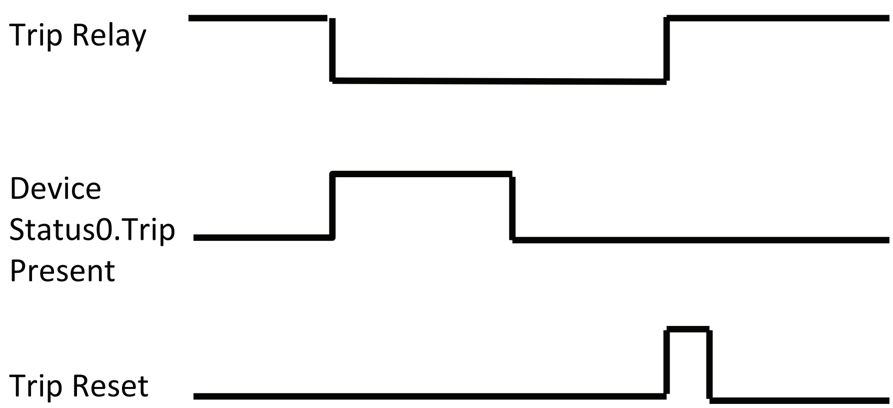
The DeviceLogix program that is shown in Figure 57 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 2.

Figure 57 - Overload (Network) DeviceLogix Program



Timing Diagram

Figure 58 - Overload (Network) Timing Diagram



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)

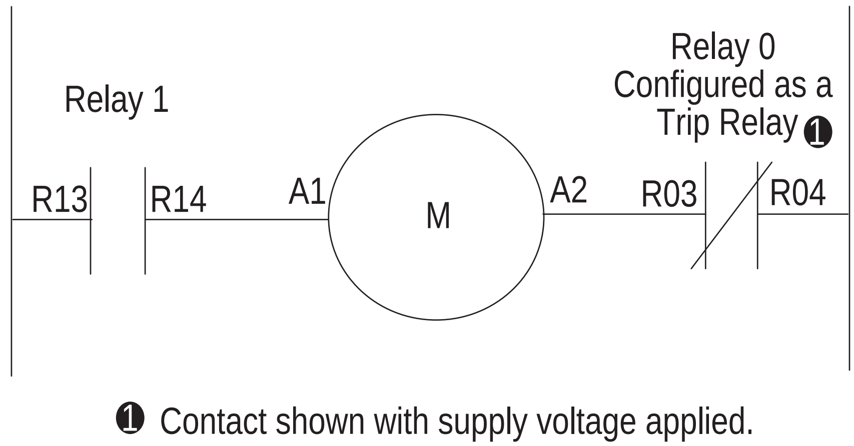
   Or

   - 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.

Wiring Diagram

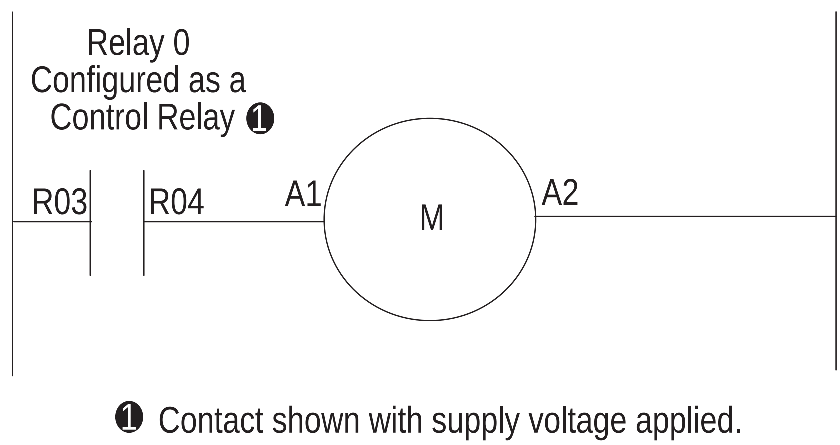
The E300 relay is wired as a traditional overload relay with one of the output relays configured as a normally closed trip relay. Figure 59 is a wiring diagram of a non-reversing starter. Relay 0 is configured as a trip relay, and Relay 1 is configured as a normally open Normal Relay, which receives commands from an automation controller to energize the contactor coil.

Figure 59 - Trip Relay 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 60 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 60 - Control Relay Wiring Diagram



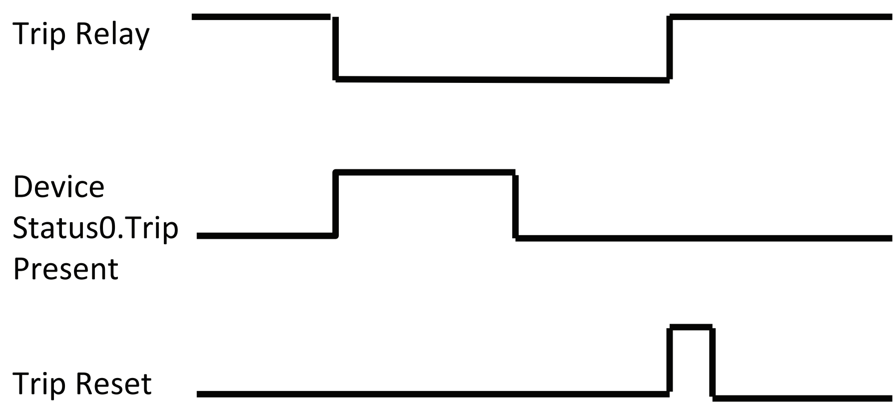
DeviceLogix Program

The DeviceLogix program that is shown in Figure 61 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 26.

Figure 61 - Overload (Operator Station) DeviceLogix Program

Timing Diagram

Figure 62 - Overload (Operator Station) Timing Diagram



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).

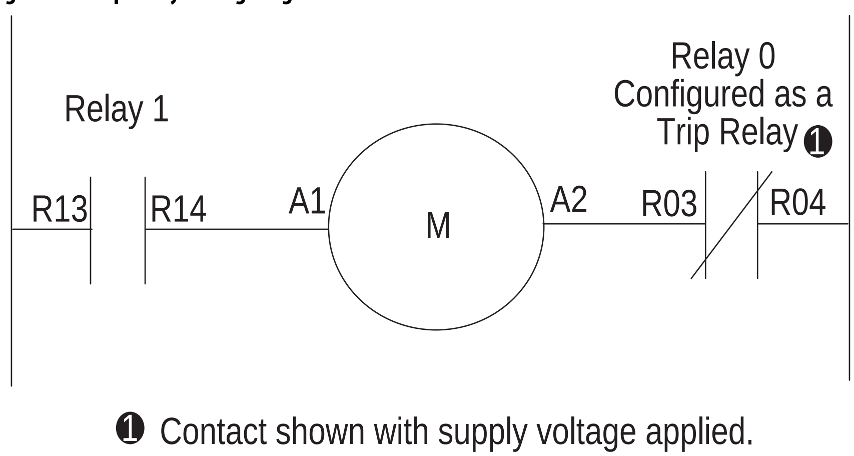
5. Operator Station Option Match Trip or Warning must be enabled.
   - Option Match Trip or must be enabled in TripEnableC (Parameter 186)
   - Operator Station must be enabled in Mismatch Action (Parameter 233)
   - An operator station must be selected in Operator Station Type (Parameter 224)

   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.

Wiring Diagram

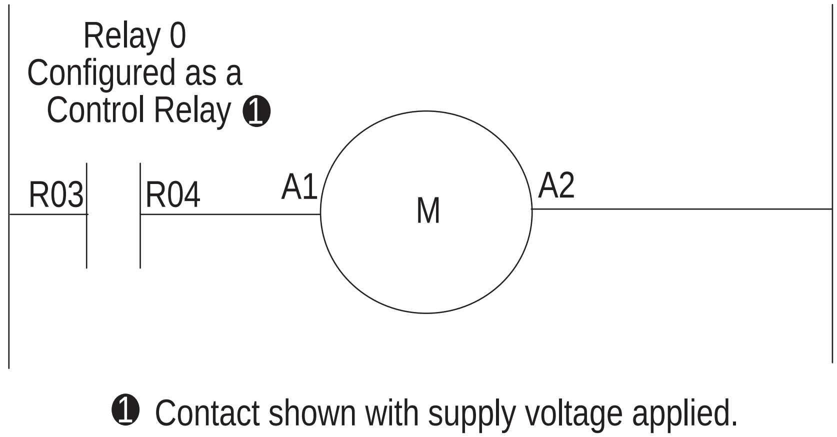
The E300 relay is wired as a traditional overload relay with one of the output relays configured as a normally closed trip relay. Figure 63 is a wiring diagram of a non-reversing starter. Relay 0 is configured as a trip relay, and Relay 1 is configured as a normally open Normal Relay, which receives commands from an automation controller to energize the contactor coil.

Figure 63 - Trip Relay 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 64 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 64 - Control Relay Wiring Diagram



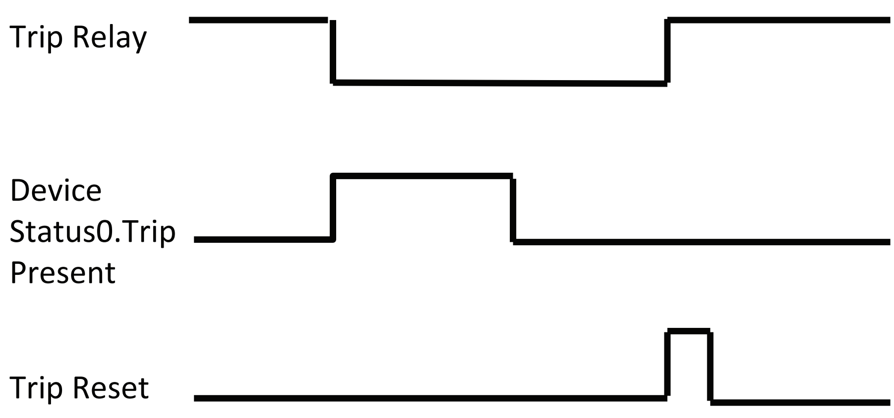
DeviceLogix Program

The DeviceLogix program that is shown in Figure 65 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 35.

Figure 65 - Overload (Local I/O) DeviceLogix Program

Timing Diagram

Figure 66 - Overload (Local I/O) Timing Diagram



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.

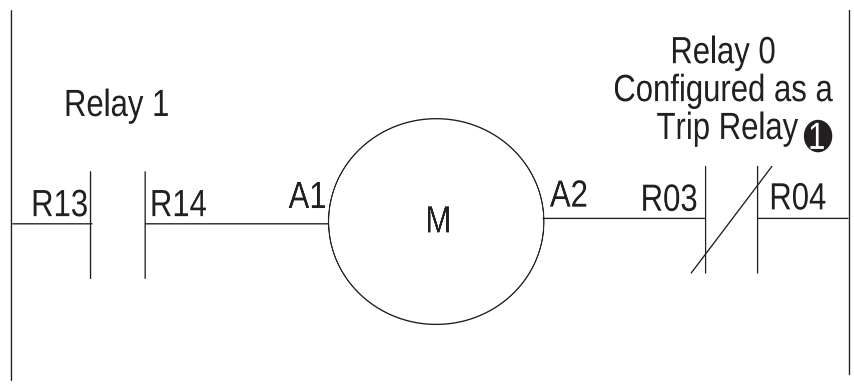
Rules

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).

Wiring Diagram

The E300 relay is wired as a traditional overload relay with one of the output relays configured as a normally closed trip relay. Figure 67 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.

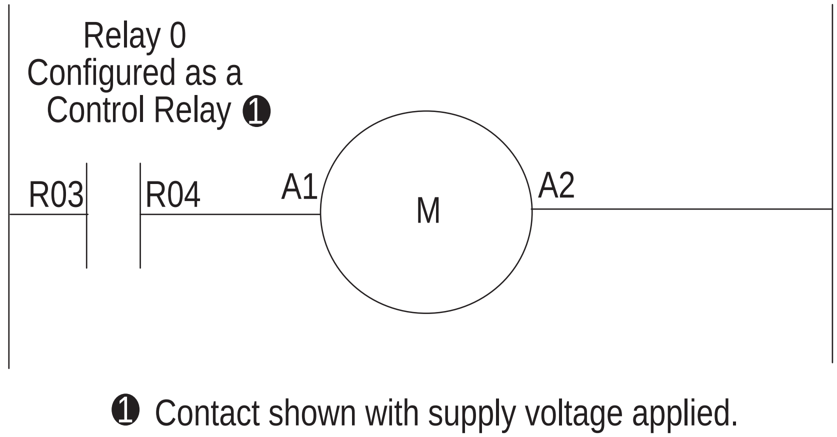
Figure 67 - Trip Relay Wiring Diagram



❶ Contact shown with supply voltage applied.

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 68 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 68 - Control Relay Wiring Diagram

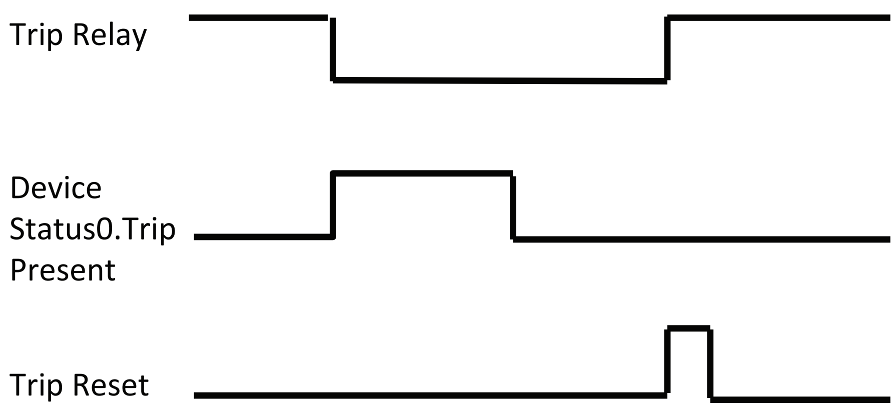


DeviceLogix Program

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

Timing Diagram

Figure 69 - Overload (Custom) Timing Diagram



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 4.

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, the starter energizes if the value in LogicDefinedPt00Data is set to 1.

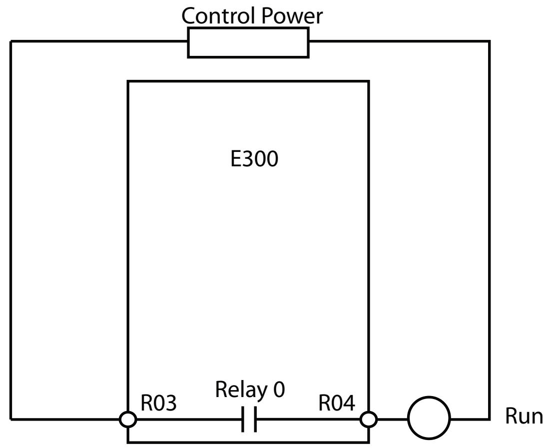
Rules

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 70 is a wiring diagram of a non-reversing starter with Output Relay 0 configured as a control relay.

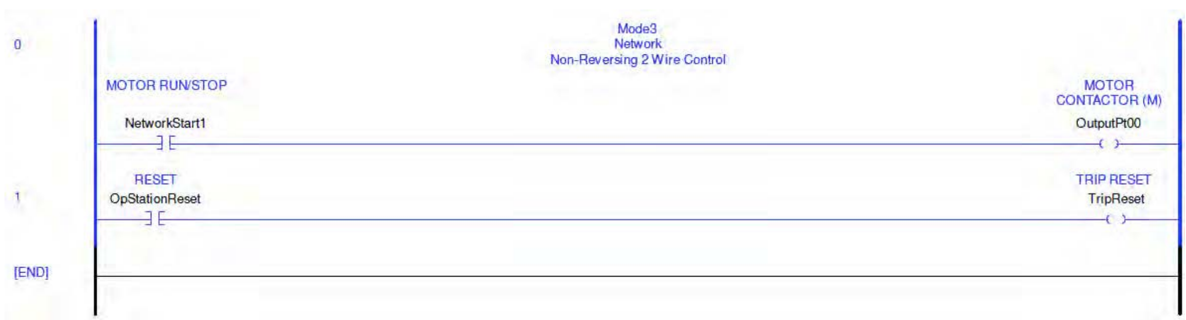
Figure 70 - Non-reversing Starter (Network) Wiring Diagram



DeviceLogix Program

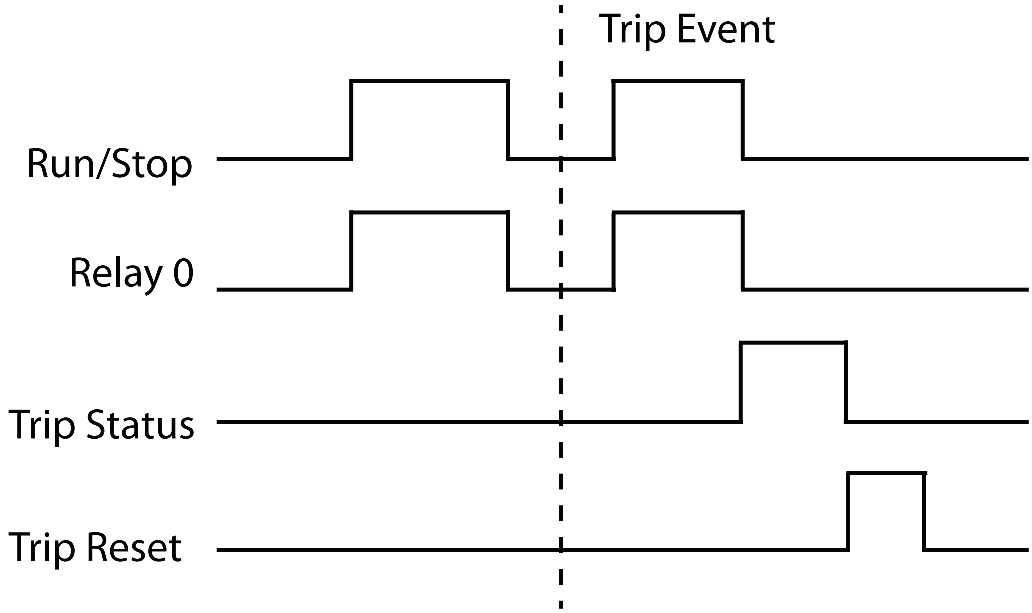
The DeviceLogix program that is shown in Figure 71 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 3.

Figure 71 - Non-reversing Starter (Network) DeviceLogix Program



Timing Diagram

Figure 72 - 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 4.

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 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, the starter energizes if the value in LogicDefinedPt00Data is set to 1.

Rules

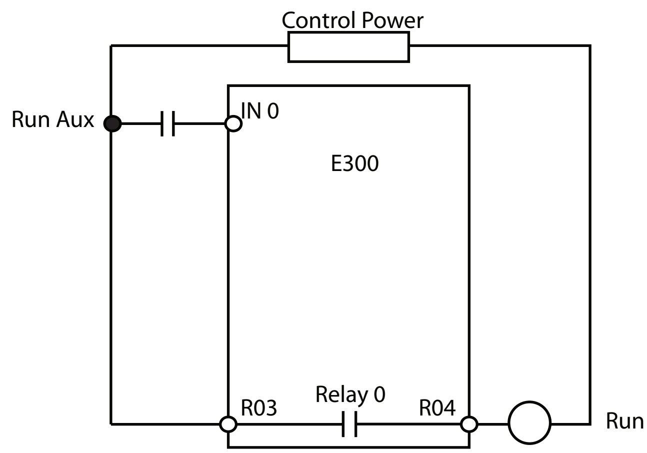
1. Available for Control Module firmware v5.000 and higher.

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 73 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.

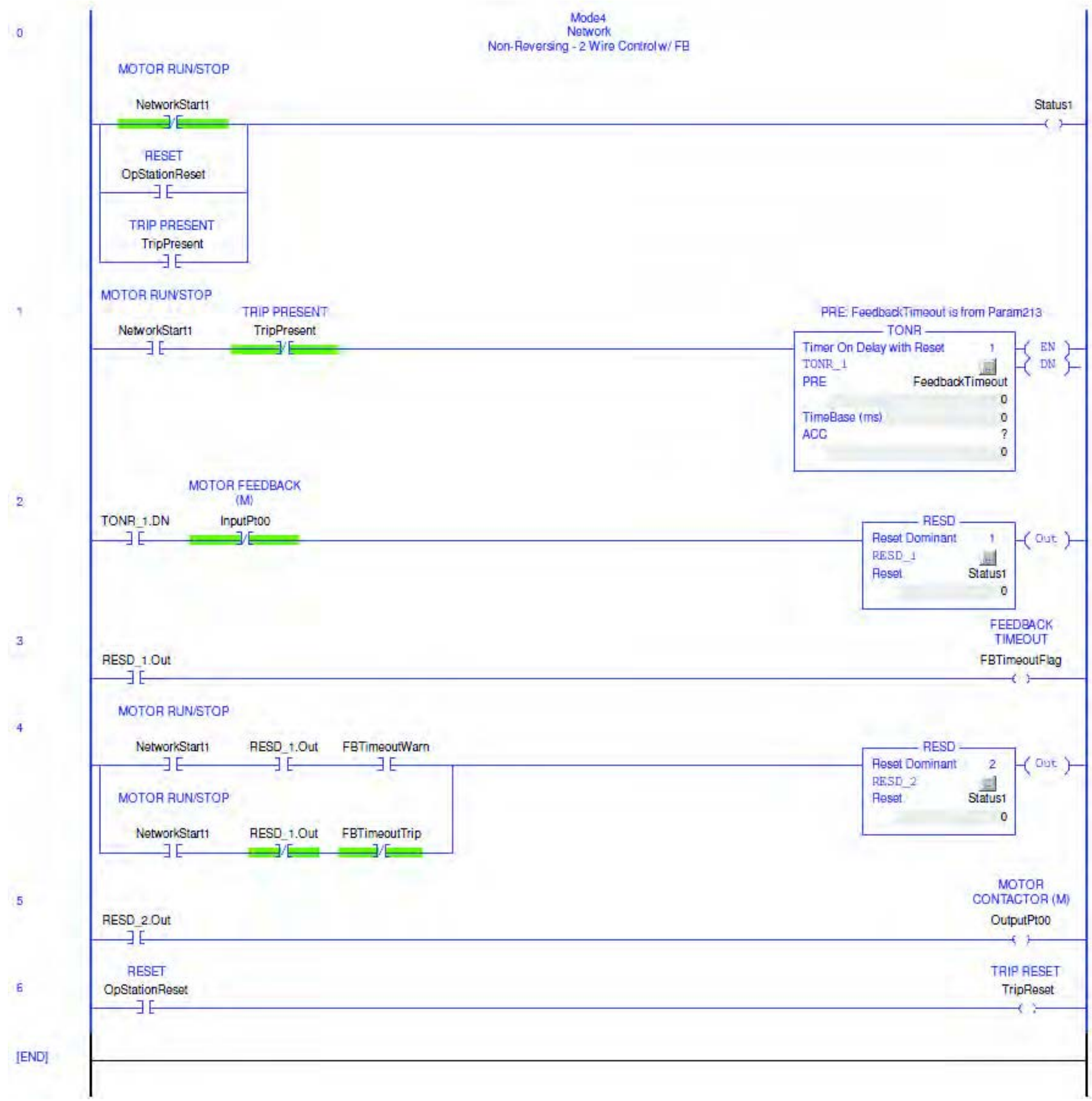
Figure 73 - Non-reversing Starter (Network) with Feedback Wiring Diagram



DeviceLogix Program

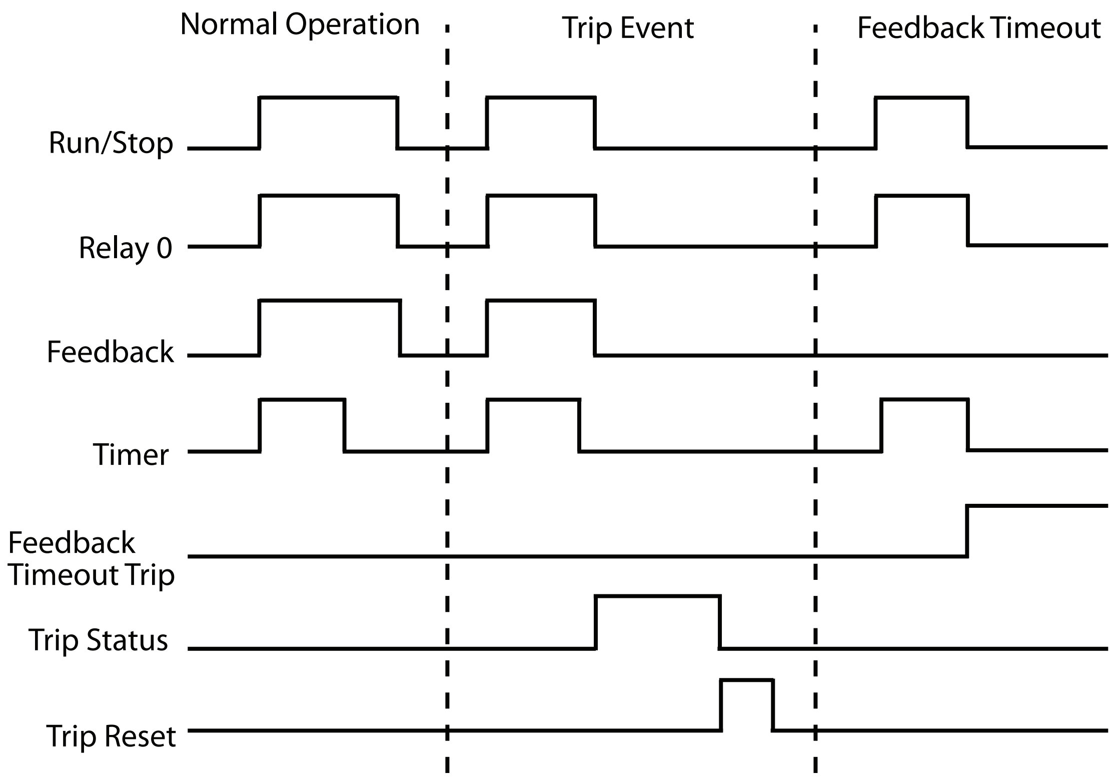
The DeviceLogix program that is shown in Figure 74is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 4.

Figure 74 - Non-reversing Starter (Network) with Feedback DeviceLogix Program



Timing Diagram

Figure 75 - 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 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

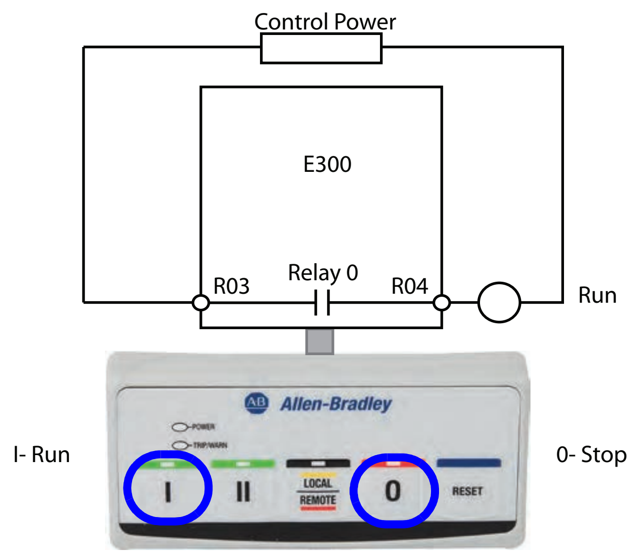
- Option Match Warning must be enabled in WarningEnableC (Parameter 192)
- Operator Station must be disabled in Mismatch Action (Parameter 233)
- An operator station must be selected in Operator Station Type (Parameter 224)

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 76 is a wiring diagram of a non-reversing starter with Output Relay 0 configured as a control relay.

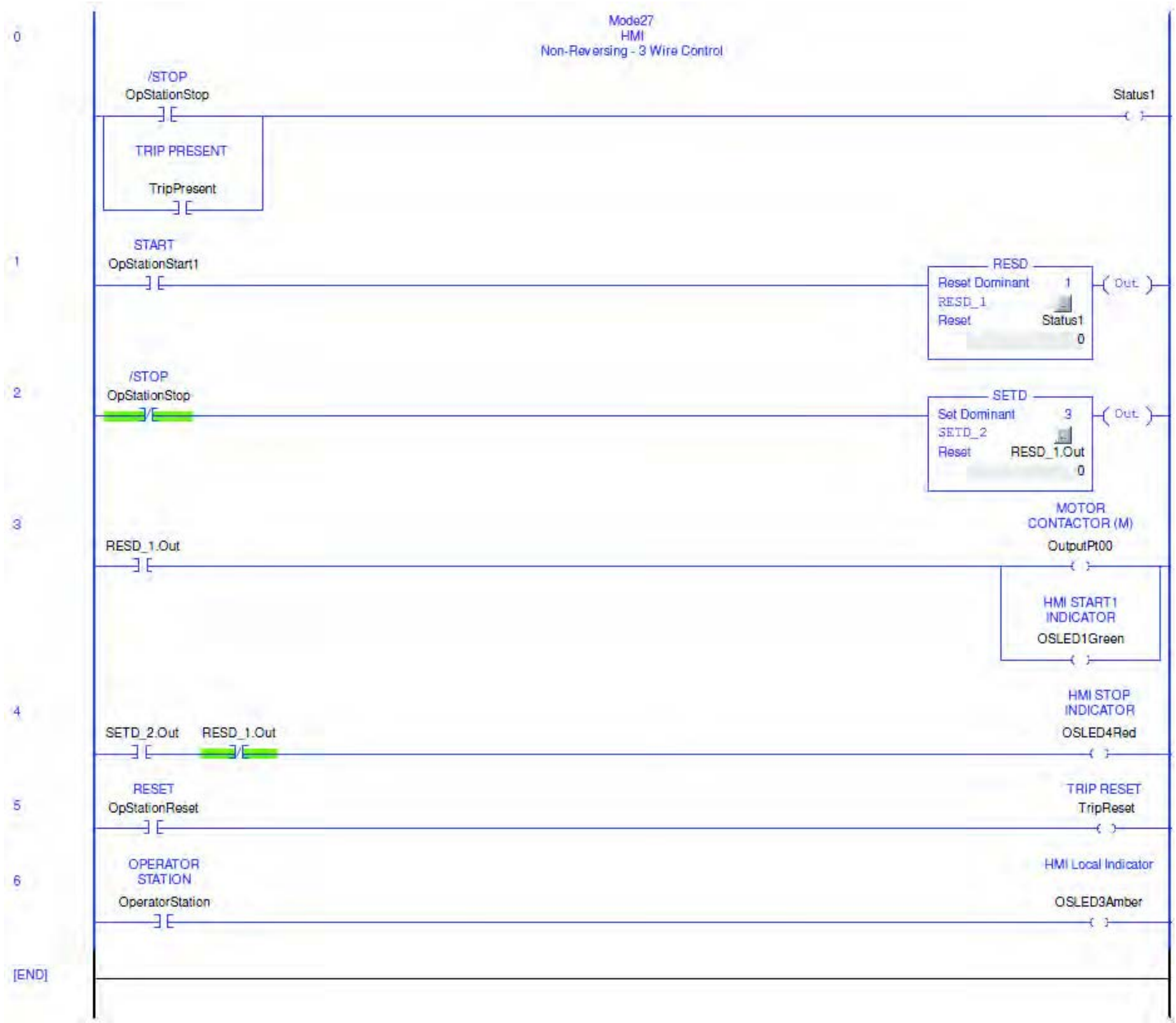
Figure 76 - Non-reversing Starter (Operator Station) Wiring Diagram



DeviceLogix Program

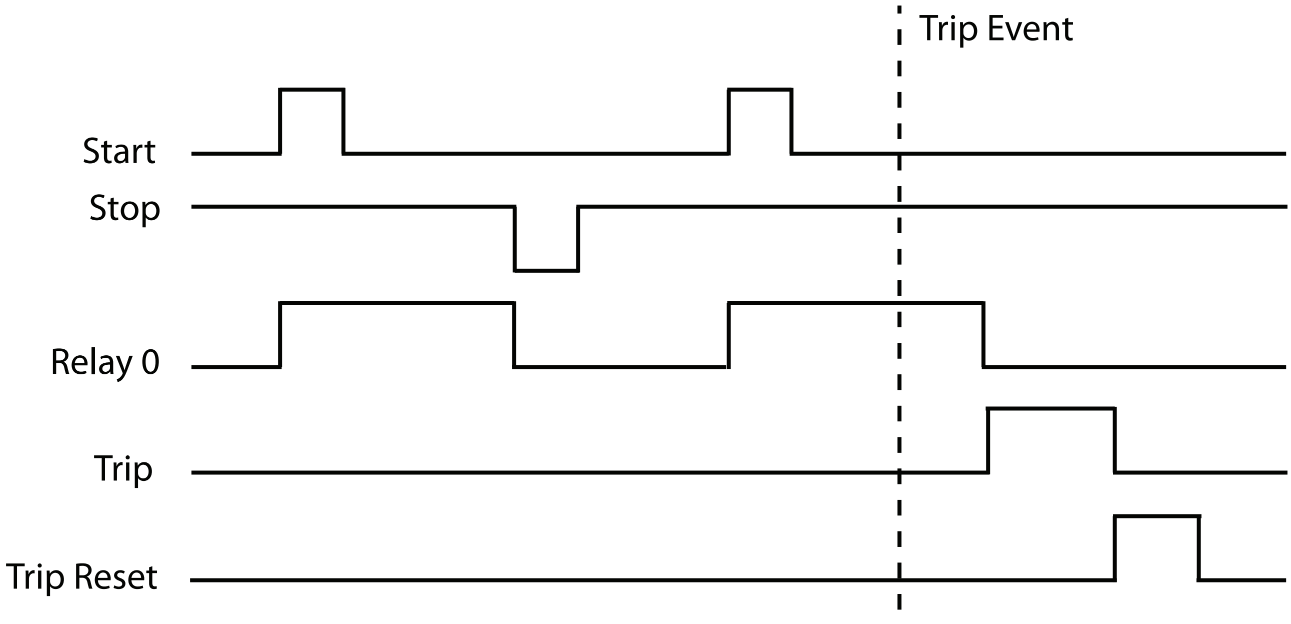
The DeviceLogix program that is shown in Figure 77 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 27.

Figure 77 - Non-reversing Starter (Operator Station) DeviceLogix Program



Timing Diagram

Figure 78 - 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 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 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

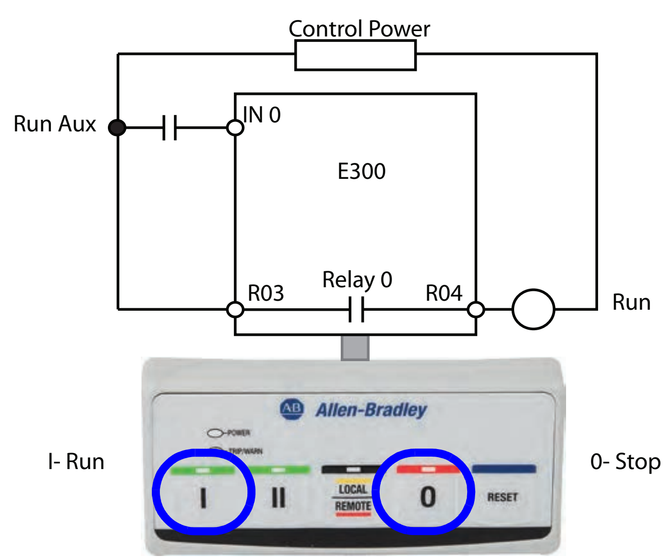
- Option Match Warning must be enabled in WarningEnableC (Parameter 192)
- Operator Station must be disabled in Mismatch Action (Parameter 233)
- An operator station must be selected in Operator Station Type (Parameter 224)

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 79 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.

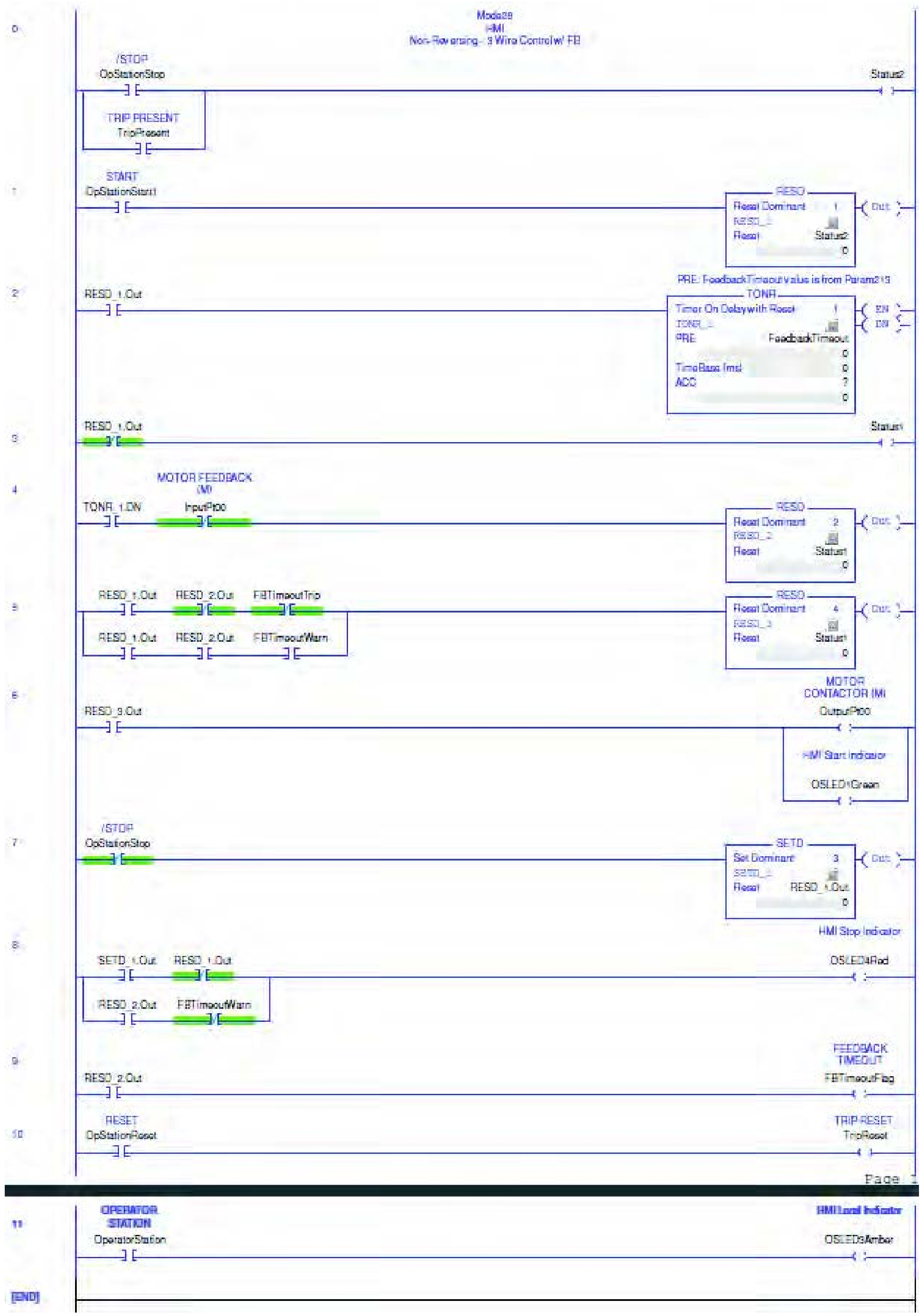
Figure 79 - Non-reversing Starter (Operator Station) with Feedback Wiring Diagram



DeviceLogix Program

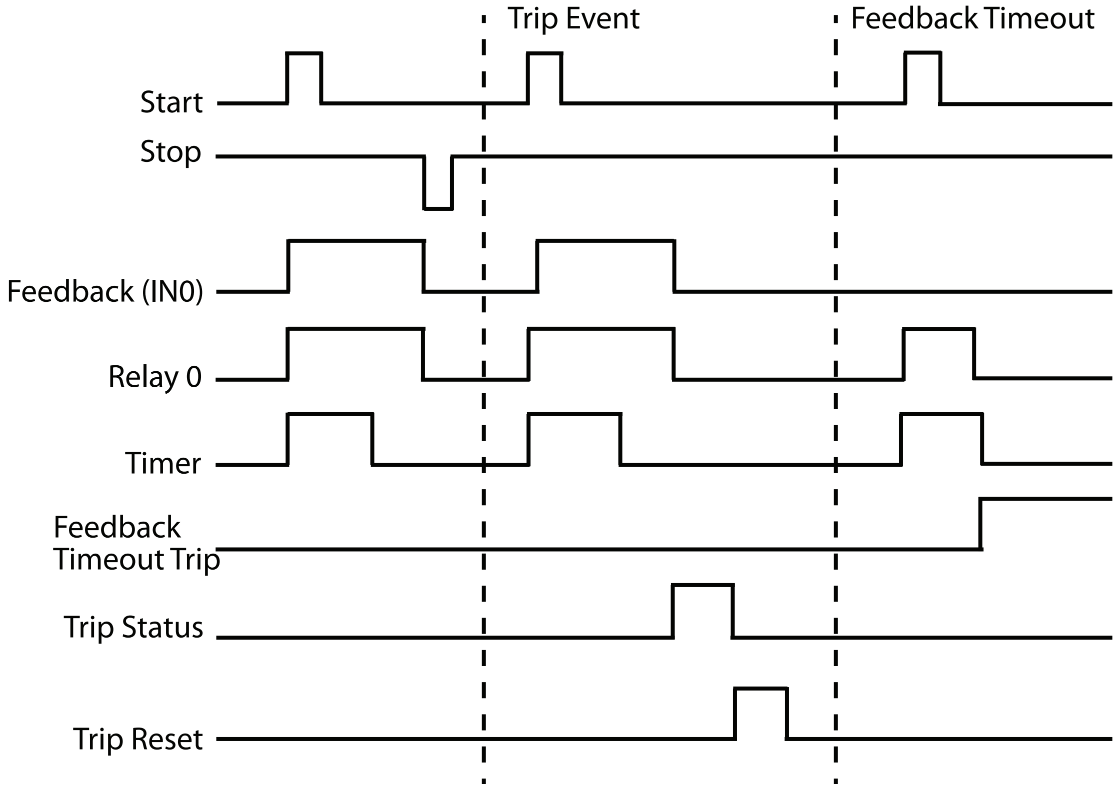
The DeviceLogix program that is shown in Figure 80 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 28.

Figure 80 - Non-reversing Starter (Operator Station) with Feedback DeviceLogix Program



Timing Diagram

Figure 81 - 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 powers up, the starter energizes if Input 0 is active.

Rules

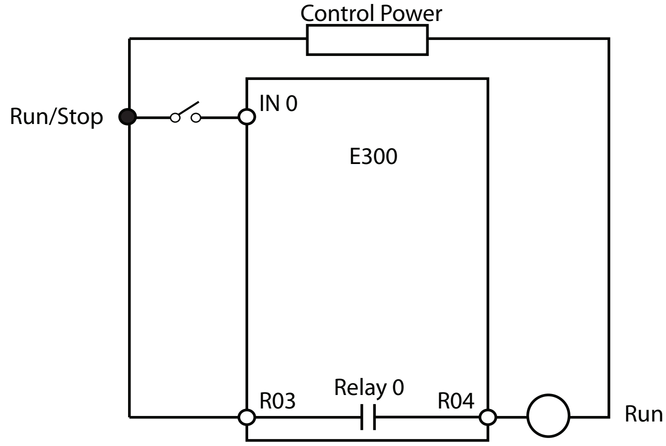
1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Overload Trip must be enabled in TripEnableI (Parameter 183).
4. Communication Fault & Idle Override (Parameter 346) must be enabled.

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 82 is a wiring diagram of a non-reversing starter with Output Relay 0 configured as a control relay.

Figure 82 - Non-reversing Starter (Local I/O) – Two-wire Control Wiring Diagram



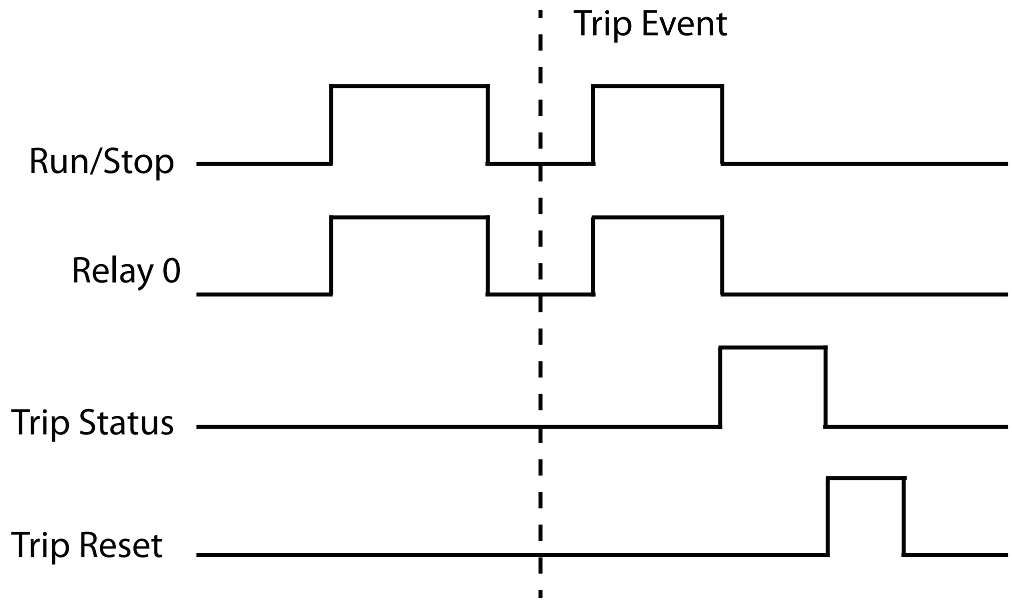
DeviceLogix Program

The DeviceLogix program that is shown in Figure 83 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 36.

Figure 83 - Non-reversing Starter (Local I/O) – Two-wire Control DeviceLogix Program

Timing Diagram

Figure 84 - 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 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 powers up, the starter energizes if Input 1 is active.

Rules

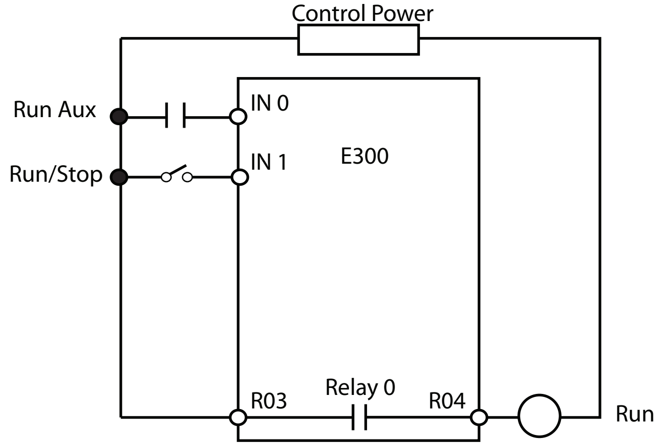
1. Available for Control Module firmware v5.000 and higher.
2. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
3. Overload Trip must be enabled in TripEnableI (Parameter 183).
4. Feedback Timeout Trip in TripEnableC (Parameter 186) or Feedback Timeout Warning in WarningEnableC (Parameter 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 85 is a wiring diagram of a non-reversing starter with Output Relay 0 configured as a control relay.

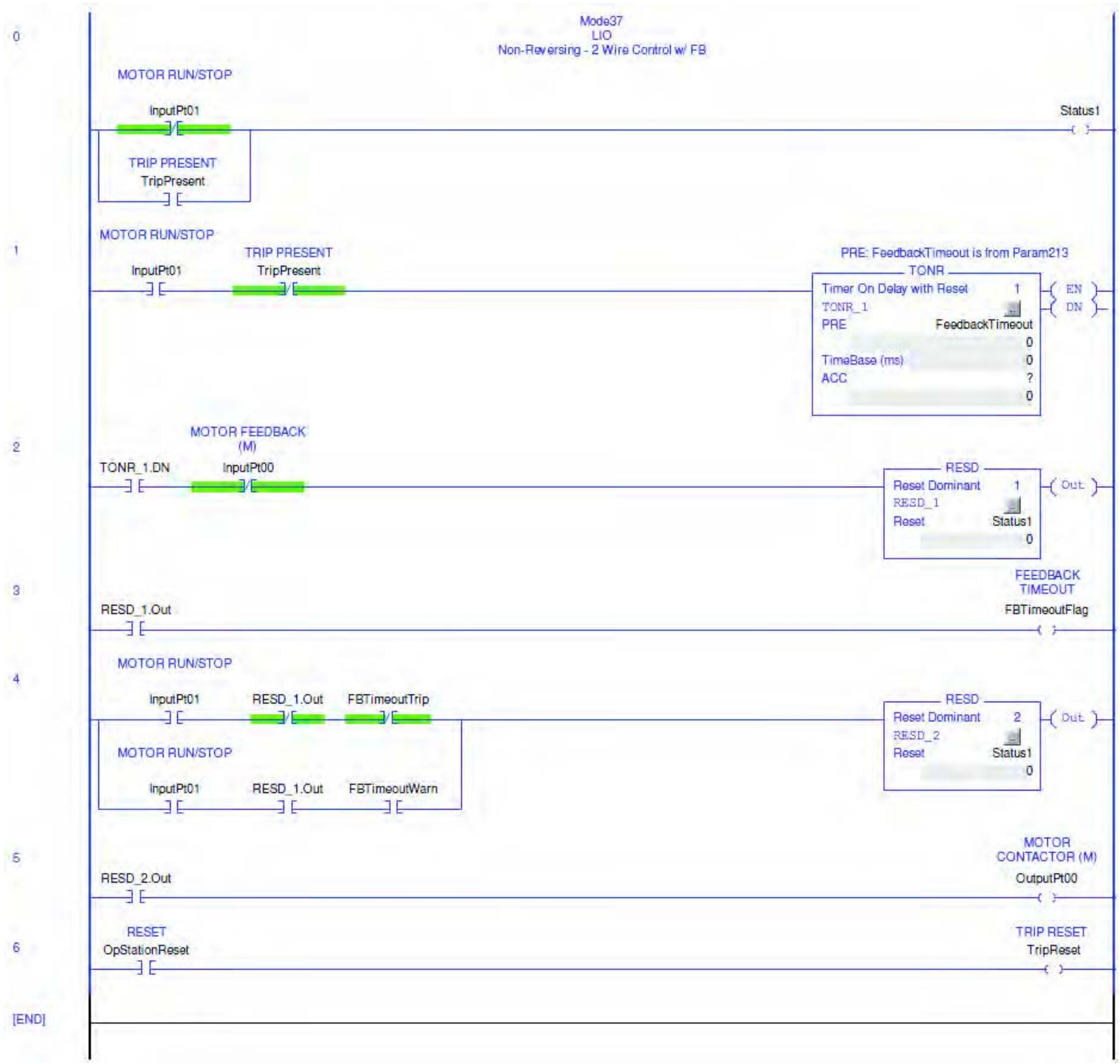
Figure 85 - Non-reversing Starter (Local I/O) – Two-wire Control with Feedback Wiring Diagram



DeviceLogix Program

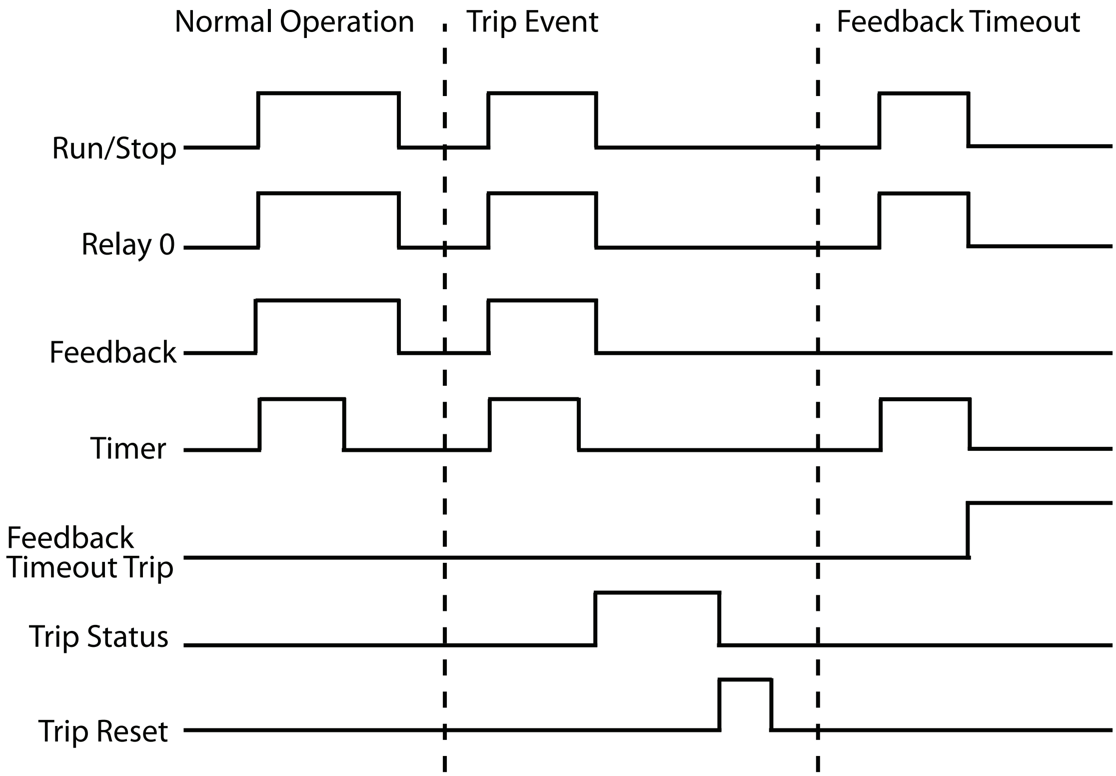
The DeviceLogix program that is shown in Figure 86 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 37.

Figure 86 - Non-reversing Starter (Local I/O) – Two-wire Control with Feedback DeviceLogix Program



Timing Diagram

Figure 87 - 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.

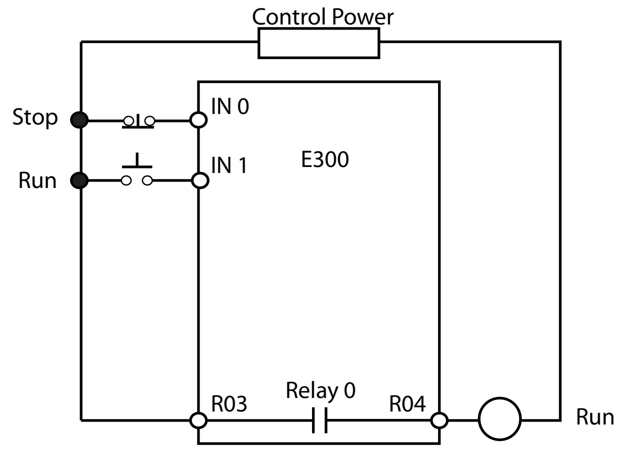
Rules

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 88 is a wiring diagram of a non-reversing starter with three wire control and an Output Relay 0 configured as a control relay.

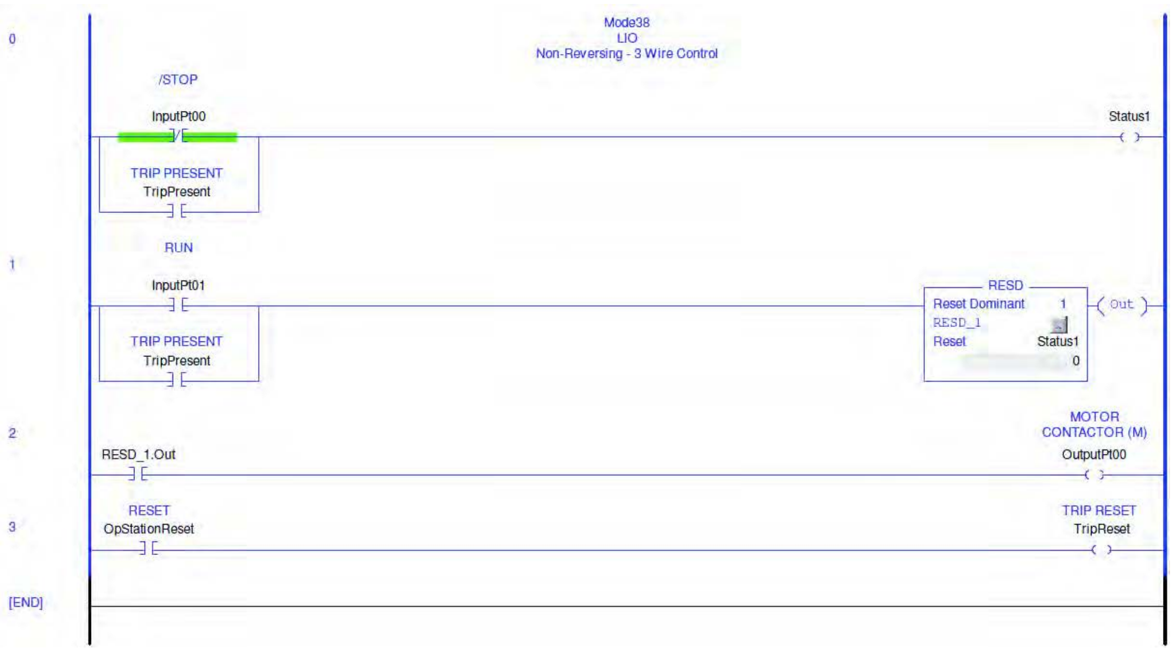
Figure 88 - Non-reversing Starter (Local I/O) – Three-wire Control Wiring Diagram



DeviceLogix Program

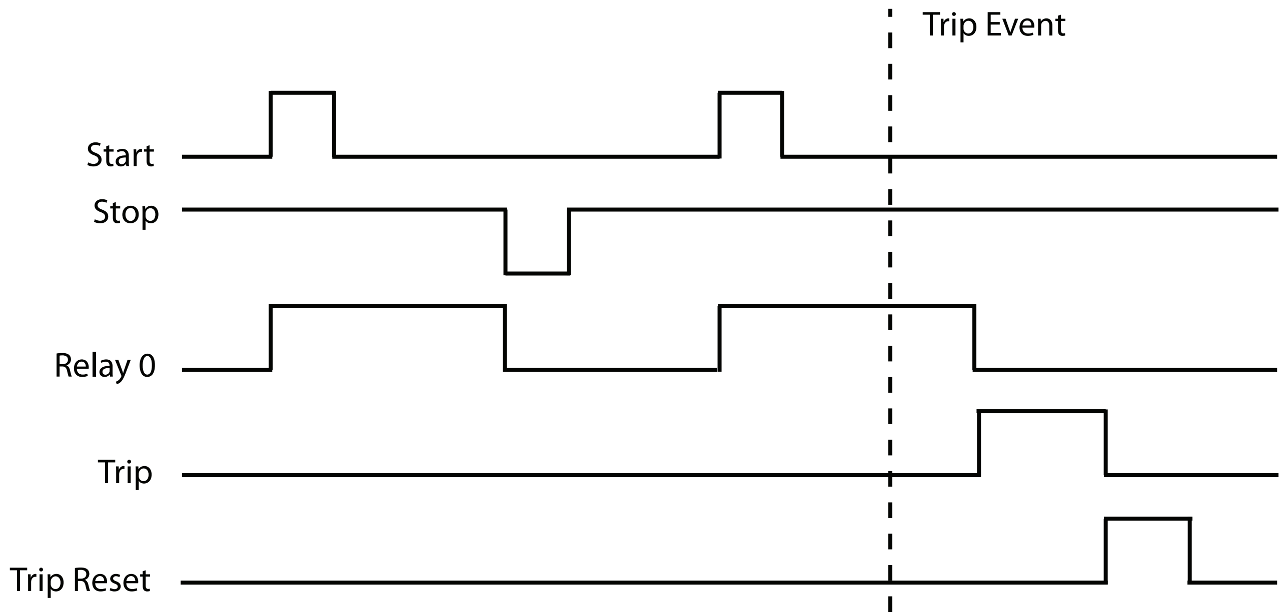
The DeviceLogix program that is shown in Figure 89 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 38.

Figure 89 - Non-reversing Starter (Local I/O) – Three-wire Control DeviceLogix Program



Timing Diagram

Figure 90 - 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 issues a trip or warning event.

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

Rules

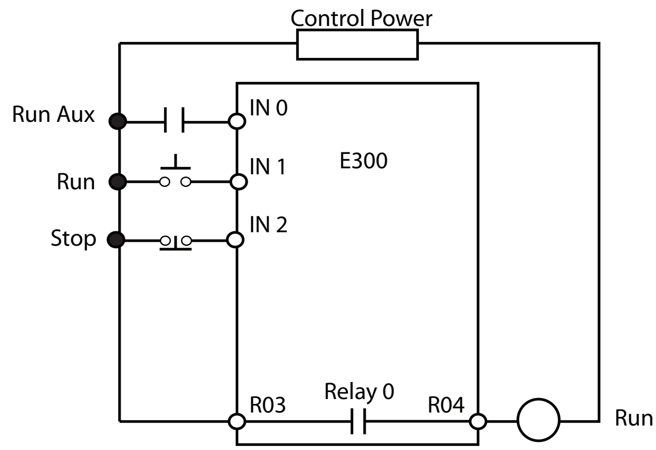
1. Available for Control Module firmware v5.000 and higher.
2. Three digital inputs must be available on the Control Module
3. Output Pt00 Assignment (Parameters 202) must be set to Control Relay.
4. Overload Trip must be enabled in TripEnableI (Parameter 183).
5. Feedback Timeout Trip in TripEnableC (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 91 is a wiring diagram of a non-reversing starter with three wire control and Output Relay 0 configured as a control relay.

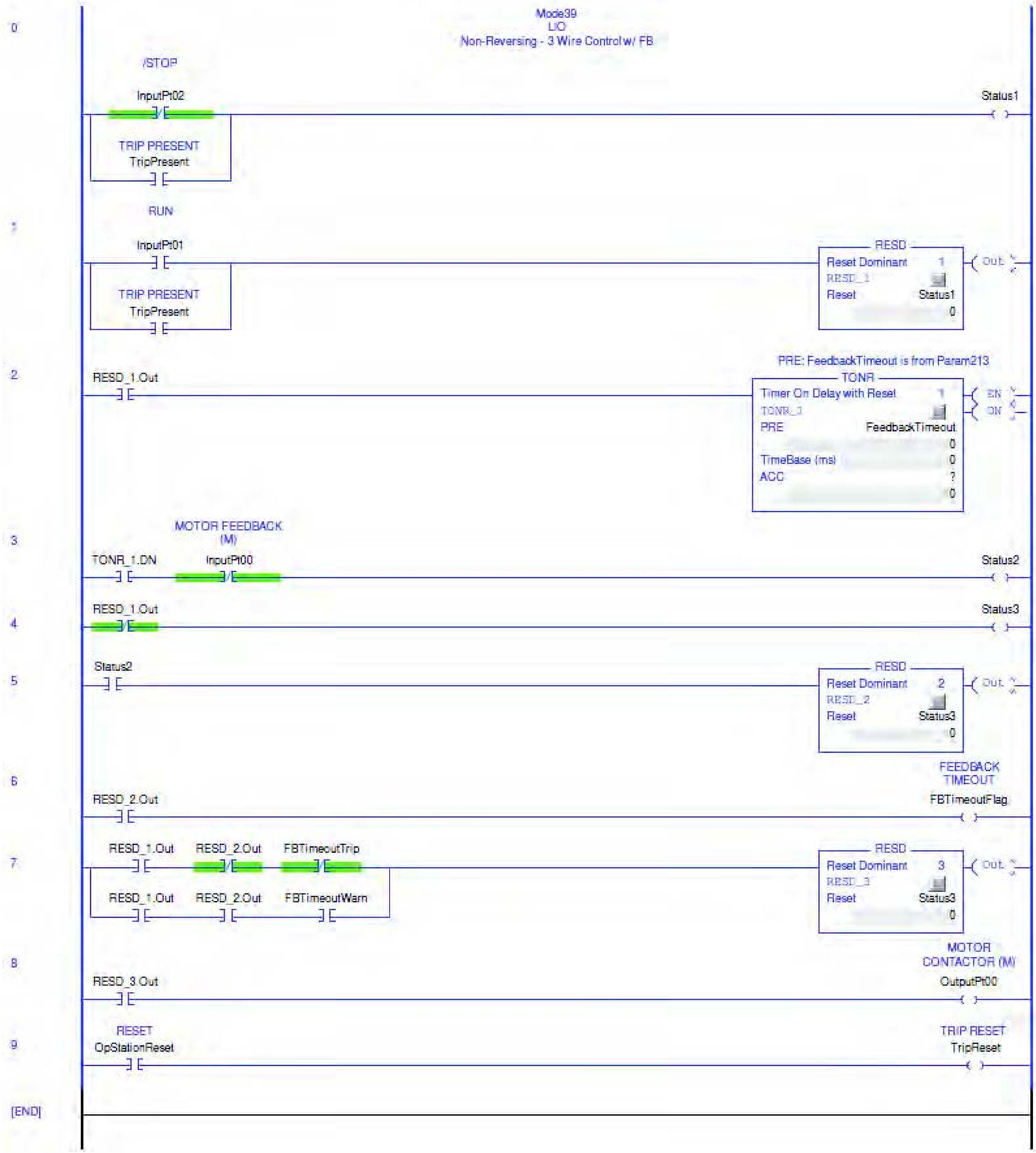
Figure 91 - Non-reversing Starter (Local I/O) – Three-wire Control with Feedback Wiring Diagram



DeviceLogix Program

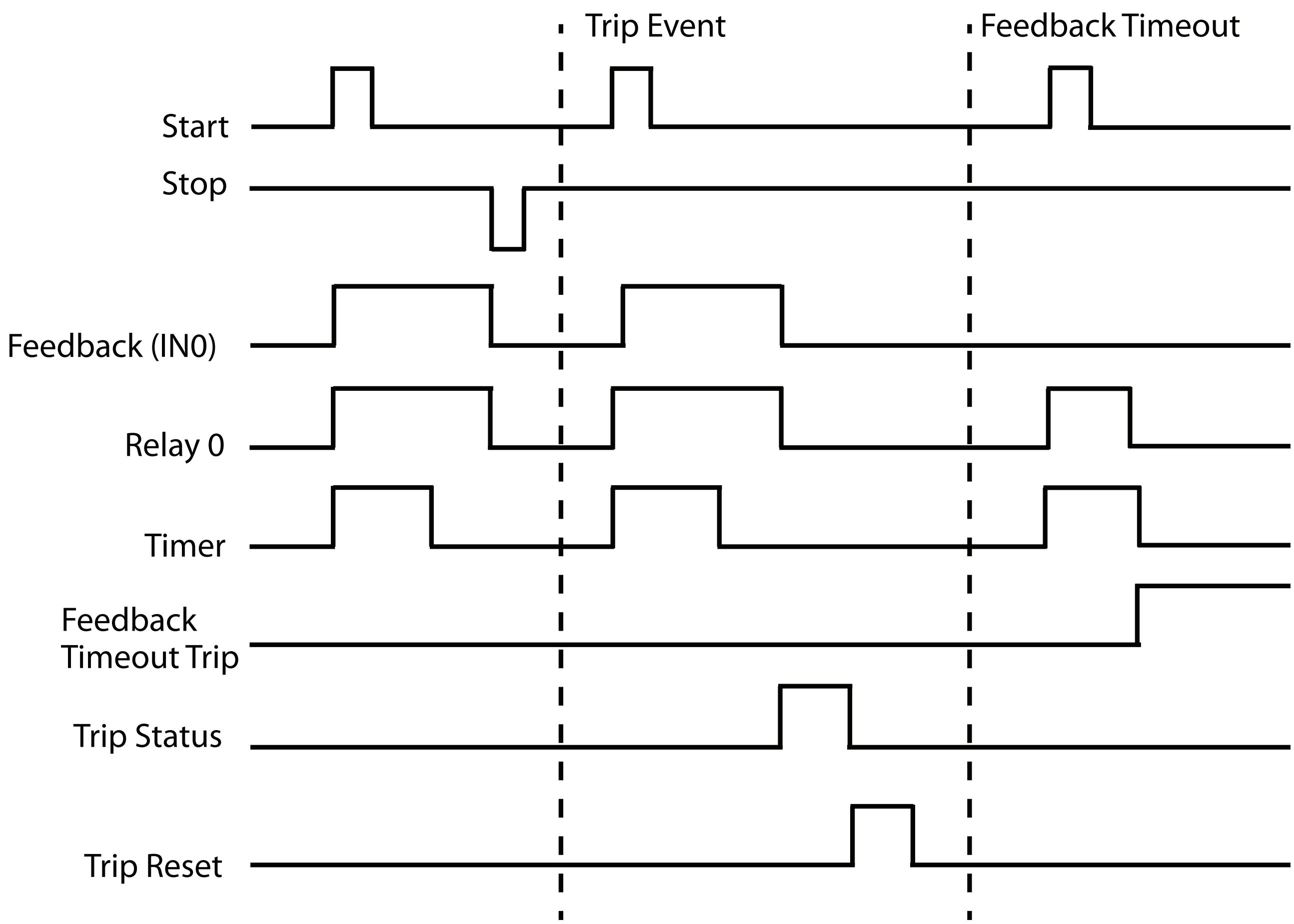
The DeviceLogix program that is shown in Figure 92 is automatically loaded and enabled in the E300 on powerup or when Operating Mode (Parameter 195) is set to a value of 39.

Figure 92 - Non-reversing Starter (Local I/O) – Three-wire Control with Feedback DeviceLogix Program



Timing Diagram

Figure 93 - 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 4.

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 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, 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)

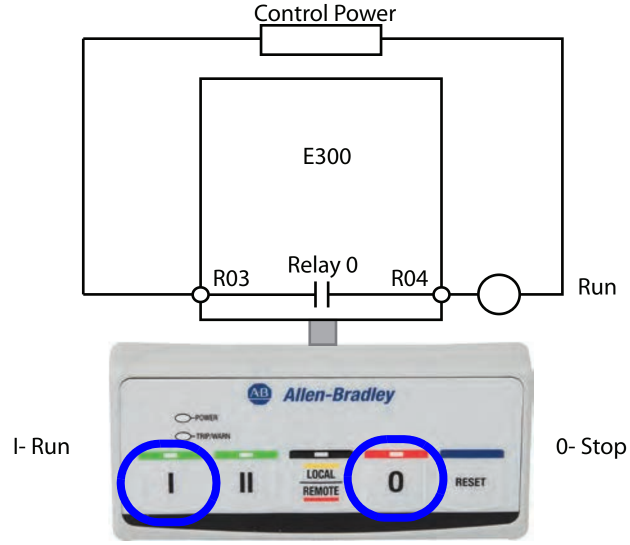
6. Communication Fault & Idle Override (Parameter 346) must be enabled.
7. Network Fault Override (Parameter 347) must be enabled.

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 94 is a wiring diagram of a non-reversing starter with Output Relay 0 configured as a control relay.

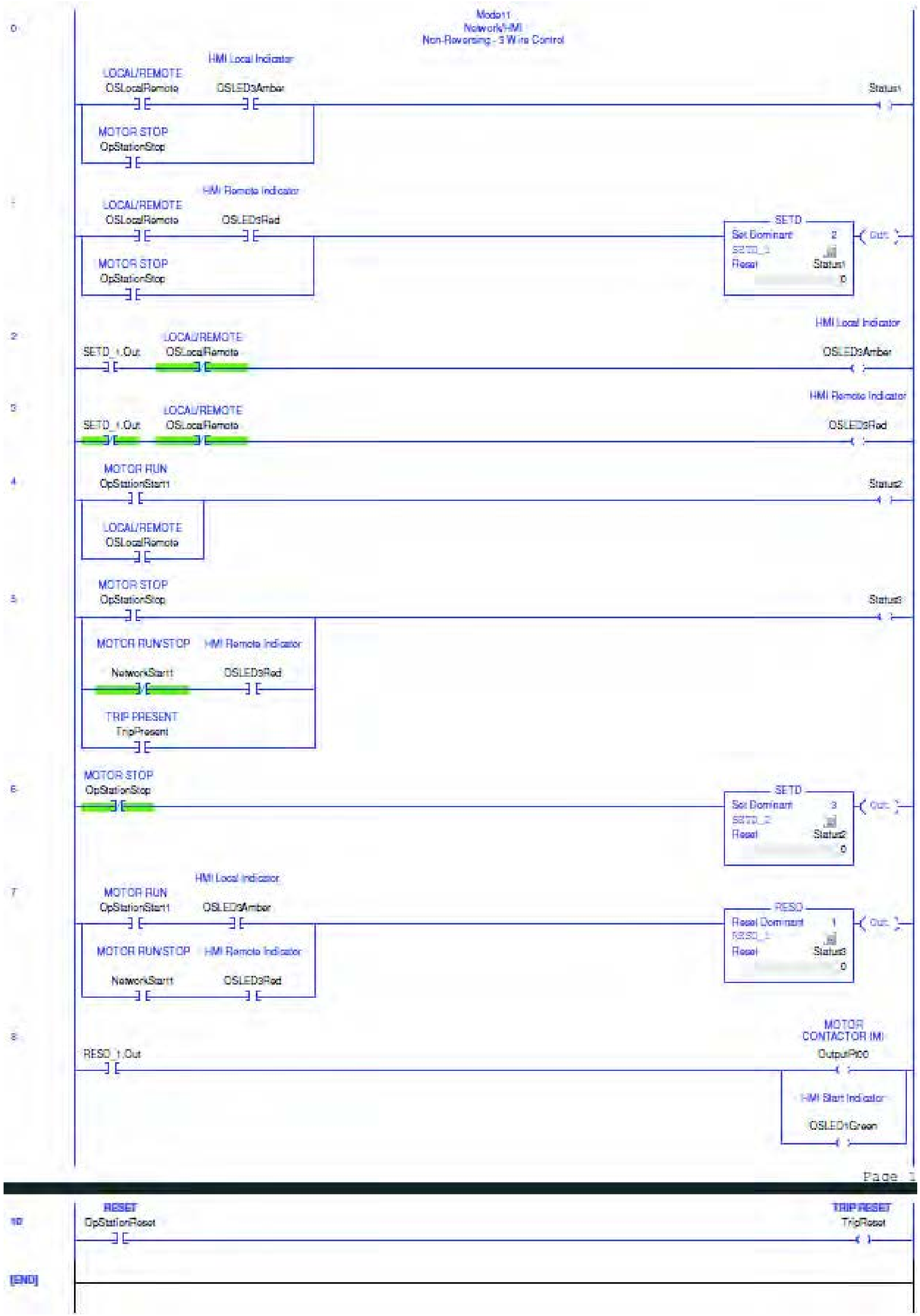
Figure 94 - Non-reversing Starter (Network & Operator Station) Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 95 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 11.

Figure 95 - Non-reversing Starter (Network & Operator Station) DeviceLogix Program



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 4.

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 issues a trip or warning event.

The E300 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, 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

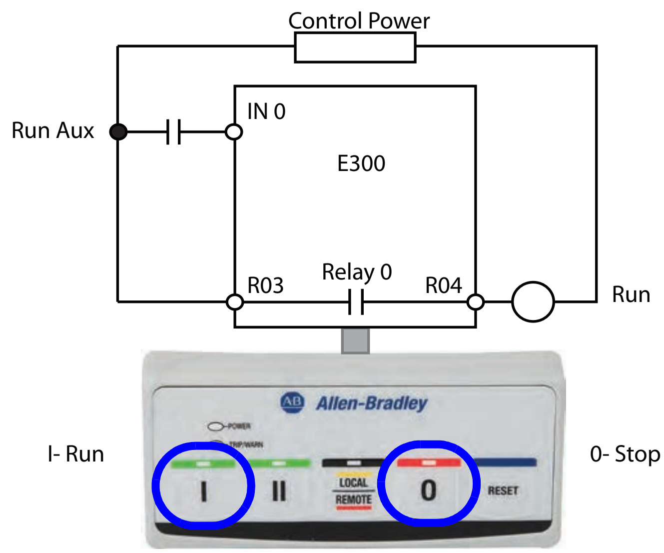
- Option Match Warning must be enabled in WarningEnableC (Parameter 192)
- Operator Station must be disabled in Mismatch Action (Parameter 233)
- An operator station must be selected in Operator Station Type (Parameter 224)

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 96 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 96 - Non-reversing Starter (Network & Operator Station) with Feedback Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 97 and Figure 98 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 12.

Figure 97 - Non-reversing Starter (Network & Operator Station) with Feedback DeviceLogix Program, Part A

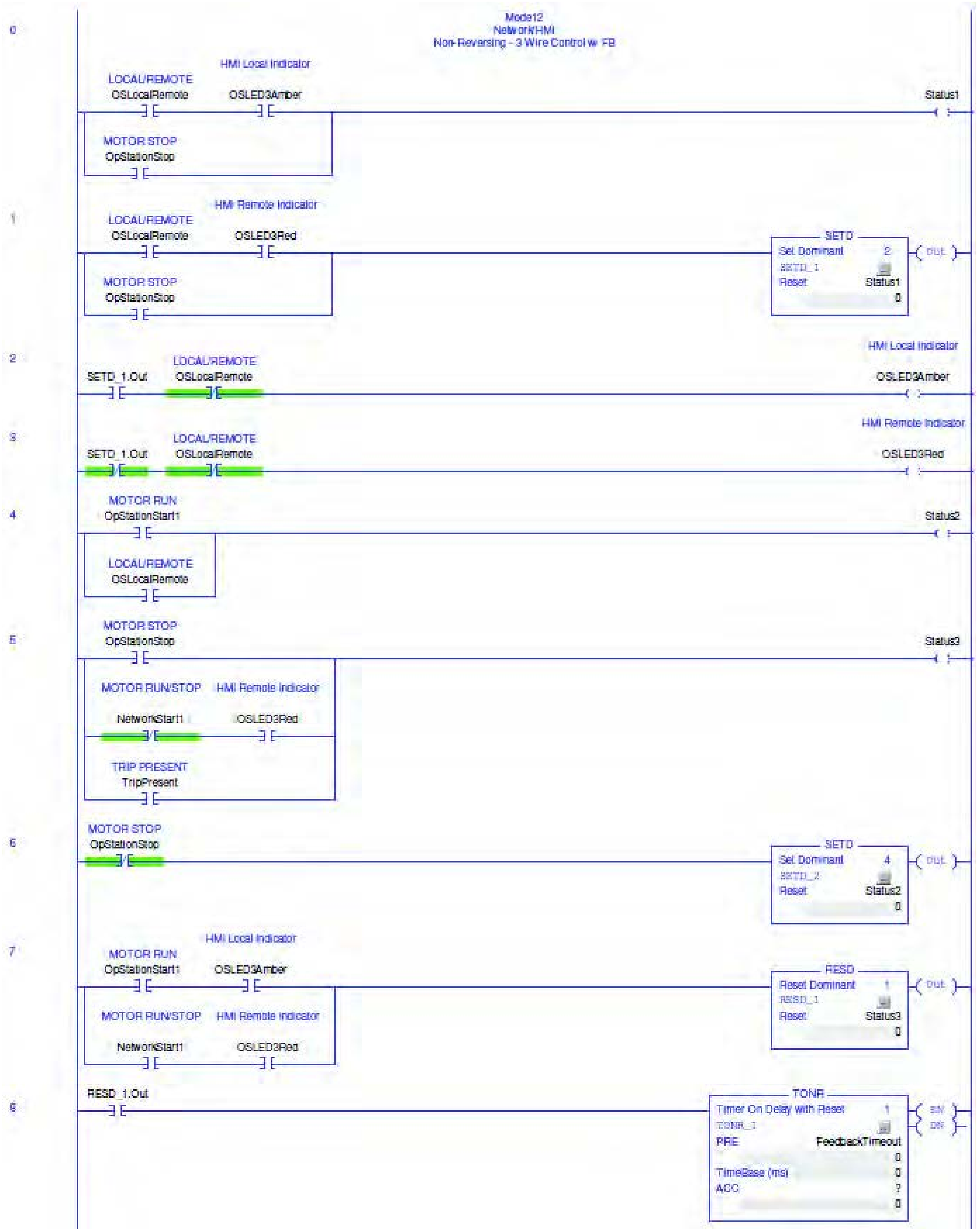
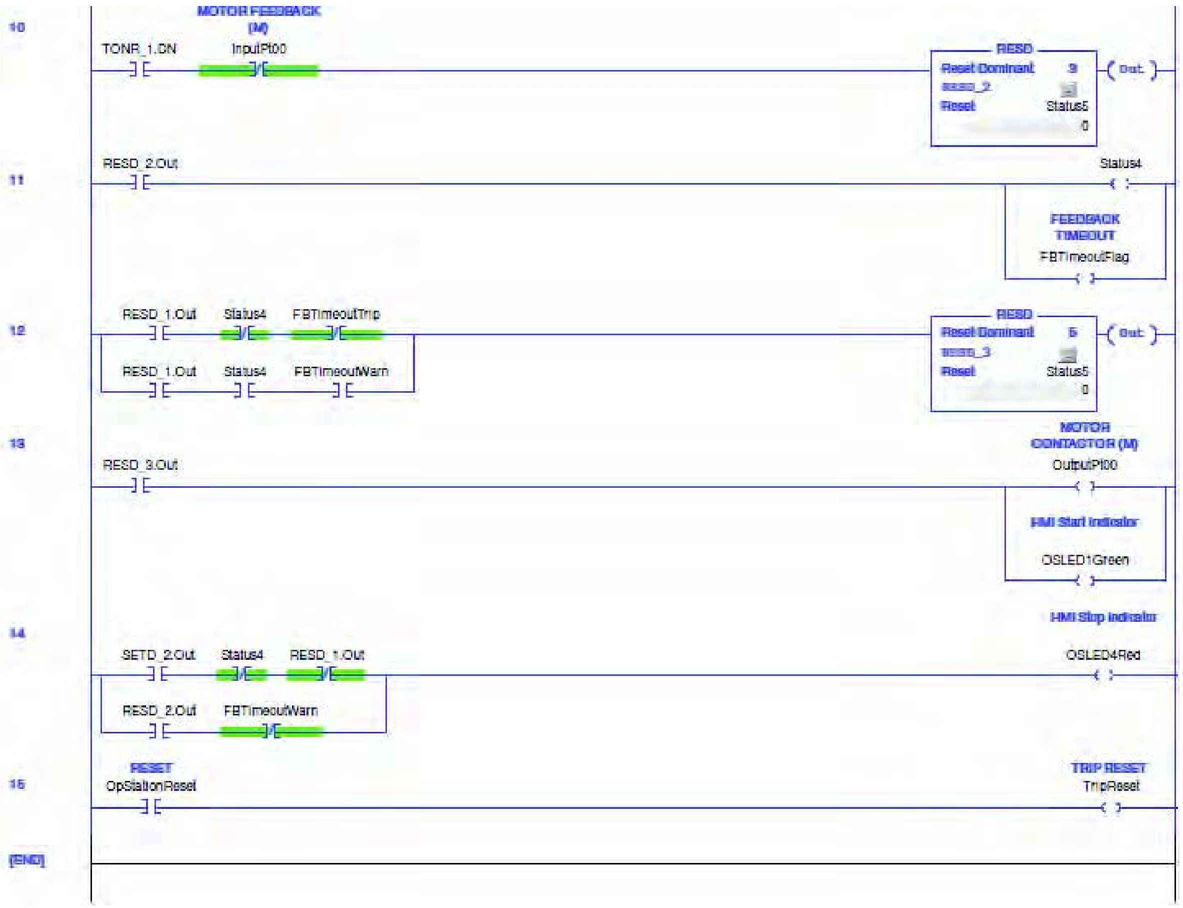


Figure 98 - Non-reversing Starter (Network & Operator Station) with Feedback DeviceLogix Program, Part B



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 4

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, the starter energizes if the value in LogicDefinedPt00Data is set to 1.

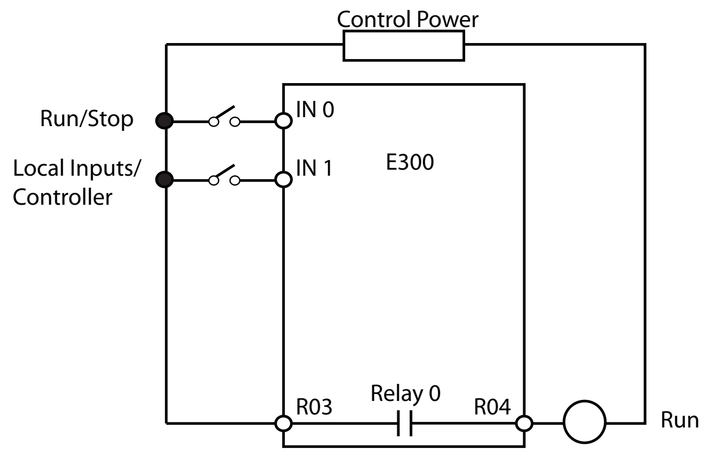
Rules

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 99 is a wiring diagram of a non-reversing starter with Output Relay 0 configured as a control relay.

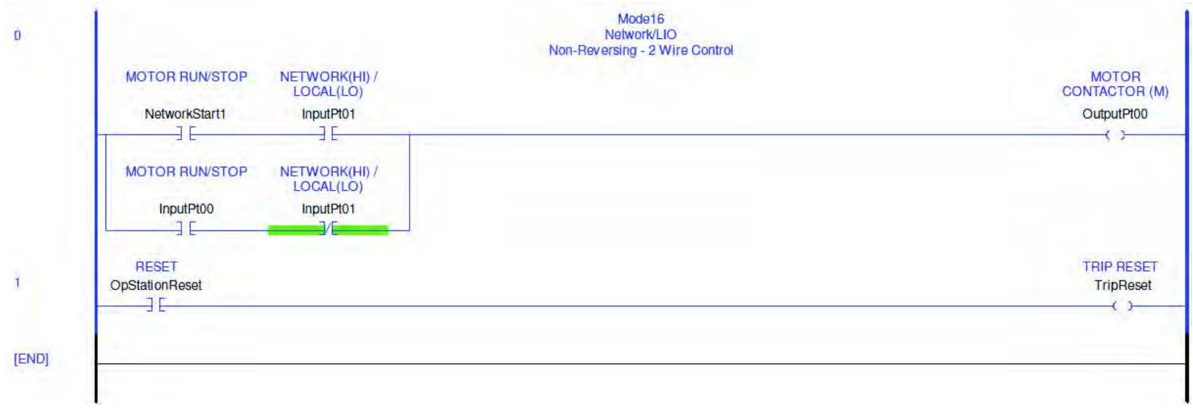
Figure 99 - Non-reversing Starter (Network & Local I/O) – Two-wire Control Wiring Diagram



DeviceLogix Program

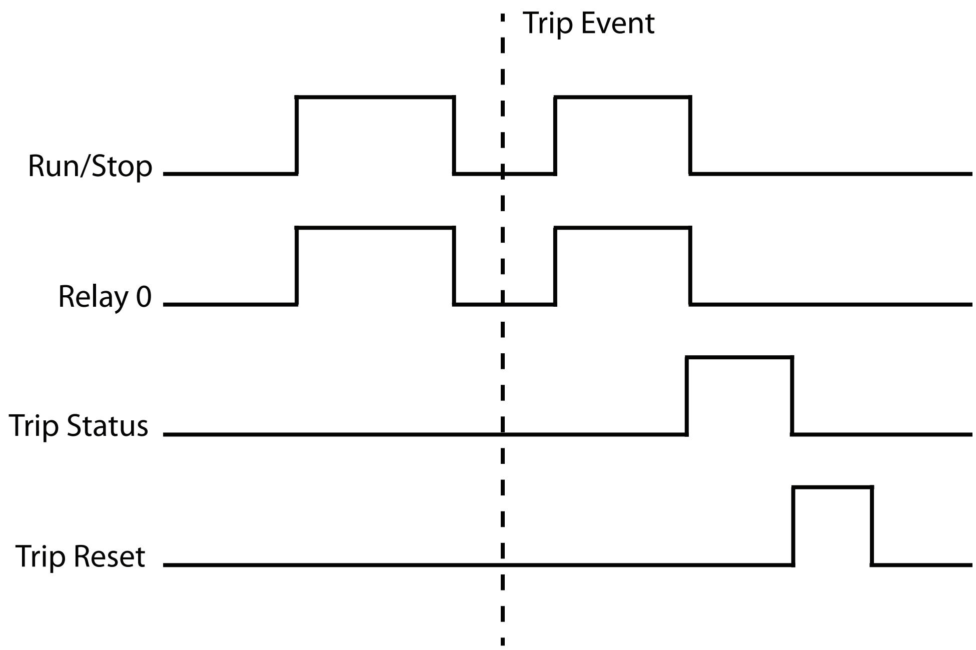
The DeviceLogix program that is shown in Figure 100 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 16.

Figure 100 - Non-reversing Starter (Network & Local I/O) – Two-wire Control DeviceLogix Program



Timing Diagram

Figure 101 - 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 4.

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 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, the starter energizes if the value in LogicDefinedPt00Data is set to 1.

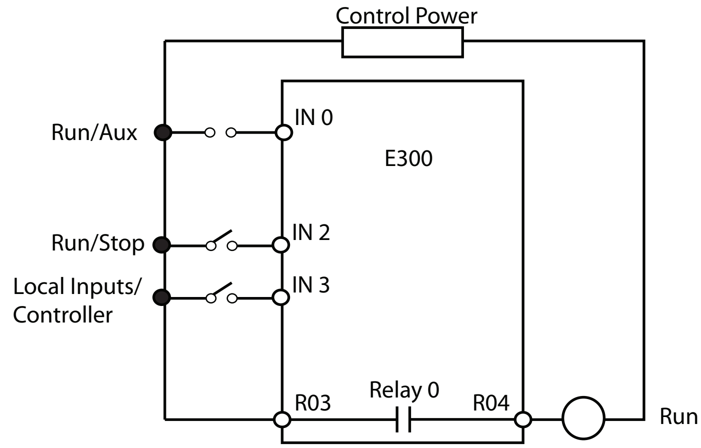
Rules

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 102 is a wiring diagram of a non-reversing starter with Output Relay 0 configured as a control relay.

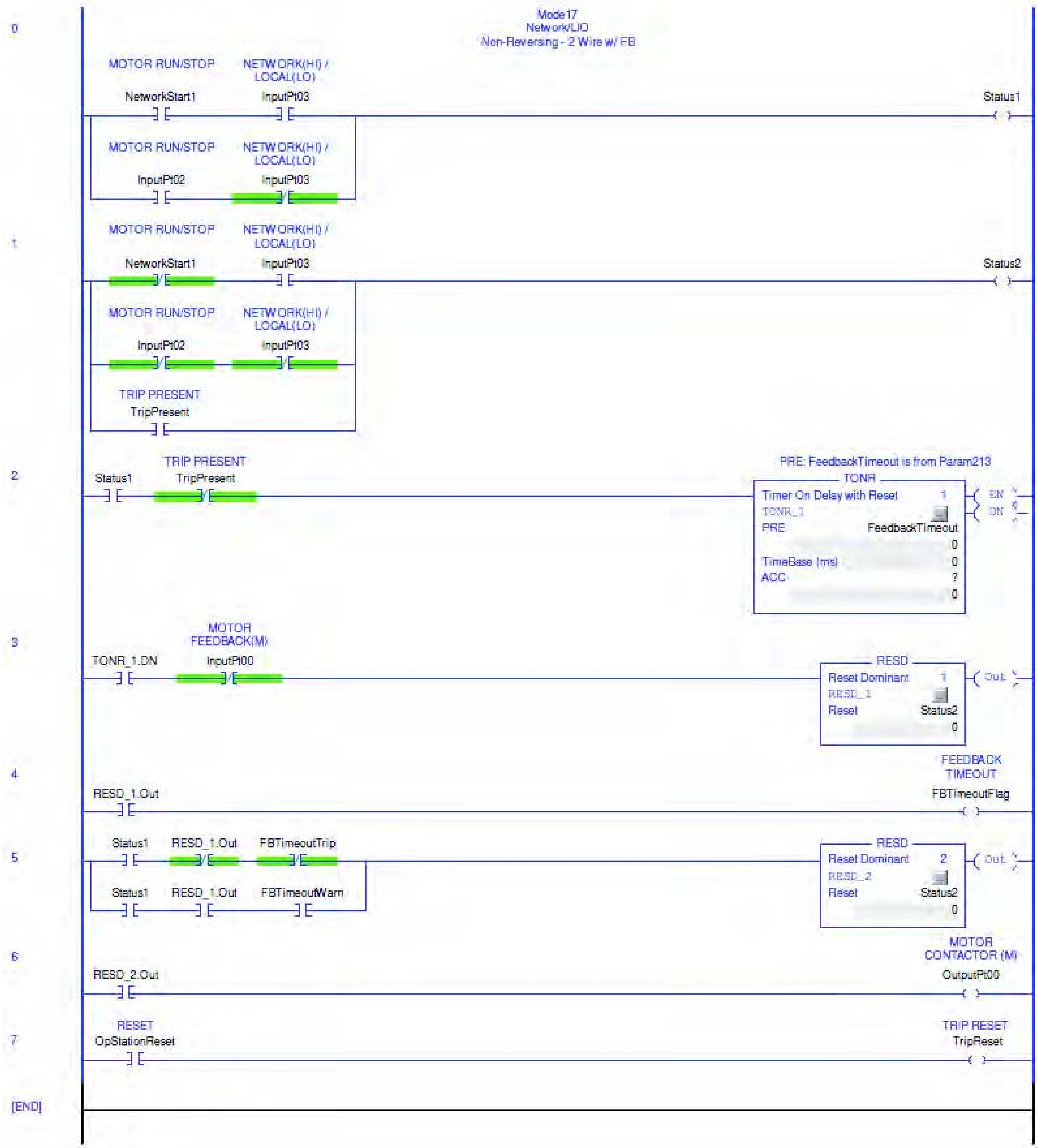
Figure 102 - Non-reversing Starter (Network & Local I/O) with Feedback – Two-wire Control Wiring Diagram



DeviceLogix Program

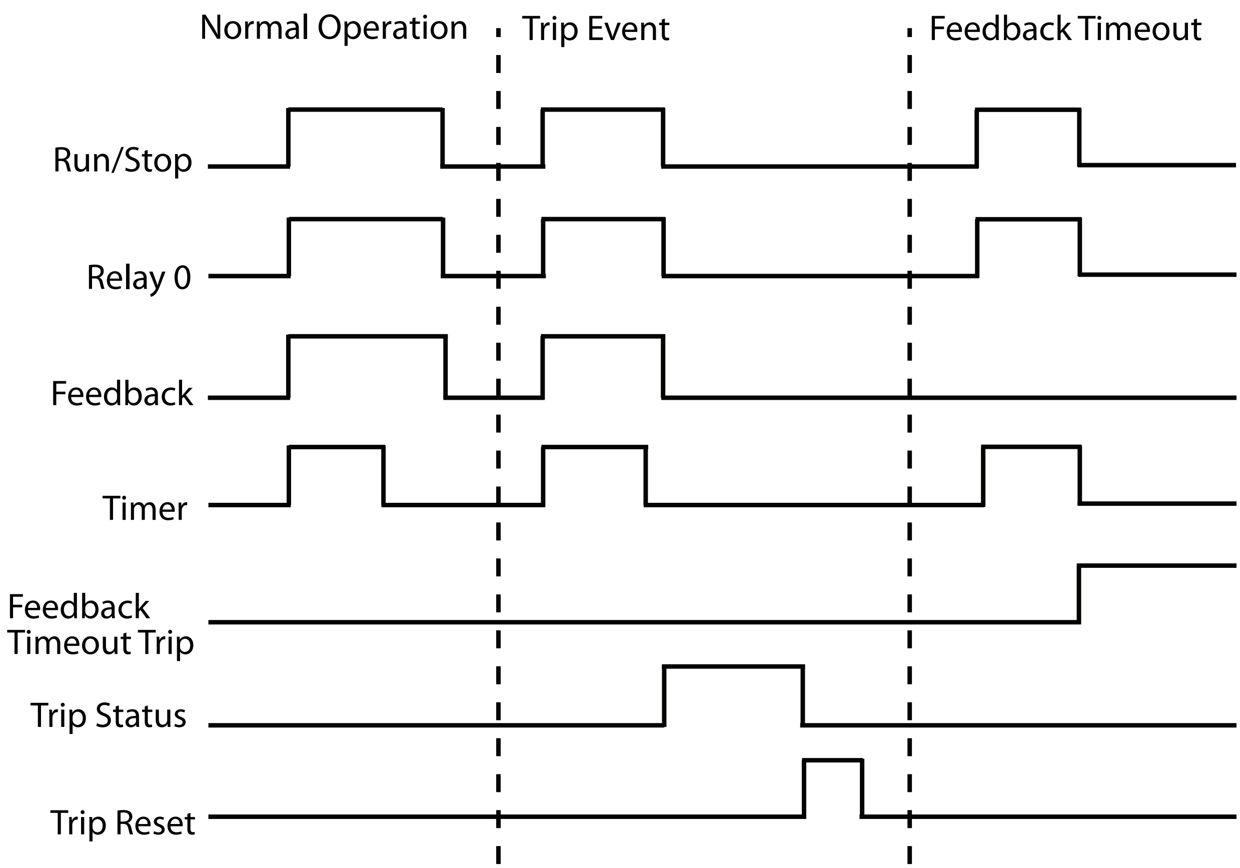
The DeviceLogix program that is shown in Figure 103 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 17.

Figure 103 - Non-reversing Starter (Network & Local I/O) with Feedback – Two-wire Control DeviceLogix Program



Timing Diagram

Figure 104 - 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 4.

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, the starter energizes if the value in LogicDefinedPt00Data is set to 1.

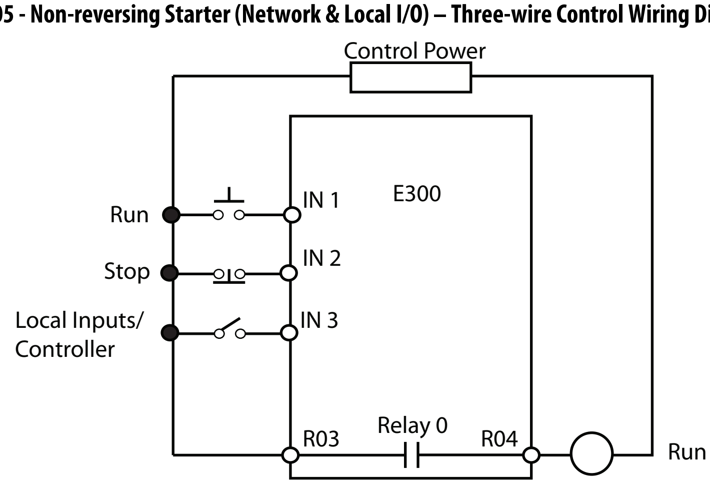
Rules

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 105 is a wiring diagram of a non-reversing starter with Output Relay 0 configured as a control relay.

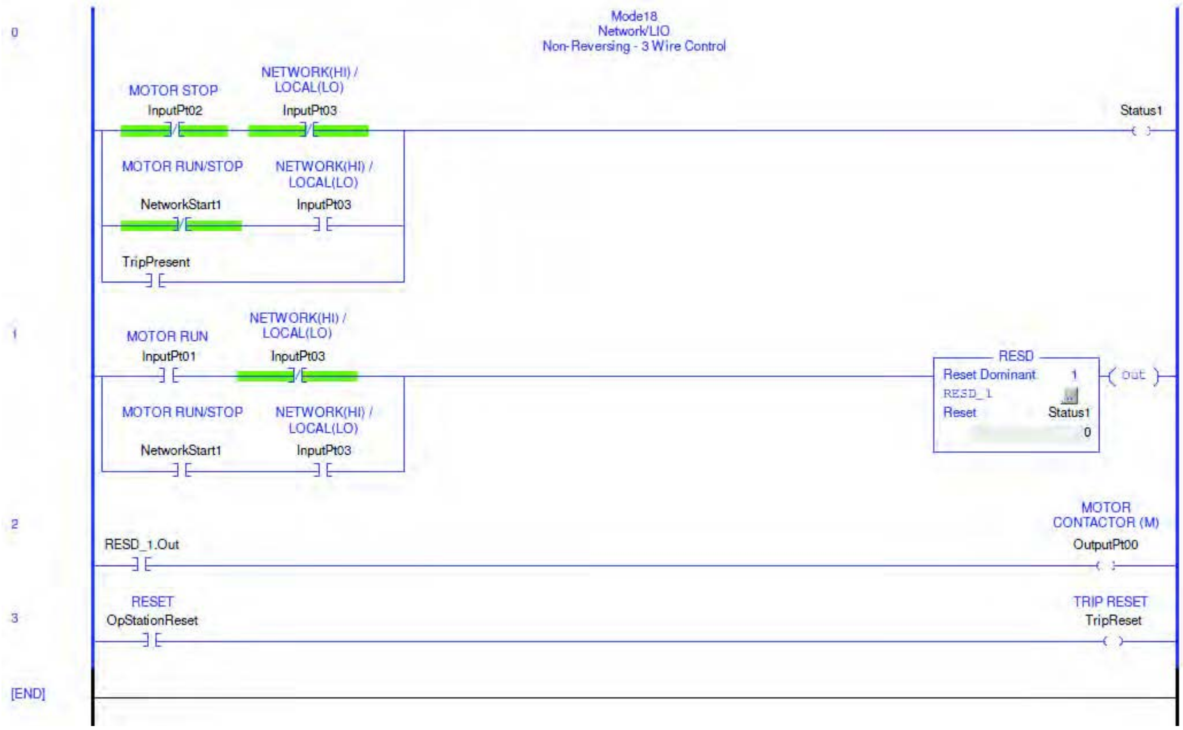
Figure 105 - Non-reversing Starter (Network & Local I/O) – Three-wire Control Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 106 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 18.

Figure 106 - Non-reversing Starter (Network & Local I/O) – Three-wire Control DeviceLogix Program



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 4.

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 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, the starter energizes if the value in LogicDefinedPt00Data is set to 1.

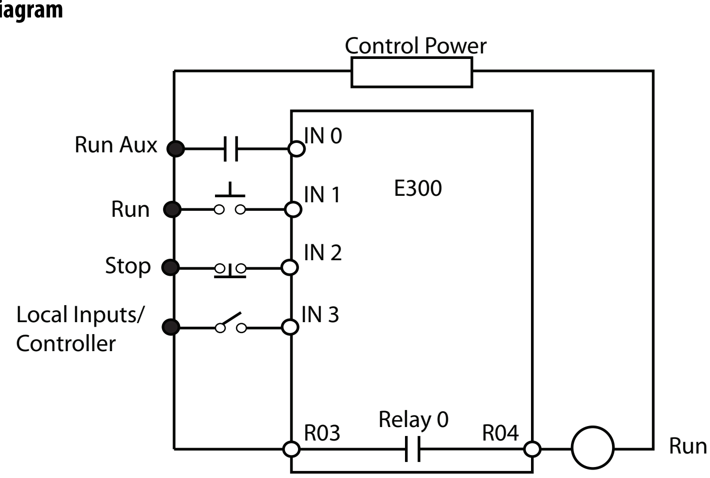
Rules

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 107 is a wiring diagram of a non-reversing starter with Output Relay 0 configured as a control relay.

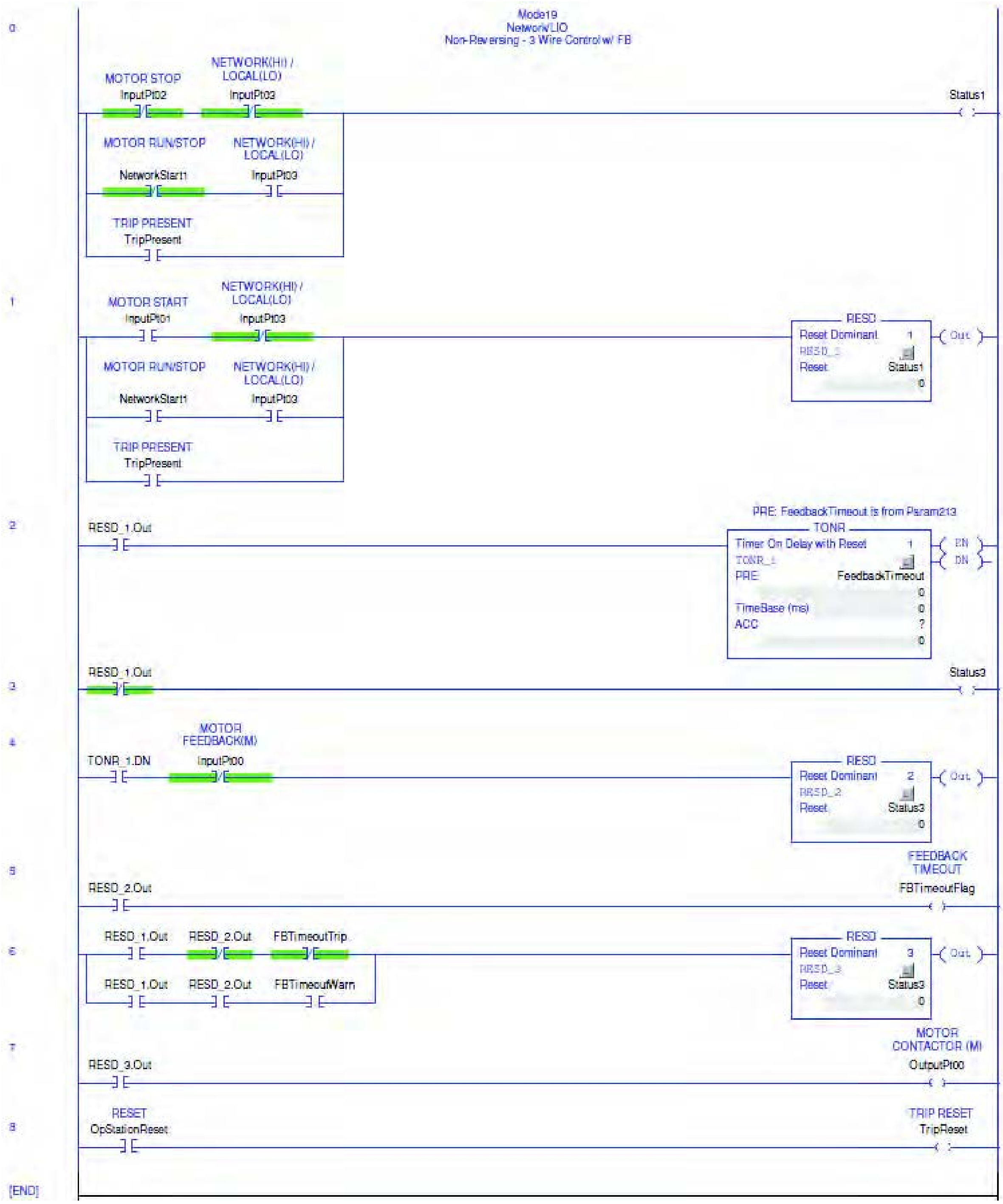
Figure 107 - Non-reversing Starter (Network & Local I/O) with Feedback – Three-wire Control Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 108 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 19.

Figure 108 - Non-reversing Starter (Network & Local I/O) with Feedback – Three-wire Control DeviceLogix Program



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.

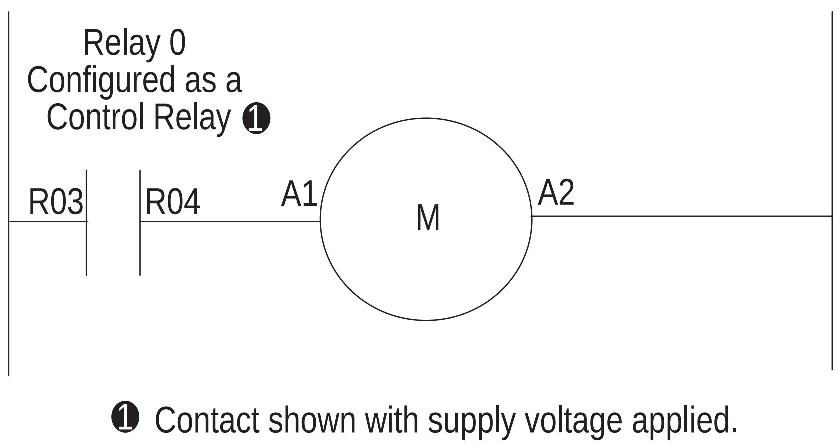
Rules

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 109 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 109 - Control Relay Wiring Diagram

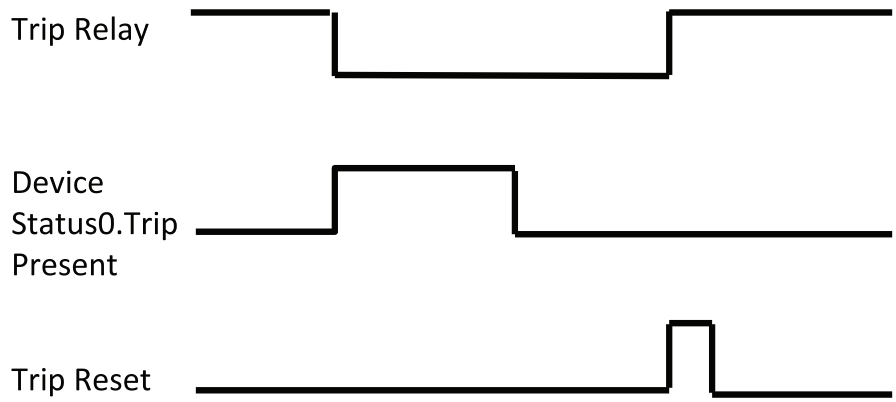


DeviceLogix Program

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

Timing Diagram

Figure 110 - 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 4.

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 is restored, the starter energizes if the value in LogicDefinedPt00Data or *LogicDefinedPt01Data* is set to 1.

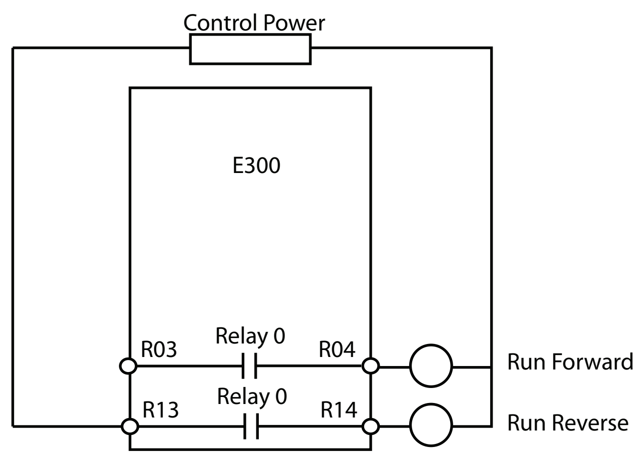
Rules

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 111 is a wiring diagram of a reversing starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 111 - Reversing Starter (Network) Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 112 and Figure 113 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 5.

Figure 112 - Reversing Starter (Network) DeviceLogix Program, Part A

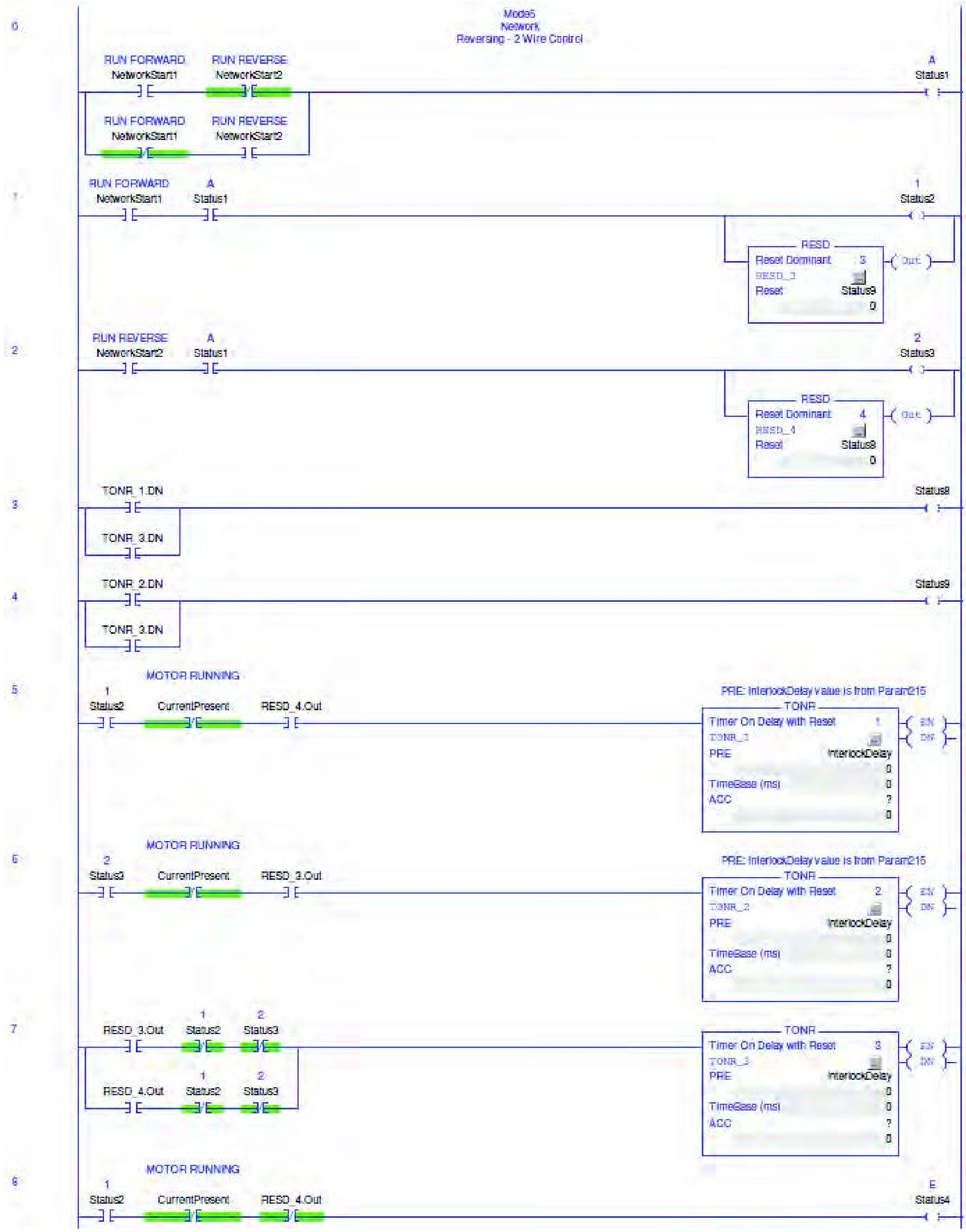
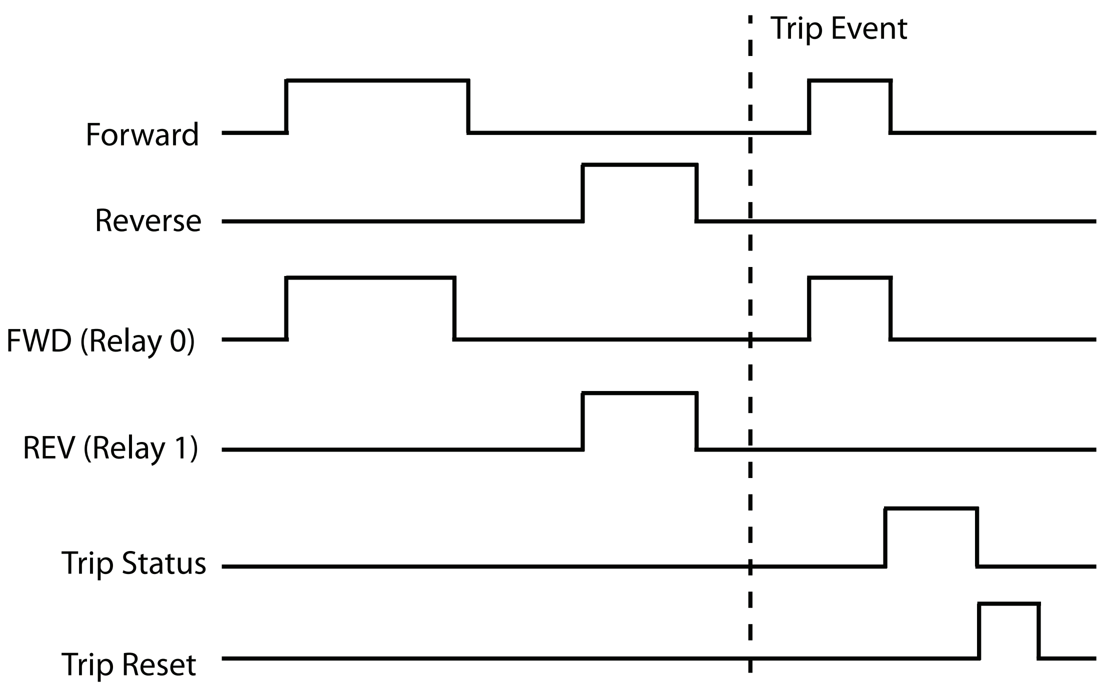


Figure 113 - Reversing Starter (Network) DeviceLogix Program, Part B

Timing Diagram

Figure 114 - 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 4.

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 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, the starter energizes if the value in LogicDefinedPt00Data or *LogicDefinedPt01Data* is set to 1.

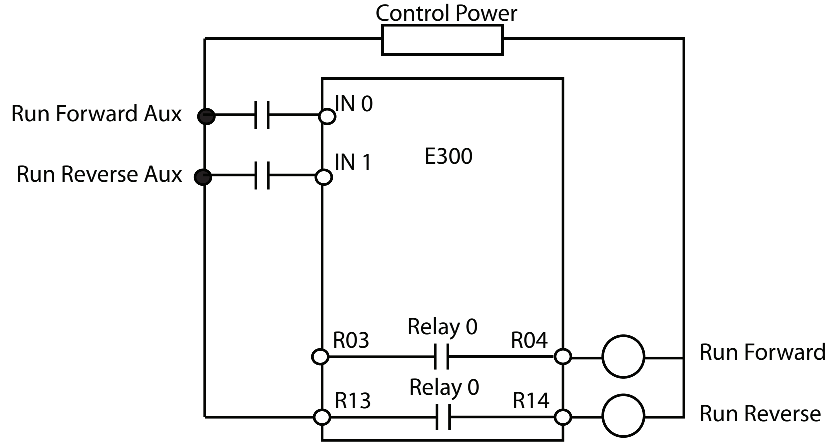
Rules

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 115 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 115 - Reversing Starter (Network) with Feedback Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 116, Figure 117, and Figure 118 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 6.

Figure 116 - Reversing Starter (Network) with Feedback DeviceLogix Program, Part A

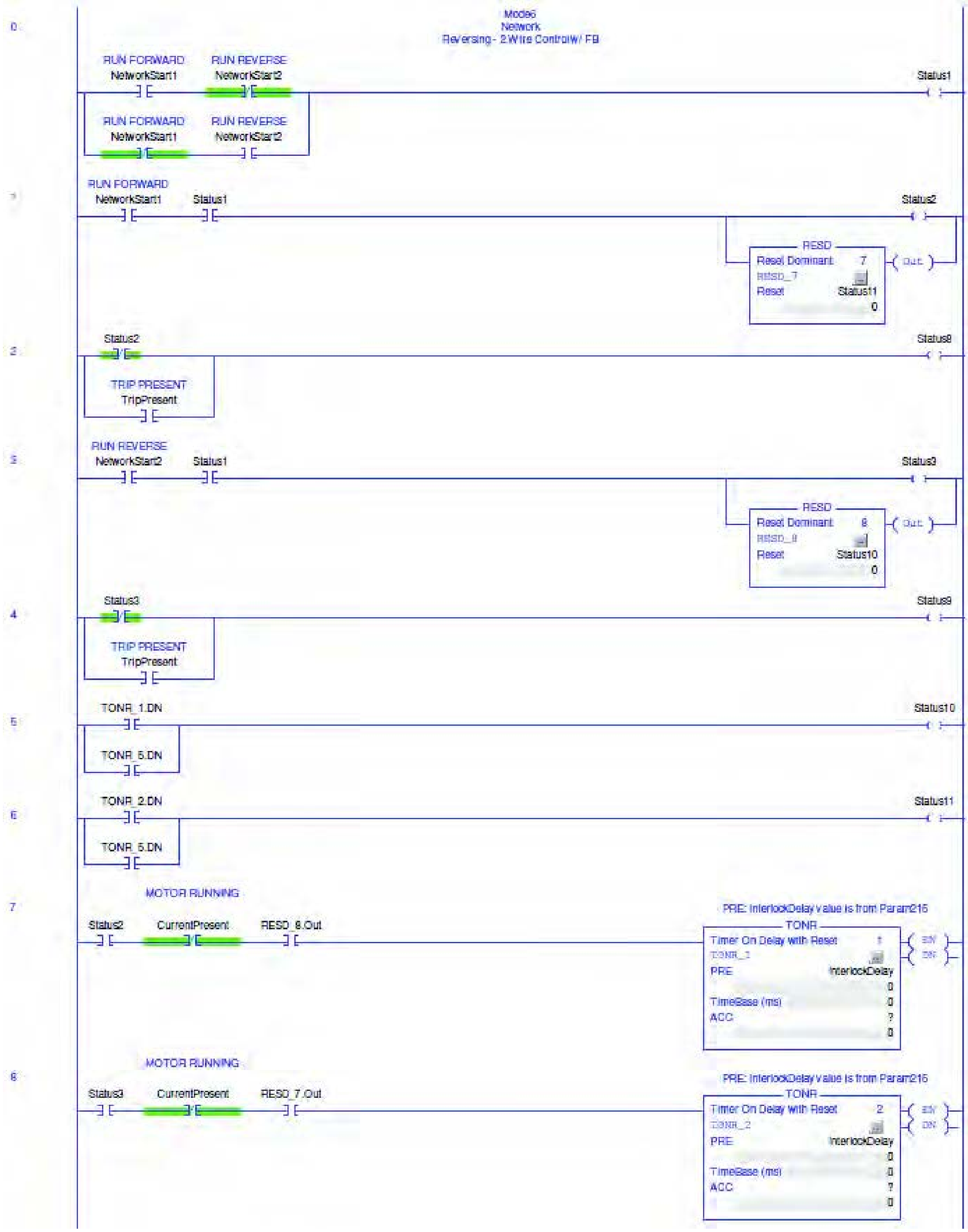


Figure 117 - Reversing Starter (Network) with Feedback DeviceLogix Program, Part B

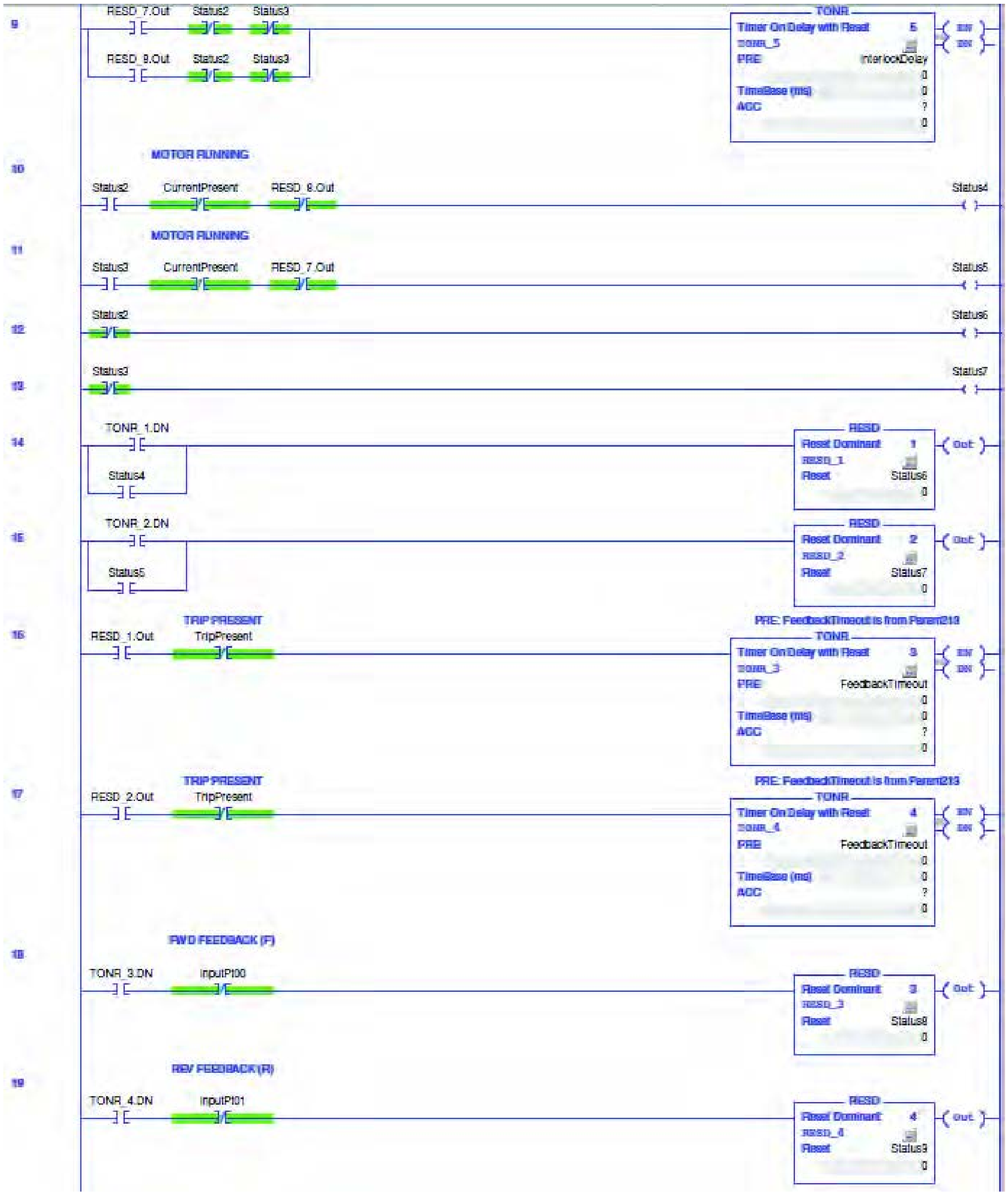
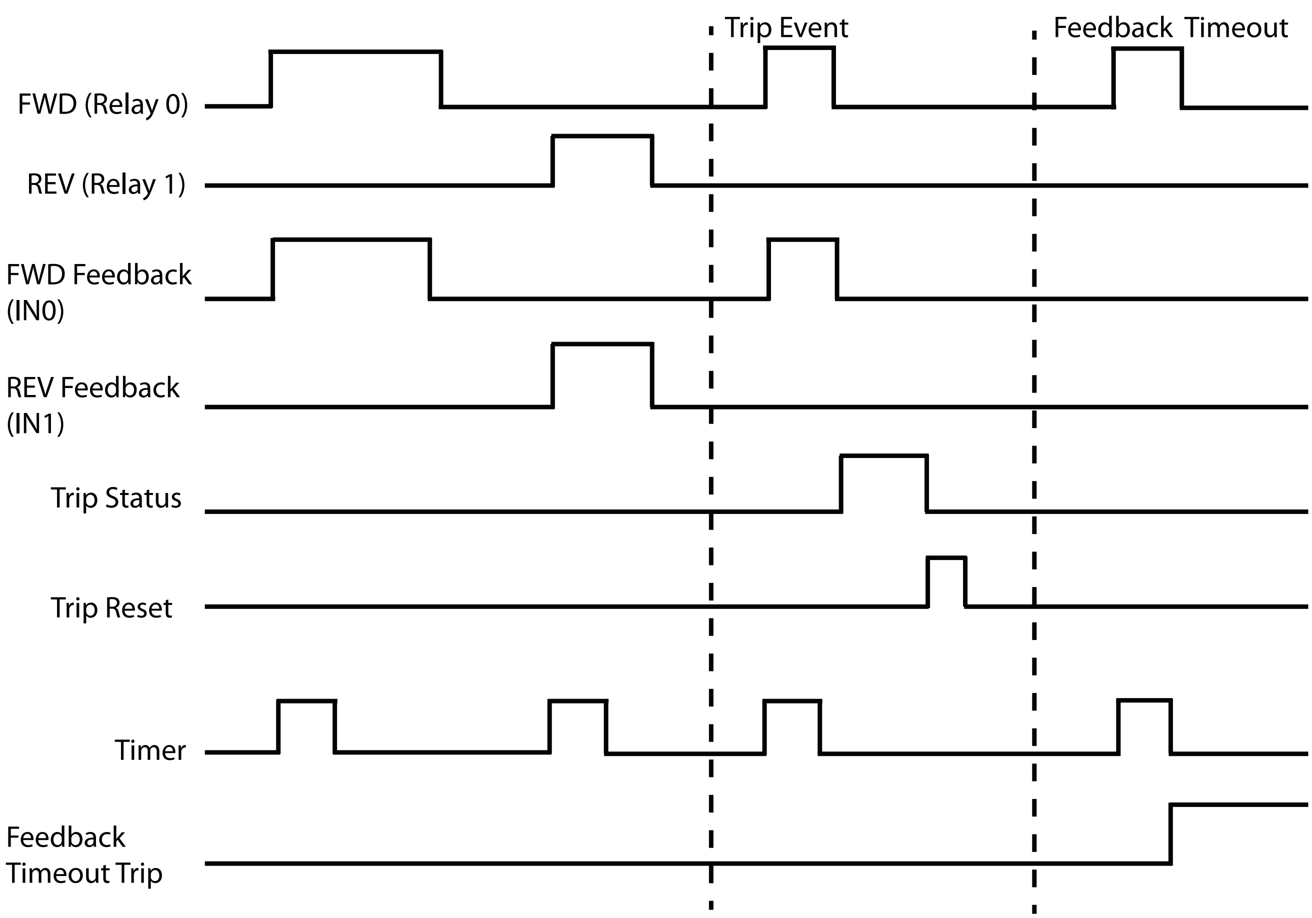


Figure 118 - Reversing Starter (Network) with Feedback DeviceLogix Program, Part C

Timing Diagram

Figure 119 - 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 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)

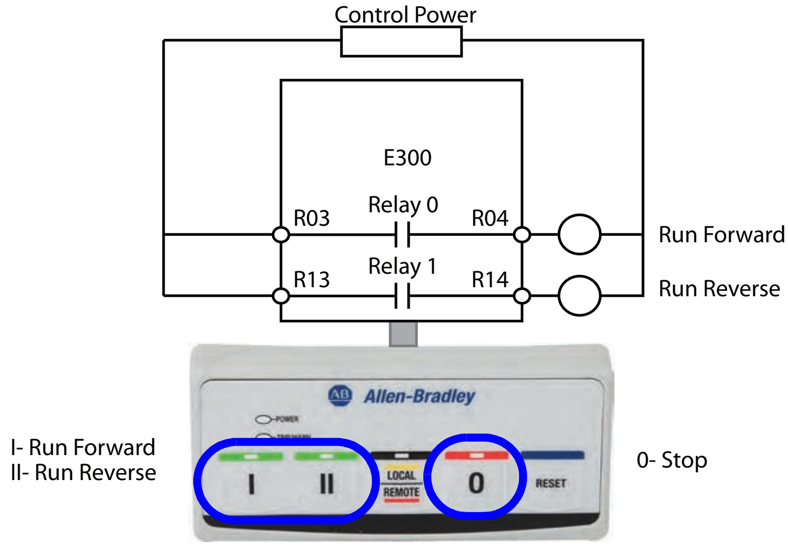
   Or

   - 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 120 is a wiring diagram of a reversing starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 120 - Reversing Starter (Operator Station) Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 121 through Figure 124 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 29.

Figure 121 - Reversing Starter (Operator Station) DeviceLogix Program, Part A

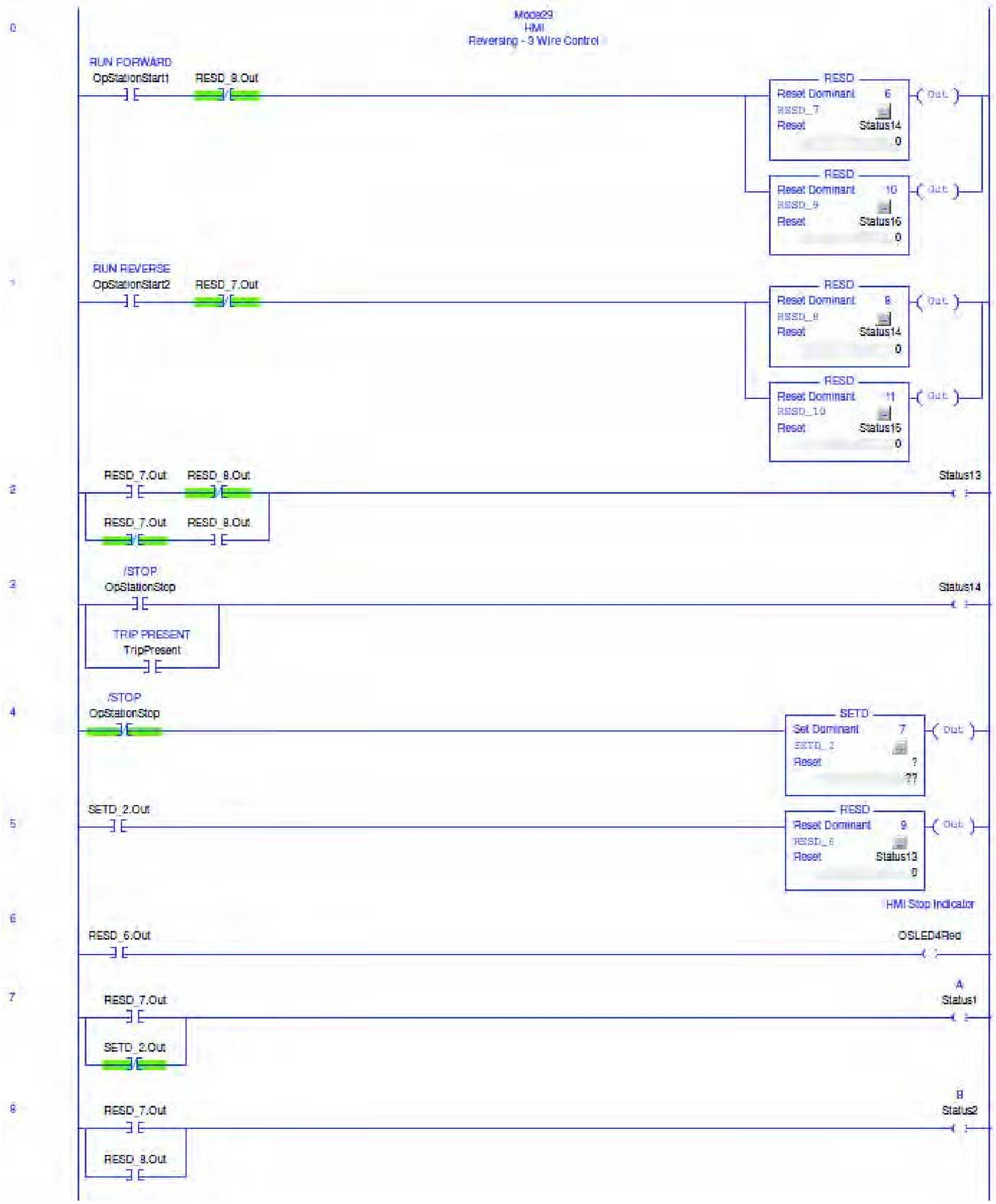


Figure 122 - Reversing Starter (Operator Station) DeviceLogix Program, Part B

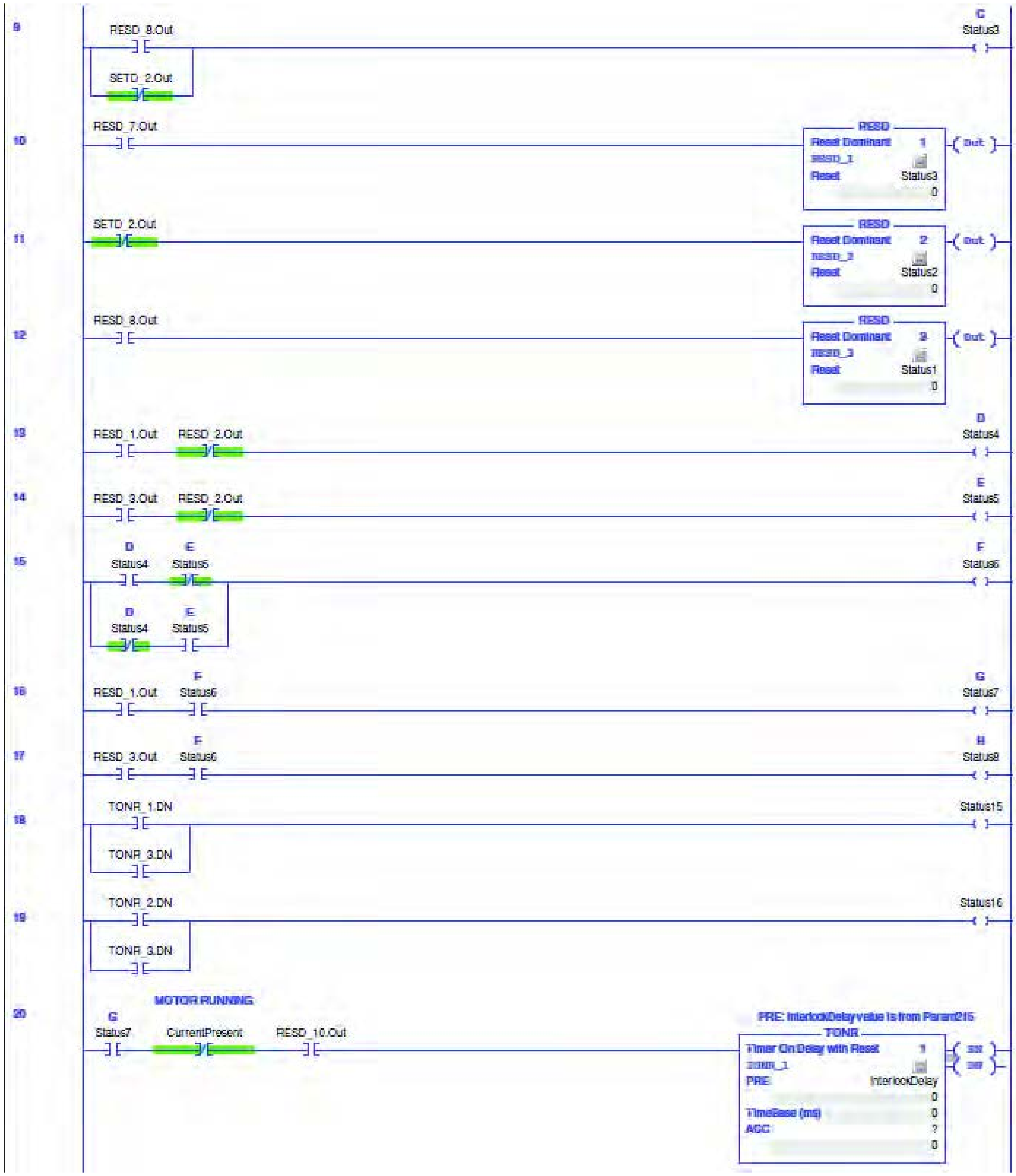


Figure 123 - Reversing Starter (Operator Station) DeviceLogix Program, Part C

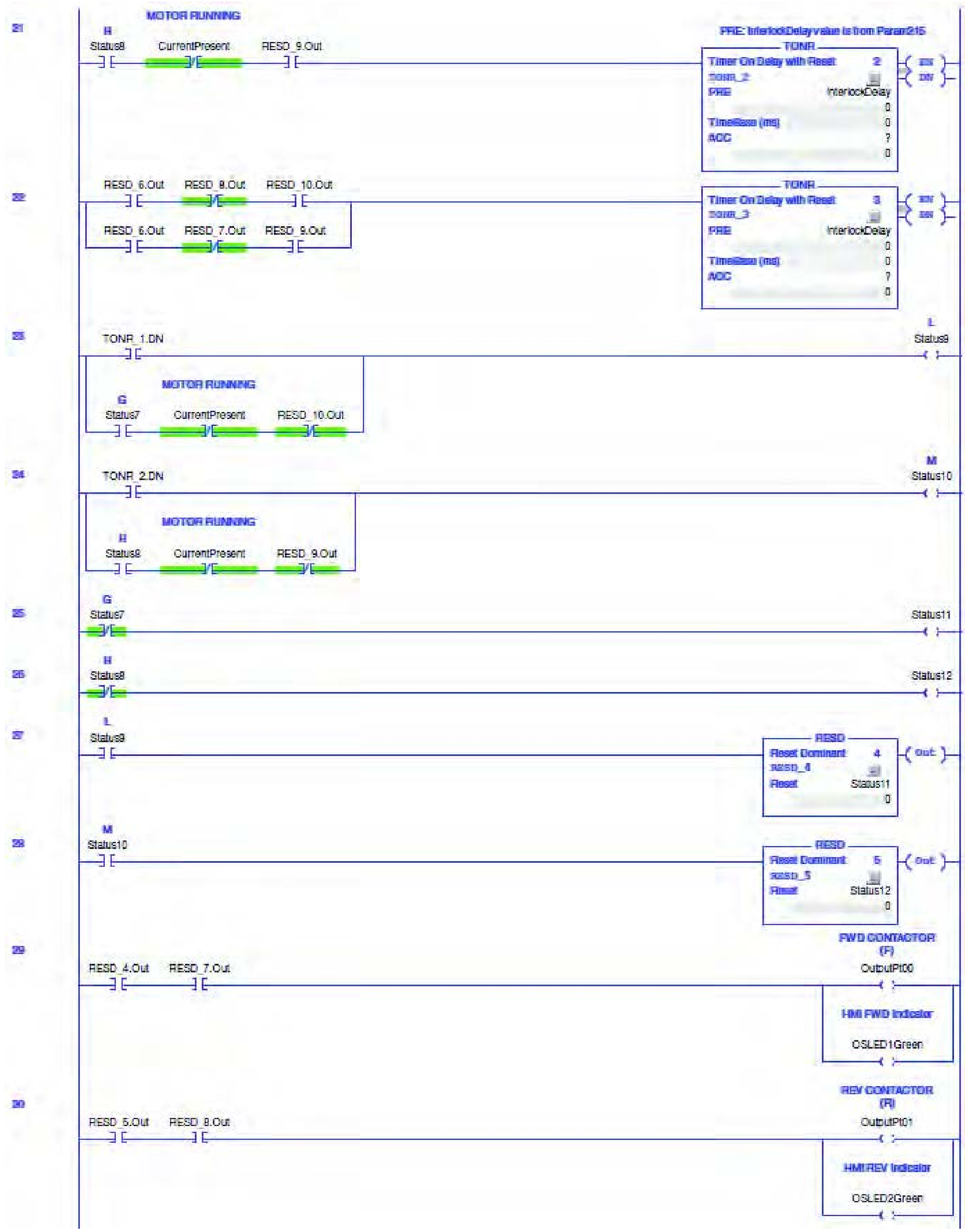
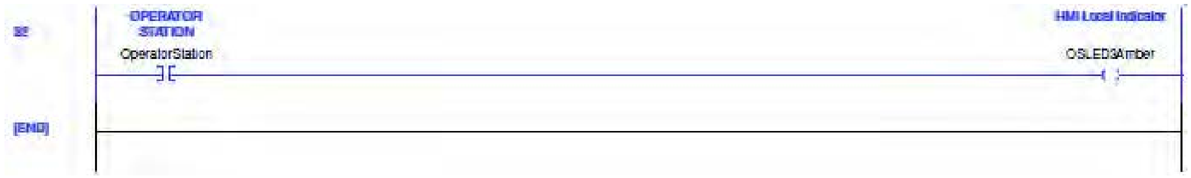
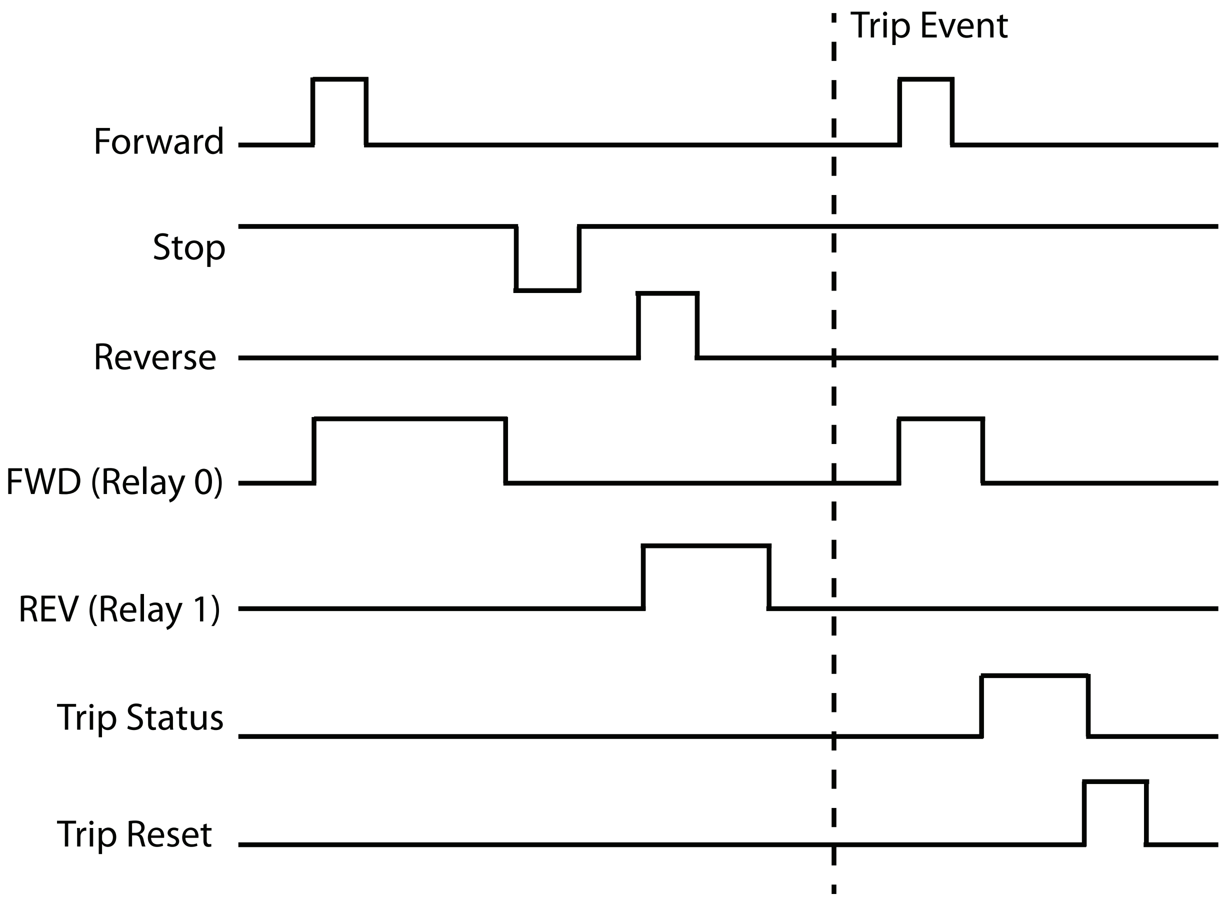


Figure 124 - Reversing Starter (Operator Station) DeviceLogix Program, Part D



Timing Diagram

Figure 125 - 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 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 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)

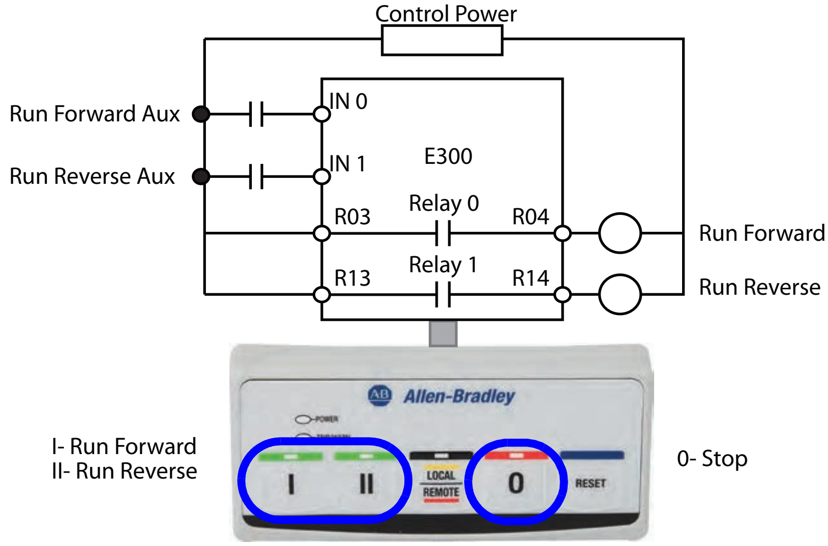
   Or

   - 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 126 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 126 - Reversing Starter (Operator Station) with Feedback Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 127 through Figure 130 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 30.

Figure 127 - Reversing Starter (Operator Station) with Feedback DeviceLogix Program, Part A

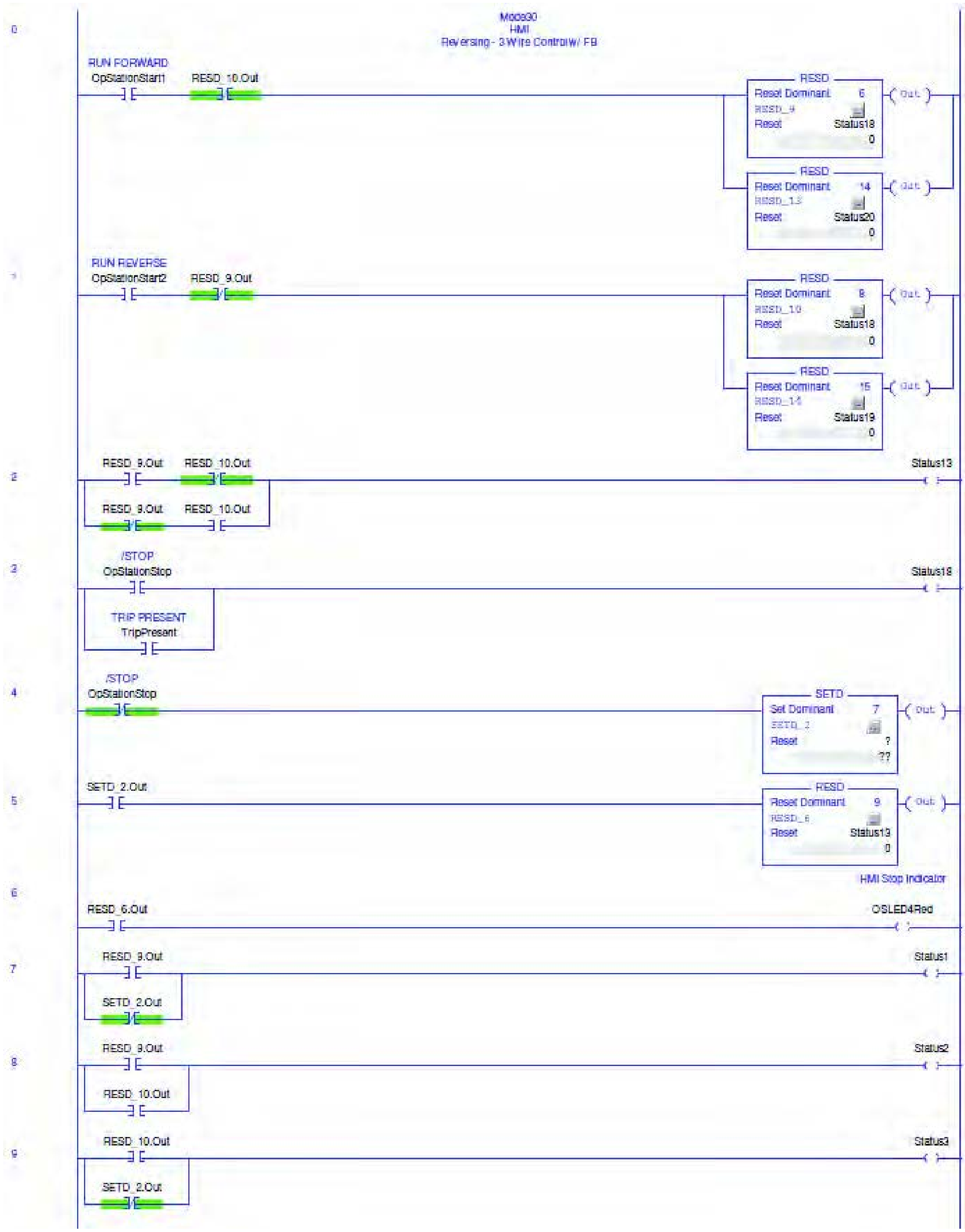


Figure 128 - Reversing Starter (Operator Station) with Feedback DeviceLogix Program, Part B

Figure 129 - Reversing Starter (Operator Station) with Feedback DeviceLogix Program, Part C

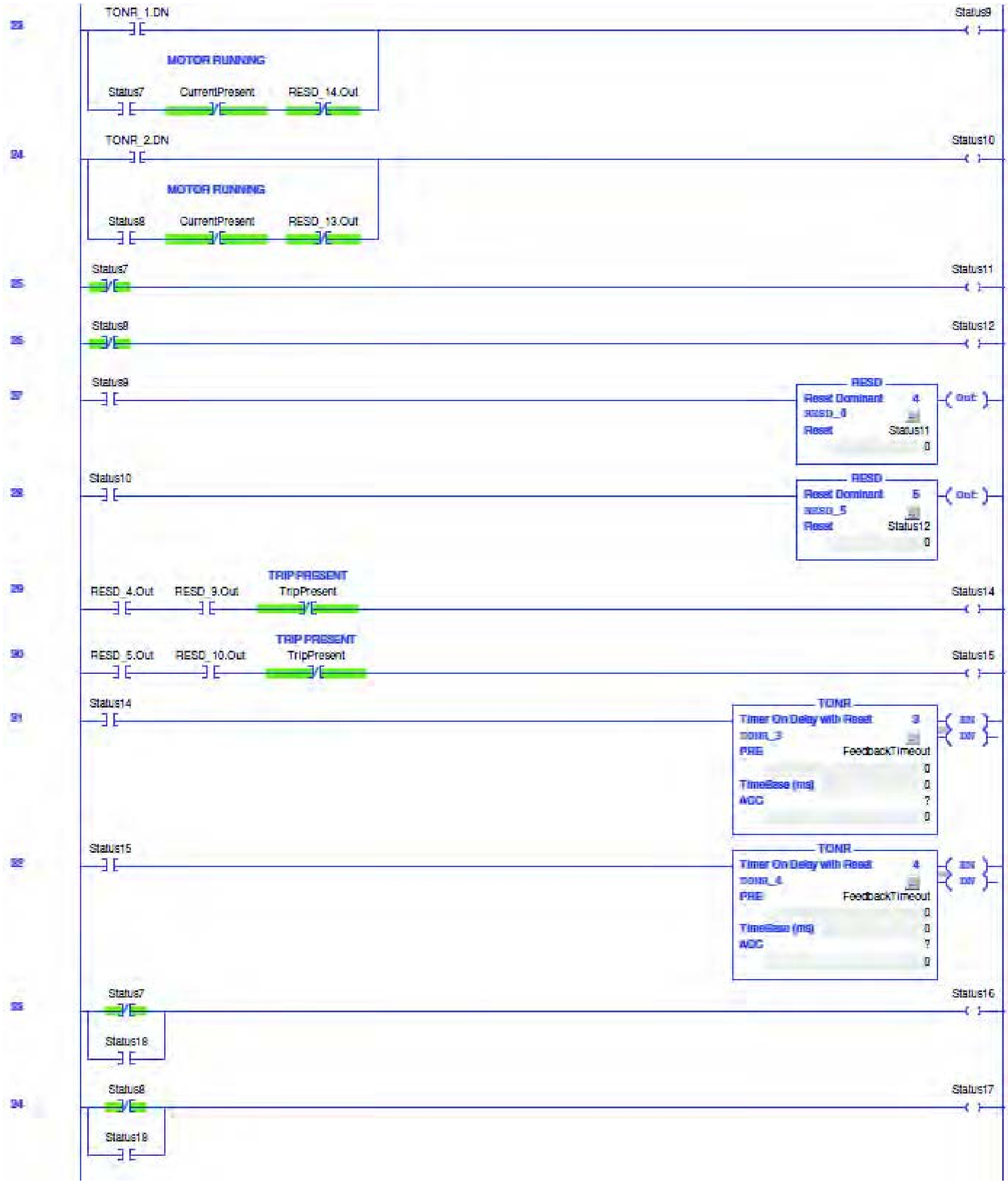
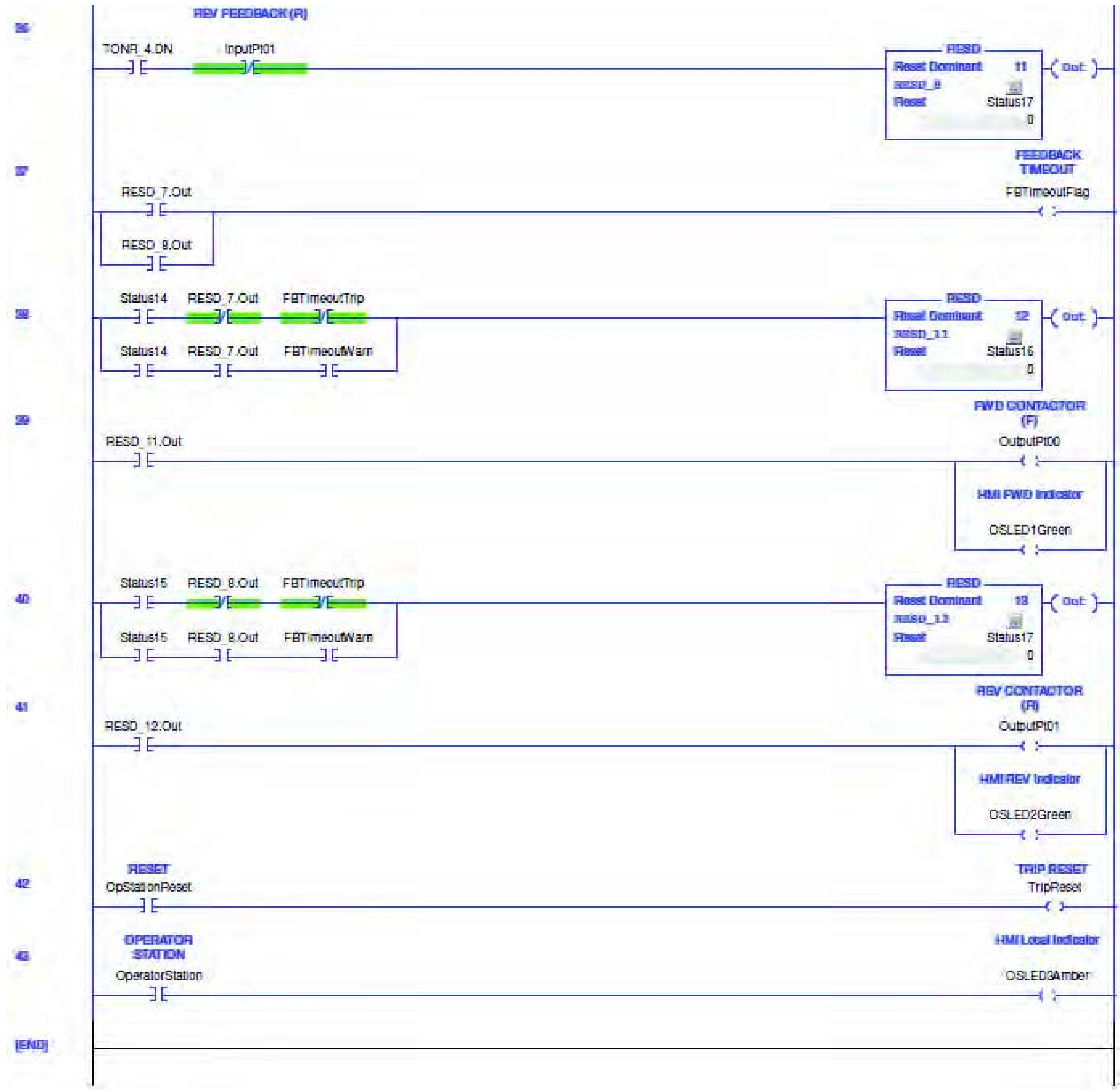
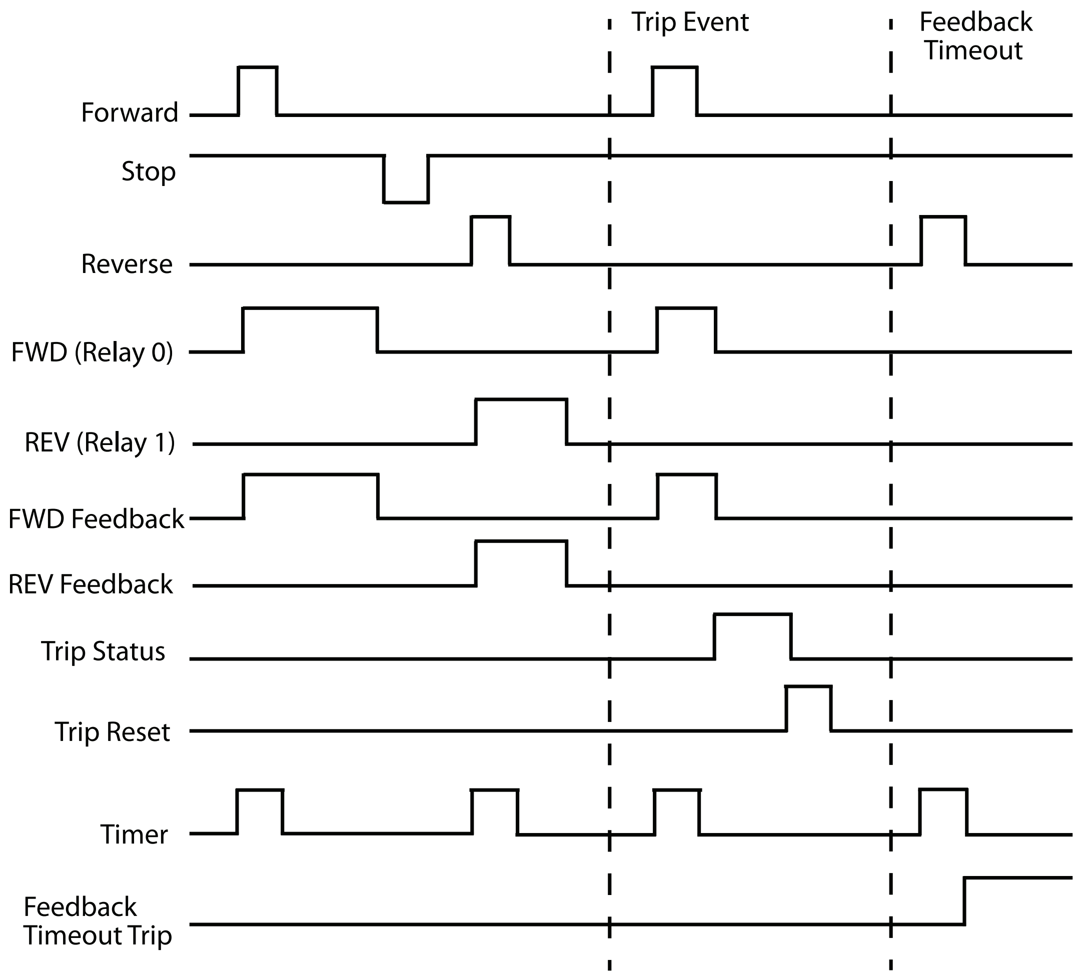


Figure 130 - Reversing Starter (Operator Station) with Feedback DeviceLogix Program, Part D



Timing Diagram

Figure 131 - 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 powers up, the starter energizes if either Input 0 or Input 1 is active.

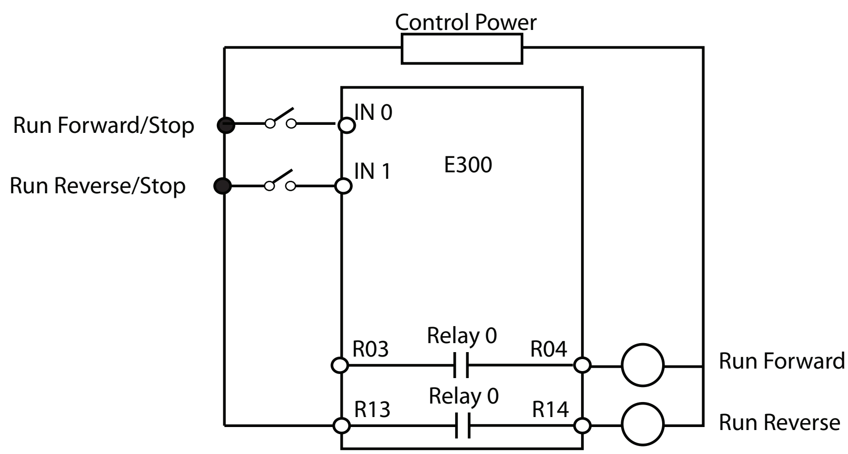
Rules

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 132 is a wiring diagram of a reversing starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 132 - Reversing Starter (Local I/O) – Two-wire Control Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 133 and Figure 134 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 40.

Figure 133 - Reversing Starter (Local I/O) – Two-wire Control DeviceLogix Program, Part A

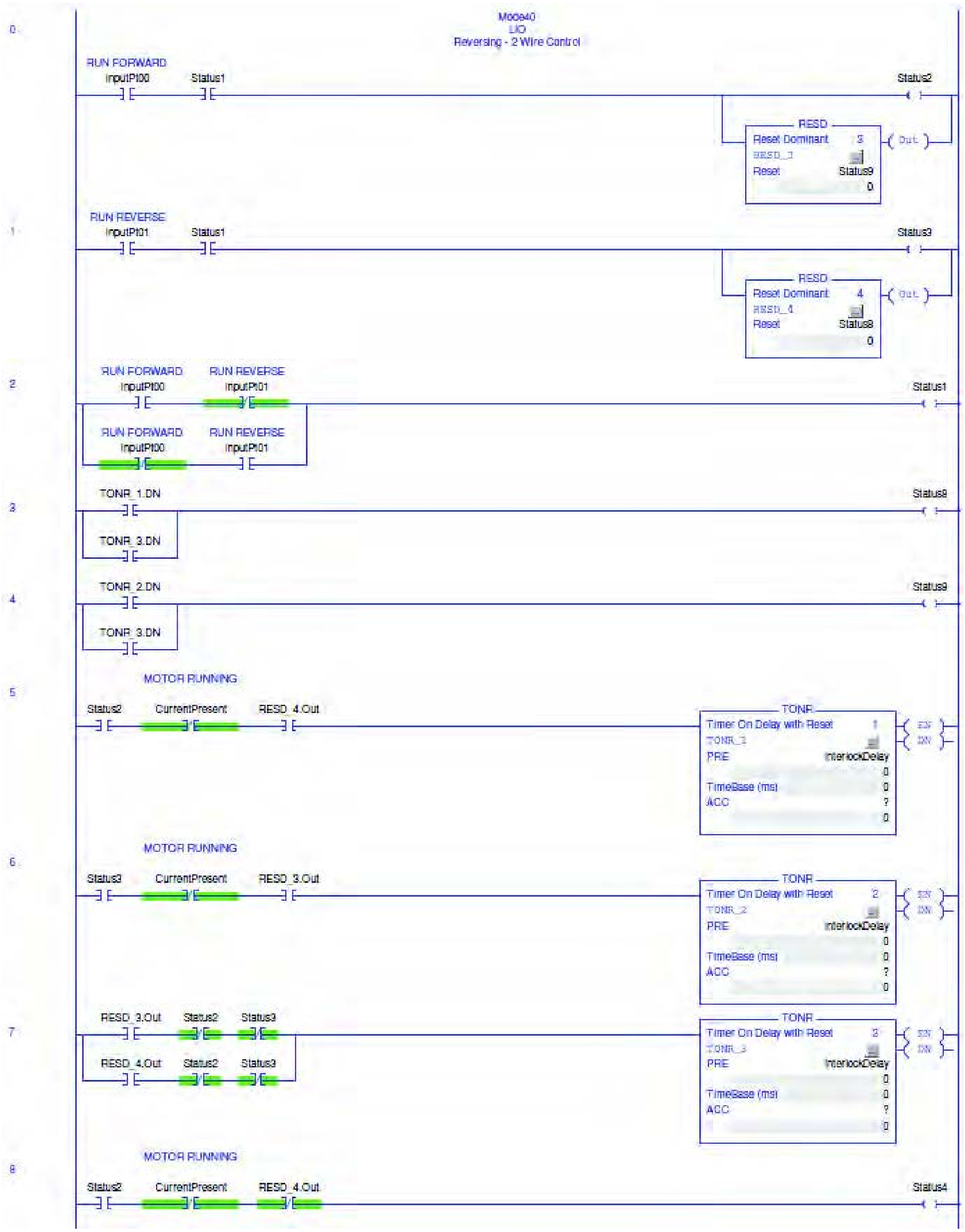
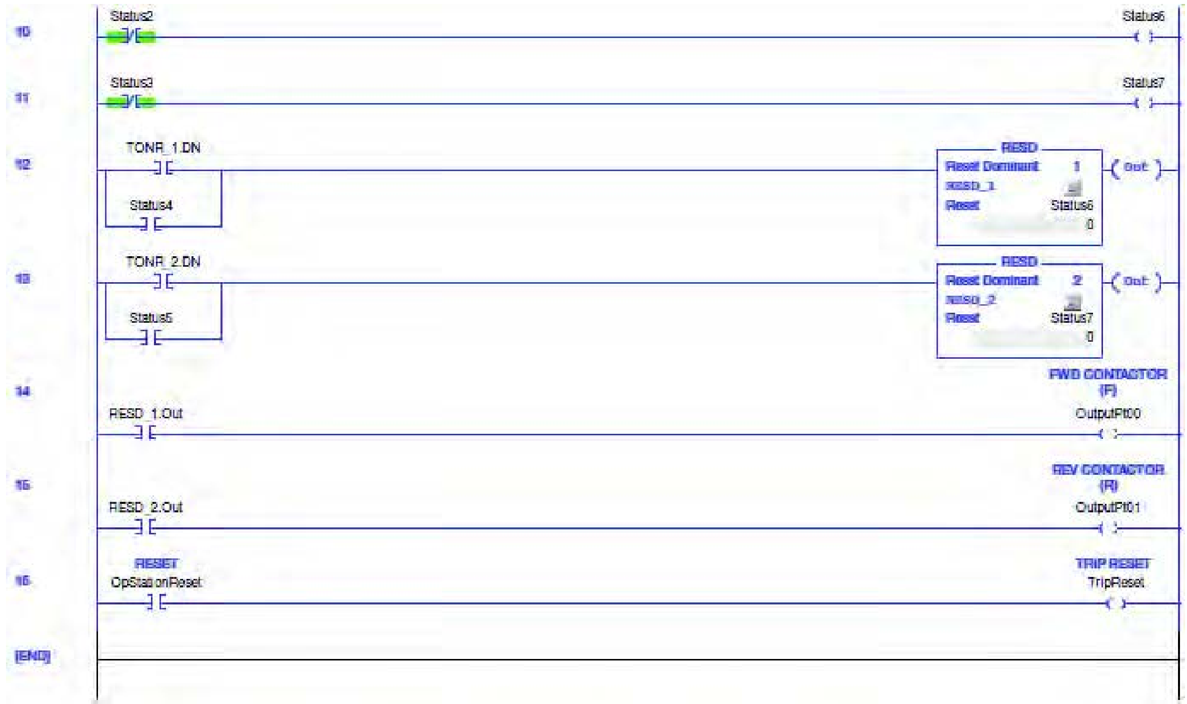
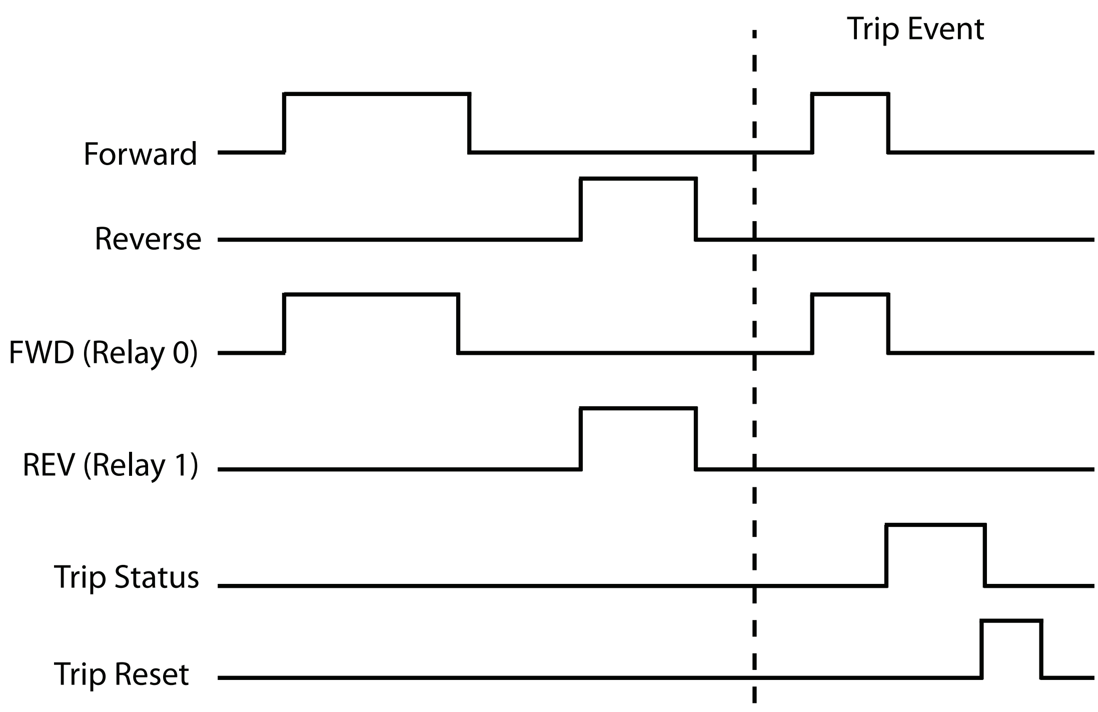


Figure 134 - Reversing Starter (Local I/O) – Two-wire Control DeviceLogix Program, Part B



Timing Diagram

Figure 135 - 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 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 powers up, the starter energizes if either Input 0 or Input 1 is active.

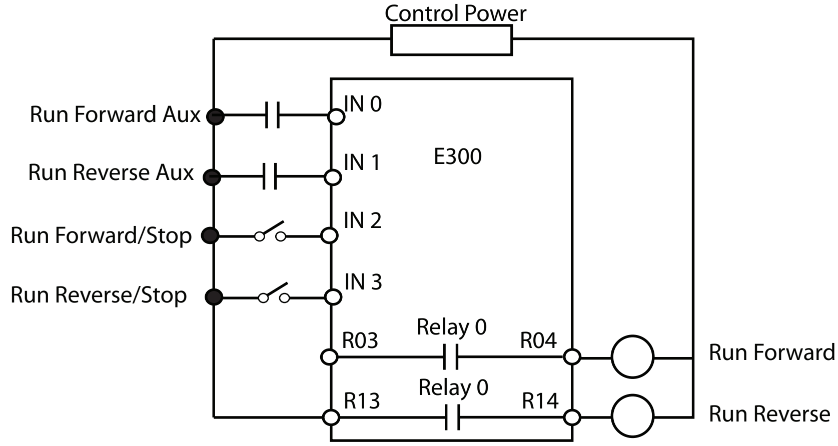
Rules

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 136 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 136 - Reversing Starter (Local I/O) – Two-wire Control with Feedback Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 137, Figure 138, and Figure 139 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 41.

Figure 137 - Reversing Starter (Local I/O) – Two-wire Control with Feedback DeviceLogix Program, Part A

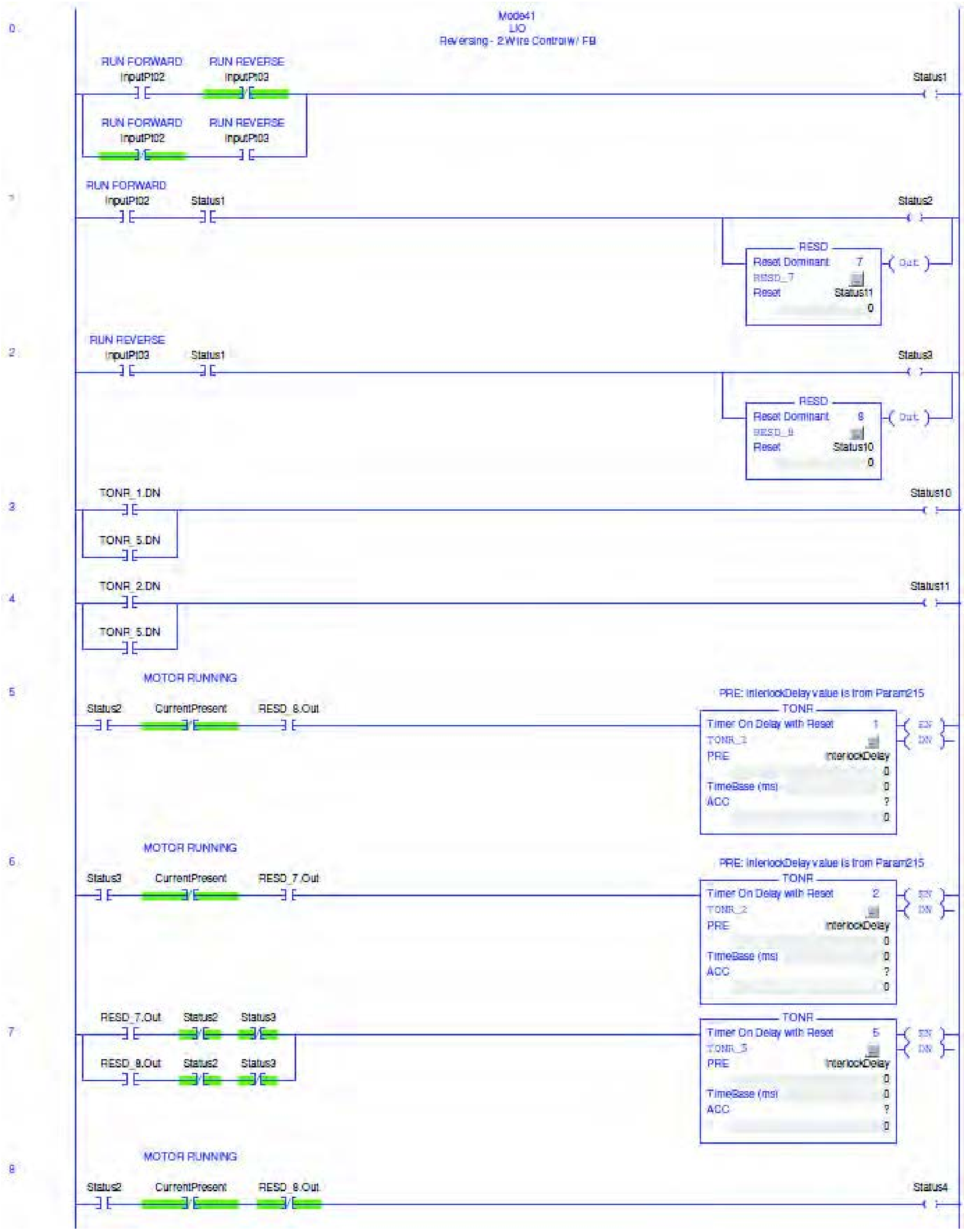


Figure 138 - Reversing Starter (Local I/O) – Two-wire Control with Feedback DeviceLogix Program, Part B

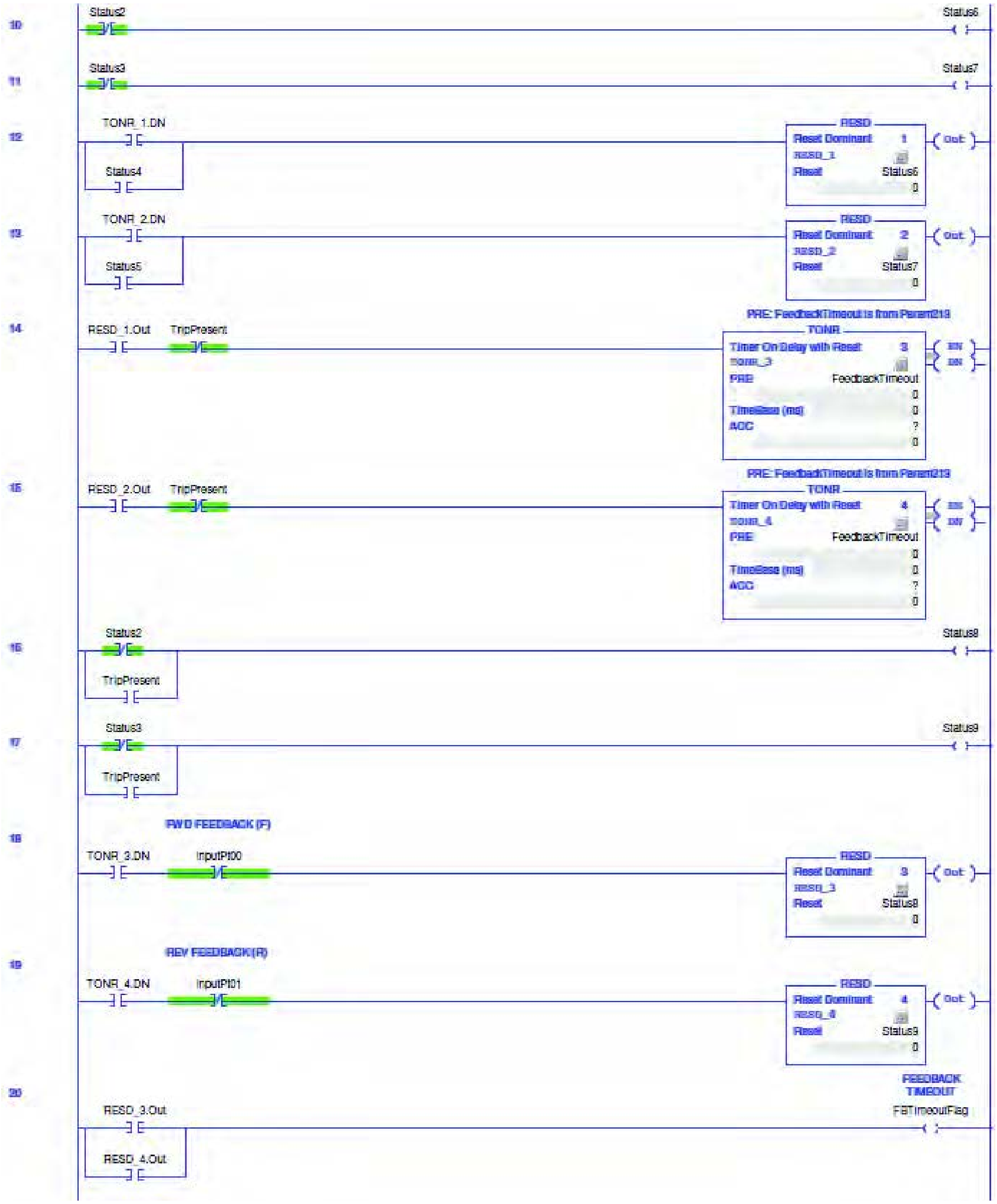
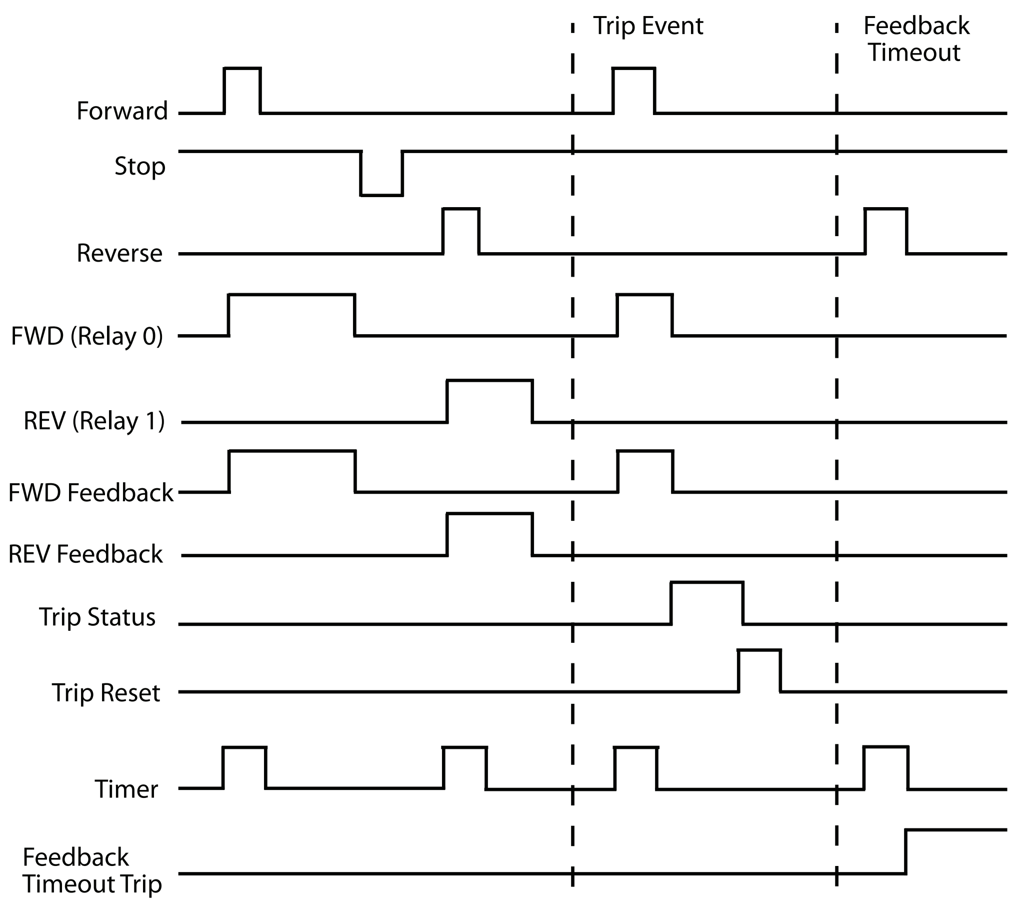


Figure 139 - Reversing Starter (Local I/O) – Two-wire Control with Feedback DeviceLogix Program, Part C

Timing Diagram

Figure 140 - 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.

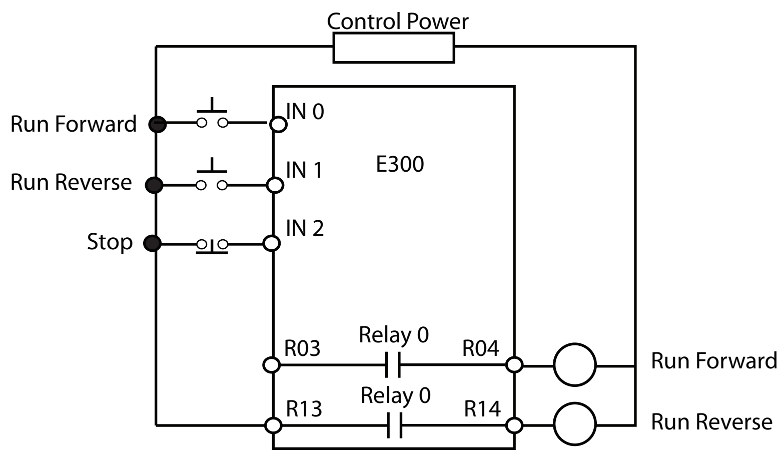
Rules

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 141 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 141 - Reversing Starter (Local I/O) – Three-wire Control Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 142, Figure 143, and Figure 144 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 42.

Figure 142 - Reversing Starter (Local I/O) – Three-wire Control DeviceLogix Program, Part A

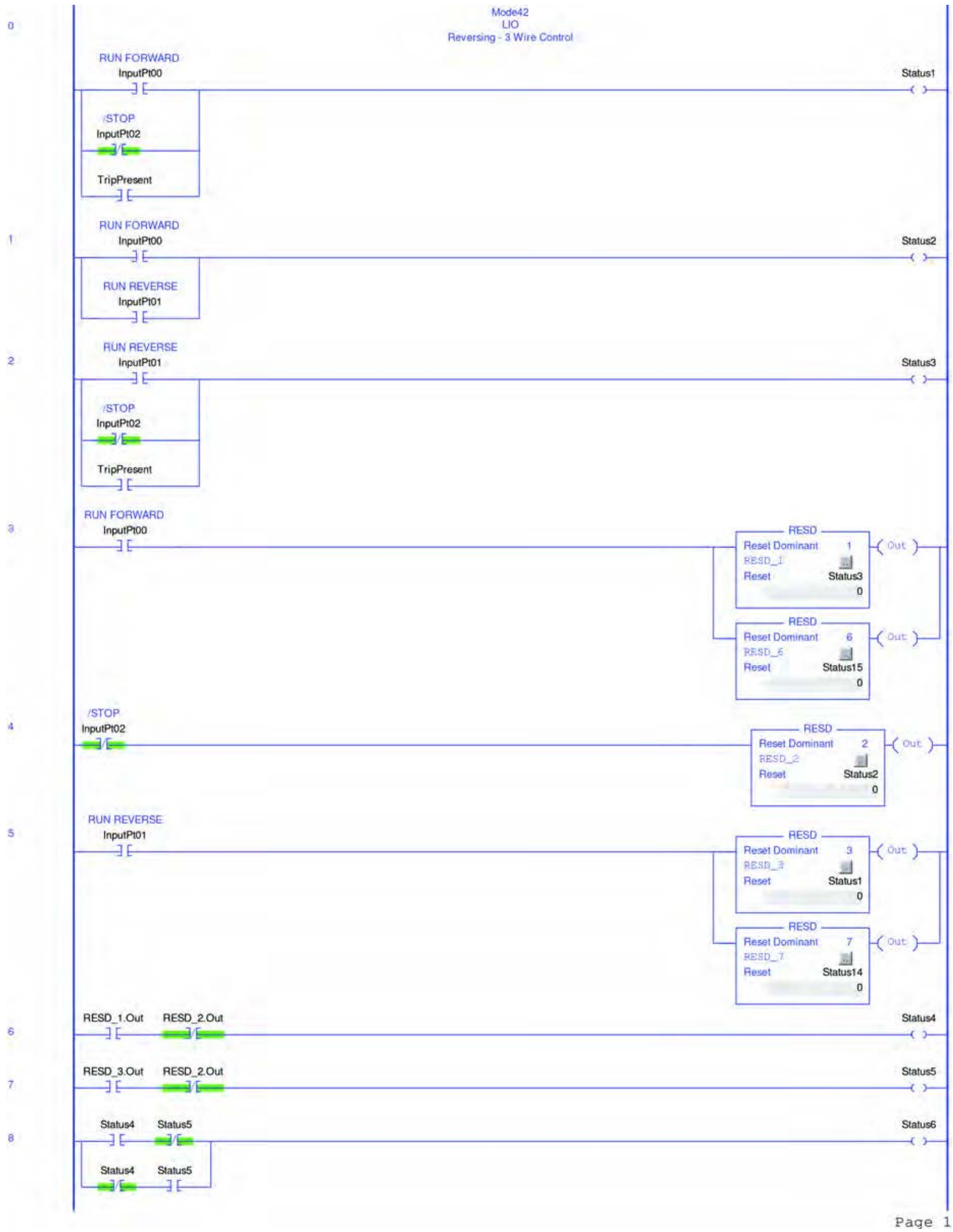


Figure 143 - Reversing Starter (Local I/O) – Three-wire Control DeviceLogix Program, Part B

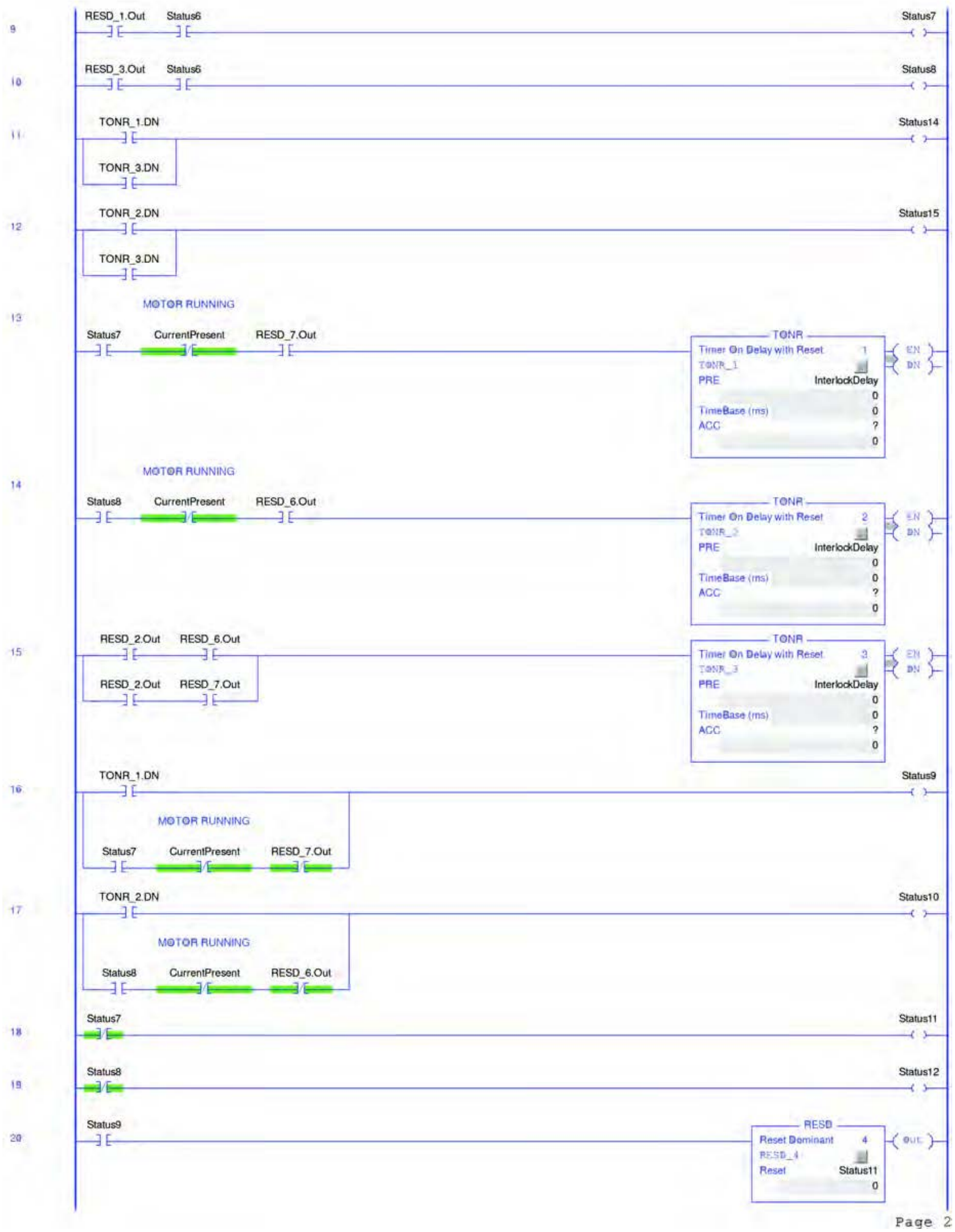
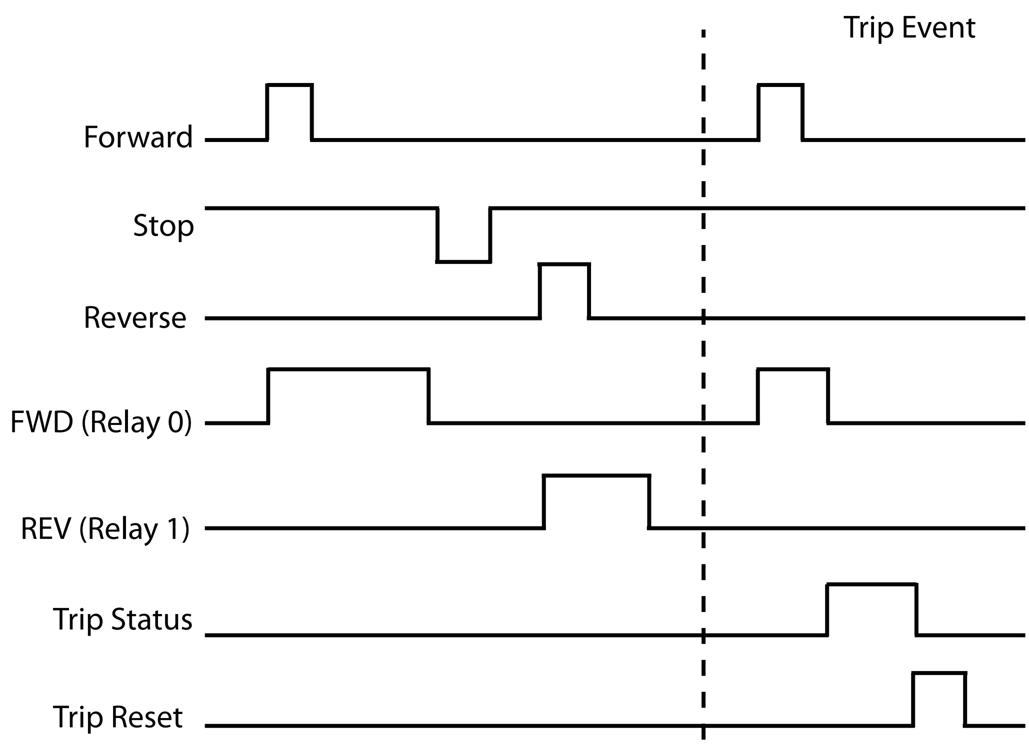


Figure 144 - Reversing Starter (Local I/O) – Three-wire Control DeviceLogix Program, Part C

Timing Diagram

Figure 145 - 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 4.

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 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, 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

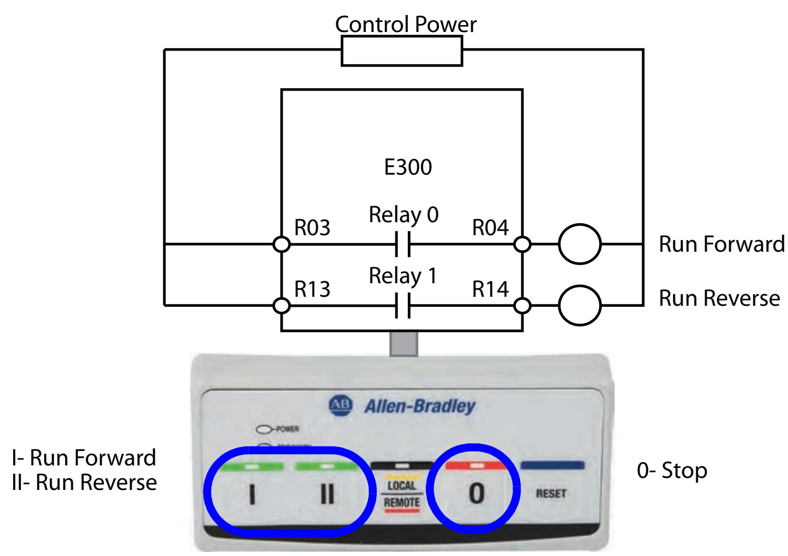
- Option Match Warning must be enabled in WarningEnableC (Parameter 192)
- Operator Station must be disabled in Mismatch Action (Parameter 233)
- An operator station must be selected in Operator Station Type (Parameter 224)

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 146 is a wiring diagram of a reversing starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 146 - Reversing Starter (Network & Operator Station) Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 147 through Figure 150 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 13.

Figure 147 - Reversing Starter (Network & Operator Station) DeviceLogix Program, Part A

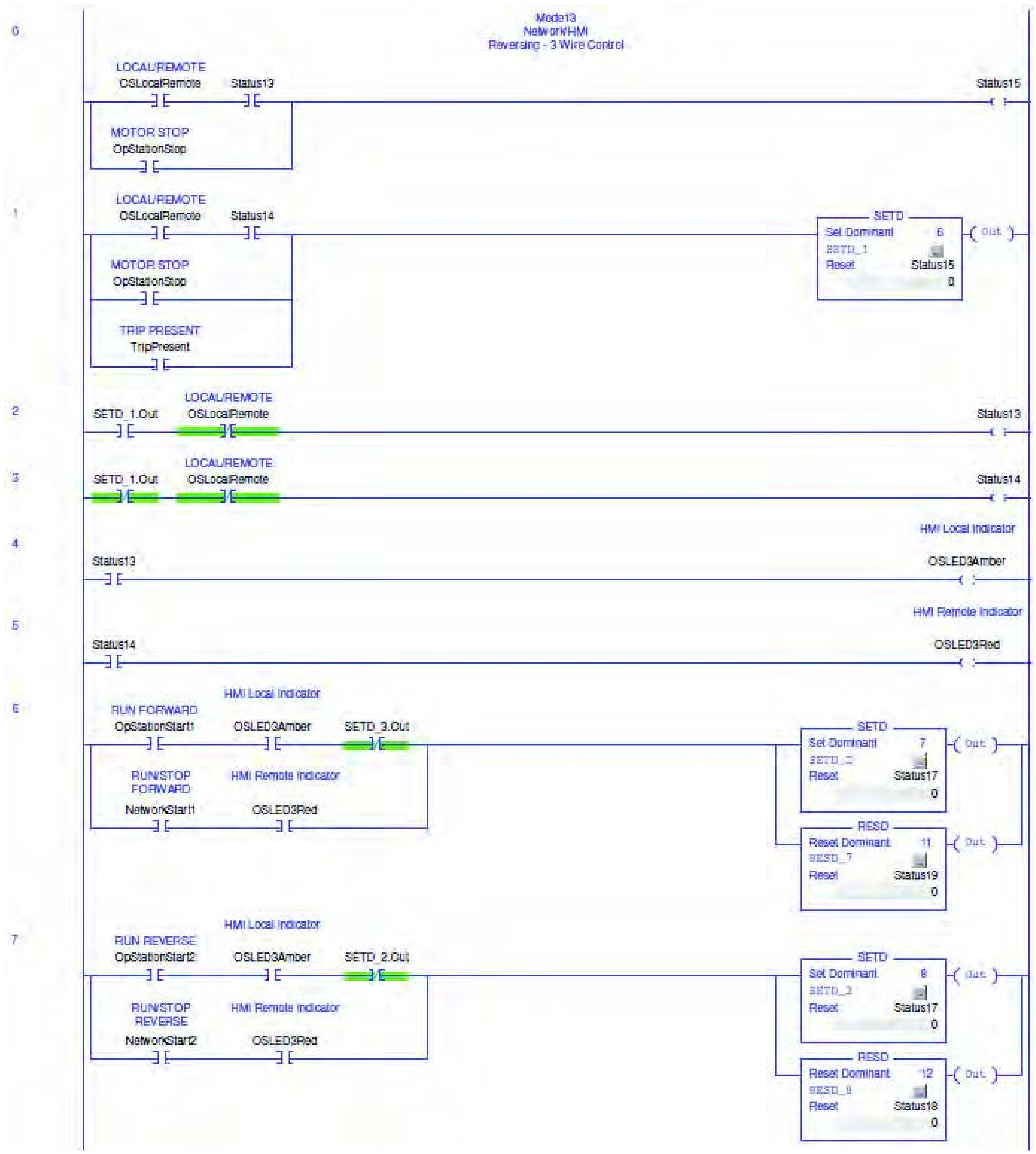


Figure 148 - Reversing Starter (Network & Operator Station) DeviceLogix Program, Part B

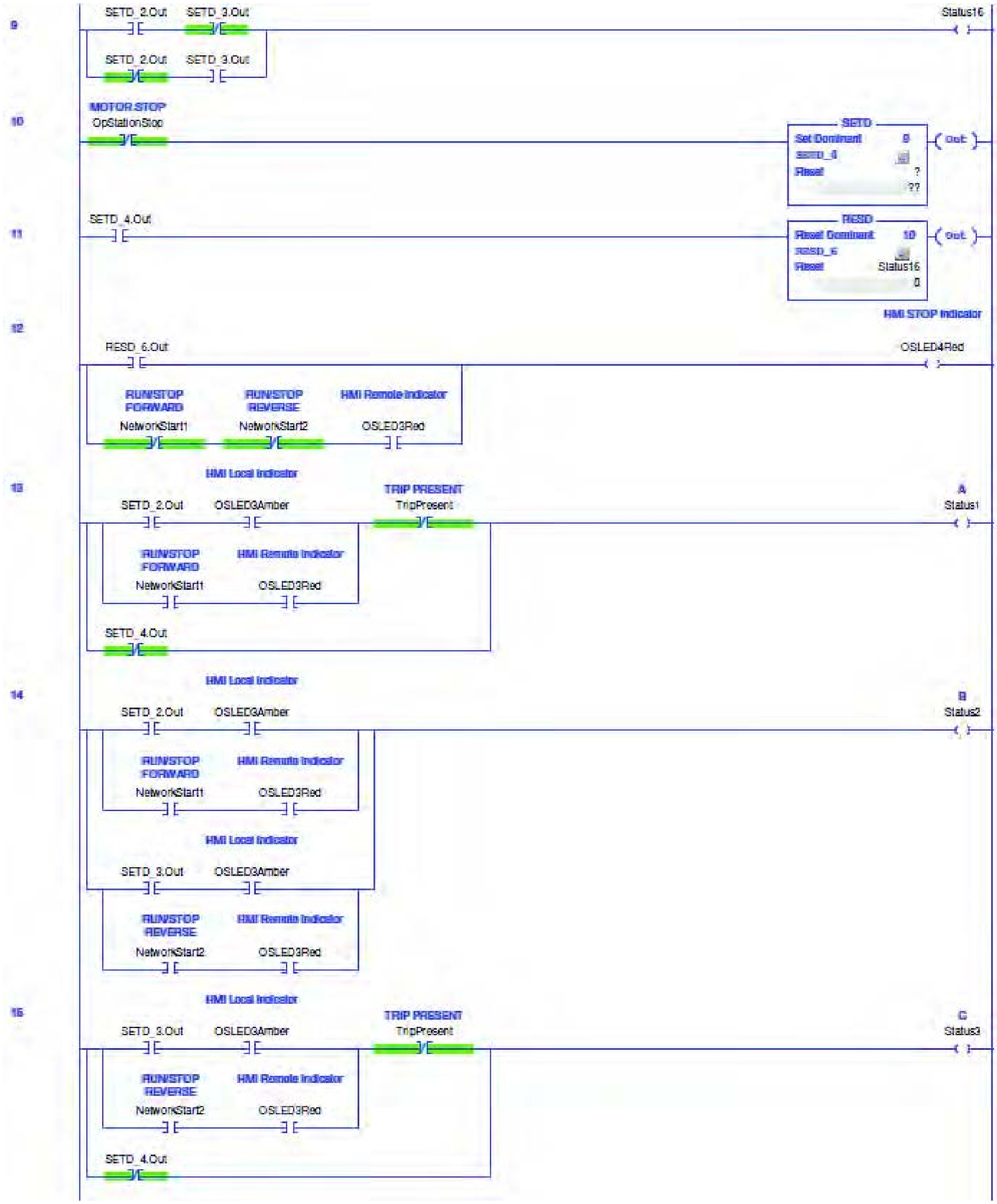
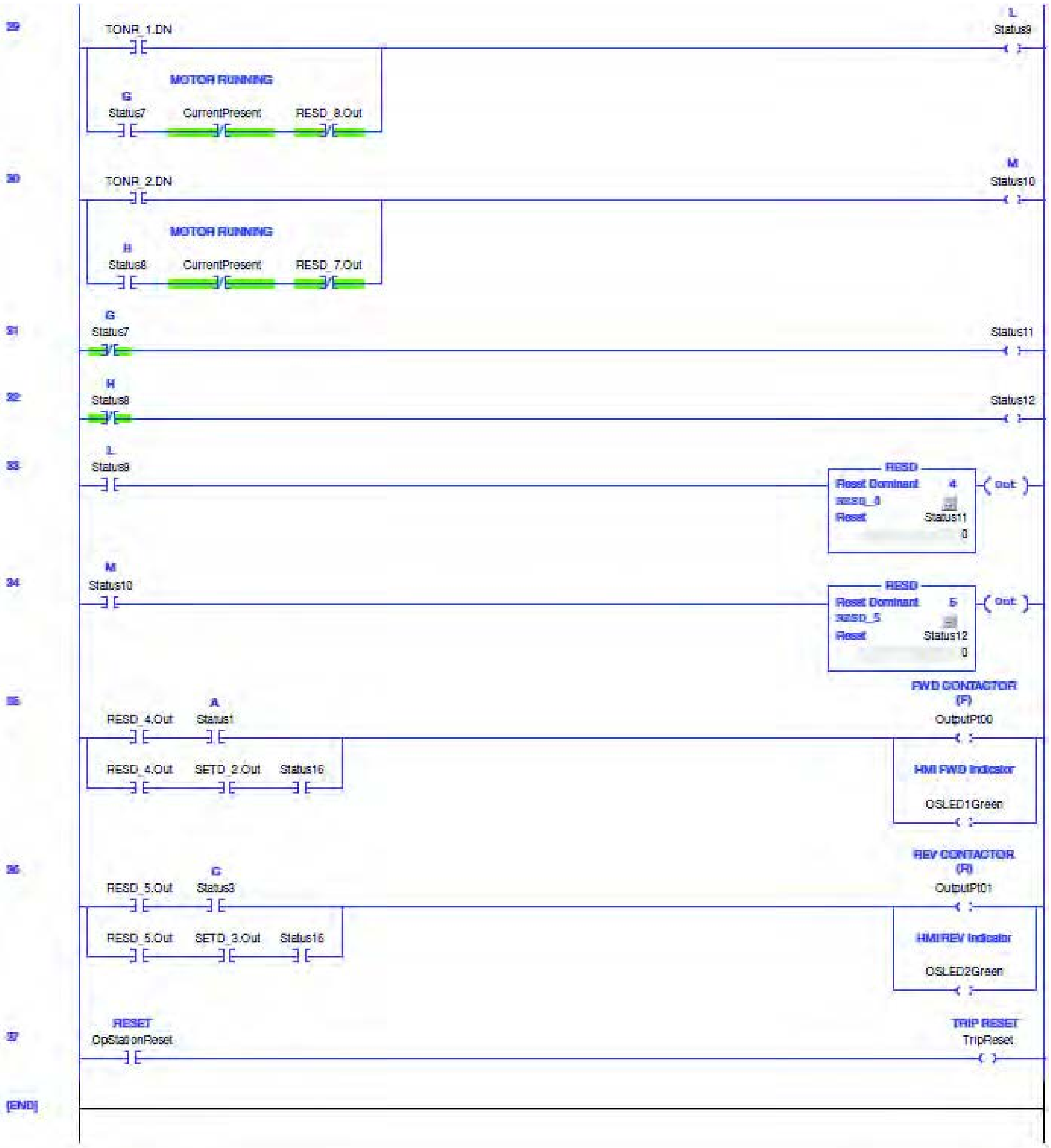


Figure 149 - Reversing Starter (Network & Operator Station) DeviceLogix Program, Part C

Figure 150 - Reversing Starter (Network & Operator Station) DeviceLogix Program, Part D



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 4.

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, the starter energizes if the value in LogicDefinedPt00Data or *LogicDefinedPt01Data* is set to 1.

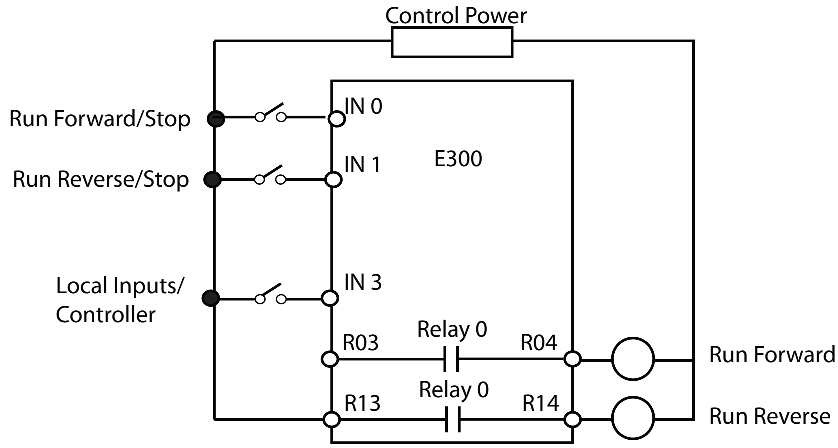
Rules

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 151 is a wiring diagram of a reversing starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 151 - Reversing Starter (Network & Local I/O) – Two-wire Control Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 152 and Figure 153 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 20.

Figure 152 - Reversing Starter (Network & Local I/O) – Two-wire Control DeviceLogix Program, Part A

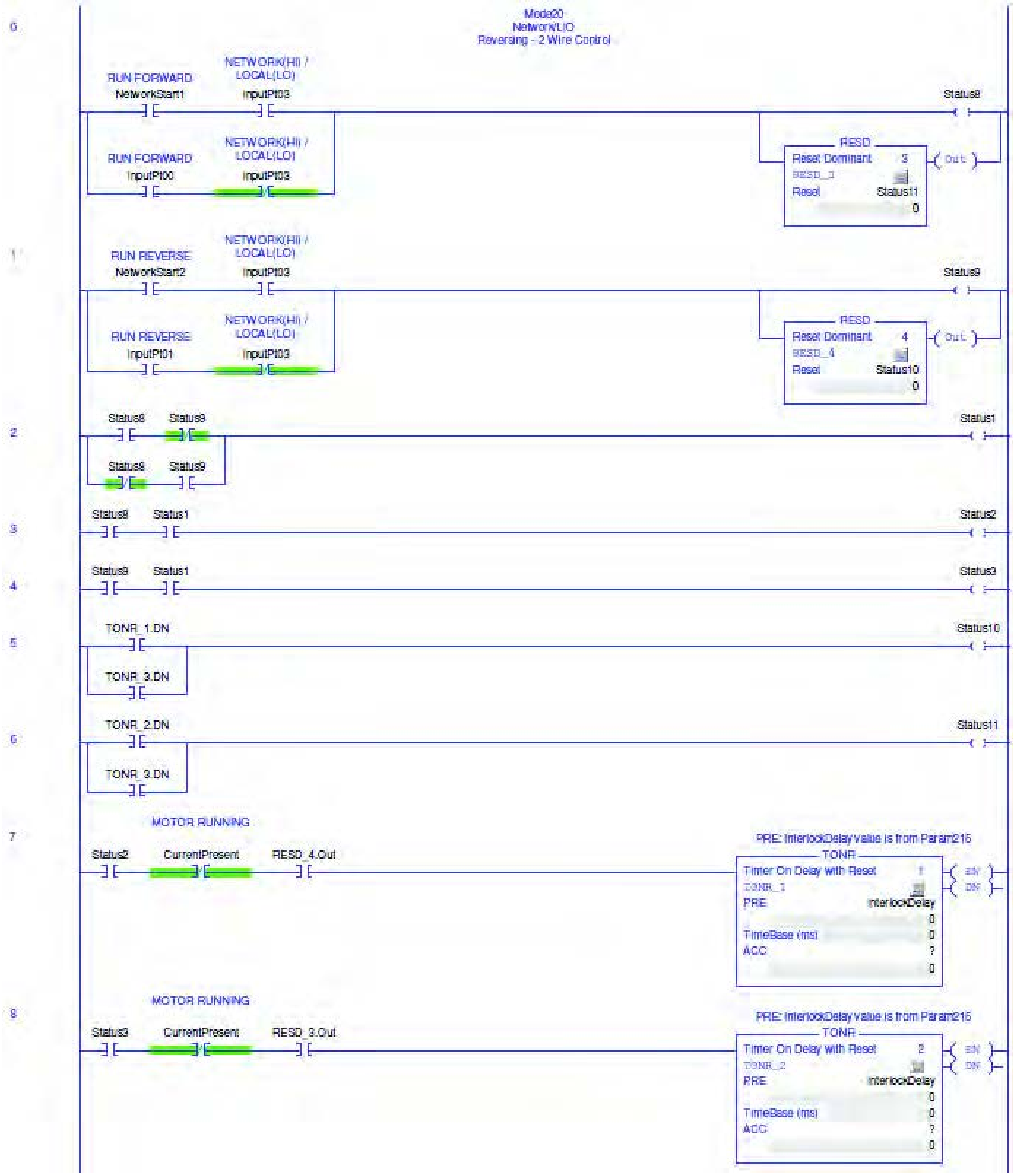
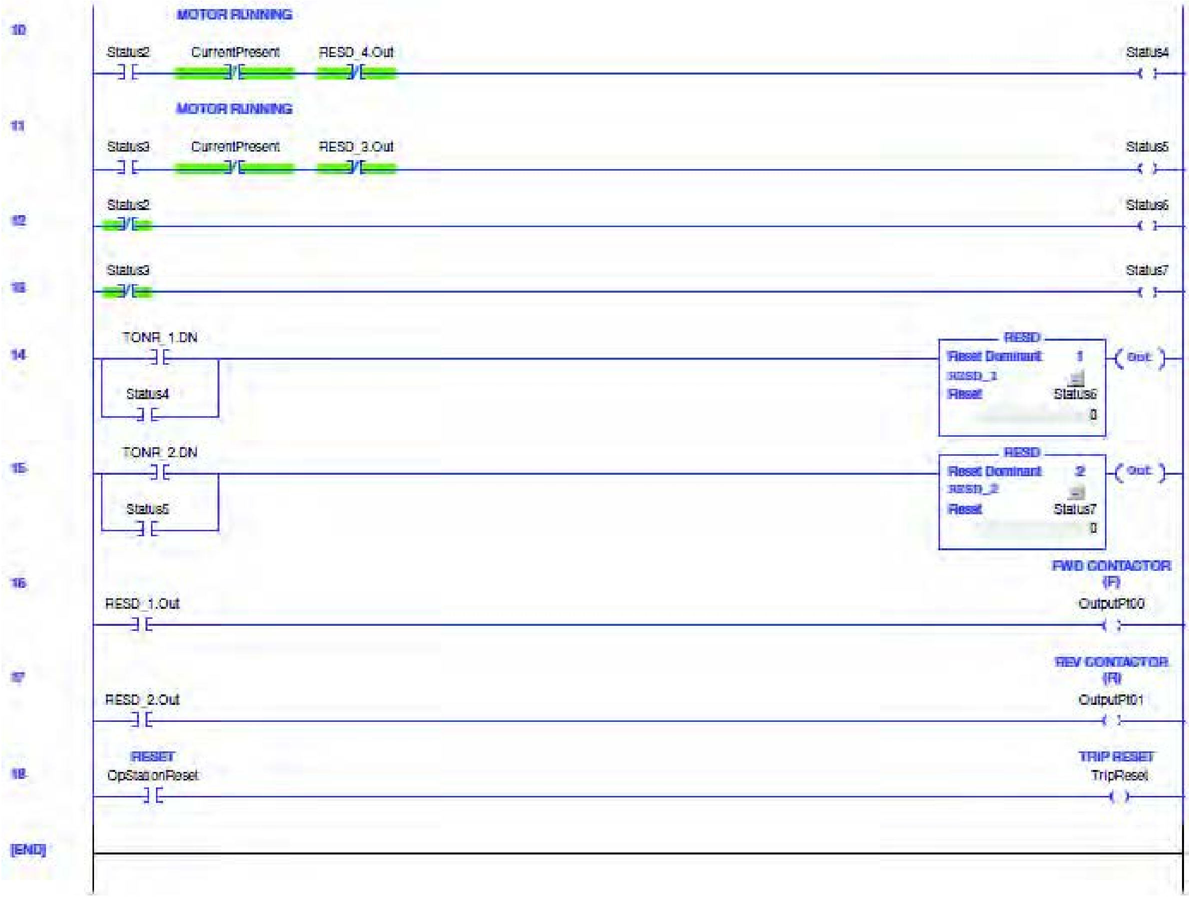
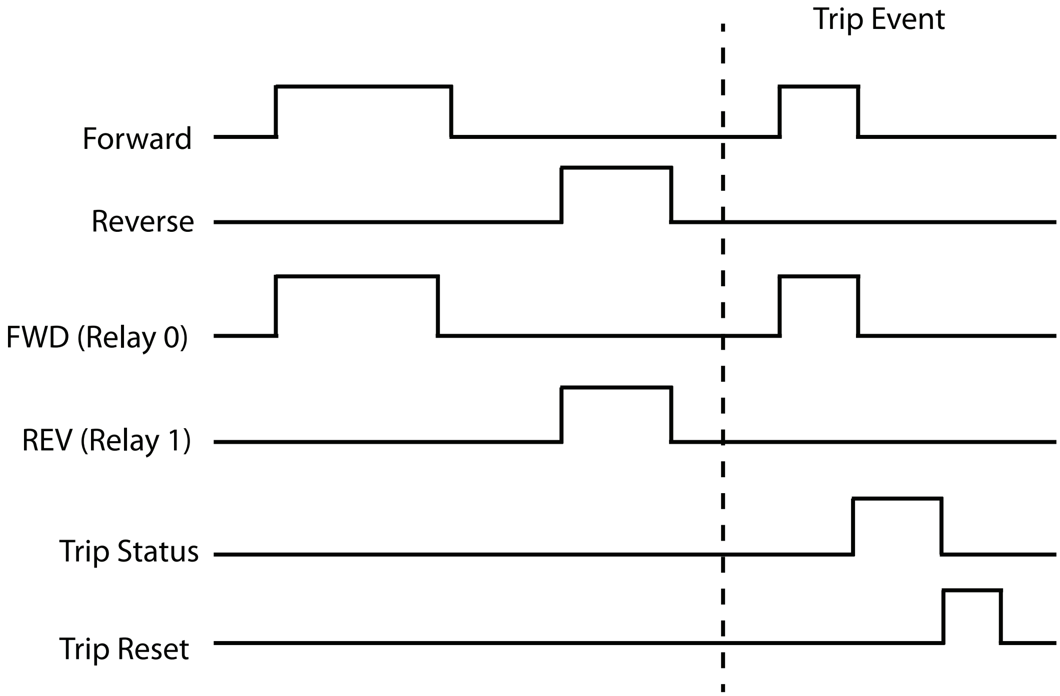


Figure 153 - Reversing Starter (Network & Local I/O) – Two-wire Control DeviceLogix Program, Part B



Timing Diagram

Figure 154 - 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 4.

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, the starter energizes if the value in LogicDefinedPt00Data or *LogicDefinedPt01Data* is set to 1.

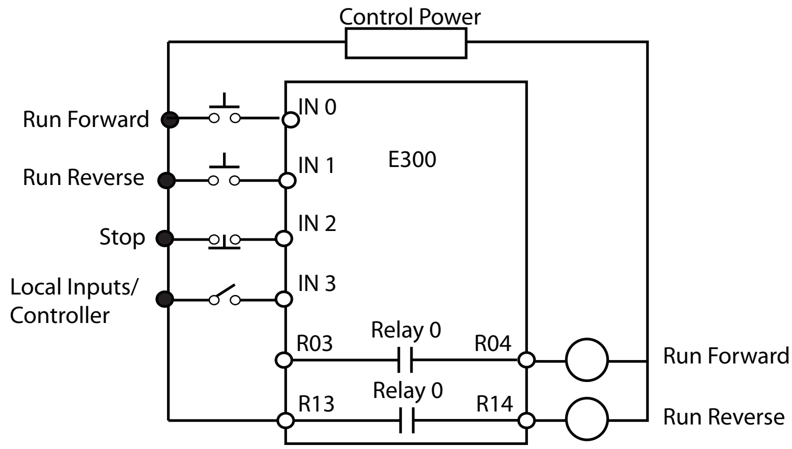
Rules

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 155 is a wiring diagram of a reversing starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 155 - Reversing Starter (Network & Local I/O) – Three-wire Control Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 156, Figure 157, and Figure 158 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 21.

Figure 156 - Reversing Starter (Network & Local I/O) – Three-wire Control DeviceLogix Program, Part A

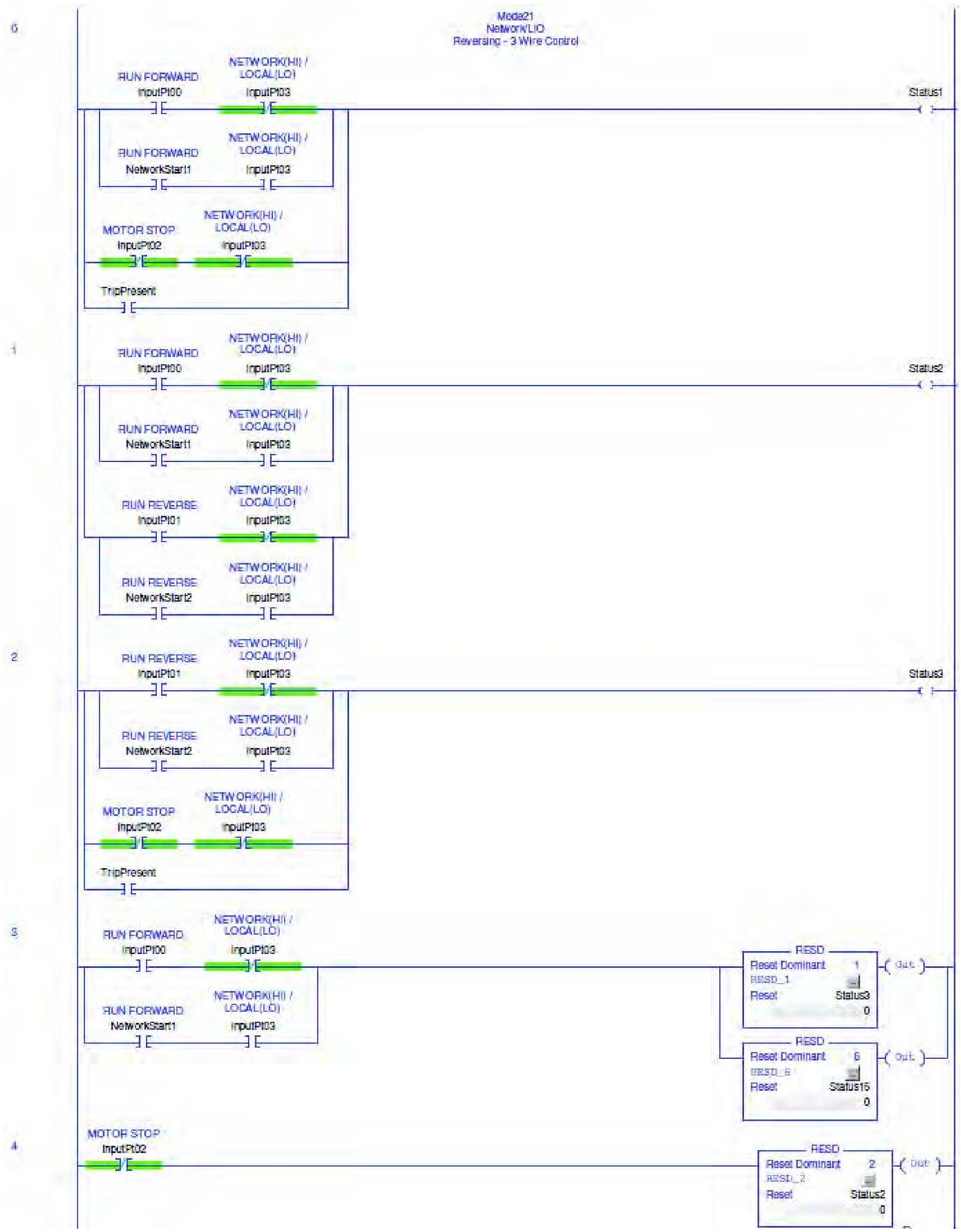


Figure 157 - Reversing Starter (Network & Local I/O) – Three-wire Control DeviceLogix Program, Part B

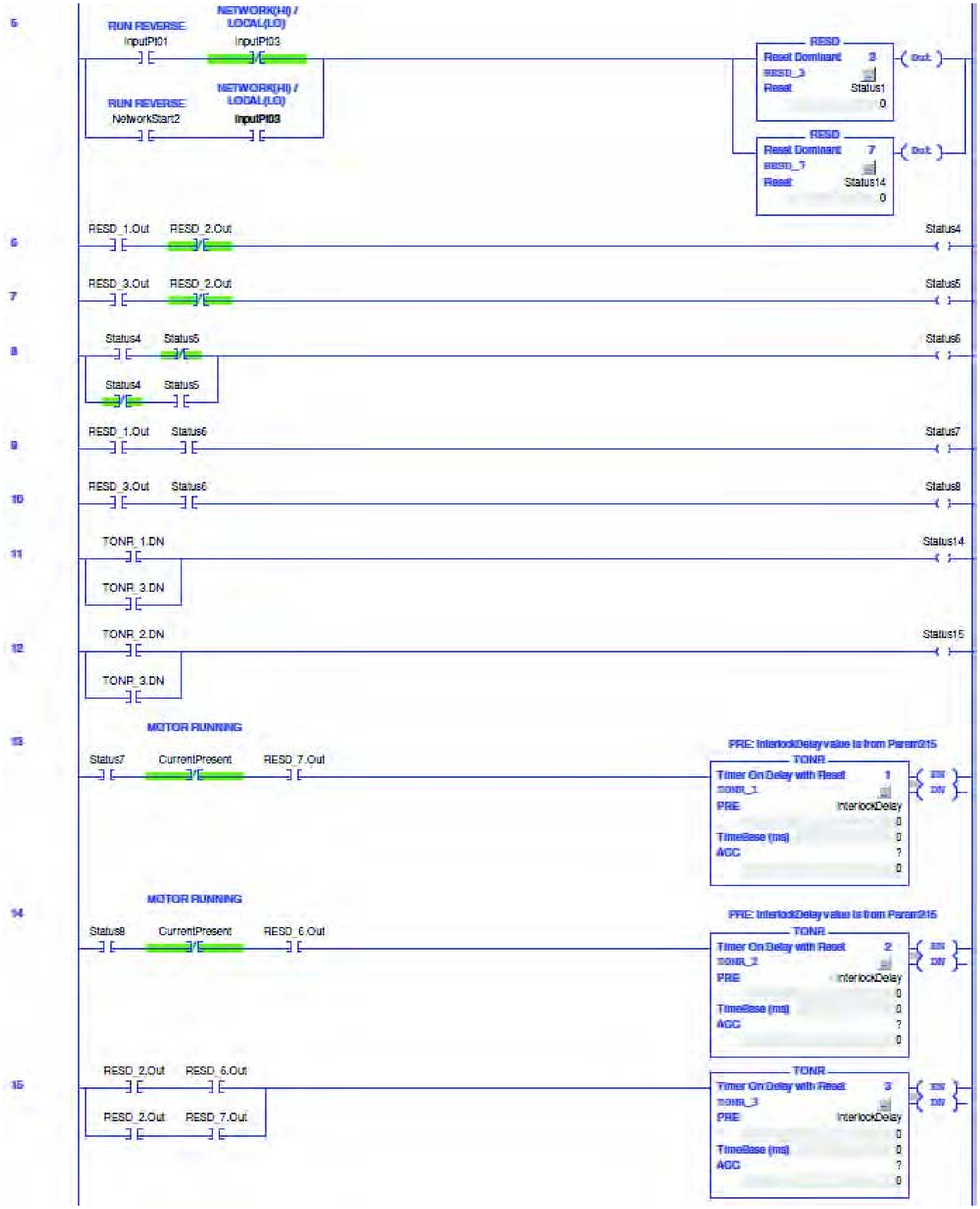
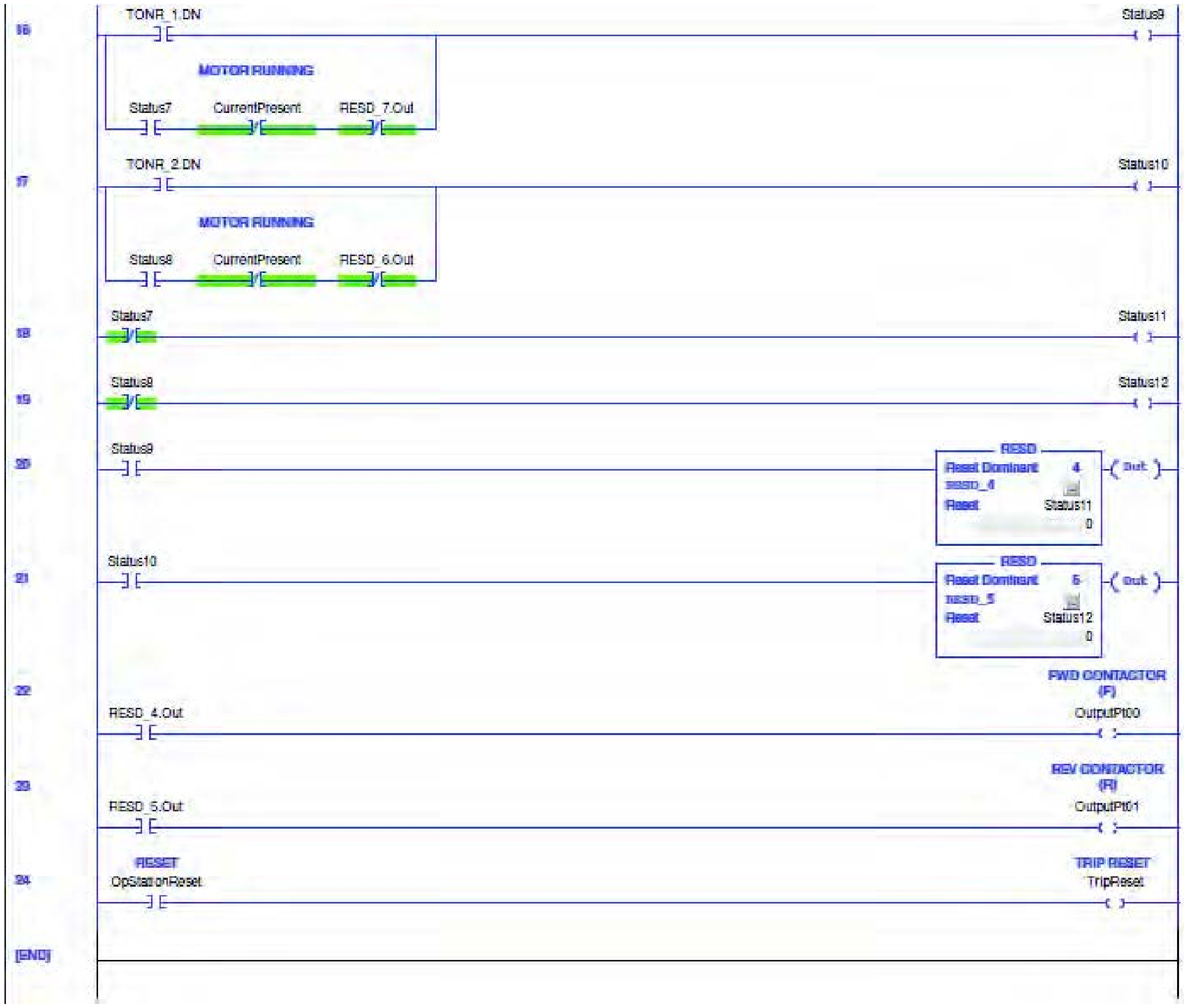


Figure 158 - Reversing Starter (Network & Local I/O) – Three-wire Control DeviceLogix Program, Part C



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.

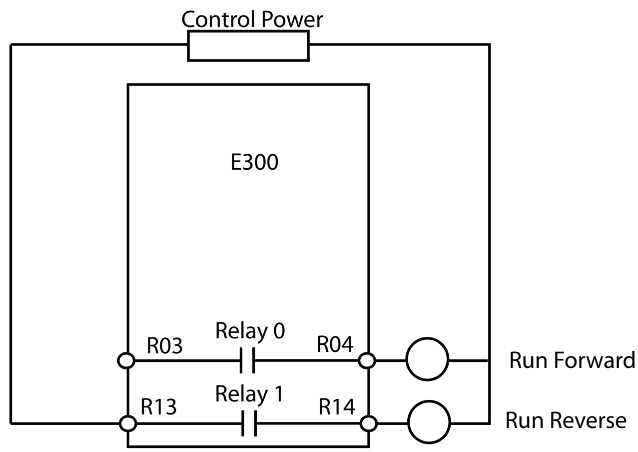
Rules

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 159 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 159 - Reversing Starter (Custom) Wiring Diagram

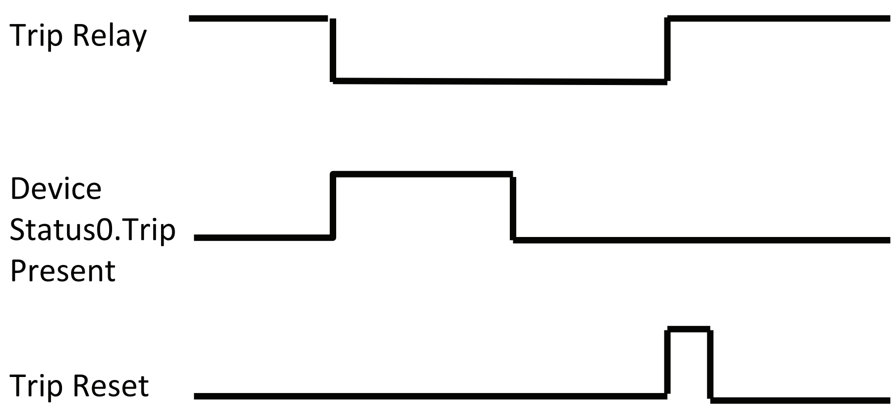


DeviceLogix Program

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

Timing Diagram

Figure 160 - 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 4.

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, the starter energizes if the value in LogicDefinedPt00Data or *LogicDefinedPt01Data* is set to 1.

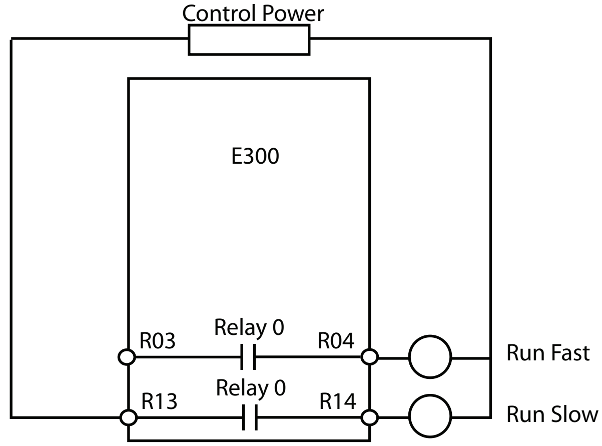
Rules

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 161 is a wiring diagram of a two-speed starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 161 - Two-speed Starter (Network) Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 162 and Figure 163 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 9.

Figure 162 - Two-speed Starter (Network) DeviceLogix Program, Part A

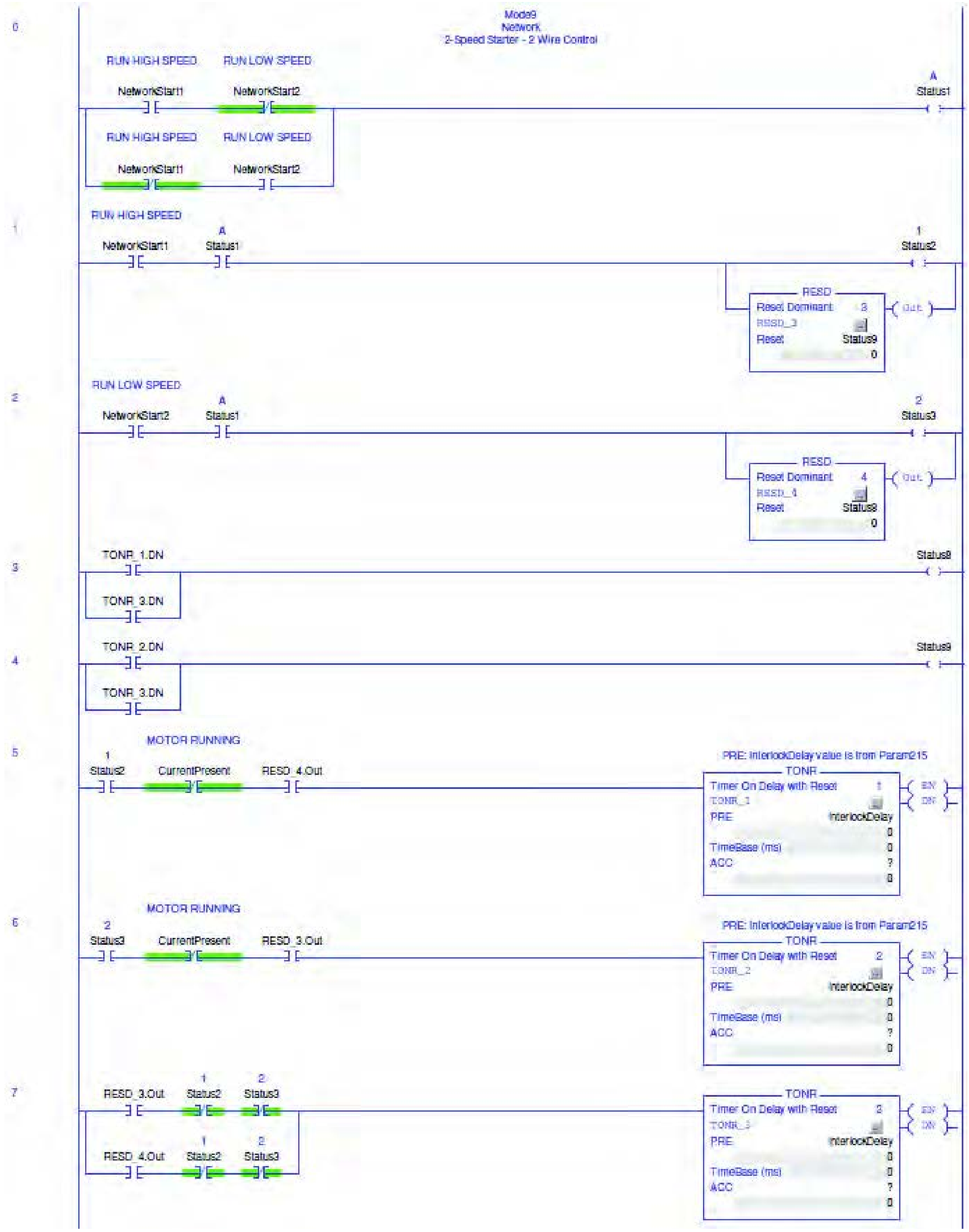
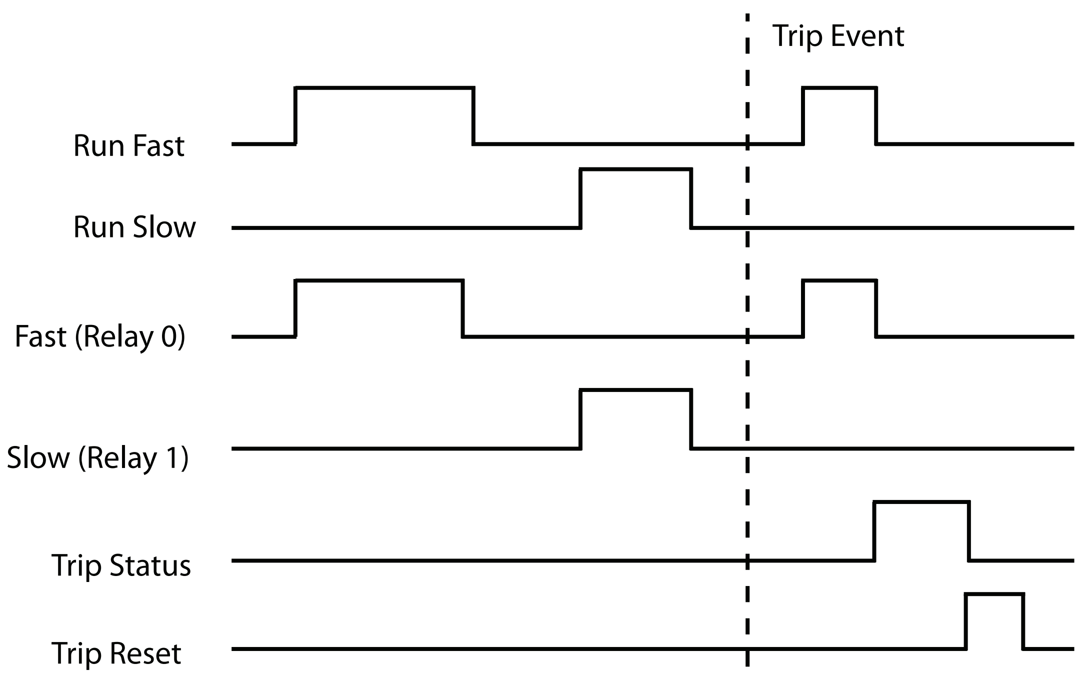


Figure 163 - Two-speed Starter (Network) DeviceLogix Program, Part B

Timing Diagram

Figure 164 - 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 4.

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 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, the starter energizes if the value in LogicDefinedPt00Data or *LogicDefinedPt01Data* is set to 1.

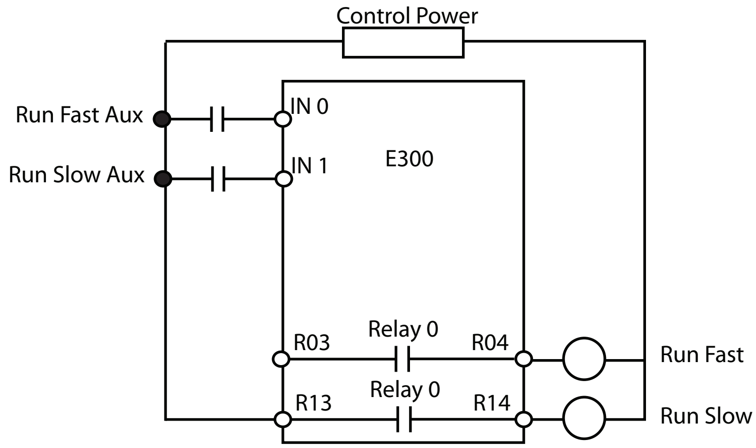
Rules

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 165 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 165 - Two-speed Starter (Network) with Feedback Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 166, Figure 167, and Figure 168 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 10.

Figure 166 - Two-speed Starter (Network) with Feedback DeviceLogix Program, Part A

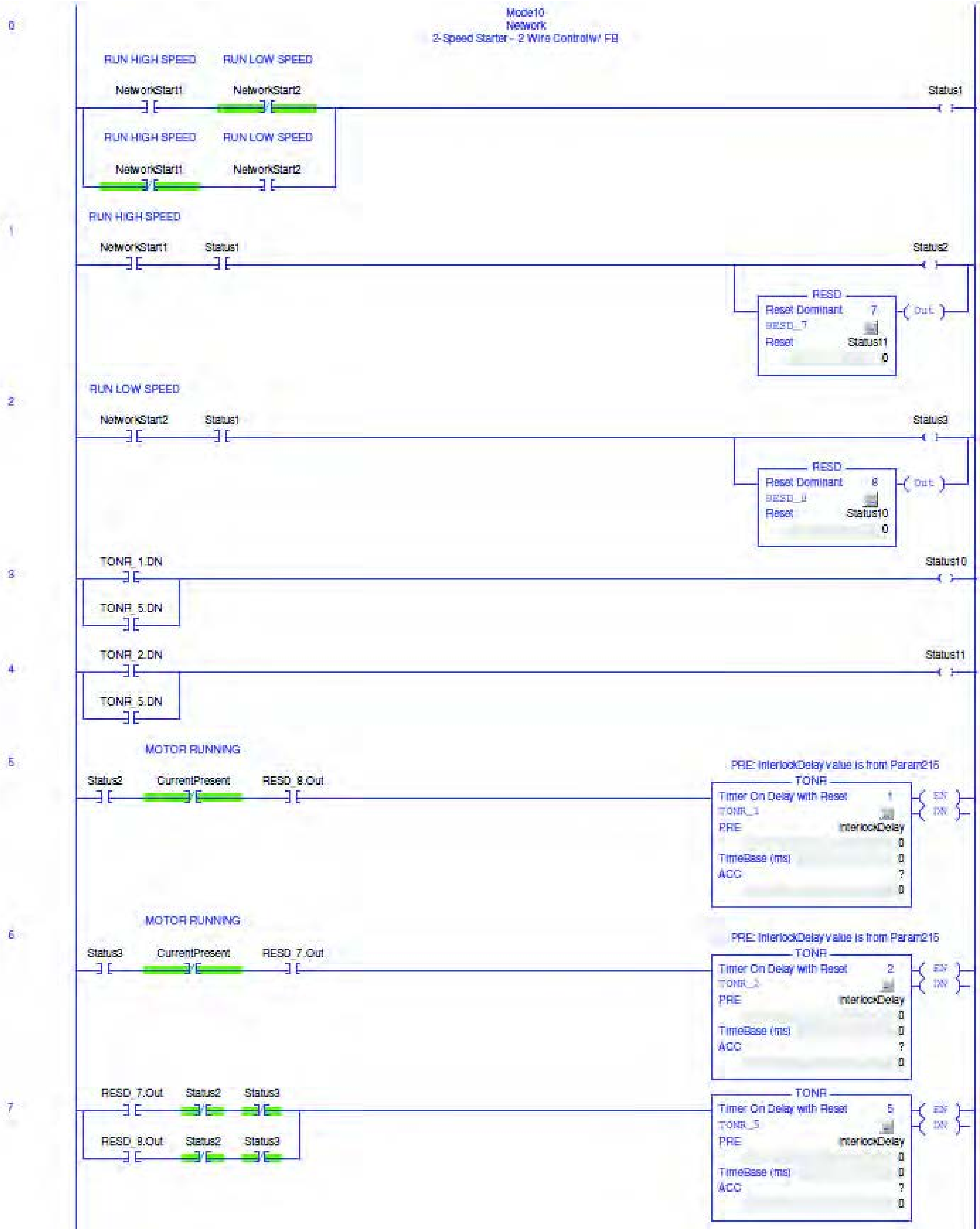
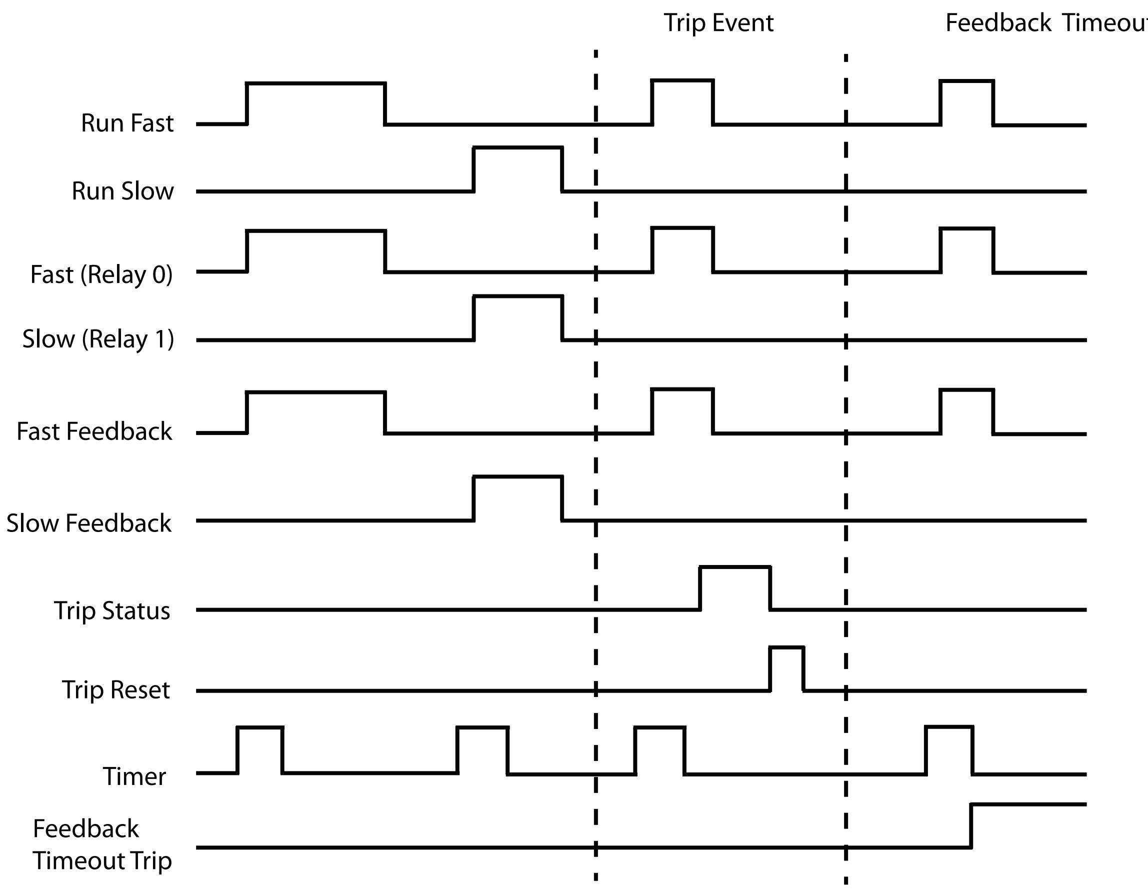


Figure 167 - Two-speed Starter (Network) with Feedback DeviceLogix Program, Part B

Figure 168 - Two-speed Starter (Network) with Feedback DeviceLogix Program, Part C

Timing Diagram

Figure 169 - 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 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)

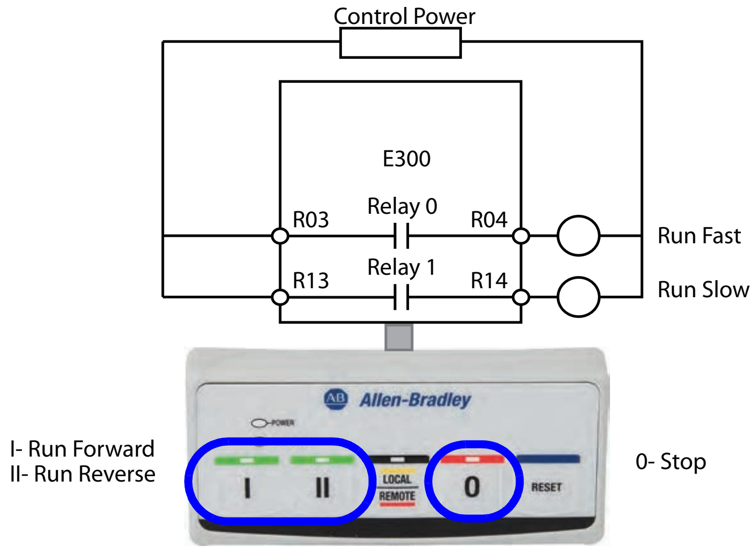
   Or

   - 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 170 is a wiring diagram of a two-speed starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 170 - Two-speed Starter (Operator Station) Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 171, Figure 172, and Figure 173 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 33.

Figure 171 - Two-speed Starter (Operator Station) DeviceLogix Program, Part A

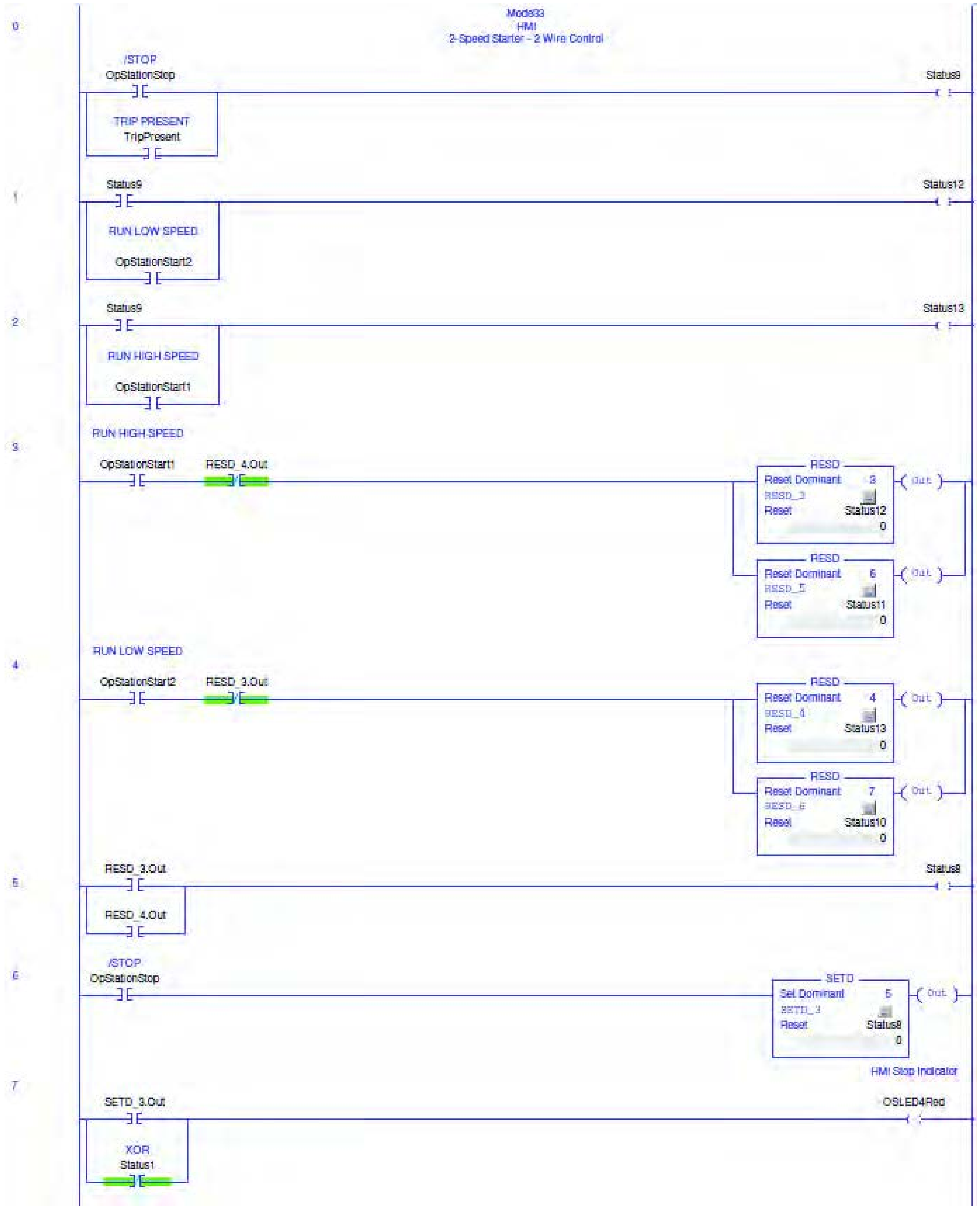


Figure 172 - Two-speed Starter (Operator Station) DeviceLogix Program, Part B

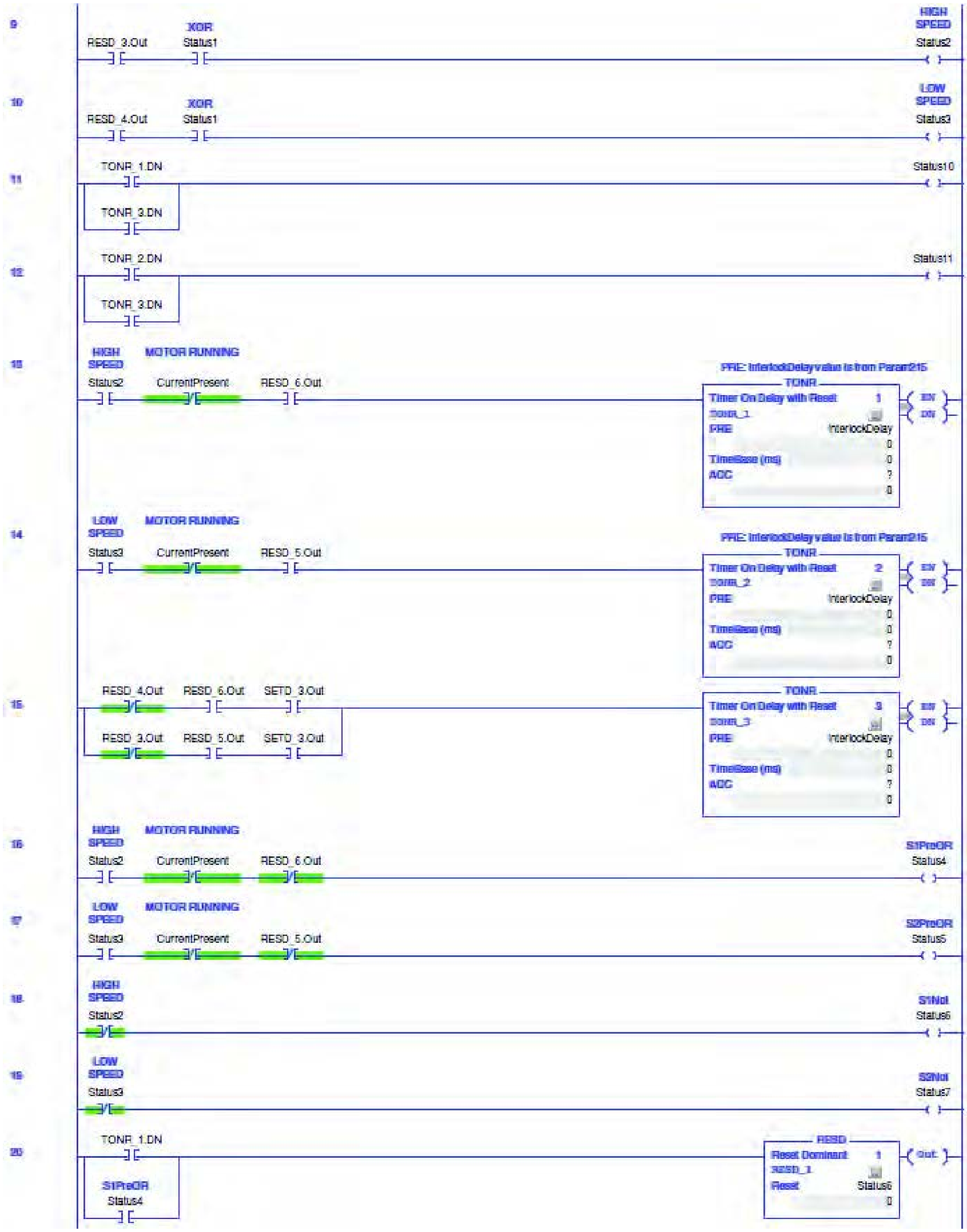
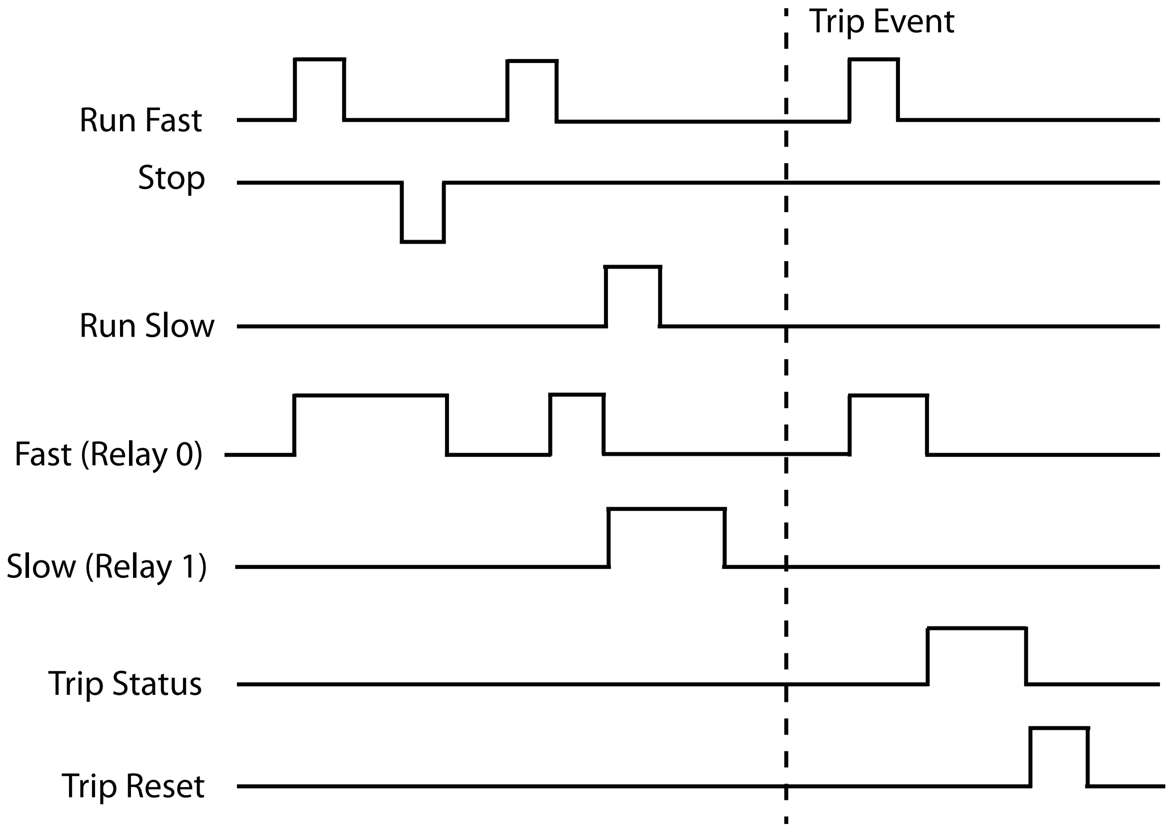


Figure 173 - Two-speed Starter (Operator Station) DeviceLogix Program, Part C

Timing Diagram

Figure 174 - 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 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 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)

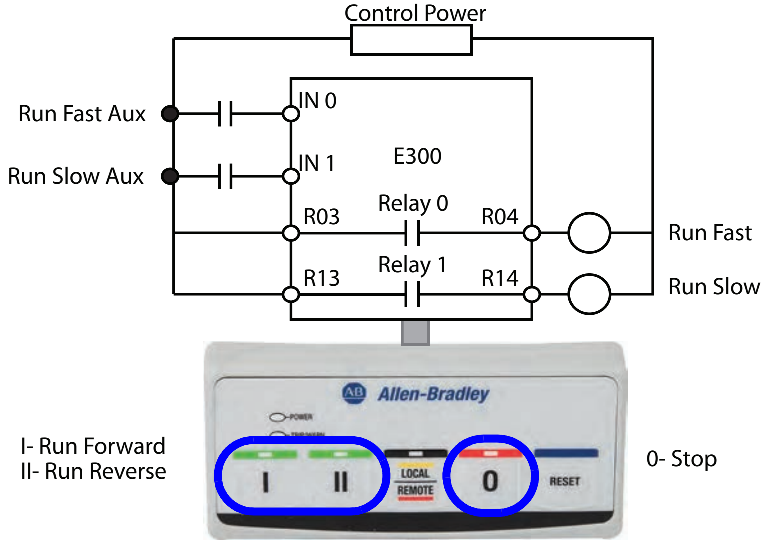
   Or

   - 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 175 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 175 - Two-speed Starter (Operator Station) with Feedback Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 176 through Figure 179 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 34.

Figure 176 - Two-speed Starter (Operator Station) with Feedback DeviceLogix Program, Part A

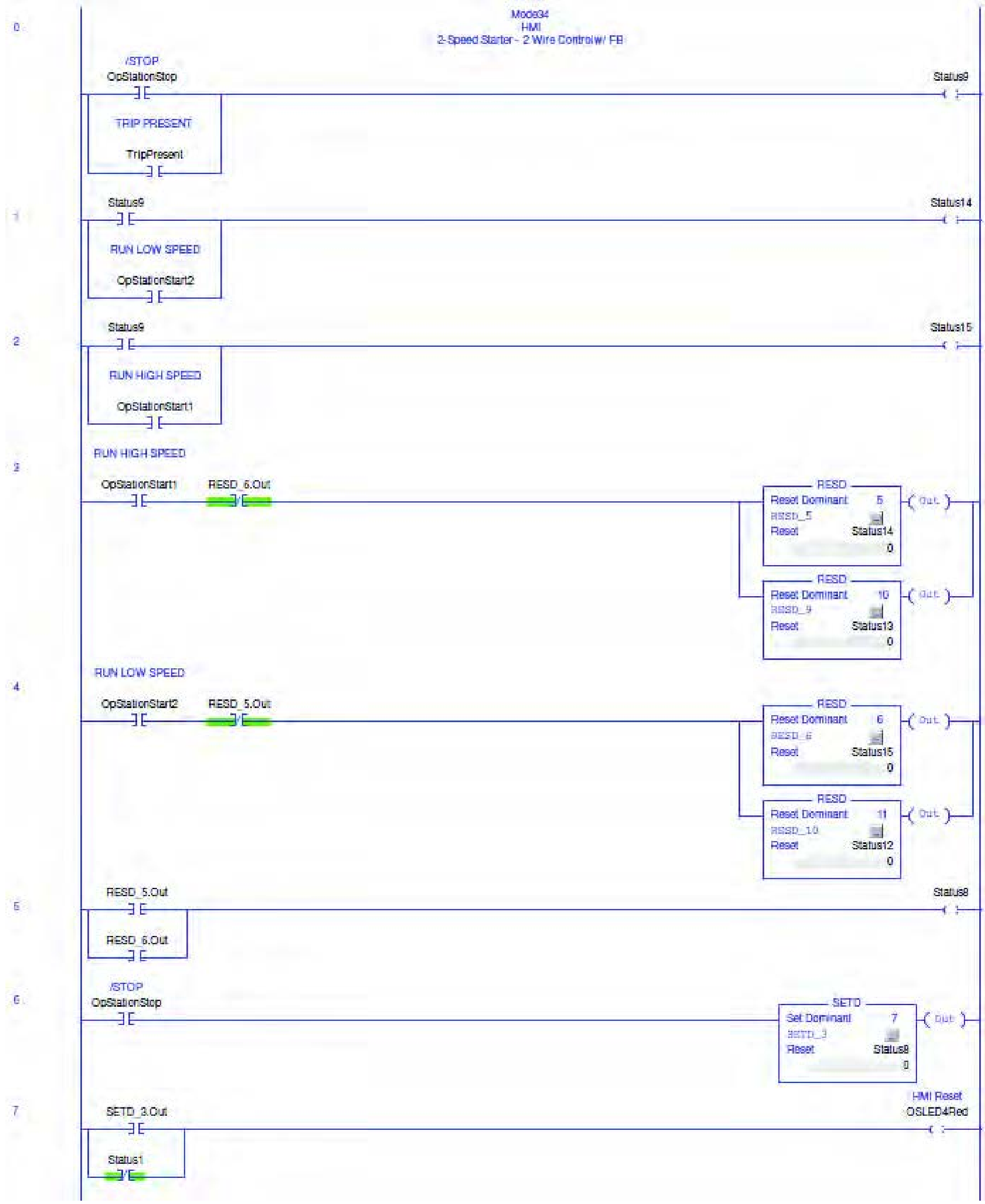


Figure 177 - Two-speed Starter (Operator Station) with Feedback DeviceLogix Program, Part B

Figure 178 - Two-speed Starter (Operator Station) with Feedback DeviceLogix Program, Part C

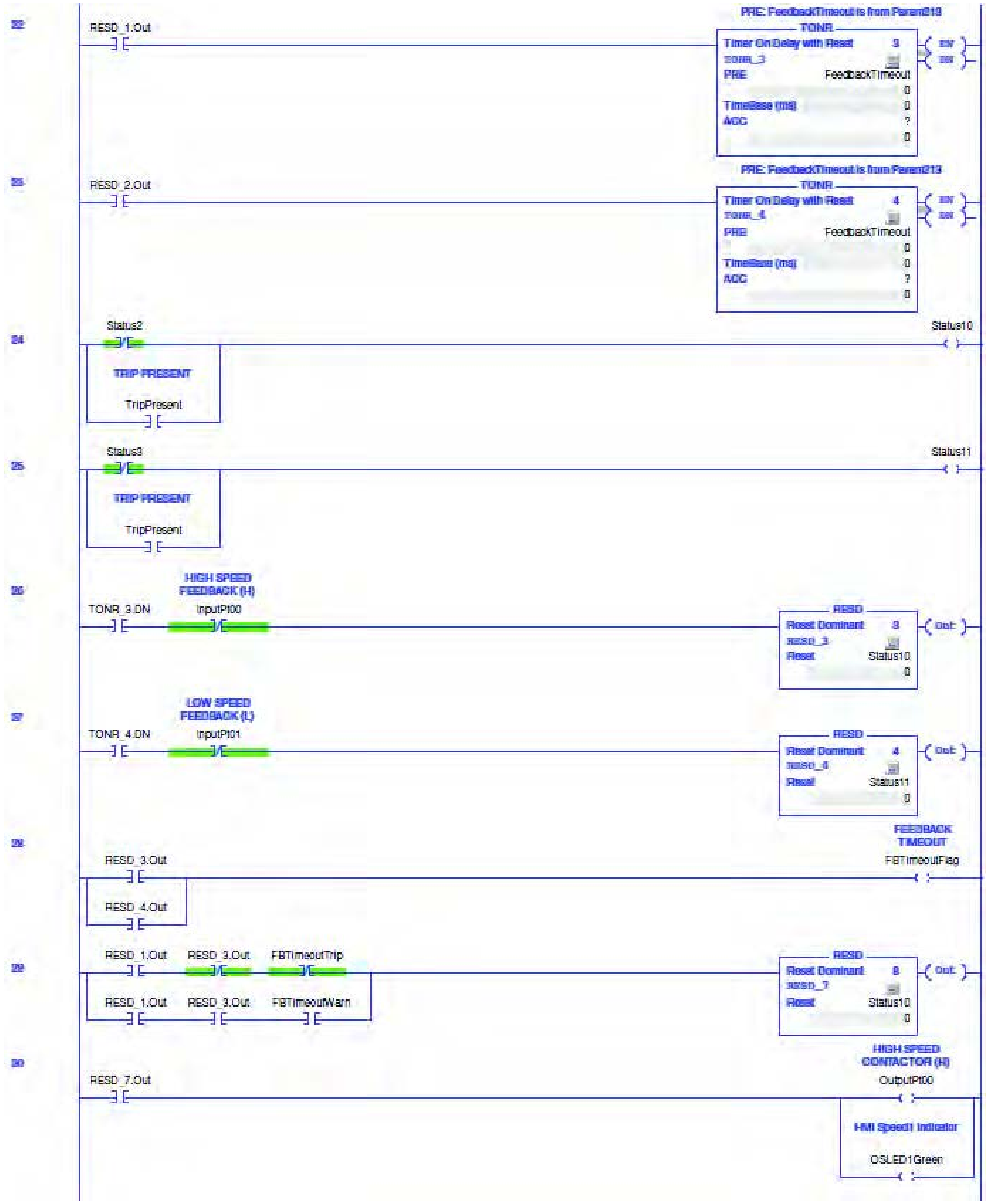
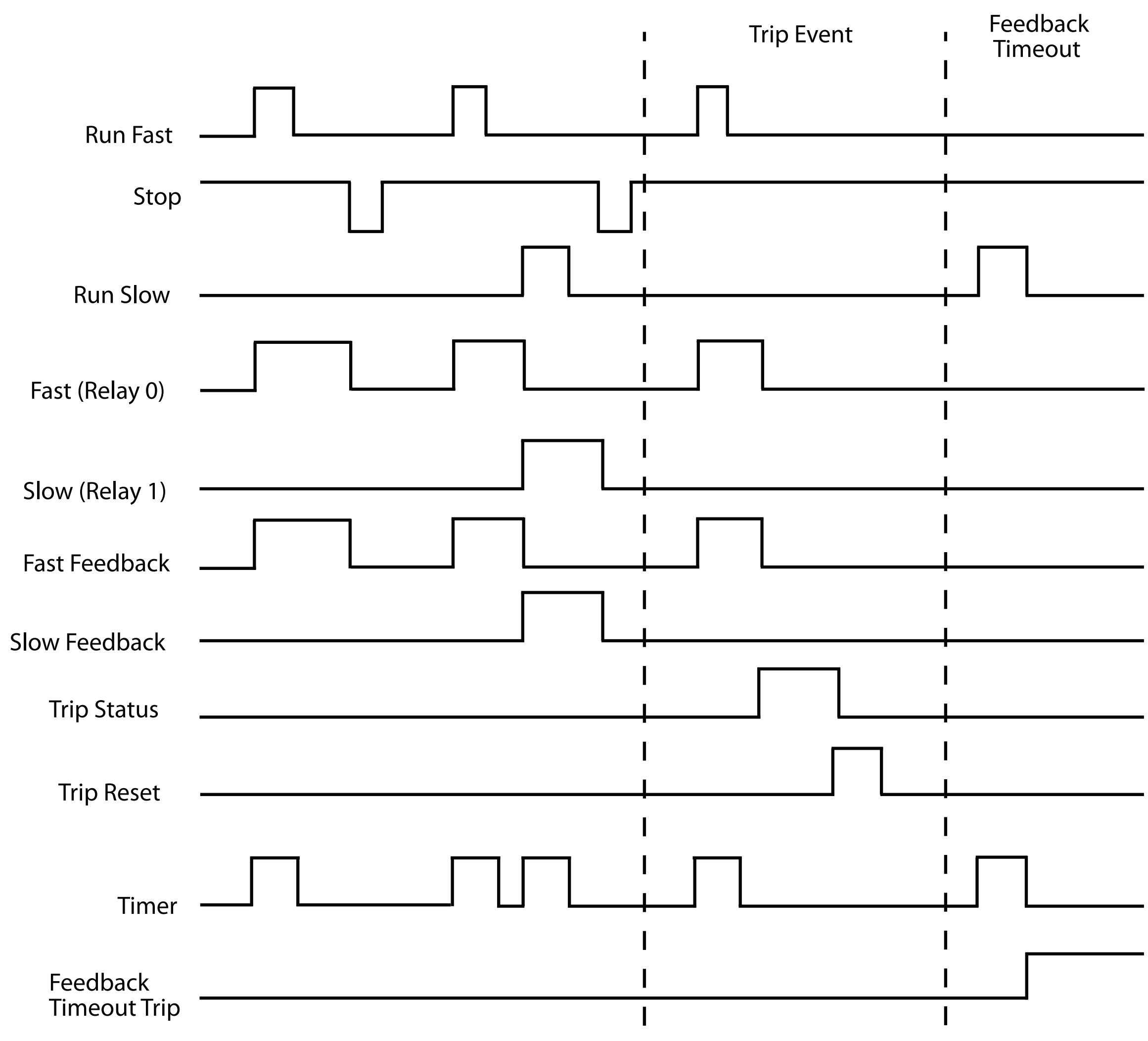


Figure 179 - Two-speed Starter (Operator Station) with Feedback DeviceLogix Program, Part D

Timing Diagram

Figure 180 - 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 powers up, the starter energizes if either Input 0 or Input 1 is active.

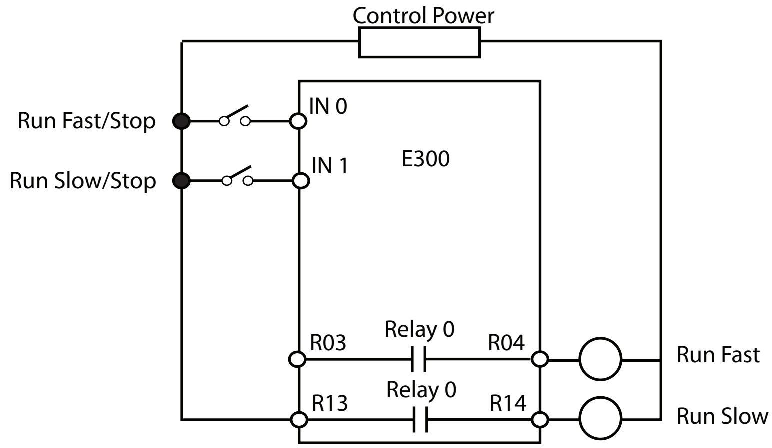
Rules

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 181 is a wiring diagram of a two-speed starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 181 - Two-speed Starter (Local I/O) – Two-wire Control Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 182 and Figure 183 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 46.

Figure 182 - Two-speed Starter (Local I/O) – Two-wire Control DeviceLogix Program, Part A

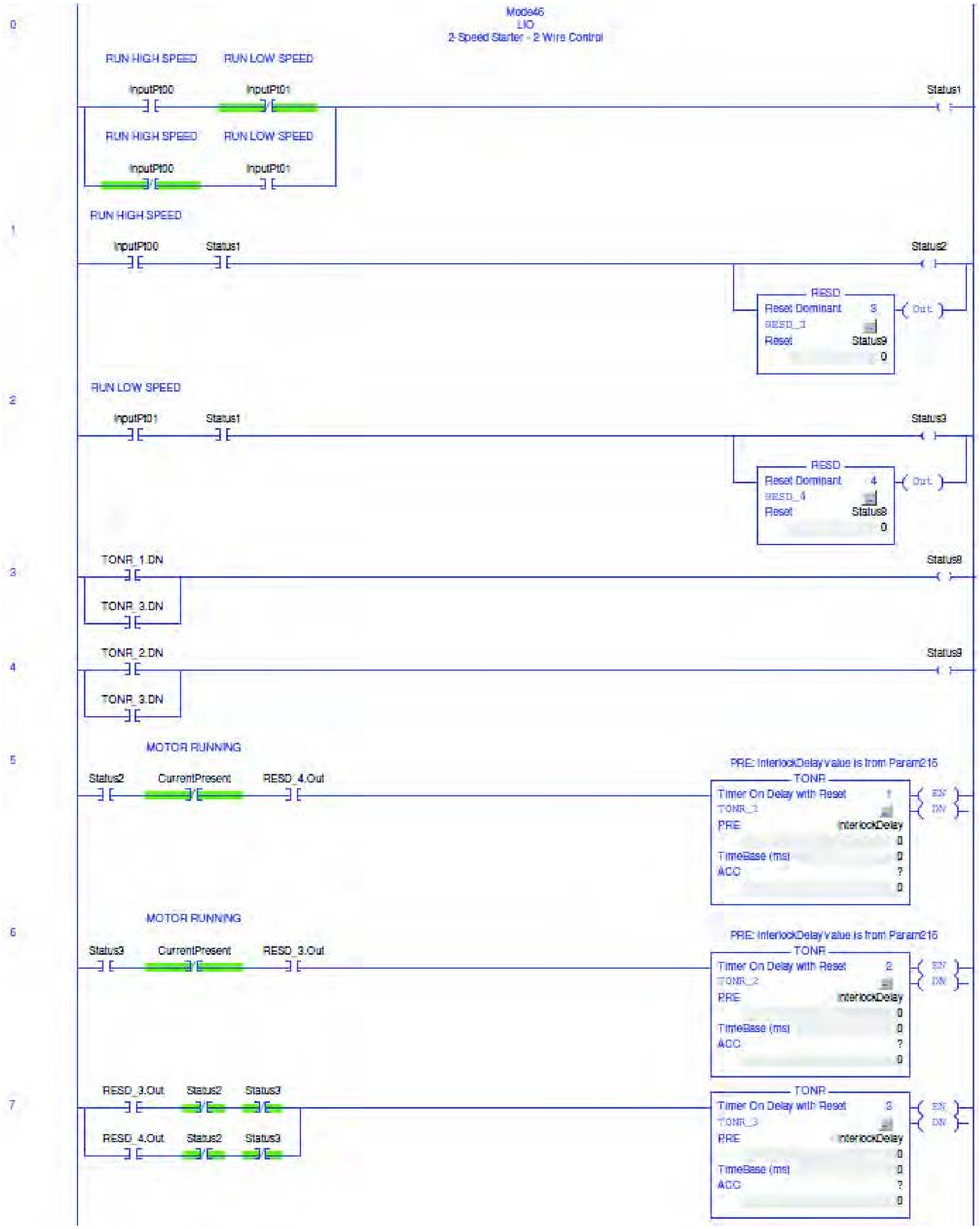
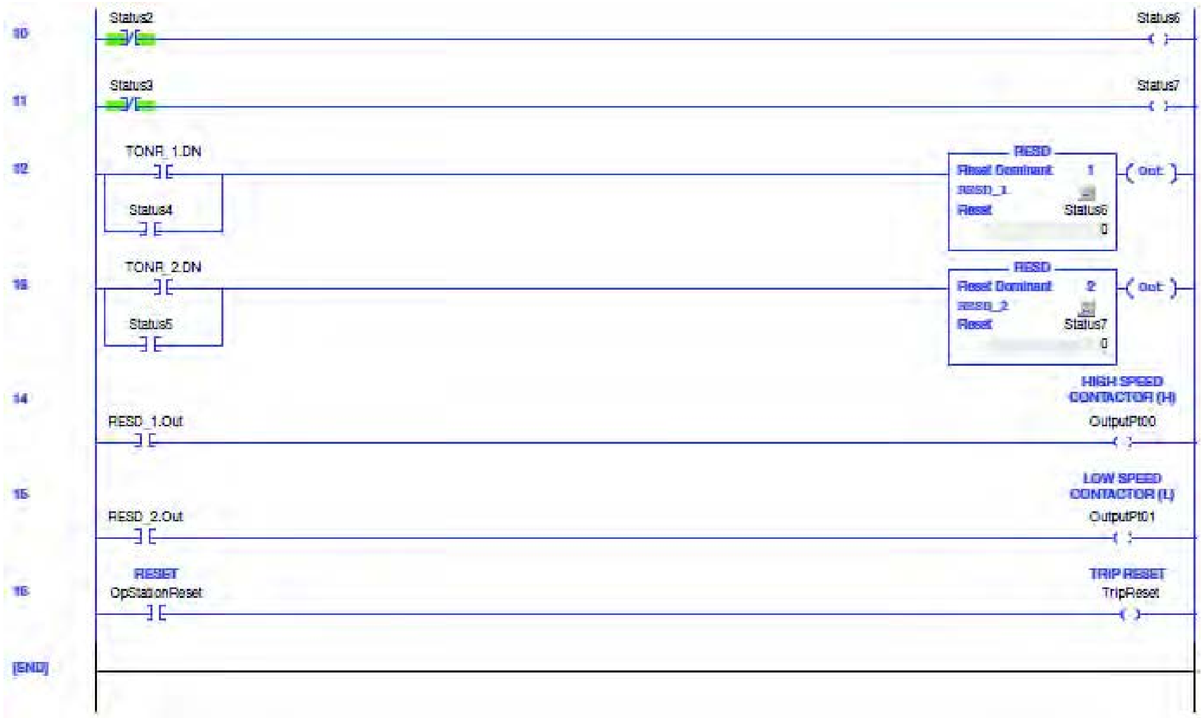
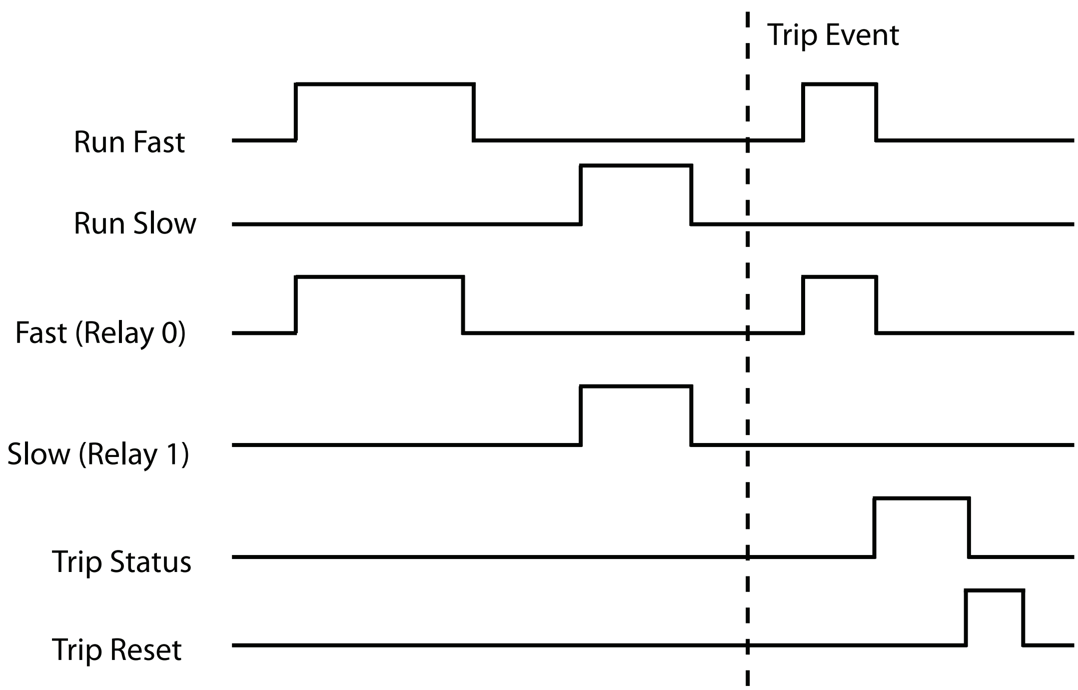


Figure 183 - Two-speed Starter (Local I/O) – Two-wire Control DeviceLogix Program, Part B



Timing Diagram

Figure 184 - 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 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 powers up, the starter energizes if either Input 0 or Input 1 is active.

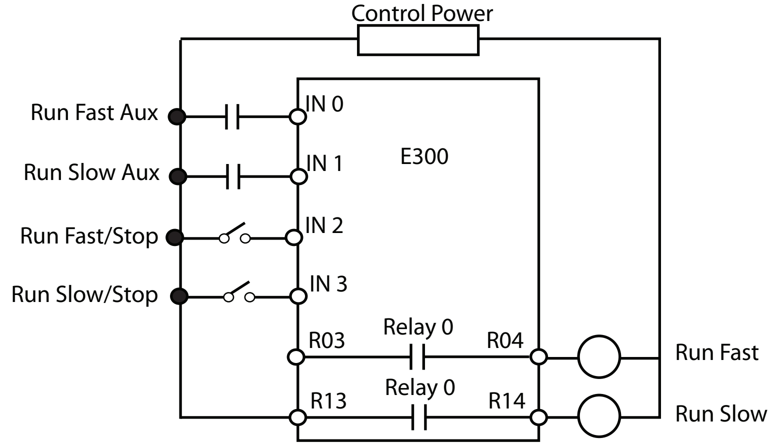
Rules

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 185 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 185 - Two-speed Starter (Local I/O) – Two-wire Control with Feedback Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 186, Figure 187, and Figure 188 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 47.

Figure 186 - Two-speed Starter (Local I/O) – Two-wire Control with Feedback DeviceLogix Program, Part A

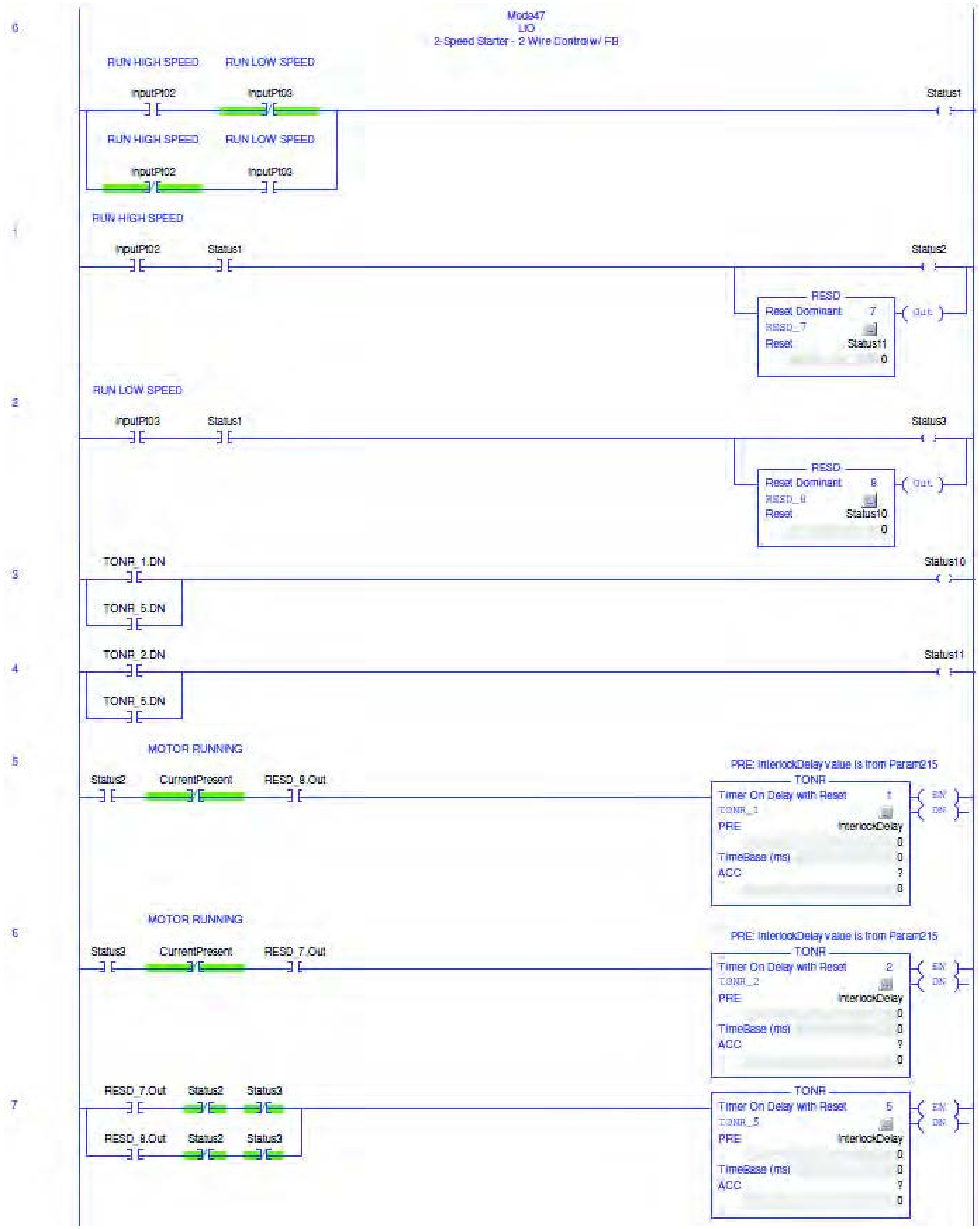
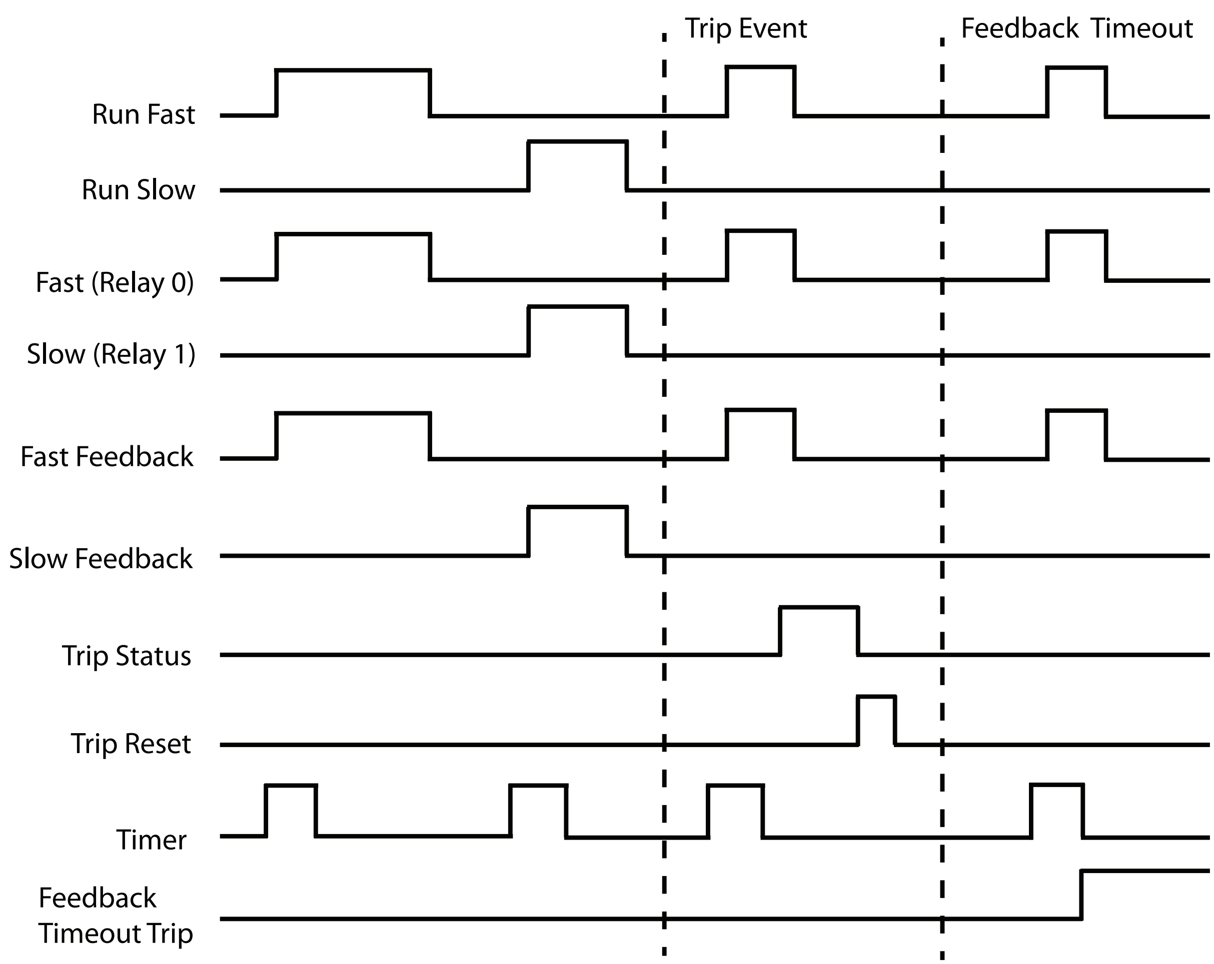


Figure 187 - Two-speed Starter (Local I/O) – Two-wire Control with Feedback DeviceLogix Program, Part B

Figure 188 - Two-speed Starter (Local I/O) – Two-wire Control with Feedback DeviceLogix Program, Part C

Timing Diagram

Figure 189 - 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.

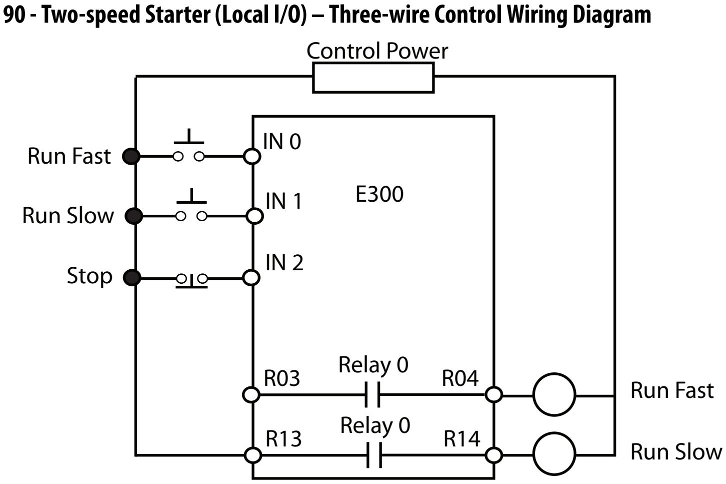
Rules

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 190 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 190 - Two-speed Starter (Local I/O) – Three-wire Control Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 191, Figure 192, and Figure 193is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 48.

Figure 191 - Two-speed Starter (Local I/O) – Three-wire Control DeviceLogix Program, Part A

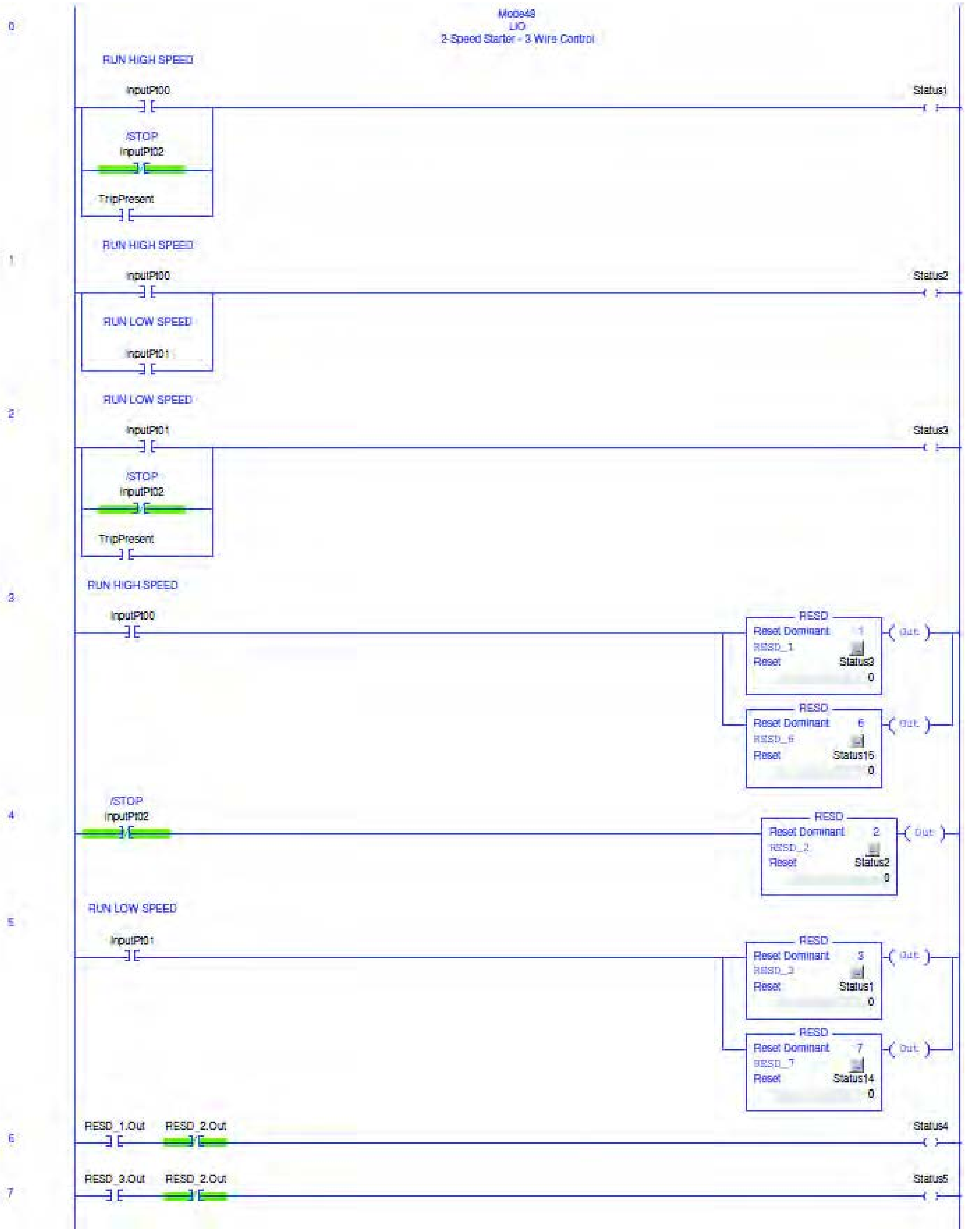


Figure 192 - Two-speed Starter (Local I/O) – Three-wire Control DeviceLogix Program, Part B

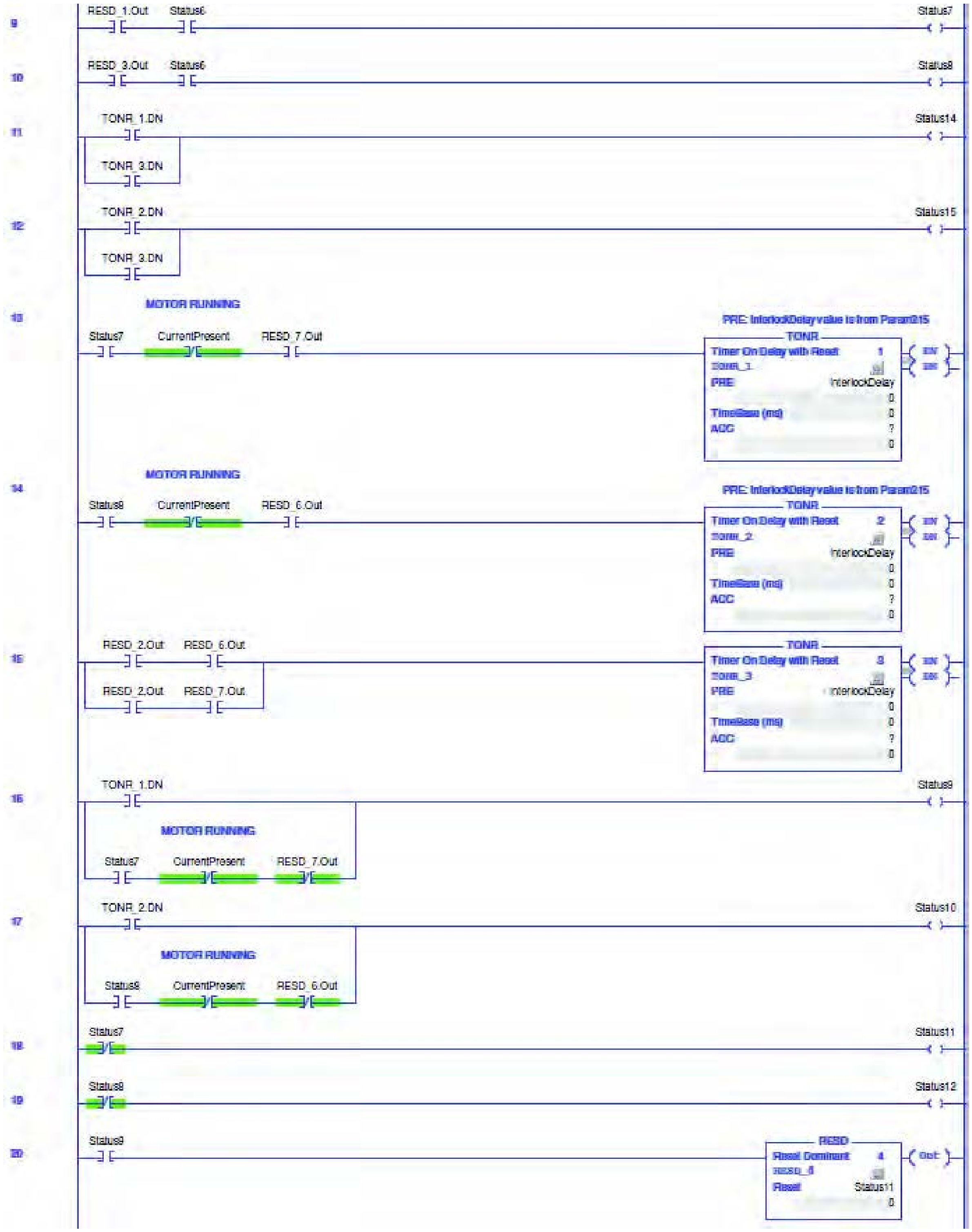
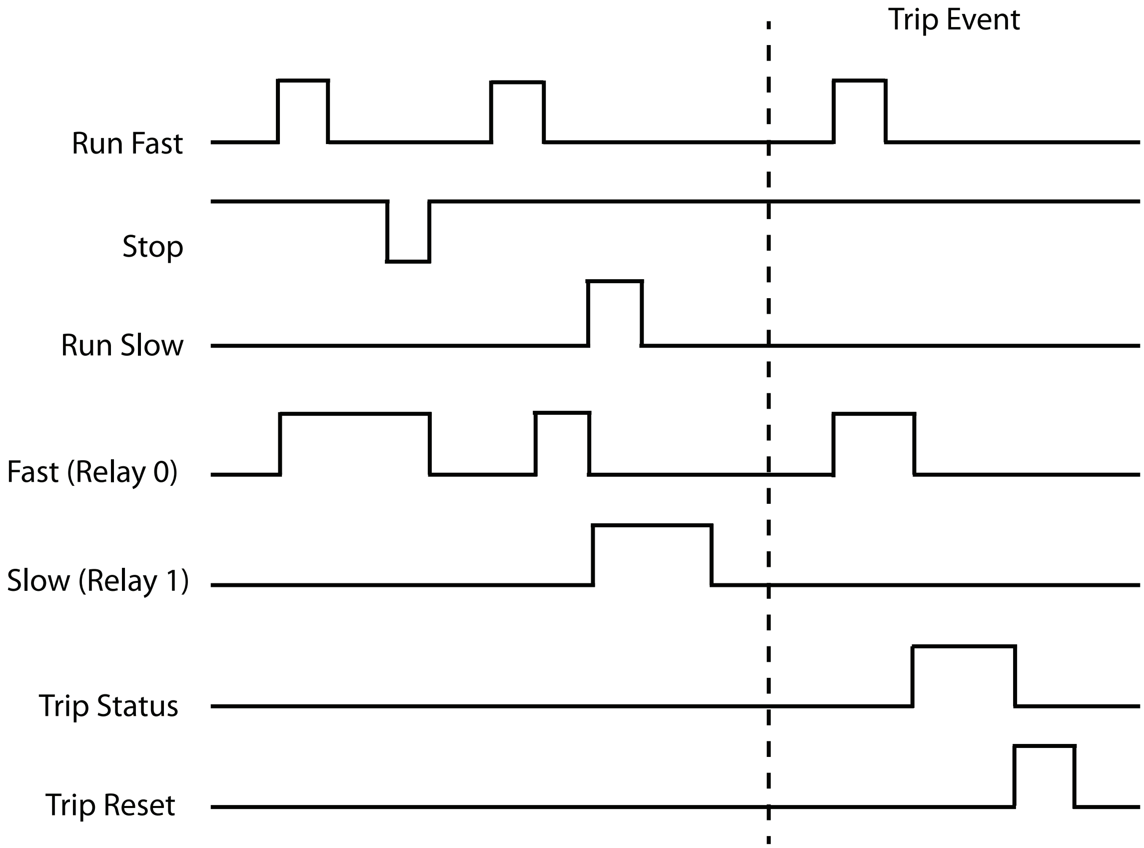


Figure 193 - Two-speed Starter (Local I/O) – Three-wire Control DeviceLogix Program, Part C

Timing Diagram

Figure 194 - 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 4.

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 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, 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

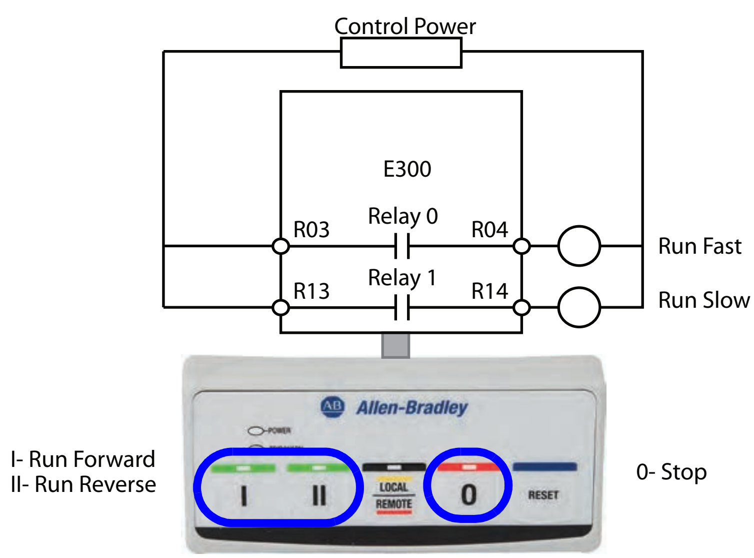
- Option Match Warning must be enabled in WarningEnableC (Parameter 192)
- Operator Station must be disabled in Mismatch Action (Parameter 233)
- An operator station must be selected in Operator Station Type (Parameter 224)

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 195 is a wiring diagram of a two-speed starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 195 - Two-speed Starter (Network & Operator Station) Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 196 through Figure 199 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 15.

Figure 196 - Two-speed Starter (Network & Operator Station) DeviceLogix Program, Part A

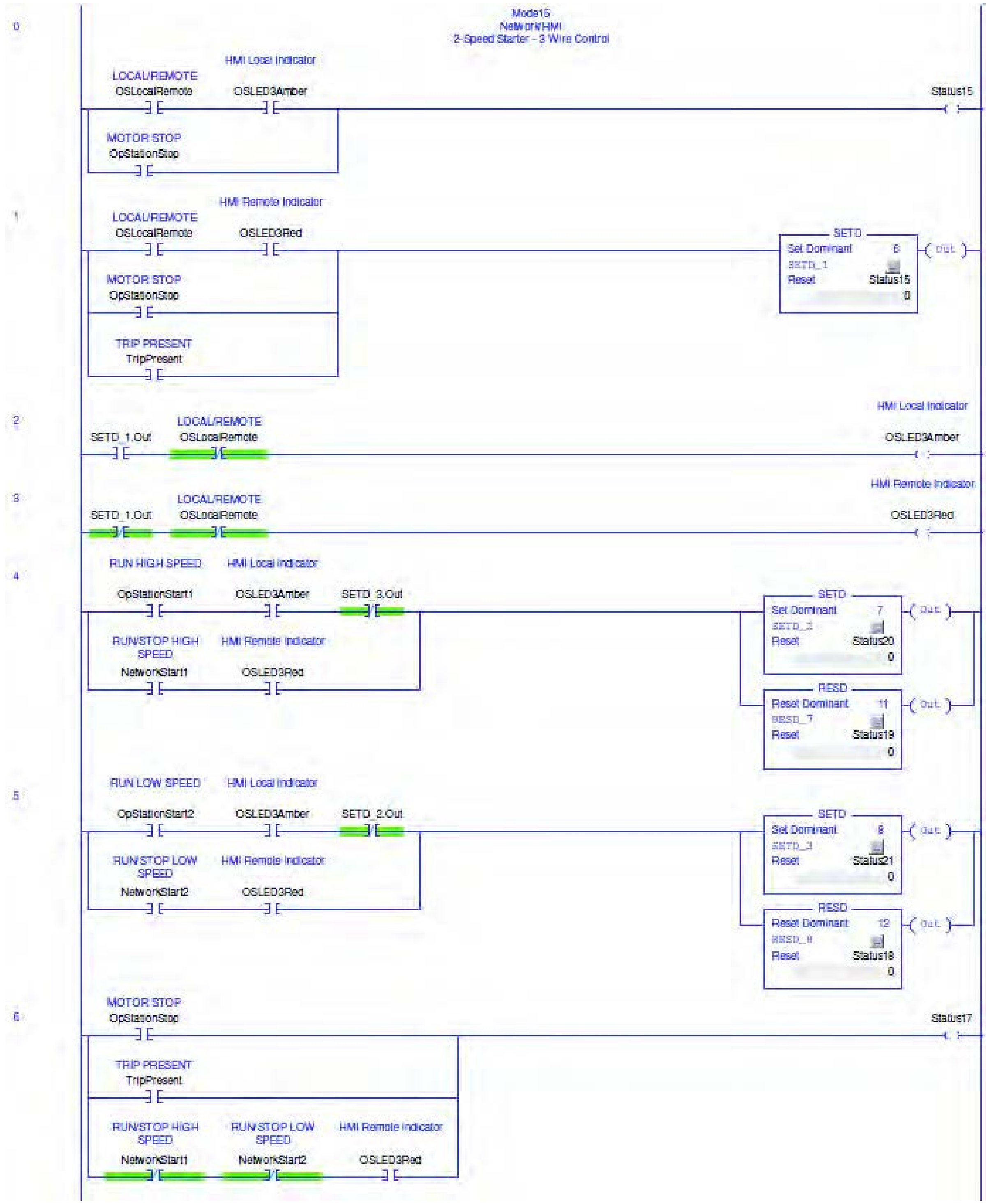


Figure 197 - Two-speed Starter (Network & Operator Station) DeviceLogix Program, Part B

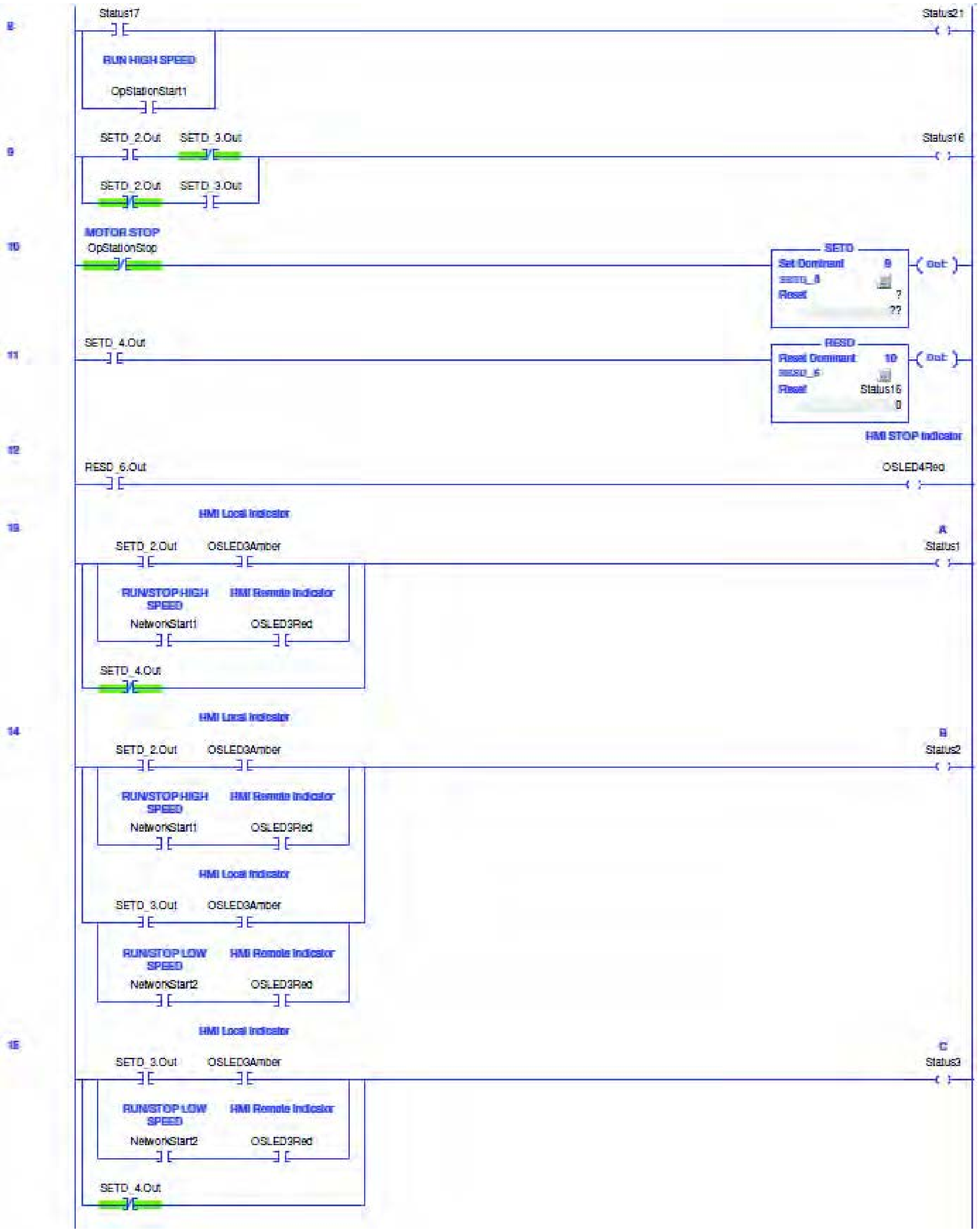


Figure 198 - Two-speed Starter (Network & Operator Station) DeviceLogix Program, Part C

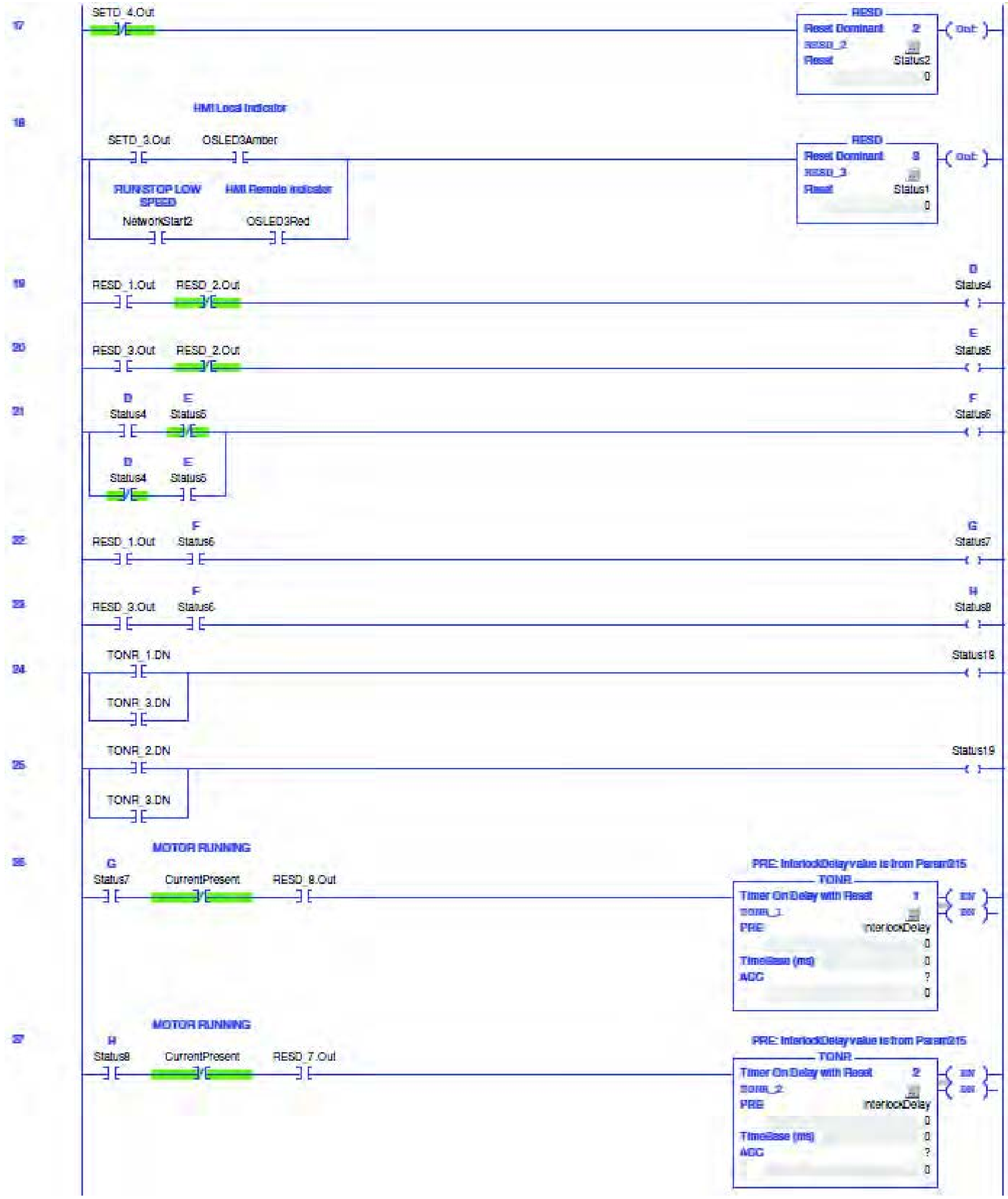
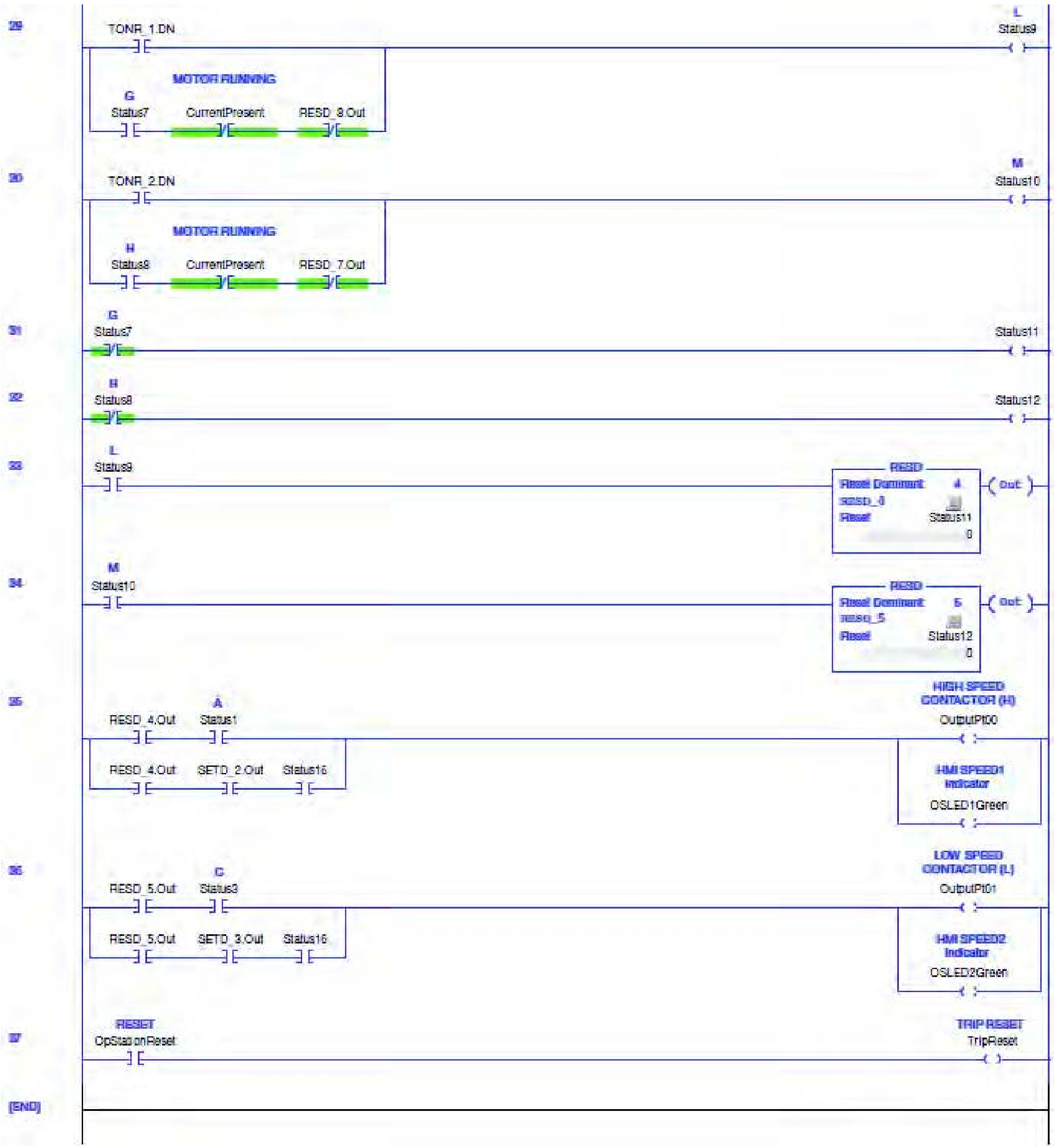


Figure 199 - Two-speed Starter (Network & Operator Station) DeviceLogix Program, Part D



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 4.

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, the starter energizes if the value in LogicDefinedPt00Data or *LogicDefinedPt01Data* is set to 1.

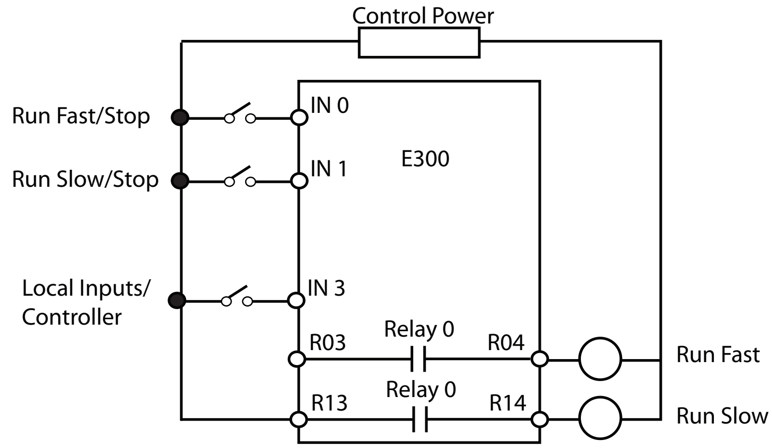
Rules

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

Figure 200 - Two-speed Starter (Network & Local I/O) – Two-wire Control Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 201 and Figure 202 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 24.

Figure 201 - Two-speed Starter (Network & Local I/O) – Two-wire Control DeviceLogix Program, Part A

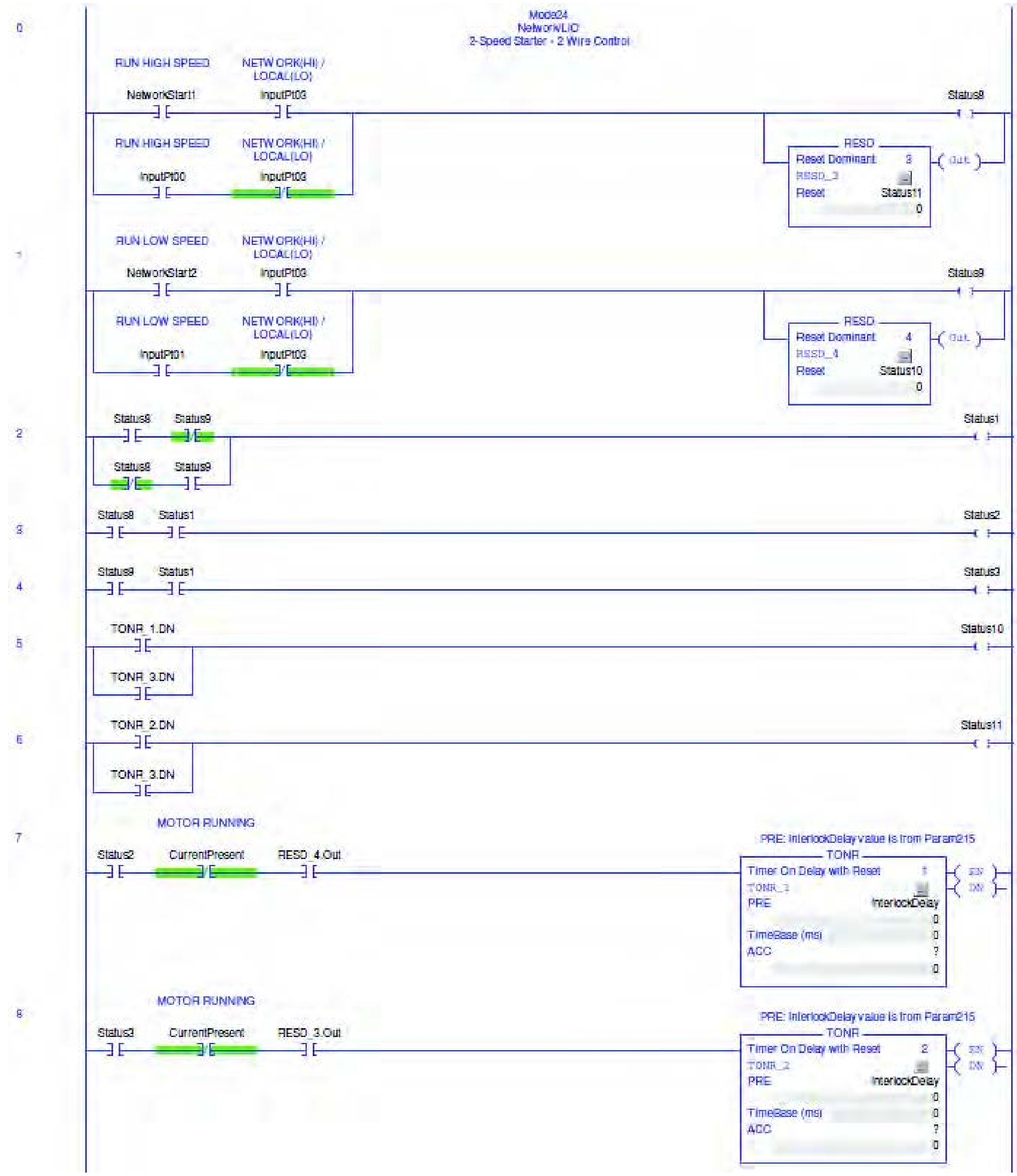
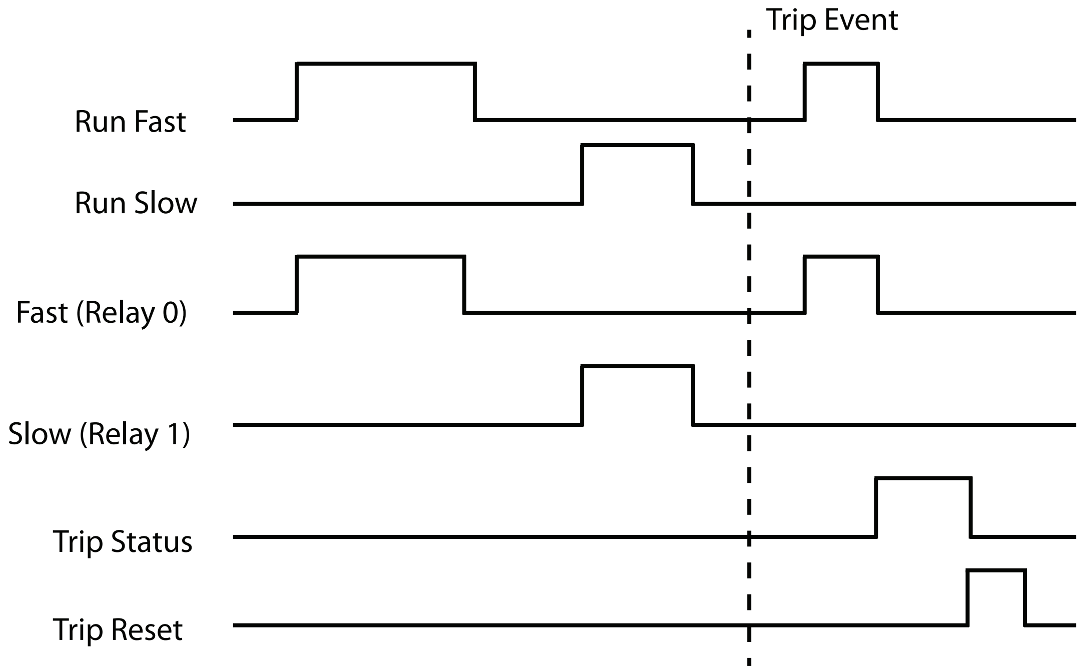


Figure 202 - Two-speed Starter (Network & Local I/O) – Two-wire Control DeviceLogix Program, Part B

Timing Diagram

Figure 203 - 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 4.

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, the starter energizes if the value in LogicDefinedPt00Data or *LogicDefinedPt01Data* is set to 1.

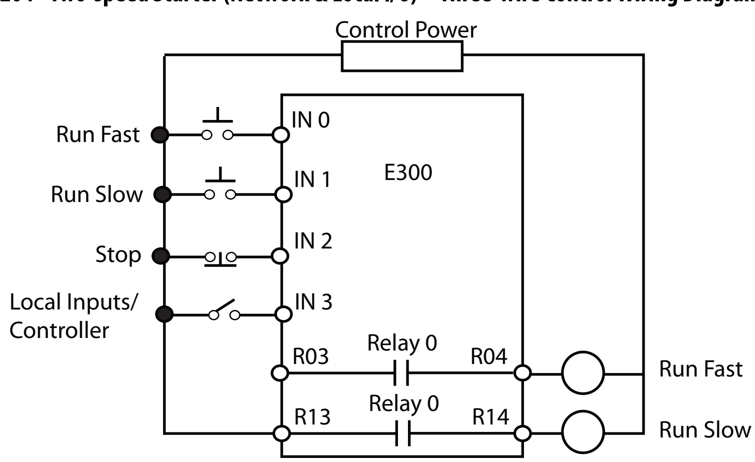
Rules

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 204 is a wiring diagram of a two-speed starter with Output Relay 0 and Output Relay 1 configured as control relays.

Figure 204 - Two-speed Starter (Network & Local I/O) – Three-wire Control Wiring Diagram



DeviceLogix Program

The DeviceLogix program that is shown in Figure 205, Figure 206, and Figure 207 is automatically loaded and enabled in the E300 on power-up or when Operating Mode (Parameter 195) is set to a value of 25.

Figure 205 - Two-speed Starter (Network & Local I/O) – Three-wire Control DeviceLogix Program, Part A

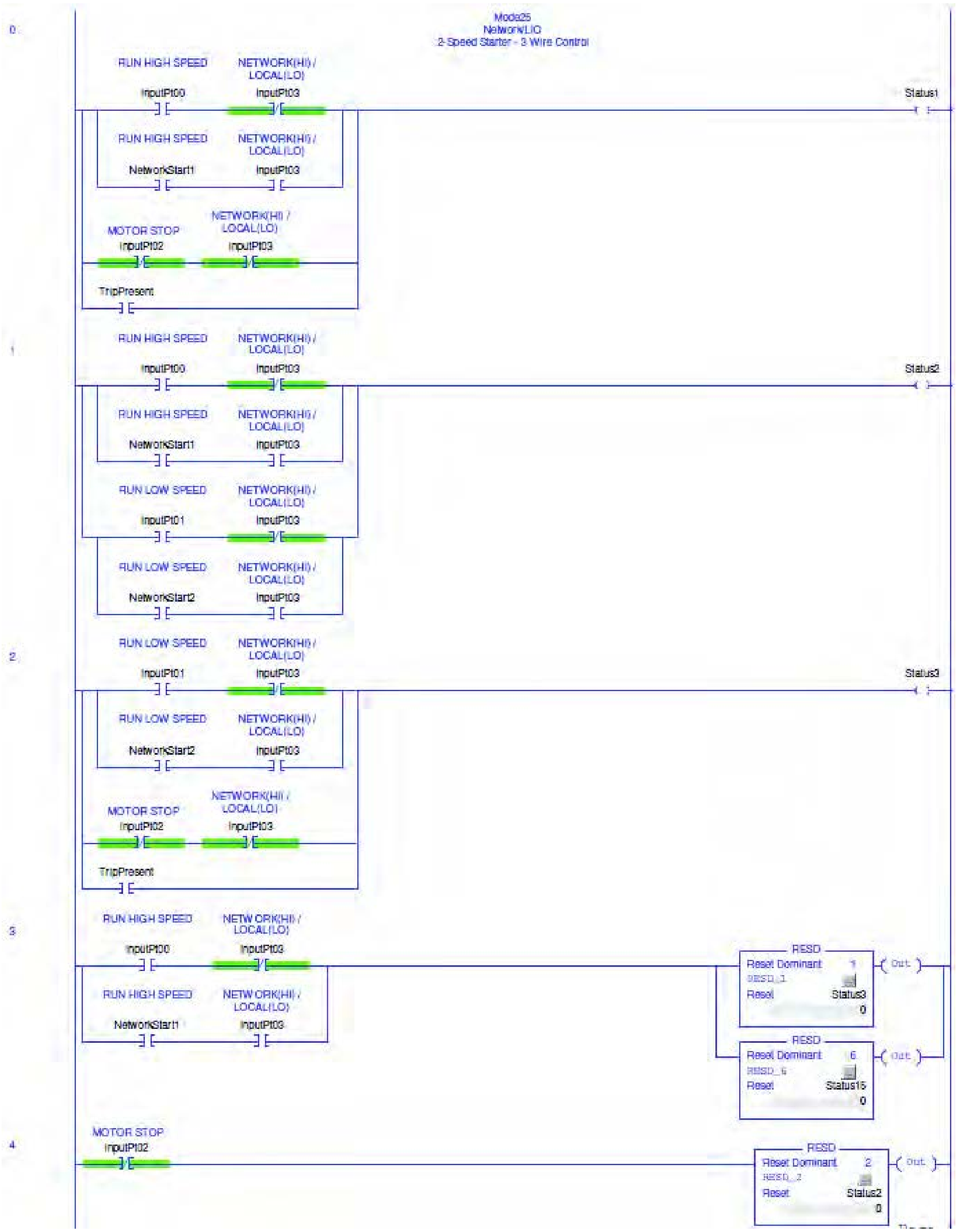


Figure 206 - Two-speed Starter (Network & Local I/O) – Three-wire Control DeviceLogix Program, Part B

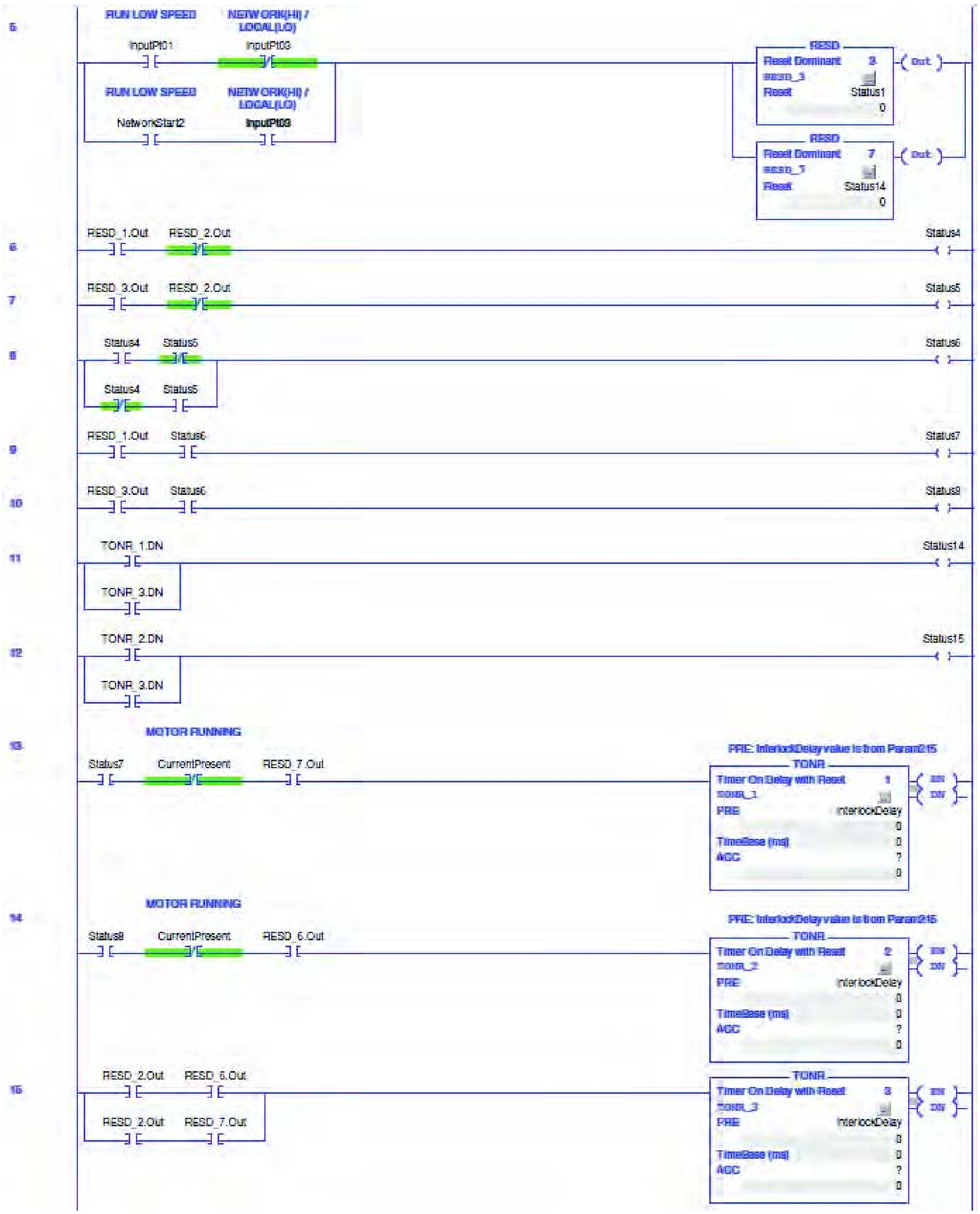
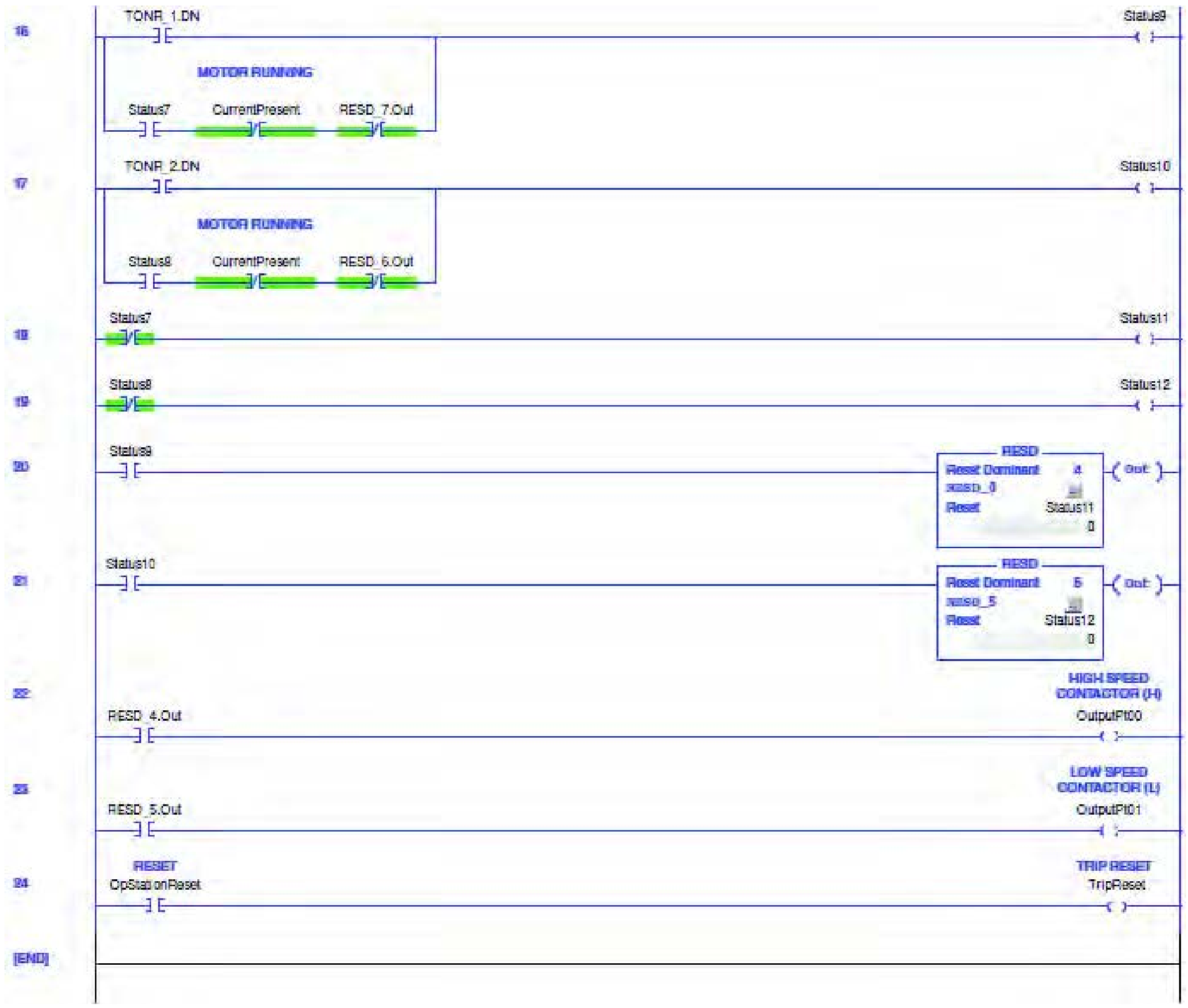


Figure 207 - Two-speed Starter (Network & Local I/O) – Three-wire Control DeviceLogix Program, Part C



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.

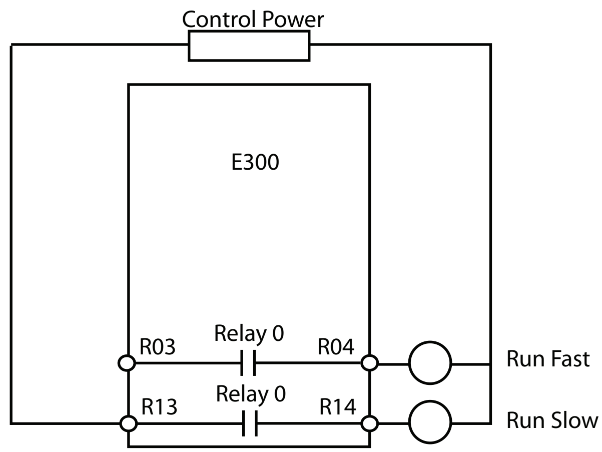
Rules

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 208 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 208 - Two-Speed Starter (Custom) Wiring Diagram

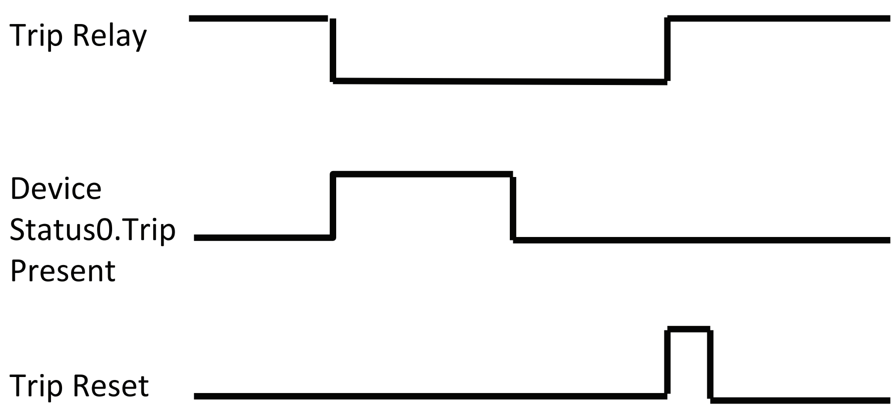


DeviceLogix Program

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

Timing Diagram

Figure 209 - 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

Notes:

Protective Trip and Warning Functions

Introduction

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-based 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.

Table 223 - Current Trip Enable (Parameter 183)

Bit																
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**
															X	Overload Trip
														X		Phase Loss Trip
													X			Ground Fault Trip
												X				Stall Trip
											X					Jam Trip
										X						Underload Trip
									X							Current Imbalance Trip
								X								L1 Under Current Trip
							X									L2 Under Current Trip
						X										L3 Under Current Trip
					X											L1 Over Current Trip
				X												L2 Over Current Trip
			X													L3 Over Current Trip
		X														L1 Line Loss Trip
	X															L2 Line Loss Trip
X																L3 Line Loss Trip

Table 224 - Current Warning Enable (Parameter 189)

Bit																
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**
															X	Overload Warning
																Reserved
													X			Ground Fault Warning
																Reserved
											X					Jam Warning
										X						Underload Warning
									X							Current Imbalance Warning
								X								L1 Under Current Warning
							X									L2 Under Current Warning
						X										L3 Under Current Warning
					X											L1 Over Current Warning
				X												L2 Over Current Warning
			X													L3 Over Current Warning
		X														L1 Line Loss Warning
	X															L2 Line Loss Warning
X																L3 Line Loss Warning

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

Table 225 - Current Trip Status (Parameter 4)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Overload Trip
														X		Phase Loss Trip
													X			Ground Fault Current Trip
												X				Stall Trip
											X					Jam Trip
										X						Underload Trip
									X							Current Imbalance Trip
								X								L1 Under Current Trip
							X									L2 Under Current Trip
						X										L3 Under Current Trip
					X											L1 Over Current Trip
				X												L2 Over Current Trip
			X													L3 Over Current Trip
		X														L1 Line Loss Trip
	X															L2 Line Loss Trip
X																L3 Line Loss Trip

Table 226 - Current Warning Status (Parameter 10)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Overload Warning
																Reserved
													X			Ground Fault Warning
																Reserved
											X					Jam Warning
										X						Underload Warning
									X							Current Imbalance Warning
								X								L1 Under Current Warning
							X									L2 Under Current Warning
						X										L3 Under Current Warning
					X											L1 Over Current Warning
				X												L2 Over Current Warning
			X													L3 Over Current Warning
		X														L1 Line Loss Warning
	X															L2 Line Loss Warning
X																L3 Line Loss Warning

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.

Overload Trip

The E300 relay trips with an overload indication if:
- No trip currently exists
- Overload trip protection is enabled
- Current is present
- % Thermal Capacity Utilized reaches 100%

If the E300 relay trips on an overload, the following occurs:
- The TRIP/WARN LED flashes a red short-1 blink pattern,
- Bit 0 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)

Full Load Amps Setting

FLA (Parameter 171) is one of two parameters that affect the E300 relay's thermal capacity utilization algorithm. Enter the motor's full-load current rating into this parameter.

Table 227 - FLA (Parameter 171)

FLA (Parameter 171)	
Default Value	0.50 *(0.5…30 A Sensing Modules)*
	6.00 *(6…60 A Sensing Modules)*
	10.00 *(10…100 A Sensing Modules)*
	20.00 *(20…200 A Sensing Modules)*
Minimum Value	0.50
Maximum Value	65535.00
Parameter Type	UDINT
Size (Bytes)	4
Scaling Factor	100
Units	Amps

FLA2 (Parameter 177) is provided for programming the high-speed FLA value in two-speed motor applications. Activating FLA2 is described in Chapter 4.

Table 228 - FLA2 (Parameter 177)

FLA2 (Parameter 177)	
Default Value	0.50 *(0.5…30 A Sensing Modules)*
	6.00 *(6…60 A Sensing Modules)*
	10.00 *(10…100 A Sensing Modules)*
	20.00 *(20…200 A Sensing Modules)*
Minimum Value	0.50
Maximum Value	65535.00
Parameter Type	UDINT
Size (Bytes)	4
Scaling Factor	100
Units	Amps

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 Class

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).

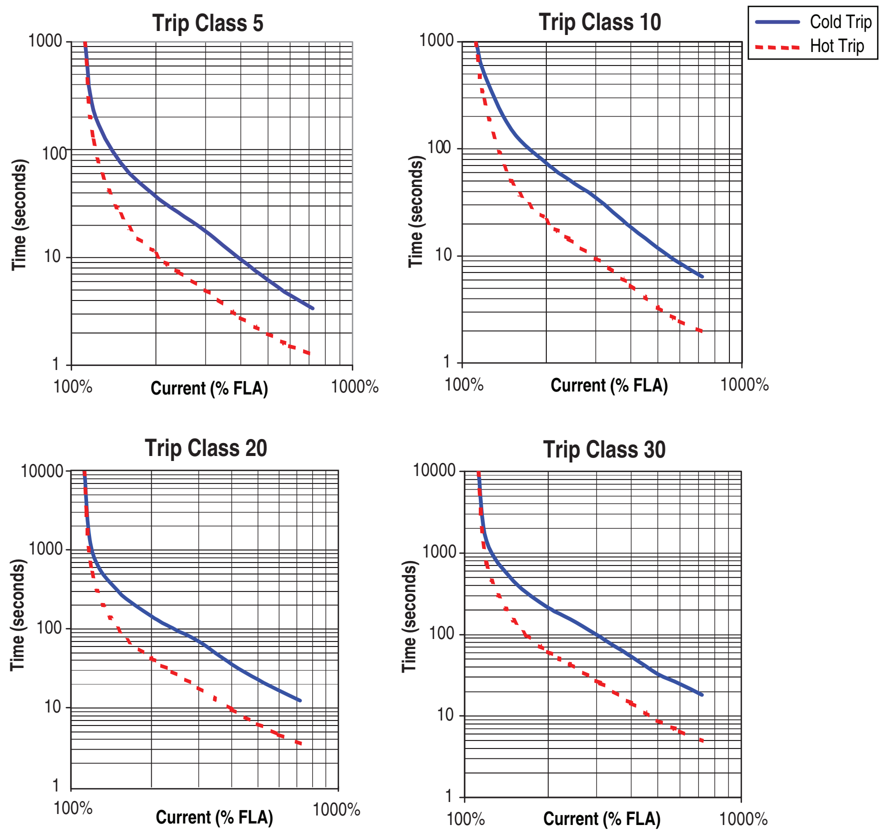
Table 229 - Trip Class (Parameter 172)

Trip Class (Parameter 172)	
Default Value	10
Minimum Value	5
Maximum Value	30
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	

Trip Curves

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

Figure 210 - 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 230 - 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

Overload Reset Mode (Parameter 173) allows you to 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.

Table 231 - Overload Reset Mode (Parameter 173)

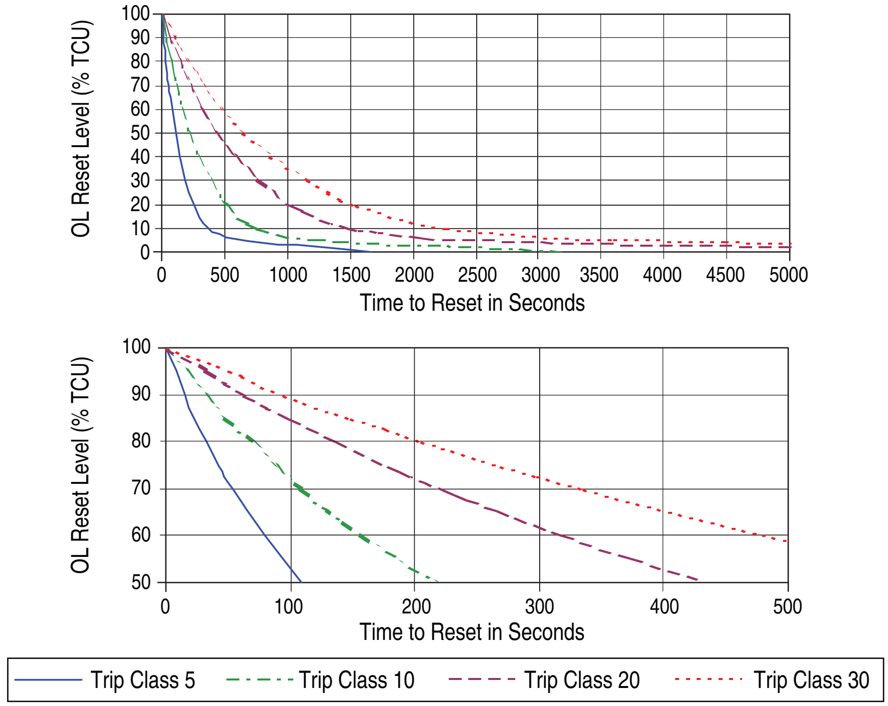
Overload Reset Mode (Parameter 173)	
Default Value	0 = Manual
Minimum Value	0 = Manual
Maximum Value	1 = Automatic
Parameter Type	BOOL
Size (Bytes)	1
Scaling Factor	1
Units	

Table 232 - Overload Reset Level (Parameter 174)

Overload Reset Level (Parameter 174)	
Default Value	75
Minimum Value	0
Maximum Value	100
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%TCU

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 211 - 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.

Overload Warning

The E300 relay indicates an overload warning if:

- No warning currently exists
- Overload warning is enabled
- Current is present
- % Thermal Capacity Utilized is equal to or greater than Overload 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 Warning Level (Parameter 175) can be used as an alert for an impending overload trip and is adjustable from 0…100% TCU.

Table 233 - Overload Warning Level (Parameter 175)

Overload Warning Level (Parameter 175)	
Default Value	85
Minimum Value	0
Maximum Value	100
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%TCU

Time to Trip

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.

Table 234 - Overload Time to Trip (Parameter 2)

Overload Time to Trip (Parameter 2)	
Default Value	9999
Minimum Value	0
Maximum Value	9999
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	Seconds

Time To Reset

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.

Table 235 - Overload Time to Reset (Parameter 3)

Overload Time to Reset (Parameter 3)	
Default Value	0
Minimum Value	0
Maximum Value	9999
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	Seconds

Nonvolatile Thermal Memory

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).

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.

Phase Loss Inhibit Time

Phase Loss Inhibit Time (Parameter 239) allows you to inhibit a phase loss trip from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.

Table 236 - Phase Loss Inhibit Time (Parameter 239)

Phase Loss Inhibit Time (Parameter 239)	
Default Value	0
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	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

The E300 relay trips with a phase loss indication if:
- No trip currently exists
- Phase Loss Protection is enabled
- Current is Present
- Phase Loss Inhibit Time has expired
- Current Imbalance is equal to or greater than 100% for a time period greater than the programmed Phase Loss Trip Delay

If the E300 relay trips on a phase loss, the:
- TRIP/WARN LED status indicator flashed a red short-2 blink pattern
- Bit 1 in Current Trip Status (Parameter 4) sets to 1
- Bit 0 of 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)

Phase Loss Trip Delay

Phase Loss Trip Delay (Parameter 240) allows you to 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.

Table 237 - Phase Loss Trip Delay (Parameter 240)

Phase Loss Trip Delay (Parameter 240)	
Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	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 238 - 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 ❶	0.02…5.0 A
193-EIOGP-42-___		

❶ One of the following Catalog Number 193-CBCT_ Core Balance Ground Fault Sensors must be used:

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 interrupt or for personal protection 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.

Ground Fault Type

The E300 relay has two options available to measure ground fault current. Ground Fault Type (Parameter 241) allows you to select the internal option or the external option with the appropriate measurement range.

Table 239 - Ground Fault Type (Parameter 241)

Ground Fault Type (Parameter 241)	
Default Value	1 = Internal 0.500…5.000 A
Range	1 = Internal 0.500…5.000 A 2 = External 0.020…0.100 A 3 = External 0.100…0.500 A 4 = External 0.200…1.000 A 5 = External 1.000…5.000 A
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	

Ground Fault Maximum Inhibit

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.

When enabled, Ground Fault Maximum Inhibit (Parameter 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).

Table 240 - Overload Reset Level (Parameter 248)

Overload Reset Level (Parameter 248)	
Default Value	0 = Disable
Minimum Value	0 = Disable
Maximum Value	1 = Enable
Parameter Type	BOOL
Size (Bytes)	1
Scaling Factor	1
Units	

Ground Fault Filter

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. Ground Fault Filter (Parameter 131) allows you to enable this filter.

Table 241 - Ground Fault Filter (Parameter 247

Ground Fault Filter (Parameter 247)	
Default Value	0 = Disable
Minimum Value	0 = Disable
Maximum Value	1 = Enable
Parameter Type	BOOL
Size (Bytes)	1
Scaling Factor	1
Units	

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

Ground Fault Inhibit Time (Parameter 242) allows you to 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).

Table 242 - Ground Fault Inhibit Time (Parameter 242

Ground Fault Inhibit Time (Parameter 242)	
Default Value	0
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

Table 243 - Device Status 0 (Parameter 20)

Bit																
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**
															X	Trip Present
														X		Warning Present
													X			Invalid Configuration
												X				Current Present
											X					Ground Fault Current Present
										X						Voltage Present
									X							Emergency Start Enabled
								X								DeviceLogix Enabled
							X									Feedback Timeout Enabled
						X										Operator Station Present
					X											Voltage Sensing Present
				X												Internal Ground Fault Sensing Present
			X													External Ground Fault Sensing Present
		X														PTC Sensing
	X															Ready
																Reserved

Ground Fault Trip

The E300 relay trips with a ground fault indication if:

- No trip currently exists
- Ground fault protection is enabled
- Ground fault current is present
- Ground Fault Inhibit Time has expired
- Ground Fault Current is equal to or greater than the Ground Fault Trip Level for a time period greater than the Ground Fault Trip Delay

If the E300 relay trips on a ground fault, the:

- TRIP/WARN LED flashes a red 3-short blink pattern
- Bit 2 in Current Trip Status (Parameter 4) sets to 1

- Bit 0 of 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)

Ground Fault Trip Delay

Ground Fault Trip Delay (Parameter 243) allows you to define the time period a ground fault condition must be present before a trip occurs and is adjustable from 0.0…25.0 s.

Table 244 - Ground Fault Trip Delay (Parameter 243)

Ground Fault Trip Delay (Parameter 243)	
Default Value	0.5
Minimum Value	0.0
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Ground Fault Trip Level

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)

Table 245 - Ground Fault Trip Level (Parameter 244)

Ground Fault Trip Level (Parameter 244)	
Default Value	2.5
Minimum Value	0.5 (internal); 0.02 (external)
Maximum Value	5.00
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	100
Units	Amps

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

The E300 relay indicates a ground fault warning if:

- No warning currently exists
- Ground Fault Warning is enabled
- Current is present
- Ground Fault Inhibit Time has expired
- Ground Fault Current is equal to or greater than the Ground Fault Warning Level for a time period greater than the Ground Fault Warning Delay.

When the ground fault warning conditions are satisfied, the:
- TRIP/WARN LED status indicator flashes a yellow 3-short blink pattern
- Bit 2 in Current Warning Status (Parameter 10) sets to 1
- Bit 1 of Device Status 0 (Parameter 20) sets to 1
- Any relay outputs configured as a Warning Alarm close

Ground Fault Warning Level

Ground Fault Warning Level (Parameter 246) allows you to define the ground fault current at which the E300 relay indicates a warning and is adjustable from 0.20…5.00 A.

Table 246 - Ground Fault Warning Level (Parameter 246)

Ground Fault Warning Level (Parameter 246)	
Default Value	2.00
Minimum Value	0.20
Maximum Value	5.00
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	100
Units	Amps

Ground Fault Warning Delay

Ground Fault Warning Delay (Parameter 245) allows you to define the time period (adjustable from 0.0…25.0 s) for which a ground fault condition must be present before a warning occurs.

Table 247 - Ground Fault Warning Delay (Parameter 245)

Ground Fault Warning Delay (Parameter 245)	
Default Value	0.0
Minimum Value	0.0
Maximum Value	25.00
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

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.

Stall Trip

The E300 relay trips with a Stall Trip indication when:
- No trip currently exists
- Stall protection is enabled
- Current is present
- The maximum phase current is greater than the Stall Trip Level for a time period greater than the Stall Enabled Time

If the E300 relay trips on a stall, the:
- TRIP/WARN LED status indicator flashes a red 4-short blink pattern
- Bit 3 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)

Stall Enabled Time

Stall Enabled Time (Parameter 249) allows you to adjust the time the E300 relay monitors for a stall condition during the motor starting sequence and is adjustable from 0…250 s.

Table 248 - Stall Enabled Time (Parameter 249)

Stall Enabled Time (Parameter 249)	
Default Value	10
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

Stall Trip Level

Stall Trip Level (Parameter 250) allows you to define the locked rotor current and is adjustable from 100…600% of the FLA Setting (Parameter 171).

Table 249 - Stall Trip Level (Parameter 250)

Stall Trip Level (Parameter 250)	
Default Value	600
Minimum Value	100
Maximum Value	600
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	%FLA

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.

Jam Inhibit Time

Jam Inhibit Time (Parameter 251) allows you to inhibit a jam trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 s.

Table 250 - Jam Trip Inhibit Time (Parameter 251)

Default Value	10
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

Jam Trip

The E300 relay trips with a jam indication if:
- No trip currently exists
- Jam Trip is enabled
- Jam Inhibit Time has expired
- The maximum phase current is greater than the Jam Trip Level for a time period greater than the Jam Trip Delay.

If the E300 relay trips on a jam, 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)

Jam Trip Delay

Jam Trip Delay (Parameter 252) allows you to define the time period a jam condition must be present before a trip occurs. It is adjustable from 0.1…25.0 s.

Table 251 - Jam Trip Delay (Parameter 252)

Default Value	5.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Jam Trip Level

Jam Trip Level (Parameter 253) allows you to 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).

Table 252 - Jam Trip Level (Parameter 253)

Default Value	250
Minimum Value	50
Maximum Value	600
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	%FLA

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

The E300 relay indicates a Jam warning if:

- No warning currently exists
- Jam Warning is enabled
- Current is present
- Jam Inhibit Time has expired
- The maximum phase current is equal to or greater than the Jam Warning Level

When the Jam Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 5-short blink pattern
- Bit 4 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 a Warning Alarm close

Jam Warn Level

Jam Warn Level (Parameter 254) allows you to define the current at which the E300 relay indicates a warning. It is user-adjustable from 50…600% for the FLA Setting (Parameter 171).

Table 253 - Jam Warning Level (Parameter 254)

Default Value	150
Minimum Value	50
Maximum Value	600
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	%FLA

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.

Underload Inhibit Time

Underload Inhibit Time (Parameter 255) allows you to inhibit an underload trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 s.

Table 254 - Underload Inhibit Time (Parameter 255)

Default Value	10
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

Underload Trip

The E300 relay trips with an underload indication if:

- No trip currently exists
- Underload Trip is enabled
- Current is present
- Underload Inhibit Time has expired
- Minimum phase current is less than the Underload Trip Level for a time period greater than the Underload Trip Delay.

If the E300 relay trips on an underload, the:

- TRIP/WARN LED status indicator flashes a red 6-short blink pattern
- Bit 5 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)

Underload Trip Delay

Underload Trip Delay (Parameter 256) allows you to define the time period an underload condition must be present before a trip occurs. It is adjustable from 0.1…25.0 s.

Table 255 - Underload Trip Delay (Parameter 256)

Default Value	5.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Underload Trip Level

Underload Trip Level (Parameter 257) allows you to 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).

Table 256 - Underload Trip Level (Parameter 257)

Default Value	50
Minimum Value	10
Maximum Value	100
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%FLA

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

The E300 relay indicates an underload warning if:

- No warning currently exists
- Underload Warning is enabled
- Current is present
- Underload Inhibit Time has expired
- The minimum phase current is less than the Underload Warning Level

When the Underload Warning conditions are satisfied, the:
- TRIP/WARN LED flashes a yellow 6-short blink pattern
- Bit 5 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 a Warning Alarm close

Underload Warning Level

Underload Warning Level (Parameter 258) allows you to define the current at which the E300 relay indicates a warning. It is user-adjustable from 10…100% for the FLA Setting (Parameter 171).

Table 257 - Underload Warning Level (Parameter 258)

Default Value	70
Minimum Value	10
Maximum Value	100
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%FLA

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

Current Imbalance Inhibit Time

Current Imbalance Inhibit Time (Parameter 259) allows you to inhibit a current imbalance trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 s.

Table 258 - Current Imbalance Inhibit Time (Parameter 259)

Default Value	10
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

Current Imbalance Trip

The E300 relay trips with a current imbalance indication if:

- No trip currently exists
- Current Imbalance Trip is enabled
- Current is present
- Current Imbalance Inhibit Time has expired
- The Current Imbalance (parameter 52) is greater than the Current Imbalance Trip Level for a time period greater than the Current Imbalance Trip Delay.

If the E300 relay trips on a current imbalance, the:

- TRIP/WARN LED status indicator flashes a red 7-short blink pattern
- Bit 6 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 Imbalance Trip Delay

Current Imbalance Trip Delay (Parameter 260) allows you to define the time period a current imbalance condition must be present before a trip occurs. It is adjustable from 0.1…25.0 s.

Table 259 - Current Imbalance Trip Delay (Parameter 260)

Default Value	5.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Current Imbalance Trip Level

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%.

Table 260 - Current Imbalance Trip Level (Parameter 261)

Default Value	35
Minimum Value	10
Maximum Value	100
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%

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

The E300 relay indicates a current imbalance warning if:

- No warning currently exists
- Current Imbalance Warning is enabled
- Current is present
- Current Imbalance Inhibit Time has expired
- The current imbalance (parameter 52) is greater than the Current Imbalance Warning Level

When the Current Imbalance Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 7-short blink pattern
- Bit 6 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 a Warning Alarm closes

Current Imbalance Warning Level

Current Imbalance Warning Level (Parameter 262) allows you to define the percentage at which the E300 relay indicates a warning. It is user-adjustable from 10…100%.

Table 261 - Current Imbalance Warning Level (Parameter 262)

Default Value	20
Minimum Value	10
Maximum Value	100
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%

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.

Under Current Inhibit Time

Under Current Inhibit Time (Parameter 265) allows you to inhibit an L1, L2, and L3 Under Current trip and warning from occurring during a load starting sequence. It is adjustable from 0…250 seconds.

Table 262 - Under Current Inhibit Time (Parameter 265)

Default Value	10
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

L1 Under Current Trip

The E300 relay trips with a L1 Under Current indication if:

- No trip currently exists
- L1 Under Current Trip is enabled
- Current is present
- Under Current Inhibit Timer has expired
- L1 Percent FLA (Parameter 47) is less than the L1 Under Current Trip Level for a time period greater than the L1 Under Current Trip Delay.
- If the E300 relay trips on a L1 Under Current, the:
- TRIP/WARN LED status indicator flashes a red 8-short blink pattern
- Bit 7 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)

L1 Under Current Trip Delay

L1 Under Current Trip Delay (Parameter 266) allows you to 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.

Table 263 - L1 Under Current Trip Delay (Parameter 266)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

L1 Under Current Trip Level

L1 Under Current Trip Level (Parameter 267) allows you to 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).

Table 264 - L1 Under Current Trip Level (Parameter 267)

Default Value	35
Minimum Value	10
Maximum Value	100
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%FLA

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

L1 Under Current Warning

The E300 relay indicates an L1 Under Current warning if:

- No warning currently exists
- L1 Under Current Warning is enabled
- Current is present
- The Under Current Inhibit Timer has expired
- L1 Percent FLA (Parameter 47) is less than the L1 Under Current Warning Level

When the L1 Under Current Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 8-short blink pattern
- Bit 7 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 a Warning Alarm close

L1 Under Current Warning Level

L1 Under Current Warning Level (Parameter 268) allows you to 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).

Table 265 - L1 Under Current Warning Level (Parameter 268)

Default Value	40
Minimum Value	10

Maximum Value	100
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%FLA

IMPORTANT	The L1 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.

L2 Under Current Trip

The E300 relay trips with a L2 Under Current indication if:
- No trip currently exists
- L2 Under Current Trip is enabled
- Current is present
- Under Current Inhibit Timer has expired
- L2 Percent FLA (Parameter 48) is less than the L2 Under Current Trip Level for a time period greater than the L2 Under Current Trip Delay.

If the E300 relay trips on a L2 Under Current, the:
- TRIP/WARN LED status indicator flashes a red 9-short blink pattern
- Bit 8 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)

L2 Under Current Trip Delay

L2 Under Current Trip Delay (Parameter 269) allows you to define the time period an L2 Under Current condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Table 266 - L2 Under Current Trip Delay (Parameter 269)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

L2 Under Current Trip Level

L2 Under Current Trip Level (Parameter 270) allows you to define the current at which the E300 relay trips on a L2 Under Current. It is user-adjustable from 10…100% of the FLA Setting (Parameter 171).

Table 267 - L2 Under Current Trip Level Parameter 270)

Default Value	35
Minimum Value	10
Maximum Value	100
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%FLA

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 L2 Under Current Trip Level (Parameter 270) is dependent on the FLA Setting and the lower limit of the E300 relay's current measurement capability

L2 Under Current Warning

The E300 relay indicates an L2 Under Current warning if:

- No warning currently exists
- 2 Under Current Warning is enabled
- Current is present
- The Under Current Inhibit Timer has expired
- 2 Percent FLA (Parameter 48) is less than the L2 Under Current Warning Level

When the L2 Under Current Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 9-short blink pattern
- Bit 8 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 a Warning Alarm close

L2 Under Current Warning Level

L2 Under Current Warning Level (Parameter 271) allows you to define the current at which the E300 relay indicates a L2 Under Current warning. It is user-adjustable from 10…100% for the FLA Setting (Parameter 171).

Table 268 - L2 Under Current Warning Level (Parameter 271)

Default Value	40
Minimum Value	10
Maximum Value	100
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%FLA

IMPORTANT	The L2 Under Current Warning function does not include a time delay feature. Once the Under Current Inhibit Timer has expired, the L2 Under Current Warning indication is instantaneous.

L3 Under Current Trip

The E300 relay trips with a L3 Under Current indication if:

- No trip currently exists
- L3 Under Current Trip is enabled
- Current is present
- Under Current Inhibit Timer has expired
- Percent FLA (Parameter 49) is less than the L3 Under Current Trip Level for a time period greater than the L3 Under Current Trip Delay.

If the E300 relay trips on a L3 Under Current, the:

- TRIP/WARN LED status indicator flashes a red 10-short blink pattern
- Bit 9 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)

IMPORTANT	L3 Under Current Trip Delay (Parameter 272) allows you to define the time period that an L3 Under Current condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds

Table 269 - L3 Under Current Trip Delay (Parameter 272)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

L3 Under Current Trip Level

L3 Under Current Trip Level (Parameter 273) allows you to define the current at which the E300 relay trips on a L3 Under Current. It is user-adjustable from 10...100% of the FLA Setting (Parameter 171).

Table 270 - L3 Under Current Trip Level (Parameter 273)

Default Value	35
Minimum Value	10
Maximum Value	100
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%FLA

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 L3 Under Current Trip Level (Parameter 273) is dependent on the FLA Setting and the lower limit of the E300 relay's current measurement capability

L3 Under Current Warning

The E300 relay indicates an L3 Under Current warning if:

- No warning currently exists
- L3 Under Current Warning is enabled
- Current is present
- The Under Current Inhibit Timer has expired
- L3 Percent FLA (Parameter 49) is less than the L3 Under Current Warning Level

When the L3 Under Current Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 10-short blink pattern
- Bit 9 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 a Warning Alarm close

L3 Under Current Warning Level

L3 Under Current Warning Level (Parameter 274) allows you to define the current at which the E300 relay indicates a L3 Under Current warning. It is user-adjustable from 10…100% for the FLA Setting (Parameter 171).

Table 271 - L3 Under Current Warning Level (Parameter 274)

Default Value	40
Minimum Value	10
Maximum Value	100
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%FLA

IMPORTANT The L3 Under Current Warning function does not include a time delay feature. Once the Under Current Inhibit Timer has expired, the L3 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.

Over Current Inhibit Time

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.

Table 272 - Over Current Inhibit Time (Parameter 275)

Default Value	10
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

L1 Over Current Trip

The E300 relay trips with a L1 Over Current indication if:

- No trip currently exists
- L1 Over Current Trip is enabled
- Current is present

- Over Current Inhibit Timer has expired
- L1 Percent FLA (Parameter 47) is greater than the L1 Over Current Trip Level for a time period greater than the L1 Over Current Trip Delay.

If the E300 relay trips on a L1 Over Current, the:

- TRIP/WARN LED status indicator flashes a red 11-short blink pattern
- Bit 10 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)

L1 Over Current Trip Delay

L1 Over Current Trip Delay (Parameter 276) allows you to 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.

Table 273 - L1 Over Current Trip Delay (Parameter 276)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

L1 Over Current Trip Level

L1 Over Current Trip Level (Parameter 277) allows you to 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).

Table 274 - L1 Over Current Trip Level (Parameter 277)

Default Value	100
Minimum Value	10
Maximum Value	100
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%FLA

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.

L1 Over Current Warning

The E300 relay indicates an L1 Over Current warning if:

- No warning currently exists
- 1 Over Current Warning is enabled
- Current is present
- The Over Current Inhibit Timer has expired
- 1 Percent FLA (Parameter 47) is greater than the L1 Over Current Warning Level

When the L1 Over Current Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 11-short blink pattern
- Bit 10 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 a Warning Alarm closes

L1 Over Current Warning Level

L1 Over Current Warning Level (Parameter 278) allows you to 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).

Table 275 - L1 Over Current Warning Level (Parameter 278)

Default Value	90
Minimum Value	10
Maximum Value	100
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%FLA

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.

L2 Over Current Trip

The E300 relay trips with a L2 Over Current indication if:

- No trip currently exists
- 2 Over Current Trip is enabled
- Current is present
- Over Current Inhibit Timer has expired
- 2 Percent FLA (Parameter 48) is greater than the L2 Over Current Trip Level for a time period greater than the L2 Over Current Trip Delay.

If the E300 relay trips on a L2 Over Current, the:

- TRIP/WARN LED status indicator flashes a red 12-short blink pattern
- Bit 11 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)

L2 Over Current Trip Delay

L2 Over Current Trip Delay (Parameter 279) allows you to define the time period an L2 Over Current condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Table 276 - L2 Over Current Trip Delay (Parameter 279)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

L2 Over Current Trip Level

L2 Over Current Trip Level (Parameter 280) allows you to define the current at which the E300 relay trips on a L2 Over Current. It is user-adjustable from 10…100% of the FLA Setting (Parameter 171)

Table 277 - L2 Over Current Trip Level (Parameter 280).

Default Value	100
Minimum Value	10
Maximum Value	100
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%FLA

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.

L2 Over Current Warning

The E300 relay indicates an L2 Over Current warning if:

- No warning currently exists
- 2 Over Current Warning is enabled
- Current is present
- The Over Current Inhibit Timer has expired
- 2 Percent FLA (Parameter 48) is greater than the L2 Over Current Warning Level

When the L2 Over Current Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 12-short blink pattern
- Bit 11 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 a Warning Alarm closes

L2 Over Current Warning Level

L2 Over Current Warning Level (Parameter 281) allows you to define the current at which the E300 relay indicates a L2 Over Current warning. It is user-adjustable from 10…100% for the FLA Setting (Parameter 171).

Table 278 - L2 Over Current Warning Level (Parameter 281)

Default Value	90
Minimum Value	10
Maximum Value	100
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%FLA

IMPORTANT	The L2 Over Current Warning function does not include a time delay feature. Once the Over Current Inhibit Timer has expired, the L2 Over Current Warning indication is instantaneous.

L3 Over Current Trip

The E300 relay trips with a L3 Over Current indication if:

- No trip currently exists
- L3 Over Current Trip is enabled
- Current is present
- Over Current Inhibit Timer has expired
- L3 Percent FLA (Parameter 49) is greater than the L3 Over Current Trip Level for a time period greater than the L3 Over Current Trip Delay.

If the E300 relay trips on a L3 Over Current, the:

- TRIP/WARN LED status indicator flashes a red 13-short blink pattern
- Bit 12 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)

L3 Over Current Trip Delay

L3 Over Current Trip Delay (Parameter 282) allows you to define the time period an L3 Over Current condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Table 279 - L3 Over Current Trip Delay (Parameter 282)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

L3 Over Current Trip Level

L3 Over Current Trip Level (Parameter 283) allows you to define the current at which the E300 relay trips on a L3 Over Current. It is user-adjustable from 10…100% of the FLA Setting (Parameter 171).

Table 280 - L3 Over Current Trip Level (Parameter 283)

Default Value	100
Minimum Value	10
Maximum Value	100
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%FLA

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.

L3 Over Current Warning

The E300 relay indicates an L3 Over Current warning if:

- No warning currently exists
- L3 Over Current Warning is enabled
- Current is present
- The Over Current Inhibit Timer has expired
- L3 Percent FLA (Parameter 49) is greater than the L3 Over Current Warning Level

When the L2 Over Current Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 13-short blink pattern
- Bit 12 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 a Warning Alarm closes

L3 Over Current Warning Level

L3 Over Current Warning Level (Parameter 284) allows you to define the current at which the E300 relay indicates a L3 Over Current warning. It is user-adjustable from 10…100% for the FLA Setting (Parameter 171).

Table 281 - L3 Over Current Warning Level (Parameter 284)

Default Value	90
Minimum Value	10
Maximum Value	100
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%FLA

IMPORTANT	The L3 Over Current Warning function does not include a time delay feature. Once the Over Current Inhibit Timer has expired, the L3 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.

Line Loss Inhibit Time

Line Loss Inhibit Time (Parameter 285) allows you to 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.

Table 282 - Line Loss Inhibit Time (Parameter 285)

Default Value	10

Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

L1 Line Loss Trip

The E300 relay trips with a L1 Line Loss indication if:

- No trip currently exists
- L1 Over Current Trip is enabled
- L1 Line Loss is activated via the appropriately programmed digital input (see Input Assignments, Parameters 196…201, in Chapter 4)
- Line Loss Inhibit Timer has expired
- L1 Percent FLA (Parameter 47) is
- equal to 0% for a time period greater than the L1 Line Loss Trip Delay.

If the E300 relay trips on a L1 Line Loss, the:

- TRIP/WARN LED status indicator flashes a red 14-short blink pattern
- Bit 13 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)

L1 Line Loss Trip Delay

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.

Table 283 - L1 Line Loss Trip Delay (Parameter 286)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	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.

L1 Line Loss Warning

The E300 relay indicates an L1 Line Loss warning if:

- No warning currently exists

- L1 Line Loss Warning is enabled
- L1 Line Loss is activated via the appropriately programmed digital input (see Input Assignments, Parameters 196…201, in Chapter 4)
- Line Loss Inhibit Timer has expired
- L1 Percent FLA (Parameter 47) is equal to 0%

When the L1 Line Loss Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 14-short blink pattern
- Bit 13 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 a Warning Alarm closes

IMPORTANT	The L1 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.

L2 Line Loss Trip

The E300 relay trips with a L2 Line Loss indication if:

- No trip currently exists
- L2 Over Current Trip is enabled
- L2 Line Loss is activated via the appropriately programmed digital input (see Input Assignments, Parameters 196…201, in Chapter 4)
- Line Loss Inhibit Timer has expired
- L2 Percent FLA (Parameter 48) is equal to 0% for a time period greater than the L2 Line Loss Trip Delay.

If the E300 relay trips on a L2 Line Loss, the:

- TRIP/WARN LED status indicator flashes a red 15-short blink pattern
- Bit 14 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)

L2 Line Loss Trip Delay

L2 Line Loss Trip Delay (Parameter 287) allows you to define the time period an L2 Line Loss condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Table 284 - L2 Line Loss Trip Delay (Parameter 287)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	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.

L2 Line Loss Warning

The E300 relay indicates an L2 Line Loss warning if:

- No warning currently exists

- L2 Line Loss Warning is enabled
- L2 Line Loss is activated via the appropriately programmed digital input (see Input Assignments, Parameters 196…201, in Chapter 4)
- Line Loss Inhibit Timer has expired
- L2 Percent FLA (Parameter 48) is equal to 0%

When the L2 Line Loss Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 15-short blink pattern
- Bit 14 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 a Warning Alarm closes

IMPORTANT	The L2 Line Loss Warning function does not include a time delay feature. Once the Line Loss Inhibit Timer has expired, the L2 Line Loss Warning indication is instantaneous.

L3 Line Loss Trip

The E300 relay trips with a L3 Line Loss indication if:

- No trip currently exists
- L3 Over Current Trip is enabled
- L3 Line Loss is activated via the appropriately programmed digital input (see Input Assignments, Parameters 196…201, in Chapter 4)
- Line Loss Inhibit Timer has expired
- L3 Percent FLA (Parameter 49) is equal to 0% for a time period greater than the L3 Line Loss Trip Delay.

If the E300 relay trips on a L3 Line Loss, the:

- TRIP/WARN LED status indicator flashes a red 16-short blink pattern
- Bit 15 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)

L3 Line Loss Trip Delay

L3 Line Loss Trip Delay (Parameter 288) allows you to define the time period an L3 Line Loss condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Table 285 - L3 Line Loss Trip Delay (Parameter 288)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	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.

L3 Line Loss Warning

The E300 relay indicates an L3 Line Loss warning if:

- No warning currently exists

- L3 Line Loss Warning is enabled
- L3 Line Loss is activated via the appropriately programmed digital input (see Input Assignments, Parameters 196…201, in Chapter 4)
- Line Loss Inhibit Timer has expired
- L3 Percent FLA (Parameter 49) is equal to 0%

When the L3 Line Loss Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 16-short blink pattern
- Bit 15 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 a Warning Alarm close

IMPORTANT The L3 Line Loss Warning function does not include a time delay feature. Once the Line Loss Inhibit Timer has expired, the L3 Line Loss Warning indication is instantaneous.

Voltage-based 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 286 - 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.

Table 287 - Voltage Trip Enabled (Parameter 184)

Bit																
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**
															X	Under Voltage Trip
														X		Over Voltage Trip
													X			Voltage Imbalance Trip
												X				Phase Rotation Mismatch Trip
											X					Under Frequency Trip
										X						Over Frequency Trip
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved

Table 288 - Voltage Warning Enable (Parameter 190)

Bit																
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**
															X	Under Voltage Warning
														X		Over Voltage Warning
													X			Voltage Imbalance Warning
												X				Phase Rotation Mismatch Warning
											X					Under Frequency Warning
										X						Over Frequency Warning
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved

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.

Table 289 - Voltage Trip Status (Parameter 5)

Bit																
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**
															X	Under Voltage Trip
														X		Over Voltage Trip
													X			Voltage Imbalance Trip
												X				Phase Rotation Mismatch Trip
											X					Under Frequency Trip
										X						Over Frequency Trip
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved

Table 290 - Voltage Warning Status (Parameter 11)

Bit																
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**
															X	Under Voltage Warning
														X		Over Voltage Warning
													X			Voltage Imbalance Warning
												X				Phase Rotation Mismatch Warning
											X					Under Frequency Warning
										X						Over Frequency Warning
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved

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.

Under Voltage Inhibit Time

Under Voltage Inhibit Time (Parameter 355) allows you to inhibit an under voltage trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.

Table 291 - Under Voltage Inhibit Time (Parameter 355)

Default Value	10
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

Under Voltage Trip

The E300 relay trips with an undervoltage indication if:

- No trip currently exists
- Under Voltage Trip is enabled
- Voltage is present
- Under Voltage Inhibit Time has expired
- The minimum phase voltage is less than the Under Voltage Trip Level for a time period greater than the Under Voltage Trip Delay.

If the E300 relay trips on an under 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)

Under Voltage Trip Delay

Under Voltage Trip Delay (Parameter 356) allows you to define the time period an under voltage condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Table 292 - Under Voltage Trip Delay (Parameter 356)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Under Voltage Trip Level

Under Voltage Trip Level (Parameter 357) allows you to define the voltage at which the E300 relay trips on an under voltage. It is user-adjustable from 0…6553.5 volts.

Table 293 - Under Voltage Trip Level (Parameter 357)

Default Value	100.0
Minimum Value	0.0
Maximum Value	6553.5
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	10
Units	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

The E300 relay indicates an Under Voltage warning if:
- No warning currently exists
- Under Voltage Warning is enabled
- Voltage is present
- Under Voltage
- Inhibit Time has expired
- The minimum phase voltage is equal to or less than the Under Voltage Warning Level

When the Under 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

Under Voltage Warn Level

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.

Table 294 - Under Voltage Warn Level

Default Value	400.0
Minimum Value	0.0
Maximum Value	6553.5
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	10
Units	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.

Over Voltage Inhibit Time

Over Voltage Inhibit Time (Parameter 359) allows you to inhibit an over voltage trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.

Default Value	10.0
Minimum Value	0.0
Maximum Value	250.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	11
Units	Seconds

Over Voltage Trip

The E300 relay trips with an Over Voltage indication if:
- No trip currently exists
- Over Voltage Trip is enabled
- Voltage is present
- Over Voltage Inhibit Time has expired
- The minimum phase voltage is greater than the Over Voltage Trip Level for a time period greater than the Over Voltage Trip Delay.

If the E300 relay trips on an over voltage, the:
- TRIP/WARN LED status indicator flashes a red 1-long / 2-short blink pattern
- Bit 1 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)

Over Voltage Trip Delay

Over Voltage Trip Delay (Parameter 360) allows you to define the time period an over voltage condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Table 295 - Over Voltage Trip Delay (Parameter 360)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Over Voltage Trip Level

Over Voltage Trip Level (Parameter 357) allows you to define the voltage at which the E300 relay trips on an over voltage. It is user-adjustable from 0…6553.5 volts.

Table 296 - Over Voltage Trip Level (Parameter 361)

Default Value	500.0
Minimum Value	0.0
Maximum Value	6553.5
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	10
Units	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

The E300 relay indicates an Over Voltage warning if:

- No warning currently exists
- Over Voltage Warning is enabled
- Voltage is present
- Over Voltage Inhibit Time has expired
- The maximum phase voltage is equal to or greater than the Over Voltage Warning Level

When the Over Voltage Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 1-long / 2-short blink pattern
- Bit 1 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 closes

Over Voltage Warn Level

Over Voltage Warn Level (Parameter 362) allows you to define the voltage at which the E300 relay indicates a warning. It is user-adjustable from 0…6553.5 volts.

Table 297 - Over Voltage Warn Level (Parameter 362)

Default Value	490.0
Minimum Value	0.0
Maximum Value	6553.5
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	10
Units	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

Voltage Imbalance Inhibit Time

Voltage Imbalance Inhibit Time (Parameter 365) allows you to inhibit a voltage imbalance trip from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.

Table 298 - Voltage Imbalance Inhibit Time (Parameter 365)

Default Value	10
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

Voltage Imbalance Trip

The E300 relay trips with a voltage imbalance indication if:

- No trip currently exists
- Voltage Imbalance Trip is enabled

- Voltage is present
- Voltage Imbalance Inhibit Time has expired
- The Voltage Imbalance (Parameter 61) is greater than the Voltage Imbalance Trip Level for a time period greater than the Voltage Imbalance Trip Delay.

If the E300 relay trips on a voltage imbalance, the:

- TRIP/WARN LED status indicator flashes a red 1-long / 3-short blink pattern
- Bit 2 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 Imbalance Trip Delay

Voltage Imbalance Trip Delay (Parameter 366) allows you to define the time period a voltage imbalance condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Table 299 - Voltage Imbalance Trip Delay (Parameter 366)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Voltage Imbalance Trip Level

Voltage Imbalance Trip Level (Parameter 367) allows you to define the percentage at which the E300 relay trips on a voltage imbalance. It is user-adjustable from 10…100%.

Table 300 - Voltage Imbalance Trip Level (Parameter 367)

Default Value	15
Minimum Value	10
Maximum Value	100
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%

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

The E300 relay indicates a voltage imbalance warning if:

- No warning currently exists
- Voltage Imbalance Warning is enabled
- Voltage is present
- Voltage Imbalance Inhibit Time has expired
- The Voltage Imbalance (Parameter 61) is greater than the Voltage Imbalance Warning Level

When the Voltage Imbalance Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow red 1-long / 3-short blink pattern
- Bit 2 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

Voltage Imbalance Warning Level

Voltage Imbalance Warning Level (Parameter 368) allows you to define the percentage at which the E300 relay indicates a warning. It is user-adjustable from 10…100%.

Table 301 - Voltage Imbalance Warning Level (Parameter 368)

Default Value	10
Minimum Value	10
Maximum Value	100
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%

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.

Phase Rotation Inhibit Time

Phase Rotation Inhibit Time (Parameter 359) allows you to inhibit a phase rotation mismatch trip and warning from occurring. It is adjustable from 0…250 seconds.

Table 302 - Phase Rotation Inhibit Time (Parameter 363)

Default Value	10
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

Phase Rotation Trip

The E300 relay trips with a Phase Rotation indication if:

- No trip currently exists

- Phase Rotation Trip is enabled
- Voltage is present
- Phase Rotation Inhibit Time has expired
- The measured Voltage Phase Rotation (Parameter 63) does not match the
- required Phase Rotation Type (Parameter 364).

If the E300 relay trips on a phase rotation mismatch, the:

- TRIP/WARN LED status indicator flashes a red 1-long / 4-short blink pattern
- Bit 3 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)

Phase Rotation Trip Type

Phase Rotation Trip Type (Parameter 364) allows you to 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.

Table 303 - Phase Rotation Trip Type (Parameter 364)

Default Value	1 = ABC
Range	1 = ABC 2 = ACB
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	

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.

Under Frequency Inhibit Time

Under Frequency Inhibit Time (Parameter 369) allows you to inhibit an under frequency trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.

Table 304 - Under Frequency Inhibit Time (Parameter 369)

Default Value	10
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

Over Frequency Inhibit Time

Over Frequency Inhibit Time (Parameter 373) allows you to inhibit an over frequency trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.

Table 305 - Over Frequency Inhibit Time (Parameter 373)

Default Value	10

Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

Under Frequency Trip

The E300 relay trips with an Under Frequency indication if:

- No trip currently exists
- Under Frequency Trip is enabled
- Voltage is present
- Under Frequency Inhibit Time has expired
- The voltage frequency is less than the Under Frequency Trip Level for a time period greater than the Under Frequency Trip Delay.

If the E300 relay trips on an under frequency, the:

- TRIP/WARN LED status indicator flashes a red 1-long / 5-short blink pattern
- Bit 4 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)

Under Frequency Trip Delay

Under Frequency Trip Delay (Parameter 370) allows you to define the time period an under frequency condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Table 306 - Under Frequency Trip Delay (Parameter 370)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Under Frequency Trip Level

Under Voltage Trip Level (Parameter 371) allows you to define the frequency at which the E300 relay trips on an under frequency. It is user-adjustable from 46…65 Hz.

Table 307 - Under Frequency Trip Level (Parameter 371)

Default Value	57
Minimum Value	46
Maximum Value	65
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	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

The E300 relay indicates an Under Frequency warning if:

- No warning currently exists
- Under Frequency Warning is enabled
- Voltage is present
- Under Frequency Inhibit Time has expired
- The voltage frequency is equal to or less than the Under Frequency Warning Level

When the Under Frequency Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 1-long / 5-short blink pattern
- Bit 4 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

Under Frequency Warn Level

- Under Frequency Warn Level (Parameter 372) allows you to define the frequency at which the E300 relay indicates a warning. It is user-adjustable from 46…65 Hz.

Table 308 - Under Frequency Warn Level (Parameter 372)

Default Value	58
Minimum Value	46
Maximum Value	65
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Hz

Over Frequency Trip

The E300 relay trips with an Over Frequency indication if:

- No trip currently exists
- Over Frequency Trip is enabled
- Voltage is present
- Over Frequency Inhibit Time has expired
- The voltage frequency is greater than the Over Frequency Trip Level for a time period greater than the Over Frequency Trip Delay.

If the E300 relay trips on an over frequency, the:

- TRIP/WARN LED status indicator flashes a red 1-long / 6-short blink pattern
- Bit 5 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)

Over Frequency Trip Delay

Over Frequency Trip Delay (Parameter 374) allows you to define the time period an over frequency condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Table 309 - Over Frequency Trip Delay (Parameter 374)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Over Frequency Trip Level

Over Voltage Trip Level (Parameter 375) allows you to define the frequency at which the E300 relay trips on an over frequency. It is user-adjustable from 46…65 Hz.

Table 310 - Over Frequency Trip Level (Parameter 375)

Default Value	63
Minimum Value	46
Maximum Value	65
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	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

The E300 relay indicates an Over Frequency warning if:

- No warning currently exists
- Over Frequency Warning is enabled
- Voltage is present
- Over Frequency Inhibit Time has expired
- The voltage frequency is equal to or greater than the Over Frequency Warning Level

When the Over Frequency Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 1-long / 6-short blink pattern
- Bit 5 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 closes

Over Frequency Warn Level

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.

Table 311 - Over Frequency Warn Level (Parameter 376)

Default Value	62
Minimum Value	46
Maximum Value	65
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	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-based 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 312 - 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.

Table 313 - Power Trip Enable (Parameter 185)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Under kW Trip
														X		Over kW Trip
													X			Under kVAR Consumed Trip
												X				Over kVAR Consumed Trip
											X					Under kVAR Generated Trip
										X						Over kVAR Generated Trip
									X							Under kVA Trip
								X								Over kVA Trip
							X									Under PF Lagging Trip
						X										Over PF Lagging Trip
					X											Under PF Leading Trip
				X												Over PF Leading Trip
																Reserved
																Reserved
																Reserved
																Reserved

Table 314 - Power Warning Enable (Parameter 191)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Under kW Warning
														X		Over kW Warning
													X			Under kVAR Consumed Warning
												X				Over kVAR Consumed Warning
											X					Under kVAR Generated Warning
										X						Over kVAR Generated Warning
									X							Under kVA Warning
								X								Over kVA Warning
							X									Under PF Lagging Warning
						X										Over PF Lagging Warning
					X											Under PF Leading Warning
				X												Over PF Leading Warning
																Reserved
																Reserved
																Reserved
																Reserved

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.

Table 315 - Power Trip Status (Parameter 6)

Bit																
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**
															X	Under kW Trip
														X		Over kW Trip
													X			Under kVAR Consumed Trip
												X				Over kVAR Consumed Trip
											X					Under kVAR Generated Trip
										X						Over kVAR Generated Trip
									X							Under kVA Trip
								X								Over kVA Trip
							X									Under PF Lagging Trip
						X										Over PF Lagging Trip
					X											Under PF Leading Trip
				X												Over PF Leading Trip
																Reserved
																Reserved
																Reserved
																Reserved

Table 316 - Power Warning Status (Parameter 12)

Bit																
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**
															X	Under kW Warning
														X		Over kW Warning
													X			Under kVAR Consumed Warning
												X				Over kVAR Consumed Warning
											X					Under kVAR Generated Warning
										X						Over kVAR Generated Warning
									X							Under kVA Warning
								X								Over kVA Warning
							X									Under PF Lagging Warning
						X										Over PF Lagging Warning
					X											Under PF Leading Warning
				X												Over PF Leading Warning
																Reserved
																Reserved
																Reserved
																Reserved

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.

Under kW Inhibit Time

Under kW Inhibit Time (Parameter 378) allows you to inhibit an under real power (kW) trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.

Table 317 - Under kW Inhibit Time (Parameter 378)

Default Value	10
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

Over kW Inhibit Time

Over kW Inhibit Time (Parameter 382) allows you to inhibit an over real power (kW) trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.

Table 318 - Over kW Inhibit Time (Parameter 382)

Default Value	10
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

Under kW Trip

The E300 relay trips with an Under kW indication if:

- No trip currently exists
- Under kW Trip is enabled
- Current is present
- Voltage is present
- Under kW Inhibit Time has expired
- The total real power (kW) is less than the Under kW Trip Level for a time period greater than the Under kW Trip Delay.

If the E300 relay trips on an under real power (kW), 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)

Under kW Trip Delay

Under kW Trip Delay (Parameter 379) allows you to 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.

Table 319 - Under kW Trip Delay (Parameter 379)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Under kW Trip Level

Under kW Trip Level (Parameter 380) allows you to 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.

Table 320 - UnderkW Trip Level (Parameter 380)

Default Value	0.000
Minimum Value	0.000
Maximum Value	2,000,000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	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

The E300 relay indicates an Under kW warning if:
- No warning currently exists
- Under kW Warning is enabled
- Current is present
- Voltage is present
- Under kW Inhibit Time has expired
- The total real power (kW) is equal to or less than the Under kW Warning Level

When the Under kW 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

Under kW Warn Level

Under kW Warn Level (Parameter 381) allows you to define the real power (kW) at which the E300 relay indicates a warning. It is user-adjustable from 0…2,000,000 kW.

Table 321 - Under kW Warn Level (Parameter 381)

Default Value	0.000
Minimum Value	0.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	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.

Over kW Trip

The E300 relay trips with an Over kW indication if:

- No trip currently exists
- Over kW Trip is enabled
- Current is present
- Voltage is present
- Over kW Inhibit Time has expired
- The total real power (kW) is greater than the Over kW Trip Level for a time period greater than the Over kW Trip Delay.

If the E300 relay trips on an over real power (kW), the:

- TRIP/WARN LED status indicator flashes a red 2-long / 2-short blink pattern
- Bit 1 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)

Over kW Trip Delay

Over kW Trip Delay (Parameter 383) allows you to 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.

Table 322 - Over kW Trip Delay

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Over kW Trip Level

Over kW Trip Level (Parameter 384) allows you to 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.

Table 323 - Over kW Trip Level (Parameter 384)

Default Value	0.000
Minimum Value	0.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	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

The E300 relay indicates an Over kW warning if:

- No warning currently exists
- Over kW Warning is enabled
- Current is present
- Voltage is present
- Over kW Inhibit Time has expired
- The total real power (kW) is equal to or greater than the Over kW Warning Level

When the Over kW Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 2-long / 2-short blink pattern
- Bit 1 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

Over kW Warn Level

Over kW Warn Level (Parameter 385) allows you to define the real power (kW) at which the E300 relay indicates a warning. It is user-adjustable from 0…2,000,000 kW.

Table 324 - Over kW Warn Level

Default Value	0.000
Minimum Value	0.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	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.

Under kVAR Consumed Inhibit Time

Under kVAR Consumed Inhibit Time (Parameter 386) allows you to inhibit an under reactive power (kVAR) consumed trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.

Table 325 - Under kVAR Consumed Inhibit Time (Parameter 386)

Default Value	10
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

Over kVAR Consumed Inhibit Time

Over kVAR Consumed Inhibit Time (Parameter 390) allows you to inhibit an over reactive power (kVAR) consumed trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.

Table 326 - Over kVAR Consumed Inhibit Time (Parameter 390)

Default Value	10
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

Under kVAR Generated Inhibit Time

Under kVAR Generated 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.

Table 327 - Under kVAR Generated Inhibit Time (Parameter 394)

Default Value	10
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

Over kVAR Generated Inhibit Time

Over kVAR Generated Inhibit Time (Parameter 398) allows you to inhibit an over reactive power (kVAR) generated trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.

Table 328 - Over kVAR Generated Inhibit Time (Parameter 398)

Default Value	10
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

Under kVAR Consumed Trip

The E300 relay trips with an Under kVAR Consumed indication if:

- No trip currently exists
- Under kVAR Consumed Trip is enabled
- Current is present
- Voltage is present
- Under kVAR Consumed Inhibit Time has expired
- The total reactive power (kVAR) consumed is less than the Under kVAR Consumed Trip Level for a time period greater than the Under kVAR Consumed Trip Delay.

If the E300 relay trips on an under reactive power (kVAR) consumed, the:

- TRIP/WARN LED status indicator flashes a red 2-long / 3-short blink pattern
- Bit 2 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)

Under kVAR Consumed Trip Delay

Under kVAR Consumed Trip Delay (Parameter 387) allows you to 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.

Table 329 - Under kVAR Consumed Trip Delay (Parameter 387)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Under kVAR Consumed Trip Level

Under kVAR Consumed Trip Level (Parameter 388) allows you to define the reactive power (kVAR) consumed at which the E300 relay trips on an under reactive power (kVAR) consumed. It is user-adjustable from 0…2,000,000 kW.

Table 330 - Under kVAR Consumed Trip Level (Parameter 388)

Default Value	0.000
Minimum Value	0.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kVAR

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.

Under kVAR Consumed Warning

The E300 relay indicates an Under kVAR Consumed warning if:

- No warning currently exists
- Under kVAR Consumed Warning is enabled
- Current is present
- Voltage is present
- Under kVAR Consumed Inhibit Time has expired
- The total reactive power (kVAR) consumed is equal to or less than the Under kVAR Consumed Warning Level

When the Under kVAR Consumed Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 2-long / 3-short blink pattern
- Bit 2 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

Under kVAR Consumed Warn Level

Under kVAR Consumed Warn Level (Parameter 389) 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.

Table 331 - Under kVAR Consumed Warn Level (Parameter 389)

Default Value	0.000
Minimum Value	0.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kVAR

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.

Over kVAR ConsumedTrip

The E300 relay trips with an Over kVAR Consumed indication if:

- No trip currently exists
- Over kVAR Consumed Trip is enabled
- Current is present
- Voltage is present
- Over kVAR Consumed Inhibit Time has expired
- The total reactive power (kVAR) consumed is greater than the Over kVAR Consumed Trip Level for a time period greater than the Over kVAR Consumed Trip Delay.

If the E300 relay trips on an over reactive power (kVAR) consumed, the:

- TRIP/WARN LED status indicator flashes a red 2-long / 4-short blink pattern
- Bit 3 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)

Over kVAR Consumed Trip Delay

Over kVAR Consumed Trip Delay (Parameter 399) allows you to 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.

Table 332 - Over kVAR Consumed Trip Delay (Parameter 391)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Over kVAR Consumed Trip Level

Over kVAR Consumed Trip Level (Parameter 392) allows you to 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.

Table 333 - Over kVAR Consumed Trip Level (Parameter 392)

Default Value	0.000
Minimum Value	0.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kVAR

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

The E300 relay indicates an Over kVAR warning if:
- No warning currently exists
- Over kVAR Consumed Warning is enabled
- Current is present
- Voltage is present
- Over kVAR Consumed Inhibit Time has expired
- The total reactive power (kVAR) consumed is equal to or greater than the Over kVAR Consumed Warning Level

When the Over kVAR Consumed Warning conditions are satisfied, the:
- TRIP/WARN LED flashes a yellow 2-long / 4-short blink pattern
- Bit 3 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

Over kVAR Consumed Warn Level

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.

Table 334 - Over kVAR Consumed Warn Level (Parameter 393)

Default Value	0.000
Minimum Value	0.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kVAR

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.

Under kVAR Generated Trip

The E300 relay trips with an Under kVAR Generated indication if:

- No trip currently exists
- Under kVAR Generated Trip is enabled
- Current is present
- Voltage is present
- Under kVAR Generated Inhibit Time has expired
- The total reactive power (kVAR) generated is less than the Under
- kVAR Generated Trip Level for a time period greater than the Under kVAR Generated Trip Delay.

If the E300 relay trips on an under reactive power (kVAR) generated, the:

- TRIP/WARN LED status indicator flashes a red 2-long / 5-short blink pattern
- Bit 4 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)

Under kVAR Generated Trip Delay

Under kVAR Generated Trip Delay (Parameter 395) allows you to 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.

Table 335 - Under kVAR Generated Trip Delay (Parameter 395)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Under kVAR Generated Trip Level

Under kVAR Generated Trip Level (Parameter 396) allows you to 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.

Table 336 - Under kVAR Generated Trip Level (Parameter 396)

Default Value	0.000
Minimum Value	0.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kVAR

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

The E300 relay indicates an Under kVAR Generated warning if:

- No warning currently exists
- Under kVAR Generated Warning is enabled
- Current is present
- Voltage is present
- Under kVAR Generated Inhibit Time has expired
- The total reactive power (kVAR) generated is equal to or less than the Under kVAR Generated Warning Level

When the Under kVAR Generated Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 2-long / 5-short blink pattern
- Bit 4 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 closes

Under kVAR Generated Warn Level

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.

Table 337 - Under kVAR Generated Warn Level (Parameter 397)

Default Value	0.000
Minimum Value	0.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kVAR

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.

Over kVAR Generated Trip

The E300 relay trips with an Over kVAR Generated indication if:

- No trip currently exists
- Over kVAR Generated Trip is enabled
- Current is present
- Voltage is present
- Over kVAR Generated Inhibit Time has expired
- The total reactive power (kVAR) generated is greater than the Over
- kVAR Generated Trip Level for a time period greater than the Over kVAR Generated Trip Delay.

If the E300 relay trips on an over reactive power (kVAR) generated, the:

- TRIP/WARN LED status indicator flashes a red 2-long / 6-short blink pattern
- Bit 5 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)

Over kVAR Generated Trip Delay

Over kVAR Generated Trip Delay (Parameter 399) allows you to 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.

Table 338 - Over kVAR Generated Trip Display (Parameter 399)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Over kVAR Generated Trip Level

Over kVAR Generated Trip Level (Parameter 400) allows you to 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.

Table 339 - Over kVAR Generated Trip Level (Parameter 400)

Default Value	0.000
Minimum Value	0.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kVAR

IMPORTANT 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

The E300 relay indicates an Over kVAR warning if:

- No warning currently exists
- Over kVAR Generated Warning is enabled
- Current is present
- Voltage is present
- Over kVAR Generated Inhibit Time has expired
- The total reactive power (kVAR) generated is equal to or greater than the Over kVAR Generated Warning Level

When the Over kVAR Generated Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 2-long / 6-short blink pattern
- Bit 5 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

Over kVAR Generated Warn Level

Over kVAR Generated Warn Level (Parameter 401) 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.

Table 340 - Over kVAR Generated Warn Level (Parameter 401)

Default Value	0.000
Minimum Value	0.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kVAR

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.

Under kVA Inhibit Time

Under kVA Inhibit Time (Parameter 402) allows you to inhibit an under apparent power (kVA) trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.

Table 341 - Under kVA Inhibit Time (Parameter 402)

Default Value	10
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

Over kVA Inhibit Time

Over kVA Inhibit Time (Parameter 406) allows you to inhibit an over apparent power (kVA) trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.

Table 342 - Over kVA Inhibit Time (Parameter 406)

Default Value	10
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

Under kVA Trip

The E300 relay trips with an Under kVA indication if:

- No trip currently exists
- Under kVA Trip is enabled
- Current is present
- Voltage is present
- Under kVA Inhibit Time has expired
- The total apparent power (kVA) is less than the Under kVA Trip Level for a time period greater than the Under kVA Trip Delay.

If the E300 relay trips on an under apparent power (kVA), the:

- TRIP/WARN LED status indicator flashes a red 2-long / 7-short blink pattern
- Bit 6 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)

Under kVA Trip Delay

Under kVA Trip Delay (Parameter 403) allows you to 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.

Table 343 - Under kVA Trip Delay (Parameter 403)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Under kVA Trip Level

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.

Table 344 - Under kVA Trip Level (Parameter 404)

Default Value	0.000
Minimum Value	0.000
Maximum Value	2,000,000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	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

The E300 relay indicates an Under kVA warning if:

- No warning currently exists
- Under kVA Warning is enabled
- Current is present
- Voltage is present
- Under kVA Inhibit Time has expired
- The total apparent power (kVA) is equal to or less than the Under kVA Warning Level

When the Under kVA Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 2-long / 7-short blink pattern
- Bit 6 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 closes

Under kVA Warn Level

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.

Table 345 - Under kVA Warn Level (Parameter 405)

Default Value	0.000
Minimum Value	0.000
Maximum Value	2,000,000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	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.

Over kVA Trip

The E300 relay trips with an Over kVA indication if:

- No trip currently exists
- Over kVA Trip is enabled
- Current is present
- Voltage is present
- Over kVA Inhibit Time has expired
- The total apparent power (kVA) is greater than the Over kVA Trip Level for a time period greater than the Over kVA Trip Delay.

If the E300 relay trips on an over apparent power (kVA), the:

- TRIP/WARN LED status indicator flashes a red 2-long / 8-short blink pattern
- Bit 7 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)

Over kVA Trip Delay

Over kVA Trip Delay (Parameter 407) allows you to 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.

Table 346 - Over kVA Trip Delay (Parameter 407)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Over kVA Trip Level

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.

Table 347 - Over kVA Trip Level (Parameter 408)

Default Value	0.000
Minimum Value	0.000
Maximum Value	2,000,000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	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

The E300 relay indicates an Over kVA warning if:
- No warning currently exists
- Over kVA Warning is enabled
- Current is present
- Voltage is present
- Over kVA Inhibit Time has expired
- The total apparent power (kVA) is equal to or greater than the Over kVA Warning Level

When the Over kVA Warning conditions are satisfied, the:
- TRIP/WARN LED flashes a yellow 2-long / 8-short blink pattern
- Bit 7 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

Over kVA Warn Level

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.

Table 348 - Over kVA Warn Level (Parameter 409)

Default Value	0.000
Minimum Value	0.000
Maximum Value	2,000,000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	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.

Under Power Factor Lagging Inhibit Time

Under Power Factor Lagging Inhibit Time (Parameter 410) allows you to inhibit an under power factor lagging trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.

Table 349 - Under Power Factor Lagging Inhibit Time (Parameter 410)

Default Value	10
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

Over Power Factor Lagging Inhibit Time

Over Power Factor Lagging Inhibit Time (Parameter 414) allows you to inhibit an over power factor lagging trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.

Table 350 - Over Power Factor Lagging Inhibit Time (Parameter 414)

Default Value	10
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

Under Power Factor Leading Inhibit Time

Under Power Factor Leading Inhibit Time (Parameter 418) 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.

Table 351 - Under Power Factor Leading Inhibit Time (Parameter 418)

Default Value	10
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

Over Power Factor Leading Inhibit Time

Over Power Factor Leading Inhibit Time (Parameter 422) allows you to inhibit an over power factor leading trip and warning from occurring during the motor starting sequence. It is adjustable from 0…250 seconds.

Table 352 - Over Power Factor Leading Inhibit Time (Parameter 422)

Default Value	10
Minimum Value	0
Maximum Value	250
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	Seconds

Under Power Factor Lagging Trip

The E300 relay trips with an Under Power Factor Lagging indication if:

- No trip currently exists
- Under Power Factor Lagging Trip is enabled
- Current is present
- Voltage is present
- Under Power Factor Lagging Inhibit Time has expired
- The total power factor lagging is less than the Under Power Factor Lagging Trip Level for a time period greater than the Under Power Factor Lagging Trip Delay.

If the E300 relay trips on an under power factor lagging, the:

- TRIP/WARN LED status indicator flashes a red 2-long / 9-short blink pattern
- Bit 8 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)

Under Power Factor Lagging Trip Delay

Under Power Factor Lagging Trip Delay (Parameter 411) allows you to 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.

Table 353 - Under Power Factor Lagging Trip Delay (Parameter 411)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Under Power Factor Lagging Trip Level

Under Power Factor Lagging Trip Level (Parameter 412) allows you to 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.

Table 354 - Under Power Factor Lagging Trip Level (Parameter 412)

Default Value	-90
Minimum Value	-100
Maximum Value	0
Parameter Type	SINT
Size (Bytes)	1
Scaling Factor	1
Units	%

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

The E300 relay indicates an Under Power Factor Lagging warning if:

- No warning currently exists
- Under Power Factor Lagging Warning is enabled
- Current is present
- Voltage is present
- Under Power Factor Lagging Inhibit Time has expired
- The total power factor lagging is equal to or less than the Under Power Factor Lagging Warning Level

When the Under Power Factor Lagging Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 2-long / 9-short blink pattern
- Bit 8 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

Under Power Factor Lagging Warn Level

Under Power Factor Lagging Warn Level (Parameter 413) allows you to define the power factor lagging at which the E300 relay indicates a warning.   It is user-adjustable from 0…2,000,000 kW.

Table 355 - Under Power Factor Lagging Warn Level (Parameter 413)

Default Value	-95
Minimum Value	-100
Maximum Value	0
Parameter Type	SINT
Size (Bytes)	1
Scaling Factor	1
Units	%

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.

Over Power Factor Lagging Trip

The E300 relay trips with an Over Power Factor Lagging indication if:

- No trip currently exists
- Over Power Factor Lagging Trip is enabled
- Current is present
- Voltage is present
- Over Power Factor Lagging Inhibit Time has expired
- The total power factor lagging is greater than the Over Power Factor Lagging Trip Level for a time period greater than the Over Power Factor Lagging Trip Delay.

If the E300 relay trips on an over power factor lagging, the:

- TRIP/WARN LED status indicator flashes a red 2-long / 10-short blink pattern
- Bit 9 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)

Over Power Factor Lagging Trip Delay

Over Power Factor Lagging Trip Delay (Parameter 415) allows you to 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.

Table 356 - Over Power Factor Lagging Trip Delay (Parameter 415)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Over Power Factor Lagging Trip Level

Over Power Factor Lagging Trip Level (Parameter 416) allows you to 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.

Table 357 - Over Power Factor Lagging Trip Level (Parameter 416)

Default Value	-95
Minimum Value	-100
Maximum Value	0
Parameter Type	SINT
Size (Bytes)	1
Scaling Factor	1
Units	%

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

The E300 relay indicates an Over kVAR warning if:

- No warning currently exists
- Over Power Factor Lagging Warning is enabled
- Current is present
- Voltage is present
- Over Power Factor Lagging Inhibit Time has expired
- The total power factor lagging is equal to or greater than the Over Power Factor Lagging Warning Level

When the Over Power Factor Lagging Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 2-long / 10-short blink pattern
- Bit 9 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

Over Power Factor Lagging Warn Level

Over Power Factor Lagging Warn Level (Parameter 417) allows you to define the power factor lagging at which the E300 relay indicates a warning. It is user-adjustable from 0…2,000,000 kW.

Table 358 - Over Power Factor Lagging Warn Level (Parameter 417)

Default Value	-90
Minimum Value	-100
Maximum Value	0
Parameter Type	SINT
Size (Bytes)	1
Scaling Factor	1
Units	%

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.

Under Power Factor Leading Trip

The E300 relay trips with an Under Power Factor Leading indication if:

- No trip currently exists
- Under Power Factor Leading Trip is enabled
- Current is present
- Voltage is present
- Under Power Factor Leading Inhibit Time has expired
- The total power factor leading is less than the Under Power Factor Leading Trip Level for a time period greater than the Under Power Factor Leading Trip Delay.

If the E300 relay trips on an under power factor leading, the:

- TRIP/WARN LED status indicator flashes a red 2-long / 11-short blink pattern
- Bit 10 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)

Under Power Factor Leading Trip Delay

Under Power Factor Leading Trip Delay (Parameter 419) allows you to 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.

Table 359 - Under Power Factor Leading Trip Delay (Parameter 419)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Under Power Factor Leading Trip Level

Under Power Factor Leading Trip Level (Parameter 420) allows you to 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.

Table 360 - Under Power Factor Leading Trip Level (Parameter 420)

Default Value	90
Minimum Value	100
Maximum Value	0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%

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

The E300 relay indicates an Under Power Factor Leading warning if:

- No warning currently exists
- Under Power Factor Leading Warning is enabled
- Current is present
- Voltage is present
- Under Power Factor Leading Inhibit Time has expired
- The total power factor leading is equal to or less than the Under Power Factor Leading Warning Level

When the Under Power Factor Leading Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 2-long / 11-short blink pattern
- Bit 10 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 closes

Under Power Factor Leading Warn Level

Under Power Factor Leading Warn Level (Parameter 421) allows you to define the power factor leading at which the E300 relay indicates a warning.   It is user-adjustable from 0...2,000,000 kW.

Table 361 - Under Power Factor Leading Warn Level (Parameter 421)

Default Value	95
Minimum Value	100
Maximum Value	0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%

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.

Over Power Factor Leading Trip

The E300 relay trips with an Over Power Factor Leading indication if:

- No trip currently exists
- Over Power Factor Leading Trip is enabled
- Current is present
- Voltage is present
- Over Power Factor Leading Inhibit Time has expired
- The total power factor leading is greater than the Over Power Factor Leading Trip Level for a time period greater than the Over Power Factor Leading Trip Delay.

If the E300 relay trips on an over power factor leading, the:

- TRIP/WARN LED status indicator flashes a red 2-long / 12-short blink pattern
- Bit 11 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)

Over Power Factor Leading Trip Delay

Over Power Factor Leading Trip Delay (Parameter 423) allows you to 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.

Table 362 - Over Power Factor Leading Trip Delay (Parameter 423)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Over Power Factor Leading Trip Level

Over Power Factor Leading Trip Level (Parameter 424) allows you to 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.

Table 363 - Over Power Factor Leading Trip Level (Parameter 424)

Default Value	95
Minimum Value	100
Maximum Value	0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%

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

The E300 relay indicates an Over kVAR warning if:
- No warning currently exists
- Over Power Factor Leading Warning is enabled
- Current is present
- Voltage is present
- Over Power Factor Leading Inhibit Time has expired
- The total power factor leading is equal to or greater than the Over Power Factor Leading Warning Level

When the Over Power Factor Leading Warning conditions are satisfied, the:
- TRIP/WARN LED flashes a yellow 2-long / 12-short blink pattern
- Bit 11 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 closes

Over Power Factor Leading Warn Level

Over Power Factor Leading Warn Level (Parameter 425) allows you to define the power factor leading at which the E300 relay indicates a warning. It is user-adjustable from 0…2,000,000 kW.

Table 364 - Over Power Factor Leading Warn Level (Parameter 425)

Default Value	90
Minimum Value	100
Maximum Value	0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%

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-Based 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.

Table 365 - Control Trip Enable (Parameter 186)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Test Trip Enable
														X		PTC Trip Enable
													X			DeviceLogix Trip Enable
												X				Operator Station Trip Enable
											X					Remote Trip Enable
										X						Blocked Start Trip Enable
									X							Hardware Fault Trip Enable
								X								Configuration Trip Enable
							X									Option Match Trip Enable
						X										Feedback Timeout Trip Enable
					X											Expansion Bus Trip Enable
																Reserved
																Reserved
		X														Nonvolatile Memory Trip Enable
	X															Test Mode Trip Enable
																Reserved

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

Table 366 - Control Warning Enable (Parameter 192)

Bit																
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**
																Reserved
																Reserved
													X			DeviceLogix Warning Enable
												X				Operator Station Warning Enable
																Reserved
																Reserved
																Reserved
																Reserved
							X									Option Match Warning Enable
						X										Feedback Timeout Warning Enable
					X											Expansion Bus Warning Enable
				X												Number Of Starts Warning Enable
			X													Operating Hours Warning Enable
																Reserved
																Reserved
																Reserved

Table 367 - Control Trip Status (Parameter 7)

Bit																
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**
															X	Test Trip
														X		PTC Trip
													X			DeviceLogix Trip
												X				Operator Station Trip
											X					Remote Trip
										X						Blocked Start Trip
									X							Hardware Fault Trip
								X								Configuration Trip
							X									Option Match Trip
						X										Feedback Timeout Trip
					X											Expansion Bus Trip
																Reserved
																Reserved
		X														Nonvolatile Memory Trip
	X															Test Mode Trip
																Reserved

Table 368 - Control Warning Status (Parameter 13)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
																Reserved
														X		PTC Warning
													X			DeviceLogix Warning
												X				Operator Station Warning
																Reserved
																Reserved
																Reserved
																Reserved
							X									Option Match Warning
						X										Feedback Timeout Warning
					X											Expansion Bus Warning
				X												Number Of Starts Warning
			X													Operating Hours Warning
																Reserved
																Reserved
																Reserved

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.

The E300 relay trips with a test trip indication if:

- No trip currently exists
- Test Trip 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 test trip, 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)

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)

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.

Thermistor (PTC) Trip

The E300 relay trips with a thermistor (PTC) trip indication if:

- No trip currently exists
- Resistance of the thermistor (PTC) sensors is greater than 3400Ω

If the E300 relay trips on a thermistor (PTC), the following occurs:

- The TRIP/WARN LED flashes a red 3-long / 2-short blink pattern
- Bit 1 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 opens
- Any relay outputs configured as a Control Relay opens

- Any relay outputs configured as a Trip Alarm closes
- 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)

Thermistor (PTC) Warning

The E300 relay provides a thermistor (PTC) warning indication if:

- No trip currently exists
- Resistance of the thermistor (PTC) sensors is greater than 3400 Ω

If the E300 relay warns on a thermistor (PTC), 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

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 9 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.

DeviceLogix Trip

The E300 relay trips with a DeviceLogix trip indication if:
- No trip currently exists
- The DeviceLogix program activates the DeviceLogix Trip bit

If the E300 relay trips on a DeviceLogix program, the following occurs:
- The TRIP/WARN LED flashes a red 3-long / 3-short blink pattern
- Bit 2 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 opens
- Any relay outputs configured as a Control Relay opens
- Any relay outputs configured as a Trip Alarm closes
- 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)

DeviceLogix Warning

The E300 relay provides a DeviceLogix warning indication if:
- No trip currently exists
- The DeviceLogix program activates the DeviceLogix Warning bit

If the E300 relay warns on a DeviceLogix program, the following occurs:
- The TRIP/WARN LED flashes a yellow 3-long / 3-short blink pattern
- Bit 2 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

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 O (stop) button. This feature is a failsafe mechanism to allow you to de-energize a contactor coil anytime the red O (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.

The E300 relay trips with an operator station trip indication if:

- No trip currently exists
- Operator Station Trip is enabled
- You press the red O button on an operator station

If the E300 relay trips on an operator station trip, the following occurs:

- The TRIP/WARN LED flashes a red 3-long / 4-short blink pattern
- Bit 3 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)

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)

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 4 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.

The E300 relay trips with a remote trip indication if:

- No trip currently exists
- Remote Trip is enabled
- 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

If the E300 relay trips on a remote trip, the following occurs:

- The TRIP/WARN LED flashes a red 3-long / 5-short blink pattern
- Bit 4 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)

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)

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).

Blocked Start Trip

The E300 relay trips with a blocked start trip indication if:

- No trip currently exists
- Blocked Start Trip is enabled
- The number of starts within the past hour equals the value set in Starts Per Hour (Parameter 205)
- The time between starts is less than the value set in Starts Interval (Parameter 206)

If the E300 relay trips on a blocked start trip, the following occurs:

- The TRIP/WARN LED flashes a red 3-long / 6-short blink pattern
- Bit 5 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)

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)

Starts Per Hour

Starts Per Hour (Parameter 205) is the number of starts within the last hour (60 minutes). This value is adjustable from 0…120 starts.

Table 369 - Starts Per Hour (Parameter 205)

Default Value	2
Minimum Value	0
Maximum Value	120
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	

Starts Interval

Starts Interval (Parameter 206) is the time that you must wait between starts. This value is adjustable from 0…3600 seconds.

Table 370 - Starts Interval (Parameter 206)

Default Value	600
Minimum Value	0

Maximum Value	3600
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	Seconds

Starts Available

Starts Available (Parameter 30) reports the number of starts currently available based on the blocked start settings and the actual motor starting events.

Table 371 - Starts Available (Parameter 30)

Default Value	0
Minimum Value	0
Maximum Value	120
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	

Time to Start

Time to Start (Parameter 31) reports the 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.

Table 372 - Time to Start (Parameter 31)

Default Value	0
Minimum Value	0
Maximum Value	3600
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	Seconds

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.

Number of Starts Warning

The E300 relay warns with a number of starts warning indication if:

- No warning currently exists
- Number of Starts Warning is enabled
- The value in Starts Counter (Parameter 29) is greater than the value set in Total Starts (Parameter 207)

If the E300 relay warns on a number of starts warning, the following occurs:

- The TRIP/WARN LED flashes a yellow 3-long / 12-short blink pattern
- Bit 11 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 close

Total Starts

Total Starts (Parameter 207) allows you to set the number starts until the starts counter warning occurs.

Table 373 - Total Starts (Parameter 207)

Default Value	0
Minimum Value	0
Maximum Value	65535
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

Starts Counter

Starts Counter (Parameter 29) represents the 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*.

Table 374 - Starts Counter (Parameter 29)

Default Value	0
Minimum Value	0
Maximum Value	65535
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

Operating Hours Warning

The E300 relay warns with an operating hours warning indication if:

- No warning currently exists
- Operating Hours Warning is enabled

- The value in Operating Time (Parameter 28) is greater than the value set in Total Operating Hours (Parameter 208)

If the E300 relay warns on an operating hours warning, the following occurs:
- The TRIP/WARN LED flashes a yellow 3-long / 13-short blink pattern
- Bit 12 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 close

Total Operating Hours

Total Operating Hours (Parameter 208) allows you to set the number operating hours that a motor can operate until the operating hours warning occurs.

Table 375 - Total Operating Hours (Parameter 208)

Default Value	0
Minimum Value	0
Maximum Value	65535
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	Hours

Operating Time

Operating Time (Parameter 28) represents the 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*.

Table 376 - Operating Time (Parameter 28)

Default Value	0
Minimum Value	0
Maximum Value	65535
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	Hours

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.

The E300 relay trips with a hardware fault trip indication if:

- No trip currently exists
- Hardware Fault Trip is enabled
- An issue exists between the Control Module, Sensing Module, and/or Communication Module

If the E300 relay trips on a hardware fault trip, the following occurs:

- The TRIP/WARN LED flashes a red 3-long / 7-short blink pattern
- Bit 6 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)

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)

Configuration Trip

See Invalid Configuration Mode in Chapter 4 for more information on Configuration Trip.

Option Match

See Option Match in Chapter 4 for more information on Option Match Trip and Warning.

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 5 for more information on Operating Modes.

Feedback Timeout

Feedback Timeout (Parameter 213) is the 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.

Feedback Timeout (Parameter 213)	
Default Value	500
Minimum Value	0
Maximum Value	65535
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

Contactor Feedback Trip

The E300 relay trips with a Contactor Feedback trip indication if:

- No trip currently exists
- The Operating Mode program does not receive a contactor feedback signal before the Feedback Timeout (Parameter 213)

If the E300 relay trips on a Contactor Feedback, the following occurs:

- The TRIP/WARN LED flashes a red 3-long / 10-short blink pattern
- Bit 9 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 opens
- Any relay outputs configured as a Control Relay opens
- Any relay outputs configured as a Trip Alarm closes
- 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)

Contactor Feedback Warning

The E300 relay provides a Contactor Feedback warning indication if:

- No trip currently exists
- The Operating Mode program does not receive a contactor feedback signal before the Feedback Timeout (Parameter 213)

If the E300 relay warns on a Contactor Feedback, the following occurs:

- The TRIP/WARN LED flashes a yellow 3-long / 10-short blink pattern
- Bit 9 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

Expansion Bus Fault

See Expansion Bus Fault in Chapter 4 for more information on Expansion Bus Trip and 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.

The E300 relay trips with a hardware fault trip indication if:
- No trip currently exists
- Nonvolatile Storage Fault Trip is enabled
- An issue exists in the E300 relay's nonvolatile storage

If the E300 relay trips on a nonvolatile storage fault trip, the following occurs:
- The TRIP/WARN LED flashes a red 3-long / 14-short blink pattern
- Bit 13 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)

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)

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.

The E300 relay trips with a test mode trip indication if:

- No trip currently exists.
- Test Mode Trip protection is enabled.
- The digital input that is assigned to read the Test Position feedback is active. See Input Assignments (Parameters 196…201) in Chapter 4.
- Motor current and/or voltage is present.

If the E300 relay trips on a test mode trip, the following occurs:

- The TRIP/WARN LED flashes a red 3-long / 15-short blink pattern
- Bit 14 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)

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)

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-based 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.

Table 377 - Analog Trip Enable (Parameter 187)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Analog Module 1 - Input Channel 00 Trip
														X		Analog Module 1 - Input Channel 01 Trip
													X			Analog Module 1 - Input Channel 02 Trip
												X				Analog Module 2 - Input Channel 00 Trip
											X					Analog Module 2 - Input Channel 01 Trip
										X						Analog Module 2 - Input Channel 02 Trip
									X							Analog Module 3 - Input Channel 00 Trip
								X								Analog Module 3 - Input Channel 01 Trip
							X									Analog Module 3 - Input Channel 02 Trip
						X										Analog Module 4 - Input Channel 00 Trip
					X											Analog Module 4 - Input Channel 01 Trip
				X												Analog Module 4 - Input Channel 02 Trip

Table 378 - Analog Warning Enable (Parameter 193)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Analog Module 1 - Input Channel 00 Warning
														X		Analog Module 1 - Input Channel 01 Warning
													X			Analog Module 1 - Input Channel 02 Warning
												X				Analog Module 2 - Input Channel 00 Warning
											X					Analog Module 2 - Input Channel 01 Warning
										X						Analog Module 2 - Input Channel 02 Warning
									X							Analog Module 3 - Input Channel 00 Warning
								X								Analog Module 3 - Input Channel 01 Warning
							X									Analog Module 3 - Input Channel 02 Warning
						X										Analog Module 4 - Input Channel 00 Warning
					X											Analog Module 4 - Input Channel 01 Warning
				X												Analog Module 4 - Input Channel 02 Warning

Analog Trip Status (Parameter 8) and Analog Warning Status (Parameter 14) are used to monitor the respective analog-based protective trip and warning functions.

Table 379 - Analog Trip Status (Parameter 8)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Analog Module 1 - Input Channel 00 Trip
														X		Analog Module 1 - Input Channel 01 Trip
													X			Analog Module 1 - Input Channel 02 Trip
												X				Analog Module 2 - Input Channel 00 Trip
											X					Analog Module 2 - Input Channel 01 Trip
										X						Analog Module 2 - Input Channel 02 Trip
									X							Analog Module 3 - Input Channel 00 Trip
								X								Analog Module 3 - Input Channel 01 Trip
							X									Analog Module 3 - Input Channel 02 Trip
						X										Analog Module 4 - Input Channel 00 Trip
					X											Analog Module 4 - Input Channel 01 Trip
				X												Analog Module 4 - Input Channel 02 Trip

Table 380 - Analog Warning Status (Parameter 14)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Analog Module 1 - Input Channel 00 Warning
														X		Analog Module 1 - Input Channel 01 Warning
													X			Analog Module 1 - Input Channel 02 Warning
												X				Analog Module 2 - Input Channel 00 Warning
											X					Analog Module 2 - Input Channel 01 Warning
										X						Analog Module 2 - Input Channel 02 Warning
									X							Analog Module 3 - Input Channel 00 Warning
								X								Analog Module 3 - Input Channel 01 Warning
							X									Analog Module 3 - Input Channel 02 Warning
						X										Analog Module 4 - Input Channel 00 Warning
					X											Analog Module 4 - Input Channel 01 Warning
				X												Analog Module 4 - Input Channel 02 Warning

Analog Module 1

The E300 Analog I/O Expansion Module scans up to three analog signals. An over level trip or warning can be configured for each input channel.

Analog Module 1 – Channel 00 Over Level Trip

The E300 relay trips with an Analog Module 1 – Channel 00 Over Level Trip indication if:

- No trip currently exists
- Analog Module 1 – Channel 00 Over Level Trip is enabled

- The measured analog input signal is greater than the Analog Module 1 – Channel 00 Trip Level for a time period greater than the Analog Module 1 – Channel 00 Over Level Trip Delay.

If the E300 relay trips on an Analog Module 1 – Channel 00 Over Level, 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 Module 1 – Channel 00 Over Level Trip Delay

Analog Module 1 – Channel 00 Over Level Trip Delay (Parameter 443) allows you to define the time period an Analog Module 1 – Channel 00 Over Level condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Table 381 - Analog Module 1 – Channel 00 Over Level Trip Delay (Parameter 443)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Analog Module 1 – Channel 00 Trip Level

Analog Module 1 – Channel 00 Trip Level (Parameter 444) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 1 – Channel 00 Over Level trip. It is user-adjustable from -32768…+32767.

Table 382 - Analog Module 1 – Channel 00 Trip Level (Parameter 444)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 1 – Channel 00 Over Level Warning

The E300 relay indicates an Analog Module 1 – Channel 00 Over Level 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 Analog Module 1 – Channel 00 Over Level 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 1 – Channel 00 Warning Level

Analog Module 1 – Channel 00 Warning Level (Parameter 445) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 1 – Channel 00 Over Level warning. It is user-adjustable from -32768…+32767.

Table 383 - Analog Module 1 – Channel 00 Warning Level (Parameter 445)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 1 – Channel 01 Over Level Trip

The E300 relay trips with an Analog Module 1 – Channel 01 Over Level Trip indication if:

- No trip currently exists
- Analog Module 1 – Channel 01 Over Level Trip is enabled
- The measured analog input signal is greater than the Analog Module 1 – Channel 01 Trip Level for a time period greater than the Analog Module 1 – Channel 01 Over Level Trip Delay.

If the E300 relay trips on an Analog Module 1 – Channel 01 Over Level, the:

- TRIP/WARN LED status indicator flashes a red 4-long / 2-short blink pattern
- Bit 1 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 Module 1 – Channel 01 Over Level Trip Delay

Analog Module 1 – Channel 01 Over Level Trip Delay (Parameter 452) allows you to define the time period an Analog Module 1 – Channel 01 Over Level condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Table 384 - Analog Module 1 – Channel 01 Over Level Trip Delay (Parameter 452)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Analog Module 1 – Channel 01 Trip Level

Analog Module 1 – Channel 01 Trip Level (Parameter 453) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 1 – Channel 01 Over Level trip. It is user-adjustable from -32768…+32767.

Table 385 - Analog Module 1 – Channel 01 Trip Level (Parameter 453)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 1 – Channel 01 Over Level Warning

The E300 relay indicates an Analog Module 1 – Channel 01 Over Level warning if:

- No warning currently exists
- Analog Module 1 – Channel 01 Over Level Warning is enabled
- The maximum phase current is equal to or greater than the Analog Module 1 – Channel 01 Warning Level

When the Analog Module 1 – Channel 01 Over Level Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 4-long / 2-short blink pattern
- Bit 1 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 closes

Analog Module 1 – Channel 01 Warning Level

Analog Module 1 – Channel 01 Warning Level (Parameter 454) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 1 – Channel 01 Over Level warning. It is user-adjustable from -32768…+32767.

Table 386 - Analog Module 1 – Channel 01 Warning Level (Parameter 454)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 1 – Channel 02 Over Level Trip

The E300 relay trips with an Analog Module 1 – Channel 02 Over Level Trip indication if:

- No trip currently exists
- Analog Module 1 – Channel 02 Over Level Trip is enabled

- The measured analog input signal is greater than the Analog Module 1 – Channel 02 Trip Level for a time period greater than the Analog Module 1 – Channel 02 Over Level Trip Delay.

If the E300 relay trips on an Analog Module 1 – Channel 02 Over Level, the:
- TRIP/WARN LED status indicator flashes a red 4-long / 3-short blink pattern
- Bit 2 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 Module 1 – Channel 02 Over Level Trip Delay

Analog Module 1 – Channel 02 Over Level Trip Delay (Parameter 461) allows you to define the time period an Analog Module 1 – Channel 02 Over Level condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Table 387 - Analog Module 1 – Channel 02 Over Level Trip Delay (Parameter 461)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Analog Module 1 – Channel 02 Trip Level

Analog Module 1 – Channel 02 Trip Level (Parameter 462) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 1 – Channel 02 Over Level trip. It is user-adjustable from -32768…+32767.

Table 388 - Analog Module 1 – Channel 02 Trip Level (Parameter 462)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 1 – Channel 02 Over Level Warning

The E300 relay indicates an Analog Module 1 – Channel 02 Over Level warning if:

- No warning currently exists
- Analog Module 1 – Channel 02 Over Level Warning is enabled
- The maximum phase current is equal to or greater than the Analog Module 1 – Channel 02 Warning Level

When the Analog Module 1 – Channel 02 Over Level Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 4-long / 3-short blink pattern
- Bit 2 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 closes

Analog Module 1 – Channel 02 Warning Level

Analog Module 1 – Channel 02 Warning Level (Parameter 463) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 1 – Channel 02 Over Level warning. It is user-adjustable from -32768…+32767.

Table 389 - Analog Module 1 – Channel 02 Warning Level (Parameter 463)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 2

The E300 Analog I/O Expansion Module scans up to three analog signals. An over level trip or warning can be configured for each input channel.

Analog Module 2 – Channel 00 Over Level Trip

The E300 relay trips with an Analog Module 2 – Channel 00 Over Level Trip indication if:

- No trip currently exists
- Analog Module 2 – Channel 00 Over Level Trip is enabled
- The measured analog input signal is greater than the Analog Module 2 – Channel 00 Trip Level for a time period greater than the Analog Module 2 – Channel 00 Over Level Trip Delay.

If the E300 relay trips on an Analog Module 2 – Channel 00 Over Level, the:

- TRIP/WARN LED status indicator flashes a red 4-long / 4-short blink pattern
- Bit 3 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 Module 2 – Channel 00 Over Level Trip Delay

Analog Module 2 – Channel 00 Over Level Trip Delay (Parameter 474) allows you to define the time period an Analog Module 2 – Channel 00 Over Level condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Table 390 - Analog Module 2 – Channel 00 Over Level Trip Delay (Parameter 474)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Analog Module 2 – Channel 00 Trip Level

Analog Module 2 – Channel 00 Trip Level (Parameter 475) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 2 – Channel 00 Over Level trip. It is user-adjustable from -32768…+32767.

Table 391 - Analog Module 2 – Channel 00 Trip Level (Parameter 475)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 2 – Channel 00 Over Level Warning

The E300 relay indicates an Analog Module 2 – Channel 00 Over Level warning if:

- No warning currently exists
- Analog Module 2 – Channel 00 Over Level Warning is enabled
- The maximum phase current is equal to or greater than the Analog Module 2 – Channel 00 Warning Level

When the Analog Module 2 – Channel 00 Over Level Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 4-long / 4-short blink pattern
- Bit 3 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 closes

Analog Module 2 – Channel 00 Warning Level

Analog Module 2 – Channel 00 Warning Level (Parameter 476) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 2 – Channel 00 Over Level warning. It is user-adjustable from -32768…+32767.

Table 392 - Analog Module 2 – Channel 00 Warning Level (Parameter 476)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 2 – Channel 01 Over Level Trip

The E300 relay trips with an Analog Module 2 – Channel 01 Over Level Trip indication if:

- No trip currently exists
- Analog Module 2 – Channel 01 Over Level Trip is enabled

- The measured analog input signal is greater than the Analog Module 2 – Channel 01 Trip Level for a time period greater than the Analog Module 2 – Channel 01 Over Level Trip Delay.

If the E300 relay trips on an Analog Module 2 – Channel 01 Over Level, the:

- TRIP/WARN LED status indicator flashes a red 4-long / 5-short blink pattern
- Bit 1 in Analog Trip Status (Parameter 8) sets to 1
- Bit 4 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 Module 2 – Channel 01 Over Level Trip Delay

Analog Module 2 – Channel 01 Over Level Trip Delay (Parameter 483) allows you to define the time period an Analog Module 2 – Channel 01 Over Level condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Table 393 - Analog Module 2 – Channel 01 Over Level Trip Delay (Parameter 483)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Analog Module 2 – Channel 01 Trip Level

Analog Module 2 – Channel 01 Trip Level (Parameter 484) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 2 – Channel 01 Over Level trip. It is user-adjustable from -32768…+32767.

Table 394 - Analog Module 2 – Channel 01 Trip Level (Parameter 484)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 2 – Channel 01 Over Level Warning

The E300 relay indicates an Analog Module 2 – Channel 01 Over Level warning if:

- No warning currently exists
- Analog Module 2 – Channel 01 Over Level Warning is enabled
- The maximum phase current is equal to or greater than the Analog Module 2 – Channel 01 Warning Level

When the Analog Module 2 – Channel 01 Over Level Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 4-long / 5-short blink pattern
- Bit 4 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 closes

Analog Module 2 – Channel 01 Warning Level

Analog Module 2 – Channel 01 Warning Level (Parameter 485) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 2 – Channel 01 Over Level warning. It is user-adjustable from -32768…+32767.

Table 395 - Analog Module 2 – Channel 01 Warning Level (Parameter 485)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 2 – Channel 02 Over Level Trip

The E300 relay trips with an Analog Module 2 – Channel 02 Over Level Trip indication if:

- No trip currently exists
- Analog Module 2 – Channel 02 Over Level Trip is enabled
- The measured analog input signal is greater than the Analog Module 2 – Channel 02 Trip Level for a time period greater than the Analog Module 2 – Channel 02 Over Level Trip Delay.

If the E300 relay trips on an Analog Module 2 – Channel 02 Over Level, the:

- TRIP/WARN LED status indicator flashes a red 4-long / 6-short blink pattern
- Bit 5 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 Module 2 – Channel 02 Over Level Trip Delay

Analog Module 2 – Channel 02 Over Level Trip Delay (Parameter 492) allows you to define the time period an Analog Module 2 – Channel 02 Over Level condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Table 396 - Analog Module 2 – Channel 02 Over Level Trip Delay (Parameter 492)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Analog Module 2 – Channel 02 Trip Level

Analog Module 2 – Channel 02 Trip Level (Parameter 493) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 2 – Channel 02 Over Level trip. It is user-adjustable from -32768…+32767.

Table 397 - Analog Module 2 – Channel 02 Trip Level (Parameter 493)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 2 – Channel 02 Over Level Warning

The E300 relay indicates an Analog Module 2 – Channel 02 Over Level warning if:

- No warning currently exists
- Analog Module 2 – Channel 02 Over Level Warning is enabled
- The maximum phase current is equal to or greater than the Analog Module 2 – Channel 02 Warning Level

When the Analog Module 2 – Channel 02 Over Level Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 4-long / 6-short blink pattern
- Bit 5 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 2 – Channel 02 Warning Level

Analog Module 2 – Channel 02 Warning Level (Parameter 494) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 2 – Channel 02 Over Level warning. It is user-adjustable from -32768…+32767.

Table 398 - Analog Module 2 – Channel 02 Warning Level (Parameter 494)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 3

The E300 Analog I/O Expansion Module scans up to three analog signals. An over level trip or warning can be configured for each input channel.

Analog Module 3 – Channel 00 Over Level Trip

The E300 relay trips with an Analog Module 3 – Channel 00 Over Level Trip indication if:

- No trip currently exists
- Analog Module 3 – Channel 00 Over Level Trip is enabled
- The measured analog input signal is greater than the Analog Module 3 – Channel 00 Trip Level for a time period greater than the Analog Module 3 – Channel 00 Over Level Trip Delay.

If the E300 relay trips on an Analog Module 3 – Channel 00 Over Level, the:

- TRIP/WARN LED status indicator flashes a red 4-long / 7-short blink pattern
- Bit 6 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 Module 3 – Channel 00 Over Level Trip Delay

Analog Module 3 – Channel 00 Over Level Trip Delay (Parameter 505) allows you to define the time period an Analog Module 3 – Channel 00 Over Level condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Table 399 - Analog Module 3 – Channel 00 Over Level Trip Delay (Parameter 505)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Analog Module 3 – Channel 00 Trip Level

Analog Module 3 – Channel 00 Trip Level (Parameter 506) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 3 – Channel 00 Over Level trip. It is user-adjustable from -32768…+32767.

Table 400 - Analog Module 3 – Channel 00 Trip Level (Parameter 506)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 3 – Channel 00 Over Level Warning

The E300 relay indicates an Analog Module 3 – Channel 00 Over Level warning if:

- No warning currently exists
- Analog Module 3 – Channel 00 Over Level Warning is enabled
- The maximum phase current is equal to or greater than the Analog Module 3 – Channel 00 Warning Level

When the Analog Module 3 – Channel 00 Over Level Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 4-long / 7-short blink pattern
- Bit 6 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 3 – Channel 00 Warning Level

Analog Module 3 – Channel 00 Warning Level (Parameter 507) allows you to define the magnitude of the analog signal in which the E300 relay trips on an

Analog Module 3 – Channel 00 Over Level warning. It is user-adjustable from -32768...+32767.

Table 401 - Analog Module 3 – Channel 00 Warning Level (Parameter 507)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 3 – Channel 01 Over Level Trip

The E300 relay trips with an Analog Module 3 – Channel 01 Over Level Trip indication if:

- No trip currently exists
- Analog Module 3 – Channel 01 Over Level Trip is enabled
- The measured analog input signal is greater than the Analog Module 3 – Channel 01 Trip Level for a time period greater than the Analog Module 3 – Channel 01 Over Level Trip Delay.

If the E300 relay trips on an Analog Module 3 – Channel 01 Over Level, the:

- TRIP/WARN LED status indicator flashes a red 4-long / 8-short blink pattern
- Bit 7 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 Module 3 – Channel 01 Over Level Trip Delay

Analog Module 3 – Channel 01 Over Level Trip Delay (Parameter 514) allows you to define the time period an Analog Module 3 – Channel 01 Over Level condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Table 402 - Analog Module 3 – Channel 01 Over Level Trip Delay (Parameter 514)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Analog Module 3 – Channel 01 Trip Level

Analog Module 3 – Channel 01 Trip Level (Parameter 515) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 3 – Channel 01 Over Level trip. It is user-adjustable from -32768…+32767.

Table 403 - Analog Module 3 – Channel 01 Trip Level (Parameter 515)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 3 – Channel 01 Over Level Warning

The E300 relay indicates an Analog Module 3 – Channel 01 Over Level warning if:

- No warning currently exists
- Analog Module 3 – Channel 01 Over Level Warning is enabled
- The maximum phase current is equal to or greater than the Analog Module 3 – Channel 01 Warning Level

When the Analog Module 3 – Channel 01 Over Level Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 4-long / 8-short blink pattern
- Bit 7 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 3 – Channel 01 Warning Level

Analog Module 3 – Channel 01 Warning Level (Parameter 516) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 3 – Channel 01 Over Level warning. It is user-adjustable from -32768…+32767.

Table 404 - Analog Module 3 – Channel 01 Warning Level (Parameter 516)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 3 – Channel 02 Over Level Trip

The E300 relay trips with an Analog Module 3 – Channel 02 Over Level Trip indication if:

- No trip currently exists
- Analog Module 3 – Channel 02 Over Level Trip is enabled

- The measured analog input signal is greater than the Analog Module 3 – Channel 02 Trip Level for a time period greater than the Analog Module 3 – Channel 02 Over Level Trip Delay.

If the E300 relay trips on an Analog Module 3 – Channel 02 Over Level, the:
- TRIP/WARN LED status indicator flashes a red 4-long / 9-short blink pattern
- Bit 8 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 Module 3 – Channel 02 Over Level Trip Delay

Analog Module 3 – Channel 02 Over Level Trip Delay (Parameter 523) allows you to define the time period an Analog Module 3 – Channel 02 Over Level condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Table 405 - Analog Module 3 – Channel 02 Over Level Trip Delay (Parameter 523)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Analog Module 3 – Channel 02 Trip Level

Analog Module 3 – Channel 02 Trip Level (Parameter 524) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 3 – Channel 02 Over Level trip. It is user-adjustable from -32768...+32767.

Table 406 - Analog Module 3 – Channel 02 Trip Level (Parameter 524)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 3 – Channel 02 Over Level Warning

The E300 relay indicates an Analog Module 3 – Channel 02 Over Level warning if:

- No warning currently exists
- Analog Module 3 – Channel 02 Over Level Warning is enabled
- The maximum phase current is equal to or greater than the Analog Module 3 – Channel 02 Warning Level

When the Analog Module 3 – Channel 02 Over Level Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 4-long / 9-short blink pattern
- Bit 8 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 3 – Channel 02 Warning Level

Analog Module 3 – Channel 02 Warning Level (Parameter 525) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 3 – Channel 02 Over Level warning. It is user-adjustable from -32768...+32767.

Table 407 - Analog Module 3 – Channel 02 Warning Level (Parameter 525)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 4

The E300 Analog I/O Expansion Module scans up to three analog signals. An over level trip or warning can be configured for each input channel.

Analog Module 4 – Channel 00 Over Level Trip

The E300 relay trips with an Analog Module 4 – Channel 00 Over Level Trip indication if:

- No trip currently exists
- Analog Module 4 – Channel 00 Over Level Trip is enabled
- The measured analog input signal is greater than the Analog Module 4 – Channel 00 Trip Level for a time period greater than the Analog Module 4 – Channel 00 Over Level Trip Delay.

If the E300 relay trips on an Analog Module 4 – Channel 00 Over Level, the:

- TRIP/WARN LED status indicator flashes a red 4-long / 10-short blink pattern
- Bit 9 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 Module 4 – Channel 00 Over Level Trip Delay

Analog Module 4 – Channel 00 Over Level Trip Delay (Parameter 536) allows you to define the time period an Analog Module 4 – Channel 00 Over Level condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Table 408 - Analog Module 4 – Channel 00 Over Level Trip Delay (Parameter 536)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Analog Module 4 – Channel 00 Trip Level

Analog Module 4 – Channel 00 Trip Level (Parameter 537) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 4 – Channel 00 Over Level trip. It is user-adjustable from -32768…+32767.

Table 409 - Analog Module 4 – Channel 00 Trip Level (Parameter 537)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 4 – Channel 00 Over Level Warning

The E300 relay indicates an Analog Module 4 – Channel 00 Over Level warning if:

- No warning currently exists
- Analog Module 4 – Channel 00 Over Level Warning is enabled
- The maximum phase current is equal to or greater than the Analog Module 3 – Channel 00 Warning Level

When the Analog Module 3 – Channel 00 Over Level Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 4-long / 10-short blink pattern
- Bit 9 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 closes

Analog Module 4 – Channel 00 Warning Level

Analog Module 4 – Channel 00 Warning Level (Parameter 538) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 4 – Channel 00 Over Level warning. It is user-adjustable from -32768…+32767.

Table 410 - Analog Module 4 – Channel 00 Warning Level (Parameter 538)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 4 – Channel 01 Over Level Trip

The E300 relay trips with an Analog Module 4 – Channel 01 Over Level Trip indication if:

- No trip currently exists
- Analog Module 4 – Channel 01 Over Level Trip is enabled

- The measured analog input signal is greater than the Analog Module 4 – Channel 01 Trip Level for a time period greater than the Analog Module 4 – Channel 01 Over Level Trip Delay.

If the E300 relay trips on an Analog Module 4 – Channel 01 Over Level, the:

- TRIP/WARN LED status indicator flashes a red 4-long / 11-short blink pattern
- Bit 10 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 Module 4 – Channel 01 Over Level Trip Delay

Analog Module 4 – Channel 01 Over Level Trip Delay (Parameter 545) allows you to define the time period an Analog Module 4 – Channel 01 Over Level condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Table 411 - Analog Module 4 – Channel 01 Over Level Trip Delay (Parameter 545)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Analog Module 4 – Channel 01 Trip Level

Analog Module 4 – Channel 01 Trip Level (Parameter 546) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 4 – Channel 01 Over Level trip. It is user-adjustable from -32768…+32767.

Table 412 - Analog Module 4 – Channel 01 Trip Level (Parameter 546)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 4 – Channel 01 Over Level Warning

The E300 relay indicates an Analog Module 4 – Channel 01 Over Level warning if:

- No warning currently exists
- Analog Module 4 – Channel 01 Over Level Warning is enabled
- The maximum phase current is equal to or greater than the Analog Module 4 – Channel 01 Warning Level

When the Analog Module 4 – Channel 01 Over Level Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 4-long / 11-short blink pattern
- Bit 10 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 4 – Channel 01 Warning Level

Analog Module 4 – Channel 01 Warning Level (Parameter 547) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 4 – Channel 01 Over Level warning. It is user-adjustable from -32768…+32767.

Table 413 - Analog Module 4 – Channel 01 Warning Level (Parameter 547)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 4 – Channel 02 Over Level Trip

The E300 relay trips with an Analog Module 4 – Channel 02 Over Level Trip indication if:

- No trip currently exists
- Analog Module 4 – Channel 02 Over Level Trip is enabled
- The measured analog input signal is greater than the Analog Module 4 – Channel 02 Trip Level for a time period greater than the Analog Module 4 – Channel 02 Over Level Trip Delay.

If the E300 relay trips on an Analog Module 4 – Channel 02 Over Level, the:

- TRIP/WARN LED status indicator flashes a red 4-long / 12-short blink pattern
- Bit 11 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 Module 4 – Channel 02 Over Level Trip Delay

Analog Module 4 – Channel 02 Over Level Trip Delay (Parameter 554) allows you to define the time period an Analog Module 4 – Channel 02 Over Level condition must be present before a trip occurs. It is adjustable from 0.1…25.0 seconds.

Table 414 - Analog Module 4 – Channel 02 Over Level Trip Delay (Parameter 554)

Default Value	1.0
Minimum Value	0.1
Maximum Value	25.0
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	10
Units	Seconds

Analog Module 4 – Channel 02 Trip Level

Analog Module 4 – Channel 02 Trip Level (Parameter 555) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 4 – Channel 02 Over Level trip. It is user-adjustable from -32768…+32767.

Table 415 - Analog Module 4 – Channel 02 Trip Level (Parameter 555)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 4 – Channel 02 Over Level Warning

The E300 relay indicates an Analog Module 4 – Channel 02 Over Level warning if:

- No warning currently exists
- Analog Module 4 – Channel 02 Over Level Warning is enabled
- The maximum phase current is equal to or greater than the Analog Module 4 – Channel 02 Warning Level

When the Analog Module 4 – Channel 02 Over Level Warning conditions are satisfied, the:

- TRIP/WARN LED flashes a yellow 4-long / 12-short blink pattern
- Bit 11 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 4 – Channel 02 Warning Level

Analog Module 4 – Channel 02 Warning Level (Parameter 556) allows you to define the magnitude of the analog signal in which the E300 relay trips on an Analog Module 4 – Channel 02 Over Level warning. It is user-adjustable from -32768…+32767.

Table 416 - Analog Module 4 – Channel 02 Warning Level (Parameter 556)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Commands

Introduction

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).

Table 417 - Trip Reset (Parameter 163)

Default Value	0 = Ready
Range	0 = Ready 1 = Trip Reset
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	

Configuration Preset

The E300 relay has a number of preset configurations that allow you to quickly configure all of the 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.

Table 418 - Config Preset (Parameter 164)

Default Value	0 = Ready
Range	0 = Ready 1 = Factory Defaults
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	

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 212 - 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	
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	

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	
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	

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
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	

No.	Parameter Name	Default Value	Units
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	
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

No.	Parameter Name	Default Value	Units
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
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

No.	Parameter Name	Default Value	Units
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	
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	

No.	Parameter Name	Default Value	Units
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	%
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
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	%
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	%

No.	Parameter Name	Default Value	Units
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	
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	

No.	Parameter Name	Default Value	Units
426	DemandPeriod	15	Min
427	NumberOfPeriods	1	
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 419 - Clear Command (Parameter 165)

Default Value	0 = Ready
Range	0 = Ready
	1 = Clear Operating Statistics
	2 = Clear History Logs
	3 = Clear %TCU
	4 = Clear kWh
	5 = Clear kVARh
	6 = Clear kVAh
	7 = Clear Max kW Demand
	8 = Clear Max kVAR Demand
	9 = Clear Max kVA Demand
	10 = Clear All
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	

Clear Operating Statistics

When the Clear Operating Statistics command is issued, the E300 relay sets the following parameters to a value of zero (0):

- Operating Time (Parameter 28)
- Starts Counter (Parameter 29)

Clear History Logs

When the Clear History Logs command is issued, the E300 relay sets the following parameters to a value of zero (0):

- Trip History 0 (Parameter 127)
- Trip History 1 (Parameter 128)
- Trip History 2 (Parameter 129)
- Trip History 3 (Parameter 130)
- Trip History 4 (Parameter 131)
- Warning History 0 (Parameter 132)
- Warning History 1 (Parameter 133)
- Warning History 2 (Parameter 134)
- Warning History 3 (Parameter 135)
- Warning History 4 (Parameter 136)

Clear % TCU

When the Clear %TCU command is issued, the E300 relay sets % Thermal Capacity Utilized (Parameter 1) to a value of zero (0).

Clear kWh

When the Clear kWh command is issued, the E300 relay sets the following parameters to a value of zero (0):

- kWh x 10^9 (Parameter 80)
- kWh x 10^6 (Parameter 81)
- kWh x 10^3 (Parameter 82)
- kWh x 10^0 (Parameter 83)
- kWh x 10^{-3} (Parameter 84)

Clear kVARh

When the Clear kVARh command is issued, the E300 relay sets the following parameters to a value of zero (0):

- kVARh Consumed x 10^9 (Parameter 85)
- kVARh Consumed x 10^6 (Parameter 86)
- kVARh Consumed x 10^3 (Parameter 87)
- kVARh Consumed x 10^0 (Parameter 88)
- kVARh Consumed x 10^{-3} (Parameter 89)
- kVARh Generated x 10^9 (Parameter 90)
- kVARh Generated x 10^6 (Parameter 91)
- kVARh Generated x 10^3 (Parameter 92)
- kVARh Generated x 10^0 (Parameter 93)
- kVARh Generated x 10^{-3} (Parameter 94)
- kVARh Net x 10^9 (Parameter 95)
- kVARh Net x 10^6 (Parameter 96)
- kVARh Net x 10^3 (Parameter 97)
- kVARh Net x 10^0 (Parameter 98)
- kVARh Net x 10^{-3} (Parameter 99)

Clear kVAh

When the Clear kVAh command is issued, the E300 relay sets the following parameters to a value of zero (0):

- kVAh x 10^9 (Parameter 100)
- kVAh x 10^6 (Parameter 101)
- kVAh x 10^3 (Parameter 102)
- kVAh x 10^0 (Parameter 103)
- kVAh x 10^{-3} (Parameter 104)

Clear Max. kW Demand

When the Clear %TCU command is issued, the E300 relay sets Max kW Demand (Parameter 106) to a value of zero (0).

Clear Max kVAR Demand

When the Clear %TCU command is issued, the E300 relay sets Max kVAR Demand (Parameter 108) to a value of zero (0).

Clear Max kVA Demand

When the Clear %TCU command is issued, the E300 relay sets Max kVA Demand (Parameter 110) to a value of zero (0).

Clear All

When the Clear All command is issued, the E300 relay sets the following parameters to a value of zero (0):

- % Thermal Capacity Utilized (Parameter 1)
- Operating Time (Parameter 28)
- Starts Counter (Parameter 29)
- kWh x 10^9 (Parameter 80)
- kWh x 10^6 (Parameter 81)
- kWh x 10^3 (Parameter 82)
- kWh x 10^0 (Parameter 83)
- kWh x 10^{-3} (Parameter 84)
- kVARh Consumed x 10^9 (Parameter 85)
- kVARh Consumed x 10^6 (Parameter 86)

- kVARh Consumed x 10^3 (Parameter 87)
- kVARh Consumed x 10^0 (Parameter 88)
- kVARh Consumed x 10^{-3} (Parameter 89)
- kVARh Generated x 10^9 (Parameter 90)
- kVARh Generated x 10^6 (Parameter 91)
- kVARh Generated x 10^3 (Parameter 92)
- kVARh Generated x 10^0 (Parameter 93)
- kVARh Generated x 10^{-3} (Parameter 94)
- kVARh Net x 10^9 (Parameter 95)
- kVARh Net x 10^6 (Parameter 96)
- kVARh Net x 10^3 (Parameter 97)
- kVARh Net x 10^0 (Parameter 98)
- kVARh Net x 10^{-3} (Parameter 99)
- kVAh x 10^9 (Parameter 100)
- kVAh x 10^6 (Parameter 101)
- kVAh x 10^3 (Parameter 102)
- kVAh x 10^0 (Parameter 103)
- kVAh x 10^{-3} (Parameter 104)
- Max kW Demand (Parameter 106)
- Max kVAR Demand (Parameter 108)
- Max kVA Demand (Parameter 110)
- Trip History 0 (Parameter 127)
- Trip History 1 (Parameter 128)
- Trip History 2 (Parameter 129)
- Trip History 3 (Parameter 130)
- Trip History 4 (Parameter 131)
- Warning History 0 (Parameter 132)
- Warning History 1 (Parameter 133)
- Warning History 2 (Parameter 134)
- Warning History 3 (Parameter 135)
- Warning History 4 (Parameter 136)

Notes:

Metering and Diagnostics

Introduction

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

Percent Thermal Capacity Utilized

Percent Thermal Capacity Utilized (Parameter 1) reports the calculated percent thermal capacity utilization of the motor being monitored. When the percent thermal capacity utilization equals 100%, the E300 relay issues an overload trip.

Table 420 - Percent Thermal Capacity Utilization (Parameter 1)

Default Value	0
Minimum Value	0
Maximum Value	100
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	%

Time to Trip

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.

Table 421 - Overload Time to Trip (Parameter 2)

Default Value	9999
Minimum Value	0
Maximum Value	9999
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	Seconds

Time To Reset

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.

Table 422 - Overload Time to Reset (Parameter 3)

Default Value	0
Minimum Value	0
Maximum Value	9999
Parameter Type	UINT

Current Trip Status

Current Trip Status (Parameter 4) reports the status of the current-based protective trip functions.

Table 423 - Current Trip Status (Parameter 4)

Bit																
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**
															X	Overload Trip
														X		Phase Loss Trip
													X			Ground Fault Current Trip
												X				Stall Trip
											X					Jam Trip
										X						Underload Trip
									X							Current Imbalance Trip
								X								L1 Under Current Trip
							X									L2 Under Current Trip
						X										L3 Under Current Trip
					X											L1 Over Current Trip
				X												L2 Over Current Trip
			X													L3 Over Current Trip
		X														L1 Line Loss Trip
	X															L2 Line Loss Trip
X																L3 Line Loss Trip

Voltage Trip Status

Voltage Trip Status (Parameter 5) reports the status of the voltage-based protective trip functions.

Table 424 - Voltage Trip Status (Parameter 5)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Under Voltage Trip
														X		Over Voltage Trip
													X			Voltage Imbalance Trip
												X				Phase Rotation Mismatch Trip
											X					Under Frequency Trip
										X						Over Frequency Trip
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved

Power Trip Status

Power Trip Status (Parameter 6) reports the status of the voltage-based protective trip functions.

Table 425 - Power Trip Status (Parameter 6)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Under kW Trip
														X		Over kW Trip
													X			Under kVAR Consumed Trip
												X				Over kVAR Consumed Trip
											X					Under kVAR Generated Trip
										X						Over kVAR Generated Trip
									X							Under kVA Trip
								X								Over kVA Trip
							X									Under PF Lagging Trip
						X										Over PF Lagging Trip
					X											Under PF Leading Trip
				X												Over PF Leading Trip
																Reserved
																Reserved
																Reserved
																Reserved

Control Trip Status

Control Trip Status (Parameter 7) reports the status of the control-based protective trip functions.

Table 426 - Control Trip Status (Parameter 7)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Test Trip
														X		PTC Trip
													X			DeviceLogix Trip
												X				Operator Station Trip
											X					Remote Trip
										X						Blocked Start Trip
									X							Hardware Fault Trip
								X								Configuration Trip
							X									Option Match Trip
						X										Feedback Timeout Trip
					X											Expansion Bus Trip
																Reserved
																Reserved
		X														Nonvolatile Memory Trip
	X															Test Mode Trip Enable
																Reserved

Current Warning Status

Current Warning Status (Parameter 10) reports the status of the current-based protective warning functions.

Table 427 - Current Warning Status (Parameter 10)

Bit																
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**
															X	Overload Warning
																Reserved
													X			Ground Fault Warning
																Reserved
											X					Jam Warning
										X						Underload Warning
									X							Current Imbalance Warning
								X								L1 Under Current Warning
							X									L2 Under Current Warning
						X										L3 Under Current Warning
					X											L1 Over Current Warning
				X												L2 Over Current Warning
			X													L3 Over Current Warning
		X														L1 Line Loss Warning
	X															L2 Line Loss Warning
X																L3 Line Loss Warning

Voltage Warning Status

Voltage Warning Status (Parameter 11) reports the status of the control-based protective warning functions.

Table 428 - Voltage Warning Status (Parameter 11)

Bit																
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**
															X	Under Voltage Warning
														X		Over Voltage Warning
													X			Voltage Imbalance Warning
												X				Phase Rotation Mismatch Warning
											X					Under Frequency Warning
										X						Over Frequency Warning
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved

Power Warning Status

Power Warning Status (Parameter 12) reports the status of the control-based protective warning functions.

Table 429 - Power Warning Status (Parameter 12)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Under kW Warning
														X		Over kW Warning
													X			Under kVAR Consumed Warning
												X				Over kVAR Consumed Warning
											X					Under kVAR Generated Warning
										X						Over kVAR Generated Warning
									X							Under kVA Warning
								X								Over kVA Warning
							X									Under PF Lagging Warning
						X										Over PF Lagging Warning
					X											Under PF Leading Warning
				X												Over PF Leading Warning
																Reserved
																Reserved
																Reserved
																Reserved

Control Warning Status

Control Warning Status (Parameter 13) reports the status of the control-based protective warning functions.

Table 430 - Control Warning Status (Parameter 13)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
																Reserved
														X		PTC Warning
													X			DeviceLogix Warning
												X				Operator Station Warning
																Reserved
																Reserved
																Reserved
																Reserved
							X									Option Match Warning
						X										Feedback Timeout Warning
					X											Expansion Bus Warning
				X												Number Of Starts Warning
			X													Operating Hours Warning
																Reserved
																Reserved
																Reserved

Input Status 0

Input Status 0 (Parameter 16) reports the state of the digital inputs on the E300 relay Control Module.

Table 431 - Input Status 0 (Parameter 16)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Input Pt00
														X		Input Pt01
													X			Input Pt02
												X				Input Pt03
											X					Input Pt04
										X						Input Pt05
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved

Input Status 1

Input Status 1 (Parameter 17) reports the state of the digital inputs on the E300 relay Digital Expansion Modules.

Table 432 - Input Status 1 (Parameter 17)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Digital Module 1 Input Pt00
														X		Digital Module 1 Input Pt01
													X			Digital Module 1 Input Pt02
												X				Digital Module 1 Input Pt03
											X					Digital Module 2 Input Pt00
										X						Digital Module 2 Input Pt01
									X							Digital Module 2 Input Pt02
								X								Digital Module 2 Input Pt03
							X									Digital Module 3 Input Pt00
						X										Digital Module 3 Input Pt01
					X											Digital Module 3 Input Pt02
				X												Digital Module 3 Input Pt03
			X													Digital Module 4 Input Pt00
		X														Digital Module 4 Input Pt01
	X															Digital Module 4 Input Pt02
X																Digital Module 4 Input Pt03

Output Status

Output Status (Parameter 18) reports the state of the relay outputs on the E300 relay Control Module and Digital Expansion Modules.

Table 433 - Output Status (Parameter 18)

Bit																
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**
															X	Output Pt00
														X		Output Pt01
													X			Output Pt02
												X				Digital Module 1 Output Pt00
											X					Digital Module 1 Output Pt01
										X						Digital Module 2 Output Pt00
									X							Digital Module 2 Output Pt01
								X								Digital Module 3 Output Pt00
							X									Digital Module 3 Output Pt01
						X										Digital Module 4 Output Pt00
					X											Digital Module 4 Output Pt01
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved

Operator Station Status

Operator Station Status (Parameter 19) reports the state of the E300 relay Operator Station input buttons and output LEDs.

Table 434 - Operator Station Status (Parameter 19)

Bit																
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**
															X	Operation Station I
														X		Operation Station II
													X			Operation Station Local Remote
												X				Operation Station 0
											X					Operation Station Reset
																Reserved
																Reserved
																Reserved
							X									Operation Station I LED
						X										Operation Station II LED
					X											Operation Station Local LED
				X												Operation Station Remote LED
			X													Operation Station 0 LED
																Reserved
																Reserved
																Reserved

Device Status 0

Device Status 0 (Parameter 20) reports the general status of the E300 relay and the sensing capabilities that are present.

Table 435 - Device Status 0 (Parameter 20)

Bit																
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**
															X	Trip Present
														X		Warning Present
													X			Invalid Configuration
												X				Current Present
											X					Ground Fault Current Present
										X						Voltage Present
									X							Emergency Start Enabled
								X								DeviceLogix Enabled
							X									Feedback Timeout Enabled
						X										Operator Station Present
					X											Voltage Sensing Present
				X												Internal Ground Fault Sensing Present
			X													External Ground Fault Sensing Present
		X														PTC Sensing Present
	X															Ready
																Reserved

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

Device Status 1 (Parameter 21) reports the specific features of the E300 relay Control and Sensing Modules, it reports which Expansion Digital Modules Analog Modules are present on the E300 relay Expansion Bus.

Table 436 - Device Status 1 (Parameter 21)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	24V DC Control Module Present
														X		120V AC Control Module Present
													X			240V AC Control Module Present
												X				0.5…30 A Sensing Module Present
											X					6…60 A Sensing Module Present
										X						10…100 A Sensing Module Present
									X							20…2000 A Sensing Module Present
								X								Digital Module 1 Present
							X									Digital Module 2 Present
						X										Digital Module 3 Present
					X											Digital Module 4 Present
				X												Analog Module 1 Present
			X													Analog Module 2 Present
		X														Analog Module 3 Present
	X															Analog Module 4 Present
																Reserved

Firmware Revision Number

Firmware Revision Number (Parameter 22) reports the firmware revision number of the E300 relay system.

Table 437 - Firmware Revision Number (Parameter 22)

Default Value	0.000
Minimum Value	0.000
Maximum Value	65.535
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1000
Units	

Control Module ID

Control Module ID (Parameter 23) identifies which specific Control Module is present in the E300 relay system.

Table 438 - Control Module ID (Parameter 23)

Default Value	0
Range	0 = Unknown 1 = 193-EIO-63-24D 2 = 193-EIO-43-120 3 = 193-EIO-43-240 4 = 193-EIOGP-42-24D 5 = 193-EIOGP-22-120 6 = 193-EIOGP-22-240
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	

Sensing Module ID

Sensing Module ID (Parameter 24) identifies which specific Sensing Module is present in the E300 relay system.

Table 439 - Sensing Module ID (Parameter 24)

Default Value	0
Range	0 = Unknown 1 = 193/592-EIO-VIG-30A-___ 2 = 193/592-EIO-VIG-60A-___ 3 = 193/592-EIO-VIG-100A-___ 4 = 193/592-EIO-VIG-200A-___ 5 = 193/592-EIO-IG-30A-___ 6 = 193/592-EIO-IG-60A-___ 7 = 193/592-EIO-IG-100A-___ 8 = 193/592-EIO-IG-200A-___ 9 = 193/592-EIO-I-30A-___ 10 = 193/592-EIO-I-60A-___ 11 = 193/592-EIO-I-100A-___ 12 = 193/592-EIO-I-200A-___
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	

Operator Station ID

Operator Station ID (Parameter 25) identifies which specific Operator Station is present on the Expansion Bus of the E300 relay system.

Table 440 - Operator Station ID (Parameter 25)

Default Value	0
Range	0 = Unknown 1 = None 2 = 193-EOS-SCS 3 = 193-EOS-SDS
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	

Expansion Digital Module ID

Expansion Digital Module ID (Parameter 26) identifies which specific Expansion Digital Modules are present on the Expansion Bus of the E300 relay system.

Table 441 - Expansion Digital Module ID (Parameter 26

Bit																	
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**	
												0	0	0	0	Unknown	
												0	0	0	1	None	
												0	0	1	0	193-EXP-DIO-42-24D	Digital Module 1
												0	0	1	1	193-EXP-DIO-42-120	
												0	1	0	0	193-EXP-DIO-42-240	
								0	0	0	0					Unknown	
								0	0	0	1					None	
								0	0	1	0					193-EXP-DIO-42-24D	Digital Module 2
								0	0	1	1					193-EXP-DIO-42-120	
								0	1	0	0					193-EXP-DIO-42-240	
				0	0	0	0									Unknown	
				0	0	0	1									None	
				0	0	1	0									193-EXP-DIO-42-24D	Digital Module 3
				0	0	1	1									193-EXP-DIO-42-120	
				0	1	0	0									193-EXP-DIO-42-240	
0	0	0	0													Unknown	
0	0	0	1													None	
0	0	1	0													193-EXP-DIO-42-24D	Digital Module 4
0	0	1	1													193-EXP-DIO-42-120	
0	1	0	0													193-EXP-DIO-42-240	

Expansion Analog Module ID

Expansion Analog Module ID (Parameter 27) identifies which specific Expansion Analog Modules are present on the Expansion Bus of the E300 relay system.

Table 442 - Expansion Analog Module ID (Parameter 27)

Bit																	
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Function**	
														0	0	Unknown	Analog Module 1
														0	1	None	
														1	0	193-EXP-AIO-31	
												0	0			Unknown	Analog Module 2
												0	1			None	
												1	0			193-EXP-AIO-31	
										0	0					Unknown	Analog Module 3
										0	1					None	
										1	0					193-EXP-AIO-31	
								0	0							Unknown	Analog Module 4
								0	1							None	
								1	0							193-EXP-AIO-31	

Operating Time

Operating Time (Parameter 28) represents the 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.

Table 443 - Operating Time (Parameter 28)

Default Value	0
Minimum Value	0
Maximum Value	65535
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	Hours

Starts Counter

Starts Counter (Parameter 29) represents the 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.

Table 444 - Starts Counter (Parameter 29)

Default Value	0
Minimum Value	0
Maximum Value	65535
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

Starts Available

Starts Available (Parameter 30) reports the number of starts currently available based on the blocked start settings and the actual motor starting events.

Table 445 - Starts Available (Parameter 30)

Default Value	0
Minimum Value	0
Maximum Value	120
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	

Time to Start

Time to Start (Parameter 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.

Table 446 - Time to Start (Parameter 31)

Default Value	0
Minimum Value	0
Maximum Value	3600
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	Seconds

Year

Year (Parameter 32) reports the year in the virtual real-time clock of the E300 relay.

Table 447 - Year (Parameter 32)

Default Value	0
Minimum Value	0
Maximum Value	12
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

Month

Month (Parameter 33) reports the month in the virtual real-time clock of the E300 relay.

Table 448 - Month (Parameter 33)

Default Value	0
Minimum Value	0
Maximum Value	12
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

Day

Day (Parameter 34) reports the day in the virtual real-time clock of the E300 relay.

Table 449 - Day (Parameter 34)

Default Value	0
Minimum Value	0
Maximum Value	31
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

Hour

Hour (Parameter 35) reports the hour in the virtual real-time clock of the E300 relay.

Table 450 - Hour (Parameter 35)

Default Value	0
Minimum Value	0
Maximum Value	24
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

Minute

Minute (Parameter 36) reports the minute in the virtual real-time clock of the E300 relay.

Table 451 - Minute (Parameter 36)

Default Value	0
Minimum Value	0
Maximum Value	60
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

Second

Second (Parameter 37) reports the second in the virtual real-time clock of the E300 relay.

Table 452 - Second (Parameter 37)

Default Value	0
Minimum Value	0
Maximum Value	60
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

Invalid Configuration Parameter

Invalid Configuration Parameter (Parameter 38) reports the parameter number that is causing a configuration trip in the E300 relay. See Chapter 4 for more information about a configuration fault.

Table 453 - Invalid Configuration Parameter (Parameter 38)

Default Value	0
Minimum Value	0
Maximum Value	9999
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

Invalid Configuration Cause

Invalid Configuration Cause (Parameter 39) reports the reason for the configuration trip in the E300 relay. See Chapter 4 for more information about a configuration fault.

Table 454 - Invalid Configuration Cause (Parameter 39)

Default Value	0
Range	0 = No Error 1 = Value Over Maximum 2 = Value Under Minimum 3 = Illegal Value 4 = L3 Current Detected 5 = CopyCat Error
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	

Mismatch Status

Mismatch Status (Parameter 40) reports the module that is causing a mismatch trip or warning in the E300 relay. See Chapter 4 for more information on a mismatch fault.

Table 455 - Mismatch Status (Parameter 40)

Bit																	
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function	
															0	Match	Control Module
															1	Mismatch	
														0		Match	Sensing Module
														1		Mismatch	
													0			Match	Communication Module
													1			Mismatch	
												0				Match	Operator Station
												1				Mismatch	
											0					Match	Digital Module 1
											1					Mismatch	
										0						Match	Digital Module 2
										1						Mismatch	
									0							Match	Digital Module 3
									1							Mismatch	
								0								Match	Digital Module 4
								1								Mismatch	
							0									Match	Analog Module 1
							1									Mismatch	
						0										Match	Analog Module 2
						1										Mismatch	
					0											Match	Analog Module 3
					1											Mismatch	
				0												Match	Analog Module 4
				1												Mismatch	

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.

L1 Current

L1 Current (Parameter 43) reports the current in Amperes flowing through the L1 and T1 power terminals of the E300 relay Sensing Module.

Table 456 - L1 Current (Parameter 43)

Default Value	0.00
Minimum Value	0.00
Maximum Value	20000000.00
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	100
Units	Amps

L2 Current

L2 Current (Parameter 44) reports the current in Amperes flowing through the L2 and T2 power terminals of the E300 relay Sensing Module.

Table 457 - L2 Current (Parameter 44)

Default Value	0.00
Minimum Value	0.00
Maximum Value	20000000.00
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	100
Units	Amps

L3 Current

L3 Current (Parameter 45) reports the current in Amperes flowing through the L3 and T3 power terminals of the E300 relay Sensing Module.

Table 458 - L3 Current (Parameter 45)

Default Value	0.00
Minimum Value	0.00
Maximum Value	20000000.00
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	100
Units	Amps

Average Current

Average Current (Parameter 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

Table 459 - Average Current (Parameter 46)

Default Value	0.00
Minimum Value	0.00
Maximum Value	20000000.00
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	100
Units	Amps

L1 Percent FLA

L1 Percent FLA (Parameter 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 Amps

Table 460 - L1 Percent FLA (Parameter 47)

Default Value	0.0
Minimum Value	0.0
Maximum Value	1000.00
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	10
Units	%

L2 Percent FLA

L2 Percent FLA (Parameter 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

Table 461 - L2 Percent FLA (Parameter 48)

Default Value	0.0
Minimum Value	0.0
Maximum Value	1000.00
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	10
Units	%

L3 Percent FLA

L3 Percent FLA (Parameter 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

Table 462 - L3 Percent FLA (Parameter 49)

Default Value	0.0
Minimum Value	0.0
Maximum Value	1000.00
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	10
Units	%

Average Percent FLA

Average Percent FLA (Parameter 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

Table 463 - Average Percent FLA (Parameter 50)

Default Value	0.0
Minimum Value	0.0
Maximum Value	1000.00
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	10
Units	%

Ground Fault Current

Ground Fault Current (Parameter 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.

Table 464 - Ground Fault Current (Parameter 51)

Default Value	0.0
Minimum Value	0.0
Maximum Value	99.99
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	100
Units	Amps

Current Imbalance

Current Imbalance (Parameter 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

Table 465 - Current Imbalance (Parameter 52)

Default Value	0
Minimum Value	0
Maximum Value	200
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	%

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.

L1-L2 Voltage

L1-L2 Voltage (Parameter 53) reports the voltage in volts in reference to the T1 and T2 power terminals of the E300 relay Sensing Module.

Table 466 - L1-L2 Voltage (Parameter 53)

Default Value	0.0
Minimum Value	0.0
Maximum Value	6553.5
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	10
Units	Volts

L2-L3 Voltage

L2-L3 Voltage (Parameter 54) reports the voltage in volts in reference to the T2 and T3 power terminals of the E300 relay Sensing Module.

Table 467 - L2-L3 Voltage (Parameter 54)

Default Value	0.0
Minimum Value	0.0
Maximum Value	6553.5
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	10
Units	Volts

L3-L1 Voltage

L3-L1 Voltage (Parameter 55) reports the voltage in volts in reference to the T3 and T1 power terminals of the E300 relay Sensing Module.

Table 468 - L3-L1 Voltage (Parameter 55)

Default Value	0.0
Minimum Value	0.0
Maximum Value	6553.5
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	10
Units	Volts

Average L-L Voltage

Average L-L Voltage (Parameter 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

Table 469 - Average L-L Voltage (Parameter 56)

Default Value	0.0
Minimum Value	0.0
Maximum Value	6553.5
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	10
Units	Volts

L1-N Voltage

L1-N Voltage (Parameter 57) reports the voltage in volts in reference to the T1 power terminal of the E300 relay Sensing Module.

Table 470 - L1-N Voltage (Parameter 57)

Default Value	0.0
Minimum Value	0.0
Maximum Value	6553.5
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	10
Units	Volts

L2-N Voltage

L2-N Voltage (Parameter 58) reports the voltage in volts in reference to the T2 power terminal of the E300 relay Sensing Module.

Table 471 - L2-N Voltage (Parameter 58)

Default Value	0.0
Minimum Value	0.0
Maximum Value	6553.5
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	10
Units	Volts

L3-N Voltage

L3-N Voltage (Parameter 59) reports the voltage in volts in reference to the T3 power terminal of the E300 relay Sensing Module.

Table 472 - L3-N Voltage (Parameter 59)

Default Value	0.0
Minimum Value	0.0
Maximum Value	6553.5
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	10
Units	Volts

Average L-N Voltage

Average L-N Voltage (Parameter 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

Table 473 - Average L-N Voltage (Parameter 60)

Default Value	0.0
Minimum Value	0.0
Maximum Value	6553.5
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	10
Units	Volts

Voltage Imbalance

Voltage Imbalance (Parameter 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% * (Vd/Va)*

where

Vd = Maximum L-L Voltage Deviation from the Average L-L Voltage

Va = Average L-L Voltage

Table 474 - Voltage Imbalance (Parameter 61)

Default Value	0
Minimum Value	0
Maximum Value	200
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	%

Frequency

Frequency (Parameter 62) reports the voltage frequency in Hertz of the monitored power system from the E300 relay Sensing Module.

Table 475 - Frequency (Parameter 62)

Default Value	0.0
Minimum Value	0.0
Maximum Value	74.0
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	10
Units	Hz

Phase Rotation

Phase Rotation (Parameter 63) reports the voltage phase rotation as ABC or ACB of the monitored power system from the E300 relay Sensing Module.

Table 476 - Phase Rotation Trip Type (Parameter 63)

Default Value	0 = No Rotation
Range	0 = No Rotation 1 = ABC 2 = ACB
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	

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.

Power Scale

For large medium voltage-based power systems, it may be more convenient for you to view the real-time power information (Parameters 64-75) in terms of Megawatts instead of Kilowatts. Power Scale (Parameter 377) allows the E300 relay to display the values of Parameters 64…75 as Kilowatts or Megawatts.

Table 477 - Power Scale (Parameter 377)

Default Value	0 = Kilowatts
Range	0 = Kilowatts 1 = Megawatts
Parameter Type	USINT
Size (Bytes)	1
Scaling Factor	1
Units	

L1 Real Power

L1 Real Power (Parameter 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.

Table 478 - L1 Real Power (Parameter 64)

Default Value	0.000
Minimum Value	-2000000.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kW or MW

L2 Real Power

L2 Real Power (Parameter 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.

Table 479 - L2 Real Power (Parameter 65)

Default Value	0.000
Minimum Value	-2000000.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kW or MW

L3 Real Power

L3 Real Power (Parameter 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.

Table 480 - L3 Real Power (Parameter 66)

Default Value	0.000
Minimum Value	-2000000.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kW or MW

Total Real Power

Total Real Power (Parameter 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)

Table 481 - Total Real Power (Parameter 67)

Default Value	0.000
Minimum Value	-2000000.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kW or MW

L1 Reactive Power

L1 Reactive Power (Parameter 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.

Table 482 - L1 Reactive Power (Parameter 68)

Default Value	0.000
Minimum Value	-2000000.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kVAR or MVAR

L2 Reactive Power

L2 Reactive Power (Parameter 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.

Table 483 - L2 Reactive Power (Parameter 69)

Default Value	0.000
Minimum Value	-2000000.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kVAR or MVAR

L3 Reactive Power

L3 Reactive Power (Parameter 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.

Table 484 - L3 Reactive Power (Parameter 70)

Default Value	0.000
Minimum Value	-2000000.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kVAR or MVAR

Total Reactive Power

Total Reactive Power (Parameter 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)

Table 485 - Total Reactive Power (Parameter 71)

Default Value	0.000c
Minimum Value	-2000000.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kVAR or MVAR

L1 Apparent Power

L1 Apparent Power (Parameter 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.

Table 486 - L1 Apparent Power (Parameter 72)

Default Value	0.000
Minimum Value	0.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kVA or MVA

L2 Apparent Power

L2 Apparent Power (Parameter 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.

Table 487 - L2 Apparent Power (Parameter 73)

Default Value	0.000
Minimum Value	0.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kVA or MVA

L3 Apparent Power

L3 Apparent Power (Parameter 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.

Table 488 - L3 Apparent Power (Parameter 74)

Default Value	0.000
Minimum Value	0.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kVA or MVA

Total Apparent Power

Total Apparent Power (Parameter 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)

Table 489 - Total Apparent Power (Parameter 75)

Default Value	0.000
Minimum Value	0.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kVA or MVA

L1 Power Factor

L1 Power Factor (Parameter 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.

Table 490 - L1 Power Factor (Parameter 76)

Default Value	0.0
Minimum Value	-100.0
Maximum Value	100.0
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	10
Units	%

L2 Power Factor Power

L2 Power Factor (Parameter 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.

Table 491 - L2 Power Factor (Parameter 77)

Default Value	0.0
Minimum Value	-100.0
Maximum Value	100.0
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	10
Units	%

L3 Power Factor

L3 Power Factor (Parameter 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.

Table 492 - L3 Power Factor (Parameter 78)

Default Value	0.0
Minimum Value	-100.0
Maximum Value	100.0
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	10
Units	%

Total Power Factor

Total Power Factor (Parameter 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

Table 493 - Total Power Factor (Parameter 79)

Default Value	0.0
Minimum Value	-100.0
Maximum Value	100.0
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	10
Units	%

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.

kWh 10^9

kWh 10^9 (Parameter 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

Table 494 - kWh x 10E9 (Parameter 80)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kWh 10^6

kWh 10^6 (Parameter 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

Table 495 - kWh x 10E6 (Parameter 81)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kWh 10^3

kWh 10^3 (Parameter 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

Table 496 - kWh x 10E3 (Parameter 82)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kWh 10^0

kWh 10^0 (Parameter 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

Table 497 - kWh x 10^0 (Parameter 83)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kWh 10^{-3}

kWh 10^{-3} (Parameter 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

Table 498 - kWh x 10^{-3} (Parameter 84)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kVARh Consumed 10^{9}

kVARh Consumed 10^9 (Parameter 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

Table 499 - kVARh Consumed x 10^9 (Parameter 85)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kVARh Consumed 10^{6}

kVARh Consumed 10^6 (Parameter 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

Table 500 - kVARh Consumed x 10^6 (Parameter 86)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kVARh Consumed 10^3

kVARh Consumed 10^3 (Parameter 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

Table 501 - kVARh Consumed x 10^3 (Parameter 87)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kVARh Consumed 10^0

kVARh Consumed 10^0 (Parameter 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

Table 502 - kVARh Consumed x 10^0 (Parameter 88)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kVARh Consumed 10^{-3}

kVARh Consumed 10^{-3} (Parameter 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

Table 503 - kVARh Consumed x 10^{-3} (Parameter 89)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kVARh Generated 10^{9}

kVARh Generated 10^{9} (Parameter 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

Table 504 - kVARh Generated x 10^{9} (Parameter 90)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kVARh Generated 10^{6}

kVARh Consumed 10^{6} (Parameter 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

Table 505 - kVARh Generated x 10^6 (Parameter 91)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kVARh Generated 10^3

kVARh Generated 10^3 (Parameter 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

Table 506 - kVARh Generated x 10^3 (Parameter 92)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kVARh Generated 10^0

kVARh Generated 10^0 (Parameter 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

Table 507 - kVARh Generated x 10^0 (Parameter 93)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kVARh Generated 10^{-3}

kVARh Generated 10^{-3} (Parameter 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

Table 508 - kVARh Generated x 10^{-3} (Parameter 94)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kVARh Net 10^{9}

kVARh Net 10^{9} (Parameter 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

Table 509 - kVARh Net x 10^{9} (Parameter 95)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kVARh Net 10^{6}

kVARh Net 10^{6} (Parameter 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

Table 510 - kVARh Net x 10^6 (Parameter 96)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kVARh Net 10^3

kVARh Net 10^3 (Parameter 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

Table 511 - kVARh Net x 10^3 (Parameter 97)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kVARh Net 10^0

kVARh Net 10^0 (Parameter 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

Table 512 - kVARh Net x 10^0 (Parameter 98)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kVARh Net 10^{-3}

kVARh Net 10^{-3} (Parameter 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

Table 513 - kVARh Net x 10^{-3} (Parameter 99)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kVAh 10^9

kVAh 10^9 (Parameter 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

Table 514 - kVAh x 10^9 (Parameter 100)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kVAh 10^6

kVAh 10^6 (Parameter 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

Table 515 - kVAh x 10^6 (Parameter 101)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kVAh 10^3

kVAh 10^3 (Parameter 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

Table 516 - kVAh x 10^3 (Parameter 102)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kVAh 10^0

kVAh 10^0 (Parameter 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

Table 517 - kVAh x 10^0 (Parameter 103)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kVAh 10^{-3}

kVAh 10^{-3} (Parameter 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

Table 518 - kVAh x 10^{-3} (Parameter 104)

Default Value	0
Minimum Value	-999
Maximum Value	999
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

kW Demand

kW Demand (Parameter 105) reports the average real energy usage in kW over a defined period.

Table 519 - kW Demand (Parameter 105)

Default Value	0.000
Minimum Value	-2000000.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kW

Max. kW Demand

Max kW Demand (Parameter 106) reports the maximum kW Demand since the last Max kW Demand Reset command.

Table 520 - Max kW Demand (Parameter 106)

Default Value	0.000
Minimum Value	-2000000.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kW

kVAR Demand

kVAR Demand (Parameter 107) reports the average reactive energy usage in kVAR over a defined period.

Table 521 - kVAR Demand (Parameter 107)

Default Value	0.000
Minimum Value	-2000000.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kVAR

Max kVAR Demand

Max kVAR Demand (Parameter 108) reports the maximum kVAR Demand since the last Max kVAR Demand Reset command.

Table 522 - Max kVAR Demand (Parameter 108)

Default Value	0.000
Minimum Value	-2000000.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kVAR

kVA Demand

kVA Demand (Parameter 109) reports the average reactive energy usage in kVA over a defined period.

Table 523 - kVA Demand (Parameter 109)

Default Value	0.000
Minimum Value	0.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kVA

Max kVA Demand

Max kVA Demand (Parameter 110) reports the maximum kVA Demand since the last Max kVA Demand Reset command.

Table 524 - Max kVA Demand (Parameter 110)

Default Value	0.000
Minimum Value	0.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kVA

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

Analog Module 1

Analog Module 1 – Input Channel 00

Analog Module 1 – Input Channel 00 (Parameter 111) reports the monitored value of Analog Module 1 – Input Channel 00.

Table 525 - Analog Module 1 – Input Channel 00 (Parameter 111)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 1 – Input Channel 01

Analog Module 1 – Input Channel 01 (Parameter 112) reports the monitored value of Analog Module 1 – Input Channel 01.

Table 526 - Analog Module 1 – Input Channel 01 (Parameter 112)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 1 – Input Channel 02

Analog Module 1 – Input Channel 02 (Parameter 113) reports the monitored value of Analog Module 1 – Input Channel 02.

Table 527 - Analog Module 1 – Input Channel 02 (Parameter 113)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 1 Status

Analog Module 1 Status (Parameter 123) reports the status of Analog Module 1.

Table 528 - Analog Module 1 Status (Parameter 123)

Bit																Function
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
															X	Input Channel 00 Open Circuit
														X		Input Channel 00 Over Range
													X			Input Channel 00 Under Range
												X				Input Channel 01 Open Circuit
											X					Input Channel 01 Over Range
										X						Input Channel 01 Under Range
									X							Input Channel 02 Open Circuit
								X								Input Channel 02 Over Range
							X									Input Channel 02 Under Range
						X										Output Channel 00 Open Circuit
					X											Output Channel 00 Hold Last State Mode Active
				X												Output Channel 00 Over Range
			X													Output Channel 00 Under Range
		X														Analog Module Configured
	X															Analog Module Warning (Module Number Dial Changed)
X																Analog Module Faulted

Analog Module 2

Analog Module 2 – Input Channel 00

Analog Module 2 – Input Channel 00 (Parameter 114) reports the monitored value of Analog Module 2 – Input Channel 00.

Table 529 - Analog Module 2 – Input Channel 00 (Parameter 114)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 2 – Input Channel 01

Analog Module 2 – Input Channel 01 (Parameter 115) reports the monitored value of Analog Module 2 – Input Channel 01.

Table 530 - Analog Module 2 – Input Channel 01 (Parameter 115)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 2 – Input Channel 02)

Analog Module 2 – Input Channel 02 (Parameter 113) reports the monitored value of Analog Module 2 – Input Channel 02.

Table 531 - Analog Module 2 – Input Channel 02 (Parameter 116)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 2 Status

Analog Module 2 Status (Parameter 124) reports the status of Analog Module 2.

Table 532 - Analog Module 2 Status (Parameter 124)

Bit																Function
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	
															X	Input Channel 00 Open Circuit
														X		Input Channel 00 Over Range
													X			Input Channel 00 Under Range
												X				Input Channel 01 Open Circuit
											X					Input Channel 01 Over Range
										X						Input Channel 01 Under Range
									X							Input Channel 02 Open Circuit
								X								Input Channel 02 Over Range
							X									Input Channel 02 Under Range
						X										Output Channel 00 Open Circuit
					X											Output Channel 00 Hold Last State Mode Active
				X												Output Channel 00 Over Range
			X													Output Channel 00 Under Range
		X														Analog Module Configured
	X															Analog Module Warning (Module Number Dial Changed)
X																Analog Module Faulted

Analog Module 3

Analog Module 3 – Input Channel 00

Analog Module 3 – Input Channel 00 (Parameter 117) reports the monitored value of Analog Module 3 – Input Channel 00.

Table 533 - Analog Module 3 – Input Channel 00 (Parameter 117)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 3 – Input Channel 01

Analog Module 3 – Input Channel 01 (Parameter 118) reports the monitored value of Analog Module 3 – Input Channel 01.

Table 534 - Analog Module 3 – Input Channel 01 (Parameter 118)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 3 – Input Channel 02

Analog Module 3 – Input Channel 02 (Parameter 119) reports the monitored value of Analog Module 3 – Input Channel 02.

Table 535 - Analog Module 3 – Input Channel 02 (Parameter 119)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 3 Status

Analog Module 3 Status (Parameter 125) reports the status of Analog Module 3.

Table 536 - Analog Module 3 Status (Parameter 125)

Bit																Function
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
															X	Input Channel 00 Open Circuit
														X		Input Channel 00 Over Range
													X			Input Channel 00 Under Range
												X				Input Channel 01 Open Circuit
											X					Input Channel 01 Over Range
										X						Input Channel 01 Under Range
									X							Input Channel 02 Open Circuit
								X								Input Channel 02 Over Range
							X									Input Channel 02 Under Range
						X										Output Channel 00 Open Circuit
					X											Output Channel 00 Hold Last State Mode Active
				X												Output Channel 00 Over Range
			X													Output Channel 00 Under Range
		X														Analog Module Configured
	X															Analog Module Warning (Module Number Dial Changed)
X																Analog Module Faulted

Analog Module 4

Analog Module 4 – Input Channel 00

Analog Module 4 – Input Channel 00 (Parameter 120) reports the monitored value of Analog Module 4 – Input Channel 00.

Table 537 - Analog Module 4 – Input Channel 00 (Parameter 120)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 4 – Input Channel 01

Analog Module 4 – Input Channel 01 (Parameter 121) reports the monitored value of Analog Module 4 – Input Channel 01.

Table 538 - Analog Module 4 – Input Channel 01 (Parameter 121)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 4 – Input Channel 02

Analog Module 4 – Input Channel 02 (Parameter 122) reports the monitored value of Analog Module 4 – Input Channel 02.

Table 539 - Analog Module 4 – Input Channel 02 (Parameter 122)

Default Value	0
Minimum Value	-32768
Maximum Value	32767
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	1
Units	

Analog Module 4 Status

Analog Module 4 Status (Parameter 126) reports the status of Analog Module 4.

Table 540 - Analog Module 4 Status (Parameter 126)

Bit																Function
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
															X	Input Channel 00 Open Circuit
														X		Input Channel 00 Over Range
													X			Input Channel 00 Under Range
												X				Input Channel 01 Open Circuit
											X					Input Channel 01 Over Range
										X						Input Channel 01 Under Range
									X							Input Channel 02 Open Circuit
								X								Input Channel 02 Over Range
							X									Input Channel 02 Under Range
						X										Output Channel 00 Open Circuit
					X											Output Channel 00 Hold Last State Mode Active
				X												Output Channel 00 Over Range
			X													Output Channel 00 Under Range
		X														Analog Module Configured
	X															Analog Module Warning (Module Number Dial Changed)
X																Analog Module Faulted

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

When the E300 relay issues a trip, the reason for the trip is recorded into the Trip History. Table 541 lists the codes that are available for the trip history records.

Table 541 - 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

Trip History Code	Description
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
54	Maximum starts per hour exceeded
55	Hardware configuration fault. Check for shorts on input terminal
56	Invalid parameter config. See parameters 38-39 for details
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

Trip History Code	Description
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 0

Trip History 0 (Parameter 127) reports the most recent trip event.

Trip History 0 (Parameter 127)	
Default Value	0
Minimum Value	0
Maximum Value	99
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

Trip History 1

Trip History 1 (Parameter 128) reports the second most recent trip event.

Trip History 1 (Parameter 128)	
Default Value	0
Minimum Value	0
Maximum Value	99
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1

Units	

Trip History 2

Trip History 2 (Parameter 129) reports the third most recent trip event.

Trip History 2 (Parameter 129)	
Default Value	0
Minimum Value	0
Maximum Value	99
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

Trip History 3

Trip History 3 (Parameter 130) reports the fourth most recent trip event.

Trip History 3 (Parameter 130)	
Default Value	0
Minimum Value	0
Maximum Value	99
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

Trip History 4

Trip History 4 (Parameter 131) reports the fifth most recent trip event.

Trip History 4 (Parameter 131)	
Default Value	0
Minimum Value	0
Maximum Value	99
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

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

Current Trip History Mask (Parameter 139) allows you to select which current-based trip events are recorded in the trip history.

Table 542 - Current Trip History Mask (Parameter 139)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Overload Trip
														X		Phase Loss Trip
													X			Ground Fault Trip
												X				Stall Trip
											X					Jam Trip
										X						Underload Trip
									X							Current Imbalance Trip
								X								L1 Under Current Trip
							X									L2 Under Current Trip
						X										L3 Under Current Trip
					X											L1 Over Current Trip
				X												L2 Over Current Trip
			X													L3 Over Current Trip
		X														L1 Line Loss Trip
	X															L2 Line Loss Trip
X																L3 Line Loss Trip

Voltage Trip History Mask

Voltage Trip History Mask (Parameter 140) allows you to select which voltage-based trip events are recorded in the trip history.

Table 543 - Voltage Trip History Mask (Parameter 140)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Under Voltage Trip
														X		Over Voltage Trip
													X			Voltage Imbalance Trip
												X				Phase Rotation Trip
											X					Under Frequency Trip
										X						Over Frequency Trip
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved

Power Trip History Mask

Power Trip History Mask (Parameter 141) allows you to select which power-based trip events are recorded in the trip history.

Table 544 - Power Trip History Mask (Parameter 141)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Under kW Trip
														X		Over kW Trip
													X			Under kVAR Consumed Trip
												X				Over kVAR Consumed Trip
											X					Under kVAR Generated Trip
										X						Over kVAR Generated Trip
									X							Under kVA Trip
								X								Over kVA Trip
							X									Under Power Factor Lagging Trip
						X										Over Power Factor Lagging Trip
					X											Under Power Factor Leading Trip
				X												Over Power Factor Leading Trip
																Reserved
																Reserved
																Reserved
																Reserved

Control Trip History Mask

Control Trip History Mask (Parameter 142) allows you to select which control-based trip events are recorded in the trip history.

Table 545 - Control Trip History Mask (Parameter 142)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Test Trip
														X		PTC Trip
													X			DeviceLogix Trip
												X				Operator Station Trip
											X					Remote Trip
										X						Blocked Start Trip
									X							Hardware Fault Trip
								X								Configuration Trip
							X									Option Match Trip
						X										Feedback Timeout Trip
					X											Expansion Bus Trip
																Reserved
																Reserved
		X														Nonvolatile Memory Trip
	X															Test Mode Trip
																Reserved

Analog Trip History Mask

Analog Trip History Mask (Parameter 143) allows you to select which analog-based trip events are recorded in the trip history.

Table 546 - Analog Trip History Mask (Parameter 143)

Bit																Function
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
															X	Analog Module 1 - Input Channel 00 Trip
														X		Analog Module 1 - Input Channel 01 Trip
													X			Analog Module 1 - Input Channel 02 Trip
												X				Analog Module 2 - Input Channel 00 Trip
											X					Analog Module 2 - Input Channel 01 Trip
										X						Analog Module 2 - Input Channel 02 Trip
									X							Analog Module 3 - Input Channel 00 Trip
								X								Analog Module 3 - Input Channel 01 Trip
							X									Analog Module 3 - Input Channel 02 Trip
						X										Analog Module 4 - Input Channel 00 Trip
					X											Analog Module 4 - Input Channel 01 Trip
				X												Analog Module 4 - Input Channel 02 Trip

Warning History

When the E300 relay issues a warning, the reason for the warning is recorded into the Warning History. Table 547 lists the codes that are available for the warning history records.

Table 547 - 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

Warning History Code	Description
37	Under Reactive Power Generated (-kVAR) condition detected
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 0

Warning History 0 (Parameter 133) reports the most recent warning event.

Warning History 0 (Parameter 133)	
Default Value	0
Minimum Value	0
Maximum Value	99
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

Warning History 1

Warning History 1 (Parameter 134) reports the second most recent warning event.

Warning History 1 (Parameter 134)	
Default Value	0
Minimum Value	0
Maximum Value	99
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

Warning History 2

Warning History 2 (Parameter 135) reports the third most recent warning event.

Trip History 2 (Parameter 135)	
Default Value	0
Minimum Value	0
Maximum Value	99
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

Warning History 3

Warning History 3 (Parameter 136) reports the fourth most recent warning event.

Warning History 3 (Parameter 136)	
Default Value	0
Minimum Value	0
Maximum Value	99
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

Warning History 4

Warning History 4 (Parameter 137) reports the fifth most recent warning event.

Warning History 4 (Parameter 137)	
Default Value	0
Minimum Value	0
Maximum Value	99
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	1
Units	

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

Current Warning History Mask (Parameter 145) allows you to select which current-based warning events are recorded in the warning history.

Table 548 - Current Warning History Mask (Parameter 145)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Overload Warning
																Reserved
													X			Ground Fault Warning
																Reserved
											X					Jam Warning
										X						Underload Warning
									X							Current Imbalance Warning
								X								L1 Under Current Trip
							X									L2 Under Current Trip
						X										L3 Under Current Trip
					X											L1 Over Current Trip
				X												L2 Over Current Trip
			X													L3 Over Current Trip
		X														L1 Line Loss Trip
	X															L2 Line Loss Trip
X																L3 Line Loss Trip

Voltage Warning History Mask

Voltage Warning History Mask (Parameter 146) allows you to select which voltage-based warning events are recorded in the warning history.

Table 549 - Voltage Warning History Mask (Parameter 146)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Under Voltage Warning
														X		Over Voltage Warning
													X			Voltage Imbalance Warning
												X				Phase Rotation Warning
											X					Under Frequency Warning
										X						Over Frequency Warning
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved

Power Warning History Mask

Power Warning History Mask (Parameter 147) allows you to select which power-based warning events are recorded in the warning history.

Table 550 - Power Warning History Mask (Parameter 147)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
															X	Under kW Warning
														X		Over kW Warning
													X			Under kVAR Consumed Warning
												X				Over kVAR Consumed Warning
											X					Under kVAR Generated Warning
										X						Over kVAR Generated Warning
									X							Under kVA Warning
								X								Over kVA Warning
							X									Under Power Factor Lagging Warning
						X										Over Power Factor Lagging Warning
					X											Under Power Factor Leading Warning
				X												Over Power Factor Leading Warning
																Reserved
																Reserved
																Reserved
																Reserved

Control Warning History Mask

Control Warning History Mask (Parameter 148) allows you to select which control-based warning events are recorded in the warning history.

Table 551 - Control Warning History Mask (Parameter 148)

Bit																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function
																Reserved
														X		PTC Warning
													X			DeviceLogix Warning
																Reserved
																Reserved
																Reserved
																Reserved
																Reserved
							X									Option Match Warning
						X										Feedback Timeout Warning
					X											Expansion Bus Warning
				X												Number Of Starts Warning
			X													Operating Hours Warning
																Reserved
																Reserved
																Reserved

Analog Warning History Mask

Analog Warning History Mask (Parameter 149) allows you to select which control-based warning events are recorded in the warning history.

Table 552 - Analog Warning History Mask (Parameter 149)

Bit																Function
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
															X	Analog Module 1 - Input Channel 00 Warning
														X		Analog Module 1 - Input Channel 01 Warning
													X			Analog Module 1 - Input Channel 02 Warning
												X				Analog Module 2 - Input Channel 00 Warning
											X					Analog Module 2 - Input Channel 01 Warning
										X						Analog Module 2 - Input Channel 02 Warning
									X							Analog Module 3 - Input Channel 00 Warning
								X								Analog Module 3 - Input Channel 01 Warning
							X									Analog Module 3 - Input Channel 02 Warning
						X										Analog Module 4 - Input Channel 00 Warning
					X											Analog Module 4 - Input Channel 01 Warning
				X												Analog Module 4 - Input Channel 02 Warning

Trip Snapshot

Trip Snapshot L1-L2 Voltage

Trip Snapshot L1-L2 Voltage (Parameter 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.

Table 553 - Trip Snapshot L1-L2 Voltage (Parameter 156)

Default Value	0.0
Minimum Value	0.0
Maximum Value	6553.5
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	10
Units	Volts

Trip Snapshot L2-L3 Voltage

Trip Snapshot L2-L3 Voltage (Parameter 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.

Table 554 - Trip Snapshot L2-L3 Voltage (Parameter 157)

Default Value	0.0
Minimum Value	0.0
Maximum Value	6553.5
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	10
Units	Volts

Trip Snapshot L3-L1 Voltage

Trip Snapshot L3-L1 Voltage (Parameter 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.

Table 555 - Trip Snapshot L3-L1 Voltage (Parameter 158)

Default Value	0.0
Minimum Value	0.0
Maximum Value	6553.5
Parameter Type	UINT
Size (Bytes)	2
Scaling Factor	10
Units	Volts

Trip Snapshot Total Real Power

Trip Snapshot Total Real Power (Parameter 159) reports the total real power of the monitored power conductors in kW at the time of the most recent trip event.

Table 556 - Trip Snapshot Total Real Power (Parameter 159)

Default Value	0.000
Minimum Value	-2000000.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kW

Trip Snapshot Total Reactive Power

Trip Snapshot Total Reactive Power (Parameter 160) reports the total Reactive power of the monitored power conductors in kVAR at the time of the most recent trip event.

Table 557 - Trip Snapshot Total Reactive Power (Parameter 160)

Default Value	0.000
Minimum Value	-2000000.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kVAR or MVAR

Trip Snapshot Total Apparent Power

Trip Snapshot Total Apparent Power (Parameter 161) reports the total apparent power of the monitored power conductors in kVA at the time of the most recent trip event.

Table 558 - Trip Snapshot Total Apparent Power (Parameter 161)

Default Value	0.000
Minimum Value	0.000
Maximum Value	2000000.000
Parameter Type	DINT
Size (Bytes)	4
Scaling Factor	1000
Units	kVA

Trip Snapshot Total Power Factor

Trip Snapshot Total Power Factor (Parameter 162) reports the total power factor of the monitored power conductors in percentage at the time of the most recent trip event.

Table 559 - Trip Snapshot Total Power Factor (Parameter 162)

Default Value	0.0
Minimum Value	-100.0
Maximum Value	100.0
Parameter Type	INT
Size (Bytes)	2
Scaling Factor	10
Units	%

Notes:

DeviceLogix™ Functionality

Introduction

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 Chapter 5 – Operating Modes) 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, RSNetWorx™ for DeviceNet™ software, or Connected Component Workbench™ 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 96).

Communication Fault & Idle Override (Parameter 346)

Communication Fault & Idle Override (Parameter 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.

Table 560 - Communication Fault & Idle Override (Parameter 346)

Value	Assignment	Description
0	Disable	Use Communication Fault Mode and Communication Idle Mode
1	Enable	DeviceLogix functionality Overrides Communication Fault Mode and Communication Idle Mode

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 (Parameter 347)

Network Fault Override (Parameter 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.

Table 561 - Network Fault Override (Parameter 347)

Value	Assignment	Description
0	Disable	Use Communication Fault Mode
1	Enable	DeviceLogix functionality Overrides Communication Fault Mode

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. Keep in mind 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 on the capabilities of DeviceLogix functionality and how to use the DeviceLogix program editor

Notes:

EtherNet/IP Communication

Introduction

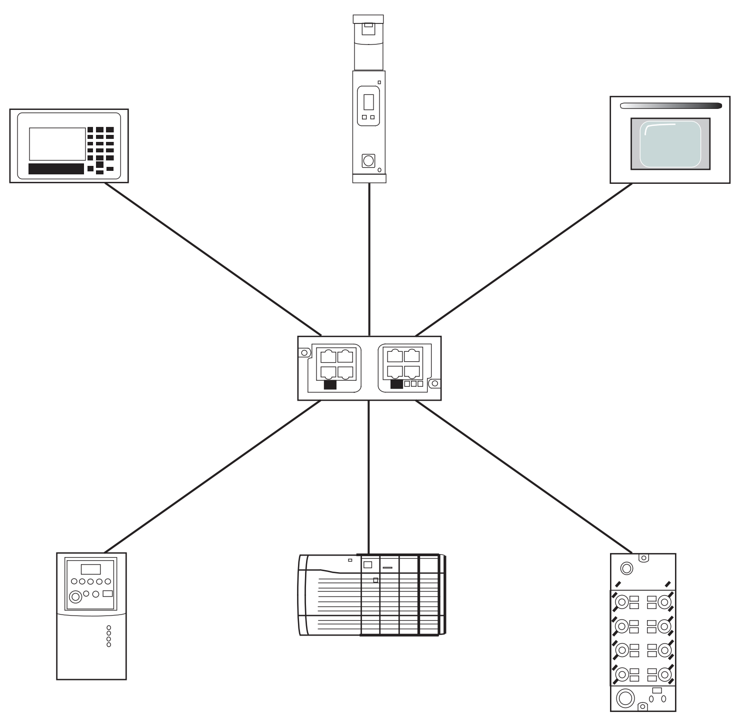
This chapter provides the necessary instructions to successfully connect the E300™ Electronic Overload Relay EtherNet/IP Communication Module (Catalog Number 193-ECM-ETR) to an Ethernet network and configure it to communicate to an EtherNet/IP scanner such as an Allen-Bradley Logix controller.

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 213 shows an example of a Star Ethernet Topology, in which all Ethernet nodes wire back to a central Ethernet switch, hub, or router.

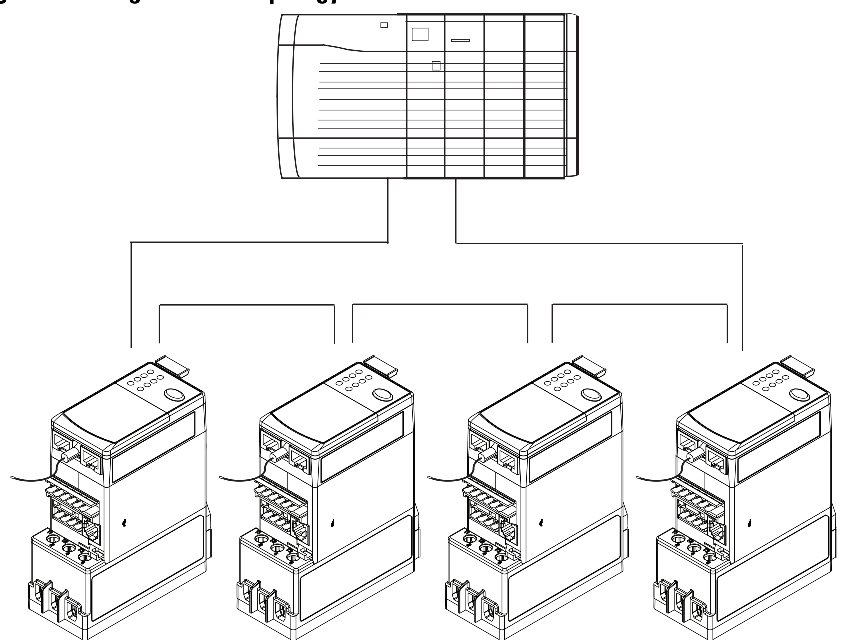
Figure 213 - Star Ethernet Topology



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 214. 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 214 - Ring Ethernet Topology



Determining Network Parameters

To operate an EtherNet/IP network, you must define these parameters.

Table 562 - EtherNet/IP Network Parameters

Network Parameter	Description
IP Address	The IP address uniquely identifies the module. The IP address is in the form xxx.xxx.xxx.xxx where each xxx is a number from 0...255. Do not use the following IP addresses, as these are reserved values: • 0.0.0.1...0.255.255.255 • 127.0.0.0...127.255.255.255 • 224.255.255.255...255.255.255.255
Subnet Mask	Subnet addressing is an extension of the IP address scheme that allows a site to use one network ID for multiple physical networks. Routing outside of the site continues by dividing the IP address into a net ID and a host ID via the class. Inside a site, the subnet mask is used to redivide the IP address into a custom network ID portion and host ID portion. **NOTE:** If you change the subnet mask of an already-configured module, you **must** cycle power to the module for the change to take effect.
Gateway	A gateway connects individual physical networks into a system of networks. When a node needs to communicate with a node on another network, a gateway transfers the data between the two networks.

If DNS addressing is used or if the module is referenced via a host name in an MSG instruction, the following parameters must be defined.

IMPORTANT	Consult with your Ethernet network administrator to determine if these parameters need to be specified.

Table 563 - EtherNet/IP Network Parameters for DNS Addressing

Network Parameter	Description
Host Name	A host name is part of a text address that identifies the module. The full text address of a module is: *host_name.domain_name*.
Domain Name	A domain name is part of a text address that identifies the domain in which the module resides. The full text address of a module is: *host_name.domain_name*. The domain name has a 48-character limit.
Primary DNS Server Address Secondary DNS Server Address	This identifies any DNS servers that are used in the network. You must have a DNS server configured if you specify an SMTP server with a name. The DNS server converts the domain name or host name to an IP address that can be used by the network. For more information on DNS addressing, see page 570.

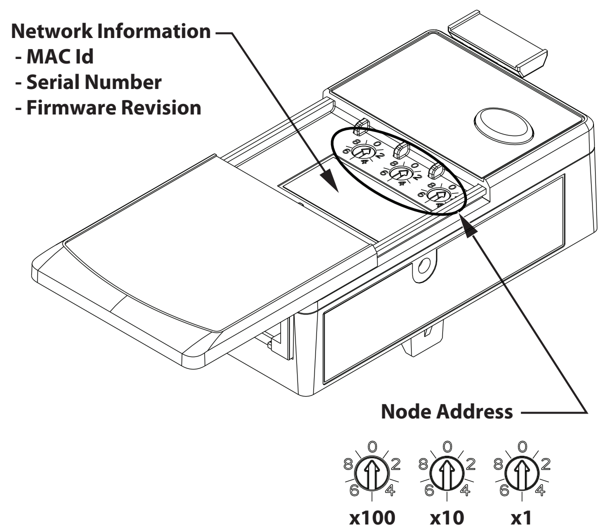
Setting the IP Network Address

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.



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.

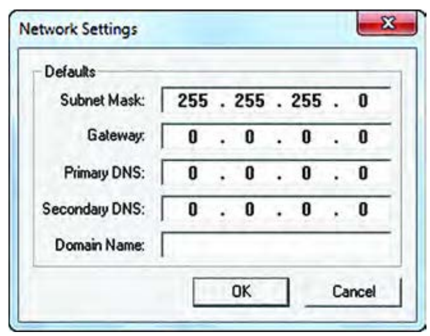
Assign Network Parameters via the BOOTP/ DHCP Utility

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.

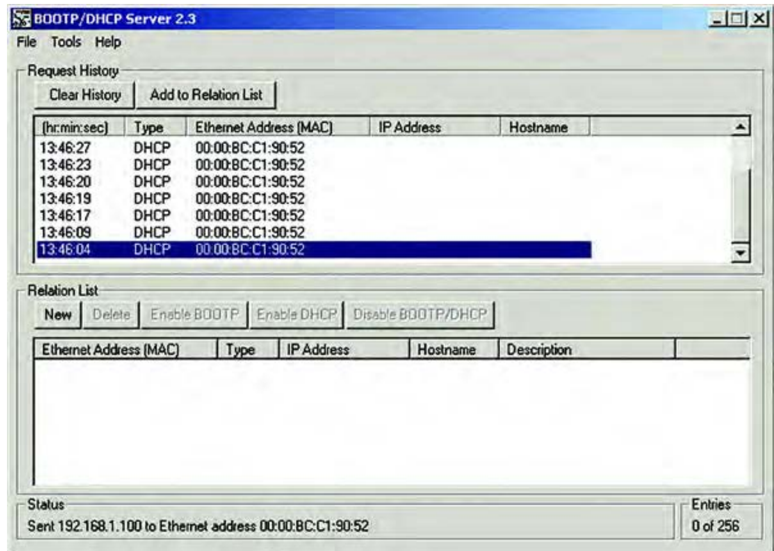
This utility recognizes DHCP-enabled devices and provides an interface to configure a static IP address for each device. To assign network parameters via the BOOTP/DHCP utility, perform this procedure:

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.

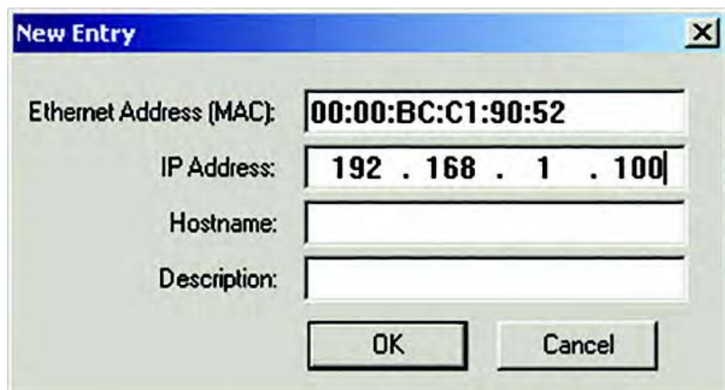


4. Click OK.
   The Request History panel displays the hardware addresses of modules issuing BOOTP or DHCP requests.
5. Double-click the MAC address of the module to be configured.

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.

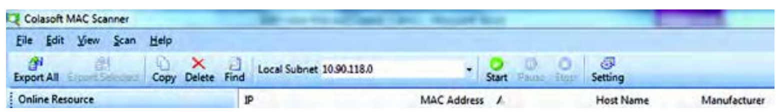
When module power is cycled, it uses the assigned configuration and does not issue a DHCP request.

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.

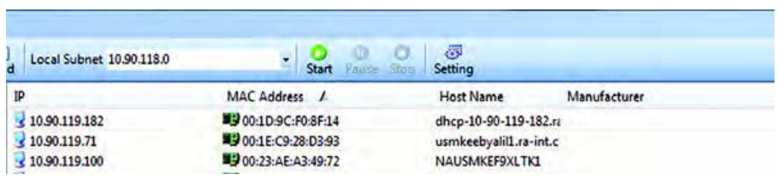
Assign Network Parameters Via a Web Browser and MAC Scanner Software

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.

Other Factors to Consider When Assigning Network Parameters

There are other factors to consider when assigning network parameters, which include:

- Network isolation from or integration into the plant/enterprise network.
- Network size. For large networks, even isolated networks, it might be more convenient and safer to use a BOOTP/DHCP server rather than RSLinx software. The BOOTP/DHCP server also limits the possibility of assigning duplicate IP addresses.
- Company policies and procedures that are associated with plant floor network installation and maintenance.
- Level of involvement by information technology personnel in plant floor network installation and maintenance.
- Type of training that is offered to control engineers and maintenance personnel.

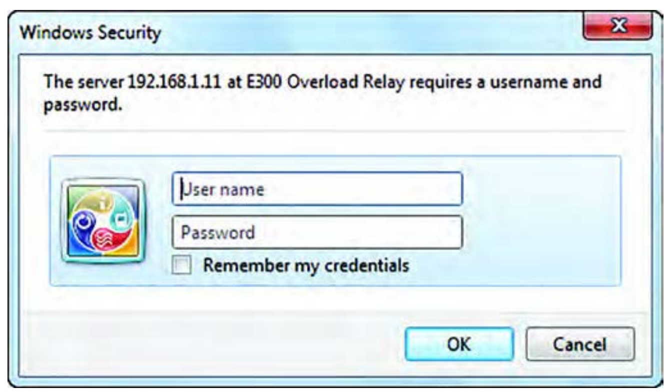
If the Rockwell Automation DHCP server is used in an uplinked subnet where an enterprise DHCP server exists, a module may get an address from the enterprise server before the Rockwell Automation utility even sees the module. In this case, disconnect the uplink to set the address and configure the module to retain its static address before reconnecting to the uplink. This is not a problem if you have node names configured in the module and leave DHCP enabled.

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 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.

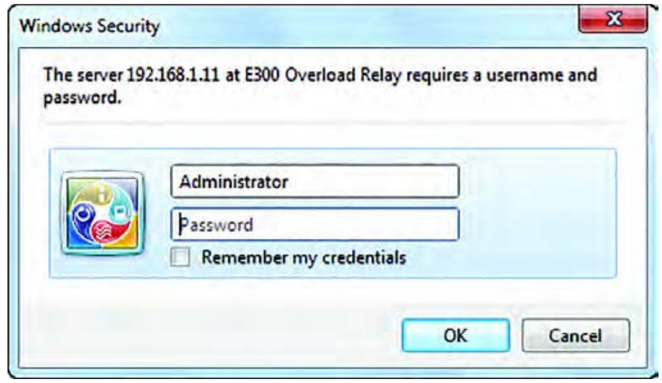


System User Name

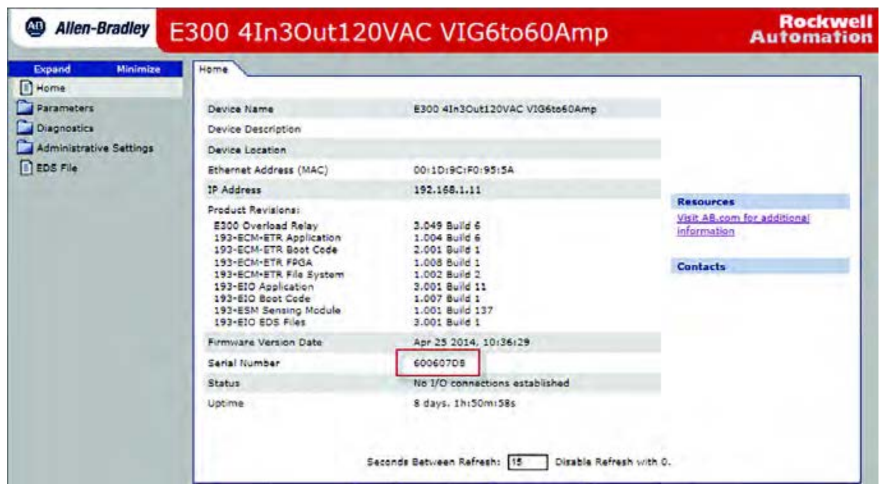
The user name **Administrator** (case sensitive) is the only user name that allows you to make EtherNet/IP system changes or E300 configuration parameter edits.

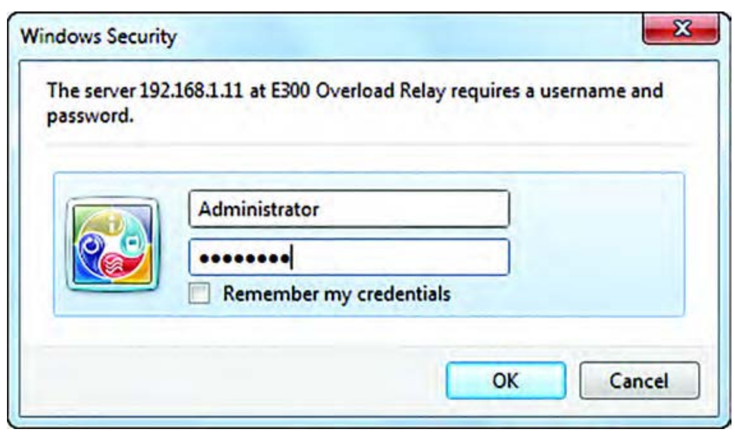
System Password

For EtherNet/IP Communication Modules with firmware v1.003, the default password is <blank>.



For EtherNet/IP Communication Modules with firmware v1.004 and higher, the default password is the serial number of the E300 EtherNet/IP Communication Module which can be found on the home page of the E300 web server.





We recommend that you change the password for user name **Administrator** to deter any malicious activity through the E300 EtherNet/IP Communication Module's web server. The password can be change on the password configuration web page.

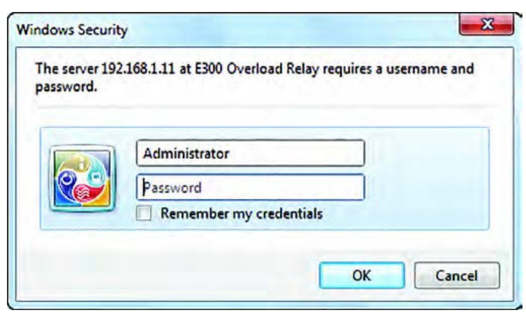
Resetting the System Password

If the password for user name **Administrator** is misplaced or forgotten, 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.

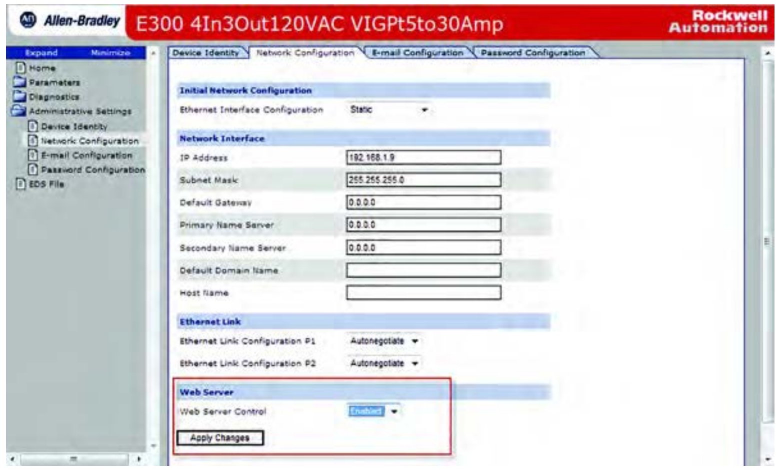
Permanently Enabling the Web Server

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.



Duplicate IP Address Detection

When you change the IP address or connect the module to an EtherNet/IP network, the module checks to make sure that the IP address assigned to this module does not match the address of any other network device. If the module determines that another device on the network with a matching IP address, the EtherNet/IP port of the module goes into conflict mode where the Network Status LED indicator is solid red.

To resolve this conflict, use the following instructions to change the IP address of the module. Then, cycle power to the module or reset the modules by disconnecting and then reconnecting the Ethernet cable.

Two modules could possibly detect a conflict simultaneously. If this occurs, perform this procedure.

1. Remove the module with the incorrect IP address and correct its conflict.
2. Cycle power or disconnect the Ethernet cable from the second module and reconnect it.

Behavior of Modules With Duplicate IP Addresses

Devices in conflict over an IP address behave differently depending on whether connections have been established to either of the modules and whether both modules support duplicate IP address detection.

Table 564 - Device Conflict over Duplicate IP Addresses

If	then
both modules support duplicate IP address detection,	the first started module uses and retains its IP address. The other module detect sa conflict, gives up the IP address, and enters conflict mode.
both modules support duplicate IP address detection and are started at roughly the same time,	one of the modules surrenders the IP address and enters conflict mode.
one module supports duplicate IP address detection and a second module does not,	the second module generally keeps its IP address, regardless of which module first obtains the IP address. The module that supports duplicate IP address detection detects the conflict and gives up the IP address.

DNS Addressing

To further qualify a module's address, use DNS addressing to specify a host name for a module, which also includes specifying a domain name and DNS servers. DNS addressing makes it possible to configure similar network structures and IP address sequences under different domains.

DNS addressing is only necessary if you see the module by host name, such as in path descriptions in MSG instructions.

To use DNS addressing, perform this procedure.

1. Assign a host name to the module.

NOTE: Contact the network administrator to have a host name assigned. Valid host names should be compliant with IEC-1131-3.

2. Configure the module's parameters.

In addition to the IP address, subnet mask, and gateway address, you must configure a host name for the module, domain name, and primary/secondary DNS server addresses.

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. The EDS file for the E300 relay EtherNet/IP Communication Module can be obtained from one of two locations:

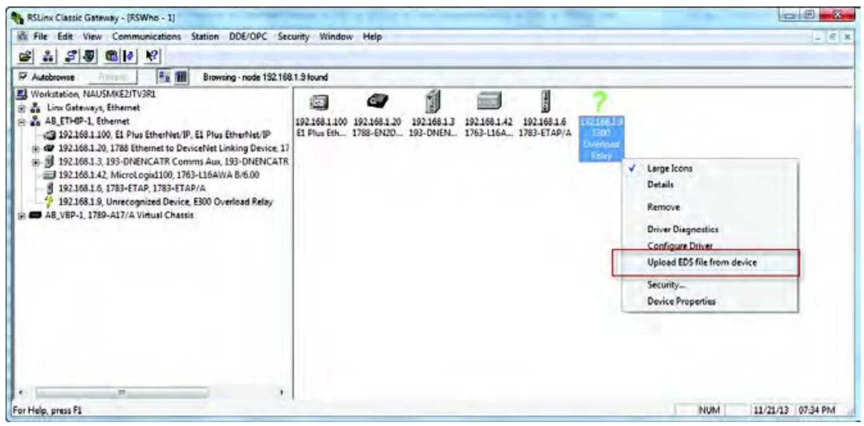
- Embedded in the module
- The Allen-Bradley EDS file download website.

Download the EDS File

Embedded in the Module

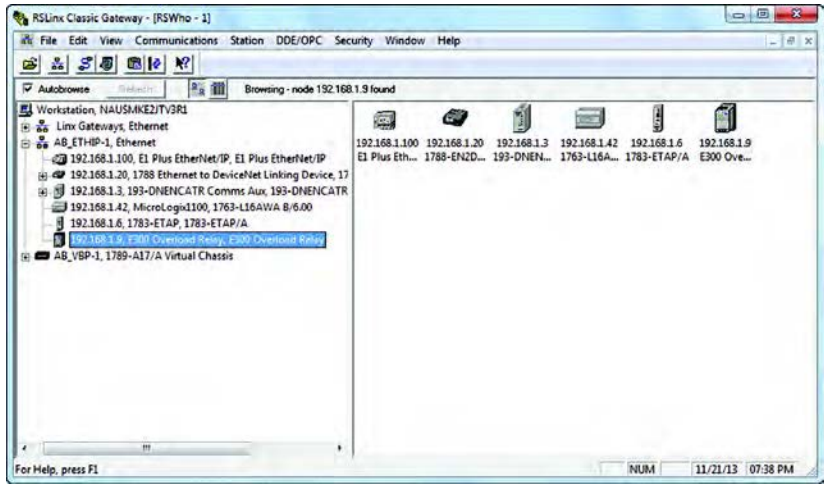
The EDS file for the E300 relay EtherNet/IP Communication Module is embedded within the module. Using RSLinx Classic, you can install the E300 relay EtherNet/IP Communication Module's EDS file from the RSLinx Classic RSWho screen using these steps:

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".



2. Using the EDS Wizard, install the embedded E300 relay EtherNet/IP Communication Module EDS file.

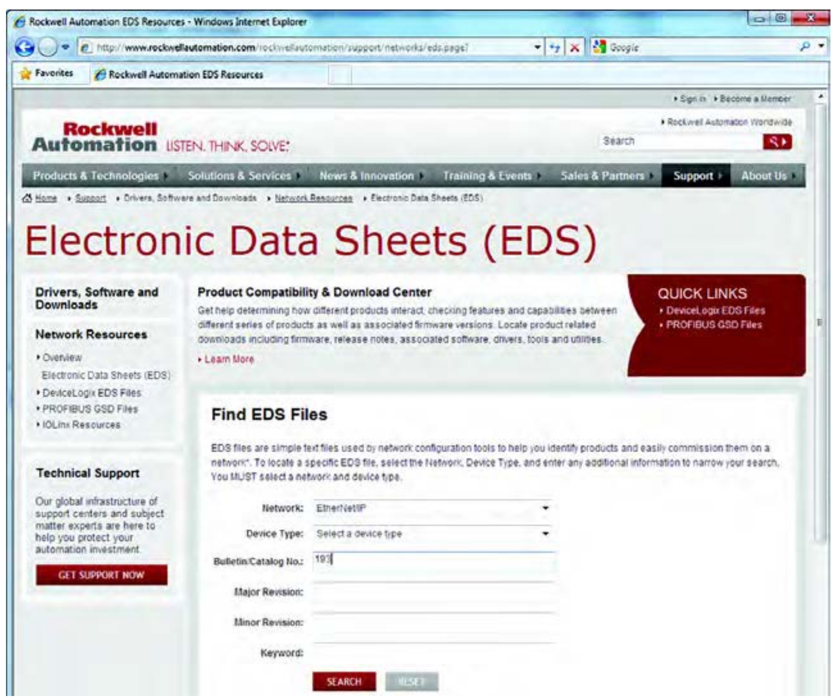
3. When finished, RSLinx Classic recognizes the newly registered E300 relay EtherNet/IP Communication Module.



From the EDS File Download Site

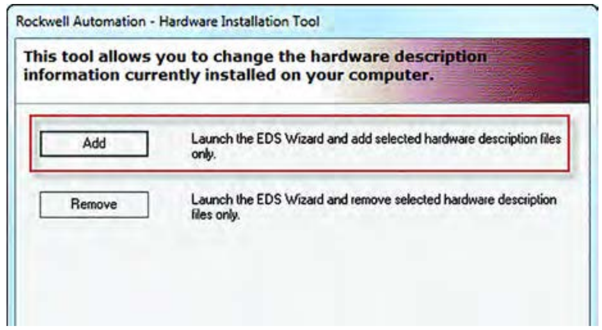
The EDS file for the E300 relay EtherNet/IP Communication Module can also be downloaded from the Allen-Bradley EDS File download site. Using a web browser on the personal computer that is connected to the internet, you can download the EDS file by following these steps:

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.



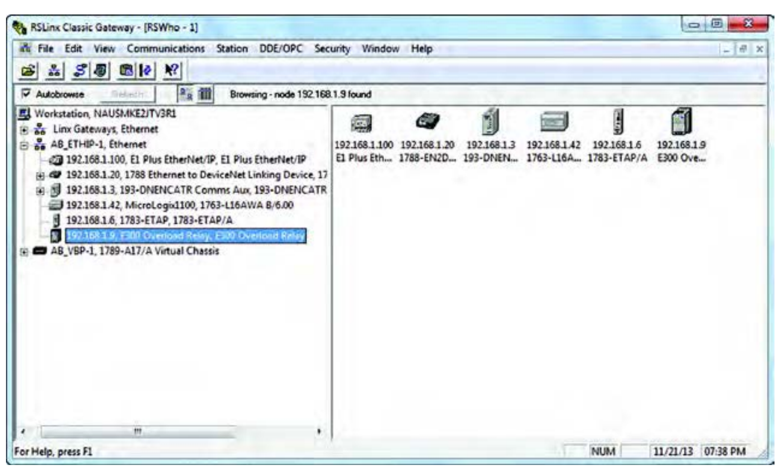
3. Locate the EDS file for the E300 relay EtherNet/IP Communication Module and download it to the personal computer.

4. Start the EDS Hardware Installation Tool located at Start>Programs>Rockwell Software>RSLinx Tools and Add a new device



5. Using the EDS Wizard, install the downloaded E300 relay EtherNet/IP Communication Module EDS file.

6. When finished, RSLinx Classic recognizes the newly registered E300 relay EtherNet/IP Communication Module.



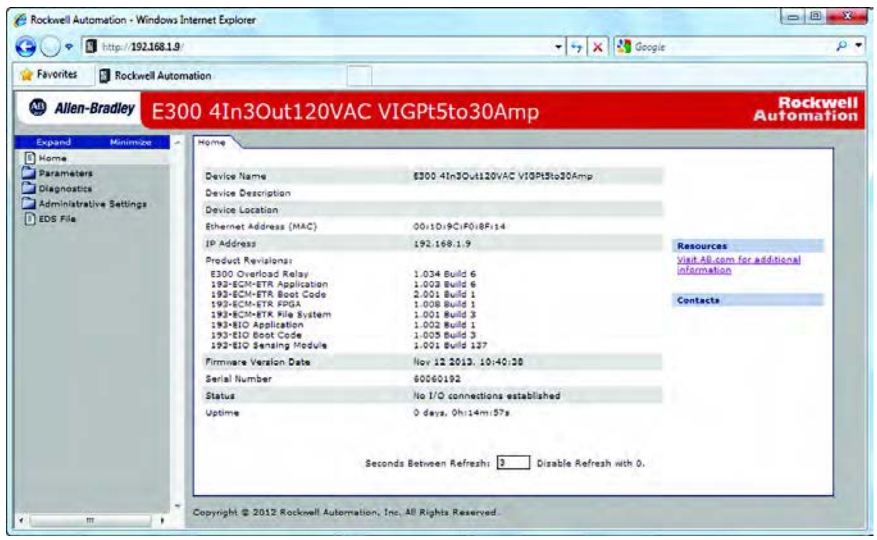
View and Configure Parameters

The web server in the E300 relay EtherNet/IP Communication Module when enabled is able to 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.

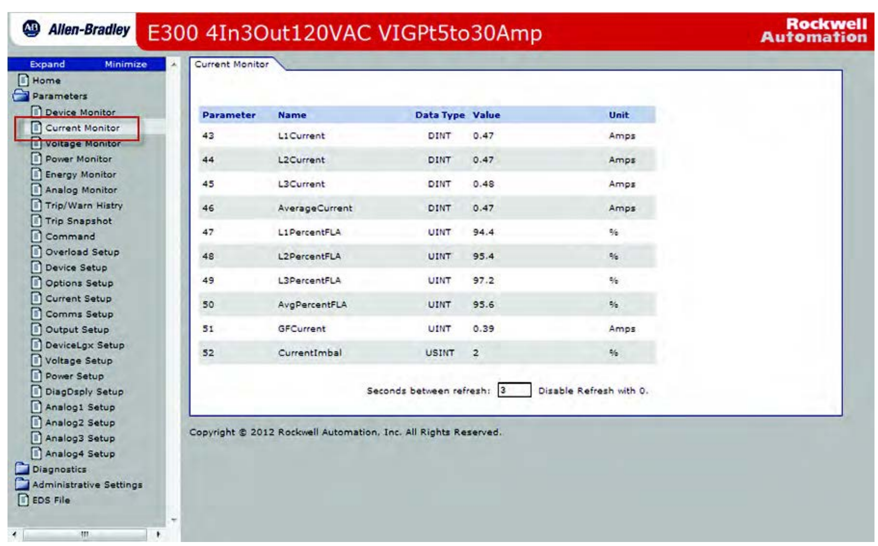
Viewing Parameters

Follow the steps below to view parameters using the web interface of the E300 relay EtherNet/IP Communication Module.

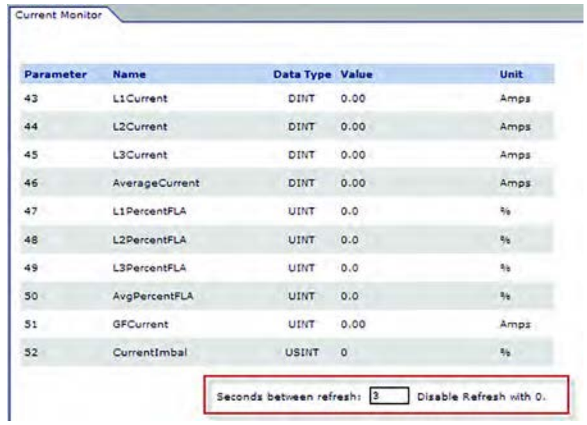
1. Using a web browser, open the web page of the E300 relay EtherNet/IP Communication Module by typing its IP address for the URL.



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:

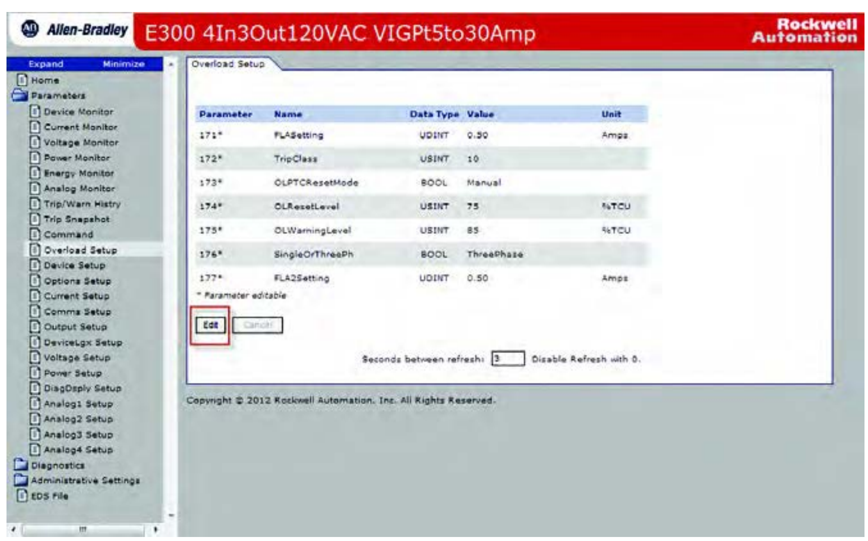


4. E300 relay EtherNet/IP Communication Module web page displays up to 17 parameters per web page. If more than 17 parameters exist for a parameter group, use the navigation arrows to display the other parameters.

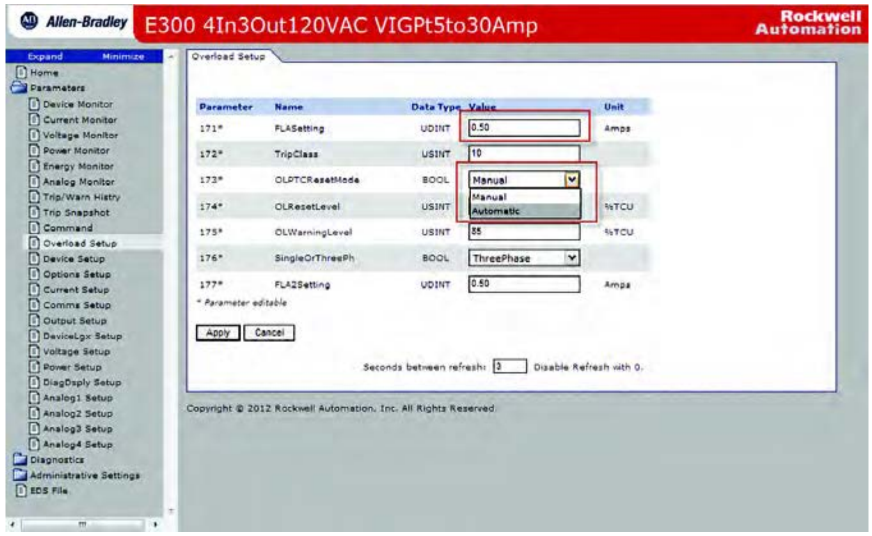
Editing Parameters

Follow the steps below to edit configuration parameters using the web interface of the E300 relay EtherNet/IP Communication Module.

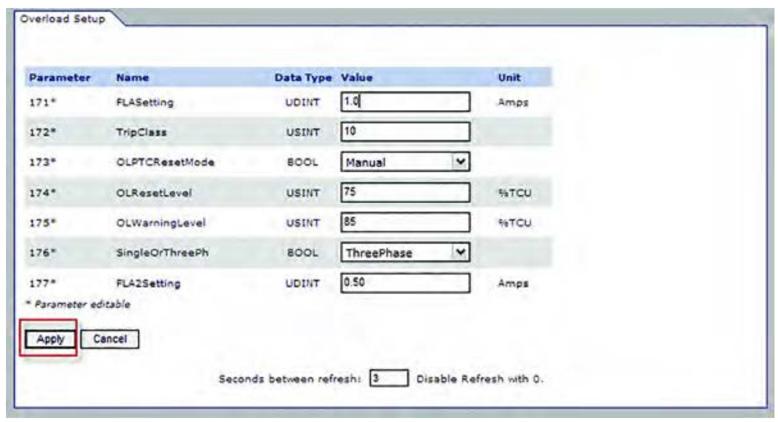
1. Select a parameter group that contains programmable parameters, then click the Edit button. The value options appears.



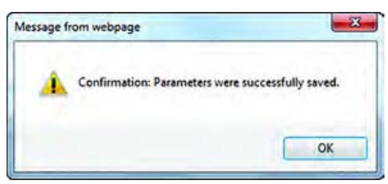
2. Click the down arrow on the pull-down boxes to adjust fixed values and/or enter numerical values in the fields without an arrow to adjust the values.



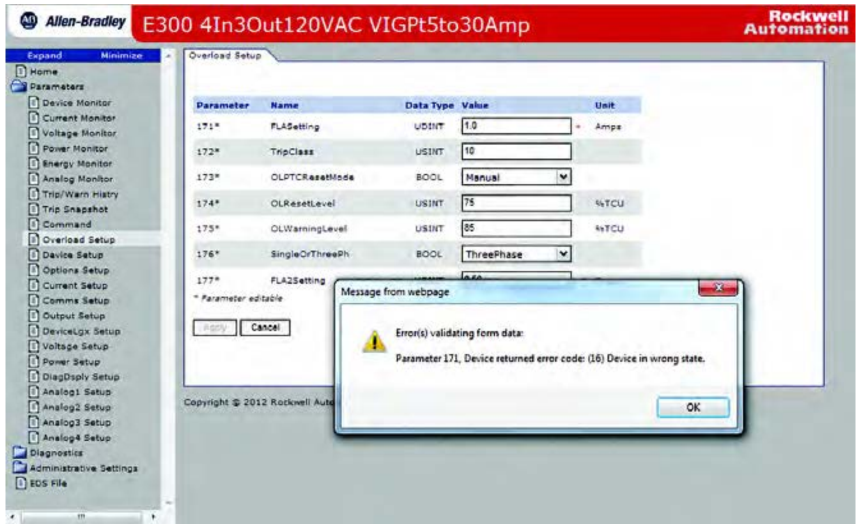
3. Click Apply once all parameter edits have been completed. The E300 relay EtherNet/IP Communication Module downloads the new parameter values to the device.



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.



Automation Controller Communication

The E300 relay EtherNet/IP Communication Module supports two types of EtherNet/IP messaging.

- I/O Messaging - Used for deterministic EtherNet/IP communication with ControlLogix, CompactLogix, SoftLogix, and EtherNet/IP scanners. Its primary use is to read and write I/O data for control purposes. It can also be used for Automatic Device Configuration, in which an automation controller manages device configuration parameters.
- Explicit Messaging - Used for non-deterministic communication in which the data is not critical for control. Logic explicit messages have a lower priority compared to I/O messages and are used to read and write non-critical data.

I/O Messaging

RSLogix 5000 or Studio 5000 software is used to configure I/O messaging between a Logix controller and an E300 relay EtherNet/IP Communication Module on an EtherNet/IP network. An Add-on Profile is available for the E300 relay EtherNet/ IP Communication Module and can be used with RSLogix 5000 version 16 and higher and Studio 5000 version 21 and higher. The E300 Add-on Profile provides a graphical user interface to modify configuration parameters, it provides intuitive input and output tag names, and it enables Automation Device Configuration. You can download the E300 Add-on Profile from: http://compatibility.rockwellautomation.com/Pages/MultiProductFindDownloads.aspx?crumb=112&refSoft=0&toggleState=&versions=50428.

Automatic Device Configuration enables the Logix controller to manage device configuration data. Every time a Logix controller establishes a connection with a device, the Logix controller downloads that device’s configuration data. This allows users to save commissioning time by preprogramming a device offline using RSLogix 5000 or Studio 5000. It also removes the need for maintenance personnel to have a computer and special programming software when replacing a device.

Shown in the following pages are three examples and the steps necessary to configure a Logix controller for I/O messaging.

- Pre-configured E300 relay Logix Integration with Add-on Profile
- Offline E300 relay Logix Integration with Add-on Profile
- Offline E300 relay Integration with a Generic Profile

ATTENTION: If an *Upload* command is not performed while discovering modules or manually adding a E300 relay online to a ControlLogix project, any preconfigured E300 relay configuration data is not retained.
See Preconfigured E300 relay Logix Integration with an Add-On Profile on page 578 for information on how to upload configuration data when adding an E300 relay to a ControlLogix project online.

ATTENTION: If an Upload command is not performed while manually adding an E300 relay offline in an RSLogix 5000 or Studio 5000 project, any preconfigured E300 relay configuration data is not retained when downloading the project to the Logix controller.
See Preconfigured E300 relay Logix Integration with an Add-On Profile on page 578 for information on how to upload configuration data when adding an E300 relay to an RSLogix 5000 or Studio 5000 project offline.

Preconfigured E300 relay Logix Integration with an Add-On Profile

The E300 Add-on Profile for RSLogix 5000 and Studio 5000 software automatically enables Automatic Device Configuration. The Logix controller overwrites any existing E300 relay configuration data when the Logix controller establishes a connection to the E300 relay.

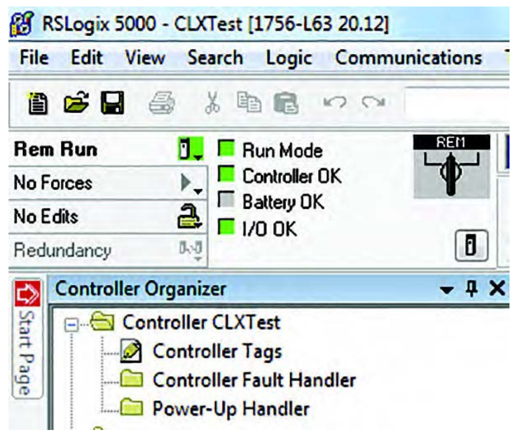
For E300 relays that come preconfigured in an Allen-Bradley Low Voltage Motor Control Center, in an Allen-Bradley Medium Voltage Motor Control Center, or in an electrical enclosure from a panel builder or system integrator, you can add the E300 relay to a new or existing RSLogix 5000 or Studio 5000 project and retain the configuration information that is stored in the E300 relay using Module Discovery or Manually Adding a New Module.

Module Discovery

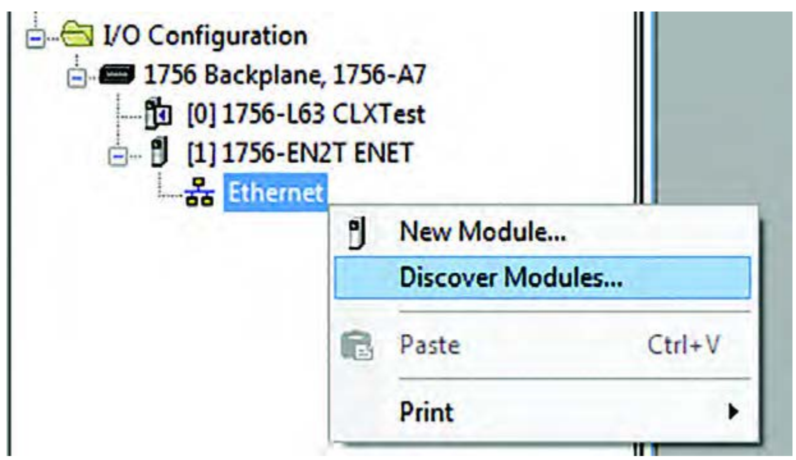
You can add a preconfigured E300 relay online to a ControlLogix processor using module discovery and retain all of the E300 relay's configuration settings. Module discovery is only available for ControlLogix processors. CompactLogix users must manually add an E300 relay to an RSLogix 5000 or Studio 5000 project and then manually upload the E300 relay configuration. See Manually Adding a New Module on page 584 for information on how to manually add an E300 relay and manually upload the configuration.

Module discovery identifies all of the available devices on an EtherNet/IP network that an EtherNet/IP scanner is connected to. You can select a specific preconfigured E300 relay that is on the EtherNet/IP network and upload the E300 relay's configuration data by following these steps:

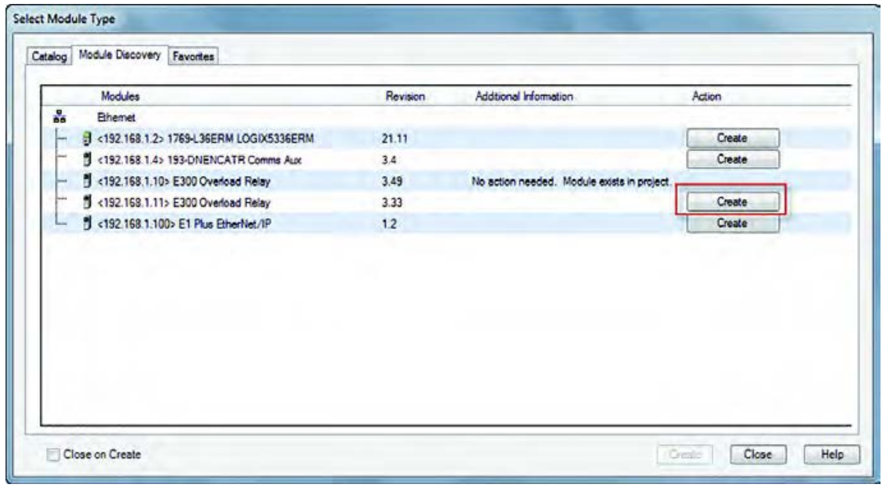
1. Go Online with the ControlLogix controller using RSLogix 5000 or Studio 5000 software. The ControlLogix controller can be in Run or Program mode.



2. Right click on the Ethernet tree of the EtherNet/IP scanner that is in the ControlLogix chassis and select *Discover Modules*.

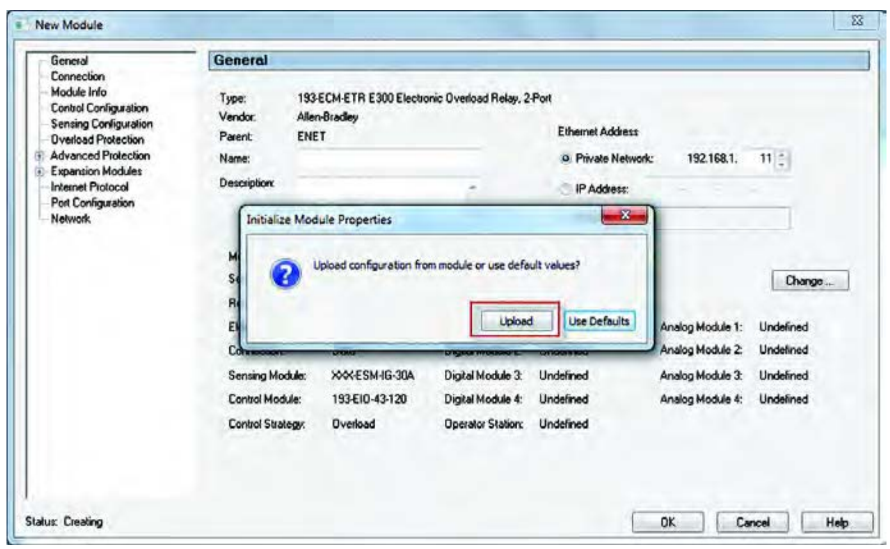


3. Choose the E300 relay to be added to the EtherNet/IP scanner's scan list and press *Create*.

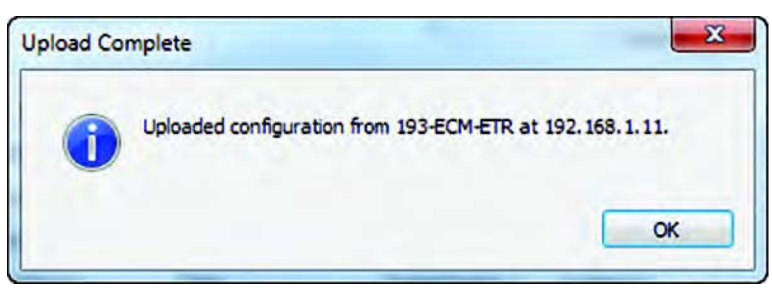


4. You are prompted whether you would like to upload the configuration settings from the E300 relay. Press *Upload* to read the configuration settings from the E300 relay.

ATTENTION: If an Upload command is not performed during Module Discovery, any preconfigured E300 relay configuration data is not retained when adding an E300 relay online to a ControlLogix project.

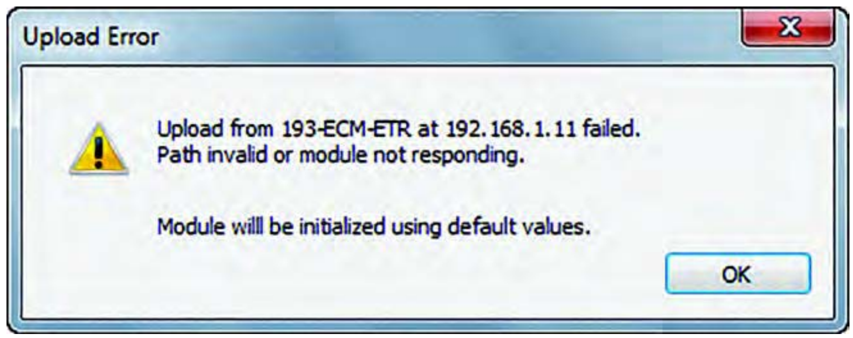


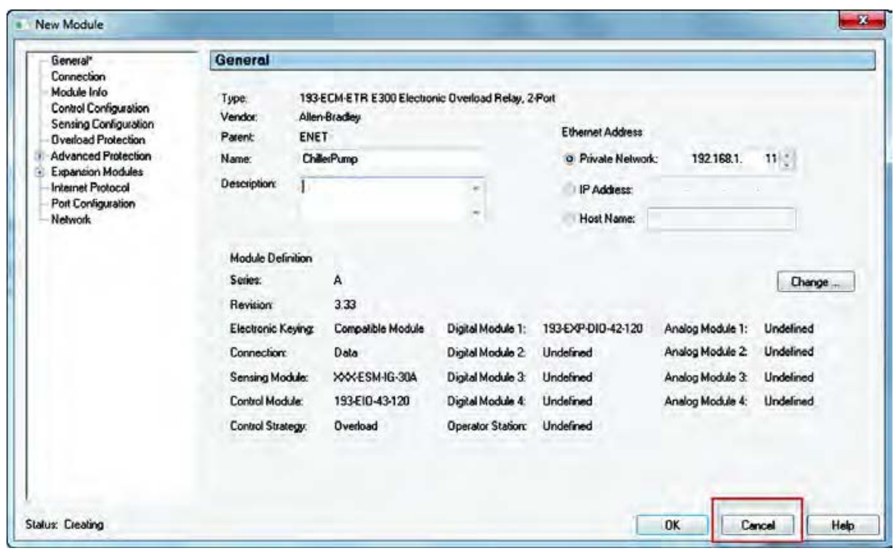
5. If the upload is successful, a display appears that indicates the success of this command. Press OK to continue.



If the upload is not successful due to communication errors, a display appears that indicates that the profile is using default settings. Press *OK* to continue, and press *Cancel* to abort the Module Discovery process. Repeat steps 1-5.

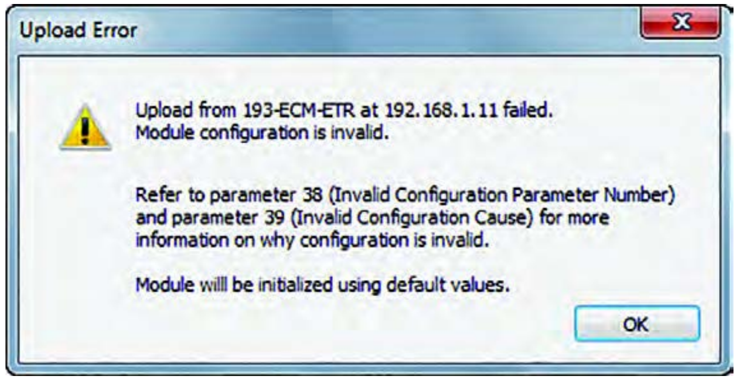
ATTENTION: If an Upload command is not successful during Module Discovery, failure to Cancel the Module Discovery process results in the loss of any preconfigured E300 relay configuration data. This configuration data is not retained and default values are used when adding an E300 relay online to a ControlLogix project.

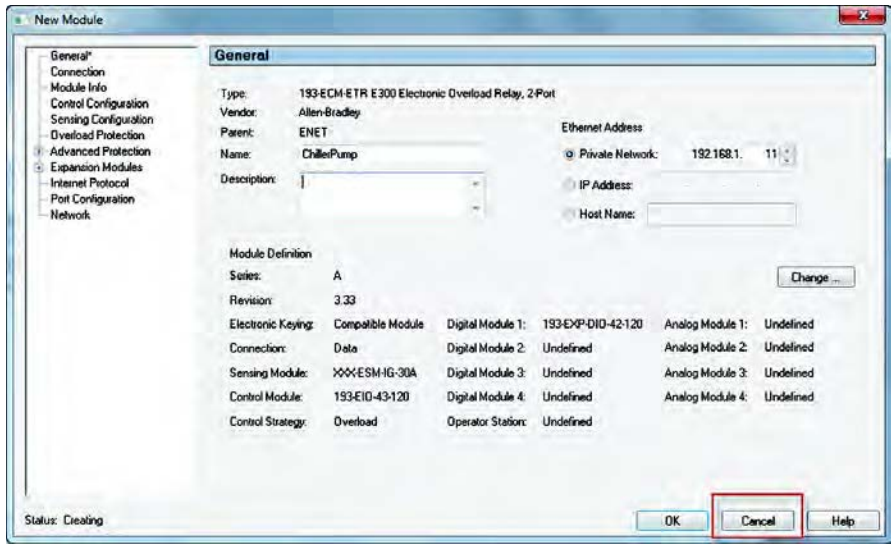




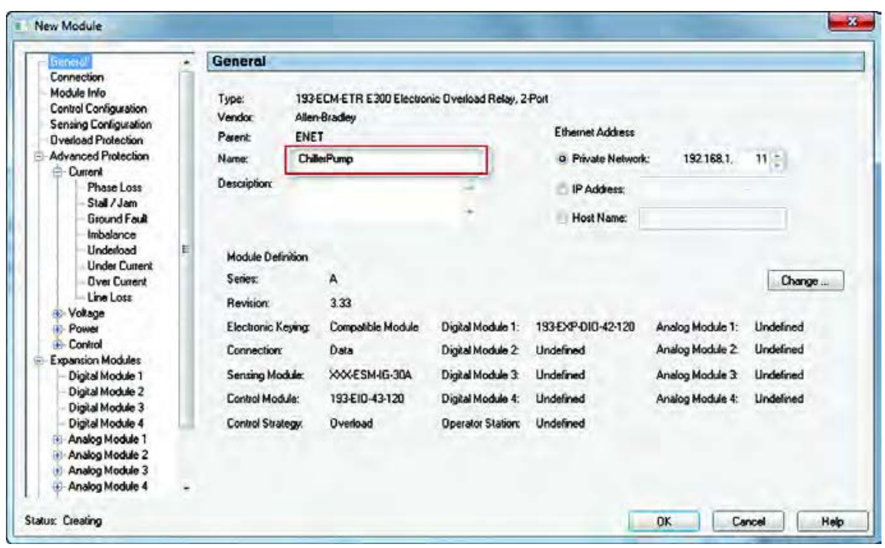
If the upload is not successful due to an E300 configuration trip, a display appears indicating that the profile is using default settings. Press *OK* to continue, and press *Cancel* to abort the Module Discovery process. Read parameters 38 and 39 from the E300 relay to determine the reason for the configuration trip. Fix the issue and repeat steps 1-5.

ATTENTION: If an Upload command is not successful during Module Discovery, failure to cancel the Module Discovery process results in the loss of any preconfigured E300 relay configuration data. This configuration data is not retained and default values are used when adding an E300 relay online to a ControlLogix project.

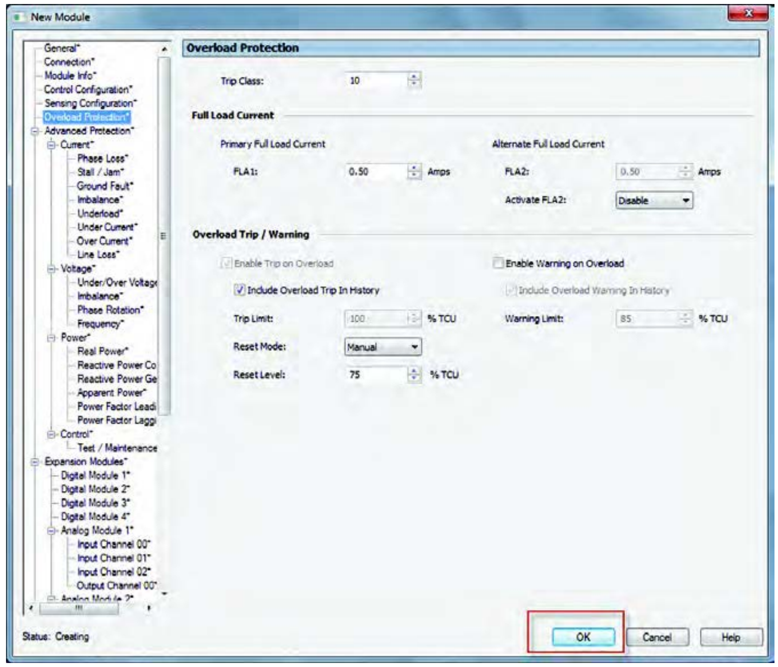




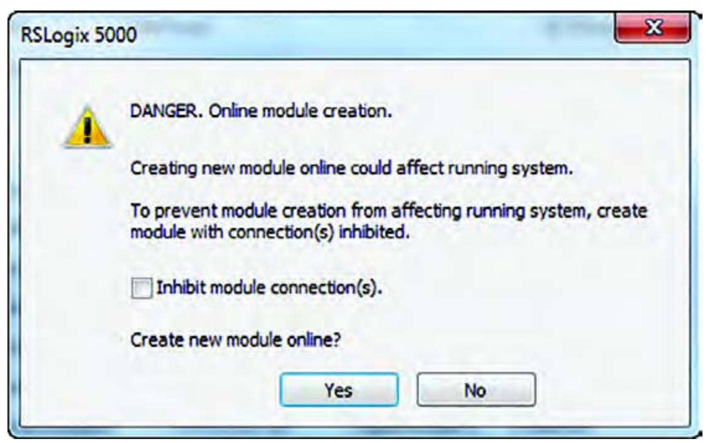
6. Enter a name for the E300 relay.



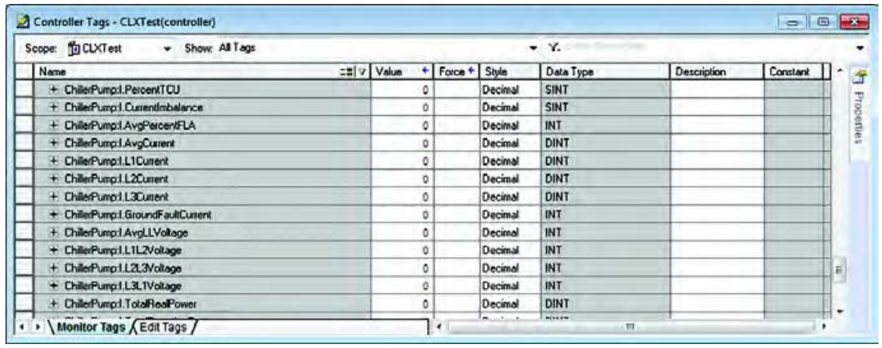
7. Navigate through the E300 Overload Relay device profile tree to make additional configuration edits. When finished, press *OK*.



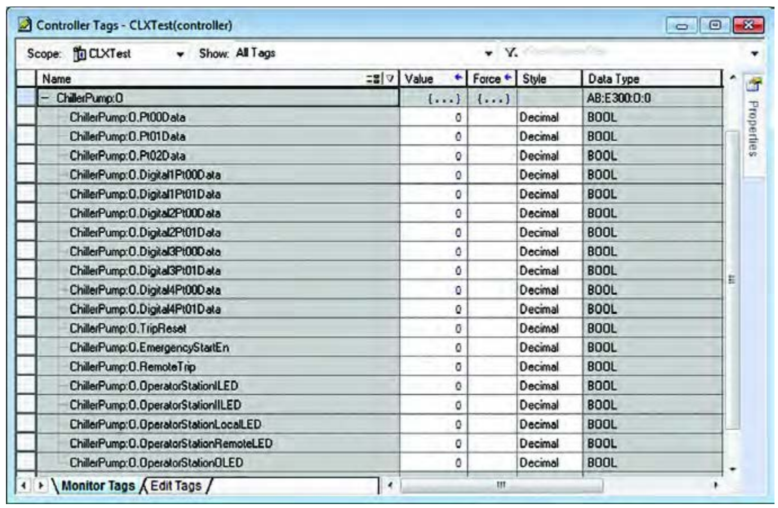
8. A display appears, verifying that you are about to create the module online. Press *Yes* to add the preconfigured E300 relay to the Ethernet tree, and communication between the E300 relay and the ControlLogix controller begins. The E300 relay's configuration data is retained and stored in the ControlLogix controller and in the RSLogix 5000 or Studio 5000 project. Press *No* to return to the new module profile and make additional edits.



9. To access the data provided by the E300 relay EtherNet/IP Communication Module, navigate to the input tags created by the Add-on Profile.



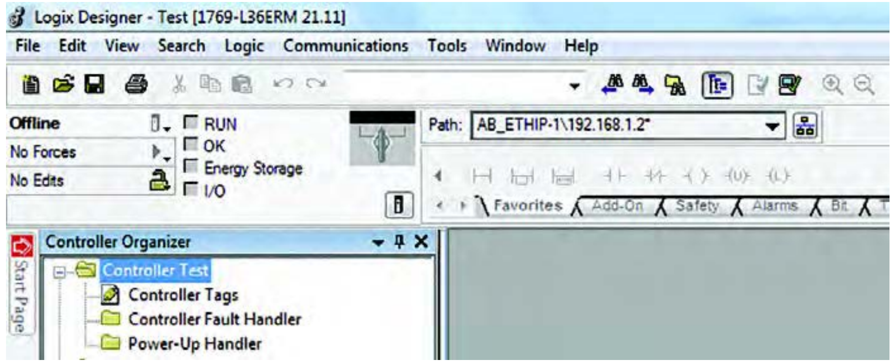
10. To control the output relays or issue a remote reset command to the E300 relay navigate to the output tags created by the Add-on Profile.



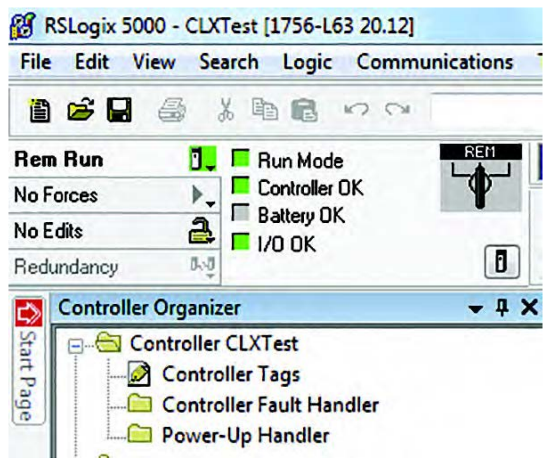
Manually Adding a New Module

You can manually add a preconfigured E300 relay offline to any Logix processor, or you can manually add a preconfigured E300 relay online to a ControlLogix processor. You can perform an upload command to retain all of the E300 relay's configuration settings. Follow the steps provided to manually add an E300 relay and retain its configuration settings with a new or existing RSLogix 5000 or Studio 5000 project. If you are running IntelliCENTER Integration Assistant for Logix 5000, you can skip to step 4 and repeat these steps for each E300 relay that was added to the project while the project is offline.

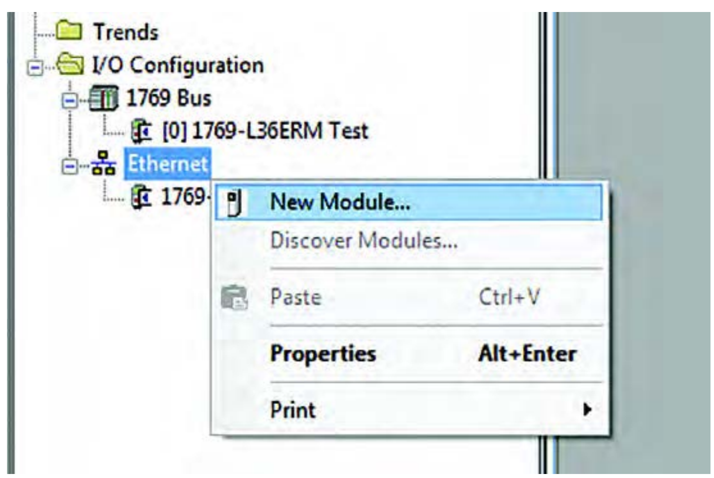
1. Create a new or open an existing RSLogix 5000 or Studio 5000 project and verify that the Logix controller is offline.



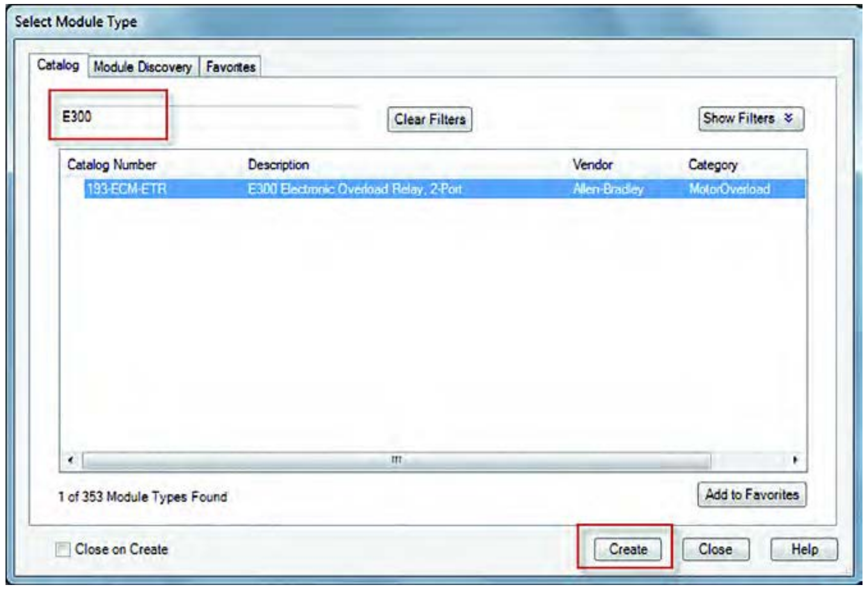
For ControlLogix users who want to manually add an E300 relay online, go online with the ControlLogix controller using RSLogix 5000 or Studio 5000 software. The ControlLogix controller can be in Run or Program mode.



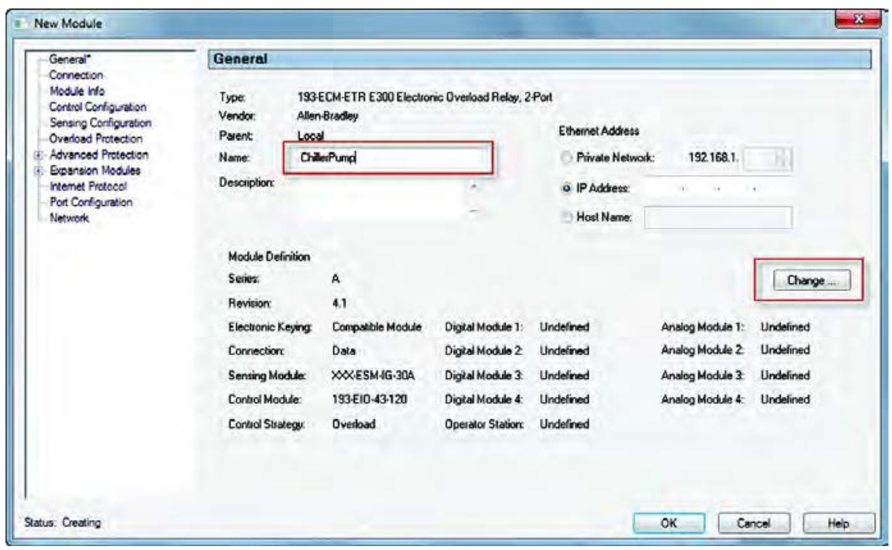
2. Right click on the Ethernet tree of the EtherNet/IP scanner and select *New Module*.



3. Search for an E300 relay by typing *E300* in the search field, select the *193-ECM-ETR E300 relay, 2-Port* device profile, and press *Create*.

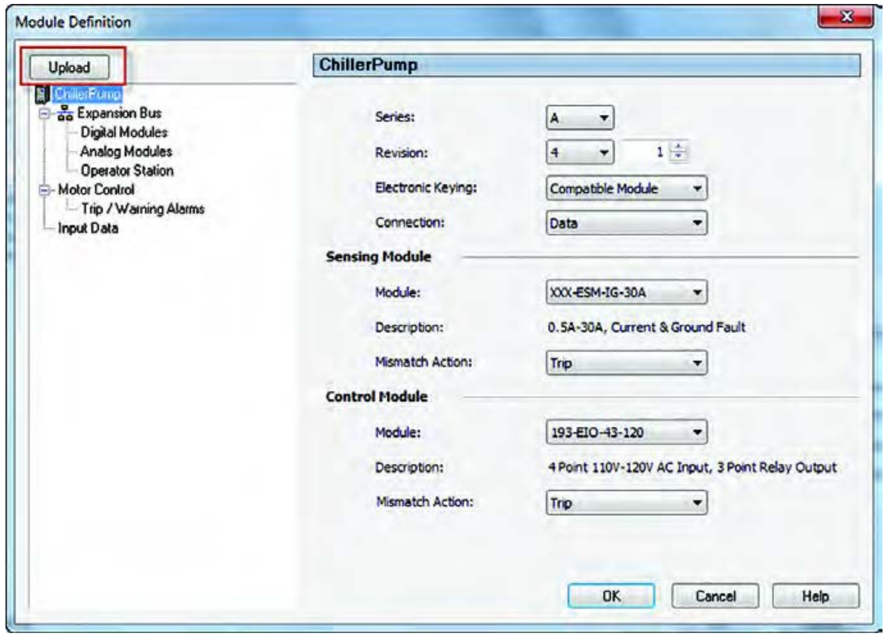


4. Type a name for the E300 relay, and press *Change* to update the module definition.

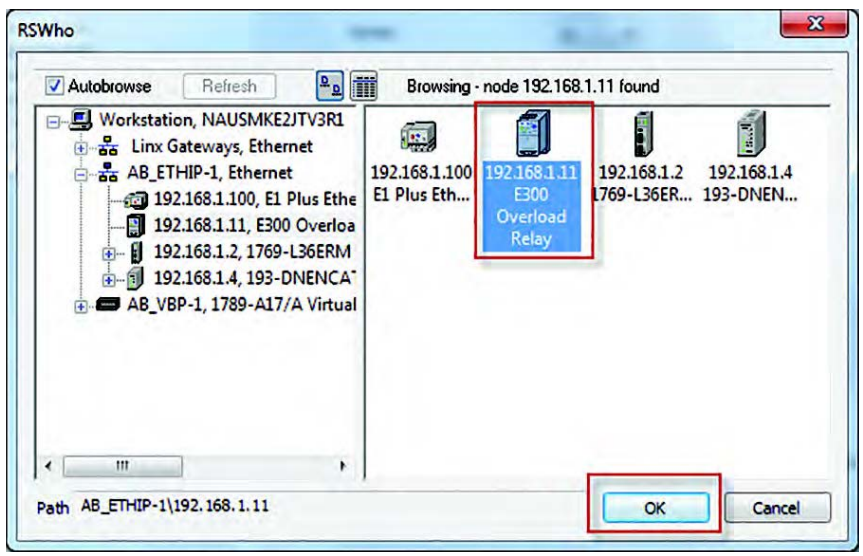


5. Press *Upload* to read the configuration settings from the E300 relay.

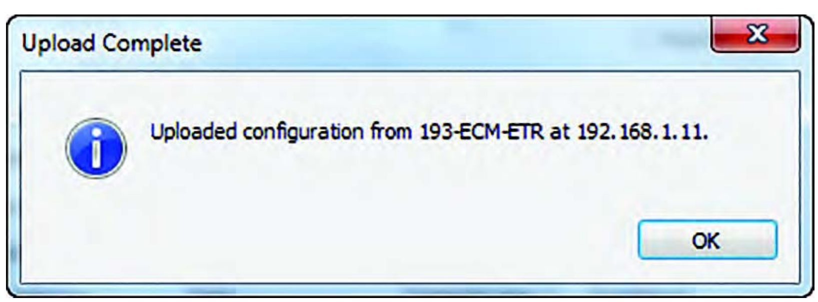
ATTENTION: If an Upload command is not performed, any preconfigured E300 relay configuration data is not retained when downloading an RSLogix 5000 or Studio 5000 project to a Logix controller or when adding a new E300 relay online to a ControlLogix project.



6. Select the appropriate E300 relay that is on the EtherNet/IP network, and press *OK*.

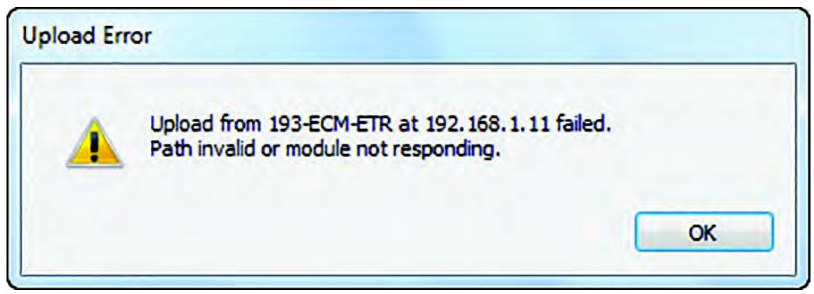


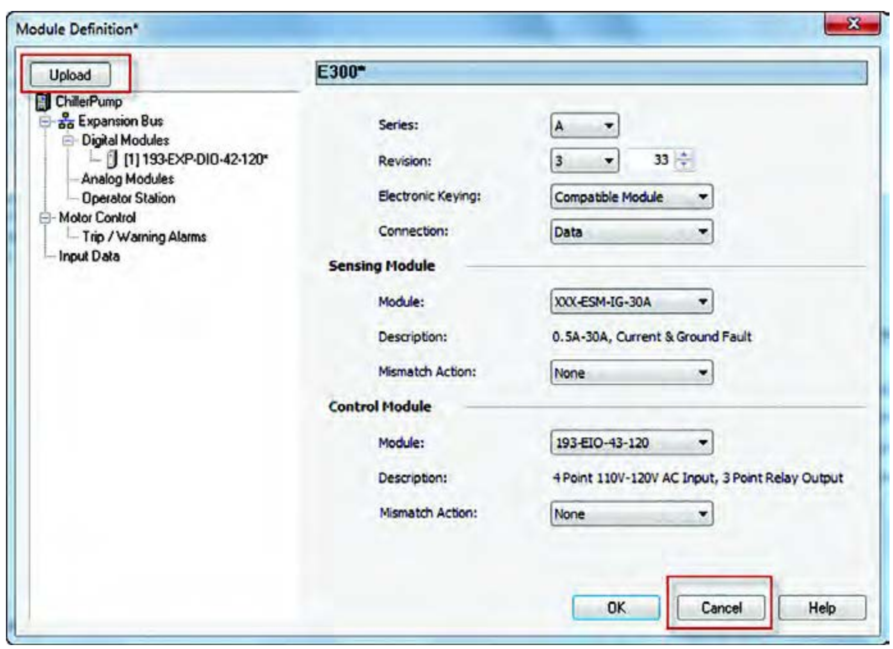
7. If the upload is successful, a display appears indicating the success of this command. Press OK to continue.



If the upload is not successful due to communication errors, a display appears indicating that there was an upload error; the device profile uses its existing settings. Press *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.

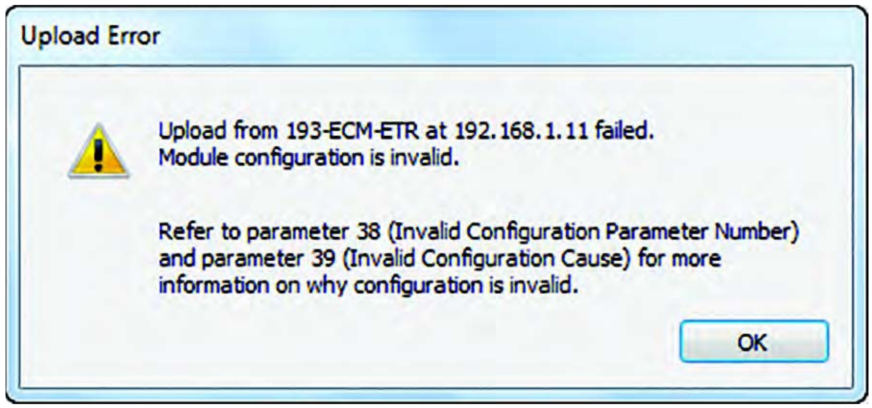
ATTENTION: If an Upload command is not successful when manually adding an E300 relay, failure to cancel the new module addition process results in the loss of any preconfigured E300 relay configuration data. Default values are used when the RSLogix 5000 or Studio 5000 project is downloaded to the Logix controller or when adding an E300 relay online to a ControlLogix project.

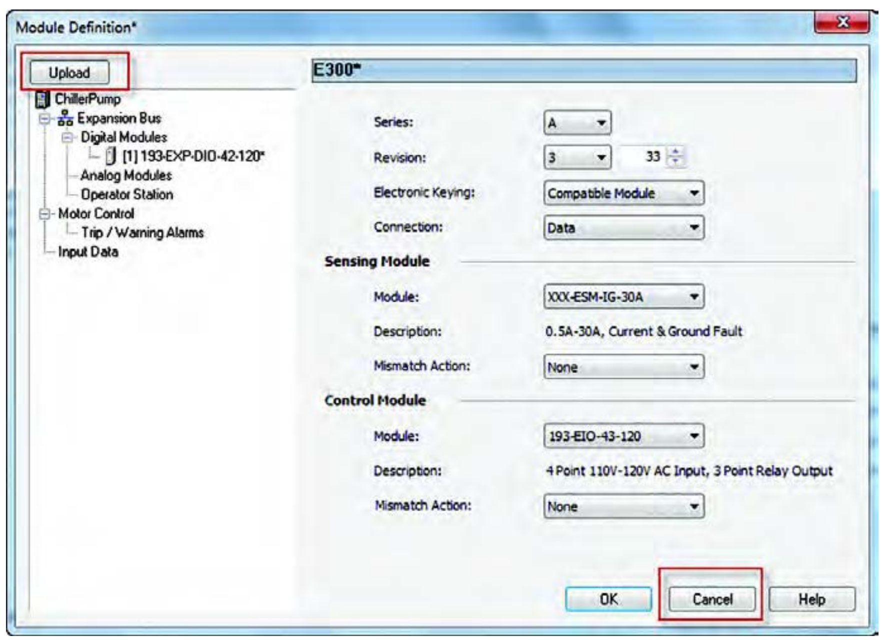




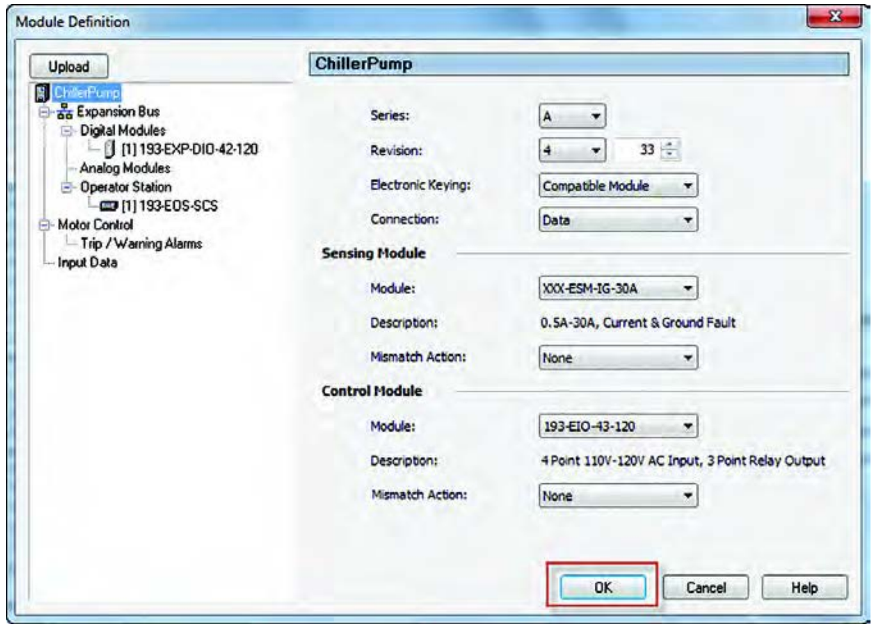
If the upload is not successful due to an E300 configuration trip, a display appears indicating that the profile is using its existing settings. Press *OK* to continue. Read parameters 38 and 39 from the E300 relay to determine the reason for the configuration trip. Fix the issue and press *Upload* again, or press *Cancel* to remove any module definition changes.

ATTENTION: If an Upload command is not successful when manually adding an E300 relay, failure to cancel the new module addition process results in the loss of any preconfigured E300 relay configuration data. Default values are used when the RSLogix 5000 or Studio 5000 project is downloaded to the Logix controller or when adding an E300 relay online to a ControlLogix project.

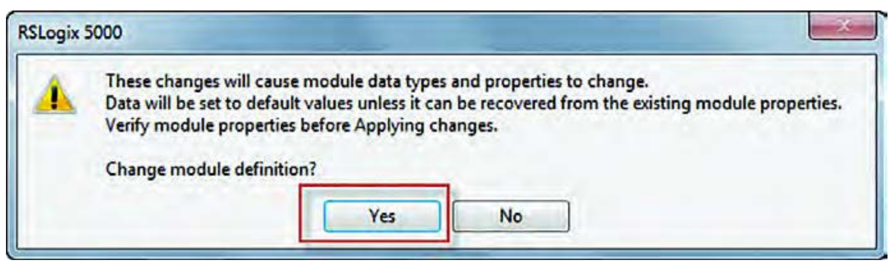




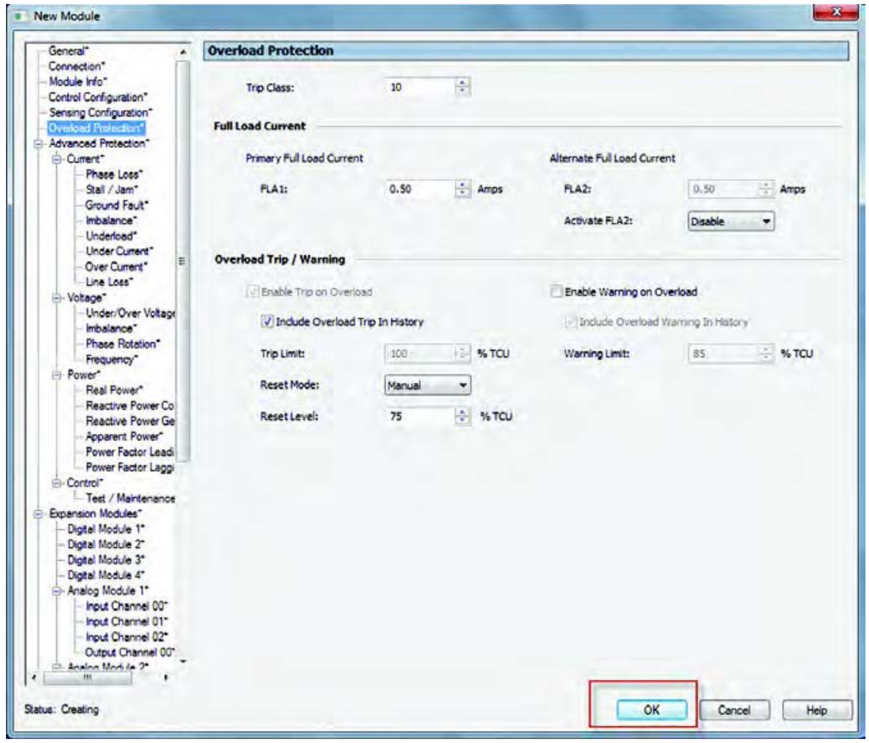
8. Additional module definition changes to E300 relay can be made. Press *OK* when finished making all module definition changes.



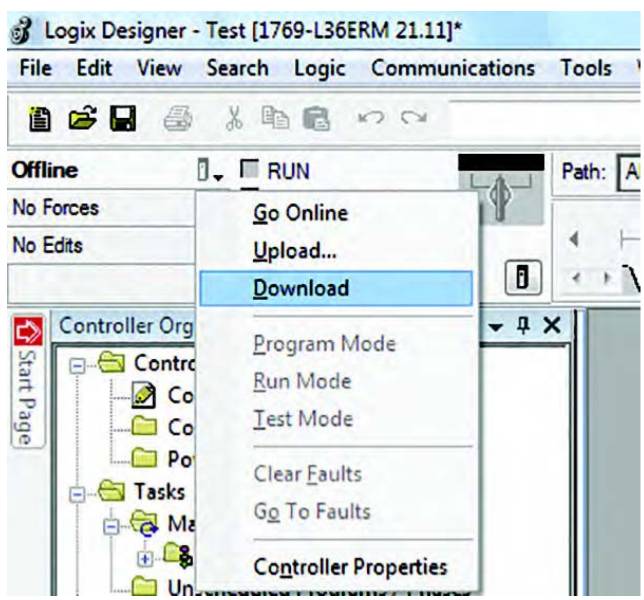
9. Press *Yes* to apply these changes to the module definition and to update the configuration parameters with the data from the upload command. Pressing *No* ignores all changes and returns the E300 relay device profile back to its default settings.



10. Navigate through the E300 Overload Relay device profile tree to make additional configuration edits. When finished, press *OK*.



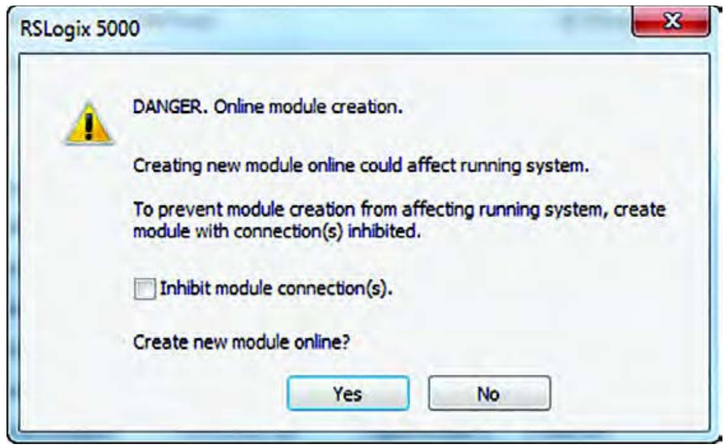
11. For users who are adding a preconfigured E300 relay offline in an RSLogix 5000 or Studio 5000 project, download the updated project to the Logix controller to establish communication between the E300 relay and the Logix controller and to apply these changes to the Logix controller and E300 relay.



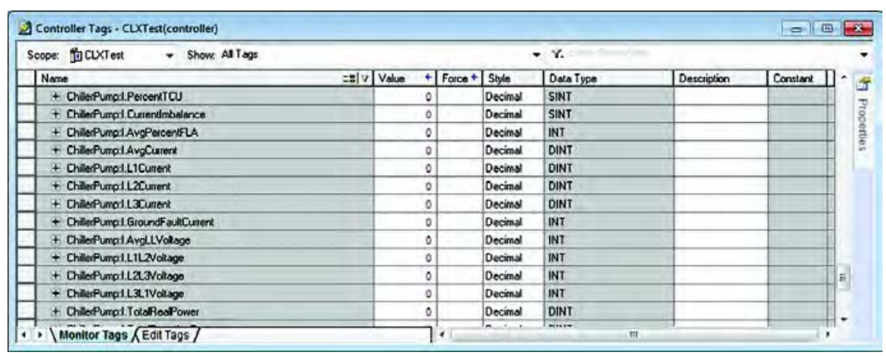
For users who are adding a preconfigured E300 relay online to a ControlLogix controller, a display appears verifying the intent to create a module online.

Press *Yes* to add the preconfigured E300 relay to the Ethernet tree and establish communication between the E300 relay; the ControlLogix controller begins. The E300 relay's configuration data is retained and stored in the ControlLogix controller and in the RSLogix 5000 or Studio 5000 project.

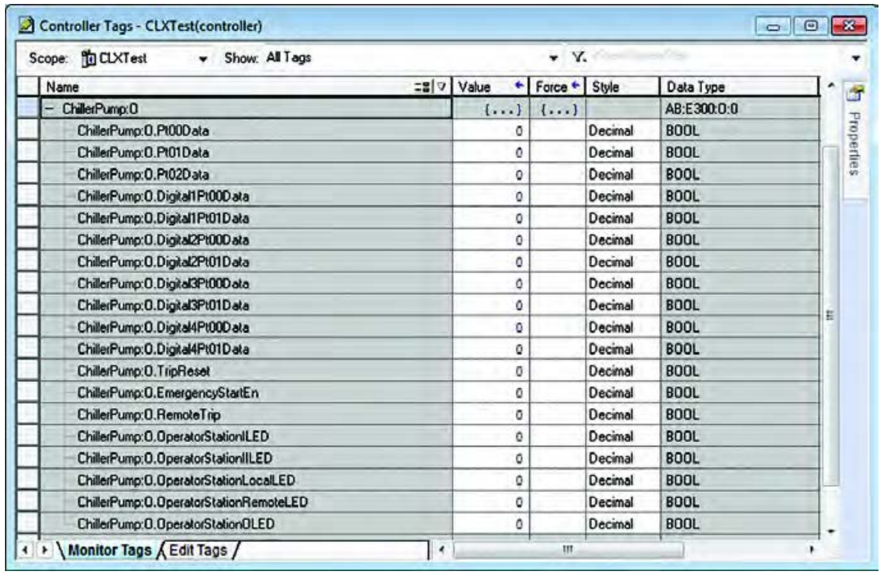
Press *No* to return to the new module profile and make additional edits.



12. To access the data provided by the E300 relay EtherNet/IP Communication Module, navigate to the input tags created by the Add-on Profile.



13. To control the output relays or issue a remote reset command to the E300 relay navigate to the output tags created by the Add-on Profile.


Controller Tags - CLXTest(controller)

Scope: CLXTest Show: All Tags

Name	Value	Force	Style	Data Type
− ChillerPump:O	{...}	{...}		AB:E300:O:0
ChillerPump:O.Pt00Data	0		Decimal	BOOL
ChillerPump:O.Pt01Data	0		Decimal	BOOL
ChillerPump:O.Pt02Data	0		Decimal	BOOL
ChillerPump:O.Digital1Pt00Data	0		Decimal	BOOL
ChillerPump:O.Digital1Pt01Data	0		Decimal	BOOL
ChillerPump:O.Digital2Pt00Data	0		Decimal	BOOL
ChillerPump:O.Digital2Pt01Data	0		Decimal	BOOL
ChillerPump:O.Digital3Pt00Data	0		Decimal	BOOL
ChillerPump:O.Digital3Pt01Data	0		Decimal	BOOL
ChillerPump:O.Digital4Pt00Data	0		Decimal	BOOL
ChillerPump:O.Digital4Pt01Data	0		Decimal	BOOL
ChillerPump:O.TripReset	0		Decimal	BOOL
ChillerPump:O.EmergencyStartEn	0		Decimal	BOOL
ChillerPump:O.RemoteTrip	0		Decimal	BOOL
ChillerPump:O.OperatorStationILED	0		Decimal	BOOL
ChillerPump:O.OperatorStationIILED	0		Decimal	BOOL
ChillerPump:O.OperatorStationLocalLED	0		Decimal	BOOL
ChillerPump:O.OperatorStationRemoteLED	0		Decimal	BOOL
ChillerPump:O.OperatorStationOLED	0		Decimal	BOOL

Monitor Tags / Edit Tags

Offline E300 relay Logix Integration with Add-on Profile

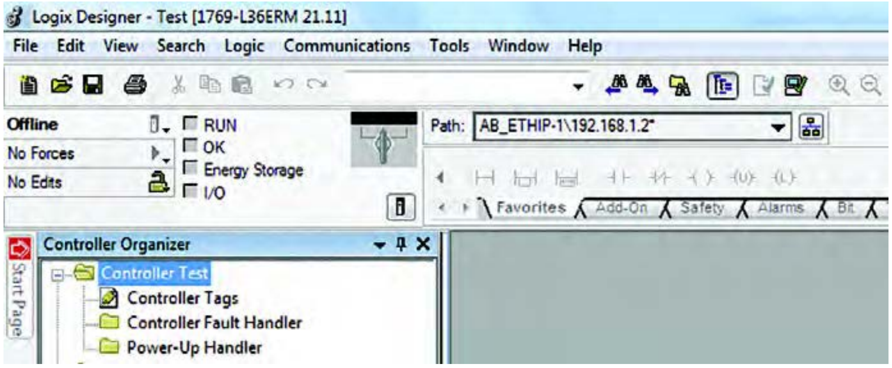
The E300 Add-on Profile for RSLogix 5000 and Studio 5000 provides an efficient means to allow you to configure an E300 relay offline in a new or existing project. You can take advantage of copying and pasting an offline configured E300 relay to quickly configure multiple E300 relays.

The E300 Add-on Profile automatically enables Automatic Device Configuration in which the Logix controller downloads the configuration setting changes to the E300 relay when the Logix controller establishes a connection to it.

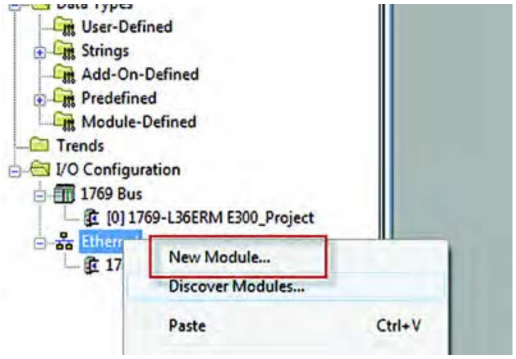
ATTENTION: Any preconfigured E300 relay configuration data is not retained when downloading an RSLogix 5000 or Studio 5000 project to a Logix controller.

Follow the steps provided to integrate an E300 relay using the E300 Add-on Profile to a Logix controller offline:

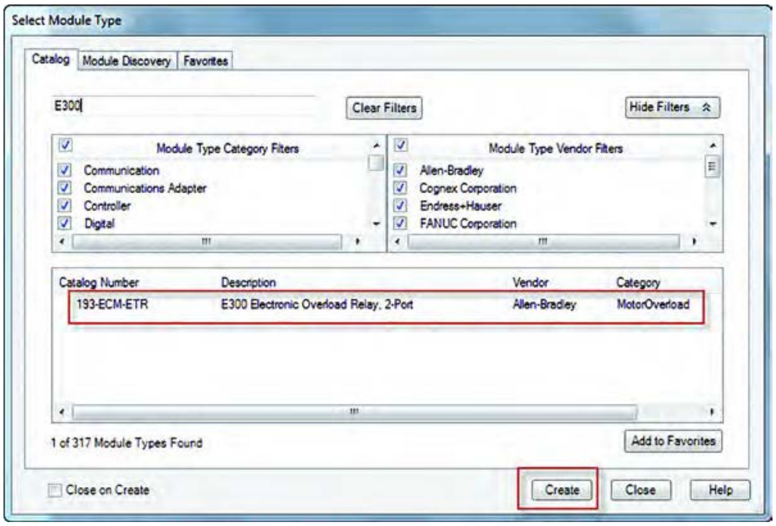
1. Create a new or open an existing RSLogix 5000 or Studio 5000 project and verify that the Logix controller is offline.



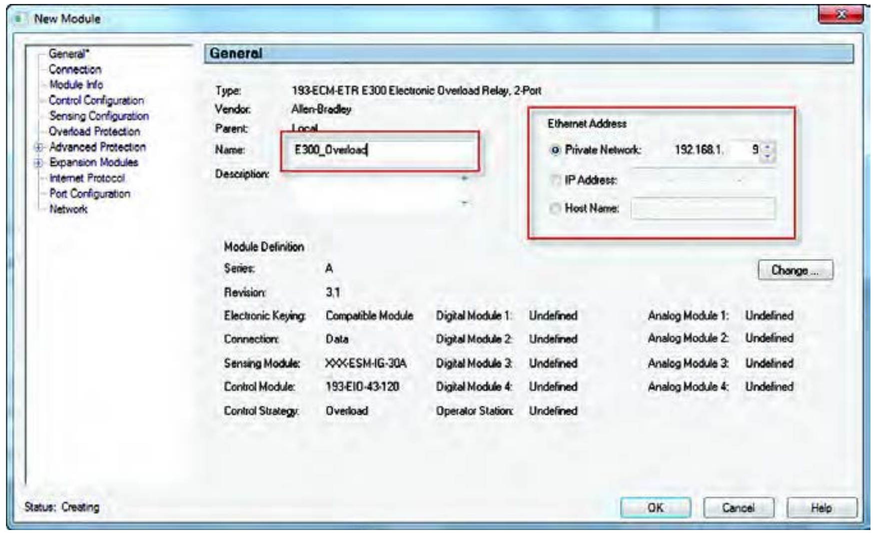
2. Right-click on the EtherNet/IP scanner within the I/O Configuration folder, then select New Module to open the Select Module Type window.



3. Select the E300 relay EtherNet/IP Communication Module (193-ECM-ETR), then click Create.

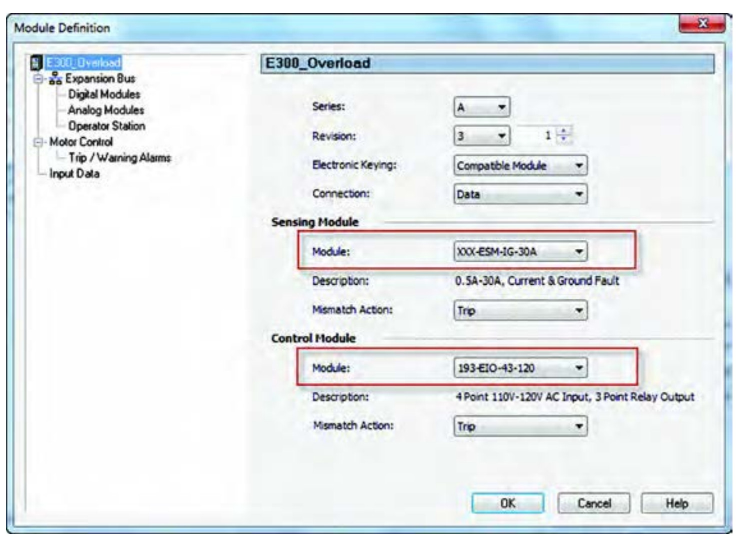


4. Enter a name and the IP address for the E300 relay EtherNet/IP Communication Module. The name creates tags in RSLogix 5000 or Studio 5000 that can be used to read and write data from the E300 relay EtherNet/IP Communication Module.



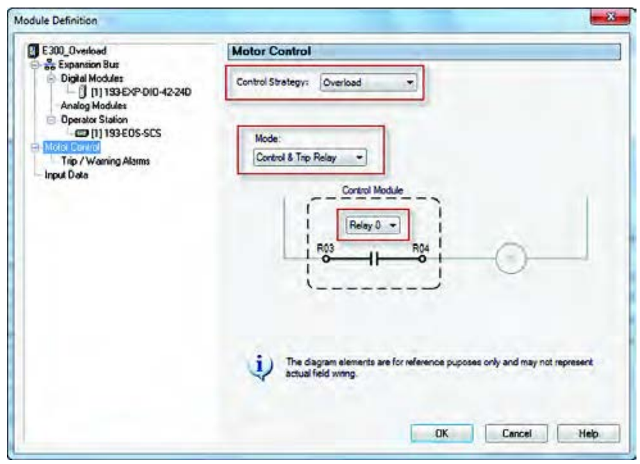
5. Select Change to select the modules and accessories of the E300 relay system.

6. Select the specific E300 relay Sensing and Control Modules and their respective Option Match actions.

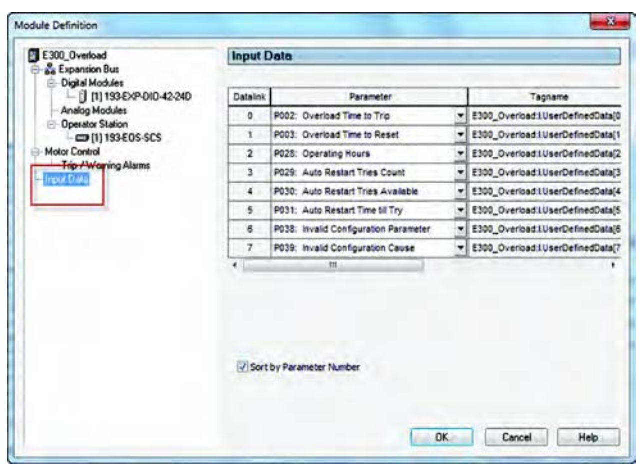


7. Right click on the Expansion Bus to add the specific Expansion Bus accessories for the E300 relay system and select their specific Option Match action. When finished, press OK.

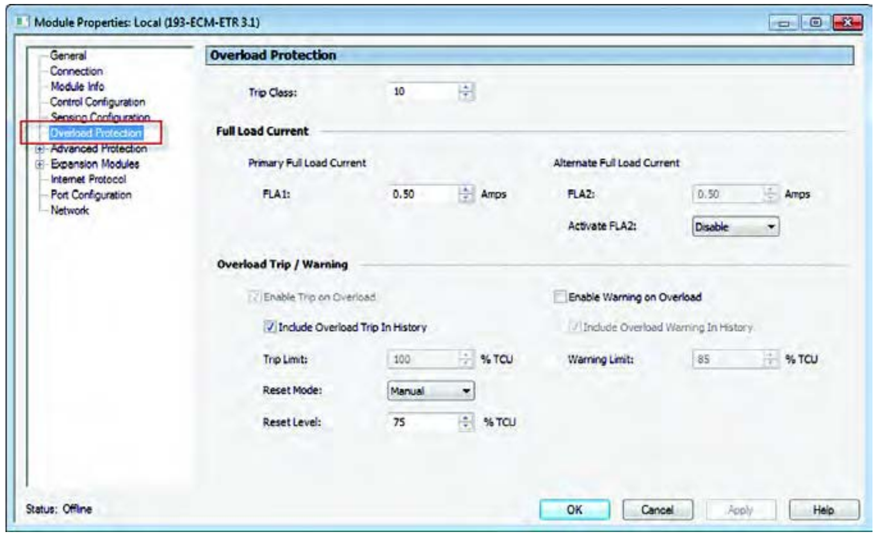
8. Configure the E300 relay system's Operating Mode and associated relay output assignments. See Chapter 5 for more information about Operating Modes.



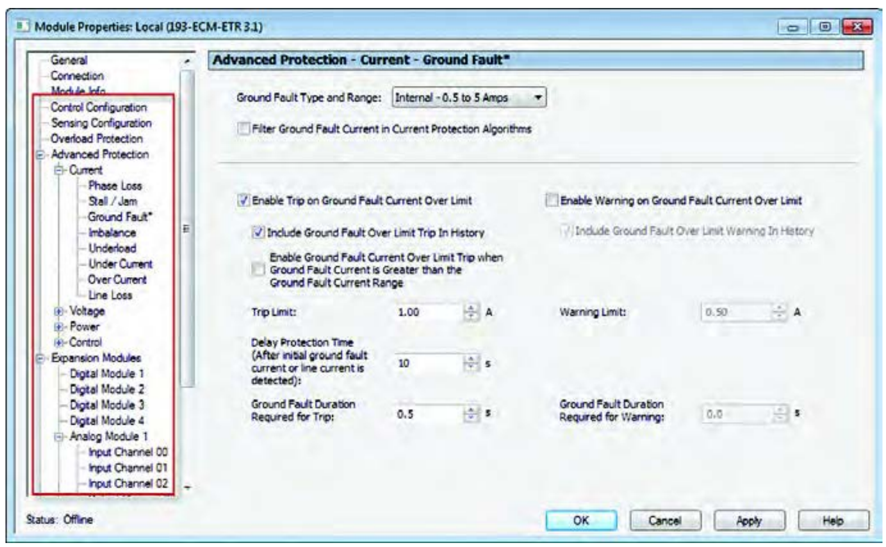
9. The E300 relay allows you to configure up to eight Datalinks. Select the parameters for the additional data to be included with the input tags. Press OK to complete the module definition.



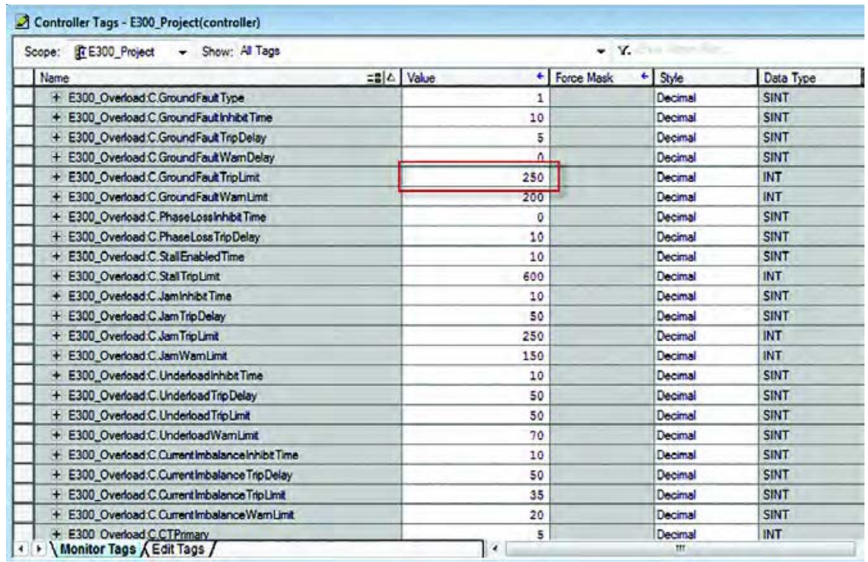
10. Next, set the overload protection configuration parameters for your specific motor application by selecting Protection.



11. To configure the other parameters for a Control Module with firmware v3.000 or higher, navigate to the proper display and make the appropriate adjustments.

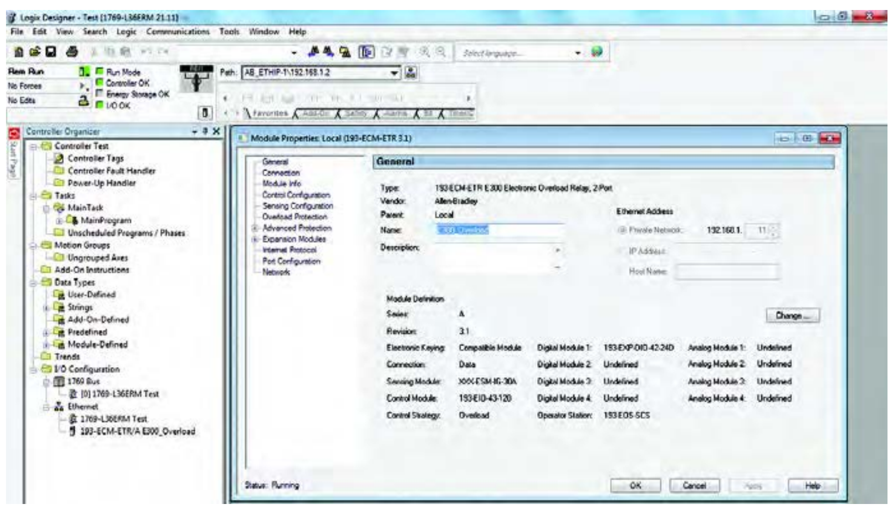


To configure the other configuration parameters for Control Modules with firmware v1.000 and v2.000, navigate to the configuration tags of the newly added E300 relay. Modify the configuration tags directly to enable and adjust the other current-, voltage-, power-, and control-based protection functions of the E300 relay.

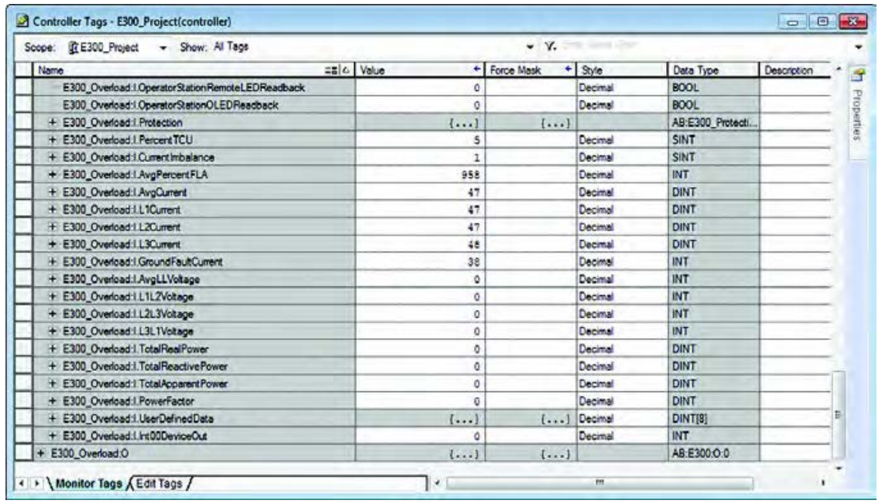


12. When finished, press OK to complete the addition of the E300 relay to the Logix system.

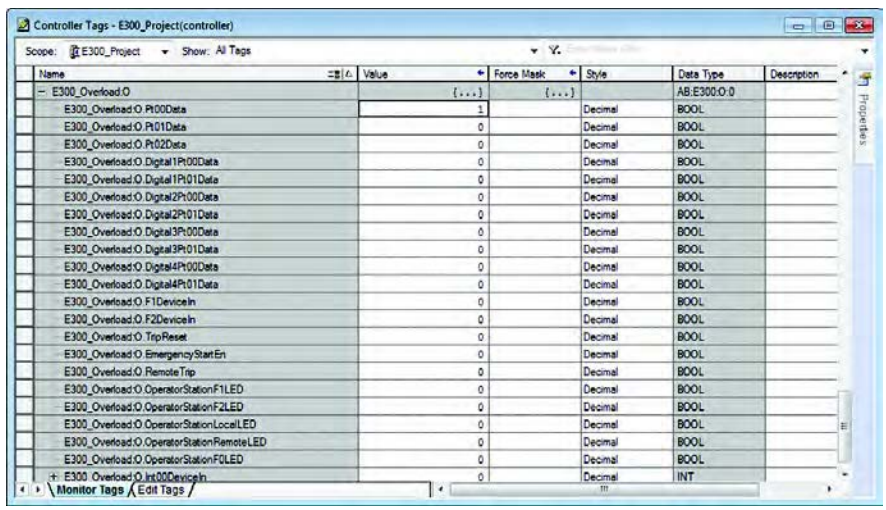
13. Download the project to the Logix controller, and place the controller into Run Mode. The E300 relay is actively communicating with the Logix controller.



14. To access the data provided by the E300 relay EtherNet/IP Communication Module, navigate to input tags created by the Add-on Profile.



15. To control the output relays or remote reset the E300 relay navigate to the output tags created by the Add-on Profile.

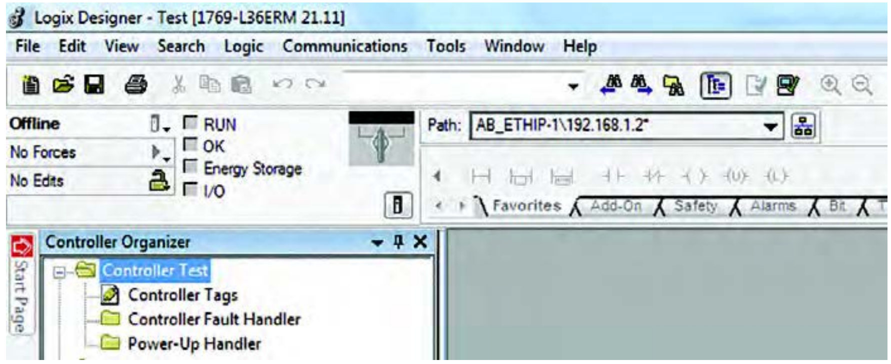


Offline E300 relay Integration with a Generic Profile

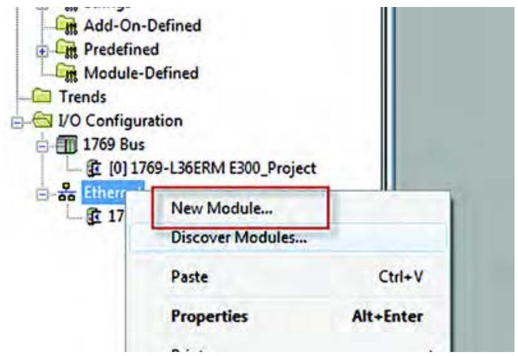
For users who would like to establish communication between an E300 relay and a Logix Controller with Automatic Device Configuration disabled or between a non-Logix based automation control system, a Generic Profile can be used.

Follow the steps provided to integrate an E300 relay using a Generic device profile to a Logix controller offline:

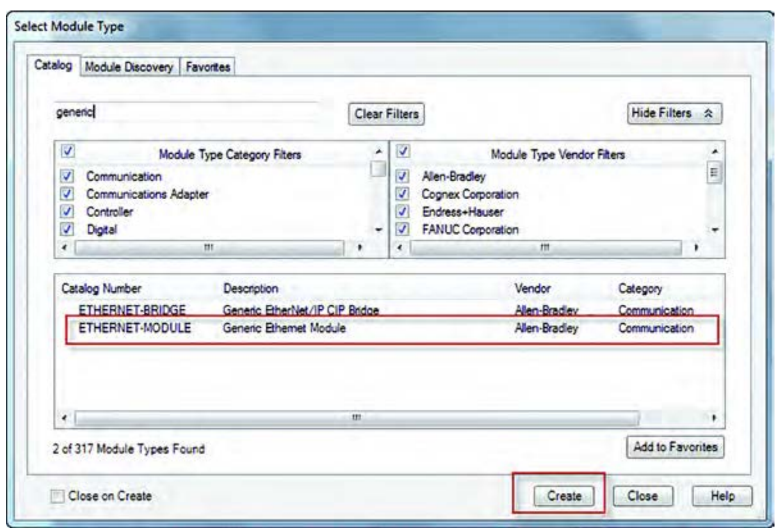
1. Create a new or open an existing RSLogix 5000 or Studio 5000 project and verify that the Logix controller is offline.



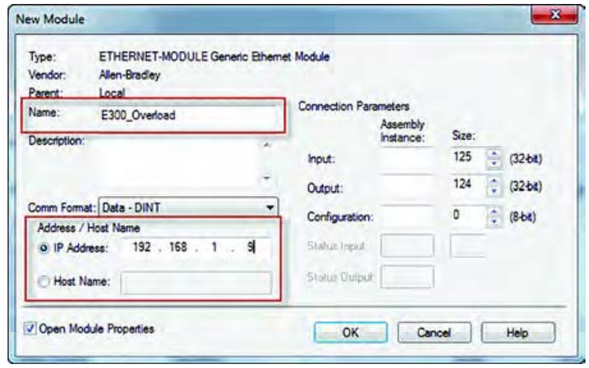
2. Right-click on the EtherNet/IP scanner within the I/O Configuration folder, then select New Module to open the Select Module Type window.



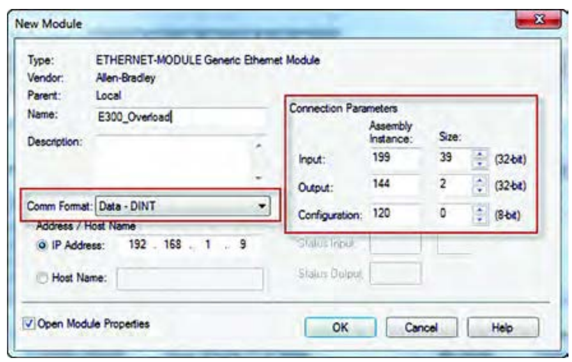
3. Select the Generic Ethernet Module, then click Create.



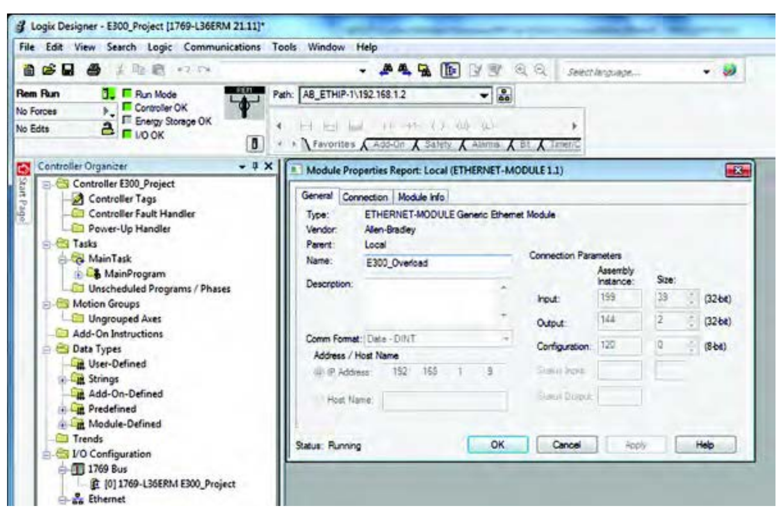
4. Enter a name and the IP address for the E300 relay EtherNet/IP Communication Module. The name creates tags in RSLogix 5000 or Studio 5000 that can be used to read and write data from the E300 relay EtherNet/IP Communication Module.



5. Select Data-DINT for the Comm Format. The Data-DINT format represents the data from the EtherNet/IP Communication Auxiliary E300 relay EtherNet/IP Communication Module as a collection of 32-bit values. Set the I/O Assemblies to the following values:
   - Input Assembly Instance 199 (Size 39)
   - Output Assembly Instance 144 (Size 2)
   - Configuration Assembly Instance 120 (Size 0)



6. Download the project to the controller and go online.



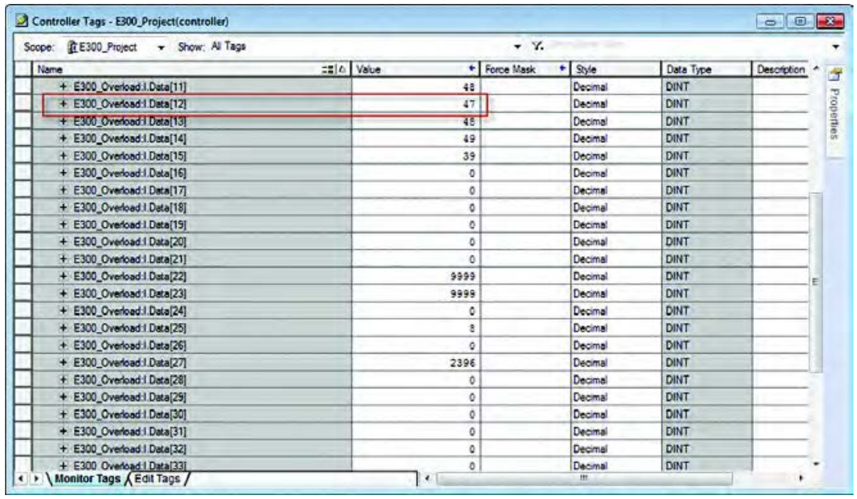
7. To access the data provided by the E300 relay EtherNet/IP Communication Module, navigate to input tags created by the Generic Profile. Table 565 represents the Input Assembly data.

Table 565 - Instance 199 - Input (Produced) Assembly

INT	DINT	Bit															
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	0	Reserved for Logix															
1																	
2	1	DeviceStaus0															
3		DeviceStaus1															
4	2	InputStatus0															
5		InputStatus1															
6	3	OutputStatus															
7		OpStationStatus															
8	4	TripStsCurrent															
9		WarnStsCurrent															
10	5	TripStsVoltage															
11		WarnStsVoltage															
12	6	TripStsPower															
13		WarnStsPower															
14	7	TripStsControl															
15		WarnStsControl															
16	8	TripStsAnalog															
17		WarnStsAnalog															
18	9	Reserved															
19																	
20	10									ThermUtilizedPct							
		CurrentImbalance															
21		AvgPercentFLA															
22	11	AverageCurrent															
23																	
24	12	L1Current															
25																	
26	13	L2Current															
27																	
28	14	L3Current															
29																	
30	15	GFCurrent															
31		Reserved															
32	16	AvgVoltageLtoL															
33		L1toL2Voltage															
34	17	L2toL3Voltage															
35		L3toL1Voltage															

INT	DINT	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
36	18	TotalRealPower															
37																	
38	19	TotalReactivePwr															
39																	
40	20	TotalApparentPwr															
41																	
42	21	TotalPowerFactor															
43																	
44	22	Datalink0															
45																	
46	23	Datalink1															
47																	
48	24	Datalink2															
49																	
50	25	Datalink3															
51																	
52	26	Datalink4															
53																	
54	27	Datalink5															
55																	
56	28	Datalink6															
57																	
58	29	Datalink7															
59																	
60	30	PtDeviceOuts															
61		AnDeviceOuts															
62	31	InAnMod1Ch00															
63		InAnMod1Ch01															
64	32	InAnMod1Ch02															
65		Reserved															
66	33	InAnMod2Ch00															
67		InAnMod2Ch01															
68	34	InAnMod2Ch02															
69		Reserved															
70	35	InAnMod3Ch00															
71		InAnMod3Ch01															
72	36	InAnMod3Ch02															
73		Reserved															
74	37	InAnMod4Ch00															
75		InAnMod4Ch01															
76	38	InAnMod4Ch02															
77		Reserved															

For example, E300_Overload:I.Data[12] represents L1 Current as shown below.

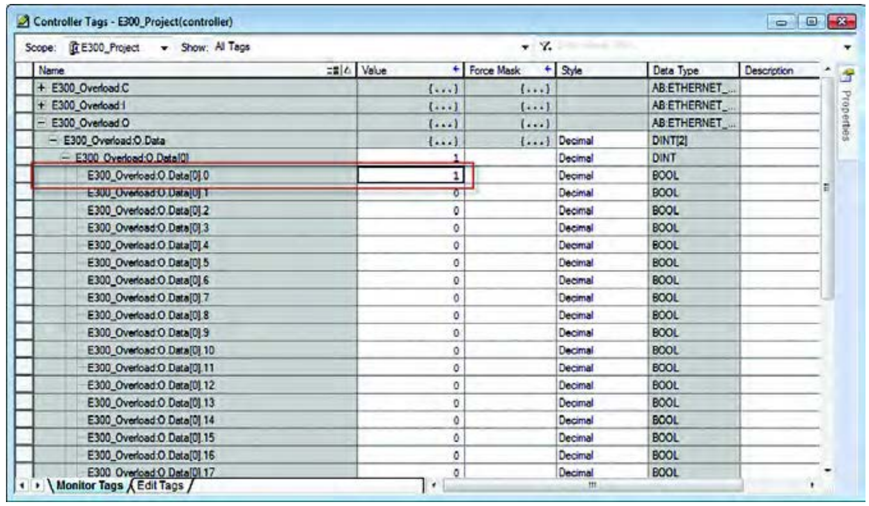


8. To control the output relays or remotely reset the E300 relay, navigate to the output tags created by the Generic Profile. Table 566 represents the Input Assembly data.

Table 566 - Instance 144 - Output (Consumed) Assembly

<table>
<tr><th rowspan="2">INT</th><th rowspan="2">DINT</th><th colspan="16">Bit</th></tr>
<tr><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="12">0</td><td colspan="16">OutputStatus0</td></tr>
<tr><td rowspan="11">1</td><td colspan="8">NetworkStart1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>X</td></tr>
<tr><td colspan="8">NetworkStart2</td><td></td><td></td><td></td><td></td><td></td><td></td><td>X</td><td></td></tr>
<tr><td colspan="8">TripReset</td><td></td><td></td><td></td><td></td><td></td><td>X</td><td></td><td></td></tr>
<tr><td colspan="8">EmergencyStart</td><td></td><td></td><td></td><td></td><td>X</td><td></td><td></td><td></td></tr>
<tr><td colspan="8">RemoteTrip</td><td></td><td></td><td></td><td>X</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="8">Reserved</td><td>X</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>X</td><td colspan="8">HMILED1Green</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>X</td><td></td><td colspan="8">HMILED2Green</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>X</td><td></td><td></td><td colspan="8">HMILED3Green</td></tr>
<tr><td></td><td></td><td></td><td></td><td>X</td><td></td><td></td><td></td><td colspan="8">HMILED3Red</td></tr>
<tr><td></td><td></td><td></td><td>X</td><td></td><td></td><td></td><td></td><td colspan="8">HMILED4Red</td></tr>
<tr><td>X</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td colspan="8">Reserved</td></tr>
<tr><td>2</td><td rowspan="2">1</td><td colspan="16">DLXPtDeviceIn</td></tr>
<tr><td>3</td><td colspan="16">DLXAnDeviceIn</td></tr>
</table>

For example, E300_Overload:O.Data[0].0 represents Relay Output Pt00 as shown below.



E-mail/Text

The E300 relay EtherNet/IP Communication Module is capable of sending 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

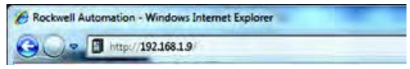
EXAMPLE	*E-mail Subject:* E300 Overload Relay has detected a fault *E-mail Body:* Fault Status: Device Name: E300 Overload Relay Device Description: Motor Starters Device Location: Bay 6-U29 Contact Info: Contact Person contactperson@thecontact.com

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.

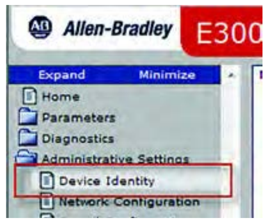
E-mail Configuration

To be able to send an e-mail, the IP address of the host name of a Simple Mail Transfer Protocol (SMTP) server must be configured and notifications must be selected. 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.



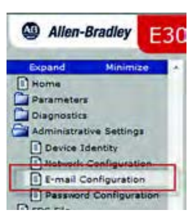
2. Select Administrative Settings>Device Identity



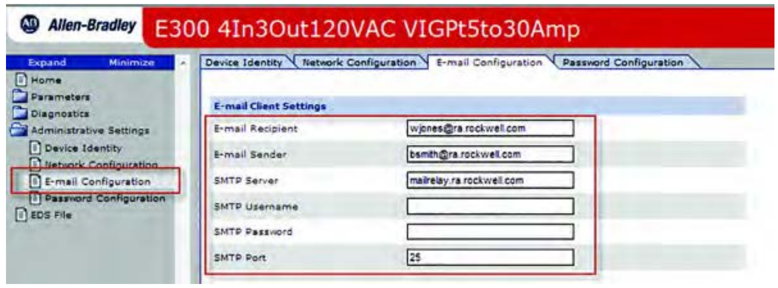
3. Type the Device Identity information into the fields as described below and press Apply.

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

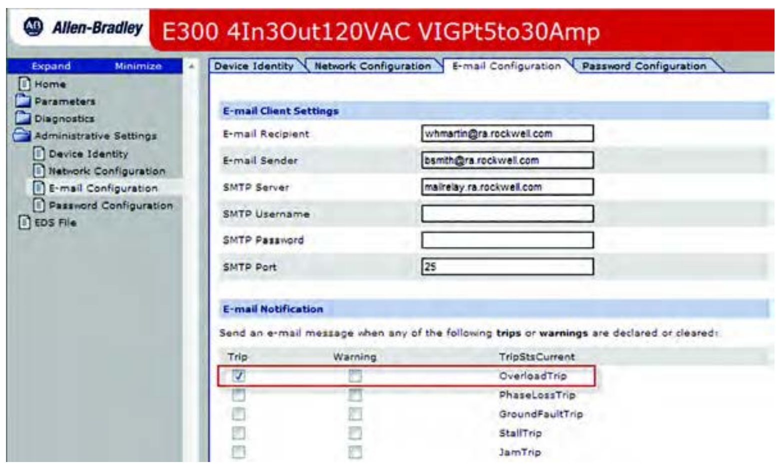


5. Type the information into the e-mail notification fields as stated below. Multiple e-mail addresses can be entered into the E-mail Recipient field by separating each e-mail address with a semicolon (;). The E-mail Recipient field is limited to 255 characters.



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.

Troubleshooting

The following table identifies possible causes and corrective actions when troubleshooting the E300 relay EtherNet/IP Communication Module.

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.

Status LED	Color	State	Possible Cause	Corrective Action
Module Status (MS)	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 EtherNet/IP 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.
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.

Firmware Updates

Introduction

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 of the E300 relay modules and subsystems for that specific system release.

Table 567 shows the specific firmware revisions for all E300 relay modules and subsystems for all of the available system releases.

Table 567 - E300 System Revision Table

	E300 System Revision	**1.034**	**1.035**	**1.085**	**2.034**	**2.035**	**2.036**	**2.085**	**3.033**	**3.034**	**3.049**	**3.050**	**3.083**	**4.033**	**4.034**	**4.049**	**4.050**	**4.083**	**5.082**
E300 Control Module	193-EIO Application	1.002	1.004	1.005	2.002	2.003	2.004	2.005	3.001	3.002	3.001	3.002	3.003	4.001	4.002	4.001	4.002	4.003	5.002
	193-EIO Boot Code	1.005	1.005	1.005	1.006	1.006	1.006	1.006	1.007	1.007	1.007	1.007	1.007	1.007	1.007	1.007	1.007	1.008	1.008
	193-EIO EDS Files	—	—	—	—	—	—	—	3.001	3.001	3.001	3.001	3.001	4.001	4.001	4.001	4.001	4.001	5.001
	193-DLX Program Files	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.001
	193-EIO Language Files	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.001
E300 Communication Module	193-ECM-ETR Application	1.003	1.003	1.006	1.003	1.003	1.003	1.006	1.003	1.003	1.004	1.004	1.006	1.003	1.003	1.004	1.004	1.006	1.006
	193-ECM-ETR Boot Code	2.001	2.001	2.001	2.001	2.001	2.001	2.001	2.001	2.001	2.001	2.001	2.001	2.001	2.001	2.001	2.001	2.001	2.001
	193-ECM-ETR FPGA	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008
	193-ECM-ETR File System	1.001	1.001	1.002	1.001	1.001	1.001	1.002	1.001	1.001	1.002	1.002	1.002	1.001	1.001	1.002	1.002	1.002	1.002
E300 Sensing Module	193-ESM Sensing Module	1.001	1.001	1.001	2.002	2.002	2.003	2.003	2.002	2.003	2.002	2.003	2.003	2.002	2.003	2.002	2.003	2.003	2.003

Table 568 shows which firmware revisions are compatible with the other E300 relay modules and their associated subsystems.

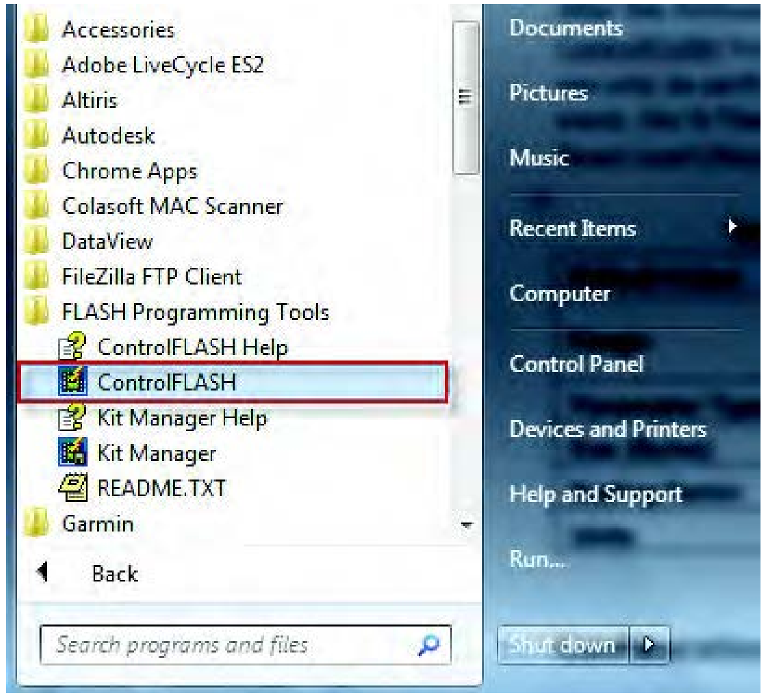
Table 568 - E300 Firmware Compatibility Table

		193-EIO Application	**1.002**	**1.003**	**1.004**	**2.002**	**2.003**	**2.004**	**3.001**	**3.002**	**4.001**	**4.002**	**4.003**	**5.002**
E300 Control Module		193-EIO Boot Code	1.005	1.005	1.005	1.006	1.006	1.006	1.007	1.007	1.007	1.007	1.008	1.008
		193-EIO EDS Files	—	—	—	—	—	—	3.001	3.001	4.001	4.001	4.001	5.002
		193-DLX Program Files	—	—	—	—	—	—	—	—	—	—	—	1.001
		193-EIO Language Files	—	—	—	—	—	—	—	—	—	—	—	1.001
E300 Communication Module	193-ECM-ETR Application	1.003	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	193-ECM-ETR File System	1.001	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	193-ECM-ETR File System	1.004	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	193-ECM-ETR File System	1.002	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	193-ECM-ETR File System	1.006	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	193-ECM-ETR File System	1.002	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	193-ECM-ETR Boot Code	2.001	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	193-ECM-ETR FPGA	1.008	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
E300 Sensing Module	193-ESM Sensing Module	1.001	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
		2.002	—	—	—	✔	✔	✔	✔	✔	✔	✔	✔	✔
		2.003	—	—	—	✔	✔	✔	✔	✔	✔	✔	✔	✔
E300 Digital I/O Expansion Modules	193-EXP-DIO-42-24D	—	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	193-EXP-DIO-42-120	—	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	193-EXP-DIO-42-240	—	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
E300 Analog I/O Expansion Module	193-EXP-AIO-31	—	—	—	—	—	—	—	✔	✔	✔	✔	✔	✔
E300 Operator Stations	193-EOS-SCS	—	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	193-EOS-SDS	—	—	—	—	—	—	—	✔	✔	✔	✔	✔	✔

Updating Firmware

Firmware for the E300 relay modules and their associated subsystems can be downloaded from the Product Compatibility and Download Center located at http://www.rockwellautomation.com/rockwellautomation/support/pcdc.page?.

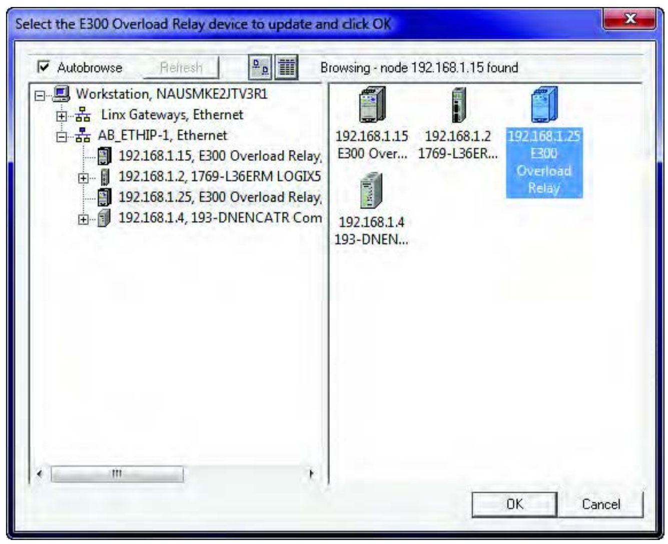
After the firmware has been downloaded and installed, run the ControlFLASH application by selecting ControlFLASH from the Start menu located at *Start -> FLASH Programming Tools -> ControlFlash* as shown below.



Select the Local directory to locate the ControlFLASH update file and press *Next* to continue.

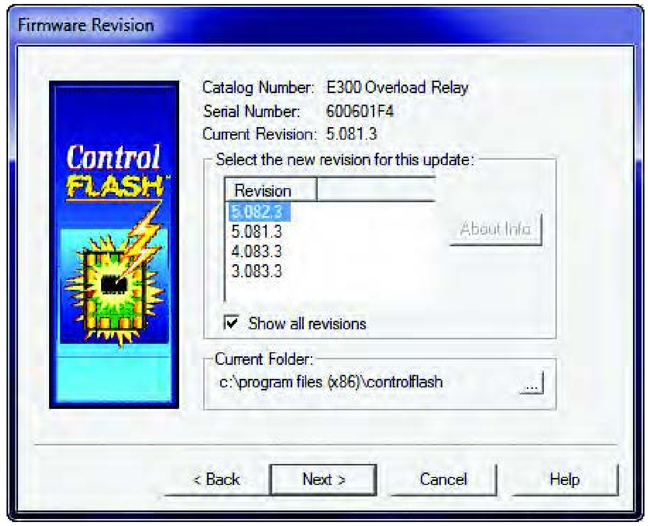
Select E300 Overload Relay update file and press *Next*.

Select the specific device to update and press *OK*.

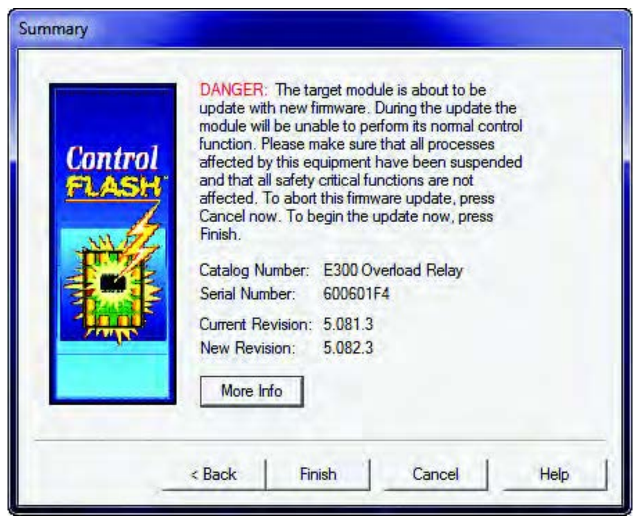


Select the E300 Overload Relay and press *OK*.

Select the specific firmware revision for the firmware update and press *Next*.

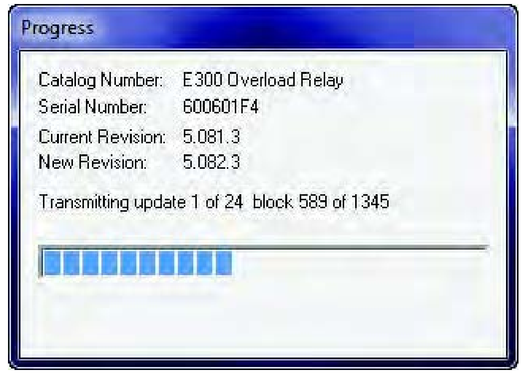


Press *Finish* to begin the firmware update process.

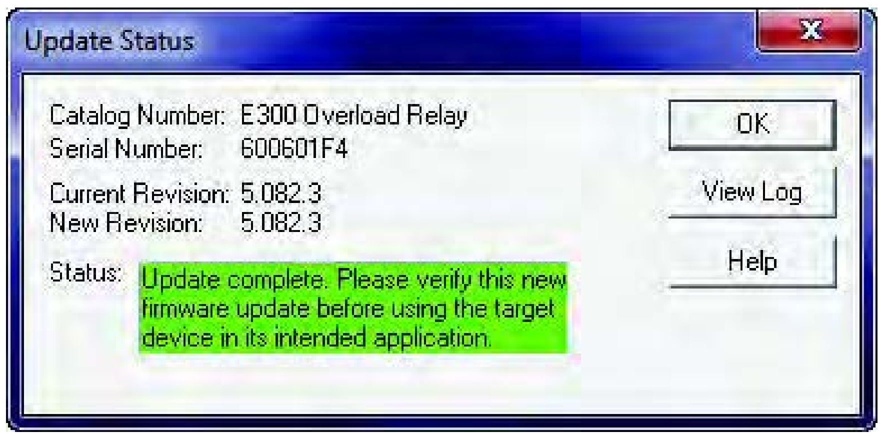


Verify that you want to update the firmware for that specific module subsystem by pressing *Yes*.

The ControlFLASH utility begins to download the new firmware files. At the end of the download, the device automatically resets.



When the device finishes its power cycle sequence, a successful firmware update message is displayed. Press *OK* to finish the firmware update process.



IMPORTANT	Do not interrupt power or communication to the device during the firmware update process. Failure of control power or communication could permanently damage the device.

Troubleshooting

Introduction

This chapter helps 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.

Advisory LEDs

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 LED

The E300 relay Power LED identifies the state of the E300 relay system.

Table 569 - Power LED

Blinking Green	Device Ready / Ready Mode
Solid Green	Device Active (Current Detected) / Run Mode
Solid Red	Device Error
Blinking Red ❶	Communication Error
Blinking Green/Red ❶	Copy Cat in Progress

❶ Available on Operator Station

Module Status (MS) LED

Refer to the Troubleshooting section in Chapter 10 to explain the states of the Module Status (MS) LED of the E300 EtherNet/IP Communication Module.

Network Status (NS) LED

Refer to the Troubleshooting section in Chapter 10 to explain the states of the Network Status (NS) LED of the E300 EtherNet/IP Communication Module.

Trip/Warn LED

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 570 - Trip / Warn LED

Blinking Red	Trip Event
Blinking Yellow	Warning Event

Listed below are the blink patterns for the E300 relay trip and warning events.

Table 571 - 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

	Code	Long Blink Pattern	Short Blink Pattern
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
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

	Code	Long Blink Pattern	Short Blink Pattern
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

Resetting a Trip

ATTENTION: Resetting a trip does not correct the cause for the trip. Take corrective action before resetting 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 Procedures

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.

Trip Description	Possible Cause	Corrective Action
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.

Trip Description	Possible Cause	Corrective Action
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)
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.

Specifications

Electrical Specifications

Table 572 - Motor/Load Ratings

Terminals	1/L1, 3/L2, 5/L3, 2/T1, 4/T2, 6/T3
Rated Insulation Voltage (U_i)	690V AC
Rated Operating Voltage (U_e) IEC: UL:	 690V AC 600V AC
Rated Impulse Voltage (U_{imp})	6 kV
Rated Operating Current (I_e)	See Catalog Number Explanation
Rated Frequency	45...65 Hz
Short Circuit Ratings	See Short-Circuit Ratings on page 56
Number of Poles	3
Application	Single-phase or Three-phase

Table 573 - Power Supply Ratings

Rated Supply Voltage (U_s)	24V DC	120V AC	240V AC
Operating Range	11…30V DC	85…132V AC	159…265V AC
Maximum Inrush Current	3 A for 30 ms	10 A for 1 ms	8 A for 3 ms
Maximum Power Consumption E300: E300 with expansion:	 6 W 8 W		
Maximum Power Interruption Time V_{min}: V_{max}:	 5 ms 5 ms	 10 ms 10 ms	 10 ms 10 ms

Table 574 - Output Relay Ratings (Control Module and Expansion Digital Module)

Terminals Relay 0: Relay 1: Relay 2:	 R03/R04 R13/R14 R23/R24
Type of Contacts	Form A SPST - NO
Rated Thermal Current (I_{the})	5 A
Rated Insulation Voltage (U_i)	300V AC
Rated Operating Voltage (U_e)	250V AC
Rated Operating Current (I_e)	3 A (@120V AC), 1.5 A (@240V AC) 0.25 A (@110V DC), 0.1 A (@220V DC)
Minimum Operating Current	10 mA @ 5V DC
Rating Designation	B300
Utilization Category	AC-15
Resistive Load Rating (p.f. = 1.0)	5 A, 250V AC 5 A, 30V DC

Table 574 - Output Relay Ratings (Control Module and Expansion Digital Module)

Inductive Load Rating (p.f. = 0.4) (L/R = 7 ms)	2 A, 250V AC 2 A, 30V DC
Short Circuit Current Rating	1,000 A
Recommended Control Circuit Fuse	KTK-R-6 (6 A, 600 V)
Rated Number of Operations Relay 0, Relay 1, and Relay 2: W/100-C09…100-C43 W/100-C60…100-C85 W/NEMA Size 0…2 W/NEMA Size 3	5,000,000 2,500,000 1,000,000 300,000

Table 575 - Input Ratings (Control Module and Expansion Digital Module)

Terminals Input 0: Input 1: Input 2: Input 3: Input 4: Input 5:	IN0 IN1 IN2 IN3 IN4 IN5		
Supply Voltage	24V DC	120V AC	240V AC
Type of Inputs	Current Sinking		
On-State Voltage	11V DC	74V AC	159V AC
On-State Current (turn-on)	2 mA	5 mA	5 mA
Off-State Voltage	5V DC	20V AC	40V AC
Off-State Current	1.5 mA	2.5 mA	2.5 mA
Transition Voltage	5...11V DC	20…74V AC	40…159V AC
Transition Current	1.5...2.0 mA	2.5…5 mA	2.5…5 mA

Table 576 - Analog I/O Ratings (Expansion Analog Module)

Module	
Bus to In/Out isolation	1000V AC = 1415V DC (1 min.)
Group Isolation (In/Out)	1000V AC = 1415V DC (1 min.)
Channel to channel isolation	None
Max. current draw	85 mA at 24V
Max. Surge Current at Power-Up	0.5 A @ 24V DC for 1 ms
Input Channels	
Input ranges	Current: 0…20 mA, 4…20 mA Voltage: 0…10V, 1…5V, 0…5V RTD: 100 Ω, 200 Ω, 500 Ω and 1000 Ω PT385 and Pt3916, 100 Ω Ni618 and Ni672, 10 Ω Cu 426, 604 Ω NiFe 518 Resistance: 0-150 Ω, 0-750 Ω, 0-3000 Ω, 0-6000 Ω
Input Impedance Tolerances	Current Impedance: 249 Ω ± 1.0% Voltage Impedance: 10M at $10V_{in}$ 4M at $5V_{in}$ 680k at $1V_{in}$
Input resolution	12 bits

Table 576 - Analog I/O Ratings (Expansion Analog Module)

Output Channels	
Output ranges	Current: 0…20 mA, 4…20 mA Voltage: 0…10V, 0…5V, 1…5V
Output Resolution	12 bits
Voltage Output Load	2k Ω min. at 10V output (5 mA max.), including wire resistance
Current Output Load	50 Ωminimum to 750 Ω max
Output Impedance	Current: >1MΩ, Voltage: <1 Ω
Output Open Circuit detect	Current outputs: O.C. detect supported Voltage outputs: O.C. detect not supported
Max Inductive Load (current outputs)	0.1 mH
Max Capacitive Load (voltage outputs)	1μF

Table 577 - Thermistor/PTC Input Ratings (PTC only)

Terminals	IT1, IT2
Type of Control Unit	Mark A
Maximum Number of Sensors	6
Maximum Cold Resistance of PTC Sensor Chain	1500 Ω
Trip Resistance	3400 Ω ± 150 Ω
Reset Resistance	1600 Ω ± 100 Ω
Short-circuit Trip Resistance	25 Ω ± 10 Ω
Maximum Voltage @ PTC Terminals (R_{PTC} = 4 kΩ)	7.5V DC
Maximum Voltage @ PTC Terminals (R_{PTC} =open)	30V DC
Response Time	800 ms

Low Voltage Directive

The E300™ Electronic Overload Relay expansion digital modules are tested to comply with EN60947-5-1 Low-voltage switchgear and controlgear Part 5-1: Control circuit devices and switching elements.

Table 578 - Expansion Digital I/O Modules

Expansion Digital I/O Modules	193-EXP-DIO-42-24D	193-EXP-DIO-42-120	193-EXP-DIO-42-240
Digital Output Rated Operational Voltage (U_e):	250V AC	250V AC	250V AC
Digital Output Rated Insulation Voltage (U_i):	2000Vrms for 1s	2000Vrms for 1s	2000Vrms for 1s
Rated Impulse Withstand Voltage (U_{imp}):	N/A	N/A	N/A
Conditional Short Circuit Current:	1000 A	1000 A	1000 A
Recommended Control Circuit Fuse:	KTK-R (6 A, 600V)	KTK-R (6 A, 600V)	KTK-R (6 A, 600V)
Utilization Category:	AC15, DC13	AC15, DC13	AC15, DC13
Pollution Degree:	3	3	3

Table 579 - Expansion Power Supply Modules

Expansion Power Supply Modules	193-EXP-PS-AC
Rated Operational Voltage (U_e):	100…250V AC
Rated Insulation Voltage (U_i):	2640Vrms for 1s
Rated Impulse Withstand Voltage (U_{imp}):	4 kV
Conditional Short Circuit Current:	N/A
Protection Against Short Circuits:	N/A
Utilization Category:	N/A
Pollution Degree:	3

Environmental Specifications

Table 580 - Environmental Specifications

Ambient Temperature Storage Operating (Open) (Enclosed)	–40…+85 °C (–40…+185 °F) –20…+55 °C (–4…+131 °F)❷❸ –20…+40 °C (–4…+104 °F)❸❹
Humidity Operating Damp Heat – Steady State (per IEC 68-2-3) Damp Heat – Cyclic (per IEC 68-2-30)	5…95% Non-condensing 92% r.h., 40 °C (104 °F), 56 days 93% r.h., 25 °C/40 °C (77 °F/104 °F), 21 Cycles
Cooling Method	Natural Convection
Vibration (per IEC 68-2-6)	2.5G operating, 5 G non-operating
Shock (per IEC 68-2-27)	30 G
Maximum Altitude	2000 m ❶
Pollution Environment	Pollution Degree 3
Terminal Marking	EN 50012
Degree of Protection	IP20

❶ Current ratings must be derated at altitudes greater than 2000 m
❷ Temperature rating based on 120V AC control module with 1 A going through relays 0, 1, and 2.
❸ Temperature rating based on 24V DC control module with four digital inputs active and 0.2 A going through relays 0, 1, and 2.
❹ Temperature rating based on 120V AC or 240V AC control module with 5A going through relays 0, 1, and 2.

NOTE: The E300 relay expansion power supplies (Cat. Nos. 193-EXP-PS-AC and 193-EXP-PS-DC) surrounding air temperature must not exceed 55 °C (131 °F).

Table 581 - Temperature Derating

	Control Module Voltage	Relay 0 Current	Relay 1 Current	Relay 2 Current	Number of Digital Inputs Active	Operating Temperature Range
Open Application	120/240V AC	1.0 A	1.0 A	1.0 A	4	-20…+55 °C (-4…+131 °F)
		5.0 A	1.0 A	1.0 A	4	-20…+50 °C (-4…+122 °F)
	24V DC	0.2 A	0.2 A	0.2 A	4	-20…+55 °C (-4…+131 °F)
		0.2 A	0.2 A	0.2 A	6	-20…+50 °C (-4…+122 °F)
		5.0 A	1.0 A	1.0 A	6	-20…+30 °C (-4…+86 °F)
Enclosed Application	120/240V AC	5.0 A	5.0 A	5.0 A	4	-20…+40 °C (-4…+104 °F)
	24V DC	0.2 A	0.2 A	0.2 A	4	-20…+40 °C (-4…+104 °F)
		5.0 A	1.0 A	1.0 A	6	-20…+30 °C (-4…+86 °F)

Electromagnetic Compatibility Specifications

Table 582 - Electromagnetic Compatibility Specifications

Electrostatic Discharge Immunity Test Level: Performance Criteria:	8kV Air Discharge 6kV Contact Discharge 1 ➊➋
RF Immunity Test Level: Performance Criteria:	10V/m 1 ➊➋
Electrical Fast Transient/Burst Immunity Test Level: Performance Criteria:	4kV (Power) 2kV (Control and Comm) 1 ➊➋
Surge Immunity Test Level: Performance Criteria:	2kV (L-E) 1kV (L-L) 1 ➊➋
Radiated Emissions	Class A
Conducted Emissions	Class A

➊Performance Criteria 1 requires the DUT to experience no degradation or loss of performance.
➋Environment 2.

Protection

Table 583 - Protection

	Trip	Warning
Overload	Yes	Yes
Phase Loss	Yes	No
Ground Fault	Yes	Yes
Stall	Yes	No
Jam	Yes	Yes
Underload	Yes	Yes
Thermistor (PTC)	Yes	Yes
Current Imbalance	Yes	Yes
Remote Trip	Yes	No
Blocked Start/Start Inhibit	Yes	No
Under Voltage L-L	Yes	Yes
Over Voltage L-L	Yes	Yes
Voltage Unbalance	Yes	Yes
Phase Rotation	Yes	Yes
Under Frequency	Yes	Yes
Over Frequency	Yes	Yes
Under Real Power (kW)	Yes	Yes
Over Real Power (kW)	Yes	Yes
Under Reactive Power Consumed (+kVAR)	Yes	Yes
Over Reactive Power Consumed (+kVAR)	Yes	Yes
Under Reactive Power Generated (-kVAR)	Yes	Yes
Over Reactive Power Generated (-kVAR)	Yes	Yes
Under Apparent Power (kVA)	Yes	Yes
Over Apparent Power (kVA)	Yes	Yes
Under Power Factor Lagging (-PF)	Yes	Yes
Over Power Factor Lagging (-PF)	Yes	Yes
Under Power Factor Leading (+PF)	Yes	Yes
Over Power Factor Leading (+PF)	Yes	Yes
Power Value Overflow (kW, kVAR or KVA)	Yes	Yes
Analog Over Level	Yes	Yes

Table 584 - Overload Protection

Type of Relay	Ambient Compensated Time-Delay Phase Loss Sensitive
Nature of Relay	Solid-State
FLA Setting	See Full Load Amps Setting on page 313
Trip Rating	120% FLA
Trip Class	5…30
Reset Mode	Automatic or Manual
Overload Reset Level	1…100% TCU

Table 585 - Ground Fault Protection (External Ground Fault Module)

Type	Core Balanced
Intended Use	Equipment Protection
Classification (Per UL 1053)	Class I
Protection Range	20…100 mA
	100…500 mA
	200 mA…1.0 A
	1.0…5.0 A
Trip and Warning Time Delay	0.1…25.0 s
Protection Inhibit Time	0…250 s

Accuracy

Metering

The E300 relay metering accuracy is listed below:

Table 586 - Metering Accuracy

Current	±2% of Sensing Module Current Range
Ground Fault Current	±5% of Full Scale
Voltage	±2% of Sensing Module Voltage Range
Power	±5%

Protection Timers

All E300 relay trip timers shall have a resolution of ±0.1 s or 0.1 s/25 s (whichever is greater).

Notes:

Parameter List

Overview

This appendix lists all accessible parameters of the E300™ Electronic Overload Relay in numerical order.

The setting range for each parameter is provided to assist especially for applications where it is desirable to set values from a logic controller via a network connection.

Information values provided include the following:

Value	Function
Setting Range	Indicated as raw numerical values.
Scale Factor	Indicate the decimal precision associated with each parameter. This must be given close attention when writing or reading values.
Default	Indicate the factory pre-programmed values.

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Device Monitor	1	ThermUtilizedPct	I.PercentTCU	% Thermal Capacity Used	USINT	1	1	0	100	0	%
	2	OLTimeToTrip		Time until an overload trip	UINT	2	1	0	9999	0	Seconds
	3	OLTimeToReset		Time until OL trip can be reset	UINT	2	1	0	9999	0	Seconds
	4	TripStsCurrent	I.Protection.OverloadTrip I.Protection.PhaseLossTrip I.Protection.GroundFaultCurrentTrip I.Protection.StallTrip I.Protection.JamTrip I.Protection.UnderloadTrip I.Protection.CurrentImbalanceTrip I.Protection.L1UnderCurrentTrip I.Protection.L2UnderCurrentTrip I.Protection.L3UnderCurrentTrip I.Protection.L1OverCurrentTrip I.Protection.L2OverCurrentTrip I.Protection.L3OverCurrentTrip I.Protection.L1LineLossTrip I.Protection.L2LineLossTrip I.Protection.L3LineLossTrip	Trip Status bits for Current	UINT	2	1	Bit0= OverloadTrip Bit1= PhaseLossTrip Bit2= GroundFaultTrip Bit3= StallTrip Bit4= JamTrip Bit5= UnderloadTrip Bit6= CurrentImbalTrip Bit7= L1UnderCurrTrip Bit8= L2UnderCurrTrip Bit9= L3UnderCurrTrip Bit10= L1OverCurrenTrip Bit11= L2OverCurrenTrip Bit12= L3OverCurrenTrip Bit13= L1LineLossTrip Bit14= L2LineLossTrip Bit15= L3LineLossTrip		0	
	5	TripStsVoltage	I.Protection.UnderVoltageTrip I.Protection.OverVoltageTrip I.Protection.VoltageImbalanceTrip I.Protection.PhaseRotationMismatchTrip I.Protection.UnderFrequencyTrip I.Protection.OverFrequencyTrip	Trip Status bits for Voltage	UINT	2	1	Bit0= UnderVoltageTrip Bit1= OvervoltageTrip Bit2= VoltageUnbalTrip Bit3= PhaseRotationTrp Bit4= UnderFreqTrip Bit5= OverFreqTrip		0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Device Monitor (continued)	6	TripStsPower	I.Protection.UnderRealPowerTrip I.Protection.OverRealPowerTrip I.Protection.UnderReactivePowerConsumedTrip I.Protection.OverReactivePowerConsumedTrip I.Protection.UnderReactivePowerGeneratedTrip I.Protection.OverReactivePowerGeneratedTrip I.Protection.UnderApparentPowerTrip I.Protection.OverApparentPowerTrip I.Protection.UnderPowerFactorLaggingTrip I.Protection.OverPowerFactorLaggingTrip I.Protection.UnderPowerFactorLeadingTrip I.Protection.OverPowerFactorLeadingTrip	Trip Status bits for Power	UINT	2	1	Bit0= UnderKWTrip Bit1= OverKWTrip Bit2= UnderKVARConTrip Bit3= OverKVARConTrip Bit4= UnderKVARGenTrip Bit5= OverKVARGenTrip Bit6= UnderKVATrip Bit7= OverKVATrip Bit8= UnderPFLagTrip Bit9= OverPFLagTrip Bit10= UnderPFLeadTrip Bit11= OverPFLeadTrip		0	
	7	TripStsControl	I.Protection.TestTrip I.Protection.PTCTrip I.Protection.OperatorStationTrip I.Protection.RemoteTrip I.Protection.BlockedStartTrip I.Protection.HardwareFaultTrip I.Protection.ConfigurationTrip I.Protection.ModuleMismatchTrip I.Protection.ExpansionBusTrip I.Protection.NVMErrorTrip I.Protection.MCCTestPositionTrip	Trip Status bits for Control	UINT	2	1	Bit0= TestTrip Bit1= PTCTrip Bit2= DLXTrip Bit3= OperStationTrip Bit4= RemoteTrip Bit5= BlockedStartTrip Bit6= HardwareFltTrip Bit7= ConfigTrip Bit8= OptionMatchTrip Bit9= DLXFBTimeoutTrip Bit10= ExpansionBusTrip Bit11= Reserved Bit12 =Reserved Bit13= NVSTrip Bit 14=TestMode Trip		0	
	8	TripStsAnalog	I.Protection.Analog1Ch00Trip I.Protection.Analog1Ch01Trip I.Protection.Analog1Ch02Trip I.Protection.Analog2Ch00Trip I.Protection.Analog2Ch01Trip I.Protection.Analog2Ch02Trip I.Protection.Analog3Ch00Trip I.Protection.Analog3Ch01Trip I.Protection.Analog3Ch02Trip I.Protection.Analog4Ch00Trip I.Protection.Analog4Ch01Trip I.Protection.Analog4Ch02Trip	Trip Status bits for Analog	UINT	2	1	Bit0= InAnMod1Ch00Trip Bit1= InAnMod1Ch01Trip Bit2= InAnMod1Ch02Trip Bit3= InAnMod2Ch00Trip Bit4= InAnMod2Ch01Trip Bit5= InAnMod2Ch01Trip Bit6= InAnMod3Ch00Trip Bit7= InAnMod3Ch01Trip Bit8= InAnMod3Ch02Trip Bit9= InAnMod4Ch00Trip Bit10= InAnMod4Ch01Trip Bit11= InAnMod4Ch02Trip		0	
	9	Reserved									
	10	WarnStsCurrent	I.Protection.OverloadWarning I.Protection.GroundFaultCurrentWarning I.Protection.JamWarning I.Protection.UnderloadWarning I.Protection.CurrentImbalanceWarning I.Protection.L1UnderCurrentWarning I.Protection.L2UnderCurrentWarning I.Protection.L3UnderCurrentWarning I.Protection.L1OverCurrentWarning I.Protection.L2OverCurrentWarning I.Protection.L3OverCurrentWarning I.Protection.L1LineLossWarning I.Protection.L2LineLossWarning I.Protection.L3LineLossWarning	Warning Status bits for Current	UINT	2	1	Bit0= OverloadWarning Bit1= Reserved Bit2= GroundFltWarning Bit3= Reserved Bit4= JamWarning Bit5= UnderloadWarning Bit6= CurrentImbalWarn Bit7= L1UnderCurrWarn Bit8= L2UnderCurrWarn Bit9= L3UnderCurrWarn Bit10= L1OverCurrenWarn Bit11= L2OverCurrenWarn Bit12= L3OverCurrenWarn Bit13= L1LineLossWarn Bit14= L2LineLossWarn Bit15= L3LineLossWarn		0	
	11	WarnStsVoltage	I.Protection.UnderVoltageWarning I.Protection.OverVoltageWarning I.Protection.VoltageImbalanceWarning I.Protection.PhaseRotationMismatchWarning I.Protection.UnderFrequencyWarning I.Protection.OverFrequencyWarning	Warning Status bits for Voltage	UINT	2	1	Bit0= UnderVoltageWarn Bit1= OvervoltageWarn Bit2= VoltageUnbalWarn Bit3= PhaseRotationWrn Bit4= UnderFreqWarning Bit5= OverFreqWarning		0	
	12	WarnStsPower	I.Protection.UnderRealPowerWarning I.Protection.OverRealPowerWarning I.Protection.UnderReactivePowerConsumedWarning I.Protection.OverReactivePowerConsumedWarning I.Protection.UnderReactivePowerGeneratedWarning I.Protection.OverReactivePowerGeneratedWarning I.Protection.UnderApparentPowerWarning I.Protection.OverApparentPowerWarning I.Protection.UnderPowerFactorLaggingWarning I.Protection.OverPowerFactorLaggingWarning I.Protection.UnderPowerFactorLeadingWarning I.Protection.OverPowerFactorLeadingWarning	Warning Status bits for Power	UINT	2	1	Bit0= UnderKWWarning Bit1= OverKWWarning Bit2= UnderKVARConWarn Bit3= OverKVARConWarn Bit4= UnderKVARGenWarn Bit5= OverKVARGenWarn Bit6= UnderKVAWarning Bit7= OverKVAWarning Bit8= UnderPFLagWarn Bit9= OverPFLagWarn Bit10= UnderPFLeadWarn Bit11= OverPFLeadWarn		0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Device Monitor (continued)	13	WarnStsControl	I.Protection.PTCWarning I.Protection.ModuleMismatchWarning I.Protection.ExpansionBusWarning I.Protection.NumberOfStartsWarning I.Protection.OperatingHoursWarning	Warning Status bits for Control	UINT	2	1	BBit0= Reserved Bit1= PTCWarning Bit2= DLXWarning Bit3= Reserved Bit4= Reserved Bit5= Reserved Bit6= Reserved Bit7= Reserved Bit8= OptionMatchWarn Bit9= DLXFBTimeoutWarn Bit10= ExpansionBusWarn Bit11= PMNumberOfStarts Bit12= PMOperatingHours		0	
	14	WarnStsAnalog	I.Protection.Analog1Ch00Warning I.Protection.Analog1Ch01Warning I.Protection.Analog1Ch02Warning I.Protection.Analog2Ch00Warning I.Protection.Analog2Ch01Warning I.Protection.Analog2Ch02Warning I.Protection.Analog3Ch00Warning I.Protection.Analog3Ch01Warning I.Protection.Analog3Ch02Warning I.Protection.Analog4Ch00Warning I.Protection.Analog4Ch01Warning I.Protection.Analog4Ch02Warning	Warning Status bits for Analog	UINT	2	1	Bit0= InAnMod1Ch00Warn Bit1= InAnMod1Ch01Warn Bit2= InAnMod1Ch02Warn Bit3= InAnMod2Ch00Warn Bit4= InAnMod2Ch01Warn Bit5= InAnMod2Ch02Warn Bit6= InAnMod3Ch00Warn Bit7= InAnMod3Ch01Warn Bit8= InAnMod3Ch02Warn Bit9= InAnMod4Ch00Warn Bit10= InAnMod4Ch01Warn Bit11= InAnMod4Ch02Warn		0	
	15	Reserved									
	16	InputStatus0	I.Pt00Data I.Pt01Data I.Pt02Data I.Pt03Data I.Pt04Data I.Pt05Data	Status of Digital Inputs	UINT	2	1	Bit0= InputPt00 Bit1= InputPt01 Bit2= InputPt02 Bit3= InputPt03 Bit4= InputPt04 Bit5= InputPt05		0	
	17	InputStatus1	I.Digital1Pt00Data I.Digital1Pt01Data I.Digital1Pt02Data I.Digital1Pt03Data I.Digital2Pt00Data I.Digital2Pt01Data I.Digital2Pt02Data I.Digital2Pt03Data I.Digital3Pt00Data I.Digital3Pt01Data I.Digital3Pt02Data I.Digital3Pt03Data I.Digital4Pt00Data I.Digital4Pt01Data I.Digital4Pt02Data I.Digital4Pt03Data	Status of Digital Expansion Module Inputs	UINT	2	1	Bit0= InputDigMod1Pt00 Bit1= InputDigMod1Pt01 Bit2= InputDigMod1Pt02 Bit3= InputDigMod1Pt03 Bit4= InputDigMod2Pt00 Bit5= InputDigMod2Pt01 Bit6= InputDigMod2Pt02 Bit7=1nputDigMod2Pt03 Bit8= InputDigMod3Pt00 Bit9= InputDigMod3Pt01 Bit10= InputDigMod3Pt02 Bit11= InputDigMod3Pt03 Bit12= InputDigMod4Pt00 Bit13= InputDigMod4Pt01 Bit14= InputDigMod4Pt02 Bit15= InputDigMod4Pt03		0	
	18	OutputStatus	I.Pt00Readback I.Pt01Readback I.Pt02Readback I.Digital1Pt00Readback I.Digital1Pt01Readback I.Digital2Pt00Readback I.Digital2Pt01Readback I.Digital3Pt00Readback I.Digital3Pt01Readback I.Digital4Pt00Readback I.Digital4Pt01Readback	Status of Digital Outputs	UINT	2	1	Bit0= OutputPt00 Bit1= OutputPt01 Bit2= OutputPt02 Bit3= OutDigMod1Pt00 Bit4= OutDigMod1Pt01 Bit5= OutDigMod2Pt00 Bit6= OutDigMod2Pt01 Bit7= OutDigMod3Pt00 Bit8= OutDigMod3Pt01 Bit9= OutDigMod4Pt00 Bit10= OutDigMod4Pt01		0	
	19	OpStationStatus	I.OperatorStationI I.OperatorStationII I.OperatorStationLocalRemote I.OperatorStationO I.OperatorStationReset I.OperatorStationILEDReadback I.OperatorStationIILEDReadback I.OperatorStationLocalLEDReadback I.OperatorStationRemoteLEDReadback I.OperatorStationOLEDReadback	Status of Operator Station Buttons and LEDs	UINT	2	1	Bit0= OpStationStart1 Bit1= OpStationStart2 Bit2= OSLocalRemote Bit3= OpStationStop Bit4= OpStationReset Bit5= Reserved Bit6= Reserved Bit7= Reserved Bit8= OSLED1Green Bit9= OSLED2Green Bit10= OSLED3Amber Bit11= OSLED3Red Bit12= OSLED4Red		0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Device Monitor (continued)	20	DeviceStatus0	I.TripPresent I.WarningPresent I.InvalidConfiguration I.MotorCurrentPresent I.GroundFaultCurrentPresent I.MotorVoltagePresent I.EmergencyStartEnabled I.DeviceLogixEnabled I.FeedbackTimeoutEnabled I.OperatorStationPresent I.VoltageSensingPresent I.InternalGroundFaultSensingPresent I.ExternalGroundFaultSensingPresent I.PTCSensingPresent I.Ready	Device Status bits	UINT	2	1	Bit0= TripPresent Bit1= WarningPresent Bit2= InvalidConfig Bit3= CurrentPresent Bit4= GFCurrentPresent Bit5= VoltagePresent Bit6= EmergencyStartEn Bit7= DeviceLogixEn Bit8= FeebckTimeoutEn Bit9= OperatorStation Bit10= VoltageSensing Bit11= InternGFSensing Bit12= ExternGFSensing Bit13= PTCSensing Bit14= Ready Bit 15=Admin Mode Active		0	
	21	DeviceStatus1	I.ContolModule24VDCPresent I.ControlModule120VACPresent I.ControlModule240VACPresent I.SensingModule30APresent I.SensingModule60APresent I.SensingModule100APresent I.SensingModule200APresent I.DigitalModule1Present I.DigitalModule2Present I.DigitalModule3Present I.DigitalModule4Present I.AnalogModule1Present I.AnalogModule2Present I.AnalogModule3Present I.AnalogModule4Present	Device Status bits	UINT	2	1	Bit0= 24VoltControl Bit1= 120VoltControl Bit2= 240VoltControl Bit3= CurrentSense30A Bit4= CurrentSense60A Bit5= CurrentSense100A Bit6= CurrentSense200A Bit7= DigitalModule1 Bit8= DigitalModule2 Bit9= DigitalModule3 Bit10= DigitalModule4 Bit11= AnalogModule1 Bit12= AnalogModule2 Bit13= AnalogModule3 Bit14= AnalogModule4		0	
	22	Firmware		Firmware Revision Number	UINT	2	1000	0	65535	1001	
	23	ControlModuleID		Control Module Type Detected	USINT	1	1	0= Unknown 1= 6In3Out24VDC 2= 4In3Out120VAC 3= 4In3Out240VAC 4= 4In2OutGFPTC24V 5= 2In2OutGFPTC120V 6= 2In2OutGFPTC240V		0	
	24	SensingModuleID		Sensing Module Types Detected	USINT	1	1	0= Unknown 1= VIGPt5to30Amp 2= VIG6to60Amp 3= VIG10to100Amp 4= VIG20to200Amp 5= IGPt5to30Amp 6= IG6to60Amp 7= IG10to100Amp 8= IG20to200Amp 9= IPt5to30Amp 10= I6to60Amp 11= I10to100Amp 12= I20to200Amp		0	
	25	OperStationID		Operator Station Types Detected	USINT	1	1	0= Unknown 1= NoStation 2= ControlStation 3= DiagStation		0	
	26	DigitalModuleID		Expansion Digital Module Types Detected	UINT	2	1	Bit0= DigitalMod1[0] Bit1= DigitalMod1[1] Bit2= DigitalMod1[2] Bit3= DigitalMod1[3] Bit4= DigitalMod2[0] Bit5= DigitalMod2[1] Bit6= DigitalMod2[2] Bit7= DigitalMod2[3] Bit8= DigitalMod3[0] Bit9= DigitalMod3[1] Bit10= DigitalMod3[2] Bit11= DigitalMod3[3] Bit12= DigitalMod4[0] Bit13= DigitalMod4[1] Bit14= DigitalMod4[2] Bit15= DigitalMod4[3]		0	
	27	AnalogModuleID		Expansion Bus Analog Module Types	UINT	2	1	Bit0= AnalogMod1[0] Bit1= AnalogMod1[1] Bit2= AnalogMod2[0] Bit3= AnalogMod2[1] Bit4= AnalogMod3[0] Bit5= AnalogMod3[1] Bit6= AnalogMod4[0] Bit7= AnalogMod4[1]		0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Device Monitor (continued)	29	StartsCounter		Number of starts	UINT	2	1	0	65535	0	
	30	Starts Available		Number of Starts Available	USINT	1	1	0	120	0	
	31	TimeToStart		The Time to Start	UINT	2	1	0	3600	0	Seconds
	32	Year		Virtual RTC Year	UINT	2	1	0	9999	0	
	33	Month		Virtual RTC Month	UINT	2	1	0	12	0	
	34	Day		Virtual RTC Day	UINT	2	1	0	31	0	
	35	Hour		Virtual RTC Hour	UINT	2	1	0	23	0	
	36	Minute		Virtual RTC Minute	UINT	2	1	0	59	0	
	37	Second		Virtual RTC Second	UINT	2	1	0	59	0	
	38	InvaldCfgParam		Number of incorrectly configured parameter	UINT	2	1	0	9999	0	
	39	InvaldCfgCause		Description of error	USINT	1	1	0=NoError 1=ValueOverMax 2=Value UnderMin 3=IllegalValue 4=L3CurrentDetected 5=CopyCat Error 6-50 = Reserved		0	
	40	Reserved									
	41	Reserved									
	42	Reserved									
Current Monitor	43	L1Current	I.L1Current	The actual L1 Phase Current.	DINT	4	100	0	2000000000	0	Amps
	44	L2Current	I.L2Current	The actual L2 Phase Current.	DINT	4	100	0	2000000000	0	Amps
	45	L3Current	I.L3Current	The actual L3 Phase Current.	DINT	4	100	0	2000000000	0	Amps
	46	AverageCurrent	I.AvgCurrent	Average of Phase Currents.	DINT	4	100	0	2000000000	0	Amps
	47	L1PercentFLA		L1 Current in %FLA	UINT	2	10	0	10000	0	%
	48	L2PercentFLA		L2 Current in %FLA	UINT	2	10	0	10000	0	%
	49	L3PercentFLA		L3 Current in %FLA	UINT	2	10	0	10000	0	%
	50	AvgPercentFLA	I.AvgPercentFLA	Average Current in %FLA	UINT	2	10	0	10000	0	%
	51	GFCurrent	I.GroundFaultCurrent	The Ground Fault Current.	UINT	2	100	0	9999	0	Amps
	52	CurrentImbal	I.CurrentImbalance	Percent Current Imbalance	USINT	1	1	0	200	0	%
Voltage Monitor	53	L1toL2Voltage	I.L1L2Voltage	3 Phase RMS Voltage Line-Line	UINT	2	10	0	65535	0	Volt
	54	L2toL3Voltage	I.L2L3Voltage	3 Phase RMS Voltage Line-Line	UINT	2	10	0	65535	0	Volt
	55	L3toL1Voltage	I.L3L1Voltage	3 Phase RMS Voltage Line-Line	UINT	2	10	0	65535	0	Volt
	56	AvgVoltageLtoL	I.AvgLLVoltage	Average RMS Voltage Line-Line	UINT	2	10	0	65535	0	Volt
	57	L1toNVoltage		3 Phase RMS Voltage Line-Neutral	UINT	2	10	0	65535	0	Volt
	58	L2toNVoltage		3 Phase RMS Voltage Line-Neutral	UINT	2	10	0	65535	0	Volt
	59	L3toNVoltage		3 Phase RMS Voltage Line-Neutral	UINT	2	10	0	65535	0	Volt

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Voltage Monitor (Continued)	60	AvgVoltageLtoN		Average RMS Voltage Line-Neutral	UINT	2	10	0	65535	0	Volt
	61	VoltageUnbalance		Voltage Unbalance	USINT	1	1	0	255	0	%
	62	VoltageFrequency		Voltage Frequency	UINT	2	10	0	2500	0	Hz
	63	VPhaseRotation		Voltage Phase Rotation (ABC or ACB)	UINT	2	1	0= NoRotation 1= ABC 2= ACB		0	
Power Monitor	64	L1RealPower		Phase L1 Real Power.	DINT	4	1000	-2000000000	2000000000	0	kW
	65	L2RealPower		Phase L2 Real Power.	DINT	4	1000	-2000000000	2000000000	0	kW
	66	L3RealPower		Phase L3 Real Power.	DINT	4	1000	-2000000000	2000000000	0	kW
	67	TotalRealPower	I.TotalRealPower	Total Real Power	DINT	4	1000	-2000000000	2000000000	0	kW
	68	L1ReactivePower		Phase L1 Reactive Power	DINT	4	1000	-2000000000	2000000000	0	kVAR
	69	L2ReactivePower		Phase L2 Reactive Power	DINT	4	1000	-2000000000	2000000000	0	kVAR
	70	L3ReactivePower		Phase L3 Reactive Power	DINT	4	1000	-2000000000	2000000000	0	kVAR
	71	TotalReactivePwr	I.TotalReactivePower	Total Reactive Power	DINT	4	1000	-2000000000	2000000000	0	kVAR
	72	L1ApparentPower		Phase L1 Apparent Power	DINT	4	1000	0	2000000000	0	kVA
	73	L2ApparentPower		Phase L2 Apparent Power	DINT	4	1000	0	2000000000	0	kVA
	74	L3ApparentPower		Phase L3 Apparent Power	DINT	4	1000	0	2000000000	0	kVA
	75	TotalApparentPwr	I.TotalApparentPower	Total Apparent Power	DINT	4	1000	0	2000000000	0	kVA
	76	L1PowerFactor		Phase L1 True Power Factor (PF)	INT	2	10	-1000	1000	0	%
	77	L2PowerFactor		Phase L2 True Power Factor (PF)	INT	2	10	-1000	1000	0	%
	78	L3PowerFactor		Phase L3 True Power Factor (PF)	INT	2	10	-1000	1000	0	%
	79	TotalPowerFactor	I.PowerFactor	Total True Power Factor (PF)	INT	2	10	-1000	1000	0	%
Energy Monitoring	80	kWhTimes10E9		Total Real Energy (kWh) Word 10^9	INT	2	1	-999	999	0	
	81	kWhTimes10E6		Total Real Energy (kWh) Word 10^6	INT	2	1	-999	999	0	
	82	kWhTimes10E3		Total Real Energy (kWh) Word 10^3	INT	2	1	-999	999	0	
	83	kWhTimes10E0		Total Real Energy (kWh) Word 10^0	INT	2	1	-999	999	0	
	84	kWhTimes10E-3		Total Real Energy (kWh) Word 10^-3	INT	2	1	-999	999	0	
	85	kVARhCon10E9		Total Reactive Energy Consumed (kVARh) Word 10^9	INT	2	1	-999	999	0	
	86	kVARhCon10E6		Total Reactive Energy Consumed (kVARh) Word 10^6	INT	2	1	-999	999	0	
	87	kVARhCon10E3		Total Reactive Energy Consumed (kVARh) Word 10^3	INT	2	1	-999	999	0	
	88	kVARhCon10E0		Total Reactive Energy Consumed (kVARh) Word 10^0	INT	2	1	-999	999	0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Energy Monitoring (Continued)	89	kVARhCon10E-3		Total Reactive Energy Consumed (kVARh) Word 10^-3	INT	2	1	-999	999	0	
	90	kVARhGen10E9		Total Reactive Energy Generated (kVARh) Word 10^9	INT	2	1	-999	999	0	
	91	kVARhGen10E6		Total Reactive Energy Generated (kVARh) Word 10^6	INT	2	1	-999	999	0	
	92	kVARhGen10E3		Total Reactive Energy Generated (kVARh) Word 10^3	INT	2	1	-999	999	0	
	93	kVARhGen10E0		Total Reactive Energy Generated (kVARh) Word 10^0	INT	2	1	-999	999	0	
	94	kVARhGen10E-3		Total Reactive Energy Generated (kVARh) Word 10^-3	INT	2	1	-999	999	0	
	95	kVARhNet10E9		Total Reactive Energy Net (kVARh) Word 10^9	INT	2	1	-999	999	0	
	96	kVARhNet10E6		Total Reactive Energy Net (kVARh) Word 10^6	INT	2	1	-999	999	0	
	97	kVARhNet10E3		Total Reactive Energy Net (kVARh) Word 10^3	INT	2	1	-999	999	0	
	98	kVARh Net 10E0		Total Reactive Energy Net (kVARh) Word 10^0	INT	2	1	-999	999	0	
	99	kVARhNet10E-3		Total Reactive Energy Net (kVARh) Word 10^-3	INT	2	1	-999	999	0	
	100	kVAhTimes10E9		Total Apparent Energy (kVAh) Word 10^9	INT	2	1	-999	999	0	
	101	kVAhTimes10E6		Total Apparent Energy (kVAh) Word 10^6	INT	2	1	-999	999	0	
	102	kVAhTimes10E3		Total Apparent Energy (kVAh) Word 10^3	INT	2	1	-999	999	0	
	103	kVAhTimes10E0		Total Apparent Energy (kVAh) Word 10^0	INT	2	1	-999	999	0	
	104	kVAhTimes10E-3		Total Apparent Energy (kVAh) Word 10^-3	INT	2	1	-999	999	0	
	105	kWDemand		Real Power Demand	DINT	4	1000	-2000000000	2000000000	0	kW
	106	MaxkWDemand		Maximum Real Power Demand	DINT	4	1000	-2000000000	2000000000	0	kW
	107	VARDemand		Reactive Power Demand	DINT	4	1000	-2000000000	2000000000	0	kVAR
	108	MaxVARDemand		Maximum Reactive Demand	DINT	4	1000	-2000000000	2000000000	0	kVAR
	109	VADemand		Apparent Power Demand	DINT	4	1000	0	2000000000	0	kVA
	110	MaxVADemand		Maximum Apparent Power Demand	DINT	4	1000	0	2000000000	0	kVA

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Analog Monitoring	111	InAnMod1Ch00	I.Analog1.Ch00Data	Value measured at Analog Expansion Module 1 Input 00	UINT	2	1	-32768	32767	0	
	112	InAnMod1Ch01	I.Analog1.Ch01Data	Value measured at Analog Expansion Module 1 Input 01	UINT	2	1	-32768	32767	0	
	113	InAnMod1Ch02	I.Analog1.Ch02Data	Value measured at Analog Expansion Module 1 Input 02	UINT	2	1	-32768	32767	0	
	114	InAnMod2Ch00	I.Analog2.Ch00Data	Value measured at Analog Expansion Module 2 Input 00	UINT	2	1	-32768	32767	0	
	115	InAnMod2Ch01	I.Analog2.Ch01Data	Value measured at Analog Expansion Module 2 Input 01	UINT	2	1	-32768	32767	0	
	116	InAnMod2Ch02	I.Analog2.Ch02Data	Value measured at Analog Expansion Module 2 Input 02	UINT	2	1	-32768	32767	0	
	117	InAnMod3Ch00	I.Analog3.Ch00Data	Value measured at Analog Expansion Module 3 Input 00	UINT	2	1	-32768	32767	0	
	118	InAnMod3Ch01	I.Analog3.Ch01Data	Value measured at Analog Expansion Module 3 Input 01	UINT	2	1	-32768	32767	0	
	119	InAnMod3Ch02	I.Analog3.Ch02Data	Value measured at Analog Expansion Module 3 Input 02	UINT	2	1	-32768	32767	0	
	120	InAnMod4Ch00	I.Analog4.Ch00Data	Value measured at Analog Expansion Module 4 Input 00	UINT	2	1	-32768	32767	0	
	121	InAnMod4Ch01	I.Analog4.Ch01Data	Value measured at Analog Expansion Module 4 Input 01	UINT	2	1	-32768	32767	0	
	122	InAnMod4Ch02	I.Analog4.Ch02Data	Value measured at Analog Expansion Module 4 Input 02	UINT	2	1	-32768	32767	0	
	123	AnalogMod1Status	I.Analog1.Ch00InputOpenWire I.Analog1.Ch00InputOverrange I.Analog1.Ch00InputUnderrange I.Analog1.Ch01InputOpenWire I.Analog1.Ch01InputOverrange I.Analog1.Ch01InputUnderrange I.Analog1.Ch02InputOpenWire I.Analog1.Ch02InputOverrange I.Analog1.Ch02InputUnderrange I.Analog1.Ch00OutputOpenWire I.Analog1.Ch00OutputInHold I.Analog1.Ch00OutputOverrange I.Analog1.Ch00OutputUnderrange I.Analog1.AddressChanged I.Analog1.SelftestFailed	Analog Expansion Module 1 Status	UINT	2	1	Bit0= InCh00OpenCrcuit Bit1= InCh00OverRange Bit2= InCh00UnderRange Bit3= InCh01OpenCrcuit Bit4= InCh01OverRange Bit5= InCh01UnderRange Bit6= InCh02OpenCrcuit Bit7= InCh02OverRange Bit8= InCh02UnderRange Bit9= OutOpenCircuit Bit10= OutHoldLastSt Bit11= OutOverRange Bit12= OutUnderRange Bit 13=Module Configured Bit 14=Module Warning Bit 15=Module Faulted		0	
	124	AnalogMod2Status	I.Analog3.Ch00InputOpenWire I.Analog3.Ch00InputOverrange I.Analog3.Ch00InputUnderrange I.Analog3.Ch01InputOpenWire I.Analog3.Ch01InputOverrange I.Analog3.Ch01InputUnderrange I.Analog3.Ch02InputOpenWire I.Analog3.Ch02InputOverrange I.Analog3.Ch02InputUnderrange I.Analog3.Ch00OutputOpenWire I.Analog3.Ch00OutputInHold I.Analog3.Ch00OutputOverrange I.Analog3.Ch00OutputUnderrange I.Analog3.AddressChanged I.Analog3.SelftestFailed	Analog Expansion Module 2 Status	UINT	2	1	Bit0= InCh00OpenCrcuit Bit1= InCh00OverRange Bit2= InCh00UnderRange Bit3= InCh01OpenCrcuit Bit4= InCh01OverRange Bit5= InCh01UnderRange Bit6= InCh02OpenCrcuit Bit7= InCh02OverRange Bit8= InCh02UnderRange Bit9= OutOpenCircuit Bit10= OutHoldLastSt Bit11= OutOverRange Bit12= OutUnderRange Bit 13=Module Configured Bit 14=Module Warning Bit 15=Module Faulted		0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Analog Monitoring (Continued)	125	AnalogMod3Status	I.Analog3.Ch00InputOpenWire I.Analog3.Ch00InputOverrange I.Analog3.Ch00InputUnderrange I.Analog3.Ch01InputOpenWire I.Analog3.Ch01InputOverrange I.Analog3.Ch01InputUnderrange I.Analog3.Ch02InputOpenWire I.Analog3.Ch02InputOverrange I.Analog3.Ch02InputUnderrange I.Analog3.Ch00OutputOpenWire I.Analog3.Ch00OutputInHold I.Analog3.Ch00OutputOverrange I.Analog3.Ch00OutputUnderrange I.Analog3.AddressChanged I.Analog3.SelftestFailed	Analog Expansion Module 3 Status	UINT	2	1	Bit0= InCh00OpenCrcuit Bit1= InCh00OverRange Bit2= InCh00UnderRange Bit3= InCh01OpenCrcuit Bit4= InCh01OverRange Bit5= InCh01UnderRange Bit6= InCh02OpenCrcuit Bit7= InCh02OverRange Bit8= InCh02UnderRange Bit9= OutOpenCircuit Bit10= OutHoldLastSt Bit11= OutOverRange Bit12= OutUnderRange Bit 13=Module Configured Bit 14=Module Warning Bit 15=Module Faulted		0	
	126	AnalogMod4Status	I.Analog4.Ch00InputOpenWire I.Analog4.Ch00InputOverrange I.Analog4.Ch00InputUnderrange I.Analog4.Ch01InputOpenWire I.Analog4.Ch01InputOverrange I.Analog4.Ch01InputUnderrange I.Analog4.Ch02InputOpenWire I.Analog4.Ch02InputOverrange I.Analog4.Ch02InputUnderrange I.Analog4.Ch00OutputOpenWire I.Analog4.Ch00OutputInHold I.Analog4.Ch00OutputOverrange I.Analog4.Ch00OutputUnderrange I.Analog4.AddressChanged I.Analog4.SelftestFailed	Analog Expansion Module 4 Status	UINT	2	1	Bit0= InCh00OpenCrcuit Bit1= InCh00OverRange Bit2= InCh00UnderRange Bit3= InCh01OpenCrcuit Bit4= InCh01OverRange Bit5= InCh01UnderRange Bit6= InCh02OpenCrcuit Bit7= InCh02OverRange Bit8= InCh02UnderRange Bit9= OutOpenCircuit Bit10= OutHoldLastSt Bit11= OutOverRange Bit12= OutUnderRange Bit 13=Module Configured Bit 14=Module Warning Bit 15=Module Faulted		0	
Trip/Warn History	127	TripHistory0		Last trip to occur	UINT	2	1	See Trip History Codes		0	
	128	TripHistory1		Second last trip to occur	UINT	2	1	See Trip History Codes		0	
	129	TripHistory2		Third last trip to occur	UINT	2	1	See Trip History Codes		0	
	130	TripHistory3		Fourth last trip to occur	UINT	2	1	See Trip History Codes		0	
	131	TripHistory4		Fifth last trip to occur	UINT	2	1	See Trip History Codes		0	
	132	Reserved									
	133	WarningHistory0		Last warning to occur.	UINT	2	1	See Warning History Codes		0	
	134	WarningHistory1		Second last warning to occur.	UINT	2	1	See Warning History Codes		0	
	135	WarningHistory2		Third last warning to occur.	UINT	2	1	See Warning History Codes		0	
	136	WarningHistory3		Fourth last warning to occur.	UINT	2	1	See Warning History Codes		0	
	137	WarningHistory4		Fifth last warning to occur.	UINT	2	1	See Warning History Codes		0	
	138	Reserved									
	139	TripHistoryMaskI	C.History.OverloadTripEnEn C.History.PhaseLossTripEn C.History.GroundFaultCurrentTripEn C.History.StallTripEn C.History.JamTripEn C.History.UnderloadTripEn C.History.CurrentImbalanceTripEn C.History.L1UnderCurrentTripEn C.History.L2UnderCurrentTripEn C.History.L3UnderCurrentTripEn C.History.L1OverCurrentTripEn C.History.L2OverCurrentTripEn C.History.L3OverCurrentTripEn C.History.L1LineLossTripEn C.History.L2LineLossTripEn C.History.L3LineLossTripEn	Trip History Mask for Current-based Trips	UINT	2	1	Bit0= OverloadTrip Bit1= PhaseLossTrip Bit2= GroundFaultTrip Bit3= StallTrip Bit4= JamTrip Bit5= UnderloadTrip Bit6= CurrentImbalTrip Bit7= L1UnderCurrTrip Bit8= L2UnderCurrTrip Bit9= L3UnderCurrTrip Bit10= L1OverCurrenTrip Bit11= L2OverCurrenTrip Bit12= L3OverCurrenTrip Bit13= L1LineLossTrip Bit14= L2LineLossTrip Bit15= L3LineLossTrip		0xFFFF	
	140	TripHistoryMaskV	C.History.UnderVoltageTripEn C.History.OverVoltageTripEn C.History.VoltageImbalanceTripEn C.History.PhaseRotationMismatchTripEn C.History.UnderFrequencyTripEn C.History.OverFrequencyTripEn	Trip History Mask for Voltage-based Trips	UINT	2	1	Bit0= UnderVoltageTrip Bit1= OvervoltageTrip Bit2= VoltageUnbalTrip Bit3= PhaseRotationTrp Bit4= UnderFreqTrip Bit5= OverFreqTrip		0x3F	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Trip/Warn History (continued)	141	TripHistoryMaskP	C.History.UnderRealPowerTripEn C.History.OverRealPowerTripEn C.History.UnderReactivePowerConsumedTripEn C.History.OverReactivePowerConsumedTripEn C.History.UnderReactivePowerGeneratedTripEn C.History.OverReactivePowerGeneratedTripEn C.History.UnderApparentPowerTripEn C.History.OverApparentPowerTripEn C.History.UnderPowerFactorLaggingTripEn C.History.OverPowerFactorLaggingTripEn C.History.UnderPowerFactorLeadingTripEn C.History.OverPowerFactorLeadingTripEn	Trip History Mask for Power-based Trips	UINT	2	1	Bit0= UnderKWTrip Bit1= OverKWTrip Bit2= UnderKVARConTrip Bit3= OverKVARConTrip Bit4= UnderKVARGenTrip Bit5= OverKVARGenTrip Bit6= UnderKVATrip Bit7= OverKVATrip Bit8= UnderPFLagTrip Bit9= OverPFLagTrip Bit10= UnderPFLeadTrip Bit11= OverPFLeadTrip		0xFFF	
	142	TripHistoryMaskC	C.History.TestTripEn C.History.PTCTripEn C.History.OperatorStationTripEn C.History.RemoteTripEn C.History.BlockedStartTripEn C.History.HardwareFaultTripEn C.History.ConfigurationTripEn C.History.ModuleMismatchTripEn C.History.ExpansionBusTripEn C.History.NVMErrorTripEn C.History.MCCTestPositionTripEn	Trip History Mask for Control-based Trips	UINT	2	1	Bit0= TestTrip Bit1= PTCTrip Bit2= DLXTrip Bit3= OperStationTrip Bit4= RemoteTrip Bit5= BlockedStartTrip Bit6= HardwareFltTrip Bit7= ConfigTrip Bit8= OptionMatchTrip Bit9= DLXFBTimeoutTrip Bit10= ExpansionBusTrip Bit11= Reserved Bit12= Reserved Bit13= NVSTrip Bit14=TestModeTrip		0x27FF	
	143	TripHistoryMaskA	C.History.Analog1Ch00TripEn C.History.Analog1Ch01TripEn C.History.Analog1Ch02TripEn C.History.Analog2Ch00TripEn C.History.Analog2Ch01TripEn C.History.Analog2Ch02TripEn C.History.Analog3Ch00TripEn C.History.Analog3Ch01TripEn C.History.Analog3Ch02TripEn C.History.Analog4Ch00TripEn C.History.Analog4Ch01TripEn C.History.Analog4Ch02TripEn	Trip History Mask for Analog Input Based Trips	UINT	2	1	Bit0= InAnMod1Ch00Trip Bit1= InAnMod1Ch01Trip Bit2= InAnMod1Ch02Trip Bit3= InAnMod2Ch00Trip Bit4= InAnMod2Ch01Trip Bit5= InAnMod2Ch02Trip Bit6= InAnMod3Ch00Trip Bit7= InAnMod3Ch01Trip Bit8= InAnMod3Ch02Trip Bit9= InAnMod4Ch00Trip Bit10= InAnMod4Ch01Trip Bit11= InAnMod4Ch02Trip		0xFFF	
	144	Reserved									
	145	WarnHistoryMaskI	C.History.OverloadWarningEn C.History.GroundFaultCurrentWarningEn C.History.JamWarningEn C.History.UnderloadWarningEn C.History.CurrentImbalanceWarningEn C.History.L1UnderCurrentWarningEn C.History.L2UnderCurrentWarningEn C.History.L3UnderCurrentWarningEn C.History.L1OverCurrentWarningEn C.History.L2OverCurrentWarningEn C.History.L3OverCurrentWarningEn C.History.L1LineLossWarningEn C.History.L2LineLossWarningEn C.History.L3LineLossWarningEn	Warning History Mask for Current-based Warnings	UINT	2	1	Bit0= OverloadWarning Bit1= Reserved Bit2= GroundFltWarning Bit3= Reserved Bit4= JamWarning Bit5= UnderloadWarning Bit6= CurrentImbalWarn Bit7= L1UnderCurrWarn Bit8= L2UnderCurrWarn Bit9= L3UnderCurrWarn Bit10= L1OverCurrenWarn Bit11= L2OverCurrenWarn Bit12= L3OverCurrenWarn Bit13= L1LineLossWarn Bit14= L2LineLossWarn Bit15= L3LineLossWarn		0xFFFF	
	146	WarnHistoryMaskV	C.History.UnderVoltageWarningEn C.History.OverVoltageWarningEn C.History.VoltageImbalanceWarningEn C.History.PhaseRotationMismatchWarningEn C.History.UnderFrequencyWarningEn C.History.OverFrequencyWarningEn	Warning History Mask for Voltage-based Warnings	UINT	2	1	Bit0= UnderVoltageWarn Bit1= OvervoltageWarn Bit2= VoltageUnbalWarn Bit3= PhaseRotationWrn Bit4= UnderFreqWarning Bit5= OverFreqWarning		0x3F	
	147	WarnHistoryMaskP	C.History.UnderRealPowerWarningEn C.History.OverRealPowerWarningEn C.History.UnderReactivePowerConsumedWarningEn C.History.OverReactivePowerConsumedWarningEn C.History.UnderReactivePowerGeneratedWarningEn C.History.OverReactivePowerGeneratedWarningEn C.History.UnderApparentPowerWarningEn C.History.OverApparentPowerWarningEn C.History.UnderPowerFactorLaggingWarningEn C.History.OverPowerFactorLaggingWarningEn C.History.UnderPowerFactorLeadingWarningEn C.History.OverPowerFactorLeadingWarningEn	Warning History Mask for Power-based Warnings	UINT	2	1	Bit0= UnderKWWarning Bit1= OverKWWarning Bit2= UnderKVARConWarn Bit3= OverKVARConWarn Bit4= UnderKVARGenWarn Bit5= OverKVARGenWarn Bit6= UnderKVAWarning Bit7= OverKVAWarning Bit8= UnderPFLagWarn Bit9= OverPFLagWarn Bit10= UnderPFLeadWarn Bit11= OverPFLeadWarn		0xFFF	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Trip/Warn History (continued)	148	WarnHistoryMaskC	C.History.PTCWarningEn C.History.ModuleMismatchWarningEn C.History.ExpansionBusWarningEn C.History.NumberOfStartsWarningEn C.History.OperatingHoursWarningEn	Warning History Mask for Control-based Warnings	UINT	2	1	Bit0= Reserved Bit1= PTCWarning Bit2= DLXWarning Bit3= Reserved Bit4= Reserved Bit5= Reserved Bit6= Reserved Bit7= ConfigWarning Bit8= OptionMatchWarn Bit9= DLXFBTimeoutWarn Bit10= ExpansionBusWarn Bit11= PMNumberOfStarts Bit12= PMOperatingHours		0x1FFF	
	149	WarnHistoryMaskA	C.History.Analog1Ch00WarningEn C.History.Analog1Ch01WarningEn C.History.Analog1Ch02WarningEn C.History.Analog2Ch00WarningEn C.History.Analog2Ch01WarningEn C.History.Analog2Ch02WarningEn C.History.Analog3Ch00WarningEn C.History.Analog3Ch01WarningEn C.History.Analog3Ch02WarningEn C.History.Analog4Ch00WarningEn C.History.Analog4Ch01WarningEn C.History.Analog4Ch02WarningEn	Warning History Mask for Analog Input Based Warnings	UINT	2	1	Bit0= InAnMod1Ch00Warn Bit1= InAnMod1Ch01Warn Bit2= InAnMod1Ch02Warn Bit3= InAnMod2Ch00Warn Bit4= InAnMod2Ch01Warn Bit5= InAnMod2Ch02Warn Bit6= InAnMod3Ch00Warn Bit7= InAnMod3Ch01Warn Bit8= InAnMod3Ch02Warn Bit9= InAnMod4Ch00Warn Bit10= InAnMod4Ch01Warn Bit11= InAnMod4Ch02Warn		0xFFF	
	150	Reserved									
Trip Snapshot	151	TSL1Current		Snapshot of the actual L1 Phase Current at trip	DINT	4	100	0	2000000000	0	Amps
	152	TSL2Current		Snapshot of the actual L2 Phase Current at trip	DINT	4	100	0	2000000000	0	Amps
	153	TSL3Current		Snapshot of the actual L3 Phase Current at trip	DINT	4	100	0	2000000000	0	Amps
	154	TSThermUtilized		Snapshot of % Thermal Capacity Used at trip	UINT	2	1	0	100	0	%
	155	TSGFCurrent		Snapshot of the Ground Fault Current at trip	INT	2	100	0	2540	0	Amps
	156	TSL1toL2Voltage		Snapshot of 3 Phase RMS Voltage Line-Line at trip	UINT	2	10	0	65535	0	Volt
	157	TSL2toL3Voltage		Snapshot of 3 Phase RMS Voltage Line-Line at trip	UINT	2	10	0	65535	0	Volt
	158	TSL3toL1Voltage		Snapshot of 3 Phase RMS Voltage Line-Line at trip	UINT	2	10	0	65535	0	Volt
	159	TSTotalRealPwr		Snapshot of Total Real Power at trip	DINT	4	1000	-2000000000	2000000000	0	kW
	160	TSTotalkVAR		Snapshot of Total Reactive Power at trip	DINT	4	1000	-2000000000	2000000000	0	kVAR
	161	TSTotalkVA		Snapshot of Total Apparent Power at trip	DINT	4	1000	0	2000000000	0	kVA
	162	TSTotalPF		Snapshot of Total True Power Factor (PF) at trip	INT	2	10	-1000	1000	0	%

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Command	163	TripReset	O.TripReset	Attempt to reset a trip	BOOL	0=Ready 1=TripReset		0	1	0	
	164	ConfigPreset		IO Configuration based on Logic Personality	USINT	0=Ready 1=Factory Defaults		0	54	0	
	165	ClearCommand		Reset Accumulator(s)	USINT	1	1	0= Ready 1= ClrOperStats 2= ClrHistoryLogs 3= ClrPercentTCU 4= ClrKWh 5= ClrKVARh 6= ClrKVAh 7= ClrMaxKWDemad 8= ClrMaxKVARDemand 9= ClrMaxKVADemand 10= ClearAll		0	
	166	Reserved									
	167	Reserved									
	168	Reserved									
	169	Reserved									
	170	Reserved									
Overload Setup	171	FLASetting	C.FLA1	Overload Full Load Current Setting	UDINT	4	100	50	6553500	50	Amps
	172	TripClass	C.TripClass	Trip Class Setting	USINT	1	1	5	30	10	
	173	OLPTCResetMode	C.OverloadResetMode	Overload and PTC Trip Reset Mode	BOOL	1	1	0=Manual 1=Automatic		0	
	174	OLResetLevel	C.OverloadResetLevel	Overload Trip Reset Level	USINT	1	1	0	100	75	%TCU
	175	OLWarningLevel	C.OverloadWarningLimit	Overload Warning Reset Level	USINT	1	1	0	100	85	%TCU
	176	SingleOrThree Ph	C.ThreePhase	Single Phase = L1 and L2	BOOL	1	1	0=SinglePhase 1=ThreePhase		1	
	177	FLA2Setting	C.FLA2	Overload Full Load Current Setting 2	UDINT	4	100	50	6553500	50	Amps
	178	Reserved									
	179	Reserved									
	180	Reserved									
	181	Reserved									
	182	Reserved									
Device Setup	183	TripEnableI	C.Protection.OverloadTripEnEn C.Protection.PhaseLossTripEn C.Protection.GroundFaultCurrentTripEn C.Protection.StallTripEn C.Protection.JamTripEn C.Protection.UnderloadTripEn C.Protection.CurrentImbalanceTripEn C.Protection.L1UnderCurrentTripEn C.Protection.L2UnderCurrentTripEn C.Protection.L3UnderCurrentTripEn C.Protection.L1OverCurrentTripEn C.Protection.L2OverCurrentTripEn C.Protection.L3OverCurrentTripEn C.Protection.L1LineLossTripEn C.Protection.L2LineLossTripEn C.Protection.L3LineLossTripEn	Bitmask used to enable/disable current-based trips	UINT	2	1	Bit0= OverloadTrip Bit1= PhaseLossTrip Bit2= GroundFaultTrip Bit3= StallTrip Bit4= JamTrip Bit5= UnderloadTrip Bit6= CurrentImbalTrip Bit7= L1UnderCurrTrip Bit8= L2UnderCurrTrip Bit9= L3UnderCurrTrip Bit10= L1OverCurrenTrip Bit11= L2OverCurrenTrip Bit12= L3OverCurrenTrip Bit13= L1LineLossTrip Bit14= L2LineLossTrip Bit15= L3LineLossTrip		3	
	184	TripEnableV	C.Protection.UnderVoltageTripEn C.Protection.OverVoltageTripEn C.Protection.VoltageImbalanceTripEn C.Protection.PhaseRotationMismatchTripEn C.Protection.UnderFrequencyTripEn C.Protection.OverFrequencyTripEn	Bitmask used to enable/disable voltage-based trips	UINT	2	1	Bit0= UnderVoltageTrip Bit1= OvervoltageTrip Bit2= VoltageUnbalTrip Bit3= PhaseRotationTrp Bit4= UnderFreqTrip Bit5= OverFreqTrip		0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Device Setup (continued)	185	TripEnableP	C.Protection.UnderRealPowerTripEn C.Protection.OverRealPowerTripEn C.Protection.UnderReactivePowerConsumedTripEn C.Protection.OverReactivePowerConsumedTripEn C.Protection.UnderReactivePowerGeneratedTripEn C.Protection.OverReactivePowerGeneratedTripEn C.Protection.UnderApparentPowerTripEn C.Protection.OverApparentPowerTripEn C.Protection.UnderPowerFactorLaggingTripEn C.Protection.OverPowerFactorLaggingTripEn C.Protection.UnderPowerFactorLeadingTripEn C.Protection.OverPowerFactorLeadingTripEn	Bitmask used to enable/disable power-based trips	UINT	2	1	Bit0= UnderKWTrip Bit1= OverKWTrip Bit2= UnderKVARConTrip Bit3= OverKVARConTrip Bit4= UnderKVARGenTrip Bit5= OverKVARGenTrip Bit6= UnderKVATrip Bit7= OverKVATrip Bit8= UnderPFLagTrip Bit9= OverPFLagTrip Bit10= UnderPFLeadTrip Bit11= OverPFLeadTrip		0	
	186	TripEnableC	C.Protection.TestTripEn C.Protection.PTCTripEn C.Protection.OperatorStationTripEn C.Protection.RemoteTripEn C.Protection.BlockedStartTripEn C.Protection.HardwareFaultTripEn C.Protection.ConfigurationTripEn C.Protection.ModuleMismatchTripEn C.Protection.ExpansionBusTripEn C.Protection.NVMErrorTripEn C.Protection.MCCTestPositionTripEn	Bitmask used to enable/disable control-based trips	UINT	2	1	Bit0= TestTrip Bit1= PTCTrip Bit2= DLXTrip Bit3= OperStationTrip Bit4= RemoteTrip Bit5= BlockedStartTrip Bit6= HardwareFltTrip Bit7= ConfigTrip Bit8= OptionMatchTrip Bit9= DLXFBTimeoutTrip Bit10= ExpansionBusTrip Bit11= Reserved Bit12= Reserved Bit13= NVSTrip Bit14=TestModeTrip		1	
	187	TripEnableA	C.Protection.Analog1Ch00TripEn C.Protection.Analog1Ch01TripEn C.Protection.Analog1Ch02TripEn C.Protection.Analog2Ch00TripEn C.Protection.Analog2Ch01TripEn C.Protection.Analog2Ch02TripEn C.Protection.Analog3Ch00TripEn C.Protection.Analog3Ch01TripEn C.Protection.Analog3Ch02TripEn C.Protection.Analog4Ch00TripEn C.Protection.Analog4Ch01TripEn C.Protection.Analog4Ch02TripEn	Bitmask used to enable/disable analog-based trips	UINT	2	1	Bit0= InAnMod1Ch00Trip Bit1= InAnMod1Ch01Trip Bit2= InAnMod1Ch02Trip Bit3= InAnMod2Ch00Trip Bit4= InAnMod2Ch01Trip Bit5= InAnMod2Ch02Trip Bit6= InAnMod3Ch00Trip Bit7= InAnMod3Ch01Trip Bit8= InAnMod3Ch02Trip Bit9= InAnMod4Ch00Trip Bit10= InAnMod4Ch01Trip Bit11= InAnMod4Ch02Trip		0	
	188	Reserved									
	189	WarningEnableI	C.Protection.OverloadWarningEn C.Protection.GroundFaultCurrentWarningEn C.Protection.JamWarningEn C.Protection.UnderloadWarningEn C.Protection.CurrentImbalanceWarningEn C.Protection.L1UnderCurrentWarningEn C.Protection.L2UnderCurrentWarningEn C.Protection.L3UnderCurrentWarningEn C.Protection.L1OverCurrentWarningEn C.Protection.L2OverCurrentWarningEn C.Protection.L3OverCurrentWarningEn C.Protection.L1LineLossWarningEn C.Protection.L2LineLossWarningEn C.Protection.L3LineLossWarningEn	Bitmask used to enable/disable current-based warnings	UINT	2	1	Bit0= OverloadWarning Bit1= Reserved Bit2= GroundFltWarning Bit3= Reserved Bit4= JamWarning Bit5= UnderloadWarning Bit6= CurrentImbalWarn Bit7= L1UnderCurrWarn Bit8= L2UnderCurrWarn Bit9= L3UnderCurrWarn Bit10= L1OverCurrenWarn Bit11= L2OverCurrenWarn Bit12= L3OverCurrenWarn Bit13= L1LineLossWarn Bit14= L2LineLossWarn Bit15= L3LineLossWarn		0	
	190	WarningEnableV	C.Protection.UnderVoltageWarningEn C.Protection.OverVoltageWarningEn C.Protection.VoltageImbalanceWarningEn C.Protection.PhaseRotationMismatchWarningEn C.Protection.UnderFrequencyWarningEn C.Protection.OverFrequencyWarningEn	Bitmask used to enable/disable voltage-based warnings	UINT	2	1	Bit0= UnderVoltageWarn Bit1= OvervoltageWarn Bit2= VoltageUnbalWarn Bit3= PhaseRotationWrn Bit4= UnderFreqWarning Bit5= OverFreqWarning		0	
	191	WarningEnableP	C.Protection.UnderRealPowerWarningEn C.Protection.OverRealPowerWarningEn C.Protection.UnderReactivePowerConsumedWarningEn C.Protection.OverReactivePowerConsumedWarningEn C.Protection.UnderReactivePowerGeneratedWarningEn C.Protection.OverReactivePowerGeneratedWarningEn C.Protection.UnderApparentPowerWarningEn C.Protection.OverApparentPowerWarningEn C.Protection.UnderPowerFactorLaggingWarningEn C.Protection.OverPowerFactorLaggingWarningEn C.Protection.UnderPowerFactorLeadingWarningEn C.Protection.OverPowerFactorLeadingWarningEn	Bitmask used to enable/disable power-based warnings	UINT	2	1	Bit0= UnderKWWarning Bit1= OverKWWarning Bit2= UnderKVARConWarn Bit3= OverKVARConWarn Bit4= UnderKVARGenWarn Bit5= OverKVARGenWarn Bit6= UnderKVAWarning Bit7= OverKVAWarning Bit8= UnderPFLagWarn Bit9= OverPFLagWarn Bit10= UnderPFLeadWarn Bit11= OverPFLeadWarn		0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Device Setup (continued)	192	WarningEnableC	C.Protection.PTCWarningEn C.Protection.ModuleMismatchWarningEn C.Protection.ExpansionBusWarningEn C.Protection.NumberOfStartsWarningEn C.Protection.OperatingHoursWarningEn	Bitmask used to enable/disable control-based warnings	UINT	2	1	Bit0= Reserved Bit1= PTCWarning Bit2= DLXWarning Bit3= Reserved Bit4= Reserved Bit5= Reserved Bit6= Reserved Bit7= ConfigWarning Bit8= OptionMatchWarn Bit9= DLXFBTimeoutWarn Bit10= ExpansionBusWarn Bit11= PMNumberOfStarts Bit12= PMOperatingHour		0	
	193	WarningEnableA	C.Protection.Analog1Ch00WarningEn C.Protection.Analog1Ch01WarningEn C.Protection.Analog1Ch02WarningEn C.Protection.Analog2Ch00WarningEn C.Protection.Analog2Ch01WarningEn C.Protection.Analog2Ch02WarningEn C.Protection.Analog3Ch00WarningEn C.Protection.Analog3Ch01WarningEn C.Protection.Analog3Ch02WarningEn C.Protection.Analog4Ch00WarningEn C.Protection.Analog4Ch01WarningEn C.Protection.Analog4Ch02WarningEn	Bitmask used to enable/disable analog-based warnings	UINT	2	1	Bit0= InAnMod1Ch00Warn Bit1= InAnMod1Ch01Warn Bit2= InAnMod1Ch02Warn Bit3= InAnMod2Ch00Warn Bit4= InAnMod2Ch01Warn Bit5= InAnMod2Ch02Warn Bit6= InAnMod3Ch00Warn Bit7= InAnMod3Ch01Warn Bit8= InAnMod3Ch02Warn Bit9= InAnMod4Ch00Warn Bit10= InAnMod4Ch01Warn Bit11= InAnMod4Ch02Warn		0	
	194	Reserved									
	195	SetOperatingMode		Logic personality Selection	USINT	1	1	2	54	2	
	196	InPt00Assignment	C.Pt00InputFunction_0 C.Pt00InputFunction_1 C.Pt00InputFunction_2 C.Pt00InputFunction_3	Assignment for Input Point 00 function	USINT	1	1	0=Normal 1=TripReset 2=RemoteTrip 3=ActivateFLA2 4=ForceSnapshot 5=EmergencyStart 6=TestMode 7=L1LossArm 8=L2LossArm 9=L3LossArm 10=L1L2LossArm 11=L2L3LossArm 12=L1L3LossArm 13=L1L2L3LossArm		0	
	197	InPt01Assignment	C.Pt01InputFunction_0 C.Pt01InputFunction_1 C.Pt01InputFunction_2 C.Pt01InputFunction_3	Assignment for Input Point 01 function	USINT	1	1	0=Normal 1=TripReset 2=RemoteTrip 3=ActivateFLA2 4=ForceSnapshot 5=EmergencyStart 6=TestMode 7=L1LossArm 8=L2LossArm 9=L3LossArm 10=L1L2LossArm 11=L2L3LossArm 12=L1L3LossArm 13=L1L2L3LossArm		0	
	198	InPt02Assignment	C.Pt02InputFunction_0 C.Pt02InputFunction_1 C.Pt02InputFunction_2 C.Pt02InputFunction_3	Assignment for Input Point 02 function	USINT	1	1	0=Normal 1=TripReset 2=RemoteTrip 3=ActivateFLA2 4=ForceSnapshot 5=EmergencyStart 6=TestMode 7=L1LossArm 8=L2LossArm 9=L3LossArm 10=L1L2LossArm 11=L2L3LossArm 12=L1L3LossArm 13=L1L2L3LossArm		0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Device Setup (continued	199	InPt03Assignment	C.Pt03InputFunction_0 C.Pt03InputFunction_1 C.Pt03InputFunction_2 C.Pt03InputFunction_3	Assignment for Input Point 03 function	USINT	1	1	0=Normal 1=TripReset 2=RemoteTrip 3=ActivateFLA2 4=ForceSnapshot 5=EmergencyStart 6=TestMode 7=L1LossArm 8=L2LossArm 9=L3LossArm 10=L1L2LossArm 11=L2L3LossArm 12=L1L3LossArm 13=L1L2L3LossArm		0	
	200	InPt04Assignment	C.Pt03InputFunction_0 C.Pt03InputFunction_1 C.Pt03InputFunction_2 C.Pt03InputFunction_3	Assignment for Input Point 04 function	USINT	1	1	0=Normal 1=TripReset 2=RemoteTrip 3=ActivateFLA2 4=ForceSnapshot 5=EmergencyStart 6=TestMode 7=L1LossArm 8=L2LossArm 9=L3LossArm 10=L1L2LossArm 11=L2L3LossArm 12=L1L3LossArm 13=L1L2L3LossArm		0	
	201	InPt05Assignment	C.Pt05InputFunction_0 C.Pt05InputFunction_1 C.Pt05InputFunction_2 C.Pt05InputFunction_3	Assignment for Input Point 05 function	USINT	1	1	0=Normal 1=TripReset 2=RemoteTrip 3=ActivateFLA2 4=ForceSnapshot 5=EmergencyStart 6=TestMode 7=L1LossArm 8=L2LossArm 9=L3LossArm 10=L1L2LossArm 11=L2L3LossArm 12=L1L3LossArm 13=L1L2L3LossArm		0	
	202	OutPt0Assignment		Assignment for OutputPt00 function	USINT	1	1	0=Normal 1=TripRelay 2=ControlRelay 3=TripAlarm 4=WarningAlarm 5=MonL1TripRelay 6= MonL2TripRelay 7= MonL3TripRelay		•1 for firmware v1.000 and v2.000 •2 for firmware v3.000 and higher	
	203	OutPt1Assignment		Assignment for OutputPt01 function	USINT	1	1	0=Normal 1=TripRelay 2=ControlRelay 3=TripAlarm 4=WarningAlarm 5=MonL1TripRelay 6= MonL2TripRelay 7= MonL3TripRelay		0	
	204	OutPt2Assignment		Assignment for OutputPt02 function	USINT	1	1	0=Normal 1=TripRelay 2=ControlRelay 3=TripAlarm 4=WarningAlarm 5=MonL1TripRelay 6= MonL2TripRelay 7= MonL3TripRelay		0	
	205	StartsPerHour	C.StartsPerHourLimit	Allowable Starts per Hour	USINT	1	1	0	120	2	
	206	StartsInterval	C.StartsIntervalLimit	The minimum allowable interval between starts	UINT	2	1	0	3600	600	Seconds
	207	PMTotalStarts	C.TotalStartsLimit	Total number of starts for preventative maintenance	UINT	2	1	0	65535	0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Device Setup (continued	208	PMOperatingHours	C.OperatingHoursLimit	Total operating hours for preventative maintenance	UINT	2	1	0	65535	0	Hrs
	209	ActFLA2wOutput	C.FLA2Select_0 C.FLA2Select_1 C.FLA2Select_2 C.FLA2Select_3	Select FLA2 activate source	USINT	1	1	0=Disable 1=OutputPt00 2=OutputPt01 3=OutputPt02		0	
	210	Reserved									
	211	SecurityPolicy		Select network security feature locks	UINT	2	1	Bit0= DeviceConfigEna Bit1= DeviceResetEna Bit2= FWUpdateEnable Bit3= NetworkCfgEna Bit4= PortCfgEna Bit5= Reserved Bit6= Reserved Bit7= Reserved Bit8= Reserved Bit9= Reserved Bit10= Reserved Bit11= Reserved Bit12= Reserved Bit13= Reserved Bit14= Reserved Bit15= PolicyConfigEna		0x8007	
	212	Language		Select the language	USINT	1	1	0	2	0	
	213	FeedbackTimeout		DeviceLogix Feedback Timer Timeout	UINT	2	1	0	65535	500	
	214	TransitionDelay		Motor Contactor Transition Delay	UINT	2	1	0	65535	10000	
	215	InterlockDelay		Motor Contactor Interlock Delay	UINT	2	1	1	65535	100	
	216	EmergencyStartEn	C.EmergencyStartEn	Enables the ability to command an Emergency Start of the motor	UINT	1	1	0=Disable 1=Enable		0	
	217	Reserved									
	218	Reserved									
	219	Reserved									
	220	Reserved									
Options Setup	221	ControlModuleTyp		Select Control Module Type	USINT	1	1	0= IgnoreType 1= 6In3Out24VDC 2= 4In3Out120VAC 3= 4In3Out240VAC 4= 4In2OutGFPTC24V 5= 2In2OutGFPTC120V 6= 2In2OutGFPTC240V		0	
	222	SensingModuleTyp		Select Sensing Module Type	USINT	1	1	0= IgnoreType 1= VIGPt5to30Amp 2= VIG6to60Amp 3= VIG10to100Amp 4= VIG20to200Amp 5= IGPt5to30Amp 6= IG6to60Amp 7= IG10to100Amp 8= IG20to200Amp 9= IPt5to30Amp 10= I6to60Amp 11= I10to100Amp 12= I20to200Amp		0	
	223	CommsModuleType		Select Communication Module Type	USINT	1	1	0=IgnoreType 1=EtherNetIP 2=DeviceNet 3=Profibus		0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Options Setup (Continued)	224	OperStationType		Select Operator Station Type	USINT	1	1	0= IgnoreType 1= NoStation 2= ControlStation 3= DiagStation		0	
	225	DigitalMod1Type		Select Digital I/O Expansion Module 1 Type	USINT	1	1	0= IgnoreType 1=NoModule 2=4In2Out24VDC 3=4In2Out120VAC 4=4In2Out240VAC		0	
	226	DigitalMod2Type		Select Digital I/O Expansion Module 2 Type	USINT	1	1	0= IgnoreType 1=NoModule 2=4In2Out24VDC 3=4In2Out120VAC 4=4In2Out240VAC		0	
	227	DigitalMod3Type		Select Digital I/O Expansion Module 3 Type	USINT	1	1	0= IgnoreType 1=NoModule 2=4In2Out24VDC 3=4In2Out120VAC 4=4In2Out240VAC		0	
	228	DigitalMod4Type		Select Digital I/O Expansion Module 4 Type	USINT	1	1	0= IgnoreType 1=NoModule 2=4In2Out24VDC 3=4In2Out120VAC 4=4In2Out240VAC		0	
	229	AnalogMod1Type		Select Analog I/O Expansion Module 1 Type	USINT	1	1	0=IgnoreType 1=NoModule 2=3In1OutAnalog		0	
	230	AnalogMod2Type		Select Analog I/O Expansion Module 2 Type	USINT	1	1	0=IgnoreType 1=NoModule 2=3In1OutAnalog		0	
	231	AnalogMod3Type		Select Analog I/O Expansion Module 3 Type	USINT	1	1	0=IgnoreType 1=NoModule 2=3In1OutAnalog		0	
	232	AnalogMod4Type		Select Analog I/O Expansion Module 4 Type	USINT	1	1	0=IgnoreType 1=NoModule 2=3In1OutAnalog		0	
	233	MismatchAction		Select Mismatched Module Actions 0=warning 1= fault	UINT	1	1	Bit0= ControlModule Bit1= SensingModule Bit2= CommsModule Bit3= OperatorStation Bit4= DigitalModule1 Bit5= DigitalModule2 Bit6= DigitalModule3 Bit7= DigitalModule4 Bit8= AnalogModule1 Bit9= AnalogModule1 Bit10= AnalogModule1 Bit11= AnalogModule1		0	
	234	Reserved									
	235	Reserved									
	236	Reserved									
	237	Reserved									
	238	Reserved									
Current Setup	239	PLInhibitTime	C.PhaseLossInhibitTime	Phase Loss Inhibit Time	USINT	1	1	0	250	0	Seconds
	240	PLTripDelay	C.PhaseLossTripDelay	Phase Loss Trip Delay	USINT	1	10	1	250	10	Seconds
	241	GroundFaultType	C.GroundFaultType	Select Ground Fault Type	USINT	1	1	0= Disabled 1= Internal1to5Amps 2= ExtPt02toPt1Amps 3= ExtPt1toPt5Amps 4= ExtPt5to1Amps 5= External1to5Amps		0	
	242	GFInhibitTime	C.GroundFaultInhibitTime	Ground Fault Inhibit Time	USINT	1	1	0	250	10	Seconds
	243	GFTripDelay	C.GroundFaultTripDelay	Ground Fault Trip Delay	USINT	1	10	0	250	5	Seconds
	244	GFTripLevel	C.GroundFaultTripLimit	Ground Fault Trip Level	UINT	2	100	2	500	200	Amps
	245	GFWarningDelay	C.GroundFaultWarnDelay	Ground Fault Warning Delay	USINT	1	10	0	250	0	Seconds

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Current Setup continued	246	GFWarningLevel	C.GroundFaultWarnLimit	Ground Fault Warning Level	UINT	2	100	2	500	200	Amps
	247	GFFilter	C.GroundFaultFilterEn	Filter GF current from %TCU calculation	BOOL	1	1	0=Disable 1=Enable		0	
	248	GFMaxInhibit	C.GroundFaultMaxInhibitEn	Trip is inhibited when GF exceeds max value	BOOL	1	1	0=Disable 1=Enable		0	
	249	StallEnabledTime	C.StallEnabledTime	Stall Monitor and Trip Delay	USINT	1	1	0	250	10	Seconds
	250	StallTripLevel	C.StallTripLimit	Stall Trip Level	UINT	2	10	100	600	600	%FLA
	251	JamInhibitTime	C.JamInhibitTime	Jam Detect Inhibit Time	USINT	1	1	0	250	10	Seconds
	252	JamTripDelay	C.JamTripDelay	Jam Detect Trip Delay	USINT	1	10	1	250	50	Seconds
	253	JamTripLevel	C.JamTripLimit	Jam Detect Trip Level	UINT	2	1	50	600	250	%FLA
	254	JamWarningLevel	C.JamWarnLimit	Jam Detect Warning Level	UINT	2	1	50	600	150	%FLA
	255	ULInhibitTime	C.UnderloadInhibitTime	Underload Inhibit Time	USINT	1	1	0	250	10	Seconds
	256	ULTripDelay	C.UnderloadTripDelay	Underload Trip Delay	USINT	1	10	1	250	50	Seconds
	257	ULTripLevel	C.UnderloadTripLimit	Underload Trip Level	USINT	1	1	10	100	50	%FLA
	258	ULWarningLevel	C.UnderloadWarnLimit	Underload Warning Level	USINT	1	1	10	100	70	%FLA
	259	CIInhibitTime	C.CurrentImbalanceInhibitTime	Current Imbalance Inhibit Time	USINT	1	1	0	250	10	Seconds
	260	CITripDelay	C.CurrentImbalanceTripDelay	Current Imbalance Trip Delay	USINT	1	10	1	250	50	Seconds
	261	CITripLevel	C.CurrentImbalanceTripLimit	Current Imbalance Trip Level	USINT	1	1	10	100	35	%
	262	CIWarningLevel	C.CurrentImbalanceWarnLimit	Current Imbalance Warning Level	USINT	1	1	10	100	20	%
	263	CTPrimary	C.CTPrimary	Current Transformer Primary Ratio	UINT	2	1	1	65535	5	
	264	CTSecondary	C.CTSecondary	Current Transformer Secondary Ratio	UINT	2	1	1	65535	5	
	265	UCInhibit Time	C.UnderCurrentInhibitTime	Under Current Inhibit Time	USINT	1	1	0	250	10	Seconds
	266	L1UCTripDelay	C.L1UnderCurrentTripDelay	L1 Under Current Trip Delay	USINT	1	10	0	250	10	Seconds
	267	L1UCTripLevel	C.L1UnderCurrentTripLimit	L1 Under Current Trip Level	USINT	1	1	10	100	35	%
	268	L1UCWarningLevel	C.L1UnderCurrentWarnLimit	L1 Under Current Warning Level	USINT	1	1	10	100	40	%
	269	L2UCTripDelay	C.L2UnderCurrentTripDelay	L2 Under Current Trip Delay	USINT	1	10	0	250	10	Seconds
	270	L2UCTripLevel	C.L2UnderCurrentTripLimit	L2 Under Current Trip Level	USINT	1	1	10	100	35	%
	271	L2UCWarningLevel	C.L2UnderCurrentWarnLimit	L2 Under Current Warning Level	USINT	1	1	10	100	40	%
	272	L3UCTripDelay	C.L3UnderCurrentTripDelay	L3 Under Current Trip Delay	USINT	1	10	0	250	10	Seconds
	273	L3UCTripLevel	C.L3UnderCurrentTripLimit	L3 Under Current Trip Level	USINT	1	1	10	100	35	%
	274	L3UCWarningLevel	C.L3UnderCurrentWarnLimit	L3 Under Current Warning Level	USINT	1	1	10	100	40	%
	275	OCInhibitTime	C.OverCurrentInhibitTime	Over Current Inhibit Time	USINT	1	1	0	250	10	Seconds
	276	L1OCTripDelay	C.L1OverCurrentTripDelay	L1 Over Current Trip Delay	USINT	1	10	0	250	10	Seconds

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Current Setup continued	277	L1OCTripLevel	C.L1OverCurrentTripLimit	L1 Over Current Trip Level	USINT	1	1	10	200	100	%
	278	L1OCWarningLevel	C.L1OverCurrentWarnLimit	L1 Over Current Warning Level	USINT	1	1	10	200	90	%
	279	L2OCTripDelay		L2 Over Current Trip Delay	USINT	1	10	0	250	10	Seconds
	280	L2OCTripLevel	C.L2OverCurrentTripDelay	L2 Over Current Trip Level	USINT	1	1	10	200	100	%
	281	L2OCWarningLevel	C.L2OverCurrentTripLimit	L2 Over Current Warning Level	USINT	1	1	10	200	90	%
	282	L3OCTripDelay	C.L2OverCurrentWarnLimit	L3 Over Current Trip Delay	USINT	1	10	0	250	10	Seconds
	283	L3OCTripLevel	C.L3OverCurrentTripDelay	L3 Over Current Trip Level	USINT	1	1	10	200	100	%
	284	L3OCWarningLevel	C.L3OverCurrentTripLimit	L3 Over Current Warning Level	USINT	1	1	10	200	90	%
	285	LineLossInhTime	C.L3OverCurrentWarnLimit	Line Loss Inhibit Time	USINT	1	1	0	250	10	Seconds
	286	L1LossTripDelay	C.LineLossInhibitTime	L1 Line Loss Trip Delay	USINT	1	10	0	250	10	Seconds
	287	L2LossTripDelay	C.L1LineLossTripDelay	L2 Line Loss Trip Delay	USINT	1	10	0	250	10	Seconds
	288	L3LossTripDelay	C.L2LineLossTripDelay	L3 Line Loss Trip Delay	USINT	1	10	0	250	10	Seconds
Communication Setup	289	OutputAssembly	C.L3LineLossTripDelay	Output Assembly Instance used by IO Connections	UINT	2	1	0	180	144	
	290	InputAssembly		Input Assembly Instance used by IO Connections	UINT	2	1	0	300	300	
	291	Datalink0		Produced I/O Assembly Datalink0 Parameter Number	UINT	2	1	0	560	0	
	292	Datalink1		Produced I/O Assembly Datalink1 Parameter Number	UINT	2	1	0	560	0	
	293	Datalink2		Produced I/O Assembly Datalink2 Parameter Number	UINT	2	1	0	560	0	
	294	Datalink3		Produced I/O Assembly Datalink3 Parameter Number	UINT	2	1	0	560	0	
	295	Datalink4		Produced I/O Assembly Datalink4 Parameter Number	UINT	2	1	0	560	0	
	296	Datalink5		Produced I/O Assembly Datalink5 Parameter Number	UINT	2	1	0	560	0	
	297	Datalink6		Produced I/O Assembly Datalink6 Parameter Number	UINT	2	1	0	560	0	
	298	Datalink7		Produced I/O Assembly Datalink7 Parameter Number	UINT	2	1	0	560	0	
	299	Reserved									
	300	Reserved									
	301	Reserved									
	302	Reserved									
	303	Reserved									

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Output Setup	304	OutPt00PrFltAct	C.Pt00OutputProtectionFaultMode	Output Pt00 action on protection fault	BOOL	1	1	0= GoToPrFltValue 1= IgnoreIfPossible		0	
	305	OutPt00PrFltVal	C.Pt00OutputProtectionFaultValue	Output Pt00 value on protection fault	BOOL	1	1	0=Open 1=Closed		0	
	306	OutPt00ComFltAct	C.Pt00OutputFaultMode	Output Pt00 action on comms fault	BOOL	1	1	0= GoToCommFltValue 1= HoldLastState		0	
	307	OutPt00ComFltVal	C.Pt00OutputFaultValue	Out Pt00 value on comms fault	BOOL	1	1	0=Open 1=Closed		0	
	308	OutPt00ComIdlAct	C.Pt00OutputProgMode	Output Pt00 action on comms idle	BOOL	1	1	0= GoToCommIdlValue 1= HoldLastState		0	
	309	OutPt00ComIdlVal	C.Pt00OutputProgValue	Output Pt00 value on comms idle	BOOL	1	1	0=Open 1=Closed		0	
	310	OutPt01PrFltAct	C.Pt01OutputProtectionFaultMode	Output Pt01 action on protection fault	BOOL	1	1	0= GoToPrFltValue 1= IgnoreIfPossible		0	
	311	OutPt01PrFltVal	C.Pt01OutputProtectionFaultValue	Output Pt01 value on protection fault	BOOL	1	1	0=Open 1=Closed		0	
	312	OutPt01ComFltAct	C.Pt01OutputFaultMode	Output Pt01 action on comms fault	BOOL	1	1	0= GoToCommFltValue 1= HoldLastState		0	
	313	OutPt01ComFltVal	C.Pt01OutputFaultValue	Output Pt01 value on comms fault	BOOL	1	1	0=Open 1=Closed		0	
	314	OutPt01ComIdlAct	C.Pt01OutputProgMode	Output Pt01 action on comms idle	BOOL	1	1	0= GoToCommIdlValue 1= HoldLastState		0	
	315	OutPt01ComIdlVal	C.Pt01OutputProgValue	Output Pt01 value on comms idle	BOOL	1	1	0=Open 1=Closed		0	
	316	OutPt02PrFltAct	C.Pt02OutputProtectionFaultMode	Output Pt02 action on protection fault	BOOL	1	1	0= GoToPrFltValue 1= IgnoreIfPossible		0	
	317	OutPt02PrFltVal	C.Pt02OutputProtectionFaultValue	Output Pt02 value on protection fault	BOOL	1	1	0=Open 1=Closed		0	
	318	OutPt02ComFltAct	C.Pt02OutputFaultMode	Output Pt02 action on comms fault	BOOL	1	1	0= GoToCommFltValue 1= HoldLastState		0	
	319	OutPt02ComFltVal	C.Pt02OutputFaultValue	Output Pt02 value on comms fault	BOOL	1	1	0=Open 1=Closed		0	
	320	OutPt02ComIdlAct	C.Pt02OutputProgMode	Output Pt02 action on comms idle	BOOL	1	1	0= GoToCommIdlValue 1= HoldLastState		0	
	321	OutPt02ComIdlVal	C.Pt02OutputProgValue	Output Pt02 value on comms idle	BOOL	1	1	0=Open 1=Closed		0	
	322	OutDig1PrFltAct	C.Digital1ProtectionFaultMode	Digital Expansion Module 1 Outputs action on protection fault	BOOL	1	1	0= GoToPrFltValue 1= Ignore		0	
	323	OutDig1PrFltVal	C.Digital1ProtectionFaultValue	Digital Expansion Module 1 Outputs value on protection fault	BOOL	1	1	0=Open 1=Closed		0	
	324	OutDig1ComFltAct	C.Digital1FaultMode	Digital Expansion Module 1 Outputs action on comms fault	BOOL	1	1	0= GoToCommFltValue 1= HoldLastState		0	
	325	OutDig1ComFltVal	C.Digital1FaultValue	Digital Expansion Module 1 Outputs value on comms fault	BOOL	1	1	0=Open 1=Closed		0	
	326	OutDig1ComIdlAct	C.Digital1ProgMode	Digital Expansion Module 1 Outputs action on comms idle	BOOL	1	1	0= GoToCommIdlValue 1= HoldLastState		0	
	327	OutDig1ComIdlVal	C.Digital1ProgValue	Digital Expansion Module 1 Outputs value on comms idle	BOOL	1	1	0=Open 1=Closed		0	
	328	OutDig2PrFltAct	C.Digital2ProtectionFaultMode	Digital Expansion Module 2 Outputs action on protection fault	BOOL	1	1	0= GoToPrFltValue 1= Ignore		0	
	329	OutDig2PrFltVal	C.Digital2ProtectionFaultValue	Digital Expansion Module 2 Outputs value on protection fault	BOOL	1	1	0=Open 1=Closed		0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Output Setup Continued	330	OutDig2ComFltAct	C.Digital2FaultMode	Digital Expansion Module 2 Outputs action on comms fault	BOOL	1	1	0= GoToCommFltValue 1= HoldLastState		0	
	331	OutDig2ComFltVal	C.Digital2FaultValue	Digital Expansion Module 2 Outputs value on comms fault	BOOL	1	1	0=Open 1=Closed		0	
	332	OutDig2ComIdlAct	C.Digital2ProgMode	Digital Expansion Module 2 Outputs action on comms idle	BOOL	1	1	0= GoToCommIdlValue 1= HoldLastState		0	
	333	OutDig2ComIdlVal	C.Digital2ProgValue	Digital Expansion Module 2 Outputs value on comms idle	BOOL	1	1	0=Open 1=Closed		0	
	334	OutDig3PrFltAct	C.Digital3ProtectionFaultMode	Digital Expansion Module 3 Outputs action on protection fault	BOOL	1	1	0= GoToPrFltValue 1= Ignore		0	
	335	OutDig3PrFltVal	C.Digital3ProtectionFaultValue	Digital Expansion Module 3 Outputs value on protection fault	BOOL	1	1	0=Open 1=Closed		0	
	336	OutDig3ComFltAct	C.Digital3FaultMode	Digital Expansion Module 3 Outputs action on comms fault	BOOL	1	1	0= GoToCommFltValue 1= HoldLastState		0	
	337	OutDig3ComFltVal	C.Digital3FaultValue	Digital Expansion Module 3 Outputs value on comms fault	BOOL	1	1	0=Open 1=Closed		0	
	338	OuDig3ComIdlAct	C.Digital3ProgMode	Digital Expansion Module 3 Outputs action on comms idle	BOOL	1	1	0= GoToCommIdlValue 1= HoldLastState		0	
	339	OutDig3ComIdlVal	C.Digital3ProgValue	Digital Expansion Module 3 Outputs value on comms idle	BOOL	1	1	0=Open 1=Closed		0	
	340	OutDig4PrFltAct	C.Digital4ProtectionFaultMode	Digital Expansion Module 4 Outputs action on protection fault	BOOL	1	1	0= GoToPrFltValue 1= Ignore		0	
	341	OutDig4PrFltVal	C.Digital4ProtectionFaultValue	Digital Expansion Module 4 Outputs value on protection fault	BOOL	1	1	0=Open 1=Closed		0	
	342	OutDig4ComFltAct	C.Digital4FaultMode	Digital Expansion Module 4 Outputs action on comms fault	BOOL	1	1	0= GoToCommFltValue 1= HoldLastState		0	
	343	OutDig4ComFltVal	C.Digital4FaultValue	Digital Expansion Module 4 Outputs value on comms fault	BOOL	1	1	0=Open 1=Closed		0	
	344	OutDig4ComIdlAct	C.Digital4ProgMode	Digital Expansion Module 4 Outputs action on comms idle	BOOL	1	1	0= GoToCommIdlValue 1= HoldLastState		0	
	345	OutDig4ComIdlVal	C.Digital4ProgValue	Digital Expansion Module 4 Outputs value on comms idle	BOOL	1	1	0=Open 1=Closed		0	
DeviceLogix Setup	346	CommOverride		Enabling allows local logic to override a loss of an I/O Connection.	BOOL	1	1	0=Disable 1=Enable		0	
	347	NetworkOverride		Enabling allows local logic to override a Network Fault.	BOOL	1	1	0=Disable 1=Enable		0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
DeviceLogix Setup (Continued)	348	PtDeviceOuts		Status of DeviceLogix Network Outputs.	UINT	2	1	Bit0= Pt00DeviceOut Bit1= Pt01DeviceOut Bit2= Pt02DeviceOut Bit3= Pt03DeviceOut Bit4= Pt04DeviceOut Bit5= Pt05DeviceOut Bit6= Pt06DeviceOut Bit7= Pt07DeviceOut Bit8= Pt08DeviceOut Bit9= Pt09DeviceOut Bit10= Pt10DeviceOut Bit11= Pt11DeviceOut Bit12= Pt12DeviceOut Bit13= Pt13DeviceOut Bit14= Pt14DeviceOut Bit15= Pt15DeviceOut		0	
	349	Reserved									
	350	PtDevOutCOSMask		When bit is set the network output will trigger a COS message.	UINT	2	1	Bit0= Pt00DeviceOut Bit1= Pt01DeviceOut Bit2= Pt02DeviceOut Bit3= Pt03DeviceOut Bit4= Pt04DeviceOut Bit5= Pt05DeviceOut Bit6= Pt06DeviceOut Bit7= Pt07DeviceOut Bit8= Pt08DeviceOut Bit9= Pt09DeviceOut Bit10= Pt10DeviceOut Bit11= Pt11DeviceOut Bit12= Pt12DeviceOut Bit13= Pt13DeviceOut Bit14= Pt14DeviceOut Bit15= Pt15DeviceOut		0	
	351	DLXUserDefData		General Purpose Data Value for Use in DeviceLogix Programs	UDINT	4	1	0	0xFFFFFFFF	0	
Voltage Setup	352	VoltageMode	C.VoltageMode	Voltage Wiring Mode	USINT	1	1	0= Delta 1= Wye 2= DeltaPTDelta2Wye 3= WyePTDelta2Wye 4= DeltaPTWye2Delta 5= WyePTWye2Delta		0	
	353	PTPrimary	C.PTPrimary	Potential Transformer Primary Rating	UINT	2	1	1	65535	480	
	354	PTSecondary	C.PTSecondary	Potential Transformer Secondary Rating	UINT	2	1	1	540	480	
	355	UVInhibitTime	C.UnderVoltageInhibitTime	Under Voltage Inhibit Time	USINT	1	1	0	250	10	Seconds
	356	UVTripDelay	C.UnderVoltageTripDelay	Under Voltage Trip Delay	USINT	1	10	1	250	10	Seconds
	357	UVTripLevel	C.UnderVoltageTripLimit	Under Voltage Trip Level	UINT	2	10	0	65535	1000	Volt
	358	UVWarningLevel	C.UnderVoltageWarnLimit	Under Voltage Warning Level	UINT	2	10	0	65535	4000	Volt
	359	OVInhibitTime	C.OverVoltageInhibitTime	Over Voltage Inhibit Time	USINT	1	1	0	250	10	Seconds
	360	OVTripDelay	C.OverVoltageTripDelay	Over Voltage Trip Delay	USINT	1	10	1	250	10	Seconds
	361	OVTripLevel	C.OverVoltageTripLimit	Over Voltage Trip Level	UINT	2	10	0	65535	5000	Volt
	362	OVWarningLevel	C.OverVoltageWarnLimit	Over Voltage Warning Level	UINT	2	10	0	65535	4900	Volt
	363	PhRotInhibitTime	C.PhaseRotationInhibitTime	Phase Rotation Inhibit Time	USINT	1	1	0	250	10	Seconds
	364	PhaseRotTripType	C.PhaseRotationTripType_0 C.PhaseRotationTripType_1	Voltage Phase Rotation Trip Type	USINT	1	1	1	0= NoRotation 1= ABC 2= ACB	1	
	365	VIBInhibitTime	C.VoltageImbalanceInhibitTime	Voltage Imbalance Inhibit Time	USINT	1	1	0	250	10	Seconds

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Voltage Setup (continued)	366	VIBTripDelay	C.VoltageImbalanceTripDelay	Voltage Imbalance Trip Delay	USINT	1	10	1	250	10	Seconds
	367	VIBTripLevel	C.VoltageImbalanceTripLimit	Voltage Imbalance Trip Level	USINT	1	1	0	100	85	%
	368	VIBWarningLevel	C.VoltageImbalanceWarnLimit	Voltage Imbalance Warning Level	USINT	1	1	0	100	75	%
	369	UFInhibitTime	C.UnderFrequencyInhibitTime	Under Frequency Inhibit Time	USINT	1	1	0	250	10	Seconds
	370	UFTripDelay	C.UnderFrequencyTripDelay	Under Frequency Trip Delay	USINT	1	10	1	250	10	Seconds
	371	UFTripLevel	C.UnderFrequencyTripLimit	Under Frequency Trip Level	USINT	1	1	46	65	57	Hz
	372	UFWarningLevel	C.UnderFrequencyWarnLimit	Under Frequency Warning Level	USINT	1	1	46	65	58	Hz
	373	OFInhibitTime	C.OverFrequencyInhibitTime	Over Frequency Inhibit Time	USINT	1	1	0	250	10	Seconds
	374	OFTripDelay	C.OverFrequencyTripDelay	Over Frequency Trip Delay	USINT	1	10	1	250	10	Seconds
	375	OFTripLevel	C.OverFrequencyTripLimit	Over Frequency Trip Level	USINT	1	1	46	65	63	Hz
	376	OFWarningLevel	C.OverFrequencyWarnLimit	Over Frequency Warning Level	USINT	1	1	46	65	62	Hz
Power Setup	377	PowerScale	C.PowerScale	Power value scale factor (kW MW)	USINT	1	1	0=kW 1=MW		0	
	378	UWInhibitTime	C.UnderRealPowerInhibitTime	Under Total Real Power Inhibit Time	USINT	1	1	0	250	10	Seconds
	379	UWTripDelay	C.UnderRealPowerTripDelay	Under Total Real Power Trip Delay	USINT	1	10	1	250	10	Seconds
	380	UWTripLevel	C.UnderRealPowerTripLimit	Under Total Real Power Trip Level	DINT	4	1000	0	2000000000	0	kW
	381	UWWarningLevel	C.UnderRealPowerWarnLimit	Under Total Real Power Warning Level	DINT	4	1000	0	2000000000	0	kW
	382	OWInhibitTime	C.OverRealPowerInhibitTime	Over Total Real Power Inhibit Time	USINT	1	1	0	250	10	Seconds
	383	OWTripDelay	C.OverRealPowerTripDelay	Over Total Real Power Trip Delay	USINT	1	10	1	250	10	Seconds
	384	OWTripLevel	C.OverRealPowerTripLimit	Over Total Real Power Trip Level	DINT	4	1000	0	2000000000	0	kW
	385	OWWarningLevel	C.OverRealPowerWarnLimit	Over Total Real Power Warning Level	DINT	4	1000	0	2000000000	0	kW
	386	UVARCInhibitTime	C.UnderReactivePowerConsumedInhibitTime	Under Total Reactive Power Consumed (+kVAR) Inhibit Time	USINT	1	1	0	250	10	Seconds
	387	UVARCTripDelay	C.UnderReactivePowerConsumedTripDelay	Under Total Reactive Power Consumed (+kVAR) Trip Delay	USINT	1	10	1	250	10	Seconds
	388	UVARCTripLevel	C.UnderReactivePowerConsumedTripLimit	Under Total Reactive Power Consumed (+kVAR) Trip Level	DINT	4	1000	0	2000000000	0	kVAR
	389	UVARCWarnLevel	C.UnderReactivePowerConsumedWarnLimit	Under Total Reactive Power Consumed (+kVAR) Warning Level	DINT	4	1000	0	2000000000	0	kVAR
	390	OVARCInhibitTime	C.OverReactivePowerConsumedInhibitTime	Over Total Reactive Power Consumed (+kVAR) Inhibit Time	USINT	1	1	0	250	10	Seconds
	391	OVARCTripDelay	C.OverReactivePowerConsumedTripDelay	Over Total Reactive Power Consumed (+kVAR) Trip Delay	USINT	1	10	1	250	10	Seconds

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Power Setup (Continued)	392	OVARCTripLevel	C.OverReactivePowerConsumedTripLimit	Over Total Reactive Power Consumed (+kVAR) Trip Level	DINT	4	1000	0	2000000000	0	kVAR
	393	OVARCWarnLevel	C.OverReactivePowerConsumedWarnLimit	Over Total Reactive Power Consumed (+kVAR) Warning Level	DINT	4	1000	0	2000000000	0	kVAR
	394	UVARGInhibitTime	C.UnderReactivePowerGeneratedInhibitTime	Under Total Reactive Power Generated (-kVAR) Inhibit Time	USINT	1	1	0	250	10	Seconds
	395	UVARGTripDelay	C.UnderReactivePowerGeneratedTripDelay	Under Total Reactive Power Generated (-kVAR) Trip Delay	USINT	1	10	1	250	10	Seconds
	396	UVARGTripLevel	C.UnderReactivePowerGeneratedTripLimit	Under Total Reactive Power Generated (-kVAR) Trip Level	DINT	4	1000	-2000000000	0	0	kVAR
	397	UVARGWarnLevel	C.UnderReactivePowerGeneratedWarnLimit	Under Total Reactive Power Generated (-kVAR) Warning Level	DINT	4	1000	-2000000000	0	0	kVAR
	398	OVARGInhibitTime	C.OverReactivePowerGeneratedInhibitTime	Over Total Reactive Power Generated (-kVAR) Inhibit Time	USINT	1	1	0	250	10	Seconds
	399	OVARGTripDelay	C.OverReactivePowerGeneratedTripDelay	Over Total Reactive Power Generated (-kVAR) Trip Delay	USINT	1	10	1	250	10	Seconds
	400	OVARGTripLevel	C.OverReactivePowerGeneratedTripLimit	Over Total Reactive Power Generated (-kVAR) Trip Level	DINT	4	1000	-2000000000	0	0	kVAR
	401	OVARGWarnLevel	C.OverReactivePowerGeneratedWarnLimit	Over Total Reactive Power Generated (-kVAR) Warning Level	DINT	4	1000	-2000000000	0	0	kVAR
	402	UVAInhibitTime	C.UnderApparentPowerInhibitTime	Under Total Apparent Power Inhibit Time	USINT	1	1	0	250	10	Seconds
	403	UVATripDelay	C.UnderApparentPowerTripDelay	Under Total Apparent Power Trip Delay	USINT	1	10	1	250	10	Seconds
	404	UVATripLevel	C.UnderApparentPowerTripLimit	Under Total Apparent Power Trip Level	DINT	4	1000	0	2000000000	0	kVA
	405	UVAWarningLevel	C.UnderApparentPowerWarnLimit	Under Total Apparent Power Warning Level	DINT	4	1000	0	2000000000	0	kVA
	406	OVAInhibitTime	C.OverApparentPowerInhibitTime	Over Total Apparent Power Inhibit Time	USINT	1	1	0	250	10	Seconds
	407	OVATripDelay		Over Total Apparent Power Trip Delay	USINT	1	10	1	250	10	Seconds
	408	OVATripLevel	C.OverApparentPowerTripDelay	Over Total Apparent Power Trip Level	DINT	4	1000	0	2000000000	0	kVA
	409	OVAWarningLevel	C.OverApparentPowerWarnLimit	Over Total Apparent Power Warning Level	DINT	4	1000	0	2000000000	0	kVA
	410	UPFLagInhibTime	C.UnderPowerFactorLaggingInhibitTime	Under Total Power Factor Lagging (-PF) Inhibit Time	USINT	1	1	0	250	10	Seconds
	411	UPFLagTripDelay	C.UnderPowerFactorLaggingTripDelay	Under Total Power Factor Lagging (-PF) Trip Delay	USINT	1	10	1	250	10	Seconds
	412	UPFLagTripLevel	C.UnderPowerFactorLaggingTripLimit	Under Total Power Factor Lagging (-PF) Trip Level	SINT	1	1	-100	0	-90	%

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Power Setup (Continued)	413	UPFLagWarnLevel	C.UnderPowerFactorLaggingWarnLimit	Under Total Power Factor Lagging (-PF) Warning Level	SINT	1	1	-100	0	-95	%
	414	OPFLagInhibTime	C.OverPowerFactorLaggingInhibitTime	Over Total Power Factor Lagging (-PF) Inhibit Time	USINT	1	1	0	250	10	Seconds
	415	OPFLagTripDelay	C.OverPowerFactorLaggingTripDelay	Over Total Power Factor Lagging (-PF) Trip Delay	USINT	1	10	1	250	10	Seconds
	416	OPFLagTripLevel	C.OverPowerFactorLaggingTripLimit	Over Total Power Factor Lagging (-PF) Trip Level	SINT	1	1	-100	0	-95	%
	417	OPFLagWarnLevel	C.OverPowerFactorLaggingWarnLimit	Over Total Power Factor Lagging (-PF) Warning Level	SINT	1	1	-100	0	-90	%
	418	UPFLeadInhibTime	C.UnderPowerFactorLeadingInhibitTime	Under Total Power Factor Leading (+PF) Inhibit Time	USINT	1	1	0	250	10	Seconds
	419	UPFLeadTripDelay	C.UnderPowerFactorLeadingTripDelay	Under Total Power Factor Leading (+PF) Trip Delay	USINT	1	10	1	250	10	Seconds
	420	UPFLeadTripLevel	C.UnderPowerFactorLeadingTripLimit	Under Total Power Factor Leading (+PF) Trip Level	USINT	1	1	0	100	90	%
	421	UPFLeadWarnLevel	C.UnderPowerFactorLeadingWarnLimit	Under Total Power Factor Leading (+PF) Warning Level	USINT	1	1	0	100	95	%
	422	OPFLeadInhibTime	C.OverPowerFactorLeadingInhibitTime	Over Total Power Factor Leading (+PF) Inhibit Time	USINT	1	1	0	250	10	Seconds
	423	OPFLeadTripDelay	C.OverPowerFactorLeadingTripDelay	Over Total Power Factor Leading (+PF) Trip Delay	USINT	1	10	1	250	10	Seconds
	424	OPFLeadTripLevel	C.OverPowerFactorLeadingTripLimit	Over Total Power Factor Leading (+PF) Trip Level	USINT	1	1	0	100	95	%
	425	OPFLeadWarnLevel	C.OverPowerFactorLeadingWarnLimit	Over Total Power Factor Leading (+PF) Warning Level	USINT	1	1	0	100	90	%
	426	DemandPeriod	C.DemandPeriod	The number of minutes in a specific demand period	USINT	1	1	1	255	15	Min
	427	NumberOfPeriods	C.NumberOfDemandPeriods	The number of periods to average for the demand calculation	USINT	1	1	1	15	1	
Diagnostic Display Setup	428	Screen1Param1	C.Screen1ParameterSelect1	Parameter to display on Operator Station Startup screen 1 line 1	UINT	2	1	0	560	1	
	429	Screen1Param2	C.Screen1ParameterSelect2	Parameter to display on Operator Station Startup screen 1 line 2	UINT	2	1	0	560	50	
	430	Screen2Param1	C.Screen2ParameterSelect1	Parameter to display on Operator Station Startup screen 2 line 1	UINT	2	1	0	560	2	
	431	Screen2Param2	C.Screen2ParameterSelect2	Parameter to display on Operator Station Startup screen 2 line 2	UINT	2	1	0	560	3	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Diagnostic Display Setup (Continued)	432	Screen3Param1	C.Screen3ParameterSelect1	Parameter to display on Operator Station Startup screen 3 line 1	UINT	2	1	0	560	51	
	433	Screen3Param2	C.Screen3ParameterSelect2	Parameter to display on Operator Station Startup screen 3 line 2	UINT	2	1	0	560	52	
	434	Screen4Param1	C.Screen4ParameterSelect1	Parameter to display on Operator Station Startup screen 4 line 1	UINT	2	1	0	560	38	
	435	Screen4Param2	C.Screen4ParameterSelect2	Parameter to display on Operator Station Startup screen 4 line 2	UINT	2	1	0	560	39	
	436	DisplayTimeout	C.OperatorStationDisplayTimeout	Inactivity time for a Diagnostic Station	UINT	2	1	0	65535	300	
Analog1 Setup	437	InAnMod1Ch00Type	C.Analog1.Ch00InputRangeType_0 C.Analog1.Ch00InputRangeType_1 C.Analog1.Ch00InputRangeType_2 C.Analog1.Ch00InputRangeType_3 C.Analog1.Ch00InputRangeType_4	Assignment for Analog Module 1 Input Channel 00 function	USINT	1	1	0= Disabled 1= 4To20mA 2= 0To20mA 3= 0To10Volts 4= 1To5Volts 5= 0To5Volts 6= 100Pt385 7= 200Pt385 8= 500Pt385 9= 1000Pt385 10=100Pt3916 11= 200Pt3916 12= 500Pt3916 13= 1000Pt3916 14= 10Cu426 15= 120Ni618 16= 120Ni672 17= 604NiFe518 18= 150ohm 19= 1000ohm 20 = 3000ohm 21= 6000ohm		0	
	438	InAMod1Ch0Format	C.Analog1.Ch00InputFormat_0 C.Analog1.Ch00InputFormat_1 C.Analog1.Ch00InputFormat_2	Assignment for Analog Module 1 Input Channel 00 Data Format	USINT	1	1	0= EngUnits 1= EngUnitsTimes10 2= RawProportional 3= ScaledForPID		0	
	439	InAMod1C0TmpUnit	C.Analog1.Ch00InputTempMode	Assignment for Analog Module 1 Input Channel 00 Temperature Units	USINT	1	1	0=DegreesC 1=DegreesF		0	
	440	InAMod1C0FiltFrq	C.Analog1.Ch00InputFilter_0 C.Analog1.Ch00InputFilter_1 C.Analog1.Ch00InputFilter_2	Assignment for Analog Module 1 Input Channel 00 Filter Freq	USINT	1	1	0=17Hz 1=4Hz 2=62Hz 3=470Hz		0	
	441	InAMod1C0OpCktSt	C.Analog1.Ch00InputOpenWire_0 C.Analog1.Ch00InputOpenWire_1	Indicates Analog Module 1 Input Channel 00 Open Circuit State	USINT	1	1	0=Upscale 1=Downscale 2=Zero		0	
	442	InAnMod1Ch0RTDEn	C.Analog1.Ch00InputTwoWireRTD	Enable Analog Module 1 Input Channel 00 to function with RTD	BOOL	1	1	0=3-wire 1=2-wire		0	
	443	InAMod1C0TripDly	C.Analog1.Ch00InputTripDelay	Analog Module 1 Input Channel 00 Trip Delay	USINT	1	10	0	250	10	Seconds
	444	InAMod1C0TripLvl	C.Analog1.Ch00InputTripLimit	Level (in selected Units) where Analog Input generates a trip	UINT	2	1	0	65535	0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Analog1 Setup (Continued)	445	InAMod1C0WarnLvl	C.Analog1.Ch00InputWarnLimit	Level (in selected Units) where Analog Input generates a warning	UINT	2	1	0	65535	0	
	446	InAnMod1Ch01Type	C.Analog1.Ch01InputRangeType_0 C.Analog1.Ch01InputRangeType_1 C.Analog1.Ch01InputRangeType_2 C.Analog1.Ch01InputRangeType_3 C.Analog1.Ch01InputRangeType_4	Assignment for Analog Module 1 Input Channel 01 function	USINT	1	1	0= Disabled 1= 4To20mA 2= 0To20mA 3= 0To10Volts 4= 1To5Volts 5= 0To5Volts 6= 100Pt385 7= 200Pt385 8= 500Pt385 9= 1000Pt385 10=100Pt3916 11= 200Pt3916 12= 500Pt3916 13= 1000Pt3916 14= 10Cu426 15= 120Ni618 16= 120Ni672 17= 604NiFe518 18= 150ohm 19= 1000ohm 20 = 3000ohm 21= 6000ohm		0	
	447	InAMod1Ch1Format	C.Analog1.Ch01InputFormat_0 C.Analog1.Ch01InputFormat_1 C.Analog1.Ch01InputFormat_2	Assignment for Analog Module 1 Input Channel 01 Data Format	USINT	1	1	0= EngUnits 1= EngUnitsTimes10 2= RawProportional 3= ScaledForPID 4= PercentRange		0	
	448	InAMod1C1TmpUnit	C.Analog1.Ch01InputTempMode	Assignment for Analog Module 1 Input Channel 01 Temperature Units	USINT	1	1	0=DegreesC 1=DegreesF		0	
	449	InAMod1C1FiltFrq	C.Analog1.Ch01InputFilter_0 C.Analog1.Ch01InputFilter_1 C.Analog1.Ch01InputFilter_2	Assignment Analog Module 1 Input Channel 01 Filter Freq	USINT	1	1	0=17Hz 1=4Hz 2=62Hz 3=470Hz		0	
	450	InAMod1C1OpCktSt	C.Analog1.Ch01InputOpenWire_0 C.Analog1.Ch01InputOpenWire_1	Indicates Analog Module 1 Input Channel 01 Open Circuit State	USINT	1	1	0=Upscale 1=Downscale 2=Zero		0	
	451	InAnMod1Ch1RTDEn	C.Analog1.Ch01InputTwoWireRTD	Enable Analog Module 1 Input Channel 01 to function with RTD	BOOL	1	1	0=3-wire 1=2-wire		0	
	452	InAMod1C1TripDly	C.Analog1.Ch01InputTripDelay	Analog Module 1 Input Channel 01 Trip Delay	USINT	1	10	0	250	10	Seconds
	453	InAMod1C1TripLvl	C.Analog1.Ch01InputTripLimit	Level (in selected Units) where Analog Input generates a trip	UINT	2	1	0	65535	0	
	454	InAMod1C1WarnLvl	C.Analog1.Ch01InputWarnLimit	Level (in selected Units) where Analog Input generate	UINT	2	1	0	65535	0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Analog1 Setup (Continued)	455	InAnMod1Ch02Type	C.Analog1.Ch02InputRangeType_0 C.Analog1.Ch02InputRangeType_1 C.Analog1.Ch02InputRangeType_2 C.Analog1.Ch02InputRangeType_3 C.Analog1.Ch02InputRangeType_4	Assignment for Analog Module 1 Input Channel 02 function	USINT	1	1	0= Disabled 1= 4To20mA 2= 0To20mA 3= 0To10Volts 4= 1To5Volts 5= 0To5Volts 6= 100Pt385 7= 200Pt385 8= 500Pt385 9= 1000Pt385 10=100Pt3916 11= 200Pt3916 12= 500Pt3916 13= 1000Pt3916 14= 10Cu426 15= 120Ni618 16= 120Ni672 17= 604NiFe518 18= 150ohm 19= 1000ohm 20 = 3000ohm 21= 6000ohm		0	
	456	InAMod1Ch2Format	C.Analog1.Ch02InputFormat_0 C.Analog1.Ch02InputFormat_1 C.Analog1.Ch02InputFormat_2	Assignment for Analog Module 1 Input Channel 02 Data Format	USINT	1	1	0= EngUnits 1= EngUnitsTimes10 2= RawProportional 3= ScaledForPID		0	
	457	InAMod1C2TmpUnit	C.Analog1.Ch02InputTempMode	Assignment for Analog Module 1 Input Channel 02 Temperature Units	USINT	1	1	0=DegreesC 1=DegreesF		0	
	458	InAMod1C2FiltFrq	C.Analog1.Ch02InputFilter_0 C.Analog1.Ch02InputFilter_1 C.Analog1.Ch02InputFilter_2	Assignment Analog Module 1 Input Channel 02 Filter Freq	USINT	1	1	0=17Hz 1=4Hz 2=62Hz 3=470Hz		0	
	459	InAMod1C2OpCktSt	C.Analog1.Ch02InputOpenWire_0 C.Analog1.Ch02InputOpenWire_1	Indicates Analog Module 1 Input Channel 02 Open Circuit State	USINT	1	1	0=Upscale 1=Downscale 2=Zero		0	
	460	InAnMod1Ch2RTDEn	C.Analog1.Ch02InputTwoWireRTD	Enable Analog Module 1 Input Channel 02 to function with RTD	BOOL	1	1	0=3-wire 1=2-wire		0	
	461	InAMod1C2TripDly	C.Analog1.Ch02InputTripDelay	Analog Module 1 Input Channel 02 Trip Delay	USINT	1	10	0	250	10	Seconds
	462	InAMod1C2TripLvl	C.Analog1.Ch02InputTripLimit	Level (in selected Units) where Analog Input generates a trip	UINT	2	1	0	65535	0	
	463	InAMod1C2WarnLvl	C.Analog1.Ch02InputWarnLimit	Level (in selected Units) where Analog Input generates a warning	UINT	2	1	0	65535	0	
	464	OutAnMod1Type	C.Analog1.Ch00OutputRangeType_0 C.Analog1.Ch00OutputRangeType_1 C.Analog1.Ch00OutputRangeType_2 C.Analog1.Ch00OutputRangeType_3	Assignment for Analog Module 1 Output function	USINT	1	1	0= Disabled 1= 4To20mA 2= 0To20mA 3= 0To10Volts 4=1to5 Volts 5= 0to5 Volts		0	
	465	OutAnMod1Select	C.Analog1.Ch00OutputMode	Assignment of parameter data value to drive Analog Module 1 Output	USINT	1	1	0= AveragePctFLA 1= ScaledAvgPctFLA 2= PercentTCU 3= GFCurrent 4= CurrentUnbalance 5= AvgLLVoltage 6=VoltLLUnbalance 7= TotalkW 8= TotalkVA 9= TotalkVAR 10= TotalPF 11= UserDLXData		0	
	466	OutAnMod1FltActn	C.Analog1.Ch00OutputFaultMode_0 C.Analog1.Ch00OutputFaultMode_1	Analog Module 1 Output action on comms fault	USINT	1	1	0= Zero 1= Maximum 2= Minimum 3= Hold Last State		0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Analog1 Setup (continued)	467	OutAnMod1IdlActn	C.Analog1.Ch00OutputProtectionFaultMode_0 C.Analog1.Ch00OutputProtectionFaultMode_1	Analog Module 1 Output action on comms idle	USINT	1	1	0= Zero 1= Maximum 2= Minimum 3= Hold Last State		0	
Analog2 Setup	468	InAnMod2Ch00Type	C.Analog2.Ch00InputRangeType_0 C.Analog2.Ch00InputRangeType_1 C.Analog2.Ch00InputRangeType_2 C.Analog2.Ch00InputRangeType_3 C.Analog2.Ch00InputRangeType_4	Assignment for Analog Module 2 Input Channel 00 function	USINT	1	1	0= Disabled 1= 4To20mA 2= 0To20mA 3= 0To10Volts 4= 1To5Volts 5= 0To5Volts 6= 100Pt385 7= 200Pt385 8= 500Pt385 9= 1000Pt385 10=100Pt3916 11= 200Pt3916 12= 500Pt3916 13= 1000Pt3916 14= 10Cu426 15= 120Ni618 16= 120Ni672 17= 604NiFe518 18= 150ohm 19= 1000ohm 20 = 3000ohm 21= 6000ohm		0	
	469	InAMod2Ch0Format	C.Analog2.Ch00InputFormat_0 C.Analog2.Ch00InputFormat_1 C.Analog2.Ch00InputFormat_2	Assignment for Analog Module 2 Input Channel 00 Data Format	USINT	1	1	0= EngUnits 1= EngUnitsTimes10 2= RawProportional 3= ScaledForPID		0	
	470	InAMod2C0TmpUnit	C.Analog2.Ch00InputTempMode	Assignment for Analog Module 2 Input Channel 00 Temperature Units	USINT	1	1	0=DegreesC 1=DegreesF		0	
	471	InAMod2C0FiltFrq	C.Analog2.Ch00InputFilter_0 C.Analog2.Ch00InputFilter_1 C.Analog2.Ch00InputFilter_2	Assignment for Analog Module 2 Input Channel 00 Filter Freq	USINT	1	1	0=17Hz 1=4Hz 2=62Hz 3=470Hz		0	
	472	InAMod2C0OpCktSt	C.Analog2.Ch00InputOpenWire_0 C.Analog2.Ch00InputOpenWire_1	Indicates Analog Module 2 Input Channel 00 Open Circuit State	USINT	1	1	0=Upscale 1=Downscale 2=Zero		0	
	473	InAnMod2Ch0RTDEn	C.Analog2.Ch00InputTwoWireRTD	Enable Analog Module 2 Input Channel 00 to function with RTD	BOOL	1	1	0=3-wire 1=2-wire		0	
	474	InAMod2C0TripDly	C.Analog2.Ch00InputTripDelay	Analog Module 2 Input Channel 00 Trip Delay	USINT	1	10	0	250	10	Seconds
	475	InAMod2C0TripLvl	C.Analog2.Ch00InputTripLimit	Level (in selected Units) where Analog Input generates a trip	UINT	2	1	-32768	32767	0	
	476	InAMod2C0WarnLvl	C.Analog2.Ch00InputWarnLimit	Level (in selected Units) where Analog Input generates a warning	UINT	2	1	-32768	32767	0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Analog2 Setup (Continued)	477	InAnMod2Ch01Type	C.Analog2.Ch01InputRangeType_0 C.Analog2.Ch01InputRangeType_1 C.Analog2.Ch01InputRangeType_2 C.Analog2.Ch01InputRangeType_3 C.Analog2.Ch01InputRangeType_4	Assignment for Analog Module 2 Input Channel 01 function	USINT	1	1	0= Disabled 1= 4To20mA 2= 0To20mA 3= 0To10Volts 4= 1To5Volts 5= 0To5Volts 6= 100Pt385 7= 200Pt385 8= 500Pt385 9= 1000Pt385 10=100Pt3916 11= 200Pt3916 12= 500Pt3916 13= 1000Pt3916 14= 10Cu426 15= 120Ni618 16= 120Ni672 17= 604NiFe518 18= 150ohm 19= 1000ohm 20 = 3000ohm 21= 6000ohm		0	
	478	InAMod2Ch1Format	C.Analog2.Ch01InputFormat_0 C.Analog2.Ch01InputFormat_1 C.Analog2.Ch01InputFormat_2	Assignment for Analog Module 2 Input Channel 01 Data Format	USINT	1	1	0= EngUnits 1= EngUnitsTimes10 2= RawProportional 3= ScaledForPID		0	
	479	InAMod2C1TmpUnit	C.Analog2.Ch01InputTempMode	Assignment for Analog Module 2 Input Channel 01 Temperature Units	USINT	1	1	0=DegreesC 1=DegreesF		0	
	480	InAMod2C1FiltFrq	C.Analog2.Ch01InputFilter_0 C.Analog2.Ch01InputFilter_1 C.Analog2.Ch01InputFilter_2	Assignment Analog Module 2 Input Channel 01 Filter Freq	USINT	1	1	0=17Hz 1=4Hz 2=62Hz 3=470Hz		0	
	481	InAMod2C1OpCktSt	C.Analog2.Ch01InputOpenWire_0 C.Analog2.Ch01InputOpenWire_1	Indicates Analog Module 2 Input Channel 01 Open Circuit State	USINT	1	1	0=Upscale 1=Downscale 2=Zero		0	
	482	InAnMod2Ch1RTDEn	C.Analog2.Ch01InputTwoWireRTD	Enable Analog Module 2 Input Channel 01 to function with RTD	BOOL	1	1	0=3-wire 1=2-wire		0	
	483	InAMod2C1TripDly	C.Analog2.Ch01InputTripDelay	Analog Module 2 Input Channel 01 Trip Delay	USINT	1	10	0	250	10	Seconds
	484	InAMod2C1TripLvl	C.Analog2.Ch01InputTripLimit	Level (in selected Units) where Analog Input generates a trip	UINT	2	1	0	65535	0	
	485	InAMod2C1WarnLvl	C.Analog2.Ch01InputWarnLimit	Level (in selected Units) where Analog Input generates a warning	UINT	2	1	-32768	32767	0	
	486	InAnMod2Ch02Type	C.Analog2.Ch02InputRangeType_0 C.Analog2.Ch02InputRangeType_1 C.Analog2.Ch02InputRangeType_2 C.Analog2.Ch02InputRangeType_3 C.Analog2.Ch02InputRangeType_4	Assignment for Analog Module 2 Input Channel 02 function	USINT	1	1	0= Disabled 1= 4To20mA 2= 0To20mA 3= 0To10Volts 4= 1To5Volts 5= 0To5Volts 6= 100Pt385 7= 200Pt385 8= 500Pt385 9= 1000Pt385 10=100Pt3916 11= 200Pt3916 12= 500Pt3916 13= 1000Pt3916 14= 10Cu426 15= 120Ni618 16= 120Ni672 17= 604NiFe518 18= 150ohm 19= 1000ohm 20 = 3000ohm 21= 6000ohm		0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Analog2 Setup (continued)	487	InAMod2Ch2Format	C.Analog2.Ch02InputFormat_0 C.Analog2.Ch02InputFormat_1 C.Analog2.Ch02InputFormat_2	Assignment for Analog Module 2 Input Channel 02 Data Format	USINT	1	1	0= EngUnits 1= EngUnitsTimes10 2= RawProportional 3= ScaledForPID		0	
	488	InAMod2C2TmpUnit	C.Analog2.Ch02InputTempMode	Assignment for Analog Module 2 Input Channel 02 Temperature Units	USINT	1	1	0=DegreesC 1=DegreesF		0	
	489	InAMod2C2FiltFrq	C.Analog2.Ch02InputFilter_0 C.Analog2.Ch02InputFilter_1 C.Analog2.Ch02InputFilter_2	Assignment Analog Module 2 Input Channel 02 Filter Freq	USINT	1	1	0=17Hz 1=4Hz 2=62Hz 3=470Hz		0	
	490	InAMod2C2OpCktSt	C.Analog2.Ch02InputOpenWire_0 C.Analog2.Ch02InputOpenWire_1	Indicates Analog Module 2 Input Channel 02 Open Circuit State	USINT	1	1	0=Upscale 1=Downscale 2=Zero		0	
	491	InAnMod2Ch2RTDEn	C.Analog2.Ch02InputTwoWireRTD	Enable Analog Module 2 Input Channel 02 to function with RTD	BOOL	1	1	0=3-wire 1=2-wire		0	
	492	InAMod2C2TripDly	C.Analog2.Ch02InputTripDelay	Analog Module 2 Input Channel 02 Trip Delay	USINT	1	10	0	250	10	Seconds
	493	InAMod2C2TripLvl	C.Analog2.Ch02InputTripLimit	Level (in selected Units) where Analog Input generates a trip	UINT	2	1	-32768	32767	0	
	494	InAMod2C2WarnLvl	C.Analog2.Ch02InputWarnLimit	Level (in selected Units) where Analog Input generates a warning	UINT	2	1	-32768	32767	0	
	495	OutAnMod2Type	C.Analog2.Ch00OutputRangeType_0 C.Analog2.Ch00OutputRangeType_1 C.Analog2.Ch00OutputRangeType_2 C.Analog2.Ch00OutputRangeType_3	Assignment for Analog Module 2 Output function.	USINT	1	1	0= Disabled 1= 4To20mA 2= 0To20mA 3= 0To10Volts 4=1To5 Volts 5=0To5 Volts		0	
	496	OutAnMod2Select	C.Analog2.Ch00OutputMode	Assignment of parameter data value to drive Analog Module 2 Output	USINT	1	1	0= AveragePctFLA 1= ScaledAvgPctFLA 2= PercentTCU 3= GFCurrent 4= CurrentUnbalance 5= AvgLLVoltage 6=VoltLLUnbalance 7= TotalkW 8= TotalkVA 9= TotalkVAR 10= TotalPF 11= UserDLXData		0	
	497	OutAnMod2EFltAct	C.Analog2.Ch00OutputFaultMode_0 C.Analog2.Ch00OutputFaultMode_1	Analog Module 2 Output action on an Expansion Bus fault	USINT	1	1	0= Zero 1= Maximum 2= Minimum 3= HoldLastState		0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Analog3 Setup	498	OutAnMod2PFltAct	C.Analog2.Ch00OutputProtectionFaultMode_0 C.Analog2.Ch00OutputProtectionFaultMode_1	Analog Module 2 Output action on a protection fault	USINT	1	1	0= Ignore 1= Maximum 2= Minimum 3= HoldLastState		0	
	499	InAnMod3Ch00Type	C.Analog3.Ch00InputRangeType_0 C.Analog3.Ch00InputRangeType_1 C.Analog3.Ch00InputRangeType_2 C.Analog3.Ch00InputRangeType_3 C.Analog3.Ch00InputRangeType_4	Assignment for Analog Module 3 Input Channel 00 function	USINT	1	1	0= Disabled 1= 4To20mA 2= 0To20mA 3= 0To10Volts 4= 1To5Volts 5= 0To5Volts 6= 100Pt385 7= 200Pt385 8= 500Pt385 9= 1000Pt385 10=100Pt3916 11= 200Pt3916 12= 500Pt3916 13= 1000Pt3916 14= 10Cu426 15= 120Ni618 16= 120Ni672 17= 604NiFe518 18= 150ohm 19= 1000ohm 20 = 3000ohm 21= 6000ohm		0	
	500	InAMod3Ch0Format	C.Analog3.Ch00InputFormat_0 C.Analog3.Ch00InputFormat_1 C.Analog3.Ch00InputFormat_2	Assignment for Analog Module 3 Input Channel 00 Data Format	USINT	1	1	0= EngUnits 1= EngUnitsTimes10 2= RawProportional 3= ScaledForPID		0	
	501	InAMod3C0TmpUnit	C.Analog3.Ch00InputTempMode	Assignment for Analog Module 3 Input Channel 00 Temperature Units	USINT	1	1	0=DegreesC 1=DegreesF		0	
	502	InAMod3C0FiltFrq	C.Analog3.Ch00InputFilter_0 C.Analog3.Ch00InputFilter_1 C.Analog3.Ch00InputFilter_2	Assignment for Analog Module 3 Input Channel 00 Filter Freq	USINT	1	1	0=17Hz 1=4Hz 2=62Hz 3=470Hz		0	
	503	InAMod3C0OpCktSt	C.Analog3.Ch00InputOpenWire_0 C.Analog3.Ch00InputOpenWire_1	Indicates Analog Module 3 Input Channel 00 Open Circuit State	USINT	1	1	0=Upscale 1=Downscale 2=Zero		0	
	504	InAnMod3Ch0RTDEn	C.Analog3.Ch00InputTwoWireRTD	Enable Analog Module 3 Input Channel 00 to function with RTD	BOOL	1	1	0=3-wire 1=2-wire		0	
	505	InAMod3C0TripDly	C.Analog3.Ch00InputTripDelay	Analog Module 3 Input Channel 00 Trip Delay	USINT	1	10	0	250	10	Seconds
	506	InAMod3C0TripLvl	C.Analog3.Ch00InputTripLimit	Level (in selected Units) where Analog Input generates a trip	UINT	2	1	-32768	32767	0	
	507	InAMod3C0WarnLvl	C.Analog3.Ch00InputWarnLimit	Level (in selected Units) where Analog Input generates a warning	UINT	2	1	-32768	32767	0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Analog3 Setup (Continued)	508	InAnMod3Ch01Type	C.Analog3.Ch01InputRangeType_0 C.Analog3.Ch01InputRangeType_1 C.Analog3.Ch01InputRangeType_2 C.Analog3.Ch01InputRangeType_3 C.Analog3.Ch01InputRangeType_4	Assignment for Analog Module 3 Input Channel 01 function	USINT	1	1	0= Disabled 1= 4To20mA 2= 0To20mA 3= 0To10Volts 4= 1To5Volts 5= 0To5Volts 6= 100Pt385 7= 200Pt385 8= 500Pt385 9= 1000Pt385 10=100Pt3916 11= 200Pt3916 12= 500Pt3916 13= 1000Pt3916 14= 10Cu426 15= 120Ni618 16= 120Ni672 17= 604NiFe518 18= 150ohm 19= 1000ohm 20 = 3000ohm 21= 6000ohm		0	
	509	InAMod3Ch1Format	C.Analog3.Ch01InputFormat_0 C.Analog3.Ch01InputFormat_1 C.Analog3.Ch01InputFormat_2	Assignment for Analog Module 3 Input Channel 01 Data Format	USINT	1	1	0= EngUnits 1= EngUnitsTimes10 2= RawProportional 3= ScaledForPID		0	
	510	InAMod3C1TmpUnit	C.Analog3.Ch01InputTempMode	Assignment for Analog Module 3 Input Channel 01 Temperature Units	USINT	1	1	0=DegreesC 1=DegreesF		0	
	511	InAMod3C1FiltFrq	C.Analog3.Ch01InputFilter_0 C.Analog3.Ch01InputFilter_1 C.Analog3.Ch01InputFilter_2	Assignment Analog Module 3 Input Channel 01 Filter Freq	USINT	1	1	0=17Hz 1=4Hz 2=62Hz 3=470Hz		0	
	512	InAMod3C1OpCktSt	C.Analog3.Ch01InputOpenWire_0 C.Analog3.Ch01InputOpenWire_1	Indicates Analog Module 3 Input Channel 01 Open Circuit State	USINT	1	1	0=Upscale 1=Downscale 2=Zero		0	
	513	InAnMod3Ch1RTDEn	C.Analog3.Ch01InputTwoWireRTD	Enable Analog Module 3 Input Channel 01 to function with RTD	BOOL	1	1	0=3-wire 1=2-wire		0	
	514	InAMod3C1TripDly	C.Analog3.Ch01InputTripDelay	Analog Module 3 Input Channel 01 Trip Delay	USINT	1	10	0	250	10	Seconds
	515	InAMod3C1TripLvl	C.Analog3.Ch01InputTripLimit	Level (in selected Units) where Analog Input generates a trip	UINT	2	1	-32768	32767	0	
	516	InAMod3C1WarnLvl	C.Analog3.Ch01InputWarnLimit	Level (in selected Units) where Analog Input generates a warning	UINT	2	1	-32768	32767	0	
	517	InAnMod3Ch02Type	C.Analog3.Ch02InputRangeType_0 C.Analog3.Ch02InputRangeType_1 C.Analog3.Ch02InputRangeType_2 C.Analog3.Ch02InputRangeType_3 C.Analog3.Ch02InputRangeType_4	Assignment for Analog Module 3 Input Channel 02 function	USINT	1	1	0= Disabled 1= 4To20mA 2= 0To20mA 3= 0To10Volts 4= 1To5Volts 5= 0To5Volts 6= 100Pt385 7= 200Pt385 8= 500Pt385 9= 1000Pt385 10=100Pt3916 11= 200Pt3916 12= 500Pt3916 13= 1000Pt3916 14= 10Cu426 15= 120Ni618 16= 120Ni672 17= 604NiFe518 18= 150ohm 19= 1000ohm 20 = 3000ohm 21= 6000ohm		0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Analog3 Setup (continued)	518	InAMod3Ch2Format	C.Analog3.Ch02InputFormat_0 C.Analog3.Ch02InputFormat_1 C.Analog3.Ch02InputFormat_2	Assignment for Analog Module 3 Input Channel 02 Data Format	USINT	1	1	0= EngUnits 1= EngUnitsTimes10 2= RawProportional 3= ScaledForPID		0	
	519	InAMod3C2TmpUnit	C.Analog3.Ch02InputTempMode	Assignment for Analog Module 3 Input Channel 02 Temperature Units	USINT	1	1	0=DegreesC 1=DegreesF		0	
	520	InAMod3C2FiltFrq	C.Analog3.Ch02InputFilter_0 C.Analog3.Ch02InputFilter_1 C.Analog3.Ch02InputFilter_2	Indicates Analog Module 3 Input Channel 02 Filter Freq	USINT	1	1	0=17Hz 1=4Hz 2=62Hz 3=470Hz		0	
	521	InAMod3C2OpCktSt	C.Analog3.Ch02InputOpenWire_0 C.Analog3.Ch02InputOpenWire_1	Indicates Analog Module 3 Input Channel 02 Open Circuit State	USINT	1	1	0=Upscale 1=Downscale 2=Zero		0	
	522	InAnMod3Ch2RTDEn	C.Analog3.Ch02InputTwoWireRTD	Enable Analog Module 3 Input Channel 02 to function with RTD	BOOL	1	1	0=3-wire 1=2-wire		0	
	523	InAMod3C2TripDly	C.Analog3.Ch02InputTripDelay	Analog Module 3 Input Channel 02 Trip Delay	USINT	1	10	0	250	10	Seconds
	524	InAMod3C2TripLvl	C.Analog3.Ch02InputTripLimit	Level (in selected Units) where Analog Input generates a trip	UINT	2	1	-32768	32767	0	
	525	InAMod3C2WarnLvl	C.Analog3.Ch02InputWarnLimit	Level (in selected Units) where Analog Input generates a warning	UINT	2	1	-32768	32767	0	
	526	OutAnMod3Type	C.Analog3.Ch00OutputRangeType_0 C.Analog3.Ch00OutputRangeType_1 C.Analog3.Ch00OutputRangeType_2 C.Analog3.Ch00OutputRangeType_3	Assignment for Analog Module 3 Output function	USINT	1	1	0= Disabled 1= 4To20mA 2= 0To20mA 3= 0To10Volts 4=1to5 Volts 5=0to5 Volts		0	
	527	OutAnMod3Select	C.Analog3.Ch00OutputMode	Assignment of parameter data value to drive Analog Module 3 Output	USINT	1	1	0= AveragePctFLA 1= ScaledAvgPctFLA 2= PercentTCU 3= GFCurrent 4= CurrentUnbalance 5= AvgLLVoltage 6=VoltLLUnbalance 7= TotalkW 8= TotalkVA 9= TotalkVAR 10= TotalPF 11= UserDLXData		0	
	528	OutAnMod3EFltAct	C.Analog3.Ch00OutputFaultMode_0 C.Analog3.Ch00OutputFaultMode_1	Analog Module 3 Output action on an Expansion Bus fault	USINT	1	1	0= Zero 1= Maximum 2= Minimum 3= HoldLastState		0	
	529	OutAnMod3PFltAct	C.Analog3.Ch00OutputProtectionFaultMode_0 C.Analog3.Ch00OutputProtectionFaultMode_1	Analog Module 3 Output action on a protection fault	USINT	1	1	0= Ignore 1= Maximum 2= Minimum 3= HoldLastState		0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Analog4 Setup	530	InAnMod4Ch00Type	C.Analog4.Ch00InputRangeType_0 C.Analog4.Ch00InputRangeType_1 C.Analog4.Ch00InputRangeType_2 C.Analog4.Ch00InputRangeType_3 C.Analog4.Ch00InputRangeType_4	Assignment for Analog Module 4 Input Channel 00 function	USINT	1	1	0= Disabled 1= 4To20mA 2= 0To20mA 3= 0To10Volts 4= 1To5Volts 5= 0To5Volts 6= 100Pt385 7= 200Pt385 8= 500Pt385 9= 1000Pt385 10=100Pt3916 11= 200Pt3916 12= 500Pt3916 13= 1000Pt3916 14= 10Cu426 15= 120Ni618 16= 120Ni672 17= 604NiFe518 18= 150ohm 19= 1000ohm 20 = 3000ohm 21= 6000ohm		0	
	531	InAMod4Ch0Format	C.Analog4.Ch00InputFormat_0 C.Analog4.Ch00InputFormat_1 C.Analog4.Ch00InputFormat_2	Assignment for Analog Module 4 Input Channel 00 Data Format	USINT	1	1	0= EngUnits 1= EngUnitsTimes10 2= RawProportional 3= ScaledForPID		0	
	532	InAMod4C0TmpUnit	C.Analog4.Ch00InputTempMode	Assignment for Analog Module 4 Input Channel 00 Temperature Units	USINT	1	1	0=DegreesC 1=DegreesF		0	
	533	InAMod4C0FiltFrq	C.Analog4.Ch00InputFilter_0 C.Analog4.Ch00InputFilter_1 C.Analog4.Ch00InputFilter_2	Assignment for Analog Module 4 Input Channel 00 Filter Freq	USINT	1	1	0=17Hz 1=4Hz 2=62Hz 3=470Hz		0	
	534	InAMod4C0OpCktSt	C.Analog4.Ch00InputOpenWire_0 C.Analog4.Ch00InputOpenWire_1	Indicates Analog Module 4 Input Channel 00 Open Circuit State	USINT	1	1	0=Upscale 1=Downscale 2=Zero		0	
	535	InAnMod4Ch0RTDEn	C.Analog4.Ch00InputTwoWireRTD	Enable Analog Module 4 Input Channel 00 to function with RTD	BOOL	1	1	0=3-wire 1=2-wire		0	
	536	InAMod4C0TripDly	C.Analog4.Ch00InputTripDelay	Analog Module 4 Input Channel 00 Trip Delay	USINT	1	10	0	250	10	Seconds
	537	InAMod4C0TripLvl	C.Analog4.Ch00InputTripLimit	Level (in selected Units) where Analog Input generates a trip	UINT	2	1	-32768	32767	0	
	538	InAMod4C0WarnLvl	C.Analog4.Ch00InputWarnLimit	Level (in selected Units) where Analog Input generates a warning	UINT	2	1	-32768	32767	0	
	539	InAnMod4Ch01Type	C.Analog4.Ch01InputRangeType_0 C.Analog4.Ch01InputRangeType_1 C.Analog4.Ch01InputRangeType_2 C.Analog4.Ch01InputRangeType_3 C.Analog4.Ch01InputRangeType_4	Assignment for Analog Module 4 Input Channel 01 function	USINT	1	1	0= Disabled 1= 4To20mA 2= 0To20mA 3= 0To10Volts 4= 1To5Volts 5= 0To5Volts 6= 100Pt385 7= 200Pt385 8= 500Pt385 9= 1000Pt385 10=100Pt3916 11= 200Pt3916 12= 500Pt3916 13= 1000Pt3916 14= 10Cu426 15= 120Ni618 16= 120Ni672 17= 604NiFe518 18= 150ohm 19= 1000ohm 20 = 3000ohm 21= 6000ohm		0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Analog4 Setup (continued)	540	InAMod4Ch1Format	C.Analog4.Ch01InputFormat_0 C.Analog4.Ch01InputFormat_1 C.Analog4.Ch01InputFormat_2	Assignment for Analog Module 4 Input Channel 01 Data Format	USINT	1	1	0= EngUnits 1= EngUnitsTimes10 2= RawProportional 3= ScaledForPID		0	
	541	InAMod4C1TmpUnit	C.Analog4.Ch01InputTempMode	Module 4 Input Channel 01 Temperature Units	USINT	1	1	0=DegreesC 1=DegreesF		0	
	542	InAMod4C1FiltFrq	C.Analog4.Ch01InputFilter_0 C.Analog4.Ch01InputFilter_1 C.Analog4.Ch01InputFilter_2	Assignment Analog Module 4 Input Channel 01 Filter Freq	USINT	1	1	0=17Hz 1=4Hz 2=62Hz 3=470Hz		0	
	543	InAMod4C1OpCktSt	C.Analog4.Ch01InputOpenWire_0 C.Analog4.Ch01InputOpenWire_1	Indicates Analog Module 4 Input Channel 01 Open Circuit State	USINT	1	1	0=Upscale 1=Downscale 2=Zero		0	
	544	InAnMod4Ch1RTDEn	C.Analog4.Ch01InputTwoWireRTD	Enable Analog Module 4Input Channel 01 to function with RTD	BOOL	1	1	0=3-wire 1=2-wire		0	
	545	InAMod4C1TripDly	C.Analog4.Ch01InputTripDelay	Analog Module 4 Input Channel 01 Trip Delay	USINT	1	10	0	250	10	Seconds
	546	InAMod4C1TripLvl	C.Analog4.Ch01InputTripLimit	Level (in selected Units) where Analog Input generates a trip	UINT	2	1	-32768	32767	0	
	547	InAMod4C1WarnLvl	C.Analog4.Ch01InputWarnLimit	Level (in selected Units) where Analog Input generates a warning	UINT	2	1	-32768	32767	0	
	548	InAnMod4Ch02Type	C.Analog4.Ch02InputRangeType_0 C.Analog4.Ch02InputRangeType_1 C.Analog4.Ch02InputRangeType_2 C.Analog4.Ch02InputRangeType_3 C.Analog4.Ch02InputRangeType_4	Assignment for Analog Module 4 Input Channel 02 function	USINT	1	1	0= Disabled 1= 4To20mA 2= 0To20mA 3= 0To10Volts 4= 1To5Volts 5= 0To5Volts 6= 100Pt385 7= 200Pt385 8= 500Pt385 9= 1000Pt385 10=100Pt3916 11= 200Pt3916 12= 500Pt3916 13= 1000Pt3916 14= 10Cu426 15= 120Ni618 16= 120Ni672 17= 604NiFe518 18= 150ohm 19= 1000ohm 20 = 3000ohm 21= 6000ohm		0	
	549	InAMod4Ch2Format	C.Analog4.Ch02InputFormat_0 C.Analog4.Ch02InputFormat_1 C.Analog4.Ch02InputFormat_2	Assignment for Analog Module 4 Input Channel 02 Data Format	USINT	1	1	0= EngUnits 1= EngUnitsTimes10 2= RawProportional 3= ScaledForPID		0	
	550	InAMod4C2TmpUnit	C.Analog4.Ch02InputTempMode	Assignment for Analog Module 4 Input Channel 02 Temperature Units	USINT	1	1	0=DegreesC 1=DegreesF		0	
	551	InAMod4C2FiltFrq	C.Analog4.Ch02InputFilter_0 C.Analog4.Ch02InputFilter_1 C.Analog4.Ch02InputFilter_2	Indicates Analog Module 4 Input Channel 02 Filter Freq	USINT	1	1	0=17Hz 1=4Hz 2=62Hz 3=470Hz		0	
	552	InAMod4C2OpCktSt	C.Analog4.Ch02InputOpenWire_0 C.Analog4.Ch02InputOpenWire_1	Indicates Analog Module 4 Input Channel 02 Open Circuit State	USINT	1	1	0= Zero 1= Maximum 2= Minimum 3= HoldLastState		0	
	553	InAnMod4Ch2RTDEn	C.Analog4.Ch02InputTwoWireRTD	Enable Analog Module 4 Input Channel 02 to function with RTD	BOOL	1	1	0=Disable 1=Enable		0	

Group	Param No.	Parameter Name	Device Profile Tag Name	Description	Type	Data Size (bytes)	Scale Factor	Min	Max	Default	Units
Analog4 Setup (continued)	554	InAMod4C2TripDly	C.Analog4.Ch02InputTripDelay	Analog Module 4 Input Channel 02 Trip Delay	USINT	1	10	0	250	10	Seconds
	555	InAMod4C2TripLvl	C.Analog4.Ch02InputTripLimit	Level (in selected Units) where Analog Input generates a trip	UINT	2	1	-32768	32767	0	
	556	InAMod4C2WarnLvl	C.Analog4.Ch02InputWarnLimit	Level (in selected Units) where Analog Input generates a warning	UINT	2	1	-32768	32767	0	
	557	OutAnMod4Type	C.Analog4.Ch00OutputRangeType_0 C.Analog4.Ch00OutputRangeType_1 C.Analog4.Ch00OutputRangeType_2 C.Analog4.Ch00OutputRangeType_3	Assignment for Analog Module 4 Output function	USINT	1	1	0= Disabled 1= 4To20mA 2= 0To20mA 3= 0To10Volts 4= 1To5Volts 5= 0To5Volts		0	
	558	OutAnMod4Select	C.Analog4.Ch00OutputMode	Assignment of parameter data value to drive Analog Module 4 Output	USINT	1	1	0= AveragePctFLA 1= ScaledAvgPctFLA 2= PercentTCU 3= GFCurrent 4= CurrentUnbalance 5= AvgLLVoltage 6=VoltLLUnbalance 7= TotalkW 8= TotalkVA 9= TotalkVAR 10= TotalPF 11= UserDLXData		0	
	559	OutAnMod4EFltAct	C.Analog4.Ch00OutputFaultMode_0 C.Analog4.Ch00OutputFaultMode_1	Analog Module 4 Output action on an Expansion Bus fault	USINT	1	1	0= Zero 1= Maximum 2= Minimum 3= HoldLastState		0	
	560	OutAnMod4PFltAct	C.Analog4.Ch00OutputProtectionFaultMode_0 C.Analog4.Ch00OutputProtectionFaultMode_1	Analog Module 4 Output action on a protection fault	USINT	1	1	0= Zero 1= Maximum 2= Minimum 3= HoldLastState		0	
Output Setup	561	FnlFltValStDur	C.FaultValueStateDuration	Final Fault Value State Duration	SINT	1	1	0 = Forever	127	0	Sec
	562	OutPt00FnlFltVal	C.Pt00OutputFaultFinalState	Output Relay 0 Final Fault Value	BOOL	1	1	0 = Open 1 = Close		0	
	563	OutPt01FnlFltVal	C.Pt01OutputFaultFinalState	Output Relay 1 Final Fault Value	BOOL	1	1	0 = Open 1 = Close		0	
	564	OutPt02FnlFltVal	C.Pt02OutputFaultFinalState	Output Relay 2 Final Fault Value	BOOL	1	1	0 = Open 1 = Close		0	
	565	OutDig1FnlFltVal	C.Digital1FaultFinalState	Digital Module 1 Output Relay Final Fault Value	BOOL	1	1	0 = Open 1 = Close		0	
	566	OutDig2FnlFltVal	C.Digital2FaultFinalState	Digital Module 2 Output Relay Final Fault Value	BOOL	1	1	0 = Open 1 = Close		0	
	567	OutDig3FnlFltVal	C.Digital3FaultFinalState	Digital Module 3 Output Relay Final Fault Value	BOOL	1	1	0 = Open 1 = Close		0	
	568	OutDig4FnlFltVal	C.Digital4FaultFinalState	Digital Module 4 Output Relay Final Fault Value	BOOL	1	1	0 = Open 1 = Closed		0	
	569	NetStrtComFltAct	C.LogicDefinedDataFaultMode	Network Start Comm Fault Action	BOOL	1	1	0 = GoToNetStCFltVal 1 = HoldLastState		0	
	570	NetStrtComFltVal	C.LogicDefinedDataFaultValue	Network Start Comm Fault Value	BOOL	1	1	0 = Open 1 = Close		0	
	571	NetStrtComIdlAct	C.LogicDefinedDataProgMode	Network Start Comm Idle Action	BOOL	1	1	0 = GoToNetStCIdlVal 1 = HoldLastState		0	
	572	NetStrtComIdlVal	C.LogicDefinedDataProgValue	Network Start Comm Idle Value	BOOL	1	1	0 = Open 1 = Close		0	
	573	NetStrtFnlFltVal	C.LogicDefinedDataFaultFinalState	Network Start Final Comm Fault Value	BOOL	1	1	0 = Open 1 = Close		0	
Voltage Setup	574	VoltageScale	C.VoltageScale	Voltage value scale factor	BOOL	1	1	0 = Volts 1 = kVolts		0	

Notes:

Wiring Diagrams

E300 Wiring Configurations

The following pages illustrate various wiring configurations for the E300™ Electronic Overload Relay

Figure 215 - Delta Configuration with Two Potential Transformers (Open Delta)

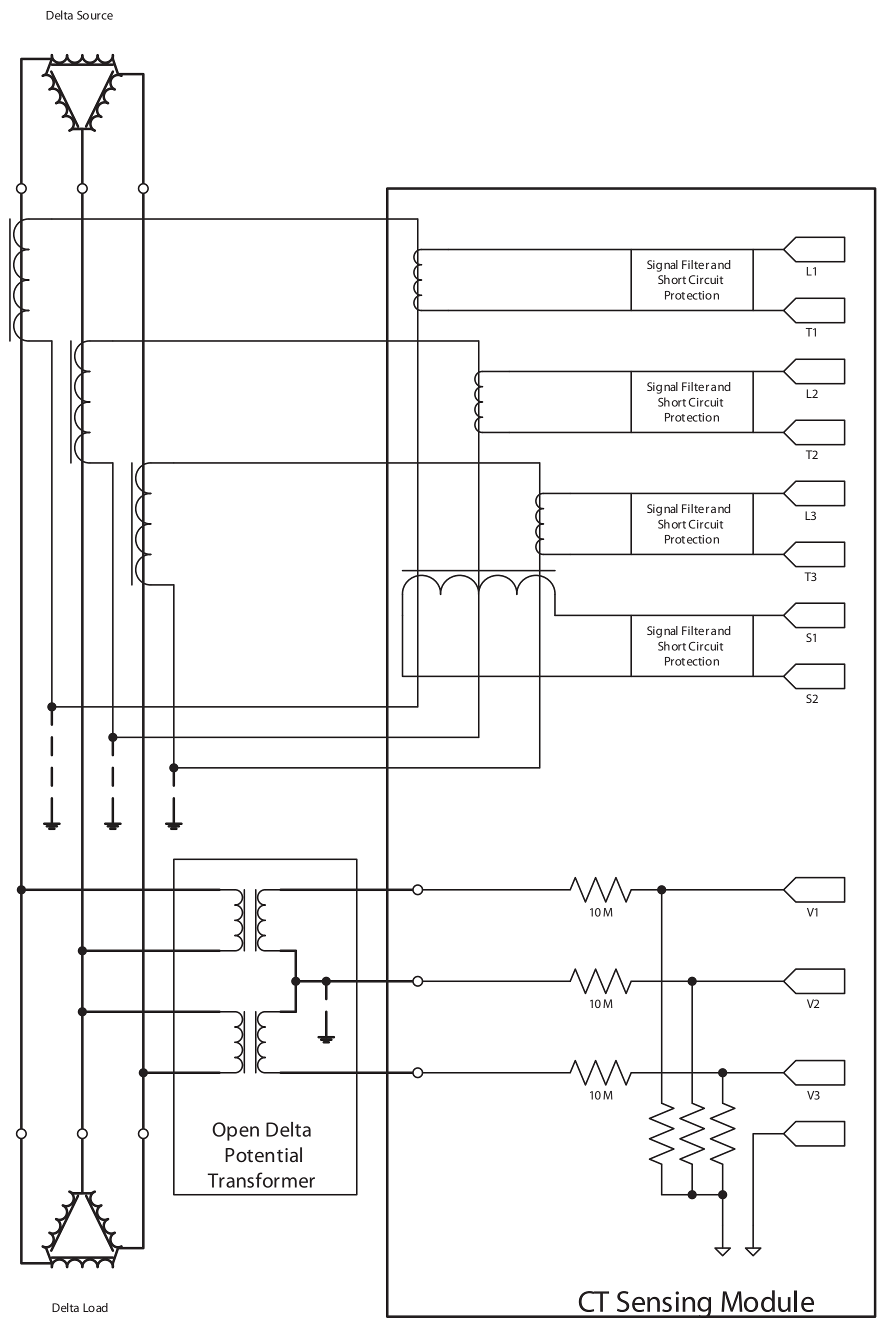


Figure 216 - Wye Configuration with Two Potential Transformers (Open Delta)

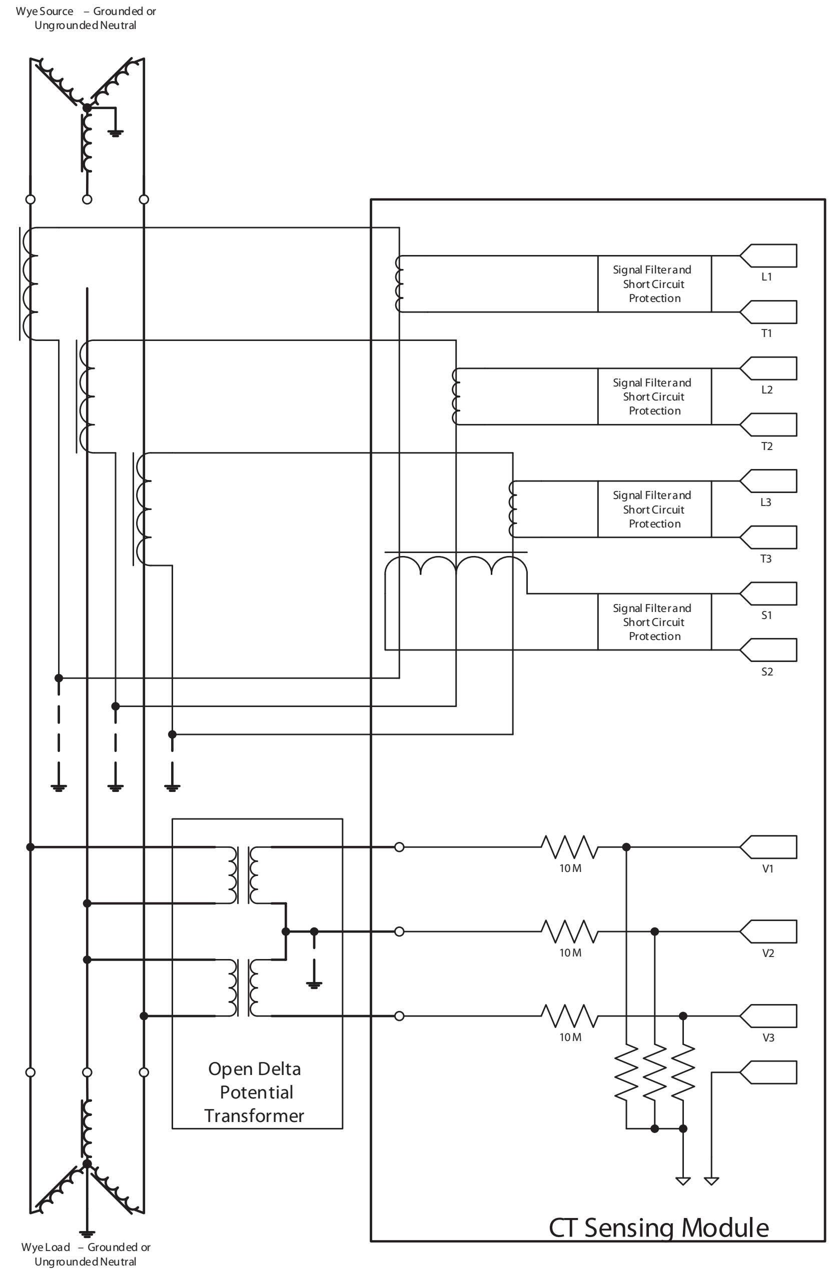


Figure 217 - Grounded B Phase Configuration With Two Potential Transformers (Open Delta)

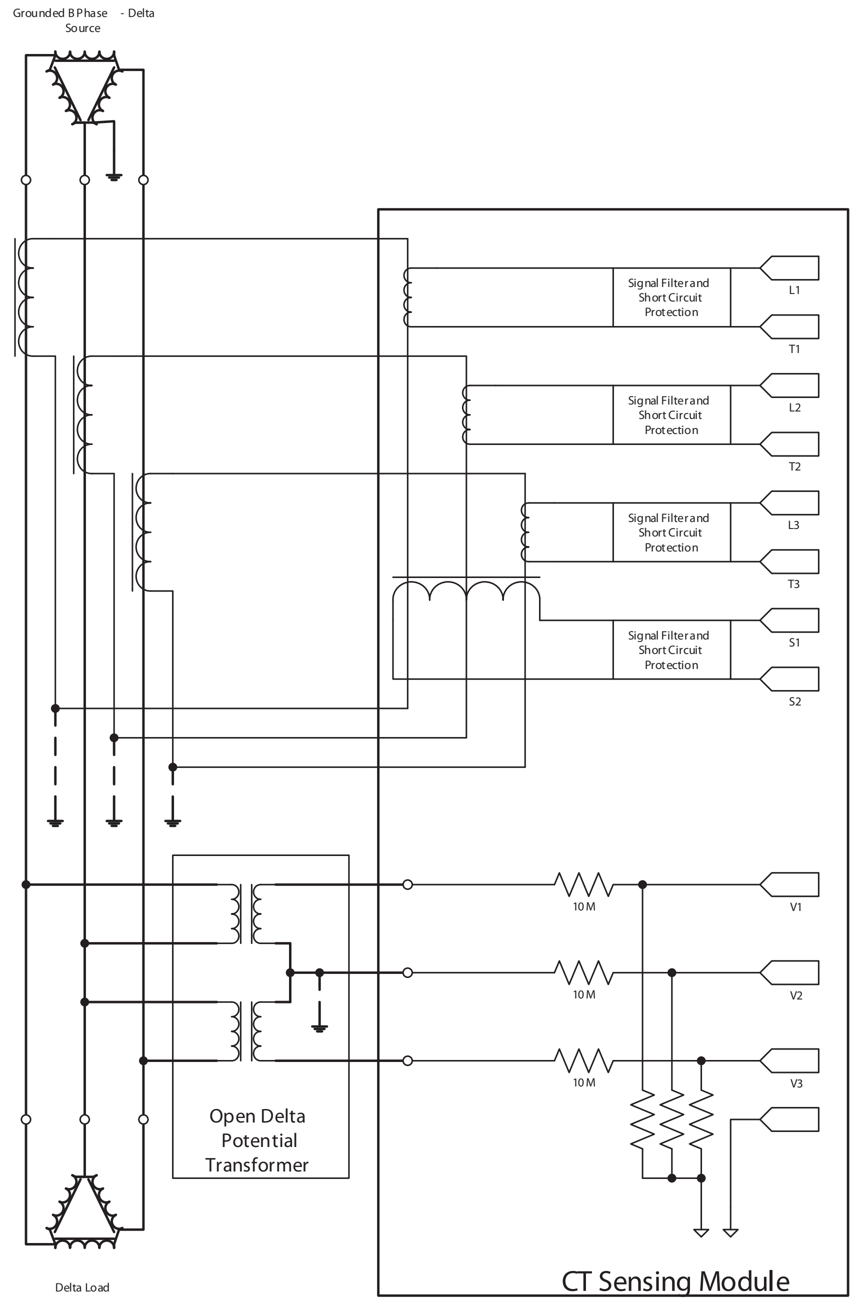


Figure 218 - Delta Configuration with Three Potential Transformers (Delta-to-Delta)

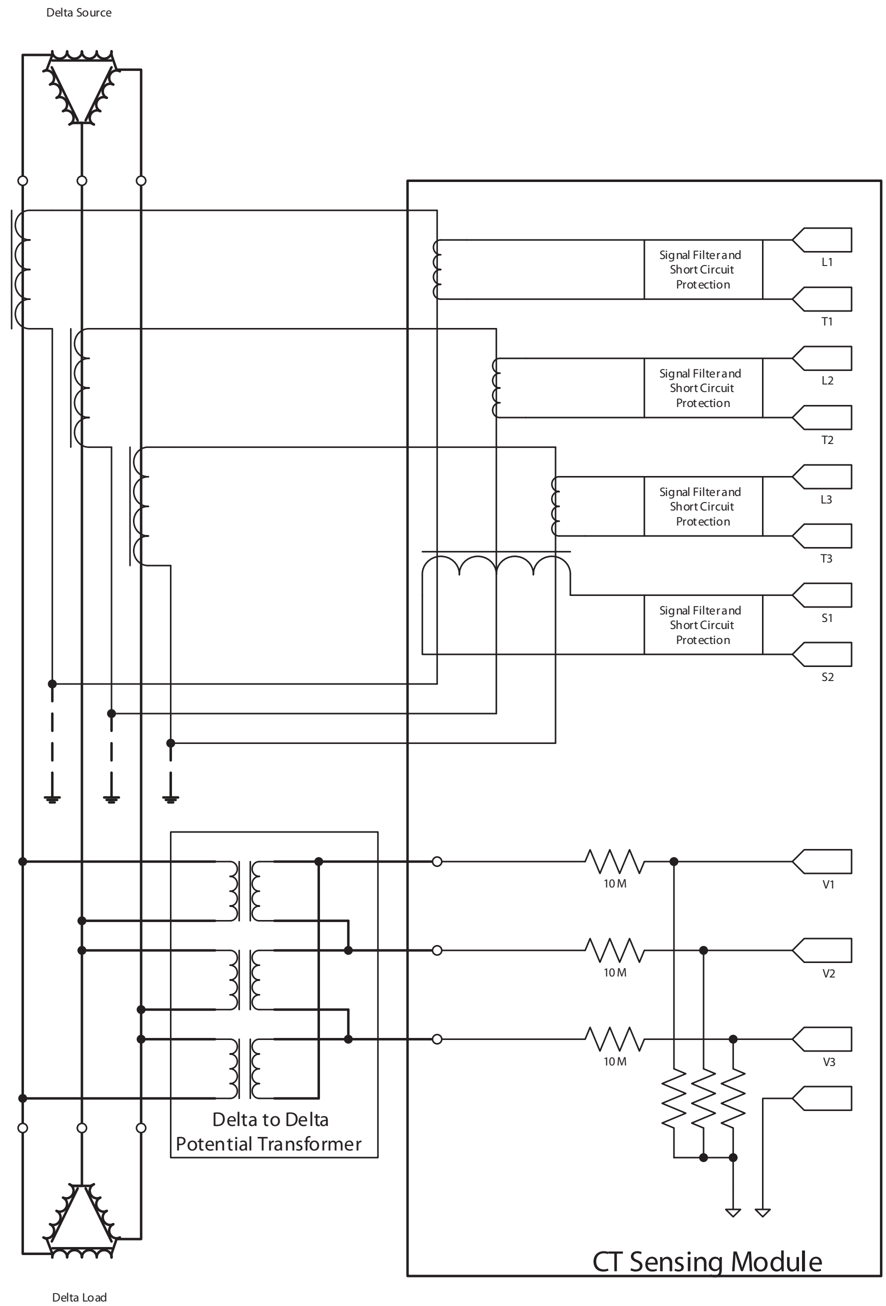


Figure 219 - Wye Configuration with Three Potential Transformers (Delta-to-Delta)

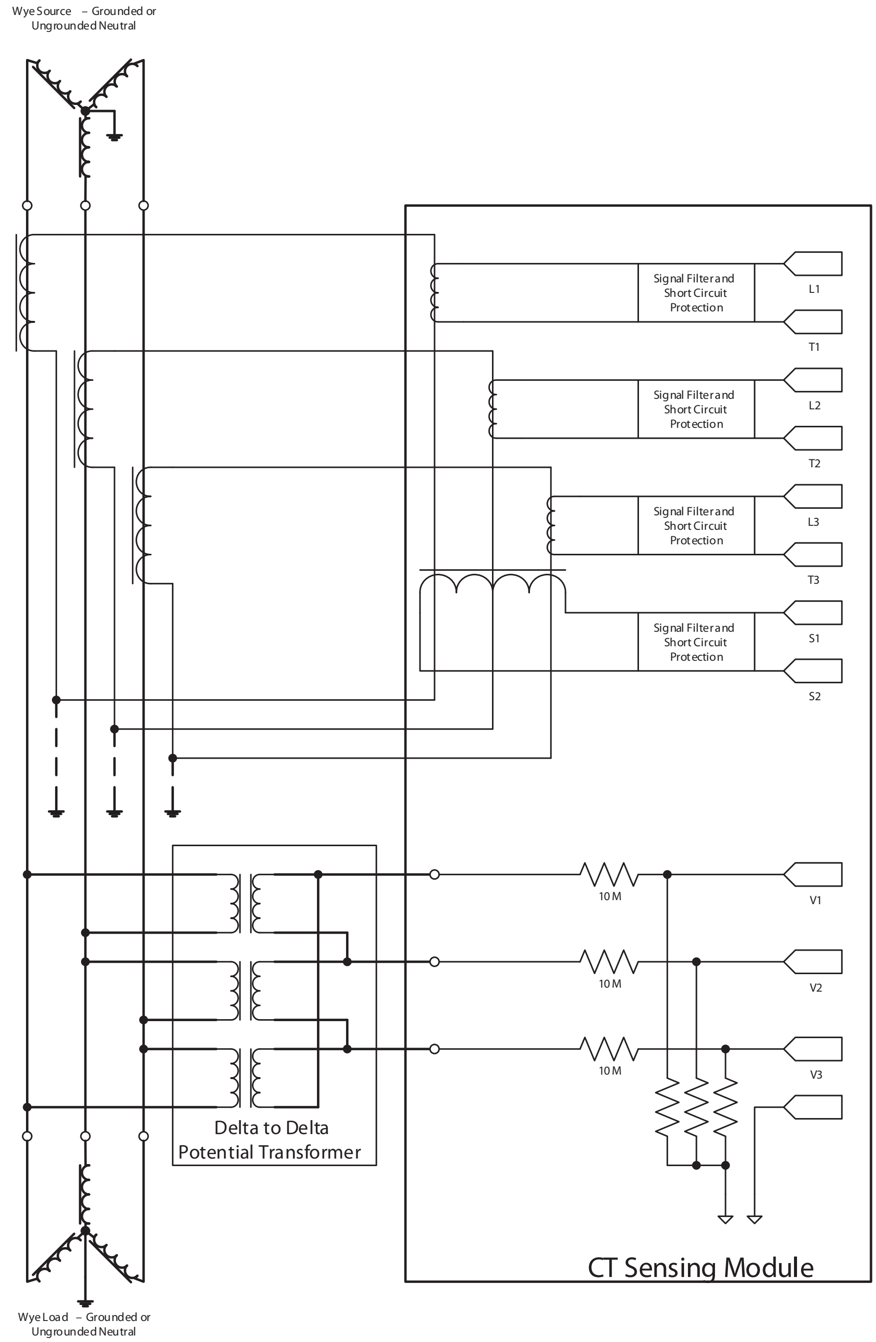


Figure 220 - Delta Configuration with Three Potential Transformers (Wye-to-Wye)

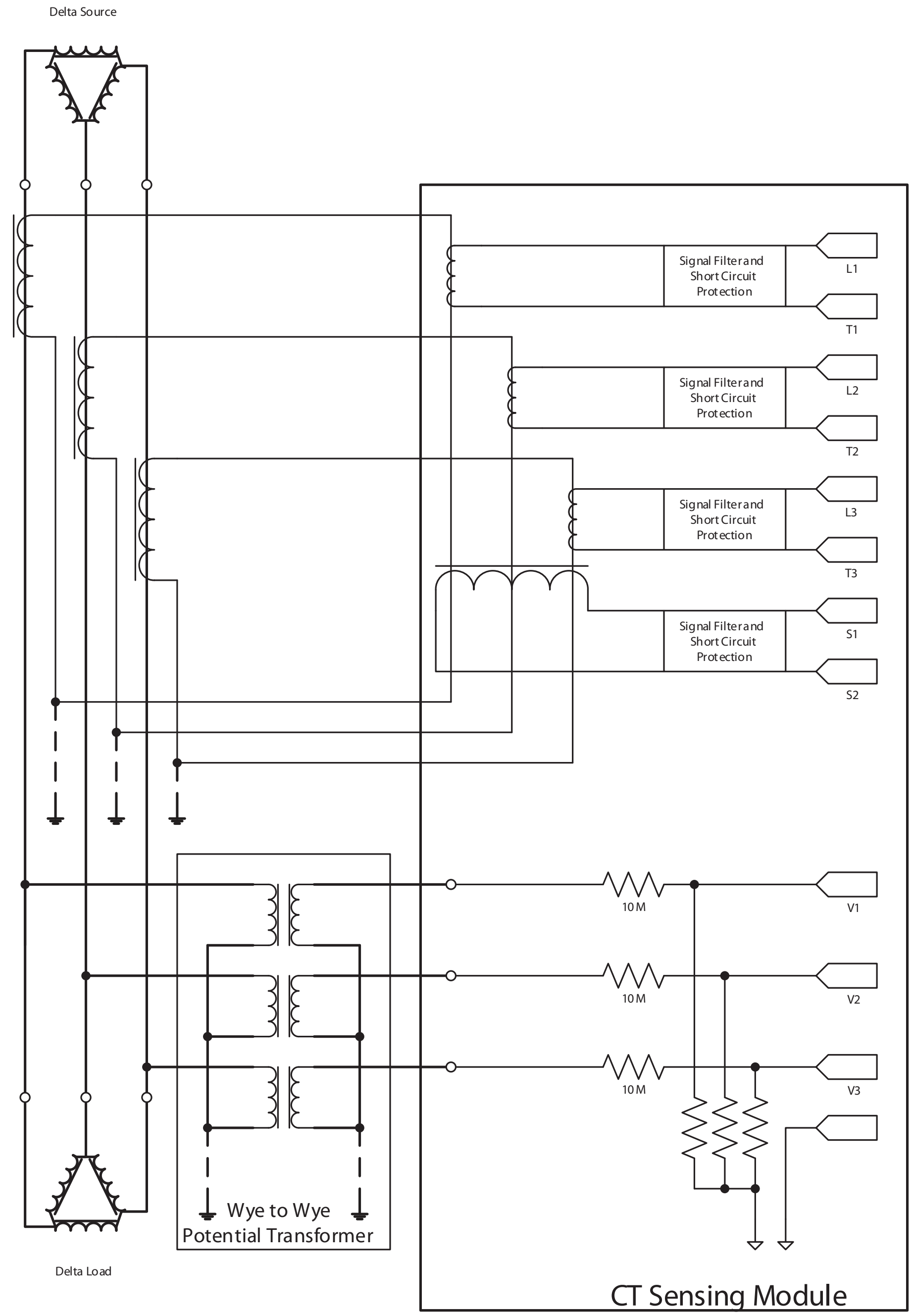


Figure 221 - Wye Configuration with Three Potential Transformers (Wye-to-Wye)

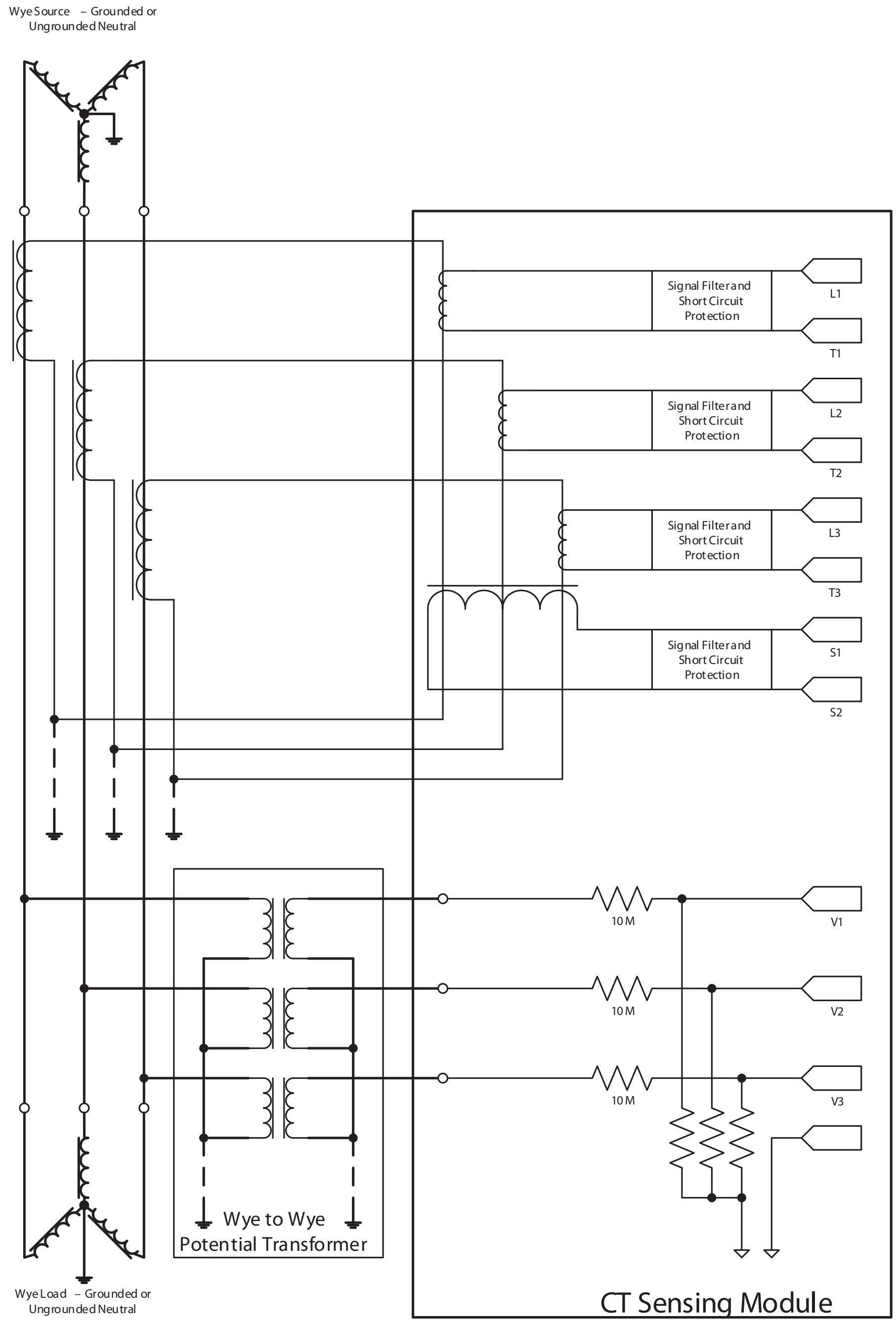


Figure 222 - Delta Configuration with Wye-to-Delta Potential Transformers

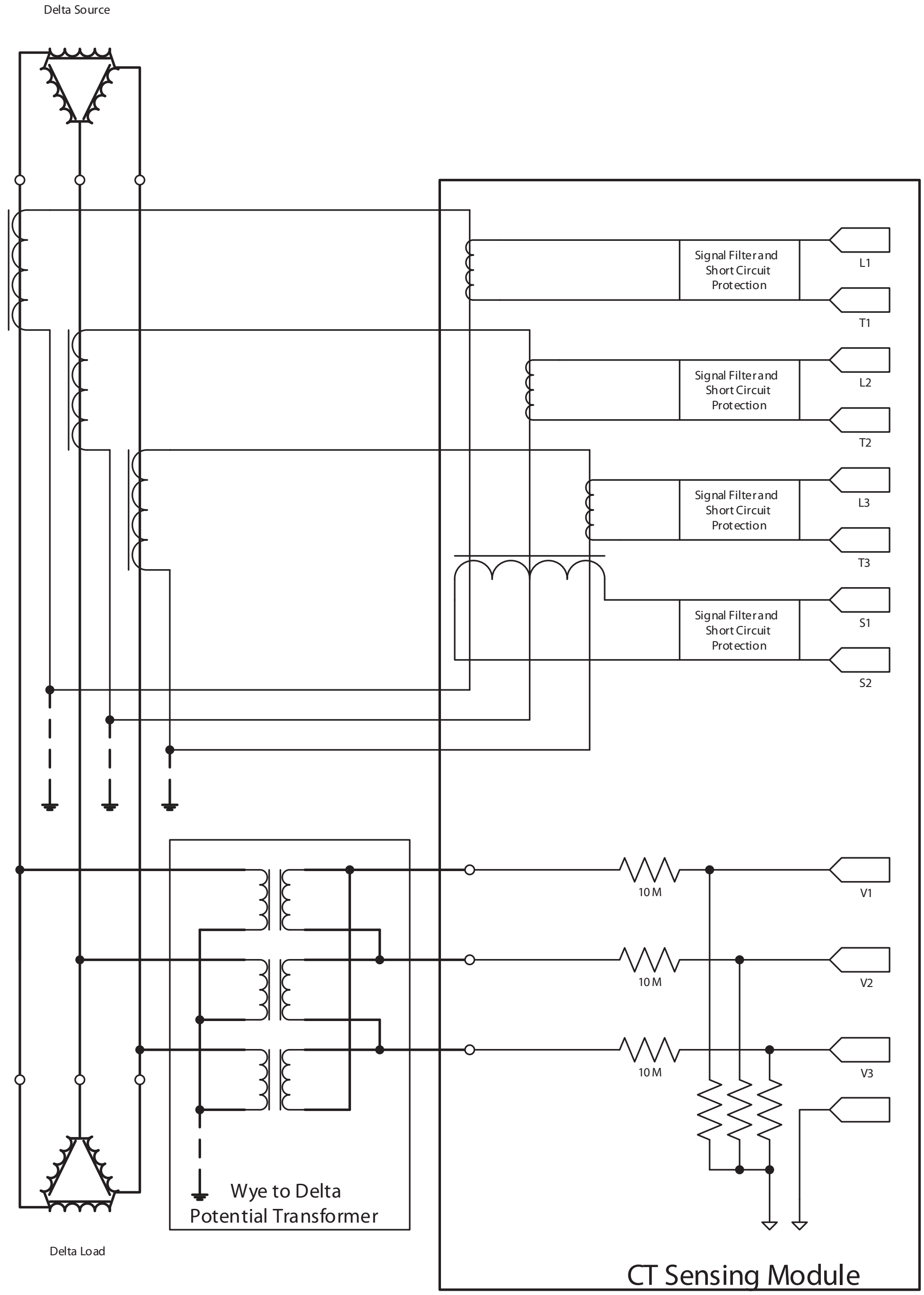


Figure 223 - Wye Configuration with Wye-to-Delta Potential Transformers

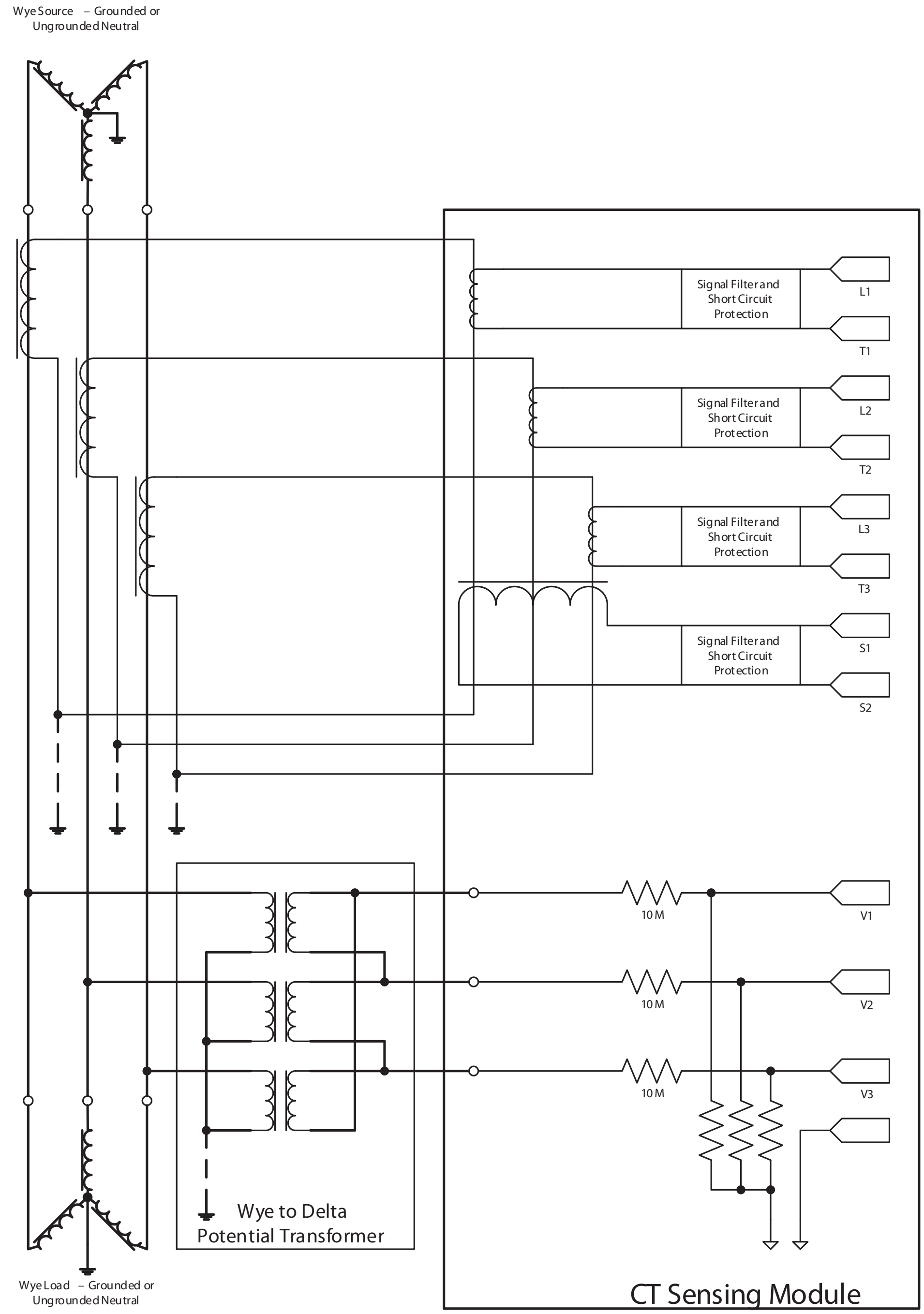


Figure 224 - Delta Configuration with Delta-to-Wye Potential Transformers

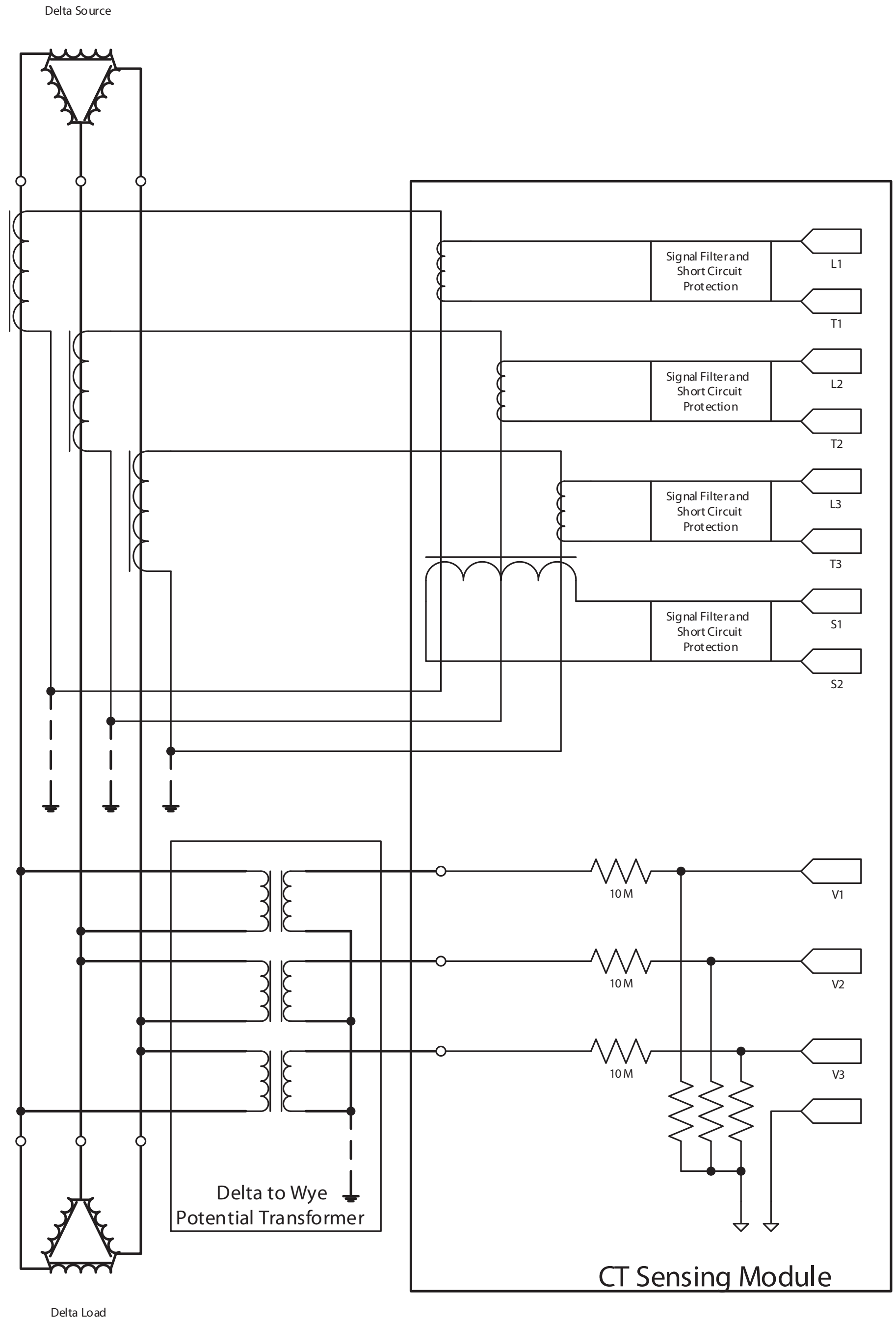
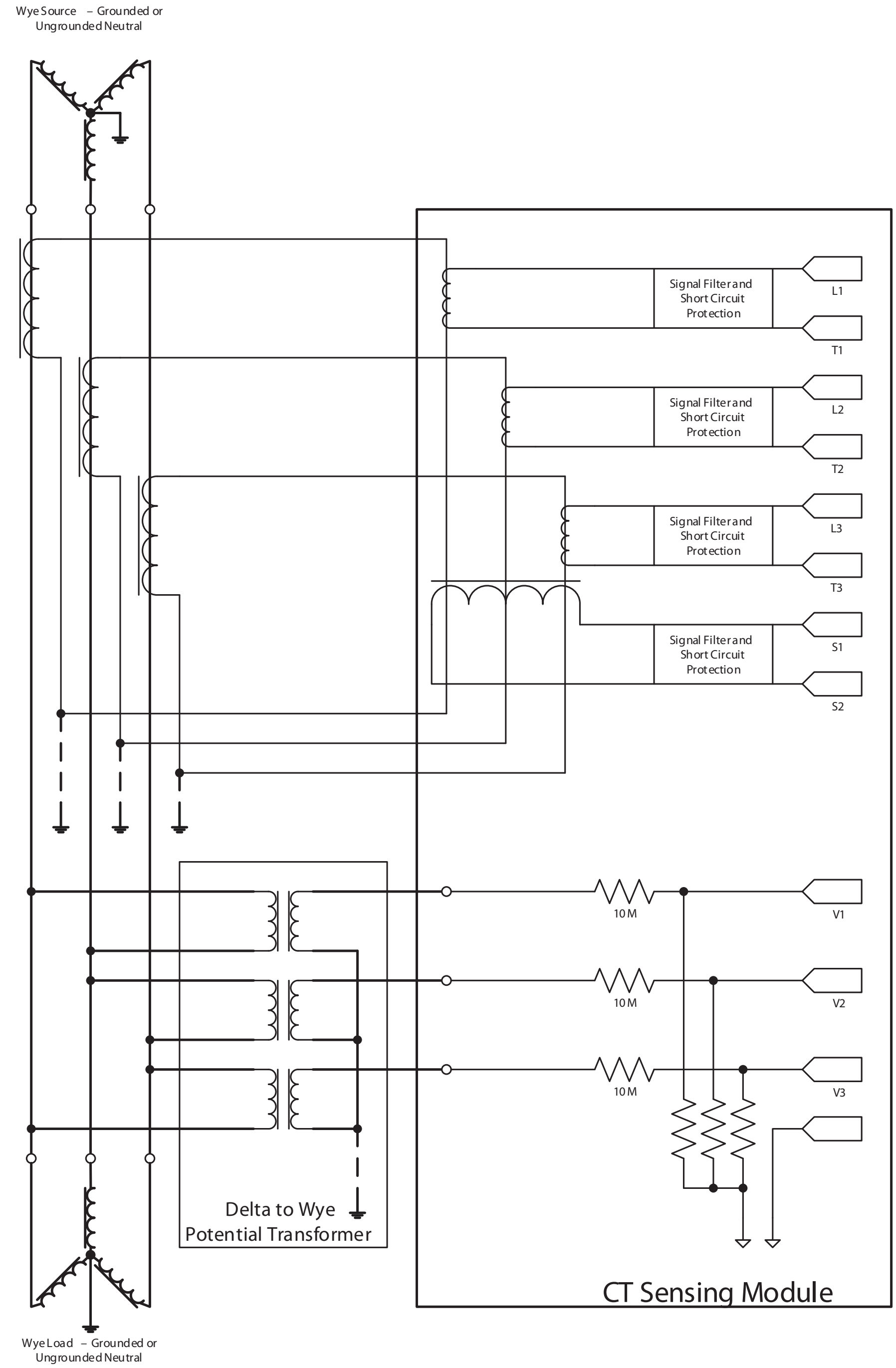


Figure 225 - Wye with Delta-to-Wye Potential Transformers



Notes:

EtherNet/IP Information

Common Industrial Protocol (CIP) Objects

The E300™ Electronic Overload Relay's EtherNet/IP Communication Module supports the following Common Industrial Protocol (CIP).

Table 587 - 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 following three instances of the Identity Object are supported:

Table 588 - 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 following class attributes are supported for the Identity Object:

Table 589 - 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 following attributes:

Table 590 - 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 591) 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 591 - 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 following attributes:

Table 592 - 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 591) 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 following attributes:

Table 593 - 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 591) 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 following common services are implemented for the Identity Object.

Table 594 - 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 following class attributes are supported for the Assembly Object:

Table 595 - Assembly Object Class Attributes

Attribute ID	Access Rule	Name	Data Type	Value
2	Get	Max. Instance	UINT	199

The following static assembly instance attributes are supported for each assembly instance.

Table 596 - 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 following services are implemented for the Assembly Object.

Table 597 - Assembly Object Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

The following table summarizes the various instances of the Assembly Object that are implemented:

Table 598 - 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
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

The following table summarizes Attribute 3 Format:

Table 599 - 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 600 - 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

The following table summarizes Attribute 3 Format:

Table 601 - 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 602 - 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 603 shows Attribute 3 Format and Attribute 2 Member List for revision 2 of the assembly.

Table 603 - 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 = 2																16	1100
1										SetOperatingMode								8	195
		Reserved																8	1102
2	1	FLASetting																32	171
3																			
4	2	FLA2Setting																32	177
5																			
6	3									TripClass								8	172
									X	OLPTCResetMode								1	173
								X		SingleOrThreePh								1	176
							X			GFFilter								1	247
						X				GFMaxInghibit								1	248
				X	X					PhaseRotTrip								1	364
			X							PowerScale								1	377
		X								Reserved								2	1101
7										OLResetLevel								8	174
		OLWarningLevel																8	175
8	4	TripEnableI																16	183
9		WarningEnableI																16	189
10	5	TripEnableV																16	184
11		WarningEnableV																16	190
12	6	TripEnableP																16	185
13		WarningEnableP																16	191
14	7	TripEnableC																16	186
15		WarningEnableC																16	192
16	8	TripEnableA																16	187
17		WarningEnableA																16	193
18	9	TripHistoryMaskI																16	139
19		WarnHistoryMaskI																16	145
20	10	TripHistoryMaskV																16	140
21		WarnHistoryMaskV																16	146
22	11	TripHistoryMaskP																16	141
23		WarnHistoryMaskP																16	147
24	12	TripHistoryMaskC																16	142
25		WarnHistoryMaskC																16	148
26	13	TripHistoryMaskA																16	143
27		WarnHistoryMaskA																16	149
28	14	MismatchAction																16	233
29										ControlModuleTyp								8	221
		SensingModuleTyp																8	222

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

The following table 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 604 - 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 605 - 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 606 - 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

INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Size (bits)	Param
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	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

INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Size (bits)	Param
52	26	InAnMod1Ch02																16	113
53		Reserved																16	1103
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 607 - 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																			

INT	DINT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Size (bits)	Param
28 29	14	L3Current																32	45
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 37	18	TotalRealPower																32	67
38 39	19	TotalReactivePwr																32	71
40 41	20	TotalApparentPwr																32	75
42 43	21	TotalPowerFactor																32	79
44 45	22	Datalink0																32	1291
46 47	23	Datalink1																32	1292
48 49	24	Datalink2																32	1293
50 51	25	Datalink3																32	1294
52 53	26	Datalink4																32	1295
54 55	27	Datalink5																32	1296
56 57	28	Datalink6																32	1297
58 59	29	Datalink7																32	1298
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 following instance 1 attributes are supported:

Table 608 - 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 following instance 2 attributes are supported:

Table 609 - 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 following instance 4 attributes are supported:

Table 610 - 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 following attributes are supported:

Table 611 - 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 following services are implemented for the Connection Object.

Table 612 - 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 following class attributes are supported for the Discrete Input Point Object:

Table 613 - 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 614 - 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 following attributes.

Table 615 - 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 following common services are implemented for the Discrete Input Point Object.

Table 616 - 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 following class attributes are supported for the Discrete Output Point Object:

Table 617 - 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 618 - 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 following attributes.

Table 619 - 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 following common services are implemented for the Discrete Output Point Object.

Table 620 - 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 following class attributes are supported for the Analog Input Point Object:

Table 621 - 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 622 - 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 following attributes.

Table 623 - 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 following common services are implemented for the Analog Input Point Object.

Table 624 - 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 following class attributes are supported for the Parameter Object:

Table 625 - Parameter Object Class Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Revision	UINT	1
2	Get	Max Instance	UINT	560
8	Get	Parameter Class Descriptor	WORD	0x03
9	Get	Configuration Assembly Instance	UINT	0
10	Get	Native Language	UINT	1 = English

The following instance attributes are implemented for all parameter attributes.

Table 626 - 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 following common services are implemented for the Parameter Object.

Table 627 - 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 following class attributes are supported for the Parameter Object:

Table 628 - 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 following instance attributes are supported for all parameter group instances:

The following instance attributes are implemented for all parameter attributes.

Table 629 - 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 following common services are implemented for the Parameter Group Object.

Table 630 - 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.

Instance 1 has the following instances:

Table 631 - 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 following attributes.

Table 632 - 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 following common services are implemented for the Discrete Output Group Object.

Table 633 - 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 634 - 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 following common services are implemented for the Control Supervisor Object.

Table 635 - 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 636 - 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)
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 following common services are implemented for the Overload Object.

Table 637 - 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 following class attributes are supported for the Base Energy Object.

Table 638 - 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 639 - 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 (TBD)
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 following services are implemented for the Base Energy Object.

Table 640 - 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

The following table describes the Get_Attributes_All response.

Table 641 - 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

Attribute ID	Data Type	Name	Value
11	REAL	Energy Transfer Rate User Setting	0.0
12	STRUCT of UINT, Padded EPATH [1]	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 642 - 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.
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

Attribute ID	Access Rule	Name	Data Type	Value
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 following services are implemented for the Electrical Energy Object.

Table 643 - Electrical Energy Object Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x01	No	Yes	GetAttributes_All
0x0E	No	Yes	Get_Attribute_Single

The following table describes the Get_Attributes_All response.

Table 644 - 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

Attribute ID	Data Type	Name	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 following class attributes are supported:

Table 645 - 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 646 - 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)

Attribute ID	Access Rule	Name	Data Type	Value
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
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 following services are implemented for the Wall Clock Time Object.

Table 647 - 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 following class attributes are supported:

Table 648 - 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 649 - DPI Fault Object Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Value
0	Get	Full / All Info	Struct of:	
		Fault Code	UINT	See Fault Table below
		Fault Source	Struct of:	
		DPI Port Number	USINT	0
		Device Object Instance	USINT	0x2c
		Fault Text	BYTE[16]	See Fault Table below
		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 651
		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 651

The following common services are implemented for the DPI Fault Object.

Table 650 - 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

The table below lists Fault Codes, Fault Text, and Fault Help Strings.

Table 651 - 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
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	

Fault Code	Fault Text	Help Text
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
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	

Fault Code	Fault Text	Help Text
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 following class attributes are supported:

Table 652 - 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
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 653 - DPI Warning Object Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Value
0	Get	Full / All Info	Struct of:	
		Warning Code	UINT	See Warning Table below
		Warning Source	Struct of:	
		DPI Port Number	USINT	0
		Device Object Instance	USINT	0x2c
		Warning Text	BYTE[16]	See Table 655
		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 655
		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 655

The following common services are implemented for the DPI Warning Object.

Table 654 - 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

The table below lists Warning Codes, Warning Text, and Warning Help Strings.

Table 655 - 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	
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

Warning Code	Warning Text	Warning Help Text
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
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

Warning Code	Warning Text	Warning Help Text
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 656 - 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 following common services are implemented for the MCC Object.

Table 657 - 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

Accessories

E300 Relay Accessories

Table 658 lists the accessories for the E300™ Electronic Overload Relay.

Table 658 - E300 Accessories

Description	For Use With	Cat. No.
Ground Fault Current Sensors	193-EIOGP-42-24D	193-CBCT1 193-CBCT2 193-CBCT3 193-CBCT4
	193-EIOGP-22-120	
	193-EIOGP-22-240	
Power Terminal Covers	193-ESM-____-200A-T	193-ESM-TCL-200 *(Line Side)* 193-ESM-TCT-200 *(Load Side)*
	193-ESM-____-200A-D180	193-ESM-TC-D180 *(Line Side)* 193-ESM-TCT-200 *(Load Side)*
Sensing Module Panel Mount Screw Adapter	193-ESM-____-30A-T	140M-CN-45
	193-ESM-____-30A-P	
	193-ESM-____-60A-T	
	193-ESM-____-60A-P	
	193-ESM-____-100A-T	193-ESM-SA-100
	193-ESM-____-100A-P	
Replacement Control Module Connectors	193-EIO-63-24D	193-NCIO-63-CNT
	193-EIO-43-120	193-NCIO-43-CNT
	193-EIO-43-240	
	193-EIOGP-42-24D	193-NCIOGP-42-CNT
	193-EIOGP-22-120	193-NCIOGP-22-CNT
	193-EIOGP-22-240	
Replacement Sensing Module Connector	193-ESM-VIG-30A-CT	193-NCSM-VIG-CNT
Replacement Communication Module Connector	193-ECM-DNT	193-NCCM-DNT-CNT
Replacement Expansion Module Connectors with Expansion Bus Cable (20cm)	193-EXP-DIO-42-24D	193-NCXP-DIO-CNT
	193-EXP-DIO-42-120	
	193-EXP-DIO-42-240	
	193-EXP-AIO-31	193-NCXP-AIO-CNT
	193-EXP-PS-DC	193-NCXP-PS-CNT
	193-EXP-PS-AC	
Expansion Bus Cable	1 Meter	193-EXP-CBL-1M
	3 Meter	193-EXP-CBL-3M
Replacement Contactor Coil Module	193-ESM-____-30A-C23	193-EIO-CM-C23
	193-ESM-____-___A-C55	193-EIO-CM-C55
	193-ESM-____-100A-C97	193-EIO-CM-C97
Lug Kit	193-ESM-____-200A-T	100-DL-180
	193-ESM-____-200A-D180	
	592-ESM-____-200A-S4	1494R-N3
3-Pole Terminal Block	193-ESM-____-200A-T	100-DTB-180
	193-ESM-____-200A-D180	

Notes:

Symbols

P

R

S

W

Y

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At http://www.rockwellautomation.com/support you can find technical and application notes, sample code, and links to software service packs. You can also visit our Support Center at https://rockwellautomation.custhelp.com/ for software updates, support chats and forums, technical information, FAQs, and to sign up for product notification updates.

In addition, we offer multiple support programs for installation, configuration, and troubleshooting. For more information, contact your local distributor or Rockwell Automation representative, or visit http://www.rockwellautomation.com/services/online-phone.

Installation Assistance

If you experience a problem within the first 24 hours of installation, review the information that is contained in this manual. You can contact Customer Support for initial help in getting your product up and running.

United States or Canada	1.440.646.3434
Outside United States or Canada	Use the Worldwide Locator at http://www.rockwellautomation.com/rockwellautomation/support/overview.page, or contact your local Rockwell Automation representative.

New Product Satisfaction Return

Rockwell Automation tests all of its products to help ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete this form, publication RA-DU002, available at http://www.rockwellautomation.com/literature/.

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Publication 193-UM015E-EN-P - October 2015
Supersedes Publication 193-UM015D-EN-P - February 2015