



Bulletin 857 Protection Relay to E300 Electronic Overload Relay Migration Guide

Bulletin Numbers 193, 857

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Overview

The purpose of this document is to provide supporting collateral to aid customers in their product life cycle journey as a product life cycle change has been issued for the Bulletin 857 relay announcing an end-of-life and discontinuation date. This document aids in the selection of associated E300™ electronic overload relay components that can be used in a migration path from the Bulletin 857 relay.

The major features of the 857 protection system included:

- Digital signals handled with a 16-bit microprocessor, and 16-bit A/D conversion technique to measure accuracy on all setting ranges
- Wide setting ranges for the protection functions to a sensitivity of 0.5%
- Integrated fault location for short circuit faults
- The protection system can match the requirements of the application by disabling unneeded functions
- Flexible control and digital signal control inputs (DI) and outputs (DO) for signal blocking
- Flexible signal-grouping matrix in the device makes it adaptable to various control and alarm systems
- Ability to control up to six objects locally (for example circuit-breakers, disconnectors)
- Status of eight objects (for example circuit breakers, disconnectors, switches)
- Configurable display with six selectable measurement values
- Configurable schemes the are interlocking with basic logic functions
- An event register record of events and fault values that can be read through the keypad, local HMI, or SetPointPS (a free PC-based configuration software)
- All settings, events, and indications are stored in nonvolatile memory
- Configuration, parameterization, and reading of information through local HMI, or with SetPointPS software interface
- Connection to any automation system through several available communication protocols. These protocols include:
 - Modbus RTU
 - Modbus TCP
 - PROFIBUS DP
 - IEC 60870-5-103
 - IEC 60870-5-101
 - IEC 61850
 - SPA-Bus
 - EtherNet/IP™
 - DNP 3.0
- Universal power supply handles any source within the range from 40...265V DC or V AC. An optional alternative power-supply for 18...36V DC is available
- Built-in high-resolution disturbance recorder for evaluating analog and digital signals
- Two different optional 12-channel RTD scanners available
- Arc flash detection/protection was also provided as an optional feature

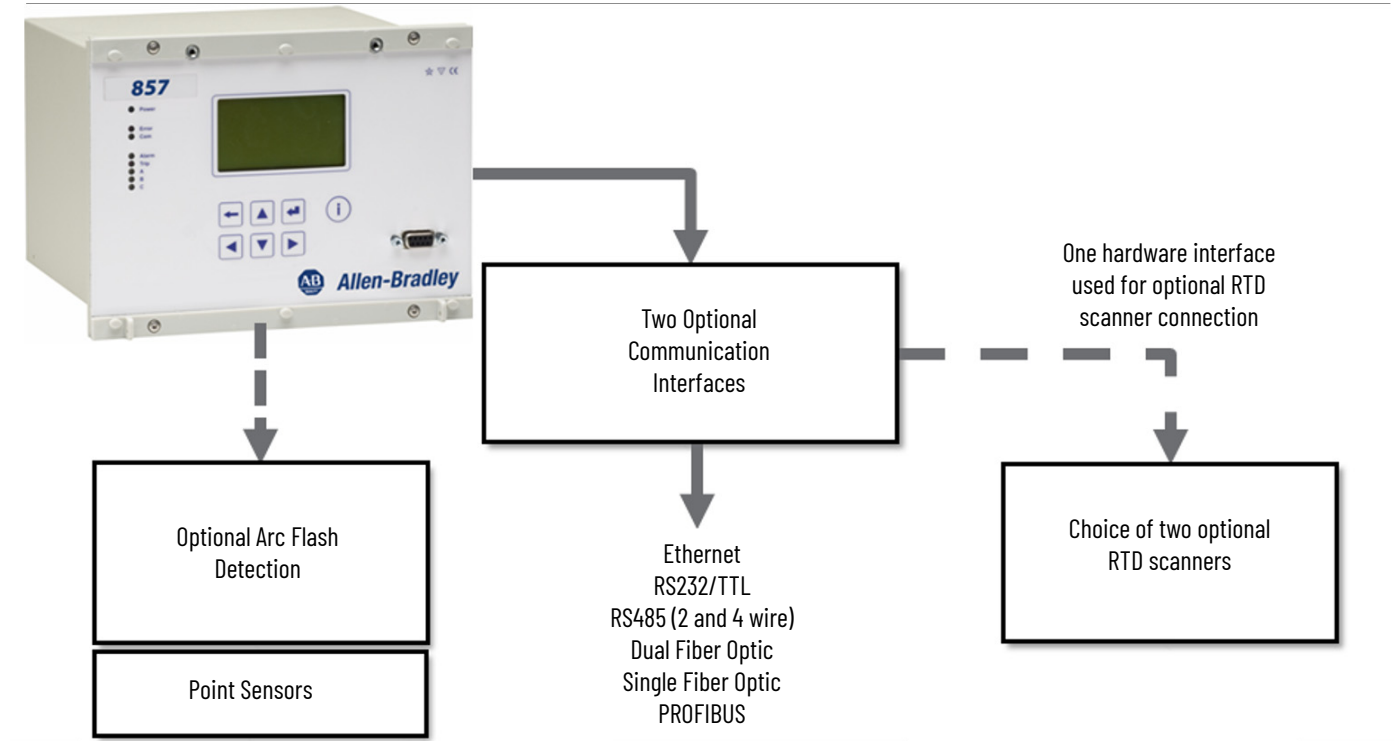


ATTENTION: Disconnect all sources of power, both low voltage and medium voltage, before working on the equipment per all Occupational Safety and Health Act (OSHA) and lockout procedures. Verify that the voltage has been removed from all sources. This should also include performance of visual inspections while the door is open, making any adjustments inside or outside the enclosure, performing required and suggested maintenance, or installing any replacement parts.



ATTENTION: Use suitable personal protective equipment (PPE) per local codes or regulations. Failure to do so may result in severe burns, injury, or death.

Bulletin 857 Relay System Configuration



E300 Electronic Overload Relay

The E300 relay provides intelligent motor control utilizing EtherNet/IP, DeviceNet®, and non-networked options. It offers a modular solution with a wide current range & basic adjustable trip class. The E300 relay provides enhanced diagnostic information for single and three phase applications

Includes integrated I/O (additional expansion I/O available). It offers simplified wiring and easy integration into Logix. The E300 relay consists of three modules: sensing, control, and communications. You have choices in each of the three with additional accessories to tailor the electronic overload for your application's exact needs.

E300 Relay Product Overview

Overload Protection	% Thermal Capacity Utilization (TCU) Annunciation
Phase Loss Protection	Voltage Protection and Measurements
Ground Fault Protection	Power Protection and Measurements
Current Imbalance Protection	Energy Protection and Measurements
Jam Protection	Flexible Integration Features
Over/Under Voltage Protection	DeviceLogix Integration
Voltage Imbalance Protection	Connect Component WorkBench Enabled
Over/Under Power Protection	Ethernet/IP Communications
Diagnostic Features Protection	DeviceNet Communications
% Full Load Amperes (FLA) Annunciation	

What is Not Supported in the E300 Relay?

The Bulletin 857 relay is a feature rich product which provided control and protection solutions to a wide global array of applications. The E300 relay is not as feature rich and thus does not directly replace all of the capabilities of the Bulletin 857 relay for all applications. Review the tables below to consider the comparable protection and control capabilities of the E300 relay. Compare the basic functionality, protective elements capabilities, and your application requirements to determine if the E300 relay is a suitable migration option. The Bulletin 857 to E300 System Conversion Table section to aid in applying and adapting the E300 relay wiring configurations.

Comparison of Primary Protection Elements and Capabilities

Protection Elements

Function Name	IEEE/ANSI Code	IEC	857 Relay	E300 Relay
Speed Switch Input	14	–	✓	–
Synchrocheck	25	df/dv	✓	–
Undervoltage protection	27	U<	✓	✓
		U<<	✓	–
		U<<<	✓	–
Reverse power protection	32	P<	✓	–
		P<<	✓	–
Undercurrent/load loss protection	37	I<	✓	✓
Bearing protective device / bearing RTD	38		✓	✓
Current unbalance protection - feeder protection mode	46R	$I_2>$	✓	–
Current unbalance protection - motor protection mode	46	$I_2>$	✓	–
Phase reversal / incorrect phase sequence protection	46	$I_2>>$	✓	–
Stall protection	48	$I_{st}>$	✓	–
Thermal overload protection	49	T>	✓	✓
RTD biased thermal overload	49RTD	–	✓	–
Optional arc fault-protection	50ARC	ArcI>	✓	–
Circuit-breaker failure protection	50BF	CBFP	✓	–
Instantaneous/time earth-fault protection	50N/51N	$I_0>$	✓	✓
Instantaneous/time earth-fault protection	50G/51G	$I_0>>$	✓	✓
Instantaneous/time earth-fault protection	50GS/51GS	$I_0>>>$	✓	✓
Instantaneous/time earth-fault protection	50GS/51GS	$I_0>>>>$	✓	–
Instantaneous earth-fault protection (Arc Option)	50NARC	Arc $I_{01}>$	✓	–
Instantaneous earth-fault protection (Arc Option)	50NARC	Arc $I_{02}>$	✓	–
Instantaneous/time capacitor-bank unbalance prot.	50NC/51INC	I_0CAP	✓	–
Instantaneous/time overcurrent protection stage 1	50/51	I>	✓	✓
Instantaneous/time overcurrent protection stage 2	50/51	I>>	✓	–
Instantaneous/time overcurrent protection stage 3	50/51	I>>>	✓	–
Power factor relay	55	–	✓	✓
Overvoltage protection stage 1	59	U>	✓	✓
Overvoltage protection stage 2	59	U>>	✓	–
Overvoltage protection stage 3	59	U>>>	✓	–
Residual voltage protection stage 1	59N	$U_0>$	✓	–
Residual voltage protection stage 2	59N	$U_0>>$	✓	–
Frequent start protection	66	N>	✓	✓
Directional overcurrent protection stage 1	67	$I_\phi>$	✓	–
Directional overcurrent protection stage 2	67	$I_\phi>>$	✓	–

Protection Elements (Continued)

Function Name	IEEE/ANSI Code	IEC	857 Relay	E300 Relay
Directional overcurrent protection stage 3	67	$I_{\phi}>>>$	✓	–
Directional overcurrent protection stage 4	67	$I_{\phi}>>>>$	✓	–
Directional earth-fault protection stage 1	67N	$I_{0\phi}>>$	✓	–
Directional earth-fault protection stage 2	67N	$I_{0\phi}>$	✓	–
Directional transient intermittent earth fault protection	67NI	$I_{0int}>$	✓	–
Magnetizing inrush, 2nd harmonic	68F2	$U_{f2}>$	✓	–
Transformer overexcitation, 5th harmonic	68F5	$U_{f5}>$	✓	–
Auto-reclose	79	AR	✓	–
Frequency protection stage 1	81	$f><$	✓	✓
Frequency protection stage 2	81	$f>><<$	✓	–
Underfrequency protection stage 1	81L	$f<$	✓	–
Underfrequency protection stage 2	81L	$f<<$	✓	–
Rate of change of frequency protection (ROCOF)	81R	df/dt	✓	–
Lockout selection	86	–	✓	–
Programmable stage 1	99	Prg1	✓	–
Programmable stage 2	99	Prg2	✓	–
Programmable stage 3	99	Prg3	✓	–
Programmable stage 4	99	Prg4	✓	–
Programmable stage 5	99	Prg5	✓	–
Programmable stage 6	99	Prg6	✓	–
Programmable stage 7	99	Prg7	✓	–
Programmable stage 8	99	Prg8	✓	–

Applications

Application	857 Relay	E300 Relay
Reversing starter	–	✓
Wye (Star) / Delta starter	–	✓
Two-speed motors	–	✓
Boolean Logic (DeviceLogix or equivalent)	✓	✓

Additional Features

Features	857 Relay	E300 Relay
Arc flash protection	✓	–
Harmonic measurements	✓	–
Pulsed metering output	✓	–
Active mimic display	✓	–
Remote start/stop from front panel buttons	✓	✓ ⁽¹⁾
ANSI and IEC symbology	✓	–
Virtual measurement tool	✓	–
12 channel disturbance recorder	✓	–
Arc flash protection	✓	–
Harmonic measurements to the 15 th	✓	–
Multiple protection element setting ranges (up to four)	✓	–
Boolean logic (DeviceLogix or equal)	✓	✓

(1) With accessories.

Communications Protocols Supported

Protocol	857 Relay	E300 Relay
Modbus Master	✓	–
Modbus Slave	✓	–
Modbus TCP	✓	_(1)
PROFIBUS DP	✓	–
SPA-Bus	✓	–
DNP-3.0	✓	–
IEC-101 & IEC-103	✓	–
ANSI 85	✓	–
Ethernet/IP	✓	✓
IEC 61850	✓	–
DeviceNet	–	✓
GetSet	✓	–
External/IO	✓	–

(1) Modbus TCP is available via the Technology Partner Program.

Physical Variances Between the Relays

There are very specific differences in the physical attributes between the Bulletin 857 and the E300. There presently is no retrofit hardware kit to support this migration. Customers need to review their physical installations and determine a suitable path forward for migration from the Bulletin 857 products, in the case of replacement of installed Bulletin 857 products. Included in the sections below are both the physical and wiring variances between the two products. The Bulletin 857 is a single base relay with one external RTD scanner option which is interconnected to the base relay by way of either a single or dual fiber optic interface. The E300 product utilizes a modular approach where individual component modules are interfaced by way of a Controller Area Network (CAN bus) communications network.

Mechanical Considerations to Replace a Bulletin 857 Relay

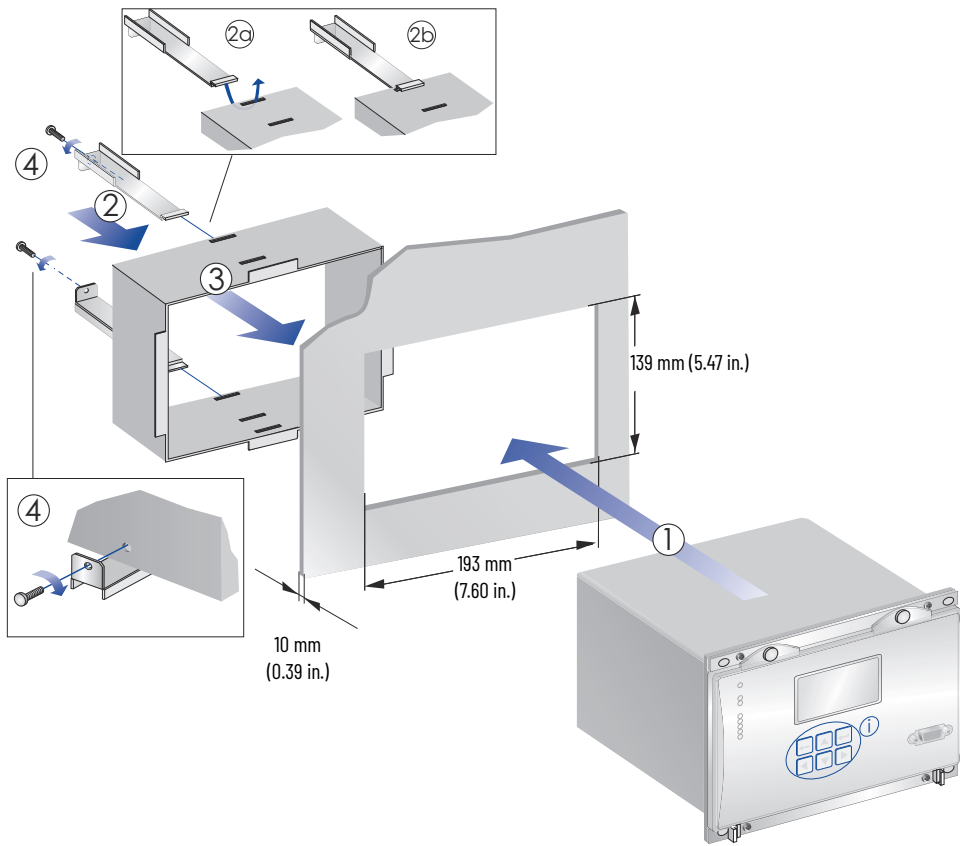
The E300 overload system can be used in place of the Bulletin 857 for many applications. You must review their specific application requirements and the protective elements used in the Bulletin 857 to determine if the E300 is an appropriate substitution. The E300 cannot perform all the functions of the Bulletin 857 can perform. However, the E300 does provide basic motor protection functionality, diagnostic and networking capabilities for many applications.

The E300 is a modular style of system which requires multiple modules to perform different functions. Shown below are aspects of the typical hardware module configurations which are used to configure systems of varying capabilities. These configurations facilitate the use of primary current transformers with five ampere secondaries. The E300 does require a very specific zero sequence ground fault current transformer, specifically the Bulletin 193-CBCTx. The typical 100:1 ratio ground fault current transformer, used with the Bulletin 857, cannot be used in place of the required 193-CBCT3 or 193-CBCT4.

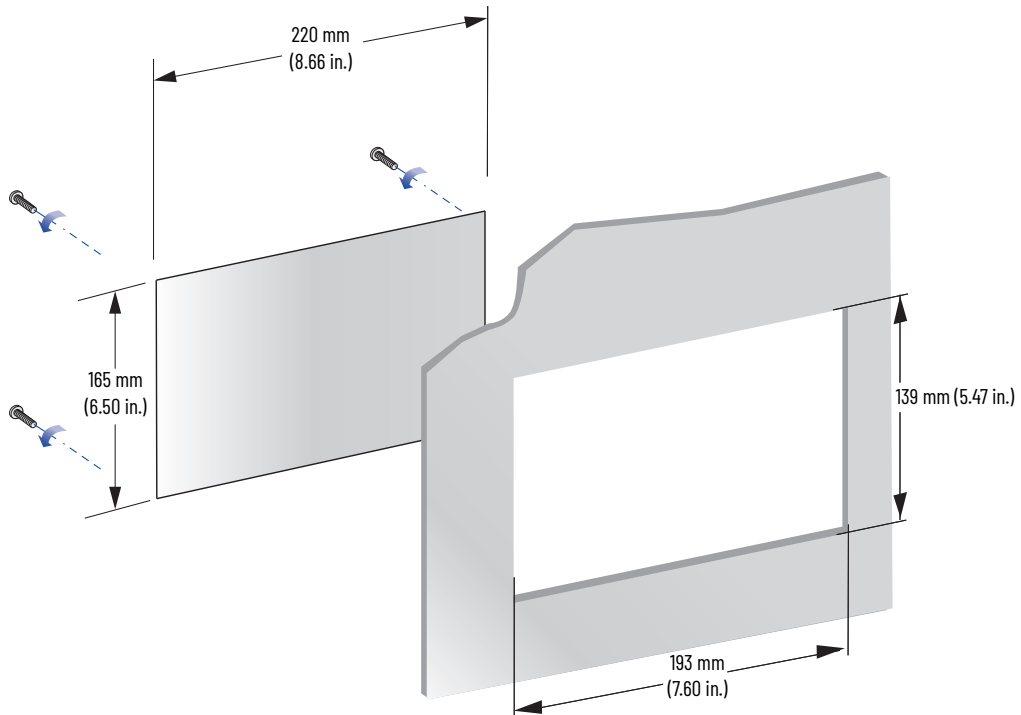
One of the more significant details regarding the physical characteristics of the E300 is that it is a module component system where the components are either directly panel mounted or mounted on a DIN rail also affixed to a panel, unlike the Bulletin 857 which is a door mounted device.

When considering a migration path to the E300, the door cutout used for the mounting of the Bulletin 857 must be covered. One option is the utilization of the space on this cover plate to mount the E300 components. The E300 components can easily fit on the rear of the cover plate used to cover the cutout used for the Bulletin 857. Additional space would not then be required on the panel. Since the control and analog wiring is already routed to this area, making the associated electrical connections is also easily facilitated.

Bulletin 857 Relay Mounting Dimensions



Bulletin 857 Cover Plate Dimensions



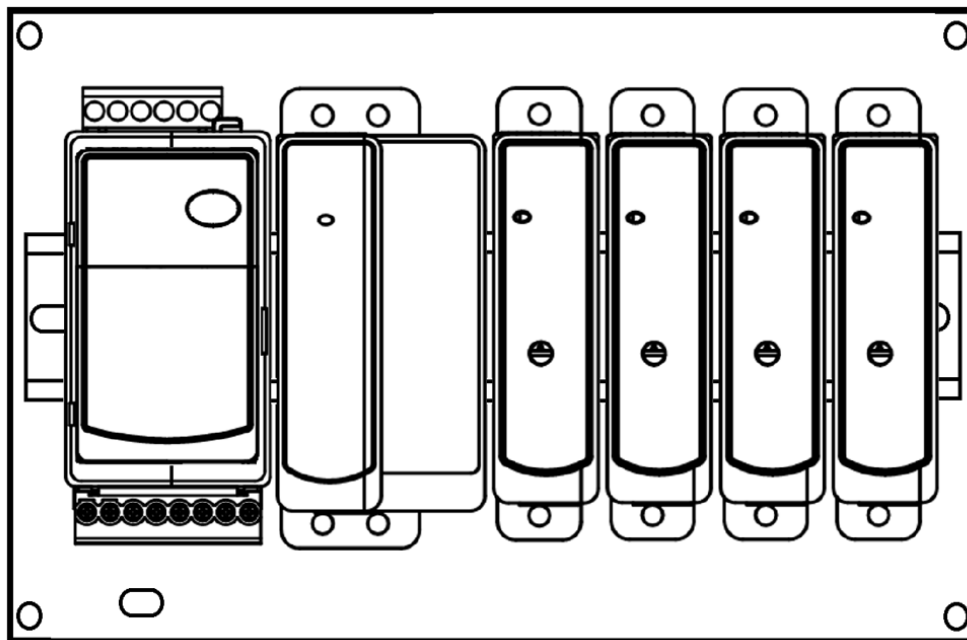
E300 Relay Mounting Location

Since the E300 is a modular style of system, where the individual modules can easily be mounted using a DIN rail, multiple modules could be mounted on the filler plate used to cover the hole from where a Bulletin 857 was removed. Shown below is one example of a typical hardware retrofit solution.

When considering a migration path to the E300, the filler plate used for the door cutout, used to cover the mounting hole for the Bulletin 857, can be utilized as a mounting location for the E300 modular components. Utilizing this space permits a simple physical installation of the E300 components. Additional space would not then be required on the control panel. Since the control and analog wiring is already routed to this area, making the associated electrical connections is also easily facilitated without the requirement of redressing or rerouting the wire harness bundles.

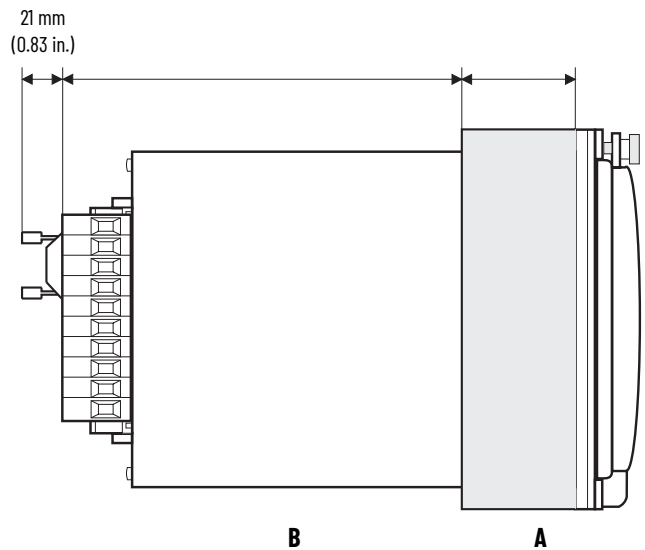
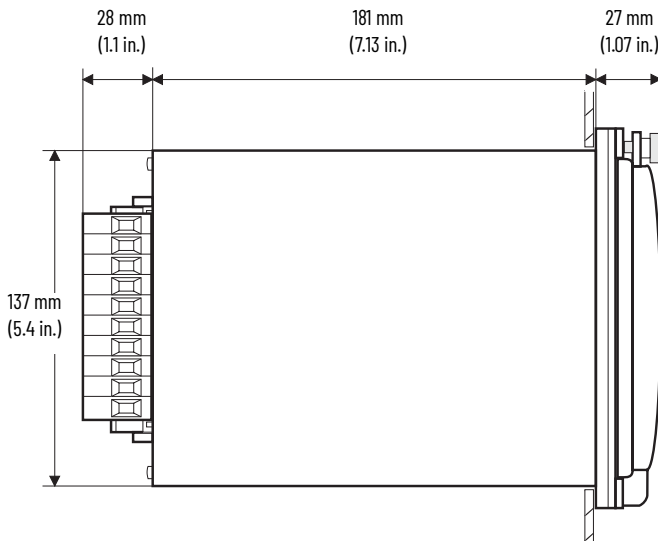
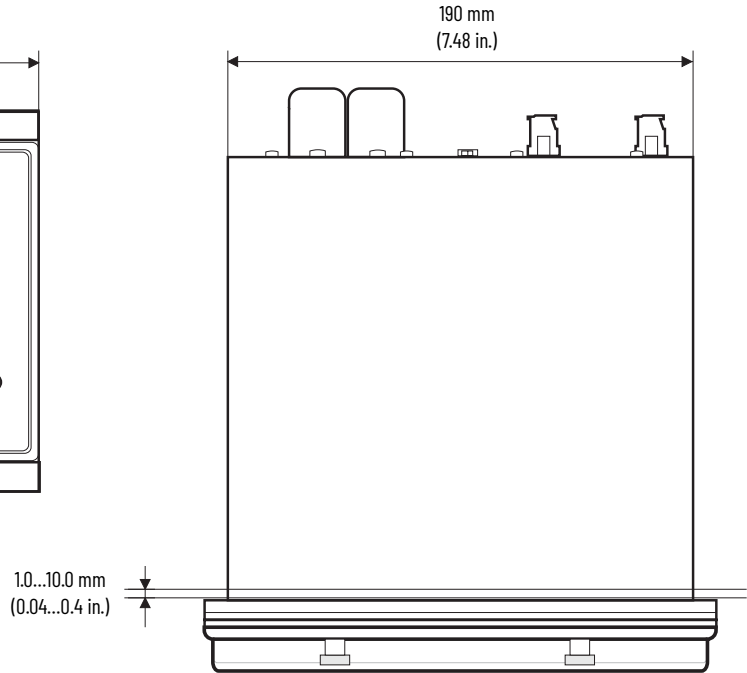
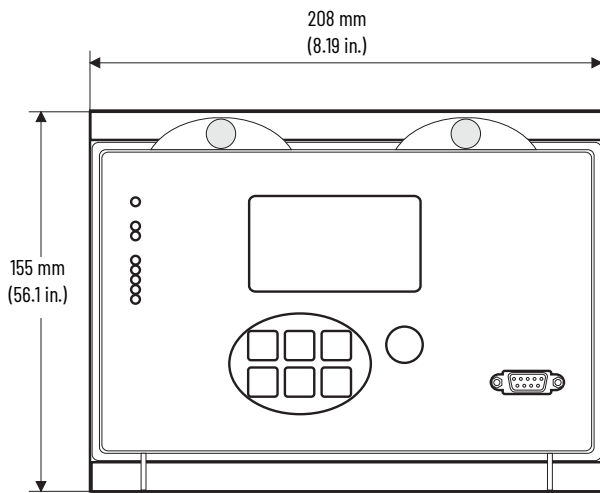
Alternatively, the E300 components could be mounted on the control panel space if there is physical space to mount the components. Because each module is interconnected to the next, the components do not have to be located side by side.

E300 Relay Mounted on Plate that Replaces Bulletin 857 Mounting Hole



Bulletin 857 Base Relay Dimensions

Dimensions

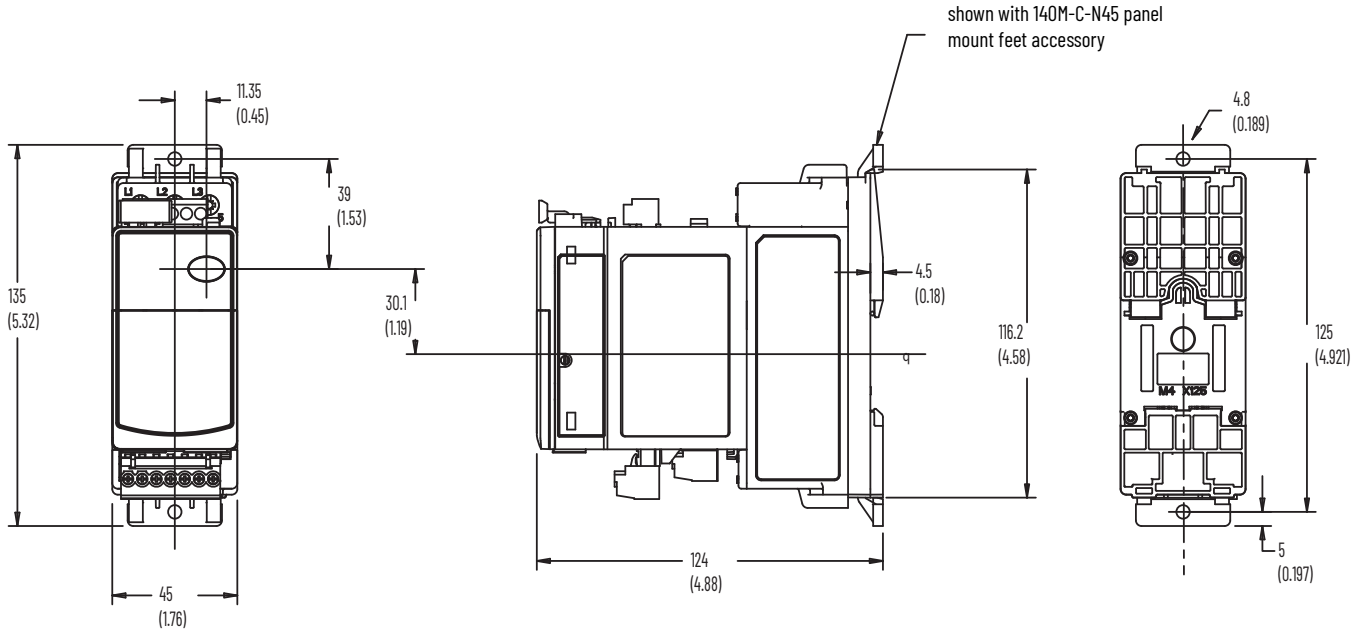


Optional Projection Mounting Collar

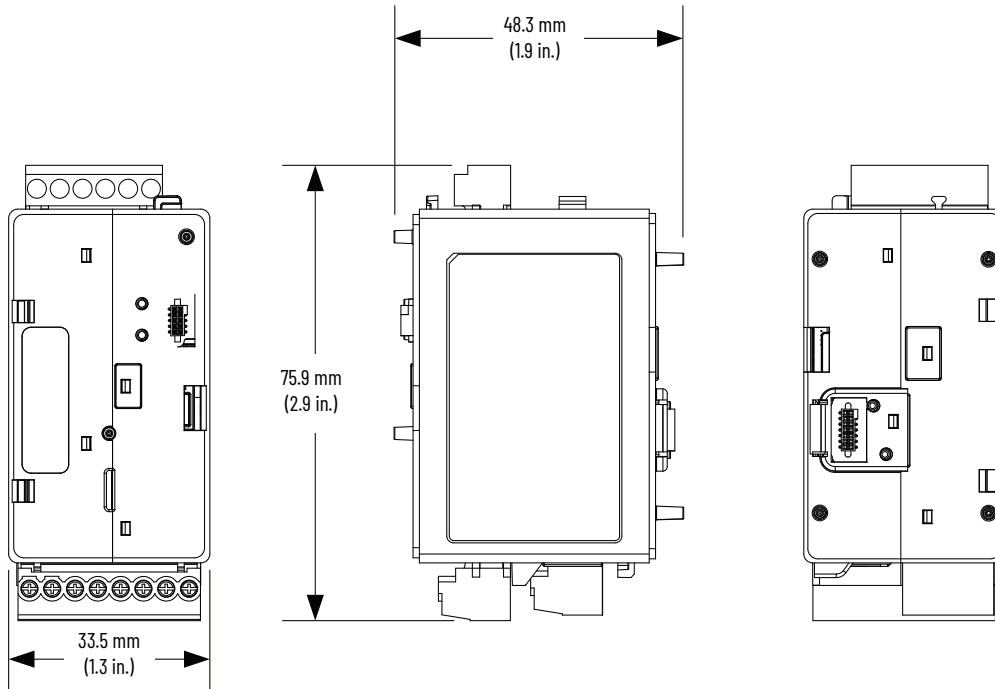
Collar Part Number	A	B
857-VYX076	40 mm (1.57 in.)	169 mm (6.65 in.)
857-VYX077	60 mm (2.36 in.)	149 mm (5.87 in.)
857-VYX233	100 mm (3.94 in.)	109 mm (4.29 in.)

E300 Relay Component Dimensions

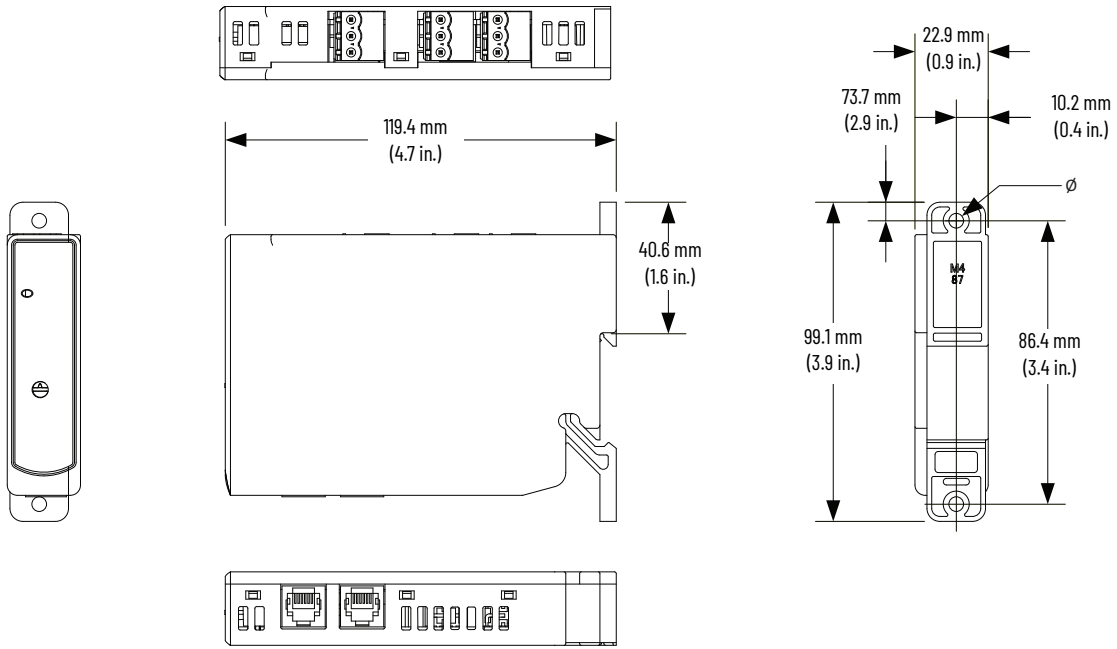
E300 Overload Relay with 193-ESM-____-30A-T Sensing Module, DIN Rail Mounted



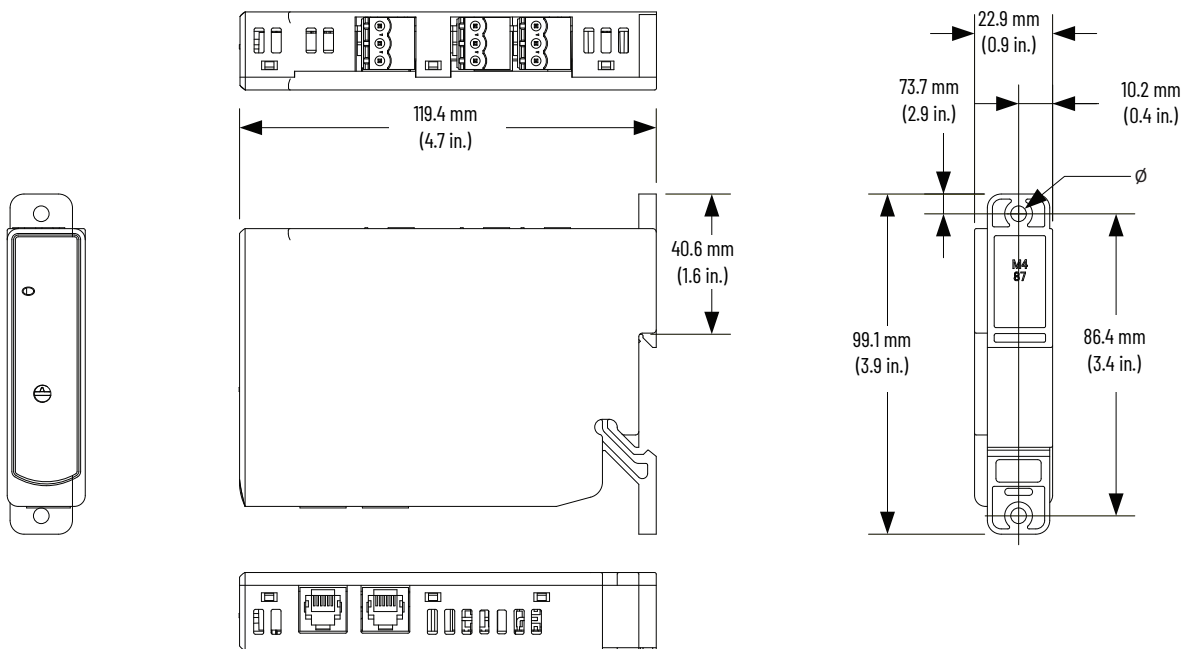
193-EIOGP-22-120 Control Module



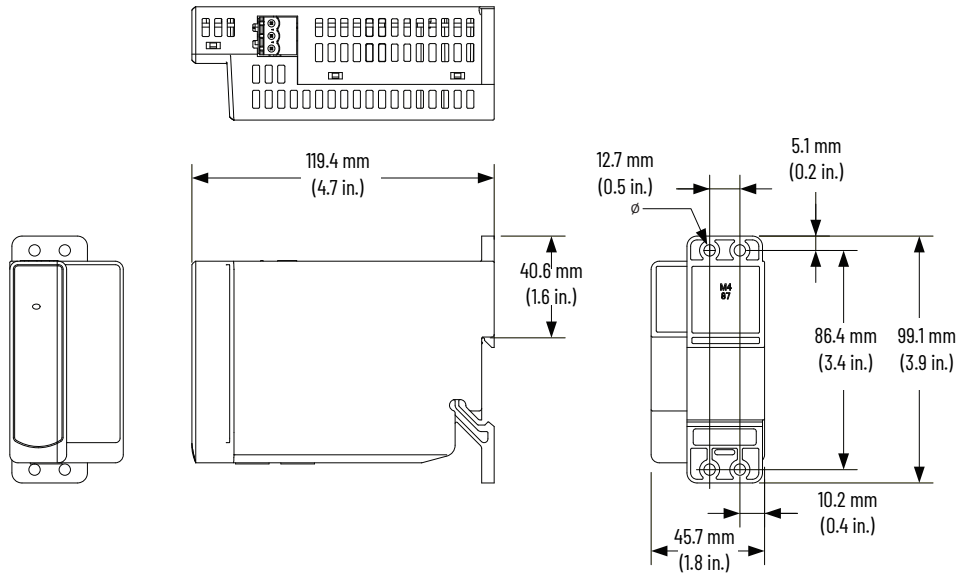
193-EXP-DI0-42-120 Digital Expansion Module



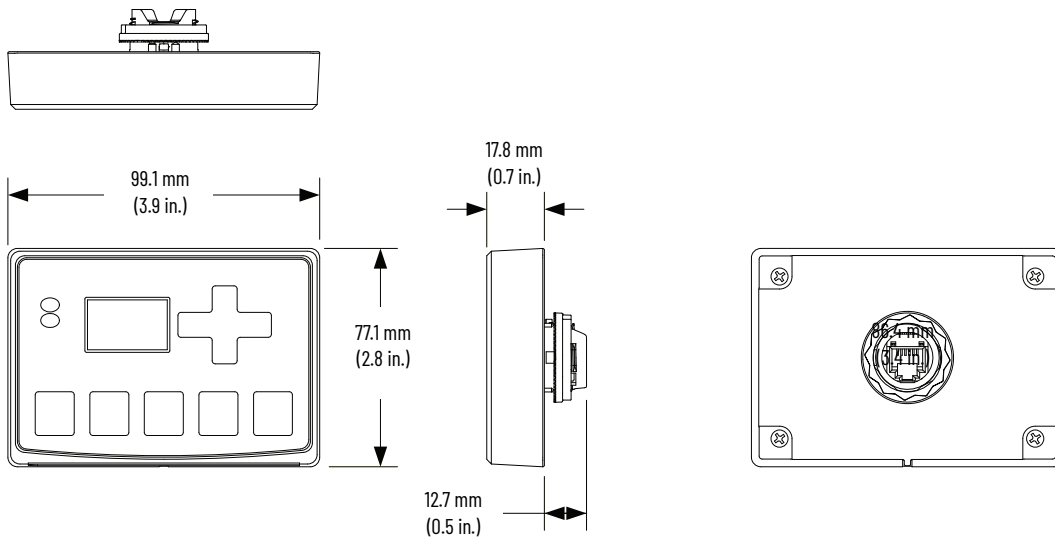
193-EXP-AI0-31 Analog Expansion Module



193-EXP-PS-AC Expansion Module Power Supply



193-EXP-EOS-SDS Diagnostic Display Station Operator Station



Bulletin 857 Relay Catalog Number Explanation

Position

	1	2	3	4	5	6	7
857 –	<u>3</u>	<u>C</u>	<u>6</u>	<u>A</u>	<u>A</u>	<u>A</u>	–
	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>

a

Nom Phase Current (A) / Nom DI7-28 Activation Voltage	
3	1 A / 5 A / 24V
6	1 A / 5 A / 110V
7	1 A / 5 A / 220V

b

Nom Earth-fault Current I/O1 and I/O2 [A]	
C	1 A and 5 A
D	0.2 A and 1 A

c

Additional I/O (X8 Terminal)	
6	None
8	Ten outputs
9	Eight standard inputs and four outputs ⁽¹⁾

(1) Some options not UL Listed. Check with your Rockwell Automation® representative.

d

Supply Voltage [V]	
A	40...265V AC/DC
B	18...36V DC
C	40...265V AC/DC, arc protection option
D	18...36V DC, arc protection option
E	40...265V AC/DC, DI19, DI20, arc channel, optional
F	18...36V DC+ DI19, DI20, arc channel, optional

e

Optional Hardware (Communication port 1)	
Code	Description
A	TTL/RS-232 (VCM TTL)
B	Plastic/Plastic serial fiber interface (VCM FIBRE PP)
C	N/A
D	RS-485 interface (4-wire, VCM 485-4)
E	Glass/Glass dual serial fiber interface for 857-RAD (857-VCMFIBRE GG) ⁽¹⁾
F	Rx Plastic/Tx Glass serial fiber interface (VCM FIBRE PG)
G	Rx Glass/Tx Plastic serial fiber interface (VCM FIBRE GP)
I	RJ45 connection (RS-232, VCM 232)
M	ST 100-Mbps Ethernet dual fiber interface including IEC 61850
N	RTD glass fiber interface for 857-RAA (857-VCMRTD) ⁽²⁾

(1) Required for connection to 857-RAD Enhanced RTD Scanner. Only available in this location.

(2) Required for connection to the 857-RAA scanner only.

f

Optional Hardware (Communication port 2)	
A	None
C	RJ45 connection (RS-232, 857-VCM232)
D	RS-485 interface (2-wire, 857-VCM485-2)
L	Built-in RJ45 10-Mbps Ethernet interface ⁽¹⁾
M	Built in RJ45 10-Mbps interface inc. IEC 61850 ⁽¹⁾
N	RTD interface for 857-RAA (Glass fiber, 857-VCMRTD) ⁽²⁾

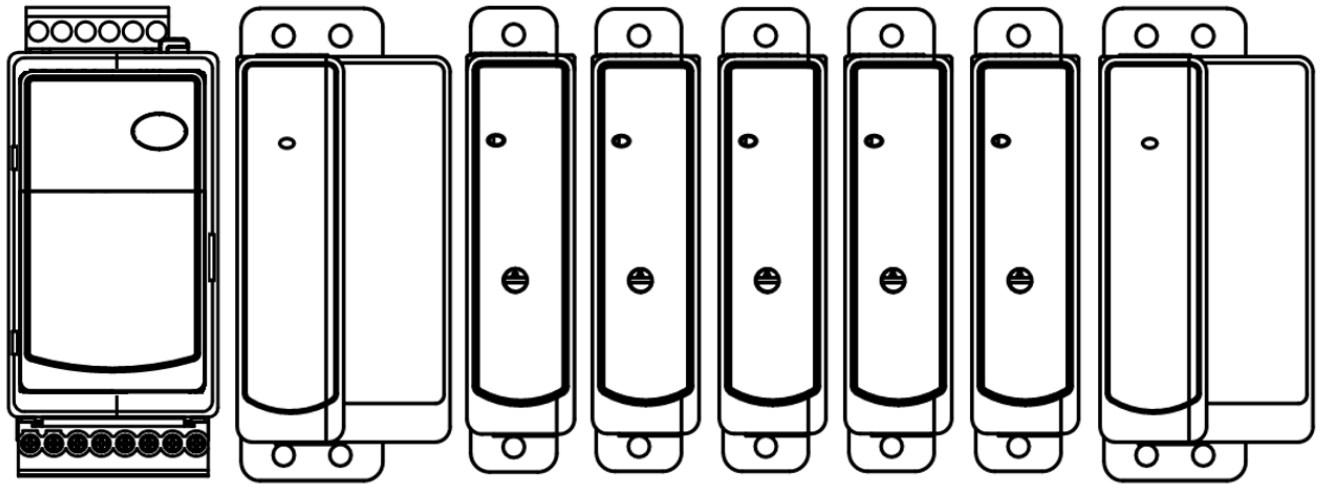
(1) Cannot order in combination with the following optional Communication PORT 1: (M) ST 100-Mbps EtherNet/IP fiber interface with IEC 61850

(2) Required for connection to the 857-RAA scanner only.

g

Ingress Protection Rating	
	IP 30 (standard)
I	IP 54 with conformal coating (optional)
C	IP 30 with conformal coating (optional)

Typical E300 Configuration



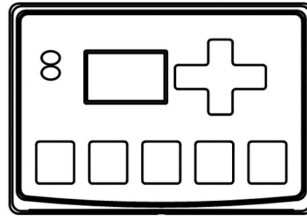
Control and Sensing Modules

Expansion Power Supply

Multiple Analog Input/Outputs for RTD Detection

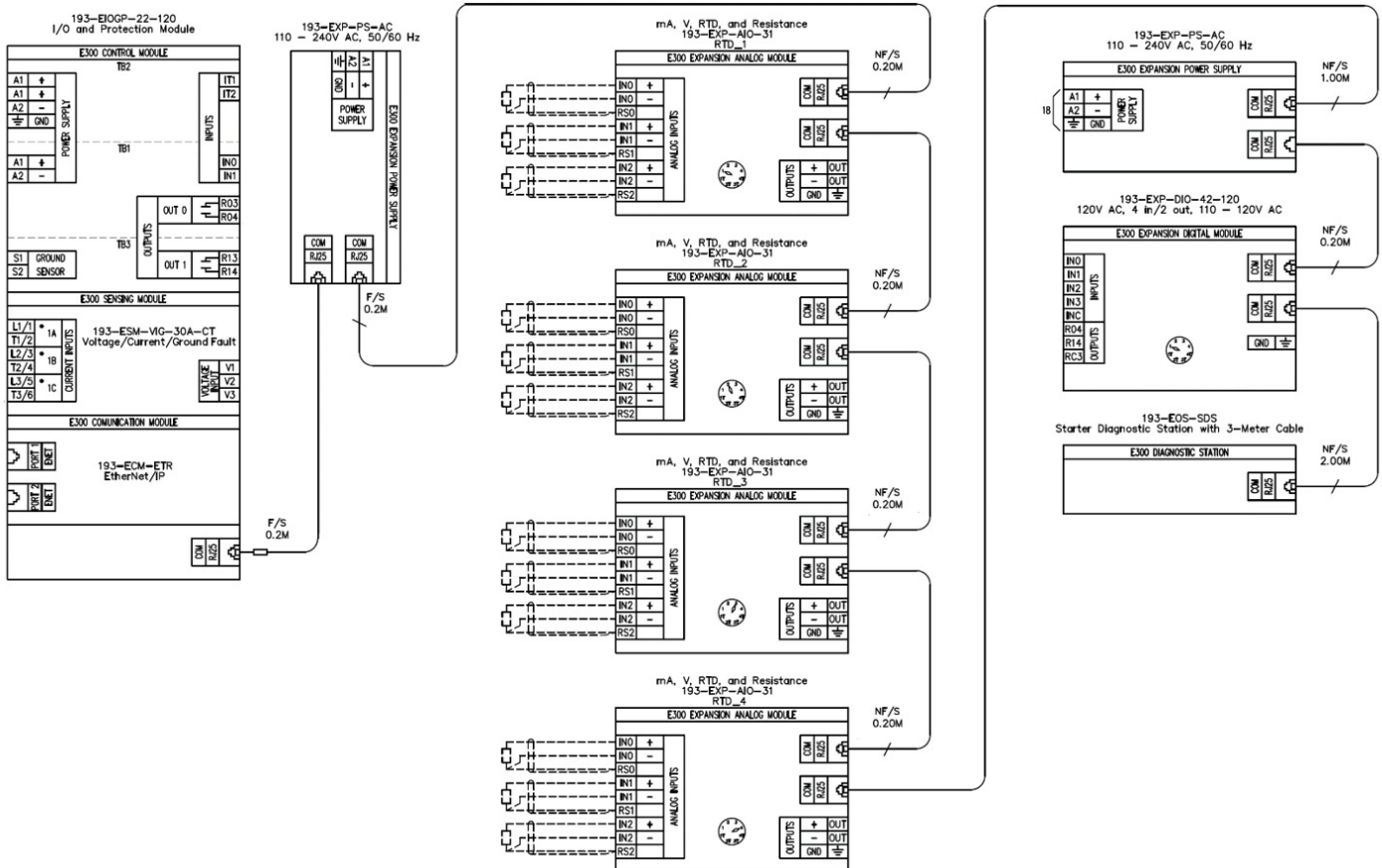
I/O Expansion Module

Expansion Power Supply

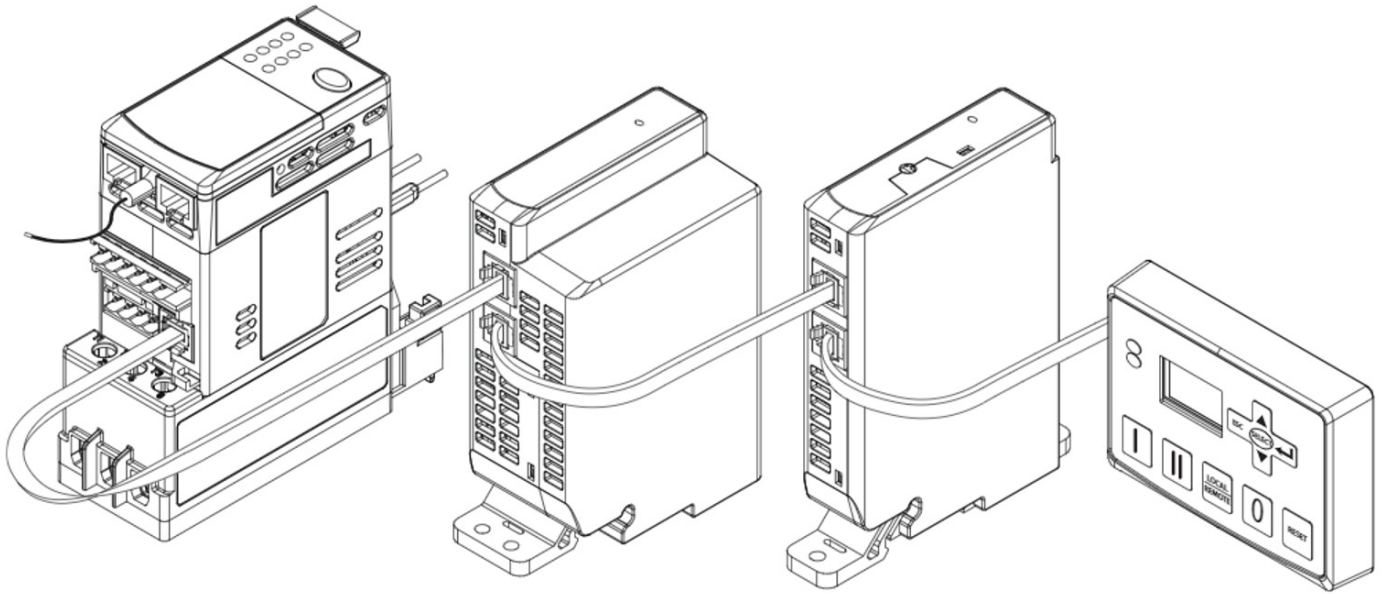


Diagnostic Display Station

Equivalent Electrical Configuration



E300 Modular Connection Methodology



Typical Bulletin 857 Relay Electrical Diagram with RTD Scanner



Bulletin 857 Relay to E300 Relay System Conversion Table

857 Terminal Connections	Use/Designation	E300 Terminal Connections	Module Type	Module Catalog Number
X1-1	L1 Current	L1	Sensing Module	193-ESM-IG-30A-T
X1-2		T1		
X1-3	L2 Current	L2		
X1-4		T2		
X1-5	L3 Current	L3		
X1-6		T3		
X1-7	1A ZSCT (I_{01})	S1 ⁽¹⁾	Control Module	193-EIOGP-22-120
X1-8		S2 ⁽¹⁾		
X1-9	5A ZSCT (I_{02})	—	—	—
X1-10		—		
X1-11	UL1	V1	Sensing Module	193-ESM-IG-30A-T
X1-12		—		
X1-13	UL2	V2		
X1-14		—		
X1-17	UL3	V3		
X1-18		—		
X3-9	A1 COM	R13	Control Module	193-EIOGP-22-120
X3-10	A1 NO	R14		
X3-11	A2 NC	—		
X3-12	T1	R03	Control Module	193-EIOGP-22-120
X3-13		R04		
X3-14	T2	R04	4 In/2 Relay Out 120V AC Digital Expansion Module	193-EXP-DIO-42-120
X3-15		RC3		
X3-17	Control Power	A1+	Control & Expansion Power Supplies (all)	193-EIOGP-22-120 193-EXP-PS-AC
X3-18	Control Power	A2-		
X7-1	IN7	IN0	Control Module	193-EIOGP-22-120
X7-2		IN8		
X7-3	IN9			
X7-4		A2		
X7-5	IN10	IN1	4 In/2 Relay Out 120V AC Digital Expansion Module	193-EXP-DIO-42-120
X7-6	IN11	IN2		
X7-7	IN12	IN3		
X7-7	COMMON	INC		
TB1-1 ⁽²⁾	RTD IN+	RTD IN+	3 Universal In/1 Out Analog Expansion Module	193-EXP-AIO-31
TB1-2	RTD IN-	RTD IN-		
TB1-3	RTD W	RTD W		
TB1-4	RTD GRD	RTD GRD		
TB3-1	Ma In1 +	In1 +	3 Universal In/1 Out Analog Expansion Module	193-EXP-AIO-31
TB3-2	Ma In1 -	In1 -		
TB3-9 ⁽³⁾	Ma Out1 +	Out+	3 Universal In/1 Out Analog Expansion Module	193-EXP-AIO-31
TB3-10	Ma Out1 -	Out-		

(1) Requires an 193-CBCT. The 100:1 ratio (typical) used with the 857 relay cannot be used.

(2) Only one of 12 channels shown (applies to the 857-RAA and 857-RAD).

(3) Only one of 4 channels shown (applies only to the 857-RAD).

Recommended E300 Relay Configuration

Use the following configurations to provide similar protection feature of a Bulletin 857 relay.

Basic E300 Configuration for Basic Current Only Measurement⁽¹⁾

193-ESM-IG-30A-T	E300 30A DIN Rail Mount Current Sensing Module	Qty-1
193-EIOGP-22-120	E300 2 In/2 Relay Out 120V AC Control Module	Qty-1
193-ECM-ETR	E300 EtherNet/IP Communication Module	Qty-1
193-EXP-DIO-42-120	E300 4 In/2 Relay Out 120V AC Digital Expansion Module	Qty-1
193-EXP-EOS-SDS	E300 Diagnostic Station	Qty-1

(1) For ground fault protection, an externally mounted ground fault (Zero Sequence) current transformer is required. The E300 relay supports only the 193-CBCT line of current transformers.

Basic E300 Configuration for Basic Current and Voltage Measurement⁽¹⁾

193-ESM-IG-30A-T	E300 30A DIN Rail Mount Current Sensing Module	Qty-1
193-EIOGP-22-120	E300 2 In/2 Relay Out 120V AC Control Module	Qty-1
193-ECM-ETR	E300 EtherNet/IP Communication Module	Qty-1
193-EXP-DIO-42-120	E300 4 In/2 Relay Out 120V AC Digital Expansion Module	Qty-1
193-EXP-EOS-SDS	E300 Diagnostic Station	Qty-1

(1) For ground fault protection, an externally mounted ground fault (Zero Sequence) current transformer is required. The E300 relay supports only the 193-CBCT line of current transformers.

Basic E300 Configuration for Advance Current Measurement Including RTD Sensing, Up to 12 RTDs⁽¹⁾

193-ESM-IG-30A-T	E300 30A DIN Rail Mount Current Sensing Module	Qty-1
193-EIOGP-22-120	E300 2 In/2 Relay Out 120V AC Control Module	Qty-1
193-ECM-ETR	E300 EtherNet/IP Communication Module	Qty-1
193-EXP-DIO-42-120	E300 4 In/2 Relay Out 120V AC Digital Expansion Module	Qty-1
193-EXP-EOS-SDS	E300 Diagnostic Station	Qty-1
193-EXP-AIO-3I	E300 3 Universal In/1 Out Analog Expansion Module	Qty-4
193-EXP-PS-AC	E300 Expansion Power Supply (110-240V AC)	Qty-1

(1) For ground fault protection, an externally mounted ground fault (Zero Sequence) current transformer is required. The E300 relay supports only the 193-CBCT line of current transformers.

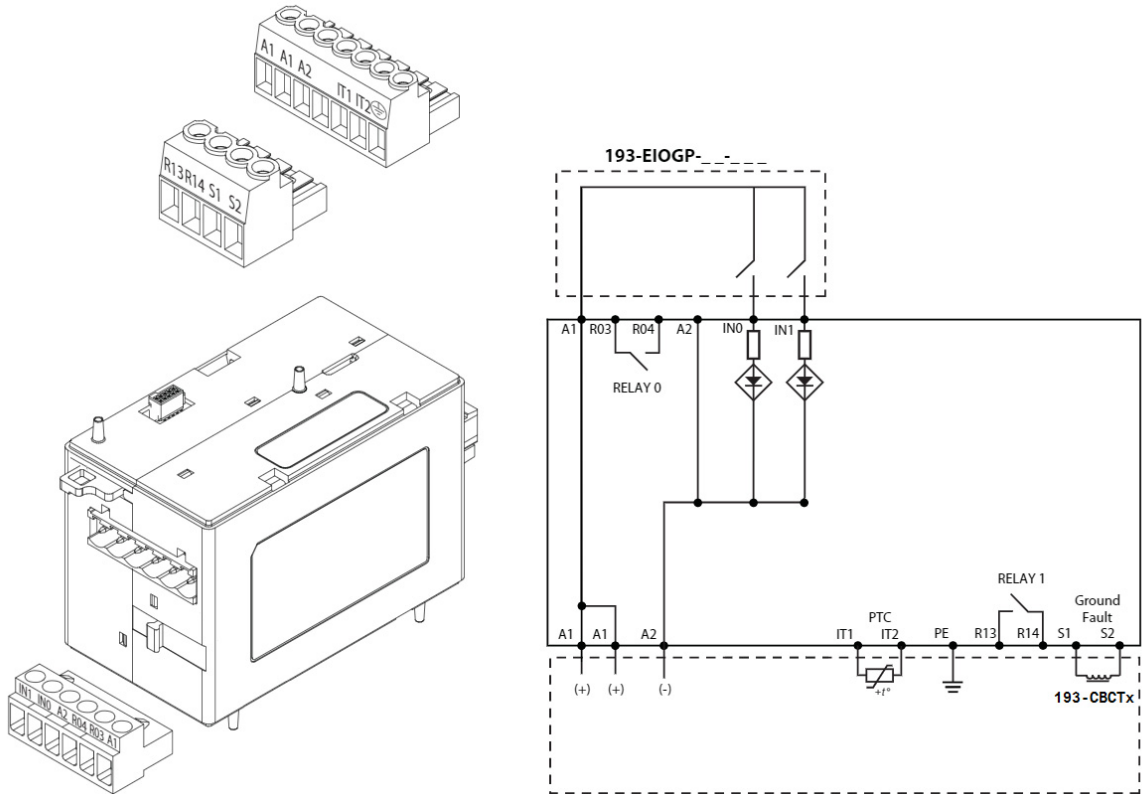
Basic E300 Configuration for Advance Current and Voltage Measurement Including RTD Sensing, Up to 12 RTDs⁽¹⁾

193-ESM-VIG-30A-CT	E300 30A DIN Rail Mount Voltage and Current Sensing Module	Qty-1
193-EIOGP-22-120	E300 2 In/2 Relay Out 120V AC Control Module	Qty-1
193-ECM-ETR	E300 EtherNet/IP Communication Module	Qty-1
193-EXP-DIO-42-120	E300 4 In/2 Relay Out 120V AC Digital Expansion Module	Qty-1
193-EXP-EOS-SDS	E300 Diagnostic Station	Qty-1
193-EXP-AIO-3I	E300 3 Universal In/1 Out Analog Expansion Module	Qty-4
193-EXP-PS-AC	E300 Expansion Power Supply (110-240V AC)	Qty-1

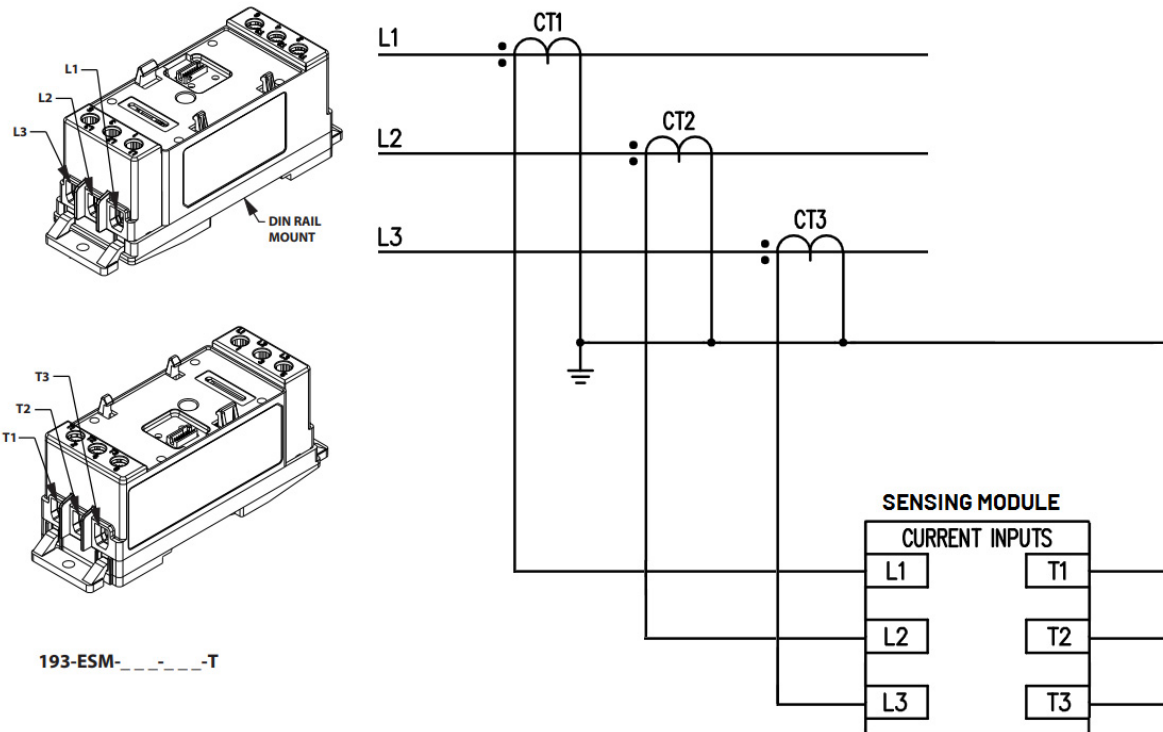
(1) For ground fault protection, an externally mounted ground fault (Zero Sequence) current transformer is required. The E300 relay supports only the 193-CBCT line of current transformers.

E300 Relay Expansion Module Terminal Locations

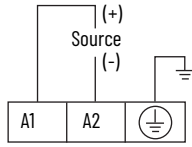
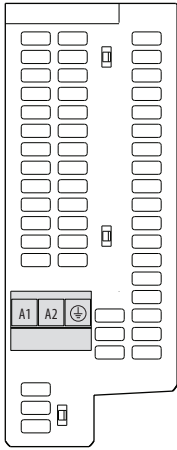
Control Module Terminal



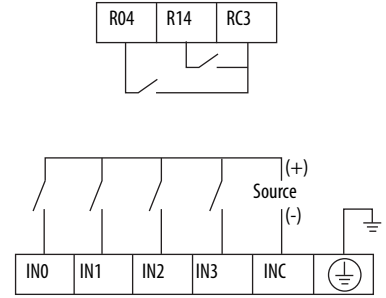
Sensing Module Terminals



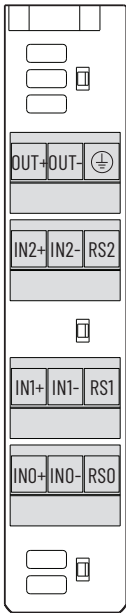
Expansion Power Supplies 193-EXP-PS-__



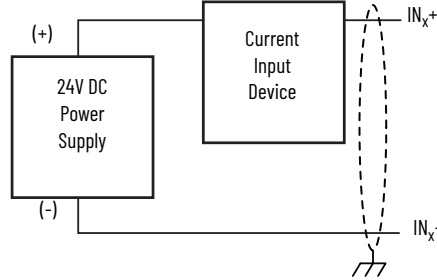
Expansion Digital I/O Modules 193-EXP-DIO-__



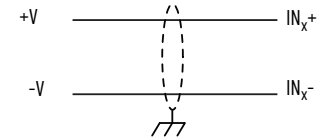
Expansion Analog I/O Module 193-EXP-AIO-31



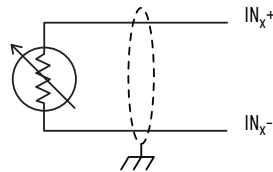
Analog Current Input



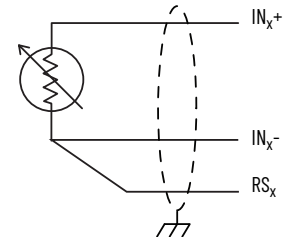
Analog Voltage Input



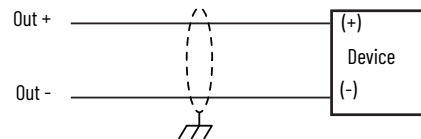
2-wire RTD/Resistance



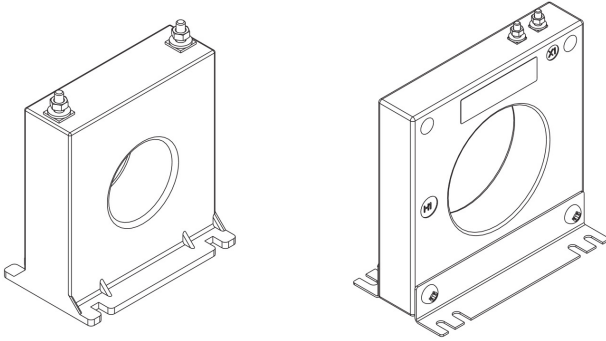
3-wire RTD



Analog Voltage or Current Output



193-CBCTx



Cat. No.	Frequency	Turns Ratio	Sensor Window I.D.	Maximum Recommended Cable Size
193-CBCT3	50/60 Hz	1000:1	63.5 mm (2.5 in.)	250MCM (120 mm ²)
193-CBCT4			82.3 mm (3.25 in.)	350MCM (185 mm ²)

The control wiring must be a twisted pair with the shield connected to the ground at only one point.



ATTENTION: The shield of the twisted pair must be connected to earth ground at the sensor.

The following points must also be considered:

- Maximum length is 30.5 m (100 ft) for the shielded cable.
- All control terminals are for copper wire only using sizes #12...24 AWG.
- Ring lug termination is required for the ground sensor terminals of 193-CBCT3 and larger.
- Sensor fastener torque: 14...16 lb•in. (1.6...N•m).

Additional Resources

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

Resource	Description
Protection System for Feeder and Motor Protection, Bulletin 857, Series A, publication 857-UM001	Provides information on parameters, installation, dimensions, troubleshooting, control functions, and specifications for the Bulletin 857 relay
857-RAA/857-RAD RTD Scanner User Manual, publication 857-UM002	Provides information on layout, wiring, installation, configurations, mounting, and I/O
SetPointPS Configuration Software Programming Manual, publication 857-PM001	Provides information on configuring, setting up, troubleshooting, and using the SetPointPS communication software
E300 Electronic Overload Relay User Manual, 193-UM015	Provides complete user information for the E300 Electronic Overload Relay.
E300 Sensing Module Installation Instructions, 193-IN080	Provides installation instructions for the E300 Electronic Overload Relay.
EtherNet/IP Network Devices User Manual, ENET-UM006	Describes how to configure and use EtherNet/IP devices to communicate on the EtherNet/IP network.
Ethernet Reference Manual, ENET-RM002	Describes basic Ethernet concepts, infrastructure components, and infrastructure features.
System Security Design Guidelines Reference Manual, SECURE-RM001	Provides guidance on how to conduct security assessments, implement Rockwell Automation products in a secure system, harden the control system, manage user access, and dispose of equipment.
Industrial Components Preventive Maintenance, Enclosures, and Contact Ratings Specifications, publication IC-TD002	Provides a quick reference tool for Allen-Bradley industrial automation controls and assemblies.
Safety Guidelines for the Application, Installation, and Maintenance of Solid-state Control, publication SGI-1.1	Designed to harmonize with NEMA Standards Publication No. ICS 1.1-1987 and provides general guidelines for the application, installation, and maintenance of solid-state control in the form of individual devices or packaged assemblies incorporating solid-state components.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, rok.auto/certifications .	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at rok.auto/literature.

Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, and product notification updates.	rok.auto/support
Knowledgebase	Access Knowledgebase articles.	rok.auto/knowledgebase
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

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Rockwell Automation maintains current product environmental compliance information on its website at rok.auto/pec.

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