MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Amikon cover with selected official Allen-Bradley pages

E300/E200 ELECTRONIC OVERLOAD RELAY

193-ESM-IG-30A-E3T

CURRENT AND GROUND-FAULT SENSING MODULE

OFFICIAL SOURCES

Rockwell Automation 193-TD006B-EN-P, current/ground-fault sensing selection and ratings. Selected pages retain their original content, color and aspect ratio.

Allen-Bradley

E300/E200 Electronic Overload Relay Specifications

Bulletin Numbers 193, 592

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Summary

The E300™ and E200™ Electronic Overload Relays are the newest technology for overload protection. The modular design, communication options, diagnostic information, simplified wiring, and integration into Logix technology make it the ideal overload for motor control applications in an automation system.

The E300/E200 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 the exact needs of your application. The communication module determines whether the complete assembled device is an E300 or an E200 overload relay.

Product Selection

This section provides catalog number explanations and product selection information for the E300/E200 overload relays and accessories.

Catalog Number Explanation

Examples given in this section are for reference purposes. This basic explanation should not be used for product selection; not all combinations will produce a valid catalog number.

Sensing Module

193	–	ESM	–	VIG	–	30A	–	C23
a		b		c		d		e

a	
Bulletin Number	
Code	**Description**
193	IEC Overload Relay
592	NEMA Overload Relay

b	
Module Type	
Code	**Description**
ESM	Sensing Module

c	
Sensing Module Type	
Code	**Description**
VIG	Current, Ground Fault Current, Voltage, and Power
IG	Current and Ground Fault Current
I	Current

d	
Sensing Current Range	
Code	**Description**
30A	0.5…30 A
60A	6…60 A
100A	10…100 A
200A	20…200 A

e	
Sensing Module Mounting Style	
Code	**Description**
C23	Mounts to 100-C09…-C23 Contactor. Can also be used for direct mount to Bulletin 300 NEMA contactors.
C55	Mounts to 100-C30…-C55 Contactor. Can also be used for direct mount to Bulletin 300 NEMA contactors.
C97	Mounts to 100-C60…-C97 Contactor. Can also be used for direct mount to Bulletin 300 NEMA contactors.
D180	Mounts to 100-D115…-D180 Contactor. Can also be used for direct mount to Bulletin 300 NEMA contactors.
E146	Mounts to 100-E116…-E146 Contactor
E205	Mounts to 100-E190…-E205 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 and Voltage Sensing

Control Module

193	–	EIO	–	43	–	120
a		b		c		d

a	
Bulletin Number	
Code	**Description**
193	IEC Overload Relay
592	NEMA Overload Relay

b	
Module Type	
Code	**Description**
EIO	I/O Only Control Module
EIOGP(1)	I/O and Protection Control Module (External Ground Fault Sensing, and PTC)

c	
I/O Count	
Code	**Description**
63	6 Inputs / 3 Relay Outputs
43	4 Inputs / 3 Relay Outputs
42	4 Inputs / 2 Relay Outputs
22	2 Inputs / 2 Relay Outputs

d	
Control Voltage	
Code	**Description**
24D	24V DC
120	110…120V AC, 50/60 Hz
240	220…240V AC, 50/60 Hz

(1) Requires Core Balanced Ground Fault Sensor Cat. No. 193-CBCT_ for external ground fault protection. Sensing module with "G" not required.

Description	Mounting Options	Current Range [A]	For Use With	Cat. No.
Current/Ground Fault	IEC Contactors	0.5…30	100-C09…C23	193-ESM-IG-30A-C23
			100-C30…C55	193-ESM-IG-30A-C55
		6…60	100-C30…C55	193-ESM-IG-60A-C55
		10…100	100-C60…100-C97	193-ESM-IG-100A-C97
		20…200	100-D115…100-D180	193-ESM-IG-200A-D180
			100-E116...100-E146	193-ESM-IG-200A-E146
			100-E190...100-E205	193-ESM-IG-200A-E205
	DIN Rail / Panel Mount Power Terminals	0.5…30	All contactors	193-ESM-IG-30A-T
		6…60		193-ESM-IG-60A-T
		10…100		193-ESM-IG-100A-T
		20…200		193-ESM-IG-200A-T
	DIN Rail / Panel Mount Power Terminals Directly replaces 193-ECPM_	0.5…30		193-ESM-IG-30A-E3T
		6…60		193-ESM-IG-60A-E3T
		10…100		193-ESM-IG-100A-E3T
	DIN Rail / Panel Mount Pass-thru	0.5…30		193-ESM-IG-30A-P
		6…60		193-ESM-IG-60A-P
		10…100		193-ESM-IG-100A-P
		20…200		193-ESM-IG-200A-P
	Bulletin 500 NEMA Contactors	0.5…30	NEMA Size 0…2	592-ESM-IG-30A-S2
		6…60		592-ESM-IG-60A-S2
		10…100	NEMA Size 3	592-ESM-IG-100A-S3
		20…200	NEMA Size 4	592-ESM-IG-200A-S4
	Bulletin 300 NEMA Contactors	0.5…30	300-AO_ Series C, NEMA Size 0	193-ESM-IG-30A-C23
			300-AO_ Series B, NEMA Size 0 300-BO_ Series B, NEMA Size 1	193-ESM-IG-30A-C55
		6…60	300-CO_ Series C, NEMA Size 2	193-ESM-IG-60A-C55
		10…100	300-CO_ Series B, NEMA Size 2 300-DO_ Series D, NEMA Size 3	193-ESM-IG-100A-C97
		20…200	300-DO_ Series C, NEMA Size 3 300-EO_ Series B/C, NEMA Size 4	193-ESM-IG-200A-D180[(1)]
		—	300-FO_ Series A/B/C, NEMA Size 5	193-ESM-IG-30A-T[(1)]

(1) Requires 193-CT-_-300A external CT kit.

Specifications

Wiring Diagrams

Figure 1 - Control Module

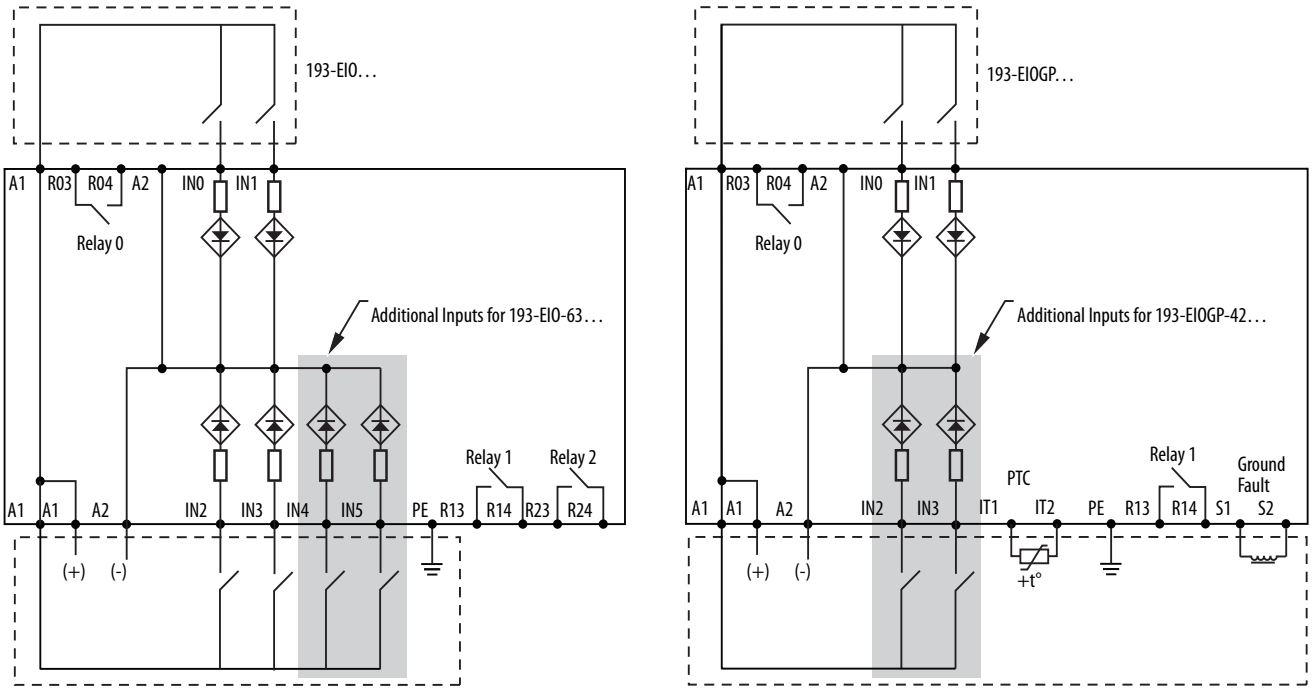


Figure 2 - Expansion Digital I/O Modules 193-EXP-DIO-___

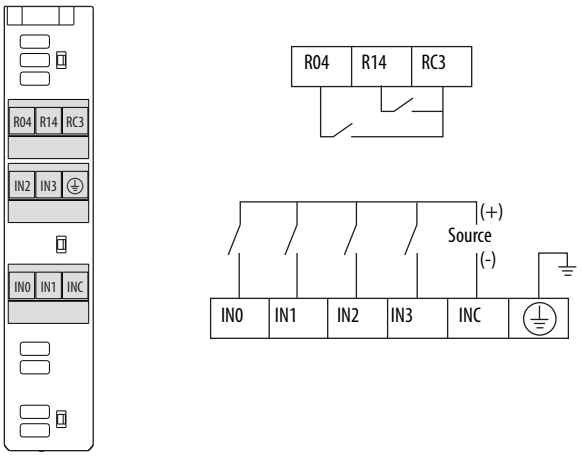


Figure 3 - Expansion Analog I/O Module 193-EXP-AIO-31

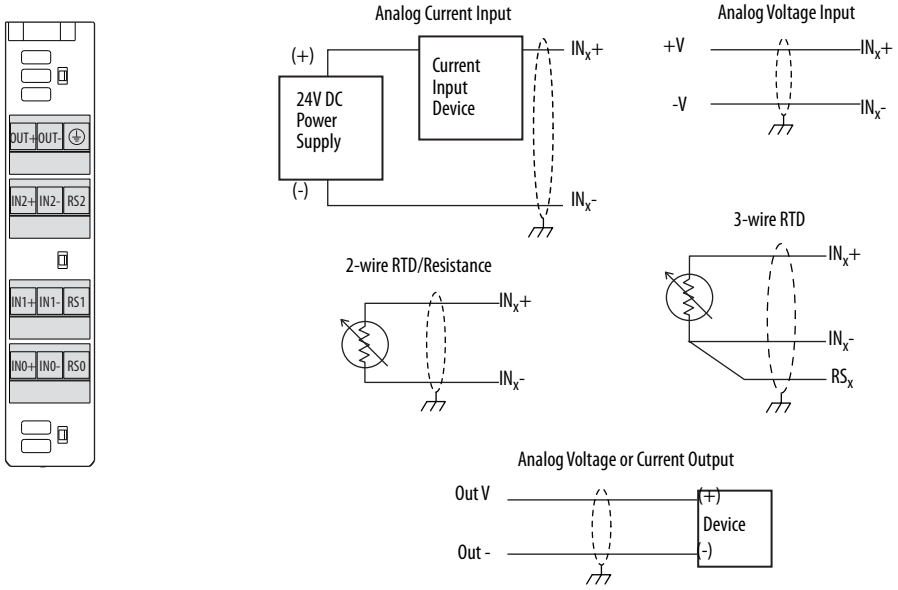


Figure 4 - Expansion Power Supplies 193-EXP-PS-___

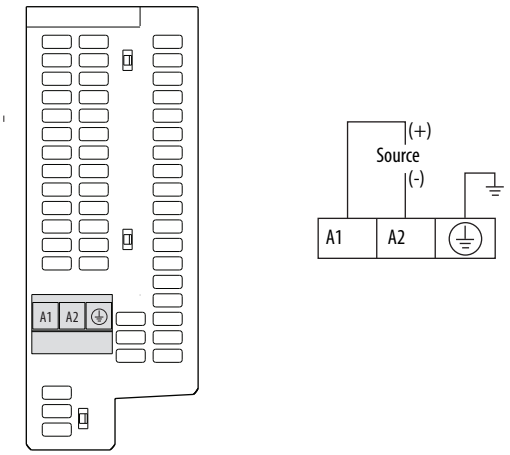
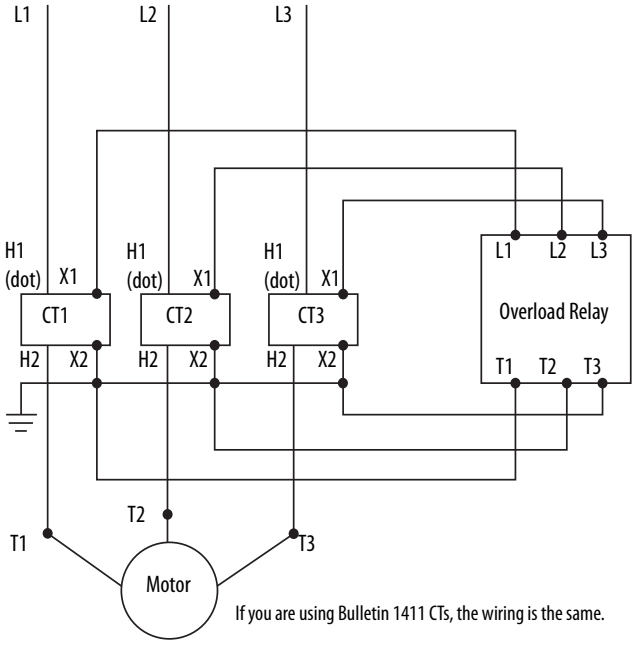


Figure 5 - External Current Transformers 193-CT-___



If you are using Bulletin 1411 CTs, the wiring is the same.

Table 1 - Standards Compliance and Certifications

Standards Compliance
CSA22.2, No. 60947-4-1
EN 60947-4-1
UL 60947-4-1
GB/T 14048.4-2010
IEC 61508
IEC 61511
SJ/T 11364, GB/T 26572, SJ/Z 11388

Certifications
cULus Listed - File No. E14840; Guide Nos. NKCR, NKCR7
CE Marked
RCM (formerly C-tick)
ABS
CCC
KCC
Suitable for use with IE3 Motors (IEC 60034-30)
SIL 2 Capable - IEC 61508:2010 Parts 1-7 (with Series B Control Module Only)
Environmental Protection Use Period 25 (China RoHS)

Electrical Specifications

Table 2 - Motor/Load Ratings

Attribute	Rating
Terminals	1/L1, 3/L2, 5/L3, 2/T1, 4/T2, 6/T3
Terminal Style Devices	
Rated Insulation Voltage U_i	690V AC
Rated Operating Voltage U_e, IEC	690V AC
Rated Operating Voltage U_e, UL	690V AC
Pass-thru Style Devices	
Rated Insulation Voltage U_i	1000V AC
Rated Operating Voltage U_e, IEC	1000V AC
Rated Operating Voltage U_e, UL	1000V AC
Rated Impulse Voltage (U_{imp})	6 kV
Rated Operating Current I_e	See product selection table
Rated Frequency	45…65 Hz[1]

(1) Exception: Any E300/E200 Overload Relay that uses an external ground fault sensor is limited to 50/60 Hz detection.

Table 3 - Control Module Power Supply Ratings

Attribute		Rating		
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/E200	6 W		
	E300/E200 with expansion	8 W		
Maximum Power Interruption Time	V_{min}	5 ms	10 ms	10 ms
	V_{max}	5 ms	10 ms	10 ms

Table 4 - Output Relay Ratings (Control Module and Expansion Digital Module)

Attribute	Rating
Relay 0:	R03/R04
Relay 1:	R13/R14
Relay 2:	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
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-C55	5,000,000
W/100-C60…100-C97	2,500,000
W/NEMA Size 0…2	1,000,000
W/NEMA Size 3	300,000

Table 5 - Input Ratings (Control Module and Expansion Digital Module)

Attribute	Rating		
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

Environmental Specifications

Note: The E300/E200 Electronic Overload 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).

Attribute	Rating
Ambient Temperature	
Storage	–40…+85 °C (–40…+185 °F)
Operating (open)	–20…+55 °C (–4…+131 °F)
Operating (enclosed)	–20…+40 °C (–4…+104 °F)
Humidity	
Operating	5…95% Non-condensing
Damp Heat – Steady State (per IEC 68-2-3)	92% r.h., 40 °C (104 °F), 56 days
Damp Heat – Cyclic (per IEC 68-2-30)	93% r.h., 25 °C/40 °C (77 °F/104 °F), 21 Cycles
Cooling Method	Natural convection
Vibration (per IEC 68-2-6)	2.5 G operating, 5 G non-operating
Shock (per IEC 68-2-27)	30 G
Maximum Altitude	2000 m(1)
Pollution Environment	Pollution Degree 3
Terminal Marking	EN 50012
Degree of Protection	IP20

(1) Exception: Any E300/E200 Overload Relay that uses an external ground fault sensor is limited to 50/60 Hz detection.

Electromagnetic Compatibility Specifications

Attribute	Rating
Electrostatic Discharge Immunity	
Test Level	8kV Air Discharge, 6kV Contact Discharge
Performance Criteria	1(1)(2)
Radio Frequency Immunity	
Test Level	10V/m
Performance Criteria	1(1)(2)
Electrical Fast Transient/Burst Immunity	
Test Level	4kV (Power), 2kV (Control & Comm)
Performance Criteria	1(1)(2)
Surge Immunity	
Test Level	2kV (L-E), 1kV (L-L)
Performance Criteria	1(1)(2)
Radiated Emissions	Class A
Conducted Emissions	Class A

(1) Performance Criteria 1 requires the DUT to experience no degradation or loss of performance
(2) Environment 2

Protection

Table 11 - General Protection

Protection Type	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
Over Analog	Yes	Yes

Table 12 - Overload Protection

Attribute	Rating
Type of Relay	Ambient Compensated Time-Delay Phase Loss Sensitive
Nature of Relay	Solid-State
FLA Setting	See user manual
Trip Rating	120% FLA
Trip Class	5…30
Reset Mode	Automatic or Manual
Overload Reset Level	1…100% TCU