

# Bulletin 193 / 592 E3 and E3 Plus Solid State Overload Relay

(Cat 193-EC\_\_\_; 592-EC\_\_\_)



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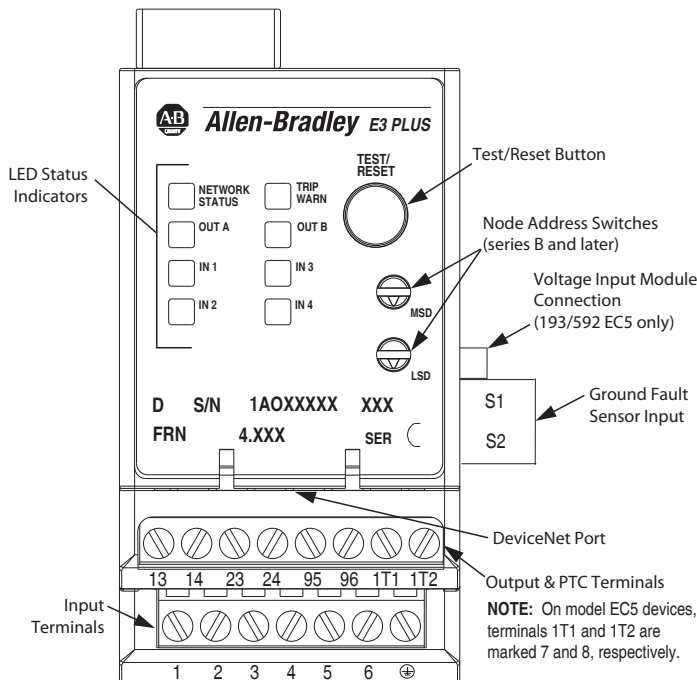
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**Additional Resources:**

- 1) Go to <http://www.rockwellautomation.com/literature>;
- 2) Go to **Search**, select **Publication Number**. Type in: **193-UM002** or **193-QR003**

## Terminal Designations


Figure 1 - E3 and E3 Plus Feature Overview



## Control Terminals

The following table defines the E3 Overload Relay control terminal designations.

**Table 1 - Control Terminal Designation**

Terminal Designation	Reference	Description
1	IN 1	General-purpose sinking input number 1
2	IN 2	General-purpose sinking input number 2
3	IN 3	General-purpose sinking input number 3 ❶ ❷
4	IN 4	General-purpose sinking input number 4 ❶ ❷
5	V+	+24V DC supply for inputs
6	V+	
7	IN 5	General-purpose sinking input number 5 ❷
8	IN 6	General-purpose sinking input number 6 ❷
	End	Earth Ground ❸
13/14	OUT A	Output A
23/24	OUT B	Output B ❶ ❷
95/96	Trip Relay	Trip Relay
1T1/1T2	PTC	Thermistor (PTC) input ❶ ❷
S1/S2	--	External ground fault sensor input ❷ ❸

- ❶ Features are available only with the E3 Plus Overload Relay (cat. nos. 193/592-EC2 and 193/592-EC3).
- ❷ Available only on cat. nos. 193/592-EC5\_ \_.
- ❸ An earth ground connection to this terminal will assist in obtaining compliance with electromagnetic compatibility requirements.
- ❹ The use of shielded cable is recommended for the positive PTC thermistor circuit to assist in obtaining compliance with electromagnetic compatibility requirements.
- ❺ Available only on cat. nos. 193/592-EC3\_ \_ and 193/592-EC4\_ \_.

## Grounding

The following grounding recommendations are provided to ensure electromagnetic compatibility compliance during installation:

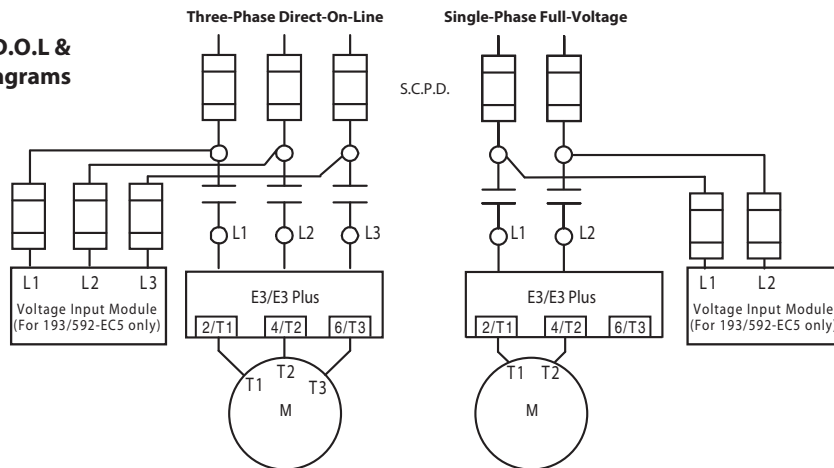
- The earth ground terminal of the E3 Overload Relay shall be connected to a solid earth ground via a low-impedance connection.
- Installations employing an external ground fault sensor shall ground the cable shield at the sensor with no connection made at the E3 Plus Overload Relay.
- The PTC thermistor cable shield shall be grounded at the E3 Plus Overload Relay with no connection made at the opposite end.

## Wiring Diagrams



**WARNING:** When working on energized circuits, do not rely on the voltage and current information provided by the E3 and E3 Plus for personal safety. Always use a portable voltage or current measurement device and measure the signal locally.

**Figure 2 - Three-Phase D.O.L & Single-Phase Wiring Diagrams**



## DeviceNet Terminals

The following table defines the DeviceNet connector terminal designations.

**Table 2 - DeviceNet Terminal Designation**

Terminal	Signal	Function	Color
1	V-	Common	Black
2	CAN_L	Signal Low	Blue
3	Drain	Shield	Non-insulated
4	CAN_H	Signal High	White
5	V+	Power Supply	Red

### Short Circuit Ratings

**Table 3 - Standard Fault Short-Circuit Ratings per UL 508 and CSA 22.2, No. 14**

Cat. No.	Max. Available Fault Current [A]	Max. Voltage [V]
193-EC_B, 592EC_T	5000	600
193-EC_D, 592EC_C	5000	
193-EC_E, 592EC_D	10000	
193-EC_F	10000	
193-EC_G	18000	
193-EC_H	42000	
193-EC_Z	5000	

**Table 4 - High Fault Short-Circuit Ratings per UL 508 and CSA 22.2, No. 14 with Bulletin 100-C and 100-D contactors**

Cat. No	Contactor	Max. Starter FLC [A]	Max. Available Fault Current [A]	Max. Voltage [V]	Max. Class J or CC Fuse [A]	
193-EC1 193-EC2 193-EC3 193-EC4 193-EC5	_B	100-C09	9	100000	600	20
		100-C12	12			20
		100-C16	16			30
		100-C23	23			30
	_D	100-C30	30			50
		100-C37	37			50
		100-C43	43			70
	_E	100-C60	60			80
		100-C72	72			100
		100-C85	85			150
	FF, ZZ	100-D95	95			200
		100-D110	110			200
		100-D140	140			250
	GG, ZZ	100-D180	180			300
		100-D210	210			400
		100-D250	250			400
	HG, ZZ	100-D300	300			500
		100-D210	210			400
		100-D250	250			400
	JG, ZZ	100-D300	300			500
100-D300		300	500			
100-D420		420	600			

**Table 5 - IEC Short-Circuit Ratings per EN60947-4-1**

Cat. No.	Prospective Short-Circuit Current I <sub>r</sub> [A]	Conditional Short-Circuit Current I <sub>q</sub> [A]	Max. Voltage [V]
193-EC_B, 592EC_T	1000	100000	690
193-EC_D, 592EC_C	3000		
193-EC_E, 592EC_D	5000		
193-EC_F	10000		
193-EC_G	18000		
193-EC_H	30000		
193-EC_Z	1000		

**Table 6 - High Fault Short-Circuit Ratings per UL 508 and CSA 22.2, No. 14 with NEMA contactors**

Cat. No.	Contactor Size	Max. Available Fault Current [A]	Max. Voltage [V]	Max. UL Fuse [A]		Circuit Breaker/Limiter	
				R	J		
592-EC1 592-EC2 592-EC3 592-EC5	_T	00	100000	600	----	20	----
	_C	0	100000	240	30	30	FDB 3025/LFB3070R
				480	30	30	FDB 3025/LFB3070R
				600	30	30	----
	_C	1	100000	240	60	100	FDB 3050/LFB3035R
				480	30	50	FDB 3050/LFB3035R
				600	30	50	----
	_C	2	100000	240	100	200	FDB 3100/LFB3150R
				480	60	100	----
				600	60	100	----
	_D	3	100000	240	200	350	FDB 3150/LFB3150R
				480	100	200	FDB 3125/LFB3150R
				600	100	200	FDB 3100/LFB3150R

## Fuse Coordination

**Table 7 - IEC Type 1 and Type II Fuse Coordination with Bulletin 100-C and 100-D Contactors per EN60947-4-1**

Cat. No	Contactor	Max. Starter FLC [A]	Prospective Short-Circuit Current $I_r$ [A]	Conditional Short-Circuit Current $I_q$ [A]	Max. Voltage [V]	Type I with Class J Fuse [A]	Type II with Class J Fuse [A]		
193-EC1 193-EC2 193-EC3 193-EC4 193-EC5	_B	100-C09	9	1000	100000	600	20	15	
		100-C12	12				20	20	
		100-C16	16				30	30	
		100-C23	23				40	40	
	_D	100-C30	30	3000			50	50	
		100-C37	37				50	50	
		100-C43	43				70	70	
	_E	100-C60	60	5000			80	80	
		100-C72	72				100	100	
		100-C85	85				150	150	
	FF, ZZ	100-D95	95	10000			200	200	
	FF, ZZ	100-D110	110				200	200	
	FF, ZZ	100-D140	140				250	250	
	GG, ZZ	100-D180	180				300	300	
	GG, ZZ	100-D210	210				400	400	400
		100-D250	250					400	400
		100-D300	300					500	500
	HG, ZZ	100-D210	210				400	400	400
		100-D250	250					400	400
		100-D300	300					500	500
JG, ZZ	100-D300	300	500	500	500				
	100-D420	420		600	600				

**Table 8 - Type 1 and Type II Fuse Coordination with NEMA Contactors**

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 with Class J Fuse [A]	Type II with Class J Fuse [A]
592-EC_T	00	9	1000	100000	600	20	20
592-EC_C	0,1	18, 27	3000			30	30
592-EC_C	2	45	3000			60	60
592-EC_D	3	90	5000			200	200

**Table 9 - Short circuit ratings, using 140U D Frame circuit breakers, per UL508 and CSA 22.2 No. 14**

Overload Relay Cat. No.	Overload Relay FLA Suffixes	Contactor	Overload Relay FLA Suffixes	Max. Available Fault Current (A)	Max. Voltage (V)	Max. Circuit Breaker
193	-EC1, -EC2, -EC3, -EC4, -EC5	100-C09,	9	65,000	480Y / 277V	140U-D6D3-C30 (30 Amps)
		100-C12,	12			
		100-C16	16			
		100-C23	23			
193	-EC1, -EC2, -EC3, -EC4, -EC5	100-C09,	9	35,000	600Y / 347V	140U-D6D3-C30 (30 Amps)
		100-C12,	12			
		100-C16	16			
		100-C23	23			
193	-EC1, -EC2, -EC3, -EC4, -EC5	100-C09,	9	5,000	600Y / 347V	140U-D6D3-C30 (30 Amps)
		100-C12,	12			
		100-C16	16			
		100-C23	23			

Rockwell Automation maintains current product environmental information on its website at <http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page>.

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