

## Bulletin 193



### 193-EA/ES (MCS-E1)

- Self Powered
- Phase Loss Protection
- Wide Adjustment Range (3.2:1)
- 1 N.O. and 1 N.C. Isolated Auxiliary Contacts
- Choice of Tripping Classes — Class 10 or 20
- Compact Size
- Low Energy Consumption (150mW)

### 193-EB (MCS-E2)

Also Includes:

- Selectable Trip Class 10, 15 or 20
- Ground Fault Tripping
- Jam/Stall Protection

## TABLE OF CONTENTS

Description	Page	Description	Page
Product Selection .....	<a href="#">31</a>	Specifications .....	<a href="#">34</a>
Accessories .....	<a href="#">33</a>	Approximate Dimensions .....	<a href="#">37</a>
Add-on Accessories .....	<a href="#">33</a>		

### Description

The MCS-E is a self-powered solid-state overload relay that provides advanced motor protection when compared to traditional bimetallic overload relays. The MCS-E1 offers motor overload protection with a choice of either trip class 10 or 20. It provides improved protection against the damaged caused to motors when operated under phase loss conditions. The MCS-E1 also offers, as standard, a manually operated trip function, visible trip indicator and isolated N.O. alarm contacts. The MCS-E2 overload relay adds to the overload protection of the MCS-E1 overload relay. The MCS-E2 provides selectable ground fault tripping, selectable jam/stall protection and selectable trip classes. A full range of accessories such as anti-tamper shields and panel mounting adapters are available.

#### Conformity to Standards:

IEC 947-4  
 CSA C22.2 No. 14  
 UL 508

#### Approvals:

CE  
 CSA Certified  
 UL Listed

#### Your order must include:

- The Cat. No. of overload relay selected.
- If required, Cat. No. of any accessories.

**Bulletin 193-E**  
**MCS-E Solid-State Overload Relays**  
**Product Selection**

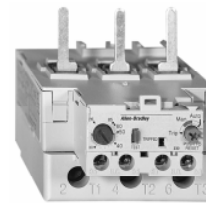
**Bulletin 193-EA/193-ES Electronic Motor Protection Relays - Manual Reset**



Cat. No. 193-EA1GB



Cat. No. 193-EA1JD



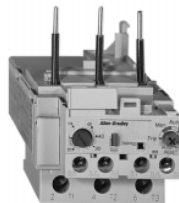
Cat. No. 193-EA1KE

Mounts to Contactor	Reset	Adjustment Range (A)	Trip Class 10		Trip Class 20	
			Cat. No.	*	Cat. No.	*
<b>Manual Reset for 3Ø Applications</b>						
100-M05...100-C23	M	0.1...0.32	193-EA1AB		193-EA2AB	
100-M05...100-C23	M	0.32...1.0	193-EA1CB		193-EA2CB	
100-M05...100-C23	M	1.0...2.9	193-EA1DB		193-EA2DB	
100-M05...100-C23	M	1.6...5.0	193-EA1EB		193-EA2EB	
100-M05...100-C23	M	3.7...12	193-EA1FB		193-EA2FB	
100-C09...100-C23	M	12...32	193-EA1GB		193-EA2GB	
100-C30...100-C37	M	12...37	193-EA1HC		193-EA2HC	
100-C43	M	14...45	193-EA1JD		193-EA2JD	
100-C60...100-C85	M	26...85	193-EA1KE		193-EA2KE	
<b>Manual Reset for 1Ø Applications</b>						
100-M05...100-C23	M	2.0...7.0	193-ES1AB		193-ES2AB	
100-M05...100-C23	M	5.0...15	193-ES1BB		193-ES2BB	
100-C09...100-C23	M	12...32	193-ES1CB		193-ES2CB	
100-C30...100-C37	M	12...37	193-ES1DC		193-ES2DC	
100-C43	M	14...45	193-ES1FD		193-ES2FD	
100-C60...100-C85	M	26...85	193-ES1HE		193-ES2HE	

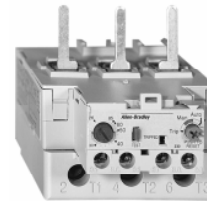
**Bulletin 193-EA/193-ES Electronic Motor Protection Relays - Automatic/Manual Reset**



Cat. No. 193-EA4GB



Cat. No. 193-EA4JD

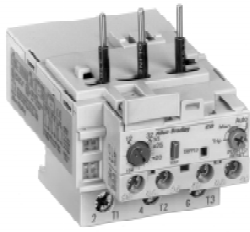


Cat. No. 193-EA4KE

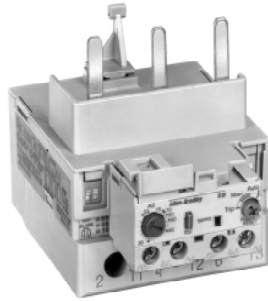
Mounts to Contactor	Reset	Adjustment Range (A)	Trip Class 10		Trip Class 20	
			Cat. No.	*	Cat. No.	*
<b>Automatic/Manual Reset for 3Ø Applications</b>						
100-M05...100-C23	A	0.1...0.32	193-EA4AB		193-EA5AB	
100-M05...100-C23	A	0.32...1.0	193-EA4CB		193-EA5CB	
100-M05...100-C23	A	1.0...2.9	193-EA4DB		193-EA5DB	
100-M05...100-C23	A	1.6...5.0	193-EA4EB		193-EA5EB	
100-M05...100-C23	A	3.7...12	193-EA4FB		193-EA5FB	
100-C09...100-C23	A	12...32	193-EA4GB		193-EA5GB	
100-C30...100-C37	A	12...37	193-EA4HC		193-EA5HC	
100-C43	A	14...45	193-EA4JD		193-EA5JD	
100-C60...100-C85	A	26...85	193-EA4KE		193-EA5KE	
<b>Automatic/Manual Reset for 1Ø Applications</b>						
100-M05...100-C23	A	2.0...7.0	193-ES4AB		193-ES5AB	
100-M05...100-C23	A	5.0...15	193-ES4BB		193-ES5BB	
100-C09...100-C23	A	12...32	193-ES4CB		193-ES5CB	
100-C30...100-C37	A	12...37	193-ES4DC		193-ES5DC	
100-C43	A	14...45	193-ES4FD		193-ES5FD	
100-C60...100-C85	A	26...85	193-ES4HE		193-ES5HE	

**Bulletin 193-EB Electronic Motor Protection Relays**

Automatic/Manual Reset, Adjustable Trip Class 10, 15 or 20, Jam/Stall and Ground Fault Tripping.



Cat. No. 193-EB1AB



Cat. No. 193-EB1NE

Mounts to Contactor	Reset ①	Adjustment Range (A)	Cat. No.	*
100-C09...100-C23	A	0.1...0.32	193-EB1AB	
100-C09...100-C23	A	0.32...1.0	193-EB1CB	
100-C09...100-C23	A	1.0...2.9	193-EB1DB	
100-C09...100-C23	A	1.6...5.0	193-EB1EB	
100-C09...100-C23	A	3.7...12	193-EB1FB	
100-C09...100-C23	A	12...32	193-EB1GB	
100-C30...100-C37	A	14...45	193-EB1JC	
100-C43	A	5.0...15	193-EB1SD	
100-C43	A	14...45	193-EB1JD	
100-C60...100-C85	A	23...75	193-EB1ME	
100-C60...100-C85	A	60...85	193-EB1NE	

① Ground Fault Tripping is inhibited for approximately 30 seconds to eliminate the possibility of nuisance tripping during motor starting.









Accessories — Page 33  
 Specifications — Page 34  
 Dimensions — Page 37

**Allen-Bradley**

\* Prices – Consult Sales Office or price list

**Bulletin 193-E**  
**MCS-E Solid-State Overload Relays**  
**Accessories**

**Add-on Accessories**






	Description	For Use With	Pkg. Qty.	Cat. No.	*
	<b>DIN Rail/Panel Adapter</b> For separate mounting of the electronic motor protection relay, can be mounted to top-hat rail EN 50 02-35	193-EA__B	1	193-EPM1	
		193-ES__B		193-EPM1	
		193-EB__B		193-EPM2	
		193-EA__C		193-EPM1	
		193-ES__C		193-EPM1	
		193-EB__C		193-EPM2	
		193-E__D		193-EPM2	
		193-E__E		193-EPM3	
	<b>Anti-Tamper Shield</b> Provides protection against inadvertent adjustment of mode selector and full load current settings.	193-E all	1	193-BC4	
	<b>Current Adjustment Shield</b> Provides protection against inadvertent adjustment of the current setting.	193-E all	1	193-BC5	
	<b>Anti-Tamper Shield for DIP Switches</b>	193-EB__B 193-EB__C 193-EB__D	40	193-BC7	
	<b>Anti-Tamper Shield for DIP Switches</b>	193-EB__E	40	193-BC6	
	<b>Remote Reset Solenoid</b> For remote reset of electronic overload relays	193-E all	1	193-ER1⊗	
	<b>External Reset Button for Enclosed Devices</b> Metal construction IP66, non-illuminated with rod (Length: 142 mm, adjustment range 141...159 mm). Please consult push button catalog 800E for additional types.	193-E all	1	800ES-R611WTR08	
	<b>Labeling Material</b> Uniform labeling material for contactors, motor protection devices, timing relays and circuit breakers.  For Product Information and Ordering Information, see Bulletin 100-C.			-	-

⊗ **Voltage Suffix Code**  
**Available Coil Voltages** 12... 600V 50 Hz/12...600V 60 Hz  
**Standard Coil Voltages**






Voltage	24	48	110	115	120	220	220-230	240
50 Hz	J	-	D	-	-	A	F	-
60 Hz	J	-	-	-	D	-	-	A
DC	Z24	Z48	-	Z01	-	-	-	-

**Surcharge** for special voltages up to 20 pcs. (no surcharge for quantities greater than 20 pcs.)

### Main Circuits

MCS-E1	Cat. No. 193-E__B	Cat. No. 193-E__C	Cat. No. 193-E__D	Cat. No. 193-E__E
<b>MCS-E2</b>	-	<b>Cat. No. 193-EB__B, 193-EB__C, 193-EB__D</b>		<b>Cat. No. 193-EB__E</b>
<b>Rated Insulation Voltage <math>U_i</math></b>	[V]	690		
<b>Rated Impulse Strength <math>U_{imp}</math></b>	[kV]	6		
<b>Rated Operating Voltage <math>U_e</math></b>	[V]	690		
<b>Terminal Cross-Sections</b>				
Terminal Type		M4	M5	M8
Terminal Screws		M4	M5	M8
 Flexible with Wire End Ferrule	[mm <sup>2</sup> ]	1 x (1...4) 2 x (1...4)	1 x (2.5...16) 2 x (2.5...10)	1 x (4...35) 2 x (4...25)
 Solid Conductor Stranded	[mm <sup>2</sup> ]	1 x (1.5...6) 2 x (1.5...6)	1 x (2.5...25) 2 x (2.5...10)	1 x (4...50) 2 x (4...35)
Solid/Stranded Conductor	[AWG]	14...8	14...6	2
Recommended Torque	[Nm] [lb-in]	1.8 (16)	1.4 (12)	1.6 (14)
Pozidriv Screwdriver	Size	2		
Slotted Screwdriver	mm	1 x 6		
Hexagon Socket Size	SW [mm]	-		
		4		

### Control Circuits

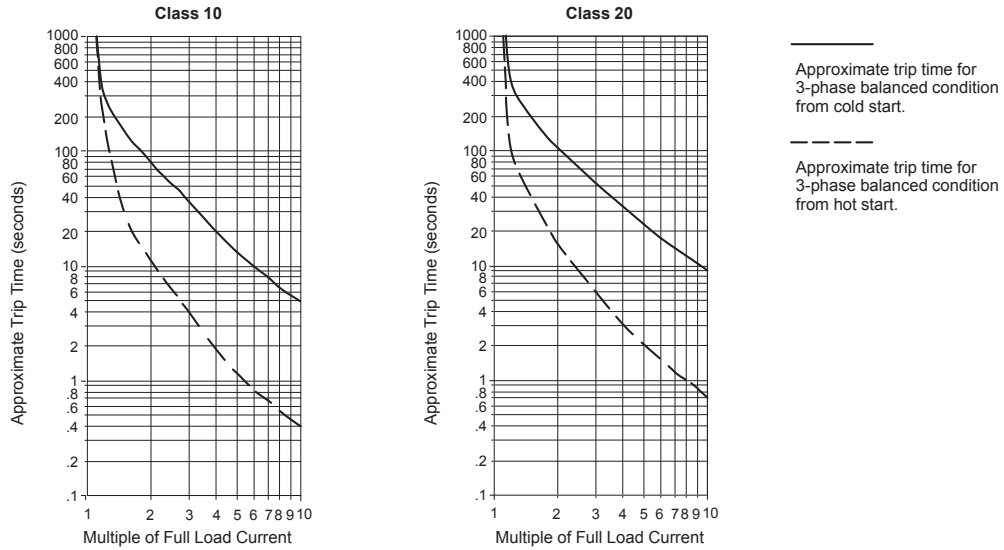
	Cat. No. 193-E__B	Cat. No. 193-E__C	Cat. No. 193-E__D	Cat. No. 193-E__E
<b>Rated Insulation Voltage <math>U_i</math></b>	[V]	600		
<b>Rated Impulse Strength <math>U_{imp}</math></b>	[kV]	6		
<b>Rated Operating Voltage <math>U_e</math></b>	[V]	600		
<b>Rated Operating Current <math>I_e</math></b>		N.O.  / N.C. 		
AC-15	12...120V [A] 220...240V [A] 380...480V [A] 500...600V [A]	3/2 1.5/1.5 0.75/0.75 0.6/0.6		
DC-13, at L/R ≤ 15ms	24V [A] 110V [A] 220V [A] 440V [A]	1.1/1.1 0.4/0.4 0.2/0.2 0.08/0.08		
<b>Conventional Thermal Current <math>I_{th}</math></b>	[A]	5		
<b>Terminal Cross-Sections</b>				
Terminal Type		M3.5		
Terminal Screws		M3.5		
 Flexible with Wire End Ferrule	[mm <sup>2</sup> ]	2 x (0.75...2.5)		
 Solid Conductor	[mm <sup>2</sup> ]	2 x (0.75...4)		
Solid/Stranded Conductor	[AWG]	18...12		
Recommended Torque	[Nm] [lb-in]	1.4 (12)		
Pozidriv Screwdriver	Size	2		
Slotted Screwdriver	mm	1 x 6		

**Bulletin 193-E**  
**MCS-E Solid-State Overload Relays**  
**Specifications, Continued**

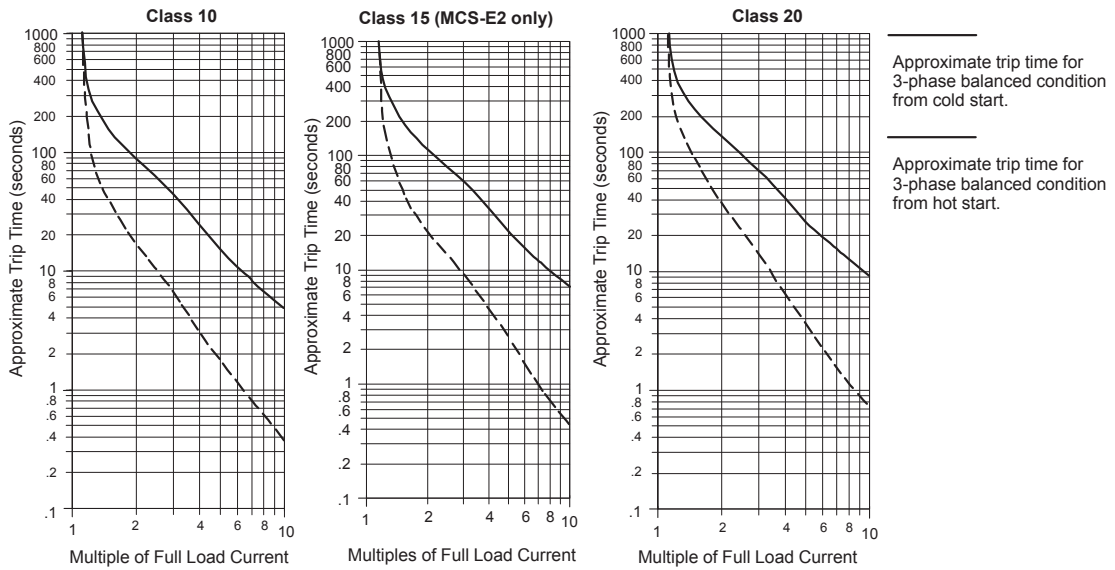
**General**

		Cat. No. 193-E__B	Cat. No. 193-E__C	Cat. No. 193-E__D	Cat. No. 193-E__E
<b>Weight</b>	[kg (lb)]	0.14 (0.31)	0.17 (0.37)	0.21 (0.46)	0.36 (0.84)
<b>Standards</b>		IEC 947, EN 60 947, DIN VDE 0660			
<b>Approvals</b>		CE, UL, CSA, PTB			
<b>Corrosion Resistance</b>		95% relative humidity, without condensation, 30...60°C			
<b>Ambient Temperature</b>					
open		-20...+60°C (-4...122°F)			
enclosed		-20...+40°C (-4...104°F)			
<b>Temperature Compensation</b>		Continuous			
<b>Shock Resistance</b>					
(10ms sinusoidal shock)	[G]	30			
<b>Type of Protection</b>					
(in connected state)		IP2LX			

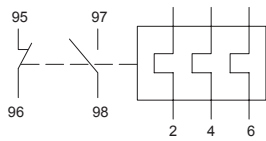
**Trip Curves for 1Ø Applications (193-ES)**



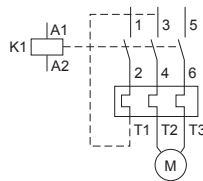
**Trip Curves for 3Ø Applications (193-EA/EB)**



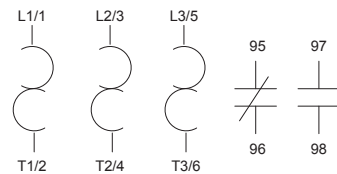
**Wiring Schematic**



Typical IEC Wiring Schematic



Typical Wiring for 1 Phase Applications

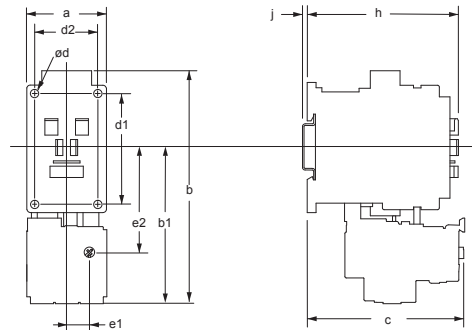


Typical NEMA Wiring Schematic

**Bulletin 193-E**  
**MCS-E Solid-State Overload Relays**  
**Approximate Dimensions**

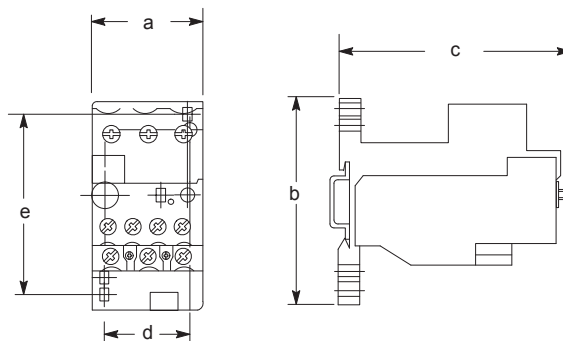
Dimensions are shown in millimeters (inches). Dimensions are not intended for manufacturing purposes.

**Mounts to Contactor 100-C**



Contactor Cat. No.	a Width	b Height	b1	c Depth	e1	e2	d1	d2	h	j	Ød
100-M05 with 193-EA or -ES	45 (1-25/32)	107 (4-13/64)	83 (3-17/64)	66.6 (2-5/8)	-	50 (1-61/64)	50 (1-61/64)	-	48.2 (1-29/32)	2 (5/64)	Two Ø 4.2 (Two 11/64 Ø)
100-C09, -C12 -C16, -C23 with 193-EA or -ES	45 (1-25/32)	131 (5-11/64)	86 (3-25/64)	88.5 (3-1/2)	16.5 (21/32)	69 (3-25/32)	60 (2-23/64)	35 (1-3/8)	86.5 (3-13/32)	2 (5/64)	Two Ø 4.2 (Two 11/64 Ø)
100-C09, -C12 -C16, -C23 with 193-EB	54 (2-1/8)	137 (5-3/8)	97 (3-13/16)	90.7 (3-37/64)	5.1 (13/64)	59 (2-23/64)	60 (2-23/64)	35 (1-3/8)	85.1 (3-23/64)	2 (5/64)	Two Ø 4.2 (Two 11/64 Ø)
100-C30, -C37 with 193-EA or -ES	45 (1-25/32)	136.5 (5-3/8)	91.5 (3-39/64)	92 (3-39/64)	16.5 (21/32)	69 (2-23/32)	60 (2-23/64)	35 (1-3/8)	104 (4-1/8)	2 (5/64)	Two Ø 4.2 (Two 11/64 Ø)
100-C30, -C37 with 193-EB	54 (2-1/8)	137 (5-3/8)	97 (3-13/16)	92.1 (3-5/8)	5.2 (13/64)	59 (2-23/64)	60 (2-23/64)	35 (1-3/8)	104.7 (4-1/8)	2 (5/64)	Two Ø 4.2 (Two 11/64 Ø)
100-C43 with 193-EA, -ES or -EB	54 (2-1/8)	136.5 (5-3/8)	91.5 (3-39/64)	93 (3-21/32)	22 (7/8)	69 (2-23/32)	60 (2-23/64)	45 (1-49/64)	107 (4-7/32)	2 (5/64)	Two Ø 4.2 (Two 11/64 Ø)
100-C60, -C72, -C85 with 193-EA, -ES or -EB	72 (2-53/64)	188.5 (7-27/64)	120 (4-23/32)	120 (4-23/32)	18 (23/32)	84.5 (3-21/64)	100 (3-15/16)	55 (2-11/64)	125.5 (4-15/16)	2 (5/64)	Four Ø 5.5 (Four 7/32 Ø)

**Individual Mounting with Relay Base**



Cat. No.	a Width	b Height	c Depth	d	e
193-EPM1	45 (1-25/32)	90 (3-35/64)	75 (2-61/64)	30 (1-3/16)	75 (2-61/64)
193-EPM2	55 (2-11/64)	90 (3-35/64)	96.5 (4-29/32)	40 (1-37/64)	75 (2-61/64)
193-EPM3	70 (2-49/64)	115 (4-17/32)	110 (4-11/32)	55 (2-11/64)	105 (4-9/64)