

NEMA AC Contactor and Starter Specifications

Bulletin Numbers 300, 305, 309

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

















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/literature/>. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.



Coil Type : Conventional Electronic — EI			NEMA Size						
			0	1	2	3	4		5
			X	X	X	X	X	—	—
Resistance and Power Dissipation									
Main current circuit resistance	[mΩ]	2.7	2	1.5	0.9	0.42	0.42	0.18	
Power dissipation by all circuits at I_e AC-3/400V	[W]	2.1	8.2	8.3	19.5	40.8	40.8	48.6	
Total power dissipation									
At I_e AC-3/400V	AC	[W]	4.7	11.2	11.5	17.5	50.8	46.8	54.6
	DC	[W]	8.1	17.4	18.4	17.5	48.8	46.8	54.6
Lifespan									
Mechanical AC control	[Mil. operations]	13	13	12	10	10	10	10	
Mechanical DC control	[Mil. operations]	13	13	13	10	10	10	10	
Electrical AC-3 (400 V)	[Mil. operations]	1.3	1.3	1	1	1	1	1	

Coil Type : Conventional Electronic — EI			NEMA Size					
			0	1	2	3	4	5
			X	X	X	X	—	—
Conductor Cross Sections - Main Contacts								
Terminal type			★	‡	‡	§	§	
	(1) conductor	[mm ²]	1...4	2.5...10	2.5...16	2.5...35	—	—
	(2) conductors	[mm ²]	1...4	2.5...10	2.5...10	2.5...25	—	—
	(1) conductor	[mm ²]	1.5...6	2.5...16	2.5...25	2.5...50	—	—
	(2) conductors	[mm ²]	1.5...6	2.5...16	2.5...16	2.5...35	—	—
	b max.	[mm]	—	—	—	—	25	30
	c max.	[mm]	—	—	—	—	12.5	15
	s max.	[mm]	—	—	—	—	5	6
	Ø min.	[mm]	—	—	—	—	8.3	10.5
Recommended torque	[N•m]	1.5...2.5	2.5...3.5	2.5...3.5	3.5...6	22	43	
Cross section per UL/CSA	[AWG]	16...10	14...4	14...4	14...1	—	—	
Recommended torque	[lb-in]	13.3...22	22...31	22...31	31...53	195	380	
With terminal lug kit			—	—	—	—	100-DL180§	100-DL420§
Cross section per UL/CSA	[AWG]	—	—	—	—	6...300 MCM	(2x) 4...350 MCM	
Recommended torque	[lb-in]	—	—	—	—	250	250	
With Frame Terminal Block			—	—	—	—	100-DTB180§	100-DTB420★
	top opening	[mm ²]	—	—	—	—	16...35	25...240△
	bottom opening	[mm ²]	—	—	—	—	16...95	25...240
	top opening	[mm ²]	—	—	—	—	16...50	25...300
	bott. opening	[mm ²]	—	—	—	—	16...120	25...300
	b max.	[mm ²]	—	—	—	—	20	25
	s top	[mm ²]	—	—	—	—	3...9	4...20
	s bottom	[mm ²]	—	—	—	—	3...14	4...20
Recommended torque	[N•m]	—	—	—	—	14	25	
Cross section per UL/CSA top	[AWG]	—	—	—	—	6...1 / 0 AWG	4 AWG...600 MCM	
bottom	[AWG]	—	—	—	—	6 AWG...250 MCM	4 AWG...600 MCM	
Recommended torque	[lb-in]	—	—	—	—	124	220	

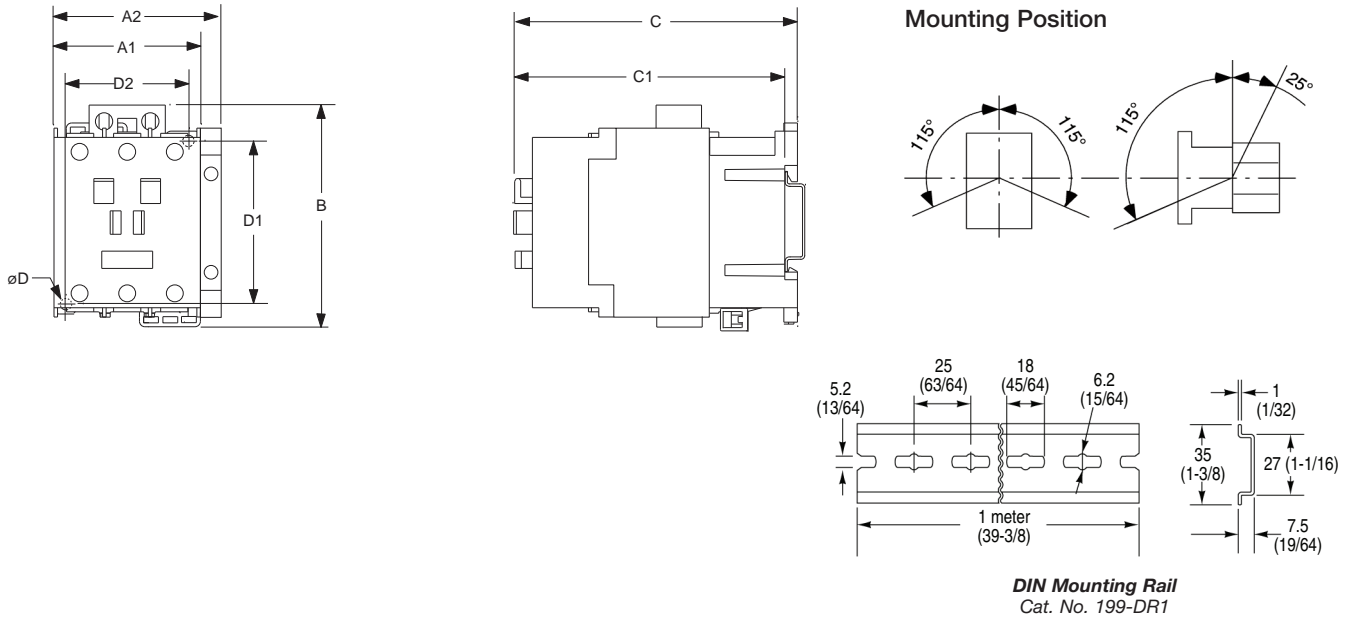
★ Pozidriv No. 2/Blade No. 3 screw
 ‡ Pozidriv No. 2/Blade No. 4 screw
 § Hexagonal socket screw
 ♣ Hexagonal screw
 △ 25...95 mm² with sleeve per DIN 46228

Coil Type			NEMA Size					
			0	1	2	3	4	5
			Conventional X	Conventional X	Conventional X	Conventional X	Electronic — EI —	Electronic — EI —
Operating Limits								
50 Hz, 60 Hz, 50/60 Hz	pick-up	[x Us]	0.85...1.1		0.85...1.1		0.85...1.1	
	dropout	[x Us]	0.3...0.6		0.3...0.6		0.3...0.5	
DC (conventional)	pick-up	[x Us]	0.8...1.1		0.8...1.1		0.85...1.1	
	dropout	[x Us]	0.1...0.6		0.1...0.6			
DC (electronic)	pick-up	[x Us]	0.7...1.25			—	0.3...0.5	
	dropout	[x Us]	0.4			—		
Coil Consumption								
50 Hz, 60 Hz, 50/60 Hz	pick-up	[VA/W]	70/50	80/60	130/90	200/110	380/240★	
	hold-in	[VA/W]	8/2.6	9/3	10/3.2	16/4.5	13/6	
DC (conventional)	pick-up	[W]	6.5	9.2	10.1	200	—	
	hold-in	[W]	6.5	9.2	10.1	4.5		
DC (electronic)	pick-up	[W]	17	17	10.1	—	265★	
	hold-in	[W]	1.7	1.7	10.1	—	6	
Operating Times								
AC	closing delay	[ms]	15...30	15...30	15...30	20...40	20...45	
	opening delay	[ms]	10...60	10...60	10...60	10...60	25...110	
With RC module	opening delay	[ms]	10...60	10...60	10...60	10...60	—	
DC (conventional)	closing delay	[ms]	40...70	50...80	50...80	20...40	25...50	
	opening delay	[ms]	7...15	7...15	7...15	—	35...110	
With integ. diode	opening delay	[ms]	14...20	17...23	17...23	≤ 220V 20...35	—	
With external diode	opening delay	[ms]	70...95	80...125	80...125	—	—	
DC (electronic)	closing delay	[ms]	—	20...40		—	25...50	
	opening delay	[ms]	—	20...40		—	35...110	
Max. Ripple			± 15%			—	—	
Min. OFF time			200			—	—	

★ Electronic coil drives are designed to minimize power requirements, but this control may exhibit a higher inrush (540 W, < 10 ms) when energizing. This must be taken into account for the proper sizing of supply devices, all-or-nothing relays and cross-sections of coil supply lines. Please contact your local Rockwell Automation sales office or Allen-Bradley distributor for detailed information.

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

Bulletin 300 Contactors and Accessories



AC Contactors

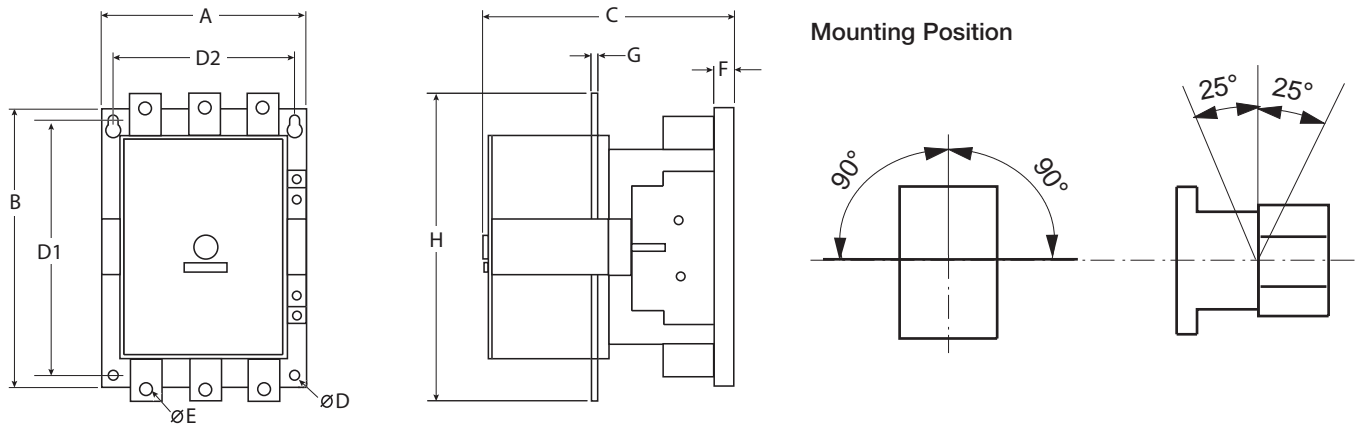
Cat. No.	NEMA Size	A1	A2	B	C	C1	Mounting Dimensions		
							ØD	D1	D2
300-AO_	0	1.76 (45)	—	3.19 (81)	3.39 (86)	3.19 (81)	0.17 (4.5)	2.36 (60)	1.38 (35)
300-BO_	1	—	2.12 (54)	3.19 (81)	4.06 (103)	3.86 (98)	0.17 (4.5)	2.36 (60)	1.38 (35)
300-CO_	2	—	2.48 (63)	3.19 (81)	4.17 (106)	3.98 (101)	0.17 (4.5)	2.36 (60)	1.77 (45)
300-DO_	3	—	3.19 (81)	4.80 (122)	4.80 (122)	4.61 (117)	0.22 (5.4)	3.94 (100)	2.17 (55)

Accessories

Contactors with		in. (mm)
Auxiliary contact block for front mounting	2- or 4-pole	C/C1 + 1.54 (39)
Auxiliary contact block for side mounting	1- or 2-pole	A + 0.35 (9)
Pneumatic Timing Module		C/C1 + 2.28 (58)
Electronic Timing Module	on coil terminal side	B + 0.94 (24)
Mechanical Interlock	on side of contactor	A + 0.35 (9)
Mechanical Latch		C/C1 + 2.40 (61)
Interface Module	on coil terminal side	B + 0.35 (9)
Surge Suppressor	on coil terminal side	B + 0.12 (3)
Labeling with:	label sheet marking tag sheet with clear cover marking tag adapter for System V4/V5 marking tag adapter for System Bul. 1492W	+ 0 + 0 + 0.22 (5.5) + 0.22 (5.5)

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

Bulletin 300 Contactors and Accessories, Continued



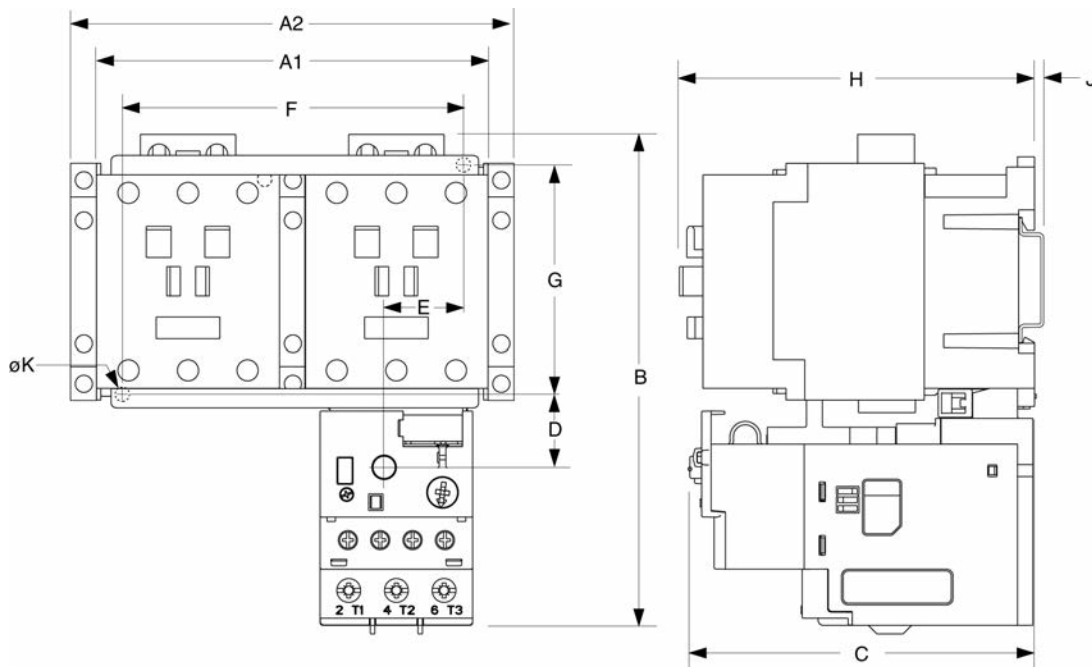
Cat. No.	NEMA Size	A	B	C	Mounting Dimensions			ØE	F	G	H
					ØD	D1	D2				
300-EO_	4	4.72 (120)	6.69 (170)	6.14 (156)	0.21 (5.2)	5.71 (145)	3.94 (100)	0.34 (8.5)	0.59 (15)	0.157 (4)	7.17 (182)
300-FO_	5	6.10 (155)	8.07 (205)	7.09 (180)	0.26 (6.5)	7.09 (180)	5.12 (130)	0.41 (10.4)	0.59 (15)	0.236 (6)	8.74 (222)

Contactors with		in. (mm)
Auxiliary contact block★	100-DS1_	A
	100-DS2_	A + 0.53 (13.5) each
Mechanical Interlock	100-DM...	A + A
Frame terminal block	100-DTB110	B + 0.28 (7) each
	100-DTB180	B + 0.28 (7) each
	100-DTB420	B + 0.33 (8.5) each
Label holder		C + 0.20 (5) each

★ Conventional DC coil contactors will accept only Cat. No. 100-DS2_ auxiliary contacts.

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

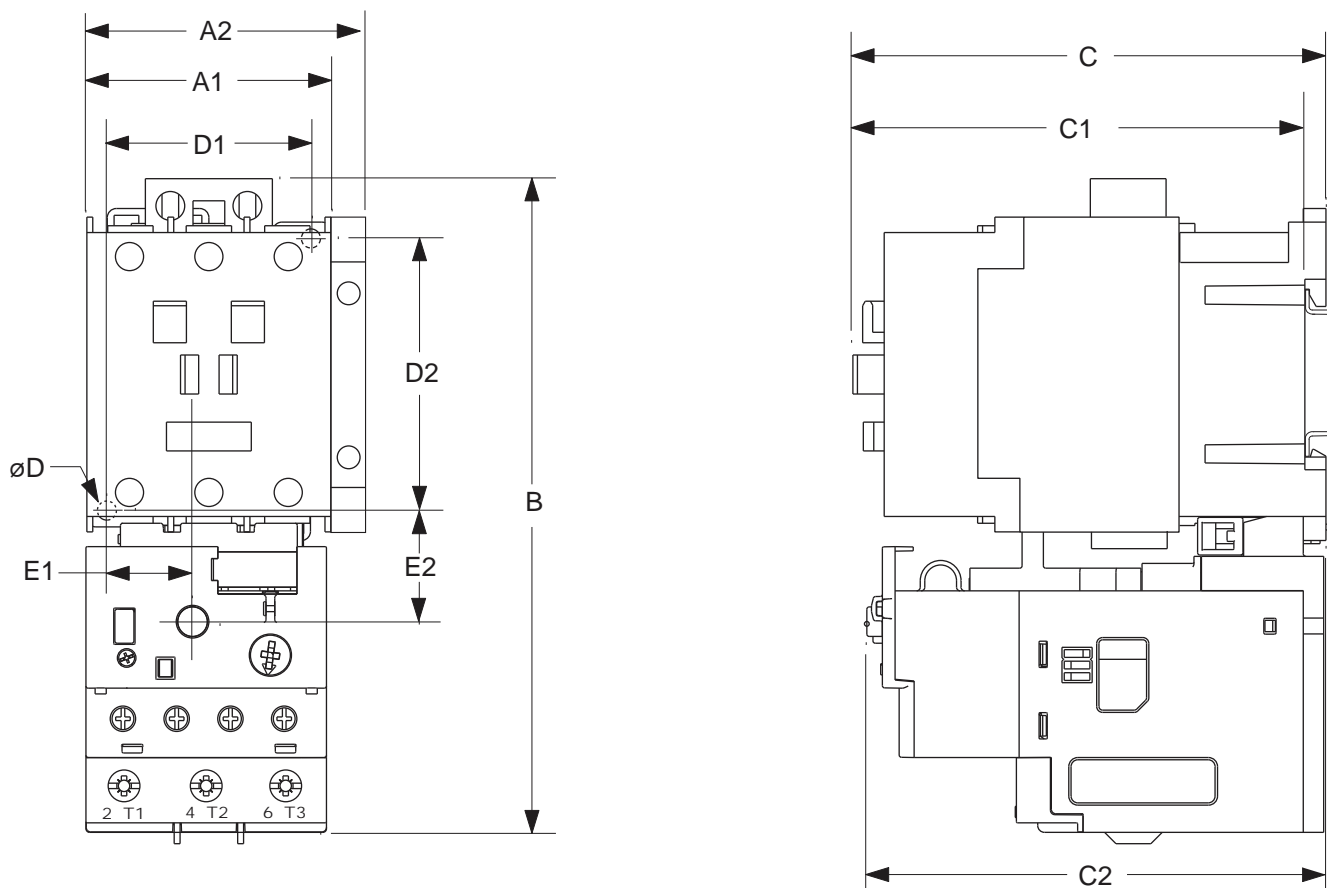
Bulletin 305 with E1 Plus Solid-State Overload Relay



Cat. No.	A1	A2	B	C	D	E	F	G	H	J	ØK
305-AO	3.9 (99)	—	5.77 (147)	3.35 (85.2)	0.96 (24.5)	0.83 (21.1)	3.54 (90)	2.36 (60)	3.4 (86.5)	0.08 (2)	0.17 (4.5)
305-BO	—	4.61 (117)	5.77 (147)	3.98 (101)	0.96 (24.5)	0.83 (21.1)	3.54 (90)	2.36 (60)	4.09 (104)	0.08 (2)	0.17 (4.5)
305-CO	—	4.61 (117)	5.77 (147)	3.98 (101)	0.96 (24.5)	0.83 (21.1)	3.54 (90)	2.36 (60)	4.09 (104)	0.08 (2)	0.17 (4.5)

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

Bulletin 309 with E1 Plus Solid-State Overload Relay

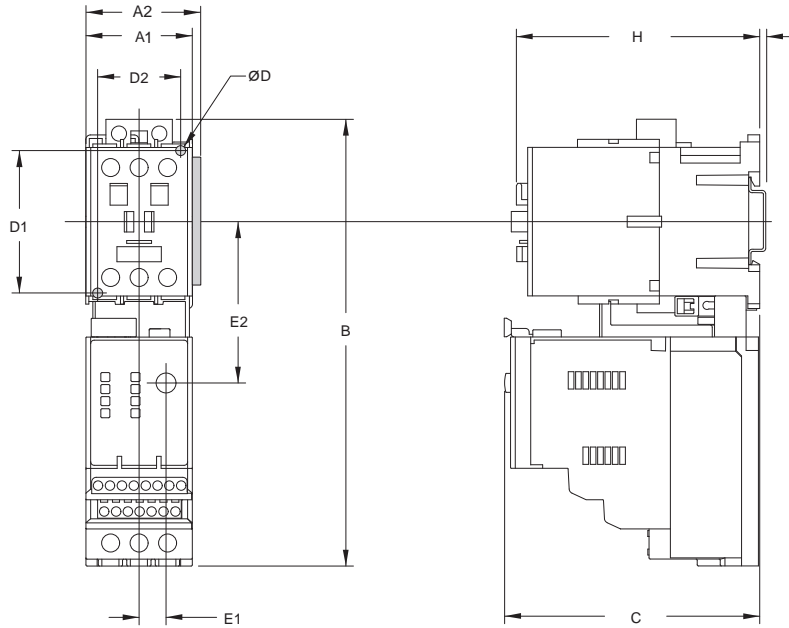


Cat. No.	NEMA Size	A1	A2	B	C	C1	C2	Mounting Dimensions			Reset Location	
								ØD	D1	D2	E1	E2
193★-EE_B	0	1.76 (45)	—	5.77 (147)	3.39 (86)	3.19 (81)	3.35 (85)	0.17 (4.5)	2.36 (60)	1.38 (35)	2.36 (60)	1.38 (35)
193★-EE_D	1	—	2.12 (54)	5.77 (147)	4.06 (103)	3.86 (98)	3.98 (101)	0.17 (4.5)	2.36 (60)	1.38 (35)	2.36 (60)	1.38 (35)
193★-EE_D	2	—	2.48 (63)	5.77 (147)	4.17 (106)	3.98 (101)	3.98 (101)	0.17 (4.5)	2.36 (60)	1.77 (45)	2.36 (60)	1.77 (45)
193★-EE_E	3	—	3.19 (81)	7.58 (192)	4.80 (122)	4.61 (117)	4.74 (120)	0.22 (5.4)	3.94 (100)	2.17 (55)	3.94 (100)	2.17 (55)

★ Valid for Bulletin Nos. 193, 193R, and 193S.

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

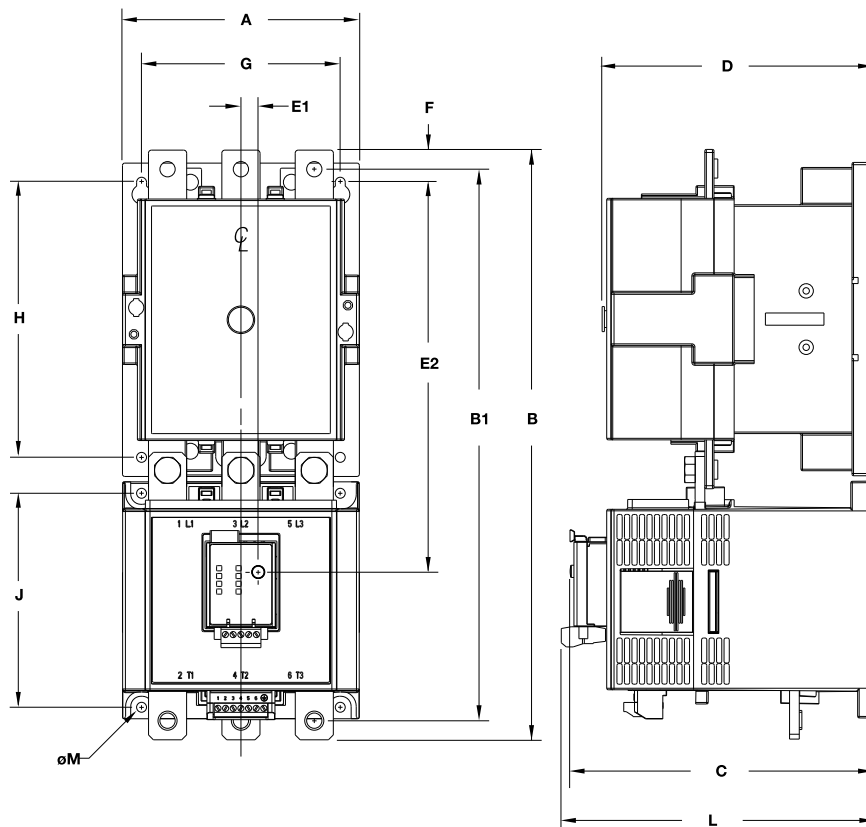
Bulletin 309 with E3, E3 Plus Solid-State Overload Relay



Overload Cat. No.	NEMA Size	A1	A2	B Height		B1	C Depth	ØD	D1	D2	E1	E2	H	J
				without 193- EIMD	with 193- EIMD									
193-EC_B	0	1.76 (45)	—	7.40 (188)	8.19 (208)	5.71 (145)	4.21 (107)	0.17 (4.5)	2.36 (60)	1.38 (35)	0.43 (11)	2.68 (68)	3.35 (85)	0.08 (2)
193-EC_D	1	—	2.12 (54)	7.40 (188)	8.19 (208)	5.71 (145)	4.21 (107)	0.17 (4.5)	2.36 (60)	1.38 (35)	0.43 (11)	2.68 (68)	4.09 (104)	0.08 (2)
193-EC_D	2	—	2.48 (63)	7.40 (188)	8.19 (208)	5.71 (145)	4.21 (107)	0.17 (4.5)	2.36 (60)	1.38 (35)	0.43 (11)	2.68 (68)	4.09 (104)	0.08 (2)
193-EC_E	3	—	3.19 (81)	9.29 (236)	10.1 (256)	6.81 (173)	4.92 (125)	0.22 (5.4)	3.94 (100)	2.17 (55)	0.43 (11)	3.54 (90)	4.96 (126)	0.08 (2)

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

Bulletin 309 with E3, E3 Plus Solid-State Overload Relay



Overload Cat. No.	NEMA Size	A Width	B Height		B1	C Depth	D	E1	E2
			without Terminal Covers	with Terminal Covers					
193-EC_F 193-EE_F	4	4.72 (120)	13.4 (340)	16.5 (418)	12.5 (318)	6.89 (175)	6.14 (156)	0.43 (11)	8.50 (216)
		4.72 (120)	13.4 (340)	16.5 (418)	12.5 (318)	6.01 (153)	6.14 (156)	0.14 (3.6)	8.91 (226)
193-EC_G 193-EE_G	5	6.10 (155)	15.2 (386)	19.2 (487)	14.2 (361)	7.83 (199)	7.09 (180)	0.43 (11)	10.0 (255)
		6.10 (155)	15.2 (386)	19.2 (487)	14.2 (361)	6.95 (177)	7.09 (180)	0.14 (3.6)	10.44 (265)

Overload Cat. No.	NEMA Size	F	G	H	J	L	M
193-EC_F 193-EE_F	4	0.63 (16)	3.94 (100)	5.71 (145)	5.31 (135)	7.13 (181)	0.21 (5.2)
193-EC_G 193-EE_G	5	0.83 (21)	5.12 (130)	7.09 (180)	5.51 (140)	8.07 (205)	0.26 (6.5)

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.

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