

Control and Load Switch Specifications

Bulletin Number 194E, 194L

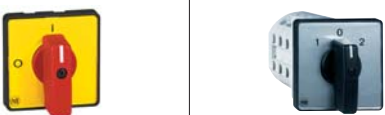
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Additional Resources

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.

		
	Bulletin 194E	Bulletin 194L
Product Type	Inductive load-rated load switch	Inductive load-rated control/load switch
Current Range	16...315 A	12...40 A
Main Applications	UL, CSA ratings "suitable as at-motor disconnect"	UL, CSA ratings "suitable as at-motor disconnect"
Functionality	3- or 6-pole switch configurations for OFF-ON or changeover applications (16...100 A switches) 3- or 4-pole switch configurations for OFF-ON or changeover applications (125...315 A switches)	1- to 6-pole multifunction switch control configurations for OFF-ON, changeover, Star-Delta (Wye-Delta), reversing, ammeter, voltmeter, and step switch applications - Also available in custom control configurations up to 16 circuits for any unique control switching application.
Mounting Styles	Front/door or base/DIN Rail mounting	Front/door or base/DIN Rail mounting
Handles	- Handle colors in grey/black and red/yellow and padlockable versions - Legend plates available in 0-I international markings and text styles	- Uniformly styled handles: selector knob, disk style, rectangular style, and key-operated versions (Type 1/12/3R, IP66) - Handle colors in grey/black and red/yellow and padlockable versions - Legend plates available in 0-I international markings and text styles
Open Switch or Enclosed	- Open switch (large frame Bul. 194E — open style only) - Enclosed: IP66 thermoplastic enclosure or UL/CSA rated enclosure	Open switch
UL/CSA Electrical Ratings: Rated Voltage U_e	600V AC	600V AC
Rated Current I_e	16...315 A @ 600V	12...40 A @ 600V
Rated Power P_e [FLA]	Varies w/ 1- or 3-phase switch, voltage	Varies w/ 1- or 3-phase switch, voltage
Short-Circuit Ratings	5 kA	5 kA
Switching Rate [ops/h]	120	120
Mechanical Life [ops]	0.2 million (16...100 A switches) 0.1 million (125 A and 160 A switches) 0.075 million (250 A and 315 A switches)	1 million
IEC Rated Current I_e		
AC-1	16...315 A @ 600V	12...40 A @ 600V
AC-21A	16...315 A @ 600V	12...40 A @ 600V
AC-22A	16...315 A @ 600V	12...40 A @ 600V
Ambient Operational Temp.	-25...+60 °C (-13...+140 °F)	-25...+60 °C (-13...+140 °F)
Ambient Enclosed Temp.	-20...+60 °C (-4...+140 °F)	-20...+60 °C (-4...+140 °F)
Ambient Storage Temp.	-40...+80 °C (-40...+176 °F)	-40...+80 °C (-40...+176 °F)
Protection class per IEC 529	Switch bodies: IP2	Switch bodies: IP2
Optional Accessories	- IP66 handles - Multi-length shafts and shaft extension kits - Terminal covers	- IP66 handles - Multi-length shafts and shaft extension kits - Terminal covers
Standards/Certifications	- UL 508 - CSA C22.2, No. 14 - IEC 60947-3 Low Voltage Switchgear and Controlgear part 3 - CE	- UL 508 - CSA C22.2, No. 14 - IEC 60947-3 Low Voltage Switchgear and Controlgear part 3 - CE

Electrical Ratings

Performance Data				16 A	25 A	32 A	40 A	63 A	80 A	100 A	Aux. Contacts	
IEC Applications												
Rated operational voltage (U_e): IEC ★				[V]	690	690	690	690	690	690	690	
Rated operational voltage (U_e): UL, CSA				[V]	600	600	600	600	600	600	600	
Rated isolation voltage (U_i): IEC/UL, CSA				[V]	690/600	690/600	690/600	690/600	690/600	690/600	690/600	
Rated impulse voltage (U_{imp}): UL, CSA				[kV]	8	8	8	8	8	8	8	
Test voltage, (U_i) 1 minute				[kV]	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
Lost power per pole				[W]	0.58	1.0	1.5	1.6	2.4	3.6	5.5	
Rated frequency				[Hz]	50/60	50/60	50/60	50/60	50/60	50/60	50/60	
Conventional free air thermal current I_{th} ★				[A]	25	40	50	63	75	100	120	
Conventional enclosed thermal current I_e ★				[A]	20	32	40	50	63	80	100	
Rated current I_e ★												
AC-1/	Non-inductive or only slightly inductive loads			[A]	16	25	32	40	63	80	100	
AC-21A	Switching of resistive loads with slight overload											
Rated power P_e												
AC-23A	Occasional switching of 3Ø motors and other highly inductive loads (criterion for selecting main switches)	230V	[kW]	5.5	7.5	7.5	15	18.5	22	30	—	
		400V	[kW]	7.5	11	15	22	30	37	55	—	
		690V	[kW]	7.5	11	15	18.5	22	37	45	—	
AC-3	Squirrel-cage motors; starting and stopping of running motors	230V	[kW]	4	5.5	7.5	11	15	18.5	22	—	
		400V	[kW]	5.5	7.5	11	15	18.5	30	37	—	
		690V	[kW]	5.5	7.5	11	15	18.5	30	22	—	
Short circuit current (co-ordination type 2)			[kA]	20	20	15	20	15	30	25	—	
Rated conditional short-circuit current			[A]	20	25	35	50	63	80	100	—	
Maximum fuse rating of circuit (type g,G)			[A]	800	900	900	1300	1300	2500	2500	—	
Rated short-time current I_{cw} (1 s)												
Rated breaking capacity AC23A (cosφ 0.45)		230V	[A]	156	296	296	484	484	780	780	—	
		400V	[A]	120	256	256	504	504	800	800	—	
		690V	[A]	70	136	136	196	196	376	376	—	
DC switching capacity												
Rated current I_e	1 pole	24/48V	[A]	20	25	32	40	63	80	100	—	
		110V	[A]	5	5	6	8	10	16	20		
		220V	[A]	1	1	1	1.5	15	3	3		
		440V	[A]	0.5	0.5	0.5	0.6	0.6	0.7	0.7		
	DC-21A	2 poles in series	96V	[A]	20	25	32	40	63	80	100	—
110V			[A]	20	23	25	32	50	70	80		
220V			[A]	5	5	6	8	10	16	20		
440V			[A]	1	1	1	1.5	1.5	3	3		
3 poles in series		600V	[A]	0.6	0.6	0.6	0.8	0.8	1	1	—	
	110V	[A]	20	25	32	40	63	80	100			
	220V	[A]	13	13	15	20	28	50	63			
	440V	[A]	2.2	2.2	2.2	3.6	3.6	6.5	6.5			
		600V	[A]	1.3	1.5	1.5	2	2	3	3		
Rated power P_e												
DC-23A, DC-3, DC-5	3 poles in series	90V	[kW]	1	1.3	1.5	2.9	4.1	5.1	7.2	—	
		For inductive loads, T ≤ 15 ms										
		110V	[kW]	1	1.1	1.3	2.2	3.3	5.5	7		
		220V	[kW]	0.8	0.9	1.1	1.7	2	3.5	4.4		
		440V	[kW]	0.6	0.6	0.6	0.9	0.9	1.1	1.1		
		600V	[kW]	0.4	0.4	0.4	0.5	0.5	0.9	0.9		

★ See standards compliance listed on page 2-404.

Electrical Ratings, Continued

Performance Data			16 A	25 A	32 A	40 A	63 A	80 A	100 A	Aux. Contacts	
UL/CSA Applications											
Continuous current		[A]	16	25	32	40	63	80	100	—	
Heavy Pilot Duty		[AC]	A600	A600	A600	—	—	—	—	A600	
Standard Duty		[DC]	—	—	—	—	—	—	—	Q600	
Motor rating 60 Hz	120V, 1P	[FLA]	16	16	16	24	34	56	80	—	
		[Hp]	1	1	1	2	3	5	7.5		
240V, 1P	[FLA]	12	12	17	17	28	50	68			
	[Hp]	2	2	3	3	5	10	15			
480V, 1P	[FLA]	8.5	8.5	14	21	26	34	68			
	[Hp]	3	3	5	7.5	10	15	30			
600V, 1P	[FLA]	11.2	11.2	11.2	16	20	27	44			
	[Hp]	5	5	5	7.5	10	15	25			
Three-phase	120V, 3P	[FLA]	13.6	13.6	19.2	30.4	40	56	84		—
		[Hp]	2	2	3	5	7.5	10	15		
	240V, 3P	[FLA]	9.6	15.2	22	28	42	68	80		
		[Hp]	3	5	7.5	10	15	25	30		
	480V, 3P	[FLA]	11	14	21	27	34	52	65		
		[Hp]	7.5	10	15	20	25	40	50		
	600V, 3P	[FLA]	11	11	17	22	27	52	52		
		[Hp]	10	10	15	20	25	50	50		

Mechanical Data

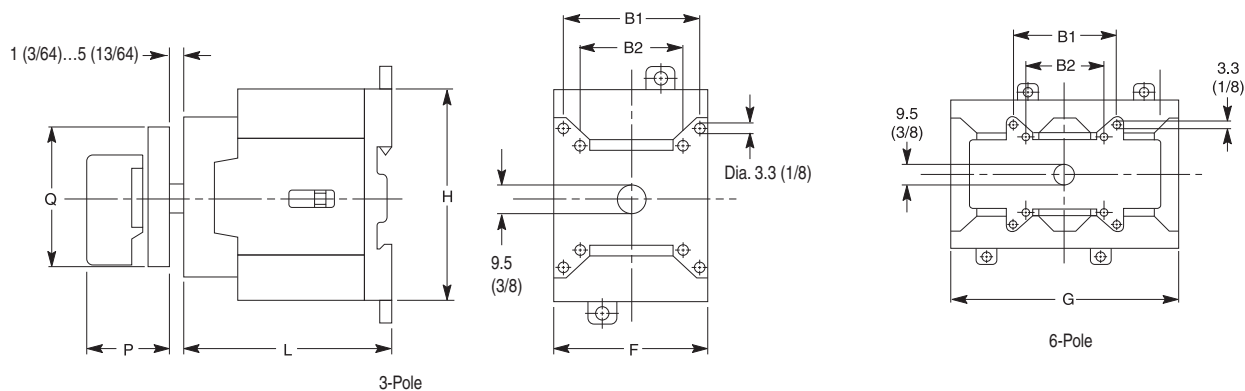
Performance Data			16 A	25...32 A	40...63 A	80...100 A	Aux. Contacts	
Protection class according to IEC 529								
Motor rating 60 Hz								
handles			IP66	IP66	IP66	IP66	IP66	
switch bodies			IP20	IP20	IP20	IP20	IP20	
Mechanical life	[million operations]		0.2	0.2	0.2	0.2	0.2	
Max wire gauges								
Terminal size per IEC 947-1			A4	A6	A7	A9	2xA2	
rigid wire	1/2 conductor	[AWG] [mm²]	(1)16...10/(2)16...12 (1)1...10/(2)1...4	(1)14...8/(2)14...10 (1)1.5...16/(2)1.5...6	(1)12...4/(2)12...8 (1)2.5...25/(2)2.5...16	(1)10...1/(2)10...4 (1)4...50/(2)4...25	18...14 0.75...2.5	
fine strands	1/2 conductor	[AWG] [mm²]	(1)16...8/(2)16...12 (1)1.5...6/(2)1.5...4	(1)14...8/(2)14...10 (1)1.5...10/(2)1...6	(1)12...4/(2)12...8 (1)2.5...16/(2)2.5...10	(1)10...1/(2)10...6 (1)4...35/(2)4...16	18...14 0.5...2.5	
Tightening torque			[N•m]/[lb•in]	1.4/12.2	1.4/12.2	2.8/24.5	5.6/50	1/8.8

Environmental Data

Storage	-40...+80 °C (-40...+176 °F)
Operation	-25...+60 °C (-13...+140 °F)

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

Front Installation Cat. No. 194E-E...



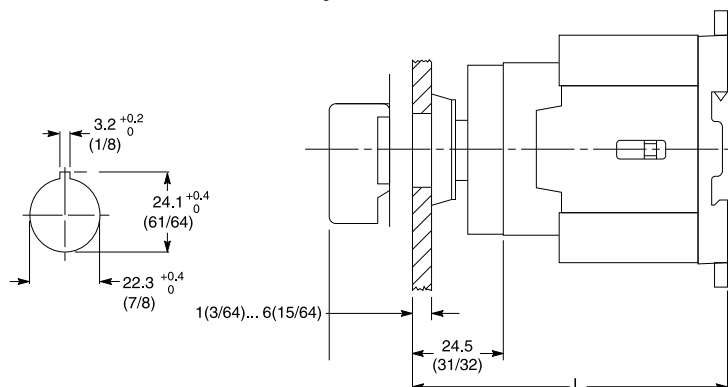
Handles		
Cat. No.	P	Q
194L-HE4A	28 (1-7/64)	48 x 48 (1-57/64 x 1-57/64)
194L-HE4I	28 (1-7/64)	48 x 48 (1-57/64 x 1-57/64)
194L-HE4S	28 (1-7/64)	48 x 62 (1-57/64 x 2-7/16)
194E-HE4N	34 (1-11/32)	54 x 54 (2-1/8 x 2-1/8)
194E-HE4G	34 (1-11/32)	54 x 54 (2-1/8 x 2-1/8)
194L-HE6A	28 (1-7/64)	64 x 64 (2-33/64 x 3-5/64)
194L-HE6I	28 (1-7/64)	64 x 64 (2-33/64 x 3-5/64)
194L-HE6S	28 (1-7/64)	64 x 78 (2-33/64 x 3-5/64)
194L-HE6N	34 (1-11/32)	67 x 67 (2-41/64 x 2-41/64)
194L-HE6G	34 (1-11/32)	67 x 67 (2-41/64 x 2-41/64)

Switch Body						
Use with Cat. No.	B1 ★	B2	F	H	L ‡	G
194E-E16	28 (1-7/64)	N/A	36 (1-37/64)	63 (2-31/64)	51 (2)	90 (3-35/64)
194E-E25/32	36 (1-27/64)	N/A	45 (1-25/32)	64 (2-33/64)	60 (2-3/8)	90 (3-1/2)
194E-E40/63	48 (1-57/64)	36 (1-27/64)	54 (2-1/8)	72 (2-27/32)	74 (2-29/32)	108 (4-1/4)
194E-E80/100	48 (1-57/64)	36 (1-27/64)	72 (2-27/32)	90 (3-35/64)	90 (3-35/64)	144 (5-11/16)

★ Does not apply to 194E-40/63A, 6-Pole Switches. Use B2 dimensions for 6-pole devices.

‡ For 6-pole switches, add 1 in. to the "L" dimension.

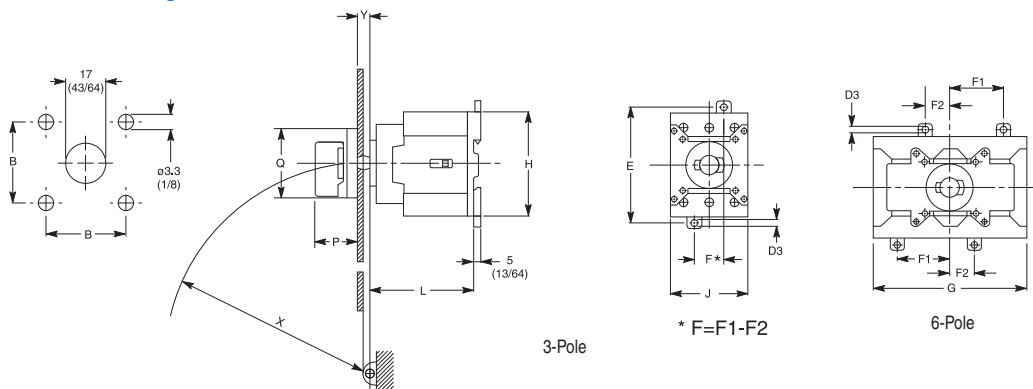
Cat. No. 194E-E Switch Body with Cat. No. 194L-HC4A Handle for 22.5 mm Hole Mounting Style



Type	L
194E-E16	76 (3)
194E-E25/32	84.5 (3-21/64)
194E-E40/63	98.5 (3-7/8)
194E-E80/100	114.5 (4-33/64)

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

Base Mounting Cat. No. 194E-A...



Handles		
Cat. No.	P	Q
194L-HE4A	28 (1-7/64)	48 x 48 (1-57/64 x 1-57/64)
194L-HE4I	28 (1-7/64)	48 x 48 (1-57/64 x 1-57/64)
194L-HE4S	28 (1-7/64)	48 x 62 (1-57/64 x 2-7/16)
194E-HE4N	34 (1-11/32)	54 x 54 (2-1/8 x 2-1/8)
194E-HE4G	34 (1-11/32)	54 x 54 (2-1/8 x 2-1/8)
194L-HE6A	28 (1-7/64)	64 x 64 (2-33/64 x 3-5/64)
194L-HE6I	28 (1-7/64)	64 x 64 (2-33/64 x 3-5/64)
194L-HE6S	28 (1-7/64)	64 x 78 (2-33/64 x 3-5/64)
194L-HE6N	34 (1-11/32)	67 x 67 (2-41/64 x 2-41/64)
194L-HE6G	34 (1-11/32)	67 x 67 (2-41/64 x 2-41/64)

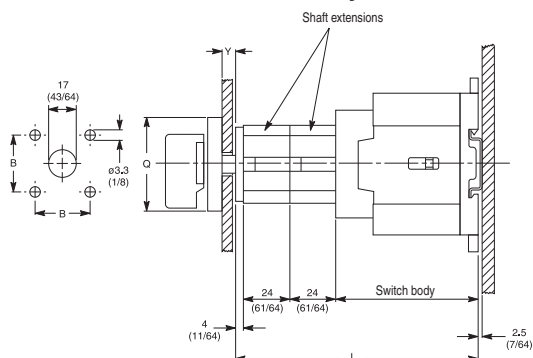
Cover Requirements				
For Use With	Y min.	X ≥	Y max.	X ≥
194E-A16	5 (13/64)	142 (5-19/32)	9.5 (3/8)	90 (3-35/64)
194E-A25/32	5 (13/64)	142 (5-19/32)	9.5 (3/8)	90 (3-35/64)
194E-A40/63	2.5 (7/64)	150 (5-29/32)	9.5 (3/8)	90 (3-35/64)
194E-A80/100	2.5 (7/64)	150 (5-29/32)	9.5 (3/8)	90 (3-35/64)

Switch Body								
Use With Cat. No.	D3	E	F1	F2	G	H	L†	J
194E-A16	4.5 (3/16)	70 (2-49/64)	45 (1-25/32)	12.5 (31/64)	90 (3-35/64)	63 (2-31/64)	80 (3-5/32)	36 (1-27/64)
194E-A25/32	4.5 (3/16)	70 (2-49/64)	30 (1-3/16)	15 (19/32)	90 (3-1/2)	64 (2-33/64)	59 (2-5/16)	45 (1-25/32)
194E-A40/63	4.5 (3/16)	80 (3-5/32)	37 (1-15/32)	17 (43/64)	108 (4-1/4)	72 (2-27/32)	73 (2-55/64)	54 (2-1/8)
194E-A80/100	5.6 (7/32)	95 (3-3/4)	48.5 (1-29/32)	23.5 (59/64)	144 (5-11/16)	90 (3-35/64)	89 (3-1/2)	72 (2-27/32)

† For 6-pole switches, add 1 in. to the "L" dimension.

Base Mounting Cat. No. 194E-A...

Cat. No. 194E-A... Switch Body with Cat. No. 194L-G2853 Shaft Extension



Switch Body				
L ★	Cat. No.			
	194E-A 16	194E-A 25/32	194E-A 40/63	194E-A 80/100
With 1 shaft extension	79 (3-7/64)	88 (3-15/32)	102 (4-1/32)	118 (4-21/32)
With 2 shaft extensions	103 (4-37/64)	112 (4-27/64)	126 (4-31/32)	142 (5-19/32)
With 3 shaft extensions	127 (5)	136 (5-23/64)	150 (5-29/32)	166 (6-35/64)
With 4 shaft extensions	151 (6-61/64)	160 (6-5/16)	174 (6-55/64)	190 (7-31/64)
With 5 shaft extensions	175 (7-57/64)	184 (7-1/4)	198 (7-51/64)	214 (8-7/16)
With 6 shaft extensions	199 (8-27/32)	208 (8-13/64)	222 (8-3/4)	238 (9-3/8)

★ For 6-pole switches, add 1 in. to the "L" dimension.

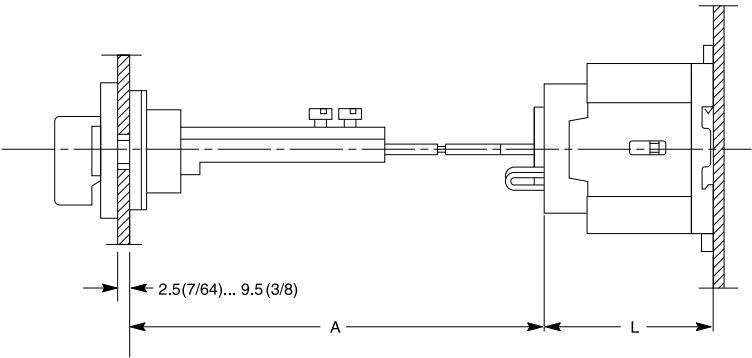
Shaft	Y
194L-G2830	2.5...9.5 (7/64...3/8)
194L-G3194	9...18 (23/64...23/32)
194L-G3195	14...23 (9/16)...(29/32)

Handles			
Type	B	Q	P
194L-HE4A	36 (1-27/64)	48 x 48 (1-57/64 x 1-57/64)	28 (1-7/64)
194L-HE4I	36 (1-27/64)	48 x 48 (1-57/64 x 1-57/64)	28 (1-7/64)
194E-HE4G	28 (1-7/64)	54 x 54 (2-1/8 x 2-1/8)	34 (1-11/32)
194E-HE4N	28 (1-7/64)	54 x 54 (2-1/8 x 2-1/8)	34 (1-11/32)
194L-HE6A	48 (1-57/64)	64 x 64 (2-33/64 x 2-33/64)	28 (1-7/64)
194L-HE6I	48 (1-57/64)	64 x 64 (2-33/64 x 2-33/64)	28 (1-7/64)
194L-HE6N	48 (1-57/64)	67 x 67 (2-41/64 x 2-41/64)	34 (1-11/32)
194L-HE6G	48 (1-57/64)	67 x 67 (2-41/64 x 2-41/64)	34 (1-11/32)

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

Base Installation Cat. No. 194E-A...

Cat. No. 194E-A Switch Body with Metal Shaft Extension



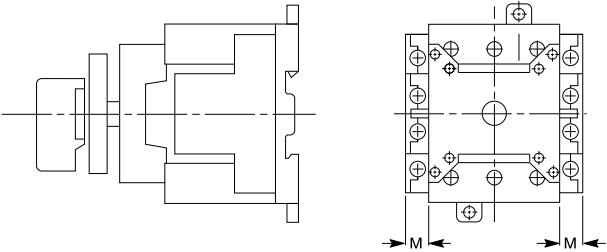
Cat. No.	A
194L-G3393	110...235 (4-11/32...9-1/4)
194L-G3394	230...350 (9-1/16...13-25/32)

Cat. No.	L ★
194E-A16	51 (2)
194E-A25/32	60 (2-3/8)
194E-A40/63	74 (2-59/64)
194E-A80/100	90 (3-35/64)

★ For 6-pole switches, add 1 in. to the "L" dimension.

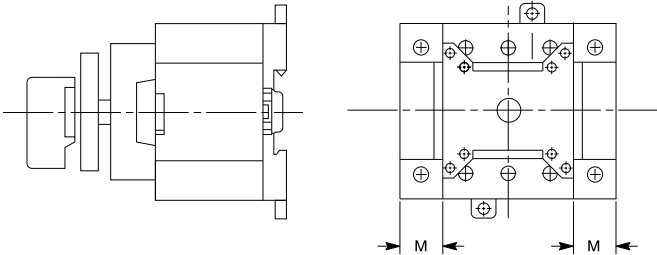
Base and Front Installation

Cat. No. 194E... with Auxiliary Contact Block Installed



Contacts	M
1 N.O. + 1 N.C.	9 (23/64)
2 N.O. + 2 N.C.	18 (23/32)

Cat. No. 194E... with 4-Pole, Ground and Neutral Terminals

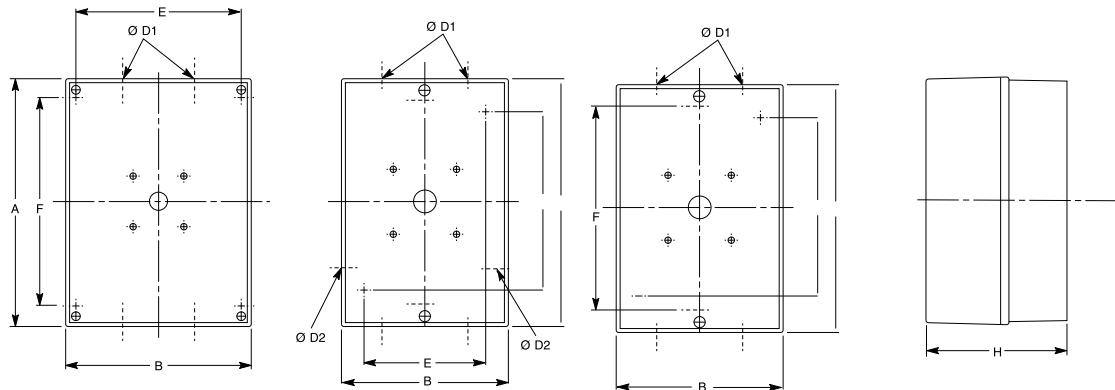


Cat. No.	M
194E-16	12.5 (31/64)
194E-25/32	14 (9/16)
194E-40/63	17.5 (11/16)
194E-80/100	22 (7/8)

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

Base Mounting Cat. No. 194E-A...

Thermoplastic Enclosures



Cat. No. 194L-3665		Cat. No. 194L-3572		Cat. No. 194L-3563		Enclosure Base View				
Complete Switches		Enclosures		Height A	Width B	Knockouts† ØD1		Mounting Holes§		Depth H
Cat. No.	Poles	ABS	Noryl					E	F	
194E-Y16	3 and 4	★	★	120 (4-23/32)	70 (2-3/4)	M16/M20 16/20 mm	PG11/PG16 18.5/22.5 mm	50 (1-31/32)	105 (4-9/64)	70 (2-49/65)
	6	194E-G3663	194E-G3664	180 (7-3/32)	125 (4-59/64)	M25/M30 25/30 mm	PG21/PG29 28.5/37.5 mm	On Center	145 (5-23/32)	105 (4-1/8)
194E-Y25/32	3 and 4	194L-G3572	194L-G3576	150 (5-29/32)	95 (3-3/4)	PG16/PG21 22.5/28.5 mm		60 (2-3/8)	115 (4-17/32)	86 (3-3/8)
	6	194E-G3663	194E-G3664	180 (7-3/32)	125 (4-59/64)	PG21/PG29 28.5/37.5 mm		On Center	145 (5-23/32)	105 (4-1/8)
194E-Y40/63	3 and 4	194E-G3663	194E-G3664	180 (7-3/32)	125 (4-59/64)	PG21/PG29 28.5/37.5 mm		On Center	145 (5-23/32)	105 (4-1/8)
	6	194E-G3665	194E-G3666	230 (9-1/16)	175 (6-57/64)	PG29/PG36 37.5/47.5 mm		155 (6-3/32)	195 (7-43/64)	120 (4-47/64)
194E-Y80/100	3 and 4	194E-G3665	194E-G3666	230 (9-1/16)	175 (6-57/64)	PG29/PG36 37.5/47.5 mm		155 (6-3/32)	195 (7-43/64)	120 (4-47/64)

★ Empty enclosures not available for purchase.

† Cat. No. 194E-A16 units have 1 knockout on each end. all others have 2 knockouts on each end. A letter "M" in the catalog number indicates metric knockouts; the unit is otherwise supplied with PG knockouts.

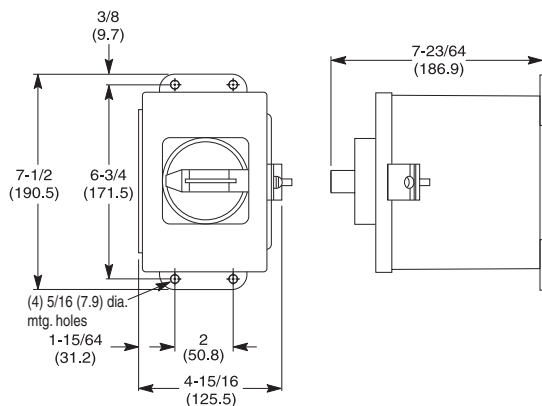
§ All mounting holes have a 4.2 mm (5/32 in.) diameter.

No. of Extensions	Cat. No. 194E-A 20/32...	Cat. No. 194E-A 40/63...	Cat. No. 194E-A 80/00...
With 1 extension	96 (3-25/32)	107 (4-7/32)	114 (4-31/64)
With 2 extensions	120 (4-23/32)	131 (5-5/32)	138 (5-7/16)
With 3 extensions	144 (5-43/64)	155 (6-7/64)	162 (6-3/8)
With 4♣ extensions	168 (6-39/64)	179 (7-3/64)	186 (7-21/64)
With 5♣ extensions	192 (7-9/16)	203 (8)	210 (8-17/64)
With 6♣ extensions	216 (8-1/2)	227 (8-15/16)	234 (9-7/32)

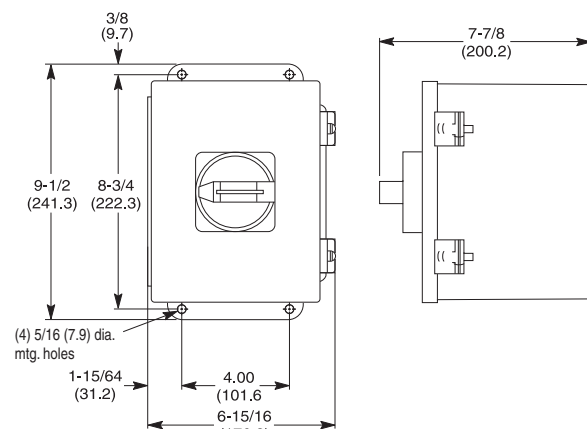
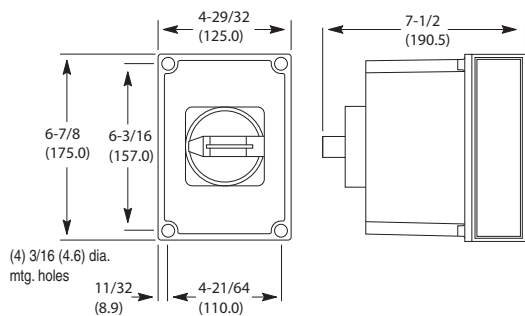
♣ When more than four modules are used, attach the first one to the switch body using the screws supplied with the extension (Cat. No. 194L-G2853).

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

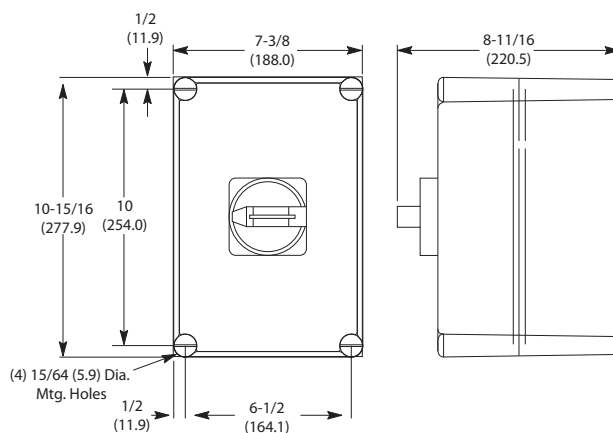
194E Enclosed Switches with 194R Handles



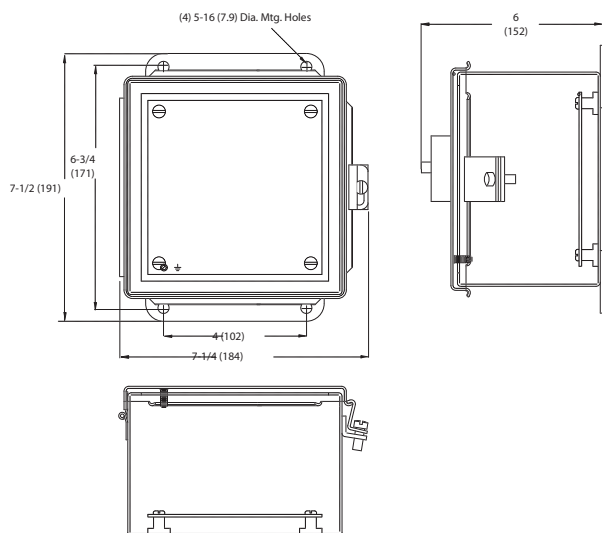
Cat. Nos. 194E-CA16...63, 194E-FA16...63, 194E-AA16...63

Cat. Nos. 194E-CA80...00, 194E-FA80...00, 194E-AA80...00
Cat. Nos. 194E-CA40X...63X, 194E-FA40X...63X, 194E-AA40X...63X

Cat. No. 194E-KA16...63



Cat. No. 194E-KA80...00

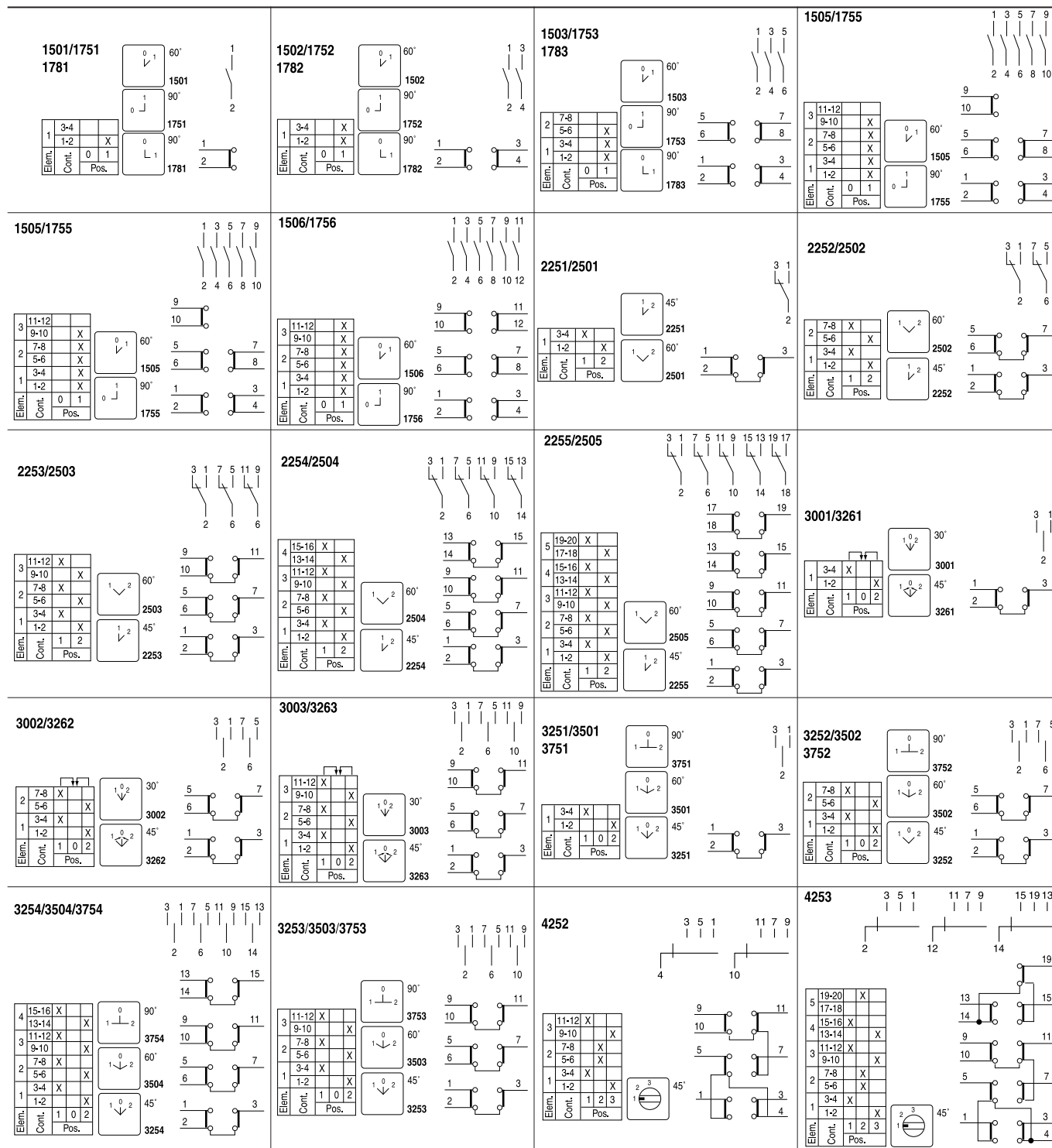


Cat. No. 194E-DA16...32, 194E-GA16...32

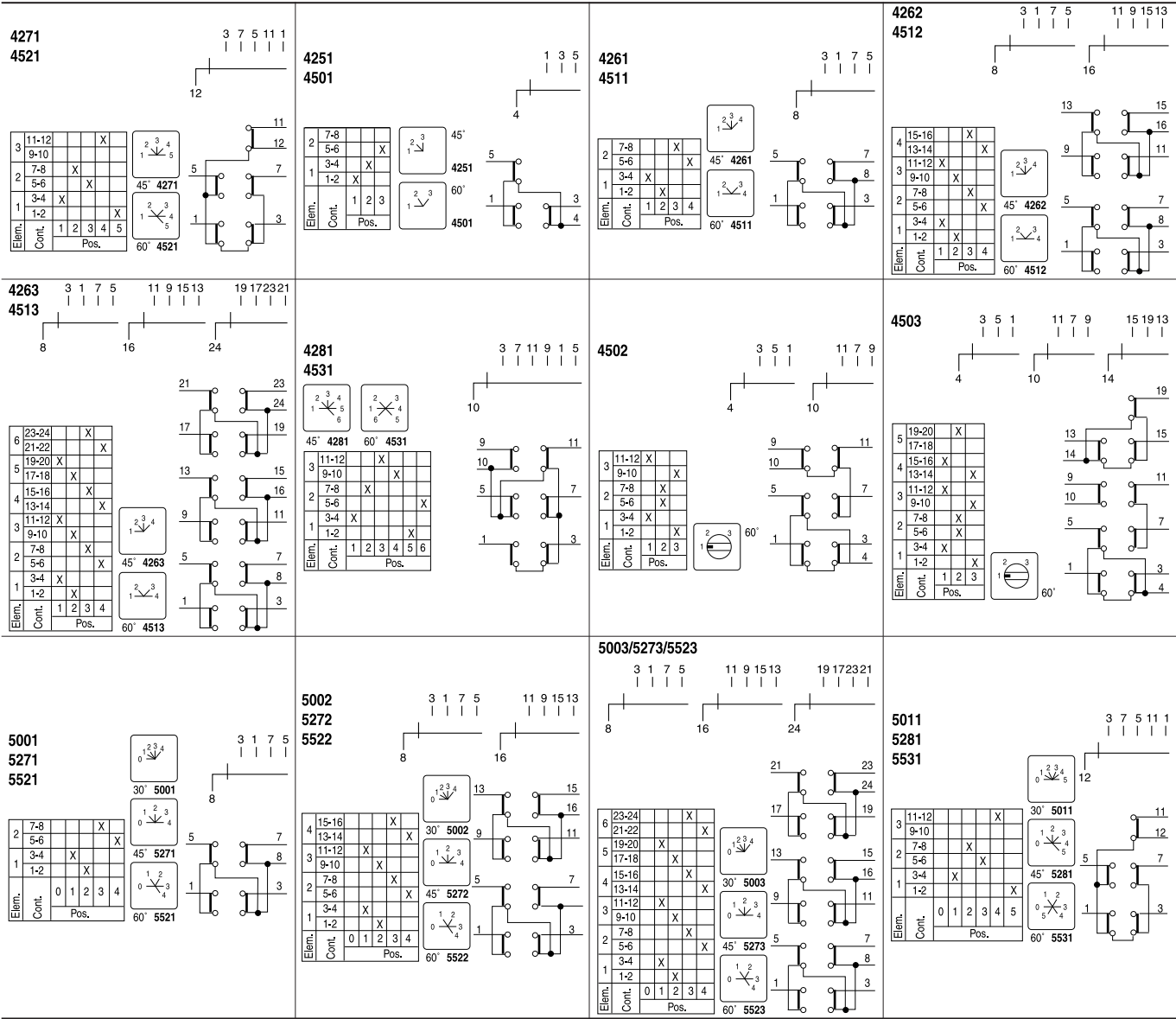
Switching Diagrams

Contact target tables: X = Contact Closed
[Blank] = Contact Open

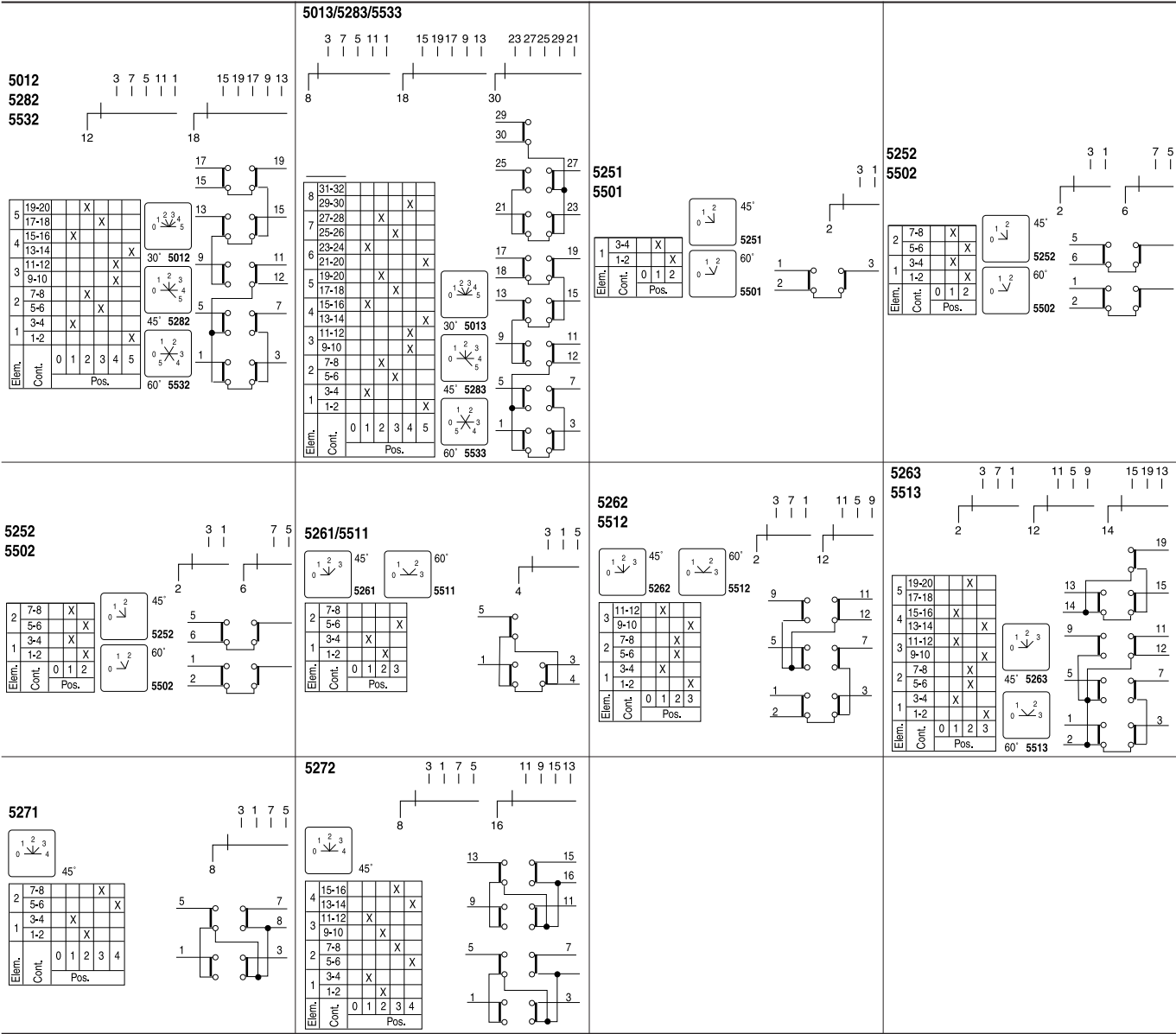
Circuit Diagram Nos. 1501...4253



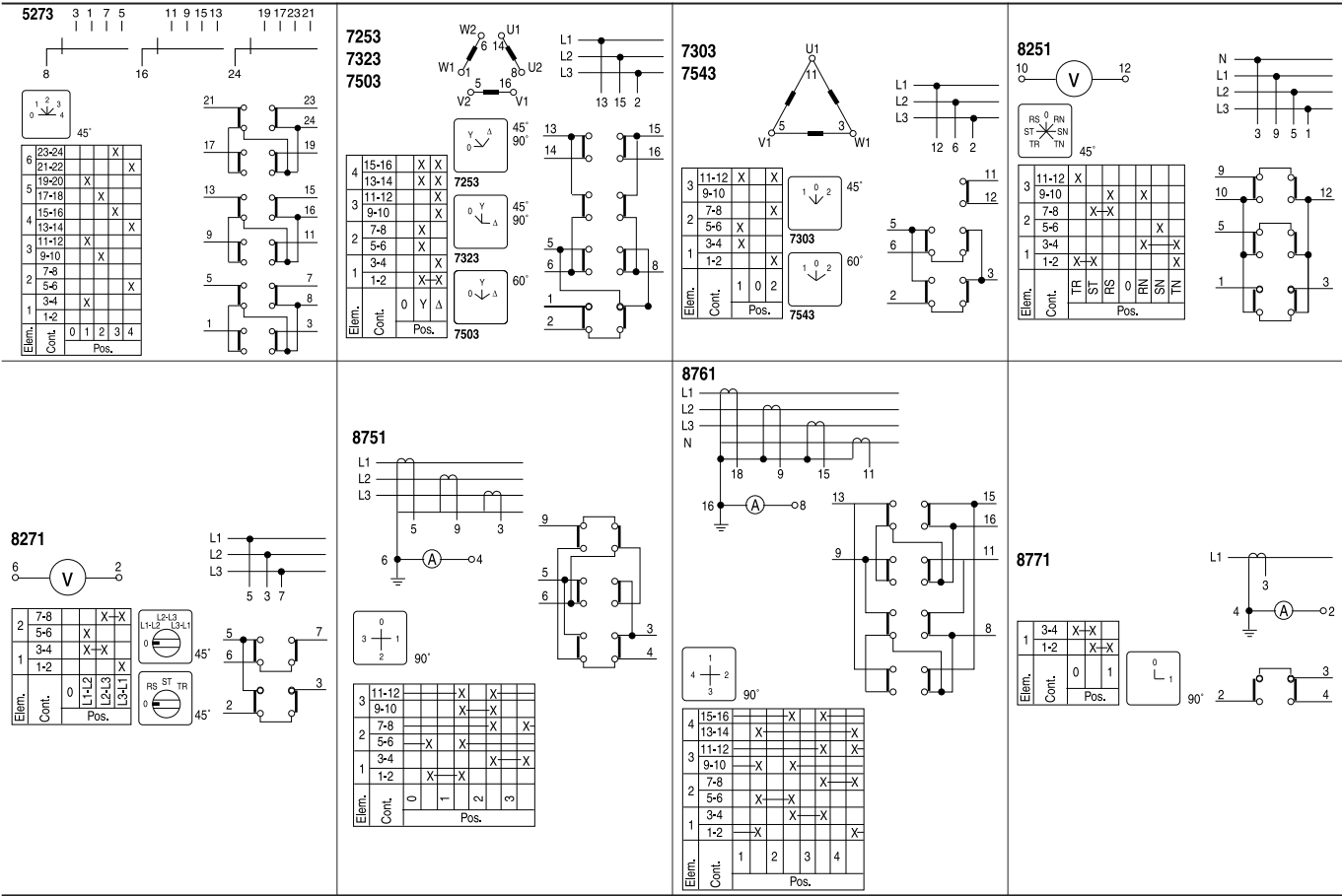
Circuit Diagram Nos. 4271...5531



Circuit Diagram Nos. 5012...5272



Circuit Diagram Nos. 5273...8771



Electrical Ratings

Performance Data							12 A	16 A	20 A	25 A	32 A	40 A					
IEC Applications																	
Rated voltage U_e ★		IEC-947					[V]	690	690	690	690	690	690				
Isolating conditions acc. to VDE fulfilled up to rated impulse voltage U_{imp}							[kV]	6	6	6	6	8	8				
Thermal rated current I_{th} ★		40 °C	IEC-947					[A]	16	20	25	30	32	45			
Thermal rated current I_{the}		60 °C	IEC-947					[A]	12	16	20	25	32	45			
Rated current I_e ★																	
AC-1/ AC-21A	Non-inductive or slightly inductive loads/ switching of resistive loads with slight overload	IEC-947					690V	[A]	12	16	20	25	32	40			
AC-1	Non-inductive or slightly inductive loads	SEV					660V	[A]	12	16	20	25	32	40			
AC22A	Switching of mixed resistive and inductive loads with slight overload	IEC-947					220...500V 690V	[A] [A]	12 12	16 16	20 20	25 25	32 32	40 40			
AC-15	Switching of inductive drives, motors, valves, and electromagnets.	IEC-947					220...240V 380...415V 500V	[A] [A] [A]	5 3 2	6 4 2.5	7 5 3	8 6 4	—	—			
DC switching capacity		Contacts in series															
Rated current I_e																	
DC-21A	Rated Voltage [V]	1	2	3	4	5	6	8									
		24	48	72	96	120	144	192	[A]	12	16	20	22	—	—		
	For resistive loads, $T \leq 1\text{ms}$	48	96	144	192	240	288	384	[A]	10	12	16	18	—	—		
		60	120	180	240	300	360	450	[A]	8	10	12	14	32	40		
		110	220	330	440	550	660	—	[A]	2	2.5	4	5	—	—		
		220	440	660	—	—	—	—	[A]	0.5	0.6	0.7	0.8	—	—		
		U_e max = 600V		440	—	—	—	—	—	[A]	0.4	0.4	0.5	0.5	—	—	
		Rated making/breaking capacity (= $1.5 \times I_e$)															
	1.05 x Rated voltage [V]	25.2	50.4	75.6	100.8	126	151.2	201.6	[A]	18	24	30	33	—	—		
		50.4	100.8	151.2	201.6	252	302.4	403.2	[A]	15	21	24	27	—	—		
For resistive loads, T_{Ith} 1ms		63	126	189	252	315	378	504	[A]	12	18	18	21	48	60		
U_e max = 600V		115.5	231	346.5	462	577.5	—	—	[A]	3	4.5	6	7.5	—	—		
Rated current I_e	Rated voltage [V]	231	462	—	—	—	—	—	[A]	0.75	1.12	1.05	1.2	—	—		
		462	—	—	—	—	—	—	[A]	0.52	0.78	0.47	0.75	—	—		
	Rated voltage [V]	24	48	72	96	120	144	192	[A]	8	10	12	14	16	16		
		30	60	90	120	150	180	240	[A]	4.5	5.5	7	8	—	—		
	For inductive loads $T = 50\text{ms}$	48	96	144	192	240	288	384	[A]	1.5	2	2.5	3	8	8		
		Rated voltage [V]	60	120	180	240	300	360	450	[A]	1	1.2	1.5	1.8	4.8	4.8	
	Rated making/breaking capacity (= $1.1 \times I_e$)	110	220	330	440	550	660	—	[A]	0.4	0.5	0.6	0.7	2	2		
		220	—	—	—	—	—	—	[A]	—	—	—	—	0.6	0.6		
		1.1 x Rated voltage [V]		26.4	52.8	79.2	105.6	132	158.4	184.8	[A]	8.8	11	13.2	1.54	—	17.6
		33	66	99	132	165	198	231	[A]	4.95	6.05	7.7	8.8	—	—		
For inductive loads $T = 50\text{ms}$	52.8	105.6	158.4	211.2	264	316.8	369.6	[A]	1.65	2.2	2.75	3.3	8.8	8.8			
	U_e max = 600V		66	132	198	264	330	396	462	[A]	1.1	1.32	1.65	1.98	5.28	5.28	
	121	242	363	484	605	—	—	[A]	4.95	6.05	7.7	8.8	2.2	2.2			
Power Lost									[W]	0.3	0.5	0.6	0.9	0.8	1.4		
Rated power P_e		Contacts in series															
Rated voltage [V] DC-23A, DC-3, DC-5 For inductive loads, $T \leq 1\text{ms}$	24	1					[kW]	0.12	0.15	0.20	0.25	0.30	0.30				
		2					[kW]	0.20	0.25	0.30	0.37	—	—				
	48	2					[kW]	0.25	0.30	0.37	0.50	0.50	0.50				
		3					[kW]	0.30	0.37	0.50	0.75	—	—				
	60	2					[kW]	0.25	0.30	0.37	0.50	1.00	1.00				
		4					[kW]	0.37	0.50	0.75	1.00	—	—				
	110	4					[kW]	0.50	0.75	1.00	1.20	—	—				
		6					[kW]	1.00	1.20	1.40	1.60	—	—				
	220	4					[kW]	0.37	0.50	0.75	1.00	—	—				
		6					[kW]	1.00	1.20	1.40	1.50	—	—				

★ See standards compliance listed on page 2-434.

Performance Data, Continued						12 A	16 A	20 A	25 A	32 A	40 A
IEC Applications, Continued											
Rated making/breaking capacity (= 4 x I _a)		Contacts in series									
DC-23A, DC-3, DC-5 For inductive loads, T ≤ 7.5 ms	Rated Voltage [V]	25.2	1	[A]	20.0	25.0	33.3	41.6	50.0	50.0	
		25.2	2	[A]	33.3	41.6	50.0	61.6	—	—	
		50.4	2	[A]	21.0	25.0	30.8	41.6	41.6	41.6	
		50.4	3	[A]	25.0	30.8	42.0	62.4	—	—	
		63	2	[A]	16.6	20.0	24.6	33.2	66.6	66.6	
		63	4	[A]	24.6	33.3	50.0	66.4	—	—	
		115.5	4	[A]	18.1	27.2	36.4	44.0	—	—	
		115.5	6	[A]	36.4	43.6	51.0	58.2	—	—	
Rated breaking capacity		231	4	[A]	6.7	9.1	13.6	18.2	—	—	
		231	6	[A]	18.1	21.8	25.2	27.2	—	—	
			at 220V	[A]	72	96	128	176	296	296	
			0.45 [cos φ]	[A]	72	96	128	176	280	336	
Rated power P _e ★			at 380V	[A]	72	96	128	176	280	336	
			0.45 [cos φ]	[A]	53	72	86	112	196	196	
			at 660V	[A]	53	72	86	112	196	196	
			0.45[cos φ]	[A]	53	72	86	112	196	196	
AC-2 Slip-ring motors: starting, reversing and electric braking; star/delta starting	3-phase 3-pole	IEC-947									
		240V	[kW]	3	4	5.5	5.5	—	—	—	
		380V	[kW]	5.5	7.5	9	13	—	—	—	
		415V	[kW]	5.5	7.5	9	13	—	—	—	
		440V	[kW]	5.5	7.5	9	13	—	—	—	
		500V	[kW]	7.5	10	11	15	—	—	—	
		660V	[kW]	7.5	10	11	15	—	—	—	
AC-3 Squirrel-cage motors: starting and stopping of running motors	3-phase 3-pole	IEC-947									
		220...240V	[kW]	2.2	3	4.5	5.5	7.5	7.5	7.5	
		380...440V	[kW]	4	5.5	7.5	11	15	18.5	18.5	
		500V	[kW]	5.5	7.5	10	13	—	—	—	
	1-phase 2-pole	660V	[kW]	5.5	7.5	8	11	18.5	18.5	18.5	
		110V	[kW]	0.75	1.1	1.2	1.6	—	—	—	
		220...240V	[kW]	1.3	2.2	2.5	3.2	4	4	4	
		380...440V	[kW]	2.2	3.7	4.5	5.5	8	16	16	
AC-4 Squirrel-cage motors: starting, reversing, electric braking, inching	3-phase 3-pole	IEC-947									
		220...240V	[kW]	0.75	1.5	3	4	5.5	5.5	5.5	
		380...415V	[kW]	1.5	2.2	3.7	5.5	7.5	7.5	7.5	
		440...550V	[kW]	1.5	2.2	3.7	5.5	7.5	7.5	11	
	1-phase 2-pole	110V	[kW]	0.18	0.37	0.55	0.75	—	—	—	
		240V	[kW]	0.37	0.75	1.5	2.2	—	—	—	
		380V	[kW]	0.75	1.1	1.8	3	—	—	—	
		440V	[kW]	0.75	1.1	1.8	3	—	—	—	

★ See standards compliance listed on page 2-434.

Specifications

194L Control and Load Switches

Performance Data, Continued					12 A	16 A	20 A	25 A	32 A	40 A
IEC Applications, Continued										
AC-23A	Occasional switching of motors and other highly inductive loads (criterion for selecting main switches)	IEC-947 3-phase 3-pole	220...240V	[kW]	2.2	3	4.5	5.5	11	11
			380...440V	[kW]	4	5.5	7.5	11	18.5	22
			500V	[kW]	5.5	7.5	10	13	—	—
			660V	[kW]	5.5	7.5	8	11	22	22
	1-phase 2-pole		110V	[kW]	0.75	1.1	1.2	1.6	—	—
		220...240V	[kW]	1.3	2.2	2.5	3.2	5.5	5.5	
			380...440V	[kW]	2.2	3.7	4.5	5.5	11	11
Short-circuit ratings										
	Rated short-time current (1s)	(gL characteristic)		[kA _{rms}]	0.48	0.48	0.6	0.75	0.8	0.8
	Strongest series fuse, not in enclosure			[A]	20★	20★	20★	25★	35	40
	Conditional rated short-circuit			[kA]	6	6	5	5	5	5
Switch Rate		electrical		[ops/h]	120	120	120	120	120	120
CSA and UL Applications										
Rated Voltage U_e				[V AC]	600	600	600	600	600	600
Ampere Rating	Pilot Duty	Contact class		[A]	A600	A600	—	—	—	—
	General Use	Non-inductive or slightly inductive load‡			12	16	20	25	32	40
Rated power P_e §		UL (CSA)			(FLA)	(FLA)	(FLA)	(FLA)		
Standard motor DOL rating (similar to AC-3)		3-phase 3-pole	120V	[Hp]	1 (7.2)	1.5 (12)	2 (13.6)	3 (19.2)	5 (30.4)	5 (30.4)
			240V	[Hp]	2 (6.8)	3 (9.6)	4 (12.4)	6 (18)	7.5 (22)	10 (28)
			480V	[Hp]	5 (7.6)	7.5 (11)	8 (11.6)	12 (17)	20 (27)	25 (34)
			600V	[Hp]	5 (6.1)	7.5 (9)	10 (11)	15 (17)	20 (22)	25 (27)
		1-phase 2-pole	120V	[Hp]	0.5 (9.8)	.75 (13.8)	1 (16)	1.5 (20)	2 (24)	2 (24)
			240V	[Hp]	1 (8.0)	1.5 (10.0)	2 (12)	3 (17)	5 (28)	5 (28)
			480V	[Hp]	2 (6.0)	3 (8.5)	4 (11.2)	6 (17)	7.5 (21)	10 (26)
			600V	[Hp]	3 (6.8)	3 (6.8)	5 (11.2)	7.5 (16)	10 (20)	15 (27)
Heavy motor load, reversing Rating (similar to AC-4)		3-phase 3-pole	120V	[Hp]	—	—	—	—		
Max. back-up fuse		(gG characteristic)	240V	[Hp]	—	—	—	—		
Short Circuit Ratings	Maximum Short Circuit Prospective Fault Current		[kA]	5	5	5	5			
			[A]	35	55	60	80			
Maximum Fuse Size										
Switching Rate		electrical		[ops/h]	120	120	120	120	120	120

Mechanical Data

Performance Data			12/16 A	20/25 A	32/40 A
Protection class acc. to IEC 529	Handles		IP66	IP66	IP66
	Switch Bodies		IP20	IP20	IP20
Mechanical Endurance		[mil.ops]	1	1	1
Switching rate	mechanical	[ops/h]	1200	1200	1200
Maximum Wire Gauges					
	rigid wire	AWG [mm²]	(2)18...12 (2)1...2.5	(2)16...10 (2)1.5...6	(2)12...8 (2)4...10
	fine strands	AWG [mm²]	(2)18...12 (2)1...2.5	(2)16...10 (2)1.5...4	(2)14...10 (2)2.5...6

Environmental Data

Performance Data		12/16/20/25 A	32/40 A
Ambient temperature			
	Operation	-25...+60 °C (-13...+140 °F)	-25...+60 °C (-13...+140 °F)
	Storage	-40...+80 °C (-40...+176 °F)	-40...+80 °C (-40...+176 °F)

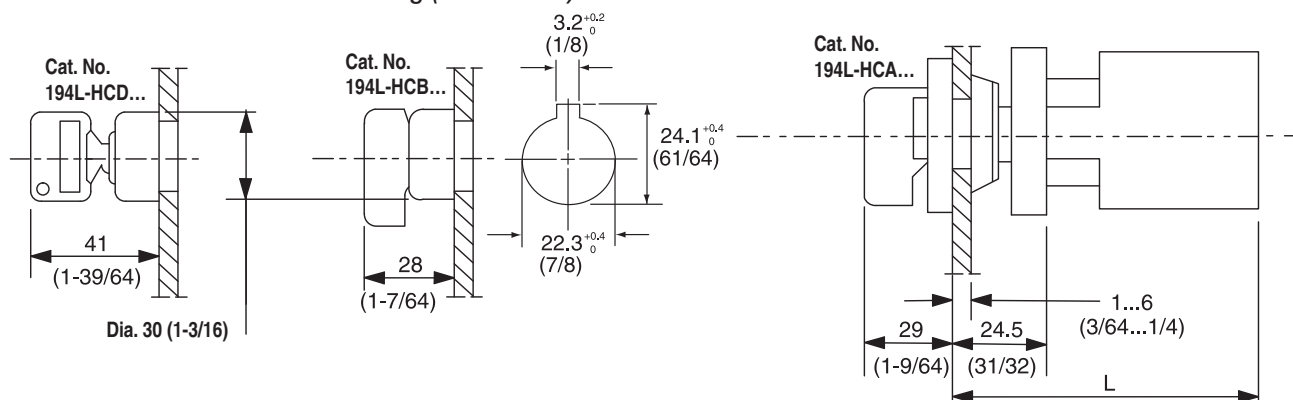
★ Does not apply to switches in enclosure.

‡ Suitable for switching off-load (AC-20) above 660V, but only up to 660V for switches with screws at the rear.

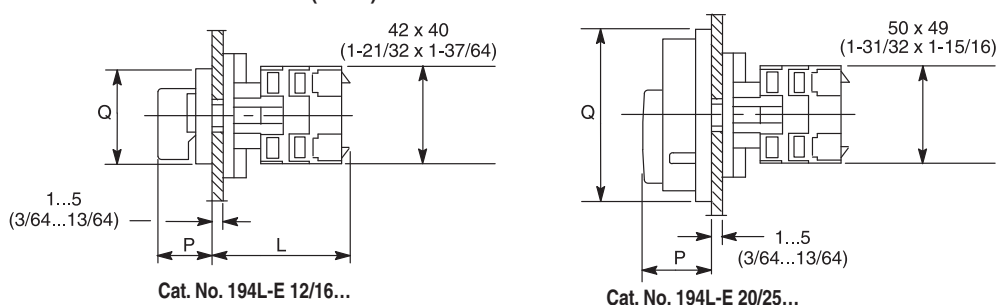
§ See standards compliance listed on page page 2-434.

Approximate Dimensions

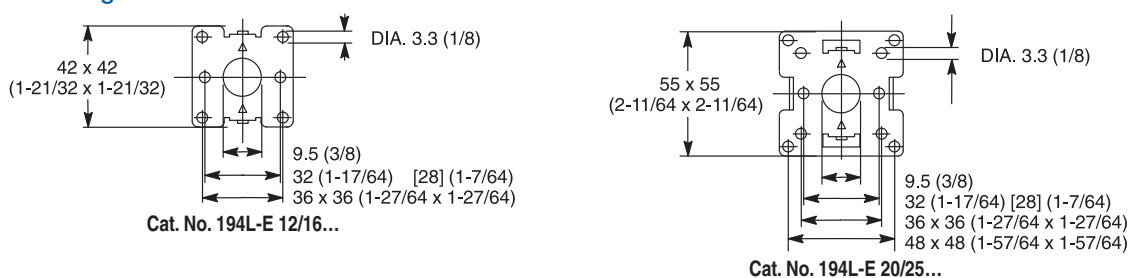
Dimensions are shown in millimeters (inches). Dimensions are not intended to be used for manufacturing purposes.

Cat. No. 194L-C... for Central Fixing (194L-HC...)

Cat. No.	L				
	No. of Contacts				
	1...2	3...4	5...6	7...8	9...10
194L-C32/40...	86 (3-25/64)	103.5 (4-5/64)	121 (4-49/64)	138.5 (5-29/64)	156 (6-9/64)

Cat. No. 194L... for Front (Door) Installation

Mounting Dimensions



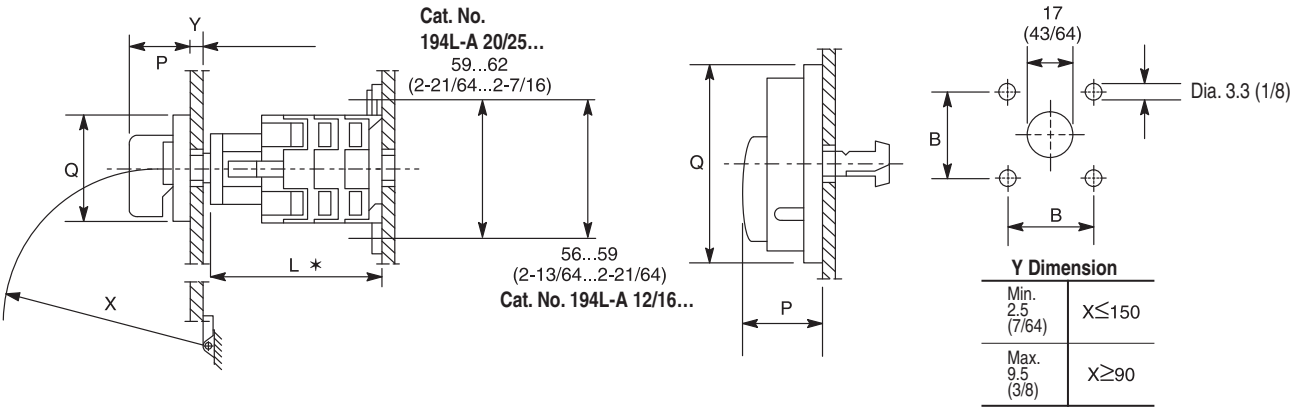
Cat. No.	L				
	No. of Contacts				
	1...2	3...4	5...6	7...8	9...10
194L-E12/16...	44 (1-47/64)	54 (2-1/8)	64 (2-33/64)	74 (2-29/32)	84 (3-5/16)
194L-E20/25...	44.5 (1-3/4)	57 (2-1/4)	69.5 (2-3/4)	82 (3-15/64)	94.5 (3-23/32)
194L-E32/40...	43 (1-11/16)	58.5 (2-5/16)	76 (2-63/64)	93.5 (3-11/16)	111 (4-3/8)

Control Knob

Cat. No.	P	Q
194L-HE4A...	28 (1-7/64)	48 (1-57/64) x 48 (1-57/64)
194L-HE4I...		48 (1-57/64) x 62 (2-7/16)
194L-HE4S...		64 (2-33/64) x 64 (2-33/64)
194L-HE6A...		64 (2-33/64) x 78 (3-5/64)
194L-HE6I...		67 (2-41/64) x 67 (2-41/64)
194L-HE6S...		
194L-HE6N...	34 (1-11/32)	
194L-HE6G...		

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

Cat. No. 194L-A... for Base/DIN Rail Installation



Cat. No.	L ★			
	No. of Contacts			
	1...2	3...4	5...6	7...8
194L-A12/16...	58 (2-9/32)	68 (2-11/16)	78 (3-5/64)	88 (3-15/32)
194L-A20/25...	58 (2-9/32)	71.5 (2-13/16)	84 (3-5/16)	96.5 (3-51/64)
194L-A32/40...	67.5 (2-21/32)	85 (3-11/32)	102.5 (4-1/32)	120 (4-47/64)

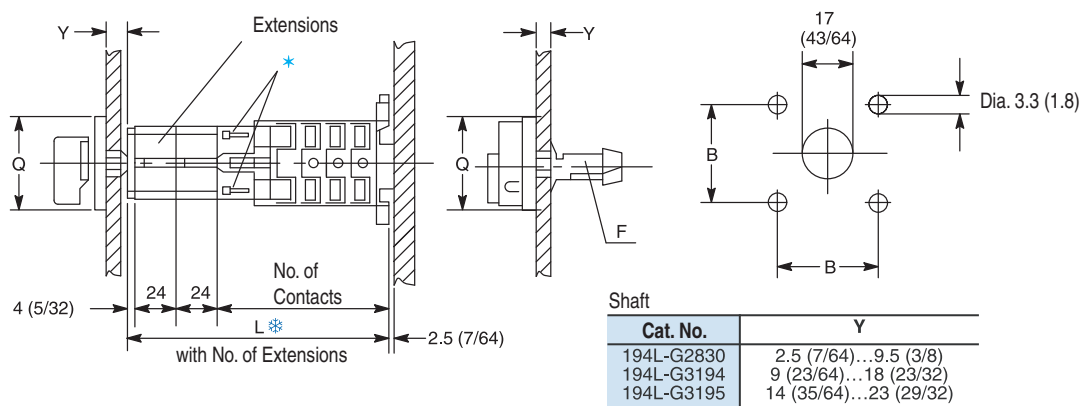
Control Knob

Cat. No.	P	B	Q	
194L-HE4A...	28 (1-7/64)	36 (1-27/64)	48 (1-57/64) x 48 (1-57/64)	
194L-HE4I...			48 (1-57/64) x 62 (2-7/16)	
194L-HE4S...		48 (1-57/64)	64 (2-33/64) x 64 (2-33/64)	
194L-HE6A...			64 (2-33/64) x 78 (3-5/64)	
194L-HE6I...			34 (1-11/32)	67 (2-41/64) x 67 (2-41/64)
194L-HE6S...				
194L-HE6N...				
194L-HE6G...				

★ With DIN 46 277 (35) Rail + 2.5 mm (7/64)

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

Cat. No. 194L-A... With Shaft Extension Cat. No. 194L-G2853



No. of Extensions	Cat. No. 194L-A12/16... 10mm (0.39)				Cat. No. 194L-A20/25... 12.5mm (0.49)				Cat. No. 194L-A32/40			
	L											
	No. of Contacts											
	1...2	3...4	5...6	7...8	1...2	3...4	5...6	7...8	1...2	3...4	5...6	7...8
With 1 extension	82 (3-15/64)	92 (3-5/8)	102 (4-1/64)	112 (4-13/32)	83 (3-17/64)	95.5 (3-49/64)	108 (4-1/4)	120.5 (4-3/4)	91.5 (3-15/64)	108 (4-1/4)	126.5 (5-63/64)	144 (6-43/64)
With 2 extensions	106 (4-11/64)	116 (4-37/64)	126 (4-31/32)	136 (5-23/64)	107 (4-7/32)	119.5 (4-45/64)	132 (5-13/64)	144.5 (5-11/16)	115.5 (5-35/64)	133 (5-15/64)	150.5 (6-5/16)	168 (7-5/8)
With 3 extensions	130 (5-1/8)	140 (5-33/64)	150 (5-29/32)	160 (6-19/64)	131 (5-5/32)	143.5 (5-21/32)	156 (6-9/64)	168.5 (6-5/8)	135.5 (5-11/32)	157 (6-3/16)	174.5 (7-7/8)	182 (8-9/16)
With 4 ★ extensions	154 (6-1/16)	164 (6-15/32)	174 (6-55/64)	184 (7-15/64)	155 (6-7/64)	167.5 (6-19/32)	180 (7-3/32)	192.5 (7-37/64)	163.5 (6-7/16)	181 (7-1/8)	198.5 (8-53/64)	216 (9-33/64)
With 5 ★ extensions	178 (7-1/64)	188 (7-13/32)	198 (7-51/64)	208 (8-3/16)	179 (7-3/64)	191.5 (7-35/64)	204 (8-1/32)	216.5 (8-33/64)	187.5 (7-3/8)	205 (8-5/64)	222.5 (9-49/64)	240 (9-29/64)
With 6 ★ extensions	202 (7-61/64)	212 (8-23/64)	222 (8-3/4)	232 (9-1/8)	203 (7-63/64)	215.5 (8-31/64)	228 (8-63/64)	240.5 (9-15/32)	211.5 (8-21/64)	229 (12)	246.5 (10-23/32)	264 (10-13/32)

Control Knob

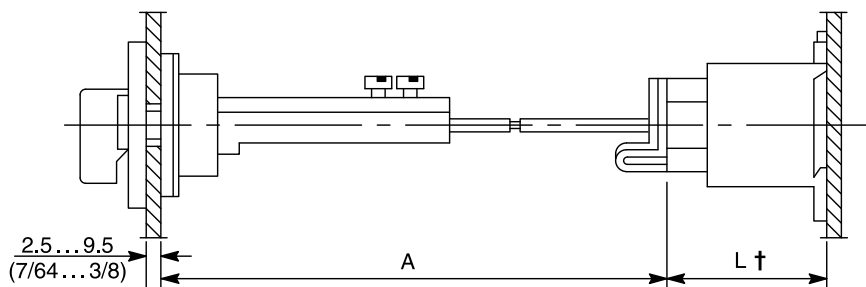
Cat. No.	Q	B
194L-HE4A...	48 (1-57/64) x 48 (1-57/64)	36 (1-27/64)
194L-HE4I...		
194L-HE6A...	64 (2-33/64) x 64 (2-33/64)	48 (1-57/64)
194L-HE6I...		
194L-HE6N...	67 (2-41/64) x 67 (2-41/64)	
194L-HE6G...		

★ When more than four modules are used, attach the first one to the switch body using the screws supplied with the extension (**Cat. No. 194L-G2853**).

‡ Mounting on DIN 46 277 (35) Rails.

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

Cat. No. 194L-A... With Metal Shafts



Cat. No.	A
194L-G3393...	110 (4-21/64)...235(9-1/4)
194L-G3394...	230 (9-1/16)...350 (13-25/32)

Cat. No.	L ★			
	No. of Contacts			
	1...2	3...4	5...6	7...8
194L-A12/16...	54 (2-1/8)	64 (2-33/64)	74 (2-29/32)	84 (3-5/16)
194L-A20/25...	55 (2-11/64)	67.5 (2-21/32)	80 (3-5/32)	92.5 (3-41/64)
194L-A32/40...	63.5 (2-31/64)	81 (3-3/16)	88.5 (3-7/8)	116 (4-9/16)

No. of Extension Modules	Required End Shaft	Enclosure Mounting Depth§	
		Cat. No. 194L-A12/16...	Cat. No. 194L-A20/25...
0	44 (1-47/64) ★	71.5...77.5 (2-13/16...3-1/16)	75...80.5 (2-61/64...3-11/64)
	52 (2-3/64)	77...87 (3-1/32...3-27/64)	80...90 (3-5/32...3-35/64)
	57 (2-1/4)	82...92 (3-15/64...3-5/8)	85...95 (3-11/32...3-3/4)
1	44 (1-47/64) ★	95.5...101.5 (3-49/64...4)	99...105 (3-29/32...4-9/64)
	52 (2-3/64)	97.5...111 (3-27/32...4-3/8)	101...114.5 (3-63/64...4-33/64)
	57 (2-1/4)	102.5...116 (4-3/64...4-37/64)	106...119.5 (4-11/64...4-45/64)
2	44 (1-47/64) ★	119.5...125.5 (4-45/64...4-61/64)	123...129 (4-27/32...5-5/64)
	52 (2-3/64)	121.5...135 (4-51/64...5-5/16)	125...138.5 (4-59/64...5-29/64)
	57 (2-1/4)	126.5...140 (4-63/64...5-33/64)	130...143.5 (5-1/8...5-21/32)
3	44 (1-47/64) ★	143.5...149.5 (5-21/32...5-57/64)	147...153 (5-51/64...6-1/32)
	52 (2-3/64)	145.5...159 (5-47/64...6-17/64)	149...162.5 (5-7/8...6-13/32)
	57 (2-1/4)	150.5...164 (5-15/16...6-15/32)	154...167.5 (6-1/16...6-19/32)
4	44 (1-47/64) ★	167.5...173.5 (6-19/32...6-27/32)	171...177 (6-47/64...6-31/32)
	52 (2-3/64)	169.5...183 (6-43/64...7-13/64)	173...186.5 (6-13/16...7-11/32)
	57 (2-1/4)	174.5...188 (6-7/8...7-13/32)	178...191.5 (7-1/64...7-35/64)
5	44 (1-47/64) ★	191.5...197.5 (7-35/64...7-25/32)	195...201 (7-43/64...7-59/64)
	52 (2-3/64)	193.5...207 (7-5/8...8-5/32)	197...210.5 (7-49/64...8-19/64)
	57 (2-1/4)	198.5...212 (7-53/64...8-23/64)	202...215.5 (7-61/64...8-31/64)
6	44 (1-47/64) ★	215.5...221.5 (8-31/64...8-23/32)	219...225 (8-5/8...8-55/64)
	52 (2-3/64)	217.5...231 (8-37/64...9-3/32)	221...234.5 (8-45/64...9-15/64)
	57 (2-1/4)	222.5...236 (8-49/64...9-19/64)	226...239.5 (8-29/32...9-7/16)

★ When more than 4 modules are used, attach the first one to the switch body using the screws supplied with the extension (**Cat. No. 194L-G2853**).

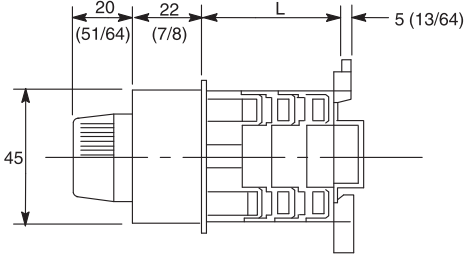
§ For DIN Rail-mounted devices, remember to deduct the offset distance provided by the rail. For example, deduct 2.5 mm (7/64 in.) from the mounting depth for Bulletin 194L switch body mounted on DIN 46277 rail.

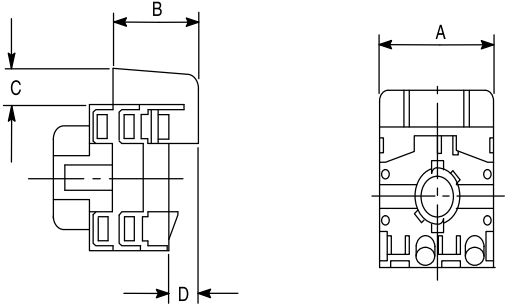
★ One 44 mm (1-47/64 in) end shaft is supplied with all Bulletin 194L Switch Bodies.

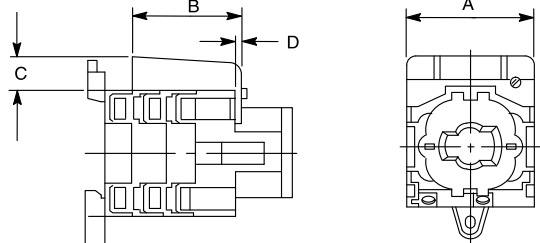
Modular Shaft Extensions (Cat. No. 194L-G2853)

Select No. of Extension Modules and Shaft for use with enclosures.

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

Cat. No. 194L-A... With Cat. No. 194L-HE4P-... Installation on DIN 46277 (35 mm) Rails + 2.5 mm (7/64 in.)		L			
	Cat. No.	No. of Contacts			
		1...2	3...4	5...6	7...8
	194L-A12/16...	35 (1-3/8)	45 (1-49/64)	55 (2-11/64)	65 (2-9/16)
	194L-A20/25...	33.5 (1-21/64)	48 (1-57/64)	60.5 (2-3/8)	73 (2-7/8)
	194L-A32/40...	43 (1-11/16)	61 (2-13/32)	79 (3-7/64)	97 (3-53/64)

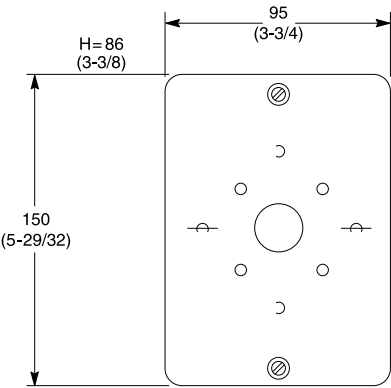
Cat. No. 194L-E... With Terminal Cover		Cat. No.	A	B	C	D
		194L-E12/16...	40 (1-37/64)	42.5 (1-43/64)	12 (15/32)	2.5 (7/64)
		194L-E20/25...	49 (1-15/16)	37.5 (1-31/64)	12 (15/32)	2.5 (7/64)
		194L-E32/40...	59 (2-21/64)	50 (1-31/32)	15 (19/32)	2.5 (7/64)

Cat. No. 194L-A... With Terminal Cover		Cat. No.	A	B	C	D
		194L-A12/16...	40 (1-37/64)	42.5 (1-43/64)	12 (15/32)	2.5 (7/64)
		194L-A20/25...	49 (1-15/16)	37.5 (1-31/64)	12 (15/32)	2.5 (7/64)
		194L-A32/40...	63.5 (2-1/2)	49 (1-53/64)	12 (15/32)	2 (5/64)

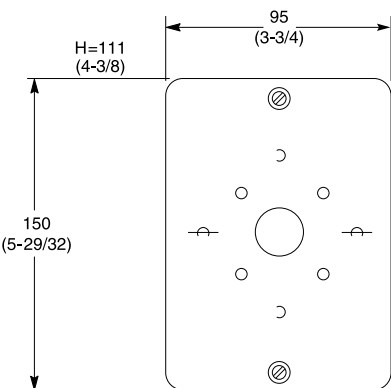
Dimensions are shown in millimeters (inches). Dimensions are not intended to be used for manufacturing purposes.

Enclosure

Cat. No. 194L-G3572...Cat. No. 194L-G3579



Cat. No. 194L-G3572/G3576
G3574/G3578



Cat. No. 194L-G3573/G3577
G3575/G3579

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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