

Product Locator



Toggle Switch Boots

Page

6 & 7



Pushbutton Boots

8 & 9



Indicator & Illuminated Pushbutton Switch Seals

10



Handset Switch Boots

10



Rotary Shaft Seals

11



Rocker Switch Boots

12



Economy Switch Seals

13



Installation Instructions

14



Custom Switch Boots & Seals

15

Qualified Products List

The following standard APM HEXSEALS are QPL-Listed, per QPL5423. Other QPL-listed products are available. Please consult factory.

HEXSEALS			HEXSEALS			HEXSEALS		
Military P/N	APM P/N	Page	Military P/N	APM P/N	Page	Military P/N	APM P/N	Page
M5423/01-01	N-1030	6	M5423/07-05	NH-3030S	8	M5423/09-08	N-9030-1/4RFI	11
M5423/01-02	IN1030RFI	7	M5423/07-06	N-3030RFI	9	M5423/09-09	N-9040-1/8RFI	11
M5423/02-01	N-1030B	6	M5423/07-07	NC-3030RFI	9	M5423/09-10	N-9060-1/4RFI	11
M5423/03-01	2030-B	7	M5423/07-08	NH-3030RFI	9	M5423/09-12	N-9063-1/4RFI	11
M5423/04-01	N-5030	6	M5423/07-09	N-3040RFI	9	M5423/09-14	N-9033-1/4RFI	11
M5423/05-01	N-5030L	6	M5423/07-10	NH-3030SRFI	9	M5423/10-01	N-5040G	8
M5423/05-02	N-5030R	6	M5423/07-11	N-3030-2513	8	M5423/10-02	N-5040R	8
M5423/06-01	3070	9	M5423/07-12	NC-3030-2513	8	M5423/10-03	N-5040	8
M5423/06-02	3075	9	M5423/09-01	N-9030-1/8	11	M5423/11-01	N-5032B	6
M5423/06-03	3073	9	M5423/09-02	N-9030-1/4	11	M5423/12-A9	1112/7	
M5423/06-04	3077	9	M5423/09-03	N-9040-1/8	11	HANDSET BOOTS		
M5423/07-01	N-3030	8	M5423/09-04	N-9060-1/4	11	Military P/N	APM P/N	Page
M5423/07-02	NC-3030	8	M5423/09-05	N-9065-3/8	11	M5423/15-01	1211/13	10
M5423/07-03	NH-3030	8	M5423/09-06	N-9063-1/4	11	M5423/15-02	1211/14	10
M5423/07-04	N-3040	8	M5423/09-07	N-9030-1/8RFI	11	M5423/15-03	1211/31	10

Toggle Switch Boots

HEXSEAL® and E-SEEL® toggle switch boots are molded from a high tear-strength silicone rubber bonded to a built-in mounting nut. Each encloses the base of the protruding switch bushing and forms a watertight and dust-tight seal against the front panel surface.

SPECIFICATIONS

Material: HEXSEALS: Silicone rubber conforms to ZZ-R-765 Class III, GR 50 (unless otherwise specified)
E-SEELS — Silicone rubber polymer type ASTM D 1418

Mounting Nut: HEXSEALS: Brass, nickel-plated
E-SEELS: Brass, black-oxide

Temperature Range: HEXSEALS: -94°F to +400°F
E-SEELS: -80°F to +400°F

Pressure Range: Exceeds 15 psi internal and 1500 psi external.
(N5032B: 10 psi)

Operational Life: 50,000 actuations (minimum).

Shelf Life: Excess of 25 years.

Resistant to: Salt spray, sunlight, ozone, weather, fungus, and most acids and lubricating oils

Military Approvals: Most HEXSEALS are QPL-approved to MIL-B-5423. (See QPL listing on page 5.)

Agency Recognition: E-SEELS and HEXSEALS are UL-listed to UL Std. 50 types 1-13, and meet CSA standards.

Installation: Please see installation instructions on page 14.

HOW TO ORDER

Specify APM boot part number and, if necessary, the appropriate bushing adaptor part number (please see page 14).

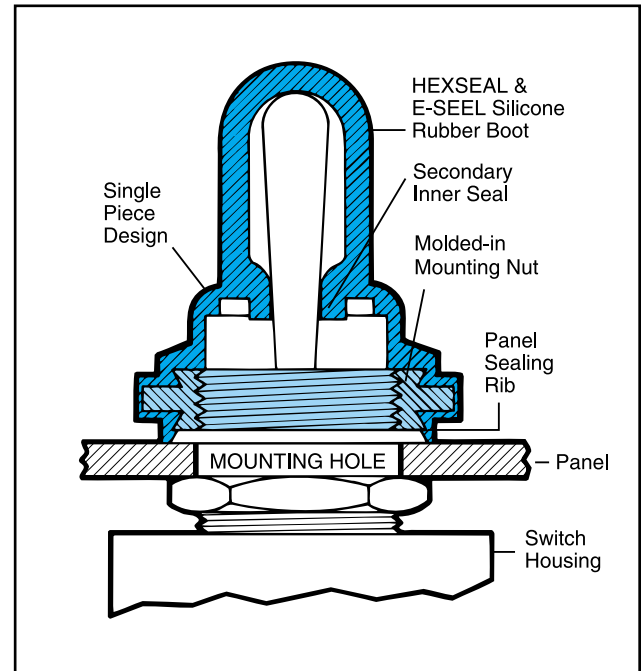
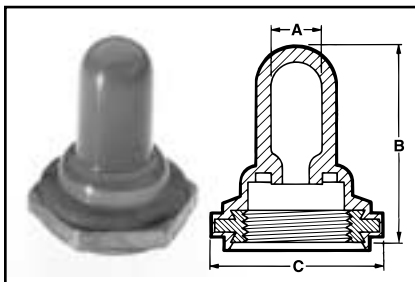


FIGURE 1 Full-Toggle Switch Boots (with integral secondary seal)

Figure 1

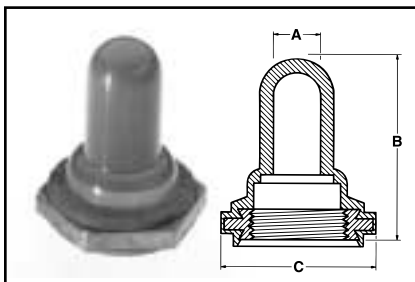


Thread Size	Max. Toggle Height Above Bushing (in.)	A Throat or I.D.		B Height		C Flat		Military Part Number	APM Boot Part Number	Color*	HEXSEAL	E-SEEL
		in.	mm	in.	mm	in.	mm					
1/4-40NS-2B	.31	.104	2.64	.422	10.72	.375	9.58	M5423/04-01	N-5030	Gray	•	
1/4-40NS-2B	.37	.062	1.53	.500	12.70	.375	9.52	M5423/05-01	N-5030L†	Gray	•	
1/4-40NS-2B	.28	.062	1.58	.390	9.91	.375	9.52	M5423/05-02	N-5030R	Gray	•	
1/4-40NS-2B	.50	.062	1.58	.594	15.08	.375	9.52	—	N-5030S	Gray	•	
15/32-32NS-2B	.66	.219	5.55	.844	21.44	.625	15.88	M5423/01-01	N-1030	Gray	•	
1/2-32NS-2B	.66	.219	5.55	.844	21.44	.625	15.88	—	N-1030 1/2-32	Gray	•	
15/32-32NS-2B	.71	.219	5.55	.937	23.81	.625	15.88	—	C1131/27	Black		•

*Other colors available. Please consult factory. †Material conforms to ZZ-R-765 Class III, Gr. 25

FIGURE 2 Full-Toggle Switch Boots (with constant I.D.)

Figure 2

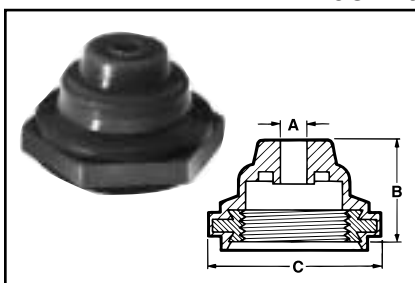


Thread Size	Max. Toggle Height Above Bushing (in.)	A Throat or I.D.		B Height		C Flat		Military Part Number	APM Boot Part Number	Color*	HEXSEAL	E-SEEL
		in.	mm	in.	mm	in.	mm					
M6 (metric)	.37	.116	2.95	.562	14.30	.352	9.00	—	1131/25	Black	•	
15/32-32NS-2B	.437	.210	5.35	.625	15.88	.625	15.88	—	1131/33	Gray	•	
M12 (metric)	.812	.234	5.95	.859	21.83	.625	15.88	—	1131/40	Black	•	
15/32-32NS-2B	.66	.219	5.55	.844	21.44	.625	15.88	M5423/01-02	IN-1030	Gray	•	
15/32-32NS-2B	.66	.256	6.50	.844	21.44	.625	15.88	—	1131/31	Gray	•	
15/32-32NS-2B	.90	.219	5.55	1.093	27.77	.625	15.88	—	1131/26	Gray	•	
15/32-32NS-2B	1.08	.390	9.92	1.328	33.37	.625	15.88	—	N-1002	Gray	•	
1/2-32NS-2B	.66	.219	5.55	.844	21.44	.625	15.88	—	IN-1030 1/2-32	Gray	•	
1/2-32NS-2B	.66	.256	6.50	.844	21.44	.625	15.88	—	1131/32	Black	•	
5/8-32UNS-2B	.78	.187	4.76	.844	21.44	.750	19.05	—	1131/23	Gray	•	
15/32-32NS-2B	.71	.219	5.55	.937	23.80	.625	15.88	—	C1131/28	Black		•

*Other colors available. Please consult factory.

FIGURE 3

Figure 3



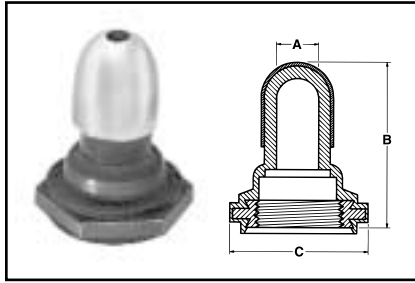
Half-Toggle Switch Boots (toggle actuator protrudes)

Thread Size	Toggle Diameter Accommodated (in.)	A Throat or I.D.		B Height		C Flat		Military Part Number	APM Boot Part Number	Color*	HEXSEAL	E-SEEL
		in.	mm	in.	mm	in.	mm					
1/4-40NS-2B	.062-.188	.047	1.19	.250	6.35	.375	9.53	M5423/11-01	N-5032B††	Gray	•	
15/32-32NS-2B	.155-.240	.078	1.98	.437	11.10	.625	15.88	M5423/02-01	N-1030B	Gray	•	
1/2-32NS-2B	.155-.240	.078	1.98	.437	11.10	.625	15.88	—	N-1030B 1/2-32	Gray	•	
15/32-32NS-2B	.155-.240	.078	1.98	.437	11.10	.625	15.88	—	C1132/20	Black		•

*Other colors available. Please consult factory. ††Material conforms to ZZ-R-765, Class II, GR. 40.

FIGURE 4

Armored Full Toggle Boots



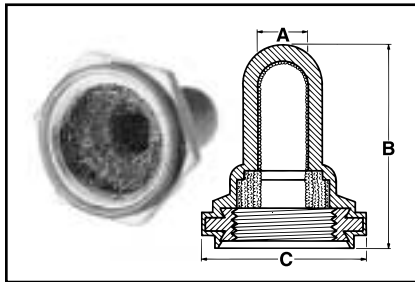
Thread Size	Max. Toggle Height Above Bushing (in.)	A Throat or I.D.		B Height		C Flat		Military Part Number	APM Boot Part Number	Color	HEXSEAL	E-SEAL
		in.	mm	in.	mm	in.	mm					
1 ⁵ / ₃₂ -32NS-2B	.66	.219	5.55	.875	21.44	.625	15.88	—	N-1030A	Gray	•	

Nickel plated brass cap bonded to boot.

Figure 4

FIGURE 5

EMI/RFI Shielded Full Toggle Boots



Thread Size	Max. Toggle Height Above Bushing (in.)	A Throat or I.D.		B Height		C Flat		Military Part Number	APM Boot Part Number	Color*	HEXSEAL	E-SEAL
		in.	mm	in.	mm	in.	mm					
1/4-40NS-2B	.36	.062	1.58	.500	12.70	.375	9.52	—	N-5030L RFI	Gray	•	
1 ⁵ / ₃₂ -32NS-2B	.66	.219	5.55	.844	21.44	.625	15.88	M5423/01-02	IN-1030 RFI	Gray	•	
1/2-32NS-2B	.66	.219	5.55	.844	21.44	.625	15.88	—	IN-1030 RFI 1/2-32	Gray	•	
1/4-40NS-2B	.28	.062	1.58	.390	9.90	.375	9.52	—	N-5030R RFI	Gray	•	
1/4-40NS-2B	.50	.062	1.58	.594	15.08	.375	9.52	—	N-5030S RFI	Gray	•	

*Other colors available. Please consult factory.

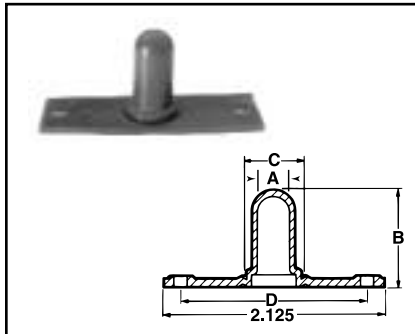
All standard EMI/RFI boots feature a knitted Monel shield. RFI/EMI shielded boots have an operational life of 15,000 actuations (minimum)

Figure 5

Back-of-Panel Mounted Toggle Switch Boots

FIGURE 6

Full Toggle Boot



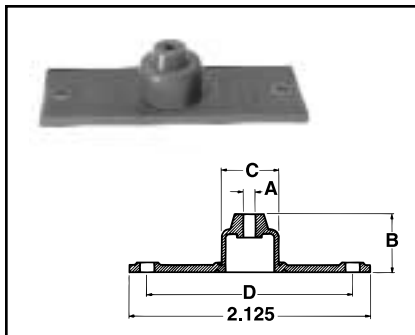
A Throat or I.D.		B Height		D Distance Between Mtg. Holes		Width		C Clearance Boot Hole Diameter		Military Part Number	APM Boot Part Number	Color*	HEXSEAL	E-SEAL
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm					
.315	7.91	.938	23.82	1.813	46.04	.750	19.05	.510	12.95	—	2030	Gray	•	

*Other colors available. Please consult factory.

Figure 6

FIGURE 7

Half Toggle Boot (Toggle Actuator Protrudes)



A Throat or I.D.		B Height		D Distance Between Mtg. Holes		Width		C Clearance Boot Hole Diameter		Military Part Number	APM Boot Part Number	Color*	HEXSEAL	E-SEAL
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm					
.093	2.38	.500	12.70	1.813	46.04	.750	19.05	.510	12.95	M5423/03-01	2030B	Gray	•	

*Other colors available. Please consult factory.

Figure 7

DIMENSIONS FOR REFERENCE ONLY.

Pushbutton Boots

HEXSEAL® and E-SEEL® push button boots are molded from a high tear-strength silicone rubber bonded to a built-in mounting nut. Each encloses the base of the protruding switch bushing and forms a watertight and dust-tight seal against the front panel surface.

SPECIFICATIONS

Material: HEXSEALS: Silicone rubber conforms to ZZ-R-765 Class III, Gr. 60 unless otherwise specified.
E-SEELS: Silicone rubber polymer type ASTM D1418.

Mounting Nut: HEXSEALS: Brass, nickel-plated (unless otherwise noted)
E-SEELS: Brass, black-oxide

Temperature Range: HEXSEALS: -94°F to +400°F
E-SEELS: -80°F to +400°F

Pressure Range: Exceeds 15 psi internal and 1500 psi external.

Operational Life: 50,000 actuations (minimum)

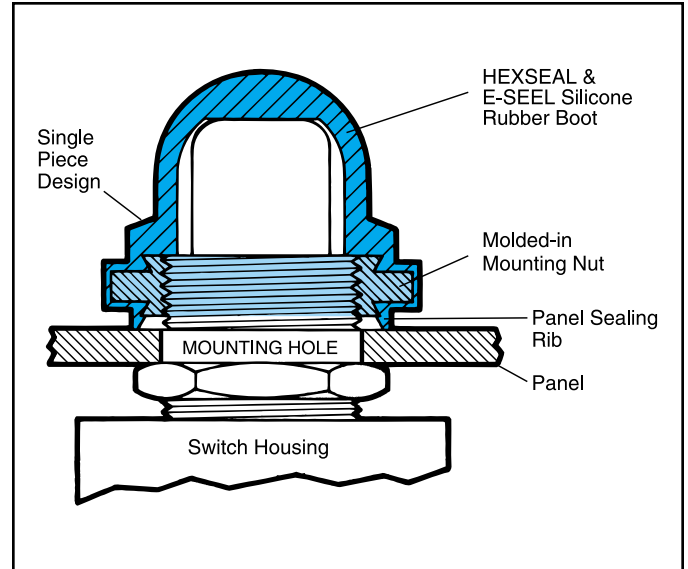
Shelf Life: In excess of 25 years

Resistant to: Salt spray, sunlight, ozone, weather, fungus, and most acids and lubricating oils

Military Approvals: Most HEXSEALS are QPL-approved to MIL-B-5423. (See QPL listing on page 5.)

Agency Recognition: E-SEELS and HEXSEALS are UL-listed to UL Std. 50 types 1-13, and meet CSA standards.

Installation: Please see installation instructions on page 14.



HOW TO ORDER

Specify APM boot part number and, if necessary, the appropriate bushing adaptor part number (please see page 14).

FIGURE 8 Full Pushbutton Boots

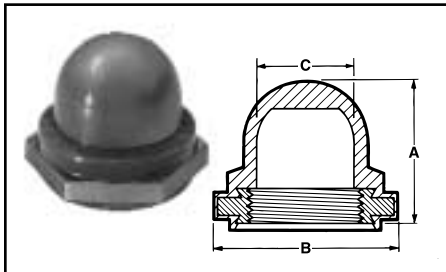


FIGURE 9

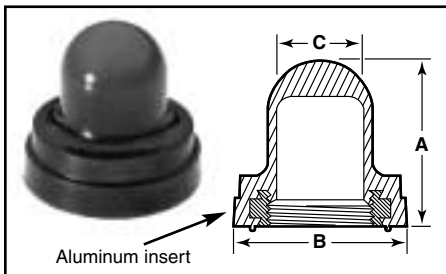


FIGURE 10

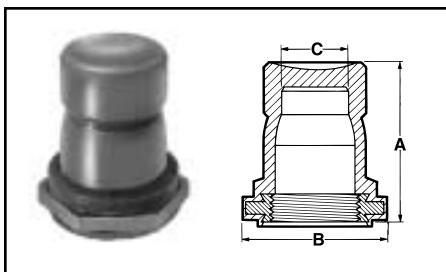


Figure 8

Thread Size	Max. Plunger Height		A		B Flat		C I.D.		Military Part Number	APM Boot Part Number	Color*	HEXSEAL	E-SEEL
	inch	mm	inch	mm	inch	mm	inch	mm					
8-40 NS-2B	.118	3.00	.226	5.70	.250	6.35	.125	3.18	—	1231/17	Gray	•	•
8-40 NS-2B	.188	4.76	.297	7.54	.250	6.35	.120	3.18	SCL6303A-03	N5045	Gray	•	•
1/4-32NS-2B	.203	5.16	.313	7.94	.375	9.53	.188	4.76	M5423/10-01	N5040G	Gray	•	•
1/4-32NS-2B	.453	11.51	.531	13.49	.375	9.53	.125	3.18	—	1231/32	Gray	•	•
1/4-40NS-2B	.141	3.57	.313	7.94	.375	9.53	.188	4.76	M5423/10-03	N5040	Gray	•	•
1/4-40NS-2B	.203	5.16	.313	7.94	.375	9.53	.188	4.76	M5423/10-02	N5040R	Gray	•	•
1/4-40NS-2B	.344	11.51	.531	13.49	.375	9.53	.125	3.18	—	1231/31	Gray	•	•
5/16-32UNEF-2B	.212	5.41	.359	9.13	.437	11.11	.156	3.97	—	1231/27	Gray	•	•
3/8-27NS-2B	.545	13.80	.653	16.60	.500	12.70	.300	7.60	—	1231/8	Gray	•	•
3/8-32NEF-2B	.545	13.80	.653	16.60	.500	12.70	.300	7.60	—	1231/35	Clear	•	•
7/16-28UNEF-2B	.438	11.11	.719	18.26	.625	15.88	.422	10.72	—	NC3030 7/16-28	Clear	•	•
7/16-32UN-2B	.438	11.11	.719	18.26	.625	15.88	.422	10.72	—	NC3030 7/16-32	Gray	•	•
15/32-32NS-2B	.281	7.14	.547	13.89	.625	15.88	.422	10.72	M5423/07-01	N3030	Gray	•	•
15/32-32NS-2B	.281	7.14	.547	13.89	.625	15.88	.422	10.72	M5423/07-11	N3030-2513	Clear	•	•
15/32-32NS-2B	.438	11.11	.719	18.26	.625	15.88	.422	10.72	M5423/07-02	NC3030	Gray	•	•
15/32-32NS-2B	.438	11.11	.719	18.26	.625	15.88	.422	10.72	M5423/07-12	NC3030-2513	Clear	•	•
1/2-32NS-2B	.281	7.14	.547	13.89	.625	15.88	.422	10.72	M5423/07-03	NH3030	Gray	•	•
1/2-32NS-2B	.188	4.76	.547	13.89	.625	15.88	.422	10.72	M5423/07-05	NH3030S	Gray	•	•
1/2-32NS-2B	.469	11.91	.734	18.65	.625	15.88	.422	10.72	—	NC3030H	Gray	•	•
5/8-24NEF-2B	.281	7.14	.609	15.48	.750	19.05	.515	13.10	M5423/07-04	N3040	Gray	•	•
15/32-32NS-2B	.281	7.14	.547	13.89	.625	15.88	.422	10.72	—	C1231/41	Black	•	•
15/32-32NS-2B	.438	11.11	.719	18.26	.625	15.88	.422	10.72	—	C1231/42	Black	•	•

Figure 9

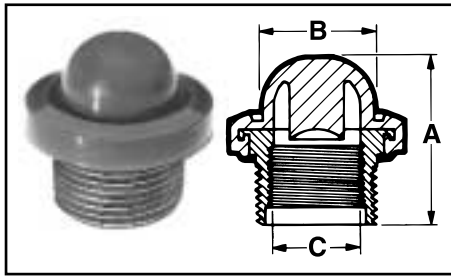
Thread Size	Max. Plunger Height		A		B O.D.		C I.D.		Military Part Number	APM Boot Part Number	Color*	HEXSEAL	E-SEEL
	inch	mm	inch	mm	inch	mm	inch	mm					
3/8-27NS-2B	.330	8.38	.609	15.48	.641	16.27	.320	8.11	—	1221/12	Gray	•	•
15/32-32NS-2B	.400	10.14	.719	18.26	.766	19.45	.375	9.53	—	1221/15	Gray	•	•
3/8-24NF-2B	.330	8.38	.609	15.48	.641	16.27	.320	8.11	—	C1221/22	Clear	•	•
3/8-27NS-2B	.330	8.38	.609	15.48	.641	16.27	.320	8.11	—	C1221/21	Black	•	•
3/8-27NS-2B	.330	8.38	.609	15.48	.641	16.27	.320	8.11	—	C1221/21 4	Clear	•	•
3/8-32NEF-2B	.330	8.38	.609	15.48	.641	16.27	.320	8.11	—	C1221/23	Clear	•	•

Mounting nut material: Aluminum

Figure 10

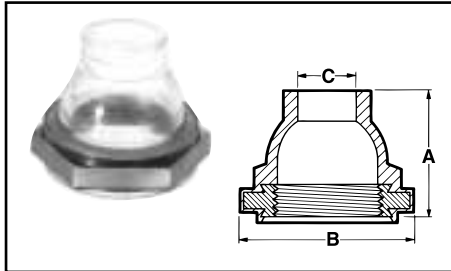
Thread Size	Max. Plunger Height		A		B Flat		C I.D.		Military Part Number	APM Boot Part Number	Color*	HEXSEAL	E-SEEL
	inch	mm	inch	mm	inch	mm	inch	mm					
7/16-28UNEF-2B	.313	7.94	.797	20.24	.625	15.88	.344	8.73	—	NC3030FL 7/16-28	Gray	•	•
7/16-32UN-2B	.313	7.94	.797	20.24	.625	15.88	.344	8.73	—	NC3030FL 7/16-32	Gray	•	•
15/32-32NS-2B	.313	7.94	.797	20.24	.625	15.88	.344	8.73	—	NC3030FL	Gray	•	•

*Other colors available. Please consult factory.

FIGURE 11 Panel-Mounted Full Pushbutton Boots
Figure 11


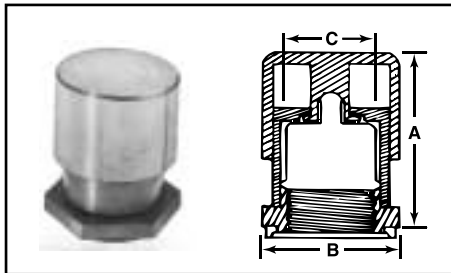
Outside Thread	Plunger-Bushing Height		A		B O.D.		C Inside Thread		Military Part Number	APM Boot Part Number	Color*	HEXSEAL	E-SEAL
	inch	mm	inch	mm	inch	mm	inch	mm					
5/8-27NS-2A	.438	11.11	.906	23.03	.875	22.23	1/2-32NS-2B		M5423/06-01†	3070	Gray	•	
5/8-24NEF-2A	.438	11.11	.906	23.02	.875	22.23	1/2-32NS-2B		M5423/06-03	3073	Gray	•	
5/8-27NS-2A	.688	17.46	.906	23.02	.875	22.23	1/2-32NS-2B		M5423/06-02†	3075	Gray	•	
5/8-24NEF-2A	.688	17.46	.906	23.02	.875	22.23	1/2-32NS-2B		M5423/06-04	3077	Gray	•	

*Other colors available. Please consult factory. †Inactive for new designs. Material conforms to ZZ-R-765 Class III, Gr. 50.

FIGURE 12 Half-Pushbutton Boots (Pushbutton Actuator Protrudes)
Figure 12


Thread Size	A Height		B Flat		C Throat		Military Part Number	APM Boot Part Number	Color*	HEXSEAL	E-SEAL
	inch	mm	inch	mm	inch	mm					
7/16-28NS-2B	.547	13.89	.625	15.88	.250	6.35	—	N3030B 7/16-28	Clear	•	
7/16-32UN-2B	.547	13.89	.625	15.88	.250	6.35	—	N3030B 7/16-32	Clear	•	
15/32-32NS-2B	.547	13.89	.625	15.88	.250	6.35	—	N3030B	Clear	•	
1/2-32NS-2B	.547	13.89	.625	15.88	.250	6.35	—	NH3030B	Clear	•	

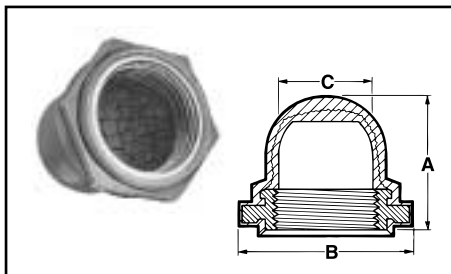
*Other colors available. Please consult factory.

FIGURE 13 Armored Pushbutton Boots
Figure 13


Thread Size	Plunger Height		A		B Flat		C I.D.		Military Part Number	APM Boot Part Number	Color	HEXSEAL	E-SEAL
	inch	mm	inch	mm	inch	mm	inch	mm					
15/32-32NS-2B	.438	11.11	.984	25.00	.750	19.05	.422	10.72	—	1238/1 SS	††	•	
15/32-32NS-2B	.438	11.11	.984	25.00	.750	19.05	.422	10.72	—	1238/5" SS	††	•	

*P/N 1238/5 features a 1 1/4" diameter actuator button.

††Stainless steel housing with silicone boot.

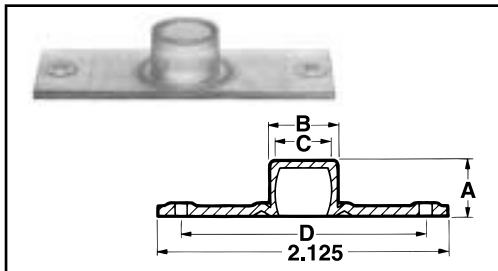
FIGURE 14 EMI/RFI Shielded Full Pushbutton Boots
Figure 14


Thread Size	Plunger Height		A		B Flat		C I.D.		Military Part Number	APM Boot Part Number	Color*	HEXSEAL	E-SEAL
	inch	mm	inch	mm	inch	mm	inch	mm					
15/32-32NS-2B	.281	7.14	.547	13.89	.625	15.88	.422	10.72	M5423/07-06	N3030RFI	Gray	•	
15/32-32NS-2B	.438	11.11	.719	18.26	.625	15.88	.422	10.72	M5423/07-07	NC3030RFI	Gray	•	
1/2-32NS-2B	.281	7.14	.547	13.89	.625	15.88	.422	10.72	M5423/07-08	NH3030RFI	Gray	•	
1/2-32NS-2B	.188	4.76	.547	13.89	.625	15.88	.422	10.72	M5423/07-10	NH3030SRFI	Gray	•	
5/8-24NEF-2B	.281	7.14	.609	15.48	.750	19.05	.516	13.10	M5423/07-09	N3040RFI	Gray	•	
1/2-32NS-2B	.469	11.91	.734	18.65	.625	15.88	.422	10.72	—	NC3030HRFI	Gray	•	

*Other colors available. Please consult factory.

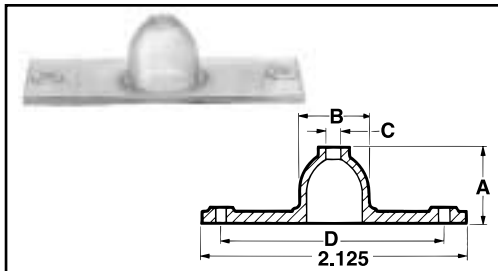
All standard EMI/RFI boots feature a molded knitted Monel shield. EMI/RFI shielded pushbutton boots have an operational life of 15,000 actuations (minimum)

Back-of-Panel Mounted Pushbutton Boots

FIGURE 15 Full Pushbutton Boots
Figure 15


A Height		B O.D.		C		D Hole Locations		Width		Military Part Number	APM Boot Part Number	Color	HEXSEAL	E-SEAL
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm					
.906	23.02	.531	13.49	.453	11.51	1.813	46.04	.750	19.05	—	3050	Clear	•	
.399	10.13	.438	11.11	.359	9.13	1.813	46.04	.750	19.05	—	3051	Clear	•	

Part numbers in this group conform to ZZ-R-765 Class III, Gr. 50.

FIGURE 16 Half Pushbutton Boots (Pushbutton Actuator Protrudes)
Figure 16


A Height		B O.D.		C Throat		D Hole Locations		Width		Military Part Number	APM Boot Part Number	Color	HEXSEAL	E-SEAL
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm					
.578	14.68	.531	13.49	.156	3.97	1.813	46.04	.750	19.05	—	3050B	Clear	•	

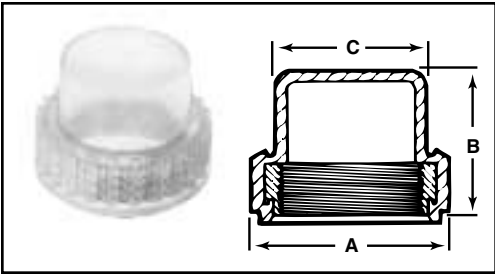
Part numbers in this group conform to ZZ-R-765 Class III, Gr. 50.

Indicator & Illuminated Pushbutton Switch Seals

HEXSEAL® indicator and lighted pushbutton switch boots are molded from RUBRGLAS™, APM's proprietary transparent silicone rubber formulation, bonded to a threaded metal insert. Each encloses the base of the protruding indicator or lighted pushbutton switch bushing and forms a watertight and dust-tight seal against the front panel surface.

FIGURE 17 RUBRGLAS® Seals

Figure 17



Thread Size	A Width		B Height		C Boot O.D.		Fits Indicator Light #	Military Part Number	APM Boot Part Number	Color	HEXSEAL
	inch	mm	inch	mm	inch	mm					
11/16-32NS-2B	1.000	25.40	.750	19.04	.712	18.08	MS-25041	—	4082	Clear	•
11/16-32NS-2B	1.000	25.40	1.000	25.40	.712	18.08	—	—	4086	Clear	•
13/16-32NS-2B	1.125	28.58	.812	20.64	.843	21.43	—	—	4080	Clear	•
7/8-32NS-2B	1.125	28.58	.812	20.64	.858	21.79	—	—	4085	Clear	•
.850-24NS-2B	1.125	28.58	.812	20.64	.838	21.28	—	—	4088	Clear	•

RUBRGLAS™ seals have an operational life of 30,000 actuations (minimum), and a pressure rating of 15 psi internal/external. Note: See page 15 for example of custom designed seals for lighted pushbutton switches. DIMENSIONS FOR REFERENCE ONLY.



Matching Colorizing Incandescent Lamp Filters Available

APM HEXSEAL also offers a broad range of silicone colorizing filters for miniature incandescent lamps. These easy-to-install filters turn a white/clear lamp into a colored indicator. Ask for SiliKrome® catalog SK100.

Handset Switch Boots

Ideal for wireless communications applications, HEXSEAL® handset switch boots are engineered to rugged specifications, withstanding a minimum of half a million actuations.



SPECIFICATIONS

- Material:** Boot: Silicone rubber. Conforms to ZZ-R-765 Class III, Gr. 50
- Temperature Range:** -94°F to +400°F
- Shelf Life:** Excess of 25 years.
- Operational Life:** 500,000 actuations, minimum.
- Resistant to:** Salt spray, weather, sunlight, ozone and most acids
- Military Specifications:** Most Hexseal products are QPL approved under Mil-B-5423. For QPL listing, see page 5.

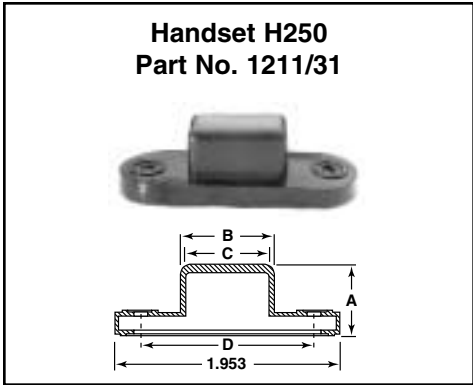
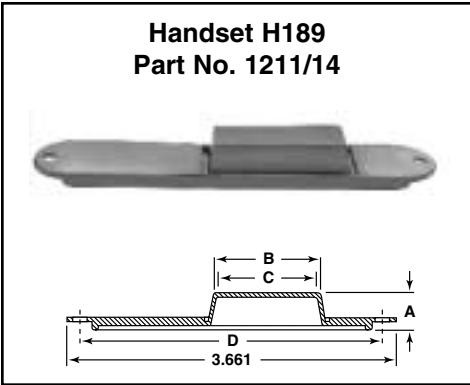
FIGURES 18, 19 & 20 DESCRIPTION	A		B		C		D Hole Locations		Width		Military Part Number	APM Part Number	Color*	HEXSEAL
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm				
Microphone M52, Handset H33/PT	.652	16.5	2.248	57.1	2.148	54.5	2.594	66.0	.612	15.5	M5423/15-01	1211/13	Gray	•
Handset H189	.406	10.4	1.300	33.0	1.250	31.7	3.380	85.9	.700	11.3	M5423/15-02	1211/14	Black	•
Handset H250	.576	14.6	.808	20.5	.718	18.2	1.500	38.0	.687	17.5	M5423/15-03	1211/31	Black	•

*Other colors available. Please consult factory.

FIGURE 18

FIGURE 19

FIGURE 20



DIMENSIONS FOR REFERENCE ONLY.

Rotary Shaft Seals For Switches & Potentiometers

HEXSEAL® and E-SEEL® rotary shaft seals are molded from a high tear-strength silicone rubber bonded to a built-in mounting nut. Each seal surrounds the rotary shaft and forms a watertight and dust-tight seal against the shaft and front panel surface.

SPECIFICATIONS

Material: HEXSEALS: Silicone rubber conforms to ZZ-R-765 Class III, GR 60 (unless otherwise specified)

E-SEELS: Silicone rubber polymer type ASTM D 1418

Mounting Nut: HEXSEALS: Brass, nickel-plated

E-SEELS: Brass, black oxide

Temperature Range: HEXSEALS: -94°F to +400°F

E-SEELS: -80°F to +400°F

Pressure Range: Exceeds 15 psi internal and 1500 psi external

Operational Life: 50,000 actuations, minimum

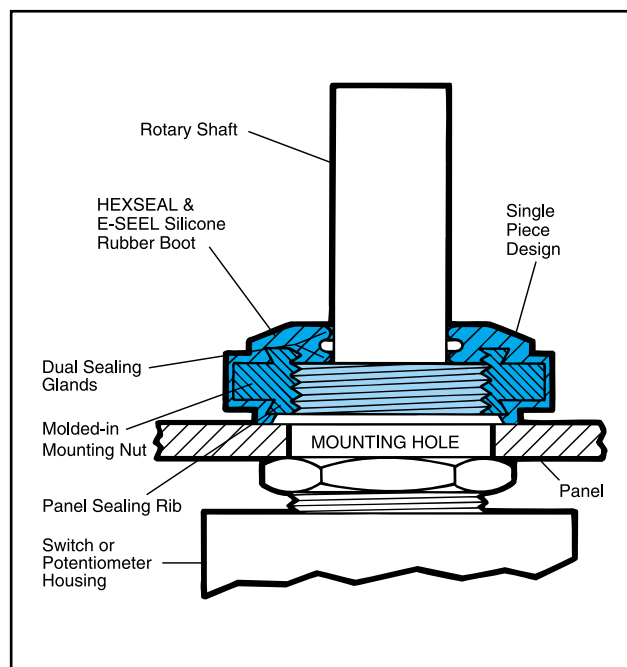
Shelf Life: In excess of 25 years

Resistant to: Salt spray, sunlight, ozone, weather, fungus and most acids and lubricating oils

Military Approvals: Most HEXSEALS are QPL-approved under MIL-B-5423 (see QPL listing on page 5)

Agency Recognition: E-SEELS and HEXSEALS are UL-listed to UL Std. 50 types 1-13, and meet CSA standards

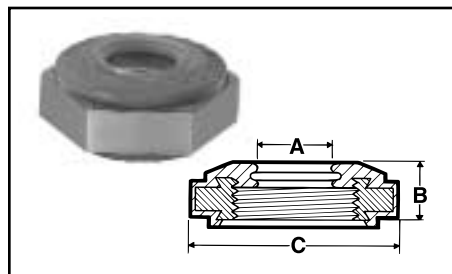
Installation: Please see installation instructions on page 14.



HOW TO ORDER

Specify APM boot part number and, if necessary, the appropriate bushing adaptor part number (please see page 14).

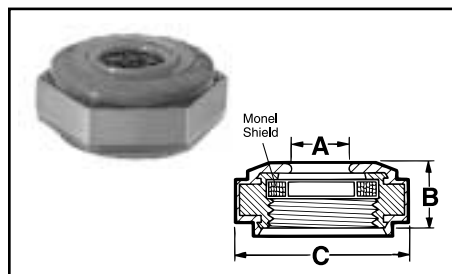
FIGURE 21 Rotary Shaft Seals



Thread Size	A Shaft Size		B Height		C Flat		Military Part Number	APM Boot Part Number	Color*	HEXSEAL	E-SEEL
	inch	mm	inch	mm	inch	mm					
1/4-28NF2B	.125	3.18	.219	5.56	.375	9.53	—	N9042 x 1/8	Gray	•	•
1/4-32NEF-2B	.125	3.18	.219	5.56	.375	9.53	M5423/09-03	N9040 x 1/8	Gray	•	•
3/8-32NEF-2B	.125	3.18	.219	5.56	.500	12.70	M5423/09-01	N9030 x 1/8	Gray	•	•
3/8-32NEF-2B	.188	4.78	.219	5.56	.500	12.70	—	N9030 x 3/16	Gray	•	•
3/8-32NEF-2B	.250	6.35	.219	5.56	.500	12.70	M5423/09-02	N9030 x 1/4	Gray	•	•
3/8-32NEF-2B	.250	6.35	.359	9.12	.500	12.70	—	N9033 x 1/4	Gray	•	•
15/32-32NS-2B	.250	6.35	.219	5.56	.625	15.88	M5423/09-04	N9060 x 1/4	Gray	•	•
1/2-32NS-2B	.250	6.35	.219	5.56	.625	15.88	M5423/09-06	N9063 x 1/4	Gray	•	•
5/8-24NEF-2B	.375	9.53	.219	5.56	.750	19.05	M5423/09-05	N9065 x 3/8	Gray	•	•
5/8-24NEF-2B	.500	12.70	.219	5.56	.750	19.05	—	N9065 x 1/2	Gray	•	•
3/8-32NEF-2B	.250	6.35	.219	5.56	.500	12.70	—	C1332/40	Black	•	•

*Other colors available. Please consult factory.

FIGURE 22 RFI/EMI Shielded Rotary Shaft Seals

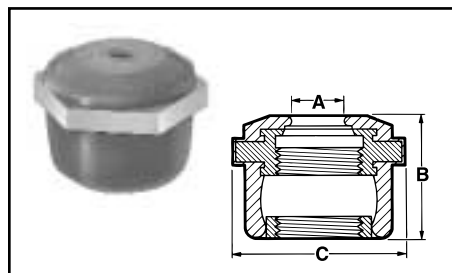


Thread Size	A Shaft Size		B Height		C Flat		Military Part Number	APM Boot Part Number	Color*	HEXSEAL	E-SEEL
	inch	mm	inch	mm	inch	mm					
1/4-32NF2B	.125	3.18	.219	5.56	.375	9.53	M5423/09-09	N9040 x 1/8 RFI	Gray	•	•
3/8-32NEF-2B	.125	3.18	.219	5.56	.500	12.70	M5423/09-07	N9030 x 1/8 RFI	Gray	•	•
3/8-32NEF-2B	.250	6.35	.219	5.56	.500	12.70	M5423/09-08	N9030 x 1/4 RFI	Gray	•	•
3/8-32NEF-2B	.250	6.35	.359	9.12	.500	12.70	M5423/09-14	N9033 x 1/4 RFI	Gray	•	•
15/32-32NS-2B	.250	6.35	.219	5.56	.625	15.88	M5423/09-10	N9060 x 1/4 RFI	Gray	•	•
5/8-24NEF-2B	.375	9.53	.219	5.56	.750	19.05	M5423/09-11†	N9065 x 3/8 RFI	Gray	•	•
1/2-32NS-2B	.250	6.35	.219	5.56	.625	15.88	M5423/09-12	N9063 x 1/4 RFI	Gray	•	•
1/4-28NF-2B	.125	3.18	.219	5.56	.375	9.53	—	N9042 x 1/8 RFI	Gray	•	•
3/8-32NEF-2B	.125	3.18	.531	13.49	.625	15.88	—	NLK9030 x 1/8 RFI	Gray	•	•
3/8-32NEF-2B	.250	6.35	.531	13.49	.625	15.88	—	NLK9030 x 1/4 RFI	Gray	•	•

*Other colors available. Please consult factory. †Inactive for new designs.

All Standard RFI/EMI boots feature knitted Monel wire shields.

FIGURE 23 Locking Rotary Shaft Seals



Thread Size	A Shaft Size		B Height		C Flat		Lock Nut O.D.		Military Part Number	APM Boot Part Number	Color*	HEXSEAL	E-SEEL
	inch	mm	inch	mm	inch	mm	inch	mm					
1/4-32NS-2B	.125	3.18	.500	12.70	.500	12.70	.344	8.74	—	NLK9040 x 1/8	Gray	•	•
3/8-32NS-2B	.125	3.18	.531	13.49	.625	15.88	.469	11.91	—	NLK9030 x 1/8	Gray	•	•
3/8-32NS-2B	.250	6.35	.531	13.49	.625	15.88	.469	11.91	—	NLK9030 x 1/4	Gray	•	•

*Other colors available. Please consult factory.

DIMENSIONS FOR REFERENCE ONLY.

Rocker Switch Boots

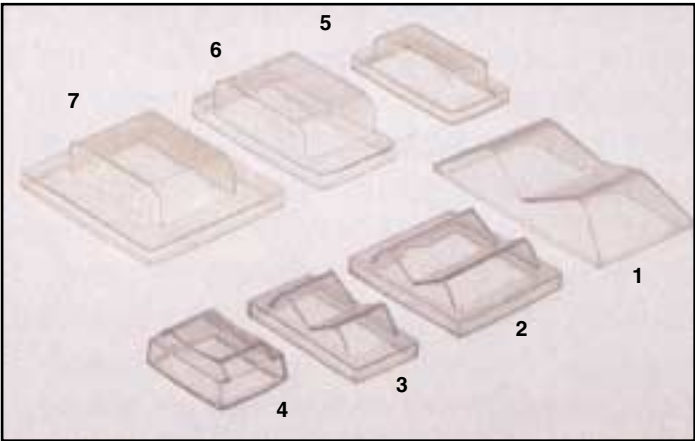
E-SEEL® (Rock-R-Seel™) rocker switch boots are molded from RUBRGLAS™ — APM's proprietary high tear-strength, transparent silicone rubber. These durable and flexible boots seal out dust, dirt, and moisture ... without compromising switch operability, position status viewing or legend visibility. Each is designed to fully enclose the switch bezel, while our unique molded-in “panel sealing rib” forms a watertight and dust-tight seal against the front panel surface.

SPECIFICATIONS

- Material:** APM RUBRGLAS™ (transparent silicone rubber), polymer type, ASTM D1418
- Temperature Range:** -80°F to +400°F
- Operational Life:** 50,000 actuations (minimum)
- Resistant to:** Salt spray, sunlight, ozone, weather, fungus, and most acids and lubricating oils
- Agency Recognition:** Rock-R-Seels™ are UL-listed to UL Std. 50, types 1, 2, 4R, 5, 12, 12K, 13, and meet CSA standards
- Shelf Life:** Excess of 25 years

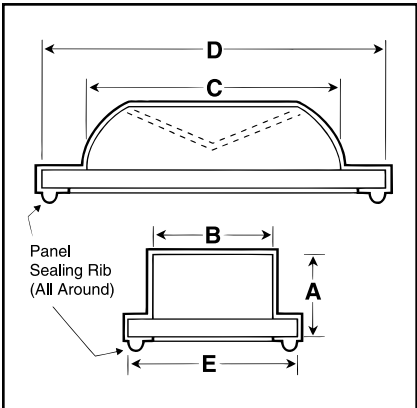
HOW TO ORDER

Specify APM boot part number.

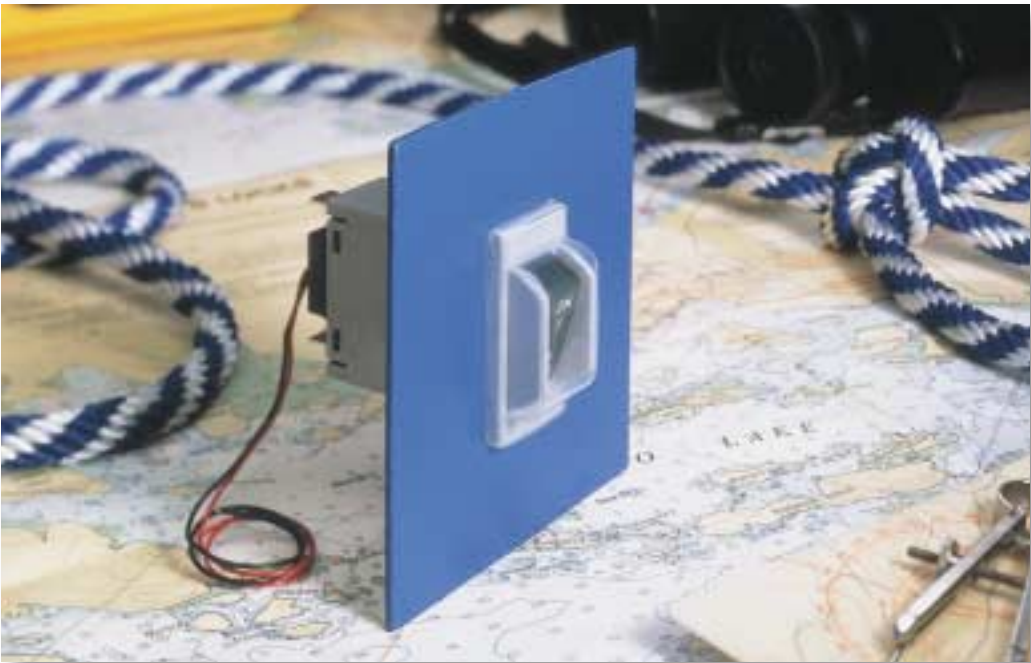


PHOTOS 1-7

Photo #	E-SEEL Part #	Dimensions										Compatible with These Rocker Switch Manufacturers (Partial List)	
		A		B		C		D		E			
		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm		
1	C1111/7	.359	9.13	.609	15.48	.937	23.81	1.703	43.26	.900	22.87	Consult Factory	
2	C1113/62	.297	7.54	.797	20.24	.687	17.46	1.093	27.78	.968	24.61	Arrow Hart – 2600 Series	
3	C1113/63	.297	7.54	.406	10.32	.687	17.46	1.093	27.78	.515	13.10	Arrow Hart – 2600 Series	
4	C1113/66	.228	5.79	.348	8.84	.531	13.46	.750	19.05	.531	13.49	Carlingswitch #621	
5	C1113/70	.297	7.54	.437	11.11	.875	22.23	1.218	30.96	.640	16.27	Carlingswitch RSC Series	
6	C1113/71	.413	10.49	.687	17.46	1.046	26.59	1.327	36.51	.703	17.86	Carlingswitch	M Series
	C1113/80	.560	14.22	.750	19.05	1.375	34.92	1.750	44.45	.900	22.86	Airpax R11	LC-1
7	C1113/75	.413	10.49	.687	17.46	1.046	26.59	1.437	36.51	1.390	35.32	Eaton/Heinemann	Carling LT16
Not Shown	C1213/53	.312	9.14	.700	19.81	.700	19.81	1.120	29.21	.800	23.11	Oslo	S Series
	C1213/60	.350	10.16	1.000	21.08	.820	21.08	1.120	29.21	.800	23.11	Oslo	S Series



DIMENSIONS FOR REFERENCE ONLY.



Carlingswitch
M Series Rocker Actuator Switch
with C1113/71 E-SEEL

Economy Switch Seals

SNAPSEELS®

SNAPSEELS® combine economy with performance for more moderate temperature conditions and lower-demand commercial-grade applications. Each consists of a molded neoprene boot which snaps over a specially designed shouldered mounting nut. These inexpensive boots are an ideal way to protect switches and potentiometers against dust, dirt, grease and moderate amounts of moisture.

SPECIFICATIONS

Material: Boot: Neoprene.

Color: Black (other materials and colors available on special order.)

Temperature Range: -65°F to +300°F

Shelf Life: 2 years.

Mounting Nut: Aluminum (see table below)

Installation: A. Mount the switch using SNAPSEEL shouldered mounting nut.
B. Press SNAPSEEL over switch actuator and snap over nut.

HOW TO ORDER

Select boot to fit switch type and dimensions. Choose shouldered mounting nut to mate with selected boot. **SEE TABLE BELOW FOR SHOULDERED MOUNTING NUT OPTION.** For example: When ordering a pushbutton boot PN 1211/10, also order its companion shouldered mounting nut P/N 2120/122/1.

Pushbutton Boots

Part No. 1211/10

Pushbutton Height from panel: Up to 9/16"

Pushbutton Diameter: Up to 1/4"

Bushing Diameter: 15/32" maximum

Part No. 1211/5

Pushbutton Height from panel: Up to 9/16"

Pushbutton Diameter: Up to 1/4"

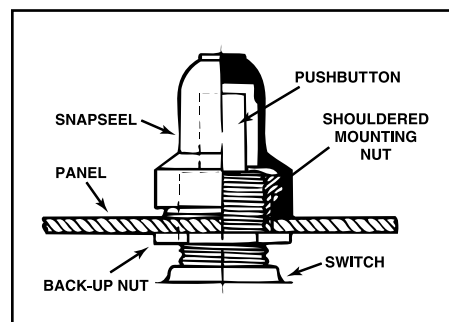
Bushing Diameter: 3/8" maximum

Part No. 1211/32

Pushbutton Height from panel: Up to 19/64"

Pushbutton Diameter: Up to 1/8"

Bushing Diameter: 1/4" maximum



Toggle Switch Boots

Part No. 1111/4

Bat Handle Height from panel: 7/8"

Bat Handle Diameter: Up to 1/4"

Bushing Diameter: 15/32" maximum

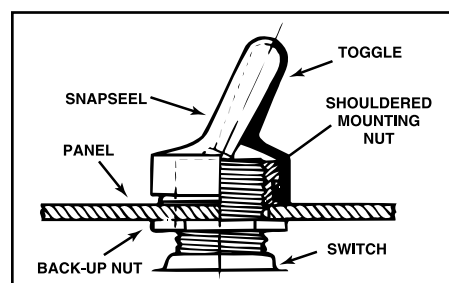
Part No. 1111/9

Subminiature Toggle Boot

Bat Handle Heights from panel: Up to 9/16"

Bat Handle Diameter: Up to 1/8"

Bushing Diameter: 1/4" maximum



Rotary Shaft Boots

Part No. 1312/7

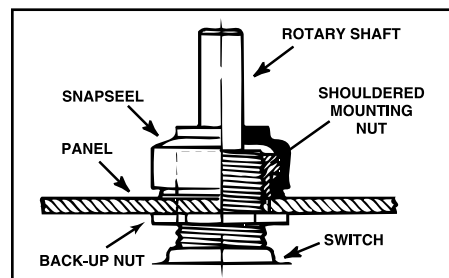
Shaft Diameter: 1/4" nominal

Bushing Diameter: 3/8" maximum

Part No. 1312/8

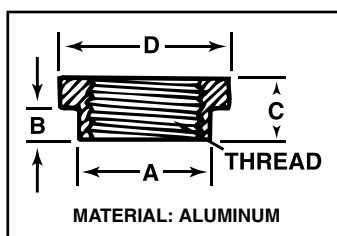
Shaft Diameter: 1/8" nominal

Bushing Diameter: 1/4" maximum



SNAPSEEL™ Shouldered Mounting Nut Selection Chart

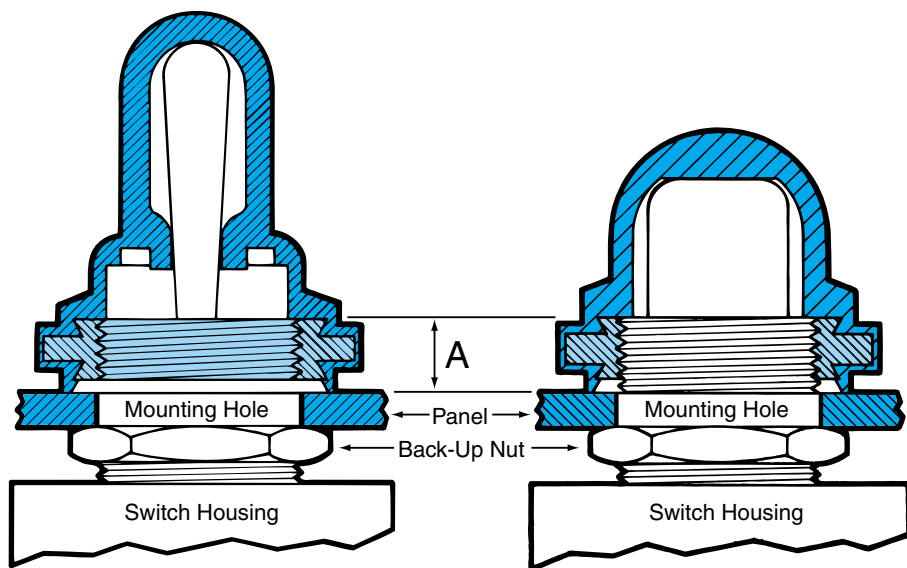
TO INSURE PROPER DESIGN FUNCTION, SNAPSEEL MUST BE USED WITH APM SHOULDER TYPE NUT (SEE CHART FOR SIZES). METRIC THREAD AVAILABLE ON REQUEST.



APM Part No. (Shouldered Nut)	Bushing Thread Size*	For use with SNAPSEEL P/N	Dimensions			
			A	B	C	D
2120/122/1	15/32-32	1211/10, 1111/4	17/32"	3/32"	11/64"	5/8"
2120/122/2	3/8-27	1211/5, 1312/7	13/32"	3/32"	11/64"	1/2"
2120/122/3	3/8-32	1211/5, 1312/7	13/32"	3/32"	11/64"	1/2"
2120/122/5	1/4-40	1211/32	9/32"	3/64"	3/32"	5/16"
2120/122/6	M6 x .75	1111/9				
2120/122/7	10-48	1312/8				
2120/122/9	1/4-32					
2120/122/10	12-24					

*Other thread sizes available. Please consult factory.

INSTALLATION INSTRUCTIONS FOR THREADED HEXSEAL® & E-SEAL® BOOTS

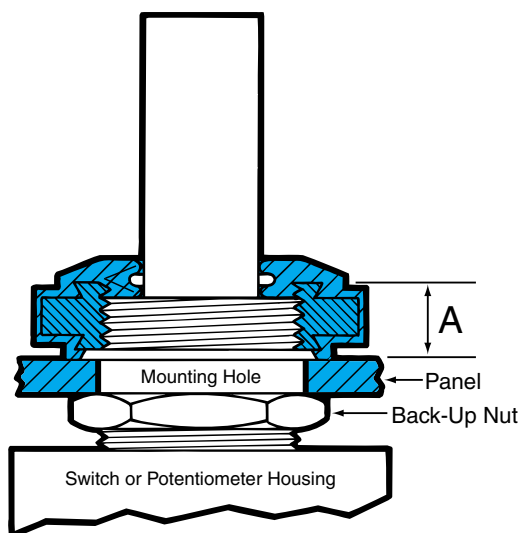


IMPORTANT — CAUTION

STEP 3: THREAD RULE DIMENSION A

3 to 4 threads (maximum) for
all toggle pushbutton
and rotary shaft seals
(except N5000 series).

2 to 3 threads (maximum) for
N5000 series.



For proper installation of these boots, follow these five sequential steps. It is **EXTREMELY IMPORTANT** that the number of threads on the switch/potentiometer bushing **EXPOSED ABOVE THE FRONT PANEL SURFACE** be within the recommendation (see chart above). Failure to respect these maximums may result in boot damage (such as tearing).

STEP 1. Remove front mounting nut from switch bushing.

STEP 2. Put threaded bushing through panel.

STEP 3. Adjust back-up nut to allow the specified number of threads to protrude past front of panel (see Dimension "A" above).

STEP 4. If needed, install appropriate bushing adaptor.

STEP 5. Install switch boot in place of front mounting nut.

RECOMMENDED INSTALLATION TOOLS:

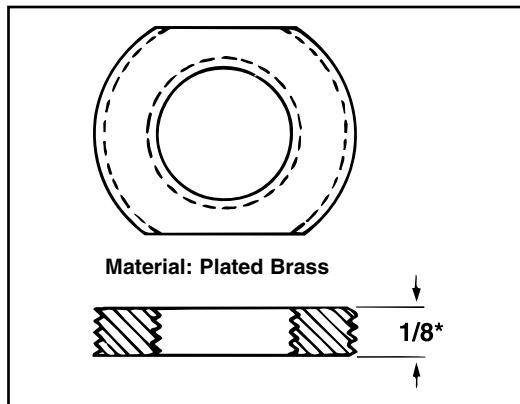
- Six point hex socket wrench.
- Spintite.
- Adjustable wrench (without serrated jaws).

Threaded Bushing Adaptors

Inside (Bushing) Thread Size (Class 2B)	Outside (Boot) Thread Size (Class 2A)	APM Part Number
3/8-32	15/32-32	2500/1/5*
15/32-32	11/16-32	2500/1/7
1/2-32	11/16-32	2500/1/10
15/32-32	13/16-32	2500/1/8
1/2-24	13/16-32	2500/1/9
5/8-24	13/16-32	2500/1/11
5/8-24	7/8-32	2500/1/12
3/4-32	7/8-32	2500/1/13*
3/4-20	7/8-32	2500/1/14*

*5/32" thick.

Additional sizes, including metric, available. Please consult factory.



*Unless otherwise noted.