

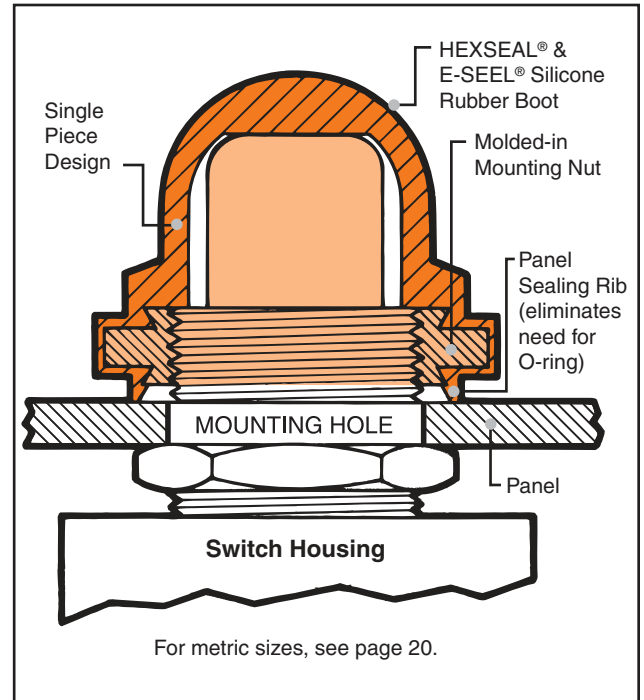
# Sealing Boots for Pushbutton-Actuated Switches

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

## SPECIFICATIONS

<b>Material</b> .....	HEXSEALS: Silicone rubber conforms to A-A-59588, Class 3B, Grade 50 unless otherwise specified. E-SEELS: Silicone rubber polymer type ASTM D1418
<b>Mounting Nut</b> .....	HEXSEALS: Brass, nickel-plated E-SEELS: Brass, black-oxide
<b>Temperature Range</b> .....	HEXSEALS: -94°F to +400°F (-70°C to +204°C) E-SEELS: -80°F to +400°F (-62°C to +204°C)
<b>Enclosure Protection</b> .....	NEMA/UL/ULC Types 1, 2, 3, 3S, 3R, 4, 4X, 6P, 12, 13; IEC IP66/IP68
<b>Pressure Range</b> .....	Exceeds 15 psi internal and 1500 psi external
<b>Operational Life</b> .....	100,000 actuations (minimum)
<b>Shelf Life</b> .....	Excess of 25 years
<b>Resistant to</b> .....	Salt spray, sunlight, ozone, weather, fungus, and most acids and lubricating oils
<b>Military Specs*</b> .....	Most HEXSEALS meet MIL-DTL-5423. (See listing on page 6)
<b>Agency Recognition</b> .....	UL & ULC Recognized Component to UL Std. 50
<b>Installation</b> .....	Please see installation instructions on page 19

\*APM's policy is to manufacture our HEXSEAL® sealing boots as defined by the requirements of MIL-Spec MIL-DTL-5423 which we regard as the standard for the switch, circuit breaker and potentiometer industry. These requirements were formulated based on our original patent.

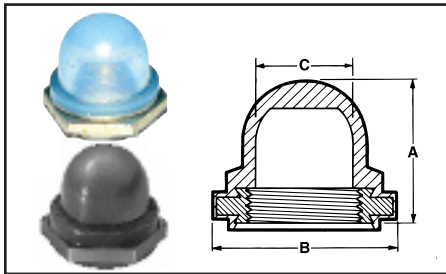


## HOW TO ORDER

Specify APM boot part number and, if necessary, the appropriate bushing adaptor part number (please see page 19).

FIGURE 8 Full Pushbutton Boots – IP66/68 Rated

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	•	
3/8-24NEF-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	•	•

IP66/68 Rated Figure 9

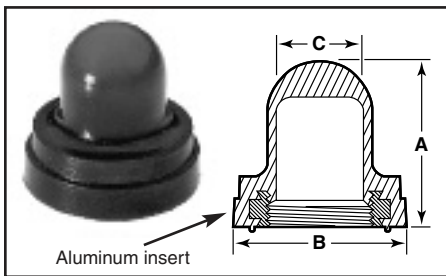


FIGURE 9

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

IP66/68 Rated Figure 10

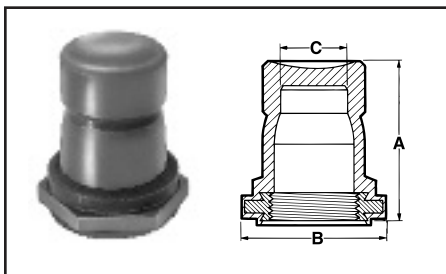


FIGURE 10

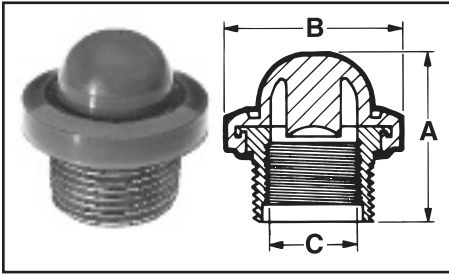
Thread Size	Max. Plunger Height		A		B Flat		C I.D.		Military Part Number	APM Boot Part Number	Color*	HEXSEAL	E-SEEL
	inch	mm	inch	mm	inch	mm	inch	mm					
7/16-28UNEF-2B	.313	7.94	.797	20.24	.625	15.88	.344	8.73	—	NC3030FL 7/16-28	Gray	•	
7/16-32UN-2B	.313	7.94	.797	20.24	.625	15.88	.344	8.73	—	NC3030FL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

DIMENSIONS FOR REFERENCE ONLY. Current dimensional drawings can be viewed on our website and CAD drawings can also be downloaded.

**FIGURE 11 Panel-Mounted Full Pushbutton Boots – IP66/68 Rated**

**Figure 11**

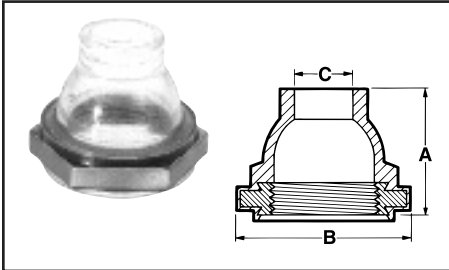


Outside Thread	Plunger-Bushing Height		A		B O.D.		C Inside Thread	Military Part Number	APM Boot Part Number	Color*	HEXSEAL	E-SEAL
	inch	mm	inch	mm	inch	mm						
5/8-27NS-2A	.438	11.12	.844	21.44	.875	22.23	1/2-32NS-2B	M5423/06-01†	3070	Gray	•	
5/8-24NEF-2A	.438	11.12	.844	21.44	.875	22.23	1/2-32NS-2B	M5423/06-03	3073	Gray	•	
5/8-27NS-2A	.688	17.47	.844	21.44	.875	22.23	1/2-32NS-2B	M5423/06-02†	3075	Gray	•	
5/8-24NEF-2A	.688	17.47	.844	21.44	.875	22.23	1/2-32NS-2B	M5423/06-04	3077	Gray	•	

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

**FIGURE 12 Half-Pushbutton Boots (Pushbutton Actuator Protrudes) – IP66/68 Rated**

**Figure 12**

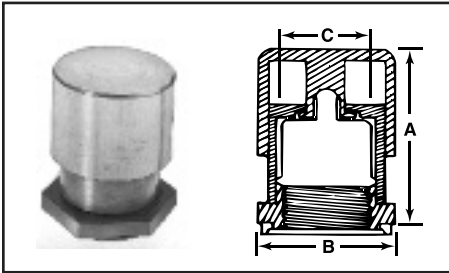


Thread Size	A Height		B Flat		C Throat		Military Part Number	APM Boot Part Number	Color*	HEXSEAL	E-SEAL
	inch	mm	inch	mm	inch	mm					
7/16-28NS-2B	.547	13.89	.625	15.88	.250	6.35	—	N3030B 7/16-28	Clear	•	
7/16-32UN-2B	.547	13.89	.625	15.88	.250	6.35	—	N3030B 7/16-32	Clear	•	
15/32-32NS-2B	.547	13.89	.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 – IP66/68 Rated**

**Figure 13**



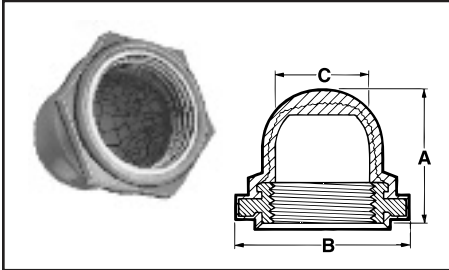
Thread Size	Plunger Height		A		B Flat		C I.D.		Military Part Number	APM Boot Part Number	Color	HEXSEAL	E-SEAL
	inch	mm	inch	mm	inch	mm	inch	mm					
15/32-32NS-2B	.438	11.11	.984	25.00	.750	19.05	.422	10.72	—	1238/1 SS	††	•	
15/32-32NS-2B	.438	11.11	.984	25.00	.750	19.05	.422	10.72	—	1238/5* SS	††	•	

\*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 – IP66/68 Rated**

**Figure 14**



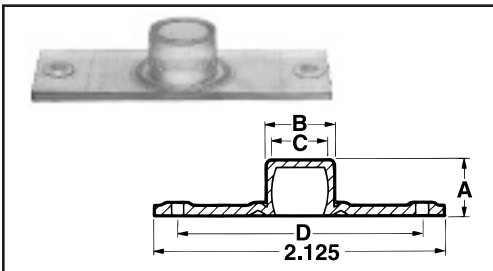
Thread Size	Plunger Height		A		B Flat		C I.D.		Military Part Number	APM Boot Part Number	Color*	HEXSEAL	E-SEAL
	inch	mm	inch	mm	inch	mm	inch	mm					
15/32-32NS-2B	.281	7.14	.547	13.89	.625	15.88	.422	10.72	M5423/07-06	N3030RFI	Gray	•	
15/32-32NS-2B	.438	11.11	.719	18.26	.625	15.88	.422	10.72	M5423/07-07	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**

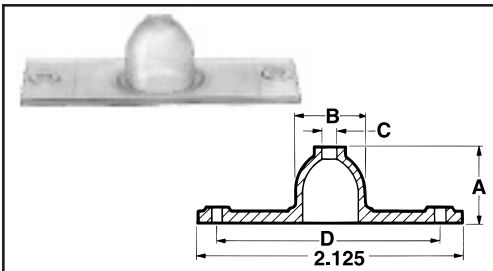


A Height		B O.D.		C		D Hole Locations		Width		Military Part Number	APM Boot Part Number	Color	HEXSEAL	E-SEAL
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm					
.906	23.02	.531	13.49	.453	11.51	1.813	46.04	.750	19.05	—	3050	Clear	•	
.399	10.13	.438	11.11	.359	9.13	1.813	46.04	.750	19.05	—	3051	Clear	•	

Part numbers in this group conform to A-A-59588 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 A-A-59588 Gr. 50.

DIMENSIONS FOR REFERENCE ONLY.

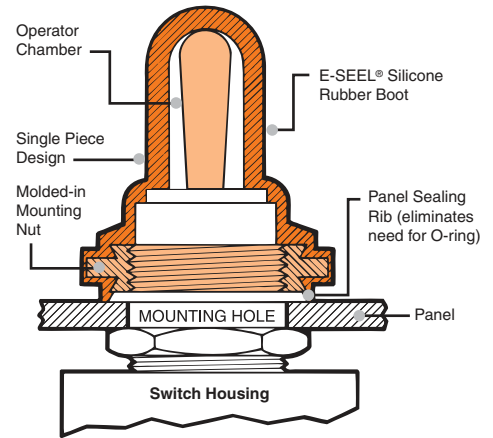
Current dimensional drawings can be viewed on our website and CAD drawings can also be downloaded.



# METRIC Sizes for Toggle, Pushbutton and Rotary Switches and Circuit Breakers

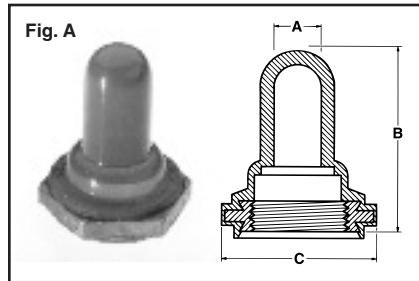
## SPECIFICATIONS

**Material**.....Silicone rubber polymer type ASTM D 1418  
**Mounting Nut**.....Brass, black-oxide. \*Brass, nickel-plated.  
**Temperature Range**....-80°F to +400°F (-62°C to +204°C)  
**Enclosure Protection**..NEMA/UL/ULC Types 1, 2, 3, 3S, 3R, 4, 4X, 6P, 12, 13; IEC IP66/IP68  
**Pressure Range**.....Exceeds 15 psi internal and 1500 psi external  
**Operational Life**.....100,000 actuations (minimum)  
**Shelf Life**.....Excess of 25 years  
**Resistant to**.....Salt spray, sunlight, ozone, weather, fungus, and most acids and lubricating oils  
**Agency Recognition**...UL & ULC Recognized Component to UL Std. 50  
**Installation**.....Please see installation instructions on page 19



Additional metric sizes available (consult factory)

## TOGGLE SWITCH BOOTS



IP66/IP68/NEMA 6P Enclosure Protection

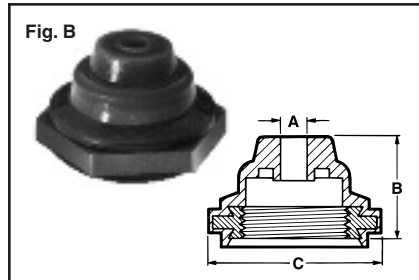
### Full Toggle (with Constant I.D.) Switch Boots (covers all external portions of switch & seals switch mounting hole)

Figure A

Thread Size	Throat Size <sup>1</sup> ("A")		Max Toggle Height <sup>2</sup>		Max Boot Height ("B")		Flat ("C")		Color	APM Cat. No.
	mm	in.	mm	in.	mm	in.	mm	in.		
M6 X 0.75	2.9	0.116	10.8	0.43	14.3	0.562	9.0	0.352	Black	1131/25*
M12 X 0.75	5.3	0.21	16.2	0.64	21.6	0.85	15.8	0.625	Black	C1131/41
M12 X 0.75	5.5	0.219	22.8	0.90	27.7	1.1	15.8	0.625	Black	1131/26-M12-.75
M12 X 1	6.5	0.256	16.7	0.66	21.4	0.844	15.8	0.625	Black	1131/31-M12
M12 X 1	5.9	0.234	16.9	0.66	21.8	0.859	15.8	0.625	Black	1131/40
M12 X 1	5.5	0.219	22.8	0.90	27.7	1.1	15.8	0.625	Black	1131/26-M12-.10

<sup>1</sup> Throat size is the maximum diameter of the switch toggle/handle (Dimension "A").

<sup>2</sup> Max toggle height is the maximum distance from the end of the switch mounting stem to the end of the switch toggle.



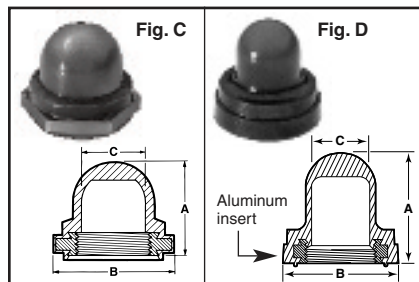
IP66/IP68/NEMA 6P Enclosure Protection

### Half Toggle Switch Boots (Seals switch mounting stem & hole; toggle actuator protrudes)

Figure B

Thread Size	Throat Size ("A")		Toggle Diameter Accomodated		Max Boot Height ("B")		Flat ("C")		Color	APM Cat. No.
	mm	in.	mm	in.	mm	in.	mm	in.		
M5 X 0.5	1.1	0.42	1.57-4.57	0.062-0.18	5.7	0.225/0.25	7.9	0.313	Black	1132/17-M5-5
M12 X 1	2.36	0.093	2.92-6.09	0.115-0.24	11.1	0.437	15.9	0.625	Black	1132/33-M12-1

## PUSHBUTTON SWITCHES & CIRCUIT BREAKERS/PROTECTORS



IP66/IP68/NEMA 6P Enclosure Protection

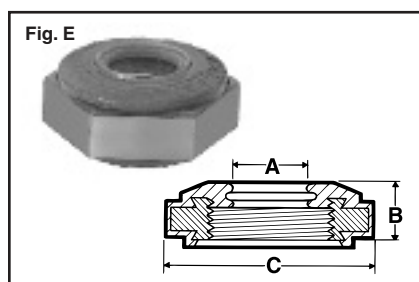
### Half Toggle Switch Boots (Seals switch mounting stem & hole; toggle actuator protrudes)

Figures C & D

Thread Size <sup>1</sup>	Max Boot Height ("A")		Max Plunger Height		Dimension "B"		Max Plunger Diameter ("C")		Color <sup>1</sup>	APM Cat. No.	Fig.
	mm	in.	mm	in.	mm	in.	mm	in.			
M10 X 1	15.47	0.62	8.4	0.33	16.3	0.64	8.1	0.32	Black	C1221/21	D
M11 X 1	15.47	0.62	11.9	0.469	18.3	0.72	10.72	0.422	Clear	C1221/27	D
M12 X 1	18.64	0.47	11.9	0.469	15.9	0.625	10.72	0.422	Black	NC3030H-M12-1	C

<sup>1</sup> "Clear" allows viewing of breaker amp rating and trip state; please enquire for other available colors.

## ROTARY SHAFT SEALS



IP66/IP68/NEMA 6P Enclosure Protection

### Seal the shaft and mounting hole of standard rotary switches/potentiometers that use a threaded stem and nut mounting.

Figure E

Thread Size	Shaft Size <sup>1</sup> ("A")		Height ("B")		Flat ("C")		Color <sup>2</sup>	APM Cat. No.
	mm	in.	mm	in.	mm	in.		
M7 X 0.75	5.0	0.2	5.5	0.2	12.7	0.500	Gray	1332/39-2*
M9 X 0.75	6.35	0.250	5.56	0.219	12.7	0.500	Gray	C1332/41*
M10 X 1	6.0	0.236	5.9	0.236	12.7	0.500	Gray	1332/45*

<sup>1</sup> Switch/potentiometer shaft must have a smooth, round cross-section where it meets the sealing edge of the shaft seal device.

<sup>2</sup> Please enquire for other available colors.