



**COLE**  
INSTRUMENT CORP.

The Innovative Switch Company

## S3900 SERIES

### Miniature Multi-Deck Solder-Lug Rotary Switches

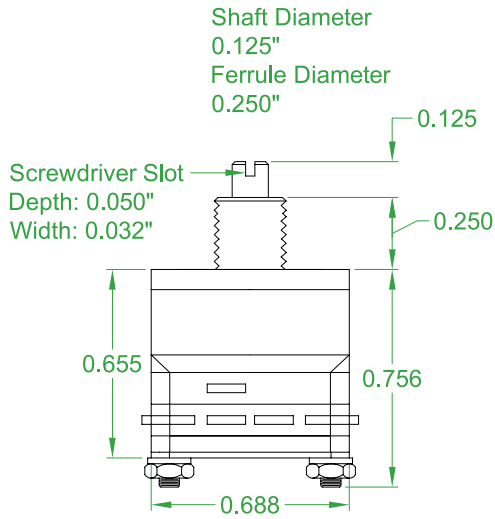
The Cole Series S3900 miniature P.C. termination rotary switch is designed to provide the ultimate mechanical and electrical reliability in instrumentation, industrial controls, medical equipment, aircraft, computers, communication, weapons, and ground support electronic equipment.

This precision switch is designed for high and low level switching, engineered to meet the requirements of MIL-S-3786 and tested per MIL-STD-202 as follows:

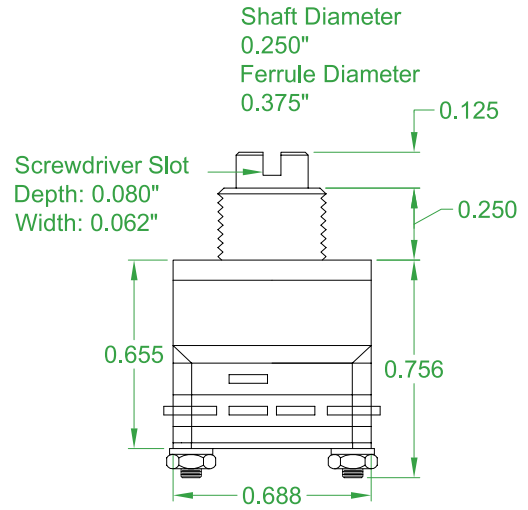
- THERMAL SHOCK PER MIL-STD-202; METHOD 107, TEST CONDITION "B"
- VIBRATION PER MIL-STD-202; METHOD 204, TEST CONDITION "B"
- MEDIUM SHOCK PER MIL-STD-202; METHOD 213
- HIGH SHOCK PER MIL-STD-202; METHOD 207
- MOISTURE RESISTANCE PER MIL-STD-202; METHOD 106
- EXPLOSION PROOF PER MIL-STD-202; METHOD 109
- SALT SPRAY PER MIL-STD-202; METHOD 101, CONDITION "B"

The Series S3900 is available with 30°, 36° and 45° indexing and one to six poles per deck. Self cleaning contacts are ideal for low level switching and offer low contact resistance through the life of the switch (25,000 cycles minimum). A hardened steel sprocket and ball bearing detent mechanism provides smooth positive detent action and mechanical life in excess of 100,000 cycles. Cole's unique terminal design and sealing technique prevents flux contamination during wave soldering and cleaning processes. Internal plastic parts are made of fiber filled plastic to prevent degrading and interior contamination by plastic dust. Finally, superior construction, in a clean room environment, ensures ultimate performance and reliability from the Cole Series S3900 rotary switch.

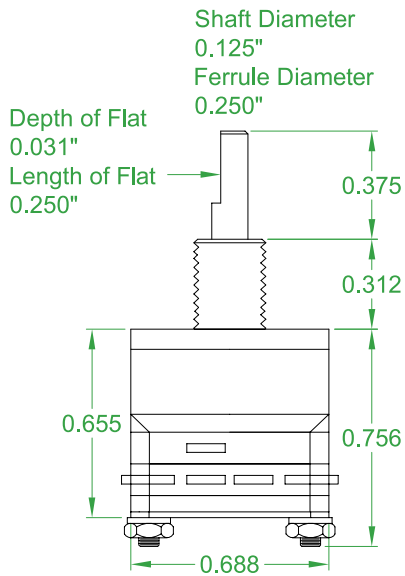
ISO9001 CERTIFIED



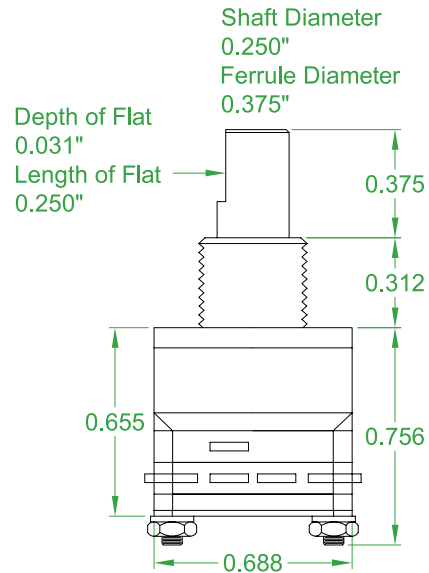
S3900 Screwdriver – .125 Shaft Diameter  
(See Page 3)



S3900 Screwdriver – .250 Shaft Diameter  
(See Page 4)



S3900 Standard – .125 Shaft Diameter  
(See Page 3)



S3900 Standard – .250 Shaft Diameter  
(See Page 4)

**NOTES:**

S3900 Standard – .125 Shaft Dia., .250 Ferrule Dia., .688 Body Dia., (See Page 3).

S3900 Screwdriver – .125 Shaft Dia., .250 Ferrule Dia., .688 Body Dia., (See Page 3).

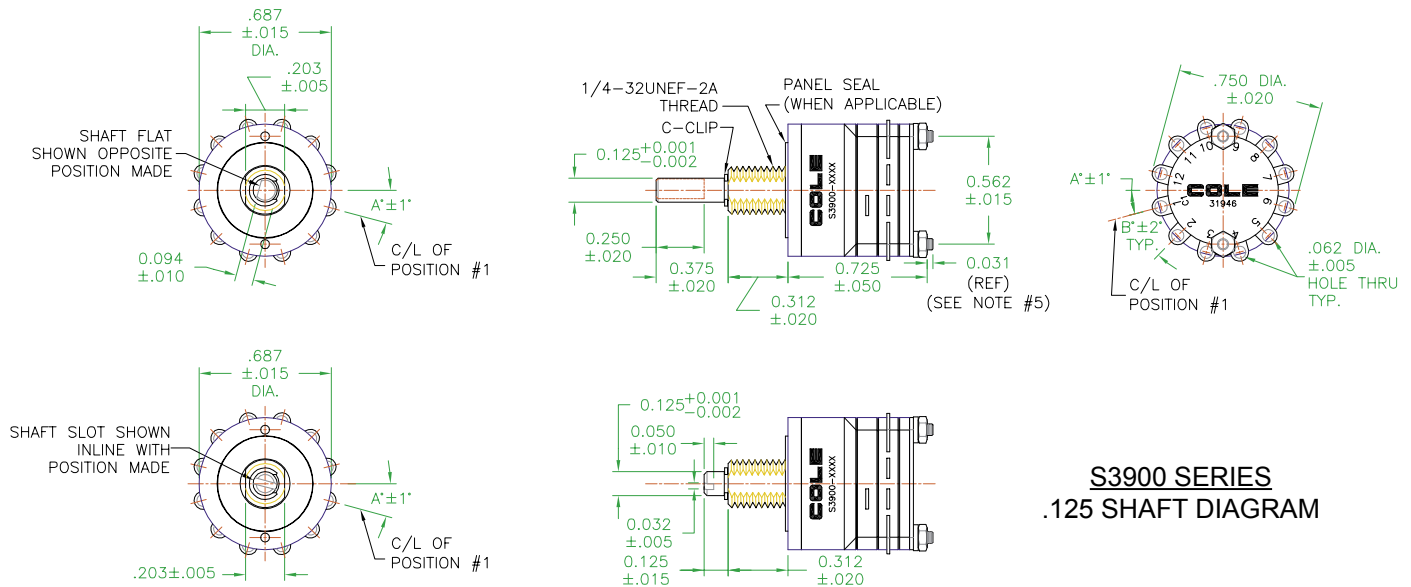
S3900 Standard – .250 Shaft Dia., .375 Ferrule Dia., .688 Body Dia., Panel Seal, (See Page 4).

S3900 Screwdriver – .250 Shaft Dia., .375 Ferrule Dia., .688 Body Dia., Panel Seal, (See Page 4).



**S3900 SERIES FEATURES:**

- Flux contamination free.
- MIL-S-3786 Qualified.
- 1 Amp. power switching.
- 100,000 plus operation life cycle.
- Ball bearing-smooth detent indexing.
- Constant low contact resistance.
- Rugged, high impact construction.



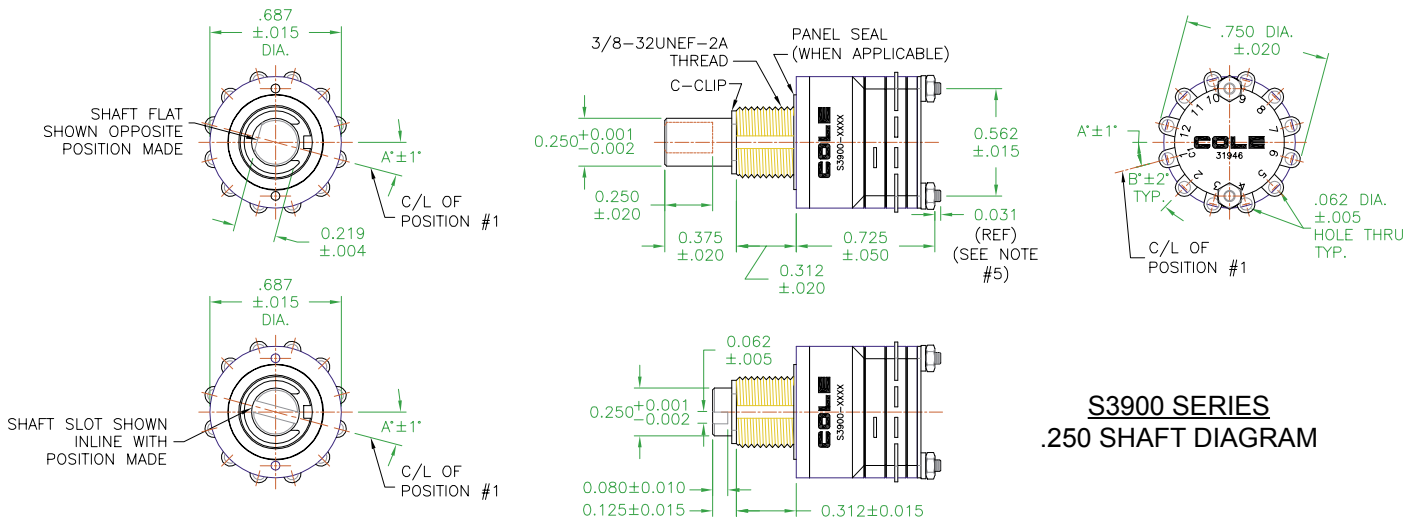
**S3900 SERIES  
.125 SHAFT DIAGRAM**

INDEX	A° ± 1°	B° ± 2°	Number of Positions	Number of Poles	Number of Decks
30°	15°	30°	12	1-2-3-4-6	1 Deck to 12 Decks Maximum (See Note Number 6)
36°	36°	36°	10	1-2	
45°	22°30'	45°	08	1-2-4	
60°	15°	60°	06	1-2-3	
90°	22°30'	90°	04	1-2	

**NOTES**

1. Dimensions are in inches.
2. Unless otherwise specified, tolerances are  $\pm .005$  and  $\pm 2^\circ$  on angles (Non-accumulative).
3. Shaft flat opposite position being made.
4. Add .218 to the length for each additional deck.
5. For switches with more than 5 decks the stud projection is .312 plus.
6. If more than 12 decks or 48 poles are required, contact the factory.
7. Switches are provided with full circle of terminals, regardless of the number of active positions.
8. A .432 dimension, non-turn washer is available for .250 shaft dia. upon request.





**S3900 SERIES  
250 SHAFT DIAGRAM**

**NOTES**

1. Dimensions are in inches.
2. Unless otherwise specified, tolerances are  $\pm 0.005$  and  $\pm 2^\circ$  on angles (Non-accumulative).
3. Shaft flat opposite position being made.
4. Add .218 to the length for each additional deck.
5. For switches with more than 5 decks the stud projection is .312 plus.
6. If more than 12 decks or 48 poles are required, contact the factory.
7. Switches are provided with full circle of terminals, regardless of the number of active positions.
8. A .432 dimension, non-turn washer is available for .250 shaft dia. upon request.

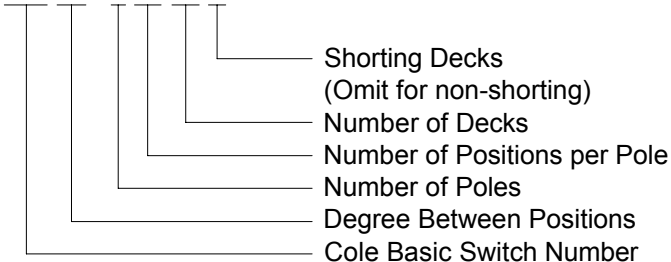
**ORDERING INFORMATION**

**MULTIDECK SWITCHES**

Add the total number of deck required as a dash No. after the part number.

**SAMPLE CODE**

S39 45 - 2 04 03 S



Switch shown in the sample code is 45° indexing, 2 pole per deck, 4 positions per pole, 3 decks, with shorting type contacts. Can be ordered as QPL Part No. M3786/39-XXX

**OPTIONS**

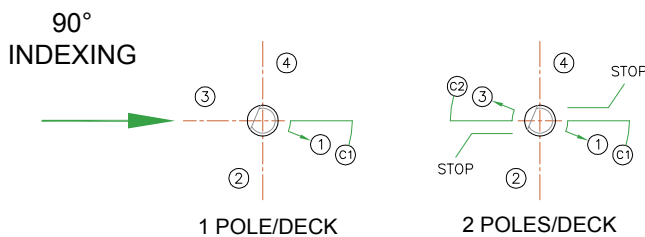
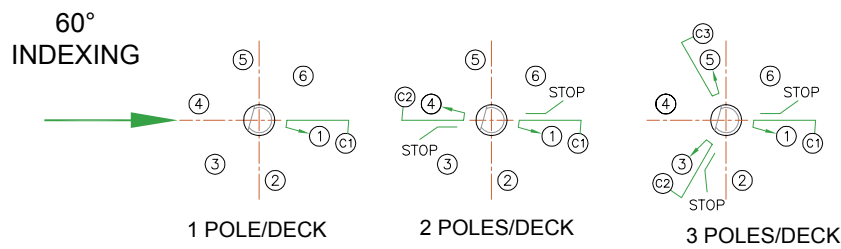
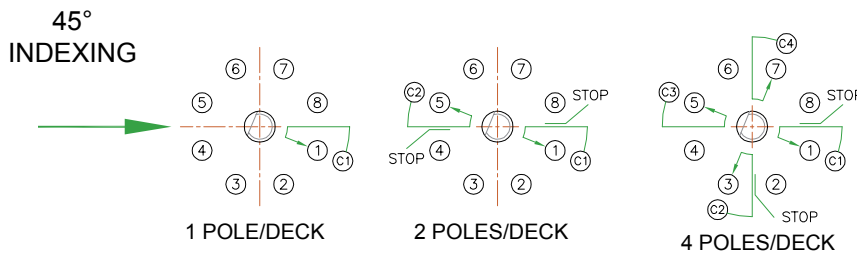
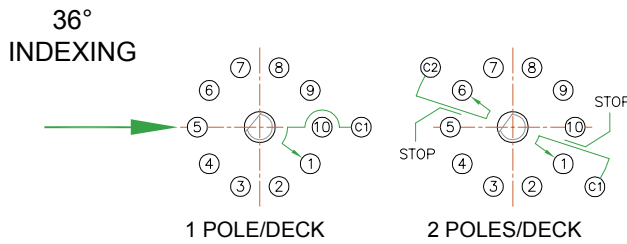
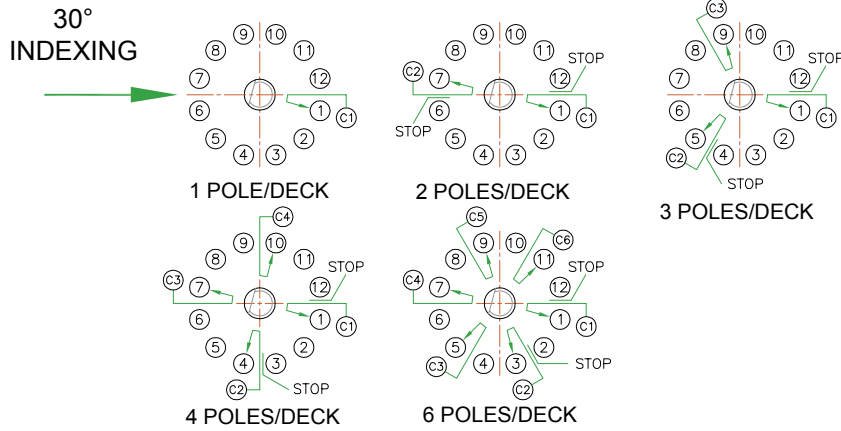
The following options can be added to the standard switch. When ordering, simply add the letters after the basic part number. Options listed in alphabetical order only.

- A = Adjustable stops.
- F = Fixed stop between the first and last position on a full turn switch.
- G = RFI-EMI shielding.
- L = Dry circuit (low level).
- P = Panel and shaft seals.
- Q = 1/4 dia. Shaft (Omit for 1/8 Dia. Shaft)
- S = Shorting type switch. (Available in all configurations. Omit for non-shorting).
- SD = Screwdriver slot.
- T = Pre-Tinned Terminals.
- Y = Optional .432 Non-Turn Washer.
- Z = Mounting Bushing Washer.



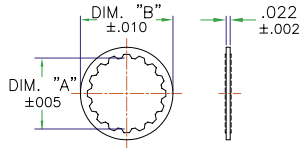
**S3900 Series – Typical Features**

**SCHEMATIC DIAGRAM  
(VIEWED FROM SHAFT END AND SHOWN IN POSITION #1)**

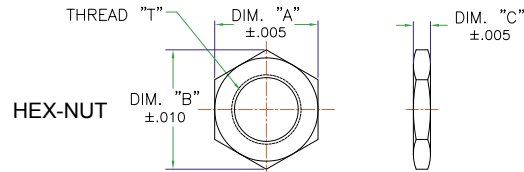


**Typical Features**

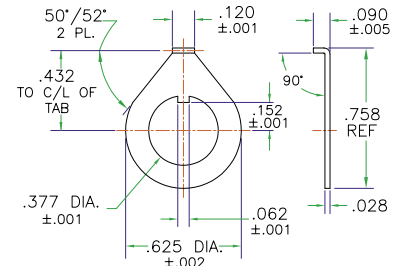
**INTERNAL TOOTH LOCK-WASHER**



FERRULE SIZE	DIM. "A"	DIM. "B"	DIM. "C"
1/4	.262	.402	.018
3/8	.384	.500	.022

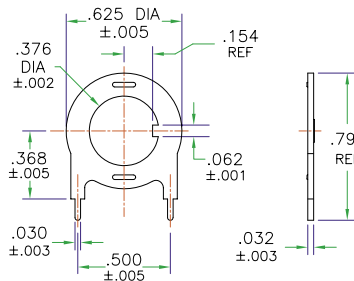


FERRULE SIZE	DIM. "A"	DIM. "B"	DIM. "C"	THREAD SIZE	MIL-SPEC.
1/4	.306	.352	.078	1/4-32 UNEF-2B	25082-C13
3/8	.558	.640	.093	3/8-32 UNEF-2B	25082-C20

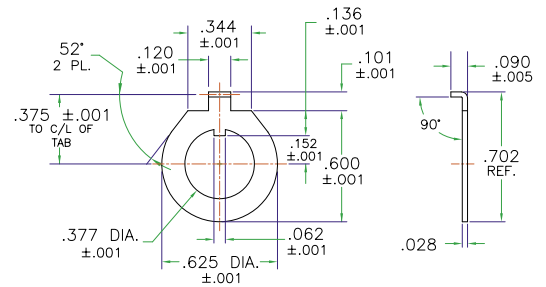
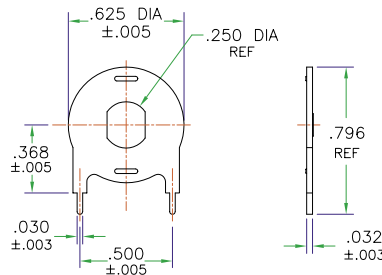


**KEY WASHERS  
3/8 FERRULE SIZE**

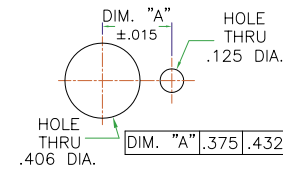
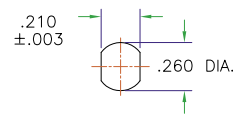
**MOUNTING BUSHING WASHER  
3/8 FERRULE SIZE**



**MOUNTING BUSHING WASHER  
1/4 FERRULE SIZE**



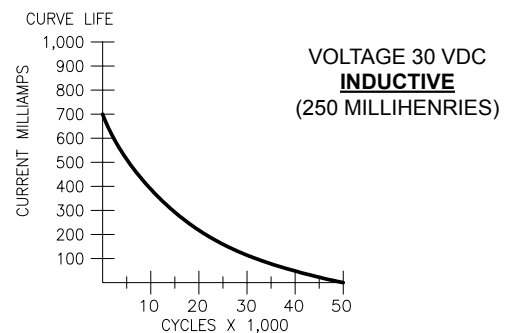
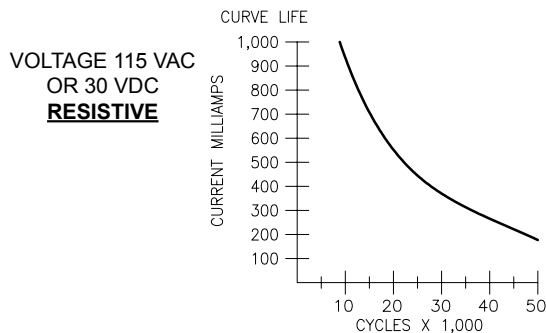
**FLATTED FERRULE**



**RECOMMENDED PANEL CUTOUT  
3/8 FERRULE SIZE**

**RECOMMENDED PANEL CUTOUT  
1/4 FERRULE SIZE**

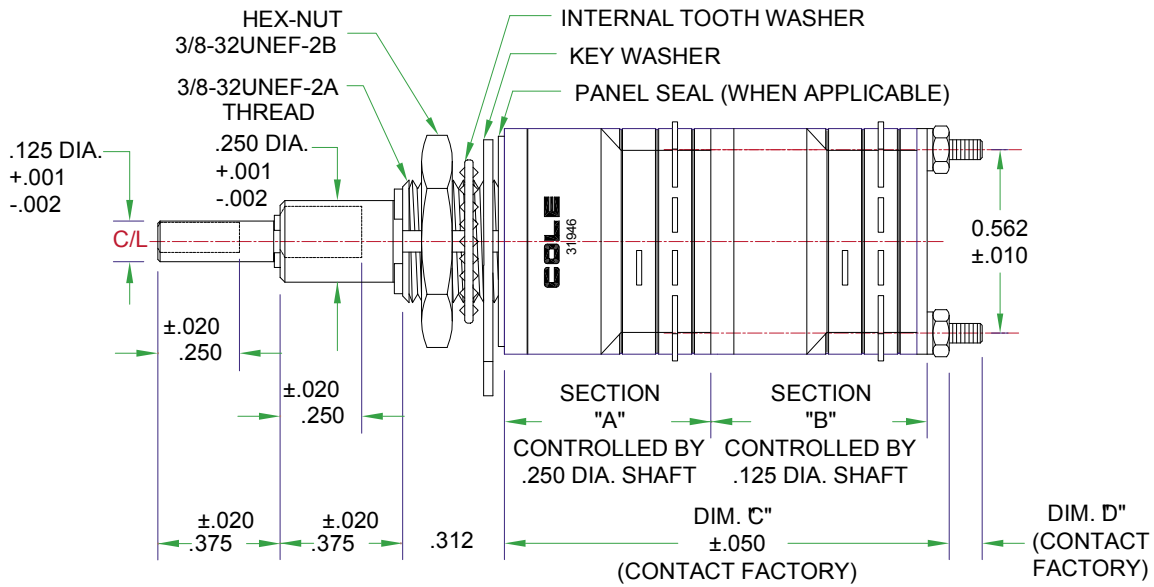
**Life Expectancy**



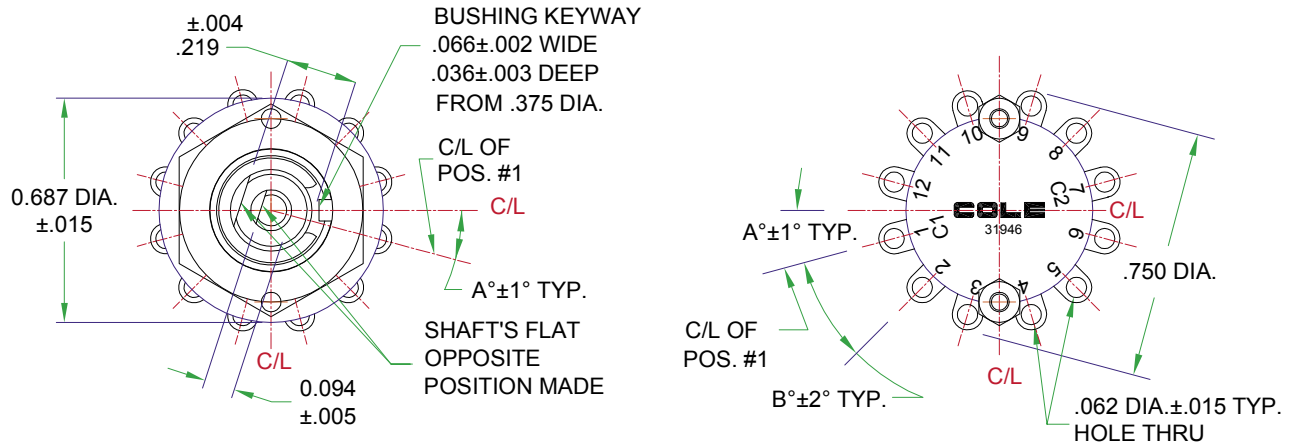
Data determined from life tests at 25°C, 68% relative humidity at sea level. One cycle is a rotation of 360° and back to position 1. Based on life-limiting criteria specified in Technical Data.



**S3900 Special – Concentric Shaft**



Side View



Front View

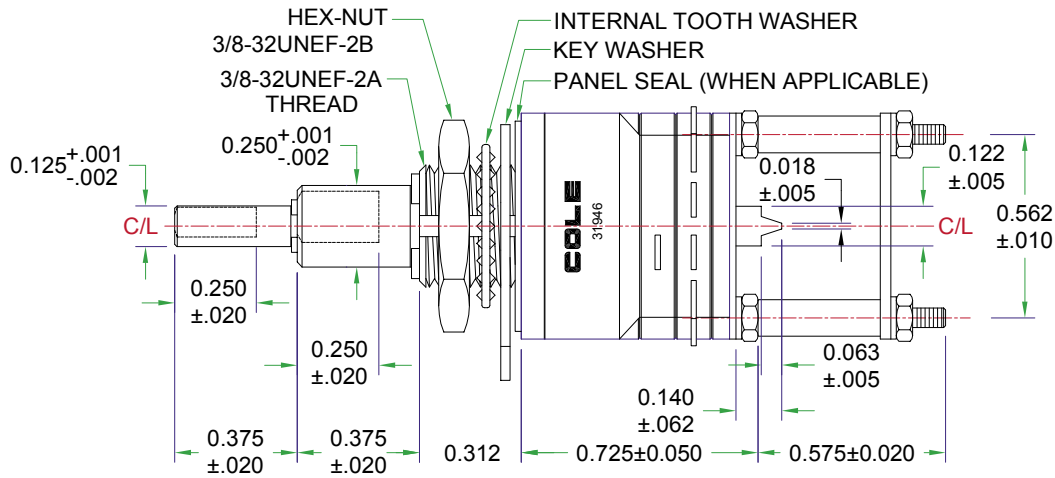
Rear View

TABLE 1

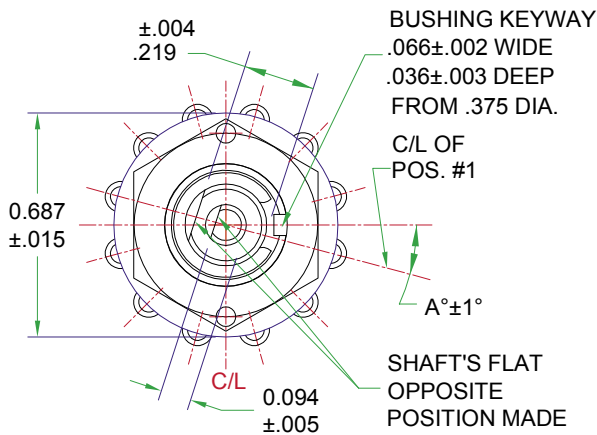
INDEX	A° ± 1°	B° ± 2°	Number of Positions	Number of Poles	Number of Decks
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36°	36°	36°	10	1-2	
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60°	15°	60°	06	1-2-3	
90°	22°30'	90°	04	1-2	



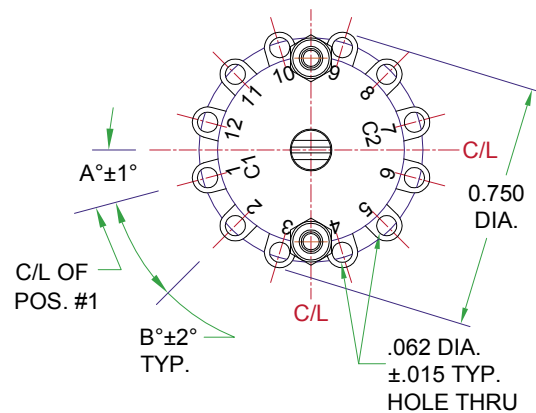
**S3900 Special – Add-a-Pot**



Side View



Front View



Rear View

TABLE 1

INDEX	A° ± 1°	B° ± 2°	Number of Positions	Number of Poles	Number of Decks
30°	15°	30°	12	1-2-3-4-6	1 Deck to 12 Decks Maximum (Contact Factory if more than 12 Decks)
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90°	22°30'	90°	04	1-2	





**Series S3900 Technical Data**

Specification	Unit	Value	Note:
Military Specifications		MIL-S-3786/39C	
Continuous (Non-Switching) Current Carrying Capacity	Amps	6	at 28 VDC, with max. contact temperature rise of 20°C
Switching Current Capacity at 28 VDC resistive	Amps	1	at Atmospheric pressure with 85°C and at reduced Barometric pressure with 25°C
Switching Current Capacity at 115 VAC resistive	Amps	1	
Switching Current Capacity at 28 VDC inductive (2.8 H.)	Amps	0.500	
Switching Current Capacity at 28 VDC Lamp Load	Amps	0.5	
Low Level max. capacity	mA	10	at 30 millivolts DC max.
Dielectric Strength, min.	VRMS	750	
Contact resistance, max. (initial)	milliohms (mΩ)	20	
Contact resistance, max. (after life)	milliohms (mΩ)	50	
Insulation resistance, min. (initial)	megaohms (MΩ)	100,000	at 100 VDC
Insulation resistance, min. (after life)	megaohms (MΩ)	50,000	at 100 VDC
Switching Life	cycles	25,000	at rated loads, sea-level, 25°C, 68% relative humidity
Mechanical Life	cycles	100,000	
Rotational Torque, min.	inch ounces	8	
Rotational Torque, max.	inch ounces	32	
Stop Strength, max.	inch pounds	10	
Mounting Ferrule Strength	inch pounds	10	
Withstanding Shaft Push Force	pounds	150	
Weight	grams	14	
Molded Parts		thermoplastic	
Contact Surfaces		Gold plated	
Altitude	feet	80,000	typical pressure at 80,000 feet: 0.4 psi
Temperature, min.	degrees Celsius	-55	
Temperature, max.	degrees Celsius	125	
Vibration Tested		Meets	Per MIL-S-3786, MIL-STD-202, Method 204, test condition "B", vibration grade 3
Impact Shock, Medium		Meets	MIL-STD 202; Method 213
Impact Shock, High		Meets	at 100g, MIL-STD 202, Method 207
Moisture Resistant		Meets	MIL-STD 202; Method 106
Salt Spray Resistant		Meets	MIL-STD 202, Method 101, Condition "B"
Explosion Proof		Meets	MIL-STD 202, Method 109
Immersion		No	
EMI/RFI		Meets	MIL-S-3786, 2 ohms Shaft to ground max.
Maximum total contacts on all decks		48	

