This precision switch is designed for high and low level switching, engineered to meet the requirements of MIL-DTL-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°, 45°, 60°, and 90° 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.

The full QPL’d MIL switch is commercially available, as are all these configurations:

- Shaft dia .125” ferrule dia .250” screwdriver (page 3)
- Shaft dia .250” ferrule dia .375” screwdriver (page 4)
- Shaft dia .125” ferrule dia .250” (page 3)
- Shaft dia .250” ferrule dia .375” (page 4)
- Concentric Shaft (page 7)
- Add-A-Potentiometer (page 8)
NOTES:
S3900 Screwdriver – .125 Shaft Dia., .250 Ferrule Dia., .688 Body Dia., (See Page 3).
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.

NOTES
1. Dimensions are in inches.
2. Unless otherwise specified, tolerances are ±.005 and ±2° on angles (Non-accumulative).
3. Shaft flat opposite position being made.
4. Add .220 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.

<table>
<thead>
<tr>
<th>INDEX</th>
<th>A’ ± 1°</th>
<th>B’ ± 2°</th>
<th>Number of Positions</th>
<th>Number of Poles</th>
<th>Number of Decks</th>
</tr>
</thead>
<tbody>
<tr>
<td>30°</td>
<td>15°</td>
<td>30°</td>
<td>12</td>
<td>1-2-3-4-6</td>
<td>1 Deck to 12 Decks Maximum (See Note Number 6)</td>
</tr>
<tr>
<td>36°</td>
<td>36°</td>
<td>36°</td>
<td>10</td>
<td>1-2</td>
<td></td>
</tr>
<tr>
<td>45°</td>
<td>22°30’</td>
<td>45°</td>
<td>08</td>
<td>1-2-4</td>
<td></td>
</tr>
<tr>
<td>60°</td>
<td>15°</td>
<td>60°</td>
<td>06</td>
<td>1-2-3</td>
<td></td>
</tr>
<tr>
<td>90°</td>
<td>22°30’</td>
<td>90°</td>
<td>04</td>
<td>1-2</td>
<td></td>
</tr>
</tbody>
</table>

TABLE 1
**S3900 SERIES**

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

**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

- Shorting Decks (Omit for non-shorting)
  - Number of Decks
  - Number of Positions per Pole
  - Number of Poles
  - Degree Between Positions
  - Cole Basic Switch Number

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.
- 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.

**NOTES**
1. Dimensions are in inches.
2. Unless otherwise specified, tolerances are ±0.005 and ±2° on angles (Non-accumulative).
3. Shaft flat opposite position being made.
4. Add .220 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
Miniature Multi-Deck Solder-Lug Rotary Switches

S3900 Series – Typical Features

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

30° INDEXING

1 POLE/DECK

2 POLES/DECK

3 POLES/DECK

4 POLES/DECK

6 POLES/DECK

36° INDEXING

1 POLE/DECK

2 POLES/DECK

45° INDEXING

1 POLE/DECK

2 POLES/DECK

4 POLES/DECK

60° INDEXING

1 POLE/DECK

2 POLES/DECK

3 POLES/DECK

90° INDEXING

1 POLE/DECK

2 POLES/DECK
Typical Features

INTERNAL TOOTH LOCK-WASHER

**DIMENSIONS**
- **A**
- **B**
- **C**
- **D**

**FERRULE SIZE**
- 1/4: .262 ± .002
- 3/8: .384 ± .022

HEX-NUT

**DIMENSIONS**
- **A**
- **B**
- **C**
- **D**

**FERRULE SIZE**
- 1/4: .306 ± .010
- 3/8: .558 ± .010

MOUNTING BUSHING WASHER

3/8 **FERRULE SIZE**

**DIMENSIONS**
- **A**
- **B**
- **C**
- **D**

**FERRULE SIZE**
- 3/8: .377 ± .001

KEY WASHERS

3/8 **FERRULE SIZE**

**DIMENSIONS**
- **A**
- **B**
- **C**
- **D**

**FERRULE SIZE**
- 3/8: .377 ± .001

3/8 **FERRULE SIZE**

**DIMENSIONS**
- **A**
- **B**
- **C**
- **D**

**FERRULE SIZE**
- 3/8: .377 ± .001

RECOMMENDED PANEL CUTOUT

3/8 **FERRULE SIZE**

**DIMENSIONS**
- **A**
- **B**
- **C**
- **D**

**FERRULE SIZE**
- 3/8: .375 ± .032

FLATTED FERRULE

**DIMENSIONS**
- **A**
- **B**
- **C**
- **D**

**FERRULE SIZE**
- 3/8: .260 ± .003

RECOMMENDED PANEL CUTOUT

1/4 **FERRULE SIZE**

**DIMENSIONS**
- **A**
- **B**
- **C**
- **D**

**FERRULE SIZE**
- 1/4: .125 ± .001

FLATTED FERRULE

**DIMENSIONS**
- **A**
- **B**
- **C**
- **D**

**FERRULE SIZE**
- 1/4: .210 ± .003

Life Expectancy

**VOLTAGE 115 VAC OR 30 VDC**

**RESISTIVE**

**CURVE LIF**

**CURRENT MILLAMPS**

**Cycles x 1,000**

10 20 30 40 50

1,000

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.

**VOLTAGE 30 VDC**

**INDUCTIVE**

(250 MILLIHENRIES)

**CURVE LIF**

**CURRENT MILLAMPS**

**Cycles x 1,000**

10 20 30 40 50

1,000

100

200

300

400

500

600

700

800

900

1,000
S3900 Special – Concentric Shaft

Front View

<table>
<thead>
<tr>
<th>INDEX</th>
<th>A’ ± 1°</th>
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<td>36’</td>
<td>10</td>
<td>1-2</td>
<td></td>
</tr>
<tr>
<td>45°</td>
<td>22°30’</td>
<td>45°</td>
<td>08</td>
<td>1-2-4</td>
<td></td>
</tr>
<tr>
<td>60°</td>
<td>15’</td>
<td>60°</td>
<td>06</td>
<td>1-2-3</td>
<td></td>
</tr>
<tr>
<td>90°</td>
<td>22°30’</td>
<td>90°</td>
<td>04</td>
<td>1-2</td>
<td></td>
</tr>
</tbody>
</table>
S3900 Special – Add-a-Pot

**S3900 Series**

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


---

**TABLE 1**

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<tr>
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<td>30°</td>
<td>12</td>
<td>1-2-3-4-6</td>
<td>1 Deck to 12 Decks Maximum (Contact Factory if more than 12 Decks)</td>
</tr>
<tr>
<td>36°</td>
<td>36°</td>
<td>36°</td>
<td>10</td>
<td>1-2-3-4-6</td>
<td>1-2</td>
</tr>
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<td>04</td>
<td>1-2-3-4-6</td>
<td>1-2</td>
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## Series S3900 Technical Data

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