ST-Series
SEALED TOGGLE SWITCHES

Designed to conform to MIL-DTL-3950G requirements for environmentally sealed toggle switches, and compliant to UL 60079-15 standard for use in explosive gas atmospheres, Carling Technologies® ST-Series Sealed Toggle Switch features innovative design and performance principles sure to withstand the most demanding applications.

The ST-Series features a toggle seal composed of dynamic silicone material that bonds to the metal toggle, pin, and bushing, providing ideal sealing and protection against the environment, vibration and shock, while withstanding extreme temperature variations. It also utilizes up to three terminal seals per pole and an optional o-ring assures additional under panel sealing protection. All silicone seals on the ST-Series comply with A-A-59588 for silicone rubber performance specifications and together, these features meet the international IEC 60529 standard for sealing performance to an IP68 level.

**Product Highlights:**
- Complies with UL 60079-15
- Fully Sealed to IP68, Including Below the Panel
- Toggle seal bonds to toggle, pin and bushing
- UL 61058-1 and cUL recognized

**Typical Applications:**
- Off-Highway Vehicles
- Armored / Law Enforcement Vehicles
- Commercial Food & Refrigeration Equipment
- Military Equipment
- Applications requiring stringent sealing in explosive environments

**Resources:**
- Configure a Complete Part
- Download CAD & Sales Drawing
- Watch Product Video
ST-Series Switch
DESIGN FEATURES

PINNED ACTUATOR / BUSHING
Keeps toggle or paddle firmly in place and prevents rotation

BRASS ROLLER PIN
Provides rolling metal on metal actuation for maximum endurance

BASE SEAL CHANNEL
Perfectly fits the toggle assembly seal decreasing the dependence on clamping forces and rivets

TERMINAL BARRIERS
Comply with UL-61058-1 electrical spacing requirements

OPTIONAL O-RING
Assures additional under panel sealing protection

BUSHING/TOGGLE SEAL
Composed of dynamic silicone material that bonds to the metal toggle, pin, and bushing

RIVETS
High purity copper composite and silver alloy materials handle various electrical loads and maintain low contact resistance

TERMINAL SEALS
Assure a secure seal at extreme temperatures. Eliminates potential for separated joints associated with insert molded constructions
### Electrical

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contact Rating</strong></td>
<td>10A 250VAC, 15A 125VAC, 16A 12/24VDC</td>
</tr>
<tr>
<td><strong>Dielectric Strength</strong></td>
<td>MIL-STD-202G, Method 301 (1500 Volts RMS)</td>
</tr>
<tr>
<td><strong>Insulation Resistance</strong></td>
<td>MIL-STD-202G, Method 302 (50 MegOhms, 500 VDC)</td>
</tr>
<tr>
<td><strong>Initial Contact Resistance</strong></td>
<td>MIL-STD-202G, Method 307 (10 milliOhms max.)</td>
</tr>
<tr>
<td><strong>Electrical Life</strong></td>
<td>Overload: MIL-DTL-3950G, Section 4.8.11.1</td>
</tr>
<tr>
<td></td>
<td>Electrical Endurance and Temperature: UL 61058-1</td>
</tr>
<tr>
<td></td>
<td>Momentary circuits: 25,000 operations, minimum.</td>
</tr>
<tr>
<td></td>
<td>Maintained circuits: 50,000 operations, minimum.</td>
</tr>
<tr>
<td><strong>Ignition Protection</strong></td>
<td>UL-1500 Ignition-Protection Test for Marine Products</td>
</tr>
<tr>
<td><strong>Explosion Protection</strong></td>
<td>UL 60079-15 Electrical Apparatus for Explosive Gas Atmospheres</td>
</tr>
<tr>
<td><strong>Contacts</strong></td>
<td>Silver / Nickel Alloy</td>
</tr>
<tr>
<td><strong>Terminals</strong></td>
<td>Brass or Copper / silver plated. Tab Terminal: ¼” quick-connect</td>
</tr>
<tr>
<td></td>
<td>Screw Terminal: #6-32 brass screw and cage clamp</td>
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</tbody>
</table>

### Physical

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<tr>
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</thead>
<tbody>
<tr>
<td><strong>Function, Operation, Circuits</strong></td>
<td>Single Pole/ Double Pole with Single Throw/ Double Throw, Two/Three position, Maintain/ Momentary circuits</td>
</tr>
<tr>
<td><strong>Toggle</strong></td>
<td>Tin plated brass bat or tall bat</td>
</tr>
<tr>
<td><strong>Paddle</strong></td>
<td>Acetal, UV stabilized yellow, red, white and black.</td>
</tr>
<tr>
<td><strong>Mechanism Actuator</strong></td>
<td>Polyester PBT, UL94-V0 and fungus resistant per MIL-STD- 810G, Section 508.6</td>
</tr>
<tr>
<td><strong>Internal Seals</strong></td>
<td>Silicone per A-A-59588-1A.</td>
</tr>
<tr>
<td><strong>Mounting, Hardware</strong></td>
<td>15/32”-32 UNS-2A threaded bushing with a keyway. A single nut and lock washer are supplied unassembled.</td>
</tr>
<tr>
<td><strong>Bushing/Top Plate</strong></td>
<td>Zinc/aluminum die cast, with tin plating.</td>
</tr>
<tr>
<td><strong>Base</strong></td>
<td>Polyester PBT, UL94-V0 and fungus resistant per MIL-STD- 810G, Section 508.6</td>
</tr>
<tr>
<td><strong>Actuation Force</strong></td>
<td>Initial Actuation Forces ± 0.3 lb (for 2-Pole circuits, short bat)</td>
</tr>
<tr>
<td><strong>Angular Movement</strong></td>
<td>14.5 degrees, each side of center</td>
</tr>
</tbody>
</table>

### Environmental

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<tr>
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<tbody>
<tr>
<td><strong>Temperature</strong></td>
<td>Operating: -40°C to +85°C</td>
</tr>
<tr>
<td></td>
<td>Storage: -65°C to +85°C</td>
</tr>
<tr>
<td><strong>Vibration</strong></td>
<td>MIL-STD-202G: Method 204D, Test Condition A (10 G peak, Harmonic, 10Hz to 500Hz sweeps, 9 hours total)</td>
</tr>
<tr>
<td><strong>Sealing</strong></td>
<td>IP68, for above and below-panel components of actual switch only.</td>
</tr>
<tr>
<td><strong>Salt Atmosphere</strong></td>
<td>MIL-STD-202G, Method 101, Test Condition A (96 hrs)</td>
</tr>
<tr>
<td><strong>Chemical Resistance</strong></td>
<td>No permanent loss of function, obvious loss of sealing, distortion, softening, embrittlement, discoloration or corrosion after being brushed for 10 minutes, wetting all exposed surfaces. Relevant chemical compatibility documentation may be used in place of testing.</td>
</tr>
</tbody>
</table>

### Agency Approvals

UL and cUL  
Certificate number 20181012-E7560.  
UL-1500 Ignition-Protection.  
UL 60079-15 Electrical Apparatus for Explosive Gas Atmospheres.
ST  A  2  E  1 - 53

1 SERIES 1
ST  Sealed Toggle

2 CIRCUIT
2 & 3, 5 & 6 Connected Terminals 1 & 2, 4 & 5
Position:  1   2   3
A  ON   NONE   OFF
B  (ON)   NONE   OFF
C  ON   NONE   (OFF)
D  ON   NONE   ON
F 6  ON   NONE   (ON)
J  ON   OFF   ON
K  ON   OFF   (ON)
L  (ON)   OFF   (ON)
Special Circuits 6
E 2,3  5 & 6   5 & 3   5 & 1
G 2,4  2 & 3, 5 & 6  2 & 3   OFF
M 2,4  (2 & 3, 5 & 6)  2 & 3   OFF

3 POLES
1  Single pole using terminals 1, 2 & 3
2  Double pole using terminals 1, 2, 3, 4, 5 & 6

4 RATING
4  10A 250VAC; 15A 125VAC
5  10A 250VAC; 15A 125VAC (UL, cUL Recognized)
E  16A, 12/24VDC

5 TERMINATION
1  .250 (6.4mm) TAB (QC)
4  Screw with Cage Clamps
B 5  .250 (6.4mm) TAB (QC). Jumper T2 to T5. No terminal at T5
E 5  Screw with Cage Clamps. Jumper T2 to T5. No terminal at T5

6 ACTUATOR STYLE
TOGGLE (SEALED METAL)
Without  With Panel  Toggle  Toggle  Bushing
Panel Seal  Seal (Bulk)  Color  Length  Length
53  58  Dull Nickel  .561  .385
73  78  Dull Nickel  .687  .385

PADDLE (SEALED PLASTIC)
Without  With Panel  Paddle  Paddle  Bushing
Panel Seal  Seal (Bulk)  Color  Length  Length
B3  B8  Black  .880  .385
W3  W8  White  .880  .385
R3  R8  Red  .880  .385
Y3  Y8  Yellow  .880  .385

Notes:
1  Standard hardware is (1) inner tooth lock washer and (1) hex nut bulk.
2  Available only with 2 pole option in selection box # 3.
3  External customer supplied jumper required between terminals 2 & 4 to get
   SP ON-ON-ON circuit.
4  Available with termination B and E only.
5  Available with special circuit G and M only.
6  Not available with rating 5.
7  Available with termination 1 and 4 only.
Dimensional Specifications: in. [mm]
**Authorized Sales Representatives and Distributors**

Click on a region of the map below to find your local representatives and distributors or visit [www.carlingtech.com/findarep](http://www.carlingtech.com/findarep).

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**About Carling**

Founded in 1920, Carling Technologies is a leading manufacturer of electrical and electronic switches and assemblies, circuit breakers, electronic controls, power distribution units, and multiplexed power distribution systems. With four ISO registered manufacturing facilities and technical sales offices worldwide, Carling Technologies Sales, Service and Engineering teams do much more than manufacture electrical components; they engineer powerful solutions! To learn more about Carling please visit [www.carlingtech.com/company-profile](http://www.carlingtech.com/company-profile).

To view all of Carling’s environmental, quality, health & safety certifications please visit [www.carlingtech.com/environmental-certifications](http://www.carlingtech.com/environmental-certifications)
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