

ST-Series

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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



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Innovative Designs. Powerful Solutions.

Techna

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ST-Series Switch

DESIGN FEATURES

PINNED ACTUATOR / BUSHING

Keeps toggle or paddle firmly in place and prevents rotation

BRASS ROLLER PIN

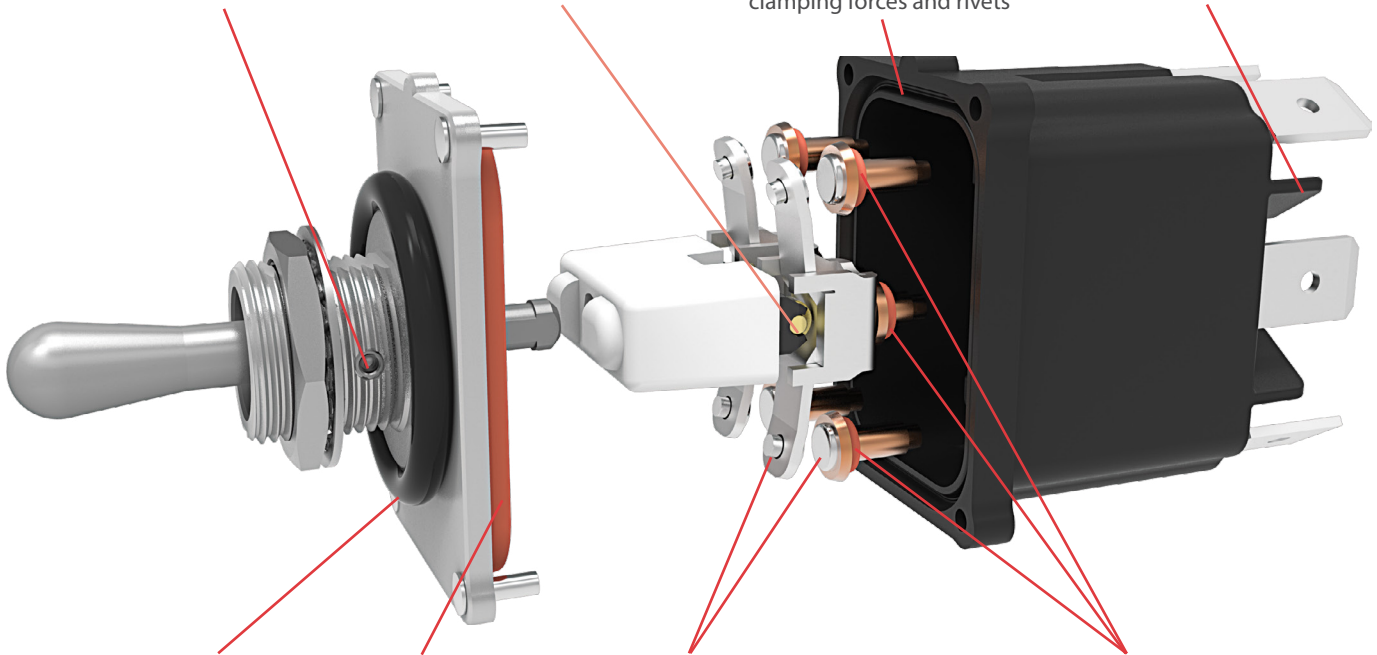
Provides rolling metal on metal actuation for maximum endurance

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

Contact Rating	10A 250VAC, 15A 125VAC, 16A 12/24VDC
Dielectric Strength	MIL-STD-202G, Method 301 (1500 Volts RMS)
Insulation Resistance	MIL-STD-202G, Method 302 (50 MegOhms, 500 VDC)
Initial Contact Resistance	MIL-STD-202G, Method 307 (10 milliOhms max.)
Electrical Life	Overload: MIL-DTL-3950G, Section 4.8.11.1 Electrical Endurance and Temperature: UL 61058-1 Momentary circuits: 25,000 operations, minimum. Maintained circuits: 50,000 operations, minimum.
Ignition Protection	UL-1500 Ignition-Protection Test for Marine Products
Explosion Protection	UL 60079-15 Electrical Apparatus for Explosive Gas Atmospheres
Contacts	Silver / Nickel Alloy
Terminals	Brass or Copper / silver plated. Tab Terminal: ¼" quick-connect Screw Terminal: #6-32 brass screw and cage clamp MIL-STD-202G, Method 211 Test Condition A, and B: 25 lb. pull test, two terminal bends.

Physical

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

Environmental

Temperature	Operating: -40°C to +85°C Storage: -65°C to +85°C										
Vibration	MIL-STD-202G: Method 204D, Test Condition A (10 G peak, Harmonic, 10Hz to 500Hz sweeps, 9 hours total).										
Shock	MIL-STD-202G: Method 213B, Test Condition K (30 G, half sine)										
Sealing	IP68, for above and below-panel components of actual switch only.										
Salt Atmosphere	MIL-STD-202G, Method 101, Test Condition A (96 hrs)										
Thermal Shock	MIL-STD-202G, Method 107, Test Condition A (five cycles in air: -55°C, +25°C, +125°C, +25°C)										
Moisture Resistance, Humidity	MIL-STD-202G, Method 106 (ten 24-hour stepped cycles)										
Chemical Resistance	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.										
	<table> <thead> <tr> <th>Chemical</th> <th>Concentration</th> </tr> </thead> <tbody> <tr> <td>Gasoline</td> <td>100%</td> </tr> <tr> <td>Ethylene Glycol</td> <td>50% in water</td> </tr> <tr> <td>Ethanol/Methanol</td> <td>10% in water</td> </tr> <tr> <td>Diesel Fuel</td> <td>100%</td> </tr> </tbody> </table>	Chemical	Concentration	Gasoline	100%	Ethylene Glycol	50% in water	Ethanol/Methanol	10% in water	Diesel Fuel	100%
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Agency Approvals

UL and cUL
Reference:UL 61058-1 and CAN/CSA-C22.2 No. 61058-1-09, Switches for Appliances - Part 1: General Requirements. Certificate number 20181012-E7560.
UL-1500 Ignition-Protection.
UL 60079-15 Electrical Apparatus for Explosive Gas Atmospheres.

*Manufacturer reserves the right to change product specification without prior notice.
GPS-0004 Rev: D



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

- 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.

4 RATING

- 4** 10A 250VAC; 15A 125VAC
- 5**⁷ 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

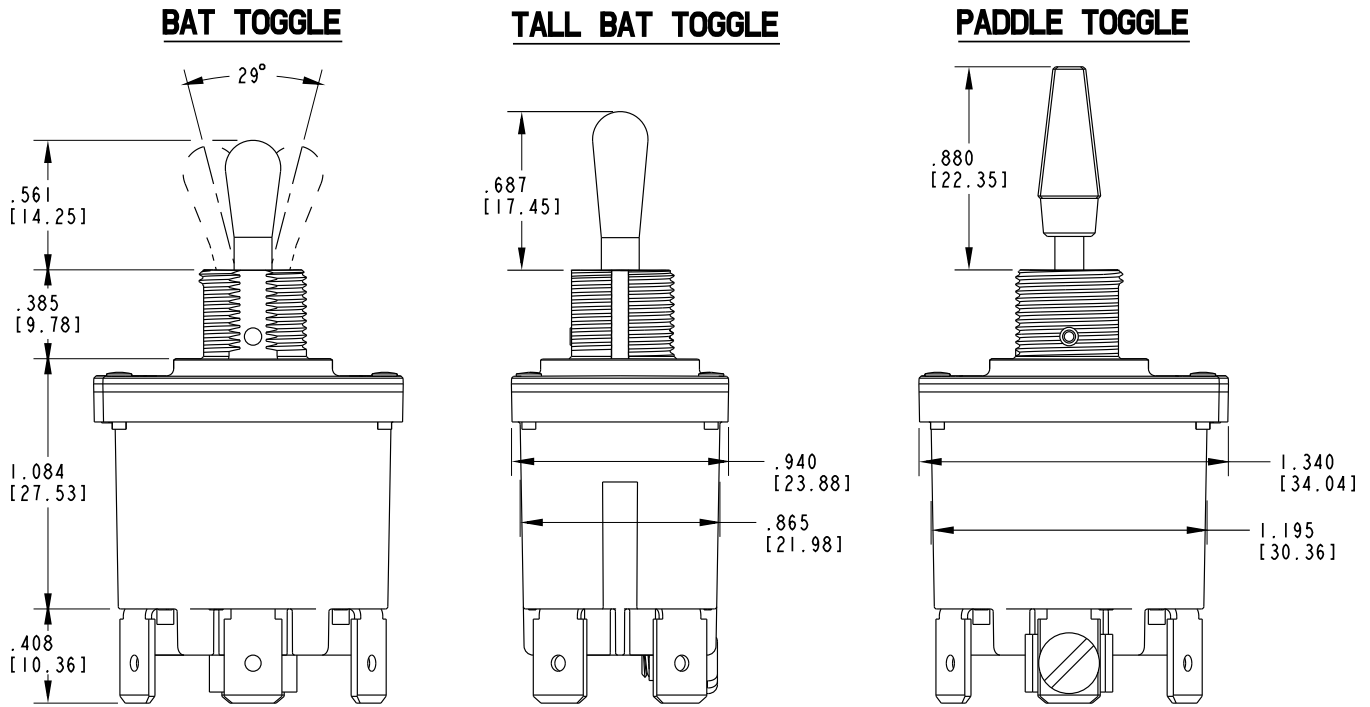
TOGGLE (SEALED METAL)

Without Panel Seal	With Panel Seal (Bulk)	Toggle Color	Toggle Length	Bushing Length
53	58	Dull Nickel	.561	.385
73	78	Dull Nickel	.687	.385

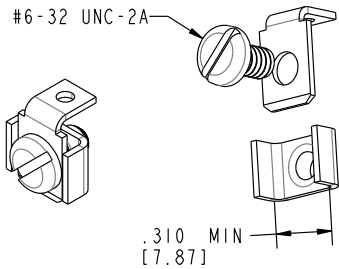
PADDLE (SEALED PLASTIC)

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

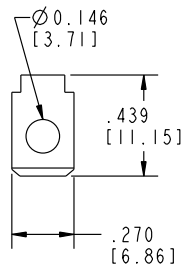
Dimensional Specifications: in. [mm]



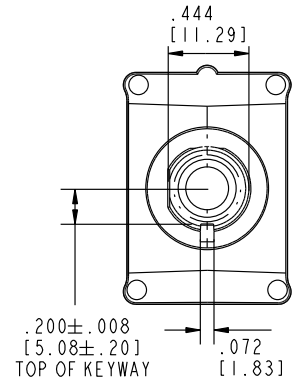
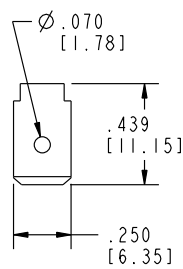
TERMINALS



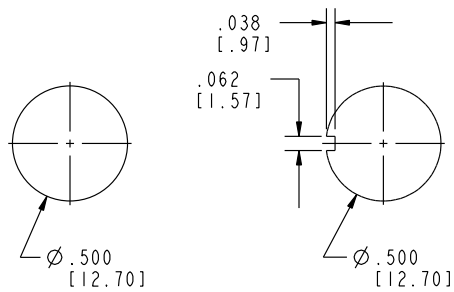
SCREW (AND CAGE) TERMINAL



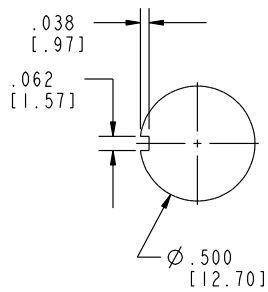
.250 TAB (O.C.) TERMINAL



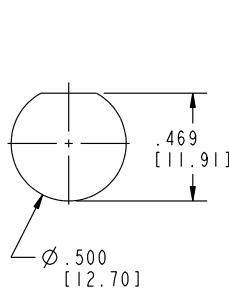
PANEL CUTOUTS



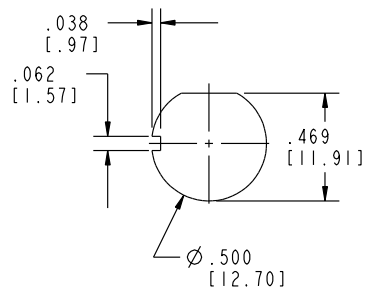
MOUNTING HOLE



WITH KEYWAY



WITH FLAT



WITH KEYWAY, FLAT