



Aerospace | Defence | Energy | Commercial | Marine | Motorsport



Switches and Grips

Shortform Guide to Performance



Rugged Switches
Extended Life-Cycle
and Reliable
Performance

Hall Effect Switches
10 million Cycles,
ultra reliable and
proportional output





Extended Life-cycle and Reliable Performance

We offer an extensive range of precision switches and operator controls commonly used throughout some of the toughest environments and applications. Typical markets and industries include Defence, Aerospace, Marine, Industrial Equipment, Motorsport, Medical, Communication and Process Control.

The product range covers an array of mechanical, hall effect, sealed and illuminated high performance switching technologies, in a variety of styles including pushbutton, toggle, rocker, slide and rotary.

Project and custom builds also undertaken.



Custom control panels possible - Please contact us

Both Standard Mechanical and Hall Effect Proportional Switches and Grips Available

Custom Illuminated Panels

Supplementary to the range of performance switches and grips outlined in this guide, we can also offer a broad range of specialist lighted switches and scratch resistant illuminated panels designed and approved for use in aircraft cockpits and ground defence equipment. For more information on these products and services please contact us or see our website.



Grips (joysticks)	page 4
Range of Military, Aerospace and Commercial grips available in both modular designs and specialist custom made. These designs utilise the broad range of switches as reviewed in this product guide.	
Pushbutton Switches	page 8
Extensive range of rugged and high performance switches available from P1 to the ever popular P9 Series. Various options and permutations possible, including lighted and hall effect versions.	
Toggle Switches	page 12
These switches offer the user multiple configurations and options, including various toggle bar designs. Many of which meet MIL standards and approvals.	
Trim Switches	page 14
Ideal for application joysticks for all in field applications whether commercial or military, with numerous button styles, colours and approval standards.	
Rocker Switches and Other Types	page 15
Wide selection of rocker switches, including UL and CSA approved from K1 to K5 Series. Additional switches include slide, transducer, pendant and trigger style.	
Hall Effect Switches and Overview	page 16
Ultra reliable, broad range of 'Hall Effect' switches offering proportional outputs and millions of mechanical and electrical cycles. For explanation see below.	
Basic Switches	page 18
Range of miniature and subminiature switches for low level signals, ideal for integration into assemblies and mechanisms requiring high performance switching.	
Limit Switches	page 19
Used to determine the position of a moving component that activates it, especially in harsh environments. Sealed against immersion and corrosive atmospheres.	

Explanation of Hall Effect Switches and Grips

Hall Effect switches from an industry leader in the integration of J1939 and CANopen® serial bus communications in on and off-highway operator controls. Having extensive experience implementing CAN operating systems in conjunction with the latest generation of operator controls; replacing traditional electromechanical and hydraulic systems with solid state, digital and analogue electro-hydraulic control systems. Their product line of electro-mechanical switches, Hall effect devices, push buttons and mini joysticks mated to our Hall effect joysticks and control handles provide a CAN based integrated solution for any application.

J1939 offers an industry standard set of defined codes for consistent system integration.

The J1939 Joystick will work in systems running with 250Kbit/sec processing a message approximately every 10ms. J1939 can be configured into three variations (50, 51, 52 are the default addresses). An external resistor change at the connector pins allows multiple joysticks to be used on the same bus. Additional joystick addresses can be added by assigning a unique identification during configuration.

CANopen® provides a greater degree of flexibility in defining device IDs and can be remotely configured. CANopen® can also be configured to run with other system baud rates.

Features:

- Standard configuration for both is three analogue input channels and 12 digital input channels with two digital output channels
- CAN power accommodates a 9–32VDC power supply
- I/O extension for up to 40 digital inputs, eight analogue inputs & multiple digital outputs by I²C interface
- Both J1939 & CANopen® versions include a failure monitoring feature
- EMI/RFI per ISO 11898 89/336 ECC, tested to 100V/M
- Operating temperature -40°C to +85°C
- Storage temperature -65°C to +105°C

Commander Grips

G2 Modular Design Series



Commander Grip with Brow Shown

Rugged Cast Aluminium Alloy
Standard Modular Design
Nine Standard Faceplate Configurations
IP68S Sealed

G2 Modular Grips

Cast from aluminum alloy, the G2 Commander Grip is a rugged industrial control grip suitable for demanding applications. The standard G2 Commander Grip offers nine different faceplate configurations that include pushbutton, toggle, transducer, split trim and Hall effect switches. Thousands of custom faceplate configurations are possible. The grip body has 10 possible switch location options.

The G2 Commander Grip is suitable for use in military, aerospace and industrial applications, and is the ideal solution where durability and dependability are required.

- Standard design eliminates need for tooling charges.
- Available as a fixed grip or can be mounted on a JH or JHM series Hall effect joystick.
- Various mounting & termination options available.
- Nine standard faceplate configurations that include T3, T4 and T5 toggle switches, P4, P7 and P9 pushbutton switches, K1 rocker switches, SPT split trim switches, J2 transducer switches, FG flip guards, and HTWM, HTL and HTLT Hall effect switches.
- Thousands of custom faceplate configurations possible that can accommodate virtually all OTTO pushbutton, rocker, toggle, trim, transducer and thumb wheel switches.
- Operator presence and trigger options.
- USB output option.
- Tested to withstand a 265 lb. load.
- Grip sealed to IP68S (subject to change based on switch choice).

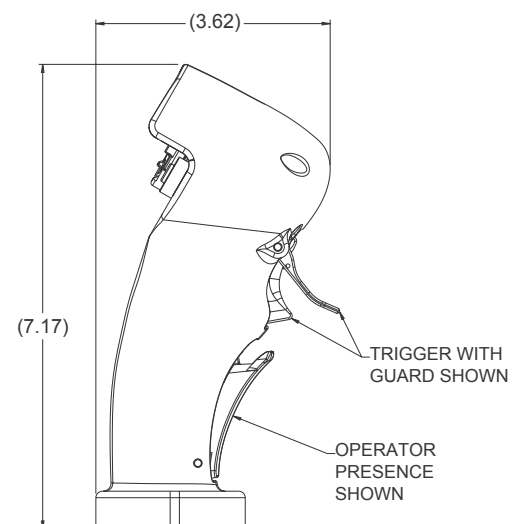
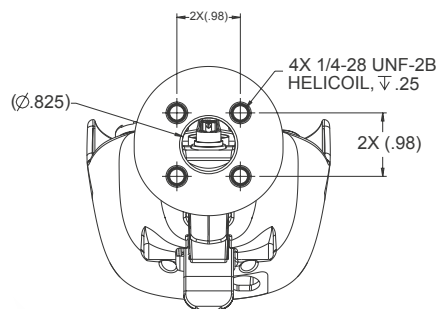
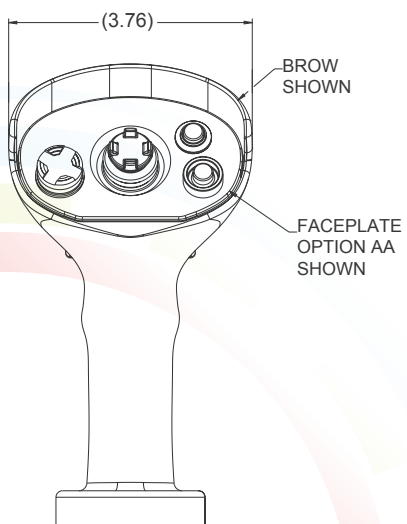
For more information on the multiple options available please contact us to discuss your requirements further.

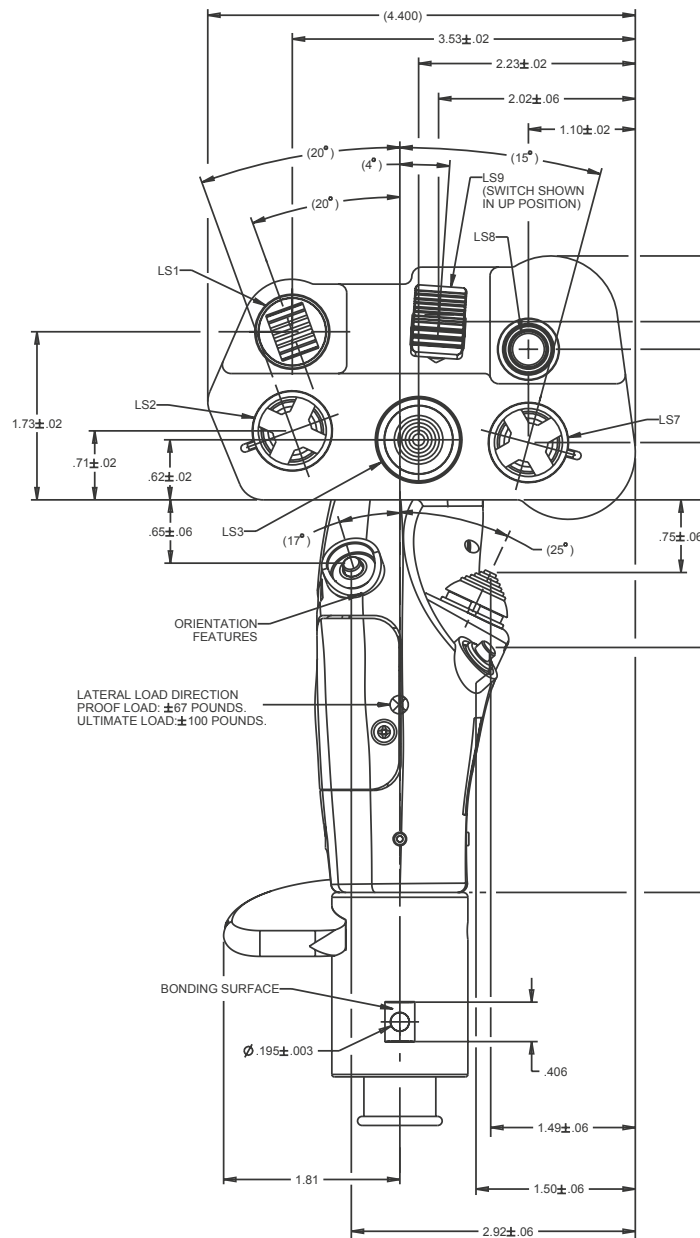
Call us for more information or to discuss your needs in detail

Standard Characteristics

Grip Materials

Handle	Aluminium, investment cast, A356-T6
Faceplate	Aluminium, Wrought, 6061-T6
Wires	22 AWG per M22759/11-22





G2 Custom Grips

A comprehensive range of aerospace and military control grips are available. These G2 grips perform every day in some of the toughest applications from military ground vehicles, throttle quadrant and control grips for fixed wing aircraft, to helicopter cyclic collective grips. With the manufacturer being registered to ISO 9001:2008, AS9100C and FAA Part 145 Repair Station.

Military Ground Support Grips

- Custom machined heads available.
- Back lighting options.
- Custom head can be outfitted with a variety of standard switches.

Flight Control Grips

- B8 and Cobra style grips are made in accordance with MIL-DTL-25561.
- Non-reflecting, non-hygroscopic, rugged injection moulded grip.
- Choice of termination styles - from integral connectors to wire harnesses.
- Threaded interface or tube mounting.
- Can be populated with MIL qualified switches, standard or custom configurations.

Throttle Control Grips

- Control for fixed-wing aircraft.
- Custom toggle and rocker switches can be used to meet high cycle requirements.

Helicopter Cyclic & Collective Grips

- Grips have thin-wall, investment cast aluminium construction for high strength and low weight.
- Modular construction.
- Custom heads and switch mounting plates can be fabricated to fit standard handles.
- A variety of button colours & style options available

For more information on this extensive range, or for assistance with your specific requirements, please contact us to discuss in detail.



Universal Grips

G3 Modular Design Series



G3 Modular Grips

The G3 Universal Grips can be customised for top-of-the-line machines requiring high switch content, or to provide only basic control function on lower tier units. The G3 Universal Grips have a modular design and were developed for use with our standard pushbuttons, rockers, toggles, Hall effect switches and the JH and JHM series Hall effect joystick.

Available in both Small and Medium size, they are easily customised with multiple switch configurations, quickly and without tooling charges. Some of the markets for the G3 Universal Grip include Industrial, Medical, Off-Highway and Transportation.

- Modular Design eliminates the need for tooling charges.
- Compatible with the JH and JHM series Joysticks.
- Small & Medium sizes available.
- Accommodates a full line of Pushbutton, Rocker, Toggle, HP Hall Effect & HPL Proportional Output series of switches.
- Various mounting & termination styles available.
- Includes mounting adaptor with boot ring.

For more information on the multiple options available please contact us to discuss your requirements further.



Multiple Standard Button and Faceplate Configurations

Standard Modular Design Keeps Costs Down

Soft Touch Versions Available

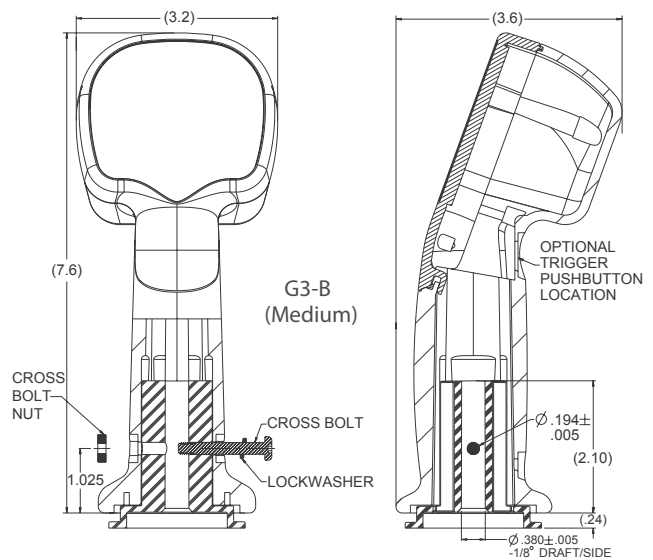
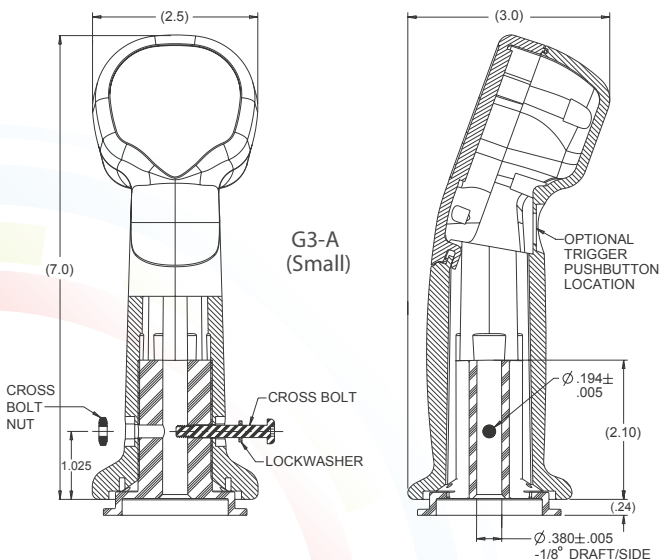
Configure Your Own Grip Design

Call us for more information or to discuss your needs in detail



Small G3-A

Medium G3-B



Dual and Commercial Grips

G3 Modular Design Series



G3 Dual Grip

The G3 dual grip remote is a durable, lightweight, two-handed game style grip. Its ergonomic design allows for comfortable extended use and its standard moulded body eliminates the need for tooling charges.

The G3 dual grip remote accommodates our standard HTL and P7 series switches, with your choice of button styles and colors. The G3 Dual Grip Remote is designed for unmanned vehicles, robotics, and can be used for military applications.

- Standard USB interface.
- Readily available options include HTL series and P7/P9 switches.
- Lightweight, ergonomic design for comfortable use.
- Excellent proportional control.
- Switches sealed to IP68S.
- Switches have excellent EMI/RFI immunity.
- Custom configurations are also available, please contact us.

G3 Commercial Grips

The G3 range of commercial grips have been designed to serve the agriculture, off-highway, material handling and specialised industrial equipment markets.

Heavy Equipment & Material Handling Grips

- Rugged injection moulded grip can be outfitted with a variety of our switches.
- Ergonomic design for extended use.
- Custom designs.
- Left or right hand orientation available.
- Comfortable Soft Touch Grip available.

Tractor Grips

- Rugged thermoplastic.
- Can be outfitted with a variety of our switches.

Agricultural Grips

- Powder-coated, cast aluminum grip and steel mounting bracket.
- Can be outfitted with a variety of our switches.



Soft Touch Grips



Palm Grips



Tractor Grips



The ergonomically designed Contour Grip reduces muscle strain allowing for extended use with minimal fatigue and is available in both left handed and right handed versions.



Push-Button Switches

Range Overview



P Series Overview

A diverse and comprehensive range of pushbutton switches, both rugged and aesthetically pleasing. Designs available include illuminated, vandal resistant, domed, shrouded and many more, that are often used in Defence, Aerospace, Off-Road Equipment, Material Handling, Medical, Marine, Industrial and Process Control.

Sealed models such as the P1 operate on the patented 'rolling sleeve' principle, providing longer life and smoother operation over a wide temperature range. The inherent wiping action breaks welds and wipes the contacts clean on each operation.

Hall Effect Versions

Hall Effect pushbuttons also available on selected versions, see table below.

Illuminated Versions*

Illuminated versions of selected push button switches are also available, denoted by * in the table below.

Please contact us for additional information on these parts or see our website.



Series	Feature	Actuation	Max Rating	Seal Rating	Approvals	Circuitry
P1	Mil Grade	Momentary Action, Push-Pull Option	10A	MIL-PRF-8805 Design 2, 3 or IP68S	UL (E61705) CSA (LR43865)	SPDT-DB, SPST-DB
P2	Commercial	Momentary Action, Two Step	5A	MIL-PRF-8805 Design 2 nd Design 3	n/a	DPST, DPDT
P3	* Commercial	Momentary Action, Push-Pull Option	10A	IP64 or IP68S & IP69K (Except push- pull)	UL (E61705), CSA (LR43865)	SPDT-DB, SPST-DB
P3-D	Domed Style P3	Momentary Action	10A	IP64 or IP68S and IP69K	UL (E61705)	SPDT-DB, SPST-DB
P4	1 to 4 Poles, Custom Pushbutton	Momentary Action, Two Step	8A	IP64 or IP68S	n/a	1 to 4 Poles
P5	* Commercial & MIL Grades	Alternate Action	10A	IP64 & MIL-PRF-8805 Design 2, or IP68S	UL (E61705)	SPST, SPDT
P5-D	Domed Style P5	Alternate Action	10A	IP64 & MIL-PRF-8805 Design 2, or IP68S	UL (E61705)	SPST, SPDT
P5-V	* Vandal Resistant P5	Alternate Action	10A	IP64 or IP68S and IP69K	UL (E61705)	SPST, SPDT
P7	* Subminiature, MIL Grade	Momentary Action	5A	IP64 & MIL-PRF-8805 Design 2 or IP68S & MIL-PRF-8805 Design 3	UL (E61705), CSA (LR43865)	SPST-DB, SPDT-DB
P7-D	* Domed Style P7	Momentary Action	5A	IP64 and MIL-PRF-8805 Design 2 or IP68S	UL (E61705),	SPST-DB, SPDT-DB
P8	Shorter Behind Panel Depth	Momentary Action, Push-Pull Option	10A	IP64 or IP68S	UL (E61705), CSA (LR43865)	SPST-DB, SPDT-DB
P8-V	Vandal Resistant P8	Momentary Action	10A	IP64 or IP68S and IP69K	UL (E61705)	SPST-DB, SPDT-DB
P9	* Domed Style	Momentary Action	5A	IP64 or IP68S and IP69K	UL (E61705), CSA (LR43865)	SPST-DB, SPDT-DB
P9C	Lower Cost P9	Momentary Action	100mA @ 1-32VDC	IP68S	n/a	SPST-DB
P9M	Latching P9	Normally Open, Latching	4A @ 12VDC	IP68S	n/a	SPST-DB
PE	MIL Grade	Momentary Action	5A	Unsealed or MIL-PRF-5505 Design 2	n/a	SPST-DB, SPST-DB
PE2	Splashproof, MIL Grade	Momentary Action	2A	Splashproof per MIL-PRF-8805 Symbol 6	n/a	2 Circuit, DPDT

Hall Effect Push-Button Series

HP7	Subminiature MIL Grade	Momentary Action	n/a	Electronics sealed to IP64 or Watertight to IP68S	n/a	n/a
HP7-C	Lower Cost HP7	Momentary Action	n/a	-	n/a	n/a
HPL	Hall Effect Linear Output	Output Proportional to Travel of Button	n/a	Watertight per IP65 or IP68S Available	n/a	n/a

Push-Button Switches

P1, P2, P3, P4, P5 and P7 Series Overview



P1

Offers a mechanical life well beyond the 50,000 cycles MIL-PRF-8805. The double break switching mechanism has an incredibly fast transfer time, reducing arcing and increasing contact life. For use in panel boards, control grips, instruments and where sealed pushbutton switches are required.

Available with 5/8" and 15/32" threaded case or press fit mounting.



P2

Three position, offering two steps of momentary switch action plus "rest" (or "off"). Each detent operates an independent set of SPDT contacts in a watertight and dust tight package. Designed for applications in the high performance commercial market such as the control of two-speed motors.

Available with 5/8" threaded case or press fit mounting.



P3 and P3-D

A commercial version of the P1 Push button switch, with either momentary or push-pull action. Offering vastly improved life under extreme conditions found in some industrial environments. Available with 5/8" or 15/32" threaded or press fit mounting. Also available in domed style as P3-D.

Available with 5/8" and 15/32" threaded case or press fit mounting. P3-D only 5/8" threaded.



P1 Custom



P4 Custom

Custom designs are possible where button design and display text or icon is configurable.



P7 Custom



P4

Auxiliary actuators designed for use with B2 and B3 Basic Switches, bushing mount. Moisture proof at the front panel. Choice of one and two pole configurations and select from a variety of six bezel/bushing mount case styles in clear (silver) or black anodized aluminum.

Buttons are available in nine colours. Basic switches are per MIL-PRF-8805/101.



P5, P5-D and P5-V

Alternate Action switches match the P1, P3 and P8 momentary action models for mixed function. Anodised aluminium alloy case. Design panels with both alternate and momentary action switches with uniform panel appearance. P5 requires less behind the panel space than the P1 and P3 momentary versions.

Available with 5/8" (both) or 15/32" (P5 only) threaded or press fit.

P7

These subminiature switches embrace today's technology requirements by allowing for a large number of switches to fit within a faceplate. Anodised aluminium alloy case. Numerous mounting styles, including a swaged bushing for installation in aircraft flight control and hand grips and similar applications.

Available with 1/4" or 15/32" threaded or press fit mounting.



Push-Button Switches

P7-D, P8, PE Series and Accessories Overview



P7-D

Offered as either dome style round or square push button. Featuring a short behind panel depth. Rugged, subminiature momentary switch in an anodised aluminium alloy case.

One million operations at 1 amp resistive, 50,000 at full rated load of 5 amps resistive or 3 amps inductive.

Positive tactile feedback signals the operator when switch is operated.

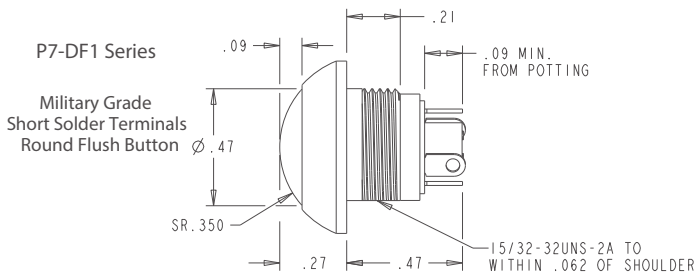
Available with 15/32" threaded mounting.

P8 and P8-V

Momentary action subminiature switch, with push-pull option. P8 series switches offer vastly improved electrical and mechanical life under extreme conditions found in most military and industrial environments. Case is anodised aluminium. P8-V is the vandal resistant version, stainless steel case option.

Available with 5/8", 15/32" or 1/2" threaded or press fit mounting.

P8 Custom



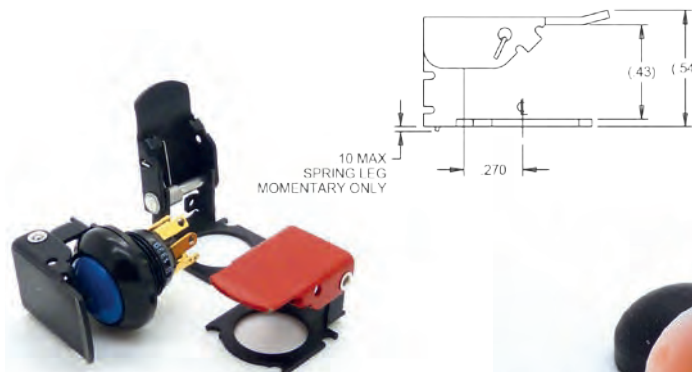
Custom designs are possible where button design & display text or icon is configurable.



PE and PE2 Description

PE pushbuttons per MIL-PRF8805/96, with momentary snap-action. Available with black or red button colours and clear or black case colours. PE2 pushbuttons per MIL-PRF8805/99 with momentary snap-action. Available with black, white or red button colours

Available with 1/4" (PE) or 15/32" (PE2) threaded aluminium alloy case mounting.



FG Flip Guard and HDW Hardware

The FG Flip Guard assembly offers a maintained or momentary actuation for pushbutton switches with a 15/32" (12mm) threaded bushing. Supplied with or without flats to prevent rotation during assembly.

The HDW accessories range includes shrouds, panel seals, push button and toggle boots and more.



Push-Button Switches

P9 Series Overview



P9 and P9M

The P9 Domed series switches feature a contoured push button in a tough plastic housing. Offered in a 'low' and 'raised' button profile, with a threaded case for hex nut mounting or with snap-in case. Offering Excellent mechanical and electrical performance while operating under severe conditions found in demanding applications.

Share similar size and characteristics to the P7 series. Major differences being plastic housing construction and the availability of a shorting bar contact arrangement.

P9-M is the latching maintained version.



P9M Latching Version

P9C

Competitively priced, the P9C pushbutton is a low-level only momentary, normally open, IP68S sealed switch with a domed style pushbutton and a 3 million cycle life.

Flush dome and raised dome button profiles are available in either gloss or matte finish.

Available with 15/32" threaded case and features short behind panel depth. Not certified.

UL Recognised & CSA Certified

Sealed to IP64 or IP68S

Two Button Heights

Threaded Body or Snap-In

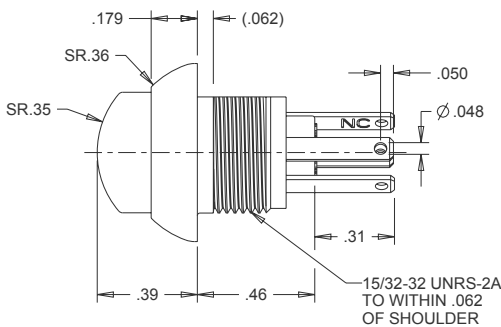
Panel Mounting

Wide Stocked Range

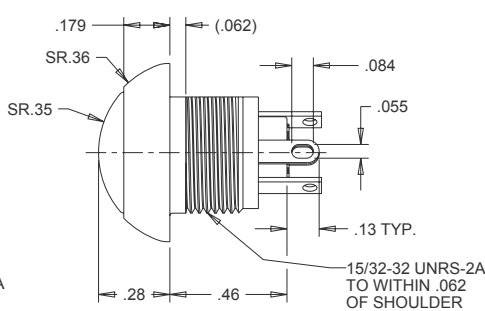
Choice of nine button colours are available with a black bezel, from stock. Alternative bezel colours are also available please contact us for details and options.



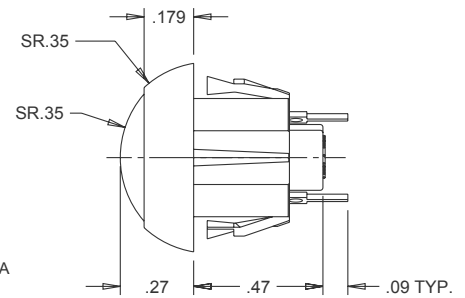
P9 Custom



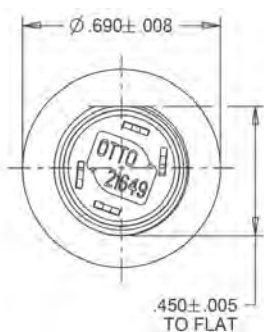
Raised Dome Button Style



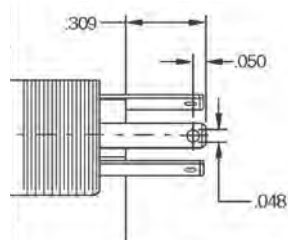
Flush Dome Button Style



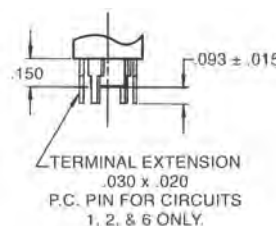
Snap-In Case
(PC Terminals Shown)



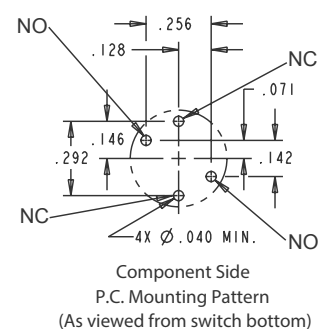
Threaded Case Terminal Detail



0.110" Quick Connect Detail



Please note that all dimensions are Imperial



Component Side
P.C. Mounting Pattern
(As viewed from switch bottom)

Toggle Switches

T1, T3 and T7 Series



T1 Series - Panel sealed and unsealed toggle switches to MIL-PRF-83731.

T3 Series - Miniature toggles are rugged, highly reliable switches with snap-action switch.

T7 Series - High performance switch, entirely sealed to withstand direct water spray.

T9 Series - Suitable for applications in Off-Highway, Aerospace, Commercial & Industrial equipment (MS24523, 24 and MS24658, 59).

TE Series - All metal components are corrosion resistant and exceed requirements of MS25224.

Series	Feature	Actuation	Max Rating	Seal Rating	Mounting	Circuitry
T1	2 or 3 Position, 1 to 8 poles, Lever Lock Option	Momentary, Maintained	8A	MIL-PRF-83731	15/32", 7/16" or 11/16" Threaded	Multi-Pole B2, B3 Basics
T3	Snap Action, Lever Lock Option	Momentary, Maintained	5A	MIL-PRF-83731 on 15/32" Threaded only	15/32" or 1/4" Threaded	SPST, DPST
T7	Lower Cost, Sealed	Momentary, Maintained	16A	IP68S or IP69K	15/32" Threaded	SPST, SPDT DPST, DPDT
T9	High Performance Lever Lock Option	Momentary, Maintained	20A	IP68S or MIL-DTL-3950	15/32" Threaded	SPST, SPDT DPST, DPDT
TE	Snap Action, Non-Teasible	Momentary, Maintained	5A	MIL-DTL-8834	15/32" or 1/4" Threaded	SPST, DPST
TG	Toggle guards to fit standard size toggles such as the T9, prohibiting accidental actuation. They meet requirements of MIL-DTL-7703, MS25224-1/-3 and MS27752-1					



T1

Available as panel sealed per MIL-PRF-83731 in various configurations and actuator designs. Also available as unsealed toggle featuring B2 and B3 basic switches.

Mounting is via 15/32", 7/16" or 11/16" threaded collar.

T3

Rugged miniature toggles to MIL-PRF-83731, highly reliable switches offering positive detent action for safe switching operation. Featuring a snap-action switch mechanism.

Choose sealed one or two pole circuitry, 15/32" sealed or 1/4" unsealed bushing construction, momentary and/or maintained.

We also offer two different lengths of pins for printed circuit soldering.

T7

Rugged, high performance sealed switches designed for use under severe conditions found in heavy equipment, industrial control, marine and appliance applications. Offered in single and double pole designs.

In conjunction with the snap-action switch mechanism, the T7 offers non-teasible contact transfer. Offers numerous actuator stalk or thumb designs. Available with 15/32" threaded mounting.

Toggle Switches

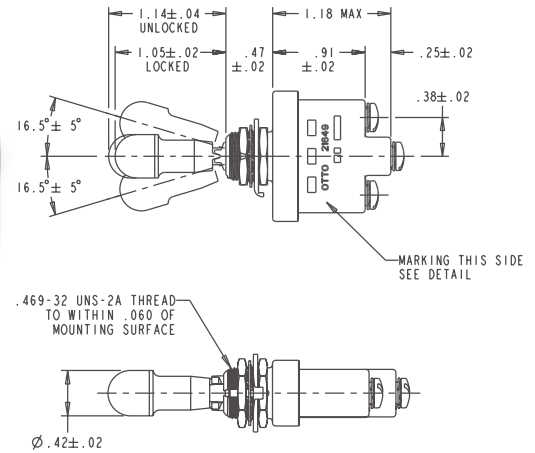
T9, TG and TE Series



T9

This MIL-DTL-3950 qualified high performance switch is a logical choice for use in environments where sealing and resistance to shock and vibration are required. Particularly suitable for applications in military, off-highway, aviation, commercial and industrial equipment.

Circuitry configurations include two or three positions with many combinations of OFF-ON in momentary and maintained action including ON-ON-ON.



Part Number Example **T9-MS2-21A**

Type

- M** Mil qualified to MIL-PRF-3950
- C** Commercial version

Contacts

- S** Standard (Silver plate)
- L** Low level (Gold plate)

Poles

- 1** Single pole
- 2** Double pole

Circuit ID

Contact us for details

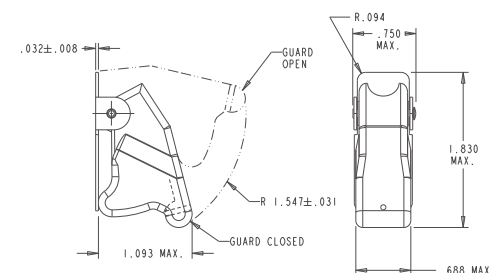
Lockout Suffix

A, B, D, E, F, G, H, J, K, L, M, N, P
(see list to right)

Broad Stock Profile Available, including MS24523-21, -23, MS24524-21, -23, -27 and MS25224-1, -3

Lever Lockout Configuration Codes

- A** Locked in all three positions
- B** Locked in centre and keyway side position
- D** Locked out of centre position
- E** Locked in centre position
- F** Locked in opposite keyway position
- G** Locked in keyway side position
- H** Locked out of centre and keyway side position
- J** Locked out of centre and opposite keyway position
- K** Locked in centre and opposite keyway position
- L** Locked out of keyway side position
- M** Locked out of and into opposite keyway position
- N** Locked out of opposite keyway position
- P** Locked out of and into keyway side position



TE

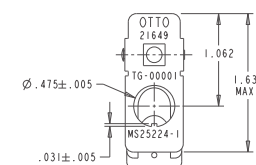
MIL qualified, snap-action, non-teasible, positive make & break, panel mount toggle switch. Mechanism ensures that the switch will actuate and not “hang up” even when actuated very slowly. All metal components are corrosion resistant.

- MS90310-211/221/231/271/311
- MS90311-211/221/231/271/311
- MS24655-211/221/231/271/311
- MS24656-211/221/231/271/311 and /331/ 341/351

TG Toggle Guards

Offered for 2 and 3 position switches with 15/32-32 threaded bushings with slotted or flat key ways. All models feature spring loaded covers that lock in either the open or closed positions. Moulded plastic cover available in multiple colour choices.

- MS25224-1 and -3
- MS27752



Trim Switches

Range Overview



MT T1, Two Way

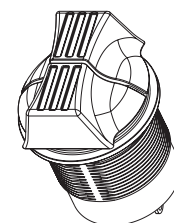
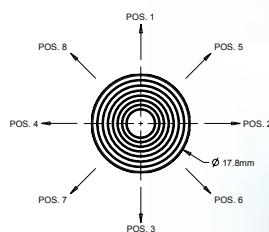
T1 single pole, double throw, centre off, momentary contact (self return to centre off) switch. Also available in a latching version MT T1-T single throw, centre off momentary/maintained action contact switch.

MT T4, Four Way

T4 Mini Trim is a single pole, 4 throw, centre off, momentary contact (self return to centre off). Also available with tactile response T4-T version, which offers a positive detent to indicate circuit transfer.



Series	Feature	Actuation	Max Rating	Seal Rating	Mounting	Circuitry
MT T1	2 Way, centre pushbutton option	Momentary	10mA @ 5VDC	IP64, IP68S MIL-PRF-8805 Design 3	11/16" Threaded or Press Fit	SPST (x2)
MT T1-T	2 Way, tactile feedback	Momentary/Maintained	10mA @ 30VDC	Water resistant per MIL-STD-810F, 506.4	11/16" Threaded	SPST (x2)
MT T4	4 Way	Momentary	10mA @ 5VDC	IP64, IP68S MIL-PRF-8805 Design 3	11/16" Threaded or Press Fit	SPST (x4)
MT T4-T	4 Way, tactile feedback	Momentary with tactile feel	2A @ 28VDC	Water resistant per MIL-STD-810F, 506.4	Press Fit	SPST (x4)
MT T5	4 Way, centre pushbutton	Momentary, lenient option	10mA @ 5VDC	IP64, IP68S MIL-PRF-8805 Design 3	11/16" Threaded or Press Fit	SPST (x5)
MT T8	8 Way	Momentary	10mA @ 5VDC	IP64, IP68S MIL-PRF-8805 Design 3	11/16" Threaded or Press Fit	SPST (x8)
MT T8-T	8 Way, tactile feedback	Momentary with tactile feel	2A @ 28VDC	Water resistant per MIL-STD-810F, 506.4	Press Fit	SPST (x8)
SPT	Two 2 Way trim switches	Momentary with tactile feel	0.6mA @ 15VDC	Water resistant per MIL-STD-810F, 506.4	3/4" Threaded	Two SPST (x2)
T2	2 Way, centre pushbutton option	Momentary with tactile feel	10A @ 28VDC	MIL-PRF-8805 Design 2, resilient Design 4	Threaded or Press Fit	SPST, DPST Double break x3
T4	4 Way	Momentary with tactile feel	5A @ 30VDC	MIL-PRF-8805 Design 2, resilient Design 4	Threaded or Press Fit	SPST (x4) multi pole option
T5	4 Way, plus centre pushbutton	Centre maintained	2A @ 28VDC	MIL-PRF-8805 Design 2	Threaded or Press Fit	SPST (x5) multi pole option



MT T5, Four Way + Centre

The T5 Mini Trim is a single pole, 5 throw centre off momentary contact (self return to centre off) switch.

Available in both military and commercial versions.

MT T8 and MT T8-T

The T8 Mini Trim is a single pole, 8 throw, centre off momentary contact (self return to centre off switch). T8-T Tactile switches remain a favourite due to the positive detent indicates circuit transfer to the operator.

SPT Split Trim

Uses two single-pole-single-throw momentary toggles with detent providing a positive click action.

Each two-way switch can operate independently or simultaneously. Available in both commercial and military grades

Rocker and Other Switches

Overview



Approved to, UL (1054), CSA (LR43865), DEMKO (97-01807), (UL1500) and Ignition protected.

K1 and K2 16A

Rugged, high performance sealed switches designed for use under severe conditions found in marine, appliance, heavy equipment and industrial control applications.

Available with rocker or paddle style switches.

K3 20A

Attractive and rugged, snap-in rocker for wet and dusty environments.

Fits industry standard panel cutouts, nominal 24mm x 45.5mm.



K4 16A

Entry level, Snap-in toggle for wet and dusty environments.

K5 20A

Attractive style and rugged construction, snap-in rocker for wet and dusty environments.

U2 10A

Designed to run a minimum of one million mechanical cycles and withstand extreme environmental conditions.

Rocker switches are designed to comply with standards established for Appliances, Marine (ignition protection) and Off-Road Vehicles. Mounting is simple and quick. The snap-in design supports a variety of panel thicknesses. Choose LED, incandescent or neon illumination. Legends can be printed onto a button or lens, or laser etched and back-lit. Custom colours are also available. All switches have a seal rating of IP68S and IP69K.

Various custom designed U2 switches and U7 type pendant designs are also available, please contact us for details.



SL Slide Switches

Three position centre 'OFF', with momentary or maintained action available in any combination.

Supplied in both commercial and military grades, dust-tight to MIL-PRF-8805 Design 2. Button styles include raised or flush contours, choice of button colour.

J2 Transducer

These are strain gauge based designs, force transducer switches, providing analogue an output proportional to the force applied to the button.

Normally mounted in a grip and operated by a finger or thumb.

U2 Trigger Switches

A selection of Single-step and Two-Step trigger switches are also available, including qualified to M8805/111-1 and -04. Please contact us for specific details and brackets available.



HPL - Linear Output Pushbuttons

Provides the user an output proportional to the travel of the button. The HPL delivers up to 10 million cycles. This rugged switch is ideal for applications where a simple on/off control is insufficient and a linear output is desired.

Using the HPL, an operator can control the motion of a device as well as the speed of the movement. The HPL switch is an ideal control device for valves and variable speed drives and can be used in industrial control, construction, heavy equipment and material handling applications.

The HPL is offered as a stand-alone switch and in a dual HPL rocker assembly. As with all OTTO switches, a wide variety of case and button styles and colors are offered, along with various termination styles and two levels of sealing. OTTO can provide custom configurations as well as provide the HPL switches installed in a control grip.



HPW - Single Axis Paddle

The HPW series is available with 14 output options, offers a self-centering single axis actuator that provides linear change in voltage output in either direction from centre. Options include increasing or decreasing voltage output in either direction (from center position to the full travel position) with single or dual outputs in either direction. The HPW series without detent provides a five million cycle, full forward to full back life and with detent (available with HPW-3) provides a two million cycle full forward to full back life. Electronics are sealed to IP68S, while offering outstanding EMI/RFI immunity.

- Designed for grip, armrest and panel mounting.
- 14 output options available.
- Self-centering, single axis actuator.
- Up to 5 million mechanical life.
- Electronics sealed to IP68S.
- Optional soft touch coating available.



HFNR - Forward/Neutral/Reverse Rocker

The HFNR is compact, robust and reliable, ideal for grip or panel mount applications. This 3-position switch provides operator comfort by reducing the movement required to change direction or switch gears. Back lighting provides enhanced visibility, making them easy to see in poor lighting or night-time operation.

The electronics are sealed to IP68S, the switch has excellent EMI/RFI immunity and a mechanical life of three million cycles.

- Choice of bezel and button colours
- 2V to 24V LED back lighting options
- Snap-in panel mounting, accepts multiple panel thicknesses



HTW and HTWE - Proportional Output Thumbwheel

HTW is a spring-return-to-center, single axis thumbwheel with an actuator that provides linear change in voltage output in either direction from the centre. Whereas the HTWE offers an return-to-end alternative.

These switches are available with eight output options, including increasing and decreasing voltage output from the centre position to the full travel position and single or dual (redundant) outputs.

A durable switch providing three million cycle rotational life, sealed to IP68S and excellent EMI /RFI immunity. Both HTW and HTWE are also available with short behind panel depth versions.

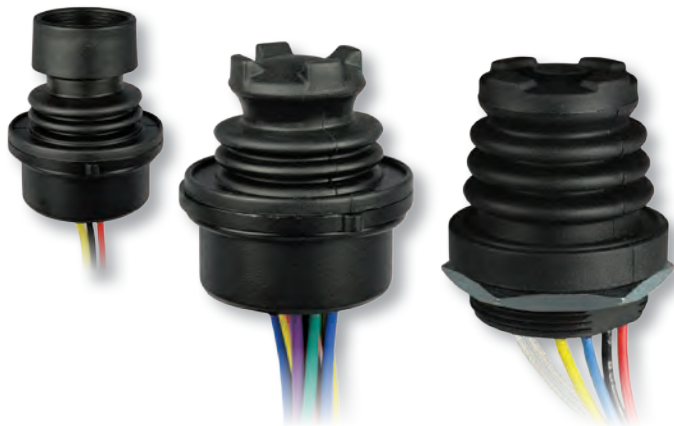
Mini Joysticks - Hall Effect

HTL, HTLT, JHM, JHT and JHT-Z Series

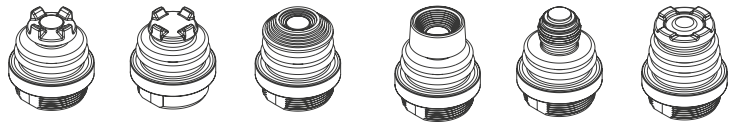


HTL Series, Finger Joystick

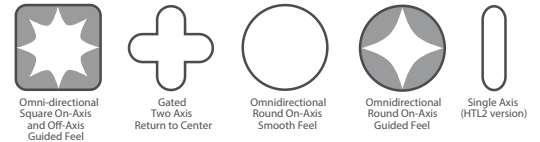
Provides all of the performance of a full size, dual axis joystick in a miniature package that can be mounted in control handles, armrests and panels. The Hall effect sensors are immune to electromagnetic and radio frequency interference up to 100V/M. The HTL series has excellent tactile feel for improved operator control and is available with either dust tight or IP68S watertight seal. Numerous output configurations are available for different applications. An additional centre push button option is also available with the HTLT Series, which features six different button styles, multiple output configurations and three mounting options.



Selection of Typical HTL Button Styles



Selection of Typical Gating Options



JHM, Medium Joystick

The JHM series Medium Hall Effect Joystick is a full function operator control in a package that will fit in an armrest or on a panel. It utilises patented Hall effect technology for unmatched life and reliability.

Electronics are sealed and it has an operational life of ten million cycles in all directions. Additional options include CANopen(R) and CAN J1939 versions, multiple analog and digital auxiliary control outputs, redundant sensors and a variety of output configurations, along with a variety of grip and switch options



JHT and JHT-Z, Miniature Joystick

The JHT miniature series Hall Effect joystick's compact design and robust construction is the ideal solution where space is limited and precision control is required. Ideal applications include: robotics, construction equipment, hydraulic controls, medical and surgery equipment, security and surveillance video cameras. The JHT has been tested to five million cycles with no degradation of electrical performance or boot wear. Electronics are sealed to IP68S and the EMI/RFI withstand are per SAE J1113 specifications. Also available with a 60° rotational movement of the actuator top, JHT-Z.

Basic Switches

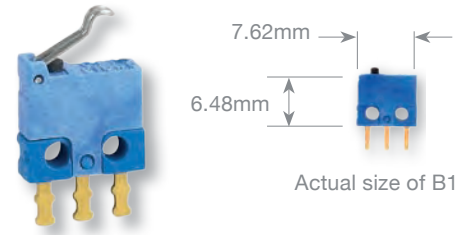
Miniature and Subminiature



B1/B1-5 Series Description

Designed to reliably switch low level signals as well as up to 2 amps switching capacity for a minimum of 25,000 cycles. Mechanical life expectancy is in excess of one million cycles. The terminals are available as a double turret solder style, or 0.508mm x 0.635mm PC pins.

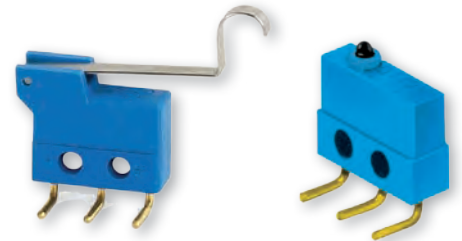
- Low level logic switching capability.
- In accordance with MIL-PRF-8805/94.



B2/B2-5 Series Description

Choice of turret, quick connect and three lengths of PCB circuit board style terminal are available for both the 3.96mm and 5.08mm wide models. Conform to and are qualified under MIL-PRF-8805/4, MIL-PRF-8805/106 (high temp -55°C to 205°C) and MIL-PRF-9905/109.

- Up to 7 amps switching.
- Sensitive movement differentials.
- UL recognised and CSA certified.



B3 Series Description

Designed to switch at least one million mechanical cycles, contact resistance less than 25mΩ. Gold plated contacts are available for non-military applications. UL recognised and CSA certified models available.

- Low level switching capability.
- Qualified under MIL-PRF-8805/76 & /101.
- Choice of widths 3.96mm and 5.08mm



B5 Series Description

Feature up to 10 amps switching capability of 100,000 cycles. Mechanical life is one million cycles. The terminals are sealed against solder flux entering the switch and are bright acid tin plated for excellent solder-ability.

- Constructed under MIL-PRF-8805/7
- UL recognised and CSA certified.
- B5-21141 qualified to MS27217-1



B5-7 Series Description

Feature up to 10 amps switching capability of 100,000 cycles. The terminals are sealed against solder flux entering the switch and are bright acid tin plate brass for excellent solder-ability.

- Double pole, 4-circuit.
- Simultaneity of both poles within .004"
- Accordance with MIL-PRF-8805



Series	Feature	Max Rating	Mechanical Life	Approvals	Circuitry
B1	Ultra Small Subminiature	2A	100,000	n/a	SPST, SPDT
B1-5	Ultra Small Subminiature, with Integral Levers	2A	1,000,000	n/a	SPST, SPDT
B2	Subminiature	7A	50,000 - 250,000 (varies by part)	UL (E61705), CSA (LR43865), DSCC (QPL8805)	SPST, SPDT
B2-5	Subminiature with Integral Levers	7A	100,000	UL (E61705), CSA (LR43865), DSCC (QPL8805)	SPST, SPDT
B3	Double Break Subminiature	8A	1,000,000	UL (E61705), CSA (LR43865), DSCC (QPL8805)	SPST-DB, SPDT-DB
B5	Double Break Miniature	10A	1,000,000	UL (E61705), CSA (LR43865), DSCC (QPL8805)	SPST-DB, SPDT-DB
B5-7	Double Break Miniature, Two Pole	10A	100,000	UL (E61705), CSA (LR43865), DSCC (QPL8805)	DPDT-DB

Please contact us for individual part numbers and specifications or see our website for information.

Sealed Limit Switches

Immersion and Corrosive Atmospheres



P6 Limit Switches

Sealed against immersion and corrosive atmospheres. These switches are designed for rugged duty both mechanically and electrically. A one-piece stainless steel or nickel plated brass housing, sealed at the plunger with an O-ring seal and at the base with a glass-to-metal header option provides true environment-free sealing to comply with MIL-PRF-8805/39, MIL-PRF-8805/40, MIL-PRF-8805/43, MIL-PRF-8805/100 and MIL-PRF-8805/104. Most case parts are grounded for EMI reduction.

The P6 series is available with roller plunger styles for cam or slide actuation and pin plunger for in-line actuation. Please contact us for additional design options.

P6 series features the B2, B3 or B5 series snap-action basic switch.

High contact pressure and unique contact design provides low contact resistance for low level switching as well as full rated service.

- Complies with MIL-PRF-8805 sealing.
- One-piece housing.
- Sealed at plunger with O-rings.
- Sealed at base with a glass seal.
- EMI reduction construction.
- Choice of pin or roller plunger.
- Choice of axial or radial leads.

P6-3 Subminiature

These subminiature sealed limit switches are contained in a rugged aluminum housing with choice of lever, roller or plunger. Featuring the B5 series basic switch, the P6-3 series is able to switch up to 10 amps. The high contact pressure and superior wiping action of the design also makes the P6-3 series an excellent choice when switching logic level loads.

Sealing against water and other liquids is per MIL-PRF-8805. Wire leaded models feature potted leads. The solder terminals are epoxy sealed.



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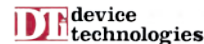


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