



MILITARY & AEROSPACE



OTTO[®]
Expect Excellence.



OTTO IN MILITARY & AEROSPACE

OTTO designs and manufactures precision switches, grips, joysticks, operator control modules and custom solutions for the most demanding applications including a broad range of standard and unique products from traditional snap action switches to Hall effect technology, USB, PWM, CANopen® and J1939 communication protocols.

OTTO's products perform in some of the toughest industries such as aerospace and in military applications, where high performance and reliability are essential. We are ISO 9001, ISO 14001 and AS9100 registered, A2LA accredited to ISO/IEC 17025, and TL 9000, TS 16949 and QS 9000 compliant – maintaining the highest quality standards.



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MILITARY & AEROSPACE CONTROL GRIPS



G2-0216

G2 GRIP FEATURES

- Flight control grips now offered as a standard part – Ready to use right out of the box
- Available in three versions – left hand with hand rest, right hand with hand rest and right hand with no hand rest
- Grips have thin-wall, investment cast aluminum construction for high strength & low weight
- Modular construction
- Incorporates switch access panel for easy repair & maintenance



G2 Flight Control Grips



G2-0217



G2-0218



MILITARY & AEROSPACE CONTROL GRIPS

G2 COMMANDER GRIP FEATURES

- Standard design eliminates the need for tooling charges
- Available as a fixed grip or can be mounted on an OTTO Hall effect joystick
- Various mounting & termination options available
- Nine standard faceplate configurations that collectively include OTTO's 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 controls
- Thousands of custom faceplate configurations possible that can accommodate virtually all OTTO pushbutton, rocker, toggle, trim, transducer and thumbwheel 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)



Commander Grip

G3 DUAL GRIP REMOTE FEATURES

- 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
- RoHS compliant



G3 Dual Grip Remote



HELICOPTER CYCLIC & COLLECTIVE GRIPS

HELICOPTER CYCLIC & COLLECTIVE GRIP FEATURES

- Grips have thin-wall, investment cast aluminum construction for high strength & low weight
- Modular construction
- Custom heads & switch mounting plates can be fabricated to fit standard handles
- Available with switch access panel for easy repair & maintenance
- A variety of button colors & style options available
- Transducer & electromechanical trim switch options



Collective Grip with
Thumbwheel Switch
and NVG Compatible
Backlighting



Collective Grip Head



Cyclic Grips with Custom
Switch Guards





HELICOPTER CYCLIC & COLLECTIVE GRIPS



Helicopter Cyclic Grips



FLIGHT CONTROL & THROTTLE CONTROL GRIPS

MILITARY FLIGHT CONTROL GRIP FEATURES

- B8 & Cobra style grips are made in accordance with MIL-DTL-25561
- Most ergonomic version on the market
- Non-reflecting, non-hygrosopic, rugged injection molded grip
- Choice of termination styles—from integral connectors to wire harnesses
- Threaded disconnect or tube mounting
- Can be populated with MIL qualified switches, standard or custom configurations



B8 Style Grip

Cobra Style Grip



Throttle Grip

THROTTLE CONTROL GRIP FEATURES

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



HTLT FINGER JOYSTICKS

HTLT FINGER JOYSTICK FEATURES

- One/two axis gated or 360°
- Pushbutton option
- Electronics sealed to IP68S
- Dusttight or Watertight per IP68S option
- 3.3V SPI output option
- Single or redundant analog output options
- PWM output option
- 3 million cycle mechanical life
- Tested for harsh environments
- Great for industrial, medical, unmanned vehicle and off-highway industries



HTLT with Pushbutton



HTLT4 with Control Stick



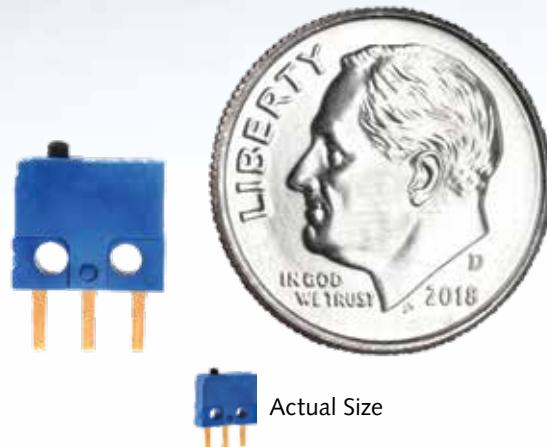
Dual Grip with HTLT4s



SUBMINIATURE SWITCHES

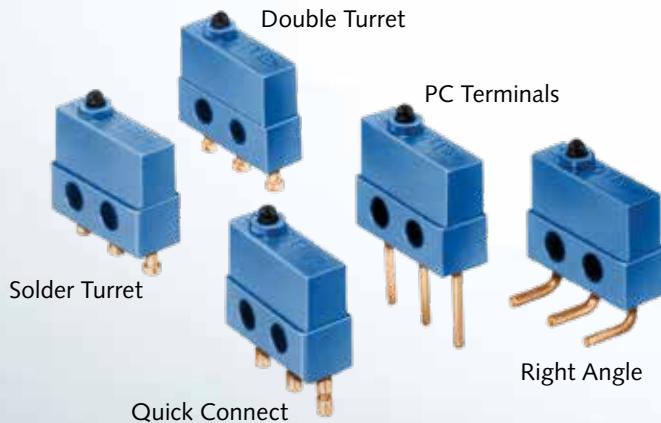
B1 FEATURES

- Ultra-compact:
only 0.300" w x 0.255" h x 0.100" thick
- 1 million cycle life, B1-5 Series
- Logic level switching capability
- Designed in accordance with MIL-PRF-8805/94
- Available in Commercial & Military grades
- Choice of solder or PC molded-in terminals
- Precision operating points
- RoHS compliant



B1 Ultra Small Subminiature Basic Switch

B2 Subminiature Basic Switch



B2 FEATURES

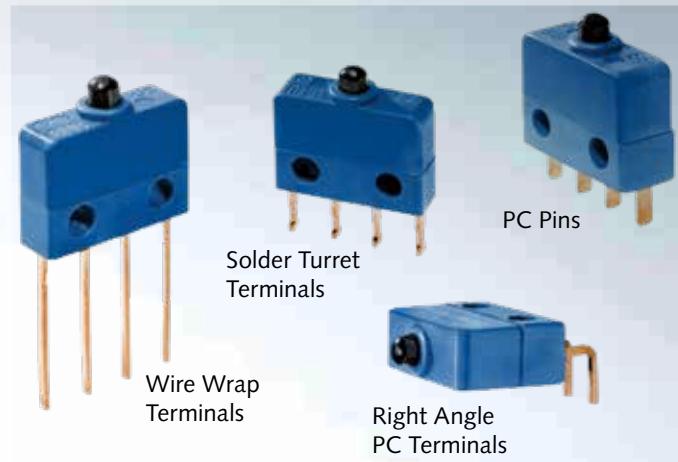
- Choice of 0.156" & 0.200" wide models
- Up to 7 amps switching
- Sensitive movement differentials
- Low operating forces
- Choice of 8 terminal styles or wire leads
- Long operating life
- Qualified under MIL-PRF-8805/4, MIL-PRF-8805/106 & MIL-PRF-8805/109
- UL recognized & CSA certified
- RoHS compliant



SUBMINIATURE SWITCHES

B3 FEATURES

- Low level switching capability
- Less than $25\text{m}\Omega$ initial contact resistance
- Up to 8 amps switching capability
- Button accepts actuation directly from a cam
- Choice of 0.156" & 0.200" wide models
- Choice of 6 standard terminal styles or wire leads
- Available in Commercial & Military grades
- Qualified to MIL-PRF-8805/76 & MIL-PRF-8805/101
- UL recognized & CSA certified
- RoHS compliant



B3 Subminiature Basic Switch

B5 Miniature Basic Switch



B5 FEATURES

- Up to 10 amps switching capability
- High contact pressure
- Precision operating points
- Button accepts actuation directly from cam
- Constructed in accordance with MIL-PRF-8805/7
- Available in Commercial & Military grades
- Choice of four standard terminal styles or wire leads
- UL recognized
- B5-21141 qualified to MS27217-1
- RoHS compliant



SEALED LIMIT SWITCHES

P6 SEALED LIMIT SWITCH FEATURES

- 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 with Roller Plunger



P6 with Pin Plunger
Radial Leads



P6 with Roller Plunger
Axial Leads

P6 with Pin Plunger
Axial Leads



P6 with
Custom Paint



Modified Military Styles



SUBMINIATURE SEALED LIMIT SWITCHES

P6-3 SEALED LIMIT SWITCH FEATURES

- Compact design
- Watertight to MIL-PRF-8805
- Choice of four actuator styles
- Choice of wire lead or solder termination styles
- Up to 10 amps switching capability
- High contact pressure
- Precision operating points



P6-3 Double Pole



P6-3 Subminiature Lever Style



P6-3 Subminiature Over-Travel Plunger Style



PUSHBUTTONS PER MIL-PRF-8805/3 (MS25089)

P1 MILITARY PUSHBUTTON FEATURES

- Pushbutton per MIL-PRF-8805
- Button sealed with patented “rolling sleeve” principle
- Contact area sealed at button & terminals
- Less than $25\text{m}\Omega$ initial contact resistance
- Ideal for low level switching as well as up to 10 amp duty
- Positive tactile feedback
- Variety of mounting styles
- Engraved buttons & bezels available
- UL recognized & CSA certified
- Watertight to IP68S available
- RoHS compliant



P1 Military Pushbuttons per MIL-PRF-8805



MINI-SIZED PER MIL-PRF-8805/110

P7 SUBMINIATURE PUSHBUTTON FEATURES

- Low level switching capability
- Less than $25\text{m}\Omega$ initial contact resistance
- High contact pressure
- 6 circuit variations
- Positive tactile feedback
- Variety of mounting styles
- Square button option with case style A
- Qualified to MIL-PRF-8805/110
- Moistureproof and dusttight to IP64 and MIL-PRF-8805 Design 2 or Watertight to IP68S and MIL-PRF-8805 Design 3
- RoHS compliant



P7 Subminiature Pushbuttons
per MIL-PRF-880/110



MILITARY PUSHBUTTONS

PE MILITARY PUSHBUTTON FEATURES

- MIL-PRF-8805/96 qualified
- Momentary snap-action
- Sealed or unsealed
- Compact, space-saving design
- Black or red button colors available
- Clear or black case colors available
- RoHS compliant



PE Military Pushbuttons per MIL-PRF-8805/96



PE2 MILITARY PUSHBUTTON FEATURES

- MIL-PRF-8805/99 qualified
- Momentary snap-action
- Black, white or red button colors available
- Splashproof
- RoHS compliant

PE2 Military Pushbuttons per MIL-PRF-8805/99



TRIGGER SWITCHES

TRIGGER SWITCH FEATURES

- Two-Step Trigger
- Actuating force of 2.25 lbs. to make the first pole
- Additional force of 6.5 lbs. passing through a detent to actuate the second pole
- Rated 7 amps resistive @ 28VDC
- Electrical life 50,000 cycles
- RoHS compliant



U2-016 Trigger Switch

Military qualified to M8805/111-01, has a width of 0.641" +/- 0.016".



U2-082 Trigger Switch

Military qualified to M8805/111-03, has a width of 0.641" +/- 0.016".



U2-025 Trigger Switch

Military qualified to M8805/111-04, has a width of 0.762" +/- 0.025".



U2-084 Low Level Trigger Switch

Military qualified to M8805/111-06, has a width of 0.762". Rated 1 amps resistive @ 28VDC.



SLIDE SWITCHES

SLIDE SWITCH FEATURES

- Single & double pole, double throw switch configuration
- Logic level rating available with gold plate contacts & terminals
- 3-position center OFF with momentary or maintained switch action in any combination
- Dusttight to MIL-PRF-8805 Design 2
- Raised & flush button contours available
- Choice of button color
- FAA/PMA available (contact factory)
- RoHS compliant



SL Slide Switches



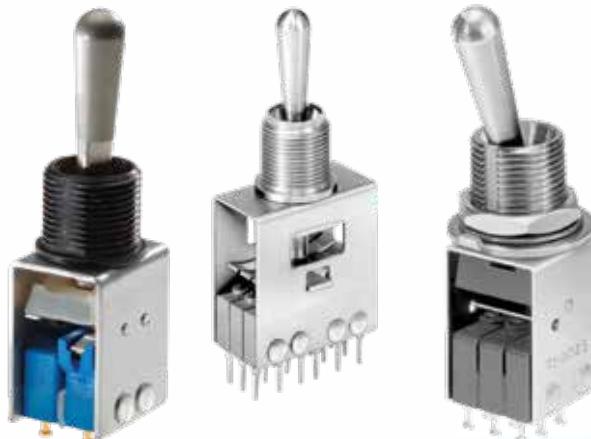
T1 TOGGLE SWITCHES

T1 SEALED TOGGLE SWITCH FEATURES

- Panel sealed per MIL-PRF-83731
- 2 & 3 position 2, 3, 4 & 8 pole styles available
- Several lever lock options



T1 Sealed Toggle
Switches



T1 Unsealed Toggle Switches

T1 UNSEALED TOGGLE SWITCH FEATURES

- Unsealed toggle switches featuring B2 & B3 basic switches
- 3 position, 3 & 6 pole styles available
- Lever lock styles available



T3 MINIATURE TOGGLES

T3 TOGGLE SWITCH FEATURES

- Commercial and military toggle
- Snap-action contact actuation
- Shorter behind panel depth
- Superior wiping action keeps contacts clean
- Positive tactile response prevents operating errors
- Weighs up to 25% less than competitive products
- More contact/terminal plating choices
- Highly reliable, simpler design, fewer parts
- Black matte finish available, contact factory
- RoHS compliant



T3 Miniature Toggles



T9 COMMERCIAL & MILITARY TOGGLS

T9 TOGGLE SWITCH FEATURES

- Qualified to MIL-DTL-3950
- Commercial version is sealed per IP68S
- Lever lockout option available
- Maintained & momentary toggle action
- Optional panel seal
- RoHS compliant
- Black matte finish available, contact factory



T9 Commercial and Military Toggles



TE MINIATURE NON-TEASIBLE TOGGLES

TE TOGGLE SWITCH FEATURES

- Commercial and military toggle
- Positive action miniature toggle
- Wiping action contacts
- Momentary & maintained toggle action
- Panel mount
- Solder lug termination
- Single & double pole
- Sealed per MIL-DTL-8834
- MIL qualified: MS90310-211/221/231/271/311
MS90311-211/221/231/271/311
MS24655-211/221/231/271/311
MS24656-211/221/231/271/311/331/341/351
- RoHS compliant
- Black matte finish available, contact factory



TE with 15/32" Bushing



TE with Black Finish



1/4-40 Bushing Style

TE Miniature, Non-Teasible Toggles



T1 & T1-T 2-WAY TRIM SWITCHES

T1 – 2-WAY MINI TRIM FEATURES

- The T1 mini trim toggle is a single pole, double throw, center off, momentary contact, 2-way switch
- Commercial & Military grades available
- Variety of button styles
- Standard & logic level switching
- Dusttight to IP64 & Watertight to IP68S, Mil Watertight Design 3
- Press fit or threaded case styles



T1 2-Way Mini Trim



T1-T Latching 2-Way Mini Trim

T1-T – LATCHING 2-WAY MINI TRIM FEATURES

- The T1-T Mini Trim is a latching, single pole, single throw, center off, momentary/maintained action contact switch
- Has an 11/16" threaded case
- 2-way momentary/maintained toggle action with a positive click action
- Four switch action/circuit options



2-WAY & 4-WAY TRIM SWITCHES



T2 3-Way Mini Trim

T2 – 3-WAY MINI TRIM FEATURES

- The T2 mini trim is a single pole, 3 throw Center off momentary contact (self return to center off) switch
- Numerous button styles are available on both the commercial and military grade switch versions
- Typically press fit into control grips or are panel mounted using versions with a 11/16" threaded case
- Also available with multiple sealing levels to fit all applications

T4 – 4-WAY MINI TRIM FEATURES

- Commercial & Military grade available
- Variety of button styles
- Standard and low level switching
- Dusttight to IP64 & Watertight to IP68S
- Press fit or threaded case styles



T4 4-Way Tactile Mini Trims



4-WAY & 5-WAY TRIM SWITCHES

T4-T 4-Way Tactile
Mini Trims



T4-T – 4-WAY TACTILE MINI TRIM FEATURES

- 4-way momentary toggle
- Sealed to IP64, IP68S or water resistant per MIL-STD-810F; method 506.4, procedure 3 (drip)
- Positive click action
- Standard and low level options with or without an internal jumper
- Available in Commercial & Military grades
- Variety of button styles & colors available
- RoHS compliant

T5 – 4-WAY PLUS CENTER PUSHBUTTON MINI TRIM FEATURES

- 4 way plus center pushbutton
- Commercial & Military grade available
- Variety of button style
- Standard & logic level switching
- Dusttight to IP64 or Watertight to IP68S or MIL-PRF-8805 Design 3
- Press fit or threaded case styles



T5 4-Way Plus Center Pushbutton Mini Trims



T8 & T8-T 8-WAY MINI TRIM SWITCHES

T8 – 8-WAY MINI TRIM FEATURES

- The T8 mini trim is a single pole, 8 throw, center off, momentary contact switch
- 2-way, 4-way, 4-way plus pushbutton and 8-way versions available
- Commercial & Military grade available
- Variety of button styles
- Standard and low level switching
- Dusttight to IP64 or Watertight to IP68S or MIL-PRF-8805 Design 3
- Press fit or threaded case styles



T8 8-Way Mini Trim



T8-T Tactile 8-Way Mini Trims

T8-T – TACTILE 8-WAY MINI TRIM FEATURES

- The T8 mini trim is a single pole, 8 throw, center off, momentary contact switch with tactile response
- Positive detent
- 8-way momentary toggle action
- IP64 or IP68S options (panel seal)
- Logic level switching options
- Available in commercial & military grades
- Variety of button styles & colors available
- RoHS compliant



TACTILE & SPLIT TRIM SWITCHES

TK TACTILE MINI TRIM FEATURES

- Logic level, normally open
- Shorter behind panel
- 4-way or 4-way with center pushbutton momentary toggle action
- Positive click action indicates actuation
- Panel sealed to IP64, IP68S or unsealed
- Wire leads or Molex connector
- RoHS compliant



TK with
Molex Connector



TK with Wire Leads
(Coming Soon)



SPLIT TRIM FEATURES

- Tactile feedback
- 2-way momentary actuation of each switch
- Logic level switching option
- Water resistant per MIL-STD-810F; method 506.4, procedure 3 (drip)
- Available in Commercial & Military grades
- Choice of button colors
- Choice of case styles
- RoHS compliant



LARGE TRIM SWITCHES

T2 - LARGE TRIM 2-WAY PUSHBUTTON FEATURES

- Two functions in one compact switch; toggle and pushbutton action
- Features toggle lockout when pushbutton mode is actuated
- Pushbutton lockout when in toggle mode
- Splashproof and dusttight seal



T2 Large Trim Switches



T4 Large Trim Switches



T5 Large Trim Switches

T4/T5 - LARGE TRIM SWITCHES FEATURES

- 4-way momentary with center position maintained toggle action
- Dusttight
- Up to 100,000 life cycles
- Low-level switching
- Commercial & Military grades available
- Variety of button styles and colors available



TRANSDUCERS

J2 SHORT TRAVEL TRANSDUCER FEATURES

- IAW MIL-S-81619 & MIL-STD-810
- Resolution: Infinite
- Actuation Force: 3.0 lbs. nominal
- Short (.05 max) or long (.20 typ.) travel options
- Hysteresis: +/- 0.5% of full scale within 1 second after release
- Sensitivity Temp Coefficient +/- 0.2% full scale per degree Celsius
- Temp Range: -55 degrees thru 85 degrees Celsius
- Exposure: Dusttight IAW MIL-PRF-8805 Design Symbol 2
- Wire leads 24 AWG, 12" IAW MIL-W-16878/4
- Variety of button style & color options available
- Different output polarity available
- Available with or without pushbutton
- Applications include:
 - Flight control grips
 - Cursor control
 - Target acquisition



J2- S1 Series



J2- S2 Series



J2- S3 Series





TRANSDUCERS

J3 STRAIN GAUGE BASED TRANSDUCER FEATURES

- Full bridge circuit type
- 1 million cycle life
- Short travel in each direction
- Watertight to IP67 and dusttight to MIL-PRF-8805 Design 2
- Shorter behind panel
- Multiple button types available



J4 HALL EFFECT TRANSDUCER FEATURES

- A cost effective alternative to strain gauge technology
- Mini joystick function
- 5V DC input
- Proven Hall effect technology
- Magnetic shielding in case offers excellent external EMI protection
- Rugged construction for demanding applications



TOGGLE GUARDS & FLIP GUARDS

TC TOGGLE GUARD FEATURES

- MS approved & QPL'd choices
- Offered for 2 and 3-position switches with 15/32-32 threaded bushings and slotted or flat keyways
- Spring loaded covers
- Easily installed from the front panel
- Optional panel seal provided with each switch
- Molded plastic cover - multiple color choices
- Bracket: Black painted steel



FLIP GUARD FEATURES

- Maintained or momentary actuation for pushbutton switches with a 15/32 threaded bushing
- Spring loaded cover
- Easily installed from the front panel
- Optional D-flat or mounting tabs option to prevent any rotation during assembly



VERTICALLY INTEGRATED MANUFACTURING AND VALUE ADDED CAPABILITY

For nearly 60 years, OTTO has been designing and manufacturing precision switches and operator controls for the most demanding applications. OTTO has a broad range of standard and custom products including traditional snap action switches, Hall effect technology and grips. OTTO excels in providing all levels of value added services to meet our customers needs by managing every phase of the project from conceptual design to finished product. On site capabilities include product engineering, 3D printing, injection molding, stamping, milling, machining and full quality testing.

Our expertise allows us to offer complete custom interfaces incorporating various control products plus LED indicators, keypads/touchpads, cable assemblies and additional electronic circuitry. From a simple basic switch to a sophisticated panel assembly integrating many components, the array of possibilities are endless.

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