

ITW Switches

SENSORS, SWITCHES, ELECTRONIC CONTROLS

Product Catalog

Design, development and manufacture of switch solutions

 **PUSH BUTTON**

 **SNAP ACTION**

 **ACTUATORS**

 **SLIDE**

 **ROTARY**

 **CUSTOM ASSEMBLIES**

 **MILITARY / AEROSPACE**



 **LICON**
High Current Series

 **FLEX-TECH**
Low Current Series

 **REPEL**
Vandal-Resist Series

ITW Switches is a division of Illinois Tool Works (ITW), a diverse manufacturing corporation with more than 850 operating divisions worldwide. Our value proposition, combined with our global reach, broad product offerings, innovative technologies and financial stability make ITW Switches an ideal choice among manufacturers today.

EXPERIENCE

ITW Switches has manufactured electronic and electro-mechanical switches, sensors and assemblies for over 54 years. Founded as the Licon division of ITW in 1954, we also offer the strengths of Chicago Switch, UID, and RCL switches. Providing customized solutions to demanding customer requirements is our forte. Some of the markets served: Military / Aerospace, Transportation, Heavy Transport and Industrial Controls.



ENGINEERING EXCELLENCE

ITW's experienced engineers have modern tools at their disposal, including 3-D Modeling, and Rapid Prototype capabilities. We have a UL-Approved Test Facility on site. Additional R&D expertise is provided by The ITW Technology Center. The Technology Center is well versed in the latest scientific and technological advancements in engineering, materials, and the physical sciences. Our salespeople are market focused. Along with our engineers, they work closely with customers to develop cost-effective, reliable solutions for the most demanding applications.



UL, CSA, and VDE.

PRODUCT AVAILABILITY

ITW Switches supports customers directly, and through a network of stocking distributors in North America. Call us, or check our website www.itwswitches.com for a list of our distributors, and product availability.

QUALITY RECOGNITION

ITW Switches is ISO9001:2000 registered for our manufacturing and engineering locations in:

Buffalo Grove, Illinois

Portsmouth, England

Kaohsiung, Taiwan

Shanghai, China

Each manufacturing location maintains capability and responsibility for appropriate regulatory approval from

For ITW's corporate profile, visit www.itwinc.com

Visit our website at www.itwswitches.com or email us at customer_service@itwswitches.com

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Break An opening or interruption of a circuit.

Break-Before-Make With double throw contacts where the moving contact, in transferring, from one position to another, interrupts one circuit before establishing the other.

Bounce Rapid rebounding of moving contact from stationary contact after closing.

Clearance Air space between live metal parts of opposite polarity or to ground.

Contact Gap The minimum distance between mating contacts when contacts are fully open.

Dielectric Strength The property of an insulating material which determines the maximum potential gradient that the material can withstand without arc over.

Double Break A contact arrangement in which the moving switch element bridges across two fixed contacts so that the circuit is broken in two places simultaneously. Sometimes called "shorting bar".

Double Throw A switch that alternately completes a circuit at each of its two extreme positions. It has both normally open and normally closed circuits.

Free Position The position the switch button (or actuator) assumes when no force is exerted against it. Free position is dimensioned from the top of the switch button (or actuator) to the mounting hole centerline, top of switch panel or other specified reference.

Movement Differential The distance between operating point to reset point.

Operating Force The force that must be applied to the button (or actuator) to cause the moving contact transfer from normal to operated position.

Operating Point (or Position) The position of the button (or actuator) at which moving contact transfers from normal to operated position. Operating point is dimensioned from the top of the switch button (or actuator) to mounting hold centerline, top of switch panel, or other specified reference point.

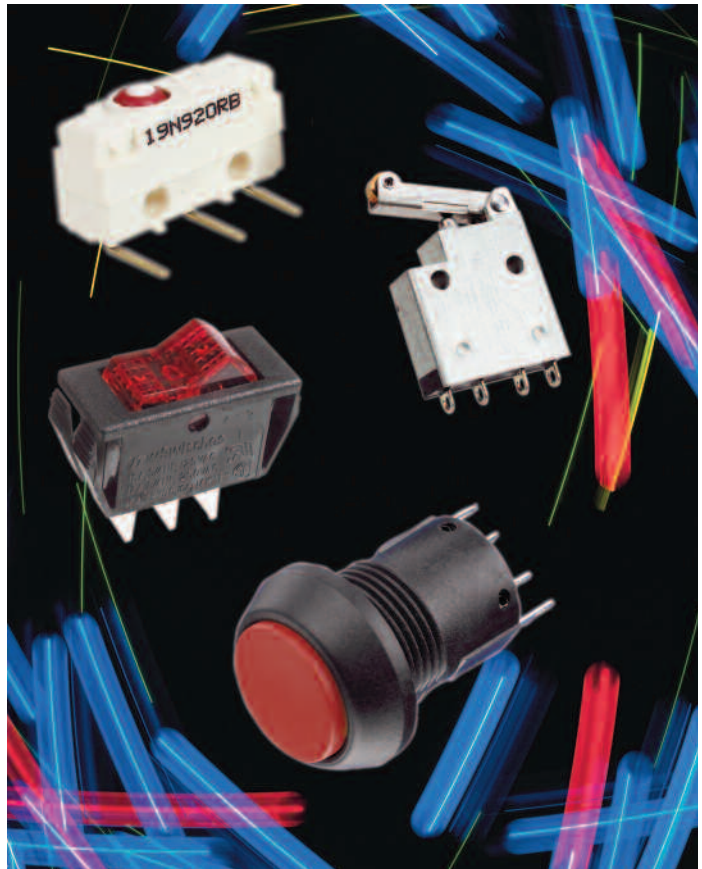
Over Travel The distance of button (or actuator) movement from operating point to full over travel point, without bottoming or damage to switch mechanism.

Pretravel The distance of button (or actuator) movement from free (rest) position to the operating position.

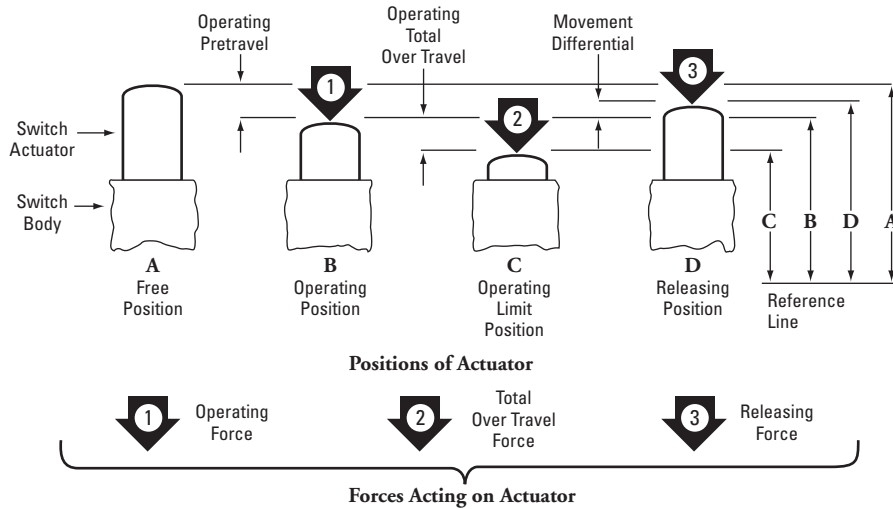
Reset Point (Releasing Position) The position of the button (or actuator) at which the moving contact transfers from operated to normal position. Reset point is dimensioned from top of switch button (or actuator) to mounting hole centerline, top of switch panel or other specified reference point.

Reset Travel The distance of button (or actuator) movement from reset point to free position.

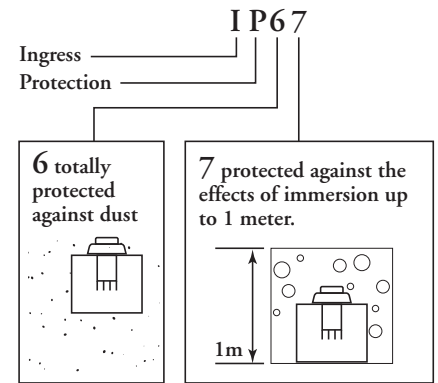
Snap Action The action of moving contact members that transfer from one position to another at a speed which is relatively independent of actuator speed.



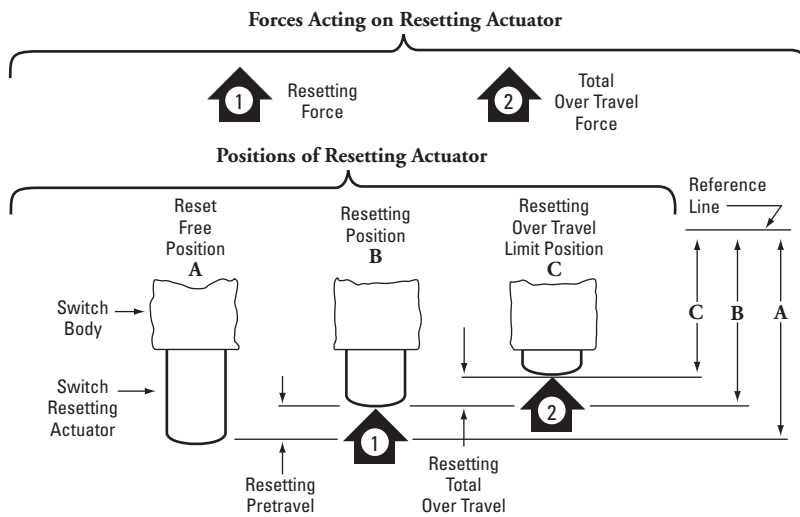
MOMENTARY CONTACT SWITCH



INGRESS PROTECTION



MAINTAINED CONTACT SWITCH (RESET ACTUATOR)



RoHS AND WEEE COMPLIANT

Most ITW Switches products meet RoHS and WEEE requirements. Please consult the website for the latest product listing.

SWITCH CIRCUITRY

Form A SPST-NO	Form B SPST-NC	Form C SPDT	Form AA DPST-NO
Form BB DPST-NC	Form CC DPDT	Form X SPST-NO-DB	Form Y SPST-NC-DB
Form Z SPDT-DB	Form XX DPST-NO-DB	Form YY DPST-NC-DB	Form ZZ DPDT-DB

SERIES 034:



ACTUAL SIZE



SUB-MINIATURE T-05 SPACE SAVER PUSHBUTTON SWITCHES

This sub-miniature pushbutton switch offers high quality and reliability in a very small package. With gold contacts, this switch offers up to 1,000,000 cycles. This switch is ideal for applications where PC board space is at a premium.

KEY FEATURES:

- Momentary action
- Gold contacts
- PC terminals
- SPST-NO circuitry
- Variety of actuator lengths
- Up to 1,000,000 mechanical actuations

APPLICATIONS

- Reset switch
- Detect switch

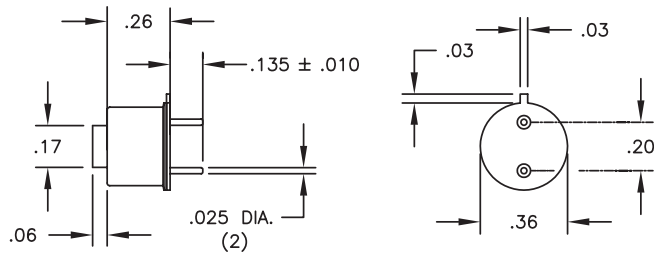
ORDERING INFORMATION:

Part Number	Button Height
034-550-001	0.06
034-550-002	0.50
034-550-005	0.15
034-550-006	0.25
034-550-010	0.37
034-550-015	0.19

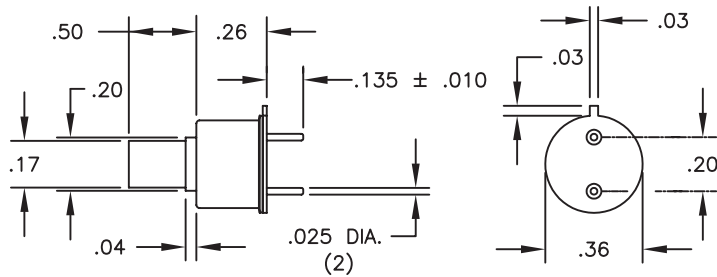
STANDARDS / AGENCY / RATINGS:



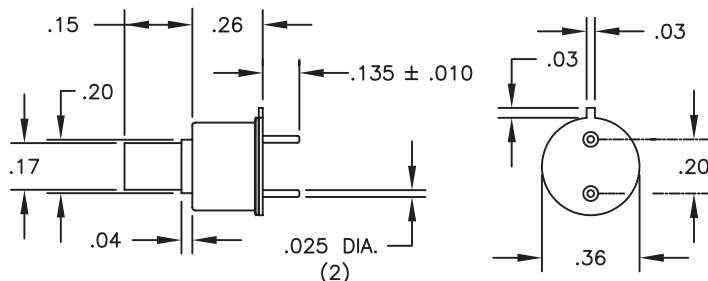
034-550-001



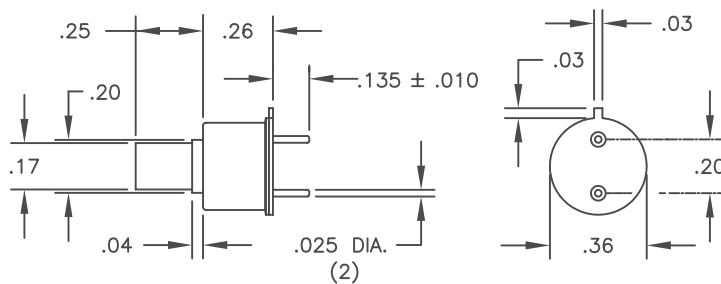
034-550-002



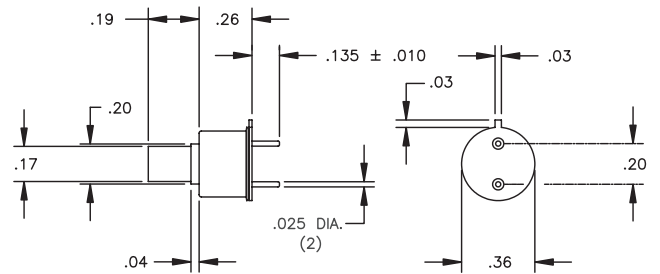
034-550-005



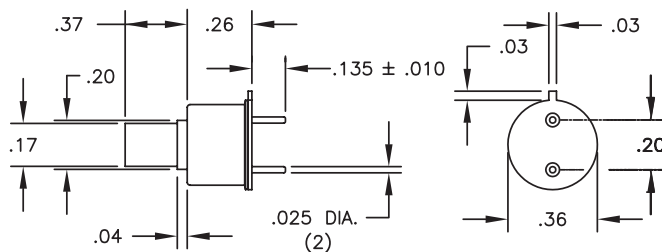
034-550-006



034-550-015



034-550-010



MECHANICAL / ELECTRICAL CHARACTERISTICS:

Circuit:
SPST-NO Momentary

Temperature rating:
-30°C to +65°C
(-22°F to +149°F)

Life (mechanical):
1,000,000 actuations

Contact rating:
100 mA @ 125 VAC

Actuator:
thermoplastic (PBTP)

Can:
Nickel-silver

Contacts & terminals:
gold over nickel plate

SERIES 39:



ACTUAL SIZE



0.25 AMP MINIATURE LED LIGHTED PUSHBUTTON SWITCHES

This highly reliable low cost pushbutton features bifurcated contacts that have wiping, self-cleaning action. The PC terminals allow for vertical mounting, while an optional connector allows for right angle mounting.

KEY FEATURES:

- Momentary or maintained action
- Lighted (T-1 LED) or non-lighted
- Variety of button and keycap styles
- Wave solderable
- Bifurcated silver contacts

APPLICATIONS

- Control panel assemblies
- Recording equipment
- Telecom switching systems
- Scientific instrumentation
- Telecom test gear

ORDERING INFORMATION:

Switches

Part Number	Lighted	LED Color	Button Color	Button Style	Action
39-12101	Yes*	—	Clear	Button	Momentary
39-12111	Yes*	—	Red	Button	Momentary
39-12113	Yes*	—	Yellow	Button	Momentary
39-12114	Yes*	—	Smoke Grey	Button	Momentary
39-12502	No	—	White	Button	Momentary
39-12503	No	—	Red	Button	Momentary
39-12509	No	—	Black	Button	Momentary
39-12601	Yes	Red	Clear	Button	Momentary
39-12611	Yes	Red	Red	Button	Momentary
39-12712	Yes	Green	Green	Button	Momentary
39-12801	Yes	Yellow	Clear	Button	Momentary
39-12813	Yes	Yellow	Yellow	Button	Momentary
39-13101	Yes*	—	Clear	Button	Maintained
39-13113	Yes*	—	Yellow	Button	Maintained
39-13611	Yes	Red	Red	Button	Maintained
39-22100	Yes*	—	—	Keycap	Momentary
39-22500	No	—	—	Keycap	Momentary
39-23100	Yes*	—	—	Keycap	Maintained
39-23500	No	—	—	Keycap	Maintained

* LED not included; LED support 80-390003 supplied in bulk.

Button/Keycap Colors

Part Number	Lighted	Color	Cap Size
80-390101	Yes*	White	Large
80-390102	Yes*	Light Grey	Large
80-390103	Yes*	Dark Grey	Large
80-390104	Yes*	Black	Large
80-390106	No	Light Grey	Large
80-390107	No	Dark Grey	Large
80-390108	No	Black	Large
80-390110	Yes**	Light Grey	Small
80-390111	Yes**	Black	Small
80-390112	No	Light Grey	Small

* Requires light pipe 80-390100 (order separately)
** Requires light pipe 80-390109 (order separately)

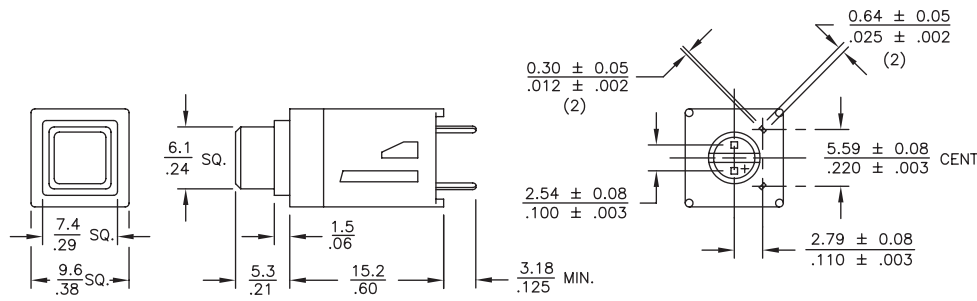
Connectors

Part Number	Mount
39-800001	In-Line
39-800002	Right Angle

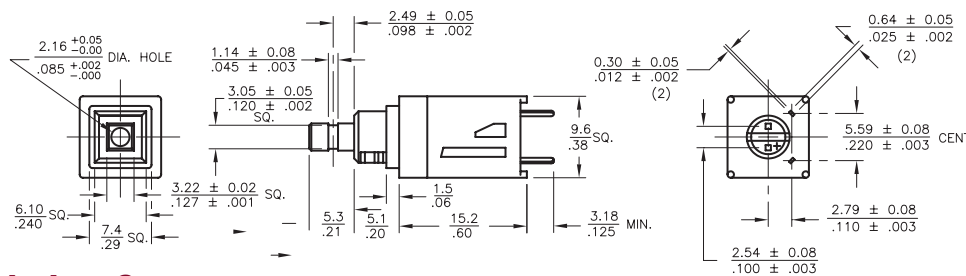
STANDARDS / AGENCY / RATINGS:



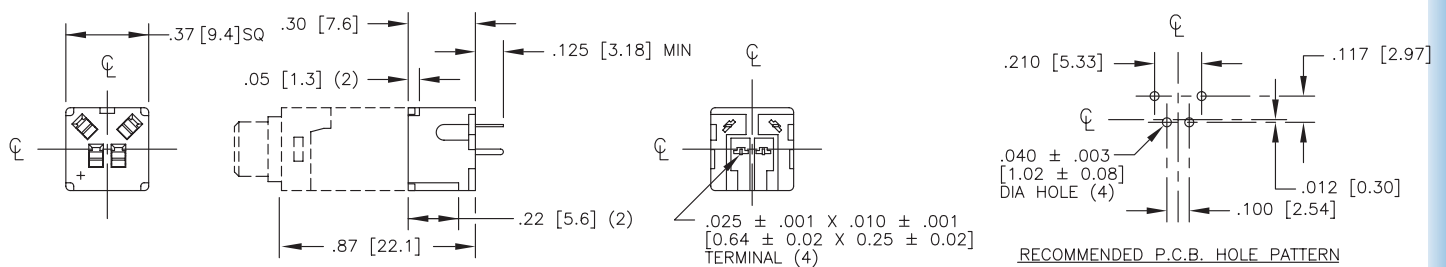
STANDARD BUTTON STYLE



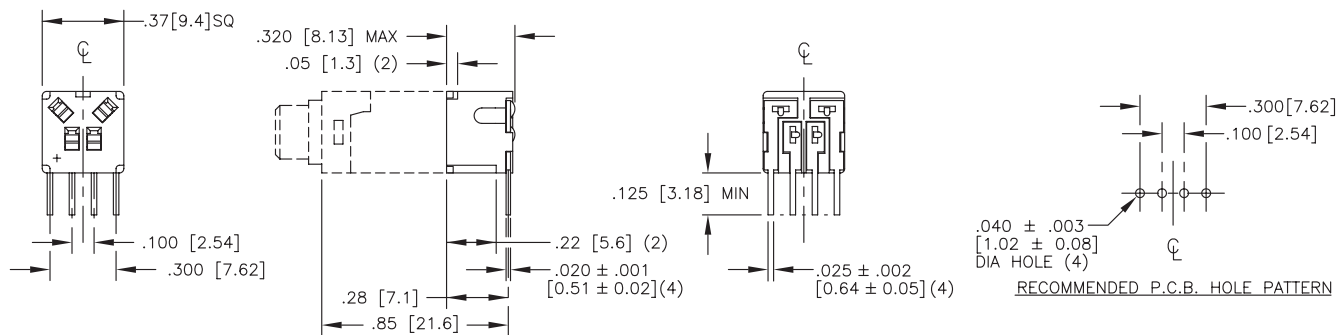
KEYCAP BUTTON STYLE



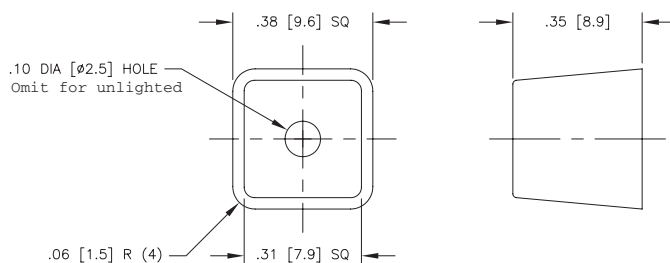
IN-LINE CONNECTOR



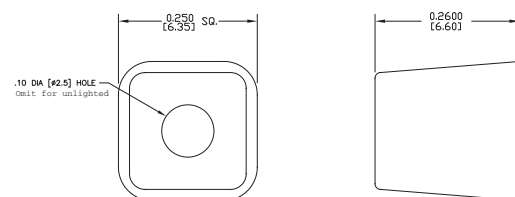
RIGHT ANGLE CONNECTOR



LARGE LIGHTED & UNLIGHTED KEYCAP



SMALL LIGHTED & UNLIGHTED KEYCAP



MECHANICAL / ELECTRICAL CHARACTERISTICS:

- Action:** SPST-NO-DB (Form X)
- Button travel:** 3.05 mm (.120 in) nominal
- Operating Force:** 113 grams nominal
- Contact Resistance:** Initial: 25 mΩ max. End of life: 50 mΩ max.
- Contact bounce:** Initial: 1 millisecond max. End of life 3 milliseconds max.
- Electrical life:** Momentary: 1 million cycles Maintained: 25,000 cycles
- Electrical rating:** .25A @ 30 VDC res.

SERIES 39-4 & 39-5:



ACTUAL SIZE



0.25 AMP RIGHT-ANGLE DPST LIGHTED PUSHBUTTON SWITCHES

This miniature pushbutton meets the needs for a cleaner trouble-free switch in confined space PC board applications. Only the terminal base is exposed to soldering and cleaning in this unique two-piece construction.

KEY FEATURES:

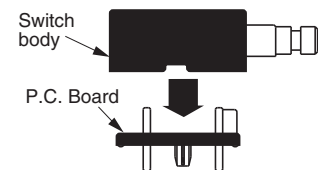
- Momentary or maintained action
- Lighted (T-1 LED) or non-lighted
- Variety of button and keycap styles
- Wave solderable
- Unique two piece construction

APPLICATIONS

- Control panel assemblies
- Recording equipment
- Telecom switching systems
- Scientific instrumentation
- Telecom test gear

INSTALLATION:

The terminal base is installed manually, or with automatic equipment, on the PC board. It is then wave soldered along with other board components. The base is compatible with fluorinated, chlorinated and aqueous cleaning methods to remove flux. When the board and its components have been cleaned and dried, the pushbutton switch body, which has not been exposed to the contamination associated with these operations, is snapped positively onto the terminal base, where it is securely retained.



ORDERING INFORMATION:

Button Style

Part Number	LED Color *	Button Color	Action
39-422106	—	Black	Momentary
39-422508	Red	Red	Momentary
39-422607	Green	Clear	Momentary
39-422609	Green	Green	Momentary
39-422707	Yellow	Clear	Momentary
39-422710	Yellow	Yellow	Momentary
39-423508	Red	Red	Maintained
39-423609	Green	Green	Maintained

*Lighted styles have button and LED installed as required.

Keycap Style

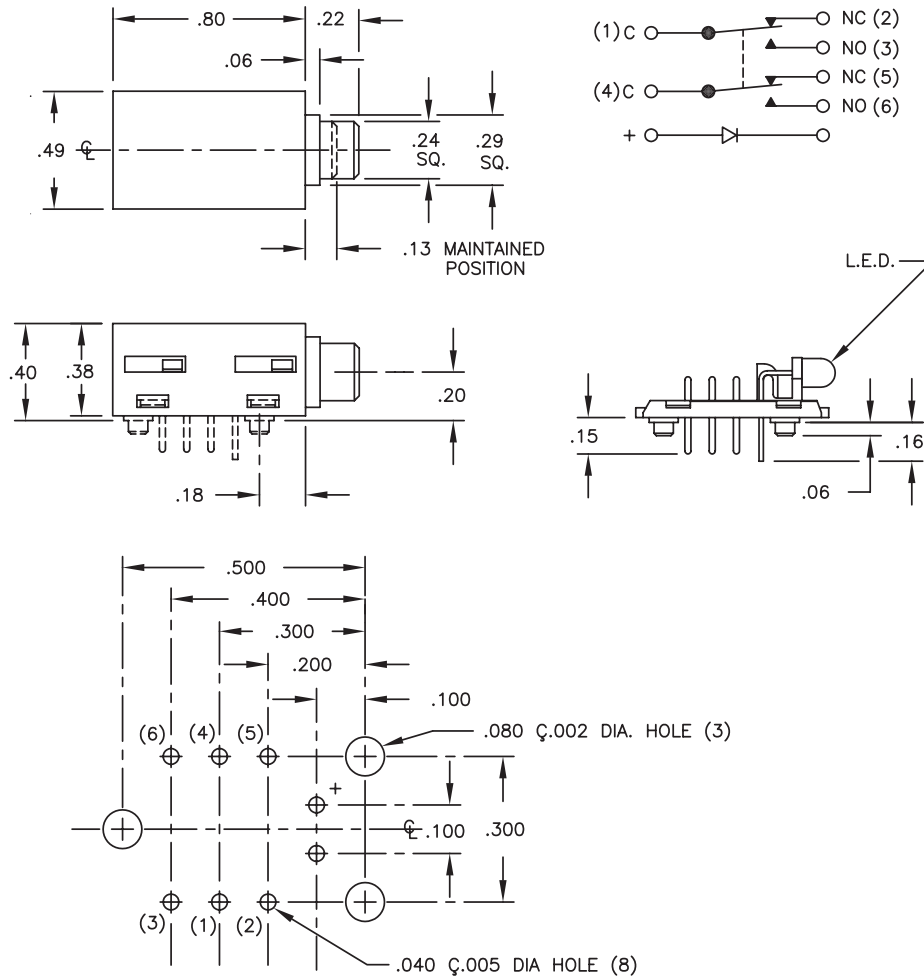
Part Number	LED Color *	Action
39-522101	—	Momentary
39-522501	Red	Momentary
39-522701	Yellow	Momentary
39-523101	—	Maintained
39-523501	Red	Maintained
39-523701	Yellow	Maintained

* Order keycap and light pipe separately (see series 39) as necessary

STANDARDS / AGENCY / RATINGS:



BUTTON STYLE

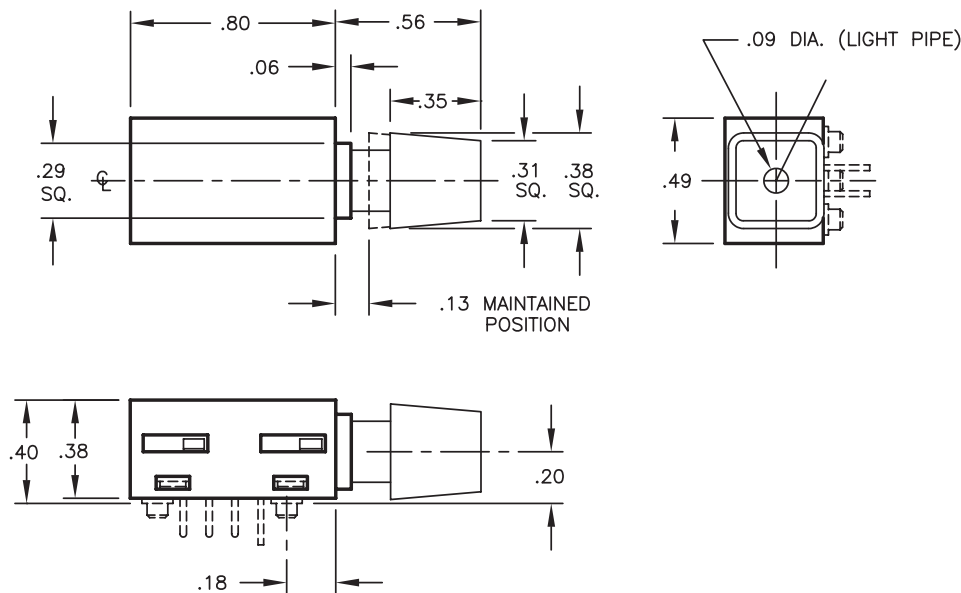


RECOMMENDED P.C. BOARD HOLE PATTERN
COMPONENT SIDE

MECHANICAL / ELECTRICAL CHARACTERISTICS:

- Circuit:**
DPDT-SB (Form CC)
- Operating force:**
8 oz nominal
- Total travel:**
.12 nominal
- Electrical rating:**
.25A @ 30 VDC resistive max.
Contact Resistance:
25 mΩ max. initial
50 mΩ max. final
- Contact bounce:**
500 microseconds max.
- Insulation resistance:**
1000 MΩ min.
@ 500 VDC
- Dielectric strength:**
1000 VAC
- Life Momentary:**
250,000 cycles
- Life Maintained:**
25,000 cycles

KEYCAP STYLE



SERIES 39-7:



ACTUAL SIZE



20 mA RIGHT-ANGLE ULTRA-MINIATURE LIGHTED PUSHBUTTON SWITCHES

This switch was developed for designs with minimal PCB space and maximum switching requirements. With crisp action, process compatibility and clear bright LED indication, these switches form efficient and attractive arrays of highly dense, yet easy to use control stations. Two piece design is ideal for processing.

KEY FEATURES:

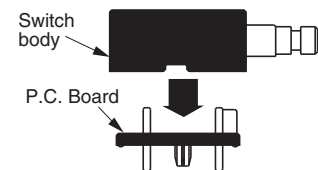
- Gold contacts
- Momentary or maintained action
- Resistance to high temperatures
- Logic level switching
- Optional tape and reel or tube packaging
- PC mounting
- LED lighted

APPLICATIONS

- Computers
- Hand-held instruments
- Compact communication equipment
- Battery operated monitors
- Diagnostic devices
- Portable peripherals
- Audio equipment
- Nurse call

INSTALLATION:

The terminal base is installed manually, or with automatic equipment, on the PCB board. It is then wave soldered along with other board components. The base is compatible with fluorinated, chlorinated and aqueous cleaning methods to remove flux. When the board and its components have been cleaned and dried, the pushbutton switch body, which has not been exposed to the contamination associated with these operations, is snapped positively onto the terminal base, where it is securely retained.



ORDERING INFORMATION:

Assembled Base & Body

Part Number	LED Color	Action
39-712200	Red	Momentary
39-712300	Green	Momentary
39-712400	Yellow	Momentary
39-713200	Red	Maintained
39-713300	Green	Maintained
39-713400	Yellow	Maintained

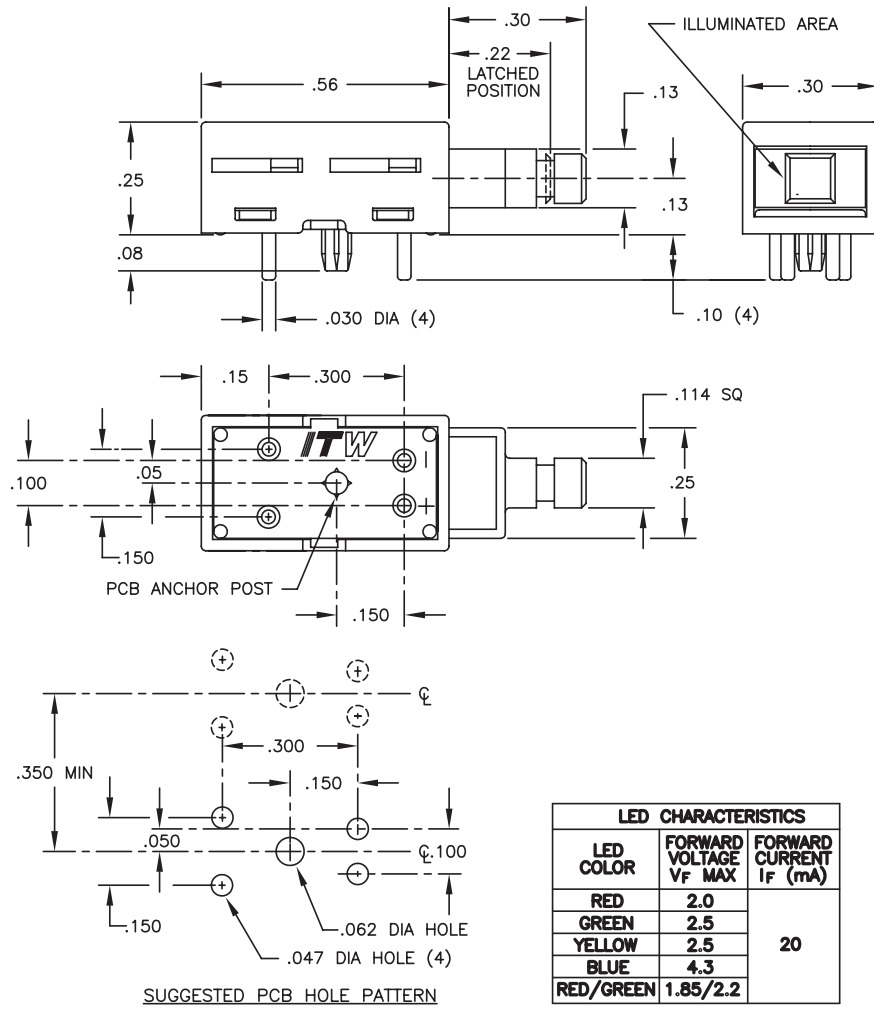
Keycaps

Part Number	Color
80-397014	Light Grey
80-397015	Dark Grey
80-397016	Black
80-397017	White

STANDARDS / AGENCY / RATINGS:



BUTTON STYLE



MECHANICAL / ELECTRICAL CHARACTERISTICS:

Circuit:
SPST-NO-DB (Form X)

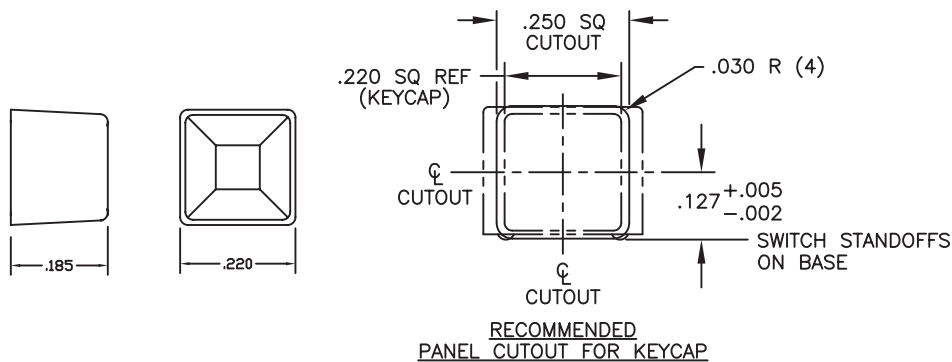
Rating:
logic level
(5mA, 5 VDC typical)

Plunger travel:
.13 inches

IR process compatible when Base processed separately

Positive LED lead is identified by (+) on the bottom surface of the base.

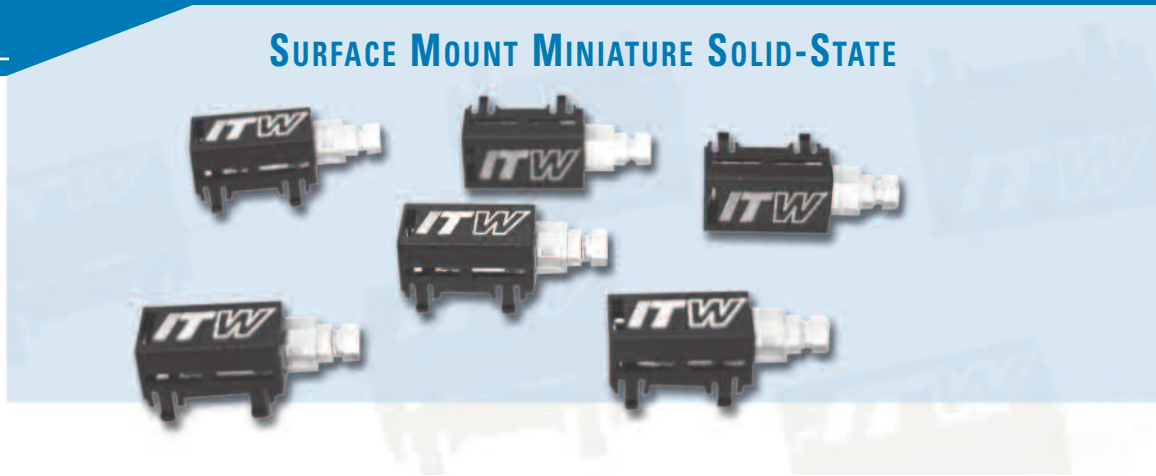
KEYCAP STYLE



SERIES 39-8:



ACTUAL SIZE



SURFACE MOUNT / SOLID-STATE MINIATURE PUSHBUTTON SWITCHES

The unique approach to SS /SMT switching allows the customer to process a Hall-effect chip and LED (optional) to their board. Then simply snap the ITW Switches Series 39-8 actuator in place. This can be done manually or robotically completing a totally process compatible switching system.

KEY FEATURES:

- Solid-State (Hall-effect) switching
- No mechanical contacts
- Momentary or maintained action
- Lighted (Surface Mount LED) or non-lighted
- Key caps available
- Lower overall installed cost
- RoHS process compatibility

APPLICATIONS

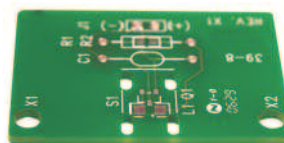
- Control panel assemblies
- Recording equipment
- Datacom switching systems
- Telecom switching systems
- Scientific instrumentation
- Computers
- Telecom test gear

ORDERING INFORMATION:

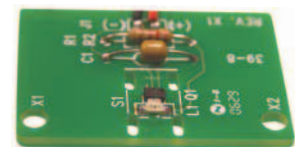
Switches

Part Number	Action	Polarity
39-82N	Momentary	North
39-82S	Momentary	South
39-83N	Maintained	North
39-83S	Maintained	South

①—Customer Designed PCB



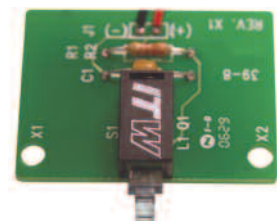
②—Customer Loaded PCB



③—ITW Series 39-8 SS/SMT Pushbutton Switch



④—Complete Assembly



STANDARDS / AGENCY / RATINGS:



39-8XX

MECHANICAL / ELECTRICAL CHARACTERISTICS:

Action:

SPST-NO

Button travel:

3.05 mm (0.13 in) nominal

Operating Force:

113 grams nominal

Electrical life:

Momentary: 1 million cycles

Maintained: 25,000 cycles

Electrical rating:

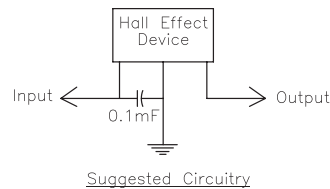
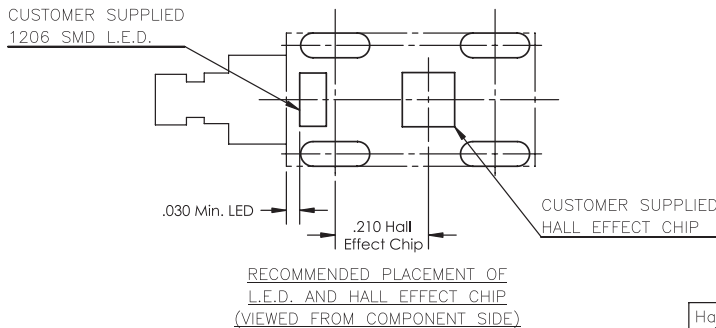
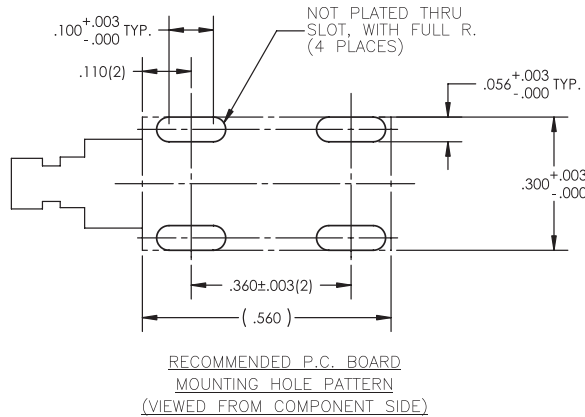
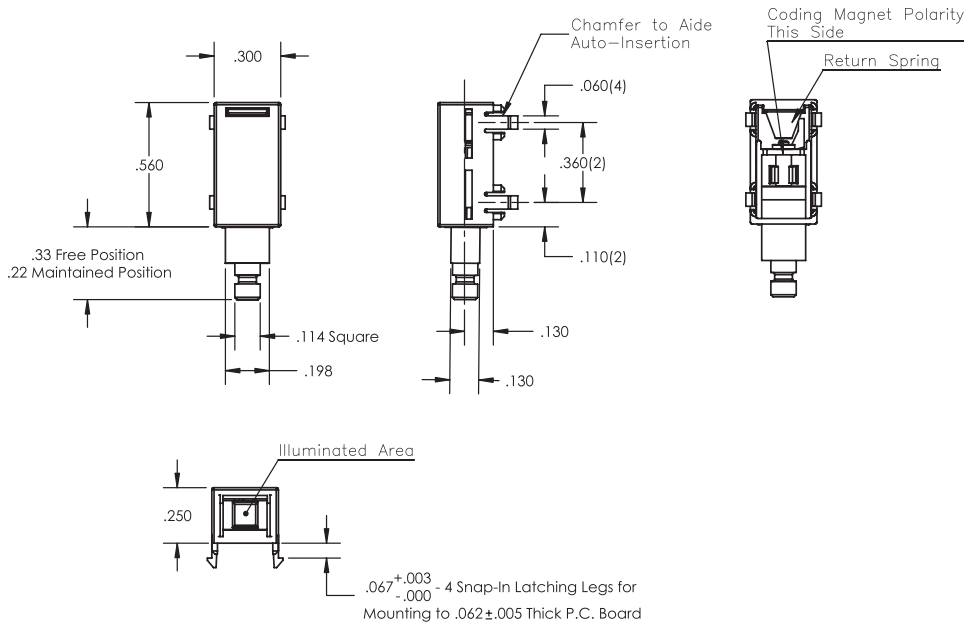
5VDC, 5mA typical

(when used with

Allegro Hall Effect

P/N A3280ELHLT,

customer supplied)



SERIES 47:



ACTUAL SIZE



LOW COST SEALED PUSHBUTTON SWITCH

The Series 47 is a uniquely designed sealed miniature pushbutton switch. The silicone button and body can be panel mounted and terminated with a standard connector or mounted in a P.C. board. The switches come in two levels of sealing: a panel sealed only version and a fully sealed version with epoxy sealed base. Both meet respective IP67 requirements. The buttons are available in seven different colors. All this at a very affordable price.

KEY FEATURES:

- Sealed to IP67
- Small size
- 7 button colors
- P.C. terminals (connector available)
- Long life
- Low cost

APPLICATIONS

- Marine equipment
- Medical equipment
- Outdoor controls
- Food processing equipment
- Appliances
- Recreational vehicles

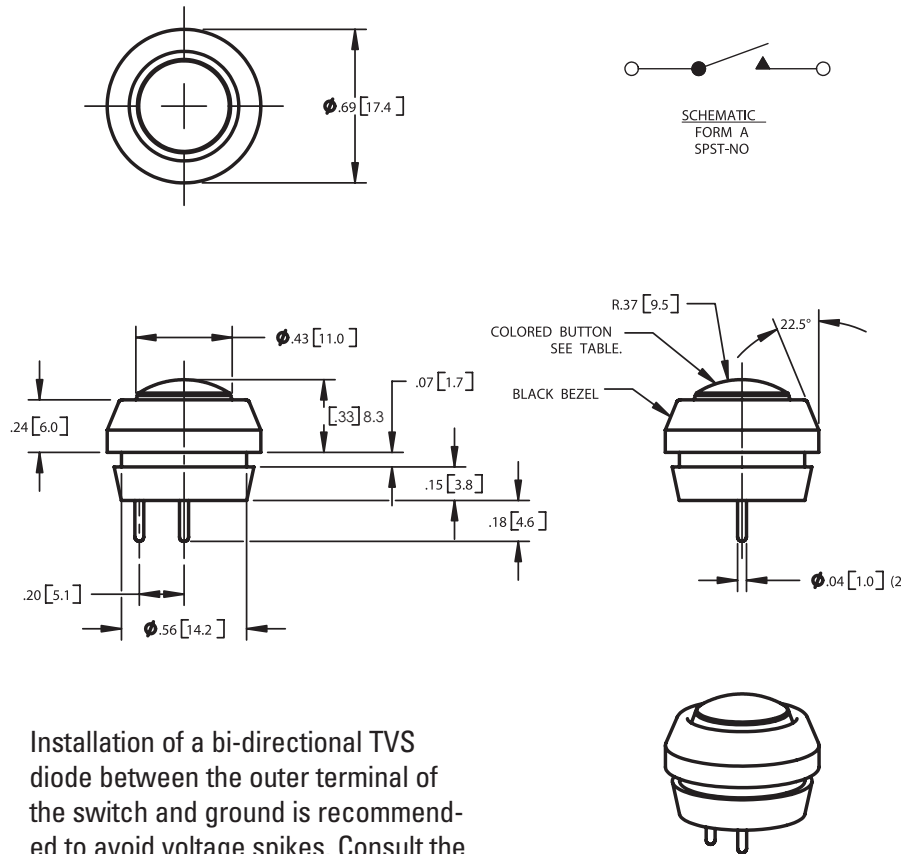
ORDERING INFORMATION:

Part Number	Button Color	Panel Sealed	Epoxy Sealed Base
47-1111	Black	✓	✓
47-1121	Red	✓	✓
47-1131	Green	✓	✓
47-1141	White	✓	✓
47-1151	Yellow	✓	✓
47-1161	Blue	✓	✓
47-1171	Orange	✓	✓
47-2111	Black	✓	
47-2121	Red	✓	
47-2131	Green	✓	
47-2141	White	✓	
47-2151	Yellow	✓	
47-2161	Blue	✓	
47-2171	Orange	✓	

STANDARDS / AGENCY / RATINGS:



47-XXX



Installation of a bi-directional TVS diode between the outer terminal of the switch and ground is recommended to avoid voltage spikes. Consult the factory for details.

MECHANICAL / ELECTRICAL CHARACTERISTICS:

Travel (nom):

.020 inches

Life:

100,000 cycles

Operating force:

1,000 grams (nominal)

Sealed to:

IP67

Operating temperature:

-40°C to +85°C

Button material:

silicone

Contact:

metal snap dome providing a tactile feel

Terminal finish:

gold over nickel

Dielectric strength:

1,000 VAC

Insulation Resistance:

10,000 MΩ

Contact Resistance (initial):

<100 Ω

Current rating:

20 mA @ 28 VDC

Switch terminals mate with

ITW Pancon Mas-Con

Connector CE100F24-3-DB

Recommended panel cut-out:

0.565" / 0.560" diameter

(ø14.40 / 14.22)

Recommended panel

thickness:

0.060" (1.52) max

SERIES 48EM:



ACTUAL SIZE



FLEX-TECH MINIATURE SEALED PUSHBUTTON SWITCHES

This rugged multi-option sealed pushbutton series offers the utmost in choices of mounting styles, colors, terminations, bezels, lighting and momentary or alternate-action switching. The Series 48 offers all these options in one compact package size.

KEY FEATURES:

- Momentary or maintained action
- Gold contacts
- Many button colors
- Choice of LED colors (or non-lighted versions)
- Long life
- Solder or PC terminals
- Panel sealed to IP 67

APPLICATIONS

- Office equipment
- Medical equipment
- Industrial machinery
- Outdoor controls
- Mass transportation
- Food processing equipment

ORDERING INFORMATION:

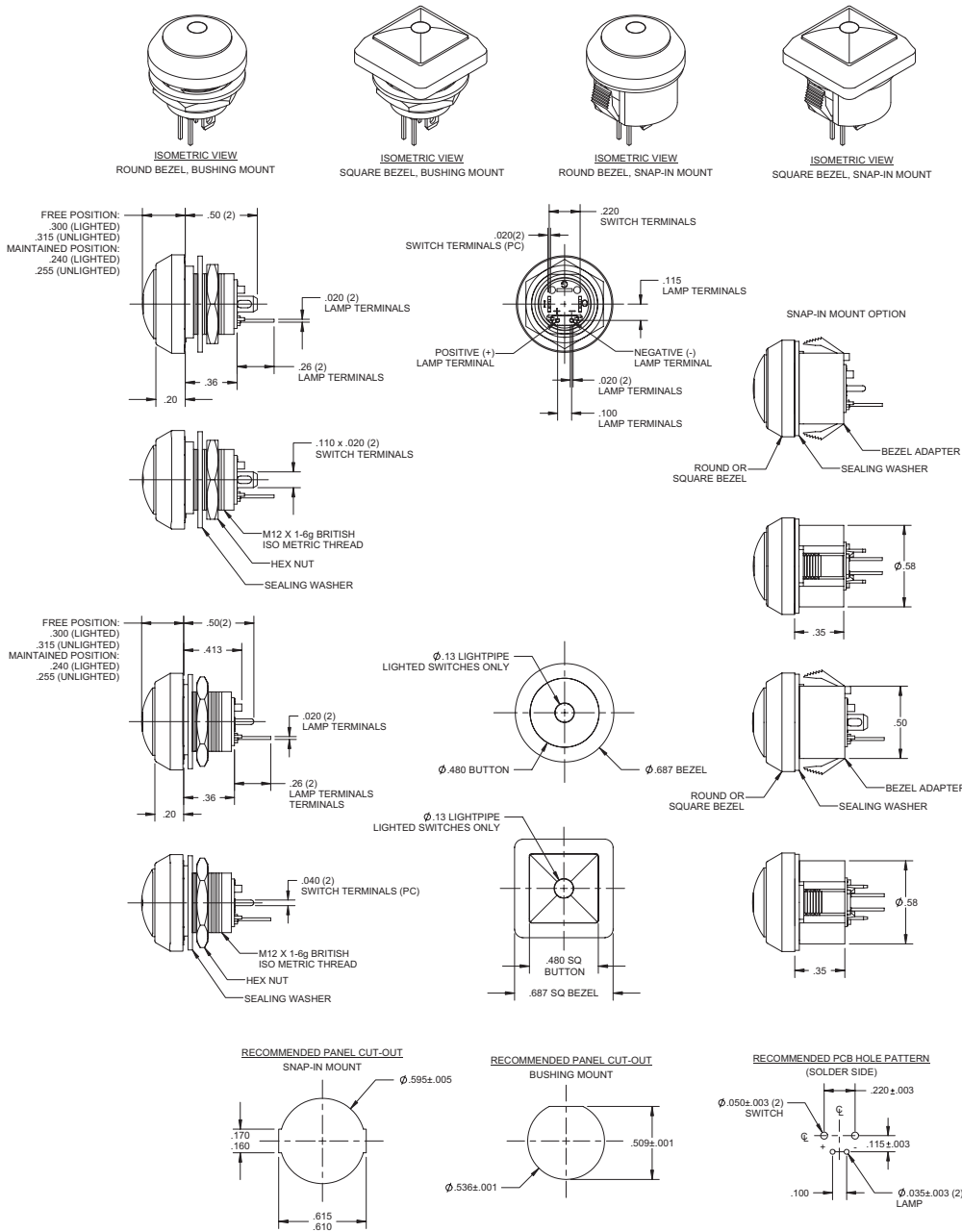
Switch Function	Switch Termination	Module Type	Bezel Type	LED Color	Button Color	Mounting Type	Voltage Resistor
Momentary	Solder Tabs	48-1	RB - Round, Black	N - None	RD - Red	B - Bushing	If Blank*
Maintained	Solder Tabs	48-2	SB - Square, Black	R - Red	GR - Green	S - Snap-fit	05 - 5V forward
Momentary	PC	48-5	RC - Round, Chrome	G - Green	BK - Black		
Maintained	PC	48-6	SC - Square, Chrome	Y - Yellow	BL - Blue		
Momentary	Wire Leads	48-A		A - Amber	YL - Yellow		
Maintained	Wire Leads	48-B		B - Blue	OR - Orange		
				W - White	CR - Chrome		
					PK - Black with Standby Symbol		
					WH - White		

* Current limiting resistor is required to limit LED forward current to 20 mA (not included).

STANDARDS / AGENCY / RATINGS:



PRODUCT DRAWINGS



MECHANICAL / ELECTRICAL CHARACTERISTICS:

- Circuit:**
SPST-NO-DB
- Button travel (nominal):**
0.09 inches / 2.3 mm
- Operating force (nominal):**
3N / 306 grams
- Contact bounce (nominal):**
1 millisecond
- Panel thickness:**
0.02 – 0.12 inches / 0.5 – 3mm
- Temperature index:**
-40° F to + 185° F
- LED operating temperature:**
-13° F to +185° F /
-25° C to +85° C
- Current ratings (resistive):**
250mA @ 12VDC, 100K cycles
150mA @ 28VDC, 150K cycles (momentary)
100mA @ 48VDC, 100K cycles
10mA @ 12VDC, 1 million cycles (momentary)
- Dielectric strength:**
1,000 VAC
- Insulation resistance:**
1G OHM
- Contact resistance:**
50 mΩ max (initial)
- Torque (max):**
10 inch pounds

SERIES 48SS:



ACTUAL SIZE



MINIATURE HALL-EFFECT SEALED PUSHBUTTON SWITCHES

This rugged sealed pushbutton switch uses a Hall-Effect sensor to achieve extremely long life, up to 1,000,000 cycles momentary. This switch is suited for harsh environments where long life and reliability are needed.

KEY FEATURES:

- 1,000,000 cycles momentary
- Momentary and maintained action
- Hall-Effect technology
- Panel sealed to IP67
- Square and round versions available
- Variety of colors

APPLICATIONS

- Communications
- Data entry
- Hand-held control modules
- Outdoor controls
- Mass transport controls
- Instrumentation

ORDERING INFORMATION:

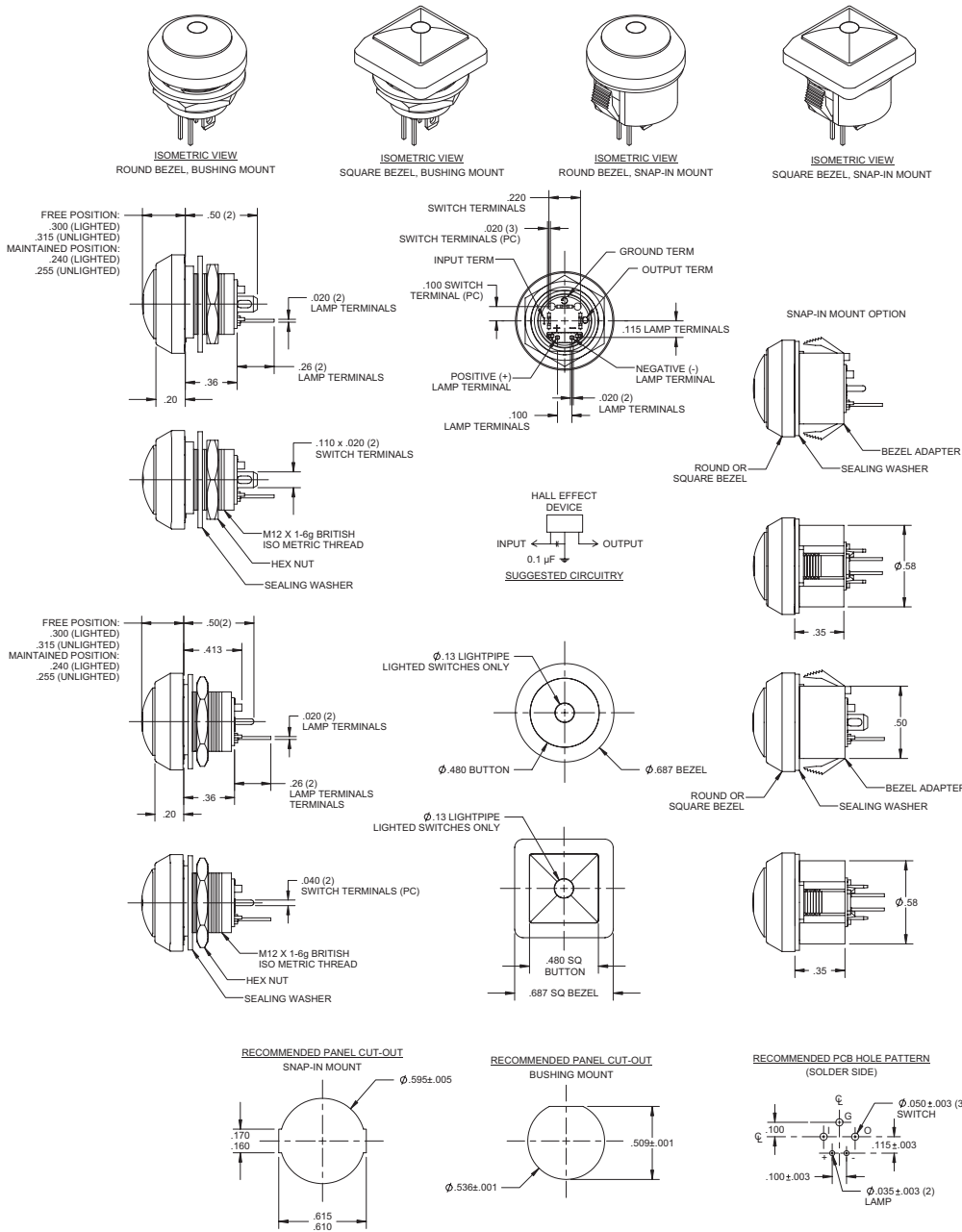
Switch Function	Switch Termination	Module Type	Bezel Type	LED Color	Button Color	Mounting Type	Voltage Resistor
Momentary	Solder Tabs	48-3	RB - Round, Black	N - None	RD - Red	B - Bushing	If Blank*
Maintained	Solder Tabs	48-4	SB - Square, Black	R - Red	GR - Green	S - Snap-fit	05 - 5V forward
Momentary	PC	48-7	RC - Round, Chrome	G - Green	BK - Black		
Maintained	PC	48-8	SC - Square, Chrome	Y - Yellow	BL - Blue		
Momentary	Wire Leads	48-C		A - Amber	YL - Yellow		
Maintained	Wire Leads	48-D		B - Blue	OR - Orange		
				W - White	CR - Chrome		
					PK - Black with Standby Symbol		
					WH - White		

* Current limiting resistor is required to limit LED forward current to 20 mA (not included).

STANDARDS / AGENCY / RATINGS:



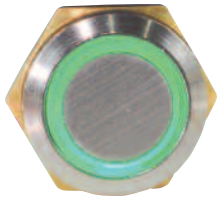
PRODUCT DRAWINGS



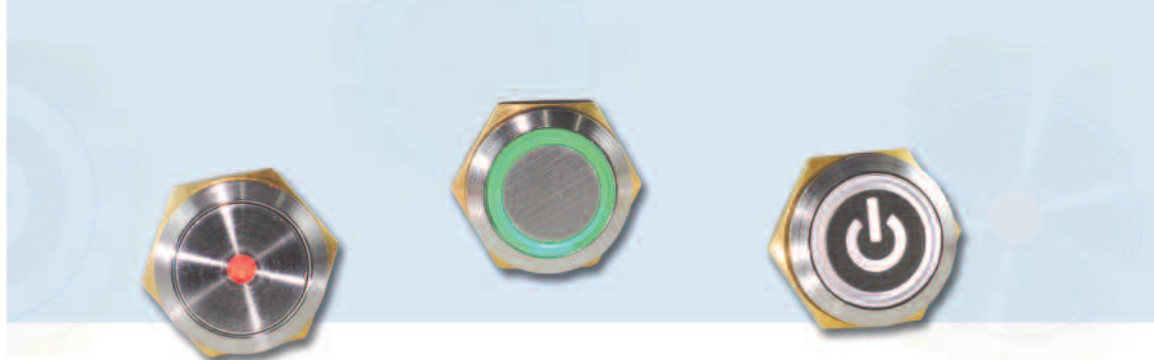
MECHANICAL / ELECTRICAL CHARACTERISTICS:

- Circuit:**
SPST-NO
- Button travel (nominal):**
0.09 inches / 2.3 mm
- Life (mechanical) (nominal):**
1,000,000 cycles (momentary)
100,000 cycles (maintained)
- Operating force (nominal):**
3N / 306 grams
- Panel thickness:**
0.02 – 0.12 inches / 0.5 – 3mm
- Temperature index:**
-40°F to + 185°F
- LED operating temperature:**
-13° F to +185° F /
-25° C to +85° C
- Supply voltage:**
4.2V to 24V, 26.5V Max.
- Supply current:**
B<Brp, Vcc=12V: 3mA Typ.
To 8mA Max.
B>Bop, Vcc=12V: 4mA Typ.
To 8mA Max.
- Output current:**
20 mA
- Reverse battery voltage:**
-30V Max.
- Reverse output current:**
-50mA Max.
- Torque (max):**
10 inch pounds

SERIES 48M-EM:



ACTUAL SIZE



PANEL SEALED METAL PUSHBUTTON SWITCHES

Built on the proven series 48 platform these rugged switches come in stainless steel housings, electro-mechanical with either momentary or maintained action and lighted or unlighted versions. The variety of options in this compact package size make the 48M ideal for many applications: outdoor controls, security products, food processing and medical products.

KEY FEATURES:

- Momentary or Maintained Action
- Stainless Steel Housing
- Center Spot or Ring Illumination
- Variety of LED colors
- Electro-Mechanical
- Panel Sealed to IP67
- ROHS Compliant
- Gold Plated Contact and Terminals

APPLICATIONS

- Outdoor Controls
- Kiosks
- Security Equipment
- Medical Equipment
- Food Processing Equipment
- Military Equipment
- Industrial Machinery
- Transportation: Mass-Transit, Marine, Lift Trucks

ORDERING INFORMATION:

SWITCH FUNCTION:

1. MECHANICAL, MOMENTARY, SOLDER TERMINAL
2. MECHANICAL, MAINTAINED, SOLDER TERMINAL
5. MECHANICAL, MOMENTARY, PC TERMINAL
6. MECHANICAL, MAINTAINED, PC TERMINAL
- A. MECHANICAL, MOMENTARY, WIRE LEADS
- B. MECHANICAL, MAINTAINED, WIRE LEADS
9. SPECIAL, DIGITS ARE IN SERIAL ORDER

HOUSING MATERIAL:

1. STAINLESS STEEL
2. ZINC ALLOY CHROME PLATED

ILLUMINATION:

0. NON-LIT
1. CENTER SPOT ILLUMINATION
2. RING ILLUMINATION
3. ILLUMINATED POWER SYMBOL

LED COLOR:

- N. NONE
- G. GREEN L.E.D.
- R. RED L.E.D.
- A. AMBER L.E.D.
- B. BLUE L.E.D.
- W. WHITE L.E.D.

VOLTAGE RESISTOR

- IF BLANK *
- 05 5V FORWARD

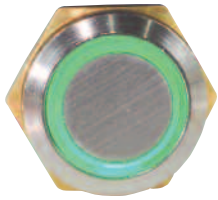
48M-

* Current limiting resistor is required to limit LED forward current to 20 mA (not included).

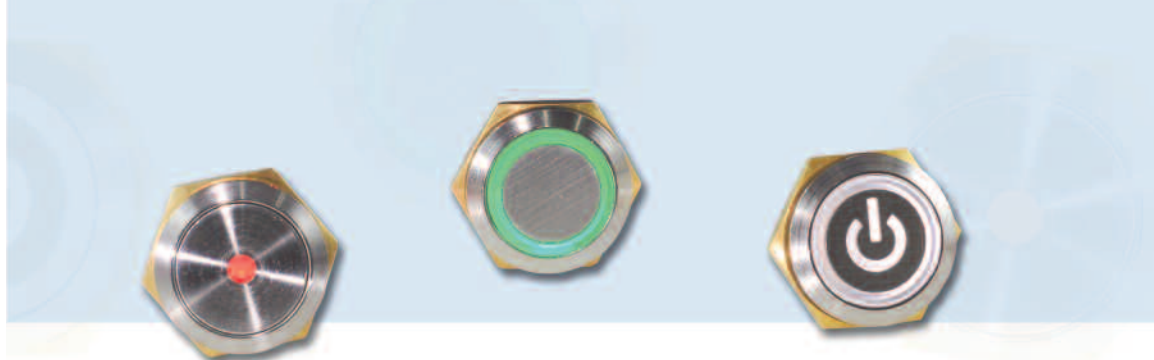
STANDARDS / AGENCY / RATINGS:



SERIES 48M-SS:



ACTUAL SIZE



PANEL SEALED METAL PUSHBUTTON SWITCHES

Built on the proven series 48 platform these rugged switches come in stainless steel housings, solid-state with either momentary or maintained action and lighted or unlighted versions. The variety of options in this compact package size make the 48M ideal for many applications: outdoor controls, security products, food processing and medical products.

KEY FEATURES:

- Momentary or Maintained Action
- Stainless Steel Housing
- Center Spot or Ring Illumination
- Variety of LED colors
- Solid State
- Panel Sealed to IP67
- ROHS Compliant
- Gold Plated Contact and Terminals

APPLICATIONS

- Outdoor Controls
- Kiosks
- Security Equipment
- Medical Equipment
- Food Processing Equipment
- Military Equipment
- Industrial Machinery
- Transportation: Mass-Transit, Marine, Lift Trucks

ORDERING INFORMATION:

SWITCH FUNCTION:

- 3. SOLID STATE, MOMENTARY, SOLDER TERMINAL
- 4. SOLID STATE, MAINTAINED, SOLDER TERMINAL
- 7. SOLID STATE, MOMENTARY, PC TERMINAL
- 8. SOLID STATE, MAINTAINED, PC TERMINAL
- C. SOLID STATE, , MOMENTARY, WIRE LEADS
- D. SOLID STATE, , MAINTAINED, WIRE LEADS
- 9. SPECIAL, DIGITS ARE IN SERIAL ORDER

HOUSING MATERIAL:

- 1. STAINLESS STEEL
- 2. ZINC ALLOY CHROME PLATED

ILLUMINATION:

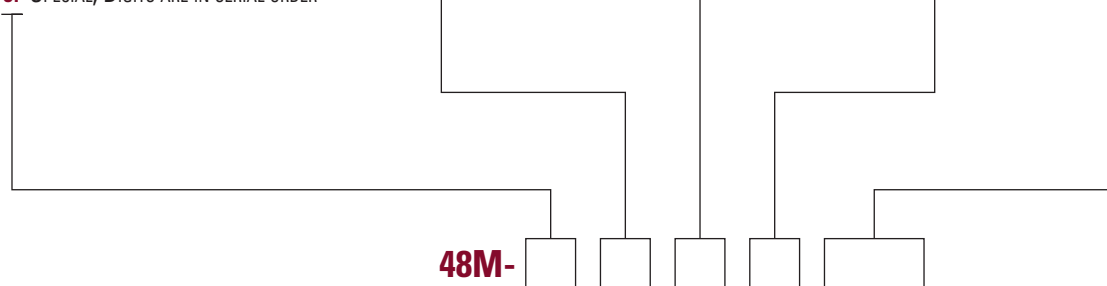
- 0. NON-LIT
- 1. CENTER SPOT ILLUMINATION
- 2. RING ILLUMINATION
- 3. ILLUMINATED POWER SYMBOL

LED COLOR:

- N. NONE
- G. GREEN L.E.D.
- R. RED L.E.D.
- A. AMBER L.E.D.
- B. BLUE L.E.D.
- W. WHITE L.E.D.

VOLTAGE RESISTOR

- IF BLANK *
- 05 5V FORWARD



STANDARDS / AGENCY / RATINGS:



* Current limiting resistor is required to limit LED forward current to 20 mA (not included).

SERIES 49:



ACTUAL SIZE



MINIATURE SEALED ESD RESISTANT PUSHBUTTON SWITCHES

This switch series is rugged, panel sealed, available with round or square bezels and LED lighted or non-lighted. Bushing mount or snap-in mounting available. Series 49 switches are ideal for demanding applications in harsh environments where water, moisture or dust are problematic.

KEY FEATURES:

- Normally open or closed circuitry
- Momentary action
- LED lighted or non-lighted
- .110 Quick Connect or Solder terminals available
- Gold contacts
- ESD 15KV minimum
- Panel sealed to IP67
- Long life – up to 1 million cycles
- Threaded or snap-in mounting

APPLICATIONS

- Industrial equipment control handles
- Dog training control modules
- Outdoor controls
- Medical equipment
- Beverage dispensing

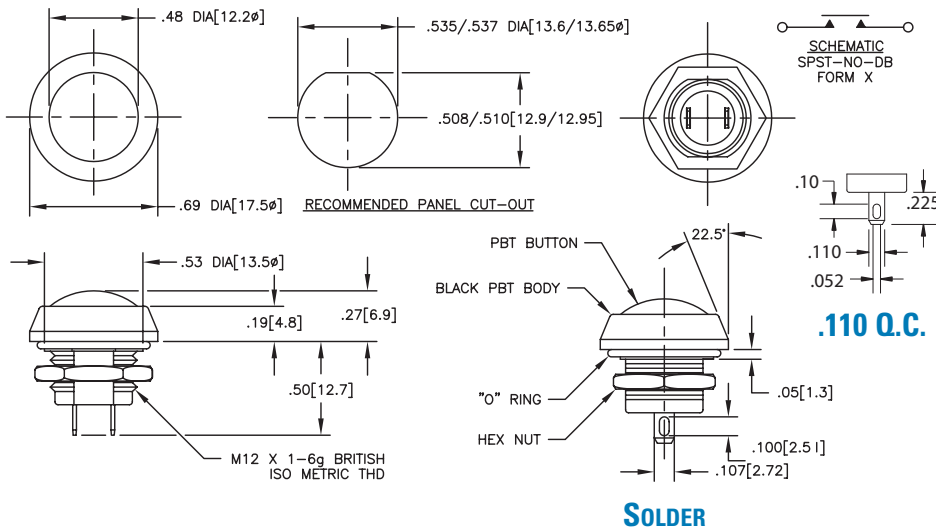
ORDERING INFORMATION:

Part Number	Body Style	Button Color	LED Color	Contacts	Terminals
49-111	Round bezel	Black	—	Normally Open	Solder
49-112	Round bezel	Red	—	Normally Open	Solder
49-113	Round bezel	Green	—	Normally Open	Solder
49-114	Round bezel	White	—	Normally Open	Solder
49-115	Round bezel	Yellow	—	Normally Open	Solder
49-116	Round bezel	Blue	—	Normally Open	Solder
49-411G	Illuminated round	Black	Green	Normally Open	Solder
49-411R	Illuminated round	Black	Red	Normally Open	Solder
49-412G	Illuminated round	Red	Green	Normally Open	Solder
49-412R	Illuminated round	Red	Red	Normally Open	Solder
49-413G	Illuminated round	Green	Green	Normally Open	Solder
49-413R	Illuminated round	Green	Red	Normally Open	Solder
49-9111	Snap-in round	Black	—	Normally Open	Solder
49-9112	Snap-in round	Red	—	Normally Open	Solder
49-9113	Snap-in round	Green	—	Normally Open	Solder
49-611	Round bezel	Black	—	Normally Closed	Solder
49-612	Round bezel	Red	—	Normally Closed	Solder
49-613	Round bezel	Green	—	Normally Closed	Solder
49-131	Round bezel	Black	—	Normally Open	.110 QC
49-132	Round bezel	Red	—	Normally Open	.110 QC
49-133	Round bezel	Green	—	Normally Open	.110 QC

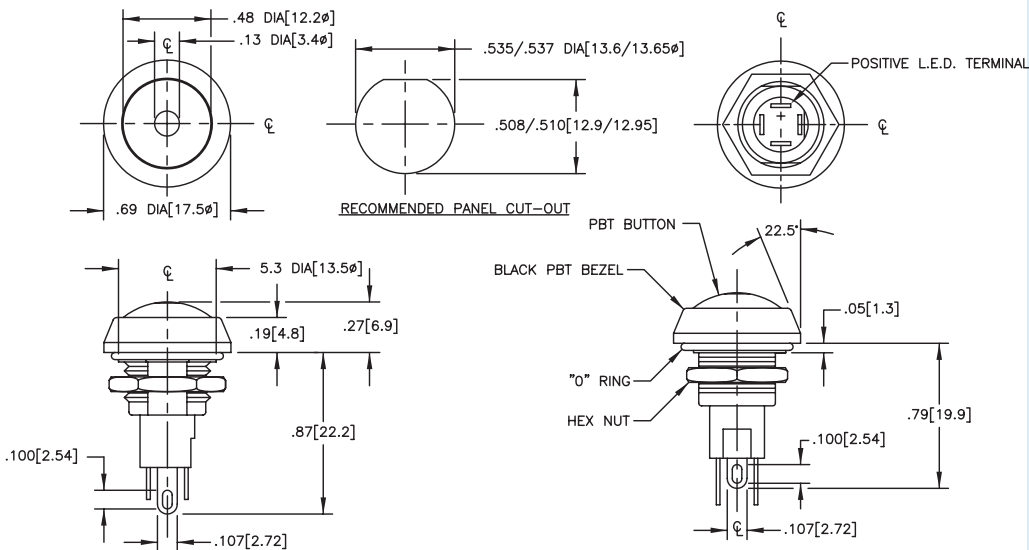
STANDARDS / AGENCY / RATINGS:



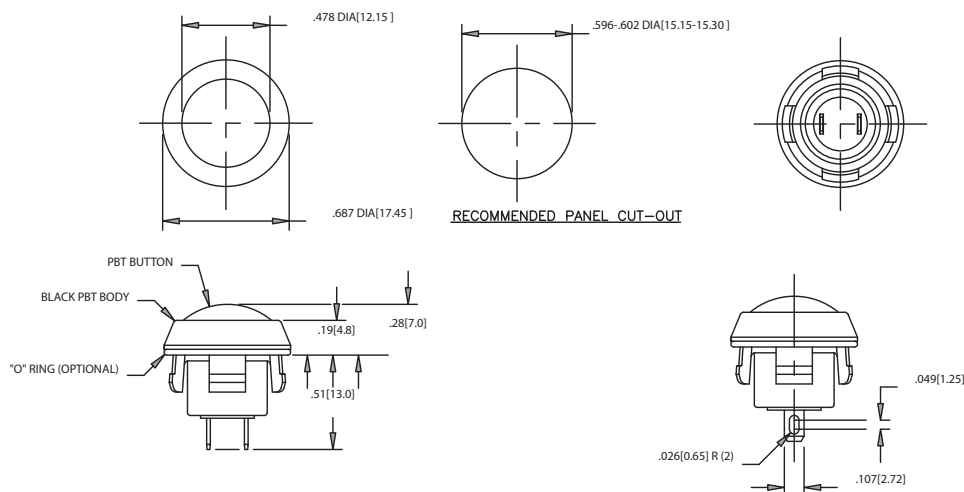
49-11X & 49-61X SERIES



49-41X SERIES



49-91X SERIES



MECHANICAL / ELECTRICAL CHARACTERISTICS:

Circuit:
SPST-NO-DB or SPST-NC-DB

Travel (nominal):
0.09 inches / 2.3 mm

Life (nominal):
1,000,000 cycles (mechanical)
500,000 cycles (electrical)

Operating temperature:
-40°C to +85°C
(-40°F to +185°F)

Operating force (nominal):
3N / 306 grams

Contact bounce (nominal):
1 millisecond

LED:
T-1

Dielectric strength:
1,000 VAC

Insulation resistance:
1 GΩ

Contact resistance:
50 mΩ max (initial)

Switching power (max):
16 VA AC

Mounting Torque (max):
15 inch pounds

Electrical Ratings:

Circuitry	Current	Voltage
SPST-DB-NO	400 mA	32 VAC Res
SPST-DB-NC	100 mA	50 VDC Res
	125 mA	125 VAC Res

SERIES 49-59W:



ACTUAL SIZE



FULLY SEALED PUSHBUTTON SWITCHES WITH WIRE LEADS

This fully sealed switch series is SPST-DB for a variety of circuit requirements. The double break mechanism also provides reliable switching of DC loads. This rugged switch is ideal for harsh environments.

KEY FEATURES:

- Fully sealed to IP67
- Momentary action
- Wire leads
- Flame retardant UL rated material
- Gold plated contacts
- Life up to 500,000 cycles

APPLICATIONS

- Communications
- Instrumentation
- Data processing
- Military environments
- Mass transport controls
- Dry circuit switching

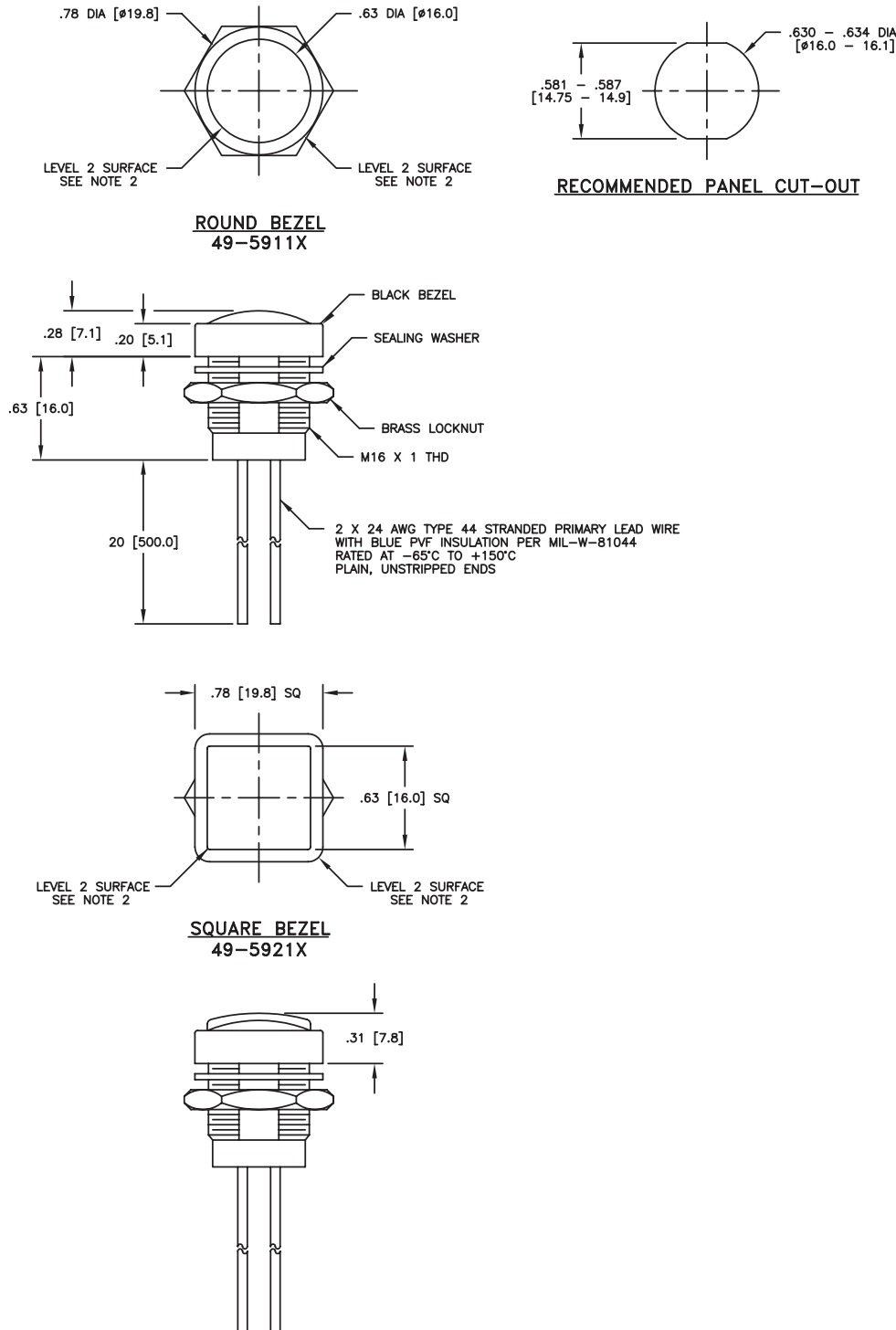
ORDERING INFORMATION:

Part Number	Button Style	Button Color
49-59111	Round bezel	Black
49-59112	Round bezel	Red
49-59113	Round bezel	Green
49-59211	Square bezel	Black
49-59212	Square bezel	Red
49-59213	Square bezel	Green

STANDARDS / AGENCY / RATINGS:



PRODUCT DRAWINGS



MECHANICAL / ELECTRICAL CHARACTERISTICS:

- Circuit:**
SPST-NO-DB
- Travel:**
0.09 inches / 2.3 mm (nominal)
- Operating force:**
3N / 306 grams
- Panel thickness:**
0.31 inches 8 mm (Max)
- Contact material:**
gold plated palladium nickel
- Contact resistance (initial):**
150 mΩ max including wire leads
- Current Rating (typical):**
400mA at 32 VAC resistive
100mA at 50 VDC resistive
125mA at 125 VAC resistive
- Dielectric strength:**
1000 VAC for 1 min
- Insulation resistance:**
1 GΩ @ 500 VDC
- Contact resistance:**
50 mΩ max initial including leads
- Life (nominal):**
1,000,000 cycles (mechanical)
500,000 (max) cycles (electrical)
- Operating temperature:**
-55°C to 105°C
(-67°F to +221°F)
- Body and button material:**
PBT

SERIES 49-59T:



ACTUAL SIZE



PANEL SEALED PUSHBUTTON SWITCHES WITH SERIES 16 & 26 SNAP SWITCHES

These rugged panel sealed pushbuttons employ the workhorse basic switches for high (or low) current applications. Connections are made with solder terminals at the rear of the switch. The pushbuttons are available with square or round bezels. These switches are ideal for harsh environments.

KEY FEATURES:

- Panel sealed to IP67
- Momentary action
- Solder terminals
- Flame retardant UL rated material
- Life (min.) – 1,000,000 cycles
- Available with Series 16 or 26 switch
- Rated up to 10 amps

APPLICATIONS

- Environmentally demanding keypads
- Mass transport controls
- Communications
- Instrumentation
- Data processing
- Military environments

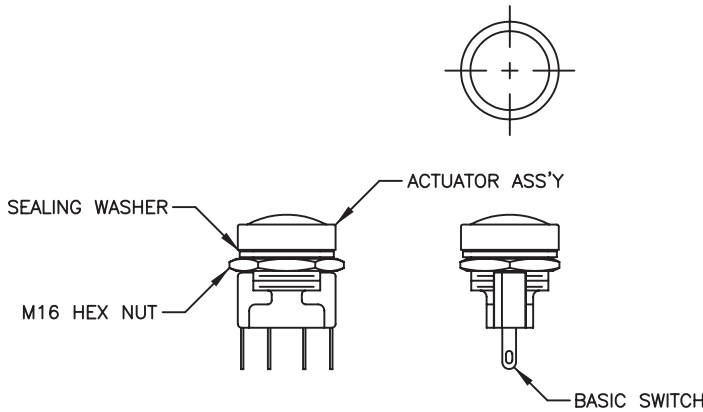
ORDERING INFORMATION:

Part Number	Button Style	Button Color	Circuit	Contact Material
49-5911 / 530004	Round	Black	SPDT-DB	Silver
49-5912 / 530004	Round	Red	SPDT-DB	Silver
49-5913 / 530004	Round	Green	SPDT-DB	Silver
49-5911 / 810	Round	Black	DPDT-DB	Enhanced Gold
49-5912 / 810	Round	Red	DPDT-DB	Enhanced Gold
49-5913 / 810	Round	Green	DPDT-DB	Enhanced Gold

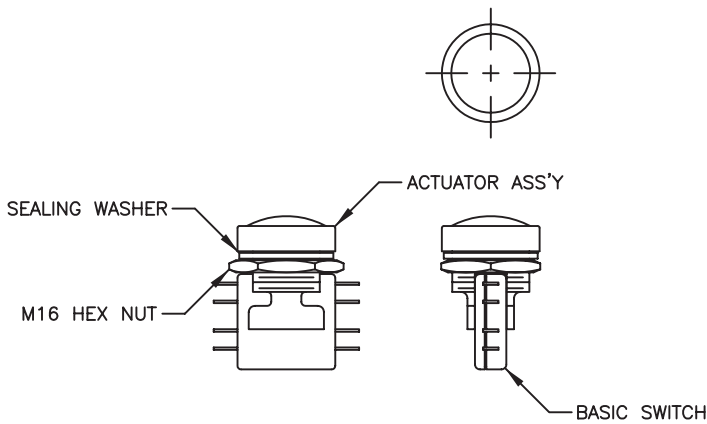
STANDARDS / AGENCY / RATINGS:



49-591x / 530004



49-591x / 810



Current rating: 26-810

Load	Sea Level				70,000 Ft.	
	28 VDC DPDT	28 VDC 4 CKT	115 VAC 60 HZ DPDT	115 VAC 60 HZ 4 CKT	28 VDC DPDT	28 VDC 4 CKT
Resistive	8 amp	8 amp	6 amp	4 amp	8 amp	8 amp
Inductive	6 amp	4 amp	4 amp	4 amp	2 amp	1 amp
Lamp	0.5 amp	0.5 amp	2 amp	1 amp	—	—

INSTALLATION:

The actuator assembly is installed from the front of the panel and locked down with the hex nut using a 20mm spanner. To attain the correct sealing, the nut should be tightened to a recommended torque of between 1.106 pound/foot (1.5 Nm) not exceeding 1.475 pound/foot (2 Nm). The basic switch can then be snapped into place from the back of the panel. Panel Thickness (Max): .118 (3.0).

MECHANICAL / ELECTRICAL CHARACTERISTICS:

Travel (nom):

0.09 inches / 2.3 mm

Operating force (nom):

387g–561g (3.8N–5.5N)

Dielectric strength:

1,000 VAC for 1 minute

Insulation resistance:

1 GΩ @ 500 VDC

Contact resistance initial:

25 mΩ max.

Electrical:

Life: 50,000 cycles

@ 158°F (70°C)

Current rating 16-530004:

Form X or Y: 10 amps 125 VAC;

10 amps 28 VDC IND.

Form Z: 5 amps 125/250 VAC;

3 amps 28 VDC IND.

Current rating 26-810:

See chart on left

Operating temperature:

-67°F to +221°F

(-55°C to +105°C)

Body/Button material:

PBT

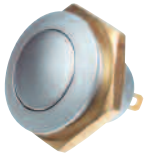
Contacts 16-530004:

silver

Contacts 26-810

enhanced gold

SERIES 57:



ACTUAL SIZE



MINIATURE VANDAL RESISTANT SEALED PUSHBUTTON SWITCHES

This rugged miniature, momentary action, sealed switch series is ideal for a variety of applications in harsh environments where durability is key. It is panel sealed to IP67 and designed to be impact resistant.

KEY FEATURES:

- Panel sealed to IP67
- Momentary action
- Impact resistant
- Non-spark material
- Lighted and non-lighted versions
- Wide temperature range: -40°C to +125°C
- Gold Plated Palladium Nickel contacts

APPLICATIONS

- Military / Aerospace
- Process Controls
- Security Access Controls
- Medical Instrumentation
- Computers
- Transportation: Mass-transit, Marine, Lift Trucks, Personal and Recreational Vehicles, Rail

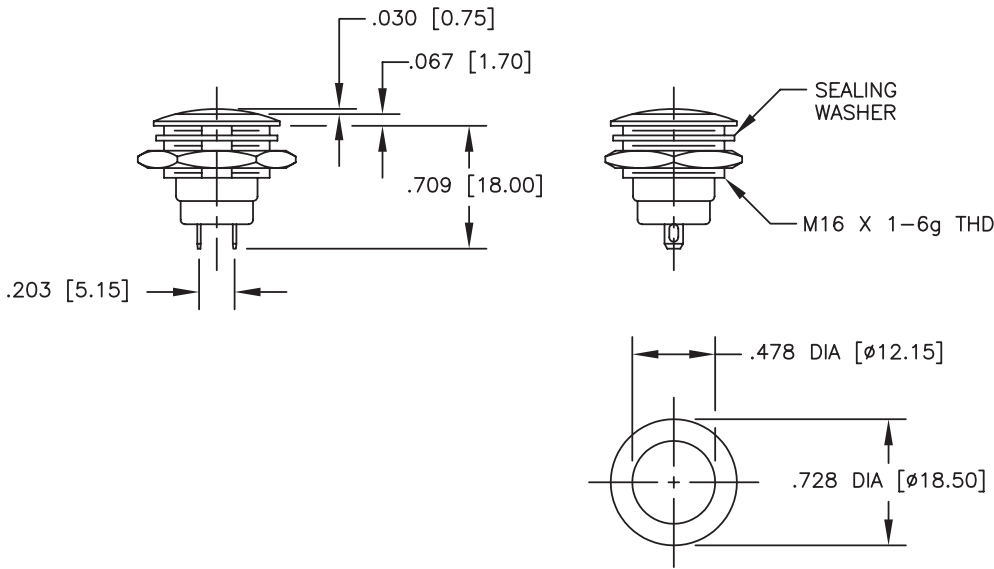
ORDERING INFORMATION:

Part Number	Lighted	LED Color
57-111	No	—
57-112B	Yes	Blue
57-112G	Yes	Green
57-112R	Yes	Red

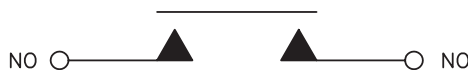
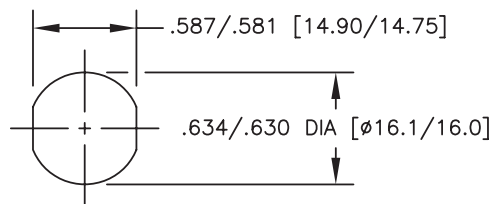
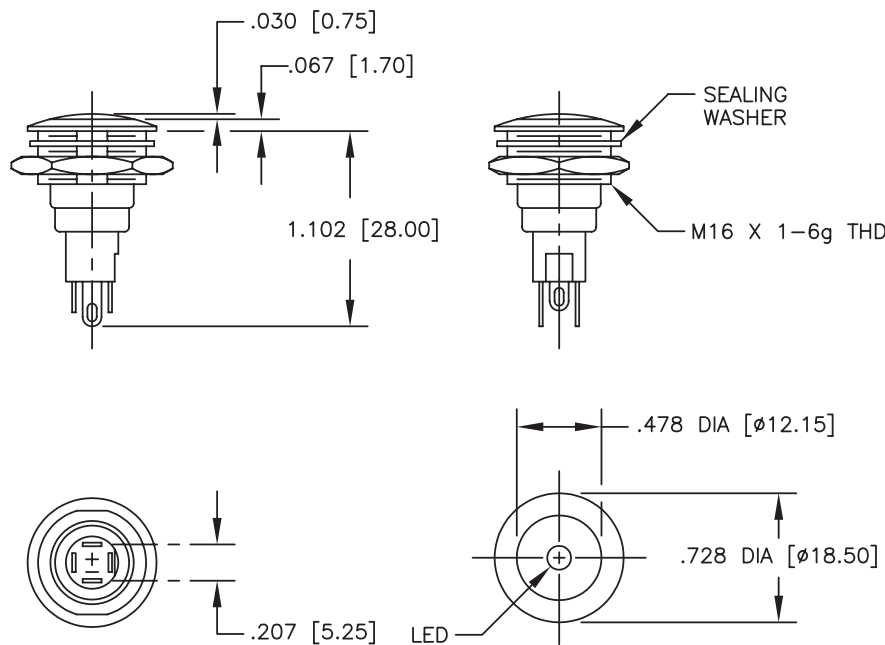
STANDARDS / AGENCY / RATINGS:



NON-LIGHTED



LIGHTED



MECHANICAL / ELECTRICAL CHARACTERISTICS:

Travel (nom):

0.09 inches / 2.3 mm

Life (nominal):

1,000,000 cycles (mechanical)
500,000 cycles (electrical)

Operating force (nom):

3N / 306 grams

Contact bounce (nom):

1 millisecond

Panel thickness (max):

0.118 inches / 3.0 mm

Contact resistance initial:

50 mΩ (Max)

Current Rating (typical):

400mA at 32 VAC resistive
100mA at 50 VDC resistive
125mA at 125 VAC resistive

Switching power (max):

16VA AC

Shock:

100g

Body and button material:

Velour chrome plated
zinc alloy

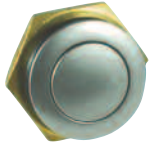
Terminals:

gold plated brass

Soldering information:

608°F (320°C) max for 3s

SERIES 57M-EM:



ACTUAL SIZE



MINIATURE PANEL SEALED METAL PUSHBUTTON SWITCHES

The 57M is a miniature switch designed for rugged environments. The housing is zinc alloy with velour chrome plating. It is available as maintained or momentary action, Electro-mechanical operation with Gold plated contacts and solder terminals. It is ideal for a multitude of applications.

KEY FEATURES:

- Zinc Alloy/Velour Chrome Plated
- Center Spot LED and Non-Lighted Versions
- Maintained or Momentary Action
- Panel Sealed to IP67
- RoHS Compliant
- Electro-Mechanical
- Gold Plated Contacts and Terminals

APPLICATIONS

- Security Equipment
- Industrial Control
- Medical Equipment
- Military Equipment
- Food Processing
- Transportation
- Computers

ORDERING INFORMATION:

SWITCH FUNCTION:

1. MECHANICAL, MOMENTARY, SOLDER TERMINAL
2. MECHANICAL, MAINTAINED, SOLDER TERMINAL
5. MECHANICAL, MOMENTARY, PC TERMINAL
6. MECHANICAL, MAINTAINED, PC TERMINAL
- A. MECHANICAL, MOMENTARY, WIRE LEADS
- B. MECHANICAL, MAINTAINED, WIRE LEADS
9. SPECIAL, DIGITS ARE IN SERIAL ORDER

HOUSING MATERIAL:

1. ZINC ALLOY, VELOUR CHROME PLATED
2. ZINC ALLOY, MIRROR BLACK

ILLUMINATION:

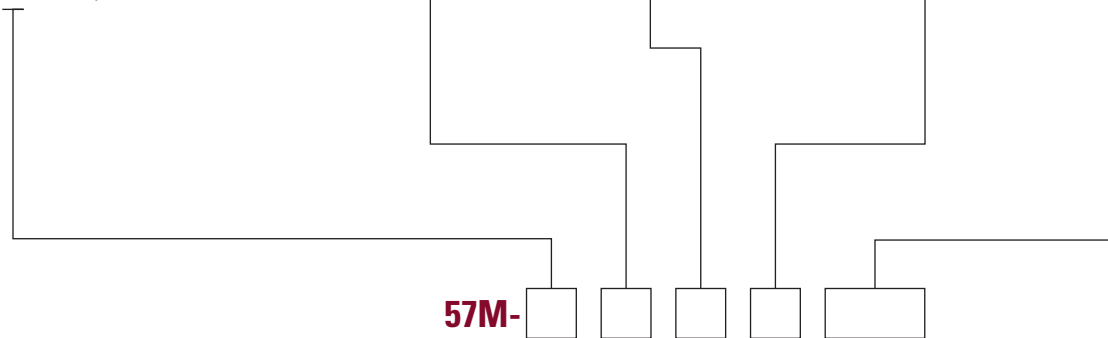
0. NON-LIT
1. CENTER SPOT ILLUMINATION
2. RING ILLUMINATION
3. STANBY LOGO ILLUMINATION

LED COLOR:

- N. NONE
- G. GREEN L.E.D.
- R. RED L.E.D.
- A. AMBER L.E.D.
- B. BLUE L.E.D.
- W. WHITE L.E.D.

VOLTAGE RESISTOR

- If BLANK *
- 05 5V FORWARD

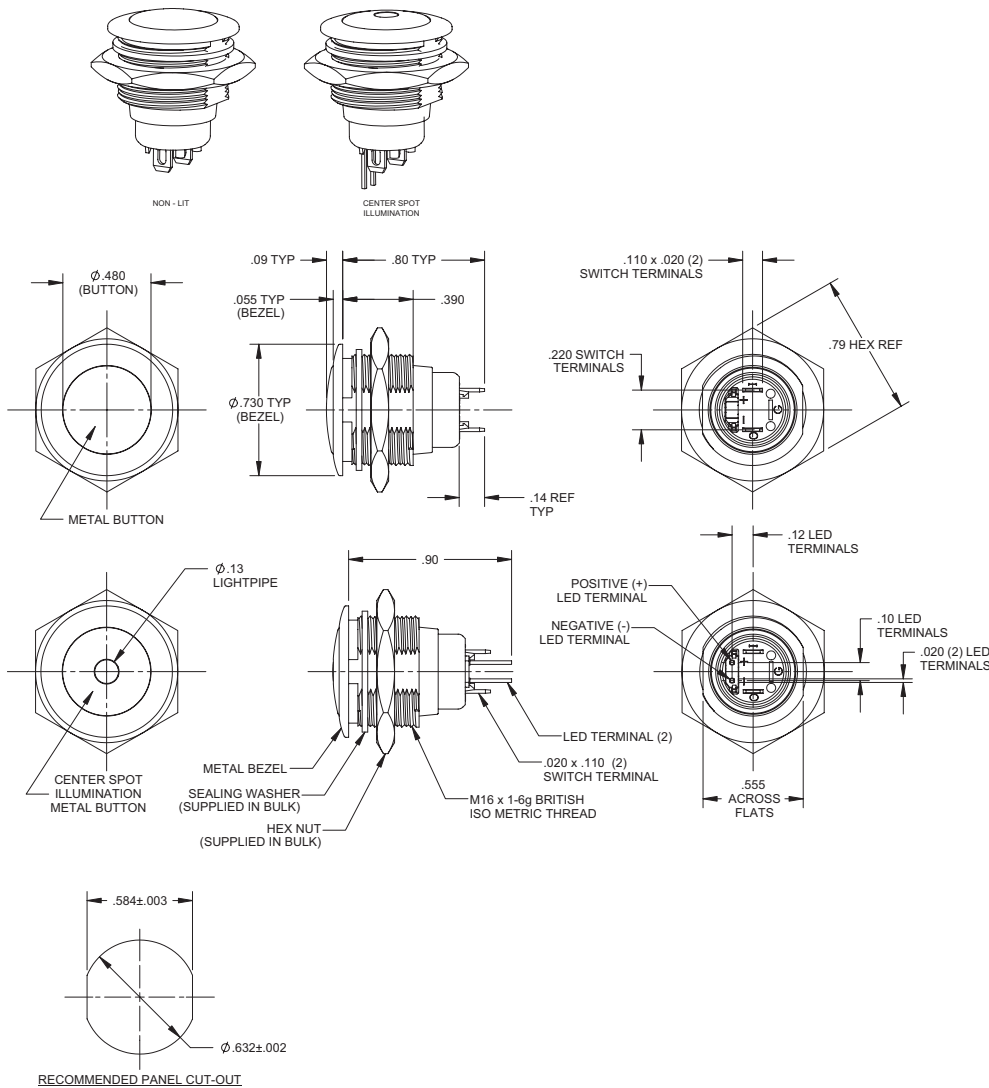


STANDARDS / AGENCY / RATINGS:



* Current limiting resistor is required to limit LED forward current to 20 mA (not included).

PRODUCT DRAWINGS



MECHANICAL / ELECTRICAL CHARACTERISTICS:

Circuit:

SPST-NO-DB

Button travel (nominal):

0.09 inches / 2.3 mm

Operating force (nominal):

3N / 306g

Contact bounce (nominal):

1 millisecond

Panel thickness:

0.20 – 0.120 inches /
0.5 – 3mm

Temperature index:

-40°C to + 85°C

Torque (max):

10 inch pounds

LED operating temperature:

-13° F to +185° F /
-25° C to +85° C

Current ratings (resistive):

250mA @ 12VDC, 100K cycles
150mA @ 28VDC, 150K cycles
(momentary)
100mA @ 48VDC, 100K cycles
10mA @ 12VDC, 1 million cycles
(momentary)

ELECTRO-MECHANICAL

Dielectric strength:

1,000 VAC

Insulation resistance:

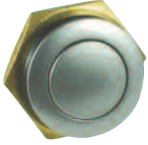
1 GΩ

Contact resistance:

PANEL MOUNTING AND CONSTRUCTION INFORMATION

The series 57M mounts easily into panels of minimum 0.20" (0.5mm) and maximum 0.120" (3mm) thicknesses. Front panel sealing to IP67 is achieved by a sealing washer which is fitted to the body of the switch before it is inserted into the panel hole cutout. It is held onto the panel by means of a brass hex nut tightened down to a torque of 10 inch pounds to achieve the correct sealing pressure.

SERIES 57M-SS:



ACTUAL SIZE



MINIATURE PANEL SEALED METAL PUSHBUTTON SWITCHES

The 57M is a miniature switch designed for rugged environments. The housing is zinc alloy with velour chrome plating. It is available as maintained or momentary action, solid-state operation with Gold plated contacts and solder terminals. It is ideal for a multitude of applications.

KEY FEATURES:

- Zinc Alloy/Velour Chrome Plated
- Center Spot LED and Non-Lighted Versions
- Maintained or Momentary Action
- Panel Sealed to IP67
- RoHS Compliant
- Solid State
- Gold Plated Contacts and Terminals

APPLICATIONS

- Security Equipment
- Industrial Control
- Medical Equipment
- Military Equipment
- Food Processing
- Transportation
- Computers

ORDERING INFORMATION:

SWITCH FUNCTION:

3. SOLID STATE, MOMENTARY, SOLDER TERMINAL
4. SOLID STATE, MAINTAINED, SOLDER TERMINAL
7. SOLID STATE, MOMENTARY, PC TERMINAL
8. SOLID STATE, MAINTAINED, PC TERMINAL
- C. SOLID STATE, , MOMENTARY, WIRE LEADS
- D. SOLID STATE, , MAINTAINED, WIRE LEADS
9. SPECIAL, DIGITS ARE IN SERIAL ORDER

HOUSING MATERIAL:

1. ZINC ALLOY, VELOUR CHROME PLATED
2. ZINC ALLOY, MIRROR BLACK

BUTTON STYLE:

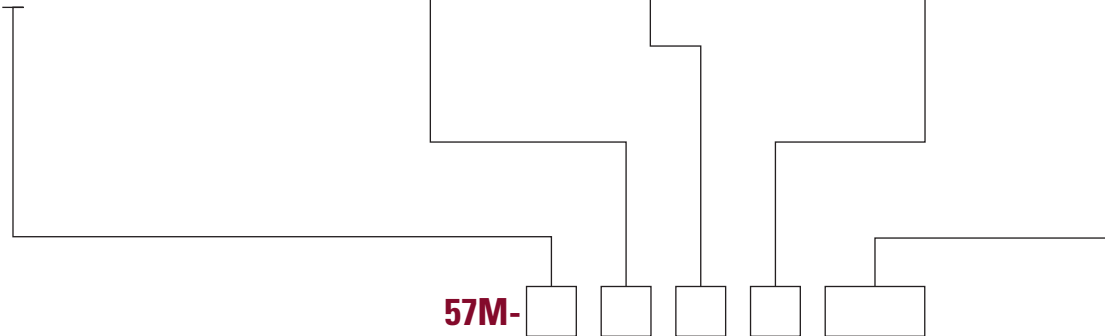
0. NON-LIT
1. CENTER SPOT ILLUMINATION
2. RING ILLUMINATION
3. STANBY LOGO ILLUMINATION

LED COLOR:

- N. NONE
- G. GREEN L.E.D.
- R. RED L.E.D.
- A. AMBER L.E.D.
- B. BLUE L.E.D.
- W. WHITE L.E.D.

VOLTAGE RESISTOR

- If BLANK *
- 05 5V FORWARD

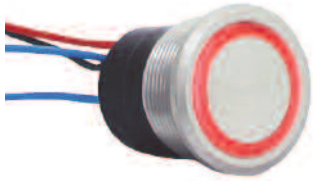


* Current limiting resistor is required to limit LED forward current to 20 mA (not included).

STANDARDS / AGENCY / RATINGS:



SERIES 58M-EM:



ACTUAL SIZE



FULLY SEALED METAL PUSHBUTTON SWITCHES WITH WIRE LEADS

Built on the proven series 48 platform these rugged switches come in stainless steel or aluminum housings, electro-mechanical with either momentary or maintained action and lighted or unlighted versions. The variety of options in this compact package size make the 58M ideal for many applications: transportation, outdoor controls, security products, food processing and medical products.

KEY FEATURES:

- Momentary or Maintained Action
- Stainless Steel or Aluminum Housing
- Non Lit or Ring Illumination
- Variety of LED colors
- Electro-Mechanical
- Panel Sealed to IP67
- ROHS Compliant
- Gold Plated Contacts

APPLICATIONS

- Outdoor Controls
- Kiosks
- Security Equipment
- Medical Equipment
- Food Processing Equipment
- Military Equipment
- Industrial Machinery
- Transportation: Mass-Transit, Marine, Lift Trucks

ORDERING INFORMATION:

SWITCH FUNCTION:

- A.** MECHANICAL, MOMENTARY, WIRE LEADS
- B.** MECHANICAL, MAINTAINED, WIRE LEADS

HOUSING MATERIAL:

- 1.** STAINLESS STEEL
- 2.** ALUMINUM

BUTTON STYLE:

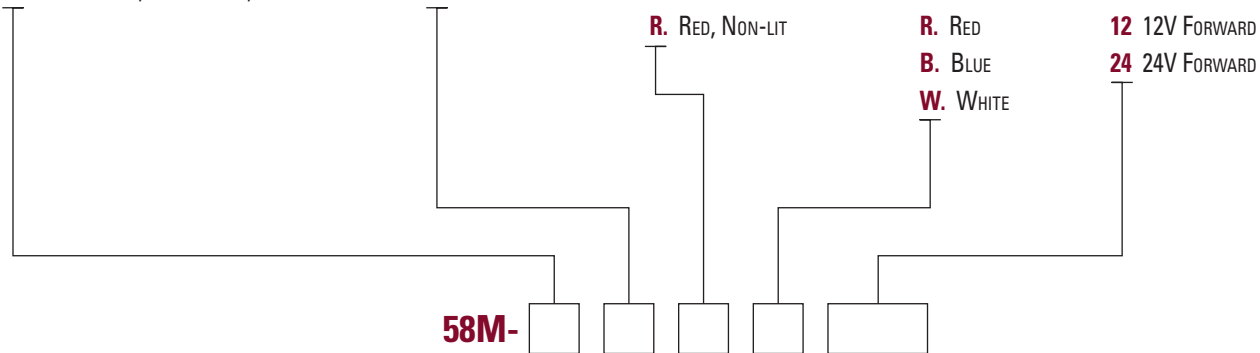
- 0.** NON-LIT
- 2.** RING ILLUMINATION
- R.** RED, NON-LIT

LED COLOR:

- N.** NONE
- G.** GREEN
- R.** RED
- B.** BLUE
- W.** WHITE

VOLTAGE RESISTOR

- If BLANK *
- 05** 5V FORWARD
- 12** 12V FORWARD
- 24** 24V FORWARD



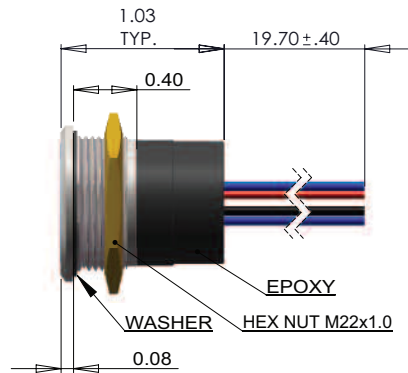
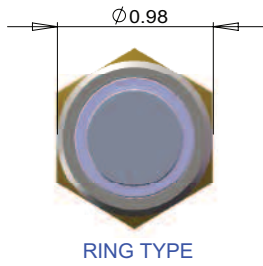
STANDARDS / AGENCY / RATINGS:



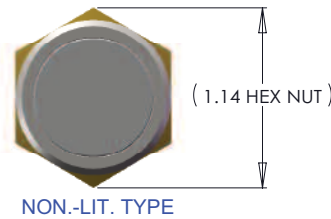
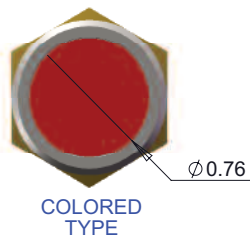
* Current limiting resistor is required to limit LED forward current to 20 mA (not included).

PRODUCT DRAWINGS

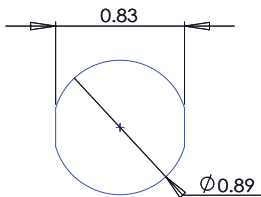
ILLUMINATION



NON-ILLUMINATION



RECOMMENDED PANEL CUTOUT



WIRELEADS DESCRIPTION

WIRELEADS TYPE	WIRELEADS SPECIFICATION	SW TERMINAL		LED	
		I	O	+	-
ILLUMINATION	AWG26/UL1007	BLUE	BLUE	RED	BLACK
NON-ILLUMINATION		BLUE	BLUE	---	---

MECHANICAL / ELECTRICAL CHARACTERISTICS:

Circuit:

SPST-NO-DB (Form X)

Button travel (nominal):

0.09 inches / 2.3 mm

Operating force (nominal):

3N / 306 grams

Contact bounce (nominal):

1 millisecond

Panel thickness:

0.50" – 0.150" (1.3 – 3.8mm)

Temperature index:

-40°C to +85°C

Torque (max):

10 inch pounds

LED operating temperature:

-13° F to +185° F /

-25° C to +85° C

Current ratings (resistive):

250mA @ 12VDC, 100K cycles

150mA @ 28VDC, 150K cycles
(momentary)

100mA @ 48VDC, 100K cycles

10mA @ 12VDC, 1 million cycles
(momentary)

ELECTRO-MECHANICAL

Dielectric strength:

1,000 VAC

Insulation resistance:

1 GΩ

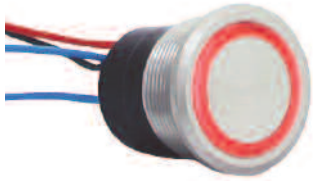
Contact resistance:

50 mΩ max (initial)

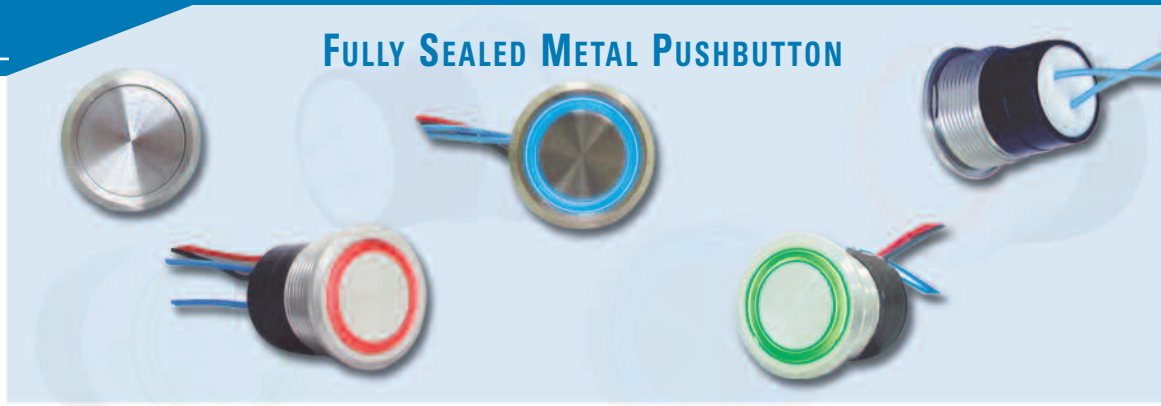
PANEL MOUNTING AND CONSTRUCTION INFORMATION

The series 58M mounts easily into panels of minimum 0.50" (1.3 mm) and maximum 0.150" (3.8 mm) thickness. Front panel sealing to IP67 is achieved by a sealing o-ring fitted to the body of the switch before it is inserted into the panel hole cut-out. It is held onto the panel by means of a brass hex nut tightened down to a torque of 10 inch pounds to achieve the correct sealing pressure.

SERIES 58M-SS:



ACTUAL SIZE



FULLY SEALED METAL PUSHBUTTON SWITCHES WITH WIRE LEADS

Built on the proven series 48 platform these rugged switches come in stainless steel or aluminum housings, solid state with either momentary or maintained action and lighted or unlighted versions. The variety of options in this compact package size make the 58M ideal for many applications: transportation, outdoor controls, security products, food processing and medical products.

KEY FEATURES:

- Momentary or Maintained Action
- Solid State
- Stainless Steel or Aluminum Housing
- Panel Sealed to IP67
- Non Lit or Ring Illumination
- ROHS Compliant
- Variety of LED colors
- Gold Plated Contacts

APPLICATIONS

- Outdoor Controls
- Kiosks
- Security Equipment
- Medical Equipment
- Food Processing Equipment
- Military Equipment
- Industrial Machinery
- Transportation: Mass-Transit, Marine, Lift Trucks

ORDERING INFORMATION:

SWITCH FUNCTION:

- C.** SOLID STATE, , MOMENTARY, WIRE LEADS
- D.** SOLID STATE, , MAINTAINED, WIRE LEADS

HOUSING MATERIAL:

- 1.** STAINLESS STEEL
- 2.** ALUMINUM

BUTTON STYLE:

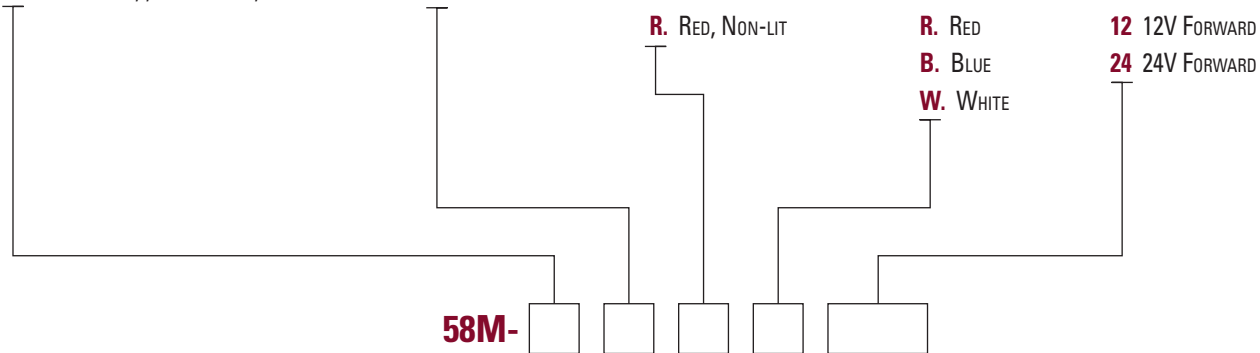
- 0.** NON-LIT
- 2.** RING ILLUMINATION
- R.** RED, NON-LIT

LED COLOR:

- N.** NONE
- G.** GREEN
- R.** RED
- B.** BLUE
- W.** WHITE

VOLTAGE RESISTER

- If BLANK *
- 05** 5V FORWARD
- 12** 12V FORWARD
- 24** 24V FORWARD



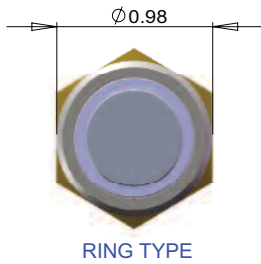
STANDARDS / AGENCY / RATINGS:



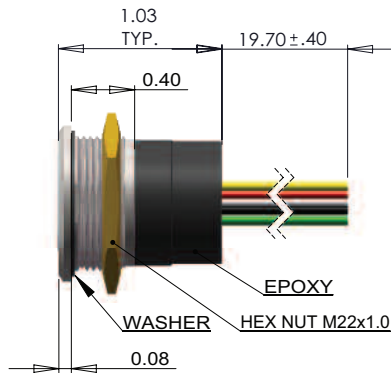
* Current limiting resistor is required to limit LED forward current to 20 mA (not included).

PRODUCT DRAWINGS

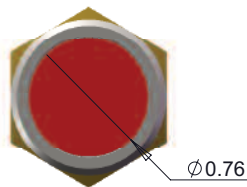
ILLUMINATION



RING TYPE



NON-ILLUMINATION

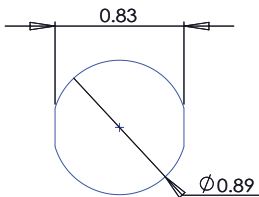


COLORED TYPE



NON-LIT. TYPE

RECOMMENDED PANEL CUTOUT



WIRELEADS DESCRIPTION

WIRELEADS TYPE	WIRELEADS SPECIFICATION	SW TERMINAL			LED	
		I	O	G	+	-
ILLUMINATION	AWG26/UL1007	YELLOW	GREEN	WHITE	RED	BLACK
NON-ILLUMINATION		YELLOW	GREEN	WHITE	---	---

MECHANICAL / ELECTRICAL CHARACTERISTICS:

Circuit:

SPST-NO-DB (Form X)

Button travel (nominal):

0.09 inches / 2.3 mm

Life (mechanical) (nominal):

1,000,000 cycles (momentary)

100,000 cycles (maintained)

Operating force (nominal):

3N / 306 grams

Panel thickness:

0.02 – 0.12 inches / 0.5 – 3mm

Temperature index:

-40°F to + 185°F

Supply voltage:

4.2V to 24V, 26.5V Max.

Supply current:

B<Brp, Vcc=12V: 3mA Typ.

To 8mA Max.

B>Bop, Vcc=12V: 4mA Typ.

To 8mA Max.

Output current:

20 mA

Reverse battery voltage:

-30V Max.

Reverse output current:

-50mA Max.

Torque (max):

10 inch pounds

PANEL MOUNTING AND CONSTRUCTION INFORMATION

The series 58M mounts easily into panels of minimum 0.50" (1.3 mm) and maximum 0.150" (3.8 mm) thickness. Front panel sealing to IP67 is achieved by a sealing o-ring fitted to the body of the switch before it is inserted into the panel hole cut-out. It is held onto the panel by means of a brass hex nut tightened down to a torque of 10 inch pounds to achieve the correct sealing pressure.

SERIES 59:



ACTUAL SIZE



MINIATURE PANEL SEALED PUSHBUTTON MADE OF ZINC ALLOY

This rugged panel sealed pushbutton is made of a special high creep strength non-spark zinc alloy suitable for use in mining or other potentially explosive atmospheres where dust and moisture are problematic.

KEY FEATURES:

- Panel sealed to IP67
- Momentary action
- Non-spark material
- 500,000 life cycles @ max power
- Impact resistant
- Gold contacts
- Wide temperature range: -55°C to +125°C

APPLICATIONS

- Communications
- Instrumentation
- Data processing
- Process controls
- Transportation/ material handling

ORDERING INFORMATION:

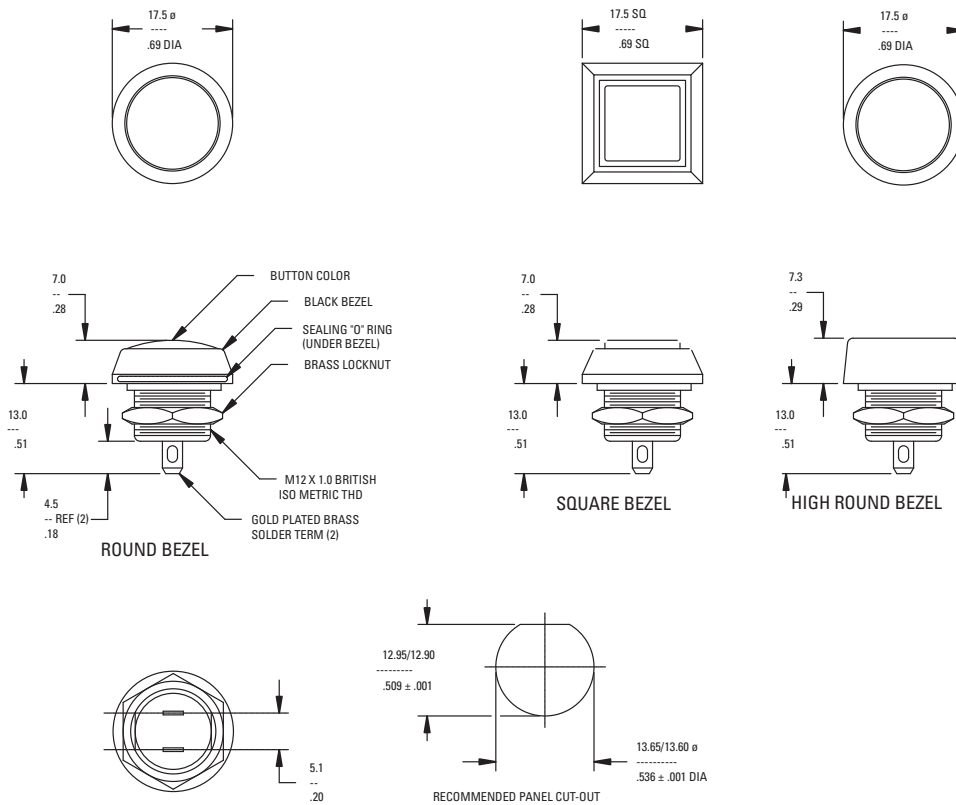
Part Number	Bezel Style	Button Color*
59-111	Round	Black
59-112	Round	Red
59-113	Round	Green
59-211	Square	Black
59-212	Square	Red
59-213	Square	Green
59-311	High Round	Black
59-312	High Round	Red
59-313	High Round	Green

*Consult factory for additional colors.

STANDARDS / AGENCY / RATINGS:



PRODUCT DRAWINGS



PANEL MOUNTING AND CONSTRUCTION INFORMATION

The series 59 mounts easily into panels of minimum 1.5mm (.060 in.) and maximum 3mm (.118 in.) thickness. Front panel sealing to IP67 is achieved by a sealing "O" ring fitted into a premachined groove on the body of the switch before it is inserted into the panel hole cut-out. It is held onto the panel by means of a brass hex nut tightened down by a 14mm spanner, to a torque of between 1.5Nm to 3.0Nm to achieve the correct sealing pressure. A "D" flat is provided to prevent rotation.

MECHANICAL / ELECTRICAL CHARACTERISTICS:

Travel (nom):
2.3mm (.090 in.)

Life (max):
1,000,000 cycles

Operating force (nom):
3N / 306 grams

Contact bounce (nom):
1 millisecond

Panel thickness (max):
3mm (.118 in.)

Dielectric strength:
1000 VAC

Insulation resistance:
1 GΩ

Contact resistance (initial):
50 mΩ (Max)

Current rating (typical):
400mA at 32 VAC resistive
100mA at 50 VDC resistive
125mA at 125 VAC resistive

Shock:
100G

Operating temp range:
-55°C to +125°C
(-67°F to +257°F)

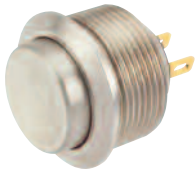
Body material:
zinc alloy, black

Button material:
PBT thermoplastic

Contacts:
gold plated palladium nickel

Terminals:
gold plated brass

SERIES 76-59:



ACTUAL SIZE



EXTRA TOUGH VANDAL RESISTANT SEALED PUSHBUTTON SWITCH

The Series 76-59 is an extra tough, stainless steel sealed pushbutton. It is made to withstand rough use and the concave stainless button makes it ADA compatible. The switch is momentary action and the button is available in a stainless or red powder coated button.

KEY FEATURES:

- Sealed to IP67
- SPST-NO-DB
- Stainless steel body and button
- .110 quick connect terminals
- Standard ITW Pancon connector available
- Extra ruggedized construction
- ADA compatible

APPLICATIONS

- Security systems
- Kiosks
- Process control
- Public access equipment
- Gas pumps
- Outdoor machinery
- Industrial machinery

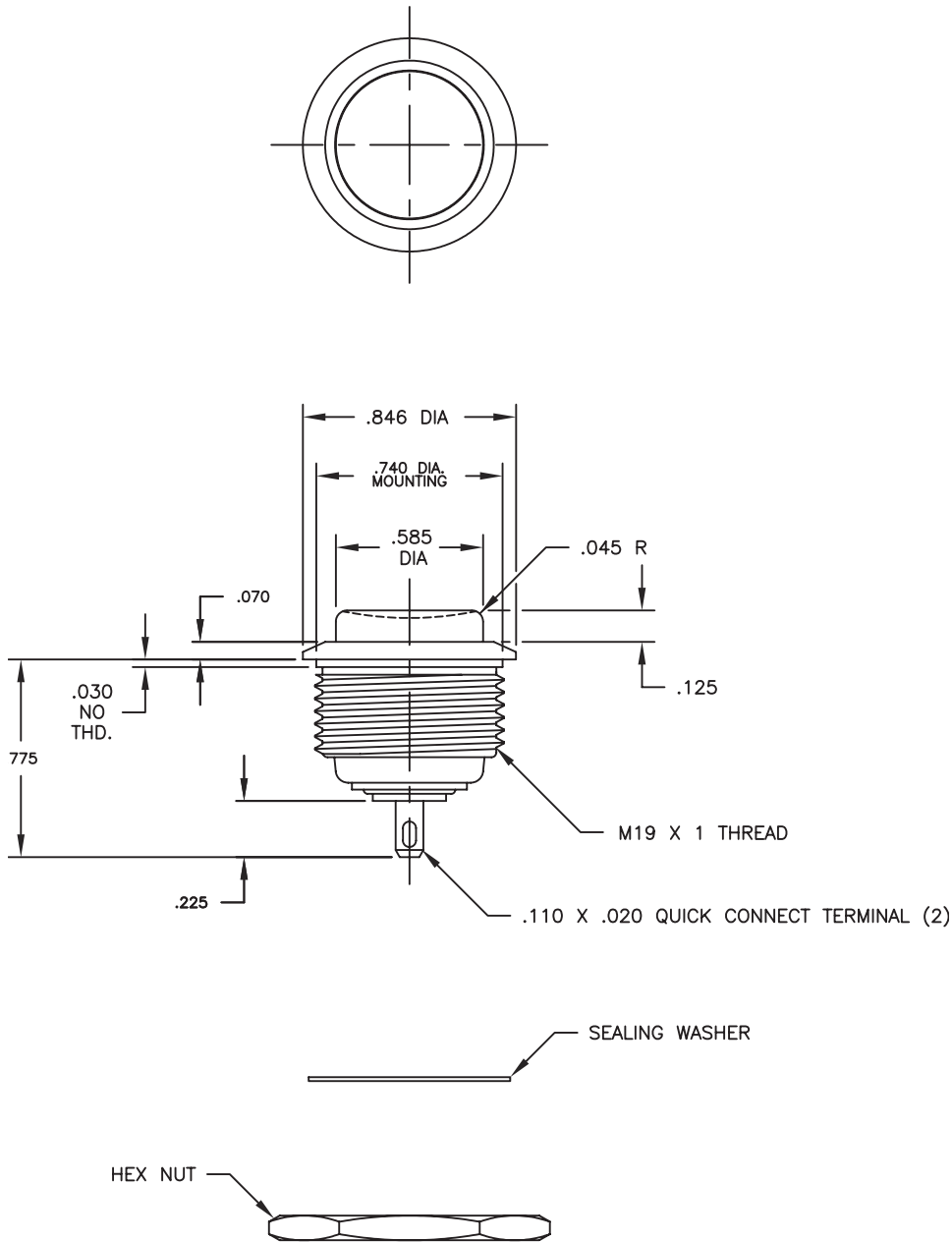
ORDERING INFORMATION:

Part Number	Bushing	Button
76-59200	Stainless steel	Raised concave stainless steel
76-59300	Stainless steel	Raised concave brass with UV stabilized red powder coat finish

STANDARDS / AGENCY / RATINGS:



76-59200 & 76-59300



MECHANICAL / ELECTRICAL CHARACTERISTICS:

Electrical rating:

100 mA max @
50 VDC Resistive

Life (electrical):

500,000 cycles @ max load

Operating force:

3.0 N ref

Operating temperature:

-55°C to +125°C

Bushing material:

stainless steel

Button material:

stainless steel (76-59200) or
brass with UV stabilized red
powder coat finish (76-59300)

Contacts & terminals:

gold plated brass

Switch terminals mate with

**ITW Pancon Connector
CSF-MH-0202**

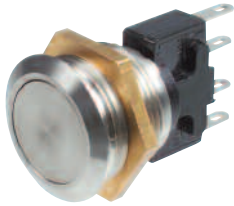
Recommended panel cutout:

0.758 inch diameter

Recommended panel

thickness:

SERIES 76-95:



ACTUAL SIZE



10 AMP VANDAL RESISTANT PUSHBUTTON SWITCHES

This rugged panel sealed switch is designed to withstand impacts of significant force. Using Series 16 and 26 Butterfly® snap action switches loads of up to 10.1 amps can be switched. The low profile makes it difficult to pry the switch from its mounting.

KEY FEATURES:

- Panel sealed to IP67
- Form Z switch contacts
- Wide temperature range: -30°C to +105°C (-22°F to +221°F)
- UL recognized (16-530004 & 26-810 only) and CSA certified
- Solder Terminals
- Life: 50,000 cycles at full load

APPLICATIONS

- Military/Aerospace
- Industrial: welding, motors, pumps, controls, valves
- Transportation: mass transit, marine, lift trucks, personal and recreational vehicles, rail
- Security access controls
- Elevators

ORDERING INFORMATION:

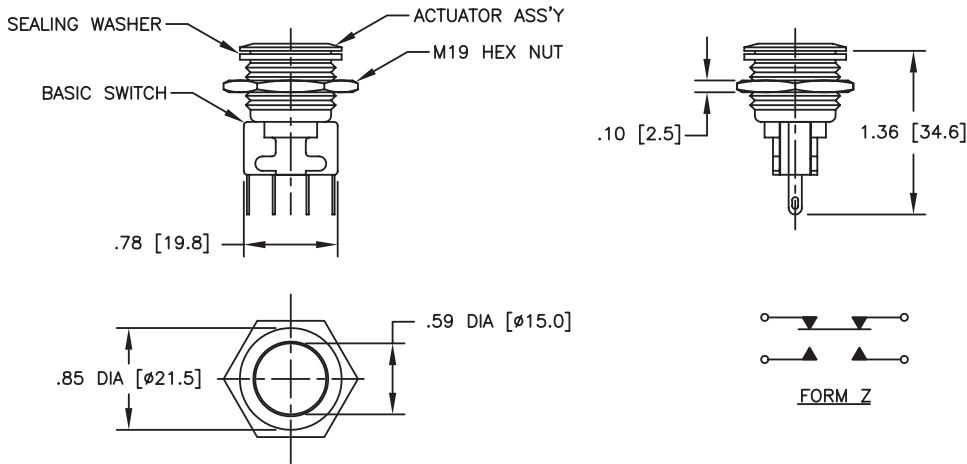
Part Number*	Contacts	Circuit
76-9510/530004	Silver	SPDT-DB
76-9510/810	Enhanced Gold	DPDT-DB

* Switches are individually packaged with one each: actuator assembly, basic switch, sealing washer, and hex nut per bag.

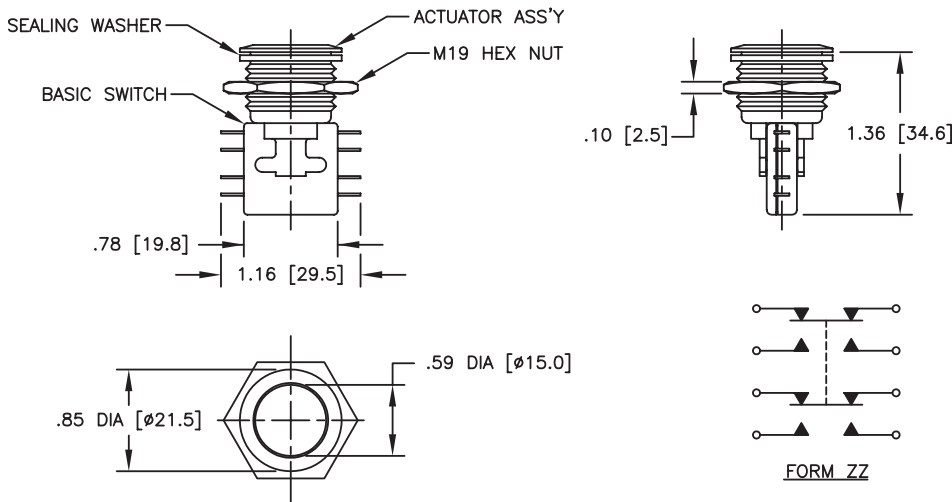
STANDARDS / AGENCY / RATINGS:



76-9510/530004



76-9510/810



Current rating, 26-810:

Load	Sea Level				70,000 Ft.	
	28 VDC DPDT	28 VDC 4 CKT	115 VAC 60 HZ DPDT	115 VAC 60 HZ 4 CKT	28 VDC DPDT	28 VDC 4 CKT
Resistive	8 amp	8 amp	6 amp	4 amp	8 amp	8 amp
Inductive	6 amp	4 amp	4 amp	4 amp	2 amp	1 amp
Lamp	0.5 amp	0.5 amp	2 amp	1 amp	—	—

MECHANICAL / ELECTRICAL CHARACTERISTICS:

Mechanical Life:

1,000,000 cycles

Operating force:

2.6N / 265 grams

Panel thickness:

0.06 – 0.31 inches / 1.5 – 8mm

Panel cut out:

0.758 inch Diameter /
19.25mm

Dielectric strength:

1,000 VAC for 1 minute

Insulation resistance:

1 GΩ @ 500VDC

Contact resistance initial:

25 mΩ max

Current rating, 16-530004:

Form X or Y: 10 amps 125 VAC;
10 amps 28 VDC Ind.

Form Z: 5 amps 125/250 VAC;
3 amps 28 VDC Ind.

Current rating, 26-810:

see chart on left

Electrical:

Life: 50,000 cycles (max load)
@ 158°F (70°C)

Button and bezel material:

stainless steel

Contact material:

16-530004: silver

Contact material:

26-810: enhanced gold

SERIES 76-97:



ACTUAL SIZE



PANEL SEALED PUSHBUTTON SWITCH

The Series 76-97 is robust. The switch body and button are made from hard-wearing plastic and produced in front mounting style. The 76-97 series is available as momentary or maintained action. In addition the buttons have a brightly colored switch indicator which gives an “at a glance” recognition of the mode currently in use. Buttons and status rings can be supplied in a variety of colors. The 76-97 utilizes ITW Switches’ proven Series 16 snap action switch.

KEY FEATURES:

- Wide temperature range: from -40°C to + 105°C
- Panel sealed to IP67
- Maintained and momentary action
- Solder terminals
- Status Indication

APPLICATIONS:

- Military environments
- Industrial machinery
- Mining equipment
- Petrochemical
- Process control
- Material handling

ORDERING INFORMATION:

Switch

Part Number*	Switch Action	Number of Poles
76-9711/4044X	Momentary	1
76-9711/804X	Momentary	2
76-9712/4044X	Maintained	1
76-9712/804X	Maintained	2

* X = Button/Identity Ring Color

Button

Button/Identity Ring Color	Add to Part Number
Black/Red	B
Red/Yellow	R
Green/Yellow	G
White/Yellow	W
Yellow/Red	Y
Blue/Red	N
Light Grey/Red	GY

NON-STANDARD OPTIONS:

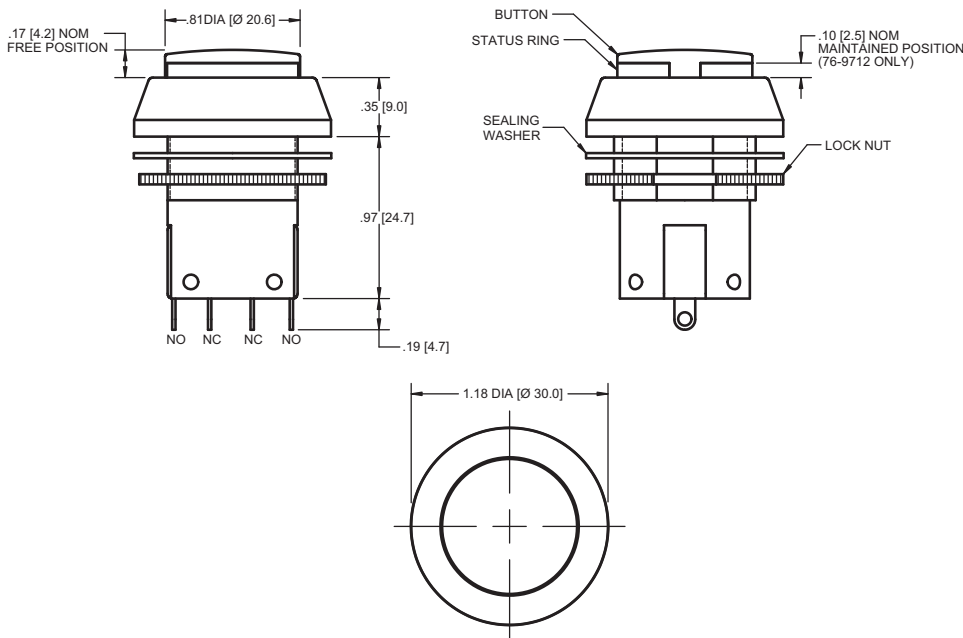
- PCB terminals
- Gold contacts
- 2 poles available
- Color variants
- Surface or sublimation legend printing

*For non-standard options, please consult factory.

STANDARDS / AGENCY / RATINGS:



PRODUCT DRAWINGS



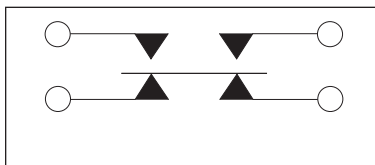
PANEL MOUNTING AND CONSTRUCTION:

The 76-97 mounts easily into panels not exceeding .235" (6mm) thickness. Front panel sealing to IP67 is achieved by use of the sealing washer which is fitted to the switch before it is inserted into the panel hole cut out. It is held into the panel by means of a lock nut, tightened down to a torque of between 13 lb/in (1.5 Nm) to 25 lb/in (2.85 Nm) to achieve the correct sealing pressure. It is mounted into a standard .885" (22.5 mm) diameter and a double "D" flat is provided to prevent rotation if required (.800 between flats). Thread size —M2 x 1.5 ISO metric thread to British Standard 3643.

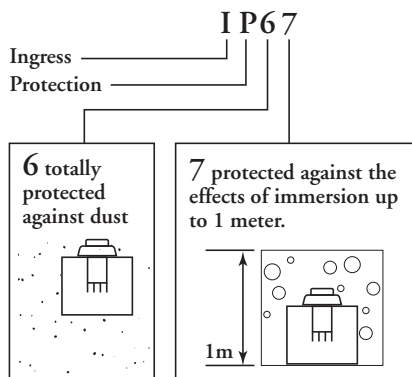
MULTI-POLE INFORMATION:

The Series 76-97 has a non-standard option of 2 poles. The 2 pole switch is provided separate to the switch body and must be fitted, via a spring clip, after the switch body has been mounted in the panel.

SWITCH CIRCUITRY:



INGRESS PROTECTION:



MECHANICAL / ELECTRICAL CHARACTERISTICS:

Travel:

.14" (3.5 mm)

Mechanical Life:

2,000,000 (Momentary)
100,000 (Maintained)

Operating force:

45 oz (12N) nominal

Contact bounce:

5 milliseconds

Panel thickness (max):

.235" (6 mm)

Dielectric strength:

1000 VAC

Insulation resistance:

1 GΩ

Contact resistance (initial):

25 mΩ (Max)

Current rating (max):

10A resistive 250 VAC
Electrical Life 100,000 cycles
@ 20°C

Ingress protection:

IP67

Shock:

50g

Operating temperature range:

-40°C to + 105°C

Body / Actuator material:

PBT

Contact material:

Fine silver

Terminal material:

200 microseconds
(5 microns) bright acid tin plate
nickel flash undercoat.

WHY CHOOSE ITW SWITCHES FOR YOUR MIL / AERO APPLICATION...

1) Engineering Excellence — ITW Switches started as the Licon division, our specialty is in high-load snap action switches using the Butterfly double-break design for reliable and long lifecycle results. New Product Development includes custom electromechanical assemblies, solid-state sensors for NextGen requirements, or any design / quality / application challenge that you may have. Designs can be modeled using 3D CAD, built using in-house fabrication and rapid prototyping, and testing using our UL-Approved test lab.

Use us for your design needs!



2) Manufacturing Capabilities — Mil / Aero products are produced in Buffalo Grove, IL – the same facility as the engineers that designed the product. Delivery is supported either direct or through our distribution channel with the capability to support Kanban, Just in Time (JIT), and other delivery options.

3) Quality Control — Buffalo Grove facility has MIL-PRF-8805, ISO 9001:2000 and AS900B quality ratings. Our Military QPL products are 100% inspected and we stand behind our product with an industry leading 36 month warranty. Six Sigma certified management maintains high quality with tools such as Failure Modes and Effects Analysis (FMEA), lot control, and traceability.

4) Custom Design — Products are designed to the customer specifications based on particular needs. Specifications can include hermetic seal, high/long life cycle, high actuation force, vibration resistance, capability to withstand high G-forces, IP rating seal, chemical resistance, various connector and harness types, and many more. We are recognized in the industry as both a designer and supplier of high-quality and reliable parts.

5) Service — Our Sales Staff has personnel dedicated strictly to the Mil / Aero Market for specific focus and knowledge in the market. Customer Service provides key customer contact for accurate planning and order entry, fast turnaround on supplier surveys, Defense Federal Acquisition Regulation Supplement (DFARS), and certifications needed, and is there to help you with any questions or needs that you might have.



KEY PRODUCTS

- KAP-16
- KAP-26
- Series-18
- Series-26
- Series-63
- Series-65



APPLICATIONS

- Landing gear
- Missile ejection / activation
- Pilot ejection
- Vehicle brake switches
- Aircraft actuator / contactors
- Aircraft rotary actuator
- Fuel valves

SNAP ACTION SWITCHES

SERIES 11:



ACTUAL SIZE



MINIATURE 10 AMP DOUBLE-BREAK SNAP ACTION SWITCHES

This rugged miniature switch features the Butterfly® double-break snap action switch mechanism. It is ideal for tough applications where high current capability and Butterfly® reliability are needed.

KEY FEATURES:

- Gold or silver contacts
- Variety of terminals configurations and styles available
- UL recognized and CSA certified
- Reset style switch available
- Roller lever and overtravel plunger actuator are available

APPLICATIONS

- Welding guns
- Pipeline valve actuator
- Discrete length tape dispenser machines
- Lift trucks
- Electrical contractors

ORDERING INFORMATION:

Switches

Part Number	Terminals
11-104	End Solder
11-204	#4 Screw
11-304	Side Solder
11-314 Reset	Side Solder
11-504	Quick Disconnect .250

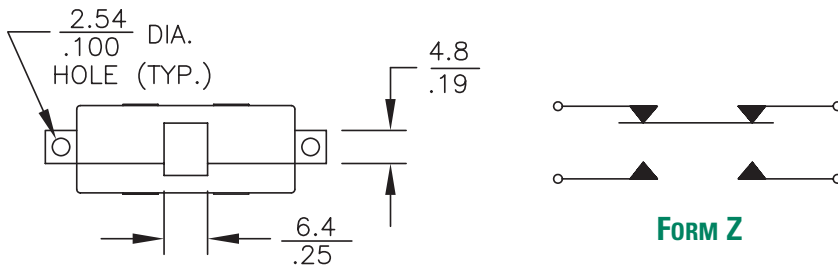
Actuators (see page 74 for additional specifications)

Part Number	Oper. Force	Release Force	Pretravel	Overtravel	Movement Diff.	Operating Point
71-1040 Roller Lever	3.5 oz max	2 oz min	.093 max	.062 min	.030 ± .015	.671 ± .031
71-2010 Over Travel	8 ± 3 oz	4 oz min	.050 max	.215 min	.020 ± .005	.828 ± .015

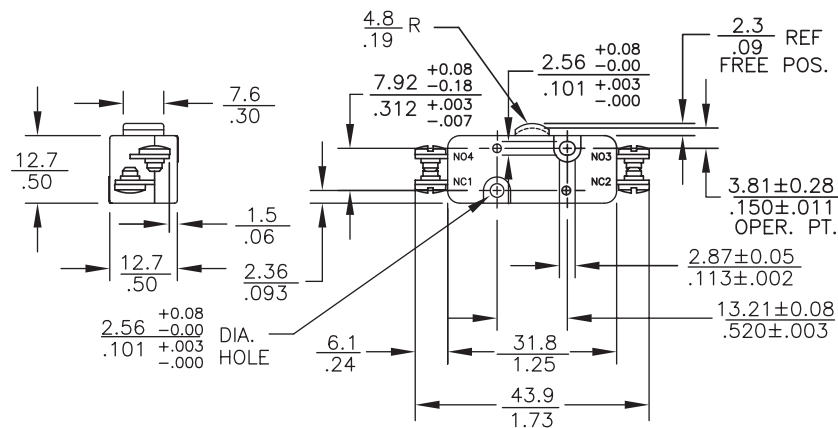
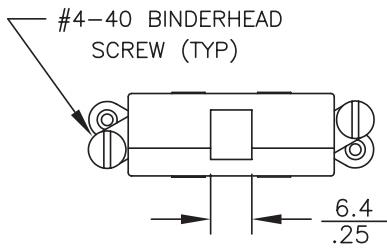
STANDARDS / AGENCY / RATINGS:



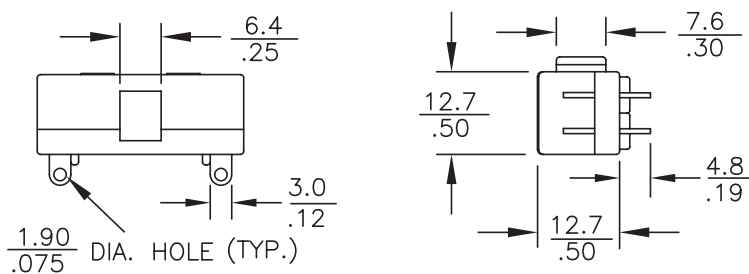
END SOLDER



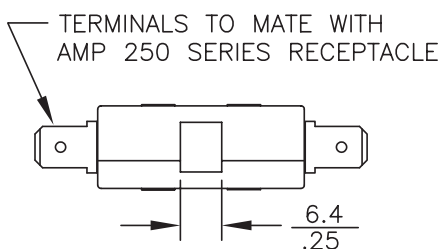
4 SCREW



SIDE SOLDER



QUICK DISCONNECT



MECHANICAL / ELECTRICAL CHARACTERISTICS:

Pretravel:
0.050 inches max

Overtravel:
0.015 inches min

Operating Force:
8 oz + 3 oz

Release Force:
4 oz min

Movement Differential:
0.020 ± 0.007 inches

Operating Point:
0.150 ± 0.011 inches
(from mounting hold centers)

Circuit:
SPDT-DB (Form Z)

Electrical Ratings (Typical):

Circuitry	125/250 VAC	28 VDC
SPST-DB NC (Form Y) or NO (Form X)	10 amp (75-80% PF)	10 amp Ind
SPDT-DB (Form Z)	1/2 HP 125 VAC	15 amp Res
SPDT-SB (Form C)	3/4 HP 250 VAC	7 amp Ind 10 amp Res 4 amp Ind 6 amp Res

SERIES 14:



ACTUAL SIZE



HEAVY DUTY 20 AMP DOUBLE-BREAK SWITCHES

This rugged single-pole double-break Butterfly® switch will handle up to 20 amps. Ideal for high-current applications which require long life and reliability.

KEY FEATURES:

- Available in standard or heavy duty mounting
- Semirefactory contacts and offset #6 screw terminals with cup washers are standard
- Sealed button actuator is available
- Button, overtravel plunger or pivoted lever actuator are available
- UL recognized and CSA certified

APPLICATIONS

- Train car door operators
- Bus door operators
- Pendant controls
- Lift trucks
- Heavy industrial machinery

ORDERING INFORMATION:

Part Number	Mounting	Operating Force	Release Force	Pretravel	Overtravel	Movement Differential	Operating Point	Actuator Style
14-124	Standard	12 ± 3 oz	4 oz min	.074 max	.030 min	.020 ± .007	.808 ± .013	Standard Button Actuator
14-12404	Heavy Duty	12 ± 3 oz	4 oz min	.074 max	.030 min	.021 ± .007	.090 ± .053	Standard Button Actuator
14-324	Standard	12 ± 3 oz	4 oz min	.074 max	.219 min	.020 ± .007	.830 ± .036	Overtravel Panel Mount
14-724	Standard	5 ± 2 oz	2 oz min	.156 max	.060 min	.046 ± .017	1.406 ± .034	Roller Lever Actuator

Electrical Ratings:

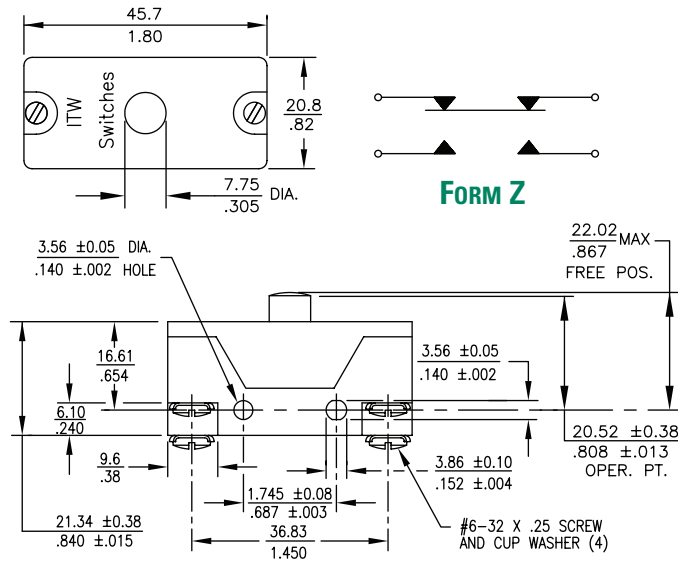
Circuitry	Volts	AC		DC	
		Steady	In-Rush	SPDT	SPST
SPDT-DB(Form Z)	28	20	80	10.0	25.0
SPDT-DB(Form Z)	125	20	80	—	—
SPDT-DB(Form Z)	250	20	80	—	—
SPDT-DB(Form Z)	480	20	50	—	—

UL recognized. Amps @ 125/250/480 VAC 78-80%PF and CSA Certified File No. 16388.
1 HP 125 VAC, 2 HP 250 VAC. Materials recognized by UL for use at temperatures not exceeding 105° C (220° F)

STANDARDS / AGENCY / RATINGS:



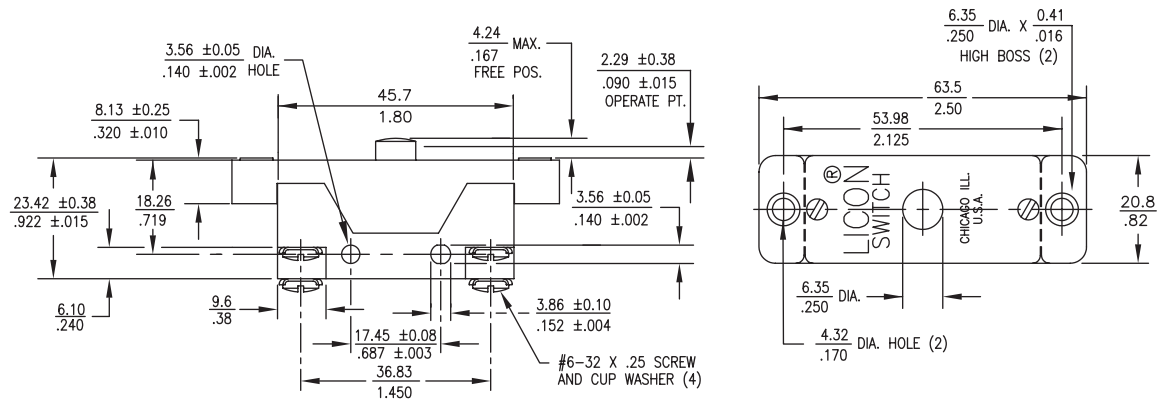
STANDARD BUTTON ACTUATOR



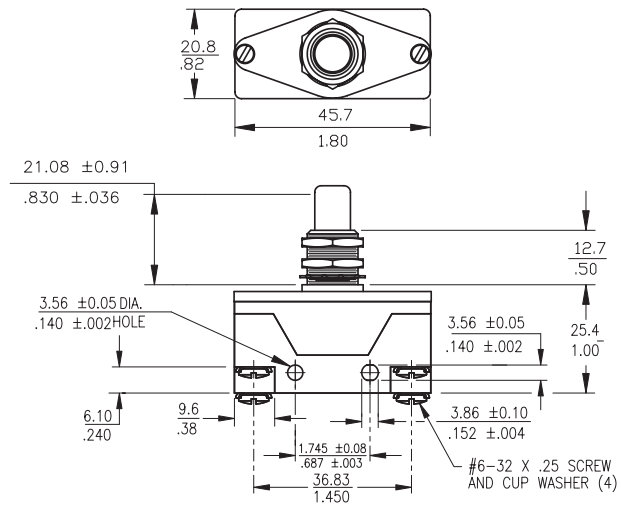
MECHANICAL / ELECTRICAL CHARACTERISTICS:

- Circuit:** SPDT-DB (Form Z)
- Terminal:** #6 screw with cup washer
- Electrical Ratings :** See chart on left

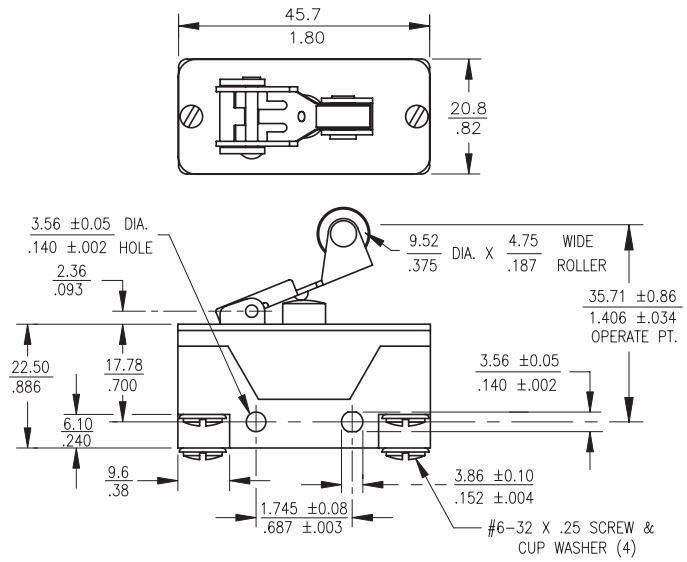
STANDARD BUTTON ACTUATOR—HEAVY DUTY MOUNTING



OVERTRAVEL PANEL MOUNT



ROLLER LEVER

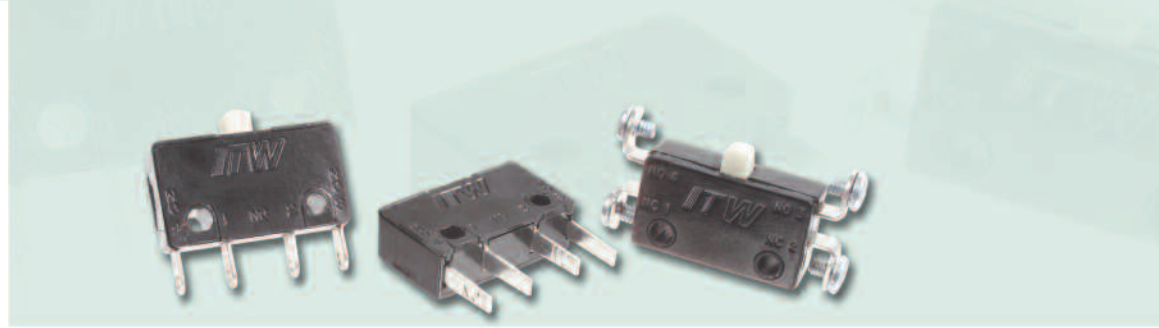


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SERIES 16:



ACTUAL SIZE



SUB-MINIATURE 10.1 AMP DOUBLE-BREAK SNAP ACTION SWITCHES

Series 16 switches feature the Butterfly® double-break momentary switch mechanism. This offers the capability of handling high (or low) current loads in a small switch and gives the options of controlling two circuits with the Form Z switch circuitry.

KEY FEATURES:

- Gold or silver contacts
- Meets MIL-PRF-8805/7
- UL recognized and CSA certified: 10.1 amps @ 125/250 VAC
- Variety of terminal configurations and styles
- Roller lever, lever, short roller lever and bushing mount actuator are available

APPLICATIONS

- Lift truck seat switch
- Aircraft contactor
- Sump pump float switch
- Aircraft actuator
- Valve actuator
- Industrial equipment and machinery
- Office equipment

ORDERING INFORMATION:

Part Number	Circuit	Temperature Index	Contacts	Terminals	RoHS Compliant
16-104	SPDT (Form Z)	To 275°F Ambient	Silver **	End Solder	✓
16-188051	SPDT (Form Z)	To 275°F Ambient	Gold Plated	End Solder	✓
16-204	SPDT (Form Z)	To 275°F Ambient	Silver **	End Screw	—
16-304	SPDT (Form Z)	To 275°F Ambient	Silver **	Side Solder	✓
16-404	SPDT (Form Z)	To 275°F Ambient	Silver **	Bottom Solder	✓
16-40401	SPDT (Form Z)	To 275°F Ambient	Gold Plated	Bottom Solder	✓
16-4044*	SPDT (Form Z)	To 275°F Ambient	Silver **	Bottom Solder	✓
16-40441*	SPDT (Form Z)	To 275°F Ambient	Gold Plated	Bottom Solder	✓
16-488051	SPDT (Form Z)	To 275°F Ambient	Gold Plated	Bottom Solder	—
16-504	SPDT (Form Z)	To 275°F Ambient	Silver**	Bottom QC Taper Tab	✓
16-530004***	SPDT (Form Z)	To 275°F Ambient	Silver **	Bottom QC .110	✓

* Thermoplastic case and cover. ** For electrical loads under 250mA, consult factory. *** Mounts easily to Series 76-95 Switches.

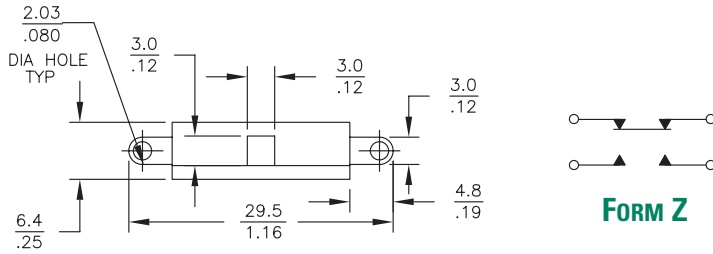
actuator (see page 75 for additional specifications)

Part Number	Switch Series	Oper. Force	Release Force	Pretravel	Overtravel	Movement Diff.
76-1200 Roller Lever	16	4 oz max	1 oz min	.125 max	.025 min	.045 ± .011
76-1210 Lever	16	2.5 oz max	1 oz min	.125 max	.025 min	.047 ± .013
76-1220 Short Roller Lever	16	5 + 3 oz - 2 oz min	2 oz min	.050 max	.023 min	.020 ± .005
76-22604 Bushing Mount	16	5 oz	—	.050 max	.156 MIN	—

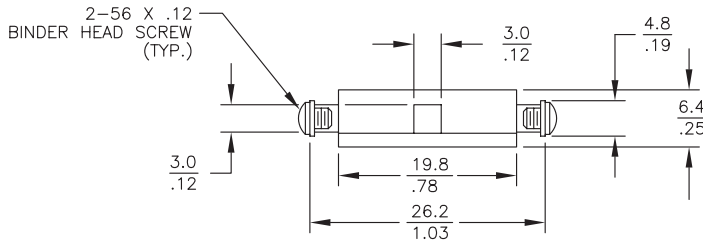
STANDARDS / AGENCY / RATINGS:



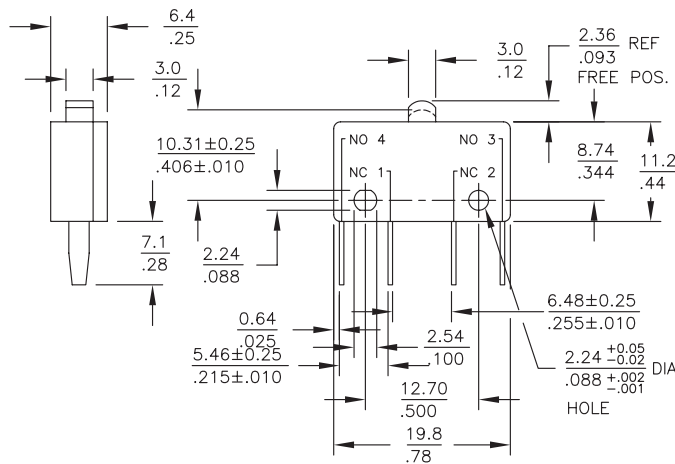
END SOLDER



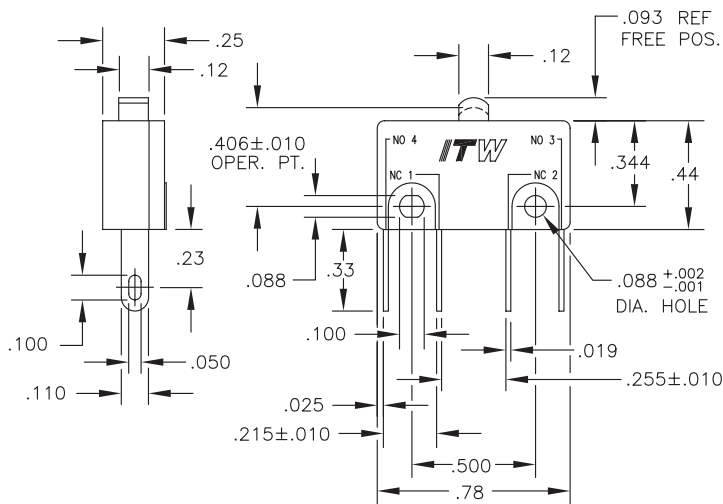
END SCREW



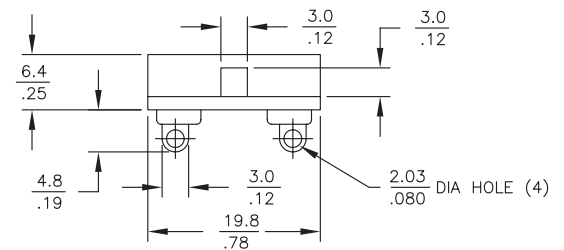
QC TAPER TAB



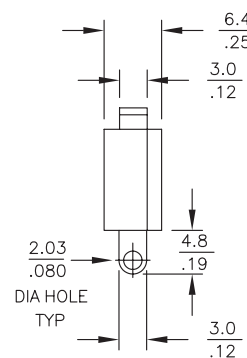
BOTTOM QC .110



SIDE SOLDER



BOTTOM SOLDER



MECHANICAL / ELECTRICAL CHARACTERISTICS:

Pretravel:
0.050 inches max

Overtravel:
0.012 inches min

Operating Force:
5 oz + 3 oz - 2 oz

Release Force:
2 oz min

Movement Differential:
0.020 inches ± 0.005

Operating Point:
0.406 inches ± 0.010
(from mounting hold centers)

Circuit:
SPDT-DB (Form Z)

Temperature Index:
-54°C to +135°C
(-65°F to +275°F)

MIL-PRF-8805/7 QPL listed:
16-188051 MS25476-1
16-488051 MS27217-1

Electrical Rating @ 28VDC:

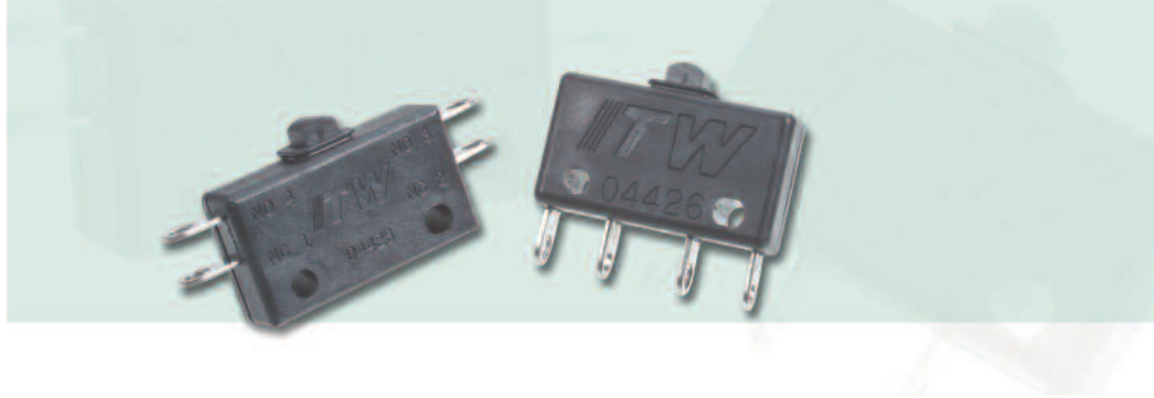
		Sea Level	70,000 Feet
Form Z 2 Circuit	Res	10A	10A
	Ind*	5A	2A
	Lamp	3A	—

*L/R = .026

SERIES KAP 16:



ACTUAL SIZE



SUB-MINIATURE 10.1 AMP DOUBLE-BREAK SNAP ACTION SWITCHES

Similar to Series 16 switches with improved materials and performance. Ideal for critical applications where long life and reliability are needed.

KEY FEATURES:

- Enhanced gold contacts for high or low power applications
- Thermoplastic case sealed to prevent flux intrusion
- Meets MIL-PRF-8805 requirements
- Roller lever, lever, short roller lever and bushing mount actuator are available.

APPLICATIONS

- Lift truck seat switch
- Aircraft contactor
- Sump pump float switch
- Aircraft actuator
- Valve actuator
- Industrial equipment and machinery
- Office equipment
- Medical equipment

ORDERING INFORMATION:

Switches

Part Number	Contacts	Terminals
16-110	Enhanced Gold	End
16-111	Silver	End
16-410	Enhanced Gold	Bottom
16-411	Silver	Bottom

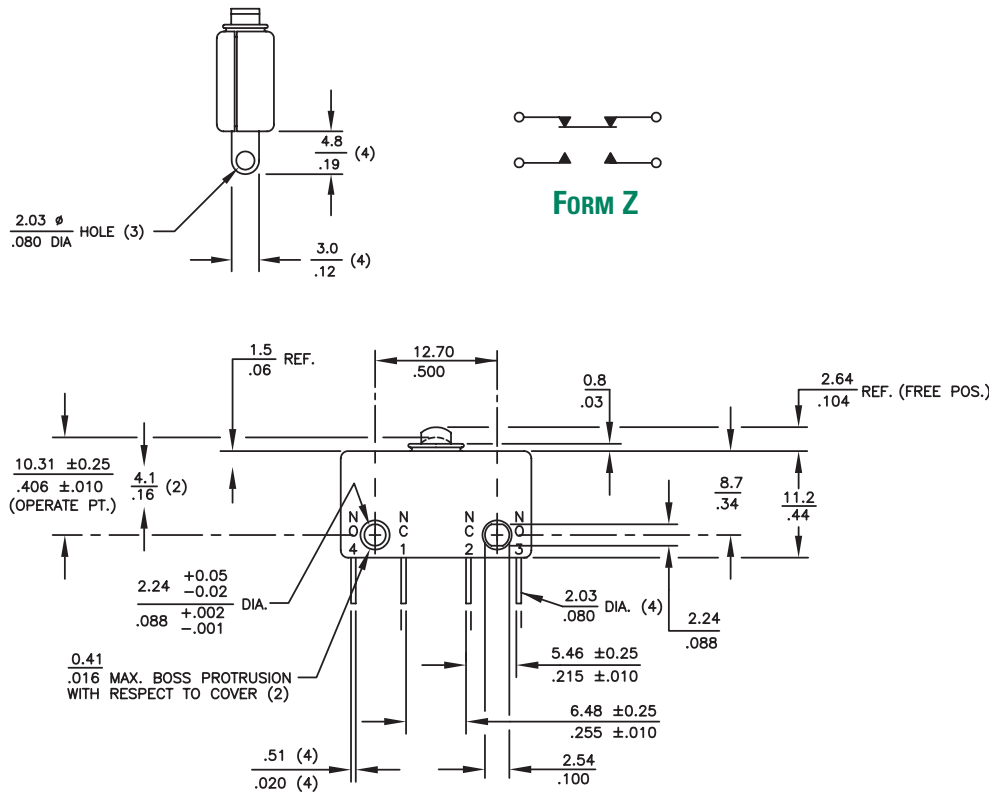
actuator (see page 75 for additional specifications)

Part Number	Switch Series	Oper. Force	Release Force	Pretravel	Overtravel	Movement Diff.
76-1200 Roller Lever	16	4 oz max	1 oz min	.125 max	.025 min	.045 ± .011
76-1210 Lever	16	2.5 oz max	1 oz min	.125 max	.025 min	.047 ± .013
76-1220 Short Roller Lever	16	5 + 3 oz - 2 oz min	2 oz min	.050 max	.023 min	.020 ± .005
76-22604 Bushing Mount	16	5 oz	—	.050 max	.156 min	—

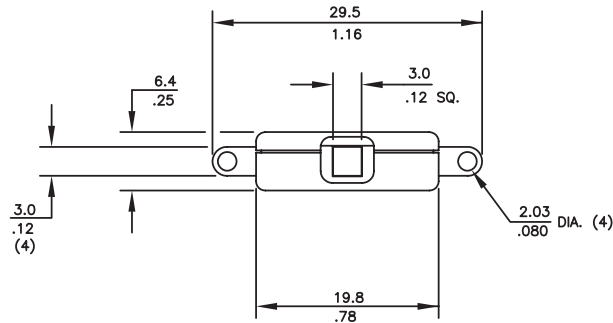
STANDARDS / AGENCY / RATINGS:



BOTTOM SOLDER



END SOLDER



MECHANICAL / ELECTRICAL CHARACTERISTICS:

- Pretravel:**
0.050 inches max
- Overtravel:**
0.012 inches min
- Operating Force:**
5 oz + 3 oz - 2 oz
- Release Force:**
2 oz min
- Movement Differential:**
0.020 inches ± 0.005
- Operating Point:**
0.406 inches ± 0.010
(from mounting hole centers)
- Circuit:**
SPDT-DB (Form Z)
- Temperature Index:**
-65°C to +125°C
(-85°F to +257°F)

Electrical Rating @ 28VDC:

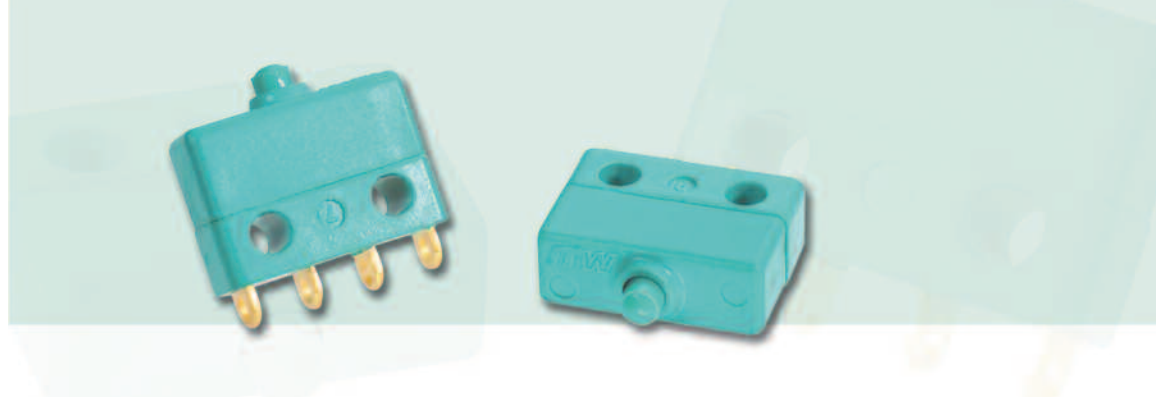
		Sea Level	70,000 Feet
Form Z 2 Circuit	Res	10A	10A
	Ind*	5A	2A
	Lamp	3A	—

*L/R = .026

SERIES 18:



ACTUAL SIZE



ULTRA SUB-MINIATURE 7 AMP DOUBLE-BREAK SNAP ACTION SWITCHES

Series 18 switches feature the Butterfly® double-break momentary switch mechanism. This very small package can carry a full 7 amp load (or low current load).

KEY FEATURES:

- Gold contacts
- Solder terminals
- Meets MIL-S-8805/76
- UL recognized and CSA certified: 7 amps @ 125/250 VAC
- Lever and roller actuator are available

APPLICATIONS

- Industrial valve controls
- Aircraft rotary actuator
- Aircraft linear actuator
- Float control pumps
- Spool valves
- Medical equipment
- Aircraft fuel valves
- Pressure switches

ORDERING INFORMATION:

Switches

Part Number	Contacts	Terminals	RoHS Compliant
18-40421	Gold Plated	End Solder	✓
18-488051 (MS27257-1)	Gold Plated	End Solder	✓

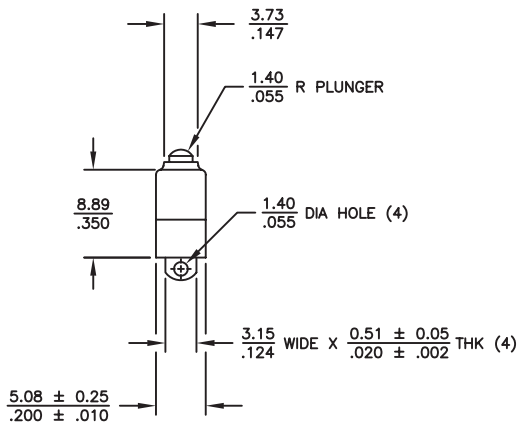
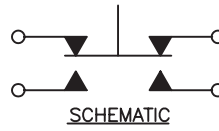
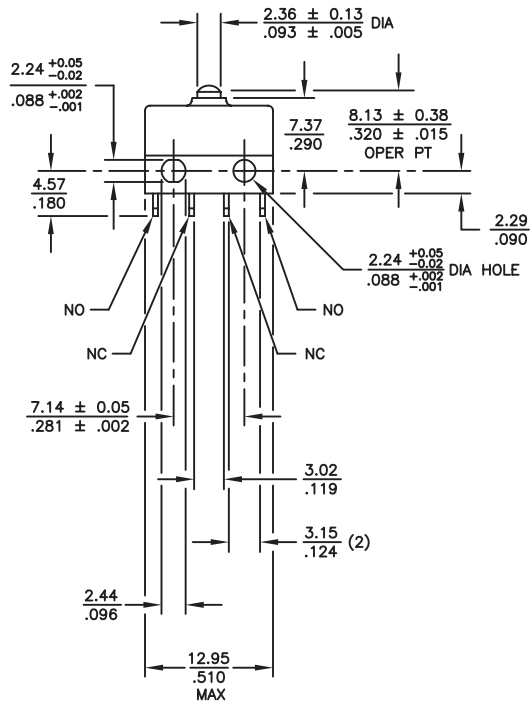
actuator (see page 76 for additional specifications)

Part Number	Oper. Force	Release Force	Pretravel	Overtravel	Movement Diff.	Operating Point
78-3000 Spring Lever	6 ± 2 oz	2 oz min	.125 max	.030 min	.030 ± .015	.325 ± .030
78-3100 Roller Lever	6 ± 2 oz	2 oz min	.125 max	.030 min	.035 ± .015	.560±.030

STANDARDS / AGENCY / RATINGS:



PRODUCT DRAWINGS



MECHANICAL / ELECTRICAL CHARACTERISTICS:

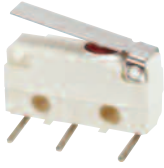
- Pretravel:**
0.030 inches max
- Overtravel:**
0.006 inches min
- Operating Force:**
5 oz + 3 oz - 2 oz
- Release Force:**
1.5 oz min
- Movement Differential:**
0.015 inches ± 0.005
- Operating Point:**
0.320 inches ± 0.015
(from mounting hole centers)
- Circuit:**
SPDT-DB (Form Z)
- MIL-PRF-8805/77 QPL listed:**
18-488051 MS27257-1

Electrical Rating @ 28VDC:

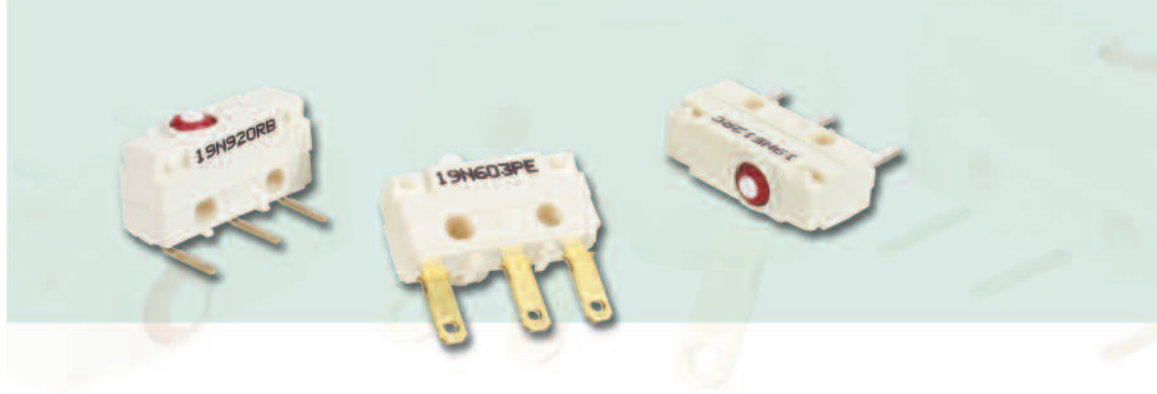
Circuitry	Current
2 Circuit (SPDT-DB)	5 amp Res 3 amp Ind*
1 Circuit (SPST)	8 amp Res 7 amp Ind*

*L/R = .026

SERIES 19:



ACTUAL SIZE



5-AMP SUB-MINIATURE SWITCHES

This fully sealed snap action switch series is ideal for applications in harsh environments where ingress of water and dust must be prevented.

KEY FEATURES:

- Insert molded terminals—fully sealed base
- Meets IP67
- BEAB and ENEC approvals
- SPDT (Form C) circuitry
- Choice of actuator
- Silver or gold contacts
- Non-flammable switch
UL94-V0 rated materials

APPLICATIONS

- Industrial equipment
- Battery chargers for cordless tools
- Medical equipment
- Welding guns

ORDERING INFORMATION:

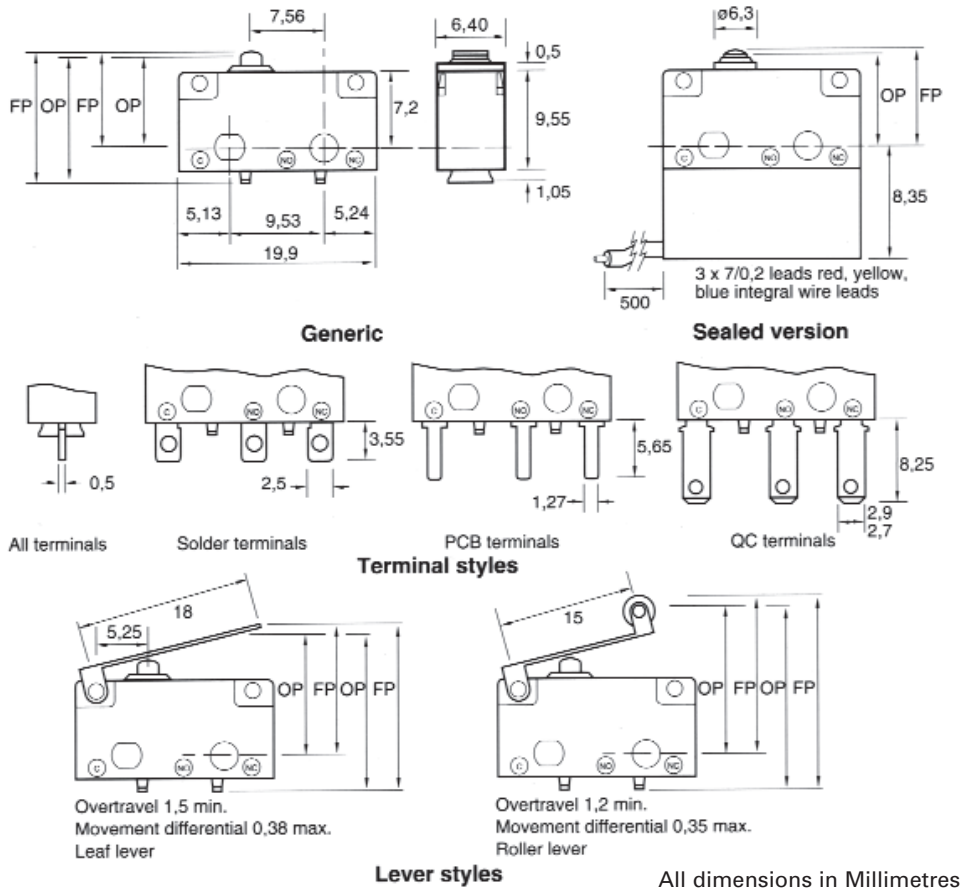
Part Number	Contacts	Actuator Style*	Terminal Style	Sealed	RoHS Compliant	IP67 Compliant
19N402	Silver	Plunger	Solder	Yes	✓	✓
19N402L18	Silver	Leaf lever	Solder	Yes	✓	✓
19N402R15	Silver	Roller lever	Solder	Yes	✓	✓
19N403	Silver	Plunger	Solder	No	✓	—
19N412	Gold	Plunger	Solder	Yes	✓	✓
19N502	Silver	Plunger	P.C.	Yes	✓	✓
19N503	Silver	Plunger	P.C.	No	✓	—
19N512	Gold	Plunger	P.C.	Yes	✓	✓
19N602	Silver	Plunger	Q.C.	Yes	✓	✓
19N603	Silver	Plunger	Q.C.	No	✓	—
19N702	Silver	Plunger	Wire Leads	Yes	✓	✓
19N712	Gold	Plunger	Wire Leads	Yes	✓	✓
19N703	Silver	Plunger	Wire Leads	No	✓	—
19N713	Silver	Plunger	Wire Leads	No	✓	—
19N920	Gold	Plunger	P.C. Right Angle (L)	Yes	—	✓
19N922	Gold	Lever	P.C. Right Angle (R)	Yes	—	✓

*Note: Lever and roller lever actuator are available as options on most switches. Consult factory.

STANDARDS / AGENCY / RATINGS:



PRODUCT DRAWINGS



MECHANICAL / ELECTRICAL CHARACTERISTICS:

- Overtravel:**
.2mm (min) depress to case
- Movement differential:**
.1mm reference
- Mechanical life:**
10,000,000 operations
- Operating force:**
2.0 N (203.9 gf) sealed
1.5 N (153.0 gf) sealed
- Ingress protection:**
IP67
- Temperature:**
-40°C to +125°C
(-40°F to +257°F)
- Body material:**
Nylon 46
- Contacts:**
Silver—Silver nickel alloy
Gold—5 microns of gold on copper/nickel
- Terminals:**
QC — Brass
PCB — Tin plated brass
Solder — Brass
- Electrical Life (nominal):**
100,000 operations
- Dielectric strength:**
1000 VAC
- Insulation resistance:**
1 G Ohm
- Contact resistance (initial):**
20m Ω (max) gold,
50m Ω (max) silver
- Contact bounce:**
5 millisecond (max),
1 millisecond per individual pulse

BUTTON / LEVER POSITIONS:

Free position (F.P)

Standard switch to mounting holes.....	0.360 inches / 9,14mm (max)
Standard switch to PCB.....	0.486 inches / 12,35mm (max)
Sealed switch to mounting holes.....	0.368 inches / 9,35mm (max)
Leaf lever to mounting holes.....	0.492 inches / 12,50mm (max)
Leaf lever to PCB.....	0.618 inches / 15,70mm (max)
Roller lever to mounting holes.....	0.677 inches / 17,20mm (max)
Roller lever to PCB.....	0.803 inches / 20,40mm (max)

Operating point (O.P)

Standard switch to mounting holes.....	0.330 inches ±.016 / 8,40mm ± 0,40
Standard switch to PCB.....	0.457 inches ±.016 / 11,60mm ± 0,40
Sealed switch to mounting holes.....	0.335 inches±.016 / 8,50mm ± 0,40
Leaf lever to mounting holes.....	0.400 inches±.054 / 10,15mm ± 1,37
Leaf lever to PCB.....	0.527 inches ±.054 / 13,38mm ± 1,37
Roller lever to mounting holes.....	0.610 inches ±.045 / 15,50mm ± 1,14
Roller lever to PCB.....	0.719 inches ±.045 / 18,25mm ± 1,14

SERIES 22:



ACTUAL SIZE



MINIATURE 10 AMP DOUBLE-POLE/SIMULTANEOUS SNAP ACTION SWITCHES

This rugged double-pole double-break Butterfly® mechanism switch can be configured for Form XX, Form YY or Form ZZ switching. This unique design is ideal for your toughest applications where reliability is a must.

KEY FEATURES:

- Gold or silver contacts
- Variety of terminal styles
- UL recognized and CSA certified
- Roller lever and overtravel plunger actuator are available

APPLICATIONS

- Pressure control sensors
- Pendant controls
- Door openers for transit equipment
- Valve actuator
- Lift trucks
- Interlock kiosk

ORDERING INFORMATION:

Switches

Part Number	Terminals
22-104	End Solder
22-204	#4 Screw
22-304	Side Solder
22-504	Quick Disconnect .250

actuator (see page 77 for additional specifications)

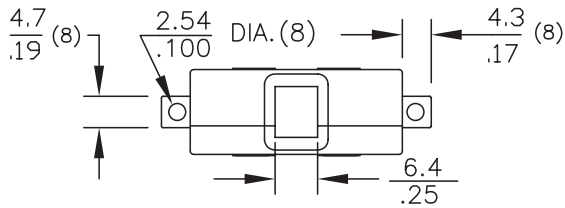
Part Number	Oper. Force	Release Force	Pretravel	Overtravel	Movement Diff.	Operating Point
72-1160 Roller Lever (1)	10 oz max	1.5 oz min	.150 max	.035 min	.070 ± .015	1.0 ± .031
72-2080 Over Travel (2)	17 ± 5 oz	4 oz min	.060 max	.215 min	.030 ± .007	.828±.031

(1) When used with 22-104 basic switch or 22-204 basic switch
 (2) When used with 22-304 basic switch

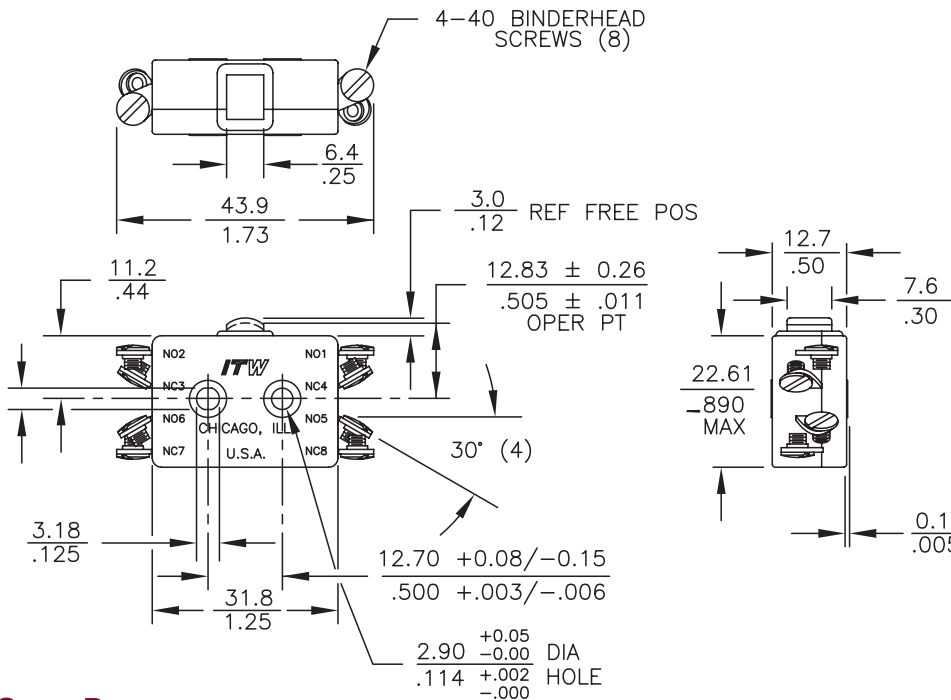
STANDARDS / AGENCY / RATINGS:



END SOLDER



#4 SCREW



MECHANICAL / ELECTRICAL CHARACTERISTICS:

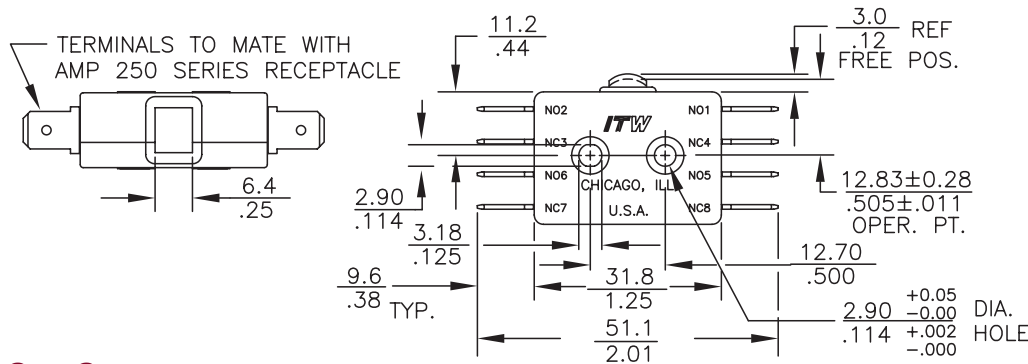
- Pretravel:** 0.060 inches max
- Overtravel:** 0.015 inches min
- Operating Force:** 17 ± 5 oz
- Release Force:** 4 oz min
- Movement Differential:** 0.030 inches ± .009
- Operating Point:** 0.505 inches ± .011 (from mounting hole centers)

Circuit: DPDT-DB (Form ZZ)

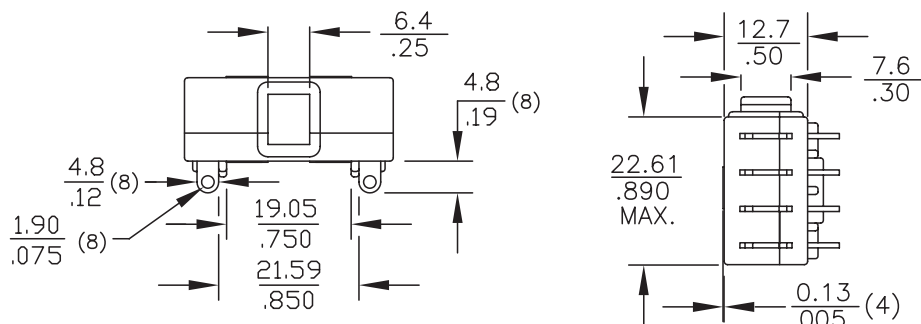
Electrical Ratings:

Circuitry	125/250 VAC	28 VDC
DPST-DB NO or NC (Form XX or YY)	10 amp (75-80% PF) 1/2 HP 125 VAC	10 amp Ind 15 amp Res
DPDT-DB (Form ZZ)	3/4 HP 250 VAC	7 amp Ind 10 amp Res

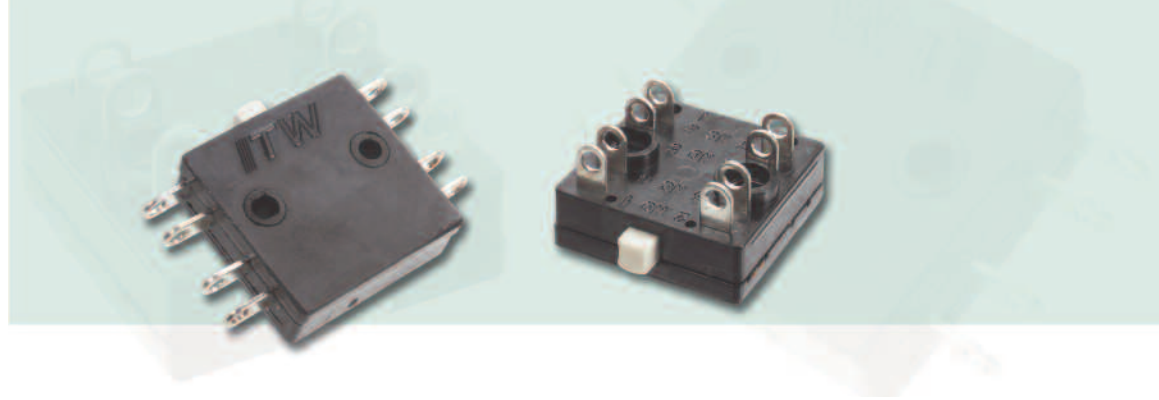
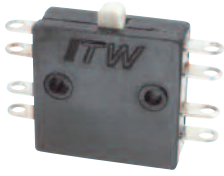
QUICK DISCONNECT



SIDE SOLDER



SERIES 26:



ACTUAL SIZE ACTUAL SIZE

SUB-MINIATURE 8 AMP DOUBLE POLE SNAP ACTION SWITCHES

This unique design has a DPDT-DB (Form ZZ) contact arrangement, or can be wired externally to provide two commons to form standard DPDT (Form CC) circuitry. This switch can control up to 4 isolated circuits.

KEY FEATURES:

- Gold or silver contacts
- Meets MIL-PRF-8805/77
- End or side terminals available
- UL recognized and CSA certified: 8 amps @ 125/250 VAC
- Roller lever, lever, short roller lever and bushing mount actuator are available

APPLICATIONS

- Aircraft rotary actuator
- Aircraft valve actuator
- Circuit breakers
- Aircraft contractors
- Industrial machinery

ORDERING INFORMATION:

Switches

Part Number	Simultaneity	Contacts	Terminals	RoHS Compliant
26-804	Simultaneous*	Silver**	End Solder	✓
26-888051	Ref. M8805/77-001	Gold Plated	End Solder	—
26-904	Simultaneous*	Silver**	Side Solder	✓
26-988051	Ref. M8805/77-002	Gold Plated	Side Solder	—

* Within .004" of plunger travel.
 ** For electrical loads under 250 mA, consult factory.

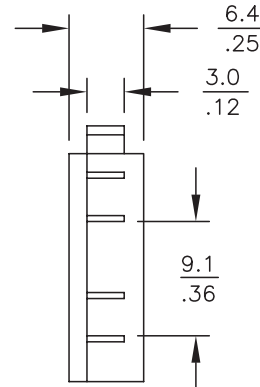
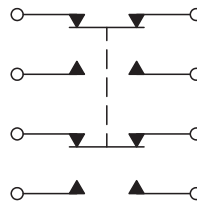
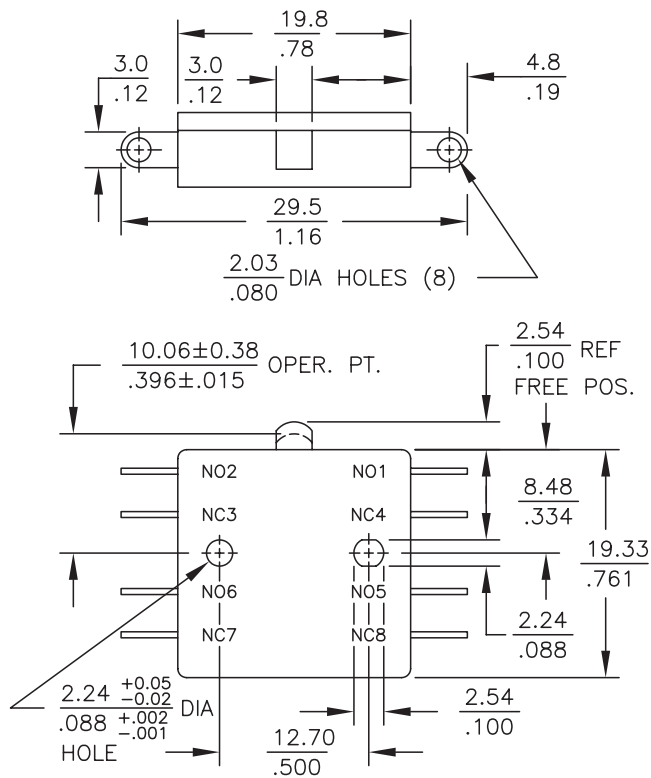
actuator (see page 78 for additional specifications)

Part Number	Switch Series	Oper. Force	Release Force	Pretravel	Overtravel	Movement Diff.
76-1200 Roller Lever	26	8 oz max	1 1/2 oz min	.130 max	.026 min	.054 ± .022
76-1210 Lever	26	7 oz max	2 oz min	.155 max	.025 min	.065 max
76-1220 Short Roller Lever	26	16 oz max	5 oz min	.050 max	.012 min	.020 ± .010 - .005

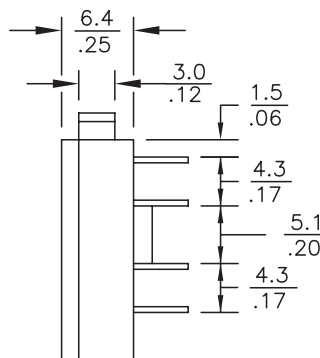
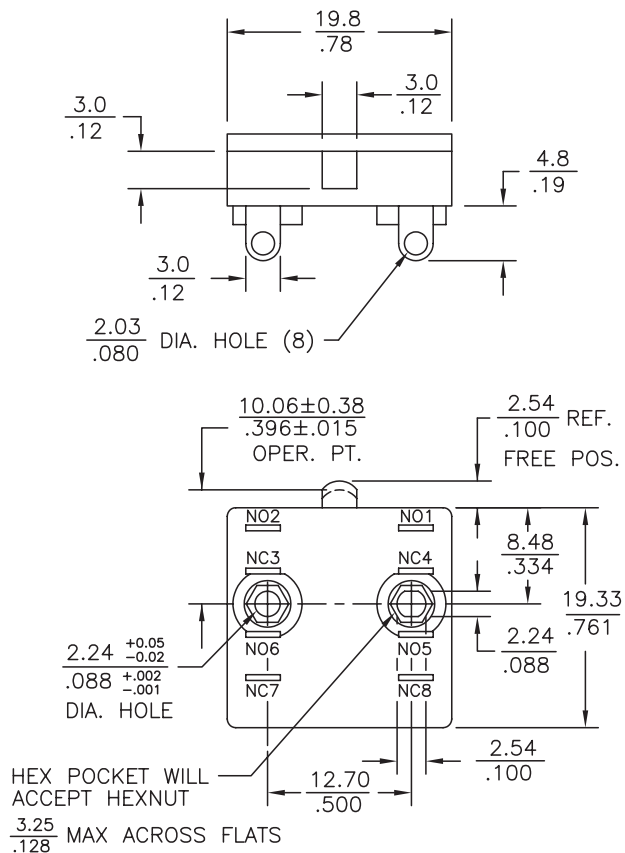
STANDARDS / AGENCY / RATINGS:



END SOLDER



SIDE SOLDER



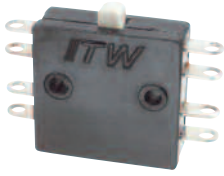
MECHANICAL / ELECTRICAL CHARACTERISTICS:

- Pretravel:**
0.050 inches (Max)
- Overtravel:**
0.012 inches (Min)
- Operating Force:**
12 ± 4 oz
- Release Force:**
5 oz (Min)
- Movement Differential:**
0.020 inches ± .010 / .005
- Operating Point:**
0.396 inches ± .015
(from mounting hole centers)
- Circuit:**
DPDT-DB (Form ZZ)
- Temperature Index:**
To 275°F Ambient
- MIL-PRF-8805/7 QPL listed:**
26-888051 M8805/77-001
26-988051 M8805/77-002

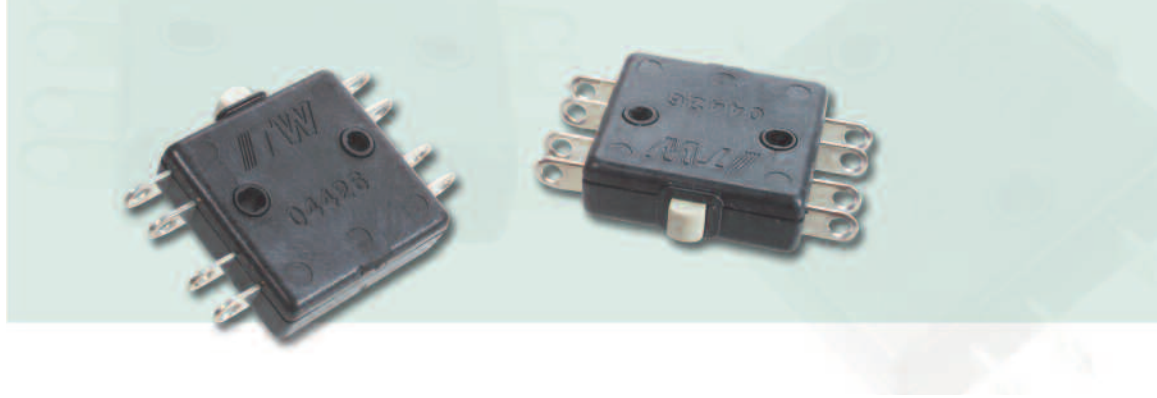
Electrical Ratings:

Circuitry	Current	Voltage
DPDT-DB (Form ZZ)	8 Amps 5 Amps	125/250 VAC 75-80% PF 28 VDC

SERIES KAP 26:



ACTUAL SIZE



SUB-MINIATURE 8 AMP DOUBLE POLE/SIMULTANEOUS SNAP ACTION SWITCHES

Similar to Series 26 with improved materials and performance. Ideal for critical applications where long life and reliability are needed.

KEY FEATURES:

- Enhanced gold contacts for high or low power applications
- Thermoplastic case sealed to prevent flux intrusion
- Meets MIL-PRF-8805/77
- End or side terminals available
- Roller lever, lever, short roller lever and bushing mount actuators are available

APPLICATIONS

- Aircraft rotary actuators
- Aircraft valve actuators
- Circuit breakers
- Aircraft contractors
- Industrial machinery
- Medical equipment

ORDERING INFORMATION:

Switches

Part Number	Simultaneity	Contacts	Terminals
26-810	Simultaneous*	Enhanced Gold	End Solder

* Within .002" of plunger travel.

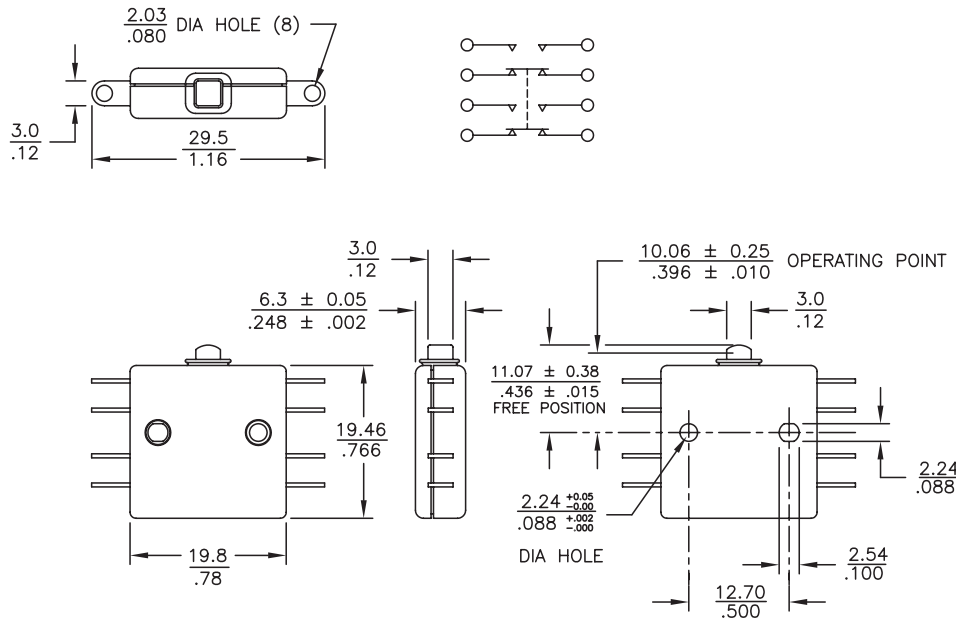
actuator (see page 78 for additional specifications)

Part Number	Switch Series	Oper. Force	Release Force	Pretravel	Overtravel	Movement Diff.
76-1200 Roller Lever	26	8 oz max	1 1/2 oz min	.130 max	.026 min	.054 ± .022
76-1210 Lever	26	7 oz max	2 oz min	.155 max	.025 min	.065 max
76-1220 Short Roller Lever	26	16 oz max	5 oz min	.050 max	.012 min	.020 ± .010 - .005

STANDARDS / AGENCY / RATINGS:



END TERMINATION



MECHANICAL / ELECTRICAL CHARACTERISTICS:

- Pretravel:**
0.060 inches (Max)
- Overtravel:**
0.020 inches (Min)
- Operating Force:**
18 ± 5 oz
- Release Force:**
5 oz (Min)
- Movement Differential:**
0.025 inches ± .010
- Operating Point:**
0.396 inches ± .010
(from mounting hole centers)
- Circuit:**
DPDT-DB (Form ZZ)
- Temperature Index:**
-85°F to +275°F Ambient
- MIL-PRF-8805 QPL Listed:**
26-810 M8805/77-003
- Electrical Ratings:**
See chart below

Electrical rating, 26-810:

Load	Sea Level				70,000 Ft.	
	28 VDC DPDT	28 VDC 4 CKT	115 VAC 60 HZ DPDT	115 VAC 60 HZ 4 CKT	28 VDC DPDT	28 VDC 4 CKT
Resistive	8 amp	8 amp	6 amp	4 amp	8 amp	8 amp
Inductive	6 amp	4 amp	4 amp	4 amp	2 amp	1 amp
Lamp	0.5 amp	0.5 amp	2 amp	1 amp	—	—

SERIES 65:



ACTUAL SIZE



SEALED 10 AMP SUB-MINIATURE SWITCHES

These rugged metal enclosed sealed switches use the Butterfly® switch mechanism providing long-life, durability and reliability. These switches are ideal for demanding military and industrial applications.

KEY FEATURES:

- Meets the (watertight) requirements per MIL-PRF-8805 enclosure design symbol 3
- Gold contacts
- Variety of actuators available
- Solder terminals standard or wire leads available
- Temperature rating: -55°C to +85°C (-65°F to +185°F)
- MIL-PRF-8805 QPL listed switches available

APPLICATIONS

- Aircraft valves
- Wheelchair lifts
- Machine tools
- Missiles and missile launchers
- Heavy industrial equipment

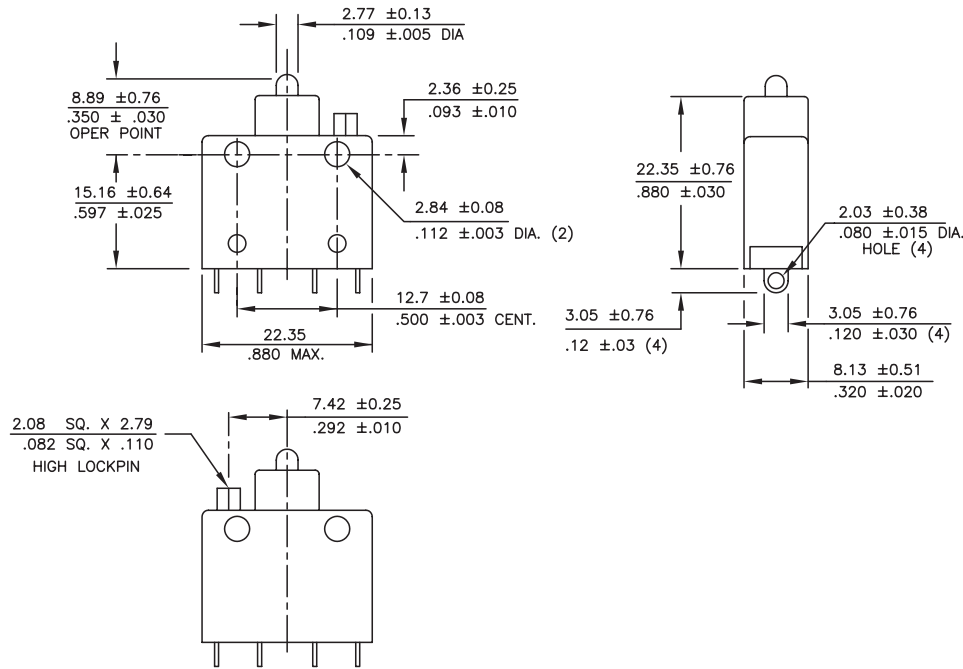
ORDERING INFORMATION:

Part Number	Actuator	P.T.	O.T.	O.F.	R.F.	M.D.
65-201000	Pin plunger	.050 max	.012 min	24 ± 8 oz	8 oz min	.010-.030
65-301000	Roller lever	.115 max	.025 min	16 oz max	5 oz min	.058 max
65-401000	Over travel	.070 max	.187 min	36 oz max	8 oz min	.010-.030

STANDARDS / AGENCY / RATINGS:



PIN PLUNGER



MECHANICAL / ELECTRICAL CHARACTERISTICS:

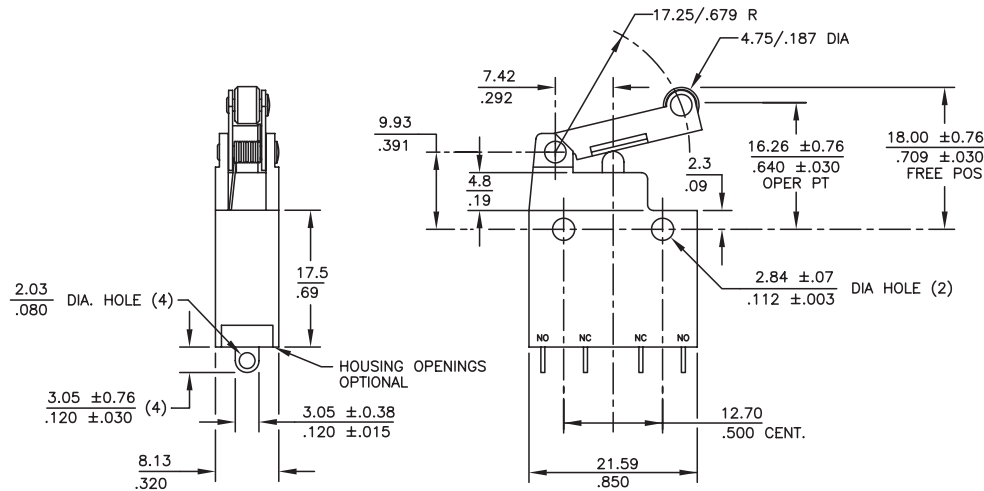
Circuit:
SPDT-DB (Form Z)

Temperature range:
-55°C to +85°C
(-65°F to +185°F)

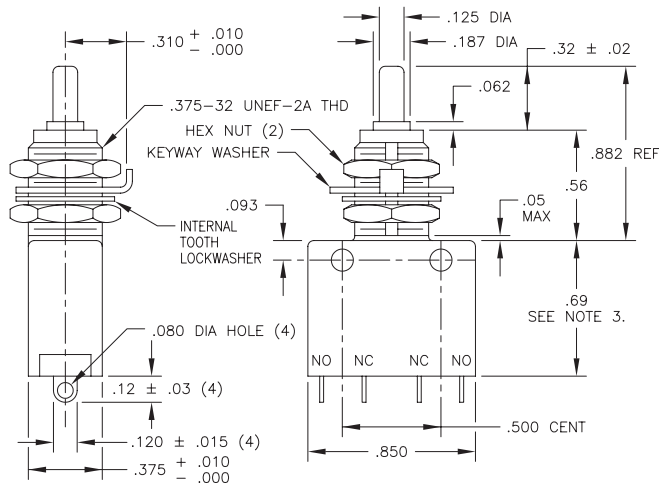
Electrical Ratings (Typical):

Circuitry	125/250 VAC	28 VDC
SPDT-DB (Form Z)	10 A	5 A Ind.

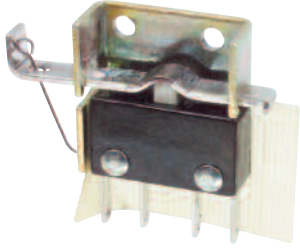
ROLLER LEVER



OVER TRAVEL



SERIES 76-6:



ACTUAL SIZE



DOOR INTERLOCK SWITCHES FOR CABINET, SERVICE DOOR SAFETY

Door interlocks use 10 amp Butterfly® switch mechanisms to provide long life and reliability.

KEY FEATURES:

- Protection for testing and servicing electronic equipment
- Automatic interruption of power
- Manual set allows continuation of power for testing
- Restores power with closing of door or drawer
- UL recognized

APPLICATIONS

- Computer door interlocks
- Audio-Visual equipment
- Oil exploration equipment
- Seismographic sending
- Process control enclosures
- Remote enclosure for telephone switches

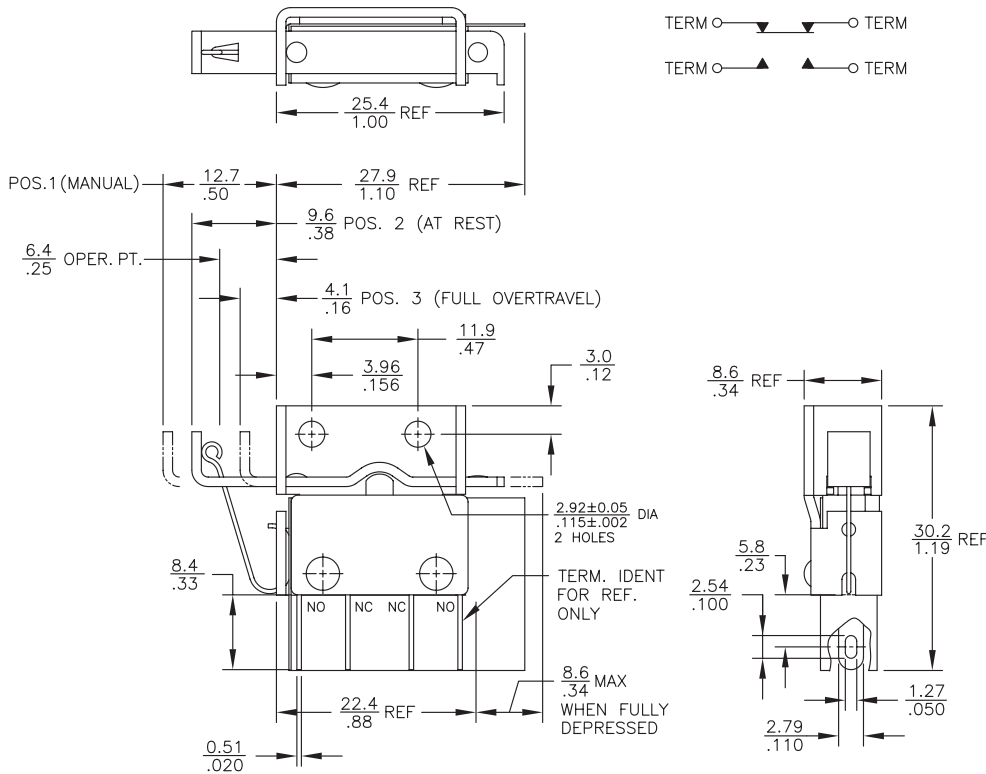
ORDERING INFORMATION:

Part Number	CIRCUIT	125/250 VAC	28 VDC IND	TERMINALS
76-6005	SPDT (Form Z)	5A *	3A	Bottom Solder/ .110 QC
* 75-80% Power Factor				
** Contact Factory for Minimums				

STANDARDS / AGENCY / RATINGS:



PRODUCT DRAWINGS



MECHANICAL / ELECTRICAL CHARACTERISTICS:

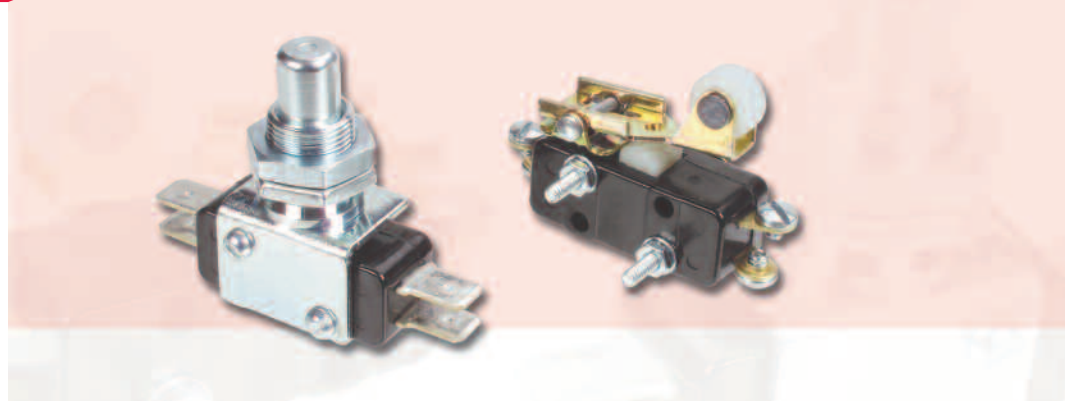
Circuit:
SPDT-DB

Electrical Ratings:

Circuitry	Current	Voltage
Form X or Y	10 Amps	125/250 VAC *
	10 Amps	28 VDC IND
Form Z	5 Amps	125/250 VAC
	3 Amps	28 VDC IND

* UL and CSA Listed 75% PF

SERIES 11:



KEY FEATURES:

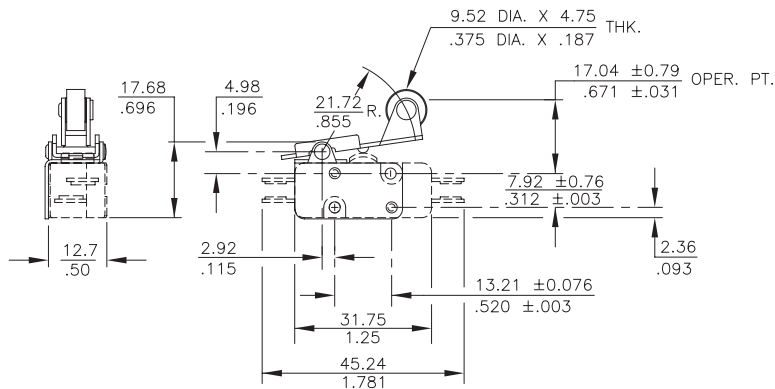
- Roller Lever
- Overtravel

MECHANICAL CHARACTERISTICS*:

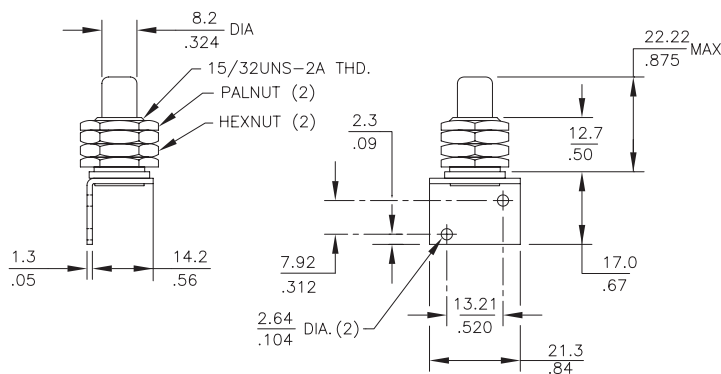
Part Number	Oper. Force	Release Force	Pretravel	Overtravel	Movement Diff.	Operating Point
71-1040 Roller Lever	3.5 oz max	2 oz min	.093 max	.062 min	.030 ± .015	.671 ± .031
71-2010 Overtravel Plunger	8 ± .3 oz	4 oz min	.050 max	.215 min	.020 ± .005	.828 ± .015

*Mechanical characteristics when used with Basic Switch 11-104.

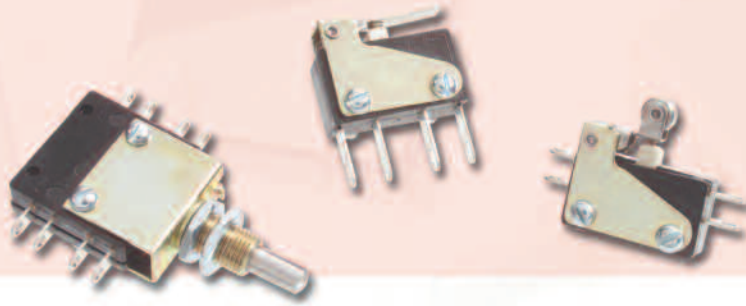
71-1040



71-2010



SERIES 16:



KEY FEATURES:

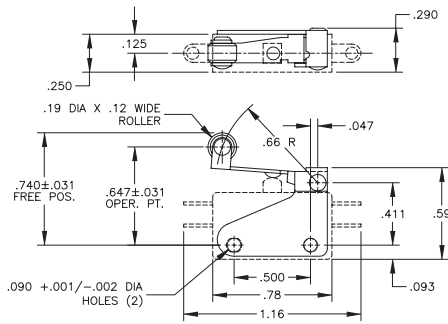
- Roller Lever
- Short Roller Lever
- Lever
- Bushing Mount

MECHANICAL CHARACTERISTICS:

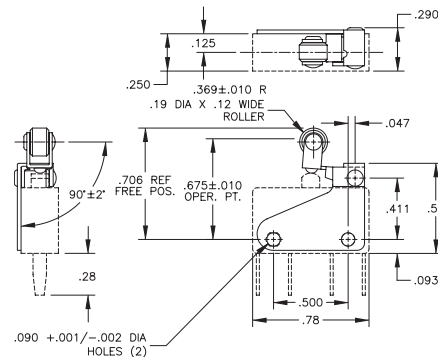
Part Number	Switch Series	Oper. Force	Release Force	Pretravel	Overtravel	Movement Diff.
76-1200 Roller Lever	16	4 oz max	1 oz min	.125 max	.025 min	.045 ± .011
76-1210 Lever	16	2.5 oz max	1 oz min	.125 max	.025 min	.047 ± .013
76-1220 Short Roller Lever	16	5 + 3 oz - 2 oz min	2 oz min	.050 max	.023 min	.020 ± .005
76-22604 Bushing Mount	16	5 oz	—	.050 max	.156 min	—

Notes: (1) Characteristics may vary depending on type of basic switch used in assembly. (2) All actuators supplied with mounting hardware.

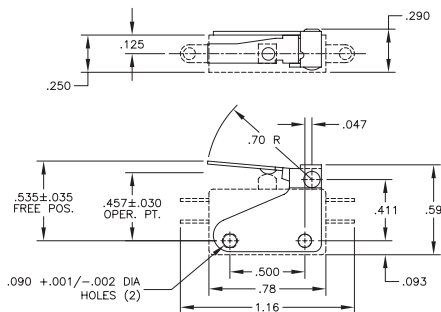
76-1200



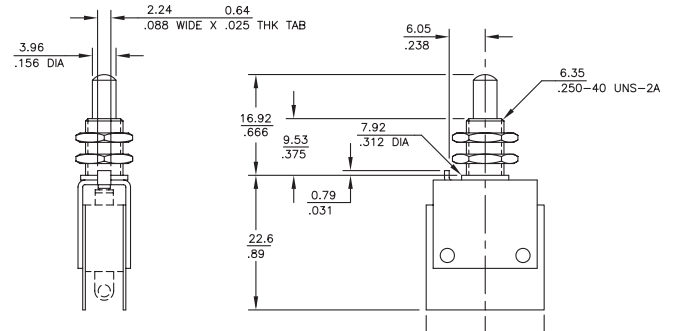
76-1220



76-1210



76-22604



SERIES 18:



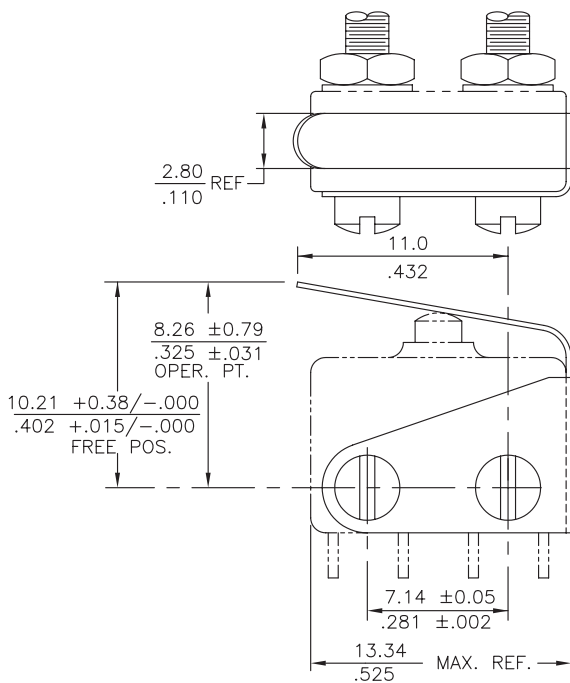
KEY FEATURES:

- Spring Lever
- Roller Lever

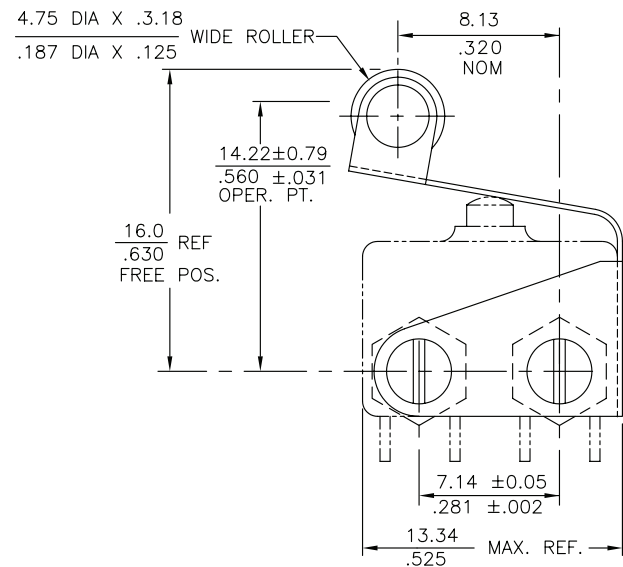
MECHANICAL CHARACTERISTICS:

Part Number	Oper. Force	Release Force	Pretravel	Overtravel	Movement Diff.	Operating Point
78-3000 Spring Lever	6 ± 2 oz	2 oz min	.125 max	.030 min	.030 ± .015	.325 ± .030
78-3100 Roller Lever	6 ± 2 oz	2 oz min	.125 max	.030 min	.035 ± .015	.560 ± .030

78-3000



78-3100



SERIES 22:

KEY FEATURES:

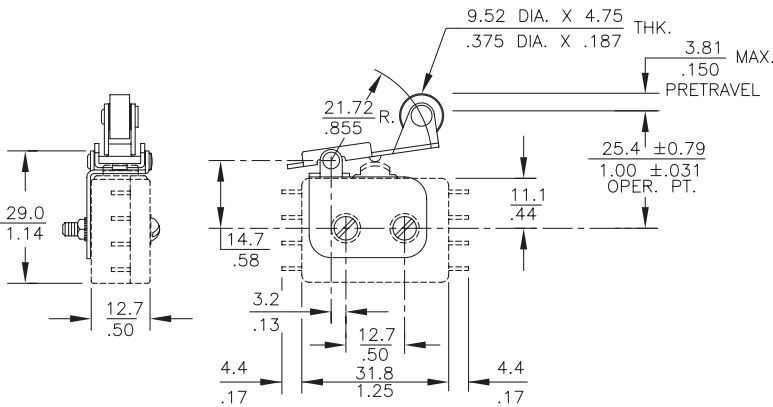
- Roller Lever
- Overtravel

MECHANICAL CHARACTERISTICS:

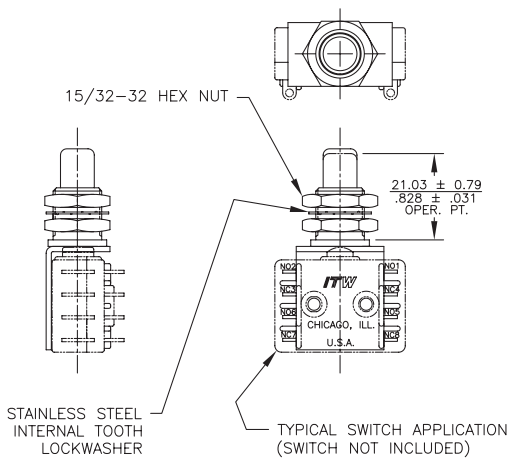
Part Number	Oper. Force	Release Force	Pretravel	Overtravel	Movement Diff.	Operating Point
72-1160 Roller Lever (1)	10 oz max	1.5 oz min	.150 max	.035 min	.070 ± .015	1.0 ± .031
72-2080 over travel (2)	17 ± 5 oz	4 oz min	.060 max	.215 min	.030 ± .007	.828 ± .031

(1) When used with 22-104 basic switch or 22-204 basic switch. (2) When used with 22-304 basic switch

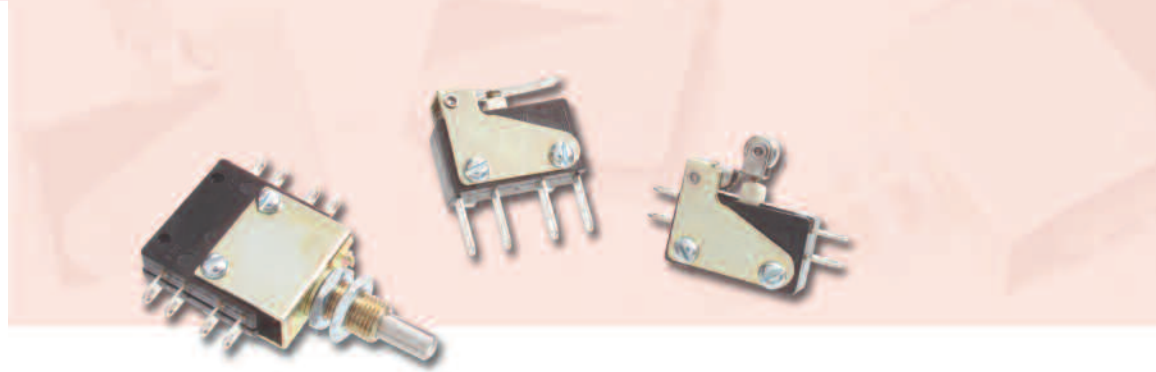
72-1160



72-2080



SERIES 26:



KEY FEATURES:

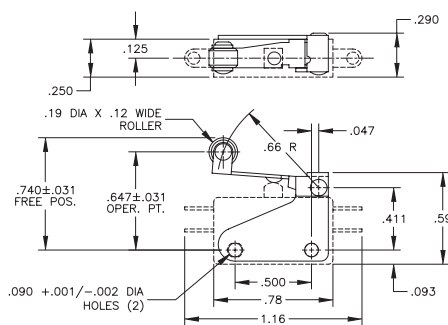
- Roller Lever
- Short Roller Lever
- Lever
- Bushing Mount

MECHANICAL CHARACTERISTICS:

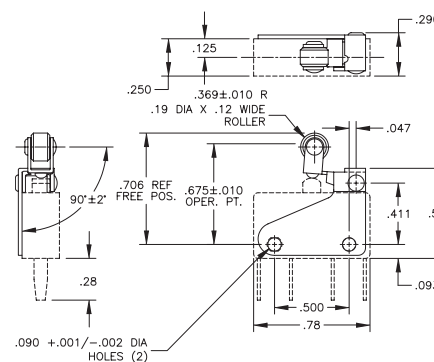
Part Number	Switch Series	Oper. Force	Release Force	Pretravel	Overtravel	Movement Diff.
76-1200 Roller Lever	26	8 oz max	1.5 oz min	.130 max	.026 min	.054 ± .022
76-1210 Lever	26	7 oz max	2 oz min	.155 max	.025 min	.065 max
76-1220 Short Roller Lever	26	16 oz max	5 oz min	.050 max	.012 min	.010 ± .005
76-22604 Bushing Mount	16	5 oz	—	.050 max	.156 min	—

Notes: (1) Characteristics may vary depending on type of basic switch used in assembly. (2) All actuators supplied with mounting hardware.

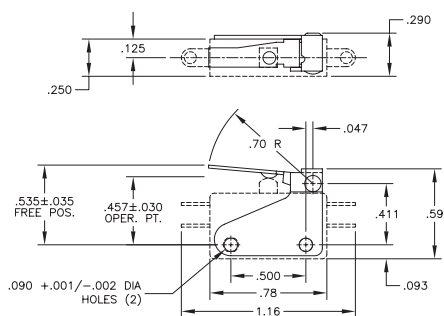
76-1200



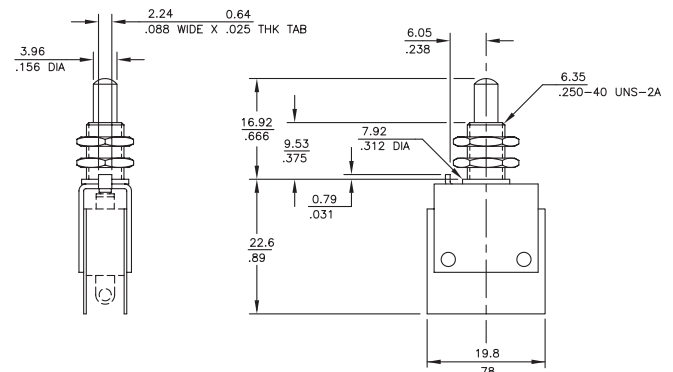
76-1220



76-1210



76-22604



SLIDE SWITCHES

SERIES SW:



ACTUAL SIZE



COMMERCIAL SLIDE SWITCH

This small slide switch is ideal for a variety of applications where long life and reliability is required. With the compact design the switch can carry loads up to 6 amps.

KEY FEATURES:

- Compact space saver
- Simple trouble-free design
- Long life
- Low contact resistance
- UL recognized

APPLICATIONS

- Consumer products
- Telecommunications
- Office equipment
- Toys

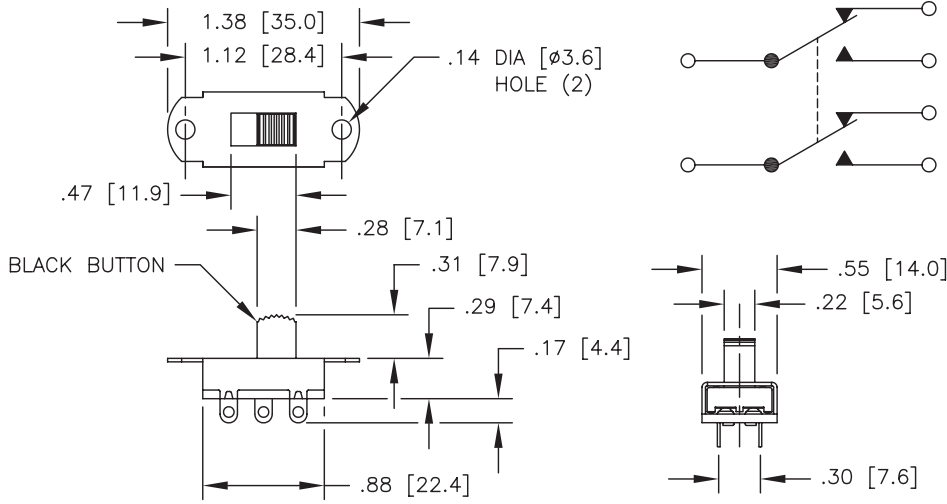
ORDERING INFORMATION:

Part Number	Circuit	Terminals	Contacts	Button Height	Button Color
01-000-0004	DPDT	Half Solder	Silver	5/16"	Black

STANDARDS / AGENCY / RATINGS:



PRODUCT DRAWINGS



MECHANICAL / ELECTRICAL CHARACTERISTICS:

Circuit:

DPDT

Contact resistance (initial):

20 MilliOhms (Max)

Dielectric strength:

1,000 VAC

Electrical rating*:

6 amp 125 VAC

3 amp 250 VAC

Contact material:

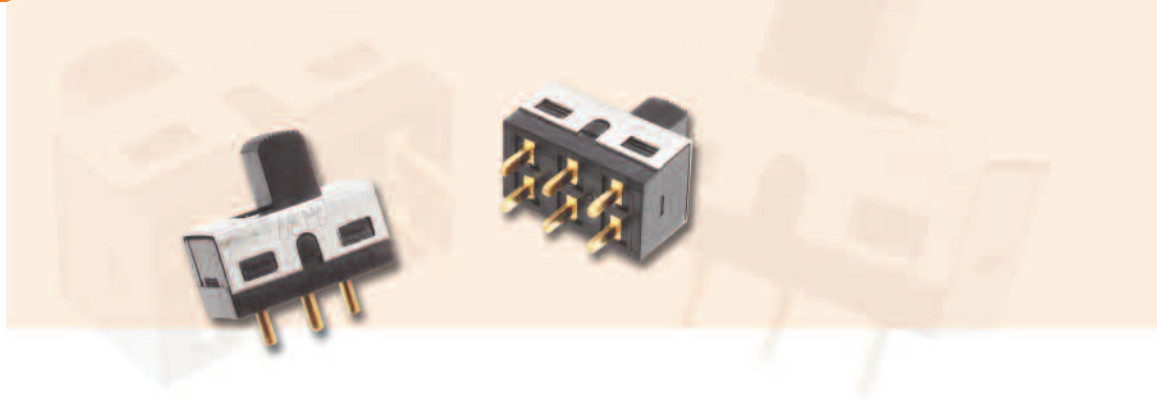
silver plated copper

* U.L. recognized

SERIES 23:



ACTUAL SIZE



MINI MIKE MINIATURE SLIDE SWITCHES

This rugged, long life miniature slide switch is ideal for applications where exceptional quality and reliability are needed. Available in SPDT and DPDT configurations, these gold contact slide switches come with PC terminals.

KEY FEATURES:

- SPDT and DPDT circuits
- Gold Contacts
- PC terminals
- Some versions UL recognized
- Temperature range: -40°C to +100°C

APPLICATIONS

- Medical controls
- Test equipment
- Datacom
- Precision instrumentation

ORDERING INFORMATION:

Part Number	Circuit	Button Height	Terminal Configuration	Rating
023-021-105	SPDT	0.20	2	250 mA @ 30 VDC
023-021-114	DPDT	0.20	3	100 mA @ 125 VDC
023-021-304 *	SPDT (Form Z)	0.14	4	500 mA @ 30 VDC

* UL recognized 0.5 A @ 125 VAC, 75 VDC

STANDARDS / AGENCY / RATINGS:



MECHANICAL / ELECTRICAL CHARACTERISTICS:

Circuit:

SPDT (023-021-105)
 DPDT (023-021-114)
 SPDT-DB (023-021-304)

Operating force:

200-500 grams (023-021-114)
 100-500 grams (023-021-105 & 304)

Electrical rating:

100 milliamps 125 VDC (023-021-114)
 250 milliamps 30 VDC (023-021-105)
 0.5 amp 125 VAC (023-021-304)

Contact resistance:

20 milliohms max initially

Temperature rating:

-40°F to 212°F
 (-40°C to 100°C)

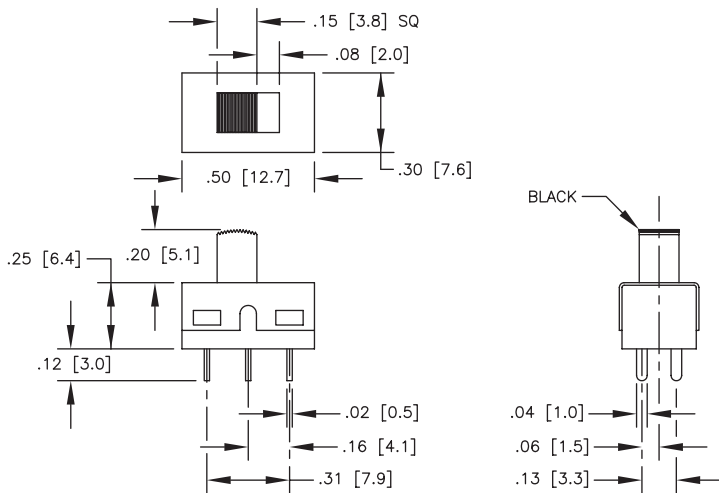
Life:

100,000 actuations

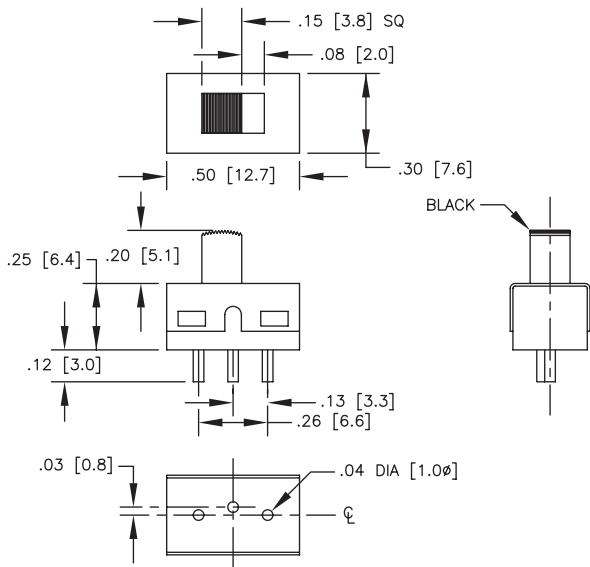
Contact material:

hard gold over barrier

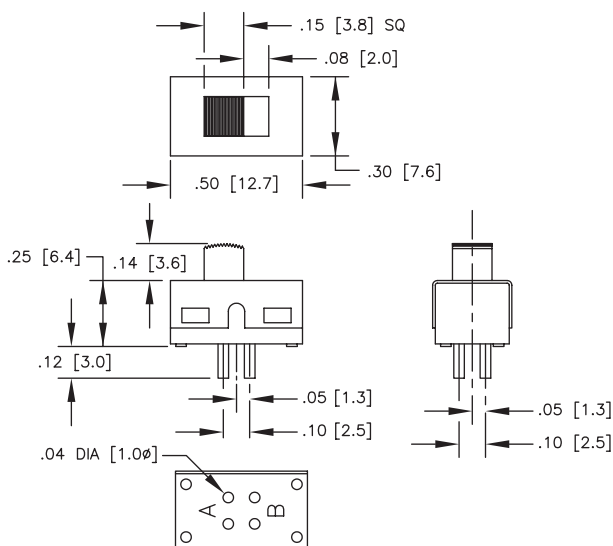
023-021-114



023-021-105



023-021-304



SERIES SE1022:



ACTUAL SIZE



DOUBLE POLE LINE VOLTAGE SELECTOR SWITCHES

This rugged fully enclosed housing is built for tough applications. The positive detect action, status indication and variety of contact configurations make this series ideal for a variety of needs.

KEY FEATURES:

- Status indication: variety of markings available
- Variety of terminal styles
- Electrical life: 10,000 cycles
- UL recognized and CSA certified and VDE approved
- Variety of mounting styles
- Silver plated contacts

APPLICATIONS

- Consumer power supplies
- Lower cost dual use power supplies

ORDERING INFORMATION:

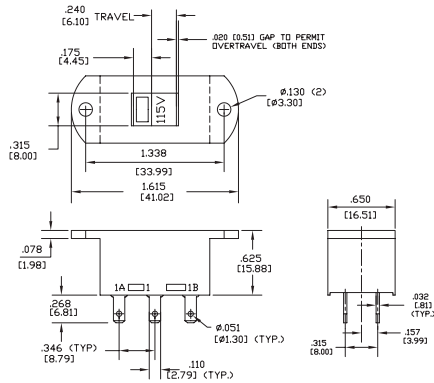
Part Number	Terminals	Dimensions	Marking
18-000-0016	.110 quick connect	1.615 L x .650 W x .625 H	230V/115V
18-000-0019	Right angle	1.030 L x .650 W x .625 H	230V/115V
18-000-0022	PC	1.030 L x .650 W x .625 H	230V/115V
18-000-0040	.110 quick connect	Snap in: .677 x 1.240 Cut out *	230V/115V

* It is recommended that panel thickness range from .015 to .125" (.038 to 3.18 mm) with switch cut-out punched from front of panel.

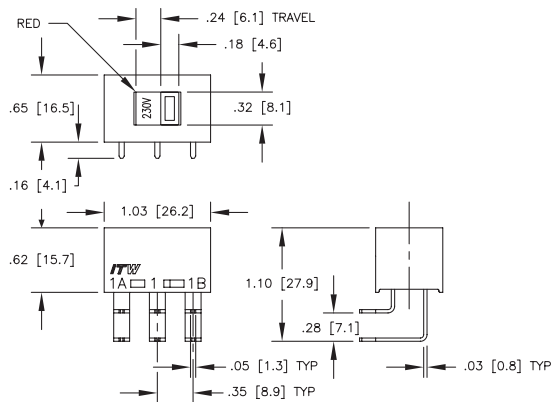
STANDARDS / AGENCY / RATINGS:



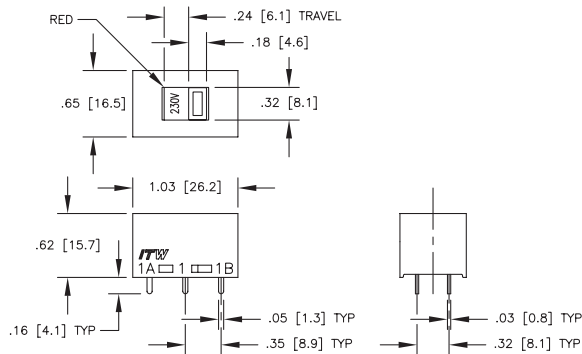
18-000-0016



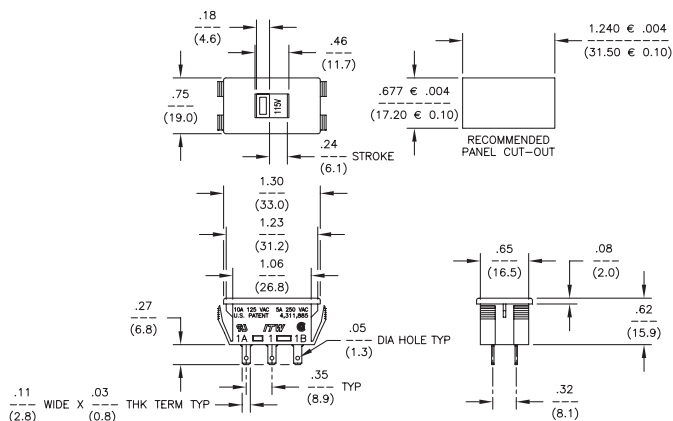
18-000-0019



18-000-0022



18-000-0040



MECHANICAL / ELECTRICAL CHARACTERISTICS:

Circuit:

DPDT

Electrical life:

10,000 cycles

Housing/actuator:

Nylon 94 V0

Terminal base:

phenolic laminate

Terminals:

silver plated copper

Electrical ratings:

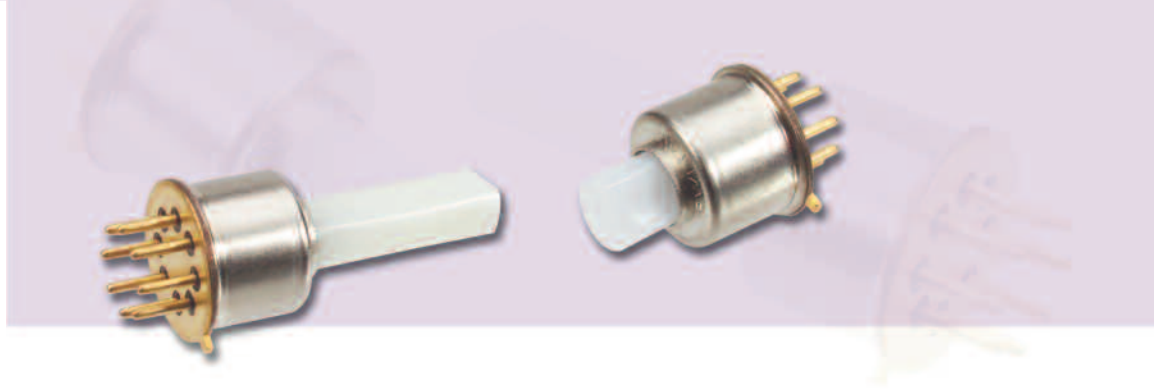
Circuitry	Current	Voltage
DPDT*	10 Amp	125 VAC
DPDT*	5 Amp	250 VAC
DPDT**	10 Amp	125 VAC-T85
DPDT**	5 Amp	250 VAC-T85

* UL and CSA recognized
** VDC approved

SERIES 030:



ACTUAL SIZE



SUB-MINIATURE T-05 SPACE SAVER ROTARY SWITCHES

This sub-miniature rotary switch has up to 8 positions in a T-05 can. Gold contacts deliver long life and reliability. Contacts are glass to metal sealed to prevent solder flux penetration. The Series 030 can be used for manually programming a single PC board for test or multi-function use.

KEY FEATURES:

- Gold contacts
- Up to 8 positions
- Life: 10,000 mechanical actuation (nom.)
- Variety of actuator lengths
- Glass to metal sealed header
- PC terminals
- Sub-miniature package size (.36" diameter)

APPLICATIONS

- Communications equipment
- Cable TV equipment
- Circuit breakers
- Timers
- Thermostatic controls

ORDERING INFORMATION:

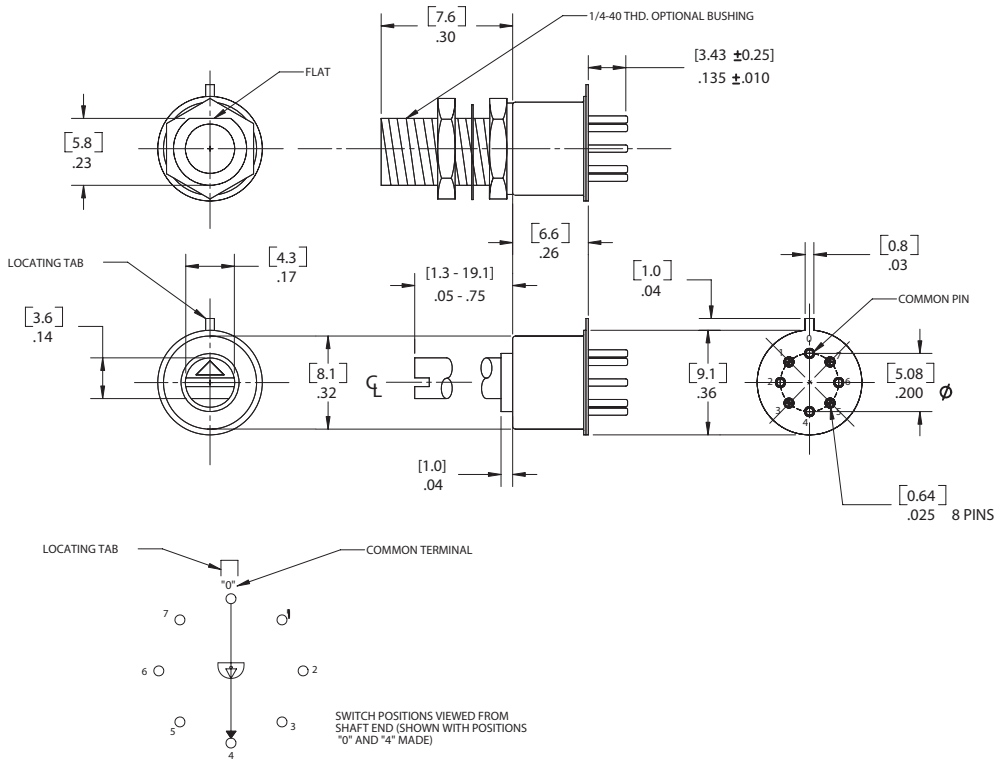
Part Number	Positions	Shaft Length	Custom *
030-202-018	2	0.18	—
030-303-018	3	0.18	—
030-404-018	4	0.18	—
030-404-904	4	0.05	Black Insert, Spacer, No Post
030-404-905	4	0.05	Red Insert, Micro Plastic Spacer
030-505-018	5	0.18	—
030-505-906	5	0.05	Black Insert, Spacer, No Post
030-606-018	6	0.18	—
030-606-902	6	0.30	Black Insert, Spacer, No Post
030-808-005	8	0.05	—
030-808-030	8	0.30	—
030-808-907	8	0.05	Black Insert, Spacer, No Post
030-808-908	8	0.30	Black Insert, Spacer, No Post
030-808-909	8	0.30	No Insert, Spacer, No Post

* Subject to change without notice, all orders are NC & NR.

STANDARDS / AGENCY / RATINGS:



030-XOX-XXX



MECHANICAL / ELECTRICAL CHARACTERISTICS:

Contact rating:
dry circuit to 500 mA
@ 125 VAC

Contact material:
hard gold over barrier

Contact resistance:
80 milliohms Max (initially)

Life:
10,000 actuations

End of life criteria:
100 milliohms
contact resistance

Angle of throw:
45° / position—
8 positions max

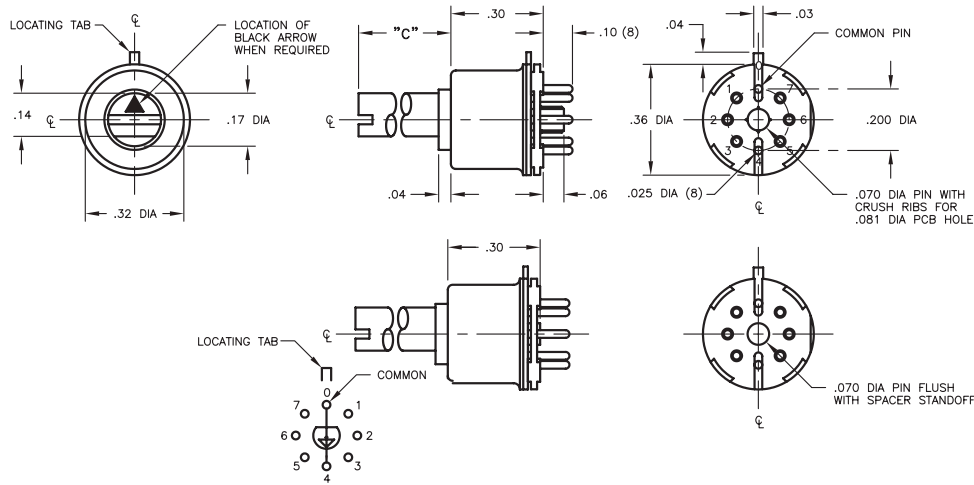
Breakdown voltage:
500 V 60 HZ

Insulation resistance:
50,000 megohms

Actuation torque:
85 inch—grams nom initially

Temperature range:
-30°C to +100°C

030-XOX-9XX



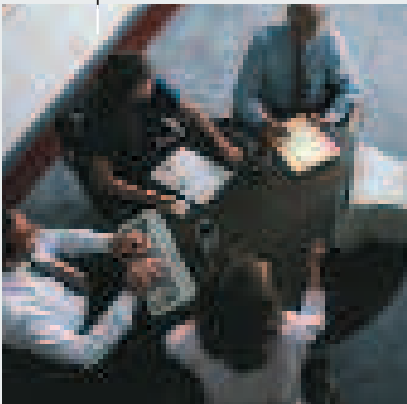
Custom Solution



The ITW Six Step Plan from concept to implementation

1

STEP ONE
We listen



We attend a planning meeting with your team where we form an understanding of your needs and expectations through our team of sales and engineering experts.

2

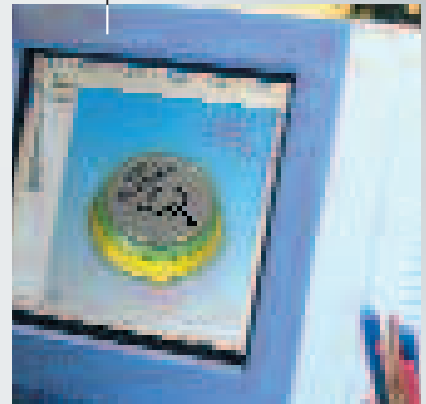
STEP TWO
Utilize proven technology



We offer the benefits of our engineers strengths including diverse experience from serving many industries, a well rounded knowledge of electronic and electromechanical processes, and the ability to sort and evaluate a variety of opinions and information.

3

STEP THREE
Define the concept



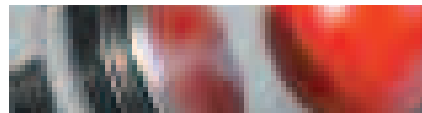
A team of professional ITW Design Engineers will conceptualize your requirements, generating a variety of potential directions to consider. A team evaluation will then define the best concept and develop it further.

For over 54 years we've gained a reputation for the highest quality standards, innovative ideas and a rapid response to customer requirements.

Partnership

ITW Switches has the willingness, the engineering resources, and the global manufacturing capability to design, develop, manufacture and supply exactly the product you need for your specific application. We can help you to identify opportunities by finding better and more economic ways to build your products,

lower total costs, enhance performance, increase desirability, speed assembly and win a greater share of the market. How can we do this? By following our tried and tested Six Step Plan to design and development success, controlled and monitored all the way by dedicated and experienced design professionals.



4

STEP FOUR
Final concept presented



We present you with the final concept, addressing all criteria such as anticipated schedules, final cost analysis and savings, and specific design benefits.

5

STEP FIVE
Development of prototypes



We jointly agree on a design direction and the development of prototypes begins. Our in house rapid prototyping, desktop molding, and highly skilled tool and model technicians add unbeatable value at this stage.

6

STEP SIX
Finished component supplied



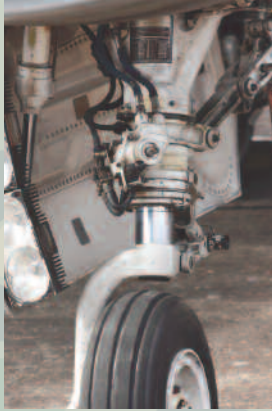
Upon full, joint approval of the prototype, tooling and preproduction planning are finalized. ITW Manufacturing facilities then provide dependable assembly, individual testing, and packaging to your finished components, all controlled under our ISO9001:2000/AS9100 Quality Standards.



WHY CHOOSE ITW SWITCHES FOR YOUR MIL / AERO APPLICATION...

1) Engineering Excellence — ITW Switches started as the Licon division, our specialty is in high-load snap action switches using the Butterfly double-break design for reliable and long lifecycle results. New Product Development includes custom electromechanical assemblies, solid-state sensors for NextGen requirements, or any design / quality / application challenge that you may have. Designs can be modeled using 3D CAD, built using in-house fabrication and rapid prototyping, and testing using our UL-Approved test lab.

Use us for your design needs!



2) Manufacturing Capabilities — Mil / Aero products are produced in Buffalo Grove, IL – the same facility as the engineers that designed the product. Delivery is supported either direct or through our distribution channel with the capability to support Kanban, Just in Time (JIT), and other delivery options.

3) Quality Control — Buffalo Grove facility has MIL-PRF-8805, ISO 9001:2000 and AS900B quality ratings. Our Military QPL products are 100% inspected and we stand behind our product with an industry leading 36 month warranty. Six Sigma certified management maintains high quality with tools such as Failure Modes and Effects Analysis (FMEA), lot control, and traceability.

4) Custom Design — Products are designed to the customer specifications based on particular needs. Specifications can include hermetic seal, high/long life cycle, high actuation force, vibration resistance, capability to withstand high G-forces, IP rating seal, chemical resistance, various connector and harness types, and many more. We are recognized in the industry as both a designer and supplier of high-quality and reliable parts.

5) Service — Our Sales Staff has personnel dedicated strictly to the Mil / Aero Market for specific focus and knowledge in the market. Customer Service provides key customer contact for accurate planning and order entry, fast turnaround on supplier surveys, Defense Federal Acquisition Regulation Supplement (DFARS), and certifications needed, and is there to help you with any questions or needs that you might have.



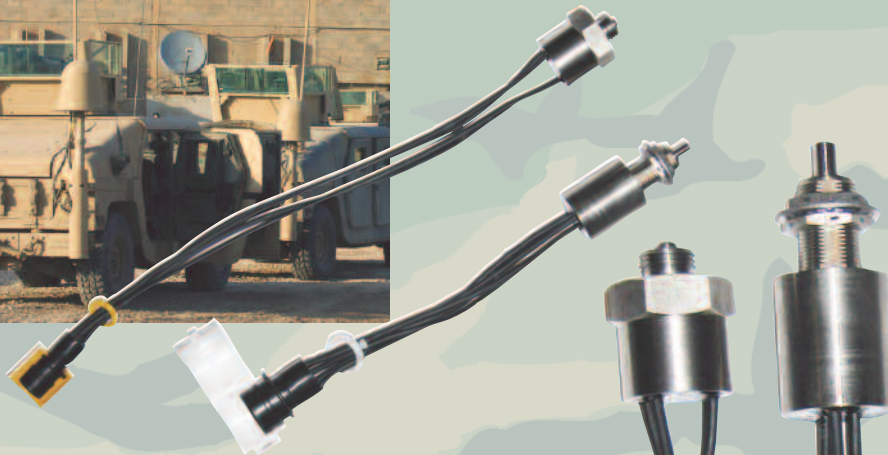
KEY PRODUCTS

- KAP-16
- KAP-26
- Series-18
- Series-26
- Series-63
- Series-65



APPLICATIONS

- Landing gear
- Missile ejection / activation
- Pilot ejection
- Vehicle brake switches
- Aircraft actuator / contactors
- Aircraft rotary actuator
- Fuel valves



MILITARY SPECIFICATION NUMBER	MILITARY PART NUMBER	ITW PART NUMBER	NATIONAL STOCK NUMBER	CATALOG PAGE NUMBER
MIL-PRF-8805/7	MS25476-1	16-188051	5930-00-843-0145	pp 46 – 47
	MS27217-1	16-488051	5930-00-824-9433	pp 46 – 47
	MS27217-2	16-388051	5930-00-435-6626	pp 46 – 47
MIL-PRF-8805/39	MS21321-1	63-210050		call factory
	MS21321-2	63-210055		call factory
MIL-PRF-8805/40	MS24331-1	63-210021	5930-00-503-3883	call factory
	MS24331-2	63-210029	5930-00-837-6694	call factory
	MS24331-3	63-210028		call factory
	MS24331-4	63-210026		call factory
	MS24331-6	63-210155		call factory
MIL-PRF-8805/76	MS27257-1	18-488051	5930-00-420-8517	pp 50 – 51
MIL-PRF-8805/77	M8805/77-001	26-888051	5930-00-005-7051	pp 56 – 57
	M8805/77-002	26-988051	5930-00-127-4224	pp 56 – 57
	M8805/77-003	26-810		pp 58 – 59
	M8805/77-004	26-910		pp 58 – 59
MIL-PRF-8805/80	M8805/80-01	62-200021	5930-00-401-6456	call factory
MIL-PRF-8805/84	M8805/84-001	65-230101		pp 60 – 61
	M8805/84-002	65-330101	5930-01-325-8299	pp 60 – 61
	M8805/84-003	65-430101	5930-01-123-1471	pp 60 – 61
	M8805-84-004	65-230102		pp 60 – 61
	M8805/84-005	65-330102		pp 60 – 61
	M8805/84-006	65-430102		pp 60 – 61
MIL-PRF-8805/100	M8805/100-001	63-210175		call factory
	M8805/100-002	63-210176	5930-00-332-0780	call factory
	M8805/100-003	63-210177		call factory
	M8805/100-004	63-710085		call factory
	M8805/100-005	63-710086	5930-00-417-3819	call factory
	M8805/100-006	63-710087		call factory
	M8805/100-007	63-210178	5930-00-417-5935	call factory
	M8805/100-008	63-210179		call factory
	M8805/100-009	63-710088	5930-00-417-3684	call factory
	M8805/100-010	63-710089		call factory
	M8805/100-011	63-210014	5930-01-082-9586	call factory
	M8805/100-012	63-210015		call factory
	M8805/100-013	63-710009	5930-01-186-0178	call factory
	M8805/100-014	63-710010	5930-01-199-7192	call factory
	M8805/100-015	63-210016	5930-01-050-9100	call factory
	M8805/100-016	63-210017	5930-01-100-8531	call factory
	M8805/100-017	63-710011	5930-01-114-2944	call factory
	M8805-/100-018	63-710012	5930-01-395-5067	call factory

CROSS REFERENCE

01-000-0004	80	16-404	54	26-988051	64
023-021-105	82	16-40401	54	39-12101	4
023-021-114	82	16-4044*	54	39-12111	4
023-021-304	82	16-40441*	54	39-12113	4
030-202-018	88	16-410	56	39-12114	4
030-303-018	88	16-411	56	39-12502	4
030-404-018	88	16-488051	54	39-12503	4
030-404-904	88	16-504	54	39-12509	4
030-404-905	88	16-530004***	54	39-12601	4
030-505-018	88	18-000-0016	84	39-12611	4
030-505-906	88	18-000-0019	84	39-12712	4
030-606-018	88	18-000-0022	84	39-12801	4
030-606-902	88	18-000-0040	84	39-12813	4
030-808-005	88	18-40421	58	39-13101	4
030-808-030	88	18-488051	58	39-13113	4
030-808-907	88	19N402	60	39-13611	4
030-808-908	88	19N402L18	60	39-22100	4
030-808-909	88	19N402R15	60	39-22500	4
034-550-001	2	19N403	60	39-23100	4
034-550-002	2	19N412	60	39-23500	4
034-550-005	2	19N502	60	39-422106	6
034-550-006	2	19N503	60	39-422508	6
034-550-010	2	19N512	60	39-422607	6
034-550-015	2	19N602	60	39-422609	6
11-104	50	19N603	60	39-422707	6
11-204	50	19N702	60	39-422710	6
11-304	50	19N703	60	39-423508	6
11-314 Reset	50	19N712	60	39-423609	6
11-504	50	19N713	60	39-522101	6
14-124	52	19N920	60	39-522501	6
14-12404	52	19N922	60	39-522701	6
14-324	52	22-104	62	39-523101	6
14-724	52	22-204	62	39-523501	6
16-104	54	22-304	62	39-523701	6
16-110	56	22-504	62	39-712200	8
16-111	56	26-804	64	39-712300	8
16-188051	54	26-810	66	39-712400	8
16-204	54	26-888051	64	39-713200	8
16-304	54	26-904	64	39-713300	8

39-713400	8	49-413R	22	60-4003	40
39-800001	4	49-5911 / 530004	26	60-4004	40
39-800002	4	49-5911 / 810	26	65-201000	68
39-82N	10	49-59111	24	65-301000	68
39-82S	10	49-59112	24	65-401000	68
39-83N	10	49-59113	24	71-1040	50, 74
39-83S	10	49-5912 / 530004	26	71-2010	50, 74
47-1111	12	49-5912 / 810	26	72-1160	62, 77
47-1121	12	49-5913 / 530004	26	72-2080	62, 77
47-1131	12	49-5913 / 810	26	76-1200	54, 56, 64, 66, 75, 78
47-1141	12	49-59211	24	76-1210	54, 56, 64, 66, 75, 78
47-1151	12	49-59212	24	76-1220	54, 56, 64, 66, 75, 78
47-1161	12	49-59213	24	76-22604	54, 56, 75, 78
47-1171	12	49-611	22	76-59200	42
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47-2121	12	49-613	22	76-6005	70
47-2131	12	49-9111	22	76-9510/530004	44
47-2141	1 2	49-9112	22	76-9510/810	44
47-2151	12	49-9113	22	76-9711/4044X	46
47-2161	12	57-111	28	76-9711/804X	46
47-2171	12	57-112B	28	76-9712/4044X	46
48EM	14	57-112G	28	76-9712/804X	46
48SS	16	57-112R	28	78-3000	58, 76
48M-EM	18	57M-EM	30	78-3100	58, 76
48M-SS	20	57M-SS	32	80-390101	4
49-111	22	58M-EM	34	80-390102	4
49-112	22	58M-SS	36	80-390103	4
49-113	22	59-111	38	80-390104	4
49-114	22	59-112	38	80-390106	4
49-115	22	59-113	38	80-390107	4
49-116	22	59-211	38	80-390108	4
49-131	22	59-212	38	80-390110	4
49-132	22	59-213	38	80-390111	4
49-133	22	59-311	38	80-390112	4
49-411G	22	59-312	38	80-397014	8
49-411R	22	59-313	38	80-397015	8
49-412G	22	60-1000	40	80-397016	8
49-412R	22	60-4001	40	80-397017	8
49-413G	22	60-4002	40		

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ISO 9001:2008
AS9100

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