



E-SWITCH®

Understanding Sealed Switches, Switch Types and Applications

Product Training Module



Service ♦ **Selection** ♦ **Speed**



Introduction

Purpose

- Introduce designers, engineers and customers to E-Switch's wide range of sealed electro-mechanical switches, which includes the definition of process seal and IP rated seal, advantages of sealed switches, features and applications for various types of sealed switches.

Objective

- Define the meaning of process sealed and IP rated seal
- Provide overview of industry standard IP rating system
- Provide advantages of using a sealed switch
- Review E-Switch's categories of sealed switches along with typical applications

Content

- 18 pages



Process Seal or IP Rated Seal

What is the difference between a process sealed switch and an IP rated sealed switch?

PROCESS SEAL

A process sealed switch withstands a typical water washing procedure that takes place during the PCB assembly cleaning process to remove flux and other contaminants from the finished PCB assembly.

IP RATED SEAL

An IP rated sealed switch withstands various predefined levels of protection from dust and moisture. The predefined levels are established by the international classification system specified by the IEC60529 standard, known as the IP Rate.

PROCESS SEALED Tact Switches



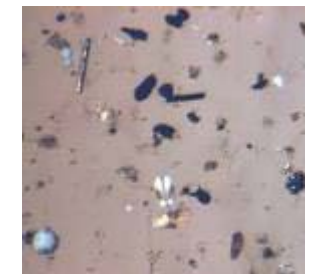
Industry IP Rating Standard

IP Rating Standard

Some switch applications reside in uncontrolled environments where temperature, humidity level and airborne debris fluctuate at any given time. In these types of environments, it is recommended to utilize a sealed switch, which is specifically designed and manufactured to protect against the entry of foreign bodies and moisture.

Electro-mechanical switches can be sealed to different levels of effectiveness against intrusion from moisture and foreign bodies, like tools, fingers, dirt and debris.

The seal effectiveness level is ranked according to the international classification system specified by the IEC60529 standard, known as the IP Rate. **IP** stands for “**International Protection**” Rating or “**Ingress Protection**” Rating.



Code Definitions and Rating Chart

Code Definitions

This code consists of the letters "I" "P" followed by two digits. The first digit references solids protection, which ranges from 0 to 6. The second digit refers to liquids protection and ranges from 0 to 8. As an example, a switch rating would appear as IP67.

Each number is assigned a specific definition. Based on the chart to the right, a switch rated IP67 specifies solids protection as 6, which means that the switch is totally protected from dust penetration. The second digit specifies the liquids protection level as 7, which means that protection against effects of immersion from 15cm to 1m (6" to 40") or will pass a water submersion test at 40" (1 meter), for up to 30 minutes.

This chart can be found at e-switch.com, under Technical Information.

IP Rating Chart			
First Number	Definition	Second Number	Definition
<i>Protection against solid objects</i>		<i>Protection against liquids</i>	
0	No protection	0	No protection
1	Protected against solid objects over 50mm (e.g. accidental touch by hands)	1	Protected against vertically falling drops of water
2	Protected against solid objects over 12mm (e.g. fingers)	2	Protected against direct sprays up to 15° from the vertical
3	Protected against solid objects over 2.5mm (e.g. tools and wires)	3	Protected against direct sprays up to 60° from vertical
4	Protected against solid objects over 1mm (e.g. tools, wires and small wires)	4	Protected against sprays from all directions - limited ingress permitted
5	Protected against dust - limited ingress (no harmful deposit)	5	Protected against low pressure jets if water from all directions - limited ingress permitted
6	Totally protected against dust	6	Protected against strong jets of water (e.g. for use on shipdecks - limited ingress permitted)
		7	Protected against the effects of temporary immersion between 15cm and 1m. Duration of test 30 min.
		8	Protected against long periods of immersion under pressure

Advantages of Using A Sealed Switch

Why use a sealed switch?

- Protects switch functionality at which it has been rated
- Develop to withstand rugged use and harsh environmental elements
- Prevents premature switch failure
- Protects switch against accidental spillage
- RoHS compliant switch models available



Types of Sealed Switches

Toggle



Rocker



Dip



Slide



Rotary Dip



Pushbutton



Anti-vandal



Tactile



Illuminated Styles



Rocker



Pushbutton

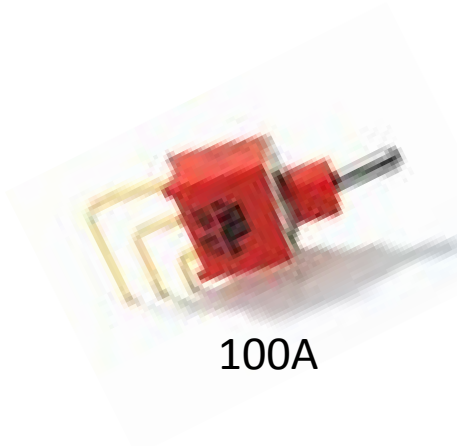


Anti-vandal



Tactile

Sealed Toggle Switches & Applications



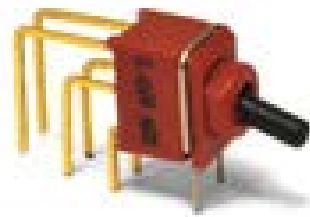
100A



200A



200B



200U

Rated IP67

Mounting Options

- Vertical mount
- Right angle mount
- Surface mount

Applications

- Telecommunication
- Instrumentation
- Medical equipment
- Networking equipment
- Handheld devices

Sealed Rocker Switches & Applications



400A/IP67



400B/IP67



R7/IP67

Rated IP55 to IP67



RBW2/IP66



WB2/IP55

Applications

400A / 400B / R7

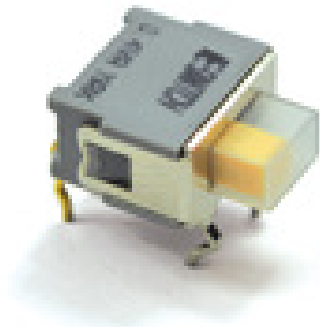
- Industrial Equipment
- Marine Transportation
- Construction Equipment
- Agricultural Equipment
- Recreational Vehicles
- Lawn and Garden Equipment

RBW2 and WB2

- Commercial Appliances
- Electrical Housewares
- Floor Care Appliances
- Industrial Controls
- Medical Equipment
- Household Appliances/White Goods



Sealed Slide Switch & Applications



500R

Rated IP67

Applications

- Telecommunication
- Instrumentation
- Medical equipment
- Computer Peripherals
- Audio/Visual equipment
- Consumer Electronics

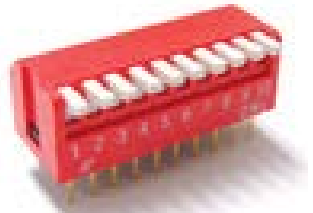
Sealed Dip Switches & Applications



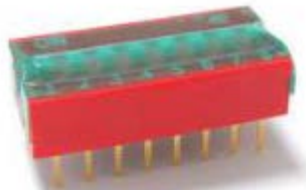
KAE*
Low Profile



KAN*
Low Profile



KAP*
Piano



KAS*
Slide Dip

Process Sealed

*Top Tape Seal Optional

Style Options

- Low profile
- Piano
- Slide

Applications

- Garage door openers
- Controllers
- Telecommunication
- Test and Instrumentation equipment
- Audio/Visual equipment
- Medical equipment

Sealed Rotary Dip Switches & Applications



RDM



RDT

Rated IP67



SRJ*



SRM*



SRT*

Process Sealed

*Top Tape Seal Optional

Applications

- Telecommunication
- Test and instrumentation devices
- Medical equipment
- Networking equipment
- Handheld devices

Sealed Pushbutton Switches & Applications



LA / IP65



700A



800A



800B



800U

Rated IP67

Applications

- Telecommunication
- Networking equipment
- Audio/Visual equipment
- Instrumentation
- Medical equipment
- Houseware appliances



RP8100



RP8200



RP8300



RP8400



RP8500



RP8600

Sealed Anti-vandal Switches & Applications



PV0



PV1



PV2



PV3



PV4



PV5



PV6



PV7



PV8



PV9

Rated IP65



PVL



ULV4



ULV7



ULV8

Rated IP67

Applications

- Vending kiosk
- Ticket dispensers
- Security Devices
- Industrial controls
- Medical equipment
- Audio/Visual equipment

Sealed Tactile Switches & Applications



TL6100



TL6105



TL6110



TL6120



TL6190



TL6700

Process Sealed

Styles

- Through hole
- Earth ground terminal
- Right angle mount
- Surface mount
- Illumination



TL52



TL6200



TL6210



TL6215

Rated IP67

Applications

- Portable handheld devices
- Consumer electronics
- Telecommunication
- Medical equipment
- Audio/visual equipment
- Test equipment and Instrumentation

Resources

www.e-switch.com

Radial x

Product Catalog / Sealed / Product Lines / TL52 Series Sealed Radial Lead Tact Switch

Contact Us Catalog Request

E-SWITCH®

Product Catalog Training Where to Buy

Catalog by Type
Catalog by Features
Cap Options

- Cap Options
- Illuminated
- Long Life
- Low Profile
- Miniature
- Panel Mount
- Power Rated
- Right Angle
- Sealed**
- Surface Mount

Request Sample/Quote Request Distributor Stock Check

- Surface mount design
- Top tape seal option
- Tube or tape and reel packaging

SRT Series Rotary DIP Switches

- 4x1 pin layout
- Through hole and right angle mount designs
- Top tape seal option
- Tube packaging

TL52 Series Sealed Radial Lead Tact Switch

- 8mm x 8mm tactile switch
- 160 ± 50; 260 ± 50 gram force options
- Through hole mount design
- IP67 sealed

External Login

E-SWITCH®

Search Part No, Drawing, Series

Product Catalog Training Where to Buy Technical Information About E-Switch 800.867.2717

Home / Product Catalog / By Feature / Sealed / TL52 Series Sealed Radial Lead Tact Switch

View Large Image View PDF Data Sheet Distributor Stock Check

TL52 Series Sealed Radial Lead Tact Switch

The TL52 series tactile switch is a thru hole switch that comes in radial packaging and is a sealed switch with IP67 rating.

The TL52 tactile switch with radial leads is very popular in the appliance market, and other applications, including testing/instrumentation, medical, and more.

CERTIFICATIONS (click the logo below)

RoHS

Other tact switches
Other sealed switches

Product Configurator Detail Specs Spec Sheets

Step 1 Configure your part number by selecting from the columns below

Step 2 When your part number is complete, click to view additional options

PART NUMBER:

Clear Additional Options

Most Common Parts

- TL52AF1000
- TL52AF2000

Series	Model	Actuator	Operating Force	Contact Material
TL	52	A 12mm	F160 160g	Q Silver

Resources

www.e-switch.com

The image shows a screenshot of the E-Switch website's navigation bar and promotional banners. The navigation bar includes links for Contact Us, Catalog Request, Sample/Quote Request (circled in purple), and Distributor Stock Check. Below the navigation bar is the E-Switch logo, an Extranet Login link, and a search bar with the text "Part No, Drawing, Series" and a "GO" button. A horizontal menu contains links for Product Catalog, E-Cross™, Where to Buy, Technical Information, and About E-Switch. The phone number 800.867.2717 is displayed below the menu. The main content area features a large orange banner for "INTRODUCING... E-Switch Virtual Solutions" with a grid of product images and a "CLICK HERE to interact with our virtual solutions" call to action. To the right, there are two smaller banners: "3D Drawings" with a "Request 3D Drawings" button (circled in purple) and "Product Matrix" with a product image.

Contact Us Catalog Request **Sample/Quote Request** Distributor Stock Check

Extranet Login

E-SWITCH®

Search Part No, Drawing, Series **GO**

Product Catalog E-Cross™ Where to Buy Technical Information About E-Switch

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INTRODUCING... E-Switch Virtual Solutions

Our complete array of anti-vandal switches... at your fingertips!

CLICK HERE to interact with our virtual solutions

E-SWITCH®

3D Drawings

Request 3D Drawings

Product Matrix

Resources

Data Sheet

Switch Samples

TL3750 SERIES TACT SWITCH

APPLICATIONS / MARKETS

- Medical Equipment
- Computer Peripherals
- Consumer Electronics
- Automotive
- Industrial
- Marine
- Aviation

RoHS

SPECIFICATIONS

Electrical Rating: 50mA @ 12VDC
 Electrical Life: 300,000 Cycles
 Mechanical Life: 300,000 Cycles
 Contact Resistance: 50mΩ Max. initial
 Insulation Resistance: 100M Ω at 100VDC
 Dielectric Strength: 100VAC for 1 min.
 Operating Temperature: -30°C to 80°C
 Storage Temperature: -60°C to 160°C
 Operating Forces: 130, 190, 240 gf
 Travel: 0.13mm
 Contact Arrangement: SPST

FEATURES & BENEFITS

- Ultra-miniature - 2.8mm x 2.8mm
- Surface mount termination
- Very low profile - 0.58mm

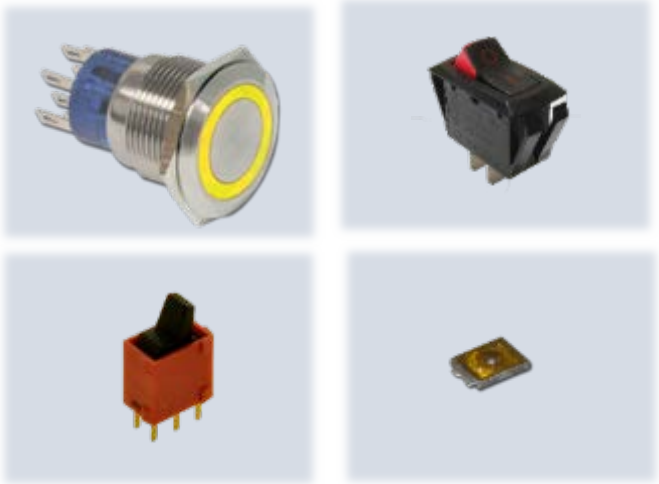
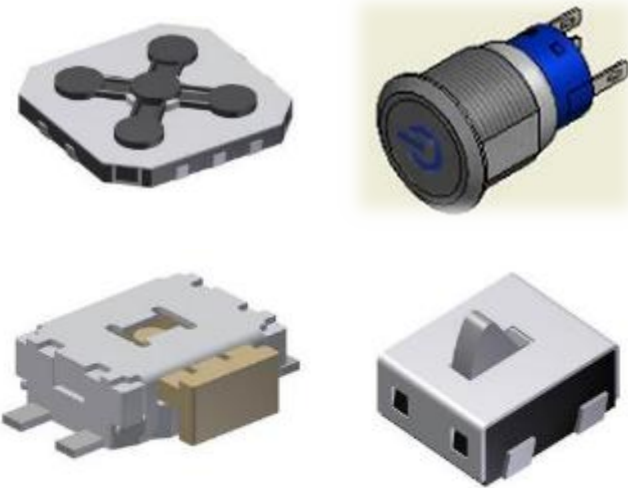
PART NUMBER CONFIGURATOR

Series	Model	Actuator Option	Actuation Force	Contact Material	Termination
<input type="checkbox"/> TL	<input type="checkbox"/> 578	<input type="checkbox"/> A - 4.9mm	<input type="checkbox"/> F100 - 100 gf <input type="checkbox"/> F130 - 130 gf <input type="checkbox"/> F240 - 240 gf	<input type="checkbox"/> 0 - Silver <input type="checkbox"/> 1 - Gold	<input type="checkbox"/> 0 - Dipping <input type="checkbox"/> 1 - Solder

Specifications subject to change without notice

E-SWITCH | www.e-switch.com | 800.867.2317

3D Models. jpg





Summary

- E-Switch provides both process sealed and IP rated switches rating from IP55 to IP67.
- A process seal can withstand the normal wash procedure used in the PCB assembly process.
- Seal effectiveness level is ranked according to the international protection rating or ingress protection rating, known as the IP rate.
- The IP code has two digits; the first digit specifies the solids (dust/particles) protection level and the second digit specifies the liquids protection level.
- A sealed switch protects switch functionality, can withstand rugged use and harsh environmental elements, prevents premature failure, prevents against accidental spillage, and several switches are RoHS compliant.
- E-Switch provides numerous sealed switches from toggle, rocker, slide, dip, rotary dip, pushbutton, anti-vandal and tactile. Many of the switch types offer multiple illumination options.
- Specific product details on sealed switches can be found at e-switch.com.