

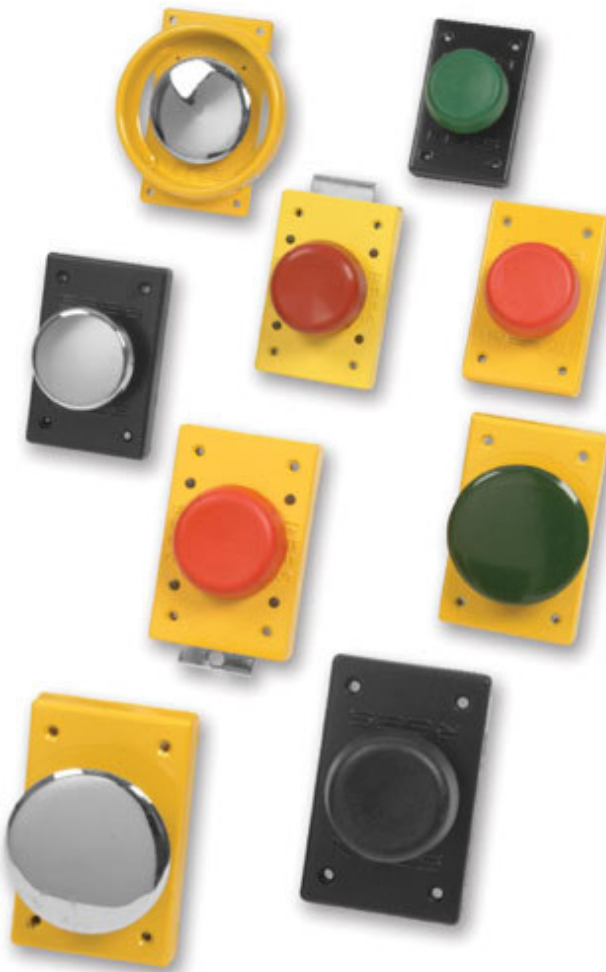
SINGLE PLUNGER

PUSH BUTTON SWITCHES



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Definition

A push button switch is a mechanical device used to make and/or break one or more electrical circuits. They are designed to be solely operated by human hands.

Operation

REES single plunger push button switches have contact arrangements ranging from one normally open contact or one normally closed contact to two normally open contacts plus two normally closed contacts. By pushing the plunger (by hand) the contacts will change state and either start or stop the circuit they are connected to. When the plunger is released, the contacts of the momentary style switches will return to their normal at rest state. The maintained and latching style will stay as pushed until they are either pulled open or the latch is released to allow the plunger to return to its normal position. Another type available is the keylock style which takes the added action of turning the key to lock the plunger in the depressed position and then turning the key back again to release the plunger.

Selection

The selection and use of a push button switch involves knowing the details of the particular installation. The following questions should be answered in order to make the proper selection.

- Does a circuit need to be made and/or broken?
- Are there multiple circuits?
- What operating force is desired?
- What color plunger is required or requested?
- What style plunger is necessary?
- Does the button need to be guarded from unintentional operation?
- What is the switch environment?(Exposed to weather?)

Installation

Every installation is unique, therefore there are only a very few hard and fast rules to follow. Above all, observe all SAFETY REQUIREMENTS, PROCEDURES and LOCAL CODES. To mount these devices it will be necessary to have a suitable enclosure. These are available from REES (see page 39) or they will mount on Condulet® "FS" style cast enclosures. Switches found on page 18 must be mounted on enclosures with large openings (series 04938) found on page 39. On pages 18 through 27 you will find more than ninety different models of single plunger push button switches that should satisfy any installation requirements. They cover a full range of functions and operating forces from ~ 2.0 lbs to 6.0 lbs. In the fourth section of this catalog you can find a number of accessory items to facilitate in the installation or operation of these switches. These switches, as all mechanical devices, will wear out and eventually need to be replaced. The estimated minimum mechanical life is 1,000,000 operations. Regular scheduled Preventive Maintenance inspections are strongly recommended for these switches. Some items to look for are:

- Physical damage to the switch.
- Loose connections or components.
- Broken or weak springs.
- Burnt or very worn contacts.

REES push button switches are designed and manufactured to surpass the minimal standards of industry. On the facing page is a brief look at some of these regulations and how our switches conform. The testing done by independent facilities is the minimum requirement that the REES switches far exceed. If other assistance is desired please contact the factory.

See **"WARNING ON PRODUCT APPLICATION"** page (2)

Regulations

Following are references and excerpts from Federal and Foreign Regulations that have applicability to Push button Switches.

29 CFR 1910.217 (b) (6) (i)

"A two hand trip shall have the individual operator's hand controls protected against unintentional operation and have the individual operator's hand controls arranged by design and construction and/or separation to require the use of both hands to trip the press and use a control arrangement requiring concurrent operation of the individual operator's hand control."

29 CFR 1910.217 (b) (7) (ii)

"A red color stop control shall be provided with the clutch/brake control system. Momentary operation of the stop control shall immediately deactivate the clutch and apply the brake. The stop control shall override any other control, and reactivation of the clutch shall require use of the operating (tripping) means which has been selected."

29 CFR 1910.217 (b) (7) (iii)

"A means of selecting Off, Inch, Single Stroke, and Continuous (when the continuous function is furnished) shall be supplied with the clutch/brake control to select type of operation of the press. Fixing of selection shall be by means capable of supervision by the employer."

OSHA Sources of Standards:

Sec. 1910.217 is derived from ANSI B 11.1 - 1971

ANSI B 11.3 - 1982 (4.4.4.2.1)

"Emergency Stop Control. An emergency stop control shall be provided. This control shall immediately stop the ram movement by momentary actuation of this control. The emergency stop control shall override every other control. Reactuation of the ram movement shall require the use of the predetermined operator's control station which has been selected."

NEMA ICS 2 - 1988 (2-216.22)

"Heavy-duty push buttons and selector switches shall have contact rating designations of A600, A300, A150, N600, N300, or N150 as shown in Table 2-125-1 for alternating current and Table 2-125-2 for direct current."

NEMA ICS 2 - 1988 (2-216.62)

"The color of those push buttons which perform a stop function shall be red."

CEN (European Committee for Standardization) EN 418 :1992 (4.1.2)

"The control device and its actuator shall apply the principle of positive mechanical action."

CEN (European Committee for Standardization) EN 418 :1992 (4.4.3)

"The emergency stop actuators shall be coloured red. As far as a background exists behind the actuator and as far as it is practicable, it shall be coloured yellow."

REES switches exceed the following:

Listed by Underwriters Laboratories per Standard UL 508
File No. E 58589

Certified by Canadian Standards Association per Standard C 22.2
File No. LR 3648

Certified by DEMKO to IEC/EN 60947-5-5 or IEC/EN 60947-5-1

Third party certified under DEMKO File #FI-17205


NEMA ICS 2-1988

IEC/EN 60947-5-5: Standard which applies to electrical emergency stop devices with a mechanical latching function. This standard also encompasses all requirements of regular electromechanical switches (60947-5-1)

IEC/EN 60947-5-1: Standard which applies to low-voltage switchgear and controlgear such as the electromechanical switches manufactured by REES, Inc.

Following are definitions of terms as relating to Push Button Switches:

Push Button - A push button switch (push button) is a switch having a manually operable plunger, rocker or button for actuating the switch.

Positive Break -  The achievement of contact separation as the direct result of a specified movement of the switch actuator through non-resilient members. (e.g. NOT dependent upon springs)

Positive Transfer - A contact system so designed that, it remains in one state (NO or NC) until the switch actuator moves to a "point of no return" then the contacts transfer and cannot be teased.

Slow-Make / Slow-Break - A contact system that opens and/or closes at the same rate (speed and time) that the actuator is moved.

Snap Action - A rapid motion of the contacts from one state to another, that is independent of the rate of travel of the actuator. Similar to "Positive Transfer".

Emergency Stop - A device that can be actuated in an emergency situation (one that arises from a sudden and unexpected need) and utilizes a positive mechanical action to function as a "stop category 0" device [i.e. stopping by immediate removal of power to the machine or mechanical disconnection between the hazardous elements and their machine actuator(s)].

Operating Force - The amount of pushing or pulling force (in pounds) necessary to change the state of the switch from an **at rest** condition to one of contact change, that is, to **make** a set of Normally Open contacts or **break** a set of Normally Closed contacts.

Two-Hand Control (anti-tie down) - Each hand control shall be protected against unintended initiation and shall be arranged by design, construction, or separation so that the concurrent use of both hands is required to trip the press. The safety distance (D_m) between the two hand trip and the point of operation shall be greater than the following formula:

$D_m = 63 \text{ inches/second} \times T_m$

D_m = minimum safety distance (inches); 63 inches/second = hand speed constant; and
 T_m = the maximum time the press takes for the die closure after it has been tripped (seconds).

Reference OSHA 1910.217(c)(3)(ii)(e) for additional safety distance information.
OSHA website is www.OSHA.gov