

# CABLE/ROPE OPERATED SWITCHES



P.O. Box 652 • Fremont, IN • 46737  
www.reesinc.com

P: 260-495-9811 • F: 260-495-2186



## Definition

A cable pull switch is a mechanical device used to make and/or break one or more electrical circuits from a semi-remote location through pulling or pushing of a cable or rope.

## Operation

The cable, attached to the operating ring or lever of the switch, is installed with multiple supports in close proximity to the individuals who require control of the circuit. The pulling of the cable anywhere along its entire length will actuate the switch and either turn on or turn off the circuit it is wired into. One switch and cable can cover a distance of up to two hundred feet. This is especially useful when trying to guard conveyors.

## Selection

The selection and use of a cable pull switch involves knowing the details of the particular installation. The following questions must be answered in order to make the proper selection. Does a circuit need to be made and/or broken? Does the circuit need to be manually or automatically reset? Are visual indicators required? What operating force is desired? How much cable slack (pre-travel) is acceptable? Will shorter cable runs increase operator reaction time? Are longer runs adequate?

## Installation

Every installation is unique, therefore there are only a very few hard and fast rules to follow. First of all, observe all SAFETY REQUIREMENTS, PROCEDURES and LOCAL CODES. Secondly, the cable switch MUST be mounted on a flat surface. Bolting the switch to an irregular surface can cause the housing to be twisted and alter the function of the switch. The first cable support MUST be located 6 to 12 inches from the switch and in line with the switch shaft within 5 degrees. It is recommended that the balance of the cable supports be spaced at intervals not exceeding 10 feet. Long unsupported spans of cable will sag causing the operator at a different location to "pull up" that slack before actuating the switch. Unmanned sections of the cable can be run through open ended conduit affording maximum support and protection. This is also a very good way to route the cable around a corner if necessary. A larger radius curve can be bent into a short piece of conduit than can be obtained with a pulley. The operating force of a cable switch is dependent upon the distance between the cable supports and the total distance the cable has to be pulled to actuate the switch. Our switch "Instruction Sheets" chart these forces and can be used as a guide for the desired installation. It is recommended that the cable length does not exceed 200 feet and be in as straight a line as possible. This recommendation, as with the others given can be circumvented by the experience, knowledge and good sense of the installation supervisor. Cable weight is another factor to consider, as a too heavy cable may impair the system function by placing too great a pre-load on the switch. The use of a turnbuckle and/or an anchor spring in line with the cable will facilitate the installation and adjustment of the cable system. All cable materials will stretch with use and when subjected to varying temperature swings. This is more of a problem on longer runs than on shorter ones, so the cable must be regularly checked and re-adjusted to maintain the desired cable tension. These switches, as all mechanical devices, will wear out and eventually need to be replaced. The estimated minimum mechanical life is 150,000 operations. Regularly scheduled Preventive Maintenance inspections are strongly recommended for these switches. Some items to watch for are:

- Physical damage to the switch.
- Damage to the cable, particularly at the points that it passes through its supports.
- Loose connections or components.
- The cable out of adjustment!

If other assistance is desired please contact the factory.

On pages 7 through 13 you will find almost fifty different models of cable/rope pull switches that should satisfy any installation requirements. They cover a wide range of functions and operating forces from light to heavy duty. Also included are a number of accessory items to facilitate the installation or operation of these switches.

REES cable 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 (UL, CSA and DEMKO) are the minimum requirements that the REES switches far exceed. We also conform to published standards by OSHA, NEMA, The Low Voltage Directory and ASME.

See "WARNING ON PRODUCT APPLICATION" page (2)

## Federal Regulations

Following are references and excerpts from Federal Regulations that have applicability to Cable Switches.

### 29 CFR 1910.216 (c) (2)

"On both sides of the calendar and near each end of the face of the roll there should be a cable or wire center cord connected to the safety trip. They shall operate readily when pushed or pulled."

### 29 CFR 1910.216 (e)

"All trip and emergency switches shall not be of the automatically resetting type, but shall require manual resetting."

### 29 CFR 1910.218 (j) (3)

"Conveyor power transmission equipment shall be guarded in accordance with ANSI B20.1 -1992."

### 29 CFR 1910.261 (c) (15) (iv)

"Every belt conveyor shall have an emergency stop cable extending the length of the conveyor so that it may be stopped from any location along the line, or conveniently located stop buttons within 10 feet of each work station, in accordance with ANSI B20.1-1992."

### 29 CFR 1910.262 (aa)

"A safety trip rod, cable, or wire center cord shall be provided across the front and back of all palmer cylinders, extending the length of the face of the cylinder. It shall operate readily whether pushed or pulled. This safety trip shall be not more than 72 inches above the level on which the operator stands and shall be readily accessible."

### 29 CFR 1910.262 (bb)(2)

"A safety trip rod, cable or wire center cord shall be provided across the front and back of all rope washers extending the length of the face of the washer. This safety trip shall be not more than 72 inches above the level on which the operator stands and shall be readily accessible."

### 29 CFR 1910.263 (i)(7)(iii)

"Where hazard of getting caught exists a sufficient number of stop buttons shall be provided to enable quick stopping of the conveyor."

### OSHA Sources of standards:

Sec. 1910.216 is derived from ANSI B 28.1 - 1967

Sec. 1910.218 is derived from ANSI B 24.1 - 1971

Sec. 1910.261 is derived from ANSI P 1.1 - 1969

Sec. 1910.262 is derived from ANSI Z 8.1 - 1961

Sec. 1910.263 is derived from ANSI Z 50.1 - 1947

### ASME B 20.1 - 1992 (5.11.2) (c)

"Remotely and automatically controlled conveyors, and conveyors where operator stations are not manned or are beyond voice or visual contact from drive areas, loading areas, transfer points, and other potentially hazardous locations on the conveyor path not guarded by location, position, or guards, shall be furnished with emergency stop buttons, pull cords, limit switches or similar emergency stop devices."

## The majority of 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 No. FI-17205

NEMA ICS 2-1988

ASME B 20.1

DEMKO A/S is a body notified to the Member States and Commission of the European Communities according to the provisions of Article 8 of the Low Voltage Directive.


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 terms as relating to Cable Switches:

**Reset (A) Auto** - After the cable tension is removed, the switch will automatically return to its normal state.

**Reset (M) Manual** - After the cable tension is removed, the switch will remain in that state until manually returned to its normal condition.

**Positive Break** -  The achievement of Normally Closed contact separation is 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)].

**Latching Contacts** - After the cable tension has been removed, the mechanical trip mechanism will return to its normal state; the contacts then require resetting through an independent means.

**Broken Cable Detection** - After the switch has been setup, if for any reason the actuator cable is broken or becomes unattached from the switch or is intentionally pulled, the switch will trip and latch.