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INDUSTRIAL AUTOMATION WITH PLC

PUSH BUTTON & IT'S WORKING

PUSH BUTTON

A push-button or a button is a simple mechanism to control a process or some aspect of the machine. Usually, these buttons are made out of materials like plastic or metal.
It is used to close or open an electric circuit when a button or knob is pressed and returns to its normal position when it is released.

The Push buttons are used in no. of applications like in industrial and commercial applications, calculators, and kitchen appliances and various electronic and mechanical devices, etc.

Push buttons, shown in figure 1, are the most common type of control devices found in industrial facilities. Almost all industrial machines contain push buttons even if the facility's operation is set to run automatically. Typical push buttons are momentary meaning they are designed with a spring to keep the button contacts open or closed at all times. Some push buttons are designed with a toggle action, once they are set into a position it will require someone to pull or push on it to change its contact state.

Fig.1: Push Button

Push Button Switch Working Principle:

Push buttons are simple single-pole switches. They contain a set of contact plates that make or break when activated by someone. All push buttons are made the same way, what gives them their special characteristics or function is the legend plate and sometimes the operator or button head. The legend plate surrounding the push button lets the user know the purpose of the control device, whether it is to turn something on or off or move something up or down, it all depends on what the label is telling the user of the push button to do. In some instances, the shape of the push button indicates its function. For example, a push button in the shape of a mushroom and red in colour informs the user that the intention of the push button is to serve as an emergency stop, as shown in figure 2, unlike a push button that is simply red to indicate stop and/or green to indicate the start.

Fig.2: Emergency Stop Button

Push buttons are designed to function the same way but they are equipped with different operators. An operator is the part of the device that is pushed, pulled, or rotated by someone operating the circuit. Most operators of pushbuttons are covered by shrouds to prevent dust and dirt from entering the control device.

Push Button Contact Block:

A contact block, as shown in figure 3, is part of the control device that is activated by the operator. Contact blocks contain metallic alloy often called points that are great for conducting current**.** Some control devices contain one normally open or normally close set of contacts while others contain a combination of normally open and normally closed contacts and then there are those that contain two or more normally open and normally closed contacts. Multiple contacts can be added or changed out to the operator as desired.

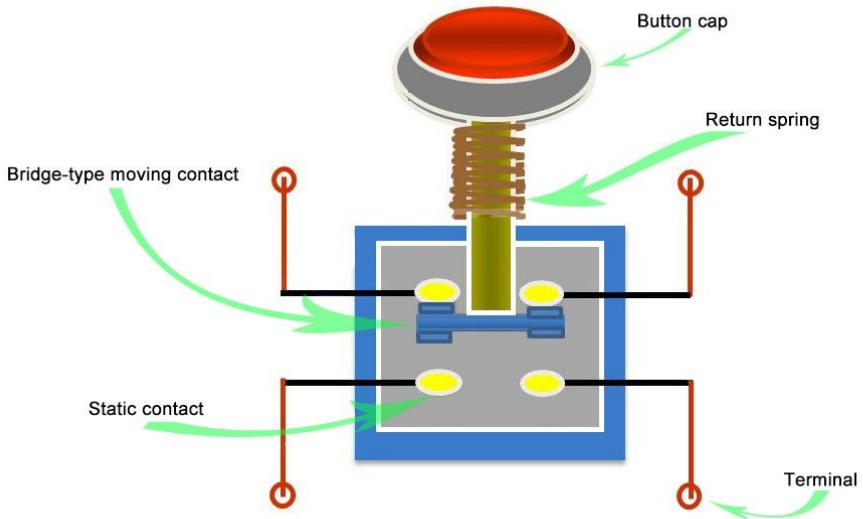
Fig.3: Contact Block

Contact blocks can be replaced if necessary. The reason for replacing the contact blocks occur when the arcing effects occur within the block. This takes place due to short-circuit and high current affecting the contacts that become pitted, distorted or welded together rendering the control device useless.

Push buttons should be installed into control panels or push button stations for safe and secure operation. When installing or replacing push buttons it is important to pay close attention to the size of the push button because push buttons are different sizes and shapes.

Construction of a Push Button:

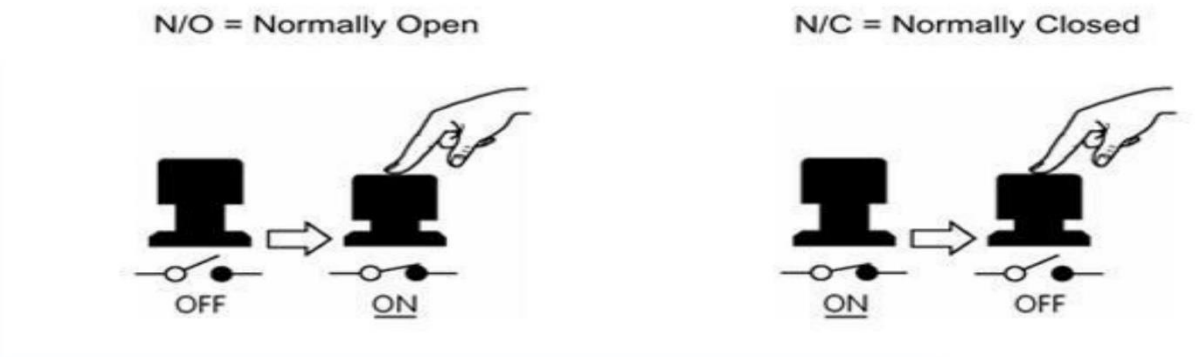
A push-button has the following components- The Actuator, Stationary contacts, and the grooves. When we press on it, the small metal spring inside makes contact with the two wires and the electricity will flow through it. When we release, the spring retracts, contact is interrupted and, the current won't flow.

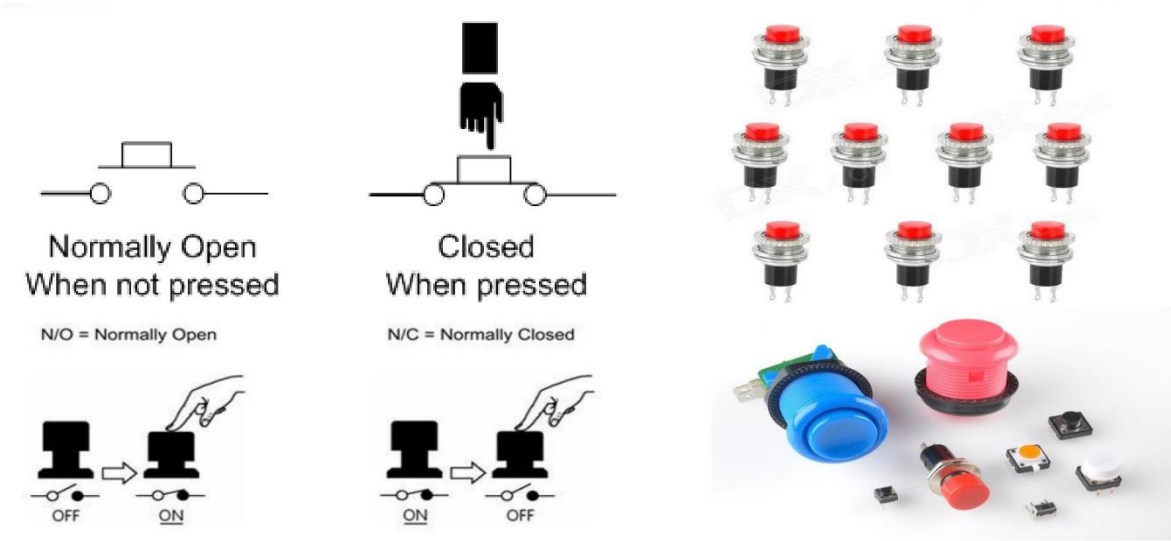


The push-buttons can be of two types. NO and NC. For NO pushbutton, at initial condition, it will not allow the supply through it. When we press the push button, it will allow the supply through it, and when we release it will come to its normal position. To maintain the output in a continuously ON state after releasing the pushbutton, we will provide the latching to it.

At initial condition, The NC pushbutton allows the supply through it and when we press the button, it will cut the power flow and when we release the button it will come to the normal position.

As per the industrial norms, we have two types of pushbuttons, Green and Red. Green means always NO and red means always NC. A green push-button is used to turn on the devices and red push-button is used to turn off them.


N/O = Normally Open
OFF
ON
N/C = Normally Closed
ON
OFF


Normally Open
When not pressed
Closed
When pressed
N/O = Normally Open
N/C = Normally Closed
OFF
ON
ON
OFF