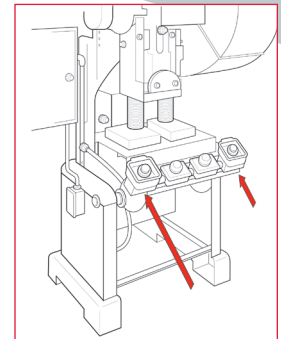


# SAFEGUARDING IN MANUFACTURING

## 9. Two-Hand Controls and Trips

### Two-Hand Controls

Both controls (buttons, levers, sensors) must be activated at the same time and kept engaged throughout the hazardous portion of the machine cycle. If the controls are released the machine either stops or returns to top of stroke (the position that opens the dies). This type of machine operation is called **part revolution clutch (12)** or friction clutch, and is found with pneumatic clutches/brakes and with hydraulically powered machinery such as brake presses.



Two-Hand Controls  
Power Press

### Two-Hand Trips

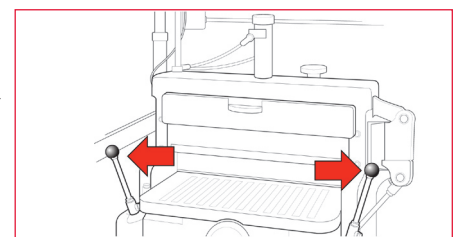
Both controls must be activated at the same time to initiate the machine cycle but releasing the controls will not interrupt the machine cycle. This type of machine operation is called **full revolution clutch (12)** or mechanical clutch.

Two-hand controls and trips must be:

- Protected against unintended or accidental operation, i.e., surrounding the activating button with a “ring” guard
- Separated or otherwise designed to require both hands to activate controls (no hand-and-elbow operation)
- Designed so that both hands must be released before another cycle can be initiated (“anti-repeat” feature). The design should also prevent the operator from tying down one of the controls by using tape, rubber band, wedge, etc., (“anti-tie down” feature)
- Located a safe distance from the nearest hazard so that the operator cannot reach it with a hand/other body part before the hazardous machine cycle has stopped. This safe distance is calculated using a “Hand Speed Constant” of 1,600 mm (63”) per second (sec.), considered the speed of a person reaching into a machine’s point of operation to retrieve an object or correct a fault.

In a simple example, the safe location of a two-hand control for a machine that comes to a complete stop 1sec. after the controls are released is 1,600 mm (63”) from the nearest point of operation. For a machine that stops in 1/2 sec., the safe distance is 800 mm (31-1/2”), etc.

**WARNING**  
Two-hand controls alone may not provide sufficient safeguarding. Additional barrier guards may be required to protect workers other than the operator.



Two-Hand Controls (Paper Guillotine)

To find the precise stopping time of a machine cycle requires specialized measuring equipment.

Safeguarding of  
Machinery: CSA  
Standard Z432



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