ENVIRONMENT, SAFETY & HEALTH DIVISION

*Chapter 25: Machine and Portable Tools*

# Machine Safeguarding Anti-restart Device Requirements

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# 1 Purpose

The purpose of these requirements is to prevent electric-powered *machine tools* from restarting automatically. They cover the selection and installation anti-restart devices on such tools. They apply to workers, supervisors, and machine and shop custodians.

## 1.1 Background

Equipment that is dependent upon electricity for its power source will stop working when the electrical power is interrupted. Once power is restored, some equipment may restart automatically, which could present a significant hazard to workers.

Equipment may likely restart automatically if

- The switch is left in the on or closed position.
- It can be restarted through a computer.
- It has instrumentation, such as a level switch, that will re-set itself, allowing the machine to restart once power has been restored.
- It is wired to a different power source for control power. (When there are two separate sources of power, and a local electrical outage occurs for the main power circuit, the control power remains energized even though the main power is off. This means that the starter will remain energized, or in the closed position. When the main power is restored, the equipment will restart because the starter is already energized.)

# 2 Requirements

To protect workers, machine tools that have the capability of restarting automatically must

1. Be fully guarded or
2. Be provided with an anti-restart device (ARD)

An ARD is not required for machines that meet any of these conditions:

1. Machines whose moving parts are fully guarded.
2. Machines that have a magnetic starter and

1. Do not have a computerized auto start feature
2. Do not have automatic re-setting instrumentation such as a level switch
3. Do not have a separate power source for the control circuit

3. Machines that meet the requirements of the applicable standard in the American National Standard Institute (ANSI) B11 series

4. Machines that are listed and labeled by a nationally recognized testing laboratory (NRTL) and are used in accordance with the instructions included in the listing

**Caution** ARDs must not be installed on equipment that is required to be on-line constantly, such as HVAC, sump pumps, and refrigerators. This type of equipment must be fully guarded.

## 2.1 Installing ARDs

Depending upon the wiring configuration, there are several methods available to install ARDs.

### 2.1.1 Cord-connected machines (120 volts)

Use method A or B below.

#### 2.1.1.1 Method A, Plug-in Adapters

Adapters are the easiest and least expensive way to apply an ARD. To install, plug an adapter into the electrical outlet for the machine, then plug the machine cord into the adapter. When power is lost, the adapter will remain de-energized until it is manually reset.

The following adapters are recommended:

- Shock Shield, Model 14000 (wall mounted, three outlets, comes with anti-theft screw).
- Shock Shield, Model 14650 (portable)

#### 2.1.1.2 Method B, User-attachable Plug

This has an ARD device built in to the plug. To install, replace the regular plug on the cord with the attachable plug. The following plug is recommended:

- Shock Shield, Model 14880 (for cord attachment)

The adapters and plugs may only be used

- If the machine is connected with a cord
- If the load requirement does not exceed 15 amperes at 120 volts

*Note* *The adapters and plug listed above have ground fault circuit interrupters (GFCIs). Not all plugs and adapters have GFCI protection.*

### 2.1.2 Hard-wired Machines (120 volts)

This ARD is a panel-mounted device consisting of a compact molded case that must be mounted in a box. It is connected between the source of power and the machine and will work even without a starter or contactor. When power is lost, the device trips out and cannot restart until it is manually reset after power is restored. The following ARD is recommended:

- Shock Shield, Model 14060 (20 ampere, 120 volts AC)

### 2.1.3 Three-phase Machines (208 or 480 volts)

Most machines are wired through a starter or contactor, providing anti-restart protection. If, however, a machine has an automatic start or if the control power comes from a different source, the built-in anti-restart feature is defeated. In this event, there are two ways to create an anti-restart feature depending upon the wiring configuration:

1. Install an under-voltage relay with the coil in the main circuit and the contact in the control circuit. (This prevents the contactor from re-closing without a manual reset.)
2. Install two under-voltage relays with one coil in the main circuit and another in the control circuit. Contacts of both relays should be wired in series in the control circuit.

# 3 Forms

The following forms and systems are required by these requirements:

- None

# 4 Recordkeeping

The following recordkeeping requirements apply for these requirements:

- None

# 5 References

SLAC Environment, Safety, and Health Manual (SLAC-I-720-0A29Z-001)

- Chapter 25, “Machine and Portable Tools”
  - Machine and Portable Tools: Machine Safeguarding Requirements (SLAC-I-730-0A21S-005)
  - Machine and Portable Tools: Machine Safeguarding Guideline (SLAC-I-730-0A21T-016)

Other Documents

- American National Standards Institute (ANSI) B11 standard series, “Machine Safety” (ANSI B11)