

MECHANICAL POWER PRESS SYSTEM

Each mechanical power press must be looked at as an individual system. This system consists of, but is not limited to, the frame, all mechanical parts, clutch and brake assemblies, electrical or electronic systems, hydraulic systems, pneumatic systems, tooling or dies (present and future), tool or die setup, safeguarding, material handling, maintenance requirements, size or configuration of workpiece, and most importantly, production requirements.

OSHA STANDARDS

The controls and safeguarding systems offered in this section of the catalog will help the user of mechanical power presses (punch presses) meet or exceed OSHA 29 CFR 1910.212, 1910.217, 1910.219, 1910.147 and ANSI B11.1 safety standards as we interpret them. OSHA's Code of Federal Regulations can be purchased by contacting:

U.S. Government Printing Office

P.O. Box 371954
Pittsburgh, PA 15250-7954
Phone: (212) 512-1800
<http://bookstore.gpo.gov>

ANSI STANDARDS

There are several references available on press safety; however, most industries use the ANSI (American National Standards Institute) B11.1 standard for the best safety practice on power presses. This standard can be purchased by contacting:

ANSI

American National Standards Institute, Inc.
25 West 43rd Street, 4th Floor
New York, New York 10036
Phone: (212) 642-4900 • Fax: (212) 398-0023
www.ansi.org

OR

AMT

The Association for Manufacturing Technology
7901 Westpark Drive
McLean, VA 22102-4206
Phone: (703) 893-2900 • Fax: (703) 893-1151
www.amtonline.org

OR

GLOBAL ENGINEERING

15 Inverness Way East
Englewood, CO 80112
Toll-Free: 1-800-624-3974
<http://global.ihs.com>

TYPES OF CLUTCHES ON PRESSES

Most power presses have one of two types of clutches:

1. **Full Revolution** (sometimes referred to as a mechanical clutch)
2. **Part Revolution**, classified in two categories:
 - Air Clutch
 - Mechanical-Friction Clutch



CONDITION OF THE PRESS

The equipment offered in this catalog can neither cure nor overcome a malfunctioning machine or prevent a mechanical defect or failure of a component part thereof, nor prevent a repeat or unintended stroke (cycle) resulting from a mechanical malfunction, defect or failure of the machine itself.

For example, on mechanical power presses, a brake monitoring system can only detect a gradual deterioration of the brake on the press, not a catastrophic mechanical failure in the clutch/brake mechanism.

It is essential that the machine be thoroughly inspected and that all mechanical, electrical, pneumatic, and hydraulic components and systems, including all collateral equipment, be in first-class operating condition before any equipment is installed. A maintenance and inspection program must be established and implemented to keep machines in your plant in first-class condition. This program must include regular periodic inspections of each machine to ensure that, among other things, (i) the clutch and brake mechanism, mechanical linkages, and air counterbalances are operating and used properly; (ii) there is no dirt or water in the air lines; and (iii) the machine is operating at its proper speed (RPM or SPM). Any part of the machine that is worn, damaged, or not operating correctly must immediately be replaced or repaired before the machine is used.

SAFETY CONSIDERATIONS ON PRESSES

Referencing OSHA 29 CFR 1910.217(d)(1), it states: "The employer shall (i) use dies and operating methods designed to control or eliminate hazards to operating personnel, and (ii) furnish and enforce the use of hand tools for freeing and removing stuck work or scrap pieces from the die, so that no employee need reach into the point of operation for such purposes."

BASIC REQUIREMENTS

When updating presses to comply with the indicated safety standards, there are five basic requirements that must always be considered. They are:

1. **Safeguarding (pp. 7-86)**
2. **Controls (pp. 90-102)**
3. **Disconnects (pp. 193-195)**
4. **Starters (pp. 193-195)**
5. **Covers (user to provide)**

This introduction and subsequent pages in this catalog will provide information on safety requirements in the above areas.

SAFEGUARDING

The following are OSHA-recognized methods for safeguarding the point of operation on mechanical power presses:

Part Revolution	Full Revolution
1. Barrier Guard	1. Barrier Guard
2. Two-Hand Control	2. Two-Hand Trip
3. Presence-Sensing Device	3. Pullback
4. Pullback	4. Restraint
5. Restraint	5. Type A Gate
6. Type A or B Gate	

When safeguarding, please keep in mind that the sides and back of the point of operation must also be safeguarded to protect the operator and other employees.

See page 74 for the safety distance formula for two-hand control, page 47 for the two-hand control chart, and page 46 for the OSHA and ANSI safety distance formula for presence-sensing devices on part-revolution-clutch power presses. See pages 75 and 76 for the safety distance formula and graph for two-hand trip on full-revolution-clutch presses.

CONTROLS

Controls are furnished according to the type of press: full revolution or part revolution. Please see later pages detailing these requirements for further explanation.

ELECTRICAL AND LOCKOUT REQUIREMENTS

A press system requires a proper disconnect switch, motor starter, transformer (for reducing the voltage to 120 V or less), and an air lockout valve.

When applying any of the standard control boxes offered in this catalog, a 120-V coil must exist or be changed in the present magnetic starter on the press. If a press has a manual starter, it must be replaced with a magnetic-type starter. The standard and custom control boxes are furnished with a multi-tap transformer for various primary voltages.

COVERS

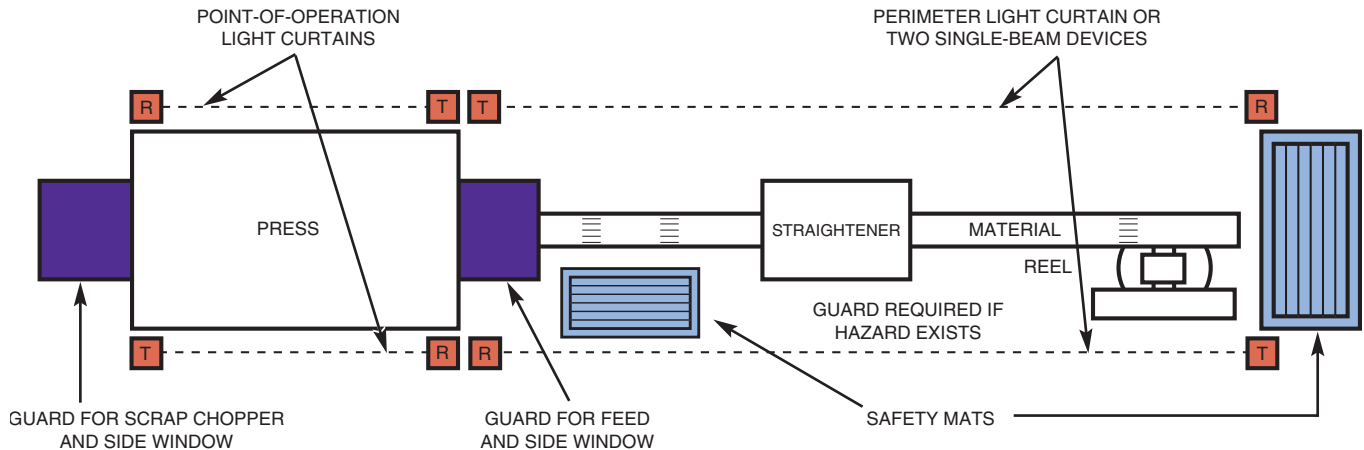
Mechanical power-transmission apparatus include components on a machine or auxiliary equipment including shafts, crankshafts, splines, pulleys, sprockets, rolls, flywheels, gears, and couplings. These components can create hazards to personnel who work on or around the machines. They must be covered in accordance with OSHA 29 CFR 1910.219 and ANSI B15.1. All apparatuses that create a hazard must be guarded (covered) if at or below a seven-foot level from the floor or platform. This is usually done by the user, either by modifying existing guards or by contacting a local sheet-metal fabricator to make a new cover.

AUXILIARY SAFEGUARDING

Auxiliary safeguarding is used for additional protection from injuries for all personnel in the machine area. It is used in conjunction with primary safeguarding devices. Auxiliary safeguarding also involves the guarding of other components or hazardous openings on machines. One of these hazards is created by auxiliary feeding equipment used with some power presses. Auxiliary equipment includes various types of feeds, shuttles, magazines, stackers, indexing tables, straighteners, reels, cradles, recoilers, scrap choppers, iron hands, robots, etc.

Auxiliary safeguards include such items as point-of-operation side barriers when light curtains are used, pressure-sensitive safety mats, workpiece tables, or horizontal light curtains. An additional set of light curtains can be used horizontally to prevent an operator or other persons from standing between the vertical plane of light and the point-of-operation hazard. Please remember that light curtains can only be used on part-revolution presses.

AUXILIARY SAFEGUARDING (continued)



Straight-Side Press Arranged for Automatic Feeding

The two most commonly used safeguards for presses equipped with automatic feeds are guards and presence-sensing devices (light curtains). These safeguards are detailed in previous pages of this catalog. When considering either of these safeguards, arrange them to protect the point of operation as well as the feed. This may require the guard to extend to the right or left of the bolster on OBI presses. If a scrap chopper is furnished, the guarding must also be extended to safeguard it. If a feed and scrap chopper are on the sides of straight-side presses, the feed, scrap chopper, and window openings also need to be safeguarded.

When protecting operators and other employees in the press area from hazards created by straighteners, pay-off reels, cradles, iron hands, robots, etc., the perimeter or work envelope of this auxiliary equipment can be safeguarded as illustrated above. This is usually accomplished with guards, presence-sensing devices, safety mats, or a combination of these safeguards.

When protecting these areas, keep in mind that access may be required for changing coils and removing scrap, blanks, etc.

Danger signs, used for warning, can be mounted on the machine in a position that is readily visible to the operator, setup person, or other personnel. Hand tools are another auxiliary safeguard often used when feeding and retrieving small workpieces or removing scrap from the die area. Hand tools by themselves are not a point-of-operation safeguarding device.

When using a light curtain, the mounting brackets for the transmitter and receiver may have to be modified to include safeguarding of the feed. The light curtain's plane of light commonly protects only the front of the press. Additional guards or mirrors that reflect the light curtain's plane of light are needed to safeguard the sides and back of the machine.

When safeguarding presses equipped with shuttles, magazines, stackers, indexing tables, etc., the previously discussed safeguards can be used. This assumes that the press is operating in either the continuous or automatic single-stroke mode of operation. If the press is single-stroked by overt operator action, other safeguards such as two-hand control, pullback devices, restraints, or gate devices could be used. The back and sides of the point of operation must always be protected as well.

AIR AND HYDRAULIC PRESSES

Included in this catalog are two-hand-control packages for air presses and other air-operated machines and devices. See pages 143-144.

Controls for hydraulic presses are also available. Two-hand control is usually furnished along with other point-of-operation safeguarding. Please see pages 130-142 for further details.