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:

<table>
<thead>
<tr>
<th>Part Revolution</th>
<th>Full Revolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Barrier Guard</td>
<td>1. Barrier Guard</td>
</tr>
<tr>
<td>2. Two-Hand Control</td>
<td>2. Two-Hand Trip</td>
</tr>
<tr>
<td>4. Pullback</td>
<td>4. Restraint</td>
</tr>
<tr>
<td>5. Restraint</td>
<td>5. Type A Gate</td>
</tr>
<tr>
<td>6. Type A or B Gate</td>
<td></td>
</tr>
</tbody>
</table>

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.

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.

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.
AUXILIARY SAFEGUARDING (continued)

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.

Straight-Side Press Arranged for Automatic Feeding

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.
OSHA 29 CFR 1910.211 Definition

“Full-Revolution Clutch” means a type of clutch that, when tripped, cannot be disengaged until the crankshaft has almost completed a full revolution and the press slide a full stroke.

All of the full-revolution-clutch press control systems are furnished with two-hand trip that can be used as a point-of-operation safeguard. See pages 75 and 76 for detailed information on the safety requirements for two-hand trip. Various other types of guards or devices may be more desirable, such as barrier guards, pullbacks, restraints, or type A gates. For these guards and devices, please refer to pages 7-86.
FULL-REVOLUTION CLUTCH

The full-revolution-clutch press was designed to make one full machine cycle (stroke) or crankshaft revolution after each engagement of the mechanical pin, collar, or rolling key.

On full-revolution presses, the main concern of the clutch control is that it has single-stroke capability if the press is single-stroked. This means that if the actuating means, such as the palm buttons or foot switch, is held operated through an entire stroke, the press will stop at its normal TDC (top dead center) stopping position, barring any mechanical catastrophic failures.

This catalog includes trip-control systems (pages 75-76) which provide single-stroke capability, a requirement of both OSHA and ANSI. These systems also provide two-hand trip which can be used as a point-of-operation safeguarding device when mounted at the proper safety distance.

Full-revolution single-stroke trip-control systems provide other modes of operation, such as continuous-on-demand, foot-maintained continuous, automatic single stroke, and two-hand motor jog for die setup and maintenance requirements.

Two-hand motor jog is used when the die or tooling is being set up in the press, with the flywheel at rest. It allows the designated set-up person to engage the clutch and jog the motor in order to bring the slide down to BDC (bottom dead center). Usually when the slide is in this position of crankshaft rotation (BDC), a die is removed and another is set up.

Three reasons to install a trip-control system on full-revolution-clutch presses that may already have single-stroke mechanisms are: 1) the two-hand motor jog feature, 2) the ease of operating a foot switch versus a mechanical foot treadle, and 3) two-hand trip eliminates the foot pedal/treadle operation.

In addition to providing single-stroke capability with a trip-control system, all full-revolution presses require a safeguarding system. The following are OSHA-recognized methods for safeguarding the point of operation on full-revolution-clutch mechanical presses:

1. Barrier Guard (pp. 11-30)
2. Two-Hand Trip (pp. 75-76)
3. Pullback (p. 77)
4. Restraint (p. 78-79)
5. Type A Gate (p. 80-86)

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 pages 75 and 76 for the safety requirements including the safety distance formula and graph for two-hand trip on full-revolution-clutch presses. See previous pages in this catalog for information on the various safeguards available.

Other safety considerations on a full-revolution-clutch press are the main power disconnect switch, magnetic motor starter, and covers for the flywheel, gears, etc.

CONTROL SYSTEMS

A full-revolution control system consists of:

1. A control box (pp. 92-94)
2a. Individual components (pp. 95-97)

OR
2b. Component packages (pp. 98 and 99)
3. An air cylinder (p. 100)
4. An air lockout valve (p. 97 or 119)

Components in the control system can include a palm button assembly, a foot switch, a monitored dual-solenoid air valve, a filter-regulator-lubricator assembly, an air pressure switch, an air lockout valve, a cam and mounting strap assembly, and a dual photoelectric sensor. The components for these systems will vary depending on the actuating means and the modes of operation that are chosen.

SELECTING A CONTROL SYSTEM

1. To order a control system, determine which control box is required. Choose a control from pages 92-94.
2. Determine which components meet your mode-of-operation requirements. This depends on your production requirements. To simplify this step, component packages are available. See pages 98 and 99.
3. Select an appropriate air cylinder. Air cylinders are available in a variety of sizes and configurations to fit the specific machine application. See page 100.
4. Add an air lockout valve, if required. See page 97 or 119.
FULL-REVOLUTION CONTROL

STANDARD FULL-REVOLUTION CONTROL BOX

The electro-pneumatic trip-control system is designed for use on full-revolution-clutch mechanical power presses. It is designed and built to comply with OSHA 29 CFR 1910.217 and ANSI B11.1 and B11.19. This control updates full-revolution-clutch presses that do not presently have single-stroke capability. It can also be a replacement for existing trip-control systems.

This control is an economic, full-featured microprocessor-based press trip control. The system uses a microprocessor to cross-check and monitor the control relays. In the event of a control malfunction, further operation is prevented. See page 259 for details on control reliability.

The multi-tap transformer has a 115-, 208-, 230-, 460-, and 575-V primary, 115-V secondary, and 100-VA rating. This control must be wired in to a motor starter that has a 115-V operating coil. This provides primary power to the clutch control and to the control box for the two-hand motor jog mode of operation.

The standard control box is housed in a 16” x 10” x 6” NEMA 12 enclosure. The ground indicator light and operator controls are located on the front of the enclosure door. The motor controls are usually located in a remote station.
FULL-REVOLUTION CONTROL (continued)

STANDARD MODES OF OPERATION
- Two-hand motor jog
- Two-hand single stroke
- Two-hand “walk-away” continuous*
- Foot single stroke
- Foot-maintained continuous*
- Automatic single stroke*
- Continuous-on-demand*
*Requires a remote prior-action station.

FEATURES
- Single-stroke capability operation
- Two-hand antirepeat
- Two-hand trip as a point-of-operation safeguard
- Two-hand anti-tie down and concurrent operation
- Controls all types of full-revolution clutches
- Redundant-logic system microprocessor
- Provisions for electrically interlocking safety devices
- Isolated microprocessor logic power supply
- Redundantly monitored solid-state relay/captive-contact relay output for trip solenoid(s)
- Saddle-clamp circuit board terminal strips
- Supports redundant, self-checking solenoid valves
- Fused SSR (solid-state relay) outputs
- Type A gate interface

CUSTOM FULL-REVOLUTION CONTROL BOX
Full-revolution-clutch custom control boxes and packages are available to fit your particular press room needs. A custom control box contains the standard control module and components as described on the previous page plus the following:
- main power disconnect switch
- main drive motor starter
- ram-adjust motor starter (if required)

These boxes are furnished with an IEC through-the-door main power fused disconnect switch and an IEC magnetic motor starter (with push buttons). A reversing ram-adjust motor starter with selector and push buttons may also be included. They are prewired and built into a larger NEMA 12 enclosure.

Operator controls are located on the front of the enclosure door. The motor controls can be located in a remote station or on the enclosure door.

NEMA-style disconnect switches and motor starters, and brand-name components specified by our customers are also available. To ensure the starter(s) and disconnect are sized properly, please check horsepower for the main drive motor and slide adjust motor (if furnished) on the press, as well as full-load amps, and primary voltage to the press. After obtaining this information, please go to the chart on page 94 to determine the proper custom control box part number. Follow directions 1-7 to determine the correct part number.
SELECTING A FULL-REVOLUTION-CLUTCH PRESS CONTROL

To determine the 8-digit configured part number for the full-revolution control required, follow directions 1-7 below and use the information in the PART NUMBERING SYSTEM CHART below.

1. The first 2 digits for all full-revolution controls are FP.
2. The 3rd digit determines the modes of operation required.
3. The 4th digit determines the size of the disconnect switch, if provided, in the control enclosure. Zero (0) indicates no disconnect switch provided.
4. The 5th and 6th digits determine the size and type of nonreversing motor starter, if provided, in the control enclosure. Zeros (00) in both positions indicate no motor starter provided.
5. The 7th digit determines the location of the operator controls.
6. The 8th digit will indicate the type of modifier provided: i.e., main drive motor control operators remote.

**SAMPLE**

```
FP  F 1 1 2  F 5
```

The sample shown, FPF-112-F5, indicates that the custom full-revolution-clutch control box will provide two-hand single stroke, two-hand motor jog, two-hand continuous, foot single stroke, and foot-maintained continuous modes of operation. There will be an IEC 30-A disconnect switch and an IEC 16-A nonreversing main drive motor starter without ram adjust. All operator controls will be on the door of the enclosure with the exception of the main drive motor operators which will be located remote.
INDIVIDUAL COMPONENTS

The components for these full-revolution control systems will vary depending on the actuating means and the modes of operations that are chosen. To simplify this, component packages are available. Please see pages 98-99 for part numbers and descriptions of the component packages. The control system can include the following components.

¼" MONITORED DUAL-SOLENOID AIR VALVE
PART NO. RCD-116*

This three-way, ¼" monitored dual-solenoid air valve is ideal for operating air cylinders on full-revolution presses. This dual valve is pneumatically checked. To assist in installation, this valve has a common electrical connector for both solenoids with a 12-foot cord.

<table>
<thead>
<tr>
<th>Cv (Flow Rate)</th>
<th>Ports 1 to 2</th>
<th>Ports 2 to 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.3</td>
<td>1.6</td>
</tr>
</tbody>
</table>

¼" FILTER-REGULATOR-LUBRICATOR ASSEMBLY (FRL)
PART NO. RCL-043*

This assembly is needed to meet the OSHA and ANSI requirements. This FRL assembly filters, regulates, and lubricates the air going through it. This filtered and lubricated air then goes to the solenoid air valve assembly and air cylinder. The regulator should be adjusted so just enough air pressure reaches the air cylinder to operate the clutch. This assembly includes a gauge, coupling, and steel mounting bracket.

AIR PRESSURE SWITCH
PART NO. CTD-062*

This air pressure switch is needed to meet the OSHA and ANSI requirements. The air pressure switch monitors low pressure to either the air cylinder air supply or ram counterbalance systems. The pressure switch must be set so if the air pressure operating the components is not adequate, or if the air pressure suddenly drops, the press becomes inoperable.

CAM AND STRAP ASSEMBLY
PART NO. CML-002*

A cast-aluminum cam and adjustable stainless-steel strap are furnished so the cam can easily be mounted on the crankshaft extension. The strap is adjustable up to 6” diameter and is locked in place by tightening the screw.

Note: Drilling or tapping the end of the crankshaft is not required. All that is required to install it is to slip the cam and strap assembly on the crankshaft, line it up with the opening of the dual photoelectric sensor, and tighten.

*Included in a component package on pages 98 and 99.
INDIVIDUAL COMPONENTS (continued)

DUAL PHOTOELECTRIC SENSOR ASSEMBLY  
PART NO. CMK-090*  
This dual photoelectric sensor assembly with a 15' cord is actuated by the cam mounted on the crankshaft and is specifically selected for this application. The photoelectric sensors provide redundant output signals when the machine is in the single-stroke mode of operation. The cam is used to indicate the approximate top-dead-center position of the machine crankshaft rotation. The cam must be detected by the photo-eye switches (located inside the enclosure) before the machine is allowed to stroke. If the machine does not stop at top dead center (± 5°), or if the sensor assembly malfunctions, becomes improperly adjusted, or the mounting becomes jarred loose, the control will not allow a successive stroke.

A mounting bracket for the sensor assembly is not furnished.

PALM BUTTON ASSEMBLIES
To meet OSHA and ANSI safety requirements, the two run/jog buttons must be protected against accidental operation (with ring guards) and separated to require the use of both hands to operate them. They also must be mounted at the proper safety distance, if they will be used as a safeguard. The electrical contact arrangement of the following buttons is 1 NO and 1 NC.

Part No. CTL-502*  
This palm button assembly consists of two black run/inch buttons (with ring guards), a red emergency-stop button, and a yellow top-stop button. Mounting boxes are furnished with each button. The red and yellow palm buttons each have 1 NO and 1 NC arrangement. The red button is on a yellow-covered mounting box and is equipped with a mechanical latch to meet NFPA 79.

Part No. CTL-507*  
This palm button assembly consists of two black run/inch buttons (with ring guards), and a red emergency-stop button (for press applications without the continuous mode of operation). Mounting boxes are furnished with each button. The red palm button is on a yellow-covered mounting box and has 1 NO and 1 NC arrangement plus a mechanical latch to meet NFPA 79.

See pages 187 and 188 for other palm button assembly options.

*Included in a component package on page 98 and 99.
INDIVIDUAL COMPONENTS (continued)

FOOT SWITCH
PART NO. CTD-011*
To meet OSHA and ANSI safety requirements, a foot switch must be protected from unintentional operation. The foot switch pedal (on the inside) is protected on the top and both sides by the cast cover and the front is protected by the hinged flap. This flap must be raised by the operator’s toe before allowing the foot to enter the switch. When the hinged flap is in the down position, it is also mechanically interlocked with the operating pedal. The contact arrangement is 1 NO and 1 NC.

PRIOR-ACTION STATION FOR CONTINUOUS
PART NO. LLD-400*
This remote prior-action station is required for the continuous or maintained-continuous mode of operation. If a component package is not supplied with the control box, this station must be ordered. The button is furnished separately in an enclosure so it can be mounted in a convenient location on the front of the press. The NEMA 12 enclosure size is 3½” x 4½” x 3½”.

PRIOR-ACTION STATION FOR AUTOMATIC SINGLE STROKE
OR CONTINUOUS-ON-DEMAND
PART NO. LLD-406*
This prior-action station is required for the automatic single-stroke or the continuous-on-demand mode of operation. These modes of operation are only available with the FPA control box. This prior-action push-button station can also be used for either the two-hand “walk-away” or the foot-maintained-continuous mode of operation.

This station is furnished with a three-position keyed selector switch for off, automatic single, and continuous-on-demand. It also has an illuminated prior-action push button. If a component package is not supplied with the control box, this station must be ordered separately. It is furnished in its own enclosure so it can be mounted in a convenient location on the front of the press. The NEMA 12 enclosure size is 5⅞” x 4” x 3⅞”.

¼” AIR LOCKOUT VALVE
PART NO. RCD-071
This three-way valve is operated with the manual movement of a slide that opens and closes the valve. This valve shuts off air at the press and then bleeds off downstream air. This lockout is not included in the component packages listed on pages 98-99 and must be ordered separately. Different styles and valve sizes are available; please see page 119.

Pneumatic System on Full-Revolution-Clutch Power Press

*Included in a component package on page 98 and 99.
COMPONENT PACKAGE ORDERING INFORMATION

SELECTING A COMPONENT PACKAGE
Determine which modes of operation and actuating means you require. Use the following charts to select the component package you require.

MODES OF OPERATION AVAILABLE:
H—Two-Hand Single Stroke
F—Foot Single Stroke
M—Foot-Maintained Continuous
J—Two-Hand Motor Jog
C—Two-Hand “Walk-Away” Continuous
A—Automatic Single Stroke
A—Continuous-On-Demand

COMPONENT PACKAGE SELECTION CHART

<table>
<thead>
<tr>
<th>Component Package</th>
<th>Modes of Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H</td>
</tr>
<tr>
<td>FNH-011</td>
<td>x</td>
</tr>
<tr>
<td>FNH-012</td>
<td>x</td>
</tr>
<tr>
<td>FNH-112</td>
<td>x</td>
</tr>
<tr>
<td>FNF-012</td>
<td>x</td>
</tr>
<tr>
<td>FNF-013</td>
<td>x</td>
</tr>
<tr>
<td>FNF-014</td>
<td>x</td>
</tr>
<tr>
<td>FNF-114</td>
<td>x</td>
</tr>
</tbody>
</table>

COMPONENT PACKAGES USED WITH FPH, FPF, OR FPG CONTROL BOXES

<table>
<thead>
<tr>
<th>PACKAGE NO. FNH-011</th>
<th>HJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWO-HAND SINGLE STROKE AND MOTOR JOG</td>
<td></td>
</tr>
<tr>
<td>Part No.</td>
<td>Description</td>
</tr>
<tr>
<td>RCD-116</td>
<td>1⁄4” Dual-Solenoid Air Valve</td>
</tr>
<tr>
<td>RCL-043</td>
<td>1⁄4” Filter-Regulator-Lubricator Assembly</td>
</tr>
<tr>
<td>CTD-062</td>
<td>Air Pressure Switch</td>
</tr>
<tr>
<td>CML-002</td>
<td>Cam and Strap Assembly</td>
</tr>
<tr>
<td>CMK-090</td>
<td>Dual Photoelectric Sensor Assembly</td>
</tr>
<tr>
<td>CTL-507</td>
<td>Palm Button Assembly (3-button assembly)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PACKAGE NO. FNH-012</th>
<th>HJ-C</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWO-HAND SINGLE STROKE, MOTOR JOG, AND TWO-HAND CONTINUOUS</td>
<td></td>
</tr>
<tr>
<td>Part No.</td>
<td>Description</td>
</tr>
<tr>
<td>RCD-116</td>
<td>1⁄4” Dual-Solenoid Air Valve</td>
</tr>
<tr>
<td>RCL-043</td>
<td>1⁄4” Filter-Regulator-Lubricator Assembly</td>
</tr>
<tr>
<td>CTD-062</td>
<td>Air Pressure Switch</td>
</tr>
<tr>
<td>CML-002</td>
<td>Cam and Strap Assembly</td>
</tr>
<tr>
<td>CMK-090</td>
<td>Dual Photoelectric Sensor Assembly</td>
</tr>
<tr>
<td>CTL-502</td>
<td>Palm Button Assembly (4-button assembly)</td>
</tr>
<tr>
<td>LLD-400</td>
<td>Continuous Prior-Action Station</td>
</tr>
</tbody>
</table>

COMPONENT PACKAGES USED WITH FPA CONTROL BOXES

<table>
<thead>
<tr>
<th>PACKAGE NO. FNH-112</th>
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</tr>
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<tbody>
<tr>
<td>TWO-HAND SINGLE STROKE, MOTOR JOG, TWO-HAND CONTINUOUS, AUTO SINGLE STROKE, AND CONTINUOUS-ON-DEMAND</td>
<td></td>
</tr>
<tr>
<td>Part No.</td>
<td>Description</td>
</tr>
<tr>
<td>RCD-116</td>
<td>1⁄4” Dual-Solenoid Air Valve</td>
</tr>
<tr>
<td>RCL-043</td>
<td>1⁄4” Filter-Regulator-Lubricator Assembly</td>
</tr>
<tr>
<td>CTD-062</td>
<td>Air Pressure Switch</td>
</tr>
<tr>
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<td>Cam and Strap Assembly</td>
</tr>
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<td>Dual Photoelectric Sensor Assembly</td>
</tr>
<tr>
<td>CTL-502</td>
<td>Palm Button Assembly (4-button assembly)</td>
</tr>
<tr>
<td>LLD-406</td>
<td>Automatic Prior-Action Station</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PACKAGE NO. FNF-114</th>
<th>HFMJ-CA</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWO-HAND &amp; FOOT SWITCH SINGLE STROKE, FOOT MAINT. CONT., MOTOR JOG, TWO-HAND CONT., AUTO SINGLE, &amp; CONT.-ON-DEMAND</td>
<td></td>
</tr>
<tr>
<td>Part No.</td>
<td>Description</td>
</tr>
<tr>
<td>RCD-116</td>
<td>1⁄4” Dual-Solenoid Air Valve</td>
</tr>
<tr>
<td>RCL-043</td>
<td>1⁄4” Filter-Regulator-Lubricator Assembly</td>
</tr>
<tr>
<td>CTD-062</td>
<td>Air Pressure Switch</td>
</tr>
<tr>
<td>CML-002</td>
<td>Cam and Strap Assembly</td>
</tr>
<tr>
<td>CMK-090</td>
<td>Dual Photoelectric Sensor Assembly</td>
</tr>
<tr>
<td>CTL-502</td>
<td>Palm Button Assembly (4-button assembly)</td>
</tr>
<tr>
<td>CTD-011</td>
<td>Foot Switch</td>
</tr>
<tr>
<td>LLD-406</td>
<td>Automatic Prior-Action Station</td>
</tr>
</tbody>
</table>

Note: For control box selection, see pages 92-94. For air cylinder selection, see page 100, and for lockout valve, see page 97.
COMPONENT PACKAGE ORDERING INFORMATION (continued)

COMPONENT PACKAGES USED WITH FPF OR FPG CONTROL BOXES

<table>
<thead>
<tr>
<th>PACKAGE NO. FNF-012</th>
<th>HFJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWO-HAND AND FOOT SWITCH SINGLE STROKE, AND MOTOR JOG</td>
<td></td>
</tr>
<tr>
<td>Part No.</td>
<td>Description</td>
</tr>
<tr>
<td>RCD-116</td>
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</tr>
<tr>
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<td>¼&quot; Filter-Regulator-Lubricator Assembly</td>
</tr>
<tr>
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<td>Air Pressure Switch</td>
</tr>
<tr>
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<td>Cam and Strap Assembly</td>
</tr>
<tr>
<td>CMK-090</td>
<td>Dual Photoelectric Sensor Assembly</td>
</tr>
<tr>
<td>CTL-507</td>
<td>Palm Button Assembly (3-button assembly)</td>
</tr>
<tr>
<td>CTD-011</td>
<td>Foot Switch</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PACKAGE NO. FNF-013</th>
<th>HFMJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWO-HAND AND FOOT SWITCH SINGLE STROKE, FOOT MAINTAINED CONTINUOUS, &amp; MOTOR JOG</td>
<td></td>
</tr>
<tr>
<td>Part No.</td>
<td>Description</td>
</tr>
<tr>
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</tr>
<tr>
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<tr>
<td>CMK-090</td>
<td>Dual Photoelectric Sensor Assembly</td>
</tr>
<tr>
<td>CTL-507</td>
<td>Palm Button Assembly (3-button assembly)</td>
</tr>
<tr>
<td>CTD-011</td>
<td>Foot Switch</td>
</tr>
<tr>
<td>LLD-400</td>
<td>Continuous Prior-Action Station</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PACKAGE NO. FNF-014</th>
<th>HFMJ-C</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWO-HAND AND FOOT SWITCH SINGLE STROKE, FOOT MAINTAINED CONTINUOUS, MOTOR JOG, AND TWO-HAND CONTINUOUS</td>
<td></td>
</tr>
<tr>
<td>Part No.</td>
<td>Description</td>
</tr>
<tr>
<td>RCD-116</td>
<td>¼&quot; Dual-Solenoid Air Valve</td>
</tr>
<tr>
<td>RCL-043</td>
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</tr>
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<tr>
<td>CMK-090</td>
<td>Dual Photoelectric Sensor Assembly</td>
</tr>
<tr>
<td>CTL-507</td>
<td>Palm Button Assembly (4-button assembly)</td>
</tr>
<tr>
<td>CTD-011</td>
<td>Foot Switch</td>
</tr>
<tr>
<td>LLD-400</td>
<td>Continuous Prior-Action Station</td>
</tr>
</tbody>
</table>

Note: For control box selection, see pages 92-94. For air cylinder selection, see page 100, and for lockout valve, see page 97.
AIR CYLINDERS

All Illustrated Cylinders are Pull-Type/Spring-Return

An air cylinder must be ordered separately using a specific part number. It is required to complete the control system. The air cylinder is attached to the clutch operating rod in order to trip the press. Normally, single-acting, pull-type/spring-return air cylinders are required. The return spring on the cylinder rod is compression type and is designed to prevent interleaving to meet OSHA and ANSI standards. A clevis mounting arrangement is furnished to attach the cylinder to the press frame. A rod, yoke, and pin assembly for ease in connecting to the existing clutch operating rod is standard on all cylinders. Push-type/spring-return and longer- or shorter-stroke air cylinders are also available. To determine the proper size or type of air cylinder, check the linkage where the cylinder will be inserted. Please consult the factory for any special requirements.

<table>
<thead>
<tr>
<th>Part No.:</th>
<th>RCL-001</th>
<th>RCL-002</th>
<th>RCL-003</th>
<th>RCL-004</th>
<th>RCL-005</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRESS SIZE (Tons)</td>
<td>¼ to 7</td>
<td>8 to 35</td>
<td>36 to 70</td>
<td>71 to 125</td>
<td>126 to 200</td>
</tr>
<tr>
<td>SIZE (Bore x Stroke)</td>
<td>½&quot; x 1&quot;</td>
<td>1½&quot; x 1&quot;</td>
<td>2&quot; x 2&quot;</td>
<td>2½&quot; x 2&quot;</td>
<td>3&quot; x 2&quot;</td>
</tr>
<tr>
<td>PULL FORCE (@75 PSI)</td>
<td>50 lb</td>
<td>100 lb</td>
<td>200 lb</td>
<td>300 lb</td>
<td>500 lb</td>
</tr>
</tbody>
</table>

**Standard Pull Type**

<table>
<thead>
<tr>
<th>Part No.:</th>
<th>RCL-022</th>
<th>RCL-023</th>
<th>RCL-024</th>
<th>RCL-025</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRESS SIZE (Tons)</td>
<td>8 to 35</td>
<td>36 to 70</td>
<td>71 to 125</td>
<td>126 to 200</td>
</tr>
<tr>
<td>SIZE (Bore x Stroke)</td>
<td>1½&quot; x 1&quot;</td>
<td>2&quot; x 2&quot;</td>
<td>2½&quot; x 2&quot;</td>
<td>3&quot; x 2&quot;</td>
</tr>
<tr>
<td>PUSH FORCE (@75 PSI)</td>
<td>100 lb</td>
<td>200 lb</td>
<td>300 lb</td>
<td>500 lb</td>
</tr>
</tbody>
</table>

**Standard Push Type**
SURVEY FOR **FULL-REVOLUTION PRESS**

Company ____________________________
City ____________________________ State ____________
Surveyed By ____________________________ Date ____________

**INSTALLATION □ N □ Y**

When filling out this form, be sure that the information for satisfying the basic areas of safety are answered.

They are: 1. Safeguarding □ 4. Starter □
2. Control □ 5. Cover □
3. Disconnect □ 6. Other Considerations □

For identification and reference, please fill in this area first.

Machine No. ____________ Manufacturer ____________
Model No. ____________ Serial No. ____________

Tonnage (always required) ____________

Type: □ OBI □ Gap □ Gap DC □ Horn □ SSSC □ SSDC □

Is machine out of service? □ N □ Y

What are **methods of feeding** material?

□ Hand, From: □ Front □ Sides: □ Right □ Left;
□ Automatic: □ Coil □ Strip; □ Magazine;
□ Shuttle; □ Sliding Bolster; □ Other

---

<table>
<thead>
<tr>
<th>1. Safeguarding:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>When providing, please attach completed measurement data form. Sides and back must be guarded.</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

1 When providing, please attach completed measurement data form for type A gate and guards for the sides of the point of operation.

Two-Hand Trip

If press has two-hand trip, are the palm buttons at the proper safety distance? □ N □ Y If we are to provide, what is proper safety distance? ____________" (See pp. 75-76 in FAB catalog for details)

When providing any of the above safeguarding devices, the sides and rear of the point of operation must be safeguarded. Are side and rear guards required? □ N □ CTF (Customer to Furnish) □ Y If Y, please complete and attach measurement form.

---

<table>
<thead>
<tr>
<th>2. Control:</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Does clutch have single-stroke capability? □ N □ Y:</td>
</tr>
<tr>
<td>If Y, circle one: Mechanism or Trip Control</td>
</tr>
<tr>
<td>If Trip Control, check type: □ Air □ Air/Elec.</td>
</tr>
</tbody>
</table>

B. Information about press:

1. Hand Actuating □ N □ Y If Y:
   □ Lever □ Palm Buttons No. of Stations: □ 1 □ 2

2. Foot Actuating □ N □ Y If Y:
   □ Pedal □ Foot Switch No. of Stations: □ 1 □ 2

3. Modes: □ Jog □ Single □ Continuous
   □ Maintained Continuous □ Other
## SURVEY FOR FULL-REVOLUTION PRESS

### 3. Disconnect:

#### A. Present
- Location of disconnect:
  1. [ ] On Press or [ ] Off Press
  2. [ ] With Clutch Control
     - Separate from Clutch Control
     - With Starter Only
     - Not Furnished

#### B. Is electrical disconnect switch required?
- [ ] N [ ] Y Reuse Existing
- [ ] Y [ ] Customer to Furnish
- [ ] Y [ ] If Y, furnish HP, FLA, and voltage in Section 4C.

#### C. How is disconnect to be furnished?
- [ ] Separate Box
- [ ] Combination With Starter
- [ ] Custom Box

#### D. Is 1/4" air lockout valve required?
- [ ] N [ ] Y

### 4. Starter:

#### A. Present
- Location of Starter:
  1. [ ] On Press or [ ] Off Press
  2. [ ] With Clutch Control
     - Separate from Clutch Control
     - With Disconnect Only
     - Not Furnished

#### B. Is transformer for reducing voltage to starter required?
- [ ] N [ ] Y (Provided in new control box if proposed.)

#### C. Is magnetic starter required for main drive?
- [ ] N [ ] Y Reuse Existing
- [ ] Customer to Furnish
- If N, existing starter must have 115-V coil and one normally open auxiliary contact.
- [ ] Y

**Estimate** | **Actual**
---|---
If Y, provide: | 
- Horsepower
- Full-Load Amps
- Voltage

#### D. How is starter to be furnished?
- [ ] Separate Box
- [ ] Combination W/Disconnect
- [ ] Custom Box

#### E. Is remote push-button station required?
- [ ] N [ ] Y

### 5. Covers: (Customer to Furnish)
- Do mechanical power-transmission apparatuses need to be covered up to 7 feet above floor or platform?
- [ ] N [ ] Y
- If Y, what needs to be covered?
  - [ ] Flywheel
  - [ ] Connection Rod
  - [ ] Gears
  - [ ] Turnover Bar Slot
  - [ ] Shaft End

- Are additional brackets required?
- [ ] N [ ] Y

### 6. Other Considerations:

#### A. Does press have lube system requiring electrical tie-in?
- [ ] N [ ] Y

#### B. Is safety block to be furnished?
- [ ] N [ ] Y
  - If Y, what size is needed? (circle one)
    - [ ] M
    - [ ] S
    - [ ] L
  - How many? ______ S M L (circle one)

#### C. Is spring-loaded turnover bar required?
- [ ] N [ ] Y
  - If Y, what diameter? ______

#### D. If questionable about any information furnished, please enclose photos of entire front, sides (left and right), and rear of press. Include close-up photos of the inside of the existing control box, clutch, and crankshaft extension end.
- [ ] Sending
- [ ] Enclosed