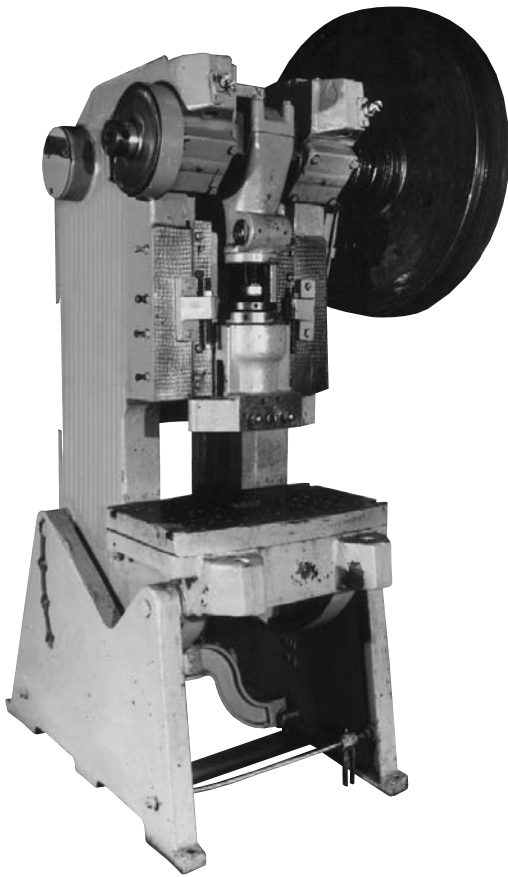
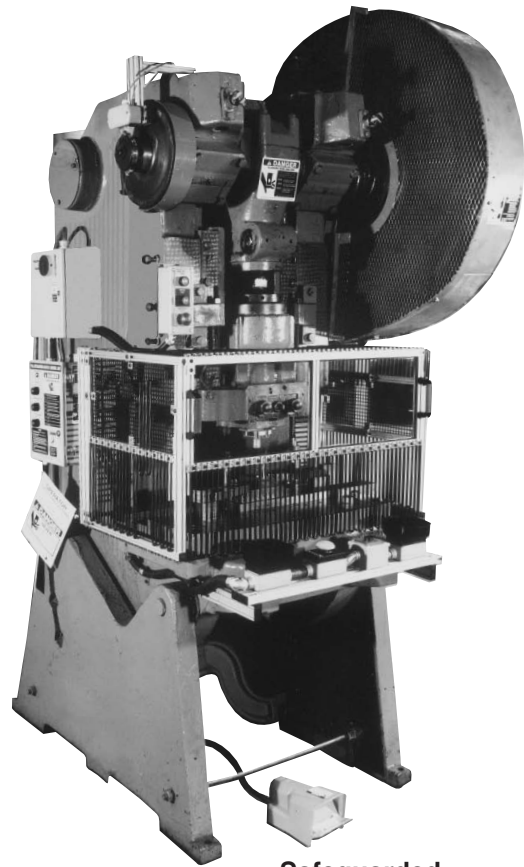




INSTALLATION MANUAL FOR SINGLE STROKE TRIP CONTROL SYSTEMS ON *FULL REVOLUTION* CLUTCH MECHANICAL POWER PRESSES



Unguarded



Safeguarded

IMPORTANT: PLEASE REVIEW THIS ENTIRE PUBLICATION BEFORE INSTALLING, OPERATING, OR MAINTAINING THE TRIP CONTROL SYSTEM.

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Safety Precautions

“ **⚠ DANGER** ” Danger is used to indicate the presence of a hazard which WILL cause SEVERE personal injury if the warning is ignored.



THIS SAFETY ALERT SYMBOL IDENTIFIES IMPORTANT SAFETY MESSAGES IN THIS MANUAL. WHEN YOU SEE THIS SYMBOL **⚠** , BE ALERT TO THE POSSIBILITY OF PERSONAL INJURY, AND CAREFULLY READ THE MESSAGE THAT FOLLOWS.

Efficient and safe machine operation depends on the development, implementation and enforcement of a safety program. This program requires, among other things, the proper selection of point-of-operation guards and safety devices for each particular job or operation and a thorough safety training program for all machine personnel. This program should include instruction on the proper operation of the machine, instruction on the point-of-operation guards and safety devices on the machine, and a regularly scheduled inspection and maintenance program.

Rules and procedures covering each aspect of your safety program should be developed and published both in an operator's safety manual, as well as in prominent places throughout the plant and on each machine. Some rules or instructions which must be conveyed to your personnel and incorporated into your program include:

⚠ DANGER Never place your hands or any part of your body in this machine.

⚠ DANGER Never operate this machine without proper eye, face and body protection.



Never operate this machine unless you are fully trained and instructed and unless you have read the instruction manual.



Never operate this machine if it is not working properly—stop operating and advise your supervisor immediately.



Never use a foot switch to operate this machine unless a point-of-operation guard or device is provided and properly maintained.



Never operate this machine unless two-hand trip, two-hand control or presence sensing device is installed at the proper safety distance. Consult your supervisor should you have any questions regarding the proper safety distance.



Never tamper with, rewire or bypass any control or component on this machine.

A company's safety program must involve everyone in the company, from top management to operators, since only as a group can any operational problems be identified and resolved. It is everyone's responsibility to implement and communicate the information and material contained in catalogs and instruction manuals to all persons involved in machine operation. If a language barrier or insufficient education would prevent a person from reading and understanding various literature available, it should be translated, read or interpreted to the person, with assurance that it is understood.



FOR MAINTENANCE AND INSPECTION ALWAYS REFER TO THE OEM'S (ORIGINAL EQUIPMENT MANUFACTURER'S) MAINTENANCE MANUAL OR OWNER'S MANUAL. If you do not have an owner's manual, please contact the original equipment manufacturer.

(Continued on next page.)

SECTION 1—IN GENERAL

Full-Revolution-Clutch Press Control System

Safety References

OSHA'S ACT AND FEDERAL REGULATIONS

Since the enclosed equipment can never overcome a mechanical deficiency, defect or malfunction in the machine itself, OSHA (Occupational Safety and Health Administration) has established certain safety regulations that the employers (users) must comply with so that the machines used in their plants, factories or facilities are thoroughly inspected and are in first-class operating condition before any of the enclosed equipment is installed.

1. An Act – Public Law 91 - 596, 91st Congress, S. 2193, December 29, 1970

Duties:

Sec. 5.(a) Each employer —

- (1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;
- (2) shall comply with occupational safety and health standards promulgated under this Act.
- (b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

2. OSHA's Code of Federal Regulations, Subpart O, that an employer (user) must comply with include:

Section 1910.211 Definitions

Section 1910.212 (a) General Requirements for all Machines

Section 1910.217 Mechanical Power Presses

Section 1910.219 (b)(1) Mechanical Power-Transmission Apparatus (Flywheel and Gear Covers)

3. OSHA's 29 Code of Federal Regulations, Subpart J 1910.147 The Control of Hazardous Energy (Lockout / Tagout)

4. OSHA's Publications

"General Industry Safety and Health Regulations Part 1910," Code of Federal Regulations, Subpart O

"Concepts and Techniques of Machine Safeguarding," OSHA 3067, Revised 1992

These publications can be obtained by contacting:

Superintendent of Documents
US Government Printing Office
P.O. Box 371954
Pittsburgh, PA 15250-7954
Phone: (202) 512-1800
Fax: (202) 512-2250
www.gpo.gov

ANSI SAFETY STANDARDS FOR MACHINES

The most complete safety standards for machine tools are published in the ANSI (American National Standards Institute) B11 series. The following is a list of each ANSI B11 Standard available at the printing of this publication.

- B11.1 Mechanical Power Presses
- B11.2 Hydraulic Presses
- B11.3 Power Press Brakes
- B11.4 Shears
- B11.5 Iron Workers
- B11.6 Lathes
- B11.7 Cold Headers and Cold Formers
- B11.8 Drilling, Milling and Boring
- B11.9 Grinding Machines
- B11.10 Sawing Machines
- B11.11 Gear Cutting Machines
- B11.12 Roll Forming and Roll Bending
- B11.13 Automatic Screw/Bar and Chucking
- B11.14 Coil Slitting Machines
- B11.15 Pipe, Tube and Shape Bending
- B11.16 Metal Powder Compacting Presses
- B11.17 Horizontal Hydraulic Extrusion Presses
- B11.18 Coil Processing Systems
- B11.19 Performance Requirements for Risk Reduction Measures: Safeguarding and other Means of Reducing Risk
- B11.20 Safety Requirements for Manufacturing Systems/Cells
- B11.21 Lasers
- B11.22 CNC Turning Machines
- B11.23 Machining Centers
- B11/TR1 Ergonomic Considerations for the Design, Installation and Use of Machine Tools
- B11/TR2 Mist Control
- B11/TR3 Hazard ID and Control
- B11/TR4 Control Reliability
- R15.06 Robotic Safeguarding

These standards can be purchased by contacting:

American National Standards Institute, Inc.
11 West 42nd Street
New York, New York 10036
Phone: (212) 642-4900
Fax: (212) 302-1286
www.ansi.org

OR

Association of Manufacturing Technology (AMT)
7901 Westpark Drive
McLean, Virginia 22102
Phone: (703) 827-5211
Fax: (703) 893-1151
www.mfgtech.org

(Continued on next page.)

NATIONAL SAFETY COUNCIL SAFETY MANUALS AND DATA SHEETS

Other good references for safety on machine tools are the National Safety Council's Safety Manuals and Data Sheets. These manuals and data sheets are written by various committees including the Power Press, Forging and Fabricating Executive Committee. Copies of the following publications are available from their library:

Manuals

Power Press Safety Manual - 4th Edition
Safeguarding Concept Illustrations - 7th Edition
Forging Safety Manual

Data Sheets

Bench and Pedestal Grinding Wheel Operations 12304-0705
Boring Mills, Horizontal Metal 12304-0269
Boring Mills, Vertical 12304-0347
Coated Abrasives 12304-0452
Cold Shearing Billets and Bars in the Forging Industry 12304-0739
Degreasing (Liquid), Small Metal Parts 12304-0537
Dies, Setup and Removal of Forging Hammer 12304-0716
Drill Presses, Metalworking 12304-0335
Drills, Portable Reamer 12304-0497
Drop Hammers, Steam 12304-0720
Electrical Controls for Mechanical Power Presses 12304-0624
Forging Hammer Dies, Setup and Removal of 12304-0716
Forging Presses, Mechanical 12304-0728
Gear-Hobbing Machines 12304-0362
Handling Materials in the Forging Industry 12304-0551
Kick (Foot) Presses 12304-0363
Lathes, Engine 12304-0264
Milling Machines, Metalworking 12304-0364
Planers, Metal 12304-0383
Power Press (Mechanical) Point-of-Operation Safeguarding, Concepts of 12304-0710
Power Press Point-of-Operation Safeguarding: Two-Hand Control and Two-Hand Tripping Devices 12304-0714
Power Press Point-of-Operation Safeguarding: Type A and B Movable Barrier Devices 12304-0712
Power Press Point-of-Operation Safeguarding: Point-of-Operation Guards 12304-0715
Power Press Point-of-Operation Safeguarding: Presence Sensing Devices 12304-0711

Power Press Point-of-Operation Safeguarding: Pullbacks and Restraint Devices 12304-0713
Power Presses (Mechanical), Inspection and Maintenance of 12304-0603
Power Presses (Mechanical), Removing Pieceparts from Dies in 12304-0534
Power Press, Setting Up and Removing Dies 12304-0211
Press Brakes 12304-0419
Robots 12304-0717
Saws, Metal (Cold Working) 12304-0584
Shapers, Metal 12304-0216
Shears, Alligator 12304-0213
Shears, Squaring, Metal 12304-0328
Upsetters, 12304-0721

Copies of these manuals and data sheets can be obtained by contacting:

National Safety Council
1121 Spring Lake Drive
Itasca, IL 60143-3201
1-800-621-7619 ext. 2199
Fax: (630) 285-0797
www.nsc.org

OTHER SAFETY SOURCES

National Institute of Occupational Safety and Health (NIOSH)
4676 Columbia Parkway
Cincinnati, OH 45226
Phone: (513) 533-8236
www.NIOSH.cdc.gov

Robotic Industries Association (RIA)
P.O. Box 3724
Ann Arbor, MI 48106
Phone: (734) 994-6088
www.robotics.org

For additional safety information and assistance in devising, implementing or revising your safety program, please contact the machine manufacturer, your state and local safety councils, insurance carriers, national trade associations and your state's occupational safety and health administration.

SECTION 1—IN GENERAL

Full-Revolution-Clutch Press Control System

Warranty

9. Limited Warrantie

9.1. (i) Subject to Section 8.1(ii) below, Rockford Systems makes to Customer the following sole and exclusive warranties with respect to Goods:

(a) with respect to Goods that are manufactured based on Customer specifications, at the time of shipment by Rockford Systems, the Goods sold under the Agreement that are manufactured by Rockford Systems pursuant to such specifications conform to such specifications set forth in the applicable Order Documentation; and

(b) at the time of shipment by Rockford Systems, the Goods sold under the Agreement that are manufactured by Rockford Systems are free from defects in material and workmanship.

(c) Rockford Systems's warranty is for a period of 1 year, and begins from date of shipment from Rockford Systems to the original purchaser.

This warranty does not include accessories, parts or equipment sold hereunder that are manufactured by someone other than Rockford Systems.

(ii) Every claim by Customer against Rockford Systems for breach of warranty with respect to the Goods shall be deemed waived by Customer unless written notice thereof is received by Rockford Systems within fifteen (15) days after discovery.

9.2. If Rockford Systems breaches either of the warranties set forth in Section 8.1(i) above, and written notice thereof is received by Rockford Systems from Customer within the applicable time period specified in Section 8.1(ii) above, Customer's sole and exclusive remedy and Rockford Systems's only obligation shall be, as Rockford Systems in its sole and exclusive judgment shall determine, the replacement of the nonconforming Goods, or an adjustment to the purchase price for the nonconforming Goods or the repair of the nonconforming Goods. All transportation charges related to replacement or repair of Goods shipped to Rockford Systems's plant or facility (or other place at Rockford Systems's direction) shall be prepaid by Customer. Rockford Systems shall be responsible for reasonable transportation charges back to Customer for Goods that have been replaced or repaired by Rockford Systems. Any replacement Goods or repaired Goods shall be subject to these Terms and Conditions.

9.3. THE EXPRESS WARRANTIES SET FORTH HEREIN ARE THE ONLY WARRANTIES APPLICABLE TO THE SALE OF GOODS BY ROCKFORD SYSTEMS TO CUSTOMER PURSUANT TO THE AGREEMENT, AND THEY EXCLUDE ALL OTHER EXPRESS, ORAL OR WRITTEN WARRANTIES, AS WELL AS ANY WARRANTIES IMPLIED BY LAW WITH RESPECT TO THE GOODS, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PURPOSE, NOTWITHSTANDING ANY DISCLOSURE TO ROCKFORD SYSTEMS OF THE INTENDED USE OF THE GOODS.

9.4. Rockford Systems's warranties under Section 8.1(i) are void if repairs or modifications of the Goods are made by anyone other than Rockford Systems. Without limitation of the foregoing, Rockford Systems assumes no responsibility for and shall have no obligations to Customer because defects in any materials furnished by, or any faulty workmanship provided by, any party other than Rockford Systems.

9.5. Rockford Systems reserves the right to improve its products through changes in design or material without being obligated to incorporate such changes into products of prior manufacture. Customer cannot rely on any such changes as proof of insufficiency or inadequacy of prior designs of the Goods or material contained in the Goods.

9.6. If Customer grants to an end user of the Goods (or any other customer of Customer) any warranty that is greater in scope or time than the warranty and claims period stated herein, Rockford Systems shall not be liable beyond the scope of the limited warranty, the claim period, the damages and the remedies provided for under this Section.

9.7. Solely to the extent transferable, Rockford Systems assigns and transfers to Customer the original manufacturer's warranty on Goods sold hereunder that are not manufactured by Rockford Systems.

SECTION 2—INTRODUCTION

Full-Revolution-Clutch Press Control System

Press Identification

Figure 2.1
Full-Revolution OBI Press
Left View

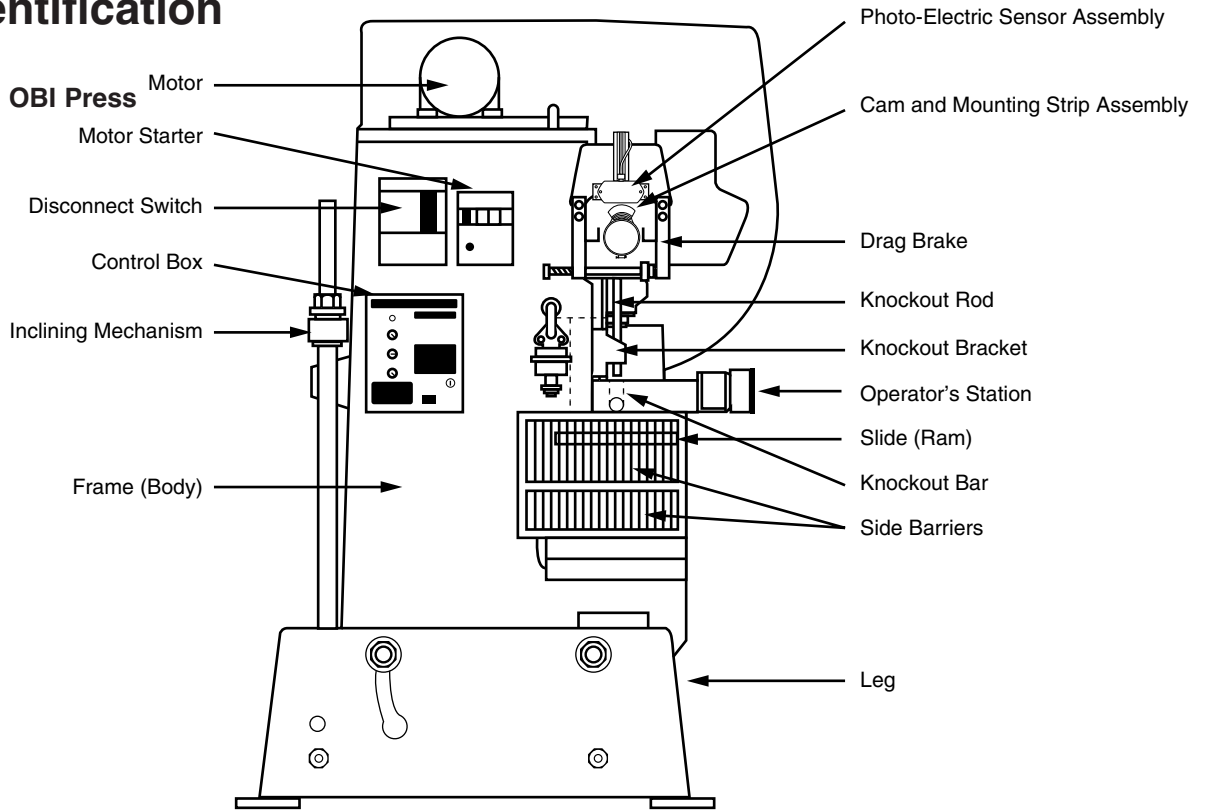
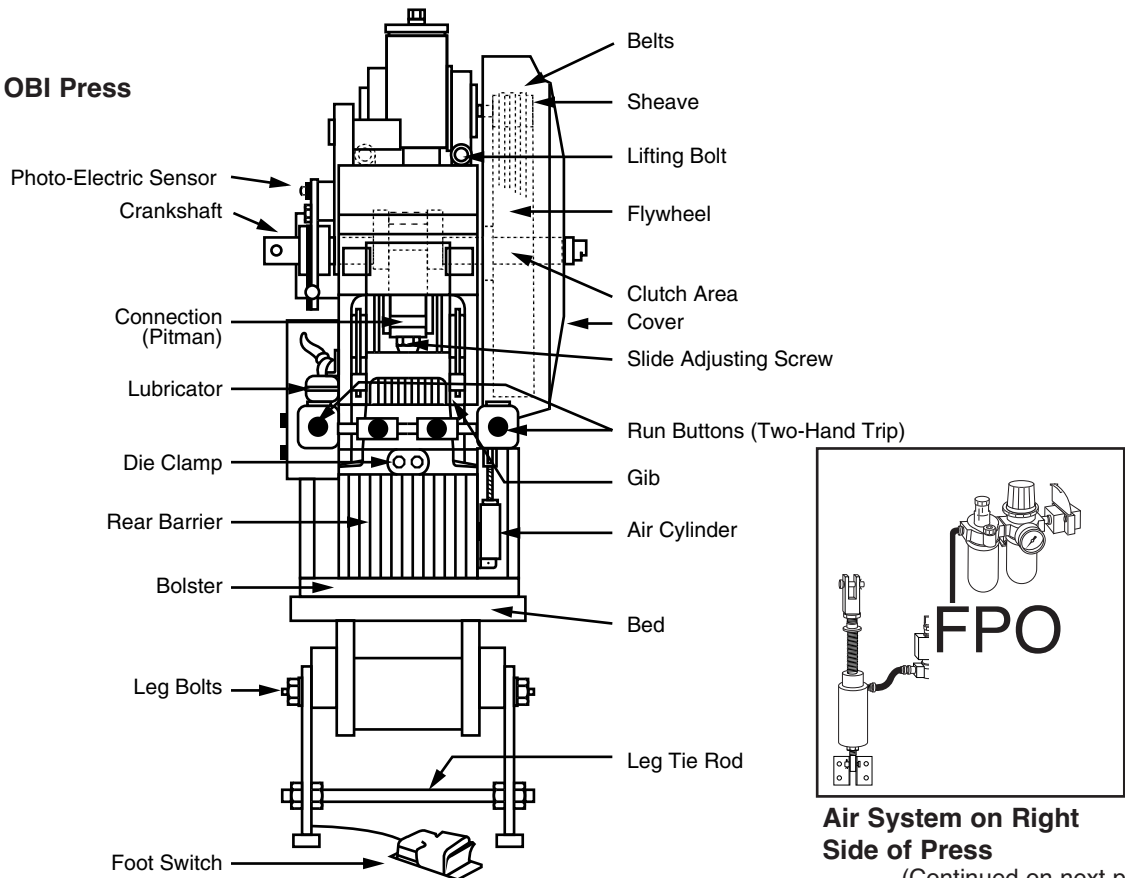


Figure 2.2
Full-Revolution OBI Press
Front View



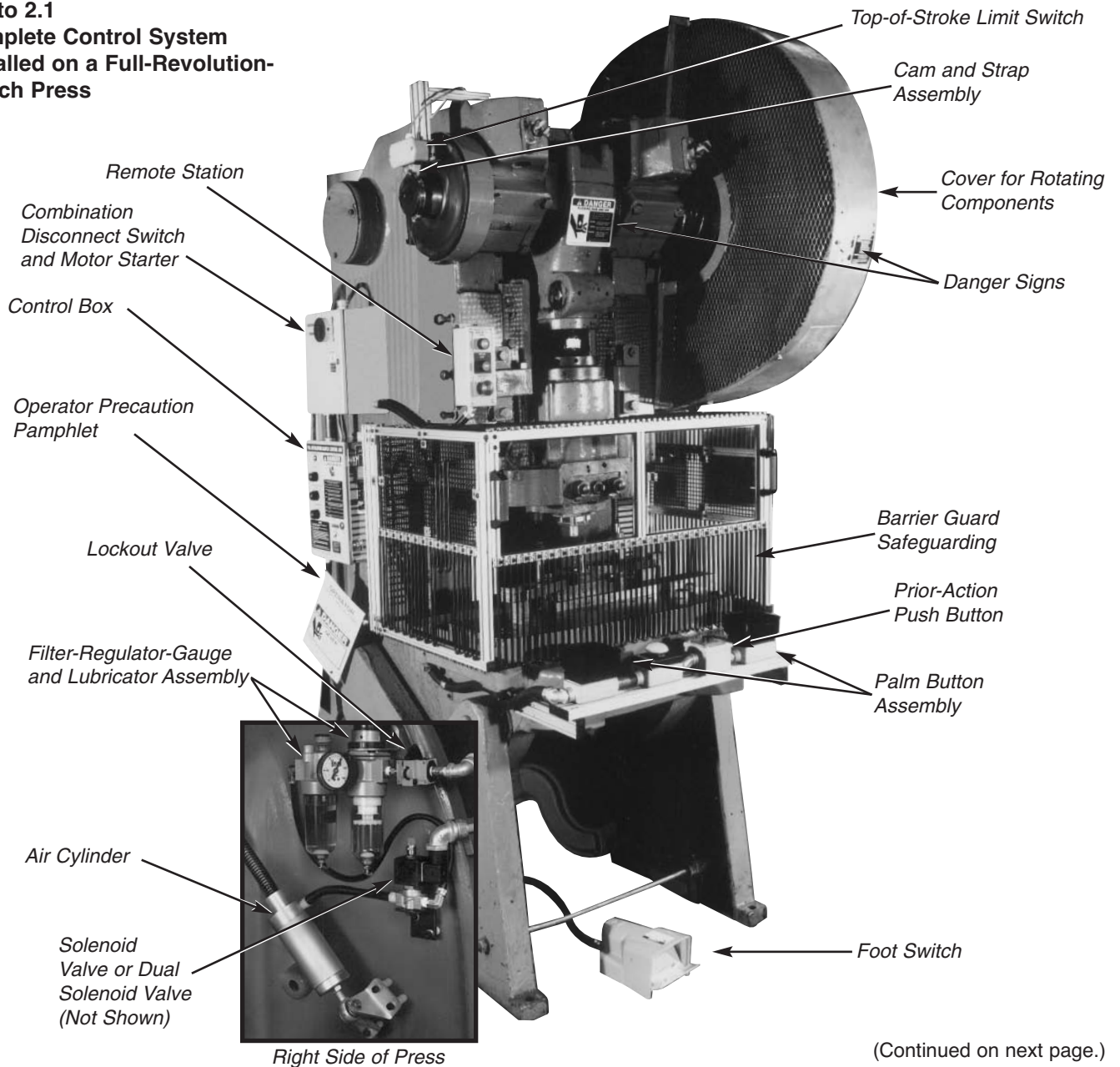
Updated Full-Revolution Press

The control packages described in this manual provide single-stroke capability which is required by OSHA Regulations and ANSI Standards. A full-revolution-clutch trip control package usually consists of a control box, palm button assembly, foot switch, solenoid air valve, air cylinder, filter-regulator-gauge and lubricator assembly, and a top-of-stroke limit switch and cam assembly. The components supplied may vary depending on the actuating means and modes of operation that are chosen.

Additional equipment that may be required to complete a basic safeguarding system includes: a main power disconnect switch, a magnetic motor starter, covers for rotating components, lockout valves for the pneumatic system, and a point-of-operation safeguard. Safeguarding choices for full-revolution mechanical clutch power presses are:

- Type A Gate
- Pullback
- Two-Hand Trip (included in most packages)
- Barrier Guard
- Restraint

Photo 2.1
Complete Control System
Installed on a Full-Revolution-
Clutch Press



(Continued on next page.)

SECTION 2—INTRODUCTION

Full-Revolution-Clutch Press Control System

General Description of Components in the System

A complete control package for full-revolution-clutch machines includes the following:

1. Literature packet (see pages 14 and 15) containing installation manuals, Operator Safety Precautions sign, danger sign(s), electrical control schematics, and *Mechanical Power Press Safety* booklet
2. Control box - standard (custom or special includes motor controls and/or disconnect switch) with danger and warning signs attached to enclosure
3. Air cylinder assembly including mounting feet, yoke, and pin
4. Solenoid air valve assembly including muffler, mounting bracket and hose **OR** Dual solenoid air valve assembly including exhaust muffler (meets ANSI)
5. Quick dump valve (when applicable, on larger presses over 71 tons or on fast stroking presses)
6. Lockout valve (if supplied)
7. Filter-regulator-gauge and lubricator assembly including connector and mounting bracket
8. Top-of-stroke limit switch assembly
9. Cam and strap assembly
10. Palm button assembly (includes two black palm buttons, two palm button guards, and mounting boxes. When the “continuous” mode of operation is included, one yellow top-stop button with mounting box is furnished.) If multiple operator stations are on a machine, more than one assembly is furnished.
11. Air pressure switch (included when the “walk-away” continuous mode of operation is provided)
Note: Not furnished with “maintained” continuous.
12. Foot switch (optional)
13. Emergency-stop button (optional) - Required to meet ANSI and NFPA 79 Standards
14. Other required components and safeguarding that may be necessary for machine (See packing list for details.)

Individual packages may vary in contents. However, a packing list is always enclosed showing exactly what material was shipped on this order. Please check the components actually received against this packing list immediately. In most cases, this control package system includes two-hand trip which can be used as a point-of-operation safeguarding device provided the palm buttons are mounted correctly and at the proper safety distance (see formula and chart on pages 32 and 33 of this manual). If the optional foot switch is provided, a safeguard **must** always be used. Examples of safeguards include barrier guards, pull-backs, restraints, or gates. The hands or any other part of the body of an operator, maintenance person, setup person, etc., must never be put into the point-of-operation hazard for any reason, at any time.



These controls can neither cure nor overcome a malfunctioning machine. They cannot compensate for or prevent a mechanical defect or failure of a machine part. These controls cannot prevent a repeat or unintended stroke (cycle) resulting from a mechanical malfunction, defect or failure of the machine itself.


(Continued on next page.)

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Call: 1-800-922-7533

Preliminary Steps Before Installation

Before proceeding with the installation of the enclosed equipment, you should undertake the following preliminary steps.

1. Read and make sure you understand this entire Installation Manual.
2. Refer to the front cover, other line drawings and photos, then make a rough sketch of your installation to plan the location of the enclosed equipment on the machine.
3. This may be an opportunity to strip down the entire machine by removing all components, piping, wire, etc. Clean, paint and check the entire mechanical condition of the machine, including the clutch and brake, for proper adjustment and required replacement parts before proceeding with the installation of the furnished equipment.
4. **Please make sure the machine is in first-class condition.** Before starting any installation, it is essential that the machine is thoroughly inspected. Be sure that all mechanical components and all collateral equipment are in first-class operating condition. Your inspection should be done according to the machine manufacturer's installation and maintenance instruction manual. Special attention must be given to the machine clutch and brake. The clutch and brake must be maintained in an operating condition which is within the specifications set by the machine manufacturer. If you have any doubts or questions concerning the condition of the machine, contact the machine manufacturer for assistance. **Repair or replace all parts not operating properly before proceeding.**

 **Inspection and maintenance programs must be established and implemented to keep machines in first-class condition. Programs must include thorough inspections of each machine on a weekly basis and records kept of these inspections. Any part of the machine that is worn, damaged or is not operating properly must be replaced immediately or repaired before the machine is used.**


5. Verify that the machine is in first-class condition and operating properly; shut off all power to the machine. Padlock the disconnecting means in the "off" position and do not actuate the machine again until the installation of all package components has been completed. Lockout/tagout energy isolation procedures must always be practiced and enforced during installation of the equipment.
6. Install the air cylinder in the most logical place to actuate the clutch.

When installing an air cylinder, the existing clutch linkage and clutch return assembly **should not** be removed for two reasons:

- It is an integral part of the machine clutch mechanism and must be present to return the clutch assembly which in turn disengages the clutch. A return spring is supplied to return the piston on all air cylinders. However, this is not intended to replace the existing return action in the clutch assembly.
- It normally contains a mechanical advantage which will allow the air cylinder to operate the machine clutch with less force. *Note: Excessive air pressure to the air cylinder will cause damage to the mechanical linkage or clutch mechanism.* Adjust air pressure according to need only. Be sure the air cylinder stroke is the correct length. If it is too short, the clutch will not engage and if it is too long, the cylinder and linkage may jackknife. Various air cylinder mounts, bores, strokes and power direction strokes are available. If your control package includes an air cylinder and it does not fit your machine application, please contact factory for an alternate cylinder.

7. Check all springs in the clutch operating assembly to ensure they comply with OSHA Regulation 1910.217(b)(3)(ii) which states:

"If a single-stroke mechanism is dependent upon spring action, the spring(s) shall be of the compression type, operating on a rod or guided within a hole or tube and designed to prevent interleaving of the coils in the event of breakage."

 **Tension-type springs should not be used.**

(Continued on next page.)

SECTION 2—INTRODUCTION

Full-Revolution-Clutch Press Control System

Preliminary Steps Before Installation (continued)

8. Mechanical Single-Stroke Mechanism

If your machine is equipped with a mechanical single-stroke mechanism, DO NOT REMOVE THIS DEVICE. It is imperative that the clutch operating rod and air cylinder be connected so that the portion of the mechanical single-stroke mechanism device is operational. Furthermore, it is imperative that the mechanical single-stroke mechanism device is operating properly. Should you experience any operational problem, do not operate the machine. Contact the machine manufacturer and make all necessary repairs. Be sure the mechanical single-stroke mechanism device is in first-class operating condition.

To test for proper operation of the control system, deactivate the mechanical single-stroke mechanism on power presses equipped with a mechanical single-stroke device. Do this by setting the clutch up for continuous operation. After all *Preliminary Testing* (pages 43 and 44) is completed satisfactorily, change the clutch operating mechanism back to single stroke so that the mechanical single-stroke device is operational when in the single stroke mode of operation.

If the control has continuous operation, mechanically deactivate the mechanical single-stroke mechanism when performing continuous-type operations. **Anytime** the mode of operation is other than continuous, change the clutch operating mechanism back to single stroke **so the mechanical single-stroke device is operational.**

Full-Revolution-Control Box Options

The furnished control box may include more features than what was ordered. The reason for this is the controls have been designed to be easily upgraded for options that may be required in the future. For example, the press requires foot single stroke only which is Control Box Part No. FRF-000. This control includes selector switches for the jog, single, and continuous modes of operation. At a later time, by purchasing a palm button assembly and a prior-action pushbutton station, the following modes of operation would become available: two-hand motor jog, two-hand single stroke and foot maintained continuous.

General Features of the Full-Revolution Control

- Provides single-stroke capability
- Antirepeat feature is included
- Provides two-hand trip safeguarding device
- Two-hand anti-tie-down and concurrent operation
- Operates all types of full-revolution-clutches (pin, jaw, or key)
- Provisions for electrically interlocking safety devices
- Redundant logic system microprocessor
- Isolated microprocessor logic power supply
- Redundant monitored solid-state relay/captive contact relay output for trip solenoid(s)
- Unpluggable saddle-clamp circuit board terminal strips
- Supports redundant solenoid valves (self-checking)
- Fused SSR (Solid-State Relay) outputs eliminate costly relay replacement (field-replaceable fuses)
- “A” Gate safeguarding interface included

(Continued on next page.)

Modes of Operation

- Off
- Two-hand motor jog
- Two-hand trip single stroke
- Two-hand “walk-away” continuous*

Optional Modes of Operation

- Foot switch trip single stroke
- Foot switch maintained continuous*
- Automatic single stroke*
- Continuous-on-demand*

**Requires a remote prior-action station.*

Sequence of Operation

OFF

The machine is inoperable in this mode of operation. To initiate any of the following modes of operation, turn the Off/On Selector Switch from the “Off” position to the “On” position.

TWO-HAND MOTOR JOG

This mode of operation is specifically provided for die setup and maintenance operations. For die setting, this mode allows use of the main drive motor to position the ram at bottom dead center. It is normally used only on larger machines and should only be used by qualified setup personnel. To initiate this mode of operation, set the Mode Selector to “Jog” and set the Actuating Means Selector to the “Hand” position. Depress both palm buttons to jog the drive motor and engage the machine clutch simultaneously. Quickly depress the palm buttons intermittently to jog the press through its cycle. Hold the palm buttons down to rapidly accelerate the motor so the crankshaft will stop at top dead center.

TWO-HAND TRIP SINGLE STROKE

This mode of operation allows the press to make one complete stroke or cycle after initiation. To initiate this mode of operation, set the Mode Selector to “Single” and set the Actuating Means Selector to the “Hand” position. Depressing both run buttons concurrently causes the press to make one complete stroke. In order to initiate another press stroke, both run buttons must be released and depressed again.

TWO-HAND “WALK-AWAY” CONTINUOUS

This mode of operation allows the press to operate continuously, after initiation, without the operator present. To initiate this mode of operation, set the Mode Selector to “Continuous” and set the Actuating Means Selector to the “Hand” position. At this point, depressing the run buttons should not cause the press to trip. First depress the “Continuous Prior-Action” push button, then depress both run buttons at the same time. The press should start and run in the continuous mode until the yellow top-stop button is depressed.

Note: When the Automatic Single Stroke mode of operation is provided, an “Automatic Prior-Action” pushbutton station (LLD406) is required and will be used in place of the “Continuous Prior-Action” push button (LLD400). To initiate two-hand walk away continuous with the LLD406 pushbutton station, set the Mode Selector to “Continuous” and set the Actuating Means Selector to the “Hand” position. Turn the remote selector switch to “OFF,” depress the “Automatic Prior-Action” push button, and then depress both run buttons to start the press.

(Continued on next page.)

SECTION 2—INTRODUCTION

Full-Revolution-Clutch Press Control System

Sequence of Operation (continued)

FOOT SWITCH TRIP SINGLE STROKE

This mode of operation allows the press to make one complete stroke or cycle. To initiate this mode of operation, set the Mode Selector to “Single” and set the Actuating Means Selector to the “Foot” position. Depressing and tripping the foot switch causes the press to make one complete stroke. In order to initiate another press stroke, the foot switch must be released and depressed again.

OPERATOR (FOOT SWITCH) MAINTAINED CONTINUOUS

This mode of operation allows the press to operate in a continuous mode as long as the foot switch is held depressed. To initiate this mode of operation, set the Mode Selector to “Continuous” and set the Actuating Means Selector to the “Foot” position. At this point, depressing the foot switch should not cause the press to trip. First depress the remote “Continuous Prior-Action” push button, then depress the foot switch. The machine should start and run in the foot switch “maintained continuous” mode until the foot switch is released. Once the foot switch is released, the machine will top stop. If the foot switch is reactivated before an internal **fixed** timer “times out,” the “Continuous Prior-Action” push button does not require reactivation.

AUTOMATIC SINGLE STROKE

This mode of operation allows the press to operate in a mode of operation that is similar to “walk-away” continuous. This mode of operation requires an “Automatic Prior-Action” pushbutton station. To initiate this mode of operation, set the Mode Selector to “Single,” set the Remote Selector to “Automatic,” and set the Actuating Means Selector to the “Hand” position. Press the “Automatic Prior-Action” remote push button and then both run buttons concurrently (within five seconds). The press should start and run in the automatic mode until the yellow top-stop button is depressed or if an input signal is not received (within one minute).

CONTINUOUS-ON-DEMAND

This mode of operation allows the press to operate in a continuous-on-demand mode. This mode of operation requires an “Automatic Prior-Action” pushbutton station. To initiate this mode of operation, set the Mode Selector to “Continuous,” set the Remote Selector to “Continuous-On-Demand,” and set the Actuating Means Selector to the “Hand” position. Press the “Continuous-On-Demand Prior-Action” remote push button and then both run buttons concurrently (within 5 seconds). The press should start to run in the continuous mode. The press will operate in continuous until a signal is given to top stop. At this point, the press can be restarted with an input signal; or, if the timer runs out (one minute), the continuous prior-action push button must be reinitiated and the palm buttons reinitiated.



A method of safeguarding the point of operation must be provided when using any of these modes of operation. Do not operate until you choose to either electrically interlock or mechanically guard the point of operation with a safeguarding system or device.

SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

Introduction

The following materials are also required to install the equipment in this shipment.

1. **Wire:** Size and type will depend on local ordinances or plant practices. We recommend stranded machine tool wire with appropriate color coding. **Never use solid wire**—the vibration caused by these machines precludes the successful use of solid wire for these installations.
2. **Numbered Wire Markers:** Made of suitable material to resist oil, grease, etc. and remain firmly attached to the wire.
3. **Conduit:** Rigid, thin wall, Sealtite, or any other suitable tubular connecting means which complies with local ordinances and provides adequate mechanical protection for the wires is satisfactory. We have supplied most electrical components in an oil-tight construction and would strongly recommend the use of oil-tight wiring components and practices in order to produce a successful installation.
4. **Miscellaneous wiring components** such as electrical tape, wire connectors, and terminals, as required.

This control system is a means of tripping the machine. This control replaces the mechanical foot treadle or mechanical hand levers for two reasons:

1. If the mechanical treadle or levers were depressed too long, the machine would make dangerous successive strokes.
2. This control system provides an easier means of tripping the machine; therefore, reduces operator fatigue.
3. The two-hand motor job feature provides a safer way of jogging the press.

Figure 3.1 - Illustration of Pneumatic System on Full Revolution Clutch Power Press

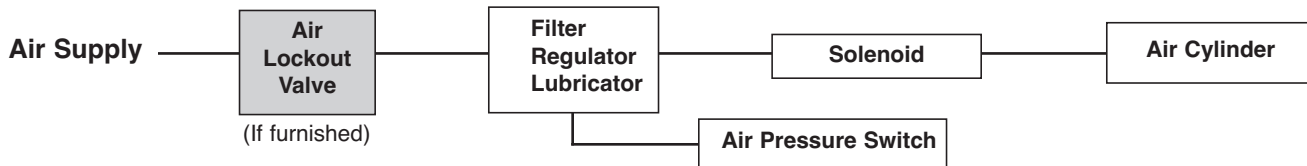
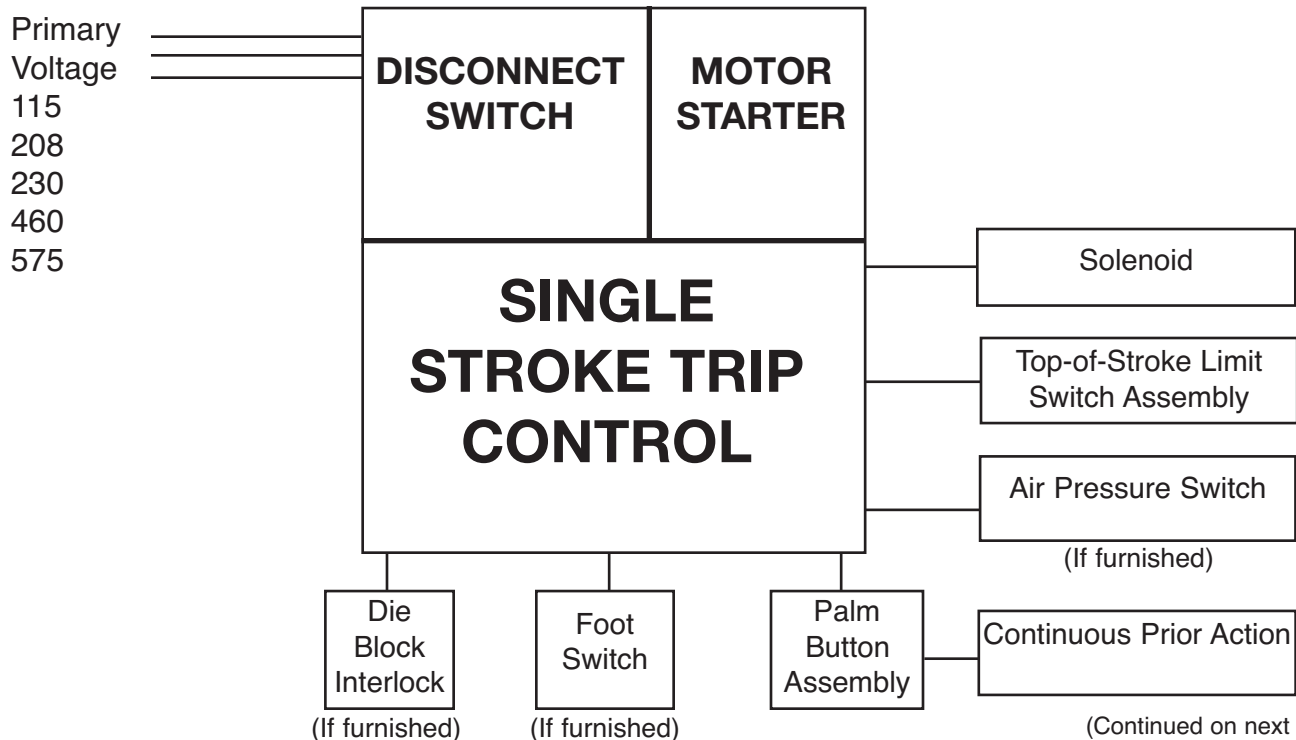


Figure 3.2 - Illustration of Electrical System on Full-Revolution-Clutch Power Press



(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

DANGER SIGNS

Photo 3.3



Photo 3.4



Attachment of Danger Signs

1. Locate the furnished danger sign(s).
2. Determine the mounting location for the danger sign(s) on the machine.



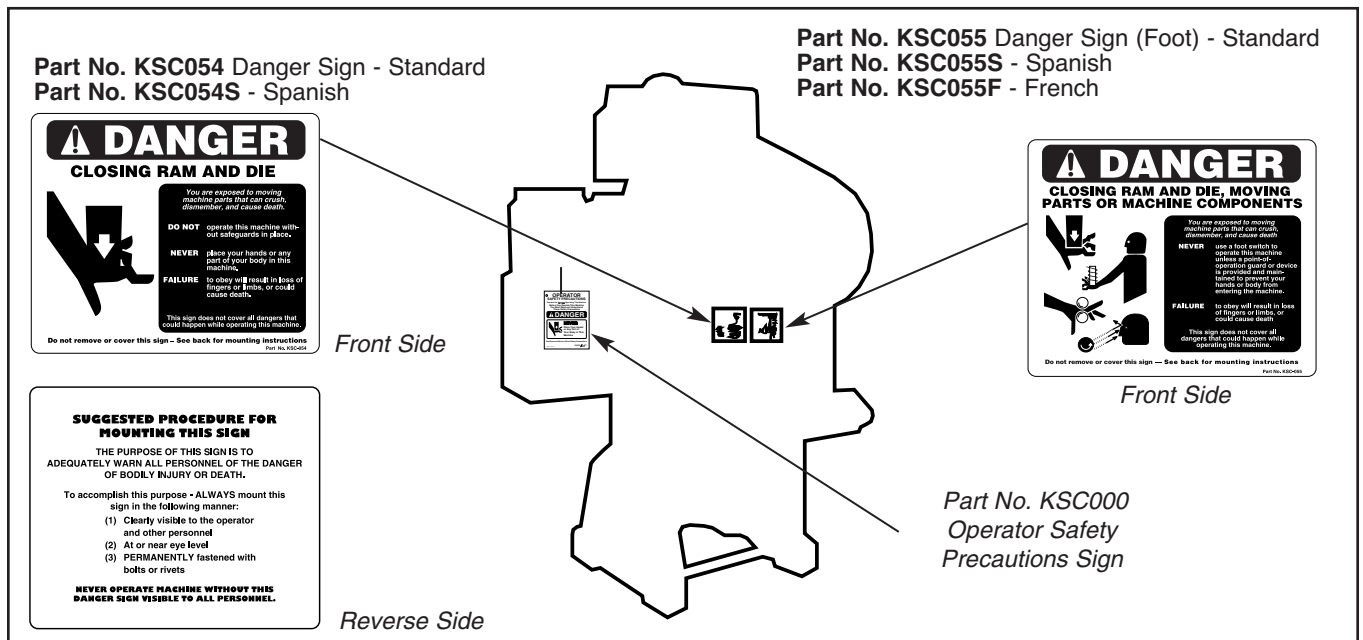
It must be permanently mounted in a prominent location on the machine where it is readily accessible and visible to the operator setup person, or other personnel who work on or around the machine where this equipment will be installed.

3. Drill a hole(s) in the sign and the machine at the mounting location. See Photo 3.3.
4. Attach the sign(s) to the machine with screws or rivets (not furnished). See Photo 3.4.



Never operate the machine unless the danger sign(s) is in place. Also make sure the sign(s) is read and understood before operating the machine.

Figure 3.3 - Illustration of the Placement of the Operator Safety Precaution Pamphlet and Danger Signs



(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

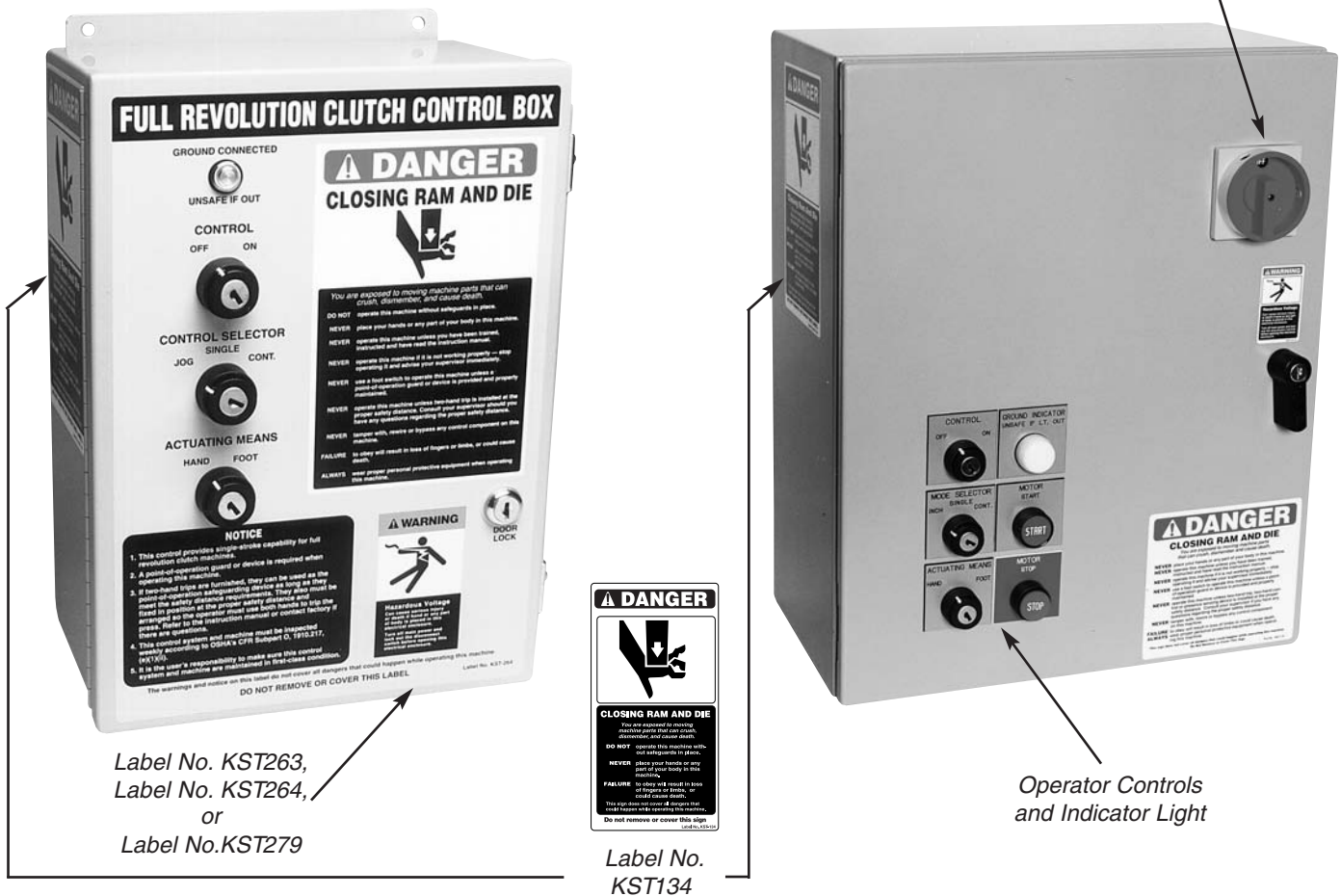
Control Box

DANGER AND WARNING LABELS PROVIDED

The illustrated danger and warning labels are affixed to all control boxes provided. All personnel operating or working around the machine, where this control box is installed, must be required to read, understand and adhere to all dangers and warnings. If any of these labels become destroyed or unreadable, labels **MUST** be replaced. Contact factory immediately for replacement labels and do not operate machine until danger and warning labels are all in place.

Photo 3.5
Standard Control Box

Custom Control Box



COMPONENTS OF CONTROL

The control box furnished with this order was based on the modes of operation and initiating means required for the machine. Please refer to the electrical control schematics provided with this manual for details. As standard, a control box can be furnished as shown; however, a custom control box could also be furnished. In this case, a larger enclosure is provided that includes a starter and disconnect switch.

The basic control box consists of a multi-tap voltage control transformer, control module assembly, ground light, and selector switches.

If two-hand “walk-away” continuous, foot “maintained continuous,” “automatic single stroke,” or “continuous-on-demand” is furnished, a remote pushbutton station is supplied. It should be mounted in a convenient location, usually on the front of the press. If a Type “A” Gate is furnished, a two-position gate off/on key-operated selector switch is furnished on the front of the control box enclosure.

(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

COMPONENTS OF CONTROL (continued)

CONTROL TRANSFORMER

The control transformer, located inside the control box, is used to obtain an isolated 120 volts or less control voltage from the incoming primary power supply. Be sure to determine the exact primary voltage for the machine and connect the primary connections to the appropriate lugs. Refer to the schematic for transformer connections.

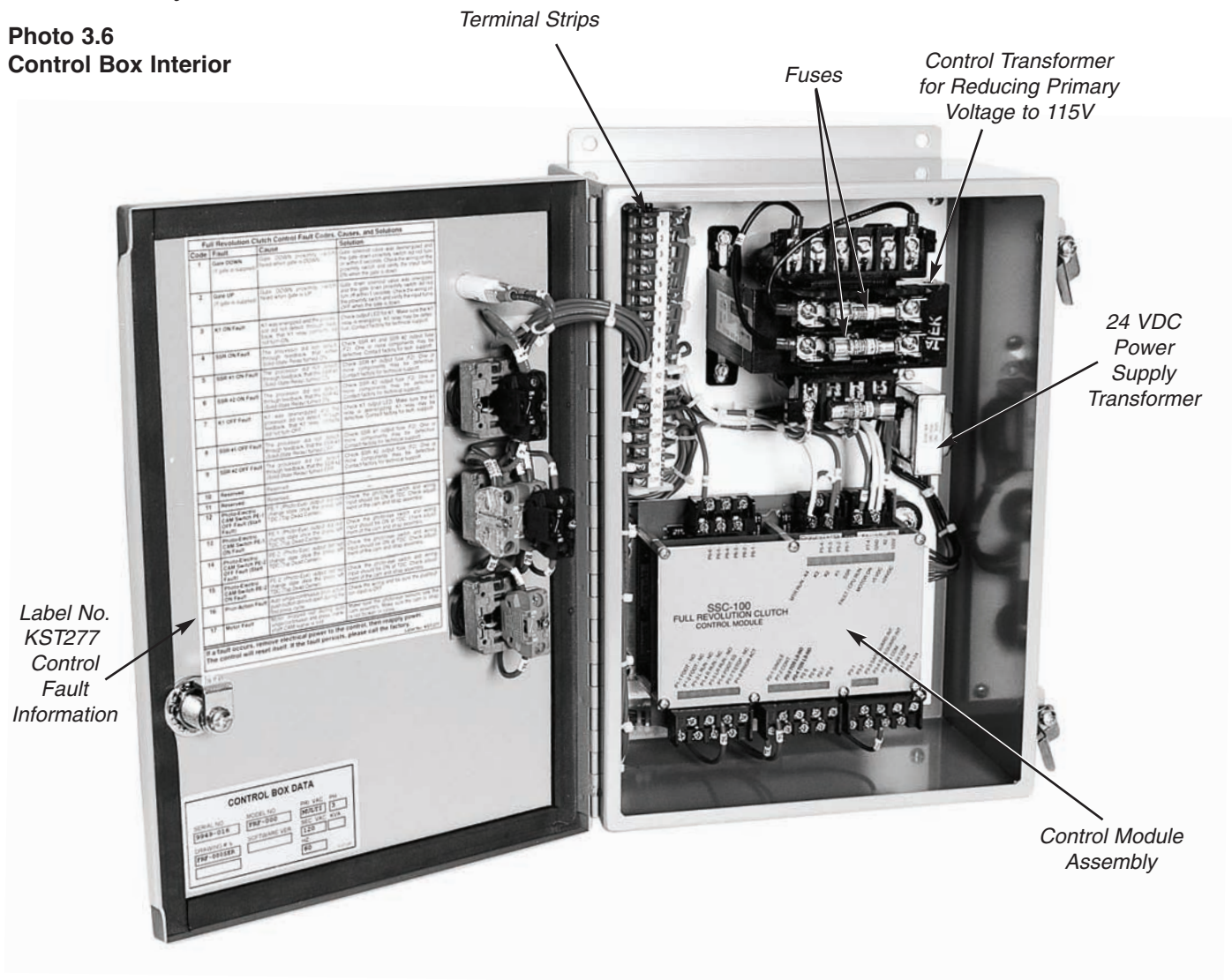
MAIN MOTOR STARTER

When this control box is wired to an existing main motor starter on the machine, this starter must be magnetic and have a 120 volt coil. If the starter does not meet these requirements, please contact Rockford Systems for a replacement starter. See address, phone and fax numbers on the front cover of this manual.

CONTROL MODULE ASSEMBLY

The control module assembly consists of two printed circuit boards mounted to an aluminum carrier plate with a top plate. It also includes green LEDs (Light Emitting Diodes) for CPU Run/Power supplies, red LEDs for all inputs and outputs, and saddle-clamp style circuit board terminal strips at the bottom edge of the assembly.

Photo 3.6
Control Box Interior



(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

Photo 3.7
Power Supply Output Board

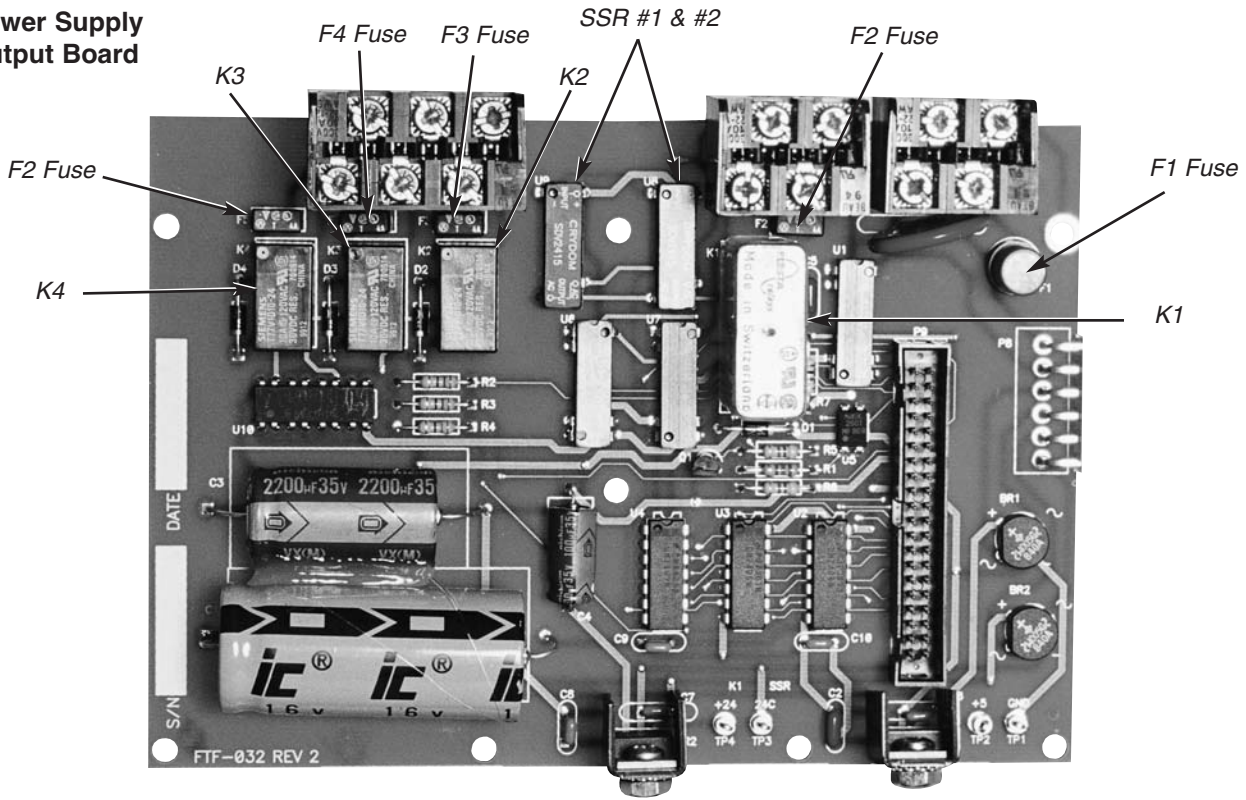
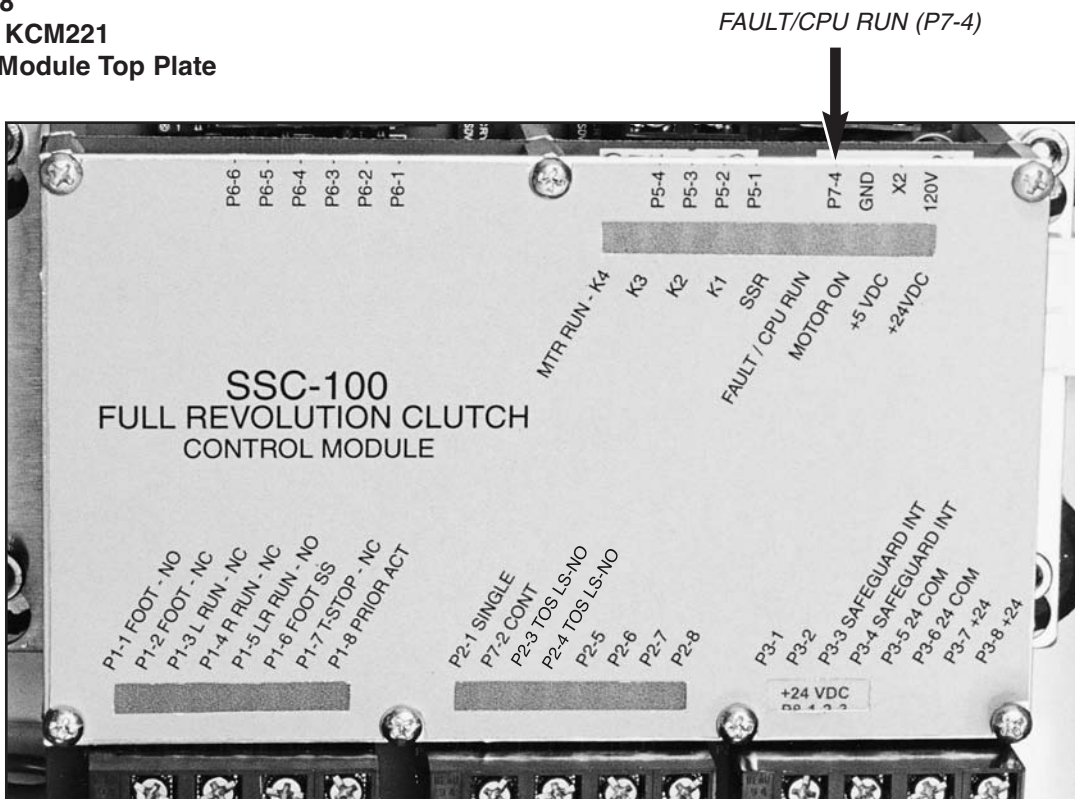


Photo 3.8
Part No. KCM221
Control Module Top Plate



(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

MOUNTING THE CONTROL BOX

Photo 3.9



Photo 3.10

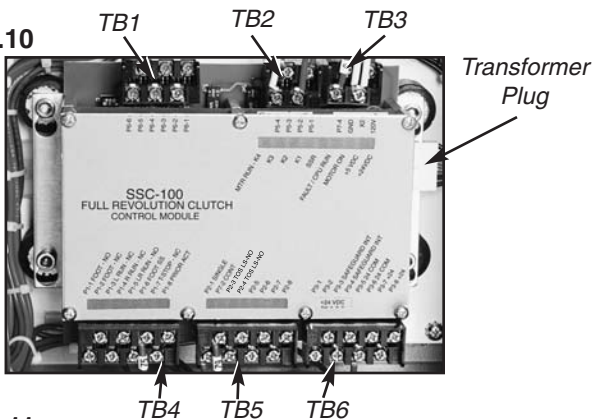


Photo 3.11

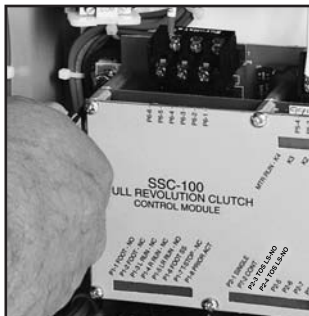
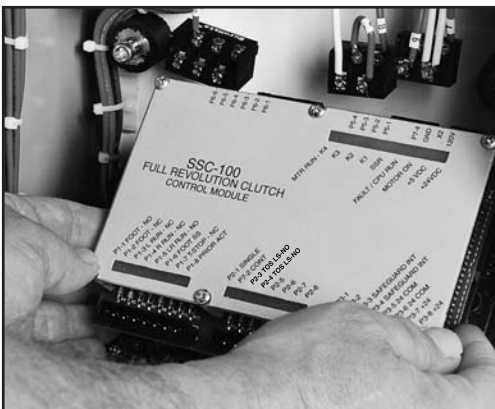


Photo 3.12



1. Locate the control box.
2. Determine a mounting location. Make sure it is in an accessible location either on or near the machine to be controlled. If the control box includes a disconnect switch, the disconnect handle must be mounted below 6'7" from the floor to meet NFPA 79 Electrical Standards. A convenient location will keep the conduit runs to a minimum length. Although operation of this control will not be adversely affected by normal operation, excessive shock or vibration may require shock mounting in specific applications.

Note: On OBI presses, caution must be used to ensure that the control box location does not interfere with the ability to incline the press to its maximum inclinable position. On inclined presses, the length and flexibility of each individual conduit run must be carefully planned.

3. Drill and tap holes for mounting the control box.
4. Solidly mount the control box using fasteners (not furnished) and a level. See Photo 3.9.
5. Before drilling and punching holes in the control box for conduit connectors, the circuit board module **must** be removed. Use of a static guard* is recommended for this procedure.
 - Unplug all the terminal blocks (TB1 - TB6). See Photo 3.10.
 - Unplug the transformer. See Photo 3.10.
 - Loosen the four (4) Allen-Head screws that hold the circuit board assembly in place. See Photo 3.11.
 - Grab the edges of the circuit board and lift it up and out. See Photo 3.12.
 - Make sure the circuit board is stored in a safe place until it is ready to be reinstalled.
 - Make sure the control module is protected from any metal shavings when drilling holes.
6. Drill and punch holes, as required, in the control box for conduit connectors.
7. Refer to the electrical diagrams furnished with your control for wiring instructions.

*Material used to disperse static electricity.

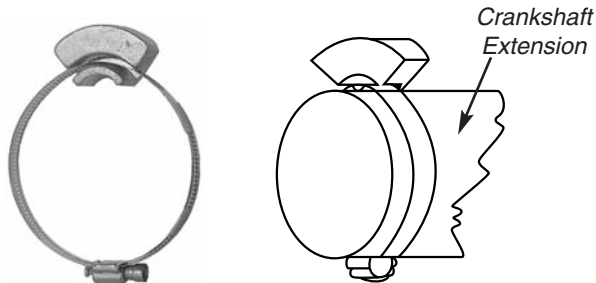
(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

Cam and Mounting Strap Assembly

Photo 3.13
Part No. CML002



A cast aluminum cam and an adjustable stainless steel strap are furnished. These parts are designed to mount easily over the crankshaft extension, usually on the left side of the machine.

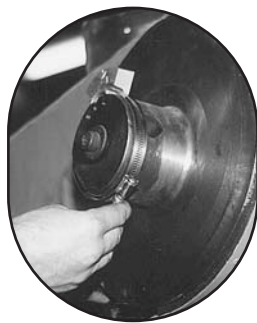
The cam is used to indicate the approximate top-dead-center position of the machine crankshaft rotation. It must be detected by the limit switch before the machine is allowed to stroke.

MOUNTING THE CAM AND STRAP ASSEMBLY

Photo 3.14

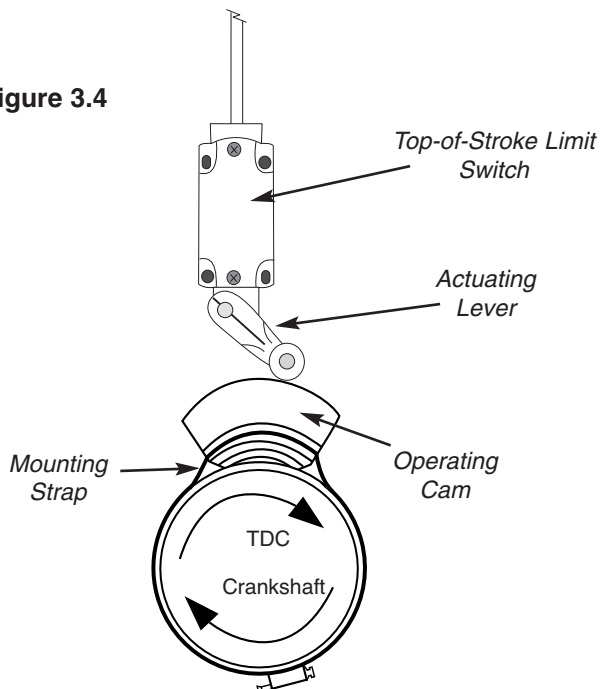


Photo 3.15



1. Locate the cam and strap assembly.
2. With the crankshaft at top dead center, place the mounting strap and cam around the crankshaft extension. See Photo 3.14.
 - Make sure the cam is installed so that it is positioned directly under the actuating lever of the limit switch. See Figure 3.4.)
3. With a screw driver, tighten the cam and strap assembly securely to the crankshaft. See Photo 3.15.
4. The cam is positioned correctly when the actuating lever of the limit switch is in contact with the cam. See Figure 3.4.

Figure 3.4



Note: If the cam and/or mounting strap breaks or becomes jarred loose in the single stroke mode, the press circuit cannot be actuated if the control system is properly installed and wired. If there is a mechanical failure of the machine, this does not apply.

(Continued on next page.)

Top-of-Stroke Limit Switch Assembly

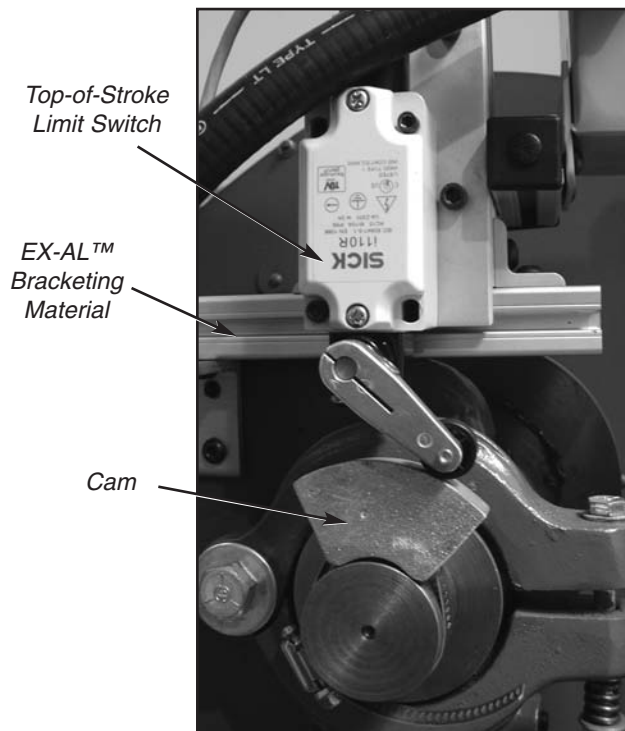
Photo 3.16
Part No. CMK103



The top-of-stroke limit switch provides dual redundant output signals when the machine is in the single stroke mode of operation. If the machine does not stop on top dead center ($\pm 5^\circ$), or if the limit switch malfunctions, becomes improperly adjusted, or the mounting becomes jarred loose, the control will not initiate a successive stroke.

MOUNTING THE TOP-OF-STROKE LIMIT SWITCH

Photo 3.17



1. Locate the top-of-stroke limit switch.
2. Determine the mounting location for the limit switch on the machine in the crankshaft area. In most cases, a special mounting bracket will need to be fabricated.

Note: To purchase the EX-AL™ bracketing material shown in the photos, please contact Rockford Systems.

- The crankshaft must be at top dead center when mounting this limit switch.
 - Mount the limit switch in an accessible location.
3. Wire the 24-V DC common through the two NO contacts in the top-of-stroke limit switch back to the proper inputs on the control using the 25' of cable provided. This cable should be run in conduit if required by local codes. Cut and strip wires as needed. Please consult the factory if a longer cable is required.
- Refer to the electrical schematics furnished with your order for wiring instructions.

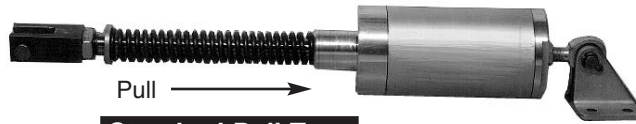
SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

Air Cylinder Assembly (RCL Series)

(See Installation Manual No. KSL092)

Photo 3.18



Standard Pull Type

Part No.:	RCL001	RCL002	RCL003	RCL004*	RCL005*
PRESS SIZE (Tons)	1/4 to 7	8 to 35	36 to 70	71 to 125	126 to 200
SIZE (Bore x Stroke)	1-1/8" x 1"	1-1/2" x 1"	2" x 2"	2-1/2" x 2"	3" x 2"
PULL FORCE (@75 PSI)	50 lbs.	100 lbs.	200 lbs.	300 lbs.	500 lbs.

* A quick dump valve is required. Please see page 24.

Optional Push Type

Part No.:	RCL022	RCL023	RCL024*	RCL025*
PRESS SIZE (Tons)	8 to 35	36 to 70	71 to 125	126 to 200
SIZE (Bore x Stroke)	1-1/2" x 1"	2" x 2"	2-1/2" x 2"	3" x 2"
PUSH FORCE (@75 PSI)	100 lbs.	200 lbs.	300 lbs.	500 lbs.

* A quick dump valve is required. Please see page 24.

Single-acting, spring-return pull-type air cylinders are usually supplied with a swivel-clevis mount as standard. Other special cylinders, such as clevis mount, flange mount (either end) or foot mount, are also available. They can be push-type (spring inside cylinder), or pull-type (spring on cylinder rod, as illustrated). The main consideration is the cylinder is a single-acting spring-return type (not double acting) to meet best safety practices.

The assembly consists of the cylinder, two mounting feet, mounting pin, drive yoke, drive pin, and yoke locknut. This assembly is illustrated in **Figure 3.5** on page 23.

The air cylinder is usually mounted on the right side of the machine in the vertical position. On some occasions, with special air cylinders, they can be mounted horizontal on a special bracket (foot mount) or directly attached to the side frame. **When locating the cylinder assembly, the piston rod must have a straight in-line pull and the cylinder rod, yoke or any moving parts must not bind after installation.** Be sure the rod stroke is not too long because it could cause jackknifing of the cylinder and clutch operating rod. If this is a concern, shorter stroke cylinders are available. Too much air pressure may damage the clutch operating linkage. Please consider these points when installing any air cylinder.

The purpose of the spring on the cylinder is to return the piston rod of the air cylinder. All existing clutch and rod spring action must be compression type and remain in the linkage to disengage the clutch even if they have to be relocated to accommodate the air cylinder.

MOUNTING THE AIR CYLINDER ASSEMBLY

1. Locate the air cylinder assembly.
2. Determine a mounting location on the machine (usually on the right side of the machine frame).
 - Make sure the feet can be attached to a flat surface. See Photo 3.19.
 - Align the yoke with the clutch operating rod or lever. See Photo 3.20.
 - Orient the air inlet of the cylinder toward a convenient mounting location for the air solenoid valve.
3. Locate the drive yoke and locknut approximately halfway down on the threaded portion of the piston rod in order to provide for either up or down adjustment when necessary.

Photo 3.19

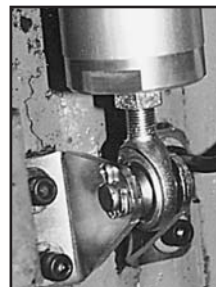


Photo 3.20



! Make sure the operating linkage or cylinder doesn't bind.

(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

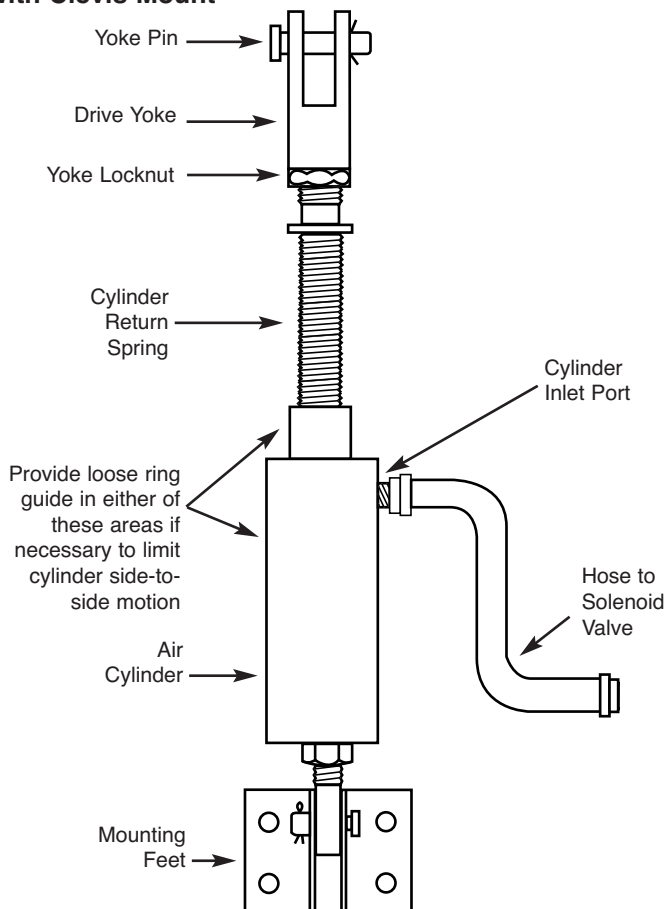
Full-Revolution-Clutch Press Control System

MOUNTING THE AIR CYLINDER ASSEMBLY (continued)

Photo 3.21



Figure 3.5
Standard Pull Cylinder
with Clevis Mount



5. Attach the press clutch operating rod to the air cylinder by some convenient means. One easy method is to establish an approximate cylinder location, then cut the existing operating rod to a length which allows the forming of a loop at the end.
6. To make a loop, heat the end and form a loop which is suitable to receive the yoke pin.
7. Assemble the yoke and operating rod and establish the final mounting feet location.
8. Measure and spot holes on the machine at the mounting feet location. Drill and tap holes for the mounting feet. Fasten the mounting feet to the machine. When mounting the cylinder, be sure it is secured in such a manner that it will not vibrate loose, jackknife, bind, or rub on some other part of the machine. See Photo 3.21.
9. Adjust the assembly so the air cylinder bottoms at the end of each stroke. Final adjustments may be made using the threaded portion of this piston rod, yoke and locknut. Tighten the locknut securely after final adjustment.



The existing clutch mechanism must contain adequate returning means for the operating rod after the press is tripped. The return spring on the air cylinder is intended to return the piston rod of the cylinder only, when air is dumped. The air cylinder return spring is not intended to be applied as the only returning means for disengaging the clutch or applying the brake.

Note: If your machine is equipped with a mechanical single-stroke mechanism device, refer to page 10.

(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

Quick Dump Valve (If furnished)

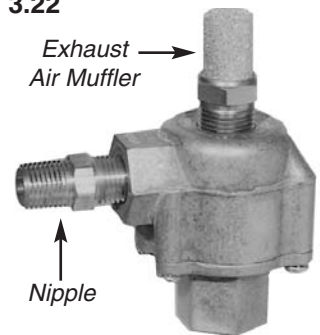
PART NO. RCL511

PART NO. RCL513

The RCL511 valve (1/4") is required with the RCL004 or RCL024 air cylinders. The RCL513 valve (3/4") is required with the RCL005 or RCL025 air cylinders. An exhaust air muffler and nipple are included.

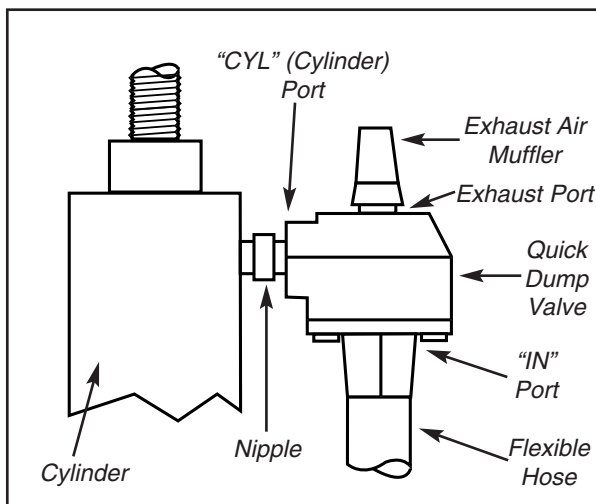
The solenoid air valve (described on the next page), normally exhausts the trapped air from the air cylinder to the atmosphere in sufficient time for successful single-stroke operation. However, for presses using larger cylinders or operating at higher speeds, this quick dump valve provides much quicker exhausting of the trapped air for successful single-stroke operation of the press. When the quick dump valve is supplied, it should be mounted at the cylinder inlet port as described below.

Photo 3.22



MOUNTING THE QUICK DUMP VALVE

Figure 3.6



1. Locate the dump valve and the threaded muffler.
2. Attach the muffler to the dump valve port marked EXH (exhaust). Refer to Figure 3.6.
3. Using the furnished nipple, connect the quick dump valve port marked **CYL** (cylinder) to the threaded inlet port of the air cylinder. Refer to Figure 3.6.
4. Refer to the Solenoid Valve Installation Section on the next page to connect the dump valve to the solenoid valve.



The exhaust air muffler must be kept clean at all times. Remove and clean the muffler on a regular basis. Never operate the machine unless the muffler is clean.

Note: Should special requirements of an installation dictate the use of longer or smaller diameter tubing or hose between the solenoid valve and the cylinder, then a quick dump valve must be used regardless of the cylinder size.

(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

Solenoid Air Valve Assembly

(See Installation Sheet KSL151)

Photo 3.23

Part No. RCD006

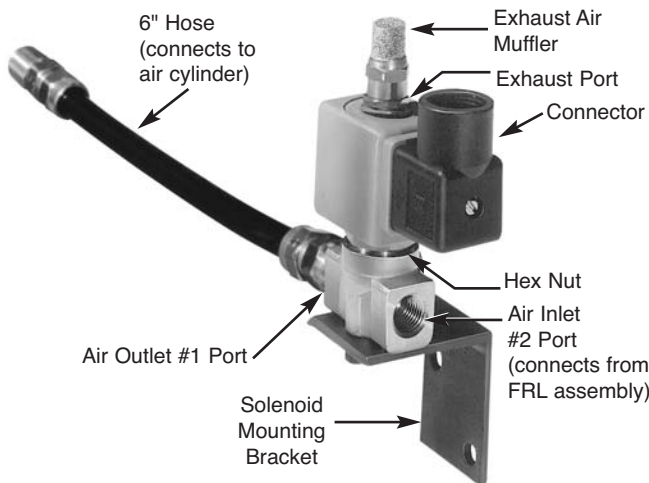
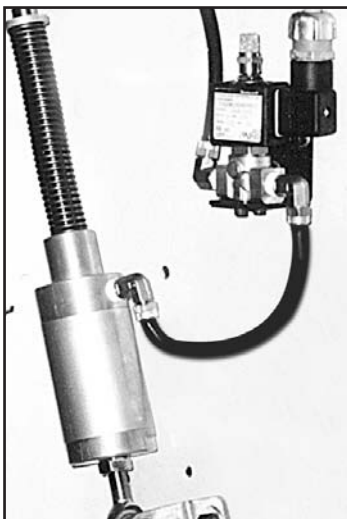


Photo 3.24



Photo 3.25



The ¼" NPT port solenoid air valve is a three-way, normally closed, quick exhaust type. This assembly consists of the electrically-operated air solenoid valve, exhaust air muffler, steel mounting bracket with fasteners, and 6" hose.

1. Locate the solenoid air valve assembly.
2. Attach the exhaust air muffler onto the threaded exhaust port located on top of the valve.
3. Assemble the mounting bracket to the base of the valve with the fasteners provided. Orient this assembly so the air outlet port (marked "1" on the valve body) points toward the air cylinder.
4. Locate the 6" hose supplied with the solenoid air valve. Attach one end of this hose to the No. 1 port of the solenoid valve and the other end of the hose to the threaded inlet port of the air cylinder.



It is extremely important to use the 6" hose provided for the connection between the solenoid valve and the air cylinder. It provides the correct size and length for proper exhaust of cylinder air, which are required for successful single-stroke press operation. Refer to Photo 3.24.

5. Mount the solenoid valve assembly on the press frame. Make sure the assembly is mounted in a vertical position and allows sufficient flexibility to accommodate cylinder movement. See Photo 3.25.
6. Attach one brass connector (not furnished) to the air inlet port (marked "2" on the valve body) for the incoming air connection.
 - Use teflon tape on the male threads of the brass connector. Make sure the tape does not extend beyond the threaded portion of the connector.
7. Refer to the electrical diagrams furnished with your order for solenoid valve wiring instructions.
 - The electrical conduit fitting can be easily adjusted to face in any horizontal direction by loosening the hex nut and turning the top portion of the solenoid valve assembly.
 - Retighten this hex nut after determining the location of the conduit fitting.



The exhaust air muffler must be kept clean at all times. Never operate the machine unless the muffler is clean.

(Continued on next page.)

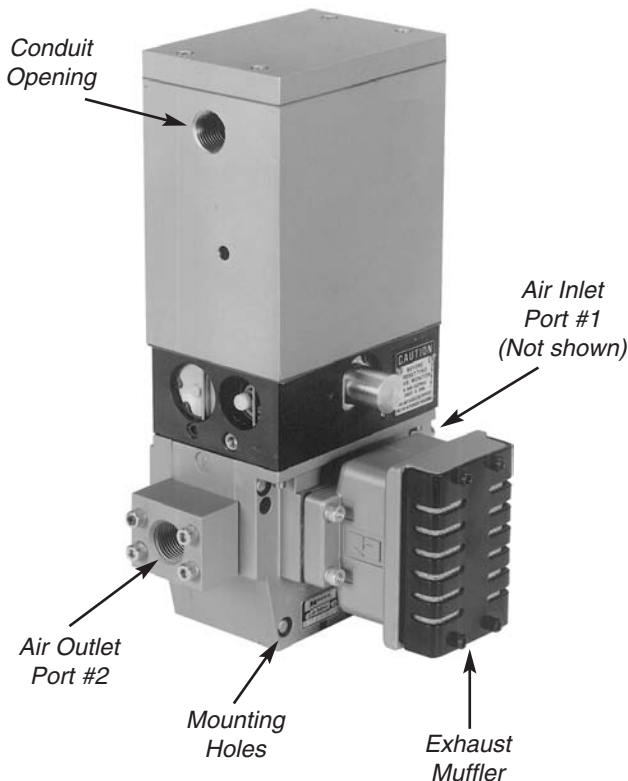
SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

Dual Solenoid Air Valve and Muffler

(If furnished, see Installation Manual No. KSL036)

Photo 3.26
Part No. RCL551



Note: The 1/2" NPT port on the dual valve will need a reducing nipple to correspond to the appropriate size NPT hose for connection of the other components.

To meet ANSI B11.1 Standard, optionally available is a 1/2" NPT port dual checking valve for the full revolution trip control packages. When this valve is supplied in the package, it replaces the standard part number RCD006 solenoid valve (page 25).

This valve is a three-way, normally closed, cross-flow series/parallel air valve. It consists of two main parts: the piloted monitor assembly and the valve body assembly.

1. Locate the dual solenoid air valve.
2. Determine the mounting location for the dual solenoid air valve on the machine, within 6" of the air cylinder.
3. Measure or spot holes on the machine at the mounting location.
4. Drill and tap two holes for two 1/4-20 x 4" screws.
5. Attach the dual solenoid air valve to the machine with two 1/4-20 x 4" screws (not furnished). Tighten securely.



The exhaust air muffler must be kept clean at all times. Never operate the machine unless the muffler is clean. The muffler must be cleaned on a regular basis.

6. Attach a pipe or hose (customer to furnish) to the inlet port (marked "1" on the valve body). The other end of the pipe or hose connects to the FRL assembly. Use teflon tape on the male threads. Make sure the tape does not extend beyond the threaded portion.
 - A minimum of 30 to 40 PSI must be maintained at the valve for proper operation.
7. Attach a flexible hose (customer to furnish) to the outlet port (marked "2" on the valve body). Attach the other end of this hose to the threaded inlet port of the air cylinder.
8. Attach a 1/2" flexible conduit fitting to either conduit opening (on the sides of the valve body).
9. Refer to the electrical diagrams furnished with your order for dual solenoid valve wiring instructions.

(Continued on next page.)

Filter-Regulator-Gauge and Lubricator Assembly (FRL)

(See Installation Manual No. KSL208)

Figure 3.7
Part No. RCL043

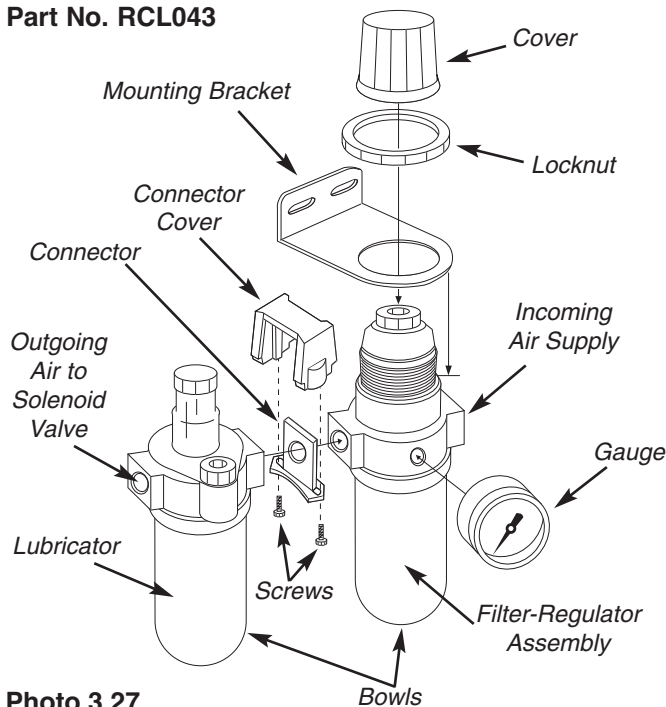


Photo 3.27

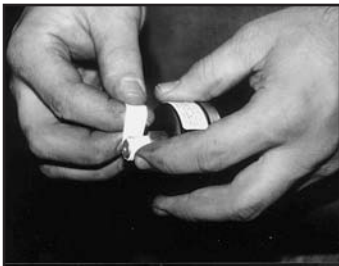
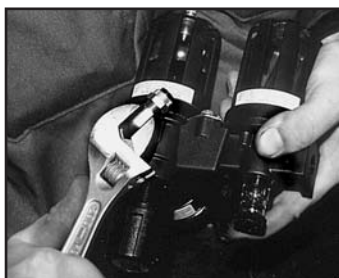


Photo 3.28



Photo 3.29



The filter cleans air that goes to the solenoid air valve and air cylinder. The regulator and gauge are used to adjust air pressure to the proper amount to engage the clutch. The lubricator keeps the solenoid air valve and the air cylinder properly lubricated.

1. Locate the FRL assembly. Check the packing list to verify the parts needed for this assembly.
 - Before assembling the components, determine the direction of air flow and the mounting location on the machine or equipment. The filter/regulator should be mounted upstream of any lubricators and as near as possible to the application point.
2. Place the connector between the filter/regulator and the lubricator.
3. Slide the connector cover over the connector (this joins the filter/regulator to the lubricator). Tighten the two screws furnished in the kit. Refer to Figure 3.7.
 - Make sure the bowls are hand tight.
 - Make sure the air flow is in the direction of the arrow or the “in/out” indication on the body of the filter-regulator-lubricator assembly. Refer to Figure 3.7.
4. Locate the pressure gauge. Use teflon tape on the male threads. Make sure the tape does not extend beyond the threaded portion of the gauge. See Photo 3.27.
5. Install the pressure gauge in the threaded port opposite the mounting surface on the regulator. Tighten securely. See Photo 3.28.
6. A 1/4" port plug is supplied to use when there is an unused port on the regulator. If an air pressure switch will be installed, a brass connector (not furnished) is required for connecting the air line. Use teflon tape on the male threads of the plug or the brass connector. Make sure the tape does not extend beyond the threaded portion. Install either the plug or connector into the port and tighten securely. See Photo 3.29.

(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

Filter-Regulator-Gauge and Lubricator Assembly (FRL) (continued)

Photo 3.30



Photo 3.31

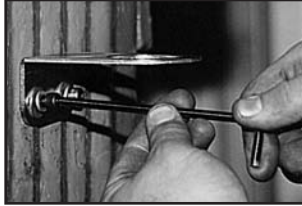


Photo 3.32



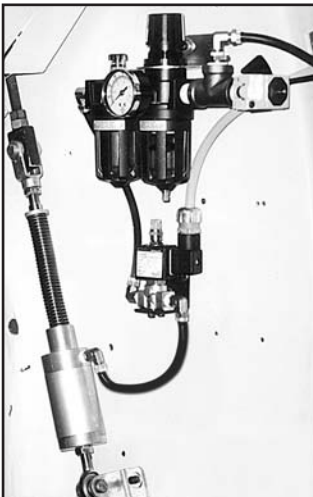
Photo 3.33



Photo 3.34



Photo 3.35



7. Measure or spot holes on the machine for the mounting bracket. See Photo 3.30.

- Make sure the assembly is at floor level for easy access. Install the FRL vertically (filter drain at the bottom) in the air line. Locate the filter/regulator upstream of the lubricator.

- Make sure the outlet port of the lubricator is oriented toward the inlet port of the next component to be mounted in the air line, usually the air solenoid valve.

8. Drill and tap holes in the machine frame for the mounting bracket. Attach the mounting bracket. See Photo 3.31.

9. Remove the cover from the top of the filter/regulator.

10. Locate the locknut. Insert the filter/regulator portion up through the mounting bracket hole. See Photo 3.32. Place the locknut over the filter-regulator and tighten it securely. Snap the cover back onto the filter/regulator. See Photo 3.33. Make sure the FRL unit is level after the installation. See Photo 3.34.

11. Fill the lubricator with a good quality lubricant to the level indicated by the maximum fill line on the transparent bowl. Do not overfill. Set the drip rate to the minimum level. Please see the FRL Installation Manual No. KSL208 for further details.

Note: Air pressure must be regulated high enough to develop sufficient cylinder action to actuate the clutch mechanism cleanly. Depending on the clutch construction and linkage design, this will usually be between 60 and 75 PSI.



Do not use more pressure than is necessary and never apply more than 125 PSI.



The air filter must be kept clean at all times. Never operate the machine unless the air filter is clean.



The lubricator must not be filled while under pressure.

(Continued on next page.)

Lockout Air Valve

(If furnished. See Installation Manual No. KSL098)

A lockout valve is usually attached to the air inlet of a machine. Part No. RCD-071 is a ¼" manually operated valve, with a slide-type valve that opens and closes with a short one-inch movement. See Photo 3.36. When locking out, the downstream air is automatically exhausted. The valve slide can only be locked in the closed position.

Figure 3.8 - Illustration of Pneumatic System on Full Revolution Clutch Power Press

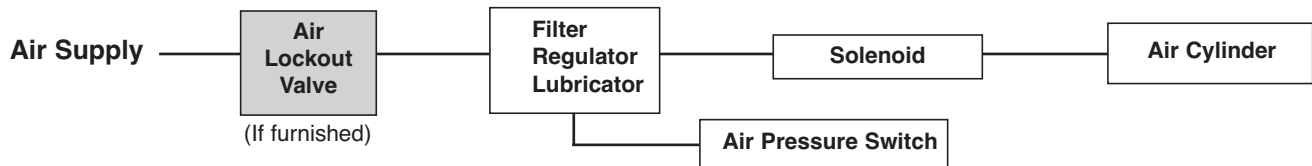


Photo 3.36
Part No. RCD071



Photo 3.37



MOUNTING THE LOCKOUT VALVE

1. Locate the lockout valve, if furnished.
2. Using a nipple, attach the lockout valve to the inlet port of the FRL assembly. Use teflon tape on the male threads. Make sure the tape does not extend beyond the threaded portion.
 - The port size of the lockout valve should match the pipe size where it will be installed.
 - For convenience, the lockout valve should be mounted so it can be closed, opened, and tagged from the shop floor. If it is out of reach, personnel may be discouraged from using the valve to lock out the press when performing maintenance duties.
3. After installing all components, attach the air supply hose for the machine to the inlet port of the lockout valve. See Photo 3.37. If the pipe size of the air hose is larger than the inlet port of the equipment, a reducer is required.
 - The lockout valve is also designed to bleed the downstream air into the atmosphere. Check the air line where the lockout valve will be inserted.
 - Exercise care to avoid getting particles such as chips, sealing compounds or scale in the piping. This could cause valve failure and damage.

(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

Air Pressure Switch

(See Installation Manual No. KSL165)

Photo 3.38
Part No. CTD062



Photo 3.39

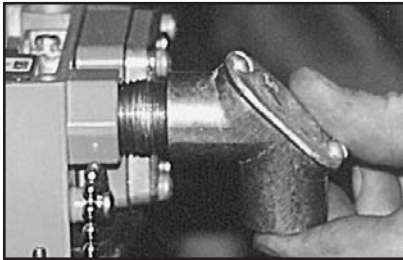


Photo 3.40

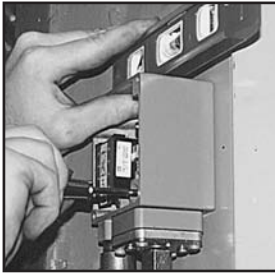


Photo 3.41

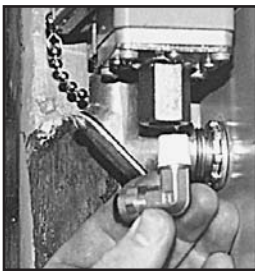


Photo 3.42

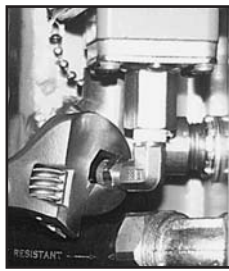


Photo 3.43



An air pressure switch is used to monitor for air-supply failure. The air pressure switch must be set so if the air coming to the press is not adequate, the machine becomes inoperable.

1. Locate the air pressure switch.
2. Determine the mounting location for the air pressure switch and measure or spot the holes. To keep conduit runs to a minimum, mount the air pressure switch as close as possible to the control box. The air pressure switch can be mounted to the control box, as illustrated, or on the machine frame, or on a special mounting plate.
3. Drill and tap holes at the mounting location for 1/4-20 x 2 1/2" fasteners (not furnished).
4. At the electrical port, attach a 1/2" NPT close nipple, elbow, or other connector (not furnished) to the conduit opening. See Photo 3.39.
5. Using a level, mount the air pressure switch at the predetermined mounting location. See Photo 3.40.
6. Use teflon tape on the male threads of a brass connector (not furnished). Attach it to the female inlet port on the switch and tighten. See Photos 3.41 and 3.42.
7. With flexible air hose or other air-line material, connect the air pressure switch to the unused port of the FRL Assembly (or other location in the air line after the FRL Assembly and before the solenoid valve). See Photo 3.43.
 - Since only low pressure is being monitored, the diameter of the tubing can be small and the length is not critical.
8. Refer to the electrical diagrams furnished with your order for air pressure switch wiring instructions.
 - These switches are set to open the electrical circuit any time pressure falls below the preset level. They are normally set between 30 and 40 PSI to prevent unnecessary opening due to loss in line pressure when air is used to trip the press via the air cylinder.

(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

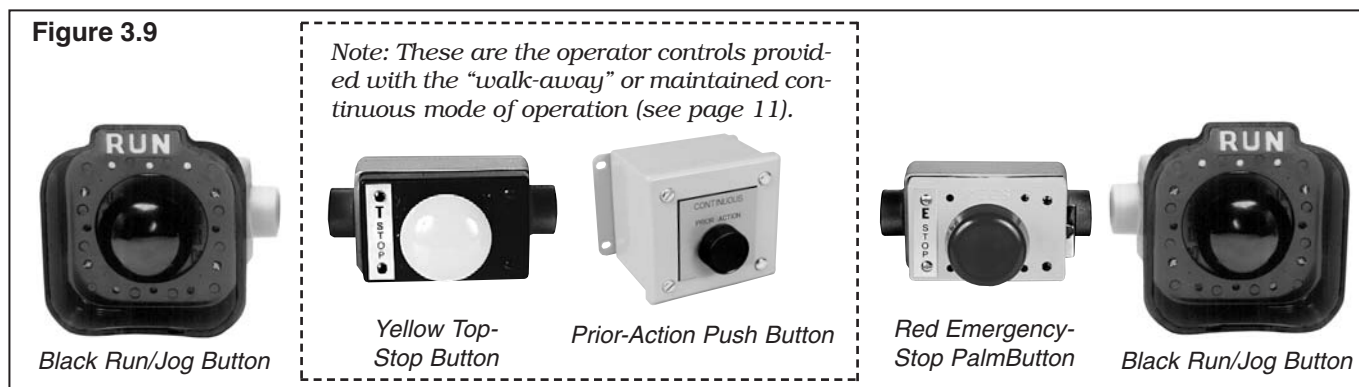
Palm Button Assembly

(See Installation Manual No. KSL071 or KSL073)

1. When the standard modes of operation of off, jog, single stroke and maintained continuous are furnished a palm button assembly and a foot switch are provided for actuation of the press. The palm button assembly consists of two buttons (two run/jog buttons with ring guards) and two mounting boxes (one double hub and one single hub). If the “walk-away” continuous, “automatic single stroke,” or “continuous-on-demand” mode of operation is furnished, a yellow top-stop button and mounting box are supplied. Optionally available are the “Touchdown” or chrome “light touch” palm buttons. These may be furnished in place of the standard “run/jog” black palm buttons. These palm buttons can be assembled in the order shown in **Figure 3.9** and mounted according to the requirement of the application. Nipples, conduit, and wire for connecting the mounting boxes are not furnished.

! Install the palm “run” buttons in such a way that it requires the use of both hands to cycle the press. See pages 34 - 35 for palm button mounting instructions.

2. The two “run” palm buttons, on full revolution-type machines, can be used to initiate a machine cycle and as a method of safeguarding the point of operation. In both instances, OSHA and ANSI have established certain requirements for these buttons. For your convenience we have reproduced the pertinent sections of OSHA’s CFR, Subpart O, 1910.217 as well as the safety distance formula for two-hand trip. These sections cover two-hand trip as an initiating means and two-hand trip as a point-of-operation safeguard for full revolution clutch presses.



Please read and make sure you understand the following sections **before** proceeding with the mounting of the two “run” buttons.

OSHA 1910.217 (b)(6) for two-hand trip used as a method of initiating a press cycle only:

- (i) A two-hand trip shall have the individual operator’s hand controls protected against unintentional operation and have the individual operator’s hand controls arranged by design and construction and/or separation to require the use of both hands to trip the press and use a control arrangement requiring concurrent operation of the individual operator’s hand controls.
- (ii) Two-hand trip systems on full revolution clutch machines shall incorporate an antirepeat feature.
- (iii) If two-hand trip systems are used on multiple operator presses, each operator shall have a separate set of controls.”

! The above description covers the use of two palm buttons as a method of initiating a press cycle. It does not provide any form of point-of-operation safeguarding. Some other properly applied and installed guard or device must be provided in accordance with OSHA 1910.217 Section (c) using the run palm buttons as an initiating means.

(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

Palm Button Assembly (continued)

OSHA 1910.217 for two-hand trip used as a method of safeguarding the point of operation as follows:

(c)(3) Point-of-Operation Devices

(i) Point-of-Operation devices shall protect the operator by:

(e) Requiring the application of both of the operator's hands to machine operating controls and locating such controls at such a safety distance from the point of operation that the slide completes the downward travel or stops before the operator can reach into the point of operation with his hands;

(viii) The two-hand trip device shall protect the operator as specified in paragraph (c)(3)(i)(e)(see above) of this section.

(a) When used in press operations requiring more than one operator, separate two-hand trips shall be provided for each operator, and shall be designed to require concurrent application of all operator controls to activate the slide.

(b) Each two-hand trip shall meet the construction requirements of paragraph (b)(6) of this section. (See paragraph (b)(6) on page 31.)

(c) The safety distance (D_m) between the two-hand trip and the point of operation shall be greater than the distance determined by the following formula: (Also, see **Figure 3.10**.)

$D_m = 63 \text{ inches/second} \times T_m$; where:

$D_m =$ minimum safety distance (inches);

63 inches/second = hand speed constant; and

$T_m =$ the maximum time the press takes for the die closure after it has been tripped (seconds). For full revolution clutch presses with only one engaging point, T_m is equal to the time necessary for one and one-half revolutions of the crankshaft. For full revolution clutch presses with more than one engaging point, T_m shall be calculated as follows:

$$T_m = 1/2 + \left[\frac{1}{\text{Number of engaging points per revolution}} \right] \times \text{time necessary to complete one revolution of the crankshaft (seconds).}$$

(d) Two-hand trips shall be fixed in position so that only a supervisor or safety engineer is capable of relocating the controls.

Note: The control system provided with this package is not designed for two-hand **control**. (Two-hand control is a part revolution clutch safeguarding device only.) This control system is designed for two-hand **trip** only.

(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

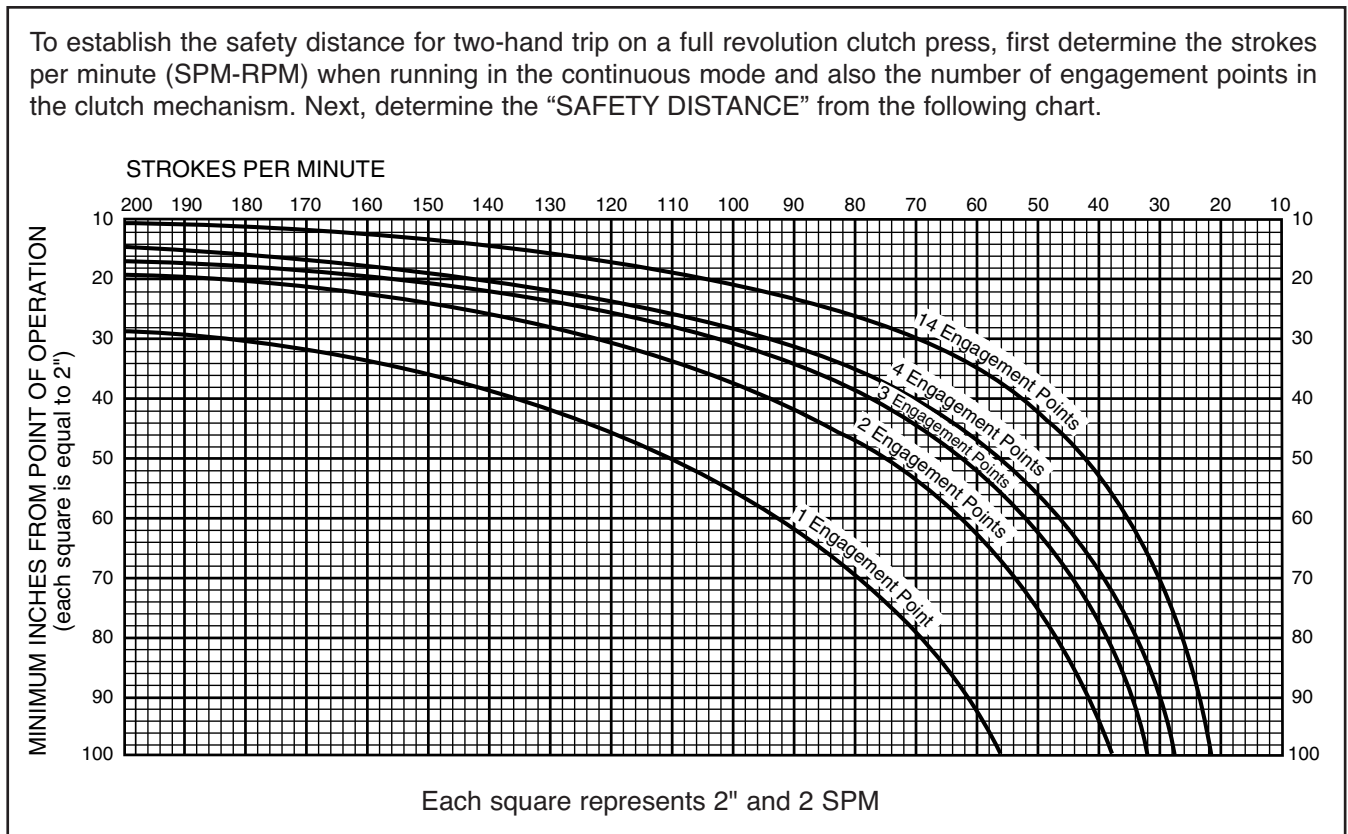
Full-Revolution-Clutch Press Control System

Palm Button Assembly (continued)



When applying the two palm “run” buttons to meet the requirements for a “point-of-operation safeguarding device,” make certain these buttons are located on the machine so they meet the minimum safety distance required by the OSHA formula described previously, or refer to the chart in Figure 3.10 below.

Figure 3.10



Simply stated, safety distance is the mounting and location of the palm buttons at a distance where the operator cannot reach into the point-of-operation hazard before the ram has completed its downward travel.



In order to meet the requirements, an inspection and preventive maintenance program is mandatory. Two-hand trips, when used as a point-of-operation device, only initiate the press stroke. Once the stroke is started, it will make one full stroke. Other mechanical components in the press and press system provide top stop. Two-hand trips can safeguard the point of operation provided there is no mechanical failure of the press. No trip control system can overcome a mechanical deficiency, defect or malfunction in the press itself. Two-hand trip should not be the only safeguard on full revolution clutch presses.

(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

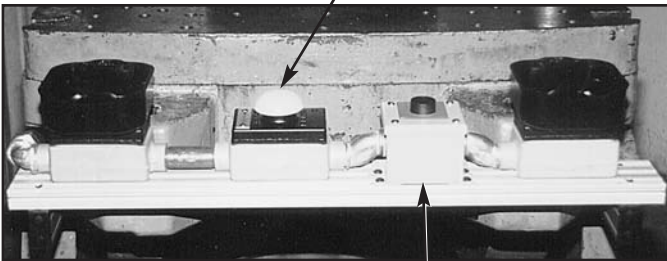
PALM BUTTON ASSEMBLY MOUNTING

Photo 3.44



Photo 3.45

Optional Top-Stop Button



Prior-Action Push Button

Photo 3.46
Mounting Boxes

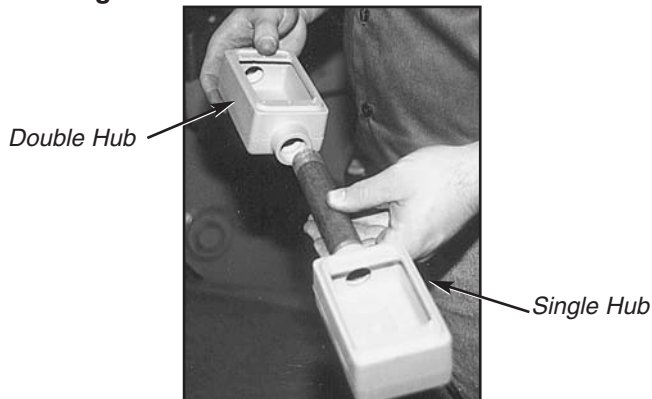


Photo 3.47



1. Locate the palm button assembly. Lay the parts out on a working surface. Check the packing slip to verify which parts are furnished for this assembly. See Photo 3.44.
2. Determine the mounting location for the palm button assembly.
 - If the two-hand trips are the point-of-operation safeguard, they **must** be mounted at the proper safety distance as discussed previously. To comply with all the OSHA Code of Federal Regulations, Subpart O, 1910.217 (c)(3)(viii), see page 32 of this manual.
 - These operator controls should be mounted in a convenient location, keeping ergonomics in mind. Make sure the palm buttons are located far enough apart so the operator cannot use the elbow or fingers of the same arm to operate them concurrently.
 - If a prior-action station is furnished for “walk-away” continuous, “automatic single stroke,” or “continuous-on-demand,” it should be mounted in a convenient location for the operator. It may be mounted as part of the palm button assembly. See Photo 3.45.
3. Locate the mounting boxes for the assembly. There should be one single-hub mounting box. One of the “run” buttons will be installed in this box. Install it where the wires will terminate. See Photo 3.46.
4. Threaded pipe and elbows (not furnished) are required to tie the mounting boxes and prior-action station together. Make sure they are the proper length for the installation.
 - Connect the boxes together. See Photo 3.46.
5. Drill two or more holes into each of the mounting boxes for installation on the machine. See Photo 3.47.
 - Attach the mounting boxes to the machine or to a special fabricated palm button assembly bracket (not furnished).
6. See page 42 of this manual and the electrical schematics furnished with your order for palm button assembly wiring instructions.

(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

PALM BUTTON ASSEMBLY MOUNTING (continued)

Photo 3.48

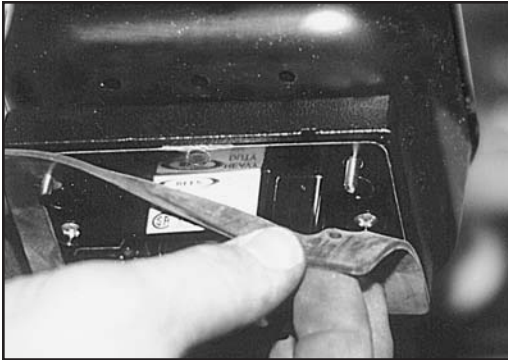
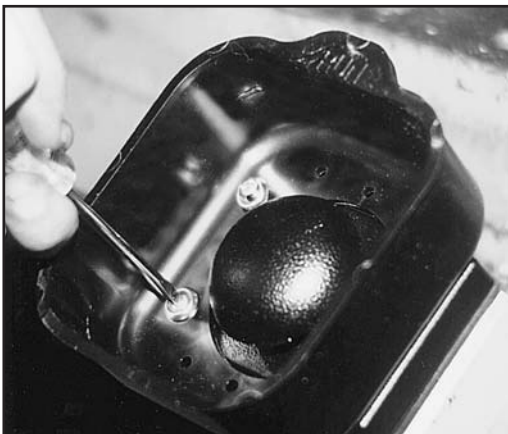


Photo 3.49



7. After wiring the palm buttons properly, continue assembling the buttons.
 - Locate two black run/jog buttons, two black ring guards, and the flat-head screws.
 - Take one run button, one ring guard and place one screw through each of the four corner holes of the ring guard, into the run button, and through the gasket on the back of the button. See Photo 3.48. Make sure the ring guard is installed with the word RUN at the top of the button. See Photo 3.49.
 - Attach this assembly to the mounting box on the machine and tighten the fasteners. See Photo 3.49.
 - Repeat this procedure with the second run button.
8. Locate the yellow top-stop button (if furnished) and the plastic bag containing the top-stop tag and fasteners.
 - Attach the top-stop tag to the cover of the yellow button with the furnished fasteners.
 - Place one screw through each of the four holes of the yellow top-stop button and into the mounting box. Tighten the fasteners.

Packages That Include “Two-Hand Continuous,” “Foot Maintained Continuous,” “Automatic Single Stroke,” and “Continuous-on-Demand” Modes of Operation

A method of safeguarding the point of operation must always be provided before using “two-hand continuous,” “foot maintained continuous,” “automatic single stroke,” and “continuous-on-demand” modes of operation.

The machine will not operate or must not be operated until you either:

1. Electrically interlock or
2. Mechanically guard the machine’s point of operation with a safeguarding system or device.

Install either the electrically interlocked method of safeguarding or the mechanical guard or device.

1. When an electrically interlocked method of safeguarding the point of operation is chosen, connect the interlock to the safeguard interlock terminals (P3-3 and P3-4) in the control box (see page 18), and as shown on the control wiring schematic (wire numbers 88 and 89).
2. When a mechanical guard or device (nonelectrically interlocked) is chosen, the safeguard interlock terminals (P3-3 and P3-4) are not used. In order for the machine to operate with the use of a mechanical guard or device, the **safeguard interlock** terminals must be connected.

Note: When the mechanical guard or device is removed for other modes of operation, the safeguard interlock terminals must be disconnected.

(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

PRIOR-ACTION STATIONS

A prior-action station is a push button that must be depressed and released by the operator before depressing the two palm buttons or foot switch in order to initiate any of the continuous or automatic modes of operation listed here.

Mount the remote station on the machine so that it is convenient for the operator to depress and release the prior-action push button prior to depressing the two palm buttons or foot switch. It may be mounted as part of the operator's control station (see page 31).

“WALK-AWAY” CONTINUOUS AND “MAINTAINED” CONTINUOUS MODES OF OPERATION

According to ANSI Standard B11.1-1988 Paragraph 4.12.4 Operating Modes for “walk-away” continuous and “maintained continuous” operation:

A trip-control system with a CONTINUOUS mode of operation:

- Shall be capable of employer supervision (key selector on control box).
- Shall require a prior action or decision by the operator in addition to the selection of the CONTINUOUS mode of operation (prior-action pushbutton station).
- Shall have a control to disengage the clutch when the press is in the CONTINUOUS mode of operation (yellow or red push button).

A trip-control system with a MAINTAINED CONTINUOUS mode of operation:

- Shall require a prior action or decision by the operator in addition to the selection of the MAINTAINED CONTINUOUS mode of operation, and the slide shall stop at TDC when the actuating means is released.

“CONTINUOUS-ON-DEMAND” AND “AUTOMATIC SINGLE STROKE” MODES OF OPERATION

According to ANSI Standard B11.1-1988 Paragraph 4.12.4 Operating Modes for “continuous-on-demand” and “automatic single stroke” operations:

A trip-control system with a CONTINUOUS ON DEMAND mode of operation:

- Shall be capable of employer supervision (key-operated selector switch).
- Shall require a setup and reset action or decision by the operator in addition to the selection of the CONTINUOUS ON DEMAND mode of operation before stroke initiation. (Prior-action push button.)
- Shall have a timer to prevent reactivation of CONTINUOUS stroking if the time expires between the initiating signals.
- Shall require a setup and reset action or decision by the operator in addition to the selection of the CONTINUOUS ON DEMAND mode of operation when a STOP signal prevents successive strokes, or returns the press to TDC.

A trip-control system with AUTOMATIC SINGLE STROKE mode of operation:

- Shall be capable of employer supervision (key-operated selector switch).
- Shall require a setup and reset action or decision by the operator in addition to the selection of the AUTOMATIC SINGLE STROKE mode of operation before stroke initiation (prior-action push button).
- Shall have a timer to prevent successive automatic single strokes if the time expires between the initiating signals.
- Shall require a setup and reset action or decision by the operator prior to stroke initiation when a STOP signal returns the press to TDC, or prevents initiation of successive strokes.

Photo 3.50
Part No. LLD400



Photo 3.51
Part No. LLD406



(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

Other Components That May Be Required

YELLOW TOP-STOP PALM BUTTON

The yellow top-stop button is used to stop the machine when it is in the two-hand “walk-away” continuous, “automatic single stroke,” or continuous-on-demand” mode of operation. When the operator depresses this button, the press will top stop or stop at top dead center (TDC). This palm button assembly uses a double-hub mounting box. It can be located between the two “run” palm buttons, as part of the operator’s control station. (Please refer to page 31.)

To meet the ANSI B11 Series Safety Standards for Machine Tools and NFPA 79 Safety Standards, optionally available is one of the following Red Emergency-Stop Buttons.

Photo 3.52
Part No. CTC727 (Button) with
Part No. CTK003 (Mounting Box)



RED EMERGENCY-STOP PALM BUTTON

Photo 3.53
Part No. CTC736 (Button) with
Part No. CTK003 (Mounting Box)



This red emergency-stop button is used to stop the stroke of the machine and stop the main motor drive on full revolution presses. When the operator depresses the button, the press will top stop or stop at top dead center (TDC). It can be located between the two “run” palm buttons as part of the operator’s control station. (Please refer to page 31.) This emergency-stop button uses a double-hub mounting box—Part No. CTK-003 as shown in Photo 3.53. (A single-hub mounting box, Part No. CTK-004, is used when the only actuating means is a foot switch.)

This heavy-duty, single plunger red “emergency-stop” palm button provides one normally-closed contact arrangement. This 2¼” diameter button has a spring latch that keeps the button latched down when pushed. A mechanical side release is incorporated in the assembly. This mechanical latch must be reset after depressing the red button. It also has provisions for attaching a padlock to the latch. The palm button has a neoprene gasket which provides an oil-tight seal upon installation. Refer to pages 34 and 35 for mounting instructions.

RED EMERGENCY-STOP REMOTE STATION

This 4½” x 3½” x 3” station is a self-latching red “Emergency-Stop” palm button. It is furnished in a NEMA 12 metal enclosure. The palm button includes a reset. To reset it, the button must be turned to the right.

This station can be located between the two “run” palm buttons as part of the operator’s control station. Refer to pages 34 and 35 for mounting instructions.

Photo 3.54
Part No. LLD800



BAR RUN STATION (If furnished)

This remote bar/run station can be used in conjunction with manual turnover bar operation when setting dies in the press. The flywheel must have holes in the periphery for insertion of the turnover bar (or the flywheel can be manually turned when the flywheel cover is removed). The remote station includes a three-position selector switch for “bar,” “off,” “run,” and one push button used for energizing the air solenoid valve to allow air into the air cylinder. This pulls on the linkage to engage the clutch. The flywheel must be at rest (static) when engaging the clutch. After the clutch is engaged, the die setup person can manually turn the flywheel with the spring loaded turnover bar. This then causes the ram to move.

Photo 3.55
Part No. LLD404



1. Determine a mounting location on the machine for this station.
2. Drill and tap holes for mounting.
3. Mount the station to the machine.
4. Drill or punch a hole for the electrical connection. Attach conduit connector to this station.
5. Refer to the electrical schematics furnished with your order for wiring instructions.

(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

FOOT SWITCH (OPTIONAL) (See enclosed Installation Manual No. KSL-001)

Photo 3.56
Part No. CTD011



If you elect to use a foot control, all personnel must be warned that it is impossible for a foot switch to provide any form of point-of-operation safeguarding. It is the responsibility of the employer (user) to always provide an appropriate guard and/or device to prevent bodily injury whenever a foot switch is used to initiate a machine cycle. (See OSHA's CFR Subpart O, 1910.217 paragraph (c) for safeguarding.)

The following steps should be taken when using a foot switch:

A method of safeguarding (guard, gate, pullback, or restraint) the point of operation must be provided before installing or using a foot switch.

The machine will not operate or must not be operated until you either:

1. Electrically interlock or
2. Mechanically guard the machine's point of operation with a safeguarding system or device.

Install either the electrically interlocked method of safeguarding or the mechanical guard or device.

1. When an electrically interlocked method of safeguarding the point of operation is chosen, connect the interlock to the safeguard interlock terminals (P3-3 and P3-4) in the control box (see page 18), and as shown on the control wiring schematic (wire numbers 88 and 89).
2. When a mechanical guard or device (nonelectrically interlocked) is chosen, the safeguard interlock terminals (P3-3 and P3-4) are not used. In order for the machine to operate with the use of a mechanical guard or device, the **safeguard interlock** terminals must be connected.



Never use a foot switch to operate this machine unless a point-of-operation guard or device is provided and properly adjusted and maintained.



The mechanical guard or device must be properly installed, used and maintained. It must prevent all personnel from bodily injury or death.



If the mechanical guard or device is not used, is removed or is defeated, an electrically interlocked method of safeguarding must be used and connected to the safeguard interlock terminals (P3-3 and P3-4, see page 18).

FOOT SWITCH INSTALLATION

Photo 3.57



1. Locate the foot switch. (Conduit, cord, wire, and connectors are not furnished.)
2. Attach a connector or cord grip to the conduit opening on the back of the foot switch. Tighten securely. See Photo 3.57.

(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

FOOT SWITCH INSTALLATION (continued)

Photo 3.58

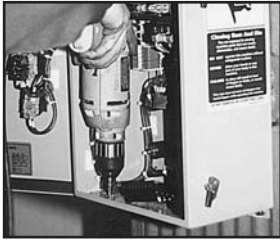


Photo 3.59

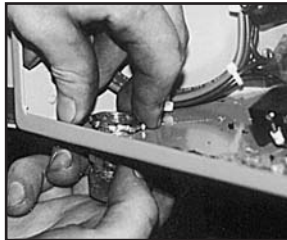


Photo 3.60



3. Drill a hole in the enclosure of the control box for conduit or a cord grip. Attach a conduit connector and conduit nut and tighten. See Photos 3.58 and 3.59.
4. Run conduit or cord from the foot switch to the control box, allowing enough length to reach the operator's station. See Photo 3.60. Use cord only if allowed by local ordinances
 - Refer to the electrical schematics furnished with your order for wiring instructions.

Note: Be sure to maintain the foot switch in first-class condition. It must always be wired properly and the protection on top, sides and front must always remain in place. Do not allow the front flap to be rigged in the open position. The foot must be removed after each foot stroke initiation to avoid accidental tripping.

MAIN POWER DISCONNECT SWITCH

A main power disconnect switch may have been supplied in this control package shipment, either in a custom control box or separately. If the existing switch complies to the safety standards, it can be reused. The main power disconnect switch is designed to disconnect the primary voltage to the press and lock it out. Please refer to the enclosed wiring schematics for proper wiring of this switch, if it is furnished separately.

OSHA Regulation 1910.217 (b)(8) and ANSI Standards B11.1 require that:

1. A main power disconnect switch capable of being locked in the "Off" position shall be provided with every power press control system.
2. If the machine already has a main power disconnect switch, it must be checked for the "locking off" and locking out feature. Some switches use construction which can be easily altered mechanically to comply with this requirement. If this is not possible, or an electrical disconnect switch is not provided, then a proper disconnect switch must be installed. (For a proper disconnect switch, please contact Rockford Systems, LLC)

For compliance to NFPA 79 Safety Standards, the disconnect handle should be mounted a maximum of 6'7" from the floor or working platform.

Photo 3.61



(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

MOTOR STARTER

A nonreversing motor starter may have been supplied with this trip control package. The main purpose of this starter is to drop out the main drive motor and power to the trip controls when a power failure occurs. Please refer to the enclosed wiring schematics for proper wiring of this starter. If an existing starter is used, a 120 VAC coil is required.

Photo 3.62



OSHA Regulation 1910.217 (b)(8) and ANSI Standards B11.1 require that:

1. The motor start button shall be protected against accidental operation.
2. All mechanical power press controls shall incorporate a type of drive motor starter that disconnects the drive motor from the power source in the event of control voltage or power source failure. It shall also require operation of the motor start button to restart the motor when voltage conditions are restored to normal.

The above requirements are normally met by using a magnetic motor starter. This starter operates with a 120 VAC coil which is powered from the secondary of the control transformer on the control panel. Refer to the electrical schematics supplied to obtain details of how to wire the starter and associated motor start/stop push buttons. If you are using an existing starter, have questions, or require a proper starter, please contact Rockford Systems, LLC.



When properly connected, no control voltage will be present in the trip control circuit when the motor starter is “dropped out” or “off.” This prevents possible danger due to inadvertent tripping of the clutch control with the press flywheel coasting. It also prevents engagement of the clutch when the flywheel is at rest; therefore, preventing a press stroke when the press is started. Control boxes equipped with the motor jog feature also meet this criteria. However, when the “jog” mode is selected by the keyed selector switch, the motor and clutch actuator is operated by depressing the palm buttons to jog the motor with the clutch engaged. This is used for die setup purposes.

Manual motor starters incorporating an “under-voltage release” mechanism may be used; however, they must **always** be wired so that no control voltage is present in the trip circuit when the starter is “dropped out.” If this type of starter is used, the control will be incapable of jogging.

Magnetic motor starters, having the start and stop push buttons mounted integral to the starter enclosure, may use line voltage for the operating coil; however, the wiring must be done in a way that ensures no control voltage is present in the trip circuit when the starter is “dropped out.” If this type of starter is used, the control will be incapable of jogging.

CUSTOM OR SPECIAL CONTROL BOX

In place of the standard control box previously described, you may have ordered and received a custom or special control box. This box usually includes a magnetic motor starter and disconnect switch which comply with the previous requirements. Be sure to wire in primary voltage and components to terminals as indicated on the enclosed wiring schematics.

FLYWHEEL AND GEAR COVERS

According to OSHA 1910.219 and ANSI B15.1 for Mechanical Power-Transmission Apparatus, all rotating components including flywheels, gears, sprockets and chain, sheaves and belts, shaft ends, etc., must be covered if below a seven-foot level from floor or platform. *Note: ANSI states it should be a nine-foot level.* Adequate cover material and brackets must be fabricated to retain these components in event of shaft or wheel mounting failure.

(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

COLLATERAL EQUIPMENT

All collateral press room and plant equipment (spring or air counterbalances, die cushions, feeding equipment, robots, etc.) must be safeguarded if they create hazards to personnel.

POINT-OF-OPERATION SAFEGUARDS

OSHA Regulation 1910.217(c)(i) and (ii) require that: “It shall be the responsibility of the employer (user) to provide and ensure the usage of point-of-operation guards or properly applied and adjusted point-of-operation devices on every operation performed on a mechanical power press.”

Please refer to Section 6—Methods of Safeguarding pages 51 and 52, for examples of point-of-operation safeguards for power presses.

Other Installation Considerations

PIPING

1. A manual shut-off valve and lockout must be installed in the air line usually just before the filter-regulator-lubricator assembly to meet OSHA 1910.147 Lockout/Tagout requirements.
2. From the “lockout” valve, connect at the “**In**” threaded opening of the filter-regulator (as indicated by the cast-in arrows). Try to maintain an appropriate pipe size throughout for proper air flow. Connect the piping to the ports using teflon tape on the male threads only. Do not allow tape to enter the interior of the filter-regulator-lubricator, valve, or air cylinder. Before applying air pressure, make sure the filter and regulator bowls are hand tight.
3. Most approved pipe or hose can be used on the press. Make sure the size is consistent throughout the system in order to avoid restriction. Keep air runs as short as possible.
4. See enclosed Filter-Regulator-Lubricator (FRL) Assembly Manual No. KSL-208 for additional details.



All air components require clean air. Blow all lines clean of water, dirt, scale, etc., before making final connection. Drain water from filter bowl regularly. Should this bowl refill in a short period of time, it may indicate the need for a larger filter in the main air supply line or an air line dryer system. The air filter must be kept clean at all times. Never operate the machine unless the air filter is clean and water is drained.

WIRING

National Electrical Code practices, including NFPA (National Fire Protection Agency) 79, are usually followed for wiring the control system, especially color coding and the use of numbered wire markers on **both ends of every wire**. Color coding is Black for line voltage and control at line voltage, Red for 120 VAC control circuits, Blue for 24 VDC control circuits, White for current carrying ground (commonly referred to as the “Neutral”), and Green for any equipment grounding conductor.

DISCONNECT SWITCH

Install and wire the main disconnect switch (unless one already exists or is furnished in a custom control) using black wire. Follow the wiring instructions shown on the electrical schematics. Make sure this switch is capable of being locked in the “**Off**” position **only**.

MOTOR STARTER

1. Install and wire the motor starter (unless one already exists or is installed in a custom control box) using black wire for the power; red and white wires for the coil and control circuits. Follow the wiring instructions shown on the electrical schematics.
2. If an existing starter **does not have** a 120 VAC coil, a new 120 VAC coil must be obtained, installed and wired per the schematics provided before proceeding. **Do not run a separate 120 volt line to the machine for operating the clutch/brake controls. The clutch trip controls should only have electrical power when the starter is on or when in the jog mode.**

(Continued on next page.)

SECTION 3—INSTALLATION OF COMPONENTS

Full-Revolution-Clutch Press Control System

MOTOR STARTER (continued)

3. For standard controls, run two black power lines (any two lines) from the load side of the disconnect switch (or from the line side of the motor starter) to the control enclosure. Connect the two black wires to the proper terminals on the control transformer (see electrical schematic or transformer nameplate for proper connections for different primary voltages). *Note: This step is not necessary for a custom control box that has a disconnect and starter.*
4. Run a green ground wire from the incoming system ground to the control panel.
5. Wire the motor starter and start/stop control according to the connection schematics.
Note: If a custom control box with a starter has been provided, this step is not necessary.

DUAL SOLENOID AIR VALVE (If furnished)

To wire the dual solenoid air valve, see the enclosed Installation Manual No. KSL-036 and the wiring schematics. The exhaust air muffler must be kept clean at all times. Never operate the machine unless the muffler is clean.

STANDARD SOLENOID AIR VALVE

Run two wires, one red and one white between the air solenoid valve and the control box. Number both ends and connect the solenoid coil to the corresponding numbered terminals in the control box.

TOP-OF-STROKE LIMIT SWITCH

Run the furnished cord to the control box and use a cord grip connector when going into the enclosure (not furnished). *Note: If conduit is used, use appropriate wire enclosure and connectors.*

AIR PRESSURE SWITCH

Run ½" nominal conduit from the pressure switch to the control box. Pull two or more red wires into the conduit as required per the enclosed diagram. Number per the diagram and connect to terminals at both ends. This pressure switch always uses the NO (normally open) contact which is held closed by normal air pressure. Loss of air pressure will open this contact and render the control inoperative.

PALM BUTTON ASSEMBLY

These are normally wired as an assembly with the red wires routed from the control box to the nearest palm button and then the others, as required, within the units. Wires between the two "run/jog" buttons are not connected back to the control box. If "Touchdown™" (proximity) palm buttons are furnished, please refer to the enclosed Installation Manual No. KSL-071 and the wiring schematic.

If the palm button assembly is not bolted directly to the machine frame, then a separate green ground wire should be run from the control box to all palm buttons. Attach one end of the wire to each mounting box by a lug under one of the mounting bolts and the other end of the wire to the "GND" terminal in the control box to assure proper grounding.

These operator controls should be mounted in a convenient location, keeping ergonomics in mind. Make sure the palm buttons are located far enough apart so the operator cannot use the elbow and fingers of the same arm to operate them concurrently. To comply with OSHA Regulations for "two-hand trip," the "run" buttons must be located according to the "minimum safety distance" requirements of each individual machine as defined by OSHA's CFR, Subpart O, 1910.217 (c)(3)(viii) (see pages 32 and 33 of this manual).

PRESS GROUND

The machine frame must always be firmly connected to ground in order to ensure the control potential will never exceed 120 volts above ground. Run a green grounding wire from the control box to some convenient location **directly on the machine frame** (provided the machine is already grounded). Connect one end solidly to the frame using a mounting bolt or other convenient means of attachment. Scrape any paint, rust, etc., from the area, to ensure an adequate ground connection. Connect the other end to the "GND" terminal in the control box.

Note: All exposed metal components, which may be touched by personnel during normal operation or adjustment, must be firmly grounded to the machine frame (provided the machine is already grounded). The disconnect switch and motor starter should also be grounded if they are mounted separately.

Preliminary Testing

Assuming all conditions are normal (with no die in the press)—if the following sequence does not occur, refer to the *Electrical Troubleshooting* Section.

Remove lock and turn on power at main disconnect switch. The “ground indicator” light should now be on. If this light is not on, check the following:

- Main Power Supply – “ON” and voltage present at the “LOAD” terminals.
- Primary Fused – check for continuity and if faulty, replace with proper size fuse.
- Transformer – check to see if proper voltage is present at both the primary and secondary terminals.
- Ground Indicating Light – check for loose connections. If voltage is present at light terminals and the light is not on, then a replacement must be obtained. This is a neon-type light and burnout is uncommon.
- Machine frame is not adequately grounded; recheck all ground connections.

Turn on air pressure and adjust to a level that will trip the press. If there is too much pressure, decrease it; if there is too little pressure, increase it.

After the die area is clear, press the motor “Start” button and make sure the flywheel is moving in the proper direction. Push the motor “Stop” button and make sure the flywheel coasts to a stop. After verifying the action of this circuit, restart the press by depressing the motor “Start” button.

Turn the mode selector to the “Off” position. Select “Foot” then “Hand” with the initiating means selector switch. Depress the corresponding hand or foot initiating means and make sure no slide motion results.

SINGLE STROKE OPERATION

Single stroke operation is obtained by setting the stroke selector to the “single” position. Select the initiating means by setting the Actuating Means Selector to either the “Hand” or “Foot” position. Depressing the appropriate actuating means should now operate the machine and it should make a single stroke. Under normal operating conditions, the press makes a single stroke and stops at the top, even if the actuating means is held operated. Verify the existence of proper air pressure.

MOTOR JOG OPERATION (If provided)

This mode uses the main drive motor to position the ram at bottom dead center for die setting. It is normally used on larger machines (over 30 tons) and should only be used by qualified setup personnel.

In this mode, the dual palm buttons are used to jog the drive motor and engage the machine clutch simultaneously. The palm buttons are “depressed” intermittently to jog the press through its cycle. If the palm buttons are held down, then the motor accelerates rapidly and a full cycle will result.

To test this feature, proceed as follows:

- Make certain the machine flywheel is at rest.
- Set the selector to the “Hand” position and the mode of operation selector to “Jog.”
- “Depress” both palm buttons concurrently.

Once the clutch has been engaged, then incremental ram motion may be obtained by short intermittent operation of both palm buttons until the desired ram position has been reached (usually bottom dead center). During this portion of the cycle **only** (once the clutch has been engaged and until one full revolution of the crankshaft has been completed), it is possible to hold down one palm button and jog the machine using the other palm button.

(Continued on next page.)

SECTION 4—OPERATING CONSIDERATIONS

Full-Revolution-Clutch Press Control System



After completing the setup operation, always switch the control back to the single stroke mode and start the drive motor. This will complete any remaining portion of an incomplete crankshaft revolution and prevent any unexpected movement of the press ram when the motor is started and the stroke is completed (back to top dead center).

FOOT MAINTAINED CONTINUOUS OPERATION

Set the stroke selector to “Maintained Continuous” and the hand/foot selector to “Foot.” Initiating the foot switch should not cause the machine to trip. First, depress the “Continuous Prior-Action” push button, then depress the foot switch. The machine should start and RUN in the “foot switch maintained continuous” mode until the foot switch is released. The crankshaft should then stop at TDC (top dead center).



Remember, when a foot switch is used, a point-of-operation guard or device must be provided to protect everyone from injury.

*Note: Should the press be equipped with a mechanical single-stroke mechanism, you must mechanically deactivate the mechanical single-stroke mechanism for continuous operation. Anytime the control is in a mode other than continuous, the clutch must be arranged for single stroke operation. **Do not permanently deactivate this mechanism unless continuous operation is required.***



For continuous operation, point-of-operation safeguarding must always be provided to protect everyone from injury.

CONTINUOUS OPERATION (“WALK-AWAY”)

Set the stroke selector to “Continuous” and the hand/foot selector to “Hand.” Initiating the two palm buttons should not cause the machine to trip. First, depress the “Continuous Prior-Action” push button, then depress the two “RUN” palm buttons. The machine should start and RUN in the continuous mode until the “Top-Stop” palm button is depressed. The machine should stop at TDC (top dead center).

CONTINUOUS-ON-DEMAND AND AUTOMATIC SINGLE STROKE

Refer to page 12 for details on these modes of operation.

If all preliminary testing is complete and functioning properly and there is still a problem, it is generally mechanical. Refer to the OEM’s (Original Equipment Manufacturer) installation and maintenance instruction manual. Special attention must be given to the clutch. The clutch must be maintained in an operating condition which is within the specifications set by the manufacturer. Check all machine parts for adjustment, excessive wear, looseness, or breakage. Immediately repair or replace all parts that are worn or defective before proceeding. For assistance, contact the OEM.

If the machine still does not operate properly, check all electrical circuitry. A meter with scales covering 120 V AC and some resistance ranges (Ohms) is all that is required. Check air supply (50 PSI normal minimum) and then work through the *Troubleshooting Outline* on pages 47 and 48.

(Continued on next page.)

SECTION 4—OPERATING CONSIDERATIONS

Full-Revolution-Clutch Press Control System

Fault Codes

When a fault is detected by the machine control software, it will drop the main motor enable relay and flash green on the FAULT/CPU RUN (P7-4, refer to page 18). The LED will flash between 1 and 16 times. The number of flashes corresponds to the fault code below. A delay of two seconds occurs and it then continues to flash. To clear the fault, remove power from the control by shutting off the main disconnect. Reapply power. The control will reset itself. If the fault persists, please call the factory with the corresponding fault code number.

The following is a list of fault codes, their causes, and the action to take to correct the problem.

QUICK REFERENCE TABLE - Fault Codes

Table 4.1

Code	Fault	Cause	Solution
1	Gate DOWN (If gate is supplied)	Gate DOWN proximity switch failed when gate is DOWN.	Gate solenoid valve was deenergized and the gate down proximity switch did not turn on within 5 seconds. Check the wiring on the proximity switch and verify the input turns ON when the gate is down.
2	Gate UP (If gate is supplied)	Gate DOWN proximity switch failed when gate is UP.	Gate down solenoid valve was energized and the gate down proximity switch did not turn off within 5 seconds. Check the wiring on the proximity switch and verify the input turns OFF when the gate is down.
3	K1 ON Fault	K1 was energized and the processor did not detect, through feedback, that K1 relay contacts did not turn ON.	Check K1 output LED. Make sure the K1 relay is energizing. K1 relay may be defective. Contact factory for technical support.
4	SSR ON Fault	The processor did not detect, through feedback, that either Solid-State Relay turned ON.	Check SSR#1 and SSR#2 output fuse (F2). One or more components may be defective. Contact factory for technical support.
5	SSR #1 ON Fault	The processor did not detect, through feedback, that the SSR #1 (Solid-State Relay) turned ON.	Check SSR#1 output fuse (F2). One or more components may be defective. Contact factory for technical support.
6	SSR #2 ON Fault	The processor did not detect, through feedback, that the SSR #2 (Solid-State Relay) turned ON.	Check SSR#2 output fuse (F2). One or more components may be defective. Contact factory for technical support.
7	K1 OFF Fault	K1 was deenergized and the processor did not detect, through feedback, that K1 relay contacts did not turn OFF.	Check K1 output LED. Make sure the K1 relay is deenergizing. K1 relay may be defective. Contact factory for technical support.

SSR - Solid State Relay

LED - Light Emitting Diode

F - Fuse

TDC - Top Dead Center

TOS - Top-Of Stroke

(Continued on next page.)

SECTION 4—OPERATING CONSIDERATIONS

Full-Revolution-Clutch Press Control System

Fault Codes (continued)

QUICK REFERENCE TABLE - Fault Codes

Table 4.1

Code	Fault	Cause	Solution
8	SSR #1 OFF Fault	The processor did not detect, through feedback, that the SSR #1 (Solid-State Relay) turned OFF.	Check SSR #1 output fuse (F2). One or more components may be defective. Contact factory for technical support.
9	SSR #2 OFF Fault	The processor did not detect, through feedback, that the SSR #2 (Solid-State Relay) turned OFF.	Check SSR #2 output fuse (F2). One or more components may be defective. Contact factory for technical support.
10	Reserved	Reserved.	—
11	Reserved	Reserved.	—
12	TOS Limit Switch TOS-1 OFF Fault (Start Fault)	TOS (Top-of-Stroke) limit switch output did not change state once the press left TDC (Top Dead Center).	Check the (Top-of-Stroke) limit switch and wiring. Input should be ON at TDC. Check adjustment of the cam and strap assembly.
13	TOS Limit Switch TOS-1 ON Fault	TOS (Top-of-Stroke) limit switch output did not change state once the press left TDC (Top Dead Center).	Check the (Top-of-Stroke) limit switch and wiring. Input should be ON at TDC. Check adjustment of the cam and strap assembly.
14	Prior-Action Fault	Auto single/continuous prior-action push button did not open during the first press cycle.	Check the wiring and be sure the pushbutton input is OFF.
15	Motor Fault	Motor dropped out during auto single/continuous and press crankshaft CAM signal is lost.	Make sure the TOS (Top-of-Stroke) limit switch is in contact with the cam assembly. Make sure the cam or strap is not broken or loose.
16	Gate Down Fault	Gate down is on when starting with gate selector switch on.	Check the gate down input. It should not be on when gate on is selected until the palm button or foot switch is depressed and the gate drops.

SSR - Solid State Relay
LED - Light Emitting Diode
F - Fuse

TDC - Top Dead Center
TOS - Top-Of Stroke

(Continued on next page.)

Troubleshooting



All troubleshooting, as well as installation, must be performed by qualified and properly trained personnel. Furthermore, when a defective component is found, do not operate the machine until that component has been replaced with an exact replacement part.

This procedure is written as a general guide for troubleshooting most Rockford full revolution clutch control systems. In all cases, please refer to the individual control wiring schematic for particular test points and terminal numbers.

Each control system may be slightly different depending on the various modes of operation provided. Keyed selector switches are used to select a particular mode of operation. Be sure to follow the schematic and select the proper modes of operation when troubleshooting.

When a defective component (contact) is found, always verify the defectiveness with an ohm meter. Lock-out the disconnect switch in the “Off” position, isolate the component or contact from other wiring and check its integrity with an ohm meter.

Check the following if your press is not functioning properly at this time:

1. Is the clutch trip operating rod returning promptly and fully? If not, check the clutch linkage and clutch return assembly. This is part of the OEM clutch equipment; the linkage and return spring, must always return the clutch latch or collar in time to disengage the clutch before completion of the first stroke when in the single stroke mode of operation. A return spring is provided on the air cylinder; however, it only helps return the piston rod and cannot be expected to take the place of the return spring action in the OEM clutch assembly.

Note: If your machine is equipped with a mechanical single-stroke mechanism please refer to page 10.

2. Are the air cylinder and solenoid air valve assembly mounted close to each other? They should be located within 6" of each other to quickly exhaust air from the cylinder into the atmosphere when the solenoid is deenergized. A 6" hose is furnished for connecting the air cylinder to the standard solenoid air valve and must be used whenever possible.

Note: Presses operating at higher speeds (generally above 120 SPM) or presses requiring very large cylinders may require the use of a quick dump valve mounted at the cylinder inlet port. This dump valve is supplied as standard on our control packages for machines rated above 70 tons and is available as an optional item for other applications. See page 24.

3. Periodically check the exhaust port and muffler on the solenoid valve and the quick dump valve. The exhaust port and exhaust muffler must be kept clean and unobstructed so an unrestricted flow of exhaust air from the cylinder is obtained.
4. Is the photo-electric sensor mounted properly (see pages 20 and 21), adjusted properly and wired to the correct terminals in the control box? (See electrical drawings for proper connections.)

TROUBLESHOOTING OUTLINE

Use the control drawing schematic in conjunction with the following troubleshooting outline:

NO GROUND LIGHT ILLUMINATION - POSSIBLE CAUSES:

1. No ground connection

If the ground connection checks OK, the ground light should be illuminated.

If still not illuminated, replace the indicator light.

2. No voltage

No Line Voltage—check line voltage on the transformer primary.

No Control Voltage—check transformer primary connections (wiring) and the secondary for 120 VAC.

Fuse is Blown—replace it with the proper size and amperage per the control drawing. Using an ohm meter, locate the reason for the blown fuse before reapplying power.

(Continued on next page.)

SECTION 4—OPERATING CONSIDERATIONS

Full-Revolution-Clutch Press Control System

MOTOR DOES NOT START - POSSIBLE CAUSES:

1. Other electrical interlocks could be open. The circuit is arranged to accommodate machine protective electrical interlocks, overload interlocks, and safety block interlocks. These interlocks are strategically located to prevent machine operation when open. Please refer to the schematic for the location of the various miscellaneous interlocks. Basically, closed interlock contacts are connected in series between the indicated terminals. If no interlocks are used, there must be a connection between the appropriate terminals. Press may not be at TOS (Top-of-Stroke).

2. Motor starter does not energize.

Motor starter operating coil is not 120 V AC.

Motor overload tripped, no heaters or improperly rated heaters.

Motor start/stop push buttons are improperly wired or defective.

Check wiring on the control system that may have open contacts.

Press may not be at TOS (Top-of-Stroke).

Inputs may not be made.

Stroke selector is in the “jog” position.

3. Motor starter contact defective.

Motor should start if the above checks OK. If the motor fails to continue to run when the start button is released, check the motor starter holding contact for proper wiring and function.

MACHINE WILL NOT TRIP—POSSIBLE CAUSES:

1. “Safeguard interlock” terminals could be open.

2. Other electrical interlocks could be open. The circuit is arranged to accommodate machine protective electrical interlocks, overload interlocks, die protection electrical interlocks, etc. These interlocks are strategically located to prevent machine operation when open. Please refer to the schematic for the location of the various miscellaneous interlocks. Basically, closed interlock contacts are connected in series between the indicated terminals. If no interlocks are employed, there must be a connection between the appropriate terminals.

3. Two-hand trip initiating means (palm buttons)

If the two-hand trips are used to stroke the press, check the selectors for proper selection. If the two-hand trips still won't operate the press, please refer to the instructions found on the control schematic and connection diagrams.

4. Clutch Actuator

Air cylinder capacity could be too small and may need to be replaced with a larger air cylinder.

Air supply is off.

Insufficient amount of air pressure.

5. Standard Solenoid or Dual Solenoid Air Valve

Check for proper installation and wiring.

Check for proper air flow direction. See pages 25-26.

Check for open solenoid coils.

6. Control Output Voltage

Check voltage at the solenoid (terminals P5-02/P5-03 in the control box) when the initiating means (palm buttons or foot switch) is depressed. 120 V AC should be present. If no voltage, check for proper wiring of the initiating means, the photo-electric sensor, and the motor starter. Follow the control schematic—start at the transformer and check for 120 V AC throughout the circuit.

SECTION 5—MAINTENANCE AND INSPECTION

Full-Revolution-Clutch Press Control System

A full-revolution power press consists of mechanical engaging parts, springs, air components, electrical components, and other mechanical equipment. Because of this inherent design, machine parts will ultimately wear, get out of adjustment or break which could cause a malfunction and/or mechanical failure. This control system can never cure nor overcome a misadjusted, worn, broken or malfunctioning mechanical part or mechanical failure. Periodically inspect all parts for adjustment, excessive wear, looseness, breakage, and proper lubrication. **Do not operate this machine until all parts are adjusted, repaired, or replaced.**

We recommend that visual inspections and examinations of the entire machine be made at least once per shift by qualified personnel.

According to OSHA's CFR Subpart O, 1910.217 (e), machines must always be inspected and tested on a weekly basis to determine the condition of the clutch mechanism, antirepeat feature, and single-stroke mechanism. Necessary maintenance and repair must be done before the machine is operated again, and the employer must maintain records of both the inspections and the maintenance work performed (see below).



After any maintenance, always operate the machine numerous times in all modes of operation before allowing the operator to start production. Always make sure all point-of-operation safeguarding is in place, adjusted and operating properly for the job and the operator.

OSHA Regulations for Inspections

OSHA 1910.217 Section (e)(1) Inspection and Maintenance Records

(i) *It shall be the responsibility of the employer to establish and follow a program of periodic and regular inspections of his power presses to insure that all parts, auxiliary equipment, and safeguards are in a safe operating condition and adjustment. The employer shall maintain a certification record of inspections which includes the date of inspection, the signature of the person who performed the inspection, and the serial number or other identifier of the power press that was inspected.*

(ii) *Each press shall be inspected and tested no less than weekly to determine the condition of the clutch/brake mechanism-antirepeat feature and single stroke mechanism. Necessary maintenance or repair or both shall be performed and completed before the press is operated. These requirements do not apply to those presses which comply with paragraphs (b)(13) Control Reliability and (b)(14) Brake Monitoring of this section. The employer shall maintain a certification record of inspections, tests and maintenance work which includes the date of the inspection test or maintenance; the signature of the person who performed the inspection, test or maintenance; and the serial number or other identifier of the press that was inspected, tested or maintained.*

(e)(3) Training of Maintenance Personnel

It shall be the responsibility of the employer to insure the original and continuing competence of personnel caring for, inspecting, and maintaining power presses.

OSHA Regulations for Operator Training

OSHA 1910.217 Section (f)(2) Instruction to Operators

The employer shall train and instruct the operator in the safe method of work before starting work on any operation covered by this section. The employer shall insure by adequate supervision that correct operating procedures are being followed.

(Continued on next page.)

SECTION 5—MAINTENANCE AND INSPECTION

Full-Revolution-Clutch Press Control System

Electrical Controls

Switch the main power disconnect to the “Off” position; lock and tag before inspecting or maintaining electrical or electronic controls. Make a periodic inspection of the control box and electrical machine components for loose or broken wires. The relays and switches must be examined for burned or worn contacts. Look for loose or broken conduit and cable fittings. The control box and other components must be kept closed and locked. Keys must be removed to prevent tampering. To test the system for proper operation, repeat the Preliminary Testing procedure in this installation manual in Section 4—Operating Considerations on pages 43 - 44.

Air System

1. Inspection of the entire air system is dependent on the frequency of machine operation and the cleanliness of the plant air lines. Most free moisture and solids should be removed automatically by the filter-regulator. Drain the filter whenever the water level in the sump reaches the lower baffle. To remove the filter element for cleaning, shut air line down and exhaust all air pressure. See Filter-Regulator Installation Manual No. KSL208, and pages 27 - 28 of this manual.
2. Check the lubricator for proper oil level and oil delivery adjustment. See Installation Manual No. KSL208 and pages 27 - 28 of this manual.
3. The standard solenoid valve, dual solenoid air valve, and/or quick dump valve (if provided), must be protected from moisture and foreign material. These valves rely on the performance of the air filter. The exhaust mufflers must be removed regularly and cleaned so the exhaust air is unrestricted. Please refer to pages 22 - 24 of this manual.



The maintenance and inspection section in this manual cannot be all-inclusive. Always refer to the original equipment manufacturer’s maintenance manuals or the machine owner’s manual. If you do not have an owner’s manual, contact the OEM (original equipment manufacturer).

SECTION 6—METHODS OF SAFEGUARDING

Full-Revolution-Clutch Press Control System

OSHA 1910.217 Section (c) under General Requirements states:

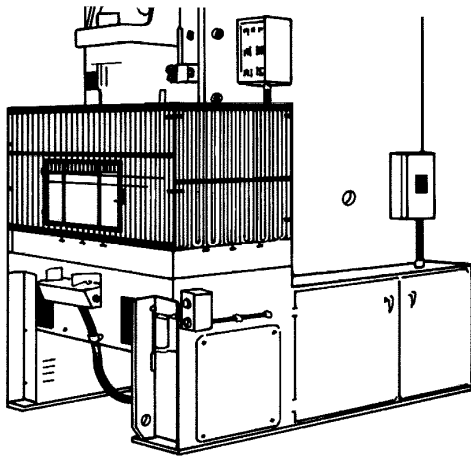
- (i) It shall be the responsibility of the employer to provide and insure the usage of “point-of-operation guards” or properly applied and adjusted point-of-operation devices on every operation performed on a mechanical power press.

This means that for every mechanical power press that is being used in United States industry, there must be safeguarding for the operator by at least one type of guard or a device. This protection may also be accomplished by the use of a combination of guards and devices.

When updating a power press, the most important decision is the selection of the proper guard or device. The following are safeguarding choices for full revolution power presses.

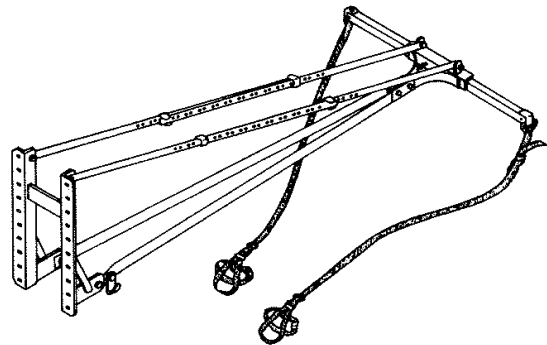
BARRIER GUARDS ON POWER PRESSES

OSHA 1910.217 Section (c), General Requirements, (c)(2) Point of Operation Guards and Table 0-10 (Ref. enclosed MPPS, pages 19 - 20)



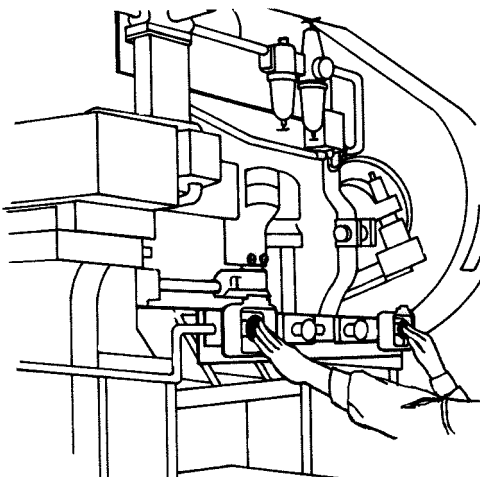
RESTRAINT (HOLDOUT) ON POWER PRESSES

OSHA 1910.217 Section (c)(3)(vi) Restraint or Holdout (Ref. MPPS, page 18)



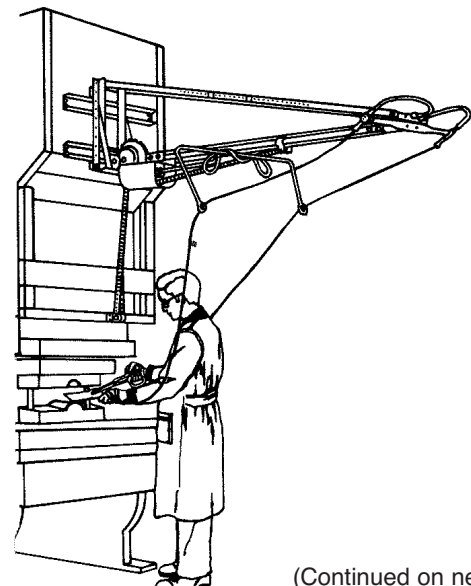
TWO-HAND TRIP ON POWER PRESSES

OSHA 1910.217 Section (c)(3)(viii) Two-Hand Trip (Ref. MPPS, pages 14 and 15)



PULLBACK (PULL-OUT) ON POWER PRESSES

OSHA 1910.217 Section (c)(3)(iv)(b) Pull-out (Ref. MPPS, page 18)



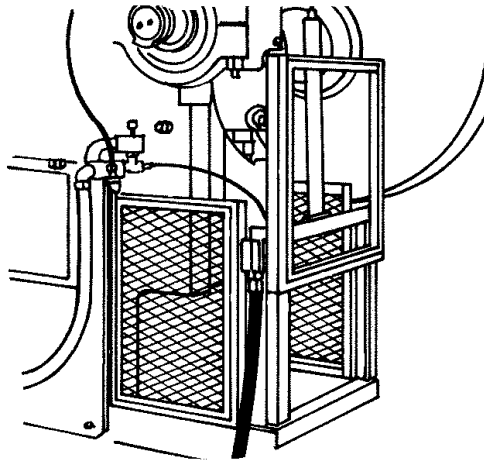
(Continued on next page.)

SECTION 6—METHODS OF SAFEGUARDING

Full-Revolution-Clutch Press Control System

TYPE “A” GATE ON POWER PRESSES

OSHA 1910.217 Section (c)(3)(ii)(a)
Gate or Movable Barrier Device
(Ref. MPPS, page 18)



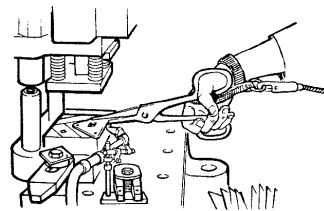
AUXILIARY SAFEGUARDING ON POWER PRESSES

Auxiliary safeguarding is additional protection from injuries for all personnel in the machine area. It is most often used in conjunction with primary safeguarding devices. Auxiliary safeguarding also involves the safeguarding of other hazardous components or openings on machines.

Danger signs, used for warning, must be mounted on the machine in a position that is readily visible to the operator, setup person or other personnel. Hand tools can be used as auxiliary safeguarding. They are often used when feeding and retrieving small pieceparts. Hand tools by themselves are NOT a point-of-operation safeguarding device.

OSHA 1910.217 Section (c) (Ref. MPPS, page 13)

(4) *Hand feeding tools.* Hand feeding tools are intended for placing and removing material in and from the press. Hand feeding tools are not a point-of-operation guard for protection device and shall not be used in lieu of the guards or devices required.



Hand Feeding Tool used for Feeding Parts

OTHER SAFETY CONSIDERATIONS

Other areas of machine safety must be considered in order to comply to the OSHA Regulations and ANSI Standards as we know them. This includes, but is not limited to, items such as a main power disconnect switch, which must be provided for each machine, and a magnetic type motor starter for the main drive motor. All mechanical power-transmission apparatus of the machine, such as rotating flywheels, gears, sprockets, chains, and shafts, must be covered in accordance with OSHA's CFR Subpart O, 1910.219. As with all machinery, best safety practices must be a continuing program. The operator, die setter and all personnel must be fully trained and instructed on all safety procedures and have full knowledge of the safeguarding device being used.

Note: The preceding point-of-operation safeguarding options are explained in OSHA's CFR Subpart O, 1910.217 Standard for Mechanical Power Presses, ANSI's B11.1 booklet entitled "Safety Requirements for the Construction, Care and Use of Mechanical Power Presses." Also see the enclosed Rockford Systems' booklet entitled "Mechanical Power Press Safety" (MPPS).

When using the devices described, for point-of-operation safeguarding, sides and rear of the hazardous point-of-operation area must be safeguarded to protect the operator and other employees in the machine area (OSHA' CFR Subpart O, 1910.212).

SECTION 7—INSPECTION REPORT

Full-Revolution-Clutch Press Control System

Sample Press Inspection Report

Company _____

Building _____ Department _____ Press No. _____

Parts Inspected	✓ OK	Defective Condition	Corrective Action	Date Repaired
1. Frame				
2. Motor				
3. Flywheel				
4. Gears (if furnished)				
5. Crankshaft				
6. Clutch				
7. Brake				
8. Slide and Gibs				
9. Connection (Pitman) and Slide Adjusting Screw				
10. Slide Counterbalance (if furnished)				
11. Air System				
12. Electrical System				
13. Foot Switch				
14. Point-of-Operation Safeguarding				
A) Guard				
B) Presence Sensing (Light Curtain)				
C) Pullback (Pullout)				
D) "A" or "B" Gate (Movable Barrier)				
E) Restraint (Holdout)				
F) Two-Hand Trip or Control				
15. Miscellaneous				
Inspected by:		Date	<input type="checkbox"/> Approved for Use	<input type="checkbox"/> Not Approved



The *Sample Press Inspection Report* on this page and the *Guide for the Inspection of Mechanical Power Presses* on the next page are only a guideline. They may be modified to fit specific applications.

(Continued on next page.)

SECTION 7—INSPECTION REPORT

Full-Revolution-Clutch Press Control System

Guide for the Inspection of Mechanical Power Presses

*Inspect for Code Violations, defects, missing parts, malfunctions, maintenance

Inspection of:

1. Frame Cracks? Broken or loose parts? Loose hold down bolts?
2. Motor Clean? Lubricated? Overheating?
3. Flywheel Rotates in correct direction? Free running? Lubricated? Covered?
4. Gears Loose? Broken or cracked teeth? Excess noise? Proper lubrication? Covered?
5. Crankshaft Cracks? Bent? Lubricated? Proper clearance in bearings?
6. Clutch Full revolution: single stroke capability, loose or worn parts, including linkage? Weak or broken springs? Compression springs operating on rod, or guided within hole or tube? Properly adjusted?

Part revolution: air leaks? Proper alignment? Proper engagement and disengagement? Stopping position? Worn clutch lining? Weak or broken springs? Proper air pressure adjustment or failure? Momentary operation of stop control applies brake and releases clutch? Does press stop immediately by depressing red stop button?
7. Brake Is brake lining worn? Brake properly adjusted and brake monitoring set properly? Does it stop slide quickly? Are friction brakes set with compression springs operating on rod, or guided within a hole or tube?
8. Slide and gibs Face of slide parallel to bolster? Proper gib clearance? Any scoring? Lubricated?
9. Connection rod (pitman) & slide adjusting screw Proper bearing and ball seat clearances? Screw turns freely? Lubricated?
10. Slide counter-balance Spring type: proper adjustment? Broken springs or loose nuts? Pneumatic type: air leakage? Proper air pressure? Loose connection to slide?
11. Air system Proper air pressure? Valve operation? Proper pressure gauge settings? Leaks?
12. Electrical system Can main power switch be locked only in "off" position? Grounded? Condition of wiring? Relays? Rotary limit switches or electronic timing device? Solenoids? Motor starter drops out when voltage fluctuates or there is a power failure? Is any component bypassed?

Inspection of:

13. Foot switch Nonslip pad on contact area? Guarded from accidental operation?
14. Point-of-operation safeguarding:
 - A) Guard - Barrier that prevents entry of operator's (or other's) hands or fingers into the point-of-operation area at any position? Adjustment and maintenance? Are there pinch points remaining in adjacent areas?
 - B) Presence Sensing (light curtains on part revolution clutch only) - reliable design and proper electrical interface to control? Fixed at proper "safety distance" from hazard? Barrier guards for other hazardous point-of-operation areas not protected by light curtain?
 - C) Pullback (Pull-out) - enough or too much pull on wristlets? Operated by slide or upper die? Is proper adjustment and inspection being made for change in operator, die, and shift? Pullback for each operator? Records of inspection/maintenance being kept?
 - D) "A" or "B" Gate ("B" gate for part revolution clutch only) - point of operation enclosed before press cycle can be initiated? Barrier guards for other hazardous point-of-operation areas?
 - E) Restraint (Holdout) - adjusted so operator's hands and fingers cannot reach into dies? Securely anchored? Adjusted for each operator, die, shift?
 - F) Two-hand Trip or Control (two-hand control for part revolution clutch only) - protected against unintended operation? Concurrent, antirepeat? Fixed in place at proper "safety distance" from pinch point? Interrupted stroke protection and adequate "holding time" (for two-hand control only)?
15. Miscellaneous Comment on any other items such as: Protection from falling overhead parts. Lighting. Cleanliness. Lubrication. Pressure vessels. Hydraulic-equipment. Auxiliary equipment. General maintenance. Special types of clutches or brakes. Covering of gears, belts, pulleys. Overloading. All auxiliary equipment.

*Refer to Federal Occupational Safety & Health Administration Regulations, OSHA's CFR Subpart O, 1910.212, 1910.217, 1910.219, ANSI B11.1 and B15.1, and other applicable codes.