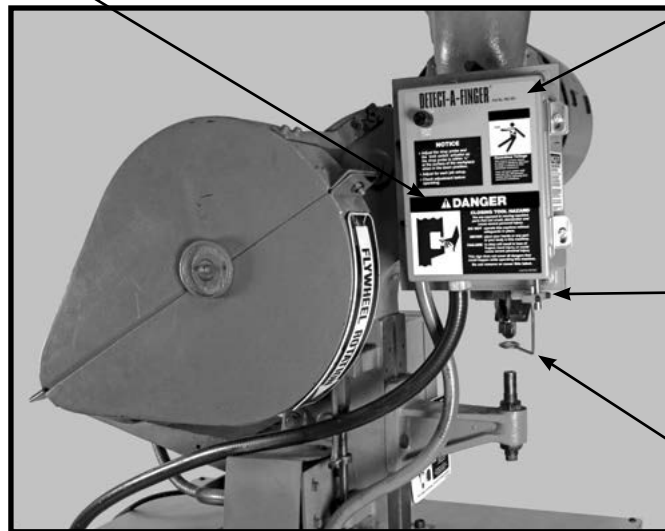




INSTALLATION MANUAL FOR DETECT-A-FINGER™ DROP PROBE DEVICE FOR RIVETERS AND OTHER MACHINES

Danger Sign

Control Box



Sensing Probe Clamp

Sensing Probe

**IMPORTANT: PLEASE REVIEW THIS ENTIRE
PUBLICATION BEFORE INSTALLING, OPERATING
OR MAINTAINING THIS DEVICE.**

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Detect-A-Finger™ Drop Probe Device - Riveter

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SECTION 1—IN GENERAL

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, a thorough safety training program for all machine personnel, that includes instruction on the proper operation of the machine, 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, instructed, and 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.

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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:

US Department of Labor
Occupational Safety and Health Administration
Washington, DC 20210 (202) 219-5257

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 Criteria for the Design, Construction, Care and Operation of Safeguards as Referenced in the Other B11 Machine Tool Safety Standards
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
(212) 642-4900

OR

Association of Manufacturing Technology (AMT)
7901 Westpark Drive
McLean, Virginia 22102-4269
(703) 827-5211

SECTION 1—IN GENERAL

Detect-A-Finger™ Drop Probe Device - Riveter

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. The following publications are available for all types of machines:

MANUALS

Power Press Safety Manual - 4th Edition
Safeguarding Concept Illustrations - 6th 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

These manuals and data sheets can be purchased by contacting:

National Safety Council
1121 Spring Lake Drive
Itasca, IL 60143-3201
(708) 295-1121

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.

Warranty, Disclaimer and Limitation of Liability

WARRANTY

Rockford Systems, LLC warrants that this product will be free from defects in material and workmanship for a period of 12 months from the date of shipment thereof. ROCKFORD SYSTEMS LLC'S OBLIGATION UNDER THIS WARRANTY IS EXPRESSLY AND EXCLUSIVELY LIMITED to repairing or replacing such products which are returned to it within the warranty period with shipping charges prepaid and which will be disclosed as defective upon examination by Rockford Systems, LLC. This warranty will not apply to any product which will have been subject to misuse, negligence, accident, restriction and use not in accordance with Rockford Systems, LLC's instructions or which will have been altered or repaired by persons other than the authorized agent or employees of Rockford Systems, LLC. Rockford Systems, LLC's warranties as to any component part is expressly limited to that of the manufacturer of the component part.

DISCLAIMER

The foregoing Warranty is made in lieu of all other warranties, expressed or implied, and of all other liabilities and obligations on the part of Rockford Systems, LLC, including any liability for negligence, strict liability, or otherwise, and any implied warranty of merchantability or fitness for a particular purpose is expressly disclaimed.

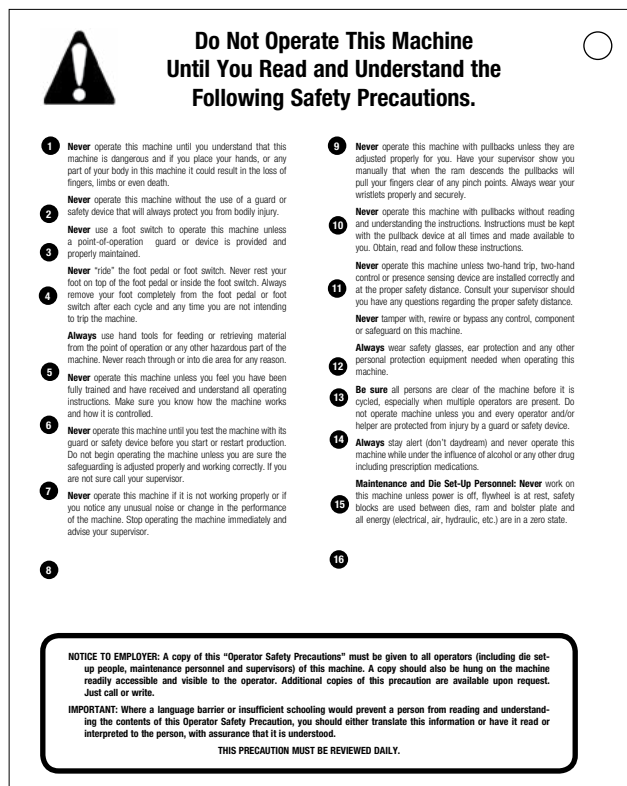
LIMITATION OF LIABILITY

Under no circumstances, including any claim of negligence, strict liability, or otherwise, shall Rockford Systems, LLC be liable for any incidental or consequential damages, or any loss or damage resulting from a defect in the product of Rockford Systems, LLC.

Operator Safety Precaution Pamphlet (Attachment for machine operators)



Front



Back



Accompanying this equipment is an 8-1/2" x 11" operator safety precaution pamphlet, Part No. KSC-000, for anyone operating the machine where this equipment will be installed. This precaution pamphlet is to be given to all operators, including setup people, maintenance personnel and supervisors.



This pamphlet should also be attached to the machine, readily accessible and visible to the operator. (A hole in the corner of this precaution pamphlet is provided for attaching purposes.) Additional copies of this precaution are available. Please call, e-mail, write, fax, or use the order form found on a later page in this manual.



When a language barrier or insufficient education prevents a person from reading or understanding the contents of this operator safety precaution pamphlet, you should either translate this information or have it read or interpreted to the person. Make sure that the person understands the information. To order this pamphlet in Spanish, use Part No. KSC-000S; in French, use Part No. KSC-000F.



This precaution pamphlet must be reviewed daily.

SECTION 1—IN GENERAL

Detect-A-Finger™ Drop Probe Device - Riveter

Danger Sign(s) to be Mounted on Machine

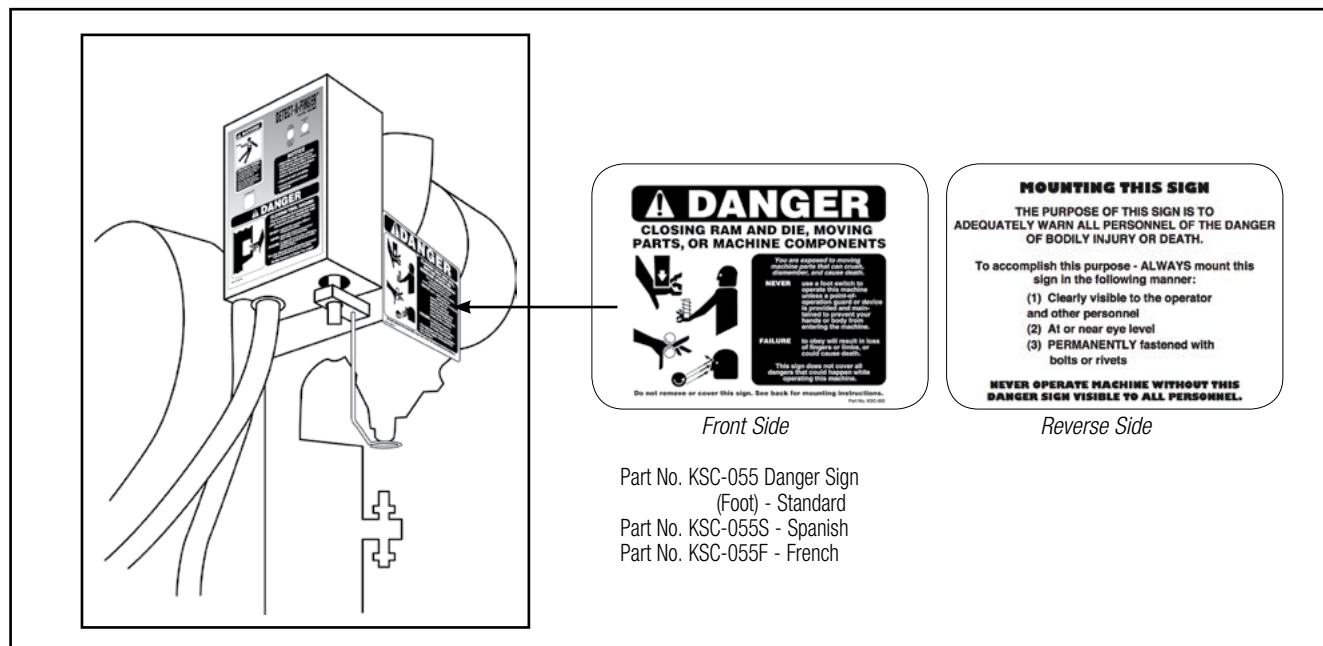


Accompanying this equipment are two 5" x 6" polyethylene danger signs, Part Nos. KSC-054 and KSC-055. These signs **MUST BE PERMANENTLY MOUNTED IN A PROMINENT LOCATION** on the machine where this equipment is installed. Both signs must be in a **LOCATION THAT IS EASILY VISIBLE** to the operator, setup person, or other personnel who work on or around this machine. **ALWAYS** mount these signs with bolts or rivets when installing the enclosed equipment.

If any danger sign becomes destroyed or unreadable, the sign must be replaced immediately. Contact factory for replacement danger sign(s).



Never operate this machine unless the danger sign(s) is in place.



“Mechanical Power Press Safety” Booklet

A copy of Booklet No. MPPS (“Mechanical Power Press Safety”) is available upon request. This booklet is copied verbatim from the CFR (Code of Federal Regulations) and contains all relevant sections of the OSHA Regulations concerning power presses with which an employer (user) must comply. The enclosed equipment must be installed, used and maintained to meet these regulations. Specifically, any time a foot switch is used, a suitable point-of-operation safeguard or device must be used to prevent bodily injury. In addition, every press must be provided with a point-of-operation safeguard! Please review this booklet before installing the enclosed equipment. If you are unfamiliar with these detailed safety regulations, which include regulations on safeguarding the point of operation properly, you may want to attend our regularly scheduled machine safeguarding seminars. To obtain detailed information about these training seminars, please call, e-mail, fax, or write. Our telephone and fax numbers, and addresses are on the front cover of this manual.

(Continued on next page.)

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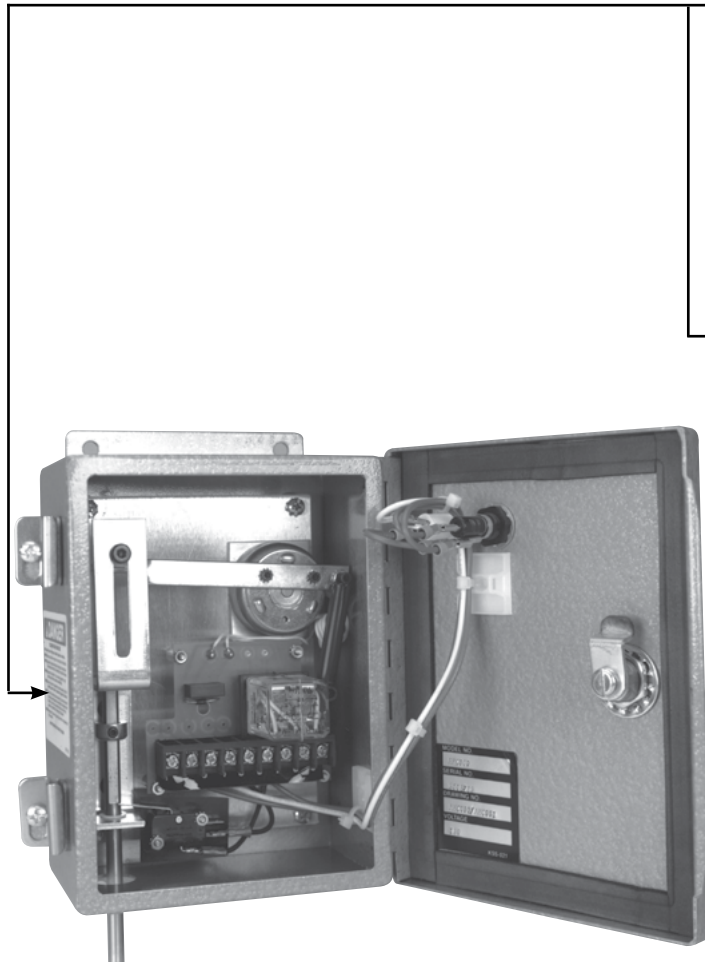
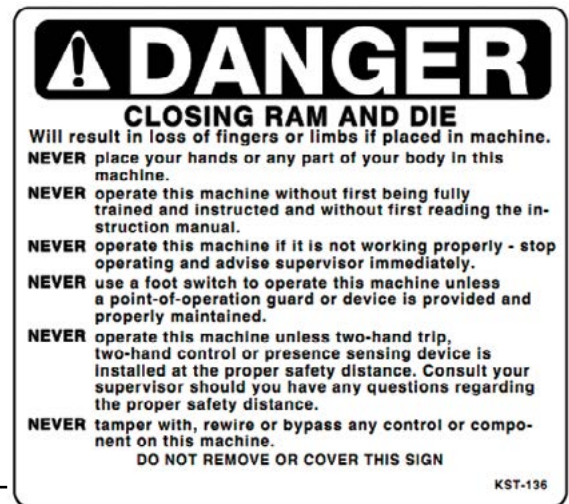
SECTION 1—IN GENERAL

Detect-A-Finger™ Drop Probe Device - Riveter

Danger and Warning Labels Provided on Control Box



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.



Label No. KST-154

FOR REPLACEMENT SIGNS CALL, E-MAIL, OR FAX FACTORY OR USE ORDER FORM TOWARDS THE BACK OF THIS MANUAL.

Rockford Systems, LLC.

5795 Logistics Parkway

Rockford, Illinois 61109

Toll Free: 1-800-922-7533 (USA only)

Phone: (815) 874-7891

Fax: (815) 874-6144

Web Site: www.rockfordsystems.com

E-Mail: customerservice@rockfordsystems.com

SECTION 2—INSTALLATION

Detect-A-Finger™ Drop Probe Device - Riveter

Components in the System

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. Standard components of this system are as follows:

- ☐ Literature Folder
- ☐ Control Box (Right or Left Mount)
- ☐ Sensing Probe (2) (formed by user) and Sensing Probe Clamp
(Sensing probe on the long-stroke devices (see pages 20-23) is formed as illustrated.)

Other components that may be required for a particular application are:

- ☐ Disconnect Switch
- ☐ Motor Starter
- ☐ Transformer
- ☐ Air Cylinder Assembly
- ☐ Solenoid Air Valve or Electric Solenoid (Pull Type)
- ☐ Air Filter-Regulator-Gauge and Lubricator Assembly
- ☐ Lockout Valve
- ☐ Foot Switch

General Information

The purpose of the Detect-A-Finger Drop Probe Device is to effectively reduce accidents on applications where the operator's fingers may enter the point of operation. The components of this system are (1) a "Mechanical Sensing Probe" shaped to fit over or around the workpiece and (2) a Control Box. When the operator initiates a machine cycle, the "Sensing Probe" is released and drops by gravity over or around the workpiece. If the operator's fingers are still in the danger area, the "Sensing Probe" cannot reach its preset down position and the machine is prevented from cycling. Conversely, if no obstruction prevents the "Sensing Probe" from dropping, then as soon as it reaches its preset down position, the control unit will allow the machine to cycle.

The control box is ruggedly built to provide continued successful operation under operating conditions usually found around this type of machinery. The sensing probe that operates the limit switch is tied into the control relay (in the control box) and when properly wired into the machine system prevents cycling of the machine accidentally or intentionally. This can be confirmed by moving the "Sensing Probe" manually without operating the hand or foot actuating means.

Preliminary Steps Before Installation

Before proceeding with the installation of the enclosed equipment, the following preliminary steps should be considered:

1. Read and make sure you understand this entire Installation Manual.
2. **Ensure that the machine is in first-class condition.** Before starting any installation it is essential that the machine be thoroughly inspected. Make sure all mechanical components and collateral equipment are in first-class operating condition. Your inspection should be in accordance with the machine manufacturer's installation and maintenance instruction manual. 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 immediately be replaced or repaired before the machine is used.

3. 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 also be practiced and enforced for all energy sources when installing the enclosed equipment, setting up and maintaining the machine.

(Continued on next page.)

SECTION 2—INSTALLATION

Detect-A-Finger™ Drop Probe Device - Riveter

Preliminary Steps Before Installation (continued)



The operator must be protected from all hazards. All applicable sections of OSHA Section 1910.212, General Machine Safeguarding, and ANSI B154.1 for Rivet Setting Equipment, must be complied with on all machines where this equipment is installed.



The Detect-A-Finger controls are applicable on most types of riveting, eyeletting, staking and similarly operated assembly and fastening machines. The function of the Detect-A-Finger device, when properly installed, adjusted and maintained, is to keep the operator from inadvertently cycling the machine with fingers in the point of operation. The Detect-A-Finger control does not incorporate single stroke capability. This control only provides an interface between the clutch actuator and the trip control operating means which will not allow stroke initiation unless the area being probed is cleared of all unwanted obstructions. To accomplish this protection, the Detect-A-Finger must be properly installed on the machine and the device must be properly maintained and adjusted by the user. A properly designed sensing probe must be used and additional sensing probe safeguarding must be provided where applicable. This device does not protect the operator if fingers are placed above the sensing probe. This device cannot prevent clutch or machine malfunction or repeat strokes of the machine.



Before starting any installation work, it is imperative that the machine's clutch is inspected and exhibits proper operation. Run the machine in a normal operating sequence to determine proper operation. Do not install the Detect-A-Finger on a machine that does not function properly. When the machine is operating satisfactorily, shut off the power with the disconnect switch and do not operate the machine again until installation is complete. Use of a lockout device and padlock on the disconnect handle must be used during this period.



The maintenance and inspection section in this manual cannot be all-inclusive for maintaining machines. Always refer to the original machine manufacturer's maintenance manuals or owner's manual. If you do not have an owner's manual, please contact the original equipment manufacturer.

Specifications and Operating Data

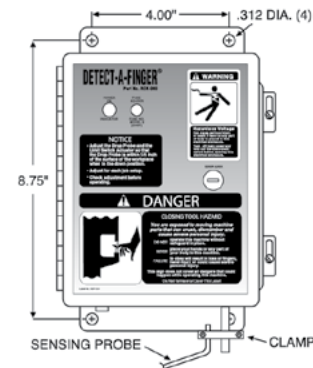
CONTROL BOX

Part Number	RKC-000 or RKC-001	
Fuse	313 Series,	
3AG, 3 Amps,.....		
.....	250V, Slow Blow	
Input Voltage	115 + 15% VAC, 50/60 Hz	
Operating Current	0.8 Amps Typical	
Output Relay Ratings	Resistive	General Use
	10A 110VAC	7.5A 110VAC
	7.5A 220VAC	5A 220VAC
	10A 30VDC	

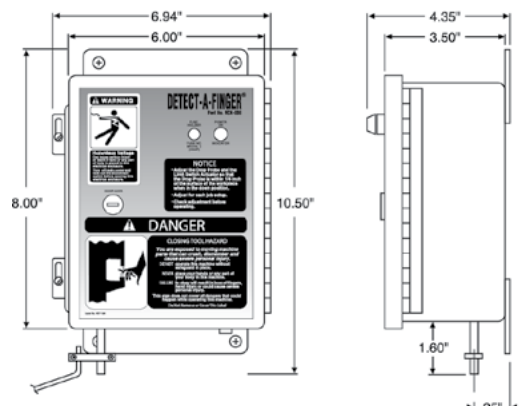
Operating Current	3.0 Amps Typical
Duty Cycle	25% (10 Second Maximum
.....	Continuous On-Time)
Stroke.....	Travel Adjustable to 1.75 (1-3/4) Inches Max.
Mechanical Life	Relay - 10 Million Operations
.....	Rotary Solenoid - 100 Million Operations
Weight	3.5 Lbs.

SENSING PROBE (UNFORMED)

Part Number.....	FCT-030
Wire Size	156 Dia. x 18 inches Long
Material	Aluminum Rod (Standard)
Total Weight.....	(Including Probe and Clamp)
.....	0.5 lbs. Maximum Allowable



Left Side Mount
Control Box
(Part No. RKC-001)



Right Side Mount Control Box (Part
No. RKC-000)

SECTION 2—INSTALLATION

Detect-A-Finger™ Drop Probe Device - Riveter

Installation of Control Package Components

INSTALLATION MANUAL

Included with every shipment is an installation manual, "Operator Safety Precaution" Pamphlet (Part No. KSC-000), danger sign(s), and electrical schematics. These publications must be available and fully understood before any retrofit installation begins. Please notify Rockford Systems, LLC immediately if there are any questions about the components received.



Sign No. KSC-055

FOOT SWITCH DANGER SIGN - PART NO. KSC-055

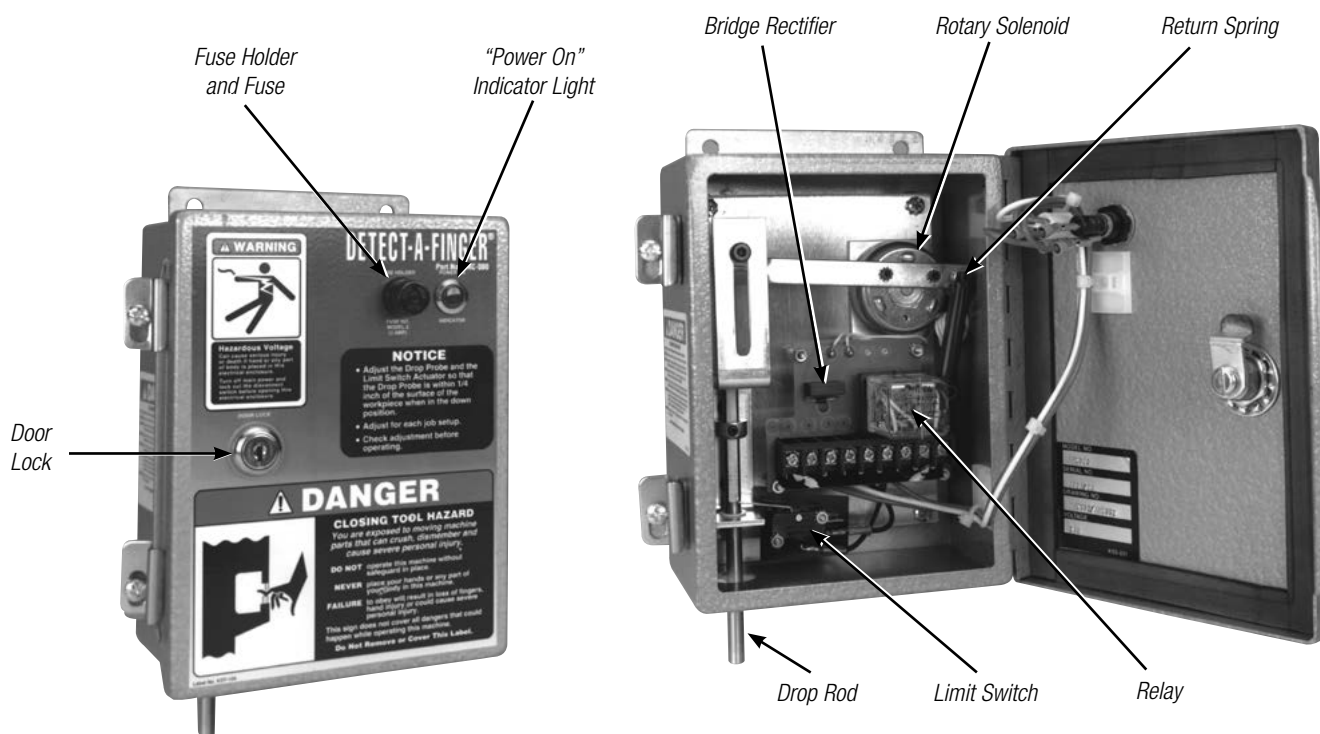
If a foot switch is ordered, a 5" x 6" polyethylene danger sign, as illustrated on page 6, is supplied. It is imperative that this sign be firmly attached to the machine in a location readily visible to all personnel. Suggested mounting instructions are shown on the reverse side of this sign.

This sign must be the first thing mounted to prevent any possibility that it might be overlooked. If this sign becomes destroyed or unreadable, it must be replaced immediately. Contact factory for replacement and do not operate the machine until the danger sign is in place.

CONTROL BOX (RKC-000 OR RKC-001) For part Nos. RKC-700 through RKC-701, please see pages 20 - 23.

Two models are available to fit the Detect-A-Finger to various machines. Part No. RKC-000 mounts on the right side of a machine. Part No. RKC-001 mounts on the left side of a machine. The drop rod exits bottom left of Part No. RKC-000. The drop rod exits bottom right of Part No. RKC-001. The selected model should provide access to the machine for general maintenance and adjustments. It should be installed so that the sensing probe can be positioned above the point of operation without obstructing the work area. The sensing probe design should be as short and rigid as possible.

Photo 2.1 - Part No. RKC-000 (Right Side Mount)



(Continued on next page.)

SECTION 2—INSTALLATION

Detect-A-Finger™ Drop Probe Device - Riveter

CONTROL BOX (continued)

The control box includes a “power on” indicator light, a through-the-door fuse holder for ease of fuse inspection and replacement, a relay, terminal strips, and a PC board assembly. The door of the control box can be locked to prevent unauthorized personnel from opening the control box.



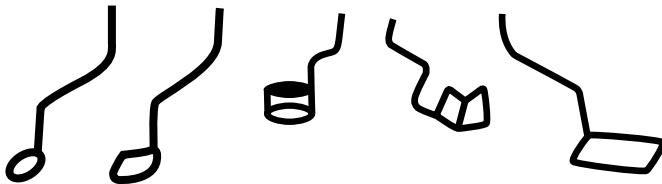
ALWAYS BE SURE TO DISCONNECT POWER BEFORE OPENING THE CONTROL BOX DOOR.

Sensing Probe

The drop rod is allowed to drop by gravity when the rotary solenoid is energized. The action-arm return spring returns this assembly when the power is removed. The DC voltage for the rotary solenoid is obtained from a full-wave bridge rectifier. The drop rod is guided in nylon bearings for long life and smooth operation. The limit switch actuates the control relay in the control box at the end of the drop rod stroke. The stroke is easily adjusted by repositioning the limit switch actuating collar. A set screw is provided to lock the collar in position.

Two 18-inch pieces of 5/32 (.156) inch diameter aluminum rod are furnished with each Detect-A-Finger. Other materials or custom made configurations may also be used. The only restriction is the total weight of the probe assembly (including the clamp). The action-arm return spring is capable of returning 0.5 pounds maximum. The user must determine and form the best shape to accommodate the particular part being run. This device must be designed, constructed and arranged to create a protected area, and to prevent engagement of the machine. In pneumatic- and hydraulic-powered machines, this device must prevent energizing of the control valve when an operator's finger or other part of the body is within the hazardous area. See Photo 2.2.

Figure 2.1 - Examples of Drop Probe Rod shapes:



Mounting

Locate the Detect-A-Finger control box on the machine in the best location for general maintenance, adjustment, and tool changing. The bottom of the drop rod, in its full down position, should barely clear the workpiece. This location allows for final positioning. If special mounting brackets are fabricated, they must be able to support the sensing probe and withstand any shock and vibration that may be encountered during machine operation. Be sure to insulate any and all special brackets. Photos at right show typical installations.

The control box should also be mounted as far forward as possible on the machine to provide for the minimum angle of the sensing probe. This position will contribute to a long mechanical life of the device since it minimizes the side loading on the drop rod bearings. See Photo 2.4.

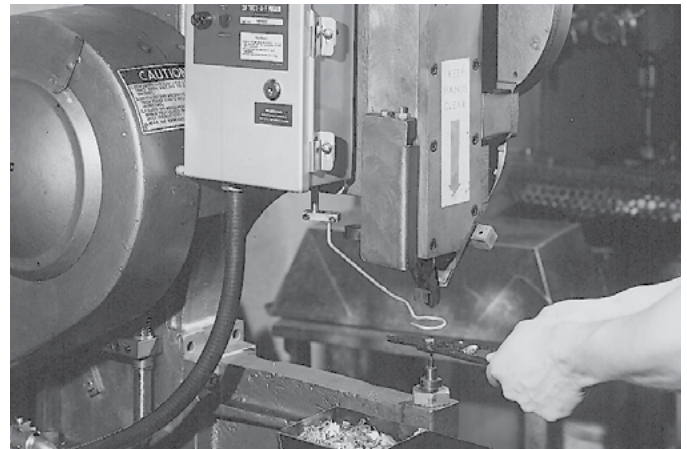


Photo 2.2

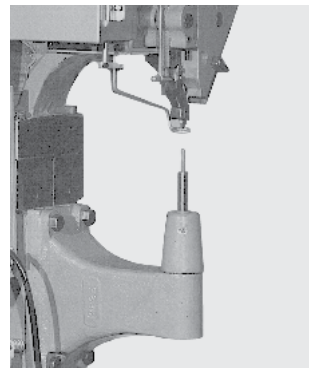


Photo 2.3



Photo 2.4

SECTION 2—INSTALLATION

Detect-A-Finger™ Drop Probe Device - Riveter

Other Required Components (Not part of package unless specifically ordered)

MAIN POWER DISCONNECT SWITCH

A main power disconnect switch may have been supplied in the package shipment. This switch is designed to disconnect the primary voltage to the machine and lock it out. Please refer to the enclosed wiring schematics for proper wiring of this switch.

OSHA Regulation 1910.217 (b)(8), ANSI Standards B11.1 and B11.3 require that:

“A main power disconnect switch capable of being locked only in the Off position shall be provided with every power press control system.” If the machine already has a main power disconnect switch, it must be checked for the “locking off” and lockout 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 you must obtain and install a proper disconnect switch. (To purchase a disconnect switch, please contact Rockford Systems, LLC)

MOTOR STARTER

A nonreversing motor starter may have been supplied in this shipment. The main purpose of this starter is to drop out the main drive motor and power to the controls when a power failure occurs. The Detect-A-Finger control must be tied into a motor starter. (For safety reasons do not run a separate line to the control. Please refer to the enclosed wiring schematics for proper wiring of this starter.)

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

“The motor start button shall be protected against accidental operation.”

“All mechanical power press controls shall incorporate a type of drive motor starter that will disconnect the drive motor from the power source in event of control voltage or power source failure, and require operation of the motor start button to restart the motor when voltage conditions are restored to normal.”

These requirements are normally met by using a magnetic motor starter. This starter (if furnished) operates with a 120 VAC coil. Refer to the electrical schematics supplied for details on wiring the starter and associated motor start/stop push buttons.

TRANSFORMER PART NO. RSF-021

This externally mounted transformer may have been supplied in this shipment. It has a 100VA, 230/460 volt primary and a 115 volt fused secondary. The fuse is 1 amp, 250 volt and is accessible from the outside of the transformer housing.

Components Required for Typical Applications

Inspect each machine where these Detect-A-Fingers will be installed. Most machines are controlled electrically, pneumatically or mechanically; however, other components may be required. Review this section for typical applications of the Detect-A-Finger. Accessory equipment and components such as solenoid air valves, air cylinders, or electric solenoids are available from Rockford for your convenience. If you require application assistance for these components, please contact the factory.

All mechanically operated machines that are powered with flywheels, must incorporate single-stroke capability. Please consult factory for single stroke (single cycle) conversion packages when required.

If single-stroke capability is dependent upon spring action then this feature must be inspected. This spring must be of the compression type, operating on a rod, or guided in a hole or tube, and designed to prevent interleaving of the spring coils in the event of breakage.

Mechanical to Electro-Pneumatic Conversion

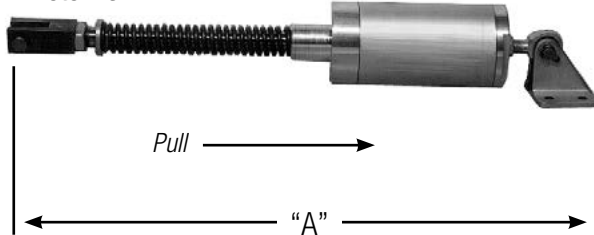
Convert from mechanical operation by removing the hand or foot treadle and replacing it with an air cylinder. The cylinder bore and stroke (push or pull type) can be determined from actual machine measurements and the location of attachment to the linkage. The air cylinder is controlled by a three-way, normally closed, 120 VAC solenoid air valve. A filter-regulator-lubricator and pressure gauge assembly is also required. In most cases, the Detect-A-Finger controls the solenoid air valve.

(Continued on next page.)

Mechanical to Electro-Pneumatic Conversion (continued)

RCL SERIES AIR CYLINDERS (See Specification Sheet No. KSL-092)

Photo 2.5



One of the following pull-type air cylinders may be adequate to operate the machine:

Part Number	Bore (Inches)	Stroke (Inches)	Lbs. Pull (@ 75 PSI)	Overall Length "A"
RCL-001	1.125	1.0	50	10.25"
RCL-002	1.500	1.0	100	15.75"
RCL-003	2.000	2.0	200	19.75"

Single-acting spring-return 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 must be that the cylinder is a single-acting spring-return type (not double acting) to meet best safety practices. When mounting the cylinder, be sure it is secured in such a manner that it will not vibrate loose, bind or rub on some other part of the machine.

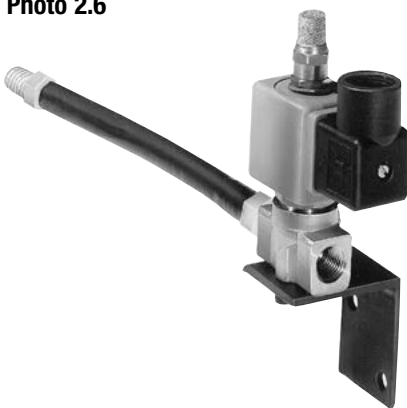
The assembly consists of the cylinder, two mounting feet, mounting pin, drive yoke, drive pin, and yoke lock nut. This assembly is illustrated in Figure 2.3 on the next page. Locate this assembly on the machine so that the feet can be mounted to a convenient surface. The yoke should be attached to the machine linkage, and the air inlet should be oriented toward the air solenoid valve location.

The air cylinder should be mounted in the most logical position to operate the machine linkage most efficiently. **The main requirement in locating the cylinder assembly, is that the piston rod will have a straight, in-line pull (or push) when attached to the operating linkage. When applying an air cylinder to the machine, make sure that the cylinder rod, yoke or any moving parts will not bind after installation.** Adjust so that the air cylinder bottoms at the end of each stroke. The air cylinder will operate in any position. The operating linkage may be connected to the air cylinder by any convenient means. Be sure the rod stroke is not too long because it could cause jackknifing of the cylinder. If this is a concern, shorter stroke cylinders are available. Too much air pressure may damage the operating linkage. Please consider these points when installing any air cylinder.

Make certain that the drive yoke and lock nut are located approximately halfway down on the threaded portion of the piston rod in order to provide for either up or down adjustment when necessary. Attach one end of the flexible rubber hose in the threaded cylinder inlet port and tighten firmly.

Note: Threaded air joints do not generally require sealant; however, "Teflon" tape may be used to prevent leakage.

Photo 2.6



SOLENOID AIR VALVE ASSEMBLY (See enclosed Installation Sheet No. KSL-151.) PART NO. RCD-006

If furnished, the Solenoid Air Valve is a three-way, normally closed, quick-exhaust type. This assembly consists of the electric air solenoid valve, exhaust air muffler, steel mounting bracket and flexible hose.

Mount the air muffler on the threaded exhaust port located on top of the valve. Assemble the mounting bracket to the base of the valve and orient this assembly so that the air outlet port (marked "1" on the valve body) points toward the air cylinder and is within reach of the flexible hose. Next attach this hose to the No. 1 port of the solenoid valve and mount the valve assembly on the machine allowing sufficient flexibility to accommodate cylinder movement. (See Figure 2.3.) **It is extremely important to use the rubber hose provided for the connection between the solenoid valve and the air cylinder. It provides the necessary flexibility, size and length for proper exhaust of cylinder air, all of which are required for successful machine operation.**

(Continued on next page.)

SECTION 2—INSTALLATION

Detect-A-Finger™ Drop Probe Device - Riveter

SOLENOID AIR VALVE ASSEMBLY (continued)

Mount the solenoid valve assembly in a vertical position. The electrical conduit fitting can be easily adjusted to face in any horizontal direction by loosening the hex nut at the top and turning the enclosure. Retighten this nut after locating the fitting. Saddle clamp-type terminals are provided on the solenoid for wiring.



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

Figure 2.2
Typical Electro-Pneumatic Application

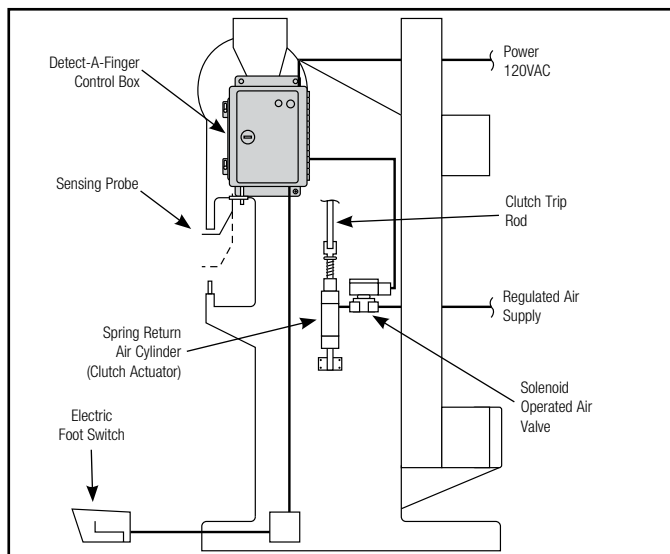
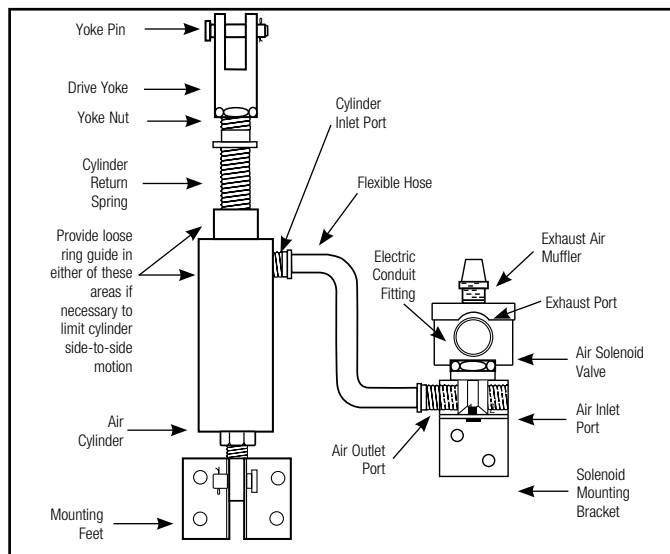


Figure 2.3
Solenoid Air Valve Assembly and Air Cylinder



FILTER-REGULATOR-GAUGE AND LUBRICATOR ASSEMBLY (FRL)

(If furnished, see enclosed Installation Manual No. KSL-208. Reference page 15 for installation instructions on the lockout air valve.)

*Filter/Regulator
Combination*

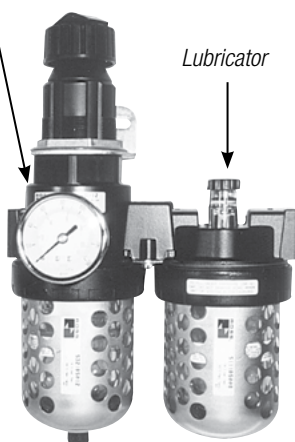


Photo 2.7
Part No. RCL-043 (1/4")

The filter cleans air that goes to the solenoid air valve (and air cylinder, if furnished). The regulator and gauge are used to adjust air pressure. The lubricator keeps the solenoid air valve or the air cylinder (if required) properly lubricated.

The filter-regulator unit with one threaded pipe plug, lubricator, gauge, mounting bracket, and a connector or nipple are shipped together.

Unpack the filter-regulator unit and install the connector between the filter/regulator lubricator (see arrow for air flow direction). Tighten this assembly and position the two units with both bowls in alignment. Be sure to check air flow direction and the location of the dual valve to avoid excessive piping.

Choose an appropriate location on the machine for mounting this assembly. If possible, it should be accessible from floor level.

Install the pressure gauge in the threaded port opposite the mounting surface and plug the unused port. Attach the mounting bracket to the machine and then mount the FRL Assembly using the lock nut supplied.

The air line run length is not critical; but the port and pipe sizes should be maintained.

Fill the lubricator with a good quality lubricant (see OEM's specifications) to the level indicated by the maximum fill line on the transparent reservoir. **Do not overfill.** When the machine is cycled, the lubricator drip rate may be adjusted according to the Instruction Manual. Please check the machine owner's manual for proper specifications for oil, if required. Some clutch and brake assemblies do not require lubrication.

(Continued on next page.)

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SECTION 2—INSTALLATION

Detect-A-Finger™ Drop Probe Device - Riveter

FILTER-REGULATOR-GAUGE AND LUBRICATOR ASSEMBLY (FRL) (continued)

Regulate the air pressure high enough to develop sufficient pull (or push) to operate the machine mechanically.

Bring shop air supply to the machine. Connect the air supply at the threaded opening, indicated as “IN” by the direction arrow on the filter/regulator. Maintain minimum 1/4” pipe size.



Never apply more than 145 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.



Important - Blow air line clear of all dirt, scale, etc., before connecting filter. Drain water out of filter bowl when filled. If bowl fills with water in a short period of time, install a larger filter in your main air supply line leading to the machine.



It is recommended that a manual shut-off valve be installed in the main line ahead of the filter/regulator/lubricator assembly and close to the machine for convenience and lockout.

LOCKOUT AIR VALVE

The OSHA Regulation, under Subpart J, Section 1910.147, requires that all employers develop a complete hazardous energy control program. This regulation covers the servicing and maintenance of machines and equipment where the unexpected energization or start-up of the machines or equipment, or release of stored energy could cause injury to employees.

Photo 2.8
Part No. RCD-071
(1/4”)



Shut-Off Air Valve

This valve is usually attached to the inlet end of a filter-regulator-gauge and lubricator unit. It is manually operated with a slide-type valve that opens and closes with a short one inch movement of the slide. When locking out, the downstream air is automatically exhausted. The valve slide can only be locked in the closed position.

Slide-Operated Lockout Valve

This valve is similar to the shut-off air valve except this valve has a larger body size for more air flow.



Photo 2.9
Part No. RCD-112
(3/8”)

FOOT SWITCH (OPTIONAL)

(See enclosed Installation Manual No. KSL-001)

When installing the optional foot switch, be sure that the wiring schematics are referenced for proper connections. Be sure to maintain the foot switch in first-class condition. It must always be wired properly and the protection on top and sides must always remain in place.

Photo 2.10 - Part No. CTD-066



Photo 2.11 - Part No. CTD-065



Photo 2.12 - Part No. CTD-011



(Continued on next page.)

SECTION 2—INSTALLATION

Detect-A-Finger™ Drop Probe Device - Riveter

FOOT SWITCH (continued)



If you choose 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 1910.217 paragraph (c) for safeguarding.)



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



The mechanical guard or device must be properly installed, used and maintained. The safeguard must prevent personnel from receiving bodily injuries.

Mechanical to Electrical Conversion

This type of conversion uses an electric push- or pull-type solenoid to actuate the clutch in place of the mechanical treadle. This conversion may also require the addition of a spring to assist the return of the clutch actuation linkage. A typical installation is shown in Figure 2.4.

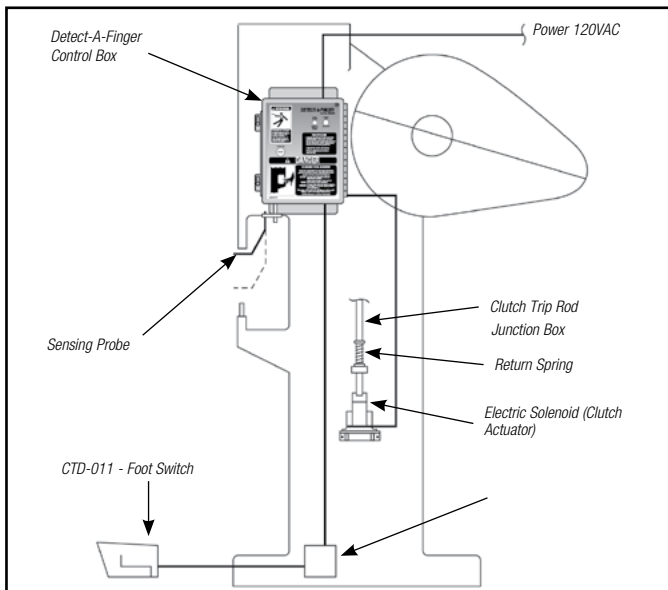


Figure 2.4

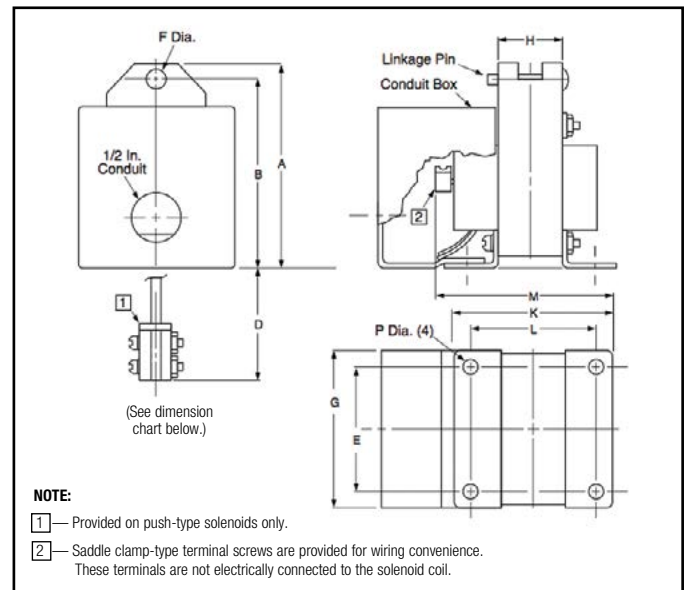


Figure 2.5

Electric Solenoids - If a solenoid is required and was not ordered, please select one of the following solenoids. If another size is required, please consult factory.

Part No.	Dimension (Inches) of Electric Solenoids (See Figure 2.5)										
	A	B	D	E	F	G	H	K	L	M	P
CMF-001	4.33	3.98	—	2.25	0.44	3.06	1.44	3.56	2.90	3.86	1/4
CMF-014	4.33	3.98	2.08	2.25	0.44	3.06	1.88	4.00	3.33	4.30	1/4

Part No. of Solenoid Assembly Including Conduit Box	Operation Push/Pull	Maximum Stroke (Inches)	Pounds Developed @ Max. Stroke & 100% Volts					Electrical Load Volt Amps (VA)	
			With Gravity		Against Gravity		@ Max. Stroke	Seated	Seated
			Force	Load*	Force	Load*			
CMF-001	Pull	1	26.1	18.6	23.9	16.4	45	2700	130
CMF-014	Push	1	30.0	21.0	26.0	17.0	50	3450	190

*Maximum

(Continued on next page.)

Mechanical to Electrical Conversion (continued)



Do not remove any of the clutch operating linkage compression springs or return mechanism.

The solenoid must be properly aligned with the trip-rod for a successful application. The installation must allow the solenoid plunger to travel in a straight line, perpendicular to the mounting surface. Be sure that the solenoid plunger moves freely and is fully seated when the machine clutch trips. The solenoid plunger MUST seat at the end of the stroke to prevent overheating and coil burnout. The recommended maximum stroke must never be exceeded. See Figure 2.5 for mounting dimensions.

The force required can be determined by different methods. One way is to place known weights on the treadle until the clutch is tripped. Then calculate the trip-rod force required by the following formula.

Measure the distances (D & D₁) shown at right and insert these values in the following formula for minimum trip-rod force (F) required:

$$F \text{ (Pounds)} = \frac{\text{Weight (Pounds)} \times D \text{ (Inches)}}{D_1 \text{ (Inches)}}$$

Another method is to use a direct reading scale (similar to those used to weigh fish) to pull the trip rod directly. This will actually measure the minimum force required to trip the clutch. In both methods the selected electric solenoid should be rated at least 50% more than the measured or calculated force.

Install the solenoid so that the trip-rod movement is the same as originally required to trip the clutch. The rod may be shortened and/or formed to accommodate the solenoid when required.

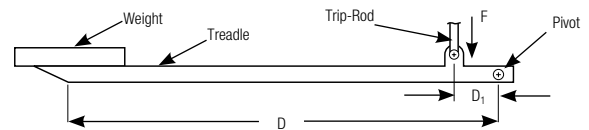


Figure 2.6 - Weights on Treadle Method

Other Installation Considerations

PIPING

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.

From the "lockout" valve, connect at the "In" threaded opening of the filter-regulator (as indicated by the cast-in arrows). Maintain an appropriate pipe size throughout.



These controls require clean air. Blow all lines clean of 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. Air filter must be kept clean at all times. Never operate the machine unless the air filter is clean and water is drained.

See enclosed Filter-Regulator-Gauge & Lubricator (FRL) Assembly Manual No. KSL-208.

WIRING

We recommend that National Electrical Code practices be followed for wiring, especially color coding and the use of numbered wire markers on both ends of every wire. Color coding is Black for power circuits, Red for 120 VAC control circuits, White for current carrying ground (frequently referred to as the "right hand common"), and Green for any equipment grounding conductor.

The following additional installation materials and equipment may be required:

1. **Wire** - Size of wire depends on local ordinance. Number 14 stranded copper wire with an approved insulation is recommended.



Do not use solid wire.

2. **Conduit** - Rigid, Sealtite or any tubular connection media that complies with local ordinance is satisfactory. Miscellaneous wire connectors, electrical tape, and solderless spade or ring-type terminals are also required.

(Continued on next page.)

SECTION 2—INSTALLATION

Detect-A-Finger™ Drop Probe Device - Riveter

WIRING (continued)

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

Complete wiring diagrams are provided for connecting all controls and components properly. The foot switch should be installed so it is readily available to the machine operator.

Input - Bring 120 VAC three-wire service to the Detect-A-Finger control box. Ground should be connected to Terminal 1. Connect the “Hot” side of 120 VAC to Terminal 2. Connect the common to Terminal 3.

If 120 VAC is not available on the machine, then a transformer must be incorporated to step down the line voltage. This transformer must be rated in accordance with load requirements.

The incoming power for the Detect-A-Finger should be interfaced with the motor starter circuit so that power is only applied to the Detect-A-Finger control box when the motor is running. Refer to the connection diagram for an example of this interface.

Output (Load) — Refer to the connection diagram. Connect the machine operating device to Terminals 4 and 5. Two jumpers may be installed, as required, to provide the ability to control 120 VAC devices. One jumper is between Terminals 7 and 8 and the other is between Terminals 3 and 4.

Connect N.O. contact of foot switch to Terminals 6 and 7.

It is possible to isolate the output relay contact and control an external load from a separate source. Connect the external power source to Terminals 4 and 8, and the output load device to Terminals 4 and 5. **DO NOT INSTALL THE JUMPERS.**

Note: Output relay contact is rated at 230 VAC maximum.

SECTION 3—OPERATION

Detect-A-Finger™ Drop Probe Device-Riveter

PRELIMINARY CHECK

1. Apply power. The power “ON” indicator should light. If not, one of the following conditions may exist:

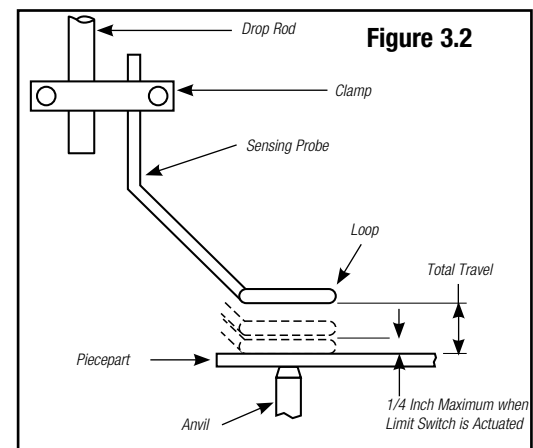
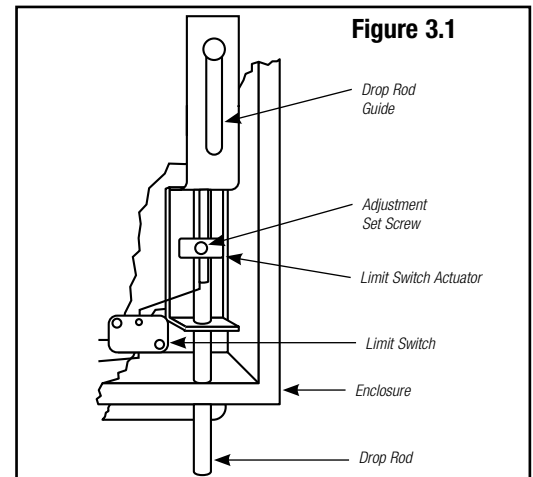
- Main Disconnect is off.
- Fuse is open.
- Indicator is faulty.
- Improper wiring.

Correct the problem and continue with the preliminary check.

2. Measure the incoming voltage at Terminals 2 and 3. This should be 115 VAC \pm 15%. Shut off the power for the next step.

3. Adjust the limit switch actuator with the set screw provided. The sensing probe should be in position over the workpiece and formed to protect the required area. Move the drop rod manually to the point where the limit switch (in the control box) is actuated. Locate the sensing probe at 1/4 inch or less above the workpiece. Loosen the adjustment set screw on the limit switch actuator. Move the actuator (collar) to the point where the limit switch is actuated and tighten the set screw. Check this adjustment periodically and before every setup. Refer to Figures 3.1 and 3.2.

Reapply power and start the motor. The machine should be ready to cycle. Depress the foot switch. The Detect-A-Finger rotary solenoid should energize, permitting the drop rod to drop until the limit switch is actuated. The limit switch now energizes the control relay and the relay contacts close, energizing the machine operating device (solenoid). The machine should cycle once (single stroke). For successive strokes, the foot switch must be released and depressed again.



(Continued on next page.)

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SECTION 4—REPLACEMENT PARTS

Detect-A-Finger™ Drop Probe Device - Riveter

Check mechanical moving parts for excessive wear on a regular basis. We recommend that the following components be stocked as replacement parts.

Part No.	Description	Qty.
RFC-057	Relay, 120 volt coil	1
RYK-001	Rectifier, half wave	1
RYK-007	Rectifier, full wave bridge	1
RTY-014	Fuse, 3 amp	1
CTS-013	Indicator light, red (neon)	1
CMC-020	Limit switch	1
FTL-022	P.C. Board	1

Part No.	Description	Qty.
FCT-030	Sensing probe	2
FCT-029	Clamp (nylon)	1
CMF-109	Rotary solenoid (right)	1
CMF-110	Rotary solenoid (left)	1
FKC-101	Spring	1
FCT-043	Drop rod assembly repair kit	1

SECTION 5—TROUBLESHOOTING

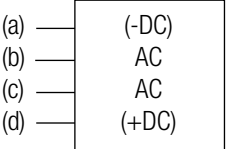
Detect-A-Finger Drop Probe Device - Riveter

VOLTAGE MEASUREMENTS (120 VAC Type Machine Operating Device)

SYMPTOM	TEST POINTS	READING	PROBLEM
"Power On" Indicator Will Not Light	Terminal 2-3	0	No primary power.
		60 VAC	Transformer wired for 460 VAC, 240 applied.
		230 VAC	Transformer wired for 230 VAC, 480 applied.
		115 VAC	Proper voltage applied, continue.
	Terminal 6-3	0	Fuse blown, replace.
		115 VAC	Defective lamp, replace.
"Power On" Indicator is Lit, Rotary Solenoid Will Not Energize	Terminal 7-3 with Foot Switch depressed	0	Foot Switch defective or improperly connected, locate problem and correct.
		115 VAC	Proper voltage - bridge rectifier or rotary solenoid defective. See resistance measurement section.
"Power On" Indicator is Lit, Rotary Solenoid Energizes, Machine Will Not Cycle	Across relay coil with Foot Switch depressed	0	Limit Switch not being actuated or Limit Switch defective. Perform adjustment procedure or replace Limit Switch.
		115 VAC	Proper voltage — relay coil open.
	Terminal 8-3 with Foot Switch depressed	0	Jumper 7-8 missing.
		115 VAC	Proper voltage, continue.
	Terminal 8-4 with Foot Switch depressed	0	Jumper 4-3 missing.
		115 VAC	Proper voltage, continue.
	Terminal 5-4 with Foot Switch depressed	0	Relay contact defective — replace relay.
		115 VAC	Proper voltage — machine operating device or wiring defective — check continuity with an ohmmeter.

RESISTANCE MEASUREMENTS — Power off with components not connected.

Bridge Rectifier, Terminal Identification:

TERMINAL		RESISTANCE	
From	To	OHMS	
a	b	700	
b	a	•	
a	c	700	
c	a	•	
d	b	•	
b	d	700	
d	c	•	
c	d	700	

Readings may vary slightly from meter to meter. However, the trend established between infinity (•) and the lower readings must remain consistent throughout the test. Any unusual reading means the bridge rectifier is defective and must be replaced.

Rotary Solenoid - Resistance 109 Ohms.

Clutch Actuating Equipment - AC Type push or pull solenoids have DC resistances typically less than 10 Ohms. AC solenoid air valves of the type usually supplied have approximately 100 Ohms DC resistance.

SECTION 6—INSTALLATION OF LONG-STROKE DROP PROBE DEVICE

Detect-A-Finger™ Drop Probe Device - Riveter

Before proceeding with the installation of this device, please use page 25 to make a rough sketch of the location of the enclosed equipment.

Mounting (RKC-700 through RKC-707)

Remove the cover from the unit for access to the mounting holes. See Figure 6.1. The unit must be mounted upright so the sensing rod travels vertically. It should also be within the distance limitations shown in Figure 6.2. The cover and sensing rod should be accessible after installation for adjustments and maintenance. After the unit is mounted, replace the cover.

Note: The horizontal reach of the sensing arm should be kept as short as possible for a more rigid sensing unit.

Photo 6.1 - Combination Air and Electrical Unit

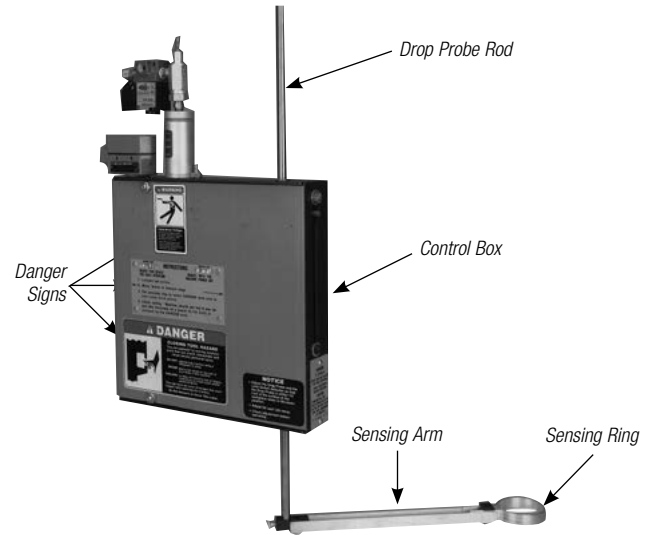


Figure 6.1 Control Box Dimensions

Use any two mounting holes, at least 2" apart, to install unit.

Use spacers or washers to level unit as necessary.

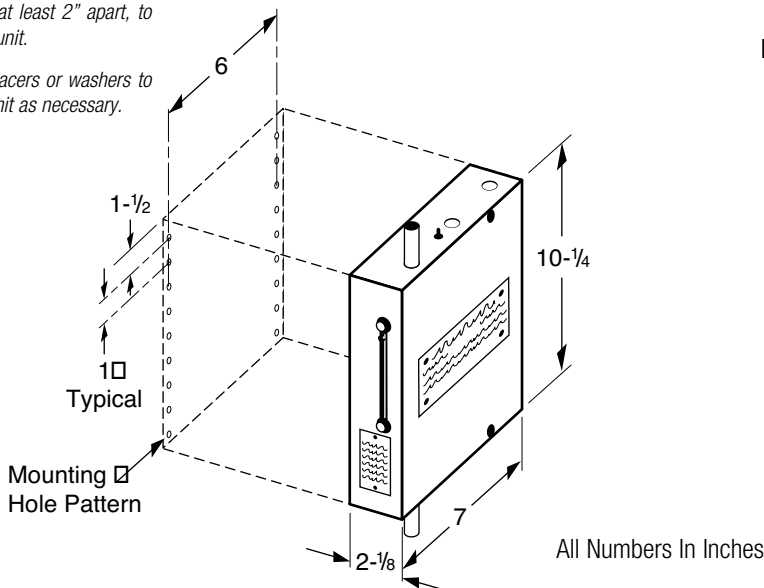
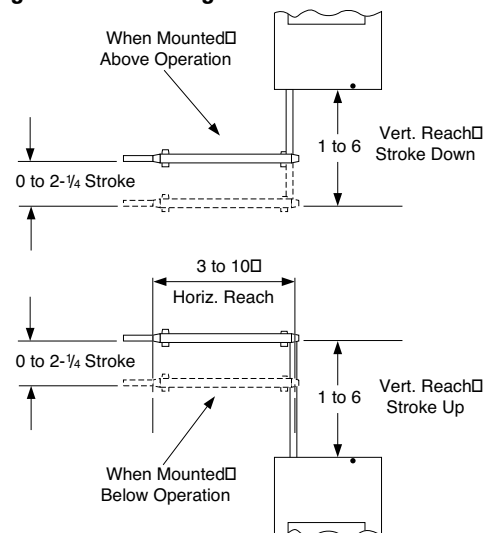


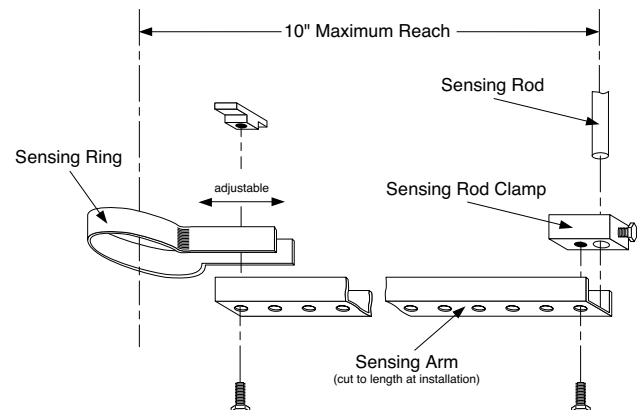
Figure 6.2- Mounting



Fitting the Sensing Arm and Ring

The standard sensing ring is a two inch (2") circle made from a 1/16" x 1/2" aluminum strip. Figure 6.3 shows the parts that make up the sensing arm and ring unit. The arm has a series of holes at 3/4" increments. It can be cut so that the ring will adjust to encircle the hazard. An extra piece of aluminum strip is provided in case your application requires a special configuration.

Figure 6.3- Exploded View of Sensing Assembly



SECTION 6—INSTALLATION OF LONG-STROKE DROP PROBE DEVICE

Detect-A-Finger™ Drop Probe Device - Riveter

Sequence of Operation and Connections

These units are air or electrically operated with a foot switch. An air cylinder input module **always** operates the unit.

AIR-OPERATED DEVICES (PART NOS. RKC-700, RKC-701, RKC-702, AND RKC-703)

On all air-operated devices, air is used to energize the air cylinder input module on the unit. This energizes an internal mechanism which in turn causes the sensing ring to drop to its preset point. The output module is a three-way valve which opens to admit air to the cylinder that trips the clutch of the machine. (See Figure 6.5.)

Input Module - When an air input is used, it requires clean, dry, lubricated air at 60 to 120 PSI. The air input module is a small bore cylinder mounted on the unit. It is positioned so that it will operate the mechanism (inside the unit) when opened. It has a flow control valve attached at its inlet port.

To connect the air input, connect the outlet air line from the foot switch or control, to the flow control valve (see Figure 6.4).

Note: If you do not have an air-operated foot switch, please consult factory.

The air output module is a three-way valve which is mounted to the cylinder. The connection to the flow control valve will supply air for both the input cylinder and the output valve. Next, connect the foot switch inlet hose to your air supply.

Check the flow control valve setting. The flow control valve is factory set at approximately 80 PSI and should not need adjustment. However, the adjustment may be inadvertently disturbed or the valve may respond differently when operated at a different pressure. Figure 6.4 shows the adjusting screw on the flow control valve.

If the cylinder operates too slow, the cycle time for your machine operation could be decreased. Turn the adjustment screw counterclockwise for more air and faster operation.

If the cylinder operates too fast, the drive assembly may be driven faster than the sensing arm can drop. This causes premature locking out of the signal to the machine clutch even though the point of operation may be clear of any interference. Turn the adjusting screw clockwise for less air and slower operation.

Output Module - The air output module is a poppet type valve with 1/8" pipe size ports. It is mounted on the unit so that it will be actuated when the input module makes a complete stroke. It is interconnected with the air cylinder for its air supply. This valve is suitable for actuating small bore cylinders or pressure piloted air valves. It is not intended to feed large bore power cylinders directly.

To connect this output module, attach a new air line from the outlet port on the valve to the air cylinder. One of the air cylinders listed is required to operate the clutch tripping mechanism if the machine is not already equipped with one.

*Note: When installing the RKC-715 or RKC-716 cylinder, the existing spring-return mechanism or mechanical return equipment must **not** be removed.*

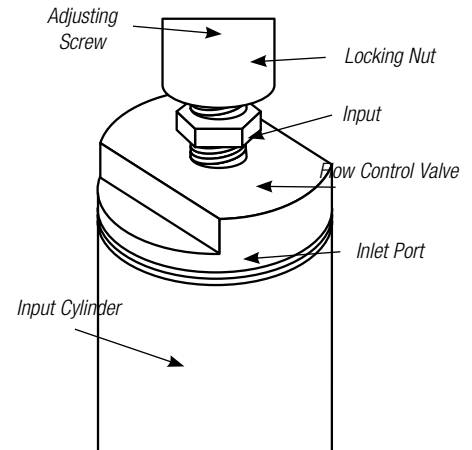


Figure 6.4

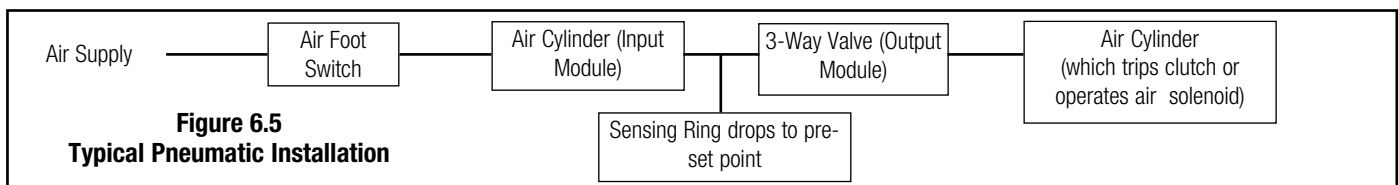


Figure 6.5
Typical Pneumatic Installation

If a mechanical riveter is converted to a pneumatic riveter, the following components may be required:

RCD-096 All Air Foot Switch
RKC-715 Air Cylinder (Pull)
OR
RKC-716 Air Cylinder (Push)



Photo 6.2
Part No. RCD-096

(Continued on next page.)

SECTION 6—INSTALLATION OF LONG-STROKE DROP PROBE DEVICE

Detect-A-Finger™ Drop Probe Device - Riveter

ELECTRICALLY-OPERATED DEVICES (PART NOS. RKC-704, RKC-705, RKC-706, AND RKC-707)

On electrically-operated devices, air is still required to operate the air cylinder input module on the unit. On these units, the air cylinder is fitted with a 115 VAC electric solenoid control valve, which is connected to the electric foot switch. Once this valve energizes the internal mechanism, the sensing ring drops to its preset point. The output module is an enclosed limit switch with capacity of 15A, 125 VAC suitable for operating a tripping solenoid or solenoid air valve. (See Figure 6.7.)

Note: Different voltages are available, please consult factory.

Input Module - To connect the input, attach an air line (60 to 120 PSI) from the air supply to the flow control valve on the cylinder. Refer to the air input instructions, on the previous page, if adjustments are necessary. Next, connect the foot switch so it operates the electric solenoid control valve. Please refer to the wiring diagram in Figure 6.6.

Output Module - The electric output module is a limit switch, as described above, which is mounted on the unit so that it will be actuated when the input module makes a complete stroke. To connect the output module, wire the limit switch to operate the machine control as shown in Figure 6.6.

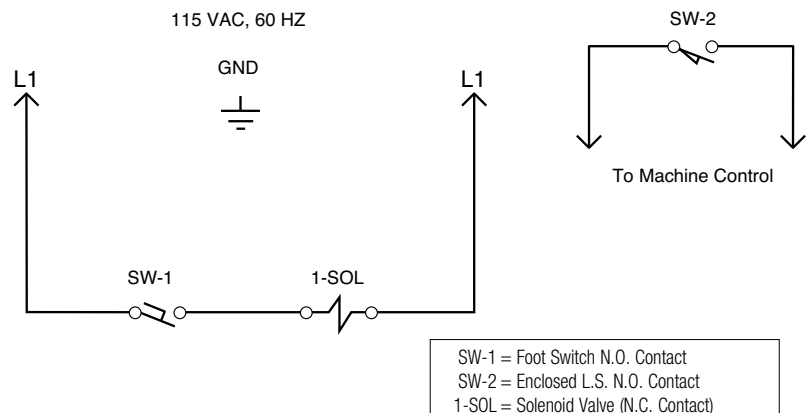
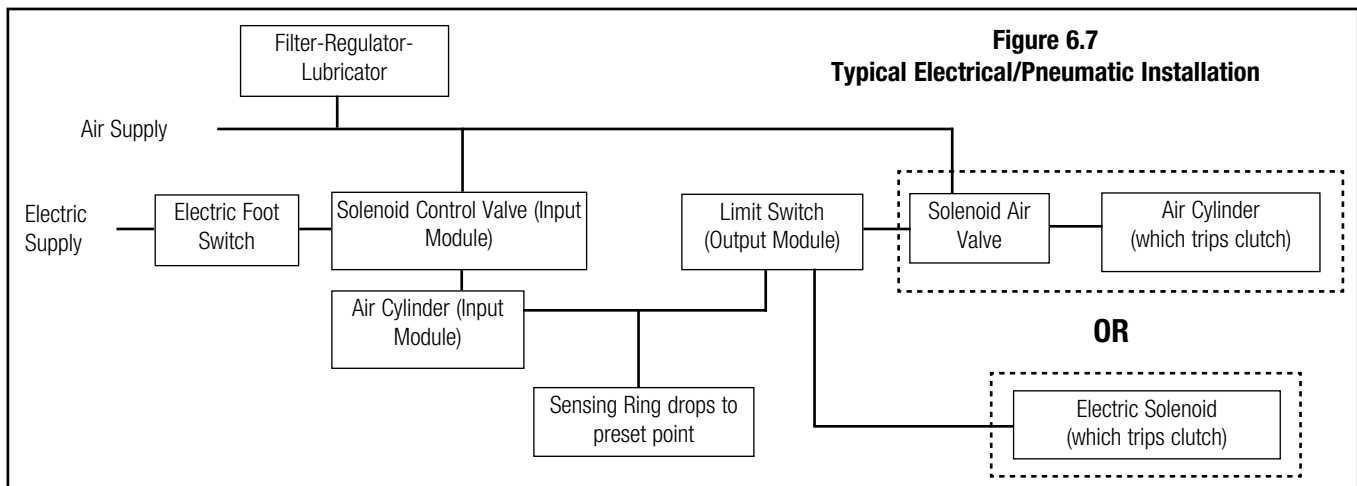


Figure 6.6 - Basic Wiring Diagram



If a mechanical riveter is converted to an electrically-operated riveter, the following components may be required:

CTD-065 Heavy-Duty Electric Foot Switch (See pages 15 - 16.)

OR

CTD-066 Light-Duty Electric Foot Switch (See pages 15 - 16.)

RCL-040 1/4" Filter-Regulator-Lubricator (See pages 14 - 15.)

RCD-006 Solenoid Air Valve Assembly (See pages 13 - 14.)

Air Cylinder (Push or Pull) (See page 13.)

OR

Electric Solenoid (Push or Pull) (See pages 16 - 17.)

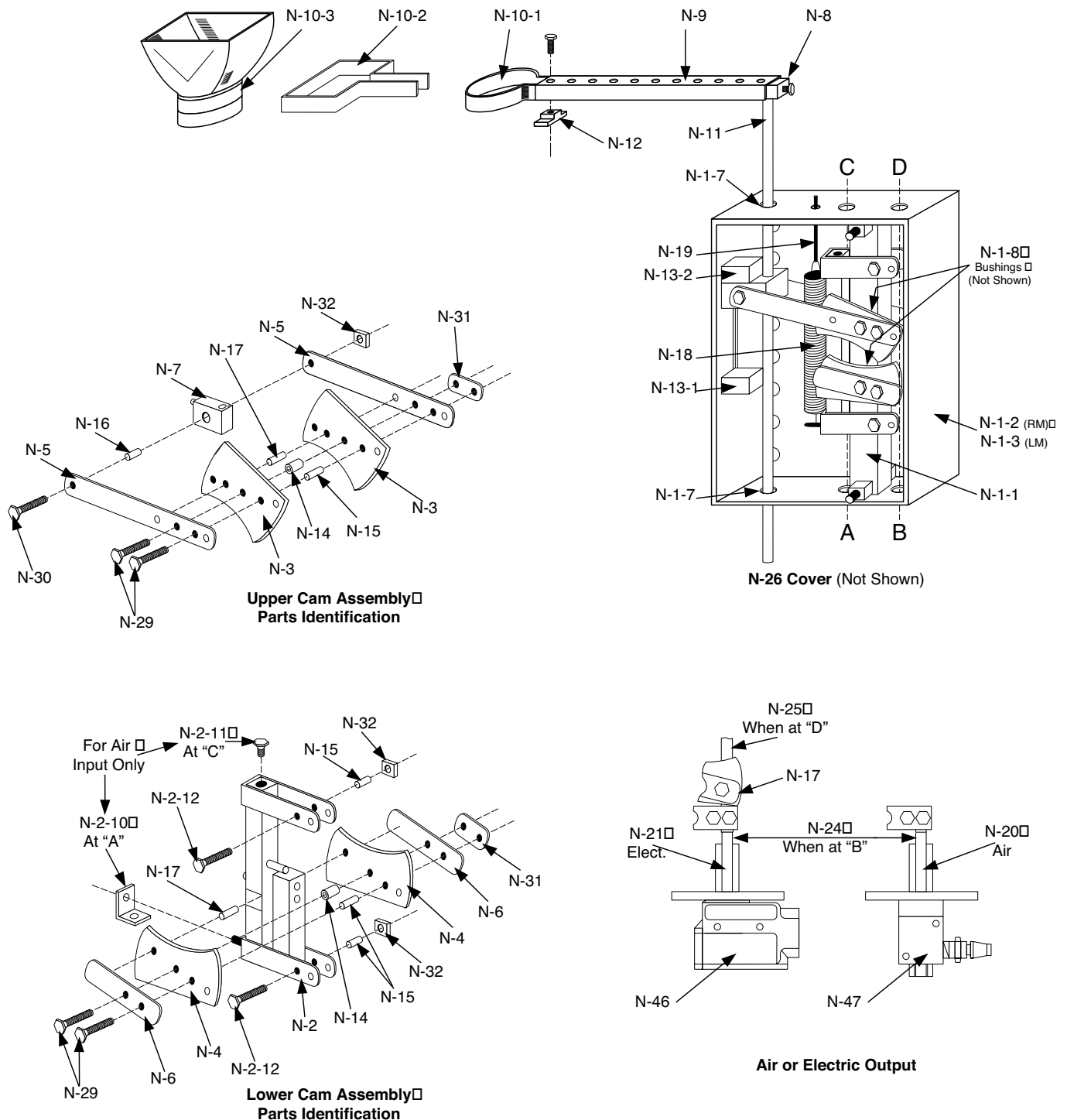
Note: If different inputs or outputs are required for your application, please consult factory for pricing and part numbers.

(Continued on next page.)

SECTION 6—INSTALLATION OF LONG-STROKE DROP PROBE DEVICE

Detect-A-Finger™ Drop Probe Device - Riveter

Parts Layout of Long-Stroke Device



(Continued on next page.)

SECTION 6—INSTALLATION OF LONG-STROKE DROP PROBE DEVICE

Detect-A-Finger™ Drop Probe Device - Riveter

Replacement Parts

Part No.	Part Name
N1-1	Frame Boss
N1-2	Frame — R.H.
N1-3	Frame — L.H.
N1-7	Drive Bushing
N1-8	Cam Bushing (not shown)
N2	Drive Assembly
N2-10	Drive Angle
N2-11	Drive Plug
N3	Upper Cam
N4	Lower Cam
N5	Lever
N6	Cam Plate
N7	Test Block Assembly
N8	Test Rod Clamp
N9	Test Arm
N10-1	Test Ring — Round
N10-2	Test Ring — Square
N10-3	Flanged Sensing Shield

Part No.	Part Name
N10-4	Round — 1" I.D., Lexan Tube — state length
N10-7	Round — 1-3/4" I.D., Lexan Tube — state length
N10-8	Round — 2" I.D., Lexan Tube — state length
N11	Test Rod
N12	Test Nut
N13-1	Stop Assembly — Lower
N13-2	Stop Assembly — Upper
N14	Cam Shaft
N15	Stop Shaft
N16	Test Bushing
N17	Cam Pin
N18	Drive Spring
N19	Spring Rod
N20	Air Nut
N21	Micro Switch Nut

Part No.	Part Name
N24	Actuator — Lower
N25	Actuator — Upper
N26	Cover (not shown)
N29	Cam Bolt
N30	Test Bolt
N31	Cam Nut
N32	Stop Nut
N46	Electric Limit Switch
N47	Air Valve
Following Parts Not Illustrated	
N53	Flow Control Valve
N56	Clutch Actuator Assembly
N61	Air Hose Assembly 1/4" I.D. x 5/8" O.D. with Male and Swivel Female ends. Specify fitting size and overall length
N70	Double Arm Assembly
N76	Air Cylinder Clutch Actuator with Mounting Bracket and Clutch Connector

Operation

Adjustments to Unit

Once installed, the unit has three simple adjustments. The ring can be extended or retracted using screw 1. The height and arm of the entire test ring assembly can be set by screw 2. The stroke of the assembly can be set by screw 3. (See Figure 6.8.)

Setting the Device

Set the test ring so that when held down against the bottom stop 4, the ring just clears a properly aligned part. (See Figure 6.8.) It should be set so that no obstacle, such as a finger, will fit between the ring and the part or anvil. Set the stroke to allow easy loading and unloading of parts.

Preliminary Check

Apply power and start the motor. The machine should be ready to cycle. Upon the initiation of a signal for a riveting stroke, the test ring will drop to the preset position allowing the signal, internally, to be passed on to the clutch thus effecting a riveting stroke. Should something prevent the test ring from dropping to the preset position, the mechanism will lock and prevent any signal to the clutch. To accomplish this, these devices must be properly applied, installed, maintained and adjusted by the user. These devices cannot prevent clutch or machine malfunction or repeat strokes of the machine. They do not protect the operator if fingers are placed above the test ring. Please refer to page 9 for other safety messages.

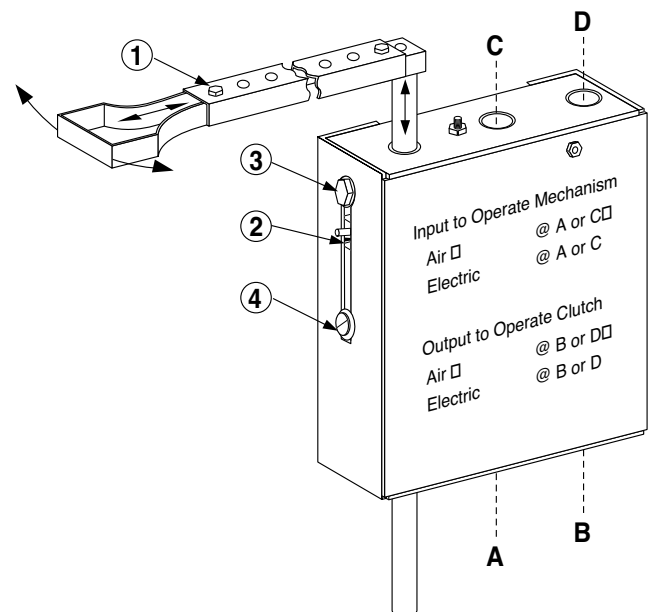


Figure 6.8 - Adjustments to Unit

LAYOUT OF DETECT-A-FINGER SYSTEM

Detect-A-Finger™ Drop Probe Device - Riveter

**MAKE YOUR SKETCH HERE FOR THE LOCATION OF THE DETECT-A-FINGER
PARTS AND COMPONENTS TO BE INSTALLED ON YOUR MACHINE**

SECTION 7—ORDER FORM FOR SIGNS AND LITERATURE

Detect-A-Finger™ Drop Probe Device - Riveter

This instruction manual references signs and literature available for your machines. This order form is for your convenience to order additional signs and/or literature as needed. (This order form is part of your installation manual so please make a copy of it when ordering.)

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____ Fax _____

Name _____ Purchase Order No. _____ Date _____

Part No.	Description	Quantity Required
KSL-020	Installation Manual	_____
KSC-000	Precaution Pamphlet (English)	_____
KSC-000S	Precaution Pamphlet (Spanish)	_____
KSC-000F	Precaution Pamphlet (French)	_____
KSC-047	Danger (Safeguard Interlock) Tag 2" x 2-3/4"	_____
KSC-055	Danger Sign (Foot Switch) 5" x 6" (English)	_____
KSC-055S	Danger Sign (Foot Switch) 5" x 6" (Spanish)	_____
KSC-055F	Danger Sign (Foot Switch) 5" x 6" (French)	_____
KST-136	Danger Label Tag 2-1/2" x 3"	_____
KSC-154	Detect-A-Finger Label (Front Cover)	_____
KSL-051	Booklet - "Mechanical Power Press Safety" (MPPS)	_____
FAB	Catalog - "Safeguarding Fabricating Machines"	_____
SFM	Catalog - "Shields for Machinery"	_____

For prices and delivery, please use address, phone or fax number listed on the front cover of this manual.

Your Signature _____ Date _____

SECTION 7—ORDER FORM FOR SIGNS AND LITERATURE

Detect-A-Finger™ Drop Probe Device - Riveter

To return material for any reason contact the sales department in our organization at 1-800-922-7533 for an R.M.A. Number. All returned materials shipments must be prepaid. Complete this form and send with material to 5795 Logistics Parkway, Rockford, IL 61109-2695. Make sure the R.M.A. Number is plainly identified on the outside of the shipping container.

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____ Fax _____

Contact Name _____ Representative _____

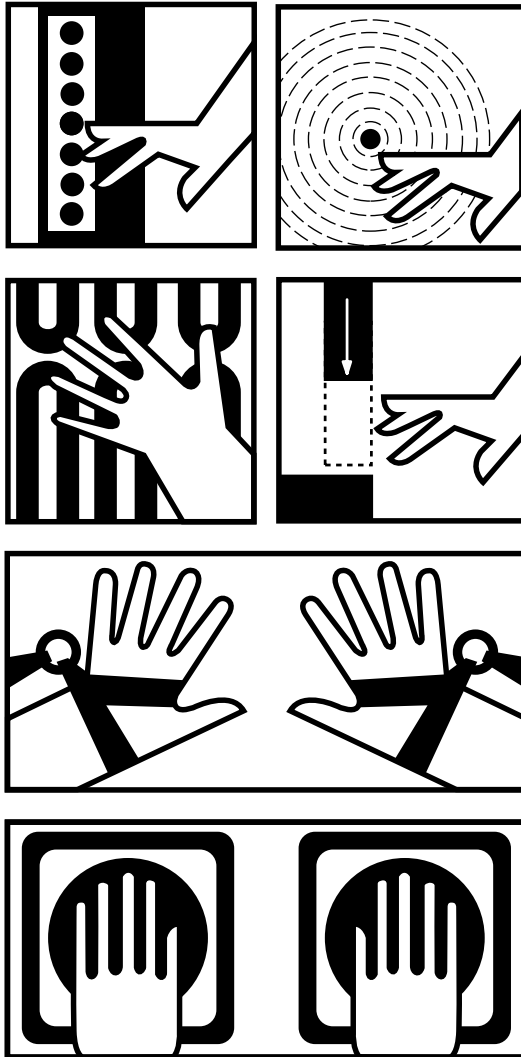
Items Authorized To Return on R.M.A. No. _____ **Original Invoice No.** _____ **Date** _____

Part No.	Serial No.	Description
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Service Requested: ☐ Full Credit ☐ 25% Restocking ☐ Repair & Return ☐ Warranty Replacement

Reason for return (describe in detail):

Return Materials Authorized by _____ Date _____



5795 Logistics Parkway
Rockford, Illinois 61109
Toll Free 1-800-922-7533 (USA Only)
Phone (815) 874-7891
Fax (815) 874-6144
Web Site: www.rockfordsystems.com
E-Mail: customerservice@rockfordsystems.com