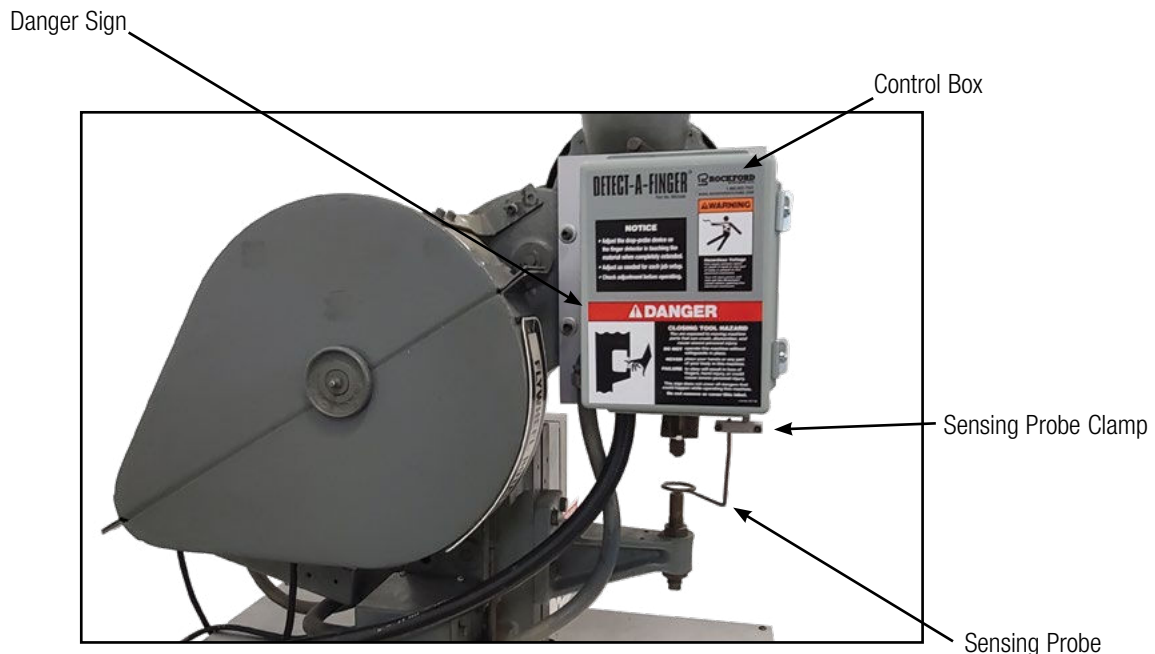




# INSTALLATION MANUAL FOR DETECT-A-FINGER™ GEN II DROP PROBE DEVICE FOR RIVETERS AND OTHER MACHINES



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

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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.**

## 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™ Gen II 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.

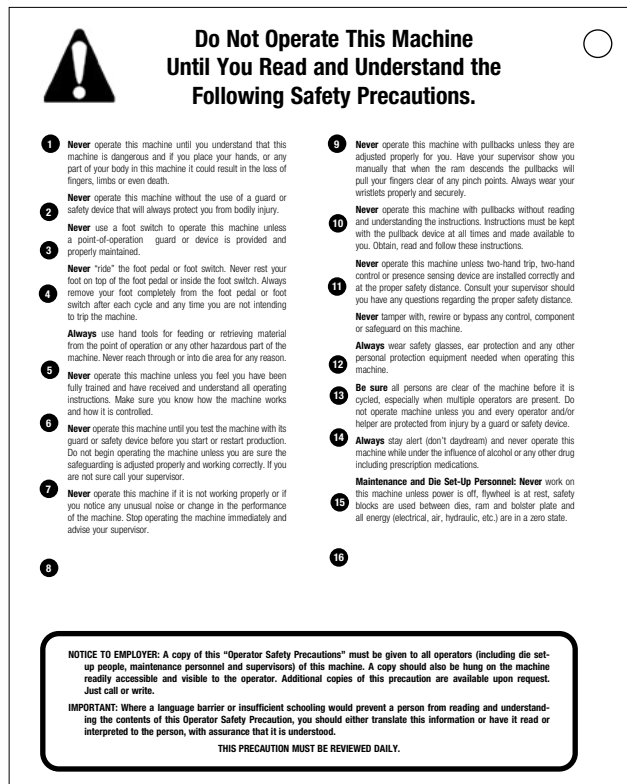
### **LIMITATION OF LIABILITY**

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. KSC000, 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. KSC000S; in French, use Part No. KSC000F.



This precaution pamphlet must be reviewed daily.

## SECTION 1—IN GENERAL

Detect-A-Finger™ Gen II Drop Probe Device - Riveter

### Danger Sign(s) to be Mounted on Machine

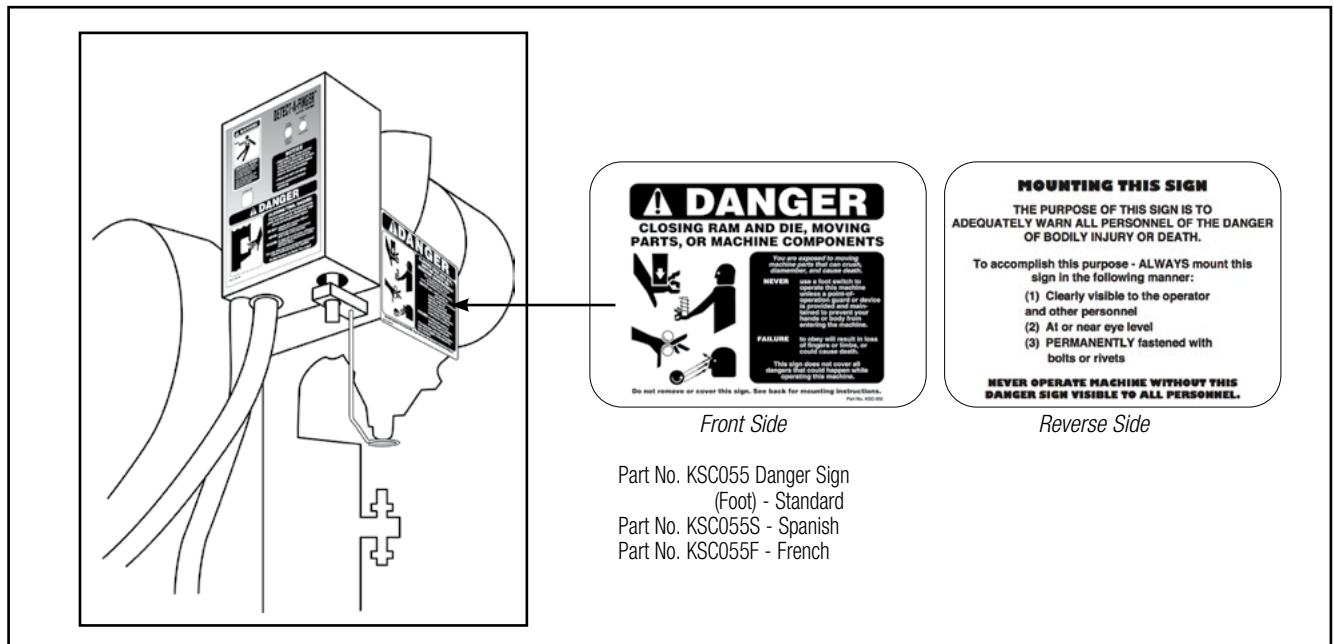


Accompanying this equipment are two 5" x 6" polyethylene danger signs, Part Nos. KSC054 and KSC055. These signs **MUST BE PERMANENTLY MOUNTED IN A PROMINENT LOCATION** on the machine where this equipment is installed. Both signs must be in a **LOCATION THAT IS EASILY VISIBLE** to the operator, setup 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.)

Rockford Systems, LLC  
Call: 1-800-922-7533



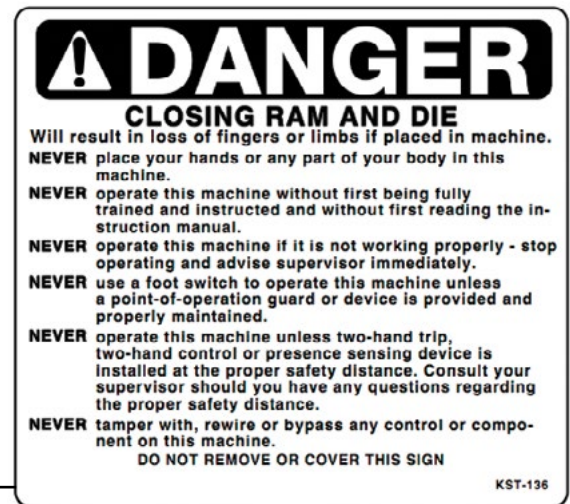
## SECTION 1—IN GENERAL

Detect-A-Finger™ Gen II 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. KST358

**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](http://www.rockfordsystems.com)

E-Mail: [customerservice@rockfordsystems.com](mailto:customerservice@rockfordsystems.com)

# SECTION 1—IN GENERAL

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*Detect-A-Finger™ Gen II 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.

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*(Continued on next page.)*

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## SECTION 2—INSTALLATION

Detect-A-Finger™ Gen II 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

<b>Part Number</b> .....	RKC008 or RKC009	
<b>Fuse</b> .....	313 Series,	
3AG, 3 Amps,.....		
.....	250V, Slow Blow	
<b>Input Voltage</b> .....	115 + 15% VAC, 50/60 Hz	
<b>Operating Current</b> .....	1 Amp Typical	
<b>Output Relay Ratings</b>	<b>Resistive</b>	<b>General Use</b>
	10A 110VAC	7.5A 110VAC
	7.5A 220VAC	5A 220VAC
	10A 30VDC	

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-057

Wire Size .....156 Dia. x 20.438 inches Long

Material .....12L14 Carbon Steel Hex

Total Weight..... (Including Probe and Clamp)  
..... 0.15 lbs. Maximum Allowable



Left Side Mount  
Control Box  
(Part No. RKC008)



Right Side Mount Control Box  
(Part No. RKC009)

## SECTION 2—INSTALLATION

Detect-A-Finger™ Gen II 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. KSC000), 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. KSC055

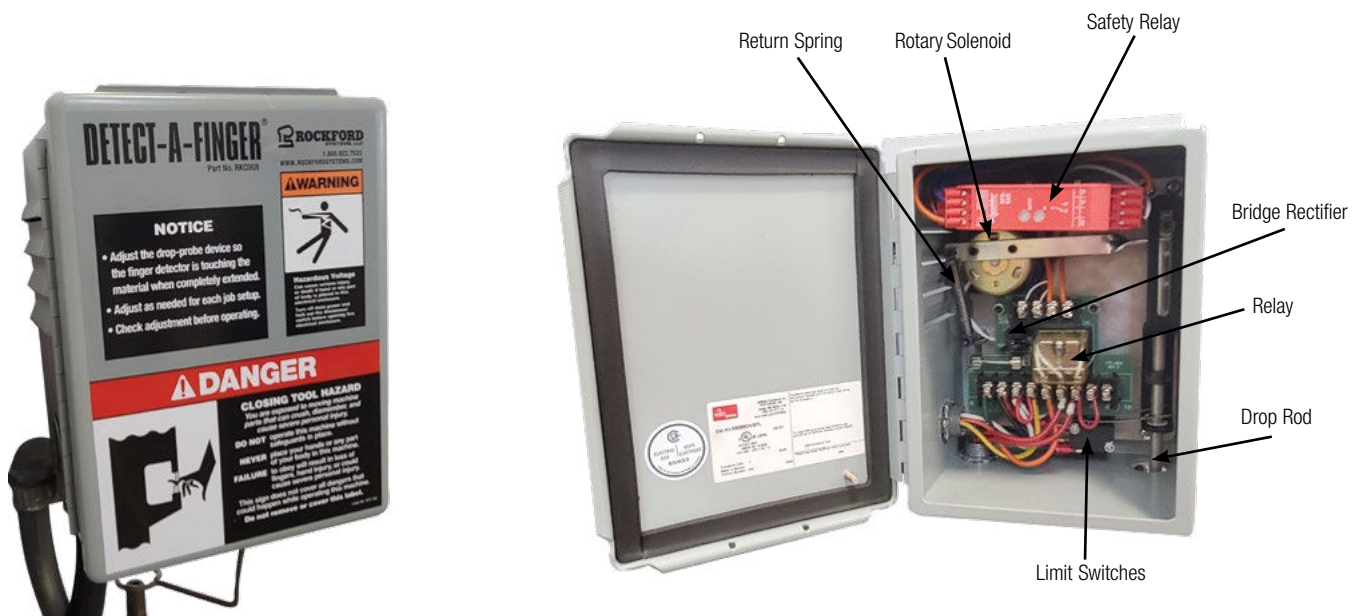
If a foot switch is ordered, a 5" x 6" polyethylene danger sign, as illustrated on page 6, is supplied. It is imperative that this sign be firmly attached to the machine in a location readily visible to all personnel. Suggested mounting instructions are shown on the reverse side of this sign.

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 (RKC008 OR RKC009)** For part Nos. RKC700 through RKC701, please see pages 20 - 23.

Two models are available to fit the Detect-A-Finger to various machines. Part No. RKC008 mounts on the right side of a machine. Part No. RKC009 mounts on the left side of a machine. The drop rod exits bottom left of Part No. RKC008. The drop rod exits bottom right of Part No. RKC009. 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. RKC008 (Right Side Mount)



(Continued on next page.)

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## SECTION 2—INSTALLATION

Detect-A-Finger™ Gen II 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.**



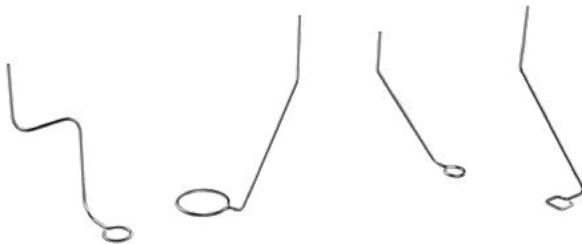
**BACK PANEL RETENSION FASTENERS HAVE PRE-APPLIED THREAD ADHESIVE. IF REMOVED FOR SERVICE, LOCTITE #242 (BLUE) OR AN EQUIVALENT MUST BE APPLIED.**

### 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 pieces of 5/32 (.156) inch rod are furnished with each Detect-A-Finger; an 18" easily-formable aluminum rod to be used as a template, and a 20" steel hexagonal rod to be formed to match the template to be used as the permanent guard. Other materials or custom made configurations may also be used, as long as the keyed feature to the clamp is retained. The only other restriction is the total weight of the probe assembly (including the clamp). The action-arm return spring is capable of returning 0.15 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:**

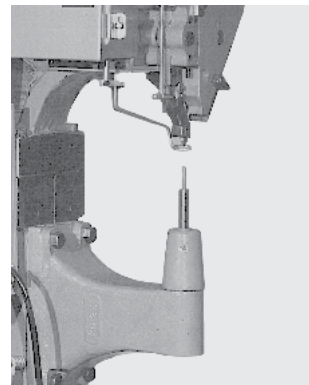


**Photo 2.2**

### 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 2.3**



**Photo 2.4**

## SECTION 2—INSTALLATION

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*Detect-A-Finger™ Gen II 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.

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*(Continued on next page.)*

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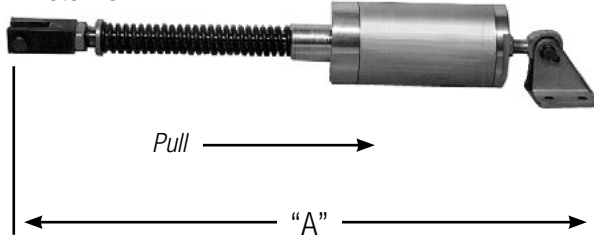
## SECTION 2—INSTALLATION

Detect-A-Finger™ Gen II Drop Probe Device - Riveter

### Mechanical to Electro-Pneumatic Conversion (continued)

**RCL SERIES AIR CYLINDERS** (See Specification Sheet No. KSL092)

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"
RCL001	1.125	1.0	50	10.25"
RCL002	1.500	1.0	100	15.75"
RCL003	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.

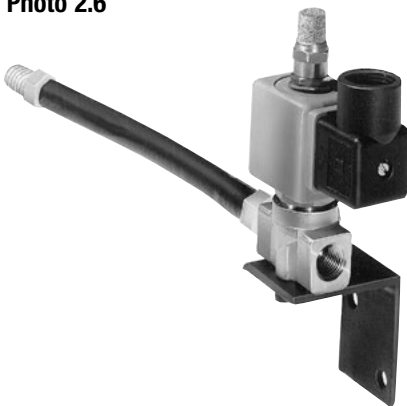
The assembly consists of the cylinder, two mounting feet, mounting pin, drive yoke, drive pin, and yoke lock nut. This assembly is illustrated in Figure 2.3 on the next page. Locate this assembly on the machine so that the feet can be mounted to a convenient surface. The yoke should be attached to the 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. KSL151.) **PART NO. RCD006**

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™ Gen II Drop Probe Device - Riveter

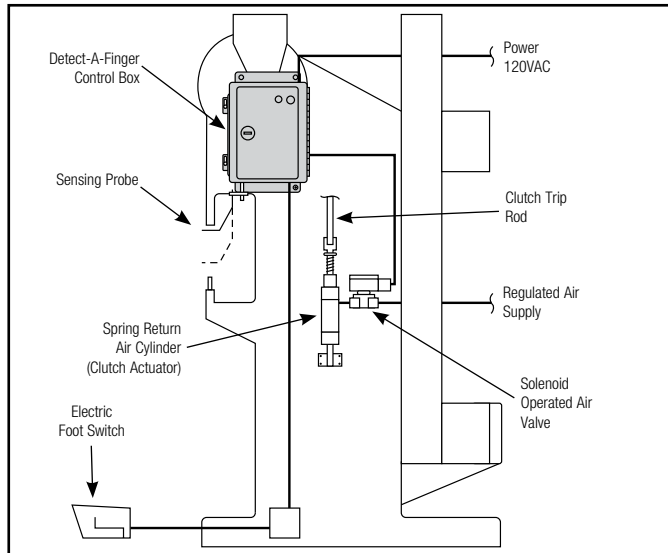
#### SOLENOID AIR VALVE ASSEMBLY (continued)

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.

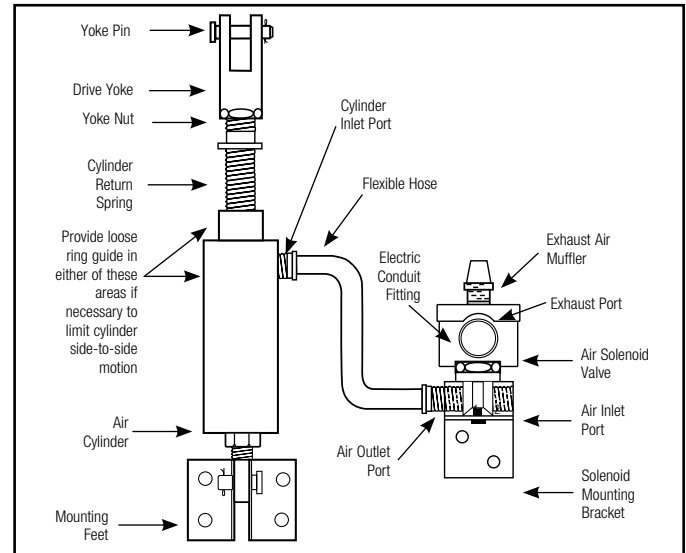


**Exhaust air muffler must be kept clean at all times. Never operate the machine unless the muffler is clean.**

**Figure 2.2**  
**Typical Electro-Pneumatic Application**



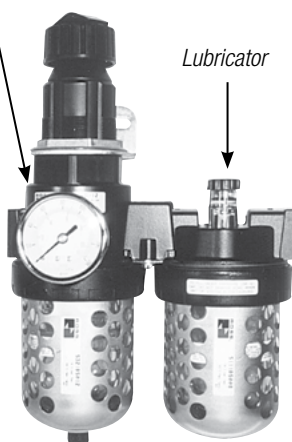
**Figure 2.3**  
**Solenoid Air Valve Assembly and Air Cylinder**



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

(If furnished, see enclosed Installation Manual No. KSL208. 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™ Gen II 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. RCD071**  
**(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. KCD112**  
**(3/8”)**

### FOOT SWITCH (OPTIONAL)

(See enclosed Installation Manual No. KSL001)

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. CTD066**



**Photo 2.11 - Part No. CTD065**



**Photo 2.12 - Part No. CTD011**



(Continued on next page.)

## SECTION 2—INSTALLATION

Detect-A-Finger™ Gen II 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.

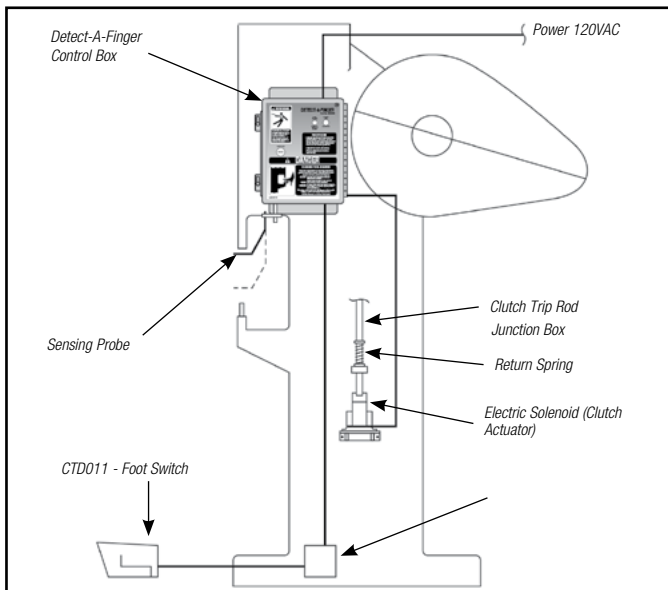


Figure 2.4

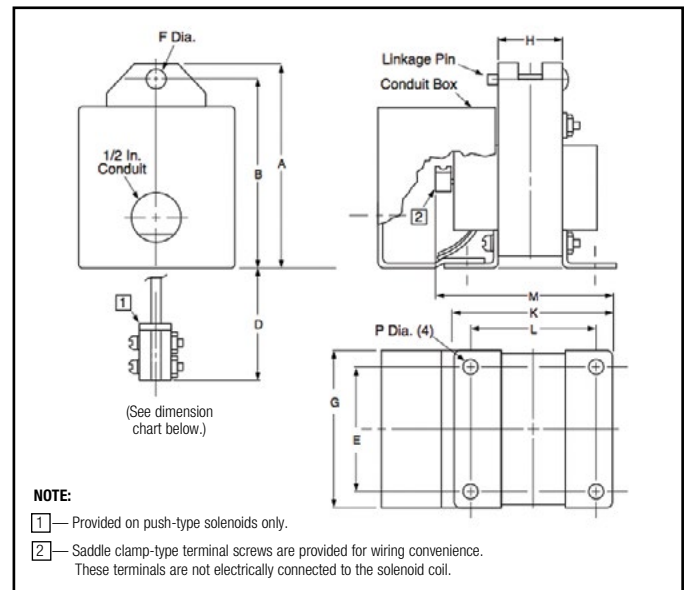


Figure 2.5

**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
CMF001	4.33	3.98	—	2.25	0.44	3.06	1.44	3.56	2.90	3.86	1/4
CMF014	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*			
CMF001	Pull	1	26.1	18.6	23.9	16.4	45	2700	130
CMF014	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 & D<sub>1</sub>) 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.

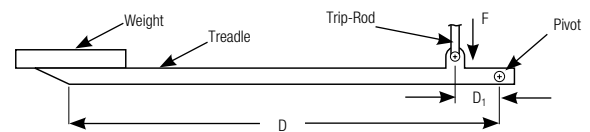


Figure 2.6 - Weights on Treadle Method

### 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. KSL208.

#### 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™ Gen II 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:

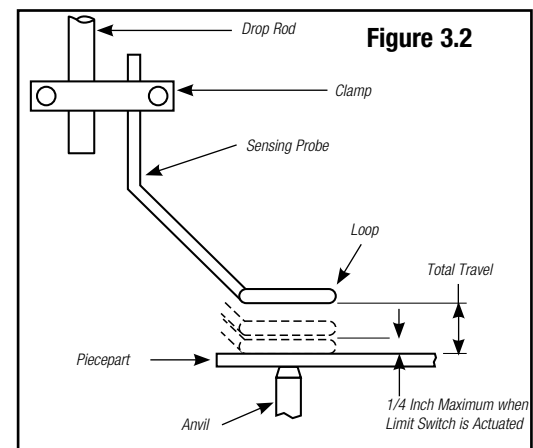
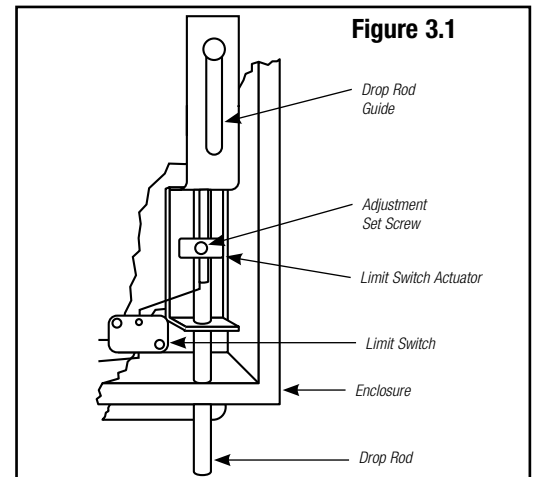
- Main Disconnect is off.
- Fuse is open.
- Indicator is faulty.
- Improper wiring.

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™ Gen II 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.
<b>RFC057</b>	Relay, 120 volt coil	1
<b>RYK001</b>	Rectifier, half wave	1
<b>RYK007</b>	Rectifier, full wave bridge	1
<b>RTY014</b>	Fuse, 3 amp	1
<b>CMC020</b>	Limit switch	2
<b>FTL044 *</b>	P.C. Board	1

Part No.	Description	Qty.
<b>FCT057 ‡</b>	Hex Sensing Probe & Clamp Kit	1
<b>CMF109 *</b>	Rotary solenoid (right)	1
<b>CMF110 *</b>	Rotary solenoid (left)	1
<b>FKC101</b>	Spring	1
<b>RFT176J</b>	2-Hand Control Safety Relay	1
<b>FCT061 *</b>	Gen II DAF Drop Rod Assembly Repair Kit	1

*\* Denotes item(s) assembled at factory with loctite #263 (red) thread assembly compound. Any parts serviced must be replaced with loctite #263 or an equivalent applied to any associated threaded fasteners.*

*‡ Denotes item(s) assembled at factory with loctite #242 (blue) thread assembly compound. Any parts serviced must be replaced with loctite #242 or an equivalent applied to any associated threaded fasteners.*

## ***LAYOUT OF DETECT-A-FINGER SYSTEM***

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*Detect-A-Finger™ Gen II 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 5—ORDER FORM FOR SIGNS AND LITERATURE**

*Detect-A-Finger™ Gen II 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 \_\_\_\_\_

<b>Part No.</b>	<b>Description</b>	<b>Quantity Required</b>
KSL294	Installation Manual	_____
KSC000	Precaution Pamphlet (English)	_____
KSC000S	Precaution Pamphlet (Spanish)	_____
KSC000F	Precaution Pamphlet (French)	_____
KSC047	Danger (Safeguard Interlock) Tag 2" x 2-3/4"	_____
KSC055	Danger Sign (Foot Switch) 5" x 6" (English)	_____
KSC055S	Danger Sign (Foot Switch) 5" x 6" (Spanish)	_____
KSC055F	Danger Sign (Foot Switch) 5" x 6" (French)	_____
KST136	Danger Label Tag 2-1/2" x 3"	_____
KSC154	Detect-A-Finger Label (Front Cover)	_____
KSL051	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 6—PRODUCT RETURNS

*Detect-A-Finger™ Gen II 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** \_\_\_\_\_

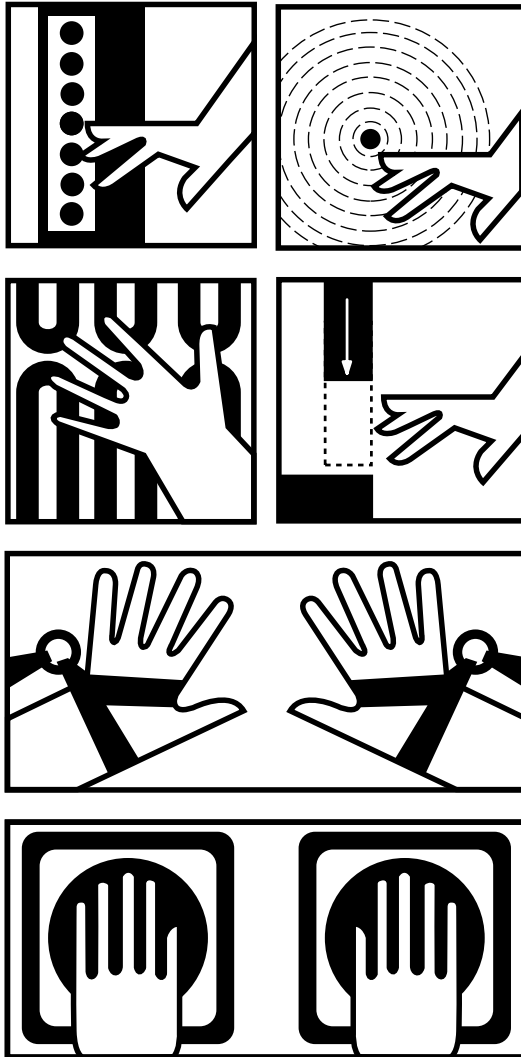
Part No.	Serial No.	Description
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_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

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

Reason for return (describe in detail):

\_\_\_\_\_  
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\_\_\_\_\_  
\_\_\_\_\_

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](http://www.rockfordsystems.com)  
E-Mail: [customerservice@rockfordsystems.com](mailto:customerservice@rockfordsystems.com)