

# MODEL 12012-24M IRONWORKER



**Trick-Tools.com**

80 Truman Road  
Pella, IA 50219

Phone: 1-877-VAN-SANT  
E-mail: sales@trick-tools.com



PRINTED JANUARY 2016

# TABLE OF CONTENTS

<b>SECTION</b>	<b>DESCRIPTION</b>	<b>PAGE#</b>
<b>1.0</b>	<b>INTRODUCTION</b>	<b>4</b>
<b>2.0</b>	<b>SAFETY PRECAUTIONS</b>	<b>5</b>
	<b>2.1</b> <b>WARRANTY</b>	<b>7</b>
<b>3.0</b>	<b>WARNING LABELS</b>	<b>8</b>
<b>4.0</b>	<b>INSTALLATION &amp; SET-UP</b>	<b>10-19</b>
	<b>4.1</b> <b>Physical Dimensions</b>	<b>10</b>
	<b>4.2</b> <b>Machine Moving Procedures</b>	<b>12</b>
	<b>4.3</b> <b>Physical Inspection</b>	<b>13</b>
	<b>4.4</b> <b>Electrical Requirements</b>	<b>14</b>
	<b>4.5</b> <b>Machine Start-Up</b>	<b>18</b>
	<b>4.6</b> <b>Machine Stroke Inspection</b>	<b>20</b>
<b>5.0</b>	<b>MAINTENANCE</b>	<b>22-25</b>
	<b>5.1</b> <b>Lubrication</b>	<b>22</b>
	<b>5.2</b> <b>Routine Lubrication</b>	<b>22</b>
	<b>5.3</b> <b>Scheduled Maintenance</b>	<b>24</b>
<b>6.0</b>	<b>MACHINE OPERATION</b>	<b>26-37</b>
	<b>6.1</b> <b>Punch Operation</b>	<b>26</b>
	<b>6.1B</b> <b>Stripper Adjustment</b>	<b>31</b>
	<b>6.2</b> <b>Bar Shear Operation</b>	<b>32</b>
	<b>6.2A</b> <b>Shear Arm Adjustment</b>	<b>32</b>
	<b>6.2B</b> <b>Shear Blade Adjustment</b>	<b>34</b>
	<b>6.3</b> <b>Cylinder Seal Replacement</b>	<b>36</b>
<b>7.0</b>	<b>OPTIONAL TOOLS</b>	<b>38-64</b>
	<b>7.1</b> <b>6 x 6 Angle Shear</b>	<b>40</b>
	<b>7.2</b> <b>Rod Shear</b>	<b>42</b>
	<b>7.3</b> <b>6 x 6 Ninety Degree Notcher</b>	<b>44</b>
	<b>7.4</b> <b>Rectangle Notcher</b>	<b>46</b>
	<b>7.5</b> <b>12" &amp; 24" Brakes</b>	<b>48</b>
	<b>7.6</b> <b>Angle Iron Brake</b>	<b>50</b>
	<b>7.7</b> <b>Channel Shear</b>	<b>52</b>

# TABLE OF CONTENTS

<b>SECTION</b>	<b>DESCRIPTION</b>	<b>PAGE#</b>
7.8	Pipe Notcher	54
7.9	Picket Tool	58
7.10	Square Tube Shear	60
7.11	Optional Die Holders & Punch Retaining Nuts	62
7.11A	3 Inch Die Insert	62
7.11B	Offset Die Holder	62
7.11C	6 x 6 Die Holder	62
7.11D	Heavy Duty Split-Ring Retaining Nut	62
7.12	Optional Gauging Equipment	64
7.12A	48 Inch Deluxe Back Gauge	64
7.12B	Gauging Tables (Punch & Bar Shear)	64
7.13	Urethane Stripper	64
8.0	<b>TROUBLE SHOOTING GUIDE</b>	<b>68-71</b>
8.1	Electrical Trouble Shooting Motor	70
8.2	Limit Switch Inspection	70
8.3	Control Valve Inspection	70
8.4	Hydraulics	71
9.0	<b>PARTS LISTS</b>	<b>72-99</b>
9.1	Shear Arm Assembly	72
9.2	Punch Assembly	74
9.3	Stripper Assembly	76
9.4	Urethane Stripper	78
9.4	Upper Arm Assembly	80
9.5	Upper Panel & Stroke Control Assembly	82
9.6	Hold-Down Assembly	84
9.7	Cylinder Assembly	86
9.8	Connecting Link Assembly	88
9.9	Power Unit	90
9.10	Electrical Unit	92

## **1.0 INTRODUCTION**

The Scotchman 12012-24M is a versatile, multi-purpose, shearing, punching and forming machine engineered for trouble free operation. The design of the machine combines simplicity of operation with smooth, full stroke control. The ability of the operator to control the machine's direction of movement at any point in the stroke (stop, jog or reverse) gives the Scotchman 9012-24M Ironworker a tremendous advantage over mechanical ironworkers. There is no chance of the Scotchman being "accidentally tripped". The hydraulic system operates at a maximum pressure of 2,700 PSI (175 BAR) and is protected from overload by a pilot operated relief valve. The Scotchman 12012-24M Ironworker lends itself to a variety of special purpose tools that can be mounted on the tool table where a selection of power and stroke potentials are available.

## **2.0 SAFETY PRECAUTIONS**

- 1) **The operators of this machine must be qualified and well trained in the operation of the machine. The operators must be aware of the capacities of the machine and the proper use of the hold down devices, strippers and guards provided with the machine.**
- 2) **All of the guards, adjustable restrictors and awareness barriers must be installed on the machine and kept in good working order. Promptly replace worn or damaged parts with authorized parts.**
- 3) **Never place any part of your body into or under any of the machine's moving parts, strippers or hold devices.**
- 4) **Wear the appropriate personal protective equipment. Safety glasses are required at all times, whether operating, setting up or observing this machine in operation. Since heavy pieces of metal with sharp edges can be processed on this machine, the operator should also wear steel-toed shoes and tight fitting leather gloves.**
- 5) **Strictly comply with all warning labels and decals on the machine. Never remove any of the labels. Replace worn or damaged labels promptly.**
- 6) **Always disconnect and lock out the power when performing maintenance work or setting up any tooling on the machine. Follow the procedures outlined in the operator's manual for setting up, changing or aligning any tooling on this machine.**
- 7) **Never operate this machine with dull or damaged tooling. Replace worn punches, dies and blades promptly.**
- 8) **Practice good housekeeping. Keep the area around the machine clear and well lit. Do not obstruct the operator's position by placing anything around the machine that would impede the operator's access to the machine.**

- 9) **Never modify this machine in any way without the written permission of the manufacturer.**
- 10) **Never leave this machine running unattended.**
- 11) **Always operate the punch station facing the station, standing. Never operate any of the work stations from a sitting or kneeling position.**
- 12) **Set up a program of routine inspections and maintenance for this machine. Make all repairs and adjustments in accordance with the manufacturer's instructions.**
- 13) **A safety DVD was mailed to you or shipped with the machine. If you did not receive it, please contact the factory or your local dealer immediately and one will be sent to you at no charge. If this machine was purchased used, please contact the factory for a safety DVD.**

## **2.1 WARRANTY**

**Scotchman Industries Inc. will, within three years of date of purchase, replace F.O.B. the factory or refund the purchase price for any goods which are defective in materials or workmanship, provided that the buyer returns the warranty registration card within thirty days of the purchase date and, at the seller's option, returns the defective goods freight and delivery prepaid to the seller, which shall be the buyer's sole and exclusive remedy for defective goods.**

**Hydraulic and electrical components are subject to their respective manufacturer's warranties.**

**This warranty does not apply to machines and/or components which have been altered, changed or modified in any way or subjected to abusive and abnormal use, inadequate maintenance and lubrication or subjected to use beyond the seller's recommended capacities and specifications.**

**In no event shall seller be liable for labor cost expended on such goods or consequential damages.**

**The seller shall not be liable to purchaser or any other person for loss or damage directly or indirectly arising from the use of the goods or from any other cause.**

**No officer, employee or agent of the seller is authorized to make any oral representations or warranty of fitness or to waive any of the foregoing terms of sale and none shall be binding on the seller.**

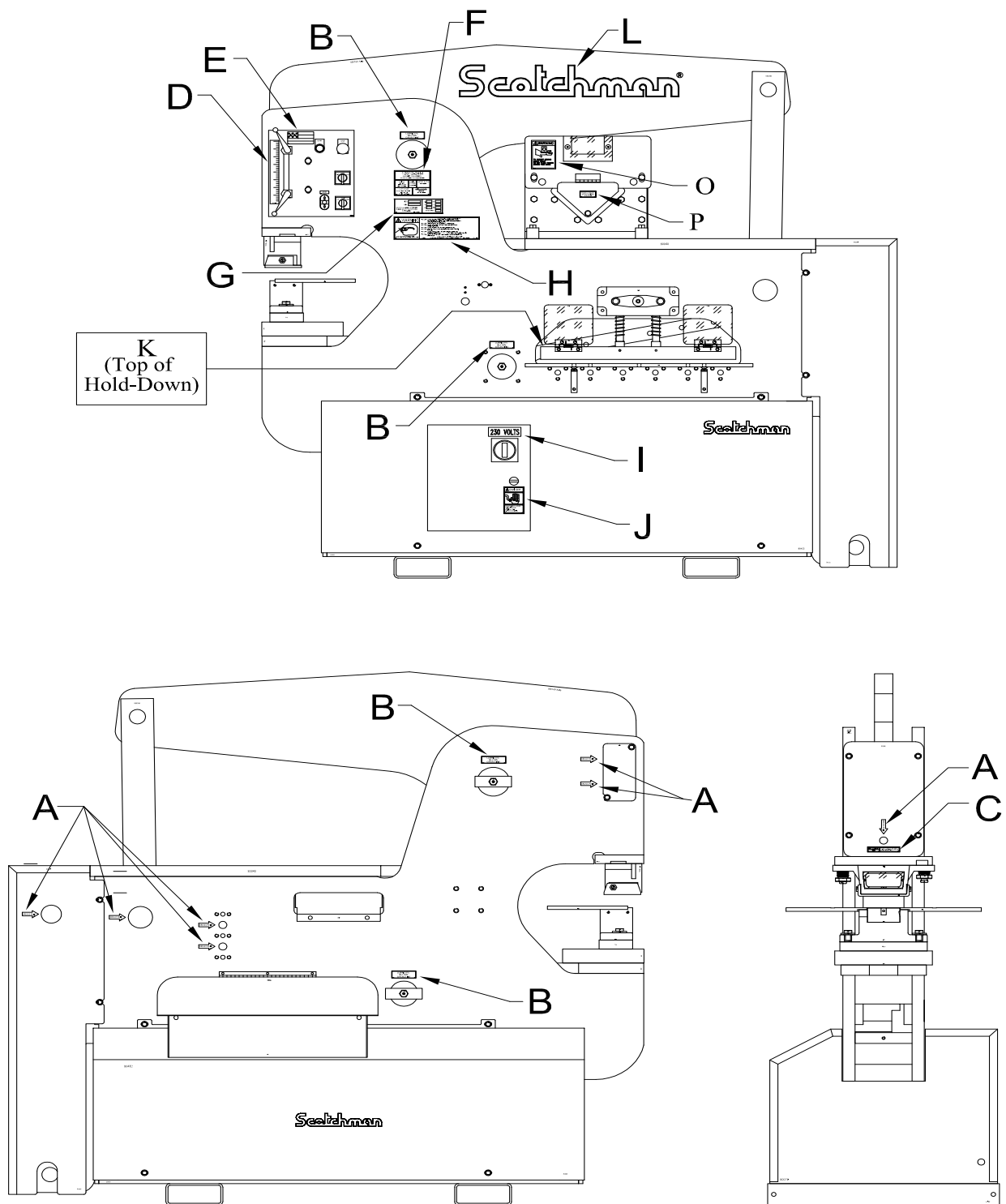
**Any electrical changes made to the standard machine due to local electrical code variations must be paid by purchaser.**

**As we constantly strive to improve our products, we reserve the right to make changes without notification.**

### 3.0 WARNING LABELS

ITEM	QTY	PART #	DESCRIPTION
A	7	019105	Grease Point Decal
B	4	000481	Lubricate Before Operating Decal
C	1	003110	Punch & Die Warning
D	1	004085	Scale Stroke Control
E	1	001927	U.S. Flag Decal
F	1	019141	120T Capacity Decal
G	1	019100	U.S. Data Plate
H	1	003100	Safety Glasses Warning Label
I	1	019121	230V Decal
I1	1	019120	230V 1PH Decal
I2	1	019119	208V Decal
I3	1	0191213	380V Decal
I4	1	019125	415V Decal
I5	1	019122	460V Decal
I6	1	019124	575V Decal
I7	1	019126	400V Decal
J	1	003122	Danger Voltage Sticker
K	1	003105	Fingers Beyond Bar Guard
L	1	010117	27" Scotchman Decal
M	1	003175	Caution Contamination (Not shown.)
N	1	019102	Reservoir Capacity Decal (Not shown.)
O	1	003140	Finger Beyond Tool Shear
P	1	003195	3 x 3 x 1/4 Max Sticker
Q	1	003550	120T Decal Package





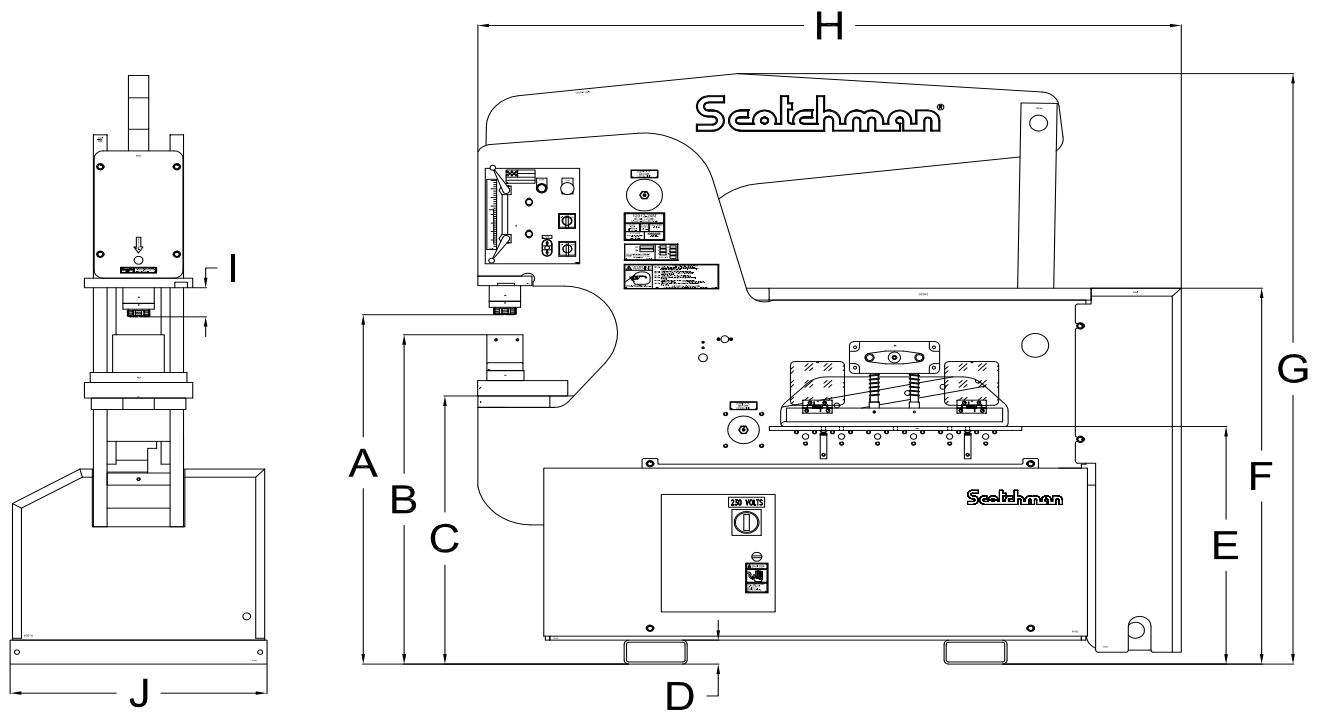
**FIGURE 1**

## 4.0 INSTALLATION & SET UP

⊠ CAUTION: THIS SECTION DISCUSSES INSTALLATION AND SET-UP PROCEDURES.  
PLEASE READ THOROUGHLY BEFORE OPERATING THIS MACHINE.

### 4.1 PHYSICAL DIMENSIONS

		INCHES	CM
A.	Floor to Punch Ram	47-1/4	120
B.	Floor to Top of the Die Holder	42-1/2	108
C.	Floor to Punch Bolster	36-1/2	93
D.	Floor to Bottom Rail	3-1/4	8.25
E.	Floor to Bar Shear	31	79
F.	Floor to Tool Table	48	122
G.	Height	73	185
H.	Length	77	196
I.	Punch Stroke	2-1/2	6.3
J.	Width	28	71
K.	Weight	5,200 LBS.	2,360 KG.



**FIGURE 2**

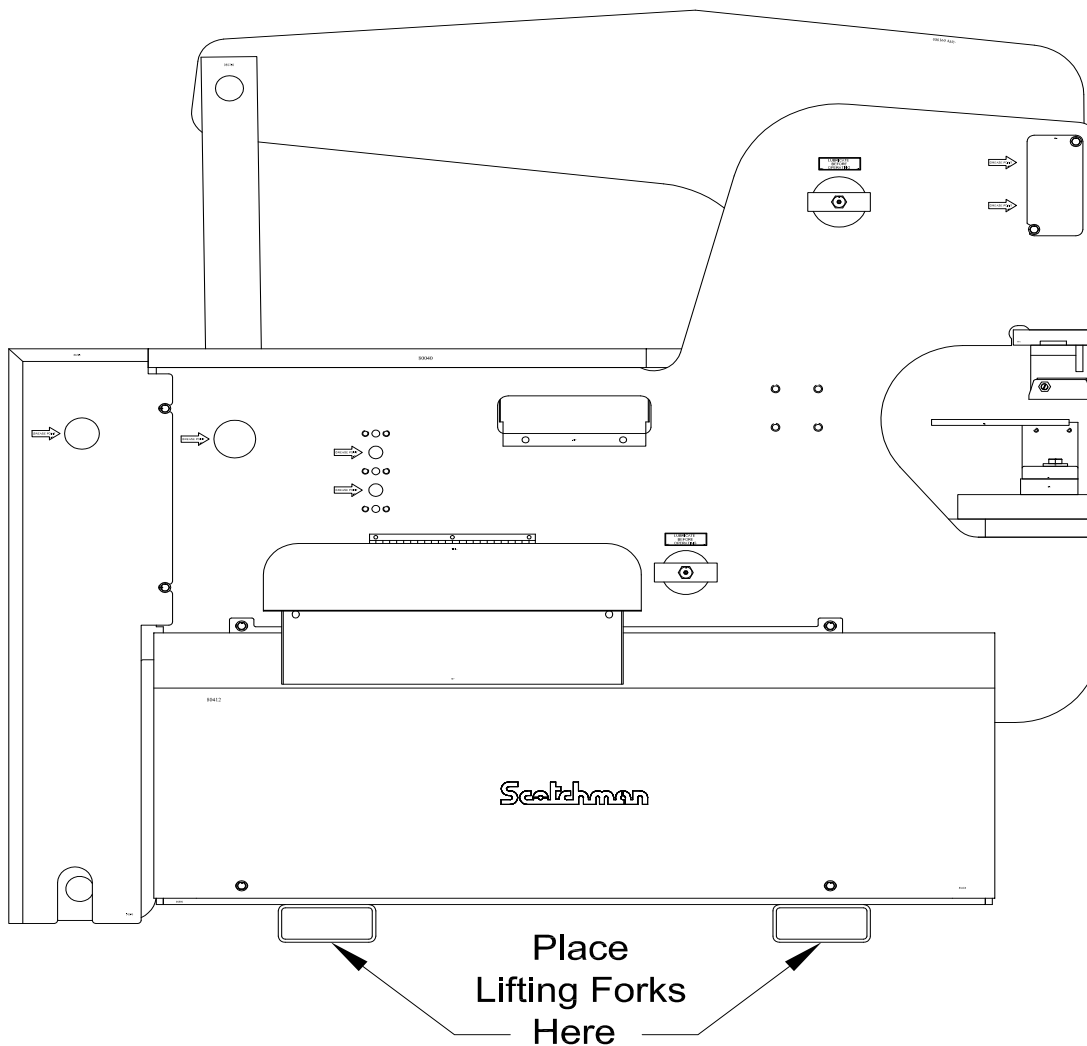
## 4.2 MACHINE MOVING PROCEDURES

SEE FIGURE 3 BELOW.

This machine is designed to be moved with a forklift. The weight of this machine is 45,200 pounds (2,360 Kg.). Check the capacity of the lifting equipment before attempting to move the machine.

➔ **THIS MACHINE IS TOP HEAVY AND SHOULD BE MOVED WITH CARE AND ON FLAT SURFACES ONLY.**

The forks of the lift should be spread so that they fit inside the lifting channels provided.



**FIGURE 3**

## **4.3 PHYSICAL INSPECTIONS**

Any damage to the machine during shipment should be reported to the delivery carrier immediately. A damage report must be made so that a claim can be placed. The carrier is responsible for shipping damage, but it is the customer's responsibility to report damages, external or internal.

After the machine has been located, remove the side shrouds and inspect the interior of the machine for possible shipping damages.

### **CHECK SPECIFICALLY THE FOLLOWING ITEMS:**

- A. Stroke control handles and limit switches.**
- B. Pump and motor assembly.**
- C. Hydraulic hoses and fittings.**
- D. Starter box and control box.**
- E. Electrical connections.**
- F. Control valve.**
- G. A general inspection of the machine shrouds, guards and awareness barriers.**
- H. Check the re-pack box for all accessory items ordered with the machine.**

The reservoir is full of oil. The recommended oil is a lightweight, non-foaming, anti-wear hydraulic oil such as Mobil DTE 25 or equivalent. The reservoir holds 14 U.S. gallons (53 liters).

**☒ CAUTION: DO NOT OVERFILL!**

## 4.4 ELECTRICAL REQUIREMENTS

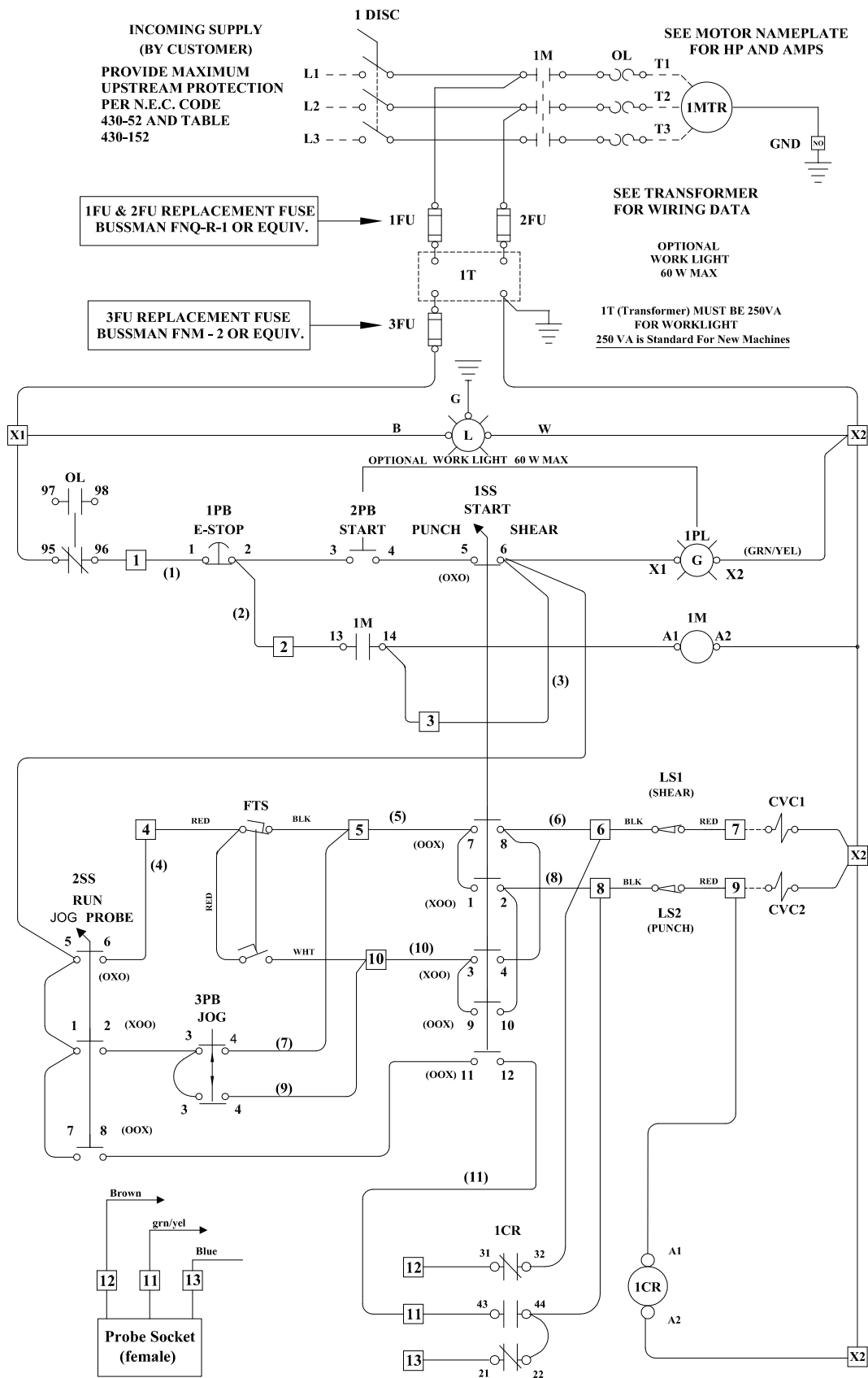
⊗ **CAUTION: TO PREVENT DAMAGE TO THE MOTOR AND DANGER TO THE OPERATOR, ALL ELECTRICAL CONNECTIONS SHOULD BE MADE BY A LICENSED ELECTRICIAN.**

All machines are wired for three phase electrical power unless otherwise specified.

To insure satisfactory machine performance, the supply voltage should be (+ or -) 10% of the motor voltage rating. Check the motor data tag for full load current requirements. The electrical diagram for the machine is inside the cover of the control box. The diagram is also in FIGURE 4 ON THE PRECEDING PAGES. For electrical supply lines ten feet (3m) or shorter, we recommend at least 12 gauge, and preferably, 10 gauge. For longer electrical supply lines, use at least 10 gauge, and preferably, 8 gauge. We do not recommend supply lines longer than twenty five feet (7.5m).

### **POWER REQUIREMENTS:**

<b>Motor frame</b>	<b>3PH=182T</b>	<b>1PH=184T</b>
<b>MOTOR VOLTAGE</b>		<b>FULL LOAD CURRENT</b>
<b>208</b>		<b>15.5</b>
<b>230</b>		<b>14</b>
<b>460</b>		<b>7</b>
<b>575</b>		<b>5.9</b>
<b>230 (Single Phase)</b>		<b>23.5</b>
<b>Motor power rating:</b>		<b>5hp Speed 1,740 RPM</b>
<b>KVA power rating:</b>		<b>5.6 KVA Frequency 60 HZ.</b>
<b>Starting Current:</b>		<b>210% Full Load</b>



**FIGURE 4A**

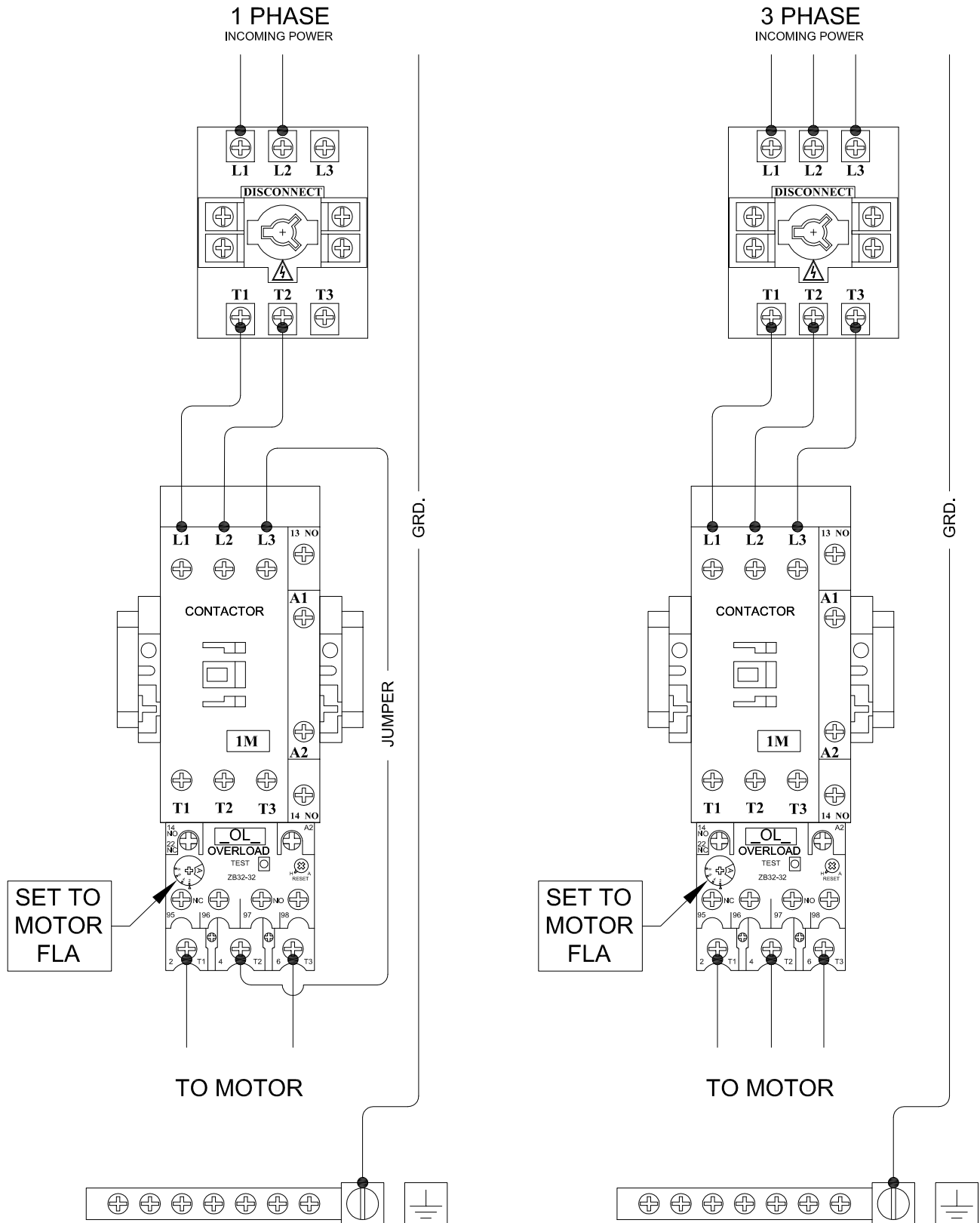


FIGURE 4B



All New Machines Now Have The 250 KVA Transformer as Standard Equipment.

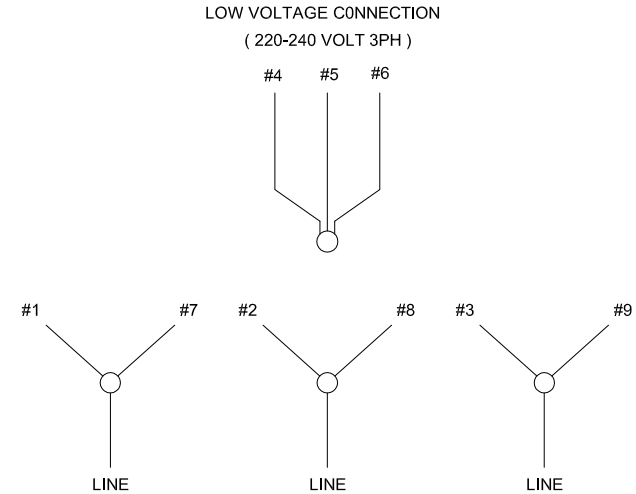
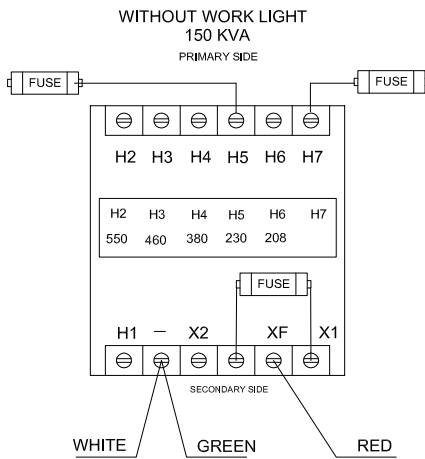
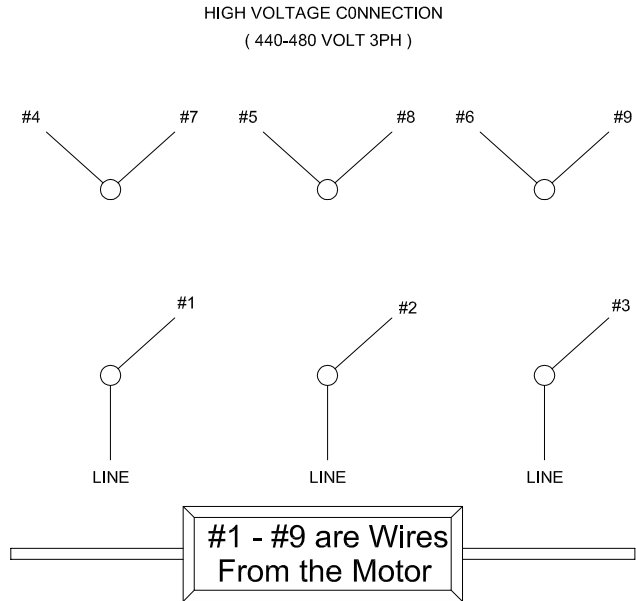
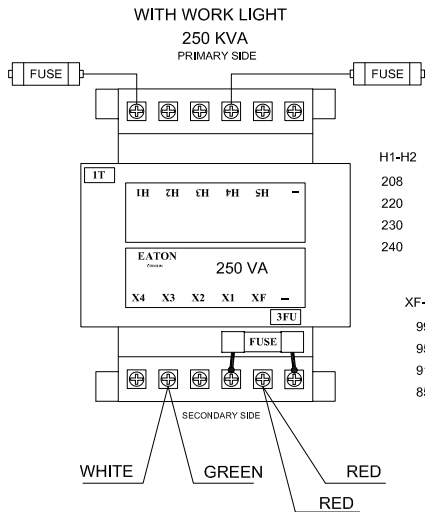


FIGURE 4C

## **4.5 MACHINE START-UP**

**Before starting this machine, take time to thoroughly review the safety dvd and the operator's manual.**

**This machine is equipped with a lock-out, disconnect switch. We strongly urge you to follow OSHA directive CFR-1910.147 (effective 09-01-90) regarding lock-out, tag-out procedures.**

**BEFORE POWERING THE MACHINE, be sure that all packing materials and tools have been removed from the machine and that the work stations are clear.**

**TO POWER THE MACHINE, place the disconnect switch in the ON position and the selector switch in the START position. Momentarily power the machine by pushing the green START button. Once the machine has been powered, it will not move until the selector switch has been placed in either the punch or the shear position.**

**Placing the selector switch in the PUNCH position will cause the arms to move down. Placing the selector switch in the SHEAR position will cause the arms to move up.**

**If the machine does not move, the electrician will have to switch two of the three supply line wires, to change the direction of rotation.**

**Any time that the power to the machine has been turned off, the selector switch must be placed in the START position to restart the machine.**

**THIS PAGE LEFT BLANK INTENTIONALLY.**

## **4.6 MACHINE STROKE INSPECTION & ADJUSTMENT**

The stroke setting is important for the proper operation of the machine. If this setting has changed, the machine may over-travel and cause the cylinder to "bottom out". This continued condition will eventually cause the starter overload to open. It can also cause the hydraulic oil to overheat and damage hydraulic system components. A slight change in the stroke setting can result in inadequate stroke to operate the tooling. A check of the machine's stroke setting is made at the punch station. SEE FIGURE 5 ON THE FOLLOWING PAGE. Set the stroke control handles (A) out to their furthest position away from the metering boss (B). Turn the selector switch (D) to the START position and power the machine. Place the selector switch in the SHEAR position. Measure the distance from the top of the punch bolster to the bottom of the punch ram. The distance should be 9-1/8 inches (232mm). Turn the selector switch to the PUNCH position and measure the distance. The distance should be 6-7/8 inches (175mm). These dimensions are + or - 1/16 of an inch (1.5mm). If the stroke is out of these limits, then use the following procedure: SEE FIGURE 5 ON THE FOLLOWING PAGE.

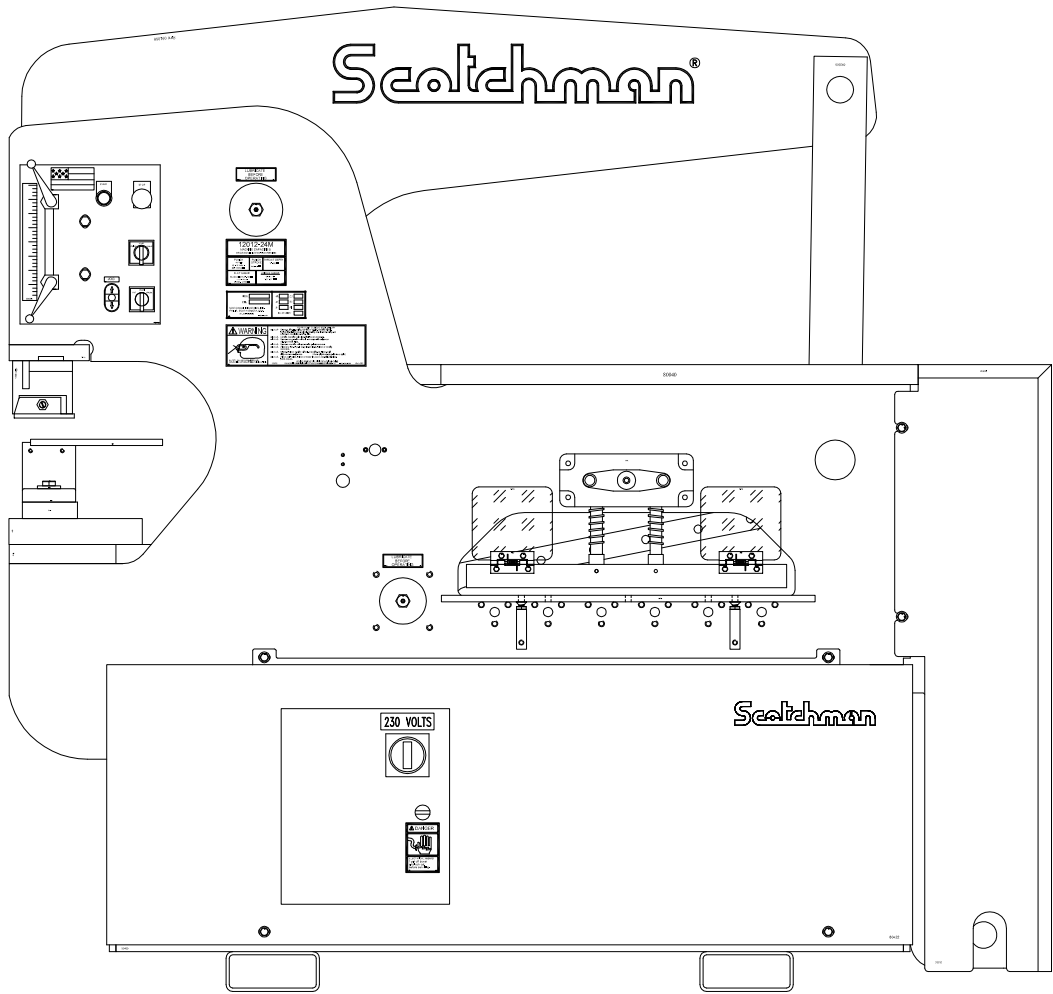
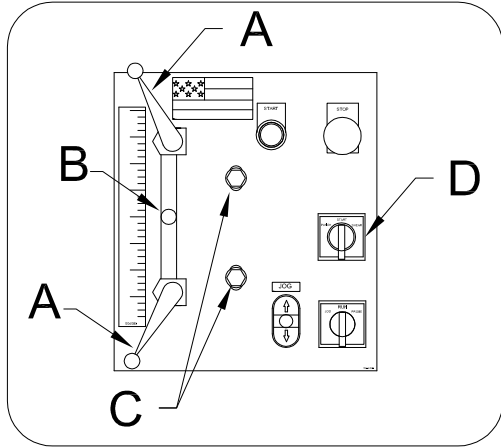
1. Loosen the two mounting plate screws (C) that hold the mounting plate to the machine.
2. Move the plate vertically, up or down. Moving the plate up will bring the distance down and a movement down will bring the distance up. Moving the plate 1/8 of an inch (3mm) will move the connecting link dimension approximately 7/16 of an inch (11mm).
3. Tighten the screws and re-check the dimensions. Repeat, if needed.

A. STROKE CONTROL HANDLES

B. METERING BOSS

C. MOUNTING PLATE SCREWS

D. PUNCH/SHEAR SELECTOR SWITCH



**FIGURE 5**

## **5.0 MAINTENANCE**

The Scotchman Ironworker is an exceptionally rugged machine designed for long life with a minimum amount of maintenance. A regular program of servicing will extend the life of the machine and prevent costly down time.

### **5.1 LUBRICATION**

- ➔ **IMPORTANT:** Before operating the 12012-24M, apply oil to the angle shear blades, bar shear blades and the punch and die.

Re-oil punches and dies every 5 to 10 holes and blades every 10 to 15 cuts.

The oil will allow the machine to shear, punch and strip more easily and increase tool life considerably. (We recommend cutting oil or motor oil swabbed on with a brush or applied with a squirt can or a spray applicator.)

### **5.2 ROUTINE LUBRICATION**

Grease the main pins (A & B) and the punch ram (D) daily.

SEE FIGURE 6 ON THE FOLLOWING PAGE.

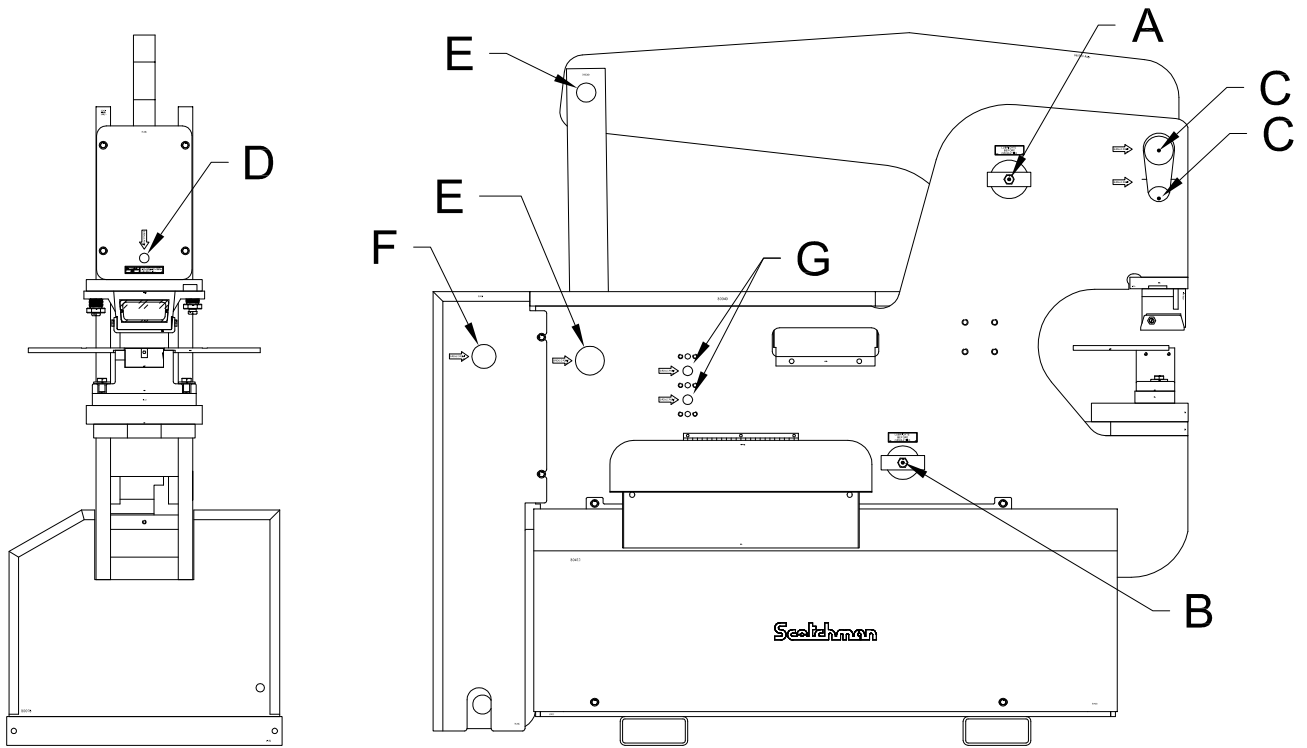
Grease all other fittings twice per week. Mobil grease XHP 222 Special is recommended.

Check the oil level in the reservoir at least once a month. It should be 2 inches (50mm) below the top of the reservoir. Change the hydraulic oil and filter at least once a year; more often under adverse conditions.

To change the hydraulic oil, **TURN THE MACHINE'S POWER OFF.**

Remove the drain plug from the bottom of the reservoir. Allow the oil to drain.

Replace with 14 U.S. gallons (53 Liters) of lightweight, non-foaming, hydraulic oil such as Mobil DTE 25 (or equivalent.)



**FIGURE 6**

## **5.3 SCHEDULED MAINTENANCE**

A program of scheduled maintenance should be set up and documented according to your application and the frequency you use this machine. The following is a list of important items that should be included in a scheduled maintenance program.

**1. EVERY 500 HOURS OR 6 MONTHS:**

**A.) Check the tolerance between the punch ram and the punch ram bushing. To check the tolerances, remove the punch ram and the bushing from the machine. For parts identification, SEE FIGURE 7 ON THE FOLLOWING PAGE.**

**1. To remove the punch ram and punch bushing, first remove the die holder (A), the stripper (B), the punch ram shroud (C) and the punch pin cover (D).**

**2. Cycle the machine until the lower punch pin (E) aligns with the access hole in the rear frame. TURN OFF THE POWER!**

**3. Block up the punch ram (F).**

**4. Remove the two mounting bolts and washers (G) from the stroke control mounting plate. Be careful with the wires.**

**5. Remove the two snap ring retainers (H) from the lower punch pin. Remove the four mounting bolts (I) and the grease zerk (J) from the punch ram bushing. The meter boss (K) can be left on the lower punch pin. Push the pin out through the access hole in the rear frame.**

**6. Clean all grease and dirt off both parts and check the clearance between the outside diameter of the punch ram and the inside diameter of the punch ram bushing. If the clearance between the two parts is five thousandths (.005) of an inch or more, replace both parts. Reassemble parts in reverse order.**

**B.) Check the condition of the cutting blades on the bar shear, angle shear and any other component tool.**

**C.) Check the condition of the bushing in the upper arm and shear arm. This can be done by visually watching the arms for vertical movement while the machine is in operation. If vertical movement is noted, block or support the arms with a lifting device and remove the pin and check the clearance. If the clearance between the pin and the bushing exceeds twelve (.012) thousandths of an inch (.3mm), replace the bushing.**

Since the 12012-24M can be used for a wide variety of applications with many optional tools, it may be necessary to include additional items in a scheduled maintenance program.

If you have questions about other applications, contact your local dealer or the factory.



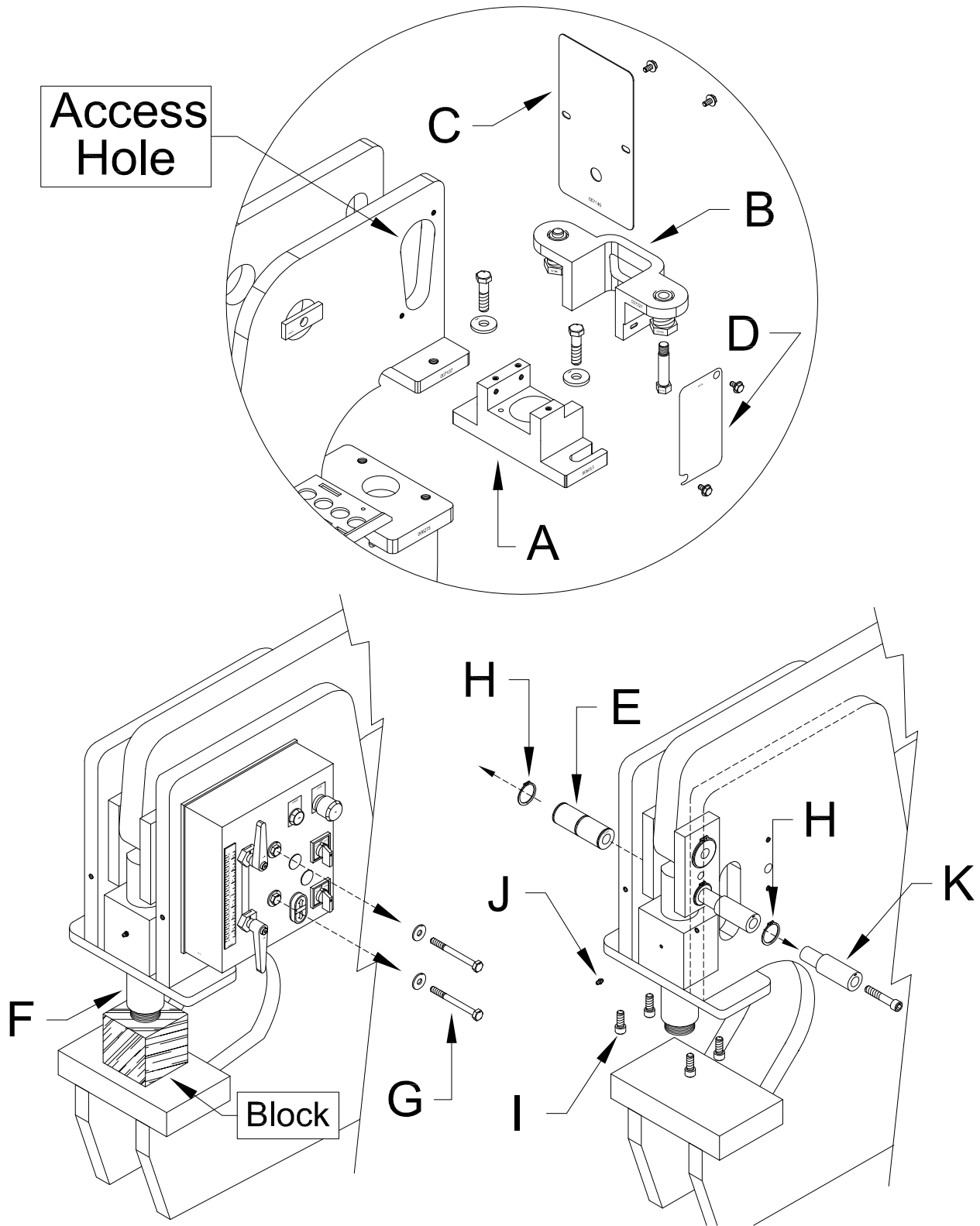


FIGURE 7

## 6.0 MACHINE OPERATION

### 6.1 PUNCH OPERATION

WHEN USING A URETHANE STRIPPER, SEE SECTION 7.13 FOR INSTRUCTIONS.

- ALWAYS WEAR SAFETY GLASSES.
- THE FIRST AND MOST IMPORTANT PROCEDURE IS THE PROPER METHOD OF CHANGING AND ALIGNING PUNCHES AND DIES.

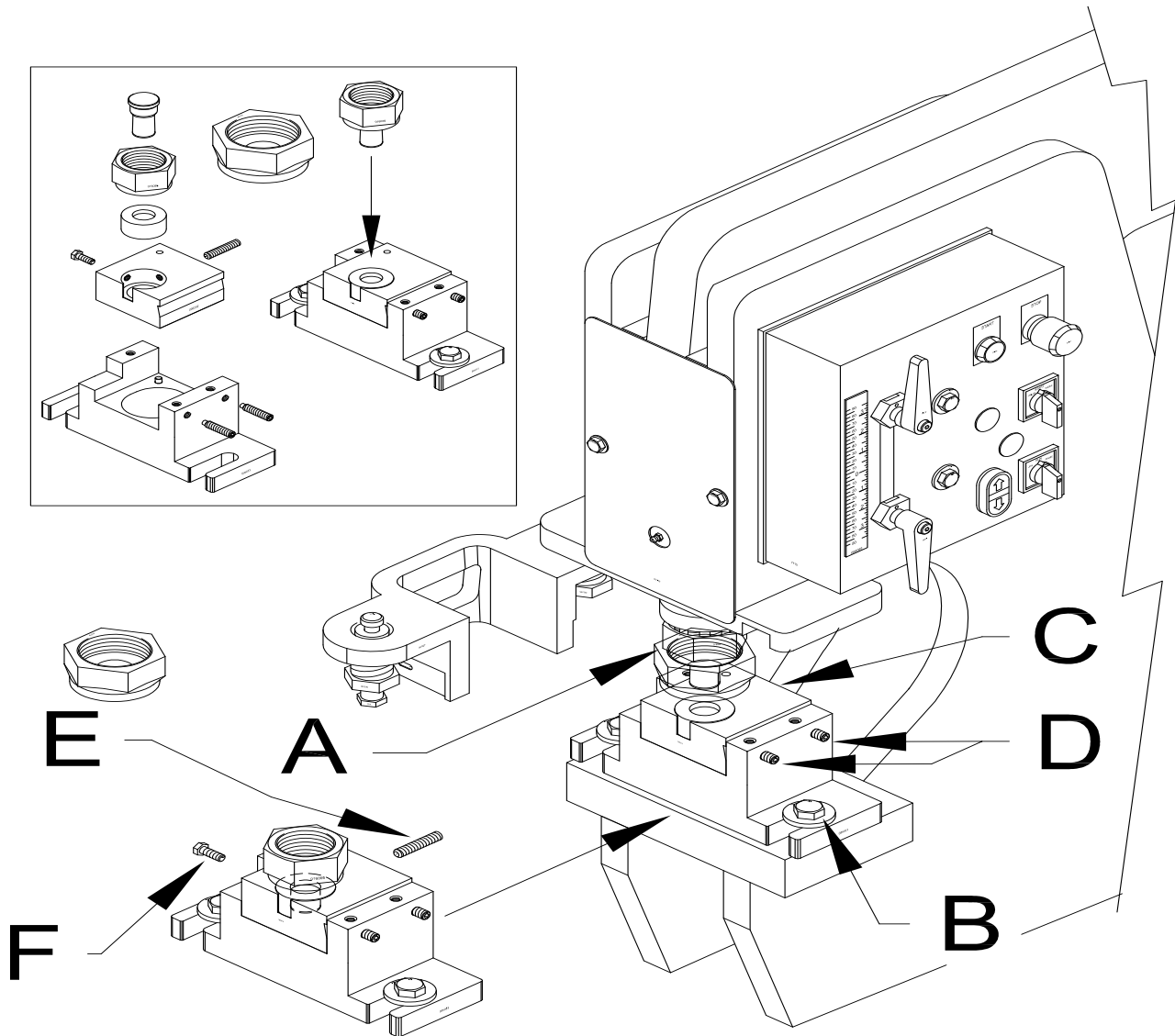


FIGURE 8

**A. ALIGNMENT AND REMOVAL OF PUNCHES AND DIES:**

- ☞ **WARNING:** Failure to properly align punches and dies can cause serious bodily injury to personnel and/or damage to equipment. Please read carefully and understand the following method. It will also be helpful to refer to the safety CD provided for a visual reference. If you did not receive a safety CD, please contact your dealer or the factory. The safety instructions are also available on VHS tape.

**FOR PARTS IDENTIFICATION, REFER TO FIGURE 8 ON THE PRECEDING PAGE.**

☒ **CAUTION: MOVE ALL TOOLING TO THE BACK OF THE TOOL TABLE AND CRANK THE BAR SHEAR HOLD-DOWN TO THE DOWN POSITION WHEN PUNCHING.**

1. With the machine in the PUNCH position, turn the machine's electrical power off at the disconnect switch.
2. Release the stripper by pushing up on the right hand bolt and swing it to the side.
3. Loosen the die holder bolts (B).
4. Loosen and remove the punch retaining nut (A). Set the punch retaining nut and punch aside.
5. Loosen the two set screws (D) holding the die insert. Remove the die insert and loosen the bolt holding the die and remove the die.

☒ **CAUTION: IF YOU ARE USING THE OFFSET DIE HOLDER FOR FLANGED PUNCHING, PLEASE SEE SPECIAL INSTRUCTIONS IN SECTION 7.11B BEFORE CONTINUING.**

6. Place the disconnect switch in the ON position and the selector switch in the START position. Power the machine by pressing the green START button.
7. Check to make sure that there are no objects (such as tools) on or under any of the moving parts.
8. Place the selector switch in the SHEAR position and allow the ram to extend.
9. Turn the machine's power OFF.
10. Clean the die holder cavity of any foreign material.
11. Select the proper punch and die. Make sure that there is proper clearance between the punch and die. For recommended clearances, SEE SECTION 6.1, PARAGRAPH G.
12. Clean both the punch and die.
13. Insert the proper die in the die insert (C). (If the die has a flat spot in it, align this with the set screw (E) of the bolt (F) in the die insert (C).) Tighten the bolt firmly with a wrench.
14. Insert the punch into the punch retaining nut (A). Make sure that it seats properly. Place the punch retaining nut assembly on the die holder with the punch inserted in the die.

- ☒ **NOTE: Please note that all of our shaped punches, including squares, ovals, hexagons and special order punches, are manufactured with a keyed alignment system. The keyed slot mates with the slots in the punch ram, to allow for two positive backed positions for the punch.**
- 15. Place the insert back in the die holder and tighten the set screws (D). Make sure that the alignment pin in the insert seats in the hole in the die holder.**
  - 16. Raise the punch retaining nut and turn it on to the punch ram. (The die holder may have to be moved slightly to align the punch retaining nut to the punch ram.)**
  - 17. If you are using keyed punches, manually rotate the punch so that the key seats in the ram before tightening the nut.**
  - 18. Tighten the punch retaining nut with a wrench. Make sure that there is equal clearance on all sides of the punch in the die.**
  - 19. Re-tighten the bolts in the die holder.**
  - 20. Check to be sure of proper alignment. Realign, if necessary.**
  - 21. Return the stripper to the FORWARD position.**
  - 22. Place the disconnect switch in the ON position and the selector switch in the START position. Power the machine.**
  - 23. Place the selector switch in the SHEAR position. To be sure that the clearance is correct, jog the machine several times with the foot switch, without letting the punch come out of the die.**
  - 24. Place the selector switch in the PUNCH position.**
  - 25. The punch and die alignment should be checked intermittently during the punching operations. To do this, bring the punch down so that it enters the die. Turn off the machine. Check and tighten the punch retaining nut, the bolt holding the die and the two bolts holding the die holder. Check for equal clearance between the punch and die. Place the selector switch in the START position and power the machine. Place the selector switch in the SHEAR position. Use the foot switch to jog the machine several times to be sure of proper alignment.**

☒ **NOTE: WHEN PUNCHING LARGE DIAMETER HOLES OR IN CASES OF HIGH PUNCH SHOCK, IT WILL HELP IF THE STROKE OF THE MACHINE IS ADJUSTED SO THAT THE PUNCH STOPS JUST ABOVE THE PLANE OF THE DIE - APPROXIMATELY.005 TO.010 THOUSANDTHS OF AN INCH.**

**B. DO NOT PUNCH ANYTHING THICKER THAN THE PUNCH DIAMETER.**

This "rule of thumb" can be extended, but the punch supplier or Scotchman should be consulted first. (i.e. do not punch plate thicker than 1/2 inch with a 1/2 inch diameter punch.) This rule of thumb applies to mild steel and must be reduced when punching alloy steels. Contact the factory or your local dealer before attempting to punch any type of alloys.

**C. LUBRICATE THE PUNCH AND DIE.**

This will hold stripping forces to a minimum and greatly extend punch life. Lubrication must be applied every 5 to 10 holes.

**D. PUNCH FULL AND COMPLETE HOLES. DO NOT PUNCH PARTIAL HOLES.**

The side thrust encountered in punching a partial hole can force the punch over against the die and result in punch or die breakage. This may result in serious bodily injury! There are special punches & dies available for this type of application. For information, please contact the factory or your local dealer.

**E. MAINTAIN SUFFICIENT MATERIAL BETWEEN THE PUNCHED HOLE AND THE EDGE OF THE WORKPIECE.**

The edge of the punch should be clear of the edge of the workpiece by a distance equal to the thickness of the material. Any edge distance less than this will result in a deformed workpiece.

**F. STAY WITHIN RATED PUNCHING CAPACITIES.**

Your 12012-24M Ironworker is designed to operate in mild steel. Within conservative limits, it can also operate in medium, carbon annealed steel and some forms of abrasion resistant steels. Conditions of high shock can be encountered punching alloyed steels and accordingly, the machine rating must be reduced.

**1 INCH (25MM) MILD STEEL IS THE MAXIMUM THICKNESS THAT CAN BE PUNCHED. Punch to die clearance depends on material thickness.**

**G. PUNCH TO DIE CLEARANCES**

In mild steels, material thicknesses of 1/4 inch through 5/8 inch (6 to 16mm) should have a total punch to die clearance of 1/32 inch (.794mm). (Punch diameter + 1/32" = Die diameter.) 3/4 inch thick and heavier (18mm) mild steel should have a minimum of 1/16 inch (1.588mm) clearance. (Punch diameter + 1/16" = die diameter.) In thin materials, the recommended punch to die clearance is 1/10 of the material thickness. We do not recommend less than 1/64 inch (.397mm) total clearance due to working clearances necessary in the punch ram and the punch bushing  
**FOR CAPACITIES, REFER TO THE PUNCH TONNAGE CHART IN FIGURE 9 BELOW.**

HOLE DIAMETER		1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16	1
METAL GAUGE	THICKNESS INCHES	PRESSURE IN TONS														
28	.015	.2	.2	.3	.4	.4	.5	.6	.7	.7	.8	.9	1.0	1.1	1.2	1.3
26	.018	.2	.3	.4	.4	.5	.6	.7	.8	.9	1.0	1.1	1.1	1.2	1.3	1.4
24	.024	.2	.4	.5	.6	.7	.8	.9	1.1	1.2	1.3	1.4	1.5	1.6	1.8	1.9
22	.030	.3	.4	.6	.7	.9	1.0	1.2	1.3	1.5	1.6	1.8	1.9	2.1	2.2	2.4
20	.036	.4	.5	.7	.9	1.1	1.2	1.4	1.6	1.8	1.9	2.1	2.3	2.5	2.6	2.8
18	.048	.5	.7	.9	1.2	1.4	1.6	1.9	2.1	2.4	2.6	2.8	3.1	3.3	3.5	3.8
16	.060	.6	.9	1.2	1.5	1.8	2.1	2.3	2.6	2.9	3.2	3.5	3.8	4.1	4.4	4.7
14	.075	.7	1.1	1.5	1.8	2.2	2.6	2.9	3.3	3.7	4.0	4.4	4.8	5.1	5.5	5.9
12	.105	1.0	1.5	2.1	2.6	3.1	3.6	4.1	4.6	5.1	5.7	6.2	6.7	7.2	7.7	8.2
10	.135	1.3	2.0	2.6	3.3	4.0	4.6	5.3	5.9	6.6	7.3	7.9	8.6	9.2	9.9	10.6
5/32	.157	---	2.3	3.1	3.8	4.6	5.4	6.1	6.9	7.7	8.4	9.2	10.0	10.7	11.5	12.3
3/16	.188	---	2.8	3.7	4.6	5.5	6.4	7.4	8.3	9.2	10.1	11.0	12.0	12.9	13.8	14.8
1/4	.250	---	---	4.9	6.1	7.4	8.6	9.8	11.1	12.3	13.5	14.7	16.0	17.2	18.4	19.7
3/8	.375	---	---	---	---	11.1	12.8	14.8	16.5	18.5	20.2	22.1	23.8	25.8	27.5	29.5
1/2	.500	---	---	---	---	---	---	19.7	22.0	24.6	26.9	29.5	31.8	34.4	36.8	39.4
5/8	.625	---	---	---	---	---	---	---	---	30.8	33.7	36.9	39.9	43.0	46.0	49.2
3/4	.750	---	---	---	---	---	---	---	---	---	---	44.3	47.7	51.7	55.2	59.0
1	1.00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	80.0

**FIGURE 9**

## 6.1B STRIPPER ADJUSTMENT

- ☒ **CAUTION: TO PREVENT PUNCH BREAKAGE ON THE RETURN STROKE, THE STRIPPER MUST BE ADJUSTED SO THAT THE BOTTOM OF THE STRIPPER IS PARALLEL WITH THE MATERIAL BEING PUNCHED.**

REFER TO FIGURE 10 BELOW.

### TO ADJUST THE STRIPPER:

1. The height of the stripper is adjusted using the adjustment bolts (A & B).
2. The stripper is opened by pushing up on item (C) and swinging it out toward the front of the machine.
3. If you are punching light material or pieces too small to contact both sides of the stripper, install the plate (D) on the bottom of the stripper.
4. For maximum visibility and safety, always adjust the stripper down as close to the material as possible.

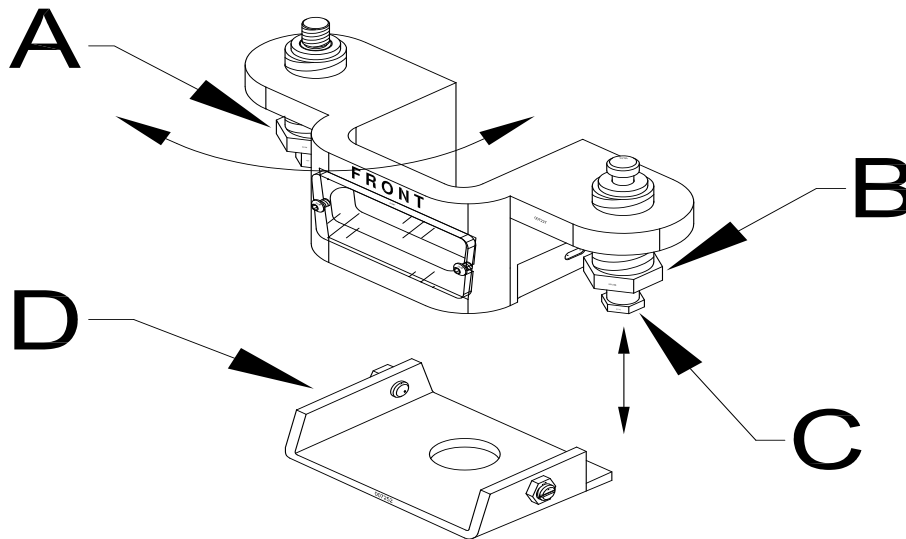


FIGURE 10

## **6.2 BAR SHEAR OPERATION**

**☒ CAUTION: ANY TIME THAT THE SHEAR SECTION IS NOT IN USE, CRANK THE HOLD-DOWN DEVICE TO ITS FULL DOWN POSITION.**

Before using the bar shear, make sure that all of the tooling has been moved out from under the upper arm and the punch and die have been removed from the punch station. When using the Bar Shear on your Scotchman Ironworker, ALWAYS use the hold-down device. NEVER put any part of your body between the hold-down and the material to be sheared. A clearance of 1/8 inch (3mm) between the hold-down and the material to be sheared is acceptable. The maximum tonnage available on the bar shear is to the left, or closest to the pivot point. For applications that do not require the maximum tonnage, move the material to the right, for minimal distortion on the drop piece. Do not attempt to shear pieces that are too short for the hold-down to grip. This will cause the material to kick-up and will result in a poor quality cut and possible damage to the machine.

**THE BASIC METHOD OF OPERATING THE BAR SHEAR CONSISTS OF SIX STEPS:**

- 1. Place the selector switch in the START position and the jog switch in the RUN position. Power the machine.**
- 2. Place the selector switch in the SHEAR position.**
- 3. Place the material to be sheared between the shear blades.**
- 4. Crank the hold-down device down to the material being sheared. This prevents kick-up of the material, which could cause injury to the operator and damage to the machine.**
- 5. Keep your hands clear from all moving parts.**
- 6. Depress the foot switch. Lubricate the blades every 10 to 15 cuts.**

In addition to the above six basic steps of operation, the operator should also be familiar with the following:

- A. MAINTAIN PROPER BLADE CLEARANCE.** The quality of cut is an immediate indication of the condition of the Shear Blades, the amount of clearance between the blades or the amount of "spring-back" in the Shear Arm. The Shear Blades are symmetrical and can be rotated to expose four (4) cutting edges. FOR RECOMMENDED CLEARANCES, SEE FIGURE 12 ON PAGE 30.
- B. ALL CUTS SHOULD BE MADE AS FAR FROM THE ARM PIVOT AS POWER WILL PERMIT.** The Shear Blades should contact the workpiece as flat as possible, to reduce to a "curl" on the cut-off piece. More shearing force is obtained as the operator moves the workpiece to the left. The machine is designed to shear mild steel rated on 60,000 psi tensile. The maximum capacity of the bar shear is 1 x 12 inch (25 x 300mm) mild steel.

### **6.2A SHEAR ARM ADJUSTMENT (SERIAL #'S 50947M & UP)**

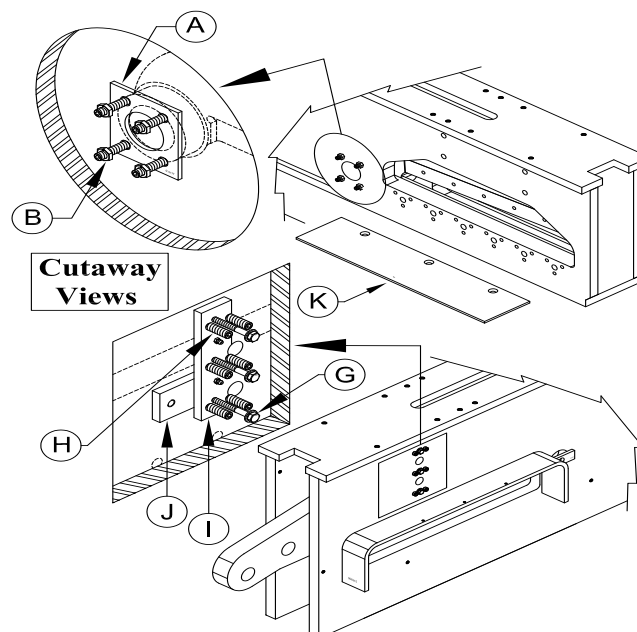
**SEE FIGURE 11 ON THE FOLLOWING PAGE.**

Adjustment on the shear arm is maintained on the front (operator's) side by the pressure plate (A) and on the rear by the rub blocks (I & J). The cylinder cover shroud must be removed to gain visual access.



**USE THE FOLLOWING STEPS TO ADJUST THE SHEAR ARM.**

- 1. Before making these adjustments, loosen the lower blade bolts and set screws and back the lower blade away from the upper blade. After making these adjustments, reset the blades following the instructions in SECTION 6.2B.**
- 2. Loosen the six adjusting screws (H) for each of the rub blocks (I) and remove the rub blocks by taking out the three mounting screws (G). (If excessive concave wear is noted on the rub blocks, they can be turned and the back surface used.) Set the pressure plate adjustment before resetting the rub blocks.**
- 3. For the pressure plate adjustment, loosen the lock nuts (B) on the four adjusting screws that engage the pressure plate (A).**
- 4. Tighten all four adjusting screws on the pressure plate so that they are "snug" and will force the shear arm solidly against the rear frame. (Excessive tightening of these screws only increases wear.)**
- 5. Replace the rub blocks (I). With the shear arm in the down position, tighten the bottom adjusting screws (H) until the rub blocks come in contact with the shear arm rub blocks (J). Raise the arm about half way and adjust the middle two adjusting screws (H) until the rub blocks make contact. Then, raise the arm completely and adjust the top two screws. (Once again, excessive tightening will cause unnecessary wear.) Check to be sure that the rub blocks (I) are in contact with the shear arm rub blocks (J) throughout the full stroke.**
- 6. Tighten the lock nuts (A) on the pressure plate adjusting screws and the mounting screws (G) on the rub blocks.**
- 7. Reset the shear blade adjustment. SEE SECTION 6.2B.**



**FIGURE 11**

## **6.2B SHEAR BLADE ADJUSTMENT PROCEDURE** (Ser.#'s 50947M & Up)

SEE FIGURE 12 ON THE FOLLOWING PAGE.

1. Place the selector switch in the SHEAR position and allow the arms to raise completely.
2. Crank the hold-down device all the way up and remove the shear table.
3. To remove the shear table, loosen the jam nut (F) on the bolts (C) and remove the bolt. Remove the lower blade bolts (E) and back the adjustment screws (D) out.
4. Remove the lower blade.
5. Power the machine and place the selector switch in the PUNCH position. Allow the arm to travel to its full down position. Turn the power off.
6. Rotate or replace the shear blade on the arm.
7. Rotate or replace the lower blade and start the socket head retaining bolts (E).
8. Place a shim with the desired clearance between the upper and lower blades.
9. Adjust the lower blade to the top blade, with the upper adjusting screws (D), about 1/8 of a turn past resistance.
10. Tighten the bolts (E) to 1/4 a turn past resistance.
11. Adjust the lower adjusting screws (D) up to the blade and then, tighten all of the bolts, starting with the blade bolts (E) and then, the adjusting screws (D).
12. CAUTION: THE BLADES MUST BE ADJUSTED PARALLEL TO EACH OTHER, vertically or with the cutting edge of the lower blade at a slight cant towards the upper blade.
13. Power the machine and place the selector switch in the SHEAR position. With the foot pedal, cycle the shear down slowly, watching the blade engagement. Make sure that the blades do not contact each other.
14. Replace the shear table (B). If needed, the shear table can be adjusted to match the lower blade.
15. The table is adjusted with the four screws (G).

If the machine is being used to shear maximum capacities, we recommend increasing the clearance. A clearance of five to seven percent of the material thickness is recommended.

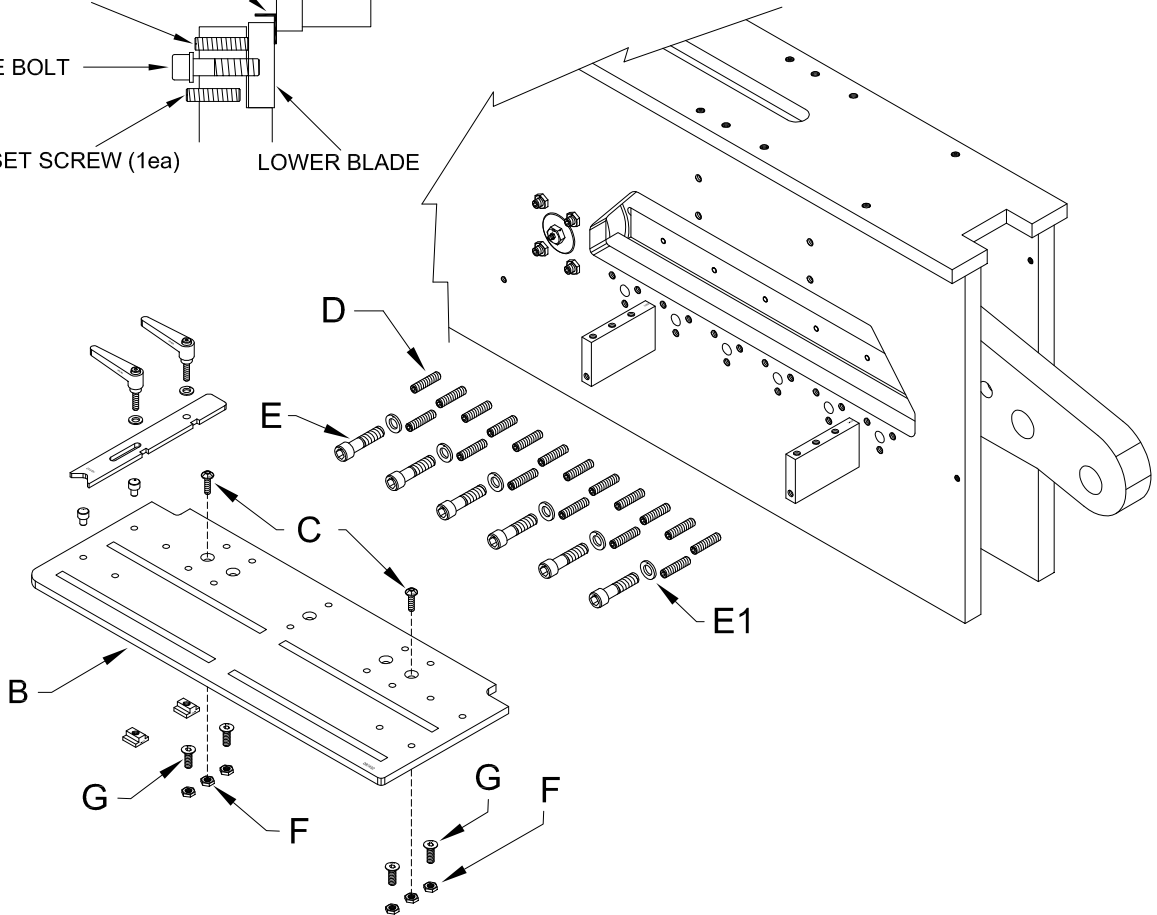
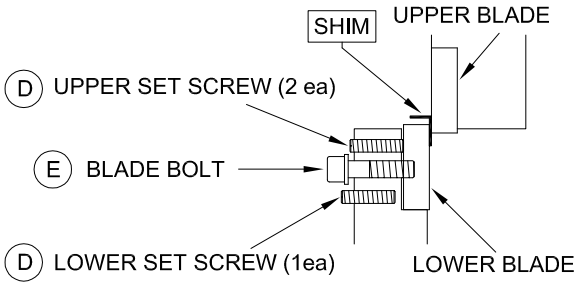
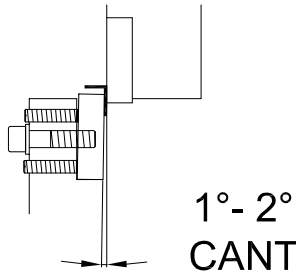
**QUICK GUIDE TO CHANGING BAR SHEAR BLADES**

- 1st - remove lower blade
- 2nd - change upper blade
- 3rd - start bolts (E) in lower blade
- 4th - place shim between blades
- 5th - adjust upper set screws 1/8 turn past resistance
- 6th - tighten blade bolts 1/4 turn past resistance
- 7th - adjust lower set screws up to lower blade
- 8th - final tighten: blade bolts, then set screws

MAKE SURE BLADES HAVE PROPER CLEARANCE AND ARE PARALLEL: LOWER BLADE MAY HAVE A SLIGHT CANT AS SHOWN

MATERIAL THICKNESS	BLADE CLEARANCE
1.0	.035 (.030-.040)
.75	.026 (.020-.030)
5/8	.022 (.018-.026)
1/2	.017 (.012-.022)
3/8	.013 (.010-.017)
1/4	.009 (.007-.012)
1/8	.004 (.004-.008)

DOUBLE CLEARANCE VALUE FOR PUNCH AND DIE CLEARANCE



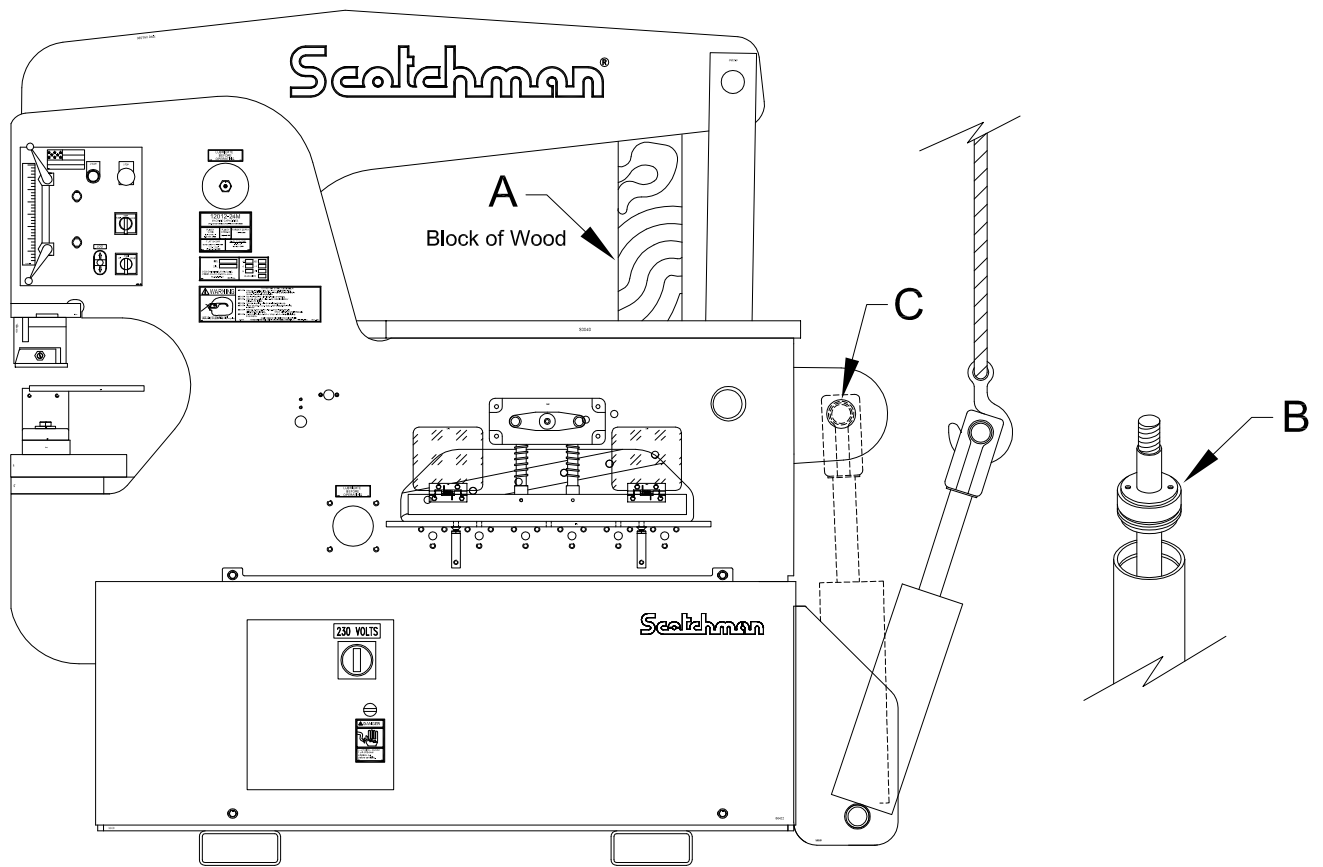
**FIGURE 12**

## **6.3 CYLINDER SEAL REPLACEMENT**

Use the following steps to replace the seals in the hydraulic cylinder.

SEE FIGURE 13 ON THE FOLLOWING PAGE.

1. With the selector switch in the SHEAR position and the arms up, turn the machine's power off at the disconnect switch and lock it.
2. Block the arms up, either on the tool table or under the shear arm. SEE ITEM A.
3. Remove the hydraulic hoses from the cylinder and allow the oil to drain from the cylinder.
4. Remove the cylinder clevis pin (D) and swing the cylinder out away from the arm.
5. The cylinder head (B) is threaded into the cylinder.
6. Use a pin wrench to unscrew the cylinder head from the cylinder tube.
7. Place a rod through the cylinder clevis and pull the cylinder apart, using a come-along or similar device.
8. Remove the locking nut from the end of the cylinder shaft and slide the piston and head off of the shaft.
9. Replace all of the seals. There will be extra seals in the kit. Match up the replacement seals with the old ones and discard the rest.
10. Clean all of the parts, including the inside of the cylinder tube, and check all parts for nicks and scratches.
11. Oil all of the seals before reassembling the cylinder.
12. After the piston and head are assembled on the shaft, they can be tapped back into the tube with a brass or plastic hammer.
13. Re-thread the cylinder head into the tube.
14. Reconnect the hoses to the cylinder.
15. Use care removing the blocking device (A) from under the arms. Since the cylinder does not contain oil, it may drop some when the blocks are removed.
16. Cycle the machine several times, to purge the air out of the hydraulic system.



**FIGURE 13**

## **7.0 OPTIONAL TOOL OPERATION**

**⊠ CAUTION: MOVE ALL TOOLS OUT FROM UNDER THE UPPER ARM WHEN THEY ARE NOT IN USE.**

**When using the tool station, crank the bar shear hold-down device completely down and remove the punch and die.**

**As with all functions on this machine, SAFETY GLASSES ARE REQUIRED when using optional tools of any type.**

**Each self contained tool has its own stroke and tonnage requirements.**

**This section will cover the operation and location of each tool.**

**There is a graphical illustration of the available tonnage at locations along the Upper Arm.**

**SEE FIGURE 14 ON THE FOLLOWING PAGE.**

**This graph will be helpful in setting up various Scotchman or custom tooling.**

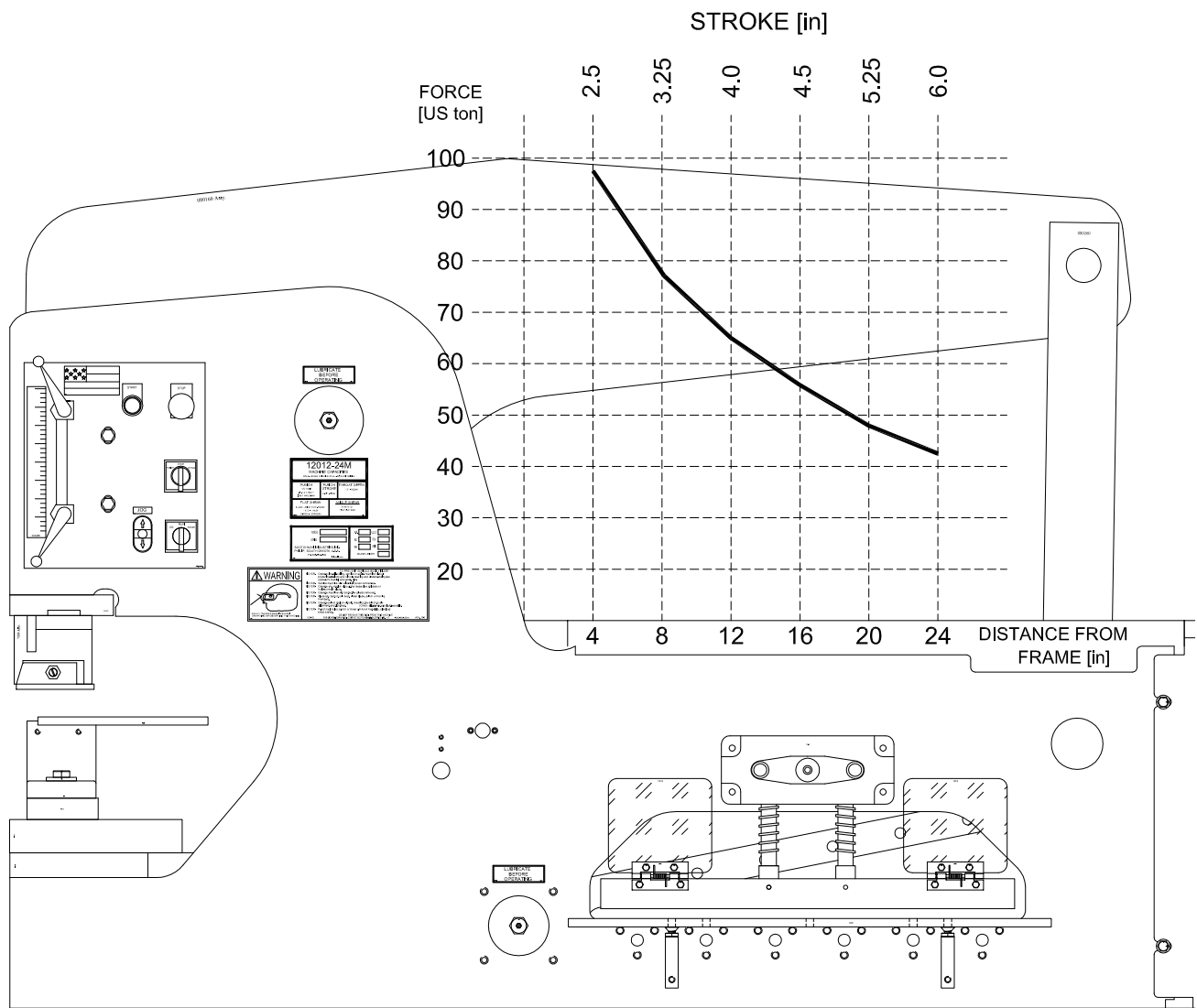


FIGURE 14

## **7.1 6 X 6 ANGLE SHEAR**

The 6 x 6 angle shear is a component tool designed to shear angle iron. It installs in the tool station on this machine and has a maximum capacity of 6 x 6 x 1/2 inch (150 x 150 x 12mm) mild steel angle iron. The selector switch must be in the SHEAR position to operate this tool.

### **7.1A 6 X 6 ANGLE SHEAR INSTALLATION**

SEE FIGURE 15 ON THE FOLLOWING PAGE.

The 6 x 6 Angle shear mounts in the tool station under the upper arm.

1. Before mounting the tool under the arm, remove the upper blade and install the return springs (A).
2. The selector switch must be in the SHEAR position and the arm in the UP position.
3. Slide the tool under the arm with the side marked FRONT to the operator's side and as close to the machine's frame as possible.
4. The tool is held in place with the finger clamps (B ) provided.
5. Care must be taken to align the slug slot in the angle shear with the slot in the tool table.
6. The upper stroke of the machine should be set so that the upper blade raises high enough to slide the workpiece freely through the unit. The lower stroke should be set so that the upper blade point enters the lower blades approximately 1/8 inch (3mm).

### **7.1B 6 X 6 ANGLE SHEAR OPERATION**

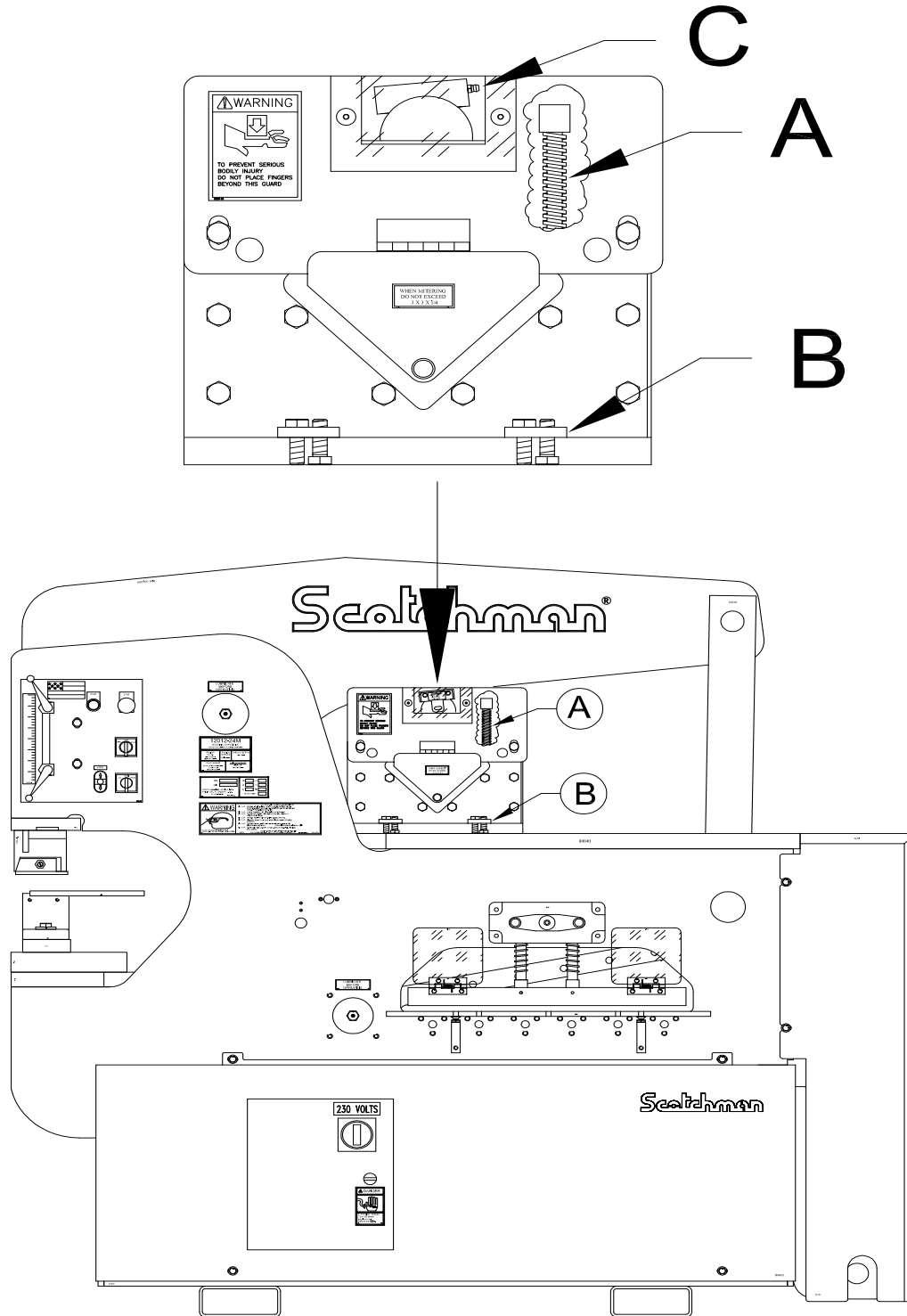
Oil must be applied to the blades before the first cut is made and every 10 to 15 cuts, thereafter. Grease the slider block (C) between the upper arm and the tool every two hours when this tool is in operation. A set of lower blade shims are shipped with each unit. These are to be installed between the lower blades and the side plate when shearing lighter angle (up to 5/16 of an inch (8mm) thick). If a burr develops when shearing very light gauge angle, the clearance should be reduced further by adding additional shim stock. All shims must be removed when shearing angle thicker than 5/16 of an inch (8mm). When cutting angle iron with legs of unequal length, a special upper angle shear blade is necessary. Do not attempt to cut unequal leg angle iron with the standard blade. It only takes one cut to damage the tool.

FOR AVAILABLE BLADES, SEE THE TOOLING MANUAL.

- NOTE: Always shear unequal leg angle with the long leg to the right. If the upper blade does not contact both legs of the angle at the same time at the beginning of the cut, the shear will be damaged.



⊠ **CAUTION: IF THE ANGLE SHEAR SHOULD JAM FOR ANY REASON, DO NOT ATTEMPT TO FREE IT BY HAND! USE A PRY BAR OR SIMILAR DEVICE. REPLACE THE BLADES OR INSTALL SHIMS, DEPENDING ON WHAT CAUSED THE JAM. ALWAYS REMOVE THE TOOL WHEN IT IS NOT IN USE.**



**FIGURE 15**

## **7.2 ROD SHEAR**

The rod shear is a component tool designed to shear sections of solid round and square stock. It has 9 round cavities that range from 1/4 to 1-1/4 inches (6 to 30mm) and one square cavity that has the capacity 1/4 to 1 inch (6 to 25mm). The selector switch must be in the SHEAR position to operate this tool.

### **7.2A ROD SHEAR INSTALLATION**

SEE FIGURE 16 ON THE FOLLOWING PAGE.

The rod shear mounts in the tool station under the upper arm and is held in place with finger clamps (A).

Since the rod shear requires a short stroke (approximately 1/2 inch (12mm) and has no slug, it can be operated at any practical location under the upper arm.

⊗ **CAUTION: TO PREVENT DAMAGE TO THE TOOL, THE STROKE OF THE MACHINE MUST BE SET WHEN USING THE ROD SHEAR.**

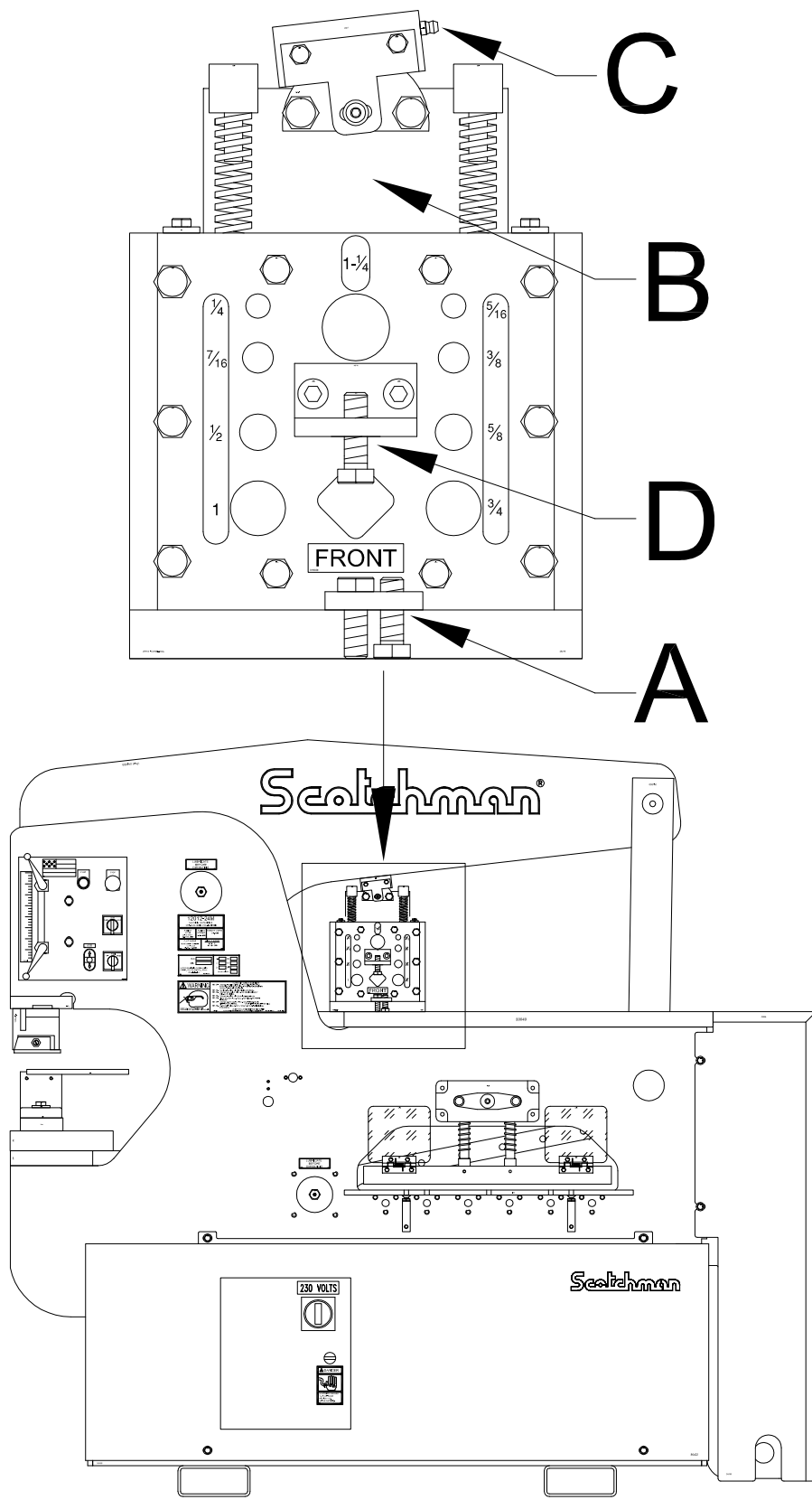
Set the up stroke of the machine so that the workpiece easily slides through the tool. Set the down stroke so that the cut can be made with a minimum amount of stroke. Failure to set the stroke of the machine will damage the tool.

### **7.2B ROD SHEAR OPERATION**

Oil the blades (B) before starting and every 10 to 15 cuts, thereafter.

Grease the slider block (C) between the upper arm and the tool every two hours whenever the tool is in operation. On all round sizes, select the proper cavity for the size being sheared. In the square cavity, there is a kick-up bolt adjustment (D). Adjust this bolt so that the workpiece will just feed under the bolt and remains horizontal to the shear.

⊗ **CAUTION: WHEN SHEARING SHORT PIECES OR NIPPING THE ENDS OF THE ROD, CARE SHOULD BE TAKEN SO THAT THE SLUGS DO NOT BUILD UP IN THE DROP-OFF SIDE. IF THIS HAPPENS, THERE IS A POSSIBILITY OF INJURY TO OTHER PERSONNEL AND DAMAGE TO THE TOOL. ALWAYS REMOVE THE ROD SHEAR WHEN IT IS NOT IN USE.**



**FIGURE 16**

## **7.3 6 X 6 NINETY DEGREE NOTCHER**

The 6 x 6 90 degree notcher is a component tool designed to cut 90 degree Vee notches in angle and flat stock. It has a maximum capacity of 5/16 inch (8mm) thick mild steel.

### **7.3A 6 X 6 NINETY DEGREE NOTCHER INSTALLATION**

SEE FIGURE 17 ON THE FOLLOWING PAGE.

The 6 x 6 Ninety Degree Notcher can be mounted either under the upper arm on the tool table or in the punch station. When the notcher is mounted on the tool table, the selector switch must be in the SHEAR position. When the notcher is in the punch station, the selector switch must be in the PUNCH position.

☒ **CAUTION: IN EITHER STATION, CARE MUST BE TAKEN TO SET THE UPPER AND LOWER STROKE CONTROLS ON THE MACHINE. FAILURE TO DO SO WILL RESULT IN DAMAGE TO THE TOOL AND POSSIBLE INJURY TO THE OPERATOR.**

The upper stroke should be set so that the pusher assembly is held in place by the spring tension of the tool. The lower stroke must be set so that the upper blade just passes the lower blades at the point of the vee by no more than 1/16 of an inch (1.5mm).

TO INSTALL THE NOTCHER UNDER THE UPPER ARM, the tool should be mounted as close to the frame as possible and anchored with bolts and washers. The pusher (B) and beam block (C) should be installed according to the dimensions in FIGURE 17 ON THE FOLLOWING PAGE.

TO MOUNT THE NOTCHER IN THE PUNCH STATION, remove the die holder and stripper. Install the punch pusher (G) to the punch ram using the #45 punch retaining nut (H). Mount the riser plate (F) to the punch bolster with the bolts provided. The notcher is bolted to the riser plate with the die holder bolts. SEE FIGURE 17 ON THE FOLLOWING PAGE. Line the pusher (E) up to the punch ram and tighten the mounting bolts. After the notcher is mounted, install the neoprene slug pad.

### **7.3B 6 X 6 NINETY DEGREE NOTCHER OPERATION**

Lubricate the blades before starting and every 10 to 15 cuts, thereafter.

Do not attempt to shear material thicker than 5/16 OF AN INCH (8mm) and never side-load the notcher.

The slug must be removed, with a magnetic probe or tongs, after every cut.

- ☞ **DO NOT REMOVE THE SLUGS BY HAND.**
- ☞ **ALWAYS REMOVE THE NOTCHER WHEN IT IS NOT IN USE.**

### **7.3C BLADE REPLACEMENT**

The lower blades are symmetrical and can be rotated to expose four cutting edges. The upper blade has two cutting edges. TO ROTATE OR REPLACE THE BLADES, USE THE FOLLOWING STEPS:

☒ **CAUTION: THE UPPER CASTING OF THE NOTCHER IS HEAVY ENOUGH TO CAUSE INJURY IF DROPPED. USE CARE WHEN HANDLING THIS TOOL.**

1. Remove the return springs from the unit.
2. Rotate or replace the upper blade and snug bolts only, to allow further adjustments.
3. Rotate or replace the lower blades.
4. Lower the upper blade down until it just passes the lower blade (approximately 1/16 of an inch (1.5mm)).
5. Adjust the upper blade until the point almost touches the lower blades.
6. Center the rear of the upper blade with the rear of the lower blades. There should be a clearance of approximately .005 of an inch (.12mm) on each side.
7. Tighten the upper blade bolts. Raise and lower the upper casting several times by hand, to check blade alignment. After alignment, tighten the back-up set screws to make sure that the upper blade does not move.

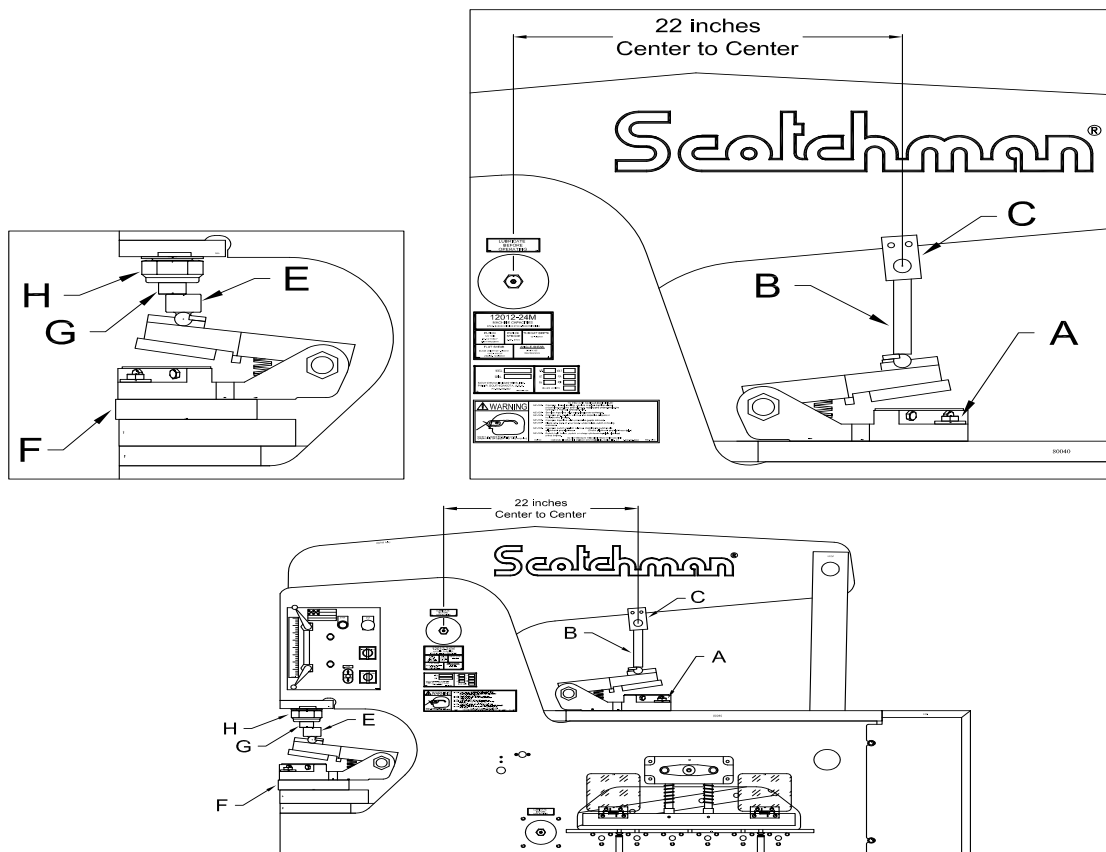


FIGURE 17

## **7.4 RECTANGLE NOTCHER**

The Rectangle Notcher is a component tool designed to make a 2 inch (50mm) wide notch in angle iron or flat stock.

### **7.4A RECTANGLE NOTCHER INSTALLATION**

SEE FIGURE 18 ON THE FOLLOWING PAGE.

The Rectangle Notcher mounts only in the punch station on this model. The selector switch must be in the PUNCH position to operate this tool.

**TO MOUNT THE NOTCHER:**

1. Remove the die holder and stripper.
2. Mount the pusher (A) to the punch ram, using the #45 punch retaining nut (B).
3. Mount the notcher so that the punch pusher (A) lines up over the pressure block on the tool.
4. Anchor the tool to the punch bolster with the bolts provided.

### **7.4B RECTANGLE NOTCHER OPERATION**

⊠ **CAUTION: BEFORE OPERATING THIS TOOL, THE DOWNSTROKE OF THE MACHINE MUST BE SET SO THAT THE FRONT OF THE TOP BLADE JUST PASSES THE LOWER BLADES, (APPROXIMATELY 1/16 OF AN INCH (1.5MM)). FAILURE TO SET THE STROKE WILL RESULT IN DAMAGE TO THE TOOL AND POSSIBLE INJURY TO THE OPERATOR. LUBRICATE THE BLADES BEFORE THE FIRST CUT AND EVERY 10-15 CUTS, THEREAFTER. 3/8 OF AN INCH (9.5MM) IS THE MAXIMUM MATERIAL THICKNESS THAT CAN BE SHEARED.**

➡ **ALWAYS REMOVE THIS TOOL WHEN IT IS NOT IN USE.**

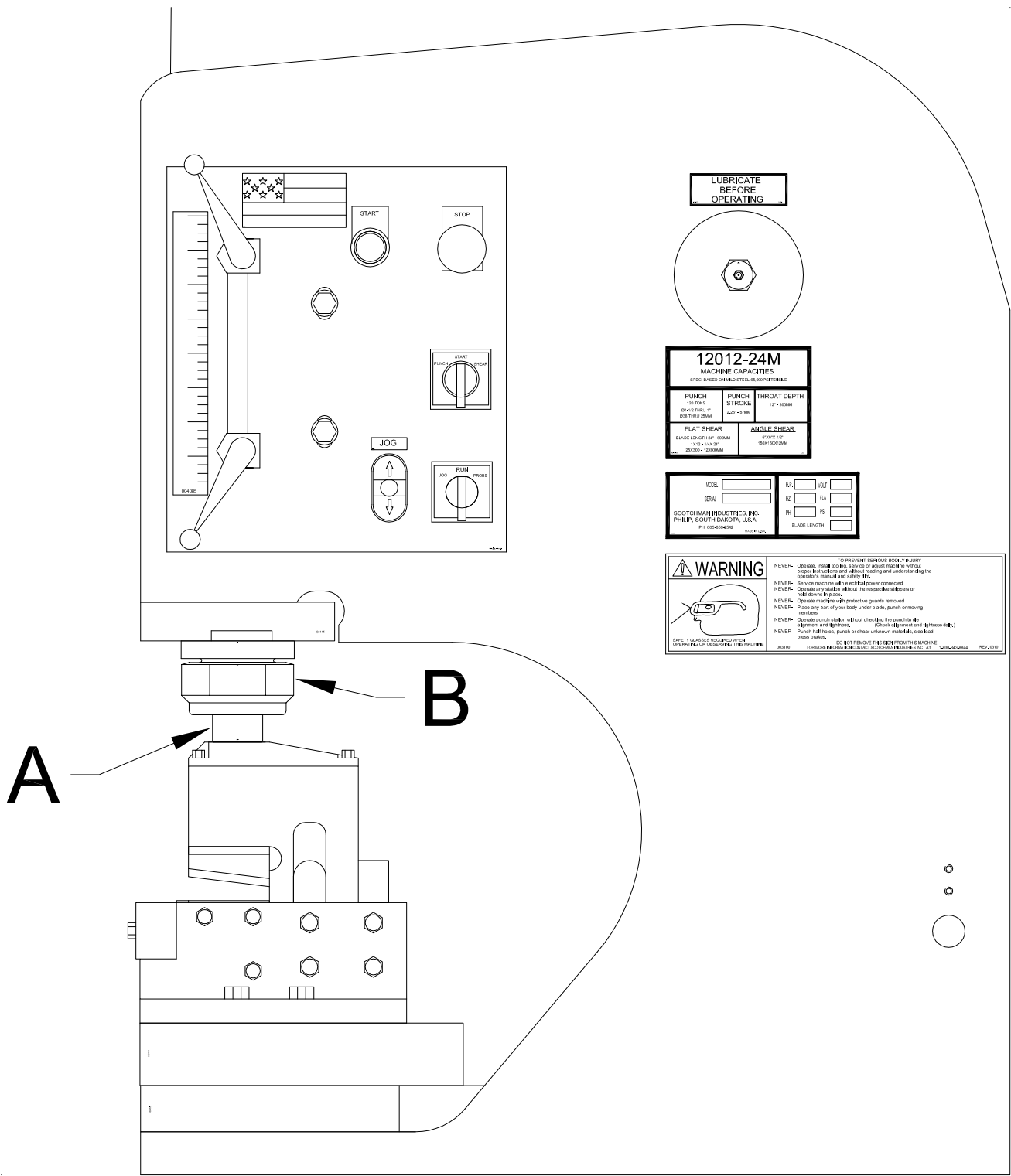


FIGURE 18

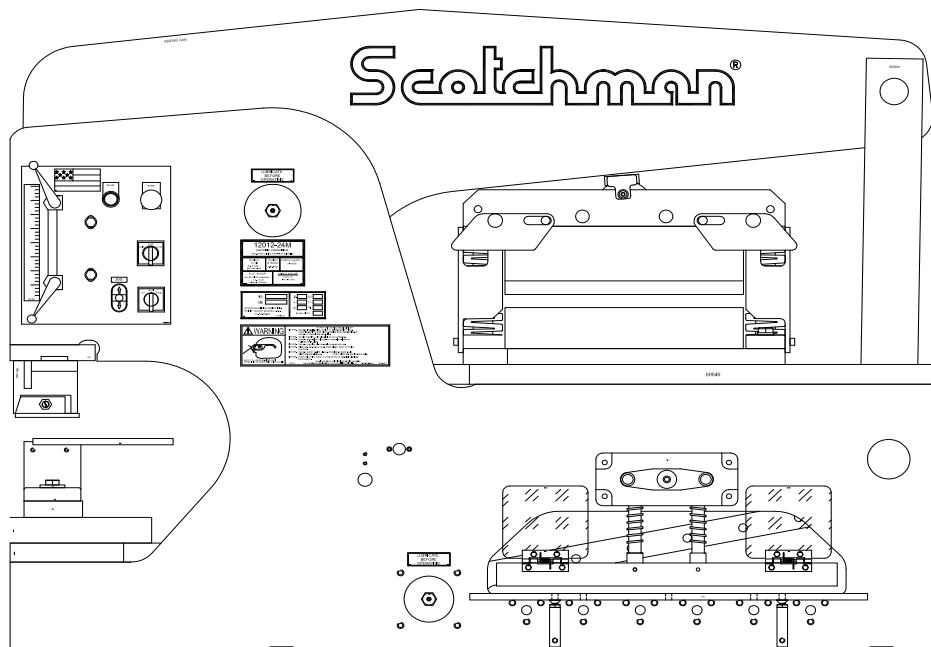
## 7.5 12 & 24 INCH BRAKES

Brakes are component tools designed to bend and form mild steel. They are shipped standard with dies to accommodate material up to 1/4 of an inch (6mm) thickness. The selector switch must be in the SHEAR position to operate these tools.

### 7.5A BRAKE INSTALLATION

SEE FIGURE 19 BELOW.

There are two lengths of brakes available for this model: 12 and 24 inch. The brakes mount under the upper arm in the tool station and are held down with the finger clamps provided. Grease the slider block between the upper arm and the tool every two hours of operation. Mount the 12 inch brake as close to the frame as possible, for maximum tonnage available. There is a press brake tonnage chart that will be helpful when using a brake on this machine. SEE FIGURE 20 ON THE FOLLOWING PAGE. On this model, the 12 inch brake has 83 tons of force. The 24 inch has 65 tons.



**FIGURE 19**



# 7.5B BRAKE OPERATION

☞ NEVER PUT YOUR HANDS INTO OR AROUND A BRAKE WHILE IT IS IN OPERATION. Hold short pieces with tongs or a similar device. Grease the slider block between the upper arm and the tool every two hours whenever the tool is in operation. When using the brake, it is necessary to load the brake centrally. (Visual centering is sufficient.) If work is performed off-center, the guide pins could be damaged. The brake lift is provided by springs. If sticking occurs at the bottom of the stroke and the upper die does not return, a slight tap on the upper die is usually sufficient to free the guides. **DO NOT ATTEMPT TO FREE THE BRAKE BY HAND.**

Sticking can be caused by lack of lubrication, complexity of the part being bent or bent guide pins. Keep the guides well lubricated and replace them if damaged. It is recommended practice to have the bottom die opening 8 times the thickness of the material being bent. If the parts require a bend of less than 90 degrees, adjust the down stroke of the machine until the desired bend is obtained. A great variety of standard brake dies can be used with this unit. These are available from Scotchman Industries or your local dealer.

☞ ALWAYS REMOVE THE TOOL WHEN IT IS NOT IN USE.

TONNAGE CHART																								
PRESSURE IN TONS PER LINEAR FOOT REQUIRED TO MAKE 90 DEGREE AIR BEND IN MILD STEEL																								
THICKNESS OF METAL		WIDTH OF V-DIE OPENING																						
GAUGE	INCHES	1/4	5/16	3/8	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4	1-1/2	2	2-1/2	3	3-1/2	4	5	6	7	8	10	12	
20	.036	2.9	<b>2.2</b>	1.7	1.2	1.0																		
18	.048		4.0	<b>2.9</b>	1.6	1.3																		
16	.060			5.6	<b>3.6</b>	2.7	2.2	1.7																
14	.075				6.0	<b>4.5</b>	3.4	3.0	2.5	2.1														
13	.090					6.8	<b>5.4</b>	4.3	3.7	3.3	2.9													
12	.105						10.1	7.4	6.3	5.4	4.4	4.0	3.2											
11	.120							10.5	8.8	7.2	6.2	5.4	4.3	3.2										
10	.135								11.3	9.6	<b>8.4</b>	5.6	4.1											
9	.150									13.1	11.9	<b>9.0</b>	6.7	5.2	3.5									
7	.188										16.4	14.0	<b>11.2</b>	7.6	5.8	4.5								
1/4	.250											28.8	22.0	<b>15.3</b>	11.5	9.1	7.5	6.2						
5/16	.313												38.0	26.0	<b>19.2</b>	16.0	12.5	10.6	7.6					
3/8	.375													41.0	29.9	<b>24.0</b>	19.4	16.0	12.3	9.3				
7/16	.438														45.2	35.0	<b>28.0</b>	24.0	17.0	14.6	11.1			
1/2	.500															47.9	39.0	<b>33.1</b>	24.0	19.0	15.6	12.7		
5/8	.625																69.5	58.0	<b>42.2</b>	32.4	26.0	23.0	16.5	
3/4	.750																	92.0	69.0	<b>52.2</b>	42.2	36.0	27.0	21.0
7/8	.875																		104	80.0	<b>63.0</b>	52.5	39.4	31.2
1.0	1.00																			112	90.0	<b>76.0</b>	56.2	44.0

PRESSURES HIGHLIGHTED IN **BOLD** ARE FOR DIES WITH FEMALE DIE OPENINGS APPROX. 8 TIMES METAL THICKNESS, WITH RADIUS ON MALE DIE EQUAL TO METAL THICKNESS, AND ARE CONSIDERED IDEAL FOR RIGHT ANGLE BENDING.

BENDING PRESSURES REQUIRED FOR OTHER METALS AS COMPARED TO 60,000 P.S.I. TENSILE MILD STEEL ON CHART:

SOFT BRASS ----- 50% OF PRESSURE LISTED  
 SOFT ALUMINUM ----- 50% OF PRESSURE LISTED  
 ALUMINUM ALLOYS (HEAT TREATED) - SAME AS STEEL  
 STAINLESS STEEL ----- 50% MORE THAN STEEL  
 CHROME MOLYBDENUM ----- 100% MORE THAN STEEL

FIGURE 20

## **7.6 OPEN END BRAKE**

This brake is designed to form box frames out of angle iron. It has a maximum capacity of 1/4" (6mm).

### **7.6A OPEN END BRAKE INSTALLATION**

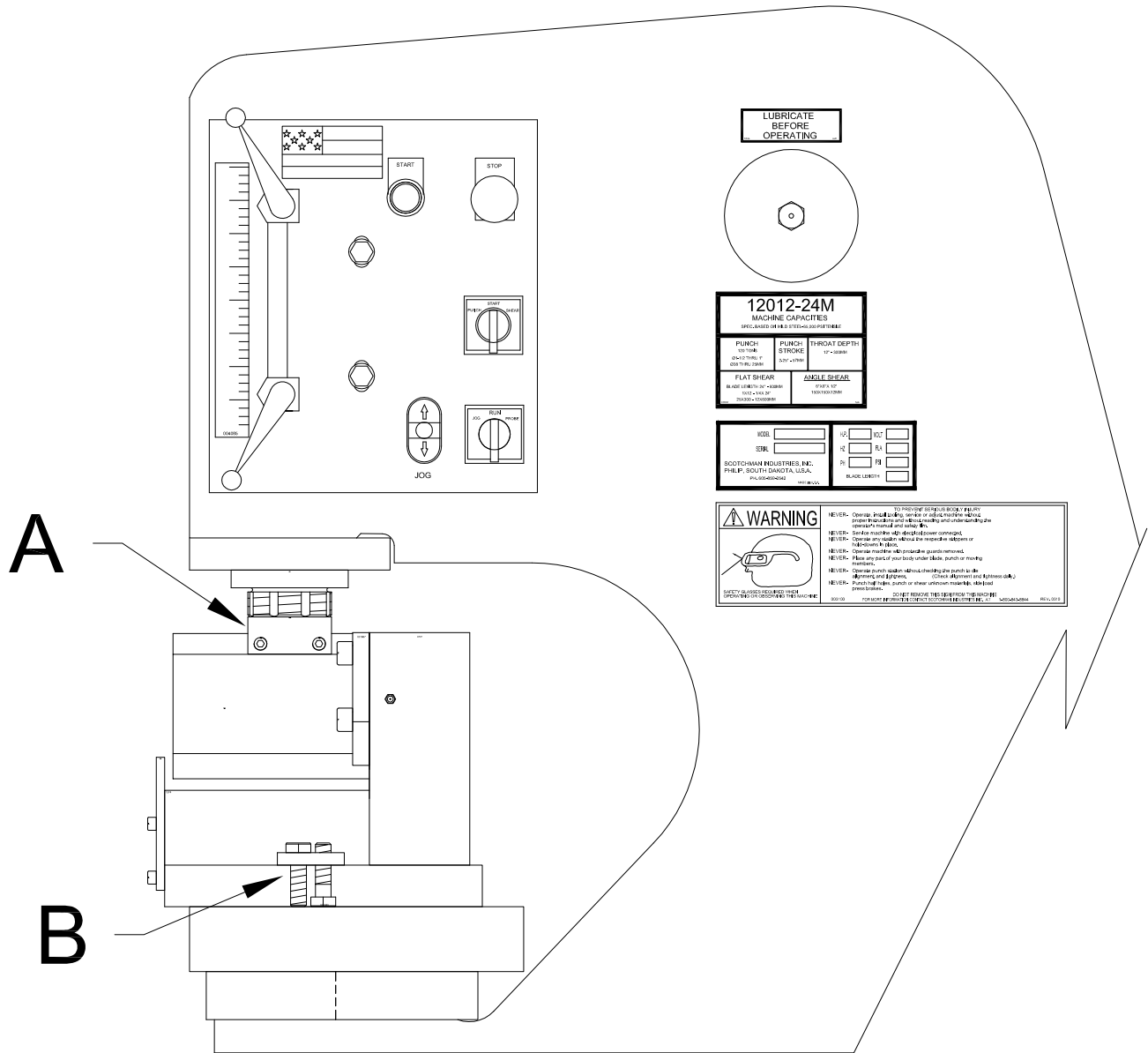
SEE FIGURE 21 ON THE FOLLOWING PAGE.

This brake mounts in the punch station and the selector switch must be in the PUNCH position to operate this tool. The die holder, punch retaining nut and the stripper must be removed to install this tool. Mount the tool so that the pressure cap (A) lines up directly under the punch ram and anchor it to the punch bed with the finger clamps (B) provided.

### **7.6B OPEN END BRAKE OPERATION**

The down stroke of the machine must be set, to prevent damage to the tool. Grease the brake guides every two hours of operation.

➡ ALWAYS REMOVE THIS TOOL WHEN IT IS NOT IN USE!



**FIGURE 21**

## **7.7 CHANNEL SHEAR**

The Channel Shear is a component tool designed to shear 2 to 6 inch (50 to 150mm) standard channel on this model.

### **7.7A CHANNEL SHEAR INSTALLATION**

SEE FIGURE 22 ON THE FOLLOWING PAGE.

The Channel Shear installs under the upper arm in the tool station. The selector switch must be in the SHEAR position to operate this tool. Before installing the tool, remove the upper blade. Install the spring guide pins with the head down in the side plate of the shear. REFER TO THE INSERT ON THE FOLLOWING PAGE. Slide the return springs over the guide pins, the short one first, followed by the long one. Replace the top blade. Mount the shear as close to the frame as possible, with the locking handle to the cylinder end. Make sure that the slug slot in the tool aligns with the slug slot in the tool table. Anchor the tool with the finger clamps provided.

### **7.7B CHANNEL SHEAR OPERATION**

The Channel Shear will shear from 2 to 5 inch (50 to 150mm) lightweight (5.4 lb/ft) channel with minimum distortion. Lubricate the blades before the first cut and every 10 to 15 cuts, thereafter. Grease the slider block between the upper arm and the tool every two hours of operation.

THE FOLLOWING ARE BASIC STEPS IN SHEARING WITH THE CHANNEL SHEAR.

\_\_\_\_\_ ADJUST BOTH MOVING AND STATIONARY SIDE BLADES TO THE SIZE OF CHANNEL BEING SHEARED.

Improper adjustment of the vertical blades will result in damage to the channel shear. To keep the channel centered in the unit, it is necessary to reset the stationary side blades for each size of channel.

\_\_\_\_\_ ONE METHOD OF ACCOMPLISHING THIS ADJUSTMENT IS AS FOLLOWS:

Place a piece of channel, the size to be sheared, in the tool. Remove the lifting springs and lower the upper blade by hand until it contacts the channel iron. Locate the channel so that the upper blade contacts both legs, which will center it in the shear. Adjust the movable vertical blades up to the flange of the channel. Loosen the fixed vertical blade clamps (four places). Slide the fixed blades up to the channel flange. Tighten the blade clamps and adjust the back-up socket set screws up against the fixed vertical blades. Now, check to see that the blades have good alignment, front and back, and have maintained their perpendicularity to the lower blades.

\_\_\_\_\_ POSITION THE ADJUSTING HANDLE.

The adjusting handle can be relocated to permit easy opening and closing of the movable vertical blades. (Approximately 1/2 turn will lock and unlock the workpiece.)

\_\_\_\_\_ SET THE BOTTOM OF THE STROKE AS LOW AS POSSIBLE.

The bottom of the stroke should be set as low as possible, without bottoming any part of the upper blade, blade holder or pressure block. The upper stroke should be set to allow the workpiece to feed through the shear freely.

## PROCEDURE FOR SHEARING:

Lubricate the blades before making the first cut and every 10 to 15 cuts, thereafter. This lubrication is critical on the channel shear.

1. Position the workpiece. Snug the movable blades up to the channel's flange.
  2. Depress the foot switch and shear the workpiece. Before releasing the foot switch, back the movable blades off by 1/2 turn of the locking handle.
  3. Make sure that the slug drops from the chute after each stroke. All of the bottom and vertical blades are symmetrical and can be turned to present four (4) cutting edges. Clearance between the upper and lower blades is changed by the addition or removal of shims. A clearance of twenty thousandths of an inch (.5mm) is recommended. For efficient shearing, blades must be kept sharp.
- ➔ ALWAYS REMOVE THE TOOL WHEN IT IS NOT IN USE.

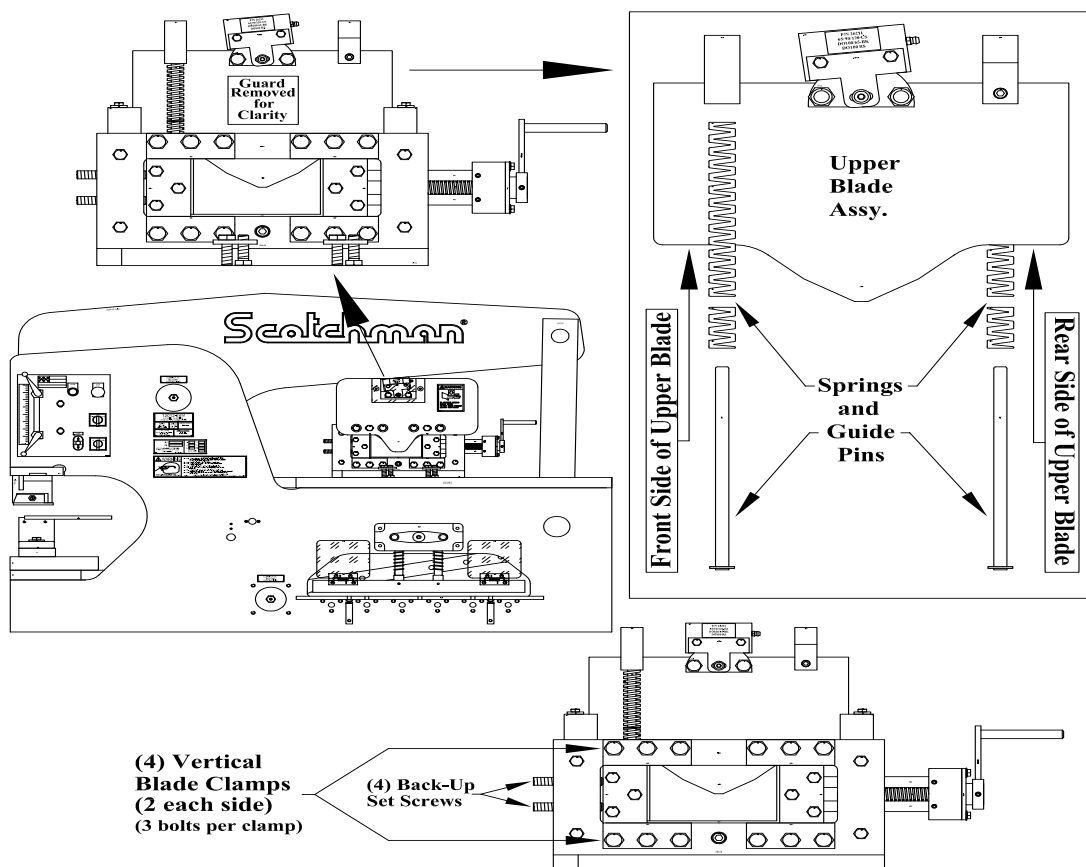


FIGURE 22

## **7.8 PIPE NOTCHER**

The Pipe Notcher is a component tool designed to saddle cut pipe or tubing for applications such as railings. There are notchers available to notch angles in pipe and tubing, also.

For prices and availability, contact your local dealer or the factory.

### **7.8A PIPE NOTCHER INSTALLATION**

SEE FIGURE 23 ON THE FOLLOWING PAGE.

The pipe notcher can be installed in either the punch station or under the upper arm.

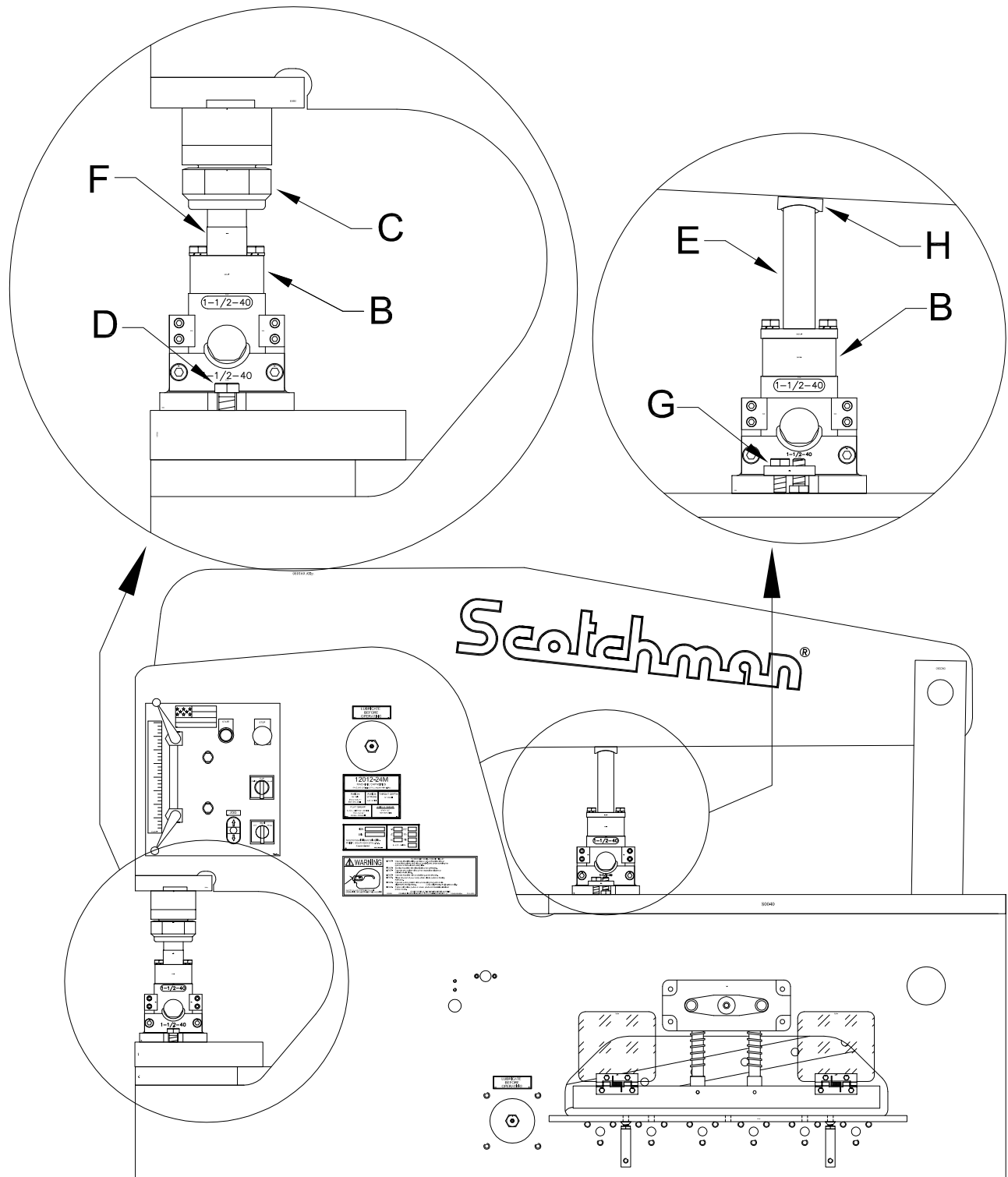
When installed on the tool table, the selector switch must be in the SHEAR position. When installed in the punch station, the selector switch must be in the PUNCH position.

#### **WHEN INSTALLING THE NOTCHER IN THE PUNCH STATION:**

1. Remove the die holder and the stripper.
  2. Install the pusher (F) on the punch ram, using the #45 punch retaining nut (C).
  3. Attach the riser (B) to the top notcher die.
- NOTE:** The upper and lower dies have an alignment pin and groove in them to prevent mismatching sizes. Make sure that the dies you have selected are a matched set before installing them.
4. Set the notcher on the bolster and align the slug hole in the notcher with the hole in the bolster.
  5. Anchor the tool with the bolt (D) provided.

#### **TO MOUNT THE NOTCHER ON THE TOOL TABLE:**

1. Attach the riser (B) and the pusher (E) to the tool and align the slug hole in the tool with the slug hole in the tool table. Grease the rocker Cap (H) and after every two hours of use.
  2. Anchor the tool to the tool table with the bolt (D) provided.
- CAUTION:** WITH THE TOOL MOUNTED IN EITHER STATION, IT IS NECESSARY TO SET THE DOWNSTROKE OF THE MACHINE TO PREVENT DAMAGE TO THE TOOL. THE UPPER DIE SHOULD NOT PASS THE LOWER DIE BY MORE THAN 1/32 OF AN INCH (.7MM).



**FIGURE 23**

## **7.8B PIPE NOTCHER OPERATION**

To achieve the best results from your unit, PLEASE OBSERVE THESE SIMPLE RULES:

1. **Keep the unit clean. Whenever dirt or metal chips accumulate, remove the 8mm limit screw located in the center, at the rear of the punch. Lift out the punch-holder and the two springs (1/2" x 3"). Clean the unit with solvent.**
2. **☒ CAUTION: DO NOT DISASSEMBLE THE UPPER PUNCH.**
3. **Check the alignment of the unit. After cleaning the unit, always check the alignment of the punch and die section. To check the alignment, insert the punch and holder, without the springs, into the housing and check the gap. SEE FIGURE 25 ON THE FOLLOWING PAGE.**
4. **If proven correct, tighten the two M-10 socket head screws holding the die section in place.**
5. **Apply some high pressure lube all around the inside of the housing, then re-assemble the unit, reversing the above procedures.**

**☒ CAUTION: WHEN USING THIS TOOL, ALWAYS WEAR SAFETY GLASSES.**

**Before operation, lubricate the sides and back of the upper die with way oil.**

**Repeat this lubrication once daily.**

**Cutting blades should be lubricated with a cutting oil or motor oil, before making the first cut and after every 10 to 15 cuts.**

## **7.8C PIPE NOTCHER CAPACITIES**

**Two inch (2") Schedule 80 is the maximum thickness that can be cut.**

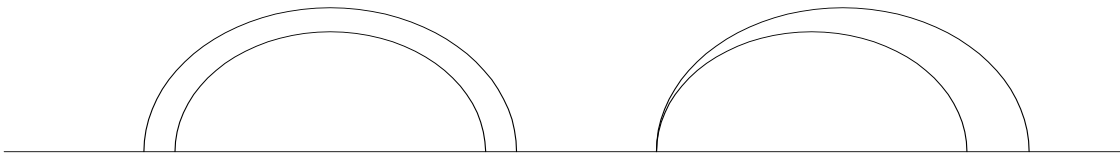
**Lighter weight tubing may be cut, but will probably require different dies for best cutting results.**

**Separate dies are required for each size of pipe or tubing being notched.**



**CORRECT**

**INCORRECT**



**FIGURE 24**

## **7.9 PICKET FENCE TOOL**

The picket fence tool is designed to make picket points on square tubing for ornamental and security fence applications. The tool has a maximum of 1 inch (25mm) 16 gauge square tubing.

### **7.9A PICKET FENCE TOOL INSTALLATION**

SEE FIGURE 25 ON THE FOLLOWING PAGE.

This tool mounts in the punch station, only.

The machine must be in the PUNCH position to operate this tool.

1. Remove the die holder, stripper and punch retaining nut.
2. Install the punch pusher (A) on the punch ram, using the #45 punch retaining nut (B).
3. Install the tool so that the punch pusher aligns with the ram on the picket tool and anchor it to the punch bolster with the finger clamps (C) provided.

### **7.9B PICKET FENCE TOOL OPERATION**

⊗ **CAUTION: THE DOWNSTROKE OF THE MACHINE MUST BE SET BEFORE OPERATING THE TOOL. FAILURE TO SET THE DOWNSTROKE OF THE MACHINE WILL RESULT IN DAMAGE TO THE TOOL.**

1. Set the down stroke of the machine so that the upper die clears the lower die by twice the wall thickness of the tube, plus 1/32 of an inch (.8mm).
2. Adjust the tube stop (D) just low enough to contact the upper edge of the tube. This stop must be removed when cutting 1" tube.
3. Adjust the rest stop (E) so that it is approximately half of the tube size below the lower die.
4. Feed the tube into the tool until it contacts the stop (D). Depress the foot pedal.
5. Make sure that the slugs eject from the tool as the next piece is fed into the tool.
6. Lubricate the dies every 10 to 15 cuts and grease the ram daily.

⊗ **CAUTION: ALWAYS REMOVE THIS TOOL WHEN IT IS NOT IN USE!**

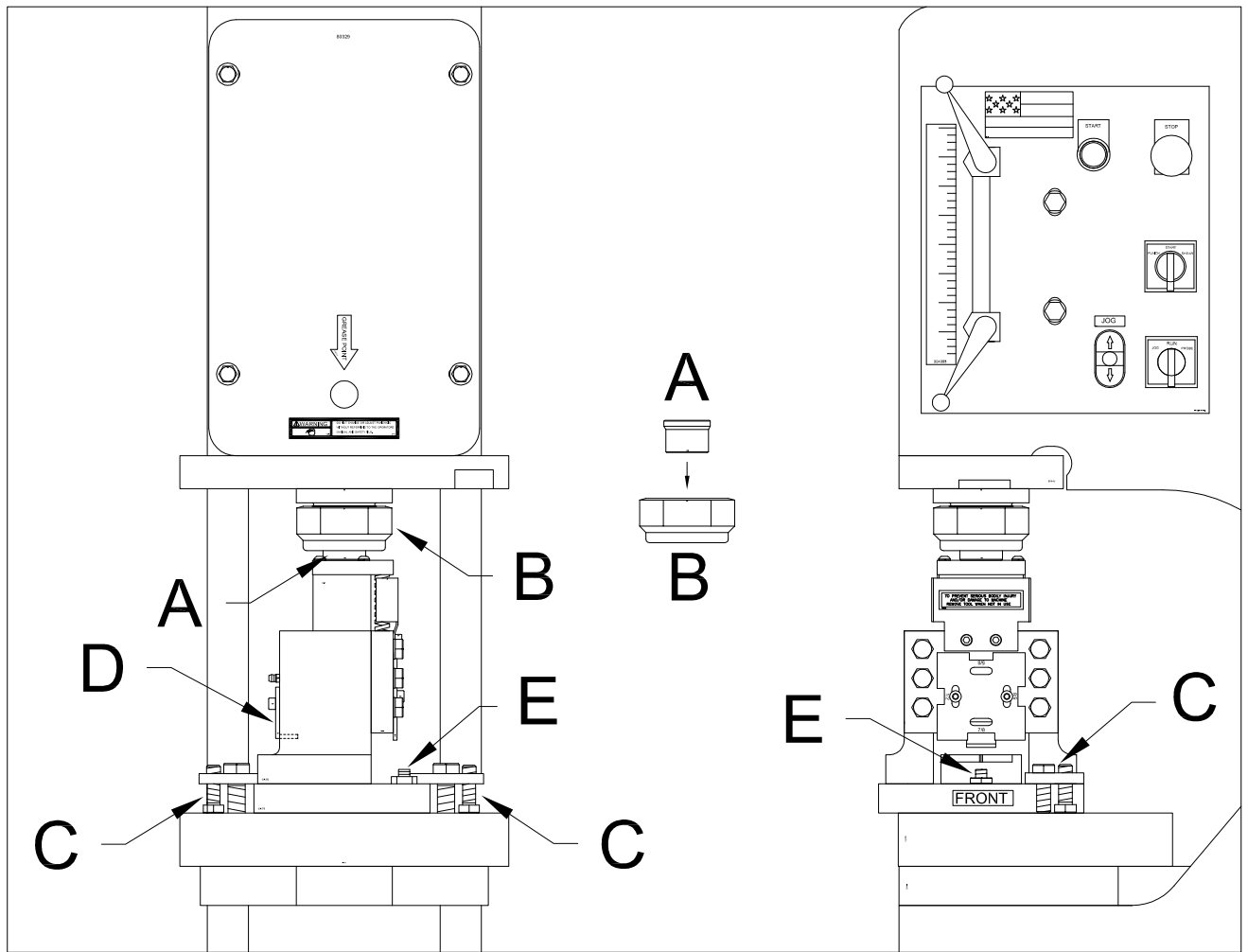


FIGURE 25

## **7.10 SQUARE TUBE SHEAR**

SEE FIGURE 26 ON THE FOLLOWING PAGE.

The square tube shear is designed to shear square tubing from 1/2" to 2".

16 gauge is the maximum material thickness.

### **7.10A SQUARE TUBE SHEAR INSTALLATION**

SEE FIGURE 26 ON THE FOLLOWING PAGE.

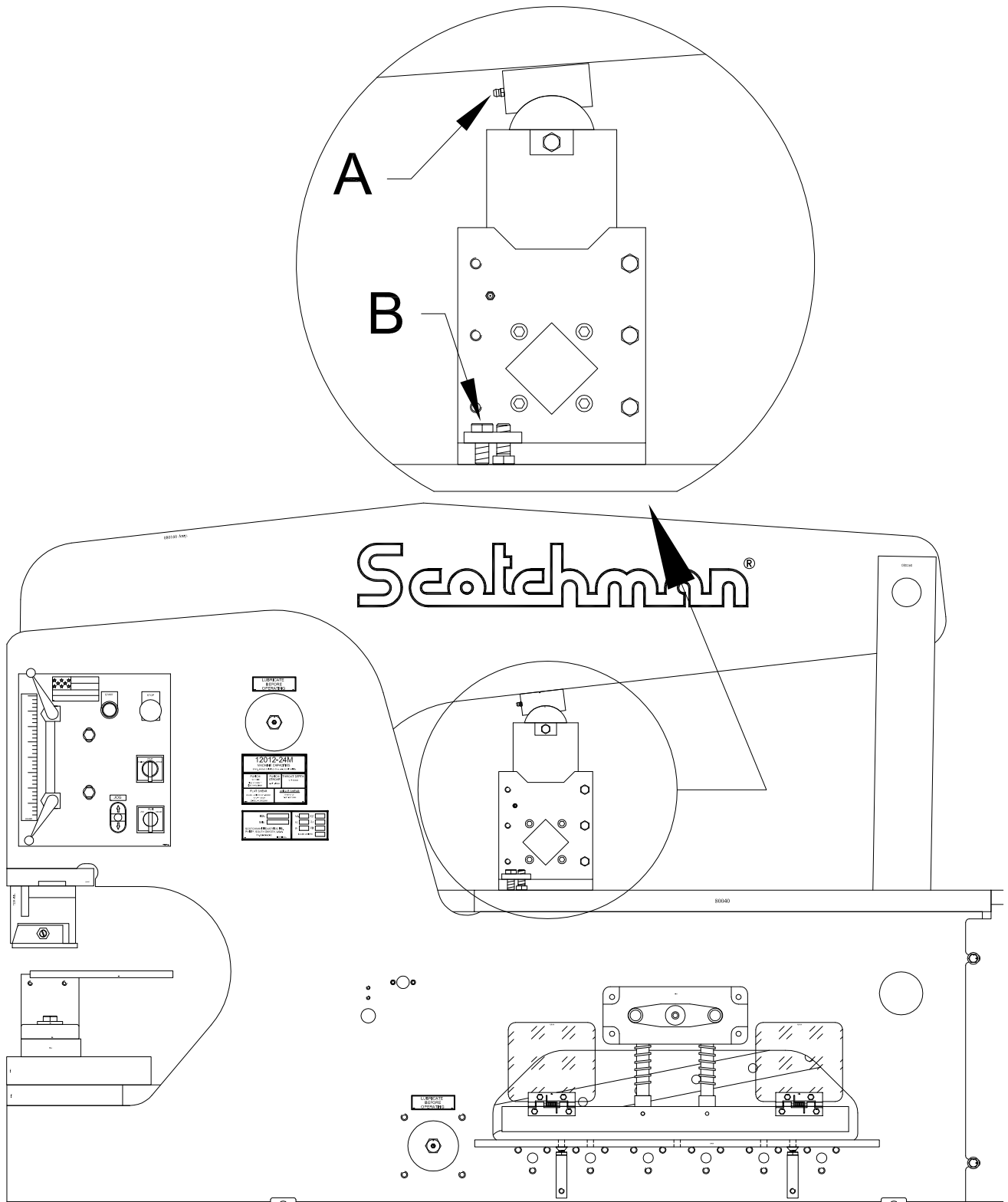
This tool mounts on the tool table. The machine must be in the SHEAR position to operate this tool.

1. Mount the tool over the slug release slot in the table and squarely under the upper arm.
2. Grease the pressure cap (A) before using and every two hours, thereafter.
3. Anchor the tool with the finger clamps (B) provided.
4. Set the up stroke of the machine so that the size of tube you want to shear will feed through the tool. Make sure that the up stroke is set so that there is spring tension on the pressure block at all times.
5. Set the down stroke so that the upper blade passes the lower blade by approximately 1/8".

### **7.10B SQUARE TUBE SHEAR OPERATION**

1. The selector switch must be in the SHEAR position to operate this tool.
2. Set the down stroke of the machine so that the upper blade passes the lower blade by approximately 1/8 of an inch.
3. Feed the tubing through the shear to the desired length and depress the foot pedal.
4. Lubricate the blades every ten to fifteen cuts.

⊗ CAUTION: ALWAYS REMOVE THIS TOOL WHEN IT IS NOT IN USE.



**FIGURE 26**

## **7.11 OPTIONAL DIE HOLDERS AND PUNCH HOLDERS**

### **7.11A 3 INCH (76MM) DIE INSERT**

The 3 inch (76mm) die insert mounts in place of the standard die insert and is used in oversize punching applications. OR APPLICATIONS, REFER TO THE TOOLING MANUAL.

### **7.11B OFFSET DIE HOLDER FOR FLANGE PUNCHING**

The offset die holder is used for punching holes in the flange of structural shapes such as channel, I-beam and H-beam. The offset die holder is installed in place of the standard die holder. The punch bolster must be removed to use this tool. Use the bolts provided with the standard die holder. Because of its design, you cannot use the same method outlined in Section 6.1. To align the punches and dies, use the instructions you received with the die holder.

- ⊗ **CAUTION:** Failure to set the stroke will allow the punch retaining nut to strike the die holder, causing damage to the machine and possible injury to the operator. Because of its design, the offset die holder has a maximum capacity of 40 tons. Exceeding 40 tons will damage the tool and may cause injury to the operator. For punch tonnage requirements, REFER TO FIGURE 9.

### **7.11C 6 X 6 DIE HOLDER**

Always follow the preferred method of aligning punches and dies. SEE SECTION 6.1. The 6 x 6 die holder is installed in place of the standard die holder. On this model, a riser plate is required and is shipped with the die holder. Mount the riser to the punch bolster with the bolts provided. Then, mount the die holder to the riser, using the standard die holder bolts. Capacities for oversize punching with this tool go up to 4 inch (100mm) diameter rounds. For sizes and applications, SEE THE TOOLING MANUAL.

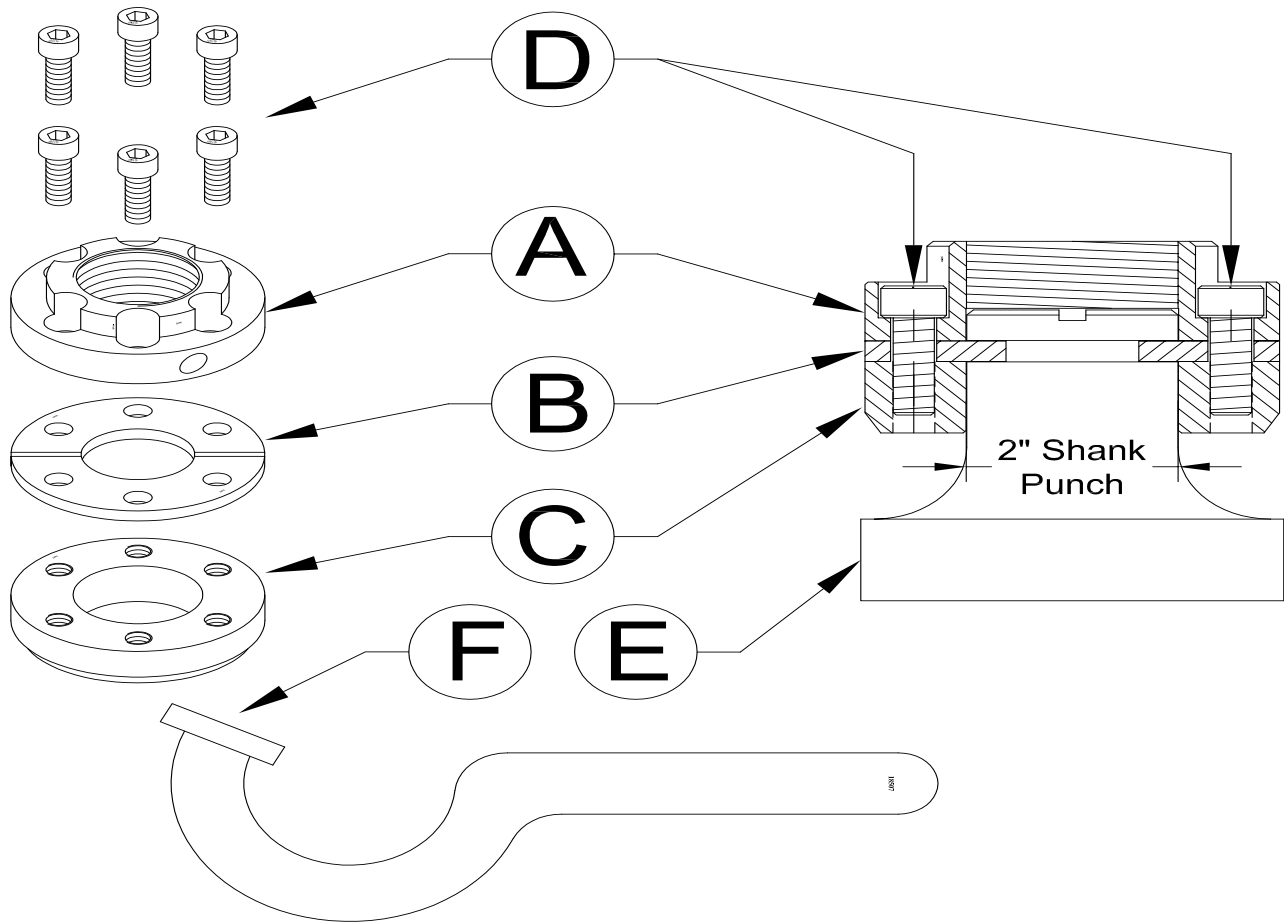
### **7.11D HEAVY DUTY SPLIT-RING RETAINING NUT**

SEE FIGURE 27 ON THE FOLLOWING PAGE.

The heavy duty split-ring retaining nut is used in oversize punching applications that require a punch with a 2 inch (50mm) shank diameter (E). Follow the instructions in SECTION 6.1 for proper punch and die alignment. This retaining nut requires a pin wrench (F), which should be ordered when ordering the nut.

**TO USE THE HEAVY DUTY SPLIT-RING RETAINING NUT:**

- 1. Remove the six socket head cap screws (D).**
- 2. Slide the retaining nut (C) over the punch shank.**
- 3. Place the split-ring (B) into the groove in the punch.**
- 4. Place the ring nut (A) on the punch and replace the six socket head cap screws (D).**



**FIGURE 27**

## **7.12 OPTIONAL GAUGING EQUIPMENT AND CONTROLS**

### **7.12A 48 NCH DELUXE BACK GAUGE**

The forty-eight inch (122cm) back gauge mounts on the drop-off side of the machine and will reach all three stations from one point. It is designed to be used as a length stop in the shear, punch and tooling stations. For parts identification, SEE THE TOOLING MANUAL.

### **7.12B GAUGING TABLES: PUNCH & SHEAR**

There are optional gauging tables available for the punch and shear station. The table for the shear has built-in guides to allow easy positioning of material to be cut at various angles, as well as straight cutting. The punch table also has built-in adjustable guides for fast set up and repeatability. For parts identification, SEE THE TOOLING MANUAL.

## **7.13 URETHANE STRIPPER**

Using this specially designed "Non Deform" stripper unit does offer a significant advantage over a standard stripper arrangement in reducing distortion when punching a confined pattern or series of holes in flat bar or plate.

### **IMPORTANT SAFETY REQUIREMENTS FOR THIS OPTION:**

- Because of the design of this unit, you must use dies with a minimum of 1/16" clearance, e.g. A 1/2" punch must have a minimum of a 9/16 die.
- You must check the stroke setting of your machine. This is critical when using this option. Refer to Section 4.6.
- You must have a punch table mounted on your die holder. Using this stripper without a punch table will damage the stripper.
- The material must contact both spring posts of the stripper. If you are punching in the corner of a piece of material or the first hole in a strap, you must place a piece of material the same thickness under the springs.
- You can only use the #40 tooling with this stripper.
- The maximum material you can punch with this stripper is 1" (25mm) in 60,000 tensile mild steel.
- This stripper is designed for flat material only.

The action of this unit will minimize distortion in the work piece and in many cases, eliminate costly correction and straightening processes. Of course, there is a limit to how much material can be removed in a confined area without causing some deformation. Contact your dealer or Scotchman for advice.



Combining this unit with a linear feed repetitive stop system for punching a series of holes in flat bar will significantly increase productivity. Because of the action of this type of unit, **particular attention must be paid when setting the stroke length.** The stripper unit moves in conjunction with the punch and extra care must be taken by the operator. (Refer to the setting and operating instructions in this section.)

## **7.13A CHANGING THE URETHANE SPRINGS**

If the unit is constantly over stroked or over a period of time, it may be necessary to renew the urethane springs. REFER TO FIGURE 28 ON PAGE 67. The springs should be checked periodically. (A sure sign of over stroking is cracking or splitting of the springs.)

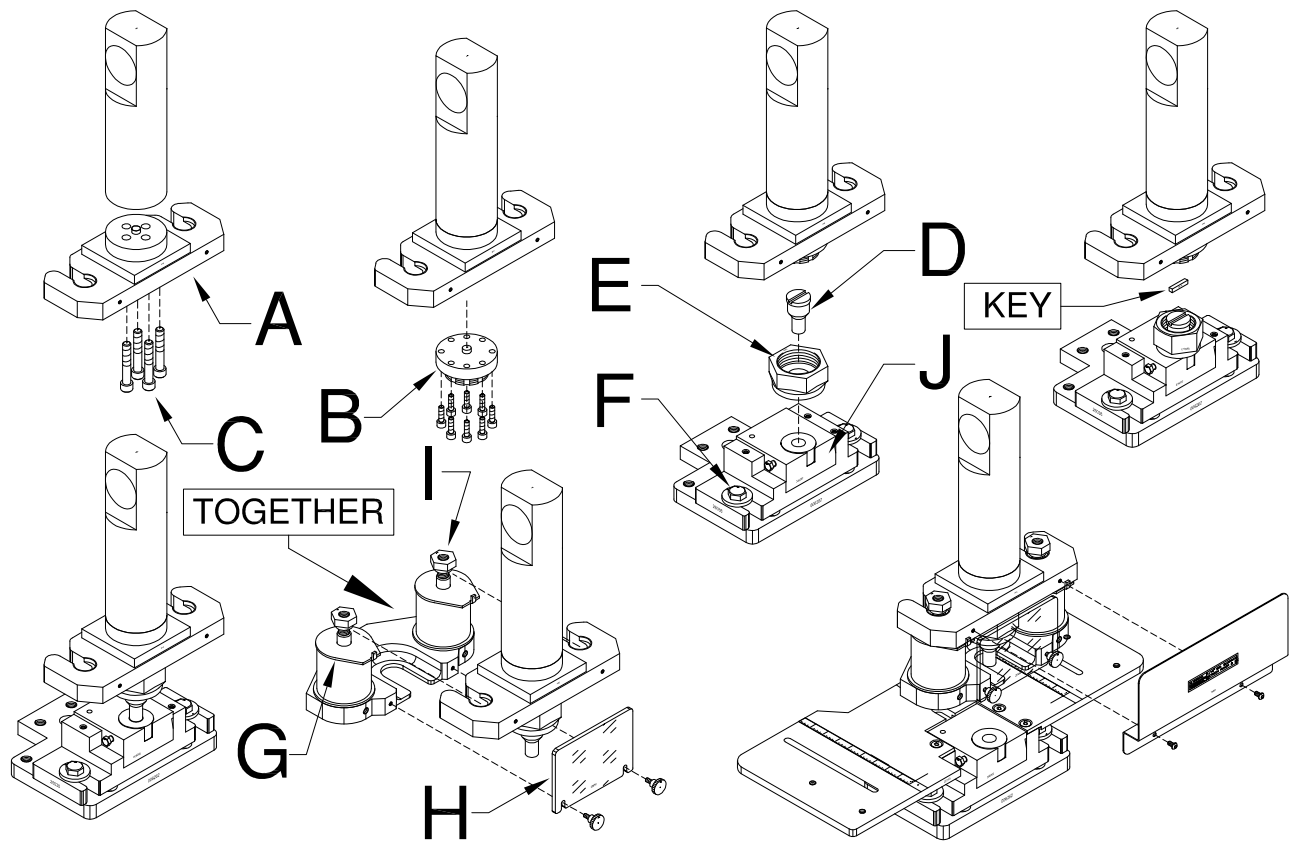
- Secure the unit in a vise by clamping the bottom plate (item11).
- Loosen and remove both nyloc nuts (6). When loosening the nyloc nuts (6), if one or both tie rods become loose, remove the loose tie rod(s) from the base plate and remove the nut(s) from the tie rod(s). Re-tighten the tie rod(s) into the base plate and lock in place, using a thread locking solution such as Nutlocâ.
- Remove items 1 and 7, top plate and spring spacers.
- Remove item 3, urethane springs.
- Re-assemble the unit with new urethane springs and finger tighten both nyloc nuts.
- Tighten both retaining nuts to achieve the correct setting distance.

## **7.13B INSTALLING THE URETHANE STRIPPER & PUNCH & DIE**

REFER TO FIGURE 28.

1. Raise the top limit switch to its highest position. Power the machine and let the punch ram retract to its full UP position.
2. Open the standard stripper and remove it from the machine by removing the left hand mounting bolt.
3. If there is a punch and die installed in the machine, remove them.
4. Remove the two bolts holding the die holder and remove the spacer plate from under the die holder. Replace the die holder bolts with the shorter bolts (F) provided with the urethane stripper. Do not tighten the bolts yet.
5. Remove the punch holder (B) from the end of the ram.
6. Disassemble the urethane stripper by removing the two retaining nuts (I).
7. Install the stripper mounting plate (A) and the punch holder (B) to the ram, with the bolts provided.
8. Select the proper punch and die. Make sure that there is proper clearance between the punch and die. For recommended clearances, SEE FIGURE 9 ON PAGE 30.

9. Clean both the punch and die of any foreign material.
10. Insert the proper die in the die insert (J). (If the die has a flat spot in it, align this with the bolt in the die insert.) Tighten the bolt firmly with a wrench.
11. Insert the punch into the punch retaining nut. Make sure that it seats properly. Place the punch retaining nut assembly on the die insert (J), with the punch inserted in the die.
- ☒ **NOTE: IF YOU ARE USING PUNCHES THAT REQUIRE A KEY, INSERT THE KEY IN THE PUNCH AT THIS POINT.**
12. Place the disconnect switch in the ON position and the selector switch in the START position. Power the machine by pressing the green START button.
13. Check to make sure that there are no objects (such as tools) under or on any of the moving parts.
14. Place the selector switch in the JOG position and carefully inch the cylinder ram to its set DOWN position.
15. Turn the machine's power OFF.
16. Lift the punch retaining nut and turn it on to the punch ram. (The die holder may have to be moved slightly to align the punch retaining nut to the punch ram.) When using keyed punches, after you start the nut on the ram, raise the punch and rotate it until the key seats in the punch ram.
17. Use a wrench to tighten the punch retaining nut. Make sure that there is equal clearance on all sides of the punch in the die.
18. Re-tighten the bolts (F) in the die holder.
19. Check to be sure of proper alignment. Realign, if necessary.
20. Power the machine and raise the ram to the top of its stroke and turn the machine OFF.
21. Slide the bottom half of the urethane stripper onto the stripper mounting plate (A) from the inside of the machine.
22. Make sure that the spring retainers (G) are positioned so that the lip on the retainer fits against the machined area on the front of the mounting plate (A). Finger tighten the retaining nuts (I).
23. Power the machine and jog the ram down until the urethane stripper contacts the top of the die die holder. Continue to jog the ram down, compressing the urethane springs until the retaining nuts (I) can be tightened down to the shoulder on the stud.
24. Install the stripper guard (H) on the front of the stripper.
- ☒ **CAUTION: REMEMBER THAT THE MAXIMUM CAPACITY OF THIS STRIPPER IS 1 INCH MATERIAL. ALSO, REMEMBER THAT THE STRIPPER MOVES WITH THE PUNCH.**



**FIGURE 28**

## **8.0 TROUBLE SHOOTING GUIDE**

### **8.1 ELECTRICAL TROUBLE SHOOTING - MOTOR**

⊗ **CAUTION: ALL ELECTRICAL WORK PERFORMED ON THE 12012 IRONWORKER MUST BE DONE BY A QUALIFIED ELECTRICIAN.**

#### **A. MOTOR WILL NOT RUN:**

- 1. Check to be sure that the disconnect switch is in the ON position and the selector switch is in the START position.**
- 2. Check to be sure that the plant voltage and phase correspond to the machine voltage and phase.**
- 3. Check the line wiring connections at the starter. For the wiring diagram, SEE FIGURE 4.**
- 4. Check the primary and secondary fuses for the transformer.**
- 5. Check the line voltage at the starter. If the correct line voltage is present at the starter, either the starter or the motor is defective. Contact your local dealer or the factory.**

#### **B. MOTOR RUNS BUT THE MACHINE WILL NOT CYCLE WHEN DEPRESSING THE FOOT PEDAL:**

- 1. Check the motor rotation. It should be clockwise when viewed from the fan end of the motor.**
- 2. Check the selector switch. It must be in either the PUNCH or the SHEAR position or the machine will not move.**
- 3. Check the stroke control adjustment and make sure that only one limit switch is in contact with the metering boss. If both limit switches are in contact with the metering boss, the machine will not move. Loosen the stroke control handles and move the limit switches. Try the machine again.**
- 4. Check the fuses in the control box. There are two fuses in line on the primary side of the transformer and one on the secondary side. Check the fuses with an Ohm meter and replace them, if necessary. Use a Bussman FNQ-R1 600V or equivalent for the primary side and a Bussman FLM-1 6/10 or equivalent for the secondary side.**
- 5. Check the limit switches. FOR PROCEDURES, REFER TO SECTION 8.2.**
- 6. No power from the transformer: Check the voltage across the transformer secondary terminals. It should read 110 to 120 volts.**
- 7. The solenoid on the control valve is not functioning: REFER TO SECTION 8.3.**
- 8. The foot pedal switch is not functioning properly: A voltage test may be run on the terminal strip in the control box to determine if the foot switch is working properly.**

- ➔ **WARNING: THERE IS LINE VOLTAGE PRESENT IN THE CONTROL BOX WHEN THE MACHINE IS POWERED. THESE TESTS MUST BE PERFORMED BY A QUALIFIED ELECTRICIAN.**

**TO TEST THE FOOT SWITCH, place the selector switch in the START position and power the machine. Place the selector switch in the PUNCH or the SHEAR position and test the voltage between terminal #'s x2 & 5 and x2 & 10. With the pedal up, the voltage should read 110-120V between #'s x2 & 5.**

**There should be no voltage reading between #'s x 2 & 10. With the pedal depressed, the voltage should read 110-120V between #'s x2 & 10. There should be no voltage reading between #'s x2 & 5. If these readings are not correct, continue on with the following steps:**

- A. Turn the machine's power off at the disconnect switch. Remove the cover on the foot switch and check for any loose connections.**
  - B. Make sure that the switches are adjusted properly. You should hear two distinct "clicks" approximately 1/2 inch (12mm) apart when depressing the pedal. There is a set screw adjustment on the pedal shaft to adjust the switches.**
  - C. Check the switches with an Ohm meter.**
- 9. Damage to the foot pedal cord: Check the continuity of the wire in the cord with an Ohm meter.**

**Make sure that the power to the machine is off and locked out. The wires must be disconnected from the pedal and the terminal blocks.**

- 10. The pump to motor coupler is damaged: Loosen the set screws in the pump and motor flanges and slide them apart. Inspect the coupler. If it is damaged, replace it.**

## **8.2 LIMIT SWITCH INSPECTION PROCEDURE**

The limit switches are sealed units and cannot be taken apart. The plunger can be manually checked. It should move freely in and out. The switches can also be tested with an Ohm meter. The wires must be disconnected from the terminal blocks and the power to the machine must be turned off. With the plunger out, the switch should read continuity; with the plunger depressed, it should read open.

## **8.3 CONTROL VALVE INSPECTION**

**THE MACHINE WILL TRAVEL IN ONLY ONE DIRECTION.**

**THIS COULD BE CAUSED BY:**

- A. Contamination in the hydraulic oil which causes the spool to stick in one position: With the machine's power off, the spool of the valve can be manually shifted. On each end of the control valve, there is a pin in the center of the knurled nut that holds the coil on. To shift the spool manually, use a small punch or similar device to push these pins in by hand, first one and then, the other. Turn the machine on and try it again. If the machine now operates, the hydraulic oil and the filter should be changed.**
  
- B. A defective coil on the control valve: The coils can be checked by using an Ohm meter. The wires to the coils must be disconnected. If the ohm reading shows open, the coil is defective and must be replaced.**

## **8.4 HYDRAULICS**

### **THE MOST COMMON HYDRAULIC PROBLEMS ARE:**

- 1. Low level of hydraulic oil in the reservoir: The reservoir holds 14 U.S. gallons (53 Liters). The level should be 1-1/2 inches (40mm) below the top of the reservoir.**
- 2. Contamination in the hydraulic oil: The oil and the filter should be changed at least once a year and any time there is a possibility that contamination has gained access into the system. For recommended hydraulic oil, SEE SECTION 5.2.**
- 3. Low pressure caused by worn or damaged parts in the cylinder or pump: There is a pressure port for a pressure gauge provided on all machines. The port will be on the valve manifold or the pressure line between the pump and the valve. A gauge with a minimum capacity of 3,000 PSI (207 BAR) is required. With the machine's power off, install the pressure gauge. Power the machine and place a piece of steel in the shear section and clamp it down with the hold-down device. As you attempt to shear the piece, watch the pressure gauge for a reading. The system pressure of this machine is 2,650 PSI (183 BAR). The pressure is adjustable by adjusting the relief valve on the control valve manifold. If the pressure cannot be increased, call your local dealer or the factory.**

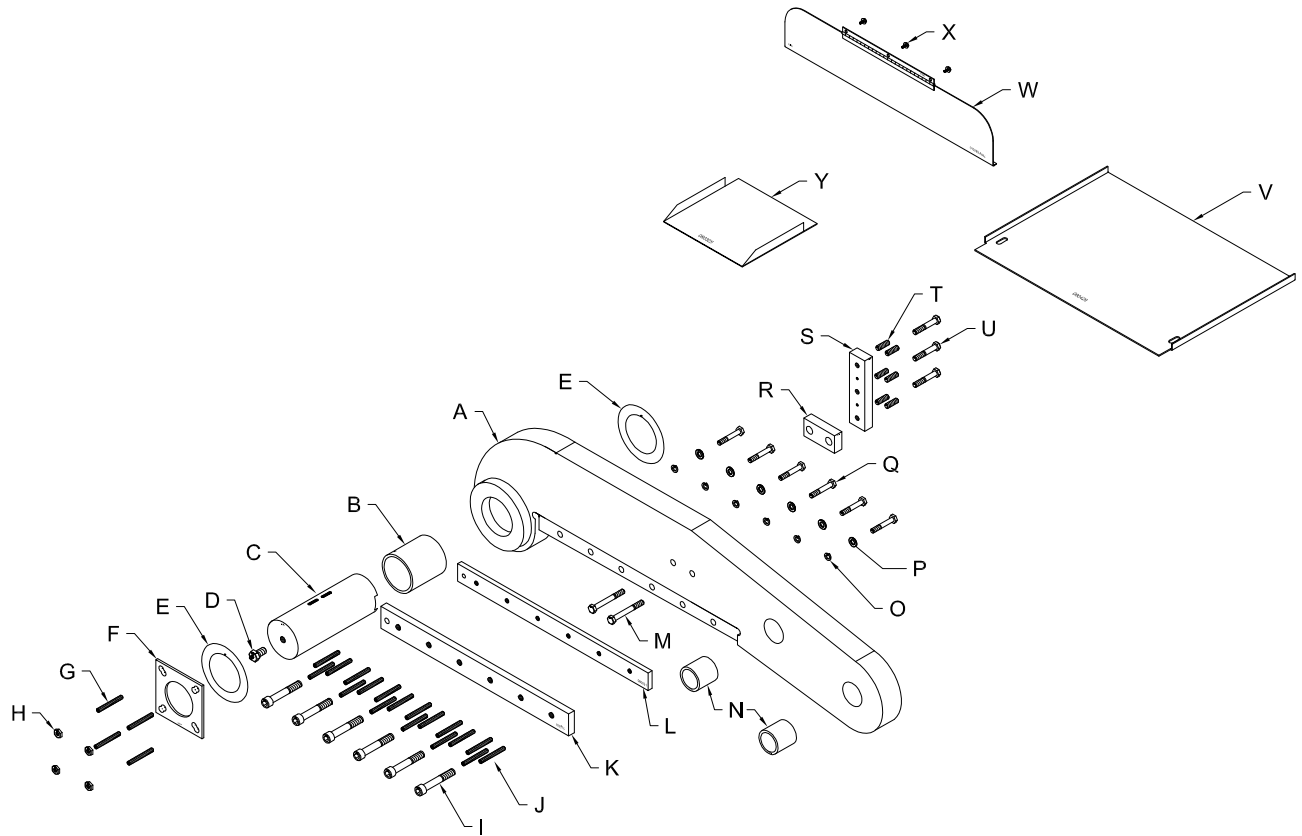
## **9.0 12012 IRONWORKER PARTS LISTS**

THE FOLLOWING SECTION CONTAINS THE IRONWORKER TOOLING PARTS LISTS AND DRAWINGS. FOR YOUR CONVENIENCE, ALWAYS GIVE YOUR COMPLETE SERIAL NUMBER WHEN ORDERING PARTS.

### **9.1 SHEAR ARM ASSEMBLY (SERIAL #'S 50947M & UP)**

<b>ITEM</b>	<b>PART #</b>	<b>DESCRIPTION</b>
A	080170	Shear Beam Assembly
B	015312	Main Bushing Tool Beam
C	080180	Shear Arm Pin
D	080174	Grease Bolt Main Pin
E	080350	Brass Wear Plate
F	004231	Pressure Plate
G	218130	M-12 x 80mm Set Screw
H	210014	M-12 Jam Nut
I	221440	M-16 x 100mm SHCS
J	218130	M-12 x 80mm Set Screw
K	033175	24" 3/4 Bar Blade
L	080031	24" Metric Bar Blade
M	201432	M-12 x 80mm HHCS
N	080169	Connecting Link Bushing
O	212014	M-12 Lock Washer
P	214014	M-12 Regular Washer
Q	205425	M-12 x 65mm HHCS
R	080178	Beam Rub Block
S	080315	Frame Rub Block
T	218112	M-12 x 35mm Set Screw
U	203427	M-12 x 70mm HHCS
V	080428	Slug Chute Bar Shear
W	013289	Shear Door Assembly
X	224005	M-6 x 12mm WLCS
Y	080325	Slug Chute Tooling

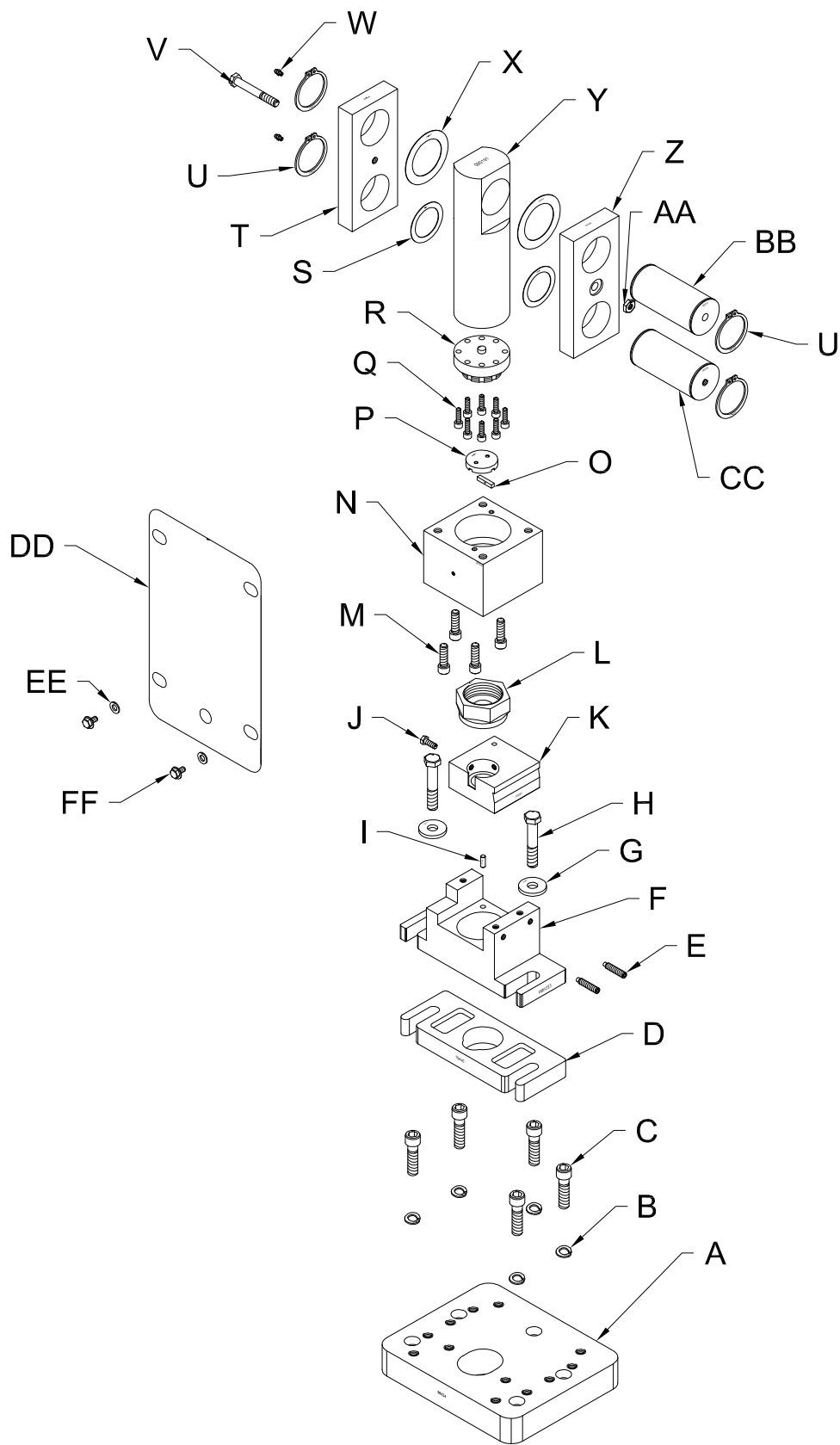




**FIGURE 29**

## 9.2 PUNCH ASSEMBLY

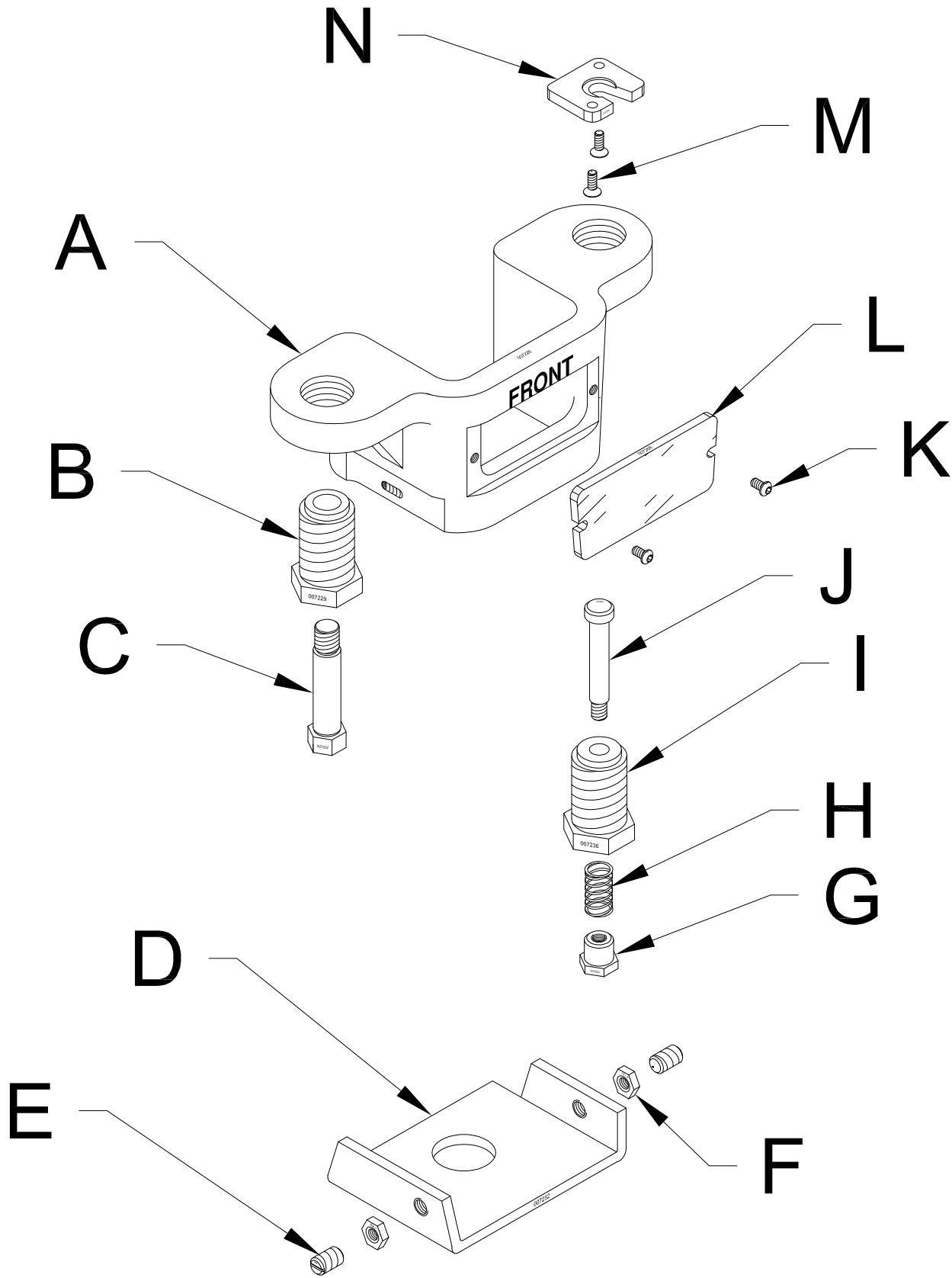
ITEM	PART #	DESCRIPTION
A	080424	Punch Bolster (Ser.#50946M & Up)
A1	080270	Punch Bolster (Ser.#50947M & Prior)
B	221425	M-16 x 60 SHCS
B1	212016	M-16 Lock Washer
C	113017	Reid Washer
D	201640	M-16 HHCS
E	006013	Die Holder (Includes F)
F	218058	M-10 x 45 Set Screw
G	006202	#82 Die Insert (2" - Includes H & GG)
H	204220	M-10 x 30 HHCS
K	080215	#40 Punch Retaining Nut
K1	080220	#45 Punch Retaining Nut
L	221315	M-12 SHCS
M & W	010239	Punch Ram & Bushing
N	080205	Lower Punch Pin
O	016625	2-1/2" Snap Ring
P	016625	2-1/2" Snap Ring
Q	080173	Upper Punch Pin & Bushing
R	210014	M-12 Jam Nut
S & T	080199	Punch Ram Strap Set
U	243101	Grease Zerk
V	203450	M-12 Hex Bolt
W & M	010239	Punch Ram & Bushing
X	080329	Punch Shroud
Y	214012	M-10 Washer
Z	224205	M-10 WLCS
AA	015440	Die Holder Spacer
BB	004123	Key
CC	080133	Insert (Includes BB)
DD	080192	Brass Spacers
EE	080211	Punch Holder
FF	221120	M-8 x 25 SHCS
GG	077145	Pin



**FIGURE 30**

## 9.3 STRIPPER ASSEMBLY

<b>ITEM</b>	<b>PART #</b>	<b>DESCRIPTION</b>
<b>A</b>	<b>007225</b>	<b>Stripper</b>
<b>A1</b>	<b>007228</b>	<b>Inc. A, D, E, F, K &amp; L</b>
<b>B</b>	<b>007229</b>	<b>Left Stripper Adjustment Screw</b>
<b>C</b>	<b>007237</b>	<b>Stripper Hex Head Stud</b>
<b>D</b>	<b>007252</b>	<b>Stripper Plate</b>
<b>E</b>	<b>001541</b>	<b>Ball Spring Screw</b>
<b>F</b>	<b>110014</b>	<b>1/2 - 13 Jam Nut</b>
<b>F1</b>	<b>007253</b>	<b>Inc. D, E &amp; F</b>
<b>G</b>	<b>007240</b>	<b>Spring Retainer</b>
<b>H</b>	<b>007241</b>	<b>Stripper Spring</b>
<b>I</b>	<b>007236</b>	<b>Right Stripper Adjustment Screw</b>
<b>J</b>	<b>007239</b>	<b>Stripper Spring Rod</b>
<b>K</b>	<b>220014</b>	<b>M-6 x 10mmFSHCS</b>
<b>L</b>	<b>007268</b>	<b>2-1/4 x 5 Sight Glass</b>
<b>M</b>	<b>230007</b>	<b>M-6 x 16mm FSHCS</b>
<b>N</b>	<b>007244</b>	<b>Stripper Retainer</b>
<b>O</b>	<b>007233</b>	<b>Complete Stripper</b>



**FIGURE 31**

## **9.4 URETHANE STRIPPER**

<b>ITEM</b>	<b>PART #</b>	<b>DESCRIPTION</b>
<b>A</b>	<b>025453</b>	<b>Spring Nut</b>
<b>B</b>	<b>025452</b>	<b>3.5" Stripper Top Plate</b>
<b>C</b>	<b>026082</b>	<b>Stripper Guard</b>
<b>D</b>	<b>220014</b>	<b>M-6 x 10mm BN 19</b>
<b>E</b>	<b>221329</b>	<b>M-12 x 70mm</b>
<b>F</b>	<b>025443</b>	<b>Post Retainer</b>
<b>G</b>	<b>025455</b>	<b>Urethane Spring</b>
<b>H</b>	<b>025456</b>	<b>Spring Spacer</b>
<b>I</b>	<b>025454</b>	<b>Spring Post</b>
<b>J</b>	<b>025447</b>	<b>Stripper Plate</b>
<b>K</b>	<b>218056</b>	<b>M-10 x 30mm Set Screw</b>
<b>L</b>	<b>025450</b>	<b>Stripper Shield</b>
<b>M</b>	<b>073691</b>	<b>M-6 x 12mm Knob</b>
<b>N</b>	<b>026070</b>	<b>Retro-Fit Kit - 010239 required</b>
<b>O</b>	<b>010239</b>	<b>Bushing &amp; Ram Kit</b>

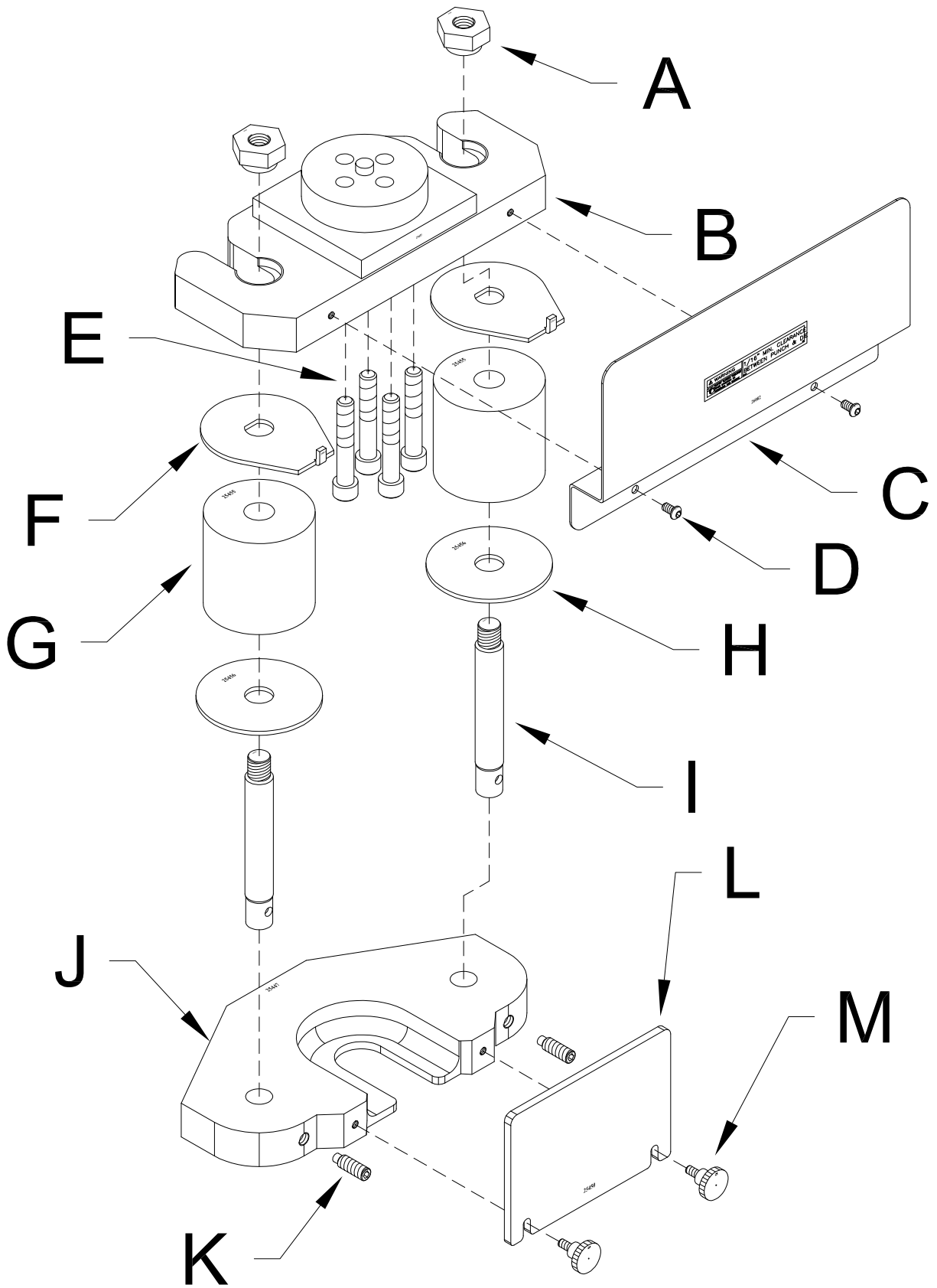
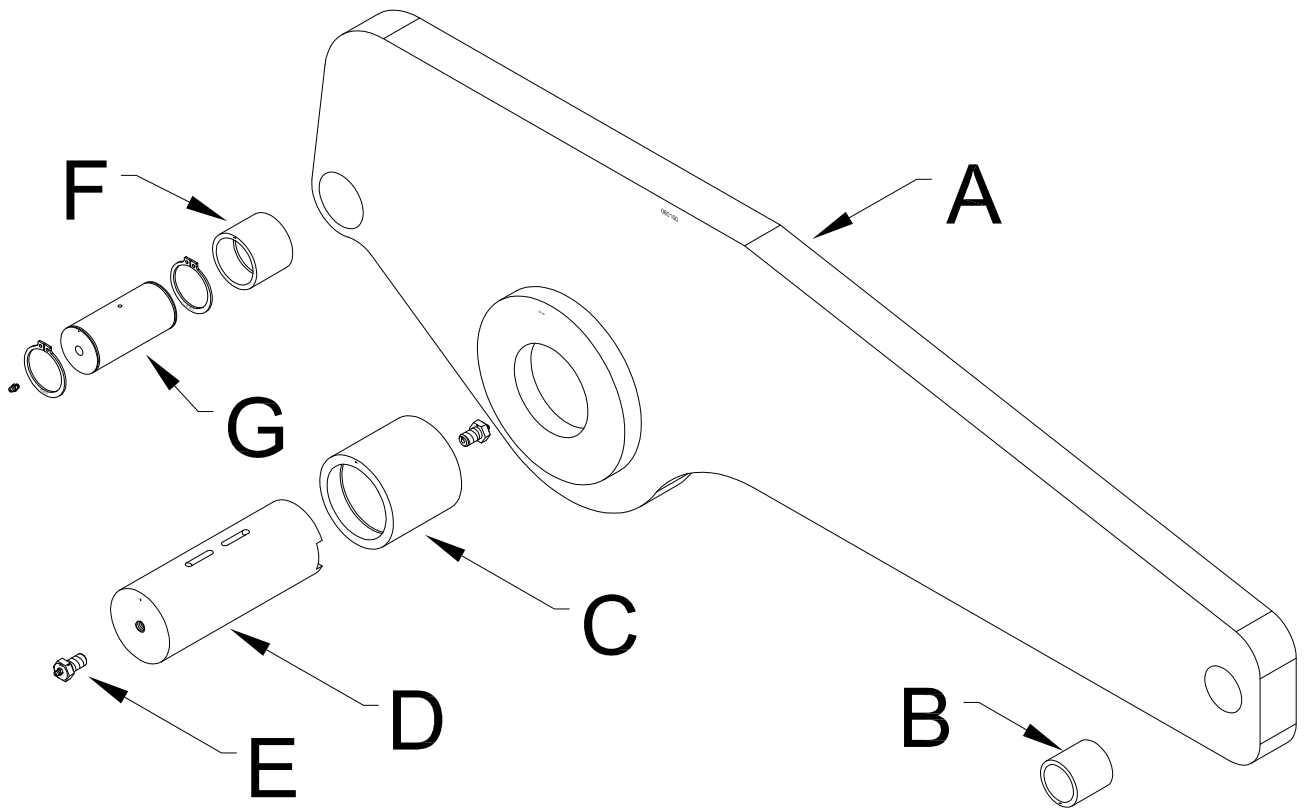


FIGURE 32

## 9.5 UPPER ARM ASSEMBLY

<b>ITEM</b>	<b>PART #</b>	<b>DESCRIPTION</b>
<b>A</b>	<b>080160</b>	<b>Upper Arm (Includes B, C &amp; J)</b>
<b>B</b>	<b>080169</b>	<b>Connecting Link Bushing</b>
<b>C</b>	<b>012070</b>	<b>Upper Arm Bushing</b>
<b>D</b>	<b>080155</b>	<b>Main Pin Upper Arm</b>
<b>E</b>	<b>080174</b>	<b>Main Pin Grease Bolt</b>
<b>F</b>	<b>080173</b>	<b>Punch Pin &amp; Kit (Includes G, H, I &amp; J)</b>
<b>G</b>	<b>016625</b>	<b>2-1/2" Snap Ring</b>
<b>H</b>	<b>080200</b>	<b>Punch Ram Pin</b>
<b>I</b>	<b>243101</b>	<b>M-6 x 13.5 OAL Gold Zerk</b>
<b>J</b>	<b>033205</b>	<b>Shear Beam Bushing</b>

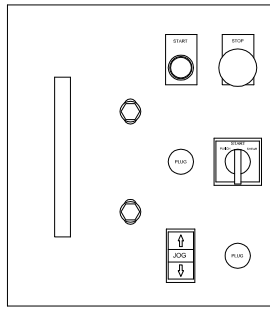




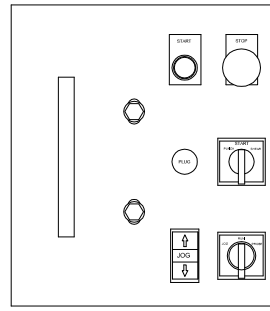
**FIGURE 33**

## **9.6 UPPER PANEL & STROKE CONTROL**

<b>ITEM</b>	<b>PART #</b>	<b>DESCRIPTION</b>
1	007711	Control Cover
2	077907	Edge Material
3	073206	M-6 Hex Nut
4	562040	Wire Cable Clamp
5	220020	M-6 x 16 BHCS
6	011862	E-Stop Operator
7	011500	Stop Legend
8	011872	Mounting Adaptor
9	011867	Contact Block
10	011879	Start Operator (Includes 8, 12 & 27)
11	011509	Start Legend
12	011874	Contact Block
13	011501	Punch/Start/Shear Legend
14	011868	Three Position Switch
15	158101	Hole Plug
16	080061	Handles
17	004087	Pointer
18	004086	Limit Switch Mount
19	562113	Limit Switch
20	073450	M-4 x16 SHCS
21	006282	Metering Boss
22	011502	Jog/Run/Probe Legend
23	011868	Three Position Switch
24	003200	Jog Legend
25	011884	Jog Button Assembly
26	011874	Contact Block
27	011873	Pilot Light
28	660457	Cord
29	562501	Cord Grip
30	011912	Ground Wire
31	221322	M-12 x 60 SHCS
32	004085	Scale
33	007710	Complete Assembly



6509 9012 12012  
STANDARD BOX



6509 9012 12012  
WITH PROBE

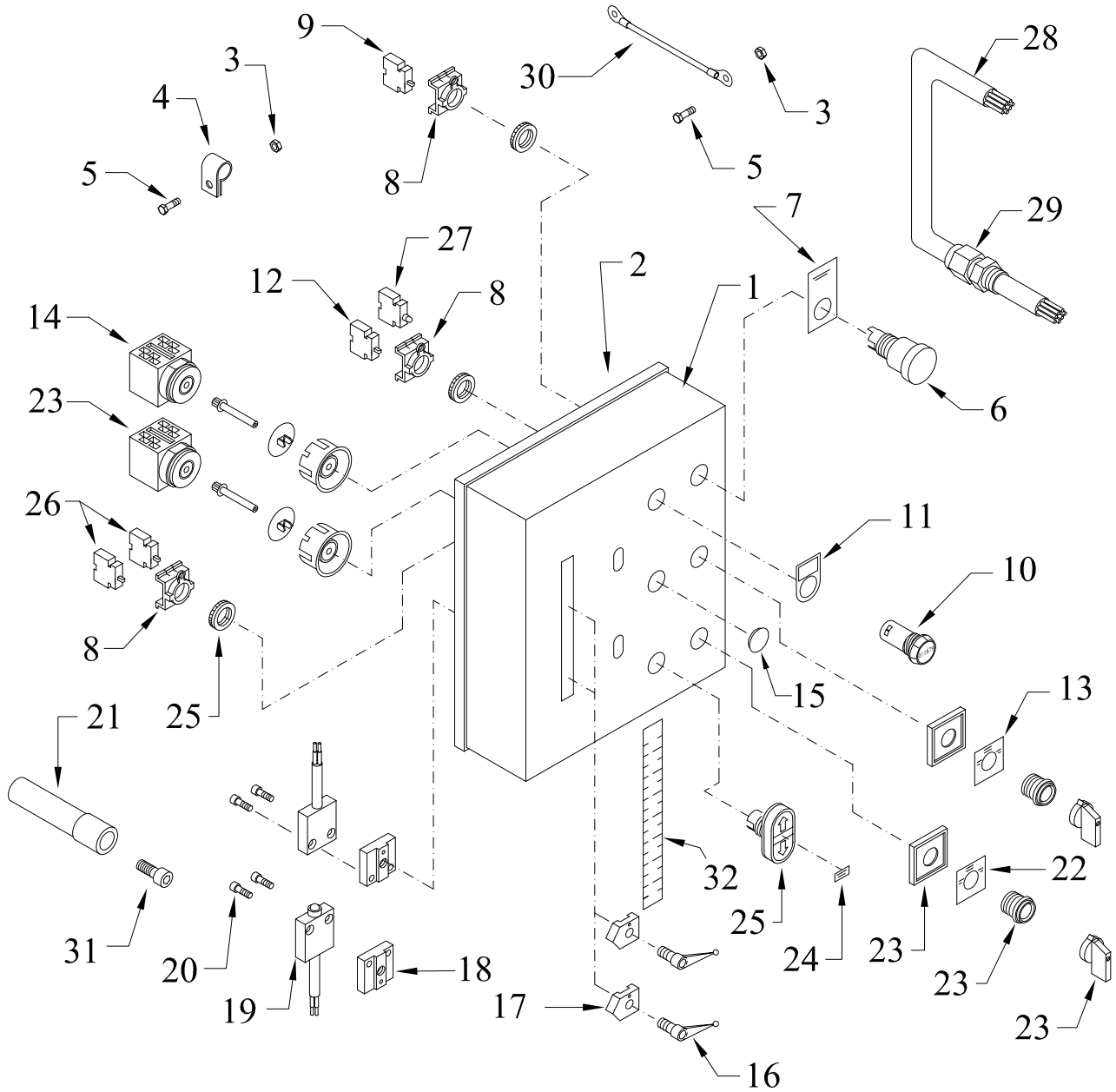


FIGURE 34

## 9.7 HOLD DOWN ASSEMBLY

<b>ITEM</b>	<b>PART #</b>	<b>DESCRIPTION</b>
<b>A</b>	<b>013185</b>	<b>Guard</b>
<b>B</b>	<b>080342</b>	<b>Housing</b>
<b>C</b>	<b>080337</b>	<b>Post-Left</b>
<b>D</b>	<b>080336</b>	<b>Post-Right</b>
<b>E</b>	<b>017340</b>	<b>Key 7 x 7 x 24</b>
<b>F</b>	<b>080347</b>	<b>Gear-Left</b>
<b>G</b>	<b>003105</b>	<b>Label (Warning)</b>
<b>H</b>	<b>080348</b>	<b>Gear-Center</b>
<b>I</b>	<b>080349</b>	<b>Gear-Right</b>
<b>J</b>	<b>080338</b>	<b>Wheel Shaft</b>
<b>K</b>	<b>080344</b>	<b>Base</b>
<b>L</b>	<b>201110</b>	<b>M-6 x 12 HHCS</b>
<b>M</b>	<b>141415</b>	<b>1/4 x 1-3/4 Roll Pin</b>
<b>N</b>	<b>017342</b>	<b>Hold-Down Crank (Includes O, P &amp; Q)</b>
<b>O</b>	<b>210014</b>	<b>M-12 Jam Nut</b>
<b>P</b>	<b>017347</b>	<b>Handle</b>
<b>Q</b>	<b>221335</b>	<b>M-12 SHCS</b>
<b>R</b>	<b>221120</b>	<b>M-8 SHCS</b>
<b>S</b>	<b>080339</b>	<b>Wheel Washer</b>
<b>T</b>	<b>221320</b>	<b>M-12 x 50mm SHCS</b>
<b>U</b>	<b>212014</b>	<b>M-12 Lock Washer</b>
<b>V</b>	<b>017341</b>	<b>Complete Hold Down</b>

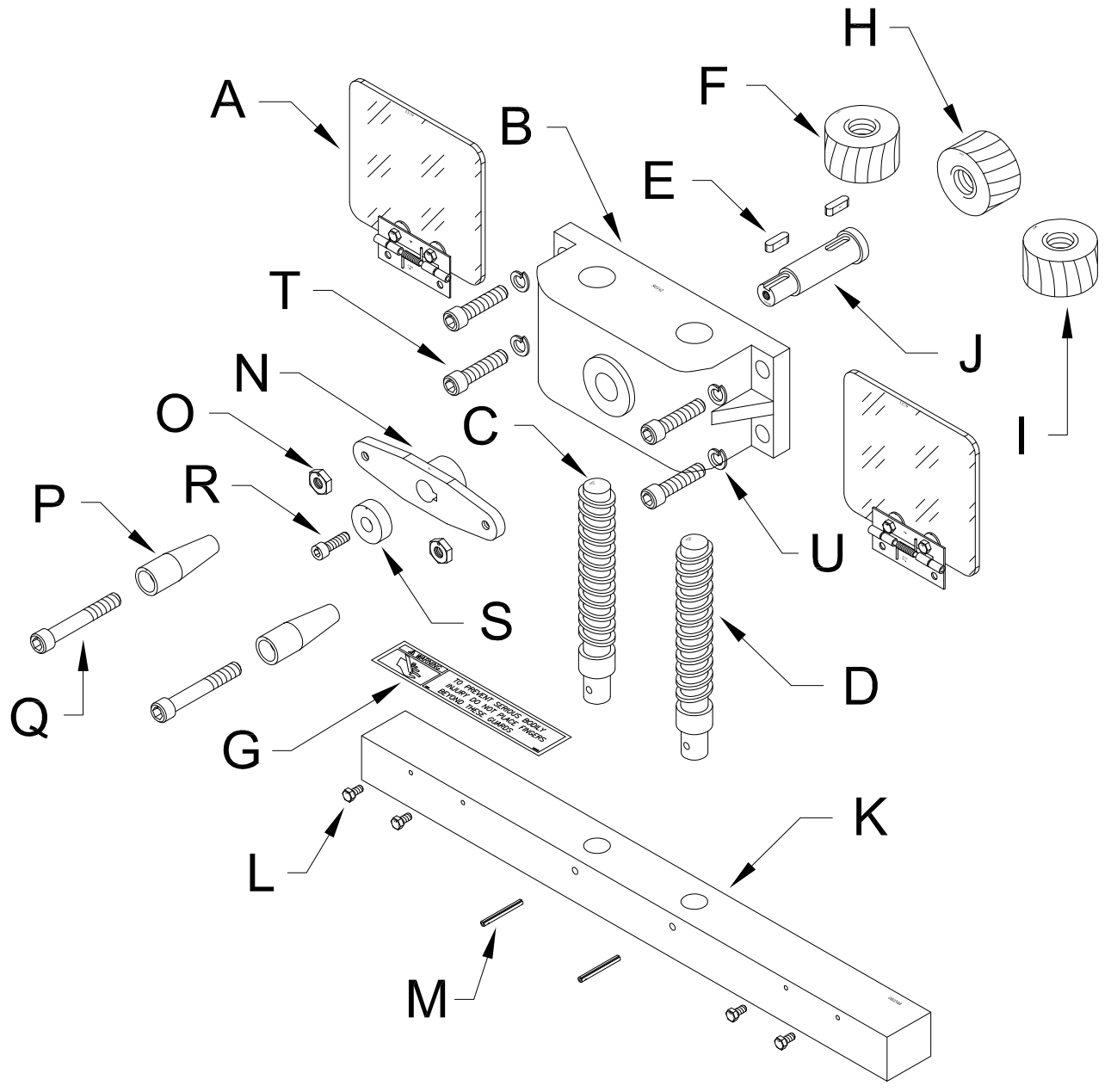


FIGURE 35

## **9.8 CYLINDER**

<b>ITEM</b>	<b>QTY</b>	<b>PART #</b>	<b>DESCRIPTION</b>
<b>A</b>	<b>1</b>	<b>006190</b>	<b>Upper Punch Pin</b>
<b>B</b>	<b>1</b>	<b>080360</b>	<b>Cylinder Clevis</b>
<b>C</b>	<b>1</b>	<b>080371</b>	<b>Cylinder (Includes B)</b>
<b>C1</b>	<b>1</b>	<b>080375</b>	<b>Cylinder Seal Kit</b>
<b>D</b>	<b>1</b>	<b>080365</b>	<b>Cylinder Base Pin</b>
<b>E</b>	<b>4</b>	<b>016620</b>	<b>2" Snap Ring</b>
<b>F</b>	<b>1</b>	<b>080235</b>	<b>Cylinder Guard 120T</b>
<b>G</b>	<b>4</b>	<b>224205</b>	<b>M-10 x 16mm WLCS</b>
<b>H</b>	<b>1</b>	<b>080147</b>	<b>Rear Shroud (Ser.#50911M &amp; Prior)</b>
<b>H1</b>	<b>1</b>	<b>080423</b>	<b>Rear Shroud (Ser.#50912M &amp; Up)</b>
<b>I</b>	<b>1</b>	<b>080142</b>	<b>Front Shroud (Ser.#50911M &amp; Prior)</b>
<b>I1</b>	<b>1</b>	<b>080422</b>	<b>Front Shroud (Ser.#50912M &amp; Up)</b>

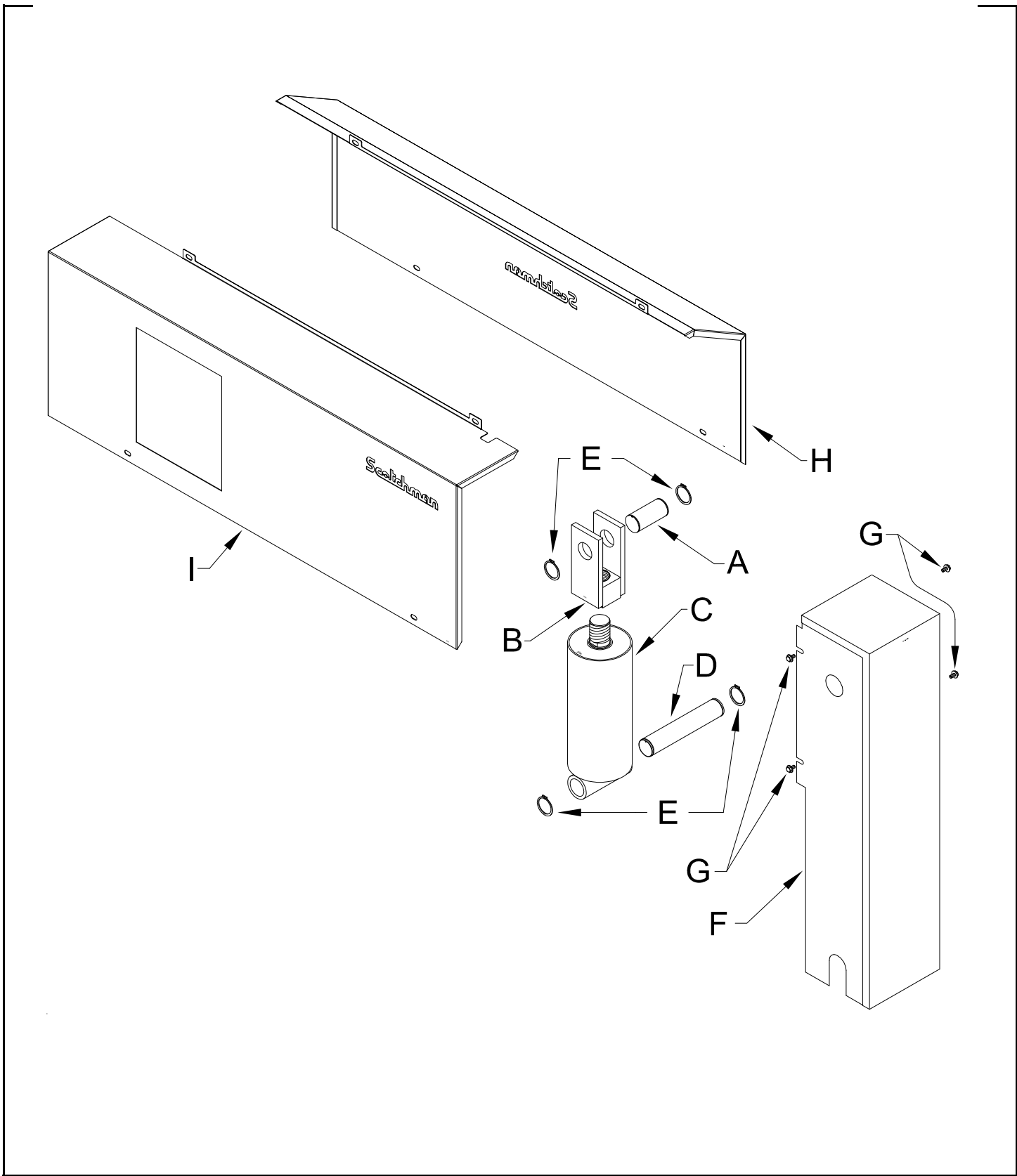


FIGURE 36

## 9.9 CONNECTING LINK ASSEMBLY

<b>ITEM</b>	<b>QTY</b>	<b>PART#</b>	<b>DESCRIPTION</b>
<b>A</b>	<b>1</b>	<b>080260</b>	<b>Connecting Link Assembly</b>
<b>B</b>	<b>2</b>	<b>006190</b>	<b>Upper Punch Pin</b>
<b>C</b>	<b>4</b>	<b>016620</b>	<b>2" Snap Ring</b>
<b>D</b>	<b>2</b>	<b>243101</b>	<b>M-6 x 13.5 OAL Gold Zerk</b>



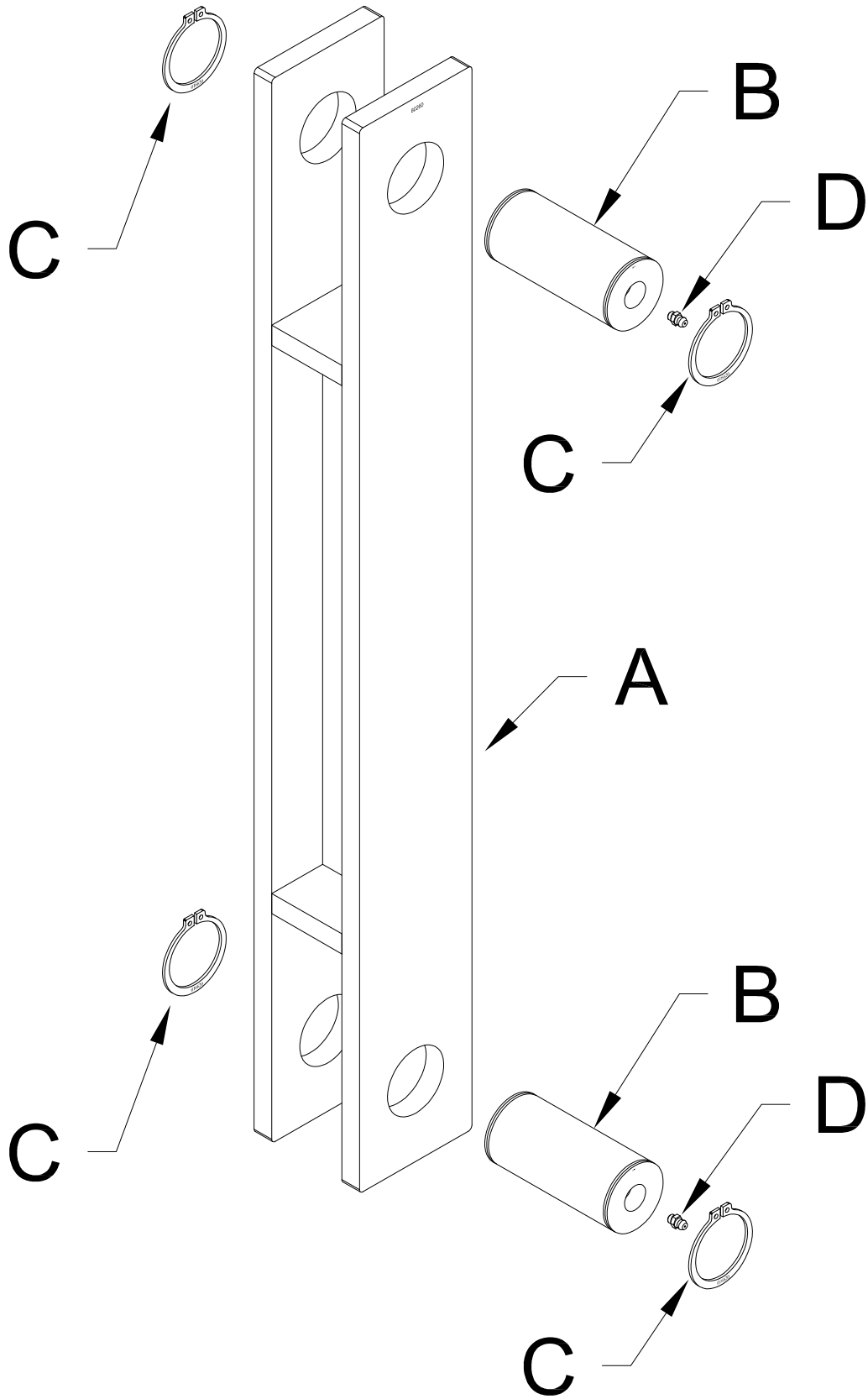
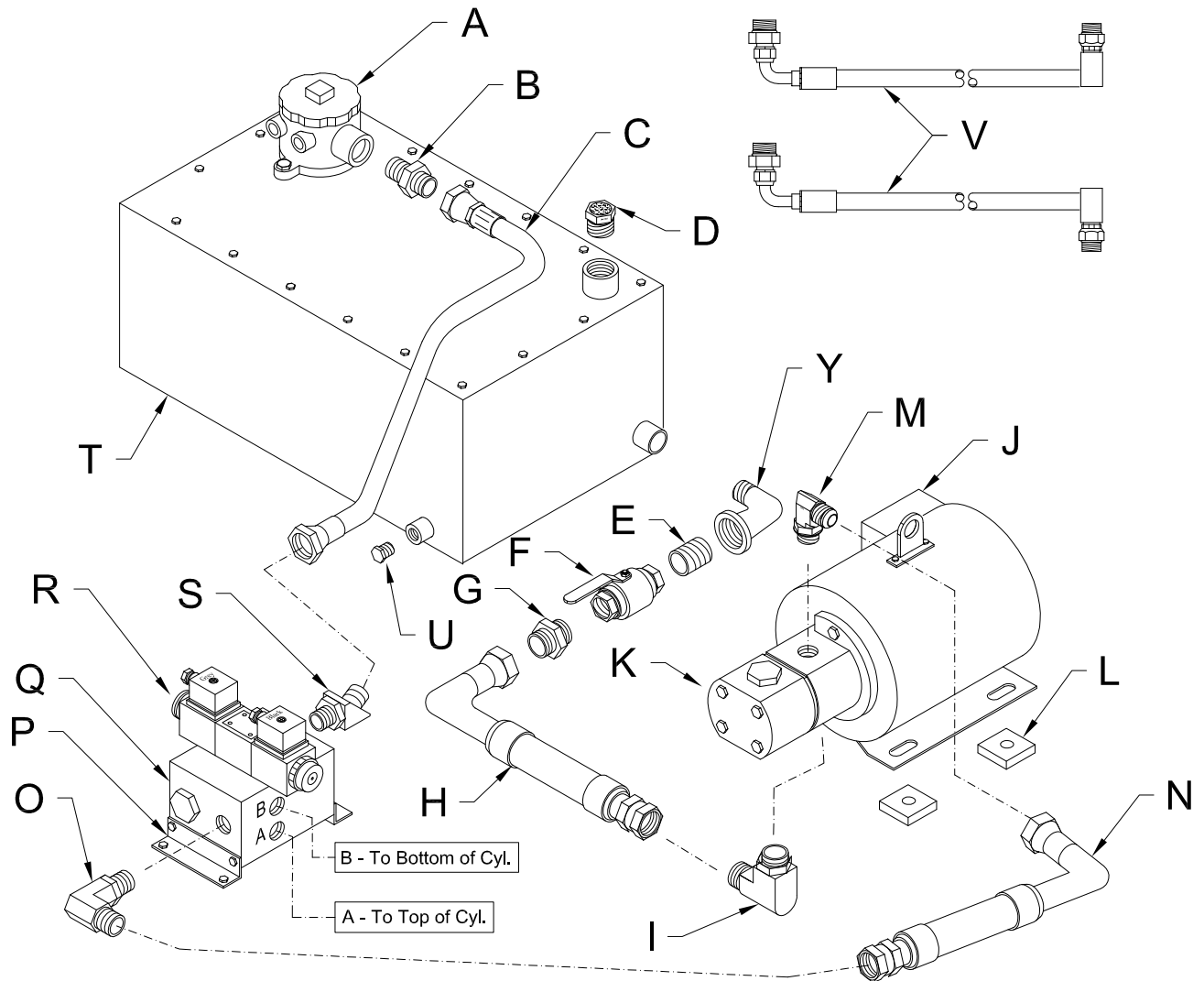


FIGURE 37

## 9.10 POWER UNIT

ITEM	PART #	DESCRIPTION
A	006860	Return Filter - Black Cap - XL
A1	006875	Filter Housing
B	N/A	Fitting
C	006840	Return Hose
D	016088	Filler Breather Cap
E	017105	1" Close Nipple (Obsolete)
F	003810	1" SAE Ball Valve
G	N/A	Fitting
H	006830	Suction Hose
I	N/A	Fitting
J	Per Machine	Motor (Shaftless-Ser.# 50808 & Up)
K	007340	Pump
K1	007344	Marzocchi Pump Seal Kit (Old Models) Model PD2AD20AC & 2D20-P216
K2	007342	Marzocchi Pump Seal Kit (New Models) Model GPHC2A-D20/20-P606
L	006960	Vibration Dampener
M	003952	12MJ - 12MB90 Adaptor
N	006835	Pressure Hose
O	N/A	Fitting
P	N/A	Manifold Mounts
Q	006870	Manifold w/Valve & Coils
Q1	006872	Manifold
Q2	006865	Relief Cartridge
R	552135	Sales Valve Assembly
R1	552180	Valve (Includes 552181 Coils)
R2	552181	Coil (For 552180)
S	N/A	Fitting
T	N/A	Hyd. Reservoir
U	158050	Square Head Plug
V	003780	90/120 Cylinder Hose 32" OAL
W	003780	90/120 Cylinder Hose 32" OAL
X	003925	Suction Screen
Y	016089	1" 90 Degree Street Elbow



**FIGURE 38**

## 9.11 ELECTRICAL UNIT

ITEM	PART #		DESCRIPTION
	DIL	DIL-M	
A		011930	Transformer (Without Work Light)
A1		011861	Transformer (With Work Light)
B		011933	Primary Fuse
C		011835	Secondary Fuse
D		011846	Coil
E		562453	Foot Switch
E1		011753	Cord (Foot Switch)
E2		562452	Micro Switch (Foot Switch)
F		011854	Disconnect Switch
F1		011895	Disconnect Switch Knob
G	See note.	011975	Contactor
G1	See note.	011975	Contactor - 230V 3PH & 1PH
	See note.	011975	Contactor - 460V & 575V
H	See note.	011999	Overload (230 Volt 3ph & 1ph) Z00-24
H1	See note.	011998	Overload (460 Volt) Z00-10
H2	See note.	011998	Overload (575 Volt) Z00-10
I	011873		Start Switch Lamp
J	060083		Aux. Contact

☒ **NOTE: IF WE ARE OUT OF STOCK WITH THE DIL (OLD STYLE) CONTACTOR OR OVERLOAD, BOTH THE DIL-M (NEW STYLE) CONTACTOR AND OVERLOAD MUST BE PURCHASED TOGETHER AS THE OLD STYLE AND NEW STYLE ARE NOT INTERCHANGEABLE.**

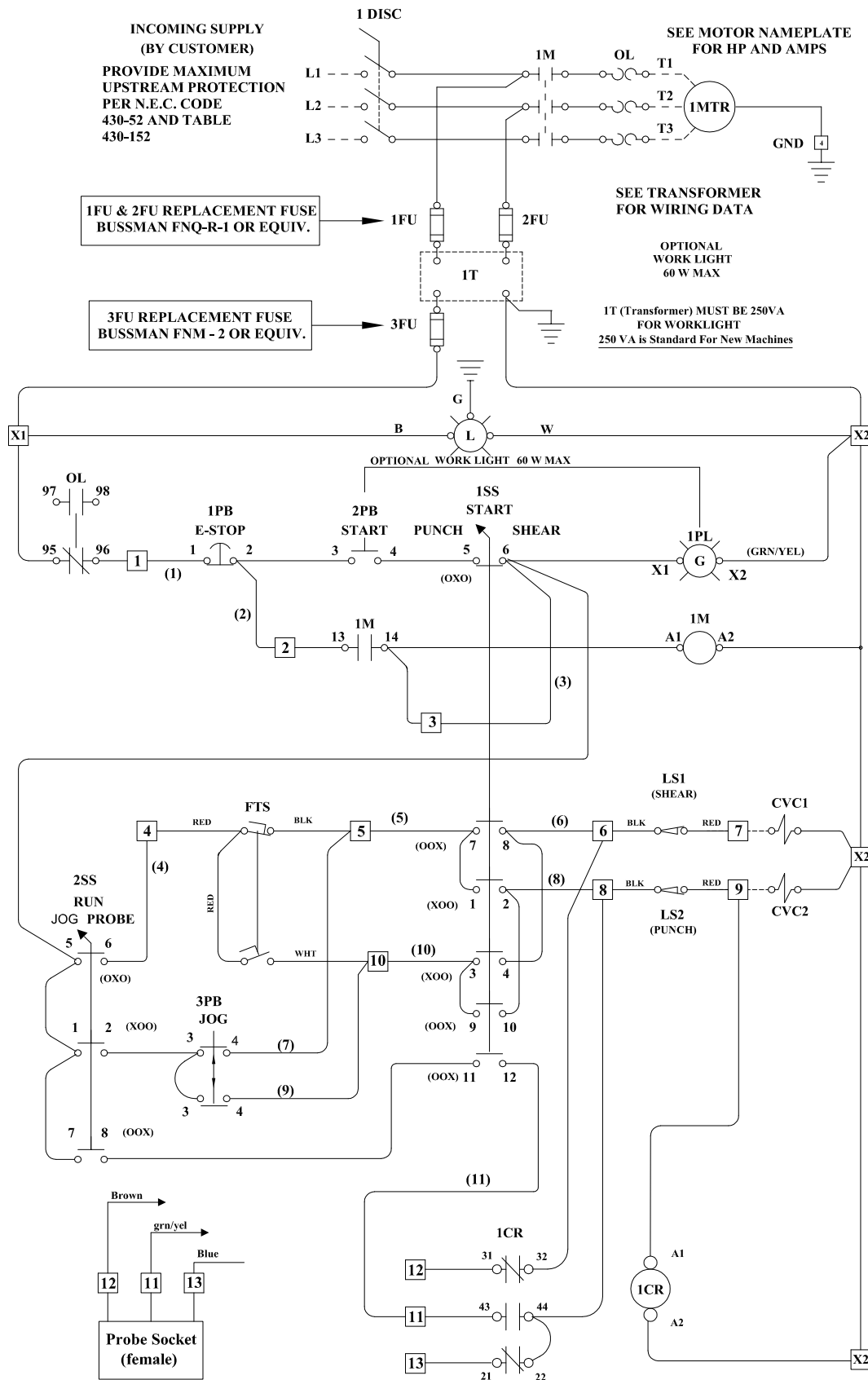
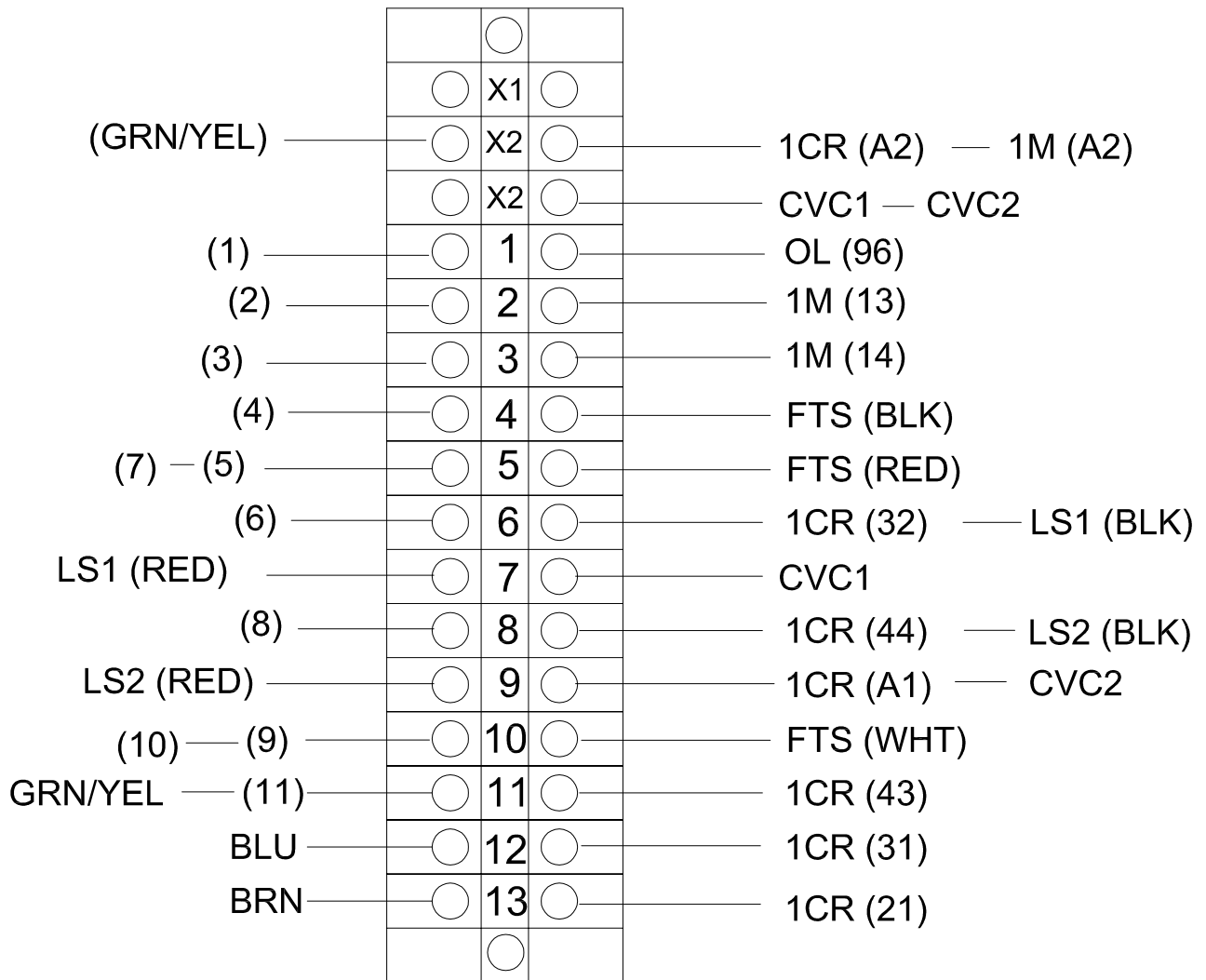


FIGURE 39



**FIGURE 40**



*SCOTCHMAN INDUSTRIES, INC.  
180 E HIGHWAY FOURTEEN  
P.O BOX 850  
PHILIP, SD 57567*

*#40 STYLE*

*TOOLING*

*PARTS*

*MANUAL*

*DECEMBER 2014*

# TABLE OF CONTENTS

---

SECTION	DESCRIPTION	PAGE #
1.0	INTRODUCTION	3
2.0	TOOLING PARTS	4
2.1	6 x 6 Angle Shear	4
2.1A	Angle Shear Miter Guide	6
2.2	Ten Cavity Rod Shear	8
2.3	6 x 6 x Ninety Degree Notcher	10
2.4	3 x 3 x Ninety Degree Vee Notcher (D.O. 85)	12
2.5	Rectangle Notcher	14
2.6	12", 18" & 24" Brakes	16
2.7	Brake Guards	18
2.8	Gauging Tables	20
2.9	6" Angle Iron Brake	22
2.10	6" Brake (D.O. 85 Only)	24
2.11	Channel Shear	26
2.12	Pipe Notcher	28
2.13	Picket Tool	30
2.14	Square Tube Shear	32
2.15	Strut Shear	34
2.16	48" Electric Back Gauge	36
2.17	48" Manual Back Gauge	38
2.18	Tool Table Extension	40
2.19	Conveyor System	42
2.20	Gauging Tables	44
2.21	4' Punch Gauging System	46
2.22	8' Punch Gauging System	52
2.23	Second Hole Punch (D.O. 85 Only)	54
2.24	Second Hole Punch Stripper (D.O. 85 Only)	56
2.25	Die Holders	58
2.26	Punch Retaining Nuts	60
2.27	Urethane Stripper	62
2.28	Laser Light	64
3.0	PUNCHES AND DIES	66



# 1.0 INTRODUCTION

---

---

**This manual contains all of the optional tools available for all Scotchman model Ironworkers, except the PORTA-FAB 45, 4014CM, 4014TM, 50514CM and Model 5014-TM.**

**☒ PLEASE NOTE THAT THERE MAY BE PARTS PICTURED THAT DO NOT PERTAIN TO THE PARTICULAR MODEL THAT YOU OWN. PLEASE PAY ATTENTION TO SPECIFIC MODELS WHEN ORDERING PARTS.**

**This manual is for parts ordering information, only. All operating and set-up instructions are contained in the operator's manual that you received with your machine or the instructions that came with the tool.**

## 2.0 TOOLING PARTS

### 2.1 6 X 6 ANGLE SHEAR (Used on machines after 08/1995)

6509: Ser.# 5298FF

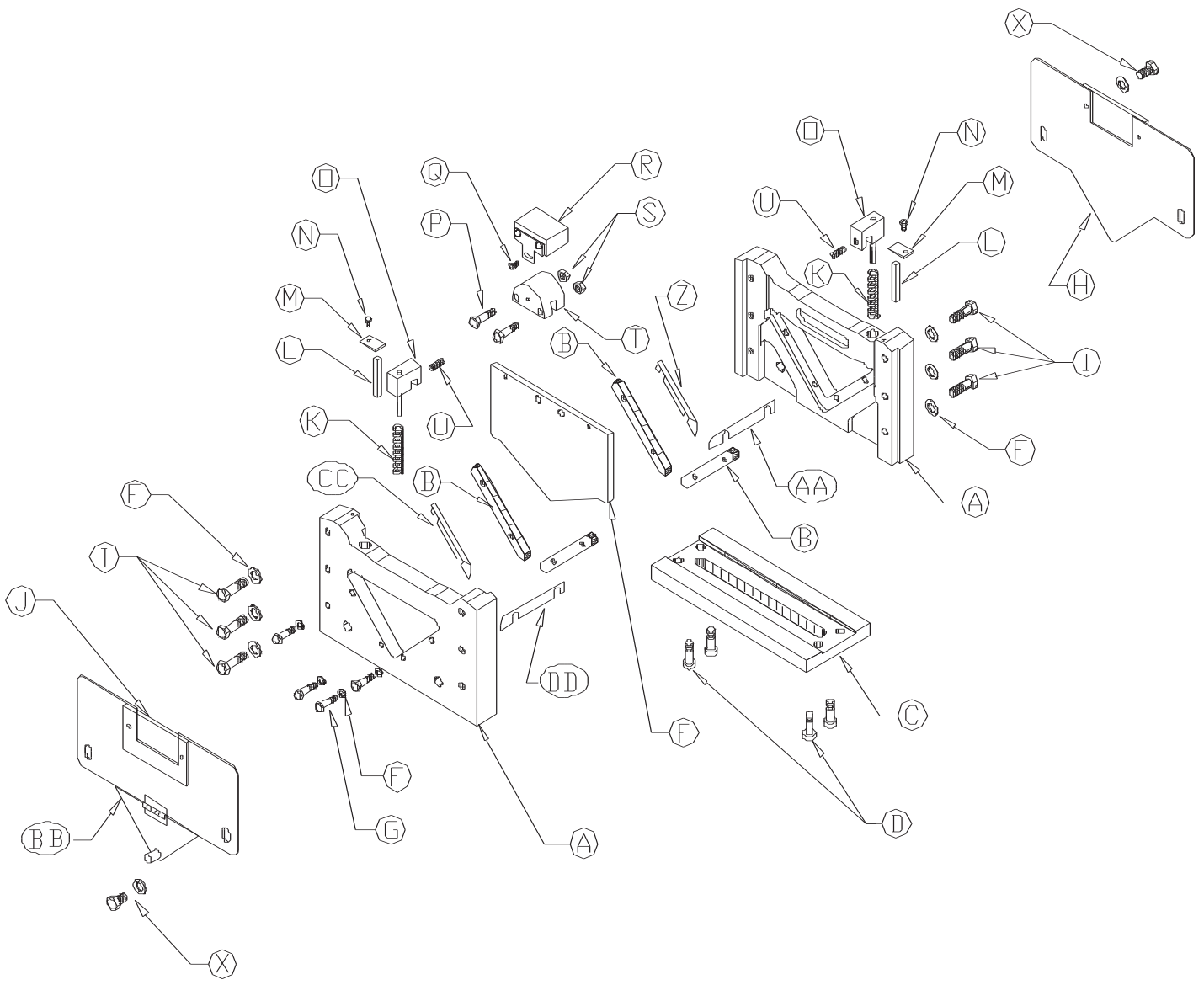
9012: Ser.# 20874

12012: Ser.# 50843

ITEM	COMMON PART #'S	DESCRIPTION
A	026728	Housing
B	026735	Lower Blades
C	026732	Base
D	221210	M-10 x 25 SHCS
E	026237	Upper Blade
F	213012	M-10 Lock Washer
G	201212	M-10 x 35 HHCS
H	026740	Rear Guard Assembly (2 Required)
I	201230	M-10 x 70 HHCS
J	026242	Sight Glass
K	016118	Spring
L	026243	Wear Strip
M	026746	Retainer
N	201110	M-6 x 12 HHCS
O	026744	Spring Block
P	204225	M-10 x 60 HHCS
Q	220014	M-6 x 10 BHCS
R	016247	Slider Block Assembly
S	217012	M-10 Hex Nut
T	026209	Pressure Block
U	219040	M-10 x 10 Set Screw
V	243101	Grease Nipple (Not pictured)
X	201210	M-10 x 20 HHCS
Y	026727	Complete Angle Shear
Z	016233	Shim
AA	016234	Shim
BB	026747	Front Guard Assembly
CC	016232	Shim & Guide - (Left)
DD	016230	Shim & Guide - (Right)
	026727	Complete Tool

#### OPTIONAL TOP BLADES

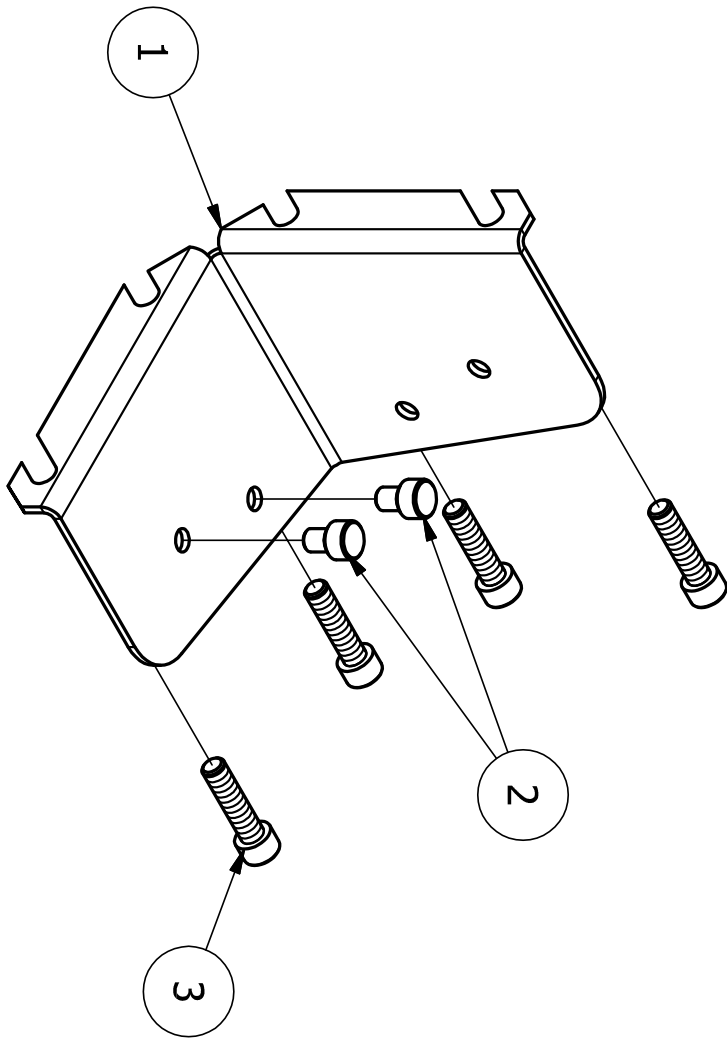
016238	4 x 3-1/2, 3-1/2 x 3 & 3 x 2-1/2
016239	4 x 3, 2-1/2 x 2 & 2 x 1-1/2
016240	6 x 4, 5 x 3-1/2 & 3 x 2
016241	6 x 3-1/2 & 5 x 3
026708	Quick Change Hardware For Unequal Blade



## **2.1A ANGLE SHEAR MITER GUIDE**

---

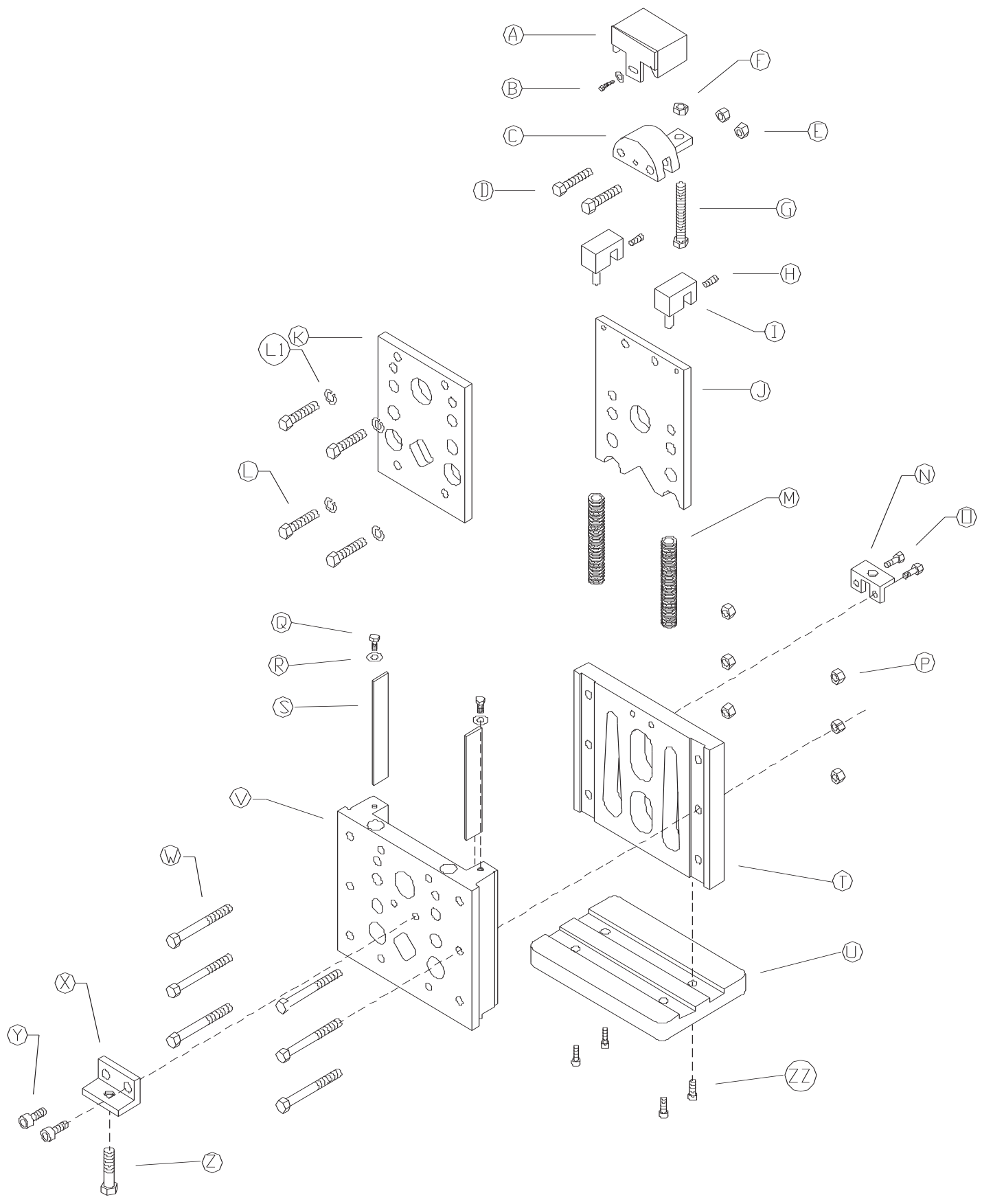
<b>ITEM</b>	<b>QTY</b>	<b>PART #</b>	<b>DESCRIPTION</b>
<b>1</b>	<b>1</b>	<b>026736</b>	<b>Angle Shear Miter Attachment</b>
<b>2</b>	<b>2</b>	<b>026698</b>	<b>Rest Button</b>
<b>3</b>	<b>4</b>	<b>221220</b>	<b>M-10 x 40 DIN912 SHCS</b>



## 2.2 ROD SHEAR

---

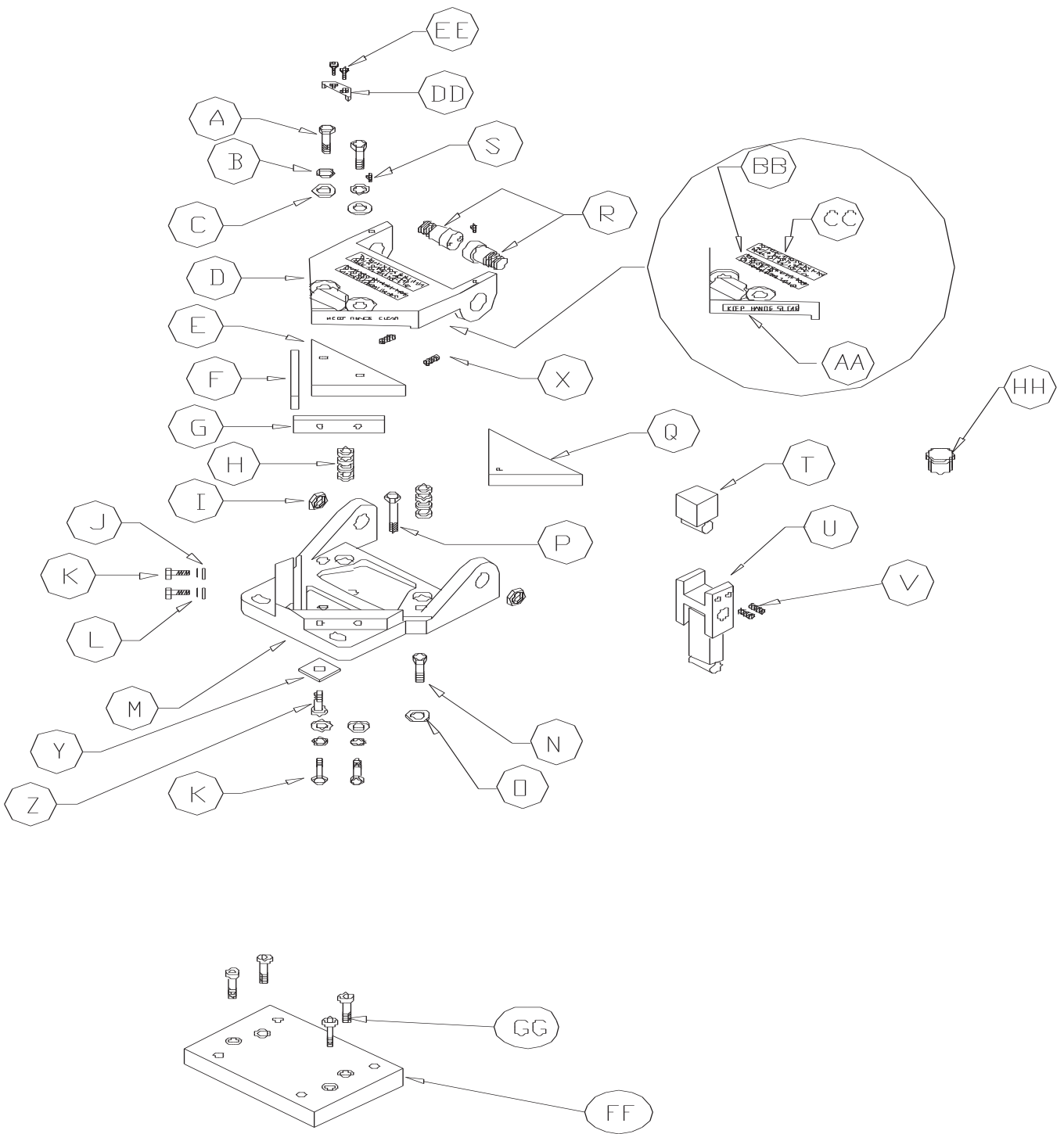
ITEM	COMMON PART #'S	9012	6509 DO-70 DO-95 12012	FI-5109 DO-100 DO-120 DO-135 DO-150	FI-8507 FI-8510	DESCRIPTION
A		026247	016247	026247	027375	Slider Block
B	224005					M-6 x 12 BHCS
C		026258	026258	026258	N/A	Pressure Cap
D	204225					M-10 x 60 HHCS
E	217012					M-10 Lock Nut
F	215012					M-10 Nylon Lock Nut
G	201235					M-10 x 80 HHCS
H	219040					M-10 x 10 Set Screw
I	026283					Spring Return Block
J	026281					Moving Blade
K	026280					Stationary Blade
L	201215					M-10 x 40 HHCS
L1	212012					M-10 Lock Washer
M	016119					Die Spring
N	026778					Stroke Mount
O	221115					M-8 x 20 SHCS
P	217012					M-10 Lock Nut
Q	201110					M-6 x 12 SHCS
R	026746					Retainer
S	016279					Wear Strip
T	026775					Rear Side Plate
U	026278					Base
V	026776					Front Side Plate
W	203235					M-10 x 90 HHCS
X	026779					Front Stop
Y	221210					M-10 x 25 SHCS
Z	201415					M-12 x 40 HHCS
ZZ	221210					M-10 x 25 SHCS
	026774					Complete Tool



## 2.3 6 X 6 NINETY DEGREE NOTCHER

ITEM	COMMON PART #'S	6509	9012	12012	DO-70 DO-95	DO-100 DO-120 DO-135 DO-150	FI-8510	DO-85	DESCRIPTION
A	205422								M-12 x 55 HHCS
B	212014								M-12 Lock Washer
C	213014								M-12 Washer
D	026160								Top Casting
E	026166								Upper Blade
F	026164								Lower Blade-Short
G	026165								Lower Blade-Long
H	160047								1 x 3 Die Spring
I	026169								M-24 Greer Nut
J	214012								M-10 Washer
K	201215								M-10 x 40 HHCS
L	212012								M-10 Lock Washer
M	026163								Lower Casting
N	201640								M-16 x 90 HHCS
O	113017								M-16 Washer
P				201625	201625	201625	201620		M-16 x 65 HHCS
Q	016162								Rubber Slug Return
R	026167								Pivot Pin
S	243101								M-6 Grease Zerk
T	016174								Punch Ram Pusher
U		016161	016161	016163	016161	016163			Beam Block Ass'y
V	218048								M-10 x 20 Set Screw
X	218048								M-10 x 20 Set Screw
Y		016177	016177						Heavy Washer
Z		201650	201650						M-16 x 100 HHCS
BB	003155								Label (Magnetic Probe)
CC	003145								Label (Remove Tool)
DD	016165								Notcher Clip
EE	230005								M-6 x 12 BHCS
FF				080860		080860	080860		Riser
GG						221420	221420		M-16 x 50 SHCS
HH				080831	001200	080831	001212		Punch Pusher
		016600	016610	016615	016628	016635	016617	016632	Complete 6 x 6 Notcher



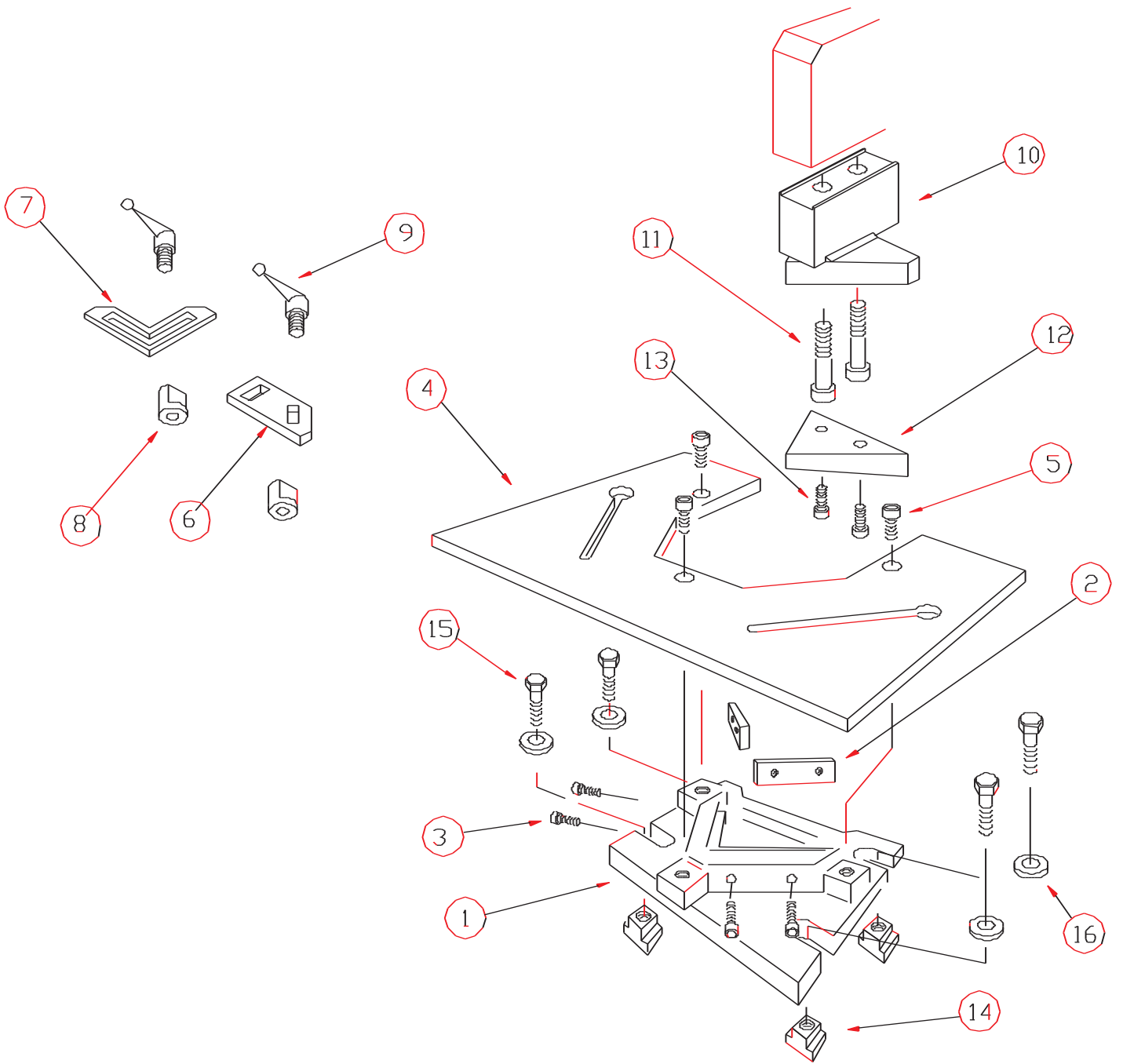


## **2.4 3 X 3 X NINETY DEGREE VEE NOTCHER**

---

(NOTCH STATION - D.O.85 ONLY)

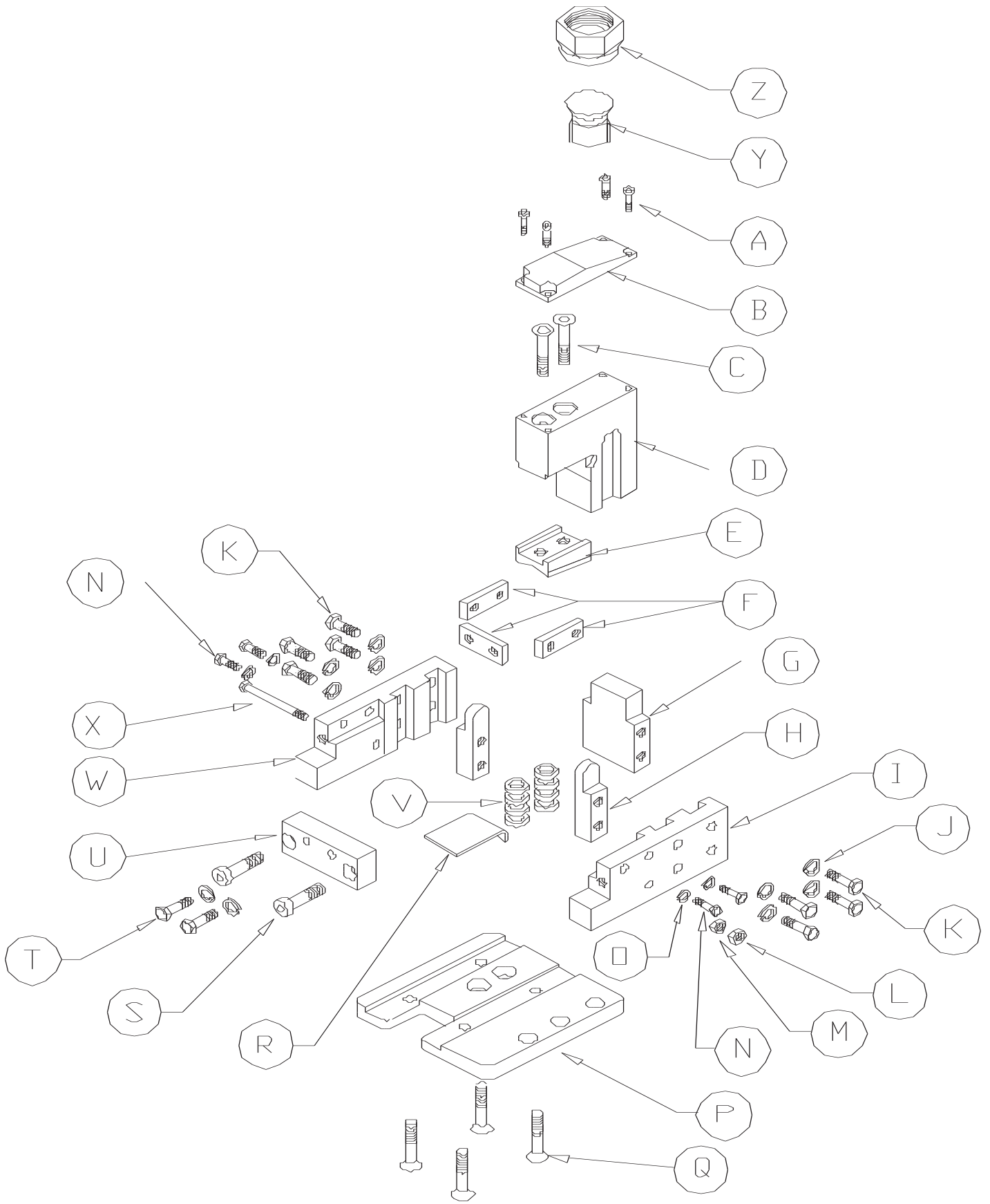
<b>ITEM</b>	<b>PART #</b>	<b>DESCRIPTION</b>
1	025906	Lower Blade Holder
2	025269	Bottom Blade
3	221314	M-12 x 35 SHCS
4	025937	Support Table
5	221210	M-10 x 25 SHCS
6	025904	Table Guide
7	014216	Angle Guide
8	025934	Table Nut
9	080061	Handles
10	025924	Top Blade Carrier
11	221825	M-20 x 70 SHCS
12	025927	Top Blade
13	221210	M-10 x 25 SHCS
14	026625	M-16 Tee Nut
15	203620	M-16 x 50 HHS
16	113017	M-16 Washer
	025490	Complete Tool



## 2.5 RECTANGLE NOTCHER

---

ITEM	COMMON PART #'S	6509 9012	12012	2450	DESCRIPTION
A	221005				M-16 SHCS
B	024012				Striker Cap
C	221320				M-12 x 50 SHCS
D	026003				Ram
E	026014				Upper Blade
F	026016				Lower Blade (3 Required)
G	026022				Cross Member
H	026024				Ram Guide (2 Required)
I	026005				Side Plate-Right
J	212014				M-12 Lock Washer
K	201415				M-12 x 40 HHCS
L	210012				M-10 Jam Nut
M	215012				M-10 Nylon Lock Nut
N	203212				M-10 x 30 HHCS
O	212012				M-10 Lock Washer
P	026008				Base
Q	230407				M-12 x 20 FSHCS
R	024020				Slug Ramp
S	221315				M-12 x 40 SHCS
T	201215				M-10 x 40 HHCS
U	026010				Blade Seat
V	160047				1 x 3 Die Spring
W	026006				Side Plate-Left
X	201250				M-10 x 130 HHCS
Y		N/A	080831	080831	Punch Pusher
Z		N/A	080220	016096	#45 Punch Retaining Nut
	003145				Label-Remove Tool (Not Pictured)
	026000				Complete Rectangle Notcher



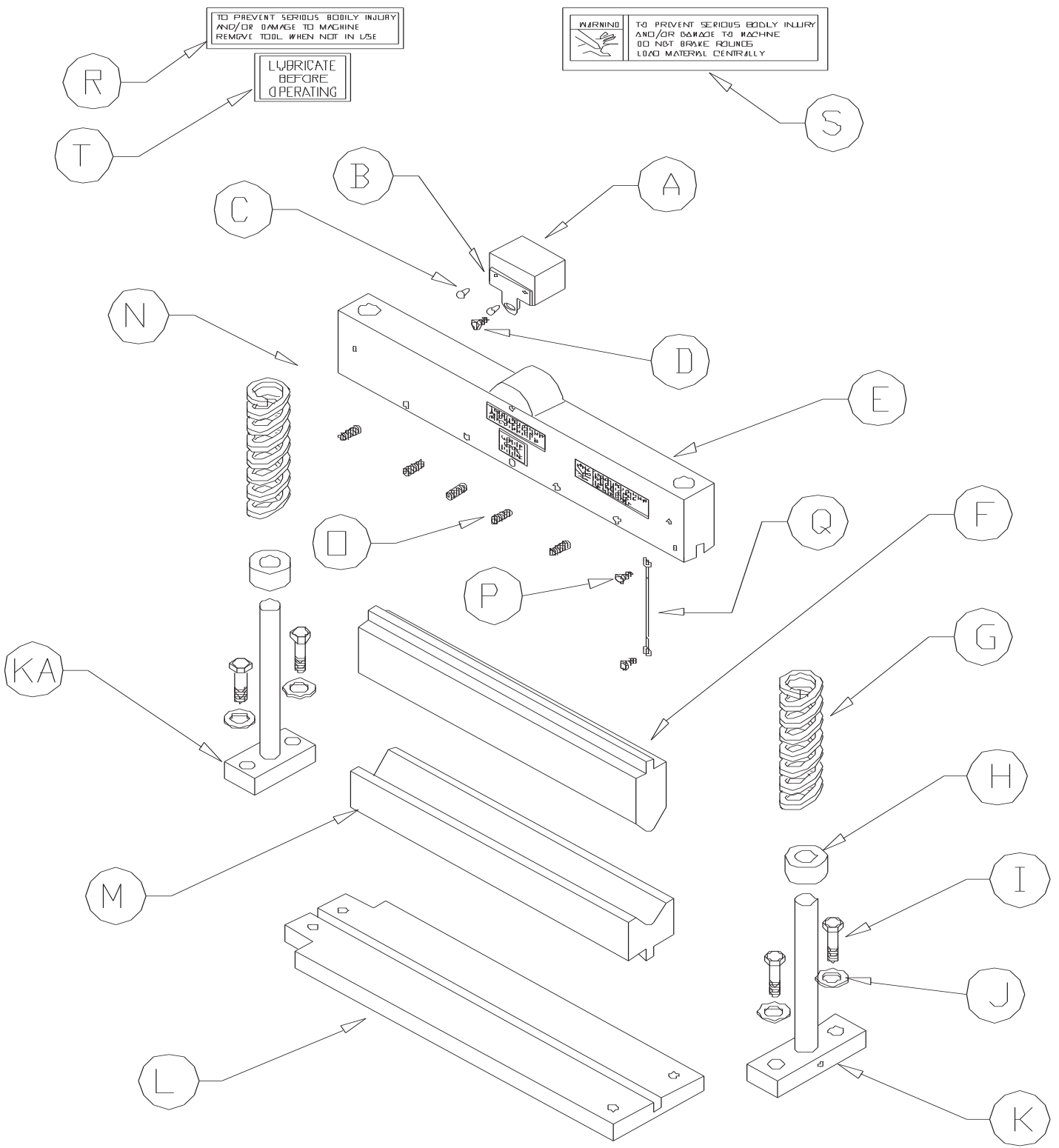
## 2.6 12, 18 AND 24 INCH BRAKES

ITEM	COMMON PART #'S	6509 DO-70	9012 12012 DO-100 DO-120 DO-150	FI-5109 FI-6008 D0-8514	FI-8507 FI-8510	DESCRIPTION
<b>12 INCH BRAKE</b>						
A-C		026211	016211	N/A		Slider Block Assembly
D	220014					M-6 x 10 BHCS
E		026312	026312	027330	027330	Brake Top
F	016335					Upper Die
G	016122					2 x 6 Die Spring
H	016307					Spring Spacer (Not required w/6"spring)
I	201417					M-12 x 45 HHCS
J	213014					M-12 Washer - Large
JA	214014					M-12 Washer
K	016309					Brake Post-Right
KA	016317					Brake Post-Left
L	026304					Base
M	016331					Lower Die
N	243101					M-6 Grease Nipple
O	218048					M-10 x 20 Set Screw
P	221005					M-6 x 12 SHCS
Q	016320					Brake Cable
R	003145					Label (Remove Tool)
S	003150					Label (Brake)
T	019103					Lubrication Decal
<b>18 INCH BRAKE</b>						
E		026315	026315	027315		Brake Top
F	016334					Upper Die
L	026291					Base
M	016330					Lower Die
<b>24 INCH BRAKE</b>						
E		026313	026313	027335	027335	Brake Top
F	016336					Upper Die
L	026302					Base
M	016332					Lower Die
		026300	026300	027300	027320	12 Inch Brake Complete
		026303	026303	027303	027325	24 Inch Brake Complete

TO PREVENT SERIOUS BODILY INJURY AND/OR DAMAGE TO MACHINE REMOVE TOOL WHEN NOT IN USE

LUBRICATE BEFORE OPERATING

WARNING TO PREVENT SERIOUS BODILY INJURY AND/OR DAMAGE TO MACHINE DO NOT BRAKE ROLLS LOAD MATERIAL CENTRALLY



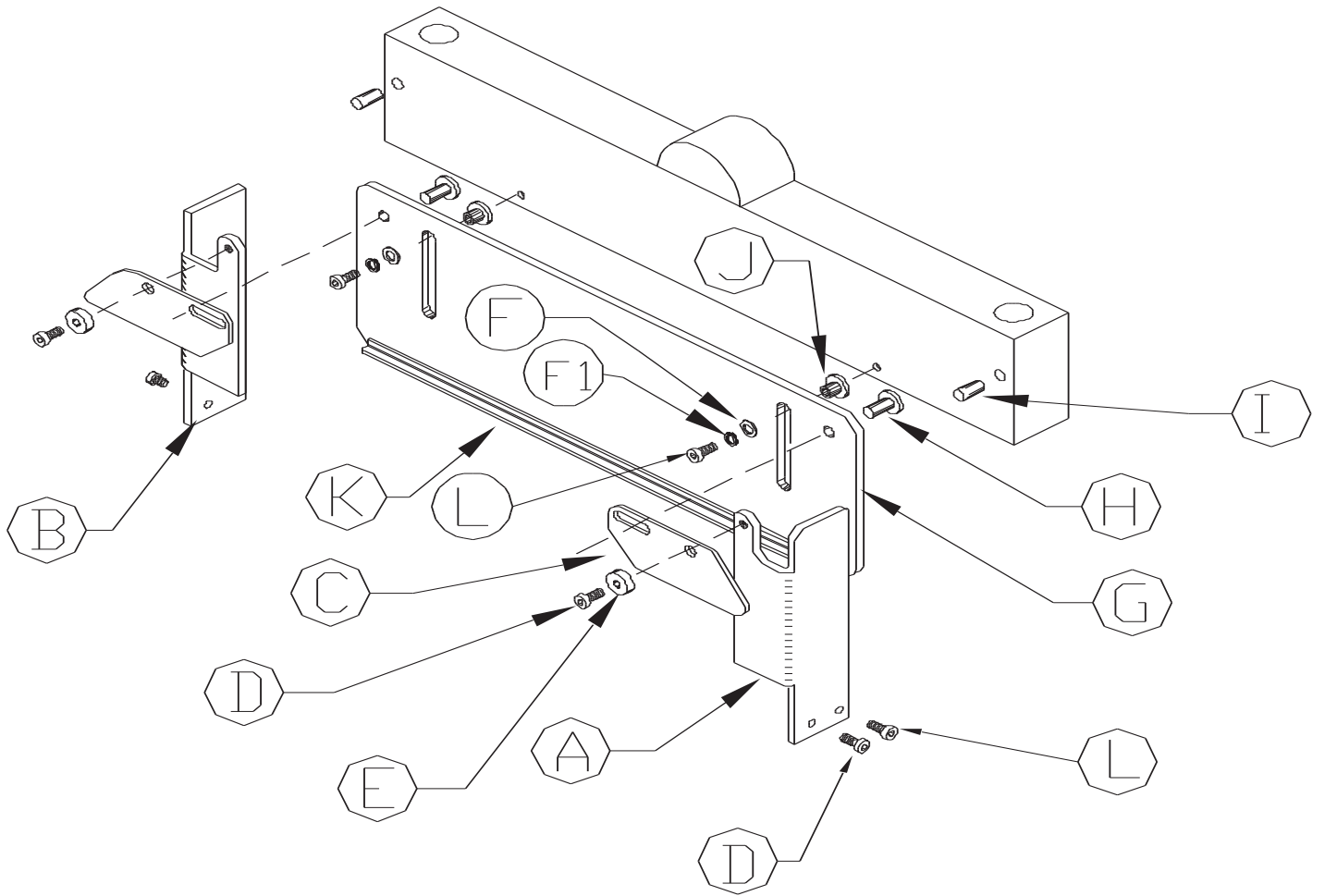
## **2.7 BRAKE GUARDS**

---

---

<b>ITEM</b>	<b>PART #</b>	<b>DESCRIPTION</b>
<b>A</b>	<b>029366</b>	<b>Right Bracket</b>
<b>B</b>	<b>029304</b>	<b>Left Bracket</b>
<b>C</b>	<b>029355</b>	<b>Lifter</b>
<b>D</b>	<b>221010</b>	<b>M-6 x 16 SHCS</b>
<b>E</b>	<b>016301</b>	<b>Lever Boss</b>
<b>F</b>	<b>213007</b>	<b>M-6 Lock Washer</b>
<b>F1</b>	<b>073106</b>	<b>M-6 Washer</b>
<b>G</b>	<b>016362</b>	<b>12" Shield</b>
	<b>016363</b>	<b>18" Shield</b>
	<b>016344</b>	<b>24" Shield</b>
<b>H</b>	<b>016342</b>	<b>Shield Peg</b>
<b>I</b>	<b>077100</b>	<b>Dowel Pin</b>
<b>J</b>	<b>016360</b>	<b>Shield Boss</b>
<b>K</b>	<b>016346</b>	<b>Alum Stiffner 8 &amp; 12" Brakes</b>
	<b>016329</b>	<b>Alum Stiffner 18 &amp; 24" Brakes</b>
	<b>016354</b>	<b>12" Brake Guard Assembly</b>
	<b>016356</b>	<b>18" Brake Guard Assembly</b>
	<b>016358</b>	<b>24" Brake Guard Assembly</b>
<b>L</b>	<b>073619</b>	<b>M-6 x 20 SHCS</b>



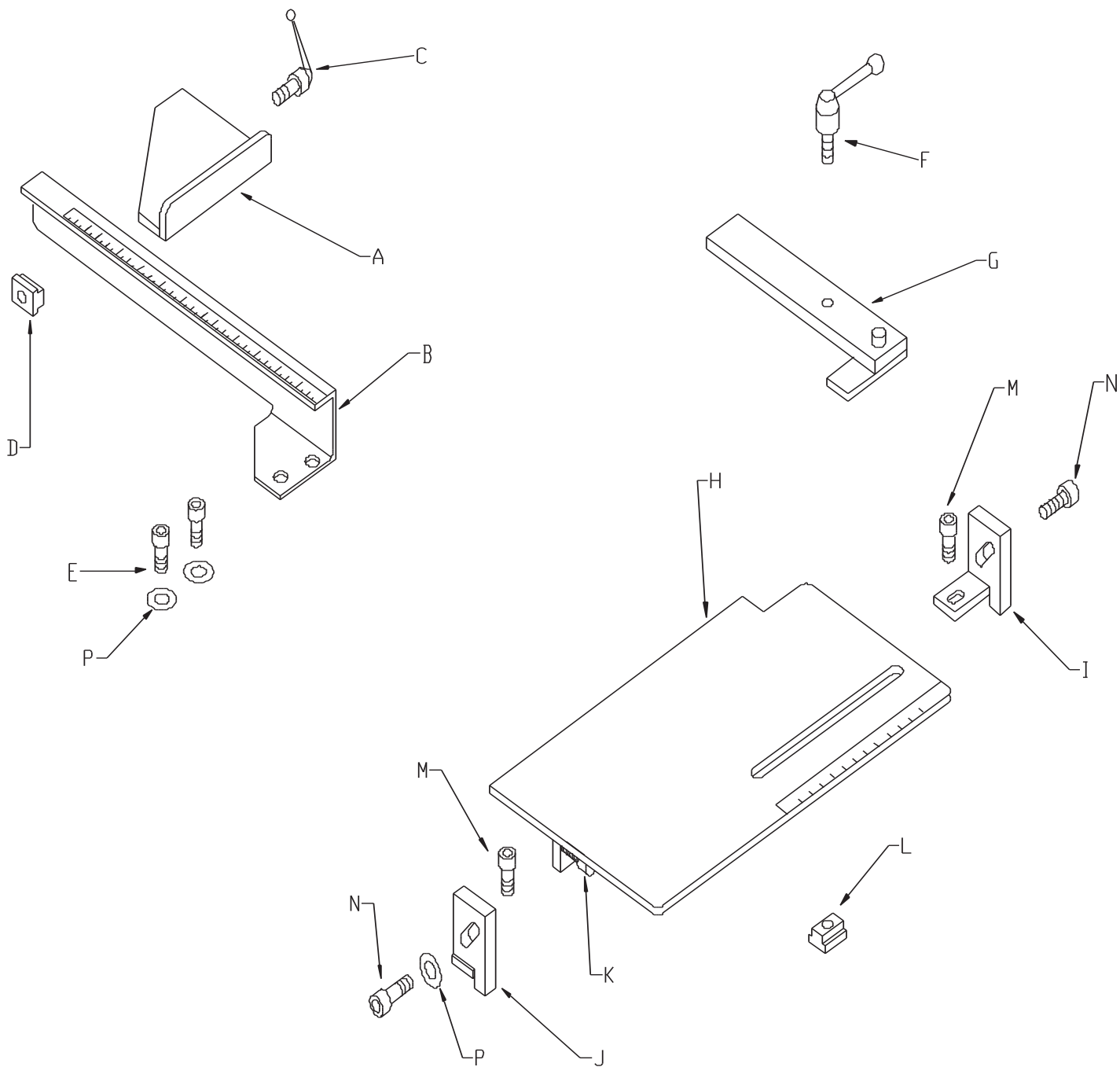


## 2.8 BRAKE GAUGING TABLES

---

---

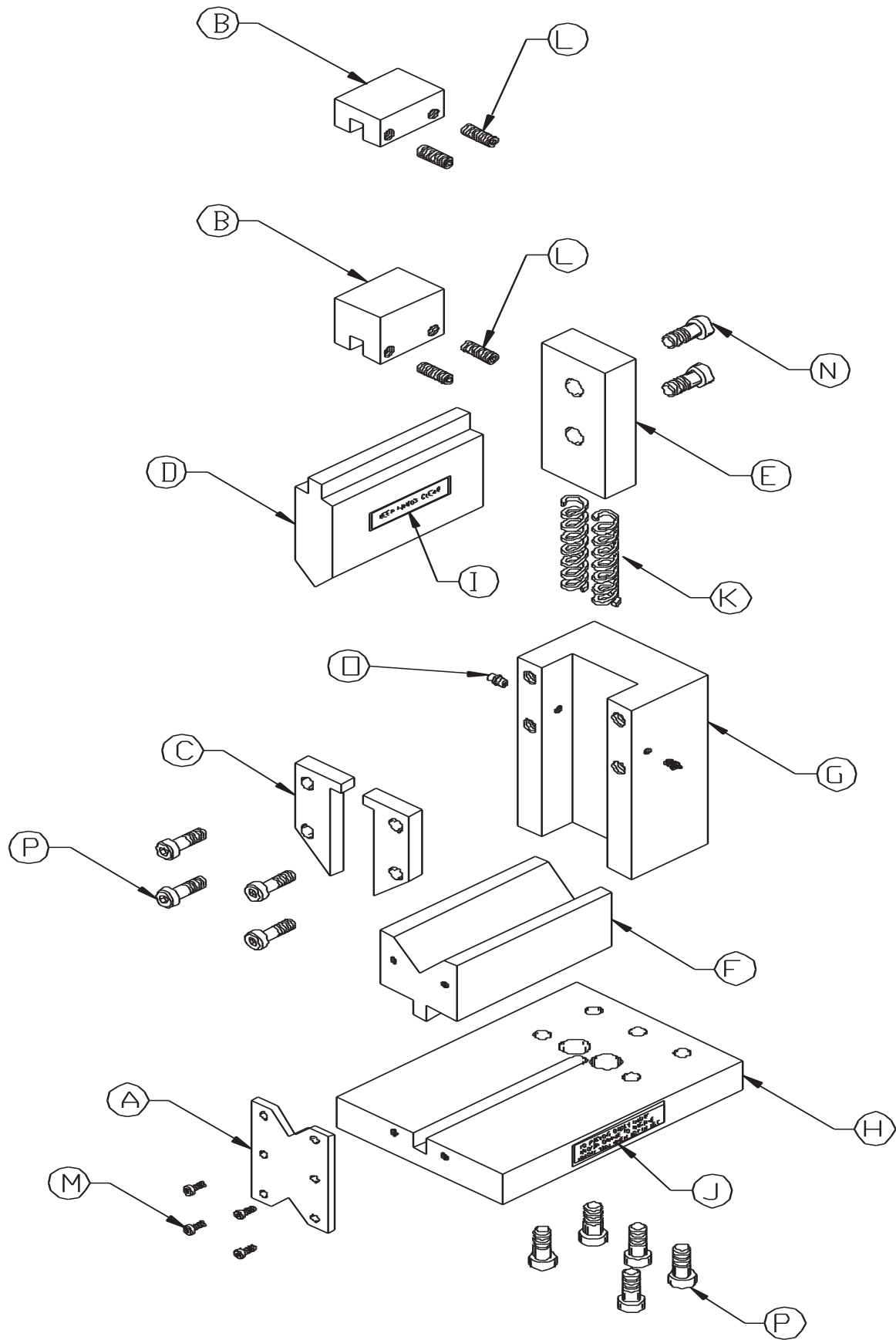
ITEM	PART #	DESCRIPTION
A	026815	Stop Assembly
B	026818	Rail
C	080061	Handle
D	026618	Tee Nut
E	203210	M-10 x 25 HHCS
F	080061	Handle
G	026860	Squaring Arm
H	026839	Table (12")
	026855	Table (24")
I	026836	Mounting Bracket - Right
J	026848	Mounting Bracket - Left
K	219060	M-10 x 50 Set Screw
K1	210012	M-10 Jam Nut
L	026618	Tee Nut
M	203210	M-10 x 25 HHCS
N	221210	M-10 x 25 SHCS
O	019350	Scale
P	214012	M-10 Washer
	026800	Complete Stop Assembly
	026865	Complete Table Assembly-12" Brake
	026880	Complete Table Assembly-24" Brake



## 2.9 6" ANGLE IRON BRAKE

---

ITEM	COMMON PART #	6509 9012	FI-5109 FI-8507 FI-8510 D0-70 D0-85 DO-95 DO-100 DO-120 12012 DO-135 DO-150	DESCRIPTION
A	001362			Gauge Brake
B		001385	001365	Pressure Cap
C	001367			Retainer
D	001369			Upper Die
E	001371			Ram
F	001374			Lower Die
G	001377			Post
H	001380			Base
J	003150			Label (Rounds)
K	016127			Springs
L	218048			M-10 x 20 Set Screws
M	221010			M-6 x 16 SHCS
N	221417			M-16 x 45 SHCS
O	243101			M-6 Grease Nipple
P	221312			M-12 x 30 SHCS
	001360			Complete Tool



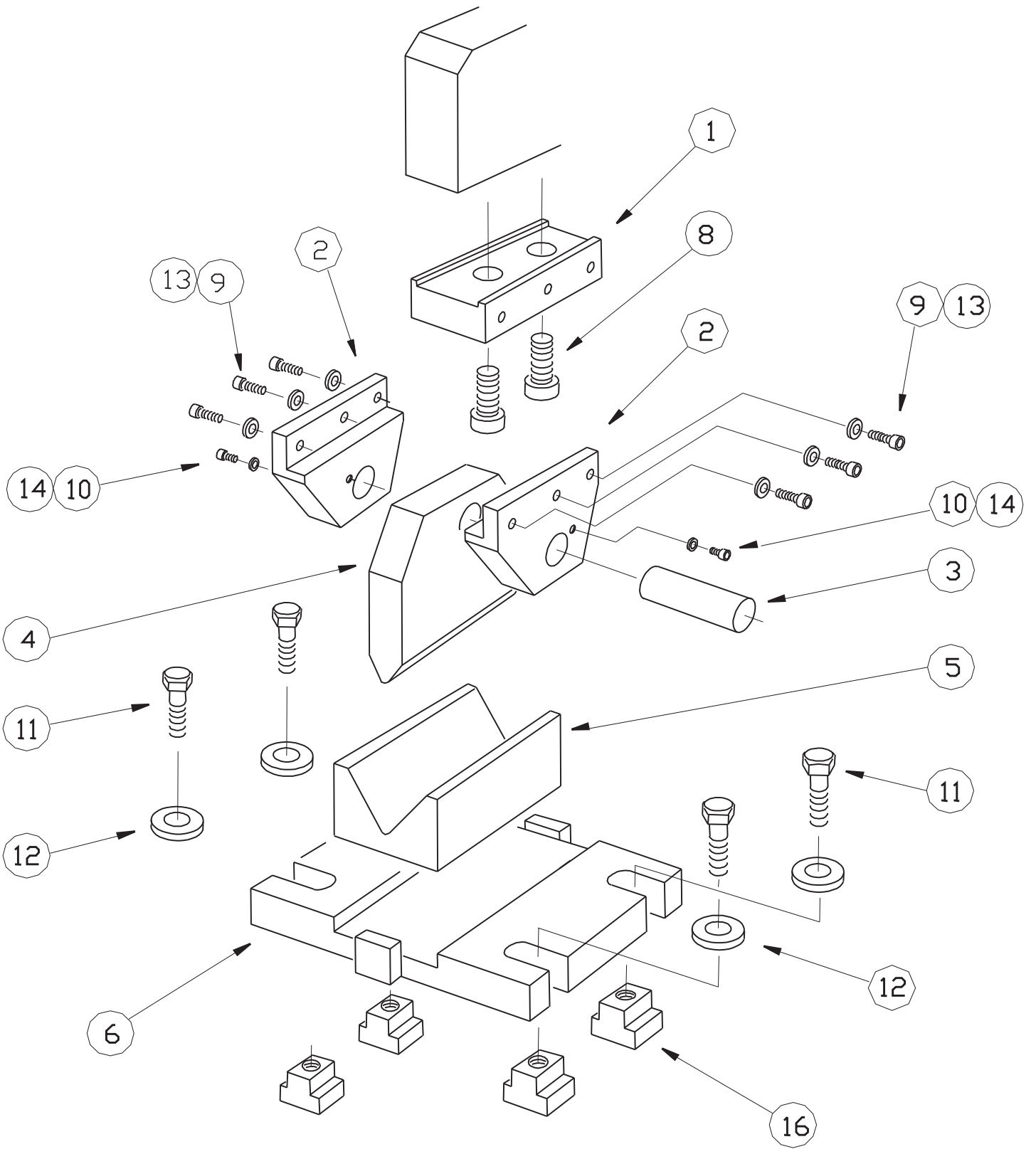
## 2.10 SIX INCH BRAKE

---

---

(NOTCH STATION - D.O.8514-20M ONLY)

ITEM	PART #	DESCRIPTION
1	025466	Top Tool Carrier
2	025469	Top Tool Side Plates
3	025410	Top Tool Pin
4	025472	Upper Brake Die
5	025457	Lower Brake Die
6	025460	Bottom Tool Holder
7		
8	221815	M-20 x 45 SHCS
9	221210	M-10 x 25 SHCS
10	073660	M-8 x 12 SHCS
11	203620	M-16 x 50 HHCS
12	113017	16mm Hd Plain Washer
13	214012	10mm Plain Washer
14	214011	8mm Plain Washer
15		
16	026625	M-16 Tee Nut
	025360	Complete Tool

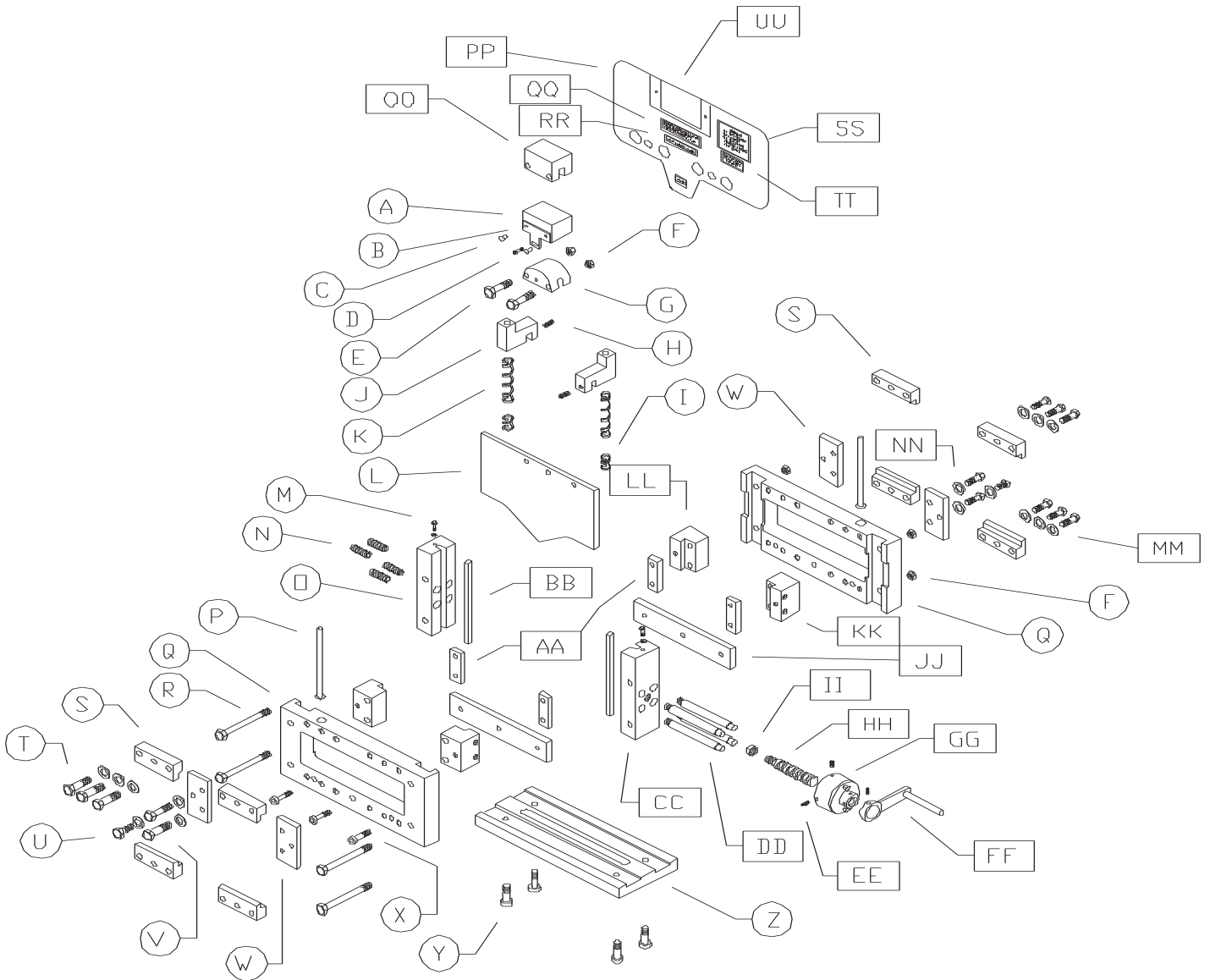


## 2.11 CHANNEL SHEAR

ITEM	COMMON PART #'S	6509 12012	9012	FI-5109 FI-6008	DESCRIPTION
		DO-100	D0-70	FI-8507	
		D0-120	DO-95	FI-8510	
		DO-135			
		DO-150		2450	
A-C	016211	026211	013247	027375	Slider Block Assembly
D	224005				M-6 x 12 BHCS
E	204225				M-10 x 60 HHCS
F	217012				M-10 Lock Nut
G	026209				Pressure Block
H	219045				M-10 x 20 Set Screw
I	160030				3/4 x 1-1/2 Die Spring
J	026435				Spring Lifting Blocks
K	016118				3/4 x 6 Die Spring
L	026433				Upper Blade
M	201110				M-6 HHCS
N	218130				M-12 x 80 Set Screw
O	026428				Post-Left
P	026438				Spring Rod
Q	026426				Side Plate
R	201250				M-10 x 130 HHCS
S	016184				Stationary Blade Clamp
SA	016185				Movable Blade Clamp
T	201420				M-12 x 50 HHCS
U	203212				M-10 x 30 HHCS
V	203225				M-10 x 65 HHCS
W	026431				Blade Flange
X	221215				M-10 x 35 SHCS
Y	221210				M-10 x 25 SHCS
Z	026182				Base
AA	026429				Vertical Blade (4 Required)
BB	016183				Wear Strip
CC	026427				Post Rod End
DD	016202				Adjustment Rod
EE	218022				M-6 x 6 Set Screw
FF	026197				Handle Assembly
GG	026191				Pressure Assembly
HH	026201				Acme Screw
II	210016				M-16 Jam Nut
JJ	026207				Lower Blade (2 Required)
KK	026432				Blade Seat-Right

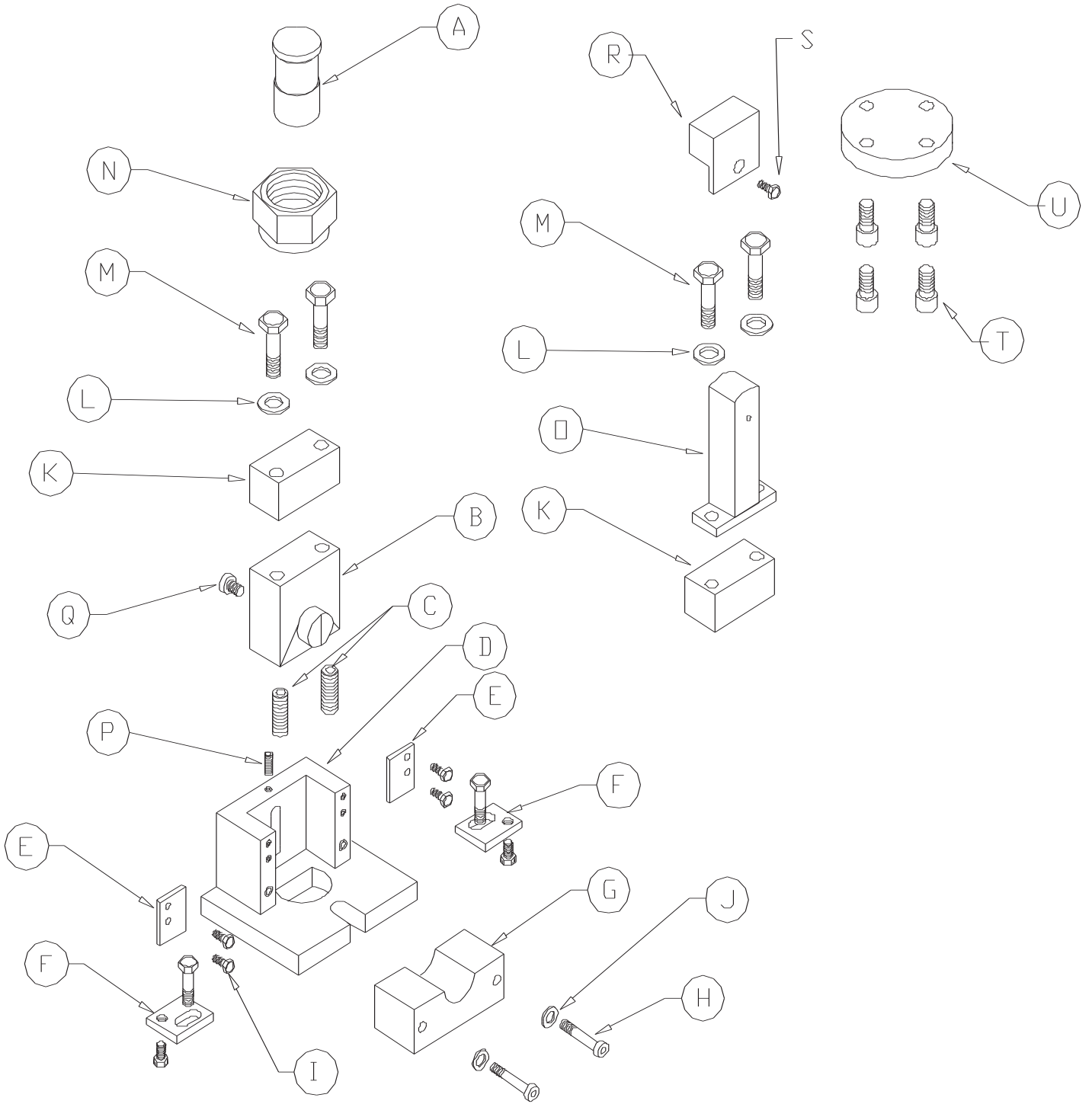


LL	026430				Blade Seat-Left
MM	212014				M-12 Lock Washer
NN	212012				M-10 Lock Washer
OO		N/A	N/A	004375	Pressure Block
PP		026440	026440	004441	Guard (Includes RR, SS, TT, QQ & UU)
QQ	003145				Label (Remove Tool)
RR	003125				Label (Hands Clear)
SS	003140				Label (Warning)
TT	003115				Label (Do Not Remove)
UU	026242				Sight Glass
VV	026746				Wear Strip Retainer
	026372			004372	Complete Channel Shear



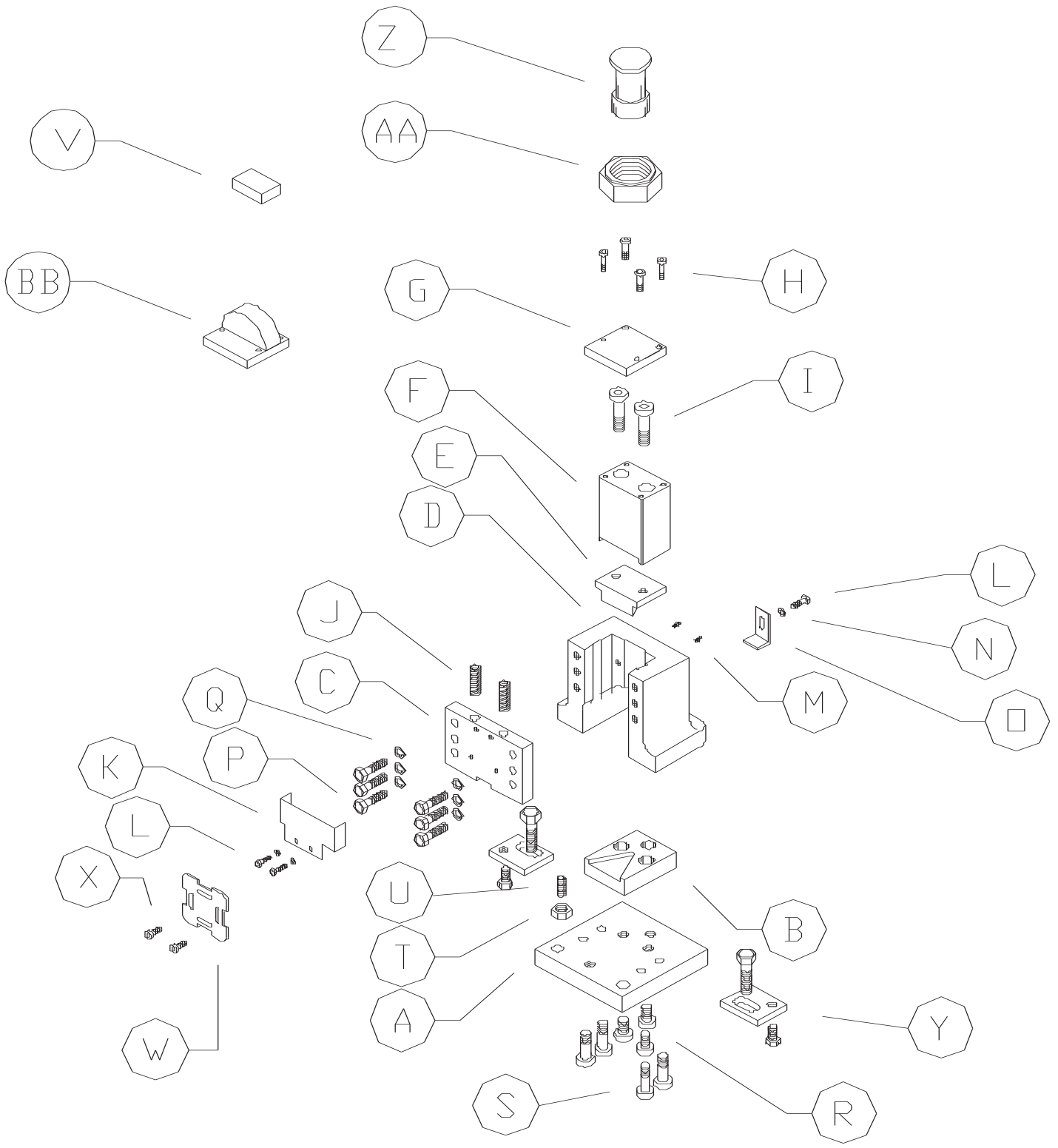
## 2.12 PIPE NOTCHER

ITEM	COMMON PART #'S	D0-70 DO-95 DO-100	6509	12012	FI-5109	DO85	DESCRIPTION
				9012	DO-120	FI-6008	
				DO-135	FI-8507		
				DO-150	2450		
					FI-8510		
A	001212					N/A	Punch Pusher
B & G	001220						3/4" Upper & Lower Die
	001222						1" Upper & Lower Die
	001224						1-1/4" Upper & Lower Die
	001226						1-1/2" Upper & Lower Die
	001228						2" Upper & Lower Die
C	001208						Die Spring
D	001294						Pipe Notcher Housing
E	001209						Guide Plates
F	001216						Finger Clamps
H	221225						M-10 x 50 SHCS
I	221005						M-6 x 12 SHCS
J	114010						1/4 Washer
K	340025						Riser
L	212012						M-10 Lock Washer
M	203225						M-10 x 65 HHCS
N		016096		080220	016096	016096	#45 Punch Retaining Nut
O	340041				N/A		Beam Pusher
P	218025						M-6 x 20 Set Screw
Q	221115						M-8 x 16 SHCS
R		433151		433151	N/A	433151	Rocker Cap
S	224005						M-6 x 12 BHCS
T						221328	M-12 x 75 SHCS
U						025299	Punch Pusher
V		016629	001205	081205	015205	025205	Punch Pusher Ass'y
W	001207				N/A	N/A	Tool Table Pusher Ass'y
X	001195						Complete Tool (Less Dies)



## 2.13 PICKET TOOL (CAST HOUSING)

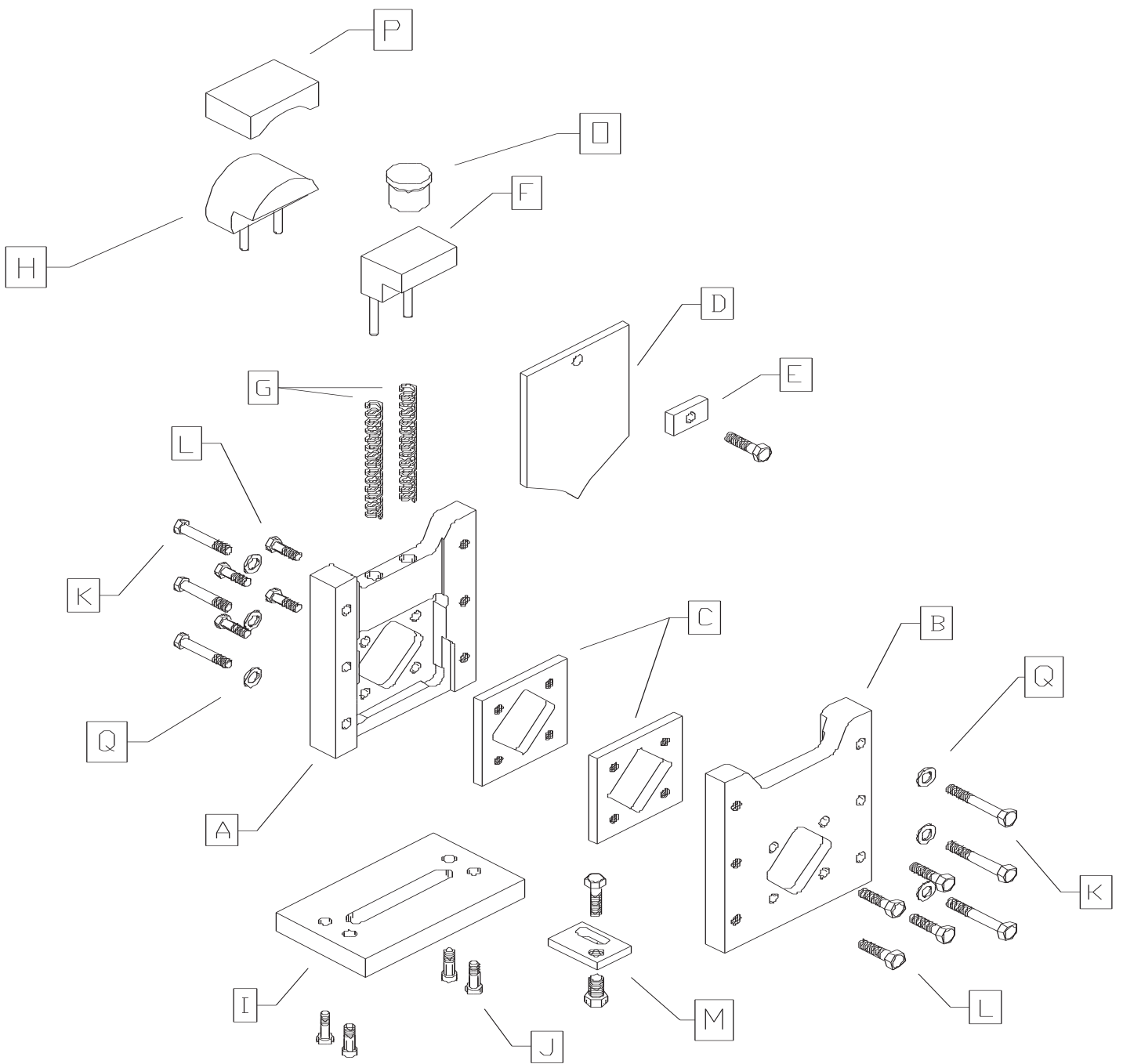
ITEM	COMMON PART #S	6509	12012	DO-70 DO-95 DO-100	FI-5109 FI-6008 FI-8507 FI-8510	DO-8514	DO-120 DO-135 DO-150	DESCRIPTION
A	001275							Base
B	001264							1" Lower Die
	001292							3/4" Lower Die
	001249							1/2" Lower Die
C	001272							Front Plate
D	001280							Housing
E	001162							1" Upper Die
	001190							3/4" Upper Die
	001150							1/2" Upper Die
F	001167							Ram
G	001163							Pressure Cap
H	073615							M-6 x 20 SHCS
I	073634							M-10 x 80 BHCS
J	160050							1/2 x 3-1/2 Die Spring
K	001166							Spring Guard
L	221005							M-6 x 12 SHCS
M	243101							M-6 Grease Nipple
O	001165							Tube Stop
P	201212							M-10 x 35 HHCS
Q	212012							M-10 Lock Washer
R	221210							M-10 x 25 SHCS
S	221210							M-10 x 25 SHCS
T	210012							M-10 Jam Nut
U	219050							M-10 x 25 Set Screw
V						001175		Rocker Cap
W	001178							Tube Guide
X	221005							M-6 X 12 BHCS
Y	001216							Finger Clamps
Z			080831	080835	015205		080831	Punch Pusher
AA			080220	016096	016096	016096	080220	#45 Punch Retaining Nut
BB						001172		Cap Weldment
CC	001293							Complete Picket Tool



## 2.14 SQUARE TUBE SHEAR

---

ITEM	PART #	FI-8510 FI-8507	DO-8514	DO-70 DO-95	DESCRIPTION
	6509 9012 12012 DO-120 DO-135 DO-150				
A	001312				Rear Side Plate
B	001313				Front Side Plate
C	001311				Lower Blades
D	001310				Upper Blade
E		001309	001309		Square Washer
F		001303	001303		Blade Cap
G	001301	001301	001308		Springs
H	001302				Blade Cap
I	026306	001306	001306	026306	Base
J	221210		073626		M-10 x 25 SHCS
K	203217				M-10 x 45 HHCS
L	221210				M-10 x 25 SHCS
M	001216	001216	001216		Finger Clamps
O		001304	001304		Pusher
P	026211			013247	Pressure Block
Q	212012				M-10 Washer
R	203212				M-10 x 30 HHCS

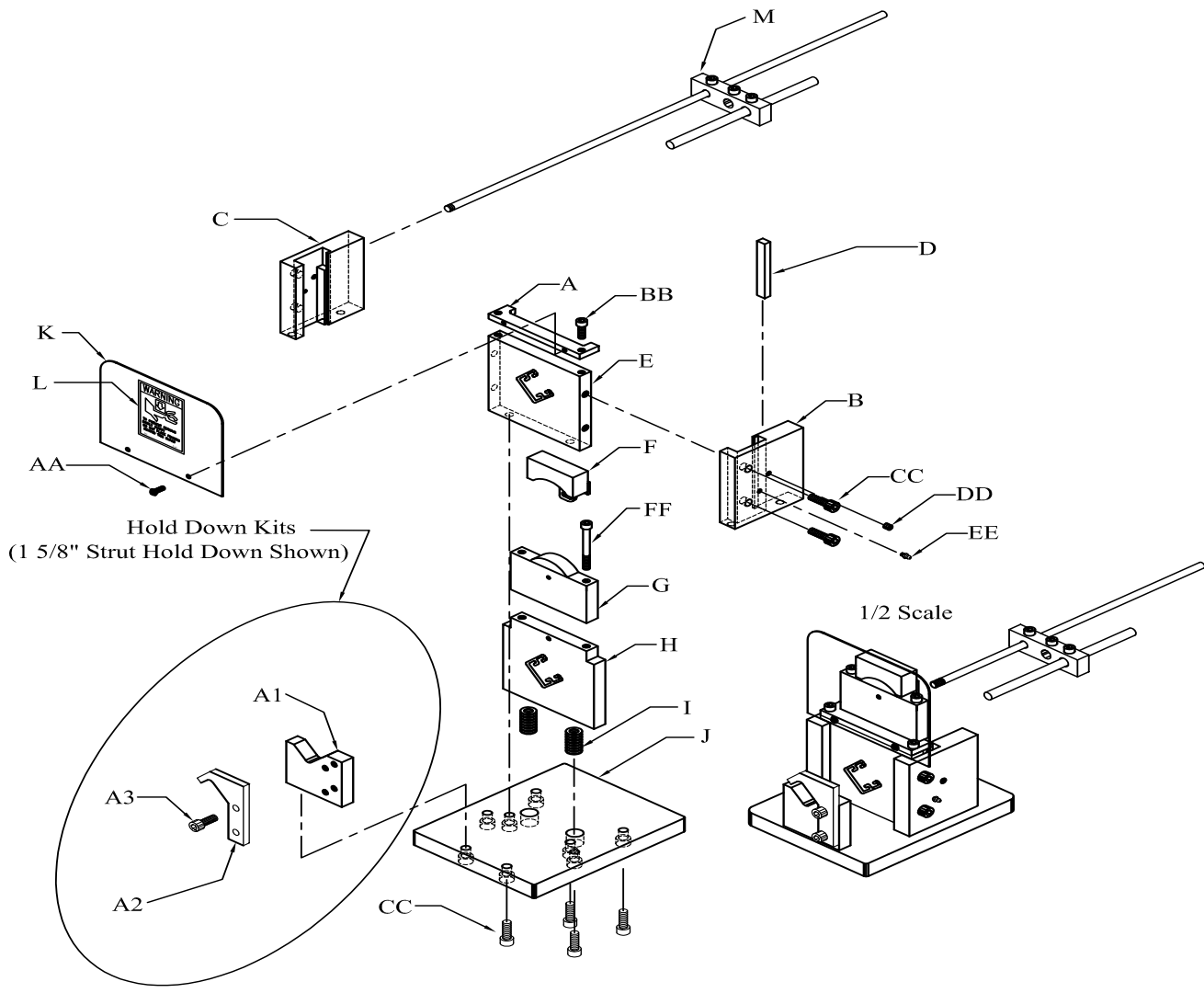


## 2.15: STRUT SHEAR

---

ITEM	QTY	PART #	DESCRIPTION
A	1	024541	Positive Stop
B	1	024512	Right Brace
C	1	024511	Left Brace
D	2	026243	Wear Strip - 6" AS
E	1	024550	Fixed Blade Blank
F	1	446170	Pressure Cap Assembly
G	1	024526	Pusher Assembly
H	1	024551	Moving Blade Blank
I	2	160030	3/4 x 1-1/2 Die Spring
J	1	024510	Multi Shear Base
K	1	024560	Guard - Multi Shear
L	1	003140	Warning Label
M	1	076930	Material Stop
AA	2	220014	M-6 x 10MM Din BN19 BHCS
BB	2	221120	M-8 x 25MM Din 912 SHCS
CC	12	221212	M-10 x 30MM Din 912 SHCS
DD	2	218000	M-8 x 8MM Din 913 Set Screw
EE	2	243101	M-6 x 13.5 OAL Gold Zerk
FF	2	073634	M-10 x 80 Dn 912 SHCS

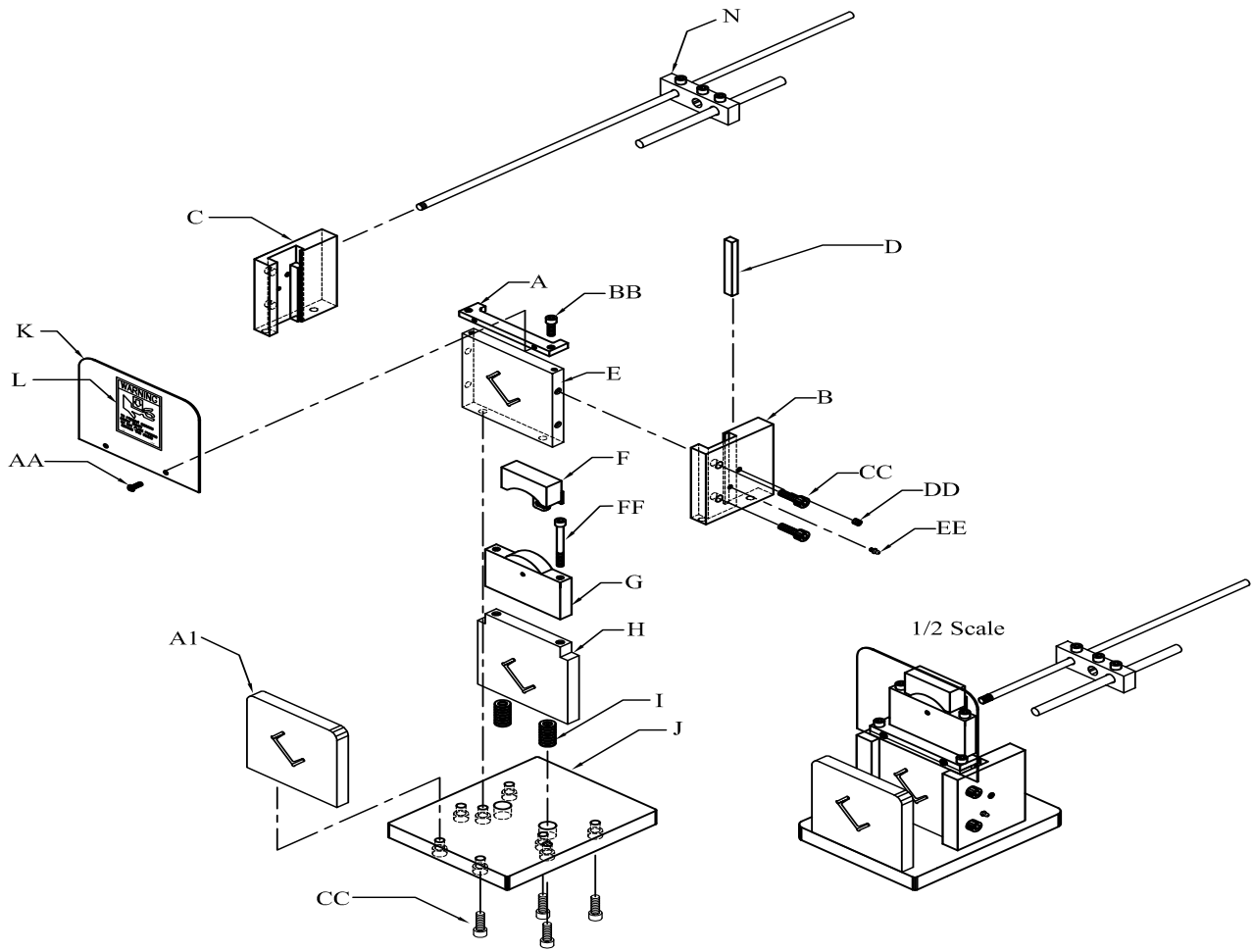




## **2.15A C2 X 1.55 CHANNEL SHEAR ASSEMBLY**

---

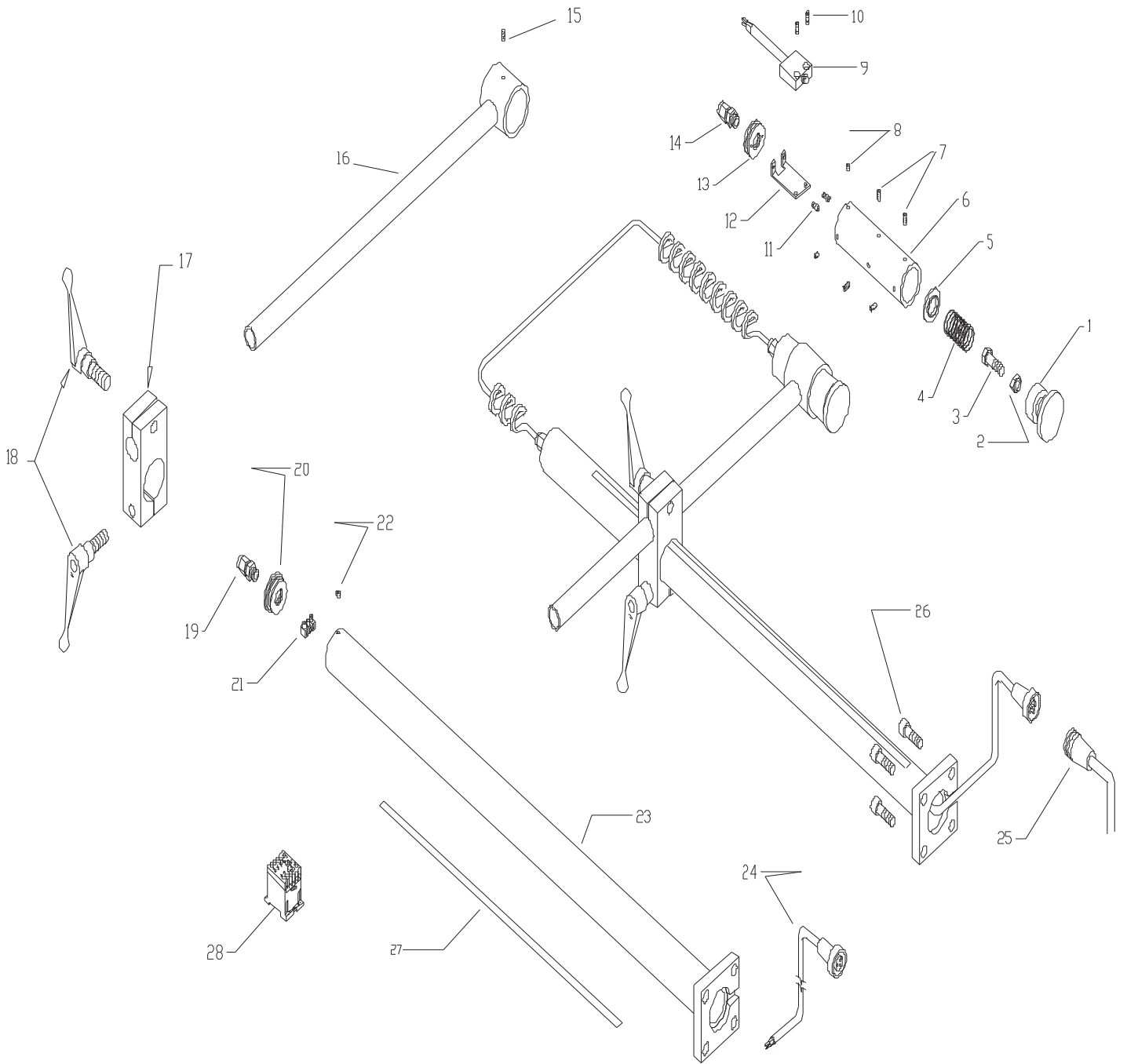
<b>ITEM</b>	<b>QTY</b>	<b>PART #</b>	<b>DESCRIPTION</b>
<b>A</b>	<b>1</b>	<b>024541</b>	<b>Positive Stop</b>
<b>B</b>	<b>1</b>	<b>024512</b>	<b>Right Brace</b>
<b>C</b>	<b>1</b>	<b>024511</b>	<b>Left Brace</b>
<b>D</b>	<b>2</b>	<b>026243</b>	<b>Wear Strip - 6" AS</b>
<b>E</b>	<b>1</b>	<b>024550</b>	<b>Fixed Blade Blank</b>
<b>F</b>	<b>1</b>	<b>446170</b>	<b>Pressure Cap Assembly</b>
<b>G</b>	<b>1</b>	<b>024526</b>	<b>Pusher Assembly</b>
<b>H</b>	<b>1</b>	<b>024551</b>	<b>Moving Blade Blank</b>
<b>I</b>	<b>2</b>	<b>160030</b>	<b>3/4 x 1-1/2 Die Spring</b>
<b>J</b>	<b>1</b>	<b>024510</b>	<b>Multi Shear Base</b>
<b>K</b>	<b>1</b>	<b>024560</b>	<b>Guard - Multi Shear</b>
<b>L</b>	<b>1</b>	<b>003140</b>	<b>Warning Label</b>
<b>M</b>	<b>1</b>	<b>076930</b>	<b>Material Stop</b>
<b>AA</b>	<b>2</b>	<b>220014</b>	<b>M-6 x 10MM Din BN19 BHCS</b>
<b>BB</b>	<b>2</b>	<b>221120</b>	<b>M-8 x 25MM Din 912 SHCS</b>
<b>CC</b>	<b>12</b>	<b>221212</b>	<b>M-10 x 30MM Din 912 SHCS</b>
<b>DD</b>	<b>2</b>	<b>218000</b>	<b>M-8 x 8MM Din 913 Set Screw</b>
<b>EE</b>	<b>2</b>	<b>243101</b>	<b>M-6 x 13.5 OAL Gold Zerk</b>
<b>FF</b>	<b>2</b>	<b>073634</b>	<b>M-10 x 80 Dn 912 SHCS</b>



## 2.16 48" ELECTRIC BACK GAUGE

---

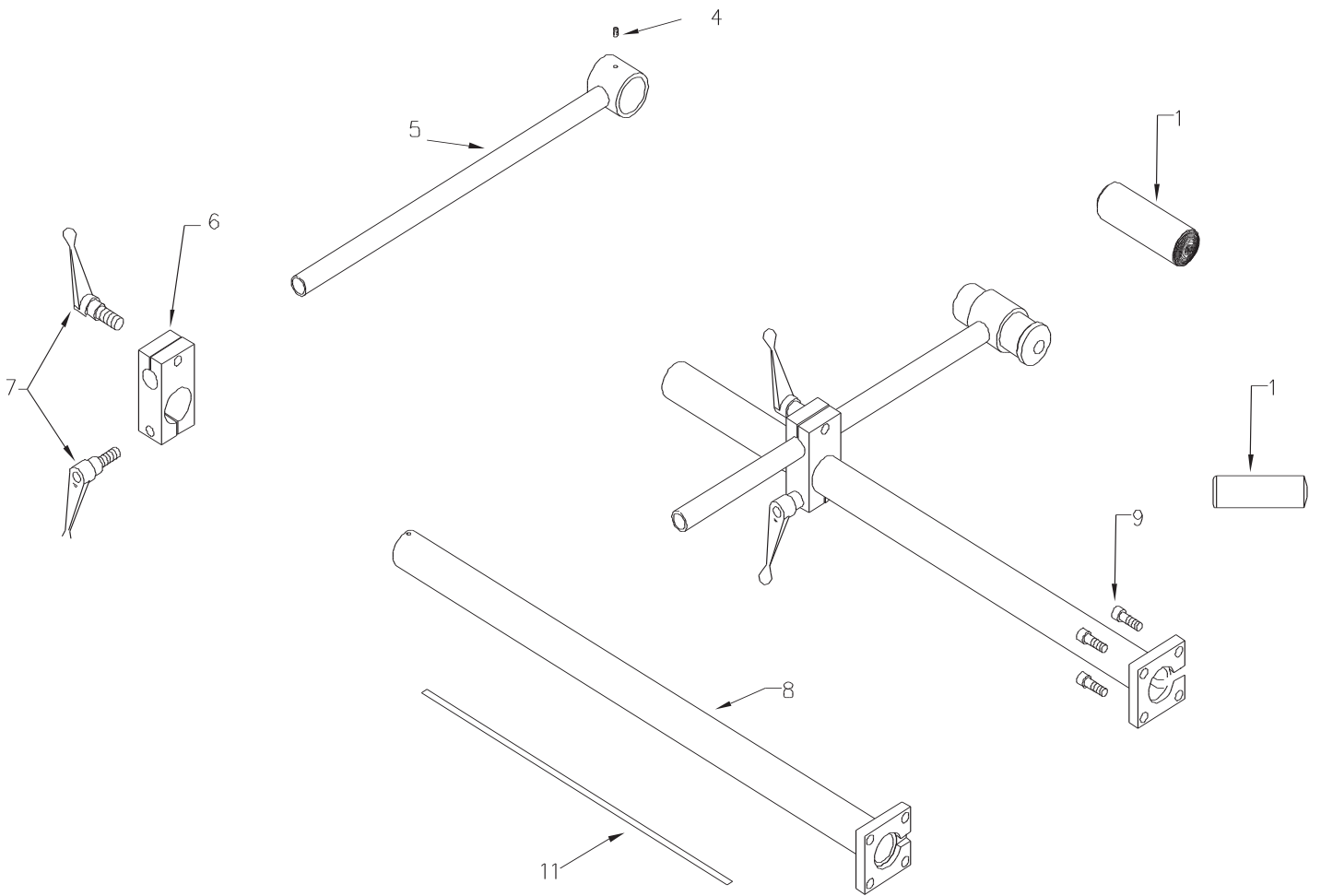
ITEM	(Common-All Models)		DESCRIPTION
	PART #	DO-85	
1	025338		Stop
2	208012		M-10 Hex Nut
3	201220		M-10 x 50 HHCS
4	025332		Spring
5	025335		Spring Plate
6	025323		Housing
7	218023		M-6 x 12 SS
8	220010		M-4 x 10 SHCS
9	562113		Limit Switch
10	073450		M-4 x 16 SHCS
11	220010		M-4 x 10 BHCS
12	025329		Switch Mount
13	025326		Gland Plate
14	000202		Cord Grip
15	219047		M-10 x 12 SS
16	025317		Length Stop
17	025320		Slide Block
18	025361		Handles
19	000202		1/2" Liquid Tight Connector
20	025330		Gland Plate
21	075207		Terminal Block
22	218022		M-6 x 6 SS
23	025308		Tube Assembly
24	025340		Cord Set (Male)
25	025342		Cord Set (Female)
26	221420		M-16 x 50 SHCS
27	029220		Scale
28	550065		Relay
	026600	025600	Complete Electric Back Gauge



## **2.17 48 INCH MANUAL BACK GAUGE ASSEMBLY**

---

<b>ITEM</b>	<b>PART #</b>	<b>DESCRIPTION</b>
1	025324	Stop
2	025323	Length Stop Housing
3	218023	M-6 x 12 Set Screw
4	219047	M-10 x 12 Set Screw
5	025317	Length Stop Assembly
6	025320	Slide Block
7	025361	Lock Handle
8	025312	Tube Assembly
9	221420	M-16 x 50 SHCS
10	080181	3mm Allen Wrench
11	029220	Scale
	080189	M-14 Allen Wrench
	025603	Complete Manual Back Gauge

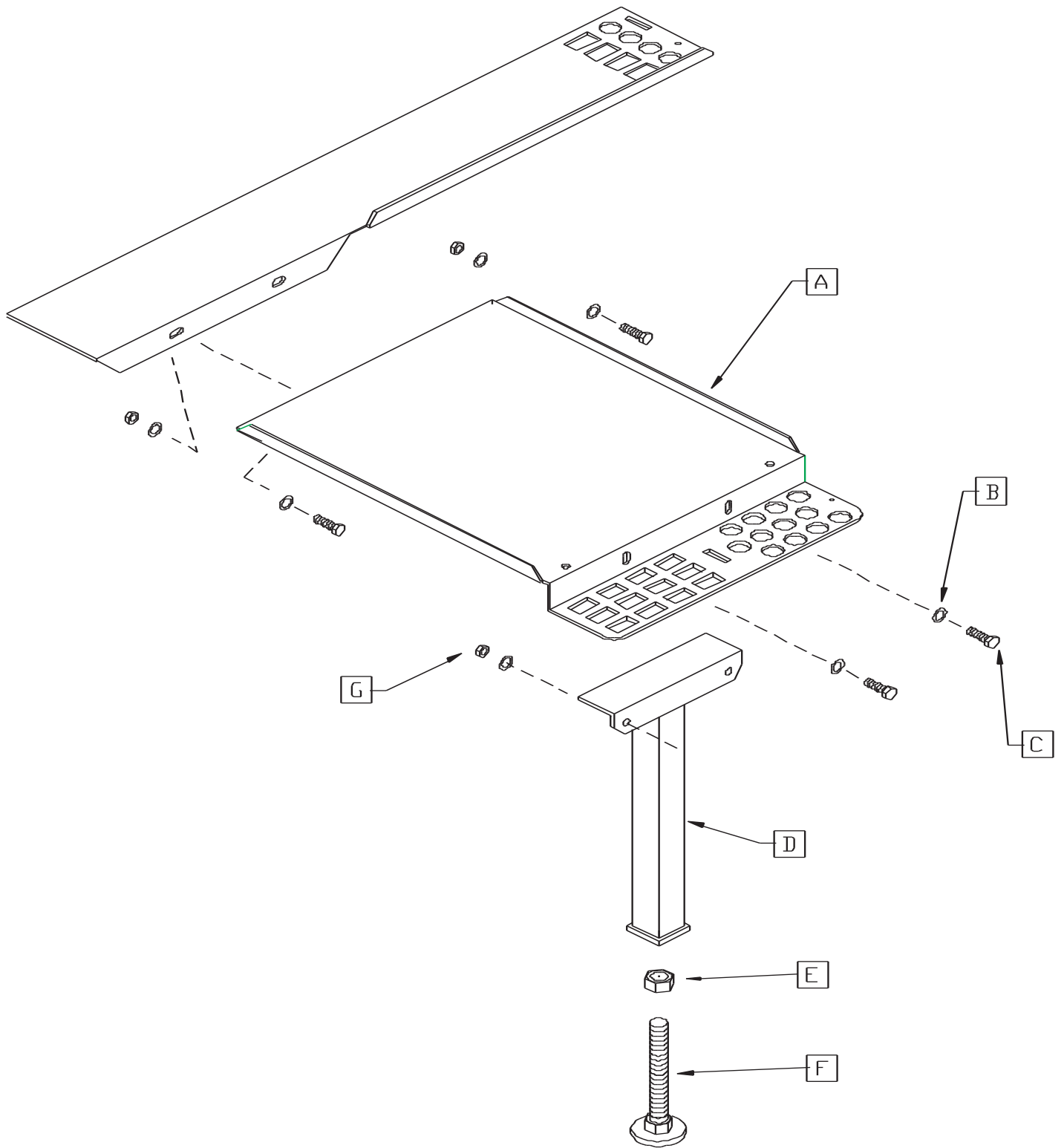


## **2.18 TOOL TABLE EXTENSION** (6509, 9012, 12012, D0-70, DO-95, DO-120, DO-135 & DO-150)

---

<b>ITEM</b>	<b>PART #</b>	<b>DESCRIPTION</b>
<b>A</b>	<b>033207</b>	<b>Table Extension</b>
<b>B</b>	<b>214012</b>	<b>M-10 Flat Washers</b>
<b>C</b>	<b>203210</b>	<b>M-10 x 25 SHCS</b>
<b>D</b>	<b>033208</b>	<b>Extension Support</b>
<b>E</b>	<b>208024</b>	<b>M-24 Hex Nut</b>
<b>F</b>	<b>033212</b>	<b>Foot Assembly</b>
<b>G</b>	<b>208012</b>	<b>M-10 Hex Nut</b>
	<b>026695</b>	<b>Complete Tool Table Extension</b>

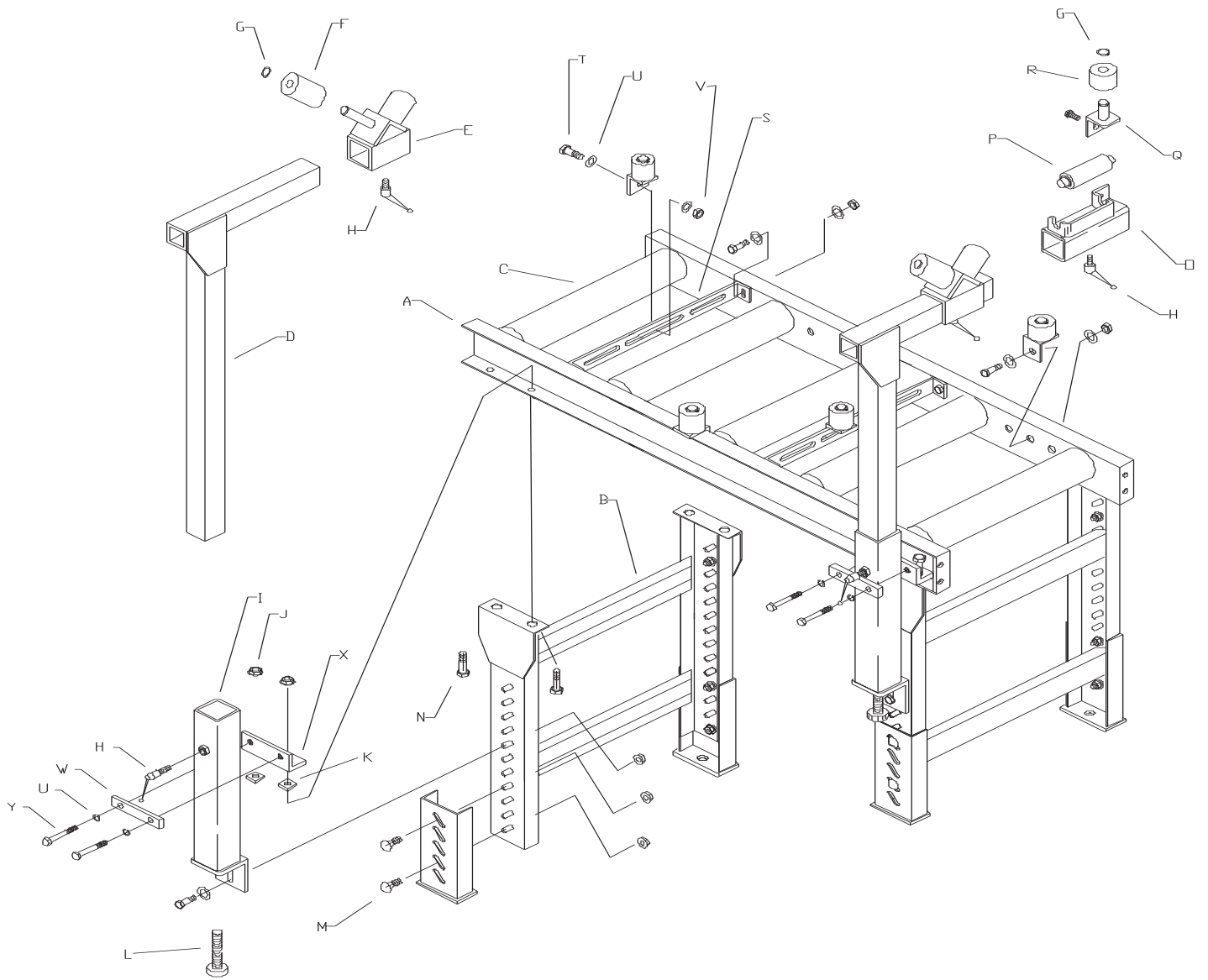




## 2.19 CONVEYOR SYSTEM

---

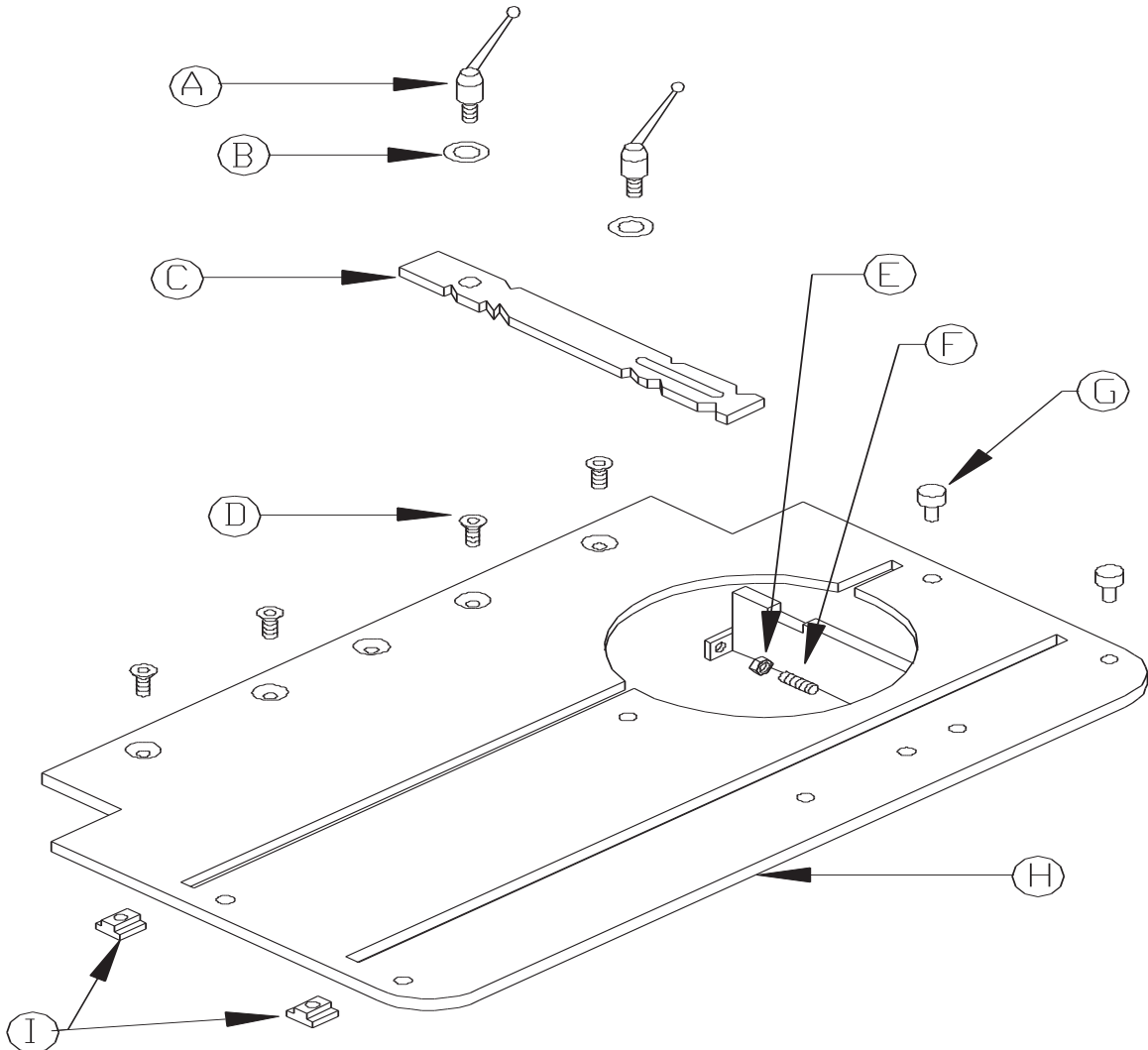
ITEM	COMMON PART #'S	6509 9012 12012 DO-70 DO-95 DO-120 DO-135 DO-150	FI-5109 FI-8507 FI-8510	DO-8514-20	SM-610	DESCRIPTION
A		026972	026972	026971		Track Assembly
B		N/A				Leg Assembly
C		026905	026905	026975	026905	Rollers
D		026930	026930	026937	026930	Upper Bracket Assembly
E		026941				V Guide Bracket
E1		026951				Complete V Guide Ass'y
F		026952				V Rollers
G	016402					3/4 Snap Ring
H	080061					Handle
I	026911					Sleeve
J	216015					M-10 Flange Nut
K	N/A					Wedge Washer
L	026920					Adjustment Bolt
M	228210					M-10 Carriage Bolt
N	203212					M-10 x 30 SHCS
O			026915	026915	026915	Bracket Assembly
O1			026923	026923		Roller Assembly
P			026919	026919	026919	Steel Roller
Q	026955					Bump Roller Mount
R	026962					Bump Roller
R1	026960					Bump Roller Assembly
S		026965	026969	026965		Bump Roller Mount
T	203210					M-10 x 20 SHCS
U	213012					M-10 Flat Washer
V	208012					M-10 Hex Nut
W	026939				026977	Leg Extensions (Not Pictured) Sleeve Brace
X	026940					Mounting Bracket
Y	203235					M-10 x 90 HHCS
		026980	026997	026995	026976	Complete Conveyor



## 2.20 GAUGING TABLES - PUNCH, SHEAR & NOTCHER

### SHEAR TABLE

ITEM	COMMON PART #'S	6509 9012 12012	FI-5109 FI-6008 FI-8507	DO-70 DO-100 DO-120 DO-150	DESCRIPTION
A	080061				Handles
C	026692				Guide
D	230207				M-10 FSHCS
E		210012	210014	210012	Jam Nut
F		219060	201435	219060	Set Screw
G	026698				Rest Button
H		026688	026591	026688	Table
I	026618				Tee Nuts
		026680	026580	026680	Complete Table

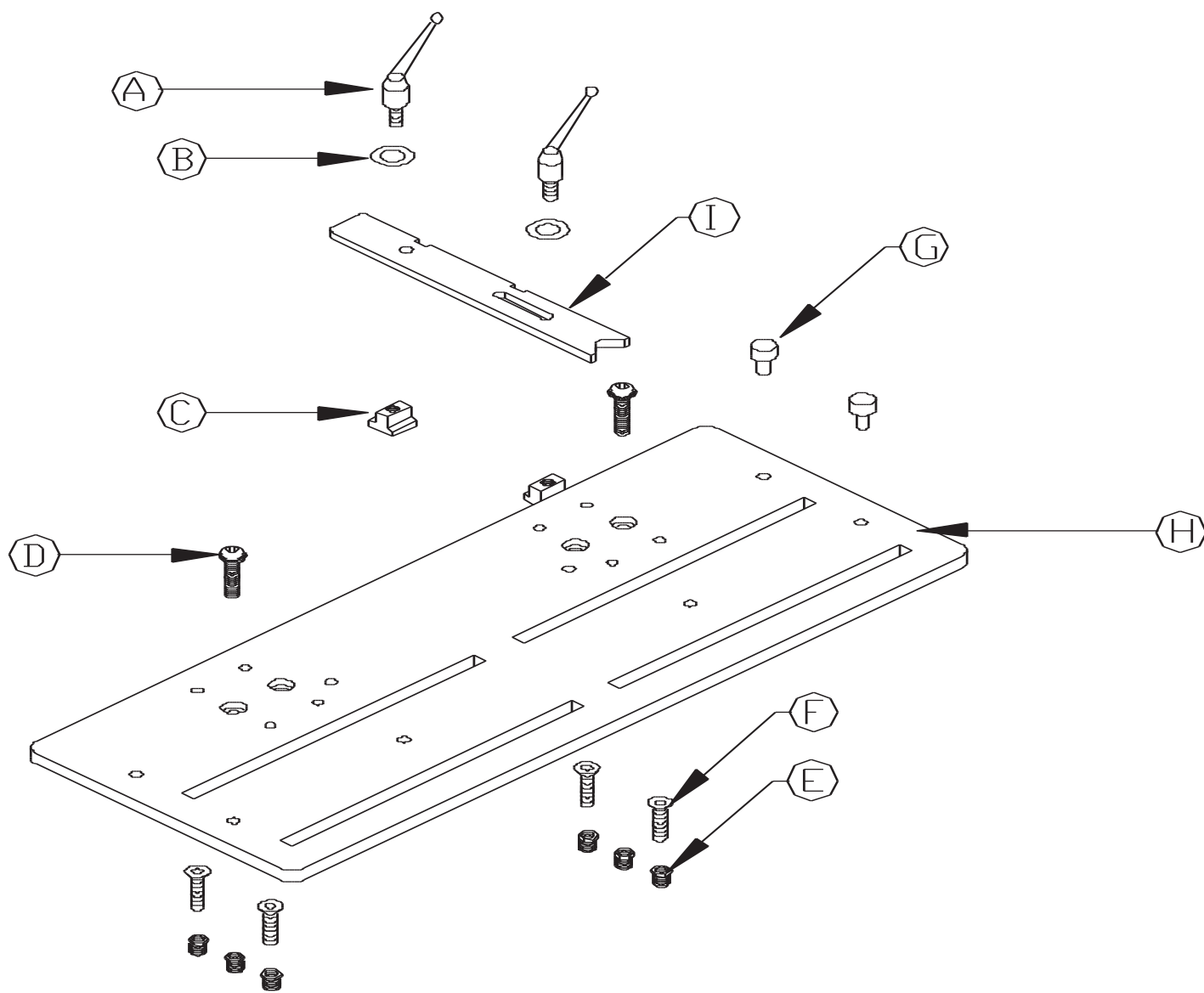


6509 SER. #'S 7814FF0907 & Prior    9012 SER. #'S 21600M0807 & Prior    12012 SER. #'S 50946M0507 & Prior

# SHEAR TABLE

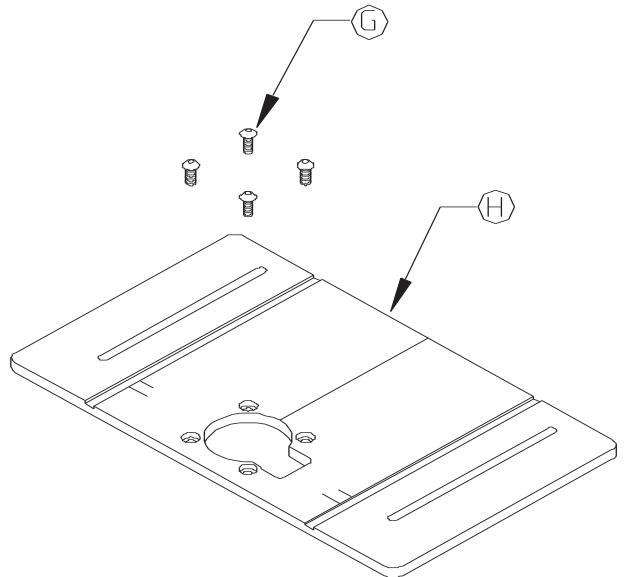
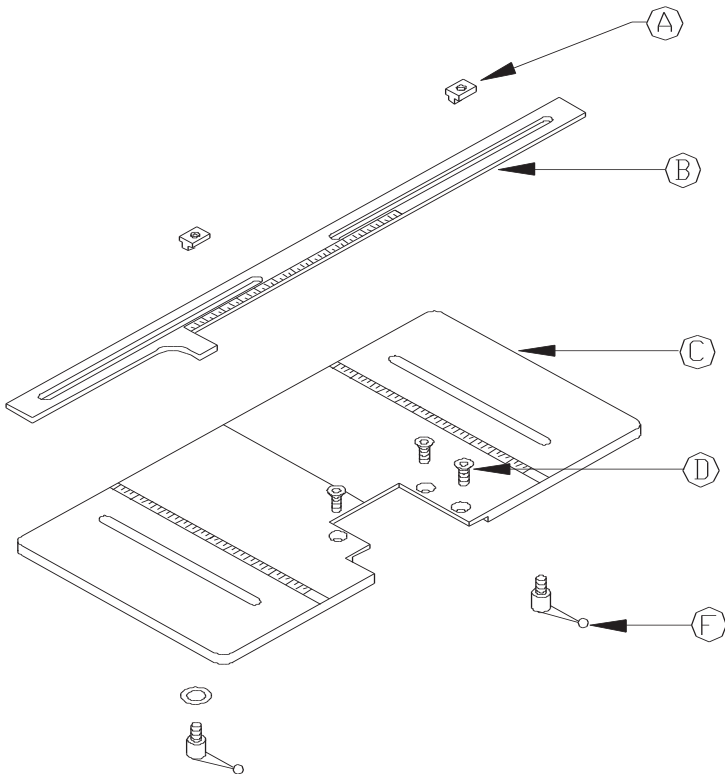
6509 SER.#'S 7815FF0907 & Up 9012 SER.#'S 21601M0807 & Up 12012 SER.#'S 50947M0507 & Up  
DO-8514, DO-95, DO-135, FI-8510

ITEM	PART #'S	DESCRIPTION
A	080061	Handles
B	214012	M-10 Washer
C	026618	Tee Nut
D	220029	M-10 x 35 BHCS
E	210012	M-10 Jam Nut
F	230210	M-10 x 30 FSHCS
G	026698	Rest Buttons
H	080426	Table
I	025705	Guide
J	080430	Complete Table



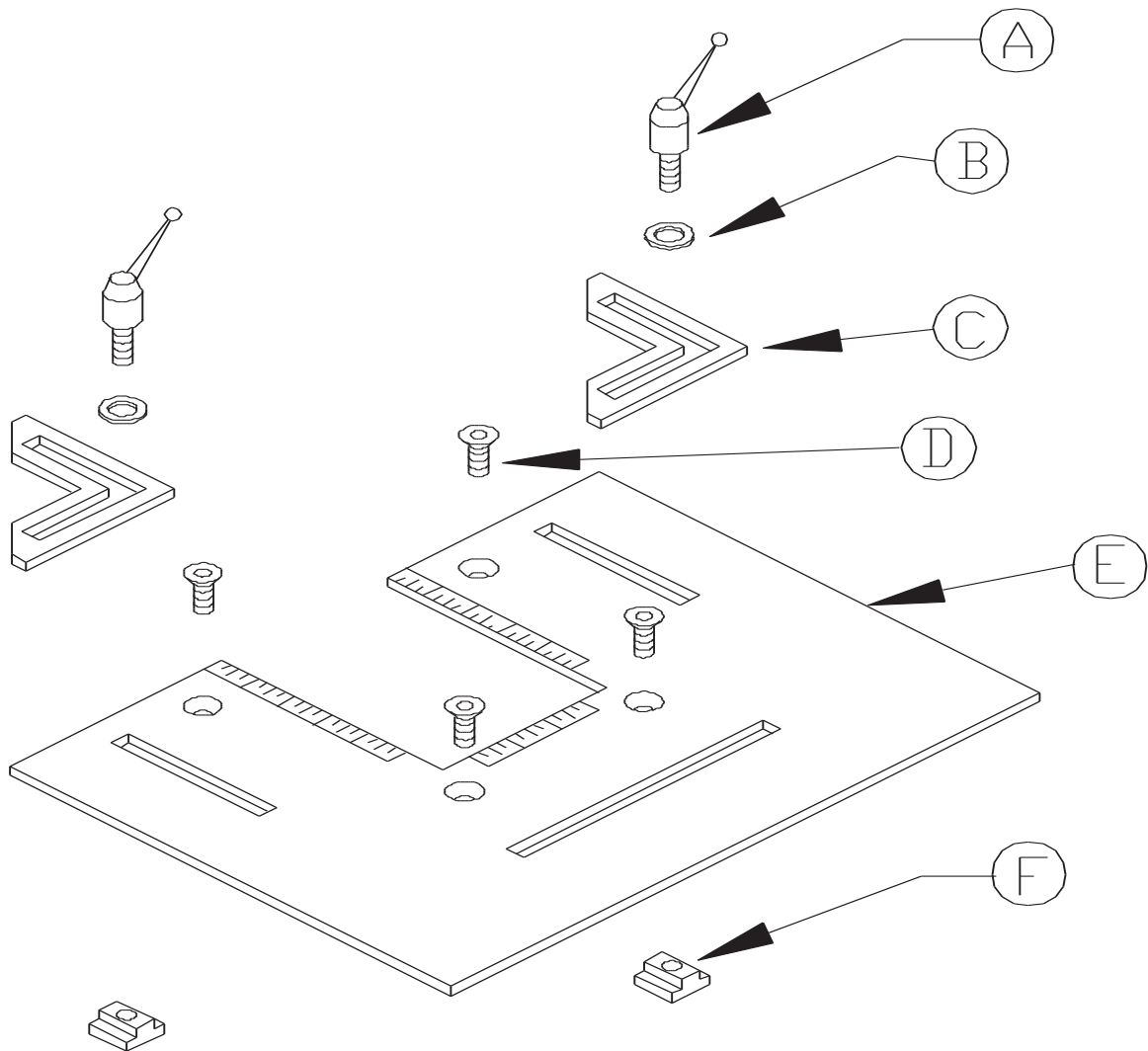
## PUNCH TABLE

ITEM	COMMON PART #'S	6509 DO-70 DO-95 FI-8510	9012 12012 DO-85 DO-100 D0-120 DO-135 DO-150	FI-5009 FI-5109 FI-6008 FI-8507	DESCRIPTION
A	026618				Tee Nuts
B	026697				Guide
C		026712	026709	026715	Complete Assembly
D	230107				M-8 x 16 FSHCS
F	080063				Handle
G			224005		M-6 x 12 BHCS
H			037018		Table
I			037019		Complete Assembly (Includes A, B, H & F)



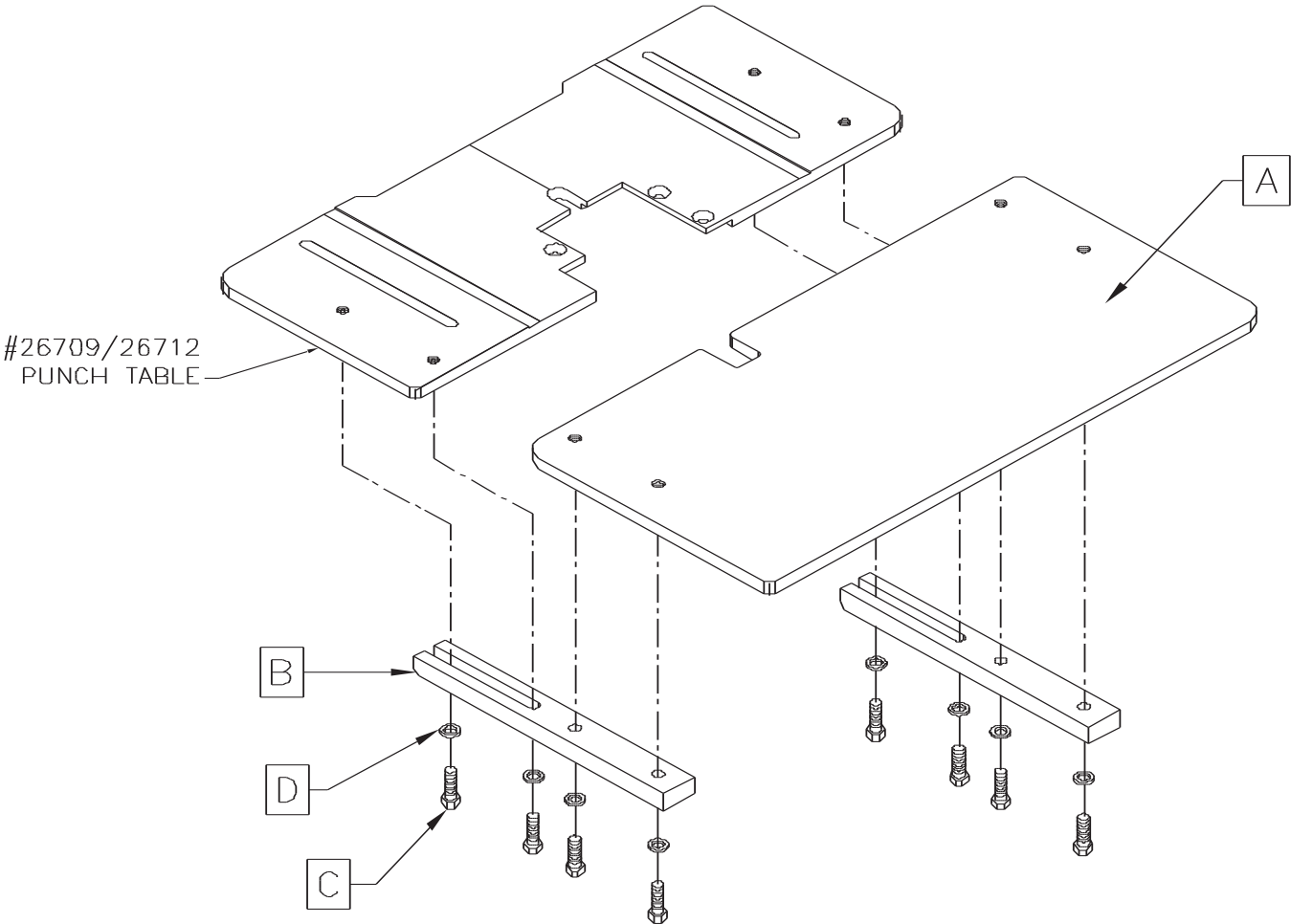
## NOTCHER TABLE

ITEM	COMMON PART #'S	FI-5109 FI-6008 FI-8507 DO-100 DO-70 DO-95 FI-8510	DO-120 DO-135 DO-150	DESCRIPTION
A	080061			Handle
B				M-10 Washer
C		014216		L Table Stop
D	230207			M-10 FSHCS
E		014119	033152	Table
F	026624	014215	033151	Tee Nuts Complete Assembly



# *PUNCH TABLE EXTENSION*

ITEM	PART #	DESCRIPTION
A	026760	Table
B	026757	Table Supports
C	201210	M-10 x 20 HHCS
D	214012	M-10 Washer
E	026765	Complete Extension Table



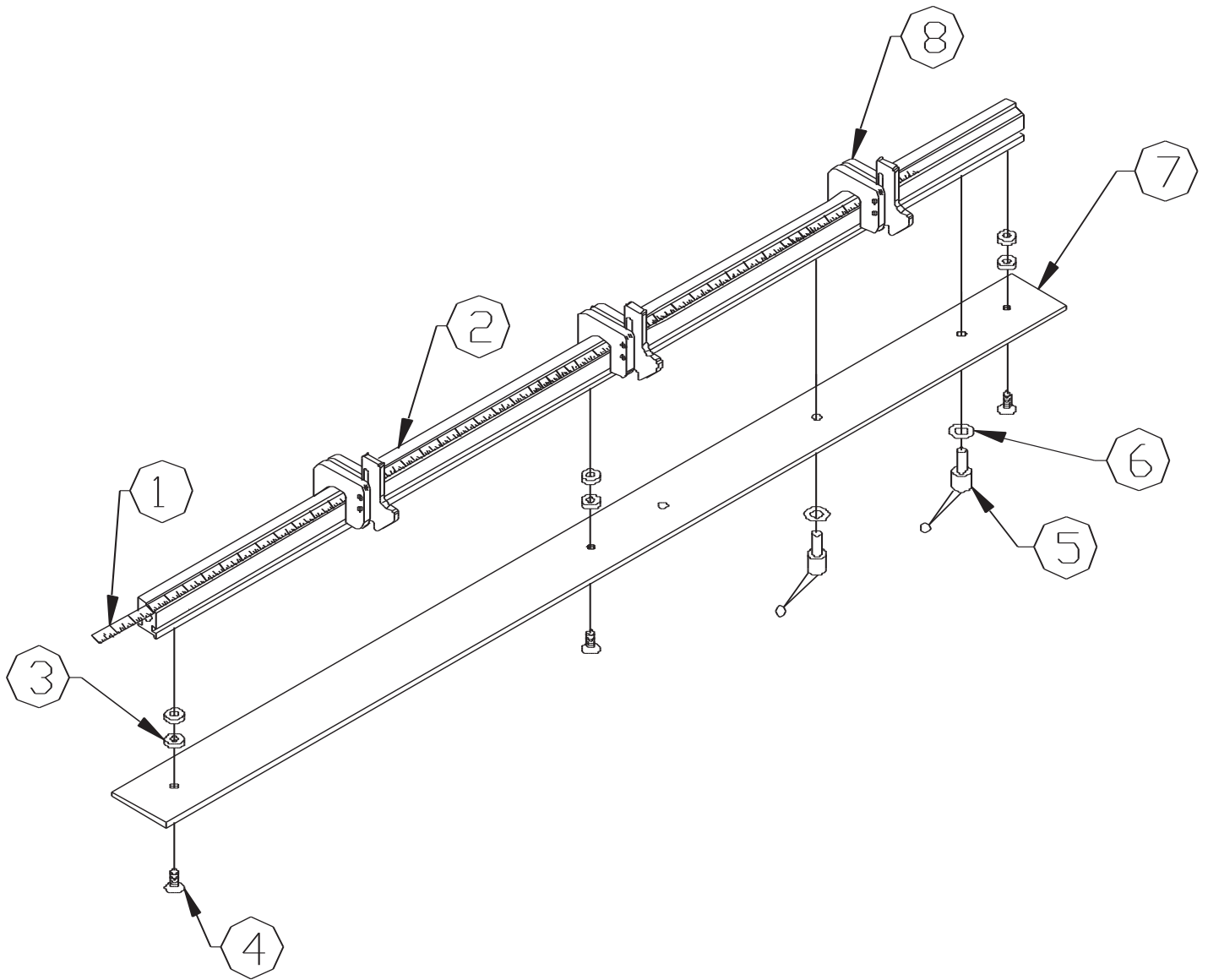


*THIS PAGE LEFT BLANK INTENTIONALLY.*

## **2.21 FOUR FOOT PUNCH GAUGING SYSTEM**

---

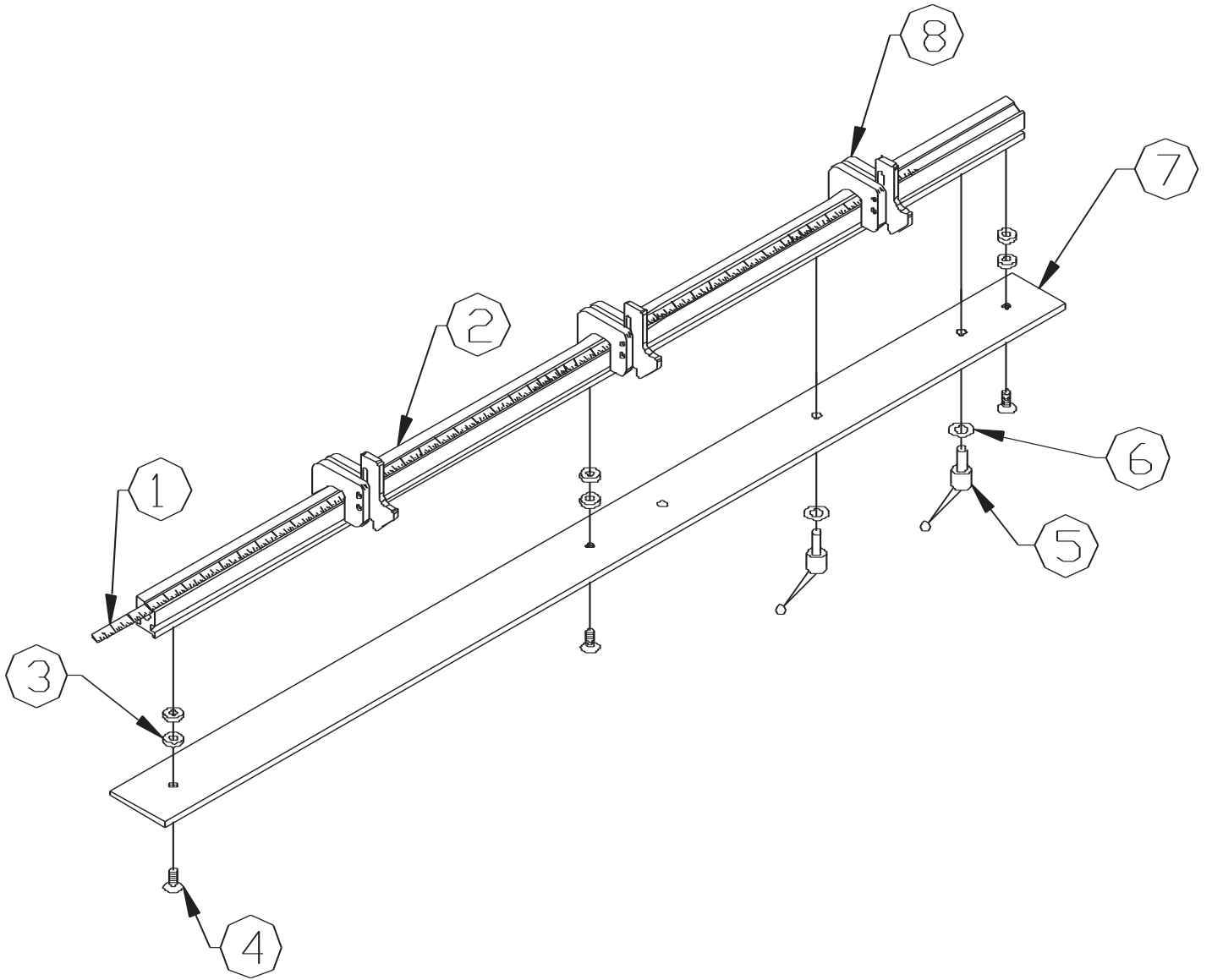
<b>ITEM</b>	<b>LEFT HAND</b>	<b>RIGHT HAND</b>	<b>DESCRIPTION</b>
<b>1</b>	<b>029220</b>	<b>029226</b>	<b>Scale</b>
<b>2</b>	<b>029200</b>	<b>029200</b>	<b>4' Rail</b>
<b>3</b>	<b>029294</b>	<b>029294</b>	<b>1/8 Washer</b>
<b>4</b>	<b>130107</b>	<b>130107</b>	<b>5/16 x 18 FSHCS</b>
<b>5</b>	<b>080061</b>	<b>080061</b>	<b>Handles</b>
<b>6</b>	<b>214012</b>	<b>214012</b>	<b>10mm Washer</b>
<b>7</b>	<b>029295</b>	<b>029295</b>	<b>Mounting Plate</b>
<b>8</b>	<b>029298</b>	<b>029299</b>	<b>Multi-Vertical Stop</b>
<b>9</b>	<b>029291</b>	<b>029289</b>	<b>Complete Assembly</b>



## **2.22 EIGHT FOOT PUNCH GAUGING SYSTEM**

---

<b>ITEM</b>	<b>LEFT HAND</b>	<b>RIGHT HAND</b>	<b>DESCRIPTION</b>
<b>1</b>	<b>029220</b>	<b>029226</b>	<b>Scale</b>
<b>2</b>	<b>029204</b>	<b>029204</b>	<b>8' Rail</b>
<b>3</b>	<b>029294</b>	<b>029294</b>	<b>1/8 Washer</b>
<b>4</b>	<b>130107</b>	<b>130107</b>	<b>5/16 x 18 FSHCS</b>
<b>5</b>	<b>080061</b>	<b>080061</b>	<b>Handles</b>
<b>6</b>	<b>214012</b>	<b>214012</b>	<b>10mm Washer</b>
<b>7</b>	<b>029296</b>	<b>029296</b>	<b>Mounting Plate</b>
<b>8</b>	<b>029298</b>	<b>029299</b>	<b>Slider Assembly</b>
<b>9</b>	<b>029292</b>	<b>029293</b>	<b>Complete Assembly</b>



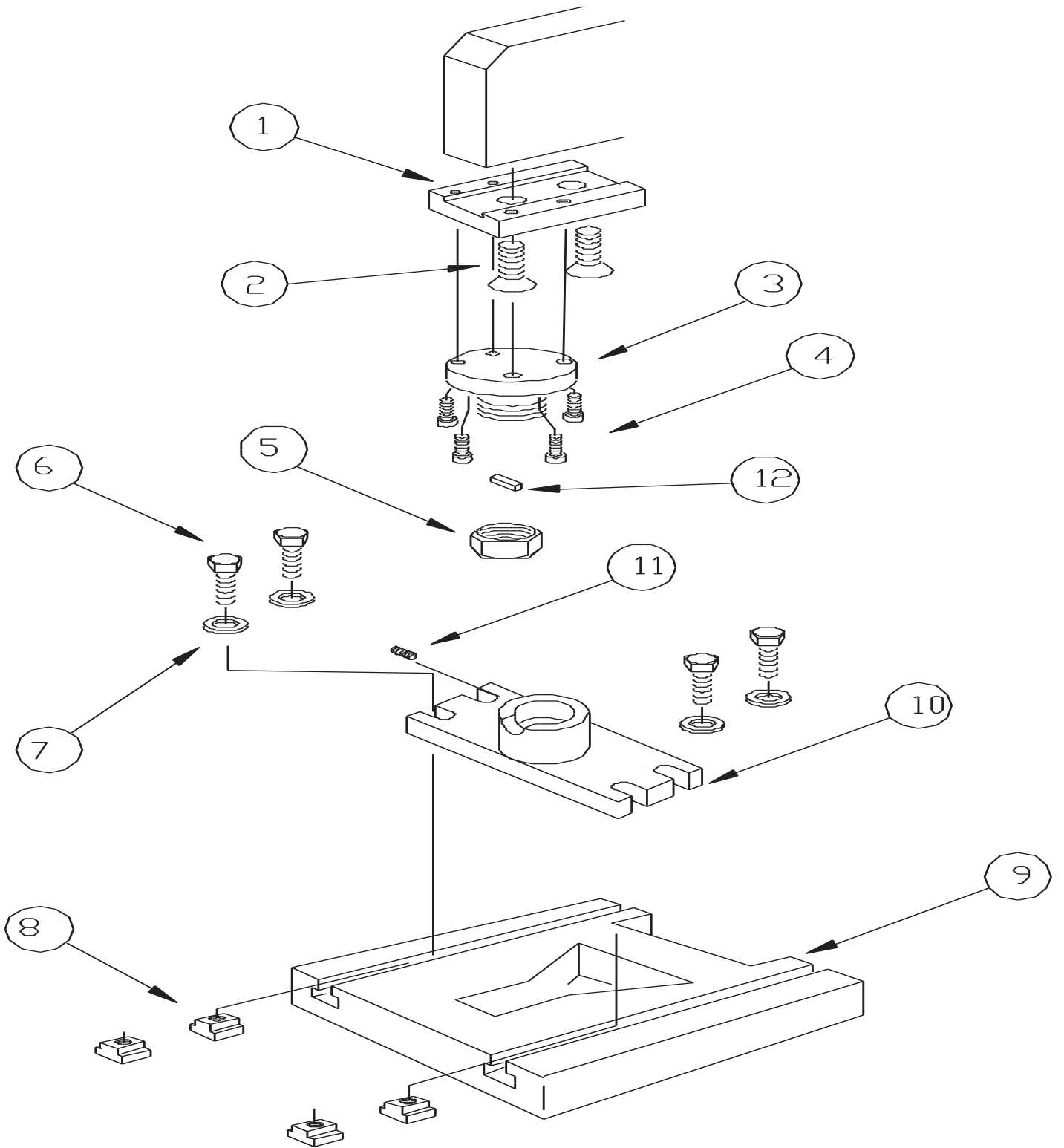
## **2.23 SECOND HOLE PUNCH**

---

---

**(NOTCH STATION - D.O.85)**

<b>ITEM</b>	<b>PART #</b>	<b>DESCRIPTION</b>
<b>1</b>	<b>025496</b>	<b>Punch Holder Carrier</b>
<b>2</b>	<b>230620</b>	<b>M-20 x 30 FSHCS</b>
<b>3</b>	<b>025193</b>	<b>Punch Holder</b>
<b>4</b>	<b>221310</b>	<b>M-12 x 25 SHCS</b>
<b>5</b>	<b>016095</b>	<b>#40 Punch Retaining Nut</b>
<b>5A</b>	<b>016096</b>	<b>#45 Punch Retaining Nut</b>
<b>6</b>	<b>201620</b>	<b>M-16 x 55 HHCS</b>
<b>7</b>	<b>113017</b>	<b>M-16 Plain HD Washer</b>
<b>8</b>	<b>026625</b>	<b>M-16 Tee Nut</b>
<b>10</b>	<b>025506</b>	<b>Die Holder</b>
<b>11</b>	<b>218044</b>	<b>M-10 x 25 SS</b>
<b>12</b>	<b>004123</b>	<b>Key</b>
<b>13</b>	<b>025485</b>	<b>Complete Tool</b>



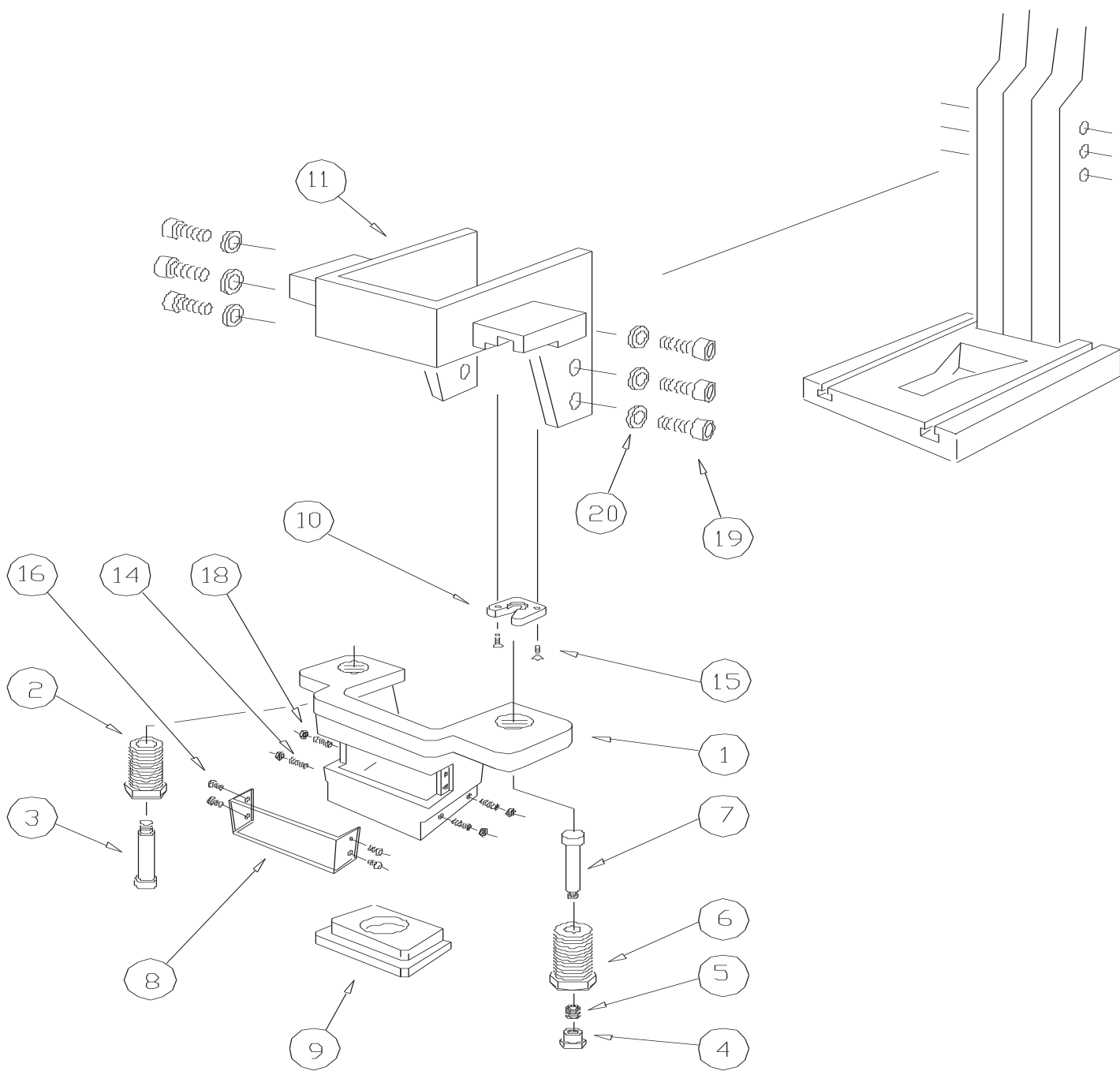
## **2.24 SECOND HOLE PUNCH STRIPPER (D.O. 85 ONLY)**

---

---

<b>ITEM</b>	<b>PART #</b>	<b>DESCRIPTION</b>
1	025012	Stripper
2	007229	Adjustment Screw (Left)
3	007237	Stripper Stud (Left)
4	007240	Spring Retainer
5	007241	Spring
6	007236	Adjustment Screw (Right)
7	007239	Spring Rod
8	025383	Polycarbon Sight Guard
9	025018	Stripper Insert Plate
10	007244	Stripper Retainer
11	025524	Stripper Frame
12		
13		
14	001541	Ball Spring Screw
15	230005	M-6 x 12 FSHCS
16	220014	M-6 x 10 BHSS
17		
18	110014	M-12 Jam (Locking) Nut
19	221412	M-16 x 35 SHCS
20	214016	M-16 Plain Washer



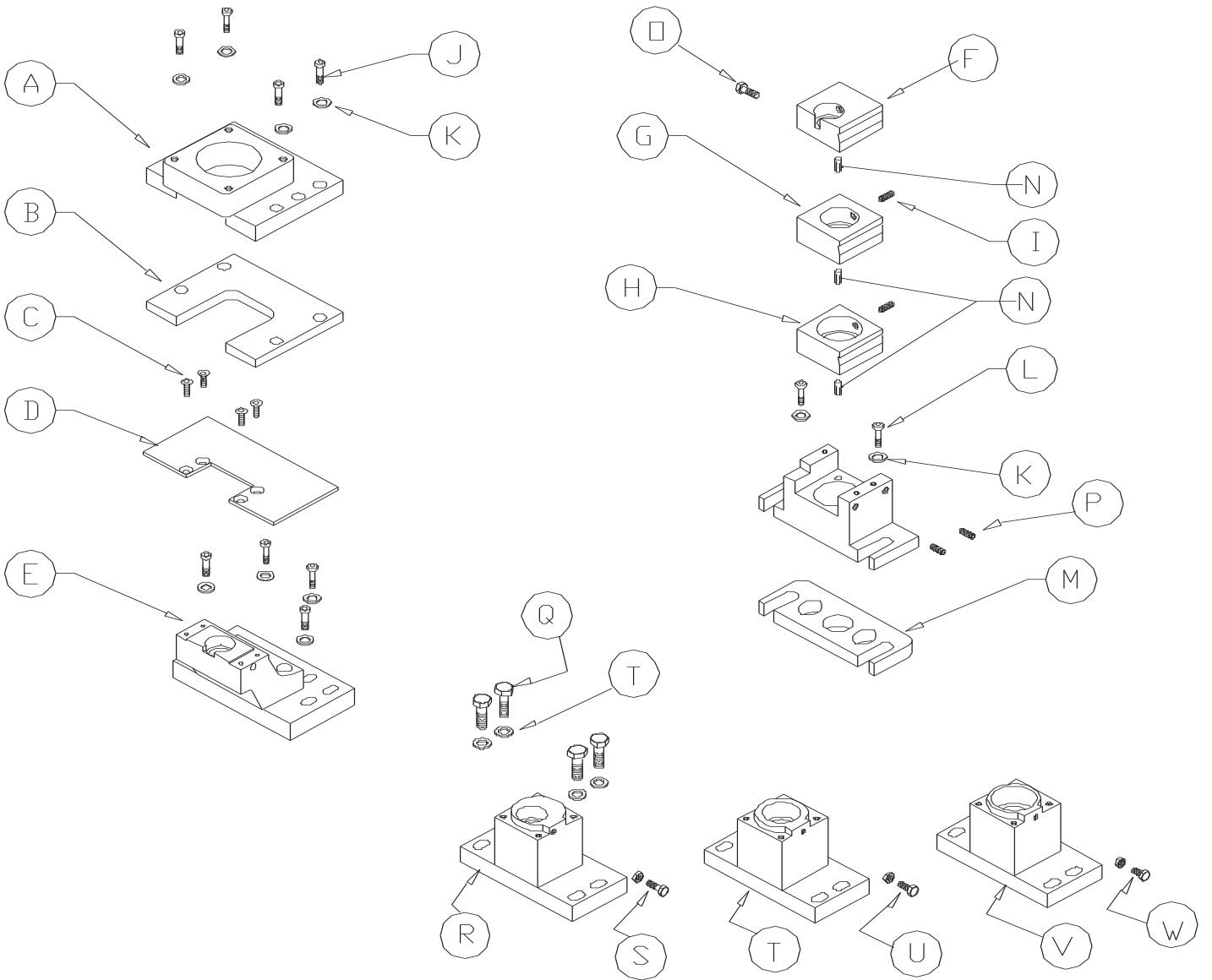


## 2.25 DIE HOLDERS

ITEM	COMMON	DO-70	6509	9012	12012	DO-100	FI-5109	DO-135	DESCRIPTION
		DO-95						DO-150	
	PART #'S	DO-85			2450		FI-6008		
		DO-120					FI-8507		
		FI-8510							
A	028300								6 x 6 Die Holder
B		080841	N/A	N/A	080841	080841	080841		Riser
C	230207								M-10 x 20 FSHCS
D	004275								Punch Table
*E		013186	026109	026152	080845	004270	004270	013186	Offset Die Holder
*E1		013186	013186	013186	013186				Offset Die Holder
F	006202							N/A	2" Die Insert
G	006252							N/A	2-1/2" Die Insert
H	006302							N/A	3" Die Insert
I	219060								M-10 x 50Set Screw
J	230415								M-12 FSHCS
K	113017								Reid Washer
L		201640	201625	201625	201640	201640	201640	201620	M-16 HHCS
M		015440	N/A	N/A	015440	015440	015440	N/A	Spacer
N	077145							N/A	Dowel Pin
O	204220							N/A	
P	218058							N/A	
Q								201620	M-16 x 55 HHCS
R								037014	2" Die Holder
S								203212	M-10 x 30 HHCS
T								037015	2-1/2" Die Holder
U								203210	M-10 x 25 HHCS
V								037016	3" Die Holder
W								201210	M-10 x 20 HHCS

\*E 6509 SER. #'S 78140907 & Prior 9012 SER. #'S 216000807 & Prior 12012 SER. #'S 509460507 & Prior

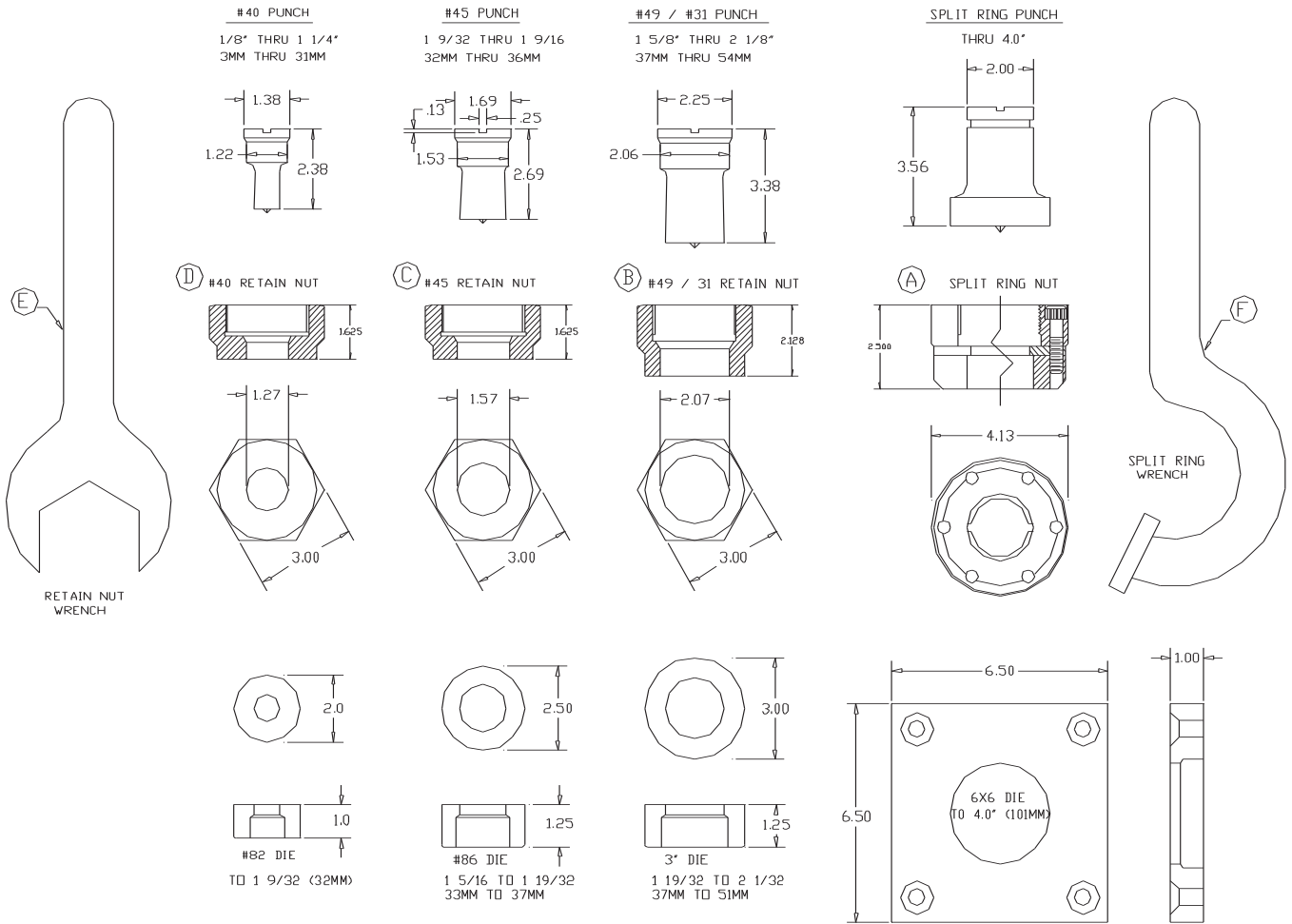
\*E1 6509 SER. #'S 78150907 & Up 9012 SER. #'S 216010807 & Up 12012 SER. #'S 509470607 & Up



## 2.26 PUNCH RETAINING NUTS

---

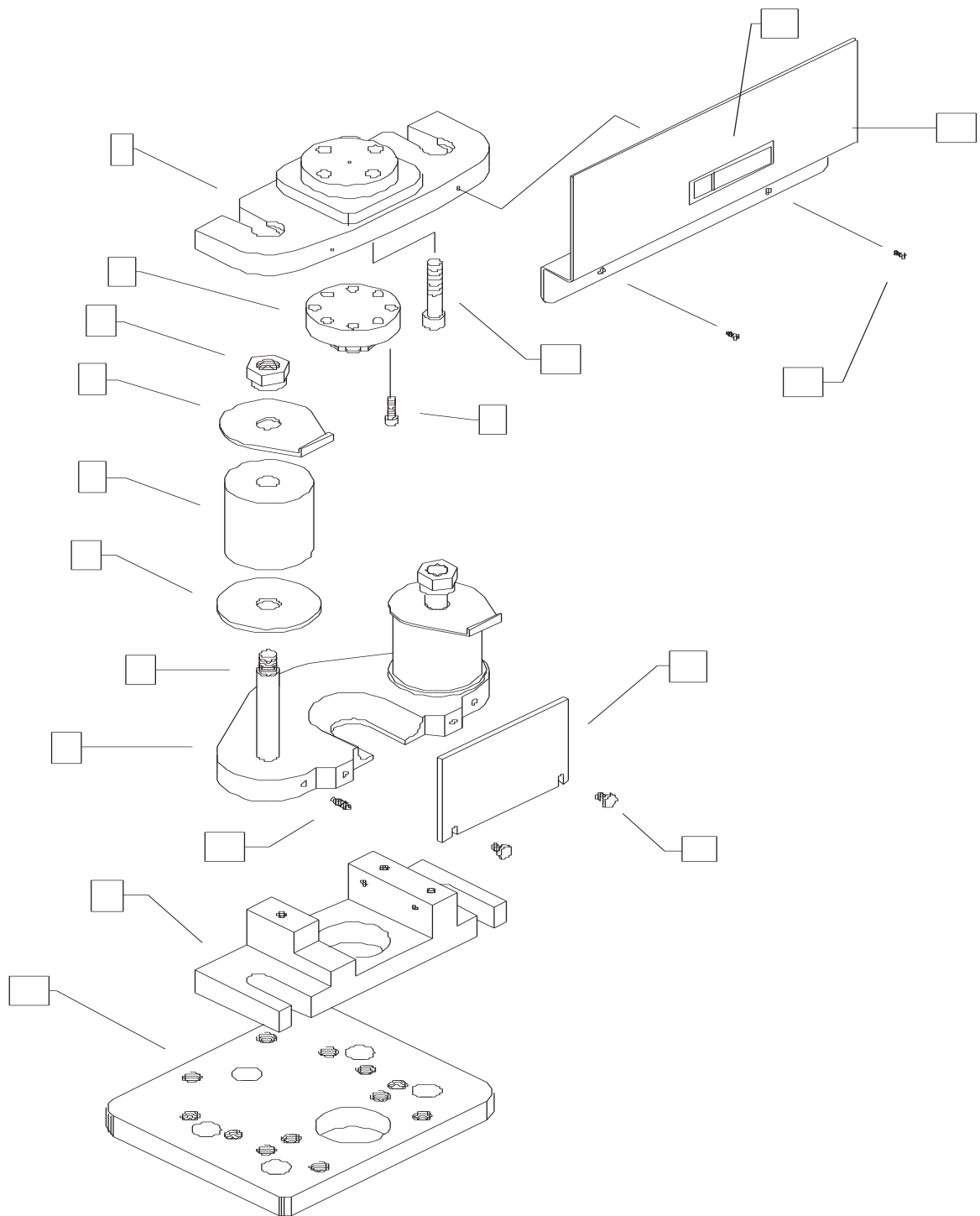
ITEM	COMMON	PART #'S	DESCRIPTION
	6509	12012	
	9012	DO-120	
	DO-70	DO-135	
	DO-95	DO-150	
	DO-85		
	DO-100		
	FI-5109		
	FI-6008		
	FI-8507		
A	026500	080895	Complete Heavy Duty Nut
B	N/A	037020	#49 Punch Retaining Nut
C	016096	080220	#45 Punch Retaining Nut
D	016095	080215	#40 Punch Retaining Nut
E	019099	080232	Wrench For B, C & D
F	018507	018507	Wrench For A
G	026501	080897	Ring Nut (Part of A)
H	026502	080896	Split Ring (Part of A)
I	026503	080898	Retaining Ring (Part of A)
J	221212	221220	M-10 SHCS (Part of A)
K	026504 (M-8)	026505 (M-10)	Brass Set Screw (Part of A)



## 2.27 URETHANE STRIPPER

---

ITEM	COMMON PART #						DESCRIPTION
	6509	9012	DO-70 DO-95	12012 DO-120 DO-135 DO-150	FI-85	DO-85	
1	025451	025451	025451	025452	025451	025441	Top Plate
2						025193	Punch Carrier
3							M-8 x 25 SHCS
4	025453						Post Nut
5	025443						Post Retainer
6	025455						Urethane Spring
7	025456						Spring Spacer
8	025454						Spring Post
9	025447						Stripper Plate
10	218023						M-6 x 12 SS
11	025447	026038 026038	026039	026039	026037		Die Holder
12	218023	006262 026042					Punch Bolster
13	025450						Lexan Shield
14	073691						Knob
15		026082 026082	026082	026082	026082	025441	Guard
16	660255						M-6 Drive Screw
17	003130						Stripper Warning
18		221329 221329	221329	221329	221329	221329	M-12 x 70 SHCS
		026030 026030	026030	026032	026030	025475	Complete Unit
Retrofit Kits		026040 026060	026050	026070	026055		



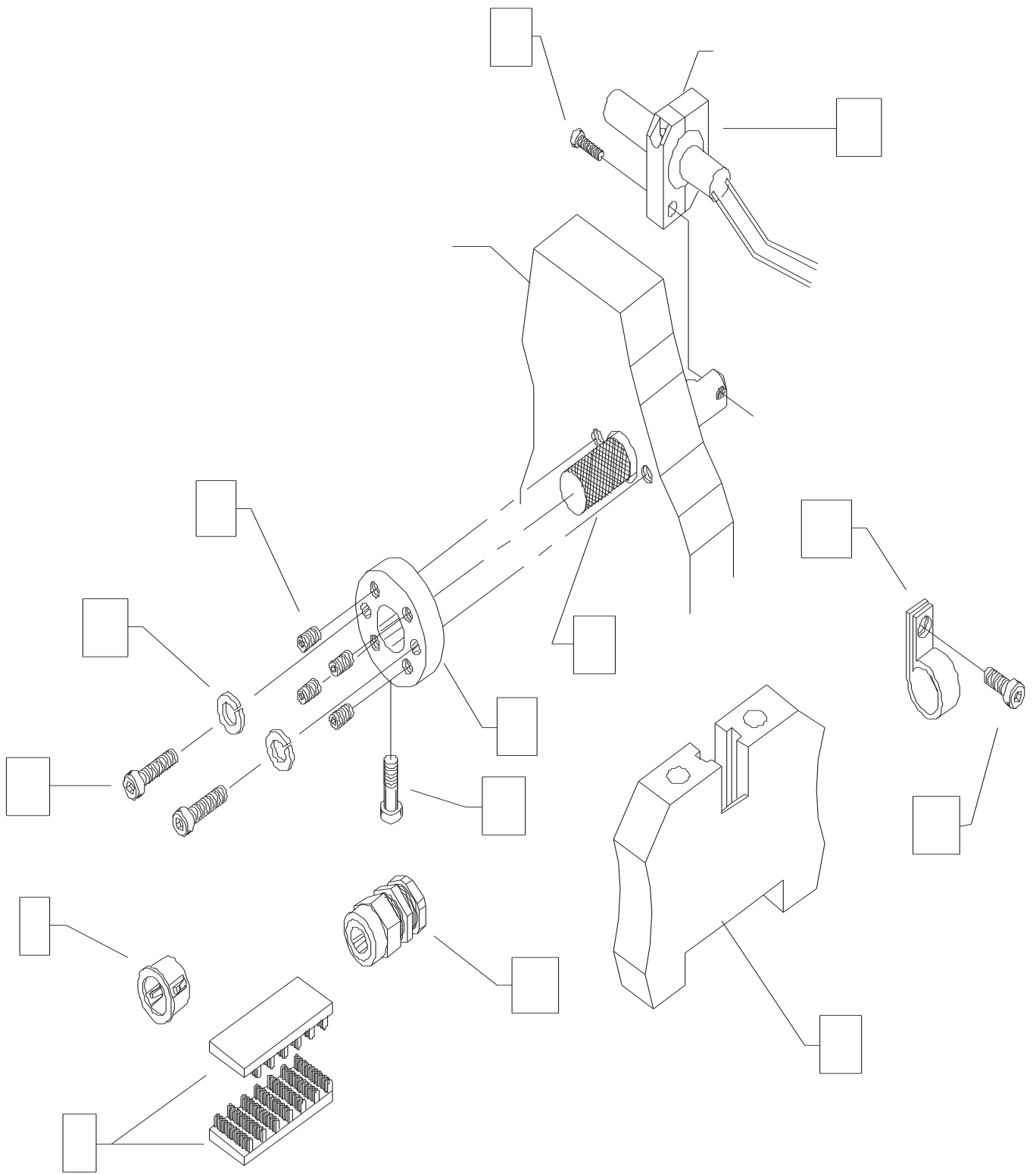
## **2.28 LASER LIGHT**

---

---

<b>ITEM</b>	<b>PART #</b>	<b>DESCRIPTION</b>
<b>A</b>	<b>033261</b>	<b>Laser w/Mounting Bracket</b>
<b>B</b>	<b>073619</b>	<b>M-6 x 20 SHCS</b>
<b>C</b>	<b>033258</b>	<b>Laser Rod</b>
<b>D</b>	<b>221120</b>	<b>M-8 x 25 SHCS</b>
<b>E</b>	<b>033255</b>	<b>Laser Rod Holder</b>
<b>F</b>	<b>218030</b>	<b>M-8 x 12 SS</b>
<b>G</b>	<b>073106</b>	<b>M-6 Lock Washer</b>
<b>H</b>	<b>073621</b>	<b>M-6 x 30 SHCS</b>
<b>I</b>	<b>158003</b>	<b>Hole Plug</b>
<b>J</b>	<b>013167</b>	<b>Velcro 5"</b>
<b>K</b>	<b>077183</b>	<b>Cord Grip</b>
<b>L</b>	<b>033228</b>	<b>WDU Terminal Block</b>
<b>M</b>	<b>562040</b>	<b>Wire Clamp</b>
<b>N</b>	<b>221005</b>	<b>M-6 x 12 SHCS</b>



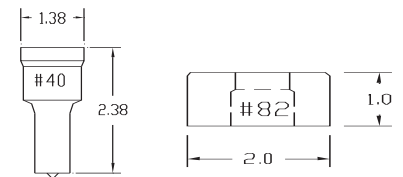


## 3.0 PUNCHES AND DIES

All Scotchman punches and dies are designed and manufactured for Scotchman products. All punches and dies are made from high quality tool steel. The following charts give punch and die dimensions for various styles and sizes. They also show what tooling is required to hold the various sizes. In addition to the punches and dies shown, Scotchman manufactures punches and dies for special applications. Please contact your dealer or the factory if you have such an application.

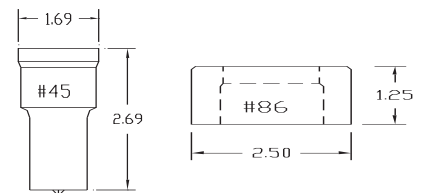
### #40 ROUND PUNCHES & #82 DIES (USE #40 PUNCH RETAINING NUT & STANDARD 2" DIE HOLDER OR INSERT)

1/8, 5/32, 3/16, 7/32, 1/4, 9/32, 5/16, 11/32, 3/8, 13/32, 7/16, 15/32, 1/2, 17/32, 9/16, 19/32, 5/8, 21/32, 11/16, 23/32, 3/4, 25/32, 13/16, 27/32, 7/8, 29/32, 15/16, 31/32, 1, 1-1/32, 1-1/16, 1-3/32, 1-1/8, 1-5/32, 1-3/16, 1-7/32, 1-1/4



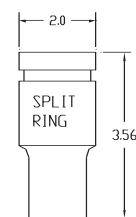
### #45 ROUND PUNCHES & #86 DIES (USE #45 PUNCH RETAINING NUT & 2-1/2" DIE HOLDER OR INSERT)

1-9/32, 1-5/16, 1-11/32, 1-3/8, 1-13/32, 1-7/16, 1-15/32, 1-1/2, 1-17/32, 1-9/16

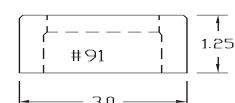


### OVERSIZED ROUND PUNCHES (USE HEAVY DUTY SPLIT-RING RETAINING NUT)

1-19/32" UP TO 1-15/16"



### OVERSIZED ROUND DIES (USE OVERSIZED 3" DIE HOLDER OR INSERT)

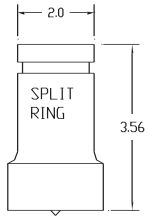


1-5/8" TO 1-31/32"

**OVERSIZED ROUND PUNCHES**

**(USE OVERSIZED SPLIT-RING RETAINING NUT)**

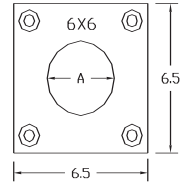
1-31/32" UP TO 2-7/16"



**OVERSIZED ROUND DIES (USE 6" x 6" DIE HOLDER)**

**I.D. SIZES LARGER THAN 1-31/32"**

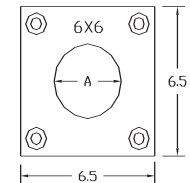
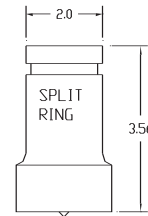
**MUST USE 6" x 6" DIE HOLDER**



**OVERSIZED ROUND PUNCHES (USE HEAVY DUTY RETAINING NUT & OVERSIZED 6" x 6" DIE HOLDER)**

2-1/2" TO 3"

3-1/32" TO 4"



**#40 OVAL SLOT PUNCHES & DIES**

**(USE #40 PUNCH RETAINING NUT AND**

**STANDARD 2" O.D. DIE HOLDER OR INSERT)**

9/32 x 3/4, 5/16 x 3/4, 11/32 x 3/4, 3/8 x 3/4,

13/32 x 3/4, 7/16 x 3/4, 15/32 x 3/4,

1/2 x 3/4, 17/32 x 3/4, 9/16 x 3/4, 19/32 x 3/4, 5/8 x 3/4,

9/32 x 1, 5/16 x 1, 11/32 x 1, 3/8 x 1,

13/32 x 1, 7/16 x 1, 15/32 x 1, 1/2 x 1,

17/32 x 1, 9/16 x 1, 19/32 x 1, 5/8 x 1,

21/32 x 1, 11/16 x 1, 23/32 x 1

3/4 x 1, 25/32 x 1, 13/16 x 1, 7/8 x 1, 15/16 x 1

9/32 x 1-1/4, 5/16 x 1-1/4, 11/32 x 1-1/4,

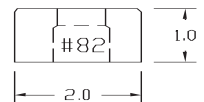
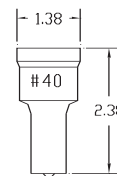
3/8 x 1-1/4, 13/32 x 1-1/4, 7/16 x 1-1/4,

15/32 x 1-1/4, 1/2 x 1-1/4, 17/32 x 1-1/4,

9/16 x 1-1/4, 19/32 x 1-1/4, 5/8 x 1-1/4,

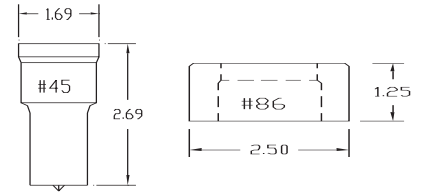
21/32 x 1-1/4, 11/16 x 1-1/4, 23/32 x 1-1/4,

3/4 x 1-1/4, 25/32 x 1-1/4, 13/16 x 1-1/4, 7/8 x 1-1/4, 15/16 x 1-1/4

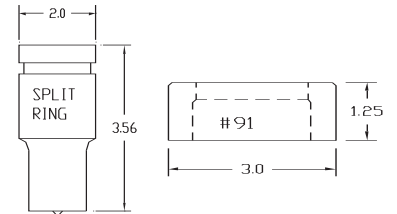


**FOR 1-17/64" TO 1-9/16" SLOT LENGTHS**

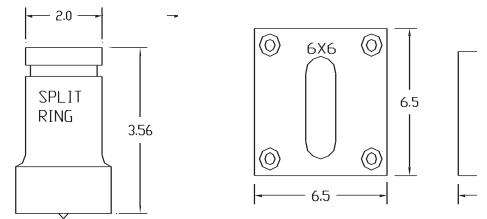
**(USE #45 PUNCH RETAINING NUT & 2-1/2" DIE HOLDER OR INSERT FOR 2-1/2" O.D. DIES)**



**FOR 1-19/32" TO 2-1/32" SLOT LENGTHS  
(USE HEAVY DUTY SPLIT-RING NUT AND 3" DIE HOLDER OR 3" O.D. INSERT)**



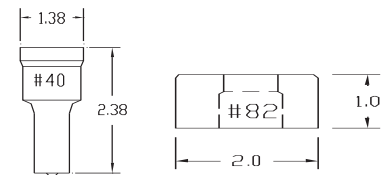
**FOR 2-3/64" TO 4" SLOT LENGTHS  
(USE HEAVY DUTY SPLIT-RING NUT & 6" x 6" DIE HOLDER)**



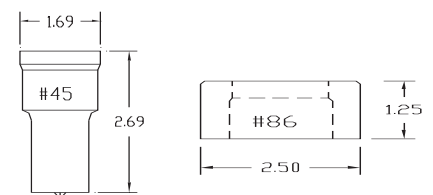
**#40 SQUARE PUNCHES & #82 DIES  
(USE #40 RETAINING NUT & 2" DIE HOLDER OR INSERT)**

**3/8, 13/32, 7/16, 15/32, 1/2, 17/32,**

**9/16, 21/32, 3/4, 25/32, 7/8**



**#45 1" SQUARE PUNCH  
#86 1-1/32" SQUARE DIE**



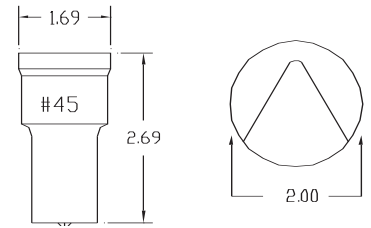
**PICKET PUNCHES & DIES FOR SQUARE TUBING**

**1" (USE SPLIT-RING NUT & #86 DIE)**

**5/8" (USE #45 NUT & #82 DIE)**

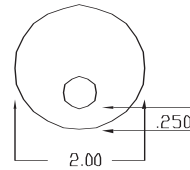
**#86 DIE IS 2.50" O.D.**

**3/4" (USE SPLIT-RING NUT & #82 DIE)**



**ECCENTRIC DIES FOR PUNCHING NEXT TO WEB OF ANGLE IRON**

**#82 - 9/32, 11/32, 13/32, 7/16, 15/32, 17/32, 9/16, 19/32, 21/32, 23/32, 25/32, 27/32**



**#40 HEXAGON PUNCHES**

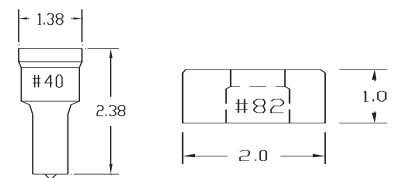
**(USE #40 RETAINING NUT)**

**1/2, 17/32, 11/16, 3/4**

**#82 HEXAGON DIES**

**(USE 2" DIE HOLDER OR INSERT)**

**17/32, 9/16, 23/32, 25**



**TRIMMING & CUTOFF PUNCHES & DIES**

**1" PUNCH (USE HEAVY DUTY SPLIT-RING NUT)**

**1" DIE (USE 2-1/2" DIE INSERT)**

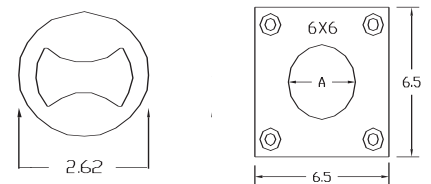
**1-1/4" PUNCH (USE HEAVY DUTY SPLIT-RING NUT)**

**1-1/4" DIE (USE 3" DIE INSERT**

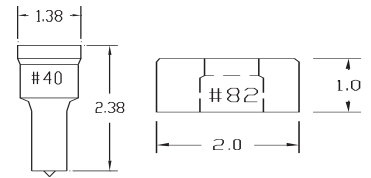
**(SEE DIAG. OF DIE — 3.00" O.D)**

**1-1/2" PUNCH (USE HEAVY DUTY SPLIT-RING NUT)**

**1-1/2" DIE (USE 6" X 6" DIE HOLDER)**



## RECTANGLE PUNCHES & DIES



**ALL SIZES ARE AVAILABLE THROUGH OUR SPECIAL TOOLING DEPARTMENT.**

**PLEASE CALL FOR PRICING AND DELIVERY.**

### *INFORMATION ON ORDERING PUNCHES & DIES*

**THE #40 & #45 PUNCHES AND THE #82 & #86 DIES LISTED ARE STANDARD SIZES KEPT IN STOCK FOR YOUR CONVENIENCE.**

**MANY METRIC SIZES FROM 5mm TO 30mm ARE ALSO KEPT IN STOCK.**

**ALL OF THE OVERSIZED PUNCHES & DIES ARE SPECIALS AND REQUIRE UP TO FOUR WEEKS FOR DELIVERY.**

**THE #40 & #45 PUNCHES AND THE #82 & #86 DIES REQUIRE DIFFERENT DIE CLEARANCES DEPENDING ON THE TYPE & THICKNESS OF MATERIAL BEING PUNCHED.**

**FOR PUNCHING MILD STEEL, WE RECOMMEND 1/32 INCH DIE CLEARANCE WHEN PUNCHING MATERIAL LESS THAN 5/8 INCH.**

**WE RECOMMEND 1/16 INCH DIE CLEARANCE WHEN PUNCHING MATERIAL 3/4 INCH OR OVER.**

**PLEASE SPECIFY TYPE & THICKNESS OF MATERIAL BEING PUNCHED, TO ASSURE PROPER DIE CLEARANCE.**

**IN ADDITION TO THE SHAPES LISTED, WE MANUFACTURE TEARDROP, KNOCK-OUT, KEYHOLE AND OTHER SPECIALTY PUNCHES & DIES.**

**PLEASE WRITE, CALL OR FAX FOR PRICES AND DELIVERY.**