

METALproTM **Corporation**

Operations Manual MP4000 Ironworker

Revised 2/19/03

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Warranty

METALpro Corporation (seller) will, within one (1) year of date of purchase replace F.O.B. the factory, any goods which are defective in materials and/or workmanship provided that the buyer, at the seller's option, returns the defective goods prepaid to the seller. Punches, dies, and/or blades are warranted to be free of defects in materials and workmanship within ten (10) days of purchase date.

This warranty does not apply to machines and/or components that 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 recommended capacities and specifications. In no event shall seller be liable for labor costs expended on such goods or consequential damages. 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 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 seller.

This warranty is non-transferable.

Introduction

This manual provides the information required for assembling, setting up, checking, operating and maintaining the MP4000 Ironworker. Included as a part of this manual are replacement parts lists and assembly illustrations.

The machine capabilities and specifications are provided. If you have questions regarding the suitability of the MP4000 Ironworker for a new application or need assistance in determining tooling requirements, please call:

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The first several pages of this manual review safety. This safety section summarizes the design safety elements, reviews **WARNINGS** and lists the **WARNING LABELS** on the machine and accessories. It is your responsibility to understand all **WARNINGS**. Observe all **WARNINGS** and **CAUTIONS** during setup, operation, servicing and maintenance of the METALpro MP4000 Ironworker.

Safety

To Prevent Serious Bodily Injury.....

- **DO NOT** operate, install tooling, service or adjust machine without proper instructions and without reading and understanding the Operations Manual
- **DO NOT** service the machine with the electrical power connected
- **DO NOT** operate any station without the respective strippers or hold-downs in place
- **DO NOT** operate machine with protective guards removed
- **DO NOT** place any part of your body under blade, punch or moving members
- **DO NOT** punch half holes or punch or shear unknown materials
- **DO NOT** side load the brake
- **DO NOT** operate punch station without checking the punch-to-die alignment and tightness
- **DO.....** check the punch-to-die alignment frequently while performing work

Safety Summary

1. The MP4000 Ironworker complies with ANSI standards for safety design and labeling.
2. The MP4000 Ironworker components are heavy. To avoid the possibility of injury, the power head assembly, which includes the hydraulic cylinder, the arm, the main weldment and the punching and shearing station, comprises more than half the weight of the machine and should be handled with a hoist.
3. Wear approved eye protection when using the MP4000 Ironworker. Observe the **WARNINGS** displayed on the Ironworker and keep hands and clothing clear of all moving parts.
4. When using the optional MP4110 brake, the ends of the workpiece move upward while bending. Make sure that there is clearance for the movement of the workpiece. Keep your hands and other body parts away from the workpiece as it moves.
5. Before doing any setup, adjustment, maintenance or repair on the Ironworker, make sure it is unplugged.

Design Features:

Pinch Points

The operating mechanism is free of unguarded pinch points.

Rotating Mechanisms

A guard encloses the rotating motor shaft, coupling and the pump shaft.

Guarding

The opening to the flat shearing station has a fixed guard immediately above the opening extending 3-1/4" beyond the shear point.

The opening to the round shearing station and the opening to the angle iron shearing station have a fixed rod guard extending 2" in front of the shear point.

The exit side of the shear station has a hinged guard that covers the back of the shear except when the workpiece is exiting the shear.

Labeling

WARNING labels are displayed on the MP4000 Ironworker

Power Arm Warning The power arm label displays the standard **WARNING** symbol, the standard symbol for safety glasses and the following text:

SAFETY GLASSES REQUIRED WHEN OPERATING OR OBSERVING THIS MACHINE

Punch Station Warning Label The punch station label displays the standard **WARNING** symbol and the following text:

40 TON CAPACITY

DO NOT CHANGE OR ADJUST PUNCH/DIE WITHOUT REFERRING TO THE OPERATORS MANUAL AND SAFETY INSTRUCTIONS

Shear Station Warning Label The entry point and the exit guard above the flat shearing station displays the standard **WARNING** symbol, the symbol for hand injury and the following text:

**TO PREVENT SERIOUS BODILY INJURY, DO NOT PLACE FINGERS BEYOND THIS GUARD
DO NOT REMOVE THIS GUARD**

The entry point and the exit guard above the angle iron shearing station displays the standard **WARNING** symbol and the following text:

KEEP HANDS CLEAR

Brake Station Warning Label The front and rear brake station labels display the standard **WARNING** symbol, the symbol for hand injury and the following text:

TO PREVENT SERIOUS BODILY INJURY AND/OR DAMAGE TO THE MACHINE:

- **DO NOT BRAKE ROUNDS**
- **LOAD MATERIAL CENTRALLY**
- **REMOVE TOOL WHEN NOT IN USE**

The second front and rear labels display the standard **WARNING** symbol and the following text:

KEEP HANDS CLEAR

Description and Specifications

(Refer to Figure 1)

Description

The MP4000 Ironworker is a multipurpose two station metal working machine that provides capability for several different operations in a single machine. The straightforward design allows for quick setup and ease of use.

The MP4000 Ironworker is a single stroke machine. That is, stroke and stroke direction is controlled by the control valve lever. When the lever is held in one direction, the ironworker will travel in that direction and will stop only if the lever is released or the maximum stroke is reached.

Physical Dimensions and Weight

Width	30 inches
Height	55-1/4 inches
Depth	24 inches
Shipping weight approximately 430 pounds, including packaging	

Operational Capacity

6 stroke operations per minute maximum (1/4" Material)

Ironworker Capacity

(Note: The Ironworker capacity is based on 65,000 psi tensile steel)

Maximum Force 40 tons

Shearing –

Flat stock	3/8 x 4 inches 1/4 x 6 inches
Angle iron	1/4 x 3 x 3 inches
Rod (round)	3/4 inch diameter
Rod (square)	5/8 inch diameter

Notching –

(Maximum one pass capacity)

1-3/4 x 2 Inches in 1/4 inch plate

Bending

1/4 inch stock x 8 inch width
(20 tons maximum force)

Forming

40 tons at the punch station
20 tons at the shear station

Specifications

Electric power requirement
Hydraulic power

110 VAC, 20 amp service
self-contained, 2500 psi.

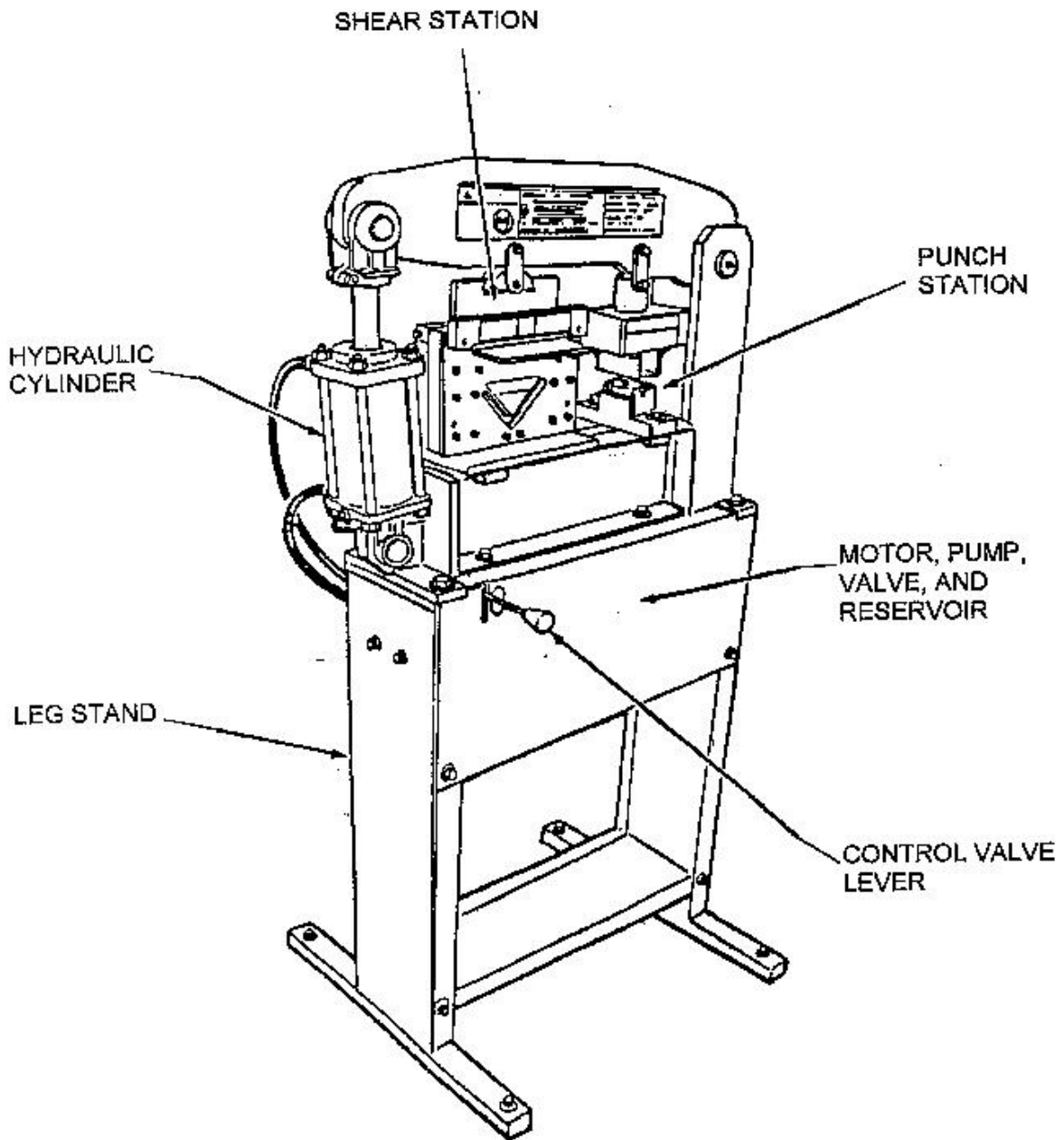


Figure 1- MP 4000 Ironworker
Assembled

Initial Assembly and Installation

(Refer to Figures 2, 3, 4 & 5)

During the assembly and installation of the MP4000 Ironworker, refer to the exploded views as well as the Bill of Materials (Pages 7 & 12).

Uncrating, Inspection and Installation Requirements

- Using a forklift or pallet jack, move the crated MP4000 Ironworker as close as practical to the workstation where the Ironworker will be assembled and installed.
- Uncrate the Ironworker.
- Make sure that instructional material and the packing list are preserved and that components are accounted for prior to discarding the shipping crate.
- Carefully inspect the Ironworker. Make sure that all items listed on the packing list are present.
- If damage is discovered, report the nature of the damage to the carrier. Replace any damaged components before using the Ironworker.
- The installation site should be level. Tools required are listed below:

Adjustable wrench	3/4" wrench
1/2" socket	9/16" socket
1/2" wrench	9/16" wrench
3/4" socket	

Hardware for Ironworker Stand Assembly

Item	Description	Quantity
11	1/2-13 x 1-3/4" Hex Head Screw	4
12	1/2" Flat Washer	4
17	5/16" Flat Washer	10
20	3/8" Flat Washer	2
22	3/8-16 x 1" Hex Head Screw	2
26	3/8-16 Lock Nut	2
31	5/16-18 x 3/4" Carriage Bolt	10
32	5/16-18 Lock Nut	10
35	Wrench	1
65	1/2-13 Lock Nut	4
98	Control Valve Lever	1
	All of the above are packed in a bag	
56	Slug Chute	1
57	Lower Shelf	1
58	Upper Shelf Assembly includes the following items: 17, 22, 23, 30, 36, 37, 38, 40, 41, 42, 43, 45, 46, 47, 48, 49, 50, 51, 52, 53, 61, 99, 101, assembled on the shelf	1
59	Leg (includes 39)	2
62	Front Panel	1

Leg Stand Assembly

(Refer to Figure 2)

1. Place the two legs (59) on edge and position the lower shelf (57) and the upper shelf (58) with pump/motor assembly between them.
2. Install 5/16-18 x 3/4" carriage bolts (31), 5/16" flat washers (17) and 5/16-18 lock nuts (32) hand tight.
3. Set the base upright.
4. Viewed from the operating side of the Ironworker, the motor will be at the right side of the base.
5. Make sure the legs and the shelves are properly positioned and square. Tighten the lock nuts on the backside of the Ironworker. Leave the lock nuts on the front side hand tight until the front panel (62) is installed.
6. Position the reservoir cover (61) against the two square holes of the left leg (59) and assemble with two 5/16-18 x 3/4" carriage bolts (31), 5/16" flat washers (17) and 5/16-18 lock nuts (32).

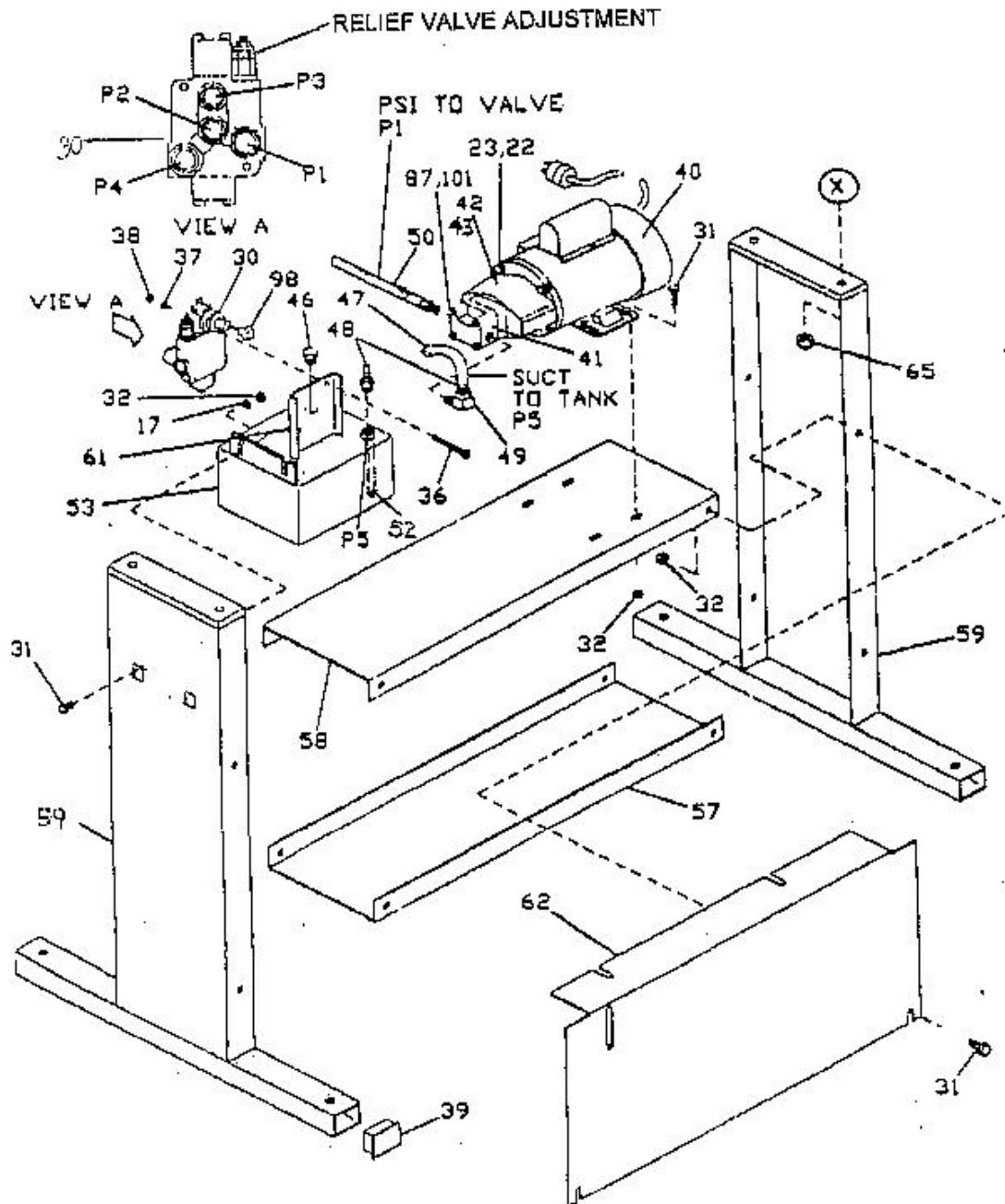


Figure 2- Leg Stand Assembly

Installation of the Power Head Assembly

(Refer to Figure 3)

WARNING: THE POWER HEAD ASSEMBLY IS HEAVY. USE A LIFTING DEVICE SUCH AS AN ELECTRIC HOIST OR A HYDRAULIC LIFT. MAKE SURE THE LIFTING STRAP IS POSITIONED TO BALANCE THE POWER HEAD.

1. Lift and position the power head assembly over the leg stand assembly. Lower until it is properly positioned and resting on the base. As viewed from the operating side of the Ironworker, the hydraulic cylinder will be at the left end of the base.
2. Before removing the lifting strap, install four 1/2-13 x 1-3/4" hex head screws (11), 1/2" flat washers (12) and 1/2-13 lock nuts (65) hand tight.
3. Tighten the screws and nuts.
4. Position the front panel (62, Figure 2, page 8) so the lip of the panel is flush against the bottom of the main weldment channel iron by first slipping the long edge of the panel inside of carriage bolts (31) of upper shelf (58). Make sure the holes in the main weldment and the slots in the lip of the front panel are aligned. Install two 3/8-16 x 1" hex head screws (22), 3/8" flat washers (20) and 3/8-16 lock nuts (26) hand tight. You will be adding the slug chute (56) using these same screws.
5. Tighten the lower and the upper shelf mounting screws (Items 17, 31 and 32) providing the small lip of the front panel (62) is flush against the bottom of the power head.
6. Install the control valve lever (96).

Hydraulic Installation

(Refer to Figures 2, 3 and 4)

CAUTION: DO NOT ALLOW PIPE TAPE TO OBSTRUCT THE FITTING OPENINGS. IF YOU USE PIPE SEALANT, USE ONLY ENOUGH TO ACHIEVE A GOOD SEAL. DO NOT ALLOW ANY OF THE PIPE SEALING COMPOUND TO GET IN THE HYDRAULIC SYSTEM.

1. Connect the hydraulic hoses as shown.

WARNING: USE THE REAR PORTS OF THE CYLINDER ONLY. THE LOWER PORT ON THE LEFT SIDE OF THE CYLINDER MUST REMAIN PLUGGED.

2. Tighten the fittings on the hydraulic hoses.
3. Remove the breather/fill plug (46) from the hydraulic reservoir.
4. Fill the reservoir to within 1/4" of the top with AW/AL ISO 68 20W/20, ISO 32 10W or Mobil DTE 24-SSU or equal hydraulic oil. Replace the fill plug.
5. Prime the hydraulic system as follows:
 - Plug the Ironworker motor into a 110 VAC, 20 AMP circuit.
 - Observe the clear suction hose (Figure 4) and start the pump by switching on the motor. You should see hydraulic oil enter the suction hose. If you do not see hydraulic oil enter the suction hose, immediately switch off the motor and call METALpro customer service.
 - Moving the control valve lever, cycle the hydraulic cylinder up and down slowly. Complete ten cycles to make sure all air has been purged from the hydraulic system.

CAUTION: AFTER THE HYDRAULIC SYSTEM HAS BEEN PRIMED, REMOVE THE BREATHER/FILL PLUG AND ADD HYDRAULIC OIL TO WITHIN 1" OF THE TOP OF THE RESERVOIR. OPERATING THE IRONWORKER WITH INADEQUATE HYDRAULIC OIL SUPPLY WILL CAUSE DAMAGE TO THE PUMP AND CYLINDER.

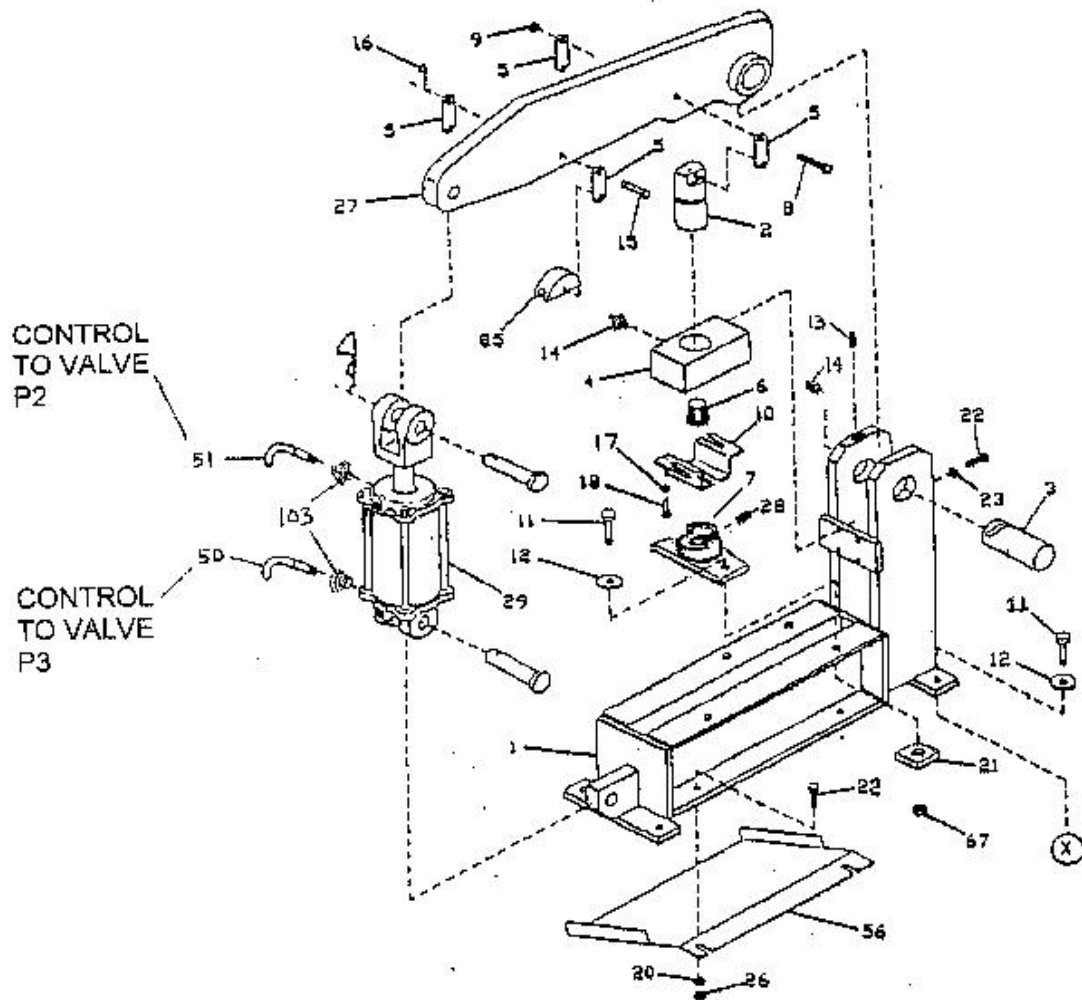


Figure 3- Power Head Assembly

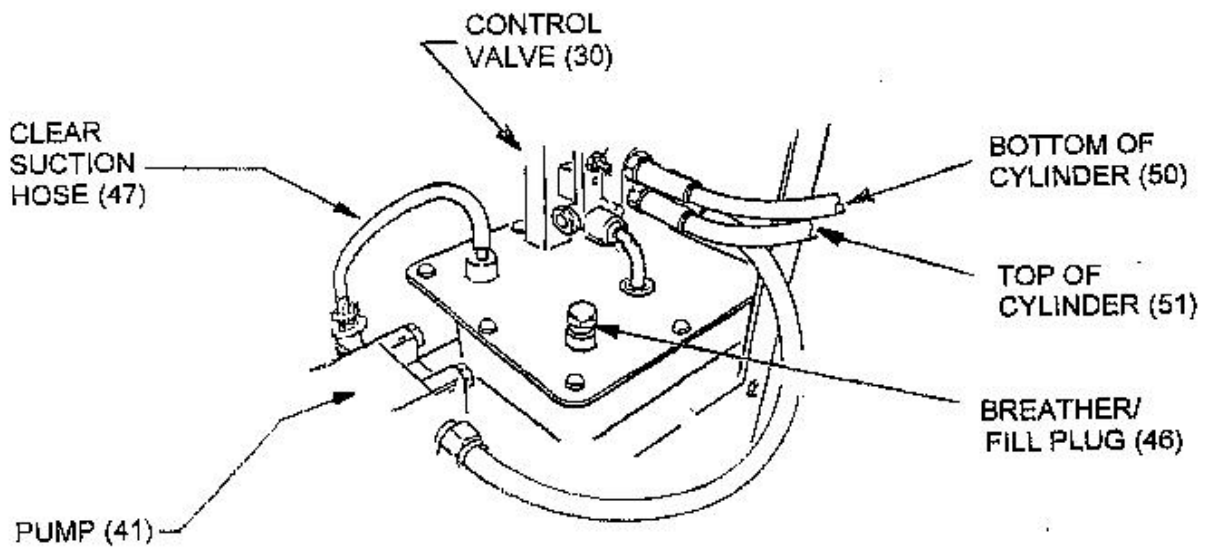


Figure 4- Hydraulic Reservoir Assembly

Slug Chute Installation (Refer to Figures 3 and 5)

Position the slug chute (56) as shown in Figure 5, making sure that the slots engage the 3/8-16 x 1" hex head screws previously installed with the front cover and tighten the screws.

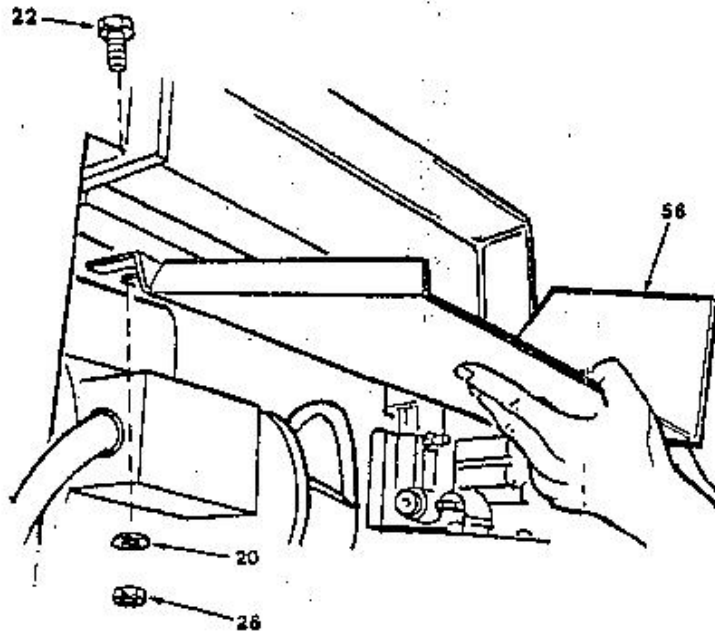


Figure 5- Slug Chute Installation

Operating Instructions

WARNING: WEAR APPROVED EYE PROTECTION WHEN OPERATING THE MP4000 IRONWORKER. OBSERVE THE WARNINGS DISPLAYED ON THE IRONWORKER AND KEEP HANDS AND CLOTHING CLEAR OF ALL MOVING PARTS.

The movement of the control valve lever determines the direction of travel. Moving the lever down from its self-centering position causes the ironworker to drive the tool downward and moving the lever up from the center position causes the tool to move upward.

Releasing the lever returns it to the center position; this stops, but does not reverse, the travel direction.

Speed of travel is regulated by how far the control valve lever is moved from the center position. As the lever is moved further downward or upward, the speed of travel in that direction increases.

Bill of Material- Leg Stand and Power Head

Item	MP#	Description	Quantity
1	5001	Main Weldment	1
2	5002	Ram	1
3	5003	Pivot Shaft	1
4	5004	Ram Bushing	1
5	5005	Link	4
6	5006	Retaining Nut	1
7	5007	Die Holder	1
8	5008	7/16-20-2-1/4" Hex Head Screw	2
9	5009	7/16-20 Lock Nut	2
10	5010	Stripper	2
11	5011	1/2-13 x 1-3/4" Hex Head Screw	8
12	5012	1/2" Flat Washer	8
13	5013	5/16-18 x 1" Set Screw	1
14	5014	1/8" NPT Grease Fitting	2
15	5015	7/16 x 2" Clevis Pin	2
16	5016	7/16" Bridge Pin	2
17	5017	5/16" Flat Washer	12
18	5018	5/16-18 x 3/4" Hex Head Screw	2
20	5020	3/8" Flat Washer	2
21	5021	1/2" Bevel Washer	4
22	5022	3/8-16 x 1" Hex Head Screw	10
23	5023	3/8" Lock Washer	8
26	5019	3/8-16 Lock Nut	2
27	5027	Arm	1
28	5028	3/8- 16 x 3/8" Set Screw	1
29	5029	Hydraulic Cylinder (3-1/2" Bore x 4" Stroke)	1
30	5030	Control Valve (includes lever 98)	1
31	5031	5/16-18 x 3/4" Carriage Bolt	14
32	5032	5/16-18 Lock Nut	14
35	5035	Wrench	1
36	5036	1/4-20 x 2" Hex Head Screw	2
37	5037	1/4" Flat Washer	2
38	5038	1/4-20 Lock Nut	10
39	5039	2" x 1-1/2" Plastic End Cap	4
40	5040	Motor	1
41	5041	Pump	1
42	5042	Pump/Motor Mount	1
43	5043, 5044, 5063	Coupling Assembly (5/8", 7/16" & Spider)	1
45	5045	Reservoir Grommet	1
46	5046	Breather/Fill Plug	1
47	5047	Suction hose	1
48	5048	3/8" barbed tubing connector	3
49	5049	3/8" MPT Street Elbow,	1
50	5050	3/8" x 20" Hydraulic Hose Assembly	2
51	5051	3/8" x 30" Hydraulic Hose Assembly	1
52	5052	3/8" NPT x 3" Nipple	1
53	5053	Plastic Reservoir	1
56	5056	Slug Chute	1
57	5057	Lower Shelf	1
58	5058	Upper Shelf	1
59	5059	Leg	2
61	5061	Reservoir Cover	1
62	5062	Front Panel	1
66	5066	1/2-13 Lock Nut	4
67	5067	1/2-13 Hex Nut	4
85	7015	Cam	1
87	5033	5/16" Lock Washer	4
99	7029	1/4-20 x 3/4" Hex Head Screw	8
101	7031	5/16-18 x 3" Hex Head Screw	4
103	5092	1/2" - 3/8" Reducer Bushing	2

Maintaining the MP4000 Ironworker

During maintenance of the Ironworker, also check condition of all hydraulic and moving parts. Repair any damage and replace any worn parts. Call METALpro customer service with any questions or concerns.

Cleaning

WARNING: ALWAYS WEAR EYE PROTECTION WHEN CLEANING THE IRONWORKER

1. Keep the Ironworker clean. Periodically remove chips, dirt and debris from the Ironworker, paying particular attention to the interior (working cavity) around the shear and punch stations. Use an appropriate brush to remove heavy accumulations. During periods of heavy use, clean the Ironworker more frequently.
2. Wipe away any oil that is found. It may be hydraulic oil, which indicates a hydraulic system leak. Inspect the Ironworker hydraulic system and repair any leaks.

Hydraulic System Maintenance

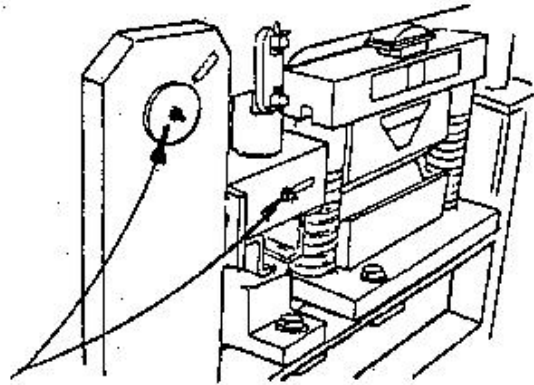
(AW/AL Hydraulic Oil ISO 68 SAE 20W/20, ISO 32 SAE 10WW, Mobil DTE 24-SSU or equal)

1. Check the entire hydraulic system for signs of leakage and check the condition of all hydraulic hoses at least monthly. Replace any damaged hoses and eliminate any leaks found.
2. Remove the breather/fill plug from the hydraulic reservoir to check the oil level and condition. Add hydraulic oil if necessary to within 1" of the top of the reservoir.
3. Check the oil condition. Although the oil is colored, it must be clear. If the oil is contaminated, drain the pump, the hydraulic cylinder and the reservoir. Clean the interior of the reservoir, fill and reprime the hydraulic system as described previously.

Lubrication of the Ironworker

Each day of use, or every three (3) hours of operation, grease the Ironworker through the fittings as shown in Figure 6. Use commercially available lubricating grease.

Figure 6-Grease Fitting Locations



Replacing Links and Clevis Pins

(Refer to Figure 3)

CAUTION: OPERATING THE MP4000 WITH BENT LINKS OR CLEVIS PINS WILL CAUSE DAMAGE TO THE SHEAR OR PUNCH STATION

It is necessary to replace the punch or shear links (5) and clevis pins (15) if they become bent. To disassemble:

1. Shut off power to the motor and unplug the Ironworker.
2. Remove bridge pins (16) and clevis pins (15). The links are now free.
3. Replace parts as necessary. Position the links, install the clevis pins and secure the links and clevis pins with the bridge pins.

Punch Set Up

(Figure 7 Note: Punches and Dies are sold separately)

1. Install the die holder (7), install two 1/2-13 x 1-3/4" hex head screws (11), 1/2" flat washers (12), 1/2" bevel washers (21) and 1/2-13 hex nuts (67) hand tight. Make sure the bevel washers are positioned so that the taper is opposite the slope of the channel iron of the main weldment (1) providing parallel surfaces for the screw heads and the nuts.
2. Secure the punch with the retaining nut (6). Tighten the nut with the wrench (35).
3. Install the die in the holder. Tighten the 3/8-16 x 3/8" set screw (28). Note: Square, oblong, special shape and some round dies have a flat on them. Always tighten the set screw against the flat if there is one.
4. Using the control valve lever, carefully lower the punch into the die. Position the die holder so that the punch is centered visually in the die. There will be approximately .030" clearance around the punch. Tighten the hex head screws and nuts securing the die holder to the main weldment without changing the alignment of the punch and the die. Make sure the bevel washers are properly positioned as the screws and nuts are tightened. Recheck that the punch is centered in the die.
5. Install the strippers (10) with the 5/16-18 x 3/4" hex head screws (18) and 5/16" flat washers (17).
6. Recheck the installation by cycling the punch slowly, making sure that the punch, die and stripper do not interfere at any point in the stroke.
7. You may use a center punch to establish the hole location in the material to be punched. Lower the punch slowly and align the tip of the punch with the center punch mark.

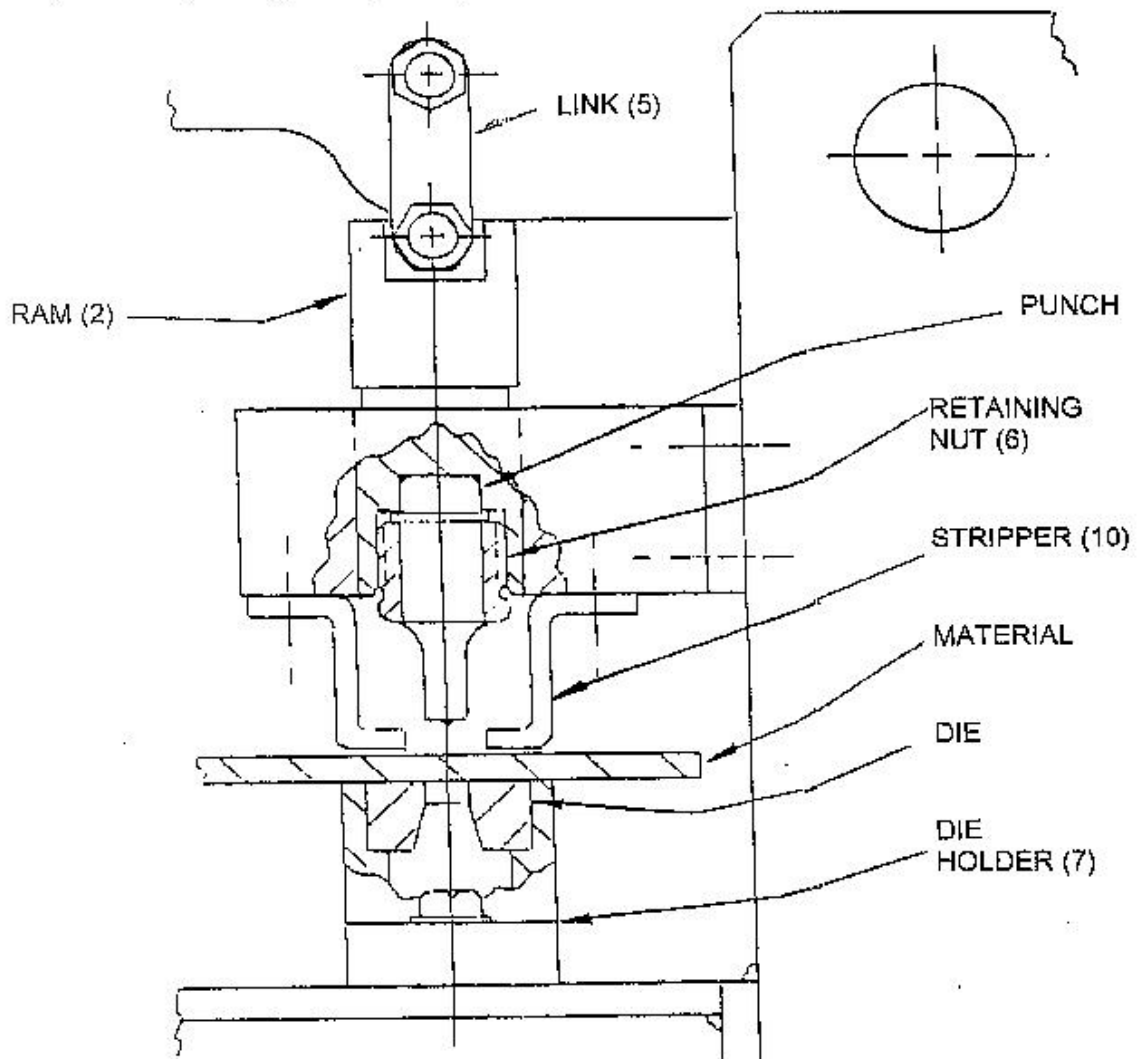


Figure 7- Punch Station Set Up

Shear Assembly Set Up

(Refer to Figure 9)

1. Using two 1/2--13 x 1-3/4" hex head screws (11), 1/2" flat washers (12), 1/2" bevel washers (21) and 1/2-13 hex nuts (67) attach the shear assembly to the main weldment (1). Make sure the bevel washers are positioned so that the taper is opposite the slope of the channel iron on the main weldment, providing parallel surfaces for the screw head and the nuts.
2. Attach the upper clevis pin (15) and links (5) to the arm (27). Install bridge pins (16).
3. Tighten the nuts, securing the shear to the main weldment making sure the shear is centered under the arm.

Positioning a workpiece to be sheared to size requires measurement. The simplest method of single piece shearing is to measure the piece as shown. Measure from the appropriate shear blade to the end of the piece to be cut.

For volume shearing, use a work table attached to the exit side of the Ironworker, with a positioning stop fixed at the length required. The stop will also aid in maintaining square cuts.

When shearing flat stock, always center the material to be sheared. Several pairs of holes are provided to allow the stop to be repositioned for centered shearing. Note: When reversing the moveable blade (84) to access the other cutting edge, position the stop starting from the right.

Bill of Material- Shear Assembly

(Refer to Figure 10)

38	5038	1/4-20 Lock Nut	2
71	7001	Base Plate	1
72	7002	Cover Plate - Rear	1
73	7055	Angle Blade with Relief (pair)	2
75	7050	Cover Plate - Front	1
76	7052	Upright	2
78	7051	Front Blade	1
80	7053	Shelf	1
81	2007	Stop	1
82	7012	Guard - Flap	1
83	7013	Guard - Bracket	1
84	7014	Moveable Blade	1
85	7015	Cam	1
86	7016	5/16-18 x 2-1/2" Socket Head Screw	8
87	5033	5/16" Lock Washer	18
88	7018	5/16" Hex Nut	8
89	7019	5/16-18 x 3/4" Socket Head Screw	12
91	7021	1/2-13 x 1-1/4" Flat Head Screw	2
93	7023	1/2 x 2-1/4" Dowel Pin	4
94	7028	1/4-20 x 1/2" Socket Head Screw	2
95	7025	Front Guard	1
99	7029	1/4-20 x 3/4" Hex Head Screw	2
111	2019	5/16-18 x 1-1/8" Hex Head Screw	2
112	2025	3/8-16 x 2" Stud Knob	2
113	7054	Hold Down Plate	1
114	2026	3/8 ID x .063 Wire x 1" Spring	2

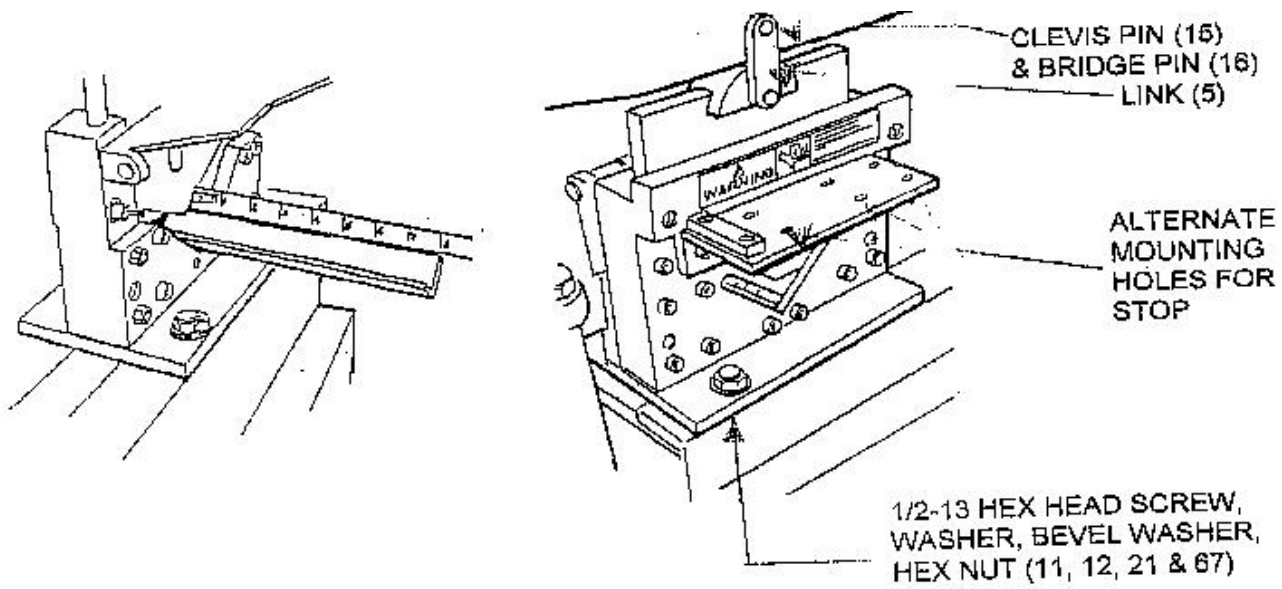


Figure 9- Shear Assembly Setup

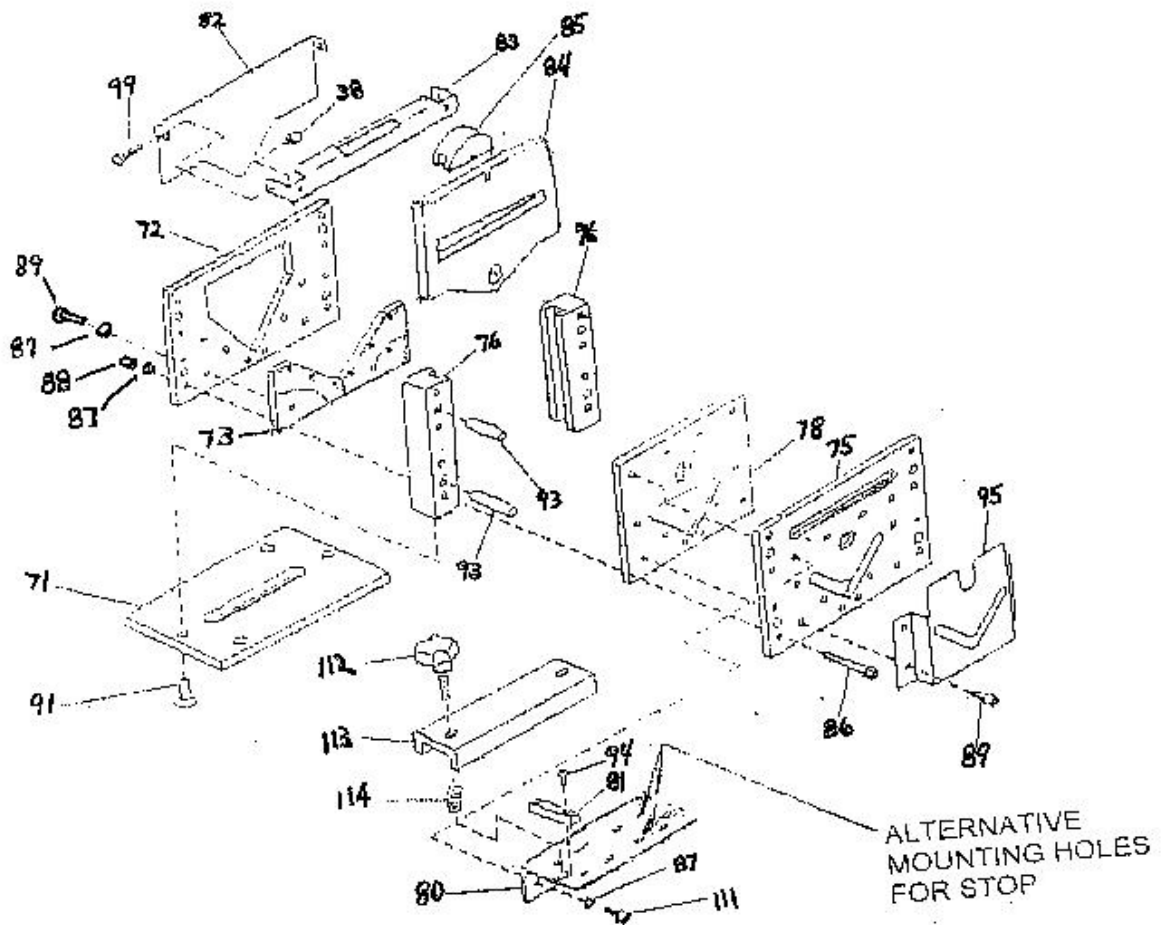


Figure 10- Shear Assembly- Exploded View

Press Brake

(Refer to Figure 11 Note; Brake sold separately)

CAUTION: MAKE SURE THE WORKPIECE IS CENTERED IN THE BRAKE. IF IT IS NOT CENTERED AS SHOWN SIDE LOADING WILL OCCUR AND DAMAGE THE BRAKE.

WARNING: THE BENDING OPERATION WILL CAUSE THE ENDS OF THE WORKPIECE TO MOVE UPWARD. MAKE SURE THERE IS CLEARANCE FOR THE MOVEMENT OF THE WORKPIECE. KEEP BODY PARTS AND CLOTHING CLEAR OF THE MOVING PARTS.

Measure and mark the workpiece where you want the bend. Locate the mark over the center of the "V" in the lower brake die. Using the control valve lever, bring the upper die down slowly to make sure it contacts the workpiece at the mark. Finish the bend by fully lowering the upper die into the lower die.

If you need a bend greater than 90 degrees, do not allow the upper brake die to fully stroke into the lower brake die. This will provide an angle that is greater than 90 degrees. If you need to bend less than 90 degrees or need to make compound bends, contact METALpro for information on special dies to fit the brake frame.

CAUTION: REMOVE TOOL WHEN NOT IN USE

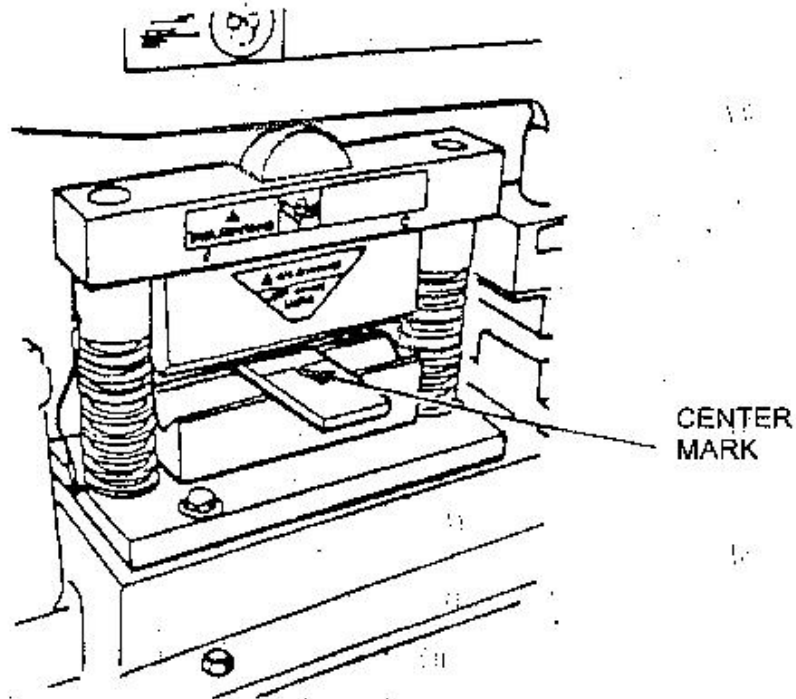


Figure 11- Brake Assembly