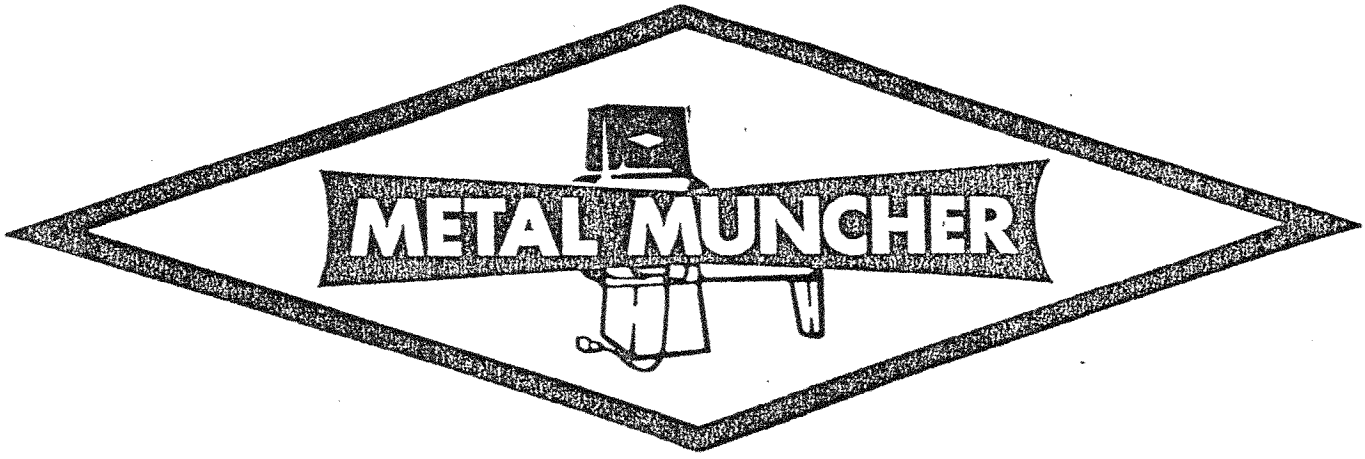
MODEL MM-40

SERIAL NUMBER COPY



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FABRICATION

CENTER

operator's manual and parts list

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OPERATOR'S MANUAL
AND
PARTS LIST
FOR
METAL MUNCHER

090195-MM40

WHEN ORDERING PARTS, CONTACT **AREA DEALER**, OR:

FAB CENTER SALES
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P.O. BOX 192
CLAY CENTER, KS 67432-0192
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ALWAYS GIVE METAL MUNCHER MODEL AND SERIAL NUMBER WHEN ORDERING PARTS.

FORWARD

This manual has been prepared for those persons who will operate and maintain the METAL MUNCHER Ironworker. It is important that all persons responsible for the operation and maintenance of this equipment READ and UNDERSTAND the information presented in this manual.

The information on the following pages was the most recent available at the time of publication and selection of this material was made on the basis of a standard unit arrangement. Differences between the unit you received and the views contained in this manual are the result of design improvement and/or the addition of optional accessories specified on your order.

WARRANTY

The METAL MUNCHER is warranted against defect in material or workmanship installed or performed at the factory. Because of the quality of workmanship, METAL MUNCHER will within one year from date of purchase, free of charge, at our option, either repair or replace any part of this machine which our examination disclosed to be defective because of workmanship or defect in material. This warranty does not apply if the METAL MUNCHER has been used contrary to the directions enclosed or which has been subject to accident. ALTERATION, abuse, misuse, inadequate power supply and specifically DOES NOT APPLY TO: (1) **normal wear from moving or bearing parts;** (2) **any other representation, warranty, or liability related to the condition or use of the product.**

METAL MUNCHER will not be responsible for lost production or incidental damage suffered while machine is down under warranty.

Warranty shall consist of replacement of parts only (no labor). All transportation costs on parts submitted under this warranty must be paid by the user. No products or parts are to be returned without first obtaining written permission. All replacement parts will be invoiced. Parts subject to warranty must be returned within 30 days.

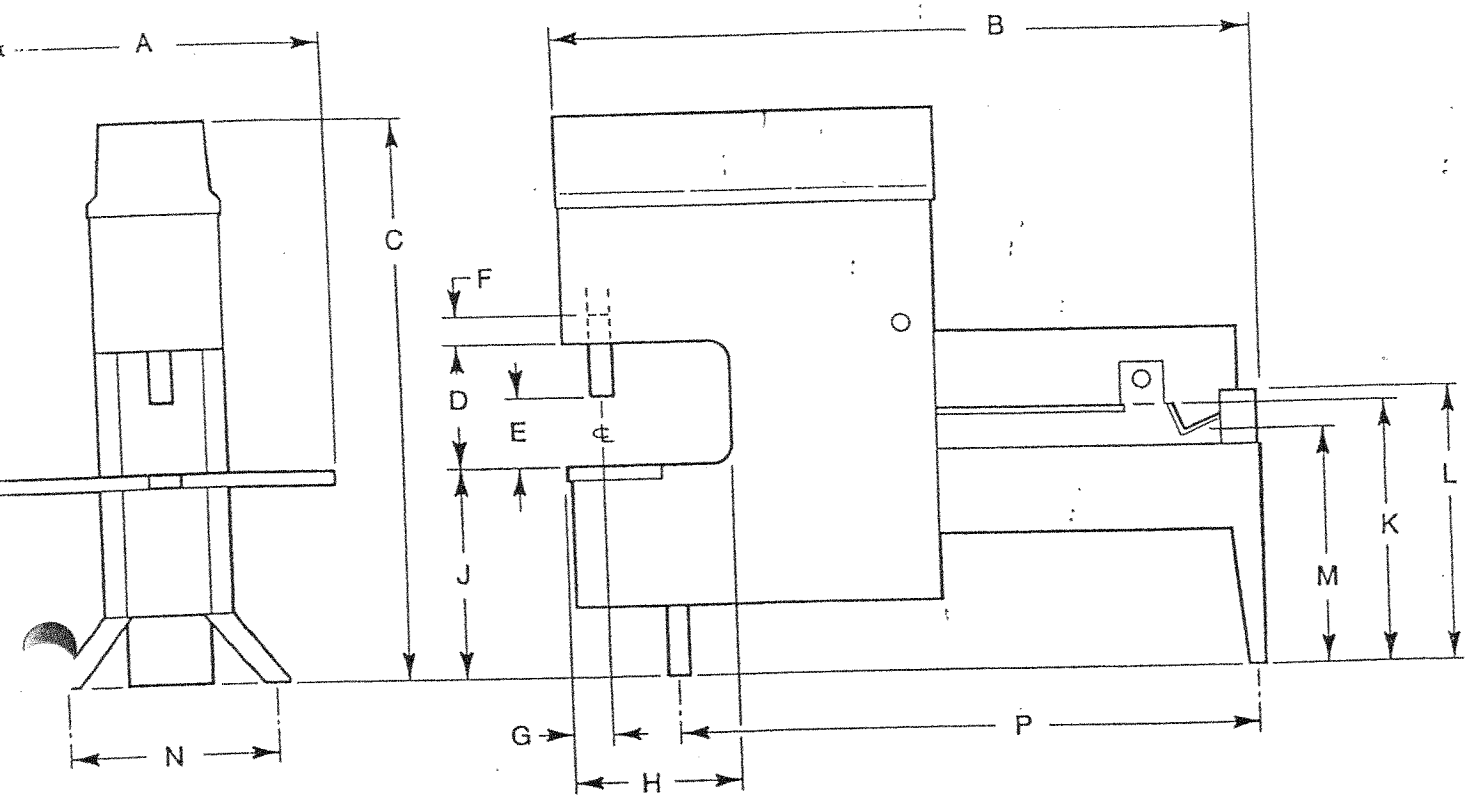
The warranty registration card must be signed by the sales agent and owner and returned to METAL MUNCHER within ten days after receiving the machine. This must be done before warranty is in effect.

There are no warranties which extend beyond the description on the face hereof.

Hydraulic pump, valves, electric motors and starter are warranted by the original manufacturer. . .not METAL MUNCHER.

TABLE OF CONTENTS

DIMENSIONAL CHART - METAL MUNCHER



Widest point (27-1/8") on MM-40 is outside at bottom of legs, not table

MODEL	Dimensions in Inches													
	A	B	C	D	E	F*	G	H	J	K	L	M	N	P
MM-40	21	60¼	65½	9½	6-7/8	1-7/8	3½	11	34¼	37-7/8	38-5/8	35	24-3/8	51
MM-70	48	73-5/8	68¼	14	8¼	1¼	4-7/8	14-7/8	30	37½	39	34½	25½	62-5/8
MM-70-18	48	97-5/8	78¾	18	10¼	1¼	4-7/8	23¼	30	37½	39	34½	28¾	83½
MM-100	48	76-1/8	69¼	14	8¼	1¼	4-11/16	14-3/8	30	37½	39	34½	27	65
MM-100-18	48	97-5/8	80¾	18	10¼	1¼	4-11/16	22-7/8	30	37½	39	34½	29-3/16	82-7/8
MM-135	48	97-5/8	74¾	14	8¼	1¼	6	20½	30	37½	39	34½	31¼	82¾
MM-135-18	48	97-5/8	79¼	18	10¼	1¼	6	24½	30	37½	39	34½	32-3/8	82¾

*F is Ram Retracted

NOTE: All dimensions are approximate.

INTRODUCTION

The METAL MUNCHER Hydraulic Ironworker is the result of many years experience and engineering development. With proper care and regular maintenance, the advanced design and rugged construction assures you of trouble-free operation for many years.

SAFETY

As with any piece of equipment, operator safety is of primary importance.

Although every attempt has been made to provide safe operation and machine control, operators should stay constantly alert when working with the METAL MUNCHER Hydraulic Ironworker.

The following symbol is used throughout this manual to bring attention to information regarding potential hazards.

CAUTION: FAILURE TO UNDERSTAND AND OBEY A SAFETY WARNING COULD RESULT IN PERSONAL INJURY TO THE OPERATOR OR OTHERS.

If any portion of the instructions or safety information presented in this manual is not clearly understood, contact your METAL MUNCHER dealer for clarification before beginning operation.

CAUTION: ALWAYS WEAR EYE PROTECTION WHEN OPERATING THE IRONWORKER.

EMERGENCY STOP BUTTON

The emergency stop button is located on top of the electrical box at the side of the machine (see Fig. 1). Depress switch to halt all machine functions immediately. Raise switch to re-start.

Fuse Disconnect Switch is located on the electrical panel door (see Fig. 1).

CAUTION: BE CERTAIN TO TEST THIS SWITCH PRIOR TO EACH DAY'S OPERATION.

COPER-NOTCHER GUARD

This guard is intended to prevent possible injury at the coper-notcher station when working at the shear stations. As upper shear bar pivots, shear station blades and coper-notcher blade move simultaneously. When shear blade end is raised, coper-notcher end is lowered.

CAUTION: MAKE CERTAIN COPER-NOTCHER SAFETY GUARD IS IN PLACE BEFORE OPERATING SHEAR STATIONS.

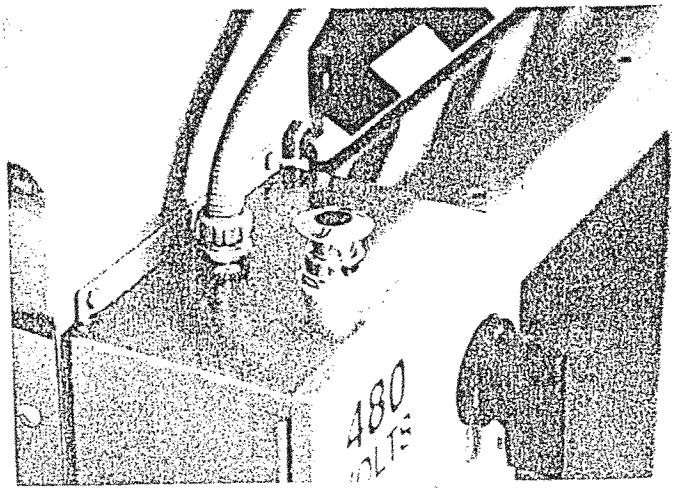


Figure 1. Emergency Stop Button

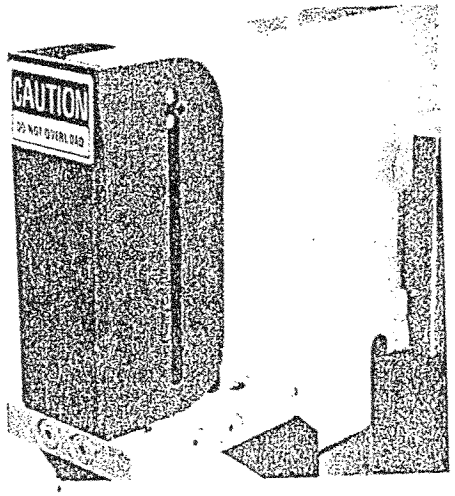


Figure 2. Guard in place

LIMIT SWITCH

This switch (Fig. 5) is provided to limit travel of the front hydraulic cylinder ram during punch or press work operation.

OKE ADJUSTMENT

ss in on quick-set stroke buttons (Item No. 3, Fig. 5) and position stroke collars (Item No. 2, Fig. 5) to allow the ram stroke desired. Final fine adjustment is made by rotating the stroke collars on the vertical threaded rod (Item No. 1, Fig. 5).

STANDARD LIMIT SWITCH MODE

1. Depress foot switch and ram will travel down, strike preset stroke collar and STOP.
2. Release foot switch and ram will travel up, strike preset stroke collar, STOP and reset for next cycle.
3. Repeat steps 1 and 2 for repeated cycles.

JOG RAM DOWN

Depress and release foot switch repeatedly as needed to jog ram DOWN for punch and die block alignment (see page 4) or for locating the punch point to a center punch location on material to be punched.

RAM RETRACT

To retract ram UP before striking the lower limit stroke collar, release foot switch and push the retract button (Item No. 7, Fig. 6). The ram will travel UP and strike stroke collar to reset for next cycle.

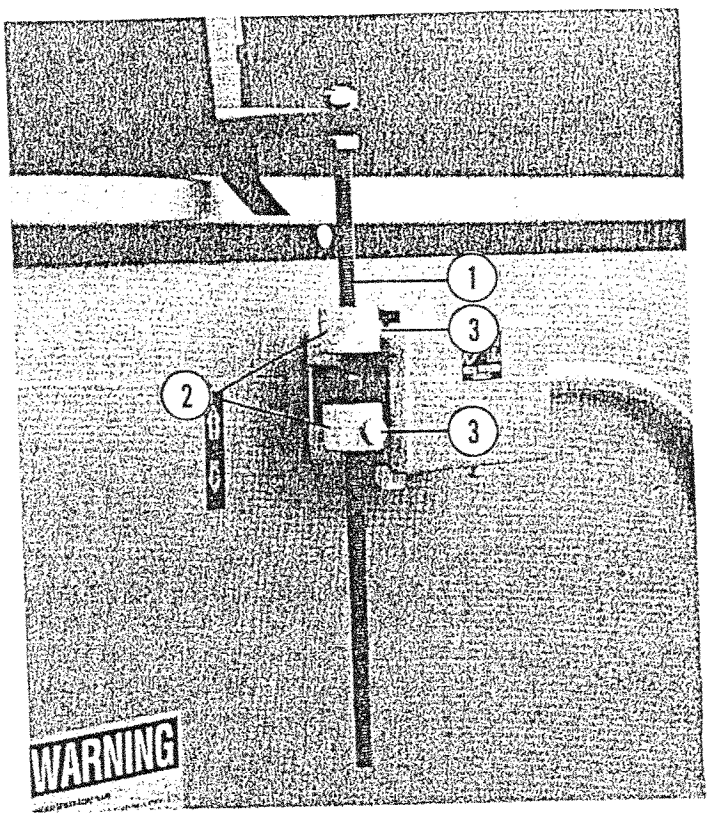


Figure 5
1. Vertical Adjustment Threaded Rod
2. Quick Adjustment Collars
3. Quick-set Buttons

PERATION

CAUTION: ALWAYS WEAR EYE PROTECTION WHEN OPERATING THE METAL MUNCHER.

The METAL MUNCHER Ironworker has a rated shearing capacity equal to the shearing point of mild steel (60,000 PSI). The various work stations also have material thickness limitations. These are specified at the beginning of the sections regarding the specific work stations.

PUNCH PRESS

NOTE: Do not attempt to punch material exceeding 60,000 PSI mild steel in strength, or the maximum thickness shown below. Material thickness should **NEVER** exceed the point diameter of the punch.

3/4" Round Hole in ..... ½" x 60,000 PSI tensile

The Punch Press station includes the following items as standard equipment:

Shaft Guide

The shaft guide is necessary to prevent cylinder ram (and herefore punch) rotation.

NOTE: Be certain shaft guide is securely attached to the cylinder ram.

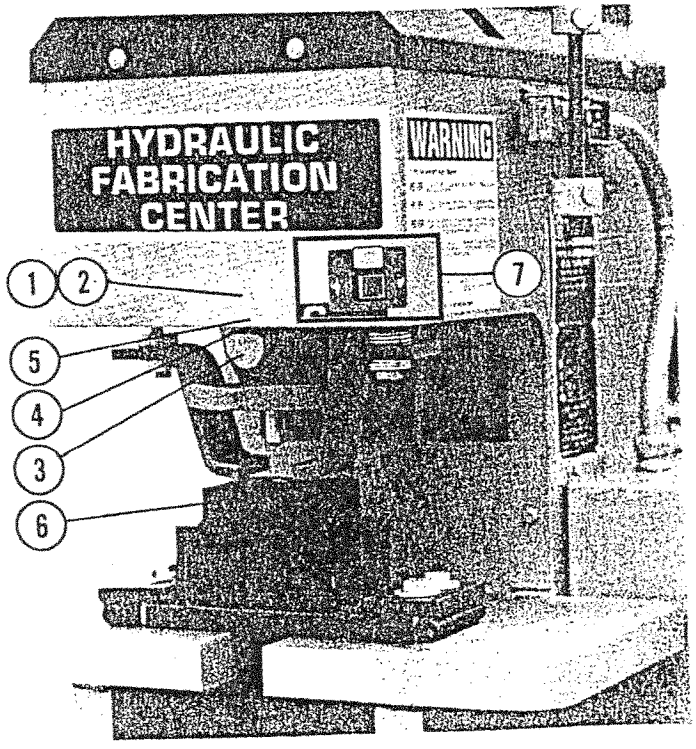


Figure 6
1. Shaft Guide
2. Cylinder Ram
3. Punch Coupling Nut
4. Threaded Punch Coupling Adapter
5. Alignment Slot
6. Die Holder Block
7. Retract Button

ctrical Connection

standard METAL MUNCHER unit is wired for 220 volt peration. Optional single phase, 208 or 480 volt re available upon request.

CAUTION: MAKE CERTAIN YOUR WIRING IS IN COMPLIANCE WITH MACHINE SPECIFICATIONS AND LOCAL ELECTRICAL CODES.

truct your electrician to familiarize himself with the ing diagrams provided in this manual and to check all ctrical connections on the machine itself before applying wer.

e-Operation Check

addition to the electrical connections discussed above, following areas must be checked before the initial riod of operation.

CAUTION: DISCONNECT POWER SUPPLY BEFORE PERFORMING ANY MAINTENANCE OR MAKING ADJUSTMENTS.

s important to check pump direction. Clockwise rotation the hydraulic pump shaft (when viewed from the shaft d of the pump and fan end of motor) is CRITICAL. ur pump in counter-clockwise rotation for more than ir, econds will damage the shaft seal (causing oil akage) and VOID any warranty. To check rotation, move ar control handle, if no movement, pump is running backwards (counter-clockwise). Rewire motor leads to obtain correct operation if necessary. See Hydraulic System, page 16, for rotation of motor and pump.

1. Check all hardware and tighten if necessary, including:
   - blade and trunion bolts
   - motor and pump mounting bolts
   - cylinder tie bolts
   - upper shear bar pivot nuts
   - set screw on shear bar clevis pin
   - bar shear arm gib bolts
2. Check pins in valve control handle and linkage.
3. Check for correct blade clearance (see Blade Maintenance, page 10).
4. Check all hydraulic lines and connections.

CAUTION: NEVER USE HANDS TO CHECK FOR SUSPECTED HYDRAULIC LEAKS. IF HYDRAULIC FLUID PENETRATES THE SKIN, SEEK IMMEDIATE MEDICAL HELP.

NOTE: Repeat all steps above after first 10 hours of operation, then after each 30 days use.

5. Properly lubricate machine (see Lubrication, page 11).
6. Release limit switch quick adjustment collars from shipping position (see Fig. 5).
7. Check oil level plug. Capacity 8 gallons. Use Phillips 66 Magnus 315 20W (non-detergent) or equivalent.

ONTROL IDENTIFICATION

TOP-START SWITCH

efer to Fig. 1, SAFETY section.

OOT CONTROL

his control (see Fig. 3) regulates movement of the ydraulic cylinder at the Punch Press work station.

epress pedal to begin cylinder movement; release pedal stop cylinder movement.

NOTE: See Standard Limit Switch Mode (page 7) for operation.

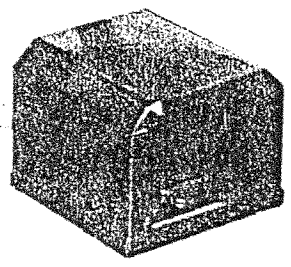


Figure 3

HAND CONTROL

The hand control is moved (as shown in Fig. 4) to raise or lower the blades at the shear stations and at the coper-notcher.

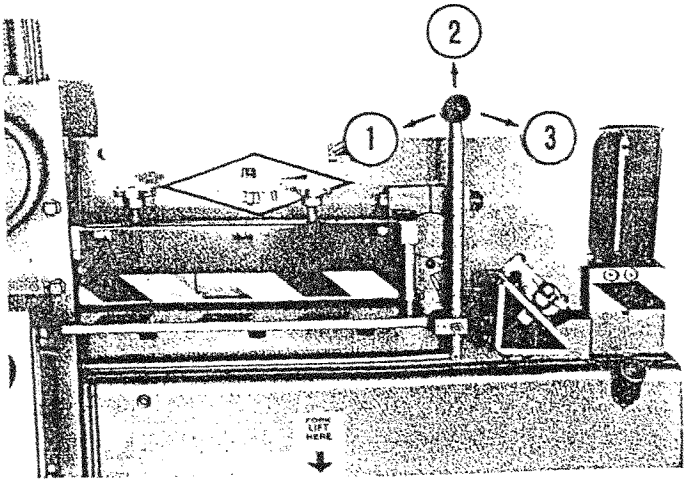


Figure 4
1. Lower Shear 2. Neutral
3. Lower Coper-Notcher

Punch Coupling Adapter

The punch coupling adapter simply provides a method of attaching the punch to the cylinder shaft. The punch coupling nut secures the punch itself to the punch coupling adapter (see Fig. 6).

Die Holder Block

The function of the die holder block is explained in the name.
The Die Holder Block is provided with clamps and hardware (see Fig. 6) to secure it to the platen.

CAUTION: OPERATOR MUST WEAR EYE PROTECTION WHEN ALIGNING THE PUNCH AND DIE.

Punch Installation and Die Alignment (Ref. Page 7, Fig. 6)

Select a mating punch and die. Insert die in the die holder block and tighten securely.

Clamp the die holder block to the platen. Do not fasten securely at this time so that die holder block may be moved as necessary to assist proper alignment.

Insert punch in coupling nut and hand tighten nut to threaded punch adapter. Then back off nut approximately 1/16" to 1/4" allowing punch to move up and down freely in nut. Slowly (jogging) bring down cylinder shaft until end of punch enters die in die block. Center die block with punch for proper all around clearance. Tighten coupling nut securely with wrench. Re-check punch and die for proper clearance and tighten die block clamp bolts securely. Adjust limit switch stroke adjustment collars for proper punch penetration and cylinder ram stroke. Then cycle several times to re-check for proper clearance and stroke. (See Punch & Die Clearance Chart, page 11.)

NOTE: Be certain punch does not travel far enough into die to cause shank portion to bind against die.

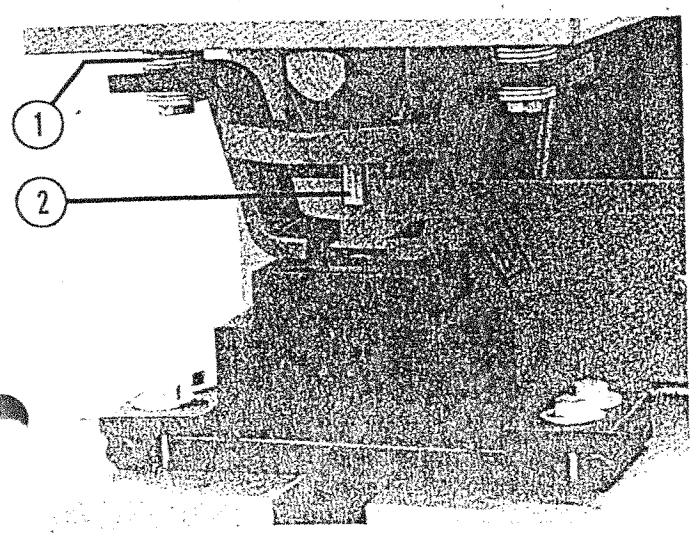


Figure 7.
1. Locknuts 2. Stripper

CAUTION: DISCONNECT POWER SUPPLY BEFORE PERFORMING ANY MAINTENANCE OR MAKING ADJUSTMENTS

Stripper

The stripper serves to remove punched material from the punch as the press cylinder moves upward. (Fig. 7)

Adjustment

Loosen locknuts on both sides; adjust stripper to allow material to pass freely beneath stripper base. Secure locknuts.

NOTE: Be certain stripper base is parallel with surface of die holder block.

Punch Operation

CAUTION: THICKNESS OF MATERIAL TO BE PUNCHED MUST NEVER EXCEED PUNCH POINT DIAMETER. IF THIS CONDITION EXISTS, PUNCH MAY SHATTER, CAUSING OPERATOR INJURY.

Proper alignment of punches and dies is essential to good results and long equipment life. Assure that punches and dies are in good condition.

NOTE: Worn punches will increase stripping pressure and can warp material. Apply lubricant to punch periodically to ease stripping and lengthen punch life.

The METAL MUNCHER Ironworker is easily adapted for use as a shop press to install or remove bearings, gears, etc.

When doing this type work, adequate support must be provided for the various items in order to prevent damage to them or to the machine. 1/2" x 13 threaded holes are provided in the platen. Their primary use is to retain guides for lower bending dies but they may also be used to retain various tooling if desired.

Special care must be taken to prevent damage to the cylinder shaft end. A shaft protector is recommended.

CAUTION: ALWAYS KEEP ANY WORK CENTERED ON PLATEN OR OTHER SUPPORT AND PROPERLY ALIGNED WITH PRESS SHAFT.

FLAT SHEAR BAR

NOTE: Do not attempt to shear material exceeding 5/8" x 6" or 1/2" x 8" mild steel in strength or dimension.

This work station includes the round and square blades.

CAUTION: MAKE CERTAIN COPER-NOTCHER GUARD IS IN PLACE BEFORE OPERATING SHEAR STATIONS.

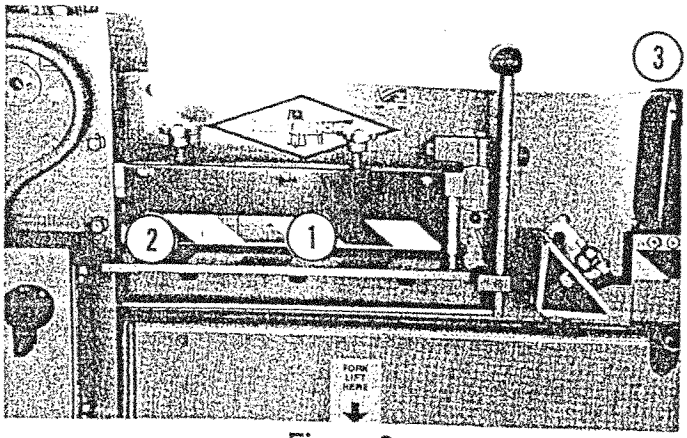


Figure 8.
1. Flat Bar Shear
2. Round and Square Blade
3. Coper Guard

(Note: Coper Guard shown in down position.)

NOTE: Shearing materials thicker or harder than advised can result in chipped or broken blades and machine system damage.

The flat bar shear has a 14" x 1/4", 12" x 3/8", 8" x 1/2" and 6" x 5/8" mild steel capacity for sheet stock. Optional: A special Hy-Performance blade is available to replace the upper flat bar blade and increase shearing capacity.

Optional: Short flat bar blades (5") are available in lieu of standard round & square blades.

NOTE: Always keep hold-down against material to at least a slip fit or tighter. A loose hold-down will allow material to be drawn or wedged between blades, forcing them apart and causing premature wear.

Clamp the hold-down securely against the material when desiring the most precise, cleanest cut possible.

To make mitre cuts on bar stock, etc., mark the desired angle on the material, slide through the hold-down and align the mark with the blade.

For production work, adapt a guide plate or the squaring arm as necessary.

Round and Square Blades

The round cutting area will accept stock up to 1" diameter.

The square cutting area will accept stock up to 1" square.

ANGLE SHEAR

The Angle Shear capacity is 3" x 3" x 5/16" angle in mild steel. It will make 90 degree cuts. Mitred ends can be cut in the coper. Unequal leg angles can be cut. To obtain a good cut, the angle must be held with the holddown screw.

In the holddown assembly, four adjusting screws are provided. These are factory set to obtain a 90 degree cut. Should adjustment be necessary, the two screws in the vertical leg of the holddown assembly adjust the cut in horizontal leg. The screws in the horizontal leg of the holddown adjust the cut in the vertical leg. Stock stands must be at proper height to insure 90 degree cuts.

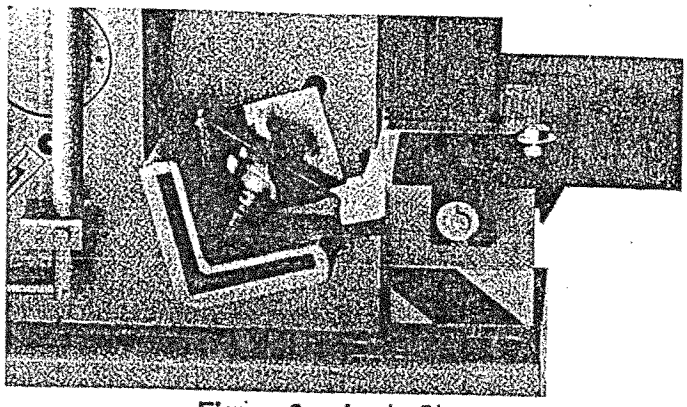


Figure 9. Angle Shear

COPER-NOTCHER

NOTE: Do not attempt to work material exceeding 5/16" mild steel in strength or dimension.

The Coper-Notcher is one of the most versatile stations on the METAL MUNCHER. Good cutting results and longevity depend on proper use and adjustment.

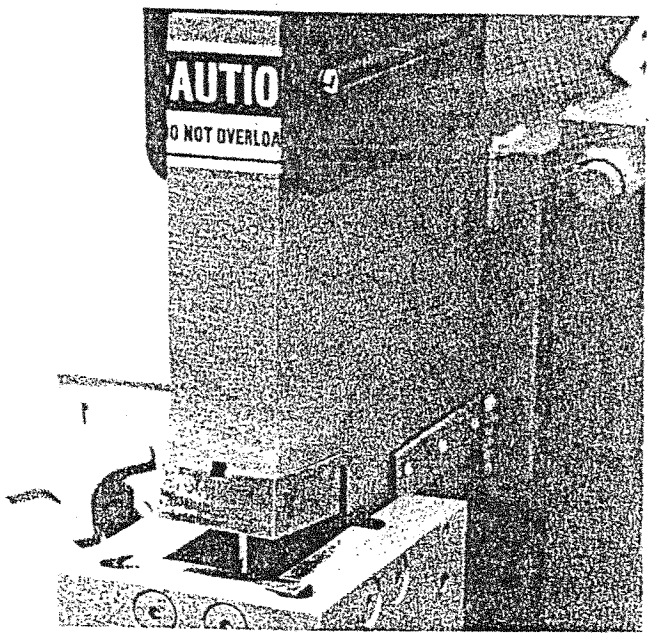


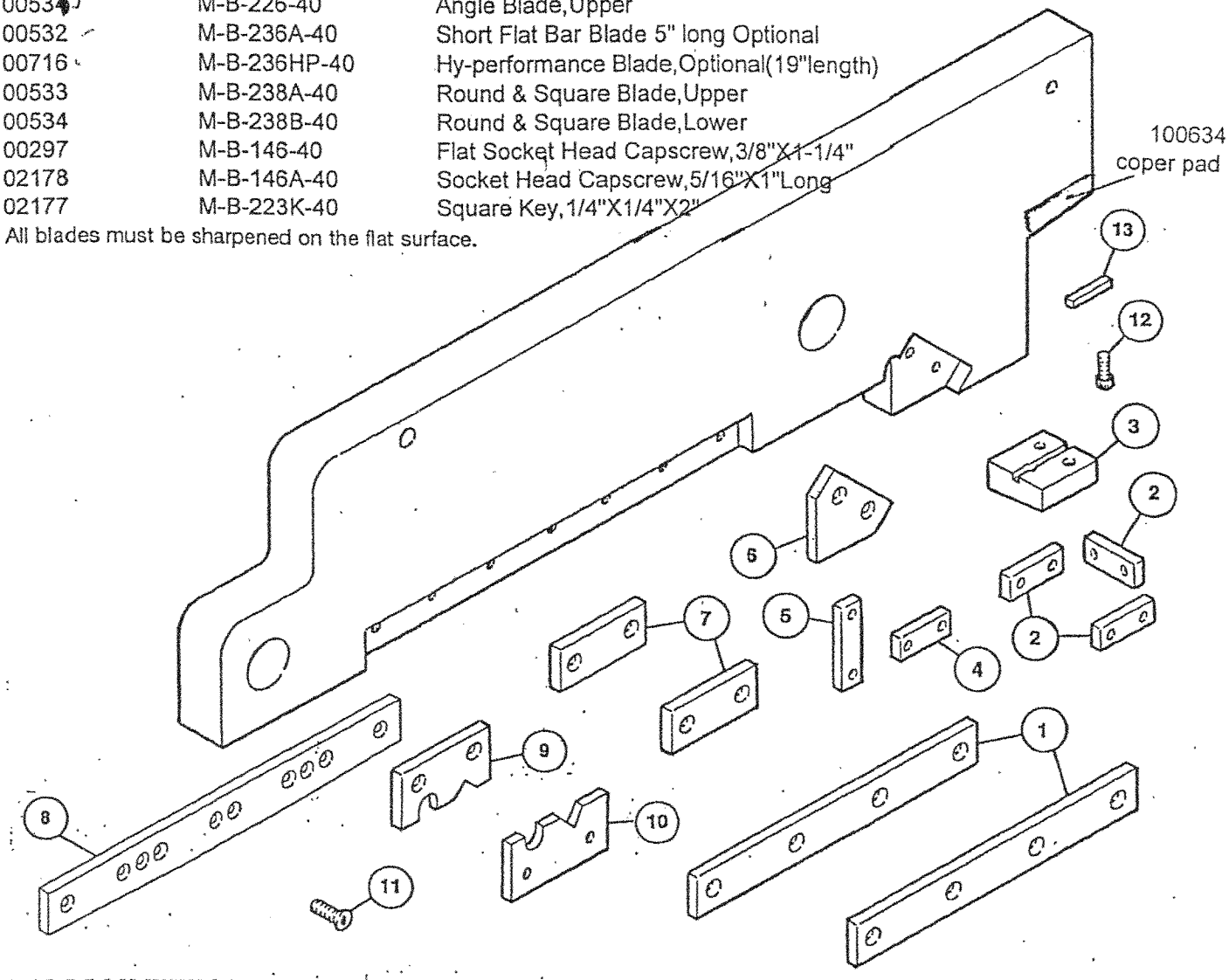
Figure 10. Coper-Notcher (shown with guard up)

Notice that as you face the front, the upper blade is angled from right to left. This angle or "rake" greatly reduces the necessary shearing pressure. Cuts should be made as close to the right (thick) side as possible.

BLADES - MM-40

1	100531	M-B-236-40	Flat Bar Blade 14" long
2	100543	M-B-223-40	Coper Blade, Lower
3	100542	M-B-223B-40	Coper Blade,Upper
4	100536	M-B-228A-40	Angle Blade, Lower(short)
5	100537	M-B-227A-40	Angle Blade,Lower(long)
6	100534	M-B-226-40	Angle Blade,Upper
7	100532	M-B-236A-40	Short Flat Bar Blade 5" long Optional
8	100716	M-B-236HP-40	Hy-performance Blade,Optional(19"length)
9	100533	M-B-238A-40	Round & Square Blade,Upper
10	100534	M-B-238B-40	Round & Square Blade,Lower
11	100297	M-B-146-40	Flat Socket Head Capscrew,3/8"X1-1/4"
12	102178	M-B-146A-40	Socket Head Capscrew,5/16"X1"Long
13	102177	M-B-223K-40	Square Key,1/4"X1/4"X2"

NOTE: All blades must be sharpened on the flat surface.



BLADE MAINTENANCE

All Blades should be surface-ground for sharpening. NOTE: Grind Blades on broad sides only.

Blade	Available Edges	Side Clearance	End Clearance
Flat Bar	4	.005-.010"	--
Round	1	.005-.010"	--
Square	1	.005-.010"	--
Angle			
(Upper)	1	.005-.010"	--
(Lower)	4	.005-.010"	--
Coper			
(Upper)	1	.005-.010"	--
(Lower-long)	4	.005-.010"	Less than.062"
(Lower-short)	4	.005-.010"	Less than.062"

LUBRICATION

Your METAL MUNCHER has been designed to incorporate the fewest possible moving parts to enhance reliability and keep necessary maintenance to a minimum. All general lubrication points are marked with the international lubrication symbol and should be easy to locate. These points should be lubricated every 10 operating hours with a good grade of automotive grease. Of course, this may be done more frequently if deemed necessary.

The areas listed below are of special importance and should be lubricated as shown, without fail:

Bar Shear Cylinder Clevis	every 10 hrs.
Bar Shear Pivot Pin	every 10 hrs.
Bar Shear Trunion	every 10 hrs.
Bar Shear Gib	every 5 hrs.

COPER-NOTCHER GIB ADJUSTMENT

Gib adjustment screws (Ref. Page 9, Fig. 10) will need periodic takeup to keep upper and lower coper blades adjusted to maintain correct clearance.

SHEAR ARM GIB ADJUSTMENT

The shear arm gibs, located on either side of the shear arm, are used to maintain proper blade clearances on the round and square blades and flat bar blades. See Figure 11. To adjust gibs, loosen large flat head socket capscrews (Ref. 1) enough so gib bar can be moved in or out as required. Loosen jam nuts (Ref. 2) on square head setscrews (Ref. 3) mounted in side plates. Tighten or loosen setscrews (Ref. 3) as required to move gib bars (Ref. 4) in or out to maintain correct blade clearance between upper and lower shear arms. (See clearance recommendations below.) After proper clearance adjustments are completed, tighten flat head socket capscrews (Ref. 1) and tighten jam nuts (Ref. 2). Run shear arm up and down several times and recheck clearances before cutting material.

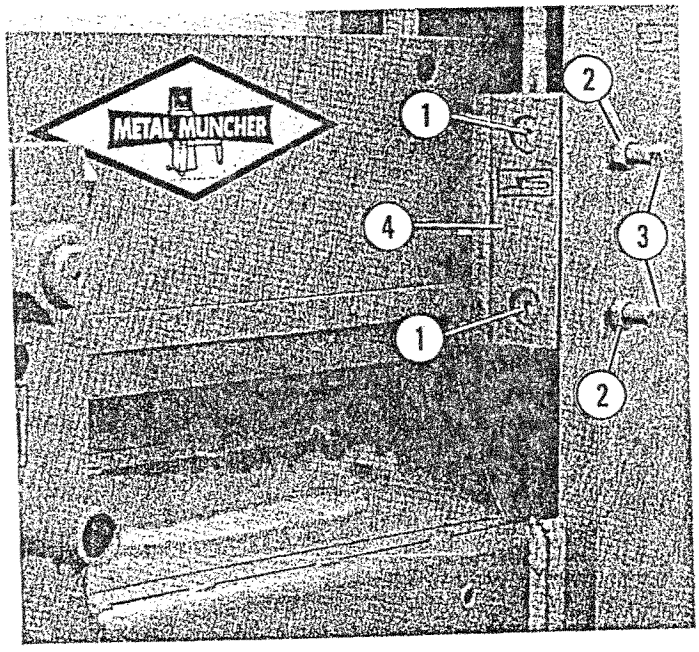


Figure 11.

PUNCH AND DIE CLEARANCES

IMPORTANT: Material thickness should never exceed the point diameter of the punch.

To determine standard Punch & Die clearances for punching mild steel:

PLATE:

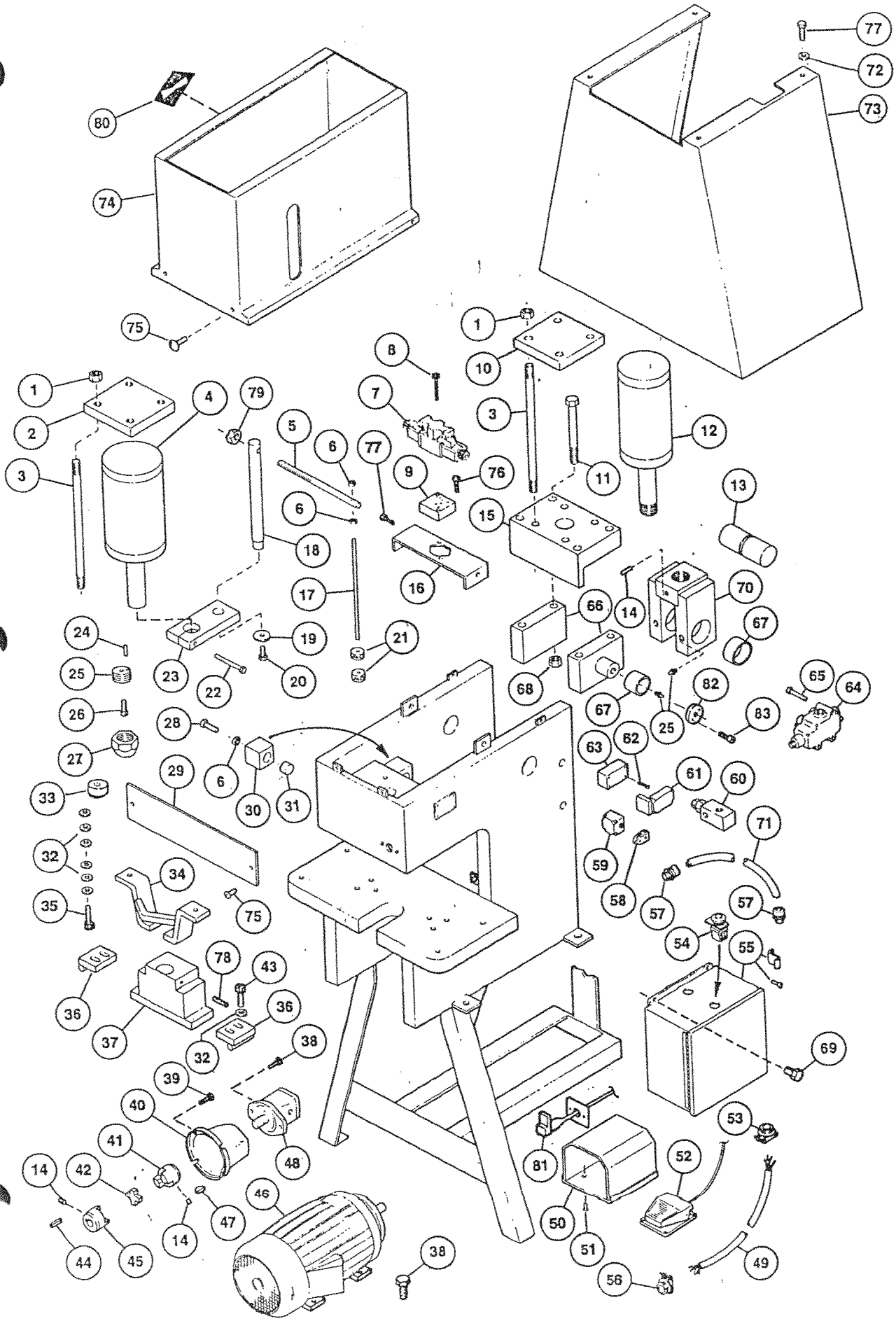
1/4" to 1/2" material thickness	1/32" clearance
1/2" to 3/4" material thickness	1/16" clearance
3/4" and over material thickness	3/32" clearance

GAUGE STOCK:

15 ga. to 13 ga. material thickness	0.10"

(1/64" clearances available)

PUNCH PRESS END PARTS EXPLOSION - MM-40



PUNCH PRESS END PARTS

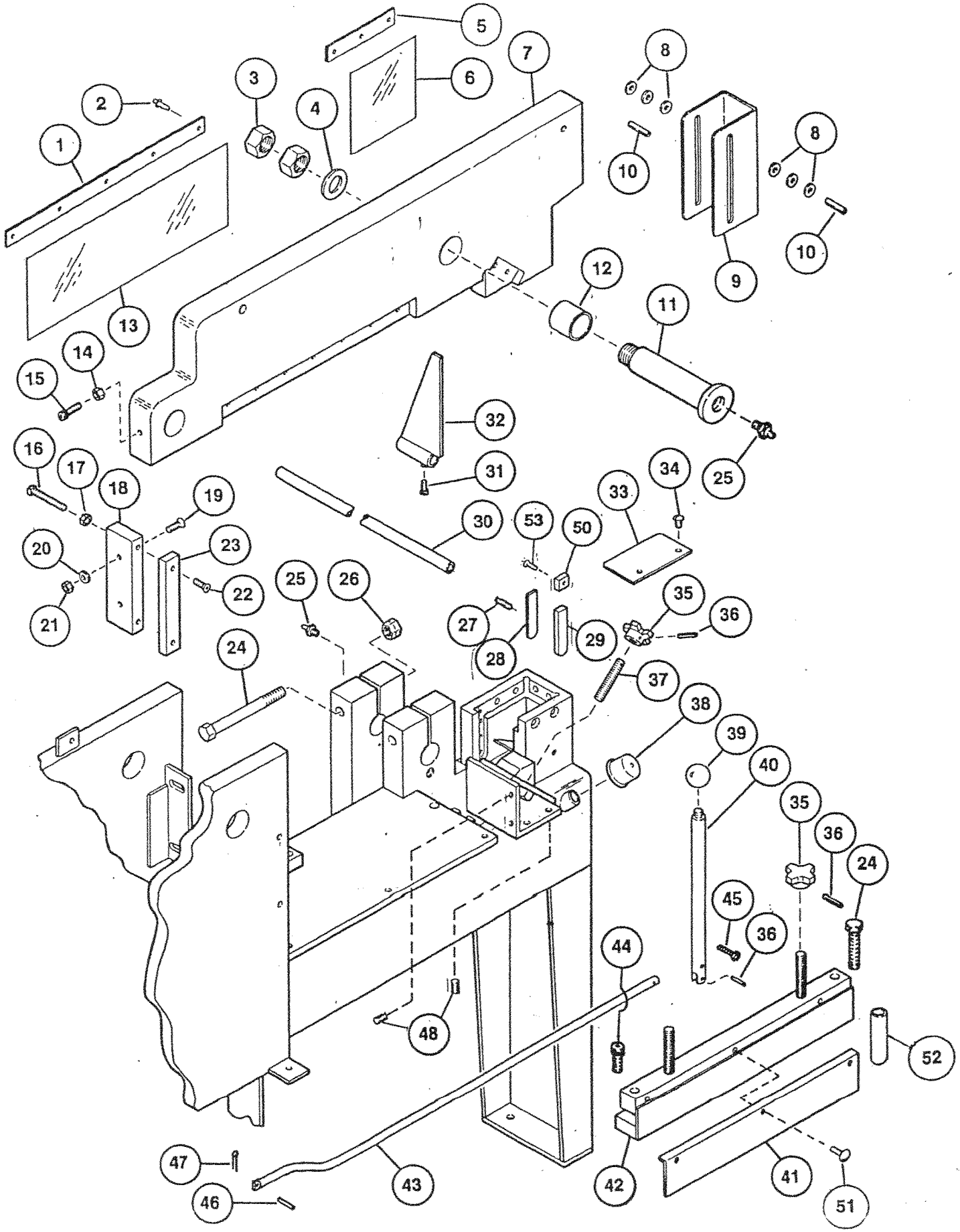
1	100320N	M-PH-254-40	Nut,7/8"
2	100387	M-PH-255-40	TieDown Plate, Press Cylinder 5"
3	101729	M-PH-256-40A	Tie Rod,7/8"X14" long W/Nut
4	101453	M-PH-523A-40	5" Cylinder 1/8" Wall
	101453-A		3/8" Wall
5	106194	M-PH-523A-40	Cross Arm,3/4"
6	100331	M-PH-523B-40	Nut,1/2"Hex Jam
7	101850	M-PH-181A-40	Solenoid Valve-Old-Rexroth
	101352		New-Nachi
8	102386	M-PH-293-40	Capscrew,Hex Socket Head#10-24X2"
9	102095	M-PH-181B-40	Sub Plate,Solenoid Valve W/Bolts
10	100388	M-PH-511-40A	Tie Down Plate,Shear Cylinder
11	100018	M-PH-535-40A	Capscrew,Hex Head 7/8"NF7",Gr.8
12	101446	M-PH-298S-40A	Shear Cylinder,4-1/2"
13	100897	M-PH-133-40A	Yoke Pin
14	100287	M-PH-512A-40	Setscrew,Socket Head 3/8"X1/2"cup point
15	100393	M-PH-510A-40A	MountPlate,Cylinder
16	102116	M-PH-181E-40	Mount Bracket,Solenoid Valve
17	102157	M-PH-523C-40	Threaded Vertical Rod,1/2"X10 1/2"
18	100401	M-PH-523D-40A	Shaft Guide Rod
19	100354	M-PH-523E-40	Washer,Flat3/4"
20	100260	M-PH-523F-40	Capscrew,Hex Head,3/4"X1"
21	100502	M-PH-523G-40	Stroke Control Knob
22	100266	M-PH-523H-40	Capscrew,Hex Head 1/2"X3"
23	100397	M-PH-523-40	Shaft Guide Clamp Bar
24	101083	M-P-266B-40	Roll Pin,1/4"X1"
25	100993	M-P-266-40	Punch Coupler Adapter-Assy. W/pin
26	100266	M-P-266A-40	Capscrew,Socket Head 1/2"X1-3/4"
27	100974	M-P-271-40	Punch Coupling Nut#37
	100975		Punch Coupling Nut # 45
28	100289	M-P-524C-40	Setscrew,Square Head 1/2"X2"
29	100661	M-P-525-40	Front Sheild
30	100408	M-P-524-40	Shaft Guide Wear Block
31	101552	M-P-524A-40	Shaft Guide Wear Block Insert
32	100351	M-P-526A-40	Washer,Flat 1/2"
33	101630	M-P-259C-40	Shaft End Protector-3/4" Length
34	101605	M-P-158-40	Stripper only
	103352		stripper bolt only
	102754		stripper w/nut & screw
35	100265	M-P526-40	Capscrew,Hex Head 1/2"X2-1/2"
36	100597	M-P-252-40	Clamping Bar
37	102945	M-P-249-40	Die Holder Bloc k (Specify 59/8; (Specify 59/82 or62/85)
	100384		Die Holder Screws 2"
38		M-PH-543A-40	Capscrew,Hex Hex Head 3/8"X1"
39	100262	M-PH-543/ B-40	Capscrew,Hex Head 1/2"X1-1/4"
40	102563	M-PEH-543C-40	Shaft Guard
41	100783	M-PEH-505-40	Pump Coupler 5/8" Bore
42	101919	M-PEH-504-40	Coupling Insert (rubber)
43	100264	M-PEH-544-40	Capscrew,Hex Head 1/2"X2"

STD. 40 Die BLK. is 2" other than 2"for a 40 model ,not stocked. Special order

PUNCH PRESS END PARTS

44		M-PEH-543D-40	Sq. Key,1/4"X1-1/2"
		Supplied w/motor	
45	101921	M-PEH-503-40	5Hp 3P
	101843		5Hp 1P
46	VAIRES	M-PE-210-40	Motor 1 OR 3 Phase
47		M-PEH-543E-40	Woodruff Key W/Pump
48	103256(OLD)	M-PH-543-40	Hyd. Pump-Rexroth,~~current~~OLD > NEW 105688
	102558(OLD)	M-PH-543-40	Hyd.Pump-Barns-old style
49	101808	M-PE-166A-40	Elect.Cord-4Wire 5'
50	100425M	M-PE-165A-40	Sheild,Foot Switch
51	102388	M-PE-165B-40	Flat Slotted Head Scre 1/4"X1/2"
52	102120	M-PE-165-40	Foot Switch W/Cord
	102138		Foot Switch Only
53	101798	M-PE-166B-40	Connector,3/4",2 screw
54	101999	M-PE-167-40	Start/Stop Switch
55		M-PE-166-40	Elec. Box-no inside parts
	includes Machine Screw, Slotted Fillister Head Clip,Elect.Box		
56	101797	M-PE-166C-40	Connector3/8" 2 screw
57	101789	M-PE-166D-40	Conduit Fitting,Liquid Tight 1/2" St.
58	101794	M-PE-165-40	E50KL39 Seimens Roller Lever ~~Limit Switch~~
	MPE165L	E50L532	C-H Roller Limit Switch
59	104111	M-PE-165C-40	Limit Switch Head-Siemens-3SE03-DN1
60	105226	M-PH-181 R-40	Pressure Relief Valve
61	104112	M-PE-165D-40	Limit Switch Body-3SE03-SN
	102142	M-PE-165CO-40	Complete Limit Switch
62	102143	M-PE-165F-40	Capscrew,#10-24X1-3/4" SH
63		M-PE-165G-40	Limit Switch Receptacal N/A
64	101853	M-PH-181-40	Hyd. Control & Pressu ure Valve(manual)
65	100248	M-PH-181G-40	Hex Head Capscrew 5/16"X2"
66	101745	M-P-510-40A	Trunion Block W/Zert
67	100494	M-P-243-40	Bronze Bushing 2" I.D.
68	100324	M-P-535A-40	Locknut,7/8"
69	100236	M-PE-166CS-40	Cap screw,1/4"X1/2"Hex Head
70	100818	M-P-512-40A	Yoke
71	101788	M-PE-166E-40	Conduit,Liquid Tight 1/2"
72	100349	M-PE-107B-40	Washer,3/8" Flat
73	100589 MM	M-P-107-40	Skirt
	102198 GB		Skirt
74	100381	M-P-159A-40	Hood
75	102388	M-P-525A-40	Machine Screw,Truss Head 1/4"X1/2"
76	103330	M-PH-293A-40	1/4"X1-3/4"SHCS
77	100256	M-P-293B-40	3/8"X1/2" HHCS
78	100288	M-P-249A-40	3/8"X3/4"SS
79	100323	M-PH-523JN-40	3/4"JN
80	105191	M-P-164A-40	Metal Muncher Decal
81	103135	M-PE-402-40	Retract Switch,Complete
82	102533	M-P-401-40	Bushing Keeper
83	101079	M-P-401CS-40	1/4"X 3/4"SHCS
	Not Shown	M-PE-507-40	Starter (complete)
		Varies with H.P.& Voltage	

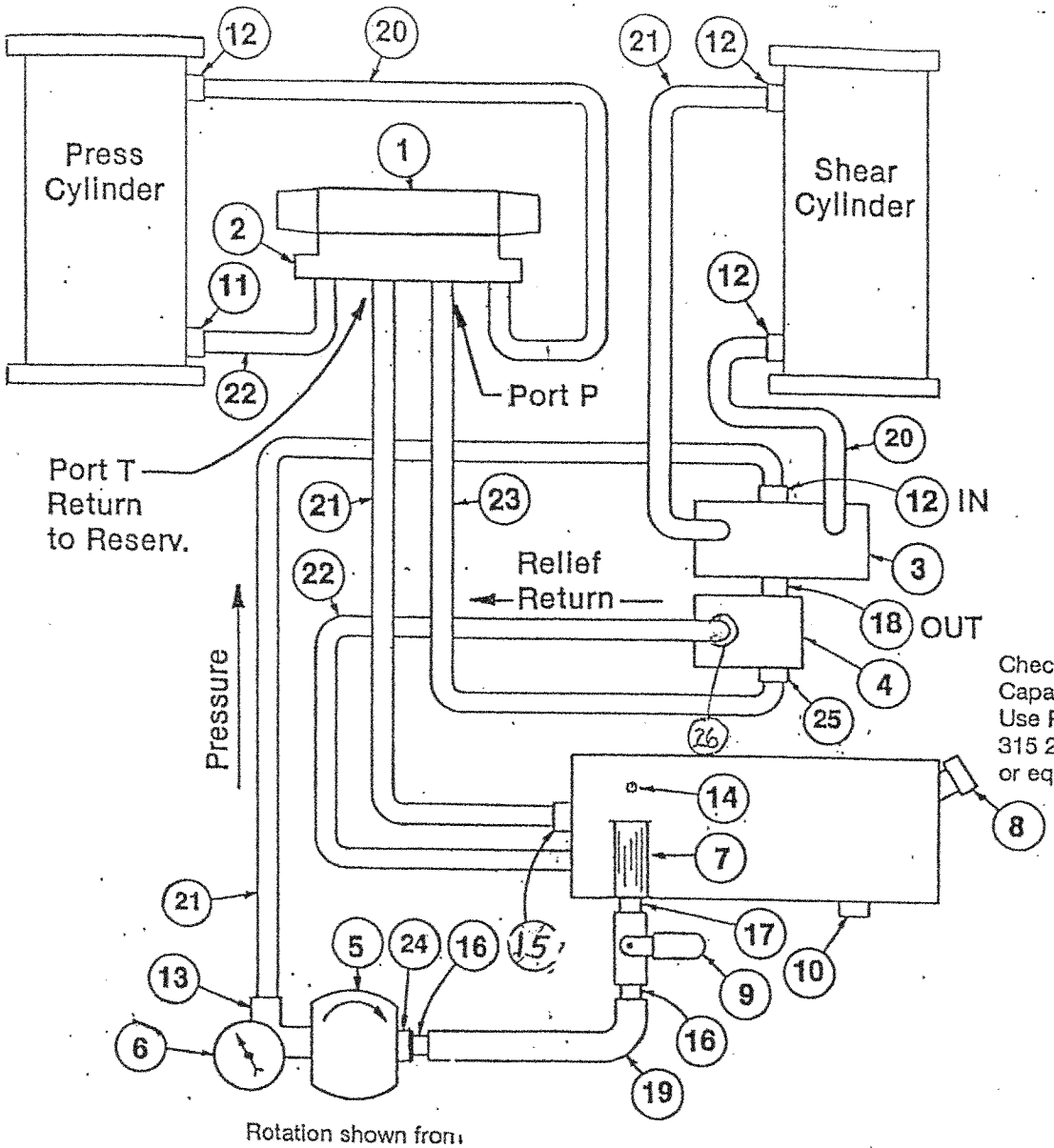
SHEAR END PARTS EXPLOSION - MM-40



SHEAR END PARTS LISTING-MM40

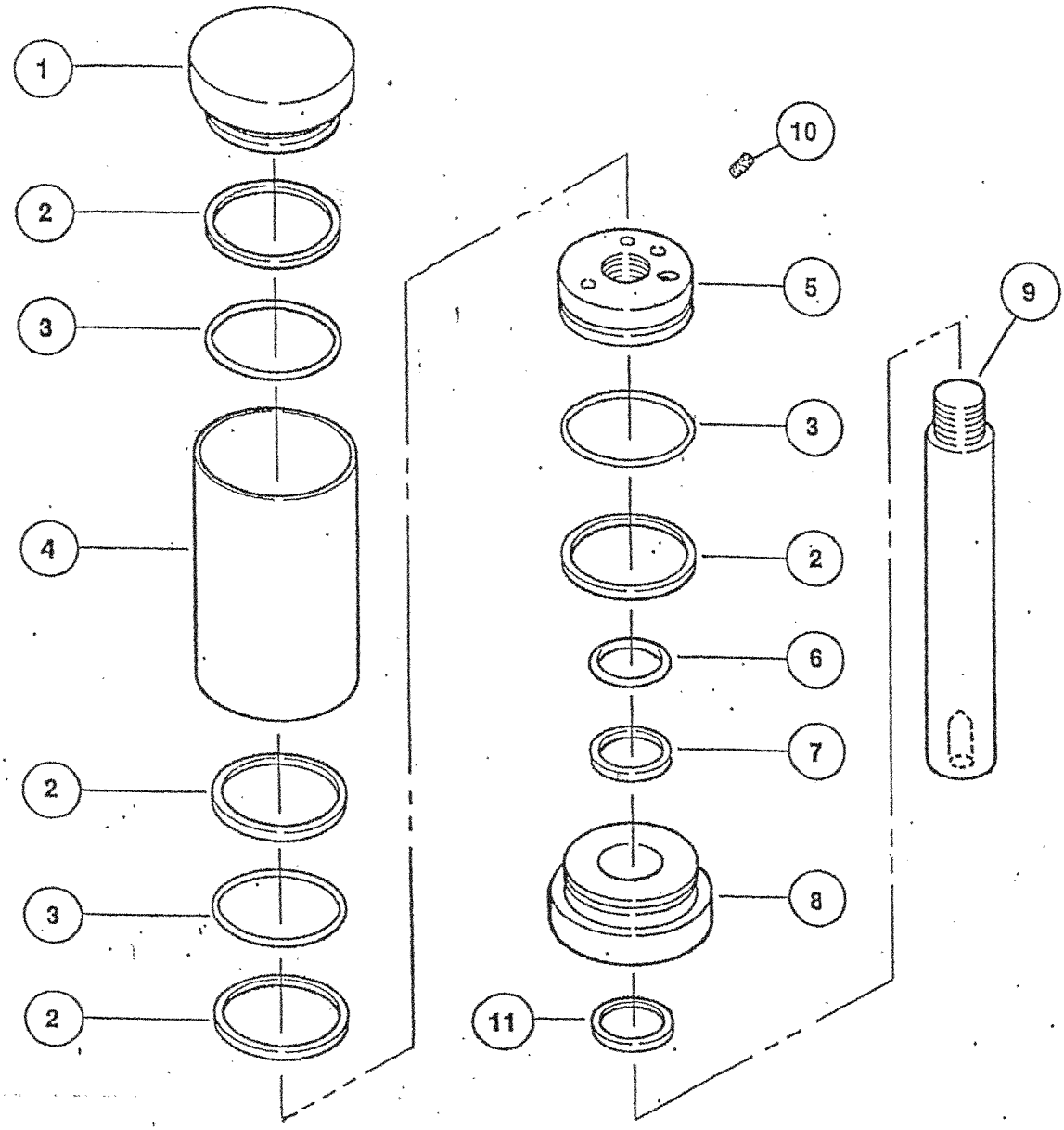
1	100633	M-S-110A- 40	Strip,long-for plastic sheild
2	101726	M-S-110C- 40	Pop rivet
3	100330	M-S-147C-40	Nut,1-1/2" Hex Jam
4	101771	M-S-147B-40	Washer,Flat 1-1/2"
5	100632	M-S-110B-40	Strip,long for plastic sheild
6	102382	M-S-111-40	Clear Plastic Shield for Rear Arm
7	100705	M-S-247-40	Upper Shear Arm(factory installed)
8	100349	M-S-302A-40	Washer,Flat 3/8"
9	100599	M-S-302-40	Coper Safety Shield
10	101074	M-S-302C-40	Roll Pin,3/8"X1-1/2"
11	103140	M-S-147A-40	Pivot Pin,Bar Shear
12	100496	M-S-147D-40	Bronze Bushing
13	102383	M-S-110-40	Clear Plastic Shield for Rear Arm
14	100314	M-S-247D-40	Nut,3/8" Hex
15	100305	M-S-247E-40	Capscrew,Socket Head 3/8"X1-1/2"
16	101859	M-S-246A-40	Screw,Square Head 5/8"X3" (Cup Point)for Gib Block Adj.
17	100326	M-S-246B-40	Nut,5/8" Hex Jam
18	100663	M-S-246-40	Gib Mounting Block
19	100300	M-S-246C-40	Screw,Flat Socket Head 5/8"X2"
20	100353	M-S-246D-40	Washer,Flat 5/8"
21	100318	M-S-246E-40	Nut,5/8" Hex
22	100297	M-S-246F-40	Screw,Flat Socket Head 3/8"X1-1/4"
23	100664	M-S-246G-40	Gib Material
24	100018	M-S-244A-40	7/8"NF7"Gr.8HHCS
25	100334	M-S-244A-40	Grease Zerk
26	100324	M-S-244B-40	Nut,Hex Top Lock 7/8"
27	100288	M-S-24D-40	3/8"X3/4"SS
28	101617	M-S-245A-40	Back Plate,Coper Gib
29	101616	M-S-245B-40	Coper Wear Gib
30	101615	M-S-306A-40	Back Gauge Pipe
31	100298	M-S-306C-40	3/8"X1" CSSH
32	101623	M-S-306B-40	Back Gauge Flag
33	100657	M-S-307-40	Angle Holddown Guard
34	102388	M-S-307A-40	1/4"X1/2" Mach Screw,Truss Head
35	102812	M-S-529-40	Holddown Knob
36	101070	M-S-529A-40	3/16"X1" Roll Pin
37	100795	M-S-529B-40	Threaded Rod,1"
	35,36,37	'102007	assembly
38	102385	M-SH-508-40	Oil Fill Cap
39	102008	M-S-152A-40	Rear Control Knob
40	101614	M-S-152-40	Rear Control Arm
41	100613	M-S-528-40	Flat Bar Holddown Shield
42	105266	M-S-240-40	Flat Bar Holddown assy
		includes 35,36,41,42,51	
43	100590	M-S-153A-40	Control Rod
44	100309	M-S-235-40	3/4"X2"SHCS
45	102362	M-S-152B-40	3/8"X2"SHCS
46		M-S-153B-40	3/16"X3/4" Roll Pin
47	supplied with valve #101853		
48	102159	M-S-235-40	1/2"X1"SHSS
49		M-S-245C-40	Wear Gib Stop
50	100614	M-S-303GS-40	Coper Gib Stop
51	102388	M-S-528S-40	1/4"X1/2"Truss Head Screw
52	100424	M-S-240P-40	Pipe Spacer for 42
53	100367	M-S-303MS-40	#10-24X3/4"PHMS

HYDRAULIC SYSTEM AND PARTS LIST - MM-40



REF. NO.	PART NO.	DESCRIPTION		QTY. REQ'D.
		Press Cylinder - See page for parts breakdown	17	1
		Shear Cylinder - See page for parts breakdown	18	1
1	103252	M-H-181A-40	Solenoid Valve	
2	102095	M-H-181B-40	Sub-plate	
3	101853	M-H-181-40	Shear Valve	
4	105226	M-H-181R-40	Relief Valv	
5	103256	M-H-182-40	Hydraulic Pump	
6	101848	M-H-182A-40	Pressure Gauge	
7	101856	M-H-182B-40	Strainer	
8	102385	M-H-182C-40	Filler Cap	
9	01854	M-H-182D-40	Shut off Valve	
10	101893	M-H-182E-40	Drain Plug	
11	101159	M-H-183-40	Straight Swivel Fitting 3/8"	
12	101139	M-H-183A-40	Swivel Fitting,3/8" 90	
13	105263	M-H-183B-40	7/8" Male O-ring to 3/8"Fema	
14	101893	M-H-182F-40	Oil Level Plug	
15	101154	3/8m-3/8FSWV	Fitting 45	
16	101895	M-H-182G-40	"Barb" Fitting,3/4"	
17	101855	M-H-183D-40	Close Nipple,3/4"	
18	101140	M-H-183E-40	3/8"Male to 1/2" Male St. Fitti	
19	101894	M-H-184-40	Hose,3/4"X7"Long/ Per Ft.	
20	101889	M-H-184A-40	Hose,3/8"X24" Long	
21	101890	M-H-184B-40	Hose,3/8" X34" Long	
22	101891	M-H-184C-40	Hose,3/8"X16"Long	
23	101892	M-H-184D-40	Hose,3/8"X30" Long	
24	102868	M-H-182F-40	7/8" Male O-ring to 3/4"Femal	
25	101911	M-H-181F-40	1/2"Male to 3/8" Female Swiv	
26	101138	1/2M-3/8FSWV	1/2M-3/8FSWV ST. Fitting	

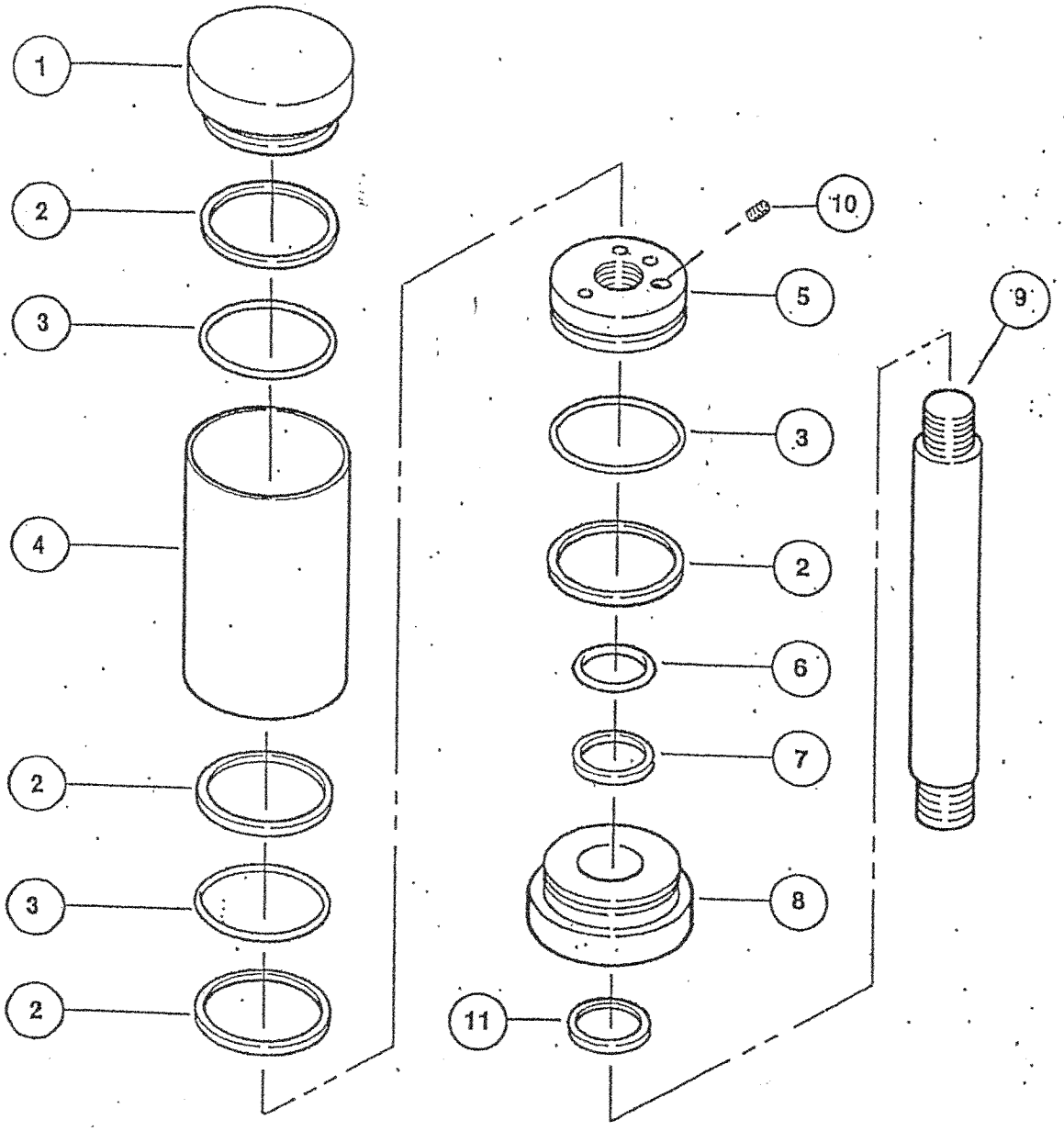
5" PRESS CYLINDER - MM-40



REF. NO.		PART NO.	DESCRIPTION	QTY. REQ'D.
1	100958	M-PC-111A-40	Plug Press Cylinder	1
2	101130	M-PC-257-40	Back-up Ring, 5"	4
3	101131	M-PC-258-40	O-Ring, 5"	3
4	100996	M-PC-259-40	5" Cylinder Barrel, 8-1/4" long	1
5	101119	M-PC-259A-40	Piston, 5" (threaded)	1
6	101150	M-PC-120-40	O-Ring Seal for 2" Shaft	1
7	101151	M-PC-114-40	Back-up Ring, 2"	1
8	100956	M-PC-263-40	Head, 5"	1
9	102474	M-PC-259B-40	Press Cylinder Shaft, 11-3/4" long	1
10	100287	M-PC-257B-40	Setscrew, 3/8" x 1/2" incd w/ piston	2
11	101157	M-PC-123-40	Wiper Seal, 2" Shaft	1
	102716	M-PC-296-40	5" Cylinder Repair Kit, Complete Includes Ref. No. 2, 3, 6, 7, 11	1
	101453		COMP. CYL. ASSY.	

Always give CLAUSING/METAL MUNCHER Model and Serial Number when ordering parts.

4½" SHEAR CYLINDER - MM-40



REF. NO.	PART NO.		DESCRIPTION	QTY. REQ'D.
1	100957	M-SC-129-40A	Plug,Shear Cylinder	1
2	101147	M-SC-112-40A	Back-up Ring,4-1/2"	4
3	101148	M-SC-113-40A	O-Ring,4-1/2"	3
4	101445	M-SC-276-40A	4-1/2" Cylinder Barrel, 8-1/4" long	1
5	101118	M-SC-118A-40A	Piston,4-1/2"(threaded)	1
6	101150	M-SC-120-40A	O-Ring Seal for 2" Shaft	1
7	101151	M-SC-114-40A	Back-up Ring,2"	1
8	100955	M-SC-122-40A	Head, 4-1/2"	1
9	100962	M-SC-275-40A	Shear Cylinder Shaft, 12-1/4" long	1
10	100287	M-SC-118B-40A	Setscrew,3/8"X1/2"	2
11	101157	M-SC-123-40A	Wiper Seal 2" Shaft	1
12	102715	M-SC-295-40A	4-1/2" Cylinder Repair Kit, Complete	1
	101446		COMPLETE CYLINDER ASSY.	

Always give CLAUSING/METAL MUNCHER Model and Serial Number when ordering parts.

TROUBLE SHOOTING

The following is a trouble shooting guide to be used by maintenance personnel should a problem occur with your METAL MUNCHER. Many of these problems can be solved in your facility by following a step-by-step procedure for isolating the problem. If the problem cannot be isolated and corrected in your shop, any information regarding your effort to isolate the area should be relayed to the service department at Fab Center Sales to assist them in finding a solution. These efforts will assure restoring your machine to full operational status with the minimum amount of down-time.

PROBLEMS

MACHINE WILL NOT START

For possible cause check:

1. Voltage, amps, and fuses at power source.
2. Fuses in electrical enclosure inside cabinet
   A. Blown fuse - loose wire in the control box.
   B. Loose fuse - fuse holder not making contact with fuse.
3. Voltage to motor starter.
4. Voltage output of transformer.
5. Wiring connections in electrical enclosure and motor junction box.
6. Main disconnect.

MACHINE STARTS BUT WILL NOT OPERATE

For possible cause check:

1. Hydraulic oil level.
2. Hydraulic system connections for tightness.
3. Pump rotation (clockwise when viewed from pump shaft end or fan end of motor) and that pump is driven by motor.
4. Activation of solenoid valve. See valve schematic for sequence of testing.
5. Improper limit switch stop settings allowing cylinder to bottom out and allowing oil to bypass without cylinder ram movement.
6. Be sure shut-off valve from reservoir is in open position.

MACHINE DOES NOT SEEM TO HAVE ENOUGH POWER TO PUNCH LARGE DIAMETER HOLES

For possible cause check:

1. Material is too hard, beyond capacity of tonnage rating of machine.
2. Proper die clearance for material thickness. (Ref. clearance chart, page 11.)
3. Sharpness of punch point.
4. Improper limit switch setting is not letting machine complete a full stroke cycle.
5. Operating pressure needs to be checked and possibly reset. (This operation should only be handled by a factory representative or dealer from which machine was purchased.)

TROUBLE SHOOTING, Cont'd.

PROBLEMS

MATERIAL CHIPS EDGES FROM KNIFE BLADES WHEN CUTTING MATERIAL

For possible cause check:

1. Material may be too hard.
2. To insure that blade cutting edges are sharp.
3. Blade clearance with no material in machine to be .005 - .010.
   A. Clearance may be set at .005 for 1/8" and less material thickness.
4. Shearing across welds.
5. Shearing rounds (rebar).

MACHINE LEAVES BURR WHEN CUTTING PLATE

For possible cause check:

1. Clearance between blades. Clearance must be set per instruction manual. (Ref. page 10.) Adjust shear arm gibs.
2. Add blade shims of correct thickness if further adjustment is needed. (Clearance may be set at .005 per 3A above.)
3. Insure that blades are sharp.
4. That material holddowns hold material down snugly.

MACHINE OVERHEATS

For possible cause check:

1. Insure that starter overload is on proper setting. (This should be the same as the amps drawn by the motor as listed on the motor.)
2. Improper stop settings allowing machine to operate beyond end stroke causing hydraulic oil to bypass and build up heat.
3. Motor fan not operating properly (Due to blown fuse, loose wiring connection, broken fan or hub.)
4. Check that strainer is not clogged.

RESET ON MOTOR KICKS OUT **SINGLE PHASE ONLY**

For possible cause check:

1. Insure that starter overload is on proper setting. (This should be the same as the amps drawn by the motor as listed on the motor.)
2. Overheating - see problem listed previously.
3. Hydraulic oil level.

TROUBLE SHOOTING FOR HYDRAULICS

CAUSES	REMEDIES

A — PUMP UNUSUALLY NOISY OR CAVITATION

1. Low oil supply.	1. Fill Oil to proper level.
2. Oil too heavy.	2. Change to proper weight oil.
3. Dirty oil strainer.	3. Install new strainer.
4. Restriction or partially clogged suction line.	4. Remove restriction in suction line.
5. Air bubbles in intake oil.	5. Use non-foaming hydraulic oil.
6. Reservoir air vent plugged.	6. Air must be allowed to breathe into reservoir. Clean out or replace breather.
7. Air leaks at pump intake piping joint or at pump shaft packing or inlet pipe opening.	7. Test by pouring oil on joints while listening for change in sound of operation. Tighten joints.
8. Flexible coupling misalignment.	8. Re-align flexible coupling.
9. Worn or broken parts.	9. Replace parts.
10. Pump head too loose or faulty head gasket.	10. Test by pouring oil over pump head, and tighten head carefully or replace gasket.

B — PUMP TAKES TOO LONG TO RESPOND OR FAILS TO RESPOND

1. Low oil supply.	1. Fill oil to proper level.
2. Relief valve pressure set too low.	2. Reset to correct pressure setting using gauge.
3. Pump worn or damaged.	3. Inspect, repair, or replace pump.
4. Oil intake pipe plugged.	4. Clean out intake pipe.
5. Wrong direction of shaft rotation.	5. Must be reversed immediately to prevent seizure and breakage of parts due to lack of oil.
6. Dirt in pump.	6. Dismantle and clean pump.
7. Air leak in suction line, preventing priming.	7. Repair leaks.
8. Oil too heavy to pick up prime.	8. Use lighter oil.

C — NO PRESSURE IN THE SYSTEM

1. Pump not delivering oil.	1. Follow remedies given above.
2. Relief valve setting not high enough.	2. Increase pressure setting of relief valve.
3. Relief valve leaking.	3. Check valve seat for scoring mark and reseat.
4. Spring in relief valve broken.	4. Replace spring and readjust valve.
5. Internal leakage in control valves or cylinders.	5. Repair and replace.

D — EXCESSIVE WEAR ON PUMP

1. Oil weight too light at working conditions.	1. Check for recommended oil weight.
2. Sustained high pressure above maximum pump rating.	2. Check relief valve maximum setting.
3. Drive misalignment.	3. Check and correct.
4. Air circulation causing chatter in system.	4. Remove air from system.

E — EXCESSIVE HEATING OF OIL

1. Foreign material lodged between the relief valve plunger and relief valve seat.	1. Inspect and remove foreign material.
2. Using very light weight oil in hot climate.	2. Drain and refill with proper weight oil.
3. Using too heavy oil.	3. Use recommended weight oil.
4. Oil level too low.	4. Fill to proper oil level.
5. Relief valve pressure too high or too low.	5. Set relief valve at correct pressure.
6. Pump worn and oil slips by pump.	6. Replace or repair pump.
7. Leaking relief valve.	7. Replace or repair relief valve.
8. Relief valve does not operate.	8. Replace or repair relief valve.

F — OIL FOAMING

1. Air leaking into suction line from tank to pump.	1. Tighten all connections.
2. Wrong kind of oil.	2. Drain and refill with non-foaming type of hydraulic oil.
3. Oil level too low.	3. Fill to proper oil level.

G — CYLINDERS CREEP WHEN STOPPED IN INTERMEDIATE POSITION

1. Internal leakage in cylinder or control valves.	1. Replace piston o-rings and backups or replace cylinder if walls are scored. Replace or repair valve.

H —TIMES OF OPERATION LONGER THAN SPECIFIED

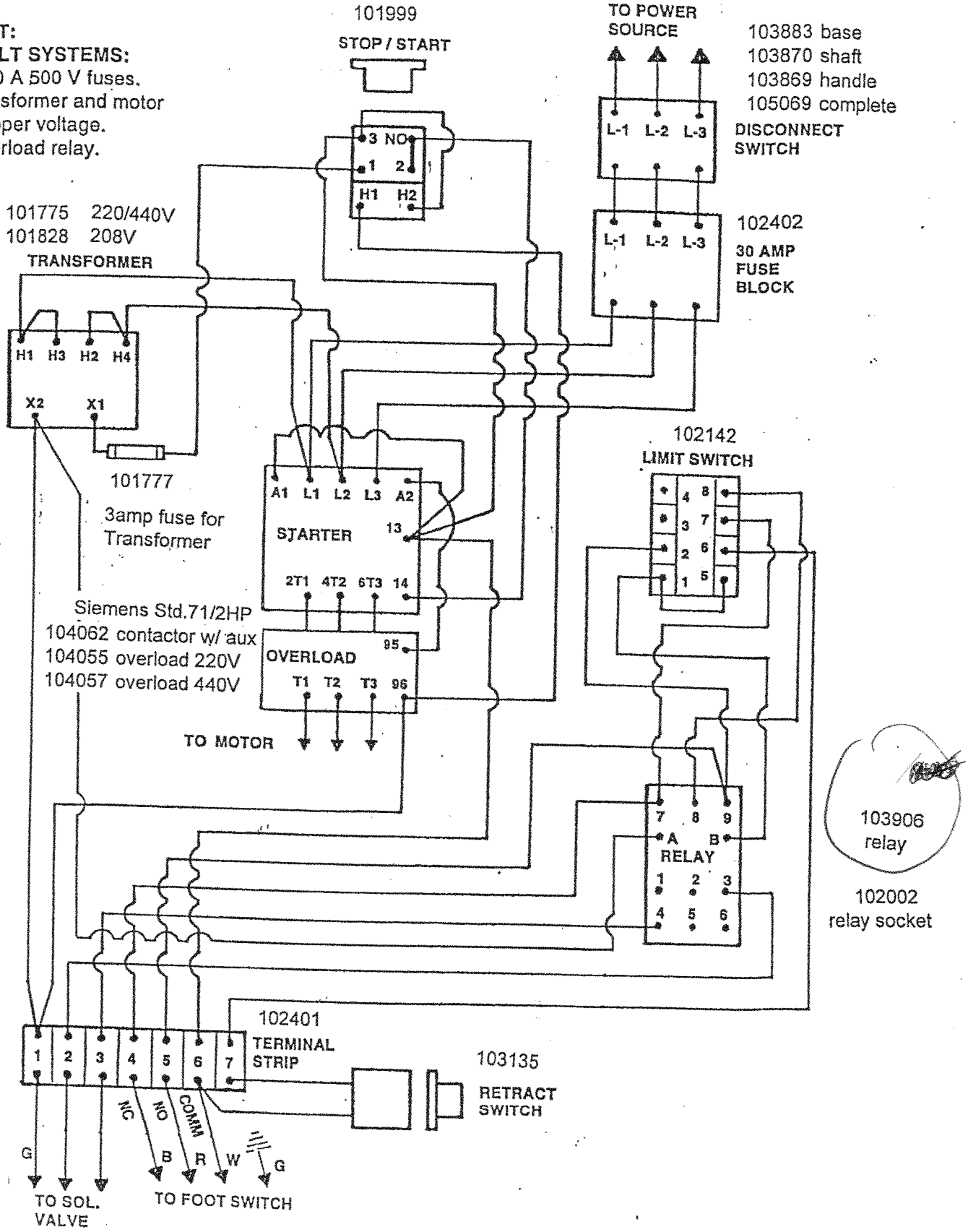
1. Worn pump.	1. Repair or replace pump.
2. Internal leak in cylinder or control valve.	2. Replace piston o-rings and backups or replace cylinder if walls are scored. Replace or repair valve.
3. Air in system	3. Bleed the system and tighten joints.
4. If action is slow on starting up, then speeds up after oil heats up, oil is too heavy weight. If action slows down after oil heats up, oil is too light weight.	4. Use oil weight recommended by manufacturer.

I — EXTERNAL OIL LEAKAGE ON CYLINDERS.

1. End caps leaking.	1. Tighten tie rod nuts if possible or replace o-rings, backups and shaft seal if necessary.

WIRING DIAGRAM - 220/230/240 VOLT - 3 PHASE

IMPORTANT:
440/480 VOLT SYSTEMS:
Fuse with 20 A 500 V fuses.
Change transformer and motor leads for proper voltage.
Replace overload relay.



January, 1994

Integral Heater Overload Relay Sizes B through E, Q

Class 48
Cat No
See Below

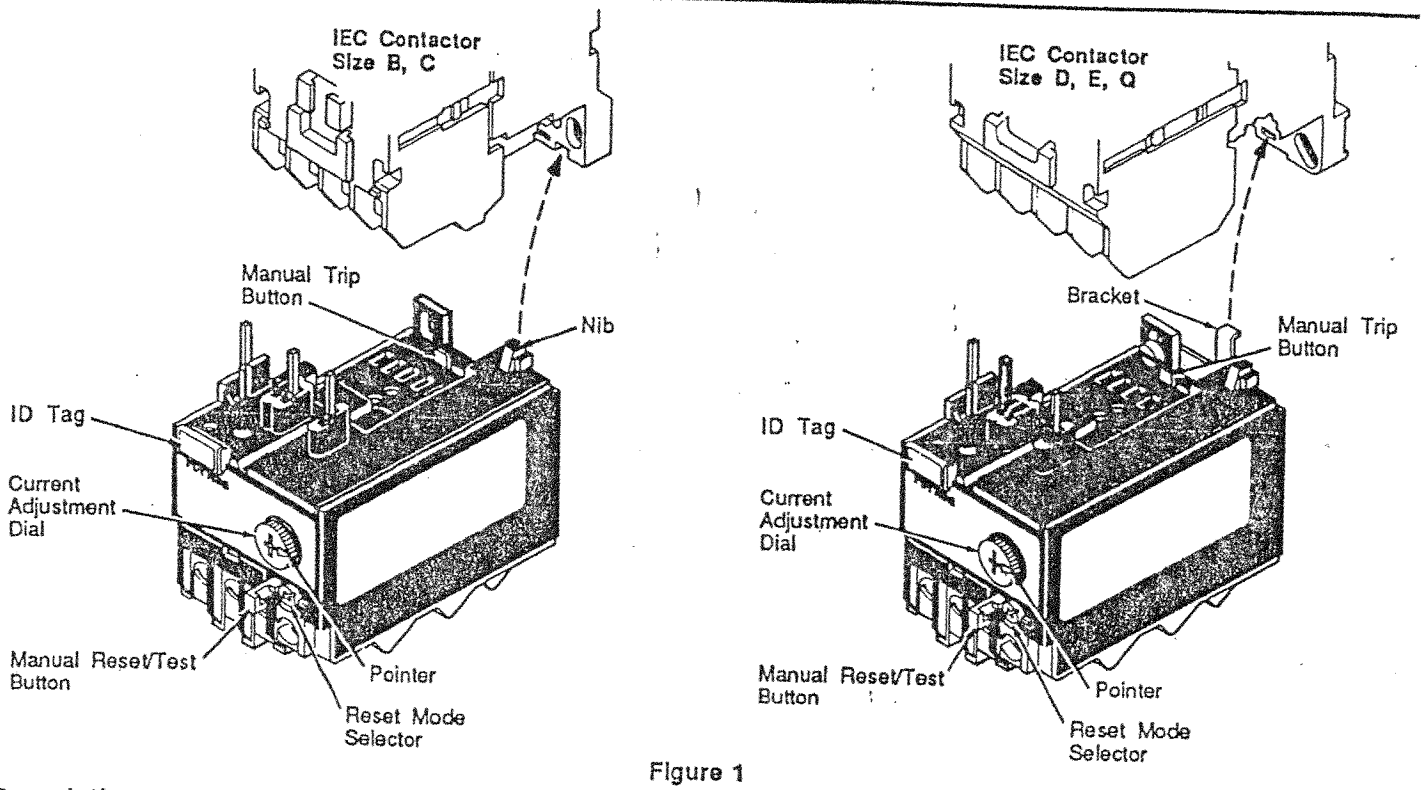


Figure 1

Description

Each of these overload relays has a current adjustment dial (*see Figure 1*). For setting the current at a value of full load amps within its range, refer to the rating table. The reset mode selector provides a choice of manual reset, automatic reset or test function. In the manual reset mode, the manual reset/test button is pressed to reset the overload relay. In the test function mode, the reset/ test button is pressed to change the state of the control circuit contacts without tripping the overload. The manual trip button is used to check the tripping function in the manual reset mode by sliding the button toward the printed side of the overload relay to trip the relay.

Use with sizes B through E Class 21 suffix E contactors or Size Q contactor to assemble a starter as indicated in the rating table. For a Class 21 suffix E contactor, the last character in the catalog number is E, e.g. 21DF32A*E.

Rating: Each overload relay has a full load current range as listed in the table.

Contactor Sizes	Full Load Current Range (Amperes)	Overload Relay Catalog No
B, C	0.24-0.38	48AH004
B, C	0.38-0.62	48AH006
B, C	0.62-1.0	48AH010
B, C	1.0-1.7	48AH017
B, C	1.7-2.5	48AH025
B, C	2.5-4.0	48AH040
B, C	4.0-6.0	48AH060
B, C	6.0-9.0	48AH090
B, C	8.5-12.5	48AH125
D, E, Q	12-17	48BH170
D, E, Q	16-23	48BH230
D, E, Q	23-32	48BH320

Contents of Kit: Each kit contains the applicable overload relay and mounting bracket and screws, if required.

Warning: Before performing installation or maintenance turn off electrical power to the controls to avoid electric shock.

INSTALLATION

Mounting

1. Loosen the three load terminal screws on the contactor.

2. For size B and C, insert overload nib into the contactor base, then insert the three overload relay leads in the contactor load terminals. For size D, E and Q contactors, attach bracket to overload, then attach bracket to mounting slot on contactor base, then insert leads into contactor load terminals. Terminal screw tightening torque is specified in step 5.

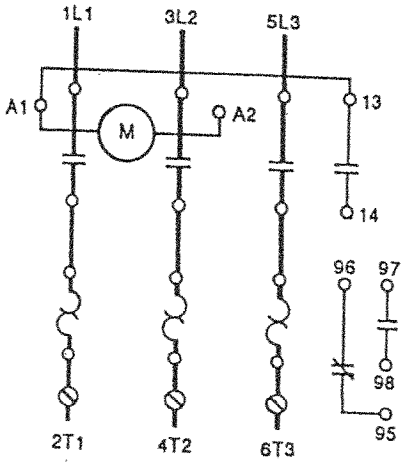


Figure 2

Figure 2 is the wiring diagram for the three phase starter. Note that the control terminals are located on the underside of the overload relay. The dashed line in *Figure 3* indicates the connection required to adapt the starter for single phase operation; select wire size to suit the load requirements and per applicable regulations (NEC, etc.).

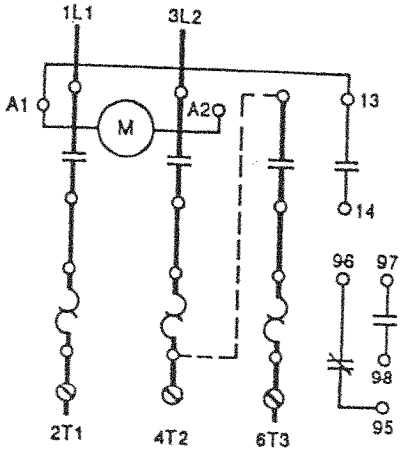


Figure 3

3. Secure the starter to the starter mounting panel or DIN rail.

4. Wire the starter as required for the installation. *Figure 4* shows a typical application. The fuse rating for the control circuit (terminals 95-98) is printed on the side of the overload relay. The maximum fuse rating (non time delay) for the main circuit is also noted on the side of the overload relay. When using time delay fuses, do not exceed 150% of the setting selected.

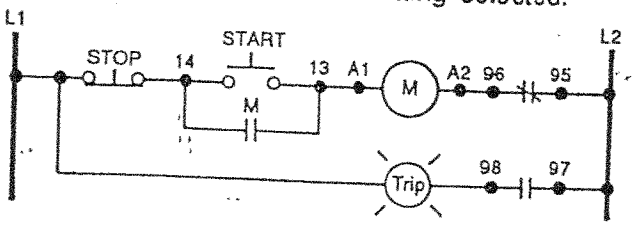


Figure 4

5. Contactor line and load terminal screw minimum tightening torque is 11 lb-in (1.24 Newton-meters) for starter sizes B and C, and 14 lb-in (1.58 Newton-meters) for starter sizes D, E and Q. Tightening torque for the load terminals of the overload relay is 12 lb-in minimum (1.35 Newton-meters) and 20 lb-in maximum (2.26 Newton-meters).

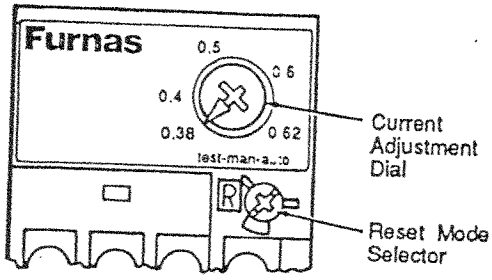


Figure 5

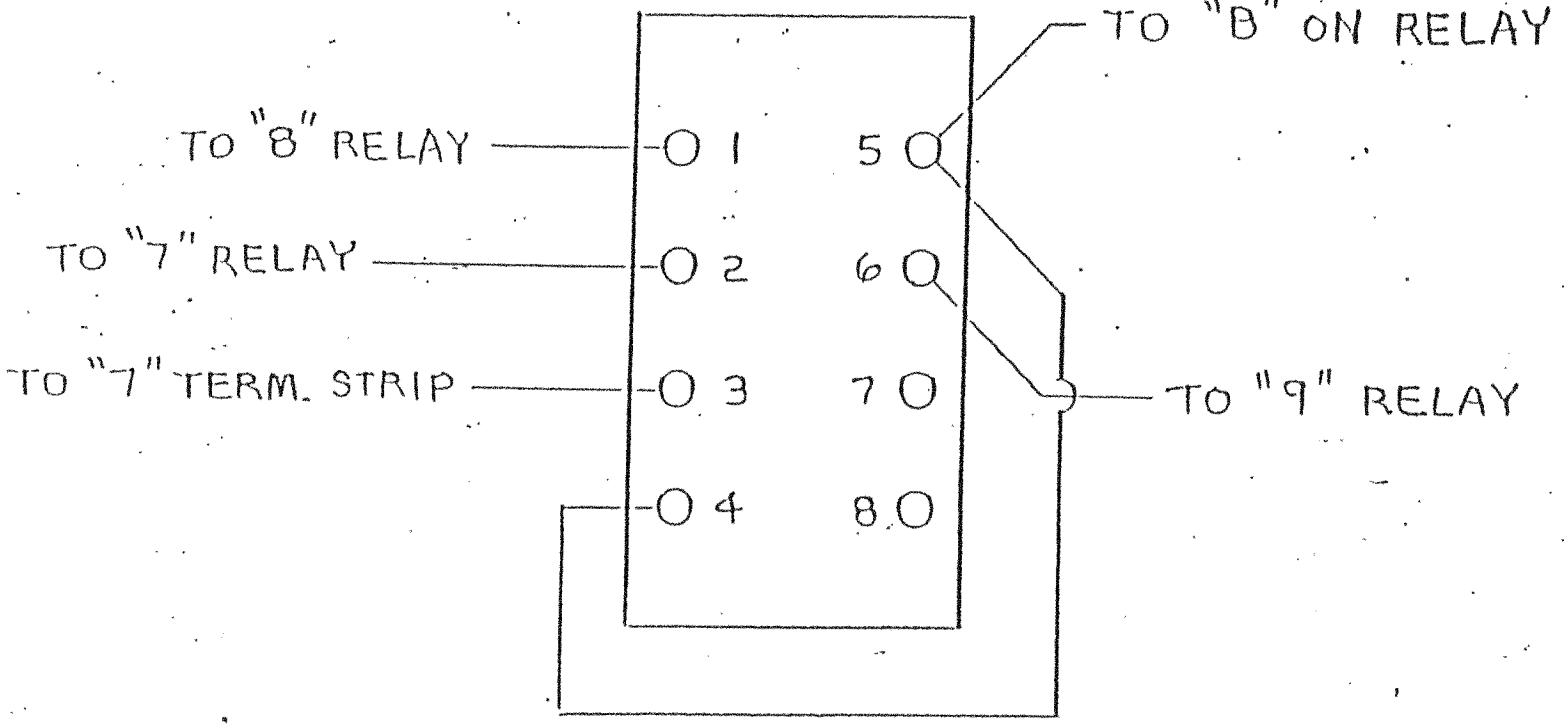
Adjustments

To change the position of the reset mode selector, use a screwdriver to turn the selector to the desired position on the label. Be sure electrical power is turned off as noted in the warning. Set the current adjustment dial to the desired position. Use a screwdriver to rotate the dial until the pointer aligns with the desired current value.

Observe the following:

1. For motors with a service factor of 1.15 or greater, set dial at motor nameplate full load current (FLA). Example: To control a 1.15 service factor motor with a FLA of 28 amperes, set dial at 28.

2. For motors with a service factor of 1.0, set dial at 0.9 x FLA. Example: To control a 1.0 service factor motor with FLA of 28 amperes, set dial at 25.



SCALE:	APPROVED BY:	DRAWN BY JM
DATE: 4-13-99		REVISED

SIEMENS LIMIT SWITCH

WIR SUPPLEMENT

DRAWING NUMBER