FAMCO

S14 SERIES

SERVICE MANUAL

READ THIS MANUAL CAREFULLY

It is essential to give the Serial Number of your machine in any order of repair parts to assure prompt and accurate service.

Order repair parts by part numbers, description and machine serial number.

1224	1436	1442
1452	1460	1470
P-1224	P-1436	P-1442
P-1452	P-1460	P-1470

WARNING

TO PREVENT SERIOUS BODILY INJURY

NEVER PLACE ANY PART OF YOUR BODY UNDER THE RAM, HOLDDOWN OR WITHIN THE KNIFE AREA.

NEVER OPERATE, INSTALL KNIVES, OR MAINTAIN THIS MACHINE WITHOUT PROPER INSTRUCTIONS AND WITHOUT FIRST READING AND UNDERSTANDING THE OPERATORS OR MACHINE MANUAL.

NEVER INSTALL KNIVES OR SERVICE THIS MACHINE WITH THE FLYWHEEL IN MOTION AND/OR MOTOR ON.

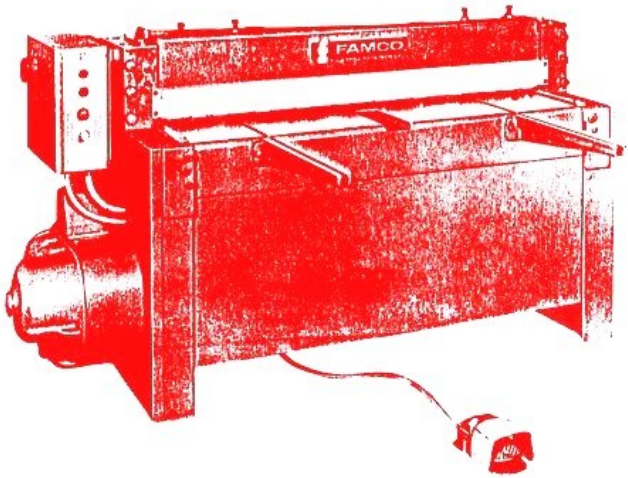
IT IS THE EMPLOYERS RESPONSIBILITY TO IMPLEMENT THE ABOVE AND ALSO TO PROVIDE PROPER DEVICES OR MEANS THAT MAY BE REQUIRED OR NECESSARY FOR ANY PARTICULAR USE, OPERATION, SET-UP OR SERVICE.

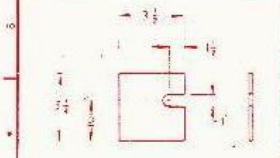
DO NOT REMOVE THIS SIGN FROM THIS MACHINE

TABLE OF CONTENTS

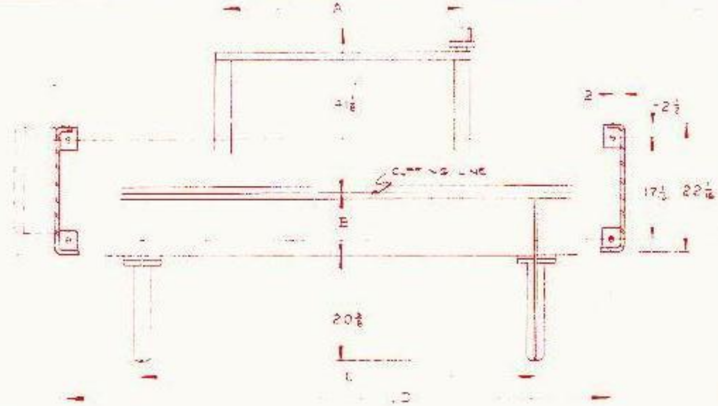
This manual has been written to instruct the operator in the operation and maintenance of the FAMCO SHEAR. When written, it was completely up-to-date. Because of the later improvements in design, descriptions may vary slightly from the shear delivered to you.

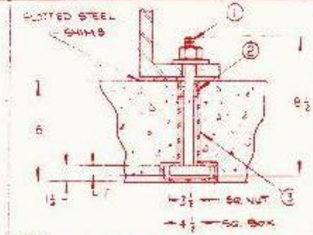
Your FAMCO SHEAR is a precision-built, accurate, quality machine tool. Careful attention to the adjustment and maintenance of the shear should result in many years of trouble-free service. Although your machine has been carefully inspected and tested in our plant, some of the adjustments may have disturbed in transit. Therefore, it is recommended that your millwrights, maintenance men and shear operators carefully read these instructions before the shear is installed or operated. Additional copies of this manual will be furnished on request at additional charge. We can assume no liability for unauthorized alterations or attachments to the shear.



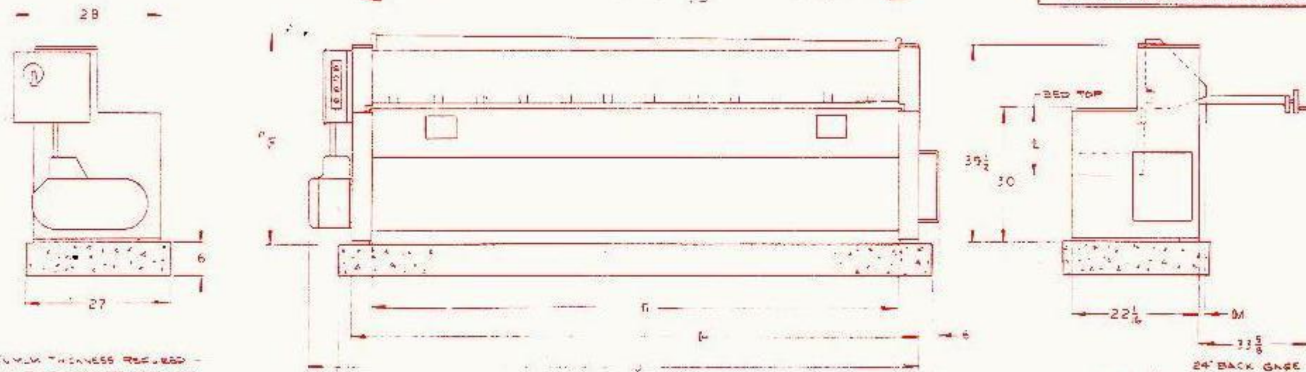


SUGGESTED FORM OF SLOTTED STEEL SHIMS





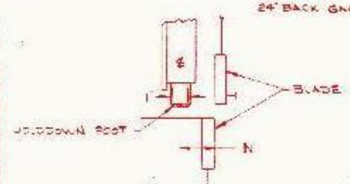
(1) 1/2" DIA. HOLDDOWN BOLT MUST FLOAT INSIDE OF PIPE TO LINE UP WITH HOLE IN MACHINE.
(2) CAUTION! INSERT WOOD PLUG BEFORE POURING CONCRETE. REMOVE AFTER POURING.
(3) 2" IRON PIPE, WELD TO SHEET METAL BOX WITH NUT INSIDE-MAKE NUT FROM SQUARE STOCK TO PREVENT TURNING IN BOX.
NOTE: HOLDDOWN BOLTS, NUTS, BOXES AND PIPES ARE NOT FURNISHED WITH MACHINE. USE WOODEN FRAMES TO SUSPEND HOLDDOWN BOLTS TO SECURE ACCURATE LOCATION



6 MINIMUM THICKNESS REQUIRED - ACTUAL DIMENSIONS ARE DEPENDENT ON LOCAL SOIL CONDITIONS. CONSULT A LOCAL REGISTERED CIVIL ENGINEER. CONCRETE TO BE REINFORCED WITH 1/4 DIA STEEL MESH ON 6 CENTERS.

*ADD 6 INCHES TO OVERALL HEIGHT WHEN EITHER THE FRONT OPERATED OR POWER OPERATED BACK GAGE IS USED.

	A	B	C	D	F	G	H	J	K	L	M	N
1472	44	13 3/8	42	76 1/2	42 1/4	73 3/4	80 3/4	94 1/2	54 3/4	10 1/2	2	1/16
1460	32	13 3/8	42	64 1/4	41 1/8	61 1/4	68 3/4	82 1/2	72 3/4	9 1/4	1/2	5/16
1452	24	13 3/8	34	56 1/4	40 5/8	53 1/4	60 3/4	70 1/2	44 3/4	7 1/4		5/16
1442	22	13 3/8	23	46 1/2	40 1/8	43 3/4	50 3/4	60 1/2	54 3/4	6 1/4		5/16
1436	18	13 3/8	6	40 1/2	40 1/8	37 3/4	44 3/4	54 1/2	48 3/4	5 1/4		5/16
1224	7 1/2	13 3/8	6	28 1/2	40	25 3/4	32 3/4	42 1/2	36 1/4	5 1/4		3/16



FAMCO MACHINE CO.
9100 SHERIDAN ROAD
KENOSHA WISCONSIN U.S.A.

DRAWN: CC
DATE: 3-24-72
TITLE: MACHINE DIMS 14'S SERIES

LAST CHANGE — PRINTED — SIZE "C"

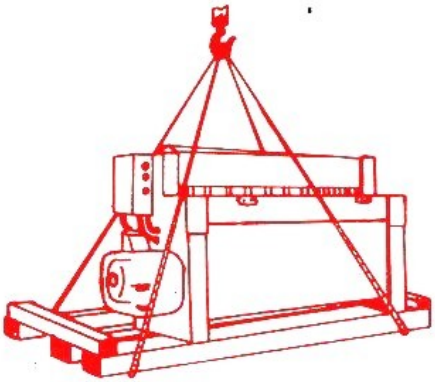


FIGURE 1

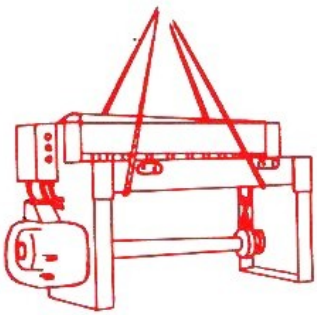


FIGURE 2

SHEAR	1224	1436	1442	1452	1460	1472
WEIGHT	1135	1275	1375	1550	1700	1850

RECEIPT AND INSPECTION

Check the shear immediately when first received for obvious shipping damage or missing parts. If there is damage that should be corrected, file a claim promptly with the carrier and have the shear inspected by the carrier's agent before proceeding with installation.

RIGGING AND MOVING

Leave the shear on the shipping skids during all moving and until ready to position on the operating location. Crane or hoist rigging is permissible when the sling is rigged under the skids. (See Figure 1.) If both the front and rear skirts of the shear are first removed, it is also permissible to rig slings beneath the bed and crosshead. (See Figure 2.)

FOUNDATION - INSTALLATION - LEVELING

To maintain good blade life and accurate shearing, it is very important that the shear should be properly installed on an adequate foundation.

A concrete floor 6" thick, reinforced with ½" dia. steel mesh, on 6" centers should be adequate. Actual dimensions are dependent on local soil conditions; consult a local registered civil engineer.

When leveling the shear, use a precision level (accurate to .001" per foot) on the shear table top surface. Use only steel shims between the shear base and the floor. The bolts must fit freely thru the machine base holes to avoid side loading. Before tightening each bolt, recheck the floor shims to be sure they are snug. Great care must be taken while tightening the foundation bolts to avoid any twisting load on the shear.

Make a final check with the precision level at each end of the shear. It should read perfectly level both lengthwise and across the table. Cement grouting is recommended to help maintain level accuracy.

Thoroughly clean and lubricate the shear when installation is complete.

Do not use any compressible material or shock absorbents, for they will allow the shear to twist and damage the ways and/or bearings.

START UP PROCEDURE

Before the motor is started, turn the drive shaft over by hand to be sure that the blades have clearance. Refer to the section on blade adjustment. The blades were properly adjusted before shipment, but may have moved during shipment.

At this point, install and set up BACK GAGE, if any. See Back Gage Instruction Manual. After the proper blade clearance is verified, power may be applied. Check for proper rotation of flywheel, as indicated by arrow on flywheel. Machine must be checked periodically for maintaining level conditions.

OPERATION

DO NOT OVERLOAD. Stay within the capacity rating of this shear. This shear is built to provide years of satisfactory operation, PROVIDED it is kept well lubricated, properly adjusted and the material capacity is not exceeded. NEVER cut anything that exceeds the rated shear capacity, no matter how short it may be.

Unless otherwise specified, this shear is equipped with a foot switch control, and it is wired for single cycle (one stroke) operation.

The foot switch or "cut" button must be held for your desired number of strokes and must be fully released at the completion of the cut to set the clutch circuit for another stroke.

OPERATIONAL SAFETY

NOTE: CAUTION SHOULD BE TAKEN WHEN ADJUSTING OR REPAIRING THE SHEAR THAT ALL ELECTRICAL POWER IS OFF TO PREVENT THE HOLDDOWN AND THE BLADES FROM ENGAGING ACCIDENTALLY.

Before operating machine, obtain (and understand) operating and safety instructions from your employer.

Providing safe and proper working conditions and point of operation safety devices consistent with the use and operation of the machine are determinations to be made by, and the sole responsibility of, the user of the machine.

The user should familiarize himself with point of operation safety devices that are in common usage in the industry, and equip the machine with such devices as are consistant with the operations being performed.

All operating and maintenance personnel should be specifically instructed by the user on the proper operating and maintenance instructions contained in this manual.

The determination as to whether to use mechanical (or other) safety devices must be made by the user; the user alone, being most intimately familiar with the operation, must judge what is practical or impractical.

Due to various types of operations that may be encountered, and a variety of feeding and/or take-off devices with which to equip machines to accommodate such operations, the user must be responsible for furnishing as part of his day-to-day procedure those devices that best satisfy safe operation.

SHUT DOWN PROCEDURE

For safety inspections not requiring air or electrical power, the following procedure is suggested:

1. Turn off drive motor.
2. Open disconnect switch & lock out.
3. Allow flywheel to completely stop before attempting any inspection, adjustment, repair or replacement.
4. Always block under ram (crosshead)
5. Turn off air supply and bleed off stored air.

BLADE AND GIB ADJUSTMENT

When an objectionable burr appears on the material sheared edge, inspect the machine for proper blade sharpness, blade clearance, and crosshead gib adjustment. Inspection and adjustments should be made in the following sequence:

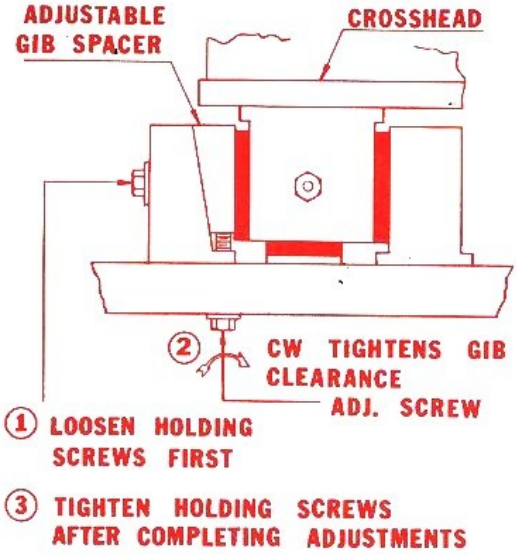
A. BLADE SHARPNESS

These shears are furnished with 4 edged blades. When the cutting edges in use become dull, the blades should be removed and turned to present a sharp edge to the work. Dull blades increase the shearing load and cause more twist and camber. Refer to the section entitled "Blade Changing and Replacement" for correct procedure.

Resharpening is necessary after all 4 edges are dulled. Factory recommendations for resharpening blades and grinding limits are outlined in the section "Regrinding".

B. CROSSHEAD GIB BEARING ADJUSTMENT (See figure)

The gib bearing clearance has been properly adjusted and should not be changed except to compensate for gib bearing wear. When necessary, adjustment can be made by loosening the holddown screws on each leg, and tightening the adjusting screws on the outside of each leg, until all play has been eliminated between the gib bearing and the gib way. Be sure to retighten the holding screws. When properly adjusted and well lubricated, the gib ways will run warm, but not hot, on continuous operation.



C. BLADE ADJUSTMENT

Properly adjusted blades should not touch or rub together. A blade clearance as noted on the following chart should be maintained.

If your machine is equipped with an "inch" push button, you can inch the crosshead down to the bottom of the stroke. If there is no "inch" button, you can manually move the crosshead down, by inserting a 1/2" diameter rod in the hole provided in the drive shaft, at the opposite end of the transmission, and slowly turn the drive shaft to the bottom of the stroke, after you first go through the "Shut Down Procedure".

For the larger machines, you can bring the blade to the bottom of the stroke as follows:

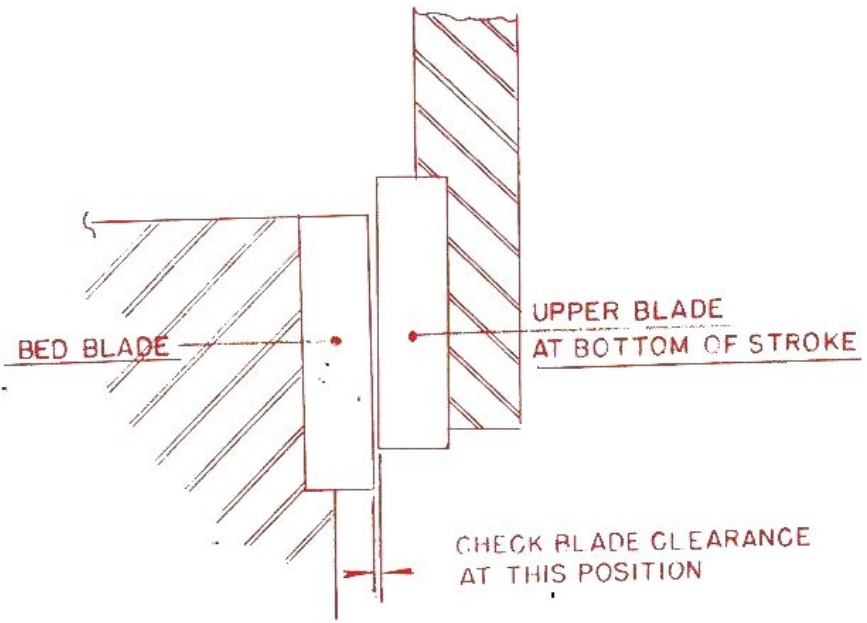
1. Turn Selector Switch to "Continuous" mode.
2. Step on the Foot Switch.
3. Quickly plug start and stop the motor until the crosshead stops at the bottom of the stroke.

NOTE: DISCONNECT ALL POWER TO THE MACHINE WHEN MANUALLY MOVING SHEAR! BE VERY CAREFUL TO AVOID PLACING YOUR FINGERS OR ANY PART OF YOUR BODY BETWEEN THE BLADES!

EXERCISE CAUTION DURING BLADE ADJUSTMENT WHEN FINGERS ARE NEAR SHARP BLADE EDGES.

KEEP BLADES SHARP. DULL BLADES CAN INCREASE THE SHEARING LOADS BY AS MUCH AS 50%.

Machine Capacity Mild Steel	Blade Clearance
14 and 16 gage	.002"-.0025"



D. ADJUSTING BLADE BLOCKS

To set the blade clearance, first loosen the four bed bolts on the side of each leg. Adjustment is then made by moving the adjusting bolts, located on the front of the leg, in or out until the same blade gap is obtained at both ends of the table. Lock this setting by tightening the two holding set screws and nuts, and the table end bolts.

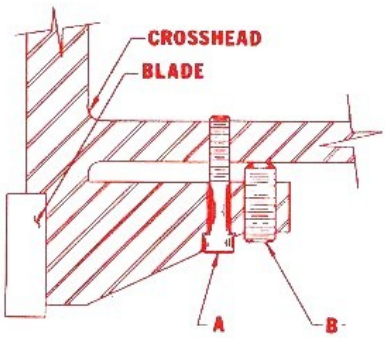
The purpose of the adjusting blocks is to get the crosshead blade parallel with the table blade thru the length of the shear.

When adjusting the crosshead blade, adjust all the blocks a little at a time. Do not take up all the gap at any one point at once. Work from both ends towards the middle of the crosshead. Once the blades are parallel, you can increase or decrease the blade clearance by moving the bed.

To move the crosshead blade towards the table blade, loosen screw "A" and tighten screw "B", see figure. To move the crosshead blade away from the table blade, the opposite applies.

NOTE: After adjusting the blade clearance, tighten all screws, and make a few full capacity cuts. You must now recheck the blade clearance, observing all SAFETY RULES.

If the blade clearance has not changed, you are ready for production. Occasionally the blade clearance will change after the first few cuts because the push-pull screws "A" and "B" "seat" themselves. However, once they are well seated, the blade clearance will not change!



E. BLADE CHANGING AND REPLACEMENTS

Refer to shut down procedure for precautionary safety procedures. Block up crosshead from floor to one end only, leaving clearance for both blade and blade bolts to be removed.

The holddown has to be removed in order to remove the crosshead blade - see instructions in this manual for removing the holddown. After the holddown is removed, insert (2) ½" dia. by approx. 1 ft. long rods through blade after all but two of the blade bolts have been removed. Now using the two rods, the blade can be lifted from the crosshead after the last two blade bolts have been removed. Always handle blades with extreme care - protect yourself from the sharp edges and protect the sharp edges from accidental damage.

Place on rack and clean with solvent before replacing.

Remove lower blade using the same procedure as outlined above.

Replace the crosshead blade by reversing the instructions given above, being careful to replace the blade shim on top of the blade; the shim is necessary to preserve the captive blade edge.

Replacing the lower blade is essentially the same procedure except the shim is under the blade (for blades that have been reground, additional shims will be necessary to bring the top of the blade flush with the table top).

See "Blade Adjustment" for setting proper clearance.

NOTE: Reground blades also require adjustment of back gage dials and scales in the table.

F. REGRINDING

Blades must be ground carefully to give you good results. We recommend you send your blades to shear blade manufacturers for regrinding because they are experienced in the care of your blades and have the equipment to give you an accurate grind. When returning blades to be reground, specify the grinding limits given below.

GRINDING LIMITS

Width - Parallel within .005" from end to end.
Thickness - Parallel within .003" from end to end.
No variation greater than .001" within any 12" of length.

HOLDDOWN ADJUSTMENT

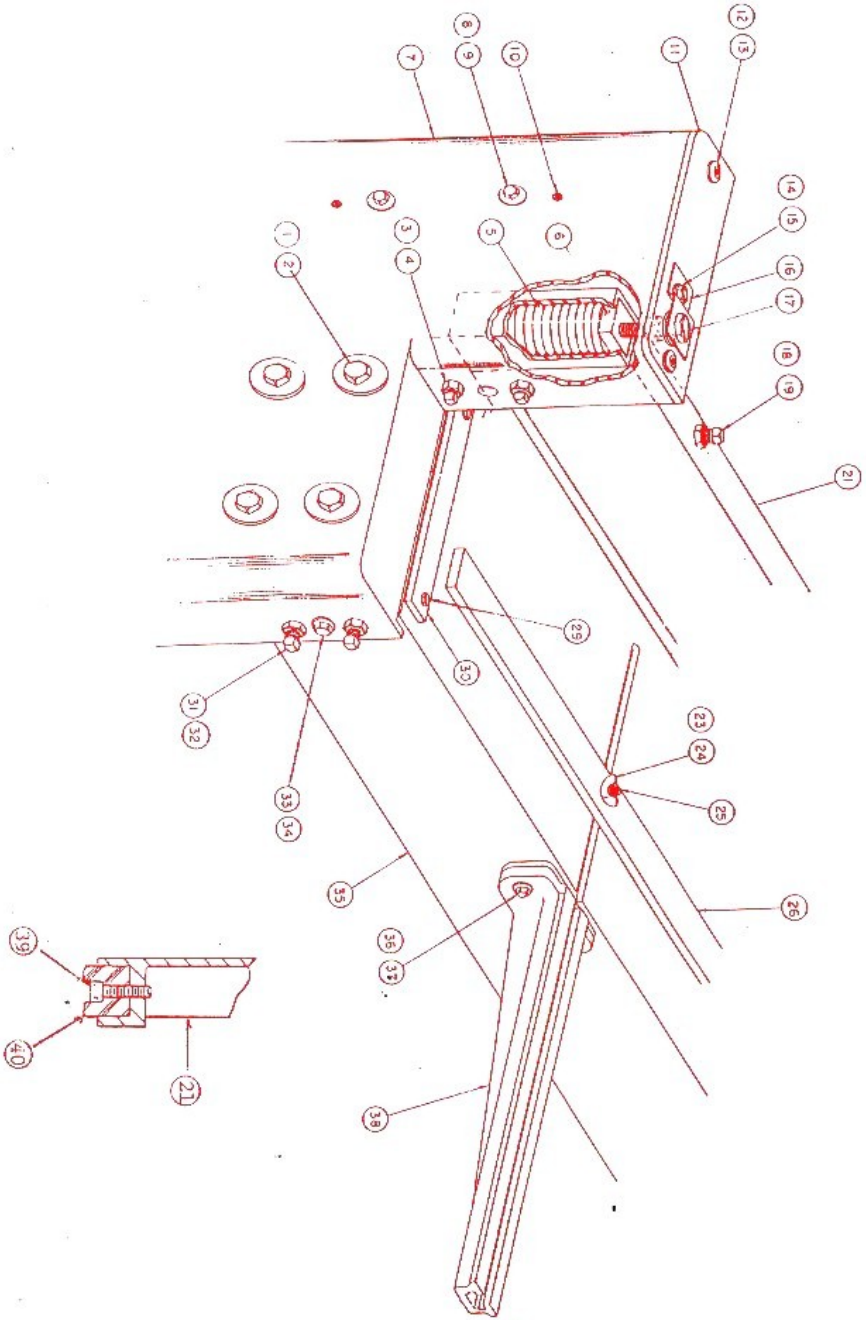
A. REMOVING THE HOLDDOWN

First, reduce the holddown spring pressure by turning the holddown pressure adjustment screw at each end of the shear in a clockwise direction to the limit of the nut travel. Then fully loosen the holddown clearance adjustment screws to permit the holddown to move down. The gibway covers and the holddown gib covers can now be removed, permitting removal of the holddown assembly.

B. INSTALLING AND ADJUSTING THE HOLDDOWN

Clean and grease the holddown ways and gib surfaces. Place the holddown assembly, and install the holddown gib covers and gibs. Install the gibway covers. Tighten the holddown clearance adjustment screws until the holddown feet clear the bed surface by 3/16". Adjust the holddown spring pressure by turning the holddown pressure adjustment screws counter-clockwise to the limit of the nut travel. This automatically adjusts the holddown end springs to the proper compression.

NOTE: The holddown should always be 1/16" lower than the low end of the blades. If, however, you ever decide to increase the holddown opening BE CAREFUL not to raise the holddown to a position where at top-dead-center the end tubes hit the holddown gib covers (Item 3, see Page 10). This causes the crosshead pick-up bosses to break!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KEY	PART NAME	PART NUMBER
1.	Hex Hd Cap Screw	9126-4210
2.	Bed End Bolt Washer	1672-107
3.	Sq Hd SS Dog Pt	9146-3470
4.	Hex Jam Nut	9223-2190
5.	Holddown End Spring	1672-030B
6.	Holddown Spring Adj Nut	1672-009
7.	Left Leg	1672-004
8.	Hex Hd Cap Screw	9127-3930
9.	Flat Washer	9228-1210
10.	Soc SS Dog Pt	9170-3420
11.	Gibway Cover	1672-024
12	Bt Hd Cap Screw	9136-1660
13.	Lock Washer	9228-5190
14.	Hex Hd Cap Screw	9126-3430
15.	Lock Washer	9228-5190
16.	Adj Screw Retainer	1472-010
17.	Holddown Spring Adj Screw	1672-008B
18.	Sq Hd SS	9144-3940
19.	Jam Nut	9223-4730
21.	Holddown	See Below
23.	Wing Nut (b) (a) (Optional)	9227-4210
24.	Washer (b) (a) (Optional)	9228-1210
25.	T-Bolt (b) (a) (Optional)	9182-3920
26.	Adj Table Gage (b) (a) (Optional)	See Below
29.	Hex Hd Cap Screw	9126-3430
30.	Guid Bar	1672-033
31.	Sq Hd SS	9144-3490
32.	Hex Jam Nut	9223-2190
33.	Hex Hd Cap Screw	9126-3460
34.	Flat Washer	9228-1190
35.	Bed	See Below
36.	Hex Hd Cap Screw (a)	9126-3460
37.	Flat Washer (a)	9228-1190
38.	Front Gage Bracket (a)	1672-010
39.	Btn Hd Cap Screw	9136-3460
40.	Holddown Pad	1472-034

KEY	PART NAME	1224	1436	1442
21.	Holddown	1224-006A	1436-006B	1442-006A
21.	Holddown "P-Series"	124-006A	136-006B	142-006B
26.	Adj Table Gage	1224-020	1436-020	1442-020
35.	Bed	1224-001	1436-001	1442-001
35.	Bed "P-Series"	1224-011	1436-011	1442-011

KEY PART NAME	1452	1460	1472	
21. Holddown		1652-006B	1460-006A	1672-006B
21. Holddown "P-Series"		152-006B	160-006A	172-006
26. Adj Table Gage		1652-020	1460-020	1672-020
35. Bed		1652-001	1460-001	1672-001
35. Bed "P-Series"		1652-011	1460-011	1472-011

NOTE; (a) Not used on "P-Series Shear"
(b) Replaced by 1672-335A Stock Finger Assembly

BRAKE ADJUSTMENT

This style brake unit is the intermittent type, i.e. it provides braking action at the end of the stroke, after the shearing has taken place.

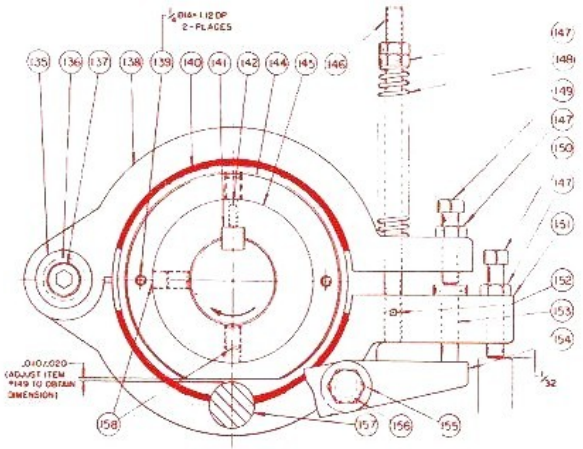
The brake tension should always be sufficient to hold the crosshead on the top-dead-center after the clutch is disengaged. If the brake does not hold the crosshead and permits it to over-

Brake Adjustment (continued)

travel, it will cause the clutch to partially engage and chatter.

The brake can be adjusted by loosening the lock nut (Item 147) and tightening the lower lock nut until the proper braking pressure is applied.

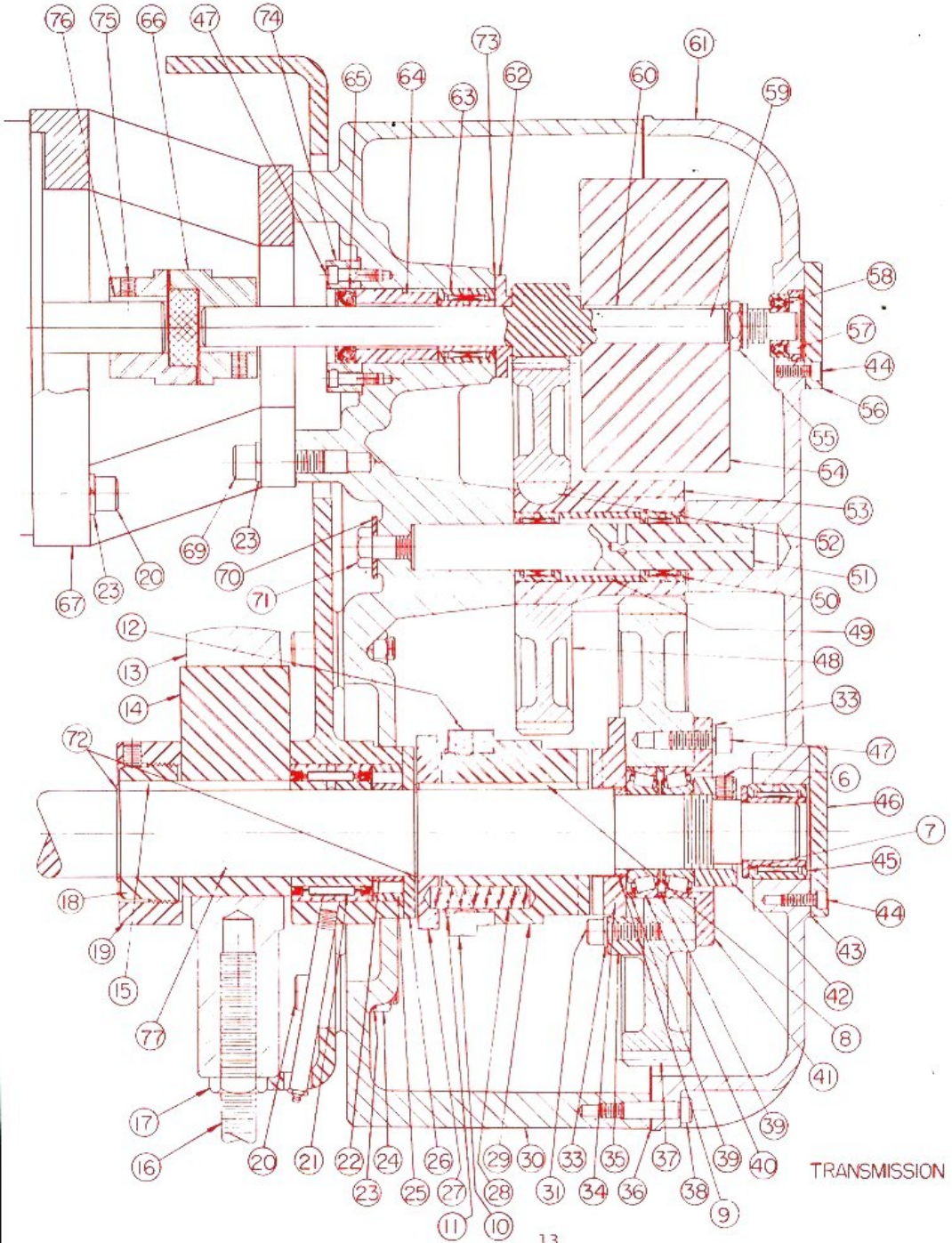
It is very important to keep a gap of not more than 1/32" between the cap screw (Item 150) and the stop block.



INTERMITTENT STYLE BRAKE

KEY	PART NAME	NUMBER
135	Washer	9228-1210
136	Brake hsg bushing	1472-120-03
137	Soc hd cap screw - 1/2-13 x 4	9132-4020
138	Brake hsg - upper half	1472-120-01
139	Roll pin - 1/4 x 1	9238-2450
140	Brake lining	1472-128
141	Key - 1/2x1/2x2-1/4	9001-2190
142	Soc hd set screw - #10-24 x 1/2	9162-1660
144	Brake cam	1472-196
145	Brake collar	1472-192
146	Stud	1273-124
147	Jam nut	9223-2190
	Brake Inst. Plate (not shown)	1472-130

KEY	PART NAME	NUMBER
148	Spring	1273-078
149	Sq hd set screw - 3/8-16 x 1-1/2	9144-3470
150	Sq hd set screw - 3/8-16 x 2	9144-3490
151	Brake hsg - lower half	1472-120-02
152	Soc hd set screw - 1/4-20 x 3/8	9162-2400
153	Lifting pin	1472-195
154	Lever arm	1472-123
155	Hex hd cap screw - 1/2-13 x 2-1/4	9126-3950
156	Lever arm bushing	1472-194
157	Roller bearing	9451-0070
158	Soc set screw - dog pt	9170-3410
	Grease slinger (not shown)	1472-197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TRANSMISSION PARTS

KEY	PART NAME	PART NUMBER
6	Nyloc set screw	9173-3410
7	Shaft end brg spacer	1272-060
8	Clutch housing key	56-121
9	Driving jaw spacer	1272-061
10	Clutch cam ring	1272-057
11	Retaining ring	9245-6720
12	Soc set screw	9173-3410
13	Eccentric strap assembly	1272-047
14	Eccentric cam	See Below
15	Machine key	9001-2210
16	Connecting rod	1672-025A
17	Jam nut	9223-2240
18	Threaded collar	1672-054
19	Adjusting collar	1672-053
20	Soc head cap screw	9132-3930
21	Drive shaft bearing set	9451-1870
		and 9451-9300
22	Bearing inner spacer	1672-086
23	Lock washer	9228-5210
24	Hex nut	9223-1210
25	Bearing outer spacer	1672-085
26	Drive shaft thrust collar	1672-055
27	Clutch spring collar	1272-058A
28	Clutch spring	50-044B
29	Clutch housing	1272-056B
	Clutch housing "P-Series (19 tooth)"	1272-056C
30	Gear case	1672-090
31	Soc head cap screw	9133-3460
33	Lockwasher	9228-5190
34	Clutch driving jaw	1272-119
	Clutch driving jaw "P-Series(19 tooth)"	1272-119C
35	Clutch driving jaw key	59-122
36	Gear case cover gasket	1672-103
37	Drive shaft gear	1672-050
38	Stripper bolt	9174-3460
39	Drive gear bearing spacer	1672-056
40	Drive gear bearing set	9452-1620
		and 9452-9280
41	Drive shaft bearing cap	1672-051
42	Bearing adjusting collar	1672-064
43	Drive shaft end cap gasket	1672-067
44	Soc head cap screw	9132-2430
45	Drive shaft end bearing	9451-1250
		and 9451-9210
46	Drive shaft end cap	1672-066
47	Soc head cap screw	9132-3450
48	Intermediate gear	1672-070
49	Intermediate gear bearing spacer	1672-073
50	Intermediate gear bearing	9451-9150

TRANSMISSION PARTS CONTINUED

51	Intermediate gear bearing	1672-071
52	Woodruff key	9240-3210
53	Intermediate pinion	1672-069
54	Flywheel	See Below
55	Locknut	9226-4950
56	Flywheel shaft end cap	1672-087
57	Flywheel bearing spacer	See Below
58	Flywheel shaft end bearing	See Below
59	Flywheel shaft	See Below
60	Flywheel machine key	9001-1250
61	Gear case cover	See Below
62	Flywheel pinion spacer	1672-080
63	Flywheel bearing set	9451-0870 and 9451-9160
64	Flywheel bearing retainer	1272-082A
65	Flywheel bearing seal	9455-0200
66	Flexible coupling	1272-097
67	Motor base	1272-089A
69	Soc head cap screw	9132-3960
70	Flat washer	9228-1210
71	Hex head cap screw	9126-3920
72	Drive shaft snap ring	9245-5480
73	Thrust washer	1272-084
74	Seal retainer	1272-083
75	Nyloc set screw	9173-3150
76	Machine key	9001-0990

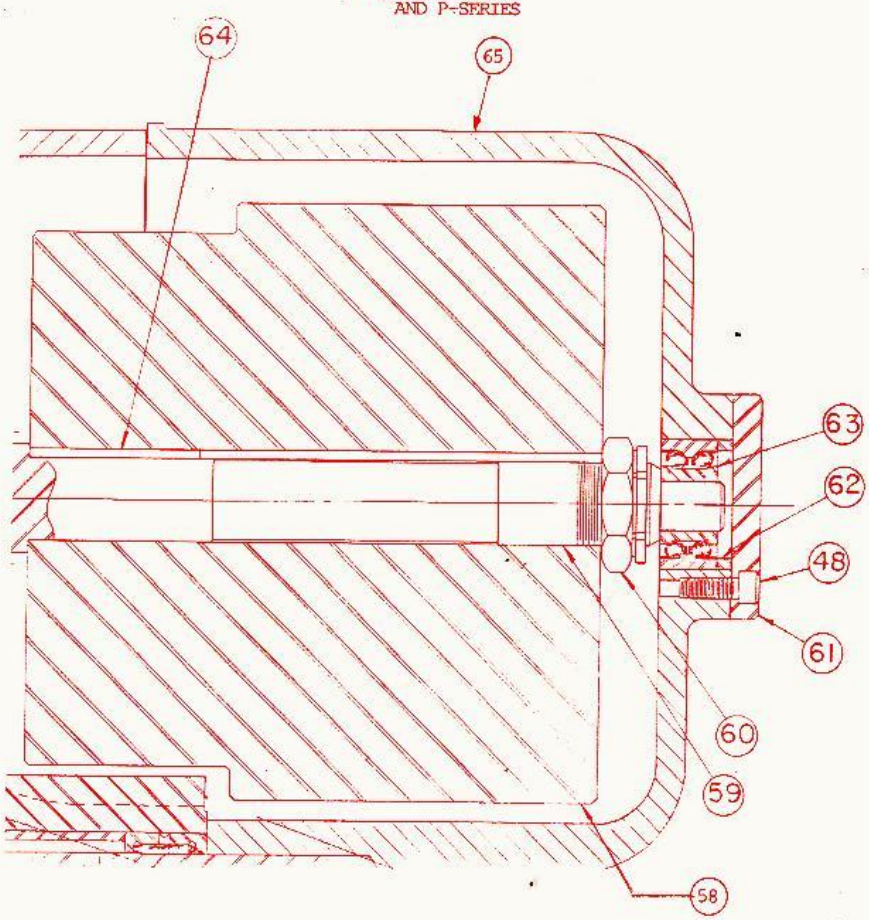
KEY	PART NAME	1224	1436	1442	1452
14	Ecc cam	1224-046	1652-046	1652-046	1652-046
		P-1224	P-1436	P-1442	P-1452
14	Ecc cam "P-Series"	1460-046	1460-046	1460-046	1460-046
54	Flywheel	1672-077A	1672-077A	1672-077A	1672-077A
57	Flywheel brg spacer	1272-079	1272-079	1272-079	1272-079
58	Flywheel shaft end bearing	9450-0620	0450-0620	9450-0620	9450-0620
59	Flywheel shaft	1672-078B	1672-078B	1672-078B	1672-078B
61	Gear case cover	1672-091	1672-091	1672-091	1672-091
77	Drive shaft	1224-044A	1436-044A	1442-044A	1652-044A

TRANSMISSION PARTS CONTINUED

KEY	PART NAME	1460	1472
14	Ecc cam	1460-046	1672-046
		P-1460	P-1472
14	Ecc cam P-Series"	1672-046	1696-046
54	Flywheel	1272-077	1272-077
57	Flywheel brg spacer	1272-079	1272-079
58	Flywheel shaft end bearing	9450-0680	9450-0680
59	Flywheel shaft	1272-078B	1272-078B
61	Gear case cover	1272-091A	1272-091A
77	Drive shaft	1460-044A	1672-044A

TRANSMISSION (FLYWHEEL SECTION)

FOR 1460 & 1472
AND P-SERIES



KEY	PART NAME	PART NUMBER
48	Soc Head Cap Sc	9132-2430
58	Flywheel	1272-077
59	Flywheel Shaft	1272-073B
60	Locknut	9226-4950
61	Flywheel shaft end cap	1672-082
62	Bearing spacer	1272-079
63	Flywheel shaft end bearing	9450-0680
64	Flywheel machine key	9001-1250
65	Gear case cover	1272-091A

CLUTCH ADJUSTMENT

The clutch setting has been set at the factory for the proper disengaging point. However, should you have to install a new clutch, the following steps should be followed:

1. Bring and hold the crosshead at top-dead-center.
2. Align the register "dot hole" on the clutch housing (Item 31) with the register "dot hole" on the clutch cam ring (Item 5) as in the old clutch you took out.
3. Block the solenoid plunger up and slip clutch onto the drive shaft, making sure the springs (Item 28) align in their seats and the clutch slides freely on the shaft. When installing the clutch the locking set screws should be at the left side facing the clutch jaws as shown.
4. Let the solenoid plunger down so that it will hold the clutch housing in place (disengaged). Install the drive gear and lock in place.
5. Through the side access opening you can now check the tooth gap with a feeler gage. When crosshead is at top-dead-center, the tooth gap should be between .035" and .045".

After the gear case is completely reassembled, you can power and actuate the shear a few times while observing the keyway slot at the brake end of the drive shaft.

The drive shaft keyway should stop approximately 13° past top-dead-center. See below. At this time, after you turn all

Clutch Adjustment (continued)

power off, recheck the clutch tooth gap with a feeler gage. The tooth gap should not be less than .030" to .032".

If the tooth gap is less than .030" or if the clutch chatters, first re-adjust the brake. Too much brake tension won't let the crosshead reach top-dead-center and the clutch is only partly disengaged.

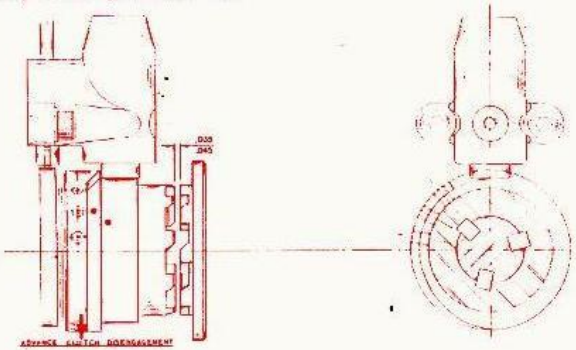
If clutch chatter persists, check for lack of lubrication of the crosshead gibs and eccentric cams. At the same time make sure the crosshead gibs are adjusted properly (page 3, section B).

After the above are checked and/or adjusted and the clutch chatter still persists or the tooth gap is less than .030", THEN AND ONLY THEN you should attempt to retard the disengaging point of the clutch, through the access opening on the gear case. (See illustration for proper cam direction.)

IMPORTANT: The clutch cam should be moved only a couple of degrees (1/16") in any direction, and the shear should be tried out again.

MAKE SURE YOU KNOW THE POINT YOU ARE STARTING FROM BEFORE LOOSENING AND MOVING THE CLUTCH CAM.

With the proper clutch tooth setting, the shear should stop at top-dead-center with minimum brake pressure.



CLUTCH ADJUSTMENT

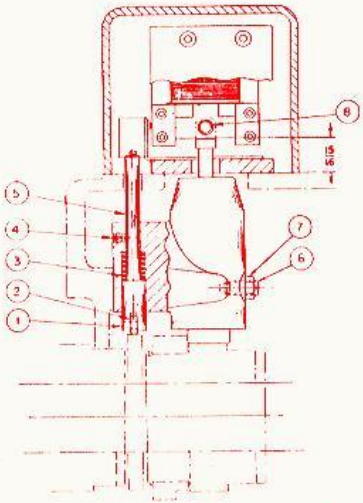
SOLENOID ASSEMBLY

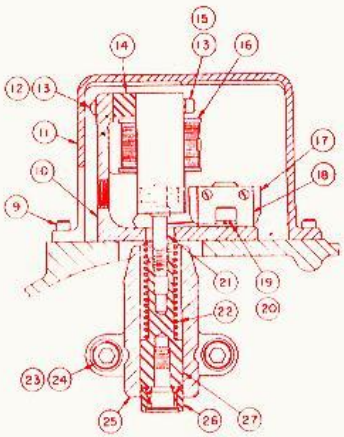
When installing a new solenoid coil make sure:

1. That the end bearing is sitting all the way down on the clutch.
2. That the set screw is tightened to prevent engaging pin from rotating.

Solenoid Assembly (continued)

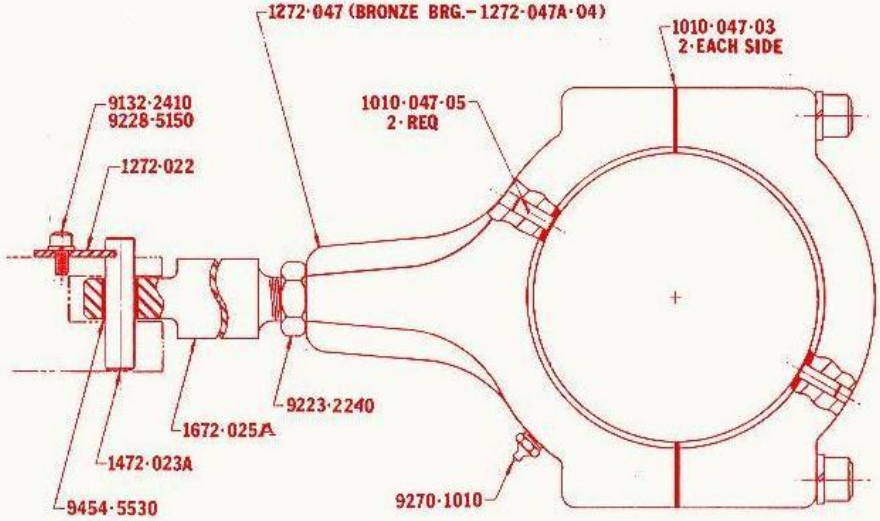
3. Adjust the solenoid linkage rod accordingly, so that when the solenoid plunger and the linkage rod are pinned, the distance between the machined surface on the gear case and the bottom of the solenoid plunger is no less than 15/16".



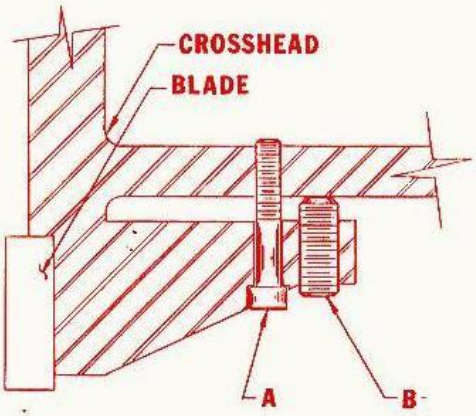


SOLENOID ASSEMBLY

KEY	PART NAME	NUMBER
1	Follower bearing shaft	1672-049
2	Follower bearing	9450-0180
3	Limit switch plunger spring	1672-119
4	Soc set screw	9170-2400
5	Limit switch plunger	1672-048
6	Soc set screw	9170-3460
7	Jam nut - 3/8	9223-2190
8	Solenoid linkage pin	9238-3460
9	Soc hd cap screw - 1/4-20 x 1	9132-2450
10	Clutch solenoid base	1672-092
11	Clutch solenoid cover	1672-093
12	Bt hd cap screw - 1/4-20 x 1	9136-2450
13	Lockwasher - 1/4	9228-5150
14	Solenoid mounting spacer	1672-094
15	Soc hd cap screw - 1/4-20 x 1-3/4	9132-2480
16	Solenoid	9503-5040
17	Limit switch	9503-4060
18	Limit switch bracket	1672-132
19	Lockwasher - 3/8	9228-5190
20	Soc hd cap screw - 3/8-16 x 1	9132-3450
21	Solenoid linkage rod	1672-100
22	Clutch engaging pin spring	59-101
23	Lockwasher - 1/2	9228-5210
24	Soc hd cap screw - 1/2-13 x 1	9132-3900
25	Clutch engaging pin housing	1672-104
26	Engaging pin end brg	9451-0080
27	Clutch engaging pin	59-099A

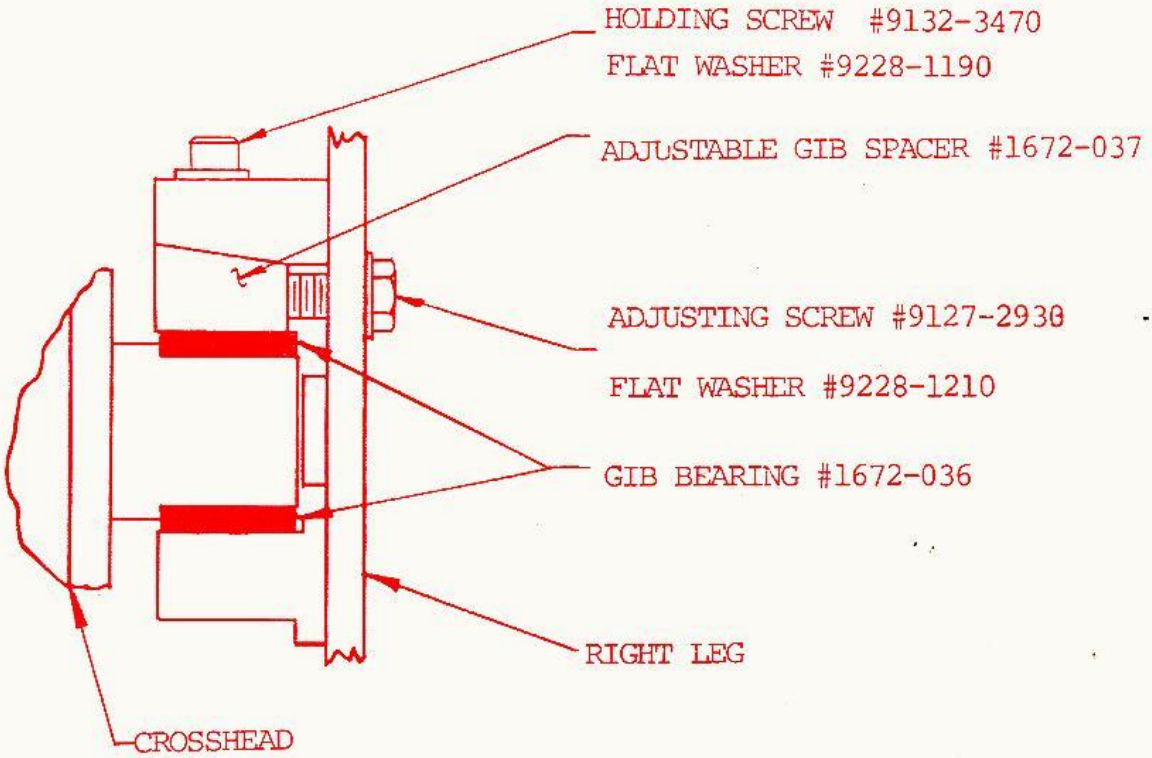


ECCENTRIC STRAP



REF PAGE _____

ITEM	1224	1436	1442	1452	1460	1472
A		9132-3490	9132-3490	9132-3490	9132-3490	9132-3960
B		1272-002-10	1272-002-10	1272-002-10	1272-002-10	1010-133


HOLDING SCREW #9132-3470
FLAT WASHER #9228-1190
ADJUSTABLE GIB SPACER #1672-037
ADJUSTING SCREW #9127-2930
FLAT WASHER #9228-1210
GIB BEARING #1672-036
RIGHT LEG
CROSSHEAD

INSPECTIONS

Should it become necessary to repair or replace any of the larger shear components, proper handling equipment must be provided. Most shear parts are quite heavy by nature and, as such, must be considered potentially dangerous to handle. Only the best type of handling equipment should be used, but it should be checked first to make cetain that the load to be applied will not exceed capacity of the equipment or cause it to become unstable. The condition of lifting cables, chains, ropes, slings and hooks should be carefully checked and tested to make sure that they will sustain the loads safely.

When it is not possible to perform maintenance or repair work on shears from floor level, a good solid work plateform, portable scaffolding lashed to the shear, or hydraulic elevator platform should be used. The work platform should provide good footing for workers, plus adequate space for tools and parts. Avoid working from ladders for climbing on shears to perform maintenance work - this practice is NOT safe.

There is an increasing amount of electrical equipment used in the control and operation of shears. An important point to remember is that all noncurrent-carring parts of electrical apparatus, the enclosures for electrical components, and the SHEAR FRAME must be permanently grounded. Make certain that electrical panels and shear frame are properly connected to earth ground with an electrical conductor which is sized to comply with recognized codes. Installation should be in accordance with the National Electrical Code and/or local codes.

Any maintenance personnel engaged in the removal, replacement, or adjustment of parts on a shear should exercise due care to assure his own safety and that of other persons in the plant. Personnel should make certain that, before any parts are removed, all spring, air and hydraulic pressures (where applicable) have been turned off at the shear and that all pressures are bled from system components. Electrical power should also be disconnected, disconnect switch locked OFF, and WARNING tags attached to the shear disconnect switch and air shutoff valve (where applicable).

After all repairs and maintenance have been completed, the repair mechanic should check his work, remove tools, rigging and handling equipment. Power should be restored to the shear only after all personnel are clear of the shear. Then start the shear as noted in the manual and run it for an adequate length of time to determine that all parts, especially the lubrication system and clutch controls, are functioning properly. All guards and applicable safety equipment must be installed fefore turning the shear over to production personnel.

MAINTENANCE CHECK LIST

These intervals are based on average use of one shift operation.

CHECK OR ADJUSTMENT	DAILY	MONTHLY	3 MONTHS	6 MONTHS
1. Check holddowns for proper operation.	X			
2. Check crosshead (ram) stopping point at top of stroke - adjust brake if necessary.	X			
3. Inspect blade for nicks or wear; turn, replace or sharpen if necessary.	X			
4. Drain air filters and/or surge tank of condensate (machines equipped with air-operated equipment)	X			
5. CHECK BLADE BOLTS (If they have not been turned) - tighten if necessary		X		
6. Check blade clearance - adjust if necessary.	X			
7. Check gib adjustment - adjust if necessary.		X		
8. Check machine level and relevel if necesary.		X		
9. Check the entire machine for loose fasteners - Tighten if necessary.		X		
10. Refer to the lubrication chart.	X			
11. Check tightness of main drive belts (where applicable)		X		
12. Check for brake lining ware		X		

ELECTRICALS

Electrical Connection

Unless otherwise specified, power connections are all for 220 volt, 3 phase, 60 hertz operation. Power connections are made to the disconnect switch, (Terminals L1, L2 and L3).

The motor is protected by automatic reset overload relays in the magnetic starter. The solenois, limit switch and control relays operate at the step down of 115 volt.

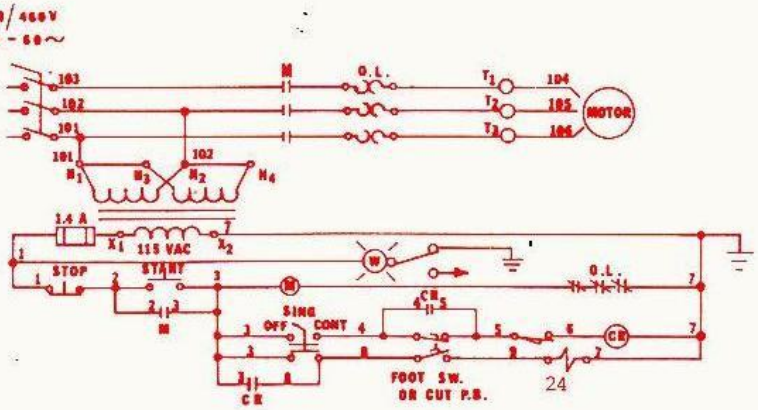
Before making power connections, check to be sure that power caracteristics match the electrical specifications of the machine.

Observe all local electrical codes and provide adequate grounding.

ELECTRICAL COMPONENTS

Part Name.	Part Name
Control box	1472-390
Control box bracket	1472-392
Control box panel	1272-391
Push botton plate	1272-129
Foot switch	9501-4020
Disconnect switch	9501-5010
Motor starter	9502-1040
Control relay	9502-2030
Pilot light	9503-2530
Stop push botton	9503-3280
Start push botton	9503-3221
Selector switch	9503-3311
Transformer .150 KVA (fused)	9503-6051
Terminal block	9504-7010
Fuse 1.6 AMP	9504-8412
Cord multiconductor (1)	9504-9190
Push button control (2)	9503-3220

NOTE; (1) Not used on P-Series
(2) Used on P-Series.



LUBRICATION

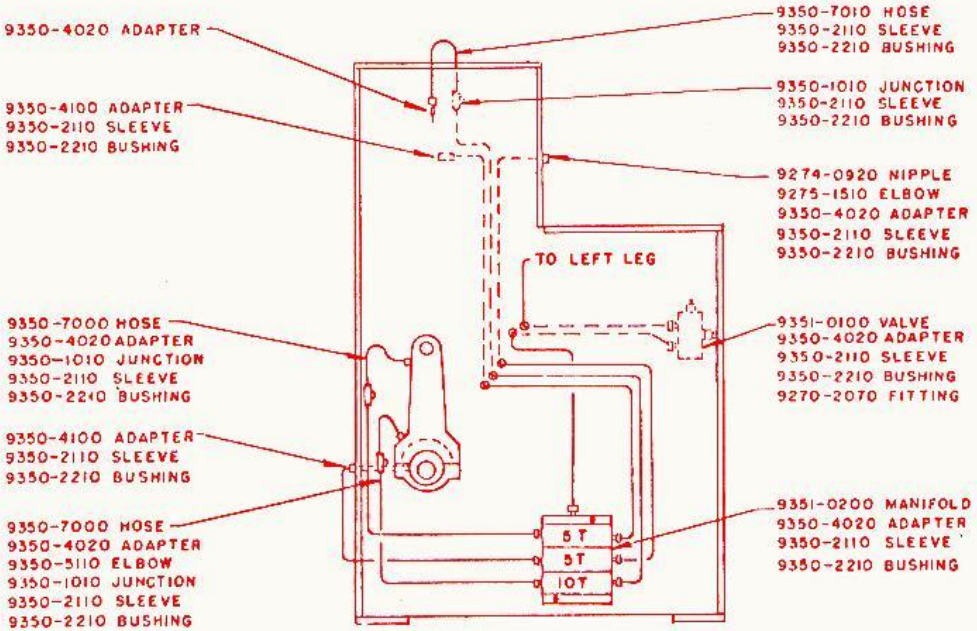
One-Shot Centralized Grease #16-6230

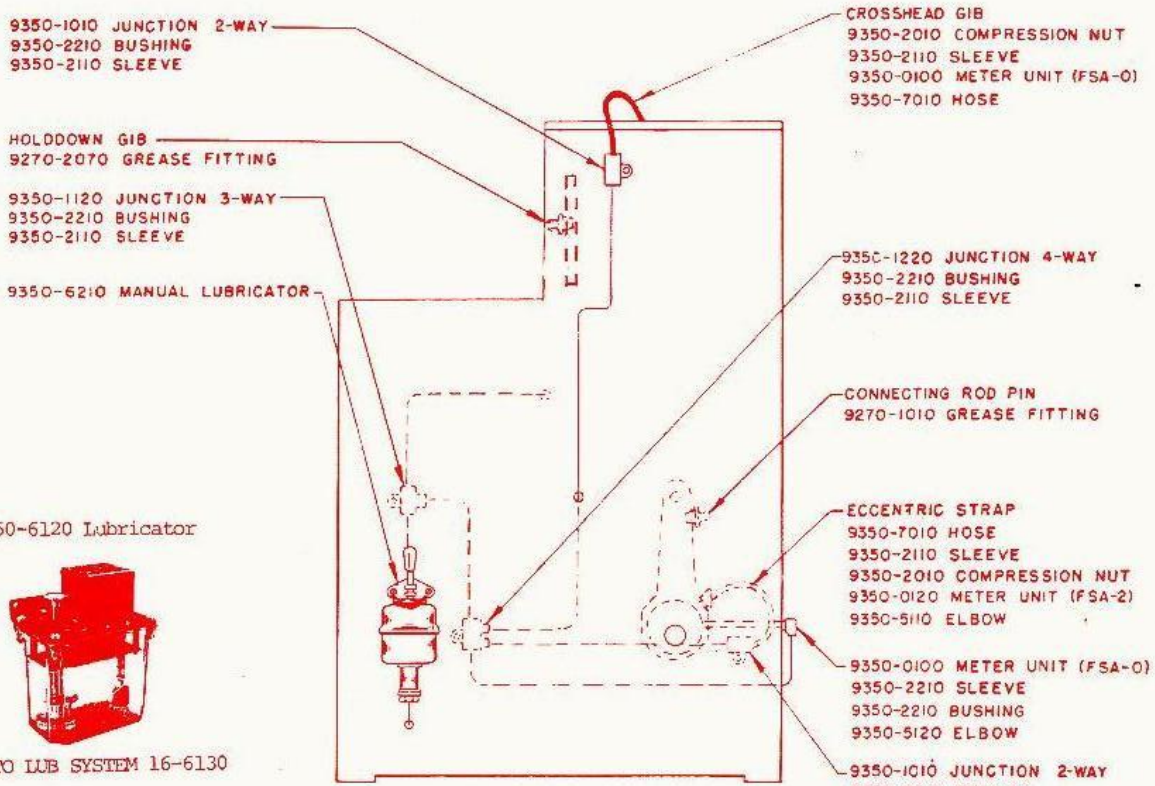
This is a progressive lubricating system, used as standard equipment on all "S" Model machines.

Measuring valve pistons are in each lube line. Each piston must operate positively forcing a full measured shot of grease into the bearing line, before the main flow operates the next piston in sequence.

Since each piston must complete its stroke before grease can flow to the next piston, it is apparent that you should NEVER block any lube points. Do not "pinch" any lube lines. Repair blockage immediately! Excessive pressure at the grease gun handle indicates a blocked condition. You must trace and clear the blockage before you operate the machine.

Use one shot of Mobilux Grease #1 twice per eight (8) hour shift, for normal operations.





9350-6120 Lubricator

AUTO LUB SYSTEM 16-6130

—OPTIONAL—
BIJUR ONE-SHOT CILING SYSTEM 16-6030

LUBRICATION SCHEDULE	LUBRICANT	DAILY	WEEKLY	MONTHLY	SIX MONTHS	ANNUALLY
1. Check and lubricate eccentric strap bearings	Amoco Grease #2	X				
2. Lubricate crosshead gib bearings	Amoco Grease #2	X				
3. Lubricate driveshaft, leg, bearings	Amoco Grease #2	X				
4. Lubricate connecting rod pins	Amoco Grease #2		X			
5. Lubricate holddown ways (except "W" series)	Amoco Grease #2	X				
6. Lubricate back gage ways and lead screw nut	Amoco Grease #2		X			
7. Lubricate flywheel bearings (W, PC, B, M series)	Amoco Grease #2			X		
8. Transmission - check oil level		X				
- empty clean & refill	S-series Amoco perma gear EP 320					X
	W-series Amoco cylinder oil #460					X
9. Empty, clean & refill power back gage gear motor (optional equip)	Transmission oil					X
10. Check air pressure, air line lubricator oil level - add if necessary		X				
drain air line filter (when air equip is used)		X				
11. For centralized "one-shot grease systems"	Amoco Grease #2	2X				
check for pinched or broken grease lines			X			
12. For "one-shot" and "automatic" oiling systems	Excel wayoil 68					
check oil reservoir - add oil if necessary		X				
check for broken or pinched lines			X			
check for blocked oil meters		X				
check for broken linkage			X			
empty; clean; change filter and refill reservoir					X	

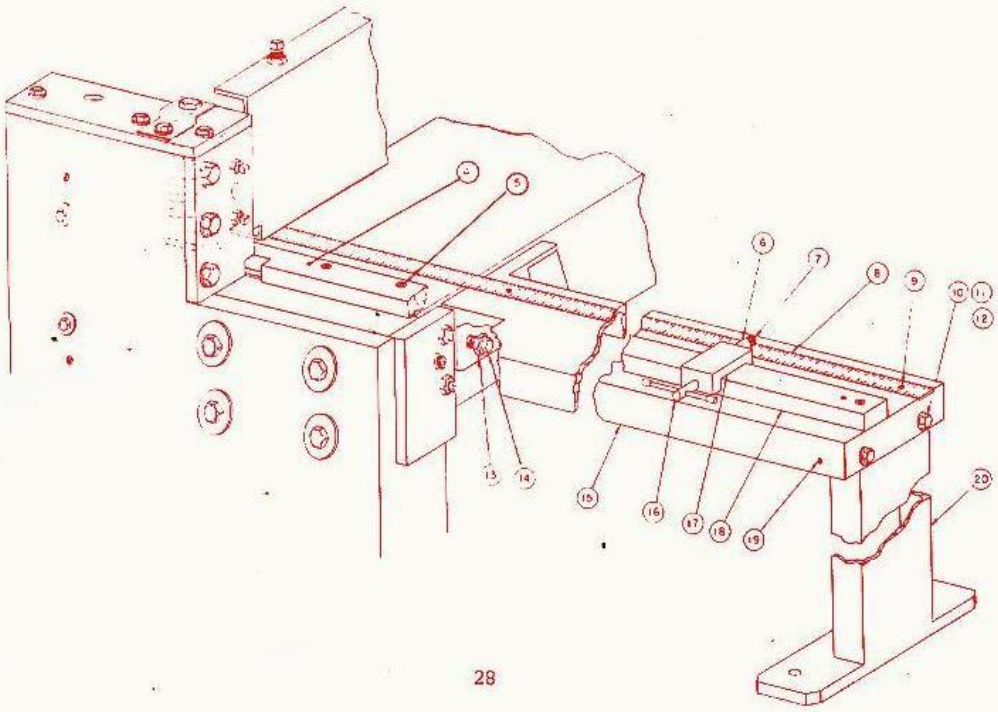
NOTE: Intervals are based on average use of one shift operation.

FRONT SQUARING GAGE
(OPTIONAL)

KEY	PART NAME	PART NUMBER	KEY	PART NAME	PART NUMBER
4	Roll Pin	9238-3220	11	Lock Washer	9228-5190
5	Soc Head Cap Screw	9132-3450	12	Hex Nut	9223-1190
6	Latch	1272-147	13	Adj. Bushing	1272-140
7	Stripper Bolt	9174-3900	14	Hex Head Cap Screw	9126-3530
8	Scale 6 Ft (for 16-4061)	9615-4660	15	Bed (For 16-4061)	1272-141A
				Bed (For 16-4080)	1272-168
	Scale 8 Ft (for 16-4080)	9615-4665		Bed (For 16-4090)	1272-134
			16	Lock Handle	1272-149
	Scale 10 Ft (for 16-4090)	9615-4685	17	Gage Block	1272-146A
			18	Guide (For 16-4061)	1272-144A
9	Not Used			Guide (For 16-4080)	1272-144A (1)
10	Hex Nut	9126-3450		Guide (For 16-4090)	1272-144A (2)
			19	Soc Set Screw	9162-3800
			20	Leg	1272-148A

6 Ft Front Squaring Gage - Assembly #16-4061
8 Ft Front Squaring Gage - Assembly #16-4080
10 Ft Front Squaring Gage - Assembly #16-4090

Note: (1) Also requires - Short Guide 1010-256
(2) Also requires - Short Guide 1010-255



PARTS NOT ILLUSTRATED

COMMON PARTS

PART NAME	PART NUMBER	PART NAME	PART NUMBER
RIGHT LEG	1672-003	GIB SPACER SHIM	1672-038
HOLDDOWN BAR GIB	1672-007A	MOTOR	9500-8280
ECCENTRIC CAM KEY	9001-2190	OIL LEVEL GAGE	9350-6420
DRIVE SHAFT COLLAR	1672-043	BED SCALE - LEFT (1)	1272-200L
GEAR CASE MTG SLEEVE	1672-114	BED SCALE - RIGHT (1)	1272-200R
GEAR CASE SIDE COVER	1272-092	ECC STRAP GUARD -R	1472-200
SIDE COVER GASKET	1272-093	ECC STRAP GUARD -L	1472-201

NOTE (1) NOT USED ON "P-SERIES"

PART NAME	1224	1436	1442	1452	1460	1472
CROSSHEAD	1224-002A	1436-002B	1442-002B	1452-002	1460-002A	1472-002
FRONT SKIRT	1224-111	1436-111	1442-111	1252-111	1460-111	1272-111
REAR SKIRT	1224-112	1436-112	1442-112	1652-112	1460-112	1672-112
BLADE BOLT	9188-3470	9188-3470	9188-3470	9188-3470	9188-3470	9188-3940
BLADE SHIM	1224-035	1436-035	1442-035	1652-035	1460-035	1672-035
FINGER GUARD	1224-026	1436-026	1442-026	1452-026	1460-026	1472-026
FINGER GUARD "P-SERIES"	1225-026	1437-026	1443-026	1453-026	1461-026	1473-026

RECOMMENDED SPARE PARTS

PART NAME	PART NUMBER	PART NAME	PART NUMBER
BRAKE LINING	1472-128	BLADE	SHEAR-029
GEAR CASE COVER GASKET	1672-103	SPIDER INSERT	1272-097-01
END CAP GASKET	1672-067	CLUTCH HOUSING	1272-056B
CAM FOLLOWER BEARING	9451-0080	CLUTCH HOUSING"P-SERIES"	1272-056C
SPRING	59-101	CLUTCH DRIVING JAW	1272-119
SOLENOID LINKAGE PIN	1672-100	CLUTCH DRIVING JAW "P-SERIES"	1272-119C
LIMIT SWITCH	9503-4060	ECCENTRIC STRAP BRG	1272-047A-04
SOLENOID COIL	9503-5041-110	SPHERICAL BEARING	9450-5110
CONNECTING ROD PIN	1272-023A	CONNECTING ROD	1672-025A

POSSIBLE PROBLEMS AND THEIR CAUSES
"S" SERIES

1. Crosshead stopping short of top-dead-center and/or clutch chattering.

   a) Not enough lubrication - see lube instructions.
   b) Brake too tight - see brake adjustment.
   c) Overloading conditions - stay within shear capacity.
   d) Excessive clutch gap - clutch disengages too soon - see clutch adjustment.
   e) Eccentric straps too tight.

2. Crosshead overtraveling past top-dead-center.

   a) Loose brake - see brake adjustment.
   b) Oil on brake lining - clean lining with non-flammable liquid, roughen with sandpaper.
   c) Not enough clutch gap - see gib adjustment.
   d) Loose gibs - see gib adjustment.

3. Crosshead stops at bottom of stroke.

   a) Loose brake - crosshead comes down under its own weight and clutch is disengaged at this point - see brake adjustment.
   b) Loose crosshead gibs - see gib adjustment.
   c) Clutch disengages prematurely - excessive gap - see clutch adjustment.
   d) Limit switch set to disengage prematurely - re-set limit switch arm.

4. Motor running - shear does not actuate.

   a) Loose motor coupling - repair or replace coupling.
   b) Clutch relay is not pulled in.
   c) Clutch solenoid not actuating - weak solenoid coil.
   d) Broken clutch engaging pin - replace pin.

5. Burr on sheared edge.

   a) Dull blades - sharpen - see blade adjustment.
   b) Improper blade clearance - see blade adjustment.
   c) Crosshead loose in gibways - see gib adjustment.

6. Kick-back of stock.

   a) Not enough holddown pressure - see holddown adjustment.
   b) Dull blades - sharpen - see blade adjustment.

7. Shear runs continuously - does not single stroke.

   a) Limit switch actuating leaf improperly - reset limit switch.
   b) Limit switch actuating pin lodged in the housing or broken - open gear case and replace pin.
   c) Short in the wiring system, thus clutch solenoid and/or clutch relay stay energized.
   d) Selector switch set for continuous operation - reset into single mode.
   e) Broken engaging pin end bearing - open gear case and replace bearing.
   f) Loose drive gear nut.
   g) Loose clutch cam ring - reset per drawing.

8. Back gage not holding size.

   a) Lead screw backlash.
   b) Back gage bar not zeroed in.
   c) Improper set-up procedure.
   d) Loose crosshead gibs.
   e) Dial and/or pointer not zeroed in.

Material comparison

Equivalent capacity of FAMCO shears for materials other than mild steel.

Mild Steel Gauge 50,000 PSI Shear Strength	3/8	1/4	3/16	10 .135	12 .105	14 .075	16 .060	18 .048	20 .036
Stainless Steel									
Type 302 Annealed	.312	.200	.141	.109	.078	.063	.050	.038	.031
Type 302 Cold Worked	.250	.187	.109	.078	.063	.044	.038	.025	.018
Silicone Steel	.350	.210	.166	.120	.075	.060	.048	.036	.030
SAE 1050 Cold Rolled	.350	.210	.135	.105	.075	.060	.048	.036	.030
Aluminum									
1100-0	.500	.375	.313	.250	.190	.125	.100	.090	.063
110-H14	.500	.375	.250	.190	.160	.125	.100	.090	.063
1100-H18	.625	.500	.250	.190	.160	.100	.090	.080	.063
3003-0	.750	.375	.313	.190	.160	.125	.100	.080	.063
3003-H14	.625	.500	.250	.190	.160	.100	.090	.080	.063
3003-H18	.625	.500	.250	.190	.160	.100	.090	.080	.063
5005-H14	.625	.500	.250	.190	.160	.100	.090	.080	.063
5052-0	.625	.500	.250	.190	.125	.100	.080	.063	.050
5052-H34	.625	.500	.250	.160	.125	.100	.080	.063	.050
5052-H38	.625	.450	.190	.160	.125	.100	.080	.063	.050
2024-0	.625	.500	.250	.190	.125	.100	.080	.063	.050
2024-T3	.625	.450	.190	.160	.125	.090	.071	.063	.050
6061-0	.625	.500	.250	.190	.160	.125	.100	.090	.063
6061-T4	.625	.450	.190	.160	.125	.100	.080	.063	.050
6061-T6	.625	.450	.190	.160	.125	.100	.080	.063	.050
7075-0	.625	.500	.250	.160	.125	.100	.080	.063	.050
7075-T6	.625	.450	.190	.125	.100	.080	.063	.050	.040
Brass–Yellow 65%–35%									
Soft	.450	.290	.229	.169	.129	.091	.072	.064	.051
1/2 Hard	.375	.250	.187	.144	.114	.081	.064	.051	.036
Hard	.375	.250	.187	.129	.102	.072	.064	.051	.036
Bronze, Phosphor									
Annealed	.375	.250	.204	.144	.114	.081	.064	.051	.040
Spring Temper	.312	.210	.162	.114	.091	.064	.051	.041	.032
Copper									
Soft	.450	.290	.229	.162	.129	.091	.072	.064	.051
Hard	.375	.250	.204	.144	.114	.081	.064	.051	.040
Gold–Soft 14 Carat	—	—	.200	.140	.110	.080	.060	.050	.040
Silver–1/2 Hard Sterling	—	—	.200	.140	.110	.080	.060	.050	.040
Plastics–ABS Compounds	1.00	.875	.560	.500	.375	.250	.200	.150	.120

Famco machine division

– MANUFACTURERS OF: FAMCO/GORTON-LARS PRODUCTS –

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GORTON LARS

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