SCHWINN # 788

Verson

(1) No. 110 O. B. G. Press

Verson Serial No. 20004

VERSON ALLSTEEL PRESS COMPANY

9300 S. KENWOOD AVE.
CHICAGO 19, ILLINOIS

8300 S. CENTRAL EXPRESSWAY
DALLAS, TEXAS

Belts 5V1400 X3

Verson

MACHINE MAINTENANCE MANUAL

FOR SERIAL NUMBER 20004

WHEN ORDERING REPAIR PARTS REFER TO PARTS DRAWINGS ENCLOSED. YOUR ORDER SHOULD GIVE PART NUMBER, DRAWING NUMBER, AND SERIAL NUMBER OF MACHINE.

LS 3108

VERSON ALLSTEEL PRESS COMPANY

1355 East 93rd Street

Chicago 19, Illinois

"CAUTION"

The points and suggestions set forth herein are not intended to be complete or specific and are not to be relied upon exclusively.

Providing safe working conditions and safety devices are the sole responsibility of the user.

A powerful machine can be potentially dangerous to its operators and other personnel. The operation and maintenance of all equipment furnished by Verson Allsteel Press Company should be clearly understood. Besides exercising standard safety practices, operators and maintenance personnel should be specifically instructed on proper operation of all such equipment. Machines must not be operated by accident prone individuals.

SAFETY RULES

Persons responsible for safety in the area in which the machines are placed must diligently enact and enforce safety rules and laws. As a guide for enacting your own safety rules for machine operation, the list below will be additionally helpful. Dependent upon the particular piece of equipment used, some of the items mentioned may not apply or may be expanded to include other necessary items.

Unsafe conditions or situations, especially those which arise because of the nature of the work being performed, are the responsibility of the user to correct. It is suggested that such conditions be brought to the attention of the manufacturer for a solution.

SAFETY LITERATURE

Literature specifically oriented to various classes of machinery and machine components, as related to safety practices and techniques, are available from several organizations. These organizations do not have any invested authority, but serve in an advisory capacity only. They may also be able to advise you of additional sources.

National Safety Council
Local Safety Council
American Standards Association
National Machine Tool Builders Association
Association of Casualty and Surety Companies

Government departments can also be sources of information, such as the United States Department of Labor and the State Department of Labor.

HOUSEKEEPING

The operator working area and areas adjacent to the die space must be maintained in an uncluttered condition to prevent accidental loss of footing, exposing personnel to danger. All hazards must be removed by the user.

The user has the responsibility of eliminating and cleaning up all oil leakages that represent a hazard to the operator or other personnel at or near the operating area, or other places hazardous to maintenance personnel.

Oil leakages occurring from worn packings, loose fittings, ruptured seals and/or any other oil leakage must be repaired by the user.

MAINTENANCE

Proper maintenance is necessary for proper functioning of the machine. Such maintenance contributes a large measure to safe machine operation and is the sole responsibility of the user. Upon request, the service facilities of the Verson Allsteel Press Company are available for assistance in such maintenance.

GUARDS AND SAFETY DEVICES

Safety standards may be set by law, union rule or insurance carriers and proper attention must be given to all.

Additional guarding of the die space area and/or safety devices must and should be provided by the user to prevent exposure of operators and others to hazards. All guards must be in place and all safety devices operable when machine is in operation. In addition, it is suggested that the user check local laws and regulations for safety requirements.

DIE SPACE GUARDING

Guarding of the die space is the users responsibility. Die space guarding is the responsibility of the user due to the innumerable combinations of tools, dies, feeds and feeding devices, with which it is possible to equip a machine. The user must furnish as part of his tooling and dies, guards that best satisfy safe operation with the tools and dies being used. Guards should afford maximum operator safety with regard for satisfactorily performing the operation. It should

be kept in mind that poorly applied guards may be hazardous or may increase the hazard. Tools should be designed with safety in mind and in many instances tools should be redesigned for safety. Many manufacturers are equipped to furnish standard or special guards. A list of such manufacturers is included with these instructions.

SAFETY DEVICES

The user must make the determination as to whether to use mechanical safety devices.
Parts and stock feeding, from a safety standpoint, is best accomplished by mechanical means. Suitable feeds generally offer the best protection to an operator since it removes his person from pinchpoints on the press or dies. Where mechanical feeds are considered impractical, whatever the reason might be, the operator must be furnished with suitable handling devices such as tongs, suction cups, etc. Means must be provided for guaranteeing that no portion of the operators person would be exposed to hazard, by furnishing him with pull backs, extractors, etc. The user alone, being most intimately familiar with the operation, must judge as to what is safe and practical.

The following list of manufacturers of guards and devices is not all inclusive and should not in any way be construed as a recommendation or an approval by Verson Allsteel Press Company of their products. We feel that several sources should be contacted for the best possible solution to guards and safety device application.

Manufacturers (as listed in "BEST'S SAFETY MAINTENANCE DIRECTORY" 10th edition. Alfred M. Best, Inc. Post Office Box 600 Morristown, New Jersey	PRESS FEEDS					SUCTION CUP FEEDING TOOL	MAGNETIC FEEDING TOOL	TONG & PLIER TYPE FEEDING TOOL	MISCL. GUARDS	DIE SPACE GUARDS	CONTROLS	PULL BACKS & EXTRACTORS
	DIAL	ROLL	HOPPER	SHUTTLE	SLIDE							
American Actuator Corp.		X			X		X				X	
Press Automation Systems Inc.		X	X	X	X	X	X	X			X	
Benchmaster Mfg. Co.	X	X									X	
Perkins Machine Co.	X	X									X	
Air-Lock Eng. Co.				X								
Cooper Weymouth Inc.		X		X	X				X			
H.E. Dickerman Mfg. Co.		X		X								
Durant Tool Co.		X		X			X		X		X	
Frank W. Egan & Co.		X		X	X							
Magni-Power Co. Inc.		X					X					
F.J. Littel Machine Co.		X				X						

Manufacturers (as listed in "BEST'S SAFETY MAINTENANCE DIRECTORY" 10th edition. Alfred M. Best, Inc. Post Office Box 600 Morristown, New Jersey)	PRESS FEEDS												
	DIAL	ROLL	HOPPER	SHUTTLE	SLIDE	SUCTION CUP FEEDING TOOL	MAGNETIC FEEDING TOOL	TONG & PLIER TYPE FEEDING TOOL	MISCL. GUARDS	DIE SPACE GUARDS	CONTROLS	PULL BACKS & EXTRACTORS
W.I. Martin & Co.						X	X	X	X		X	
Osborn Mfg. Co.						X	X	X				
Searjeant Metal Products Inc.						X	X	X		X	X	
Jess-Power Co. Inc.							X					
Permag Corp.							X					
Ullman Devices Corp.							X					
Atlantic India Rubber Works Inc.						X						
Industria Products Co.						X						
Pendergast Safety Equipment Co.						X						
Magline Inc.								X				
Wolverine Tool Co.								X				
American Allsafe Co. Inc.									X		X	
John Humm Safety Equipment Corp.										X	X	X
Clark Controller Co.											X	
Micro-Switch Div. of Honeywell											X	
Tape Switch Corp. of America											X	
A. Schraeder's Son											X	
Westinghouse Air Brake											X	
Junkin Safety Appliance Co. Inc.										X		
Safeguard Mfg. Co.										X		X
Positive Safety Mfg. Co.												X
A-1 Safety Supply Co. Inc.												X
D & M Guard Co.									X			
Globe Products Corp.									X			
Shur-Safety Mfg. Co.									X			
Wiesman Mfg. Co. Inc.									X			
Luther Mfg. Co. Inc.									X			
Falstrom Co.									X			
Security Control Inc.									X			
Wintriss Controls											X	
Homestead Valve Mfg. Co.											X	
Parker-Hannifin Corp.											X	
Dilley Mfg. Co.									X			
Mine Safety Appliances Co.									X			
Mannis Winch & Steel Co. Inc.									X			
Acme Wire & Iron Works									X			
Kirk & Blum Mfg. Co.									X			

MANUAL CLARIFICATION

If any clarification of the contents of this manual is required, or if any additional information is necessary covering the equipment furnished, it is incumbent upon the user to specifically request whatever additional information he desires.

"CAUTION"

GENERAL MAINTENANCE INSTRUCTIONS (NOT ALL INCLUSIVE)

All fasteners should be kept tight.

All adjustments should be properly made and maintained.

All electrical components including the actuating mechanism of or the drive to the press cam limit switch should be inspected and kept in good working condition.

Adequate lubrication should be provided continuously.

The clutch and brake should be given faithful, periodic inspection and should be kept well adjusted. See special instructions for making adjustment.

The clutch and brake air line lubricator should be kept full and adjusted for maintaining adequate lubrication of the valves and clutch and brake proper. Do not flood. If a mechanically actuated clutch is used, it should be adjusted to prevent "locking in".

The counterbalance cylinders, when provided, should be maintained with the air pressure adjusted to support the full weight of the slide assembly and dies.

When work is being done on either the press, or the dies within the press, the power should be "off" and the flywheel stopped.

When working in the die space area, stop blocks should be placed between the slide and bed.

If work is being done on a pneumatic system, the air reservoir should be bled and the supply line shut off. When recharging system exercise caution. Recharge slowly.

ELECTRICAL

When Machine is not being operated the power must be turned off.

The common modes of operation as determined by the position of the selector switch are "INCH", "ONCE" and "CONTINUOUS".

a. When machine is operated in either "inch" or "once" mode, no more personnel should be near the die space area than the number of operator stations in use.

b. When machine is operated in "continuous" mode, all personnel should be clear of the die space area.

c. For "once" mode, the cam limit switch bridging the "run" push button should be adjusted by the user for maximum delay to prevent the operators from exposing themselves to the closing of the dies by compelling the operators to keep their hands on the "run" push buttons.

d. A foot switch, when provided, should be used only when the operator is out of reach of the die space area. If this is not possible, other safety devices must and should be used.

e. Run buttons are equipped with locks to provide operating flexibility by permitting selection of the number of operator stations and their location, as may be required to suit the operation being performed in the machine. Each operator must be furnished with two functional run buttons.

CLUTCH AND BRAKE AIR VALVES

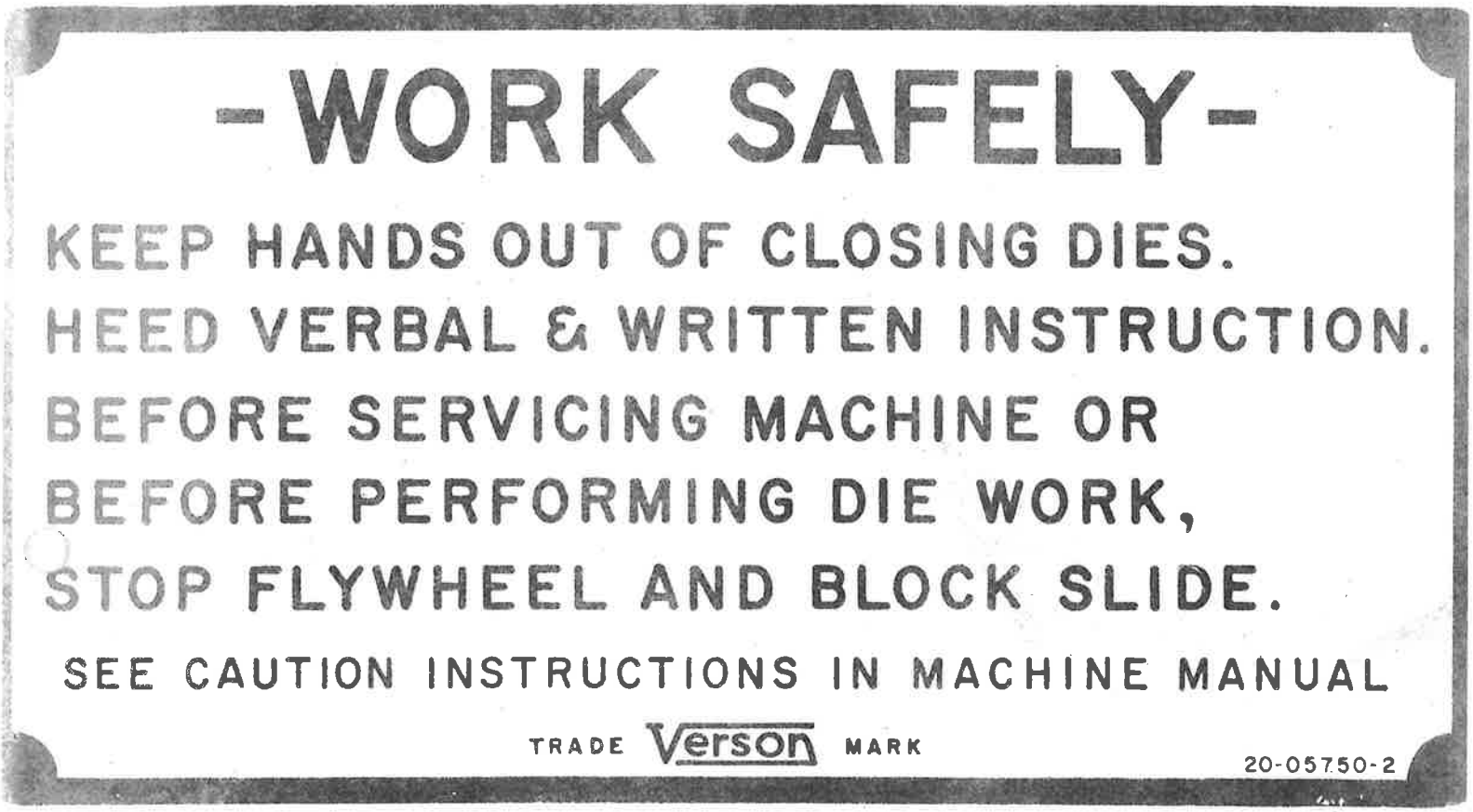
Where valves are used for engagement and disengagement of the machine clutch and brake, maintenance must be particularly good.

Although valves are made to operate for extended periods, they do not have infinite life. Adequate lubrication and cleanliness will aid in obtaining long life. The air which the valve is to control should be clean and free of condensate. Filters and separators should be used where necessary to assure clean dry air.

The valves must be kept in good operating condition to assure continued and normal functioning. This will require periodic maintenance of valves in the form of thorough inspection and rebuilding. Replace complete valve if necessary. Refer to valve manufacturer's bulletins included in manual for additional instructions. If the instruction furnished relative to the maintenance of the valves is not clearly understood, contact the Verson All-steel Press Company or the valve manufacturer, requesting whatever help you require.

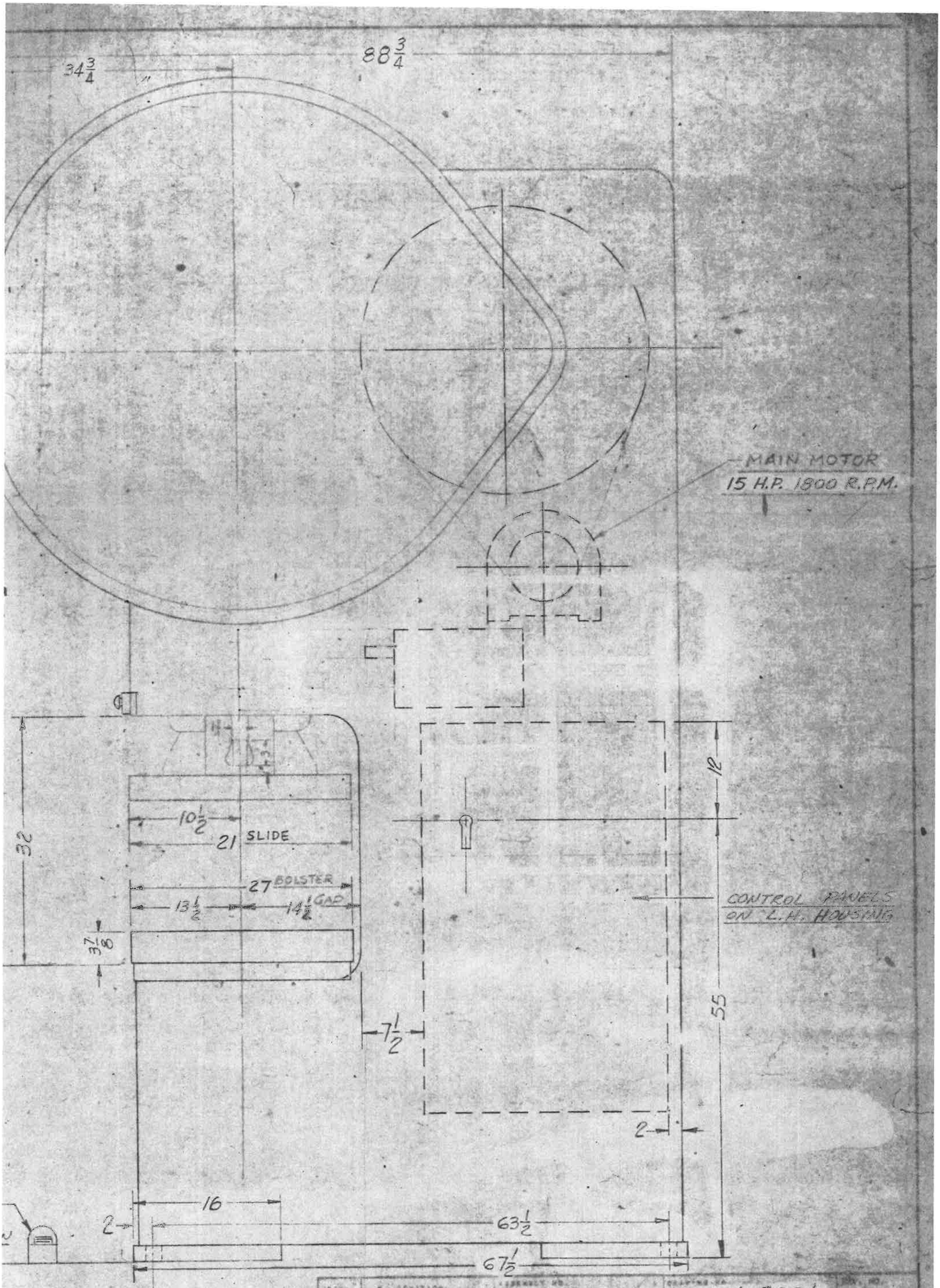
DIE SETTING AND MACHINE OPERATION

Note the "WORK SAFELY" plate on your machine and pay attention to its warning. A full size replica is shown below.



"WORK SAFELY" PLATE PROCUREMENT

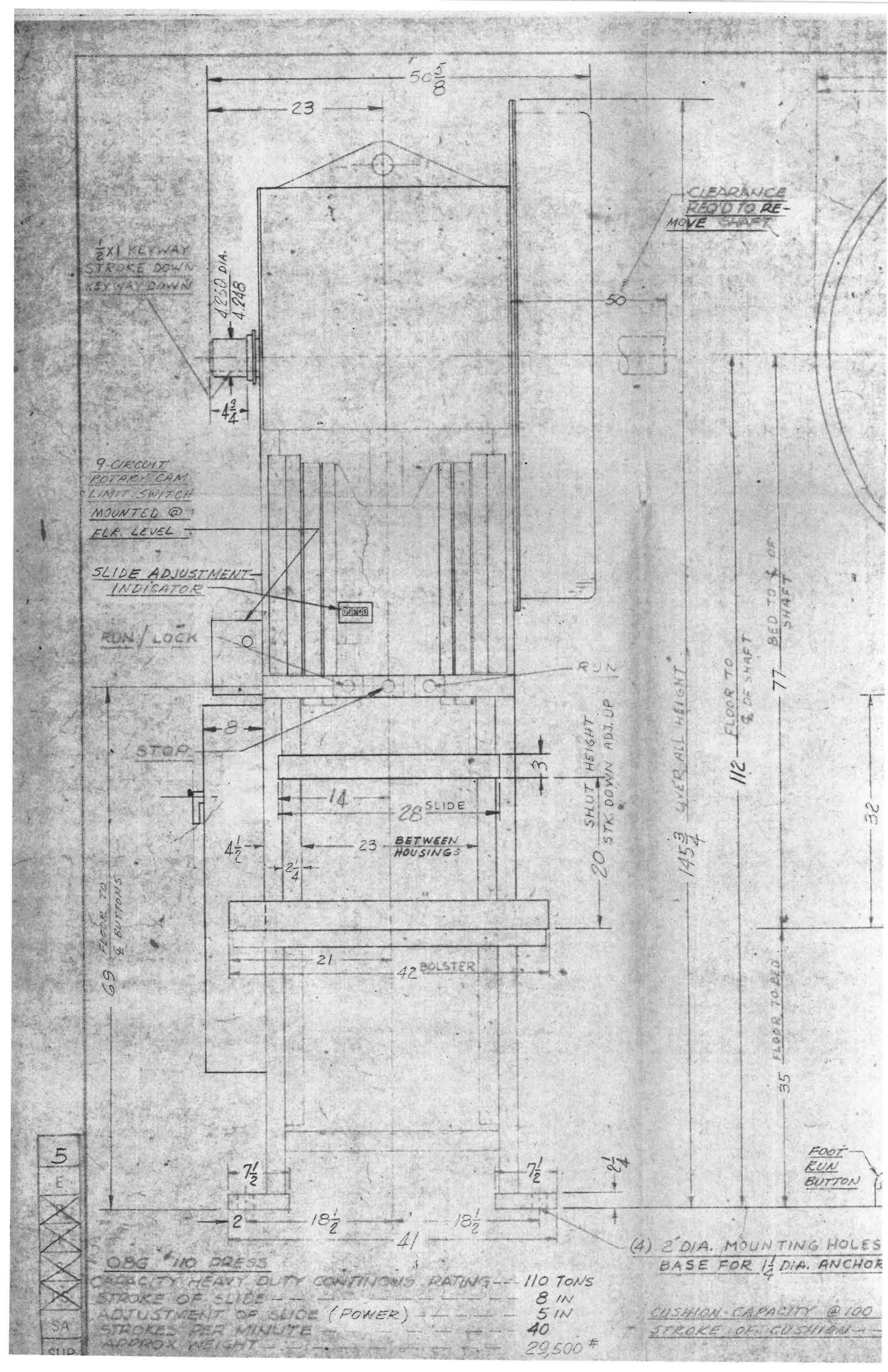
If additional plates are desired for use on other machines where these instructions apply, they are available from Verson Allsteel Press Company at a nominal charge.



LES IN
HOR BOLTS

00 P.S.I. --- 12.7 TONS
---------- 4 INCHES

		ASSEMBLY NO. 80.0	DRAWING NO. 20004-3001
		TRADE Verson PART	DATE 7-6-67
		VERSON ALLSTEEL PRESS CO. CHICAGO, ILL.	SCALE 3/32
		MACHINE #110 O.B.G. PRESS	AGM
		TITLE GENERAL ASSEMBLY	


50 5/8
23
CLEARANCE REQ'D TO REMOVE SHAFT
1/2 X 1 KEYWAY STROKE DOWN KEYWAY DOWN
4.250 DIA. 4.248
4 3/4
9-CIRCUIT ROTARY CAM LIMIT SWITCH MOUNTED @ FLR. LEVEL
SLIDE ADJUSTMENT INDICATOR
RUN / LOCK
STOP
8
14
28 SLIDE
4 1/2
23 BETWEEN HOUSINGS
2 1/4
3
20 SHUT HEIGHT STK. DOWN ADJ. UP
145 3/4 OVER ALL HEIGHT
112 FLOOR TO ℄ OF SHAFT
77 BED TO ℄ OF SHAFT
32
69 FLOOR TO ℄ BUTTONS
21
42 BOLSTER
35 FLOOR TO BED
7 1/2
7 1/2
2 1/4
FOOT RUN BUTTON
2
18 1/2
18 1/2
41
(4) 2" DIA. MOUNTING HOLES
BASE FOR 1 1/4 DIA. ANCHOR
OBG 110 DRESS
CAPACITY HEAVY DUTY CONTINUOUS RATING --- 110 TONS
STROKE OF SLIDE --- 8 IN
ADJUSTMENT OF SLIDE (POWER) --- 5 IN
STROKES PER MINUTE --- 40
APPROX WEIGHT --- 29,500 #
CUSHION CAPACITY @ 100
STROKE OF CUSHION --
5
E
SA
C11D

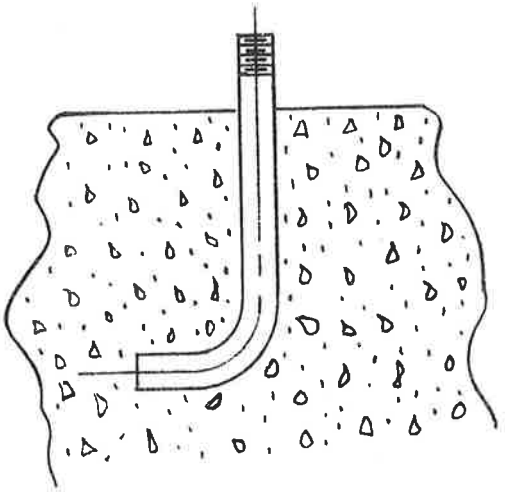
SOIL LOADING CAPACITIES*	
SOIL CONDITIONS	ALLOWABLE LOAD
WET CLAY	1 TON PER SQ. FT.
WET SAND	2 TONS PER SQ. FT.
FIRM CLAY	2 TONS PER SQ. FT.
SAND & CLAY MIXED	2 TONS PER SQ. FT.
OR IN LAYERS	2 TONS PER SQ. FT.
FINE & DRY SAND	3 TONS PER SQ. FT.
HARD DRY CLAY	4 TONS PER SQ. FT.
COARSE SAND	4 TONS PER SQ. FT.
GRAVEL	6 TONS PER SQ. FT.
SOFT ROCK	8 TONS PER SQ. FT.
HARD PAN	10 TONS PER SQ. FT.
MEDIUM ROCK	15 TONS PER SQ. FT.
HARD ROCK	40 TONS PER SQ. FT.

*Based on New York Building Code Regulations

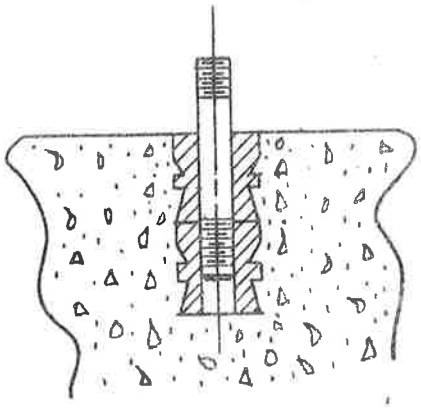
NOTE: Above chart can be used as a guide for allowable loads on the soil beneath the supporting piers , for various soil conditions. Consult your local contractor for permissable loads for soil in your locality. Being unacquainted with soil conditions at your plant, VERSON ALLSTEEL PRESS COMPANY cannot be held responsible for improper operation of machine, due to foundation failure.

Drawing No. LS-551

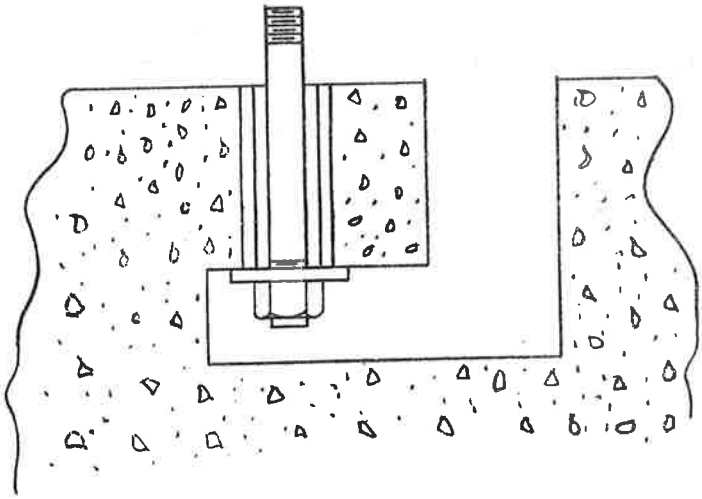
TOLERANCE ± .005 FOR ALL FINISHED MACHINE DIMENSIONS.
TOLERANCE FOR ALL ROUGH MACHINE DIMENSION ± 1/64.
TOLERANCE FOR FABRICATED SECTIONS WITHOUT MACHINING OVERALL DIMENSIONS ± 1/8. WORK TO DIMENSIONS.
DO NOT SCALE DRAWINGS.



STANDARD ANCHOR BOLT
CAN BE USED
WHEN OVER-HEAD CLEARANCE IS
NOT LIMITED FOR SETTING UP
PRESS BRAKE.



CINCH ANCHOR BOLT
TO BE USED WHEN
FOUNDATION PIT IS NOT REQUIRED.
NOT RECOMMENDED IF ANCHOR
BOLT EXCEEDS 1" IN DIA.



STANDARD ANCHOR STUD
MUST BE USED WHEN
OVER-HEAD CLEARANCE IS
LIMITED FOR SETTING
UP PRESS BRAKE.

Drawing No. L-S-551 REVISED	TRADE Verson MARK **VERSON ALLSTEEL PRESS CO.** CHICAGO, ILL.	DATE 5-20-98 SCALE ——
	MACHINE VERSON PRESS BRAKES	DR: W. B.
	PART ANCHORING STANDARDS	CH:

TRADE Verson MARK

VERSON ALLSTEEL PRESS COMPANY

Main Office - 1355 East 93rd Street - Chicago 19, Illinois
Dallas Office - 8300 South Central Expressway - Dallas, Texas

LUBRICATION INSTRUCTIONS

FOR

PRESSES & PRESS BRAKES

FOREWORD

The lubrication of mechanical equipment presents the owner with an unusual opportunity to save on maintenance, power and manufacturing costs. Because of the fluctuating and impact nature of the loads the supply of lubricants must be plentiful at all times. Failure to lubricate adequately, at all times, results in metallic friction and the likelihood of excessive wear.

It may be reasoned by some that because of the rugged nature and ample dimensions of machine construction, wear is of no consequence and can be disregarded. Actually nothing is further from the truth. While dimensions are necessarily large to withstand the tremendous loads developed, wear is the upsetting factor on every count. It acts to intensify friction and thus create more wear. It causes looseness and vibration which magnify the effect of suddenly applied loads.

A well lubricated machine, is therefore, the one that will show the lowest maintenance and production costs. Good lubrication will add years to the useful life of your equipment. Haphazard lubrication programs, coupled with carelessness or neglect, can only result in high operating costs and a short life span for the equipment. The overall cost of good lubrication is minor in relation to total operating expense. However, the resultant savings, over a long period, are sure to justify the need for a well balanced lubrication program.

INSTALLATION

During shipment your machine will have accumulated a good coating of road dust, grit and contamination in spite of the protective coatings and wrappings provided before shipment.

"BE SURE YOUR MACHINE IS CLEAN BEFORE OPERATING"

(1) Wash off all protective coatings from machined surfaces with suitable solvents.

(2) Remove the gear guards which are not oil tight and wash the gears thoroughly.

(3) Clean all exposed bearing surfaces.

(4) Give the whole machine a general cleaning to remove accumulated dirt, etc.

(5) Fill all reservoirs to the proper level with the recommended lubricant.

(6) Coat all open gearing and exposed bearing surfaces with their proper lubricant.

(7) Check all lubricant tubing, flexible hose and fittings from origin to bearing for looseness, or damage during shipment or erection.

(8) If your machine is equipped with a centralized or floor level manual grease system you must prime all grease lines with a portable gun before starting the machine for the first time or after a long shut down.

(9) Thoroughly lubricate the whole machine making certain each bearing is being served.

LUBRICATION PROGRAM

To do anything well requires both knowledge and training. This truth holds good with particular emphasis in the case of a good lubrication program. The personnel responsible for lubrication of the equipment should be thoroughly informed as to the operating needs and properly trained to assure introduction of the correct lubricant at the proper time, place and interval.

A further step towards a well organized lubrication program is regularity of attention. When setting up a schedule always arrange to perform the necessary work at regular intervals and at the same time of day. The suggested frequency of lubrication can be obtained from the chart included in these instructions. These can, to the best of our experience and knowledge, be considered as average recommendations. Due to factors such as speed, temperature, continuity of operation, and the type of lubrication system, it is not feasible to specify exact periods of lubrication for all types of equipment. This must necessarily be left to the observation and good judgment of the oiler. Generally speaking, it is preferable to lubricate frequently in small quantities, rather than large amounts at long intervals. In the latter case, much of the lubricant will be wasted without performing any useful function, and bearing surfaces may run dry before the next application of the lubricant.

OPERATION AND MAINTENANCE

Lubrication should be plentiful during the run-in period to help the bearing surfaces obtain a smooth, polished condition. To assist this running-in process, it is recommended that the intervals between lubrication be one third to one quarter the recommended intervals. Instruct your personnel to be on the alert for overheated bearings, or signs of excessive friction. If this occurs, increase the amount of lubrication until the condition improves. In certain cases where continued difficulty is experienced, special run-in lubricants can be used with beneficial results.

(1) Make sure your personnel is familiar with all of the requirements of the machine.

   (a) Location of all lube points.

   (b) Correct lubricant.

   (c) Frequency of lubrication.

(2) If your machine is equipped with a centralized system be certain your personnel is familiar with the operation and function of the system. Make sure they know the meaning of the various types of indicating and / or warning devices sometimes incorporated into lubrication systems.

(3) Transfer lubricants in clean containers. Many a lubricant has become contaminated before it ever reached a bearing.

(4) Store lubricants in a clean place. Provide covers for the containers and keep them in place when the containers are not in use.

(5) Clean all grease and oil fittings and oil cups before re-introducing lubricant.

(6) Grease guns sometimes become air bound after recharging with lubricant. Make sure all air has been eliminated before greasing bearings.

(7) If your machine has been shut down for some time, make certain it is well lubricated before it is put into operation again.

(8) After machine is run-in, check each bearing visually, once each month to be sure it is getting sufficient lubricant.

(9) Check all lubrication lines frequently for signs of damaged tubings or fittings. This is especially true of flexible hose connections to moving bearings.

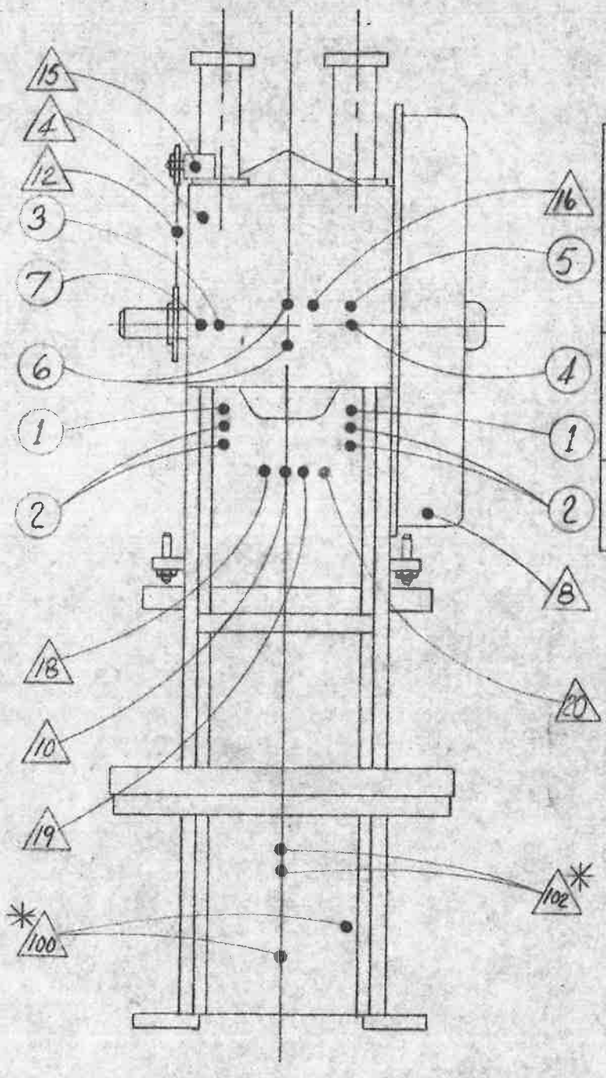
(10) It is advisable to drain and flush enclosed gear reservoirs and recharge with fresh or well filtered oil after the first month of operation.

(11) In connection with item 10, some lubricant suppliers maintain a special oil inspection service which may be valuable to large consumers. Periodic samples are examined for viscosity, water content, contamination, etc. Analysis of their findings often leads to the early discovery of contaminated lubricant due to the failure of a filter or bearing. In addition to this it often saves large quantities of good oil, which it was the intention to replace, only because it has been in use for some time.

(12) Through the cooperation with lubrication system suppliers, such as Farval, Manzel, Lincoln or Trabon, we have arranged that their local representatives contact you, if your machine is equipped with one of their systems. They will check the installation and instruct your personnel on the operation and care of their system.

(13) The following chart and list of recommendations has been prepared as a guide toward proper lubrication. We have long recognized the need for a simplified, yet effective, program of lubrication. The following recommendations have, therefore been prepared with a view towards full and adequate lubrication with a minimum number of lubricants.

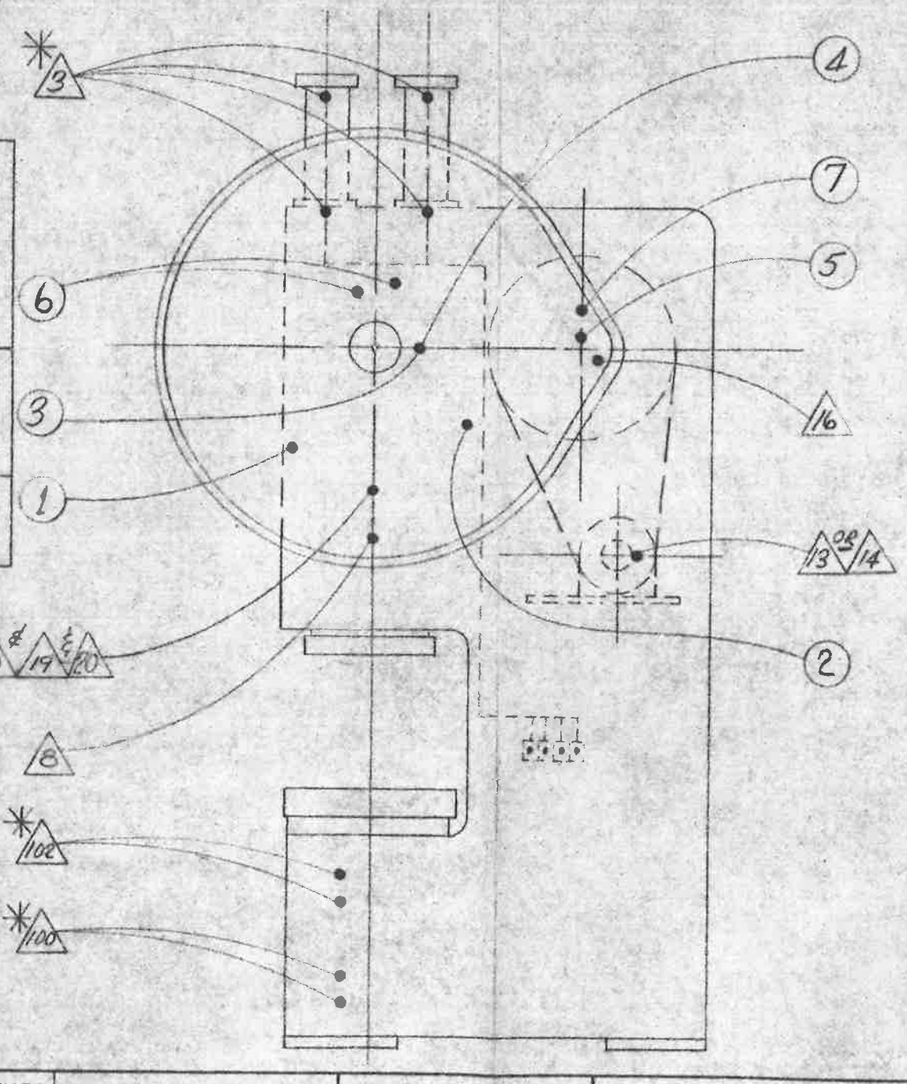
DIMENSIONS TOLERANCES UNLESS OTHERWISE SPECIFIED
FINISHED - FRACTIONAL ± 1/64. DECIMAL ± .005
UNFINISHED - WELDMENTS ± 1/8.



○ INDICATES POINTS SERVICED BY LUBRICATION SYSTEM. SEE LUBE. CHART # DIAGRAM DWG. #

△ INDICATES POINTS REQUIRING MANUAL LUBE. SEE (LS-3118-965)

* IF FURNISHED SEE (LS-3116-260)



DATE	REVISION
	1
	MF. II

ASSEMBLY No.	DRAWING NUMBER	DASH NO.
902	20-10093	—

TRADE Verson MARK
VERSON ALLSTEEL PRESS CO.
Chicago, Ill.

DATE 1-3-67
SCALE CHD
MACHINE O.B. PRESS
DRAWN BY AGM
PART LUBRICATION POINTS
CHECKED BY

FRIGHT STOCK NO.	ITEM NO	DESCRIPTION	MAT'L.	REQ.	COST

2
E
SUP

TRABON HIGH PRESSURE AUTOMATIC GREASE CENTRALIZED LUBRICATION SYSTEM

ITEM	BEARINGS R.P.M.	S.P.M.	STROKE	DIA. & LENGTH WIDTH & LENGTH OR NUMBER	R=REVOLVES M=MOVABLE F=FIXED	TYPE OR MATERIAL	LOAD IN POUNDS	DESCRIPTION	LUBE PTS. NO. OF	POINTS PER BRG.	TOTAL	ITEM	DISCH. CU. IN. PER PT. 2 HRS
1	-	40	8	2×30	M	SYNTHANE GRADE-CC-FM		FRONT GIBS	2	1	2	1	.052
2	-	40	8	2×30	M	"		REAR GIBS	4	1	4	2	.052
3	40	-	-	6×5 11/16	F	BRZ. ON STL		L.H. MAIN BEARING	1	1	1	3	.090
4	40	-	-	6×5 11/16	F	"		R.H. MAIN BEARING	1	1	1	4	.090
5	390	-	-	HYATT BRG. A-5218-TS	F	ROLLER		PINION BEARING	1	1	1	5	.018
6	40	-	-	8×7½	M	BRZ. ON STL.		PITMAN BEARING	1	2	2	6	.078
7	362	-	-	MRC-BRG 214-M	F	BALL		OUTBOARD BEARING	1	1	1	7	.018
8												8	
9												9	
10												10	
11												11	
12												12	
13												13	
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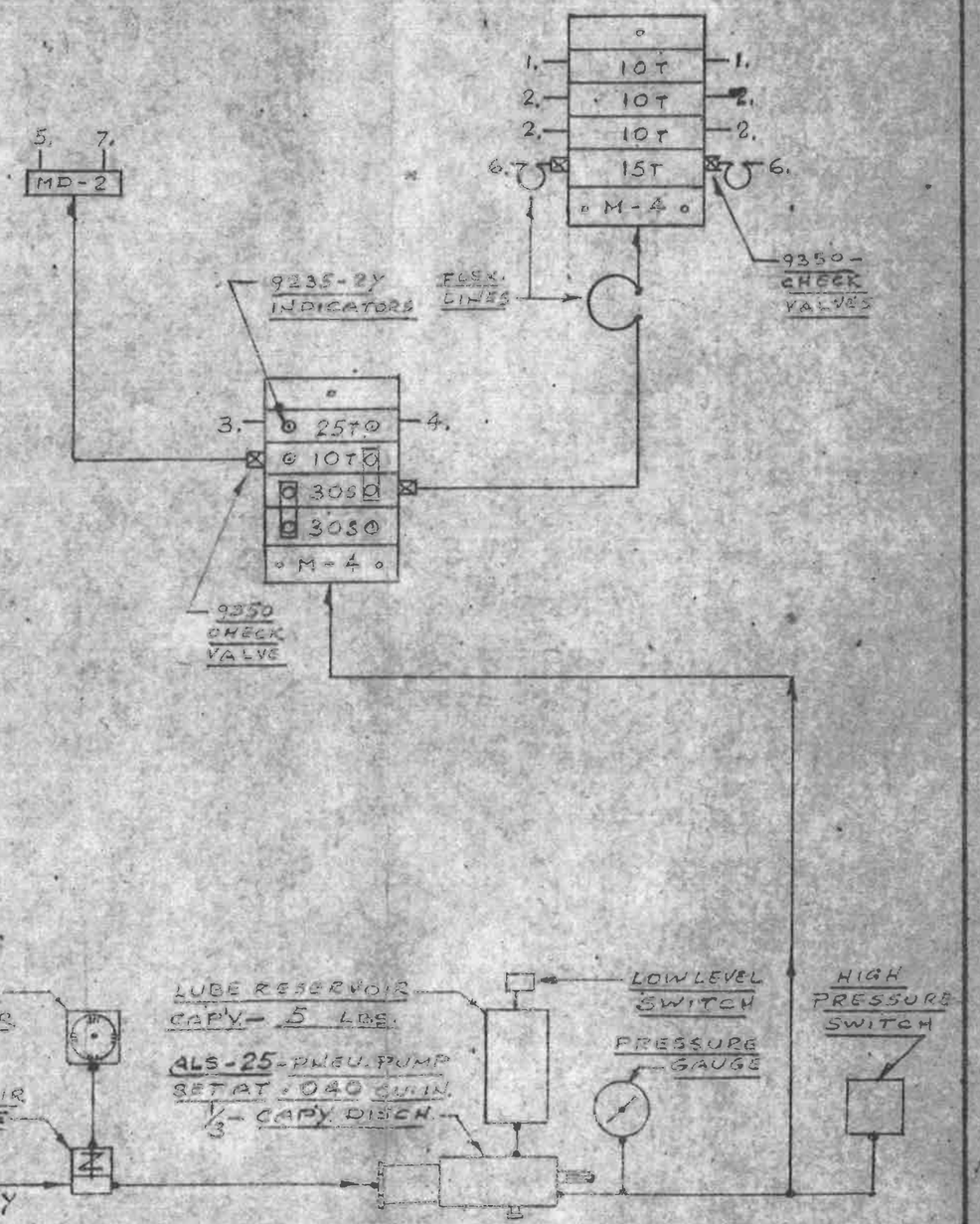

NOTE: 1) THIS SYSTEM IS FOR TOTAL OF 12 LUBRICATION POINTS AS LISTED ABOVE UNDER ITEMS 1 TO AND INCLUDING 7 USING PNEUMATIC DRIVE WITH TRABON MX AND M. DISTRIBUTING FEEDERS.

2) FILL RESERVOIR WITH VERSON LUBRICANT NO. 1 (SEE SPECIFICATION SHEET IN PARTS MANUAL LS-311)

VERSON ALLSTEEL PRESS CO.

LUBRICATION CHART AND DIAGRAM FOR PRESS — 110 OPEN BACK PRESS

ASSEMBLY NO. 9.03

DRAWING NO. 20-10100

LUBRICATION RECOMMENDATIONS FOR

VERSON MECHANICAL PRESSES

The lubrication points below are the points not included on the centralized lube system and must be lubricated by hand as recommended.

NAME OF PART	METHOD OF APPLICATION	FREQUENCY OF APPLICATION	RECOMMENDED LUBRICANT
1- WRIST PIN BEARINGS	Pressure gun Fittings	Daily	Lubricant No. 1
2- BLOCK & PIN CLUTCHES	Pressure gun Fitting	Daily	Lubricant No. 1
3- COUNTERBALANCE CYLINDER & PACKING	Oil Cup	Daily	Lubricant No. 150
4- AIR-OPERATED CLUTCH AND BRAKE UNITS (Piston Packings & Air Valve)	Air Line Oiler	Check reservoir level daily or as required	Lubricant No. 150
5- AIR-OPERATED MECHANICAL CLUTCH & BRAKE UNITS (operating valve and cylinder)	Air Line Oiler	Check reservoir level daily or as required	Lubricant No. 150
6- PRESS DRIVE GEARS OPEN	Spray application through remote floor level header block	Daily	Lubricant No. 1
7- TREADLE AND LINKAGE BEARINGS ON AIR CYLINDER OR MANUALLY OPERATED MECHANICAL CLUTCHES OR BRAKES	Oil Hole	Oil weekly	Lubricant No. 1200
8- PRESS DRIVE GEARS (enclosed)	Splash or dip	Check reservoir level gauges - weekly	Lubricant No. 1200
9- PRESS DRIVE GEARS (open)	Hand	Semi-monthly	Lubricant Open Gear Type

NAME OF PART	METHOD OF APPLICATION	FREQUENCY OF APPLICATION	RECOMMENDED LUBRICANT
10- SADDLE BEARINGS	Reservoir	Check level - Semi-monthly	Lubricant No. 1200
11- ELEVATING ADJUSTMENT MOTOR GEAR REDUCTION UNIT	Oil Bath	Check level - monthly	Lubricant No. 300
12- ELEVATING CHAIN DRIVE	Hand	Lubricate - monthly	Lubricant No. 1200
13- MOTOR BEARINGS	Oil Cup	Once each month or as directed on motor name plate.	Lubricant No. 1200
14- MOTOR BEARINGS	Pressure gun Fitting	Once each month or as directed on motor name plate.	Lubricant No. 1
15- LIMIT SWITCH BEARINGS	Pressure gun Fitting	Once each month	Lubricant No. 1
16- FLYWHEEL BEARINGS	Pressure gun Fitting	Check monthly - keep filled to one third capacity	Lubricant No. [redacted] 2
17- ELEVATING SHAFT BEARINGS	Pressure gun Fitting	Lubricate monthly	Lubricant No. 1
18- ADJUSTING SCREW	Pressure gun Fitting	Lubricate monthly	Lubricant No. 1
19- ENCLOSED ELEVATING GEARS (Bevel or Worm)	Pressure gun Fitting or Hand Packed	Lubricate monthly	Lubricant No. 1
20- OPEN ELEVATING GEARS- (Spur or Bevel)	Hand	Lubricate monthly	Lubricant No. 1
21- MECHANICAL FRICTION CLUTCH (Piston, Packings & Air Valve)	Pressure gun Fitting	Once each month	Lubricant No. 1
22- FLYWHEEL BEARINGS	Hand Packed	Every six months	Lubricant No. 2

LUBRICATION RECOMMENDATIONS FOR VERSON CUSHIONS

NAME OF PART	METHOD OF APPLICATION	FREQUENCY OF APPLICATION	RECOMMENDED LUBRICANT
SLIDE OR BED CUSHIONS (PNEUMATIC)			
100- CUSHION PACKINGS	Oil Cup or Pressure Gun Fitting - Oil	Daily	Lubricant No. 150
101- CUSHION GUIDES (External Only)	Pressure Gun Fitting	Daily	Lubricant No. 1
102- PISTON ROD AND CYLINDER (All internal guides)	Pressure Gun Fitting	Daily	Lubricant No. 1
HYDRO-PNEUMATIC LOCKS FOR PNEUMATIC SLIDE OR BED CUSHIONS			
103- ROD BUSHINGS (If any)	Pressure Gun Fitting	Daily	Lubricant No. 1
104- AIR CYLINDER	Air Line Oiler	Check reservoir level daily or as required	Lubricant No. 150
105- MAIN CYLINDER (Hydraulic Circuit)	Reservoir	Check level weekly	Lubricant No. 150
SLIDE OR BED CUSHIONS (HYDRO-PNEUMATIC)			
106- CUSHION GUIDES (External only)	Pressure Gun Fitting	Daily	Lubricant No. 1
107- ROD BUSHINGS (if any)	Pressure Gun Fitting	Daily	Lubricant No. 1
108- CUSHION (Hydraulic Cicurit)	Reservoir	Check level weekly	Lubricant No. 150
109- RELIEF VALVE AIR CYLINDER	Air Line Oiler	Check level weekly	Lubricant No. 150

LUBRICANT SPECIFICATIONS AND RECOMMENDATIONS

LUBRICANT - VERSON NO. 1

A multi-purpose water resistant grease, possessing high mechanical stability, good oxidation resistance (a maximum of 10 lb. drop per 100 hours), an A.S.T.M. worked penetration of 310-340 at 77° F., and an A.S.T.M. minimum dropping point of 300° F. Leaded or E.P. grease is preferred for its extreme pressure properties as protection against shock loading and shall have a Timken rating of 33 lbs. minimum. Grease must possess good resistance to soap separation.

LEADED OR E.P.

The Brooks Oil Company	Leadolene No. 385M or No. 385L
Cities Service Oil Company	Black Lithium EP No. 1
Mobil Oil Company	Sovarex L - No. 1
Shell Oil Company	Alvania E.P. Grease No. 1
Sun Oil Company	Sunaplex No. 991 EP No. 1 or Prestige No. 741 EP
Texaco Company	Multifak EP No. 1

NOTE: The lubricants recommended in the foregoing are obtainable in containers of various but not all sizes from each supplier. However, all obtainable sizes may not always be available in the local stocks of your preferred supplier and it is therefore advisable to order well in advance. It may at times be possible to obtain a desired type of lubricant in a desired container size from other than the preferred supplier, to meet an emergency.

VERSON ALLSTEEL PRESS COMPANY

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DALLAS OFFICE -- 8300 South Central Expressway, Dallas, Texas

LUBRICANT SPECIFICATIONS AND RECOMMENDATIONS
LUBRICANT - VERSON NO. 150

A premium type, oxidation, rust and foam inhibited hydraulic oil of approximately 150 (plus or minus 15) S.S.U. at 100 degrees F. This oil should have a high aniline point (a minimum of 200), to avoid adverse reaction with synthetic rubber packings used in air cylinders.

American Oil Company	American Industrial Oil No. 15
The Brooks Oil Company	Leadolene No. 20
Cities Service Oil Company	Pacemaker Oil No.150-T
Gulf Oil Corporation	Gulf Harmony 44
E.F. Houghton & Company	Hydro-Drive MIH-Light
Mobil Oil Company	Mobil DTE Oil - Light
Pennzoil Division of South Penn Oil Company	Pennzoil Turbine & Dynamo-Light
The Pure Oil Company	Puropale RX Light
Shell Oil Company	Tellus No. 27
Sinclair Refining Company	Duro Oil 150
Sun Oil Company	Sunvis 916
Texaco, Inc.	Texaco Regal Oil A (R&O)

NOTE: The lubricants recommended in the foregoing are obtainable in containers of various sizes but not all sizes from each supplier. However, all obtainable sizes may not always be available in the local stocks of your preferred supplier and it is therefore advisable to order well in advance. It may at times be possible to obtain a desired type of lubricant in a desired container size from other than the preferred supplier, to meet an emergency.

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DALLAS OFFICE - 8300 South Central Expressway, Dallas, Texas

LUBRICANT SPECIFICATIONS AND RECOMMENDATIONS (FOR PACKED CHAMBERS SUCH AS FLYWHEELS)

LUBRICANT - VERSON NO. 2

A multi-purpose water resistant grease, possessing high mechanical stability, good oxidation resistance (a maximum of 10 lb. drop per 100 hours), an A.S.T.M. worked penetration of 265-290 at 77° F., and an A.S.T.M. minimum dropping point of 350° F. Leaded or E.P. grease is preferred for its extreme pressure properties as protection against shock loading and shall have a Timken rating of 35 lbs. minimum. Grease must possess good resistance to soap separation.

LEADED OR E.P.

Cities Service Oil Company	Trojan HEP-2 Grease
Gulf Oil Corporation	Gulfcrown EP Grease #2
E. F. Houghton & Co.	Cosmolube E.P. #2
Pennzoil Division of South Penn Oil Company	EP #2 TTM Lubricant
The Pure Oil Company	Poco HT-EP Grease #2
Shell Oil Company	Shell Alvania EP Grease No. 2
Sinclair Refining Company	Litholine Industrial 2 EP
Standard Oil Company (Indiana)	Rykon Grease No. 2 EP
Sun Oil Company	Sun Prestige #742 EP Grease
Texaco, Inc.	Multifak EP #2

NON LEADED - NON E.P.

The Brooks Oil Company	Thermo DA
Cities Service Oil Company	Trojan H-2 Grease
Gulf Oil Corporation	Gulfcrown No. 2
E. F. Houghton & Company	Cosmolube #1
Mobil Oil Company	Mobilux Grease #2
Pennzoil Division of South Penn Oil Company	Pennzoil Lubricant #303
The Pure Oil Company	Poco Super Service Grease #2
Shell Oil Company	Shell Alvania Grease #2
Sinclair Refining Company	Litholene Industrial #2
Standard Oil Company (Indiana)	Amolith Grease #2
Sun Oil Company	Sun Prestige #42 Grease
Texaco, Inc.	Texaco Multifak #2

Note: The lubricants recommended in the foregoing are obtainable in containers of various sizes but not all sizes from each supplier. However, all obtainable sizes may not always be available in the local stocks of your preferred supplier and it is therefore advisable to order well in advance. It may at times be possible to obtain a desired type of lubricant in a desired container size from other than the preferred supplier, to meet an emergency.

VERSON ALLSTEEL PRESS COMPANY
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Dallas Office - 8300 South Central Expressway, Dallas, Texas

LUBRICANT SPECIFICATIONS AND RECOMMENDATIONS

LUBRICANT - VERSON #1200

A stable gear oil, approximately 1150 (plus or minus 100) S.S.U. at 100° F., and having a minimum Timken rating of 30 pounds. Leaded or E.P. oils are preferred for their extreme pressure characteristics as protection against shock loading.

The Brooks Oil Company	Leadolene No. 70
Cities Service Oil Company	Trojan Compound L-2
Gulf Oil Corporation	Gulf E.P. Lubricant 95
E. F. Houghton & Company	Vital E.P. Gear Oil SAE 90
Mobil Oil Company	Mobil Compound D.D.
Pennzoil Division of South Penn Oil Company	Maxol E.P. Gear Oil Grade 3
The Pure Oil Company	Poco P.B. Lubricant No. 8
Shell Oil Company	Macoma No. 72
Sinclair Refining Company	Pennant E.P. Oil No. 3
Standard Oil Company (Indiana)	Stanogear Compound No. 3
Sun Oil Company	Sunep 90
Texaco, Inc.	Meropa No. 3 Lubricant

NOTE: The lubricants recommended in the foregoing are obtainable in containers of various sizes but not all sizes from each supplier. However, all obtainable sizes may not always be available in the local stocks of your preferred supplier and it is therefore advisable to order well in advance. It may at times be possible to obtain a desired type of lubricant in a desired container size from other than the preferred supplier, to meet an emergency.

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Main Office - 1355 East 93rd Street, Chicago 19, Illinois
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LUBRICANT SPECIFICATIONS AND RECOMMENDATIONS

LUBRICANT - VERSON #300

A stable lubricating oil, approximately 300 (plus or minus 25) S.S.U. at 100° F., and having a minimum Timken rating of 30 pounds. This oil must be relatively light for rapid return to the sump of a recirculating type oil system. Leaded or E.P. oils are preferred for their extreme pressure characteristics as protection against shock loading.

The Brooks Oil Company	Leadolene No. 40
Cities Service Oil Company	Trojan Compound L-00
Gulf Oil Corporation	Gulf E.P. Lubricant 55
E. F. Houghton & Company	Hydro-Drive MIH-20
Mobil Oil Company	Mobil Compound AA
Pennzoil Division of South Penn Oil Company	Maxol E.P. Gear Oil, Grade 1
The Pure Oil Company	Poco PB Lubricant #5
Shell Oil Company	Macoma No. 33
Sinclair Refining Company	Pennant E.P. Oil No. 1
Standard Oil Company (Indiana)	Stanogear Compound No. 1
Sun Oil Company	Sunep 50
Texaco, Inc.	Meropa Lubricant No. 1

NOTE: The lubricants recommended in the foregoing are obtainable in containers of various sizes but not all sizes from each supplier. However, all obtainable sizes may not always be available in the local stocks of your preferred supplier and it is therefore advisable to order well in advance. It may at times be possible to obtain a desired type of lubricant in a desired container size from other than the preferred supplier, to meet an emergency.

VERSON ALLSTEEL PRESS COMPANY

Main Office - 1355 East 93rd Street - Chicago 19, Illinois
Dallas Office - 8300 South Central Expressway - Dallas, Texas

MECHANICAL PRESS INSTRUCTIONS

Press Mounting

Fasten machine to rigid foundation through anchor holes provided. Level machine and grout in place, using non shrink grouting material. See foundation plan drawing if cushions are used.

Ram Adjustment Mechanism

On all but the very small presses, the ram is adjusted through gearing which is either manually operated or motor driven. An indicator is provided showing the maximum position of the ram at stroke up with adjustment up and the position stroke down with adjustment down. The press should never be operated with the indicator stroking past these positions. To do so may invite serious press trouble.

On multiple point presses, a coupling is provided in the adjustment drive which can be uncoupled to permit individual adjustment of the connections to level the ram. If parallelism of ram to slide must be restored, bring ram to bottom stroke position, loosen gibs and adjust tightly against parallels. Disconnect the coupling, adjust the appropriate connections (All connection clearances to the main bearings should be taken up). Reconnect coupling. Slide must remain on parallels to readjust gibs, however, relieve pressure on parallels.

Gibs

Occasionally the gibs may require adjustments due to normal wear of the bronze gib liners provided. When this is necessary, the following procedure should be followed. Bring the ram down on top of parallel blocks which will set the bottom of the ram parallel with the top of the bolster. Check for uniform clearance the length of the fixed gib. If necessary, shim adequately for establishing uniform clearance. Force the adjustable gibs up firmly against the ram and the fixed gibs by loosening the jack set screws and tightening the studs on the adjustable gibs. After this has been done, the front gibs should be jacked away from the ram by loosening the studs and tightening the jack screws for approximately .005 to .008 clearance between the ram and gibs. This can be determined by using feeler gauges.

11-23-66
LS-06205

Counterbalance

Counterbalances are used in presses to counterbalance the weight and mass accelerating forces of the reciprocating parts of the press. They take up bearing clearances so that at the time the press applies pressure, impact is reduced in the main bearings and in the connection components. The capacity of the counterbalance should be adjusted accordingly. Counterbalances provide additional safety because the slide cannot descend when it is not driven.

Air counterbalance cylinders consist of pneumatic cylinders attached to the frame and slide of the press. The cylinders remain pressurized and the air that is displaced as the press slide reciprocates, flows freely between the cylinders and a large surge tank to minimize air pressure fluctuation in the cylinders. The only compressed air consumed is that used to charge the system and resulting from leakage. For proper operating pressure, see counterbalance air pressure nameplate. For piping instructions, refer to the Schematic Air Piping Diagram and for counterbalance lubrication, see specific lubrication instructions.

Replacement Parts

It is difficult to recommend what replacement parts should be kept in stock for emergency use since, generally speaking, the antifriction bearings, bushing, liners and gears break down or wear gradually unless inadequate lubrication is supplied. We do not recommend stocking the parts unless a shutdown of the press would cause serious production problems as they are designed to operate for a prolonged period with proper usage and proper lubrication.

Perishable items such as clutch and brake linings, packings for such items as couterbalances clutch, brake and cushion are subject to wear and a spare set of each should be kept on hand.

Part breakage is not predictable and is generally caused by overload or abuse and therefore, no recommendation can be made on spare parts for stock.

Electrical component replacement is infrequently necessary, however, periodic inspection must be made to insure reliable performance. Relays, etc., are available from stock at many supply houses. Maintaining stock will generally only be necessary if immediate repairs are necessary. Kits for rebuilding relays are available and may represent a wise investment.

VERSON ALLSTEEL PRESS COMPANY

DIE SET-UP PROCEDURE ON PRESSES

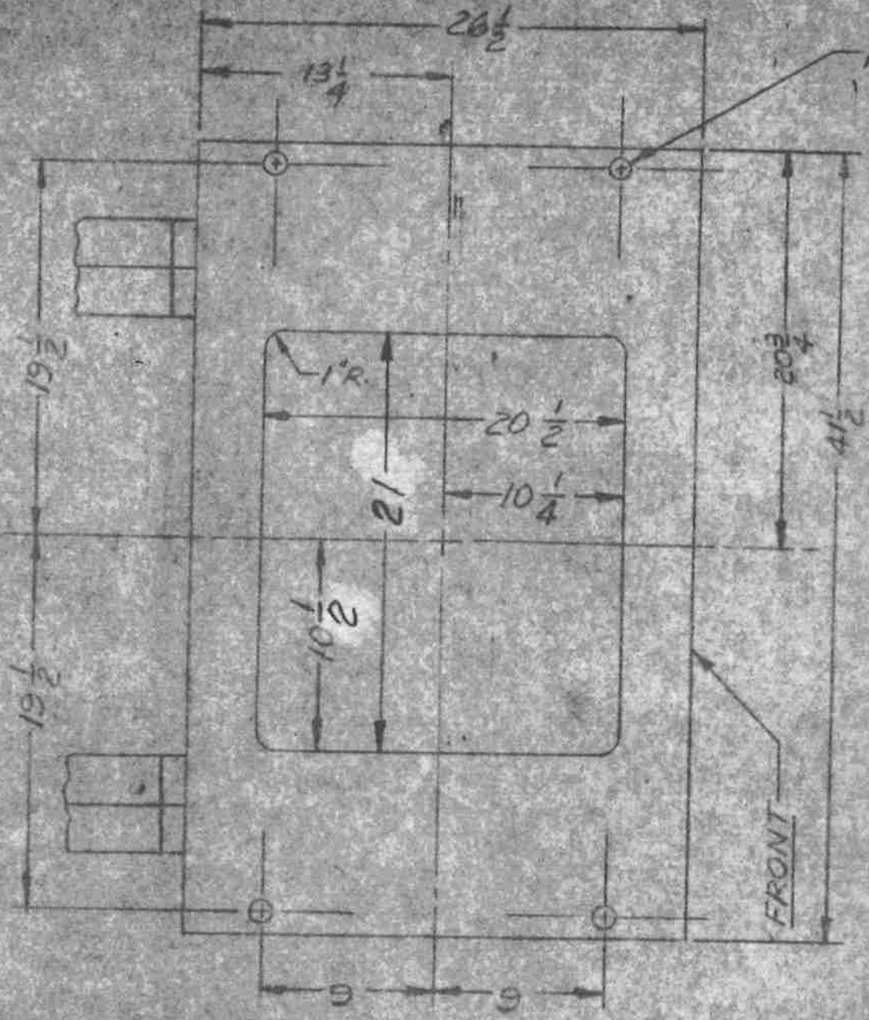
Clean the ram, bolster, and pressure pad of all dirt, slugs, and burrs to provide good bearing for dies and pressure pins, lubricate leader pins and all sliding bearing surfaces (cams, etc.) before starting and during the production run with press stopped.

Check the shut height of the die. Bring the ram to the bottom of the stroke and adjust the ram to the shut height of the dies plus 1/16". Return the ram to the top of the stroke and insert die. Bring the ram to the bottom of the stroke and fasten upper die securely to the ram. On presses with an air clutch, start the motor to bring the flywheel up to less than half speed and shut off the motor. Make one stroke and adjust the shut height. Repeat until the dies are set. In using this procedure, if the dies are set too deep, there will not be enough energy stored in the flywheel to stick the press or to damage either the press and/or the dies. The motor can be reversed if the dies are set too deep. When setting a blanking die, the depth can be checked with a piece of paper. Single stroke the press and adjust the shut height until the paper is indented, then try stock. Loading the machine, using stock in the machine, will probably make another slide adjustment necessary.

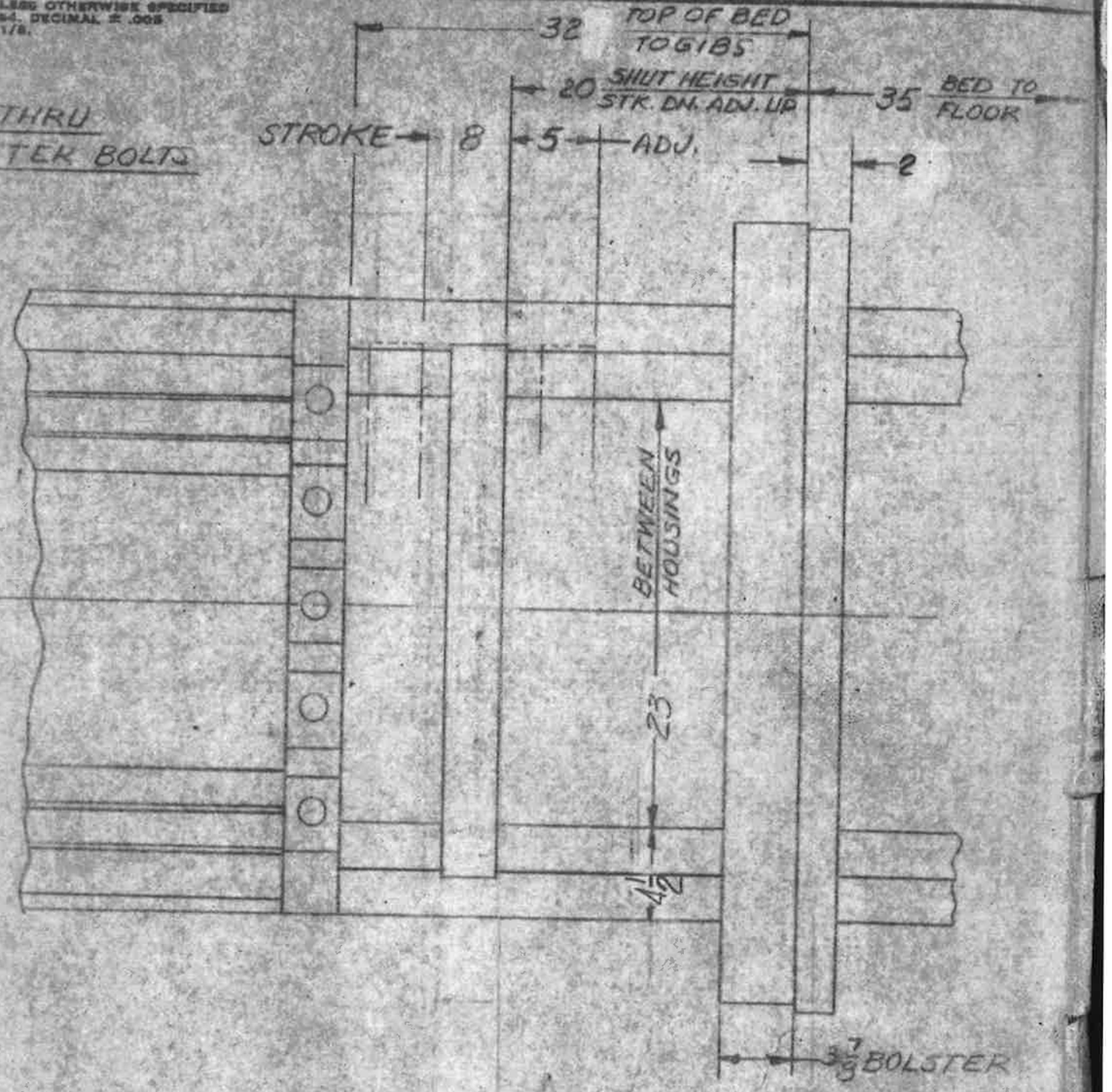
The ram adjusting mechanism should never be used with the dies bottomed together, or when loaded by the die springs or the cushion. The ram should be brought up off the dies by the press drive and then adjusted. The ram adjusting mechanism should never be used to try to unstick a press.

On presses using hydro-pneumatic cushions, it is very important that at least 3/8 inch pre-travel be allowed on the draw ring before the punch touches the work. This permits compression of the oil to the desired blankholding pressure before the punch reaches the material. Operating any cushion with more pressure than necessary, usually results in a greater percentage of scrap. Always start with low pressure and increase the pressure gradually as required. Cushions should not be operated in excess of their rated capacity to avoid abnormally high maintenance.

DIMENSIONS TOLERANCES UNLESS OTHERWISE SPECIFIED
FINISHED - FRACTIONAL ± 1/64, DECIMAL ± .005
UNFINISHED - WELDMENTS ± 1/8.



PLAN VIEW OF BED WITH BOLSTER REMOVED



#110 O.B.G. PRESS

CAPACITY HEAVY DUTY CONTINUOUS RATING	110 TONS
STROKE OF SLIDE	8 INCHES
ADJUSTMENT OF SLIDE (POWER)	5 INCHES
STROKES PER MINUTE	40
APPROX. WEIGHT	29,500 #

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X							
X							
X							
X							
SUP	PART NO. OR ASSY.	ITEM NO.	DESCRIPTION	MAT'L.	REQ.	COST	MFR. P

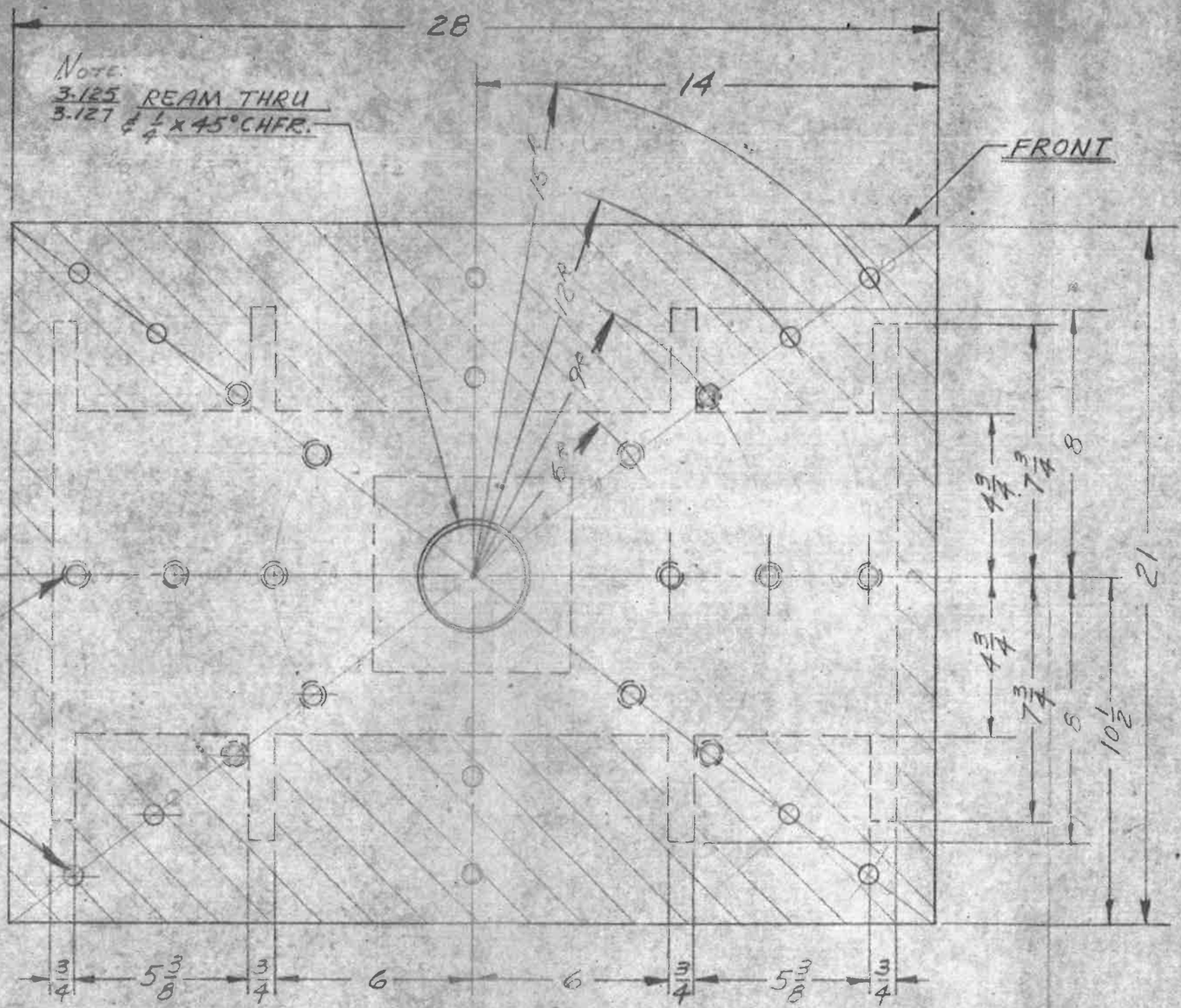
DATE	REVISION
	1
	2
	3
	4

ASSEMBLY NO. 50.0
DRAWING NO. 20004-2005
REV. NO.

TRADE Verson MARK
VERSON ALLSTEEL PRESS CO.
CHICAGO, ILL.

MACHINE #110 O.B.G. PRESS
PART DIE SPACE

DATE 8-25-
SCALE 1/8
DRAWN BY CEJ
CHECKED



NOTE:
5/8-11 TAP, 1 1/4 DR - 14 HOLES

NOTE:
41/64 DR. THRU - 12 HOLES
⌀ 1/4 SPOTFACE (FARSIDE)

BOTTOM VIEW OF SLIDE

NOTE:
SHADED AREA AVAILABLE
FOR DRILLED HOLES
NON-SHADED FOR TAPPED HOLES

DATE	REVISION
	1
	2
	3
	4
MF. #	

ASSEMBLY NO. 80.0
DRAWING NO. 20004-2006
REV. NO.

TRADE Verson MARK
VERSON ALLSTEEL PRESS CO.
CHICAGO, ILL.

MACHINE #110 O.B.G. PRESS
PART SLIDE DRILLING

DATE 11-14-66
SCALE 1/4
DRAWN BY AGM
CHECKED BY

PATT. #

4
E
X
I
S
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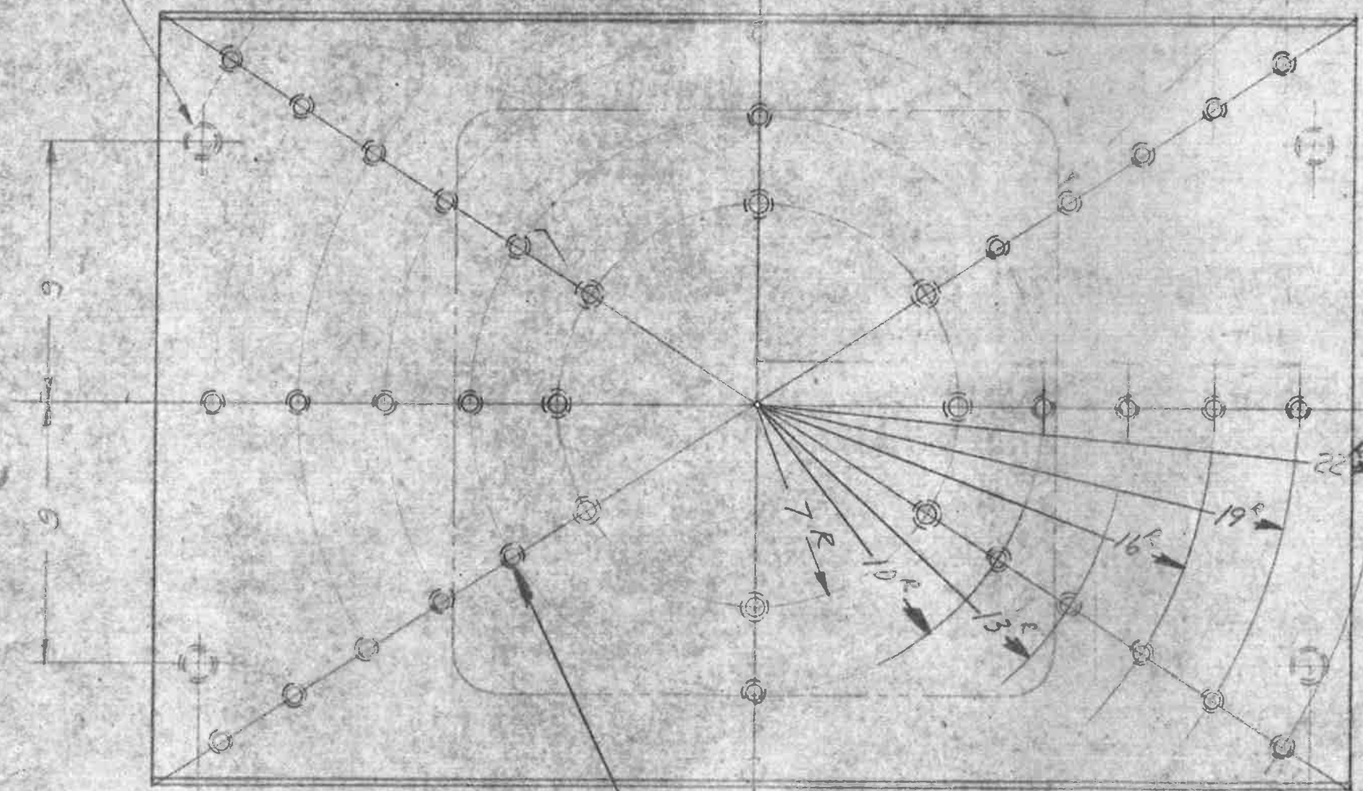
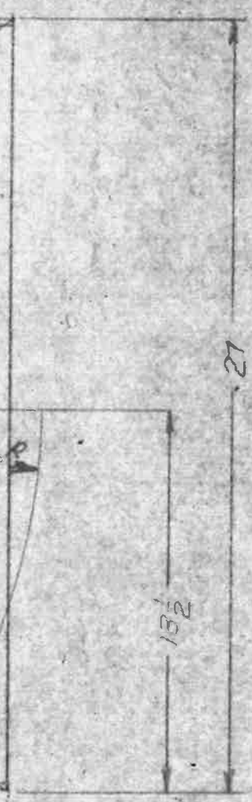
X
SUP

DIMENSIONS TOLERANCES UNLESS OTHERWISE SPECIFIED
FINISHED - FRACTIONAL ± 1/64, DECIMAL ± .005
UNFINISHED - WELDMENTS ± 1/8.

$1\frac{1}{4}$-7 TAP X $2\frac{1}{2}$ DEEP (FARSIDE) 4-HOLES

OUTLINE OF $20\frac{1}{2}$ X $20\frac{1}{2}$ BED OPENING





⅛ X 45° CHAMFER BOTH SIDES

NOTE:
5/8-11 TAP, 1¼ DP -38 HOLES

DATE	REVISION
	1
	2
	3
	4

ASSEMBLY NO. 80-0
DRAWING NO. 20004-2007
REV. NO.

TRADE Verson MARK
VERSON ALLSTEEL PRESS CO.
CHICAGO, ILL.

DATE 11-28-66
SCALE 3/16
DRAWN BY AGM
CHECKED BY

MACHINE "110 O.B.G. PRESS"
PART BOLSTER DRILLING

QUAN. PER MACH.	ITEM NO.	DESCRIPTION	MATL.	REQ'D	COST

4 E X I S X SUP

VERSON PNEUMATIC CLUTCH AND BRAKE

INSTRUCTIONS

The Verson Pneumatic Clutch and Brake, which is installed on the press covered by this Instruction Book, consists of a single disc, air operated, friction clutch in combination with a single disc, spring set, friction brake. It is so designed that when air under pressure is admitted to the clutch operating cylinder, the brake is released, causing compression of the brake springs, and the clutch is engaged by a small additional travel of the clutch piston. Exhausting the air from the clutch operating cylinder releases the clutch and engages the brake through the pressure from the brake springs. The included copies, of a Parts Drawing of the clutch and brake, illustrate the design, as an aid in explaining its operation. Each part bears a part name and number which will facilitate recognition when ordering repair parts. It is recommended that the following parts, indicated with an asterisk, be carried in customer's stock for emergency replacement purposes.

STOCK FOR EMERGENCY REPLACEMENT PURPOSES

ITEM NO.	NAME	QUANTITY FOR ONE UNIT
* (3) & * (4)	Assembly of Lining Disc & Lining	2
* (4)	Lining	2 sets
* (14)	"U" Packing	1
* (15)	"U" Packing	1
* (16)	Flange Packing	1 set
* (19)	Brake Spring	1 set
* (21)	"O" Ring	1 set
* (25)	Air Valve Seal	1

When ordering repair parts, give part name, part number, number of drawing which is a part of these instructions, serial number of machine and machine model number.

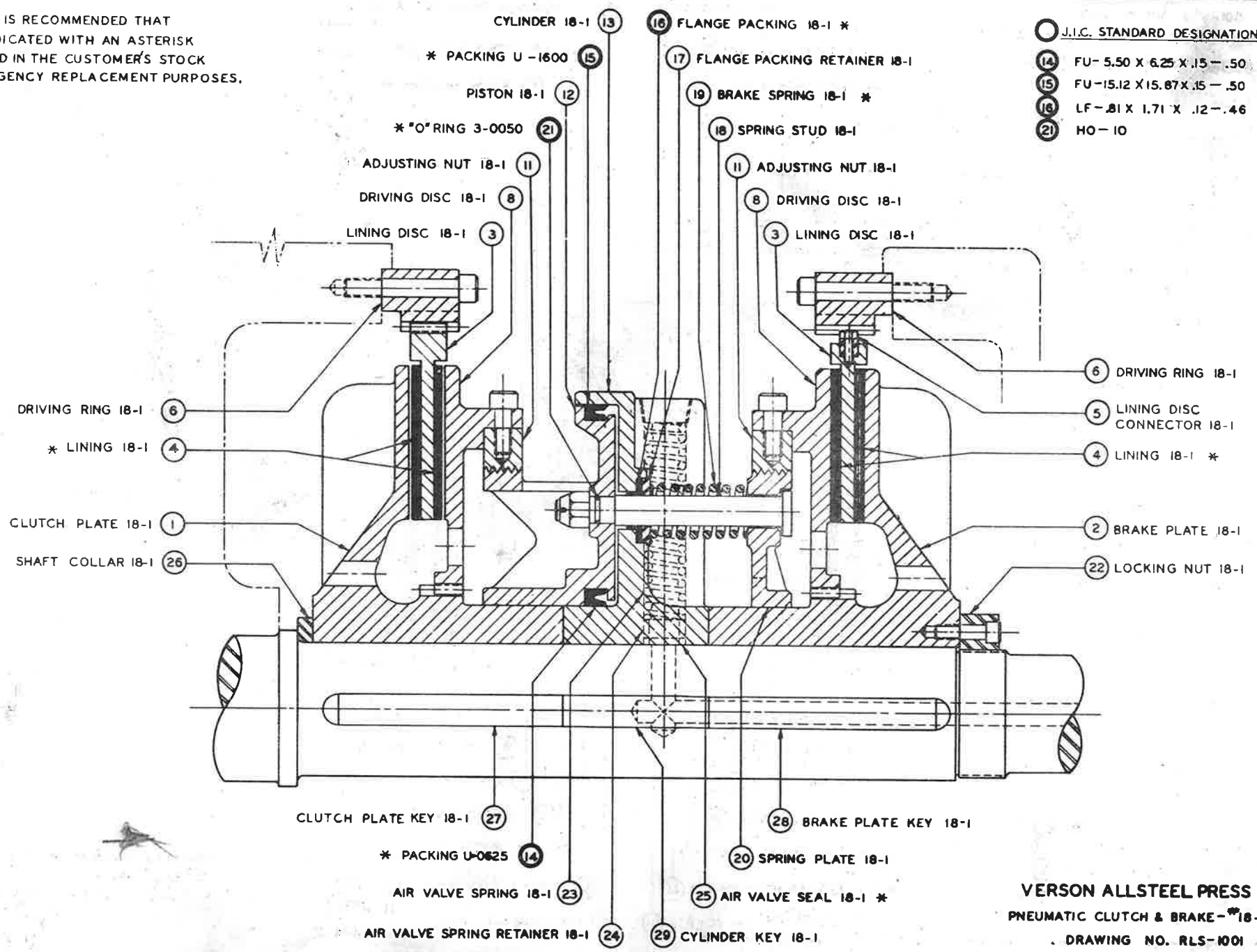
The following pages cover a description of the clutch and brake unit, its adjustment and lubrication and the replacement of parts when needed. There is also appended a schematic layout or layouts of the pneumatic piping and equipment essential for operation of the clutch and brake.

ADJUSTMENT OF CLUTCH AND BRAKE:

When the clutch and brake are correctly adjusted and the air cylinder (13) open to exhaust, the brake lining disc (3) will be solidly clamped between driving disc (8) and brake plate (2) by action of the brake springs (19). At this time the piston assembly should be free to float axially approximately 1/8 inch before releasing the brake and there should be approximately 3/16 inch clearance distributed between the contact surfaces of the clutch plate (1), the clutch driving disc (8) and the clutch lining disc (3). As friction linings wear, the clutch and brake must be checked at regular intervals and adjusted as necessary to maintain the specified clearances. This will conserve air, make the clutch more responsive, minimize wear and prevent overheating due to excessive slippage. The brake surfaces must be entirely free before any pressure is applied to the clutch, to prevent one surface from pulling against the other. This will be automatically provided for, if the specified clearances are maintained. The adjustment, which requires little time and assures satisfactory operation of this unit, is made as follows:

1. Bring press slide to bottom of stroke and shut off the motor.
2. When fly wheel has stopped, remove screws holding the adjusting nuts (11) to their respective driving discs (8).
3. Admit air pressure into clutch operating cylinder (13) to relieve pressure on the brake parts.
4. Loosen brake by screwing the brake adjusting nut (11) away from driving disc (8) until the brake parts are free of any spring pressure when air is exhausted from the cylinder (13). With the air exhausted and the brake driving disc (8) loose, the brake springs (19) will pull the piston (12) solidly against the rear wall of cylinder (13). With the piston and cylinder in this position, note the relative position of the edges of the piston and cylinder, where they are readily visible, for use in the clutch adjustment to follow.
5. With the air exhausted, screw brake adjusting nut (11) toward the brake driving disc (8) until all clearances between the brake parts have been removed. (Bring nut up solidly but do not force).
6. Admit air to the clutch operating cylinder (13).
7. Screw brake adjusting nut (11) toward brake driving disc (8) one full turn. Line up holes in the adjusting nut (11) with the tapped holes in the brake driving disc (8) by advancing nut to next nearest hole. Insert screws and tighten. Wire screw heads in position.
8. Exhaust air from clutch operating cylinder (13). The brake will now be correctly engaged and the piston will be free to float axially and accomodate a brake lining wear of approximately 1/8 inch.
9. To adjust clutch. With the air exhausted, screw the clutch adjusting nut (11) toward the clutch driving disc (8) until all clearances between clutch parts have been removed. (Bring nut up solidly but do not force). The adjusting nut must be tight enough to insure that the piston is bottomed against the rear wall of the cylinder. This may be checked by comparing the relative position of the edges of the piston and cylinder, where they are readily visible, as noted in Instruction 4 above.
10. Screw clutch adjusting nut (11) away from the clutch driving disc (8) one and one half turns. Line up holes in the adjusting nut (11) with the tapped holes in the driving disc (8) by advancing nut to next nearest hole. Insert screws and tighten. Wire screw heads in position. If all instructions have been carefully followed the clutch and brake unit is now in correct adjustment.
11. IMPORTANT. NO ATTEMPT SHOULD EVER BE MADE TO ADJUST EITHER THE CLUTCH OR THE BRAKE INDEPENDENTLY. IF EITHER ONE OR THE OTHER IS OUT OF ADJUSTMENT THE ENTIRE PROCEDURE OUTLINED ABOVE MUST BE FOLLOWED.
12. Satisfactory clutch operation also requires the periodic checking of the solenoid operated air valve, air pressure regulator, air cleaner, drain valve, etc. and such maintenance as may be required to insure an adequate supply of clean, compressed air. The recommended pressure is shown on the piping layout and on an instruction plate mounted on the press. Operation at a pressure materially below that recommended will cause slippage, heating and premature lining wear.

* NOTE: IT IS RECOMMENDED THAT PARTS INDICATED WITH AN ASTERISK BE CARRIED IN THE CUSTOMER'S STOCK FOR EMERGENCY REPLACEMENT PURPOSES.



O J.I.C. STANDARD DESIGNATION

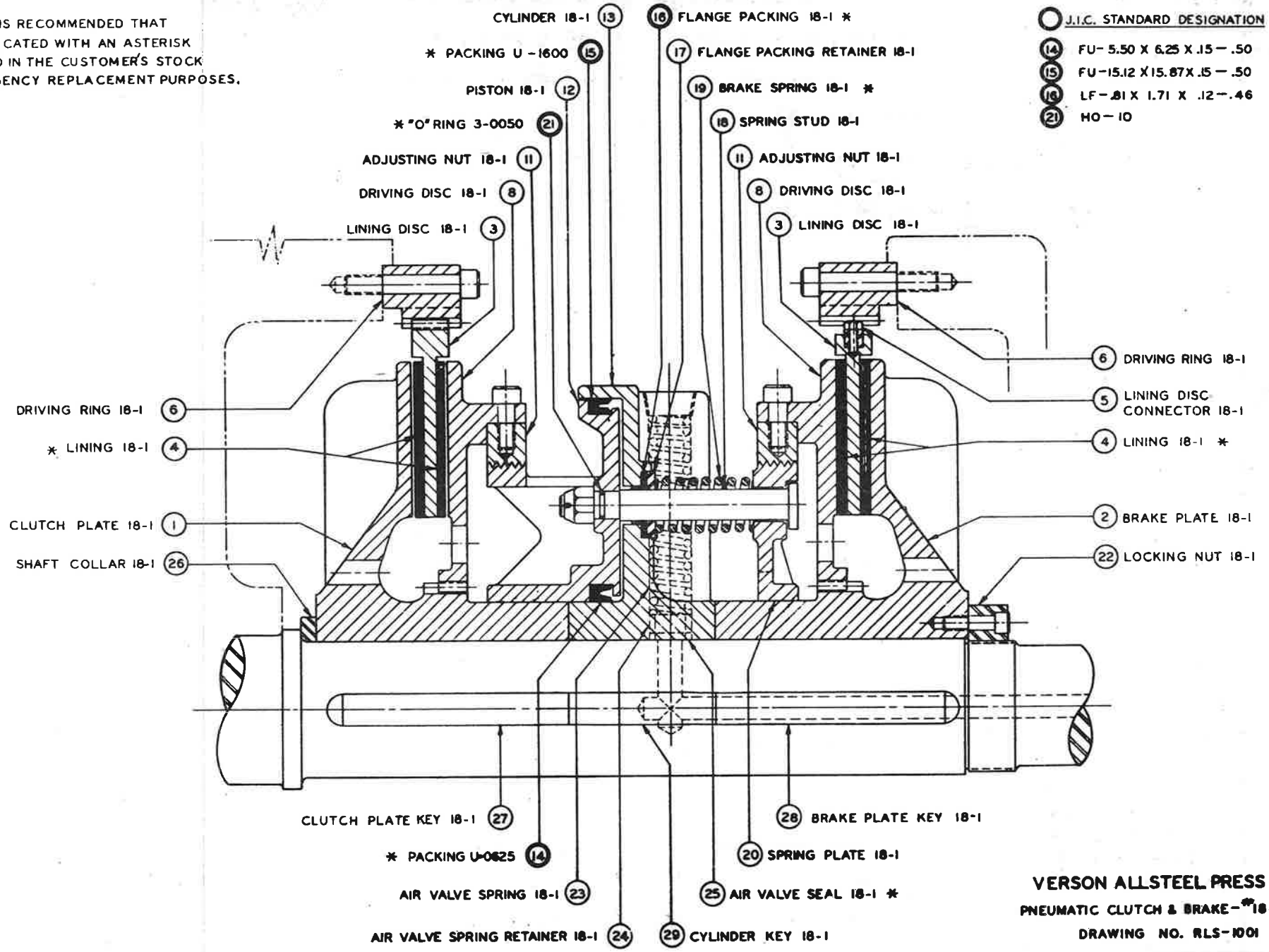
(14) FU-5.50 X 6.25 X .15 - .50
(15) FU-15.12 X 15.87 X .15 - .50
(16) LF-.81 X 1.71 X .12 - .46
(21) HO - 10

VERSON ALLSTEEL PRESS CO.

PNEUMATIC CLUTCH & BRAKE - 18-11

. DRAWING NO. RLS-1001

* NOTE: IT IS RECOMMENDED THAT PARTS INDICATED WITH AN ASTERISK BE CARRIED IN THE CUSTOMER'S STOCK FOR EMERGENCY REPLACEMENT PURPOSES.



J.I.C. STANDARD DESIGNATION

(14) FU-5.50 X 6.25 X .15 — .50
(15) FU-15.12 X 15.87 X .15 — .50
(16) LF-.81 X 1.71 X .12 — .46
(21) HO — 10

VERSON ALLSTEEL PRESS CO.

PNEUMATIC CLUTCH & BRAKE — 18-11

DRAWING NO. RLS-1001

REPLACEMENT OF LINING DISCS

To replace clutch lining disc or discs (3), as the case may be, remove screws holding the clutch driving ring (6) or (7), as the case may be, to the fly wheel. Slide the driving ring back over the clutch until the lining disc or discs (3), as the case may be, is clear. Remove the lining disc connectors (5) and lift out the halves of the lining disc or discs, as the case may be. Reverse the procedure to replace the relined disc or discs. Insert and tighten lining disc connector screws and clutch driving ring screws and wire the screw heads in position. Follow this same procedure on the brake side of the unit to replace the brake lining disc or discs (3), as the case may be.

IMPORTANT: WHEN LINING DISC OR DISCS, AS THE CASE MAY BE, OF EITHER OR BOTH THE CLUTCH AND OR BRAKE ARE REPLACED, THE CLUTCH AND BRAKE MUST BOTH BE READJUSTED USING THE ENTIRE PROCEDURE PREVIOUSLY OUTLINED.

PACKING REPLACEMENT:

When it becomes necessary to replace piston packings and spring stud packings, the outboard support and the outboard bearing assembly are removed from the press. Remove the pipe plug, the air valve spring (23), the air valve spring retainer (24) and the air valve seal (25). Then remove the cap screws holding the clutch adjusting nut (11) to the clutch driving disc (8). Remove the locking nut (22) after first removing the screw locking it to the brake plate (2). The brake assembly and the entire cylinder assembly may now be removed from the end of the drive shaft. The cylinder assembly may be dismantled by removing the nuts holding the spring studs (18) in place. While the clutch and brake are thus partially dismantled, check all parts carefully to determine if any parts should be replaced.

The brake springs (19) are a vital part of this unit. Replace these as well as all packings (14) (15) & (16) and "O" Rings (21) each time the clutch is dismantled. Replacement of the brake springs will insure uniform pressure over the entire brake area.

The cylinder packings (14) and (15) are pliable and easily slipped into place. Apply a liberal quantity of grease to the packings and piston before assembling the packings into the piston recesses. Before assembling the piston and packings into the cylinder, coat the cylinder walls with grease. This grease will insure easier assembly and will save the packings from damage in assembly.

Reassemble the entire unit, replace the outboard support and the outboard bearing assembly, making certain all bolts and cap screws are tightened and rewired through the drilled holes in the heads. Readjust the clutch and brake, following the procedures previously outlined.

DESCRIPTION:

The Pneumatic Clutch and Brake Unit is mounted on and keyed to the drive shaft, adjacent to the flywheel. The flywheel revolves freely on the drive shaft when the clutch is disengaged. The clutch driving ring (6) is dowelled and bolted to the flywheel. The brake driving ring (6) is dowelled and bolted to the outboard support which in turn is dowelled and bolted to the press frame. The bolt heads in each case are drilled and wired in position. The clutch driving ring (6) and the brake driving ring (6) have internal gear teeth which engage teeth cut in the clutch and the brake lining discs (3), forming two couplings. The clutch lining disc (3), when disengaged, floats axially between the clutch plate (1) and the driving disc (8). The brake lining disc (3), when disengaged, floats axially between the brake plate (2) and the driving disc (8). These lining discs are split for convenient removal when lining replacement is necessary.

The clutch plate (1), the air cylinder (13) and the brake plate (2) are keyed to the drive shaft and locked in position by a lock nut (22). The clutch driving disc (8) and the brake driving disc (8) have internal gear teeth which engage gear teeth on the clutch plate (1) or the brake plate (2) as the case may be. The driving disc for the clutch is free to move axially to engage the clutch lining disc (3) when air pressure is admitted into the cylinder (13) and the driving disc for the brake is free to engage the brake lining disc (3) by action of the brake springs (19) when the air under pressure is exhausted from the cylinder (13).

The clutch adjusting nut (11) is recessed into the clutch driving disc (8) and threaded onto the piston (12). The brake adjusting nut (11) is recessed into the brake driving disc (8) and threaded onto brake spring plate (20). The adjusting nuts are locked to their respective driving discs by cap screws, the heads of which are drilled and wired. This assures a positive lock and prevents the clutch and brake from working out of adjustment.

The piston (12) is sealed against the wall and the hub of the cylinder (13) by two "U" type packings (14) and (15) mounted in piston recesses. Air is admitted into the cylinder (13) through a hole drilled in the center of the drive shaft. The drive shaft is cross drilled to connect this center hole with the inlet port of the cylinder (13). The inlet port passage of the cylinder (13) is sealed by means of a synthetic rubber, air valve seal (25) at the shaft. To exert sealing pressure, an air valve spring (23) with a spring retainer (24) is placed in the inlet passage and held in position by a pipe plug inserted in the outer end of the passage. The brake spring studs (18) are clamped solidly against the piston (12) by slotted nuts which are prevented from coming loose by cotter pins through the studs. The piston (12) is effectively sealed against air leakage around the spring studs (18) by means of "O" rings (21). Since these studs also pass through the rear wall of the cylinder (13) and must be free to move axially, the studs are sealed at this point through the use of flange packings (16) and packing retainers (17) which are held in position by the brake springs (19).

The foregoing description pertains primarily to a basic arrangement of single disc clutch and single disc brake. When multiple disc clutch and or brake assemblies are used, intermediate discs (9) are included. These have internal gear teeth which engage teeth cut into the clutch plate (1) or brake plate (2) as the case may be. When not engaged, the intermediate discs (9) float axially to a free position due to the effect of centering springs (10). When engaged, the intermediate discs serve as mating surfaces so that both sides of lining discs (3) are utilized. It should be noted that the identifying number for single disc type clutch and brake driving rings is (6) but that the number for double disc type clutch and brake driving rings is (7).

REGULAR LUBRICATION

All Verson Pneumatic Clutches and their solenoid operated control valves, including all packings, have been designed and selected for this application after extensive tests. They are lubricated by means of an oil fog and with reasonable care will supply long, uninterrupted and trouble free service. The oil fog is produced thru the use of a lubricator located in the piping which supplies the clutch with compressed air. The amount of oil injected into the air supply is controlled by means of an adjustable screw on top of the lubricator, clockwise rotation of the screw decreases it and counter-clockwise rotation increases it.

The quantity of oil required depends primarily upon the frequency of clutch engagements and can best be regulated on the basis of experience. The relative location of the lubricator is shown on the schematic piping diagram, but its actual physical location should be such that the level of oil in the transparent bowl is clearly visible from the floor.

CAUTION

It is evident that correct operation of the solenoid operated air valve is absolutely necessary for correct and safe operation of the clutch and brake. These items, as is inherent in all such components with moving parts, require adequate and continuous lubrication during operation. This is attainable only by seeing to it that the lubricator is in good operating condition, correctly adjusted and well filled with oil. This will minimize wear but should supplement rather than take the place of regular, periodic, inspection at least once in every 1000 hours of operation. THOROUGH MAINTENANCE, ESPECIALLY OF THE SOLENOID OPERATED VALVE, IS OF UTMOST IMPORTANCE IN ORDER TO AVOID MALFUNCTION, RANGING FROM SLUGGISH ACTION TO REPEAT ACTION, AND THE DANGERS WHICH THIS ENTAILS.

EMERGENCY LUBRICATION

If the clutch fails to operate normally after a long period of inactivity or after an extended period of operation during which lubrication has been neglected, proceed as follows: Fill the transparent bowl of the air line lubricator, check its operation and take steps to insure adequate care of this item. Then remove the pipe plug, which will be found near the outer edge of the clutch air cylinder, and introduce a supply of the regular lubricant directly into the cylinder. This method can also be used to introduce 600W. grade lubricant in case a noticeable leakage of air takes place between the cylinder and the piston. These suggestions are for emergencies only and should not be considered as a substitute for adequate maintenance.

VERSON ALLSTEEL PRESS COMPANY

Ross INSTALLATION NOTES

FOR ALL VALVES

Use a Filter and Lubricator in the Line. Dirt, scale, moisture, etc., are present in virtually any air system and should be removed continuously with a filter if valves are to function properly. The air stream should be lubricated with a top grade, light, non-gumming, lubricating oil (see list of proper oils under "Maintenance Notes", next page).

Provide Ample Size Supply Line. For maximum efficiency of the pneumatic system, use supply line with inside diameter equivalent of inside diameter of pipe from which the valve is tapped.

Observe Pressure Minimums and Maximums. The plate drawing (information sheet) describing a valve denotes these minimums and maximums. These ranges are established for assurance of reasonable service in general air applications. Although many of the valves may be used for fluids other than air within these pressure ranges, and used for vacuum, your Ross representative should be consulted for advice on such applications.

Observe Temperature Minimums and Maximums. The valve's plate drawing (information sheet) denotes the suggested temperature range both for fluid flowing through the valve and for the ambient temperature. Improper valve actions and/or a shortening of valve life can result if these limits are exceeded. If your service requires operating outside these ranges consult your Ross representative.

Exhaust Restrictions Should be Avoided. For maximum valve efficiency, if a muffler is used it should be of ample capacity. Should you have any question about muffler capacity, consult your Ross representative.

If Valve has been Dormant. If the valve has been stored, it may be advantageous to disassemble the valve, add a small quantity of lubricating oil directly into the valve's moving parts and move the parts manually a few times (see list of proper oils under "Maintenance Notes", next page).

PILOT OPERATED VALVES

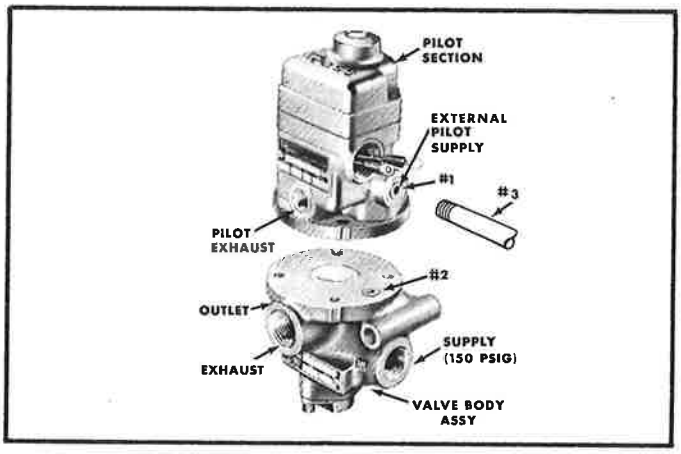
Use Proper Pilot Pressure. Most solenoid pilot operated valves are internally supplied with pilot air and there should be no problems in assuring that the pressure is sufficient to operate the valve, provided the main valve pressure is not less than 30 psig. When external pilot supply is used it should be close as possible to the pressure in the valve body, but again not less than 30 psig. A large pressure differential between pilot air and air in the valve body will tend to shorten the life of the main valve's parts.

If a valve must operate on 5 to 30 psig . . . then the valve's pilot should be supplied from an external source rather than using the standard provision for internal pilot supply. You can make this conversion in the field to accommodate external pilot supply as follows.

1. Remove pilot section assembly from valve body assembly.
2. Remove ⅛" pipe plug #1 from external pilot supply port.
3. Install ⅛" pipe plug in internal supply passage #2 in main valve body.
4. Replace pilot section.
5. Install ⅛" pipe #3 in external pilot supply port. Pilot pressure should be equal to main valve pressure, never less than 30 psig. A large pressure differential between pilot air and main air will tend to shorten life of the main valve parts.
6. Make clear note of this conversion, and mention it when you identify the valve in future parts orders or service inquiries.

Using the Valve to Control Liquids and Gases other than Air. The valve should be connected to external pilot supply as described above. Certain liquids and gases can attack the seals and other materials in the valves. Therefore, you should consult your Ross representative when the valve is to be used with such materials.

Assure Proper Voltage for Solenoids. Voltage should not vary more than plus 5% or minus 15% of rating on solenoid coil.



Ross MAINTENANCE NOTES

FILTERS, LUBRICATORS AND VALVES

Supply Clean, Lubricated Air. An efficient filter and lubricator should be installed in the line supplying air to the equipment. The filter should be a unit that will remove water and other contaminants in an air system. Accumulated liquid should be drained often from the filter. If a portion of your system is in an area that does not get frequent routine maintenance, or if there is considerable water in your air system, you should consider a filter which drains itself automatically when its water level reaches a given point. The lubricator used should deposit oil in the system at *low* air flow rates as well as at *high* air flow rates. Proper lubrication is achieved when all moving parts in the air system are receiving enough oil to *maintain* a thin coat of high grade lubrication. This is necessary to insure long life for the equipment.

Following is a list of air line lubricants we have found suitable:

1. Cities Service Oil Co. . . . . Pacemaker #1
2. Esso . . . . . Lopar
3. Penola Company . . . . . Penola S-075
4. Shell . . . . . Tellus #15
5. Socony-Mobil Oil Co. . . . . Almo #1
6. Socony-Mobil Oil Co. . . . . Vectra (Light)
7. Socony-Mobil Oil Co. . . . . DTE (Light)
8. Standard Oil Co. . . . . Stanoil #15
9. Texaco . . . . . Rabtex
10. Texaco . . . . . Regal Oil A.R.&O

Generally speaking, any light bodied mineral or petroleum base oil with a 180°F. to 220°F. analine point and an SAE #10, or lighter, viscosity equivalent will prove compatible with the Buna N sealing compounds used in Ross Valves. Such oils should also atomize sufficiently in most lubricators so to provide adequate lubrication of the moving parts of an air system.

Normal Service. In most cases, it will not be necessary to remove the valve from its installation for servicing. Normally, all that will need replacing are the seals and possibly the springs. A periodic check of actuators and locking devices for wear is recommended.

In Some Services Valves Require Periodic Cleaning. Under certain operating conditions, the valve ports and the internal channels of the valve may build up a deposit of varnish and/or foreign materials. Over a period of time, these deposits will contribute to a sluggish action and possibly a malfunction. It is suggested that a periodic cleaning of valves be established should this condition exist. (As to the cause of varnish, it sometimes results from faulty rings in the air compressor which may allow oil to get into the compression chamber. Heat in that chamber can cause the oil's chemical breakdown.)

SOLENOIDS

Keep Relay Contacts Clean. Dirty or pitted contacts can cause irregularities in the electric power supply which can cause solenoid burn-out.

Moisture or Heat In Solenoid Enclosure. Under normal temperature and humidity conditions, a standard solenoid should give no problems. Excessive moisture, condensation or heat in the solenoid enclosure can be harmful and shorten coil life. Avoid subjecting standard solenoid valves to such conditions. Should ambient temperature exceed 120°F. or abnormally high humidity condition exist, contact Ross for suitable solenoid coils.

LITHO IN USA

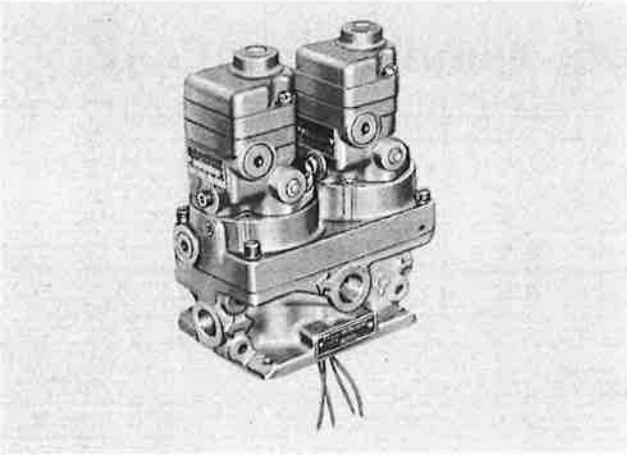
G10003 REVISED 4-65

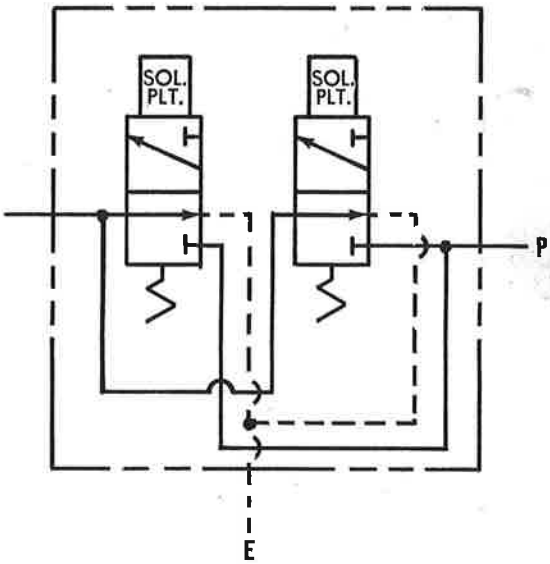
ROSS OPERATING VALVE COMPANY • DETROIT, MICHIGAN 48203

PACER
DOUBLE
VALVE

SOLENOID ACTUATED—THREEWAY
NORMALLY CLOSED—PARALLEL FLOW—INLINE

PLATE NO. 25A006
ISSUED 7-63



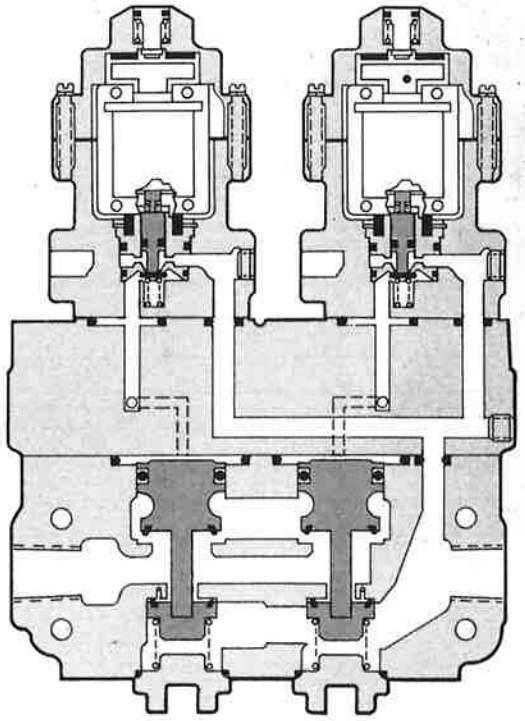


STANDARD SPECIFICATIONS

HEAD: Conforms to J.I.C. standards, A.C. solenoid
Inrush: 116 Volt amps @ 60 cycles (58 VA each solenoid)
Holding: 52 Volt amps @ 60 cycles (26 VA each solenoid)
Ambient temperature range +40°F min., +120°F max.
Air pressures 30-150 psig.
Internal pilot supply.

BODY: Air pressures 30-150 psig.
Temperature of fluid passing through valve +40°F min., +175°F max.

OPERATION:
Solenoids de-energized; Inlet closed, outlet open to exhaust.
Solenoids energized; Inlet open to outlet, exhaust closed.

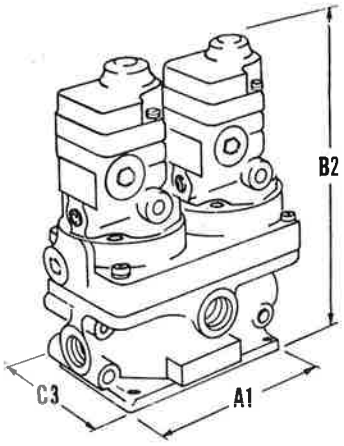


MODEL NUMBERS

Pipe Size	Model Numbers
¼	2573A2006
⅜	2573A3006
½	2573A4016
½	2573A4006
¾	2573A5006
1	2573A6016
1	2573A6006
1¼	2573A7006
1½	2573A8016

OPTIONAL MODELS

D.C. solenoid—Button type manual actuator—No manual actuator—Position indicator pins—Lifeguard adaptor.

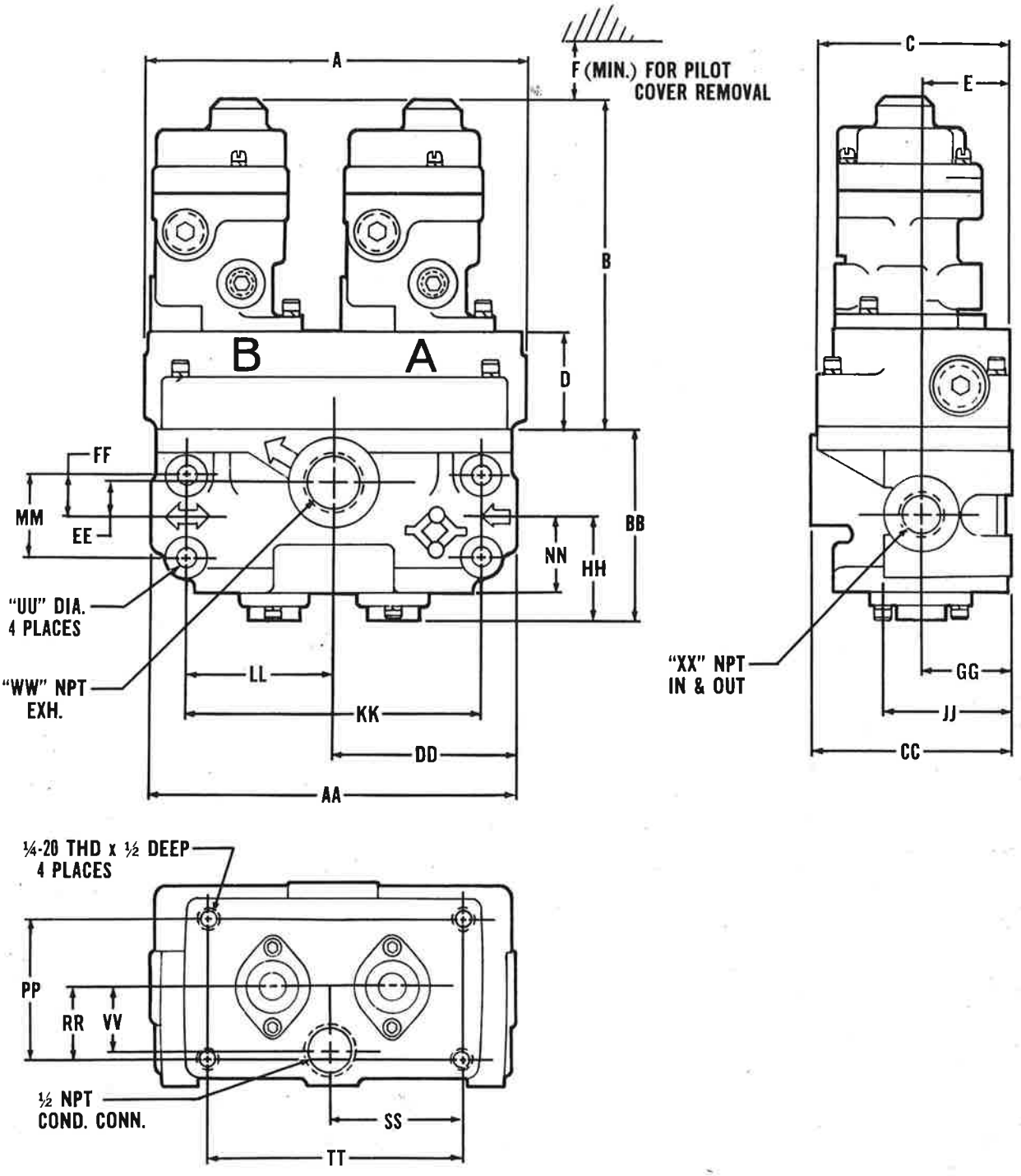


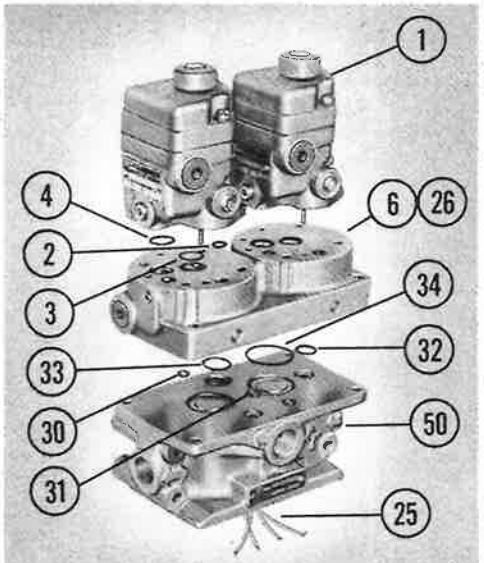
OVERALL DIMENSION CHART

Pipe Size	¼-⅜-½	½-¾-1	1-1¼-1½
Wt. Lbs.	7½	8½	23¾
A1	6¼	6 7/16	10 3/16
B2	8⅝	9⅜	12 7/16
C3	3 7/16	4	4⅞

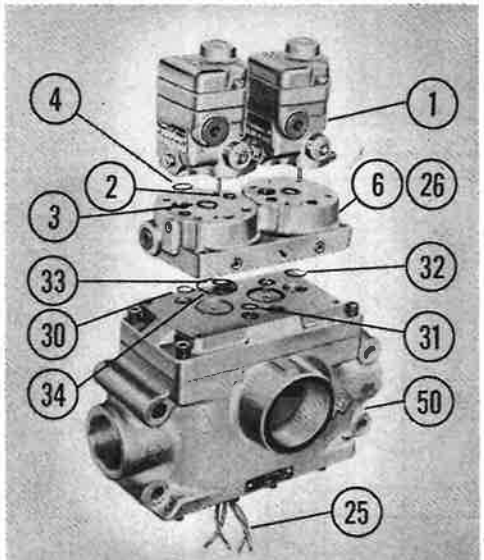
HEAD AND BODY DIMENSIONS

PIPE SIZE	¼	⅜	½	½	¾	1	1	1¼	1½
A	6¼								
B	5½								
C	3¼								
D	1 21/32								
E	1½								
F	13/16								
AA	6⅛			6 7/16			10 3/16		
BB	3⅛			3⅞			6 15/16		
CC	3 7/16			4			4⅞		
DD	3 1/16			3 5/16			5¼		
EE	⅝			19/32			1⅛		
FF	11/16			15/16			1 13/32		
GG	1⅝			1⅝			1 13/16		
HH	1 23/32			2⅛			3 3/32		
JJ	2¼			2 11/32			3		
KK	5 1/16			5½			8 9/16		
LL	2½			2 21/32			4 3/32		
MM	1⅜			2 1/16			3 1/16		
NN	1 9/32			1½			2 7/16		
PP	2⅜			2⅜			2⅞		
RR	1 3/16			1 3/16			1 7/16		
SS	2⅛			2⅛			3 19/32		
TT	4¼			4¼			7 3/16		
UU	9/32			11/32			17/32		
VV	1			1			1 3/16		
WW	¾			1¼			2		
XX	¼	⅜	½	½	¾	1	1	1¼	1½

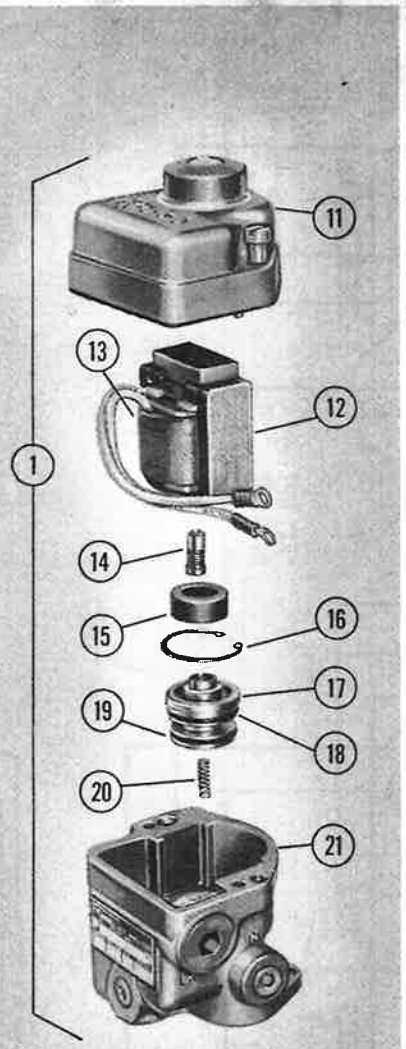

A
F (MIN.) FOR PILOT
COVER REMOVAL
B
B
A
D
FF
MM
EE
BB
NN
HH
"UU" DIA.
4 PLACES
"WW" NPT
EXH.
LL
KK
DD
AA
C
E
"XX" NPT
IN & OUT
GG
JJ
CC
¼-20 THD x ½ DEEP
4 PLACES
PP
RR
VV
½ NPT
COND. CONN.
SS
TT



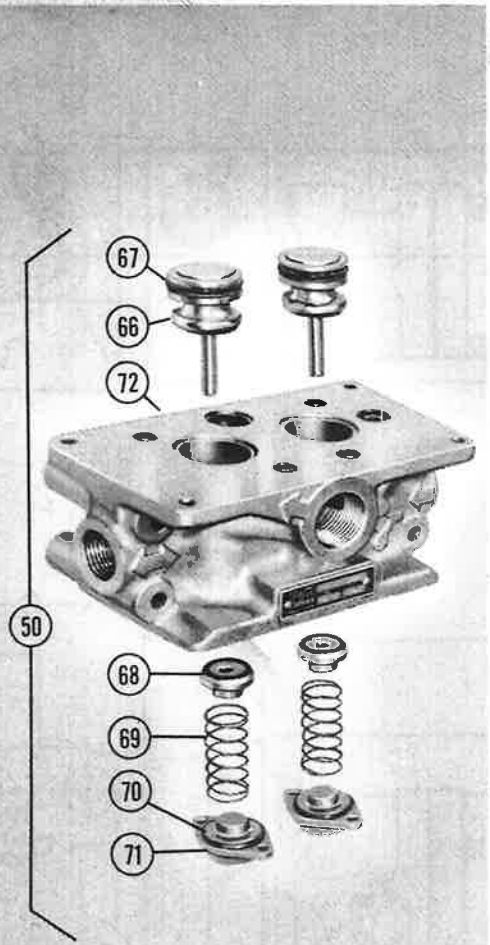
BASIC PIPE SIZE ⅜ & ¾



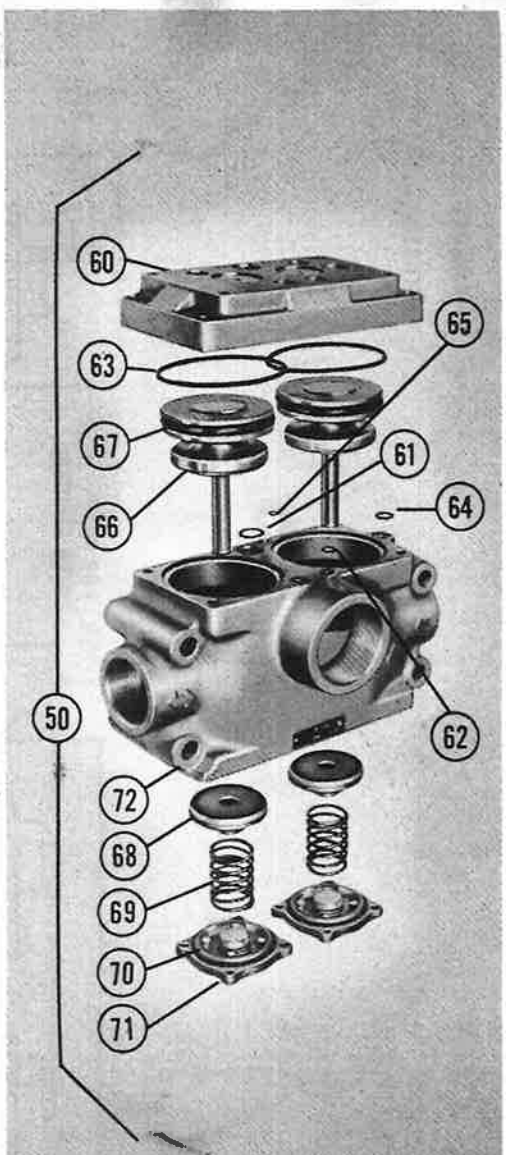
BASIC PIPE SIZE 1¼



PILOT & SOLENOID



VALVE BODY ASSEMBLY
BASIC PIPE SIZE ⅜ & ¾



VALVE BODY ASSEMBLY
BASIC PIPE SIZE 1¼

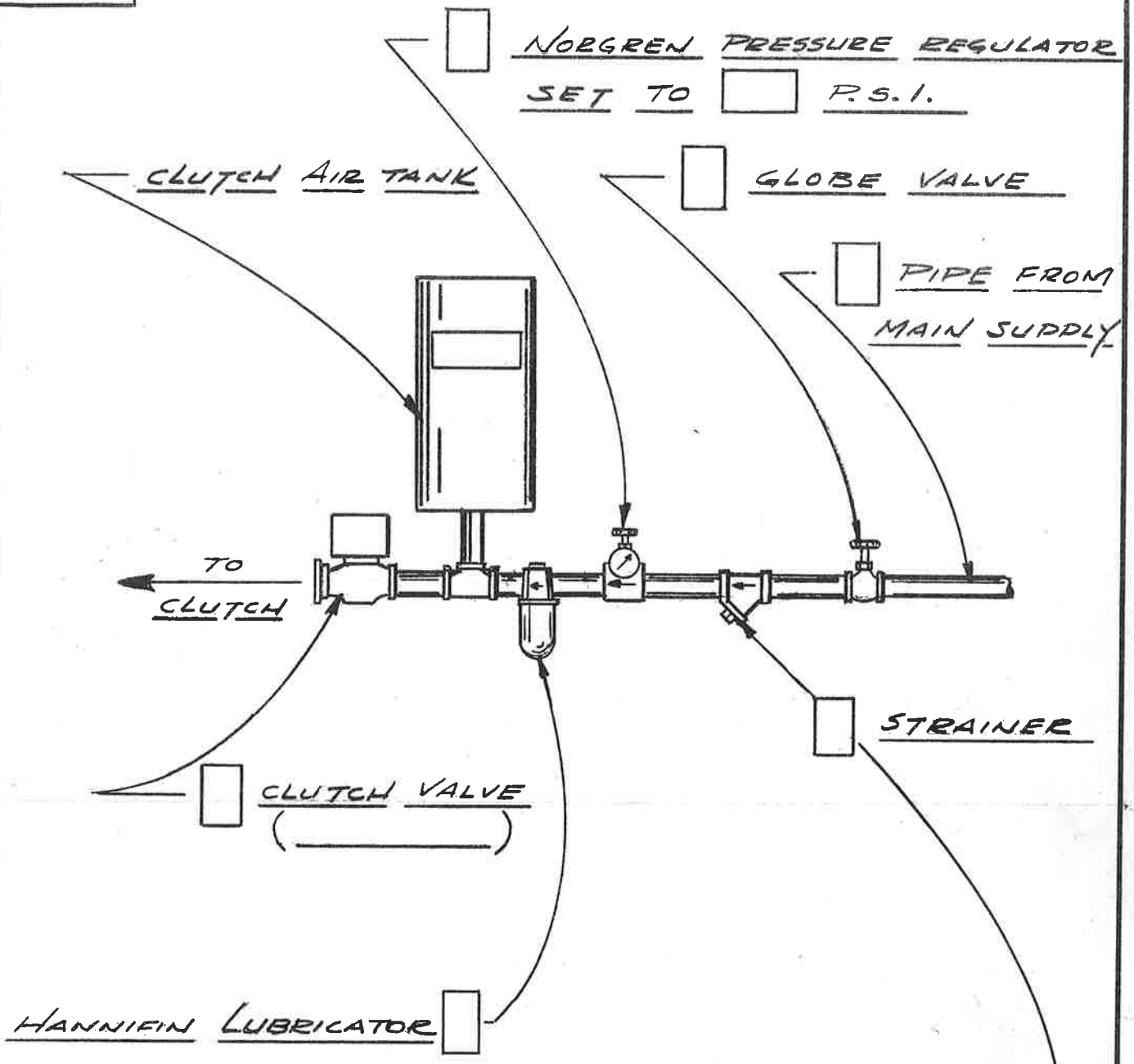
SOLENOID ACTUATED—THREEWAY
NORMALLY CLOSED—PARALLEL FLOW—INLINE

PLATE NO. 25A006
ISSUED 7-63

ITEM NO.	NO. REQ'D	ITEMS	MODEL NUMBERS	2573A2006	2573A3006	2573A4016	2573A4006	2573A5006	2573A6016	2573A6006	2573A7006	2573A8016
			PIPE SIZE	¼	⅜	½	½	¾	1	1	1¼	1½
			BASIC PIPE SIZE	⅜			¾			1¼		
1	2	PILOT & SOLENOID ASSY.		435C93								
11	2	COVER ASSY.		134A89								
12	2	SOLENOID (SPECIFY VOLTAGE & CYCLE)		183B04								
13	2	COIL (SPECIFY VOLTAGE & CYCLE)		138K33								
14	2	OVERTRAVEL ASSY.		148A87								
15	2	CUSHION		164A32								
16	2	RETAINING RING		119K22								
17	2	INSERT ASSY.		113A97								
18	2	"O" RING		207K15								
19	2	"O" RING		206K15								
20	2	SPRING		207A13								
21	2	BODY		NOT SOLD SEPARATELY								
2	4	"O" RING		105K15								
3	2	"O" RING		204K15								
4	2	"O" RING		202K15								
6	1	ADAPTOR ASSY.		199B86						200B86		
25	4	WIRE ASSY.		202A94								
26	1	ADAPTOR		NOT SOLD SEPARATELY								
30	2	"O" RING		103K15						201K15		
31	2	"O" RING		105K15						201K15		
32	1	"O" RING		107K15						204K15		
33	1	"O" RING		204K15						204K15		
34	2	"O" RING		228K15						212K15		
50	1	VALVE BODY ASSY.		118C81	119C81	120C81	121C81	122C81	123C81	124C81	125C81	126C81
60	1	ADAPTOR		—			—			319C25		
61	1	"O" RING		—			—			204K15		
62	2	"O" RING		—			—			106K15		
63	2	"O" RING		—			—			312K15		
64	1	"O" RING		—			—			107K15		
65	2	"O" RING		—			—			103K15		
66	2	PISTON POPPET ASSY. W/"O" RING		136T88			137T88			138T88		
67	2	"O" RING		116K15			122K15			136K15		
68	2	POPPET ASSY.		162A98			176A98			165A98		
69	2	SPRING		227A13			73318			196A13		
70	2	"O" RING		209K15			216K15			240K15		
71	2	END PLUG		186A10			190A10			187A10		
72	1	BODY		NOT SOLD SEPARATELY								

ROSS OPERATING VALVE COMPANY • DETROIT 3, MICHIGAN

LS 2852



RECOMMENDED : A COMBINATION STRAINER AND WATER SEPARATOR BE PLACED IN THE SUPPLY LINE TO PRESS

WHEN ORDERING REPAIR PARTS. GIVE PART NAME. NUMBER AND THIS DRAWING NUMBER. ALSO SERIAL NUMBER OF MACHINE AND MACHINE MODEL NUMBER.

NOTE:
PARTS MARKED WITH ASTERISK (*) ARE RECOMMENDED TO BE STOCKED.

VERSON ALLSTEEL PRESS CO.

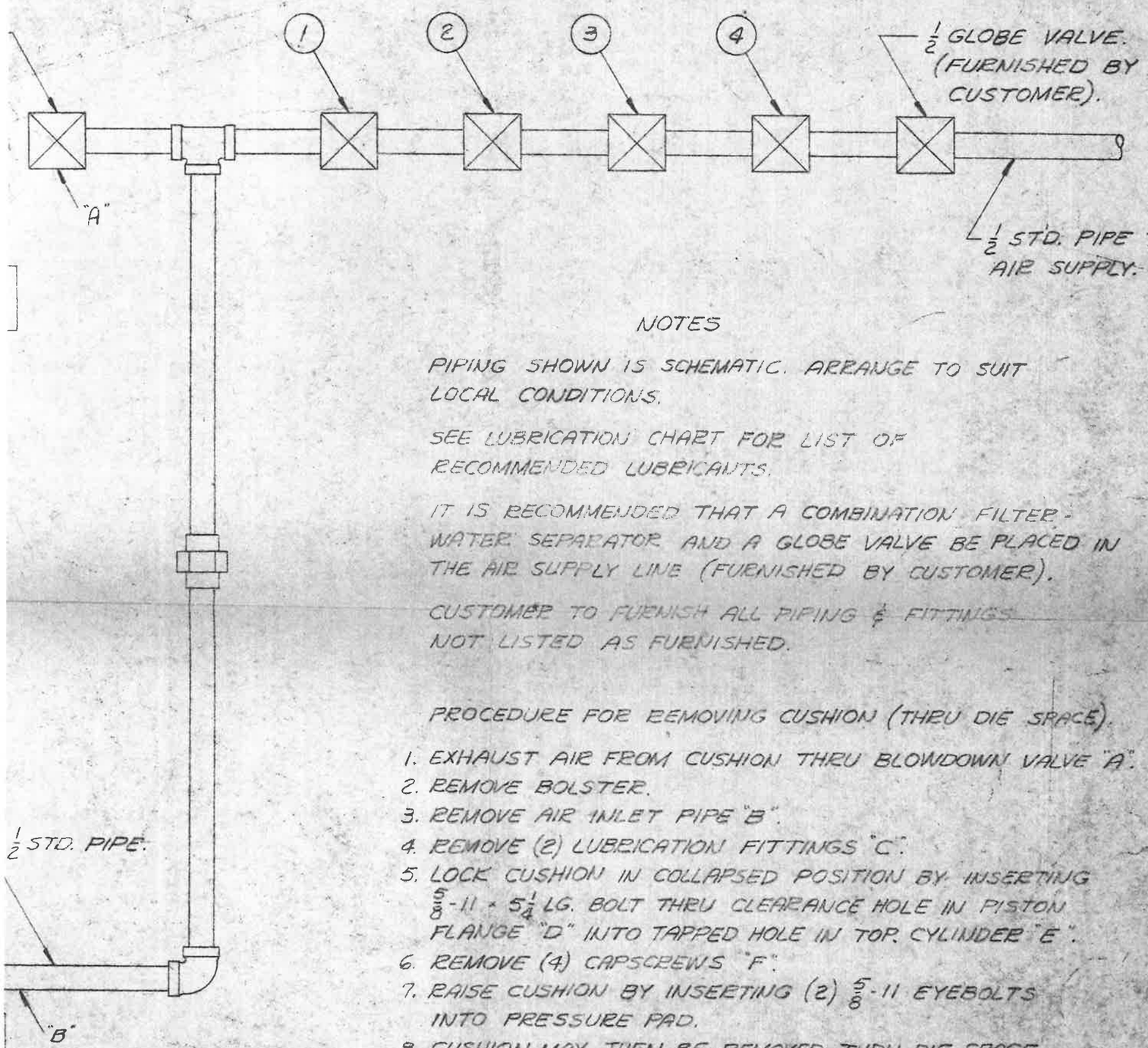
PARTS LIST FOR

CLUTCH PIPING SCHEMATIC

DRAWING NO.

LS-2852

8/59 | JWN



NOTES

PIPING SHOWN IS SCHEMATIC. ARRANGE TO SUIT LOCAL CONDITIONS.

SEE LUBRICATION CHART FOR LIST OF RECOMMENDED LUBRICANTS.

IT IS RECOMMENDED THAT A COMBINATION FILTER-WATER SEPARATOR AND A GLOBE VALVE BE PLACED IN THE AIR SUPPLY LINE (FURNISHED BY CUSTOMER).

CUSTOMER TO FURNISH ALL PIPING & FITTINGS NOT LISTED AS FURNISHED.

PROCEDURE FOR REMOVING CUSHION (THRU DIE SPACE).

1. EXHAUST AIR FROM CUSHION THRU BLOWDOWN VALVE "A".
2. REMOVE BOLSTER.
3. REMOVE AIR INLET PIPE "B".
4. REMOVE (2) LUBRICATION FITTINGS "C".
5. LOCK CUSHION IN COLLAPSED POSITION BY INSERTING $\frac{5}{8}$-11 × $5\frac{1}{4}$ LG. BOLT THRU CLEARANCE HOLE IN PISTON FLANGE "D" INTO TAPPED HOLE IN TOP CYLINDER "E".
6. REMOVE (4) CAPSCREWS "F".
7. RAISE CUSHION BY INSERTING (2) $\frac{5}{8}$-11 EYEBOLTS INTO PRESSURE PAD.
8. CUSHION MAY THEN BE REMOVED THRU DIE SPACE.

WHEN PLACING CUSHION IN BED, REVERSE THE ABOVE PROCEDURE.

CAUTION:- CARE MUST BE TAKEN TO REMOVE BOLT USED FOR LOCKING CUSHION IN COLLAPSED POSITION BEFORE ADMITTING COMPRESSED AIR TO CUSHION.

ASSEMBLY NO.	DRAWING NO.
40.01	16438-3201

DESCRIPTION	MAT'L	REQ.	COST
EK. FITTING		2	
IN COCK		1	
SIBLE PLUG		1	
STRAINER		1	

Drawing No. N-
REVISED

TRADE Verson MARK

VERSON ALLSTEEL PRESS CO.
CHICAGO, ILL.

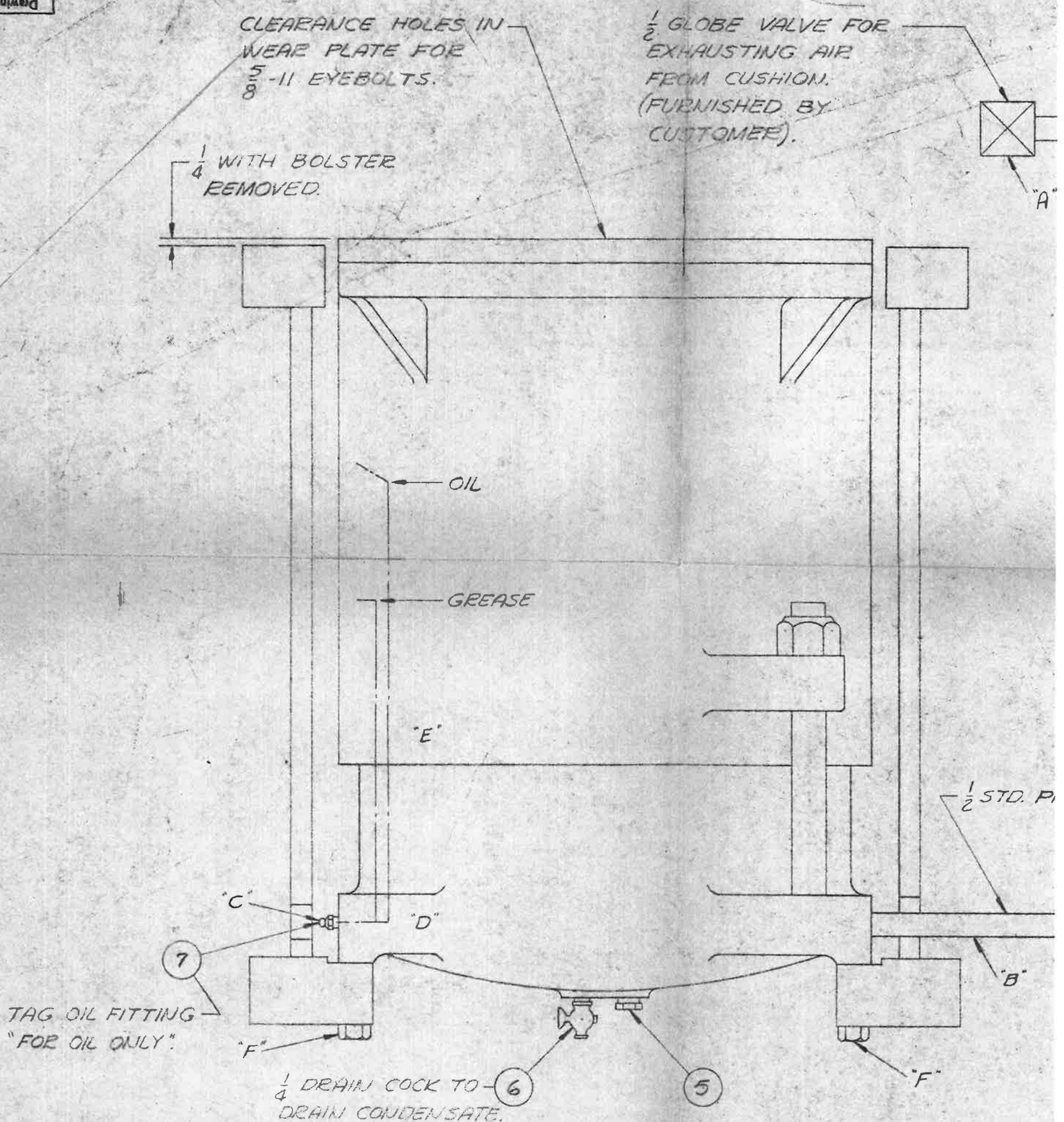
MACHINE U18-4 PNEU. CUSHION

PART INSTALLATION

DA 11-7
SCA
DR
CH

DIMENSIONS TOLERANCES UNLESS OTHERWISE SPECIFIED
FINISHED - FRACTIONAL ± 1/64, DECIMAL ± .005
UNFINISHED - WELDMENTS ± 1/8.

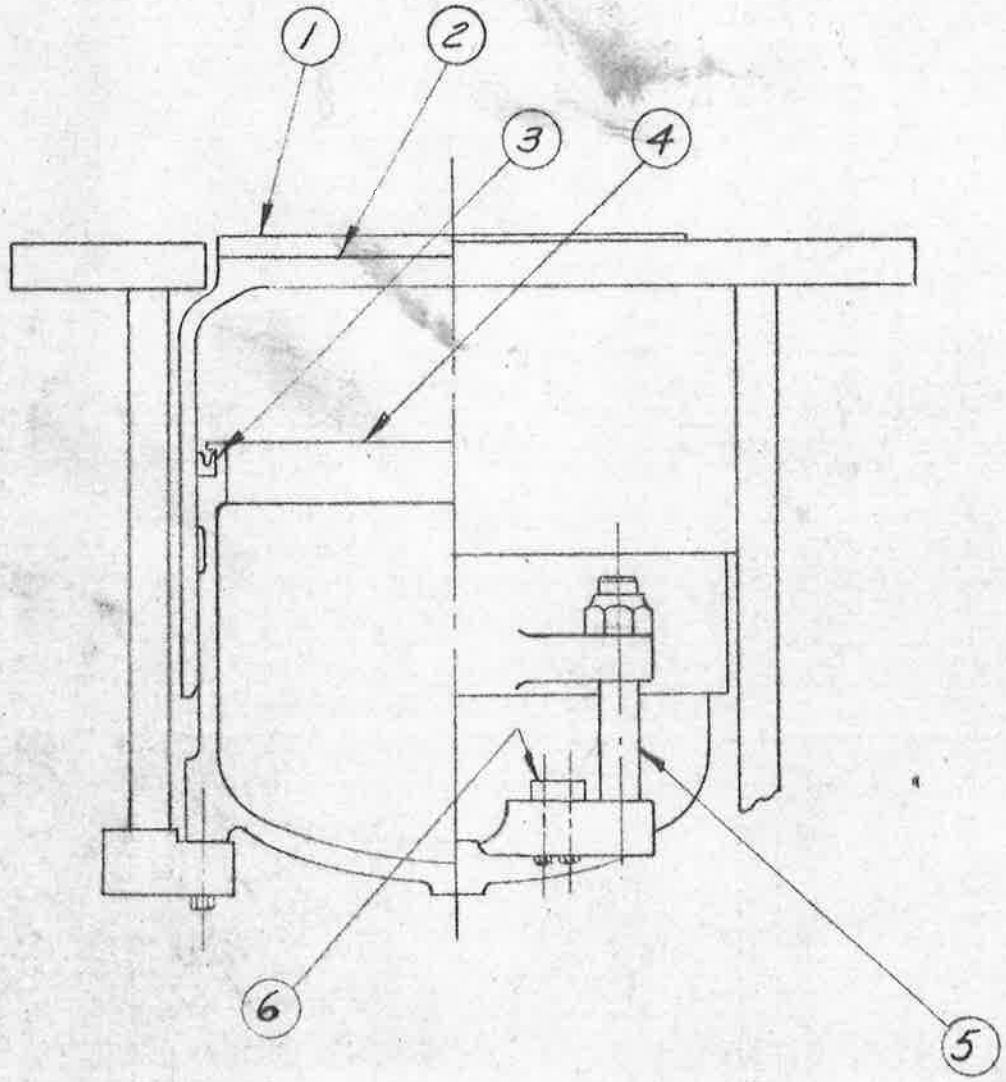
Drawing No.



P.O. NO. WEIGHT STOCK	ITEM NO.	DESCRIPTION	MAT'L	REQ.	COST
	3	1/2 NORGEEN PRESSURE REGULATOR WITH BACK MOUNTED GAUGE.		1	
	2	1/2 SWING CHECK VALVE.		1	
	1	1/2 SAFETY VALVE.		1	

P.O. NO. WEIGHT STOCK	ITEM NO.	DE
	7	1/8 ZERK FITTI
	6	1/4 DRAIN COCK
	5	1/2 FUSIBLE PL
	4	1/2 AIR STRAIN

ITEM	DESCRIPTION
1	WEAR PLATE
2	TOP CYLINDER
3	"U" PACKING
4	PISTON
5	STUD & LOCKNUT
6	SPACERS (IF USED)



WHEN ORDERING REPAIR PARTS, GIVE PART NAME, NUMBER AND THIS DRAWING NUMBER. ALSO SERIAL NUMBER OF MACHINE AND MACHINE MODEL NUMBER.

NOTE:
PARTS MARKED WITH ASTERISK (*) ARE RECOMMENDED TO BE STOCKED.

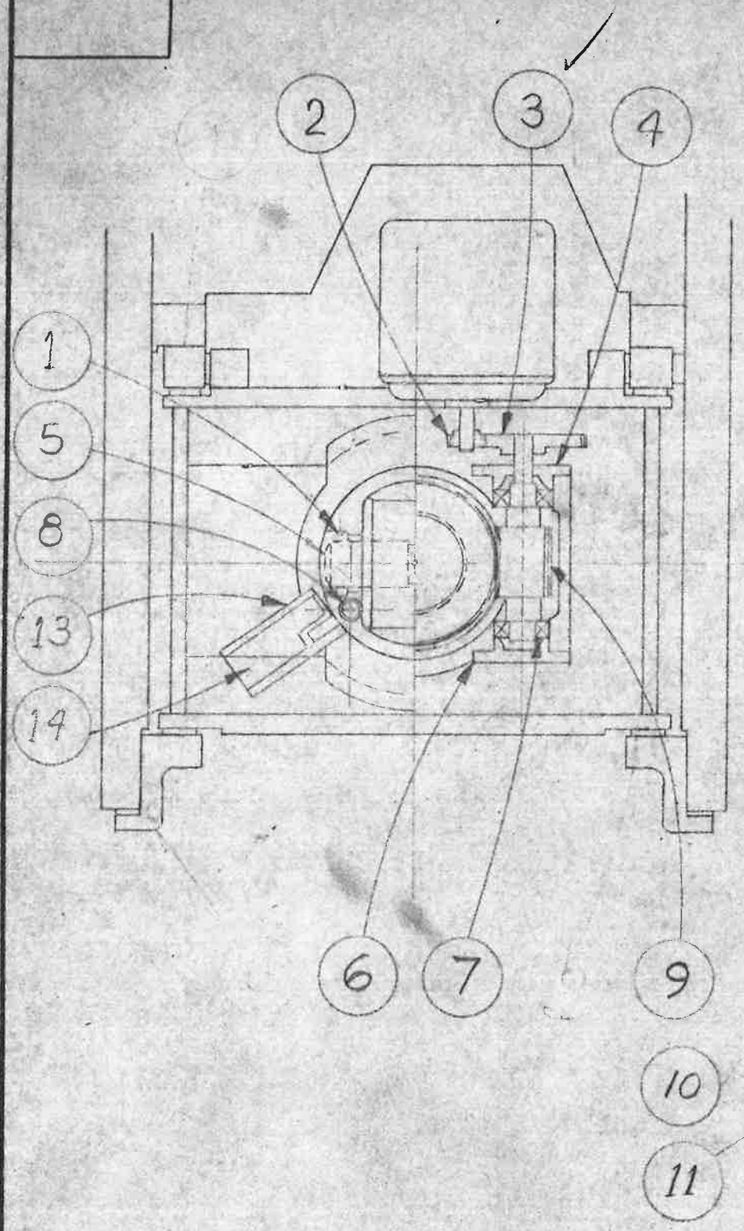
VERSON ALLSTEEL PRESS CO.

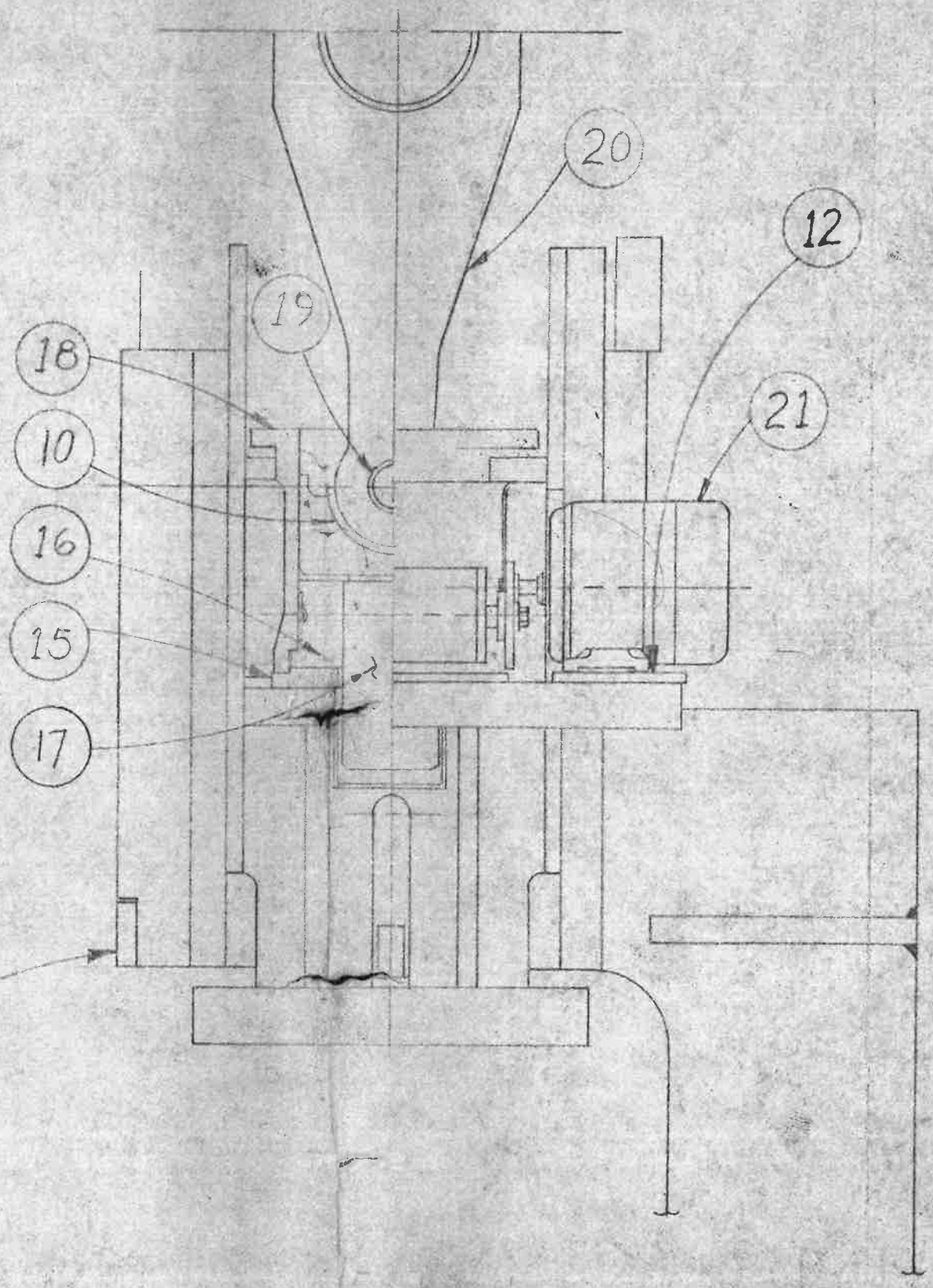
U-18-4 PARTS LIST FOR

U-22 PNEUMATIC CUSHION

DRAWING NO.
10-13032

12-13-66 AGM





PART No.	PART NAME
* 1	SEAL
2	ELEVATING PINION
3	ELEVATING GEAR
4	BEARING RETAINER
5	WRIST PIN
6	BEARING RETAINER
7	RADIAL THRUST BRG
8	LIMIT SWITCH TRIP
9	ELEVATING SHAFT
10	SADDLE BUSHING
11	TIE BAR
12	SLIDE ADJ. MOTOR BLK.
13	LOX SWITCH BASE PL
14	LOX SWITCH
15	MOUNTING PLATE
16	ELEVATING NUT
17	ADJUSTING SCREW
18	HOUSING
19	BUSHING
20	PITMAN
21	MOTOR

WHEN ORDERING REPAIR PARTS, GIVE PART NAME, NUMBER AND THIS DRAWING NUMBER. ALSO SERIAL NUMBER OF MACHINE AND MACHINE MODEL NUMBER.

NOTE:
PARTS MARKED WITH ASTERISK (*) ARE RECOMMENDED TO BE STOCKED.

VERSON ALLSTEEL PRESS CO.

PARTS LIST FOR

POWER ELEVATION

DRAWING NO.
20-07771

7.00 1-1

7.00 1-16

7.00 1-15

7.00 1-14

7.00 1-13

OPTIONAL

P.S.

TANK

C'BALANCE CYLINDER

GLOBE VALVE AT LOWEST POINT OF TANK

7.00 1-17

GLOBE VALVE (FURNISHED BY CUST.)

SOL.

LUB. PUMP

CLUTCH

BRAKE

1.03 2-17

1.03 2-15

1.03 2-16

STR.

LUB

TANK

P.S.

OPTIONAL

ELEC. ITEM

GLOBE VALVE (FURNISHED BY CUST.)

1" SUPPLY LINE

MAN.

1.03 2-17

FLYWHEEL BRAKE

TANK

40.01 1-17

40.01 1-18

40.01 1-19

CUSHION

40.01 1-24

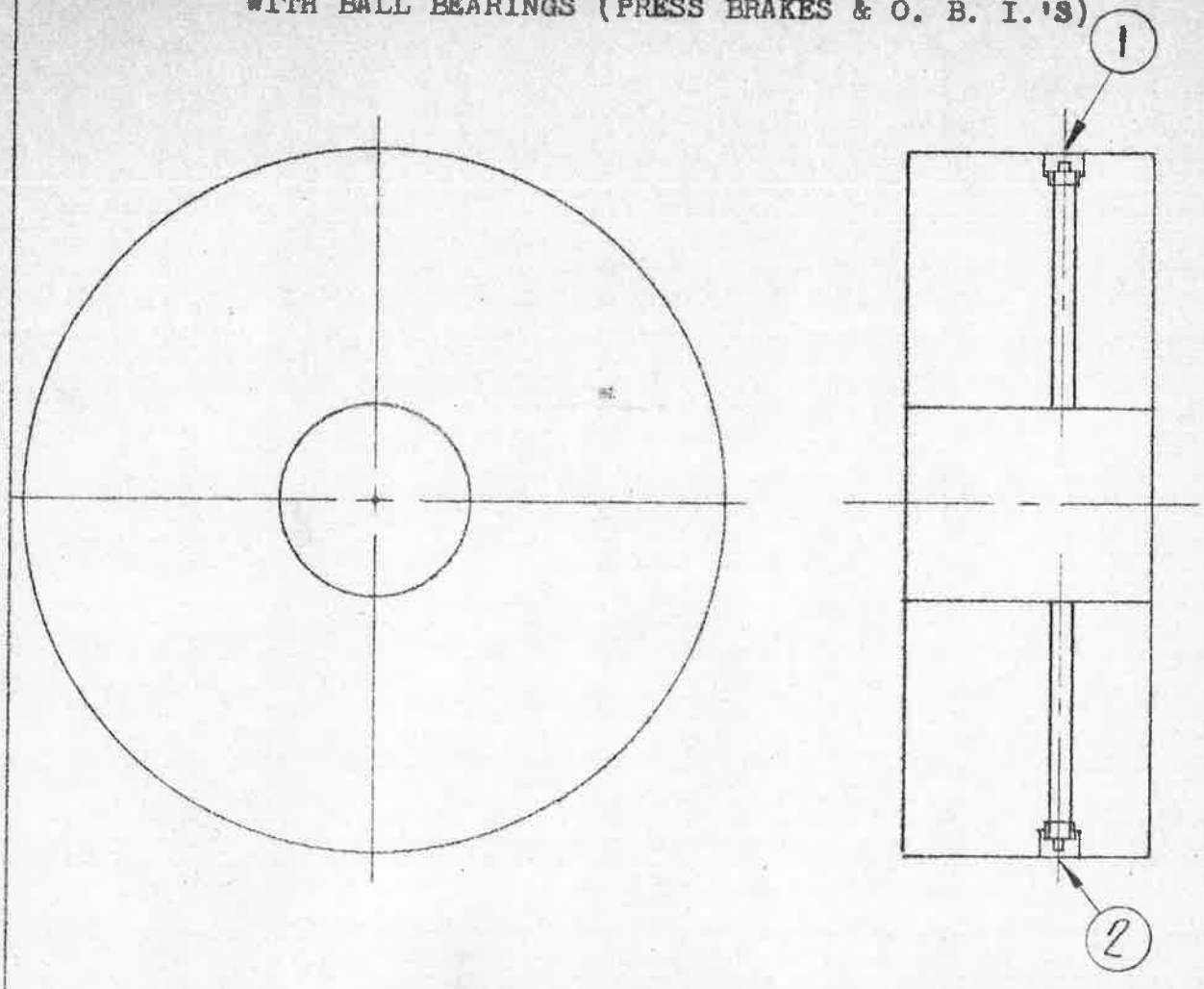
DRAIN COCK LOC AT LOWEST POINT OF SYSTEM

40.01 1-21

DATE	REVISION	ASSEMBLY NO. 80.0	DRAWING NO. 20-10021	REV. NO.
	1	TRADE Verson MARK		DATE 5-26-66
	2	VERSON ALLSTEEL PRESS CO. CHICAGO, ILL.		SCALE ~
	3	MACHINE OPEN BACK PRESS		DRAWN BY G.M.V.
	4	PART PNEUMATIC SCHEMATIC		CHECKED BY
MF.				

PATT. #

LUBRICATION INSTRUCTIONS FOR FLYWHEELS WITH BALL BEARINGS (PRESS BRAKES & O. B. I.'S)

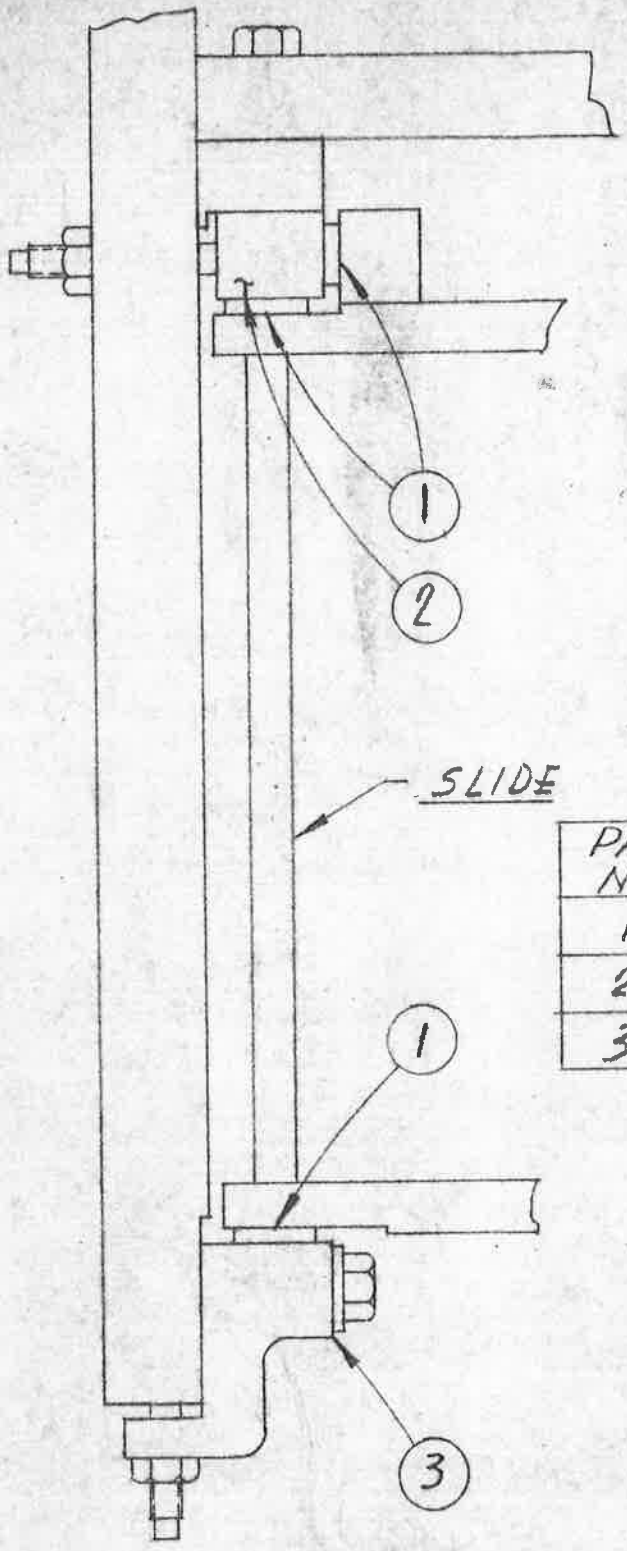


Flywheel bearings have been hand packed in assembly at the factory.

Lubricate once a month using the following procedure:

1. Remove vent pipe plug (1)
2. Pump recommended grease into point (2) until it is forced out through vent (1)
3. Replace vent pipe plug (1)

For the type of grease to be used - See VERSON Recommended Lubricant Specification Sheet No. LS-3925-762



PART N°	PART NAME
1	GIB LINER
2	REAR GIB
3	FRONT GIB

WHEN ORDERING REPAIR PARTS, GIVE PART NAME, NUMBER AND THIS DRAWING NUMBER. ALSO SERIAL NUMBER OF MACHINE AND MACHINE MODEL NUMBER.

NOTE:
PARTS MARKED WITH ASTERISK (*) ARE RECOMMENDED TO BE STOCKED.

VERSON ALLSTEEL PRESS CO.

PARTS LIST FOR

GIBS & LINERS

DRAWING NO.

LS-6120

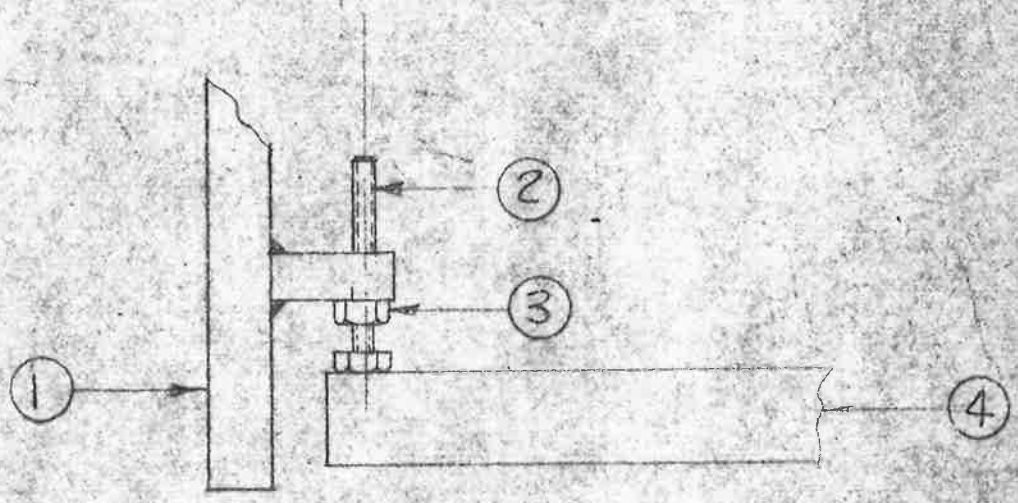
9/66 | G.M.V

Drawing No. LS-823

TOLERANCE ± .005 FOR ALL FINISHED MACHINE DIMENSIONS.
TOLERANCE FOR ALL ROUGH MACHINE DIMENSIONS ± 1/64.
TOLERANCE FOR FABRICATED SECTIONS WITHOUT MACHINING OVERALL DIMENSIONS ± 1/8. WORK TO DIMENSIONS.
DO NOT SCALE DRAWINGS.

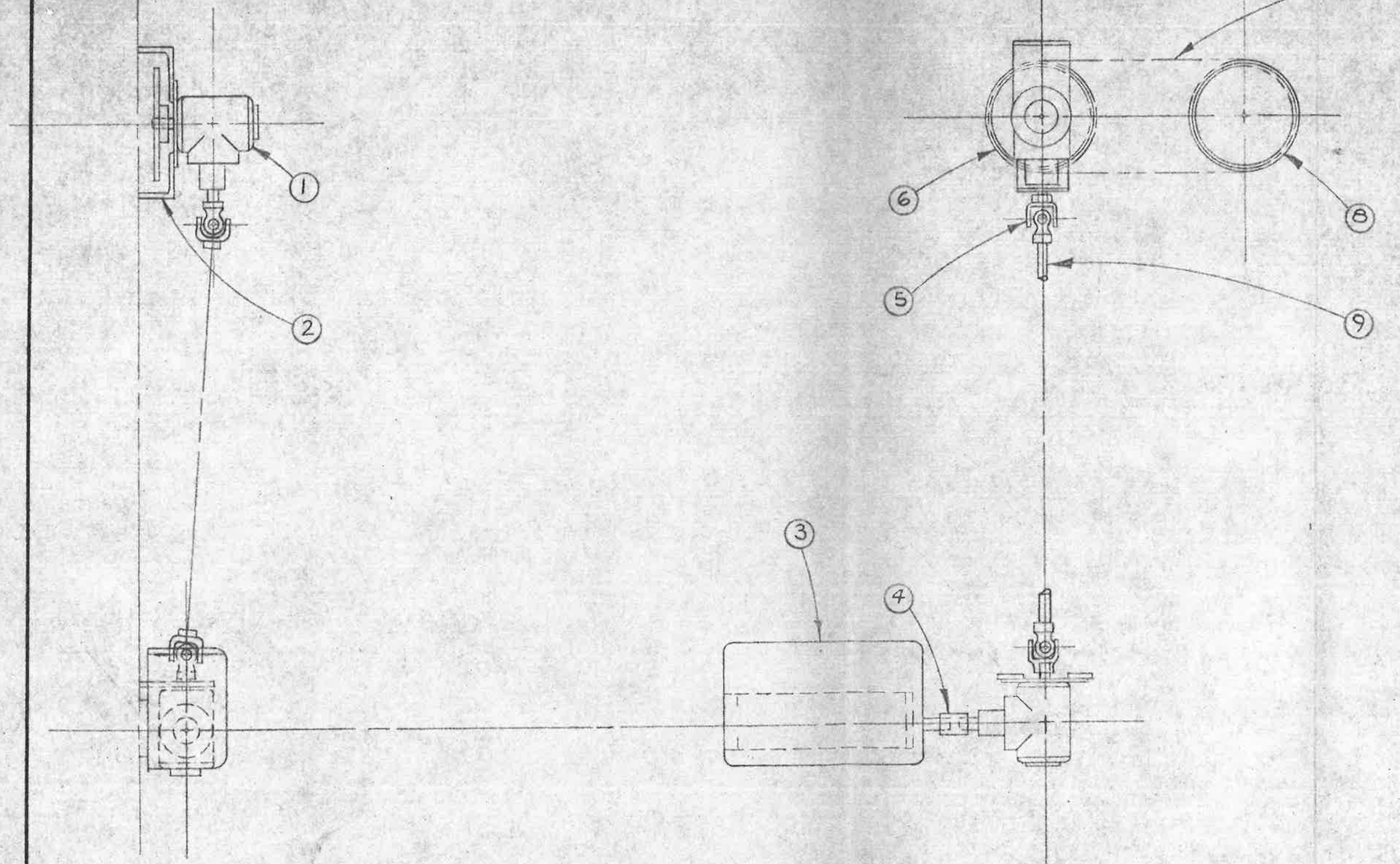
KNOCKOUT REPAIR PARTS

WHEN ORDERING REPAIR PARTS GIVE PART NO., NAME OF PART, PRESS NO., & SERIAL NO.



NO.	DESCRIPTION
1	TIE PLATE
2	ADJ. SCREW
3	JAM NUT
4	KNOCKOUT BAR

Drawing No. LS-823	TRADE Verson MARK 14/32	DATE 6-14-51
REVISED	VERSON ALLSTEEL PRESS CO. CHICAGO, ILL.	SCALE
	MACHINE VERSON PRESSES	DR: J.A.
	PART KNOCK OUT REPAIR	CH: V



IT.	DESCRIPTION
1	RIGHT-ANGLE GEAR DRIVE
2	R. ANGLE GEAR PAD
3	LIMIT SWITCH
4	DRIVE COUPLING
5	UNIVERSAL JOINT
6	SPROCKET
7	ROLLER CHAIN
8	SPROCKET
9	POWER TAKE-OFF DRIVE BAR

WHEN ORDERING REPAIR PARTS, GIVE PART NAME, NUMBER AND THIS DRAWING NUMBER. ALSO SERIAL NUMBER OF MACHINE AND MACHINE MODEL NUMBER.

NOTE:
PARTS MARKED WITH ASTERISK (*) ARE RECOMMENDED TO BE STOCKED.

VERSON ALLSTEEL PRESS CO.

PARTS LIST FOR

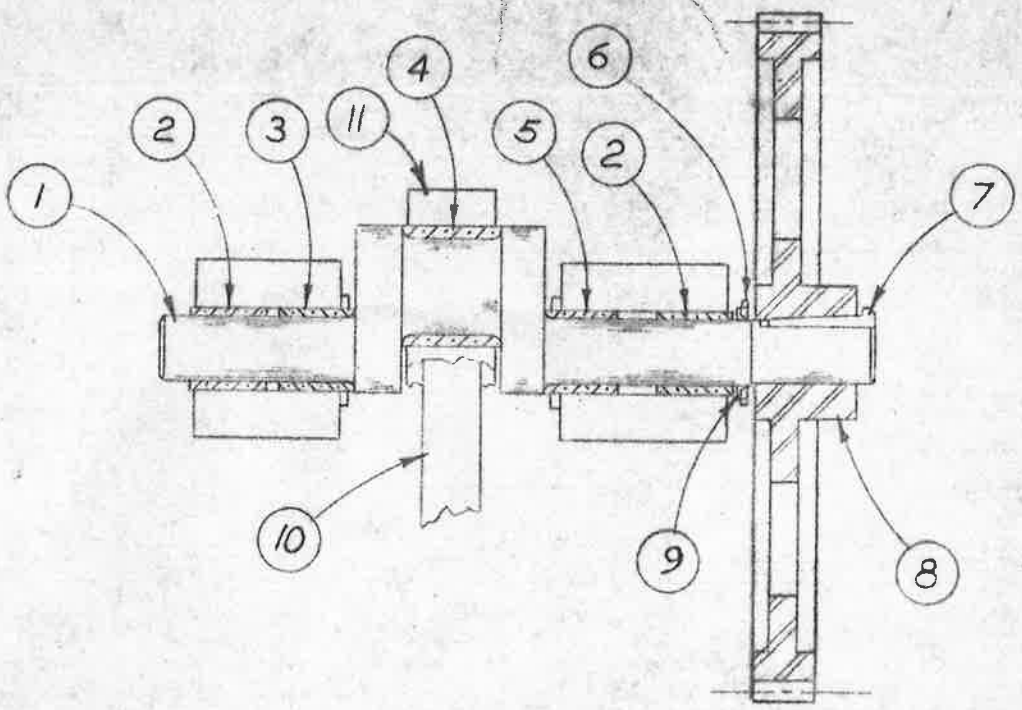
LIMIT SWITCH FLOOR LEVEL

DRAWING NO.

20-07788

4-6-67

LS-2873



PART NO.	PART NAME
1	CRANKSHAFT
2	BUSHING
3	BUSHING
4	BUSHING
5	BUSHING
6	OIL SEAL HOUSING
7	KEY
8	BULL GEAR
* 9	OIL SEAL
10	PITMAN
11	PITMAN CAP

WHEN ORDERING REPAIR PARTS, GIVE PART NAME, NUMBER AND THIS DRAWING NUMBER. ALSO SERIAL NUMBER OF MACHINE AND MACHINE MODEL NUMBER.

NOTE:
PARTS MARKED WITH ASTERISK (*) ARE RECOMMENDED TO BE STOCKED.

VERSON ALLSTEEL PRESS CO.

15094

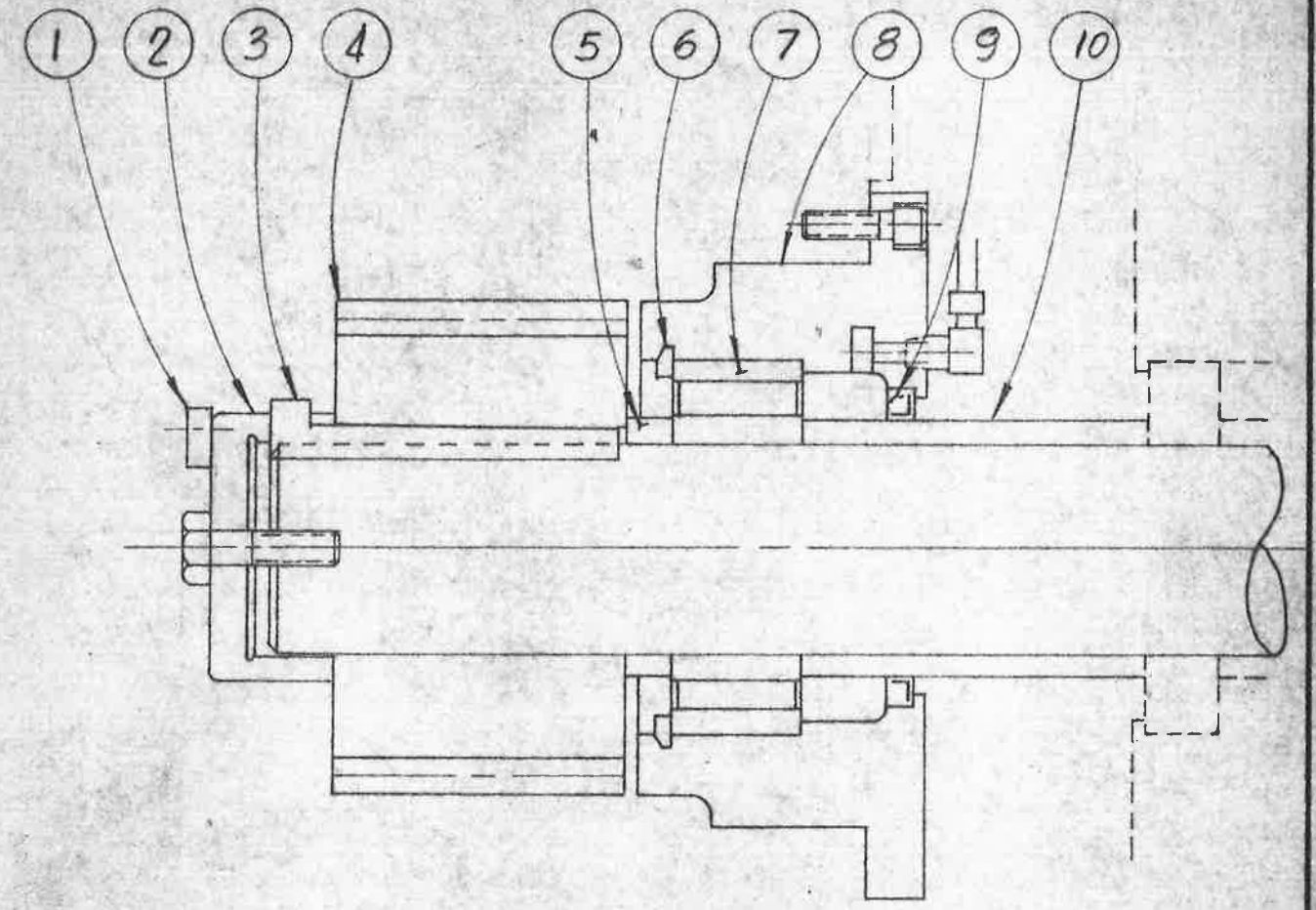
PARTS LIST FOR

CRANKSHAFT

(M)

DRAWING NO.
LS-2873

9-59 P.T.C.



PART Nº	PART NAME	PART Nº	PART NAME	
1	KEY RETAINER	6	RETAINING RING	*
2	COLLAR	7	BEARING	*
3	KEY	8	BEARING HOUSING	
4	PINION GEAR	9	OIL SEAL	*
5	SPACER	10	SPACER	

WHEN ORDERING REPAIR PARTS, GIVE PART NAME, NUMBER AND THIS DRAWING NUMBER. ALSO SERIAL NUMBER OF MACHINE AND MACHINE MODEL NUMBER.

NOTE:
PARTS MARKED WITH ASTERISK (*) ARE RECOMMENDED TO BE STOCKED.

VERSON ALLSTEEL PRESS CO.

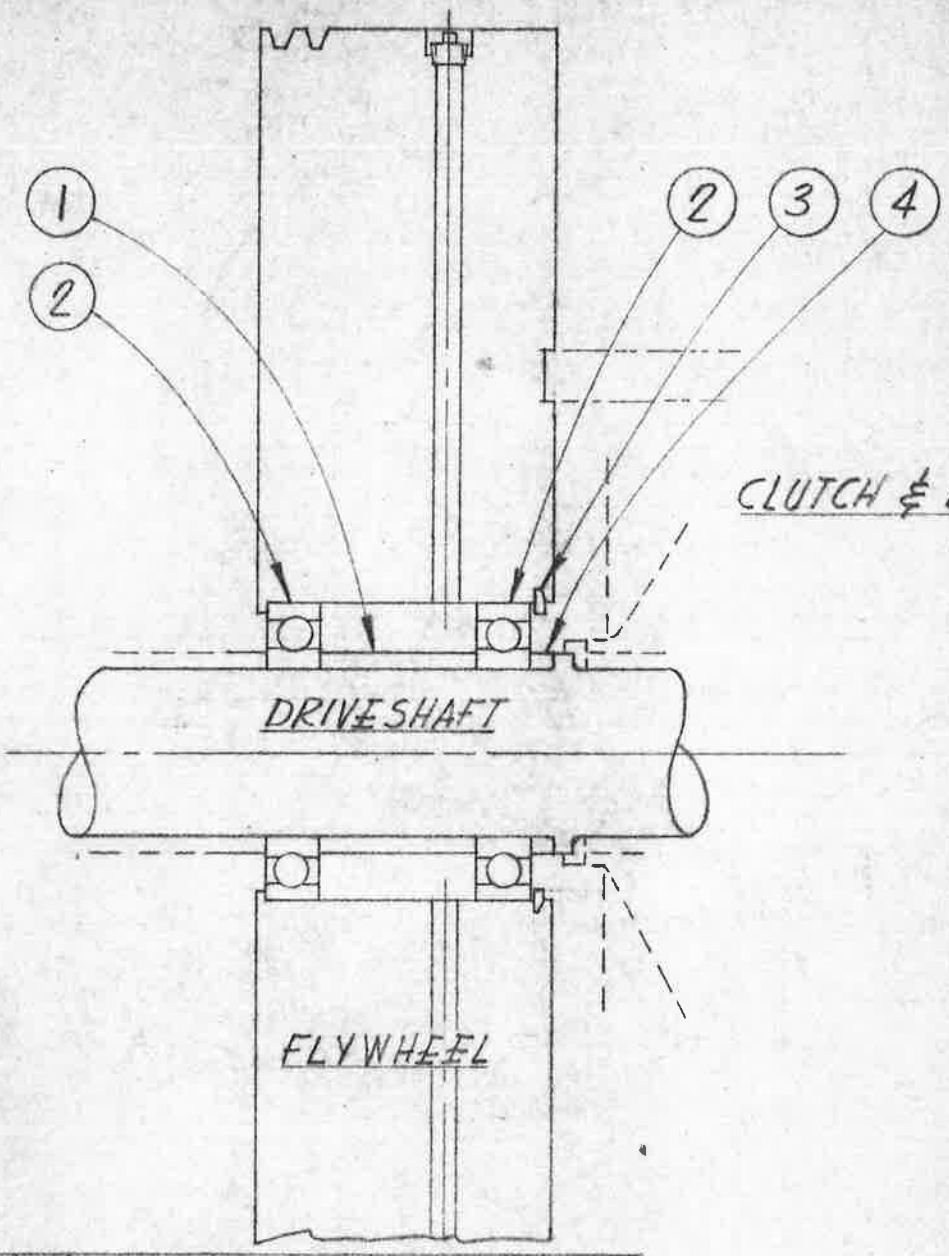
PARTS LIST FOR

DRIVESHAFT ACCESSORIES
-PINION END-

DRAWING NO.

LS-6109

9/66 | G.M.V.



	PART Nº	PART NAME
	1	SPACER
*	2	BEARING
*	3	RETAINING RING
	4	SPACER

WHEN ORDERING REPAIR PARTS, GIVE PART NAME, NUMBER AND THIS DRAWING NUMBER. ALSO SERIAL NUMBER OF MACHINE AND MACHINE MODEL NUMBER.

NOTE:
PARTS MARKED WITH ASTERISK (*) ARE RECOMMENDED TO BE STOCKED.

VERSON ALLSTEEL PRESS CO.

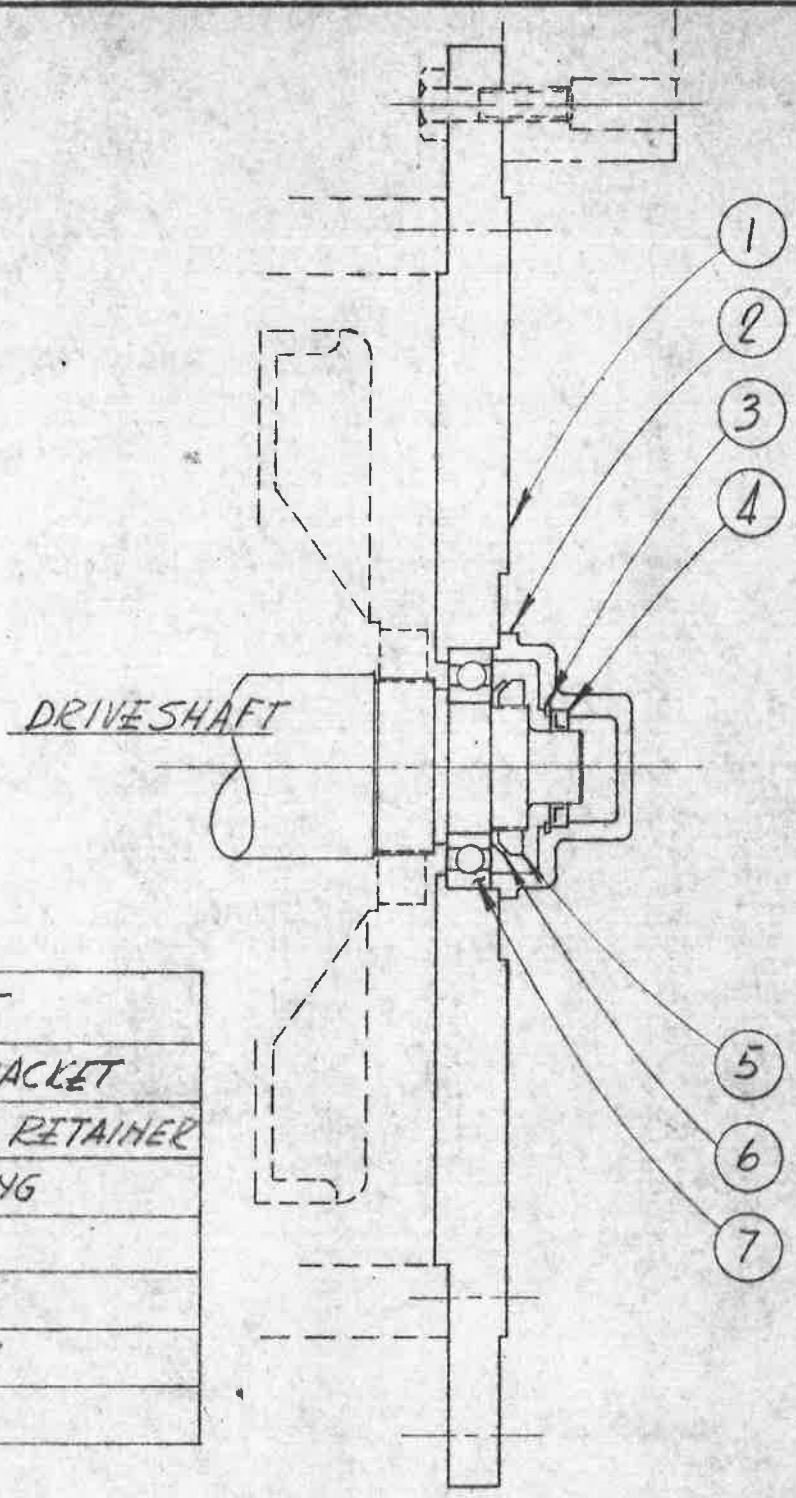
PARTS LIST FOR

FLYWHEEL & ACCESSORIES

DRAWING NO.

LS-6117

9/66 G.M.



	PART Nº	PART NAME
	1	OUTBOARD BRACKET
	2	OUBOARD BRG. RETAINER
*	3	RETAINING RING
*	4	AIR SEAL
	5	LOCKNUT
	6	LOCKWASHER
*	7	BEARING

WHEN ORDERING REPAIR PARTS, GIVE PART NAME, NUMBER AND THIS DRAWING NUMBER. ALSO SERIAL NUMBER OF MACHINE AND MACHINE MODEL NUMBER.

NOTE:
PARTS MARKED WITH ASTERISK (*) ARE RECOMMENDED TO BE STOCKED.

VERSON ALLSTEEL PRESS CO.

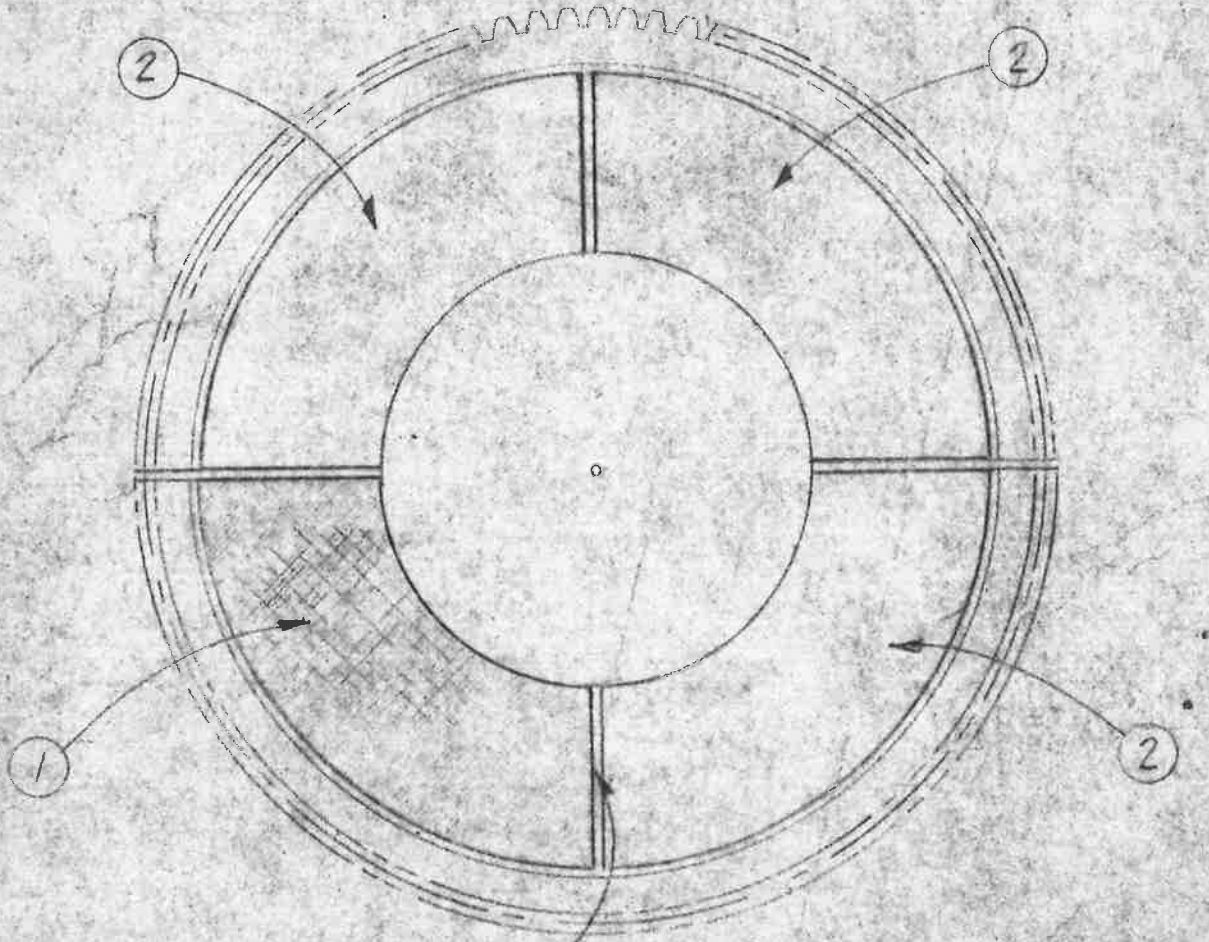
PARTS LIST FOR

OUBOARD ACCESSORIES

DRAWING NO.

LS-6116

9/66 | G.M.V.



SCRUBBER LINING CAN BE IDENTIFIED BY RED EDGE

PART NO.	PART NAME	NO REQ. PER DISC
1	SCRUBBER LINING	2
2	FRICTION LINING	6

WHEN ORDERING REPAIR PARTS, GIVE PART NAME, NUMBER AND THIS DRAWING NUMBER. ALSO SERIAL NUMBER OF MACHINE AND MACHINE MODEL NUMBER.

NOTE:
PARTS MARKED WITH ASTERISK (*) ARE RECOMMENDED TO BE STOCKED.

VERSON ALLSTEEL PRESS CO.

PARTS LIST FOR

LINING FOR 18" CLUTCH & BRAKE

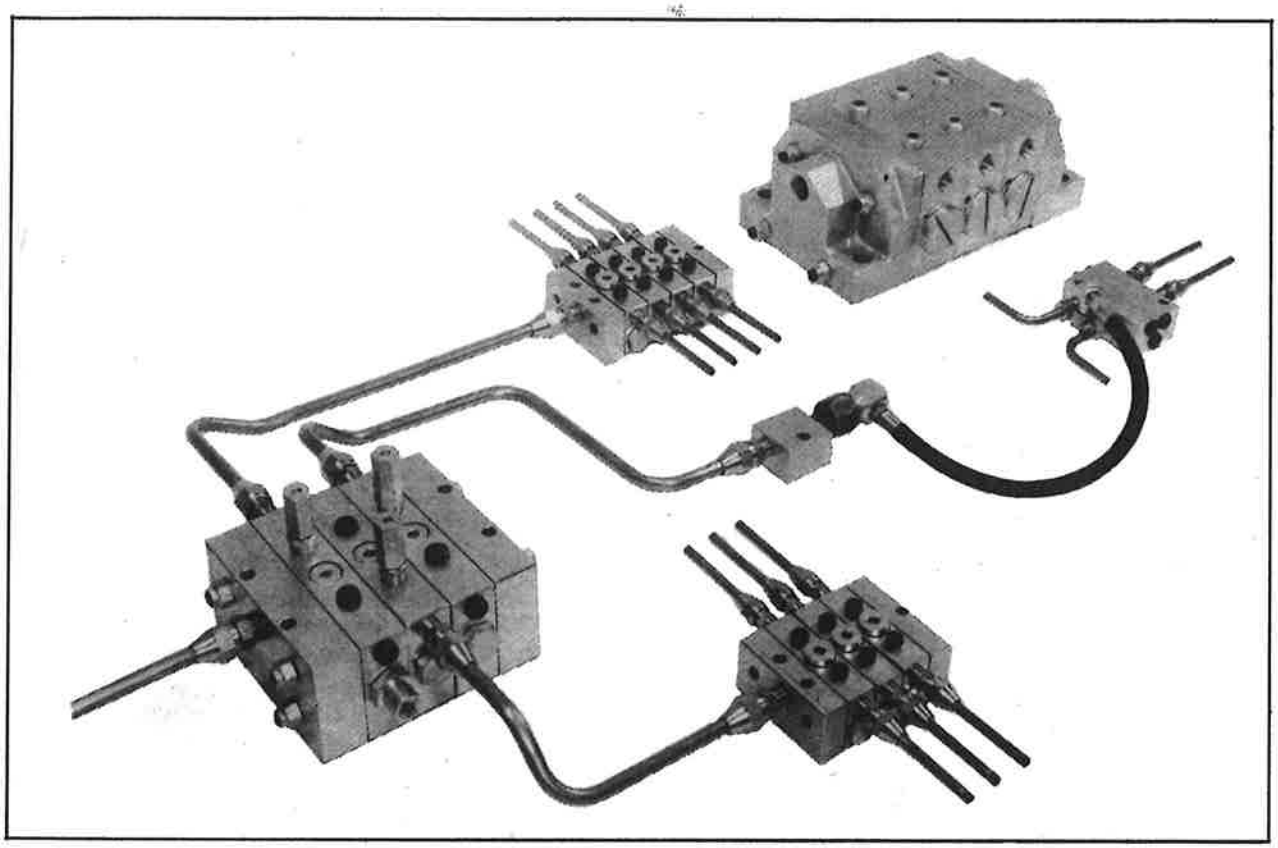
DRAWING NO.

LS-3050

Trabon

ENGINEERING BULLETIN E-463-2

Trabon M (MO), MX (MXO), MG (MGO) Oil and Grease Systems



Typical combination MX and M System. Heavy-duty MX Master Assembly (left), equipped with Reset Indicators and Cycle Indicator Pin proportions lubricant from pump to Secondary Assemblies.

(Above) Type M Secondary Assemblies receive their force-fed share of lubricant and proportion it to bearings.

(Right) Compact MD Divisional Feeders have 2, 3 or 4 outlets. MG high volume Assembly (upper right), designed for circulating oil, is also used on large, high volume grease systems.

General Description

Trabon Type M and MX Centralized Systems (patented) provide a simple, positive means of oiling or greasing all the bearings on one or several machines from one central pumping point. On small machines a single M or MX Assembly may conveniently serve all bearings — from 2 to 16 points. On larger machines several Assemblies may be required. In this case a Master Assembly is employed to distribute the pump output, in the proportions required, to the Secondary Assemblies feeding the bearing lines.

M and MX Systems will handle all pumpable oils and greases. MO and MXO Systems are designed for circulating oil distribution. (Extra-large MG Assemblies are designed for extremely high volume grease and oil systems. MGO Assemblies, for circulating oil systems, can handle pump volumes up to 3 GPM.)

Systems are usually served by piston-type pumps either manually-operated (Type KM and KR), mechanically-driven (Series 3400, RMLS or EMLS), air-powered (Type ALS or MSA), hydraulically-powered (HLJ or HLS) or motor-driven (MP, AKA, SS-75 or H-400). (Also see "Meterflo Circulating Oil Systems," page 6.)

Extremely small systems, requiring infrequent operation and usually consisting of a single M or MX Assembly, may be served through a single gun fitting by an ordinary hand or power-operated grease gun—eliminating the fixed pump entirely.

PUMPING PRESSURES

Being progressive in operation, direct pump pressure is connected to each system outlet in sequence. Consequently, M and MX Systems develop only the the pressure necessary to deliver lubricant to the bearing. Gauge pressure will fluctuate accordingly. Pumps with low discharge rates — particularly with oils or light greases — may never indicate more than a few pounds on the pressure gauge.

Generally speaking, every system will have its own pressure range, determined by lubricant used, length and size of lines, bearing entry resistance, temperature conditions, and pump discharge rate. Most grease systems, given free and open bearings and operating at room temperatures, will operate at pressure ranges below 1000 psi. A comparable oil system will usually operate at pressure ranges under 500 psi.

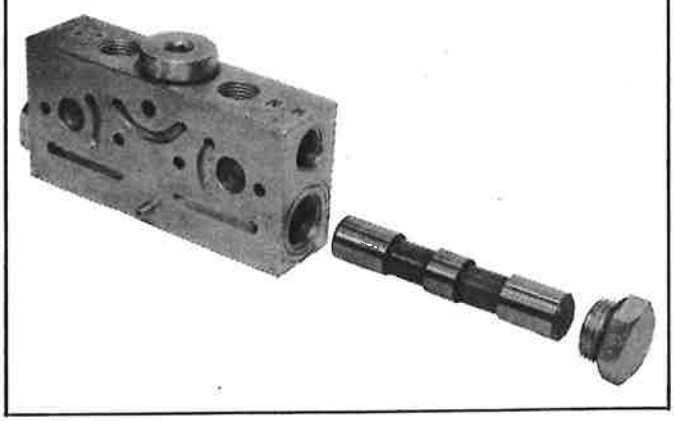
Tight pins or bearings will cause temporary pressure build-up. Exposure to cold weather will usually bring about a considerable rise in operating pressure range. (In this connection it is always prudent to change over to winter-grade lubricant well in advance of cold weather for best performance.)

M AND MX OPERATING PRINCIPLES

M and MX Systems (MG, MO, MXO and MGO) are single line, "one-way" systems with lubricant flowing from pump through system outlets to lubrication points. **The system operates on flow and flow alone.** There is no reversing operation or pressure relieving operation involved. There is no fixed pressure build-up required. The pump is simply operated at the desired frequency and rate, and the system does the rest.

The usual system has M or MX Assemblies, each serving a group of bearing taps in reasonable proximity, located about the machine. (Bearings on a moving machine component can be lubricated through a single flex connection by mounting the Assembly serving these bearings directly on the moving part.) These **Secondary** Assemblies serving the bearing taps are, in turn, fed from a **Master** Assembly. The Master Assembly accepts lubricant from the pump and distributes it to the Secondary Assemblies, according to their proportionate requirements.

Excellent sealing characteristics are obtained by long-lobed piston design—match-fitted to a micro-honed cylinder bore.



Each M or MX Assembly consists of an Inlet and End Section and **at least three but not more than eight** Intermediate (or working) Sections, each with twin or single outlets. Each Intermediate Section has a center-less ground, multi-lobed piston of hardened steel, match-fitted to its micro-honed cylinder. Composition gaskets separate the ground surfaces of all sections in the Assembly. (See page 7.)

POSITIVE PISTON OPERATION

Each M or MX Assembly cycles endlessly as lubricant is pumped through it — almost in the same way an automobile engine functions — except there is no mechanical linkage involved. Instead, each Intermediate piston is operated by hydraulic flow from the pump in a predetermined sequence or progression. Incoming pressure and flow from the pump is directed behind one piston at a time. Each piston must complete a full stroke, forcing a measured amount of lubricant into the bearing line, before pump flow is diverted behind the next piston in sequence.

The cycle has no beginning or end. The system picks up right where it left off each time the pump is re-activated. No bearing is skipped or under-lubricated.

6 sizes each of M and MX pistons provide a wide range of section discharges so that correct proportioning for both large and small bearing requirements can be provided from the same Assembly. (If greater output differential is desired, adjacent Intermediate Sections may be cross-ported together to provide extra-large output per outlet. See page 9.)

BUILT-IN "MONITORING" OF SYSTEM PERFORMANCE

The positive sequential operation of M and MX Systems provide an extra dividend to the user in that system operation is **continuously "monitored".** Unlike other systems the M and MX System **always gives assurance of normal operation** — that each and every bearing is being properly lubricated — unless system performance indicators signal to the contrary. (See page 3.)

BUILT-IN CHECK VALVES

M and MX Intermediate Sections have built-in check valves which improve the ability to generate and maintain the pressure necessary to overcome bearing resistance. (MO, MXO, MG and MGO Assemblies for higher volume grease and circulating oil systems are **not** equipped with built-in check valves.) Located in the top center of the M or MX Intermediate Section, the circular check valve assembly may be removed with a socket-head wrench.

Performance Indicators For M and MX Systems

Back-and-forth motion of Cycle Indicator Pin on M or MX Assembly indicates normal flow.

Pressure Gauge in main line shows the "highs" and "lows" of pump pressure.

Cycle Completion Indicator on manual pumps protrudes to the ring groove at end of cycle, is manually returned.

System Performance Indicators

CYCLE INDICATOR PIN

The Cycle or Flow Indicator Pin may be installed on Type M (20 or larger) or Type MX (50 or larger) Intermediate Sections to provide an externally visible indication of normal flow through the Assembly or to provide a means of counting the cycles of the Assembly. The Pin is simply an extension of the piston within the Section so equipped. Since every piston in the Assembly operates in sequence, the Indicator Pin "monitors" the performance of the entire assembly and, if installed on the Master Assembly, "monitors" the performance of the entire system.

The Cycle Indicator Pin may be equipped with a Micro-Switch to actuate a remote Blinker Light or to send electrical impulses or "counts" to a Count Control Panel.

PRESSURE GAUGE

Usually located in the main line between the pump and the Master Assembly, the Pressure Gauge is employed as a "performance indicator" for most automatic and many manual systems. Gauge readings in normal ranges signify normal system operation. (See page 2.)

MANUAL PUMP INDICATOR

At the beginning of the lubrication cycle, the KM Pump Indicator Stem is pushed by finger pressure into its cylinder or sleeve (left of pump base). Then, upon repeated strokes of the pump handle, the Indicator inches out until the ring groove is exposed, signalling completion of the cycle.

BLOWOUT WARNING ASSEMBLY

Many Trabon pumps are equipped with a Blowout Warning Assembly which contains a color-coded disc. (See Bulletin 6109.) When excess pressure occurs the Disc ruptures allowing pumped lubricant to relieve to atmosphere, providing a visual central signal of blockage in the system.

Trabon LP (Low Pressure) Series Blowout Indicators, similar to above, are available for oil or grease systems in pressures of 350, 650 and 950 PSI. (See Bulletin 6212)

-2 HIGH PRESSURE BLOWOUT SWITCH

A High Pressure Blowout Switch may be attached to the standard pump Blowout Warning Assembly by means of an adapter nut. When excess pressure occurs lubricant vented through the Safety Blowout Disc is tubed to the Switch plunger assembly where a micro-switch is actuated. This electrical impulse can be used to operate a horn or red light to give warning of blockage anywhere in the system.

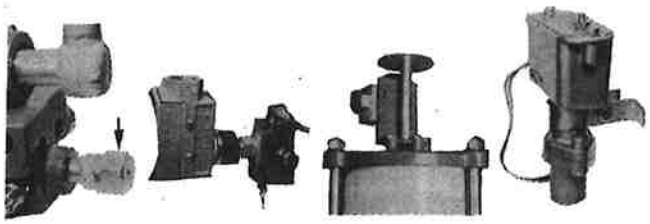
-3 RESERVOIR LOW LEVEL SWITCH

Mounted atop cylindrical grease or oil reservoirs equipped with follower assemblies, the Low Level Switch can be connected to a horn, buzzer or light to signal reservoir depletion.

ADJUSTABLE PRESSURE SWITCH

Available in 15 to 200, 125 to 1500 and 250 to 3000 psi ranges the High Pressure Switch can be used to signal excess pressure when teed into the main line. (A higher pressure version is standard equipment on the H-400 Barrel Pump for motor cut-out protection.)

Central Signalling Indicators



(Left) Blowout Assembly contains color-coded Safety Rupture Disc. High Pressure Blowout Switch may be added to Blowout Assembly.

(Left) Reservoir Low Level Switch mounts atop pump reservoir. Adjustable High Pressure Switch provides electrical impulse if excess pressure occurs.

Zone or Bearing Indicators

(See Bulletin 6109)

9242
9249

9235–

9230
9241

8200–

No. 9242 (MX) or 9249 (M) Blowout Indicators have color-coded rupture discs. No. 9235 Reset Indicators reset automatically.

No. 9230 (M) and 9241 (MX) Blowout-to-Atmosphere Indicators. No. 8200 Automatic Relief Indicators relieve, yet signal.

No. 9242 AND 9249 BLOWOUT INDICATORS

Blowout Indicators may be installed in alternate outlets of the Master Assembly and Secondary Assemblies to pinpoint blockage. A color-coded blowout disc (Bulletin 6109) ruptures under excess line pressure, causing the pin to protrude. Lubricant under pressure remains trapped so that a central warning signal is given. No. 9242 with ¼" male thread fits MX alternate outlets and No. 9249 with ⅛" male thread, M alternate outlets.

No. 9235 RESET INDICATORS

Reset Indicators also pop up under excess pressure and are installed in alternate outlets of M or MX Assemblies. Trapped lubricant provides a central warning impulse and the Reset Indicator automatically resets itself after blockage is cleared. No. 9235-2 Indicators have ⅛" male thread for M Assemblies and No. 9235-4 have ¼" male thread for MX. (See Bulletin 6109 for spring pressures available. In using Reset or Blowout Indicators always use light discs and springs in Secondary Assemblies — heavier in Master Assemblies.)

No. 9230 AND 9241 BLOWOUT-TO-ATMOSPHERE INDICATORS

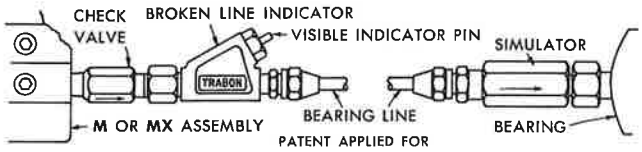
Used where it is desirable to keep the rest of the system in normal operation with the exception of the blocked line, Blowout-to-Atmosphere Indicators have color-coded rupture discs which perforate under excess pressure giving visual evidence at the location of the blocked line. No. 9230, for alternate outlets of M Assemblies, has a ⅛" male thread and No. 9241, for MX, has a ¼" male thread.

No. 8200 AUTOMATIC RELIEF INDICATORS

Used in alternate outlets of MX Secondary Assemblies, Automatic Relief Indicators may also be used in M Secondary Assemblies by employing a ¼" x ⅛" female-to-male hex adapter. The indicator, available with varying spring pressures, sets off the central warning signal when excess line pressure occurs. At the same time it automatically relieves the trapped pressure expelling it to atmosphere. This permits the rest of the system to operate normally and provides a visual signal of the blockage location.

BLM AND BLX BROKEN LINE INDICATORS

Broken Line Indicators may be installed in M or MX outlets feeding critical bearings. Should the bearing line break or leak, the Indicator pin retracts, pinpointing broken line location. At the same time, the Indicator blocks the outlet sending a high pressure impulse back to the central warning signal. BLM (Type M) and BLX (Type MX) Kits include Outlet Check Valve, Indicator and Simulator. Four spring pressures are available.



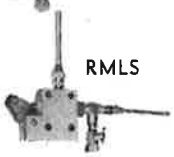
Pumps for M and MX Systems

Extremely small Trabon M Systems may be operated by an ordinary hand grease gun through a single gun fitting. In this case lubrication is guided by a Cycle Indicator Pin — one back-and-forth oscillation indicating one cycle of the entire M Assembly.

In general, manual and motor-driven pumps have a built-in or attached reservoir. In the case of certain automatic pumps, such as the air-powered ALS and MSA Series, the hydraulic-powered HL Series and the mechanically-driven MLS Series, a separate (or attachable) reservoir is used to supply lubricant. H-400 Series Barrel Pumps mount atop a standard 400-lb. drum.

Type K Manual Pumps have either 3-lb. or 12-lb. (or pint) grease or oil reservoirs. Indicator, left of base, emerges fully when cycle is complete. (KR Pumps have diverting valve for serving two systems.)

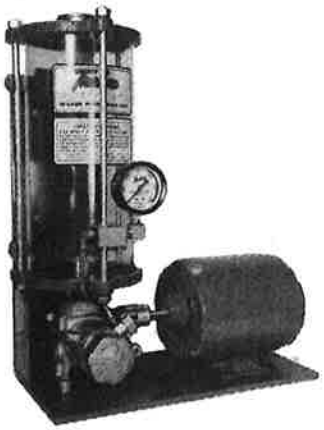
3400 Mechanically-Driven Pumps have 40 to 1, 20 to 1 or 10 to 1 gear ratios and 5-lb. (5 pint) or 12-lb. (12 pint) grease or oil reservoirs. Overrunning clutch drive is actuated by reciprocal or eccentric motion.



RMLS Cam Roller-Driven and EMLS Lever-Operated Pumps have adjustable stroke and require separate reservoirs.

Air-Powered ALS (top left) and MSA (bottom left) have adjustable stroke and are available in two sizes. Separate or attachable reservoirs are available.

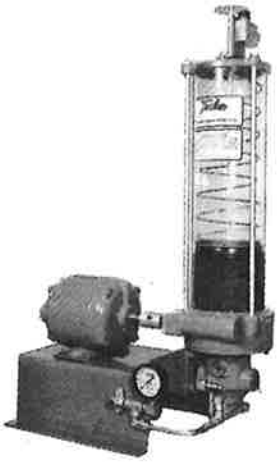
HLS (Single-Acting) and HLJ (Double-Acting) Hydraulic-Powered Pumps have adjustable stroke and require separate or attachable reservoir. Available in three sizes.



MP Motor-Driven Pump has three easily adjusted pistons and is mounted on base with gauge, ¼ H.P. motor and 5-lb. (or pint) or 12-lb (or pint) grease or oil reservoir.

6800-2 Reservoir Filler Pak has 25-lb. container, built-in filter screen, hose and coupler to fit male stud on spring-loaded grease reservoirs. (100-120-lb. and 400-lb. Drum Transfer Pumps are also available.)

AKA Heavy-Duty Motorized Pump has internal adjustment but is usually timer-controlled. Is mounted on base with gauge, ¼ H.P. motor and 12-lb. (or pint) or 20-lb. (or pint) grease or oil reservoir.



H-400 Electric-Hydraulic Barrel Pump mounts atop standard 400-lb. grease drum and has gauge, drum cover, lifting bale, ½ H.P. motor and adjustable pressure cut-off switch. #25550 Extension Adapter available.

SS-75 Mill-Type Motor-Driven Pump is floor-mounted and has 1 H.P. motor, gauge, built-in filter, 75-lb. reservoir and adjustable pressure cut-off switch.

RECOMMENDED INSTALLATION PRACTICE

Single-line design and progressive piston metering of M and MX Systems usually permit the use of small diameter, leak-proof tubing and equivalent hose. Although soft-annealed copper or plated, laminated steel tubing are satisfactory, maximum leak-proof service life is provided by stainless steel. High pressure nylon tubing is acceptable except in hot locations.

If pipe is used specify "pickled and lightly oiled" to eliminate scale and rust. (Installation of a line strainer ahead of the Master Assembly is recommended.) Flex connections can be made with oil-resistant hose, nylon hose or nylon tubing. Main line hoses should always have one or more wire reinforcing braids.

Select pipe, tubing or hose to withstand anticipated peak pressures. Pipe of nominal ½" size and under should be Schedule 40, larger pipe Schedule 80. Copper tubing should be of the "heavy wall" type, particularly ½" and ⅝" OD sizes.

Since dirt, grit and chips are the principal enemies of centralized systems, it is extremely important to keep all lines and connections free of internal contamination. If grease is used, tubing in coils should be filled before it is cut and installed. Open tube and pipe ends should be kept covered during installation. Pipe should be blown or swabbed out.

After installation the system should be filled, **working outward from the pump.** First, disconnect the main line from the inlet of the Master Assembly. Operate the pump until clean grease emerges, then reconnect. Next, remove the Allen plugs (or Indicators) from the alternate outlets of the Master Assembly which are adjacent to the outgoing discharge lines. Then, disconnect the **discharge end** of each of these lines from the Secondary Assembly inlet or bearing tap. Screw a gun fitting into each open hole in the Master Assembly, in turn, and pump with hand gun until clean lubricant emerges at end of discharge line. As each is filled, reconnect. Repeat these steps with each Secondary Assembly until all lines are filled and reconnected. Test system, pumping until all bearings are adequately lubricated.

SELECTING TUBING AND PIPE

The following table, indicating recommended pipe and tubing sizes, is to be used as a general guide only. Use hose of equivalent size for flex lines.

Type of Pump	Oil or Grease	M or MX	Pump to Master	Master to Secondary	Bearing Lines
Gun-operated	G	M	¼ T	¼ T	¼ T
KM Manual	G	M	⅜ T	⅜ T	¼ T
KM Manual	G	MX	½ T*	½ T*	⅜ T
KM Manual	O	M	⅜ T	¼ T	¼ T
ALS-5, HL-5, MLS-5	G	M	⅜ T	¼ T	¼ T
ALS-5, HL-5, MLS-5	O	M	¼ T	3/16 T	3/16 T
ALS-25, MSA-10, HL-25, MLS-50, MP, 3400	G	M	⅜ T	⅜ T	¼ T
ALS-25, MSA-10, HL-25, MLS-50, MP, 3400	O	M	⅜ T	¼ T	3/16 T
MSA-100, HL-100, AKA	G	M	½ T*	⅜ T	¼ T
MSA-100, HL-100, AKA, 3400	G	MX	½ T*	½ T*	⅜ T
MSA-100, HL-100, AKA	O	M	½ T*	¼ T	¼ T
H-400, SS-75	G	MX	½ P	½ T*	⅜ T
Multi-Zone System**	G	MX	½ T*	½ T*	⅜ T

Note: Where M is substituted for MX **Secondary** Assemblies use ¼"OD Tubing for bearing lines.

* In all cases where ½"OD Tubing is suggested, ⅜" Pipe may be substituted. (¼" Pipe may be used on short secondary main lines.)

** Use 2" Schedule 80 Pipe for main header supplying Multi-Zone Systems. ½" or ⅜" Schedule 40 Pipe may be used from main header to system Master Assembly or Count Control Panel.

RESERVOIR-TO-PUMP LINES

Where separate reservoirs are used mount the reservoir as near the pump inlet as possible. Oil reservoirs must be mounted **above pump inlet while** spring-loaded grease reservoirs may be mounted above or below but no more than two feet away for best priming. Grease reservoir-to-pump lines should be, **at minimum,** ½"OD tubing with as few bends as possible. Oil reservoir-to-pump lines are usually ⅜"OD tubing.

MO, MXO AND MGO METERFLO CIRCULATING OIL SYSTEMS

Single or dual cartridge High Pressure Discharge Filters have twin gauges.

Typical RTP-H Series Gear Pump is mounted on base with ¼ H.P. motor and relief valve.

Dual Range Hi-Lo Pressure Switch signals blockage, lack of oil, suction leak or pump failure.

Meterflo Circulating Oil Systems differ from conventional M and MX oil or grease systems in that oil is pumped in considerably higher volumes using a gear instead of a piston-type pump. Specially honed MO, MXO and MGO Assemblies are used for piston-displaced metering of oil to bearings. Available pump outputs are as follows:

RTP-H Suffix Number	Pump Size	Motor Speed	Cubic Inches Minute	Recommended Master	Recommended Secondary	Usual PSI Pressure Range-*
40008	000L	1140	8	MO	MO, MDO	30-100
40012	000L	1725	12	MO	MO, MDO	30-100
40030	0L	1140	30	MXO	MO, MDO	60-300
40045	0L	1725	45	MXO	MO, MDO	75-350
40070	1L	1725	70	MXO	MO, MDO	125-450
40100	2L	1140	100	MXO	MO, MDO	150-475
40150	2L	1725	150	MXO	MO, MDO	175-500
(Outputs of ½	to 3 GPM)			MGO	MXO	200-800

* Normal ranges may be affected by line length, oil viscosity and temperature.

OPERATION OF METERFLO OIL SYSTEMS

Because of positive piston displacement to bearings, Meterflo Systems employ much smaller pump volumes than do "conventional" circulating oil systems. This means that distribution and return piping can be considerably reduced in size resulting in substantial savings in both material and labor. Positive piston displacement also permits **continuous monitoring of system performance.**

Hi-Lo Adjustable Pressure Switch provides an electrical signal in case of extremely low pressure (indicating lack of oil, pump failure or suction leak) and excessively high pressure (indicating blockage anywhere in the system). This electrical signal can be used to operate a horn, fault light or to shut down the machine itself. (The "Hi" and "Lo" sides of the Switch must be set well above and well below the normal operating "highs" and "lows" of the System.)

The Pressure Relief Valve, set well above the normal peak operating pressure of the system and at least 50 psi above the "Hi" setting of the Pressure Switch is designed to protect pump, filter and system from excess pressure.

The Flow Monitor Panel periodically checks rate of flow, senses and signals any significant decrease attributable to clogged filter, lack of oil or progressive pump failure.

Single or Dual High Pressure Discharge Filters are used in the main line between pump and Master Assembly. Twin gauges show drop across the filter, indicating degree of cartridge contamination. (A pressure drop of 25 psi or more indicates cartridge should be changed.) Filters are available with cartridge lengths of 3¾ and 9¾ inches. Cartridges can be ordered with 25 or 50 micron spacing. (Dual Filter has a Selector Valve which can be used to divert the flow through one cartridge while the other cartridge is being replaced.)

METERFLO CIRCULATING OIL PIPING

For oil volumes of 12 cubic inches per minute and under, use ⅜"OD tubing for main lines, ¼"OD tubing for bearing feed lines and ⅜" or ½" OD tubing for pump suction line.

For oil volumes of 30 to 100 cubic inches per minute use ½"OD tubing for main lines, ¼"OD tubing for bearing feed lines and ⅝" or ¾" OD tubing for suction line.

Return lines from bearings should be one size larger than bearing feed lines. Avoid traps in return lines or headers and pitch all lines for best gravity flow back to sump.

To avoid suction problems, pump is best located near by and below oil level in sump. If necessary, the pump may be mounted as much as 2 feet above oil level if suction line is kept short with few bends. Suction lines and suction filter equipment must be airtight for **any leak can destroy suction.** (Pump primes best when located so that a little oil is trapped on both inlet and outlet side of pump.)

METERFLO DO'S AND DONT'S

At start-up allow pump to operate for some time to establish the normal operating pressure range of the system. By blocking off system, set Pressure Relief Valve so that it dumps 100 to 150 psi above peak operating pressures.

Set "Hi" side of Pressure Switch **at least 50 psi below** dump setting of Pressure Relief Valve to make sure Switch will make high pressure contact **before** Valve starts to dump.

Set "Lo" side of Pressure Switch **well below the minimum normal operating pressure of the system.** (If system operates at extremely low pressure, an artificial restriction, such as a piece of $\frac{3}{16}$"OD or ¼" OD tubing, may be placed in the main line to build up pressure — preventing the "Lo" side of the Switch from making unwarranted contact.) Should system pressures fluctuate rapidly and violently, it is recommended that an accumulator be teed-in to the main line to prevent damage to gauges and switches.

If pump cavitates, check for lack of oil, suction filter clogging, pin-hole leaks in suction line or filter.

If pump still fails to prime properly, open air cock on discharge side of pump to relieve back pressure.

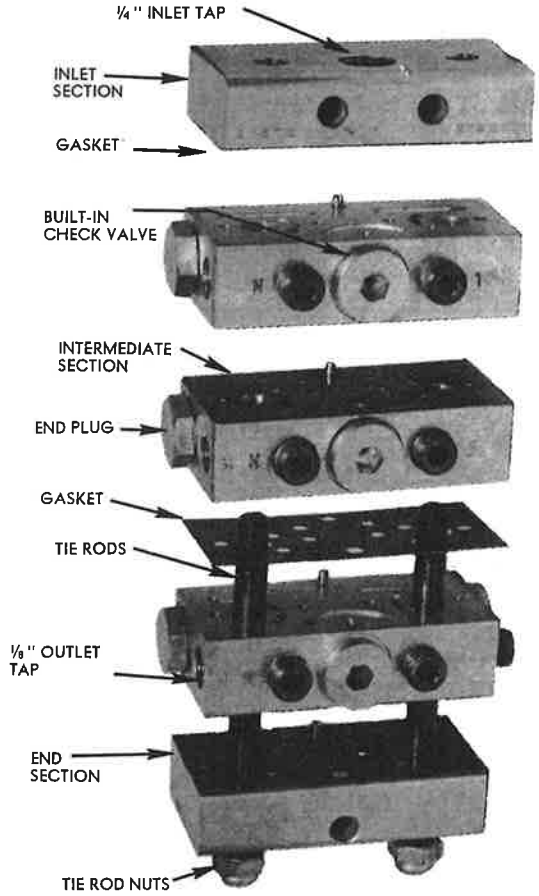
Don't be alarmed at fairly high operating pressures. (See chart on pump volumes and normal operating pressures.) Trabon Meterflo Systems normally operate at higher pressures than conventional circulating oil systems.

Be sure oil is clean and that filter cartridges are changed regularly.

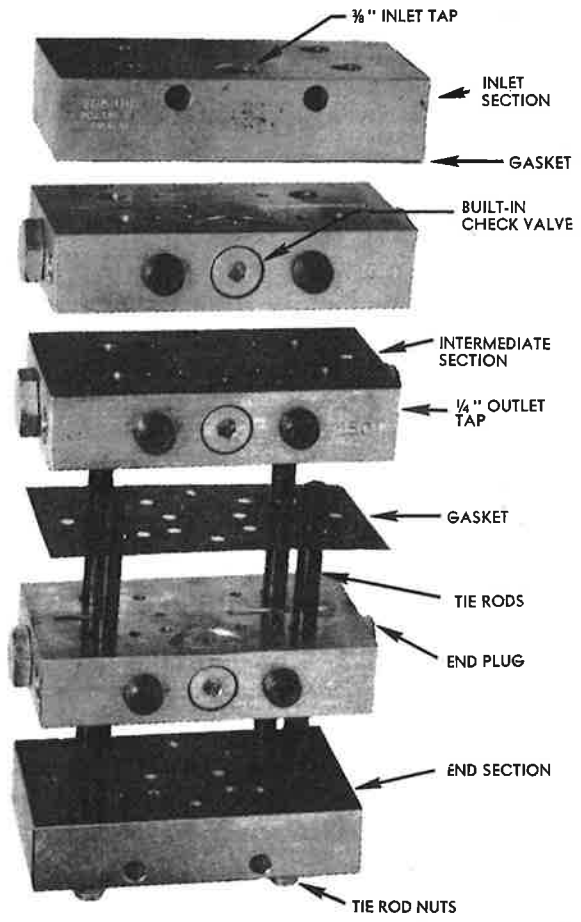
When system blocks, use tracing method described on page 12.

CONSTRUCTION OF TYPE M (MO) AND MX (MXO) ASSEMBLIES

M or MO



MX or MXO



Each M, MX, MO, MXO, MG and MGO assembly must have **at least 3 Intermediate Sections** plus an End and Inlet Section. Recommended maximum number of Intermediate Sections is 8.

Ground surfaces of M and MX Sections are separated by thin composition gaskets. Assemblies are drawn together by tie rods. In the case of M Assemblies two rods are used. One end of the rod is threaded into the Inlet Section. Special lock-nuts on the other end of the rods are **torqued to 19 lbs.** in drawing the assembly together.

MX and MXO Assemblies have four alloy steel tie rods. Special lock nuts on each end are **torqued to 30 lbs.** at assembly.

Type M Assemblies have a dowel pin in the upper ground surface which interlocks with a drilled hole in the corresponding face of the section above.

NEW AND OLD M AND MX ASSEMBLIES

Early in 1961 an improved M and MX Feeder was introduced. The outstanding external characteristics of the new model is a **circular, socket-head plug** located at top-center of each Intermediate Section. Under this plug is a **built-in check valve.** (MO and MXO Assemblies have the circular plugs **but the check valve components have been removed.** MG and MGO Sections remain as before, without built-in checks or circular center plugs.)

Old M, MX, MO and MXO Assemblies manufactured from July 1950 to early 1961 had no built-in check valve. When ordering simply state "without built-in check valve".

New MX and MXO Assemblies also have **four tie rods instead of three.**

Do not attempt to intermix new and old sections in the same assembly.

SINGLE AND TWIN OUTLET SECTIONS

Intermediate Sections for M, MO, MX, MXO, MG and MGO Assemblies are available with either one (Single) or two (Twin) outlets. Outlet taps are located at each end of the Section. An alternate outlet tap for each outlet is located atop the Section, one on each side of the built-in check valve. The alternate outlet is common with the regular side outlet and may be used for the installation of Allen Test Plugs (standard), Indicators, or for installing an outlet line where

space does not permit the use of the regular side outlet.

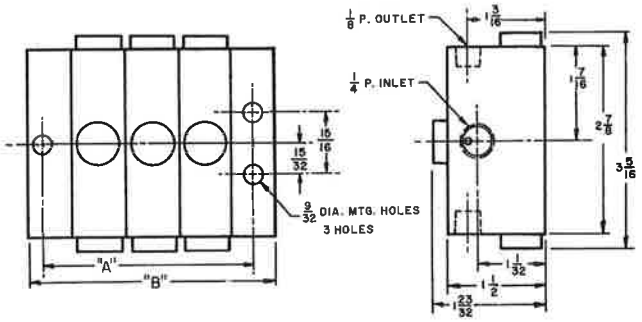
Twin outlet sections (stamped T) **must have two outlets used** — one from each end of the Section. **Under no circumstances block off one of these outlets. Also never use the alternate outlet and the regular side outlet from the same end of the Section.**

Single outlet sections (stamped S) have only one outlet. The Section is drilled internally so that **any** of the four outlet holes, side or alternate, may be used. **Never use more than one outlet from a single (S) Section or attempt to block off all four outlets.** (See Cross-Porting.)

INTERMEDIATE SECTION OUTPUT SIZES

Referring to the M and MX tables (below) you will note that an M Section stamped 10 puts out .010 cubic inches. This means that one piston cycle (one **back-and-forth** piston stroke) discharges .010 cubic inches **from each end of the piston.** If the section is stamped 10T this means that each of the two outlets get .010 on a cycle of the piston, back-and-forth. If the Section is stamped 10S, the outputs from **each** end of the piston are ported together inside and expelled out of one outlet during the same back-and-forth piston cycle. Thus the S Section puts out .020 cubic inches from its **single** outlet during the same cycle that the T Secfion puts out .010 from each of its **two** outlets. A bearing served by a 10S could also be served by one side of a 20T, and so on. (See Table A, page 10.)

TRABON M AND MO FEEDER DIMENSIONS AND OUTPUTS PER CYCLE

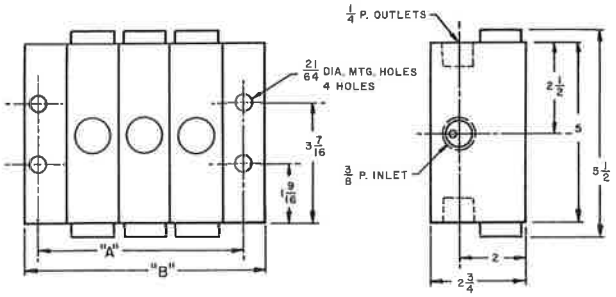


M AND MO DIMENSIONS

(M-3 or MO-3 Assembly Shown)

Model	"A"	"B"	DISCHARGE Section Size	DISCHARGE Cubic In.
M-3	3-1/4	3-51/64	10	.010
M-4	4-1/16	4-39/64	15	.015
M-5	4-7/8	5-27/64	20	.020
M-6	5-11/16	6-15/64	25	.025
M-7	6-1/2	7-3/64	30	.030
M-8	7-9/32	7-55/64	35	.035

TRABON MX AND MXO FEEDER DIMENSIONS AND OUTPUTS PER CYCLE



MX AND MXO DIMENSIONS

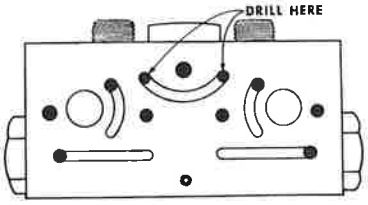
(MX-3 or MXO-3 Assembly Shown)

Model	"A"	"B"	DISCHARGE Section Size	DISCHARGE Cubic In.
MX-3	5-3/64	5-39/64	25	.025
MX-4	6-5/32	6-23/32	50	.050
MX-5	7-25/64	7-55/64	75	.075
MX-6	8-13/32	8-63/64	100	.100
MX-7	9-33/64	10-5/64	125	.125
MX-8	10-43/64	11-7/32	150	.150

Note: High Volume MG and MGO Assemblies have ½" NPTF inlet taps and ⅜" NPTF outlet taps. Width of any MG or MGO Assembly is 6" and height is 3⅝". An MG-3 or MGO-3 Assembly is 11" overall in length. For each additional Intermediate MG or MGO Section add 1¾" to overall length. Four 9/16" mounting holes are provided, two at each end of the assembly 4½" center-to-center. Center-to-center distance lengthwise is 8⅝" for an MG or MGO-3. For each additional Intermediate Section add 1¾" to center-to-center distance lengthwise.

MG and MGO Intermediate Section outputs-per-cycle are .300 and .600 cubic inches from each end of the 300T or 600T Section respectively. Outputs-per-cycle of 300S and 600S Sections are double those of T Section.

CONVERTING T to S SECTION

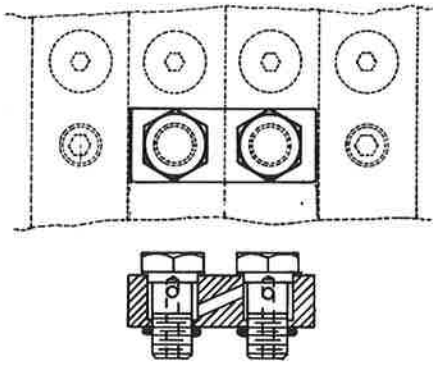


By drilling 3/32" (M) or 1/8" (MX) holes at right angles to the ground face, using spot-drilled holes at each end of the curved groove, new-style T Sections may be converted to S Sections.

Two methods are available for converting T (Twin Outlet) Sections to S (Single Outlet) Sections, in the field. If no drilling equipment is handy, simply fabricate a tube "jumper" or bypass connecting both sides of the section. This will "tee" outputs from both ends of the piston together. **Then use one outlet only.**

The other method, shown above, is to drill holes at each end of the curved groove at right angles to the face. Take care to drill only until the drill tip breaks through into the cross-hole. **Do not drill all the way through the Section.** Be sure to re-stamp the Section "S" in place of "T", **and use one outlet only.**

CROSS-PORTING M (MO) AND MX (MXO) SECTIONS FOR LARGER OUTPUTS-PER-CYCLE



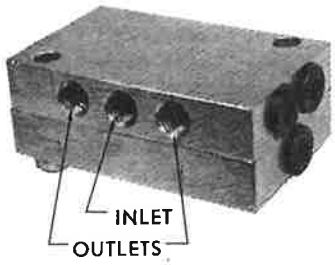
Cross-porting adjacent Intermediate Sections of M and MX Assemblies may be done easily by using #10747-1 Bar Kit (M) or #10965 Bar Kit (MX).

Although an output-per-cycle range of .010 to .070 is available using the M System and from .025 to .300 using the MX System, it is occasionally necessary to provide a greater differential. This is done by "cross-porting" which is simply a method of teeing the outputs of two or more adjacent sections together.

This can be done by internal drilling from one section to another. (See Bulletin 6103). An easier way is to employ the Cross-Porting Bar Assembly which simply provides an external connection between the alternate outlet holes of two adjacent Sections. Order No. 10747-1 for new Type M Feeders or No. 10965 for new Type MX Feeders.

After Cross-Porting is accomplished it now becomes necessary to block off one or more excess outlet holes. This is also true when a T Section is converted into an S or single outlet section by drilling as shown in the above line drawing. In the latter case the Section should be re-stamped S and the extra outlet blocked off.

MD DIVISIONAL FEEDERS



Available with 2, 3 or 4 outlets the MD Divisional Feeder piston-divides any given amount of lubricant as follows:

MD-2 — Two equal outlets (50% and 50%)
MD-3 — Three outlets (50%, 25% and 25%)
MD-4 — Four equal outlets (All 25%)

In the MD-3 the 50% outlet is located opposite the blocked port, on the side of the feeder away from the center inlet port. All inlets and outlets are tapped ⅛" pipe thread. Dimensions are 3⅛" x 1¾" x 1". Two mounting holes are located diagonally across the feeder. Feeder should be mounted so that raised bosses lie against mounting surface.

REPAIRS AND SERVICE TIPS

M and MX Sections have hardened, centerless-ground pistons with match-honed cylinders. Under normal conditions, using clean lubricant, they will perform efficiently for many years.

Keeping Lubricant Clean

Pistons are carefully match-fitted to cylinders to prevent by-passing of lubricant and to insure positive performance. Should a piston become jammed or a cylinder scored by dirt or grit so that the section will not operate properly, it is usually best to replace the damaged section. If score marks are not too deep, the section may be sent back to the factory for re-honing and fitting. (Presence of dirt or grit indicates the need for better lubricant transfer and handling techniques. Check filter screens regularly in transfer and lubricant pumps. If abnormally dusty or dirty conditions exist install ⅜" Cuno Auto-Klean Filter in the pump fill stud line.)

Use Grease That Doesn't "Bleed"

Under unusual conditions of continual high pressure operation combined with extremely slow pumping rate, certain types of grease will "bleed" allowing oil to extrude and causing soap residue to build up in piping and valves. If the condition cannot be corrected by switching to another grease recommended by your supplier or by changing to a higher volume pump, operated at less frequent intervals, then the system should be flushed out periodically with a suitable light oil.

Low Volume Oil Systems

Piping of "Low Volume Oil Systems" is described on page 5. Where light oil, pumped at extremely low volume is used it is doubly important to check system for leaks and the possibility of run-out during shut-down periods. Use #4707 Bearing Inlet Checks on all down-coming bearing lines and #4700 Feeder Outlet Checks on all feeder outlets to prevent run-out. This will make sure that pump start-up will provide immediate lubrication to all points as the system cycles. If possible, use no third-stage M Assemblies.

Diagnosing Pump Trouble

If you suspect pump trouble make these few simple tests:

1. If your pump develops high pressure on the gauge, blows out the Safety Blowout Disc or actuates the High Pressure Switch your trouble is in the System **not the pump.** (See "System Trouble Tracing.")
2. If the pump does not develop high pressure, open the air bleeder cock. Allow the pump to operate. If lubricant is pumped in adequate supply without air bubbles then you know your pump is not air-locked and is priming normally.
3. If lubricant does not appear in normal quantity, check the pump reservoir to see if (1) follower assembly is stuck and is giving a false indication of lubricant level and (2) if the reservoir is full of air indicating that **air instead of grease** is being pumped from the transfer pump into the pump reservoir. (If follower is jammed in "up" position, correct and caution men to fill reservoir only until ring groove on indicator rod appears or, in case of plastic reservoir, until reservoir is 2/3rds filled with grease.) Also check piston inlet ports for

(Continued on Page 12)

PLANNING YOUR M (MO) AND MX (MXO) SYSTEM

M and MX Assemblies are, basically, proportioning units which cycle endlessly as long as fluid is pumped into them. Thus, in planning our systems we are principally concerned with the **relative** amounts of lubricant required by each bearing as compared to other bearings on the same machine

To establish this "relativity", we figure the square inches of bearing area for each way, gib or plain bearing. (A comparable figure for anti-friction bearings is obtained by simply squaring the shaft diameter.) After correct proportioning is determined, overall control of the system is obtained by adjustment of pumping frequency and rate.

STEP-BY-STEP PROCEDURE:

1—List all the bearings, grouping them according to machine areas or proximity to one another, in column 1. (From 2 to 16 taps can be served by one assembly.)

2—In column 2 state whether plain (PL), anti-friction (AF) or gear drip (GD).

3—In column 3 list square inches of bearing area. (In case of anti-friction bearings square shaft diameter.)

4—In column 4 list taps per bearing.

5—In column 5 list square inches per tap.

6—Now refer to Table A and enter the proper M, MX or MG Section in column 6. **(Don't mix M, MX, or MG Sections.)**

7—In column 7 state quantity required.

8—In column 8 state F for fixed, M for moving or S for swivel connection.

9—You now have groups of M, MX or MG Sections ready to assemble into feeder assemblies. Taking the first group go to the lower half of the adjacent page and enter the sections in the order and arrangement you wish starting at the top or inlet end of one assembly diagram.

10—If machine is small, and taps are fewer than 17, only one assembly may be required -- in which case you are now through. (Order assembly -- reading from inlet or top end -- like this " 1 M-5 (30T-20S-30T-10S-25T) Assembly.")

11—If **more** than one assembly is required to serve all the bearing taps, complete the listing of the grouped M, MX or MG sections in the blank spaces of the diagrams. Now add up the units in each assembly. (For instance, the M-5 assembly in STEP 10 would total 115 units.) Using these totals to determine your proportions use Table A again to select your master M, MX or MG assembly.

12—If a KM **Manual** Pump is to be used to serve the system **an extra outlet in the master assembly is required to feed lubricant back to the pump indicator.** Select proper section size from the following chart -- remembering that if a "T" section is used the other half of the section must serve another outgoing line.

KM PUMP INDICATOR SECTION SIZES

Size of System	Using M Master	Using MX Master
Very Small	30S	100S
Small	15S or 30T	50S or 100T
Medium	10S or 20T	25S or 50T
Large	10T	25T

13—Order M, MX or MG Assemblies stating type, number of intermediate or working sections and then listing sections in order from inlet end. (Be sure to state if Flow Indicator Pin is required on any section, if Performance Indicators are required and what type, etc.)

TABLE A -- M AND MX PROPORTION RANGES

(Select column below whose numbers come closest to approximating Range of Square Inch figures shown in Column 5 of Bearing List. Using **only** this column, pick out correct M, MX or MG Section from column at far right. Note selection in column 6 of BEARING LIST FORM.)

							M SECTION
10	15	20	30	50	100	200	10T
15	22	30	45	75	150	300	15T
20	30	40	60	100	200	400	20T (10S)
25	37	50	75	125	250	500	25T
30	45	60	90	150	300	600	30T (15S)
35	52	70	105	175	350	700	35T
40	60	80	120	200	400	800	20S
50	75	100	150	250	500	1000	25S
60	90	120	180	300	600	1200	30S
70	105	140	210	350	700	1400	35S*
							MX SECTION
10	20	30	50	100	200	400	25T
20	40	60	100	200	400	800	50T (25S)
30	60	90	150	300	600	1200	75T
40	80	120	200	400	800	1600	100T (50S)
50	100	150	250	500	1000	2000	125T
60	120	180	300	600	1200	2400	150T (75S)
80	160	240	400	800	1600	3200	100S
100	200	300	500	1000	2000	4000	125S
120	240	360	600	1200	2400	4800	150S*
							MG SECTION
120	240	360	600	1200	2400	4800	300T
240	480	720	1200	2400	4800	9600	600T (300S)
480	960	1440	2400	4800	9600	19200	600S

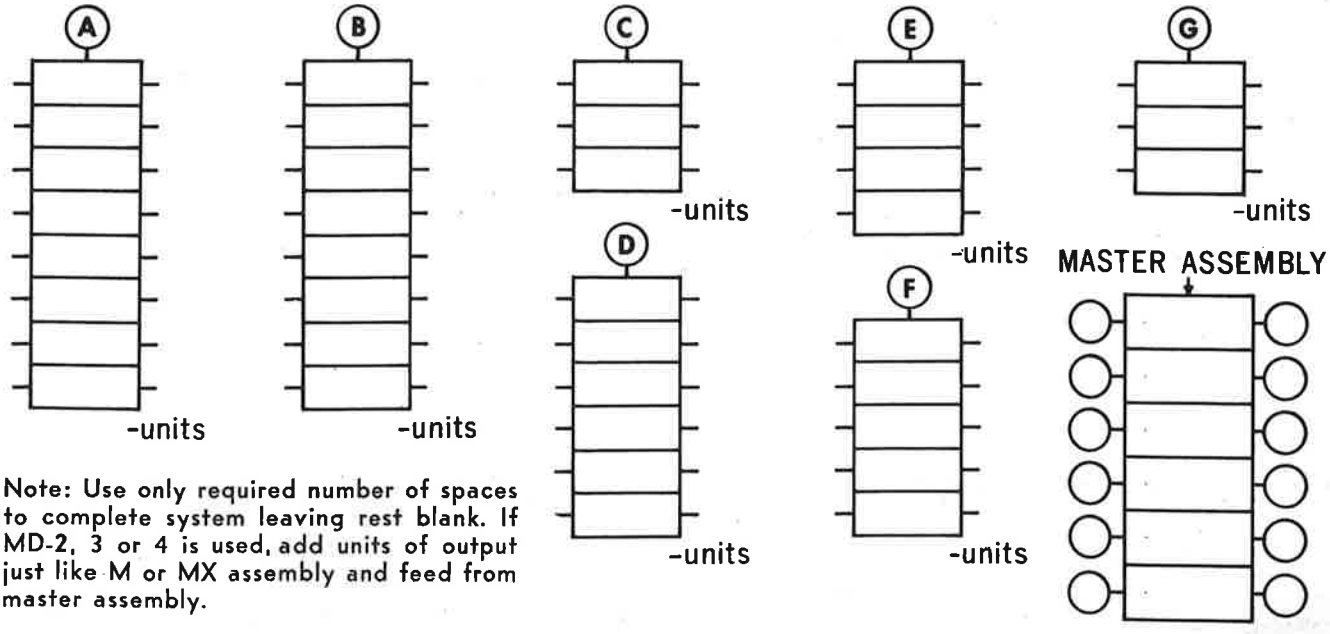
* Larger outputs may be obtained by "Cross-porting" two adjacent sections internally and allowing total output to be discharged from a single outlet. (See "Cross-Porting".)

BEARING LIST AND WORK SHEET FOR M AND MX SYSTEMS

(See adjacent page for step-by-step procedure in planning system)

BRG. CODE No.	Column 1 BEARING DESCRIPTION (Group according to location or machine area)	Col. 2 PLAIN OR A. F.	Col. 3 SQUARE INCHES AREA	Col. 4 TAPS PER BRG.	Col. 5 SQUARE INCHES PER TAP	Col. 6 M or MX T or S SECTION	Col. 7 QUANTITY SECTIONS NEEDED	Col. 8 FIXED, MOVING, SWIVEL	Col. 9 BRG. TAP SIZE
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									

INSTRUCTIONS: **Each Assembly must have at least 3 and no more than 8 intermediate sections.** For extremely small machines with less than 17 taps use only one M assembly. For larger machines split up taps among several M assemblies using M master assembly to feed secondary M assemblies. For still larger M systems employ MX master assemblies. On heavy-duty steel mill systems or equivalent use all-MX systems. (Use MG master only where size of system and high pumping rate dictate need for it.) When using blanks below write Bearing Code No. in space adjacent to outlet followed by **M** if flex connection is required or **S** if flex and swivel connection is required. (See Steps 9, 10, 11 and 12).



Note: Use only required number of spaces to complete system leaving rest blank. If MD-2, 3 or 4 is used, add units of output just like M or MX assembly and feed from master assembly.

REPAIR AND SERVICE TIPS

(Continued from Page 9)

blockage and remove any hardened or foreign matter.

4. If pump has separate reservoir, break inlet connection into pump to see if lubricant is coming through to prime pump. Use larger connection line if necessary.
5. If pump has adjustment nut be sure nut is tightened down securely so that air cannot be sucked into pump on priming stroke.
6. If pump has good supply of lubricant, block off main line to see if pump will build up pressure on gauge, blow out Safety Blowout Disc or actuate the High Pressure Switch. Operate pump. If high pressure occurs then pump prime and piston are in good shape.
7. If pressure falls off abruptly after each stroke of piston then inspect or replace outlet check valve. It is probably worn or stuck open.
8. If pump refuses to build up high pressure against a blocked main line and there is no evidence of lack of prime, pump piston and sleeve assembly is probably worn and requires replacement.
9. Other pump malfunctions are (1) broken piston return spring - ALS, MSA, HLS, MLS pumps, (2) lack of sufficient air or hydraulic actuating pressure -- ALS, MSA, HLJ and HLS pumps, (3) jammed check valve or worn clutch -- 3400 pumps, (4) blown piston sleeve packing -- K and AKA pumps, (5) stuck piston check valve, faulty foot valve, hydraulic relief valve stuck open or faulty reversing valve -- H-400 pumps.

TRACING TROUBLE IN SYSTEM

When central warning of excess pressure occurs, indicating blockage in your system, go first to the Master Assembly. If the Master Assembly is equipped with indicators which pop up or relieve, it is a simple matter to pinpoint the blocked outgoing line which will be common with the signalling indicator. The same is true when the Secondary Assemblies are also equipped with indicators. However, should Master or Secondary, or both, be without Indicators then do as follows:

1. Go to the blocked Master or Secondary Assembly and remove Allen Test Plugs from alternate outlets common with the outgoing lines. (If lubricant under pressure surges out of one of these taps, you have probably located the blocked line.)
2. To make sure, operate the pump. Grease should emerge freely and easily from each outlet without pressure build-up. (If not, see step 4.)
3. Now replace Test Plugs one at a time, operating pump after each is tightened. When pressure build-up re-occurs you know that blocked line is common with the Test Plug you have just replaced. Replace rest of plugs and go to bearing or Secondary Assembly served by line. (If bearing, correct blocked condition. If Secondary Assembly, repeat steps 1, 2 and 3.)
4. If Assembly **itself** is blocked up and lubricant refuses to emerge easily and freely from open alternate outlet taps after Allen Test Plugs have been removed, you have a jammed piston within the Assembly.
5. Remove Assembly to a clean work location. Loosen first pair of hex cylinder end plugs and remove. **Without removing piston** try to work piston back and forth in cylinder with finger pressure. Piston should be tight, but not immovable. If movable, replace end plugs and tighten as this Section is okay. Repeat with other Sections.
6. If any piston is jammed, try to loosen with light taps, using a hammer and brass rod. If unable to loosen from either end, Section is permanently damaged and should be replaced. Re-assemble Assembly with new Section. Scrap or return damaged Section to factory for inspection and possible repair.
7. In handling Assemblies and Sections use extreme caution in keeping ground surfaces and internal parts absolutely clean.

IMPORTANT DO'S. AND DON'TS

1. Don't remove pistons from cylinders unless necessary.
2. Don't try to interchange pistons from one Section to another.
3. Use clean lubricant and service pumps and assemblies under spick-and-span conditions.
4. When abnormal pressure occurs, correct condition **now.**
5. Always use **at least 3** Intermediate Sections in any M or MX Assembly.
6. Never block an outlet designed to be used. (See Cross-porting.)

Blowout Discs For M and MX Indicators

Burst Psi	Thickness	Disc Color	Indicator Disc Catalog No.	Pump Disc Catalog No. *
900	.006	Black	9276	9290
1175	.008	Green	9277	9291
1450	.010	Yellow	9278	9292
1750	.012	Red	9279	9293
2050	.014	Orange	9280	9294
2350	.016	Alum.	9281	9295
2650	.018	Pink	9282	9296
2950	.020	Blue	9283	9297
3250	.022	Purple	9284	9298

*Pump Disc must have higher burst pressure than Master Indicator Disc

Printed in U.S.A.

Trabon ENGINEERING CORPORATION

28815 AURORA ROAD • CLEVELAND 39, OHIO

CENTRALIZED OIL AND GREASE SYSTEMS

Trabon SINGLE ACTING PNEUMATIC PUMPS ALS SERIES "A"

For Automatic Lubrication Of Machinery

ALS MODEL "A" SINGLE-ACTING AIR-LUBE PUMPS, powered by air pressure, are designed for use with Trabon MJ, M and MX Centralized Oil or Grease Systems. ALS Pumps will develop lubricating pressure approximately 25 times the air pressure available, if required.

ALS Pumps Model "A" have a fool-proof air purging arrangement. Lubricant flows through the pump in an "S" curve path providing automatic lube prime and air purging. With the pumping chamber at the low point of the "S" curve, it is virtually impossible to trap air in this area. The Main Outlet Check Valve is located immediately above the pumping chamber so that air rises naturally through and above the Check Valve. Test Screw for pump operation is located at the high point of the "S" curve. Pumps are also equipped with an auxiliary check valve at outlet, providing a "double" check valve feature.

ALS Pumps have only one air connection — the piston being returned to the lube-priming position by a spring when piston air is exhausted to atmosphere. A few seconds of exhaust must be allowed to insure a full lubricant prime for the next power stroke.

ALS Pumps may be operated by connecting the air supply line with an air cylinder or other intermittently actuated air equipment. Usually, a small 3-way air solenoid valve, controlled by a timer or limit switch, is used to provide air actuation. (See next page and Bulletins 6204-B, 6207 and 6409 for operation of ALS Pumps with WSC Single Count Control Panels and WMC Multiple Count Control Panels.)

Seals are normally furnished for pumping petroleum base oil and grease. *Be sure to specify type and make of fluid or grease if it is desired to pump a synthetic base material.*

Hardened and centerless-ground steel lube pistons are individually hone-fitted to the pump cylinder, and are not interchangeable.

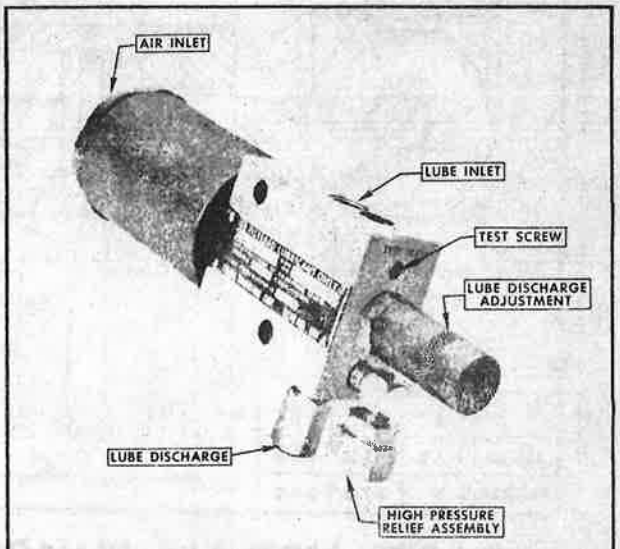
All ALS Pumps have an adjustable lube stroke. The slotted adjusting screw is protected by a screw cap at the lubricant end of the pump. (See table below.) To decrease pump volume the screw is turned in.

Each pump is equipped with a High Pressure Relief Assembly. Its replaceable rupture disc protects the pump and automatically provides a visible central signal of blockage (high pressure) in the system should it occur. ALS-5A and 25A Pumps, are equipped with a #9291 (1175 psi) rupture disc. If higher or lower disc rupture pressure is required, see Bulletin PH 79-3 for part number. If desired, a #14215-1, 3000-lb. Pressure Gauge (sold separately) can be teed into the main outlet. Also available is a High Pressure Blow-Out Switch (Suffix "-2S") which can be used to actuate a fault light or horn. (See next page).

ALS Series Pumps require separate or attachable reservoirs. The separate cylinder type reservoirs are available in 3, 5, 12 and 20-lb. (or pint) sizes. Grease reservoirs have a spring-loaded follower and are available with either metal or plastic reservoir cylinder. Oil reservoirs of clear plastic have a top fill snap lid and cone filter screen. 1-gallon tank type reservoirs for oil, part #11725, are also available.

These pumps may be ordered with attached 5, 12 or 20-lb. (or pint) cylindrical grease or oil reservoirs. A wall-mounted adapter combines pump and reservoir into one unit. See Cylindrical Reservoir Sheet dated June 18, 1964.

Also available are "package units" assembled on husky mounting plates for use with various combinations of reservoirs (oil or grease), solenoid valve, high pressure switch or blow-out relief valve, timers, air filter, pressure gauge, low level switch, air speed control valve and wired or unwired. See Air-Lube Pump and Reservoir Package Sheet dated September 18, 1964.



ALS-25A PUMP

INSTALLATION AND OPERATING INSTRUCTIONS

Mount all pumps with the lube inlet on top.

To prevent internal misalignment, use the #11827-1 spacers (⅝" lg. by 9/16" OD) when mounting pump.

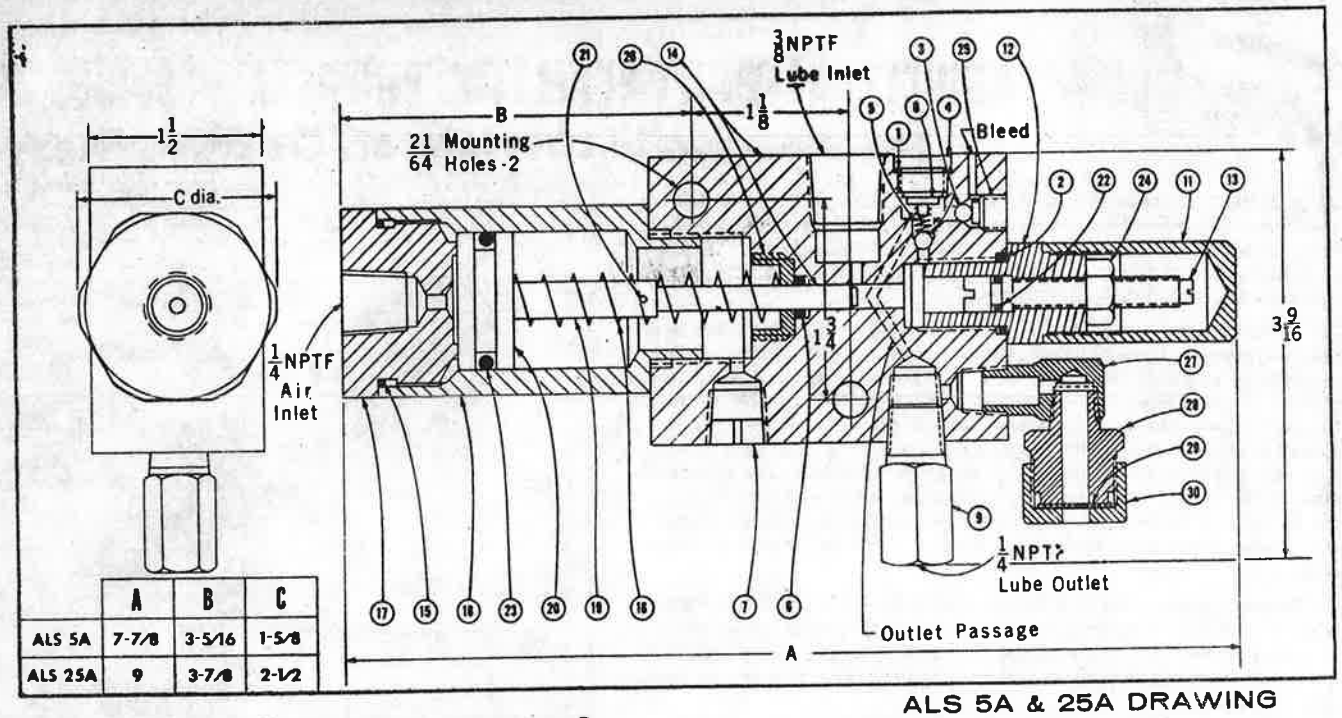
Be sure air is purged from reservoir-to-pump line. On start-up or after repairs, bleeding air from pump can be speeded up by loosening the test screw (item 25 on drawing). Be sure to re-tighten test screw after air has been purged from pump.

The lube piston "O" Ring must provide a good seal—any bypass will cut down efficiency. Loss of vacuum will prevent proper priming action.

Recommended air pressure is 60 psi minimum to 150 psi maximum. (Do not use a regulator unless normal air pressure is over 150 psi.) Very little air volume is required to stroke the pump, therefore, to prevent a high pressure surge on the lubricant pumping stroke it is wise to use a #11804 Air Control Valve or a short piece of ⅛" OD Tubing to restrict air velocity on the power stroke.

Oil reservoirs must be mounted ABOVE the pump inlet. (Spring loaded grease reservoirs may be mounted slightly below the pump, but only if necessary.) Grease reservoir - to-pump lines should be ½" OD or ⅝" OD tubing, two feet or less in length, with few bends. ⅜" OD tubing is satisfactory for oil reservoir-to-pump connections.

PUMP DESCRIPTION	RATIO OF LUBE TO AIR PRESSURE	ADJUSTABLE CU. IN. PER STROKE	OVERALL DIMENSIONS		
			LENGTH	HEIGHT	DEPTH
ALS-5A	25 to 1	.010 to .030	7-7/8"	3-9/16"	1-5/8"
		.040 to .120	9"	3-9/16"	2-3/8"



	A	B	C
ALS 5A	7-7/8	3-5/16	1-5/8
ALS 25A	9	3-7/8	2-1/2

ALS 5A & 25A DRAWING

PARTS LIST ALS PUMPS

Item	Required	Description	Part Number ALS-5A	Part Number ALS-25A
1	1	Gasket	132	132
2	1	"O"-Ring	25613	25613
3	2	Steel Balls - 5/32 Dia.	29416	29416
4	1	Enclosure Screw	117	117
5	1	Check Valve Spring	11893	11893
6	1	"O"-Ring	40259	11061
7	1	Vent Plug 1/4 N.P.T.F.	11616	11616
8	1	Spring Keeper	11892	11892
9	1	Aux. Outlet Check Valve	9260-1-35S	9260-1-35S
*10	2	Mounting Spacers	11827-1	11827-1
11	1	Adjusting Screw Cap	11818	11818
12	1	Adjusting Screw Body	11828	11817
13	1	Adjusting Screw	11829	11819
14	1	Piston and Body Assembly	11835-1	11836-1
15	1	"O"-Ring	11841	11843
16	1	Return Spring	11851	11848
17	1	Enclosure Screw	11852	11844
18	1	Air Cylinder	11853	11845
19	1	Piston Adaptor	11854	11846
20	1	Air Piston	11855	11847
21	1	Groove Pin	11884	11884
22	1	"O"-Ring	29759	40268
23	1	"O"-Ring	25604	11837
24	1	Jam Nut	1/4-28 N.F.	5/16-18 N.C.
25	1	Half Dog Pt. Set Screw	5/16-18 N.C.	5/16-18 N.C.
26	1	Retaining Plug	11833	11834
27	1	Street Elbow 90°	9110	9110
28	1	Adaptor	11812	11812
29	1	Blow-Out Disc	9292	9292
30	1	Blow-Out Nut	9209	9209

* Not Shown

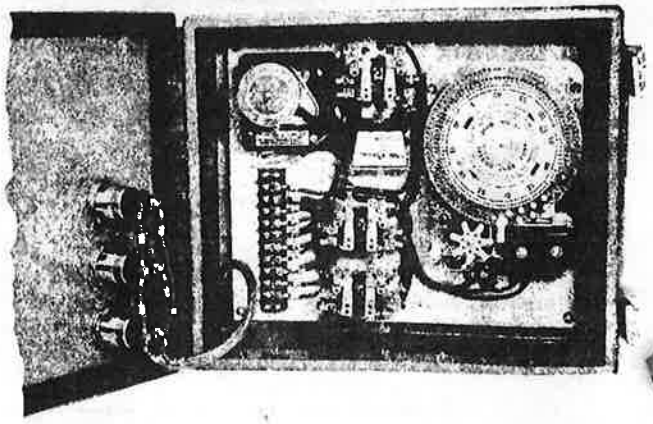
PARTS LIST

STANDARD PUMPS OR WITH OPTIONAL EQUIPMENT

PART NO.	DESCRIPTION
ALS-5A ALS-25A	PUMP WITH STANDARD BLOW-OUT
ALS-5A-2 ALS-25A-2	PUMP WITH BLOW-OUT & 9219-1 SPUD & NUT
ALS-5A-2S ALS-25A-2S	PUMP WITH BLOW-OUT, 9219-1 SPUD & NUT & #11573 INDICATOR SWITCH ASSEMBLY
9219-1	SPUD & NUT
11573	BLOW-OUT INDICATOR SWITCH ASSEMBLY

WSC OR WMC CONTROL PANELS WITH SYSTEM OPERATION LIGHTS

The style 20 WSC or WMC-40 Panels may be used with ALS series single acting air-powered lube pumps. A Recycling Timer in either panel is activated by the Program Timer and subsequently the 3-way Air Solenoid Valve is opened and closed at a rate of 10 times per minute–stroking the pump at the same frequency. The pump will continue to cycle, or stroke, delivering lubricant to the system until the "control" manifold has cycled once for a Single Count WSC Panel or 1 to 40 times with the Adjustable Count WMC Panel. At this point, the in-and-out-motion of the micro-switch, attached to the indicator on the "Control" Manifold, de-energizes the Recycling Timer and the air solenoid remains in closed position, stopping lubricant flow. Simultaneously a Green Light is energized signalling "cycle completed normally".

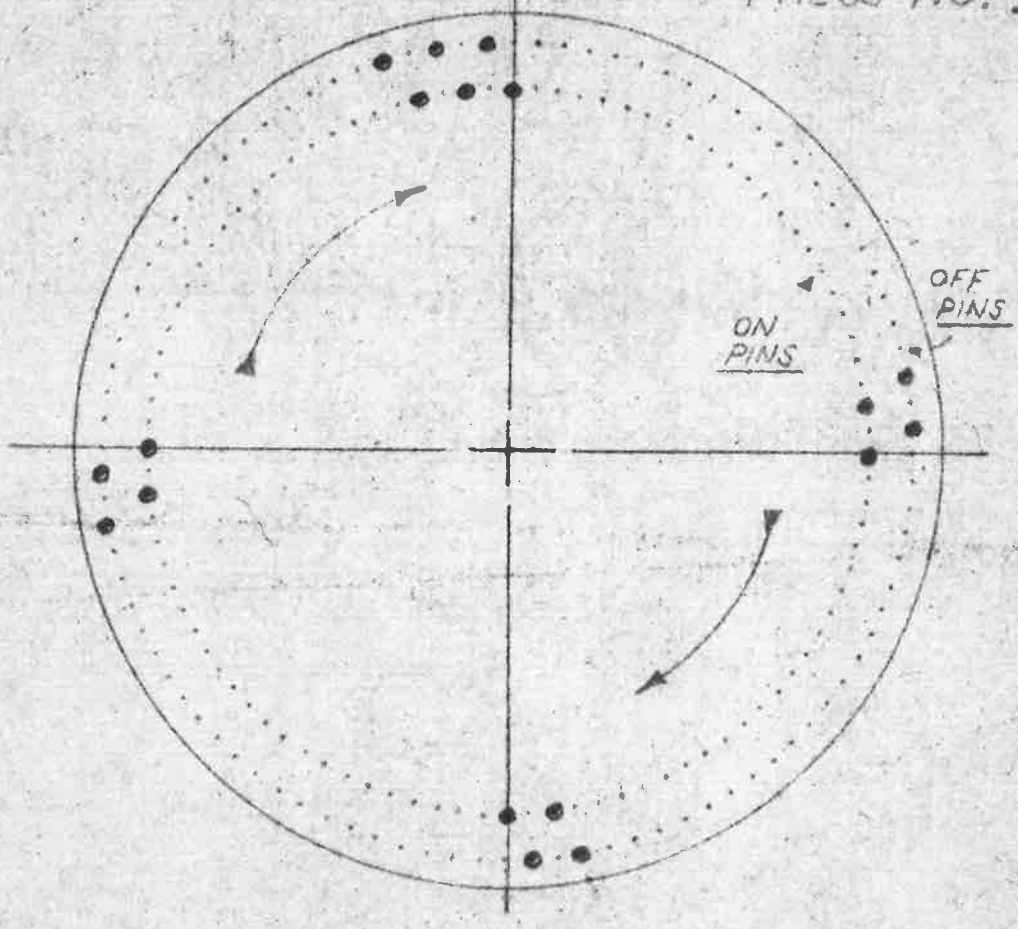


The WSC-20-1H8 Panel includes program timer and recycling timer.

TRABON ENGINEERING CORPORATION
28815 AURORA ROAD
CLEVELAND 39, OHIO

#83-1H-PB ONE HOUR CYCLE TIMER

PRESS NO. 110 O.B.



ALS - 25 PUMP SET AT .040 CU. INCHES DISCHARGE PER STROKE OF PUMP

9 DISCHARGES PER HOUR REQUIRED

E
P
I
S
S4
SUP

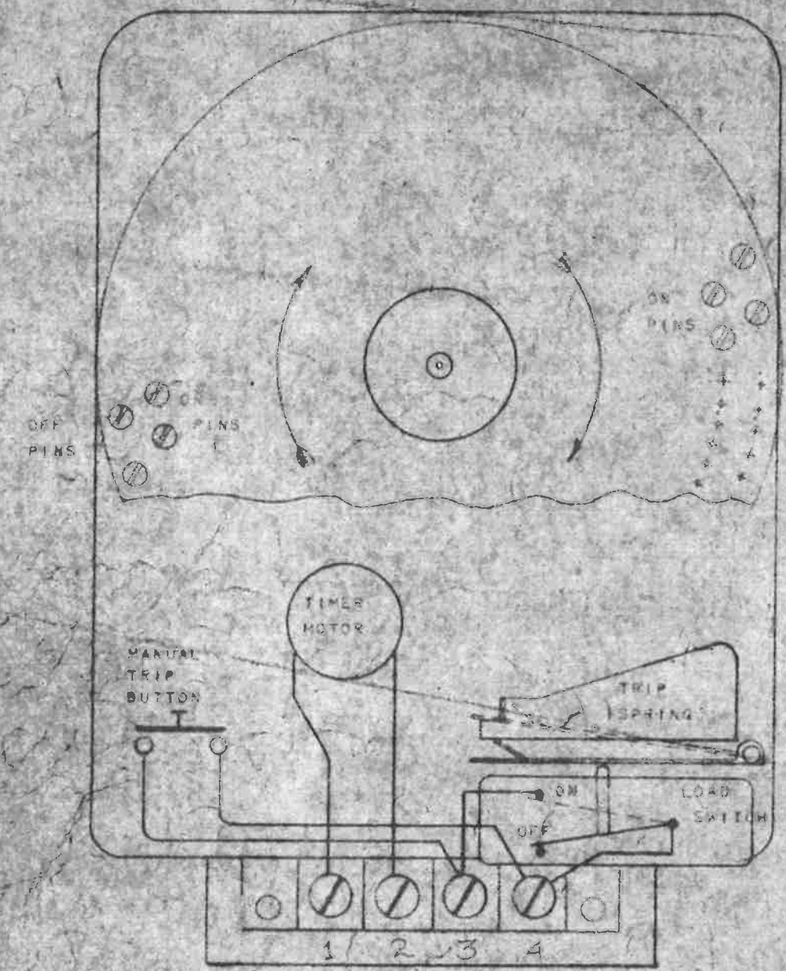
9.03

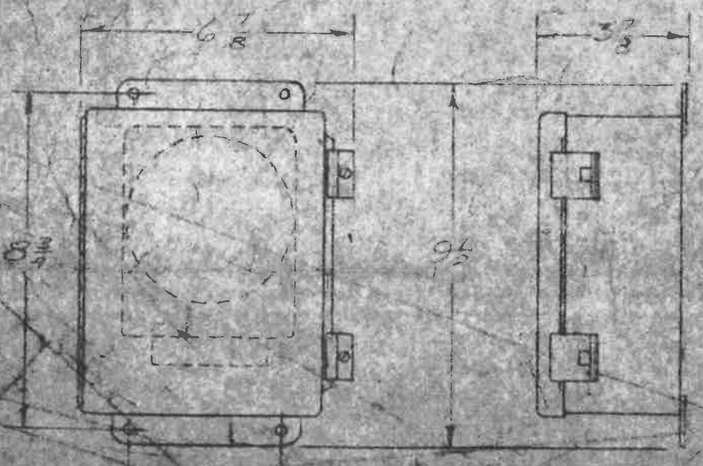
DRAWING NO. 10-10218

DRAWN BY:

CHECKED:

APPROVED:





JIC ENCLOSURE

(NO KNOCK-OUTS)

DESCRIPTION:

THE 83-1H RECYCLING TIMER IS PROVIDED WITH A DIAL FACE WHICH MAKES ONE COMPLETE REVOLUTION PER HOUR IN A CLOCKWISE DIRECTION. TWO ROWS OF TAPPED HOLES ARE PROVIDED ABOUT THE OUTSIDE OF THE DIAL FACE. TRIP PINS INSERTED IN HOLES OF THE INNER ROW TRIP THE LOAD SWITCH CLOSED WHILE PINS INSERTED IN THE OUTER ROW OPEN THE LOAD SWITCH.

A SMALL RED PUSH BUTTON AT THE LOWER LEFT SIDE OF THE TIMER'S BASE PLATE PERMITS MANUAL OPERATION OF THE LOAD.

LOAD RATING IS 10 AMPS - 115 VOLTS, 60 CYCLES A.C.

OPERATION:

PLACE A PIN IN A HOLE OF THE INSIDE ROW OF HOLES TO TRIP THE LOAD SWITCH CLOSED. PLACE A PIN IN A HOLE OF THE OUTSIDE ROW COUNTERCLOCKWISE FROM THE FIRST TRIP PIN TO TURN THE LOAD OFF. OFF PINS MUST BE LOCATED AT LEAST ONE HOLE AWAY FROM AN ON PIN. (NEVER LOCATE AN ON PIN AND AN OFF PIN IN LINE ON THE SAME RADIUS.)

THE DURATION OF THE PERIOD DURING WHICH POWER IS APPLIED TO THE LOAD IS FIXED BY THE LOCATION OF AN OFF PIN COUNTERCLOCKWISE FROM AN ON PIN. EACH HOLE AWAY FROM THE ON PIN REPRESENTS 37½ SECONDS TIME. (AN OFF PIN INSERTED 4 HOLES AWAY FROM AN ON PIN ALLOWS THE LOAD SWITCH TO REMAIN CLOSED 150 SECONDS.)

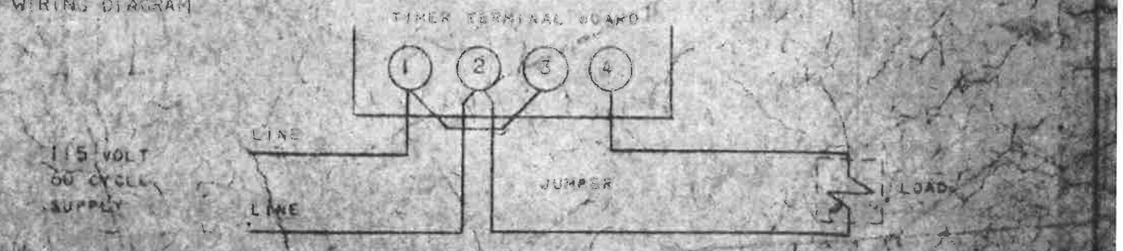
PINS SPACED SIDE BY SIDE IN THE SAME ROW OF HOLES MUST HAVE AT LEAST ONE VACANT HOLE BETWEEN THEM. 90 HOLES ARE PROVIDED IN EACH ROW, MAKING POSSIBLE A MAXIMUM NUMBER OF 40 OPERATIONS DURING ONE DIAL REVOLUTION. (ORDER ADDITIONAL PINS- #1108- AS REQUIRED. 6 PINS ARE SUPPLIED WITH EACH TIMER UNLESS OTHERWISE INDICATED.)

THE DIAL MAY BE TURNED CLOCKWISE MANUALLY BY FIRST LOOSENING THE THUMB WHEEL AT THE CENTER. ALWAYS RETIGHTEN THE THUMB WHEEL.

NOTE:

ALL PINS AND THUMB WHEEL HAVE LEFT HAND THREADS, INSERT PINS WITH A COUNTERCLOCKWISE TWIST. LIQUID SOLDER PINS IN PLACE ONCE CUBE CYCLE HAS BEEN ESTABLISHED TO PREVENT TAMPERING.

WIRING DIAGRAM



LUBRICATION SYSTEM
1 HOUR RECYCLING TIMER
MODEL 83-1H-PB JIC

3/65 JWN

Version
MS 5002