



# SERVICE MANUAL

Section 1 \_\_\_\_\_ INTRODUCTION  
GENERAL INFORMATION

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## 1-1. INTRODUCTION

### A. REMOVAL

This Service Manual contains maintenance and repair instructions for the EIMCO 911B Load-Haul-Dump machine. See Figure 1-1 for an identifying view of the machine. Functional descriptions are also given to aid the repairman in understanding the construction and operation of the major systems of the 911B LHD. Trouble Analysis tables are included to aid in insulating system malfunctions.

### B. UNIT NAMEPLATE AND SERIAL NUMBER

The unit nameplate is located on the left rail of the operator's compartment. The nameplate gives the machine serial number (the serial number is also stamped on the rail structure above the nameplate). The machine serial number must be known to enable the repairman to determine specific unit service assembly configurations as described in this manual. The serial number must also be referred to when ordering replacement parts for the machine.

### C. PREVENTIVE MAINTENANCE

Preventive maintenance procedures such as lubrication and filter replacement intervals are

given in Section 2. Always follow the maintenance schedule and recommended procedures to ensure prolonged efficiency and service from the machine.

### D. SYSTEM DESIGN SPECIFICATIONS

Design specifications for each system of the machine are listed in the individual section for that system. Additional specifications such as lubricant and fuel quantities are given in Section 2.

### E. TROUBLESHOOTING

Trouble Analysis tables for each major system are given in the section for that system.

### F. SYSTEM REPAIRS

Sections 3 through 8 contain repair instructions for the major systems of the machine as listed in the Table of Contents.

### G. OPERATING THE MACHINE

Operating instructions can be found in the applicable Operator's Manual supplied with the equipment.

## 1-2. GENERAL INFORMATION

The following information will be beneficial in comprehending and interpreting instructions and illustrations when using the Service Manual.

### A. TROUBLESHOOTING

When troubleshooting components or systems for a malfunction, use a logical process of elimination. For example:

- (1) Determine the trouble.
- (2) List possible causes.
- (3) Use system checks provided in the appropriate manual section, or if necessary, devise checks.

- (4) When repairing a component, consider the remaining service life against the cost and labor involved in the repair. It may be desirable to replace the part instead of repairing it.

### B. SCHEMATIC SYMBOLS

- (1) Schematic diagrams in Sections 6 and 7 use graphic symbols to describe component and system functions and methods of operation.
- (2) The symbols used in the hydraulic and electrical schematic diagrams are fully explained in Standards USAS Y32.10 - 1967 and ANSI Y332.2 - 1975 and are internationally recognized.



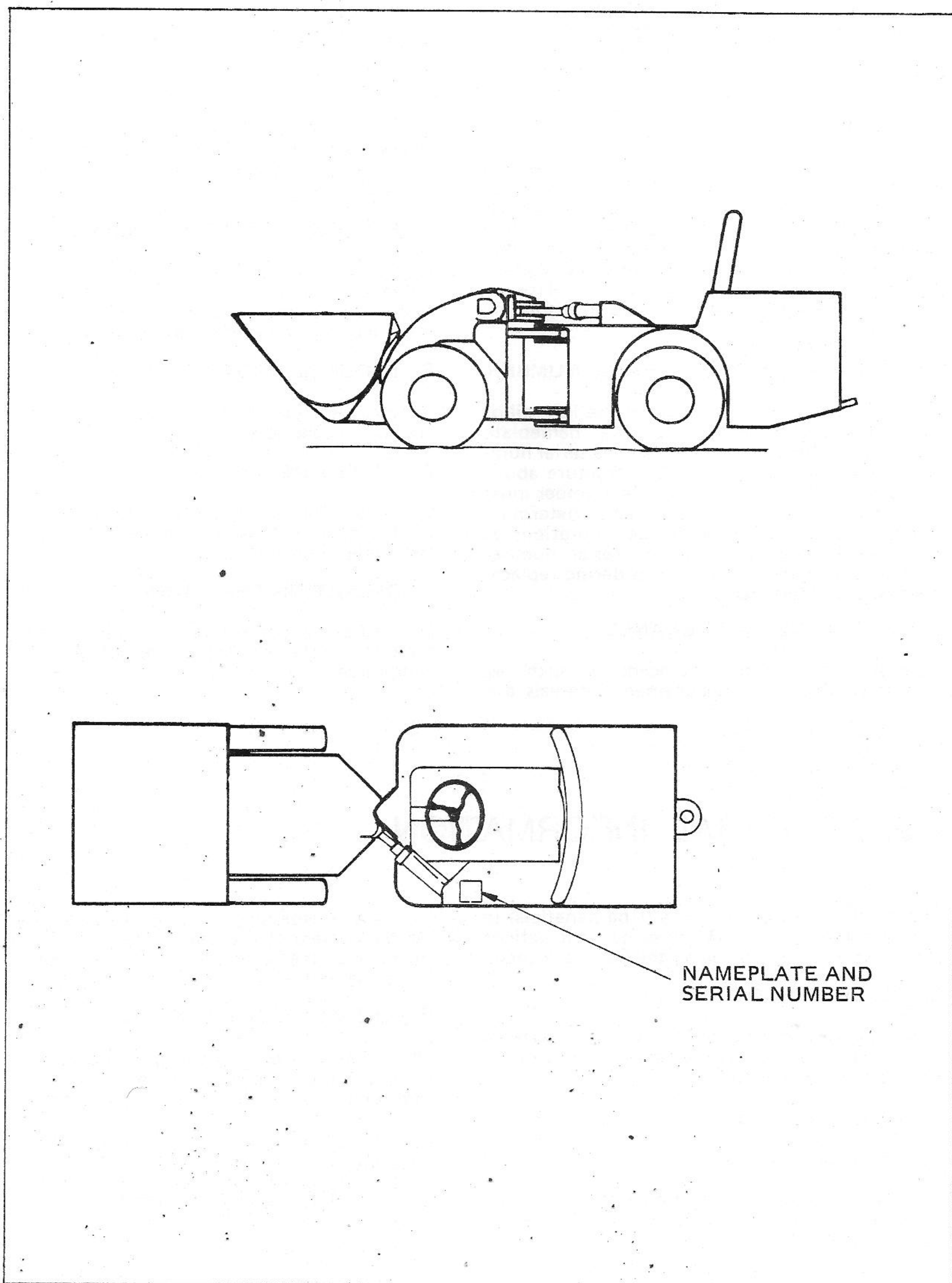


FIGURE 1 -1. 911B IDENTIFYING VIEW





### C. WORKMANSHIP AND SAFETY

- (1) Personnel safety is of prime consideration when operating and servicing the machine. Safety depends wholly upon a thorough understanding of the job to be done.
- (2) Use extreme caution when handling heavy components or equipment. Do not attempt to manually lift heavy parts when a hoist or floor jack should be used. Never leave heavy parts in a position where they can present a hazard to personnel or property. A machine or component in suspension should be securely shored up. Do not rely on lifting devices for prolonged support.

### D. UPKEEP

- (1) Keeping working parts clean and well lubricated will ensure prolonged life for the machine. Covered compartments, filters and seals are provided to protect machine systems. Maintain these components as required to help them do their job.
- (2) Whenever disconnecting hydraulic, fuel, lubricating oil or air lines, clean the immediate area. Cap the lines and plug the openings to prevent entry of foreign matter. Do likewise whenever access covers are removed.
- (3) Clean and inspect all parts. Be sure parts are free from damage when they are installed. Leave new parts in their containers until ready for assembly or installation.

### E. REMOVAL AND INSTALLATION

- (1) Use proper tools when removing or installing components to avoid damage to the attaching hardware or component. Fully complete each removal and installation in the sequence given. Make all adjustments as recommended and instructed.
- (2) Verify all adjustments and installations by operating the machine before returning it to service.

### F. WELDING SPECIFICATIONS

The following applies to all welds except those specified in other parts of this manual. Unless otherwise specified, all welds are to be naturally formed fillets or bevels.

- (1) Determine the proper weld size. The following rule of thumb should be used for determining the proper fillet weld size:

- (a) In order to develop the full strength of a plate by means of fillet welds, it is necessary

that the leg size of the fillet be  $\frac{3}{4}$  of the plate thickness. This assumes that:

1. The fillet weld is on both sides of the plate,
2. the fillet weld is for the full length of the plate, and
3. the weld thickness is that of the thinner plate, if the two being joined are of different gauges.

(b) For mild steel, this welded joint will be stronger than the plate, under any type and direction of loading.

(c) When the member is designed to maintain a certain amount of shiftness or rigidity, the stresses are usually of a rather low value. The weld as such does not contribute noticeably to the stiffness of the built-up section. The weld size is still dependent on the forces which must be transferred, although they are low.

**"Rule-of-Thumb" FILLET WELD SIZES**

PLATE THICKNESS	STRENGTH DESIGN	RIGIDITY DESIGN	
	FULL STRENGTH WELD	50% OF FULL STRENGTH WELD	33% OF FULL STRENGTH WELD
1/4	3/16	3/16	3/16
5/16	1/4	3/16	3/16
3/8	5/16	3/16	3/16
7/16	3/8	3/16	3/16
1/2	3/8	3/16	3/16
9/16	7/16	1/4	1/4
5/8	1/2	1/4	1/4
3/4	9/16	5/16	1/4
7/8	5/8	3/8	5/16
1	3/4	3/8	5/16
1-1/8	7/8	7/16	5/16
1-1/4	1	1/2	5/16
1-3/8	1	1/2	3/8
1-1/2	1-1/8	9/16	3/8
1-5/8	1-1/4	5/8	7/16
1-3/4	1-3/8	3/4	7/16
2	1-1/2	3/4	1/2
2-1/8	1-5/8	7/8	9/16
2-1/4	1-3/4	7/8	9/16
2-3/8	1-3/4	1	5/8
2-1/2	1-7/8	1	5/8
2-5/8	2	1	3/4
2-3/4	2	1	3/4
3	2-1/4	1-1/8	3/4





(d) In many rigidity designs, it is difficult to compute these forces and it is sometimes assumed that the stresses in the adjacent plate are lower than  $1/3$  to  $1/2$  of the allowable. This means, as a rule of thumb, that a rigidity design would require a fillet weld leg size  $1/3$  to  $1/2$  of that required for a strength design, assuming, as before, that both sides are based on the thinner plate. This range in leg size usually results in well proportioned fillet welds.

(e) If the weld is only made on one side of the plate, weld size should be doubled.

(f) Where a naturally formed bevel is insufficient to provide adequate access for welding, the edge should be prepared with a suitable bevel.

(g) All welds should run continuously the full length of the joint and should be smoothly hooked around all corners.

(h) The welds should be free of any undercuts, overlaps, or other discontinuities which will seriously affect the strength or appearance of the weld.

#### G. TORQUE VALUES FOR STANDARD HARDWARE

SAE GRADE 5 CARBON STEEL CAP SCREWS											
FOOT-POUNDS						KILOGRAM-METERS					
SIZE	TORQUE		SIZE	TORQUE		SIZE	TORQUE		SIZE	TORQUE	
	UNC	UNF		UNC	UNF		UNC	UNF		UNC	UNF
5/16	13	14	7/8	300	320	5/16	1.80	1.94	7/8	41.49	44.26
3/8	23	25	1	440	480	3/8	3.18	3.46	1	60.85	66.38
7/16	35	40	1-1/8	600	660	7/16	4.84	5.53	1-1/8	82.98	91.28
1/2	55	65	1-1/4	840	920	1/2	7.61	8.99	1-1/4	116.17	127.24
9/16	80	90	1-3/8	1100	1260	9/16	11.06	12.45	1-3/8	152.13	174.26
5/8	110	130	1-1/2	1460	1460	5/8	15.21	17.98	1-1/2	201.92	226.81

SAE GRADE 8 CARBON STEEL CAP SCREWS AND PLATE BOLTS											
1/4	6	10	3/4	280	320	1/4	1.24	1.38	3/4	38.13	44.26
5/16	18	20	7/8	460	500	5/16	2.49	2.77	7/8	63.62	69.15
3/8	35	35	1	680	740	3/8	4.84	4.84	1	94.04	102.34
7/16	55	60	1-1/8	960	1080	7/16	7.61	8.29	1-1/8	132.77	149.36
1/2	80	90	1-1/4	1360	1500	1/2	11.06	12.45	1-1/4	188.08	207.45
9/16	110	130	1-3/8	1780	2040	9/16	15.21	17.98	1-3/8	246.17	282.13
5/8	170	180	1-1/2	2360	2660	5/8	23.51	24.89	1-1/2	326.39	356.81

NOTE: This table lists torque values for standard hardware and is intended as a guide for average applications involving typical stresses and machined surfaces. Values are based on the physical limitations of clean, plated and lubricated hardware. In all cases, when an individual torque value is specified, it should take priority over values given in this table. Replace original equipment with hardware of equal grade.

#### H. LOCKS

(1) Lock washers, flat washers, cotter pins, lock plates and retainers are used to prevent cap screws and nuts from turning and moving along the axis of the shaft or pin.

(2) Lock plates must be properly installed to be effective. See Figure 1-2.

(3) Avoid the reuse of locks if they reflect signs of wear or fatigue.



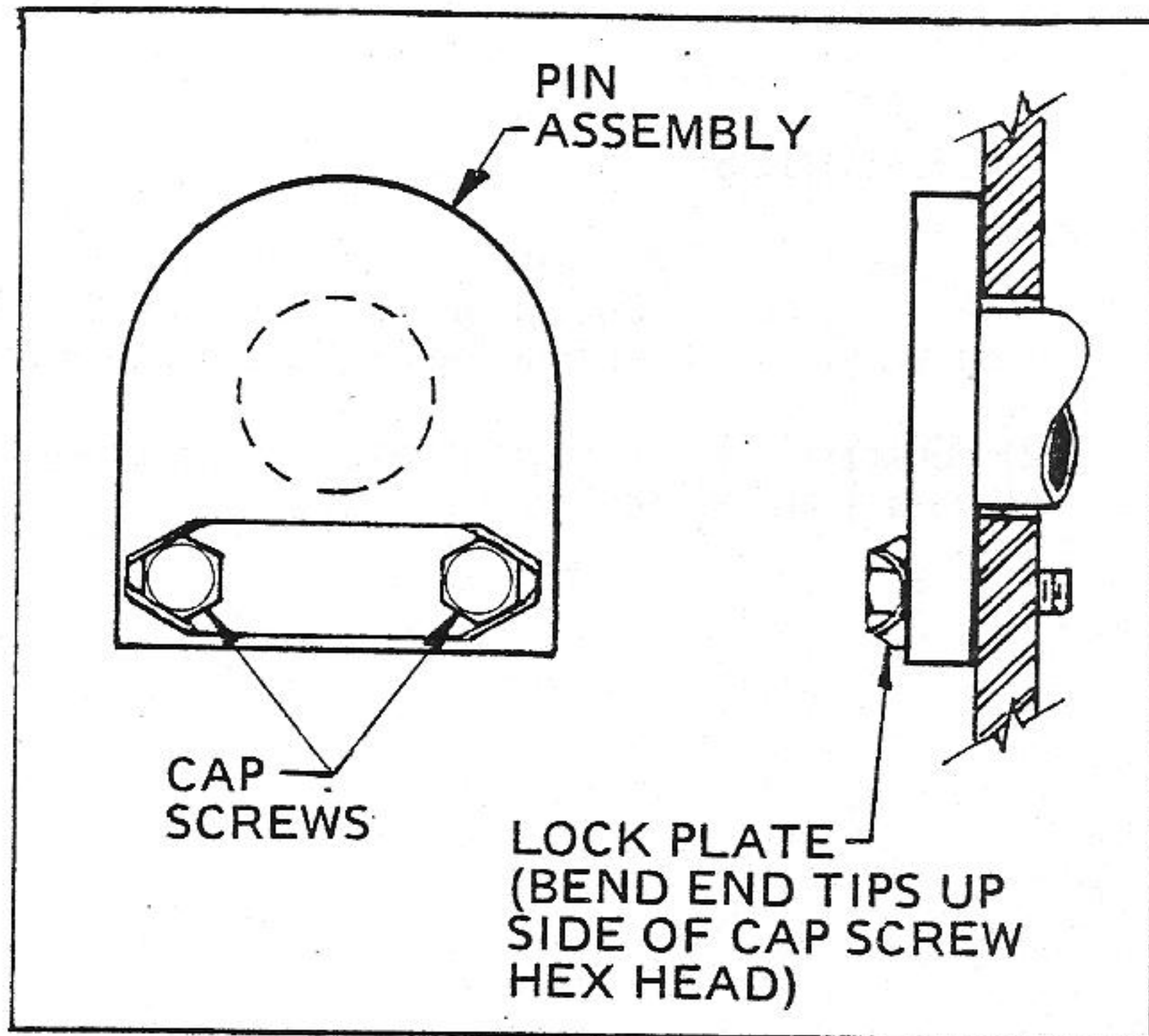


FIGURE 1 - 2. PROPER LOCK PLATE INSTALLATION

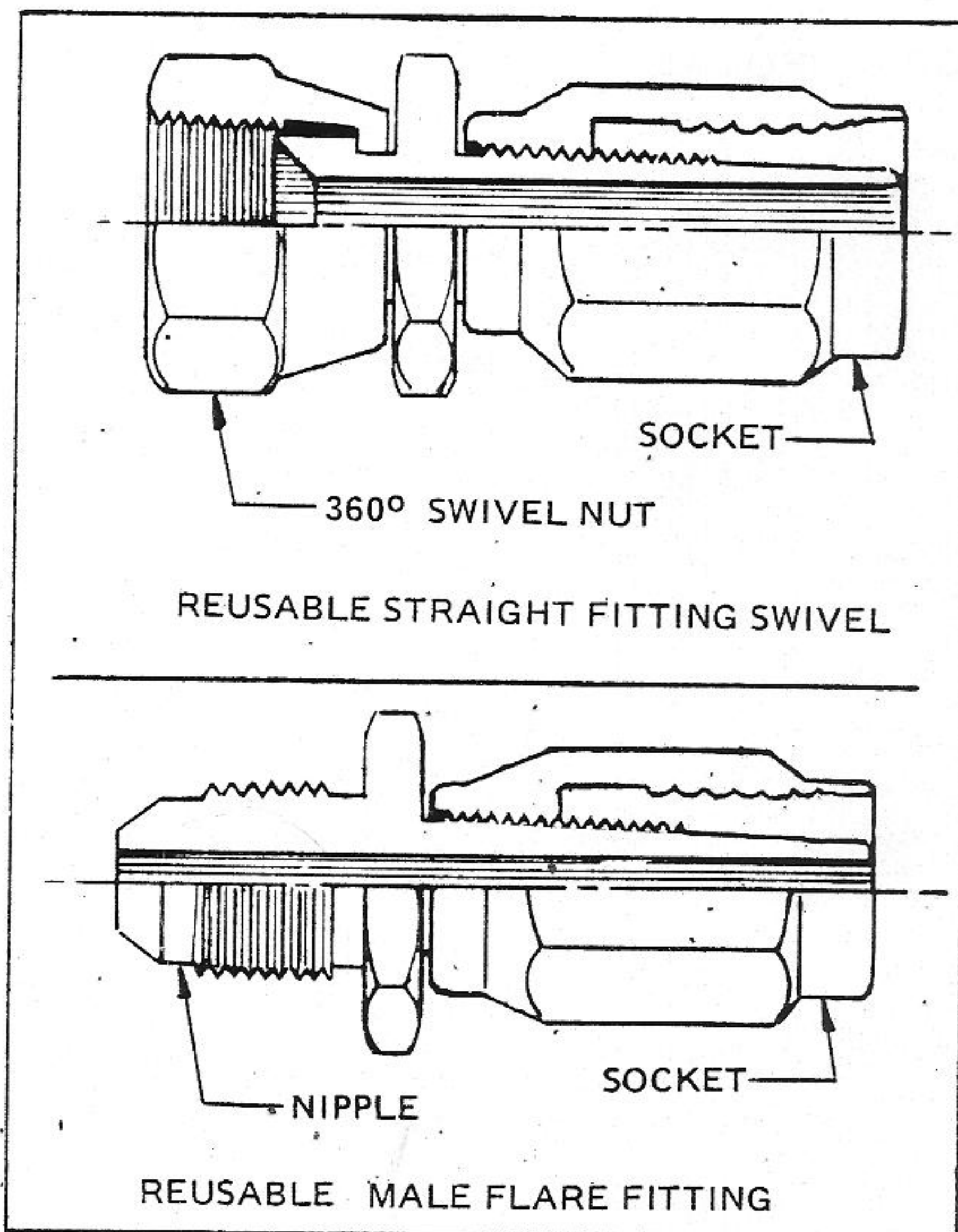


FIGURE 1 - 3. HYDRAULIC HOSE FITTINGS

#### I. HYDRAULIC FITTINGS

- (1) Hydraulic hose fittings are either JIC Swivel Nut or Male Flare type and are reusable.
- (2) Refer to Figure 1-4 to install new hose fittings.

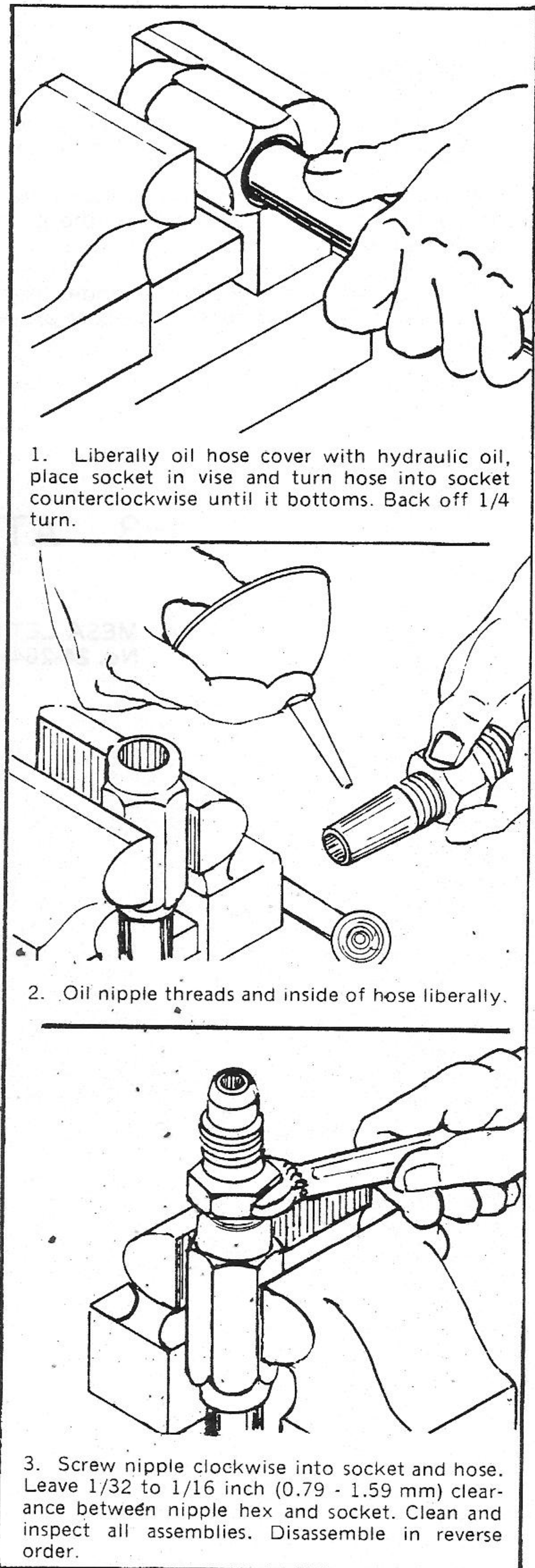


FIGURE 1 - 4. INSTALLING NEW HOSE FITTINGS





#### J. HYDRAULIC PUMPS

- (1) The clockwise and counterclockwise rotation of the pump is viewed from the shaft end.
- (2) After assembling any hydraulic pump, thoroughly lubricate it. After assembly, the pump must rotate by hand.
- (3) Before disassembling a pump, index mark the pump body and end covers to ensure proper reassembly.

#### K. BEARINGS

- (1) The life of an antifriction bearing will be limited if it is not properly lubricated. Lubricate new or used bearings before installation.
- (2) Discard the bearings if the race and balls or rollers are pitted, scored or burned.

### 1-3. ATTACHMENTS

- A. MESA LETTER OF APPROVAL,  
No. 24-264



MESA LETTER OF APPROVAL,  
No. 24-264

911B LHD (Eff. S/N 9110489)





# United States Department of the Interior

## MINING ENFORCEMENT AND SAFETY ADMINISTRATION

4800 FORBES AVENUE

In Reply Refer To: PITTSBURGH, PENNSYLVANIA 15213  
EMS:A&CC

Request No. 1000003

December 30, 1977

Envirotech Corporation  
Eimco Mining Machinery  
Eimco Operations  
Salt Lake City, Utah 84110

Attention: T. N. Hackett  
Director of Engineering

Gentlemen:

The approval investigation of the diesel-powered Eimco Model 911B LHD Loader has been completed. Approval Number 24-264 has been assigned to the vehicle.

The Loader, when manufactured in accordance with specifications on file at the Mining Enforcement and Safety Administration, meets the requirements of Part 32, Title 30, Code of Federal Regulations and is approved for use in noncoal mines. Such mines are defined as those in which the material being mined is incombustible or contains at least 65 percent by weight of incombustible material, and in which the underground atmosphere in any open workings contains less than 0.25 percent by volume of flammable gas.

The amount of fresh moving air for ventilation at any place underground where this machine is working should be 6,000 cubic feet per minute (c.f.m.) or more, when the Deutz Model F4L912W engine is governed at 2,300 r.p.m., rated speed. This volume of air for ventilation is in addition to that required underground for all other purposes, and shall be supplied at any altitude. The maximum fuel injection rates at various altitudes for this approved vehicle shall not exceed the limits set forth in the Mining Enforcement and Safety Administration Certification Number 24/D13.

An approval plate should be permanently attached in a conspicuous location where it will not be defaced. The Approval Number, ventilation requirement and vehicle serial number should be stamped in the spaces provided for them.





All machines of this type that bear the approval plate must be manufactured in accordance with the attached drawings and specifications on file at the Mining Enforcement and Safety Administration, and maintained in strict accordance with the instructions set forth in the vehicle maintenance and service manual. Any change in the design must be accepted in writing by the Mining Enforcement and Safety Administration before you are authorized to place an approval plate on any machine utilizing such a change.

The Mining Enforcement and Safety Administration reserves the right to rescind for cause, at any time, any approval granted under this part.

Respectfully,



(Dr.) Stephen G. Sawyer  
Chief, Approval and Certification Center

Enclosure