

New 10-94



MUSTANG[®]

Service Manual

930 - 940 - 960

000-12909

Revised September, 1993

MUSTANG MANUFACTURING COMPANY, INC.
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A BM Group Company

Ptd. U.S.A.
9-93 / 500



New Equipment Limited Warranty



MUSTANG MANUFACTURING COMPANY, INC. ("Company") warrants, in accordance with the provisions below, to each purchaser of Company's new MUSTANG equipment from an authorized MUSTANG dealer that such equipment is free from defects in material and workmanship if used and serviced in accordance with the recommendations in the operator's manual. This New Equipment Limited Warranty does not apply to (a) tires, tubes, and specified engines, or (b) any equipment, accessories or attachments supplied by other manufacturers.

The obligation of Company under this warranty is limited to repairing, or, at its option, replacing any part(s) which, in Company's judgment, are defective in material or workmanship under normal use and condition and shall extend only for a period of twelve (12) months from the time of first use of the equipment or for the first one thousand (1,000) hours of use (whether such first use is by the dealer or the first retail purchaser), whichever is first. The warranty on attachments manufactured by the Company shall extend only for ninety (90) consecutive days from the date of sale or 500 operating hours, whichever is first.

This warranty will not apply to equipment which has been subject to misuse, negligence, accident, or alteration. This warranty constitutes the purchaser's sole and exclusive remedy against Company and its authorized dealer.

Except as set forth in this New Equipment Limited Warranty and the Warranty Specifics described below, COMPANY SHALL HAVE NO OBLIGATION OR LIABILITY OF ANY KIND ON ACCOUNT OF ANY OF ITS EQUIPMENT, AND SHALL NOT BE LIABLE FOR ANY INJURY TO PERSON OR PROPERTY, OR ANY OTHER LOSS OR DAMAGE INCLUDING, BUT NOT LIMITED TO, LOSS OF CROP, LOSS OF PROFIT, RENTAL OF SUBSTITUTE EQUIPMENT OR OTHER COMMERCIAL LOSS, EITHER DIRECT OR CONSEQUENTIAL, ARISING OUT OF THE USE OR INABILITY TO USE THE EQUIPMENT. COMPANY MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND SPECIFICALLY COMPANY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

See below in the Warranty Specifics a more detailed outline of your owner's warranty. The Warranty Specifics are a part of this New Equipment Limited Warranty. No one has authority to vary the terms of this written warranty, or give any warranty except the one stated in the New Equipment Limited Warranty and the Warranty Specifics.

Warranty Specifics

The following information explains in detail, Company's warranty. These details include an explanation of the criteria for determining warranty, those items covered and not covered, and how to obtain warranty service.

SERVICE

Obtain service by contacting the authorized MUSTANG dealer from whom the machine was purchased. If this becomes impractical, any authorized MUSTANG dealer may perform warranty work. When the MUSTANG dealer is not an authorized engine dealer, he may have to make arrangements with the closest authorized dealer to have the work done.

REGISTRATION

All machines must have the warranty registration forms on file at Company's corporate headquarters before warranty can be honored. This must be done within 72 hours upon purchase of a new MUSTANG product to insure warranty.

REPLACEMENT

Genuine MUSTANG replacement parts will be warranted for 30 days from date of purchase, or the remainder of the original equipment period, whichever is longer. Labor will not be paid for parts replacement outside of the warranty period.

COVERAGE

Only defective parts are covered by this warranty. Any part(s) of a MUSTANG product found to be defective from date of sale or lease to the first purchaser in accordance with the provision of the warranty will be repaired or replaced by an authorized MUSTANG dealer. This warranty includes the replacement or repair of any part(s) or of machine or attachments on MUSTANG's new equipment purchased from an authorized MUSTANG dealer (except tires, tubes, and specified engines) which are defective in material, workmanship, or both. Tires, tubes and specified engines will be warranted as defined by their manufacturer.

ITEMS NOT COVERED

DEALER TRAVEL TIME

The customer is responsible for payment of dealer travel time to the machine or to deliver the machine to the dealer's service shop for repair. Company's warranty **DOES NOT** cover travel time.

USED EQUIPMENT

The Company's warranty only applies to the new equipment owner. All used equipment is sold "as is" with no warranty.

ENGINES

In some cases, engine warranty shall be handled by the engine manufacturer's local authorized dealer. See your MUSTANG dealer for this information.

TIRES & TUBES

Tires and tubes shall be warranted by the selling dealer or by local dealer of the tire manufacturer.

MODIFIED OR ALTERED EQUIPMENT

No warranty shall apply on any equipment or parts that have been modified or altered in any way without prior written approval and knowledge of the company. Warranty will be voided if done by an unauthorized dealer, or the use of parts not purchased from or approved by Company.

NORMAL WEAR OR MAINTENANCE PARTS

Company shall not be responsible for normal replacement parts such as cutting edges, chains, belts, filters, oil, anti-freeze, nor for parts which are worn out unless they are determined to be defective in material or workmanship.

MISCELLANEOUS

No warranty shall apply to damage resulting from accident, misoperation, abuse, or damage caused by environment (such as exposure to corrosive materials), or equipment not maintained per the operator's manual.

ALLIED ATTACHMENTS

Company does not approve or disapprove, warrant, service, recommend or assume any responsibility for use of these attachments when used on MUSTANG equipment.

IMPROVEMENTS

Company is continually improving its products, and therefore, reserves the right to make improvements or changes when it becomes practical and possible to do so, without incurring any obligations to make changes or additions to the equipment sold previously.

INTRODUCTION

This manual was prepared to assist the experienced mechanic in troubleshooting and repair of the **MUSTANG 930, 940 and 960**. It contains the latest information available for proper procedures and adjustments.

For information on engine repair, refer to the manufacturers service manual. When referred to, left and right sides of the machine are determined as if sitting in the operator's seat facing forward.

All **MUSTANG** products are designed with operator safety as top priority. In some cases safety equipment must be removed for access to major components. **Be sure to replace all safety equipment and be sure of proper operation when servicing is complete.**

Always have the model and serial number when ordering parts or requesting service information. The serial number tag is located on the right rear upright, near the lift arm pivot pin. (See figure 0-1)

MUSTANG is continually striving to make improvements. We therefore reserve the right to make changes in product and/or specifications without notice and are under no obligation to make changes to equipment manufactured previously.

Sincerely,

MUSTANG MANUFACTURING COMPANY, INC.

9-1-93



Steve Louks

National Service Manager

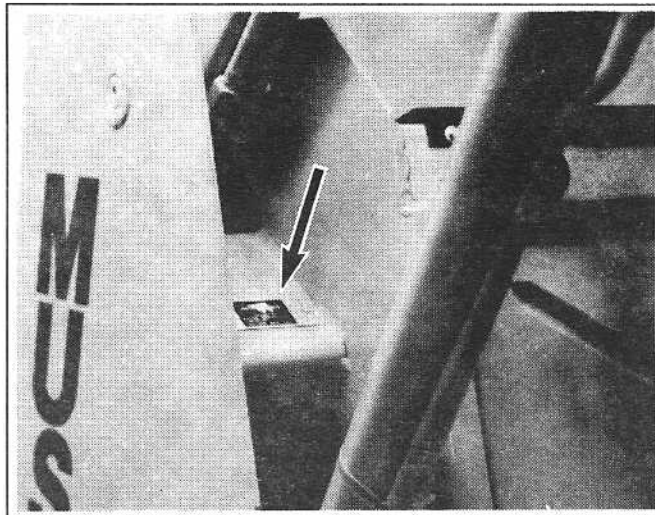


Figure 0-1

SERIAL NUMBER SYSTEM

The serial number of a product is very important when ordering repair parts or looking for service information. The purpose of a serial number is to identify an individual machine. The serial number must also be understood to eliminate confusion and assure the correct parts are ordered and proper service procedures are followed.

With our serial number system, the number is broken into four segments. Each segment has a specific definition. Shown below is a breakdown of a Mustang Skid Steer Loader serial number.

<u>Fiscal Year of Manufacture</u>	<u>Model #</u>	<u>Sequence #</u>	<u>Month of Build</u>
8 - 1988	2 - 920	XXXX	1-9 Jan. - Sept.
9 - 1989	2 - 930 or 930A		O Oct.
0 - 1990	4 - 940		N Nov.
1 - 1991	6 - 960		D Dec.

EXAMPLE: Model 940, Serial number 9409192 or 9 4 0919 2
(9) F/Y 1989 Machine
(4) Model 940
0919 - Sequence number
(2) Built in February

In the service manual and parts books we use the terminology of starting serial number or prior to serial number. On Models 940 & 960, to determine if your serial number is before or after the break, drop the first and last characters from the serial number. (ie: s# 940340D becomes 40340) Do the same thing for the serial numbers in the book.

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SPECIFICATIONS

930 GENERAL SPECIFICATIONS

UNIT DESCRIPTION

Model: 930 Mustang
 Manufacturer: MUSTANG MANUFACTURING COMPANY INC.

ENGINE SPECIFICATIONS

Make: Yanmar Diesel
 Model: 3TN82E
 Displacement: 83 CID (1362 cc)
 Max. HP (Mfg. rating): 35 (26.1 kw) @ 3600 RPM
 HP @ Governed RPM: 28 HP (20.6 kw) @ 2800 RPM
 Max. No-Load RPM: 2800 RPM
 Fuel Injection: Direct
 Number of Cylinders: 3
 Bore and Stroke: 3.23 x 3.39 (82 x 86 mm)
 Cooling Medium: Liquid
 Torque (ft. lbs.): 62.2 @ 2000 RPM (84 nm)
 Electrical System: 12 Volt
 Alternator: 35 Amp
 Battery (Group Class): 31
 (Cold crank rating): 625 Amps
 Fuel Shut Off: Manual
 Air Cleaner: Replaceable dry cartridge type
 with provision for dual element

FLUID CAPACITIES

Cooling System: 6.5 qts. (6.1 L)
 Fuel Tank: 14.3 gal. (54 L)
 Engine Oil: 5 qts. (4.7 L)
 Oil spec. SAE Class CC 15W-40
 Chain Case: 8 gal. (30.28 L) (4 per side)
 Oil spec. ISO 32 or 68
 Hydraulic System: 14.5 gal. (54 L)
 Oil spec. ISO 32 or 68

HYDRAULIC SYSTEM

Pressure Relief: 2000 PSI (136 Bar)
 Control Valve Make: Victor Dukes
 Spool Sections: 3 Spool
 Pump Make: Vickers
 Pump Type: Double Gear
 Pump Output: 12 GPM (45 L/m)
 Filters: (1) screen - 100 mesh (1) 7 micron return
 (1) 7 micron charge inlet
 Auxiliary Control: Hand Lever

TRANSMISSION and FINAL DRIVES

Type: Hydrostatic
 Make: Vickers
 Model: TA1919
 System Relief Setting: 4500 PSI (310 Bar)
 Charge Pressure Relief Setting: 180 PSI (12 Bar)
 Drive Motors (type): Geroller
 Make: Eaton
 Model: 4000
 Final Drive Chains
 Reduction from motors: #60 HK
 Reduction to axles: #80 HK
 Travel Speed: 0-4.1 MPH (6.56 km/h)
 Steering: T-Bar (Single Lever)
 Turning Radius: 360 degrees in its own length
 Axle Type: Forged
 Diameter: 2.4" (60.9 mm)
 Axle Torque: 3860 ft. lbs. (5211 nm)

HYDRAULIC CYLINDERS

	LIFT	TILT
Number:	2	2
Cylinder Type:	Double Acting	Double Acting
Bore Diameter:	2.50" (63.5 mm)	3" (76.2 mm)
Rod Diameter:	1.50" (38.1 mm)	1.25" (31.8 mm)
Stroke:	28.38" (721 mm)	11.25" (286 mm)

OPERATING SPECIFICATIONS

Load Rating (SAE): 1100 lbs (500 kg)
 Tipping Load (SAE): 2200 lbs. (1000 kg)
 Breakout (Lift): 2700 lbs (1225 kg)
 (Tilt): 3500 lbs (1588 kg)
 Raising time: 5.5 seconds
 Lowering time: 3.5 seconds
 Dumping time: 1.6 seconds
 Roll back time: 2.4 seconds
 Operating Weight: 5080 lbs (2309 kg)
 Shipping Weight: 4489 lbs. (2020 kg)
 Weight Distribution
 Rear: 3556 lbs (1613 kg) 70%
 Front: 1522 lbs. (690 kg) 30%
 Braking System: 3 way braking system, hydrostatic,
 and wet disc type parking/emergency
 brake activated by hand lever.

SPECIFICATIONS

960 GENERAL SPECIFICATIONS

UNIT DESCRIPTION

Model: 960 Mustang
Manufacturer: MUSTANG MANUFACTURING COMPANY INC.

ENGINE SPECIFICATIONS

Make:	Isuzu Diesel
Model:	4JB1
Displacement:	169 CID (2771 cc)
Max. HP (Mfg. rating):	65 HP (48.5 kw) @ 3000 RPM
HP @ Governed RPM:	57.5 HP (42.5 kw) @ 2500 RPM
Max. No-Load RPM	2650 +/- 50 RPM
Fuel Injection:	Direct
Number of Cylinders:	4
Bore and Stroke:	3.66" x 4.02" (93 mm x 102 mm)
Cooling Medium:	Liquid
Torque (ft. lbs.)	129 @ 1600 RPM (175 nm)
Electrical System:	12 Volt
Alternator:	55 Amp
Battery (Group Class):	31
(Cold crank rating):	625 Amps
Fuel Shut Off:	Electrical
Air Cleaner:	Replaceable dry cartridge type with condition indicator and dual element
Fuel Consumption	Est 1.98 gal./hr.
(Based on Normal Operation)	

FLUID CAPACITIES

Cooling System:	12 qts. (11.41 L)
Fuel Tank:	20 gal. (75.7 L)
Engine Oil:	7 qts. (6.6 L)
Oil spec.	SAE cc 15W-40
Chain Case:	8 gal. (30.28 L) (4 per side)
Oil spec.	Hydraulic Oil ISO 46
Hydraulic System	22 gal. (83.3 L)
Oil spec.	Hydraulic Oil ISO 46

HYDRAULIC SYSTEM

Pressure Relief:	2400 PSI (163.3 Bar)
Control Valve Make:	Gresen
Spool Sections:	3 Spool
Pump Make:	Vickers
Pump Type:	Double Gear
Pump Output:	18 GPM (68 L/m)
Filters:	(1) 100 mesh suction (1) 7 micron return (1) 7 micron charge inlet
Auxiliary Control:	Hand Lever
Auxiliary Hydraulic Power @ 90% Relief Pressure:	23 HP (16.8 kw)

TRANSMISSION and FINAL DRIVES

Type:	Hydrostatic
Make:	Vickers
Model:	TA1919
System Relief Setting:	4500 PSI (310 Bar)
Charge Pressure Relief Setting:	180 PSI (12 Bar)
Drive Motors (type):	Geroller
Make:	Eaton
Model:	4000
Final Drive Chains	
Reduction from motors:	#60 HK
Reduction to axles:	#80 HK
Travel Speed:	0-6.8MPH (10.9 km/h)
Steering:	T-Bar (Single Lever)
Turning Radius:	360 degrees in its own length
Axle Type:	Forged
Diameter:	3.25" (82.5 mm)
Axle Torque: (theoretical)	5874 ft. lbs. (7983 nm)

HYDRAULIC CYLINDERS

	LIFT	TILT
Number:	2	2
Cylinder Type:	Double Acting	Double Acting
Bore Diameter:	2.50" (63.5 mm)	3" (76.2 mm)
Rod Diameter:	1.50" (38.1 mm)	1.25" (31.8 mm)
Stroke:	35.6" (904 mm)	14.2 (361 mm)

OPERATING SPECIFICATIONS

Load Rating (SAE):	1700 lbs. (773 kg)
Tipping Load (SAE):	3400 lbs. (1545 kg)
Breakout (Lift):	3450 lbs. (1565 kg)
(Tilt):	5050 lbs. (2291 kg)
Raising time:	5.5 seconds
Lowering time:	3.7 seconds
Dumping time:	1.8 seconds
Roll back time:	2.3 seconds
Operating Weight:	6850 lbs. (3107 kg)
Shipping Weight:	6095 lbs. (2764.7 kg)
Weight Distribution	
Rear:	4554 lbs. 70%
Front	2260 lbs. 30%
Braking System:	3 way braking system, hydrostatic, and wet disc type parking/emergency brake activated by hand lever.
Gradeability (degrees)	25
Maximum Recommended Working Incline (degrees)	10

SAFETY EQUIPMENT

All machines have certain built in safety equipment designed to protect the operator from possible injury. If this equipment is removed for service or adjustment of the machine, it **MUST** be replaced and in proper working condition before the machine is put back into service. These items include:

ROPS – Roll Over Protective Structure.

FOPS – Falling Object Protective Structure (incorporated in ROPS)

Lift Arm Stops – Located in the ROPS - also available in lift cylinder lock form.
P/N 504-130.

Seat Belt Lockout – Prevents movement of the lift arm and bucket when the seat belt is not fastened around the operator.

CAUTION! The seat belt lock-out is not meant to prevent movement of the Lift Arm when people are under it. ALWAYS USE THE LIFT ARM STOP FOR THIS PURPOSE.

Parking Brake – To keep the machine from rolling when the engine is shut off, or in emergency situations.

Neutral Centering Device – A spring loaded device to return the steering controls to the neutral position.

NOTE: For service and adjustments refer to **STEERING CONTROLS**, page 3-6.

Neutral Start Switches – Incorporated in the Neutral Centering Device to prevent the machine from starting if the steering controls are not in neutral.

NOTE: For service and repair refer to pages 1-8 and 8-7.

Caution and Warning Decals – Designed to warn the operator of possible hazards which could cause injury if correct procedures are not followed.

Safety decals are available at no charge from our parts department. If these decals are lost, or machines are repainted, please be sure they are replaced.

All safety equipment should be inspected for proper operation and safety decals for clarity and proper placement anytime you come in contact with a **MUSTANG** product. Any faults must be corrected before the machine is put into operation.

SAFETY EQUIPMENT

ROLL OVER PROTECTIVE STRUCTURE (ROPS)

The ROPS is a certified safety structure and must not be altered or modified in any manner. Mounting additional lights or other accessories (mirrors, horns, buzzers, etc.), can be achieved only by using existing holes in the structure. Drilling holes or welding mounting brackets will nullify the certification and jeopardize operator's safety.

If the ROPS should become damaged or bent, replacement is necessary.

The ROPS is isolated from the frame by rubber mounts and secured by four (4) bolts, one at each lower front corner and two in the rear wall below the window. (See figure 1-1)

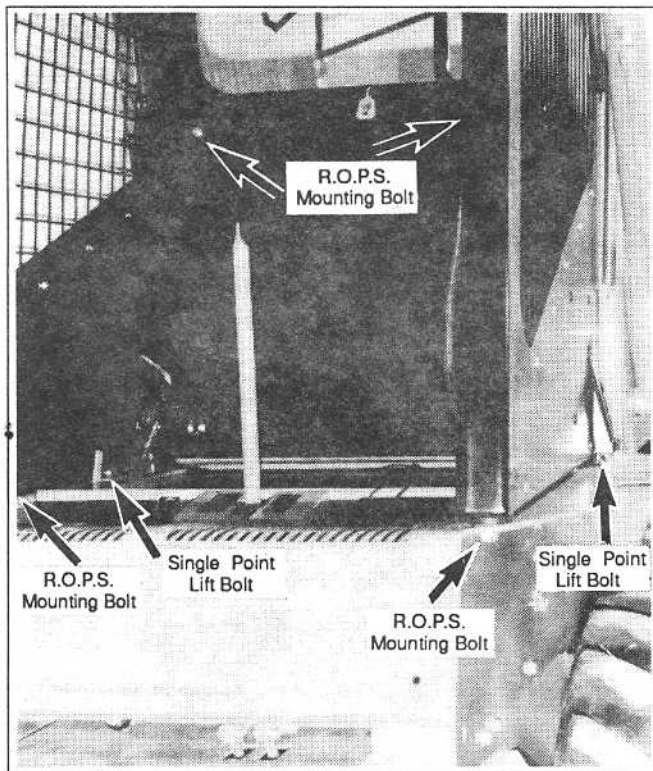


Figure 1-1

The ROPS is also designed to allow the machine to be raised off the ground from a single overhead lift point by attaching a special Single Point Lift Kit to the top of the ROPS. Because of this feature, a special mounting bracket is used at the lower left and right rear corners. Refer to installation instructions step (5) for proper spacing and torque. These bolts must also be removed for R.O.P.S. removal. (See figure 1-1)

Single Point Lift Kit P/N 655-090.

Labor hours can be reduced by removing the ROPS for access to the hydrostatic drive and chain case components.

REMOVAL AND INSTALLATION

Removal:

1. Raise the lift arms and extend Lift Arm Stops.
2. Remove seat.
3. Remove the six (6) bolts.
4. Lower the lift arms and unplug the the wiring harness at the left rear corner.
5. Using an overhead device, slowly lift ROPS up and away from machine.

Installation:

1. Suspend the ROPS so that the front corners are slightly lower than the rear.
2. Align and install the front two (2) bolts and pass the wiring harness plug through the hole in the frame prior to allowing rear of ROPS to rest on the rubber mounts. (See figure 1-2)

CAUTION! The seat belt lock-out is not meant to prevent movement of the Lift Arm when people are under it. ALWAYS USE THE LIFT ARM STOP FOR THIS PURPOSE.

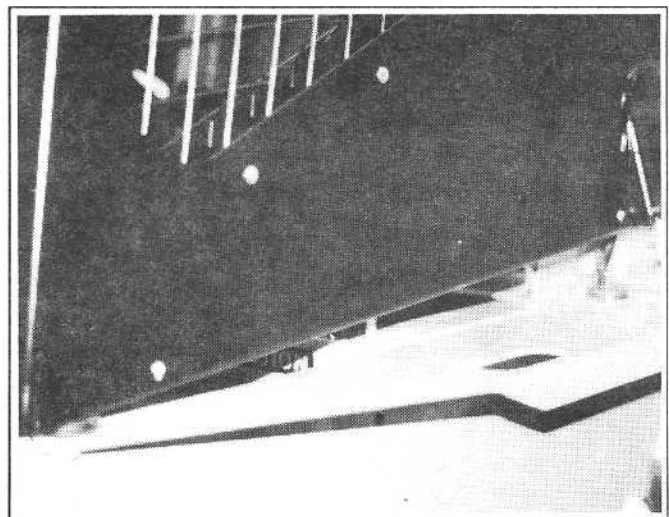


Figure 1-2

SAFETY EQUIPMENT

ROLL OVER PROTECTIVE STRUCTURE (ROPS)

Removal and Installation

Installation (continued):

3. Install the remaining four (4) bolts and nuts.
(an aligning punch may be needed to install the bolts in the rear wall.)
4. Torque the four (4) 1/2 inch nuts (front corners and rear wall) to 75 ft. lb. (102 Nm).
5. The lower bolt on each side has a jam nut system for tightening. The head of the bolt **MUST NOT** make contact with the ROPS. Clearance of 1/8 inch (3.2 mm) to 1/4 (6.4 mm) inch should be maintained. Torque the jam nut to 150 ft./lb. (203 Nm). (See figure 1-3)

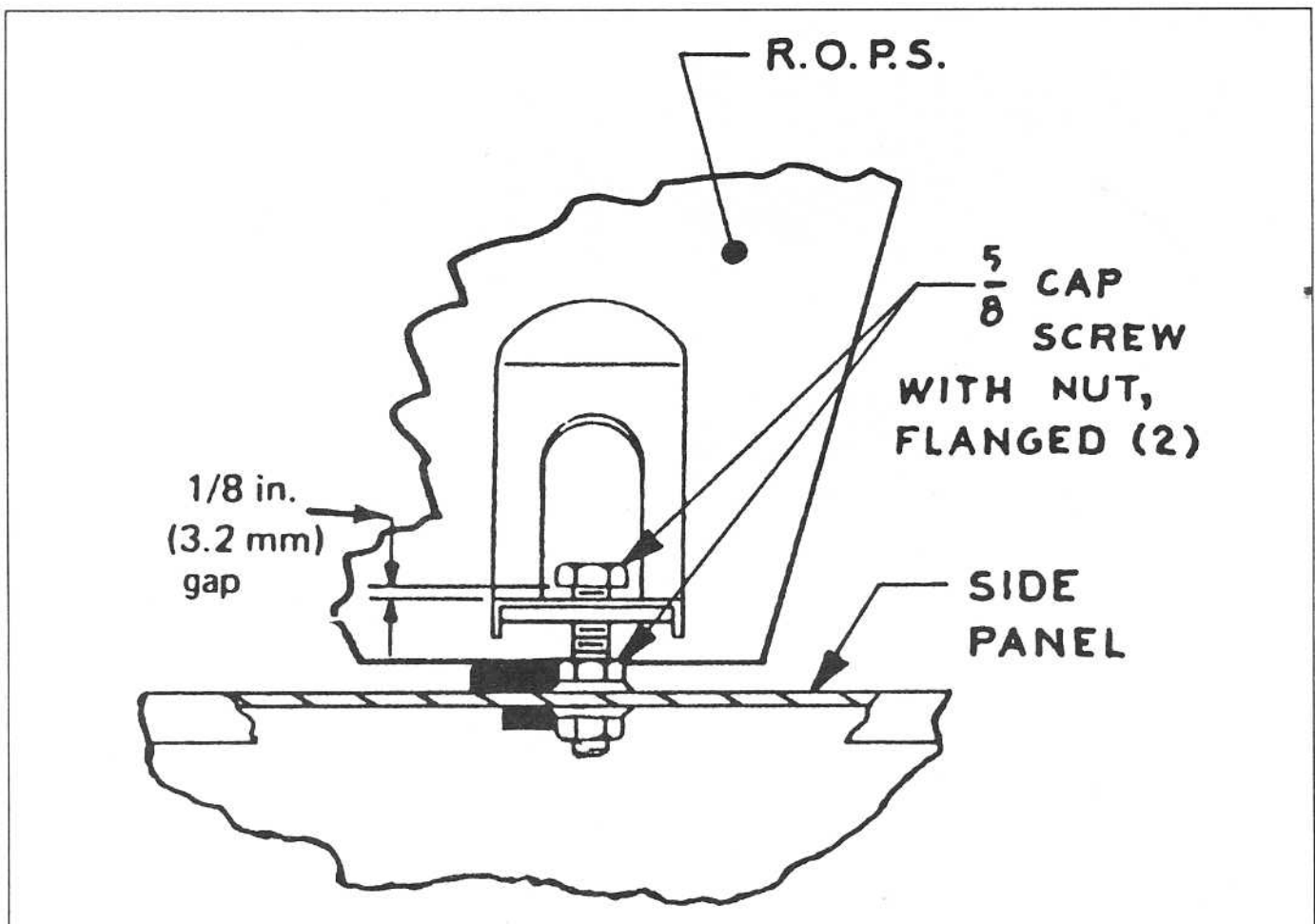


Figure 1-3

SAFETY EQUIPMENT

LIFT ARM STOPS

There are two lift arm stops located in the upper front corners of the ROPS. The stops are designed with adequate strength so if they are left extended, accidentally powering the lift arm up or down will not cause damage. However, if repeatedly abused, the pins will bend and will need replacing.

To Remove:

1. With the lift arm lowered, remove the red plastic cover from the stop handle in the operator's area.
2. Using a 5/16 inch hex wrench unscrew the retaining bolt which extends through the spring and knob into the lock pin. See figure 1-4.

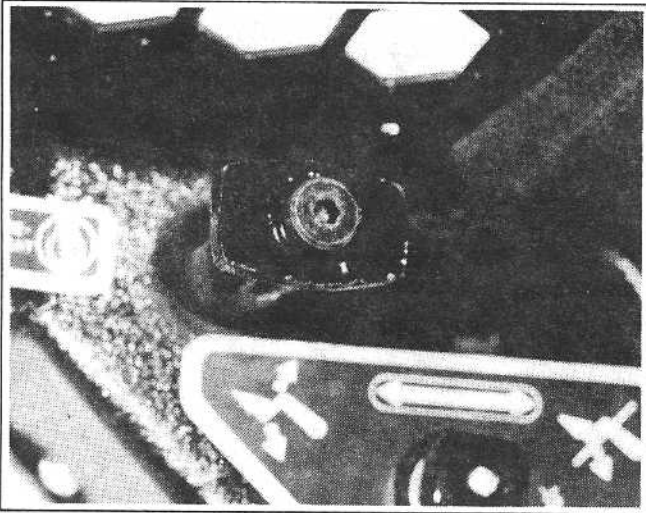


Figure 1-4

3. Remove the pin from the ROPS.
4. If there has been damage to the ROPS - the complete structure must be replaced. P/N 190-32663.

Reverse the order of removal for installation. Torque hex screw to 31 ft./lbs. (42 Nm).

Lift Cylinder Stops are available for use when the ROPS is removed and the Lift Arm needs to be raised for service. P/N 504-130. (See figure 1-5)

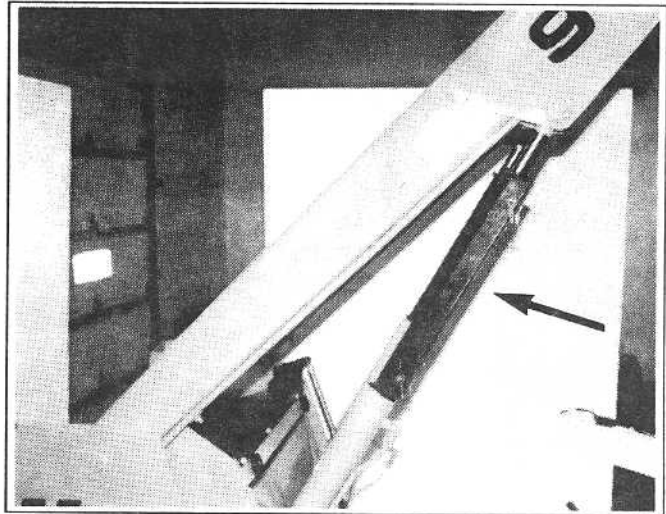


Figure 1-5

SAFETY EQUIPMENT

SEAT BELT LOCK-OUT

The seat belt lock-out system was designed to protect the operator from unexpected lift arm movement. In order to do its job it must be intact and functioning properly.

CAUTION! The seat belt lock-out is not meant to prevent movement of the Lift Arm when people are under it. ALWAYS USE THE LIFT ARM STOP FOR THIS PURPOSE.

To test this system for proper operation:

1. With engine not running, mount machine and fasten seat belt.
2. Move foot pedals, simulating machine operation.
3. Release pedals.
4. Release belt and **slowly** let return to relaxed position.
5. Attempt to operate foot pedals. The latch should hold the pedals firmly in the neutral position. If not, adjustments or repairs need to be made.

ADJUSTMENTS

Spool Catch

1. Remove the floor plate. Loosen two (2) 5/16 inch hex nuts on each spool catch. Allow spool catches to seat completely on spool linkage roll pins. (See figure 1-6)

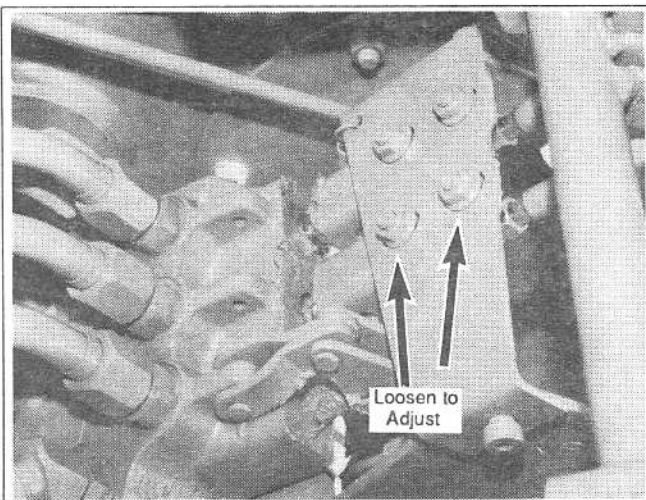


Figure 1-6

CAUTION! The seat belt lock-out is not meant to prevent movement of the Lift Arm when people are under it. ALWAYS USE THE LIFT ARM STOP FOR THIS PURPOSE.

2. With spool catches seated, tighten spool catch nuts.
3. With left hand seat belt fully relaxed (against ROPS back panel), there should be a minimum of 1/4 inch (6.4 mm) clearance between the spool lock stop and the spool catch lever. Adjust if necessary. (See figure 1-7)

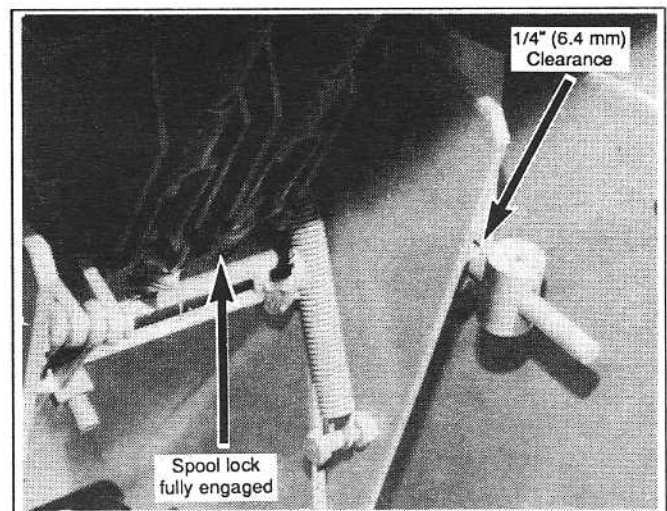


Figure 1-7

4. If the lock system does not work properly after these adjustments, replace the spool latches and linkage roll pins. Then repeat the adjusting procedures.

NOTE: If removing the lock pivot bolts for any reason, be sure to use 3/8 inch shoulder bolts and 5/16 inch center lock nuts when reinstalling. (See figure 1-8)

SAFETY EQUIPMENT

SEAT BELT LOCK-OUT

ADJUSTMENTS (continued)

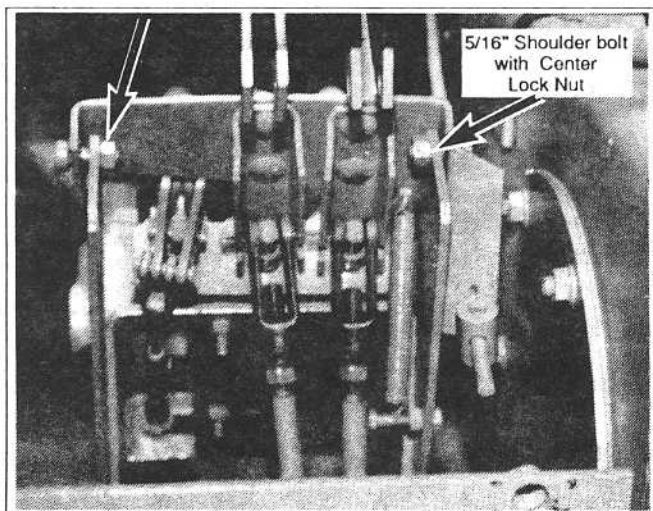


Figure 1-8

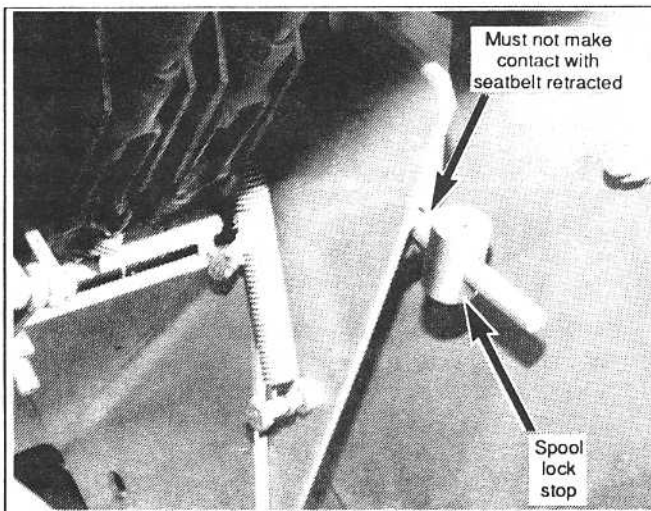


Figure 1-9

Spool Lock Rod

If the spool catches do not raise completely off the control spool, the lock rod travel can be adjusted.

1. Loosen the spool lock stop set screw.
2. Slide the stop toward the spool catch lever and retighten set screw.
3. With seat belt in fully retracted position and spool catches completely locked, the spool lock stop **MUST NOT** make contact with the spool catch lever. A minimum of 1/4 inch (6.4 mm) clearance must be maintained. (See figure 1-7 and 1-9)

NOTE: The position of the spool lock stop affects position of seat belt in the latched position. Do not adjust too tight as operator may encounter discomfort.

NOTE: Model 940 starting S/N 1425008 there is no adjustment in the seat belt lock-out.

SAFETY EQUIPMENT

PARKING BRAKE

The brakes are wet disc type, activated by mechanical (cable) linkage connected to the over-center-lock hand lever.

It should take 40 - 50 lbs. (18-23 kg). to engage the brakes when properly adjusted.

ADJUSTMENT

To increase tension, turn handle on brake lever "in" (counter-clockwise viewed from the operator's seat). (See figure 1-10)

NOTE: If additional service of the brake system is required, refer to CHAIN CASE SECTION.

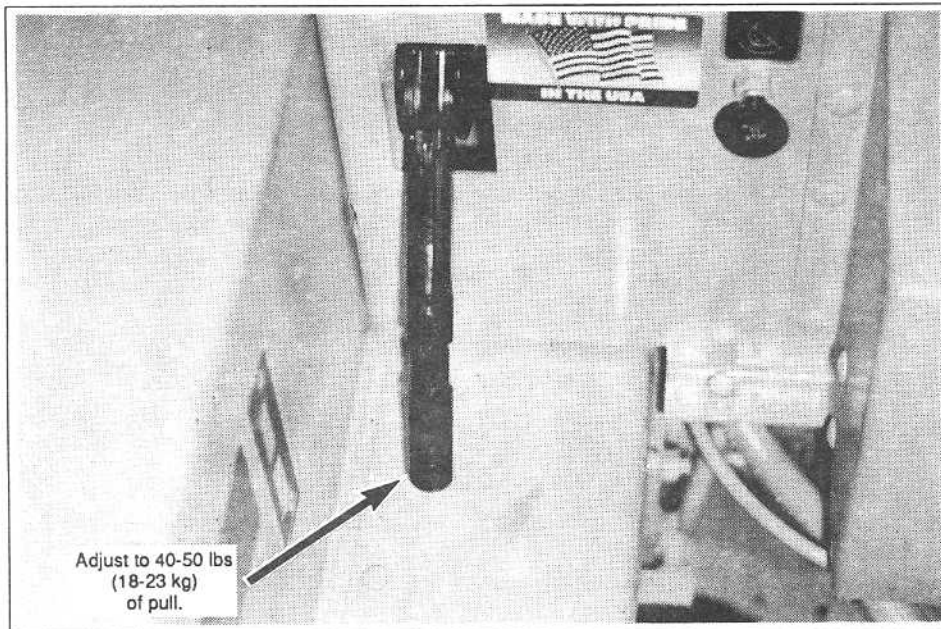


Figure 1-10

SAFETY EQUIPMENT

NEUTRAL START SWITCHES

There are two neutral start safety switches that are mounted directly on top of the spring loaded centering systems. These switches must indicate to the electrical system that the drive system is in neutral before the engine will start. There is no adjustment to the switch. If it is determined that a switch has failed, it must be replaced.

NOTE: Switches are located in the hydrostatic compartment under the seat.

To test:

1. Connect the two wires using a small clip or jumper wire. If the engine cranks, the switch is not closing properly and must be replaced. (See Figure 1-11)
2. It may be necessary to perform this test on both switches to determine which is at fault.

DO NOT UNDER ANY CIRCUMSTANCES ALLOW THE MACHINE TO BE OPERATED IN THIS MANNER. THIS IS FOR TEST PURPOSES ONLY!

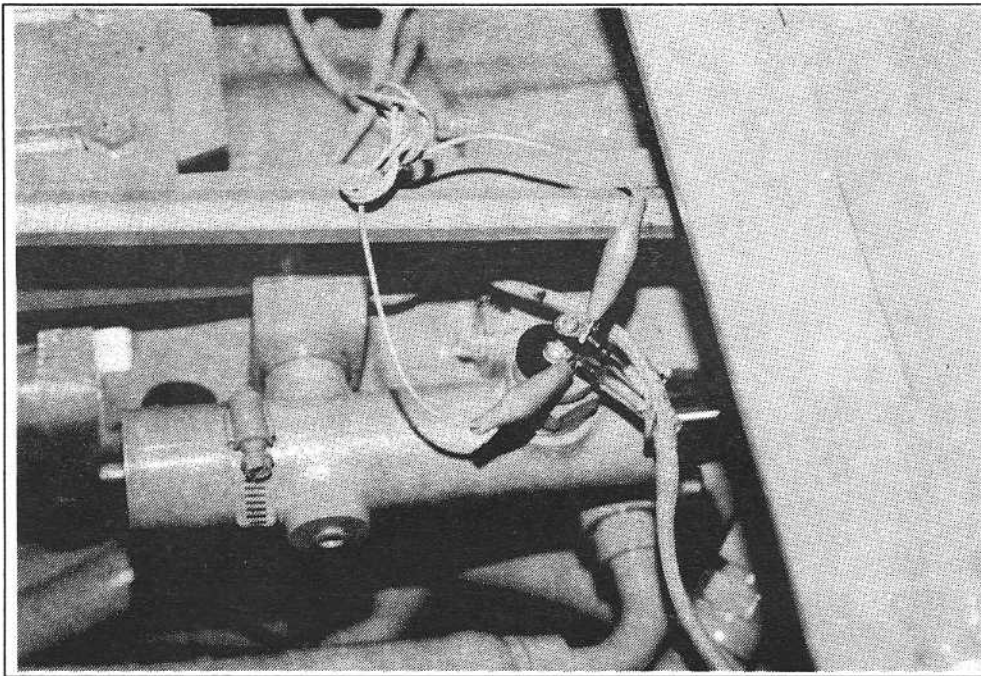


Figure 1-11

GENERAL INFORMATION

SYSTEM CONTAMINATION CONTROL

Contamination is the most frequent cause of hydraulic system failures. Cavitation and dry start-up may be second (see page 5-9 for proper start up procedure). Fluid contamination level is the biggest single factor affecting the performance and the life of a hydraulic system. Contamination can come from fabrication residue, new oil, the environment, through breathers, worn wiper seals on cylinders, quick disconnects, and open caps.

Before a hydraulic component can be considered to have failed, it is absolutely essential that the following items be checked:

- Hydraulic oil level
- Filters
- Steering and control linkage (lost motion)
- Pump drive (input rotation)
- Motor (output rotation)
- Chain drive system

Any play in the control linkages can create effects which are often attributed to worn pumps and motors. The pumps try to destroke (decrease output) and stroke (increase output) depending upon the load and flow rate.

Keep in mind when trouble shooting the hydrostatic drive system that all steering, speed, direction and braking control is done by controlling the pump output through the swash plates (yokes). For proper adjustment of the steering and control linkage, see the Operator's Manual or specific section in this Service Manual.

One of the major areas of dirt entry into a hydraulic system is the rod seal (wiper) on the hydraulic cylinders. Tests have shown that wear-out of a rod seal can increase the amount of contamination entering the hydraulic system by more than ten fold.

A high contamination level can be generated very quickly in the field if entering contaminant is allowed to circulate and regenerate more contaminant. Topping off a reservoir under field conditions without dumping a large amount of dirt into the oil is very difficult. All oil added to the system should be clean. Scheduled maintenance, use of specified filters, and good assembly practices will result in prolonged

service life of the hydraulic components.

It is **VITAL** that the area around a joint be clean when disassembling and reassembling. Contamination can fall or be pushed into the system. Shop rags should not be used to clean hydrostatic parts. Lint free paper towels should be used instead. Parts should be washed in new solvent and blown dry with clean air. Be sure to cap all ports, fittings and hoses after cleaning.

DO NOT reuse hydraulic oil in the hydrostatic system. The cost of oil is small compared to the cost of replacing hydrostatic components. **IT'S NOT WORTH THE RISK!** Clean looking oil may not be clean enough. Water and air are serious contaminants that cause changes in oil viscosity and lubricity. New "clean" oil in bulk containers, may not be clean enough for hydrostatic drive systems unless it is filtered through a 10 micron filter first. Oil in quart cans is normally acceptable. Use only Rykon 46 or equivalent.

Contamination in the system can cause three types of failures: *catastrophic* (large particles jamming a pump or valve), *intermittent* (contaminant on valve seat that is periodically washed away), and *degradation* (increased internal leakage caused by component wear or damage).

There are three major sources of contamination: new oil, built in, and environmental. New relatively clean oil is usually contaminated during storage and transfer before it reaches the system. Condensed water vapor and rust particles from the storage tank are typical contaminants.

A certain amount of contamination is built into a system. Although careful assembly and flushing will reduce it, traces of burrs, chips, flash, dirt, dust, fiber, sand, moisture, pipe sealant, weld spatter, and flushing solutions remain.

Contaminants from the immediate surroundings can be introduced into the system through air breathers and seals. In addition, operation of the system will generate internal contaminants, products of wear, corrosion, cavitation, and fluid breakdown.

GENERAL INFORMATION

SYSTEM CONTAMINATION CONTROL

(Continued)

Properly rated filters and an appropriate filter inspection and replacement schedule are critical to keeping contaminants to recommended levels.

In summary, contamination is the biggest single factor affecting the performance and life of a hydrostatic system. Understanding the function of the entire system, performing scheduled maintenance, use of specified filters, and good

assembly practices to eliminate and control contamination will result in prolonged service life of the hydraulic components.

HYDRAULIC FLUIDS

FLUID FOR HYDRAULIC RESERVOIR AND CHAIN CASE

Mustang products are shipped with hydraulic oil meeting the lubricating qualities of ISO #46 Anti-wear hydraulic oil. When replenishing reservoir use Amoco (Rykon #46), Mobile (DTE 25), Shell (Tellus T #46), Cenex (Subzero #46) or equivalent.

If loader is operated in areas where ambient temperature is consistently lower or higher than recommended for ISO #46 hydraulic oil, the hydraulic oil should be changed. Refer to guidelines below for proper oil viscosity for your climate.

<u>Ambient Air Temp.</u>	<u>Viscosity Rating</u>	<u>Reference</u>
-40 to +60 degree F	ISO #32	Rykon #32 or equiv.
0 to 95 degree F	ISO #46	Rykon #46 or equiv.
+50 to +110 degree F	ISO #68	Rykon #68 or equiv.

IMPORTANT: USE OF OTHER FLUIDS IN THE HYDRAULIC SYSTEM WILL VOID WARRANTY.

Hydraulic Fluid Level

The correct method of determining hydraulic fluid level is:

1. Park the machine on the level surface, lower the lift arms until the bucket is level on the ground.
2. With the engine stopped and the hydraulic oil cold, the oil level in the filler tank should be between the marks on the dip stick or the oil should cover the lower sight gauge depending on the machine model.

!! WARNING

**HOT LIQUID UNDER PRESSURE,
ALLOW TO COOL. REMOVE CAP
SLOWLY OR SEVERE BURNS
MAY RESULT**

GENERAL INFORMATION

MAINTENANCE CHART

Recommended Intervals for Normal Operating Conditions

MAXIMUM HOURLY INTERVAL				COMPONENTS	SERVICE REQUIRED	CAPACITY OR MEASUREMENT
10	100	500	1000 or year			
■				Air Cleaner	Check Indicator Empty Dust Cap	Clean or replace as needed
■				Cooling System	Check Coolant Level	See Cooling System Section
■				Engine Crankcase	Check Oil Level	Between marks on Dipstick
■				Loader Pivot Pins	Lubricate Grease Fittings	
■				Loader Hydraulic System	Check fluid Level	Between marks on Dipstick when cold
■				General Conditions	Safety Devices; Loose, Missing or Damaged Parts	
	■			Fan Belt	Tighten to Proper Deflection	10-15 mm .39 - .59 inches at 20 lb
	■			Radiator and Oil Cooler	Clean Fins	
	■			Tires	Check Air Pressure	40-45 PSI 2.7 - 3.1 bar
		■		Battery	Clean Terminals and Battery Top	
	■			Brakes	Check	40-50 lb to Engage
	■			Spark Arrestor Muffler	Remove Plug and Clean Out	
□	■			Engine Oil and Filter	Change Oil and Filter	See Fuels & Lubrication & Specifications Section
□		■		Hydraulic Filters	Replace Elements	
□		■		Drive Chains	Tighten to Proper Deflection Check Fluid Level	
		■		Liquid Cooled Engine	Flush cooling System	See Specifications
			■	Hydraulic Reservoir	Drain and Refill	See Specifications
□			■	Chain Cases	Drain and Refill	See Specifications
		■		Fuel Filters	Change Filters	Drain as needed

NOTE: Hourly interval must be decreased under very hot, dusty, cold or corrosive conditions.

□ Perform the initial time at 50 hours, then at ■ intervals

*Refer to Operator's Manual Maintenance section

MUSTANG SKID-STEER LOADER PRE-DELIVERY CHECK LIST

This check will require approximately 2 hours labor.

GENERAL AND VISUAL

YES	NO		YES	NO	
<input type="checkbox"/>	<input type="checkbox"/>	Is Mustang equipped as ordered?	<input type="checkbox"/>	<input type="checkbox"/>	Does the seat belt lock and work properly?
<input type="checkbox"/>	<input type="checkbox"/>	Did Mustang arrive without any shipping damage?	<input type="checkbox"/>	<input type="checkbox"/>	Do the lift arm locks work properly?
<input type="checkbox"/>	<input type="checkbox"/>	Was Owner's Package with machine and complete?	<input type="checkbox"/>	<input type="checkbox"/>	Do the brakes function properly, adjusted properly?
<input type="checkbox"/>	<input type="checkbox"/>	Were all tube lines and hoses routed properly and secure?	<input type="checkbox"/>	<input type="checkbox"/>	Are the neutral start interlocks working and adjusted correctly?
<input type="checkbox"/>	<input type="checkbox"/>	Are tires, seat cushions, and safety treads in good condition?	<input type="checkbox"/>	<input type="checkbox"/>	Is there any damage to the ROPS?
			<input type="checkbox"/>	<input type="checkbox"/>	Are all parts of the ROPS installed and fastened securely?



**DO NOT RUN MACHINE WITHOUT OPERATOR IN SEAT AND SEAT BELT FASTENED.
MAKE SURE EVERYONE IS CLEAR OF MACHINE!**

ENGINE

<input type="checkbox"/>	<input type="checkbox"/>	Is high and low RPM set properly?	<input type="checkbox"/>	<input type="checkbox"/>	Is engine timing set correctly?
<input type="checkbox"/>	<input type="checkbox"/>	Do choke, throttle, governor, and other controls function properly?	<input type="checkbox"/>	<input type="checkbox"/>	Are all connections to the air cleaner tightened and installed properly?
<input type="checkbox"/>	<input type="checkbox"/>	Are all belts aligned, and adjusted correctly, (Fan, governor, hydrostat drive, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	Is the air cleaner element in good condition and installed correctly?

ELECTRICAL

<input type="checkbox"/>	<input type="checkbox"/>	Are all warning lights and gauges operating properly?	<input type="checkbox"/>	<input type="checkbox"/>	Is the battery in good condition and connections tight?
<input type="checkbox"/>	<input type="checkbox"/>	Does the hour meter function properly?			

FLUID LEVELS

<input type="checkbox"/>	<input type="checkbox"/>	Is coolant at proper level?	<input type="checkbox"/>	<input type="checkbox"/>	Are there any leaks on this Mustang? If yes, specify the general area. (Cylinder, axle, etc.)
<input type="checkbox"/>	<input type="checkbox"/>	Is engine oil at proper level?	<input type="checkbox"/>	<input type="checkbox"/>	Are all grease zerks installed and lubricated?
<input type="checkbox"/>	<input type="checkbox"/>	Is hydraulic oil at correct level? (Chain case if separate)			
<input type="checkbox"/>	<input type="checkbox"/>	Is chain case oil at correct level?			



**OPERATE MUSTANG ONLY FROM OPERATOR'S SEAT WITH SEAT BELT FASTENED
AND ALL GUARDS IN PLACE.**

OPERATIONAL AND DRIVE SYSTEM

<input type="checkbox"/>	<input type="checkbox"/>	Are foot pedal linkages properly set for lift, tilt.	<input type="checkbox"/>	<input type="checkbox"/>	Is seat belt foot pedal lock functioning properly?
<input type="checkbox"/>	<input type="checkbox"/>	Is the hydrostatic control linkage adjusted properly and working freely?	<input type="checkbox"/>	<input type="checkbox"/>	Are wheel bolts torqued properly?
<input type="checkbox"/>	<input type="checkbox"/>	Do all hydraulic functions work smoothly, does machine drive smoothly at full RPM?	<input type="checkbox"/>	<input type="checkbox"/>	Are tire pressures correct?
<input type="checkbox"/>	<input type="checkbox"/>	Do boom and Fast-A-Tach cycle without interference and in correct direction?	<input type="checkbox"/>	<input type="checkbox"/>	Are the built in safety guards under safety recommendations in the Operator's Manual all in their proper places?
<input type="checkbox"/>	<input type="checkbox"/>	Are all drive chains adjusted properly?	<input type="checkbox"/>	<input type="checkbox"/>	Have there been any alterations to any safety guards?
			<input type="checkbox"/>	<input type="checkbox"/>	Are all decals in good condition and at their proper location?

MUSTANG SKID-STEER LOADER 50 HOUR CHECK LIST

This check will require approximately 3 hours labor.

GENERAL AND VISUAL		YES	NO	
YES	NO	<input type="checkbox"/>	<input type="checkbox"/>	Are the neutral start interlocks working and adjusted correctly?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do lift arm stops work properly?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are brakes adjusted and functioning properly?
		<input type="checkbox"/>	<input type="checkbox"/>	Is there any damage to the ROPS?
		<input type="checkbox"/>	<input type="checkbox"/>	Are all parts of the ROPS installed and fastened securely?



**DO NOT RUN MACHINE WITHOUT OPERATOR IN SEAT AND SEAT BELT FASTENED.
MAKE SURE EVERYONE IS CLEAR OF MACHINE!**

ENGINE		YES	NO	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are all connections to the air cleaner tightened and installed properly?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is the air cleaner element in good condition and installed correctly?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Has engine oil and filter been changed?
		<input type="checkbox"/>	<input type="checkbox"/>	Is battery in good condition and connections tight?
		<input type="checkbox"/>	<input type="checkbox"/>	Is wiring harness routed correctly and are all connections secure?
ELECTRICAL				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are all warning lights and gauges operating properly?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Does the hour meter function properly?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do operating lights work properly?
FLUID LEVELS				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are all grease zerks installed and lubricated?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have hydraulic and hydrostatic oil filters been changed?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Drain and refill chaincases.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is coolant at proper level?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is hydraulic oil at correct level? (chain case separate)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are there any leaks on this Mustang?



**OPERATE MUSTANG ONLY FROM OPERATOR'S SEAT WITH SEAT BELT FASTENED
AND ALL GUARDS IN PLACE.**

OPERATIONAL AND DRIVE SYSTEM		YES	NO	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is seat belt foot pedal lock functioning properly?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are wheel bolts torqued properly?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are tire pressures correct?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are the built in safety guards under safety recommendations in the Operator's Manual all in their places?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have there been any alterations to the safety guards?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are all decals in good condition and at their proper location?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	All above procedures were done with owner, operator or maintenance personnel present to insure proper procedures.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are foot pedal linkages properly set for lift, tilt and auxiliary?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is the hydrostatic control linkage adjusted properly and working freely?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do all hydraulic functions work smoothly, does machine drive smoothly at full RPM?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do lift arm and Fast-A-Tach cycle without interference?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are all drive chains adjusted properly?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Has machine been inspected for loose or missing bolts?

GENERAL INFORMATION

ACCESS PANELS

The following removable panels are provided for inspection and service purposes:



WARNING: Do not operate machine with panels removed. Serious injury or damage could result.

FRONT FLOOR PLATE

The Front Floor Plate is located in front of the T-Bar Panel under the foot pedals. Removal of this plate will provide access to the hydraulic control valve and lower front frame area. The plate is secured with four (4) 3/8 inch cap screws, two (2) at the front of the frame and two (2) at the T-Bar Panel. (See figure 2-1)

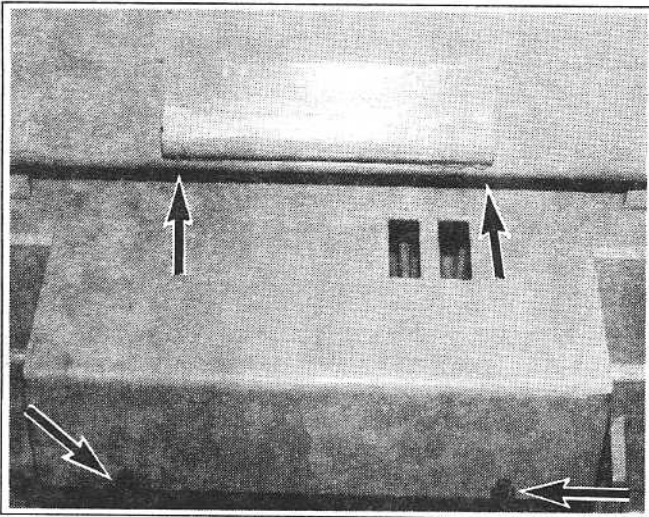


Figure 2-1

LOWER FRAME COVER PLATE

(not available on units built prior to)
Model 930 - S/N 8301005 - 9301798
Model 940 - S/N 8401002 - 9405598
Model 960 - S/N 8601006 - 960319N

The Lower Frame Cover Plate is located on the under side of the frame at the center of the machine. The plate provides an additional access to hoses, fittings, and drive system components in the lower frame area under the seat. The plate is fastened to the under side of the frame with 3/8 inch cap screws. (See figure 2-2)

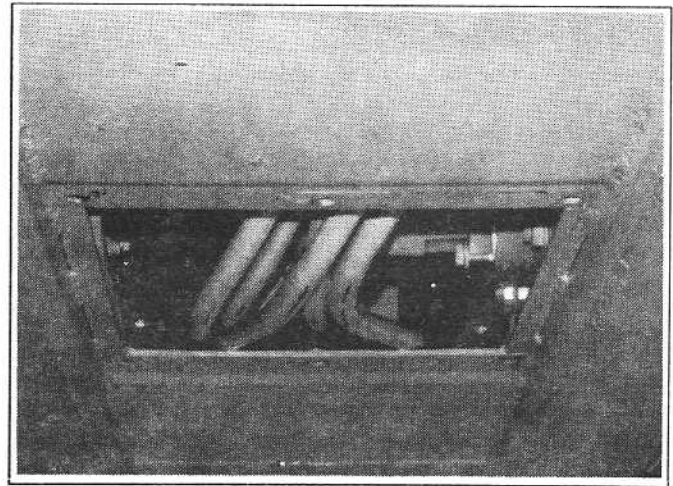


Figure 2-2

CHAIN CASE COVERS

There is one cover at the top center of each chain case for service and repair of internal components of chain drive system. The cover is sealed with a gasket and secured with 5/16 x 3/4 inch cap screw and flat washers. (See figure 2-3)

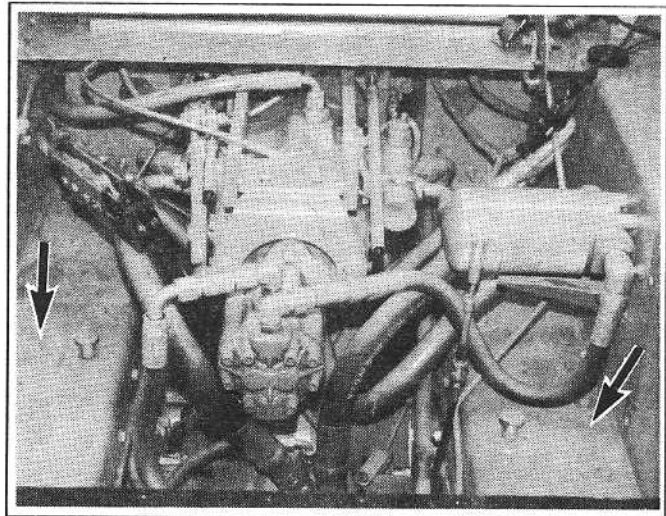


Figure 2-3

NOTE: It is necessary to remove the T-Bar panel prior to removing the chain case cover.

Access Panels continued on next page.

GENERAL INFORMATION

ACCESS PANELS (continued)

AXLE COVER PLATE

There is an axle cover access plate on the inner wall of the chain case at all four axle locations. Removal of this plate will expose the axle retaining nut, cotter pin, and sprocket for Drive Axle R & R and bearing adjustment. This plate also allows additional access to insure proper chain wrap installation. These plates are gasket sealed and secured with 3/8 inch nuts. (See figure 2-4)

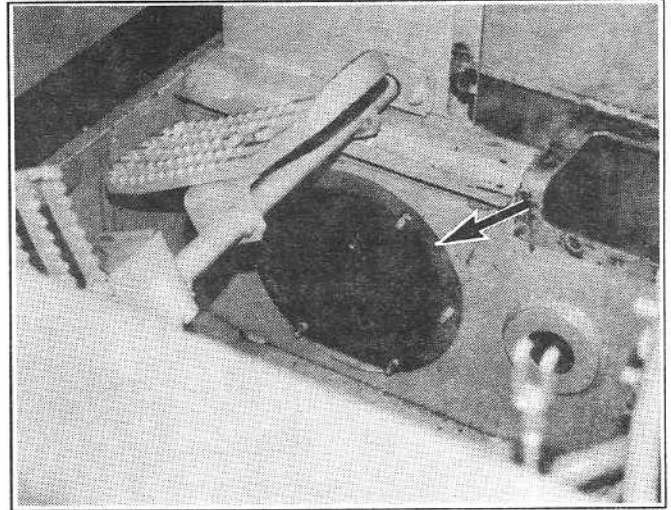
































Figure 2-4

GENERAL INFORMATION

STANDARD TORQUE VALUE SPECIFICATIONS

NOTE: Some fasteners have torque specifications other than those shown below. Use this chart only for unspecified torques.

Torque value listed for both unplated and hex-head capscrews.

<u>Screw Dia. Thread Pitch</u>	<u>Plain Head S.A.E. Grade 2 Foot - Pounds</u>		<u>3 Radial Dashes S.A.E. Grade 5 Foot - Pounds</u>		<u>6 Radial Dashes S.A.E. Grade 8 Foot - Pounds</u>	
1/4 - 20	5		8		12	
1/4 - 28	6		10		14	
5/16 - 18	11		17		24	
5/16 - 24	13		19		27	
3/8 - 16	18		31		44	
3/8 - 24	20		35		49	
7/16 - 14	28		49		70	
7/16 - 20	30		55		78	
1/2 - 13	39		75		105	
1/2 - 20	41		85		120	
9/16 - 12	51		110		155	
9/16 - 18	55		120		170	
5/8 - 11	83		150		210	
5/8 - 18	95		170		240	
3/4 - 10	105		270		375	
3/4 - 16	115		295		420	
7/8 - 9	160		395		605	
7/8 - 14	175		435		675	
1" - 8	235		590		910	
1" - 14	250		660		990	

GENERAL INFORMATION

METRIC TORQUE VALUE SPECIFICATIONS

Recommended Torque Levels for Metric Capscrews (Ft.-Lbs.)

COURSE THREAD

<u>Size</u>	<u>Property Grade (Marked on Head)</u>				<u>Head Size (mm)</u>
	<u>6.9</u>	<u>8.8</u>	<u>10.9</u>	<u>12.9</u>	
M6 x 1	6.15	7.23	10.1	12.3	10
M8 x 1.25	15.2	18.0	25	30	13
M10 x 1.5	30	35	50	60	17
M12 x 1.75	52	62	87	105	19
M14 x 2	83	98	137	166	22
M16 x 2	130	152	213	257	24
M18 x 2.5	177	210	289	350	27
M20 x 2.5	250	296	419	500	30
M22 x 2.5	336	398	565	675	32
M24 x 3	434	513	725	870	36
M27 x 3	643	760	1080	1300	41
M30 x 3.5	858	1049	1445	1735	46

FINE THREAD

<u>Size</u>	<u>Property Grade (Marked on Head)</u>				<u>Head Size (mm)</u>
	<u>6.9</u>	<u>8.8</u>	<u>10.9</u>	<u>12.9</u>	
M8 x 1	16.6	19.5	27	32	13
M10 x 1.25	32	38	53	63	17
M12 x 1.25	58	69	98	116	19
M12 x 1.5	55	65	90	108	19
M14 x 1.5	90	108	152	180	22
M16 x 1.5	137	163	228	275	24
M18 x 1.5	200	235	333	400	27
M20 x 1.5	278	332	460	560	30
M22 x 1.5	376	441	620	760	32
M24 x 2	470	564	800	940	36
M27 x 2	700	830	1160	1410	41
M30 x 2	975	1160	1630	1950	46

GENERAL INFORMATION

TORQUE SPECIFICATIONS AND PROCEDURES

Hoses & Fittings

PROCEDURE FOR INSTALLING J.I.C. (SAE 37° flare) FITTINGS

1. Tighten nut finger tight until it bottoms out on the seat.
2. Optional: Mark a line lengthwise on the nut and extend it onto the adaptor. Use an ink pen or marker.
3. Using a wrench, rotate the nut to tighten. Turn the nut the amount shown in the chart below, by flats or torque readings.

Hose & Tubing Diameter	Rotate No. of Hex Flats See Note No. 1
1/4	2 1/2
5/16	2 1/2
3/8	2
1/2	2
5/8	1 1/2 - 2
3/4	1
1	3/4 - 1
1 1/4	3/4 - 1
1 1/2	1/2 - 3/4

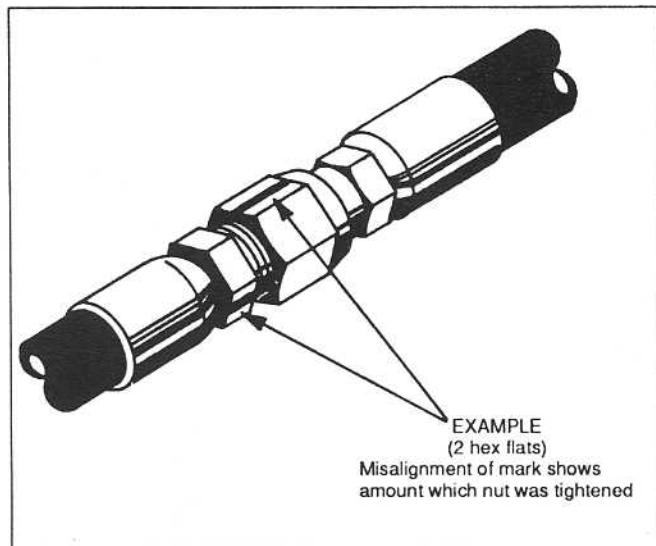


Figure 2-5

Hose & Tubing Diameter	Torque In Foot-Pounds	
	Minimum	Maximum
1/4	8	12
5/16	12	17
3/8	15	25
1/2	25	42
5/8	37	58
3/4	50	83
1	75	117
1-1/4	108	175
1 - 1/2	180	250

PROCEDURE FOR INSTALLING "O" RING FITTINGS

1. Jam nut and washer must be to the back side of the smooth portion of the elbow adaptor.
2. Lubricate the "O" ring. VERY IMPORTANT!
3. Thread adaptor into port until washer bottoms onto spot face.
4. Position elbows by backing up the adaptor (counterclockwise).
5. Tighten jam nut.

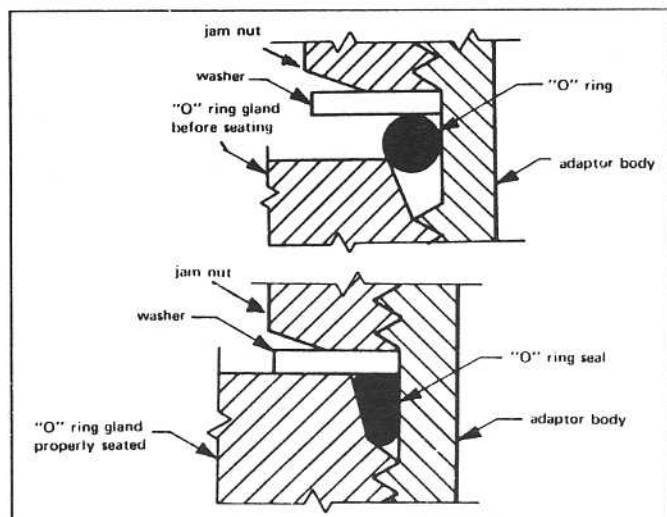


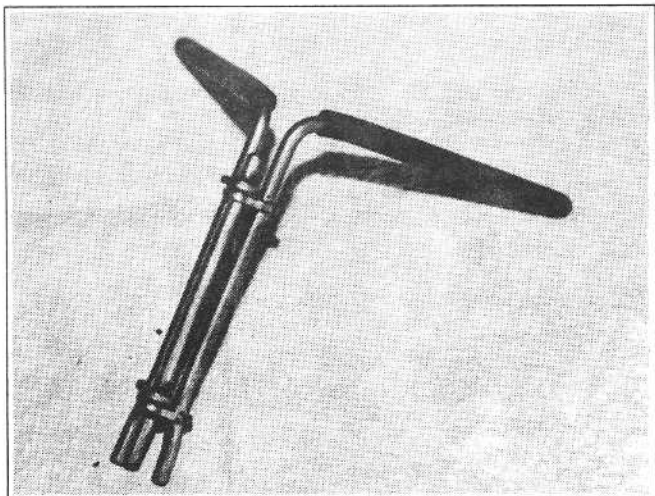
Figure 2-6

NOTE: Misalignment of marks will show how much the nut was tightened and that it has been tightened.

GENERAL INFORMATION

SPECIAL TOOLS and FITTINGS

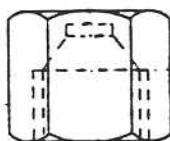
Cylinder Rod • Seal Installation Tool



Seal Size	Tool Part No.
3/4" I.D. to 1 1/4" I.D.	420-34912
1 1/2" I.D. to 2" I.D.	420-34913
2" I.D. to 3" I.D.	420-34914

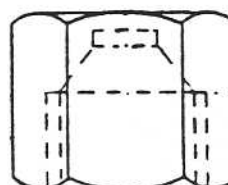
JIC Caps

Used for hydraulic and hydrostatic tests. Must be drilled and tapped to adapt to your pressure gauges.



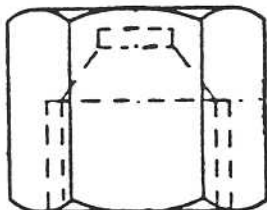
9/16"
PN 230-19281

Shuttle Valve Test. One needed.
Do not drill and tap.



7/8"
PN 230-20610

Charge Pressure and Hydraulic Pressure Test.
(Late models 960s require 1 1/16" for hydraulic pressure test.) One needed, must be drilled and tapped to accept your gauges.



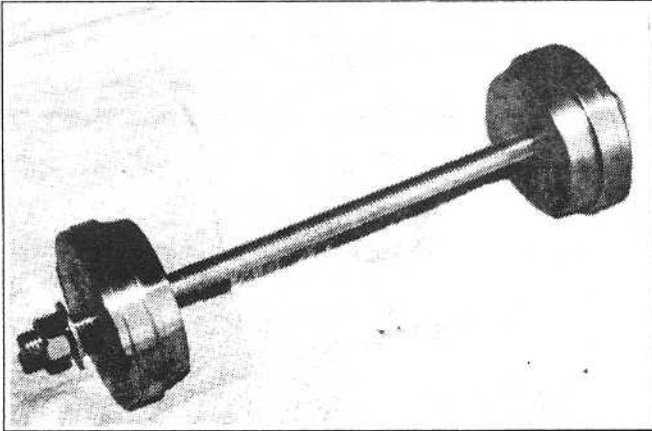
1 1/16"
PN 230-29395

Used for Closed Loop Power Test all models.
Four required, one may be drilled and tapped if you desire.

GENERAL INFORMATION

SPECIAL TOOLS and FITTINGS

Axle Bearing Cup Installation Tool



MUST be manufactured locally.

Tool includes:

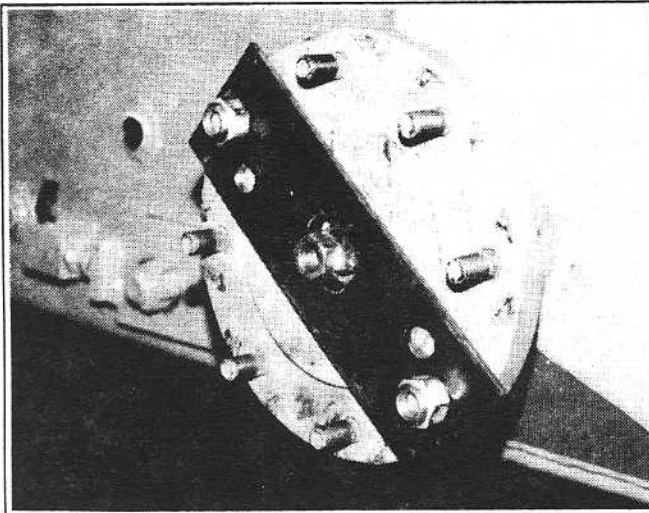
Two (2) Blocks - Drawings and dimensions on page 2-11 for Model 930/940 and page 2-12 for Model 960.

1" x 12" Threaded Rod

Two (2) 1" Nuts

Two (2) 1" Flat Washers

Axle Torque Wrench / Slide Hammer Mounting Plate



MUST be manufactured locally.

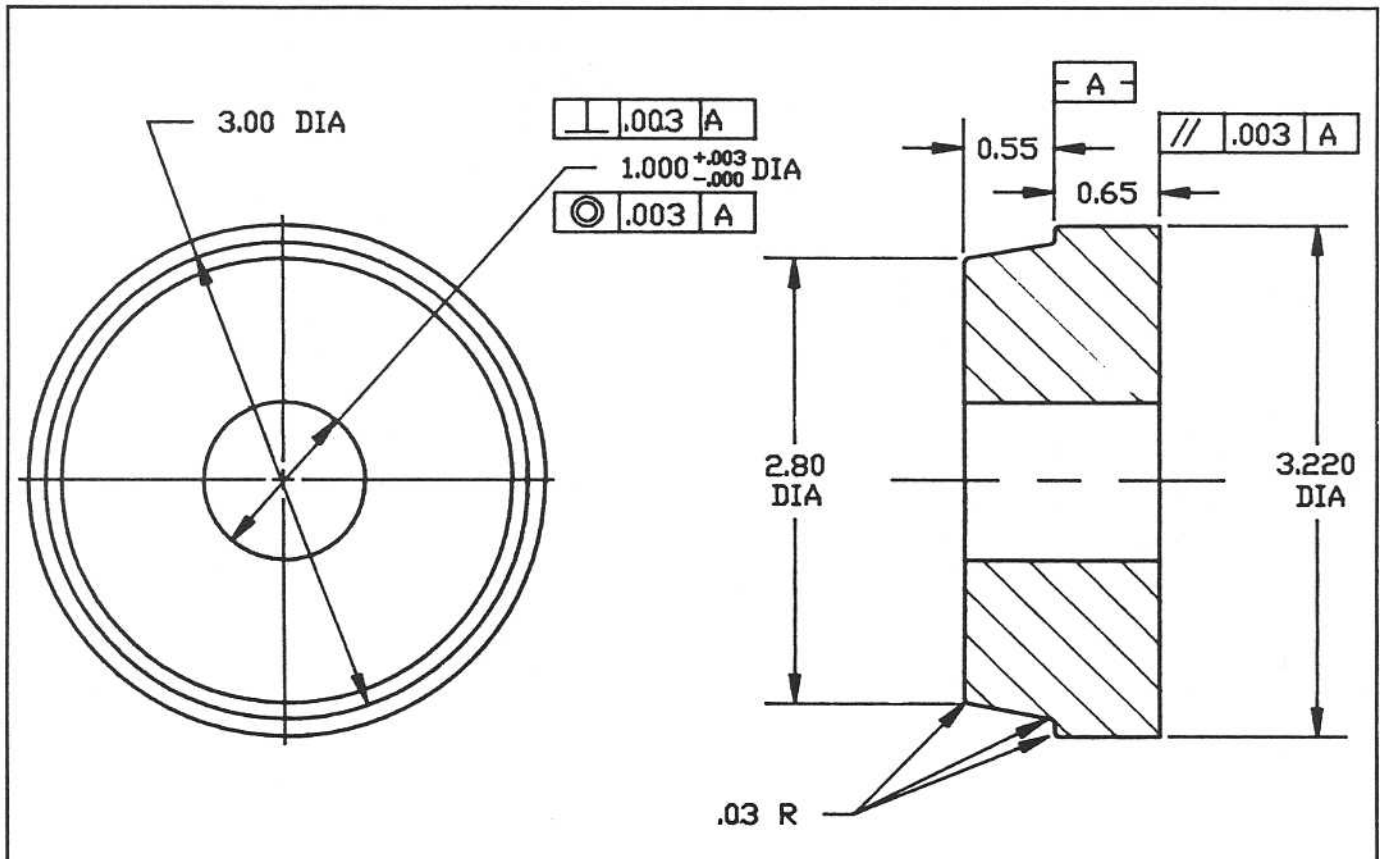
Drawing and dimensions on page 2-13.

GENERAL INFORMATION

SPECIAL TOOLS and FITTINGS

Axle Bearing Cup Installation Tool

Drawing and Dimensions for Model 930/940

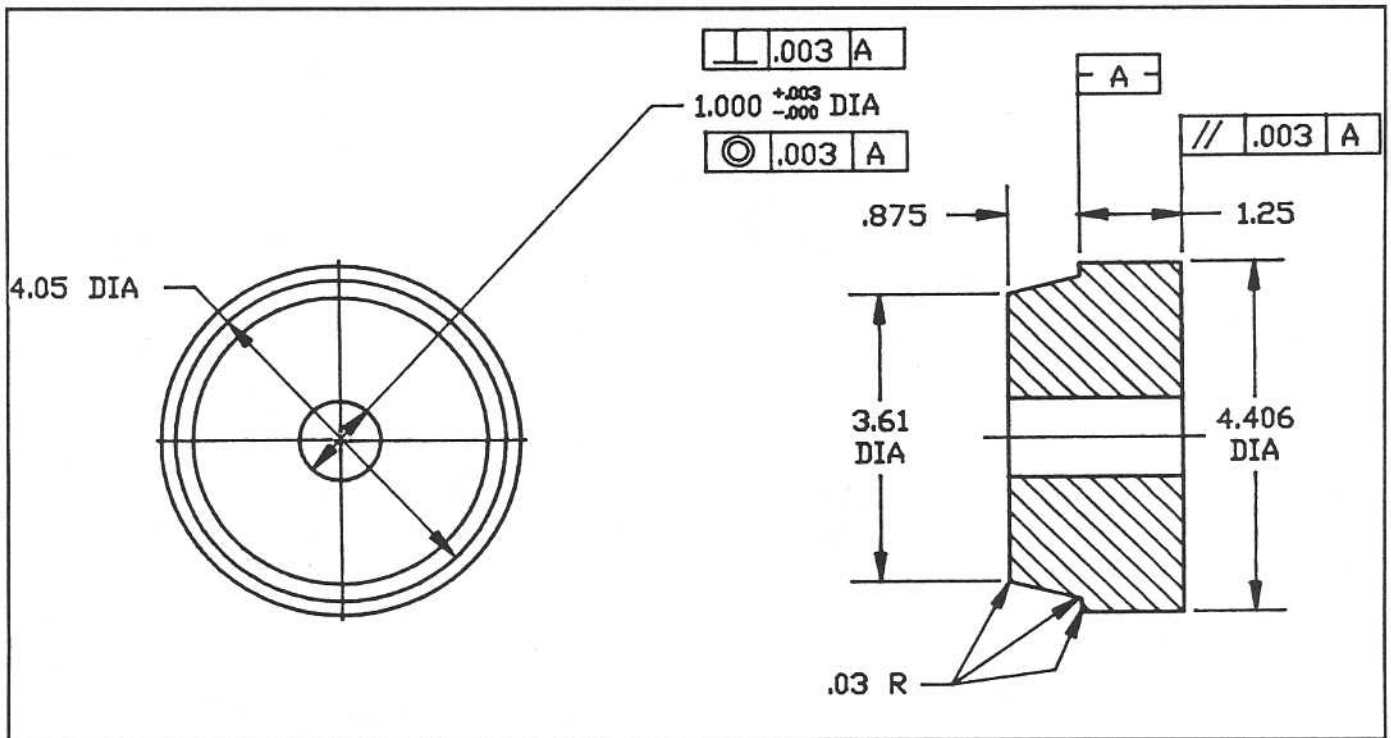


GENERAL INFORMATION

SPECIAL TOOLS and FITTINGS

Axle Bearing Cup Installation Tool

Drawing and Dimensions for Model 960

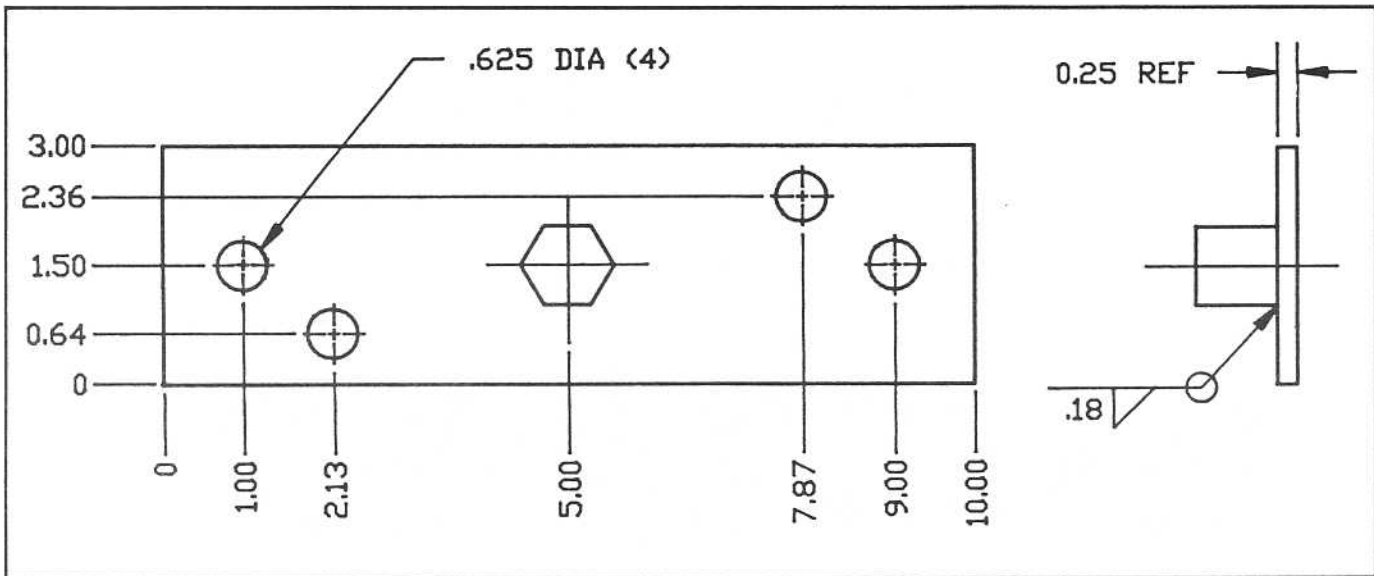


GENERAL INFORMATION

SPECIAL TOOLS and FITTINGS

Axle Torque Wrench / Slide Hammer Mounting Plate

Drawing and Dimensions for All Models



STEERING CONTROLS

Steering of the *MUSTANG* is obtained by a single control lever (T-Bar) that is connected by mechanical linkage to two reversible, variable displacement hydrostatic pumps. Travel speed, direction of travel and steering are a matter of changing the direction of flow and amount of flow from the pumps. Because the pumps are independent of each other, each set of drive wheels can be operated independently of the other. When the T-Bar is pushed straight forward or backward, the output of both pumps is approximately the same, thus the machine goes straight forward or back.

Turning the T-Bar causes the pump output to be different, thus one set of wheels will drive faster than the other, causing the machine to turn. If the T-Bar is turned far enough, one pump will reverse direction which will allow the machine to spin turn.

All movement of the machine (forward, reverse, turning, fast and slow) is determined by the amount and direction of oil flow from the hydrostatic pump, which is controlled by the T-Bar.

The steering system has two neutral centering devices and a shock absorber. The centering devices are mechanical spring loaded assemblies that return the control system to neutral when the operator releases the T-Bar. There is also an electric switch in each assembly wired in a series with the starter. This is a safety feature which prevents the engine from starting unless the controls are in neutral. The shock absorber simply dampens the movement of the T-Bar, which allows for smoother operation.

Since this is a rigid frame full time 4 wheel drive machine, equal tire size and proper tire pressures are critical for smooth operation and to minimize drive system wear.

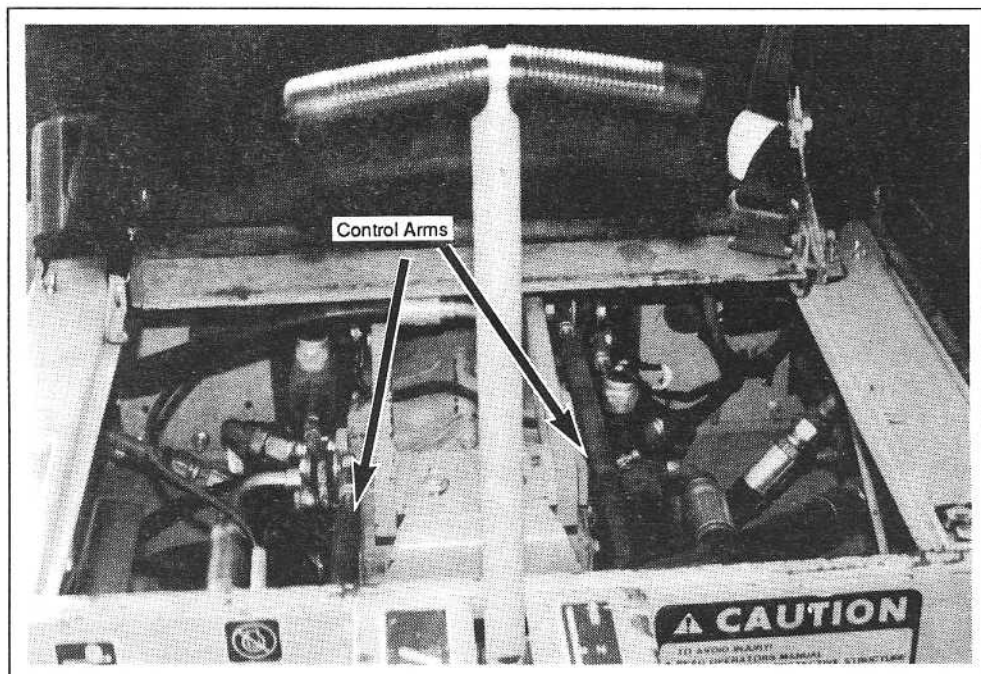


Figure 3-1

STEERING CONTROLS

TROUBLESHOOTING

Problems in the steering control system can cause the machine to not respond properly when the operator moves the T-Bar and can make the operator "feel" like it has low power to the wheels.

Anytime a complaint is received of creeping, low power, jumpiness, erratic steering, or lack of return to neutral, a visual inspection of the steering control system should be made. Make sure all connections are tight but not binding.

CAUTION: Damaged and/or loose steering control linkage can allow the machine to move unexpectedly. When troubleshooting, repairing or adjusting this system be sure to raise and block the drive wheels off the ground.

1. T-Bar Linkage Arms to Pump Arm Connection.

A. Be sure flat washers and spacer washers are in proper location, the rubber mount is in good condition and the mounting bolt is tight. (See figure 3-2)

B. Be sure rod ends are in good condition and tight. The ball should fit tight, but not so tight as to cause binding and restriction of the return to neutral feature.

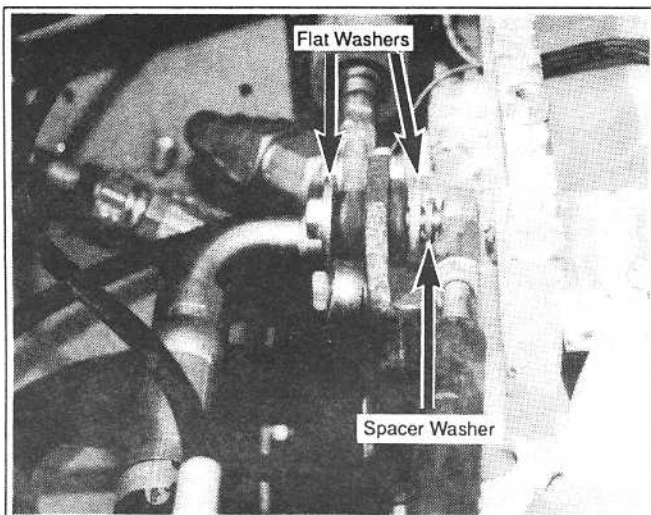


Figure 3-2

2. T-Bar Pivot.

A. Check to be sure the pivot point on the T-Bar is working freely, not rusty, corroded, or binding.

B. Be sure it is not excessively worn.

3. Neutral Start and Centering Assembly to Pump Arm Connection.

A. Check for spacer washer in proper location. (same as 1-A)

B. Be sure mount bolt is intact and tight.

4. Neutral Start and Centering Assembly to Hydrostatic Pump Support.

A. Be sure rubber mount is in good condition and mounting bolt is tight.

5. Pump Arm to Pump Connection.

A. Be sure clamp bolt on arm is tight.

B. Check key in pump arm.

C. Check for wear between the arm and key and between the key and pump shaft. (See figure 3-3)

NOTE: There must be absolutely **NO** movement between the arm and shaft.

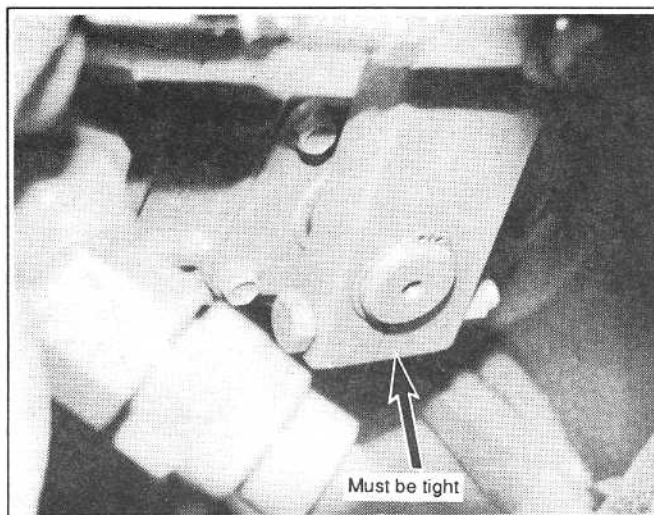


Figure 3-3

STEERING CONTROLS

T-BAR

Adjustments

The T-Bar should be straight and vertical to the operator when bar is placed in the "neutral" position.

To obtain this position, adjustment is easiest when control rods are disconnected from pump arms.

1. Shut engine off and apply parking brake.
2. Loosen jam nuts from both ends and then adjust rod to obtain correct T-Bar position. Maintain at least 1/2 inch (12.7 mm) of control rod thread into each rod end. (See figure 3-4)

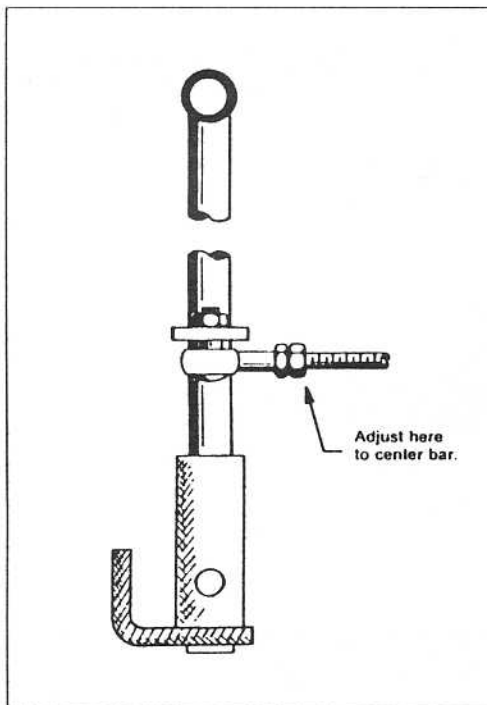


Figure 3-4

NOTE: If unit is equipped with hexagon shaped (turnbuckle) steering control rods, minor adjustments can be made without disconnecting the rod end from the pump arm. Hexagonal rod has left and right hand threads and adjustment is made by turning the rod. (See figure 3-5)

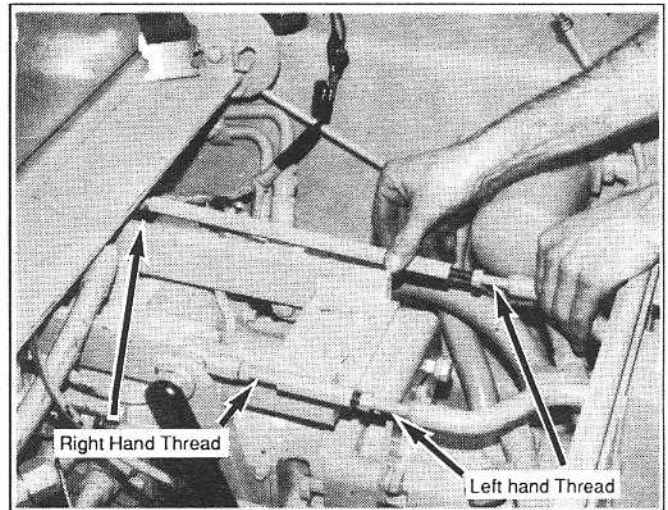


Figure 3-5

3. When correct position is obtained, be sure to tighten "jam" nuts against rod ends taking care not to twist the control rods.

NOTE: This is **NOT** an adjustment for neutral centering, and will not stop a machine from creeping when in neutral.

STEERING CONTROLS

T-BAR

Removal & Installation

REMOVAL

1. Raise the lift arm and support with Lift Arm Stops or Cylinder Lock.

CAUTION! The seat belt lock-out is not meant to prevent movement of the Lift Arm when people are under it. **ALWAYS USE THE LIFT ARM STOP FOR THIS PURPOSE.**

2. Remove front floor plate.
3. Disconnect auxiliary hydraulic cable at hand control lever and at cable mounting bracket (for model 960 with linkage rod, remove at hand control lever only).
4. Remove parking brake lever from mounting bracket.
5. Disconnect steering linkage rods at pump control arms.

NOTE: For units equipped with two piece steering rod, loosen jam nuts at each end of hexagon shaped turnbuckle rod (Left hand thread at connection of turnbuckle and steering rod), and unscrew turnbuckle from rod end. (See figure 3-6)

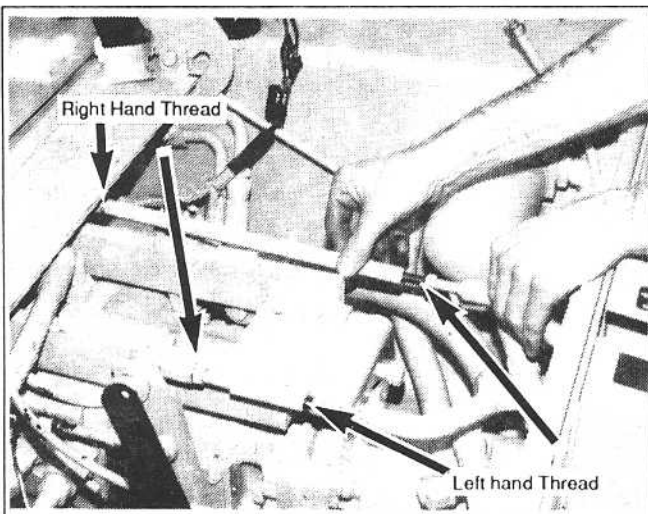


Figure 3-6

NOTE: The turnbuckle system is used in Model 940 after S/N 0420003 and Model 960 after S/N 0607504.

6. For Model 930/940 only: Remove manual fuel shut-off cable at T-Bar panel.
7. Remove the 3/8 inch mounting bolts, move panel forward at left hand side (viewed from operator's seat) to avoid wedging, and lift panel out of frame.

Mounting Bolt Locations: 930/940 two (2) on each side at outside of frame through the fender wall. (See figure 3-7)

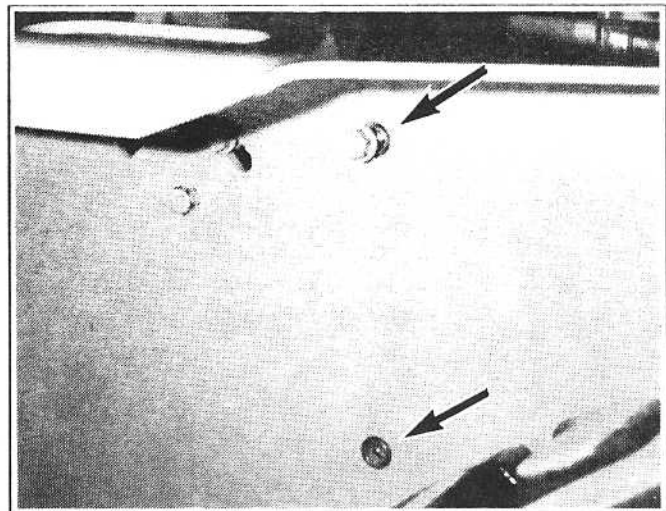


Figure 3-7

Model 960: At left side - two (2) carriage bolts through T-Bar panel flange to inner wall of frame. Reach between the inner and outer frame wall at front of machine to remove the 3/8 inch "flanged" nuts. (See figure 3-8 on page 3-5)

At right hand side - remove the three (3) carriage bolts at the corner of the T-Bar panel and mounting flange. (See figure 3-9 on page 3-5)

STEERING CONTROLS

T-BAR

Removal & Installation (continued)

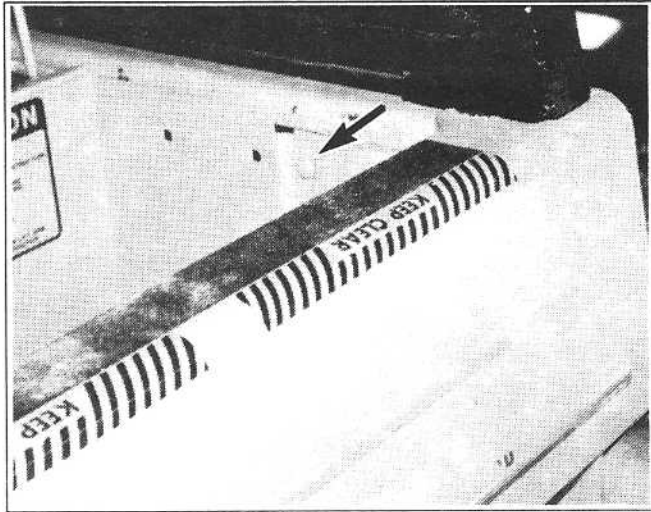


Figure 3-8

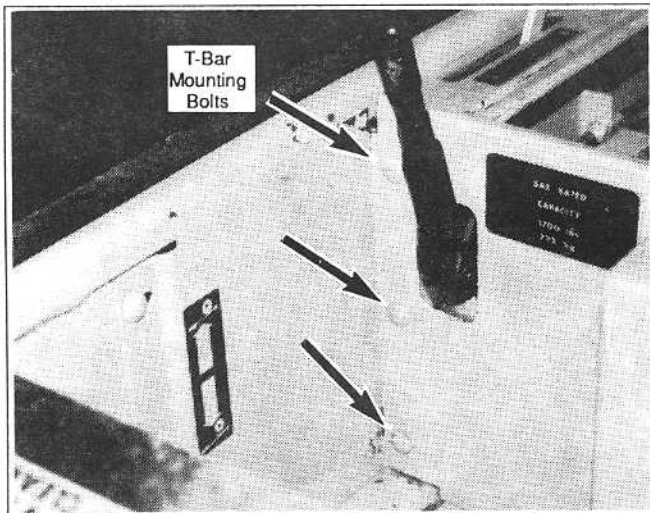


Figure 3-9

INSTALLATION TIPS

1. When lowering T-Bar panel into frame, allow the steering rods to rest on top of the hydrostatic pump support frame. This will prevent steering rods from becoming entangled with hydraulic hoses or with wire harness.
2. Mount parking brake to T-Bar panel prior to aligning and installing panel mounting bolts. This will allow easier parking brake installation without interference with the throttle lever.

3. Insure proper washer placement at steering rod end bearing to pump control arm connection.

Proper washer placement - One 3/8 inch flat washer on each side of rubber mount bushing and special 3/8 inch spacer washer P/N 400-13676 between inside flat washer and rod bearing. (See figure 3-10)

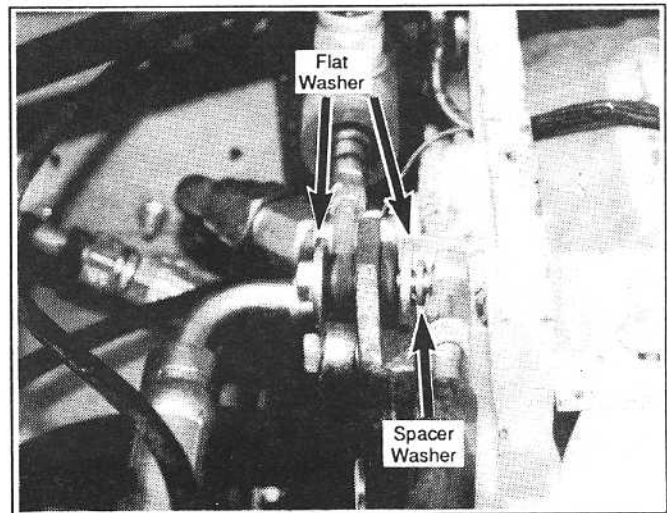


Figure 3-10

NOTE: Failure to install the special spacer washer will allow the rod end casting to contact the 3/8 inch flat washer and create a drag on the steering controls.

STEERING CONTROLS

NEUTRAL CENTERING DEVICE

Adjustments

1. Block the machine up so the wheels clear the floor.
2. Remove the seat plate to allow access to the neutral centering assemblies.
3. Activate the steering and check for wear, binding or loose parts and correct as needed. The T-Bar may not fully return to "neutral" without the engine running. This is normal.
4. Start the unit. Run at 1/4 - 1/2 throttle and check for a neutral setting of the hydrostatic pumps. When the pumps are in their neutral position, the wheels will remain stationary.
5. Adjust the neutral centering by loosening the jam nut where the control rod connects to the neutral centering device and turning the neutral centering device rod in or out until the wheels stop. Tighten the jam nut and cycle the T-Bar forward and back, making sure that the wheels return to a complete stop from both forward and reverse. (See figure 3-11)

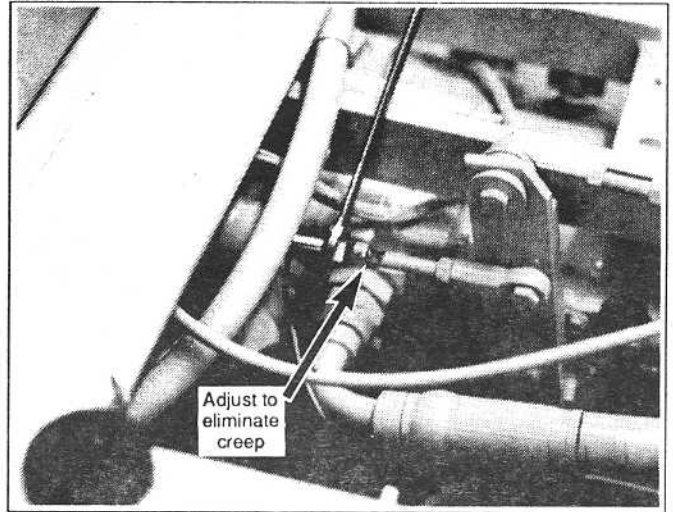


Figure 3-11

6. Sensitivity of the neutral start switch is preset at the factory and requires no adjustment. If a neutral switch does not close when the machine is in neutral or remains closed after the neutral start and centering device rod has traveled more than 1/8 inch (3.2 mm) forward or reverse, replace the switch.