TELEHANDLERS

642
844
Telehandler



Service Manual

#913250

Mustang Manufacturing Company, Inc.

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Section

301

ELECTRICAL SCHEMATICS, TROUBLESHOOTING TESTING & ADJUSTMENT PROCEDURES

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Section

601

HYDRAULIC SCHEMATICS, TROUBLESHOOTING TESTING & ADJUSTMENT PROCEDURES

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GENERAL INFORMATION

Except for some configuration differences, hydraulic cylinder disassembly, repair and assembly procedures will be basically the same for the tilt cylinder, frame leveling cylinder, boom lift cylinder, boom slave cylinder and boom extend cylinder. Except where noted differences or procedures are required for special application cylinders, use the following repair procedures for hydraulic cylinders.

When backup rings are used with O-ring seals, always note the position of the backup ring (above or below the O-ring) when removing the seals for reassembly reference.

One-piece Nylatron® type piston seals can be difficult to install on the piston. Soaking these seals in hot water for a short time prior to installation will make the seals more resilient and easier to install on the piston.

Before installing the piston and rod assembly into the barrel, lubricate the piston seals and wear rings liberally with clean operating fluid. Using an engine piston ring compressor to compress the piston seals tightly for a short period of time will often aid in the assembly procedure.

MANDATORY SAFETY SHUTDOWN PROCEDURE

BEFORE cleaning, lubricating or servicing this equipment:

1. Bring the machine to a full stop on a level surface. (If parking on a slope or hillside cannot be avoided, park across the slope and block the tires.)
2. Fully retract the boom and lower the attachment to the ground.
3. Place controls in NEUTRAL and set the park brake.
4. Idle the engine for gradual cooling.
5. Turn the starter key switch to OFF position and remove the key. (Take the key with you for security reasons.)

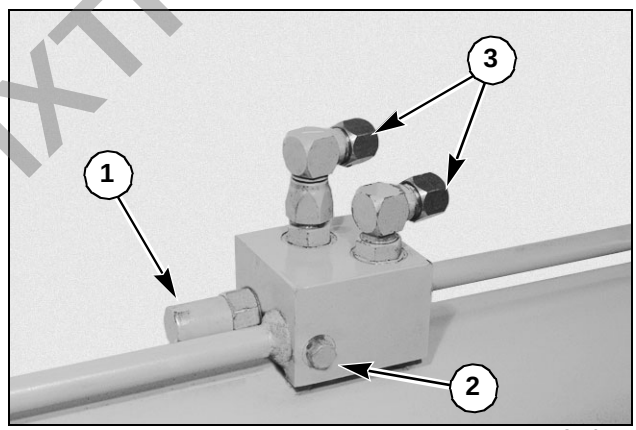
ONLY when you have taken these precautions can you be sure it is safe to proceed. Failure to follow the above procedure could lead to death or serious personal injury.

WARNING

When disassembling hydraulic cylinders, NEVER use pneumatic or hydraulic pressure to aid in removing the piston and rod assembly from the cylinder barrel. To ignore this warning may result in severe injury or death.

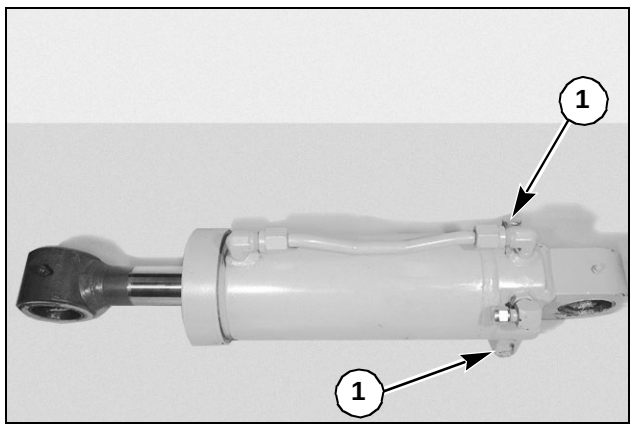
CYLINDER DISASSEMBLY

STEP 1



G1531MP

Select a clean environment. Remove the load check valve (1) slowly to relieve any residual pressure, plug (2) and caps (3) from the valve block.



G1562MP

NOTE: *The cartridges (1) for the frame leveling cylinder are located in different areas.*

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SAE FASTENER TORQUE CHART

NOTE: *Use these torques, unless special torques are specified. Values are for UNC and UNF thread fasteners, plated or unplated, as received from supplier. Fasteners can be dry or lubricated with normal engine oil. Values do not apply if graphite, moly-disulphide or other extreme pressure lubricant is used.*

SAE Grade No.	2				5				8*			
Bolt head identification (See Note 1)												
Bolt Size	LB FT		Nm		LB FT		Nm		LB FT		Nm	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1/4	5	6	7	8	9	11	12	15	12	15	16	20
5/16	10	12	14	16	17	20.5	23	28	24	29	33	39
3/8	20	23	27	31	35	42	48	57	45	54	61	73
7/16	30	35	41	47	54	64	73	87	70	84	95	114
1/2	45	52	61	70	80	96	109	130	110	132	149	179
9/16	65	75	88	102	110	132	149	179	160	192	217	260
5/8	95	105	129	142	150	180	203	244	220	264	298	358
3/4	150	185	203	251	270	324	366	439	380	456	515	618
7/8	160	200	217	271	400	480	542	651	600	720	814	975
1	250	300	339	406	580	696	787	944	900	1080	1220	1464
1-1/8					800	880	1085	1193	1280	1440	1736	1953
1-1/4					1120	1240	1519	1681	1820	2000	2468	2712
1-3/8					1460	1680	1980	2278	2380	2720	3227	3688
1-1/2					1940	2200	2631	2983	3160	3560	4285	4827

NOTE 1: *Bolt head identification marks as per grade. Manufacturing marks will vary. *Thick nuts must be used with Grade 8 bolts.*

METRIC FASTENER (ISO) TORQUE CHART

NOTE: *Use these torques, unless special torques are specified. Values are for UNC and UNF thread fasteners, plated or unplated, as received from supplier. Fasteners can be dry or lubricated with normal engine oil. Values do not apply if graphite, moly-disulphide or other extreme pressure lubricant is used.*

ISO Grade No.	8.8				10.9				12.9			
Bolt head identification (See Note 1)												
Bolt Size	LB FT		Nm		LB FT		Nm		LB FT		Nm	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
M4	3	4	2	3	4	5	3	4				
M5	6.5	8	5	6	9.5	11	7	8				
M6	10.5	12	8	9	15	17.5	11	13				
M8	26	31	19	23	37	43	27	32				
M10	52	61	38	45	73	87	54	64				
M12	90	107	66	79	125	150	93	112				
*M14	144	172	106	127	200	245	149	179				
M16	217	271	160	200	310	380	230	280				
M20	434	515	320	380	610	730	450	540				
M24	675	815	500	600	1050	1275	780	940				
M30	1250	1500	920	1100	2000	2400	1470	1770				
M36	2175	2600	1600	1950	3500	4200	2580	3090				

Because of the low ductility of these fasteners, the torque range is to be determined individually for each application. As a general rule, the torque ranges specified for grade 10.9 fasteners can be used satisfactorily.

*M14 is not a preferred size

NOTE 1: *Bolt head idenficiation marks as per grade. Manufacturing marks will vary.*

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STARTER CIRCUIT TROUBLESHOOTING

The engine does not start. Does the starter engage and turn over the engine?

YES
Is there 12 volts of current at the fuel shut off solenoid?

YES
Check the fuel system pressure before replacing the fuel solenoid.

NO
Is the fuel shut off solenoid fuse open?

YES
Replace the fuel shut off fuse.

NO
Repair or replace the wires between the fuel shut off solenoid and the fuse.

NO
Is the transmission shift lever in neutral?

YES
Is the battery fully charged?

NO
Move the shift lever to the neutral position.

YES
Is the battery properly grounded?

NO
Charge or replace the battery.

YES
Is the ignition fuse open?

NO
Replace the battery ground cable.

YES
Replace the ignition fuse.

NO
Is there 12 volts at the power terminal of the ignition fuse?

YES
Is the gear selector fuse open?

NO
Replace the 60 amp in-line fuse between the battery terminal of the starter relay and the fuse box.

YES
Replace the gear selector fuse.

NO
With the key switch ON, is there 12 volts to the power terminal of the gear selector fuse?

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GENERAL SPECIFICATIONS

POWER TRAIN

Transmission

Make	Clark
Type	3 Speeds Forward, 3 Speeds Reverse
Model	T12000
Torque Converter	Single-Stage, Dual-Phase
Travel Speeds	
1st gear	3.3 MPH (5.3 km/h)
2nd gear	7.3 MPH (11.7 km/h)
3rd gear	18.8 MPH (30.3 km/h)

Axles (Front and Rear)

Make	Dana
Type	Steerable, Open Differential, Dual-Reduction Outboard Planetaries
Ratio (overall)	22.67:1

Engine (RS6 only)

Make	John Deere
Model	4045T
Type	Diesel, In-line 4 Cyl.
Displacement	276 cu. in. (4.5 L)
Aspiration	Turbo-Charged
High Idle Speed (no load)	2600 RPM
Rated Speed (Governed)	2500 RPM
Low Idle Speed (approx.)	950-1000 RPM
Power Rating (at 2500 RPM)	99 HP (74 kW)

NOTE: *Also refer to engine manual.*

Engine (RS8)

Make	John Deere
Model	4045T
Type	Diesel, In-line 4 Cyl.
Displacement	276 cu. in. (4.5 L)
Aspiration	Turbo-Charged
High Idle Speed (no load)	2600 RPM
Rated Speed (Governed)	2500 RPM
Low Idle Speed (approx.)	950-1000 RPM
Power Rating (at 2500 RPM)	115 HP (86 kW)

NOTE: *Also refer to engine manual.*

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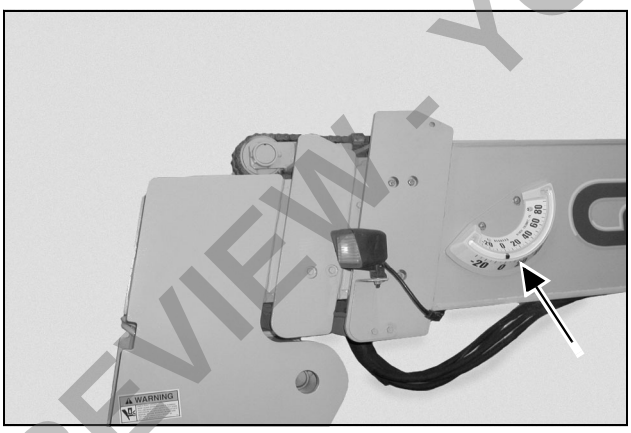
MANDATORY SAFETY SHUTDOWN PROCEDURE

BEFORE cleaning, lubricating or servicing this equipment:

1. Bring the machine to a full stop on a level surface. (If parking on a slope or hillside cannot be avoided, park across the slope and block the tires.)
2. Fully retract the boom and lower the attachment to the ground.
3. Place the controls in NEUTRAL and set the park brake.
4. Idle the engine for gradual cooling.
5. Turn the keyswitch to OFF position and remove the key. (Take the key with you for security reasons.)

ONLY when you have taken these precautions can you be sure it is safe to proceed. Failure to follow the above procedure could lead to death or serious personal injury.

RELIEVING HYDRAULIC PRESSURE

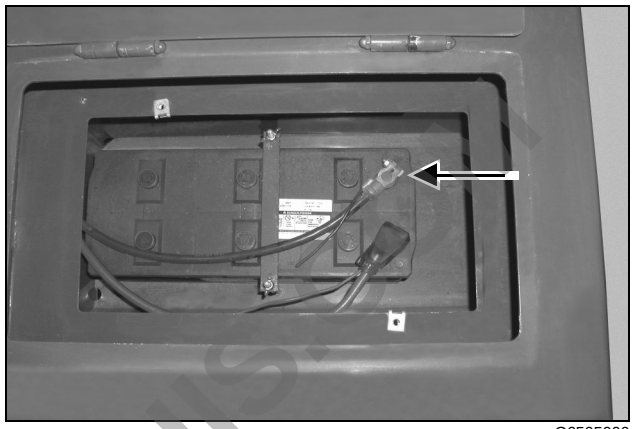


G0705090

1. Fully retract the telescopic boom and raise the telescopic boom a minimum of 20° to provide clearance for engine removal from the right hand side.
2. Install cylinder locks on both boom slave cylinders.
3. Move the boom control joystick in all directions several times to relieve hydraulic pressure in those circuits.
4. Perform mandatory shutdown procedures.

ENGINE REMOVAL

STEP 1



G0505006

Disconnect the negative (-) battery cable from the battery.

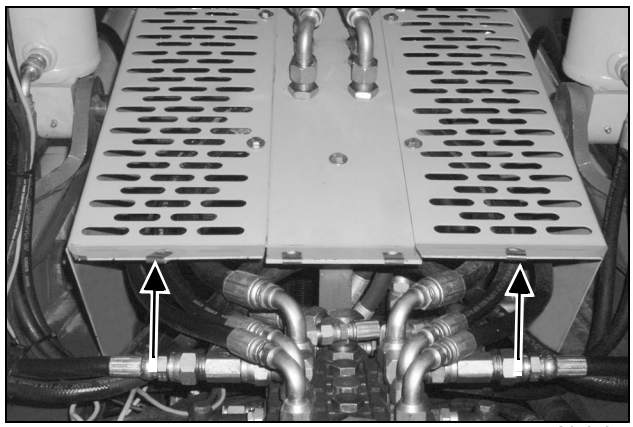
STEP 2



G0605071

Remove the rear hood. Complete Steps 10 and 11 of Section 800 for the correct procedures.

STEP 3

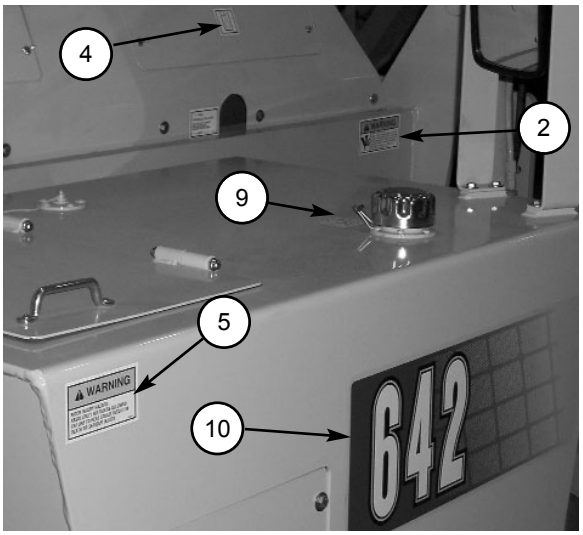


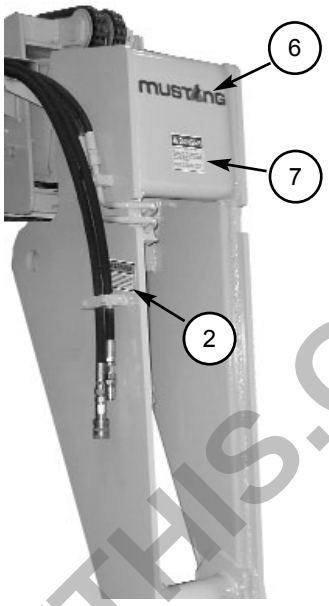
G0505075

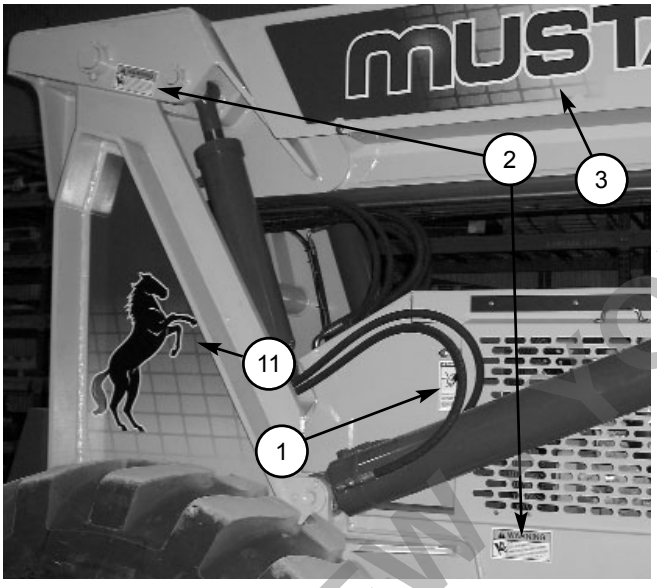
Remove the radiator covers. Complete Steps 14, 15 and 16 of Section 800 for the correct procedures.

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DECAL LOCATIONS - FRAME AND BOOM

REF. NO.	DESCRIPTION	844 PART NO.	642 PART NO.
01	DANGER - HANDS OUT	L70305	L70305
02	WARNING - PINCH POINT	L65927	L65927
03	MUSTANG GRID BOOM RIGHT SIDE	102942	102942
04	HYDRAULIC OIL FILL	137632	137632
05	WARNING - NO RIDERS	L65932	L65932
06	MUSTANG - FRONT	100156	100156
07	DANGER-PERSONNEL INJURY *(units without WPS)*	L65928	L65928
08	QUICKATTACH UNLOCKED	L66613	L66613
09	DIESEL FUEL	137634	137634
10	844 or 642 RH	102941	102940
11	HORSE - RH UPRIGHT	100146	100146

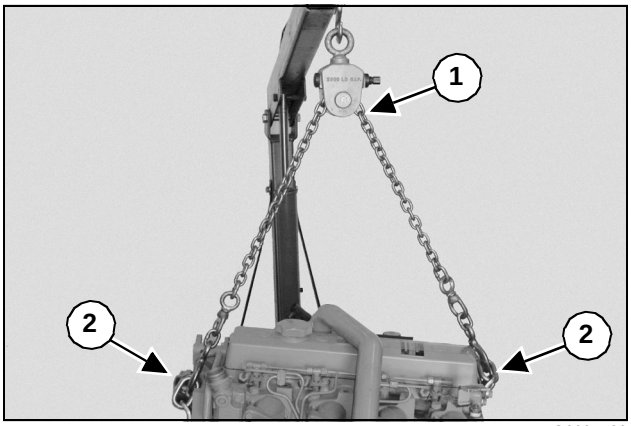
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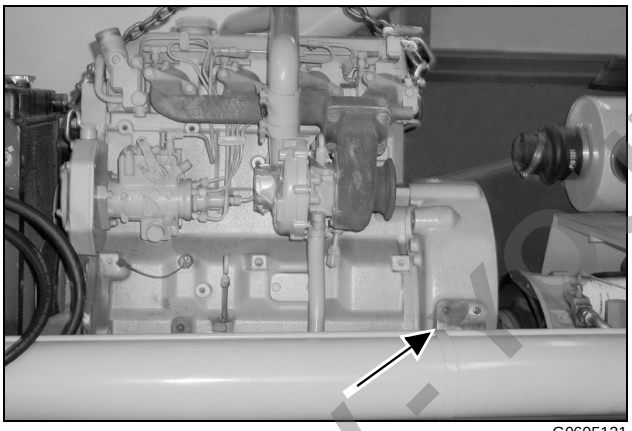
STEP 53



G0605120

Install a 2000 lb. (920 kg) or larger load rotor (1) to the lifting brackets or rings (2). Attach the load rotor to a heavy duty portable hoist.

STEP 54



G0605121

Lift the engine high enough for the oil pan to clear the frame rail. Move the engine over the engine mount area and lower the engine until the muffler mount bracket holes are just above the frame rail.

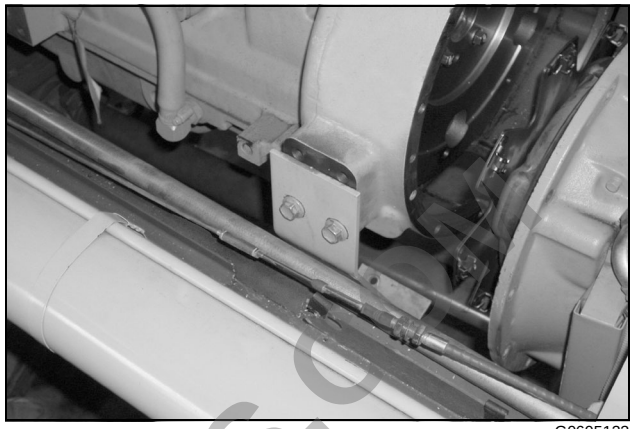
STEP 55



G0605122

Install the mounting bracket with the two bolts and tighten.

STEP 56



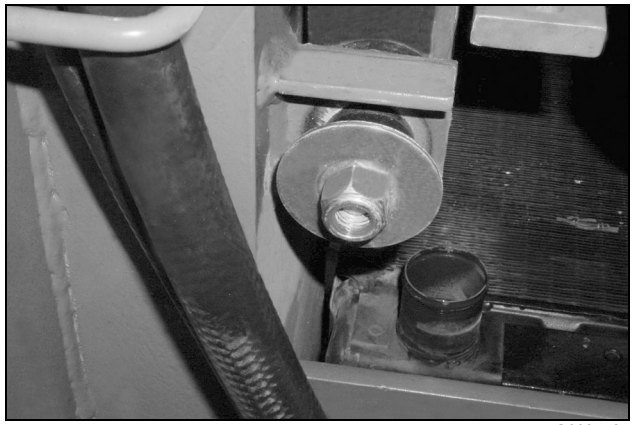
G0605123

Lower the engine until the bell housing clears the flex plate on the torque converter.

STEP 57

When the bell housing clears the flex plate, slowly move the engine forward until the mounting flanges on the bell house and transmission meet.

STEP 58



G0605124

Install the center bolts, lock washers and lock nuts in the two front engine mounts. Do not tighten the nuts.

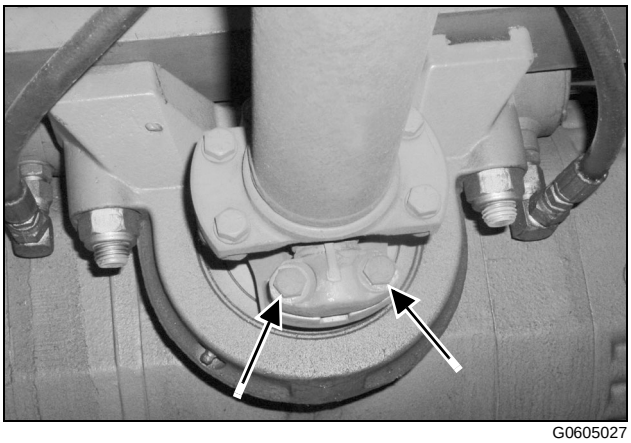
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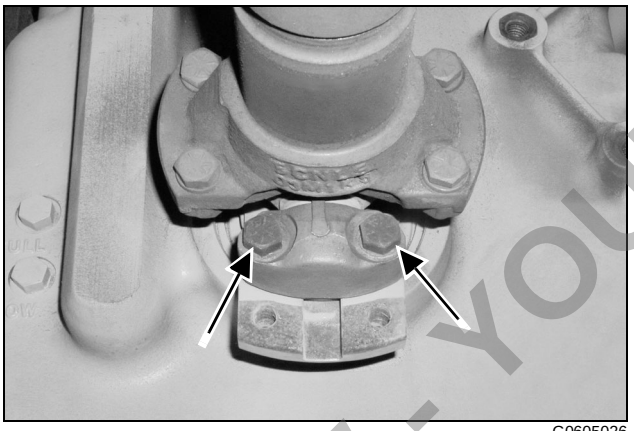
STEP 6



G0605027

Disconnect the driveshaft from the front axle by removing the four bolts and lock washers.

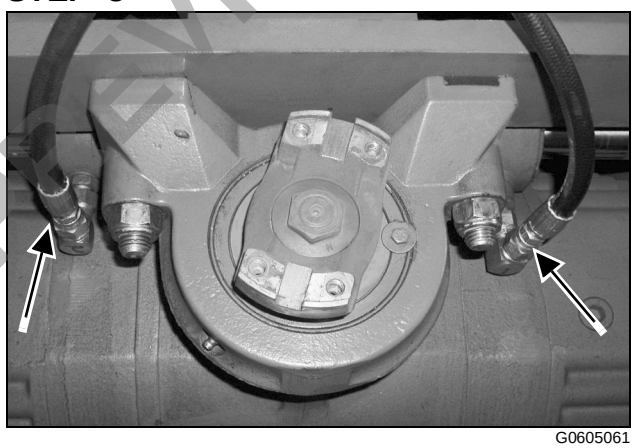
STEP 7



G0605026

Disconnect the driveshaft from the transmission by removing the four bolts and lock washers. Remove the driveshaft from the machine.

STEP 8



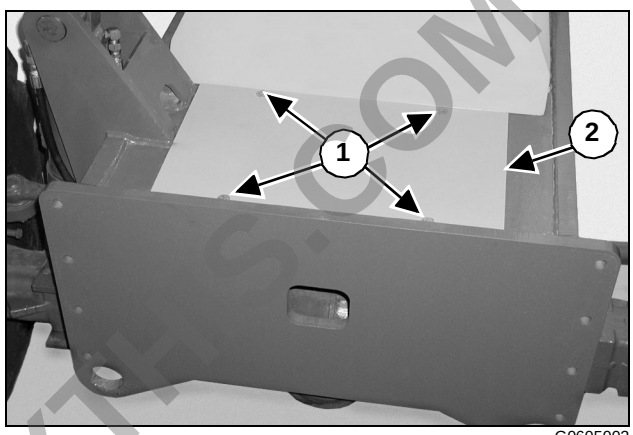
G0605061

Mark the two steering cylinder hydraulic hoses for correct assembly. Loosen and remove the two hydraulic hoses from the steering cylinder.

STEP 9

Install caps and plugs on all hoses and hydraulic fittings to prevent contaminating the hydraulic system.

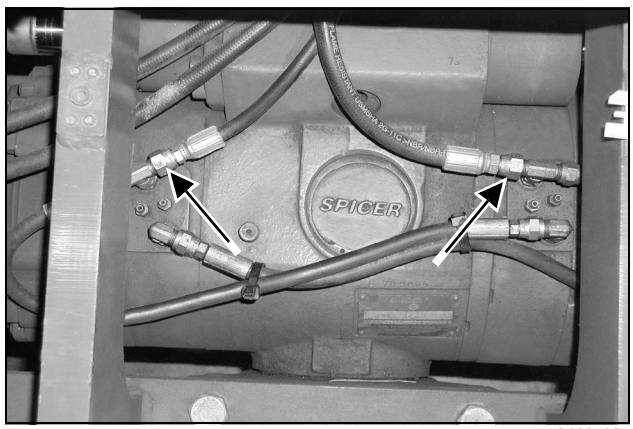
STEP 10



G0605002

Remove the four bolts (1) and the front cover (2).

STEP 11



G0605004

Mark the two hydraulic hoses for correct assembly. Loosen and remove the two hydraulic hoses from the brake connectors.

STEP 12

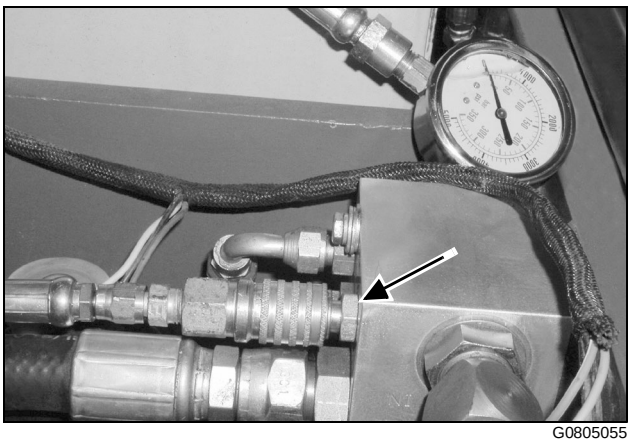
Install caps and plugs on all hoses and hydraulic fittings to prevent contaminating the hydraulic system.

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FRAME LEVELING COUNTERBALANCE VALVE DIRECT TEST

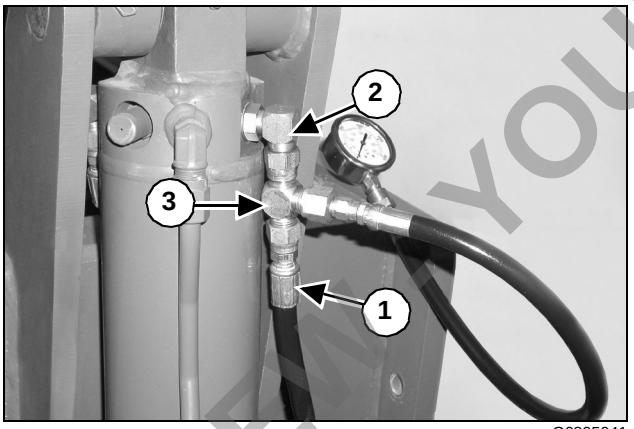
STEP 76



G0805055

Shut off the engine. Remove the pressure gauge from the MP test port on the flow divider.

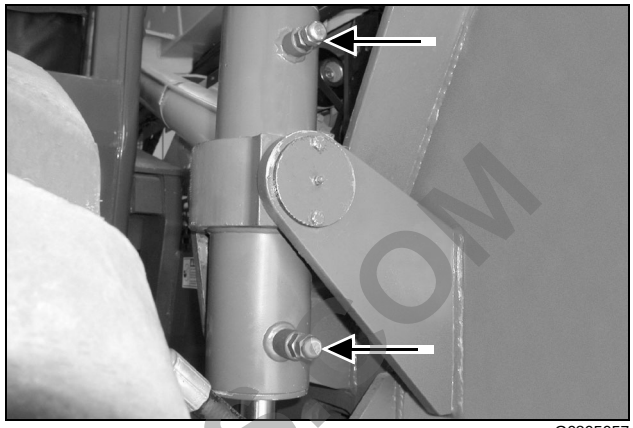
STEP 77



G0805041

Remove the supply hose (1) from the tilt right (rod) port (2) of the frame leveling cylinder. Install the 5000 psi (345 bar) pressure gauge (3) and hose between the cylinder port (2) and supply hose (1).

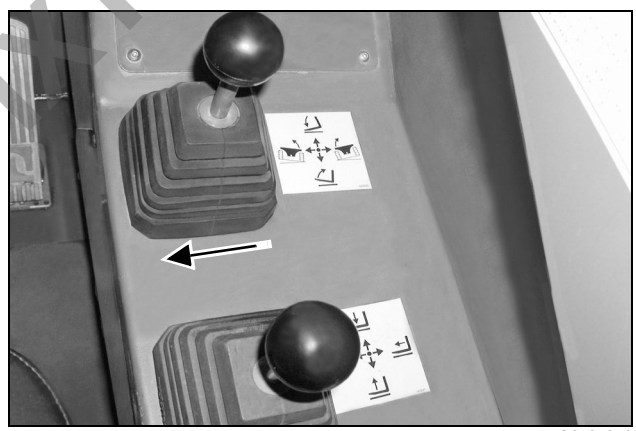
STEP 78



G0805057

Remove the hoses from the stabilizer cylinder elbow fittings. Cap the fittings and plug the hose ends.

STEP 79



G0505046

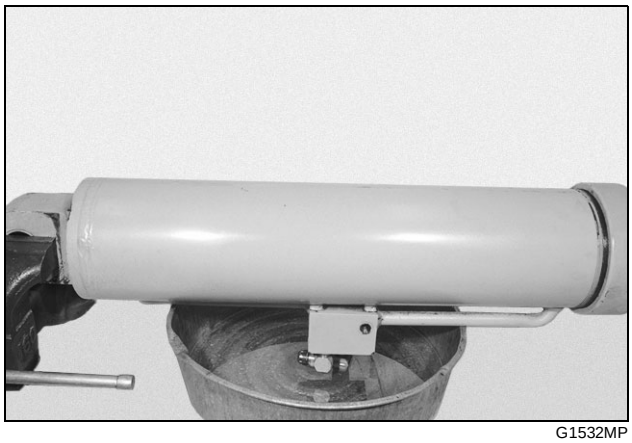
Start the engine and run at 1000 RPM. Hold the frame leveling joystick in the TILT LEFT position (1) until the cylinder reaches the end of its stroke. Move and hold the joystick to the TILT RIGHT position (2). The pressure gauge should read 1500 psi (103 bar) when the frame is tilting (moving) right.

If the pressure is less than 1500 psi (103 bar), proceed to Step 80.

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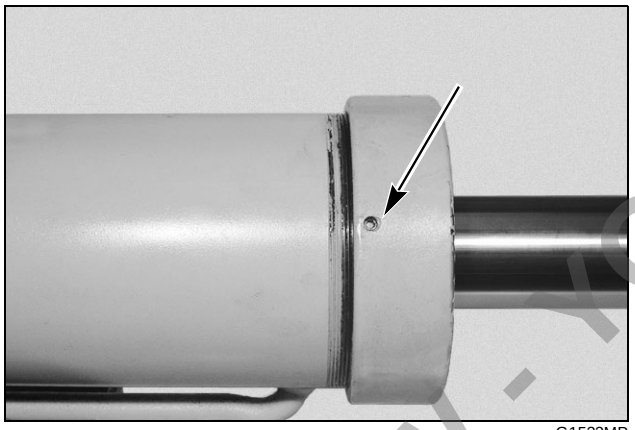
STEP 2



G1532MP

Put the base end of the cylinder in a vise. With a drain pan positioned under the cylinder, move the rod in and out slowly to remove the fluid.

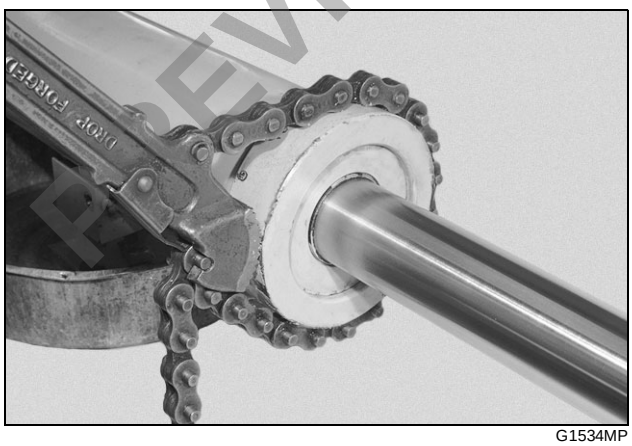
STEP 3



G1533MP

Loosen and remove the set screw from the cylinder gland ring nut.

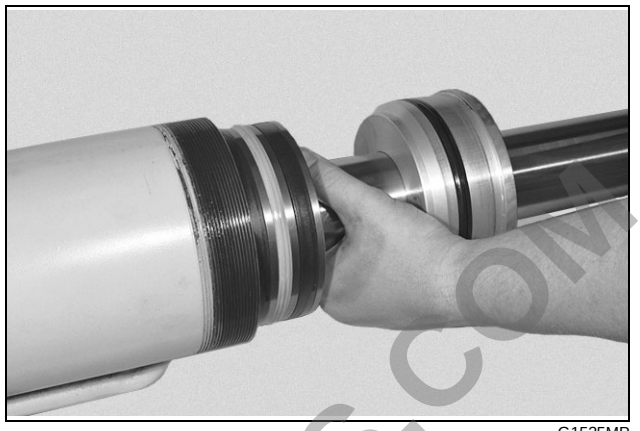
STEP 4



G1534MP

Loosen and remove the gland nut from the cylinder.

STEP 5



G1535MP

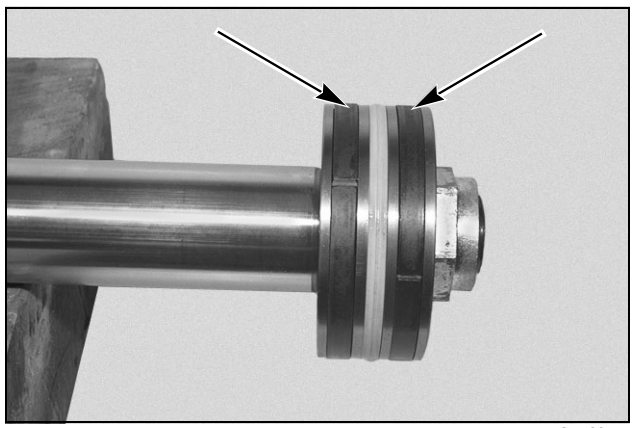
Remove the rod assembly from the cylinder.

IMPORTANT: *Protect the chrome finish on the cylinder rod at all times. Damage to surface of the rod can cause premature seal failure.*

STEP 6

Remove the cylinder barrel from the vise. Put the rod end in the vise. Support the rod on a wood block.

STEP 7



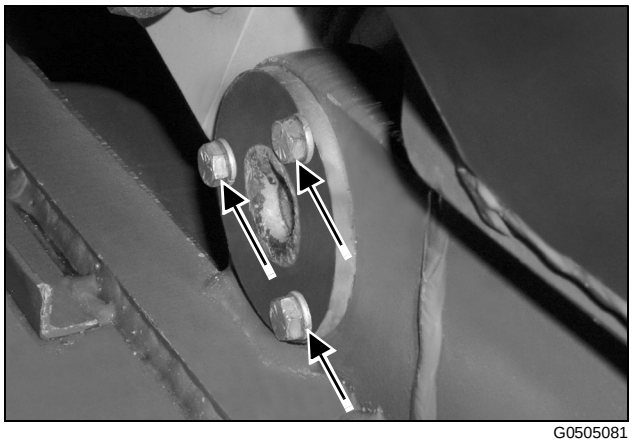
G1538MP

Remove and discard the two wear rings from the piston.

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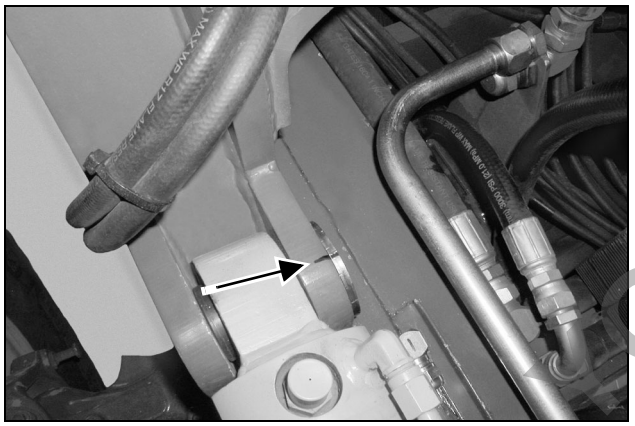
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STEP 14



G0505081

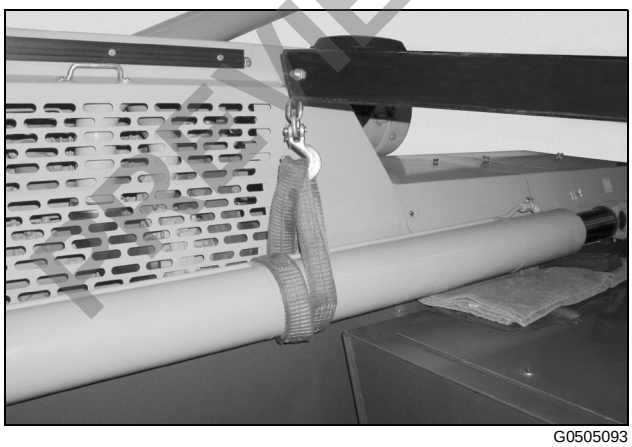
Remove the three bolts securing the eccentric pin (lower pivot pin).



G0505092

NOTE: *If the same lift cylinder will be re-installed, mark the position of the eccentric pin for installation.*

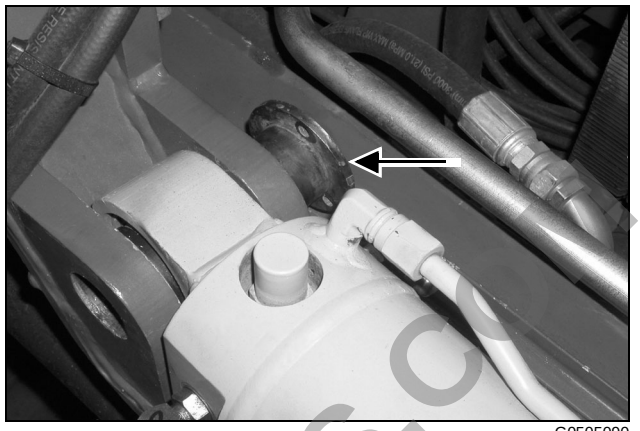
STEP 15



G0505093

Reposition the chain hoist and lifting strap to support the full weight of the lift cylinder during removal.

STEP 16



G0505090

Remove the eccentric pin from the lift cylinder lower pivot point and remove the lift cylinder.

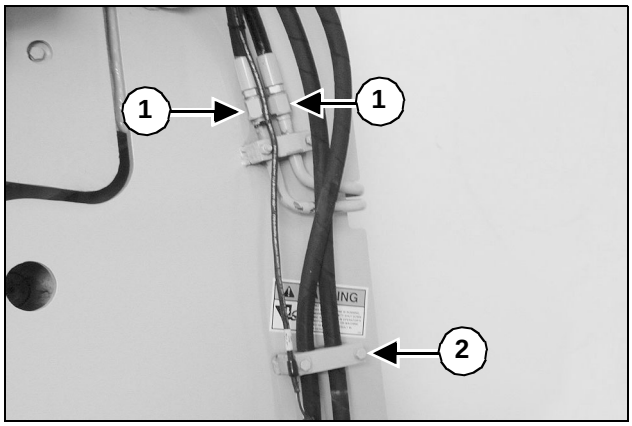
NOTE: *There are spacers on each side of the cylinder base. These spacers will be required for proper installation.*

NOTE: *If necessary, use this same procedure to remove the opposite side lift cylinder.*

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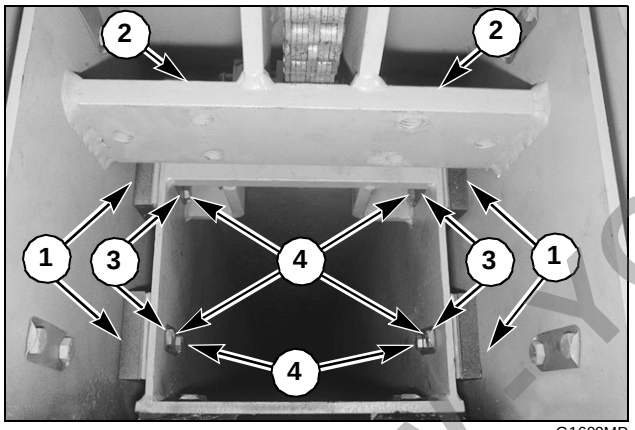
STEP 33



G0605090

Reconnect the two hydraulic hoses (1) to the tube lines connected to the tilt cylinder and the support block (2) on the auxiliary hoses.

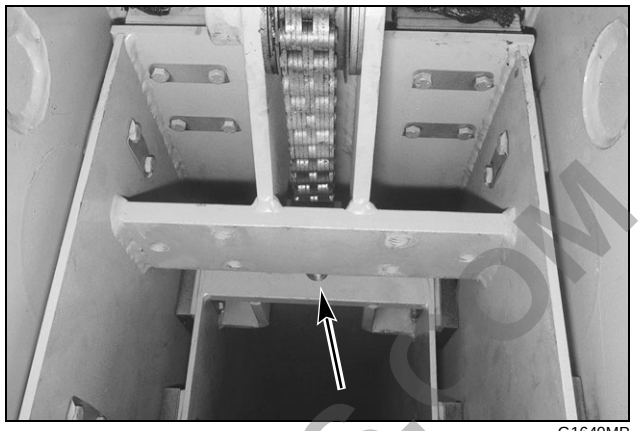
STEP 34



G1609MP

Reinstall the four side slide pads and shims (1) and the two top slide pads and shims (2) to the rear of the inner boom using the lockplates (3) and bolts (4). Use Loctite™ 271 (red) Thread Lock (or equivalent) on the threads of the bolts and tighten to 30 ft.-lbs. (41 Nm) torque. Bend each end of the lock plates up.

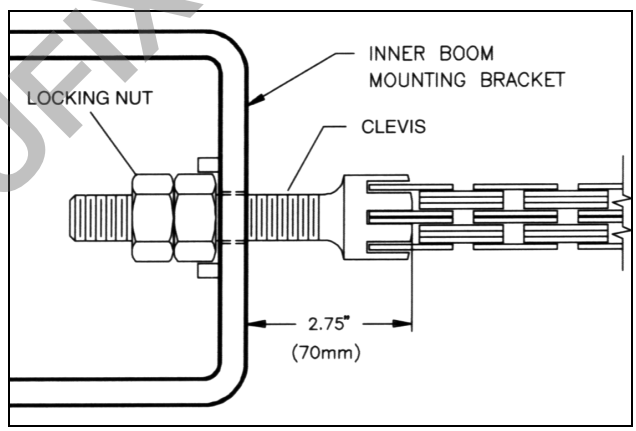
STEP 35



G1640MP

Reinstall one of the nuts on the single chain clevis so that about 2-3/4 inch (70 mm) of the clevis is extending from the mounting bracket on the inner boom.

STEP 36



G1607MS

Pull back on the single chain clevis to position the nut between the two bars on the bracket. Check the amount of clevis extending from the bracket, then adjust to achieve the 2.75 inch (70 mm) dimension shown.

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