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Form No.
913241

RS5-34
RS6-34

Telescopic Handler



SERVICE MANUAL

GEHL®

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INTRODUCTION

With correct maintenance and proper use, this Gehl RS Telescopic Handler will give years of dependable service. This service manual is intended to be a guide in the assembly and disassembly, installation and removal, adjustment and testing, troubleshooting and replacement of components that together make up the Gehl RS5-34 Telescopic Handler.

The Table of Contents can be used to make the procedure you need to find an easier process. Many photographs, schematics and line art drawings are used to help perform the necessary repairs, tests, or adjustments that this RS Series Telescopic Handler needs to keep it in good running condition.

If you have any additional questions, please contact your authorized Gehl dealer or call the Gehl Service Department for assistance.

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Section

100

PERSONAL SAFETY INFORMATION AND DECAL LOCATIONS

RS5-34 Telescopic Handler

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SAFETY



The above Safety Alert Symbol means **ATTENTION! ALWAYS BE ALERT! YOUR SAFETY IS INVOLVED!** When you see this symbol, carefully read the message that follows and be alert to the possibility of injury or death.

Gehl Company always takes safety into consideration when designing its products, and designs guards for exposed moving parts whenever it is possible and practical to do so. However, even with todays state-of-the-art technology, it must be recognized that in order to assure machine functionality for specific purposes not all machine hazards can be guarded or shielded.

Decals are placed on the machine to warn of additional hazards and must be read and strictly followed.

Gehl Company cannot anticipate every situation that may constitute a hazard. Therefore, the following safety rules and reminders are not all-inclusive and do not replace federal, state or local regulations, insurance needs or other safety code requirements.

MANDATORY SAFETY SHUTDOWN PROCEDURE

Before cleaning, lubricating or servicing this equipment:

1. Bring the machine to a full stop on 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 key switch to OFF position and remove key (take key with you for security reasons).

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

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WARNING

U.S. OSHA regulations require employers in general industry and the construction, shipyard and cargo-handling industries (excepting agricultural operations) to ensure that forklift operators are competent, as demonstrated by successful completion of a training course.

The training course must consist of acombination of formal instruction and practical training, including both forklift-related and workplace-related topics, and evaluation of the operator's performance in the workplace.

All operator training and evaluation is to be conducted by persons who have the knowledge, training and experience to train and evaluate operators.

SAFETY RULES AND REMINDERS

- **DO NOT** start or operate the machine until you have read and understood the Operator's Manual. You must become familiar with all operating controls, instruments and procedures before attempting operation or repair.
- If a service problem requires troubleshooting the machine under actual job site working conditions, unless you are totally familiar with the machine controls and operating procedures, have an experienced operator assist you.
- Always perform the Mandatory Safety Shutdown Procedure and relieve hydraulic circuit pressure before loosening or removing any hydraulic fittings or lines.
- If hydraulic cylinder repair is required, **NEVER** use pneumatic or hydraulic pressure to aid in cylinder disassembly.
- Always disconnect the battery before working on the electrical system.
- **DO NOT** start the machine from any position other than seated in the operator's seat.
- If replacement parts are required, **DO NOT** use unauthorized parts or substitute materials. Use only Gehl Company approved parts.
- Consult Gehl Company on changes, additions or modifications that may be required for this machine to comply with various regulations and safety requirements. Unauthorized modifications can cause serious injury or death. Anyone making such unauthorized modifications is solely responsible for the consequences.
- **NEVER** bypass (wire around) any safety switch or other safety device. Be sure all safety switches and devices are in proper working order before releasing the machine for operation.

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- Always use good judgement, care and common sense. Be sure the work method, procedure and equipment you choose are safe for you and other persons.
- Be sure all doors, guards or shields removed to perform service are correctly installed before operating or releasing the machine for use.
- Never use fuel, gasoline, naptha or other volatile fluids for cleaning purposes. Use only approved cleaning solvents for cleaning.
- Never run the engine in a closed building. Proper ventilation is required under all circumstances.
- Keep shop floors clean. Wipe up fluid spills immediately to prevent falls and possible injury.
- Periodically inspect all lifting fixtures, chains and slings for damage. Never exceed the load rating of lifting fixtures, chains and slings.
- **DO NOT** use the machine stabilizers to lift and support the machine to perform service of any kind. Use only adequate jacks for lifting, and blocking or jack stands for support. **NEVER** rely on jacks alone to support the machine.
- Always wear appropriate personal safety gear as required by working conditions and regulations. **DO NOT** wear loose or baggy clothing while performing maintenance or service on the machine.
- Protect your eyes! Always wear safety glasses with side shields or a full face shield when searching for hydraulic leaks, grinding, striking metal against metal or when working near batteries.
- **NEVER** use your hands to search for hydraulic fluid leaks. Use a piece of paper or cardboard. Escaping fluid under pressure can be invisible and can penetrate the skin causing serious injury. If any fluid is injected into your skin, seek medical attention at once. Injected fluid must be surgically removed by a doctor familiar with this type of injury or gangrene may result.
- If any safety decals are missing, damaged or painted over, replace the decal. If parts are replaced that have safety decals, be sure to install a new decal.
- To prevent unexpected movement, securely block working elements when repairing or changing working tool parts such as cutting edges.
- Use extreme caution when removing radiator caps, drain plugs, grease fitting or pressure taps. Park the machine and let it cool down before opening a pressurized compartment.
- When inflating tires, use a self-attaching inflation chuck with remote shutoff and stand clear of the tire.
- When necessary to tow the machine, do not exceed the recommended towing speed. Be sure the towing machine has sufficient braking capacity to stop the towed load. If the towed machine cannot be braked, a tow bar must be used or two towing machines must be used - one in front pulling and one in the rear to retard. Avoid towing over long distances.
- Whenever servicing or replacing hardened pins, etc. use a brass drift or other suitable material between the hammer and pin.

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WARNING

Construction equipment can be dangerous if improperly operated or maintained. This machine should be operated and maintained only by trained and experienced people who have read, understood and complied with the Operator's Manual.

MODIFICATIONS, NAMEPLATES, MARKINGS AND LOAD CAPACITIES

Modifications and additions, that affect load capacity or safe operation shall NOT be performed without the manufacturer's prior written approval. Where such authorization is granted, tags or decals shall be changed accordingly.

All attachments MUST be marked to identify the attachment(s), show the approximate weight of the machine and attachment(s) combination, and the total load capacity with attachment(s) at maximum elevation with load laterally centered.

Always make sure all nameplates, caution and instruction markings are in place and legible. Local government regulations may require local decals, which then become the responsibility of the local owner to provide.

Study the Load Zone Charts carefully. They show the maximum capacity to be lifted and placed at specific outward and upward distances. ALWAYS be aware of load weights prior to attempting lift and placement with the machine.

ROLL-OVER PROTECTIVE STRUCTURE (ROPS)

Do not modify the ROPS in any manner. Unauthorized modifications such as welding, drilling, cutting or adding components can weaken the structure and reduce its protective ability. If a ROPS is subjected to roll-over or other damage, it must be replaced. Do not attempt to repair a ROPS.

PROTECT THE ENVIRONMENT

Before you service this machine and before you dispose of the old fluids and lubricants, always remember the environment. DO NOT drain oil or fluids into the ground or into containers that can leak. Also, dispose of batteries and oil filters in accordance with local regulations. Check with your local environmental or recycyling center for correct disposal information.

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DECAL LOCATIONS

GENERAL INFORMATION

WARNING

ALWAYS read and follow the safety precautions on decals. Replace decals if they are damaged, or if the unit is repainted. If repainting, BE SURE that all applicable decals are affixed in their proper locations.

Decal locations information is provided to assist in the proper selection and application of new decals, in the event the original decals become damaged or the machine is repainted.

For correct replacement of decals, compare the location illustrations to your machine before starting to refinish the unit. Check off each required decal using the illustration reference number to find the part number, description and quantity in the list. Refer to the appropriate illustrations for replacement locations.

NEW DECAL APPLICATION

Before applying the new decals, surfaces must be free from dirt, dust, grease and other foreign material. To apply a solid-formed decal, remove the smaller portion of the decal backing paper and apply this part of the exposed adhesive backing to the clean surface while maintaining proper position and alignment. Slowly peel off the other portion of the backing paper while applying hand pressure to smooth out decal surface. To apply a die-cut decal, first remove the backing paper. Then, properly orient and position the decal onto the clean mounting surface. After the decal is firmly applied and smoothly pressed down, remove any front covering paper.

Decal Kits

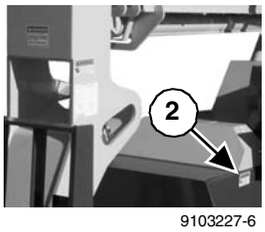
103369	RS5-34 Telescopic Handler without PWP
103372	RS5-34 Telescopic Handler with PWP

NOTE: *Decals may be purchased in kits or individually.*

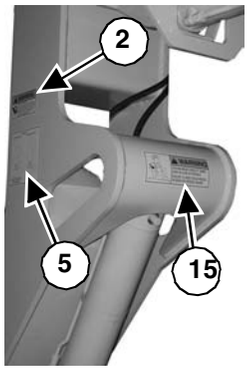
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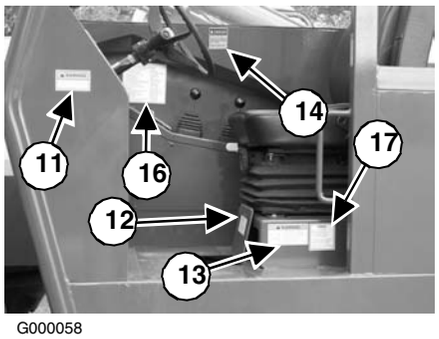
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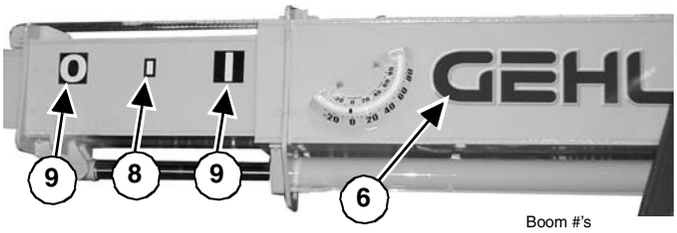
9103227-6



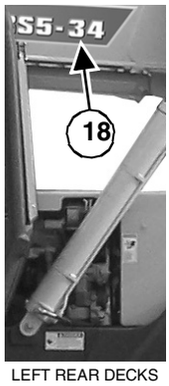
LH-BOOM NOSE



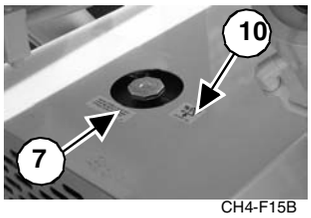
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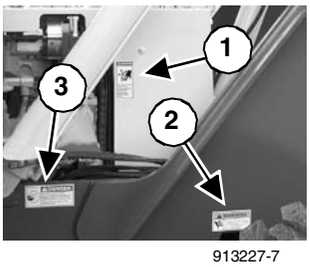
Boom #'s



LEFT REAR DECKS



CH4-F15B

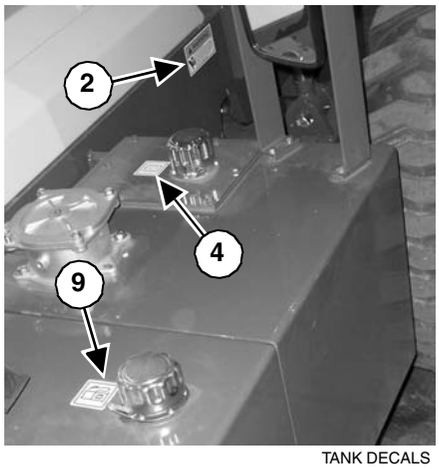


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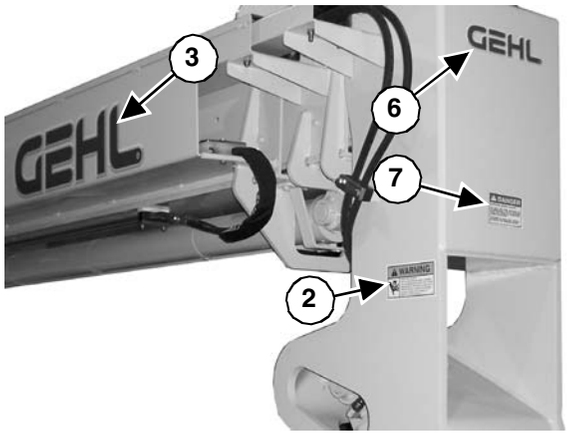
DECAL LOCATIONS - FRAME AND BOOM

REF. NO.	DESCRIPTION	PART NO.
01	DANGER - HANDS OUT	L70305
02	WARNING - PINCH POINT	L65927
03	WARNING - JUMP START	L65933
04	GEHL, 5.00”	102027
05	QUICKATTACH DIAGRAM	L65937
06	GEHL 6.75”	184069
07	ANTI-FREEZE	056859
08	HALF ZONE MARKER (5 EA.)	L62583
09	NO. “0” EXTENSION MARKER (1 EA.)	L67718
	NO. “1” EXTENSION MARKER (1 EA.)	L67719
	NO. “2” EXTENSION MARKER (1 EA.)	L67720
	NO. “3” EXTENSION MARKER (1 EA.)	L67721
	NO. “4” EXTENSION MARKER (1 EA.)	L67722
	NO. “5” EXTENSION MARKER (1 EA.)	L67723
10	COOLANT UNDER PRESSURE	072798
11	WARNING - NO RIDERS	L65932
12	BRAKE FLUID	L63474
13	OPERATOR MANUAL WARNING	100359
14	DANGER-PERSONNEL INJURY *(units without PWP)*	L65928
15	CARRY LOAD LOW	L65926
16	LUBE CHART	103229
17	ROPS & FOPS CERTIFICATION	103326
18	RS5-34 LH	103328

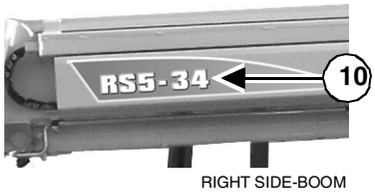
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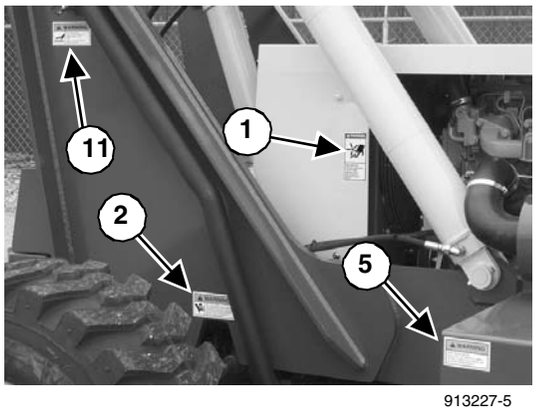
TANK DECALS



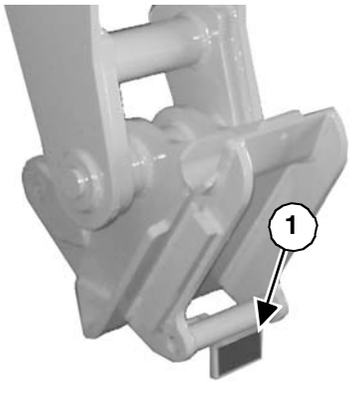
RH BOOM NOSE



RIGHT SIDE-BOOM



913227-5

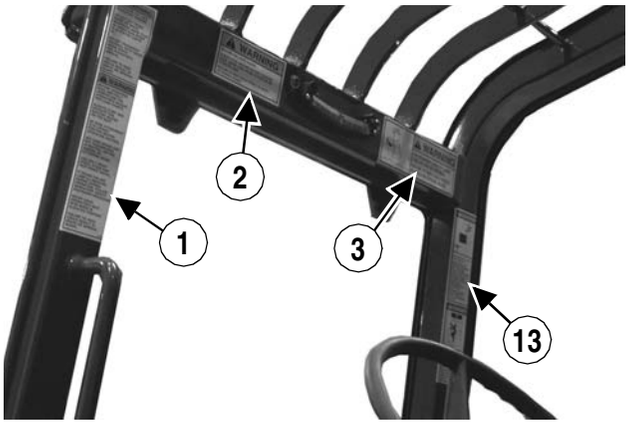


SAFETY-DECAL-P9

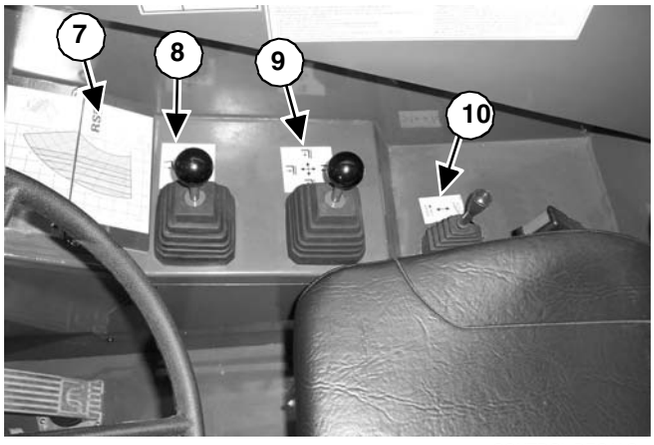
DECAL LOCATIONS - FRAME AND BOOM

REF. NO.	DESCRIPTION	RS8-44 PART NO.
01	DANGER - HANDS OUT	L70305
02	WARNING - PINCH POINT	L65927
03	GEHL, 6.75”	184069
04	HYDRAULIC OIL FILL	137632
05	WARNING - NO RIDERS	L65932
06	GEHL 2.00”	102026
07	DANGER - PERSONAL INJURY (*units without pwp*)	L65928
08	QUICKATTACH UNLOCKED	L66613
09	DIESEL FUEL	137634
10	RS5, RH	103329

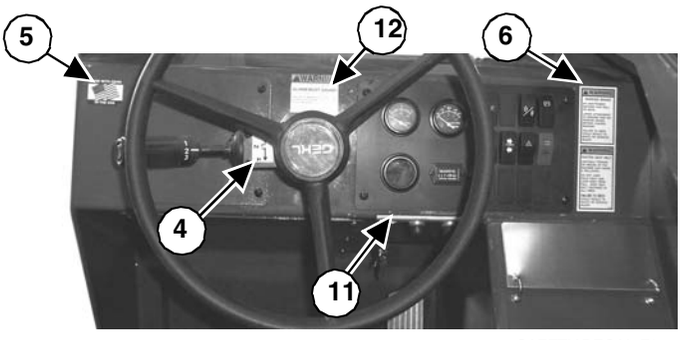
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SAFETY-DECAL-F3



CONTROL DECALS

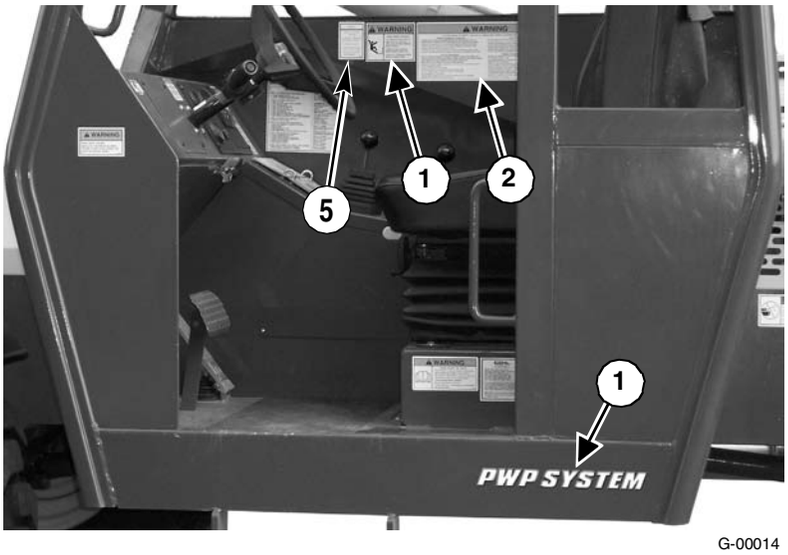


SAFETY-DECAL-F2

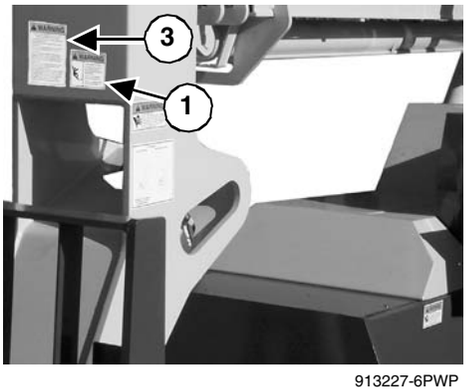
DECAL LOCATIONS - OPERATOR STATION

REF. NO.	DESCRIPTION	PART NO.
01	WARNING - TILT HAZARD/GENERAL OPERATOR	L70306
02	WARNING - MACHINE LEVEL	L65930
03	WARNING - CARRY LOAD LOW	L65926
04	F-N-R SHIFT	L68295
05	MADE IN USA	140516
06	WARNING - PARK BRAKE/SEAT BELT	101506
07	STANDARD CARRIAGE LOAD CHART	101570
	ROTATING CARRIAGE LOAD CHART	101666
	BUCKET LOAD CHART	101572
	TRUSS BOOM LOAD CHART	101574
	WINCH LOAD CHART	101573
08	ATTACHMENT TILT/FRAME LEVEL	L63632
09	BOOM CONTROL	L63631
10	AUXILIARY HYDRAULIC CONTROL *(Optional)*	102718
11	IGNITION/START/HORN	102717
12	WARNING-BACKUP ALARM	L500445
13	DANGER-HI VOLT./MOVING PARTS	L70307

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G-00014



913227-6PWP



CONTROL DECALS

G-00015

DECAL LOCATIONS - PWP EQUIPPED UNITS

REF. NO.	DESCRIPTION	RS8-44 PART NO.
01	WARNING - PERSONNEL LIFT	L71554
02	WARNING - WORK PLATFORM RULES	L71555
03	PERSONNEL LIFT SAFETY RULES	L71700
04	PWP LOAD CHART	103334
05	PWP SWITCH	102969
06	PWP SYSTEM	103028

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Section

101

GENERAL INFORMATION AND SPECIFICATIONS

RS5-34 Telescopic Handler

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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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STANDARD TORQUE DATA FOR HYDRAULIC TUBES AND FITTINGS

TUBE NUTS FOR 37° FLARED FITTINGS								O-RING BOSS PLUGS, ADJUSTABLE FITTING LOCK NUTS, SWIVEL JIC - 37° SEATS			
SIZE	TUBING O.D.		THREAD SIZE	LB FT		Nm		LB FT		Nm	
	Inches	mm		Min	Max	Min	Max	Min	Max	Min	Max
4	1/4	6.4	7/16-20	9	12	12	16	6	10	8	14
5	5/16	7.9	1/2-20	12	15	16	20	10	15	14	20
6	3/8	9.5	9/16-18	21	24	29	33	15	20	20	27
8	1/2	12.7	3/4-18	35	40	47	54	25	30	34	41
10	5/8	15.9	7/8-14	53	58	72	79	35	40	47	54
12	3/4	19/1	1-1/16-12	77	82	104	111	60	70	81	95
14	7/8	22.2	1-3/16-12	90	100	122	136	70	80	95	109
16	1	25.4	1-51/6-12	110	120	149	163	80	90	108	122
20	1-1/4	31.8	1-5/18-12	140	150	190	204	95	115	129	156
24	1-1/2	38.1	1-7/8-12	160	175	217	237	120	140	163	190
32	2	50.8	2-1/2-12	225	240	305	325	250	300	339	407

Above torque figures are recommended for plain, cadmium or zinc plated fittings, dry or wet installations and swivel nuts either swaged or brazed. These torques are not recommended for tubes 1/2 inch (12.7 mm) O.D. and larger with wall thickness of 0.035 inch (0.889 mm) or less. The torque is specified for 0.035 inch (0.889 mm) wall tubes on each application individually.

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Indicator and Operation Symbols



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FLUID CAPACITIES AND TYPES

All fluid capacitites listed are a guide to the quantities required, always use dipsticks or level plugs to ensure that the units are filled to the correct level.

Engine

Crankcase Capacity (with filter)
4045T (John Deere) ..... 14.0 qts. (13.3 L)
Oil Type..... Multi-Viscosity Engine Oil API Service Classification CH/CI-4 (See Engine Manual)
Cooling System Capacity ..... 17.2 qts. (16.3 L)
Coolant Type ..... 50/50 mixture of Ethylene Glycol and Water

Axle (Each)

Differentials..... 9.6 qts. (9.0 L)
Planetary Hubs (each)..... 0.6 qts. (0.5 L)
Oil Type ..... MobilFluid® 422/423 or 80W90 Oil Meeting API-GL-5 Classification

Brake System

Oil Type ..... SUNCO Multi-ATF or Equivalent

Transmission

Oil Capacity (with cooler)..... 24 qts. (22.7 L)
Oil Type ..... SUNCO Multi-ATF or Equivalent

Hydraulic System

Reservoir Capacity ..... 35 gal. (133 L)
Oil Type ..... Mobil DTE 15M or Equivalent Oil Conforming to ISO VG 46 Specifications

Fuel System

Fuel Tank Capacity ..... 29 gal. (110 L)
Fuel Type..... No. 2D or Winter Blend in Cold Weather Operation

Grease Fittings (all) ..... No. 2 Lithium-Based Gun Grease

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GENERAL SPECIFICATIONS

POWER TRAIN

Transmission

Make	Dana
Type	3 Speeds Forward, 3 Speeds Reverse
Model	T12000
Torque Converter	Single-Stage, Dual-Phase
Travel Speeds	
1st gear	3.6 MPH (5.8 km/h)
2nd gear	7.9 MPH (12.7 km/h)
3rd gear	20.2 MPH (32.5 km/h)

Axles (Front and Rear)

Make	Dana
Type	Full-Time 4WD, Steerable, Open Differential, Dual-Reduction Outboard Planetaries
Ratio (overall)	15.4:1

Engine (Standard)

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 (Optional)

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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HYDRAULIC SYSTEM

Type	Open-Center, Fixed-Displacement
Pump	Single-Section Gear-Type
Pump Displacement (revolution)	2.7 cu. in. (44.3 cc)
Pump Flow (at 2500 RPM)	29 GPM (110 L/min)
Main Relief Pressure	3000 PSI (207 bar)
Steering Relief Pressure	2000 PSI (138 bar)
Main Control Valve	Parallel, 4-Section Spool Type
Frame Level Control Valve	Parallel, Single-Section Spool-Type, Joystick Actuated
Auxiliary Control Valve	Parallel, Single-Section Spool-Type, Joystick Actuated
Hydraulic Filter	
Type	Remote, 10 Micron, Replaceable Element
Rated Flow	100 GPM (371 L/min)
Rated Pressure	100 PSI (690 kPa)
By-Pass Pressure (Full Flow)	25 PSI (172 kPa)
Hydraulic Strainer	
Location	In Tank - Suction Line
Type	100 Mesh, Replaceable Element
Rated Flow	50 GPM (189 L/min)
By-Pass Pressure	3 PSI (21 kPa)

STEERING SYSTEM

Type	Fixed-Displacement, Hydrostatic System
Displacement/Rev.	17.9 cu. in. (293 cc)
System Pressure	2000 PSI (172 bar)
Steering Cylinders	Double-Acting, One Each Axle
Steering Mode Valve	3-Position, 4-way Solenoid Actuated Dash Mounted Switch
Steering Modes	2-Wheel, 4-Wheel or Crab

BRAKE SYSTEM

Service Brakes	
Type	Wet, Disc-Type
Location	Front and Rear Axle
Actuation	Manual, Foot Pedal
Park Brake	
Type	Spring-Applied, Hydraulic-Release Disc-Type
Location	Front Axle
Actuation	Electric Switch With Engine Running Automatic Apply With Engine Shutdown

INSTRUMENTATION

Indicator Lights	Engine Oil Pressure, Alternator, Brake Failure, Transmission Temperature
Gauges	Coolant Temperature, Fuel Level, Hourmeter

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ELECTRICAL SYSTEM

Type	12-Volt, Negative Ground
Battery	One - 950 CCA Low-Maintenance Type, Group Size 4 DLT
Alternator	65 Amp
Circuit Protection	Fuse Panel
Backup Alarm	107 dB (A)
Horn	111 dB (A)
Neutral Start Switch	Standard
Headlights	Optional
Brake/Tail Lights	Standard

LIFTING PERFORMANCE

Maximum Lift Capacity: 6000 lbs. (2721 kg)

Maximum Lift Height: 34’ 3” (10.4 m)

Capacity at Maximum Lift Height: 4000 lbs. (1820 kg)

Maximum Forward Reach To Load Center: 23’ 3” (7.0 m)

Capacity At Maximum Forward Reach: 900 lbs. (408 kg)

Maximum Below Grade Reach: 24” (610 mm)

Frame Leveling: 10° Left/10° Right

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GENERAL DIMENSIONS

Based on standard machine equipped with listed tires, 48” (1.2 m) masonry carriage and 48” (1.2 m) pallet forks.

Recommended Tire Type: ..... 15.00 x 19.5 12-ply, 405/70 R20 x M27 Traction Type

Overall Length (Less Forks): ..... 16’ 0” (4.88 m)

Overall Width: ..... 7’10” (2.39 m)

Overall Height: ..... 7’ 9” (2.36 m)

Ground Clearance: ..... 14” (356 mm)

Wheel Base: ..... 9’ 2’ (2.8 m)

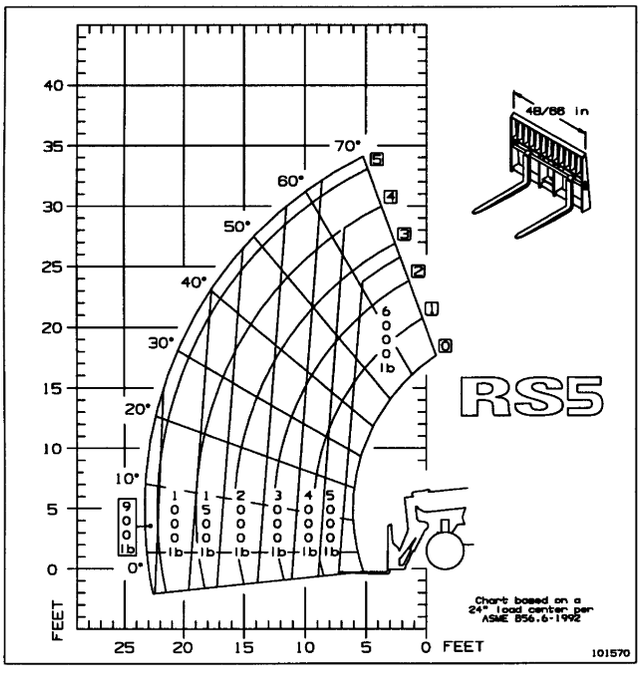
Turn Radius (outside): ..... 12’ 6” (3.8 m)

Machine Weight: ..... 15,100 lbs. (6855 kg)

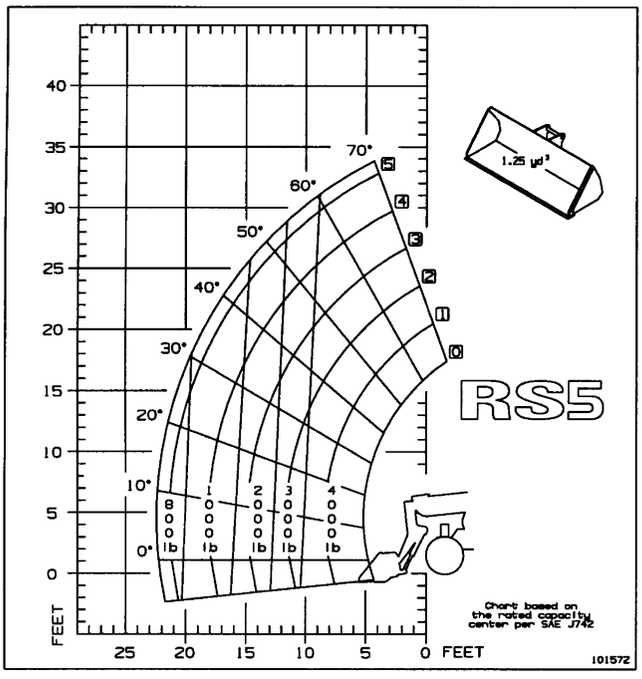
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RS5-34 Load Zone Charts

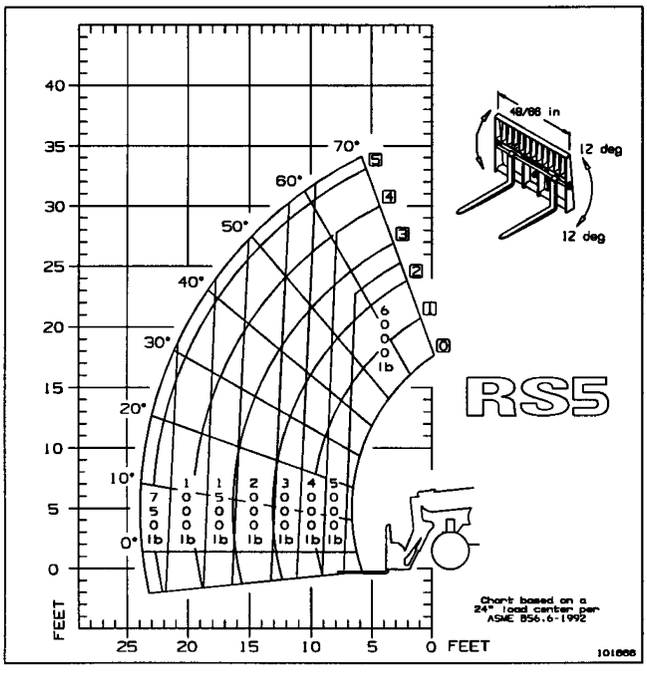
Decal 101570
Standard Carriage



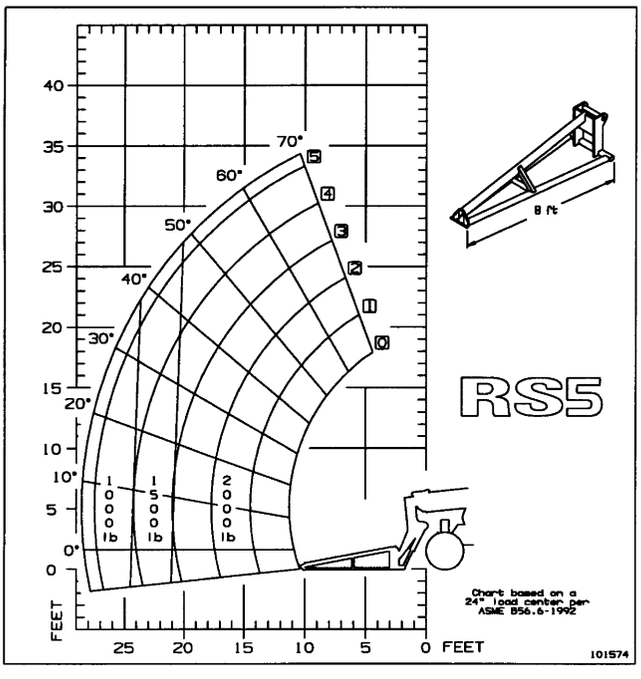
Decal 101572
1.3 Cu. Yd. Bucket



Decal 101666
Rotating Carriage



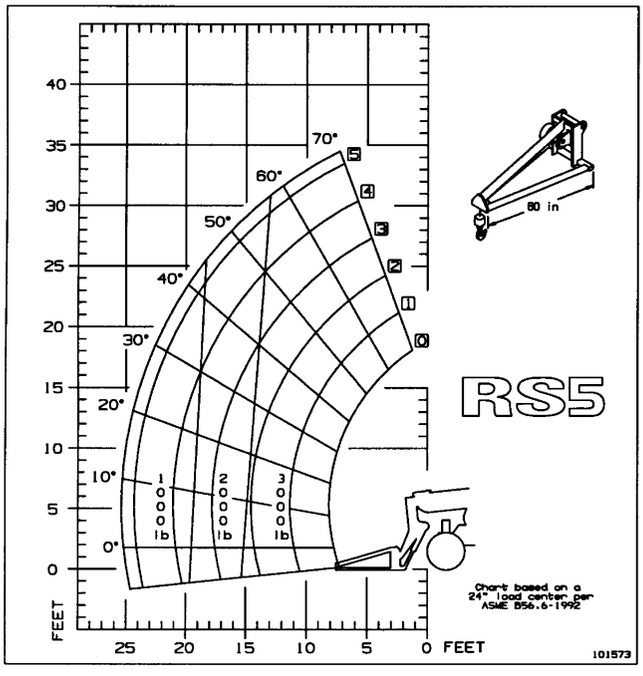
Decal 101574
8 Ft. Truss Boom



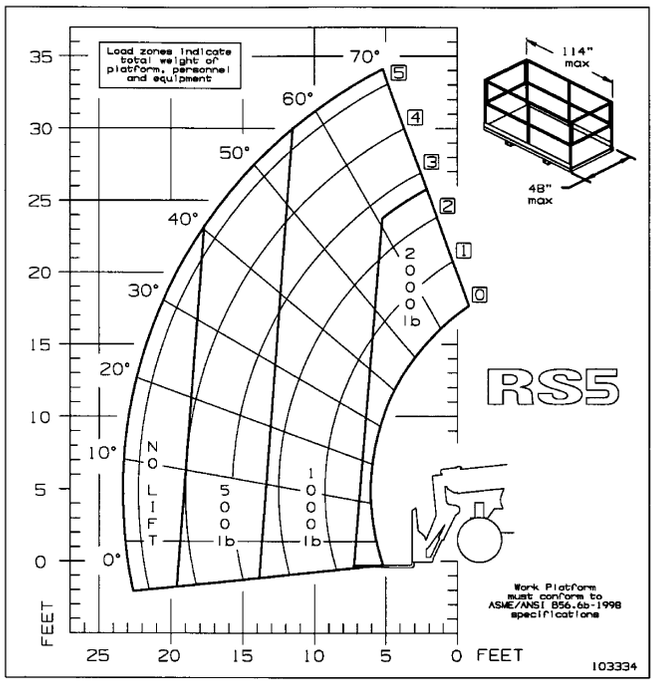
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RS5-34 Load Zone Charts

Decal 101573
Winch Boom



Decal 103334
PWP



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Section

201

ENGINE REMOVAL AND INSTALLATION

RS5-34 Telescopic Handler

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913241

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MANDATORY SAFETY SHUTDOWN PROCEDURE 1
RELIEVE HYDRAULIC OIL PRESSURE 1
ENGINE INSTALLATION 12

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MANDATORY SAFETY SHUTDOWN PROCEDURE

BEFORE cleaning, adjusting, lubricating, or servicing this unit:

1. Stop machine on a level surface. (AVOID parking on a slope, but if necessary, park across the slope and block the tires.)
2. Fully retract the boom and lower the attachment tool to the ground. Idle engine for gradual cooling.
3. Place controls in neutral and apply parking brake.
4. Shut off the engine and remove the key.

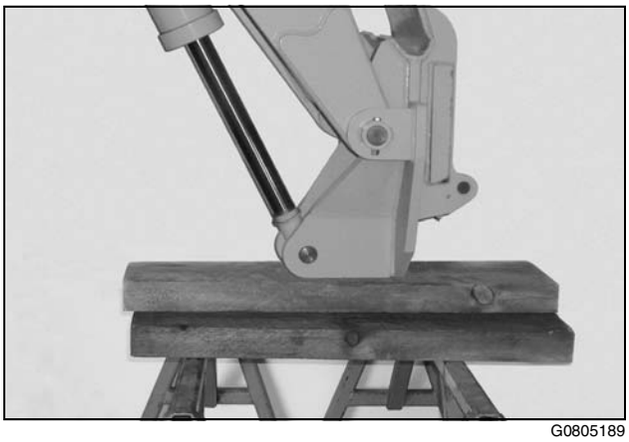
ONLY when you have taken these precautions can you be sure it is safe to proceed. Failure to follow the above procedure could lead to death or serious injury.

RELIEVE HYDRAULIC OIL PRESSURE:

1. Engage the park brake.
2. Lower equipment to the ground. Return the engine to idle for 30 seconds then shut down the engine.
3. Turn the key switch on. Operate the joystick in each direction. Confirm that there is no attachment or unit movement. This should ensure there is no residual pressure trapped in the control circuit.

ENGINE REMOVAL

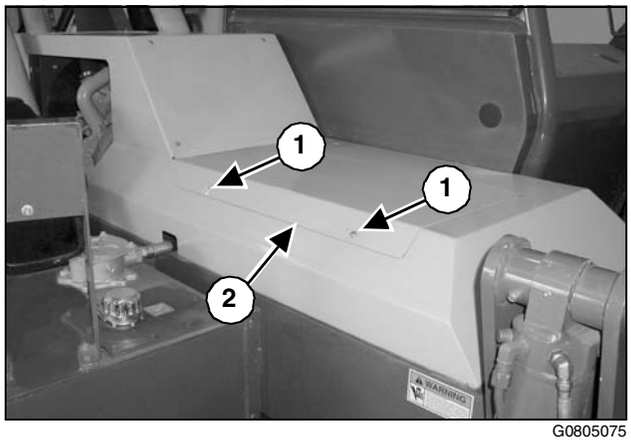
STEP 1



G0805189

Raise the telescopic boom approximately 60 inches (1.5 m) to allow a hoist to be used for removal and installation. Support the boom on a support stand.

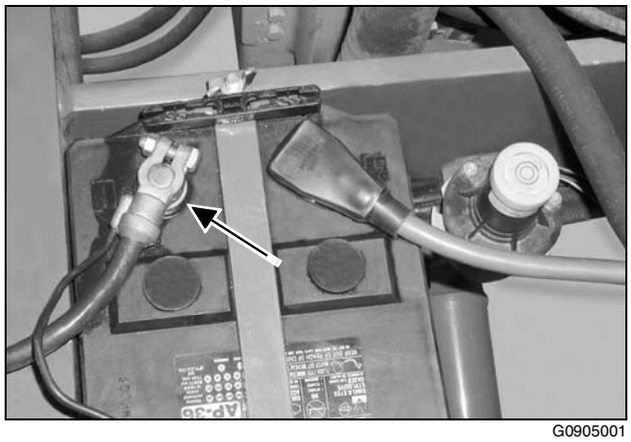
STEP 2



G0805075

Loosen the two thumbscrews and remove the battery access cover (2).

STEP 3

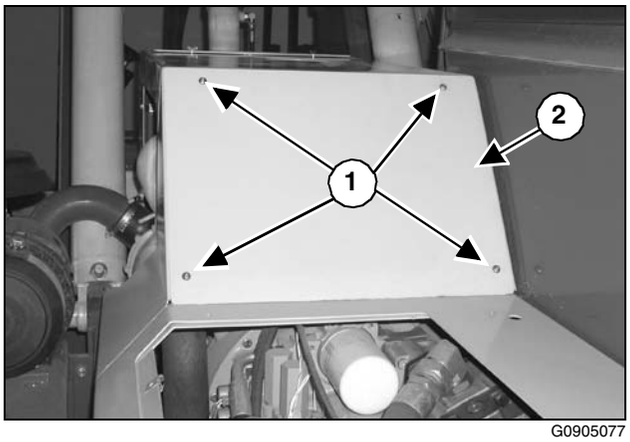


G0905001

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

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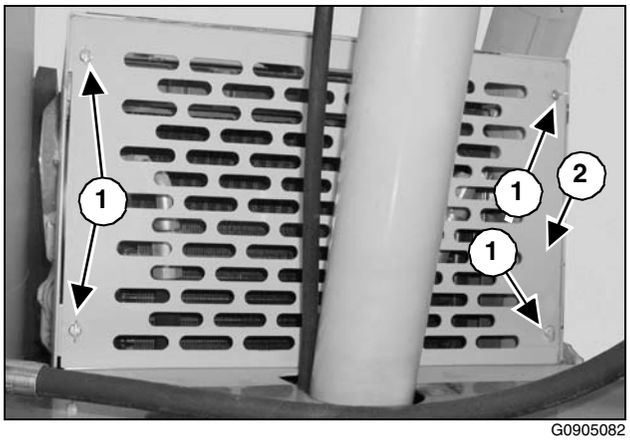
STEP 4



G0905077

Remove the four screws (1) and the fuel filter access cover (2).

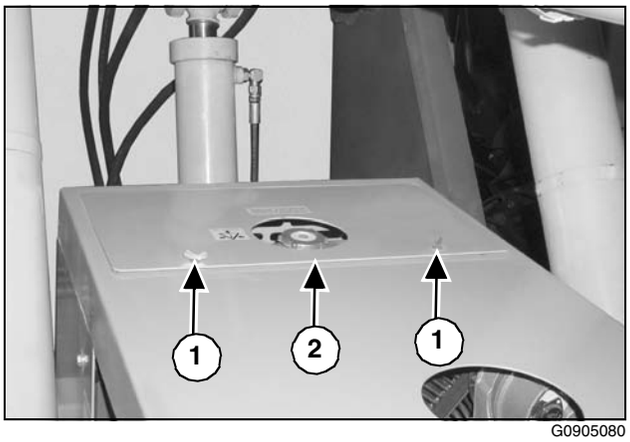
STEP 5



G0905082

Loosen the four thumbscrews (1) and remove the radiator grille (2).

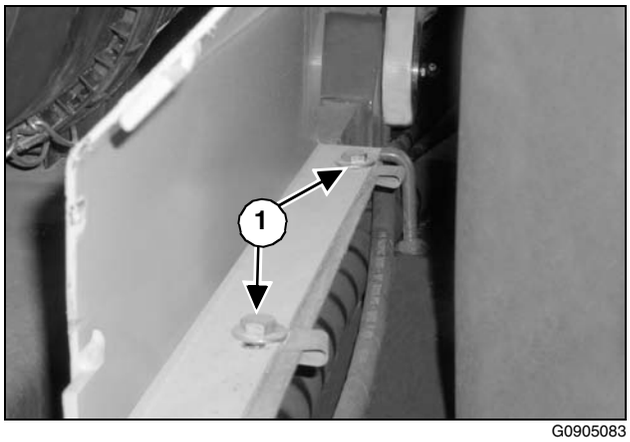
STEP 6



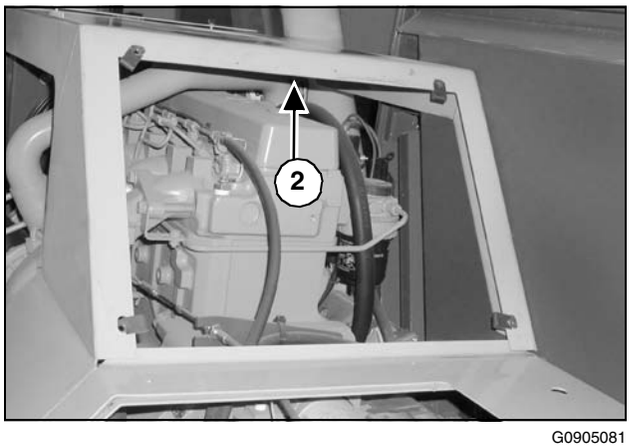
G0905080

Loosen the two thumbscrews (1) and remove the radiator cover (2).

STEP 7



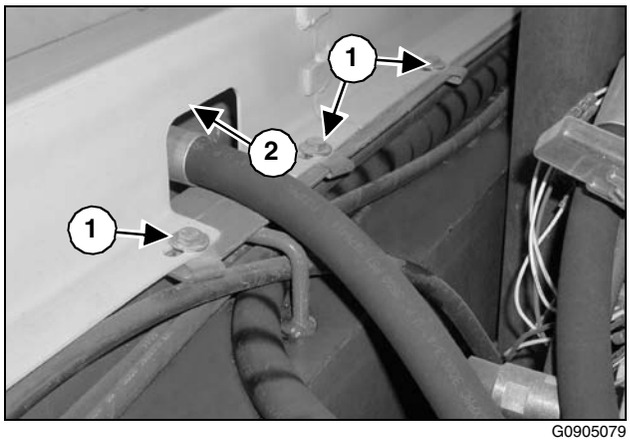
G0905083



G0905081

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

STEP 8

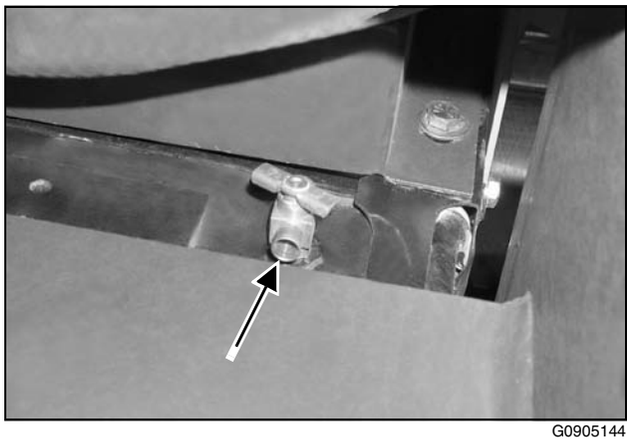


G0905079

Remove the six bolts (1) and the transmission cover (2).

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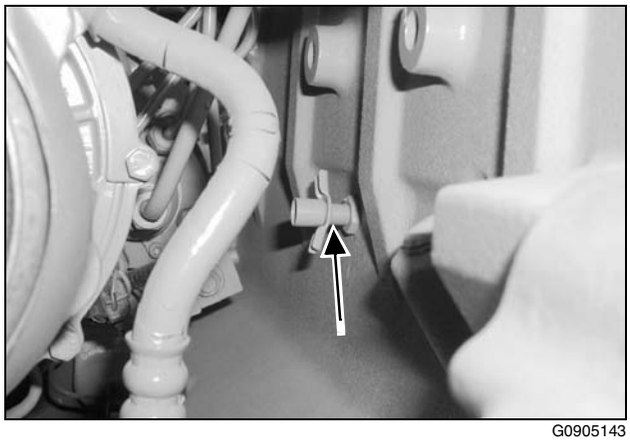
STEP 9



G0905144

Open the radiator drain valve at the bottom of the radiator. Drain the coolant into an approved container.

STEP 10



G0905143

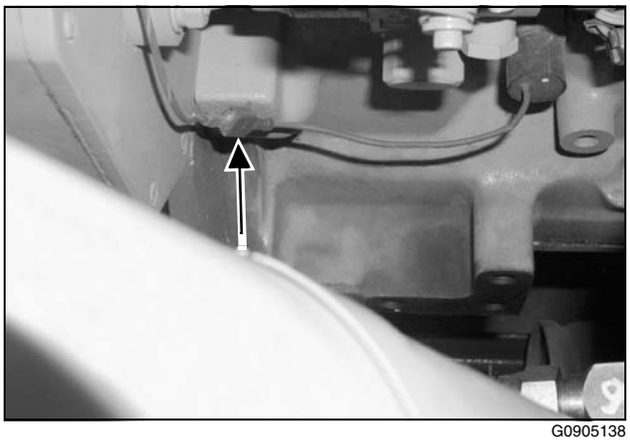
Open the engine block drain valve and drain the coolant into an approved container.

NOTE: *Attaching a hose to the drain valves will help direct the coolant to the container.*

STEP 11

After all the coolant has drained, close both drain valves. Recycle or dispose of coolant in an environmentally safe manner.

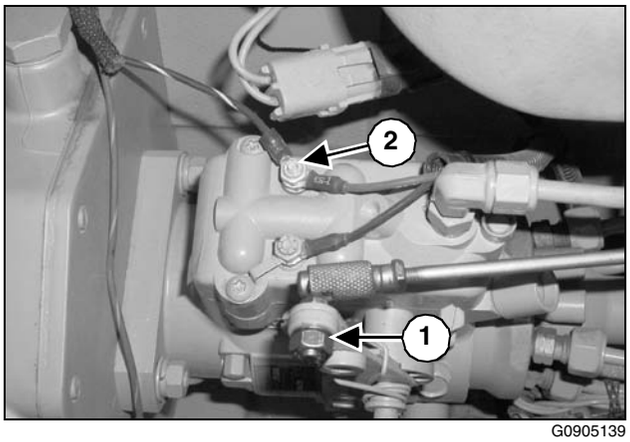
STEP 12



G0905138

Remove the wire from the oil pressure sender on the engine.

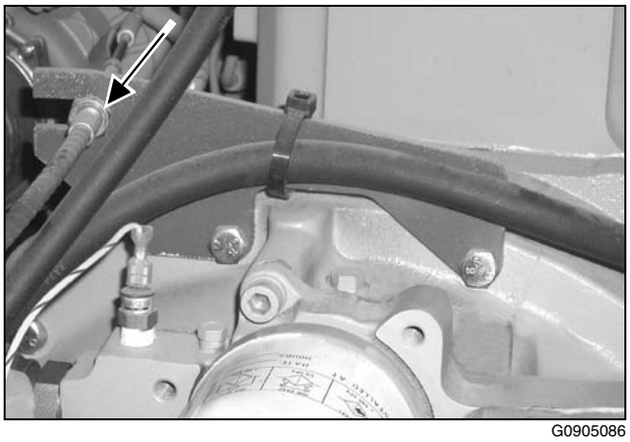
STEP 13



G0905139

Remove the throttle linkage (1) and the fuel shut-off solenoid wires (2) from the fuel injector pump.

STEP 14

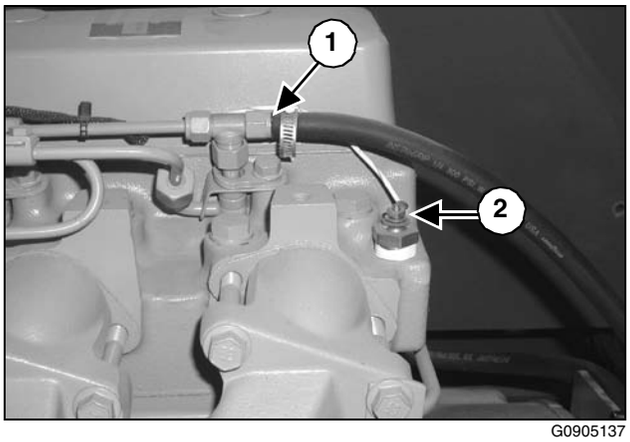


G0905086

Remove the throttle cable from the throttle cable mount bracket.

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STEP 15



G0905137

Remove the fuel return line (1) and the engine water temperature sender wire (2). Install a cap and plug on the fuel return line.

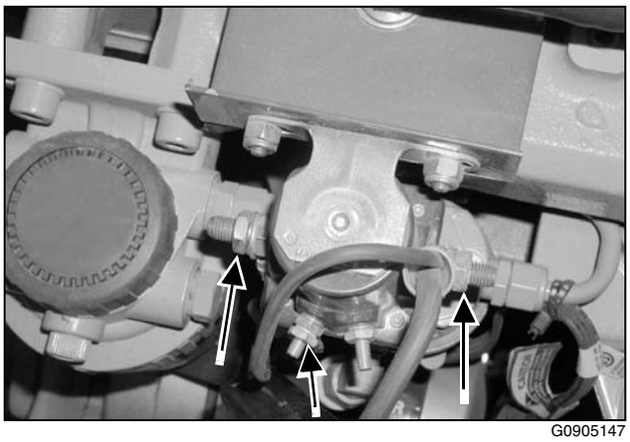
STEP 16



G0905146

Remove the fuel supply line from the fuel pump. Install a cap on the fuel pump and a plug in the line.

STEP 17



G0905147

Label and remove the wires from the starter relay.

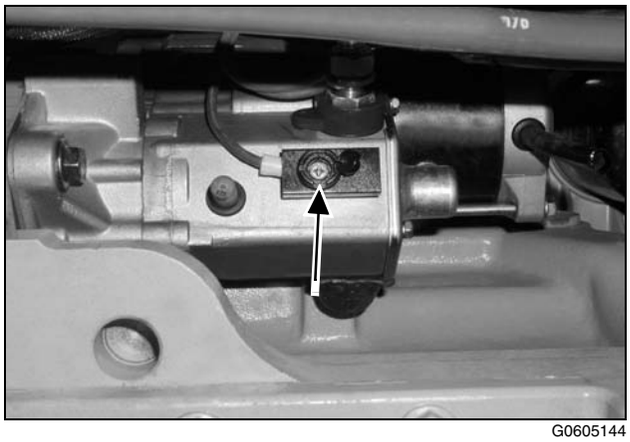
STEP 18



G0905170

Remove the battery and starter relay power cables from the starter solenoid.

STEP 19

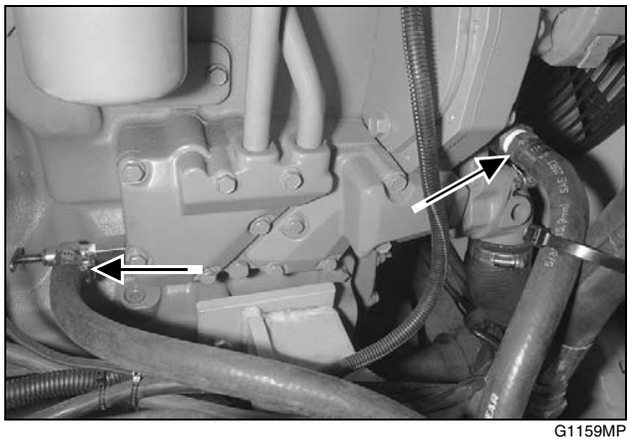


G0605144

Loosen the terminal screw and remove the starter relay wire from the solenoid.

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STEP 20



G1159MP

If equipped, place a container under the hoses and remove the heater hoses from the engine.

NOTE: *There is coolant trapped in the hoses and engine that will drain when the hoses are removed.*

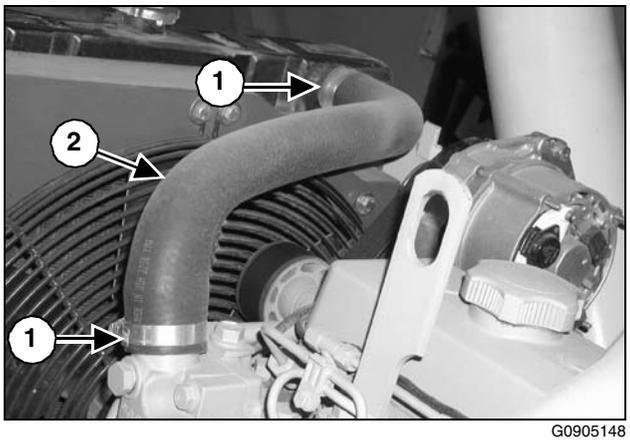
STEP 21



G1158MP

If equipped, remove the hose adapter from the water pump.

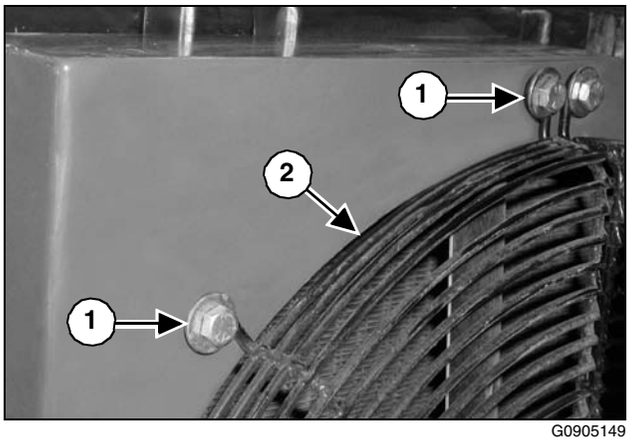
STEP 22



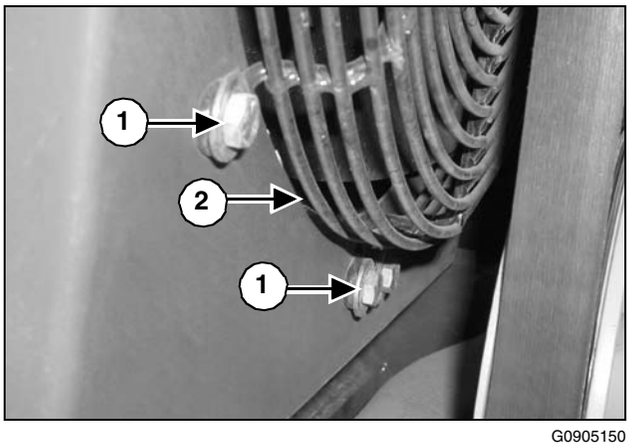
G0905148

Loosen the hose clamps (1) and remove the upper radiator hose (2).

STEP 23



G0905149

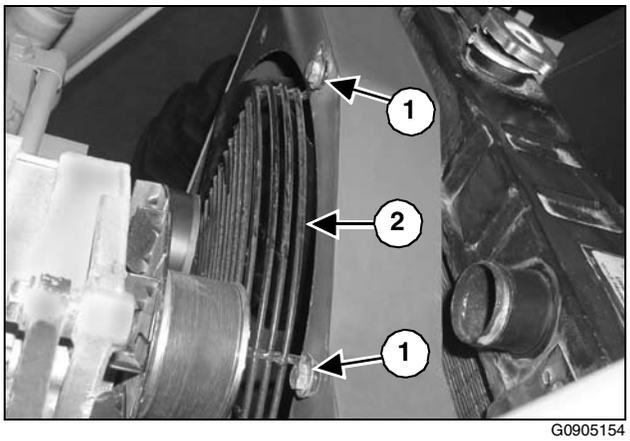


G0905150

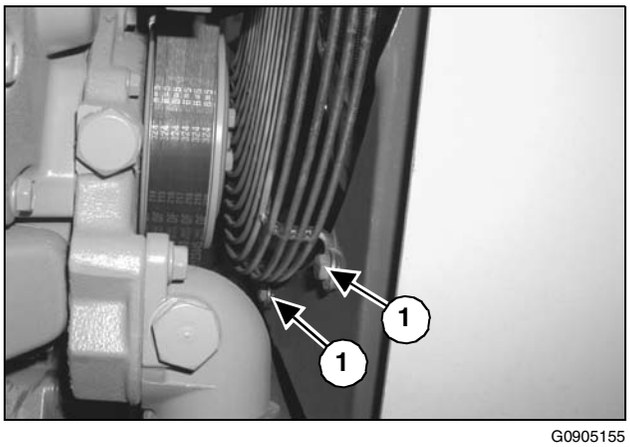
Remove the four mounting bolts (1) and the right side fan guard (2).

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STEP 24



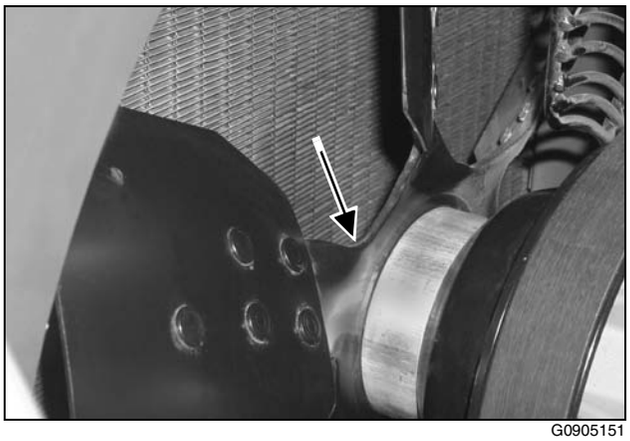
G0905154



G0905155

Remove the four mounting bolts (1) and the left side fan guard (2).

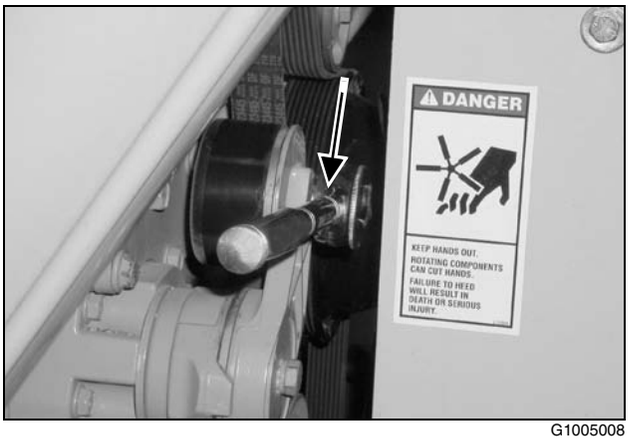
STEP 25



G0905151

Loosen the four fan mounting bolts. Do not remove the bolts at this time.

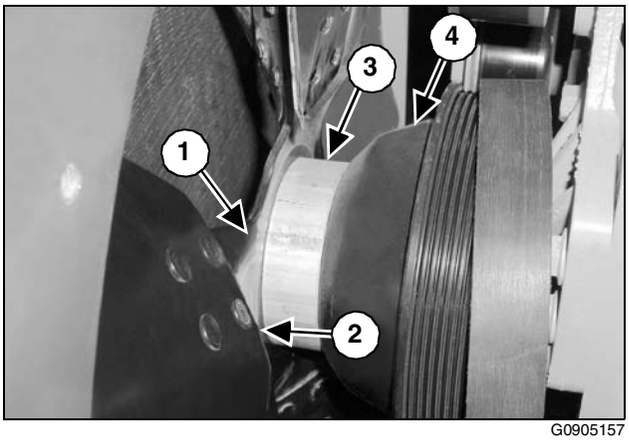
STEP 26



G1005008

Use a 1/2” ratchet on the tensioner pulley to rotate the tensioner pulley counterclockwise to release the belt tension. Remove the belt from the alternator.

STEP 27

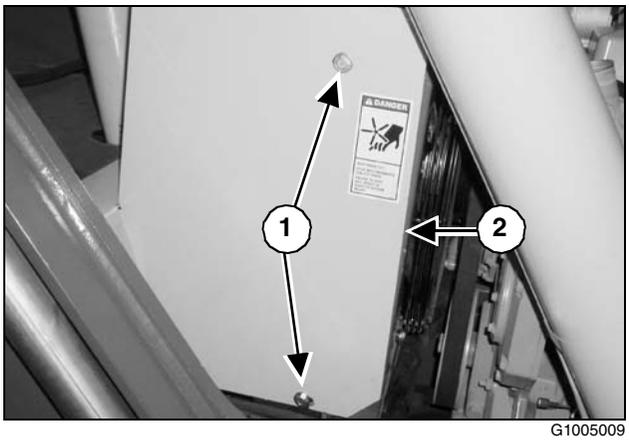


G0905157

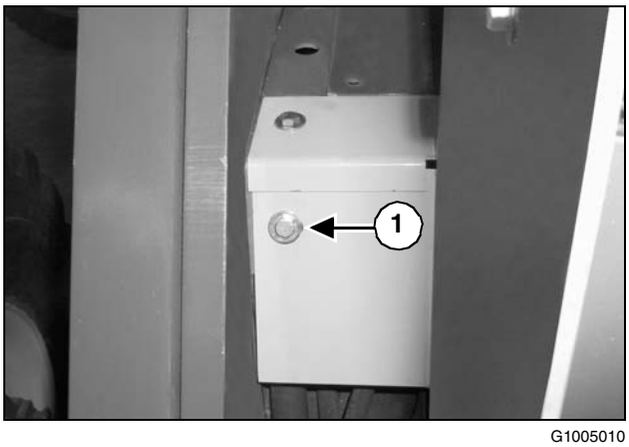
Remove the four fan mounting bolts (1), the fan (2), spacer (3) and the fan pulley (4).

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STEP 28



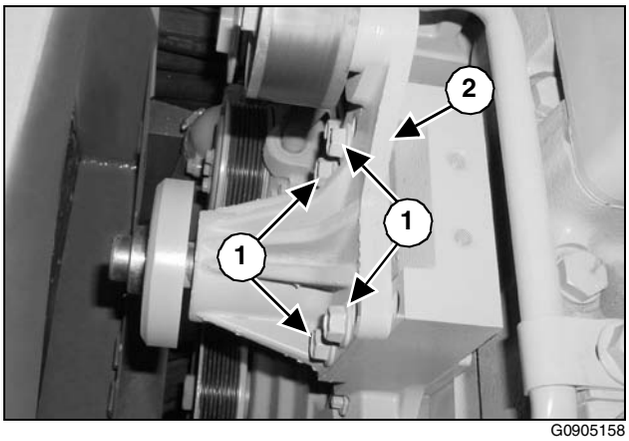
G1005009



G1005010

Remove the three bolts (1) and the right radiator panel (2).

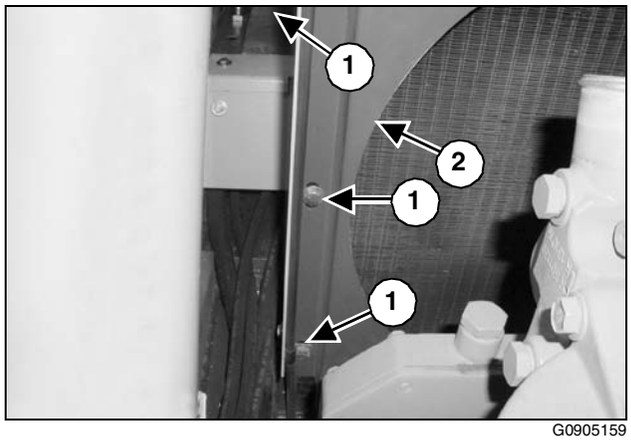
STEP 29



G0905158

Remove the four fan bearing mounting bolts (1) and the fan bearing assembly (2).

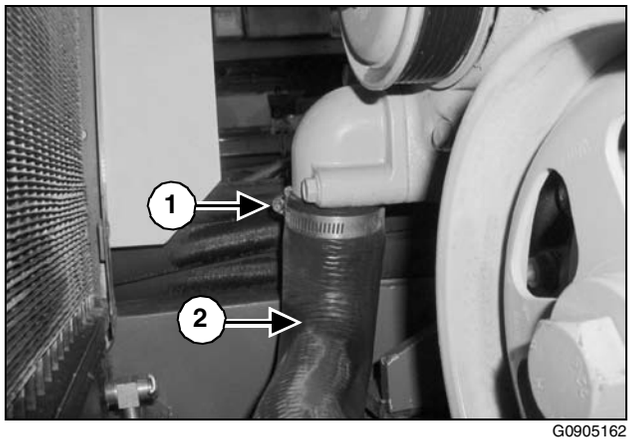
STEP 30



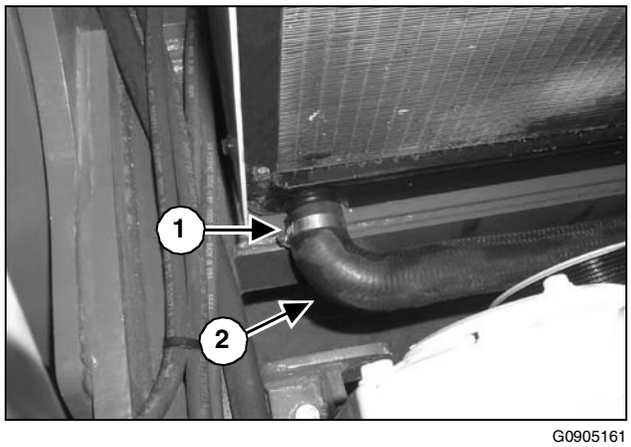
G0905159

Remove the six mounting bolts (1) and the fan shroud (2).

STEP 31



G0905162

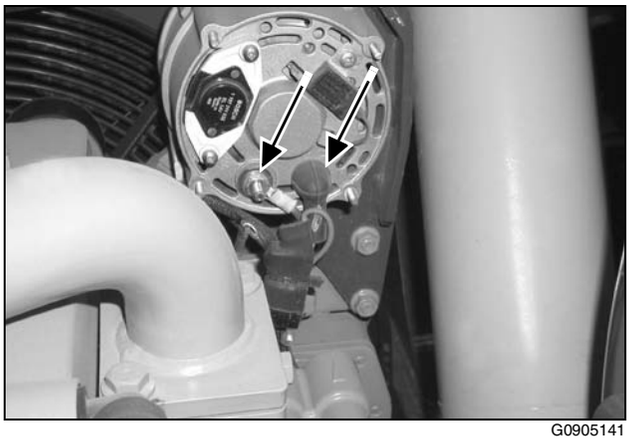


G0905161

Loosen the two hose clamps (1) and remove the lower radiator hose (2).

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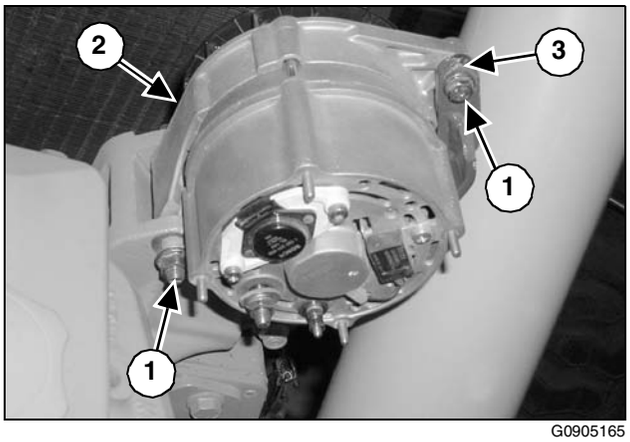
STEP 32



G0905141

Label and remove the two wires from the alternator.

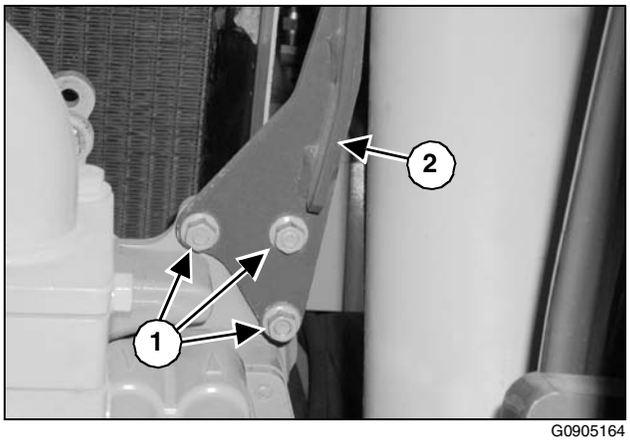
STEP 33



G0905165

Remove the two alternator mounting bolts (1) and the alternator (2). Retain the spacer (3) between the top mounting bracket and alternator for installation.

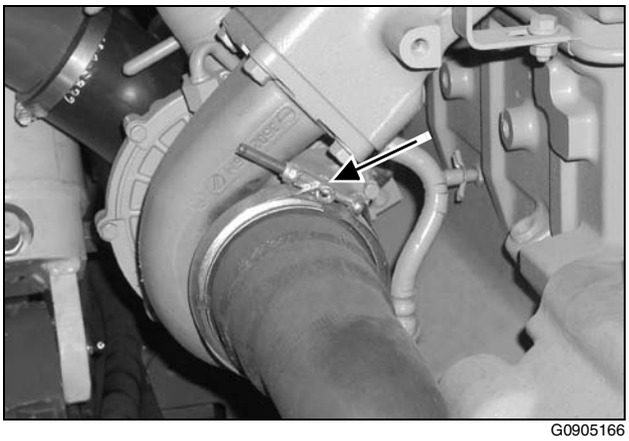
STEP 34



G0905164

Remove the three bolts (1) and the alternator left side mounting bracket (2).

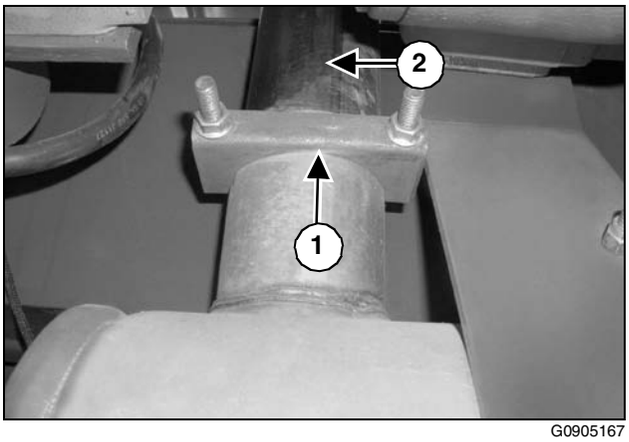
STEP 35



G0905166

Remove the band clamp from the turbocharger exhaust port.

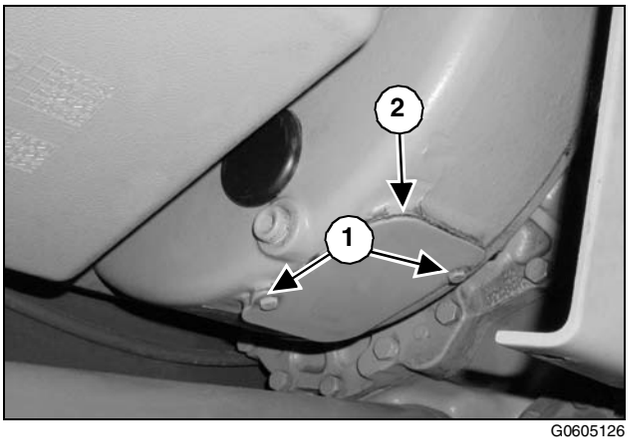
STEP 36



G0905167

Remove the exhaust pipe to muffler clamp (1) and the exhaust pipe (2).

STEP 37

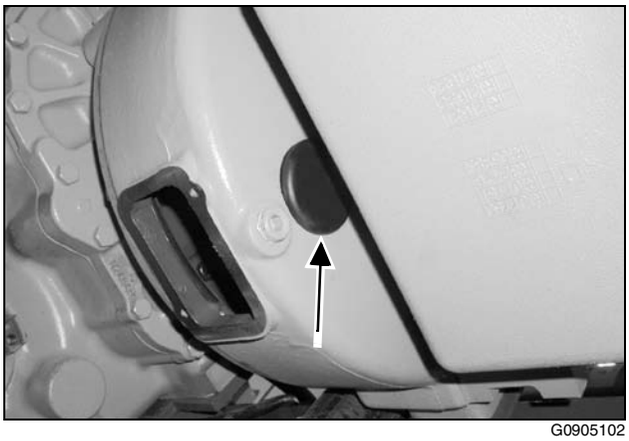


G0605126

Remove the two bolts (1) and the inspection cover (2) from the bottom of the housing bell.

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STEP 38



G0905102

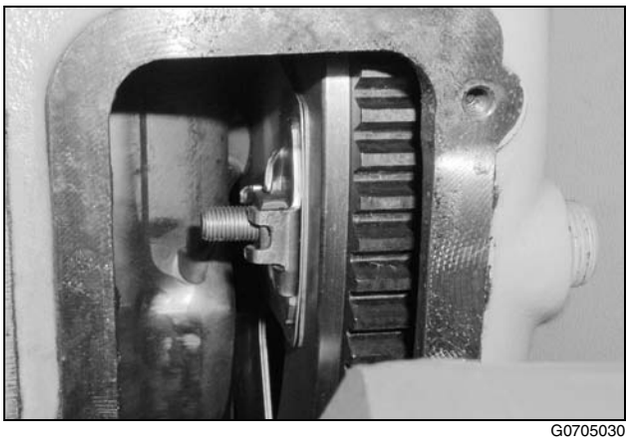
Remove the rubber access plug from the front of the housing bell.



G0705071

NOTE: *The flywheel must be rotated to remove the flywheel-to-flexplate bolts. Rotate the flywheel by inserting a pry bar through the inspection hole in the bottom of the housing bell and into the ring gear.*

STEP 39



G0705030

Rotate the flywheel until one of the flexplate bolts is in the 6 o'clock position.

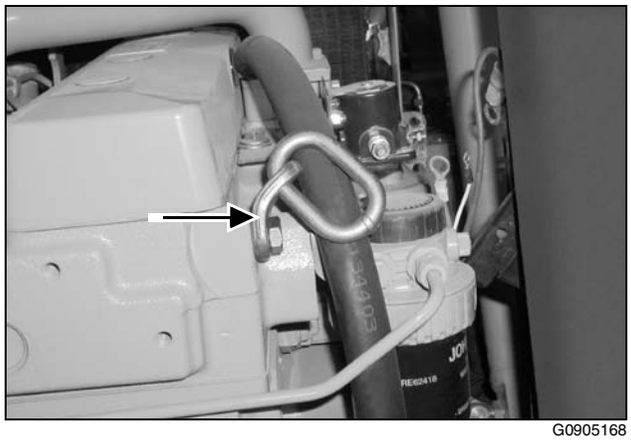
STEP 40



G0705024

Remove the flywheel-to-flexplate bolt. Repeat Steps 38 and 39 until all eight bolts are removed.

STEP 41



G0905168

Install a lifting bracket or ring to the engine head as shown.

STEP 42

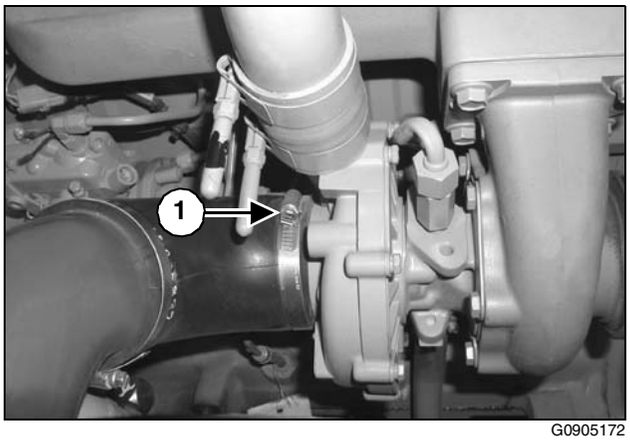


G0905179

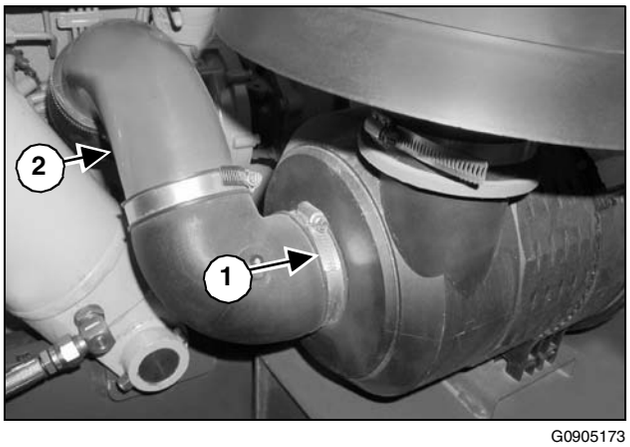
Attach a suitable lifting device to the lifting brackets or rings and a hoist. Raise the hoist enough to support the weight of the engine.

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STEP 43



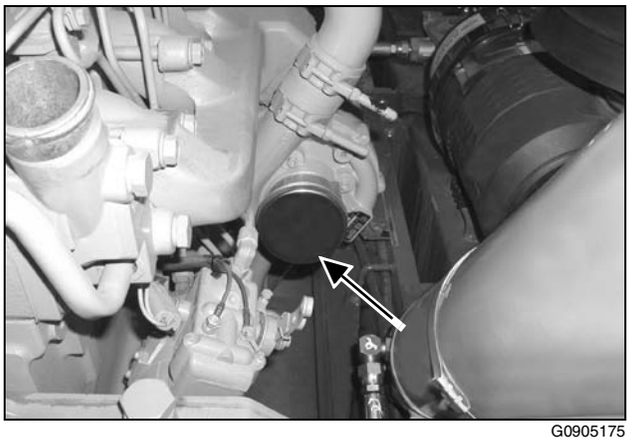
G0905172



G0905173

Loosen the two hose clamps (1) and remove the air inlet duct (2) from the turbocharger and air cleaner assembly.

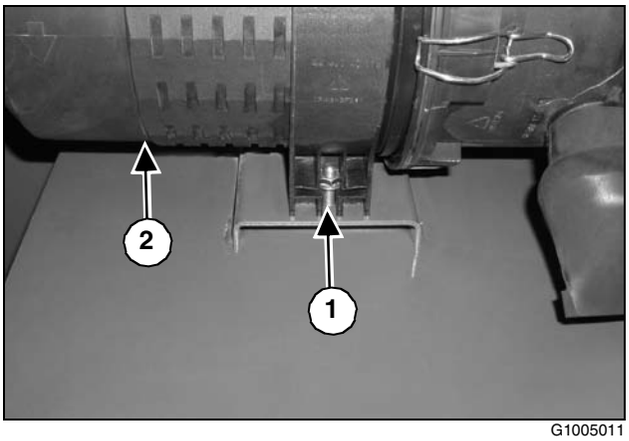
STEP 44



G0905175

Cap or plug the turbocharger inlet.

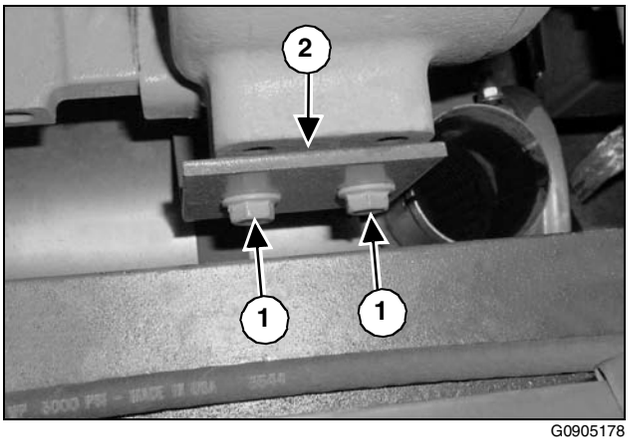
STEP 45



G1005011

Loosen the two bolts (1) and remove the air cleaner assembly (2).

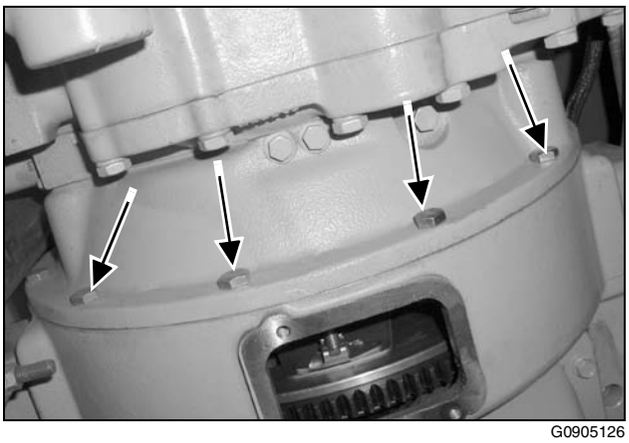
STEP 46



G0905178

Remove the two bolts (1) and the muffler bracket (2) from the right side of the engine.

STEP 47

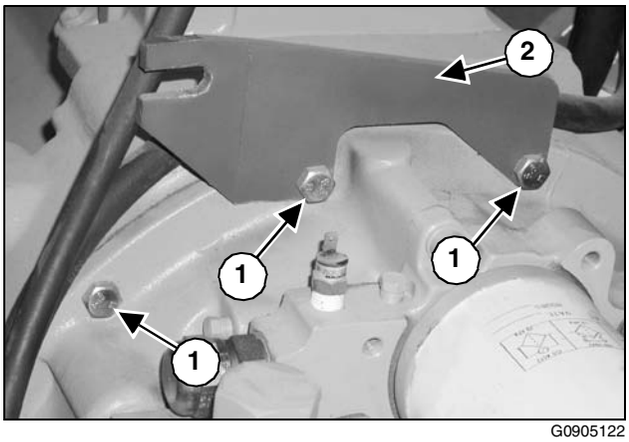


G0905126

Remove the lower housing bell bolts.

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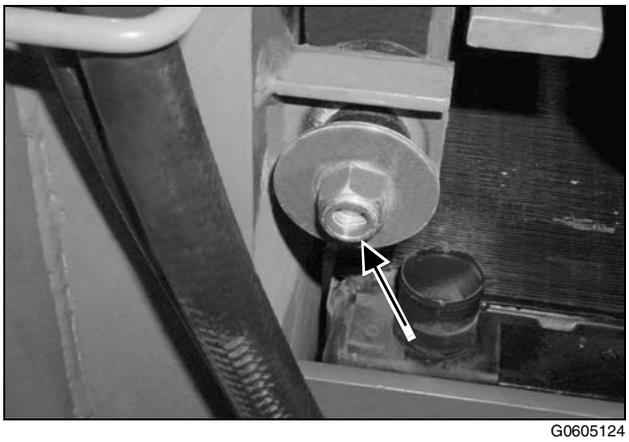
STEP 48



G0905122

Remove the upper housing bell bolts (1) and the throttle cable mounting bracket (2).

STEP 49



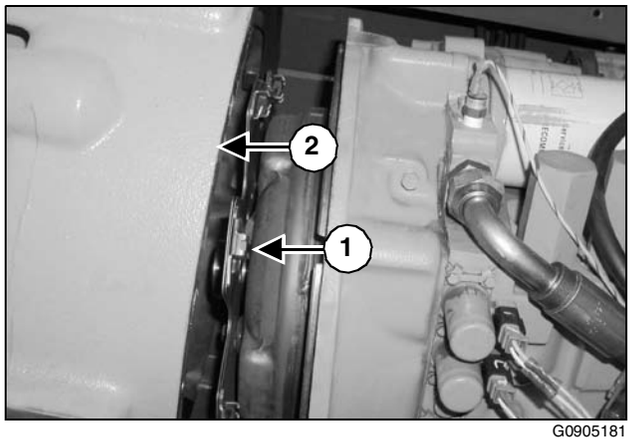
G0605124



G0705035

Remove the center bolt from the front two engine mounts.

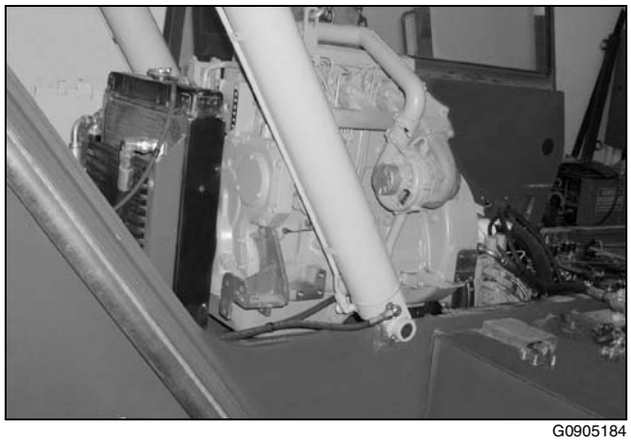
STEP 50



G0905181

Move the engine rearward until the flexplate (1) is clear of the housing bell (2).

STEP 51



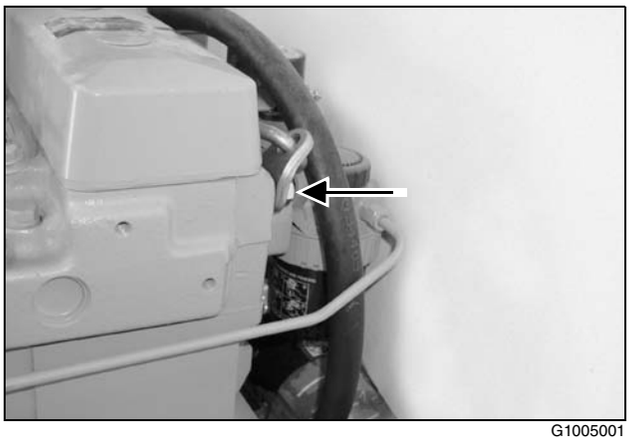
G0905184

Lift the engine until the oil pan clears the frame rail. Remove the engine from the machine.

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ENGINE INSTALLATION

STEP 52



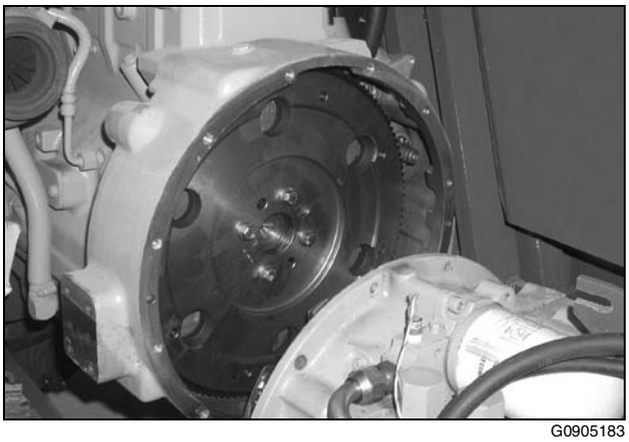
G1005001

Install a lifting bracket or ring to the engine head as shown.

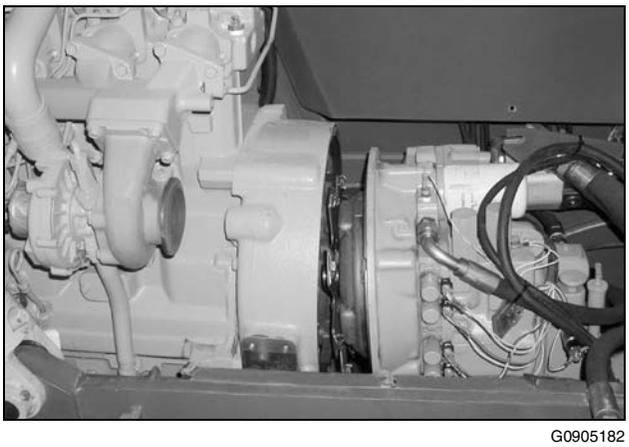
STEP 53

Attach a suitable lifting device to the lifting brackets or rings and a hoist.

STEP 54



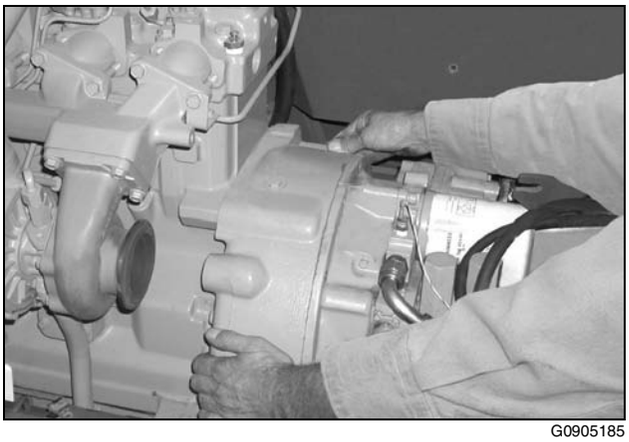
G0905183



G0905182

Lift the engine high enough for the oil pan to clear the frame rail. Move the engine over the engine compartment and lower until the housing bell clears the flexplate on the torque converter.

STEP 55

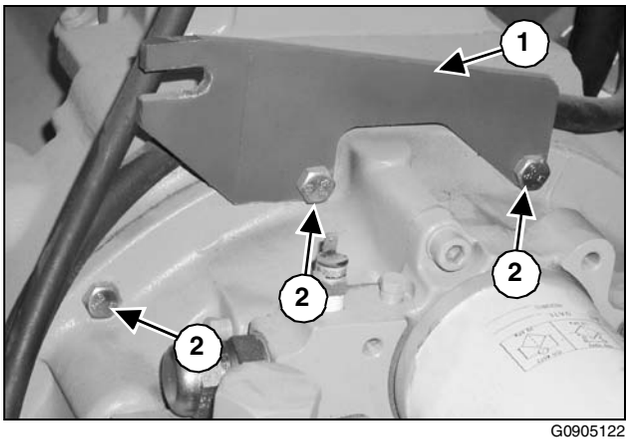


G0905185

Once the housing bell clears the flexplate, slowly move the engine forward until the mounting flanges on the housing bell and transmission meet.

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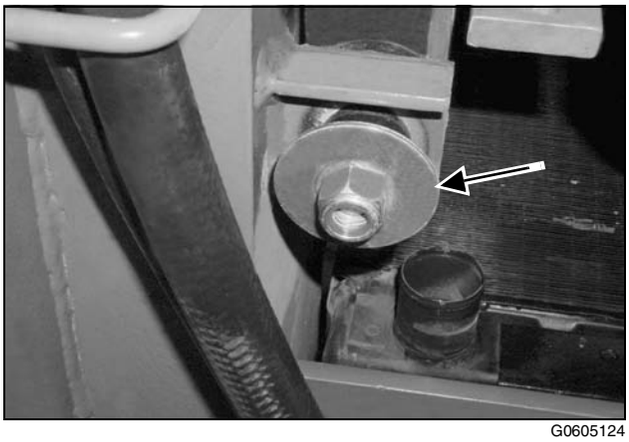
STEP 56



G0905122

Install the throttle cable mounting bracket (1) and the upper housing bell bolts (2). Do not tighten at this time.

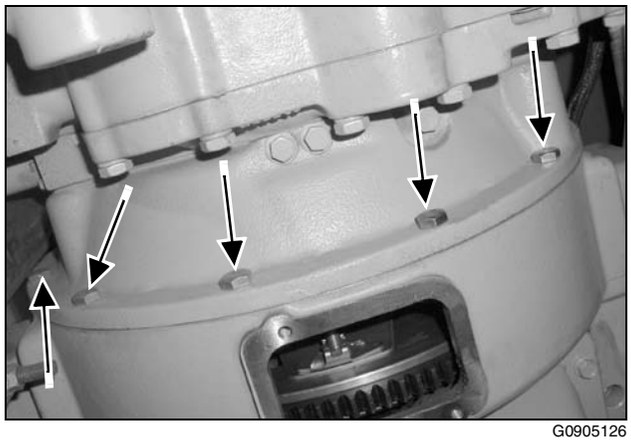
STEP 57



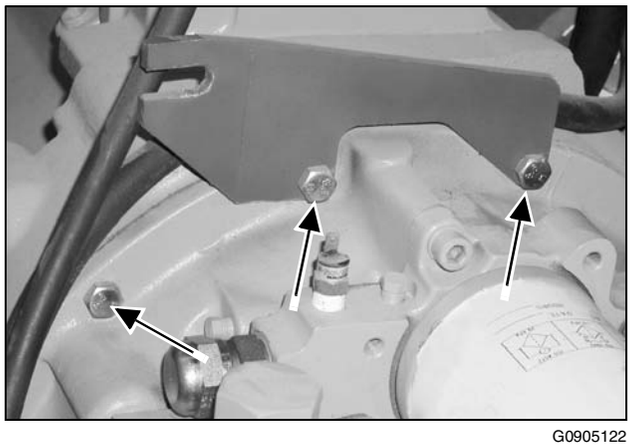
G0605124

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

STEP 58



G0905126

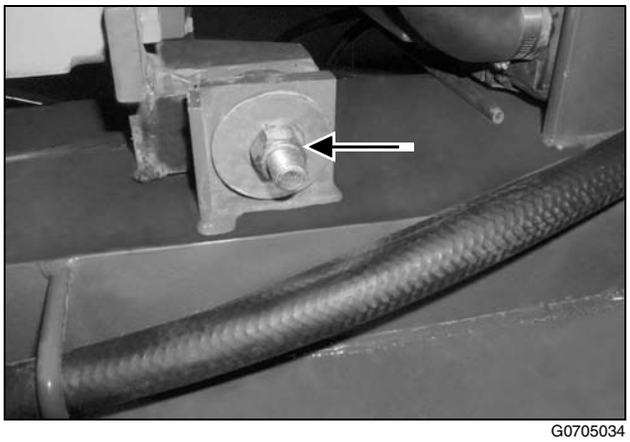


G0905122

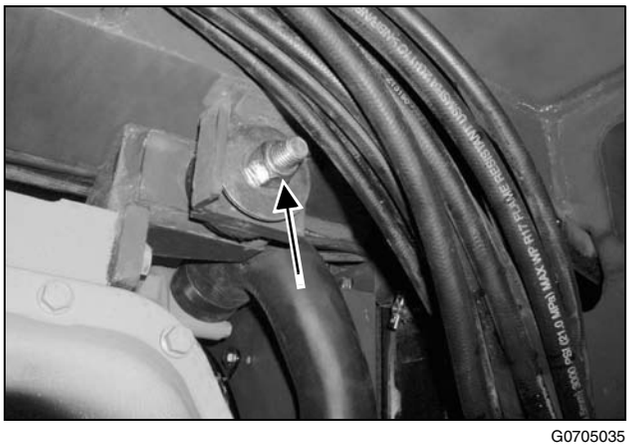
Install the lower housing bell bolts. Torque all the housing bell bolts to 40 to 45 lb.-ft. (54 to 61 Nm).

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STEP 59



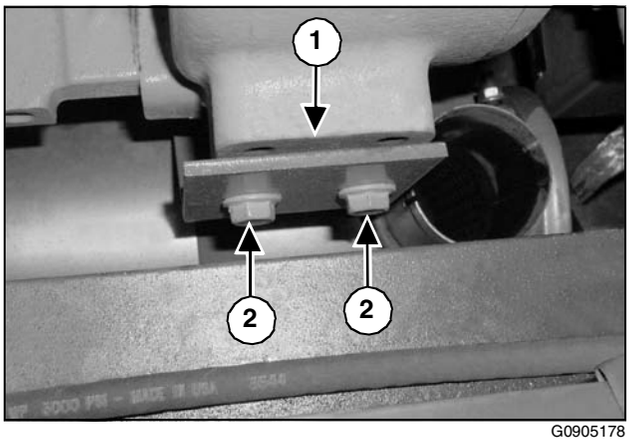
G0705034



G0705035

Torque the two center bolts in the front engine mounts to 285 to 320 lb.-ft. (385 to 435 Nm).

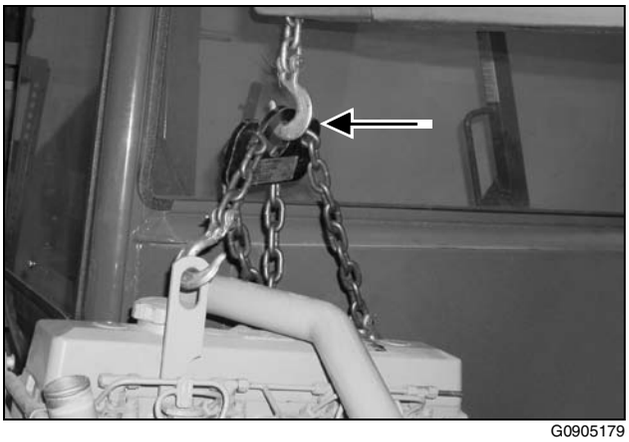
STEP 60



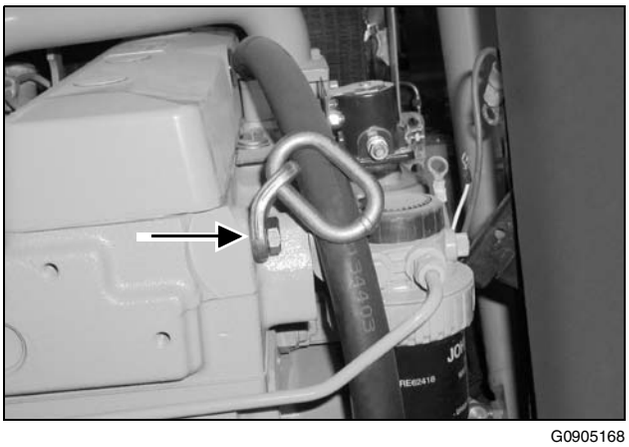
G0905178

Install the muffler bracket (1) to the right side of the engine using the two bolts (2).

STEP 61

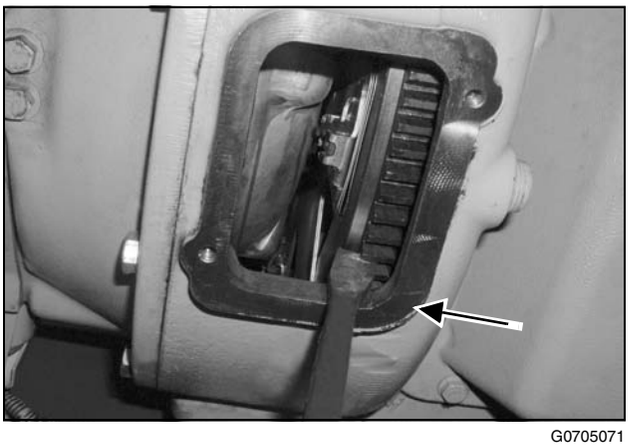


G0905179



G0905168

Remove the lifting bracket or ring from the head. Remove the lifting device and the hoist.



G0705071

NOTE: *The flywheel must be rotated to install the flywheel-to-flexplate bolts. Rotate the flywheel by inserting a pry bar through the inspection hole in the bottom of the housing bell and into the ring gear.*

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STEP 62



G0705070

Rotate the flywheel until the bolt hole in the flywheel is at approximately 6 o'clock and aligned with the nut plate on the plate flex.

STEP 63



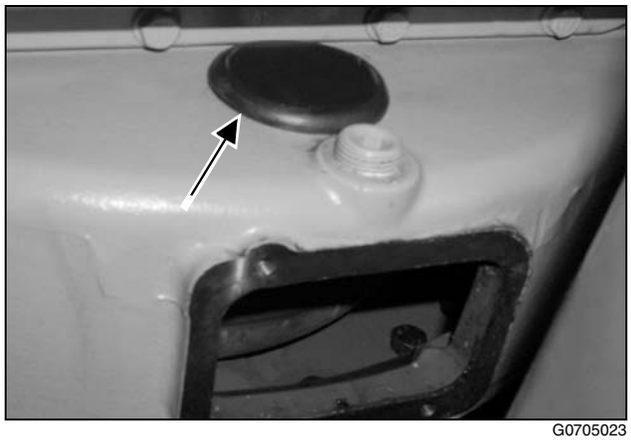
G0705024

Install the flywheel-to-flexplate bolt. Repeat Steps 61 and 62 until all eight bolts are installed.

STEP 64

Torque the flywheel-to-flexplate bolts to 35 to 40 lb.-ft. (48 to 54 Nm).

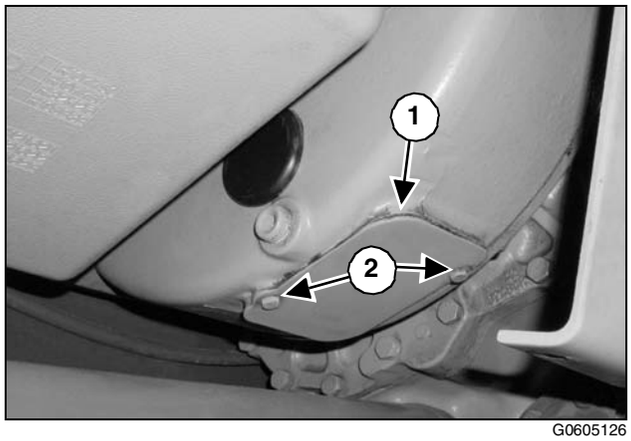
STEP 65



G0705023

Install the rubber access plug in the front of the housing bell.

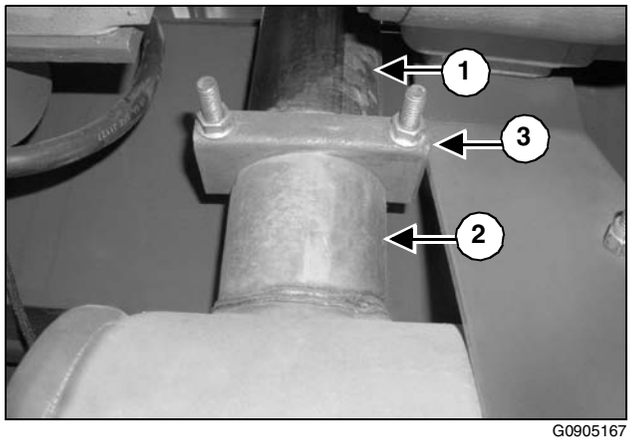
STEP 66



G0605126

Install the inspection cover (1) on the bottom of the housing bell using the two bolts (2).

STEP 67

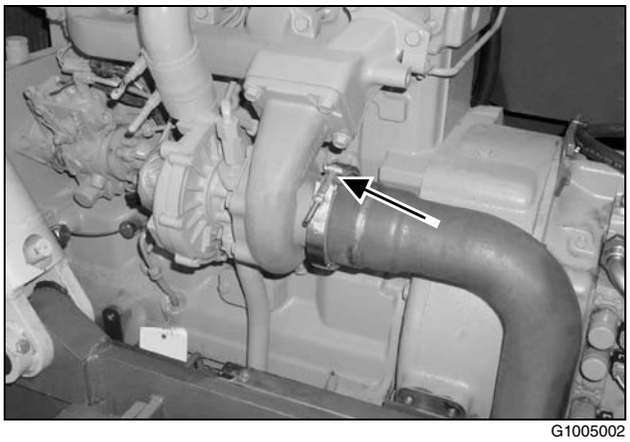


G0905167

Install the exhaust pipe (1) into the muffler (2) and secure with the muffler clamp (3).

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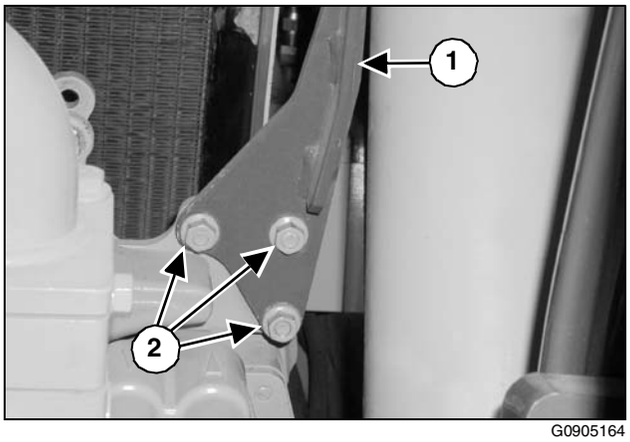
STEP 68



G1005002

Install the band clamp around the exhaust pipe and turbocharger outlet. Tighten the clamp only enough to seal the exhaust pipe against the turbocharger.

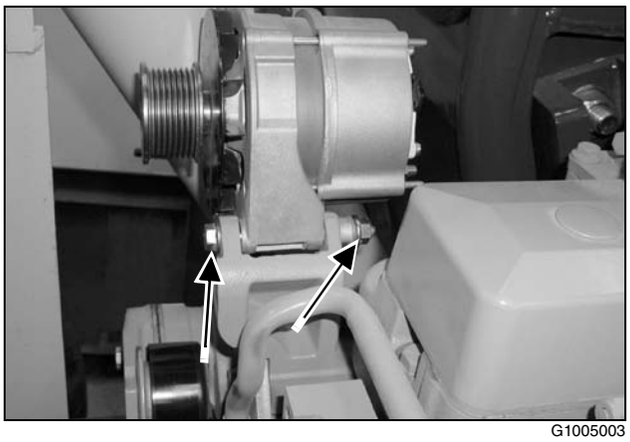
STEP 69



G0905164

Install the alternator left side mounting bracket (1) using the three bolts (2) and nuts.

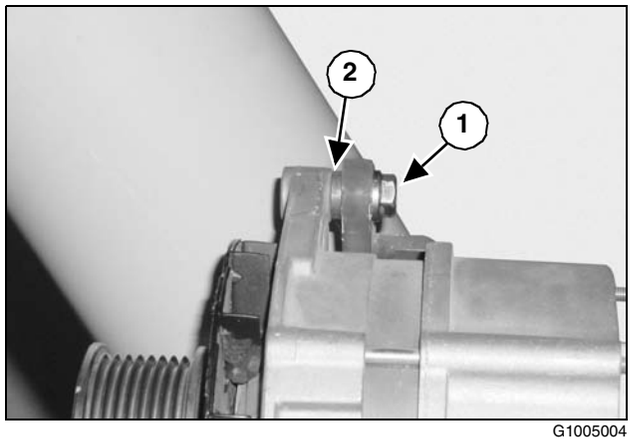
STEP 70



G1005003

Position the alternator in place. Install the lower mounting bolt and nut.

STEP 71



G1005004

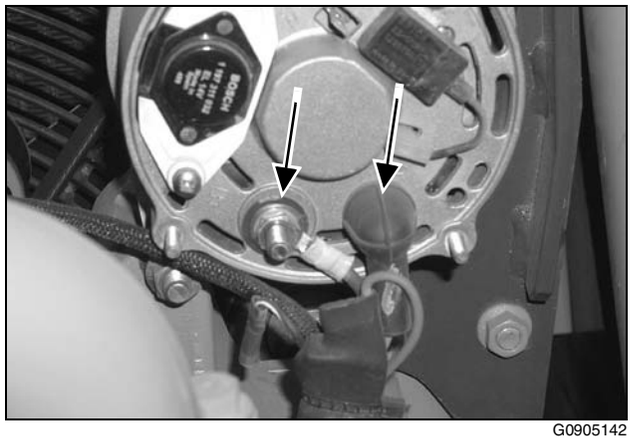
Install the top mounting bolt (1) and spacer (2).

NOTE: *The spacer goes between the alternator and the mounting bracket.*

STEP 72

Torque the lower alternator mounting bolt to 56 to 64 lb.-ft. (77 to 87 Nm) and the upper mounting bolt to 25 to 29 lb.-ft. (34 to 39 Nm).

STEP 73

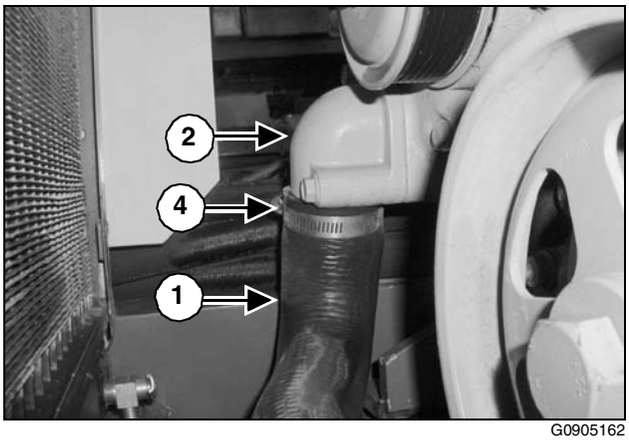


G0905142

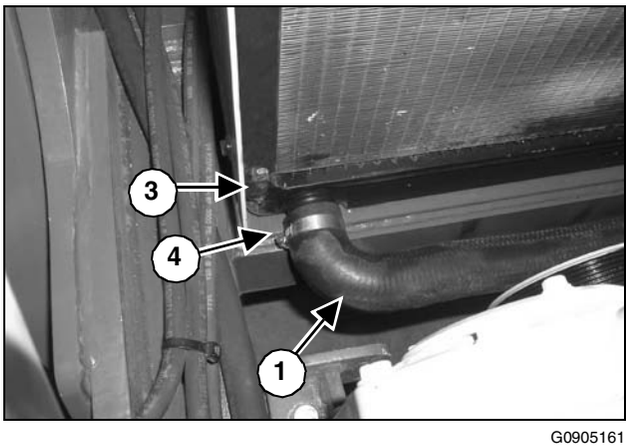
Install the alternator wires.

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STEP 74



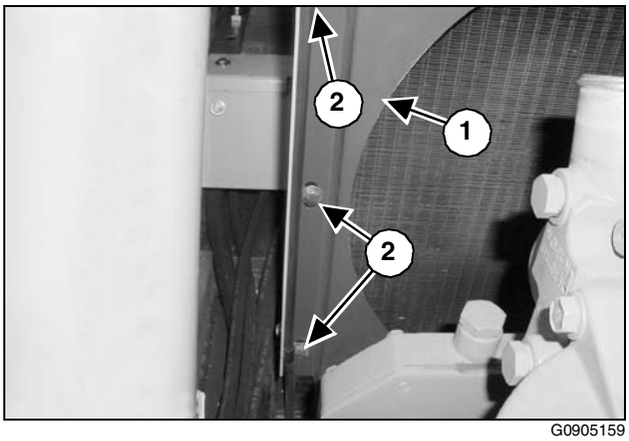
G0905162



G0905161

Install the lower radiator hose (1) between the water pump (2) and the radiator (3). Tighten the two hose clamps (4).

STEP 75



G0905159

Install the fan shroud (1) using the six bolts (2). Torque the bolts to 12 to 14 lb.-ft. (16-18 Nm).

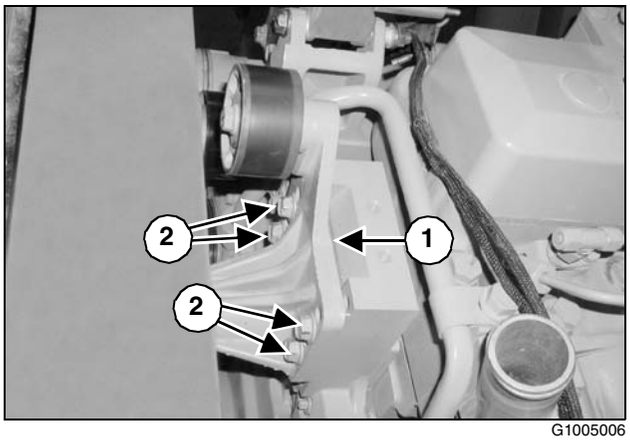
STEP 76



G1005005

Place the fan inside the fan shroud.

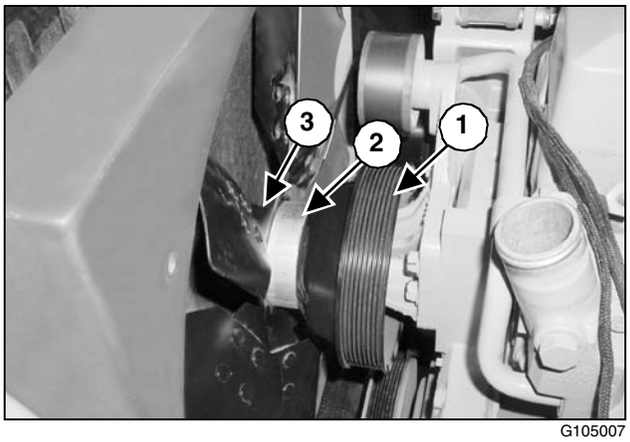
STEP 77



G1005006

Install the fan bearing assembly (1) using the four bolts (2).

STEP 78

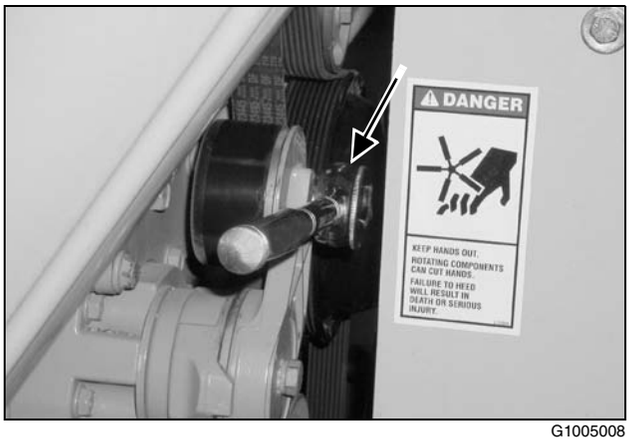


G105007

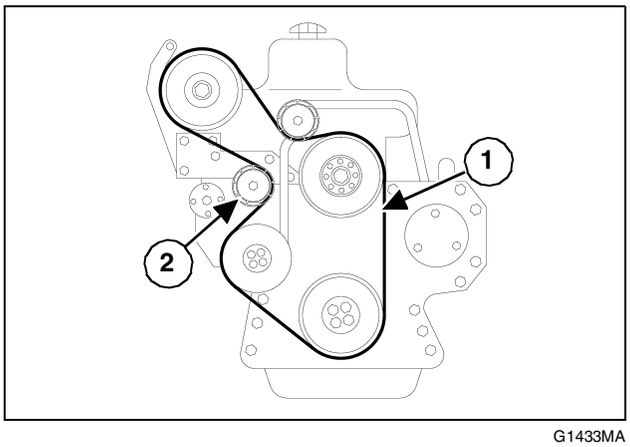
Install the fan pulley (1), spacer (2) and fan (3) on the fan bearing using the four bolts and washers. Torque the bolts to 20 to 23 lb.-ft. (27 to 31 Nm).

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STEP 79



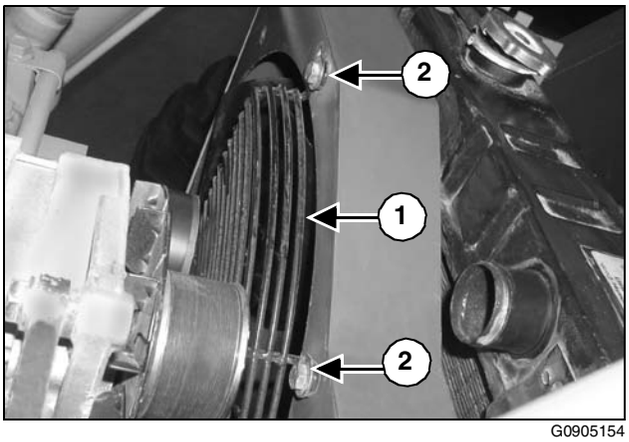
G1005008



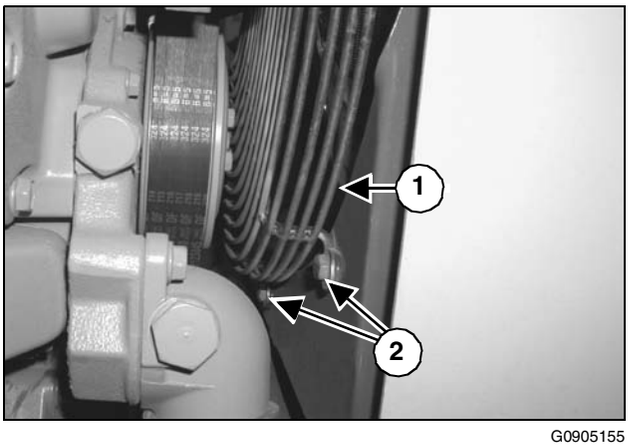
G1433MA

Route the serpentine belt (1) around the pulleys as shown. Use a 1/2” drive ratchet on the tensioner pulley (2) to rotate the tensioner counterclockwise and install the belt over the pulley.

STEP 80



G0905154

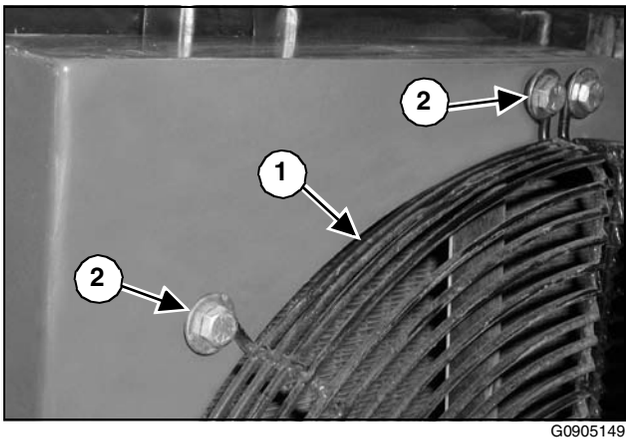


G0905155

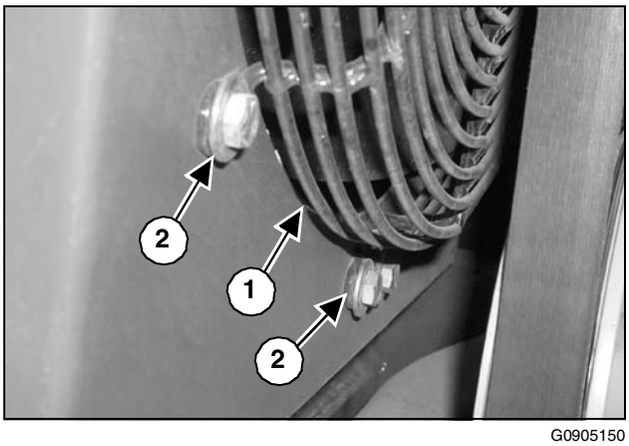
Install the left side fan guard (1) using the four bolts (2).

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STEP 81



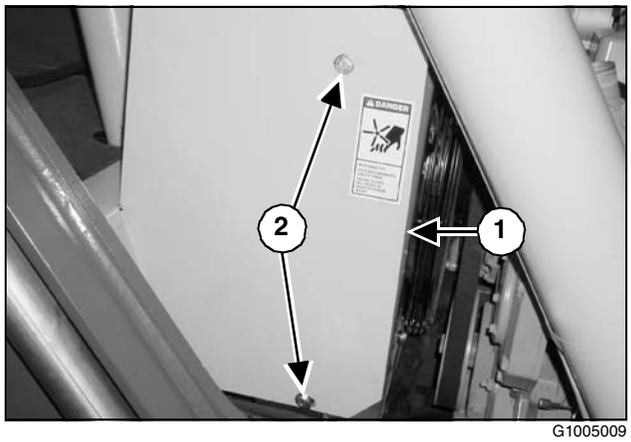
G0905149



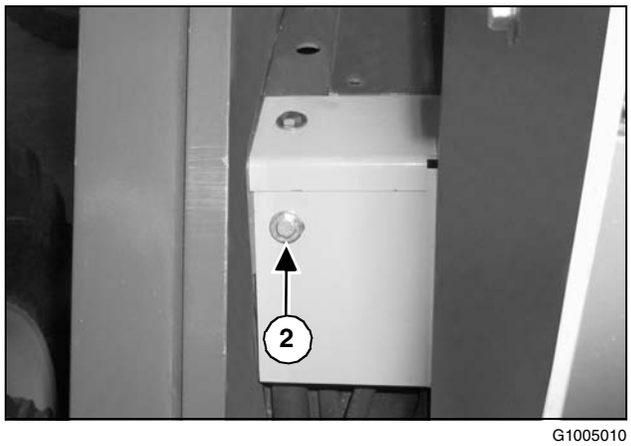
G0905150

Install the right side fan guard (1) using the four bolts (2).

STEP 82



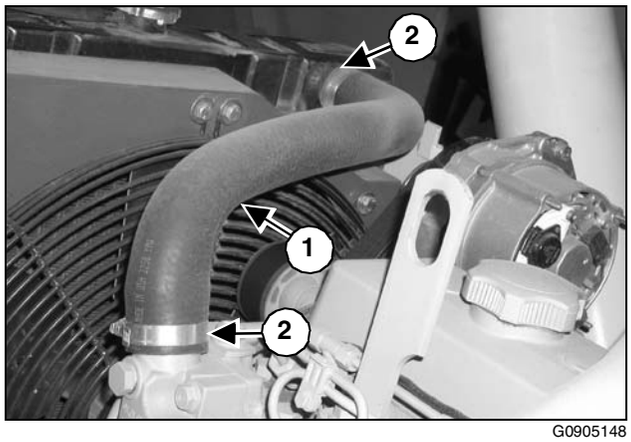
G1005009



G1005010

Install the right radiator panel (1) using the three bolts (2).

STEP 83



G0905148

Install the upper radiator hose (1) between the engine and radiator. Tighten the two hose clamps (2).

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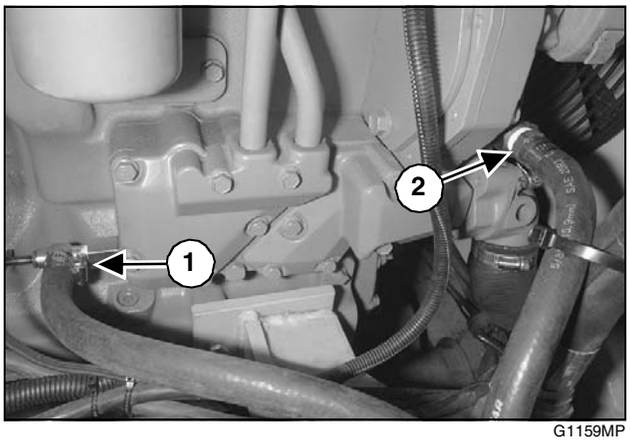
STEP 84



G1158MP

If equipped, install the hose adapter in the water pump.

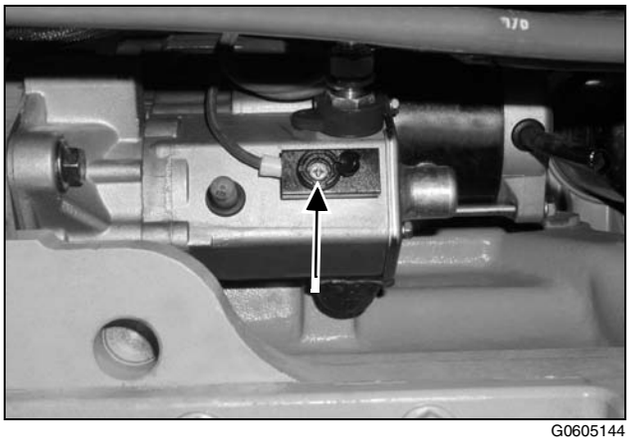
STEP 85



G1159MP

If equipped, install the cab heater supply (1) and return (2) hoses on the engine. Tighten the hose clamps.

STEP 86



G0605144

Loosen the terminal screw and insert the starter relay wire from the solenoid. Tighten the screw.

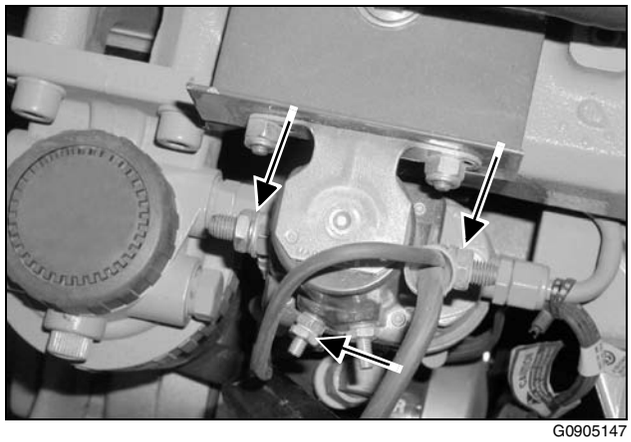
STEP 87



G0905170

Install the battery and starter relay cables on the starter solenoid.

STEP 88



G0905147

Install the wires on the starter relay.

STEP 89

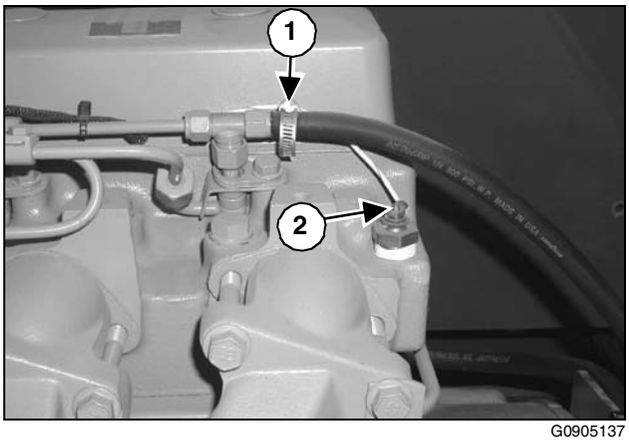


G0905146

Install the fuel supply hose on the fuel pump.

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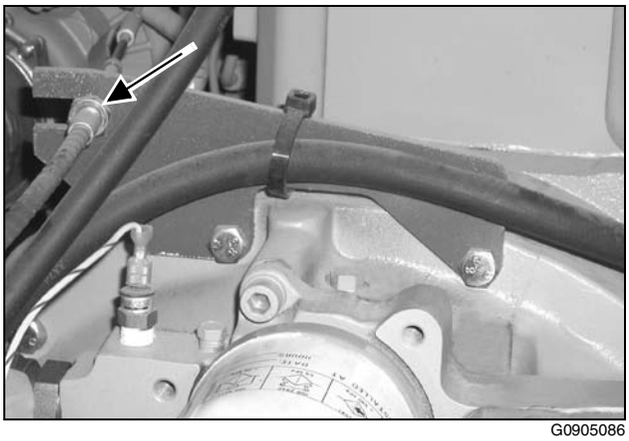
STEP 90



G0905137

Install the fuel return line (1) and the engine coolant temperature sender wire (2).

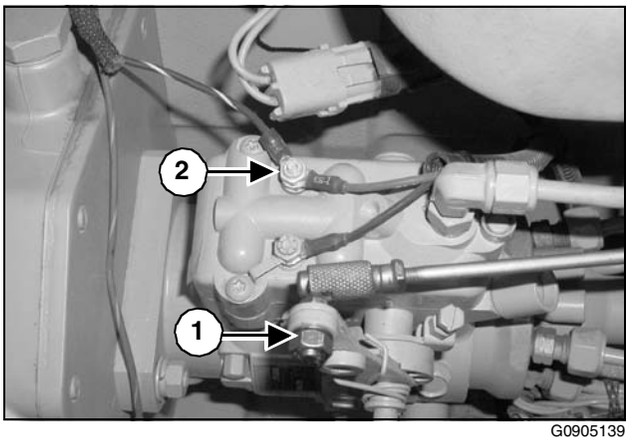
STEP 91



G0905086

Install the throttle cable onto the throttle cable mount bracket.

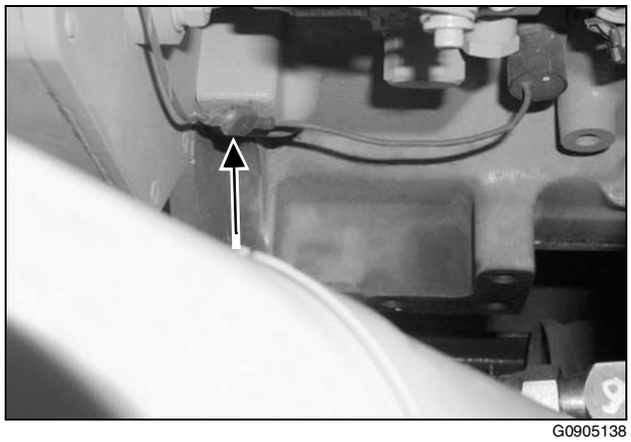
STEP 92



G0905139

Install the throttle linkage (1) and the fuel shut-off solenoid wire (2) on the fuel injector pump.

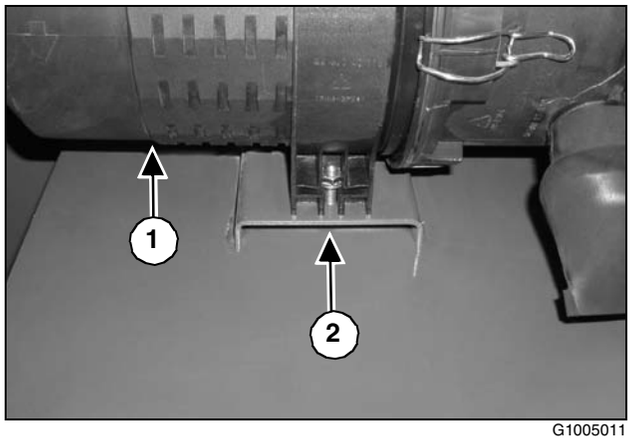
STEP 93



G0905138

Reconnect the wire to the oil pressure sender on the engine.

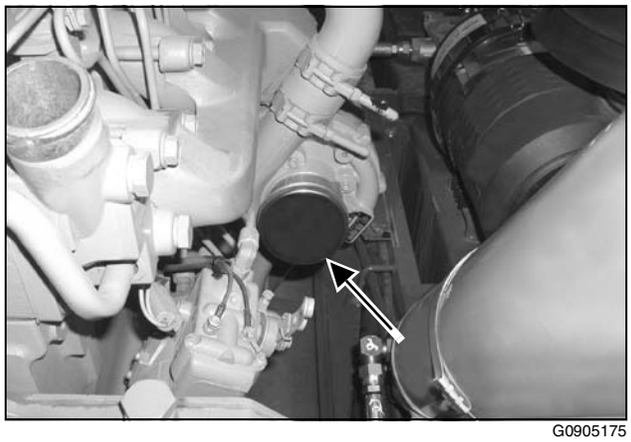
STEP 94



G1005011

Install the air cleaner assembly (1) using the two bolts (2).

STEP 95

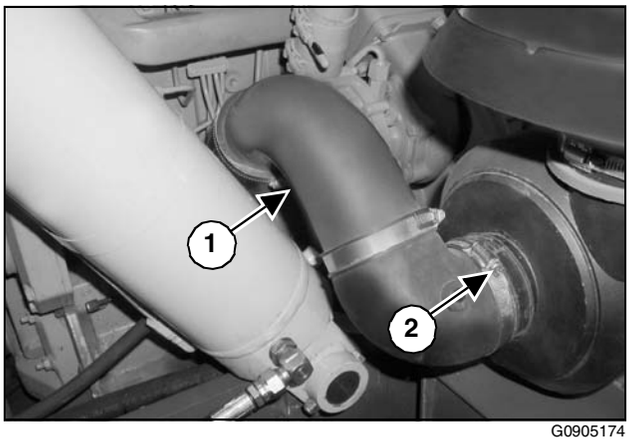


G0905175

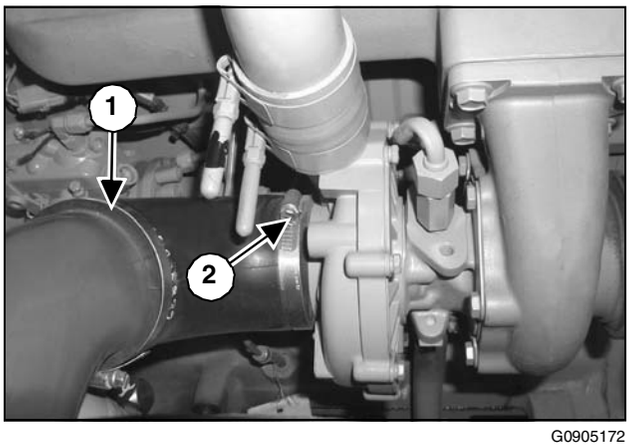
Remove the cap or plug from the turbocharger inlet.

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STEP 96



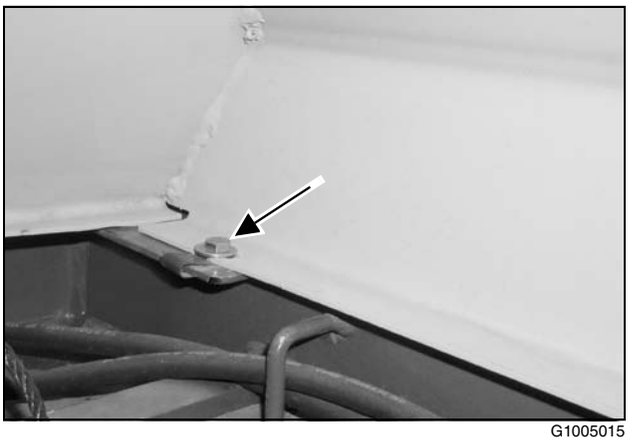
G0905174



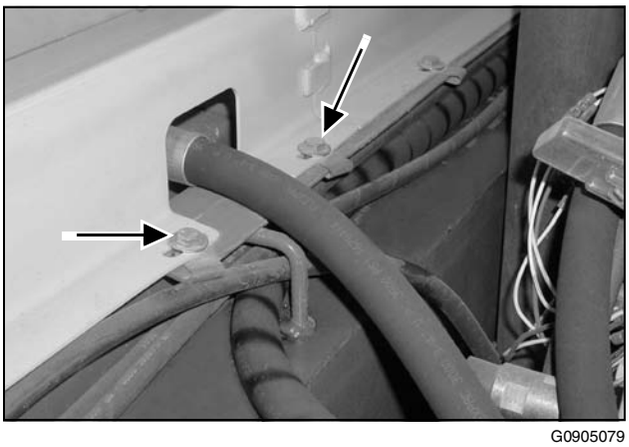
G0905172

Install the air inlet duct (1) between the turbocharger and the air cleaner assembly. Tighten the two hose clamps (2).

STEP 97



G1005015

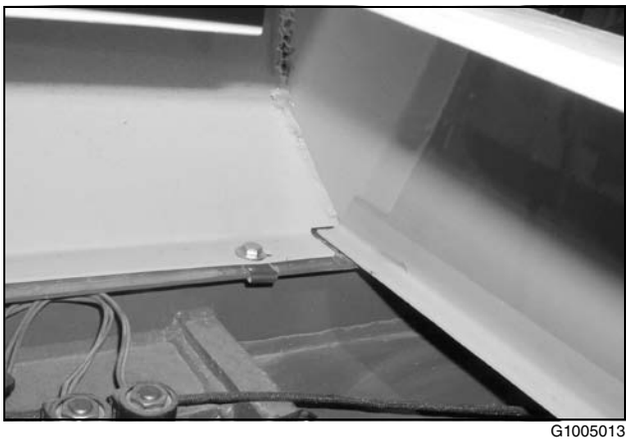


G0905079

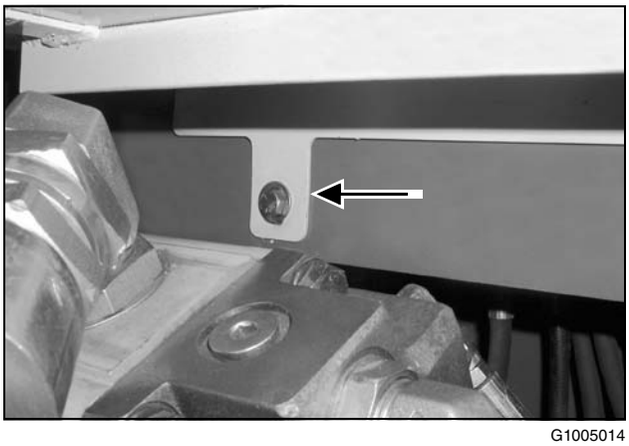
Position the transmission cover and install the three right side fasteners.

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STEP 98



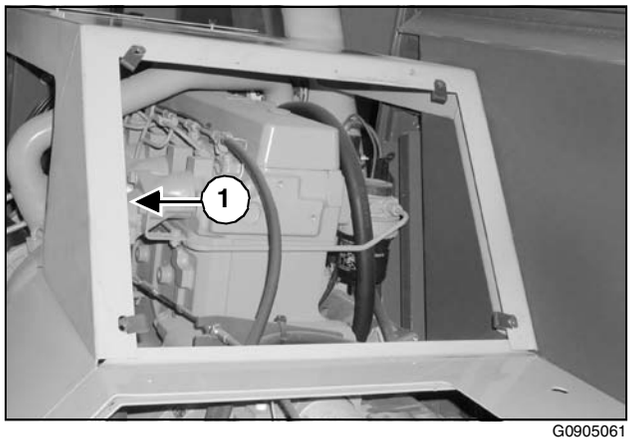
G1005013



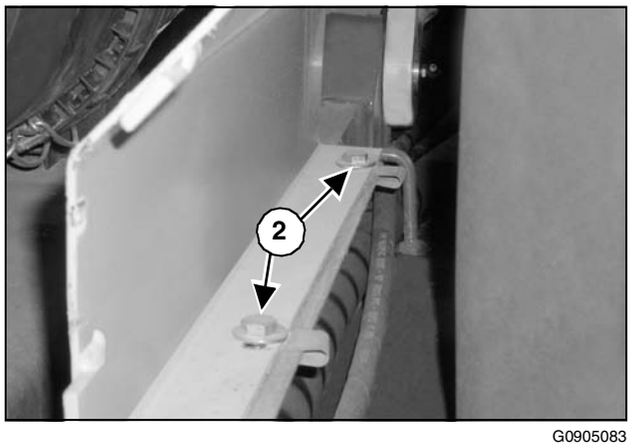
G1005014

Install the two left side fasteners in the transmission cover.

STEP 99



G0905061

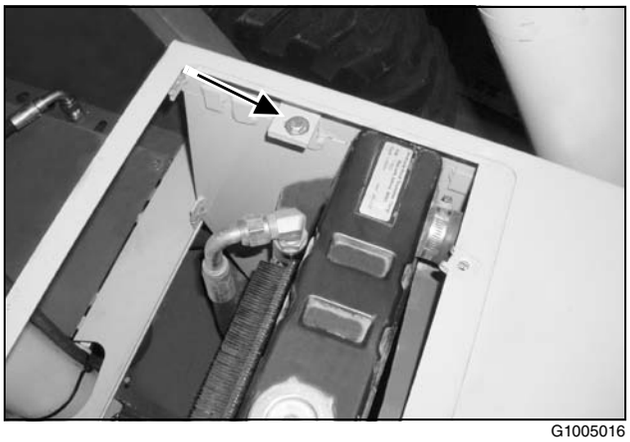


G0905083

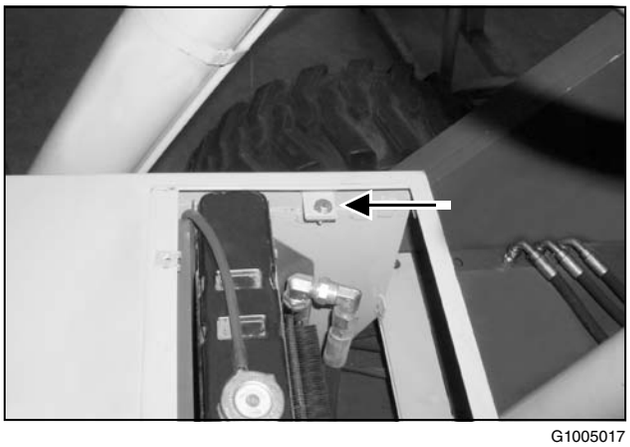
Position the engine cover (1) and install the two right side bolts (2).

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STEP 100



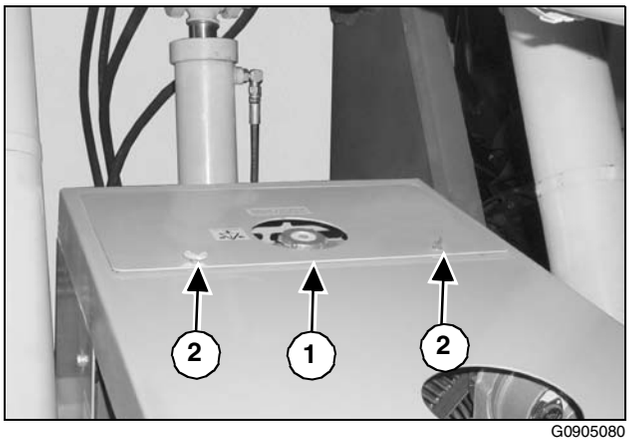
G1005016



G1005017

Install the two rear engine cover bolts.

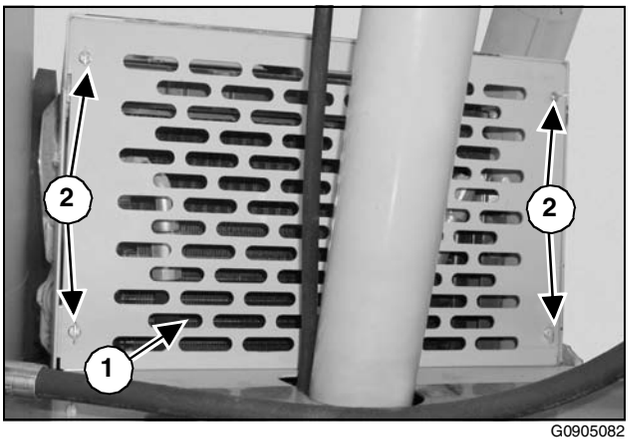
STEP 101



G0905080

Install the radiator cover (1) using the two thumbscrews (2).

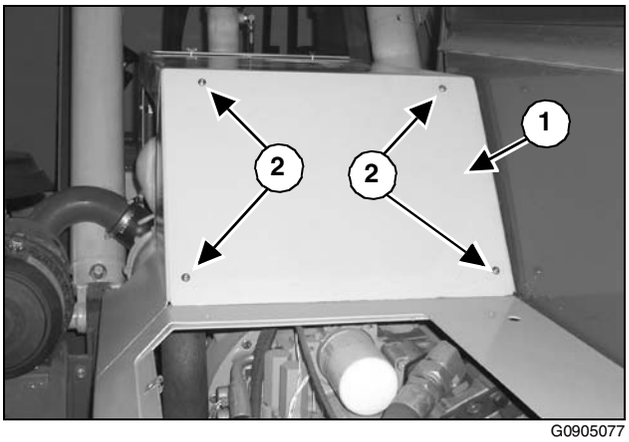
STEP 102



G0905082

Install the radiator grill (1) using the four thumbscrews (2).

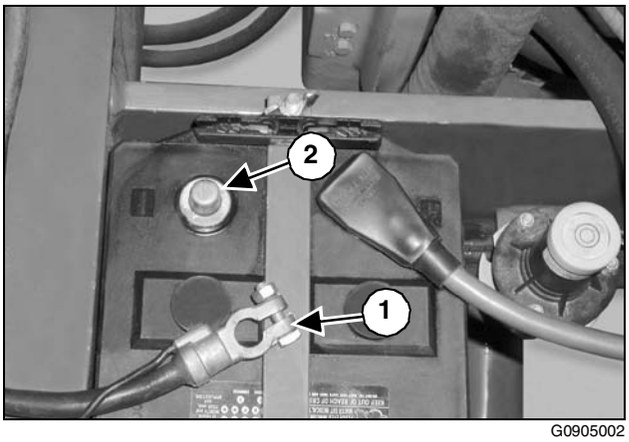
STEP 103



G0905077

Install the fuel filter access cover (1) using the four screws (2).

STEP 104



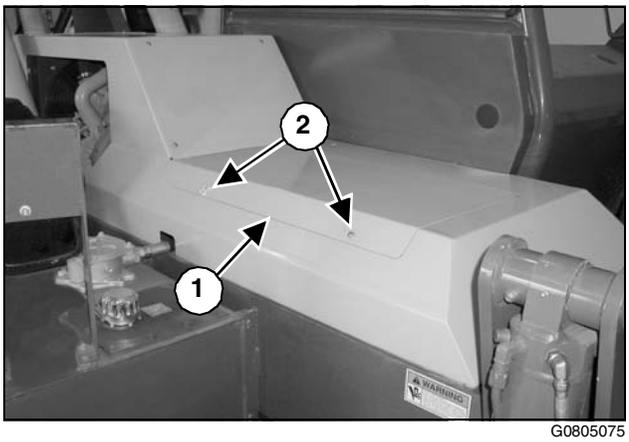
G0905002

Connect the negative (-) battery cable (1) to the negative (-) post (2) of the battery.

G0705035

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STEP 105



G0805075

Install the battery access cover (1) using the two thumb-screws (2).

STEP 106

See the *Engine Operation and Maintenance Manual* for the specified engine coolant and crankcase oil, and correct levels.

Fill the radiator and engine block with the specified coolant.

Fill the crankcase with the specified oil.

Bleed the fuel system by following the procedures in the “Service/As Required” section of the *Engine Operation and Maintenance Manual*.

STEP 107

Start the engine and run until the coolant has reached operating temperature. Adjust the throttle linkage until the engine speed ranges from 800 to 850 RPM at low idle, and from 2600 to 2700 RPM at high idle.

STEP 108

Check the hydraulic functions and transmission for proper operation. Shut off the engine and check for leaks and correct fluid levels.

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Section

301

ELECTRICAL SCHEMATICS, TROUBLESHOOTING TESTING & ADJUSTMENT PROCEDURES

RS5-34 Telescopic Handler

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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?

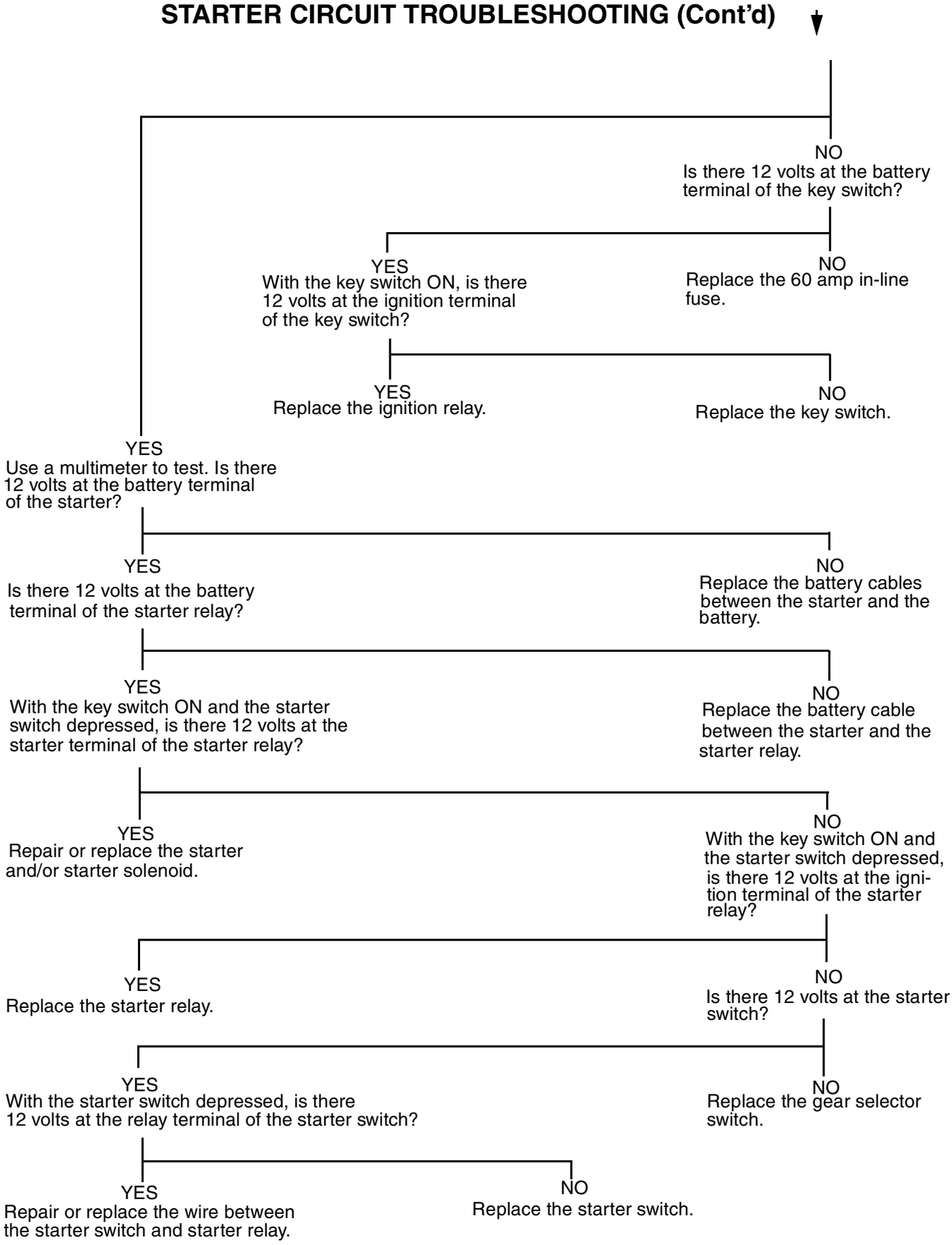
NO
Replace the 60 amp in-line fuse between the battery terminal of the starter relay and the fuse box.

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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STARTER CIRCUIT TROUBLESHOOTING (Cont'd)



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PARK BRAKE CIRCUIT TROUBLESHOOTING

The park brake switch is OFF, but the brakes do not release.
Is there 12 volts at the park brake solenoid?

YES
Replace the park brake solenoid coil and or the park brake solenoid valve cartridge.

NO
Is the park brake fuse open?

YES
Replace the fuse.

NO
Is there 12 volts to the park brake relay switch terminal #4?

YES
Is there 12 volts to the relay coil terminal #3?

NO
Repair or replace the wire between the relay and the fuse.

YES
Is there 12 volts at the relay terminal of the park brake switch?

NO
Replace the park brake relay.

YES
Replace the park brake switch.

NO
Replace the park brake relay.

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PARK BRAKE CIRCUIT TROUBLESHOOTING (CONT'D)

Park brake switch is ON, but the park brake does not apply.
Is there 12 volts at the park brake solenoid?

YES
Replace the park brake solenoid valve cartridge.

NO
Is there 12 volts at the park brake relay coil terminal #3?

YES
Replace the park brake relay.

NO
Is there 12 volts at the #2 terminal of the park brake switch?

YES
Is there 12 volts at the relay terminal #3 of the park brake switch?

NO
Repair or replace the wire between the park brake switch and the fuse panel.

YES
Repair or replace the wire between the park brake switch and the park brake relay.

NO
Replace the park brake switch.

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STEERING MODE CIRCUIT TROUBLESHOOTING

Does the steering mode change when the steering mode switch is moved to different mode positions?

YES

Is there 12 volts at the non-functioning mode solenoid of steering mode control valve?

YES

Replace the coil and/or the steer mode control valve.

NO

Is there 12 volts at the solenoid terminal of the steer mode selector switch?

YES

Repair or replace the wire between the switch and the solenoid.

NO

Replace the steer mode selector switch.

NO

Is the steer mode fuse open?

YES

Replace the fuse.

NO

Is there 12 volts at the fuse terminals of the steer mode selector switch.

YES

Is there 12 volts at the solenoid terminals of the steer mode selector switch?

NO

Repair or replace the wire between the fuse and the switch.

YES

Is there 12 volts at the steer mode selector valve solenoids?

NO

Replace the steer mode selector switch.

YES

Repair or replace the steer mode selector valve and/or the valve solenoids.

NO

Repair or replace the wire between the switch and the solenoids.

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INSTRUMENT PANEL OR PANEL BULB REPLACEMENT

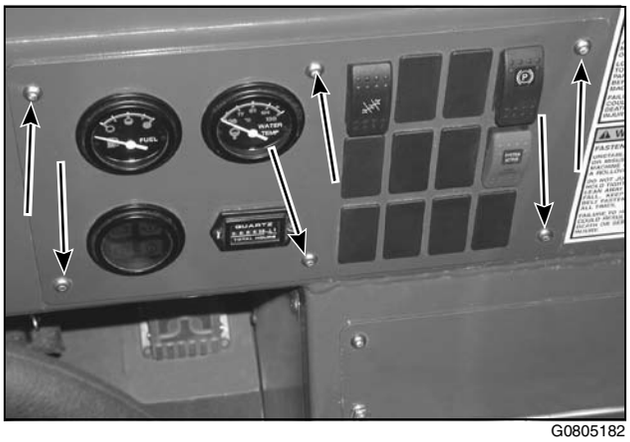
STEP 1



G0805159

Turn the key switch off. Remove the key.

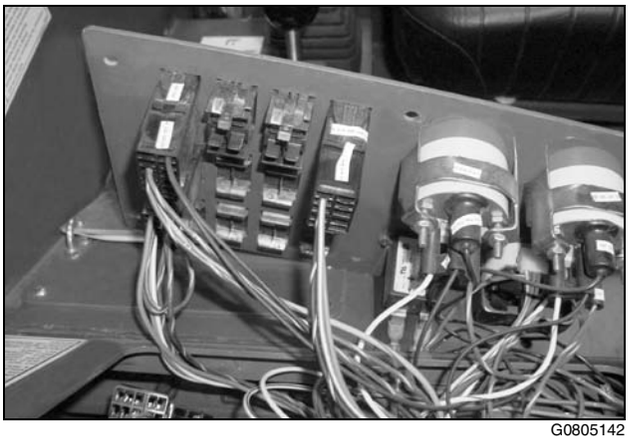
STEP 2



G0805182

Remove the six screws securing the instrument panel.

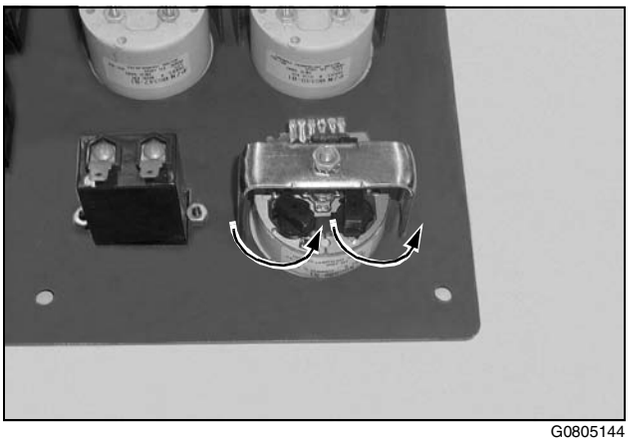
STEP 3



G0805142

Pull the instrument panel out from the dash. mark the position of all wires and connectors on the instrument panel for reassembly. Remove the wires and connectors.

STEP 4



G0805144

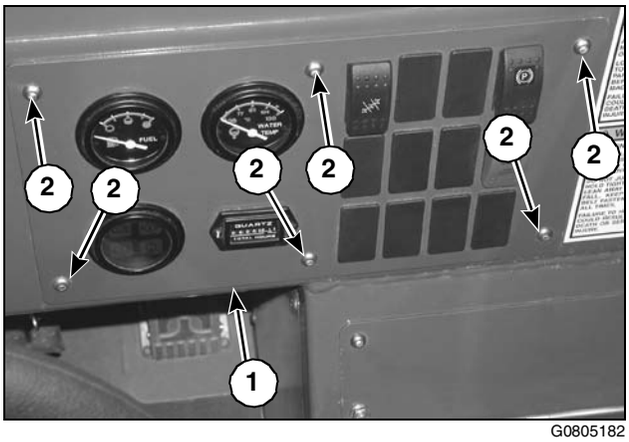
To remove the instrument panel bulbs, rotate the bulbs 1/4 turn counterclockwise.

STEP 5

Install the new bulbs and rotate 1/4 turn clockwise to lock into the instrument panel. Reconnect the switch and gauge connectors.

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STEP 6

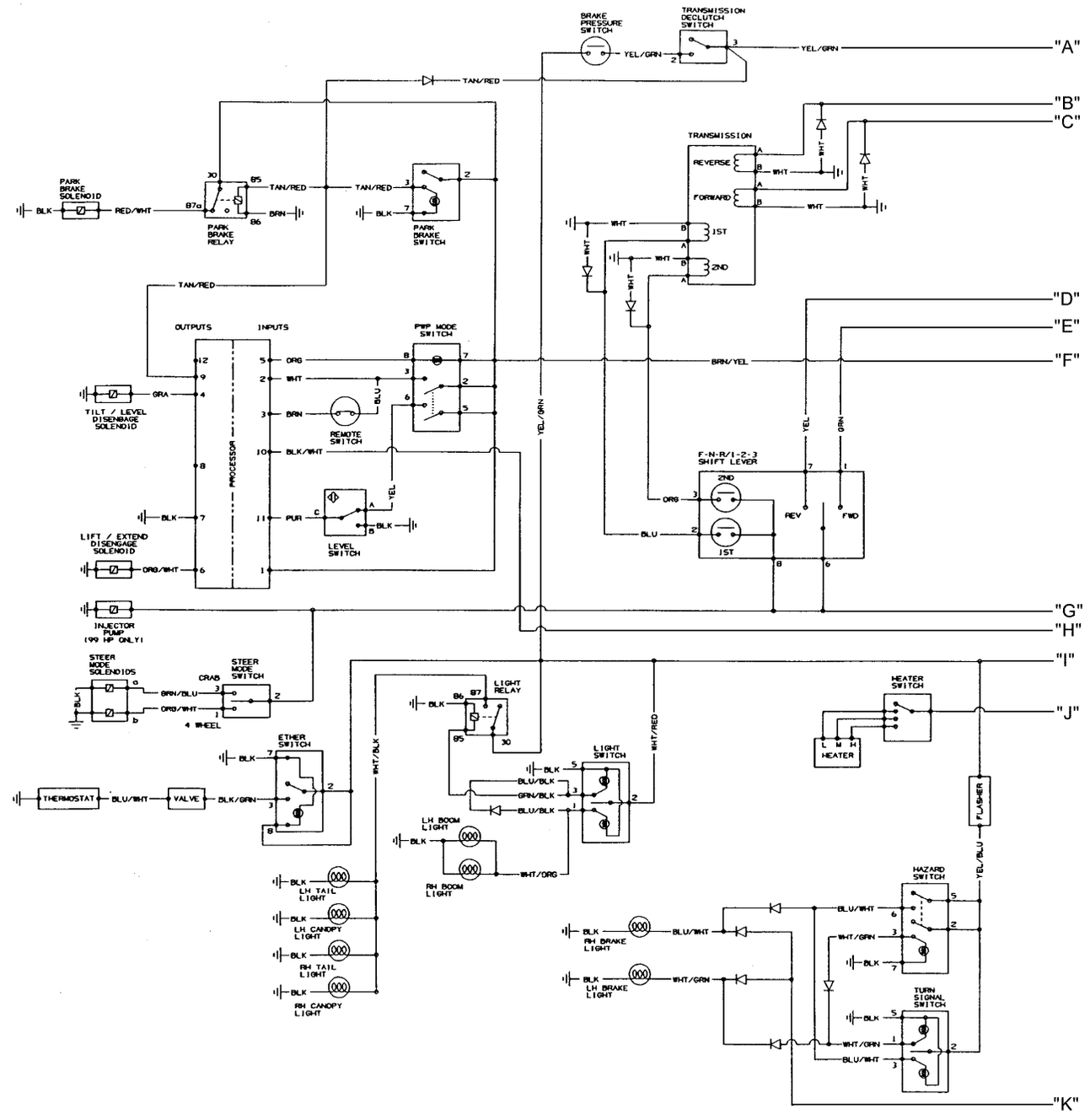


G0805182

Install the instrument panel (1) using the six screws (2).

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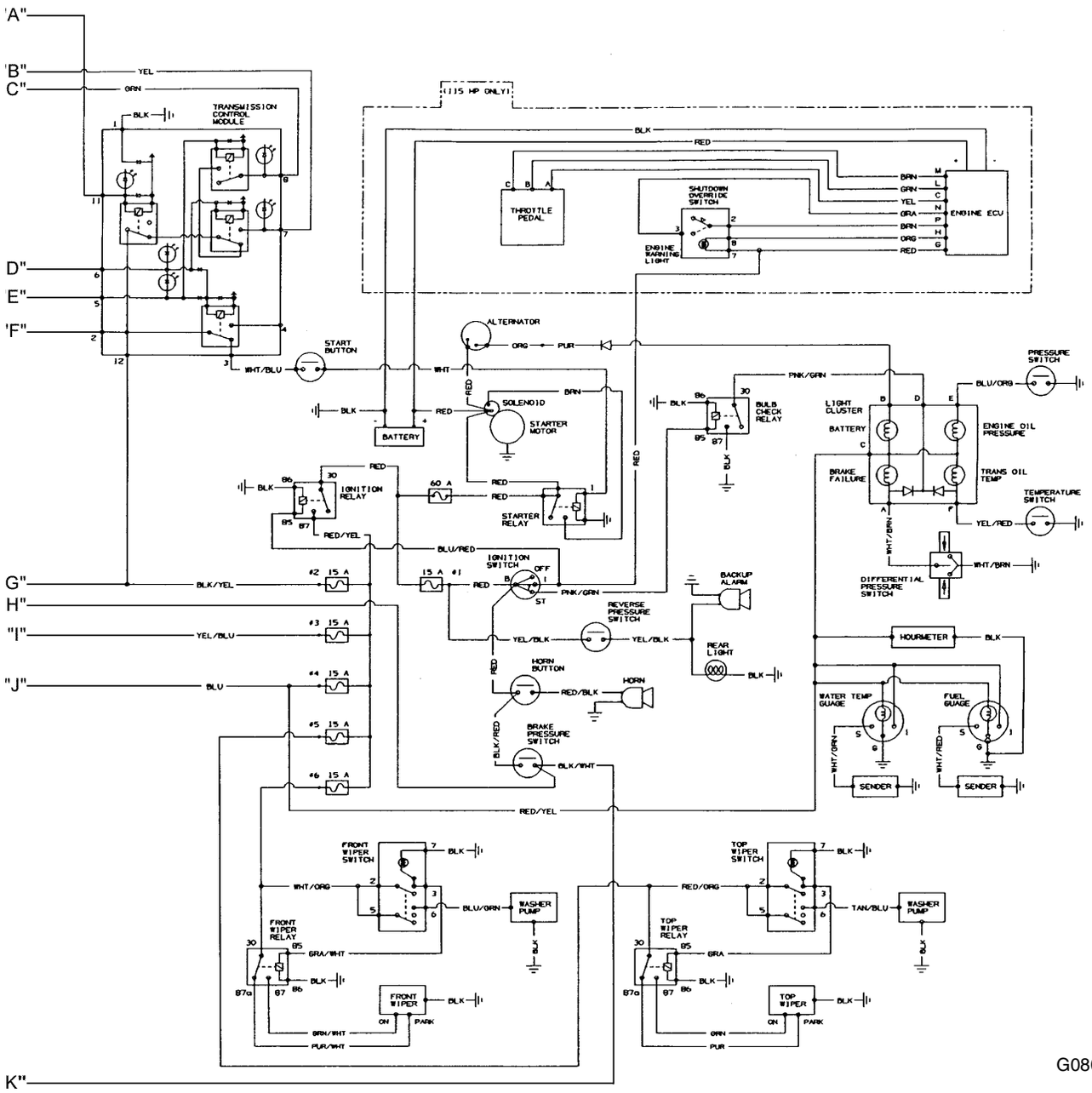
ELECTRICAL SCHEMATICS



G0805233

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ELECTRICAL SCHEMATICS



G0805234

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ELECTRICAL SYSTEM TESTS

NOTE: *Use the troubleshooting flow charts for the sequence of component testing and the following steps for test locations and procedures. Always refer to the wiring schematics when doing circuit testing for a better understanding of the circuit.*

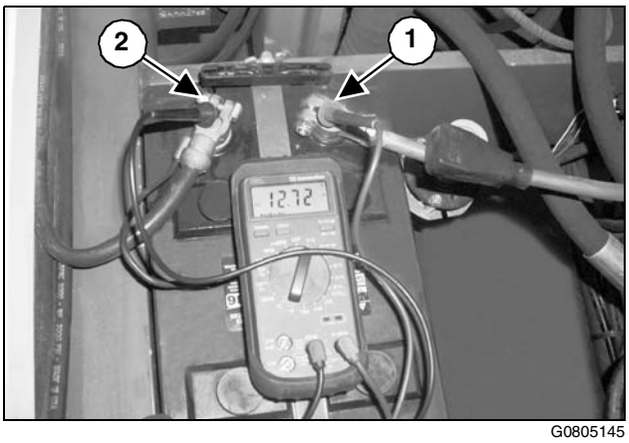
WARNING

When a test involves turning over the engine or starting the engine, use test leads long enough to read the multimeter from the operator's seat or standing clear of the machine.

NOTE: *Use a multimeter for all tests. ALWAYS install the ground (-) test lead to a clean, bare metal surface on the engine or frame.*

BATTERY TEST

STEP 1



G0805145

Set the multimeter to DC volts. Connect the multimeter positive (+) test lead to the positive post (1) and the negative (-) test lead to the negative post (2) of the battery. The multimeter should read 12 to 13 volts.

If there is no voltage, replace the battery.

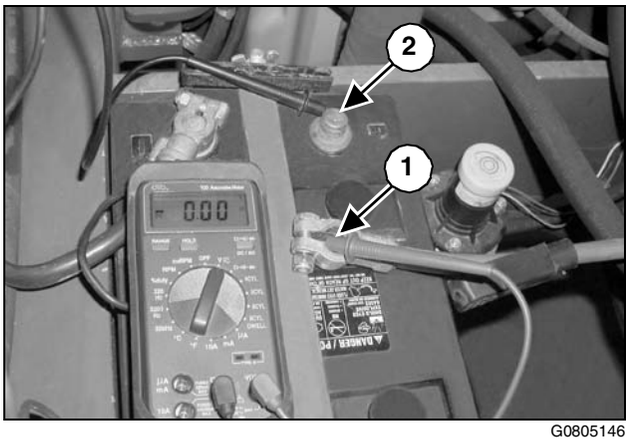
WARNING

If there is no voltage, the battery has an internal open circuit. Connecting a charger or auxiliary battery to a battery with an open circuit can cause a battery explosion.

If there is voltage but is less than 12 volts proceed to the next step.

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STEP 2



G0805146

Remove the positive (+) battery cable (1) from the battery. Connect the multimeter negative (-) test lead to the positive battery cable (1). Be sure the cable end is not in contact with any metal surfaces. Connect the positive (+) test lead to the positive (+) post (2) of the battery. The multimeter should read 0 volts.

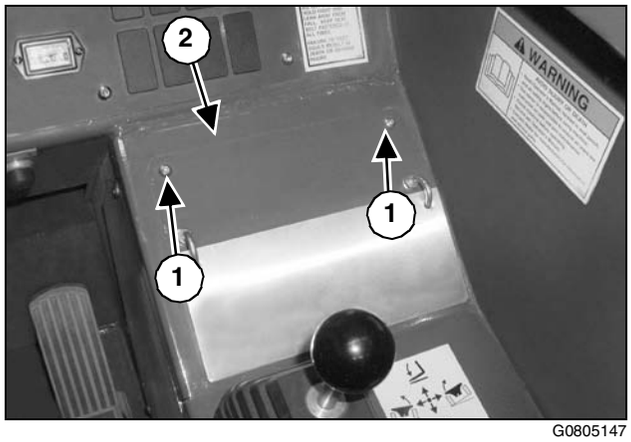
If there is voltage between the positive battery cable (1) and the battery post (2), check the wiring for shorts to ground.

If there is no voltage, recharge or replace the battery.

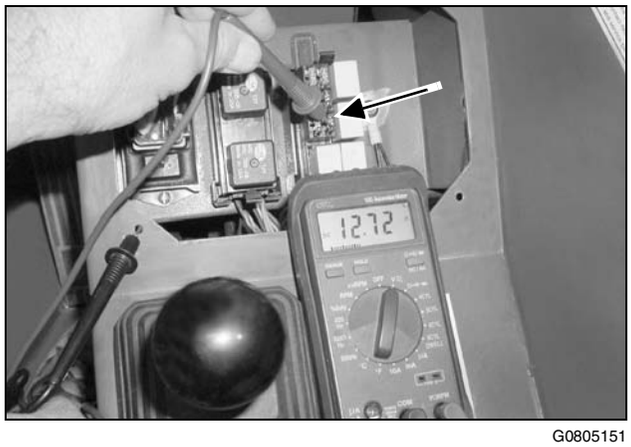
Install the positive (+) battery cable (1) on the battery.

FUSE POWER TESTS

STEP 3



G0805147



G0805151

Remove the four screws (1) and the fuse panel cover (2). Connect the positive (+) test lead to the bottom terminal of Fuse 1 to test for battery 12-volt power to the fuse panel. The multimeter should read 12 to 13 volts.

If there is no voltage, replace the 60-amp in-line fuse under the starter relay, or repair or replace th wires between the battery and the fuse panel.

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STEP 4



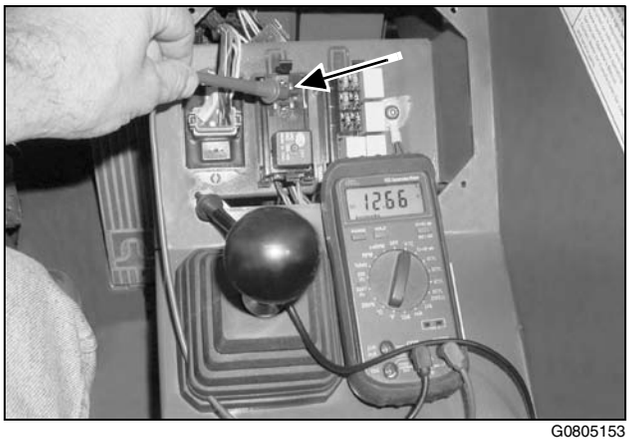
G0805152

Connect the positive (+) test lead to the front (top side) terminal of fuses 2 through 6. Turn the key switch to the ON position. The multimeter should read 12 to 13 volts.

If there is no voltage, proceed to Step 12.

IGNITION RELAY TESTS

STEP 5



G0805153

With the relay removed connect the positive (+) test lead to the right side terminal (#3) of the relay socket. The multimeter should read 12 to 13 volts.

If there is no voltage, replace the 60-amp in-line fuse under the starter relay, or repair or replace the wires between the relay socket and the battery.

If there is 12 to 13 volts, proceed to the next step.

STEP 6



G0805154

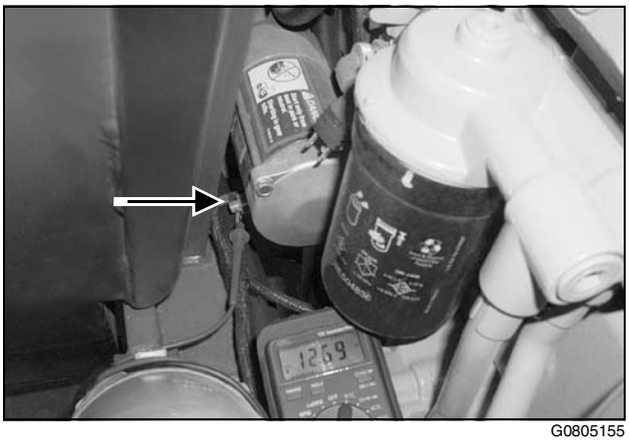
With the relay removed connect the positive (+) test lead to the bottom terminal (#2) of the relay socket. Turn the key switch to the ON position. The multimeter should read 12 to13 volts.

If there is no voltage, proceed to Step 12.

If there is 12 to 13 volts, but the relay does not work, replace the relay.

STARTER AND STARTER RELAY TESTS

STEP 7



G0805155

Connect the positive (+) test lead to the battery terminal of the starter. The multimeter should read 12 to 13 volts.

If there is no voltage, clean or replace the positive (+) battery cable between the starter and the battery.

If there is 12 to 13 volts, proceed to the next step.

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STEP 8



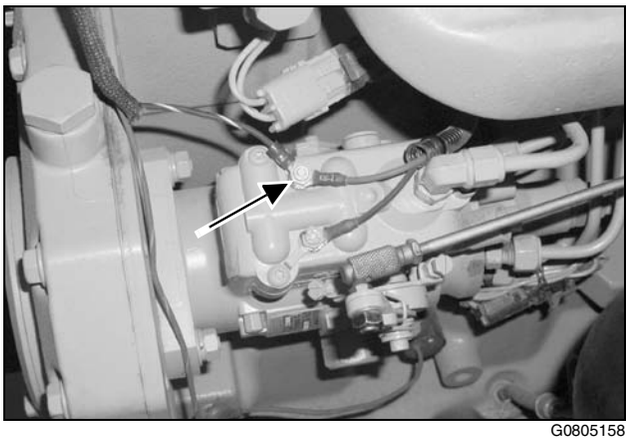
G0805156

Connect the positive (+) test lead to the battery terminal of the starter relay. The multimeter should read 12 to 13 volts.

If there is no voltage, replace the wire between the starter relay battery terminal and the starter.

If there is 12 to 13 volts, proceed to the next step.

STEP 9



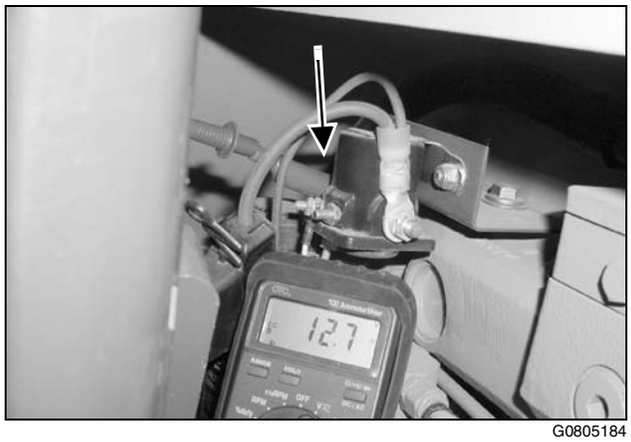
G0805158

Remove the wire from the fuel shut off solenoid.

WARNING

When a test involves turning over the engine or starting the engine, use test leads long enough to read the multimeter from the operator's seat or standing clear of the machine.

STEP 10



G0805184

Connect the positive (+) test lead to the starter terminal of the starter relay. Turn the key switch to the ON position and press the starter button. The multimeter should read 12 to 13 volts.

If there is no voltage, proceed to the next step.

If there is 12 to 13 volts and the starter does not turn over the engine, repair or replace the starter and/or the starter solenoid.

STEP 11



G0805183

Turn the key switch to the OFF position. Connect the positive (+) test lead to the ignition terminal of the starter relay. Turn the key switch to the ON position and press the starter switch. The multimeter should read 12 to 13 volts.

If there is no voltage, proceed to the next step.

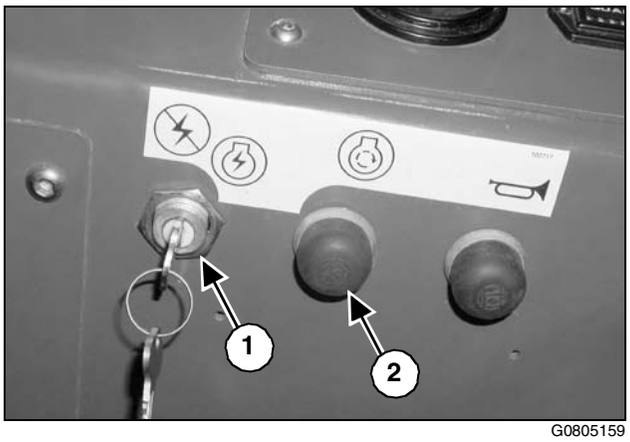
If there is 12 to 13 volts, but the starter does not turn over the engine, turn the key switch to the OFF position and replace the starter relay.

Install the wire on the fuel shutoff solenoid.

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KEY SWITCH AND STARTER BUTTON TESTS

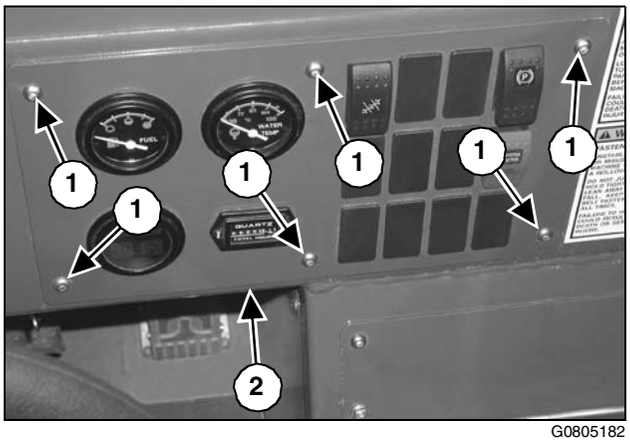
STEP 12



G0805159

Remove the retaining nut from the key switch (1) and the rubber button guard from the starter button (2).

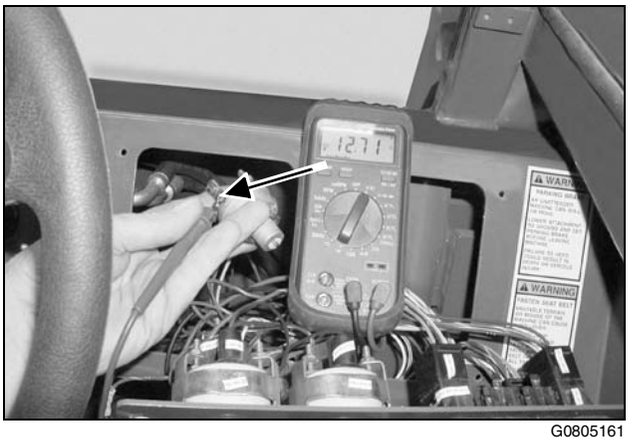
STEP 13



G0805182

Remove the six screws (1) from the instrument panel (2). Pull the instrument panel outward to gain access to the wire harnesses and switches.

STEP 14



G0805161

Connect the positive (+) test lead to the battery (red wire) of the key switch. The multimeter should read 12 to 13 volts.

If there is no voltage, check the ignition fuse, the 60-amp in-line fuse below the starter relay or the wires to the battery.

If there is 12 to 13 volts, proceed to the next step.

STEP 15



G0805162

Connect the positive (+) test lead to the ignition (blue/red wire) terminal of the key switch. Turn the key switch to the ON position. The multimeter should read 12 to 13 volts.

If there is no voltage, replace the key switch.

If there is 12 to 13 volts, proceed to Step 18.

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STEP 16



G0805163

Connect the positive (+) test lead to the white/blue wire terminal of the starter switch. Turn the key switch to the ON position. With the transmission lever in neutral the multimeter should read 12 to 13 volts.

If there is no voltage, check the fuse. If the fuse is not open, replace the transmission lever/switch assembly.

If there is 12 to 13 volts, proceed to the next step.

STEP 17



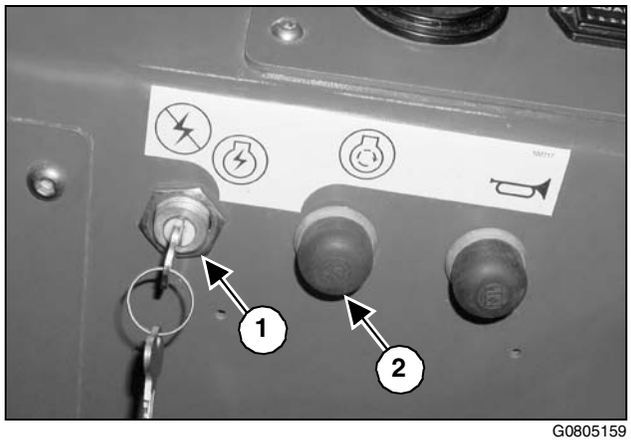
G0805164

Connect the positive (+) test lead to the white wire terminal of the starter button. Place the transmission lever in the neutral position, turn the key switch to the ON position and press the starter switch button. The multimeter should read 12 to 13 volts.

If there is no voltage, replace the starter switch.

If there is 12 to 13 volts, but there was no voltage at the starter relay ignition terminal (Step 11), repair or replace the wire between the switch and relay.

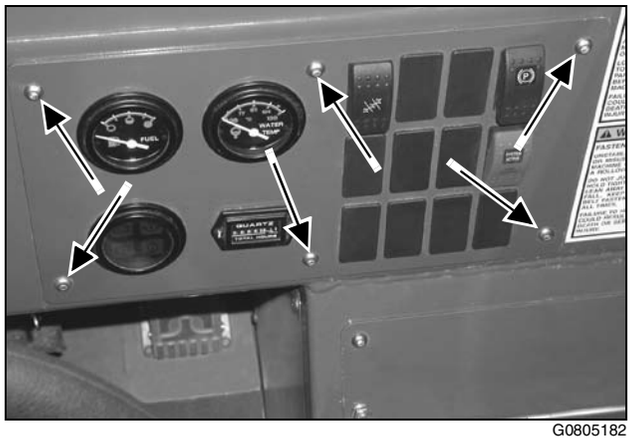
STEP 18



G0805159

Install the key switch (1) and the starter button (2).

STEP 19



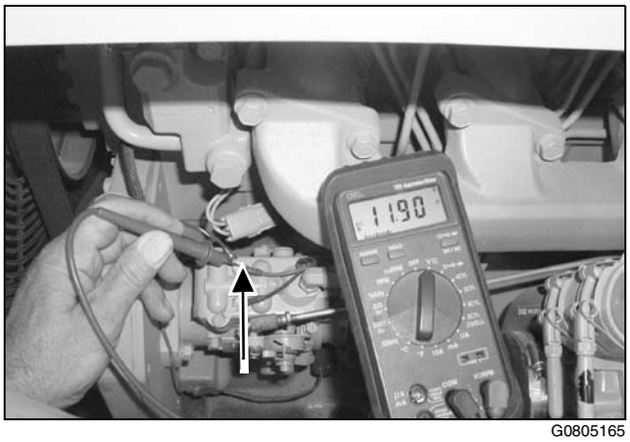
G0805182

Install the instrument panel using the six screws.

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FUEL SHUT-OFF SOLENOID TEST

STEP 20



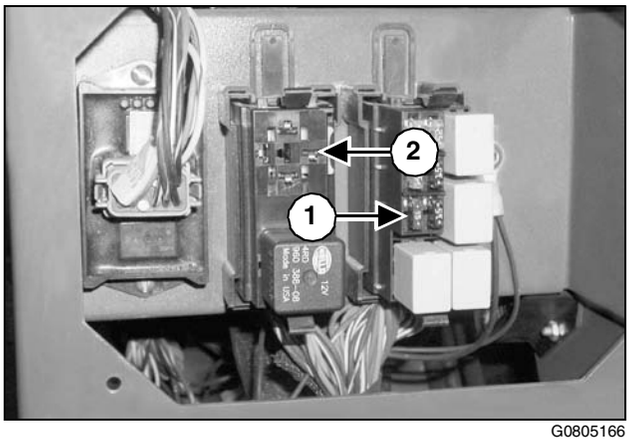
G0805165

Install the positive (+) test lead to the fuel shut-off solenoid. Turn the key switch to the ON position. The multimeter should read 12 to 13 volts.

If there is no voltage, proceed to the next step.

If there is 12 to 13 volts, but the engine will not start, replace the fuel shut-off solenoid valve.

STEP 21



G0805166

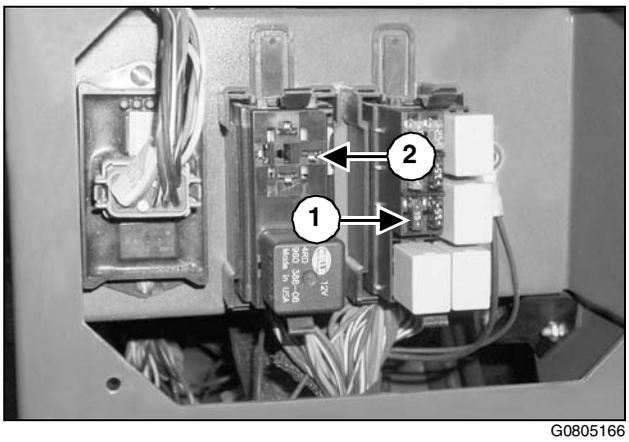
Check the fuel shut-off solenoid fuse (1) and test power to the fuse (Step 4) and ignition relay (2) (Steps 5 and 6).

If the fuel shut-off fuse and ignition relay are operating properly, repair or replace the red wire between the fuse and the fuel shut-off solenoid.

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PARK BRAKE CIRCUIT TESTS

STEP 22

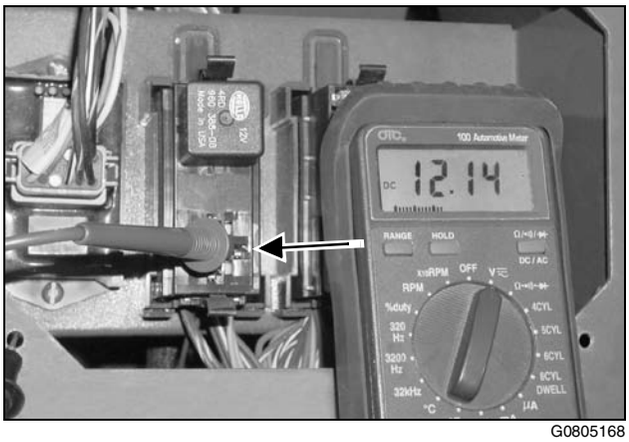


G0805166

Check the park brake fuse (1) and test for power to the fuse (Step 4) and the ignition relay (2) (Steps 5 and 6).

If there is 12 to 13 volts at the park brake fuse, proceed to the next step.

STEP 23



G0805168

Remove the park brake relay. Connect the positive (+) test lead to the right side terminal of the park brake relay socket. Turn the key switch to the ON position.

If there is no voltage, replace the red wire between the fuse and the relay.

If there is 12 to 13 volts, proceed to the next step.

STEP 24



G0805169

Connect the positive (+) test lead to the bottom terminal of the relay socket. With the key switch and park brake switches in the ON position, the multimeter should read 12 to 13 volts.

If there is no voltage, proceed to Step 31.

If there is 12 to 13 volts, proceed to the next step.

STEP 25



G0805182

Move the park brake switch to the OFF position. The multimeter should read 0 volts.

If there is no voltage, proceed to the next step.

If there is 12 to 13 volts, proceed to Step 28.

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STEP 26



G0805181

Install park brake relay (#2). Connect the positive (+) test lead and the negative (-) test lead to the park brake solenoid valve wire harness as shown. With the key switch in the ON position and the park brake switch in the OFF position, the multimeter should read 12 to 13 volts.

If there is no voltage replace the park brake relay.

If there is 12 to 13 volts, and the park brake will not release, test the park brake hydraulic circuit before replacing the park brake solenoid valve.

STEP 27



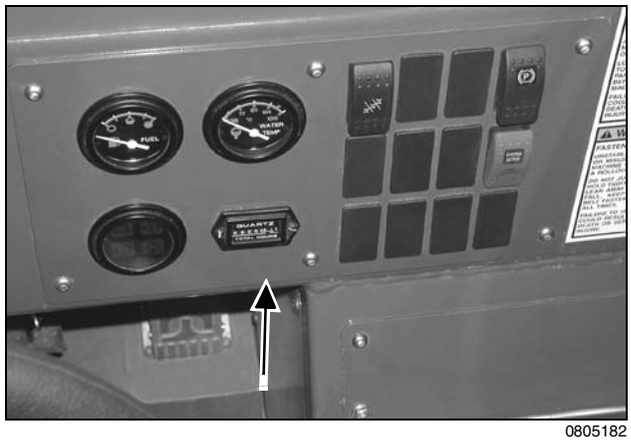
G0805078

Move the park brake switch to the ON position. The multimeter should read 0 volts.

If there is no voltage and the park brake will not apply, replace the park brake solenoid.

If there is 12 to 13 volts, proceed to the next step.

STEP 28



0805182

See Steps 13 for instructions to remove the instrument panel for access to the park brake switch.

STEP 29



G0805173

Connect the positive (+) test lead to the #2 terminal (black/green wire) of the park brake switch. With the key switch in the ON position, the multimeter should read 12 to 13 volts.

If there is no voltage repair or replace the wire between the switch and the park brake fuse.

If there is 12 to 13 volts, proceed to the next step.

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STEP 30



G0805174

Connect the positive (+) test lead to the relay terminal (tan/red wire) of the park brake switch. With the key switch and park brake switch in the ON position, the multimeter should read 12 to 13 volts.

If there is no voltage, replace the park brake switch.

If there is 12 to 13 volts, but no voltage at Step 24, replace the tan/red wire between the switch and the relay.

STEP 31

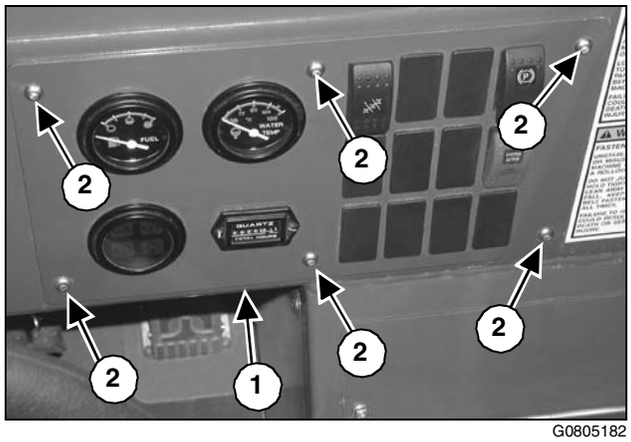


G0805078

Move the park brake switch to the OFF position. The multimeter should read 0 volts.

If there is 12 to 13 volts, replace the park brake switch.

STEP 32

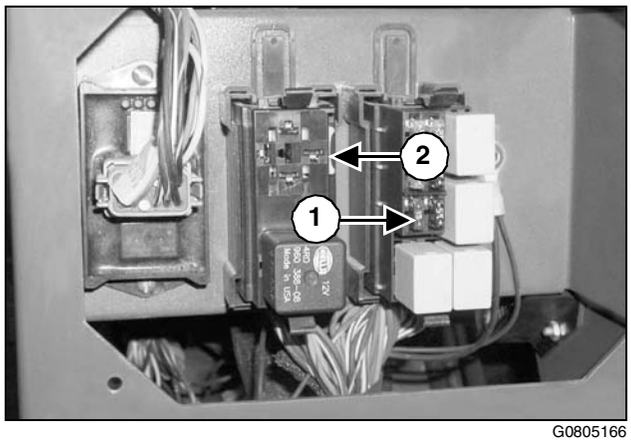


G0805182

Install the instrument panel (1) using the six screws (2).

STEERING MODE CIRCUIT TESTS

STEP 33

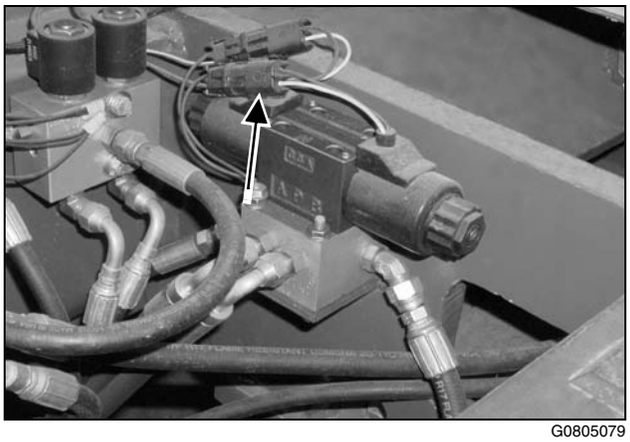


G0805166

Check the frame leveling/steer mode fuse (1). Test for power to the fuse (Step 4) and the ignition relay (2) (Steps 5 and 6).

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STEP 34



G0805079

Set the multimeter to read DC volts. Disconnect 4-wheel-steer wire harness (green and black wires) from the steer-mode solenoid connector.

STEP 35

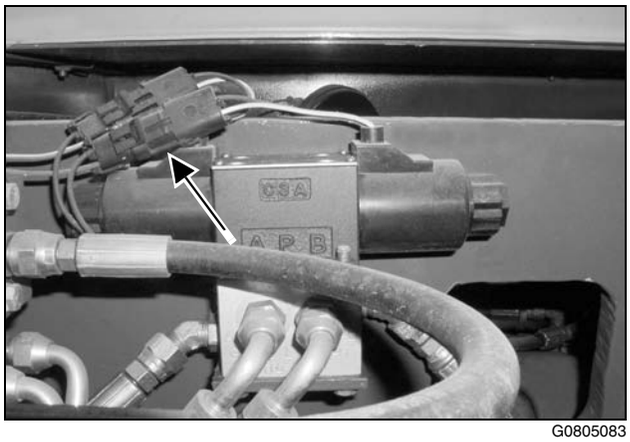


G0805176

Install the positive (+) test lead in the green wire prong of the wire harness. With the key switch in the ON position and the steer-mode switch in the 4-wheel-steer position. The multimeter should read 12 to 13 volts.

If there is no voltage proceed to Step 42.

STEP 36

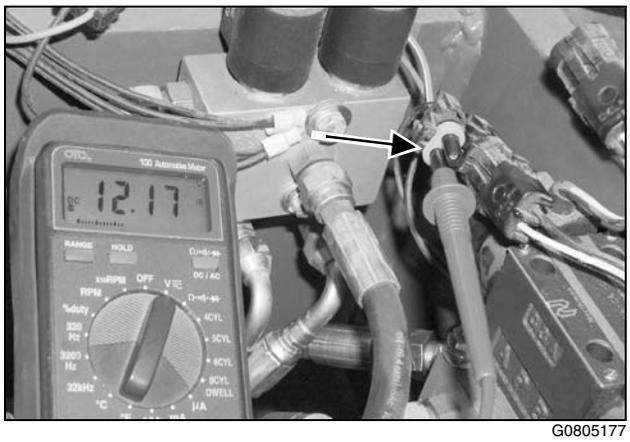


G0805083

If there is 12 to 13 volts but the 4-wheel-steer mode does not function, replace the solenoid valve.

Connect the wire harness to the 4-wheel-steer mode solenoid connector.

STEP 37



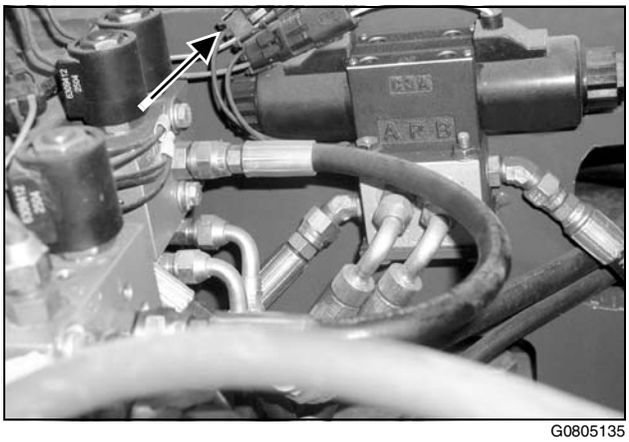
G0805177

Disconnect the crab steer wire harness (orange/white and black wires) from the steer-mode solenoid connector. Install the positive (+) test lead in the orange/white wire prong of the wire harness. With the key switch in the ON position and the steer-mode switch in the crab-steer position, the multimeter should read 12 to 13 volts.

If there is no voltage, proceed to the next step.

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STEP 38

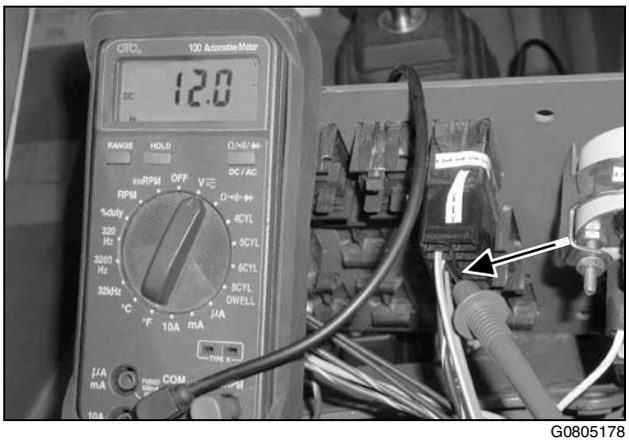


G0805135

If there is 12 to 13 volts, but the crab-steer mode does not function, replace the solenoid valve.

Connect the wire harness to the crab-steer mode solenoid connector.

STEP 39



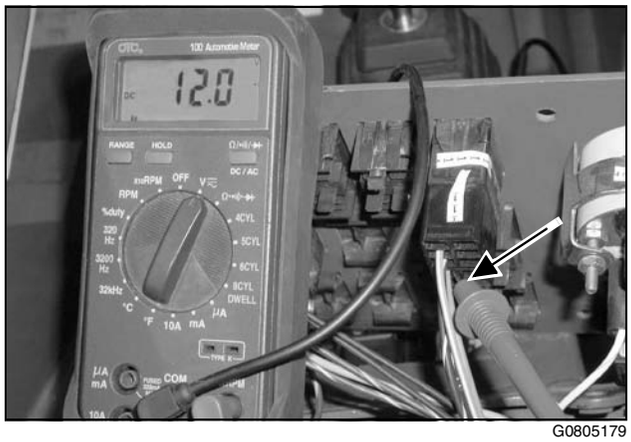
G0805178

Complete Step 13 to remove the instrument panel. Connect the positive (+) test lead to the black/yellow wire terminal of the steer-mode switch located on the left side of the instrument panel. With the key switch in the ON position the multimeter should read 12 to 13 volts.

If there is no voltage, repair or replace the black/yellow wire between the switch and the fuse panel.

If there is 12 to 13 volts, proceed to the next step.

STEP 40



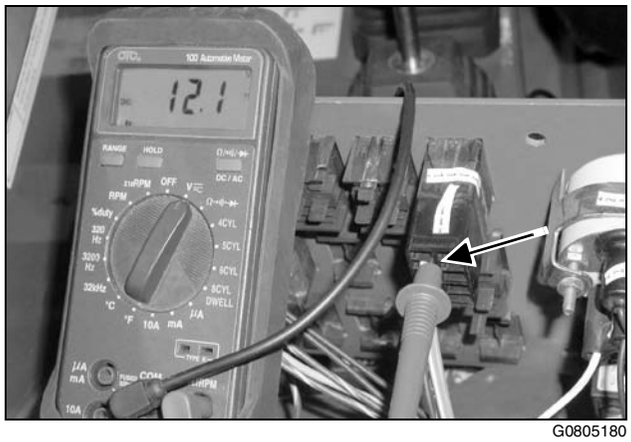
G0805179

Connect the positive (+) test lead to the green wire terminal of the steer-mode switch. With the key switch in the ON position and the steer-mode switch in the 4-WHEEL-STEER position, the multimeter should read 12 to 13 volts.

If there is no voltage, replace the steer-mode switch.

If there is 12 to 13 volts, but no voltage in Step 34, repair or replace the green wire between the switch and the solenoid valve.

STEP 41



G0805180

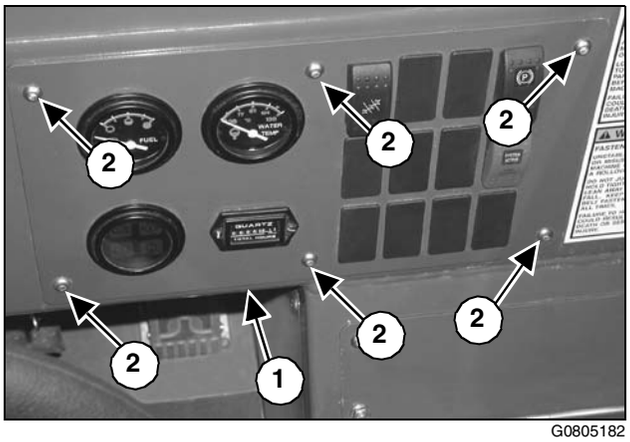
Connect the positive (+) test lead to the orange/white wire terminal of the steer-mode switch. With the key switch in the ON position and the steer-mode switch in the CRAB-STEER position, the multimeter should read 12 to 13 volts.

If there is no voltage, replace the steer-mode switch.

If there is 12 to 13 volts, but no voltage in Step 35, repair or replace the orange/white wire between the switch and the solenoid valve.

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STEP 42



G0805182

Install the instrument panel (1) using the six screws (2).

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Section

302

BATTERY REMOVAL AND INSTALLATION

RS5-34 Telescopic Handler

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BATTERY REMOVAL 1
BATTERY INSTALLATION 2

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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 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 injury.

WARNING

BATTERY ACID CAUSES SEVERE BURNS. Batteries contain sulfuric acid. Avoid contact with skin, eyes or clothing. Antidote: EXTERNAL - flush with water. INTERNAL - drink large quantities of water or milk. Follow with milk of magnesia, beaten egg or vegetable oil. Call a physician immediately. EYES - Flush with water for 15 minutes and get prompt medical attention.

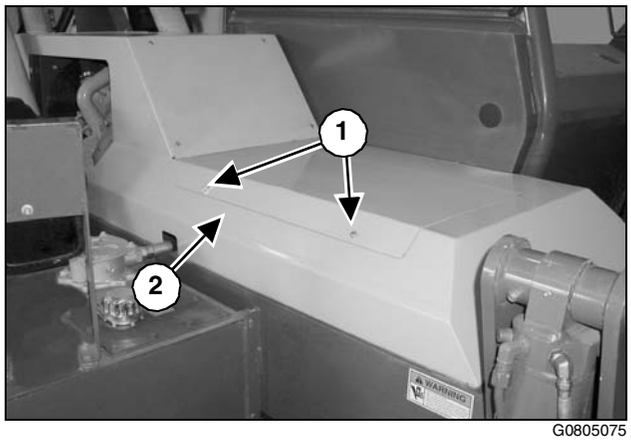
BATTERIES PRODUCE EXPLOSIVE GASES. Keep sparks, flame and cigarettes away. Ventilate when charging or using in enclosed space. Always shield eyes when working near batteries. KEEP OUT OF REACH OF CHILDREN.

WARNING

When working around storage batteries, remember that all of the exposed metal parts are “live”. Never lay a metal object across the terminals because a spark or short circuit will result.

BATTERY REMOVAL

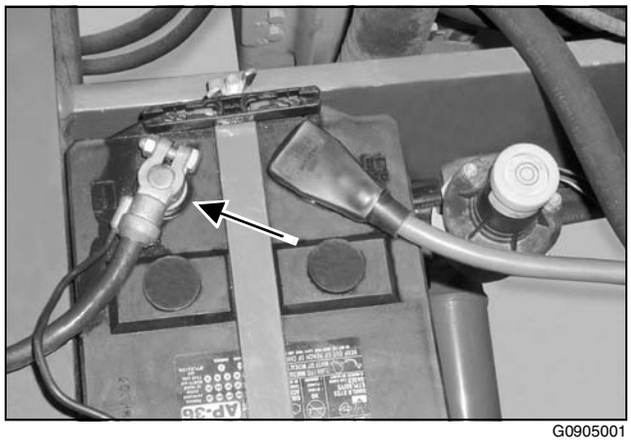
STEP 1



G0805075

Loosen the two thumbscrews (1) and remove the battery access cover (2).

STEP 2



G0905001

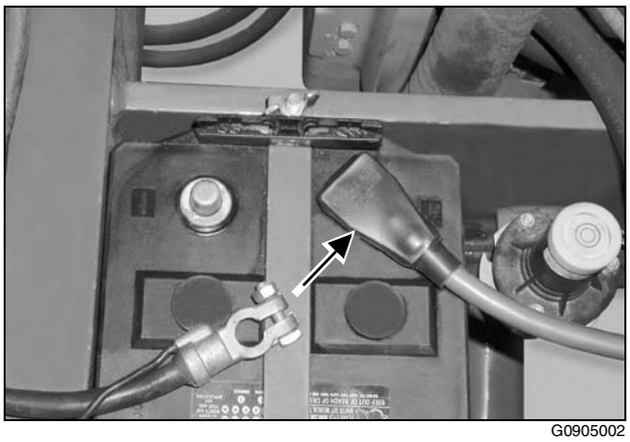
Remove the negative (-) battery cable from the battery.

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WARNING

Always remove the negative (-) battery cable first so you do not cause a spark at the battery. A spark can cause the battery to explode and cause personal injury or damage to the machine.

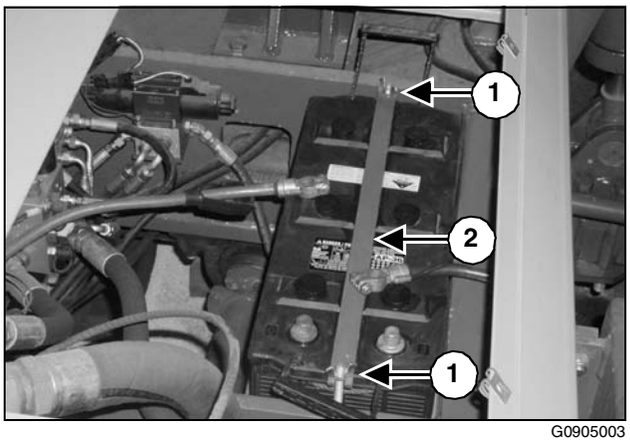
STEP 3



G0905002

Remove the positive (+) battery cable from the battery.

STEP 4



G0905003

Remove the two wing nuts (1) and the battery hold-down bar (2).

STEP 5



G0905004

Carefully lift the battery from the battery compartment.

BATTERY INSTALLATION

WARNING

When working around storage batteries, remember that all of the exposed metal parts are “live”. Never lay a metal object across the terminals because a spark or short circuit will result.

STEP 6

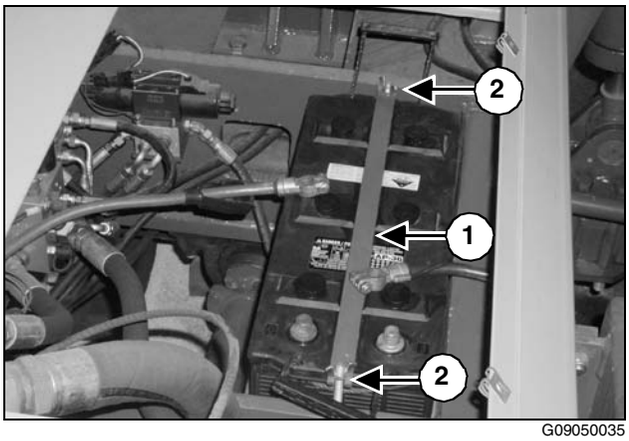


G0905004

Carefully lower the battery into the battery compartment.

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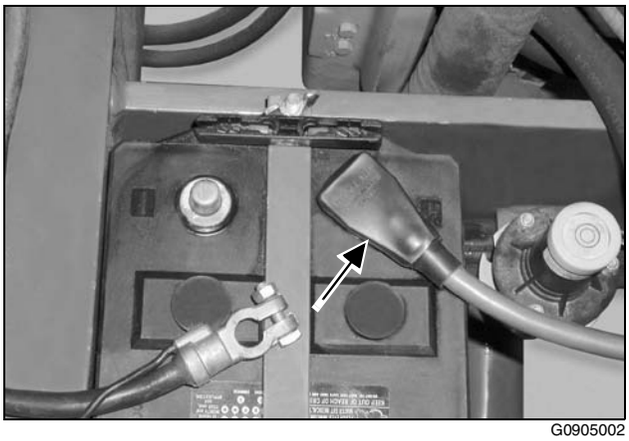
STEP 7



G09050035

Install the hold-down bar (1) and secure with the two wing nuts (2).

STEP 8



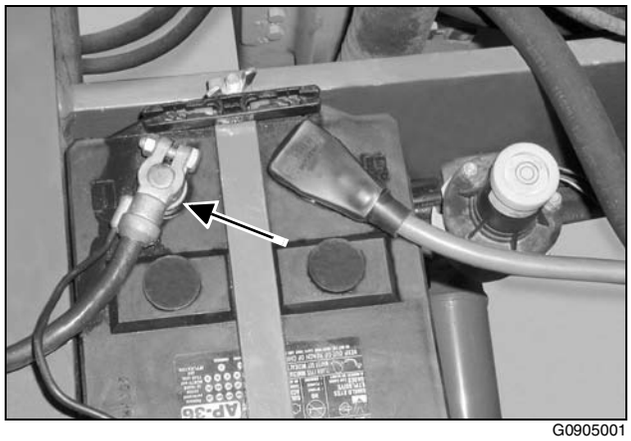
G0905002

Install the positive (+) battery cable on the positive (+) battery post.

WARNING

Always install the negative (-) battery cable last so you do not cause a spark at the battery. A spark can cause the battery to explode and cause personal injury or damage to the machine.

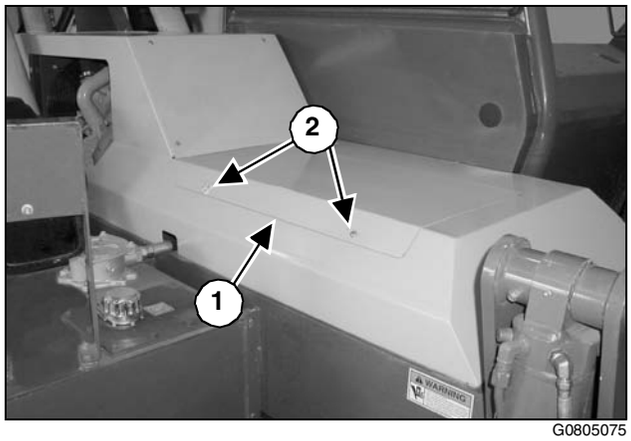
STEP 9



G0905001

Install the negative (-) battery cable on the negative (-) battery post.

STEP 10



G0805075

Install the battery access cover (1) and secure using the two thumbscrews (2).

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Section

401

STEERING CONTROL VALVE REMOVAL AND INSTALLATION

RS5-34 Telescopic Handler

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MANDATORY SAFETY SHUTDOWN PROCEDURE

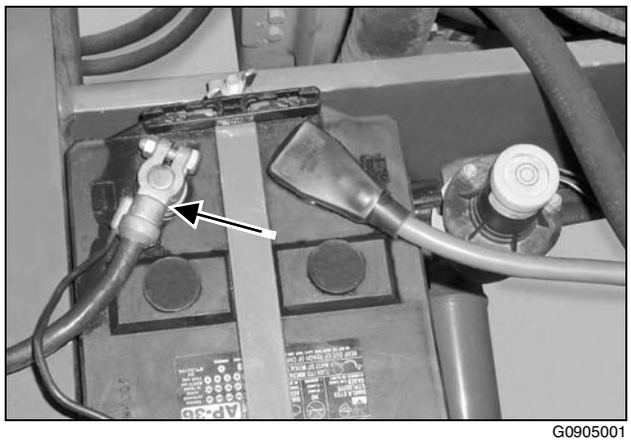
BEFORE cleaning, lubricating, or servicing this equipment:

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 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 injury.

STEERING CONTROL VALVE REMOVAL

STEP 1



G0905001

Disconnect the battery ground cable.

STEP 2



G0505035

Remove the cap from the center of the steering wheel.

STEP 3



G0905014

Loosen and remove the steering wheel nut.

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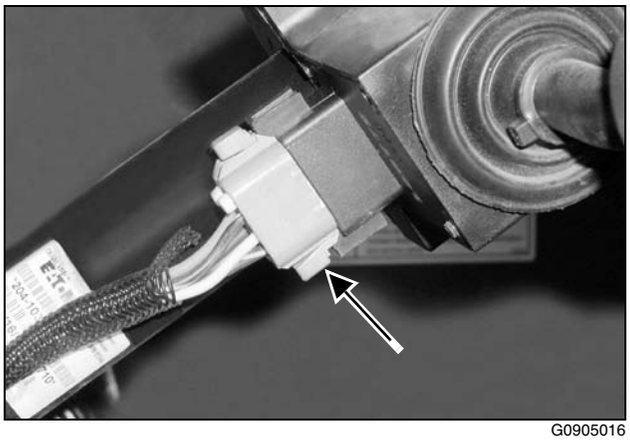
STEP 4



G0905041

Remove the steering wheel.

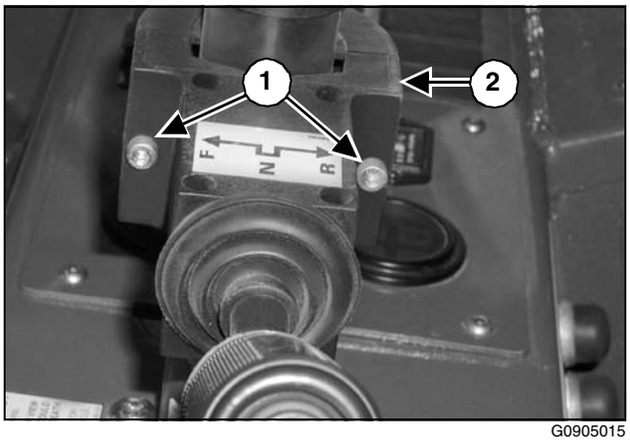
STEP 5



G0905016

Disconnect the electrical harness from the gear selector.

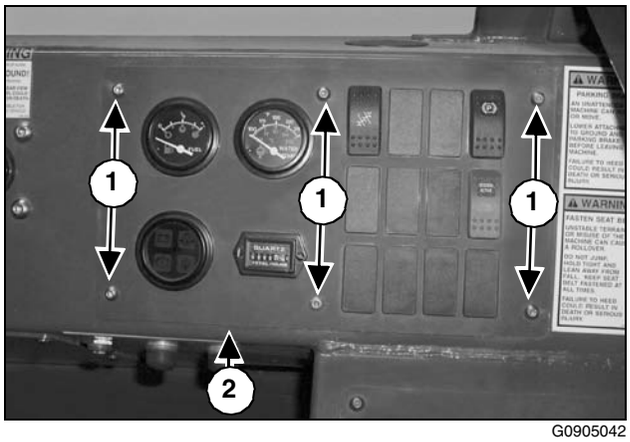
STEP 6



G0905015

Remove the two bolts (1) and gear selector (2) from the steering column.

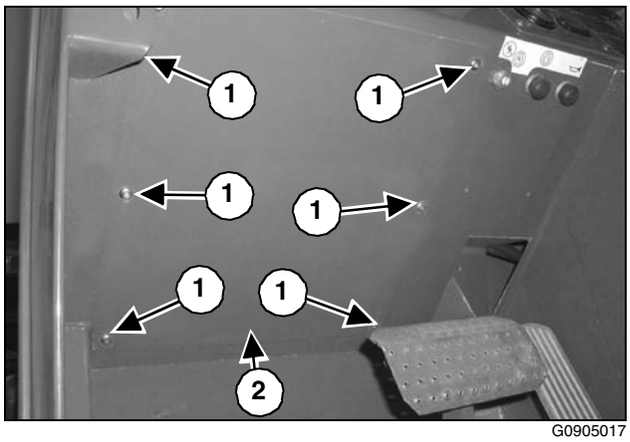
STEP 7



G0905042

Remove the six screws (1) from the instrument panel (2). Pull the instrument panel (2) outward to gain access to the hydraulic fittings and hoses on the steering control valve.

STEP 8

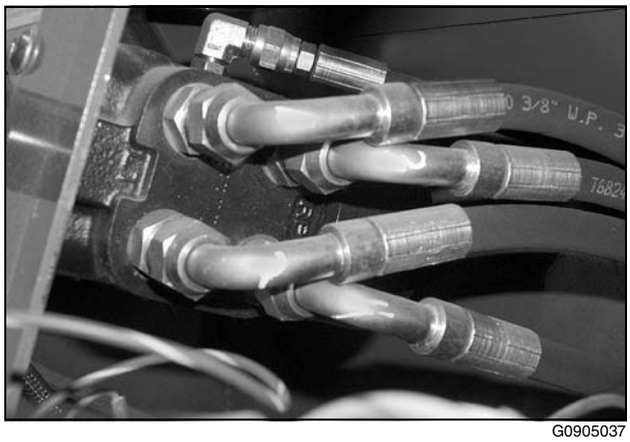


G0905017

Remove the six screws (1) and remove the heater panel (2).

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STEP 9



G0905037

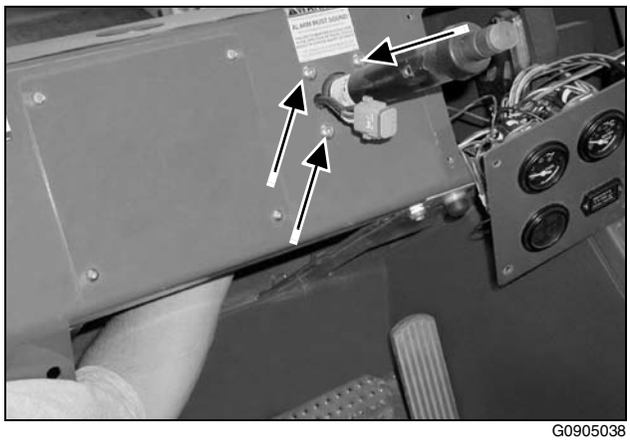
Mark the hydraulic hoses and fittings for correct installation. Remove the hydraulic hoses from the steering control valve.

NOTE: *Place a drip pan under the steering control valve before removing hoses.*

STEP 10

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

STEP 11

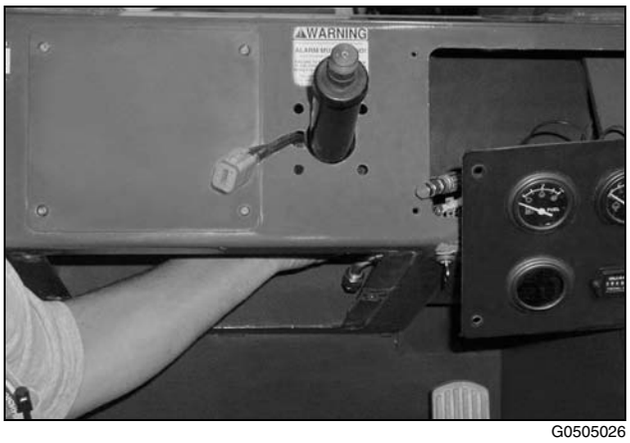


G0905038

Support the steering control valve and remove the four mounting bolts. Remove the steering control valve from the machine.

STEERING CONTROL VALVE INSTALLATION

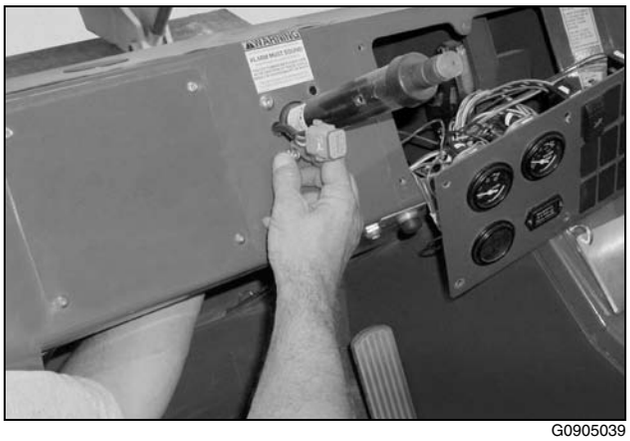
STEP 12



G0505026

Position the steering control valve in place. Make sure the fittings are in the proper position for hose installation.

STEP 13



G0905039

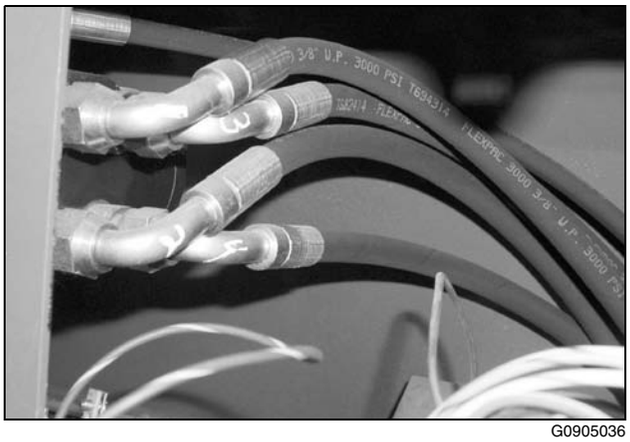
Install the four mounting bolts.

STEP 14

Remove the caps and plugs from the hydraulic hoses and fittings.

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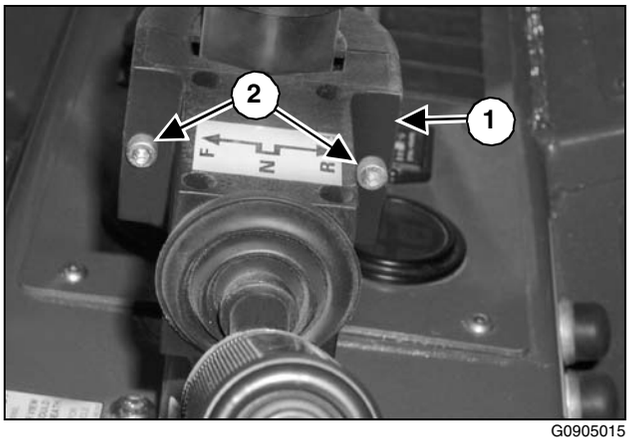
STEP 15



G0905036

Install the hydraulic hoses to the fittings on the steering control valve.

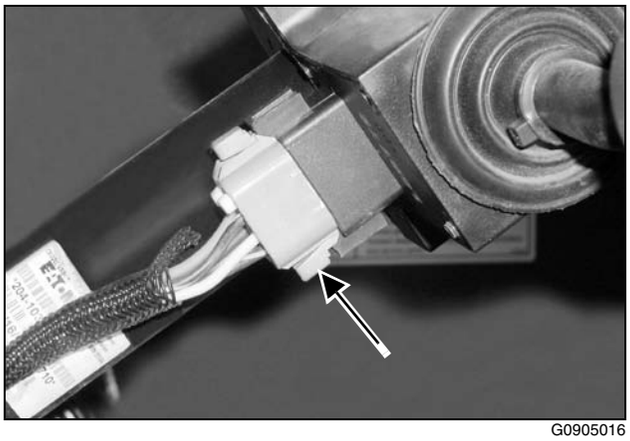
STEP 16



G0905015

Install the gear selector (1) on the steering column using the two bolts (2).

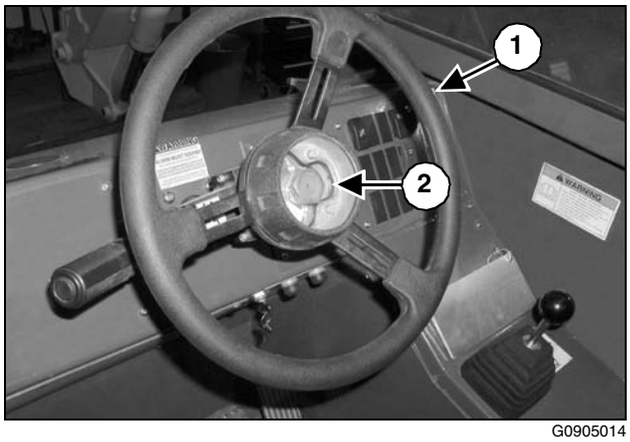
STEP 17



G0905016

Connect the electrical harness to the connector on the bottom of the gear selector.

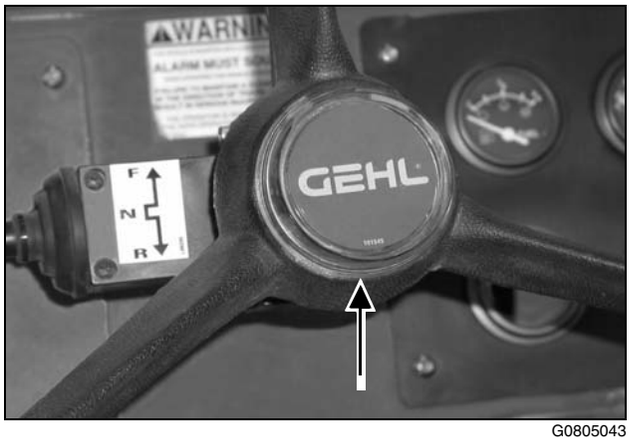
STEP 18



G0905014

Install the steering wheel (1) and the steering wheel nut (2) onto the steering column. Tighten the nut to a torque of 35 lb.-ft. (47 Nm).

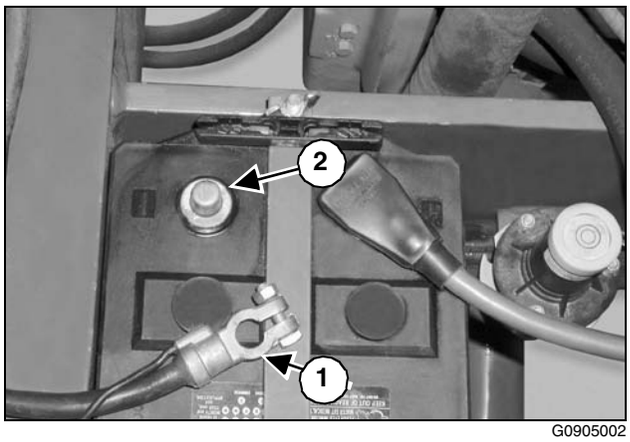
STEP 19



G0805043

Install the steering wheel center cap.

STEP 20



G0905002

Install the negative (-) battery cable (1) onto the negative (-) battery post (2).

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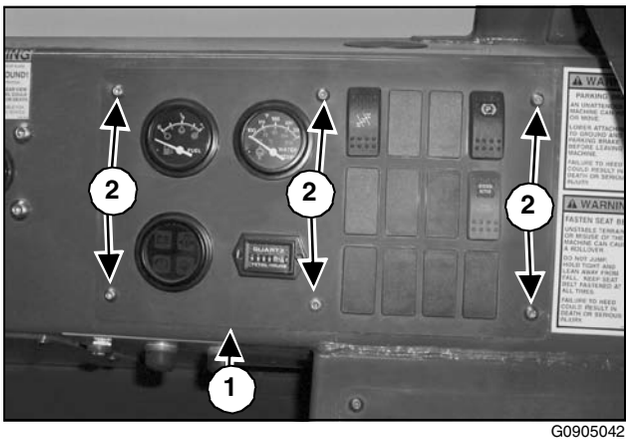
STEP 21

Start the engine; apply the park brake. Turn the steering wheel in one direction until the wheels reach their travel limits, and back the other way to their limits. Repeat this procedure several times until the air is removed from the circuit.

STEP 22

Shut off the engine; check for leaks. Correct any leakage found. Check hydraulic fluid level; add fluid if needed.

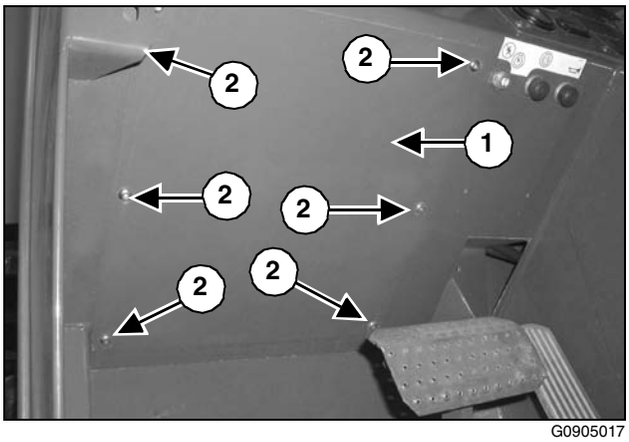
STEP 23



G0905042

Install the instrument panel (1) using the six screws (2).

STEP 24



G0905017

Install the heater panel (1) using the six screws (2).

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Section

501

TRANSMISSION REMOVAL AND INSTALLATION

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TRANSMISSION INSTALLATION 10

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TRANSMISSION REMOVAL

STEP 1

Raise the telescopic boom enough to allow a hoist to be used for transmission removal and installation. Support the boom on a support stand.

MANDATORY SAFETY SHUTDOWN PROCEDURE

BEFORE cleaning, adjusting, lubricating, or servicing this unit:

1. Stop machine on a level surface. (AVOID parking on a slope, but if necessary, park across the slope and block the tires.)
2. Fully retract the boom and lower the attachment tool to the ground. Idle engine for gradual cooling.
3. Place controls in neutral and apply parking brake.
4. Shut off the engine and remove the key.

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 injury.

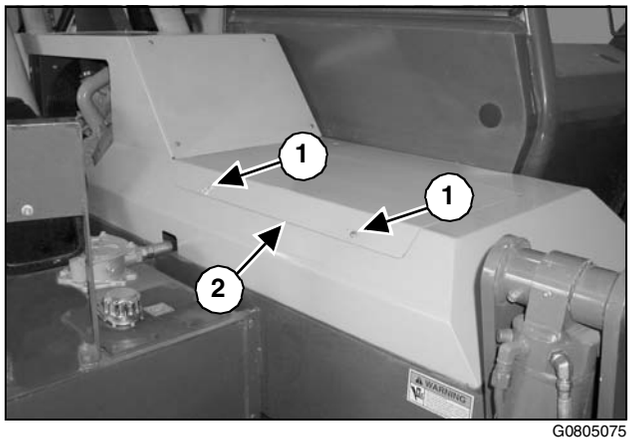
STEP 2



G0905065

Place a wheel chock in front of and behind at least one tirel.

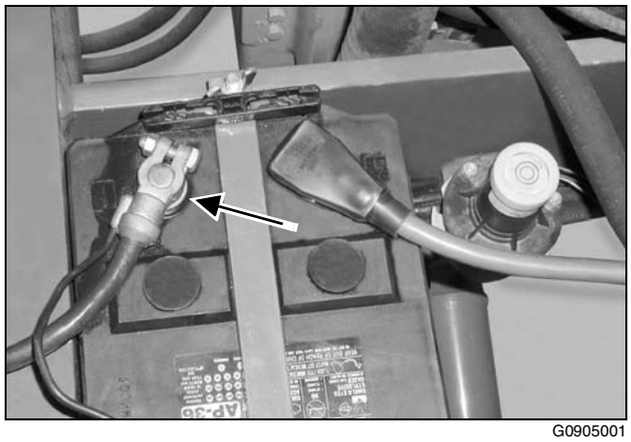
STEP 3



G0805075

Loosen the two thumbscrews (1) and remove the battery access cover (2).

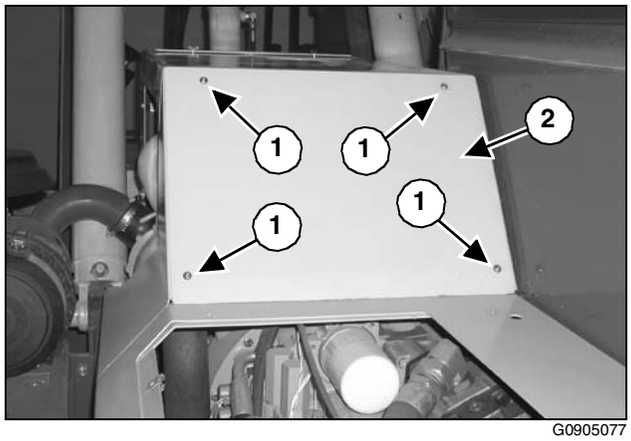
STEP 4



G0905001

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

STEP 5

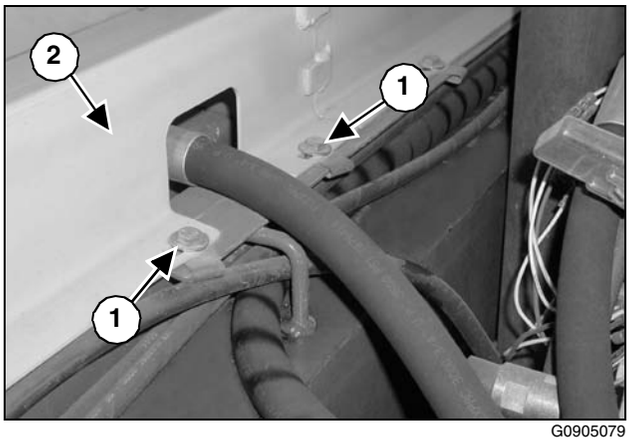


G0905077

Remove the four screws (1) and the fuel filter access cover (2).

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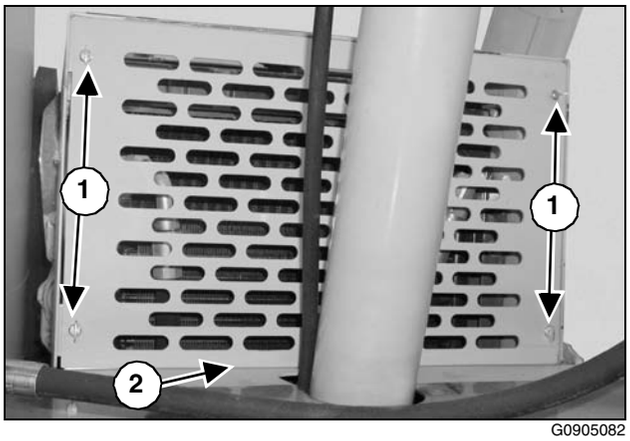
STEP 6



G0905079

Remove the six bolts (1) and the transmission cover (2).

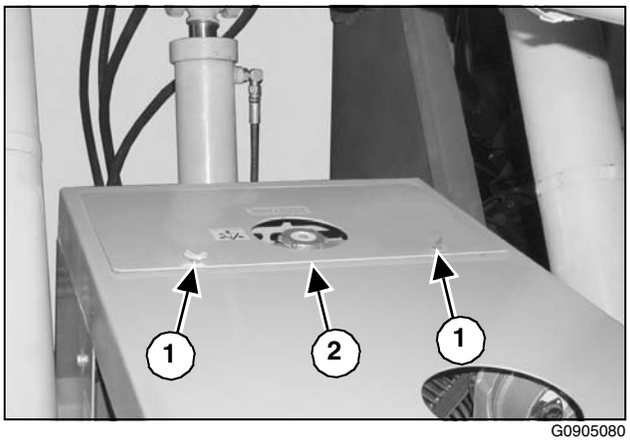
STEP 7



G0905082

Loosen the four thumbscrews (1) and remove the radiator grille (2).

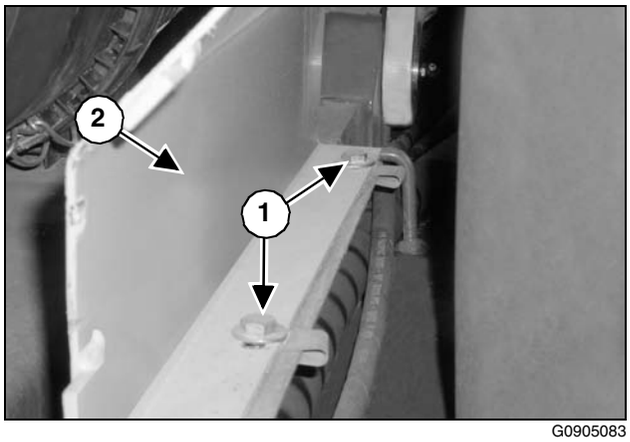
STEP 8



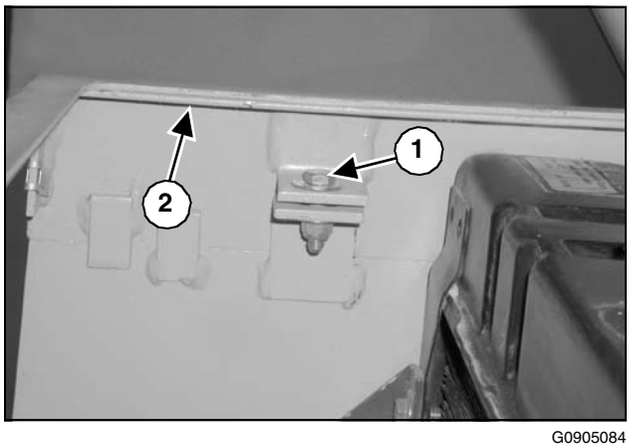
G0905080

Loosen the two thumbscrews (1) and remove the radiator cover (2).

STEP 9



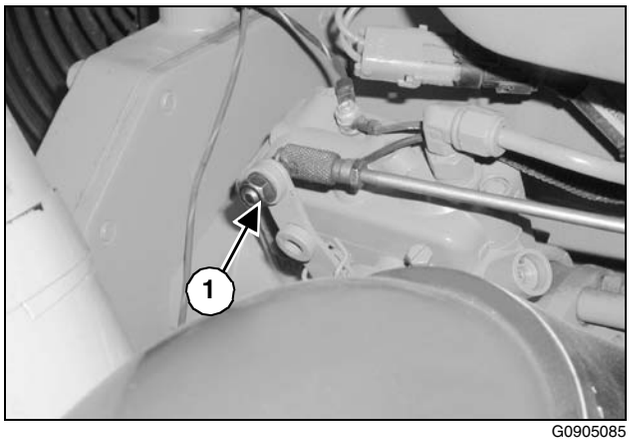
G0905083



G0905084

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

STEP 10

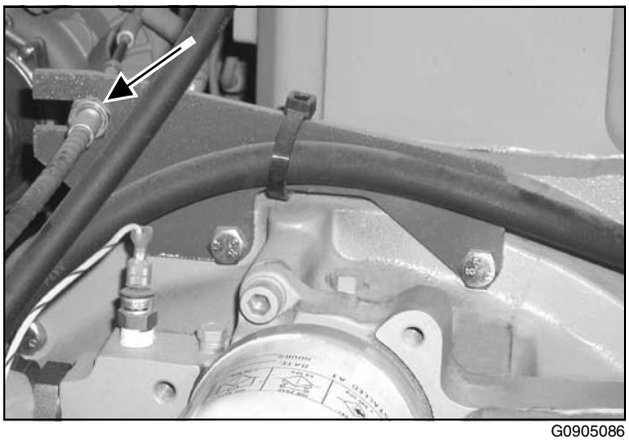


G0905085

Disconnect the throttle linkage (1) from the injector pump.

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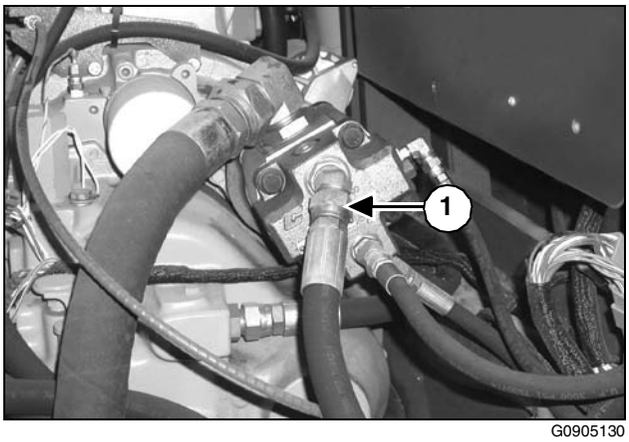
STEP 11



G0905086

Remove the throttle linkage from the mounting bracket.

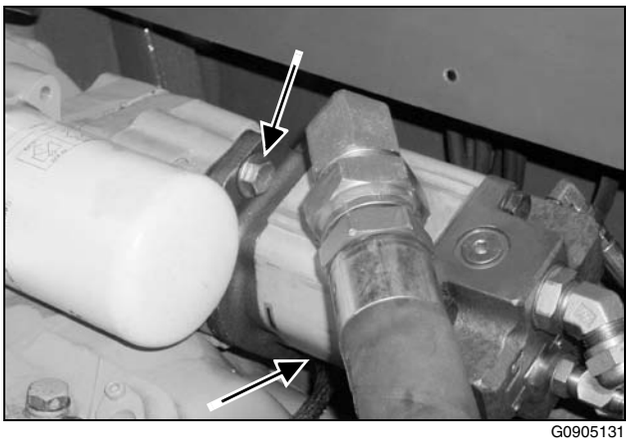
STEP 12



G0905130

Remove the flow divider IN port hydraulic hose (1) from the hydraulic pump. Install a plug in the hose and a cap on the fitting.

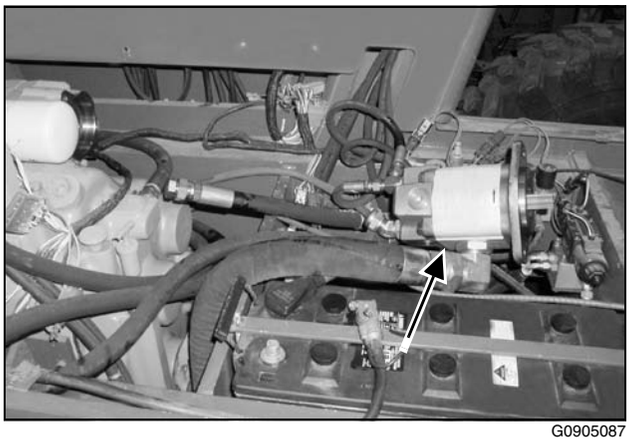
STEP 13



G0905131

Remove the two hydraulic pump mounting bolts.

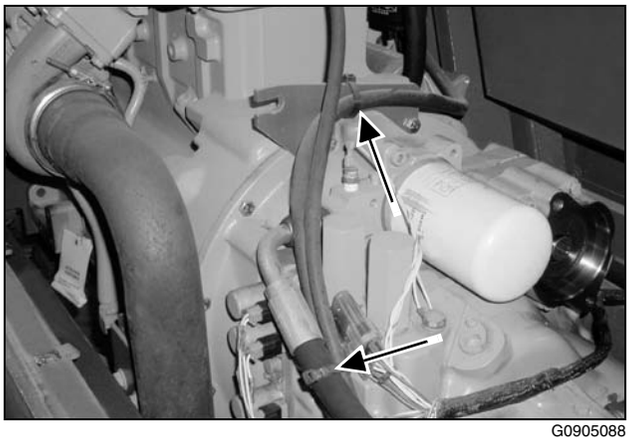
STEP 14



G0905087

Remove the hydraulic pump. Position the pump where it will not interfere with transmission removal or installation.

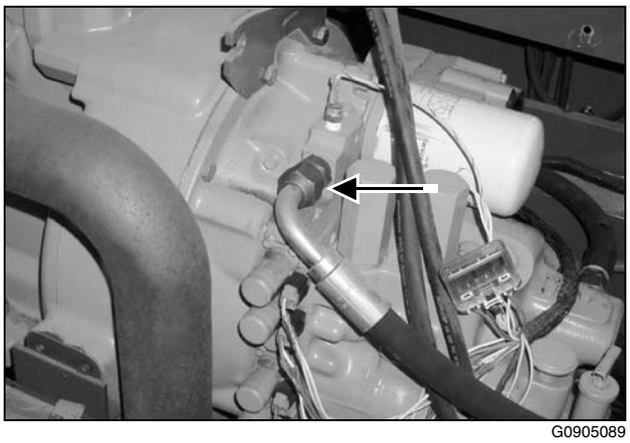
STEP 15



G0905088

Remove the cable ties from the upper transmission cooling line and fuel lines.

STEP 16

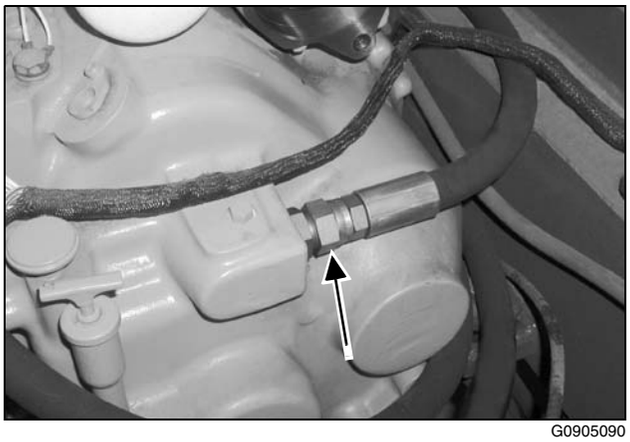


G0905089

Remove the upper cooling line. Install a plug in the line and a cap on the fitting.

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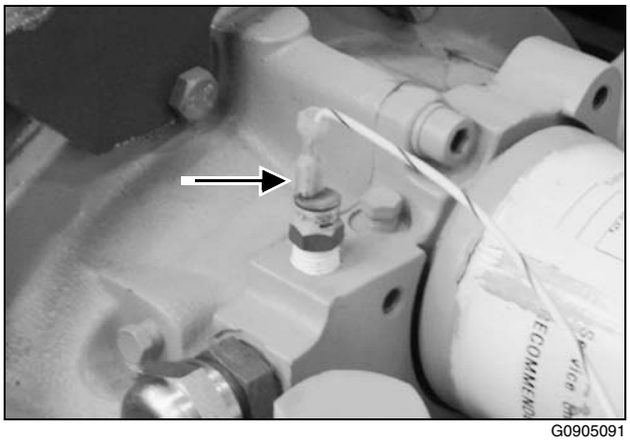
STEP 17



G0905090

Remove the lower cooling line. Install a plug in the line and a cap on the fitting.

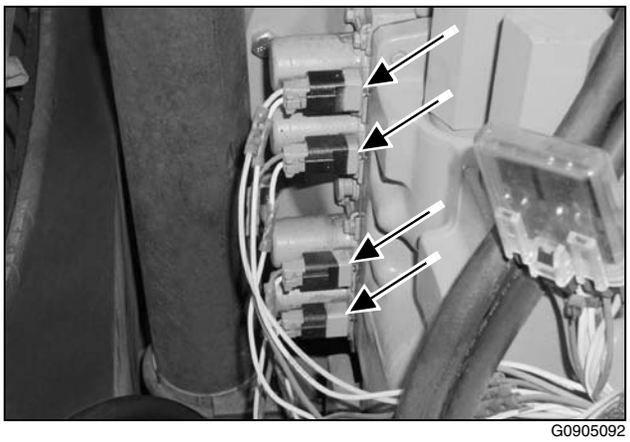
STEP 18



G0905091

Label and disconnect the transmission temperature sender wire.

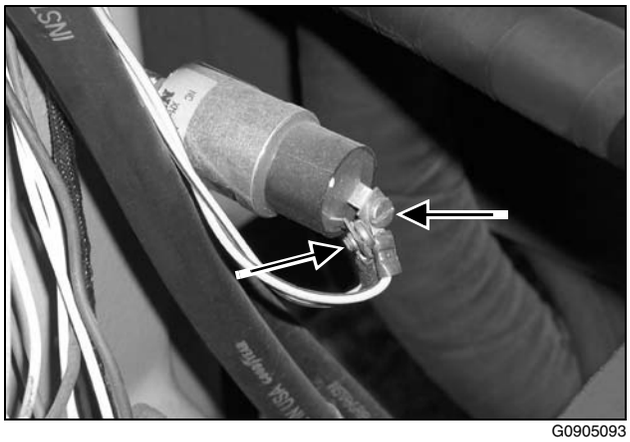
STEP 19



G0905092

Label and disconnect the four electrical connectors for the gear selection solenoids.

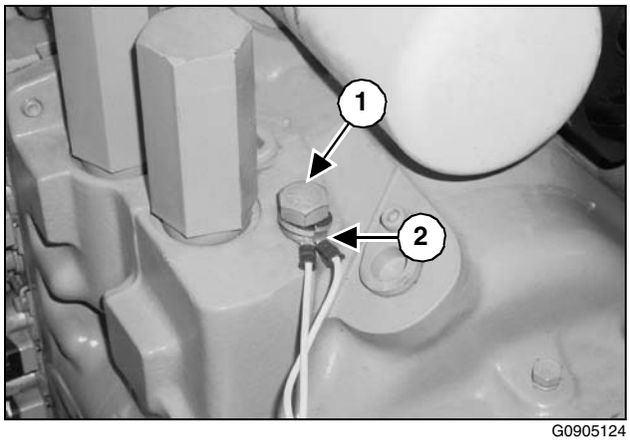
STEP 20



G0905093

Label and disconnect the two wires from the reverse pressure switch.

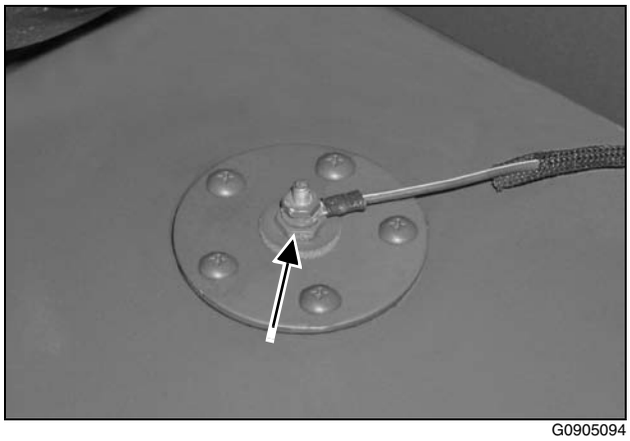
STEP 21



G0905124

Remove the bolt (1) and the two ground wires (2).

STEP 22

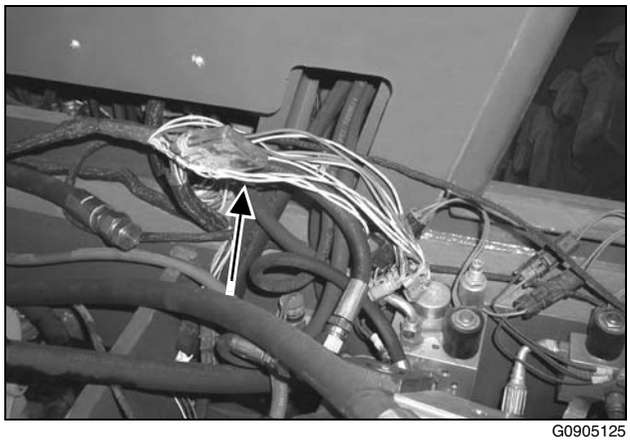


G0905094

Label and disconnect the fuel gauge sender wire.

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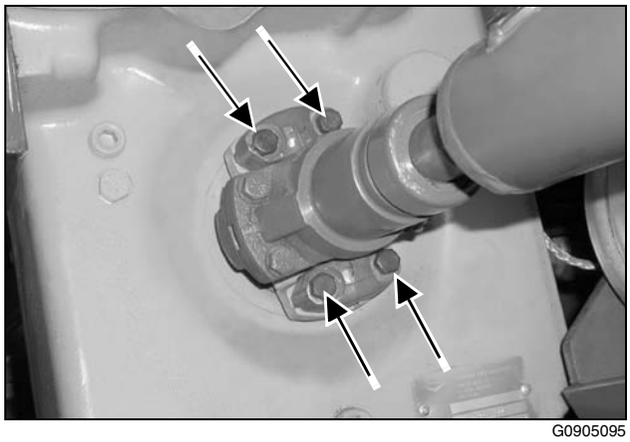
STEP 23



G0905125

Position the wire harness on the left frame rail so it will not interfere with removal or installation of the transmission.

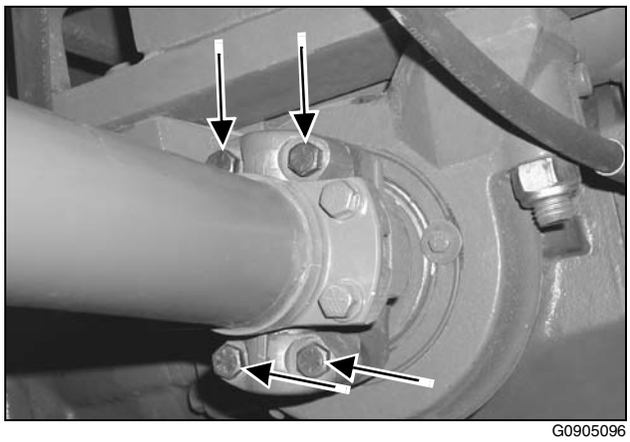
STEP 24



G0905095

Remove the four bolts securing the rear drive shaft to the transmission.

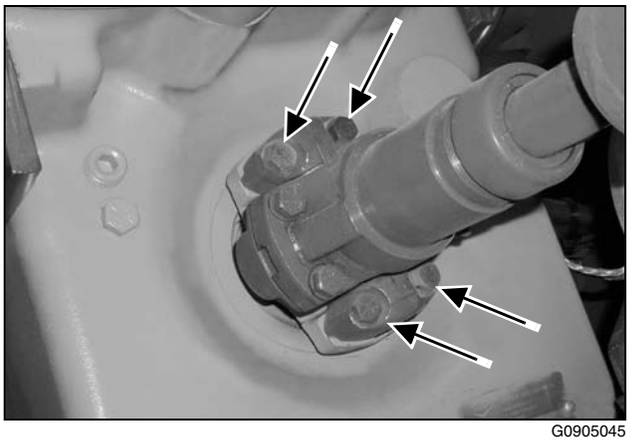
STEP 25



G0905096

Remove the four bolts securing the rear drive shaft to the rear axle and remove the rear drive shaft.

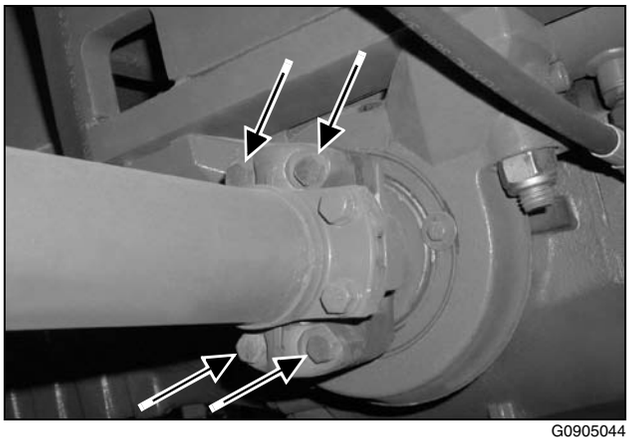
STEP 26



G0905045

Remove the four bolts securing the front drive shaft to the transmission.

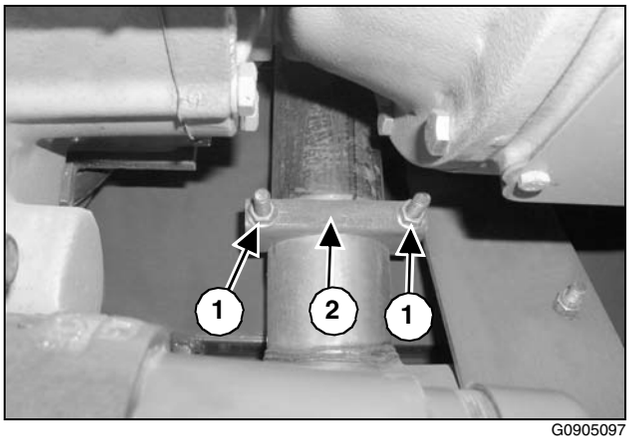
STEP 27



G0905044

Remove the four bolts securing the front drive shaft to the front axle and remove the drive shaft.

STEP 28

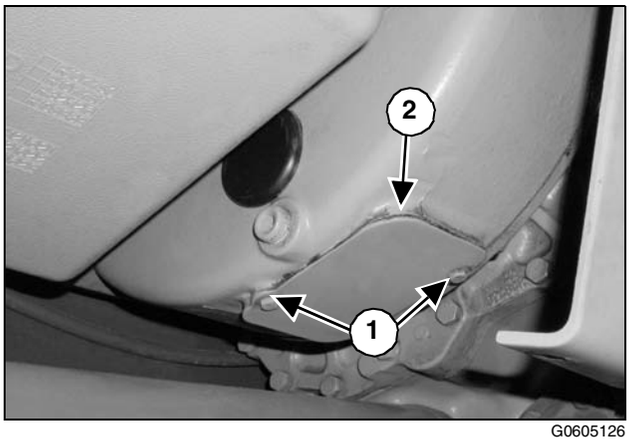


G0905097

Remove the two nuts (1) and muffler clamp (2) securing the muffler to the exhaust pipe.

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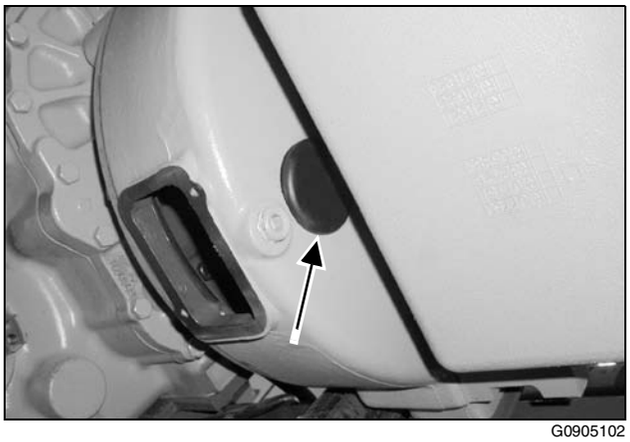
STEP 29



G0605126

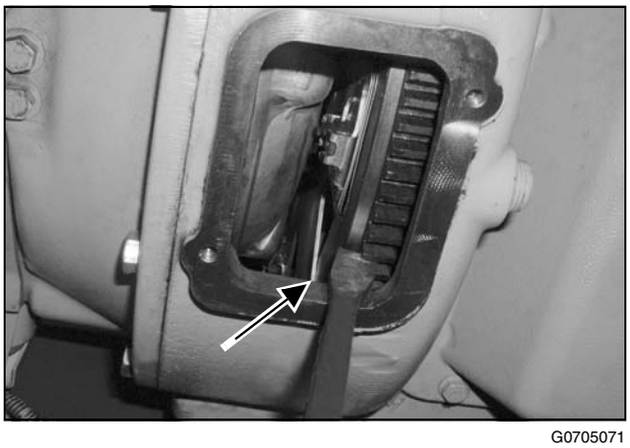
Remove the two bolts (1) and the inspection plate (2) from the bottom of the housing bell.

STEP 30



G0905102

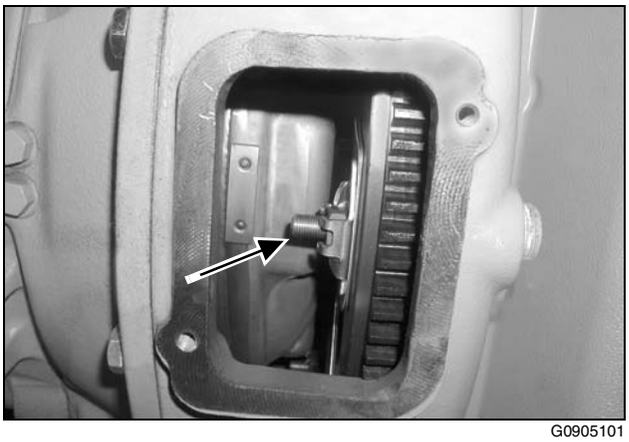
Remove the rubber access plug from the front of the housing bell.



G0705071

NOTE: *The flywheel must be rotated to remove the flywheel-to-flex plate bolts. Rotate the flywheel by inserting a pry bar through the inspection hole in the bottom of the bellhousing and into the ring gear.*

STEP 31



G0905101

Rotate the flywheel until one of the plate flex bolts is in the 6 o'clock position.

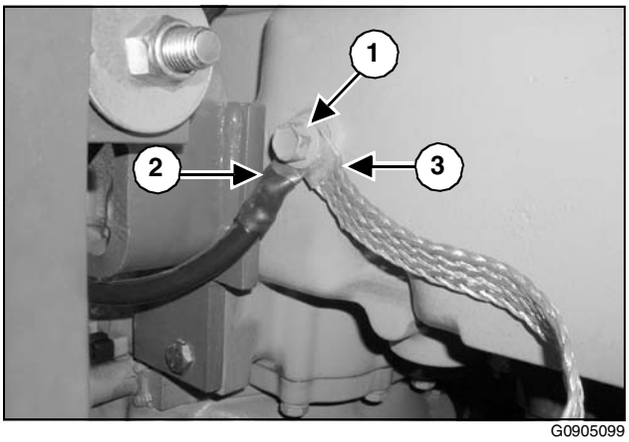
STEP 32



G0705024

Remove the flywheel to plate flex bolt. Repeat Steps 31 and 32 until all eight bolts are removed.

STEP 33



G0905099

Remove the bolt (1) securing the battery ground cable (2) and the chassis ground cable (3) to the right side of the transmission.

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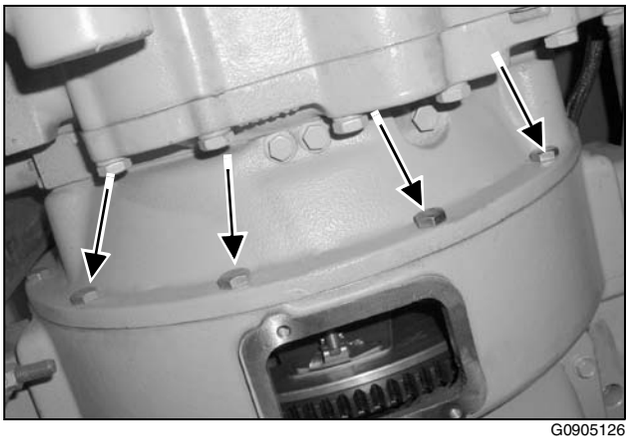
STEP 34



G0705055

Place a suitable jack under the engine, closest to the transmission. Raise the jack to support the weight of the engine when the transmission is removed.

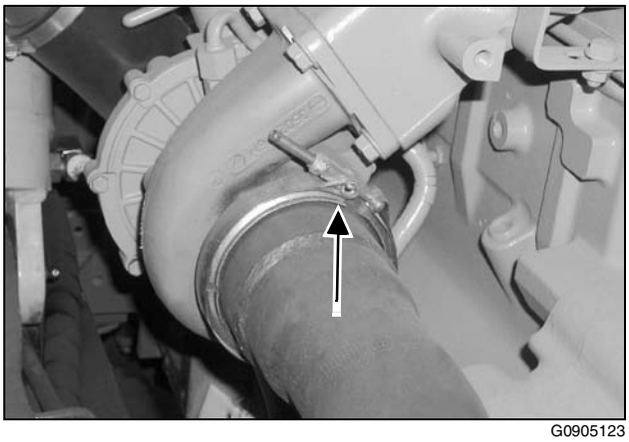
STEP 35



G0905126

Remove the lower housing bell bolts.

STEP 36



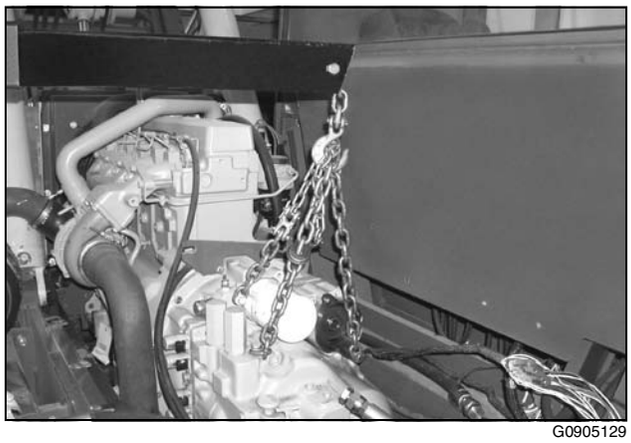
G0905123

Loosen and remove the band clamp securing the exhaust pipe to the turbocharger.

STEP 37

Remove the exhaust pipe from the machine.

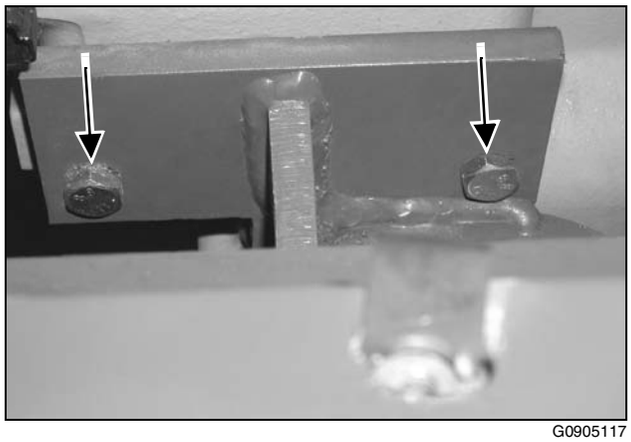
STEP 38



G0905129

Attach lifting chains to the transmission as shown. Attach the lifting chain to the hoist, apply enough upward pressure to support the transmission.

STEP 39

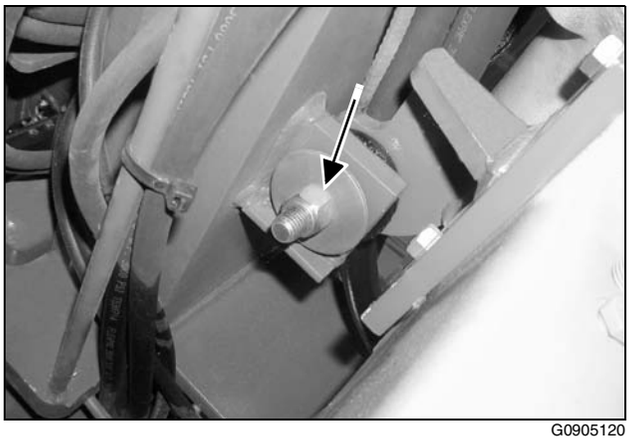


G0905117

Remove the two bolts securing the left side mounting bracket to the transmission.

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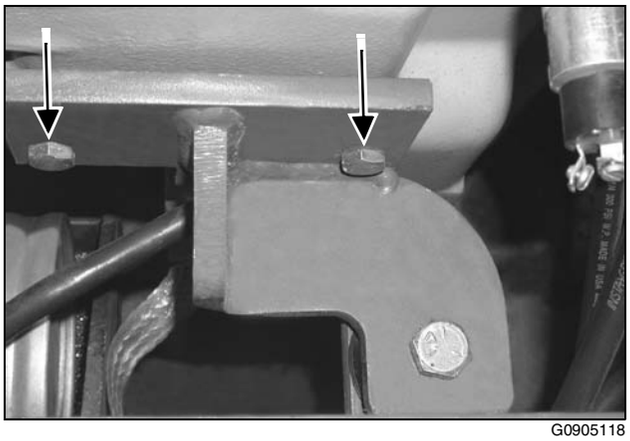
STEP 40



G0905120

Loosen the two lock nuts from the transmission mount bolts.

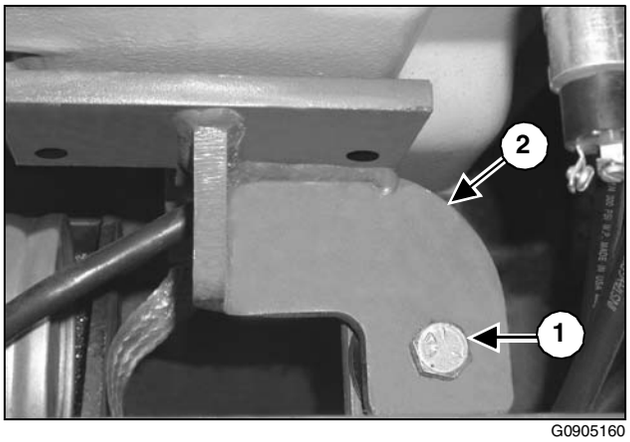
STEP 41



G0905118

Remove the two bolts securing the transmission to the right side transmission mounting bracket.

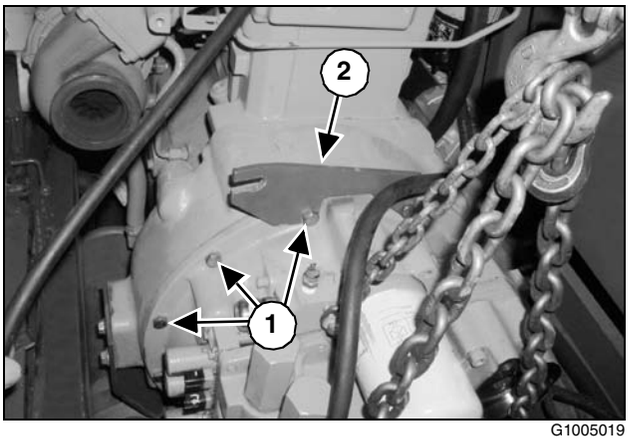
STEP 42



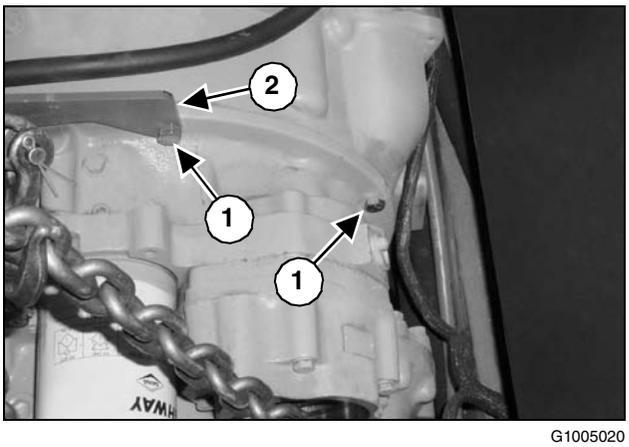
G0905160

Remove the right side transmission mounting bolt (1), washer, lock nut and the mounting bracket (2).

STEP 43



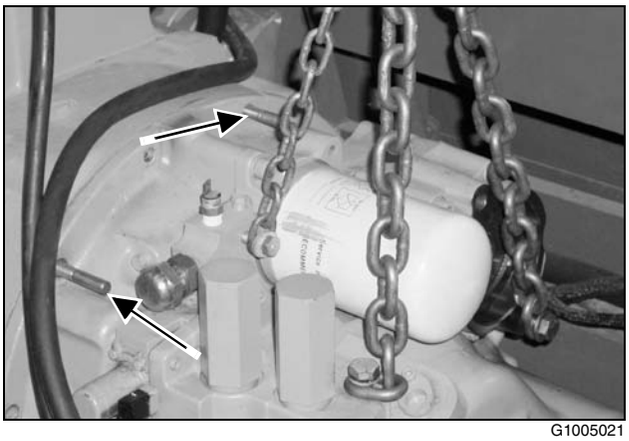
G1005019



G1005020

Remove the upper housing bell bolts (1) and the throttle cable mounting bracket (2).

STEP 44



G1005021

Install two guide studs as shown into the housing bell.

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STEP 45



G0705058

Pull the transmission forward to disengage it from the engine, and lift it out of the machine.

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TRANSMISSION INSTALLATION

STEP 46



G0705058

Lower the transmission into place until the plate flex on the torque converter clears the housing bell.

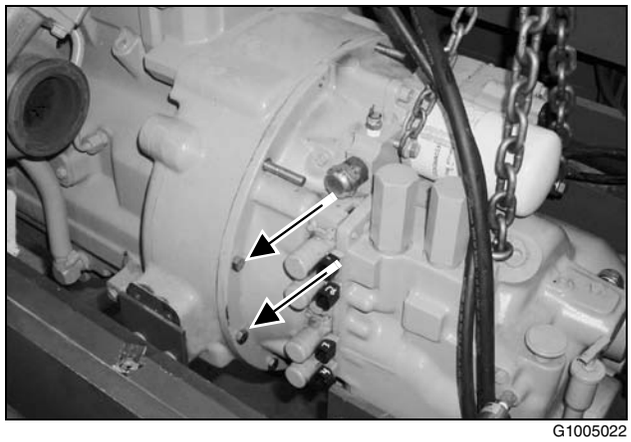
STEP 47



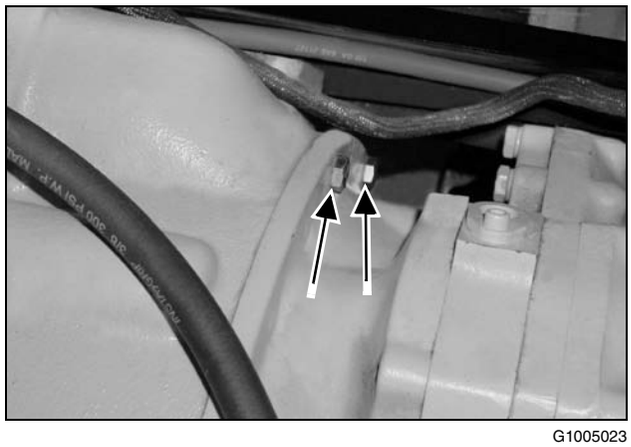
G1005021

Align the transmission with the guide studs in the housing bell. Push the transmission towards the engine until the mounting flanges on the housing bell and transmission meet.

STEP 48



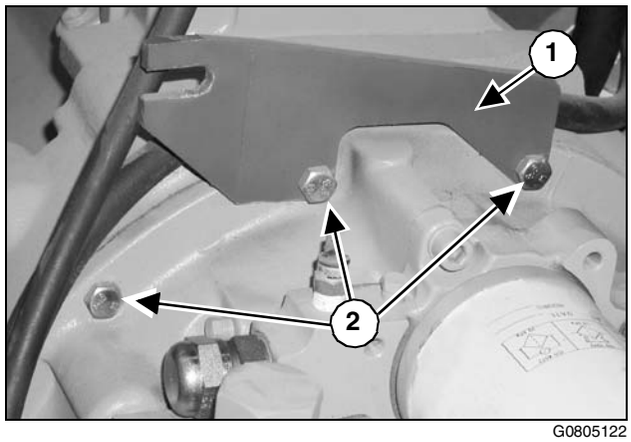
G1005022



G1005023

Install the upper side housing bell bolts.

STEP 49

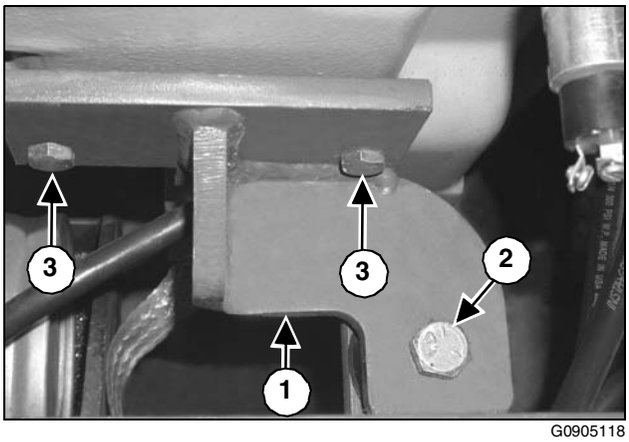


G0805122

Remove the two guide pins and install the throttle cable bracket (1) and remaining upper housing bell bolts (2).

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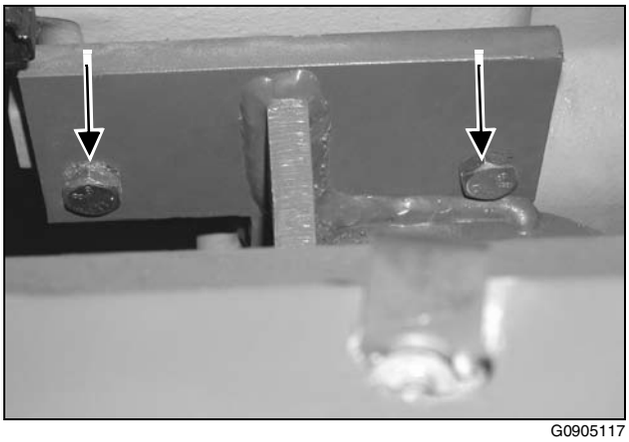
STEP 50



G0905118

Position the right side transmission mounting bracket (1) and install the mounting bolt (2) and the two bolts (3) securing the bracket to the transmission.

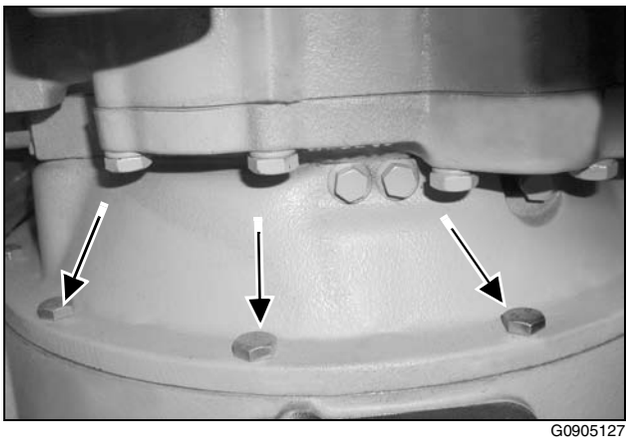
STEP 51



G0905117

Install the two bolts securing the left side mounting bracket to the transmission.

STEP 52



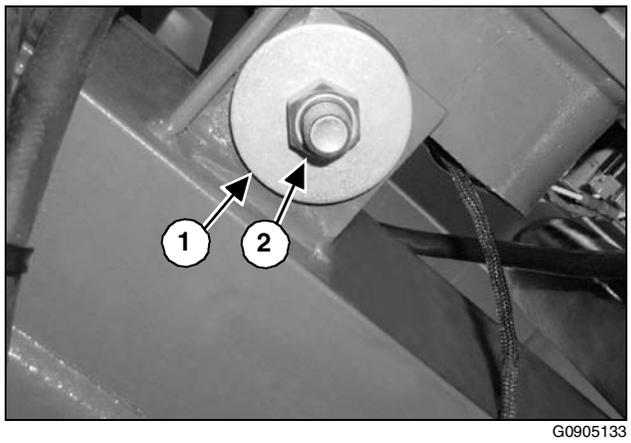
G0905127

Install the lower housing bell bolts.

STEP 53

Torque the housing bell bolts to 40 to 45 lb.-ft. (54 to 61 Nm).

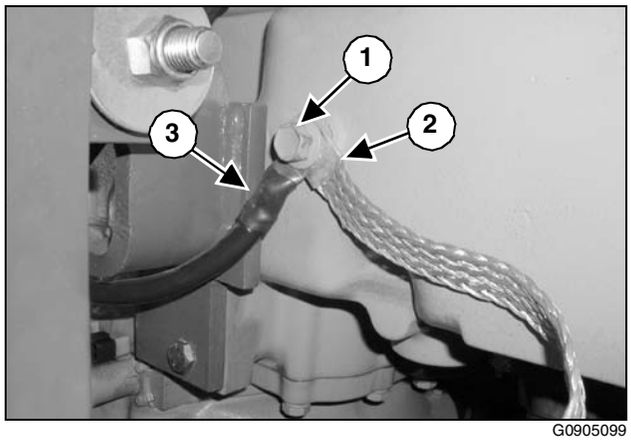
STEP 54



G0905133

Install the flat washer (1) and lock nut (2) on the right side mount bolt. Torque both center bolts to 285 to 320 lb.-ft. (385 to 435 Nm).

STEP 55



G0905099

Install and tighten the bolt (1) securing the chassis ground cable (2) and the battery ground cable (3) to the right side of the transmission.

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STEP 56



G0905128

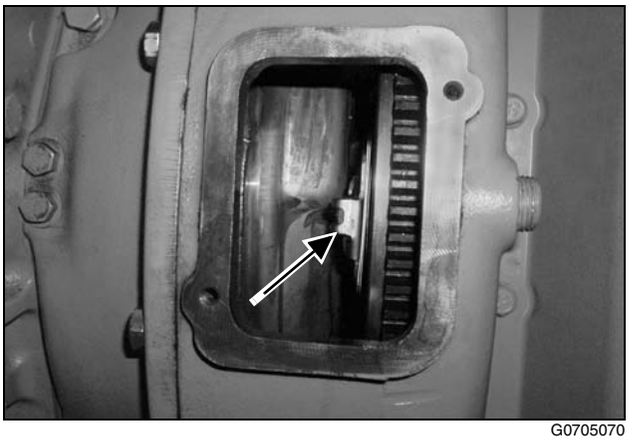
Remove the lifting chains, hoist and lower and remove the floor jack and blocking from under the housing bell.



G0705071

NOTE: *The flywheel must be rotated to install the flywheel-to-flex plate bolts. Rotate the flywheel by inserting a pry bar through the inspection hole in the bottom of the housing bell and into the ring gear.*

STEP 57



G0705070

Rotate the flywheel until the bolt hole in the flywheel is at approximately 6 o'clock and aligned with the nut plate on the plate flex.

STEP 58



G0705024

Install the flywheel to plate flex bolt.

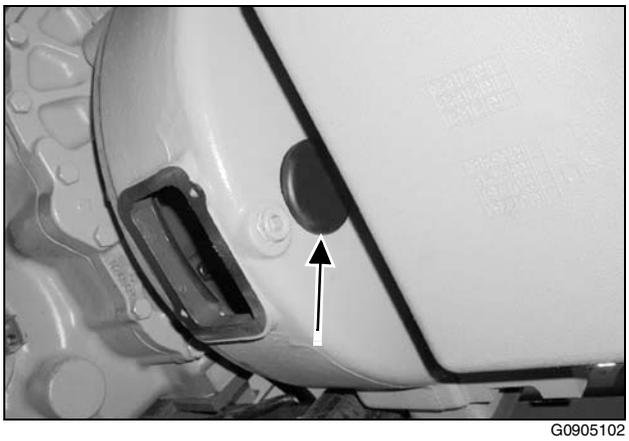
NOTE: *Do not fully tighten any of the flyweel-to-flex plate bolts until all eight bolts are installed.*

STEP 59

Repeat Steps 56 and 57 until all eight bolts are installed. Torque the bolts to 35 to 40 lb.-ft. (48 to 54 Nm).

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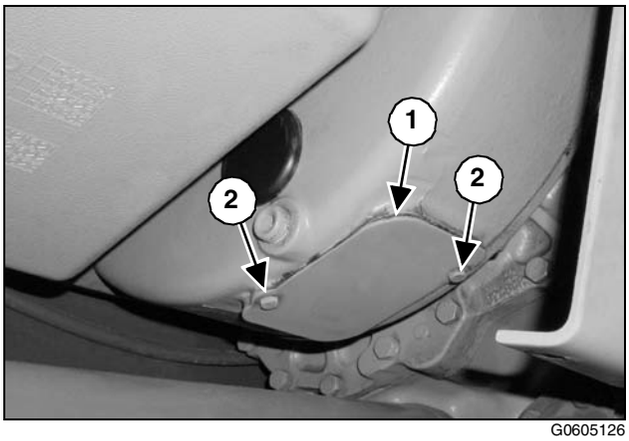
STEP 60



G0905102

Install the rubber access plug in the front of the housing bell.

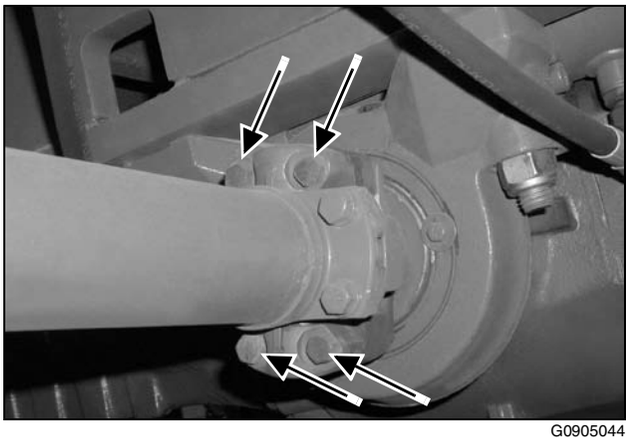
STEP 61



G0605126

Install the inspection cover (1) with the two bolts (2) on the bottom of the housing bell.

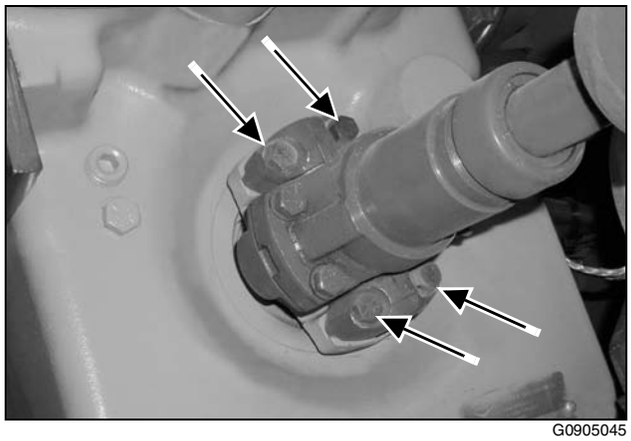
STEP 62



G0905044

Position the front shaft drive and install the four bolts securing it to the front axle.

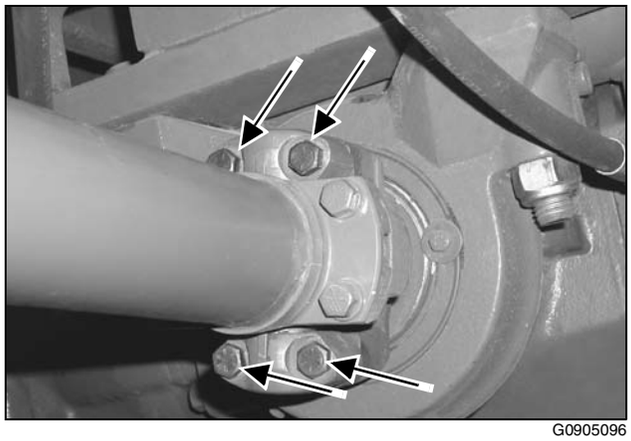
STEP 63



G0905045

Install the four bolts secure the front shaft drive to the transmission.

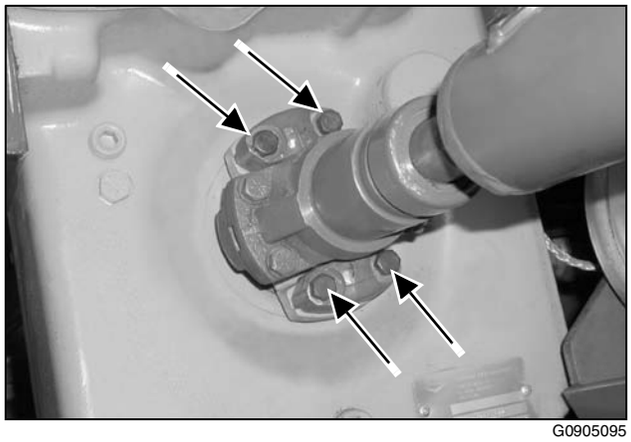
STEP 64



G0905096

Position the rear shaft drive and install the four bolts securing it to the rear axle.

STEP 65

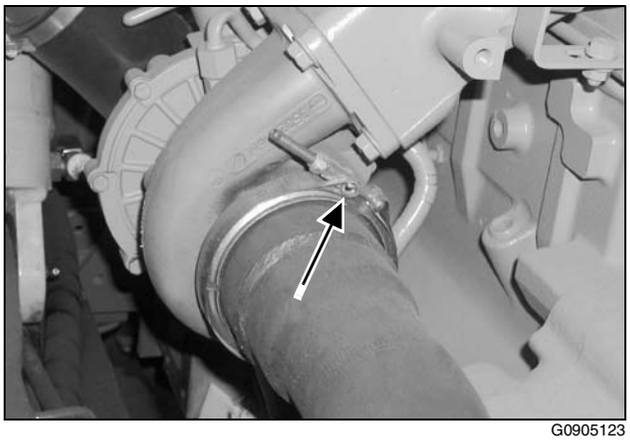


G0905095

Install the four bolts securing the rear shaft drive to the transmission.

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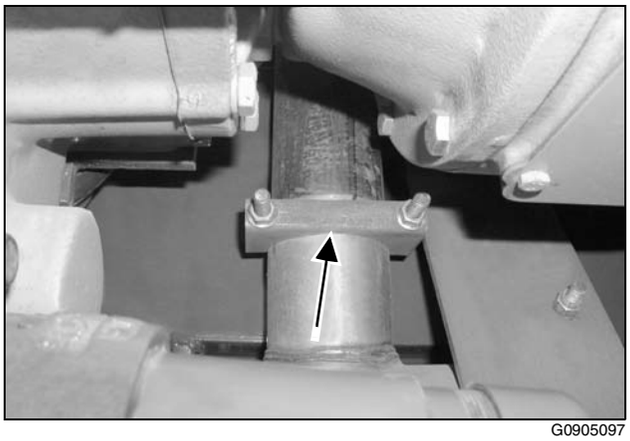
STEP 66



G0905123

Position the exhaust pipe and install the band clamp securing it to the turbocharger.

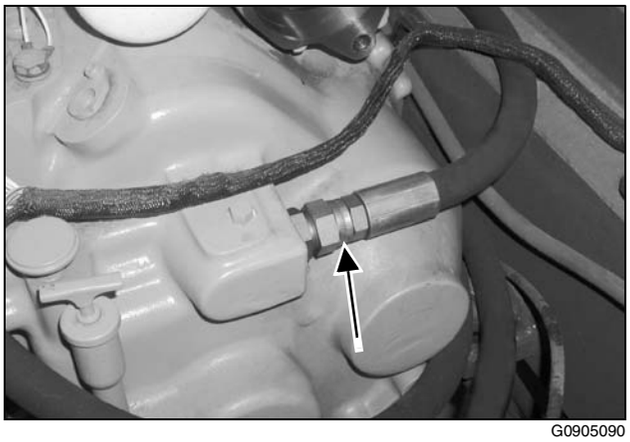
STEP 67



G0905097

Install the muffler clamp securing the exhaust pipe to the muffler.

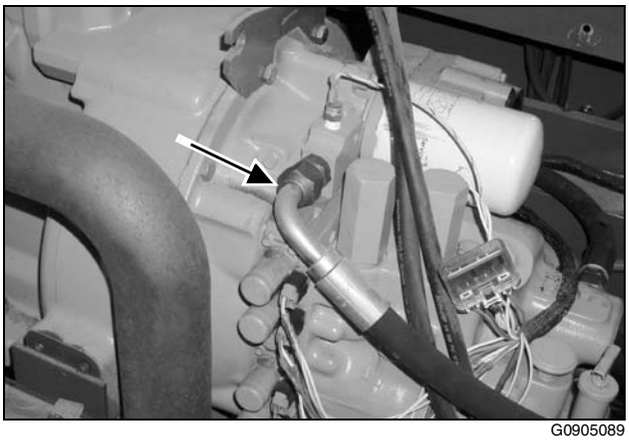
STEP 68



G0905090

Remove the cap and plug and install the lower transmission cooling line.

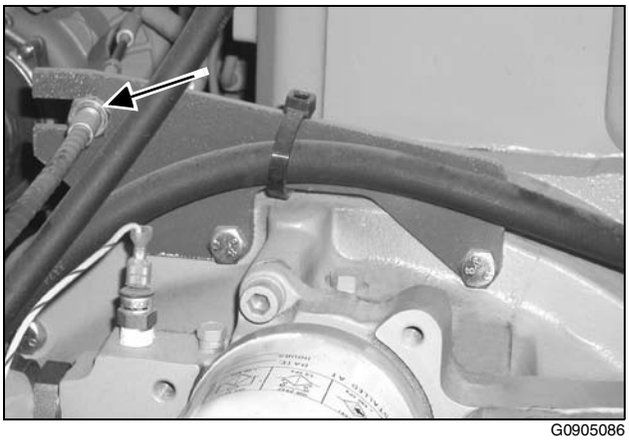
STEP 69



G0905089

Remove the cap and plug and install the upper transmission cooling line.

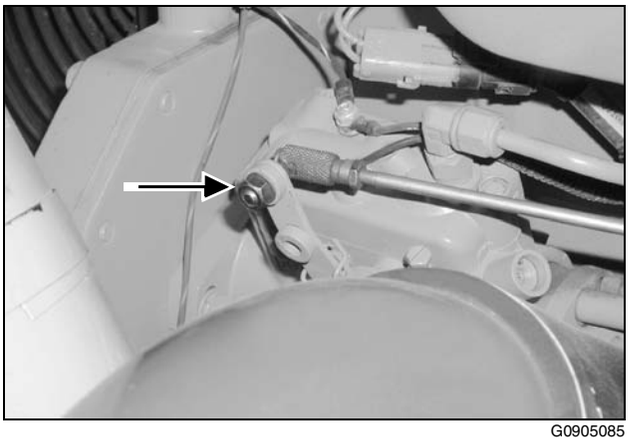
STEP 70



G0905086

Connect the throttle linkage to the mounting bracket.

STEP 71

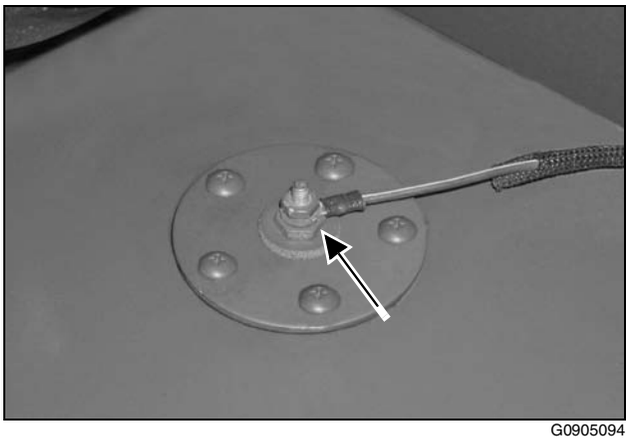


G0905085

Reconnect the throttle linkage to the injector pump.

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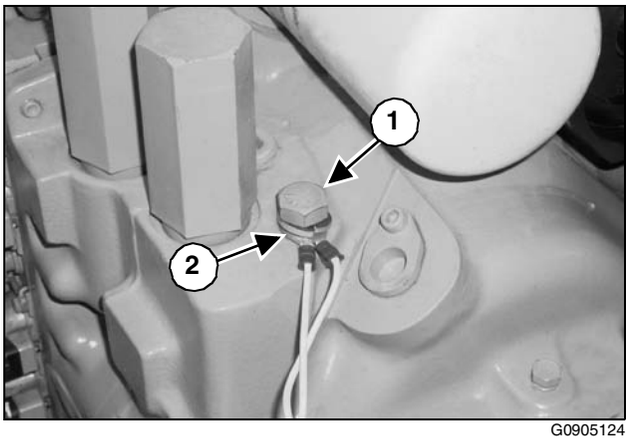
STEP 72



G0905094

Position the transmission wire harness and reconnect the wire to the fuel gauge sender.

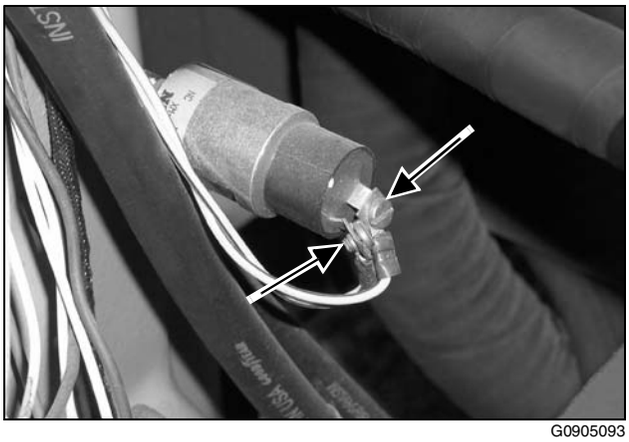
STEP 73



G0905124

Install the bolt (1) securing the two ground wires (2).

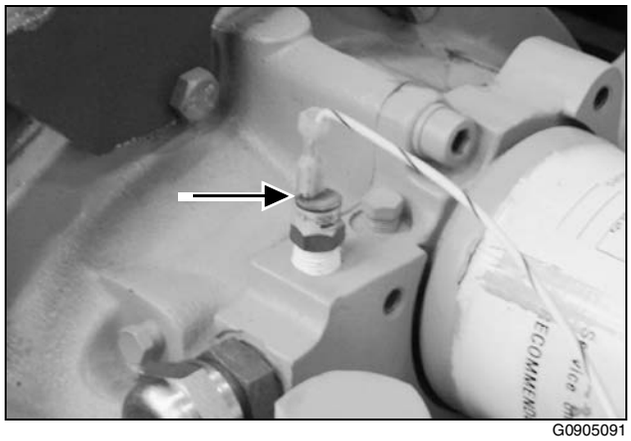
STEP 74



G0905093

Reconnect the two wires to the reverse pressure switch.

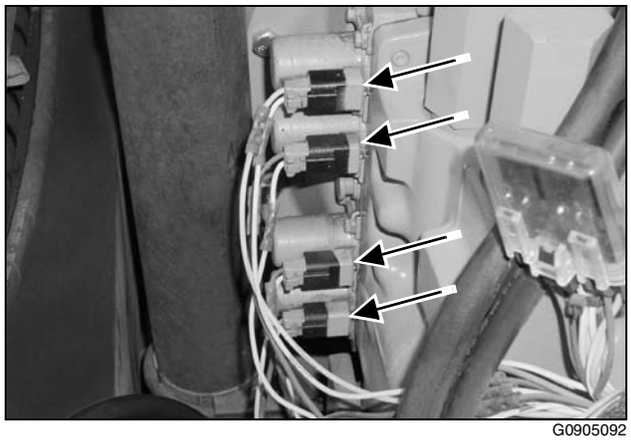
STEP 75



G0905091

Reconnect the transmission temperature sender wire.

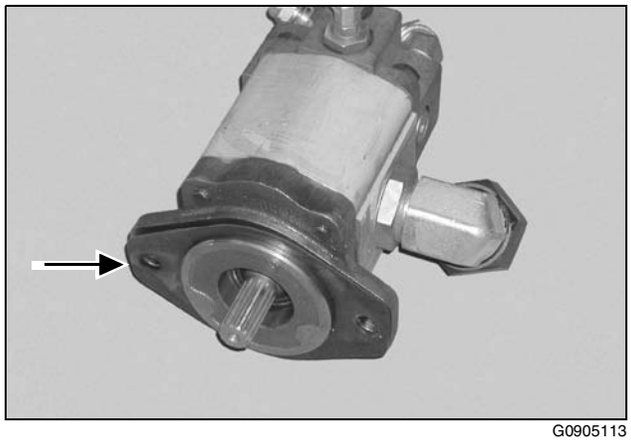
STEP 76



G0905092

Reconnect the four electrical plugs to the gear selection solenoids.

STEP 77

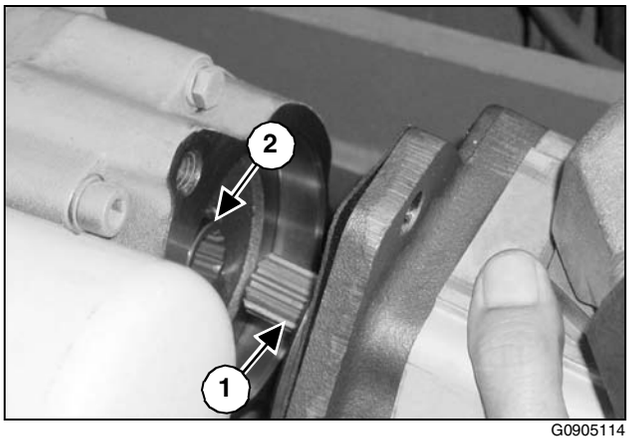


G0905113

Install a new gasket on the hydraulic pump mounting flange.

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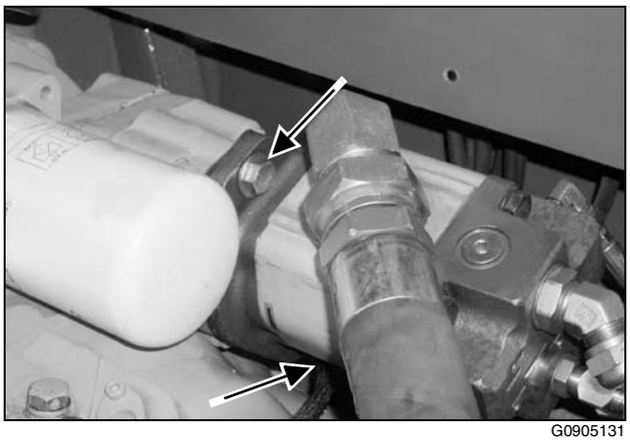
STEP 78



G0905114

Align the pump input shaft (1) with the gear drive (2) in the transmission. Slide the shaft into the transmission until the mounting flange contacts the transmission.

STEP 79



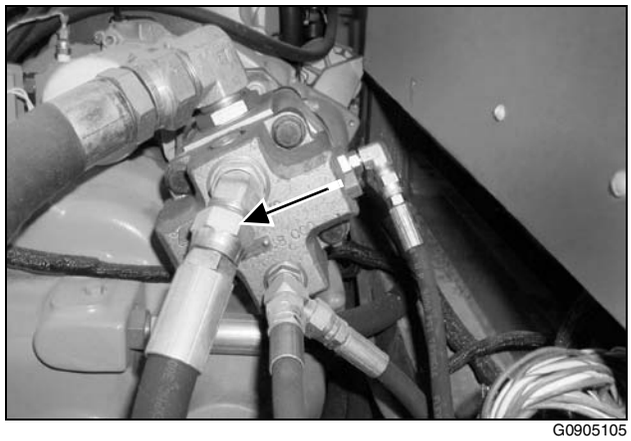
G0905131

Install the two pump mounting bolts. Torque the bolts to 80 to 90 lb.-ft. (110 to 122 Nm).

STEP 80

Remove the cap from the hydraulic pump fittling and the plug from the hose.

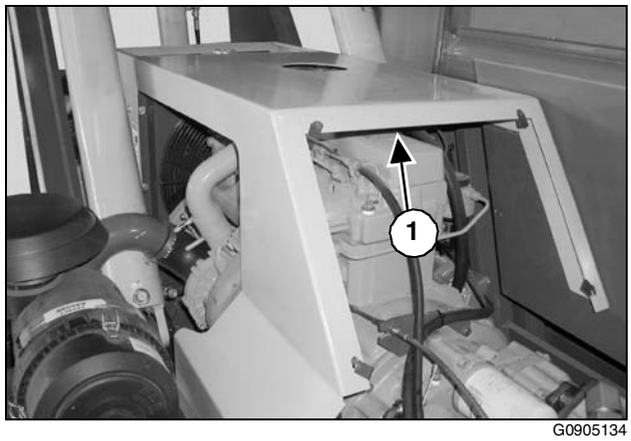
STEP 81



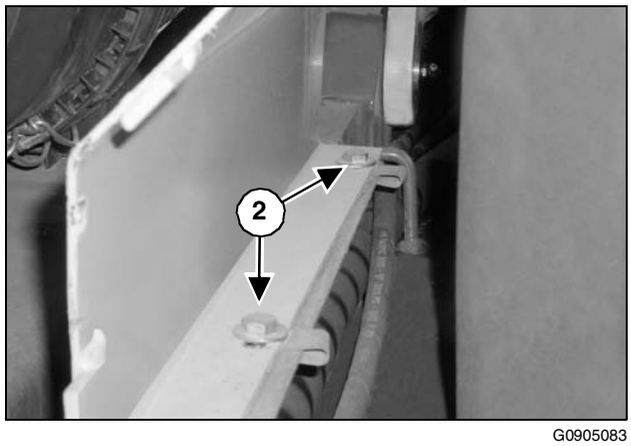
G0905105

Connect the flow divider IN port hydraulic hose to the fitting on the hydraulic pump.

STEP 82



G0905134



G0905083

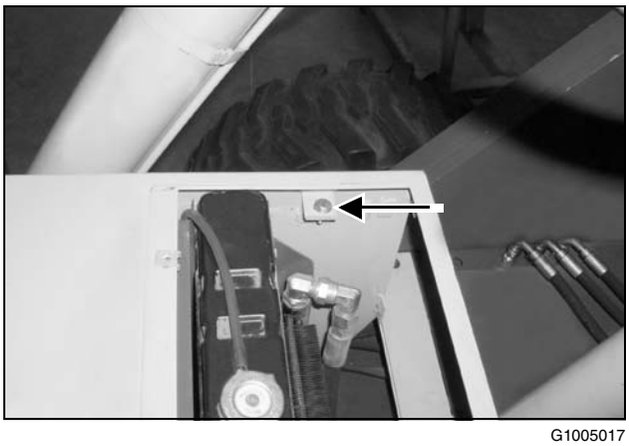
Position the engine cover (1) and install the two right side bolts (2).

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STEP 83



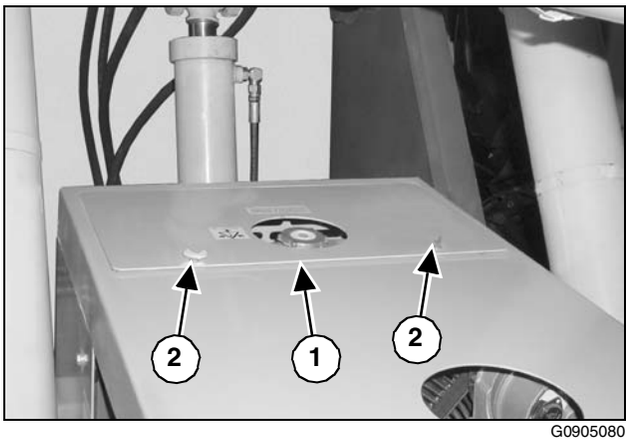
G1005016



G1005017

Install the two remaining engine cover bolts.

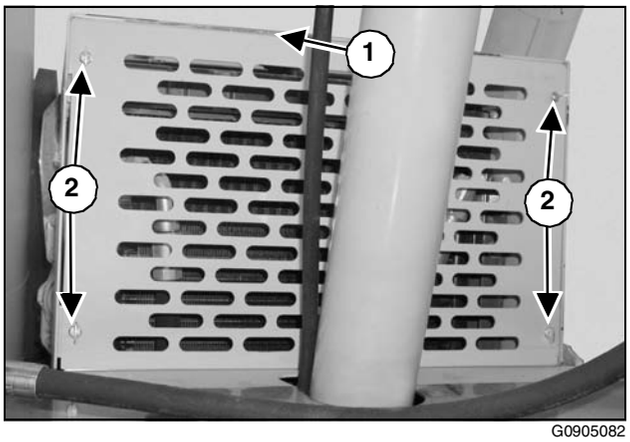
STEP 84



G0905080

Install the radiator cover (1) using the two thumbscrews (2).

STEP 85



G0905082

Install the radiator grill (1) using the four thumbscrews (2).

STEP 86

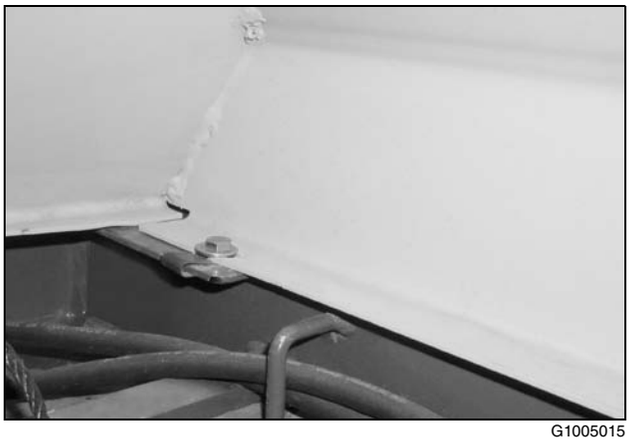


G0905135

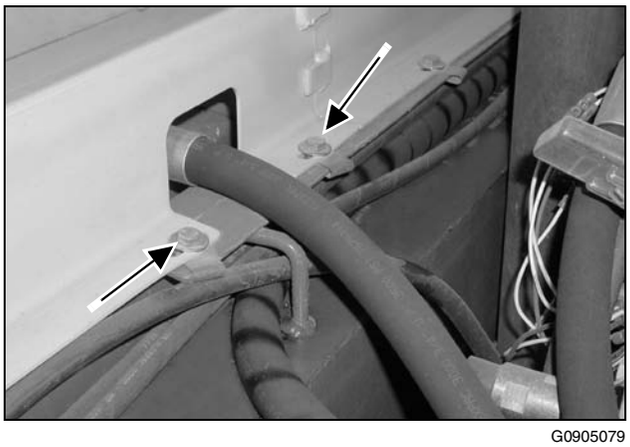
Set the transmission cover in place.

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STEP 87



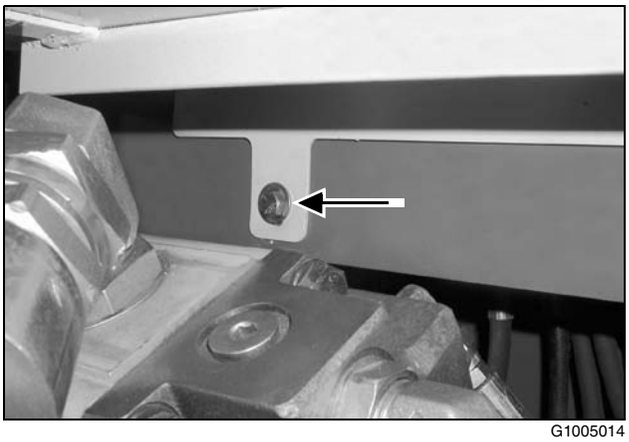
G1005015



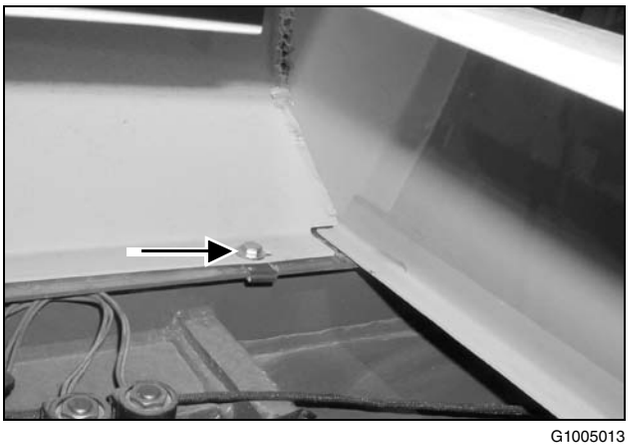
G0905079

Install the right side mounting bolts.

STEP 88



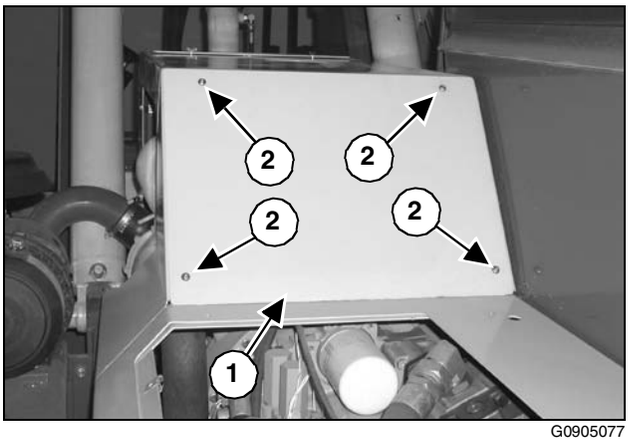
G1005014



G1005013

Install the left side mounting bolts.

STEP 89

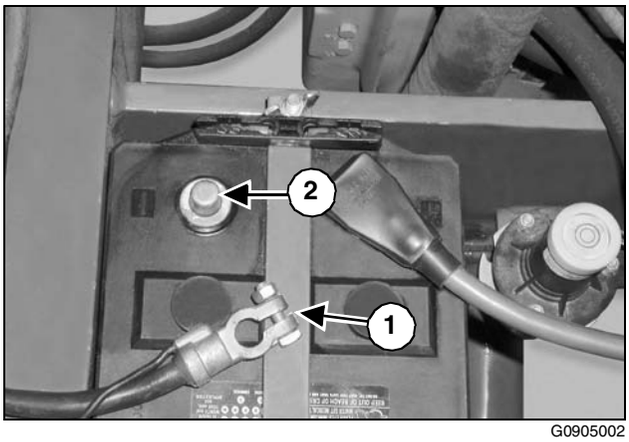


G0905077

Install the fuel filter access cover (1) using the four screws (2).

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STEP 90



G0905002

Connect the negative (-) battery cable (1) to the negative (-) post (2) on the battery.

STEP 91

Fill the transmission with new fluid through the dipstick tube. See the Operator's Manual for the specified transmission fluid.

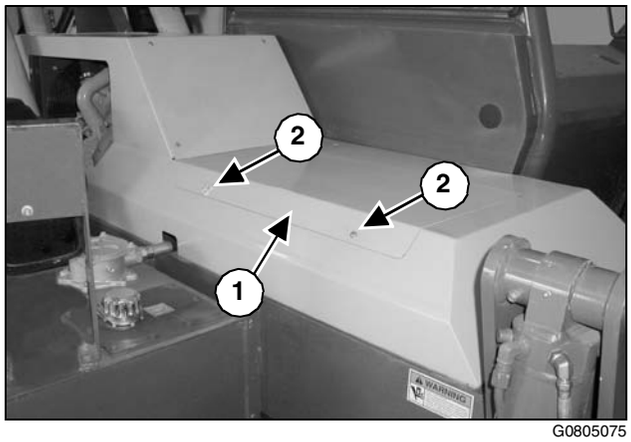
STEP 92

Start the engine and check for leaks. If no leaks appear, continue to run the engine and test the transmssion, steering and hydraulic functions for operation. Check transmission fluid level. Add fluid if necessary.

STEP 93

Shut off the engine and check the hydraulic reservoir level. Add fluid if necessary.

STEP 94



G0805075

Install the battery access cover (1) using the two thumb-screws (2).

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Section

502

REAR AXLE REMOVAL AND INSTALLATION

RS5-34 Telescopic Handler

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913241

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GENERAL INFORMATION

If steering cylinder, brakes or differential repairs are required, the axle assembly must be removed from the chassis. If only axle steering knuckle or outboard planetary service is required, the axle assembly will not require removal from the chassis.

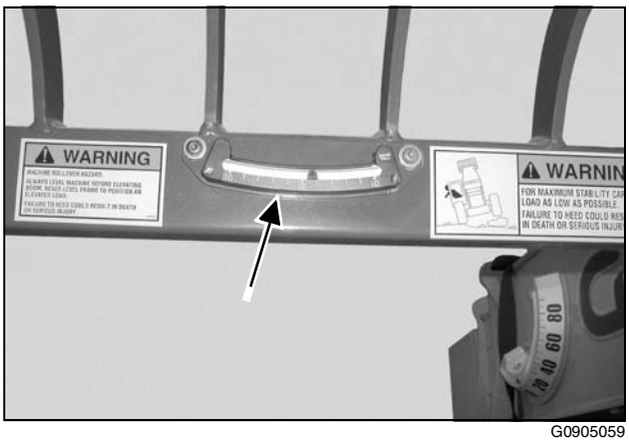
Procedures used to remove the axle will depend on machine location and the type of lifting equipment available. The following axle removal and installation procedures, using two 10-ton hydraulic bottle jacks for lifting the machine, and a 5-ton floor jack to lift and lower the axle assembly, can be done in the field or in the shop. The machine must be parked on a solid and level surface.

WARNING

Tires may be filled with liquid ballast. If filled with liquid ballast the wheels will be extremely heavy. To prevent injury, remove ballast or use proper wheel handling equipment when dismounting the wheels from the axle hubs.

REAR AXLE REMOVAL

STEP 1



G0905059

Level the frame according to the frame level indicator located in the operator's cab.

MANDATORY SAFETY SHUTDOWN PROCEDURE

BEFORE cleaning, lubricating, or servicing this equipment:

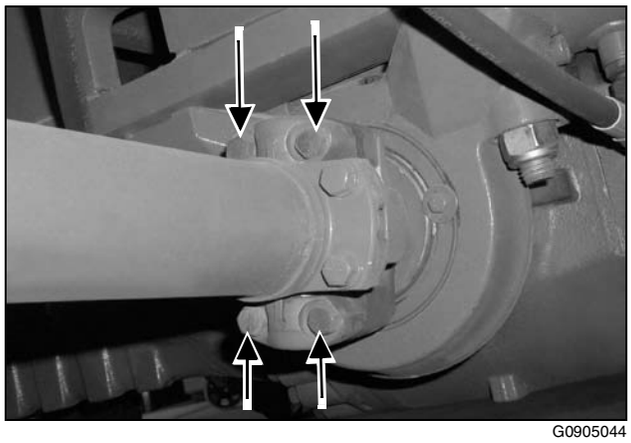
1. Bring the machine to a full stop on a level surface. (If parking on a slope or hillside cannot be avoided, park across the slope and block the tires.)
2. Fully retract the boom and lower the attachment to the ground.
3. Place controls in NEUTRAL and set the park brake.
4. Idle the engine for gradual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

RELEASE HYDRAULIC OIL PRESSURE

1. Engage the park brake.
2. Lower equipment to the ground. Return the engine to idle for 30 seconds, then shut off the engine.
3. Turn the keyswitch on. Operate the joystick in each direction. Confirm that there is no attachment or unit movement. This should ensure there is no residual pressure trapped in the control circuit. Remove the key from the switch.

STEP 2

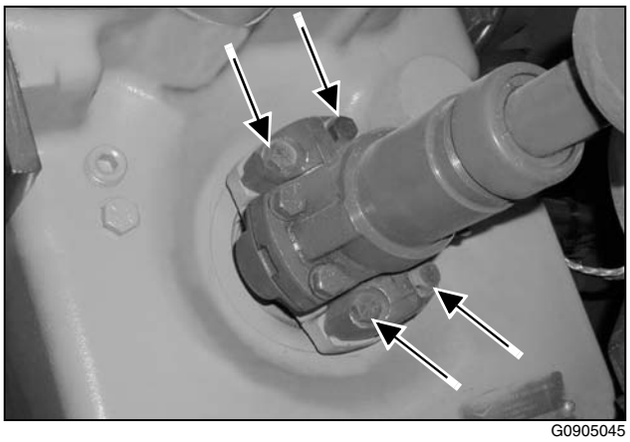


G0905044

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

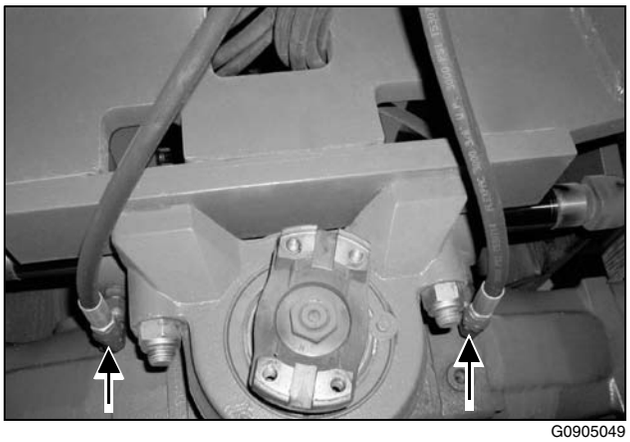
STEP 3



G0905045

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

STEP 4



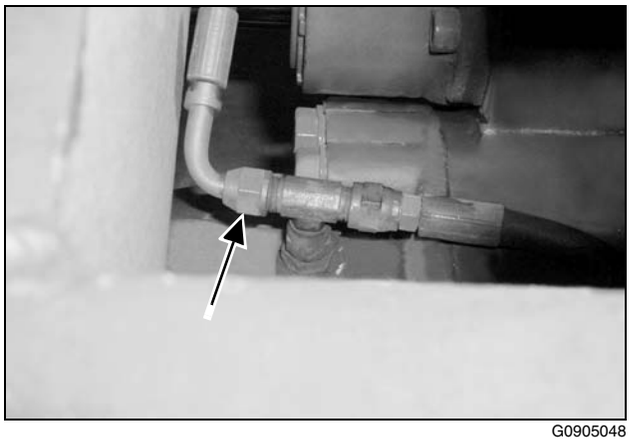
G0905049

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

STEP 5

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

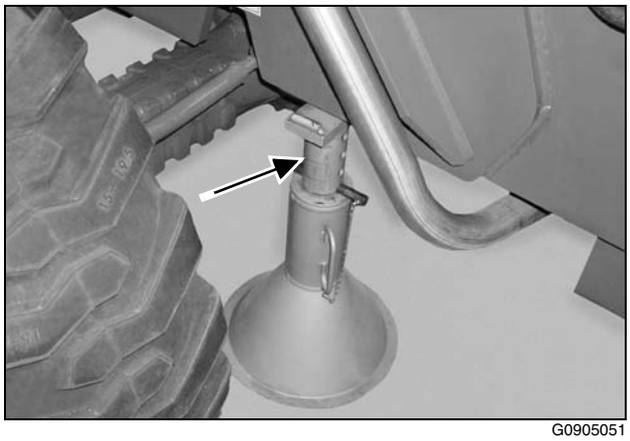
STEP 6



G0905048

Remove the brake hose from the fitting on the rear axle. Install a plug in the hose and a cap on the fitting.

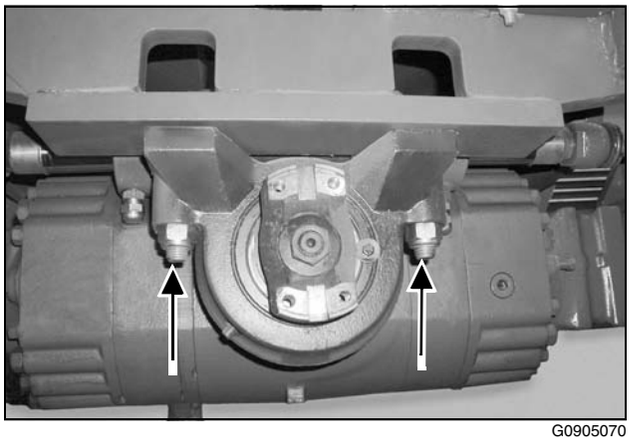
STEP 7



G0905051

Place jackstands in front of the rear axle and under the frame in the location shown.

STEP 8

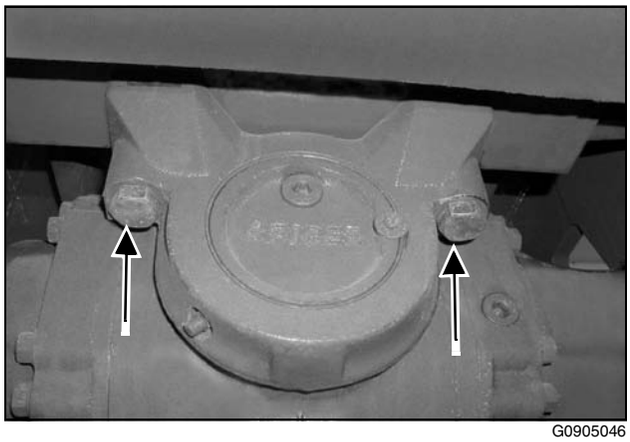


G0905070

Loosen the two axle mounting bolts located in front of the axle. Do not remove the nuts at this time.

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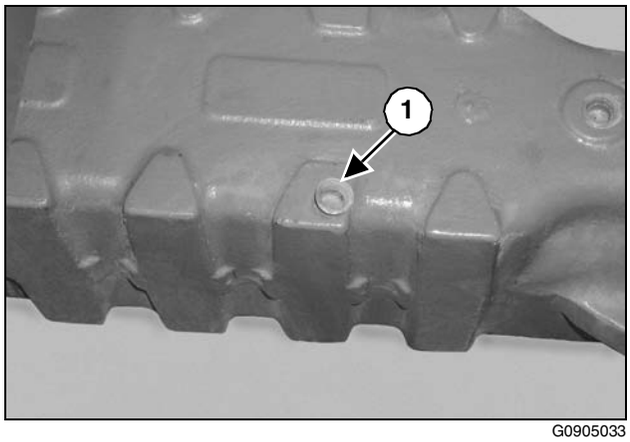
STEP 9



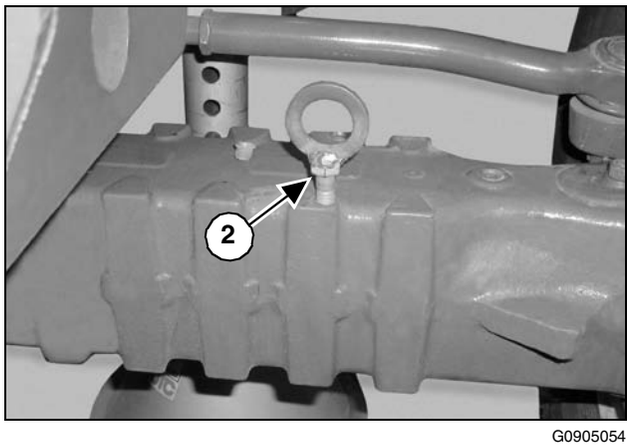
G0905046

Loosen the two axle mounting bolts located in back of the axle. Do not remove the nuts at this time.

STEP 10



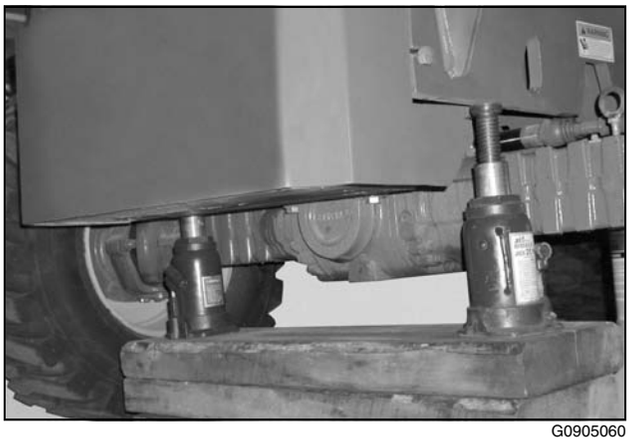
G0905033



G0905054

Remove the protective plug (1) and install an eye-bolt (2) in the rear axle.

STEP 11



G0905060

Place two 10-ton hydraulic bottle jacks under the frame in the location shown.

STEP 12



G0905055

Have an assistant balance the axle assembly using a long pipe or bar inserted through the eye-bolt installed in Step 10.

STEP 13

Remove the four axle mounting bolt nuts from the bolts front and rear. Discard the Nylock® nuts.

STEP 14

Jack the machine equally from side to side on each jack until the chassis is high enough to clear the rear axle. Adjust the jack stands to support the chassis.

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STEP 15



G0905136

Remove the bottle jacks. Use the wheels to roll the axle assembly out from under the chassis.

STEP 16

Use a double-leg chain and hoist to lift the axle only enough to remove the wheels and tires. Support the axle on adequate stands. Leave the hoist connected to ensure that the axle does not fall during wheel removal procedure.

STEP 17



G0905

Remove the wheel nuts from the wheel bolts.

STEP 18



G0905074

Remove both wheels from the axle.

REAR AXLE INSTALLATION

STEP 19



G0905074

Reinstall each wheel onto the axle.

STEP 20



G0905058

Install the wheel nuts on the wheel bolts and hand tighten.

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STEP 21

Remove the support stands from under the axle and lower the axle to the floor. Torque the wheel nuts to 450 ft.-lbs. (610 Nm).

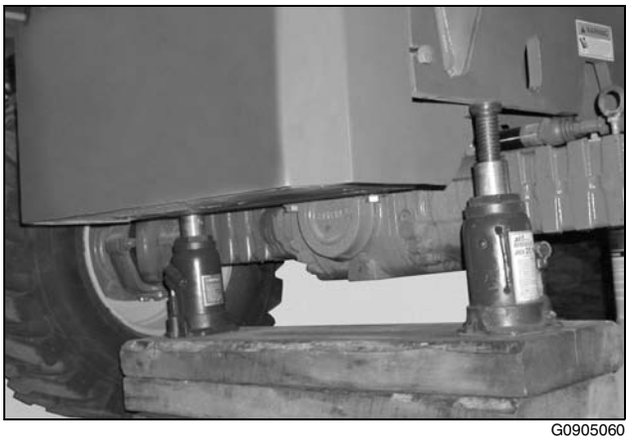
STEP 22



G0905136

With the rear of the machine raised, have an assistant balance the axle using a long pipe or bar inserted in the eye-bolt installed on the axle assembly while rolling the axle assembly into position.

STEP 23



G0905060

Place two 10-ton hydraulic bottle jacks under the frame in the location shown. Apply upward pressure until the jack stands are clear.

STEP 24

Adjust the jackstands to allow the frame to be lowered onto the axle assembly.

STEP 25

Lower the jacks and align the mounting bolt holes in the axle with the holes in the frame. Install the two mounting bolts with new Nylock® nuts in the mounting holes on the front side of the axle. Do not tighten at this time.

STEP 26

Align the rear mounting bolt holes in the axle with the holes in the frame. Install the two mounting bolts with new Nylock® nuts in the mounting holes at the rear of the axle. Torque the front and rear axle mounting bolts to 380 ft.-lbs. (515 Nm).

STEP 27

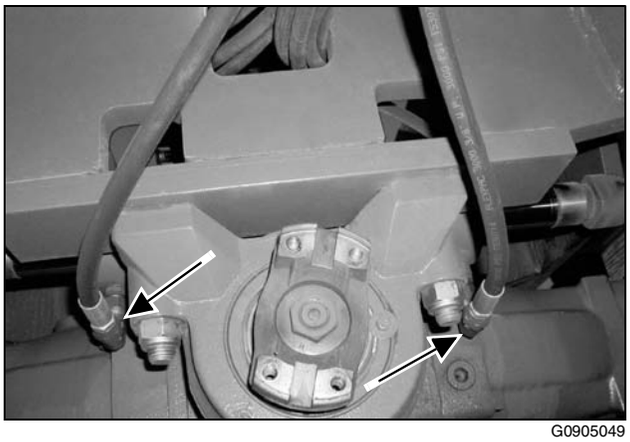
Remove the jack stands and the two bottle jacks.

STEP 28

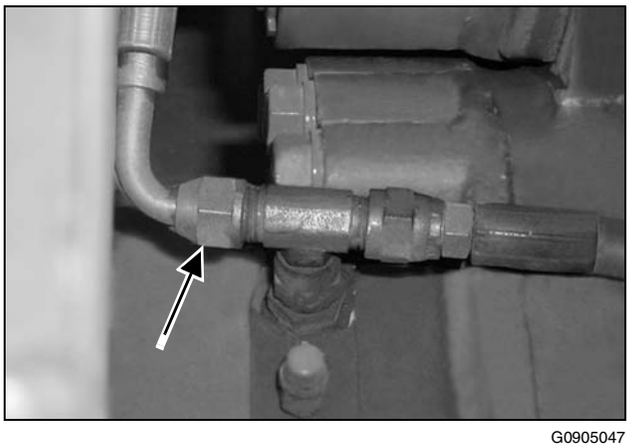
Remove the caps and plugs from the hydraulic and brake fittings and hoses.

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STEP 29



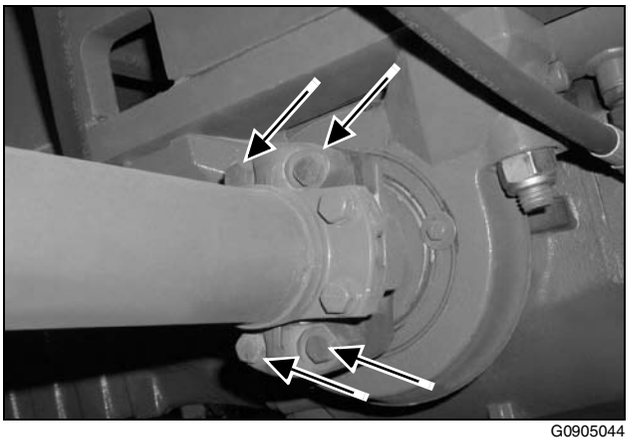
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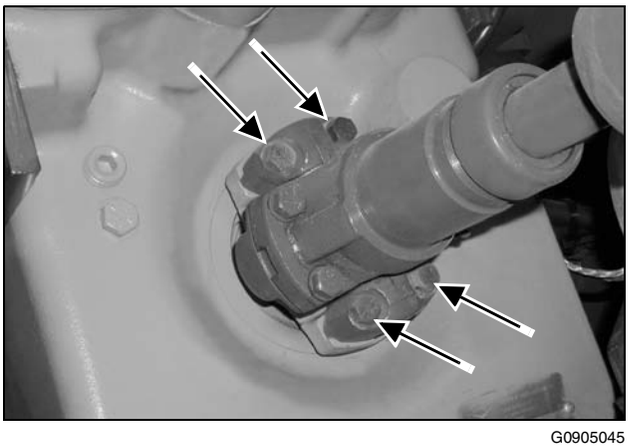
G0905047

Reconnect the hydraulic hoses to the steering cylinder. Reconnect the brake hose to the fitting on the axle assembly.

STEP 30



G0905044

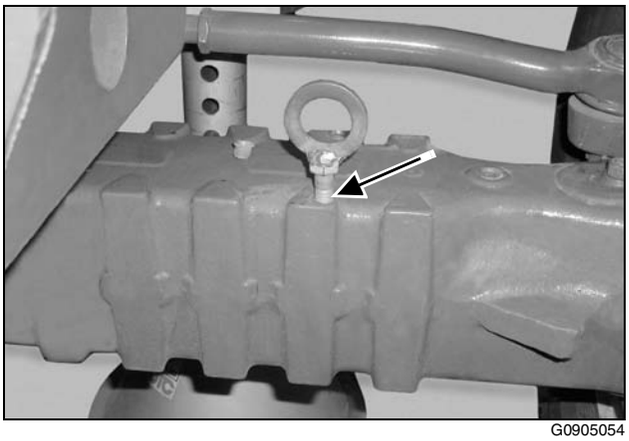


G0905045

Reinstall the driveshaft to the transmission and to the rear axle using the bolts and lock washers.

NOTE: *Use Loctite® 271 Thread Lock (or equivalent) on the threads of the bolts.*

STEP 31



G0905054

Remove the eye-bolt from the axle assembly and install the protective cover.

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STEP 32

Start the engine; apply the park brake. Move the steer mode switch to the 4-wheel steering position. Turn the steering wheel in one direction until the wheels reach their travel limits and then back the other way to their travel limits. Repeat this procedure several times until the air is removed from the circuit.

STEP 33

Shut down the engine. Check for leaks. Correct any leakage found. Check fluid level; add fluid if needed.

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Section

503

FRONT AXLE REMOVAL AND INSTALLATION

RS5-34 Telescopic Handler

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913241

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GENERAL INFORMATION

If steering cylinder, brakes or differential repairs are required, the axle assembly must be removed from the chassis. If only axle steering knuckle or outboard planetary service is required, the axle assembly will not require removal from the chassis.

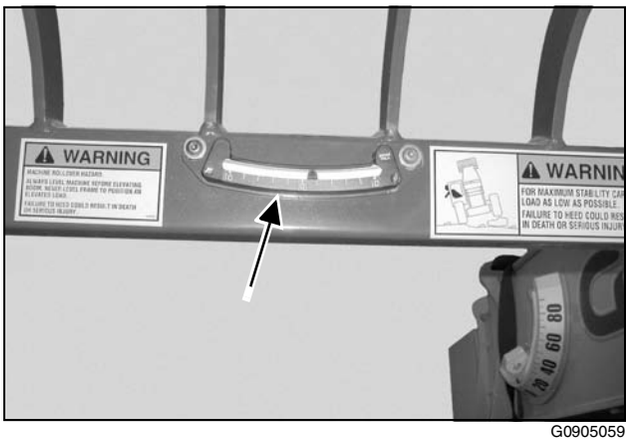
Procedures used to remove the axle will depend on machine location and the type of lifting equipment available. The following axle removal and installation procedures, using two 10-ton hydraulic bottle jacks for lifting the machine, and a 5-ton floor jack to lift and lower the axle assembly, can be done in the field or in the shop. The machine must be parked on a solid and level surface.

WARNING

Tires may be filled with liquid ballast. If filled with liquid ballast, the wheels will be extremely heavy. To prevent injury, remove ballast or use proper tire handling equipment when dismounting the wheels from the axle hubs.

FRONT AXLE REMOVAL

STEP 1



G0905059

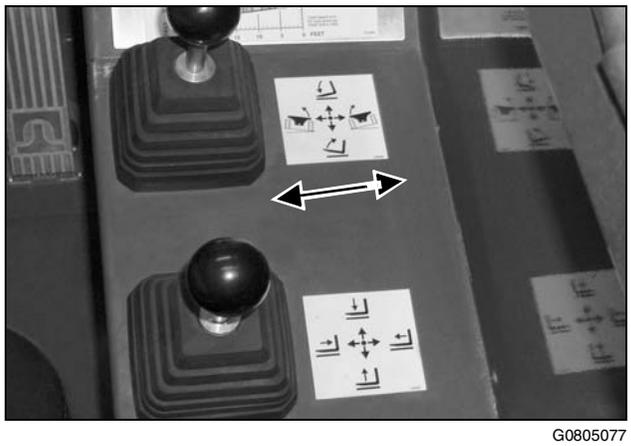
Level the frame according to the frame level indicator located in the operator's cab.

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 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 injury.



G0805077

RELIEVING HYDRAULIC PRESSURE

1. Fully retract the telescoping boom.
2. Raise the telescoping boom far enough to be able to remove the axle from under the frame.
3. Turn the keyswitch to the OFF position to shut off the engine. (See above Mandatory Safety Shutdown Procedure.)
4. Move the frame leveling joystick several times to relieve hydraulic pressure in that circuit.

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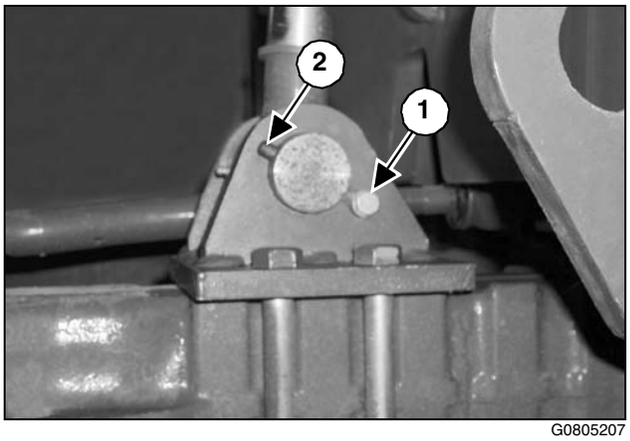
STEP 2



G0805206

Place wood blocks between the rear axle and the frame (both sides) to prevent the frame from rotating when the frame leveling cylinder is disconnected.

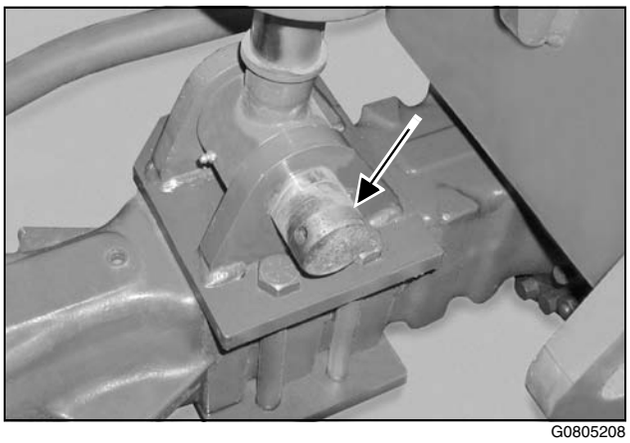
STEP 3



G0805207

Remove the retainer bolt (1) and pin (2) from the lower pivot pin on the frame leveling cylinder.

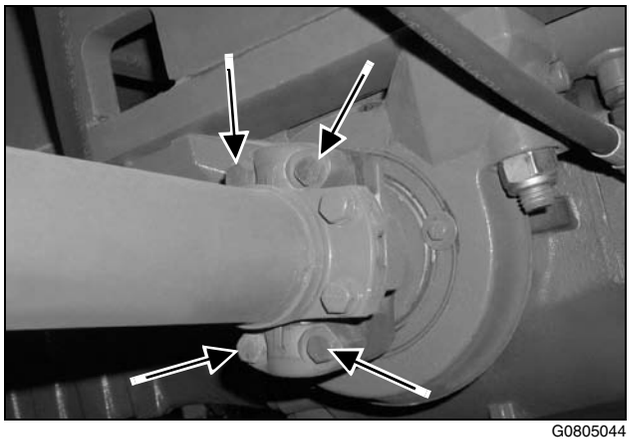
STEP 4



G0805208

Remove the lower pivot pin from the frame leveling cylinder.

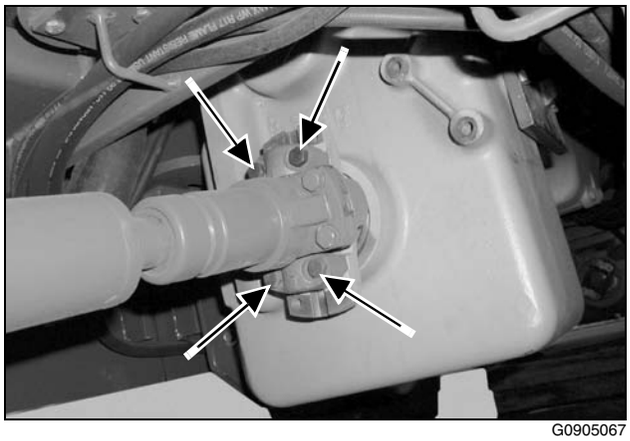
STEP 5



G0805044

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

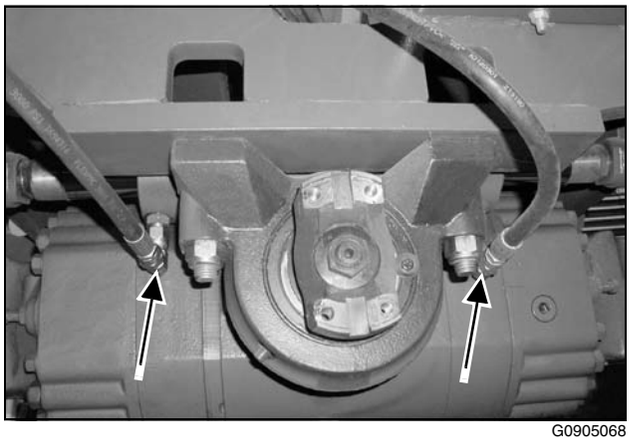
STEP 6



G0905067

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

STEP 7



G0905068

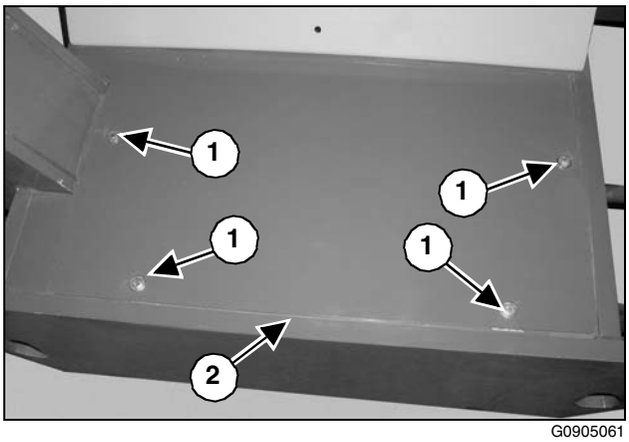
Mark the two hydraulic hoses for correct assembly. Loosen and remove the two hydraulic hoses from the steering cylinder.

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STEP 8

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

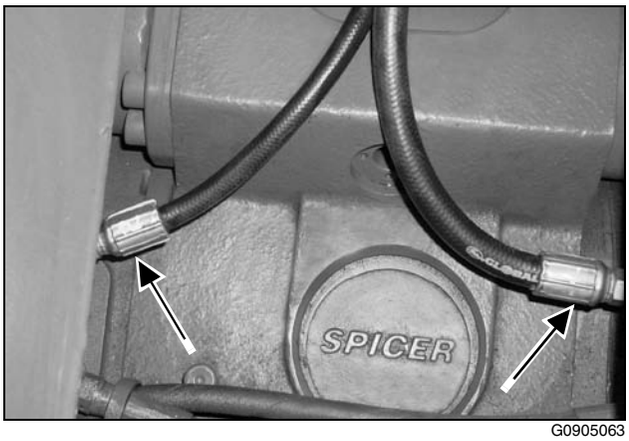
STEP 9



G0905061

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

STEP 10



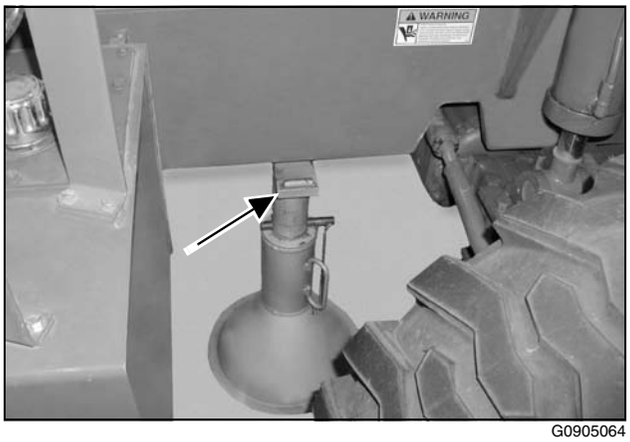
G0905063

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

STEP 11

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

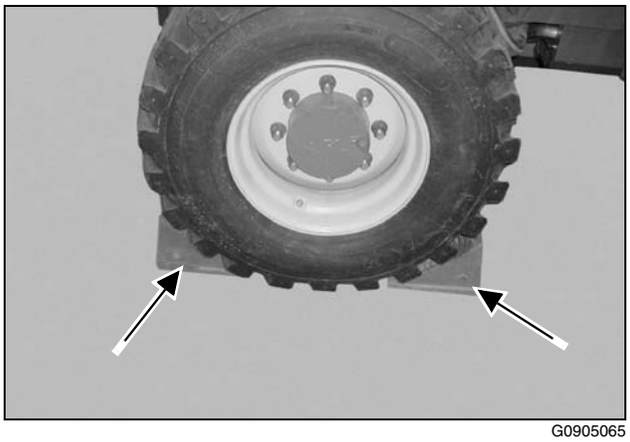
STEP 12



G0905064

Position jack stands under the frame in the location shown.

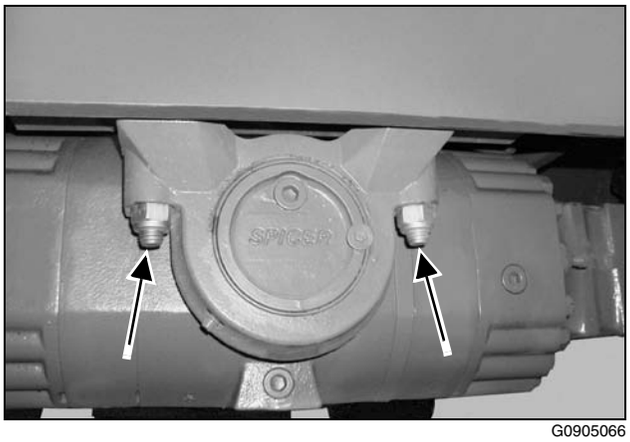
STEP 13



G0905065

Place a chock in front and behind the rear wheels to prevent the machine from rolling when lifted.

STEP 14

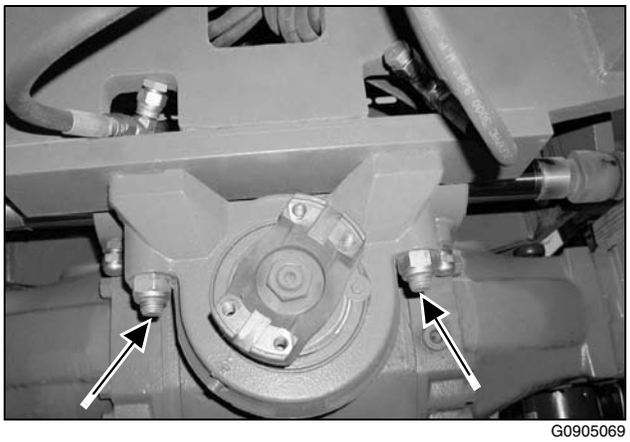


G0905066

Loosen the two axle mounting bolts located in front of the axle. Do not remove the nuts at this time.

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STEP 15



G0905069

Loosen the two axle mounting bolts located in back of the axle. Do not remove the nuts at this time.

STEP 16



G905071

Place two 10-ton hydraulic bottle jacks under the frame in the location shown and apply upward pressure equally from side to side on each jack. Raise until the front wheels are approximately 2 inches off the surface.

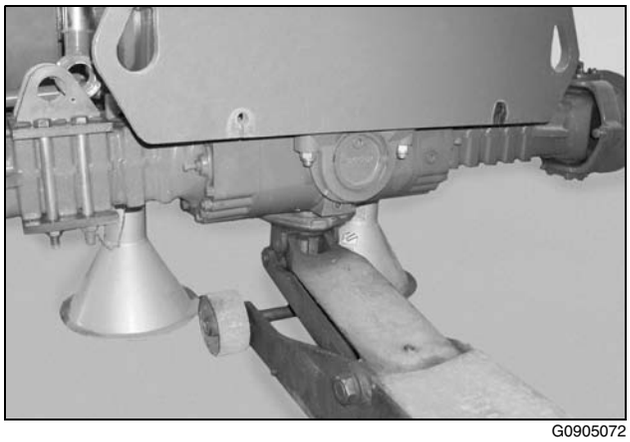
STEP 17

Adjust the jack stands to a height that will keep the wheels approximately 2 inches off the surface when the bottle jacks are removed.

STEP 18

Lower the bottle jacks equally and remove.

STEP 19



G0905072

Using a 5-ton floor jack, placed under the center of the differential housing, apply upward pressure on the axle.

NOTE: *The front axle cannot be rolled out from under the machine on the wheels because the park brake is spring-applied.*

STEP 20



G0905056

Loosen and remove the wheel nuts from the wheel bolts.

STEP 21

Remove both wheels and tires from the axle.

STEP 22

Remove the two axle mounting nuts and bolts located in back of the axle.

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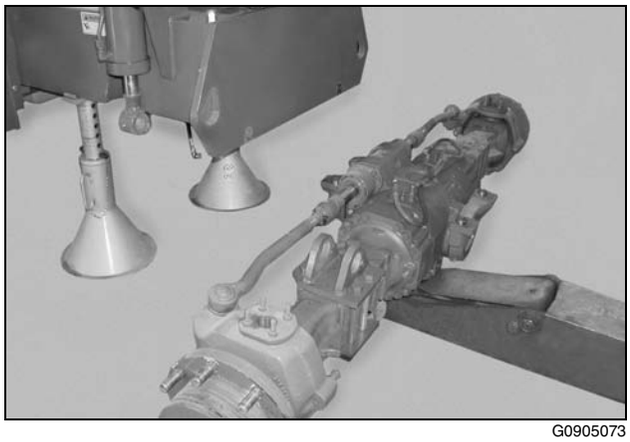
STEP 23



G0905075

Remove the two axle mounting nuts and bolts located in front of the axle.

STEP 24



G0905073

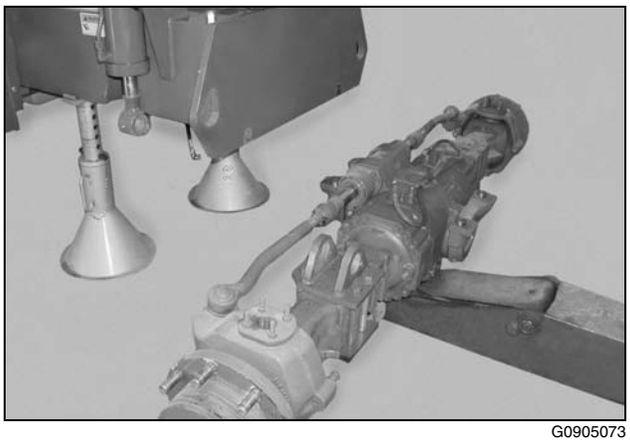
Have an assistant balance the axle on the floor jack and lower the floor jack slowly and remove the axle out from under the machine.

STEP 25

After the axle is removed, have adequate stands or work surface to support the axle safety while performing the repair procedure.

FRONT AXLE INSTALLATION

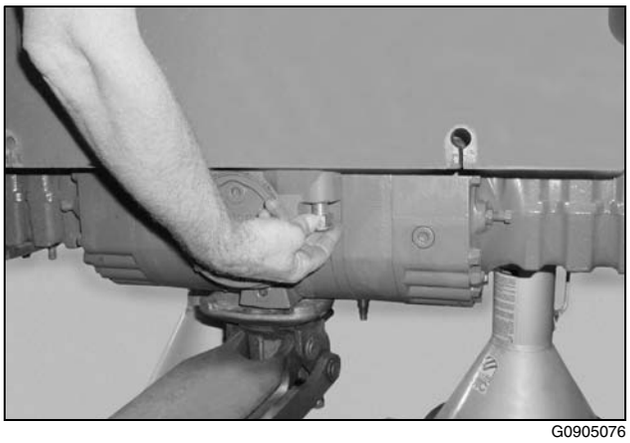
STEP 26



G0905073

Carefully roll the axle and floor jack under the machine. Apply upward pressure to raise the axle into position.

STEP 27



G0905076

Align the four bolt holes in the axle with the holes in the frame. Install and tighten the four bolts and nuts to 380 ft.-lbs. (515 Nm).

STEP 28

Lower and remove the floor jack.

STEP 29

Install both wheels and tires on the axle.

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STEP 30



G0905058

Install the wheel nuts and hand tighten.

STEP 31



G0905071

Place two 10-ton hydraulic bottle jacks under the frame in the location shown and apply upward pressure equally from side to side on each jack.

STEP 32



G0905064

Remove the jack stands. Lower the bottle jacks equally and remove.

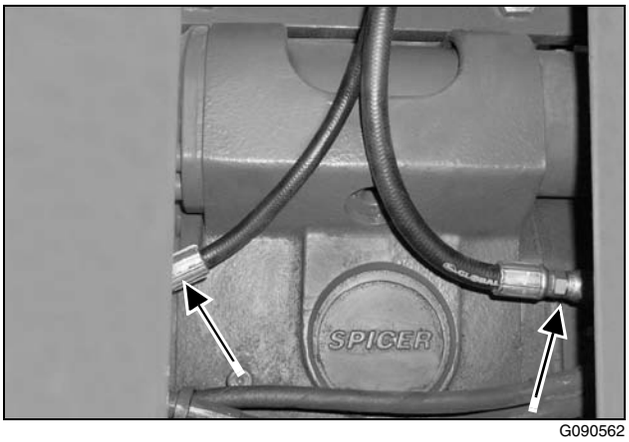
STEP 33

Tighten the wheel nuts to a torque of 450 ft.-lbs. (610 Nm).

STEP 34

Remove the caps and plugs from the brake fittings and hoses.

STEP 35



G090562

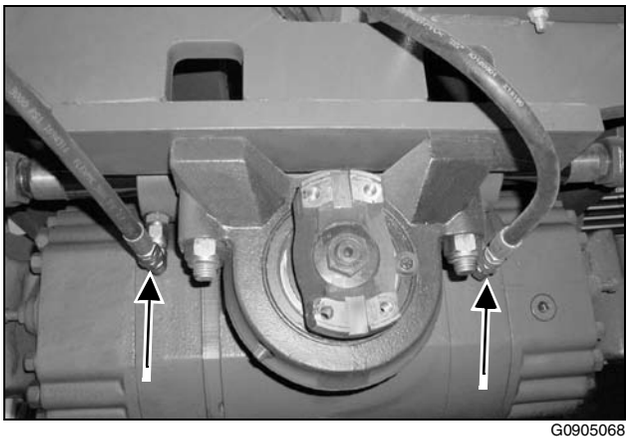
Install the two brake hoses to the fittings on the front axle.

STEP 36

Remove the caps and plugs from the hydraulic fittings and hoses.

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STEP 37

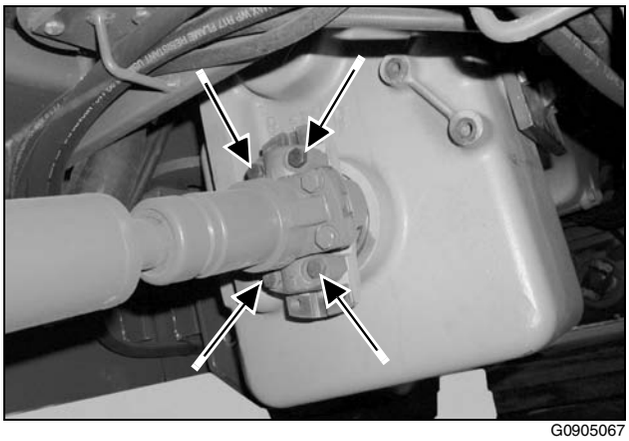


G0905068

Install the two hydraulic hoses on the fittings of the steering cylinder.

NOTE: *When performing Steps 38 and 39, it may be necessary to jack one rear wheel clear of the surface in order to align the driveshaft yokes. Use Loctite 271 Thread Lock (or equivalent) on the threads of the driveshaft mounting bolts.*

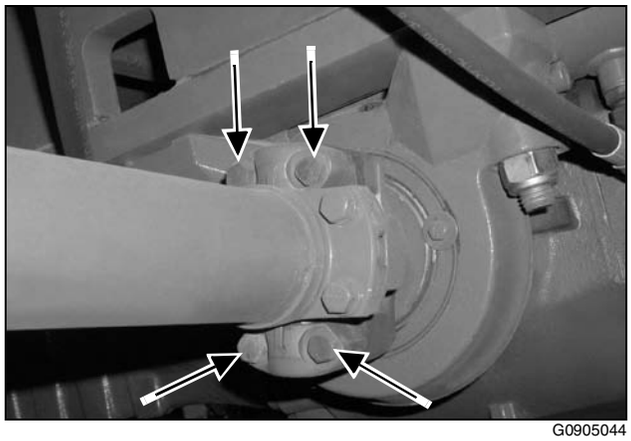
STEP 38



G0905067

Install the driveshaft to the transmission using the four bolts and lock washers.

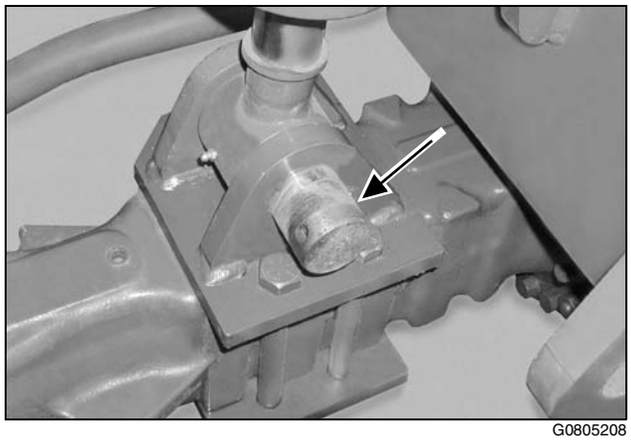
STEP 39



G0905044

Install the driveshaft to the front axle using the four bolts and lock washers.

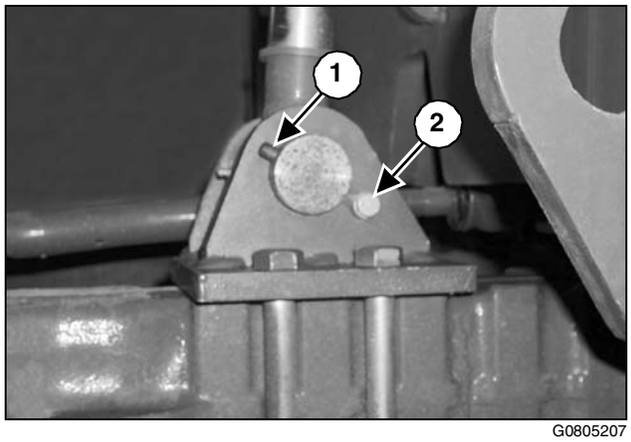
STEP 40



G0805208

Install the lower pivot pin the in frame leveling cylinder.

STEP 41



G0805207

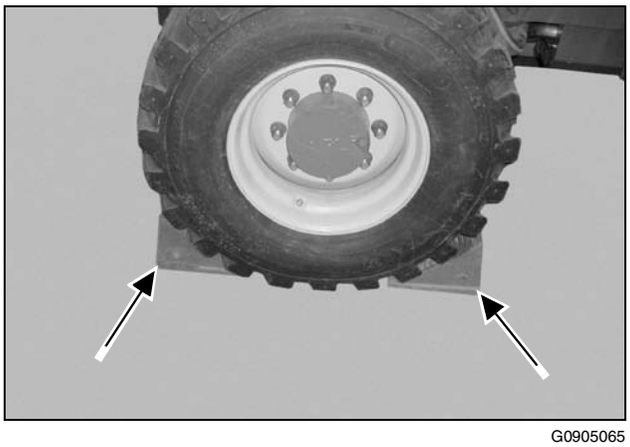
Install the retaining pin (1) and the lock bolt (2) in the lower pivot pin.

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STEP 42



G0805206



G0905065

Remove the wood blocks (both sides) from between the frame and the rear axle. Remove the wheel chocks.

STEP 43

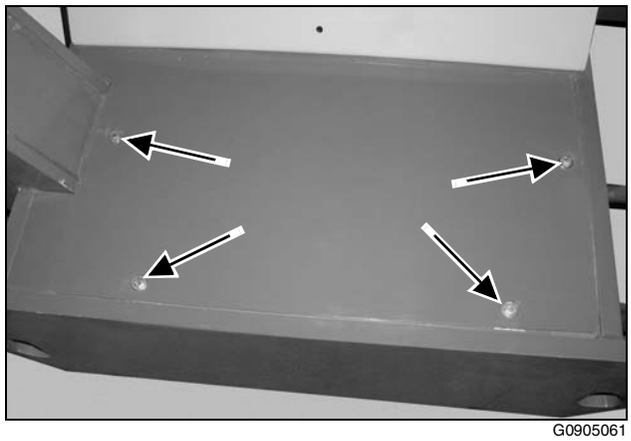


G0905078

Start the engine, apply the park brake. Move the steer mode switch to the 4-wheel steering position. Turn the steering wheel in one direction until the wheels reach their travel limits, and then back the other way to their travel limits. Repeat this procedure several times until the air is removed from the circuit.

Shut off the engine. Check for leaks. Correct any leakage found. Check fluid level; add fluid if needed.

STEP 44



G0905061

Install the front cover using the four bolts.

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Section

601

HYDRAULIC SCHEMATICS, TROUBLESHOOTING TESTING & ADJUSTMENT PROCEDURES

RS5/6-34 Telescopic Handler

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STEERING CIRCUIT PRESSURE QUICK TEST 41
STEERING CIRCUIT PRESSURE DIRECT TEST 41

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HYDRAULIC SCHEMATICS, TROUBLESHOOTING, TESTING & ADJUSTMENT PROCEDURES

INTRODUCTION

This section of the GEHL RS5/6-34 Telescopic Handler Service Manual covers the hydraulic schematics, troubleshooting, testing and adjustment procedures.

A single section gear pump attached to the rear of the transmission provides hydraulic flow to the steering system and the flow divider. The flow divider directs flow to the joystick control valves, the SAHR (Spring-Applied Hydraulic-Release) park brake, the (optional) PWP (Personnel Work Platform) valve and the main control valve.

The joysticks are located on the right hand console and direct the flow from the flow divider to the main control valve spool control solenoids. The solenoids shift the spools to direct the flow from the pump to the boom lift, extension, attachment tilt and frame leveling cylinders.

An electrical switch on the right side of the instrument panel is connected to a solenoid that operates the SAHR park brake. When the switch is OFF, the SAHR solenoid is activated and flow from the flow divider is directed to release the park brake. When the switch is ON, the electrical signal to the solenoid is switched off. The spring on the SAHR valve control spool shifts the spool, blocks the flow from the flow divider and directs the park brake hydraulic fluid to the reservoir. The spring pressure inside the park brake applies the brake.

The steering wheel is connected directly to the steering control valve. When the steering wheel is turned clockwise (right) or counterclockwise (left), the steering control unit directs flow from the pump to the steering cylinders. The steering mode valve control solenoids are connected to a 3-way switch on the left side of the instrument panel. When the switch is in the neutral position, the flow from the pump is directed to the front steering cylinder. When the switch is in the 4-wheel mode or crab mode the steering-mode Valve directs flow to or from the front cylinder to the rear steering cylinder. The front and rear steering cylinders are in a series hydraulic circuit through the steering mode valve.

GENERAL TEST PROCEDURES

WARNING

NEVER use your hands to search for hydraulic fluid leaks. Use a piece of paper or cardboard. Escaping fluid under pressure can be invisible and penetrate the skin causing serious injury. If any fluid is injected into your skin, see a doctor at once. Injected fluid must be surgically removed by a doctor familiar with this type of injury or gangrene may result.

ALWAYS wear safety glasses when checking for hydraulic fluid leaks. Escaping fluid can cause permanent eyesight damage or loss if safety glasses are not worn.

WARNING

Construction equipment can be dangerous if improperly operated or maintained. This machine should be operated and maintained only by trained and experienced people who have read, understood and complied with the Operator's Manual.

WARMING THE ENGINE:

Start the engine and run until the coolant temperature gauge is in the normal operating range.

WARMING THE HYDRAULIC OIL:

1. Operate the attachment tilt, boom extend, boom lift and frame leveling cylinders at the end of their stroke for 30 seconds.
2. Repeat Step 1 until the hydraulic oil temperature is at 120°F (49°C).
3. Operate boom and frame leveling functions 3 to 5 times in both directions to allow warm oil to enter the circuits.

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RELIEVE HYDRAULIC OIL PRESSURE:

1. Engage the park brake.
2. Lower equipment to the ground. Return the engine to idle for 30 seconds, then shut down the engine.
3. Turn the keyswitch on. Operate the joystick in each direction. This should ensure there is no residual pressure trapped in the control circuit. Confirm that there is no attachment or unit movement.

WARNING

All trapped hydraulic pressure must be relieved from the system before installing a gauge in any pressure tap. A sudden release of hot oil could cause burns or other serious injury.

WARNING

To prevent damage and/or personal injury when using an in-line flowmeter for testing, ALWAYS be sure the load valve on the flowmeter is fully OPEN before starting the engine.

PRESSURE CHECKING GUIDELINES:

1. Use an accurate gauge.
2. Release hydraulic oil pressure before connecting and disconnecting any gauge.
3. Run the engine at 1000 RPM in the specified Mode Select position.
4. As applicable, fully engage the control for the circuit being tested.
5. If adjustment is necessary, obtain each final pressure by bringing the pressure up to the proper setting. Do not bring the pressure to a higher setting and then lower it to the desired setting.

WARNING

Relief valves are provided to protect the hydraulic system. Do not increase relief valve pressures above specifications or hydraulic system damage may occur.

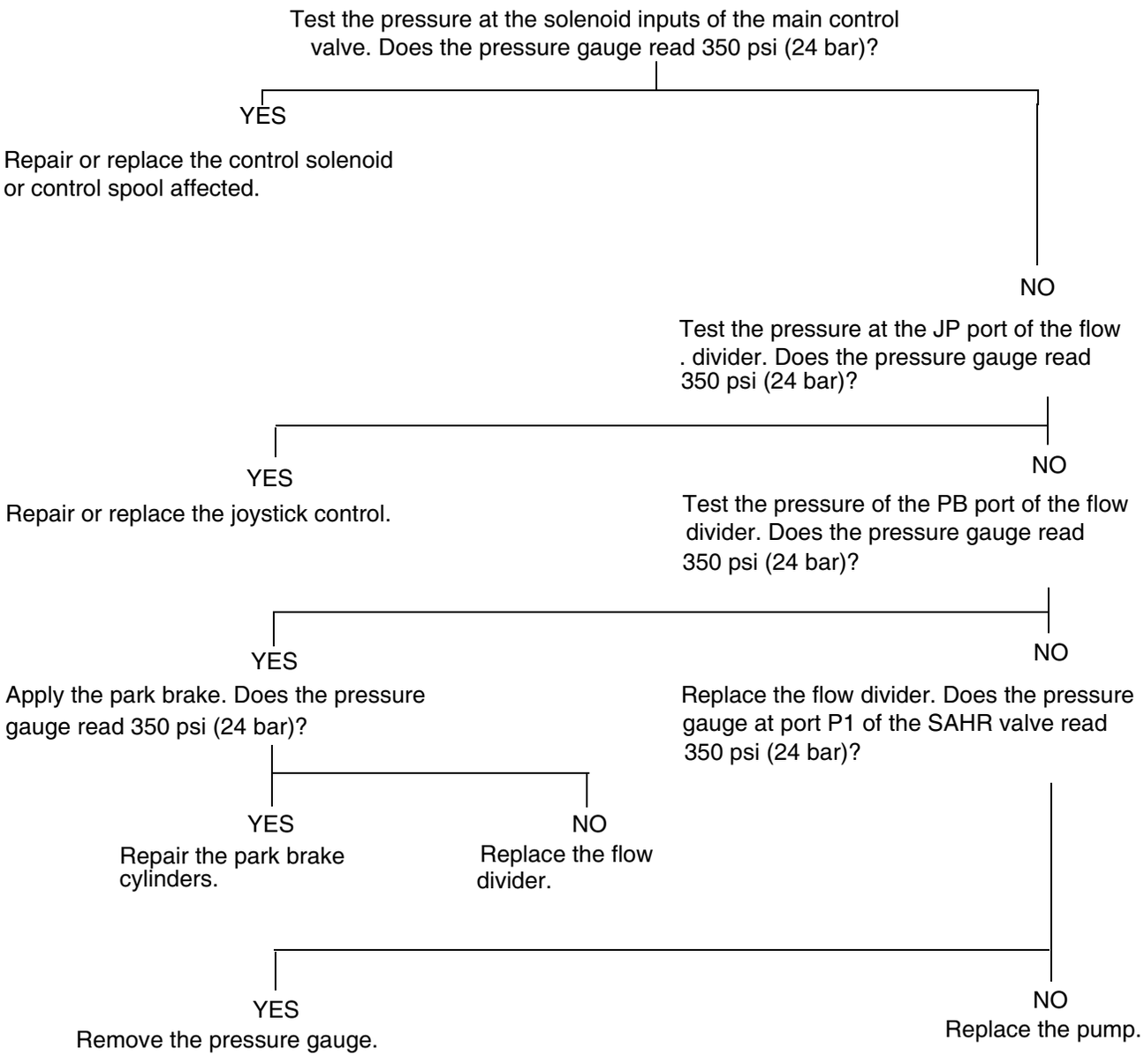
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HYDRAULIC SPECIFICATIONS

Pump Output ..... 29 GPM (110 L/min) at 2500 RPM
Pump Flow Divider Priority Flow..... 8 GPM (30 L/min)
Flow Divider (Joystick Control and Park Brake Pressure)
Relief Valve .....350 psi (24 bar)
Pump (Steering)
Modulation Relief Valve .....2000 psi (172 bar)
Service Brake Valve Modulation Pressure .....435 psi (30 bar)
Main Control Valve Relief Valve .....3000 psi (207 bar)
Attachment Tilt Up Relief Valve.....3000 psi (207 bar)
Attachment Tilt Down Relief Valve .....3000 psi (207 bar)
Auxiliary Valve Relief Valves.....2500 psi (172 bar)
Reservoir Capacity ..... 35 Gallons (133 Liters)

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CONTROL AND PARK BRAKE PILOT PRESSURE TROUBLESHOOTING



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BOOM LIFT TROUBLESHOOTING

NOTE: *If the boom will lift but will not lower or lowers slowly, repair or replace the counter balance valves on the lift cylinders.*

Does the boom lift without a capacity load?

YES

Test the pressure at the test port MP on the. flow divider. Retract the boom to the end of the cylinder stroke and hold. Does the pressure gauge read 3000 psi (207 bar)?

YES

Use an in-line flowmeter to test the pressure at the RH lift cylinder right side hose. Does the pressure gauge read 3000 psi (207 bar)?

YES

Repair or replace the right side lift cylinder.

NO

Test the pressure at the LH lift cylinder left side hose. Does the pressure gauge read 3000 psi (207 bar)?

YES

Repair or replace the left side lift cylinder.

NO

Block the LOWERING ports on both the RH and LH lift cylinders. Does the pressure gauge read 3000 psi (207 bar)?

YES

Repair or replace the RH and LH lift cylinders.

NO

Repair or replace the control valve.

NO

Follow the Control and Park Brake Pilot Pressure Troubleshooting procedure. Is the problem in the controls?

YES

Repair or replace the control components.

NO

Use an in-line flowmeter to test the pressure at the EF port of the Pump1 flow divider. Does the pressure gauge read 3000 psi (207 bar)?

YES

Adjust the relief valve in the Main Control Valve. Open the load control valve of the flowmeter and hold the joystick in the boom lower position. Does the pressure gauge read 3000 psi (207 bar)?

YES

Remove the flowmeter.

NO

Repair or replace the relief valve in the Main Control Valve.

NO

Remove and bench test the hydraulic pump. Does the hydraulic pump meet specifications?

YES

Replace the flow divider.

NO

Replace the hydraulic pump.

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BOOM EXTEND CYLINDER TROUBLESHOOTING

NOTE: *If the extend cylinder will extend but will not retract or retracts slowly, repair or replace the counter balance valve on the cylinder.*

Does the boom extend without a capacity load?

YES

Test the pressure at the MP test port on the flow divider. Lower the boom to the end of the cylinder stroke and hold. Does the pressure gauge read 3000 psi (207 bar)?

YES

Use an in-line pressure gauge to test the extend pressure at the extend cylinder. Does the pressure gauge read 2500 psi (172 bar)?

YES

Repair or replace the extend cylinder.

NO

Adjust the extend pressure relief valve in the control valve and retest the extend pressure. Does the gauge read 2500 psi (172 bar)?

YES

If the extend/retract does not work after adjusting the relief valve, repair or replace the extend cylinder.

NO

Repair or replace the extend control valve and/or the extend relief valve.

NO

Follow the Control and Park Brake Pilot Pressure Troubleshooting procedure. Is the problem in the controls?

YES

Repair or replace the malfunctioning control components.

NO

Use an in-line flowmeter to test the pressure at the EF port of the flow divider. Does the pressure gauge read 3000 psi (207 bar)?

YES

Adjust the relief valve in the Main Control Valve. Open the load control valve of the flowmeter and hold the joystick in the boom lower position. Does the gauge read 3000 psi (207 bar)?

YES

Remove the flowmeter.

NO

Replace the relief valve in the Main Control Valve.

YES

Repair or replace the flow divider.

NO

Remove and bench test the hydraulic pump. Does the pump meet specifications?

NO

Repair or replace the hydraulic pump.

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ATTACHMENT TILT CYLINDER TROUBLESHOOTING

NOTE: *If the tilt cylinder will roll back but not lower or lowers slowly, repair or replace the counter balance valve on the cylinder.*

Does the tilt operate without a load?

YES

Test the pressure at the MP test port on the. flow divider. Retract the boom to the end of the cylinder stroke and hold. Does the pressure gauge read 3000 psi (207 bar)?

YES

Use an in-line pressure gauge to test the roll tilt up at the tilt cylinder. Does the pressure gauge read 3000 psi (207 bar)?

YES

Repair or replace the tilt cylinder.

NO

Adjust the tilt pressure relief valve in the tilt control valve and retest the tilt up. Does the gauge read 3000 psi (207 bar)?

YES

If the tilt does not work after adjusting the tilt relief valve, repair or replace the tilt cylinder.

NO

Repair or replace the tilt control valve and/or the tilt relief valve.

NO

Follow the Control and Park Brake Pilot Pressure Troubleshooting procedure. Is the problem in the controls?

YES

Repair or replace the control components.

NO

Use an in-line flowmeter to test the pressure at the EF port of the flow divider. Does the pressure gauge read 3000 psi (207 bar)?

YES

Adjust the relief valve in the Main Control Valve. Open the load control valve of the flowmeter and hold the joystick in the boom lower position. Does the gauge read 3000 psi (207 bar)?

YES

Remove the flowmeter.

YES

Replace the flow divider

NO

Replace the relief valve in the Main Control Valve.

NO

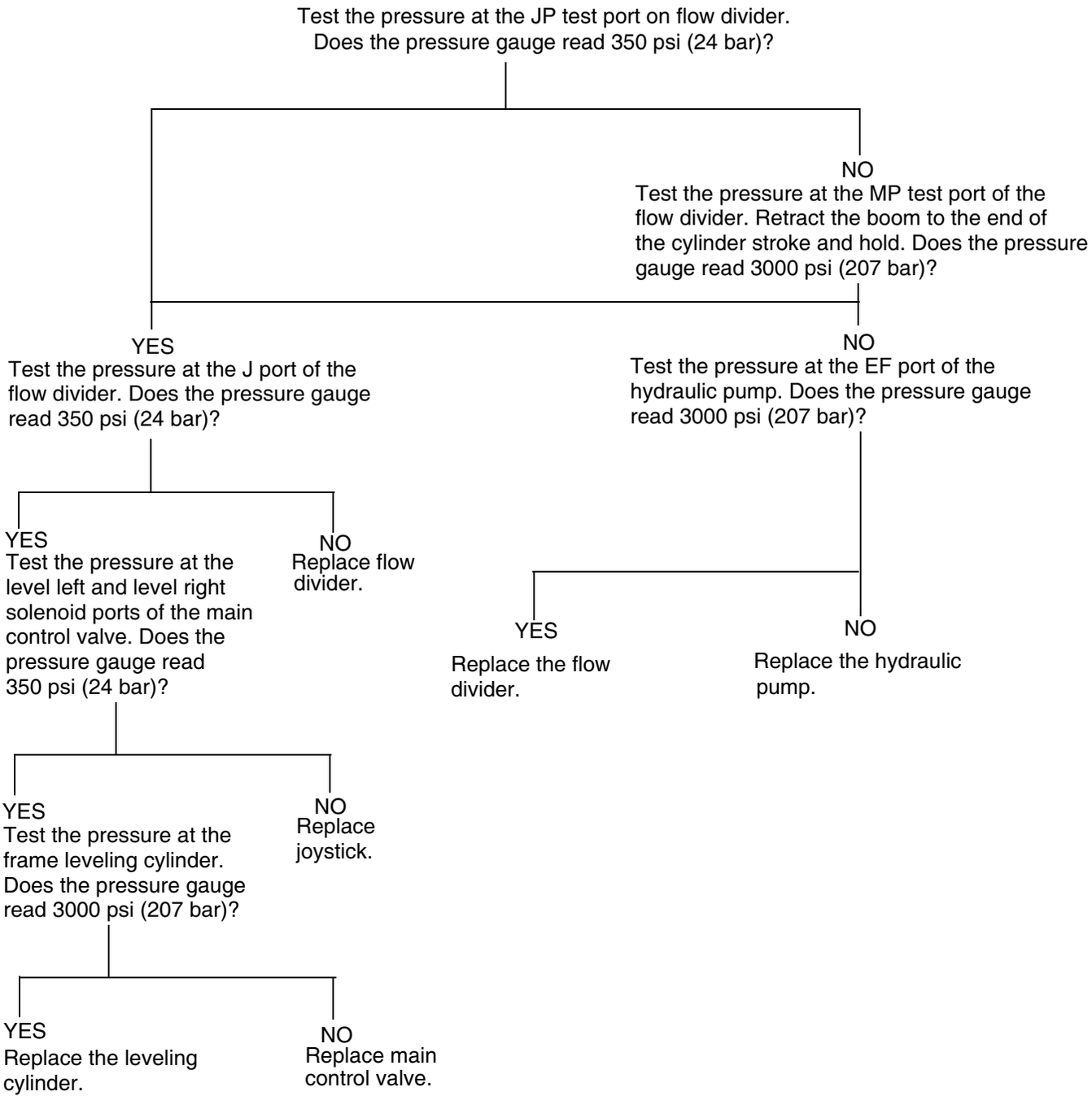
Remove and bench test the hydraulic pump. Does the hydraulic pump meet specifications?

NO

Repair or replace the hydraulic pump.

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FRAME LEVELING TROUBLESHOOTING



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STEERING CIRCUIT TROUBLESHOOTING

Test the pressure at the SP test port on the flow divider. Extend the frame leveling cylinder to the end of its stroke and hold. Does the pressure gauge read 2500 psi (172 bar)?

YES

Use an in-line flowmeter to test the pressure at port P of the Steer Mode Valve. Does the pressure gauge read 2500 psi (172 bar)?

YES

If the problem is in front steer mode only, repair or replace the front steer cylinder. If the problem is in combination steer only, repair or replace the rear steer cylinder.

NO

Repair or replace the Steering Control Valve.

NO

Test the pressure at the MP test port on the flow divider. Fully retract the boom and hold. Does the pressure gauge read 3000 psi (207 bar).

YES

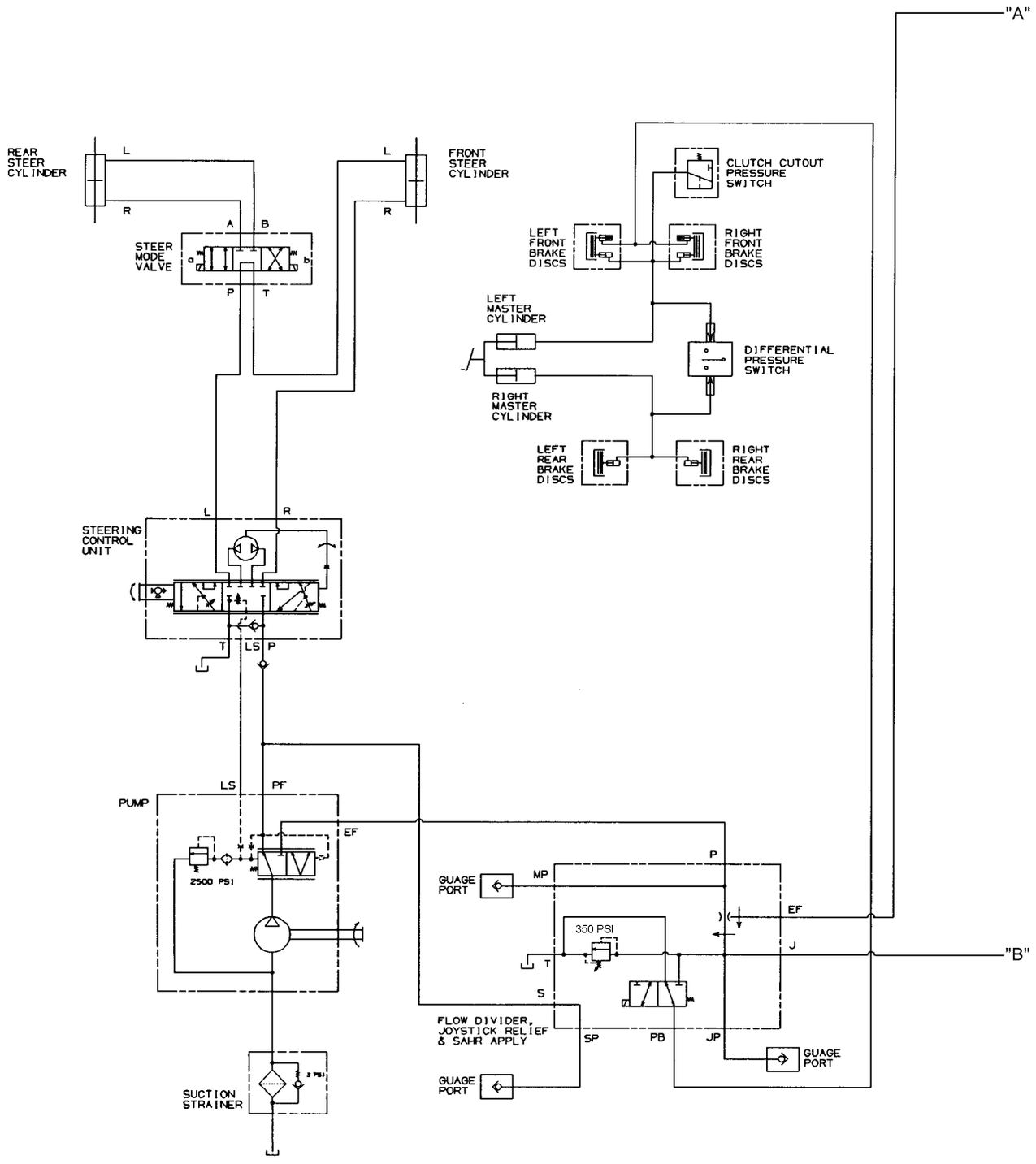
Replace the flow divider.

NO

Repair or replace the hydraulic pump.

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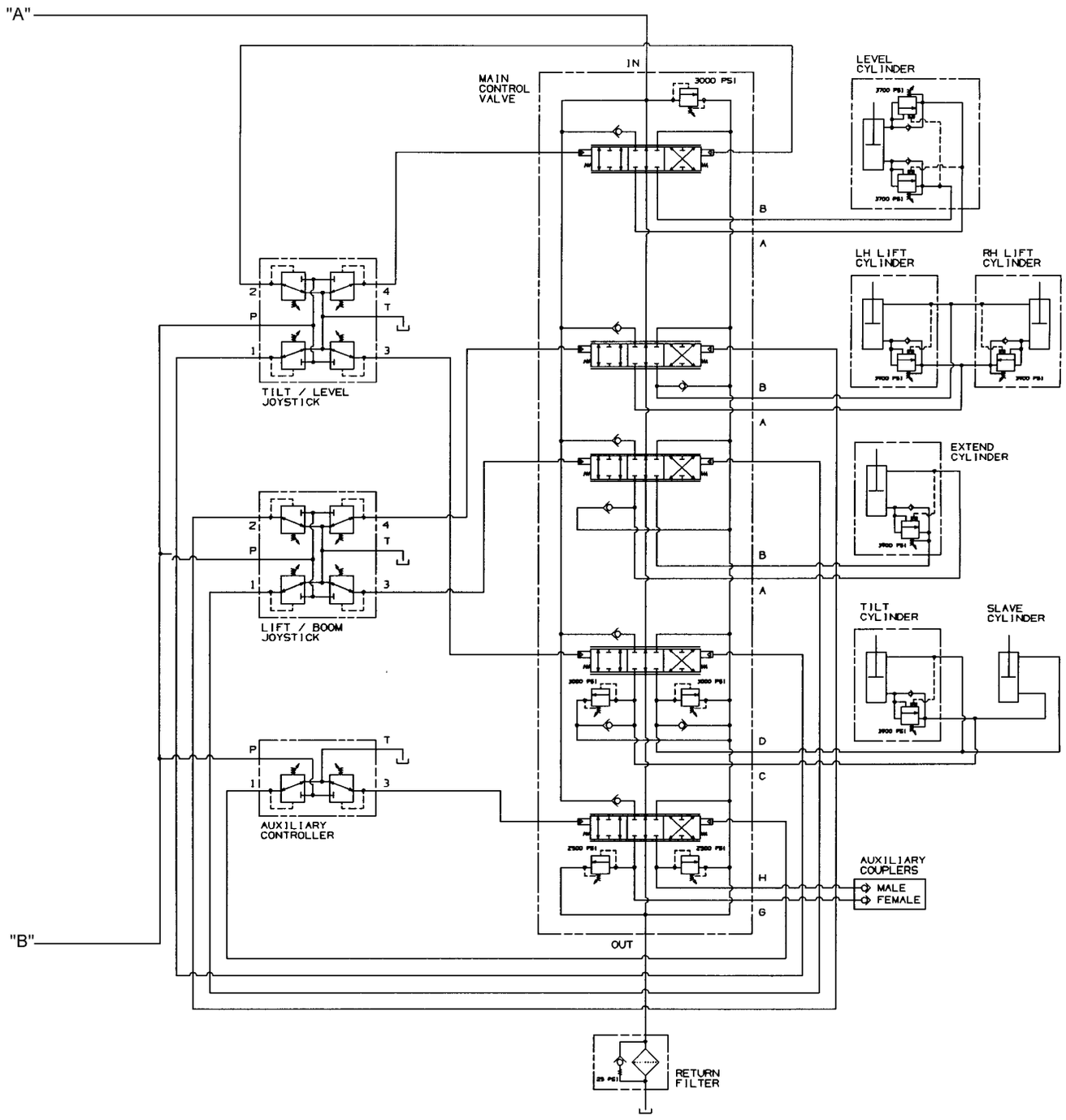
HYDRAULIC SCHEMATICS



G0805235

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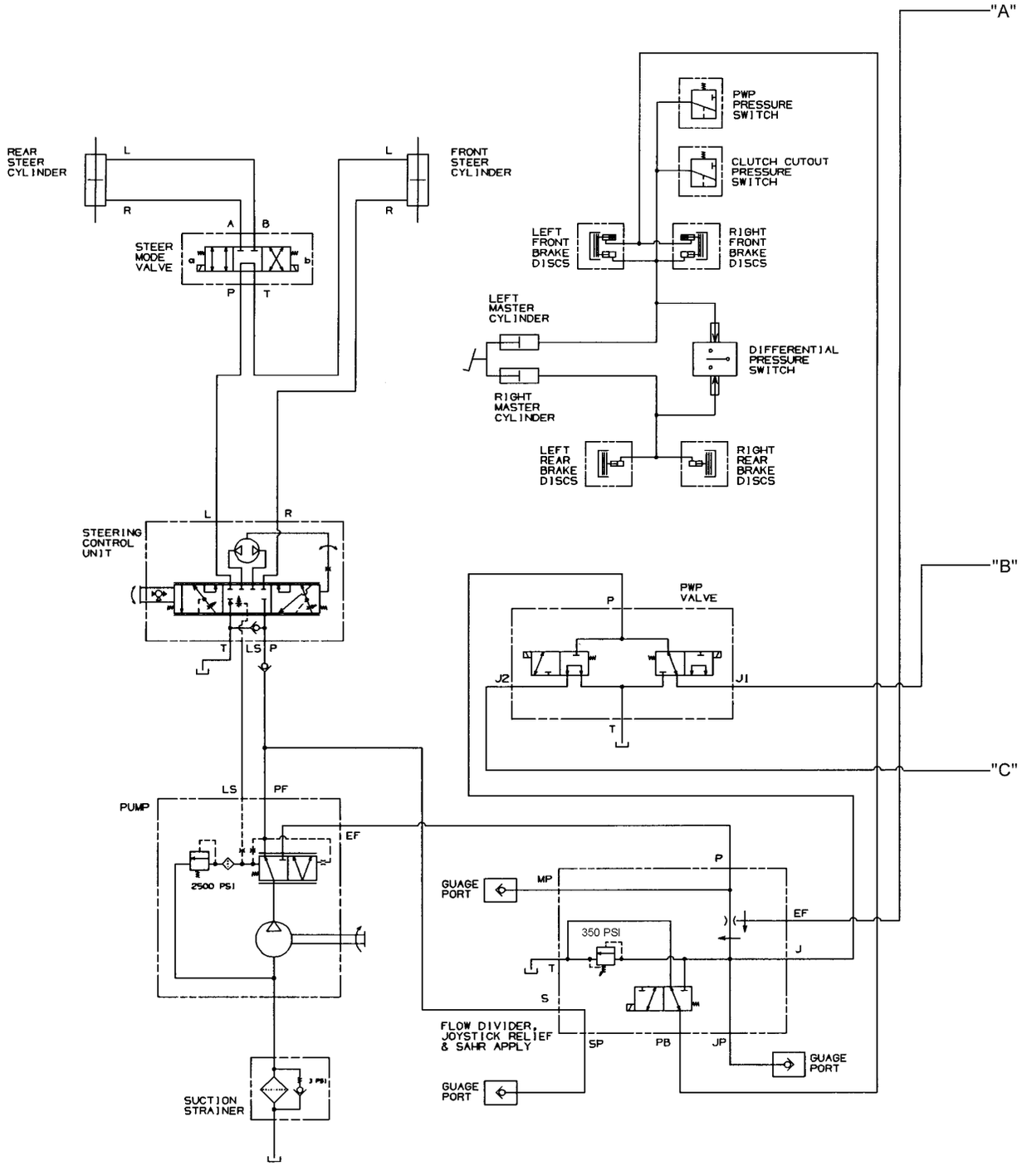
HYDRAULIC SCHEMATICS



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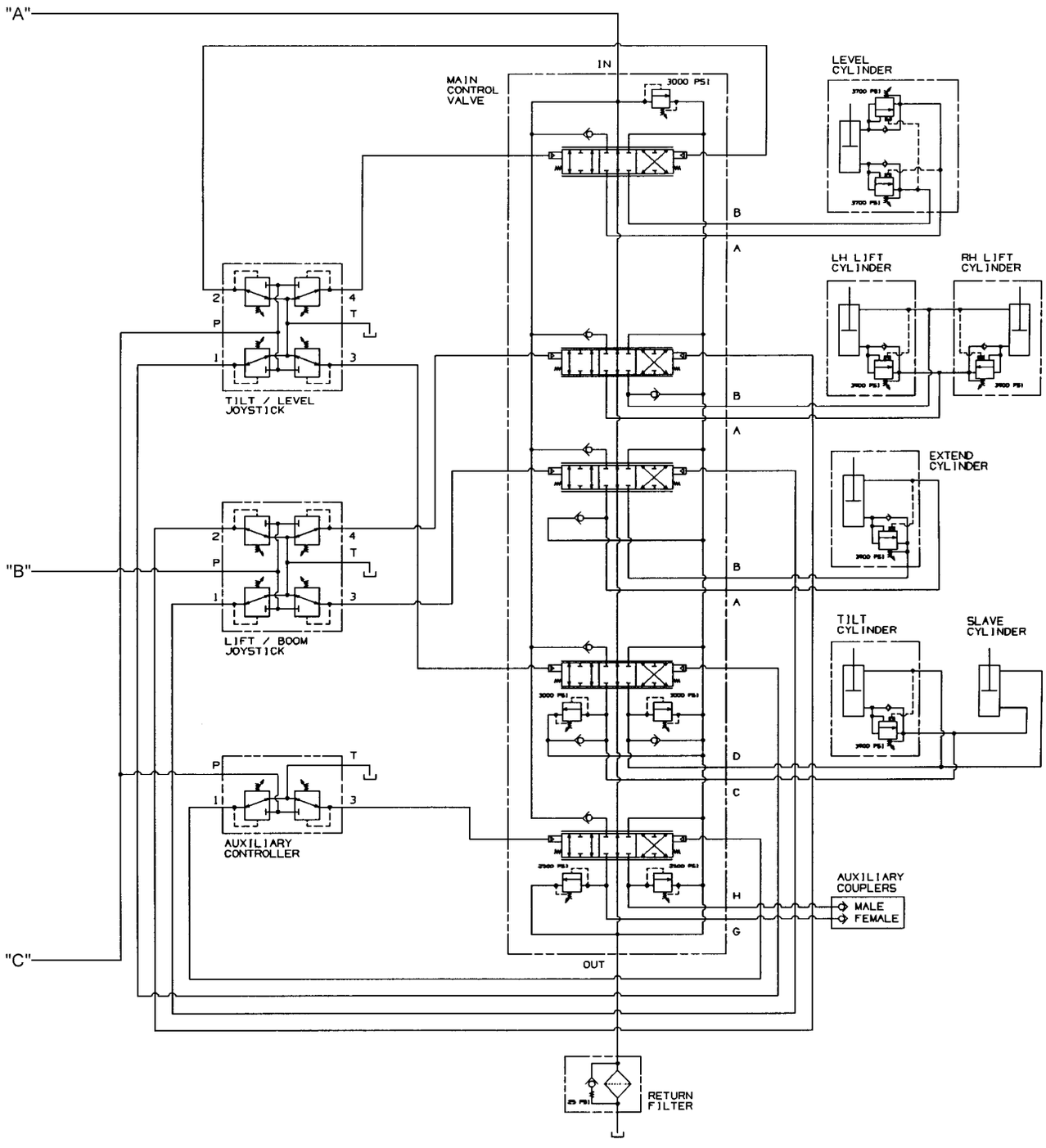
HYDRAULIC SCHEMATIC WITH PWP



G0805237

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HYDRAULIC SCHEMATIC WITH PWP (CONT'D)



G0805238

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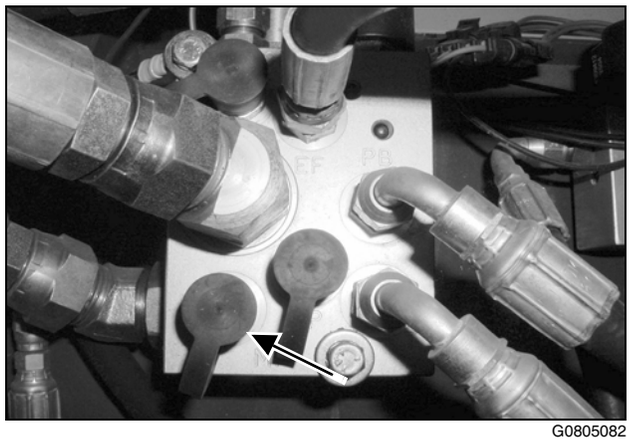
HYDRAULIC SYSTEM TESTING

PUMP PRESSURE TEST

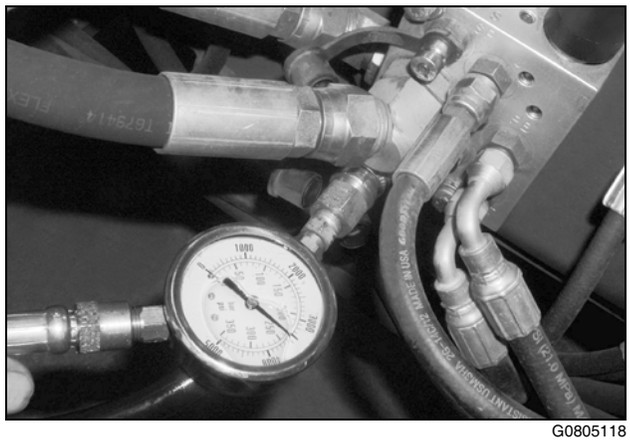
NOTE: *Before performing any hydraulic test, check for any visible leaks or component damage. Repair or replace the leaking component before proceeding with the tests.*

NOTE: *Before conducting any test port pressure checks, check the engine RPM. Engine speed must be 800 RPM at idle and 2500 to 2550 RPM at high idle. Pressure settings for relief valves are pre-set at the factory. Three test ports are provided under the front hood access cover.*

STEP 1



G0805082



G0805118

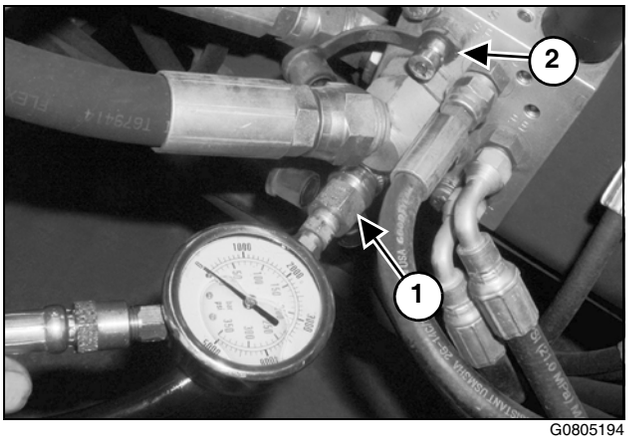
Install a 5000 psi (345 bar) pressure gauge to the MP test port on the flow divider. Start the engine and fully retract the boom and hold. The pressure gauge should read 3000 psi (207 bar).

STEP 2

Shut off the engine. If the pressure is less than 3000 psi (207 bar) remove and bench test the hydraulic pump.

If the pressure is 3000 psi (207 bar) continue with the next step.

STEP 3



G0805194

Remove the pressure gauge from the MP test port (1) and install on the SP test port (2) on the flow divider.

STEP 4



G0805117

Start the engine and cramp the steering fully to the right of left. The pressure gauge should read 2000 psi (138 bar).

STEP 5

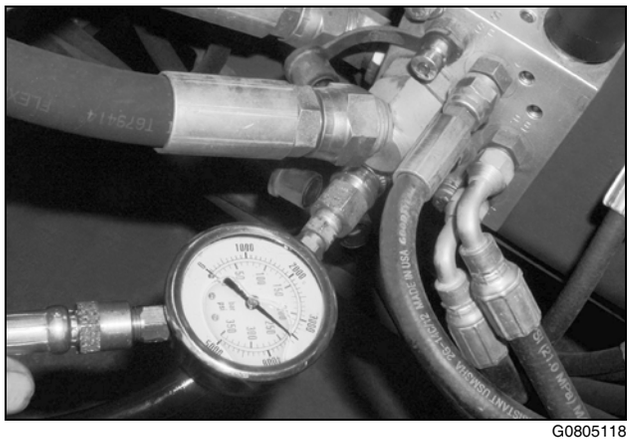
Shut the engine off. If the pressure is less than 2000 psi (138 bar) remove and bench test the hydraulic pump.

Remove the pressure gauge.

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FLOW DIVIDER PRESSURE TEST

STEP 6



G0805118

Install a 5000 psi (345 bar) pressure gauge on the MP test port on the flow divider. Start the engine and fully retract the boom and hold. The pressure gauge should read 3000 psi (207 bar).

STEP 7

Shut the engine off. If the pressure gauge reads 3000 psi (207 bar) continue with the next step.

If the gauge reads less than 3000 psi (207 bar) pressure test the hydraulic pump.

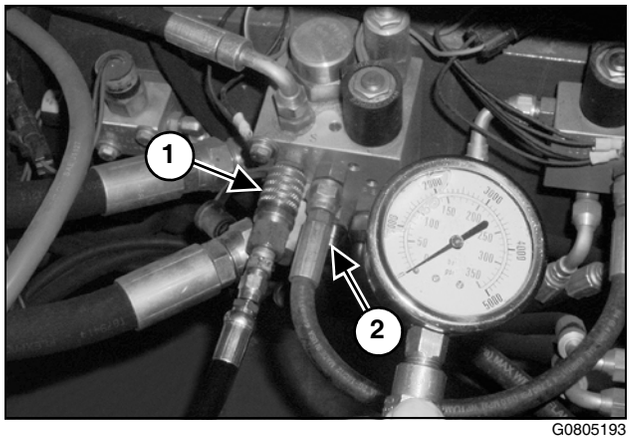
STEP 8



G0805117

Install a 3000 psi (207 bar) pressure gauge on the SP test port on the flow divider. Start the engine and cramp the steering fully to the right or left. The pressure gauge should read 2000 psi (138 bar).

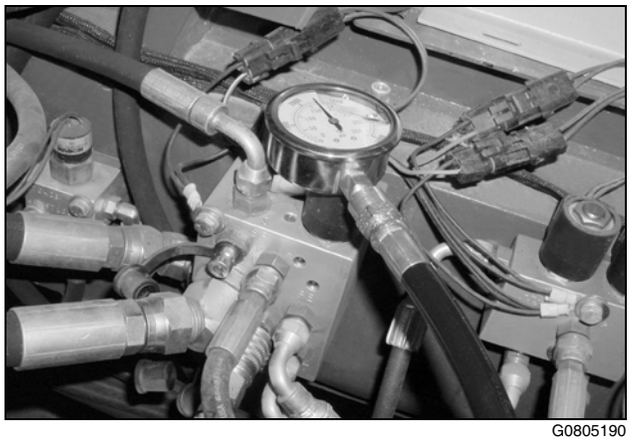
STEP 9



G0805193

Shut the engine off. Remove the pressure gauge from the SP test port (1) and install it on the JP test port (2) on the flow divider.

STEP 10



G0805190

Start the engine. The pressure gauge should read 350 psi (24 bar).

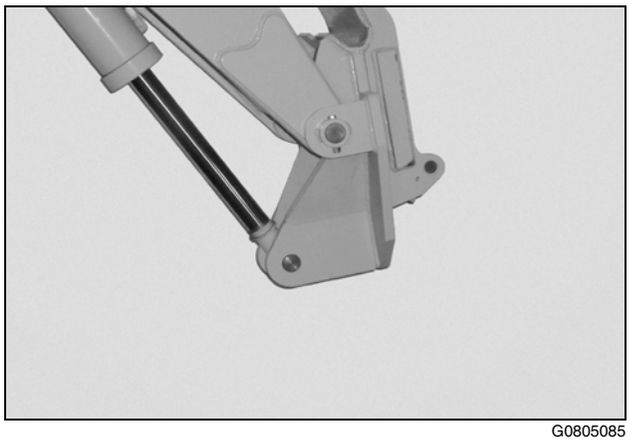
STEP 11

Shut the engine off. If the pressure readings in either Step 9 or 10 were incorrect and you had 3000 psi (207 bar) in Step 8, replace the flow divider.

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LIFT CYLINDER TEST

STEP 12

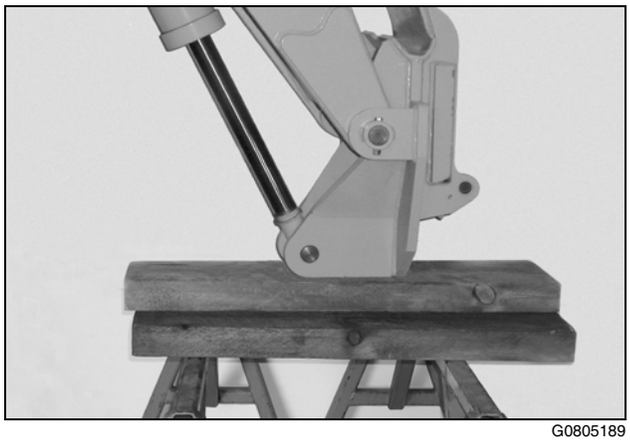


G0805085

Start the engine, set the park brake and raise the boom approximately 3 feet (1 meter). Shut off the engine.

NOTE: *If the boom lowers while the engine is off proceed to Step 19.*

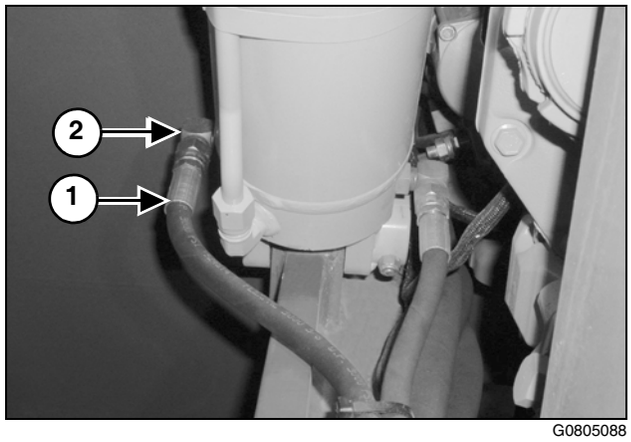
STEP 13



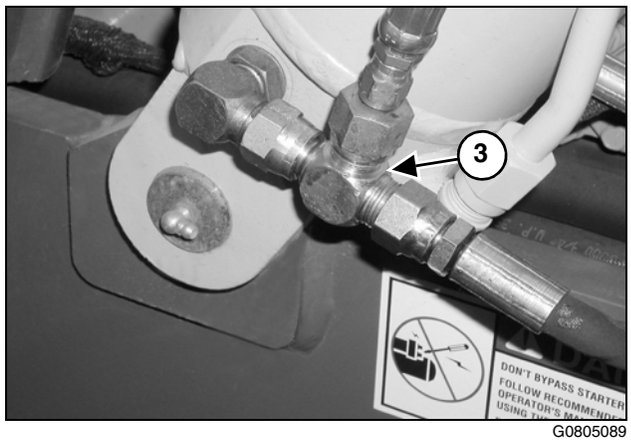
G0805189

Place a support stand under the attachment end of the boom.

STEP 14



G0805088



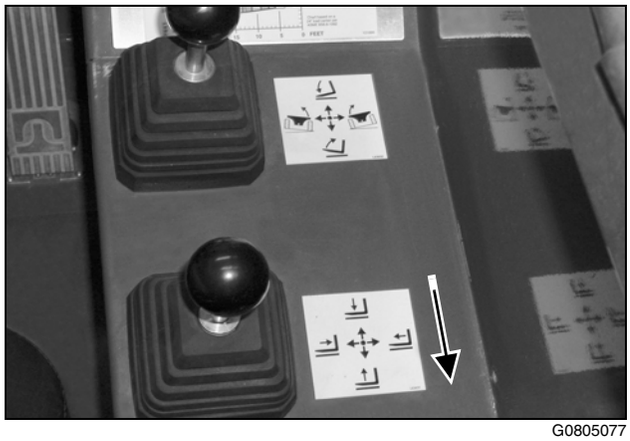
G0805089

Remove the hose (1) from the left port (2) of the lift cylinder. Install a 3000 psi (207 bar) pressure gauge and hose (3) between the hose (1) and the port (2).

NOTE: *The hose must be long enough to read the gauge while standing clear of the forklift.*

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STEP 15



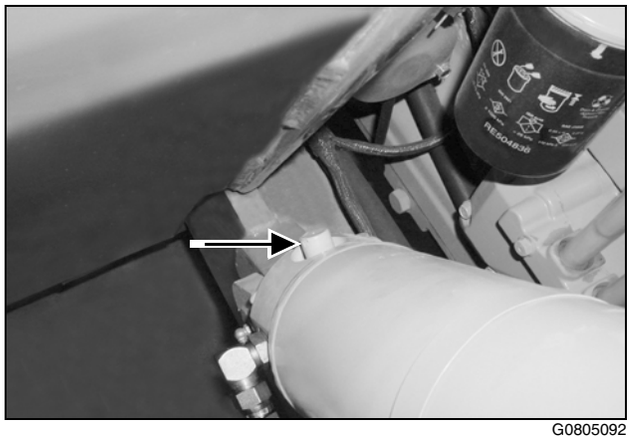
G0805077

Start the engine and remove the support stand. Watch the pressure gauge and slowly move the joystick to the lower position. The pressure gauge should read 1500 psi (103 bar) as the boom is moving downward.

If the pressure gauge reads 1500 psi (103 bar) proceed to Step 19.

If the gauge reads more or less than 1500 psi (103 bar) continue with the next step.

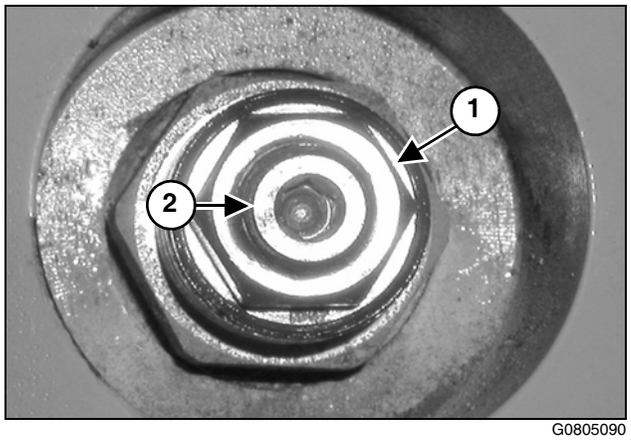
STEP 16



G0805092

Shut off the engine. Remove the cap from the counter balance valve on the lift cylinder.

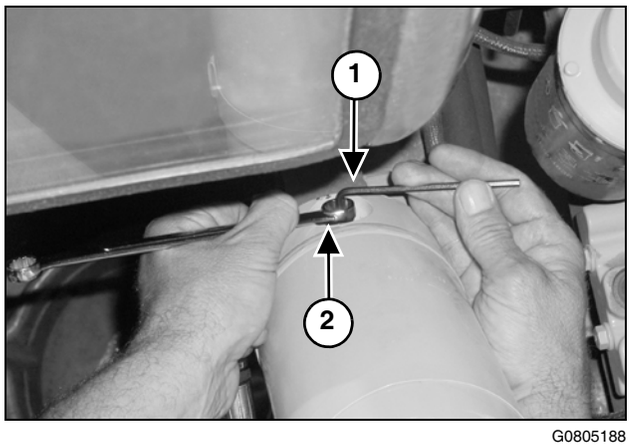
STEP 17



G0805090

Loosen the lock nut (1) and turn the adjusting screw (2) clockwise to decrease the pressure and counterclockwise to increase the pressure.

NOTE: *The pressure will change approximately 100 psi (7 bar) for every 1/4 turn of the adjusting screw (2).*



G0805188

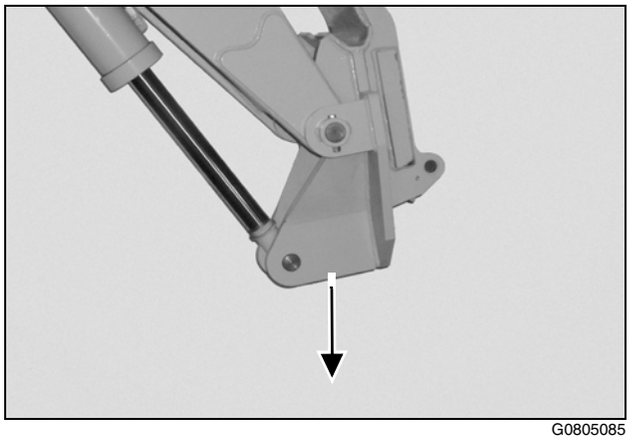
Hold the adjusting screw (1) from turning while tightening the lock nut (2).

STEP 18

Repeat Steps 15, 16 and 17 as necessary. If the adjusting screw does not change the pressure, replace the counter balance valve.

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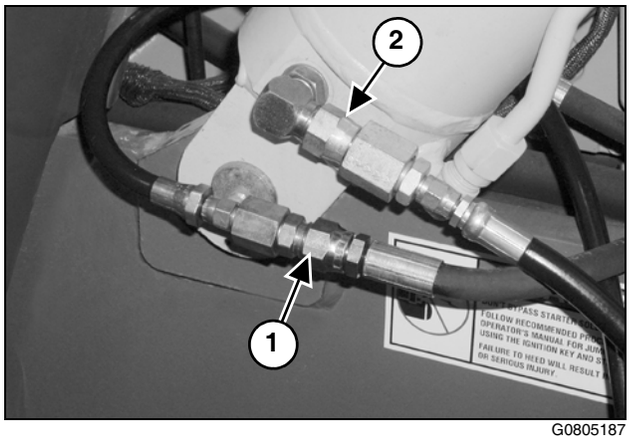
STEP 19



G0805085

Start the engine and lower the boom until the lift cylinders are at the end of their stroke. shut off the engine.

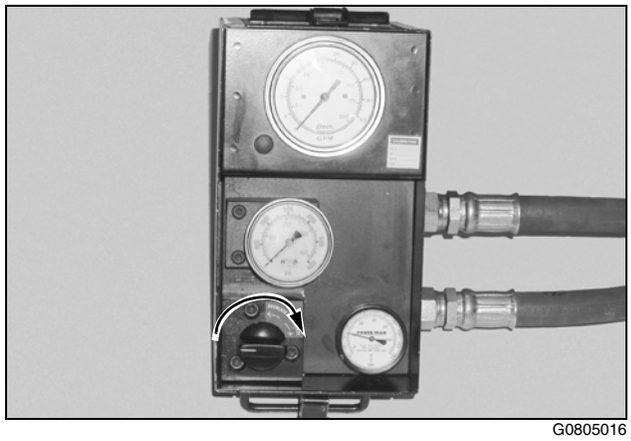
STEP 20



G0805187

Remove the pressure gauge from the lift cylinder. Installt he inlet hose (1) of an in-line flowmeter to the left hose and the outlet hose (2) of the flowmeter to the cylinder left port.

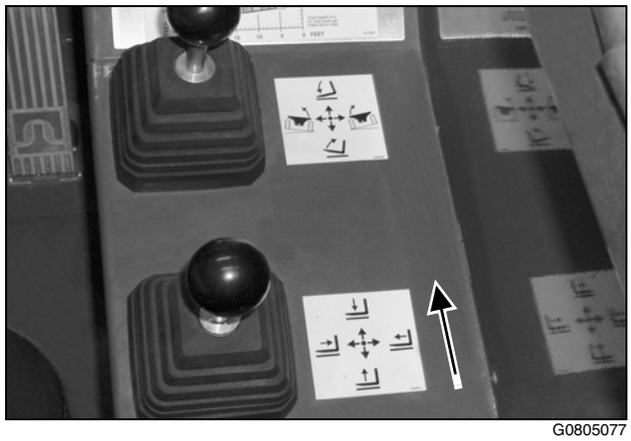
STEP 21



G0805016

Open the load control valve of the flowmeter. Start the engine and run at 1000 RPM.

STEP 22



G0805077

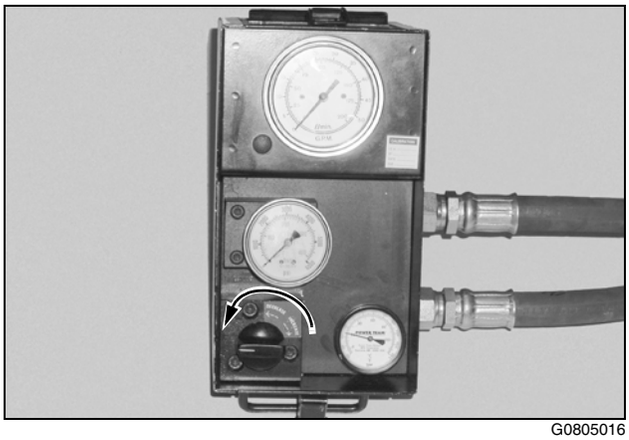
Move the joystick to the LOWER position and hold. The pressure gauge should read 3000 psi (207 bar).

If the pressure is less than 3000 psi (207 bar) proceed to Step 23.

If the pressure is more than 3000 psi (207 bar), follow the procedure in the Main Control Valve Pressure Relief Test and Adjustment section of this manual.

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STEP 23



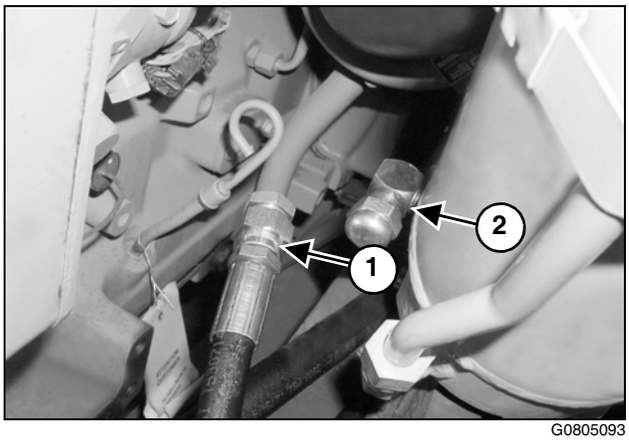
G0805016

Hold the joystick in the LOWER position and slowly close the load control valve on the flowmeter until the pressure gauge reads 3000 psi (207 bar).

If the pressure is 3000 psi (207 bar) repair or replace the lift cylinder being tested.

If the pressure is less than 3000 psi (207 bar) proceed to Step 24.

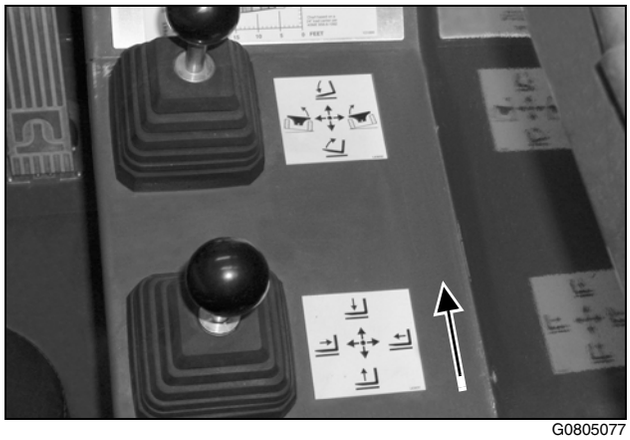
STEP 24



G0805093

Release the joystick, open the load control valve and shut off the engine. Remove the hose (1) from the left port (2) of the opposite side lift cylinder. Install a plug in the hose (1) and a cap on the cylinder port (2).

STEP 25



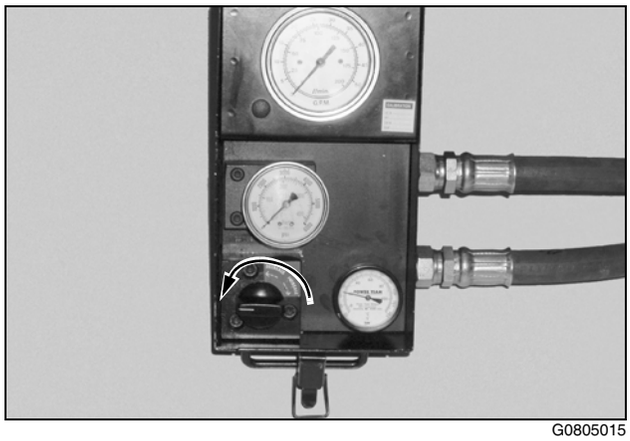
G0805077

Start the engine and run at 1000 RPM. Hold the joystick in the LOWER position.

If the pressure gauge reads 3000 psi (207 bar), repair or replace the opposite side lift cylinder.

If the pressure is less than 3000 psi (207 bar), proceed to Step 26.

STEP 26



G0805015

Hold the joystick in the LOWER position.

Slowly close the load control valve of the flowmeter until the pressure gauge reads 3000 psi (207 bar).

If the pressure is 3000 psi (207 bar), repair or replce both lift cylinder.

If the pressure is less than 3000 psi (207 bar), follow the procedure in the Main Control Valve Pressure Relief Test and Adjustment section of this manual.

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TILT CYLINDER QUICK TEST

STEP 27

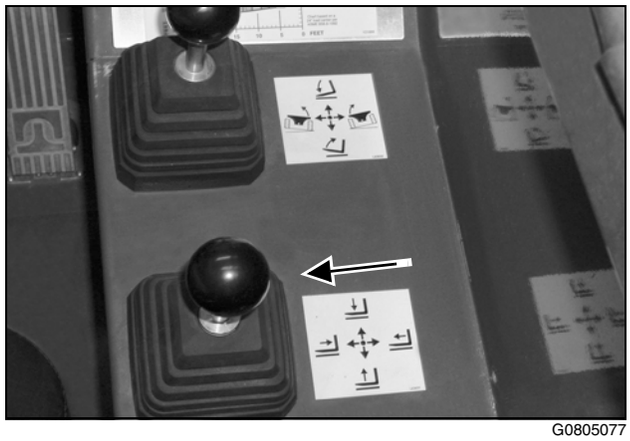


G0805194

Install a 5000 psi (345 bar) pressure gauge and hose on the MP test port on the flow divider.

NOTE: *The hose must be long enough to observe the pressure gauge from inside the cab or standing clear of the forklift.*

STEP 28



G0805077

Start the engine and run at 1000 RPM. Retract the boom until the extend cylinder is at the end of its stroke and hold the joystick in the RETRACT position. The pressure gauge should read 3000 psi (207 bar).

IF the pressure is more or less than 3000 psi (207 bar) proceed to the Main Control Valve Pressure Relief Test and Adjustment section of this manual.

STEP 29



G0805086

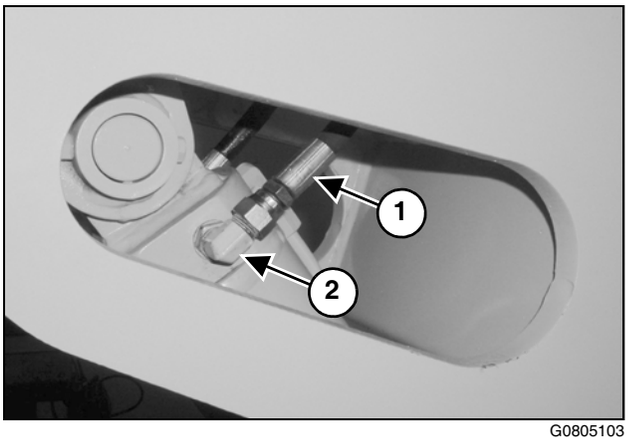
Tilt the attachment mount up until the tilt cylinder reaches the end of its stroke and hold the joystick in the TILT UP position. The pressure gauge should read 3000 psi (207 bar).

If the pressure is at 3000 psi (207 bar), but the tilt cylinder does not work, check the hoses and steel tubes between the control valve and tilt cylinder or check the cylinder barrel for damage.

If the pressure is less than 3000 psi (207 bar) proceed to the next step.

TILT CYLINDER DIRECT TEST

STEP 30



G0805103

Shut off the engine. Remove the hose (1) from the piston (tilt up) port (2) of the tilt cylinder. Cap the cylinder port. Install a 5000 psi (345 bar) pressure gauge (3) and hose on the cylinder supply hose.

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STEP 31



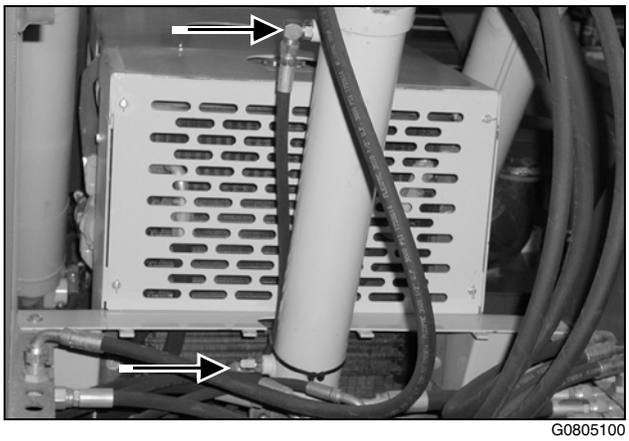
G0805104

Start the engine and run at 1000 RPM. Hold the joystick in the TILT UP position. The pressure gauge should read 3000 psi (207 bar).

If the pressure is 3000 psi (207 bar), repair or replace the tilt cylinder.

If the pressure is less than 3000 psi (207 bar), proceed to the next step.

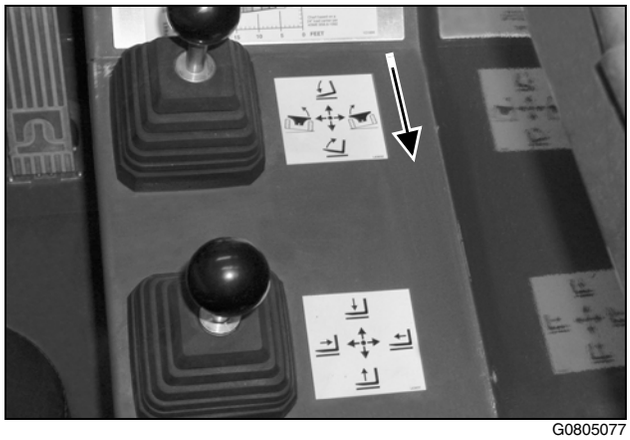
STEP 32



G0805100

Shut off the engine. Remove the slave cylinder hoses. Install plugs in the hose ends and caps on the fittings.

STEP 33



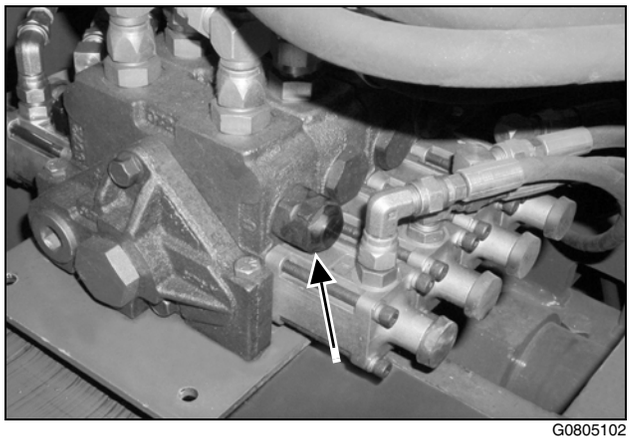
G0805077

Start the engine and run at idle RPM. Hold the joystick in the TILT UP position.

If the pressure gauge reads 3000 psi (207 bar), repair or replace the slave cylinder.

If the pressure is less than 3000 psi (207 bar), proceed to the next step.

STEP 34



G0805102

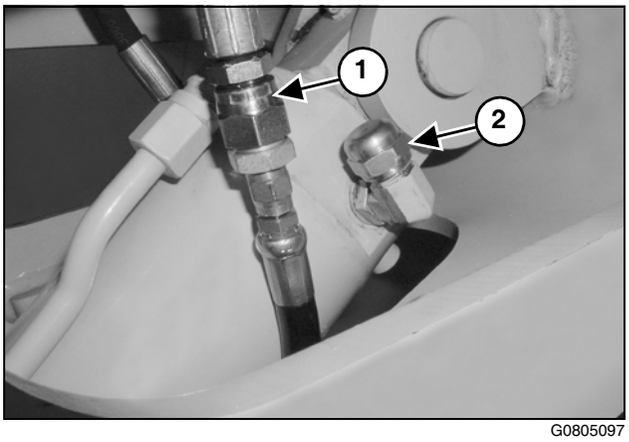
Replace the tilt up relief valve.

STEP 35

Repeat Steps 32 and 33. If the pressure is less than 3000 psi (207 bar) repair or replace the control valve.

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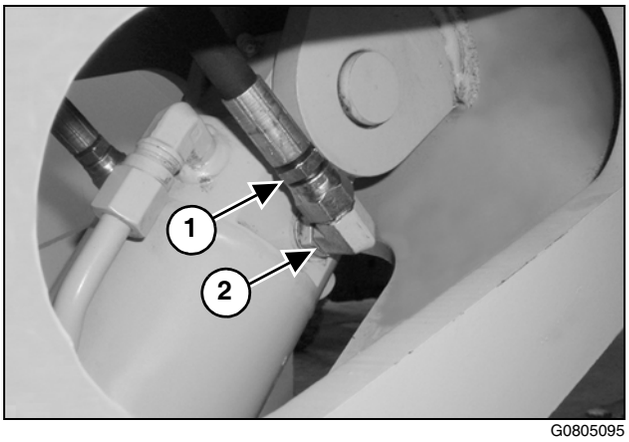
STEP 36



G0805097

Shut off the engine. Remove the pressure gauge from the tilt up supply hose (1) and remove the cap from the cylinder port (2). Install the hose on the cylinder.

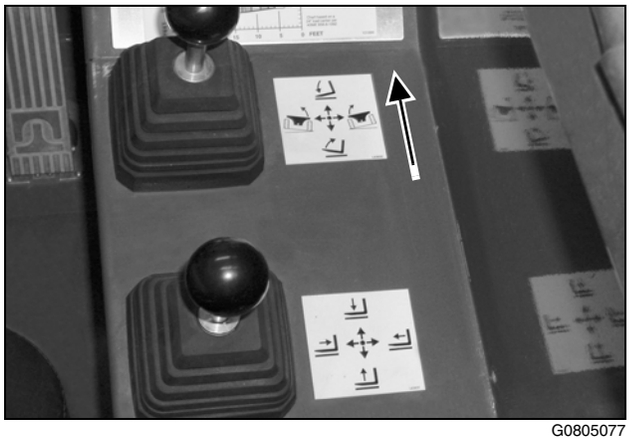
STEP 37



G0805095

Remove the supply hose (1) from the rod (tilt down) port (2) of the tilt cylinder. Cap the cylinder port and install a 5000 psi (345 bar) pressure gauge and hose on the cylinder supply hose.

STEP 38



G0805077



G0805098

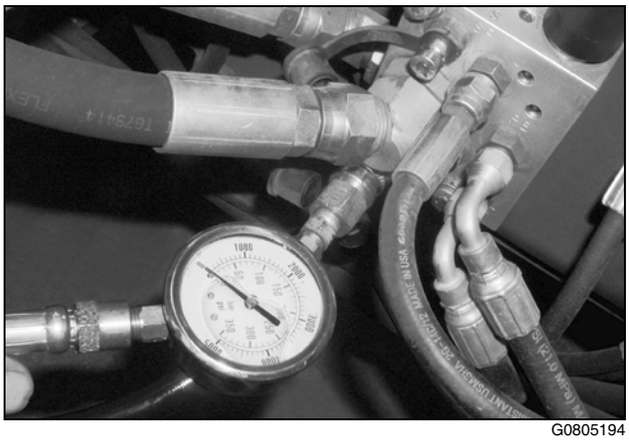
Start the engine and run at 1000 RPM. Hold the joystick in the TILT DOWN position until the cylinder reaches the end of its stroke. Hold the joystick in the TILT DOWN position. The pressure gauge should read 3000 PSI (207 Bar).

If the pressure gauge reads less than 3000 psi (207 bar), repeat Steps 33, 34 and 35 for the tilt down relief valve.

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TILT CYLINDER COUNTER BALANCE VALVE QUICK TEST

STEP 39

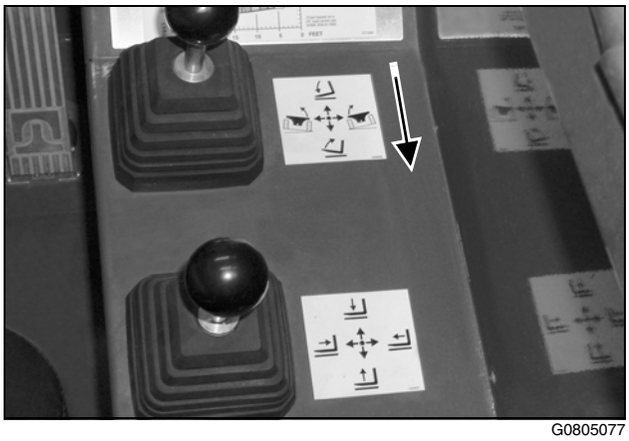


G0805194

Install a 5000 psi (345 bar) pressure gauge and hose on the MP test port of the flow divider.

NOTE: *The hose must be long enough to observe the pressure gauge from inside the cab or standing clear of the forklift.*

STEP 40



G0805077

Start the engine and run at 1000 RPM. Tilt the attachment mount up until the tilt cylinder reaches the end of its stroke and hold the joystick in the TILT UP position. The pressure gauge should read 3000 psi (207 bar).

If the pressure is less than 3000 psi (207 bar) go to Step 30 of the Tilt Cylinder Direct Test.

If the pressure is 3000 psi (207 bar), proceed to the next step.

STEP 41



G0805195

Watch the pressure gauge as the attachment mount is slowly tilted down. The pressure gauge should read 1500 psi (103 bar) as the attachment mount is moving downward.

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

TILT CYLINDER COUNTER BALANCE VALVE DIRECT TEST

STEP 42



G0805191

Shut off the engine. Install a 5000 psi (345 bar) pressure gauge and hose (1) between the tilt cylinder rod end (tilt down) port (2) and the supply hose (3).

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STEP 43

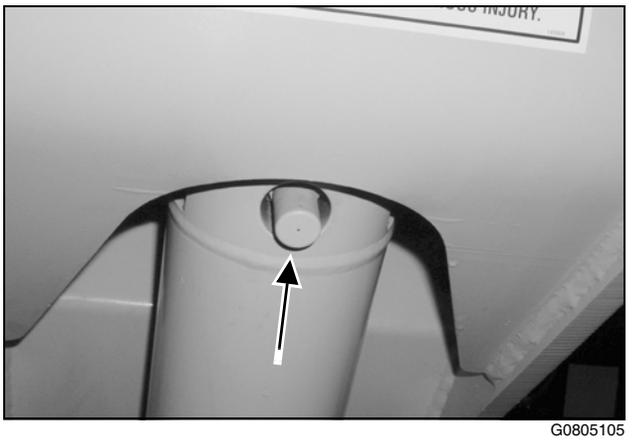


G0805108

Start the engine and run at 1000 RPM. Watch the pressure gauge as the attachment is slowly tilted DOWN. The pressure gauge should read 1500 psi (103 bar) as the attachment mount is moving downward. Shut off the engine.

If the pressure is more or less than 1500 psi (103 bar) proceed to the next step.

STEP 44

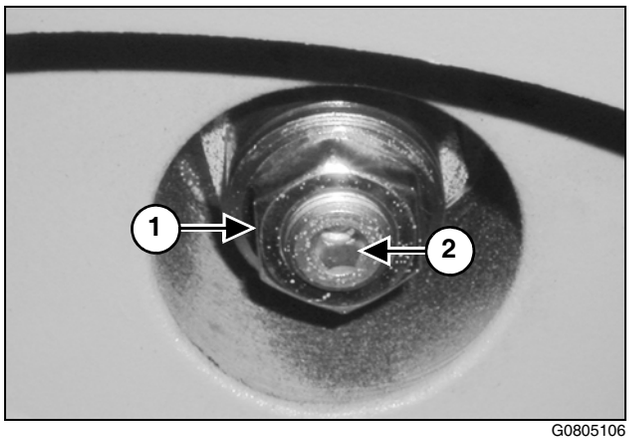


G0805105

Remove the cover from the tilt cylinder counter balance valve.

NOTE: *The cover is friction fit and can be loosened by twisting the cover on the valve cartridge.*

STEP 45



G0805106

Loosen the lock nut (1) and turn the adjusting screw (2) counterclockwise to increase and clockwise to decrease the pressure.

NOTE: *One turn of the adjusting screw (2) will change the pressure approximately 500 psi (35 bar).*

Hold the adjusting screw (2) from turning and tighten the lock nut (1). Repeat Steps 43 and 45 until the load check release pressure is 1500 psi (103 bar).

If the adjusting screw does not change the pressure, repair or replace the counter balance valve cartridge.

STEP 46

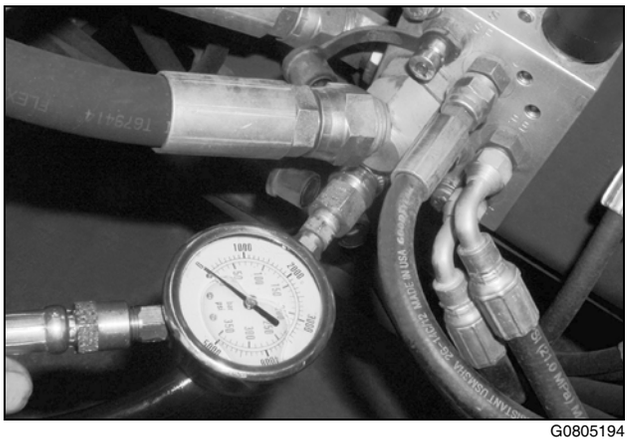
If a new counter balance valve was installed, repeat Steps 43 and 45 to set the counter balance valve release pressure.

Remove the pressure gauge from the cylinder and install the supply hose on the cylinder port.

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EXTENSION CYLINDER QUICK TEST

STEP 47

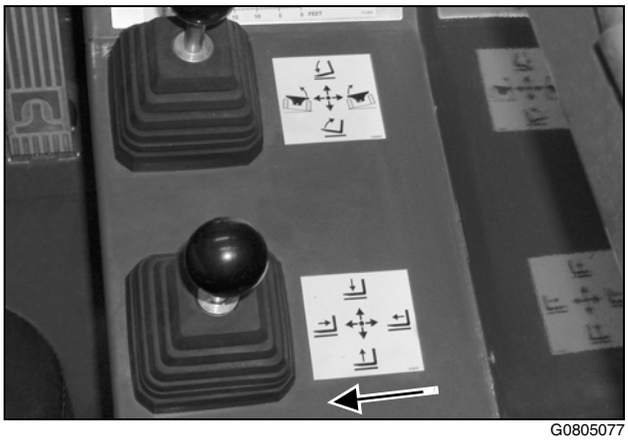


G0805194

Install a 5000 psi pressure gauge and hose on the MP test port of the flow divider.

NOTE: *The hose must be long enough to observe the pressure gauge from inside the cab or standing clear of the forklift.*

STEP 48



G0805077

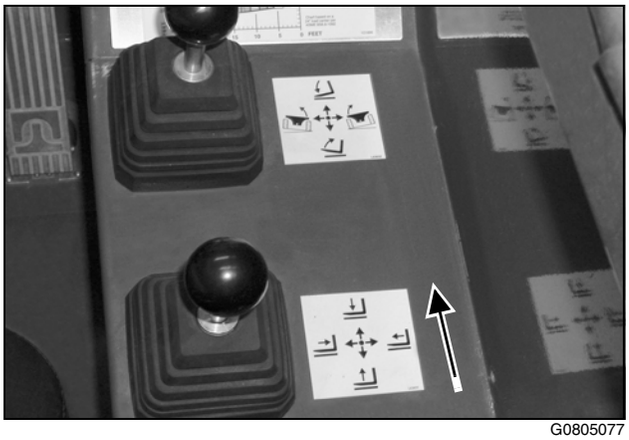
Start the engine and run at 1000 RPM. Retract the boom until the boom extension cylinder is at the end of its stroke and hold the joystick in the RETRACT position. The pressure gauge should read 3000 psi (207 bar).

If the pressure is more than 3000 psi (207 bar) proceed to the Main Control valve Pressure Relief Test and Adjustment section of this manual.

If the pressure is less than 3000 psi (207 bar), proceed to the next step.

If the pressure is 3000 psi (207 bar), but the extension cylinder is not working properly, check the boom or extension cylinder barrel for damage.

STEP 49



G0805077

Lower the boom until the lift cylinders are at the end of their stroke and hold the joystick in the BOOM LOWER position. The pressure gauge should read 3000 psi (207 bar).

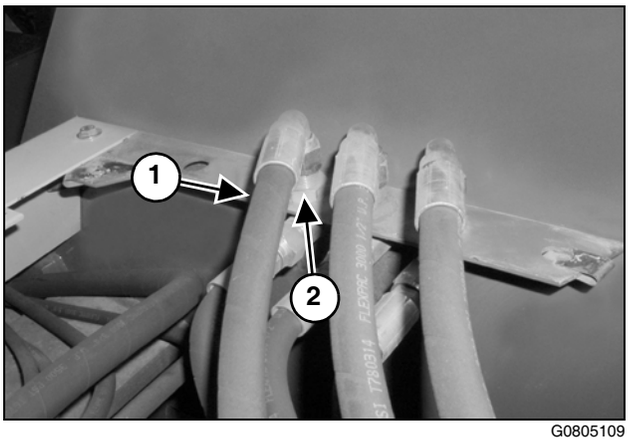
If the pressure is less than 3000 psi (207 bar), proceed to the Main Control Valve Pressure Relief Test and Adjustment section of this manual before proceeding to the next step.

If the pressure is 3000 psi (207 bar), proceed to the next step.

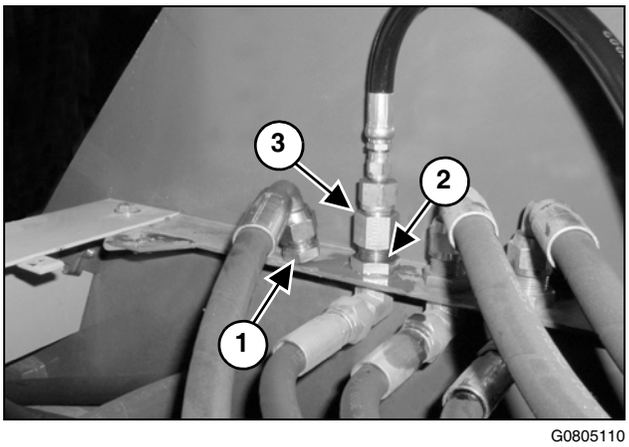
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EXTENSION CYLINDER DIRECT TEST

STEP 50



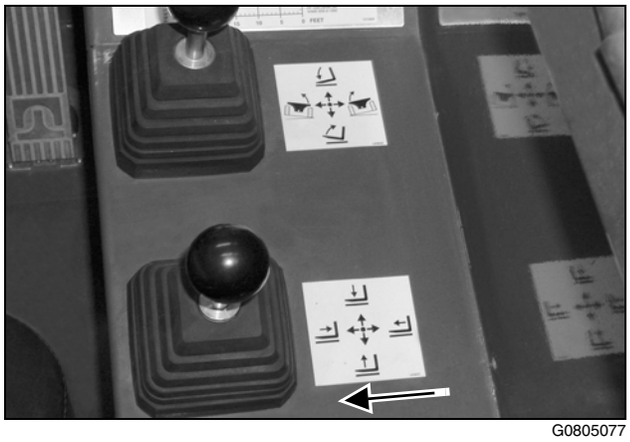
G0805109



G0805110

Shut off the engine. Remove the hose (1) from the retract bulkhead fitting (2). Install a 5000 psi (345 bar) pressure gauge and adaptor (3) on the bulkhead fitting (2) and plug the hose (1) end.

STEP 51



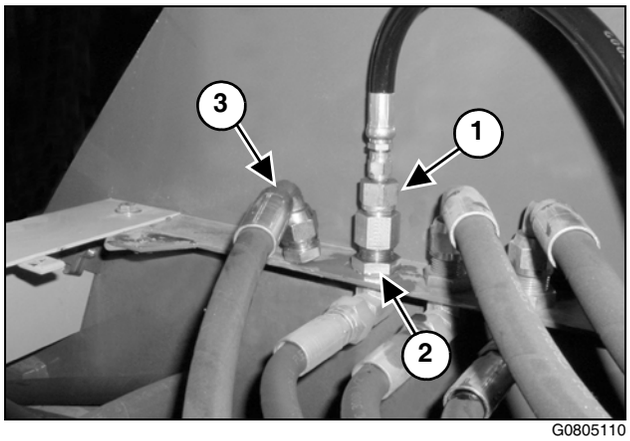
G0805077

Start the engine and run at 1000 RPM. Move the joystick into the BOOM RETRACT position and hold. The pressure gauge should read 3000 psi (207 bar).

If the pressure is 3000 psi (207 bar), repair or replace the extend/retract cylinder.

If the pressure is less than 3000 psi (207 bar), repair or replace the extend/retract control valve.

STEP 52



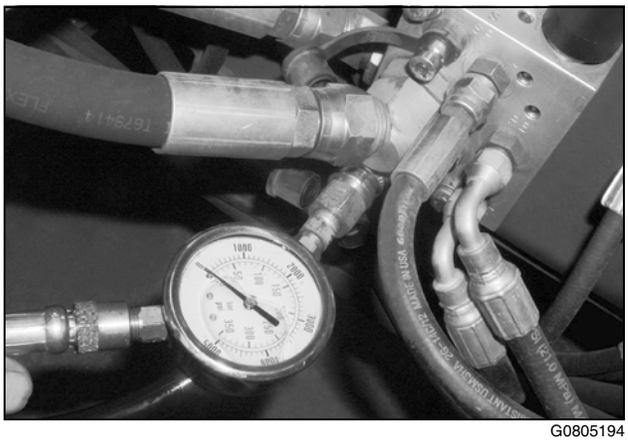
G0805110

Shut off the engine. Remove the pressure gauge (1) from the retract bulkhead fitting (2) and install the retract hose (3) on the bulkhead fitting (2).

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EXTENSION CYLINDER COUNTER BALANCE VALVE QUICK TEST

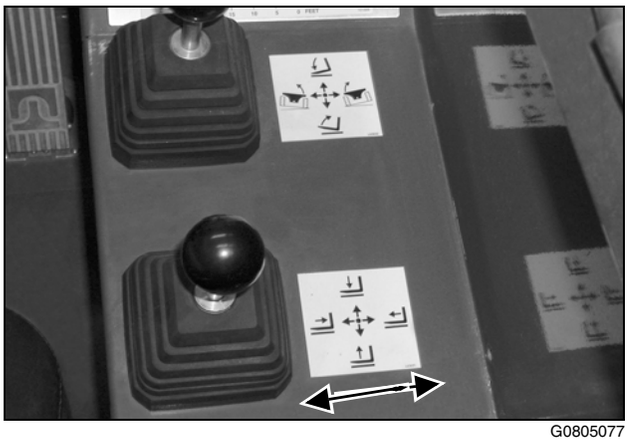
STEP 53



G0805194

Install a 5000 psi (345 bar) pressure gauge and hose on the MP test port of the flow divider.

STEP 54



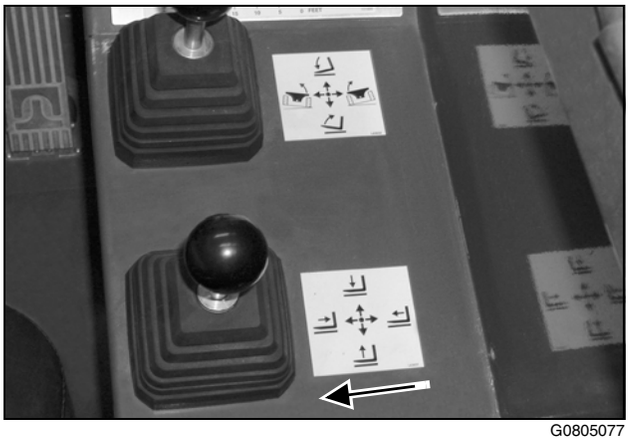
G0805077

Start the engine and run at 1000 RPM. Extend the boom approximately 6 feet or 2 meters. Watch the pressure gauge as the boom is slowly retracted, the gauge should read 1500 psi (103 bar).

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

If the pressure is more than 1500 psi (103 bar), proceed to Step 58.

STEP 55



G0805077

Retract the boom to the end of the extension cylinder stroke and hold the joystick in the RETRACT position. The pressure gauge should read 3000 psi (207 bar).

If the pressure is less than 3000 psi (207 bar), go to Step 49 of the EXTENSION CYLINDER QUICK TEST.

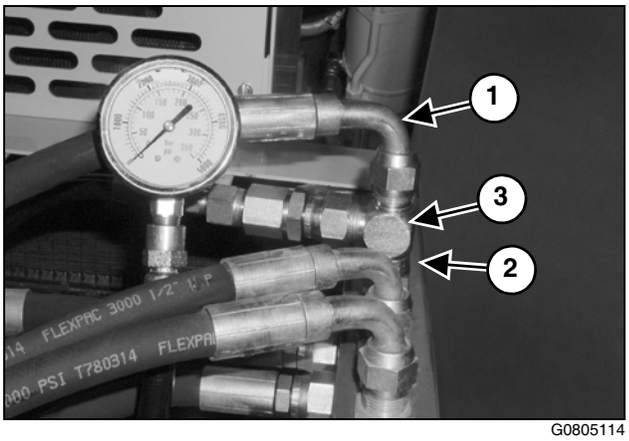
If the pressure is 3000 psi (207 bar), proceed to the next step.

If the pressure is more than 3000 psi (207 bar), go to the Main Control Valve Pressure Relief Test and Adjustment section of this manual before proceeding to the next step.

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EXTENSION CYLINDER COUNTER BALANCE VALVE DIRECT TEST AND ADJUSTMENT

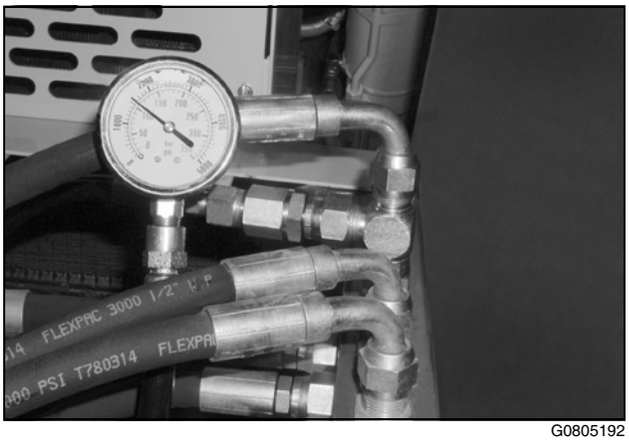
STEP 56



G0805114

Shut off the engine. Remove the pressure gauge from the MP test port. Remove the hose (1) from the retract bulkhead fitting (2). Install a 5000 psi (345 bar) pressure gauge (3) between the hose (1) and bulkhead fitting (2).

STEP 57

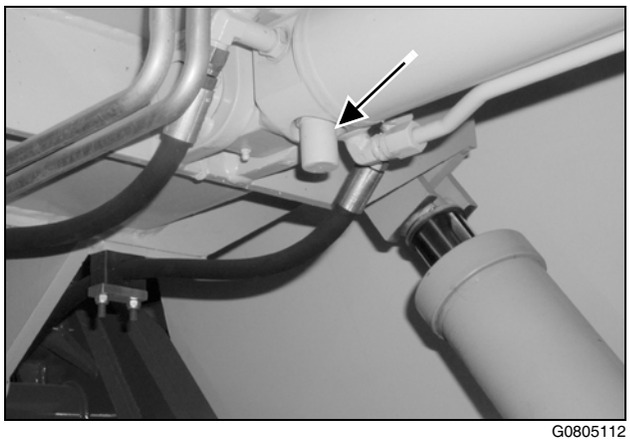


G0805192

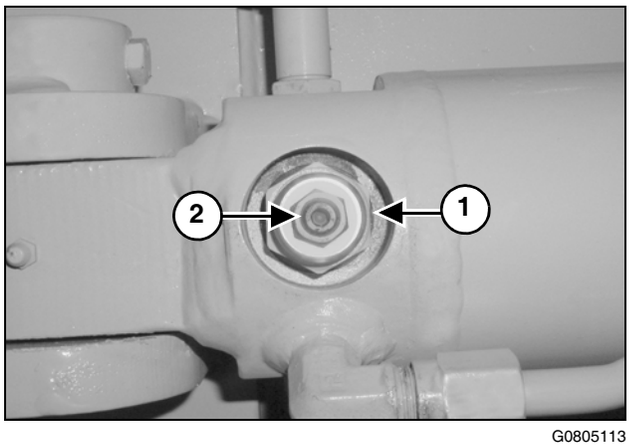
Start the engine and run at 1000 RPM. Extend the boom approximately 6 feet (2 meters). Watch the pressure gauge as the boom is slowly retracted. The gauge should read 1500 psi (103 bar) as the boom is retracted.

If the gauge is not at 1500 psi (103 bar), proceed to the next step.

STEP 58



G0805112



G0805113

Shut off the engine. Remove the cover from the counter balance valve.

NOTE: *The cover is friction fit and can be loosened by twisting the cover on the valve cartridge.*

Loosen the locknut (1) and turn the adjusting screw (2) counterclockwise to increase and clockwise to decrease the load check release pressure.

NOTE: *One turn of the adjusting screw will change the pressure approximately 500 psi (35 bar).*

Hold the adjusting screw from turning and tighten the locknut. Repeat Steps 5 and 7 until the pressure gauge reads 1500 psi (103 bar).

If the adjusting screw does not change the pressure, replace the counter balance valve cartridge.

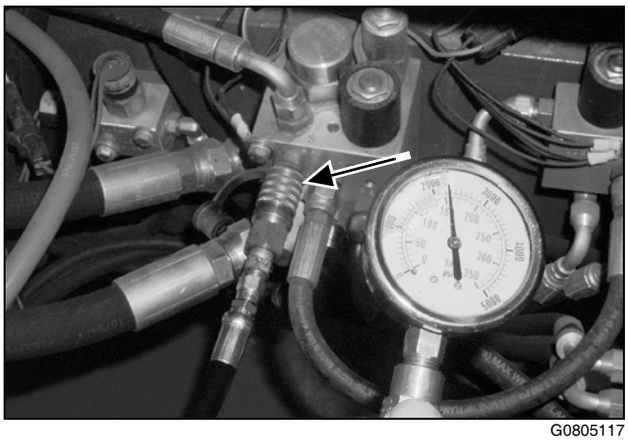
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FRAME LEVELING CYLINDER QUICK TEST

WARNING

All trapped hydraulic pressure must be relieved from the system before installing a gauge in any pressure tap. A sudden release of hot oil could cause burns or other serious injury.

STEP 59



G0805117

Install a 5000 psi (345 bar) pressure gauge and hose on the SP test port of the flow divider.

NOTE: *The hose must be long enough to observe the pressure gauge from inside the cab or standing clear of the fork lift.*

STEP 60



G0805117

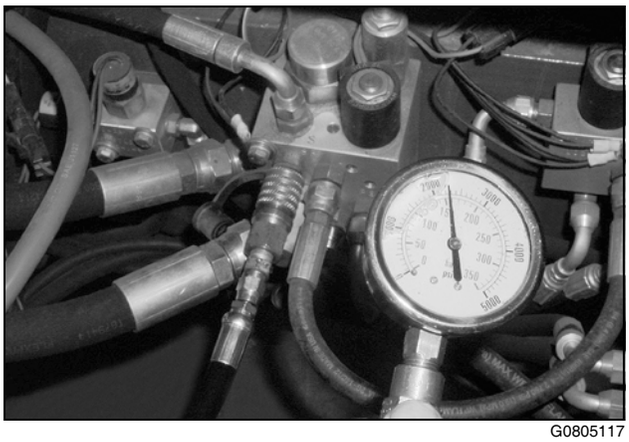
Start the engine and run at 1000 RPM. Tilt the frame to the right until the frame leveling cylinder reaches the end of its stroke and hold. The pressure gauge should read 2000 psi (138 bar).

If the pressure is less than 2000 psi (138 bar), proceed to the next step.

If the pressure is 2000 psi (138 bar), but the frame leveling does not work properly, go to the Frame Leveling Counter Balance Valve Test.

If the pressure is more than 2000 psi (138 bar), replace the flow divider.

STEP 61



G0805117

Turn the steering wheel until the wheels reach their travel limits and hold. The pressure gauge should read 2000 psi (138 bar).

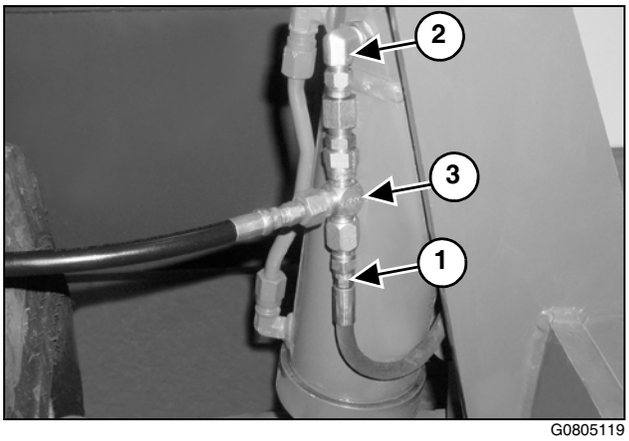
If the pressure is less than 2000 psi (138 bar), go the Pump Pressure Test.

If the pressure is 2000 psi (138 bar), proceed to the next step.

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FRAME LEVELING CYLINDER DIRECT TEST

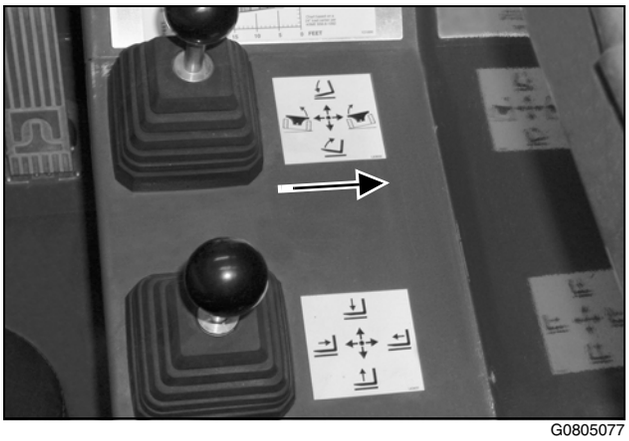
STEP 62



G0805119

Shut off the engine. Remove the hose (1) from the rod end (tilt right) port (2) of the leveling cylinder. Install a hose and a 5000 psi (345 bar) pressure gauge (3) between the hose (1) and port (2).

STEP 63

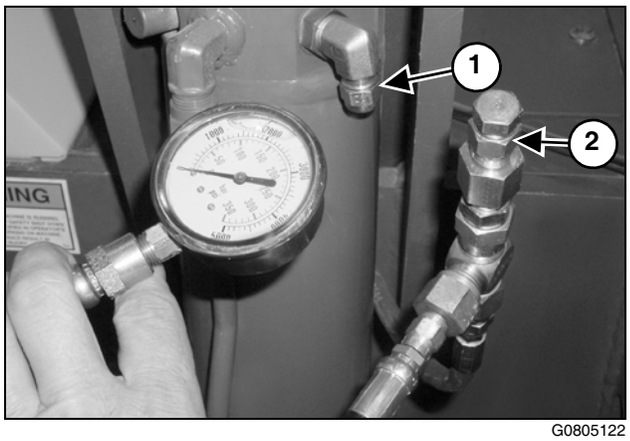


G0805077

Start the engine and run at 1000 RPM. Hold the frame leveling joystick in the TILT RIGHT position. The pressure gauge should read 2000 psi (138 bar).

If the pressure is less than 2000 psi (138 bar), proceed to the next step.

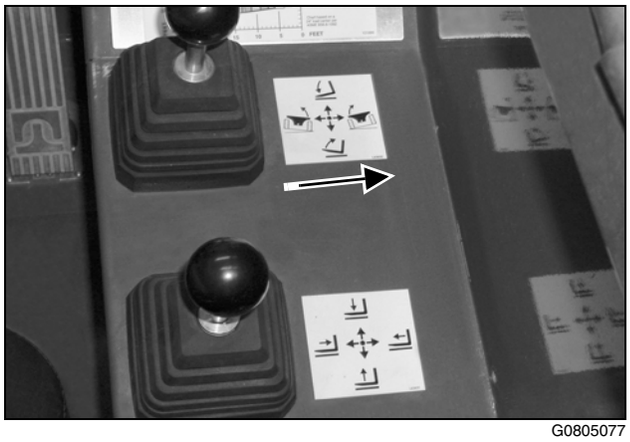
STEP 64



G0805122

Shut off the engine. Remove the pressure gauge from the cylinder port (1). Cap the port (1) and plug the gauge tee adapter (2).

STEP 65



G0805077

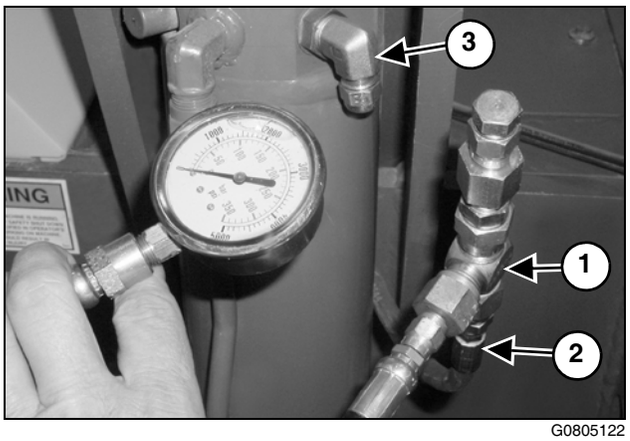
Start the engine and run at 1000 RPM. Hold the frame leveling joystick in the TILT RIGHT position. The pressure gauge should read 2000 psi (138 bar)

If the pressure is 2000 psi (138 bar), repair or replace the tilt cylinder.

If the pressure is less than 2000 psi (138 bar), proceed to the Pump Pressure Test section of this manual.

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STEP 66



G0805122

Shut off the engine. Remove the two hoses from the stabilizer cylinder. Install caps on the cylinder elbow fittings and plugs in the hose ends.

FRAME LEVELING COUNTER BALANCE VALVE QUICK TEST

WARNING

To perform any frame leveling tests, the park brake must be OFF. Park the unit on level ground and place blocks in front of and behind both rear wheels.

STEP 67

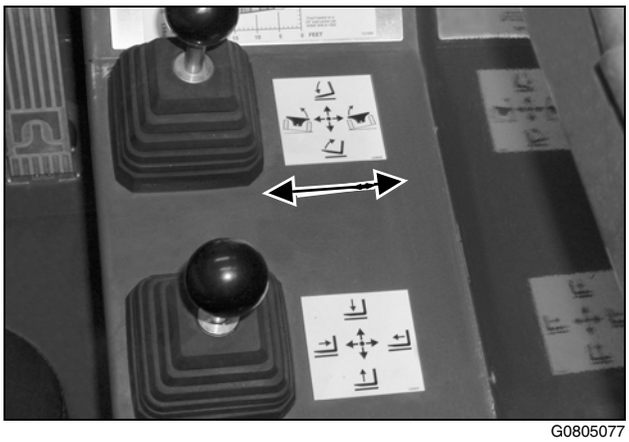


G0805193

Install a 5000 psi (345 bar) pressure gauge and hose on the SP test port of the flow divider.

NOTE: *The hose must be long enough to observe the pressure gauge from inside the cab or standing clear of the forklift.*

STEP 68



G0805077

Start the engine and run at 1000 RPM. Hold the frame leveling joystick in the TILT RIGHT or TILT LEFT position. The pressure gauge should read 1500 psi (103 bar) as the frame is tilting.

If the pressure is less than 1500 psi (103 bar) proceed to the next step.

If the pressure is more than 1500 psi (103 bar) proceed to Step 77 (Tilt Right) or Step 82 (Tilt Left).

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STEP 69



G0805117

Hold the joystick in the TILT RIGHT or TILT LEFT Position until the frame leveling cylinder reaches the end of its stroke. The pressure gauge should read 2000 psi (138 bar).

If the pressure is less than 2000 psi (138 bar) go to the Frame Leveling Cylinder Direct Test.

If the pressure is 2000 psi (138 bar) proceed to Step 76.

STEP 70

Repeat Steps 73 and 74 in the opposite direction.

FRAME LEVELING COUNTERBALANCE VALVE DIRECT TEST

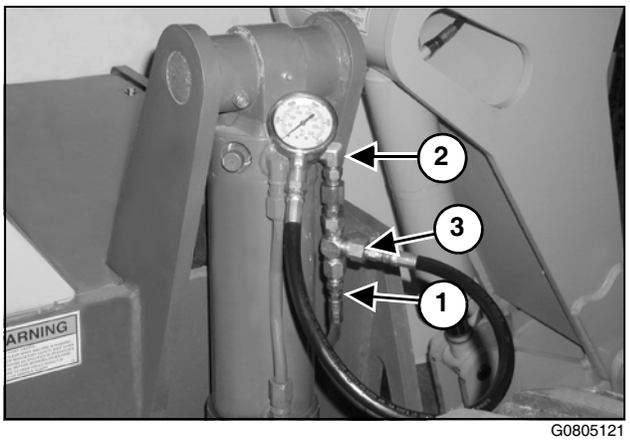
STEP 71



G0805193

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

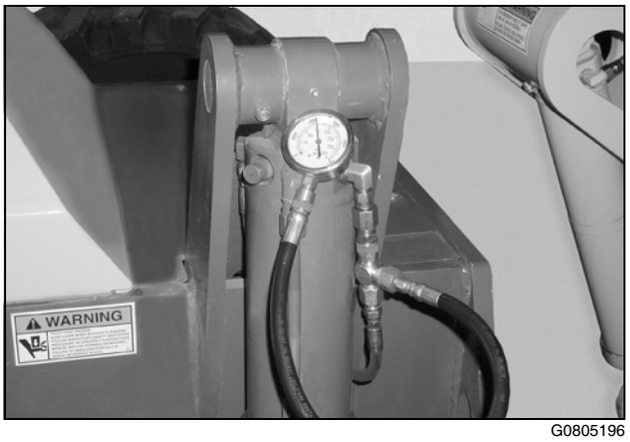
STEP 72



G0805121

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 73



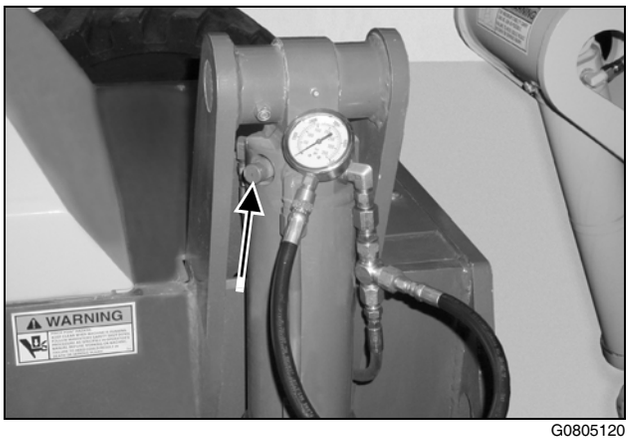
G0805196

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 the next step.

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STEP 74

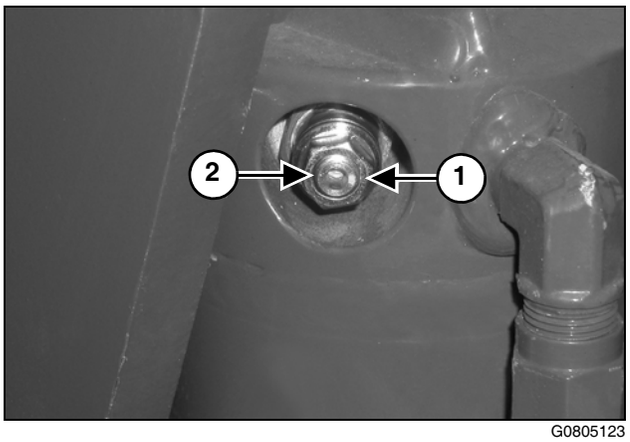


G0805120

Shut off the engine. Remove the cover from the tilt right counterbalance valve.

NOTE: *The cover is friction fit and can be loosened by twisting the cover on the valve cartridge.*

STEP 75



G0805123

Loosen the lock nut (1) and turn the adjusting screw (2) counterclockwise to increase and clockwise to decrease the load check release pressure.

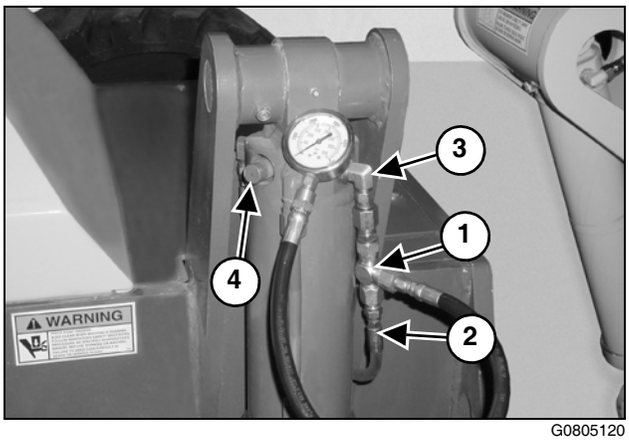
NOTE: *One turn of the adjusting screw can change the pressure up to 500 psi (34 bar).*

Hold the adjusting screw from turning and tighten the lock nut. Repeat Steps 73 and 75 until the pressure gauge reads 1500 psi (103 bar).

If the adjusting screw does not change the pressure, replace the counterbalance valve.

If a new load counterbalance valve was installed, repeat Steps 73 and 75 to set the load check release pressure.

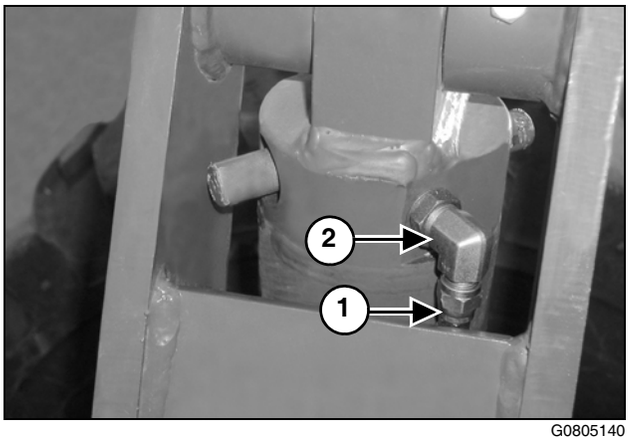
STEP 76



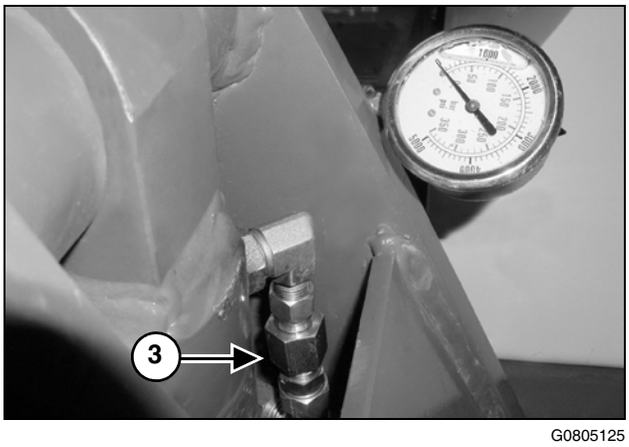
G0805120

Remove the pressure gauge (1) from the cylinder and install the tilt right supply hose (2) to the cylinder port (3). Install the cover on the load check valve (4).

STEP 77



G0805140

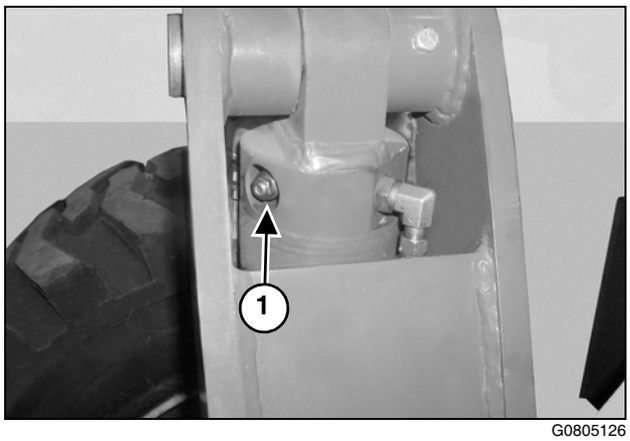


G0805125

Remove the supply hose (1) from the tilt left port (2) of the frame leveling cylinder. Install the pressure gauge (3) and hose between the cylinder port (2) and the supply hose (1).

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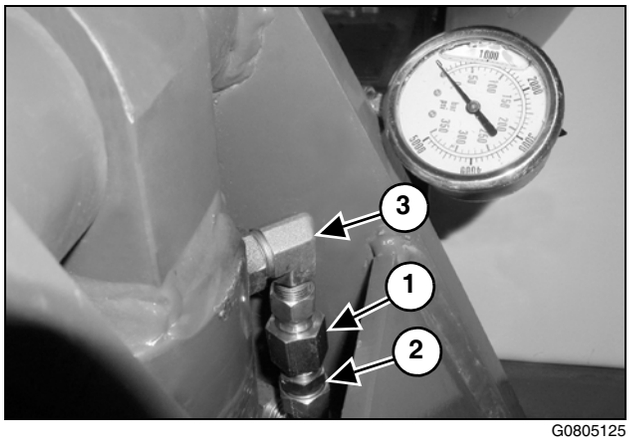
STEP 78



G0805126

Repeat Steps 73, 74 and 75, except read the pressure gauge as the frame is in the TILT LEFT mode and adjust the tilt left counterbalance valve (1).

STEP 79



G0805125

Remove the pressure gauge (1) from the cylinder and install the tilt left supply hose (2) to the cylinder port (3).

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MAIN CONTROL VALVE PRESSURE RELIEF TEST AND ADJUSTMENT

MAIN RELIEF VALVE QUICK TEST AND ADJUSTMENT

STEP 80

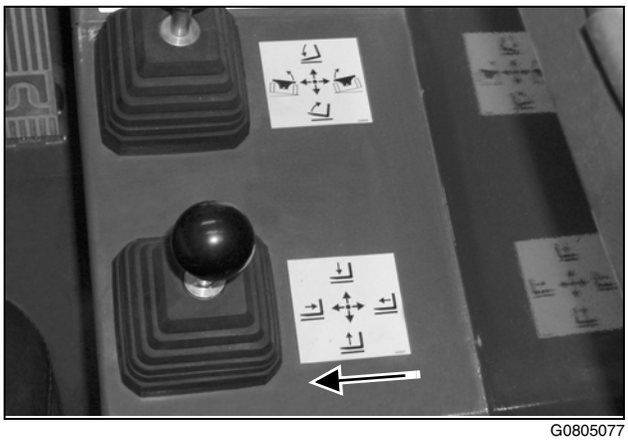


G0805194

Install a 5000 psi (345 bar) pressure gauge and hose on the MP test port on the flow divider.

NOTE: *The hose must be long enough to observe the pressure gauge from inside the cab or standing clear of the forklift.*

STEP 81



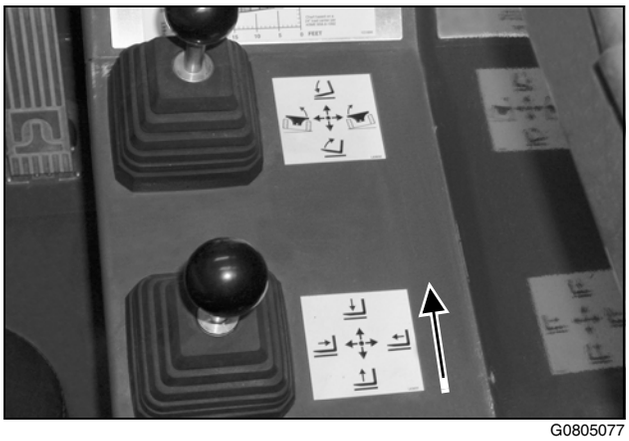
G0805077

Start the engine and run at 1000 RPM. Retract the boom until the boom extension cylinder is at the end of its stroke and hold the joystick in the RETRACT position. The pressure gauge should read 3000 psi (207 bar).

If the pressure is less than 3000 psi (207 bar), proceed to the next step.

If the pressure is more than 3000 psi (207 bar), proceed to Step 88.

STEP 82



G0805077

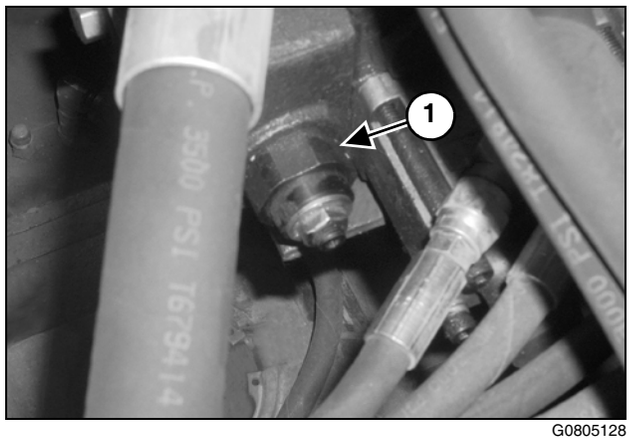
Lower the boom until the lift cylinders are at the end of their stroke and hold the joystick in the LOWER position. The pressure gauge should read 3000 psi (207 bar).

If the pressure is 3000 psi (207 bar) go to the Extension Cylinder Direct Test in this manual.

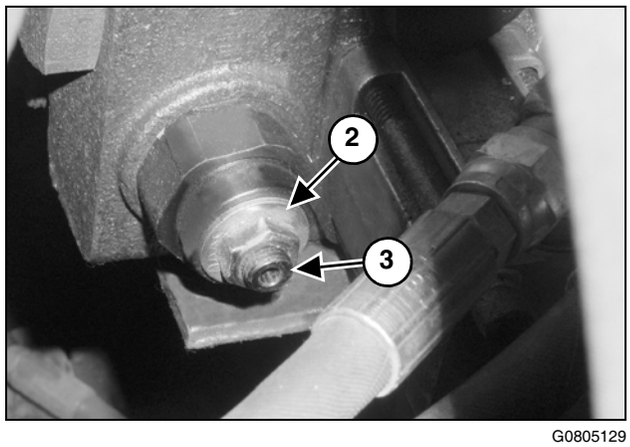
If the pressure is more or less than 3000 psi (207 bar) proceed to the next step.

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STEP 83



G0805128



G0805129

Shut off the engine. Loosen the main relief valve (1) lock nut (2) and turn the adjusting screw (3) clockwise to increase and counter clockwise to decrease the pressure.

NOTE: *1/2 turn of the adjusting screw (3) will change the pressure approximately 500 psi (35 bar).*

Hold the adjusting screw (3) from turning and tighten the lock nut (2).

Repeat Steps 81, 82 and 83 until the pressure gauge reads 3000 psi (207 bar).

If the pressure can be adjusted to 3000 psi (207 bar), proceed to Step 84.

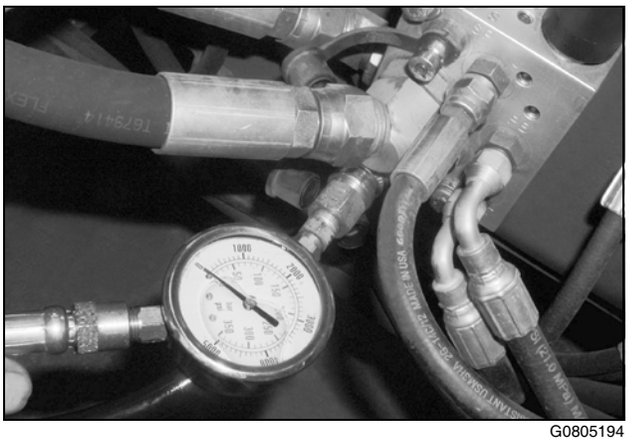
If the pressure is more than 3000 psi (207 bar) and does not change when the adjusting screw (3) is turned counterclockwise, replace the main relief valve.

If the pressure is less than 3000 psi (207 bar) and does not increase when the adjusting screw is turned clockwise, go to the Pump Pressure Test in this manual before replacing the relief valve.

STEP 84

If the pump, relief valve or any cylinders are repaired or replaced, repeat Steps 81, 82 and 83 to set the main control valve relief pressure at 3000 psi (207 bar).

STEP 85



G0805194

Remove the pressure gauge from the MP test port.

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JOYSTICK CONTROL AND PARK BRAKE PRESSURE TEST

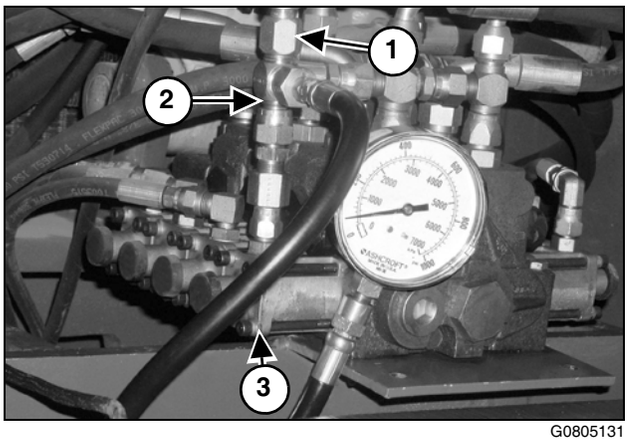
STEP 86

If the forklift does not respond to the joystick controller and the problem is not the pump or cylinders, proceed to Step 93.

If the forklift does not respond to one of the joystick controller commands, proceed to the next step.

If the park brake does not respond to the park brake switch, proceed to Steps 94 and 95.

STEP 87

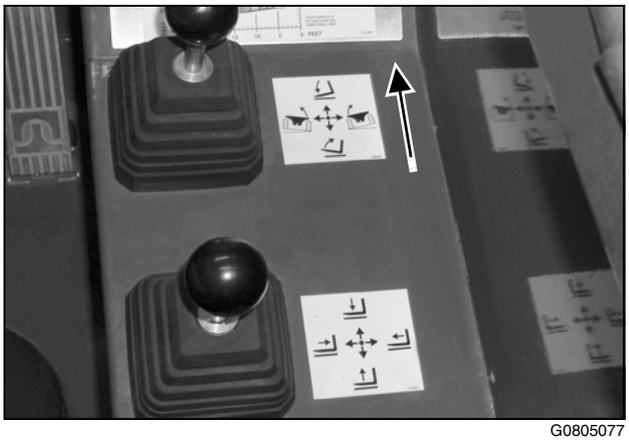


G0805131

Remove the supply hose from the hydraulic solenoid (1) of the function to be tested. Install a 1000 psi (69 bar) pressure gauge and hose (2) between the hydraulic solenoid (3) and the supply hose.

NOTE: *The hose must be long enough to observe the pressure gauge from inside the cab or standing clear of the forklift.*

STEP 88



G0805077

Start the engine and run at 1000 RPM. The park brake must be ON. Hold the joystick in the position of the solenoid to be tested. (The example shown is Boom RETRACT). The pressure gauge should read 350 psi (24 bar).

If the pressure is 350 psi (24 bar) but there is no response to the joystick command, repair or replace the control solenoid or the control valve section.

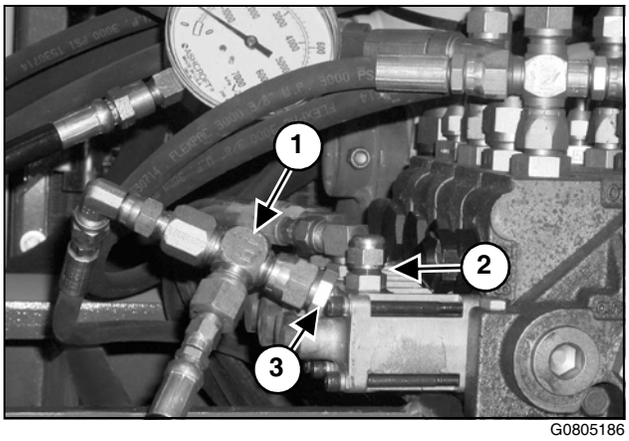
If the pressure is less than 350 psi (24 bar), proceed to Step 95.

If the pressure is more than 350 psi (24 bar), proceed to the next step.

STEP 89

Shut off the engine. Replace the flow divider. Repeat Step 88.

STEP 90



G0805186

Shut off the engine. Remove the pressure gauge tee adapter (1) from the solenoid port adapter (2). Install a cap in the port adapter (2) and a plug (3) in the gauge tee adapter (1).

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STEP 91



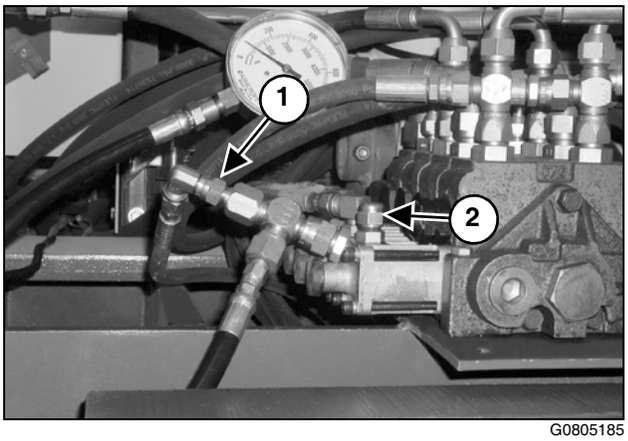
G0805198

Start the engine and run at 1000 RPM. Hold the joystick in the position of the function being tested. (Example shown is Boom RETRACT). The pressure gauge should read 350 psi (24 bar).

If the pressure is 350 psi (24 bar), repair or replace the control solenoid.

If the pressure is less than 350 psi (24 bar) proceed to the next step.

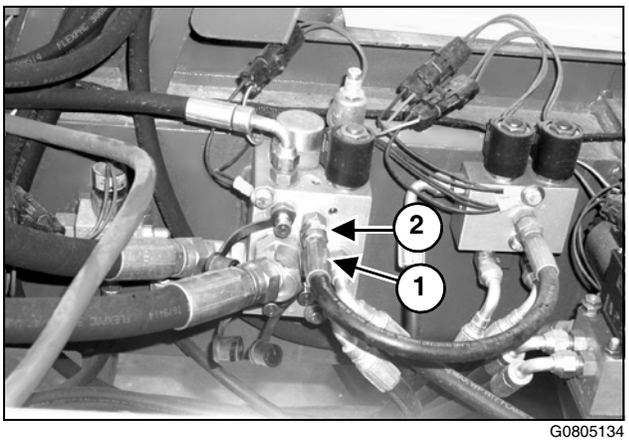
STEP 92



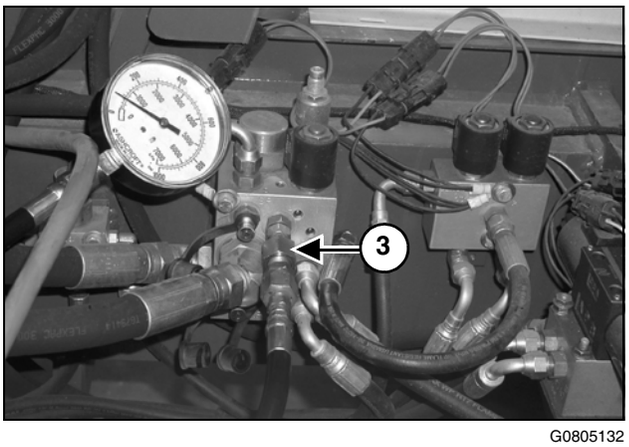
G0805185

Shut off the engine. Remove the pressure gauge from the solenoid supply hose (1) and install the supply hose (1) on the solenoid (2).

STEP 93



G0805134



G0805132

Remove the hose (1) from port J (2) of the flow divider. Install a 1000 psi (69 bar) pressure gauge (3) on port JP (2) and a plug in the hose end (1).

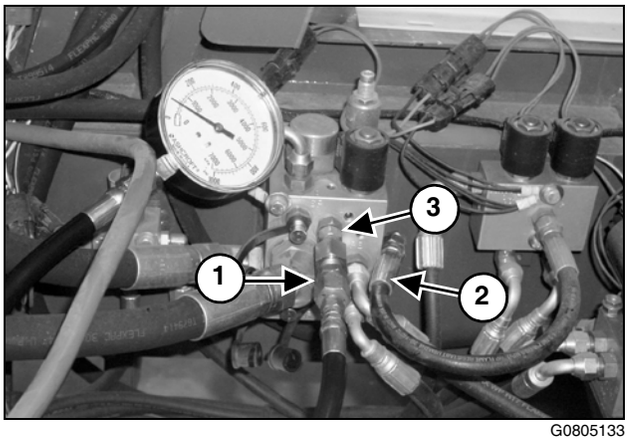
Start the engine and run at 1000 RPM. The pressure gauge should read 350 psi (24 bar).

If the pressure is 350 psi (24 bar), repair or replace the joystick control valve.

If the pressure is less than 350 psi (24 bar), proceed to the next step.

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STEP 94

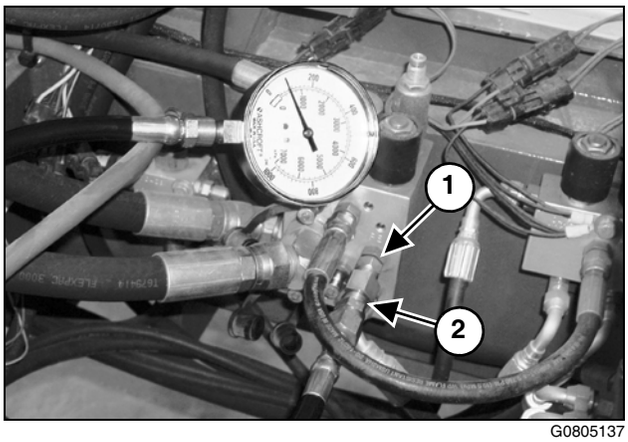


G0805133

Shut off the engine. Remove the gauge (1) from port J (3) and install the hose.

Remove the hose from port PB (1) on the flow divider. Install a 1000 psi (69 bar) pressure gauge (2) on port PB (1) and a plug in the hose end.

STEP 95



G0805137

Start the engine and run a 1000 RPM.

STEP 96



G0805078

Move the park brake switch to the OFF position. The pressure gauge should read 350 psi (24 bar) when the park brake is released.

If the pressure is less than 350 psi (24 bar) but was at 350 psi (24 bar) when the park brake switch was ON, repair or replace the park brake in the front axle.

If the pressure is 350 psi (24 bar) but the park brake will not release, repair or replace the park brake solenoid valve and repeat Steps 95 and 96 before replacing or repairing the park brake in the front axle.

Shut off the engine. Remove the pressure gauge from port PB (1) and install the hose (2) on the port (1).

STEP 97

Perform Steps 1 through 5 of this manual to test the hydraulic pump.

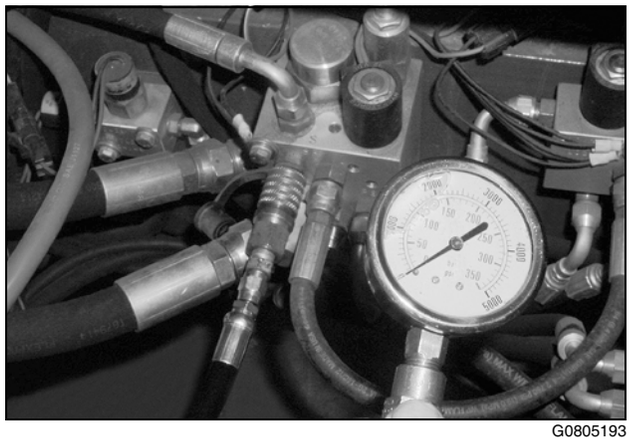
If the hydraulic pump pressure is 3000 psi (207 bar) replace the flow divider.

If the hydraulic pump pressure is less than 3000 psi (207 bar) replace the hydraulic pump.

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STEERING CIRCUIT PRESSURE QUICK TEST

STEP 98



G0805193

Install a 5000 psi (345 bar) pressure gauge and hose on the SP test port of the flow divider.

NOTE: *The hose must be long enough to observe the pressure gauge from inside the cab or standing clear of the forklift.*

STEP 99



G0805078

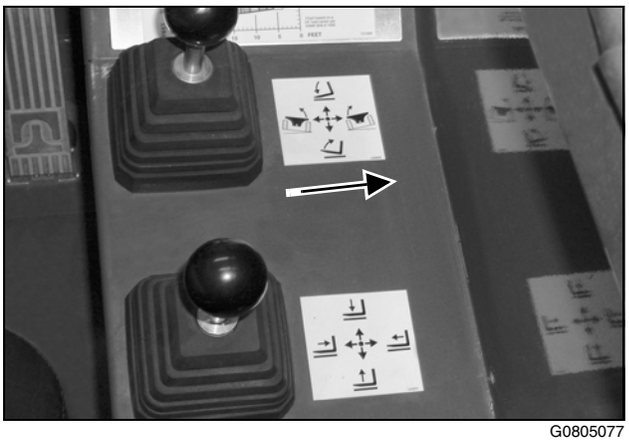
Start the engine and run at 1000 RPM. Move the Steer-Mode Switch (1) to the 4-Wheel-Steer position. Turn the steering wheel in one direction until the wheels reach their travel limits and hold. The pressure gauge should read 2000 psi (138 bar).

If the pressure is less than 2000 psi (138 bar), proceed to the next step.

If the pressure is 2000 psi (138 bar), but the steering does not work properly, check the steering linkage and pivot points, and the Steer-Mode Valve, before repairing or replacing the steering control unit.

If the pressure is more than 2000 psi (138 bar), replace the flow divider.

STEP 100



G0805077

Tilt the frame to the right until the frame leveling cylinder reaches the end of its stroke and hold. The pressure gauge should read 2000 psi (138 bar).

If the pressure is less than 2000 psi (138 bar) go to the Pump Pressure Test in this manual.

If the pressure is 2000 psi (138 bar), proceed to the next step.

STEERING CIRCUIT PRESSURE DIRECT TEST

STEP 101

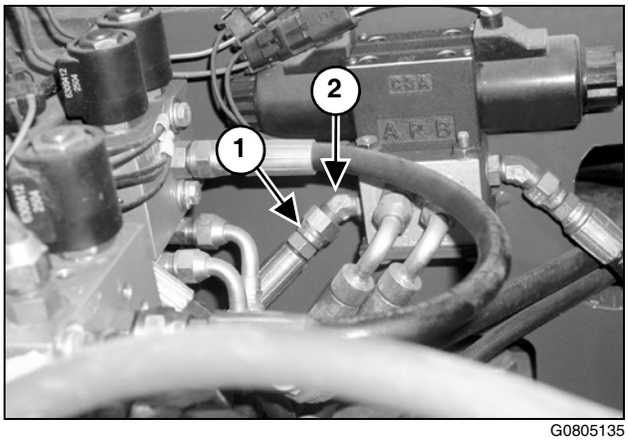


G0805193

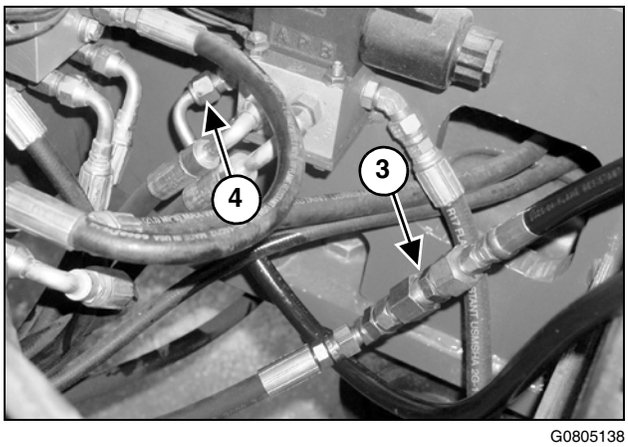
Shut off the engine. Remove the pressure gauge from the SP test port.

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STEP 102



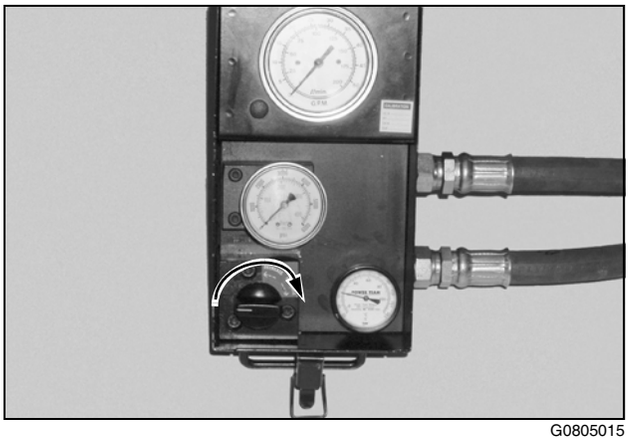
G0805135



G0805138

Remove the supply hose (1) from port P (2) of the Steer-Mode Valve. Install the inlet hose (3) from an in-line flowmeter on the supply hose (1) and the flowmeter outlet hose (4) on the Steer-Mode Valve Port P (2).

STEP 103



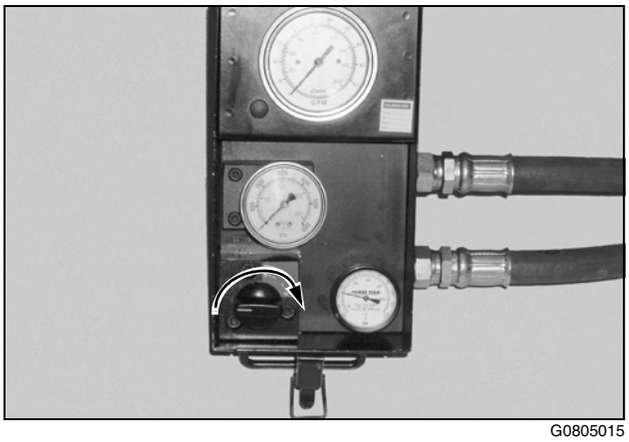
G0805015

OPEN the load control valve (1) of the flowmeter. Start the engine and run at 1000 RPM. Turn the steering wheel in one direction until the wheels reach their travel limits and hold. Slowly close the load control valve.

If the pressure is less than 2000 psi (138 bar), repair or replace the steering control unit.

If the pressure is 2000 psi (138 bar), proceed to the next step.

STEP 104



G0805015

OPEN the flowmeter load control valve and move the Steer-Mode Switch to the 2-Wheel-Steer position.

If the pressure is less than 2000 psi (138 bar), repair or replace the front steering cylinder.

If the pressure is 2000 psi (138 bar), repair or replace the rear steering cylinder.

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Section

602

HYDRAULIC PUMP REMOVAL AND INSTALLATION

RS5-34 Telescopic Handler

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MANDATORY SAFETY SHUTDOWN PROCEDURE

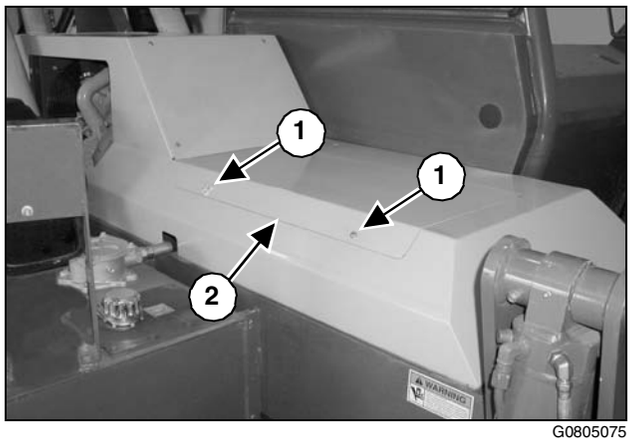
BEFORE cleaning, lubricating, or servicing this equipment:

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 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 injury.

HYDRAULIC PUMP REMOVAL

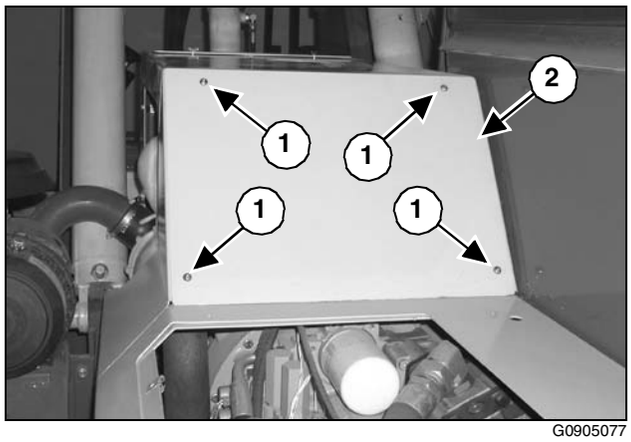
STEP 1



G0805075

Loosen the two thumbscrews (1) and remove the battery access cover (2).

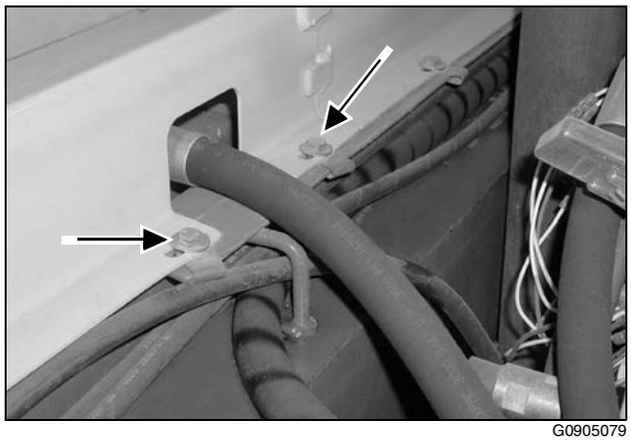
STEP 2



G0905077

Remove the four screws (1) and the fuel filter access cover (2).

STEP 3

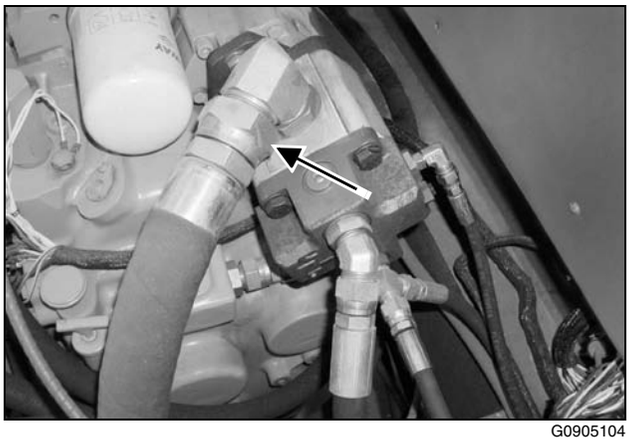


G0905079

Remove the five bolts and the transmission cover.

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STEP 4



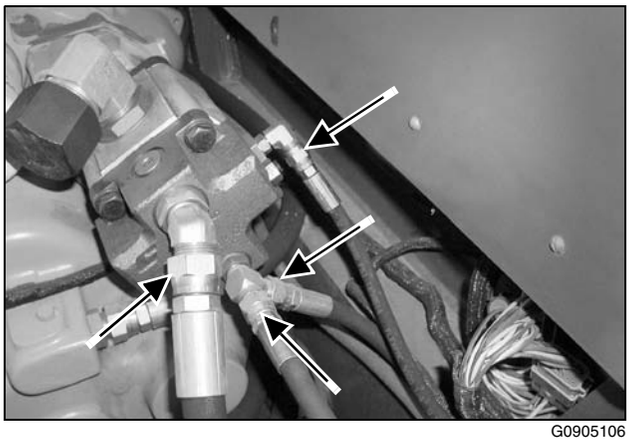
G0905104

Disconnect the hydraulic fluid supply line from the hydraulic pump. Install a cap on the fitting and a plug in the line.

STEP 5

Mark the pump output hydraulic hoses for correct assembly.

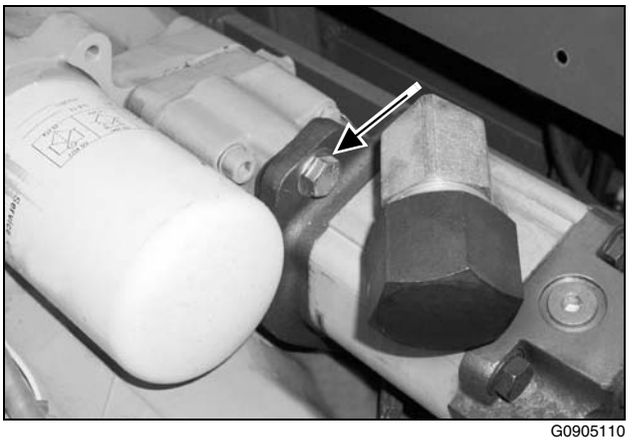
STEP 6



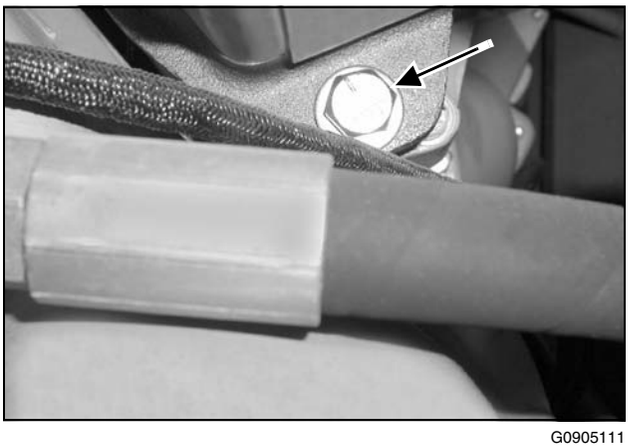
G0905106

Disconnect the remaining hydraulic hoses from the hydraulic pump. Install plugs in the hoses and caps on the fittings.

STEP 7



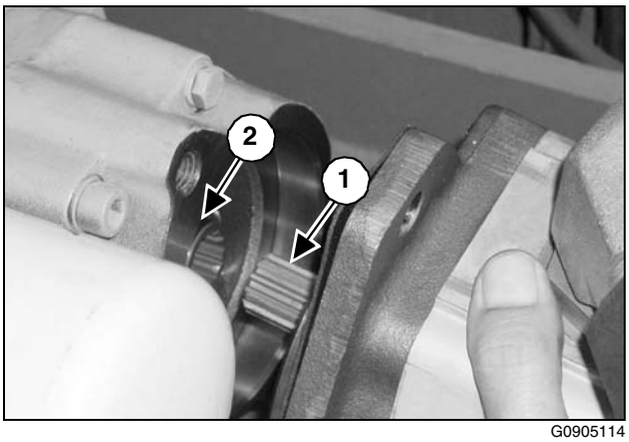
G0905110



G0905111

Remove the two hydraulic pump mounting bolts.

STEP 8



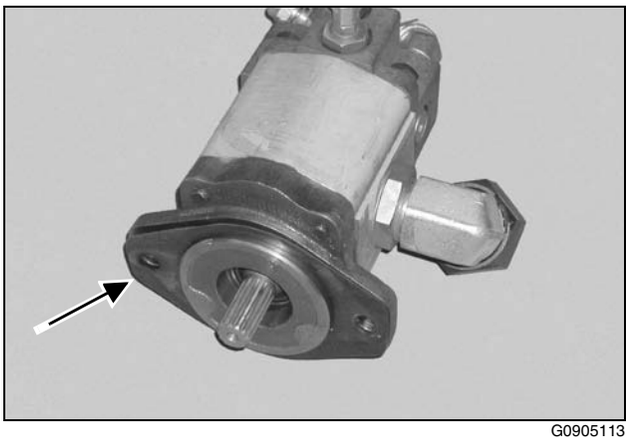
G0905114

Pull the pump forward until the pump input shaft (1) is clear of the transmission (2). Lift the pump out of the machine. Remove the gasket from the mounting flange or transmission.

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HYDRAULIC PUMP INSTALLATION

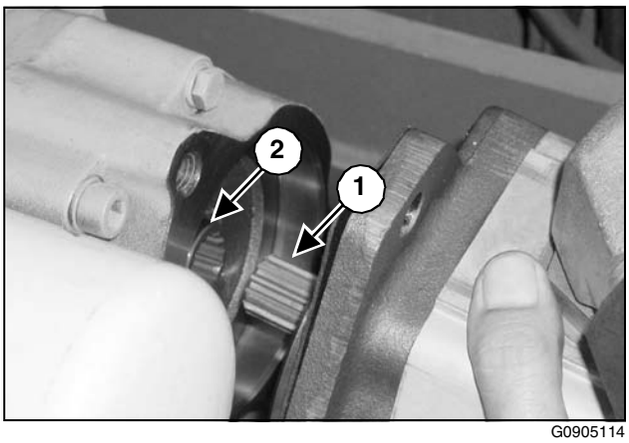
STEP 9



G0905113

Install a new gasket on the pump mounting flange.

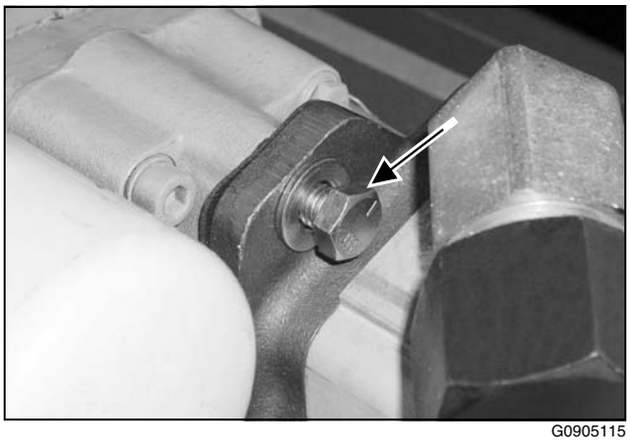
STEP 10



G0905114

Align the pump input shaft (1) with the gear drive (2) in the transmission. Slide the shaft into the transmission until the mounting flange contacts the transmission.

STEP 11



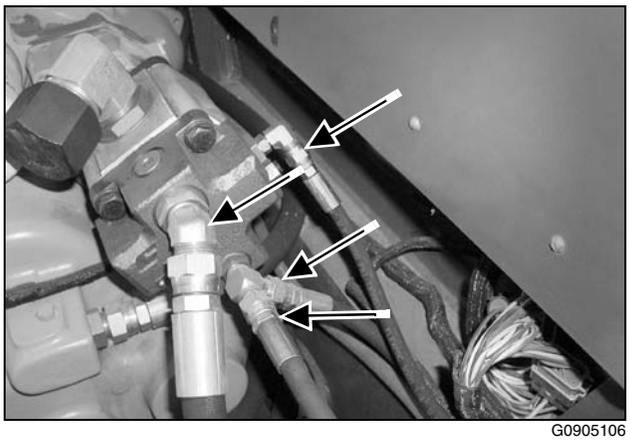
G0905115

Install the two pump mounting bolts. Tighten the bolts to a torque of 80 to 90 lb.-ft. (110 to 122 Nm).

STEP 12

Remove the plugs from the pump output hoses and the caps from the pump fittings.

STEP 13

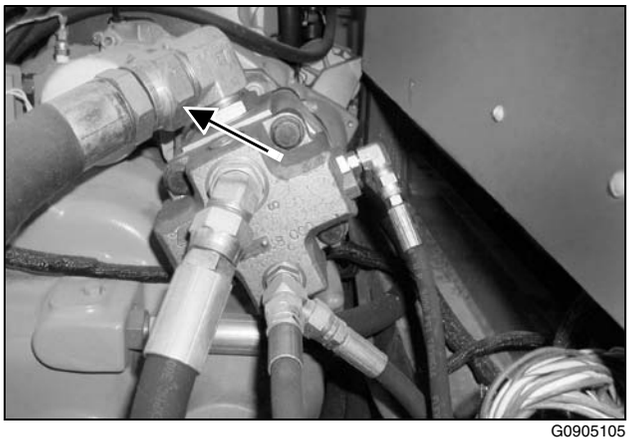


G0905106

Connect the output hoses to the hydraulic pump.

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STEP 14



G0905105

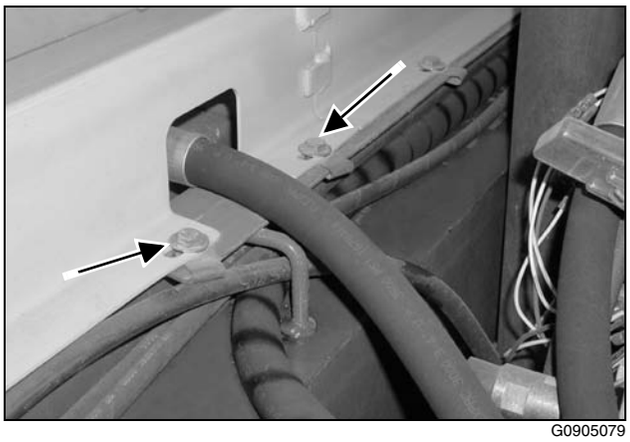
Remove the plug and cap and connect the supply hose to the hydraulic pump.

STEP 15

See the Operator's Manual for the specified hydraulic fluid. Fill the hydraulic reservoir to the correct level.

Start the engine and check for leaks. If no leaks appear continue to run the engine and test the steering and hydraulic functions for operation. Shut off the engine and check the hydraulic reservoir level. Add fluid if necessary.

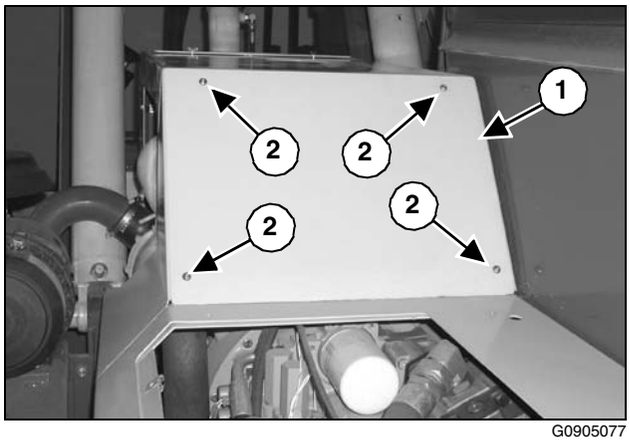
STEP 16



G0905079

Install the transmission cover using the five bolts.

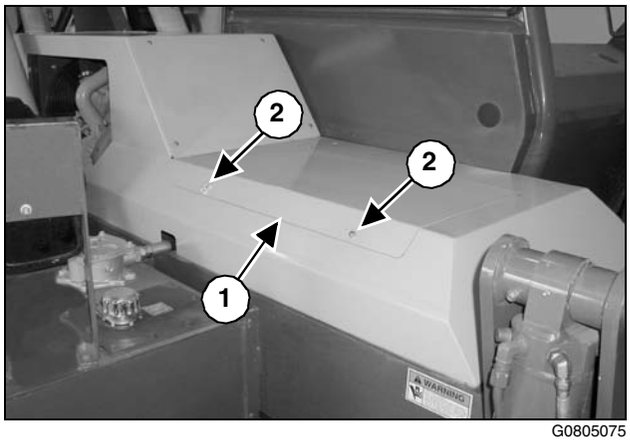
STEP 17



G0905077

Install the fuel filter access cover (1) using the four screws (2).

STEP 18



G0805075

Install the battery access cover (1). Tighten the two thumb screws (2).

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Section

603

FRAME LEVELING CYLINDER REMOVAL AND INSTALLATION

RS5-34 Telescopic Handler

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FRAME LEVELING CYLINDER INSTALLATION 3

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MANDATORY SAFETY SHUTDOWN PROCEDURE

BEFORE cleaning, lubricating, or servicing this equipment:

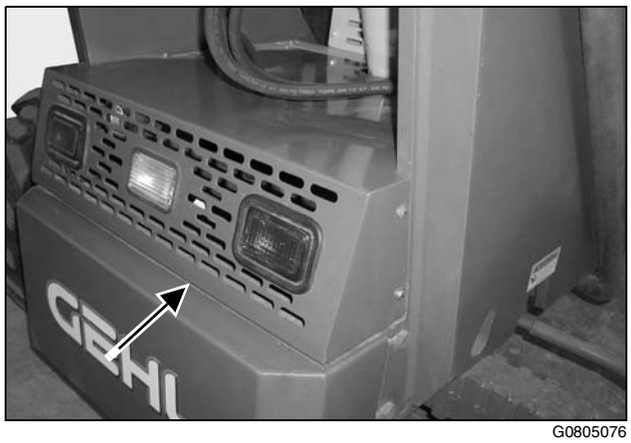
1. Bring the machine to a full stop on a level surface. (If parking on a slope or hillside cannot be avoided, park across the slope and block the tires.)
2. Fully retract the boom and lower the attachment to the ground.
3. Place controls in NEUTRAL and set the park brake.
4. Idle the engine for gradual 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 injury.

RELIEVE HYDRAULIC OIL PRESSURE

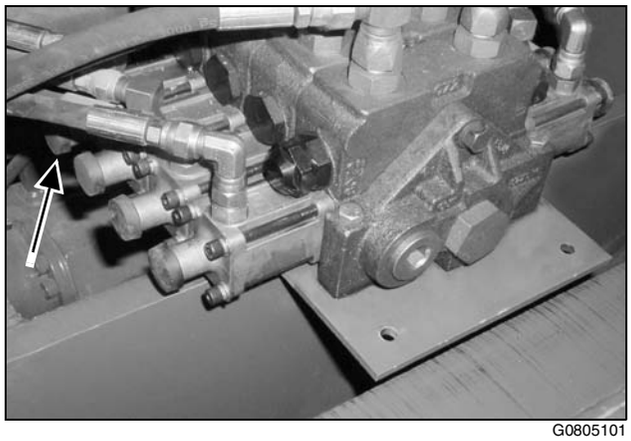
1. Engage the park brake.
2. Lower equipment to the ground. Return the engine to idle for 30 seconds, then shut off the engine.
3. Turn the keyswitch on. Operate the joystick in each direction. This should ensure there is no residual pressure trapped in the control circuit. Confirm that there is no attachment or unit movement.

RELIEVING HYDRAULIC PRESSURE FOR THE FRAME LEVELING CYLINDER



G0805076

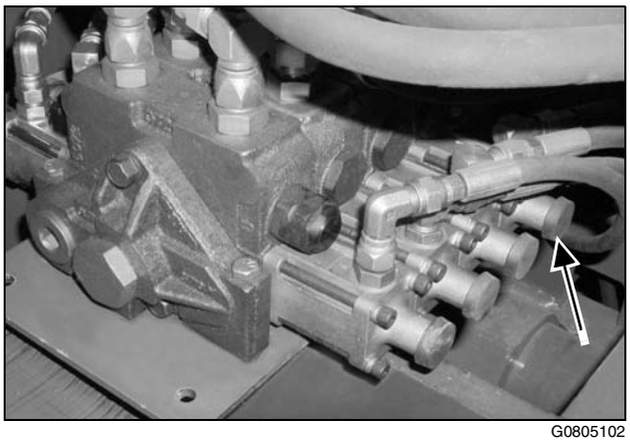
1. Fully retract and lower the telescoping boom onto a support stand.
2. Turn the keyswitch to the OFF position to shut off the engine. (See above Mandatory Safety Shutdown Procedure.)
3. Remove the rear hood to allow access to the main control valve.



G0805101

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4. Locate the level right section on the left-hand side of the main control valve and remove the rubber boot. Using a screwdriver, turn the screw IN (clockwise) until it bottoms, then turn it OUT (counterclockwise) until it bottoms. Reinstall the rubber boot.



G0805102

5. Locate the level left section on the right-hand side of the main control valve and remove the rubber boot. Using a screwdriver, turn the screw IN (clockwise) until it bottoms, then turn it OUT (counterclockwise) until it bottoms. Reinstall the rubber boot.

NOTE: *See Section 605 of this Service Manual for the repair of this cylinder.*

FRAME LEVELING CYLINDER REMOVAL

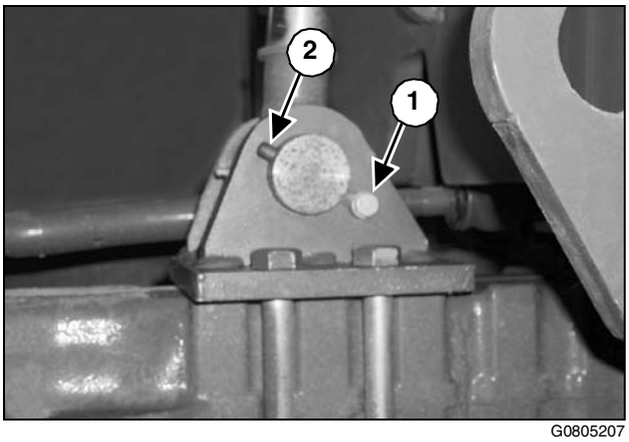
STEP 1



G0805206

Place blocks on both sides between the frame and the rear axle.

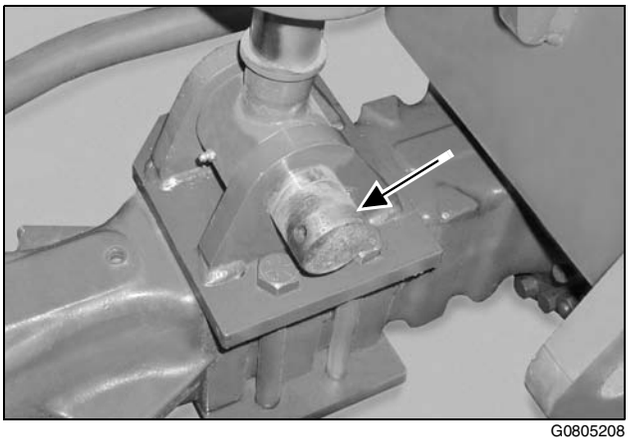
STEP 2



G0805207

Remove the bolt (1) and retaining pin (2) from the lower pivot pin.

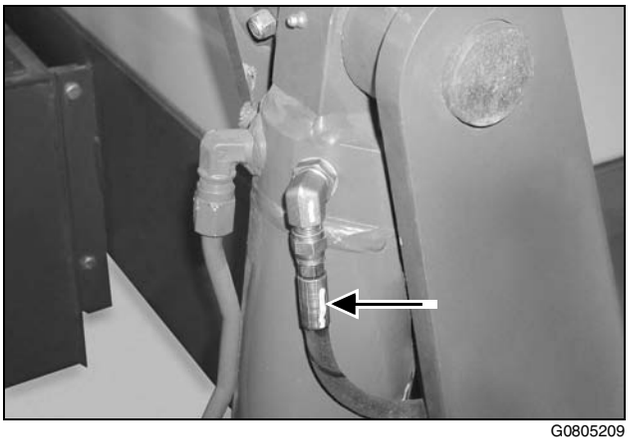
STEP 3



G0805208

Remove the lower pivot pin from the cylinder.

STEP 4

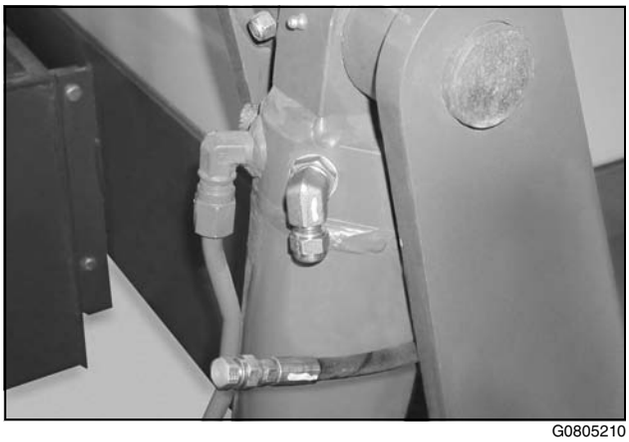


G0805209

Mark the leveling cylinder hydraulic hoses for correct assembly location.

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STEP 5



G0805210

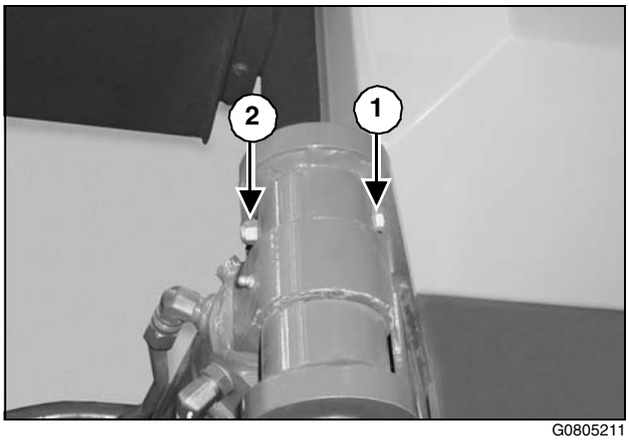
Disconnect both hydraulic hoses from the frame leveling cylinder.

NOTE: *One hydraulic hose is behind the cylinder.*

STEP 6

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

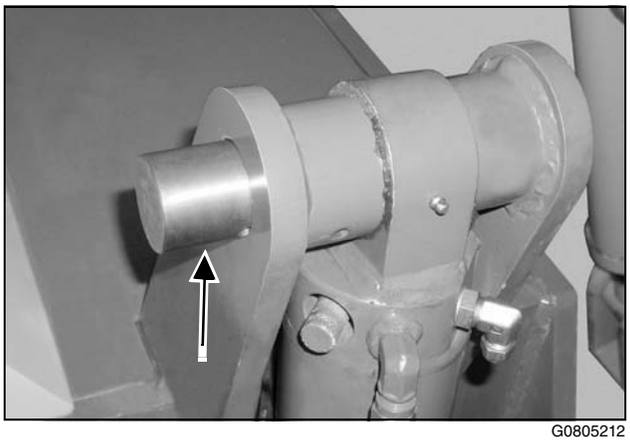
STEP 7



G0805211

Loosen and remove the retaining bolt (1) and nut (2) from the upper pivot pin.

STEP 8



G0805212

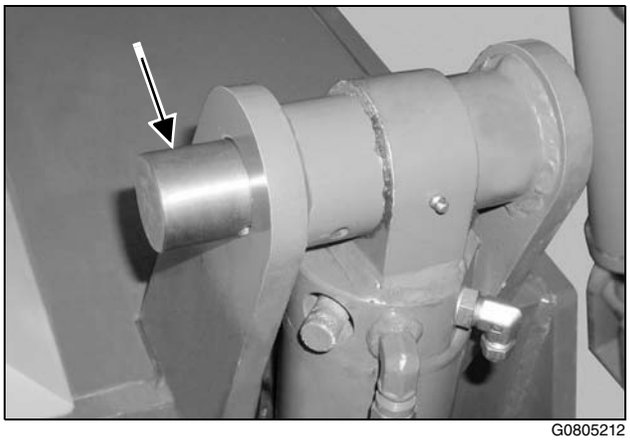
Remove the upper pivot pin from the frame leveling cylinder.

STEP 9

Remove the frame leveling cylinder.

FRAME LEVELING CYLINDER INSTALLATION

STEP 10



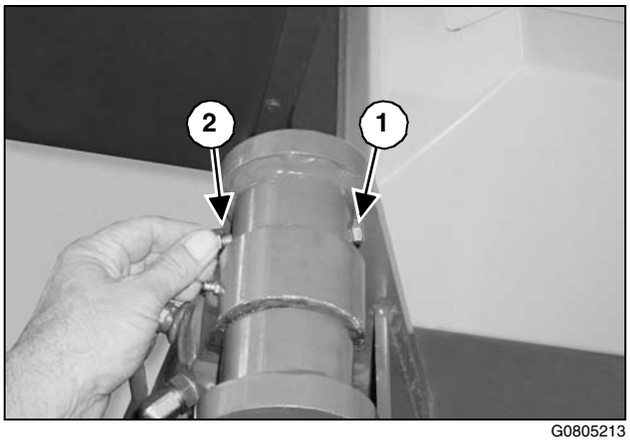
G0805212

Install the frame leveling cylinder in the upper pivot mounts and install the upper pivot pin.

NOTE: *Align the pivot pin holes with the holes in the cylinder mount.*

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STEP 11



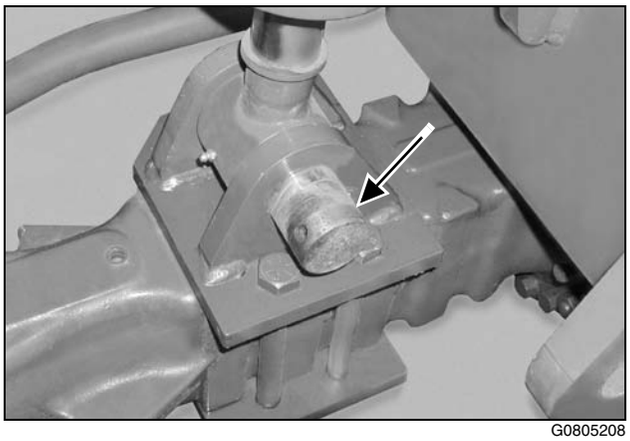
G0805213

Install the retainer bolt (1) and nut (2) in the upper pivot pin.

STEP 12

Remove the caps and plugs from the hydraulic fittings and hoses.

STEP 13

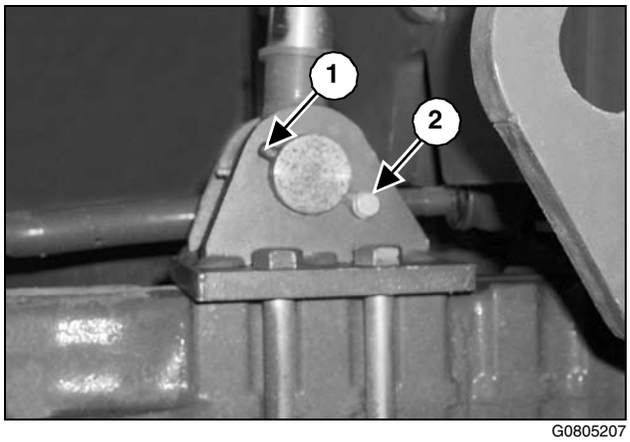


G0805208

Using a pry bar, extend the cylinder rod enough to install the pivot pin.

Install the lower pivot pin.

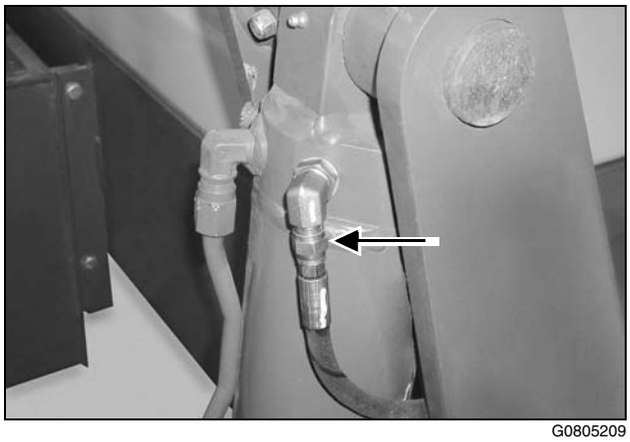
STEP 14



G0805207

Install and tighten the retainer pin (1) and bolt (2) in the lower pivot pin.

STEP 15



G0805209

Reconnect the hydraulic hoses to the frame leveling cylinder.

STEP 16



G0805206

Remove the blocks on both sides between the frame and rear axle.

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STEP 17

Use a grease gun with the specified grease to lubricate the upper and lower pin grease fittings.

STEP 18

With the park brake on, engine running and the boom raised approximately 2 feet (0.6 m), tilt the frame fully to the left and then to the right. Repeat this procedure several times to remove air from the hydraulic system.

STEP 19

Lower the boom and shut down the engine. Check for leaks. Correct any leakage found. Check the hydraulic fluid level. If necessary, fill to the correct level with the specified fluid.

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Section

604

TILT CYLINDER REMOVAL AND INSTALLATION

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MANDATORY SAFETY SHUTDOWN PROCEDURE

BEFORE cleaning, lubricating, or servicing this equipment:

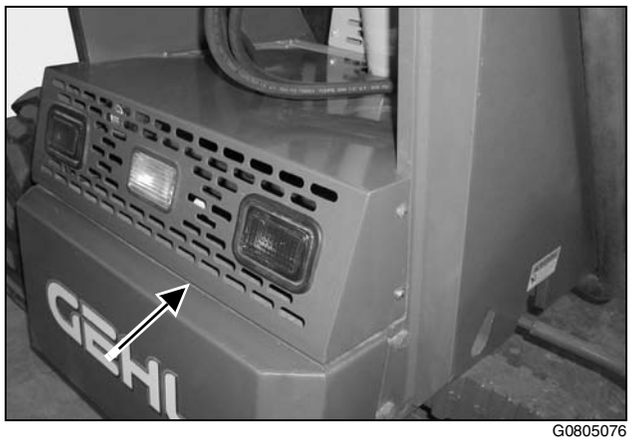
1. Bring the machine to a full stop on a level surface. (If parking on a slope or hillside cannot be avoided, park across the slope and block the tires.)
2. Fully retract the boom and lower the attachment to the ground.
3. Place controls in NEUTRAL and set the park brake.
4. Idle the engine for gradual 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 injury.

RELIEVE HYDRAULIC OIL PRESSURE

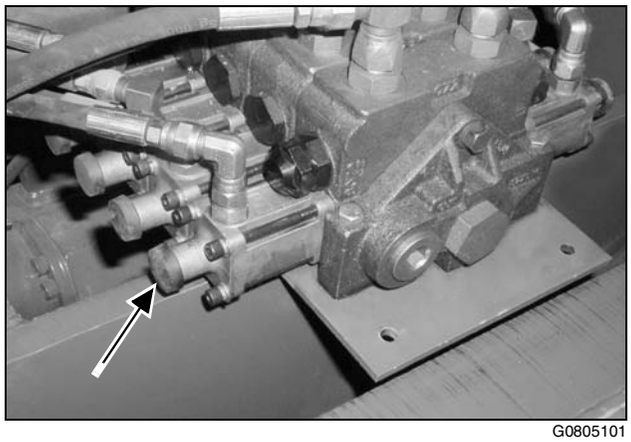
1. Engage the park brake.
2. Lower equipment to the ground. Return the engine to idle for 30 seconds, then shut down the engine.
3. Turn the keyswitch on. Operate the joystick in each direction. This should ensure there is no residual pressure trapped in the control circuit. Confirm that there is no attachment or unit movement.

RELIEVING HYDRAULIC PRESSURE FOR THE TILT CYLINDER



G0805076

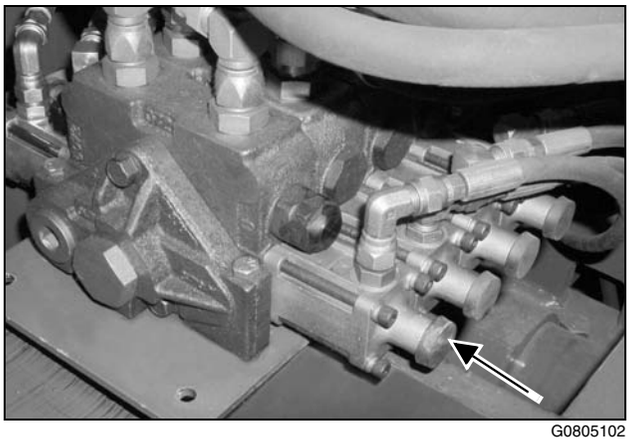
1. Fully retract and lower the telescoping boom onto a support stand.
2. Turn the keyswitch to the OFF position to shut off the engine. (See above Mandatory Safety Shutdown Procedure.)
3. Remove the rear hood to allow access to the main control valve.



G0805101

4. Locate the attachment tilt-up section on the left-hand side of the control valve and remove the rubber boot. Using a screwdriver, turn the screw IN (clockwise) until it bottoms, then turn in OUT (counterclockwise) until it bottoms. Reinstall the rubber boot.

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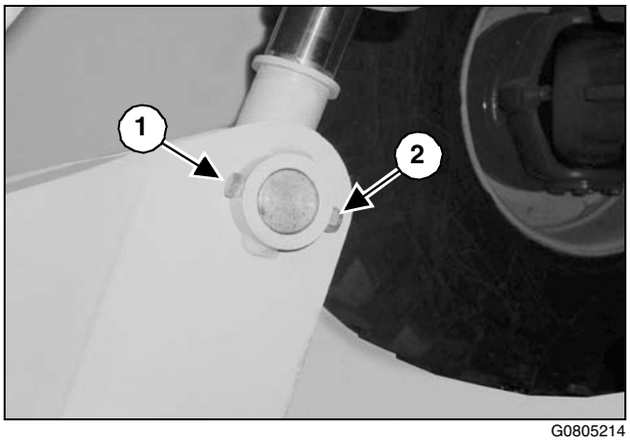
G0805102

5. Locate the attachment tilt-up section on the right-hand side of the control valve and remove the rubber boot. Using a screwdriver, turn the screw IN (clockwise) until it bottoms, then turn it OUT (counterclockwise) until it bottoms. Reinstall the rubber boot.

TILT CYLINDER REMOVAL

NOTE: *See Section 605 of this Service Manual for the repair of this cylinder.*

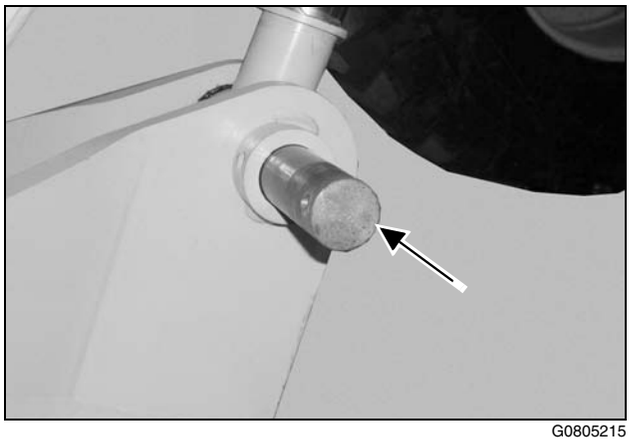
STEP 1



G0805214

Loosen and remove the retainer bolt (1) and nut (2) from the lower pivot pin.

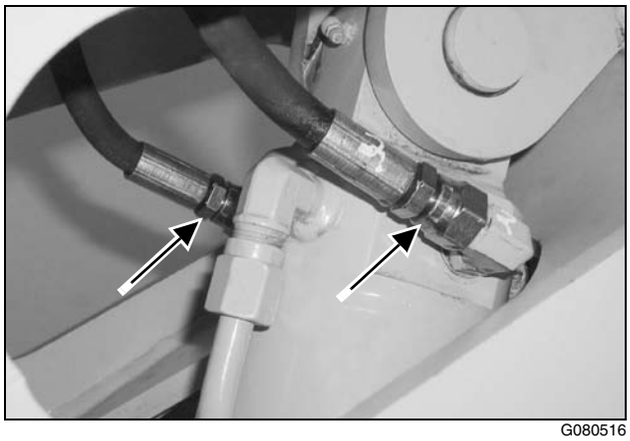
STEP 2



G0805215

Remove the lower pivot pin.

STEP 3



G080516

Mark the hydraulic hoses for correct assembly. Disconnect the two hydraulic hoses from the tilt cylinder.

STEP 4

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

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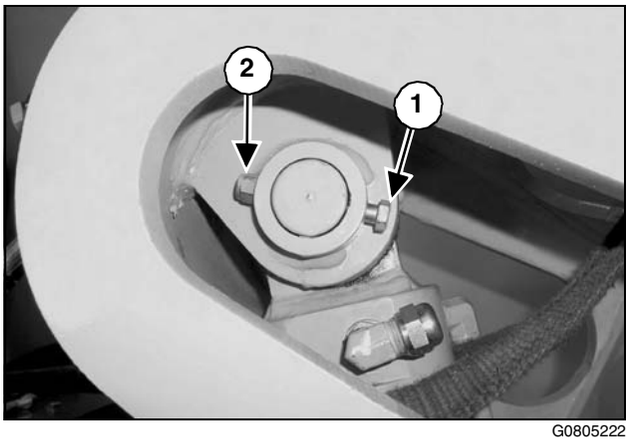
STEP 5



G0805222

Use a hoist and lifting strap, position the lifting strap around the tilt cylinder and apply upward pressure.

STEP 6

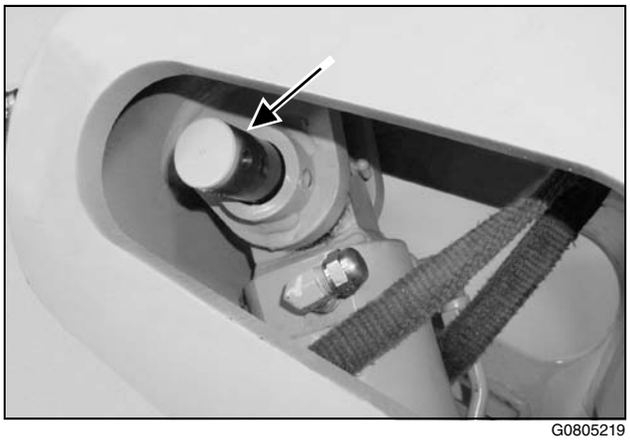


G0805222

Remove the retainer bolt (1) and nut (2) from the upper pivot pin.

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

STEP 7



G0805219

Remove the upper pivot pin from the tilt cylinder.

STEP 8



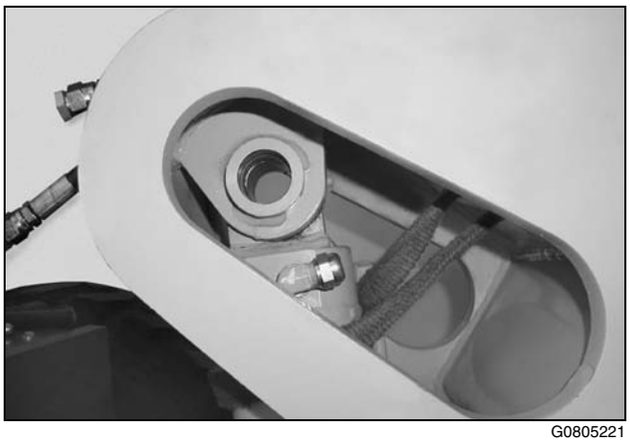
G0805220

Using the hoist, lower the tilt cylinder until it clears the mounting bracket. Remove the tilt cylinder from the machine.

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TILT CYLINDER INSTALLATION

STEP 9



G0805221

Using a hoist and lifting strap, position the tilt cylinder in the upper mounting bracket.

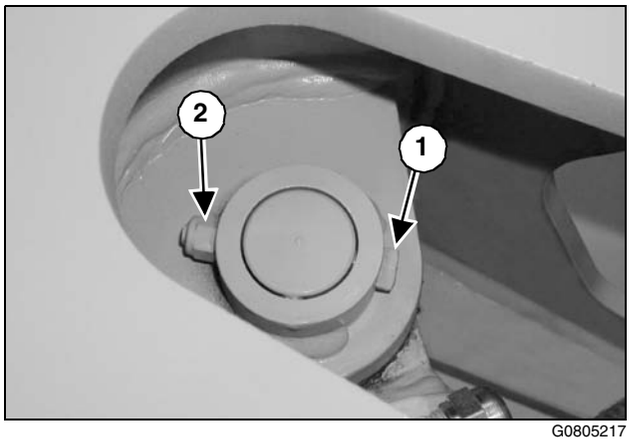
STEP 10



G0805219

Align the pivot pin retainer bolt hole with the holes in the cylinder mount. Install the upper pivot pin.

STEP 11



G0805217

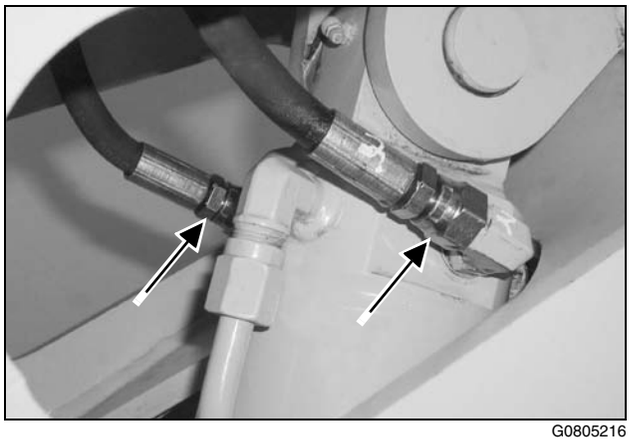
Install the retainer bolt (1) and nut (2) in the upper pivot pin and tighten.

Remove the lifting strap and chain hoist from the tilt cylinder.

STEP 12

Remove the caps and plugs from the fittings and hoses.

STEP 13



G0805216

Reconnect the two hydraulic hoses to the tilt cylinder.

STEP 14

Start the engine. The park brake must be ON. Pull back on the joystick to raise the boom approximately 2 feet (0.6 m). Shut off the engine.

STEP 15

Rotate the Dynattach® and align the rod end of the cylinder with the Dynattach® cylinder mount.

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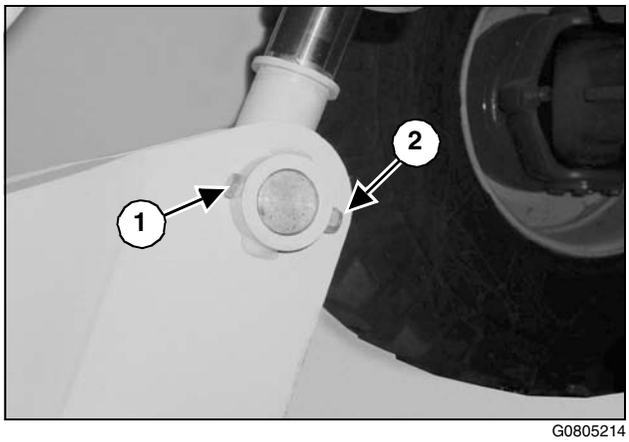
STEP 16



G0805215

Align the pivot pin retainer bolt hole with the holes in the cylinder mount. Install the lower pivot pin.

STEP 17



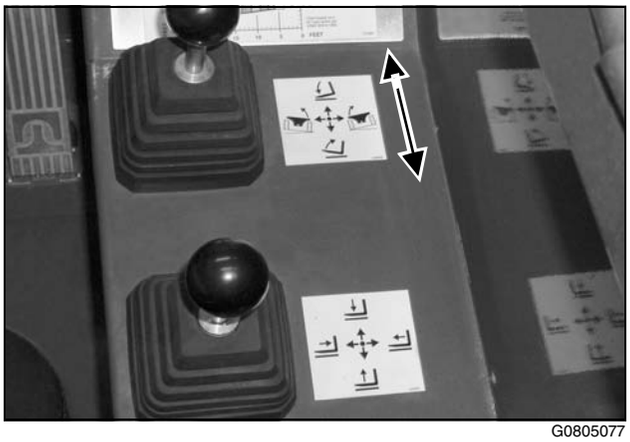
G0805214

Install the retainer bolt (1) and nut (2) in the lower pivot pin.

STEP 18

Use a grease gun with the specified grease to lubricate the upper and lower pin grease fittings.

STEP 19



G0805077

With the park brake on and the engine running, fully retract and extend the tilt cylinder several times to remove any air from the system.

Lower the boom and shut off the engine. Check for leaks. Correct any leakage found. Check the hydraulic fluid level. If necessary, fill to the correct level with the specified fluid.

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Section

605

HYDRAULIC CYLINDER REPAIR

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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 flexible and easier to install on the piston.

Before installing the piston and rod assembly into the cylinder barrel, lubricate the piston seals and wear rings liberally with clean hydraulic 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, adjusting, lubricating, or servicing this unit:

1. Stop machine on a level surface. (AVOID parking on a slope, but if necessary, park across the slope and block the tires.)
2. Fully retract the boom and lower the attachment tool to the ground. Idle engine for gradual cooling.
3. Place controls in neutral and apply parking brake.
4. Shut off the engine and remove the key.

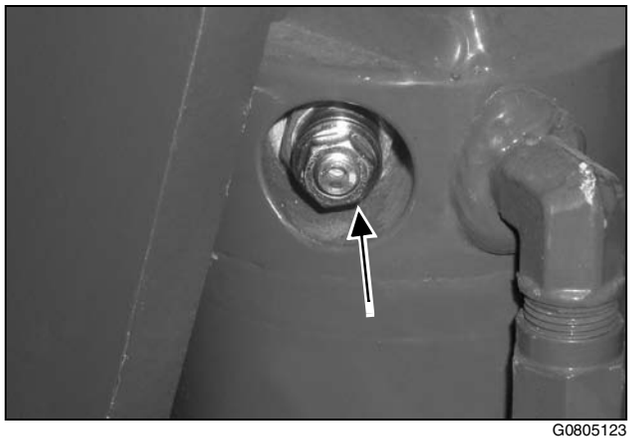
ONLY when you have taken these precautions can you be sure it is safe to proceed. Failure to follow the above procedure could lead to death or serious personal injury.

WARNING

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

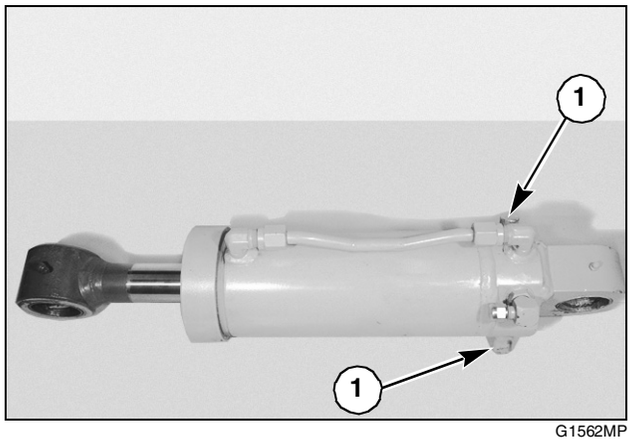
CYLINDER DISASSEMBLY

STEP 1



G0805123

Select a clean environment. Remove the counter-balance valve slowly to relieve any residual pressure.

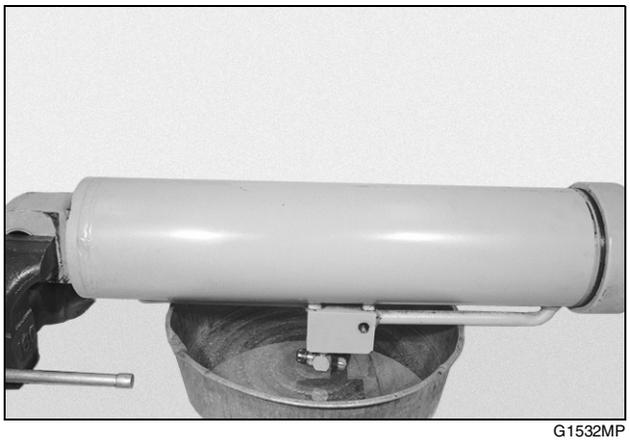


G1562MP

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

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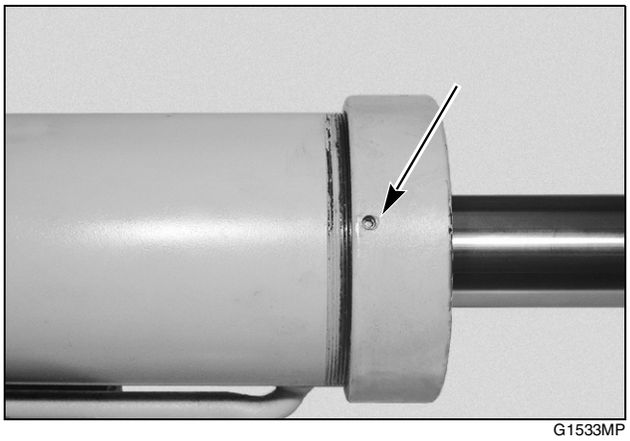
STEP 2



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.

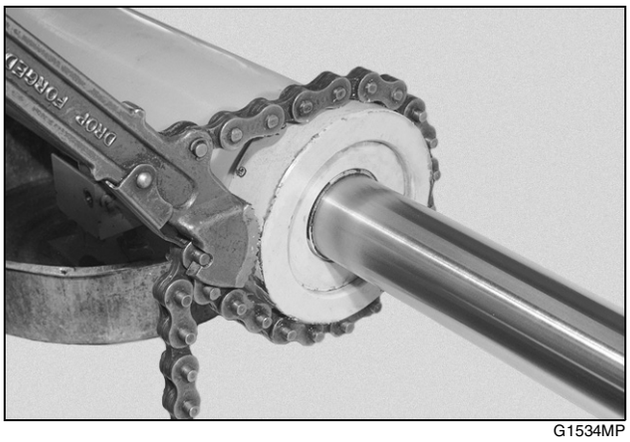
STEP 3



G1533MP

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

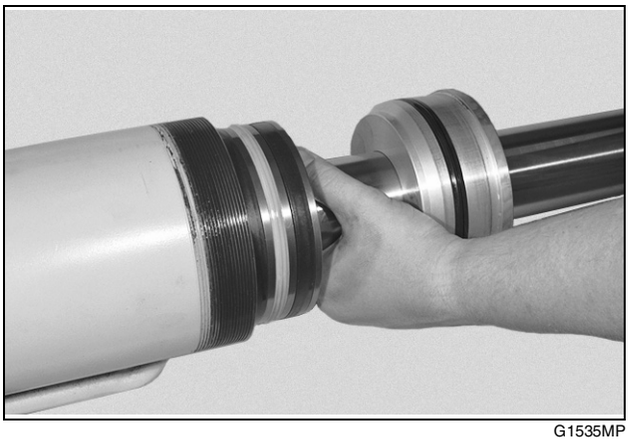
STEP 4



G1534MP

Loosen and remove the gland nut from the cylinder.

STEP 5



G1535MP

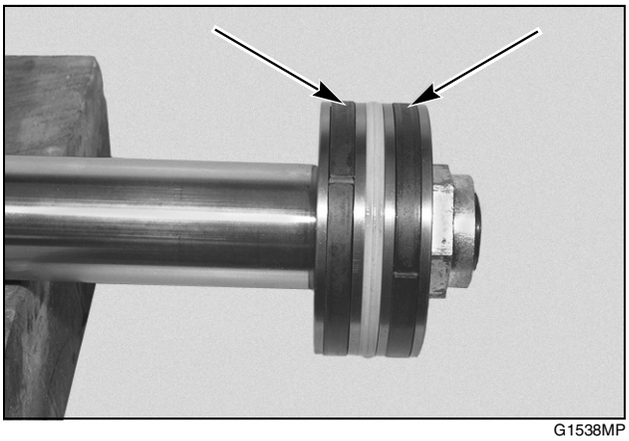
Remove the rod assembly from the cylinder.

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

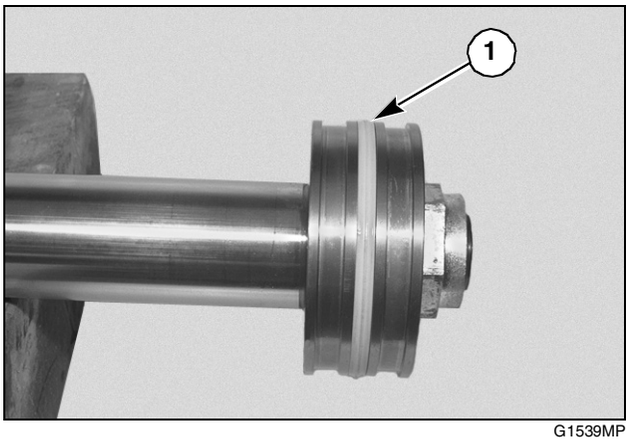


G1538MP

Remove and discard the two wear rings from the piston.

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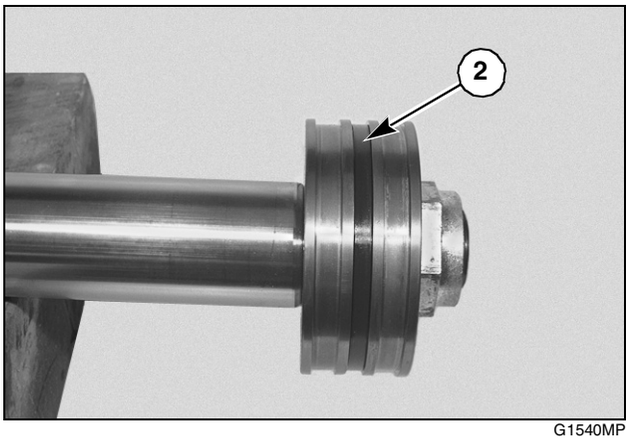
STEP 8



G1539MP

Remove and discard the outer seal (1) from the piston.

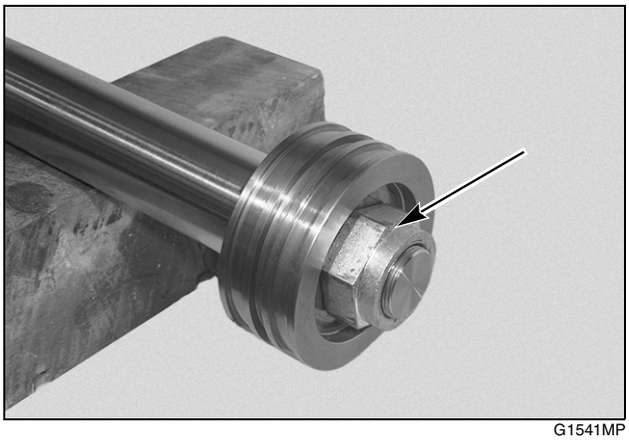
STEP 9



G1540MP

Remove and discard the inner seal (2) from the piston.

STEP 10

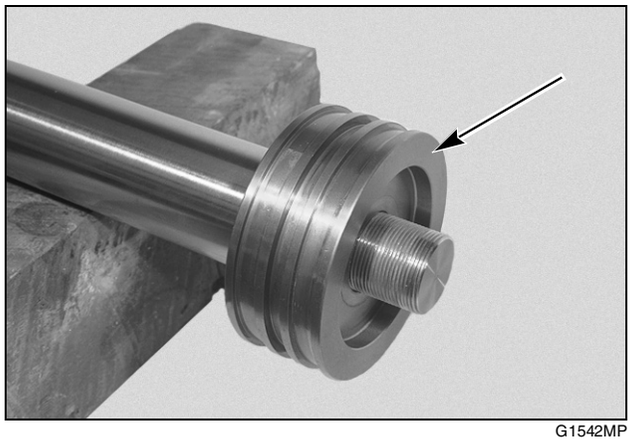


G1541MP

Loosen and remove the nut from the cylinder rod.

NOTE: *The nut is retained with thread lock compound and may require heat to remove.*

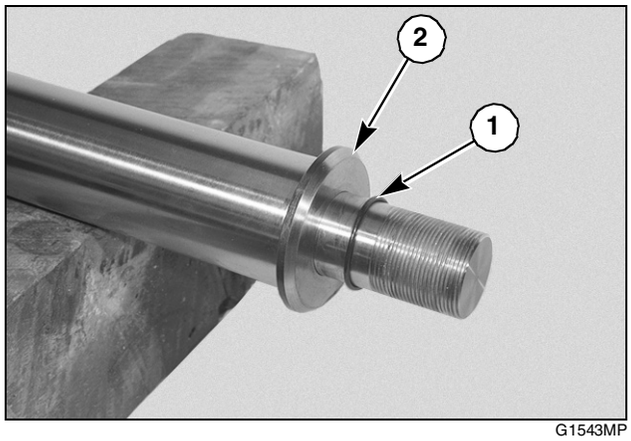
STEP 11



G1542MP

Remove the piston from the cylinder rod.

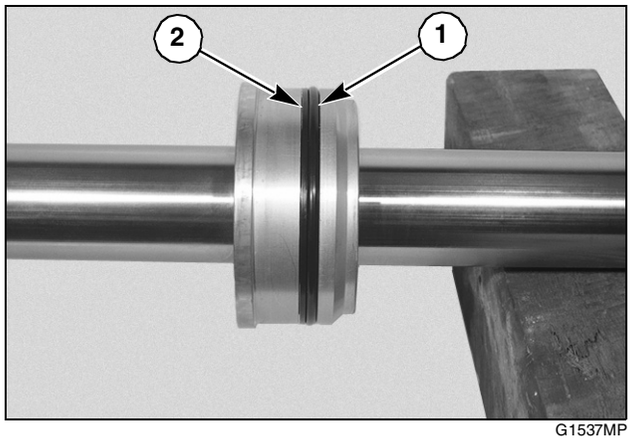
STEP 12



G1543MP

Remove and discard the O-ring (1). Remove the backup washer (2) from the cylinder rod.

STEP 13

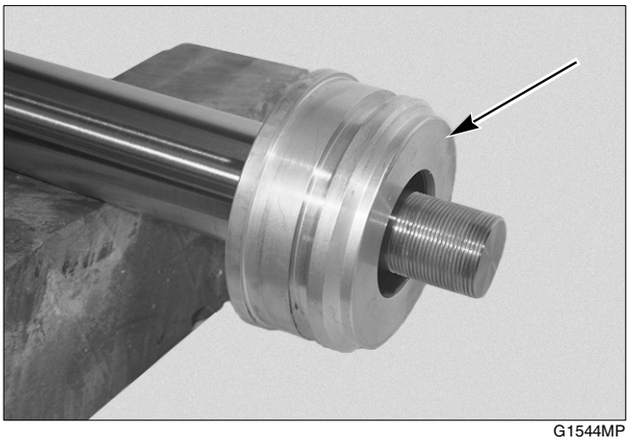


G1537MP

Remove and discard the O-ring (1) and backup ring (2) from the head gland.

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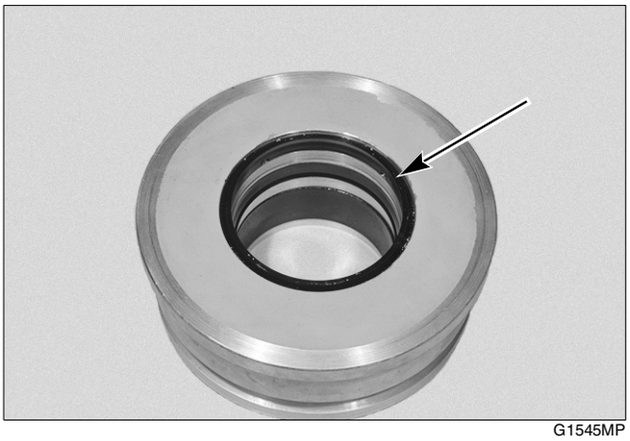
STEP 14



G1544MP

Remove the head gland from the cylinder rod.

STEP 15



G1545MP

Remove and discard the wiper ring from the head gland.

STEP 16



G1546MP

Remove and discard the inner wear ring from the head gland.

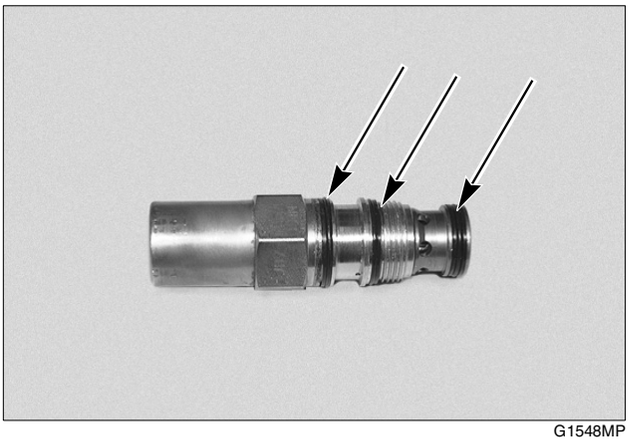
STEP 17



G1547MP

Remove and discard the inner seal from the head gland.

STEP 18

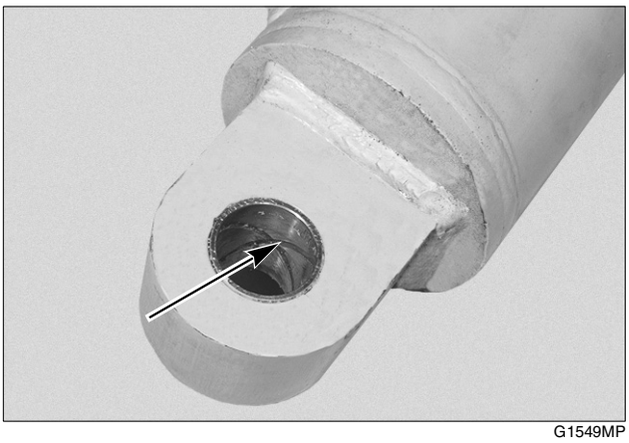


G1548MP

Remove and discard the O-rings and backup rings from the counter balance valve cartridge.

NOTE: *For correct re-assembly record the position of the O-rings and backup rings before removing .*

STEP 19



G1549MP

If required, remove and discard the bushing from the base end and the rod end of the cylinder.

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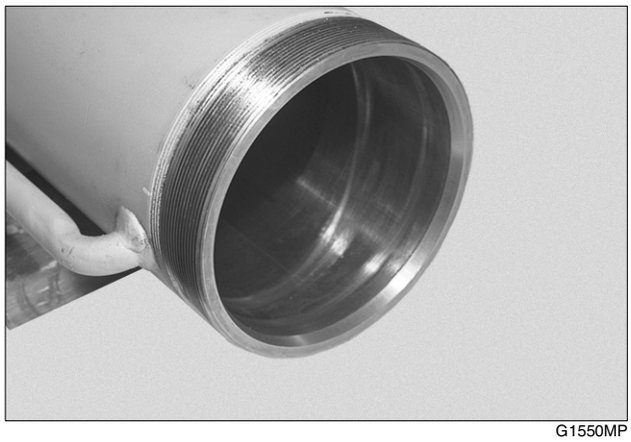
CYLINDER ASSEMBLY

STEP 20

Clean the cylinder rod threads, rod nut and all cylinder parts in solvent and dry with compressed air.

Inspect all parts for damage or wear. Replace damaged or worn parts.

STEP 21

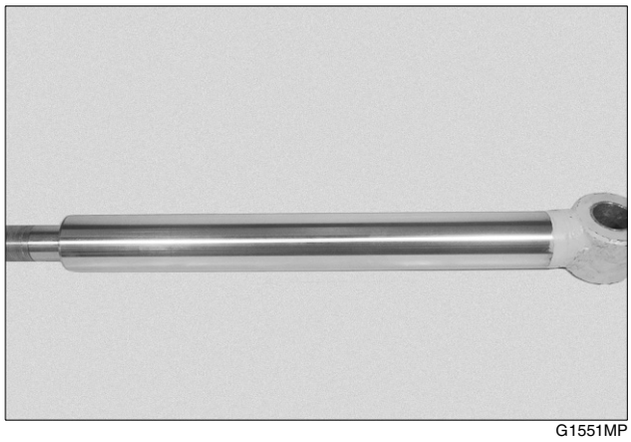


G1550MP

Inspect the cylinder barrel for nicks, scratches or scoring prior to being assembled.

Use crocus cloth to remove any minor nicks or scratches.

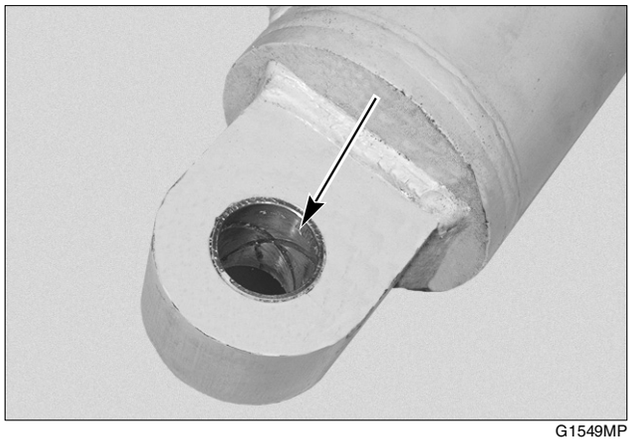
STEP 22



G1551MP

Inspect the cylinder rod for any nicks, scratches or scoring. Roll the rod on a hard flat surface to check for any bending.

STEP 23



G1549MP

If needed, install a new bushing in the base end and the rod end of the cylinder.

STEP 24

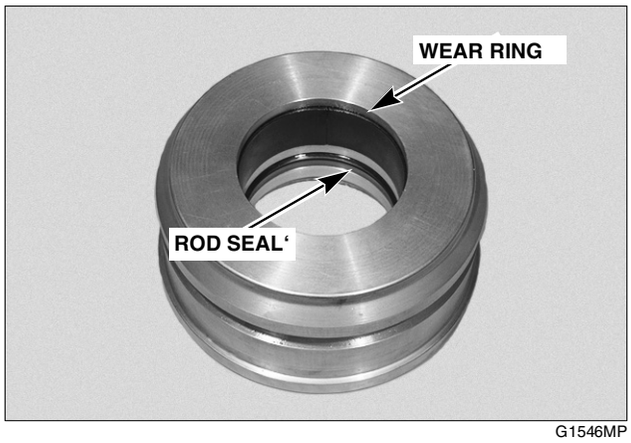


G1547MP

Install a new inner seal (lip to the inside of the barrel) in the head gland.

NOTE: *Lubricate all new seals with clean hydraulic fluid or petroleum jelly before installation.*

STEP 25

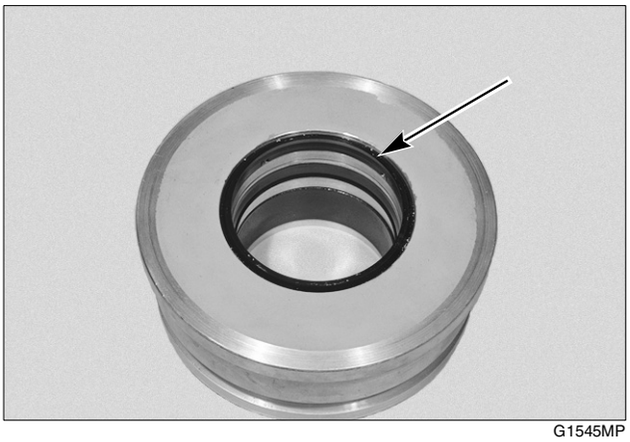


G1546MP

Install a new inner wear ring in the head gland.

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STEP 26

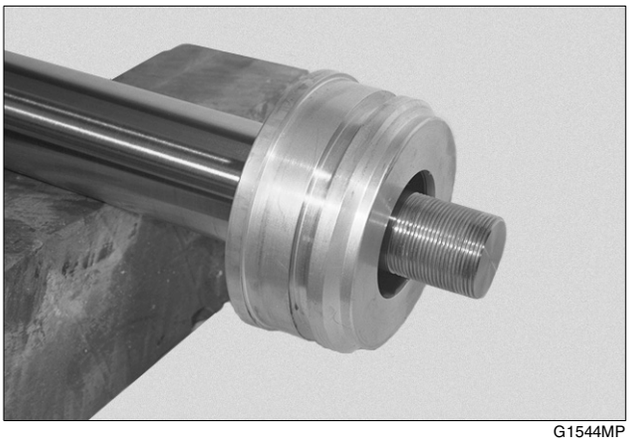


G1545MP

Install a new wiper ring in the head gland.

Apply a thin coat of oil on the seal, wear ring and wiper in the head gland, prior to installation on the rod.

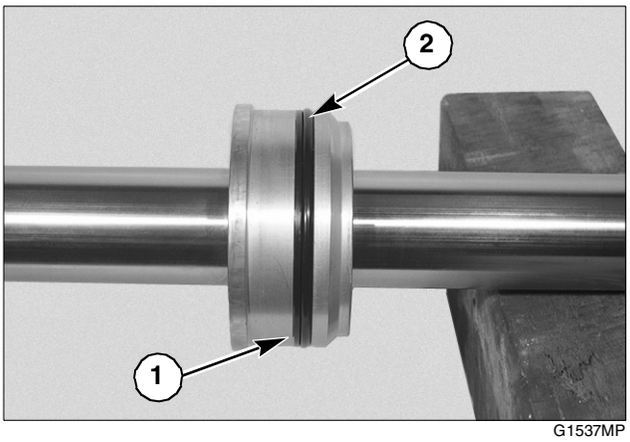
STEP 27



G1544MP

Using care, slide the head gland over the threads and onto the cylinder rod.

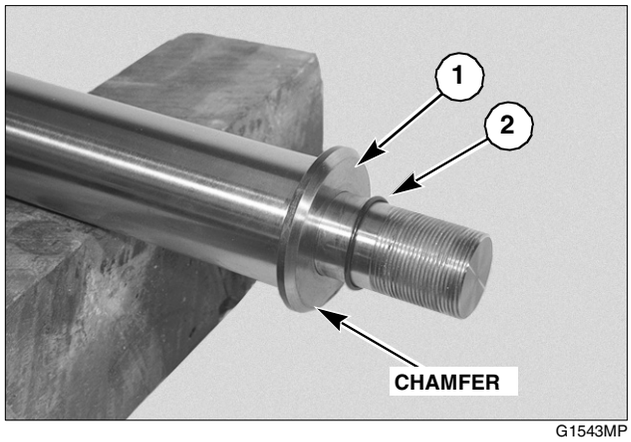
STEP 28



G1537MP

Install a new backup ring (1) and O-ring (2) on the head gland.

STEP 29

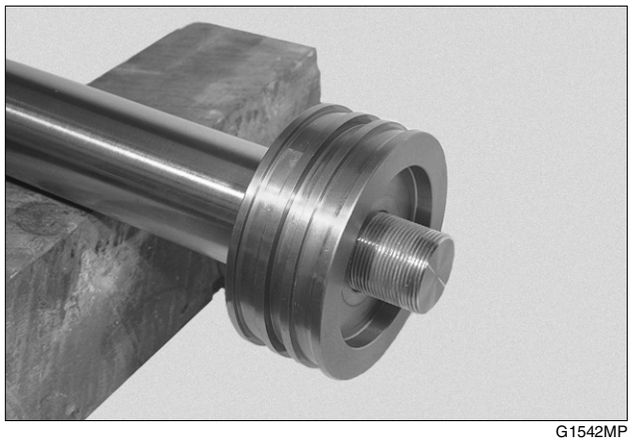


G1543MP

Install the backup washer (1) and O-ring (2) on the cylinder rod.

Push the O-ring against the backup washer. Be sure the O-ring is not twisted.

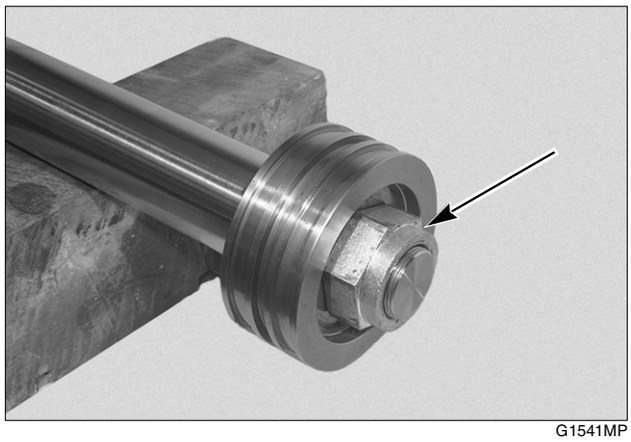
STEP 30



G1542MP

Install the piston on the cylinder rod.

STEP 31

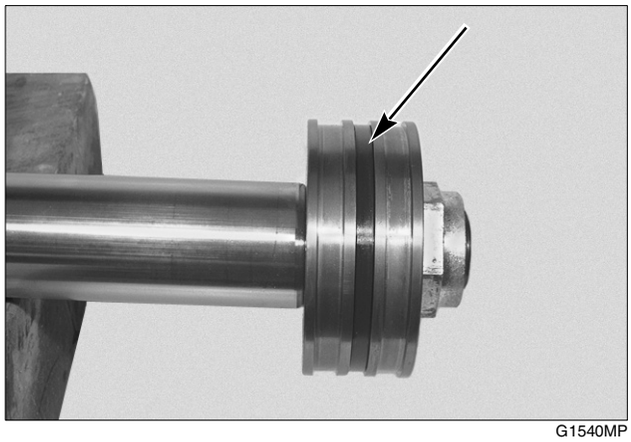


G1541MP

Apply Loctite® #271 Thread Lock (or equivalent) on the threads. Install and torque the nut on the cylinder rod to 450 ft.-lbs. (610 Nm).

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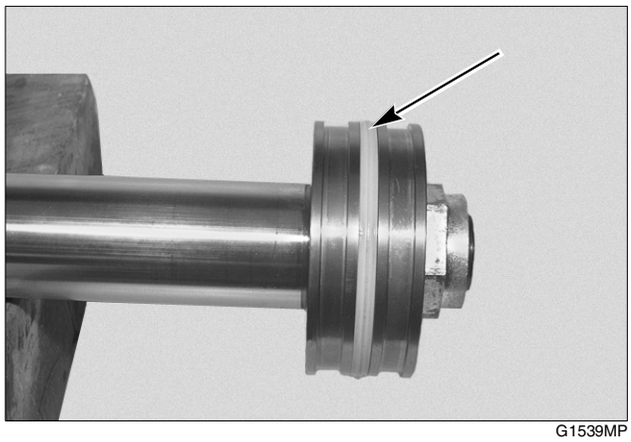
STEP 32



G1540MP

Install the inner seal in the center groove of the piston. Be sure the seal is not rolled or twisted.

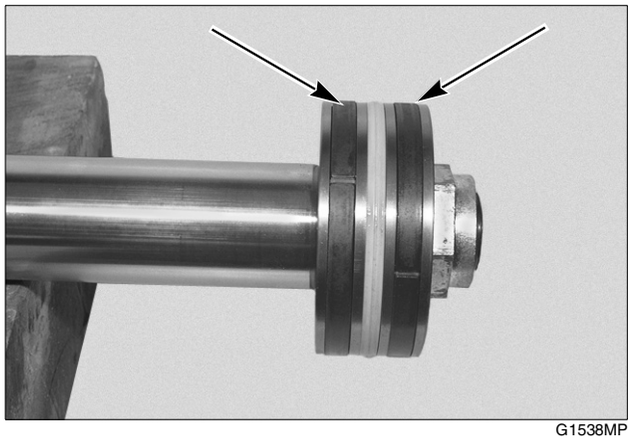
STEP 33



G1539MP

Install the outer seal over the inner seal in the center groove of the piston.

STEP 34



G1538MP

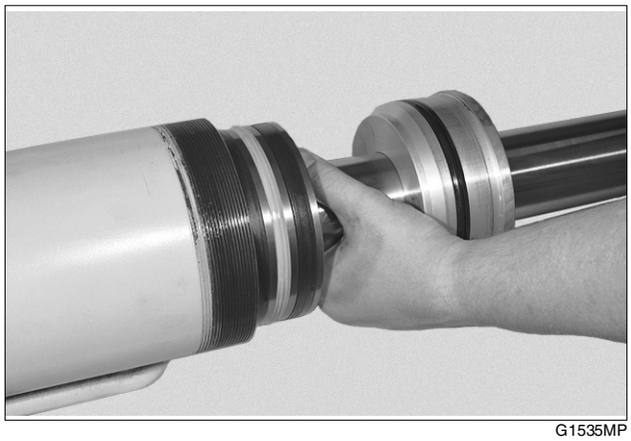
Install the two wear rings on the piston Apply a thin coat of oil on the seal and wear rings prior to installation of the rod assembly.

STEP 35

Remove the rod from the vise.

Clamp the base end of the barrel in a vise or other holding fixture.

STEP 36

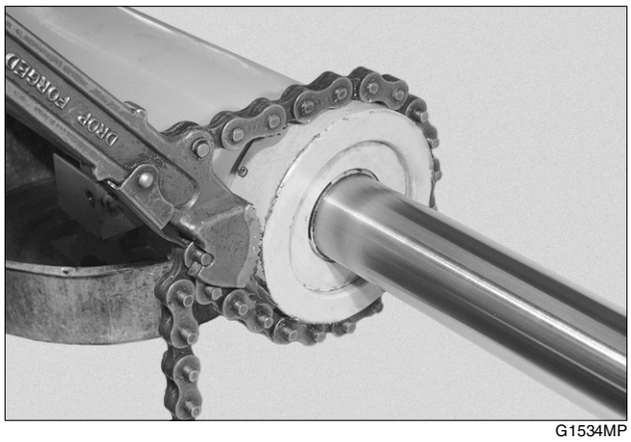


G1535MP

Carefully install the rod assembly into the cylinder barrel.

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

STEP 37

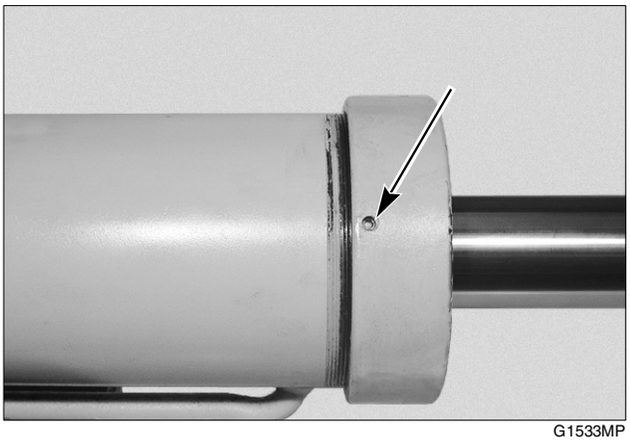


G1534MP

Install and tighten the gland ring nut on the cylinder barrel.

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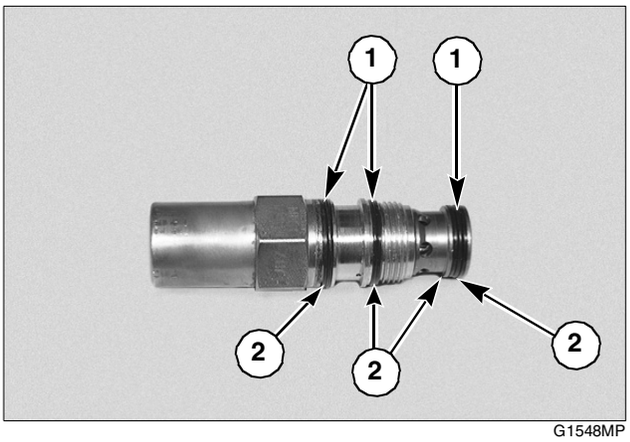
STEP 38



G1533MP

Install a new nylon locking insert inside the set screw hole. Install the set screw in the gland nut. Torque the set screw to 5 to 7 ft.-lbs. (7 to 9 Nm).

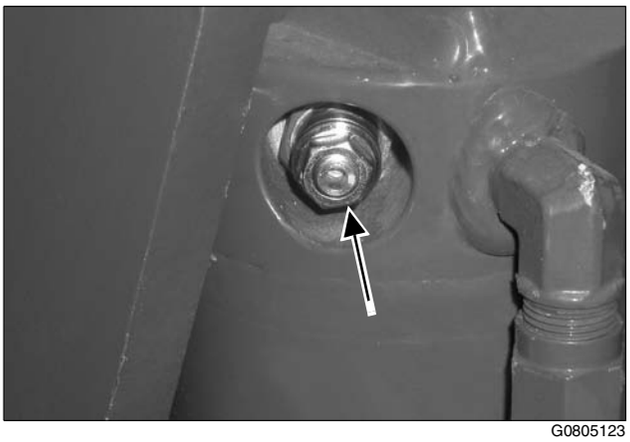
STEP 39



G1548MP

Lubricate and install new O-rings (1) and backup rings (2) on the counter-balance valve.

STEP 40



G0805123

Install the load counter-balance valve.

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Section

606

SLAVE CYLINDER REMOVAL AND INSTALLATION

RS5-34 Telescopic Handler

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SLAVE CYLINDER INSTALLATION 3

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MANDATORY SAFETY SHUTDOWN PROCEDURE

BEFORE cleaning, lubricating, or servicing this equipment:

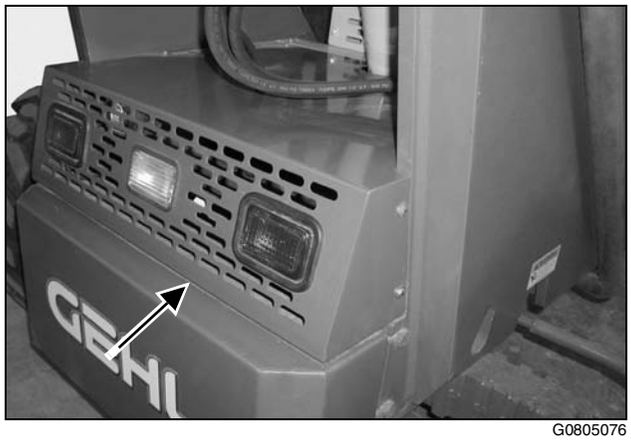
1. Bring the machine to a full stop on a level surface. (If parking on a slope or hillside cannot be avoided, park across the slope and block the tires.)
2. Fully retract the boom and lower the attachment to the ground.
3. Place controls in NEUTRAL and set the park brake.
4. Idle the engine for gradual 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 injury.

RELIEVE HYDRAULIC OIL PRESSURE

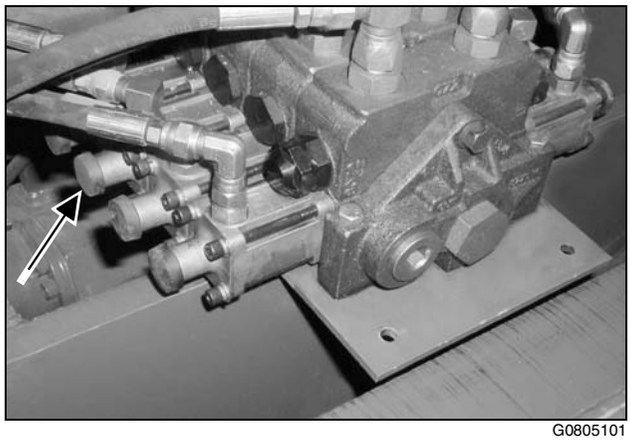
1. Engage the park brake.
2. Lower equipment to the ground. Return the engine to idle for 30 seconds then shut down the engine.
3. Turn the keyswitch on. Operate the joystick in each direction. This should ensure there is no residual pressure trapped in the control circuit. Confirm that there is no attachment or unit movement.

RELIEVING HYDRAULIC PRESSURE FOR THE SLAVE CYLINDER



G0805076

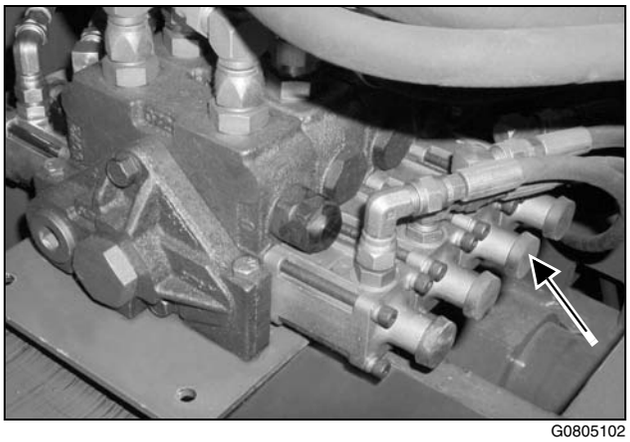
1. Fully retract and lower the telescoping boom on a support stand.
2. Turn the keyswitch to the OFF position to shut off the engine. (See above Mandatory Safety Shutdown Procedure.)
3. Remove the rear hood to allow access to the main control valve.



G0805101

4. Locate the attachment tilt-up section on the left side of the control valve and remove the rubber boot. Using a screwdriver, turn the screw IN (clockwise) until it bottoms, then turn it OUT (counterclockwise) until it bottoms. Reinstall the rubber boot.

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G0805102

5. Locate the attachment tilt-down section on the right side of the control valve and remove the rubber boot. Using a screwdriver, turn the screw IN (clockwise) until it bottoms, then turn it OUT (counterclockwise) until it bottoms. Reinstall the rubber boot.

SLAVE CYLINDER REMOVAL

STEP 1



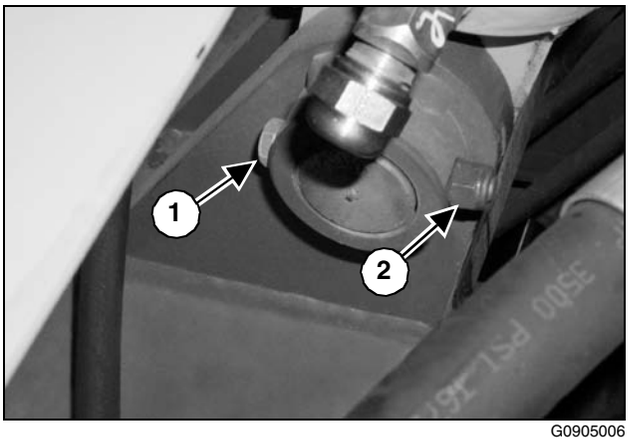
G0905005

Disconnect both hydraulic hoses from the slave cylinder.

STEP 2

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

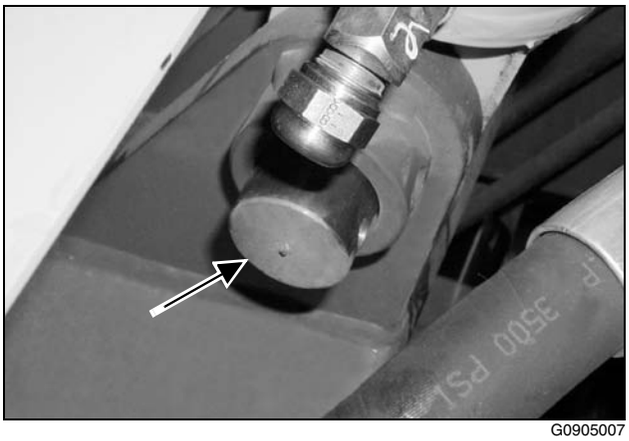
STEP 3



G0905006

Loosen and remove the retainer bolt (1) and nut (2) from the lower pivot pin.

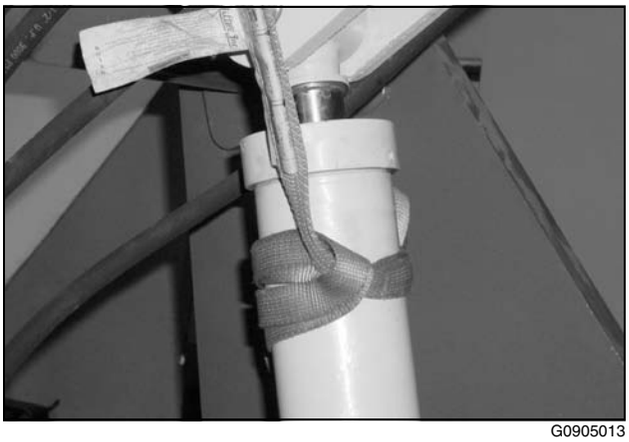
STEP 4



G0905007

Remove the lower pivot pin from the slave cylinder.

STEP 5

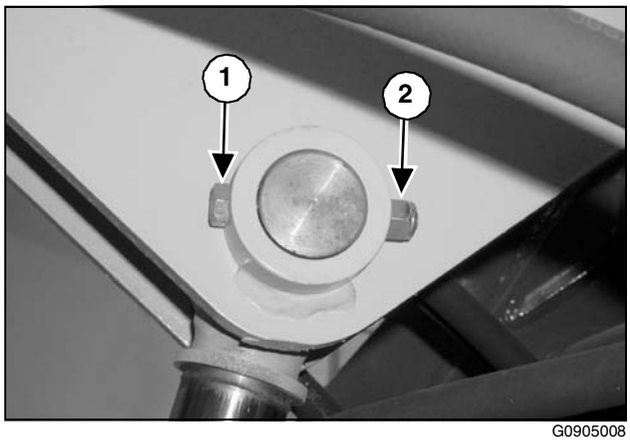


G0905013

Using a hoist and lifting strap, position the lifting strap around the slave cylinder and apply upward pressure.

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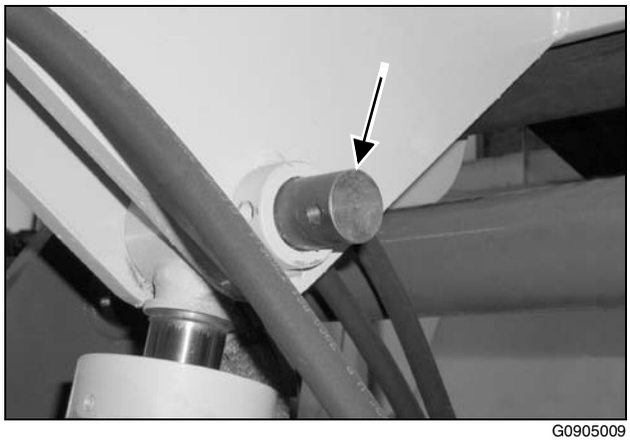
STEP 6



G0905008

Loosen and remove the retainer bolt (1) and nut (2) from the upper pivot pin.

STEP 7



G0905009

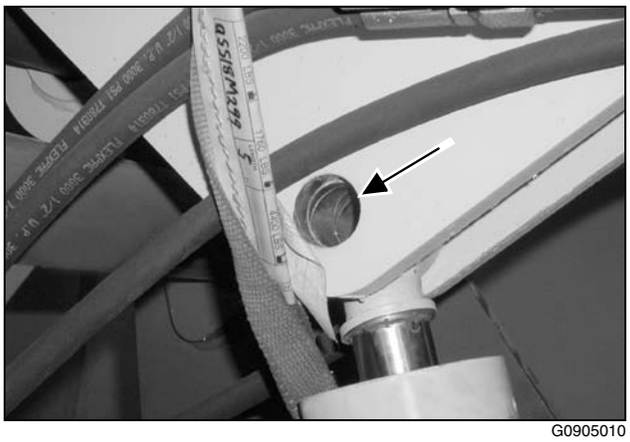
Remove the upper pivot pin.

STEP 8

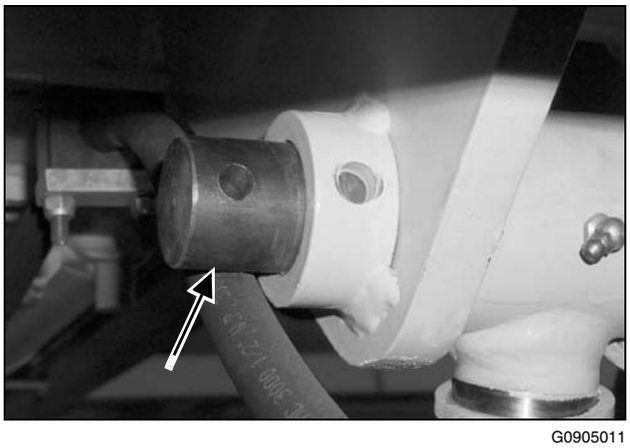
Remove the slave cylinder from the machine.

SLAVE CYLINDER INSTALLATION

STEP 9



G0905010



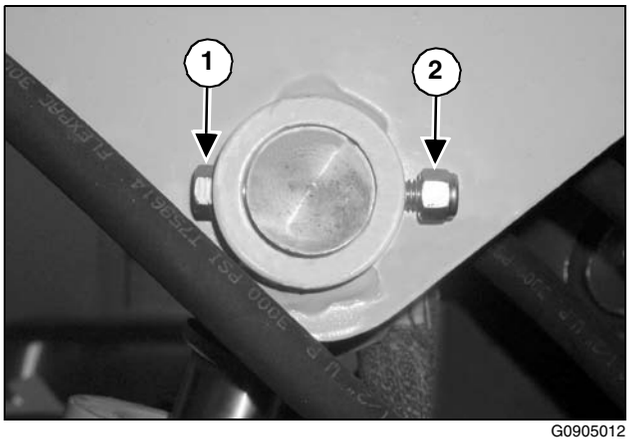
G0905011

Using a hoist and lifting strap, install the slave cylinder in the upper pivot mounts, and install the upper pivot pin.

NOTE: *Align the pivot pin holes with the holes in the cylinder mount.*

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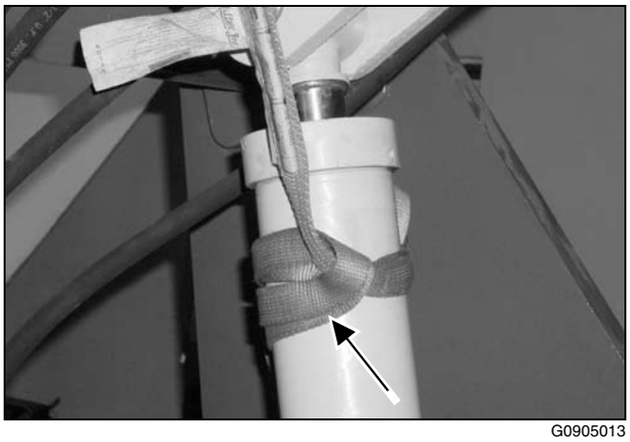
STEP 10



G0905012

Install the retainer bolt (1) and nut (2) in the upper pivot pin.

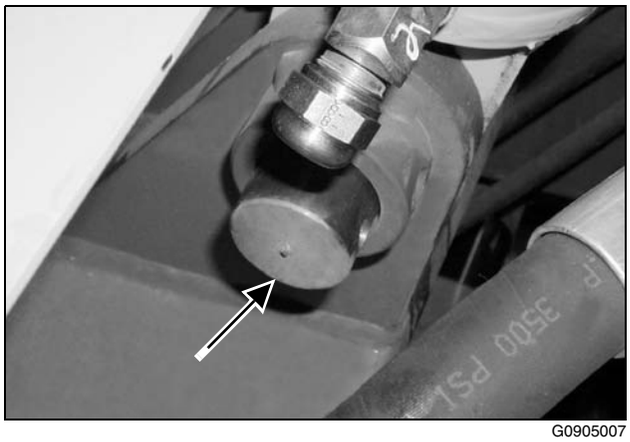
STEP 11



G0905013

Remove the lifting strap and hoist from the slave cylinder.

STEP 12



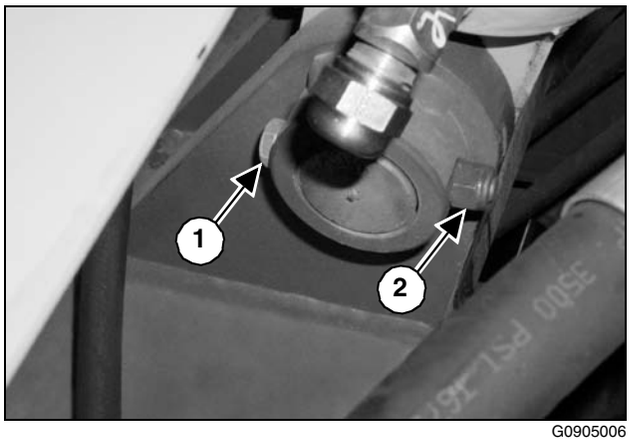
G0905007

Using a pry bar, extend the slave cylinder rod enough to install the lower pivot pin.

Install the lower pivot pin.

NOTE: *Align the pivot pin holes with the holes in the cylinder mount.*

STEP 13



G0905006

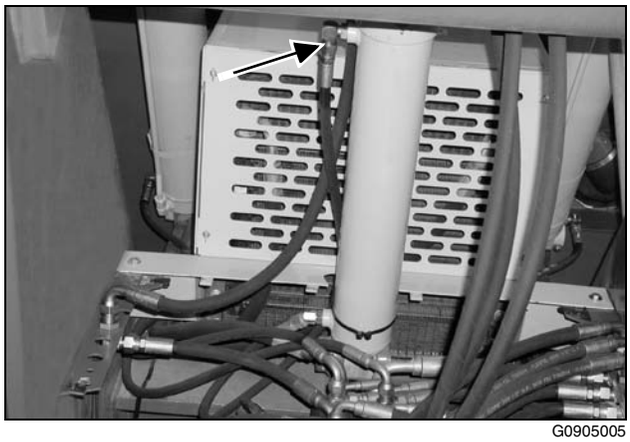
Install the retainer bolt (1) and nut (2) in the lower pivot pin.

STEP 14

Remove the plugs and plugs from the hydraulic fittings and hoses.

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STEP 15



G0905005

Reconnect the hydraulic hoses to the slave cylinder.

Lubricate the upper and lower pivot pin grease fittings with the specified grease.

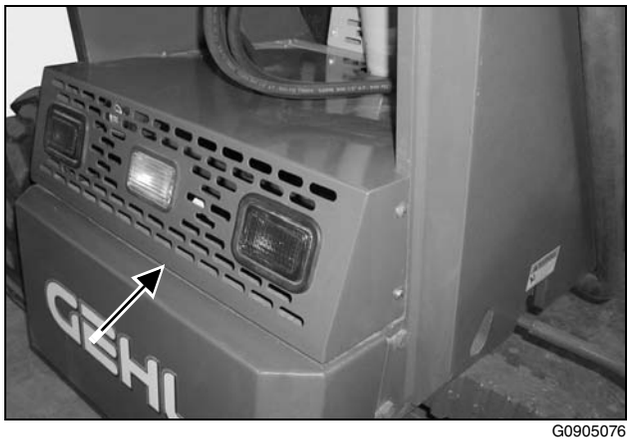
STEP 16

Start the engine. Move the machine to an open area and park on a level surface. Apply the park brake. Raise and lower the boom several times until all air is removed from the circuit.

STEP 17

Lower the boom and shut off the engine. Check for leaks. Correct any leakage found. Check the hydraulic fluid level. If necessary, fill to the correct level with the specified fluid.

STEP 18



G0905076

Install the rear hood.

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Section

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LIFT CYLINDER REMOVAL AND INSTALLATION

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MANDATORY SAFETY SHUTDOWN PROCEDURE

BEFORE cleaning, lubricating, or servicing this equipment:

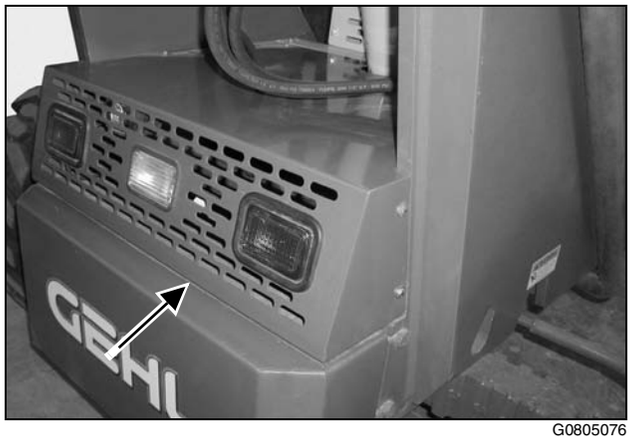
1. Bring the machine to a full stop on a level surface. (If parking on a slope or hillside cannot be avoided, park across the slope and block the tires.)
2. Fully retract the boom and lower the attachment to the ground.
3. Place controls in NEUTRAL and set the park brake.
4. Idle the engine for gradual 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 injury.

RELIEVE HYDRAULIC OIL PRESSURE

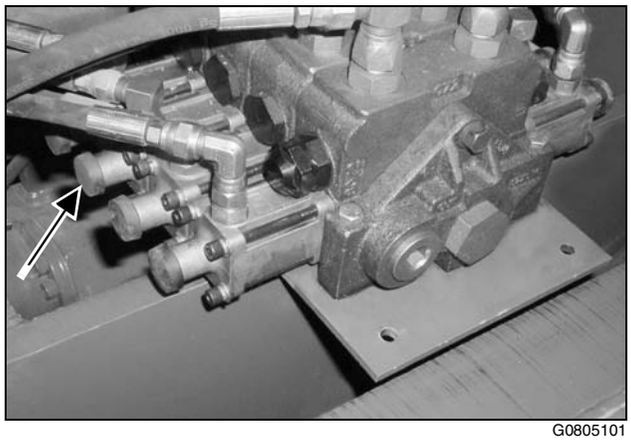
1. Engage the park brake.
2. Lower equipment to the ground. Return the engine to idle for 30 seconds, then shut down the engine.
3. Turn the keyswitch on. Operate the joystick in each direction. This should ensure there is no residual pressure trapped in the control circuit. Confirm that there is no attachment or unit movement.

RELIEVING HYDRAULIC PRESSURE FOR THE LIFT CYLINDER



G0805076

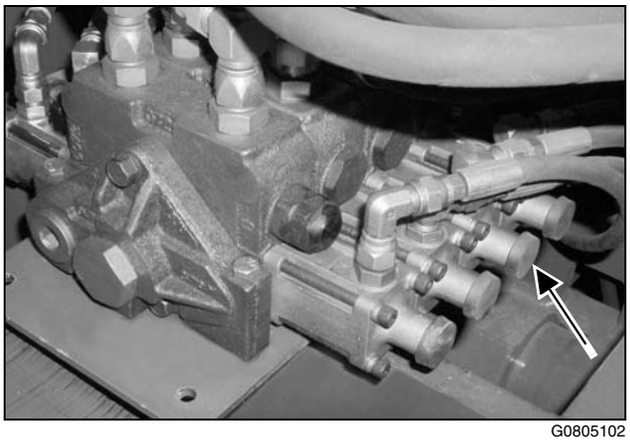
1. Fully retract and lower the telescoping boom onto a support stand.
2. Turn the keyswitch to the OFF position to shut off the engine. (See above Mandatory Safety Shutdown Procedure.)
3. Remove the rear hood to allow access to the main control valve.



G0805101

4. Locate the attachment Boom Raise section (second section) on the left hand side of the control valve and remove the rubber boot. Using a screwdriver, turn the screw IN (clockwise) until it bottoms, then turn in OUT (counterclockwise) until it bottoms. Reinstall the rubber boot.

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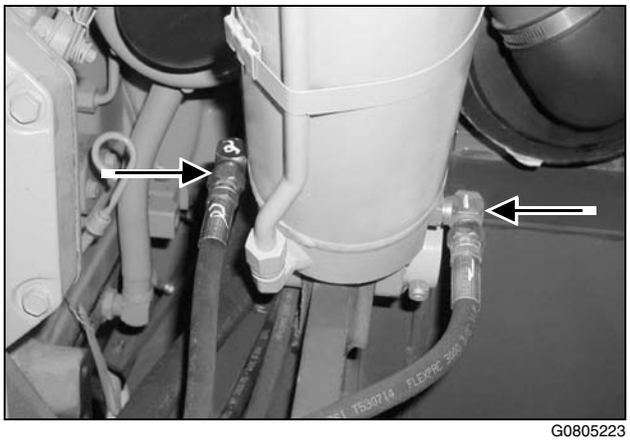
G0805102

5. Locate the attachment Boom Lower section (second section) on the right hand side of the control valve and remove the rubber boot. Using a screwdriver, turn the screw IN (clockwise) until it bottoms, then turn it OUT (counterclockwise) until it bottoms. Reinstall the rubber boot.

LIFT CYLINDER REMOVAL

NOTE: *See Section 605 of this Service Manual for the repair of this cylinder.*

STEP 1



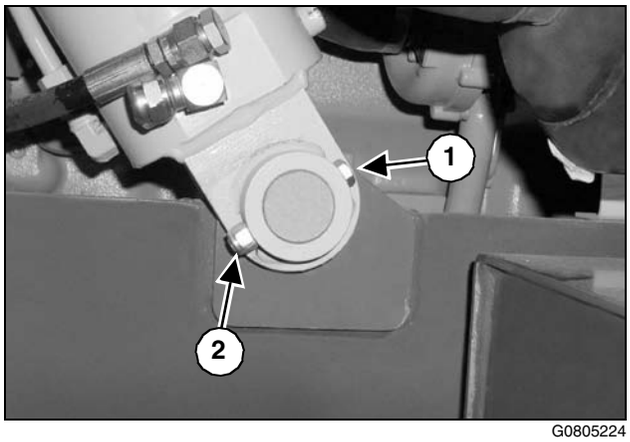
G0805223

Mark the hydraulic hoses for correct assembly. Disconnect the two hydraulic hoses from the lift cylinder.

STEP 2

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

STEP 3



G0805224

Loosen and remove the retainer bolt (1) and nut (2) from the lower pivot pin.

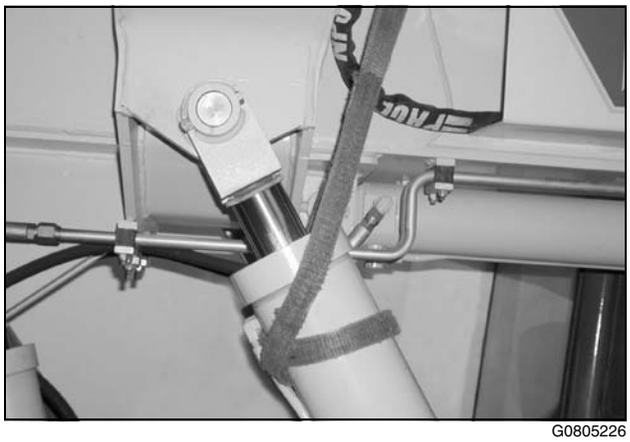
STEP 4



G0805225

Remove the lower pivot pin from the lift cylinder.

STEP 5

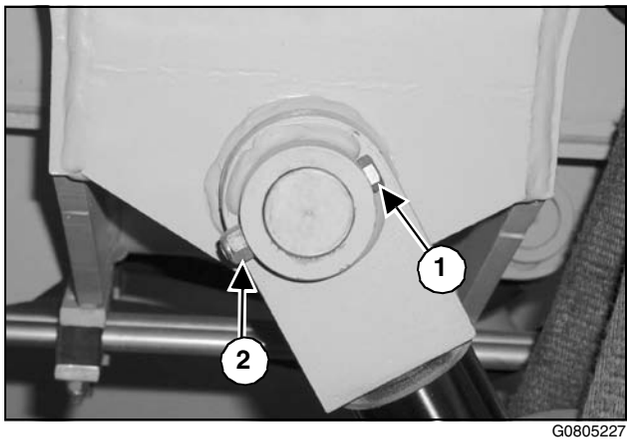


G0805226

Using a hoist and lifting strap, position the lifting strap around the lift cylinder and apply upward pressure.

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STEP 6



G0805227

Loosen and remove the retainer bolt (1) and nut (2) from the upper pivot pin.

STEP 7



G0805228

Remove the grease fitting from the upper pivot pin and remove the upper pivot pin.

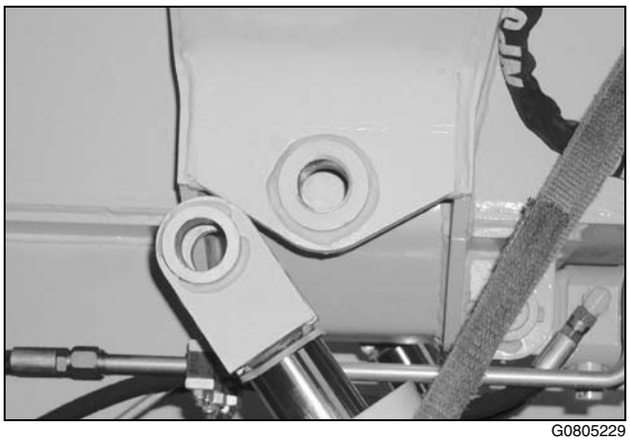
STEP 8

Remove the lift cylinder from the machine using the hoist.

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

LIFT CYLINDER INSTALLATION

STEP 9



G0805229

Using the hoist and lifting strap, position the lift cylinder in the cylinder mounts.

STEP 10



G0805231

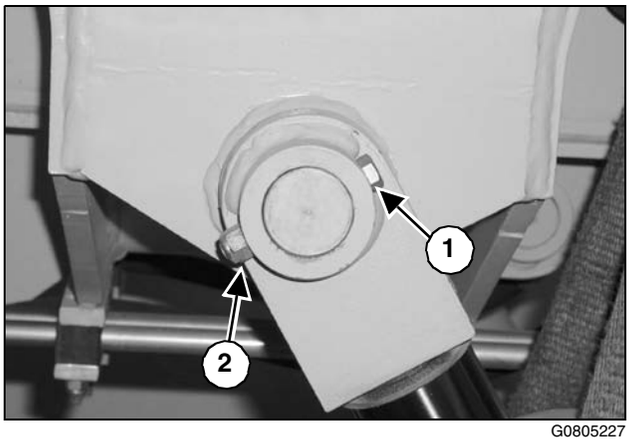
Install the grease fitting in the end of the pivot pin.

Align the pivot pin retainer bolt hole, with the hole in the cylinder mount. Reinstall the upper pivot pin.

Use care not to damage the grease fitting.

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STEP 11

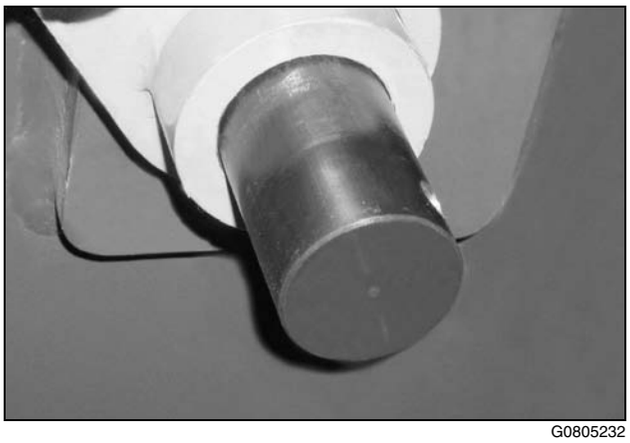


G0805227

Install and tighten the retainer bolt (1) and nut (2) in the upper pivot pin.

Remove the lifting strap and hoist from the lift cylinder.

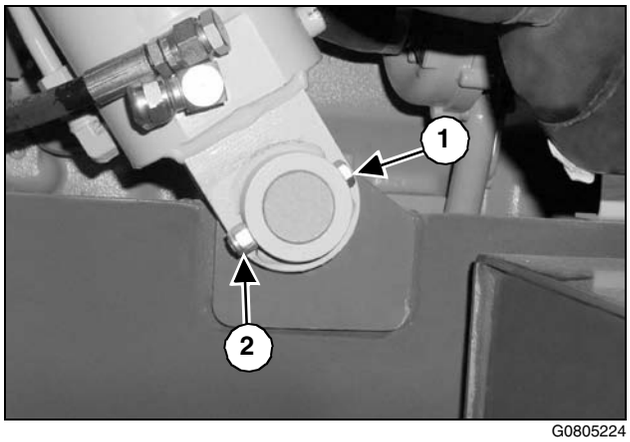
STEP 12



G0805232

Using a pry bar, extend the cylinder enough to align the pivot pin retainer bolt hole with the hole in the cylinder mount and reinstall the lower pivot pin. Use care not to damage the grease fitting.

STEP 13



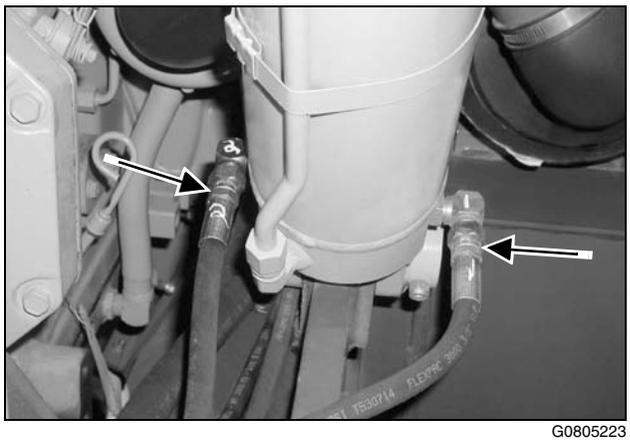
G0805224

Install and tighten the retainer bolt (1) and nut (2) in the lower pivot pin.

STEP 14

Remove the caps and plugs from the hydraulic fittings and hoses.

STEP 15



G0805223

Reconnect the hydraulic hoses to the lift cylinder.

NOTE: *If removed, install the opposite side lift cylinder in the same manner.*

STEP 16

Use a grease gun with the specified grease to lubricate the upper and lower pin grease fittings.

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STEP 17

Start the engine. Move the machine to an open area and park on a level surface. Apply the park brake. Raise and lower the boom several times until all air is removed from the circuit.

STEP 18

Lower the boom and shut off the engine. Check for leaks. Correct any leakage found. Check the hydraulic fluid level. If necessary, fill to the correct level with the specified fluid.

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Section

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BOOM EXTEND CYLINDER REMOVAL AND INSTALLATION

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MANDATORY SAFETY SHUTDOWN PROCEDURE

BEFORE cleaning, lubricating, or servicing this equipment:

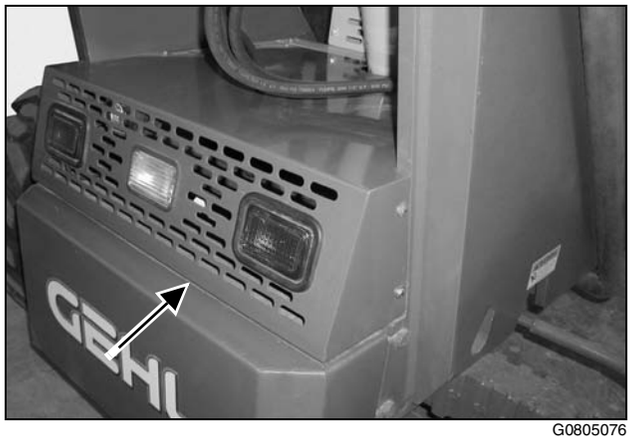
1. Bring the machine to a full stop on a level surface. (If parking on a slope or hillside cannot be avoided, park across the slope and block the tires.)
2. Fully retract the boom and lower the attachment to the ground.
3. Place controls in NEUTRAL and set the park brake.
4. Idle the engine for gradual 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 injury.

RELIEVE HYDRAULIC OIL PRESSURE

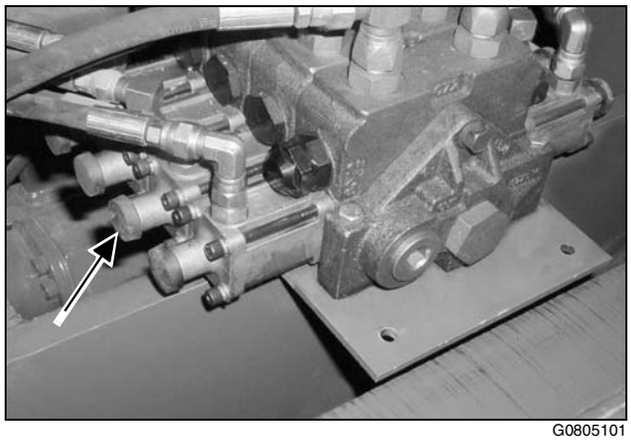
1. Engage the park brake.
2. Lower equipment to the ground. Return the engine to idle for 30 seconds then shut off the engine.
3. Turn the keyswitch on. Operate the joystick in each direction. This should ensure there is no residual pressure trapped in the control circuit. Confirm that there is no attachment or unit movement.

RELIEVING HYDRAULIC PRESSURE FOR THE EXTEND CYLINDER



G0805076

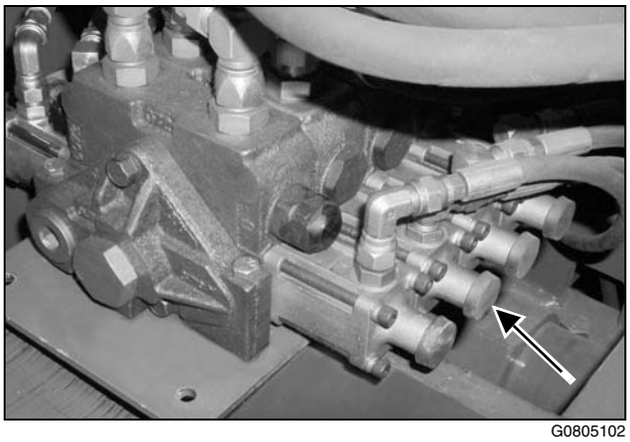
1. Fully retract and lower the telescoping boom on a support stand.
2. Turn the keyswitch to the OFF position to shut off the engine. (See above Mandatory Safety Shutdown Procedure.)
3. Remove the rear hood to allow access to the main control valve.



G0805101

4. Locate the attachment boom “Extend” section on the left side of the control valve and remove the rubber boot. Using a screwdriver, turn the screw IN (clockwise) until it bottoms, then turn it OUT (counterclockwise) until it bottoms. Reinstall the rubber boot.

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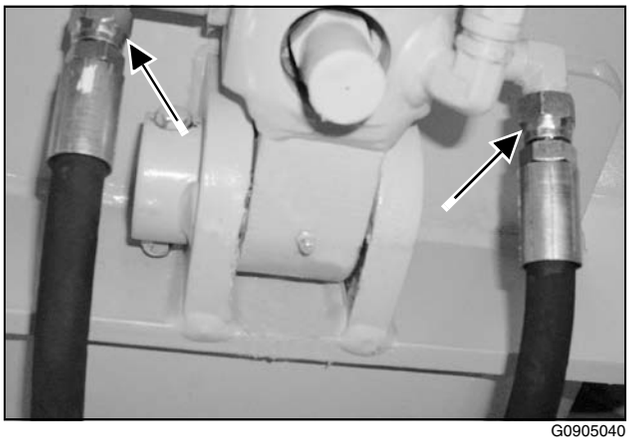
G0805102

5. Locate the attachment boom “Retract” section on the right side of the control valve and remove the rubber boot. Using a screwdriver, turn the screw IN (clockwise) until it bottoms, then turn it OUT (counterclockwise) until it bottoms. Reinstall the rubber boot.

EXTEND CYLINDER REMOVAL

NOTE: *See Section 605 of this Service Manual for the repair of this cylinder.*

STEP 1



G0905040

Mark the hydraulic lines for correct assembly. Loosen and remove the two lines from the extend cylinder.

STEP 2

Install caps and plugs on all hydraulic fittings to prevent contamination of the hydraulic system.

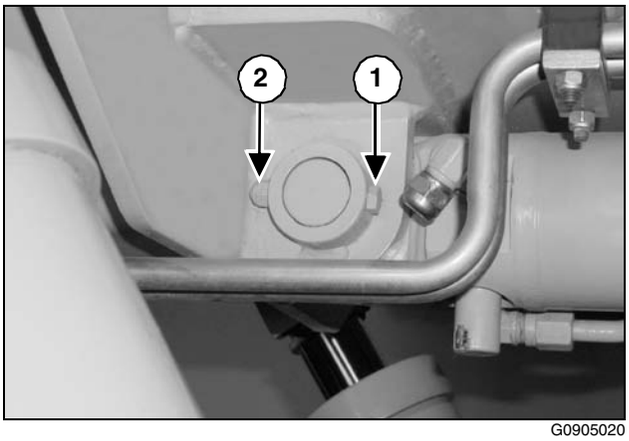
STEP 3



G0905019

Using a hoist and lifting strap, position the lifting strap around the extend cylinder base. Apply upward pressure to remove the slack from the lifting strap.

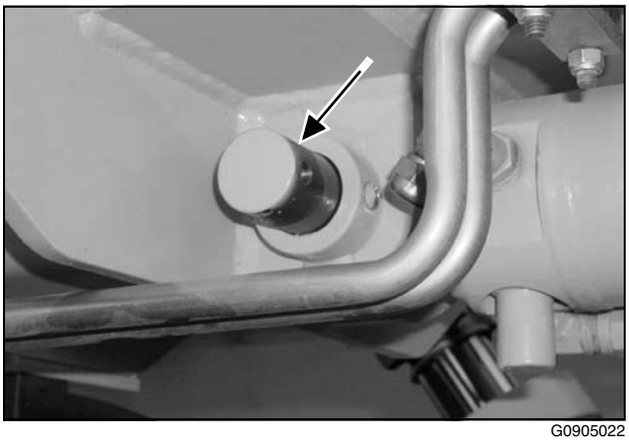
STEP 4



G0905020

Remove the retainer bolt (1) and nut (2) from the pivot pin at the base of the extend cylinder.

STEP 5



G0905022

Remove the pivot pin from the base of the extend cylinder.

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STEP 6



G0905023

Place a protective cover on the engine hood and lower the base end of the extend cylinder until it rests on the hood. Remove the lifting strap.

STEP 7



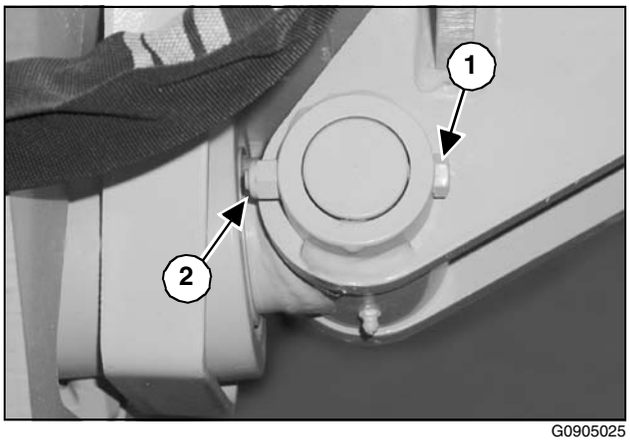
G0905050



G0905024

Using a hoist and lifting strap, position the lifting strap around the rod end of the extend cylinder. Apply upward pressure to remove the slack from the lifting strap.

STEP 8



G0905025

Remove the retainer bolt (1) and nut (2) from the pivot pin at the rod end of the extend cylinder.

STEP 9



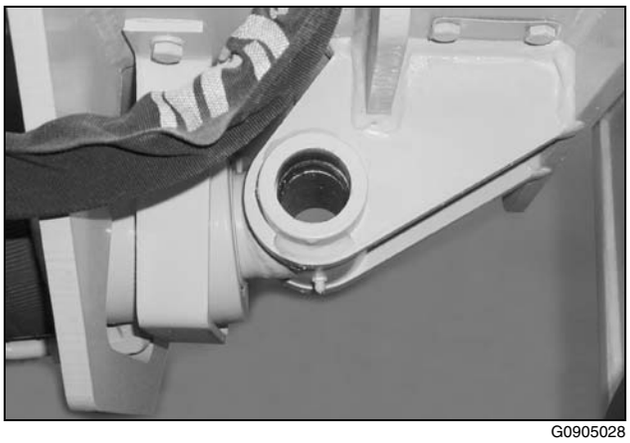
G0905027

Remove the pivot pin from the rod end of the extend cylinder. Remove the extend cylinder from the machine.

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EXTEND CYLINDER INSTALLATION

STEP 10



G0905028

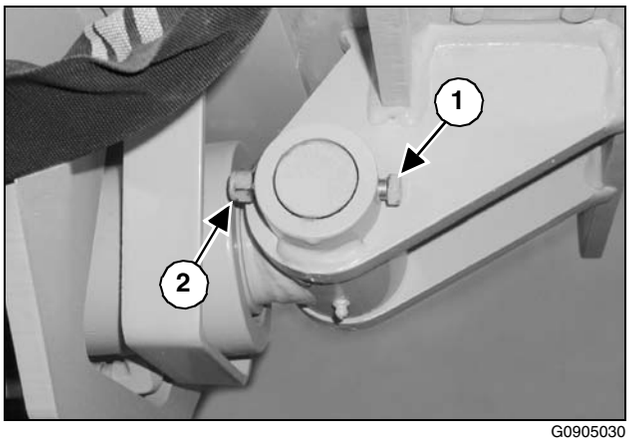


G0905029

Position the extend cylinder in place and install the pivot pin in the rod end of the extend cylinder.

NOTE: *Align the pivot pin holes with the holes in the cylinder mount.*

STEP 11



G0905030

Install the retainer bolt (1) and nut (2) and tighten. Remove the hoist and lifting strap.

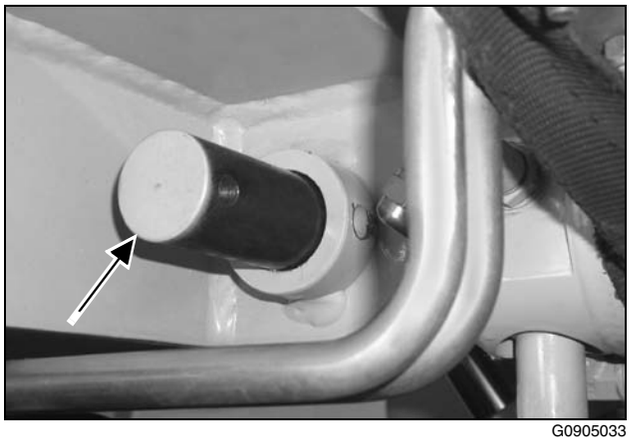
STEP 12



G0905032

Position a hoist and lifting strap around the base of the extend cylinder. Apply upward pressure until the hole in the base is aligned with the mounting bracket.

STEP 13



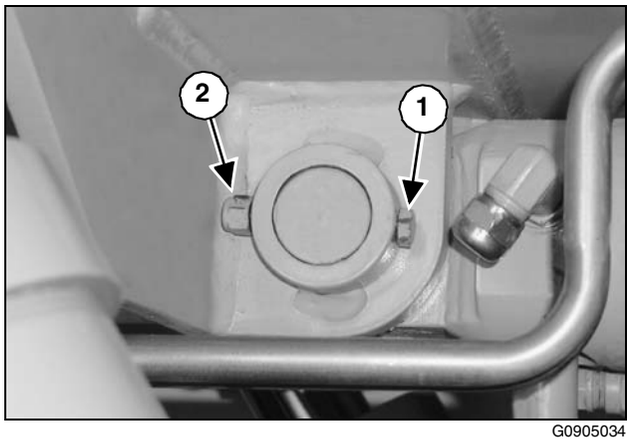
G0905033

Install the pivot pin in the base of the extend cylinder.

NOTE: *Align the pivot pin holes with the holes in the cylinder mount.*

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STEP 14



G0905034

Install the retainer bolt (1) and nut (2).

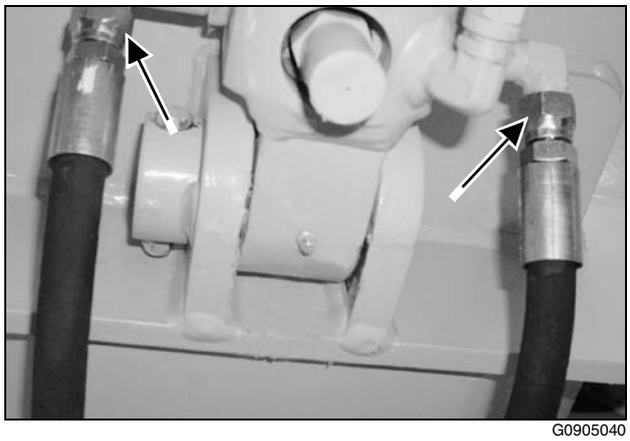
STEP 15

Remove the protective cover from the engine hood.

STEP 16

Remove the caps and plugs from the hydraulic fittings and hoses.

STEP 17



G0905040

Reconnect the two hydraulic lines to the boom extend cylinder and tighten.

STEP 18

Use a grease gun with the specified grease to lubricate the forward and aft pin grease fittings.

STEP 19

Start the engine and check boom operation in a clear area.

STEP 20

Shut off the engine. Check for hydraulic fluid leaks. Correct any leakage problem found and add hydraulic fluid as required.

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Section

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BOOM ASSEMBLY REMOVAL AND INSTALLATION

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BOOM ASSEMBLY INSTALLATION 6

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GENERAL INFORMATION

Boom removal can be accomplished in several ways, depending on the scope of damage or the reason for removal. If the boom assembly must be removed because of other machine damage, it may be removed as a complete assembly. If the boom is to be removed because of damage to the boom that requires extensive repairs, it may be desirable and easier to remove the inner and intermediate boom sections from the outer section first. Refer to Sections 703 and 706 of this manual to remove the inner and intermediate boom sections.

Boom assembly removal procedures will also be determined by the type and capacity of the lifting device that will be used to support and remove the boom assembly.

Gehl Company recommends using two rolling gantry type hoists, each with a minimum capacity of 3000 lb., to lift and support each end of the boom assembly. The following boom assembly removal procedures will be done using a rolling gantry hoist connected to each end of the boom.

BOOM ASSEMBLY REMOVAL

STEP 1

Park the unit on a solid level surface with adequate room for boom removal. Place wood blocks under the nose portion of the boom and lower the boom so that the nose portion is resting on the wood blocks and remains level.

MANDATORY SAFETY SHUTDOWN PROCEDURE

BEFORE cleaning, adjusting, lubricating, or servicing this unit:

1. Stop machine on a level surface. (AVOID parking on a slope, but if necessary, park across the slope and block the tires.)
2. Fully retract the boom and lower the attachment tool to the ground. Idle engine for gradual cooling.
3. Place controls in neutral and apply parking brake.
4. Shut off the engine and remove the key.

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.

RELIEVE HYDRAULIC OIL PRESSURE:

1. Engage the park brake.
2. Lower equipment to the ground. Return the engine to idle for 30 seconds then shut down the engine.
3. Turn the key switch on. Operate the joystick in each direction. Confirm that there is no attachment or unit movement. This should ensure there is no residual pressure trapped in the control circuit.

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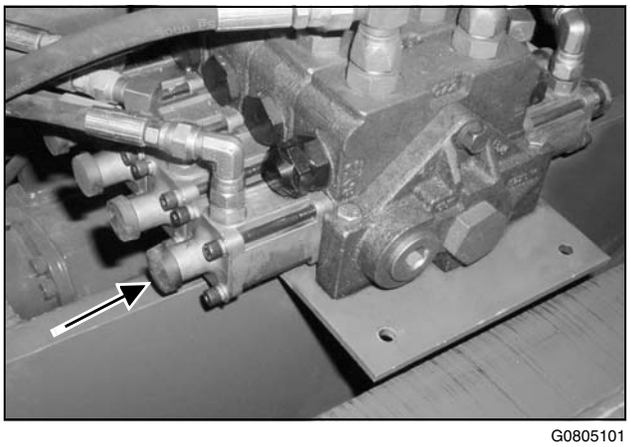
RELIEVING HYDRAULIC PRESSURE FOR THE TILT CYLINDER

1. Remove any attachments from the boom.
2. Fully retract and lower the telescoping boom on a support stand.
3. Turn the key switch to the OFF position to shut down the engine. (See above Mandatory Safety Shutdown Procedure.)



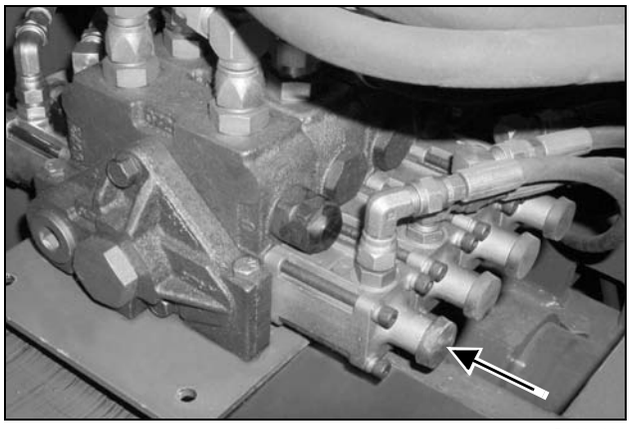
G0805076

4. Remove the rear hood to allow access to the main control valve.



G0805101

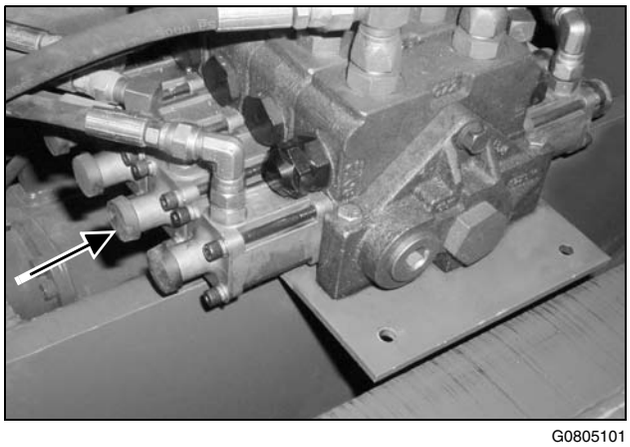
5. Locate the attachment Tilt Up section (rear section) on the left side of the control valve and remove the rubber boot. Using a screwdriver, turn the screw IN (clockwise) until it bottoms, then turn it OUT (counterclockwise) until it bottoms. Reinstall the rubber boot.



G0805102

6. Locate the attachment Tilt Down section (rear section) on the right side of the control valve and remove the rubber boot. Using a screwdriver, turn the screw IN (clockwise) until it bottoms, then turn it OUT (counterclockwise) until it bottoms. Reinstall the rubber boot.

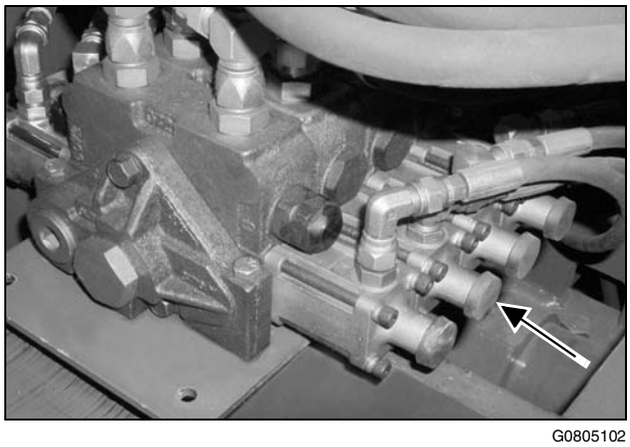
RELIEVING HYDRAULIC PRESSURE FOR THE BOOM EXTEND CYLINDER



G0805101

7. Locate the attachment Boom Extend section (third section) on the left side of the control valve and remove the rubber boot. Using a screwdriver, turn the screw IN (clockwise) until it bottoms, then turn it OUT (counterclockwise) until it bottoms. Reinstall the rubber boot.

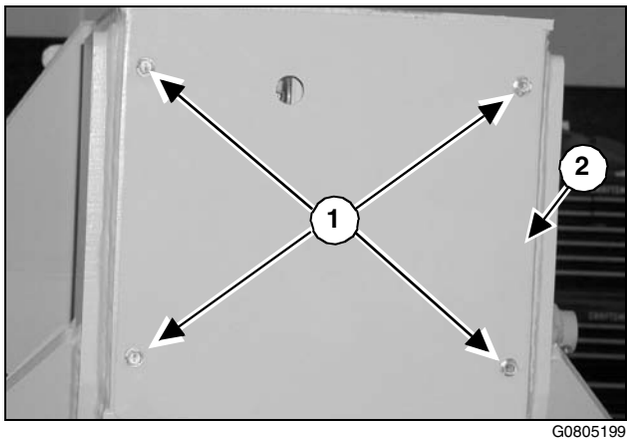
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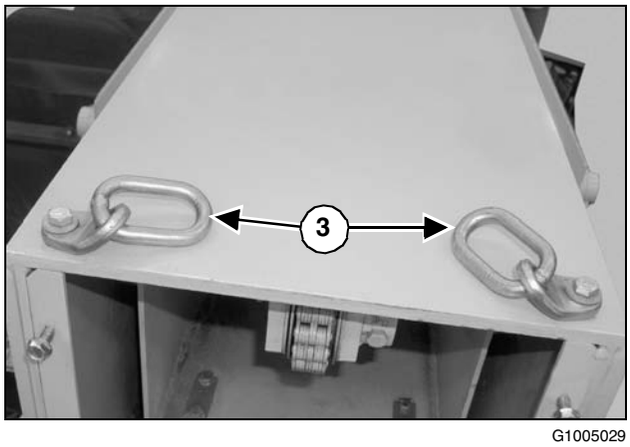
G0805102

8. Locate the attachment Boom Retract section (third section) on the right side of the control valve and remove the rubber boot. Using a screwdriver, turn the screw IN (clockwise) until it bottoms, then turn it OUT (counterclockwise) until it bottoms. Reinstall the rubber boot.

STEP 2



G0805199



G1005029

Loosen and remove the four bolts (1) and the rear cover (2).

Bolt two OEM 4129, 4000 lb. Lifting Brackets (3) (or equivalent) to the top rear of the outer boom section.

STEP 3



G1005027

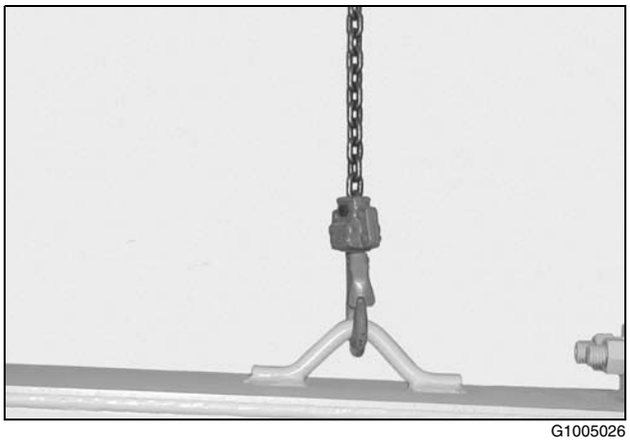
Connect two equal length chains to the lifting links. Apply upward pressure with an adequate size hoist until the chains are tight.

NOTE: *If only the boom pivot shaft is to be replaced, it will not be necessary to disconnect any hydraulic lines or lift cylinders from the boom. Connect an overhead lifting device to the rear of the boom. Use the lifting device to take up the weight of the boom from the pivot shaft. Remove the pivot shaft retainer bolt from the end of the shaft. Use a large brass drift and heavy sledge hammer or a hydraulic ram pusher arrangement to drive the shaft approximately half way out.*

Lubricate the new pivot shaft with anti-sieze grease. Install the new shaft into place. Using the old pivot shaft as a pilot, install the retainer bolt and nut.

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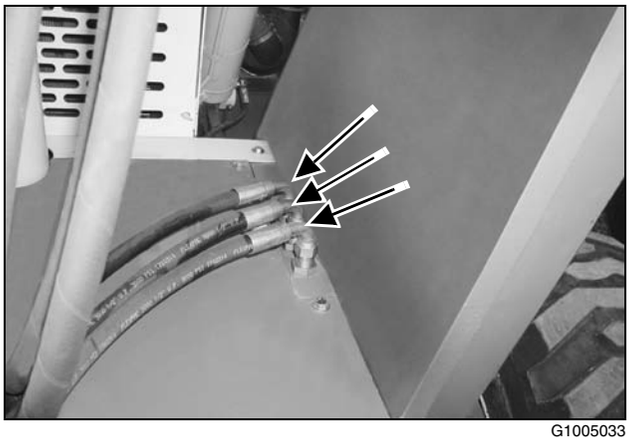
STEP 4



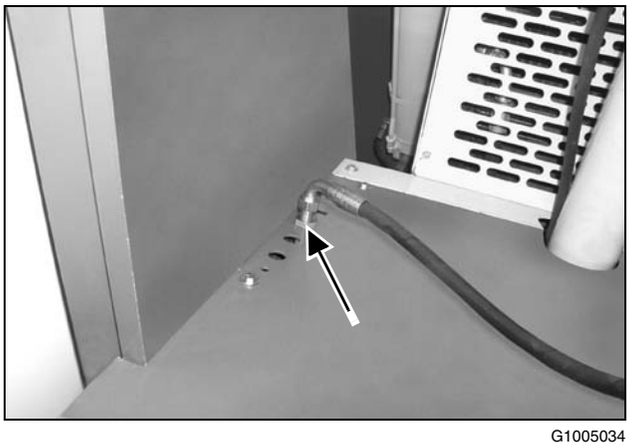
G1005026

Connect a second hoist to the lifting hook at the front of the boom assembly. Apply upward pressure until the chains are tight.

STEP 5



G1005033



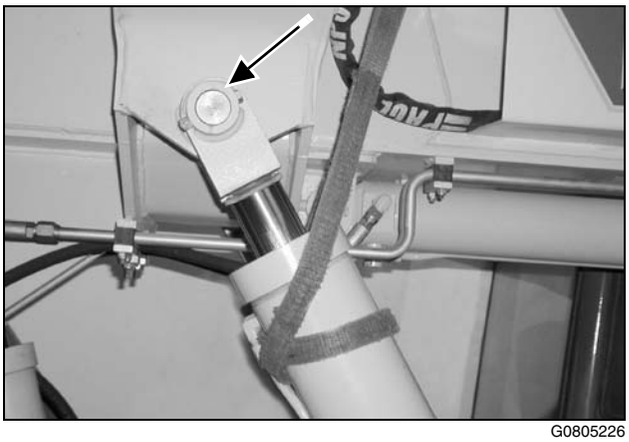
G1005034

Mark the hydraulic hoses for correct assembly. Disconnect the four hydraulic hoses from the bulkhead.

STEP 6

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

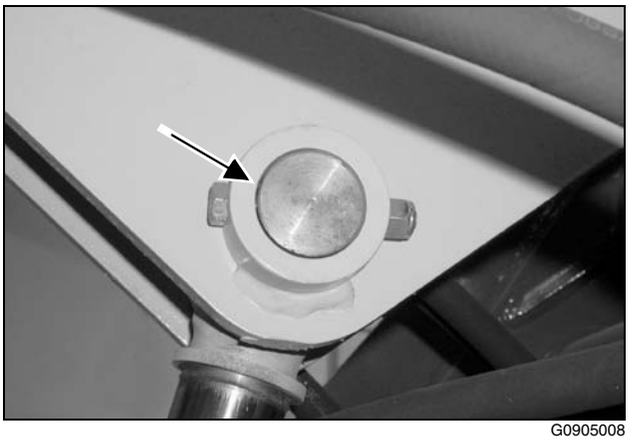
STEP 7



G0805226

Remove the top pivot pin from both lift cylinders. Complete Steps 5, 6 and 7 of Section 607 of this manual for the correct procedure.

STEP 8

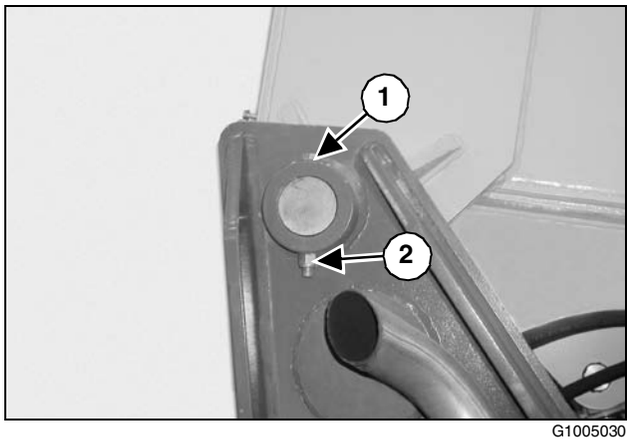


G0905008

Remove the top pivot pin from the slave cylinder. Complete Steps 5, 6 and 7 of Section 606 of this manual for the correct procedure.

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STEP 9



G1005030

Loosen and remove the retainer bolt (1) and nut (2) from the boom pivot shaft.

STEP 10



G1005031

Remove the boom pivot shaft from the boom assembly.

STEP 11

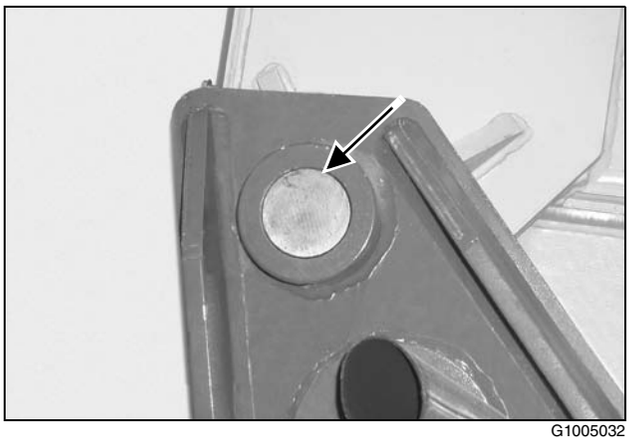
Lift the rear of the boom assembly high enough to clear the bearings and upright standard. If necessary, lift and adjust the front of the boom so that the boom is level.

NOTE: *The machine may be started and carefully backed away from under the boom, or the rolling gentry hoists may be used to roll the boom assembly away from the unit.*

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BOOM ASSEMBLY INSTALLATION

STEP 12

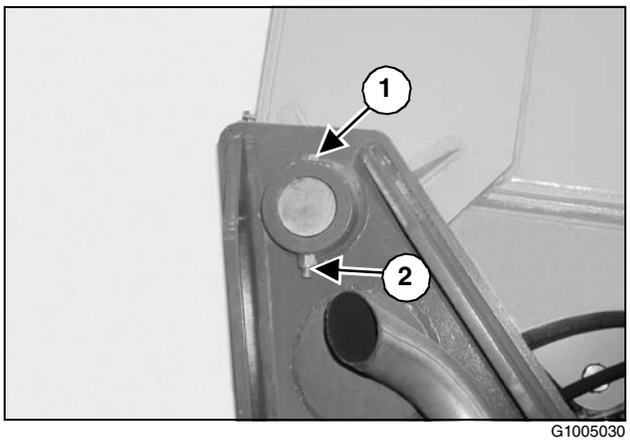


G1005032

Lower the boom assembly into position and install the rear pivot shaft.

NOTE: *Ensure that the retainer bolt hole in the pivot shaft is aligned with the retainer bolt hole in the frame.*

STEP 13



G1005030

Install and tighten the retainer bolt (1) and nut (2) in the pivot pin.

STEP 14

Remove the caps and plugs from the hydraulic hoses and fittings.

STEP 15



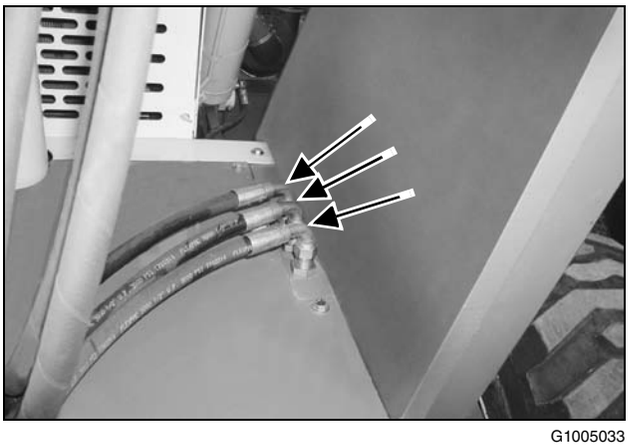
G1005027

Remove the hoist and lifting chain from the rear of the boom.

STEP 16



G1005034

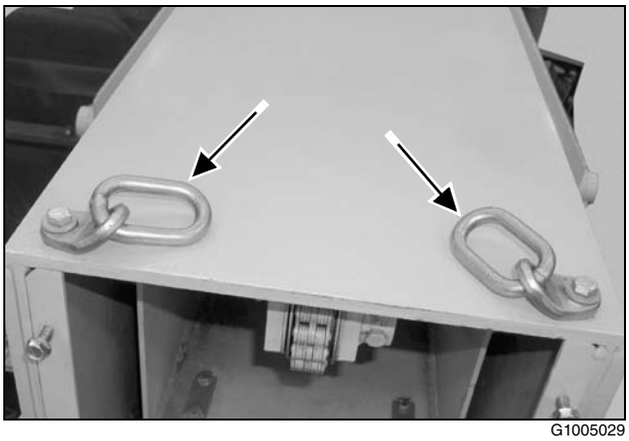


G1005033

Reconnect the four hydraulic hoses to the bulkhead.

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STEP 17



G1005029

Remove the two OEM 4129 lifting brackets from the boom.

STEP 18



G0905011

Install the slave cylinder upper pivot pin. Complete Steps 9, 10 and 11 of Section 606 of this manual for correct procedures.

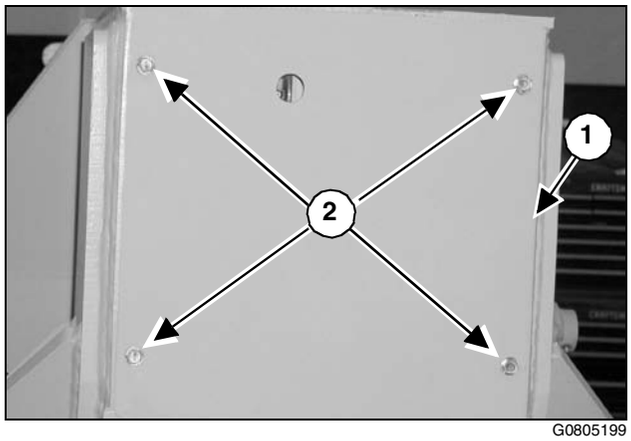
STEP 19



G0805231

Install the top pivot pin in both lift cylinders. Complete Steps 9, 10 and 11 of Section 607 of this manual for correct procedures.

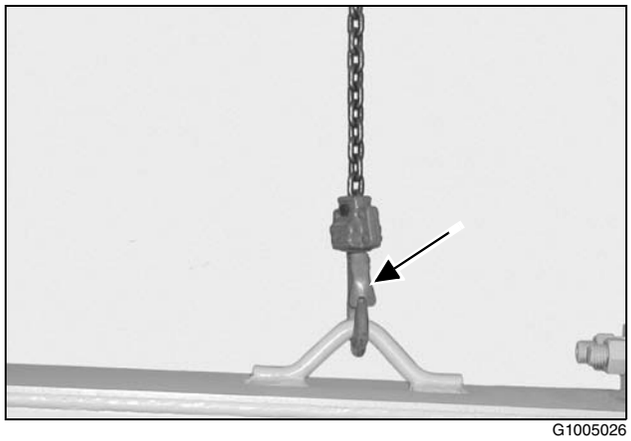
STEP 20



G0805199

Install the boom rear cover (1) using the four bolts (2).

STEP 21



G1005026

Remove the hoist and lifting chain from the front of the boom.

STEP 22

Start the engine and check boom operation in a clear area.

STEP 23

Shut down the engine and check for hydraulic fluid leaks. Correct any leakage problems found and add hydraulic fluid as needed.

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Section

702

SINGLE AND DOUBLE LEAF CHAIN ADJUSTMENT

RS5-34 Telescopic Handler

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GENERAL INFORMATION

It is necessary to retorque the front double chain assembly after fifty (50) hours of operation. Failure to do so may allow the single chain to become slack, which can result in the chain jumping off the sheave. If this occurs, it could result in severe damage to the intermediate boom section.

LEAF CHAIN ADJUSTMENT

STEP 1

With the engine running, lower the boom and level it according to the boom angle indicator, which should then read 0°.

STEP 2

Extend the boom to its maximum reach.

STEP 3

Retract the boom 6 inches (152 mm) to ensure that tension is being applied to the single chain.

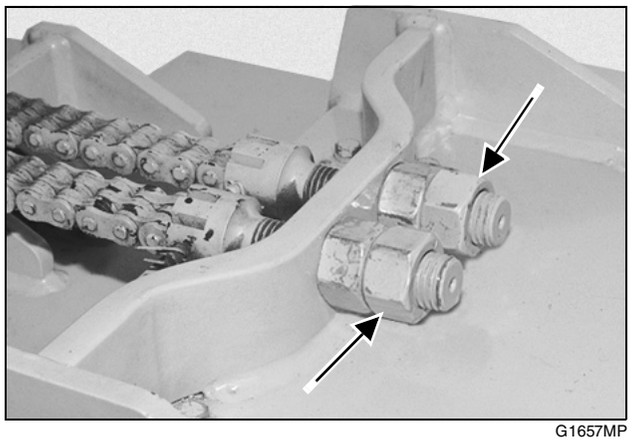
MANDATORY SAFETY SHUTDOWN PROCEDURE

BEFORE cleaning, adjusting, lubricating, or servicing this unit:

1. Stop machine on a level surface. (AVOID parking on a slope, but if necessary, park across the slope and block the tires.)
2. Fully retract the boom and lower the attachment tool to the ground. Idle engine for gradual cooling.
3. Place controls in neutral and apply parking brake.
4. Shut off the engine and remove the key.

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.

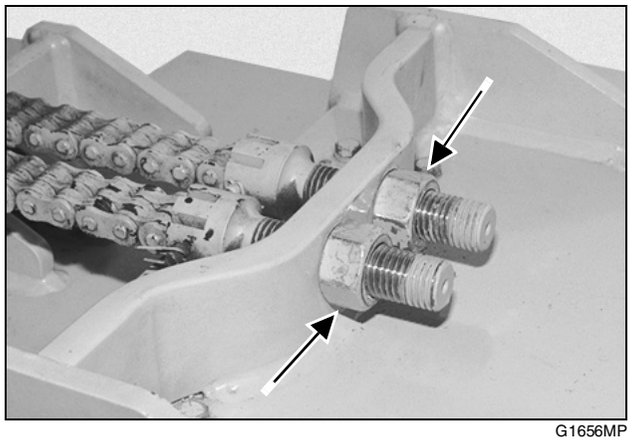
STEP 4



G1657MP

Loosen and remove the outer nut, from the chain clevis (both sides).

STEP 5



G1656MP

Torque each chain to 25 ft.-lbs. (34 Nm) using the inner nut.

STEP 6

Reinstall the outer nut and tighten against the inner nut. If either of the chains have twisted while torquing, use a wrench on the inner nut only to turn the nut and chain to its proper position.

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LEAF CHAIN MAINTENANCE

The maintenance procedure listed below will apply to all three chain assemblies, the front double-chain assembly, visible at the front of the boom, and the single-chain assembly, located inside the rear of the boom. To gain access the rear boom cover must be removed.

STEP 7

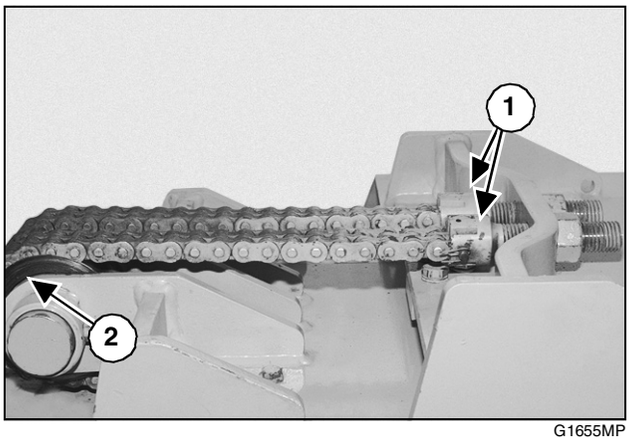
With the boom fully extended, inspect the double chains for cracked or broken plates, protruding or turned pins or excessive wear.

STEP 8

With a tape measure, measure sixteen links of chain that flexes over the sheaves. If the distance measured is 12.375 inch (314.3 mm) or more, the chain should be replaced. See Sections 704 and 705 of this manual for the correct single and double chain replacement procedures.

IMPORTANT: *Do not repair or replace sections of the single or double chain assembly; replace the complete assembly.*

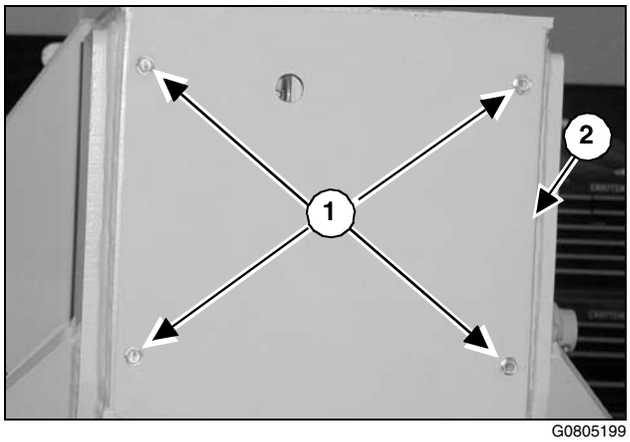
STEP 9



G1655MP

Inspect the clevis anchors (1) for broken pieces and wear. Check the sheaves (2) for worn flanges.

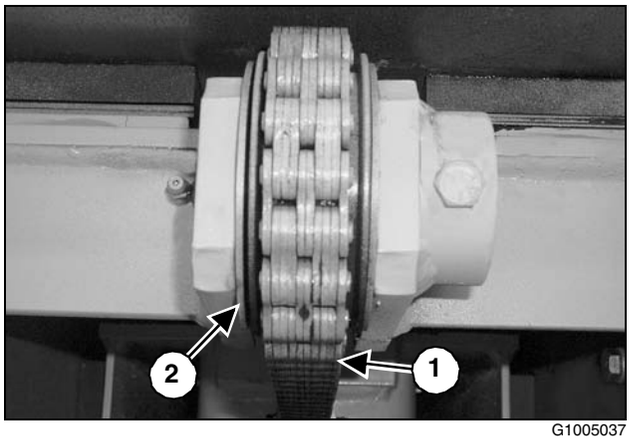
STEP 10



G0805199

Loosen and remove the four bolts (1) from the rear cover (2). Remove the cover from the boom.

STEP 11



G1005037

Inspect the single chain (1) for wear or broken pieces. Check the sheave (2) for worn flanges.

STEP 12

The single and double chains should be lubricated with 80/90 weight oil. Refer to the lubrication section of the Operator's Manual.

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Section

703

INNER BOOM SECTION REMOVAL AND INSTALLATION

RS5-34 Telescopic Handler

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MANDATORY SAFETY SHUTDOWN PROCEDURE

BEFORE cleaning, adjusting, lubricating, or servicing this unit:

1. Stop machine on a level surface. (AVOID parking on a slope, but if necessary, park across the slope and block the tires.)
2. Fully retract the boom and lower the attachment tool to the ground. Idle engine for gradual cooling.
3. Place controls in neutral and apply parking brake.
4. Shut off the engine and remove the key.

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 bodily injury.

RELIEVE HYDRAULIC OIL PRESSURE

1. Engage the park brake.
2. Lower equipment to the ground. Return the engine to idle for 30 seconds, then shut off the engine.
3. Turn the key switch on. Operate the joystick in each direction. Confirm that there is no attachment or unit movement. This should ensure there is no residual pressure trapped in the control circuit.

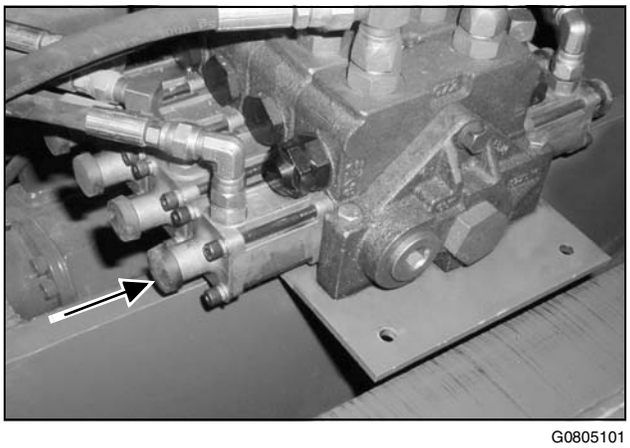
RELIEVING HYDRAULIC PRESSURE FROM THE TILT CYLINDER

1. Remove any attachments from the boom.
2. Extend boom approximately 12 inches and lower the boom onto a support stand.
3. Turn the key switch to the OFF position to shut down the engine. (See above Mandatory Safety Shutdown Procedure.)



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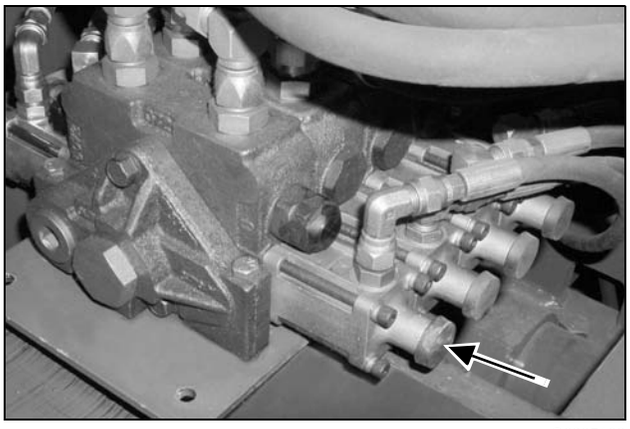
4. Remove the rear hood to allow access to the main control valve.



G0805101

5. Locate the attachment Tilt-Up section (rear section) on the left side of the control valve and remove the rubber boot. Using a screwdriver, turn the screw IN (clockwise) until it bottoms, then turn it OUT (counterclockwise) until it bottoms. Reinstall the rubber boot.

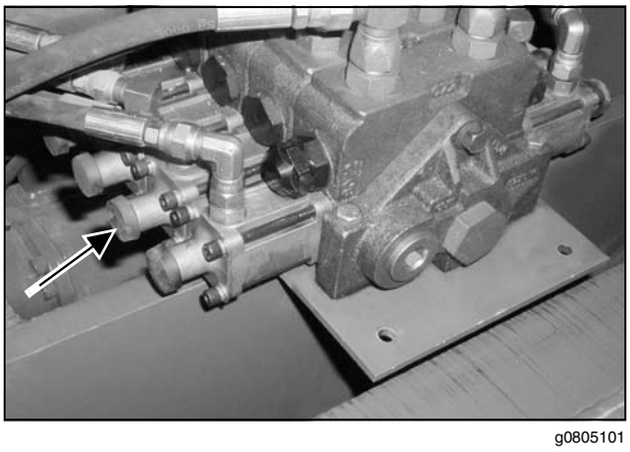
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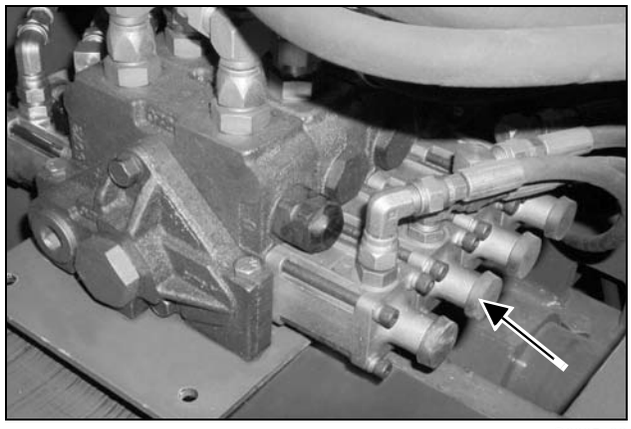
6. Locate the attachment Tilt-Down section (rear section) on the right side of the control valve and remove the rubber boot. Using a screwdriver, turn the screw IN (clockwise) until it bottoms, then turn it OUT (counterclockwise) until it bottoms. Reinstall the rubber boot.

RELIEVING HYDRAULIC PRESSURE FROM THE BOOM EXTEND CYLINDER



g0805101

7. Locate the attachment Boom-Extend section (third section) on the left side of the control valve and remove the rubber boot. Using a screwdriver, turn the screw IN (clockwise) until it bottoms, then turn it OUT (counterclockwise) until it bottoms. Reinstall the rubber boot.



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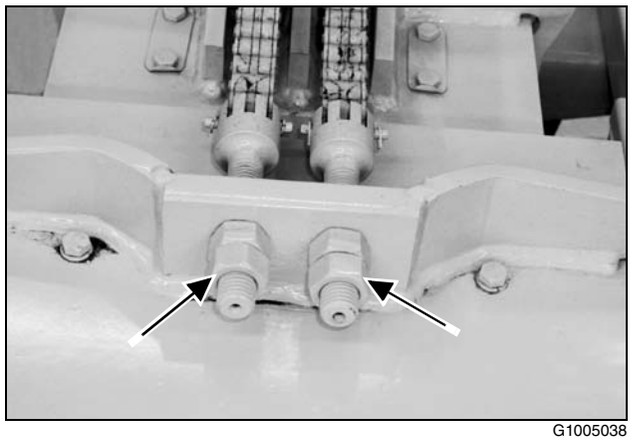
8. Locate the attachment Boom-Retract section (third section) on the right side of the control valve and remove the rubber boot. Using a screwdriver, turn the screw IN (clockwise) until it bottoms, then turn it OUT (counterclockwise) until it bottoms. Reinstall the rubber boot.

GENERAL INFORMATION

If slide pad replacement is required, see Section 707 of this manual for correct procedure.

INNER BOOM REMOVAL

STEP 1



G1005038

Loosen and remove the nuts from each clevis that secure the double chain to the outer boom.

STEP 2

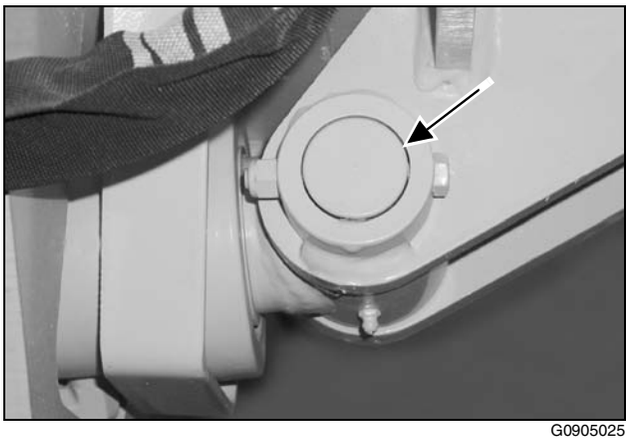
Position both ends of the double chain over the front of the inner boom.

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STEP 3

Push the inner boom into the intermediate boom 2 to 3 inches (50 - 76 mm) to relieve tension on the single chain.

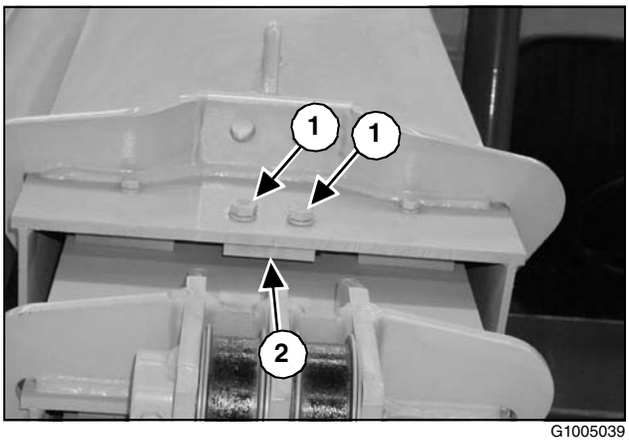
STEP 4



G0905025

Remove the front pivot pin from the extend cylinder. See Section 608 of this manual for correct procedure.

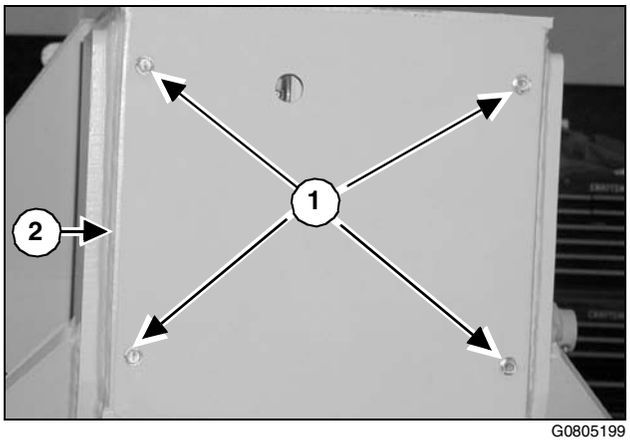
STEP 5



G1005039

Loosen and remove the two bolts (1) and washers that secure the single chain clevis block (2) to the outer boom.

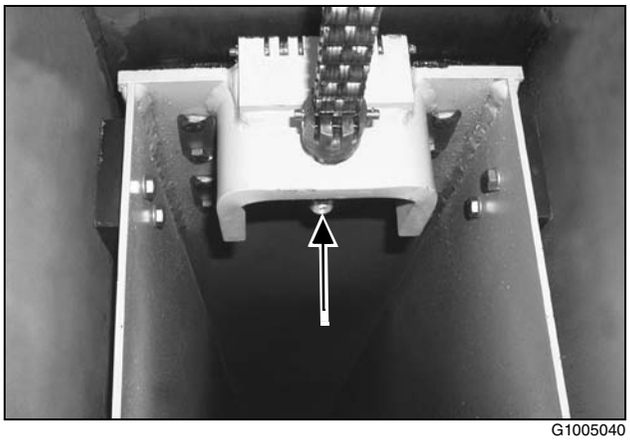
STEP 6



G0805199

Remove the four bolts (1) and the boom rear access cover (2).

STEP 7



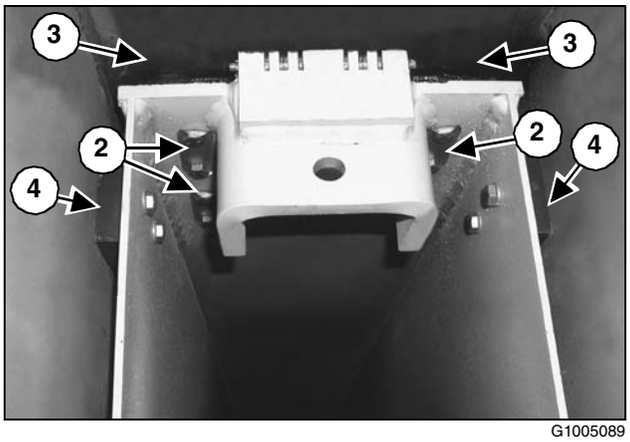
G1005040

Use a crow-foot wrench with a long extension to reach in and loosen the locking nut on the chain clevis. Once the locking nut is loosened, push the clevis forward and remove both nuts from the clevis. Do not remove the single chain from the machine.

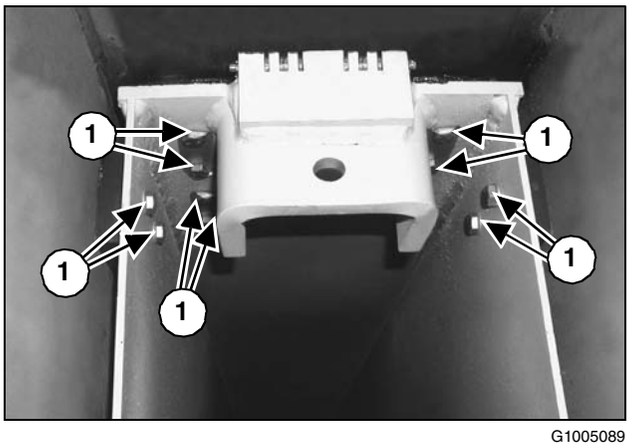
IMPORTANT: *If the slide pads are to be reused, they must be marked as to location and direction (front/rear/top/bottom) as they are removed. Wire tie the shims with each pad. Slide pads and shims must be reinstalled in their exact original positions. Refer to Section 707 of this manual for the correct procedure to install new replacement slide pads.*

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STEP 8



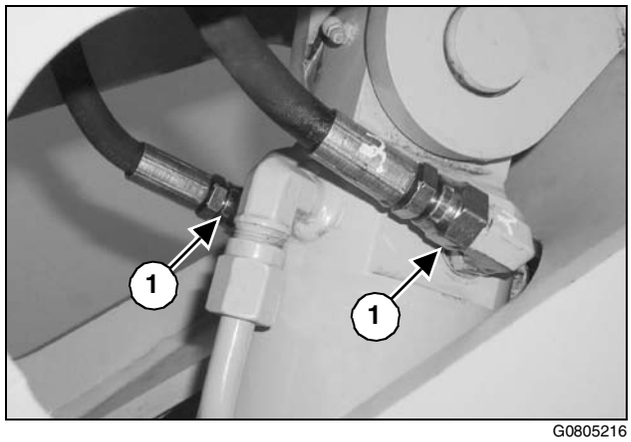
G1005089



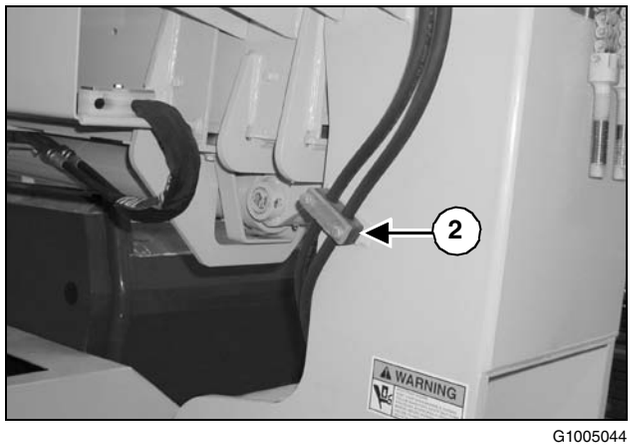
G1005089

Loosen and remove the bolts (1) and lockplates (2) and remove the two top slide pads and shims (3) and the two side slide pads and shims (4) from the rear of the inner boom.

STEP 9



G0805216



G1005044

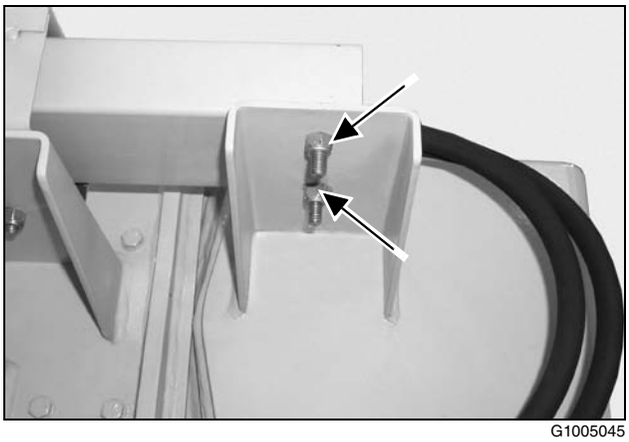
Mark the hydraulic hoses for correct assembly. Loosen and remove the two hoses (1) and the hose clamp (2).

STEP 10

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

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STEP 11



G1005045

Loosen and remove the nuts and bolts securing the hose tray to the inner boom bracket, and slide the hose tray back.

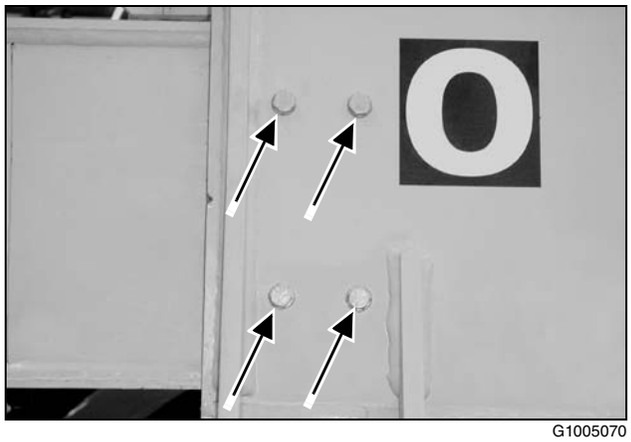
STEP 12



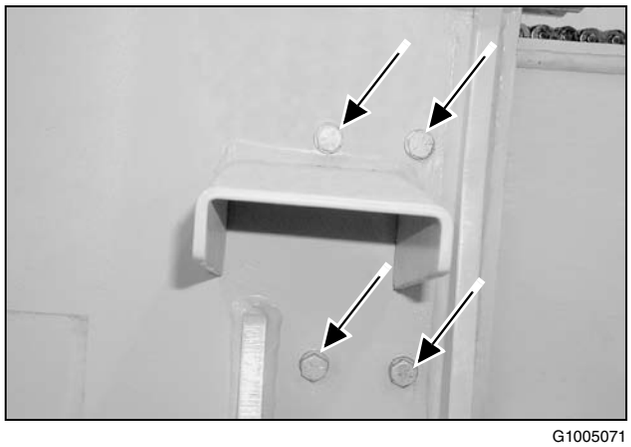
G1005086

Use a hoist and lifting strap around the inner boom section. Pull the inner boom section out from the intermediate section approximately 12 inches (300 mm).

STEP 13



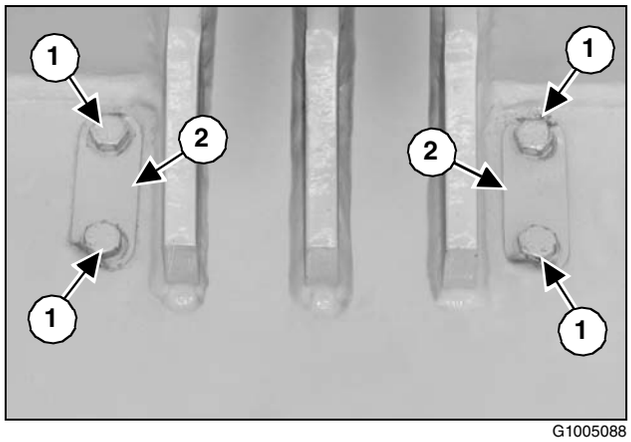
G1005070



G1005071

Loosen and remove the bolts, lock washers and remove the two side slide pads and shims from the intermediate boom (both sides).

STEP 14



G1005088

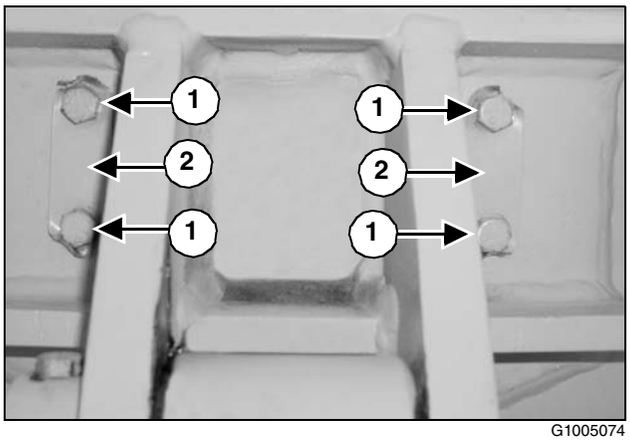
Loosen and remove the bolts (1), lock plates (2) and remove the two top slide pads and shims from the intermediate boom.

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STEP 15

Using the hoist and lifting strap, apply upward pressure on the inner boom.

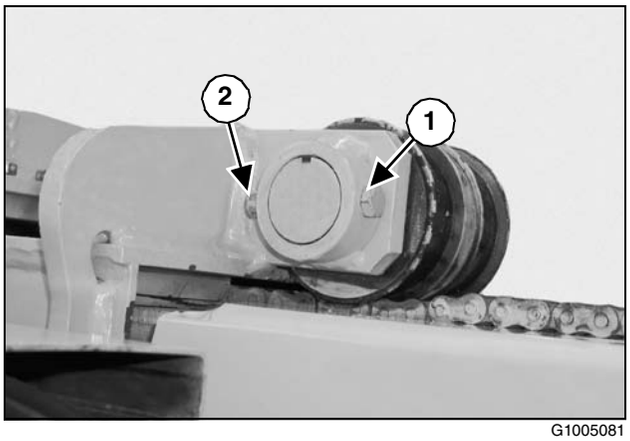
STEP 16



G1005074

Loosen and remove the bolts (1), lockplates (2) and remove the two bottom slide pads from the intermediate boom.

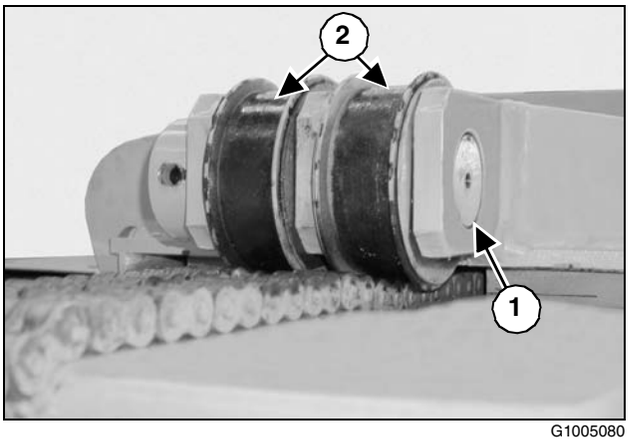
STEP 17



G1005081

Remove the retaining bolt (1) and nut (2) from the front sheave pin.

STEP 18



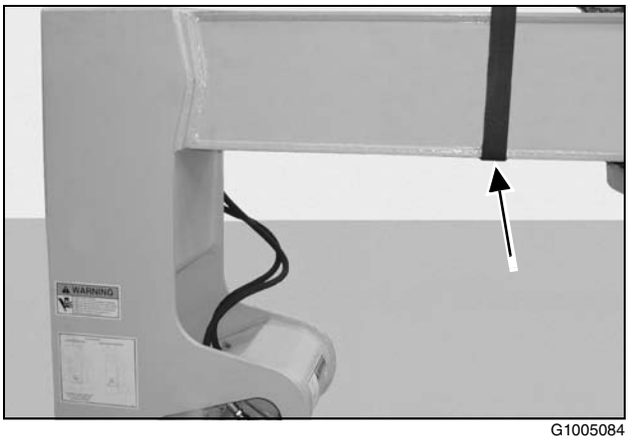
G1005080

Remove the front sheave pin (1) and the front chain sheave (2).

STEP 19

Begin sliding the inner boom section from the intermediate boom. Before the inner boom section is completely removed, put a wood block under the nose portion of the boom, and lower the inner boom so that the nose portion is resting on the block and remains level.

STEP 20



G1005084

Position the hoist and lifting strap on the inner boom 33 inches (840 mm) from the nose (as shown). This will allow a balanced lifting point.

NOTE: *Without any attachments on the boom.*

STEP 21

Remove the inner boom section from the intermediate boom.

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INNER BOOM INSTALLATION

STEP 22



G1623MP

With the inner boom section removed, apply grease to the inside bottom and top surfaces of the intermediate boom section where the pads of the inner boom will contact when assembled. Use a brush attached to a rod or pole (as shown) to reach inside the boom.

STEP 23

Install the inner boom section into the intermediate boom.

STEP 24



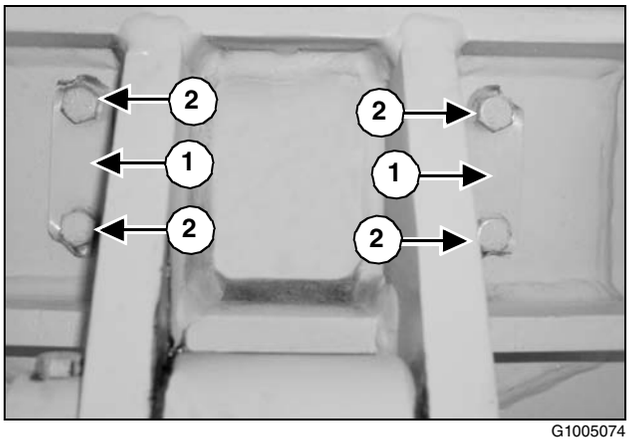
G1005090

Slide the inner boom section into the intermediate boom up to the balance point, then reposition the lifting strap and slide the inner boom in until there is approximately 12 inches (300 mm) of the inner boom sticking out of the intermediate boom.

STEP 25

Using the hoist and lifting strap, apply upward pressure to the inner boom.

STEP 26



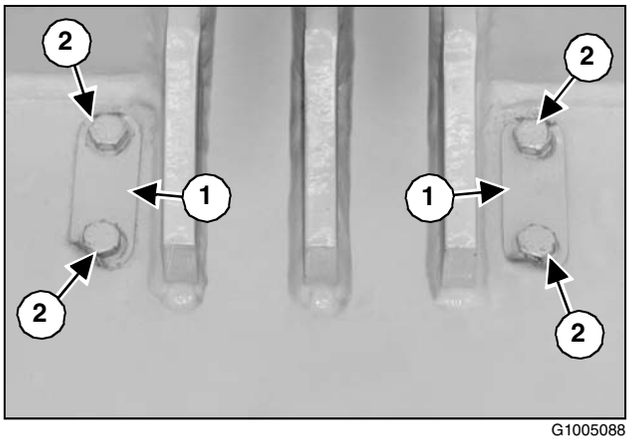
G1005074

Reinstall the two bottom slide pads on the intermediate boom, using the lock plates (1) and bolts (2). Use Loctite™ 271 (red) Thread Lock (or equivalent) on the threads of the bolts and torque to 30 ft.-lbs. (41 Nm. Bend up each end of the lock plates.

STEP 27

Using the hoist and lifting strap, lower the inner boom slightly.

STEP 28

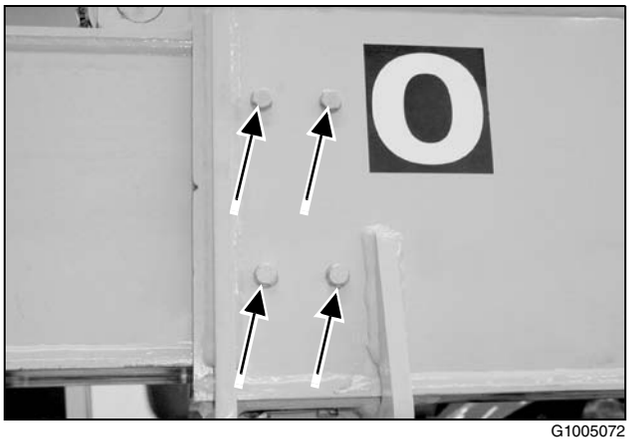


G1005088

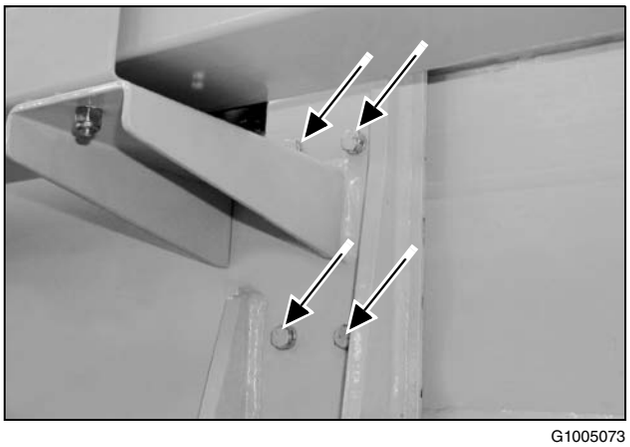
Reinstall the two top slide pads and shims on the front of intermediate boom, using the lock plates (1) and bolts (2). Use Loctite™ 271 (red) Thread Lock (or equivalent) on the threads of the bolts and torque to 30 ft.-lbs. (41 Nm).

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STEP 29



G1005072



G1005073

Reinstall the two side slide pads and shims on the front of intermediate boom (both sides), using the lock washers and bolts. Use Loctite™ 271 (red) Thread Lock (or equivalent) on the threads of the bolts and torque to 30 ft.-lbs. (41 Nm).

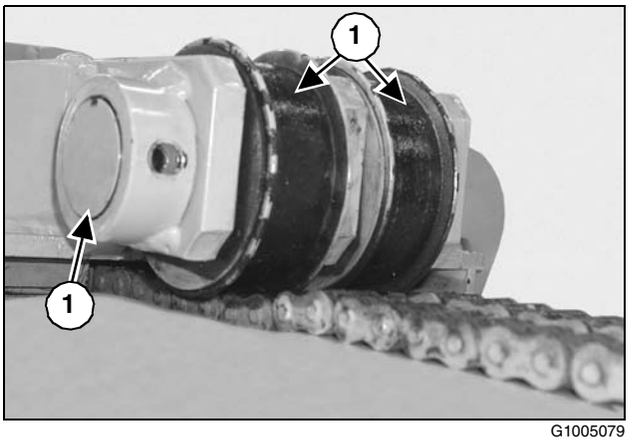
STEP 30

Remove the lifting strap and hoist from the inner boom.

STEP 31

Push the intermediate and inner boom fully into the main boom, this will allow enough room to reinstall the single chain.

STEP 32

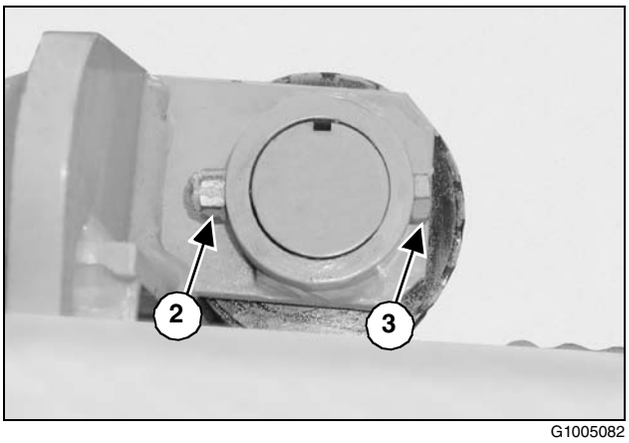


G1005079

Install the front chain sheave (1) and sheave pin (2).

NOTE: *Ensure that the retainer bolt hole in the sheave pin is aligned with the retainer bolt hole in the frame.*

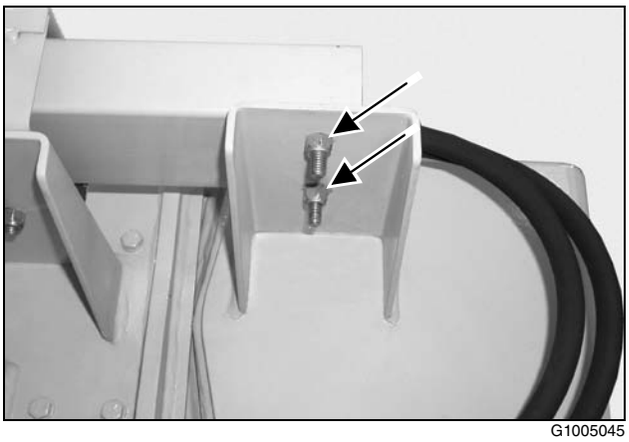
STEP 33



G1005082

Install sheave pin retaining bolt (1) and lock nut (2).

STEP 34



G1005045

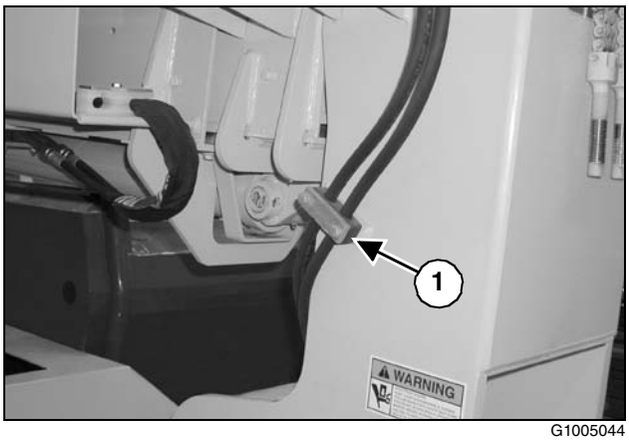
Reinstall the hose tray using the nuts and bolts.

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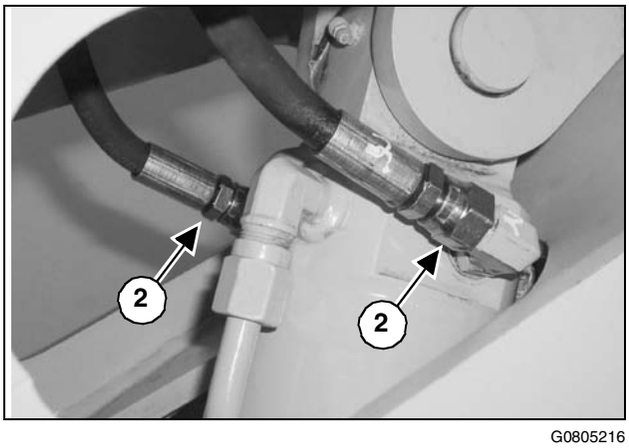
STEP 35

Remove the caps and plugs from the hydraulic fittings.

STEP 36



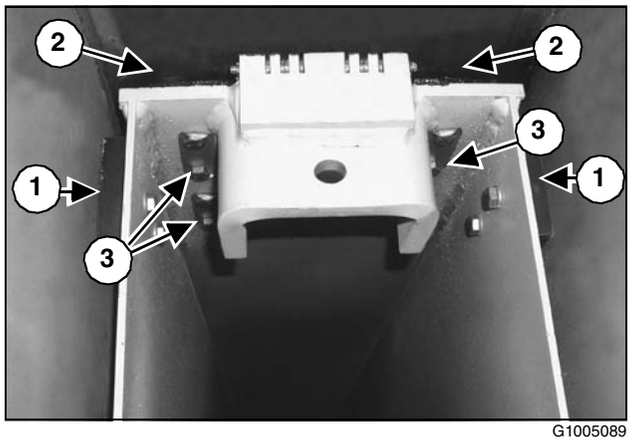
G1005044



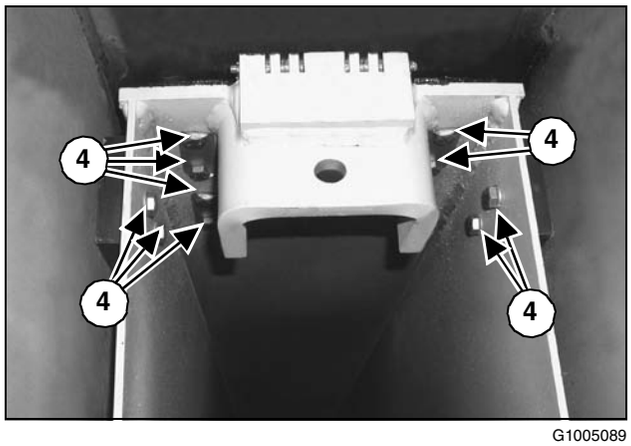
G0805216

Install the hose clamp (1) and reconnect the two hydraulic hoses (2) to the tilt cylinder.

STEP 37



G1005089

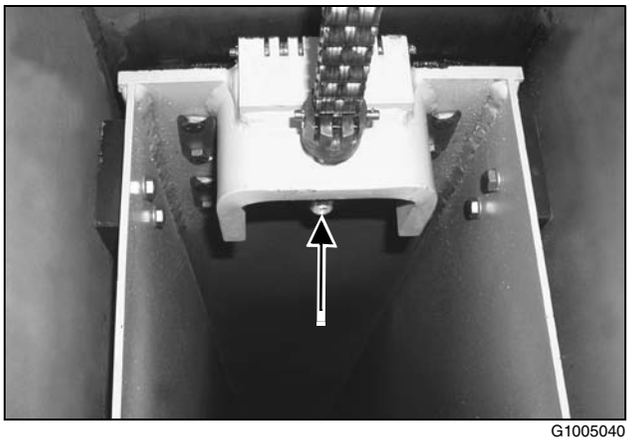


G1005089

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

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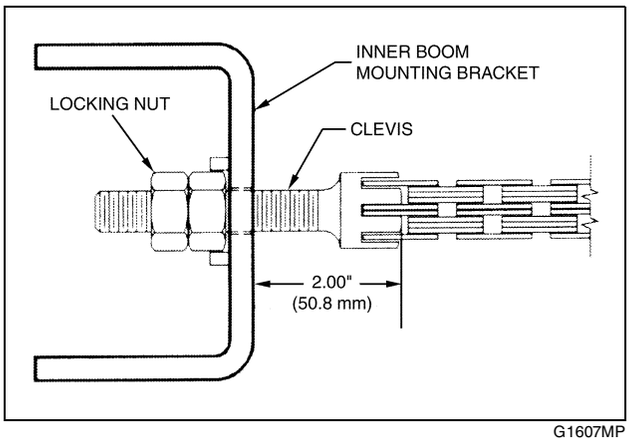
STEP 38



G1005040

Reinstall one of the nuts on the single chain clevis so that about 2 inches (50.8 mm) of the clevis is extending from the mounting bracket on the inner boom.

STEP 39

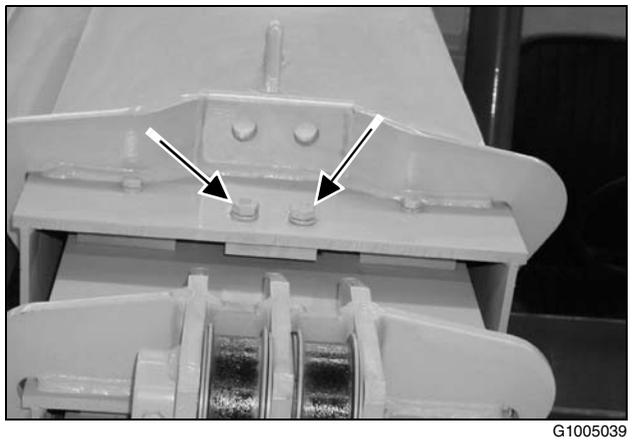


G1607MP

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 boom setting 2 inches (50.8 mm) dimension shown.

Install the locking nut.

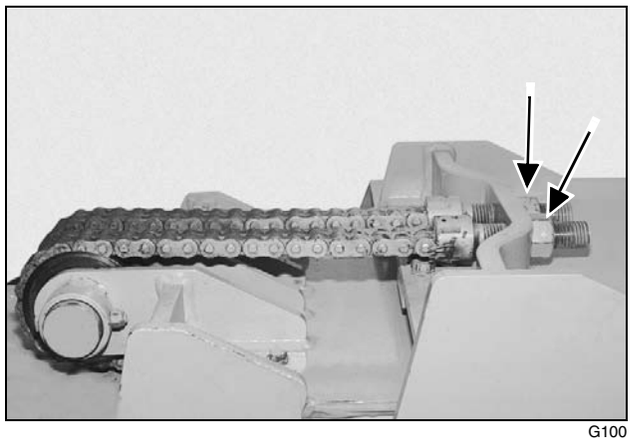
STEP 40



G1005039

Reinstall the two bolts and washers to secure the single chain clevis block to the outer boom. Use Loctite™ 271 (red) Thread Lock (or equivalent) on the threads of the bolts.

STEP 41

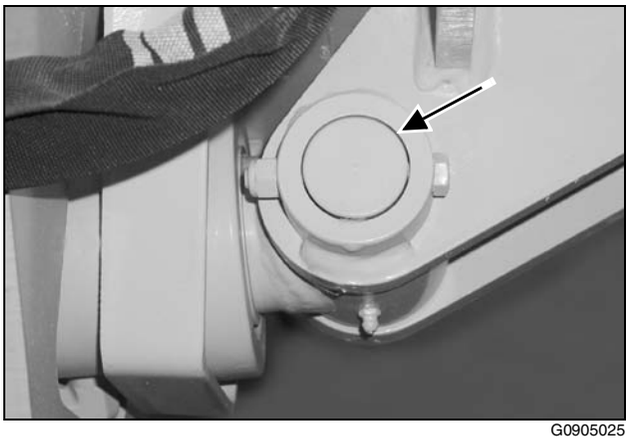


G100

Reinstall the double chain to the outer boom using the nuts. See Section 702 “Leaf Chain Adjustment Procedure” in this manual to apply the final torque to the double chain assembly.

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STEP 42



G0905025

Position the extend cylinder and install the pivot pin in the rod end of the cylinder. See Section 608 of this manual for correct procedures.

STEP 43

Start the engine and check boom operation in a clear area.

STEP 44

Shut down the engine and check for hydraulic fluid leaks. Correct any leakage problems found and add hydraulic fluid as required.

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Section

704

TELESCOPING BOOM DOUBLE CHAIN AND ROLLER BEARING REPLACEMENT

RS5-34 Telescopic Handler

PRINTED IN U.S.A.

913241

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DOUBLE CHAIN ROLLER BEARING INSTALLATION 4

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DOUBLE CHAIN ROLLER BEARING REMOVAL

STEP 1

With the engine running, retract the telescoping boom and level it according to the boom angle indicator, which should read “0”.

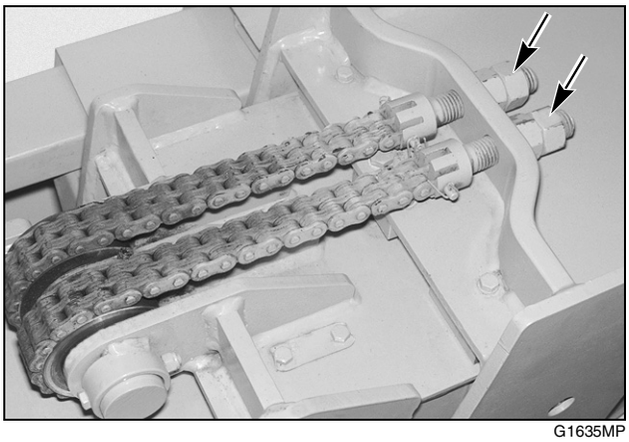
MANDATORY SAFETY SHUTDOWN PROCEDURE

BEFORE cleaning, adjusting, lubricating, or servicing this unit:

1. Stop machine on a level surface. (AVOID parking on a slope, but if necessary, park across the slope and block the tires.)
2. Fully retract the boom and lower the attachment tool to the ground. Idle engine for gradual cooling.
3. Place controls in neutral and apply parking brake.
4. Shut off the engine and remove the key.

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.

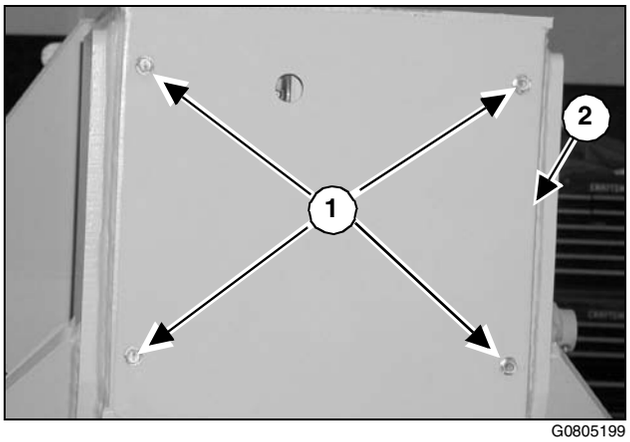
STEP 2



G1635MP

Remove the four nuts that secure the clevises of the double chain assembly to the outer boom. Hang both chains over the front of the inner boom.

STEP 3



G0805199

Loosen and remove the four bolts (1) from the rear cover (2) and remove the cover from the boom.

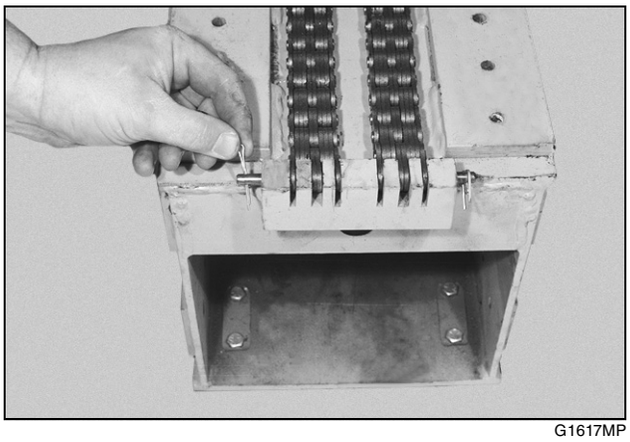
STEP 4

Relieve the hydraulic pressure and remove the extend cylinder front pivot pin. See Section 608 in this manual for correct procedure.

STEP 5

Remove the inner boom section from the intermediate boom section. See Section 703 in this manual for correct procedure.

STEP 6

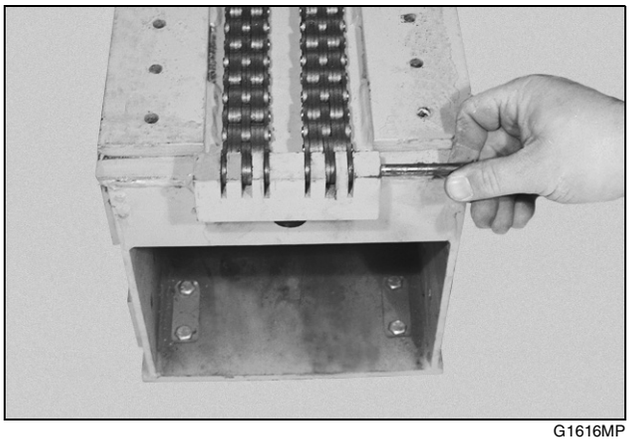


G1617MP

Remove one cotter pin from the clevis pin at the rear of the inner boom.

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STEP 7



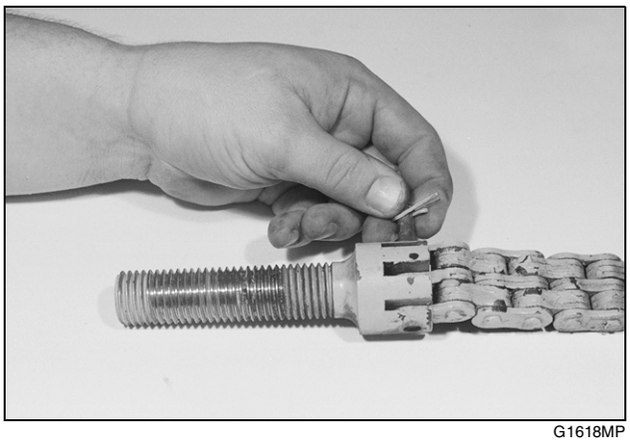
G1616MP

Remove the clevis pin from the chain.

STEP 8

Remove both chains.

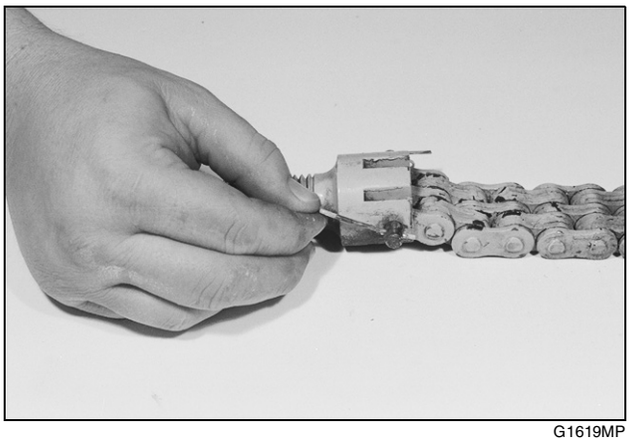
STEP 9



G1618MP

Remove the adjustment clevis from the old chain by removing one cotter pin and the retainer pin.

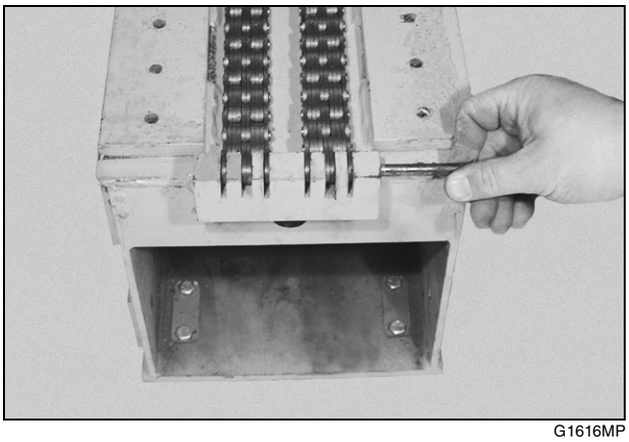
STEP 10



G1619MP

Install the adjustment clevis on to the new chain using the retainer pin and one cotter pin.

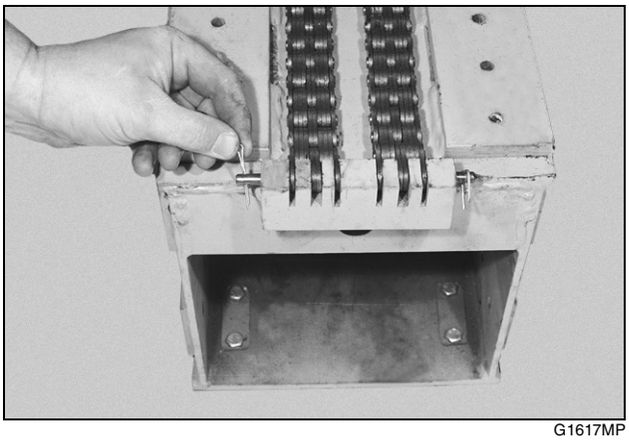
STEP 11



G1616MP

Position the chain in the clevis at the rear of the inner boom section. Install the retainer pin.

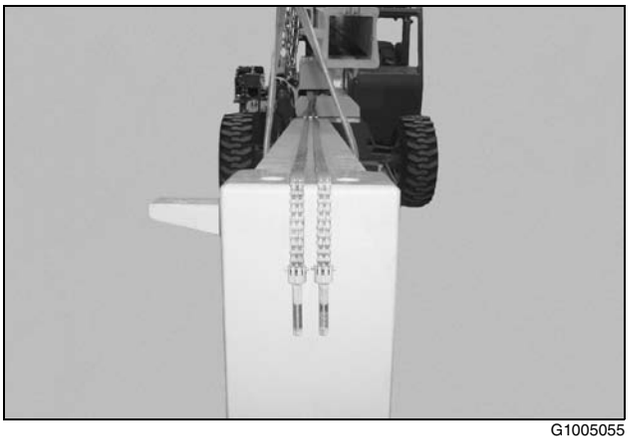
STEP 12



G1617MP

Install the cotter pin in the chain retainer pin.

STEP 13



G1005055

Lay the double chain on top of the inner boom section and stretch along the length of the inner boom section with the clevis ends hanging over the front of the boom nose.

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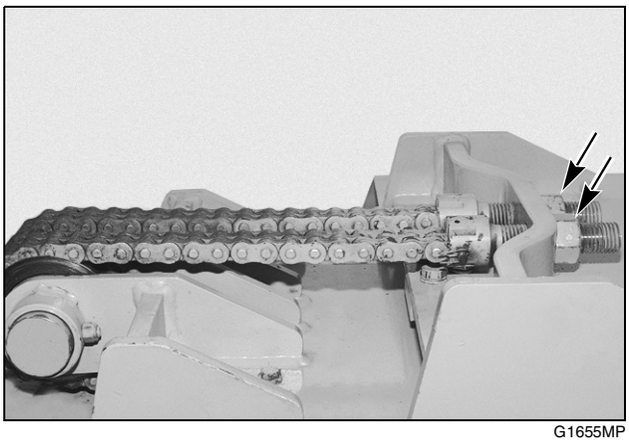
STEP 14

Reinstall the inner boom section into the intermediate boom section. See Section 703 in this manual for correct procedure.

STEP 15

Reinstall the extend cylinder forward pivot pin. See Section 608 in this manual for correct procedure.

STEP 16



G1655MP

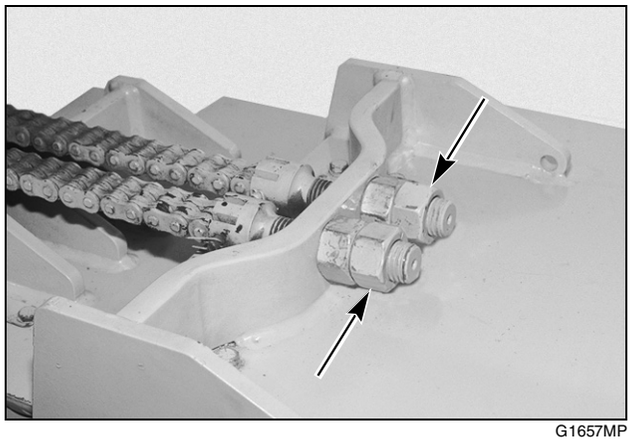
The inner boom section must be fully installed. Pull the double chain assemblies up and over the sheaves and place each clevis through the mounting holes in the outer boom section, securing it with one nut.

NOTE: *Check the condition of the sheave and roller bearing at this time. Proceed to Step 22 if repair is required.*

STEP 17

Torque the double chains. See Section 702 in this manual for correct procedure.

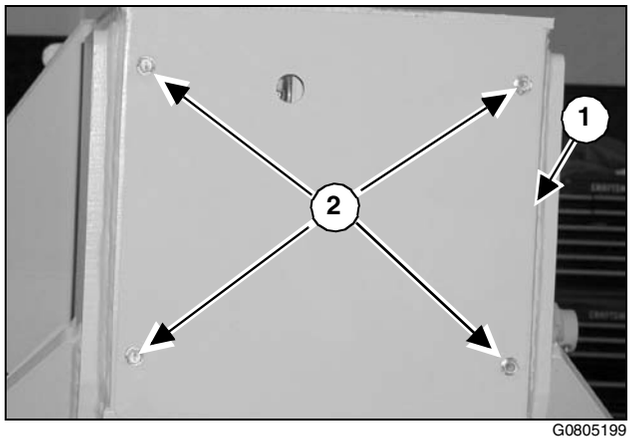
STEP 18



G1657MP

Install the lock nut on each clevis.

STEP 19



G0805199

Reinstall the cover (1) on the rear of the boom with the four bolts (2).

STEP 20

Start the engine and check boom operation in a clear area.

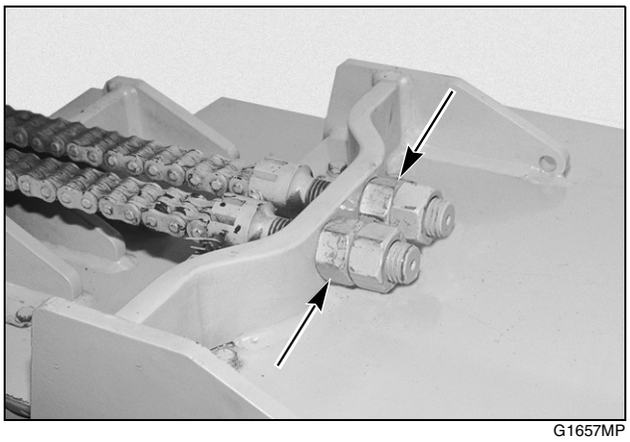
STEP 21

Shut down the engine and check for hydraulic fluid leaks. Correct any leakage found.

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DOUBLE CHAIN ROLLER BEARING INSTALLATION

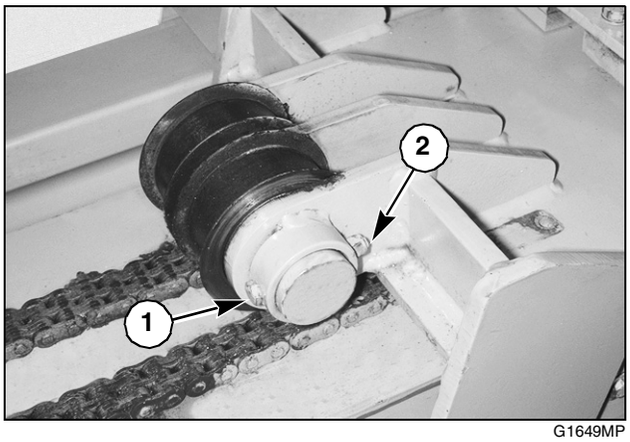
STEP 22



G1657MP

Remove the four nuts that secure the clevises of the double chain assembly to the outer boom section. Hang both chains over the front of the inner boom section.

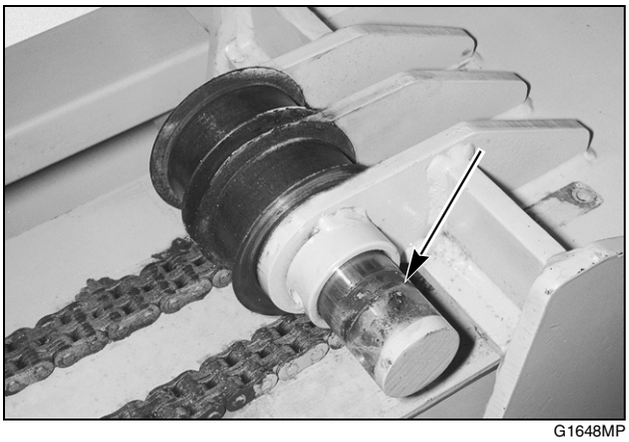
STEP 23



G1649MP

Loosen and remove the bolt (1) and nut (2) from the front sheave pin.

STEP 24



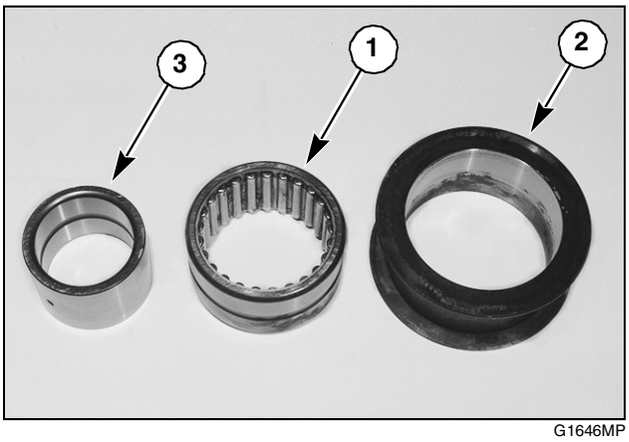
G1648MP

Remove the sheave pin.

STEP 25

Remove the roller bearings.

STEP 26

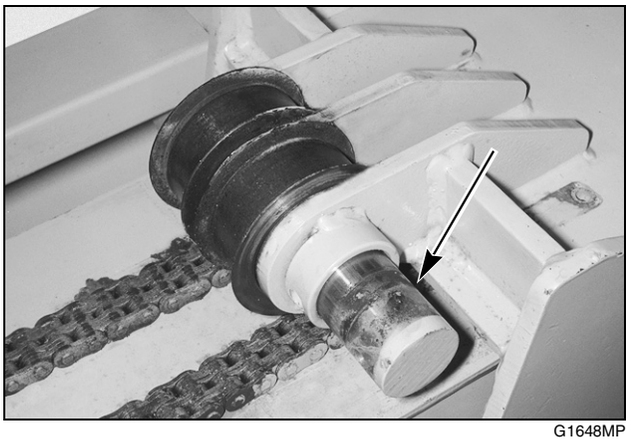


G1646MP

The two roller bearings and sheave should be assembled before installing them. Press the roller bearing (1) into the sheave (2). Apply grease to the inside of the roller bearing, then insert the inner ring (3) into the roller bearing.

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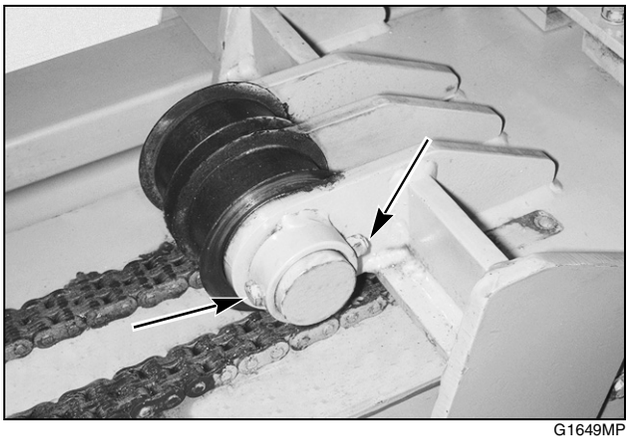
STEP 27



G1648MP

Place the roller bearing assemblies between the sections of the mount, then insert the pin. Be sure the retainer bolt holes are lined up.

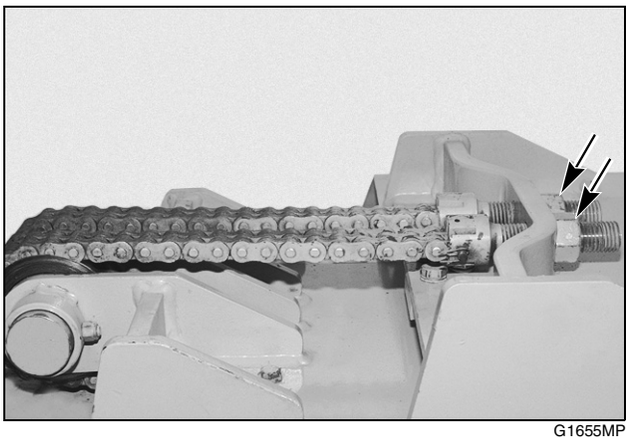
STEP 28



G1649MP

Install the retainer bolt and nut through the pin and tighten.

STEP 29



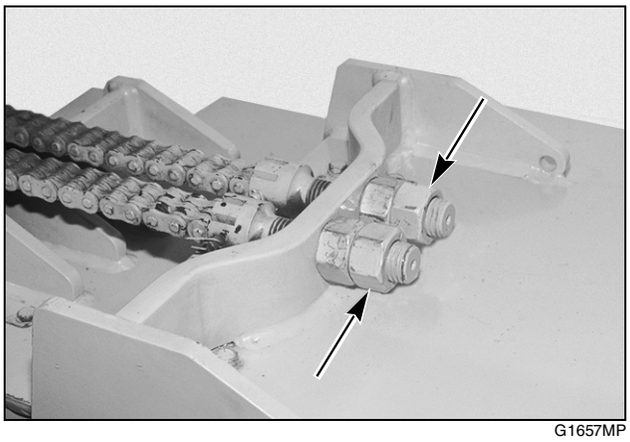
G1655MP

Pull the double chain assembly up and over the sheaves and place each clevis through the mounting holes in the outer boom securing it with one nut.

STEP 30

Torque the double chains. See Section 702 of this manual for correct procedure.

STEP 31



G1657MP

Install the lock nut on each clevis.

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Section

705

TELESCOPING BOOM SINGLE CHAIN AND ROLLER BEARING REPLACEMENT

RS5-34 Telescopic Handler

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INSTALLATION 3
SINGLE CHAIN ROLLER BEARING REPLACEMENT 5

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REMOVAL

STEP 1

With the engine running, retract the telescoping boom and level it according to the boom angle indicator, which should read “0”.

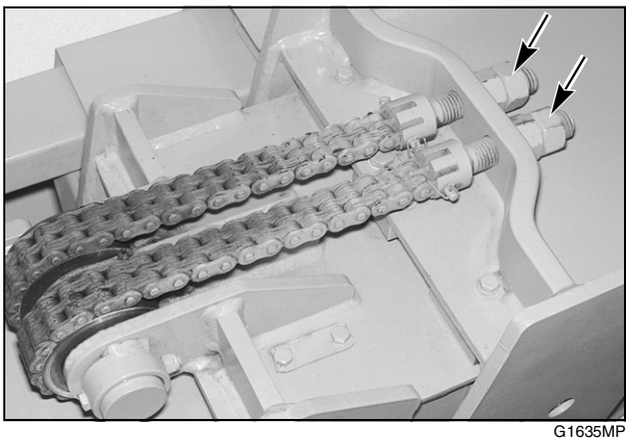
MANDATORY SAFETY SHUTDOWN PROCEDURE

BEFORE cleaning, adjusting, lubricating, or servicing this unit:

1. Stop machine on a level surface. (AVOID parking on a slope, but if necessary, park across the slope and block the tires.)
2. Fully retract the boom and lower the attachment tool to the ground. Idle engine for gradual cooling.
3. Place controls in neutral and apply parking brake.
4. Shut off the engine and remove the key.

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.

STEP 2



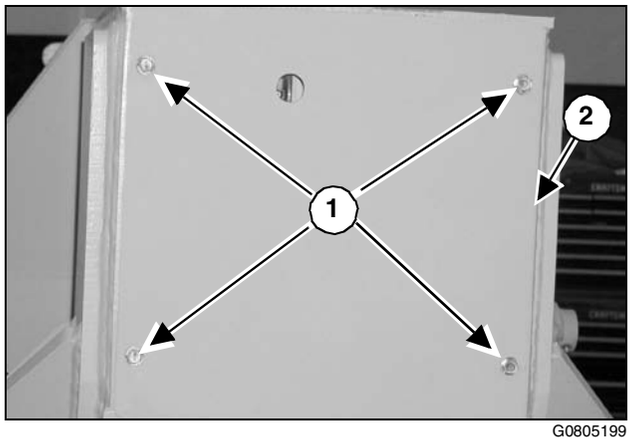
G1635MP

Remove the four nuts that secure the clevises of the double chain assembly to the outer boom. Hang both chains over the front of the inner boom.

STEP 3

Push the inner boom into the intermediate boom 2 to 3 inches (50 to 76 mm) to relieve tension on the single chain.

STEP 4



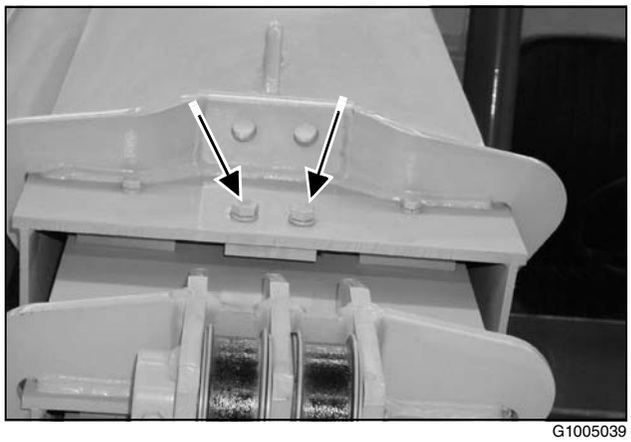
G0805199

Loosen and remove the four bolts (1) from the rear cover (2) and remove the cover from the boom.

STEP 5

Relieve the hydraulic pressure and remove the extend cylinder front pivot pin. See Section 608 of this manual for correct procedure.

STEP 6

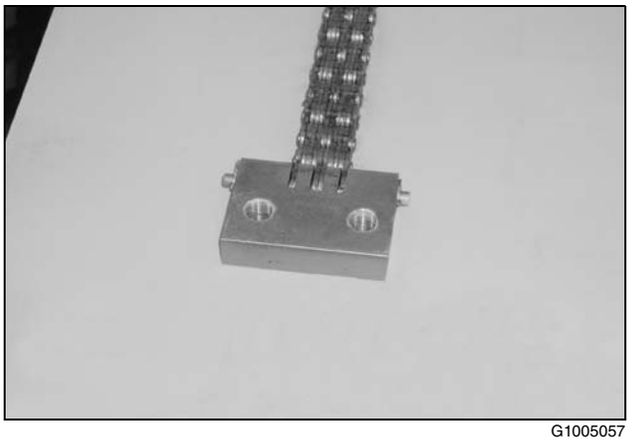


G1005039

Loosen and remove the two bolts and washers that secure the single chain clevis block to the outer boom.

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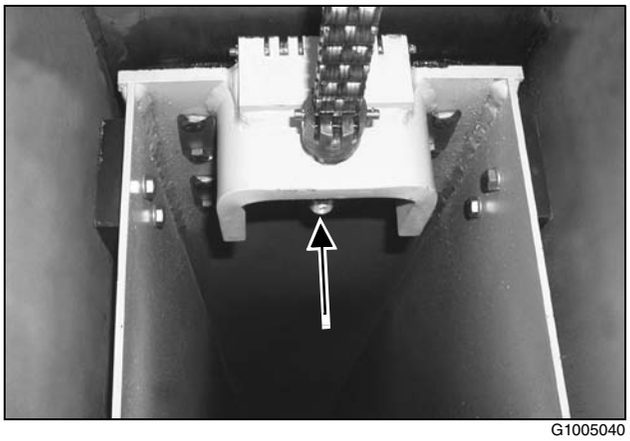
STEP 7



G1005057

Pull the clevis block forward slightly and tie a long rope to the clevis block to aid in single chain installation.

STEP 8



G1005040

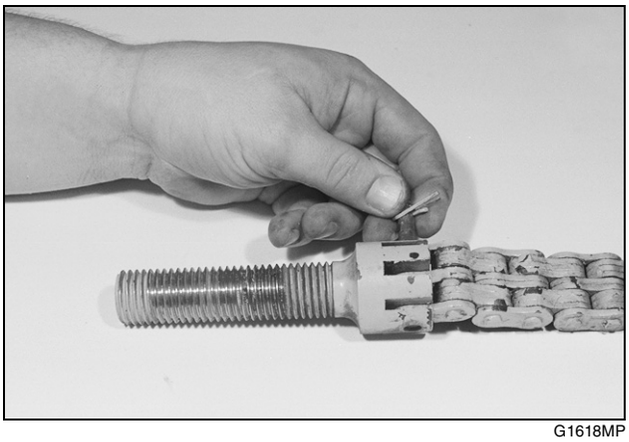
Use a crowfoot wrench with a long extension to reach in and loosen the locking nut on the clevis. Once the locking nut is loosened, push the clevis forward and remove both nuts from the clevis.

STEP 9

Remove the single chain by pulling out from the rear of the boom. Remove the rope from the single chain clevis, and leave the rope in place for single chain installation.

NOTE: *Check the condition of the sheave and roller bearing at this time. Proceed to Step 26 if repair is required.*

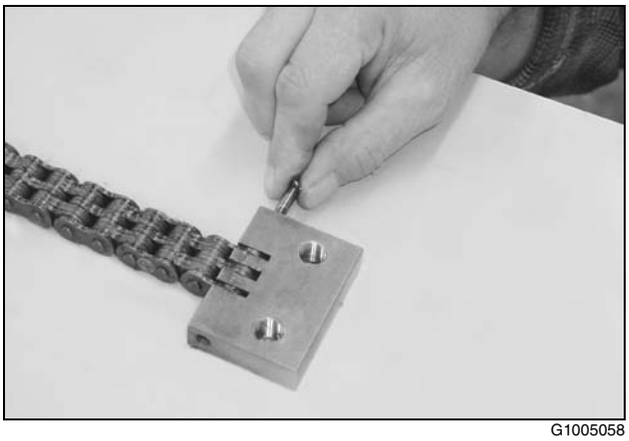
STEP 10



G1618MP

Remove the adjustment clevis from the old chain by removing one cotter pin and the retainer pin.

STEP 11



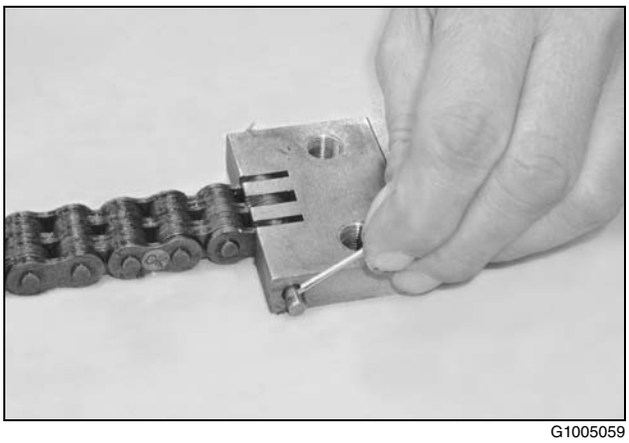
G1005058

Remove the clevis block from the old chain by removing one cotter pin and the retainer pin.

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INSTALLATION

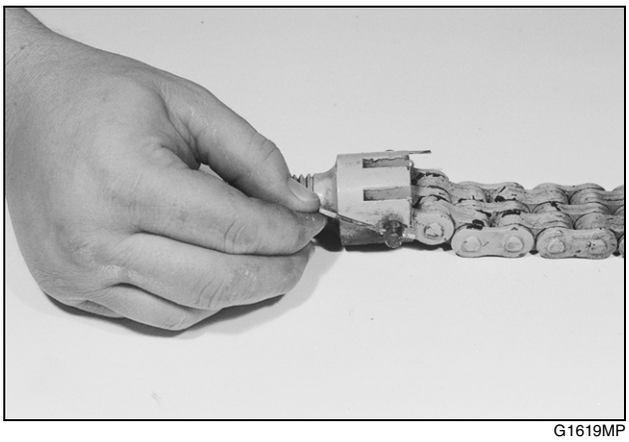
STEP 12



G1005059

Install the clevis block on the new chain using the retainer pin and cotter pin.

STEP 13



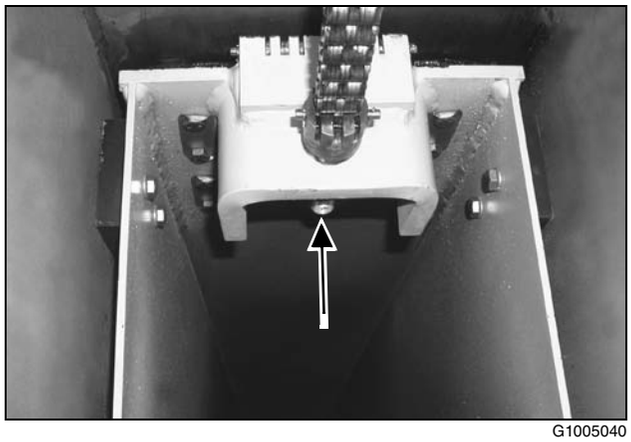
G1619MP

Install the adjustment clevis on the new chain using the retainer pin and cotter pin.

STEP 14

Attach the rope to the clevis block on the new chain. Have an assistant (at the front of the boom) pull the new chain in place with the rope while you guide the chain into position.

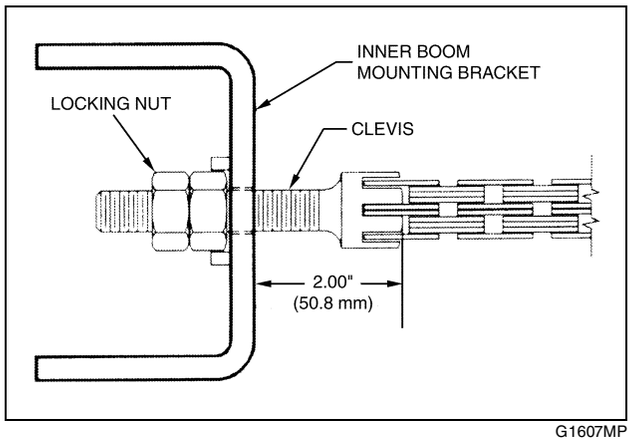
STEP 15



G1005040

Position the single chain over the bearing and insert the clevis end into the mounting hole at the rear of the inner boom section. Install the first nut onto the single chain clevis so that 2 inches (50.8 mm) of the clevis is extending from the mounting bracket on the inner boom.

STEP 16

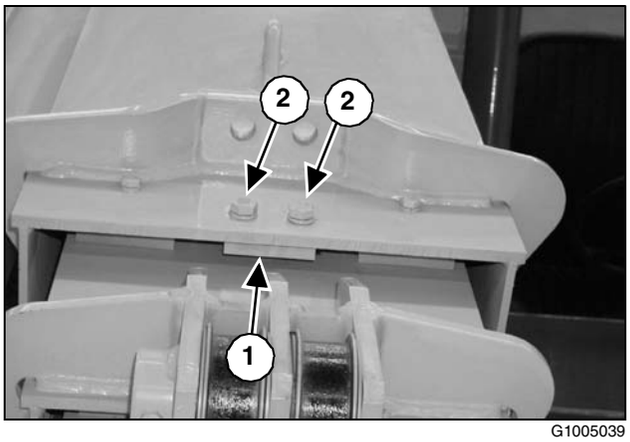


G1607MP

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 dimension shown.

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STEP 17



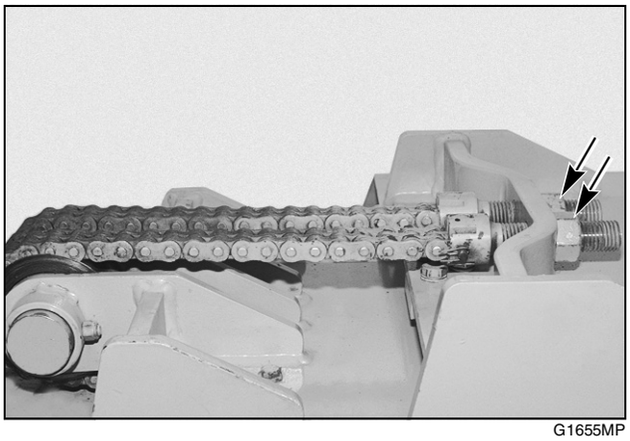
G1005039

Install the clevis block (1) to the outer boom using the two bolts and washers (2). Use Loctite™ 271 (red) Thread Lock (or equivalent) on the threads of the bolts.

STEP 18

Pull the inner boom out of the intermediate boom as far as the single chain will allow to remove any chain slack.

STEP 19



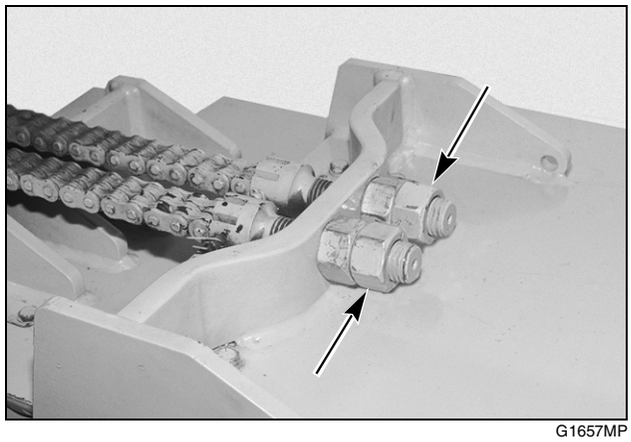
G1655MP

Pull the double chain assemblies up and over the sheaves and place each clevis through the mounting holes in the outer boom, securing each with one nut.

STEP 20

Torque the double chains. See Section 702 of this manual for correct procedure.

STEP 21



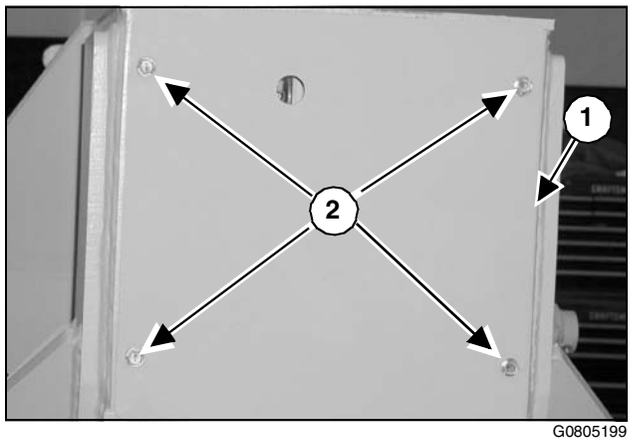
G1657MP

Install the lock nut on each clevis.

STEP 22

Reinstall the extend cylinder front pivot pin into the inner boom. See Section 608 of this manual for correct procedure.

STEP 23



G0805199

Reinstall the cover (1) on the rear of the boom with the four bolts (2).

STEP 24

Start the engine and check boom operation in a clear area.

STEP 25

Shut down the engine and check for hydraulic fluid leaks. Correct any leakage found.

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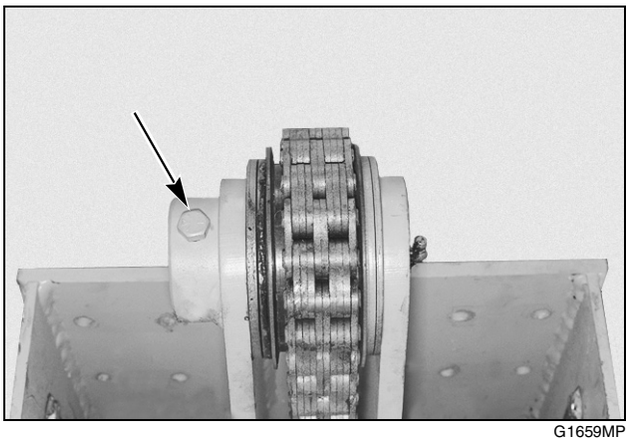
SINGLE CHAIN ROLLER BEARING REPLACEMENT

STEP 26

Remove the inner boom section. See Section 703 of this manual for correct procedure.

NOTE: *The inner boom section must be removed from the intermediate boom section to gain enough space to remove the sheave pin for the single chain.*

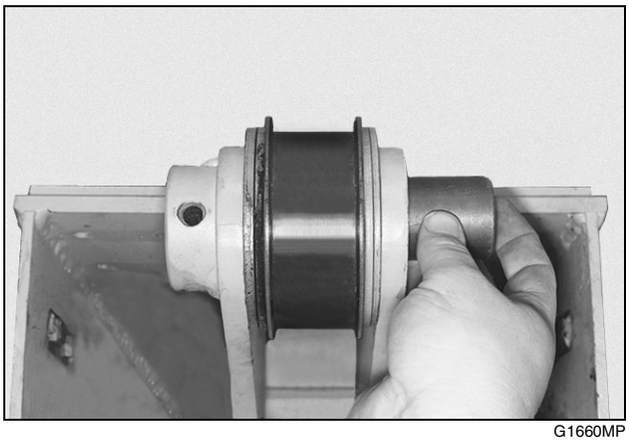
STEP 27



G1659MP

Loosen and remove the retainer bolt and nut from the rear sheave pin. Remove the single chain from the sheave pulley and position the single chain out of the way.

STEP 28



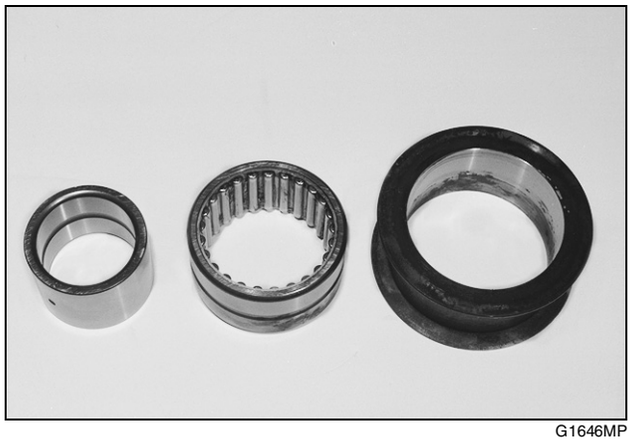
G1660MP

Remove the grease fitting from the sheave pin. Remove the sheave pin from the roller bearing.

STEP 29

Remove the roller bearing.

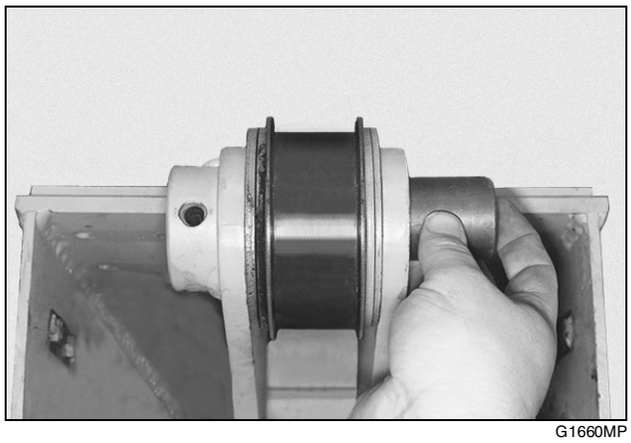
STEP 30



G1646MP

The roller bearing and sheave should be assembled before installing. Press the roller bearing into the sheave, apply grease to the inside of the roller bearing, and then insert the inner ring into the roller bearing.

STEP 31

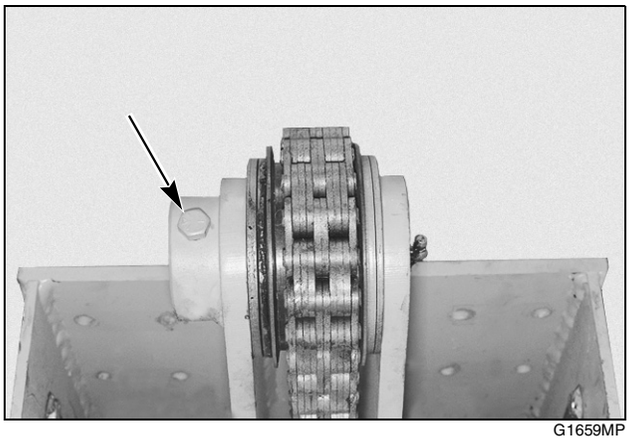


G1660MP

Place the roller bearing assembly between the sections of the mount, then insert the pin. Be sure the retainer bolt holes are lined up.

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STEP 32



G1659MP

Install the retainer bolt and nut through the pin and tighten. Reposition the single chain over the sheave pulley.

STEP 33

Reinstall the inner boom section, See Section 703 of this manual for correct procedure.

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Section

706

INTERMEDIATE BOOM SECTION REMOVAL AND INSTALLATION

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MANDATORY SAFETY SHUTDOWN PROCEDURE

BEFORE cleaning, adjusting, lubricating, or servicing this unit:

1. Stop machine on a level surface. (AVOID parking on a slope, but if necessary, park across the slope and block the tires.)
2. Fully retract the boom and lower the attachment tool to the ground. Idle engine for gradual cooling.
3. Place controls in neutral and apply parking brake.
4. Shut off the engine and remove the key.

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 bodily injury.

GENERAL INFORMATION

If slide pad replacement is required, see Section 707 of this manual for correct procedure.

INTERMEDIATE BOOM REMOVAL

STEP 1

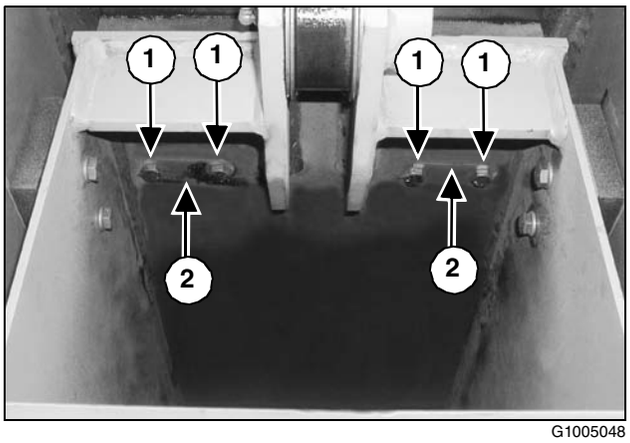


G1005084

Remove the inner boom section from the intermediate boom. See Section 703 of this manual for correct procedure.

IMPORTANT: *If the slide pads are to be reused, they must be marked as to location and direction (front/rear/top/bottom) as they are removed. Wire tie the shims with each pad. Slide pads and shims must be reinstalled in their exact original position. Refer to Section 707 of this manual for the correct procedure to install new replacement slide pads.*

STEP 2



G1005048

Loosen and remove the bolts (1) and lock plates (2) from the two top slide pads on the rear of the intermediate boom.

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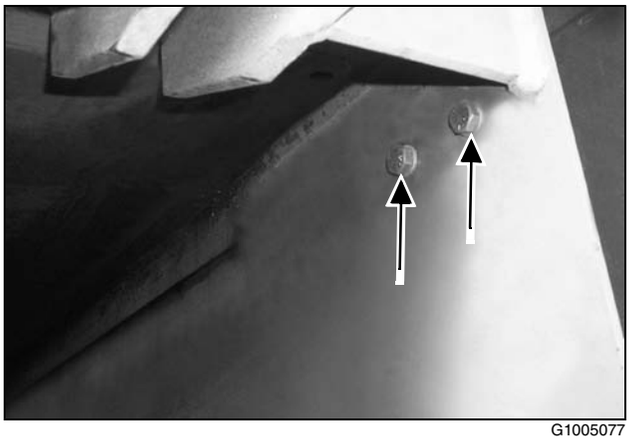
STEP 3



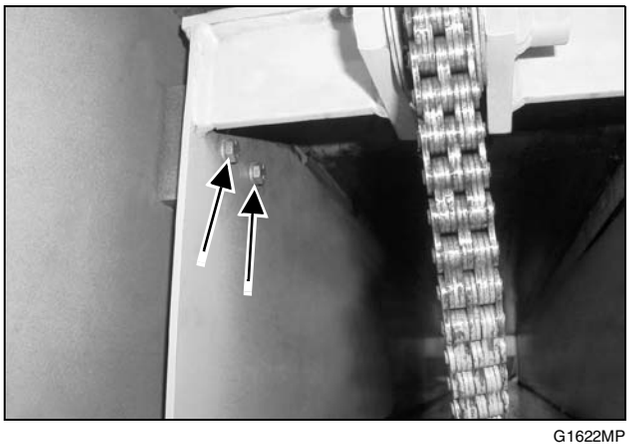
G1005050

Remove the two top slide pads and shims from the rear of the intermediate boom.

STEP 4



G1005077



G1622MP

Loosen and remove the bolts from the two side slide pads on the rear of the intermediate boom.

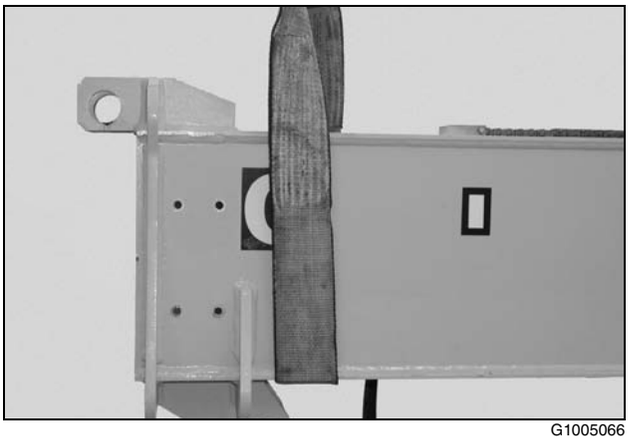
STEP 5



G1005051

Remove the two side slide pads and shims from the rear of the intermediate boom.

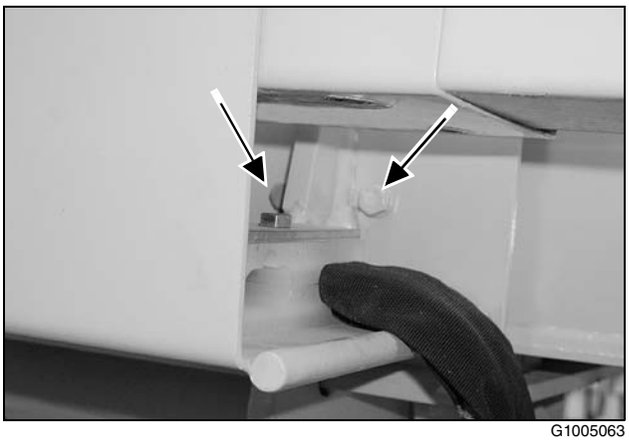
STEP 6



G1005066

Use a hoist and lifting strap around the intermediate boom section and pull it out approximately 12 inches from the outer boom section.

STEP 7

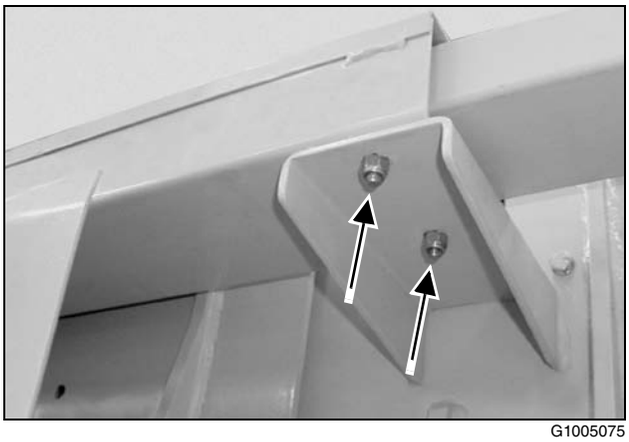


G1005063

Loosen and remove the two bolts and right side slide pad and shim from the front of the outer boom section.

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STEP 8



G1005075

Loosen and remove the two bolts and washers securing the hose tray bracket to the intermediate boom. Lower the hose tray and hose tray bracket.

STEP 9



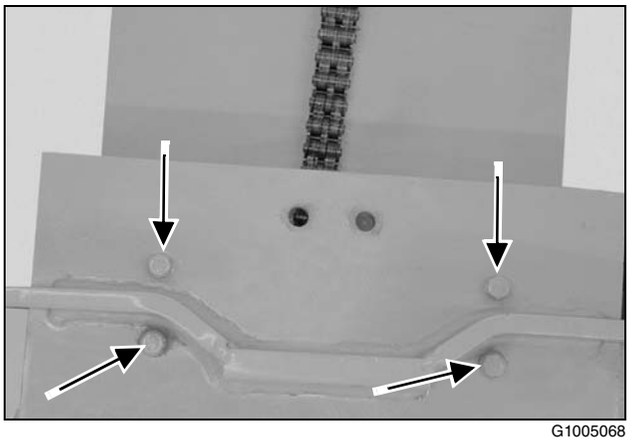
G1005062



G1005053

Loosen and remove the two bolts and remove the left side slide pad and shim from the front of the outer boom.

STEP 10



G1005068

Loosen and remove the bolts and washers from the two top slide pads on the front of the outer boom.

STEP 11



G1005052

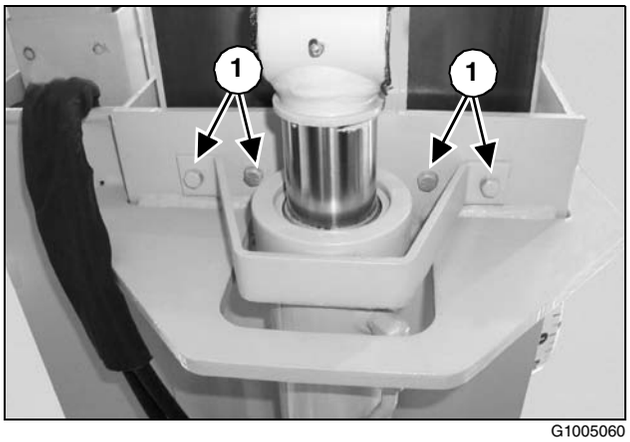
Remove the two top slide pads and shims from the front of the outer boom.

STEP 12

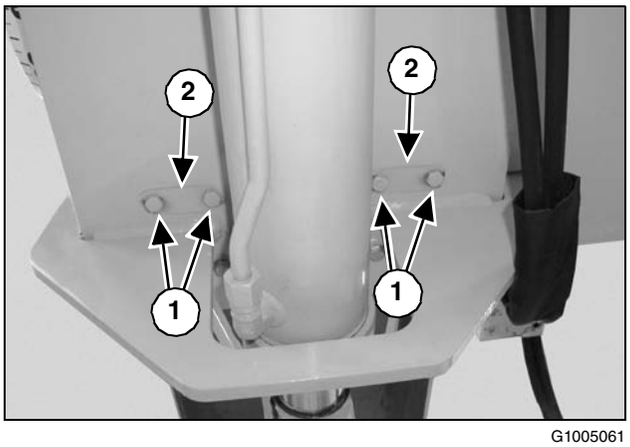
Using the hoist and lifting strap, apply upward pressure on the front of the intermediate boom.

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STEP 13



G1005060



G1005061

Loosen and remove the bolts (1) and lock plates (2), and remove the two bottom slide pads from the front of the outer boom.

STEP 14

Using the hoist and lifting strap, pull the intermediate boom out of the outer boom approximately 108 inches (2.74 mm). Lower the hoist and measure from the end of the intermediate boom section back 84 inches and make a mark using a dye marker.

STEP 15



G1005054

Position the hoist and lifting strap on the mark made earlier. This will allow a balanced lifting point.

STEP 16

Remove the intermediate boom section from the outer boom.

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INTERMEDIATE BOOM INSTALLATION

STEP 17



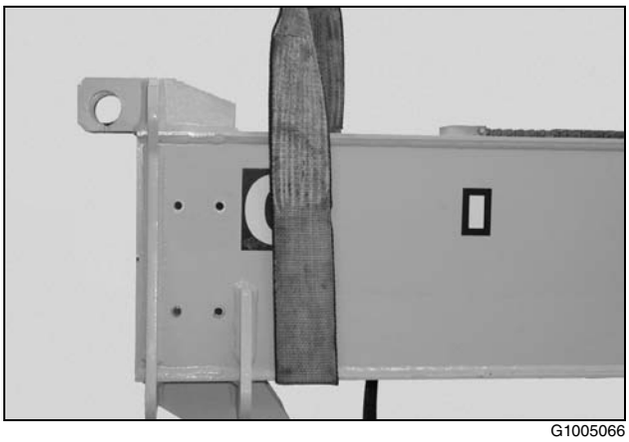
G1632MP

Apply grease to the inside bottom and top surfaces of the outer boom where the pads of the intermediate boom section will contact when assembled. Use a brush attached to a rod or pole (as shown) to reach inside the boom.

STEP 18

Install the intermediate boom section into the outer boom as far as possible.

STEP 19



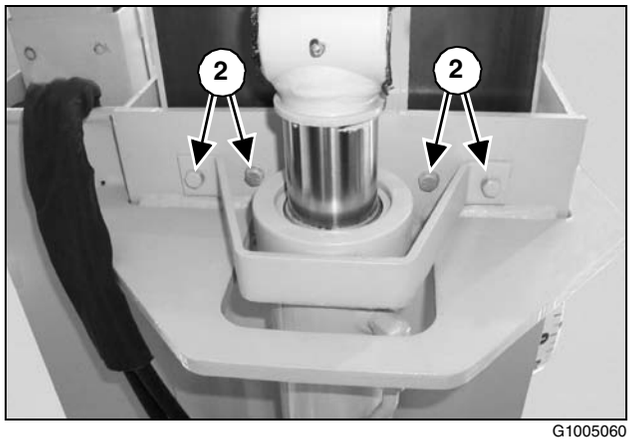
G1005066

Lower the hoist and move the lifting strap to the end of the intermediate boom section, apply upward pressure and slide the intermediate boom section into the outer boom until there is approximately 12 inches (300 mm) left sticking out the outer boom.

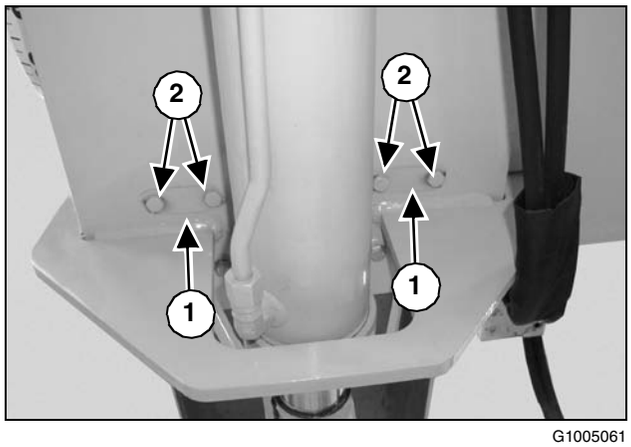
STEP 20

Using the hoist and lifting strap, apply upward pressure to the intermediate boom.

STEP 21



G1005060



G1005061

Reinstall the two bottom slide pads on the front of the outer boom, using the lock plates (1) and bolts (2). Use Loctite™ 271 (red) Thread Lock (or equivalent) on the threads of the bolts and torque to 30 ft.-lbs. (41 Nm). Bend up each end of the lock plates.

STEP 22

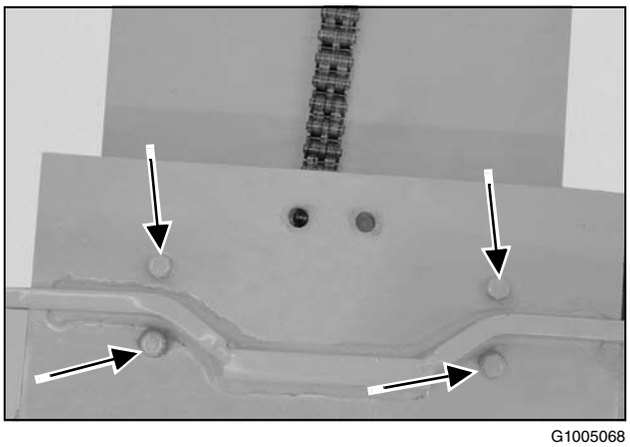
Using the hoist and lifting strap, lower the intermediate boom slightly.

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STEP 23



G1005052



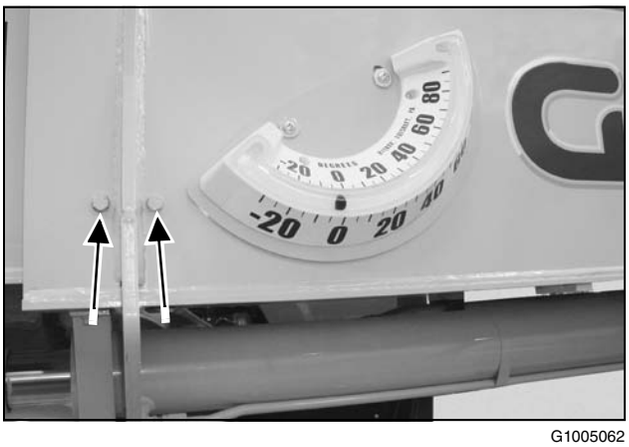
G1005068

Reinstall the two top slide pads and shims on the front of the outer boom, using the bolts and washers. Use Loctite™ 271 (red) Thread Lock (or equivalent) on the threads of the bolts and torque to 30 ft.-lbs. (41 Nm).

STEP 24



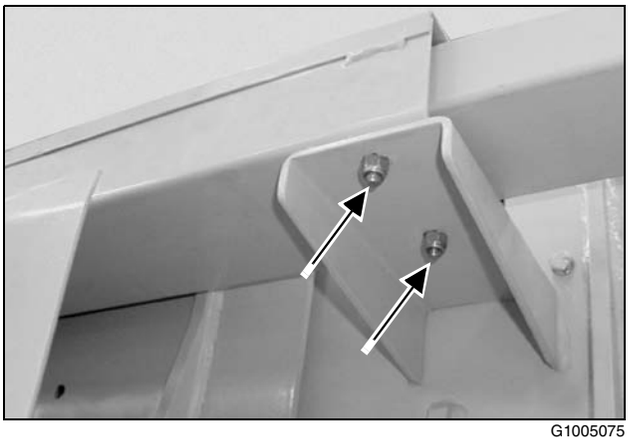
G1005053



G1005062

Reinstall the side slide pad and shim to the front of the outer boom using the bolts and washers. Use Loctite™ 271 (red) Thread Lock (or equivalent) on the threads of the bolts and torque to 30 ft.-lbs. (41 Nm).

STEP 25

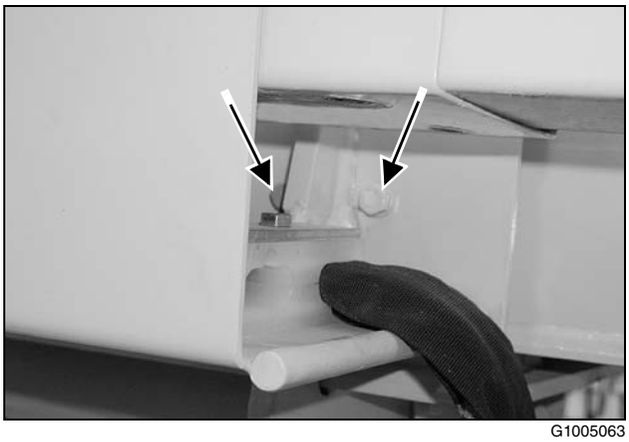


G1005075

Reinstall the hose tray bracket to the intermediate boom using the two bolts and washers. Use Loctite™ 271 (red) Thread Lock (or equivalent) on the threads of the bolts.

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STEP 26



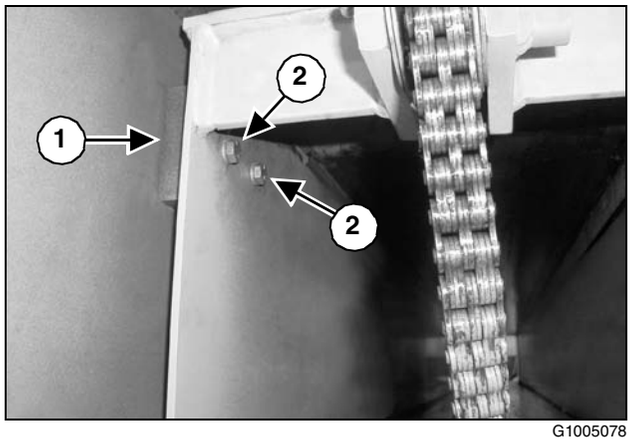
G1005063

Reinstall the right side slide pad and shims to the front of the outer boom using the two bolts. Use Loctite™ 271 (red) Thread Lock (or equivalent) on the threads of the bolts and torque to 30 ft.-lbs. (40.7 Nm).

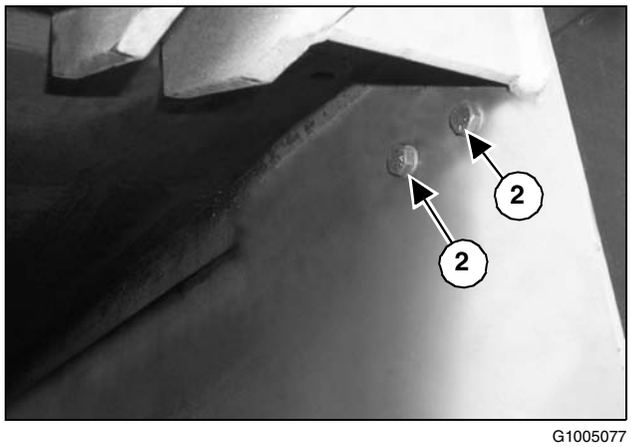
STEP 27

Remove the lifting strap and push the intermediate boom section into the outer boom as far as possible.

STEP 28



G1005078

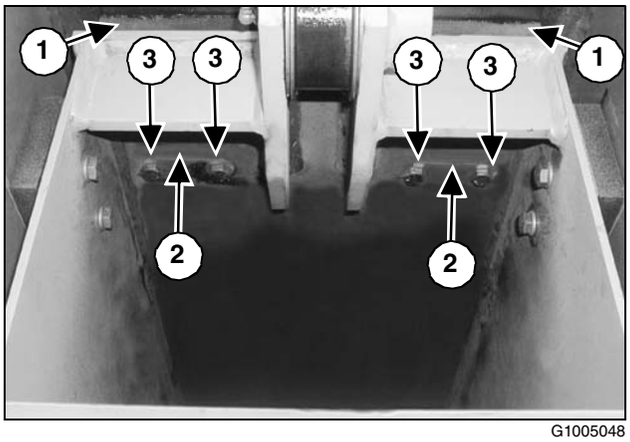


G1005077

Reinstall the two side slide pad and shims (1) to the rear of the intermediate boom using the bolts (2). Use Loctite™ 271 (red) Thread Lock (or equivalent) on the threads of the bolts and torque to 30 ft.-lbs. (41 Nm).

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STEP 29



G1005048

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

STEP 30



G1623MP

Apply grease to the inside bottom and top surfaces of the intermediate boom section where the pads of the inner boom will contact when assembled. Use a brush attached to a rod or pole (as shown) to reach inside the boom.

STEP 31



G1005084

Reinstall the inner boom section into the intermediate boom. See Section 703 of this manual for correct procedure.

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