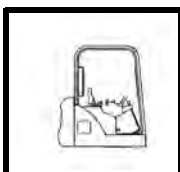


FOREWORD

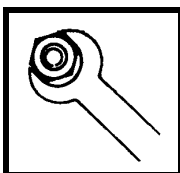
This manual is for the Bobcat excavator mechanic. It provides necessary servicing and adjustment procedures for the Bobcat excavator and its component parts and systems. Refer to the Operation & Maintenance Manual for operating instructions, starting procedure, daily checks, etc.

A general inspection of the following items must be made after the excavator has had service or repair:

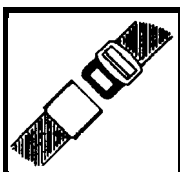
1. Check that the ROPS/TOPS/FOPS is in good condition and is not modified.



2. Check that ROPS/TOPS mounting hardware is tightened and is Bobcat approved.



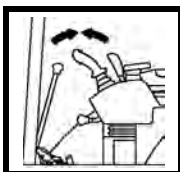
3. The seat belt must be correctly installed, functional and in good condition.



4. Machine signs (decals) must be legible and in the correct location.



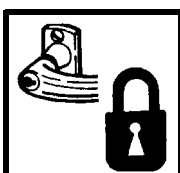
5. Travel levers, control levers and foot pedals must return to neutral. Check that the pedal locks are in working order.



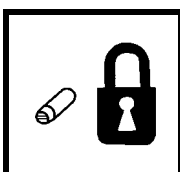
6. Check for correct function of the work lights.



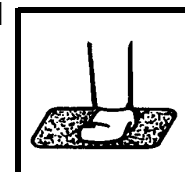
7. Enclosure door latches must open and close freely.



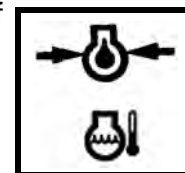
8. Attachment locking pins must function correctly and be in good condition.



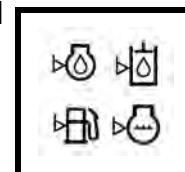
9. Safety treads must be in good condition.



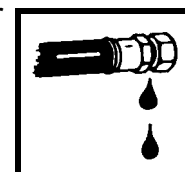
10. Check for correct function of indicator lamps.



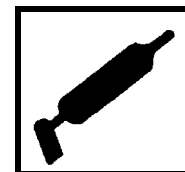
11. Check all machine fluid levels.



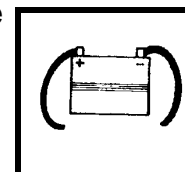
12. Inspect for fuel, oil or hydraulic fluid leaks.



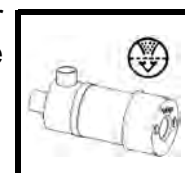
13. Lubricate the excavator.



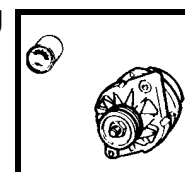
14. Check the condition of the battery and cables.



15. Inspect the air cleaner for damage or leaks. Check the condition of the element.



16. Check the electrical charging system.



FW EXC-0617SM

SERIAL NUMBER LOCATIONS

Always use the serial number of the excavator when requesting service information or when ordering parts. Early or later models (identification made by serial number) may use different parts, or it may be necessary to use a different procedure in doing a specific service operation.

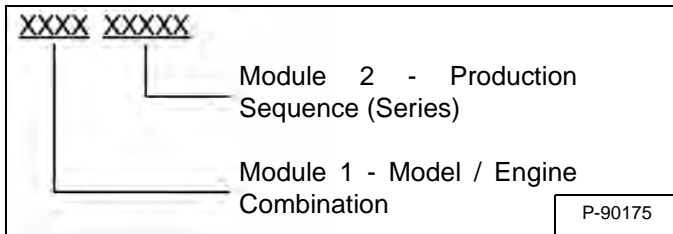
Excavator Serial Number

Figure 1



The excavator serial number plate (Item 1) [Figure 1] is located on the frame of the machine in the location shown.

Figure 2

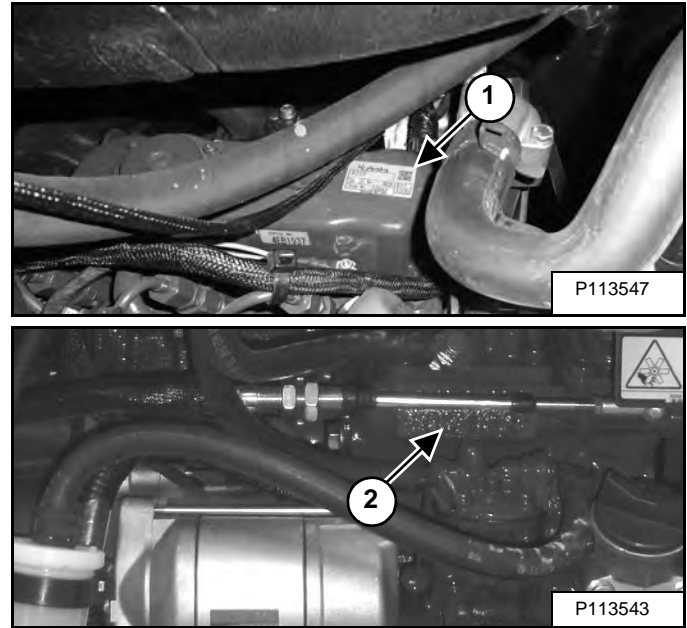


Explanation of excavator Serial Number [Figure 2]:

1. The four digit Model / Engine Combination Module number identifies the model number and engine combination.
2. The five digit Production Sequence Number identifies the order which the excavator is produced.

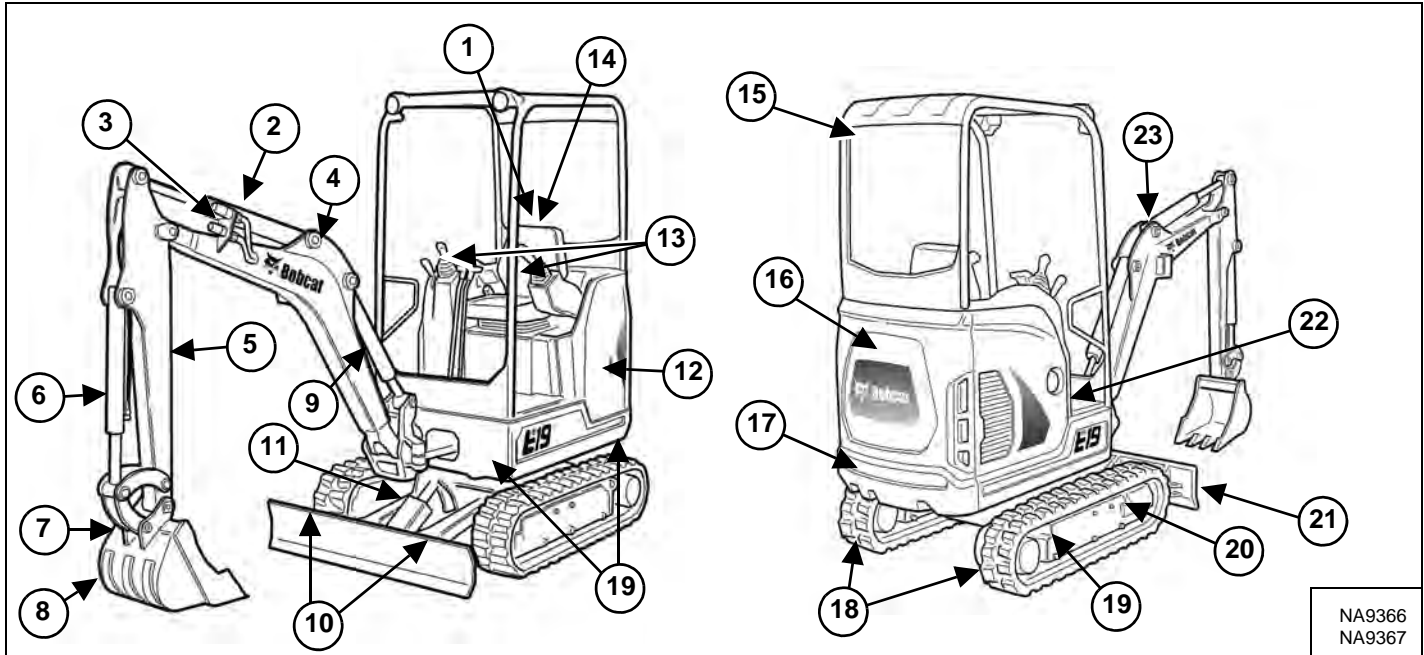
Engine Serial Number

Figure 3



The engine serial number is located on the top cover (Item 1) or on the side of the engine block (Item 2) [Figure 3] above the fuel pump.

EXCAVATOR IDENTIFICATION



ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Operator's Handbook	15	Cab / Canopy (ROPS / TOPS) [B]
2	Arm Cylinder	16	Rear Cover
3	Auxiliary Quick Couplers	17	Counterweight
4	Boom	18	Tracks
5	Arm	19	Tie Downs (Both Sides)
6	Bucket Cylinder	20	Track Frames
7	Bucket Link / Attachment Coupler (If Equipped)	21	Blade
8	Bucket [A]	22	Right Side Cover
9	Boom Cylinder	23	Lift Point
10	Tie Downs / Lift Points		
11	Blade Cylinder		
12	Upperstructure		
13	Control Levers (Joysticks)		
14	Operator's Seat with Seat Belt		

[A] BUCKET - Several different buckets and other attachments are available for the Bobcat excavator.

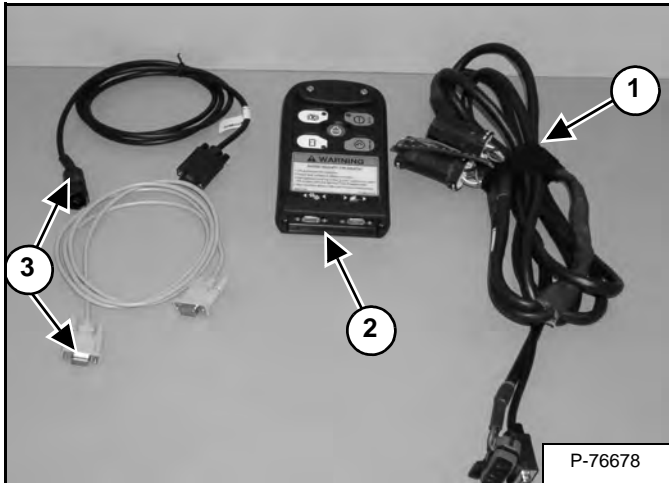
[B] ROPS, TOPS - (Roll-Over Protective Structure / Tip-Over Protective Structure) as standard equipment.

The ROPS / TOPS meets ISO 12117-2 AND ISO 12117.

REMOTE START TOOL (SERVICE TOOL) KIT - 7217666 (CONT'D)

Excavator Service Tool Harness - 6689747

Figure 10-251-3



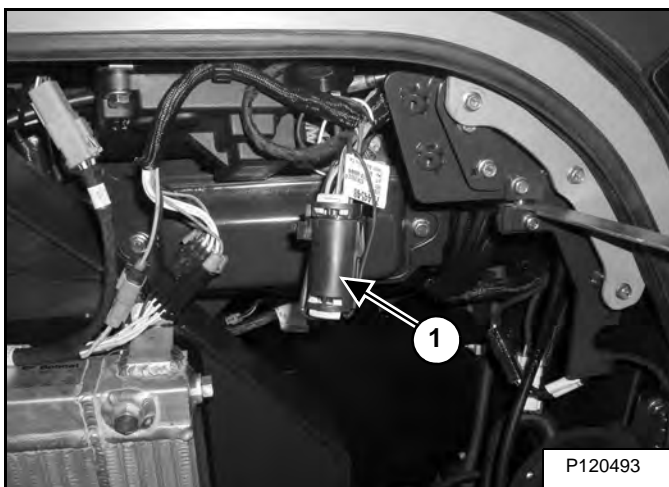
The service tool harness control (Item 1) [Figure 10-251-3] is used to connect the Remote Start Tool (Item 2) [Figure 10-251-3] to the electrical system on the excavator.

The service tool harness communicator (Item 3) [Figure 10-251-3] is used to connect the Remote Start Tool to the Service PC.

NOTE: Make all connections with the key or keyless panel in the OFF position.

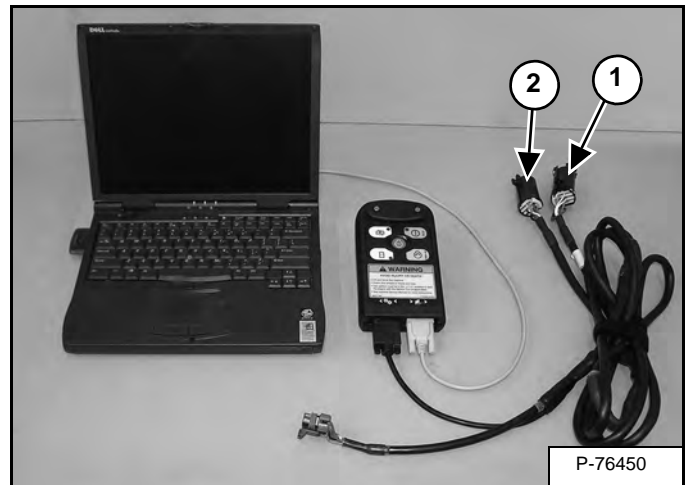
Open the right side cover.

Figure 10-251-4



Remove the plug (Item 1) [Figure 10-251-4] from the excavator harness connector.

Figure 10-251-5



NOTE: The Remote Start Tool (Service Tool) connection harness has two connectors (Item 1) and (Item 2). The main connector (Item 1) [Figure 10-251-5] is always used for connection to the excavator harness.

The second connector (Item 2) [Figure 10-251-5] is not used for excavator applications. This connector has a cap attached to it to prevent damage or corrosion when not in use.

Connect the Remote Start Tool (Service Tool) connector (Item 1) [Figure 10-251-5] to the excavator harness connector.

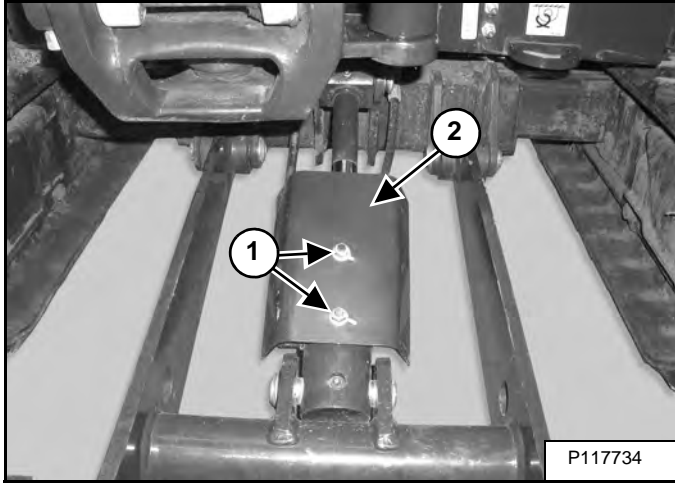
CYLINDER (BLADE) (CONT'D)

Removal And Installation

Lower the boom / bucket and blade to the ground. Stop the engine.

Support the blade. With the key in the ON position, move the blade control to release the hydraulic pressure. Raise the control console.

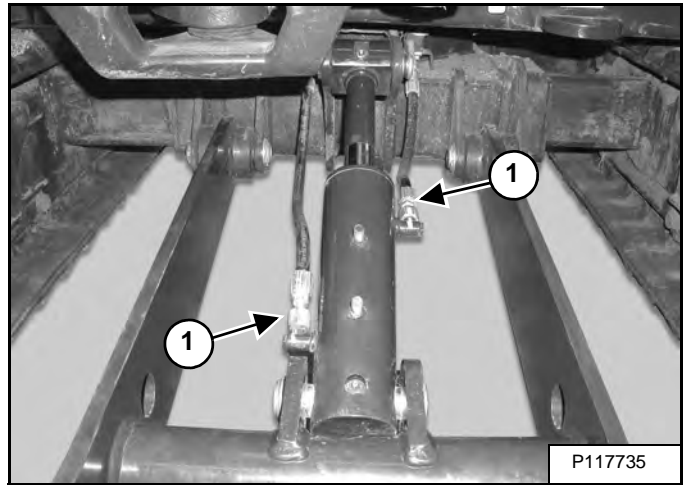
Figure 20-24-4



Remove the two nuts (Item 1) [Figure 20-24-4] from the shield.

Remove the blade cylinder shield (Item 2) [Figure 20-24-4] from the blade cylinder.

Figure 20-24-5



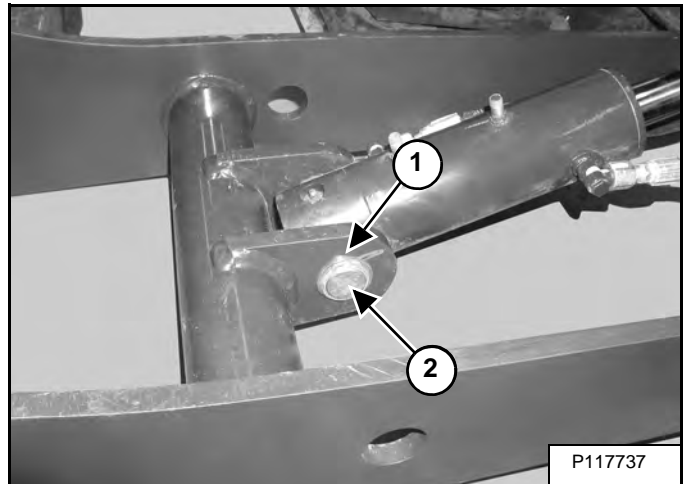
Remove the blade cylinder hoses (Item 1) [Figure 20-24-5].

IMPORTANT

When repairing hydrostatic and hydraulic systems, clean the work area before disassembly and keep all parts clean. Always use caps and plugs on hoses, tubelines and ports to keep dirt out. Dirt can quickly damage the system.

I-2003-0888

Figure 20-24-6



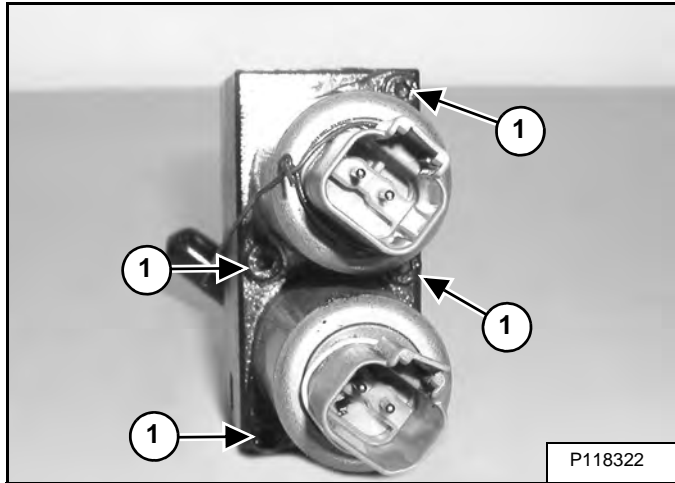
Remove the snap ring and washer (Item 1) [Figure 20-24-6] (Both sides) from the base end pivot pin.

Remove the base end pivot pin (Item 2) [Figure 20-24-6].

HYDRAULIC CONTROL VALVE (CONT'D)

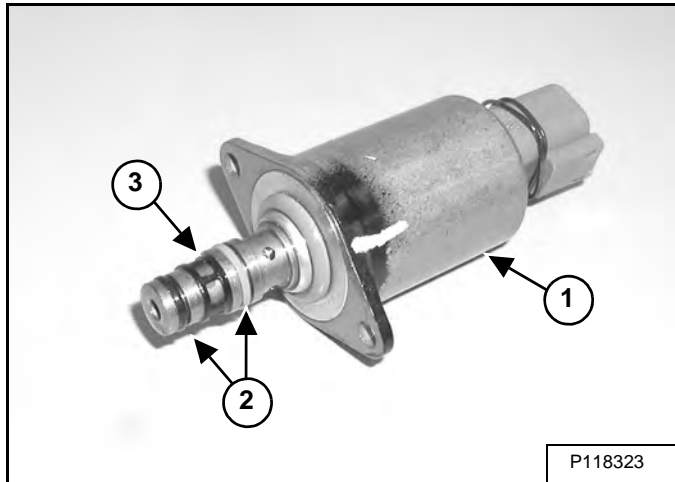
Boom Swing And Auxiliary Valve Section Disassembly And Assembly (Cont'd)

Figure 20-40-83



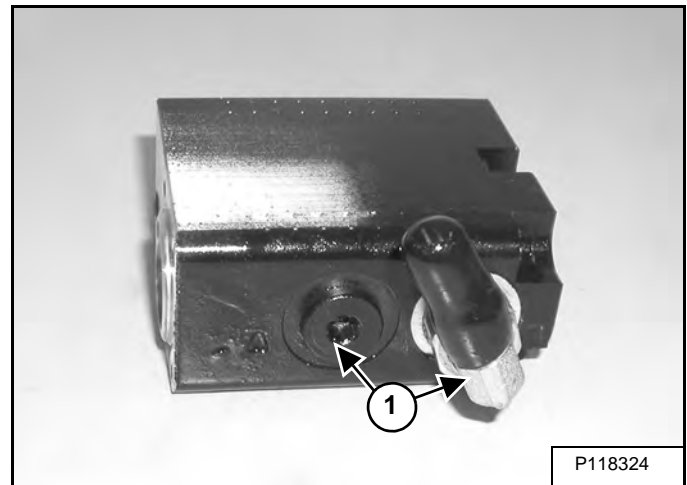
Remove four solenoid screws (Item 1) [Figure 20-40-83].

Figure 20-40-84



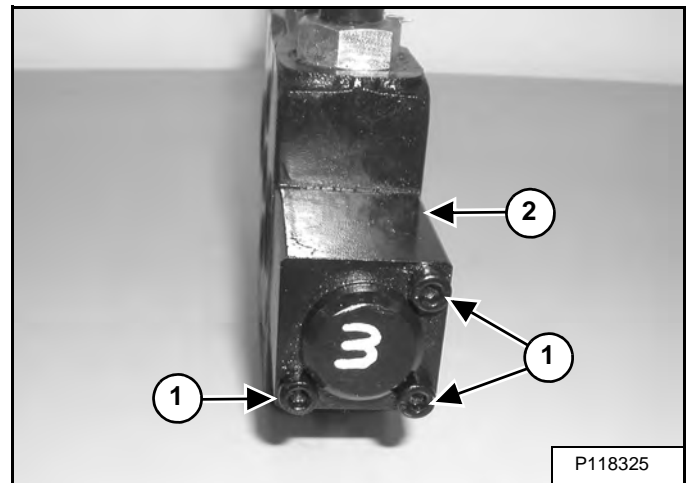
Mark and remove both solenoids (Item 1) and remove the O-rings (Item 2) and inspect the screen (Item 3) [Figure 20-40-84].

Figure 20-40-85



Remove O-ring on plug and fitting (Item 1) [Figure 20-40-85].

Figure 20-40-86



Remove the three cover screws (Items 1) and remove the cover (Item 2) [Figure 20-40-86].

HYDRAULIC PUMP (CONT'D)

Piston Pump Assembly

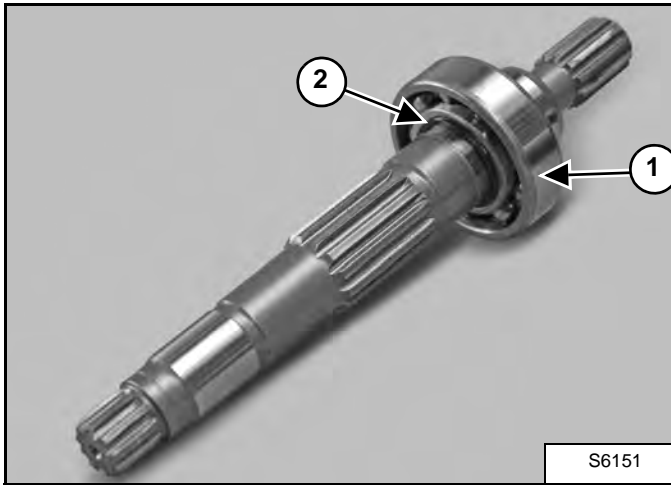
Clean all parts in solvent and dry with compressed air. Do not use compressed air to dry the bearings.

Inspect all parts for wear and damage. Replace all worn and damaged parts.

Always install new seals and O-rings.

Apply a thin coat of hydraulic fluid to all components before assembly.

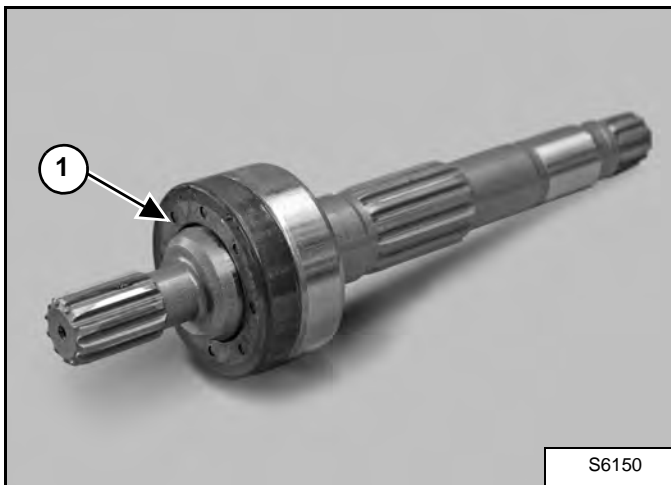
Figure 20-50-75



Install the bearing (Item 1) [Figure 20-50-75] on the shaft.

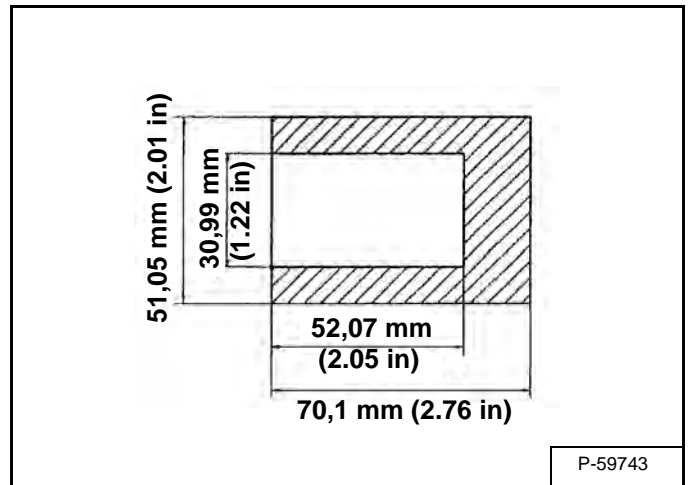
Install the snap ring (Item 2) [Figure 20-50-75] on the shaft.

Figure 20-50-76



Install the oil seal (Item 1) [Figure 20-50-76] on the shaft.

Figure 20-50-77



Manufacture the special tool [Figure 20-50-77] needed to install the oil seal into the pump housing.

Figure 20-50-78



Install the shaft, bearing, and oil seal assembly [Figure 20-50-78] into the pump housing by using the special tool.

SWIVEL JOINT

Description

The swivel joint is located under the floor panels and mounted to the upperstructure. The swivel joint directs hydraulic fluid to the undercarriage components while allowing the upperstructure to rotate.

Removal And Installation

Expand the track frame fully.

Figure 20-90-1



Place blocks under the excavator tracks [Figure 20-90-1].

Lower the boom / bucket and blade to the ground.

Relieve hydraulic pressure.

Remove the seat and seat mount. (See Removal And Installation on Page 40-40-1.)

Remove the floor mat and floor panels. (See Removal And Installation on Page 40-140-1.)

Drain the hydraulic reservoir. (See Removing And Replacing The Hydraulic Fluid on Page 10-130-3.)

WARNING

Hydraulic fluid escaping under pressure can have sufficient force to enter a person's body by penetrating the skin. This can cause serious injury and possible death if proper medical treatment by a physician familiar with this injury is not received immediately.

W-2145-0290

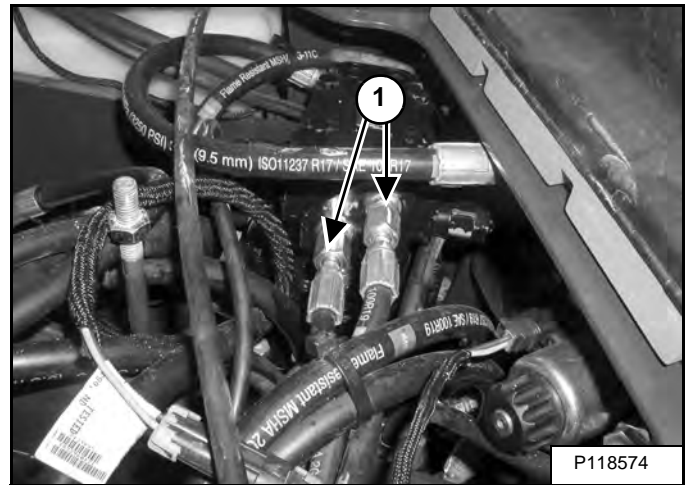
IMPORTANT

When repairing hydrostatic and hydraulic systems, clean the work area before disassembly and keep all parts clean. Always use caps and plugs on hoses, tubelines and ports to keep dirt out. Dirt can quickly damage the system.

I-2003-0888

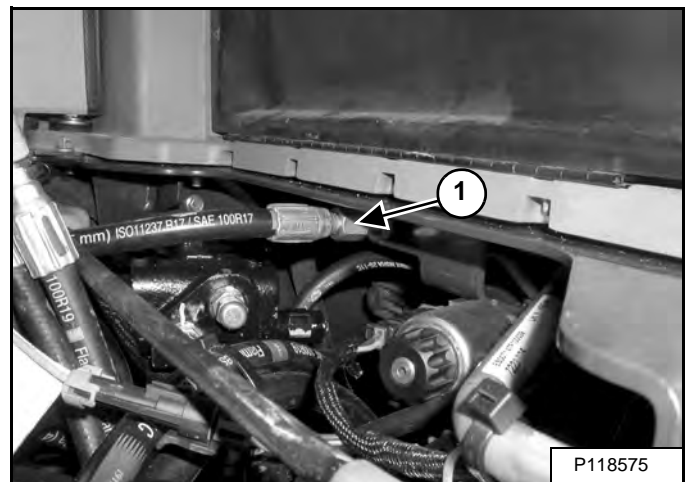
Mark all hoses and tubelines for ease of assembly.

Figure 20-90-2



Remove the two hoses (Item 1) [Figure 20-90-2] from the swing motor.

Figure 20-90-3

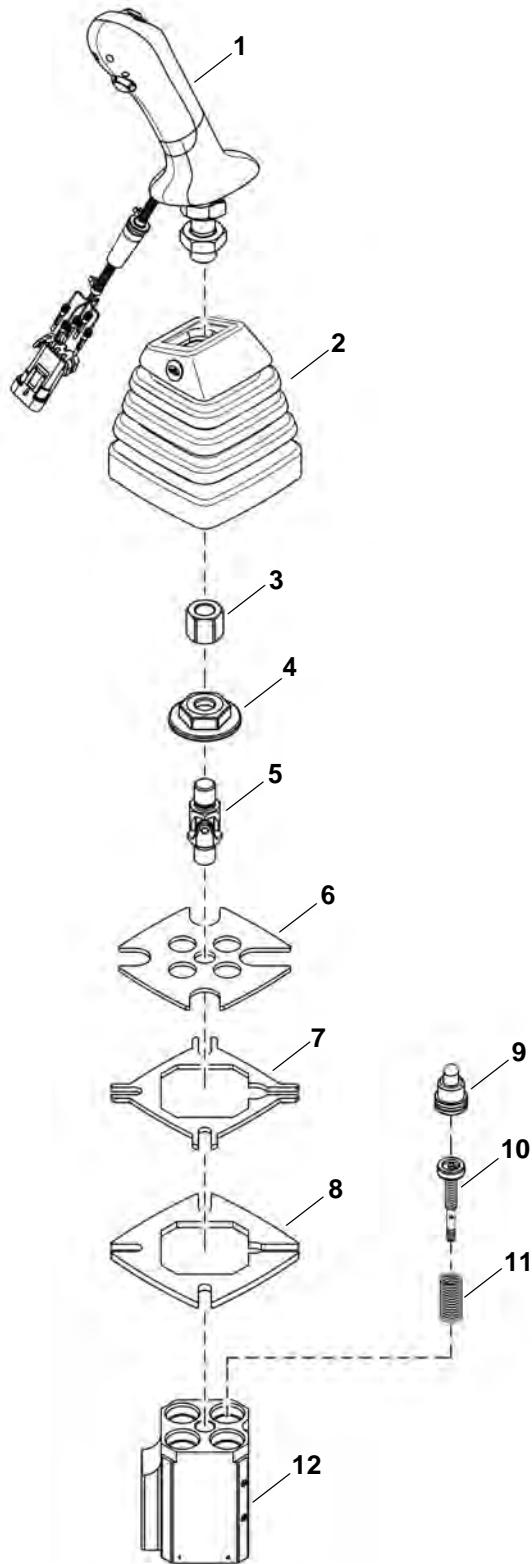


Remove the hose (Item 1) [Figure 20-90-3] from the case drain manifold block.

CONTROL LEVER (JOYSTICK) (LEFT) (CONT'D)

Parts Identification

1. Handle
2. Dust Boot
3. Coupler
4. Actuator Control Plate
5. U-Joint
6. Top Plate
7. Intermediate Plate
8. Bottom Plate
9. Plunger Assembly
10. Spool
11. Spring
12. Housing

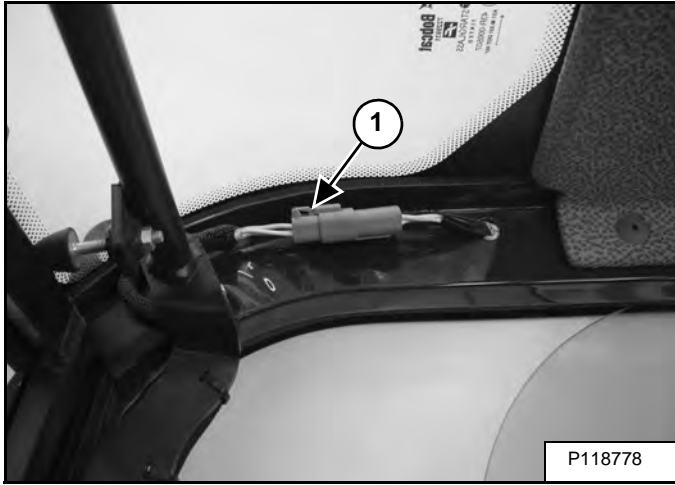


NA8316S

CAB (CONT'D)

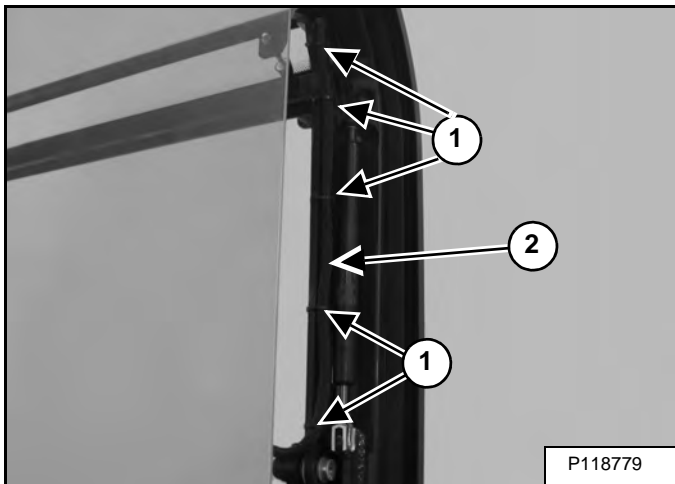
Front Window Removal And Installation

Figure 40-30-12



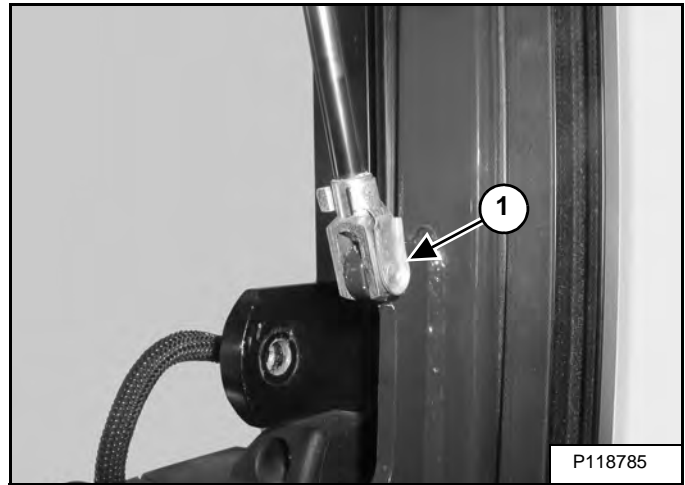
Disconnect the wire harness (Item 1) [Figure 40-30-12].

Figure 40-30-13



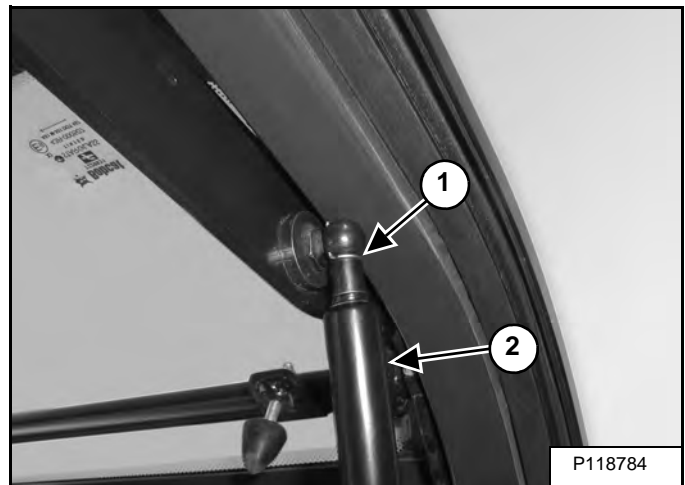
Cut the cable ties (Item 1) and remove the wire harness (Item 2) [Figure 40-30-13] from the arm.

Figure 40-30-14



Raise the window and remove the lower pin (Item 1) [Figure 40-30-14].

Figure 40-30-15



Remove the clip (Item 1) and remove the gas strut (Item 2) [Figure 40-30-15].

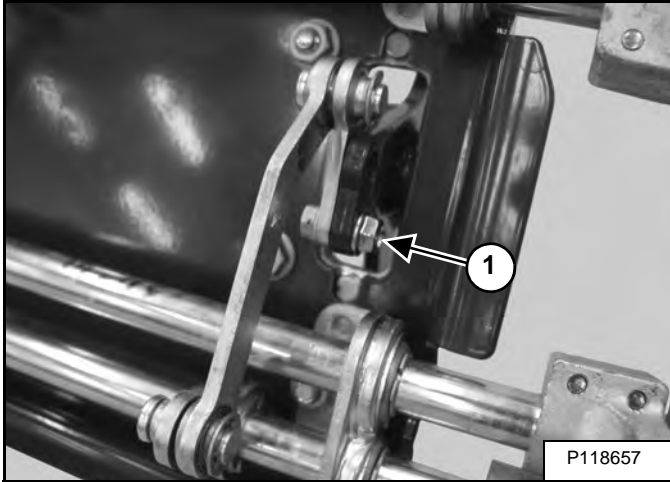
Installation: The pivot linkage must be in the raised position and the window removed to install the gas strut.

LEFT PEDAL (AUXILIARY)

Disassembly And Assembly

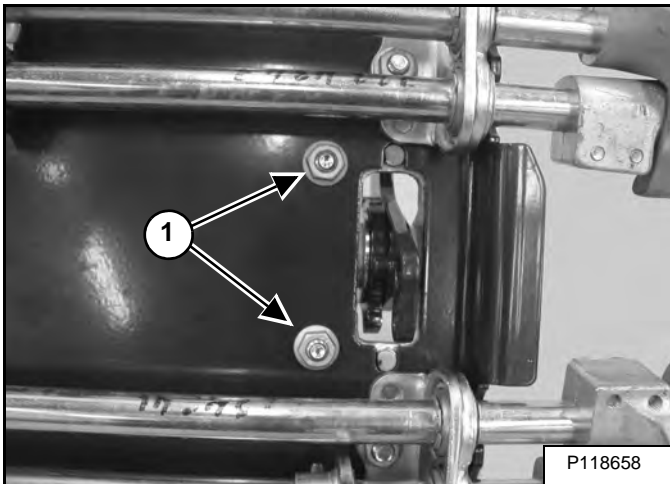
Remove the control linkage assembly. (See Removal And Installation on Page 40-130-1.)

Figure 40-120-1



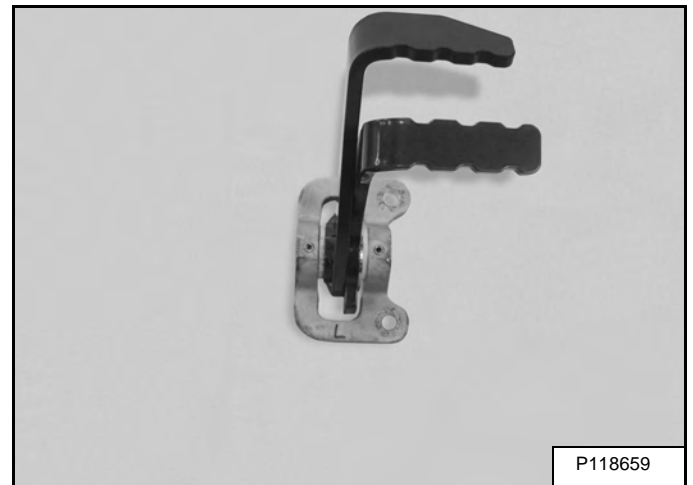
Remove the nut / bolt (Item 1) [Figure 40-120-1] connecting the linkage to the left pedal.

Figure 40-120-2



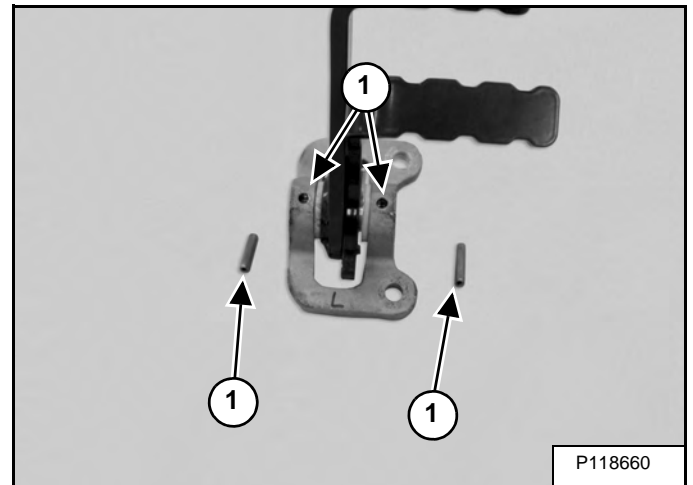
Remove the nuts / bolts (Item 1) [Figure 40-120-2] for the left pedal mounting bracket.

Figure 40-120-3



Remove the left pedal assembly [Figure 40-120-3].

Figure 40-120-4

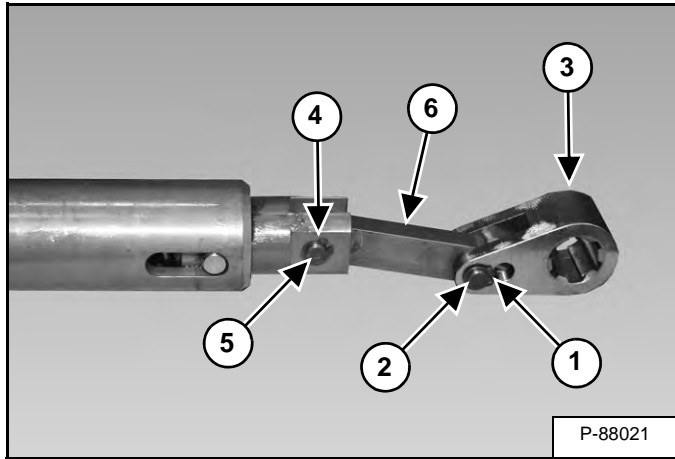


Remove the two roll pins (Item 1) [Figure 40-120-4].

QUICK COUPLER (LEHNHOFF® SYSTEM) (CONT'D)

Disassembly (MS08) (Cont'd)

Figure 40-241-22

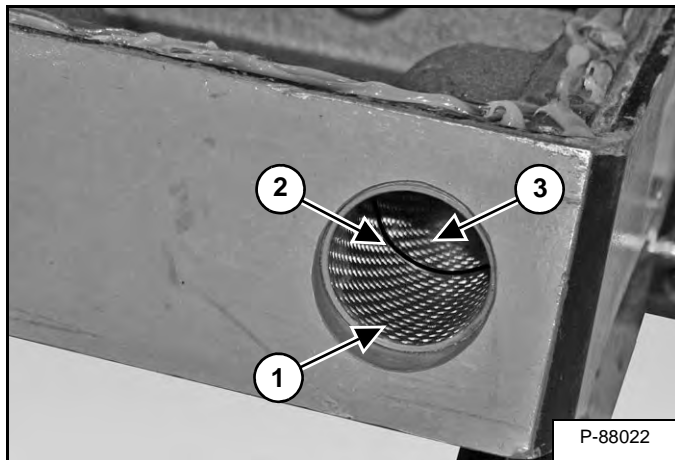


Remove the snap ring (Item 1) and pin (Item 2). Remove the driving fork (Item 3) [Figure 40-241-22].

Remove the snap ring (Item 4) and pin (Item 5). Remove the reversing lever (Item 6) [Figure 40-241-22].

Repeat the procedure for the other locking pin.

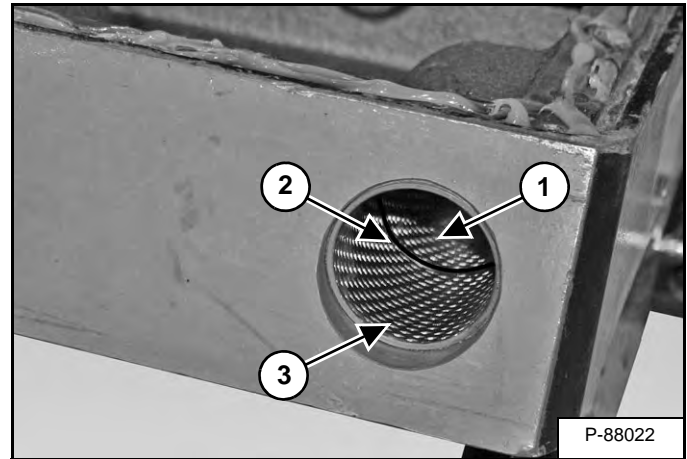
Figure 40-241-23



Remove the bushing (Item 1), O-ring (Item 2) and bushing (Item 3) [Figure 40-241-23] from both locking pin bores.

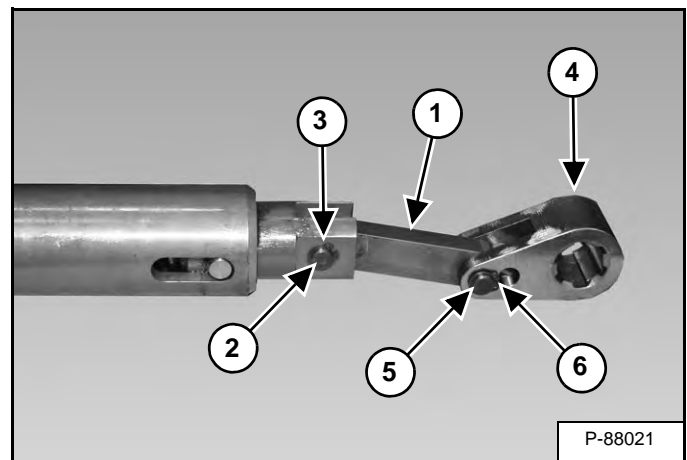
Assembly (MS08)

Figure 40-241-24



Install bushing (Item 1), O-ring (Item 2) and bushing (Item 3) [Figure 40-241-24] in both locking pin bores.

Figure 40-241-25



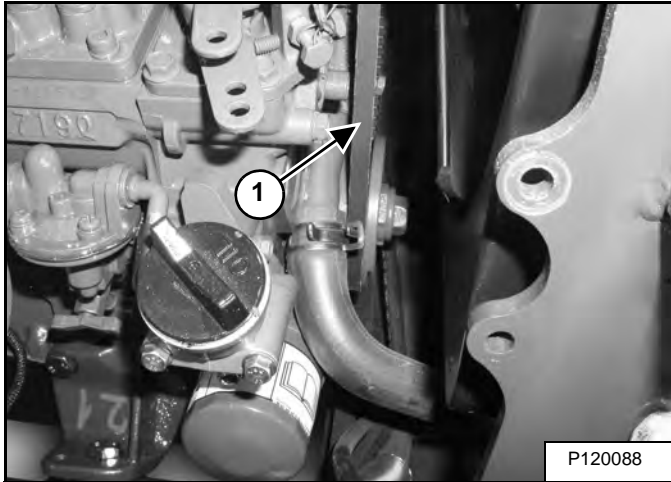
Install reversing lever (Item 1), pin (Item 2) and snap ring (Item 3) [Figure 40-241-25] on the locking pin.

Install the driving fork (Item 4), pin (Item 5) and snap ring (Item 6) [Figure 40-241-25] on the reversing lever. Repeat the procedure for the other locking pin.

ALTERNATOR (CONT'D)

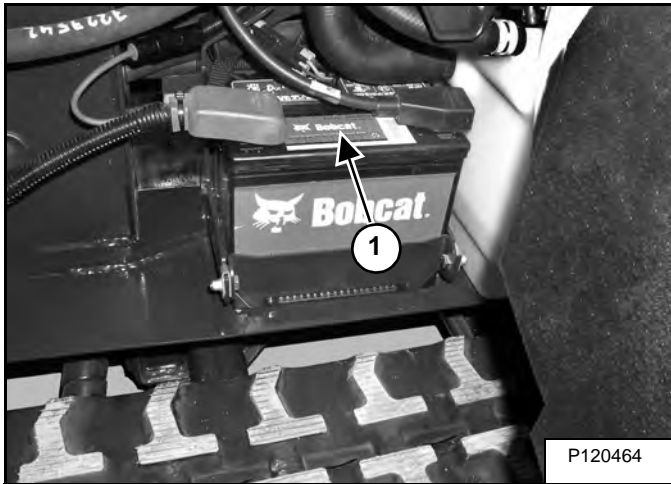
Charging System Inspection (Cont'd)

Figure 50-30-4



Start the engine. At low idle, the icon must be off. If the icon is flashing, inspect the alternator belt (Item 1) [Figure 50-30-4] for correct tension.

Figure 50-30-5



Increase engine speed to approximately 1500 rpm.

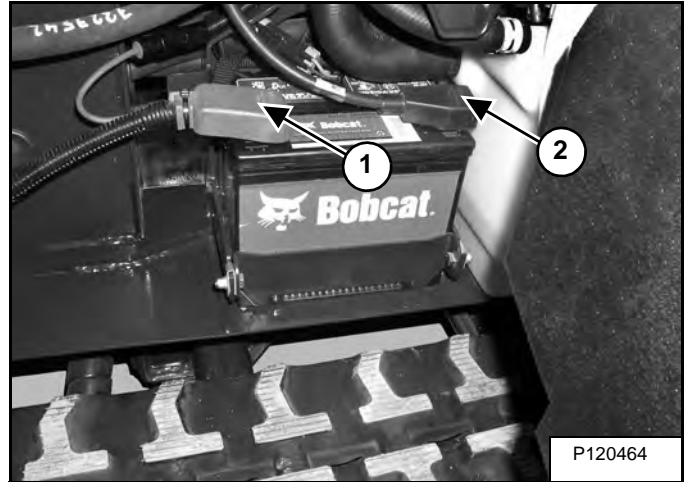
If the icon is illuminated, measure the voltage at the battery (Item 1) [Figure 50-30-5].

Battery voltage should be between 13 and 15 volts.

If voltage is less than 13 volts or over 15.5 volts, replace the alternator.

Alternator Voltage Testing

Figure 50-30-6

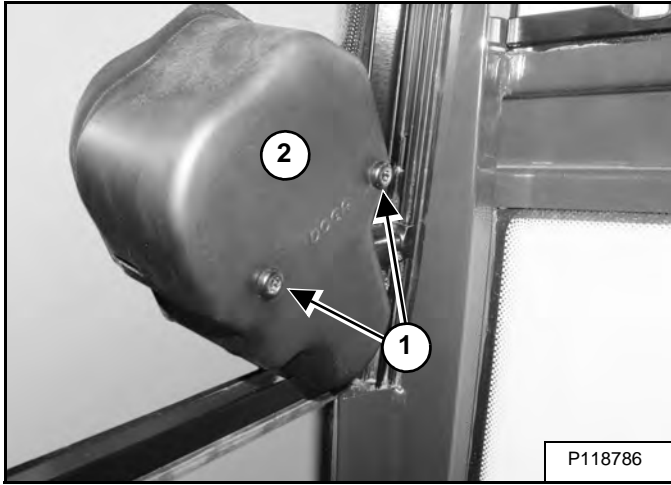


Run the engine at rated speed. Check to make sure that all accessories are turned OFF. Connect the positive lead of the voltmeter to the positive terminal (Item 1) of the battery. Connect the negative lead of the volt meter to the negative terminal (Item 2) [Figure 50-30-6]. If the reading on the voltmeter is less than 13 volts or more than 15.5 volts, replace the alternator.

WIPER MOTOR

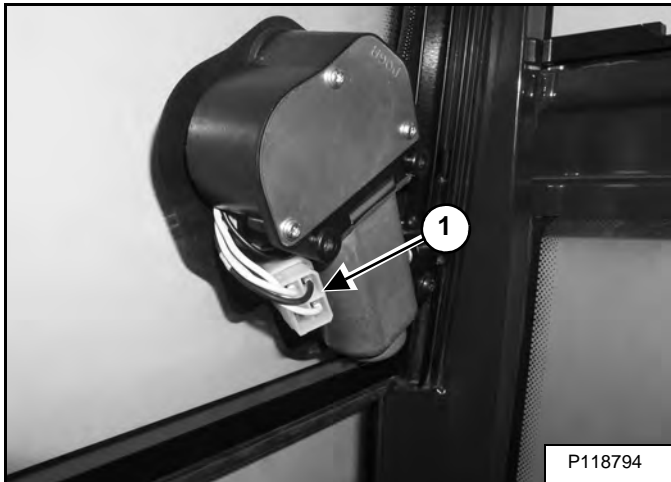
Removal And Installation

Figure 50-120-1



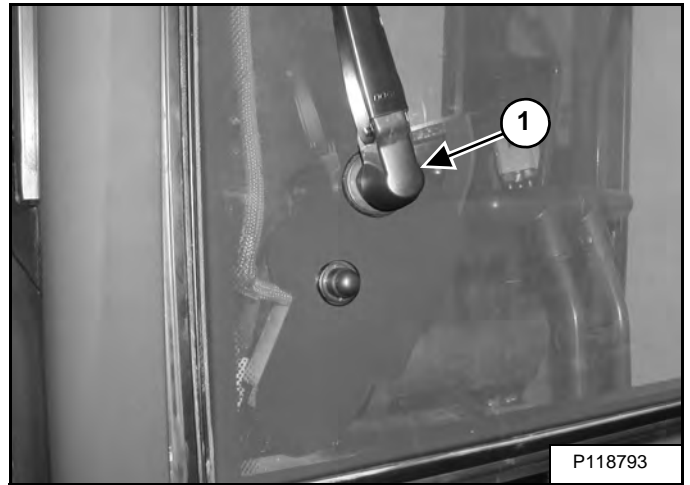
Remove the wiper motor cover screws (Item 1) and the cover (Item 2) [Figure 50-120-1].

Figure 50-120-2



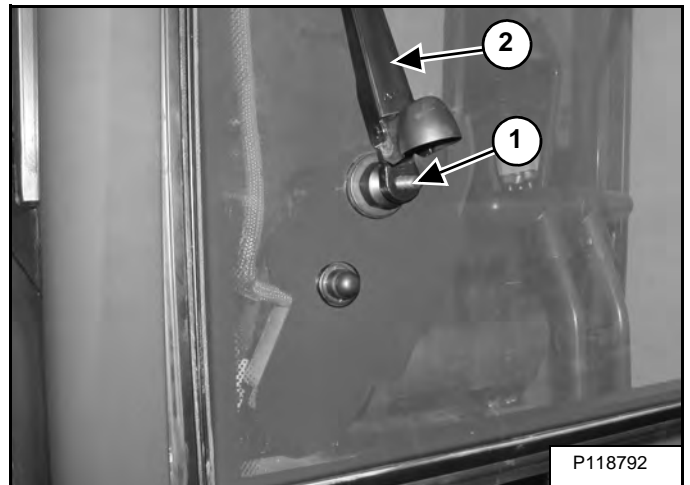
Disconnect the wire harness (Item 1) [Figure 50-120-2].

Figure 50-120-3



Open the wiper arm cover (Item 1) [Figure 50-120-3].

Figure 50-120-4



Remove the nut and washer (Item 1) and the wiper arm assembly (Item 2) [Figure 50-120-4].

ENGINE INFORMATION (CONT'D)

Troubleshooting

The following troubleshooting chart is provided for assistance in locating and correcting problems which are most common. Many of the recommended procedures must be done by authorized Bobcat Service personnel only.

PROBLEM	CAUSE
Slow cranking speed	1, 2, 3, 4
Engine will not start	2, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 19, 27, 28, 29
Difficult to start	5, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 25, 27, 28, 29
No power from engine	8, 9, 10, 11, 12, 13, 15, 16, 17, 21, 22, 24, 25, 26, 28, 29
Engine is mis-firing	8, 9, 11, 12, 13, 15, 16, 17, 21, 22, 24, 25, 26, 28
Too much fuel consumption	10, 12, 13, 15, 16, 17, 19, 20, 21, 23, 24, 25, 27, 28, 29
Black exhaust	10, 12, 13, 15, 16, 17, 19, 20, 21, 23, 24, 25, 27, 28, 29
Blue / white exhaust	4, 10, 15, 16, 17, 21, 23, 27, 29, 30, 50
Low oil pressure	4, 31, 32, 33, 34, 35, 37, 38, 39, 52
Engine knocking	13, 15, 16, 19, 22, 24, 25, 27, 29, 31, 40, 41, 53
Engine running rough	7, 8, 9, 10, 11, 12, 13, 17, 18, 22, 24, 25, 26, 29, 40, 53
Vibration	12, 13, 17, 21, 22, 25, 26, 29, 40, 42, 43
High oil pressure	4, 33, 36
Overheating	10, 12, 13, 15, 16, 20, 21, 40, 44, 45, 46, 47, 48, 51
Too much crankcase pressure	22, 27, 29, 30, 40, 49
Poor compression	10, 16, 21, 24, 25, 27, 28, 29, 30, 41, 53
Start and stop	9, 10, 11

KEY TO CORRECT THE CAUSE	
1. Battery capacity low	28. Worn valves and seat
2. Bad electrical connections	29. Broken or worn piston rings
3. Faulty starter motor	30. Worn valve stems or guides
4. Incorrect grade of oil	31. Worn or damaged bearings
5. Low cranking speed	32. Not enough oil in the oil pan
6. Fuel tank empty	33. Switch is defective
7. Faulty stop control operation	34. Oil pump worn
8. Plugged fuel line	35. Relief valve is stuck open
9. Plugged fuel filter	36. Relief valve is stuck closed
10. Restriction in the air cleaner	37. Broken relief valve spring
11. Air in the fuel system	38. Faulty suction pipe
12. Faulty fuel injection pump	39. Plugged oil filter
13. Faulty fuel injectors	40. Piston seizure
14. Broken injection pump drive	41. Incorrect piston height
15. Incorrect injection pump timing	42. Faulty engine mounting
16. Incorrect valve timing	43. Incorrect alignment of flywheel
17. Poor compression	44. Faulty thermostat
18. Plugged fuel tank vent	45. Restriction in water jacket
19. Incorrect grade of fuel	46. Loose alternator belt
20. Exhaust pipe restriction	47. Plugged radiator
21. Cylinder head gasket leaking	48. Plugged breather pipe
22. Over heating	49. Plugged breather pipe
23. Cold running	50. Damaged valve stem oil deflectors
24. Incorrect tappet adjustment	51. Coolant level too low
25. Sticking valves	52. Plugged oil pump pipe strainer
26. Incorrect high pressure fuel lines	53. Broken valve spring
27. Worn cylinder bores	