SECTION 00 – GENERAL INFORMATION

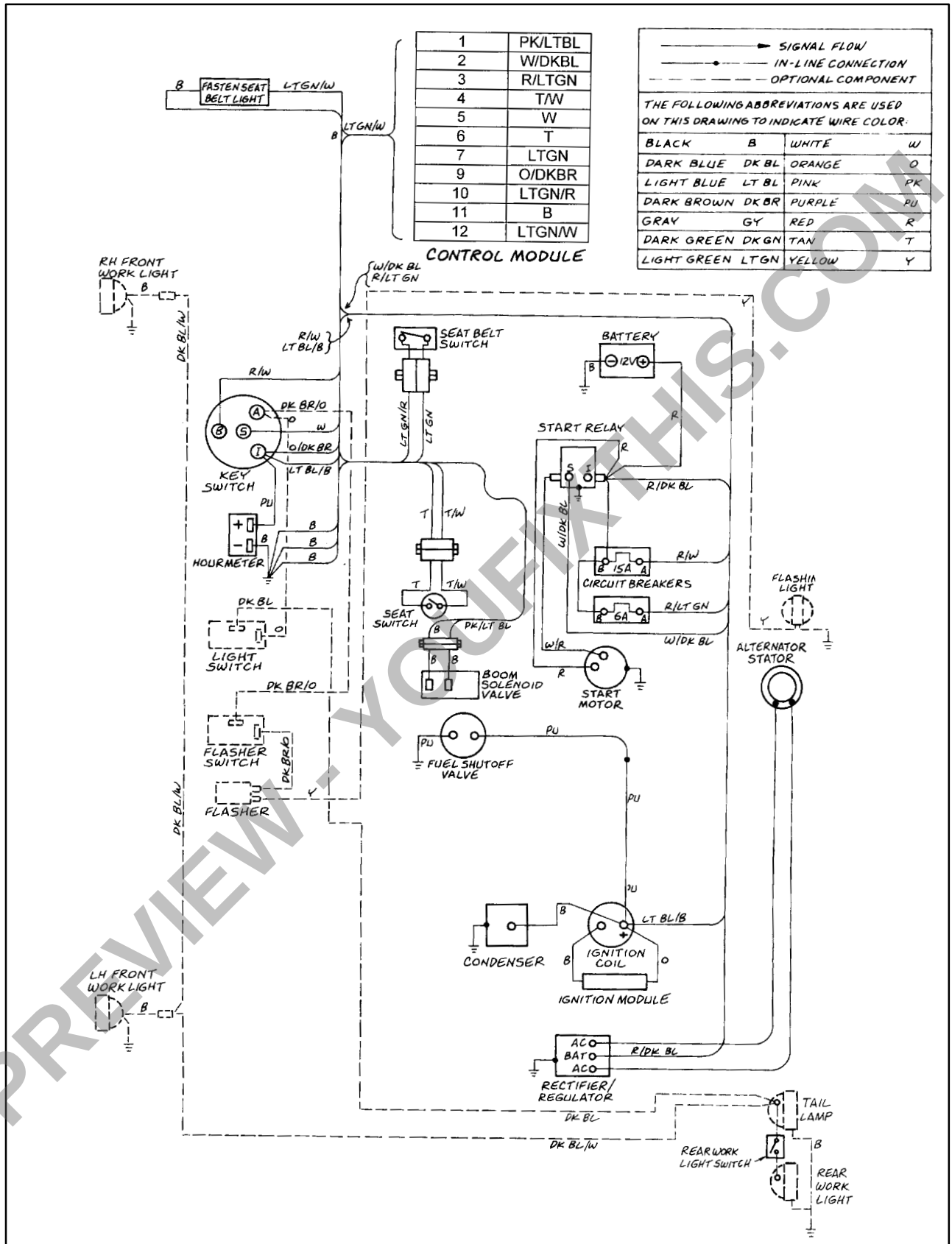
Chapter 1 – General Information

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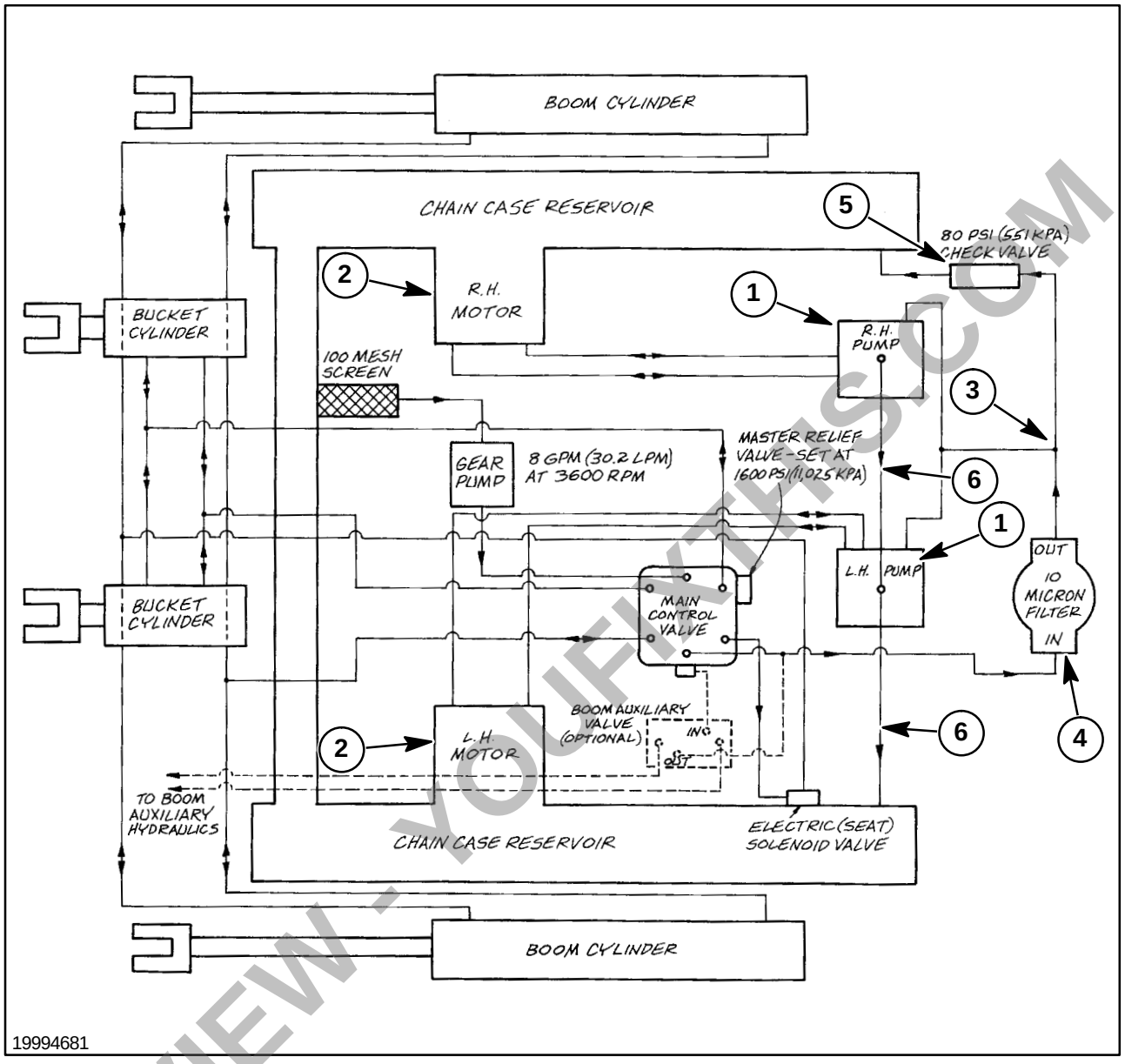


19994670 **LS120 CONTROL MODULE RESTRAINT SYSTEM - WIRING DIAGRAM**

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The transmission system consists of two variable displacement piston pumps, 1, and two fixed displacement motors, 2. The motors transfer power to each chain case where the wheels are driven by a single roller chain reduction.

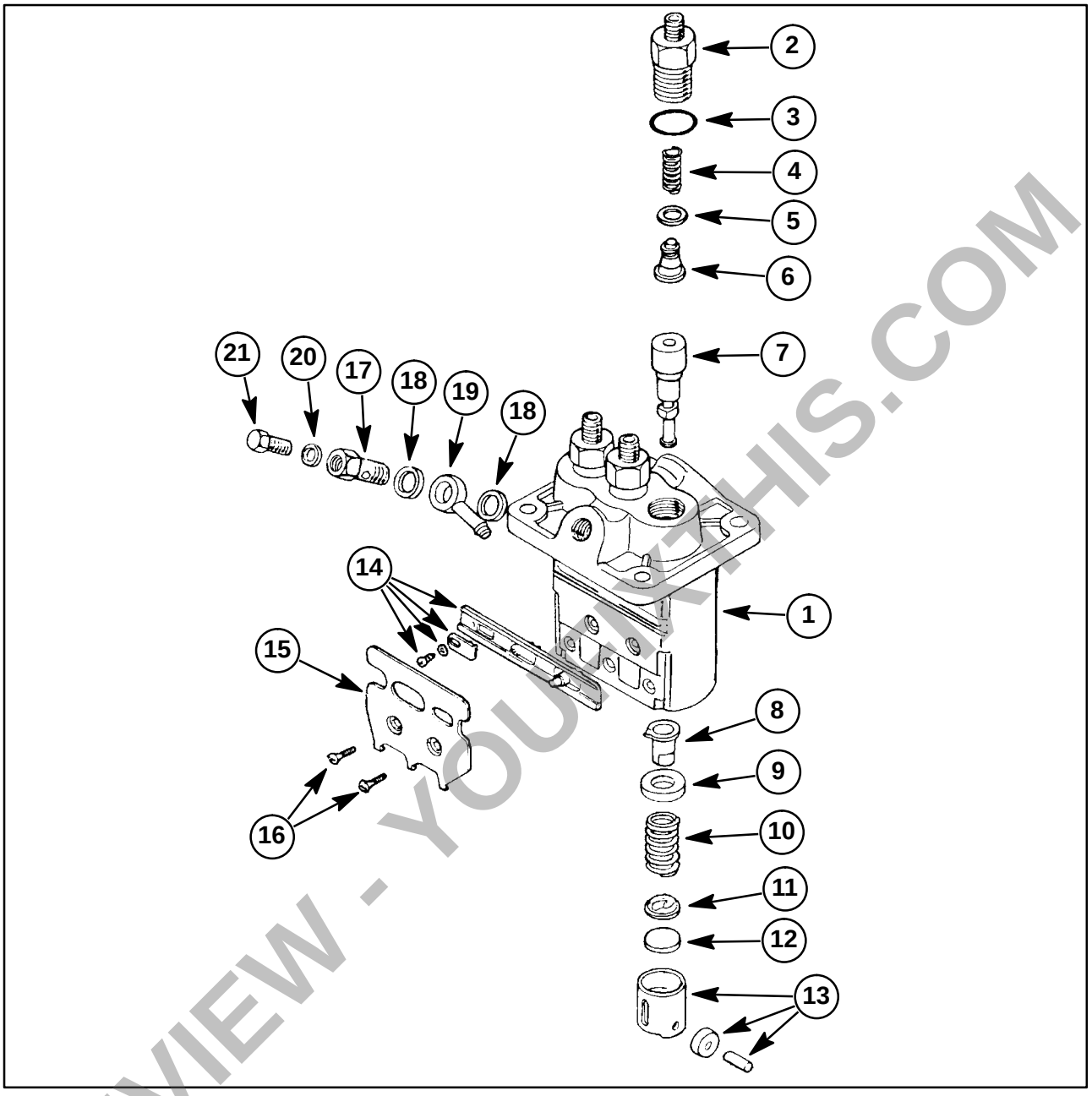
The hydrostatic charge circuit gets supply oil from the control valve return line, 3. The hydraulic oil from the control valve passes through the charge filter, 4. After the filter, the oil goes either to the hydrostatic pumps or back to the reservoir, through an 80 PSI check valve, 5. The check valve ensures that the supply pressure to the hydrostatic piston pumps always stays above 5.5 bar (80 PSI).

The charge oil pressure generally stays in the 5.8 to 8.0 bar (85 to 115 PSI) range, always providing adequate oil flow to the hydrostatic pumps. The left and right piston pumps supply oil to the motors whenever the steering levers are activated. A case drain line, 6, connects the two piston pumps to the reservoir. The case drain line drains hot oil and effectively cools the piston pumps. The case drain line allows hot lubrication/leakby oil to travel through the piston pump cases to the reservoir. The hydrostatic motor cases do not have case drains.

There are no high-pressure relief valves in the hydrostatic pumps. The ground drive is limited only by the engine power and the traction driving belt tension.

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FUEL INJECTION PUMP COMPONENTS

1. Housing Assembly
2. Delivery Valve Holder
3. O Ring
4. Delivery Valve Spring
5. Gasket
6. Valve and Seat Assembly
7. Element Assembly
8. Sleeve Assembly
9. Upper Spring Seat
10. Plunger Spring
11. Lower Spring Seat
12. Shim Plate
13. Tappet Assembly
14. Rack Assembly
15. Bracket
16. Bracket Screws
17. Bolt
18. Washers
19. Nipple
20. Washer
21. Screw

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MINIMUM HARDWARE TIGHTENING TORQUES

IN FOOT POUNDS (NEWTON-METERS) FOR NORMAL ASSEMBLY APPLICATIONS

INCH HARDWARE AND LOCKNUTS

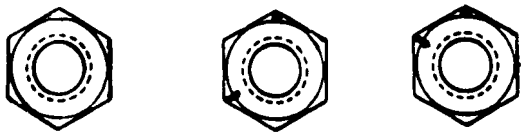
NOMINAL SIZE	SAE GRADE 2		SAE GRADE 5		SAE GRADE 8		LOCKNUTS		NOMINAL SIZE
	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD	GR.B w/GR5 BOLT	GR.C w/GR8 BOLT	
1/4	55* (6.2)	72* (8.1)	86* (9.7)	112* (13)	121* (14)	157* (18)	61* (6.9)	86* (9.8)	1/4
5/16	115* (13)	149* (17)	178* (20)	229* (26)	250* (28)	324* (37)	125* (14)	176* (20)	5/16
3/8	17 (23)	22 (30)	26 (35)	34 (46)	37 (50)	48 (65)	19 (26)	26 (35)	3/8
7/16	27 (37)	35 (47)	42 (57)	54 (73)	59 (80)	77 (104)	30 (41)	42 (57)	7/16
1/2	42 (57)	54 (73)	64 (87)	83 (113)	91 (123)	117 (159)	45 (61)	64 (88)	1/2
9/16	60 (81)	77 (104)	92 (125)	120 (163)	130 (176)	169 (229)	65 (88)	92 (125)	9/16
5/8	83 (112)	107 (145)	128 (174)	165 (224)	180 (244)	233 (316)	90 (122)	127 (172)	5/8
3/4	146 (198)	189 (256)	226 (306)	293 (397)	319 (432)	413 (560)	160 (217)	226 (306)	3/4
7/8	142 (193)	183 (248)	365 (495)	473 (641)	515 (698)	667 (904)	258 (350)	364 (494)	7/8
1	213 (289)	275 (373)	547 (742)	708 (960)	773 (1048)	1000 (1356)	386 (523)	545 (739)	1

NOTE: Torque values shown with * are inch pounds.

IDENTIFICATION
CAP SCREWS AND CARRIAGE BOLTS



SAE GRADE 2 SAE GRADE 5 SAE GRADE 8

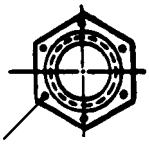


REGULAR NUTS SAE GRADE 5 HEX NUTS SAE GRADE 8 HEX NUTS

LOCKNUTS



GRADE IDENTIFICATION
GRADE A NO NOTCHES
GRADE B ONE CIRCUMFERENTIAL NOTCH
GRADE C TWO CIRCUMFERENTIAL NOTCHES



GRADE IDENTIFICATION
GRADE A NO MARKS
GRADE B THREE MARKS
GRADE C SIX MARKS
MARKS NEED NOT BE LOCATED AT CORNERS



GRADE A NO MARK
GRADE B LETTER B
GRADE C LETTER C
GRADE IDENTIFICATION

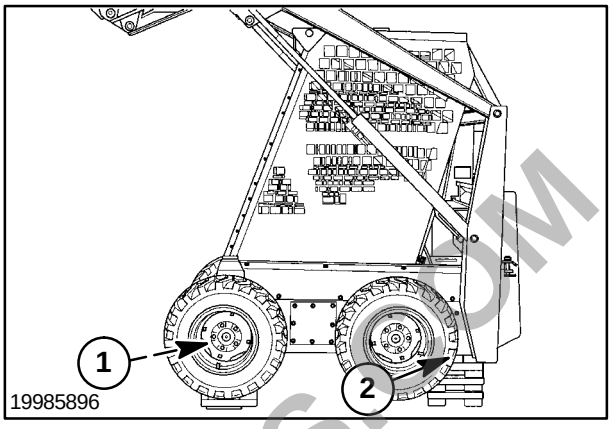
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PROPERLY SUPPORT A RAISED MACHINE

If servicing, neutral adjustment, final drive adjustment or repairs, require the machine to be raised with all four wheels off the ground, securely support the machine with adequate jack stands or blocks as shown.

Support the machine at 1, to the front of the final drive cases and to the rear at 2, making sure the supports are on the flat area of the final drive cases. Make sure the supports do not contact the wheels or tires.

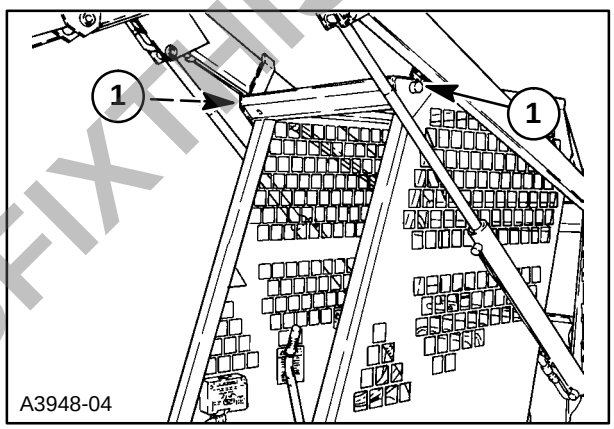


5

PROPERLY SUPPORT BOOM ON BOOM LOCK PINS

Before servicing the machine or any of its attached equipment, be sure that the attachments are lowered to the ground or the boom arms are supported by the boom lockpins, 1.

If boom is to be raised on boom lock pins, remove any attachment. Opening a hydraulic line could cause a mounted attachment to dump over unexpectedly.



6

⚠ DANGER ⚠

Never work beneath a loader or boom when it is held up only by the hydraulic system. A broken hydraulic line could cause the boom to descend rapidly.

Always actuate the boom lock before leaving a machine with the boom up and/or when servicing or repairing the unit with the boom up. Failure to do so could result in serious injury or death.

PROCEDURE:

1. RAISE THE BOOM, EXTEND THE BOOM LOCK PINS, 1, AND LOWER THE BOOM ON THE BOOM LOCKPINS.
2. AFTER STOPPING THE ENGINE AND BEFORE UNBUCKLING THE SEAT BELT AND DISMOUNTING FROM THE SKID STEER, TURN “ON” THE IGNITION SWITCH.
3. PUSH BOTH THE BOOM AND BUCKET PEDALS TO RELIEVE ALL HYDRAULIC PRESSURE IN BOTH CIRCUITS.
4. TURN “OFF” THE IGNITION SWITCH.
5. SET THE PARKING BRAKE.

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TROUBLESHOOTING

Starting				Running												
Engine fails to crank	Engine cranks slowly	Engine cranks but does not start	Backfire at carburetor	Engine stops	Exhaust black	Exhaust blue	Misfiring	Mechanical Knock	Low oil pressure	High oil pressure	Governor hunting	Loss of power	Oil Leaks	High oil consumption	Rough Idle	
																Starting System
•																Operator not in seat with belt buckled
•	•	•														Loose or corroded battery connection
•	•	•														Low or discharged battery
•	•	•														Faulty starter
•	•	•														Faulty start solenoid
																Ignition System
		•	•				•	•				•				Incorrect ignition timing
		•	•				•	•				•				Incorrect spark plug gap
		•	•				•					•				Bad ignition coil
		•	•				•					•				Bad spark plug wires
		•	•	•			•					•				Bad ignition module
		•	•	•			•					•				Bad trigger ring
																Fuel System
		•		•												Out of fuel
		•					•					•				Fuel mixture too lean
		•	•		•		•	•			•	•				Fuel mixture too rich
		•	•		•		•					•				Choke stuck
		•	•	•	•											Engine flooded
		•			•		•	•				•				Poor quality fuel
		•	•	•			•				•	•				Dirty carburetor
		•	•		•		•					•				Dirty air cleaner
		•					•				•	•				Clogged fuel filter
		•		•			•				•	•				Fuel pump defective
																Throttle and Governor
											•	•				Linkage out of adjustment
											•	•				Linkage worn or disconnected
											•	•				Governor spring sensitivity
											•	•				Linkage binding
																Lubrication System
									•							Defective oil pump
									•	•						By-pass valve stuck
						•			•							Oil too light or diluted
	•									•						Oil too heavy
									•							Oil level low
						•				•		•	•	•	•	Dirty crankcase breather valve
																Cooling System
							•									Dirty or oily cooling fins
							•									Poor air circulation
				•			•					•				Blown head gasket
																Internal Engine
								•								Valve clearance incorrect
						•		•								Broken Valve spring
						•										Valve or valve seal leaking
								•								Piston rings worn or broken
	•							•	•							Bearing clearance incorrect

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SPECIFICATIONS

CAPACITIES

Fuel Tank Capacity - LS120 and LS125 ..... 22.7 liters (6 US gal)
Chain Case Reservoir Capacity - LS120 and LS125 ..... 34.1 liters (9 US gal)
Crankcase Capacity with Filter - LS120 ..... 1.7 liters (1.8 US qts)
Crankcase Capacity with Filter - LS125 ..... 3.3 liters (3.2 US qts)
Cooling System Capacity - LS125 ..... 4.5 liters (1.2 US gal)

ENGINE GRADABILITY

LS120 Onan P218 ..... 25° (all directions except front end down - 15°)
LS125 New Holland E673 ..... 25° (all directions except front end down - 22°)

GASOLINE ENGINE - LS120

Manufacturer ..... Onan
Model P218
Fuel Type ..... Unleaded gasoline with minimum octane rating of 86
Cylinders 2
Cycle ..... 4 stroke
Bore and stroke ..... 82.55 mm x 73.03 mm (3.25″ x 2.88″)
Displacement ..... 782 cm^3 (47.7 $in.^3$)
Full Throttle Speed (no load) ..... 3500 - 3600 RPM
Idle Speed (no load) ..... 1100 - 1200 RPM
Horsepower (mfg. rating) @RPM ..... 18 hp @3600 RPM
Valve Clearance:
  Intake (cold) ..... 0.13 mm (0.005″)
  Exhaust (cold) ..... 0.33 mm (0.013″)
Ignition Timing (static setting) ..... 20° BTC
Oil Filter replacement cartridge ..... #507631
Fuel consumption (approx.) at continuous full load ..... 1.9 liters/hr. (0.50 gal./hr.)
Crankcase capacity with filter ..... 1.7 liters (1.8 US quarts)
Cooling System ..... Air-cooled
Ignition type ..... Spark
Spark plug type ..... Champion RS 12YC AC R42CLT3
Spark plug gap ..... 0.64 mm (0.025″)
Spark plug tightening torque ..... 31 - 41 N·m (25 - 30 ft. lbs.)
Fuel filter (in-line) ..... #9611973
Engine gradability ..... 25° (all directions except front end down - 15°)
Air Cleaner (standard):
  Precleaner outer (polyurethane) ..... #507138
  Inner element (paper) ..... #507139
Heavy Duty Air Cleaner (optional):
  Element (paper) ..... #217490
Engine mounting bolt torque ..... 34 N·m (25 ft. lbs.)

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PRECAUTIONARY STATEMENTS

PERSONAL SAFETY

Throughout this manual and on machine decals, you will find precautionary statements ("**CAUTION**", "**WARNING**", and "**DANGER**") followed by specific instructions. These precautions are intended for the personal safety of you and those working with you. Please take the time to read them.

⚠ CAUTION ⚠

The word "CAUTION" is used where a safe behavioral practice according to operating and maintenance instructions and common safety practices will protect the operator and others from accident involvement.

⚠ WARNING ⚠

The word "WARNING" denotes a potential or hidden hazard which has a potential for serious injury. It is used to warn operators and others to exercise every appropriate means to avoid a surprise involvement with machinery.

⚠ DANGER ⚠

The word "DANGER" denotes a forbidden practice in connection with a serious hazard.

FAILURE TO FOLLOW THE "**CAUTION**", "**WARNING**", AND "**DANGER**" INSTRUCTIONS MAY RESULT IN SERIOUS BODILY INJURY OR DEATH.

MACHINE SAFETY

Additional precautionary statement ("**IMPORTANT**") is followed by specific instructions. This statement is intended for machine safety.

IMPORTANT: *The word "**IMPORTANT**" is used to inform the reader of something he needs to know to prevent minor machine damage if a certain procedure is not followed.*

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9. Turn the ignition switch “ON” and attempt to start the installed engine. Never crank the engine for more than 30 seconds.

⚠ CAUTION ⚠

Overcranking the engine can cause starter damage. Allow the starter to cool for five minutes if engaged for 30 seconds.

10. Allow the starter to cool for at least five minutes before another attempt.
11. Once the engine starts, disconnect the negative cable from chassis ground. Then disconnect the positive cable from the positive (+) terminal of the installed battery. Do not allow cable ends to touch.
12. Disconnect the negative (–) cable from the booster battery. Disconnect the positive (+) cable from the booster battery.

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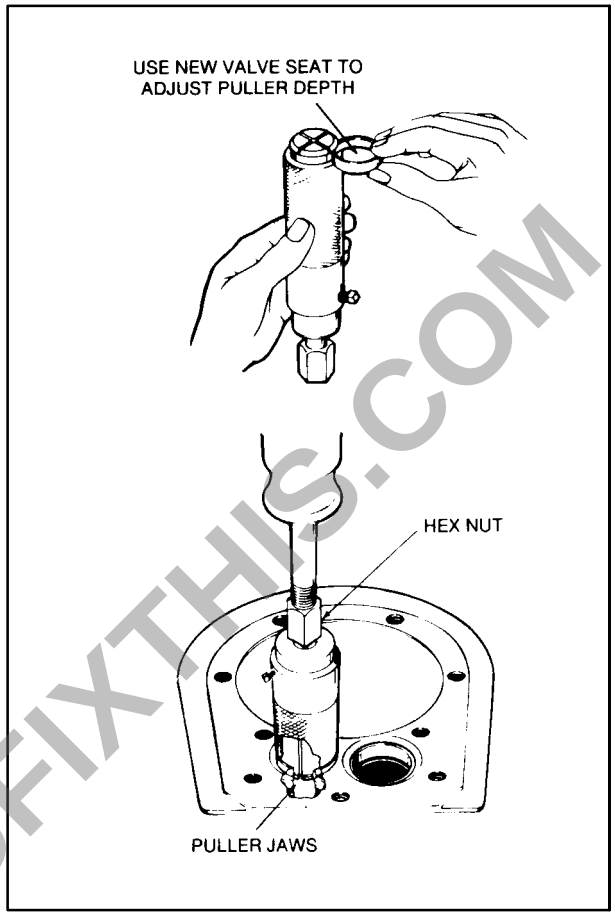
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Valve Seat Insert Replacement

1. Remove all carbon and combustion deposits from the valve seat.
2. Select the proper size puller as determined by the inside diameter of the valve seat.

NOTE: *Use a new seat as a guide to adjust the puller depth. Puller jaws must expand into the cylinder block at the point where the bottom of the valve seat insert rests on the cylinder block.*

3. Install the puller on the valve seat and tighten the hex nut.
4. Attach a slide hammer to the puller. Tighten the hex nut after each blow of the slide hammer until the seat is removed.

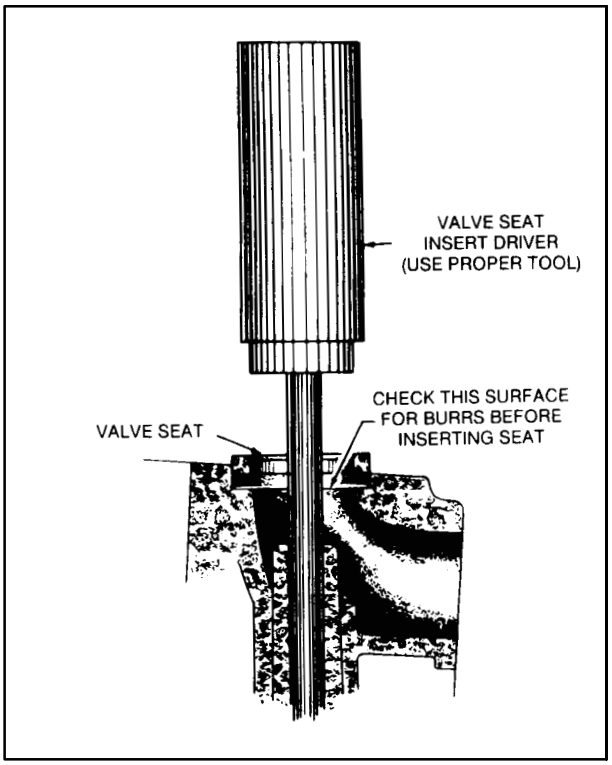


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5. Clean out any carbon deposits or metal burrs from the seat recess.

NOTE: *If the valve seat insert bores are worn or damaged so that a press fit cannot be obtained when installing new standard size valve seat inserts, the bores must be machined for the next available oversize seat.*

6. Using an inside micrometer, measure the diameter of the valve seat bore, if the bore is not within the following tolerances, machine the bore to the next oversize. If the bore is greater than the 0.64 mm (0.025″) oversize maximum value, replace the block.

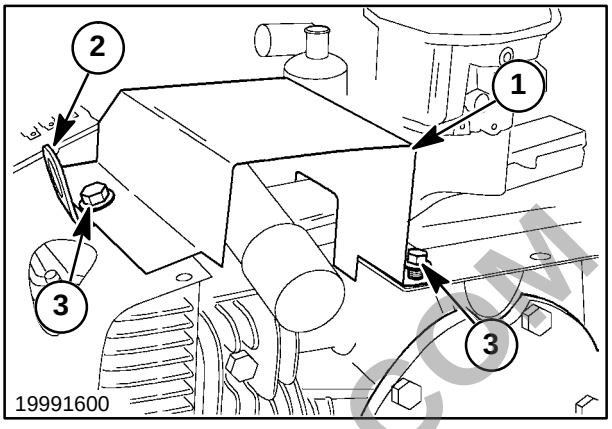


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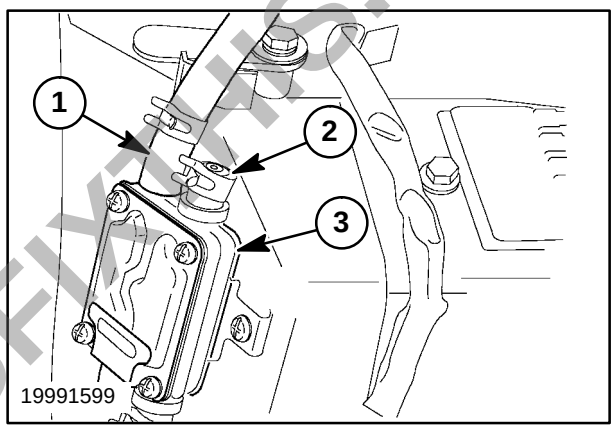
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20. Install the left exhaust pipe cover, 1, and lifting eye, 2, with two retaining bolts, 3.



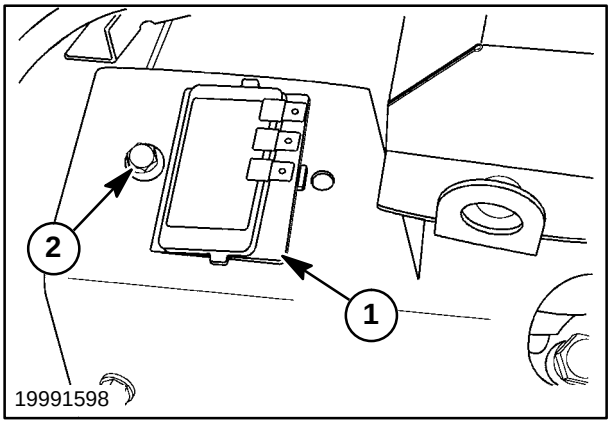
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21. Connect the tank fuel line, 1, and carburetor fuel line at 2, to the pulse fuel pump, 3.



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22. Install the voltage regulator, 1, with the attaching bolt, 2.



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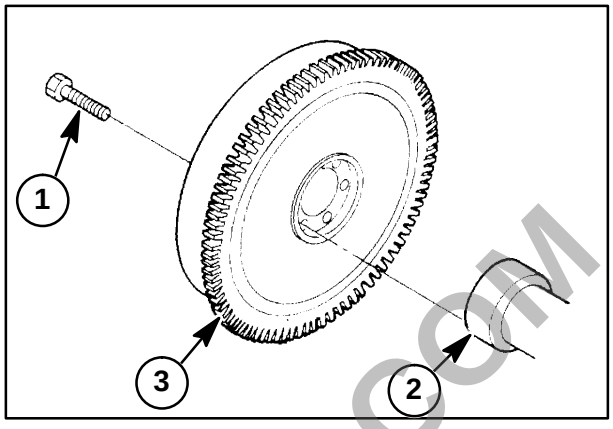
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Flywheel Removal

1. Loosen the flywheel retaining bolts, 1.
2. Using a brass drift and hammer, tap the end of the crankshaft, 2, to loosen the flywheel, 3, from the shaft.
3. Remove the retaining bolts, lock washers, and flywheel from the crankshaft.

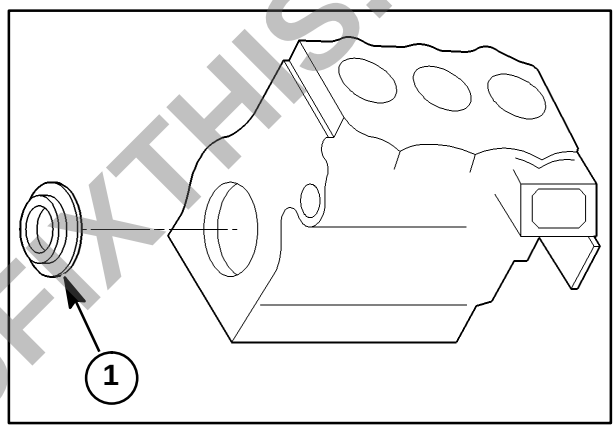


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Op. 10 102

Backplate and Oil Seal

1. Remove the backplate retaining bolts and remove the backplate.
2. Remove the rear oil seal, 1.

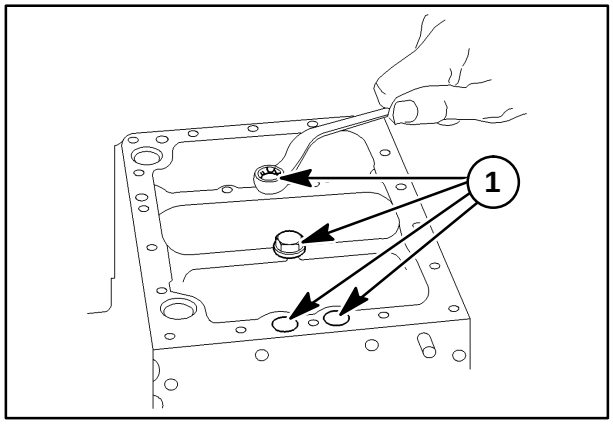


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Op. 10 103 10

Crankshaft and Main Bearings Removal

1. Remove the crankshaft bearing holder retaining bolts, 1.
2. Slide the crankshaft and main bearing assembly through the rear of the engine.



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Adjust hydrostatic drive belt

IMPORTANT: *The hydrostatic drive belt may be damaged by misalignment of the drive sheaves or the idler. Engagement of the drive belt at high engine speed can cause belt failure if the idler is not tracking true. Adjust drive sheaves and idler when reinstalling the engine.*

Use the two setscrews to adjust the right hydrostatic drive sheave for 12.7 mm (1/2″) clearance from the support plate.

Use a straight-edge to align the face of the left hydrostatic drive sheave to the face of the right hydrostatic drive sheave. Tighten the setscrews in both hydrostatic pump sheaves.

Align the back of the engine sheave with the faces of the two hydrostatic drive sheaves.

Use 9.5 mm (3/8″) washers to shim the engine mounts for up/down corrections.

Shift the engine on the engine mounting bolts for left/right adjustments.

When adjustments are complete, tighten the engine mounting bolts to 34 N·m (25 ft. lbs.)

Engage the belt drive control lever at the operator's position.

Check the idler arm for clearance with the left hydrostatic drive sheave. Shim the idler arm with 9.5 mm (3/8″) washers if required.

Check traction drive belt tension

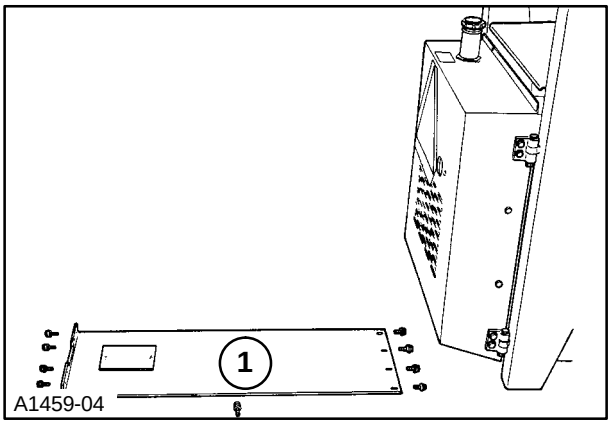
Measure the length of the spring. With the drive belt engaged, the spring length should be 140 mm (5.5″).

Loosen the two bolts and move the bracket to adjust the spring length to obtain 140 mm (5.5″).

⚠ CAUTION ⚠

The belly pan is heavy and could cause personal injury if dropped. Support the belly pan while removing or reinstalling the belly pan.

Reinstall the belly pan, 1, using a floor jack. Replace the nine bolts.

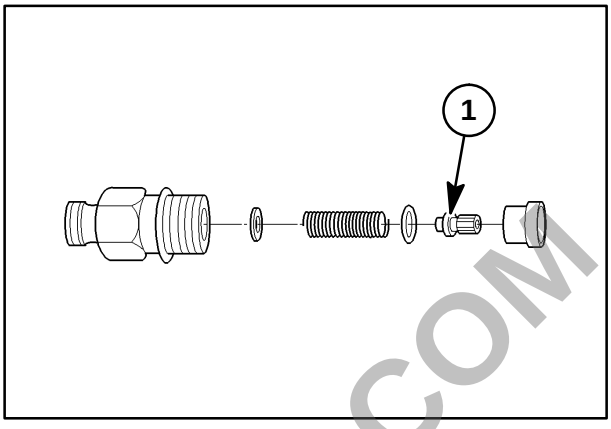


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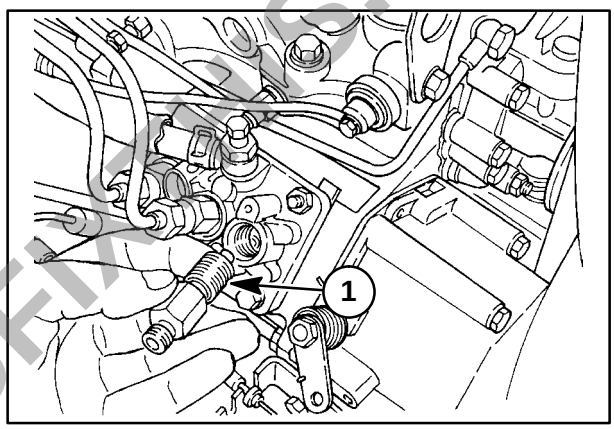
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11. Remove the delivery valve piston, 1, from the No. 1 delivery valve.



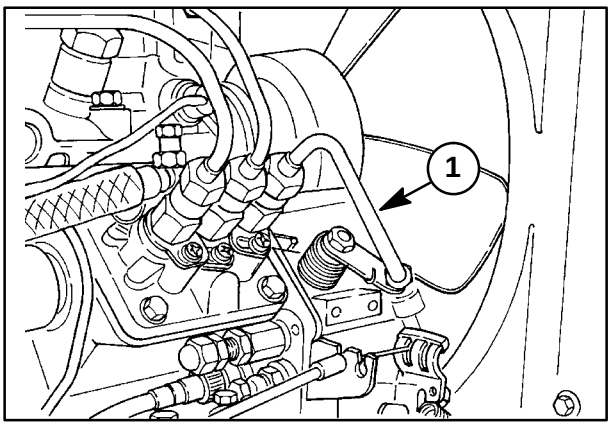
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12. Reinstall the spring and holder, 1, into the injection pump and tighten securely.



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13. Fabricate a spill tube, 1, from a discarded injection line and install the tube on the No. 1 port on the injection pump.
14. Remove the fuel shut-off solenoid from the injection pump.

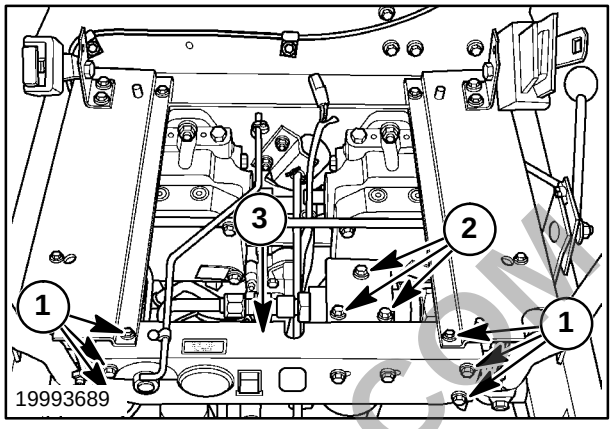


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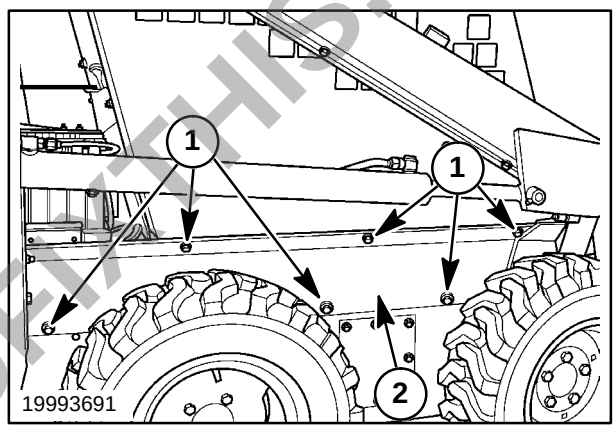
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7. Remove the six dash bolts, 1, and the three hydraulic filter mounting bolts, 2, securing the dash.
8. Pull the dash, 3, forward and down.



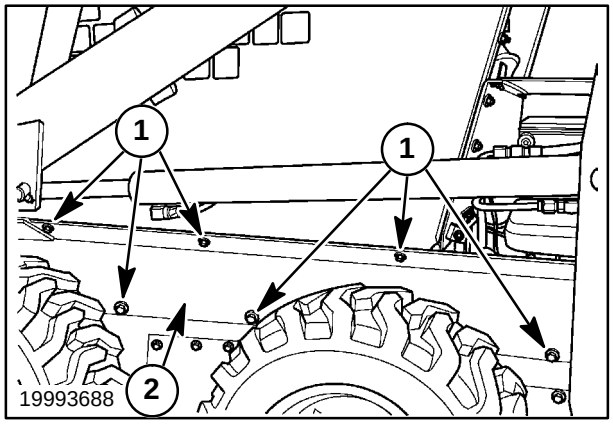
10

9. Remove the six bolts and the right side shield, 1.



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10. Remove the six bolts and the left side shield, 1.

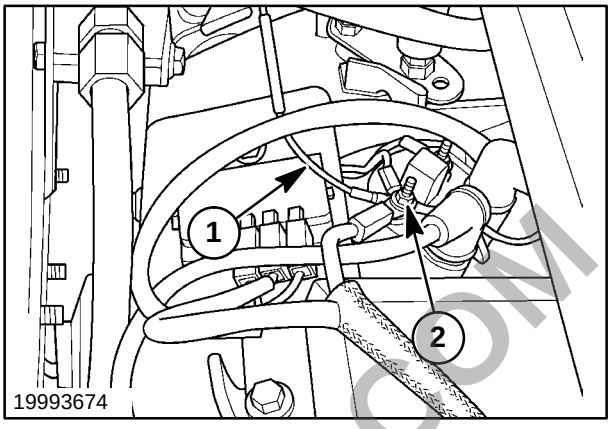


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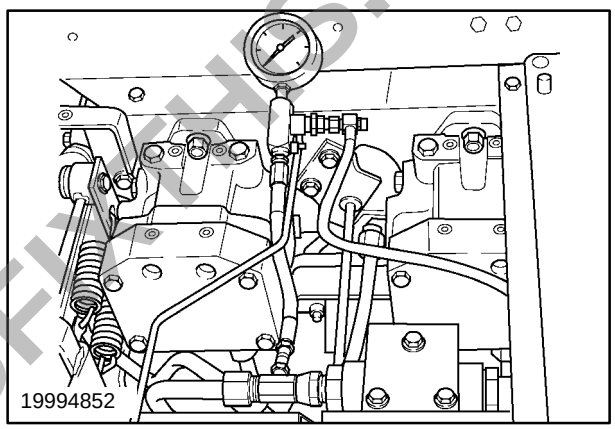
9. LS120 only - Reconnect the PU wire, 1, to the ignition coil positive (+) terminal, 2.



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10. Start the engine and set the engine speed at low idle. The charge pressure gauge should read 5.5 - 8.3 bar (80 - 120 PSI) within 5 to 10 seconds of start-up, indicating normal running conditions.

IMPORTANT: *If the charge pressure remains below 5.5 bar (80 PSI) for more than a few seconds, stop operation and determine the cause of low charge pressure. Failure to stop operation with a lack of charge oil could cause catastrophic failure of the transmissions.*



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11. After the charge pressure gauge indicates normal operation, set the engine speed at 1/2 throttle and let the engine run for 20 minutes to allow the filter to clean the hydraulic system.
12. Stop the engine and check the hydraulic reservoir oil level. Fill as needed.

⚠ CAUTION ⚠

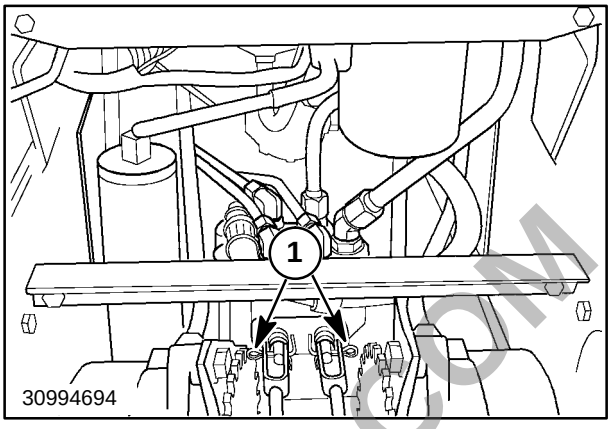
Do not operate the loader in any position other than while in the operator's seat with the seat belt securely fastened.

13. Sit in the loader and activate the boom and bucket pedals intermittently for 3 minutes at 1/2 throttle to bleed air from the system.
14. Engage the transmission belt clutch.
15. Slowly move the steering levers to activate the transmissions.
16. Continue to operate the system slowly with no load on the wheels until they turn smoothly and positively indicating trapped air has been bled back to the reservoir.
17. Stop the engine and check the hydraulic oil level in the reservoir. Fill as needed.

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3. Connect the boom and bucket linkages with the cotter pins, 1.
4. Install the belly pan on the bottom of the loader with the nine mounting bolts.



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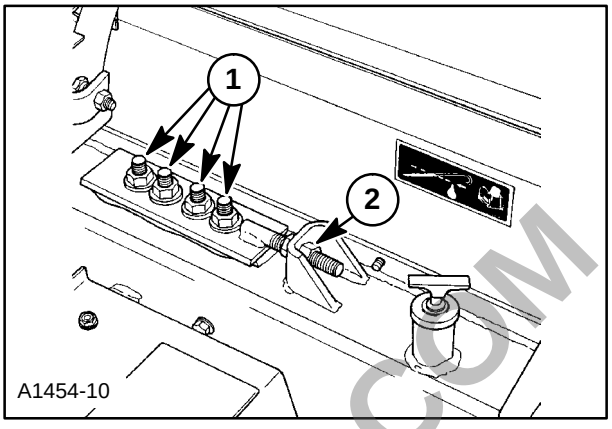
5. Tighten the four idler clamping nuts, 1, to 14 - 20 N·m (10 - 15 ft. lbs.).
6. Back off the adjusting nut, 2, about 3 mm (0.125″).

⚠ WARNING ⚠

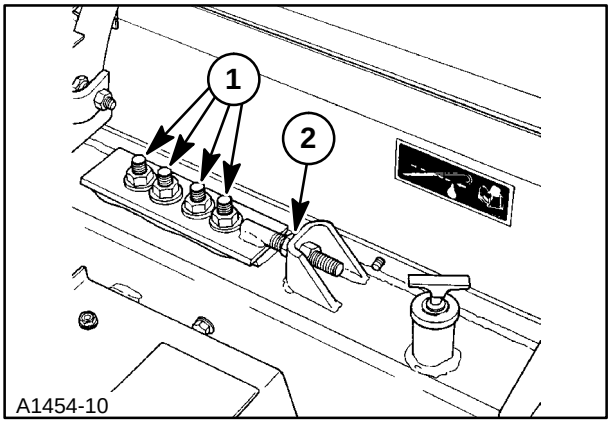
Stand clear of the wheels while the engine is running.

NOTE: *Rapid motion of the control lever may cause the idler to move more than desired. Do not move the control lever rapidly.*

7. Start the engine at idle speed.
8. Slowly stroke the control lever to turn the wheels several times forward.
9. Slowly stroke the control lever back to turn the wheels several times backward.
10. Return the control lever to the neutral position.
11. Stop the engine.
12. Check for idler cover plate movement. Movement of the cover plate indicates that chain tension was too tight. Back off the adjusting nut and repeat the test.
13. When no further movement of the idler cover plate is observed, tighten the adjusting nut.
14. Oil the idler clamping bolts, 1, and tighten the nuts to 122 N·m (90 ft. lbs.). Tighten the jam nut, 2.



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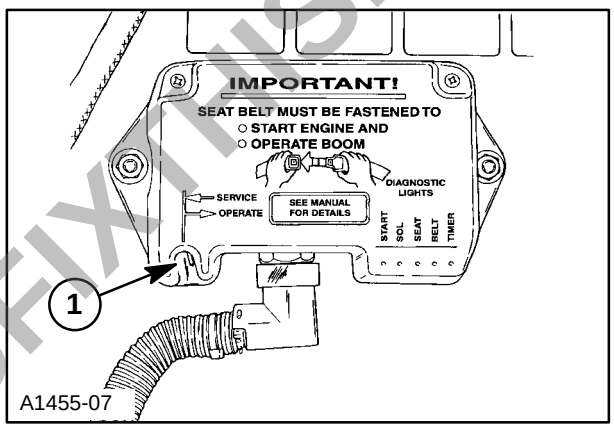
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CONTROL MODULE RESTRAINT SYSTEM OPERATION

This is a sequence system to interlock the seat and seat belt into the engine start circuit and boom hydraulic circuit.

The operator must properly sequence the system on LS120 and LS125 loaders equipped with this system. The operator must sit in the seat first, and then buckle the seat belt to activate the boom lock solenoid valve and to start the engine. If the operator unbuckles the seat belt, is out of the operator's seat, or turns the ignition key switch to the OFF position, the boom solenoid will activate and prevent movement of the boom.

The control module has a Service/Operate switch, 1. The switch must be in the OPERATE position for normal engine starting and boom operation. When the switch is in the SERVICE position, the engine will start but the boom will not operate. Use the SERVICE position for service or adjustment of the hydrostatic system and final drives.



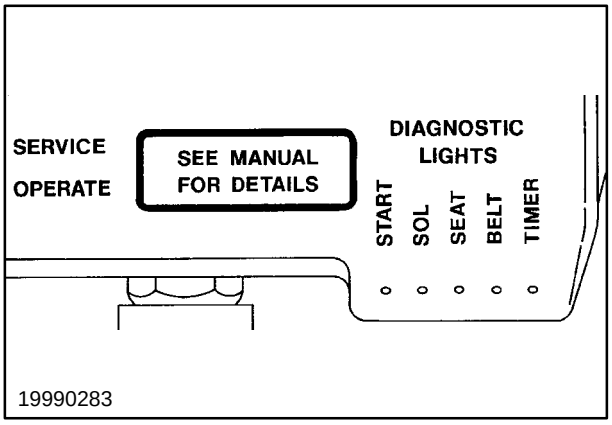
13

⚠ CAUTION ⚠

Before switching the service/operate switch to the service position, lower the boom and attachments to the ground or support the boom on the boom lock pins. The entire loader should be supported solidly with the wheels off the ground.

The control module has five diagnostic lights. The control module diagnostic lights are labeled:

Control Module Circuit	Diagnostic Light
Starting	START
Boom Solenoid	SOL
Seat Switch	SEAT
Seat Belt Switch	BELT
Timer Circuit	TIMER

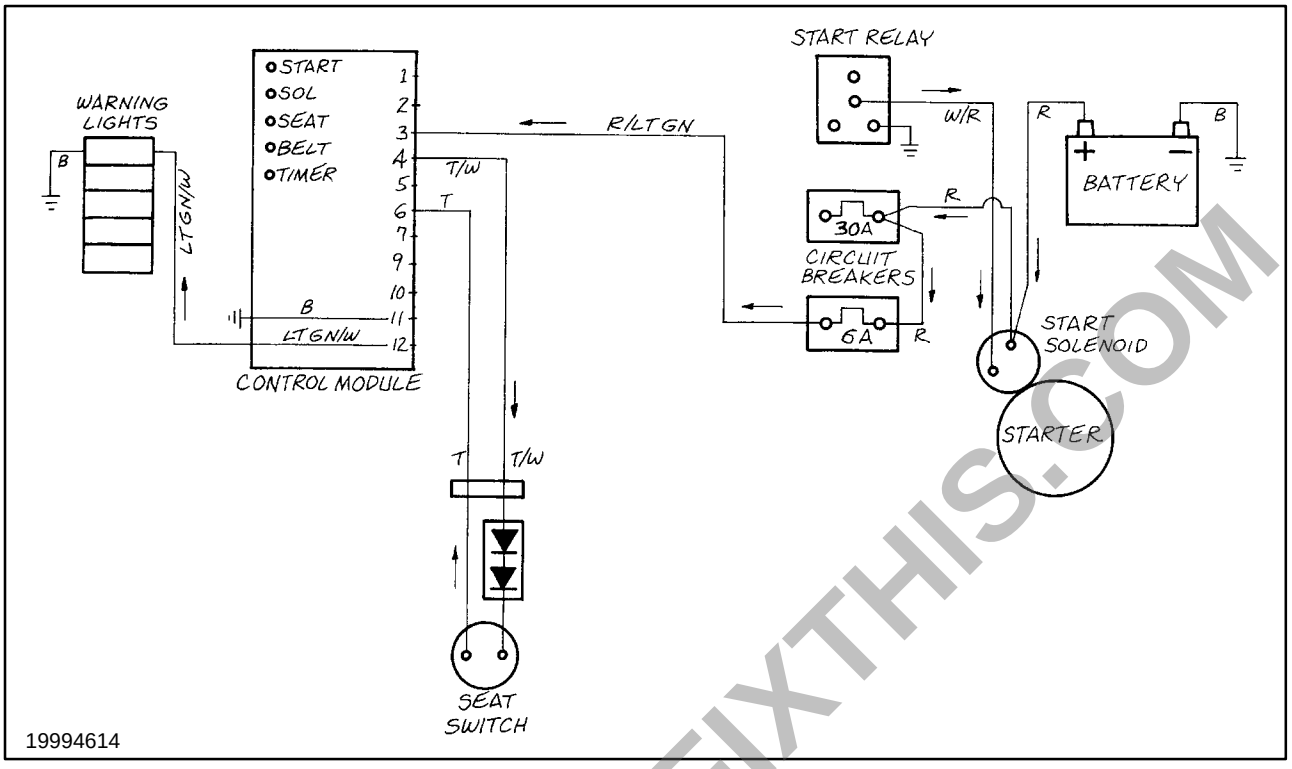


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These lights will be explained in more detail in the DIAGNOSTIC LIGHTS section.

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Step #1 Voltage Flow - LS125
Make sure the battery is connected, the Service/Operate switch is in the OPERATE position, and the ignition key is in the OFF position.

Step #1 - Sit in seat. (Seat switch activated.)

Two diagnostic lights should be on:

- SEAT
- TIMER

The power originates at the battery and continues through the R positive battery cable to the start solenoid at the starter. From the starter, power goes through the R wire to the battery side of the 30-amp breaker, then through the R wire to the 6-amp circuit breaker. The power continues from the 6-amp circuit breaker through the R/LTGN wire to the control module, pin #3 of the wire harness connector.

The control module sends battery voltage to the seat switch from connector pin #4 through the T/W wire. When the operator sits on the operator's seat and the switch is closed (switch activated), battery voltage passes through resistor-type diodes in the T/W wire to the switch, lowering the voltage before the switch. The voltage returning to the control module through the T wire to connector pin #6 will be 1.2 - 1.6 volts less than battery voltage.

The control module is grounded from harness connector pin #11 to frame ground.

Battery voltage continues from connector pin #12 through the LTGN/W wire to the console warning light, turning on the Fasten Seat Belt light. The light is grounded to frame ground.

Problems, Causes and Corrections

1. TIMER and SEAT light go OFF.
   a. Check the 6-amp and 30-amp circuit breakers for proper wiring as shown, battery side to battery side.
   b. Check the battery voltage "IN" and "OUT" of the 6-amp circuit breaker. If the voltage difference is more than 0.5 volt, replace the circuit breaker.
   c. Check the R/LTGN power wire from the circuit breaker to the control module for a loose connection or short.
2. Console Fasten Seat Belt light does not light.
   a. Check the LTGN/W power wire from the control module to the seat belt indicator light for an open.
   b. Check for a blown or loose light bulb.
   c. Check the light ground for poor or no ground.

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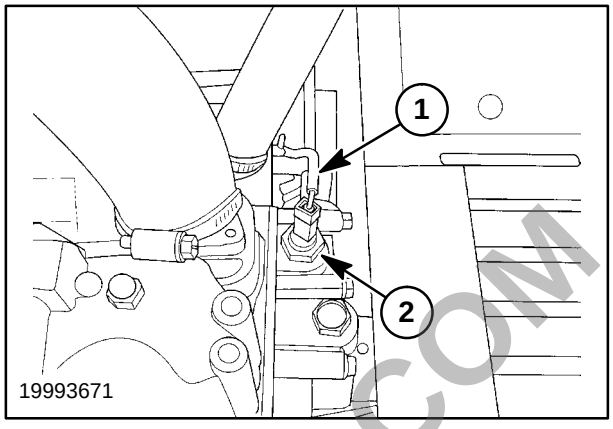
WATER TEMPERATURE SENSOR - LS125

Op. 55 414 10

Removal

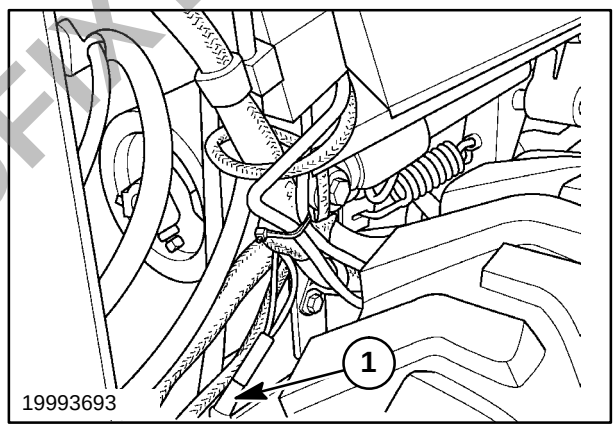
1. Unplug the PU/LTGN wire, 1, from the sensor, 2.
2. Drain the cooling system down below the sensor level to prevent loss of coolant.
3. Remove the sensor from the water pump.
4. Test the resistance of the sensor at different temperatures and compare to the chart below.

Temperature	Resistance
50° C (122° F)	154 ohms
80° C (176° F)	52 ohms
100° C (212° F)	27 ohms
120° C (248° F)	16 ohms



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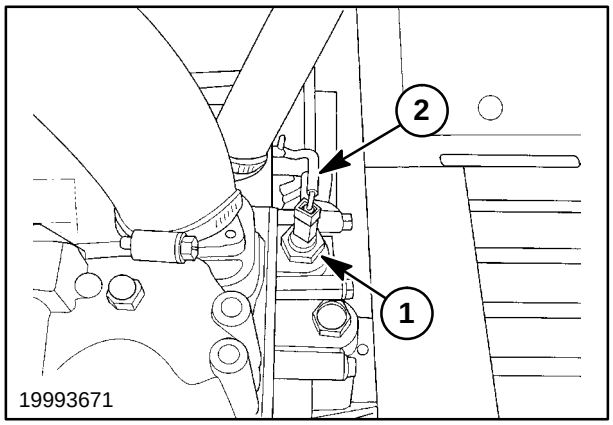
5. Remove the sensor resistor, 1, from the connector with Y/LTGN and PU/LTGN wires. Check that the resistance is close to 2000 ohms. Reinstall the resistor.



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Installation

1. Apply pipe sealant to the threads of the sensor, 1, and install the sensor into the top of the water pump.
2. Plug the PU/LTGN wire into the sensor, 2.
3. Refill the cooling system with coolant previously removed or a 50/50 mixture of a permanent-type antifreeze.
4. Operate the unit to remove air from the cooling system, and recheck the coolant level.



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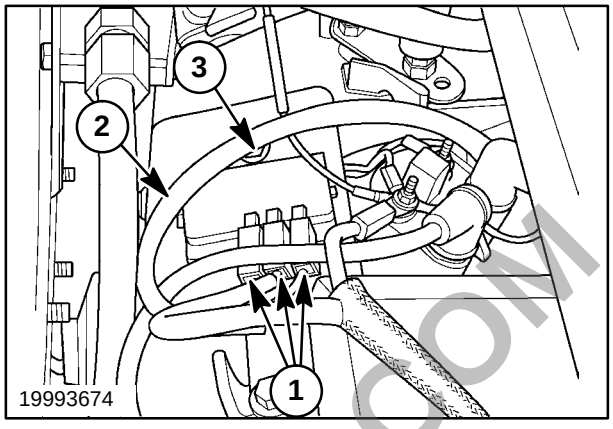
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Op. 55 301 04

ALTERNATOR SYSTEM INSPECTION - LS120

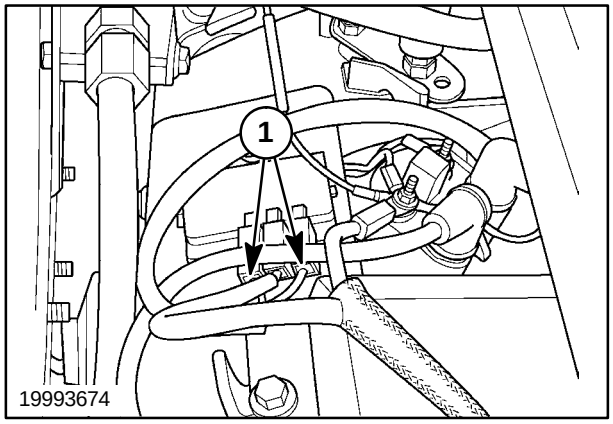
1. Be sure the regulator/rectifier connectors, 1, are inserted correctly. The plugs must be fully inserted onto the spade clips.
2. Make sure the alternator stator leads, 2, are not shorted together.
3. Check the regulator/rectifier ground connection, 3, through the mounting bolt. The mating surface must be clean and the fastener tightened properly.
4. Use a hand held tachometer to run the engine between 1800 and 2500 RPM. Install a clamp-on ammeter on the positive (+) battery cable. If no charging is evident, proceed with the Alternator Output Test.



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ALTERNATOR OUTPUT TEST - LS120

1. Use a volt-ohmmeter and check the battery voltage with the engine off. If voltage is not at least 11 volts, charge the battery before proceeding.
2. With the engine running, check the battery terminal voltage (regulator output) using a DC voltmeter.
   - If voltage is greater than 15 volts, replace the regulator/rectifier assembly.
   - If voltage is between 13.5 and 15 volts, place a load on the replace the regulator/rectifier assembly. If the amperage increases, the system is okay. If the amperage charge does not increase, measure the voltage from the B+ terminal of the regulator/rectifier with the engine speed at 3600 RPM. If the B43G engine is less than 28 volts or the P218 engine is less than 57 volts, replace the stator. If the voltage is much higher than these values, replace the regulator/rectifier.
   - If the voltage is less than 13.5 volts, examine all wires for loose, broken, or corroded connections. Check fuses. Check all ground connections. Correct as necessary to ensure continuity between the regulator/rectifier B+ terminal and the battery positive (+) terminal.
3. If battery voltage remains low with the engine running, stop the engine and disconnect the alternator stator leads, 1, from the regulator/rectifier. Restart the engine and check AC voltage at the stator leads. If AC voltage is within specifications, replace the regulator/rectifier.



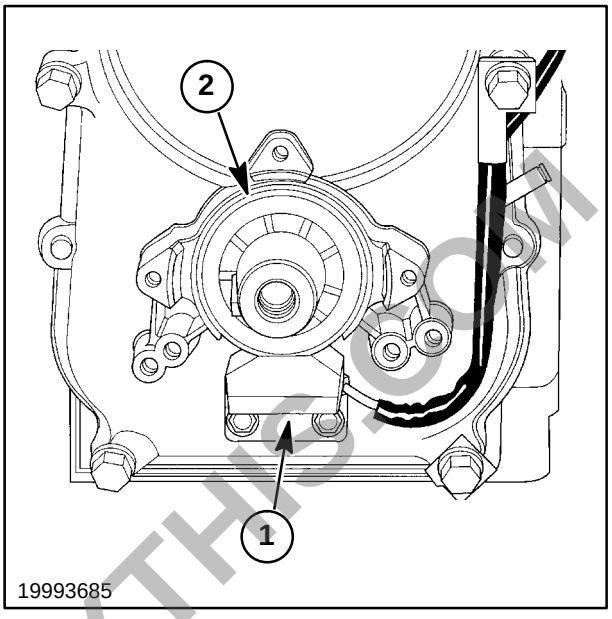
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IGNITION SYSTEM - LS120

The LS120 P218 engine has an electronic battery ignition system. No distributor is required because both plugs fire simultaneously. The electronic ignition module, 1, is located on the engine gear cover behind the flywheel. The module receives a trigger from magnets in the trigger ring, 2, that rotates with the engine crankshaft.



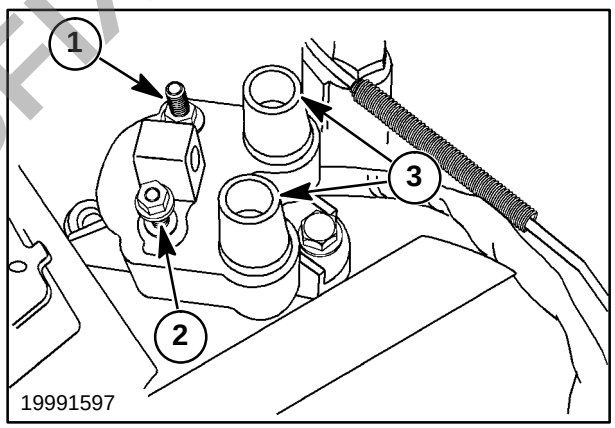
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IGNITION COIL

Test the primary and secondary windings within the ignition coil. Make sure the ignition power is OFF and the coil is at approximately 21° C (70° F).

1. Disconnect all leads from the top of the ignition coil.
2. Using an ohmmeter, place the black lead on the negative (–) coil terminal, 1, where the B ignition module wire was connected. Place the red lead on the positive (+) coil terminal, 2, where the LTBL/B power wire was connected. Primary coil resistance should read between 2.90 - 3.60 ohms.
3. Change the resistance scale on the ohmmeter. Place the ohmmeter leads inside the spark plug cable holes, 3. Secondary coil resistance should be between 14,500 - 19,800 ohms.

   If either primary and secondary windings are out of tolerance, replace the coil.



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