FARMALL 40, FARMALL 45, FARMALL 50 REPAIR MANUAL COMPLETE CONTENTS

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The following pages are the collation of the contents pages from each section and chapter of the Farmall 40, Farmall 45, Farmall 50 Repair manual. Complete Repair part # 87473193.

The sections used through out all Case IH product Repair manuals may not be used for each product. Each Repair manual will be made up of one or several books. Each book will be labeled as to which sections are in the overall Repair manual and which sections are in each book.

The sections listed above are the sections utilized for the Farmall 40, Farmall 45, Farmall 50 Tractors.

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SAFETY

⚠ PRECAUTIONARY STATEMENTS ⚠

A careful operator is the best operator. Most accidents can be avoided by observing certain precautions. To help prevent accidents, read and take the following precautions before operating this tractor. Equipment should be operated only by those who are responsible and instructed to do so.

THE TRACTOR

1. Read the Operator's Manual carefully before using the tractor. Lack of operating knowledge can lead to accidents.
2. Use an approved roll bar and seat belt for safe operation. Overturning a tractor without a roll bar can result in death or injury. If your tractor is not equipped with a roll bar and seat belt, see your Case IH Dealer.
3. Always use the seat belt. The only instance when the seat belt should not be used is if the roll bar has been removed from the tractor or folding ROPS is in down position.
4. If a front end loader is to be installed, always use a FOPS (Falling Object Protective Structure) canopy to avoid injury from falling objects.
5. Use the handholds and step plates when getting on and off the tractor to prevent falls. Keep steps and platform cleared of mud and debris.
6. Do not permit anyone but the operator to ride on the tractor. There is no safe place for extra riders.
7. Keep all safety decals clean of dirt and grime, and replace all missing, illegible, or damaged safety decals. See the list of decals in the Decal section of this manual.

SERVICING THE TRACTOR

1. The cooling system operates under pressure which is controlled by the radiator cap. It is dangerous to remove the cap while the system is hot. Always turn the cap slowly to the first stop and allow pressure to escape before removing the cap entirely.
2. Keep any type of open flame away from the tractor and do not smoke while refueling. Wait for the engine to cool before refueling.
3. Keep the tractor and equipment, particularly brakes and steering, maintained in a reliable and satisfactory condition to ensure your safety and comply with legal requirements.
4. Keep open flame or cold weather starting aids away from the battery to prevent fires or explosions. Use jumper cables according to instructions to prevent sparks which could cause explosion.
5. Stop the engine before performing any service on the tractor.
6. Escaping hydraulic/diesel fluid under pressure can penetrate the skin causing serious injury. If fluid is injected into the skin, obtain medical attention immediately or gangrene may result.
   - DO NOT use your hand to check for leaks. Use a piece of cardboard or paper to search for leaks.
   - Stop the engine and relieve pressure before connecting or disconnecting lines.
   - Tighten all connections before starting the engine or pressurizing lines.
7. Do not modify or permit anyone else to modify or alter this tractor or any of its components or functions without first consulting a Case IH Dealer.
8. The fuel oil in the injection system is under high pressure and can penetrate the skin. Unqualified persons should not remove or attempt to adjust a pump, injector, nozzle, or any other part of the fuel injection system. Failure to follow these instructions can result in serious injury.
9. Continuous long-term contact with used engine oil may cause skin cancer. Avoid prolonged contact with used engine oil. Wash skin promptly with soap and water.

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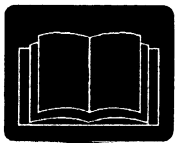
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SPECIFICATIONS - FARMALL 40, 45, 50 with 12x12 GEAR TRANSMISSION

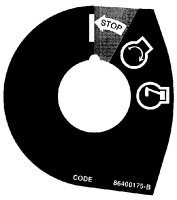
	Model Farmall 40	Model Farmall 45	Model Farmall 50
ENGINE			
Type/Model	Diesel/N843	Diesel/N844L	Diesel/N844L
Engine Gross Horsepower	29.8 kw (40.0)	33.6 kw (45.0)	37.3 kw (50)
Cylinders	4	4	4
Bore	84 mm (3.31 in)	84 mm (3.31 in)	84 mm (3.31 in)
Stroke	90 mm (3.54 in)	100 mm (3.94 in)	100 mm (3.94 in)
Displacement	2.0 L (121.7 cu. in.)	2.2 L (135.2 cu. in.)	2.2 L (135.2 cu. in.)
Compression Ratio	22.5:1	22.5:1	22.5:1
Firing Order	1-3-4-2	1-3-4-2	1-3-4-2
Low Idle Speed	1050 ± 50 rpm	1050 ± 50 rpm	1050 ± 50 rpm
Maximum Speed:			
High Idle	2840 ± 25 rpm	2840 ± 25 rpm	3025 ± 25 rpm
Rated	2600 rpm	2600 rpm	2800 rpm
CAPACITIES			
Fuel Tank	49.2 liters/ 13 U.S. gals	49.2 liters/ 13 U.S. gals	49.2 liters/ 13 U.S. gals
Cooling System	7.9 liters/ 8.3 U.S. qts	8.0 liters/ 8.4 U.S. qts	8.0 liters/ 8.4 U.S. qts
Engine Crankcase:			
With Filter	6.0 liters/ 6.3 U.S. qts	6.0 liters/ 6.3 U.S. qts	6.0 liters/ 6.3 U.S. qts
Rear Axle & Transmission (Includes Hydraulics)	36 liters/ 9.2 U.S. gals	36 liters/ 9.2 U.S. gals	36 liters/ 9.2 U.S. gals
Front Axle Final Reduction /Differential Gear Case	5.3 liters/ 5.6 U.S. qts	5.3 liters/ 5.6 U.S. qts	5.3 liters/ 5.6 U.S. qts

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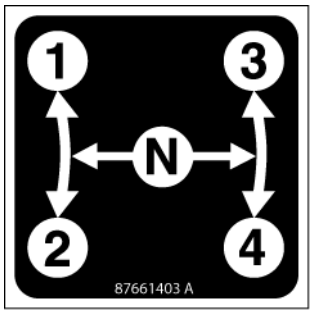
Hyd. Manifold Operation
(See Operator's Manual)
PART NO: 86532914
LOCATION: Right-Hand Side
of Hyd. Manifold/Air Filter Cap



Starter Switch
PART NO: 86400175
LOCATION: Starter Switch,
Right Side of Instrument Panel



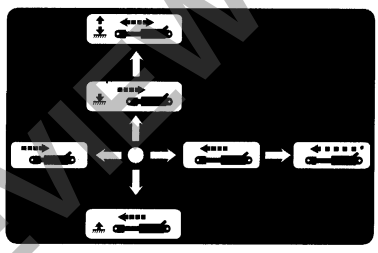
Engine Oil
PART NO: 86532916
LOCATION: Engine Oil
Filler Cap



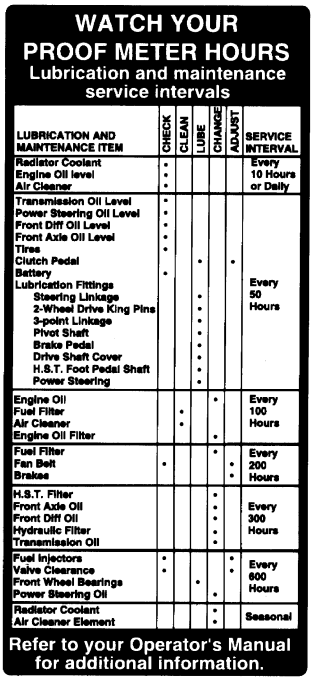
Main Shift Lever
PART NO: 87661403
LOCATION: Top right of dash



Forward-Reverse Shuttle
PART NO: 87301625
LOCATION: Top Left
of Dash



Operating Remote
Control Valve–
Double Spool
PART NO: 86532911
LOCATION: Cover of
2-Spool Remote Valve



WATCH YOUR PROOF METER HOURS
Lubrication and maintenance service intervals

LUBRICATION AND MAINTENANCE ITEM	CHECK	CLEAN	LUBE	CHANGE	ADJUST	SERVICE INTERVAL
Radiator Coolant	•					Every 10 Hours or Daily
Engine Oil level	•					
Air Cleaner	•					
Transmission Oil Level	•					Every 50 Hours
Power Steering Oil Level	•					
Front Diff Oil Level	•					
Front Axle Oil Level	•					
Tires	•					
Clutch Pedal			•		•	
Battery	•					
Lubrication Fittings						
Steering Linkage			•			
2-Wheel Drive King Pins			•			
3-point Linkage			•			
Pivot Shaft			•			
Brake Pedal			•			
Drive Shaft Cover			•			
H.S.T. Foot Pedal Shaft			•			
Power Steering			•			
Engine Oil				•		Every 100 Hours
Fuel Filter		•				
Air Cleaner		•				
Engine Oil Filter				•		
Fuel Filter				•		Every 200 Hours
Fan Belt	•				•	
Brakes					•	
H.S.T. Filter				•		Every 300 Hours
Front Axle Oil				•		
Front Diff Oil				•		
Hydraulic Filter				•		
Transmission Oil				•		
Fuel Injectors	•				•	Every 600 Hours
Valve Clearance	•				•	
Front Wheel Bearings			•			
Power Steering Oil				•		
Radiator Coolant				•		Seasonal
Air Cleaner Element				•		

Refer to your Operator's Manual for additional information.

Lubrication and
Maintenance Intervals
PART NO: 86400357
LOCATION: Inside of Hood

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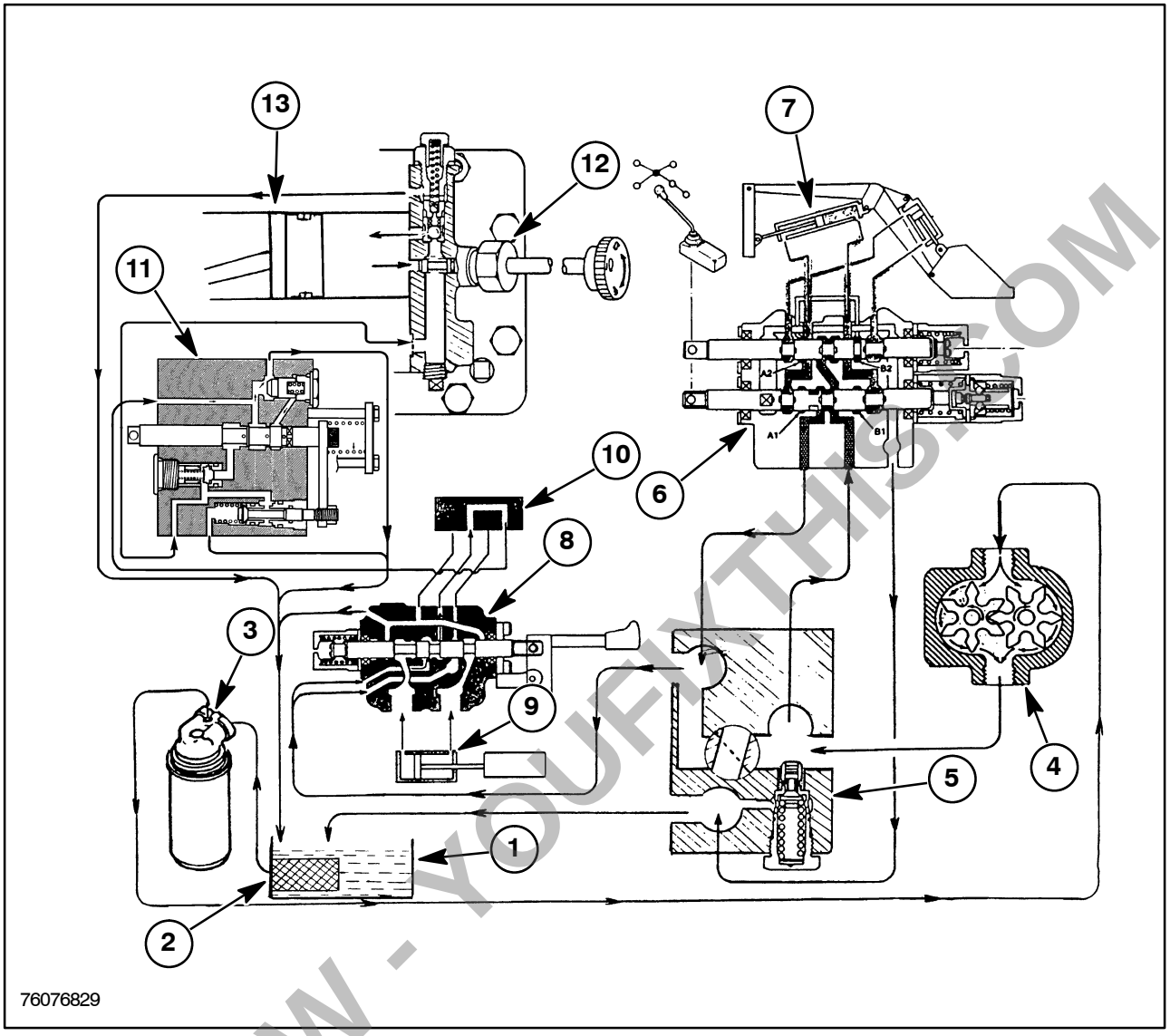
ELECTRICAL SCHEMATIC DIAGRAM 87521018
CASE IH CLASS 3 NAR COMPACT TRACTOR

GEAR TRANSMISSION

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INSTRUMENTS	10
MAIN LIGHTS	11
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STARTING SYSTEM	7
WARNING/POSITION LIGHTS	13

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Hydraulic Flow Diagram/Component Description

1. Hydraulic Fluid Reservoir
2. Sump Screen Filter
3. Hydraulic Fluid Filter
4. Hydraulic Pump
5. Relief/Diverter Valve
6. Front Double Spool Remote Valve
7. Front Boom Lift Cylinder
8. Rear Single Spool Remote Valve
9. Rear Remote Lift Cylinder
10. Rear Remote Endcap (Attached to HPL Valve)
11. HPL Valve (Control Valve)
12. Flow Valve
13. 3 Point Hitch Lift Piston

FLOW PRIORITY

This diagram shows hydraulic oil flow priority within the tractor's hydraulic system.

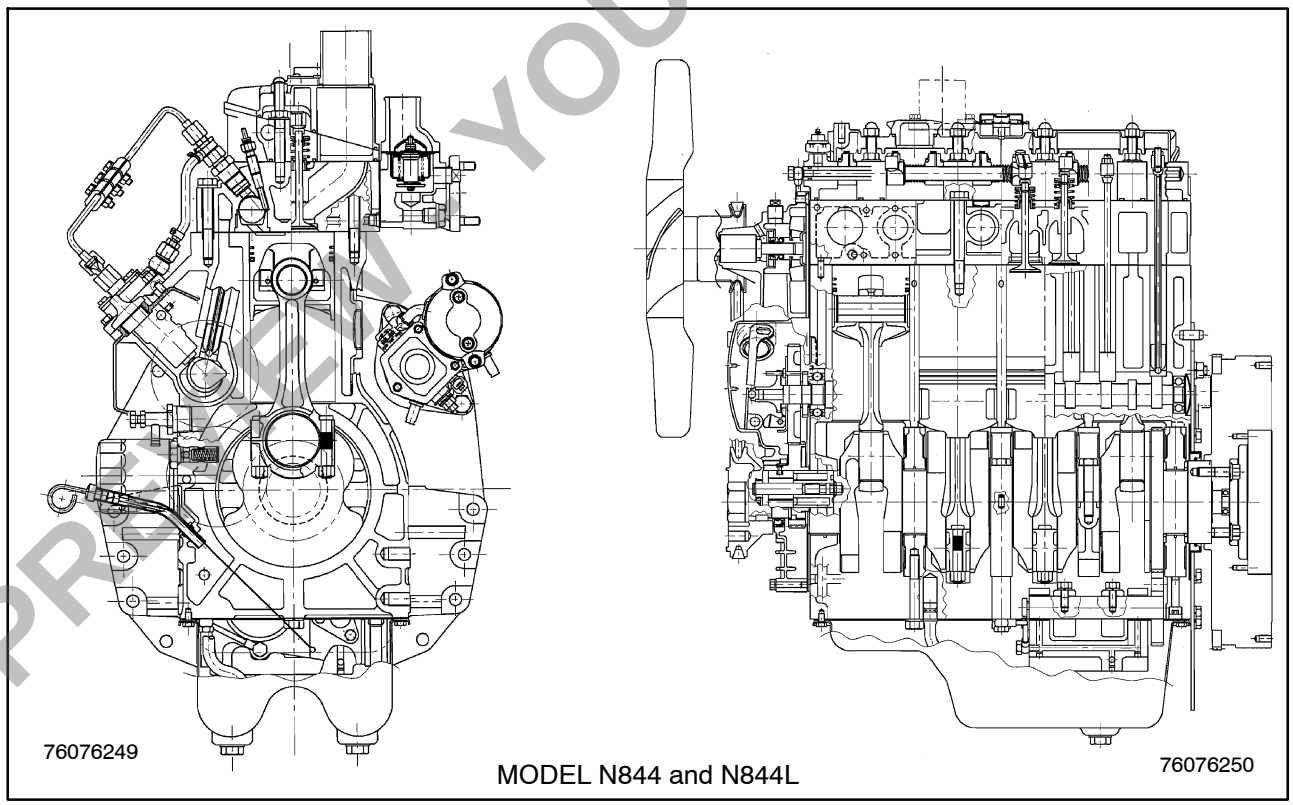
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CYLINDER HEAD AND VALVE TRAIN COMPONENTS

The cylinder head incorporates the valve assemblies, rocker arms, rocker shaft, push rods, and lifters. A swirl chamber located between the injector assembly and the main combustion chamber of the cylinders provides improved starting and greater fuel efficiency. Initial combustion starts in the precombustion chamber and as the expansion occurs a strong swirl pattern is created in the main combustion chamber for more complete combustion of the air-fuel mixture. The air intake manifold is separate from the cast aluminum valve cover on all these engines. The exhaust manifold is bolted on the left-hand side of the cylinder head on each of the models. Cylinder heads have integral valve guides. Standard size valves only are used.

The cylinder block assembly contains the pistons, connecting rods, crankshaft, timing gears, and engine oil pump. The crankshaft is supported on five main bearings. The front bearing is positioned in a bore in front of the block. The other bearings are split liners located in holders bolted to the block. The camshaft is supported on four ball bearings located in the block.



MODEL N844 and N844L

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	Model Farmall 40	Model Farmall 45	Model Farmall 50
WHEEL BOLT TORQUES			
Front Wheel— Disc-to-Hub:			
2WD	129 N·m (95 ft-lb)		
FWD	129 N·m (95 ft-lb)	129 N·m (95 ft-lb)	129 N·m (95 ft-lb)
Rear Wheel & Disc-to Axle	129 N·m (95 ft-lb)	129 N·m (95 ft-lb)	129 N·m (95 ft-lb)
Disc-to Rim	244 N·m (180 ft-lb)	244 N·m (180 ft-lb)	244 N·m (180 ft-lb)
ROPS ATTACHING BOLT TORQUES			
ROPS to Rear Axle	74 N·m (55 ft-lb)	74 N·m (55 ft-lb)	74 N·m (55 ft-lb)
Seat Belt	47.4 N·m (35 ft-lb)	47.4 N·m (35 ft-lb)	47.4 N·m (35 ft-lb)

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TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	CORRECTION
Engine does not develop full power	Clogged air cleaner	Inspect and replace air cleaner if necessary
	Fuel line obstructed	Check for crimped fuel line. Inspect fuel filter for cleanliness
	Improper injection timing	Repair/ replace components as required
	Improper nozzle injection pressure and angle	Check injection timing Inspect for proper injection pressure an angle
	Low cylinder compression	Check engine compression
	Insufficient fuel injection	Repair at authorized shop
	Improper valve lash adjustment	Adjust valves to correct tolerances
	Burned, worn or sticking valves	Inspect and replace as necessary
	Blown head gasket	Replace head gasket
	Worn or sticking piston rings	Overhaul as necessary
	Faulty engine stop solenoid	Replace stop solenoid
Low oil pressure	Engine oil level low	Fill to proper level
	Wrong grade of oil	Replace with correct grade oil
	Clogged oil pump filter	Change oil and filter
	Faulty oil pressure relief valve	Replace relief valve
	Worn oil pump drive shaft gears, or broken oil pipe	Inspect oil system and components. Replace defective components
	Excessive main or connecting rod bearing clearances	Replace bearings or shaft if necessary
	Oil pump axial clearance not properly set	Check pump clearance and shim as needed to proper tolerance
Engine will not stop	Faulty engine stop solenoid	Replace the stop solenoid
	Faulty starter switch	Replace starter switch
Low cylinder compression	Burned, worn or sticking valves	Replace valves
	Bent valve stem	Replace valves
	Broken or weak valve spring	Replace valve spring
	Blown cylinder head gasket	Replace head gasket
	Worn or sticking piston rings	Replace piston rings
	Scored piston	Replace piston
Poor engine idling	Improper injection timing	Correct the injection timing
	Air in injection pump	Purge air from the system
	Improper governor adjustment	Adjust the governor

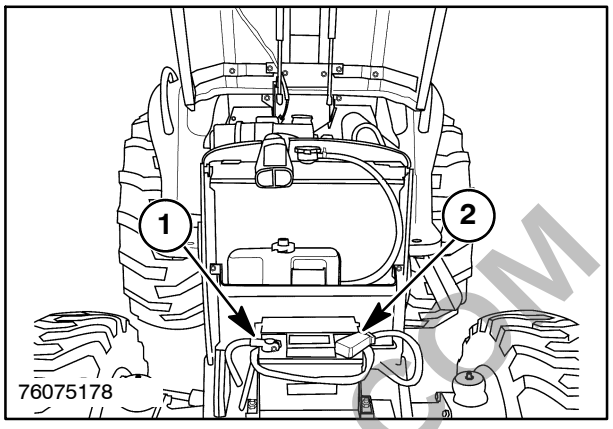
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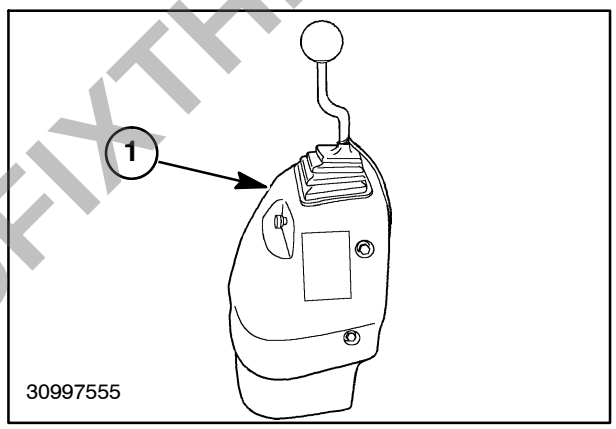
SEPARATING THE TRACTOR AT THE CLUTCH HOUSING/ENGINE – 12X12 TRANSMISSION

Removal

1. Remove the negative (-) battery cable, 1, and the positive (+) battery cable, 2, from the battery.
2. Drain all of the hydraulic fluid from the transmission and the differential into a suitable container.
3. Disconnect the headlight wire harness plug and remove the hood from the tractor.
4. Remove the seat, and the seat base assembly from the tractor.
5. Remove the light bars from the fenders and the ROPS.
6. If equipped, remove the remote loader control valve, 1, and the connecting hydraulic tubes from the right fender.
7. Remove the left and right fenders from the tractor.

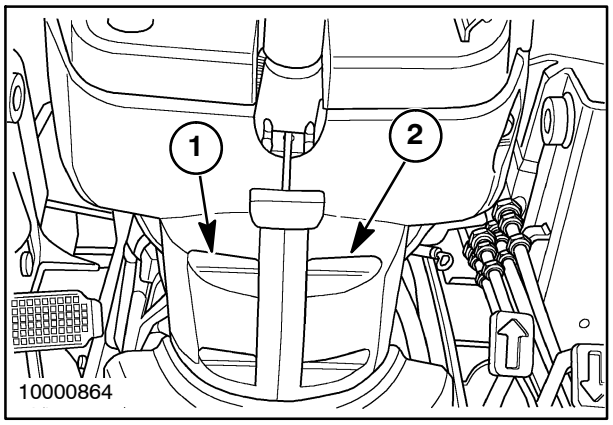


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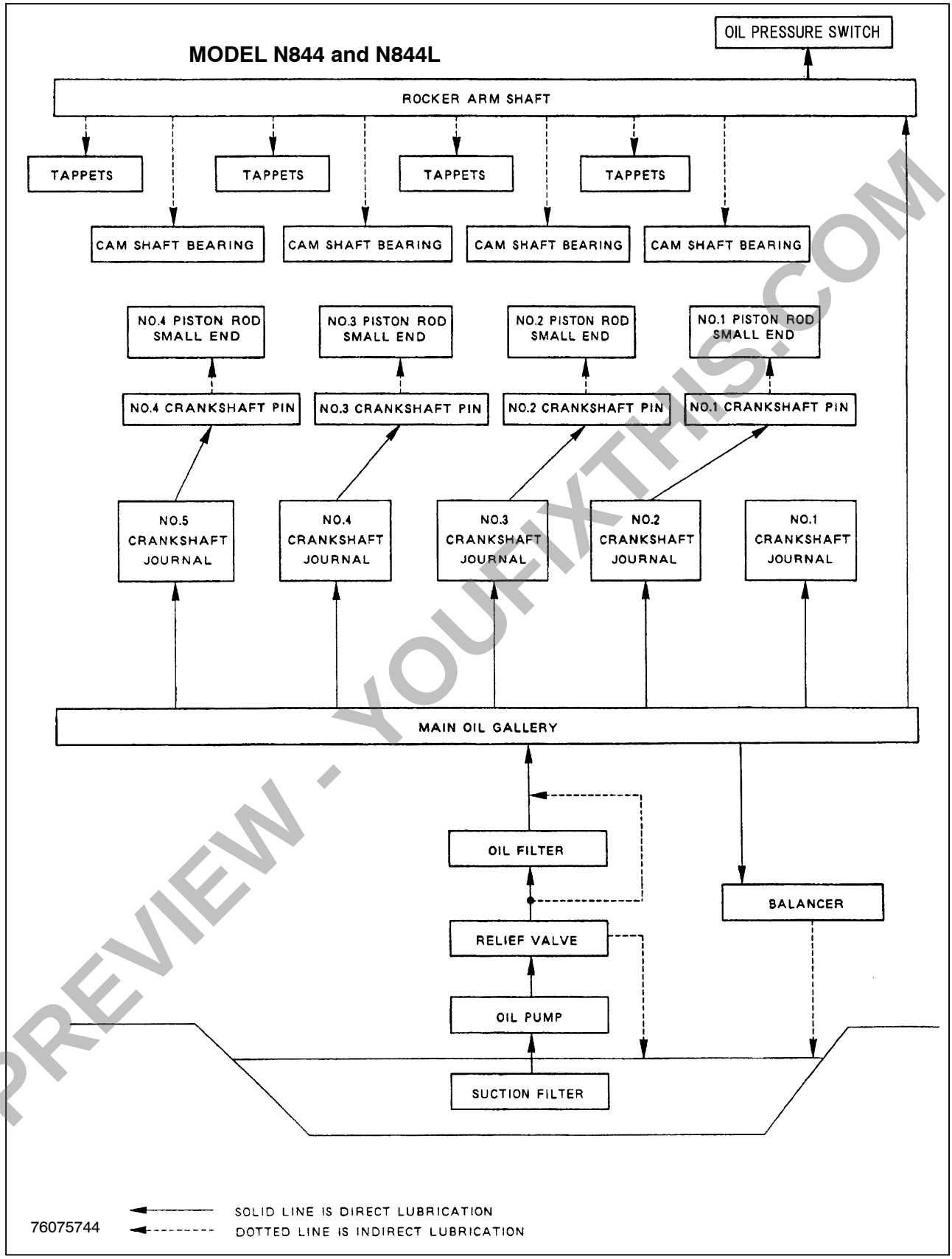
8. Remove the left, 1, and right, 2, rear hood side panels.
9. Disconnect and remove the throttle cable from the foot throttle control pedal, located on the right deck.
10. Remove the left and the right deck from the tractor.
11. Disconnect the throttle cable from the dash mounted throttle control lever.



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SECTION 10 – ENGINE

BOOK 1 - 87473194

Chapter 1 – Engine (Continued)

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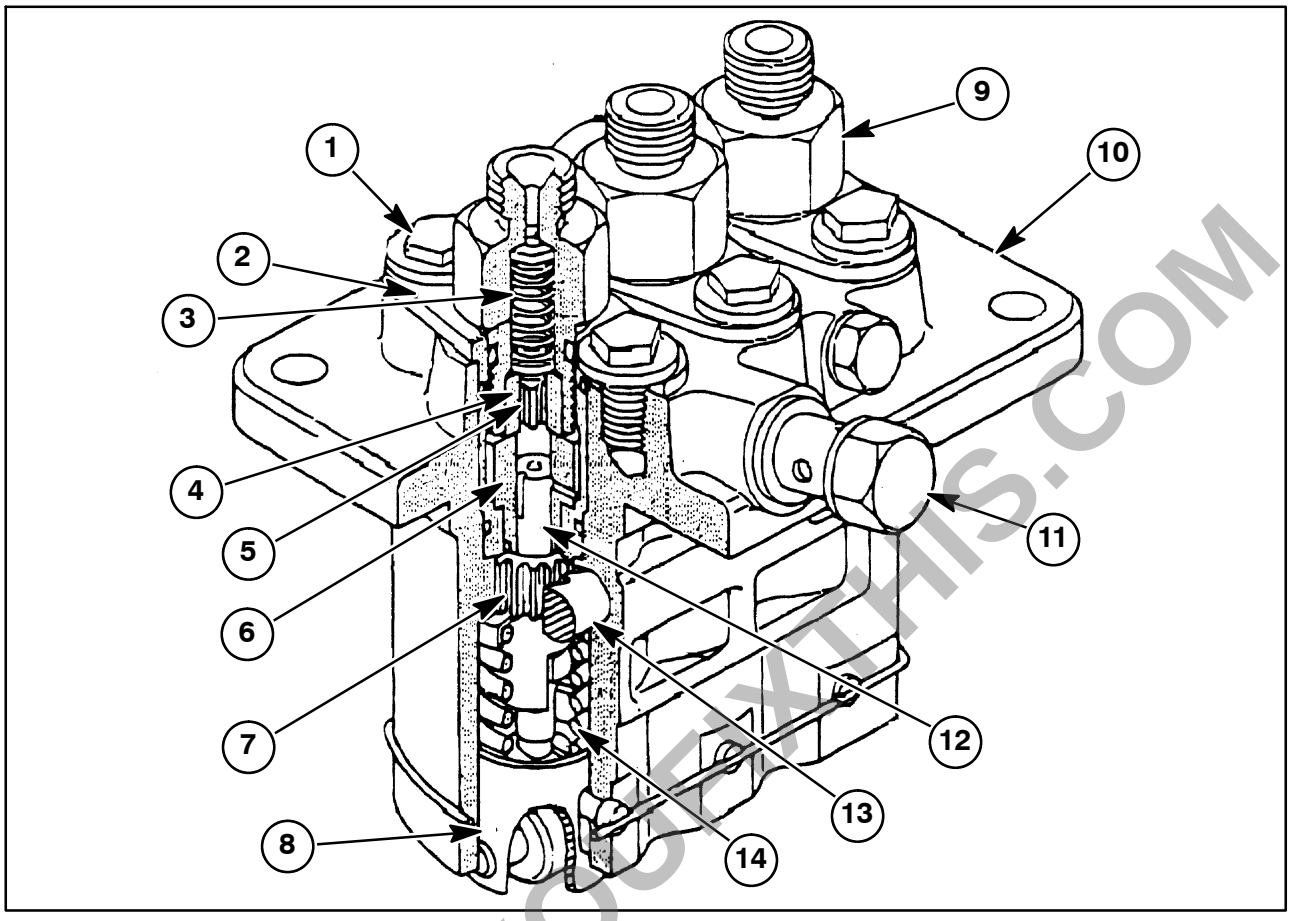
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	Assembly	60

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1

1. Five-Sided Bolt
2. Sleeve Flange
3. Delivery Valve Spring
4. Delivery Valve Seat
5. Delivery Valve
6. Plunger Barrel
7. Control Sleeve
8. Tappet
9. Delivery Valve Holder
10. Pump Housing
11. Eye Bolt
12. Plunger
13. Control Rack
14. Plunger Spring

DESCRIPTION OF OPERATION

INJECTION PUMP

The injection pump is mounted in the engine's cylinder block. It does not have a camshaft, but is driven by the engine's camshaft. Plunger, 12, movement is constant, being raised by tappet, 8, and returned by the plunger spring, 14, as the engine rotates. The plunger barrel's, 6, suction and discharge port opens onto the pump housing's fuel oil chamber, which is always filled with fuel.

When the plunger descends, fuel oil is sucked into the plunger barrel, and when the plunger reaches it's lowest point, the suction of fuel oil stops.

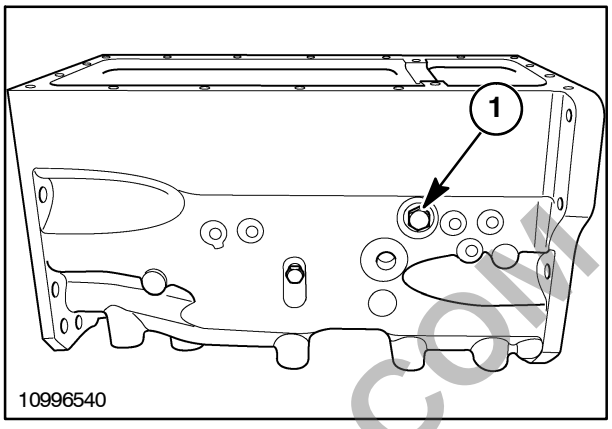
The plunger then ascends, and when the plunger barrel's suction and discharge port is closed by the plunger, the fuel oil pressure increases. The fuel oil then raises the delivery valve, 5, and is delivered through the injection pipe to the nozzle holder. When the fuel oil pressure exceeds the force of the nozzle spring's set force, fuel is injected into the engine's combustion chamber in the form of a fine spray.

The plunger further ascends, and when the plunger helix meets the plunger barrel's suction and discharge port, fuel delivery ends (at the same time injection from the nozzle ends). The delivery valve is then closed by the set force of the delivery valve spring so that fuel oil is no longer delivered, even though the plunger continues to ascend.

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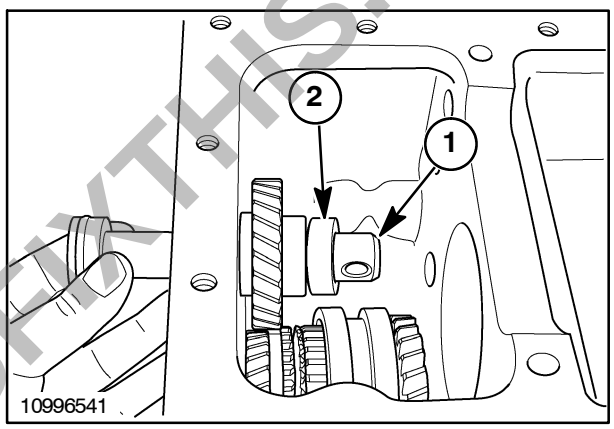
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2. Loosen and remove the idler shaft retaining bolt, 1, from the side of the transmission case.



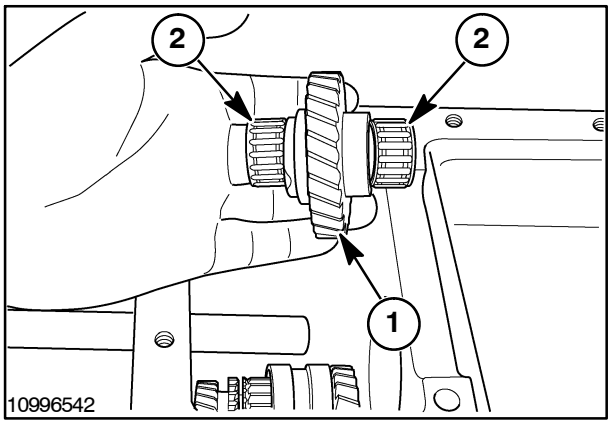
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3. Push the idler shaft, 1, towards the front of the transmission case.
4. Remove the thrust washer, 2, from the idler shaft, 1, taking note of the orientation of the oil channels in the thrust washer.



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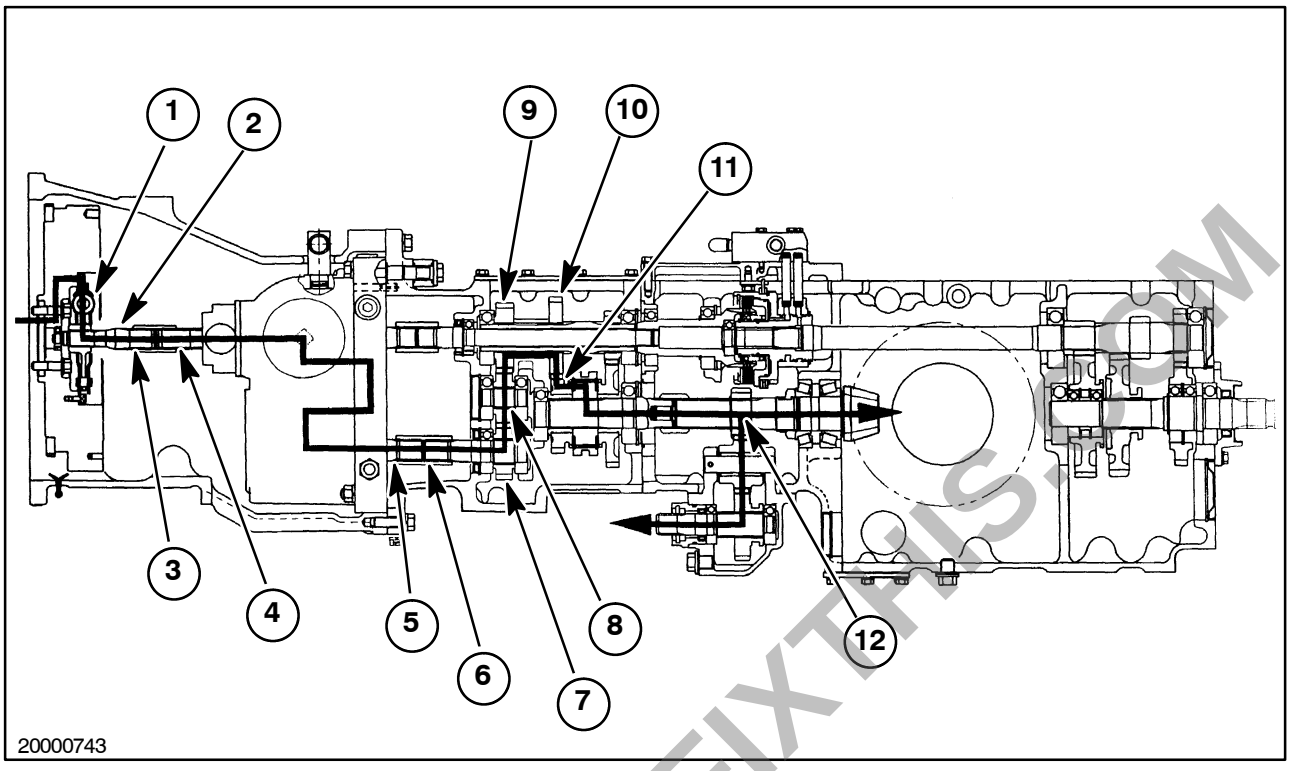
5. Remove the reverse idler gear (26T), 1, and the two needle bearings, 2, from the idler shaft.



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2

POWER FLOW

High Range

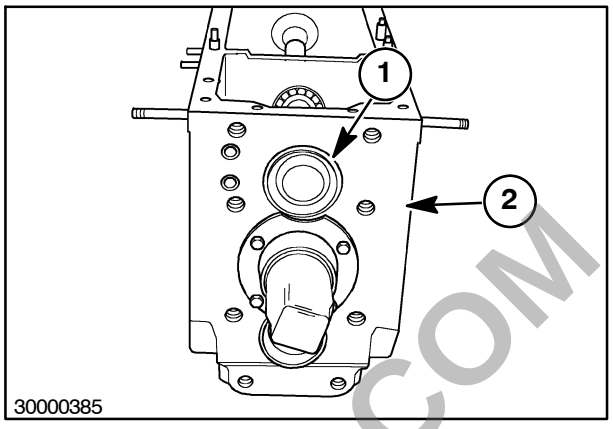
Power flow as follows:

1. Engine adapter plate
2. Input shaft
3. Input shaft splined coupler
4. Input shaft hydrostatic transmission
5. Output shaft hydrostatic transmission
6. Output shaft splined coupler
7. Lower 20-tooth counter shaft gear
8. Mid 21-tooth counter shaft gear
9. Upper front 26-tooth fixed gear
10. Upper mid 31-tooth fixed gear
11. 29-tooth high range gear and coupler
12. Output to rear pinion and FWD drop box

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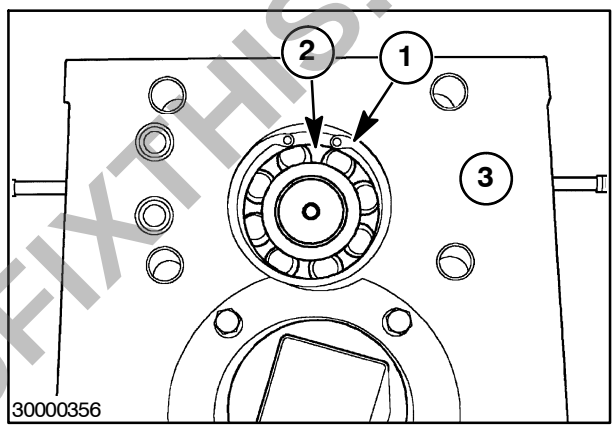
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5. Remove the rear PTO countershaft bearing seal, 1, from the rear differential housing, 2.



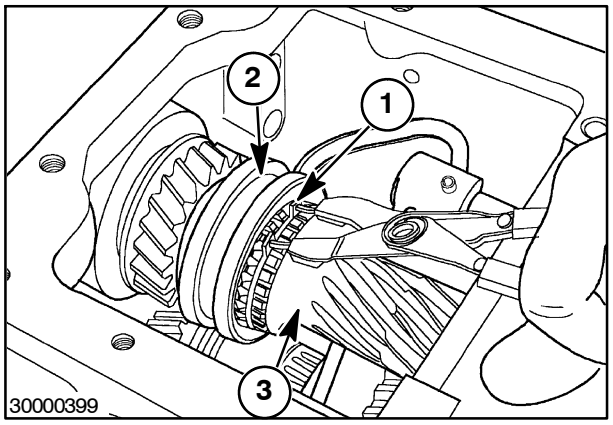
35

6. Remove the snap ring, 1, that secures the PTO countershaft bearing, 2, in the rear differential housing, 3.



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7. For tractors equipped with mid PTO, remove the snap ring, 1, that retains the gear coupler, 2, on the PTO countershaft, 3.



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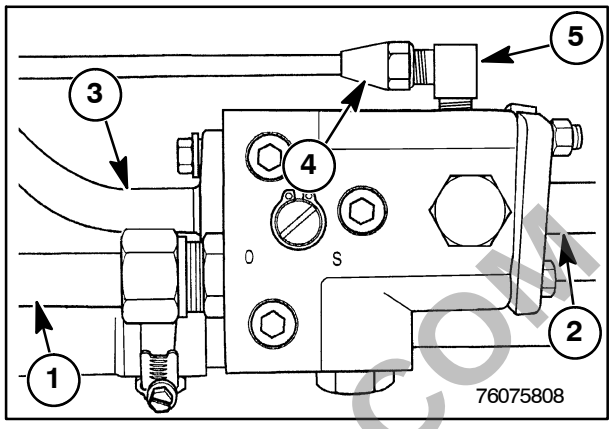
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COMBINATION SYSTEM RELIEF VALVE AND DIVERTER VALVE ASSEMBLY

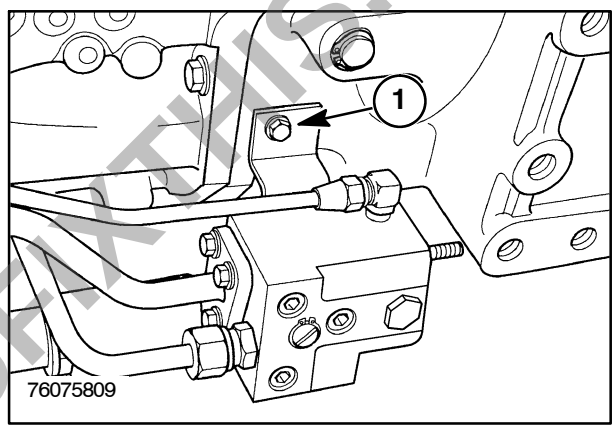
Removal

1. Disconnect the relief valve to sump return line, 1, at the valve body fitting.
2. Remove the bolts securing the pump pressure line, 2, and the pressure line, 3, to the control valve at the valve assembly.
3. Remove the PTO system pressure line, 4, at the PTO diverter valve body fitting, 5.



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4. Remove the bolt, 1, securing the valve assembly to the tractor. Cap and plug all openings.



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MANIFOLD GAUGES AND INTERPRETATIONS

PERFORMANCE TEST EXAMPLES

EXAMPLE 1

Symptoms

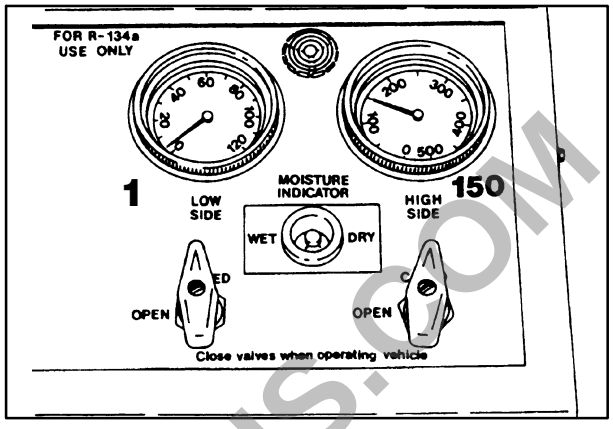
1. Evaporator air is lukewarm.
2. Low side pressure is too low. The gauge should read 0.21 – 2.1 bar (3 – 30 psi).
3. High side pressure is too low. See the pressure-temperature chart for correct gauge readings.

DIAGNOSIS: System refrigerant is low. A small leak may cause this.

Corrective Procedures

1. Leak test the system.
2. Extract the refrigerant from the system.
3. Repair the leaks. Replace any faulty lines or components.
4. Check compressor oil and add oil if necessary.
5. Evacuate the system.
6. Charge the system.
7. Performance test the system.

***NOTE:** Test procedure based upon ambient temperature of 35°C (95°F). For proper high side gauge reading for other ambient temperatures, refer to the pressure-temperature chart.*



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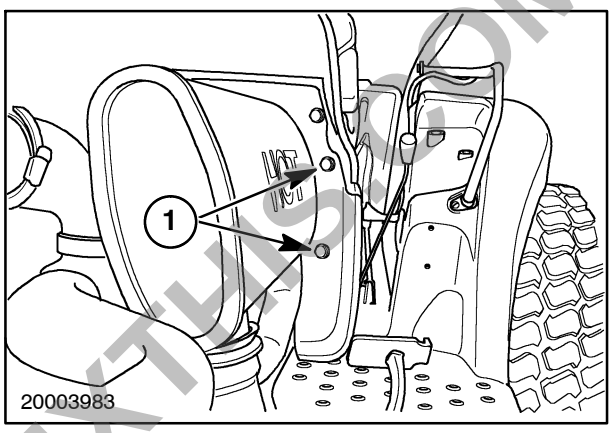
Ambient Temperature*		High Pressure Gauge Reading	High-Pressure Gauge Reading
°C	°F	bar	psi
21	70	7.9 – 9.2	114 – 134
24	75	8.7 – 10.1	126 – 146
26	80	9.7 – 11.1	141 – 161
29.5	85	11 – 12.4	159 – 179
32	90	11.6 – 13	168 – 188
35	95	12.5 – 13.9	181 – 201
38	100	13.9 – 15.2	201 – 221
40.5	105	15 – 16.4	218 – 238
43	110	17 – 18.4	246 – 266
46	115	19.1 – 20.5	277 – 297
49	120	21.2 – 22.6	307 – 327

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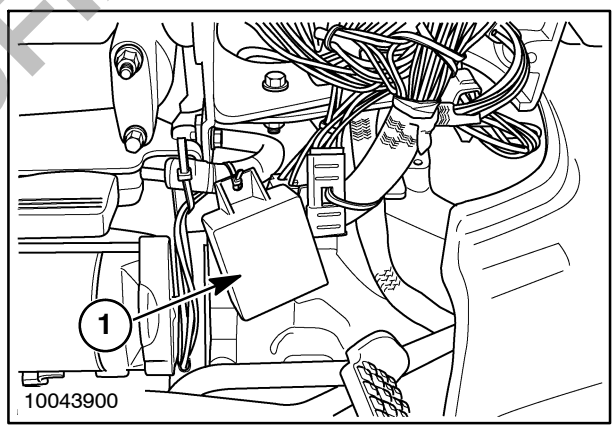
Removal

1. Disconnect the negative (-) battery cable from the negative (-) battery terminal.
2. Raise the tractor hood.
3. Disconnect the negative (-) battery cable from the negative (-) battery terminal.
4. Remove the two retaining bolts, 1, from the inside the left side of the firewall of the tractor.



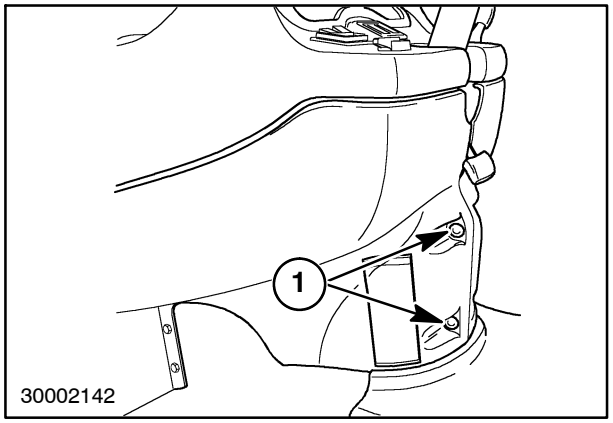
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5. Unplug the connector from the control module, 1.



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6. Remove the two retaining bolts, 1, from the left side cover of the tractor.
7. Remove the left side cover to reveal the relay/diode panel.



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MAIN HEADLIGHT CIRCUIT (HST MODEL) TROUBLESHOOTING

CONDITION	POSSIBLE CAUSE	REMEDY
Front road lamps will not illuminate or is dim	Insufficient battery charge	Test battery. Charge, add water, or replace as necessary
	Road lamp bulb faulty	Check and replace bulb as necessary
	Blown 40-amp main fuse	Inspect main fuse and replace as necessary
	Blown #4, 7.5-amp fuse	Replace fuse as necessary.
	Blown #7, 20-amp fuse	Replace fuse as necessary.
	Defective light switch	Test light switch and replace as necessary.
	Defective front lamp relay	Test relay, replace as necessary.
	Improper connection at work lamp terminals or headlight socket	Check connections and lamp socket. Repair or replace as necessary.
	Improper ground connection	Check ground connections and repair as necessary.
Rear taillights will not illuminate or are dim	Insufficient battery charge	Test battery. Charge, add water, or replace as necessary
	Taillight bulb fault	Check and replace bulb as necessary
	Blown 40-amp main fuse	Inspect main fuse and replace as necessary
	Blown #4, 7.5-amp fuse	Replace fuse as necessary.
	Defective road light switch	Test light switch and replace as necessary.
	Improper connection at taillight lamp terminals or lamp socket	Check connections and lamp socket. Repair or replace as necessary.
	Improper ground connection	Check ground connections and repair as necessary.
Instrument panel illumination light not illuminated or is dim	Insufficient battery charge	Test battery. Charge, add water, or replace as necessary
	Instrument panel illumination bulb burnt out	Check and replace bulb as necessary
	Blown #4, 7.5-amp fuse	Replace fuse as necessary.
	Defective road light switch	Test light switch and replace as necessary.
	Improper connection at instrument panel terminals or light socket	Check connections and socket. Repair or replace as necessary.
	Improper ground connection	Check ground connections and repair as necessary.

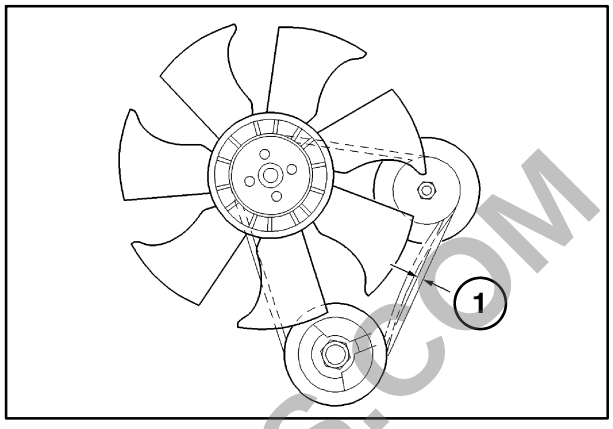
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PRELIMINARY ALTERNATOR TESTS

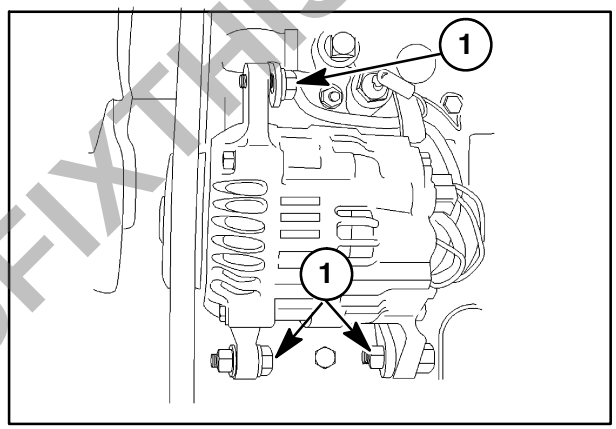
Alternator Drive Belt

1. Check the alternator drive belt deflection by applying 9–11 kg (20–25lb) of force between the crank pulley and the alternator pulley, 1. Belt deflection should be 10–15mm (0.39–0.59in.).



3

1. If the drive-belt deflection needs adjusted, loosen the adjusting/mounting bolts, 1, and adjust the alternator as needed to obtain proper belt deflection.

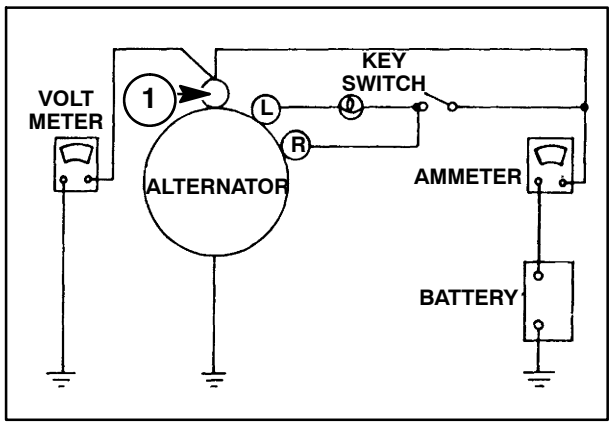


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Alternator Output

NOTE: *Use the following methods if an alternator/ charging system analyzer is unavailable.*

1. Connect a 50-amp capacity test ammeter between the positive (+) battery cable and the key switch.
2. Connect a voltmeter to the battery terminal, 1, of the alternator and to a ground source.
3. Observe the voltmeter. The meter should indicate battery voltage. If the voltmeter does not read battery voltage, the wiring between the alternator and the battery may be faulty and should be repaired or replaced.



5

⚠ WARNING ⚠

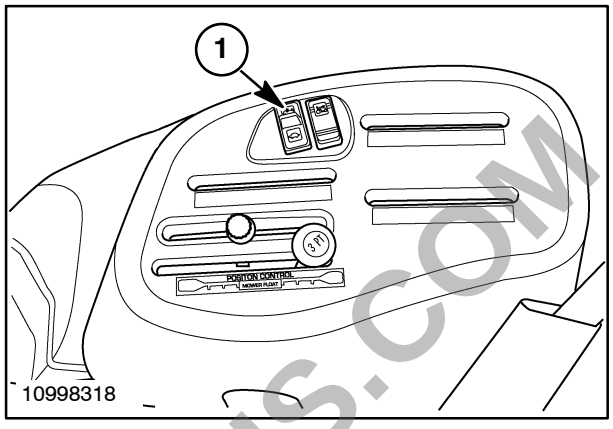
Do not attempt to start the engine without first shorting the wires between the ammeter leads. Otherwise, injury or damage to the charging and testing components may occur.

4. Use a jumper wire to short the test ammeter leads and start the tractor engine.

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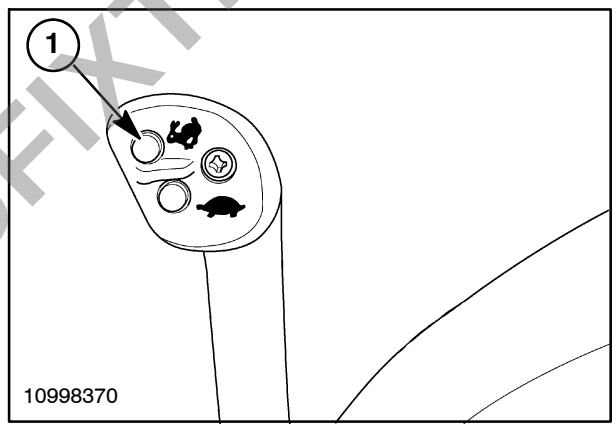
HI/LOW TRANSMISSION RANGE SWITCH (HST)

The transmission range control switch, 1, is a two-way momentary switch located on the right control pod on the tractor. This switch changes the hydraulic range of the transmission hydraulic pump. The switch contains two bulbs that illuminate, indicating what hydraulic range the transmission hydraulic pump is in, “HI” (rabbit) or “LOW” (turtle). When the switch is pushed to the “HI” range, current is supplied to the transmission range solenoid, which changes the position of the swash plate in the hydraulic pump, increasing hydraulic oil flow. The solenoid is not energized in the “LOW” position and the transmission pump operates at normal hydraulic oil flow. The “LOW” transmission setting is the default setting, meaning the tractor will reset to the “LOW” position when the tractor engine is shut off and restarted.



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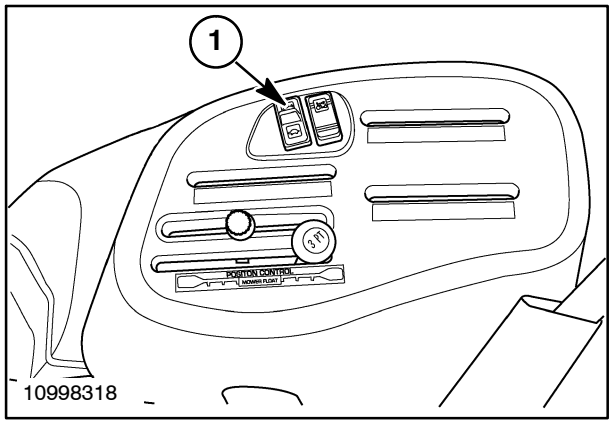
The tractors may also be equipped with an optional joystick switch, 1, that is mounted on the optional two-spool remote valve.



120

Testing

1. Carefully pry the range switch, 1, from the right control pod.
2. Disconnect the tractor wiring harness from the switch.

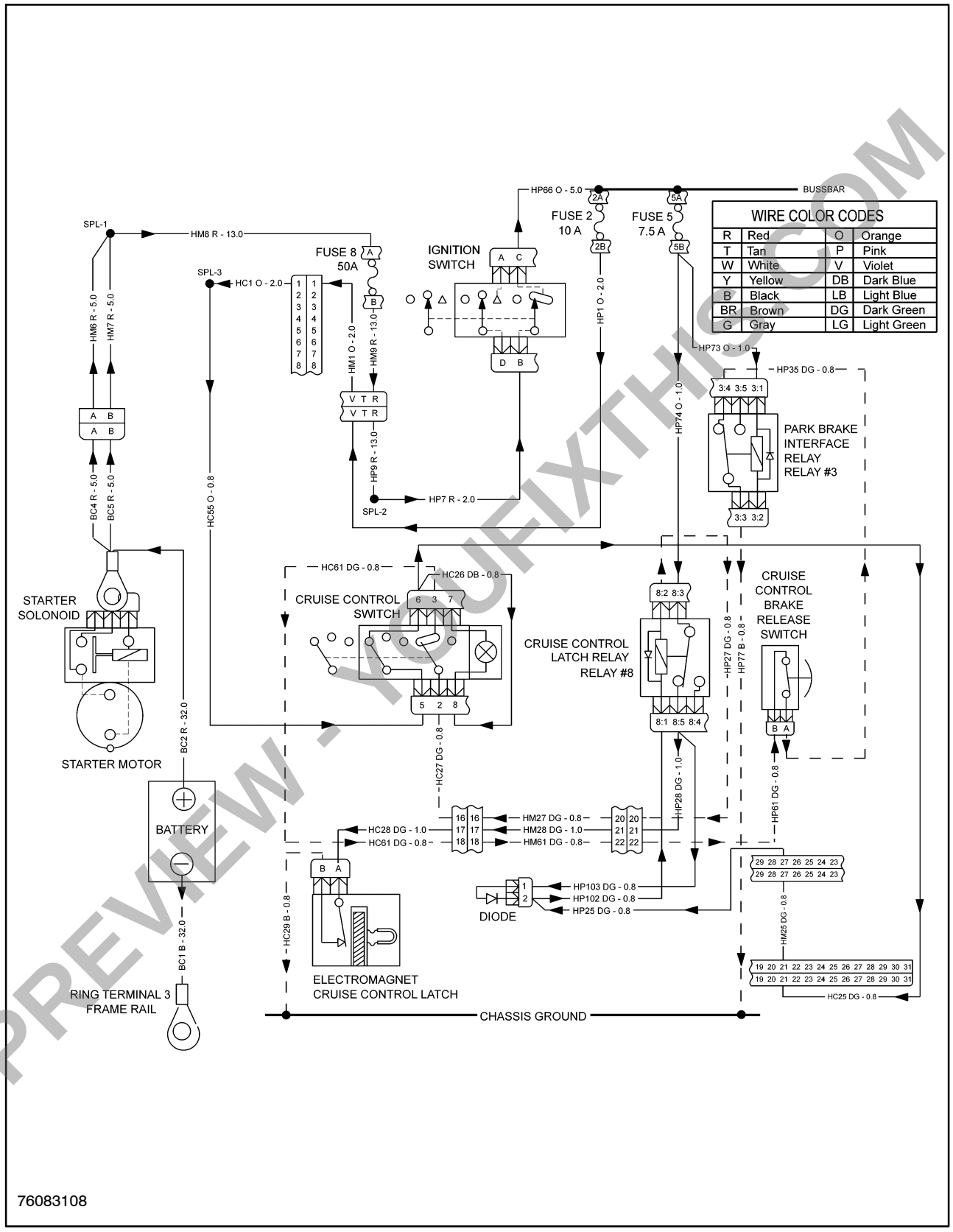


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CRUISE CONTROL CIRCUIT (HST TRANSMISSION)



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