PRIMARY HYDRAULIC POWER SYSTEM - Remove Mechanical lift assembly

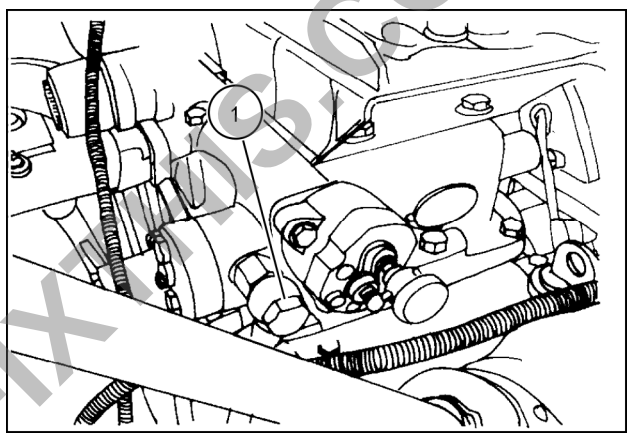
⚠ WARNING ⚠

Handle all parts carefully. Do not put your hands or fingers between parts. Always wear suitable safety items such as fitted clothing, safety goggles, gloves, shoes, etc. Failure to comply could result in death or serious injury.

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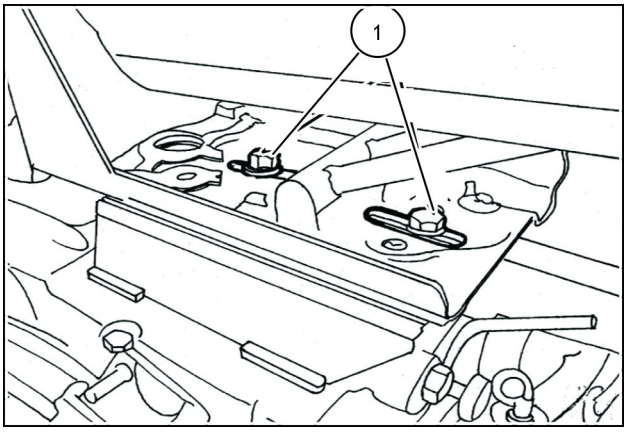
Remove the hydraulic lift from the rear axle housing as follows:

1. Disconnect the delivery pipe, **(1)**, from control valve.



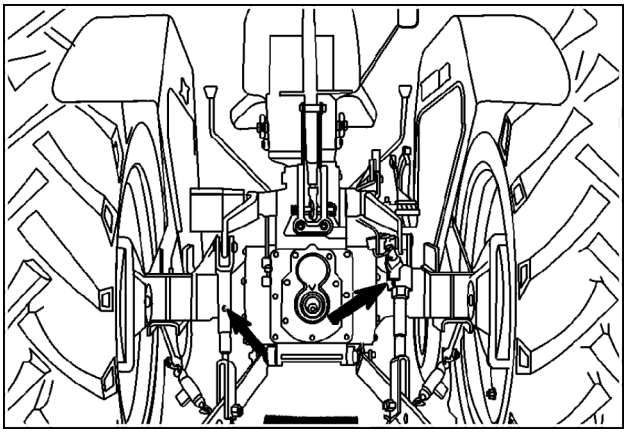
20097480 1

2. Loosen the bolts, **(1)**, and remove the operator's seat from the hydraulic lift.



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3. Remove the three-point linkages (top link, lower link and lift rod) from the tractor.

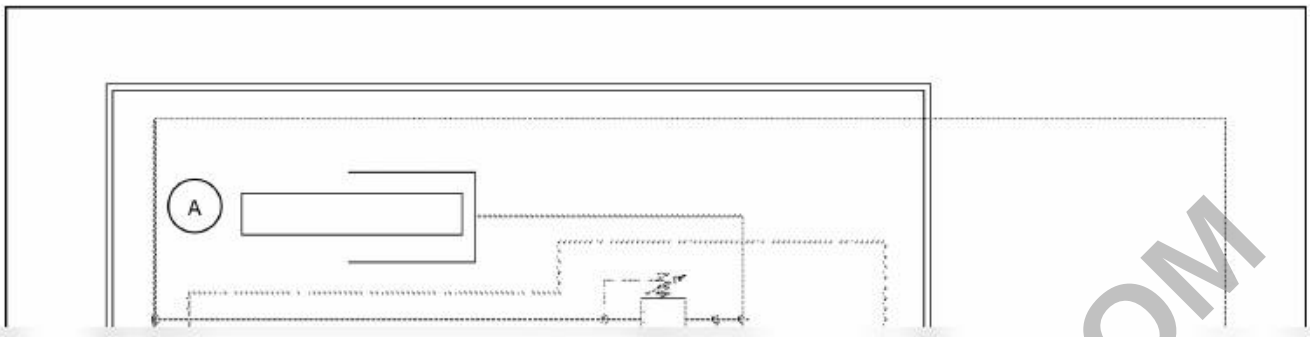


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HYDRAULIC CIRCUIT DIAGRAM



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CONTROL VALVE OPERATION

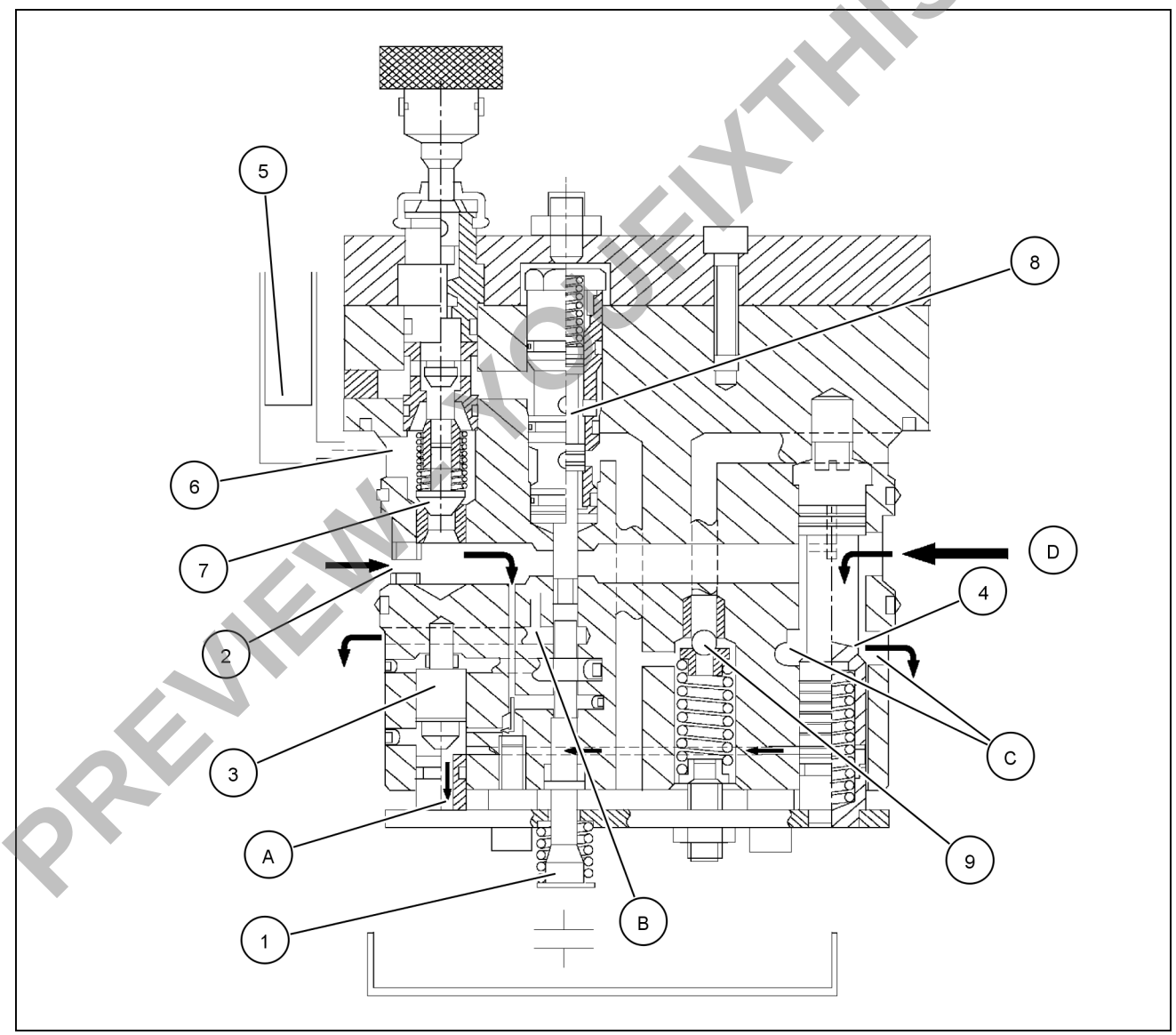
Neutral Position

In the neutral valve position, oil in the lift cylinder is contained under pressure while oil from the hydraulic pump can return freely to sump.

When the control valve spool, **(1)**, in the neutral position, oil flow from the pump is blocked by the valve spool. Oil flow is routed by the annular groove on the outside of the valve body and through orifice, **(2)**, to the pilot valve, **(3)**. The oil flow allows the pilot valve, to unseat which allows oil to discharge from ports **(A)** and **(B)**. Oil on the back side of the regulator valve, **(4)**, escapes through port **(A)**. The regulator valve is allowed to shift and opens port **(C)**. Port **(C)** allows the pump oil flow to return to sump.

The oil contained in the lift cylinder, **(5)**, is connected to the valve by annular groove, **(6)**, on the outside of the valve body. Oil in the cylinder remains under pressure because the check valve, **(7)**, discharge valve, **(8)**, and safety valve, **(9)**, are closed.

The safety valve protects the lift cylinder from excessive pressure exerted by the load on the lift arms during transport.



20097898 2

Neutral Position

D Pump flow

-

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Cylinder head - Static description

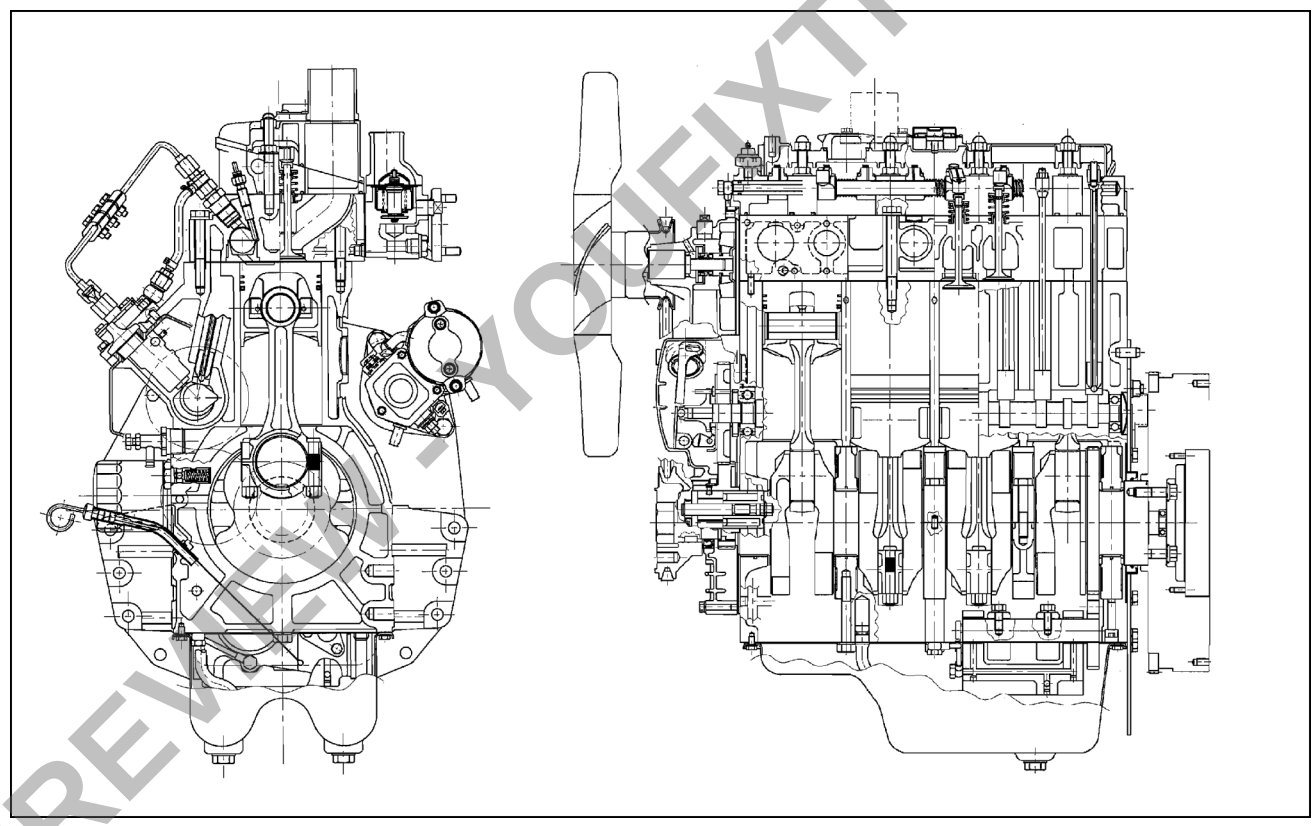
Cylinder Head and Valve Train Components

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.

Cylinder Block Assembly

(N844L and N844LT Engine - WORKMASTER 45 and WORKMASTER 55)

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.



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Engine models ISM N844L and ISM N844LT - WORKMASTER 45 and WORKMASTER 55

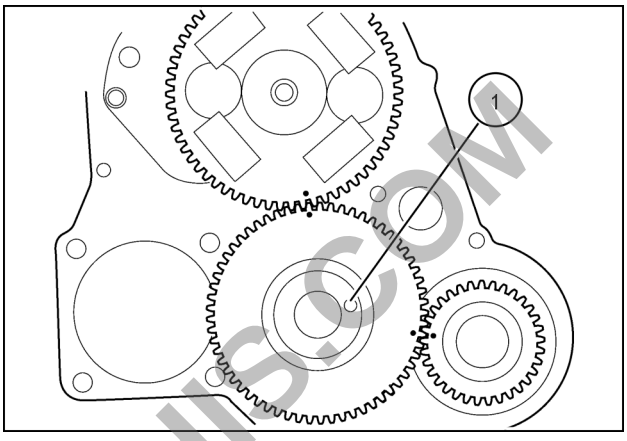
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Timing gear housing - Install

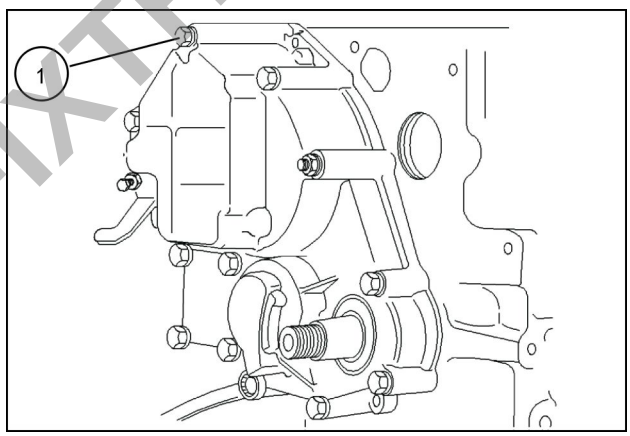
Prior operation:
Timing gear - Install Idler gear, Oil pump, and Injection timing (B.10.A).

1. Install new cover gasket.
2. Insert the governor linkage through the block.
3. Rotate the oil pump cover to position the spring pin hole, **(1)**.
4. Install cover locating pin in the oil pump cover plate.



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5. Install the cover retaining bolts, **(1)**.



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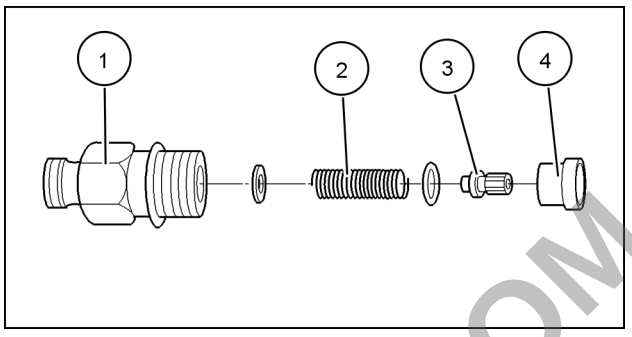
Next operation:
Crankshaft - Install Pulley (B.10.A).

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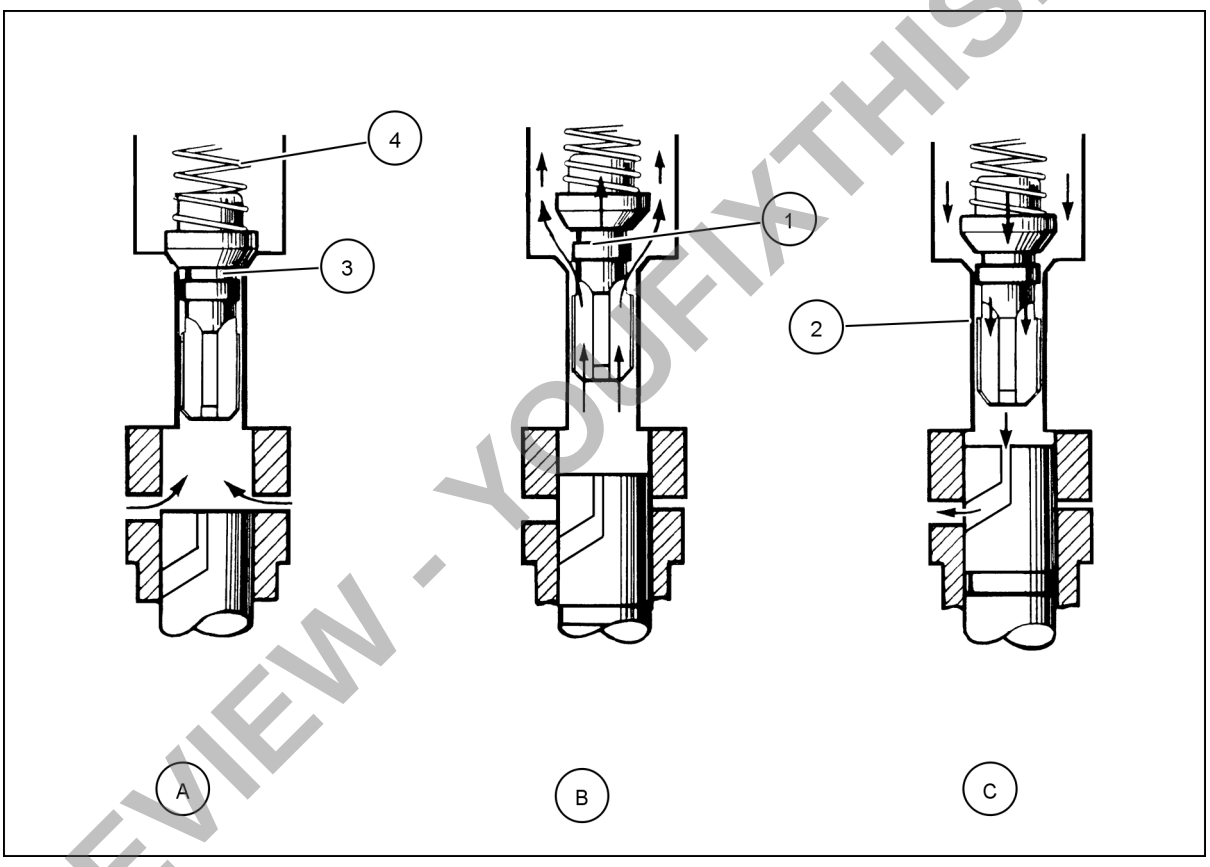
Fuel injection pump - Dynamic description Delivery Valves

Located above each pumping element is a delivery valve assembly. The delivery valve consists of a delivery valve holder **(1)**, spring **(2)**, piston and stem assembly **(3)**, operating within a cylindrical guide **(4)**, which terminates in a conical seat. The lower part of the stem has four vertical flutes which accurately locate within the guide while permitting fuel to pass. Above the flutes is a piston which is a lapped fit in the bore of the valve guide.



20093466 1

The delivery valve serves as a non-return valve and also as a means of rapidly reducing the fuel pressure in the injector line when injection ceases. Rapid pressure reduction is required to be sure injector needle valve "snaps" shut to prevent fuel "dribble", a condition which can cause carbon formation on the injector tip.



76075755 2

(1) Piston
(2) Valve Guide
(3) Conical Seat
(4) Spring
(A) Valve Closed
(B) Valve Open
(C) Valve Closing

The delivery valve operates as follows:

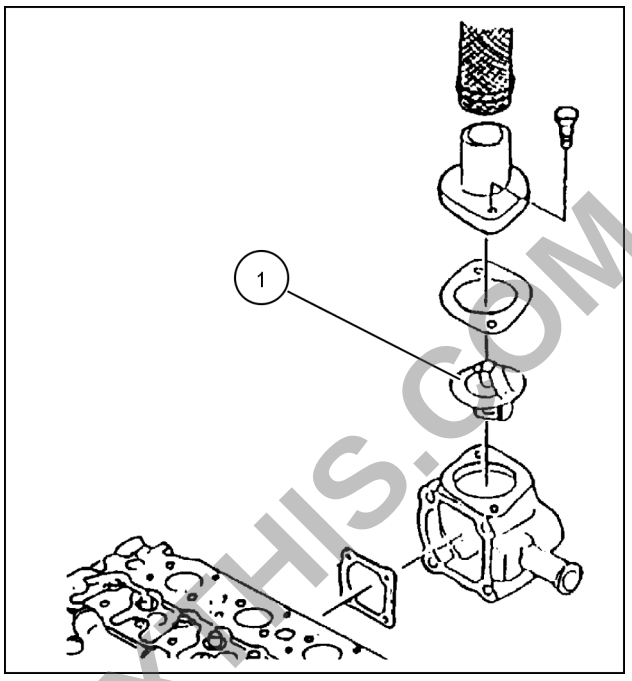
Position A:

The pump plunger is at the bottom of the stroke and the inlet ports are uncovered, so the barrel and delivery guides are filled with fuel. As the fuel is at low pressure, the delivery valve is retained on the seat by spring pressure.

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Thermostat - Dynamic description

The thermostat **(1)**, is located between the coolant outlet on the engine and the radiator. In this position the thermostat is able to sense the coolant temperature in the engine and regulate the flow of coolant to the radiator. When the engine is cold, only a small amount of coolant flows to the radiator through the thermostat bypass. As the engine warms up, the thermostat opens to allow sufficient coolant flow to the radiator to maintain a constant engine temperature.



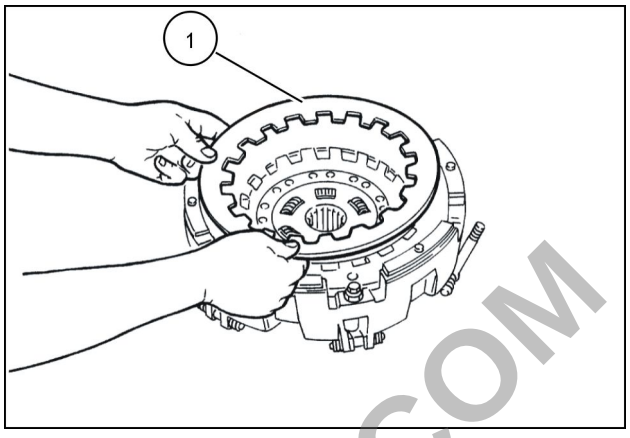
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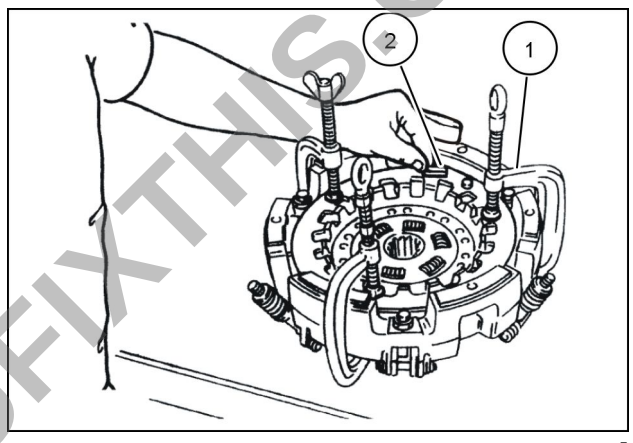
5. Install the large spring plate, **(1)**, onto pressure plate.

NOTE: *The slots in spring plate must engage the locating pin in pressure plate.*



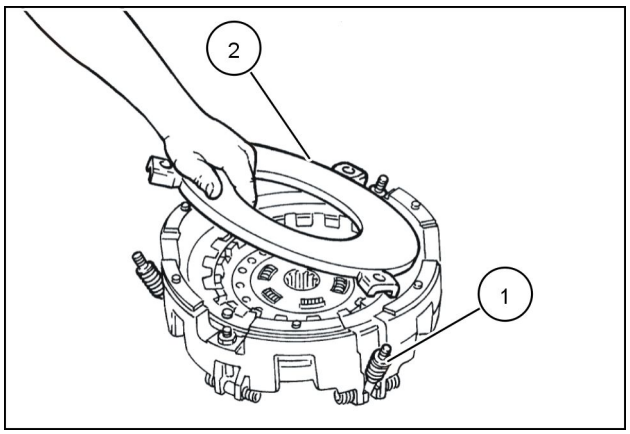
20097552 4

6. Install the large C-Clamps, **(1)**, around the spring plate in **120 °** increments.
7. Install the retaining plate, **(2)**, around the spring plate as shown.The plate will engage into a slot in the housing assembly.
8. Remove the C-Clamps, **(1)**, after all retaining plates are installed in the clutch housing.



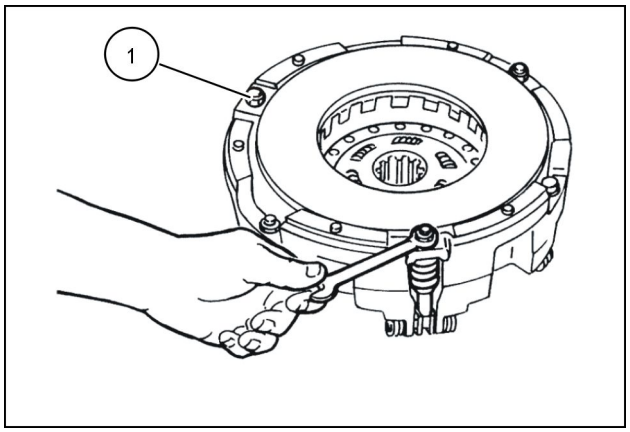
20097539 5

9. Install the springs, **(1)**, around each release lever.
10. Install the pressure plate, **(2)**, with clutch disc face towards the flywheel.



20097554 6

11. Secure the pressure plate to the release fingers with lock nuts, **(1)**.

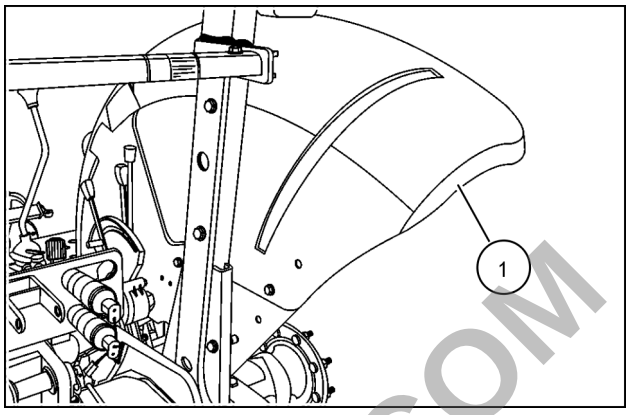


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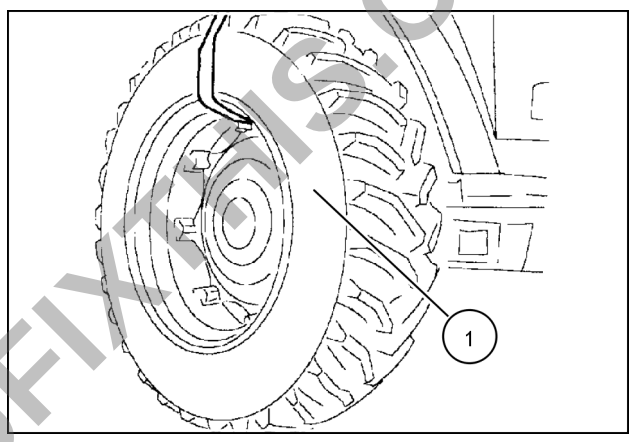
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12. Install the rear fenders, **(1)**. Refer to: **Protective shield - Install REAR WHEEL FENDERS (E.20.A)**



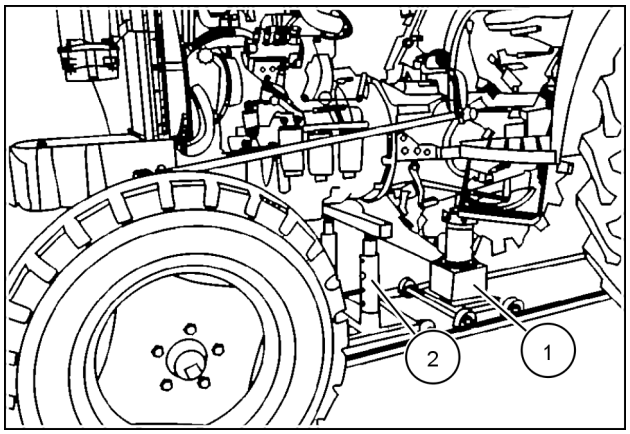
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13. Install both left-hand and right-hand side wheels, **(1)**.



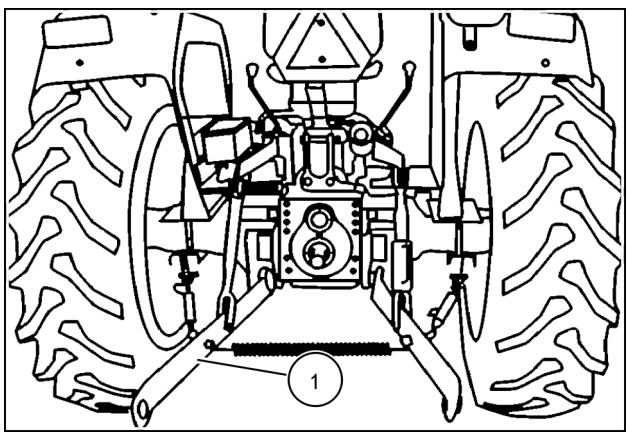
20096210 9

14. Remove the jack stands, **(1)**, and splitting trolley, **(2)**.



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15. Install the three point linkages, **(1)**, to the tractor.



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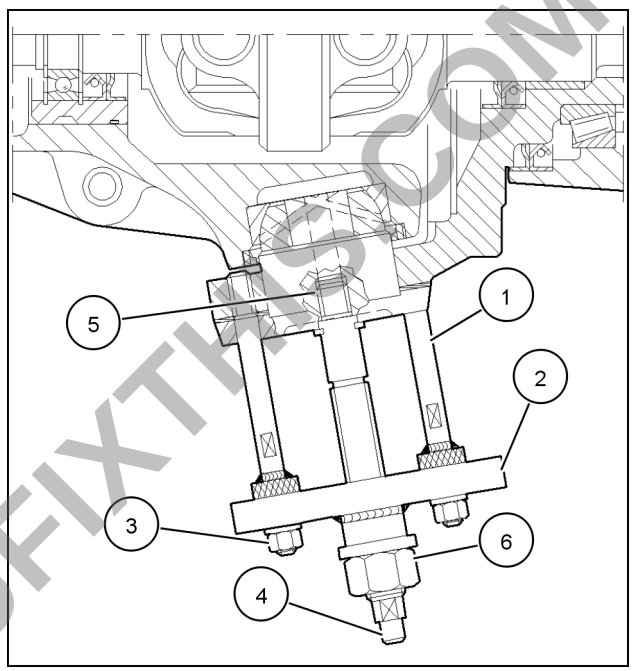
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Steering knuckle and King pin - Replace - 4WD Steering knuckle pins and bearings

Prior operation:
FRONT AXLE - Remove - 4WD (D.10.A)

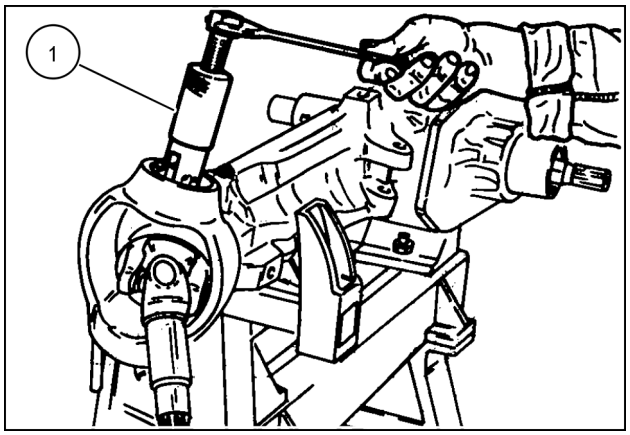
In the event that the steering knuckle pins prove difficult to remove, proceed as follows.

1. Remove the grease nipples and the steering knuckle pin retaining bolts.
2. Install the bolts, **(1)**, from tool number **380000265**.
3. Install the plate, **(2)**, from the tool and retain it to the three bolts with nuts, **(3)**.
4. Install the central tie bolt, **(4)**, screwing it fully into the grease nipple bore on the pin, **(5)**.
5. Screw in the nut, **(6)**, to drive the pin out of its bore.



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6. Using extractor tool, tool number **380000234**, **(1)**, remove the steering knuckle bearings.
7. Re-install the steering knuckle bearings using a suitable drift.



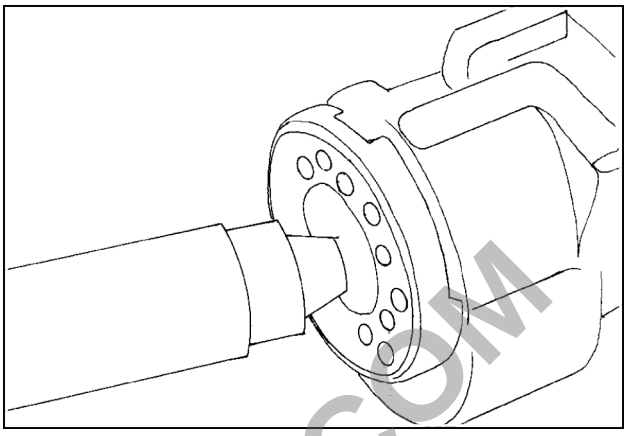
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Next operation:
Axle - Adjust - Stub axle adjustment 4WD (D.10.A)

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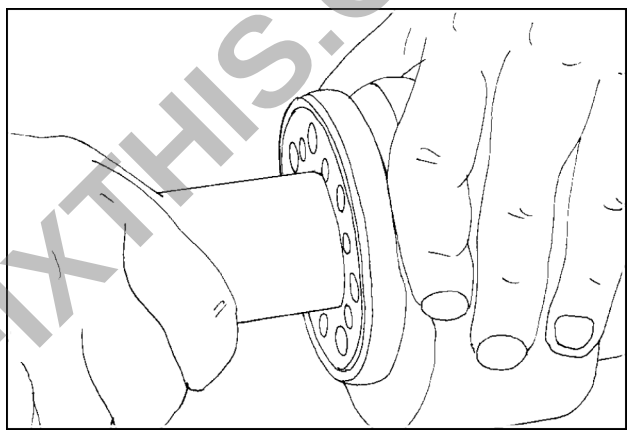
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17. Guide the assembly tool right to the bottom.



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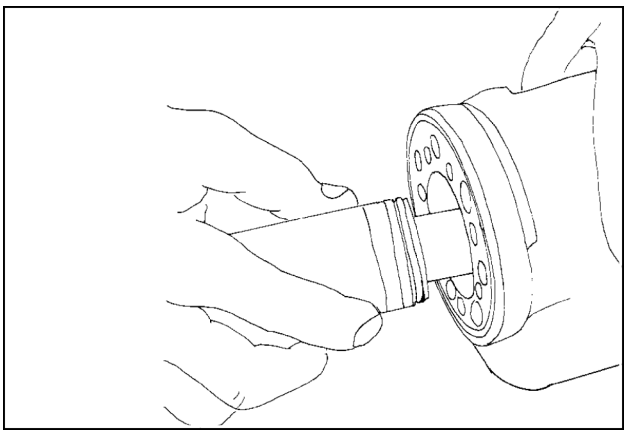
18. Press and turn the lip seal into place in the housing.



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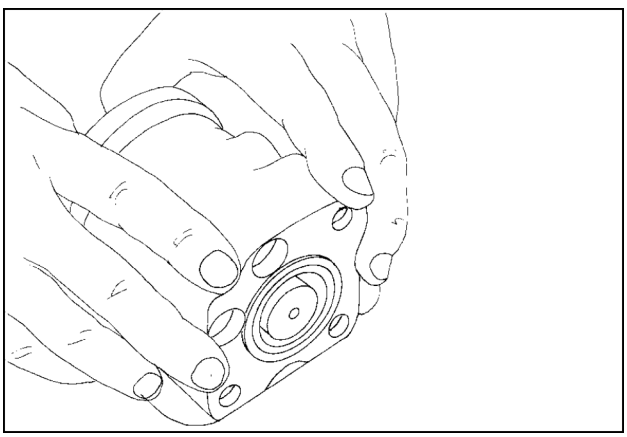
19. With a light turning movement, guide the spool and sleeve into the bore.

NOTE: *Fit the spool set holding the cross pin horizontal.*



20096308 20

20. The spool set will push out the assembly tool guide. The Vari-Seal are now in position.



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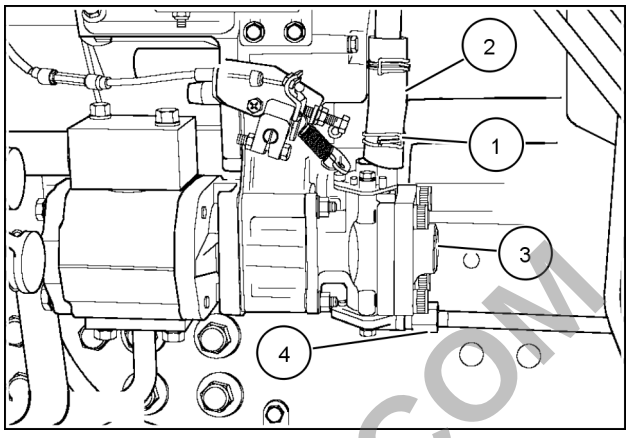
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7. Loosen the hose clamp, **(1)**, on the suction hose, **(2)**, and remove the suction hose from the steering pump, **(3)**.

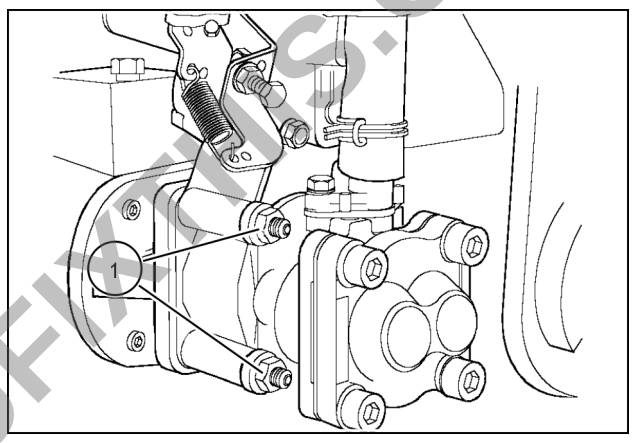
8. Remove the pressure tube, **(4)**, from the bottom of the steering pump.



20097789 4

9. Remove the through bolts and nuts, **(1)**, and remove the steering pump from the front cover. Cap the lines and pump openings.

NOTE: *Two of the power steering pump retaining bolts are not shown.*



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10. Install and tighten nuts, **(1)**, against each other, onto the retaining studs, **(2)**. Remove the studs, **(2)**, and the hydraulic pump, **(3)**.

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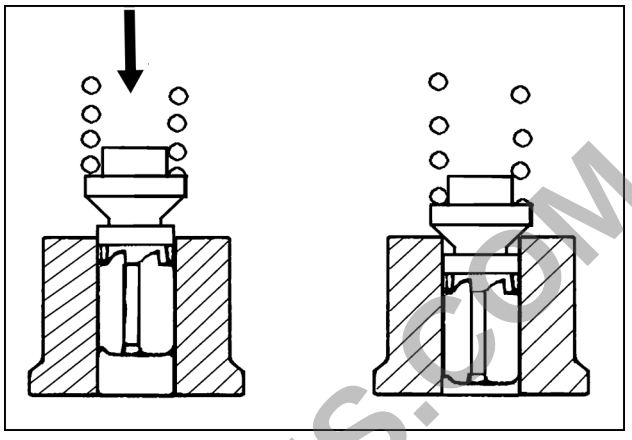
Fuel injection pump - Dynamic description (Delivery Valve Assembly)

The delivery valve assembly consists of the delivery valve and the valve seat.

When the force of the high-pressure fuel oil delivered by the plunger exceeds the force of the delivery valve spring, the delivery valve opens and fuel oil is delivered through the injection pipe to the nozzle holder.

After injection, the injection pipe retains a degree of residual pressure adequate for the subsequent injection. The delivery valve prevents the reverse flow of this fuel oil in the injection pipe to the plunger side. If the residual pressure is too high, then the flow of fuel oil will not be properly cut after injection.

By allowing the fuel oil in the injection pipe to retract an amount equal to the piston's retraction stroke, the delivery valve improves the ability of the nozzle to cut injection, as well as preventing dribbling.



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POWER COUPLING Clutch - Disassemble Clutch Assembly

Prior operation:
POWER COUPLING Clutch - Remove Clutch Assembly (C.10.C)

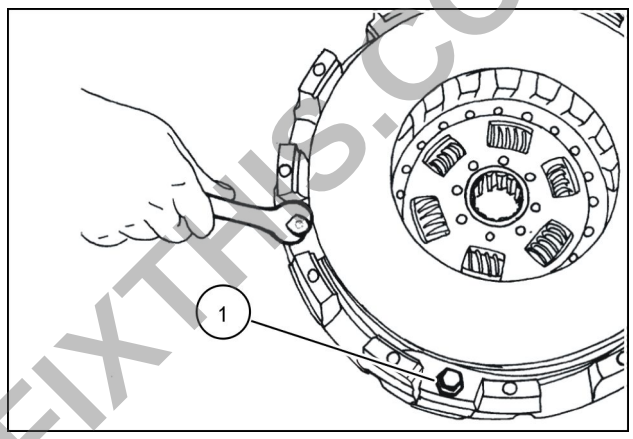
⚠ **WARNING** ⚠

Handle all parts carefully. Do not put your hands or fingers between parts. Always wear suitable safety items such as fitted clothing, safety goggles, gloves, shoes, etc. Failure to comply could result in death or serious injury.

M954A

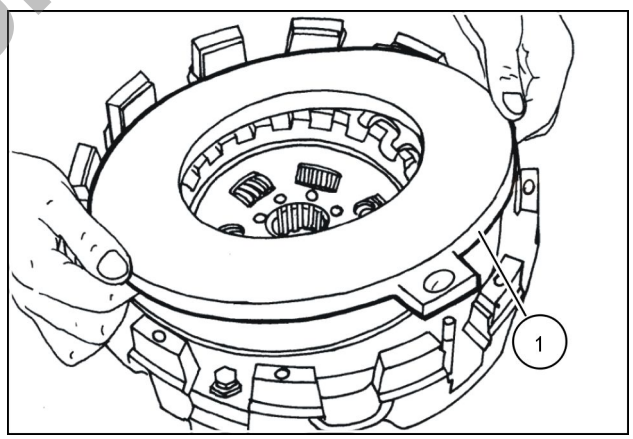
1. Loosen the PTO clutch release lever locknuts, **(1)**.

NOTE: *Since the locknuts are under the load of disk ring, loosen all these gradually and evenly by rotating 1/4 to 1/2 turns.*



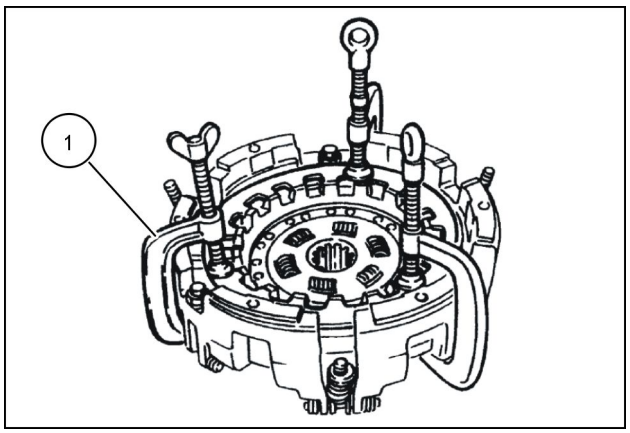
20097536 1

2. Remove PTO pressure plate, **(1)**.



20097537 2

3. Position the clamps, **(1)**, at intervals of **120 °** on the clutch body and gradually and carefully squeeze the Belleville spring disk.



20097538 3

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TRANSMISSION Mechanical - Inspect Intermediate plate

Prior operation:
TRANSMISSION Mechanical - Disassemble Intermediate plate (C.20.B)

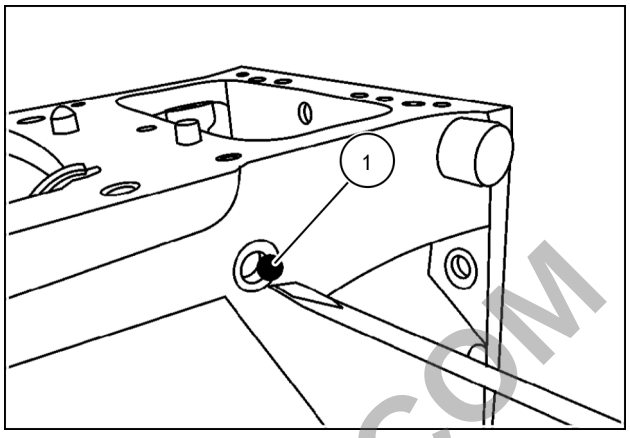
1. Clean and inspect the shift fork, shift rail, coupler, hub, bearings, and gears for excessive wear and/or damage. Replace as needed.

Next operation:
Shaft - Remove Transmission Driven and Drive Shaft (C.20.B)

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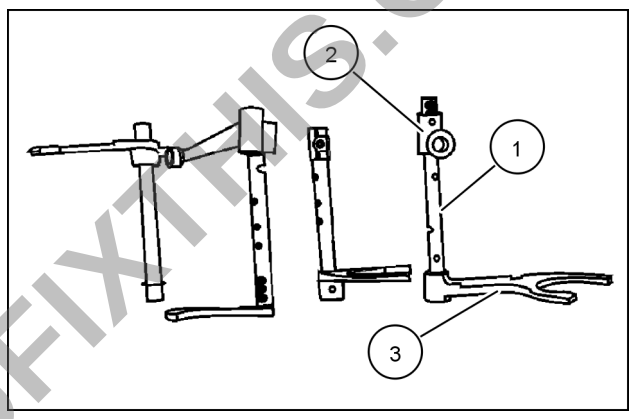
4. After fitting reverse rail insert ball **(1)**, applying some grease in the housing.



20097886 4

5. Insert the rail **(1)**, of 3rd/4th with gate **(2)**, passing through fork **(3)**, of 3rd/4th gear as shown in Figure **5**.

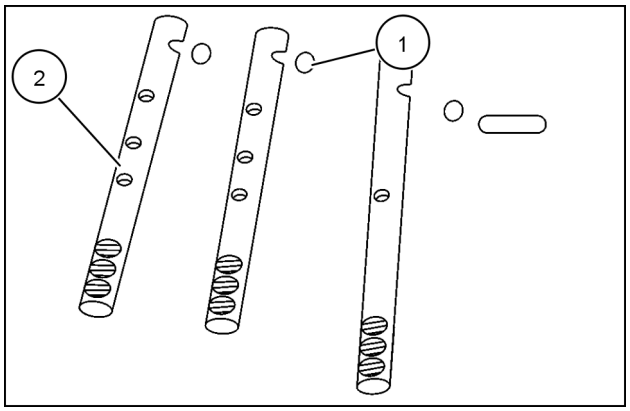
   Insert gate of 1st/2nd rail shaft on the notch of 1st/ 2nd gear fork.



200900175 5

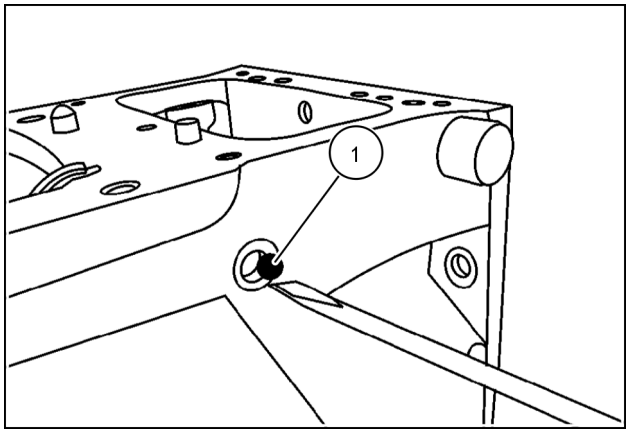
6. Insert the ball **(1)**, applying some grease in housing after removing bolt as shown in Figure **4**.
7. Insert the 1st/2nd rail **(2)**, passing thru gate as shown in Figure **5**.

NOTE: *Keep grooves of rails upward to make easy fitment of balls and springs.*



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8. Insert the ball and pin **(1)**, after removing neutral safety switch for Hi/Low rail then fit neutral safety switch and tighten it.



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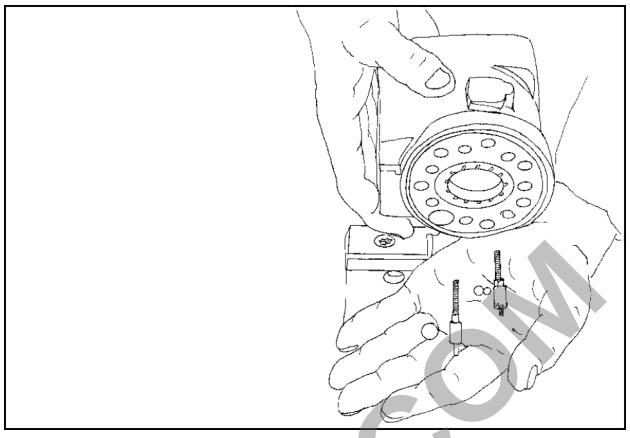
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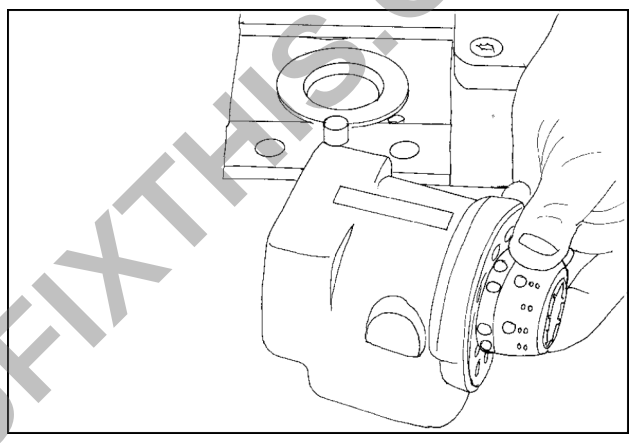
9. Shake out the check valve ball and suction valve pins and balls.

NOTE: *Replace pins prior to the reassembly.*



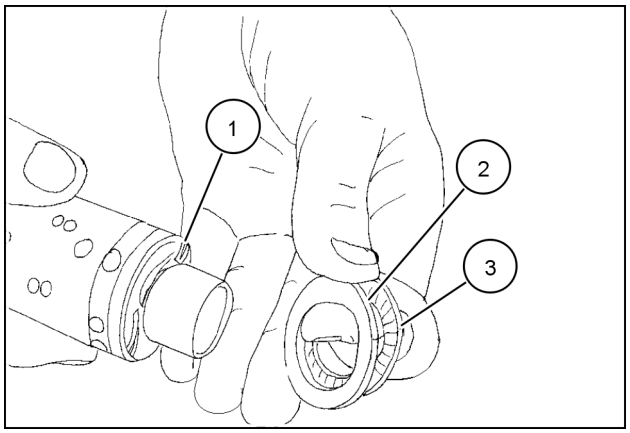
20096253 8

10. Take care to keep the cross pin in the sleeve and spool horizontal. The pin can be seen through the open end of the spool. Press the spool inwards and the sleeve, ring, bearing races and needle bearing will be pushed out of the housing together.



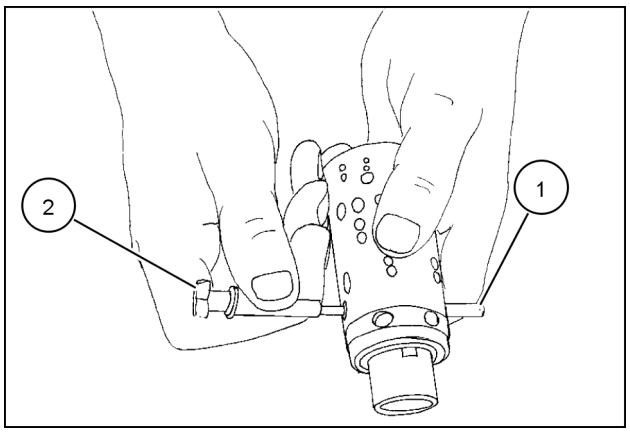
20096254 9

11. Take ring, **(1)**, bearing races, **(2)**, and needle bearing, **(3)**, from sleeve and spool. The outer (thin) bearing race can sometimes "stick" in the housing, therefore check that it has come out.



20096283 10

12. Press out the cross pin, **(1)**. Use the special screw, **(2)**, from the end cover.



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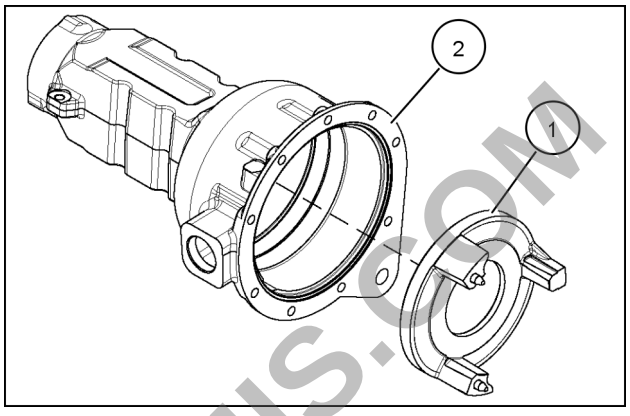
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Brake - Assemble

Prior operation:
Brake - Inspect (D.30.B)

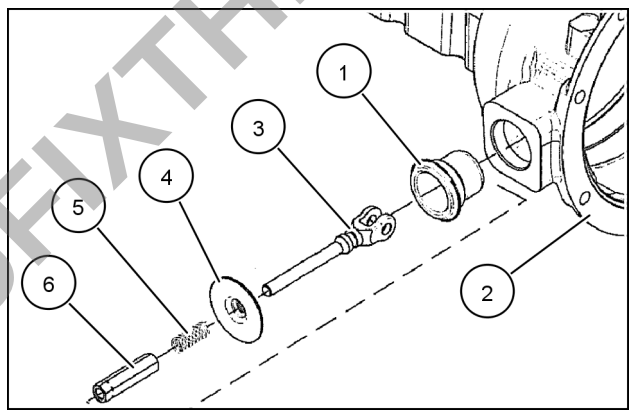
1. Install the brake disc support, **(1)**, into the axle housing, **(2)**.

NOTE: *The WORKMASTER 45 tractor uses a low duty brake disc support and the WORKMASTER 55 uses a heavy duty brake disc support.*



33084220 1

2. Install a new brake rod bellow, **(1)**, onto the axle housing, **(2)**.
3. Install the rear brake rod, **(3)**, through the rubber bellow, **(1)**, and then install the dust cover, **(4)**, onto the brake rod, **(3)**.
4. Install the spring, **(5)**, onto the rear brake rod, **(3)**.
5. Screw the turn buckle onto the end of the brake rod, **(3)**.

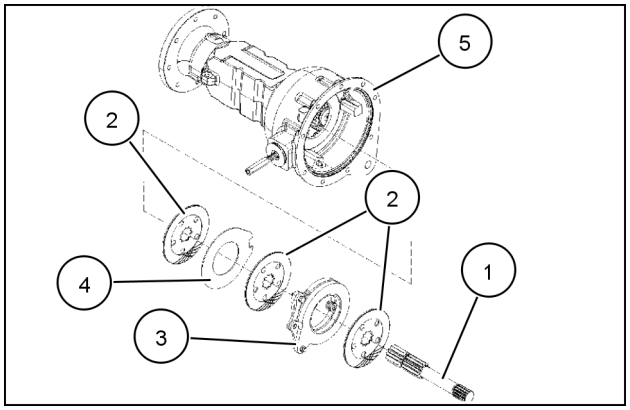


20099979 2

6. Install the brake actuator, **(1)**, brake discs, **(2)**, stator, **(3)**, and differential shaft, **(4)**, back into the axle housing, **(5)**.

NOTE: *Before installing the brake actuator, stator and brake discs, install the brake rod linkage pin to the rear brake rod.*

NOTICE: *When installing the brake actuator, stator and brake discs back into the axle housing make sure the actuator, stator and brake discs are properly aligned with the brake disc support.*



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