585G/586G/588G Forklift
Service Manual
7-14851

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Reprinted

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450 Sherman Avenue
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Bur 7-15491

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Section 1002

FLUIDS AND LUBRICANTS

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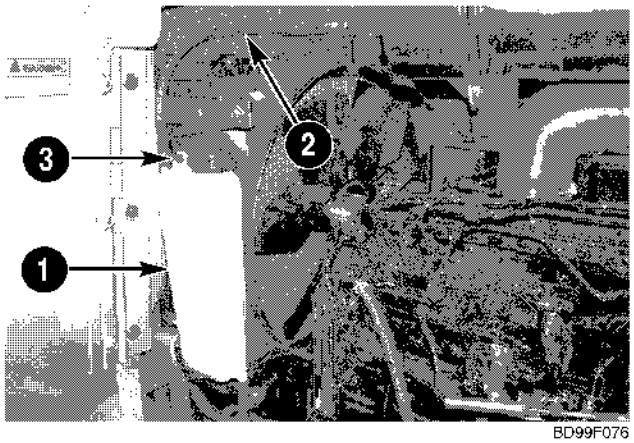


BD99F076

1. COOLANT RESEVOIR
2. COOLANT RESEVOIR HOSE
3. BOLT

Put the coolant reservoir in position on the fan shroud. Install the bolt, flat washers, and spacer that fastens the coolant reservoir to the fan shroud.

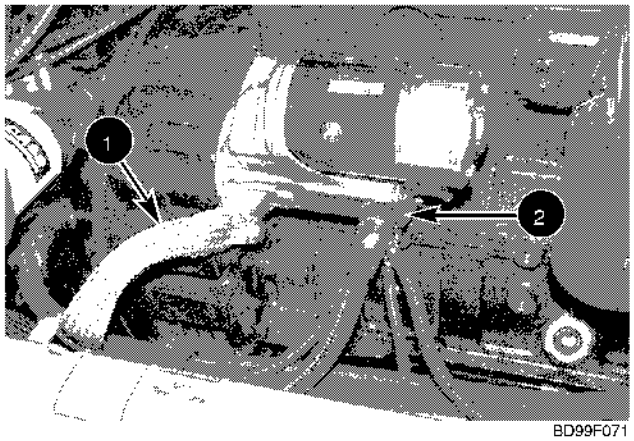
STEP 21

Connect the hose for the coolant reservoir to the radiator.

STEP 22

Connect the hose to the reservoir and make sure that the hose does not touch the starter or frame.

STEP 23



BD99F071

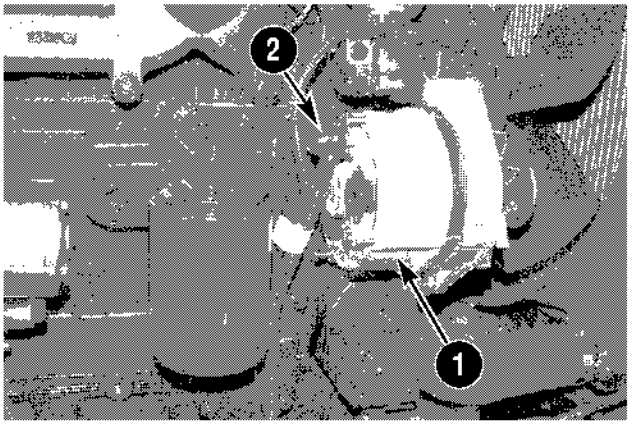
1. GROUND STRAP
2. STARTER SELENOID

Put the ground strap in position on the starter mounting bracket. Install the cap screw and lock washer that fasten the ground strap to the starter mounting bracket.

STEP 24

Put the wires and battery cable in position on the starter solenoid. Install the lock washer and nut that fasten the wires and battery cable to the starter solenoid.

STEP 25



BD99F072

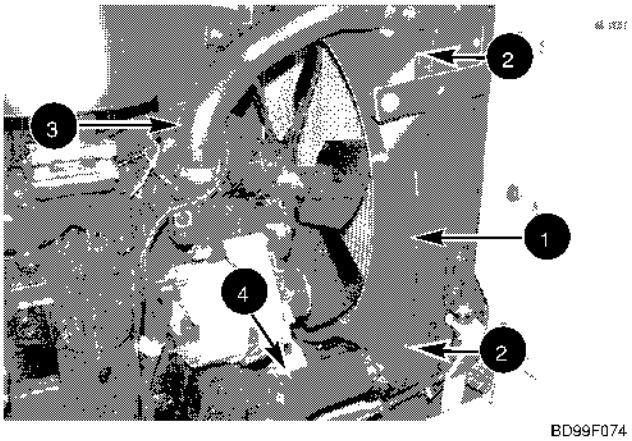
1. ALTERNATOR
2. BATTERY TERMINAL

Connect the electrical connector to the alternator.

STEP 26

Put the wires in position on the battery terminal on the alternator. Install the washer and nut that fasten the wires to the battery terminal on the alternator.

STEP 27



BD99F074

1. FAN SHROUD
2. CAP SCREWS
3. UPPER RADIATOR HOSE
4. LOWER RADIATOR HOSE

Put the fan shroud in position on the radiator. Install the cap screws and flat washers that fasten the fan shroud to the radiator. Adjust the fan shroud until there is equal clearance around the fan.

2001

Section

2001

STALL TESTS

585G, 586G and 588G Forklift

CASE CORPORATION
700 State Street
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STARTER

Removal

NOTE: *The starter is located on the engine flywheel housing.*

1. Park the machine on a level surface and apply the parking brake.
2. Loser the forks to the floor.
3. Stop the engine.
4. Remove the bolts and washers that fasten the battery cover to the left side of the machine by the step.
5. Remove the battery cover.
6. If the machine has only one battery (1), disconnect the negative ground strap (2) from the battery (1), see the illustration on page 4.
7. If the machine has two batteries:
   A. Remove the terminal nut (3) and jumper cable (4) from the battery (1), see the illustration on page 4.
   B. Remove the negative ground strap (2) from the battery (1) and move the negative ground strap (2) away from the battery (1).
   C. Make sure the jumper cable (4) is installed on the battery (1) and put the terminal nut (3) on the battery (1).
8. Open the access door on the left side of the engine.
9. Fasten identification tags to the wires and cables. Disconnect the wires and cables from the terminals (2) on the starter (1), see the illustration on page 5.
10. Remove the two bolts (3) that fasten the starter (1) to the flywheel housing.
11. Remove the starter (1).

Installation

1. Put the starter (1) in place on the flywheel housing, see the illustration on page 5.
2. Install the bolts (3) that fasten the starter (1) to the flywheel housing. Make sure the ground cable is installed under the upper bolt.
3. Connect the wires and cables to the terminals (2) on the starter (1).
4. Close the access door.
5. If the machine has only one battery, connect the negative ground strap (2) to the battery (1), see the illustration on page 4.
6. If the machine has two batteries:
   A. Remove the terminal nut (3) and jumper cable (4) from the battery (1), see the illustration on page 4.
   B. Install the negative ground strap (2) on the battery (1).
   C. Install the jumper cable (4) and terminal nut (3) on the battery (1).
7. Install the battery cover.
8. Install the washers and bolts that fasten the battery cover to the machine.

NO.	GA.	COLOR	FROM:	TO:
28	16	LT BLUE	ETHER START SWITCH	ETHER INJECTION SOLENOID
30	10/ 12/ 16	BLACK	ACCESSORIES, POWER PLUG OUTLET	GROUND
30A	12	BLACK	POWER PLUG OUTLET	GROUND
30B	16	BLACK	INSTRUMENT CLUSTER TERMINAL "K", POWER PLUG OUTLET	GROUND
31P	16	YELLOW	INSTRUMENT CLUSTER TERMINAL "E"	OIL PRESSURE SWITCH, DIODE
32T	16	YELLOW	INSTRUMENT CLUSTER TERMINAL "D"	TRANSMISSION TEMPERATURE SWITCH
34	16	LT GREEN	ALTERNATOR "D+"	INSTRUMENT CLUSTER TERMINAL "A"
36F	16	YELLOW	INSTRUMENT CLUSTER TERMINAL "C"	FUEL LEVEL SENDER
36H	16	YELLOW	INSTRUMENT CLUSTER TERMINAL "G"	HYDRAULIC FILTER RESTRICTION SWITCHES, DIODE
36P	16	YELLOW	INSTRUMENT CLUSTER TERMINAL "H"	PARK BRAKE SWITCH, , FRONT AXLE TEMPERATURE SWITCH
36R	16	GRAY	PARKING BRAKE SWITCHES	ALARM RELAY T30
37	16	YELLOW	INSTRUMENT CLUSTER TERMINAL "J"	COOLANT TEMPERATURE SWITCH
38	16	YELLOW	INSTRUMENT CLUSTER TERMINAL "F"	AIR FILTER RESTRICTION SWITCH, DIODE
41	16	GRAY	DRIVING LAMP SWITCH	DRIVING AND TAIL LAMPS
42C	16	GRAY	REAR WORK LAMP SWITCH	REAR WORK LAMPS
44	16	TAN	BRAKE SWITCH (N.O.)	BRAKE LAMPS
45L	16	TAN	FLASHER RELAY T5	LEFT TURN SIGNAL LAMPS
45R	16	TAN	FLASHER RELAY T7	RIGHT TURN SIGNAL LAMPS
46	16	TAN	FLASHER SWITCH	FLASHER RELAY T1
47L	16	TAN	TURN SIGNAL SWITCH (LEFT)	LEFT TURN INDICATOR, FLASH RELAY T6
47R	16	TAN	TURN SIGNAL SWITCH (RIGHT)	RIGHT TURN INDICATOR, FLASH RELAY T3
52	16	GRAY	DIODES	ALARM RELAY T85, SHUTTLE INTERLOCK RELAY T87A
56	16	RED	FUSE BLOCK 1B	OPTIONAL FUSED (B+)
57	16	RED	FUSE BLOCK 1C	ACCESSORIES BATT (+)
58	16	RED	FUSE BLOCK 7B	OPTIONAL FUSED (B+)
64A	16	RED	FUSE BLOCK 3B	HORN SWITCH
64B	16	GRAY	HORN SWITCH	HORN
83	12	RED	FUSE BLOCK 9C	POWER PLUG (B+)
84	12	RED	FUSE BLOCK 11C	POWER PLUG (B+)

20 Air Filter Restriction Switch

The air filter restriction switch is located in the hose between the air filter and the engine.

Check Points	Reading	Possible Cause of Bad Reading
Terminal for wire 30 to ground	Continuity	Bad ground connection.
NOTE: *Turn the key switch to ON.*		
Terminal for wire 38 to ground	12 volts	Bad circuit between the air filter restriction switch and terminal F at the instrument cluster (17). Also check the instrument cluster (17).

21 Engine Oil Pressure Switch

The engine oil pressure switch is located below the fuel injection pump on the left side of the engine.

Check Points	Reading	Possible Cause of Bad Reading
Check between the housing of the oil pressure switch and the engine block	Continuity	Bad ground connection between the oil pressure switch and the engine block.
NOTE: *Turn the key switch to ON.*		
Terminal for wire 31P to ground	12 volts	Check the circuit between the engine oil pressure switch and terminal E at the instrument cluster (17). Also check the instrument cluster (17).

NOTE: *If the readings are good, replace the engine oil pressure switch.*

22 Transmission Temperature Switch

The transmission temperature switch is located in the top, left, front cover of the transmission case.

Check Points	Reading	Possible Cause of Bad Reading
Check between the housing of the transmission temperature switch and the transmission housing	Continuity	Bad ground connection.
NOTE: *Turn the key switch to ON.*		
Terminal for wire 32T to ground	12 volts	Check the circuit between the transmission temperature switch and terminal D at the instrument cluster (17). Also check the instrument cluster (17).

NOTE: *If the readings are good, replace the transmission temperature switch.*

44 Turn Signal Switch

The turn signal switch is located on the steering column.

Check Points	Reading	Possible Cause of Bad Reading
NOTE: *Turn the key switch to ON.*		
Terminal for wire 19B to ground	12 volts	Check the circuit between the turn signal switch and power relay #2 (4). Also check the 15 ampere fuse in the fuse block (16) and power relay #2 (4).
NOTE: *Turn the key switch to ON. Move the turn signal switch for a left turn.*		
Terminal for wire 45L to ground	Intermittent 12 volts	Bad turn signal switch.
NOTE: *Turn the key switch to ON. Move the turn signal switch for a right turn.*		
Terminal for wire 45R to ground	Intermittent 12 volts	Bad turn signal switch.
NOTE: *If the readings are correct and the indicator lamp on the turn signal switch does not illuminate, do the following check.*		
Terminal for wire 30 to ground	Continuity	Bad ground circuit for turn signal switch indicator lamp.
NOTE: *Turn the key switch to ON. Put the turn signal switch in the left turn position.*		
Terminal for wire 47L to ground	Intermittent 12 volts	Check the circuit between the turn signal indicators and the flasher relay (46). Also check the flasher relay (46).
NOTE: *Turn the key switch to ON. Put the turn signal switch in the right turn position.*		
Terminal for wire 47R to ground	Intermittent 12 volts	Check the circuit between the turn signal indicators and the flasher relay (46). Also check the flasher relay (46).

NOTE: *If the readings were correct and the indicator lamps on the turn signal switch do not illuminate, replace the turn signal switch.*

45 Brake Lamp Switch

The brake lamp switch is located below the floor plate, near the brake pedals.

Check Points	Reading	Possible Cause of Bad Reading
NOTE: *Turn the key switch to ON.*		
Terminal for wire 19B to ground	12 volts	Check the circuit between the brake lamp switch and power relay #2 (4). Also check the 15 ampere fuse in the fuse block (16) and power relay #2 (4).
NOTE: *Have another person push down and hold the brake pedal.*		
Terminal for wire 44 to ground	12 volts	Bad brake lamp switch.

SAFETY RULES

Never try to charge the battery if the electrolyte in the battery is frozen.
47-83A

Never cause sparks to occur or smoke near batteries that are charging or have been recently charged.
13-8A

Disconnect the ground cable first when the battery cables are disconnected from the battery.

Connect the ground cable last when the battery cables are connected to the battery.
47-55A

Some batteries have a ventilation tube. If there is battery acid in the ventilation tube, this battery acid can be released when the battery is turned upside down. If you turn the battery upside down, make sure that the end of the ventilation tube is away from you and away from any other people in the area. Battery acid can cause severe burns.
48-57B

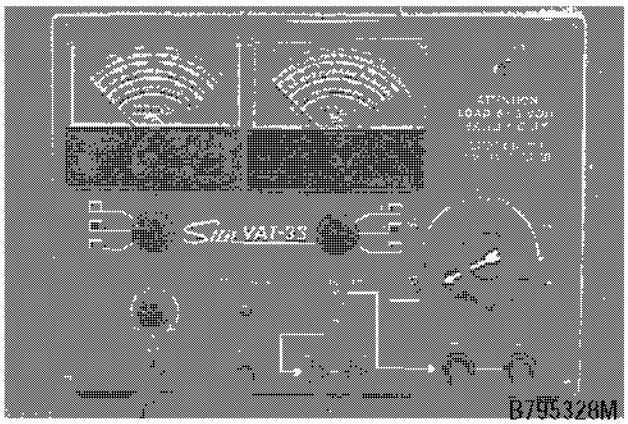
If the battery(s) in this machine must have nonspill caps, do not operate the machine if the nonspill caps do not work correctly, or if the nonspill caps are not in place.
48-99A

Battery acid causes severe burns. Batteries contain sulfuric acid. Avoid contact with skin, eyes, or clothing. Antidote: EXTERNAL-Flush with water. INTERNAL-Drink large quantities of water or milk. Follow with milk of magnesia, beaten egg, or vegetable oil. Call physician immediately. Eyes: Flush with water for 15 minutes and get prompt medical attention.

Batteries produce explosive gases. Keep sparks, flame, and cigarettes away. Ventilate when charging or using in enclosed area. Always shield eyes when working near batteries.

Keep out of reach of children.
D-47-53A

SPECIAL TOOLS



The CAS-10147 tester is used to do the Capacity (Load) Test. This tool is first used on page 4003-7.

SPECIFICATIONS

Manufacturer	Denso
Nippondenso part number	128000-0212
Case part number	1987559C1
No-Load Test at 80°F (26.7°C)	
Volts	11
Current draw	220 amperes maximum
Starter drive speed	4200 rpm (r/min) minimum

LUBRICATION

Interval	When the starter is disassembled or each time the engine is removed for repairs
Lubricant	
Molykote-GN	Use on shaft at pinion end of starter drive.
Case multipurpose grease	Use on bearings, gears, idler gear shaft, and spring.

NOTE: *The photos and illustrations in this section are typical. Your starter will have a device to keep you from jump starting the machine on the switch terminal of the starter. See page 13 for correct illustration of your starter.*

NO-LOAD TEST

General Information

1. The No-Load Test is done with the starter removed from the engine.
2. Check to see if you can pull the gear on the starter drive out of the starter drive housing.
3. Check to see if the starter drive can be turned. Pull the gear on the starter drive out of the starter drive housing. Turn the gear clockwise to turn the starter drive and the armature. Much force should be required to turn the gear. Turn the gear counterclockwise; less force should be required to turn the gear as the clutch will be slipping.
4. If the starter drive cannot be turned, disassemble the starter and make repairs as needed. Then do the No-Load Test.

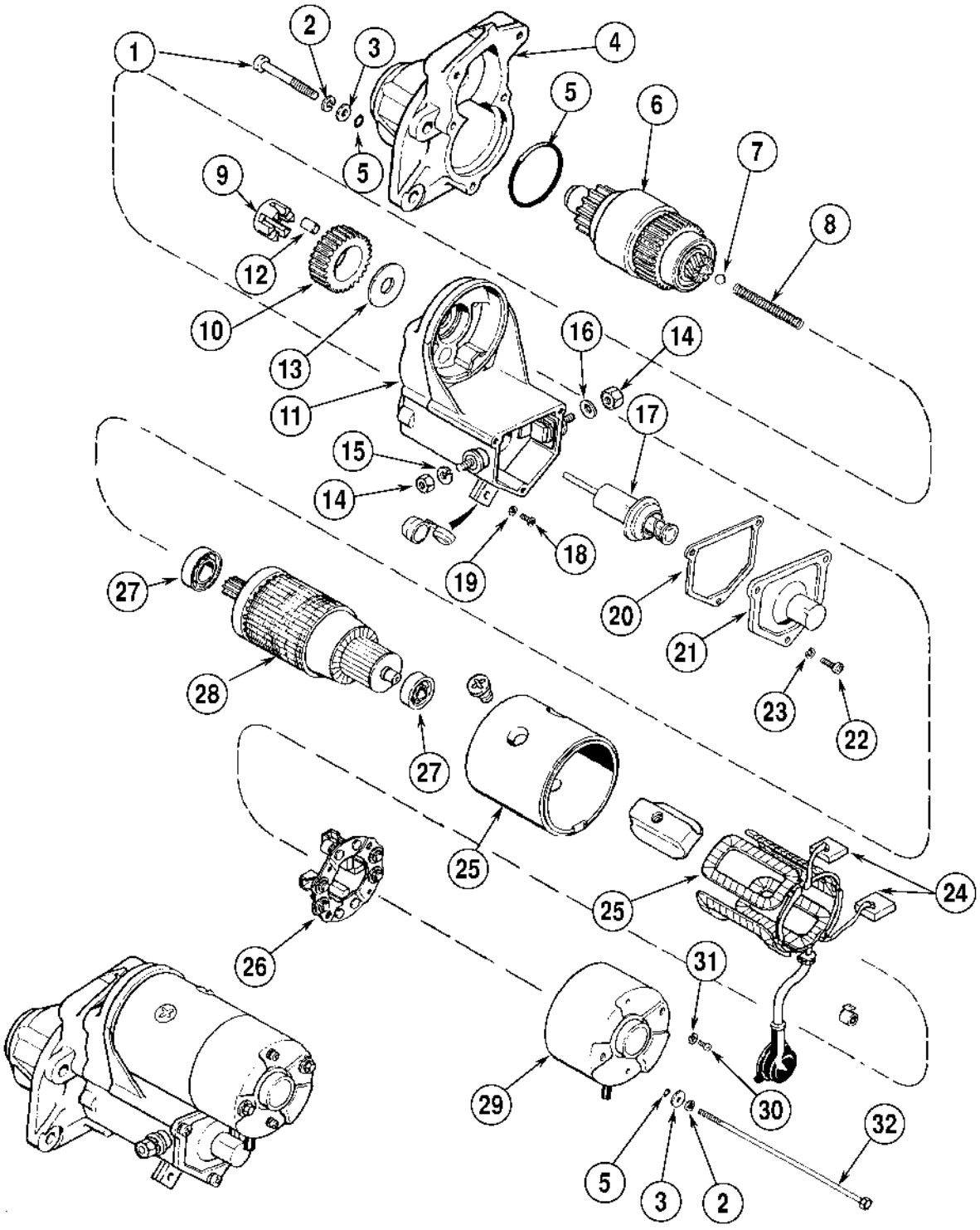
Test Equipment

The No-Load Test can be done using a Sun Electric VAT-33 Tester, an equivalent tester, or separate pieces of test equipment.

A hand held tachometer is needed to measure the speed of the armature shaft.

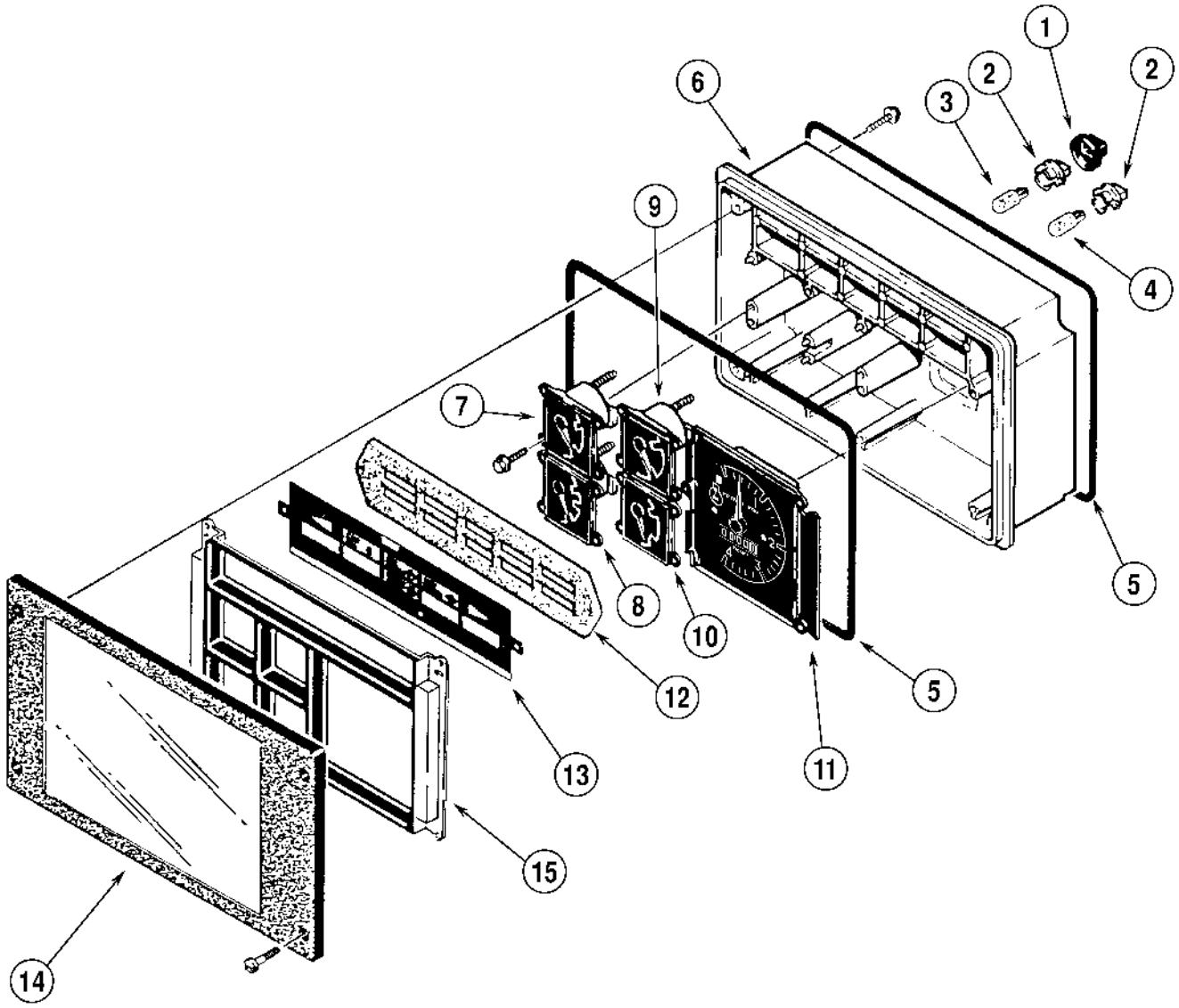
A remote starter button is needed to actuate the starter.

A fully charged 12 volt battery is needed to supply the electricity to turn the starter.



BS98E108

1. SCREW
2. LOCK WASHER
3. FLAT WASHER
4. STARTER DRIVE HOUSING
5. O-RING
6. STARTER DRIVE
7. STEEL BALL
8. SPRING
9. BEARING CAGE
10. IDLER GEAR
11. STARTER SOLENOID ASSEMBLY
12. ROLLER
13. THRUST WASHER
14. NUT
15. LOCK WASHER
16. SPRING WASHER
17. PLUNGER
18. SCREW
19. LOCK WASHER
20. GASKET
21. SOLENOID COVER
22. SCREW
23. WASHER
24. BRUSH
25. FIELD FRAME ASSEMBLY
26. BRUSH HOLDER
27. BEARING
28. ARMATURE
29. COVER
30. SCREW
31. LOCK WASHER
32. THRU BOLT

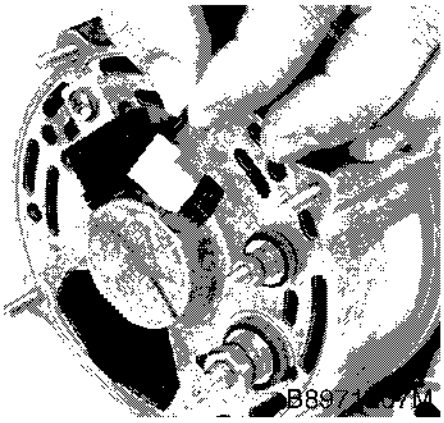


B901651J

1. *Rubber Cover*
2. *Socket*
3. *Bulb No. 194 (3)*
4. *Bulb No. 168 (8)*
5. *Gasket*
6. *Body*
7. *Water Temperature Gauge*
8. *Fuel Level gauge*
9. *Oil Temperature Gauge*
10. *Voltmeter*
11. *Tachometer*
12. *Gasket*
13. *Identification Strip*
14. *Cover*
15. *Retainer*

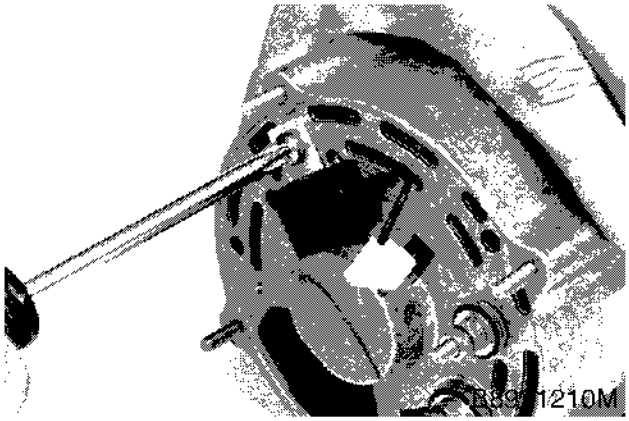
Instrument Cluster

STEP 7



Disconnect the lead for the capacitor.

STEP 8



Loosen and remove the screw and remove the capacitor.

STEP 9

B8971213M

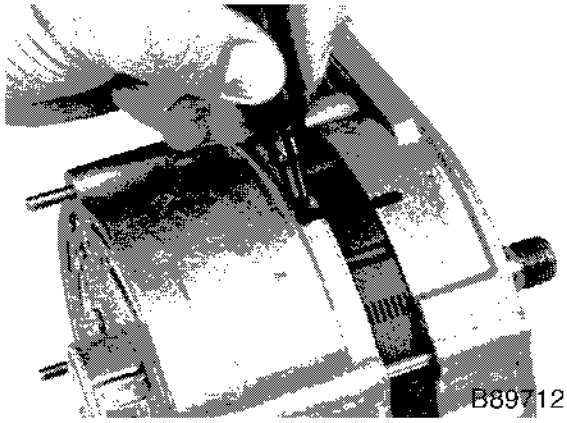
Loosen and remove the nut, flat washer, and fiber washers from the D+ terminal.

STEP 10

B8971216M

Loosen and remove the nut, flat washer, and fiber washers from the B+ terminal.

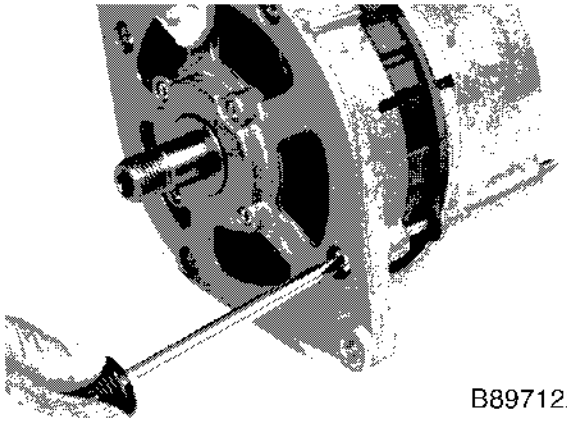
STEP 11



B8971219M

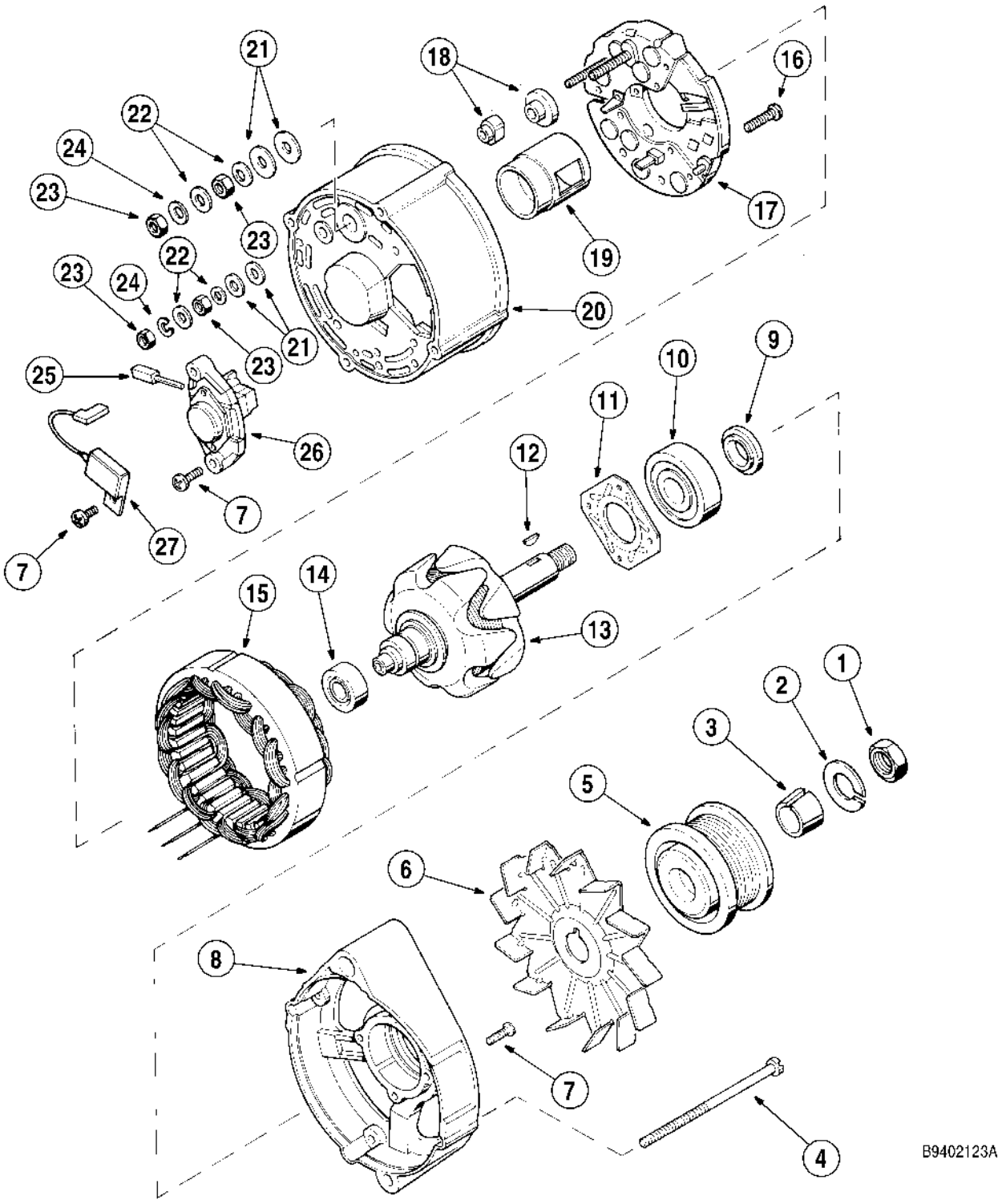
Make an alignment mark on the cover, the stator, and the housing.

STEP 12



B8971222M

Loosen and remove the screws that fasten the cover, stator, and housing together.



1. *Nut*
2. *Lock Washer*
3. *Spacer*
4. *Screw*
5. *Pulley*
6. *Fan*
7. *Screw*
8. *Cover*
9. *Spacer*
10. *Front Bearing*
11. *Bearing Retainer*
12. *Key*
13. *Rotor*
14. *Rear Bearing*
15. *Stator*
16. *Screw*
17. *Rectifier Bridge*
18. *Insulator*
19. *Shield*
20. *Housing*
21. *Fiber Washer*
22. *Flat Washer*
23. *Nut*
24. *Lock Washer*
25. *Brush*
26. *Voltage Regulator and Brush Holder*
27. *Capacitor*

Illustration of Alternator

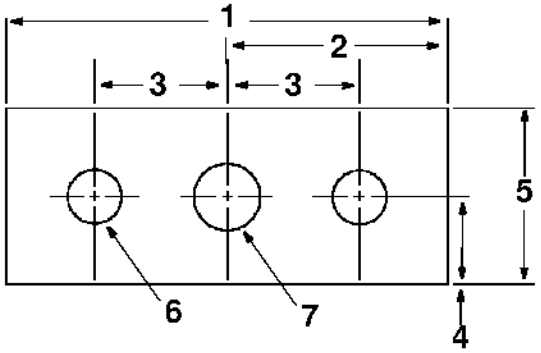
SPECIFICATIONS

Special Torques

Nut for the steering wheel	41 to 54 Nm (360 to 480 pound-inches)
Cap screws that fasten the steering cylinder to the two wheel drive steering axle	786 to 944 Nm (580 to 696 pound-feet)
Cap screws that fasten the steering cylinder to the four wheel drive steering axle	162 to 178 Nm (119 to 131 pound-feet)
Cap screws that hold the rear drive shaft	33 to 39 Nm (24 to 29 pound-feet)
Cap screws for the two wheel drive steering axle	156 to 203 Nm (115 to 150 pound-feet)
Wheel nuts for the four wheel drive steering axle	112 to 125 Nm (83 to 92 pound-feet) Then turn nuts an additional 90 degrees ±5 degrees.
Nut that fastens the ball joint to the arm of the swivel housing on the four wheel drive steering axle	165 Nm (122 pound-feet)
U-clamp for exhaust pipe	19 to 27 Nm (14 to 20 pound-feet)

SPECIAL TOOLS

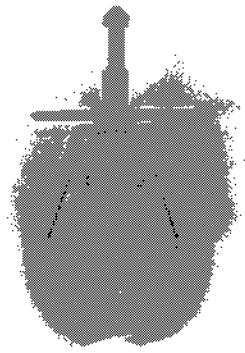
The tool shown is needed to remove the steering wheel. Make the tool in your shop. This tool is first used on page 4.



GS99J500

Make from 6 mm (1/4 inch) Cold Rolled Steel

1. 1. 50 MM (2 INCH)
2. 25.4 MM (1 INCH)
3. 15.9 MM (5/8 INCH)
4. 9.5 MM (3/8 INCH)
5. 19 MM (3/4 INCH)
6. TWO HOLES, 5.5 MM (7/32 INCH)
7. USE NO. 4 DRILL FOR 1/4 - 24 THREADS METRIC THREAD OPTIONAL TWO 10-32 X 1 INCH SCREWS REQUIRED



GS99J514

CAS-10486 Puller
This tool is used to remove the ball joint for the steering cylinder from the axle. This tool is first used on page 14.

CAS-2151 Wrench
This tool is used to remove and install the tie rod. This tool is first used on page 15.

STEERING CYLINDER, FOUR WHEEL DRIVE MACHINES

Removal

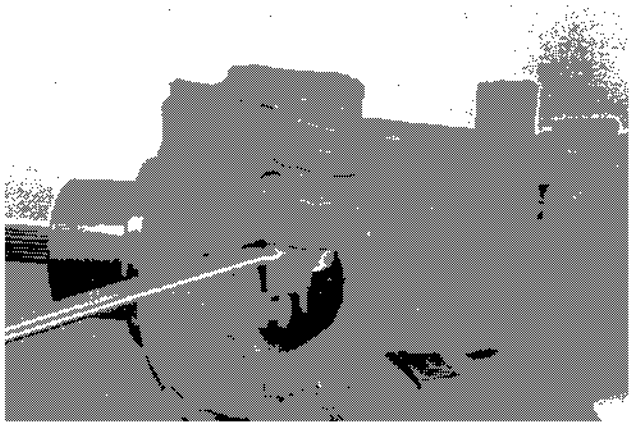
NOTE: *The following photographs show the steering cylinder being removed from the axle with the axle removed from the machine. It is not necessary to remove the axle from the machine to remove the steering cylinder.*

1. Clean the hose connections and the steering cylinder.

2. Fasten an identification tag to one of the hoses to the steering cylinder.

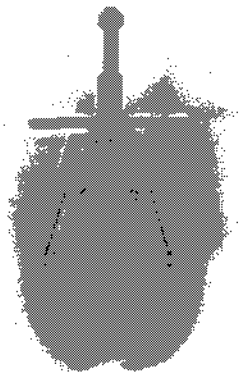
3. Disconnect the hoses from the steering cylinder. Install a plug is each hose and a cap on each fitting.

4. Remove the cotter pin from the ball joint and loosen the nut several turns. Do not remove the nut at this time.



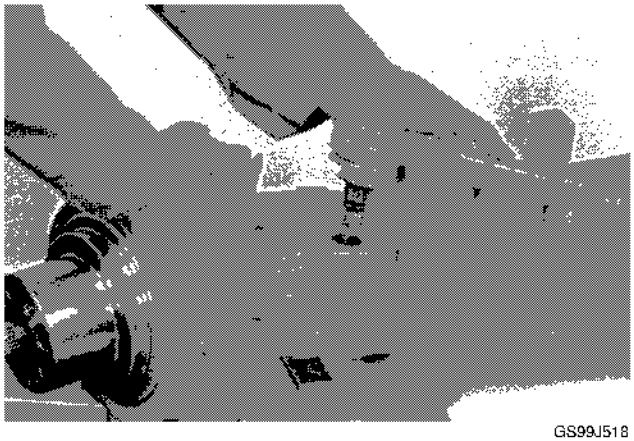
GS99J516

5. Install the CAS-10486 puller and tighten the screw.



GS99J514

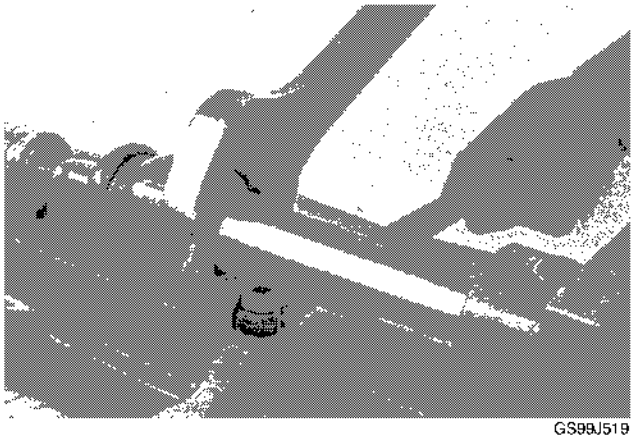
6. Remove the nut and remove the ball joint from the arm.



GS99J518

7. Repeat steps 4, 5, and 6 for the other end of the axle.

8. Install the CAS-2151 tool on the flats of the piston rod and install a wrench on the tie rod. Prevent the piston rod from turning and loosen the tie rod.



GS99J519

9. Remove the tie rod and ball joint assembly from the piston rod.

TROUBLESHOOTING PROCEDURE

Check the machine for oil leaks and damaged or missing parts. Repair as required.

Is the oil in the hydraulic reservoir at the correct level?

NO → Fill the hydraulic reservoir with the oil specified in Section 1002.

YES ↓

With the oil at operating temperature, operate all systems. Is the problem in the steering system only?

NO → See Section 8002 for troubleshooting instructions.

YES ↓

See the hydraulic schematic in the rear pocket and check the hose connections. Are the hoses connected correctly?

NO → Connect the hoses according the hydraulic schematic.

YES ↓

With the oil at operating temperature and the engine running at low idle, is the steering wheel difficult to turn?

NO → Does the steering control valve return to NEUTRAL when the steering wheel is not being turned?

NO ↓

Repair or replace the steering control valve according to instructions in Section 5002.

YES ↓

Check the setting of the steering relief valve according to the instructions in this section. Is the setting correct?

NO → See Section 8002 and check the pressure setting of the main relief valve. Is the setting correct?

YES ↓

NO ↓

Replace the main relief valve according to instructions in Section 8005.

See Section 8002 and do the pump output test. Is the pump output correct?

YES ↓

NO ↓

Repair or replace the hydraulic pump according to instructions in Section 8004.

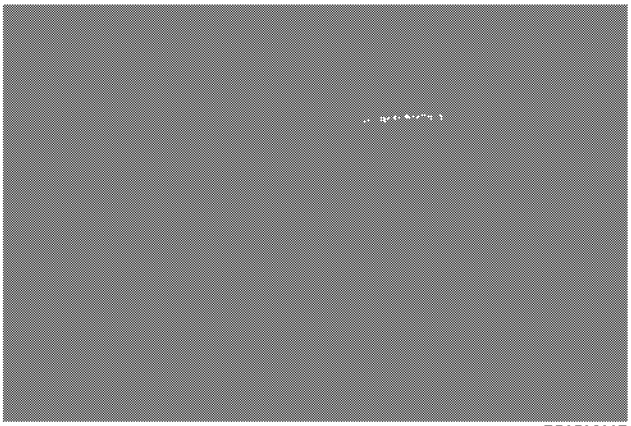
YES ↓

Replace the steering relief valve in the flow control proximity valve according to the instructions in Section 8006.

Continued

DISASSEMBLY

STEP 1



BP9503067

Put the steering control valve in the vise so that the end plate is up. Remove the Ferry head screws.

STEP 2

BP9503068

Remove the end plate.

STEP 3

BP9503069

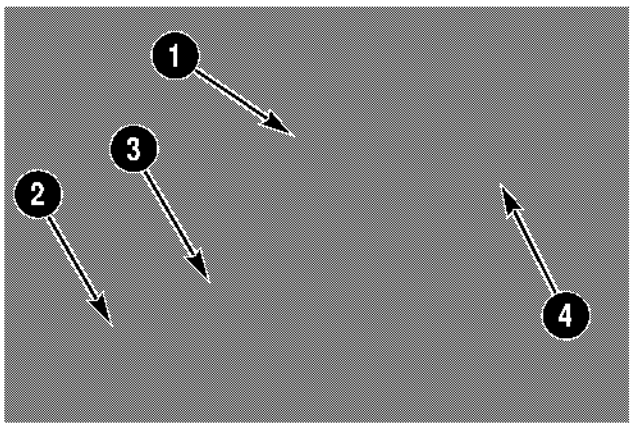
Remove the O-ring from the stator of the metering gear set.

STEP 4

BP9503070

Lift the metering gear set, the spacer, the drive shaft, and the spacer plate as an assembly from the body.

STEP 5



BP9503071

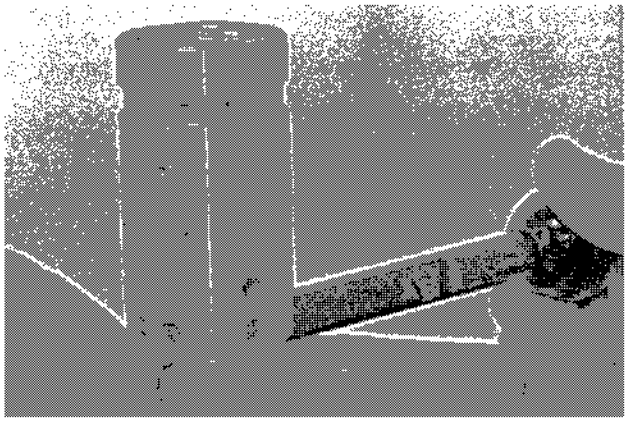
Separate the metering gear set (1), the spacer (2), the drive shaft (3), and the spacer plate (4).

STEP 6

BP9503072

Remove the O-ring from the spacer plate.

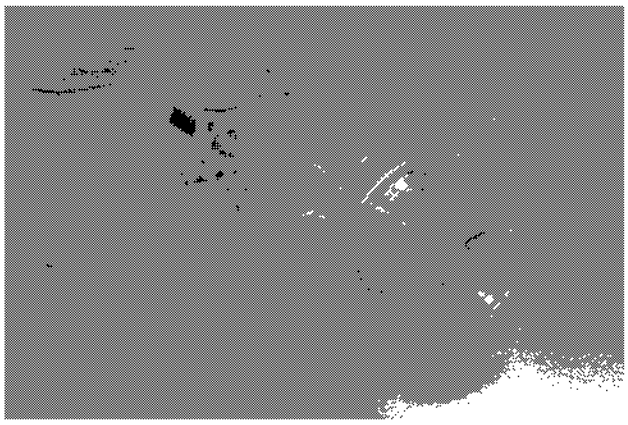
STEP 50



B523717M

Push the centering springs into the spool. Move the tool as necessary to put the centering springs in position.

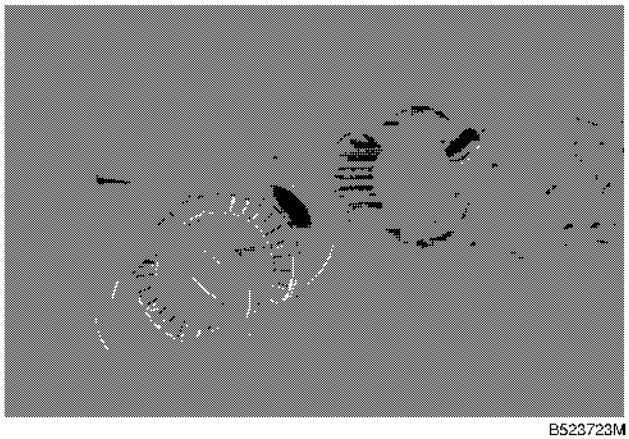
STEP 51



B523721M

Install the pin in the sleeve and through the spool.

STEP 52



B523723M

Install the thrust washer, the thrust bearing, and the other thrust washer on the spool.

STEP 53

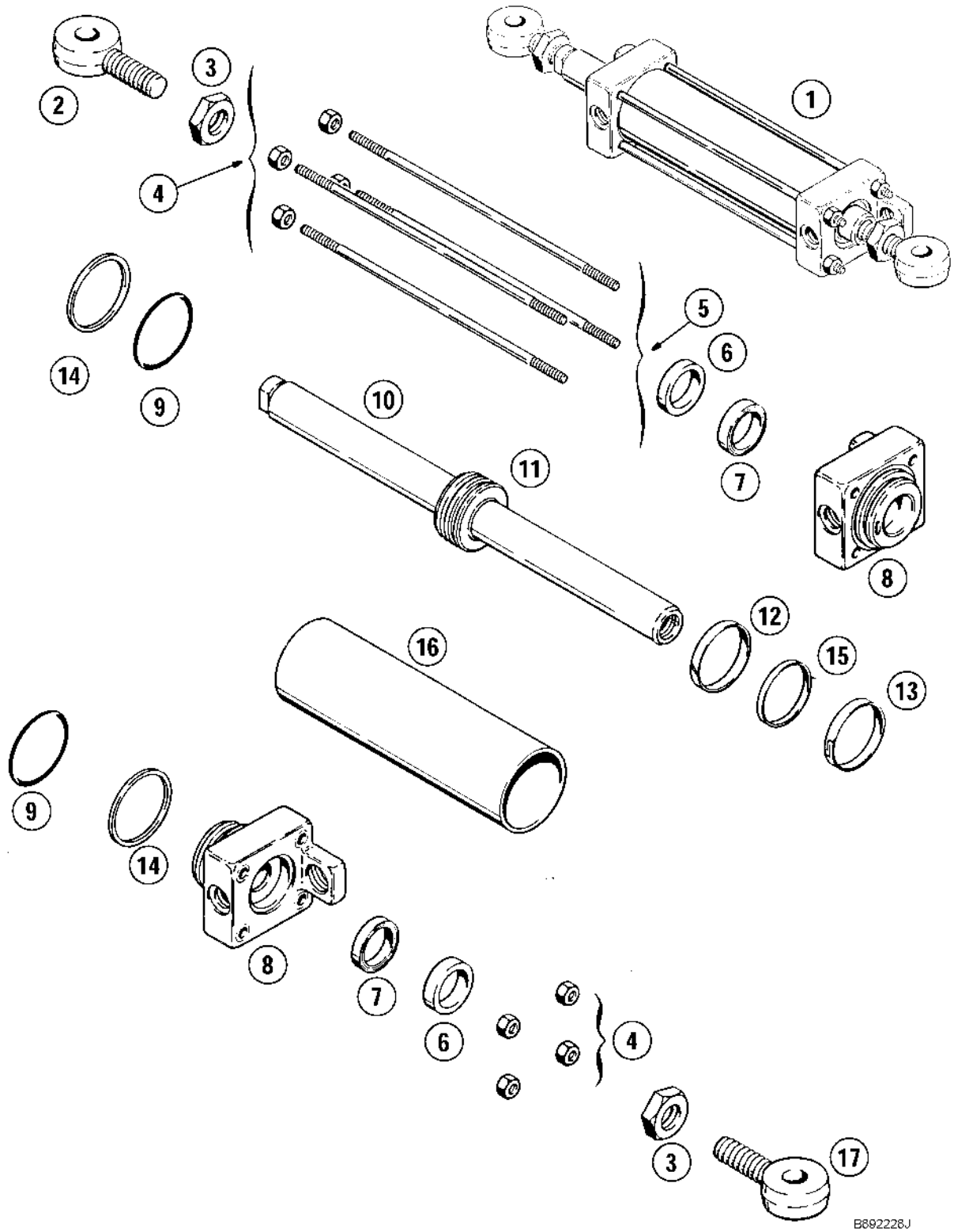
BP9503073

Install a new seal on the spool.

STEP 54

BP9503075

Use clean hydraulic oil to lubricate the outside of the sleeve. Use clean hydraulic oil to lubricate the bore in the body. Install the sleeve and the spool straight into the body.



1. STEERING CYLINDER
2. ROD EYE
3. LOCK NUT
4. NUTS
5. TIE RODS
6. WIPER
7. SEAL
8. GLAND
9. O-RING
10. PISTON ROD
11. PISTON
12. WEAR RING
13. SEAL
14. BACKUP RING
15. BACKUP RING
16. TUBE
17. ROD EYE

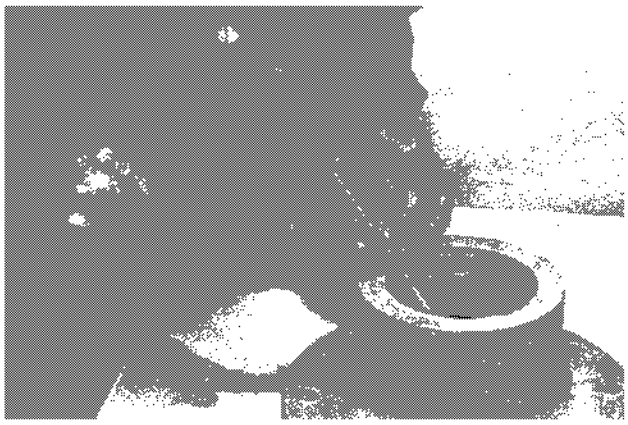
Two Wheel Drive Steering Cylinder - Exploded View

STEP 13

B021322M

Press the hub seal and the wheel bearing out of the hub.

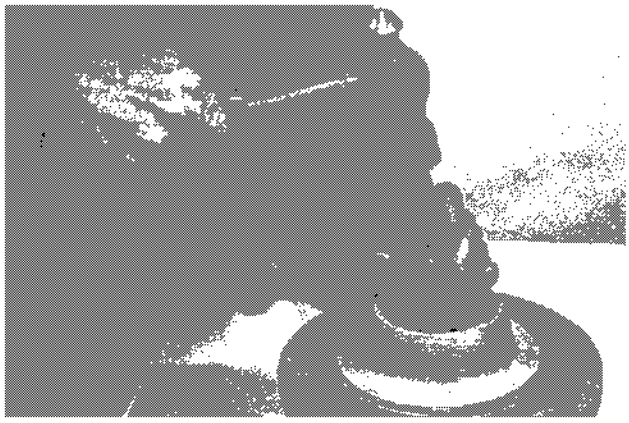
STEP 14



B021325M

If inspection indicates the need for a new bearing cup or wheel bearing, use a hammer and a punch to remove the outer bearing cup from the hub.

STEP 15



B021326M

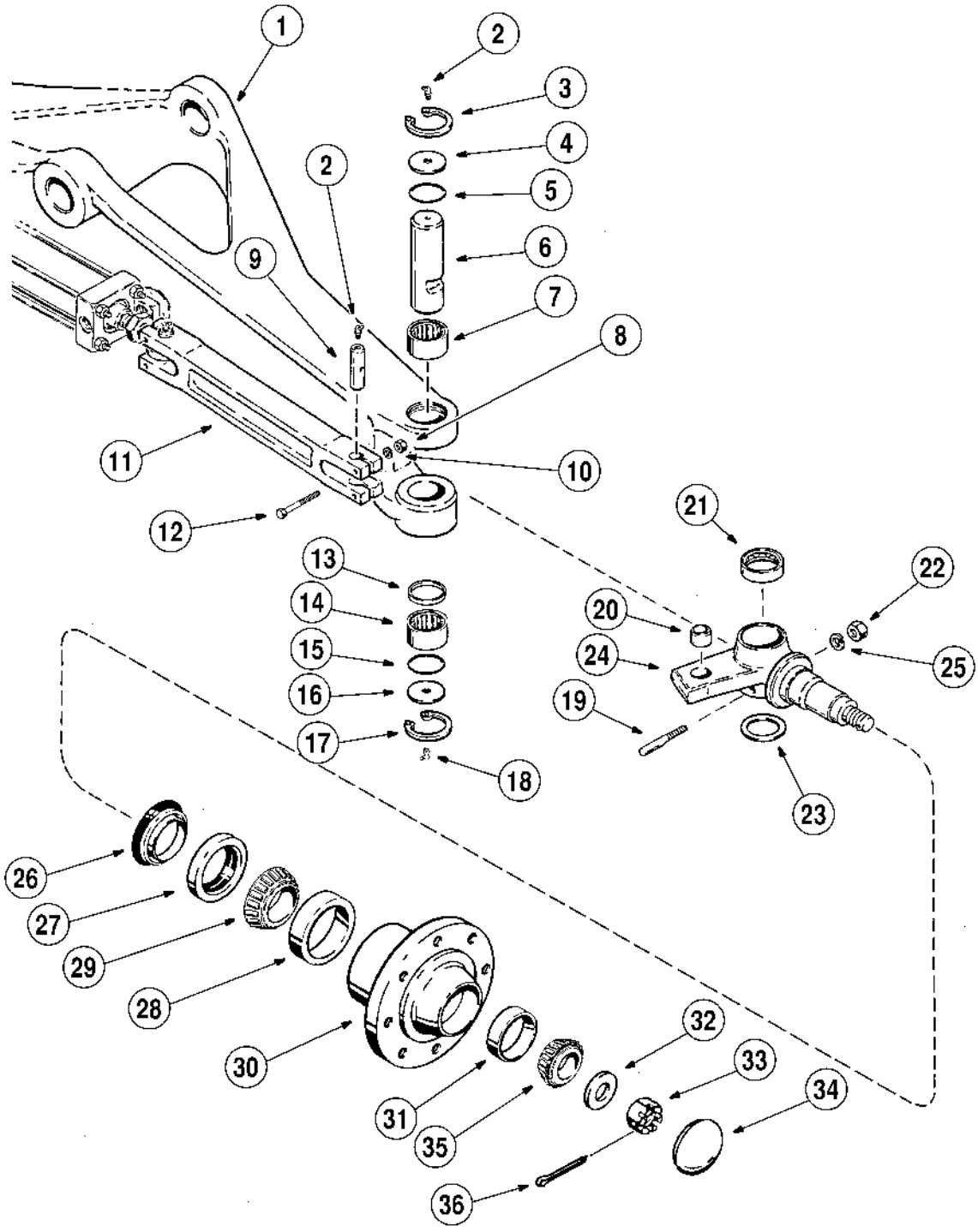
If inspection indicates the need for a new bearing cup or wheel bearing, use a hammer and a punch to remove the inner bearing cup from the hub.

Inspection

1. Clean the wheel bearings in cleaning solvent to remove all grease from the wheel bearings. Use new parts as required.

2. Check the bearing cups for scoring, flat areas, and pitting. Use new parts as required.

3. Inspect the rollers in the wheel bearings for flat areas, scoring, and other damage. Also check the inner race for wear and damage. Use new parts as required.



B891545J

1. STEERING AXLE
2. GREASE FITTING
3. SNAP RING
4. SPACER
5. O-RING
6. KINGPIN
7. BEARING
8. NUT
9. PIVOT PIN
10. LOCK WASHER
11. STEERING LINK
12. BOLT
13. SEAL
14. BEARING
15. O-RING
16. SPACER
17. SNAP RING
18. GREASE FITTING
19. LOCK PIN
20. BUSHING
21. THRUST BEARING
22. NUT
23. THRUST WASHER
24. SPINDLE
25. LOCK WASHER
26. SPINDLE SEAL
27. HUB SEAL
28. BEARING CUP
29. WHEEL BEARING
30. HUB
31. BEARING CUP
32. FLAT WASHER
33. NUT
34. CAP
35. WHEEL BEARING
36. COTTER PIN

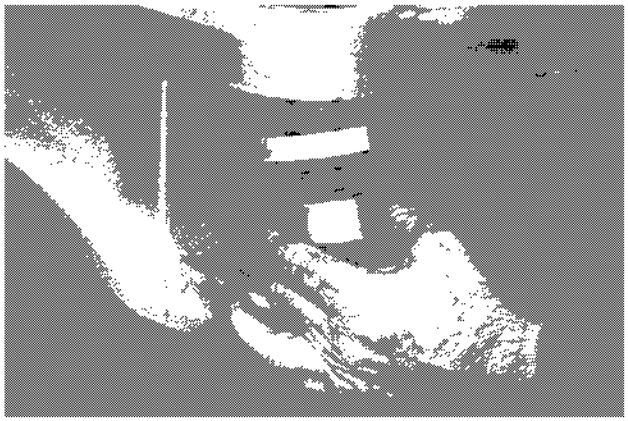
Installation

STEP 109

B633714M

Clean the bores for the bearings.

STEP 110



B633717M

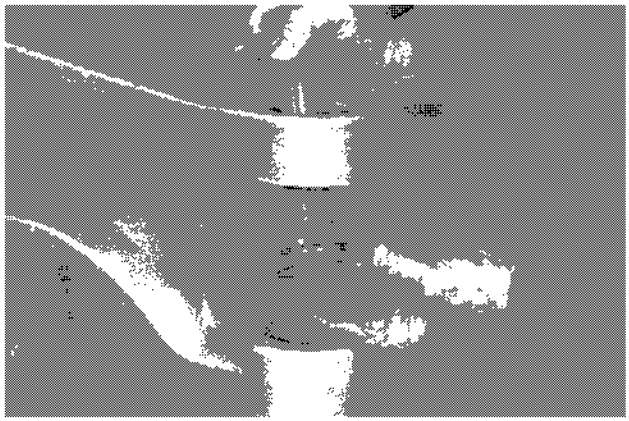
Put a bearing on a driver that has a pilot end. There is a number on one end of the bearing. Make sure that the end with the number is toward the driver. Put tape on the driver 6.4 mm (1/4 inch) from the bearing to help install the bearing to the correct depth.

STEP 111

B633719M

Drive the bearing into the bottom boss until the tape is even with the top of the boss.

STEP 112



B633721M

Install the seal on an acceptable driver so that the lip is toward the driver. The driver must have a larger diameter than the seal.

STEP 113

B633723M

Drive the seal into the bottom boss until the driver touches the boss.

STEP 114

B633725M

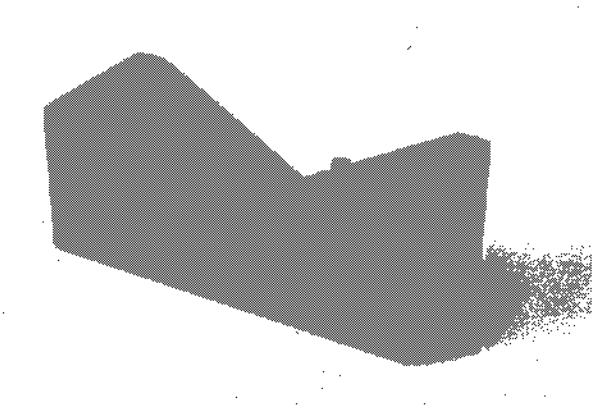
Put a bearing on an acceptable driver. There is a number on one end of the bearing. Make sure that the end with the number is toward the driver.

B4094188

CAS-1842 WHEEL STUD REMOVAL AND INSTALLATION.

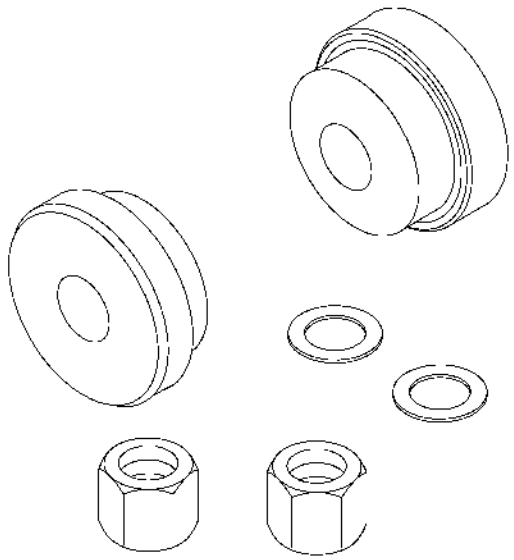
B4097488

CAS-2150 WRENCH TO LOOSEN AND TIGHTEN TIE RODS FOR STEERING CYLINDER.



B4106888

CAS-1980 V-BLOCK. USED TO SUPPORT COUPLING WHEN REPLACING A UNIVERSAL JOINT.



BT95H083

CAS2396 TRUNION BUSHING INSTALLER (PART OF CAS40032 "L SERIES" AXLE TOOL KIT) - USED TO INSTALL THE TRUNION AXLE BUSHING.

B9110718

Install the snap ring.

STEP 41

B9111102

Install a new O-ring on the planetary housing.

STEP 42

B9111104

Install the carrier.

STEP 43

B9110714

Install and tighten the Allen head screws to a torque of 25 Nm (19 pound-feet).

STEP 44

See Specifications on page 3 for the correct lubricant for the planetary(ies).

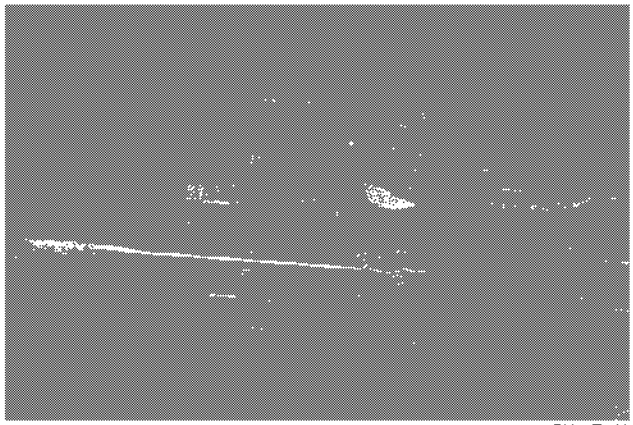
STEP 45

Install the wheel(s), hardened washers, and nuts. Tighten the nuts to a torque of 112 to 123 Nm (83 to 92 pound-feet).

B9076403

Install the ball joint and nut.

STEP 96



BK98E041

Tighten the nut to 165 Nm (122 pound-feet).

STEP 97

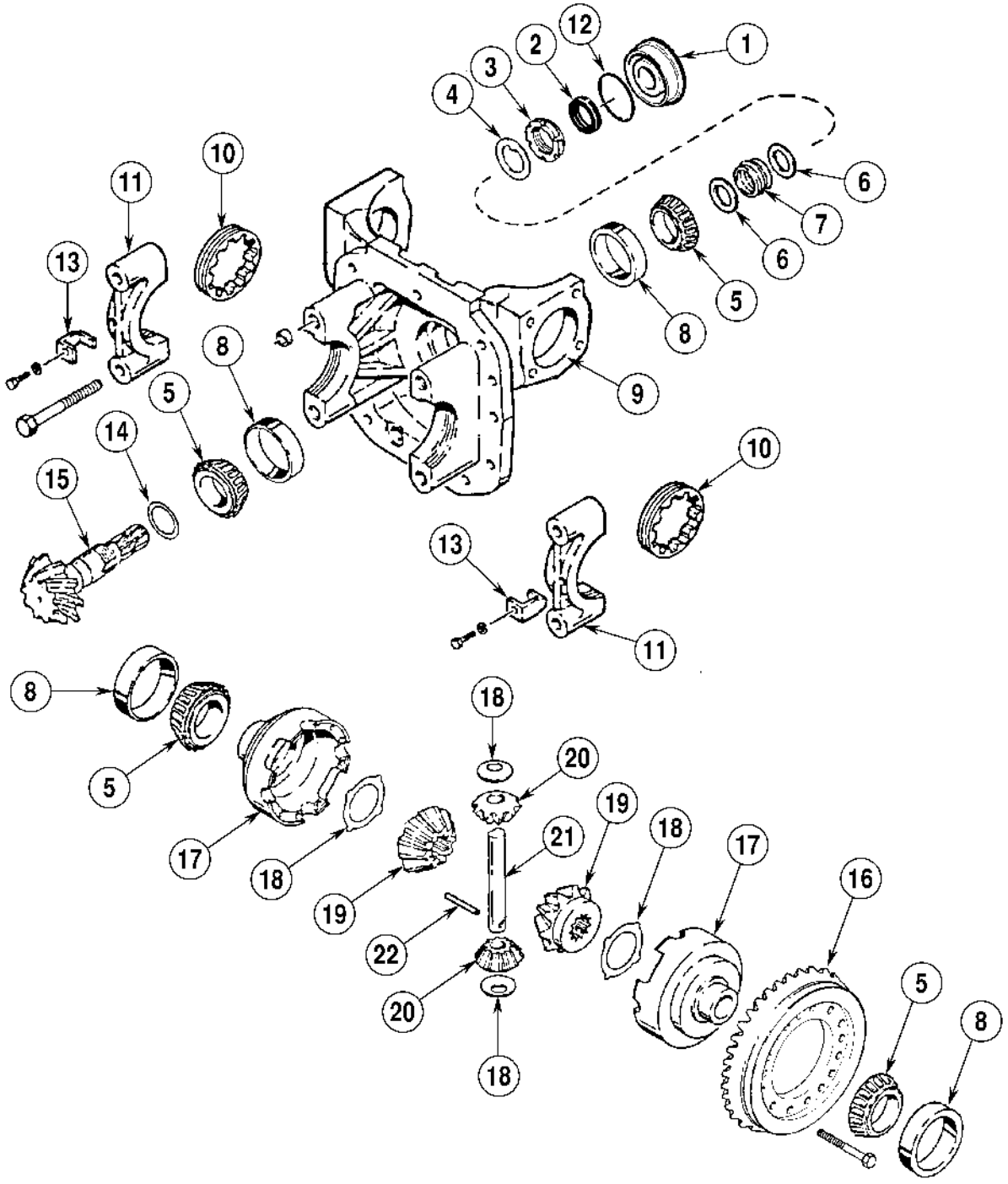
Repeat steps 89 through 96 for the opposite end of the axle.

STEP 98

Lubricate the king pins.

STEP 99

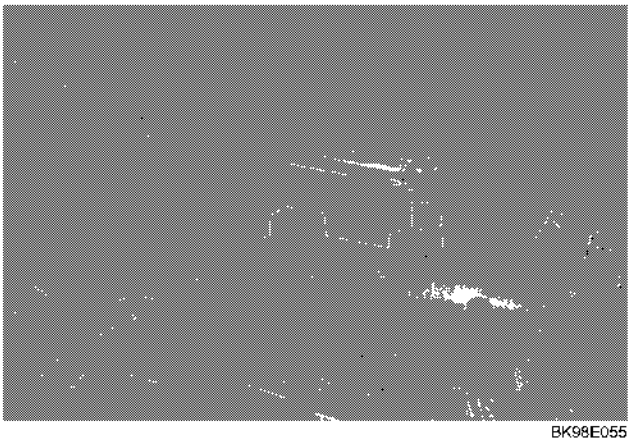
Assemble the planetary according to instructions in this section.



BS98D118

1. COVER
2. SEAL
3. PINION NUT
4. WASHER
5. BEARING
6. FLAT WASHER
7. SPACER
8. BEARING CUP
9. DIFFERENTIAL CARRIER
10. ADJUSTING RING
11. BEARING CAP
12. O-RING
13. LOCK
14. SHIM
15. PINION GEAR
16. RING GEAR
17. CASE HALF
18. THRUST WASHER
19. SIDE GEAR
20. PINION GEAR
21. PINION SHAFT
22. DOWEL PIN

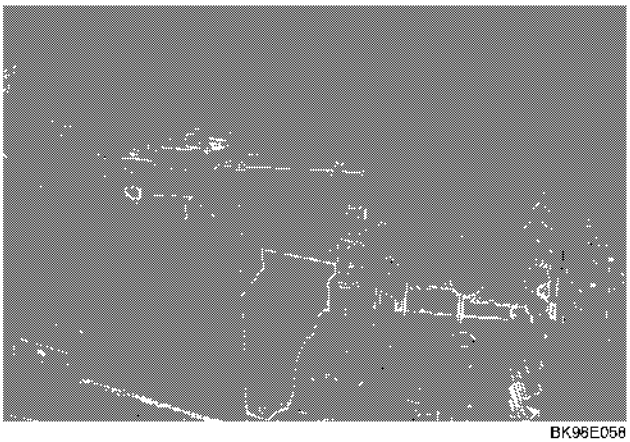
EXPOLDED VIEW OF DIFFERENTIAL FOR STANDARD (CARRARO) TRANSMISSION



BK98E055

When the backlash is correct, tighten the cap screws to 266 Nm (197 pound-feet).

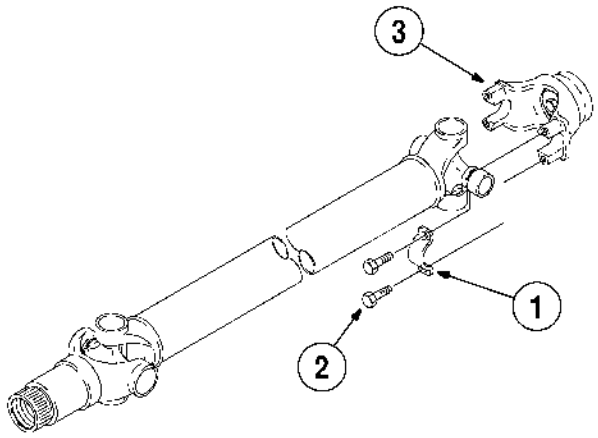
STEP 195



BK98E058

Install the lock, cap screw and lock washer that hold each adjusting ring. Tighten the cap screws to 13 Nm (120 pound-inches).

STEP 14



GS99J604

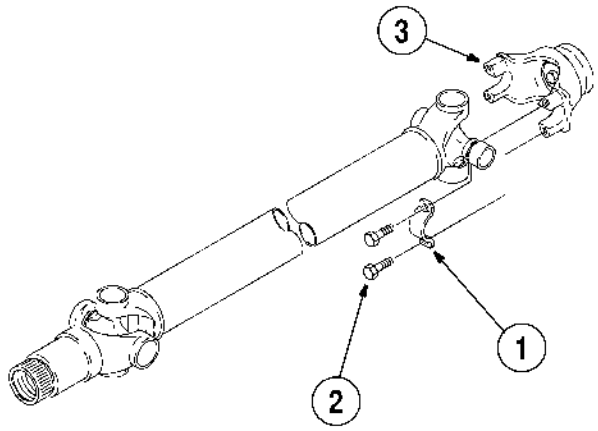
1. RETAINER
2. BOLT
3. TRANSMISSION OUTPUT SHAFT YOKE

If equipped, remove the retainer (1) and bolts (2) which fasten the front drive shaft to the transmission output shaft yoke (3).

STEP 15

Remove the rear drive shaft by sliding it off the axle pinion shaft splines.

STEP 16



GS99J604

1. RETAINER
2. BOLT
3. TRANSMISSION OUTPUT SHAFT YOKE

Remove the retainer (1) and bolts (2) which fasten the front drive shaft to the transmission output shaft yoke (3).

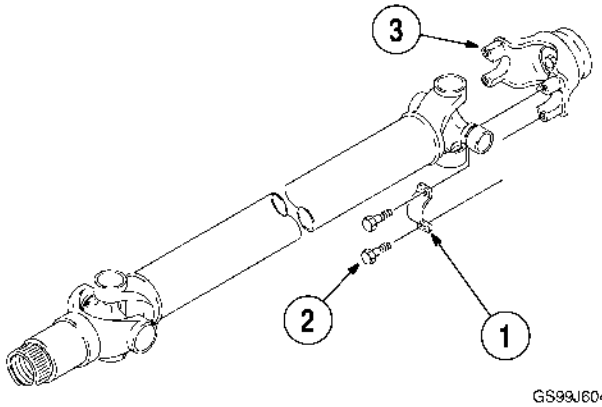
STEP 17

Remove the front drive shaft by sliding it off the axle pinion shaft splines.

STEP 58

Install the drain plugs.

STEP 59



GS99J604

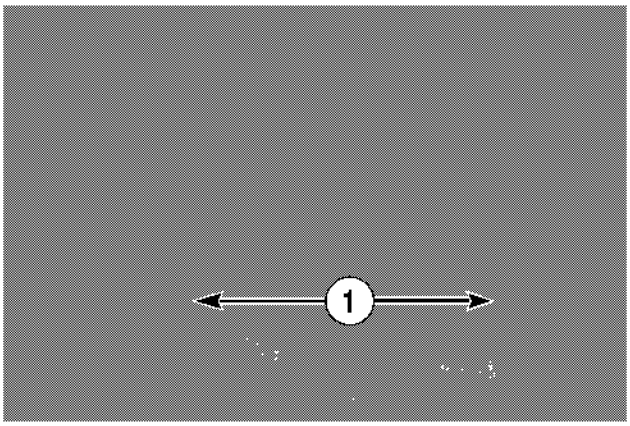
1. RETAINER
2. BOLT
3. TRANSMISSION OUTPUT SHAFT YOKE

Remove the retainer (1) and bolts (2) which fasten the front drive shaft to the transmission output shaft yoke (3).

STEP 60

Remove the front drive shaft by sliding it off the front axle pinon shaft splines.

STEP 61



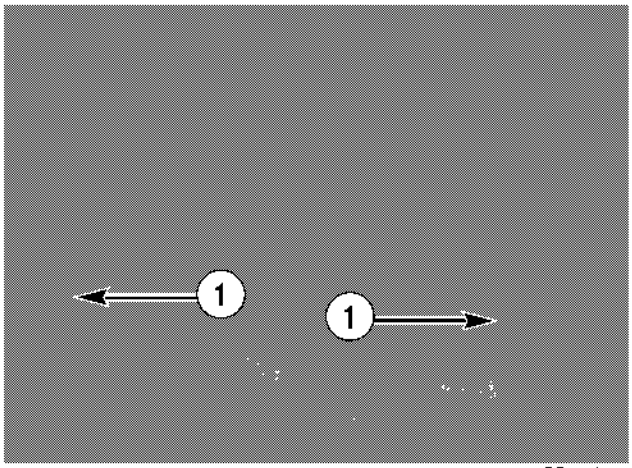
BP9503097

Disconnect both the left and right brake supply lines (1) at the front axle brake housing.

STEP 62

Install caps on the brake housing fittings and install plugs in the brake supply lines.

STEP 63

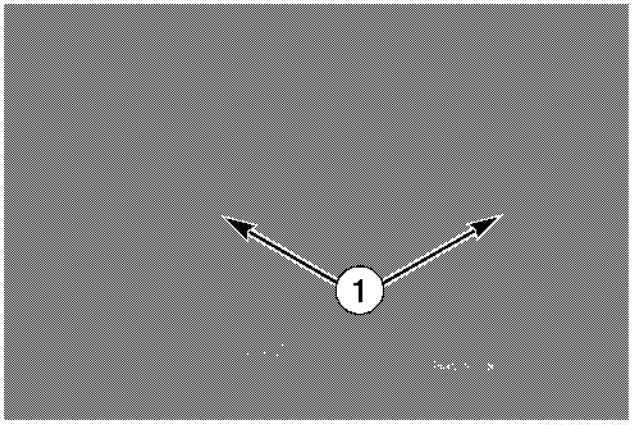


BP9503097

Disconnect both the right and left wiring harness (1) for the brake warning light and buzzer switches at the weather pack connectors.

IMPORTANT: *DO NOT remove the brake switch wire from the brake housing. Disconnect at the wiring harness connection only.*

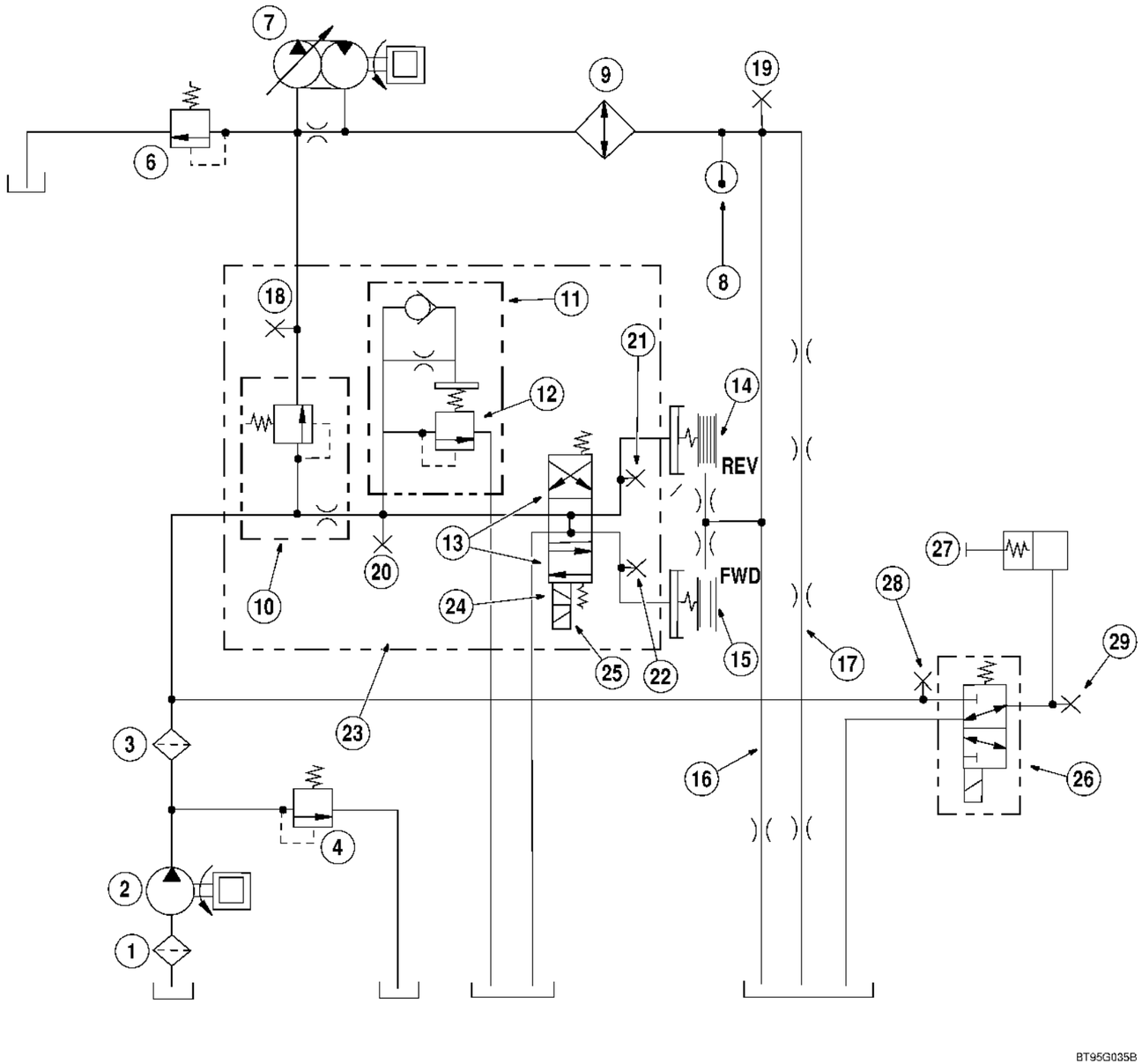
STEP 64



BP9503097

Disconnect the parking brake cable (1) from the brake levers at the top of the front axle brake housing by removing the clevis pins.

STANDARD TRANSMISSION (2WD) SCHEMATIC



1. Strainer (250 Micron)
2. Supply Pump - 8.5 To 18 Gpm (32 To 68 L/min)
3. Filter (Full Flow/with By-pass, 10 Micron)
4. Cold Oil By-Pass - 325 To 387 psi (22.4 To 26.7 bar)
5. Not Used
6. Torque Converter Relief Valve - 50 To 78 psi (3.5 To 5.5 bar), Located in Supply Pump (2) Opening
7. Torque Converter
8. Oil Temperature Sender (Cooler Out)
9. Oil Cooler
10. Flow Divider
11. Modulator Circuit (Pressure Modulation For Forward/Reverse)
12. Modulation Spool And Piston (Regulates Clutch Pressure)
13. Forward/Reverse Shuttle Spool (Directs Flow To Forward/Reverse Clutches)
14. Reverse Clutch
15. Forward Clutch
16. Lubrication To Bearings And Clutch Packs
17. Lubrication To Synchronizers And Gears
18. Torque Converter Pressure (2 WD) - 65 to 134 psi at 925 to 2480 rpm (448 to 924 kPa, 4.6 to 9.4 bars at 925 to 2480 r/min)
19. Lubrication Pressure - 47 to 66 psi at 925 to 2480 rpm (324 to 455 kPa, 3.3 to 4.6 bar)
20. Regulated Clutch Pressure - 170 to 196 psi (1172 to 1351 kPa, 12 to 14 bar)
21. Reverse Clutch Pressure - 170 to 196 psi (1172 to 1351 kPa, 12 to 14 bar)
22. Forward Clutch Pressure - 170 to 196 psi (1172 to 1351 kPa, 12 to 14 bar)
23. Control Valve Assembly
24. Reverse Clutch Solenoid - 4.7 ±10% OHM At 68° F (20° C)
25. Forward Clutch Solenoid - 4.7 ±10% OHM At 68° F (20° C)
26. Differential Lock Solenoid
27. To Differential Lock
28. Differential Lock Solenoid Pressure
    With Direction Control Lever in Forward or Reverse Position - 170 to 196 psi (1172 to 1351 kPa, 12 to 14 bar)
29. Differential Lock Solenoid Pressure
    Without Differential Lock Solenoid Energized ..... 0 psi (0 bars)
    With Differential Lock Solenoid Energized (2WD)
    And Direction Control Lever in Forward or Reverse Position 170 to 196 psi (1172 to 1351 kPa, 12 to 14 bar)

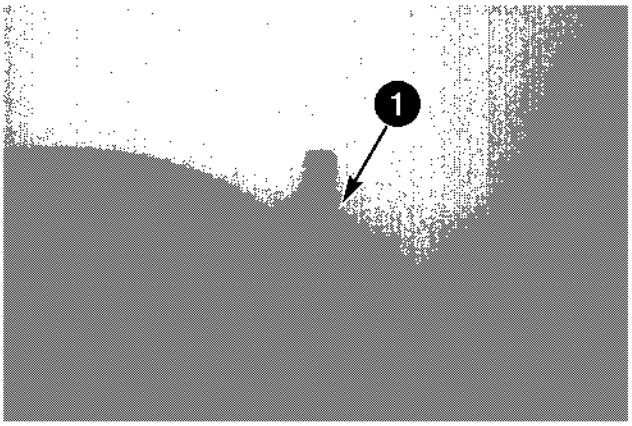
CHECKING SUPPLY PUMP PRESSURE (4WD ONLY)

Equipment Required

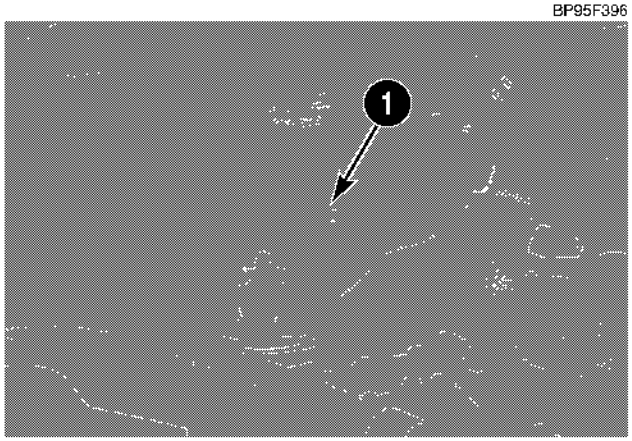
CAS-1804 Pressure Fitting Kit

Test Procedure

1. Engage the parking brake.
2. Start the engine.
3. Oil at operating temperature.
4. 600 psi (4137 kPa, 40 bar) gauge connected to Test Port 20.
5. Read gauge and record pressure at low idle 900 rpm (r/min).
6. Read gauge and record pressure at high idle 2200 rpm (r/min).
7. See page 3 for the specifications.



BP95F396



BD99F082

1. TEST PORT 20 (4WD ONLY)

CHECKING REGULATED CLUTCH PRESSURE (4WD)

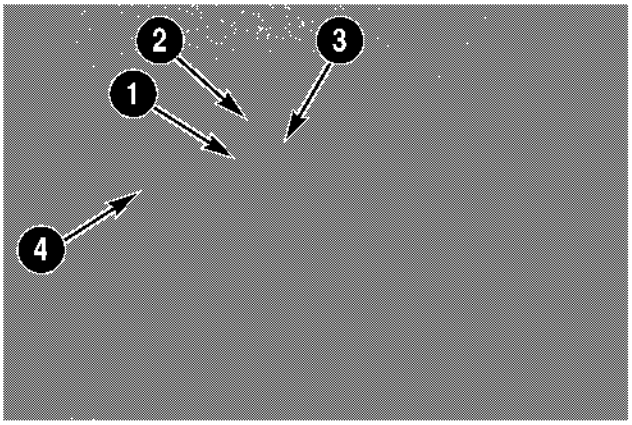
Equipment Required

CAS-1804 Pressure Fitting Kit

Test Procedure

1. Engage the parking brake.
2. Start the engine.
3. Oil at operating temperature.
4. 600 psi (4137 kPa, 40 bar) gauge connected to Test Port 23.
5. Move direction control lever to forward.
6. Read gauge and record pressure at low idle 900 rpm (r/min).
7. Read gauge and record pressure at high idle (2200 rpm (r/min).
8. See page 3 for the specifications.
9. Repeat 6 and 7 with the control lever in reverse.

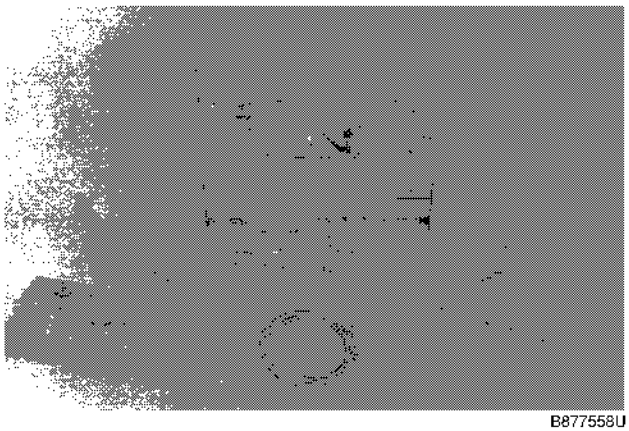
NOTE: *Forward and Reverse clutch pressure can be recorded separately using Test Port 25 Forward and Test Port 24 Reverse.*



BP95F283

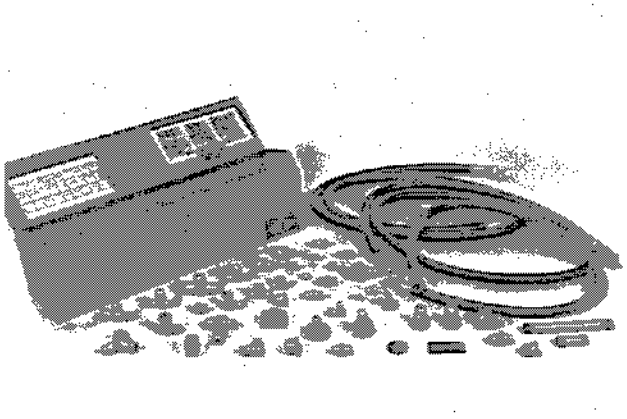
1. TEST PORT 23
2. TEST PORT 24
3. TEST PORT 25
4. TEST PORT 21

SPECIAL TOOLS



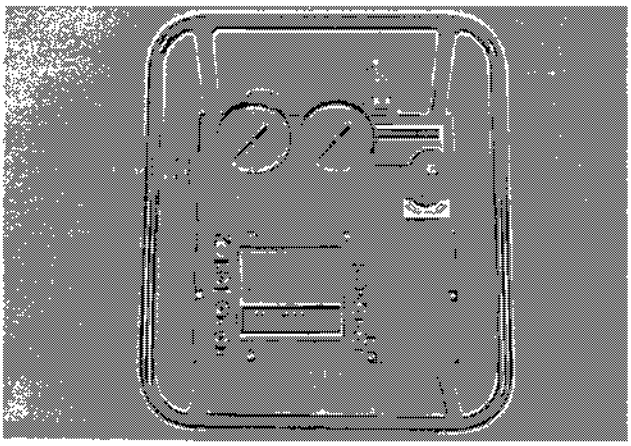
B877558U

CAS-1804 Pressure Fitting Kit



B797157M

CAS-1808 Flowmeter Fitting Kit



B785789M

CAS-10280 Flowmeter

BP95G002

CAS-40033 Transmission Tool Kit

BP95G001

CAS-2011 Filter Base Adapter used with CAS-2383 Filter Adapter Tube from CAS-40033, "L" Series Transmission Tool Kit

Loss of Power

Is oil level correct? Add oil as required. Is there still a problem?

NO → Troubleshooting complete. Find cause for loss of oil.

YES ↓

Is there a build up of mud or other foreign material on inside of wheel wells or along drive train? Clean or remove material. Is there still a problem?

NO → Troubleshooting complete.

YES ↓

Do stall test according to instructions in Section 2002. Is the engine good.

NO → Repair engine as required.

YES ↓

Check regulated clutch pressure. See pages 16 and 17. Is the pressure as specified on page 3.

NO → Inspect input shaft sealing rings and clutch piston seals. Also inspect forward and reverse clutch friction discs. See Section 6007 to repair as required.

YES ↓

Check torque converter for damage. See Section 6007 to repair or replace as required.

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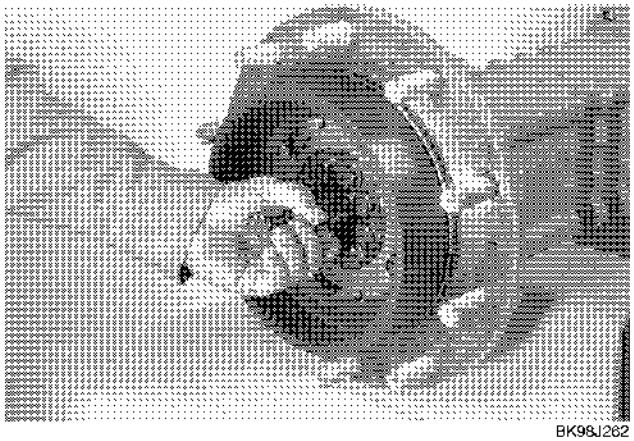
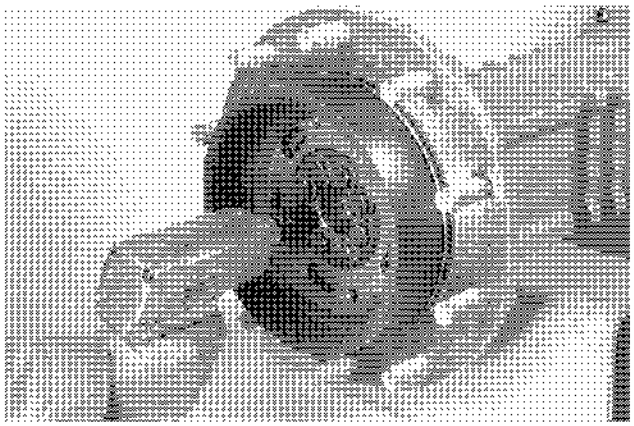
STEP 6



BK98J262

Remove the drive shaft.

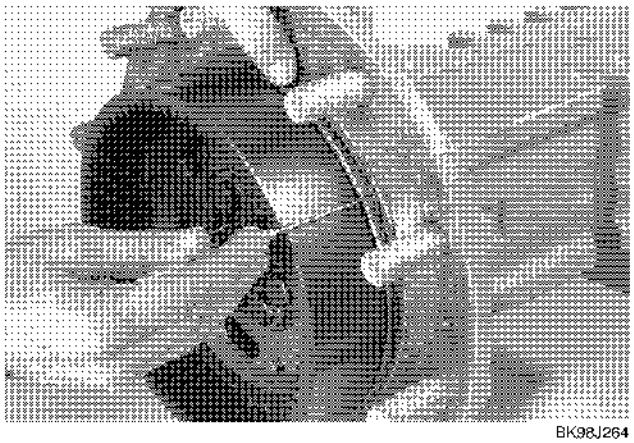
STEP 7



BK98J263

Remove the eight cap screws.

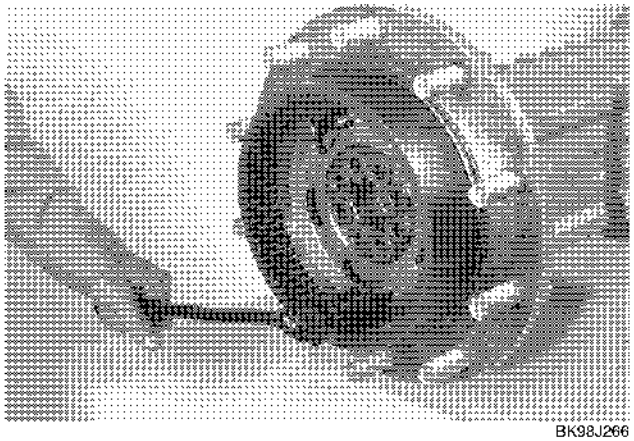
STEP 8



BK98J264

Remove the O-ring from the wheel hub.

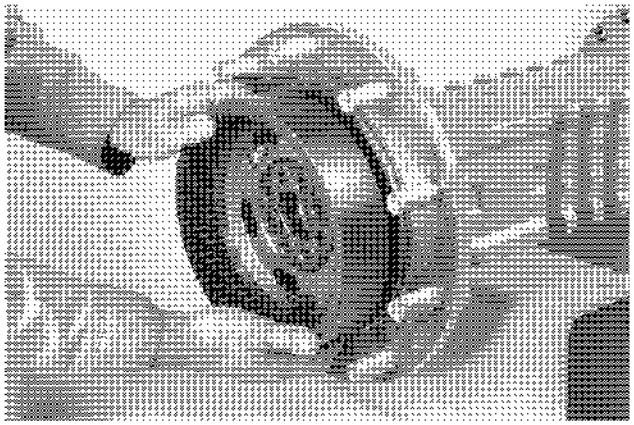
STEP 9



BK98J266

Install two of the cap screws (removed in step 7) in the threaded holes in the ring gear hub. Tighten the cap screws evenly until the ring gear hub is free of the wheel hub.

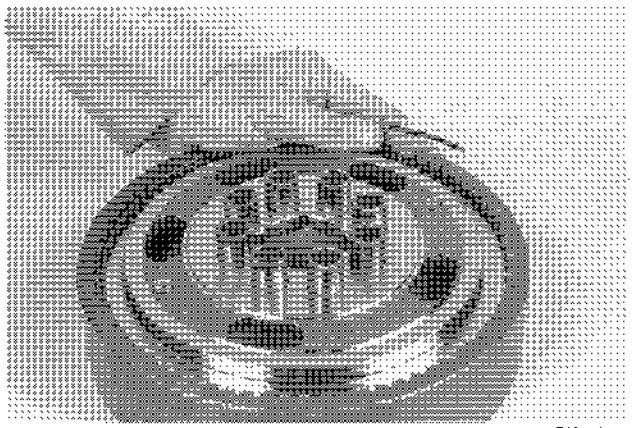
STEP 10



BK98J267

Remove the ring gear.

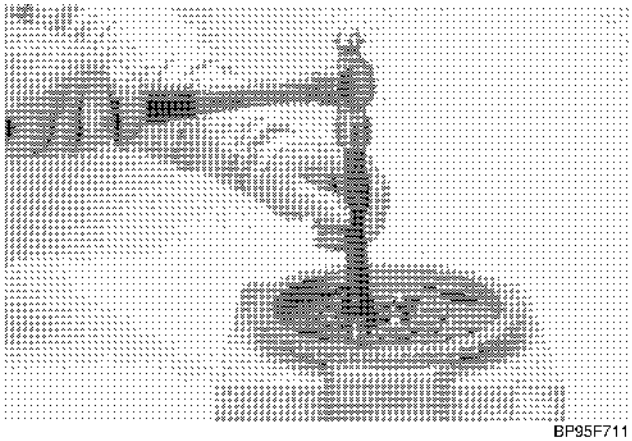
STEP 11



BK98J265

Remove the lock ring which fastens the ring gear hub to the ring gear.

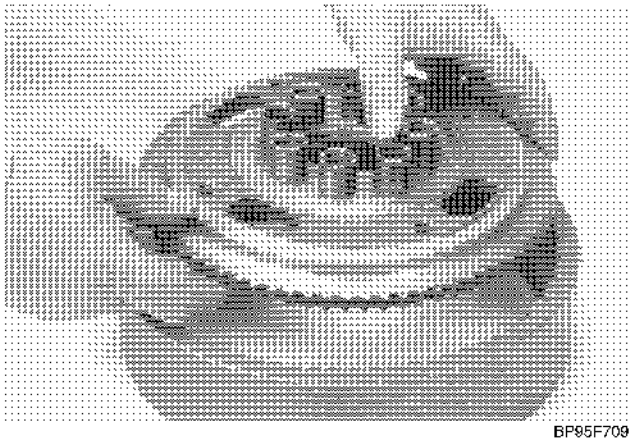
STEP 58



BP95F711

Use an acceptable driver to push the bushings into the ring gear hub.

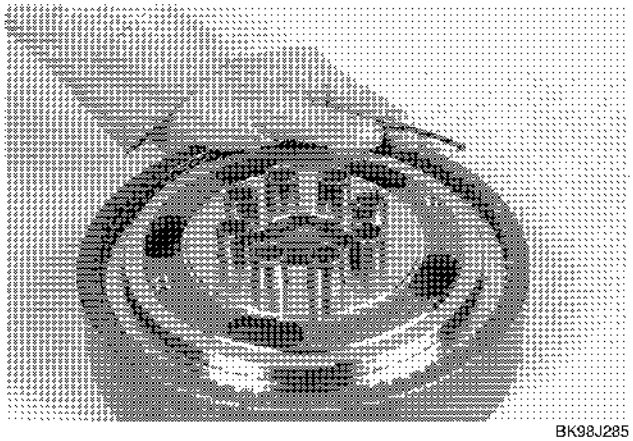
STEP 59



BP95F709

Install the ring gear hub in the ring gear.

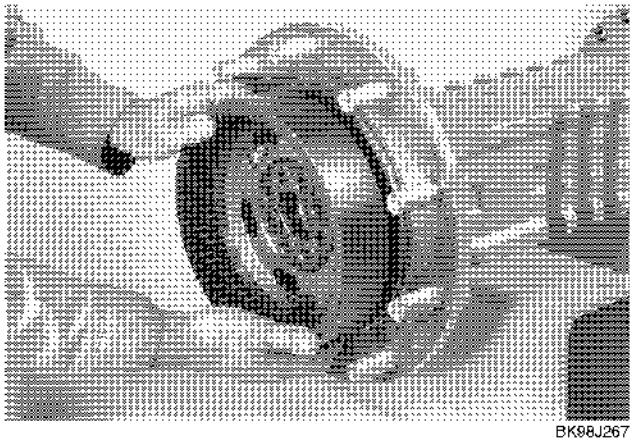
STEP 60



BK98J285

Install the lock ring to fasten the ring gear hub to the ring gear.

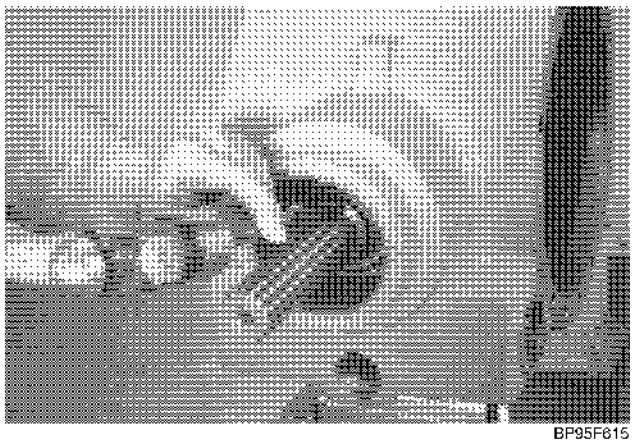
STEP 61



BK98J267

Install the ring gear hub and the ring gear.

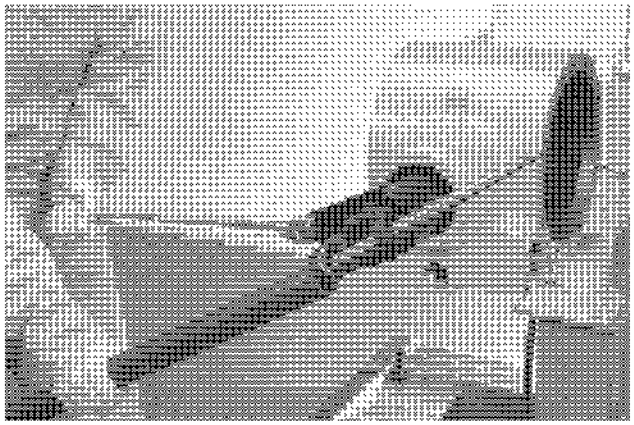
STEP 106



BP95F615

Use a chisel to push the peened area of the pinion nut out of contact with the groove in the shaft for the pinion gear.

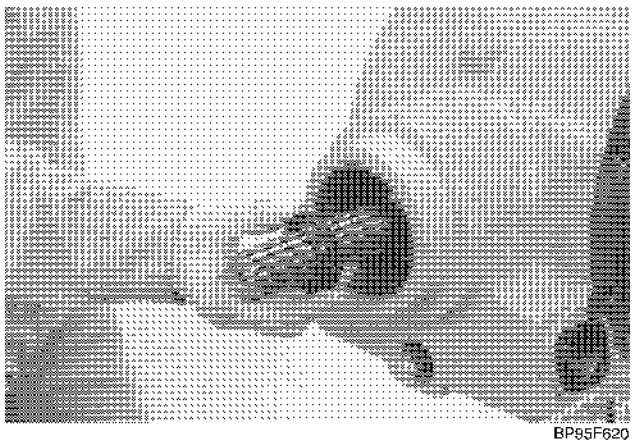
STEP 107



BP95F618

Use the CAS2151 and the N13365 Yoke to loosen the pinion nut.

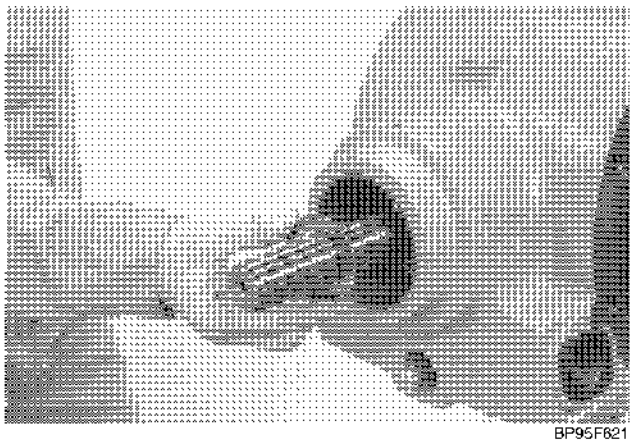
STEP 108



BP95F620

Remove the pinion nut.

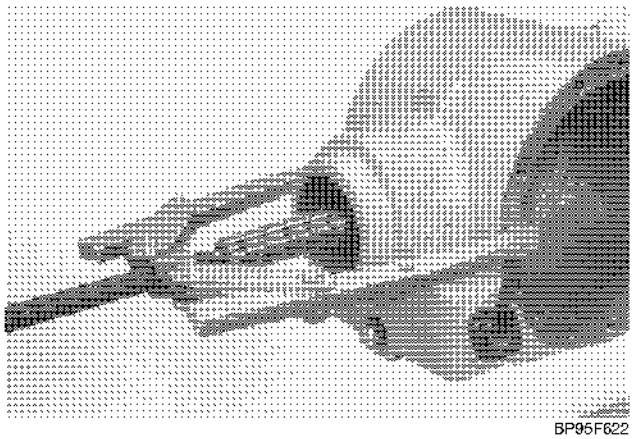
STEP 109



BP95F621

Remove the special washer.

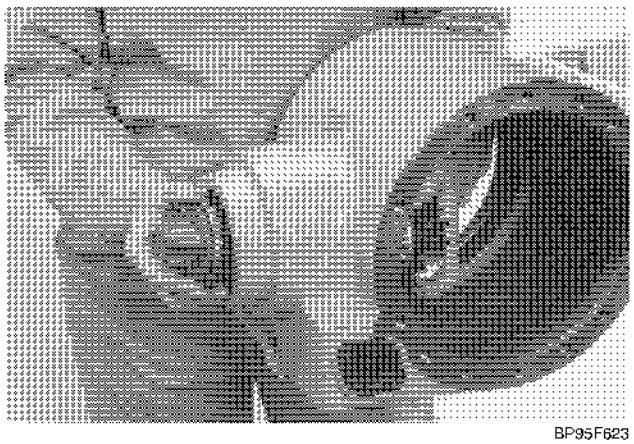
STEP 110



BP95F622

Install a puller on the shaft for the pinion gear and center housing as shown. Tighten the screw on the puller to loosen the pinion gear assembly in the center section.

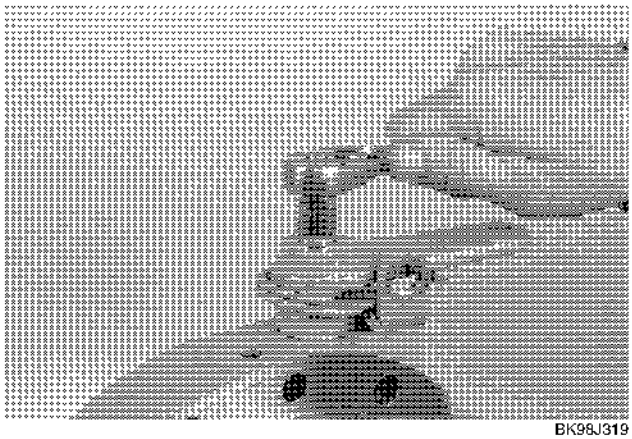
STEP 111



BP95F623

Remove the bearing from the front of the pinion shaft assembly.

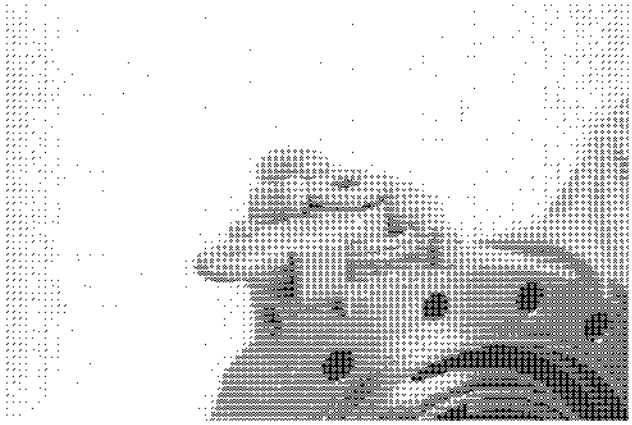
STEP 160



BK98J319

Use acceptable tools and un-hook the return spring from the lever. Loosen and remove the cap screw from the end of the shaft.

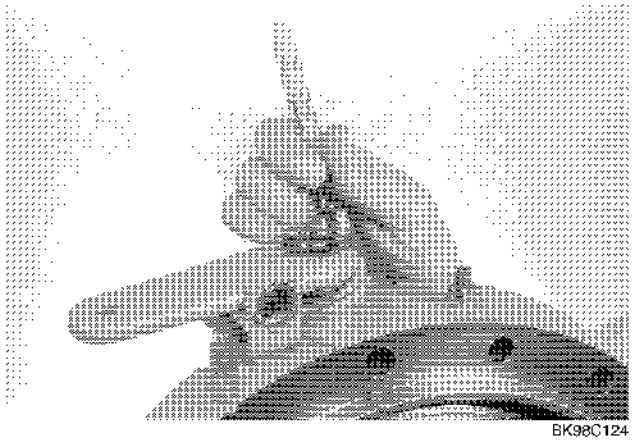
STEP 161



BP95F494

Remove the washer.

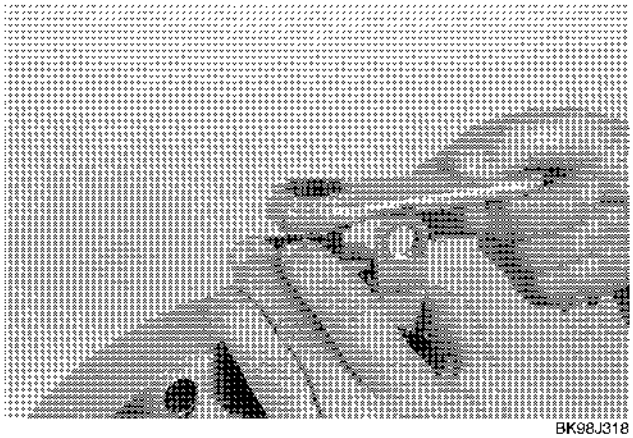
STEP 162



BK98C124

Place alignment marks on the lever and shaft splines for use during installation.

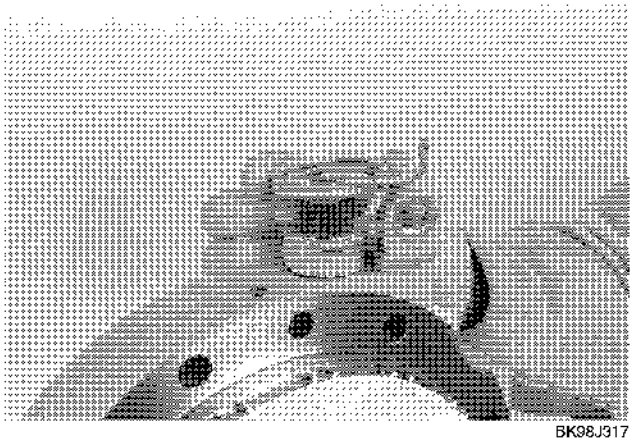
STEP 163



BK98J318

Remove the lever from the shaft.

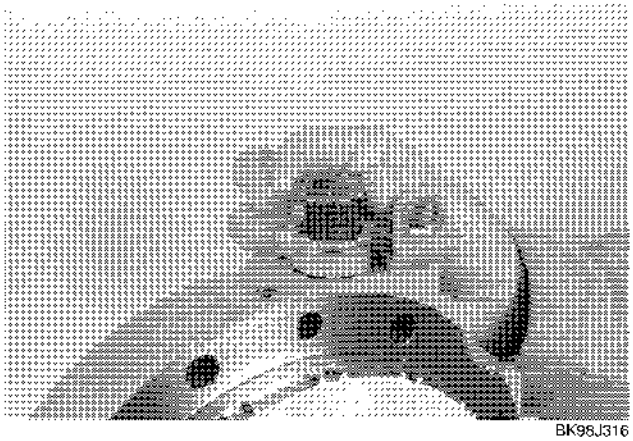
STEP 164



BK98J317

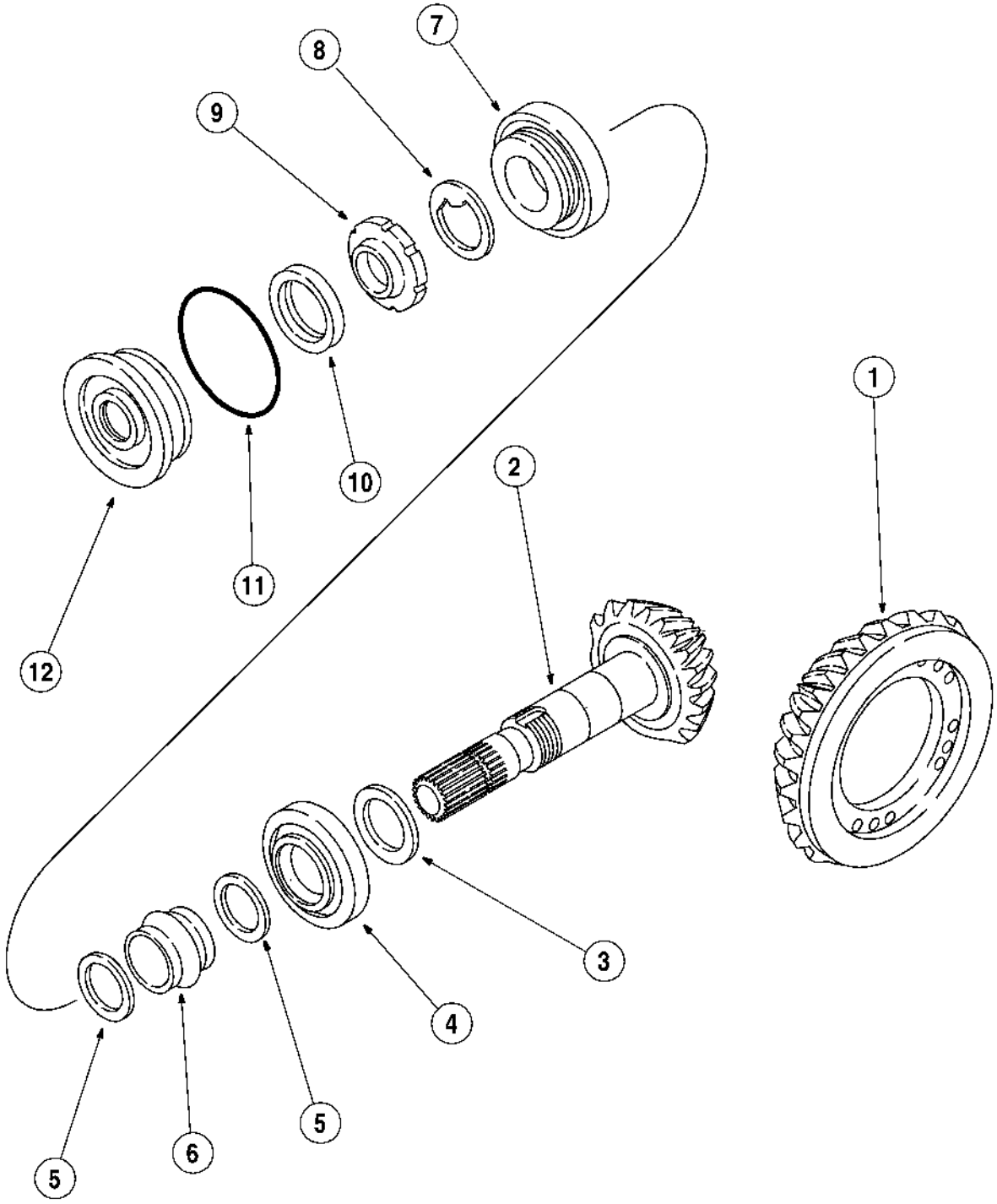
Use acceptable tools and remove the spring.

STEP 165



BK98J316

Remove the shim.

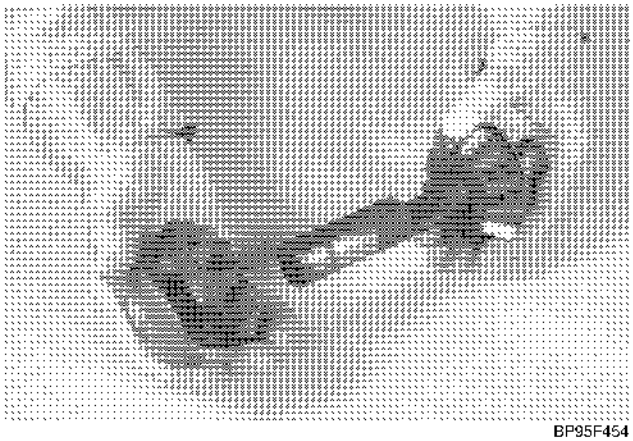


BT95G069

1. RING GEAR
2. PINION GEAR
3. SHIM
4. BEARING ASSEMBLY
5. FLAT WASHER
6. COLLAPSIBLE SPACER
7. BEARING ASSEMBLY
8. SPECIAL WASHER
9. PINION NUT
10. SEAL
11. O-RING
12. COVER

ILLUSTRATION OF RING AND PINION

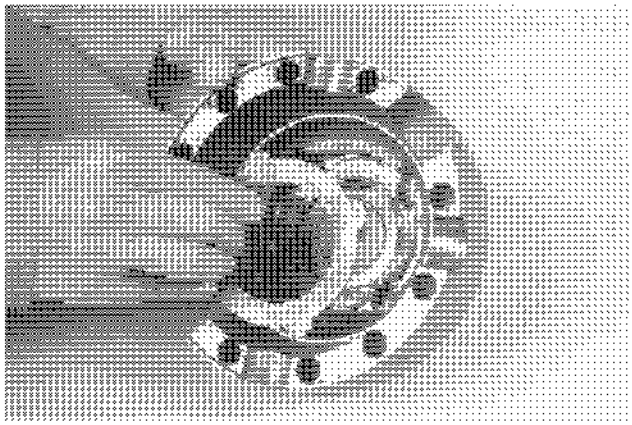
STEP 233



BP95F454

Lubricate the thrust washers, spider gears, and shafts with MS 1209. Install the thrust washers and spider gears on the shafts.

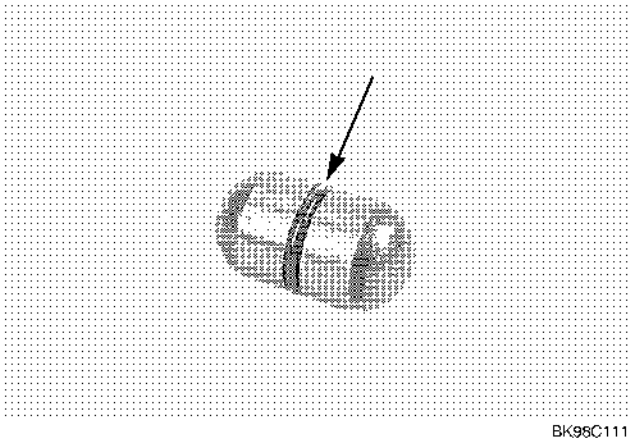
STEP 234



BP95F457

Put the differential case half without the dimples on the bench. Put grease in the bottom of the differential case half to hold the thrust washer in place when the thrust washer is installed. Install the thrust washer.

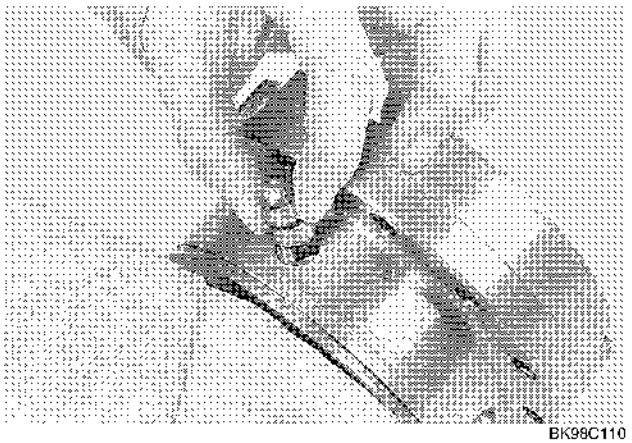
STEP 235



BK98C111

Install new O-rings on the pins. Lubricate the O-rings with MS 1209.

STEP 236

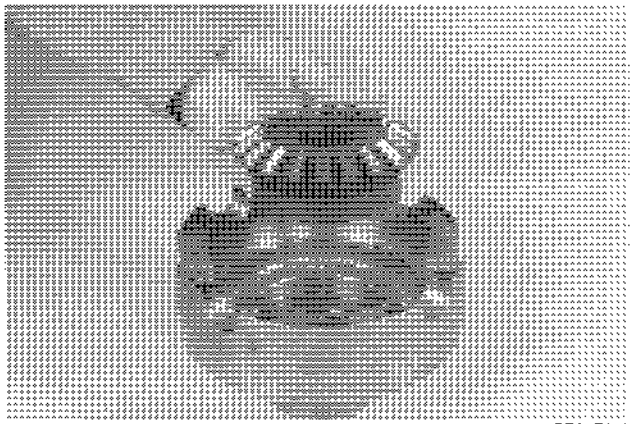


BK98C110

Install the pins in the differential case half.

NOTE: *The difference between the side pinion gears is the side pinion gear for the differential lock end has dimples in the side where the locking pins engage. The other gear does not.*

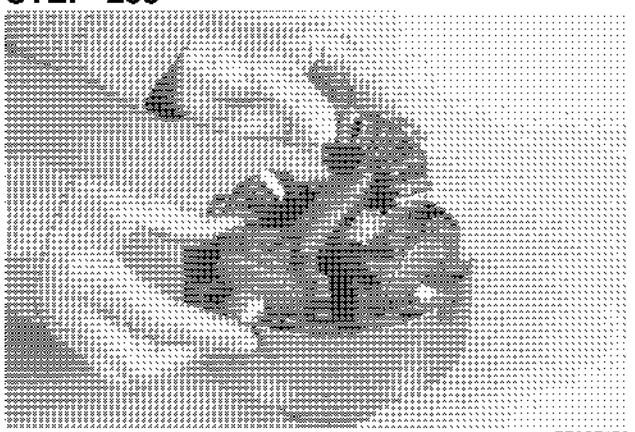
STEP 237



BP95F452

Lubricate the side pinion gear with MS 1209. Install the side pinion gear (without dimples).

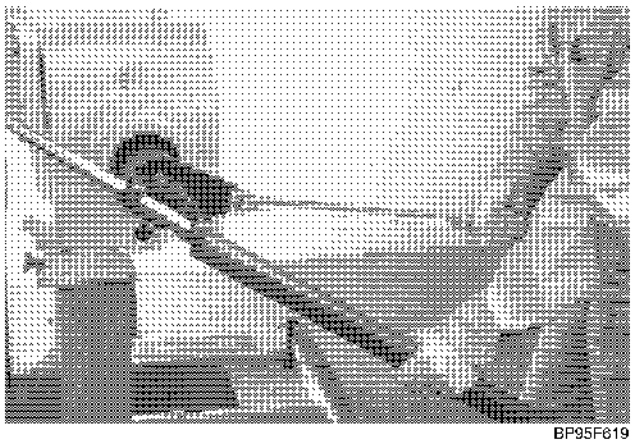
STEP 238



BP95F450

Install the shafts and spider gears.

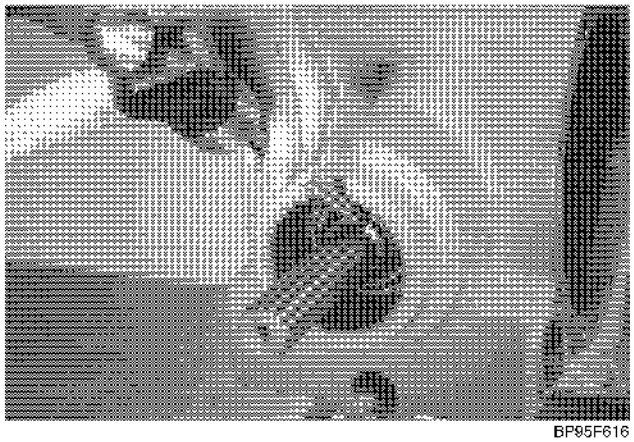
STEP 275



BP95F619

Use the yoke and the CAS2151 to tighten the pinion nut in SMALL amounts as required. Repeat steps 271 through 275 until the rotating torque is as specified in step 273. See Important above step 273.

STEP 276



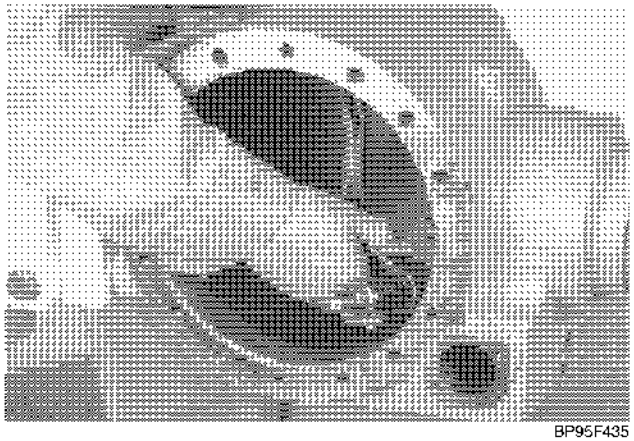
BP95F616

Stake the lip on the pinion nut into the slot in the pinion shaft.

Differential and Differential Lock Fork

IMPORTANT: *The following photos show the cover for the pinion gear shaft installed. Do not install the cover at this time.*

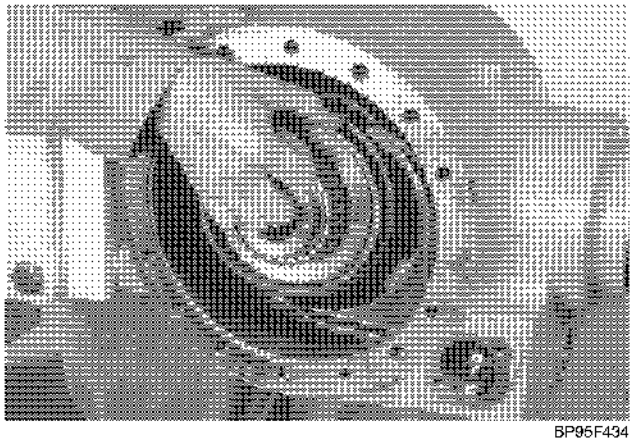
STEP 277



BP95F435

Put the differential lock fork in position in the center section.

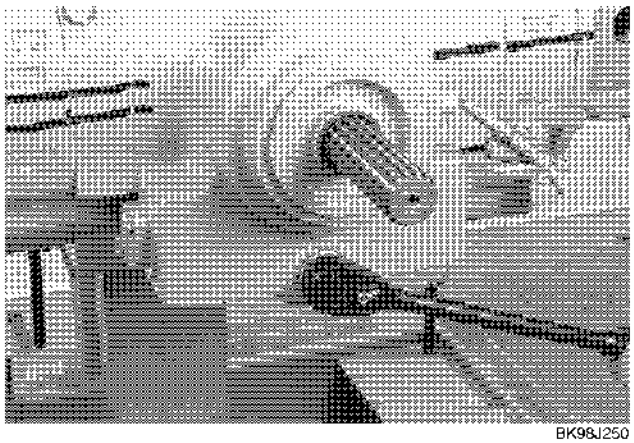
STEP 278



BP95F434

Put the differential housing in position in the center section on the differential lock fork as shown.

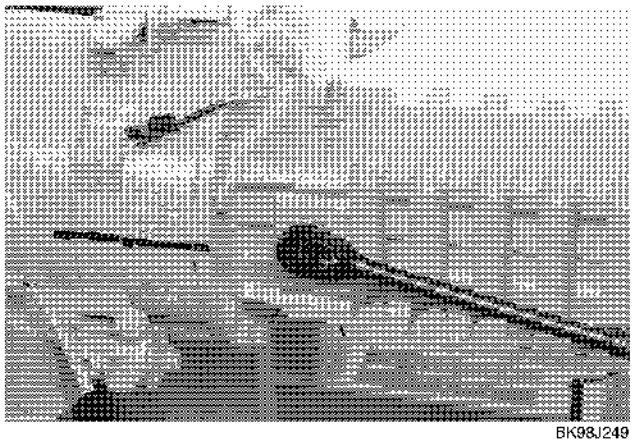
STEP 324



BK98J250

Install the drain plug in the center section. Tighten the drain plug to a torque of 80 Nm (59 pound-feet).

STEP 325

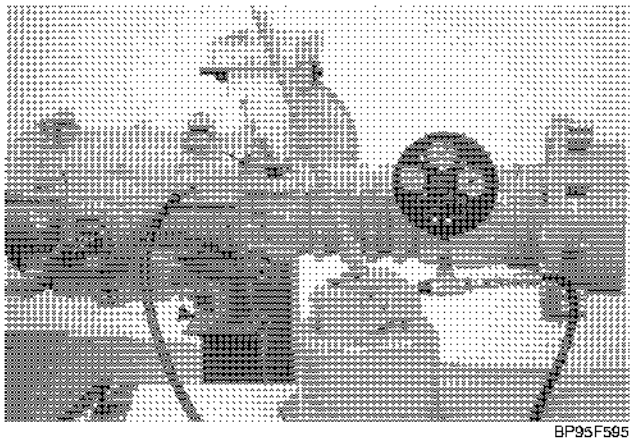


BK98J249

Fill the axle with the oil specified. See Specifications on page 3. Install the drain/fill plug. Tighten the drain plug to 80 Nm (59 pound-feet).

Adjusting Parking Brake Levers

STEP 326



BP95F595

Loosen the air bleeder screw. Connect a hand pump and gauge to the brake section as shown. Pump the hand pump until oil with no air flows from the air bleeder screw. Tighten the air bleeder screw to 12 Nm (108 pound-inches). Apply 1500 psi (10 342 kPa) pressure to the piston to set the slack adjusters.

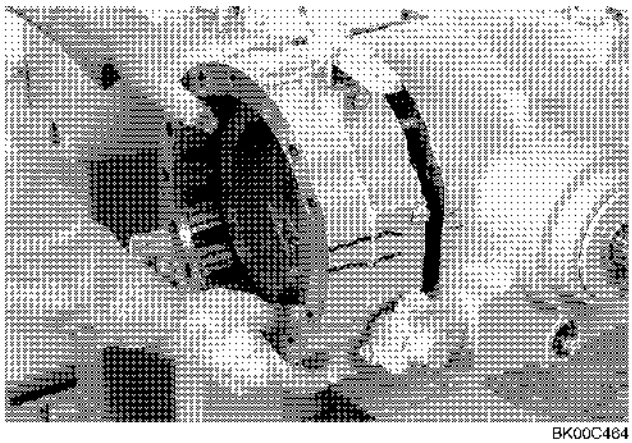
STEP 327

Repeat step 326 for the other brake assembly.

STEP 328

Remove the hand pump and gauge from the brake section.

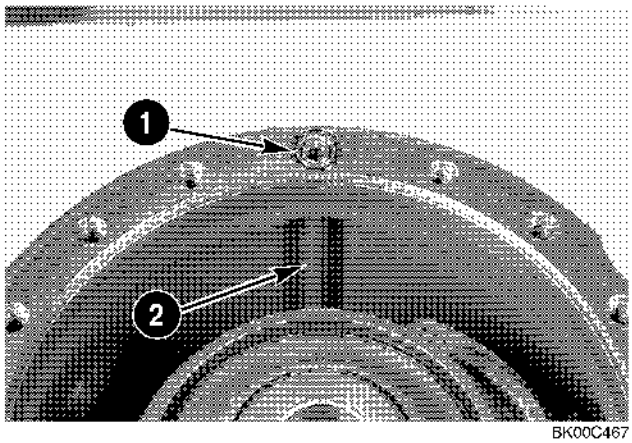
STEP 28



BK00C464

Remove the brake section.

STEP 29

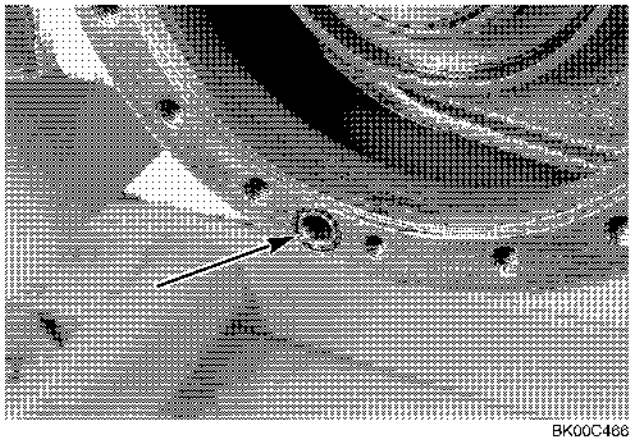


BK00C467

1. O-RING 2. INTERNAL TUBE

Remove the O-ring from the internal tube. Do not remove the internal tube unless it is damaged.

STEP 30



BK00C466

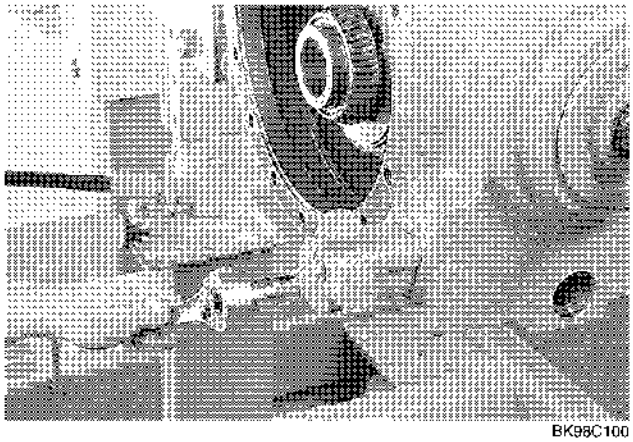
Remove the O-ring from the bottom of the center section.

STEP 31

Repeat steps 1 through 30 for the other end of the axle housing

Differential Lock

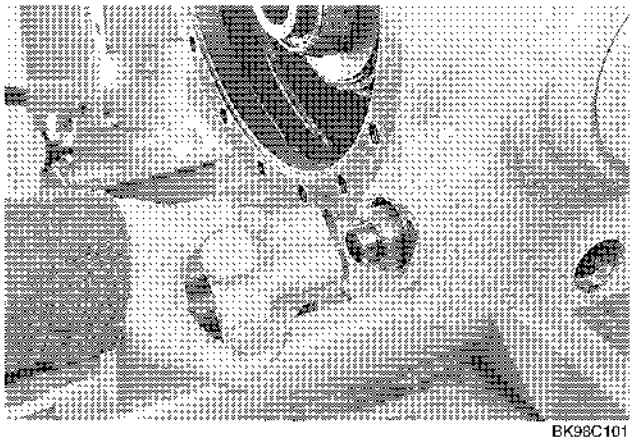
STEP 32



BK98C100

Loosen and remove the cap screws that fasten the cover for the differential lock.

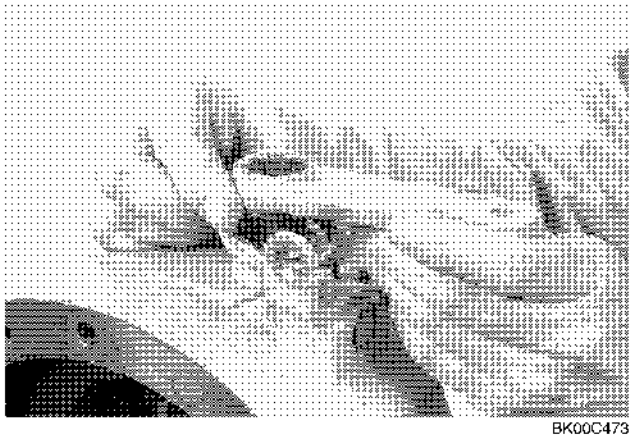
STEP 33



BK98C101

Remove the differential lock assembly.

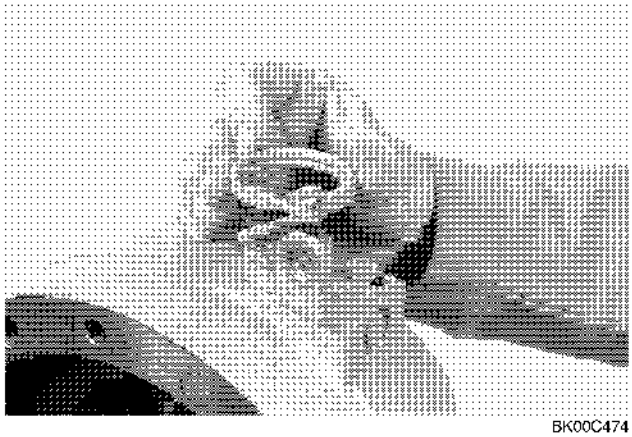
STEP 85



BK00C473

Remove the lever from the shaft.

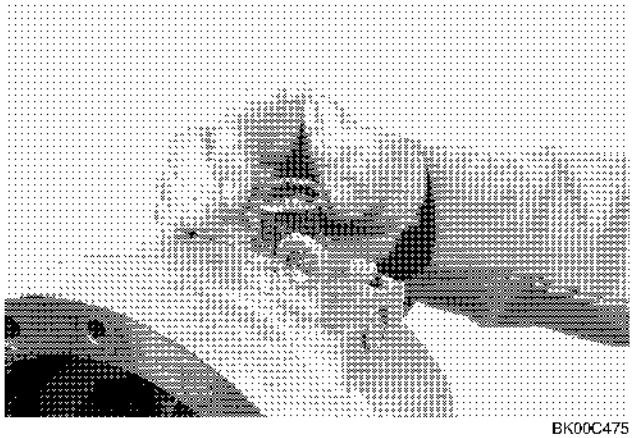
STEP 86



BK00C474

Remove the spring from the shaft.

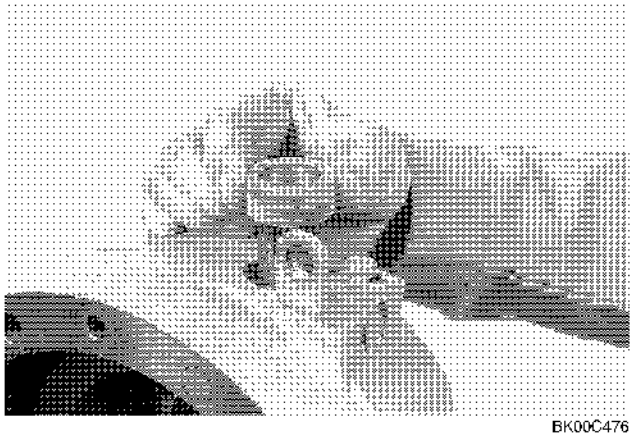
STEP 87



BK00C475

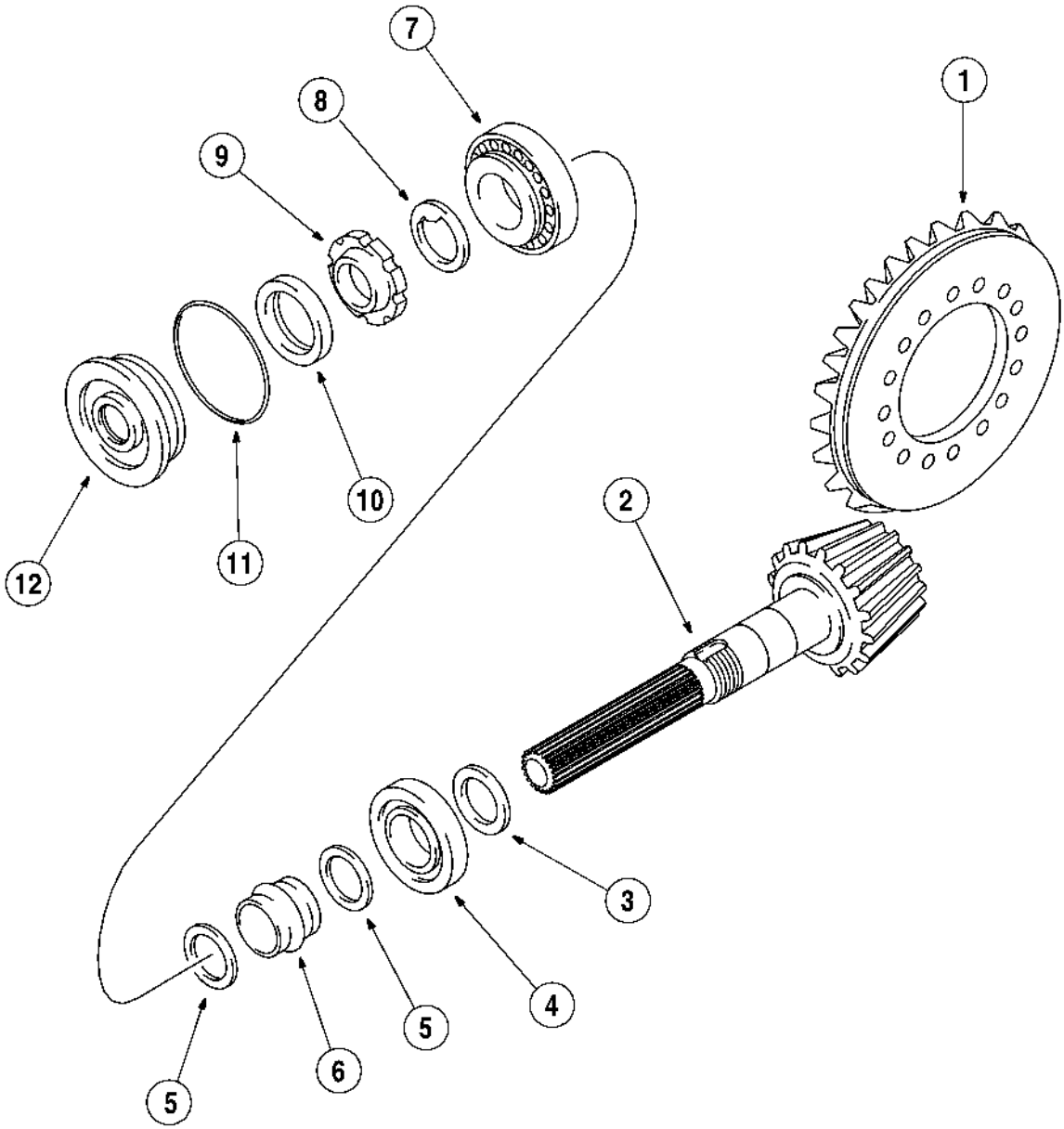
Remove the shim.

STEP 88



BK00C476

Remove the bushing.

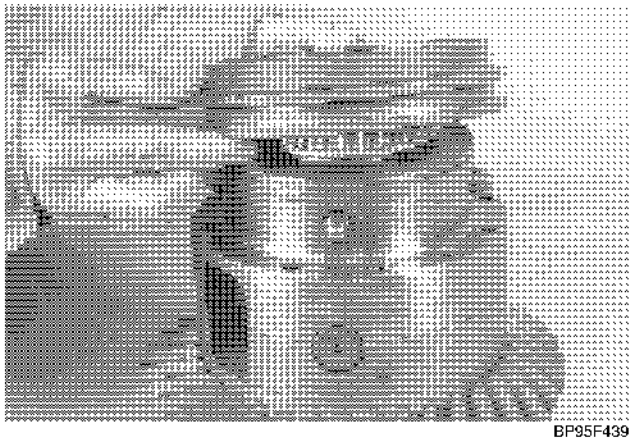


BS00B308

1. RING GEAR
2. PINION GEAR
3. SHIM
4. BEARING ASSEMBLY
5. FLAT WASHER
6. COLLAPSIBLE SPACER
7. BEARING ASSEMBLY
8. SPECIAL WASHER
9. PINION NUT
10. SEAL
11. O-RING
12. COVER

ILLUSTRATION OF RING AND PINION (AXLE P/N 319063A1)

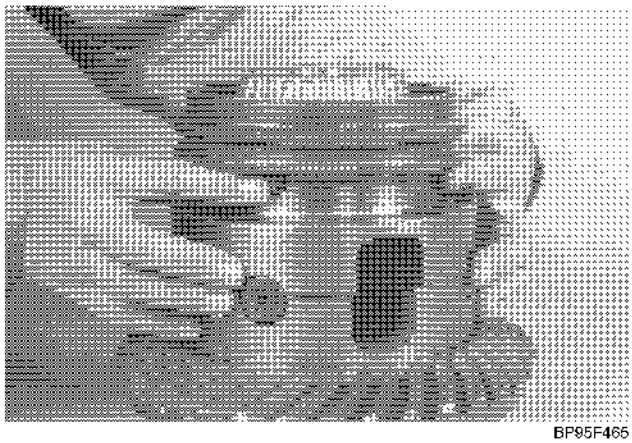
STEP 148



BP95F439

Put the differential lock ring in position on the differential housing as shown.

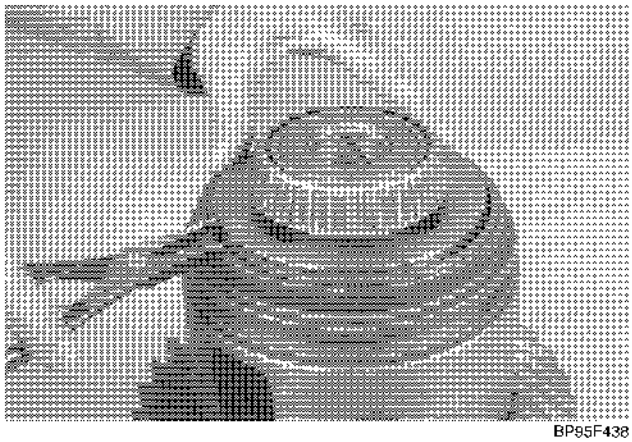
STEP 149



BP95F465

Hold the pins in and lower the differential lock ring into position. Push the differential lock ring all the way down to get access to the groove for the snap ring. If it is difficult to push down, reach through the housing and rotate the spider gears until the differential lock ring will go down.

STEP 150

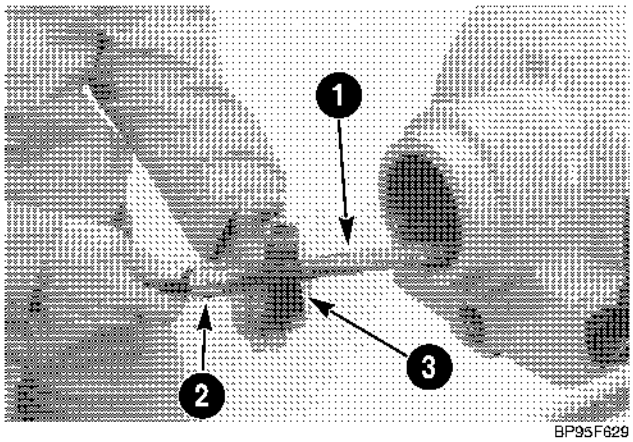


BP95F438

Install the snap ring.

Center Section

STEP 151

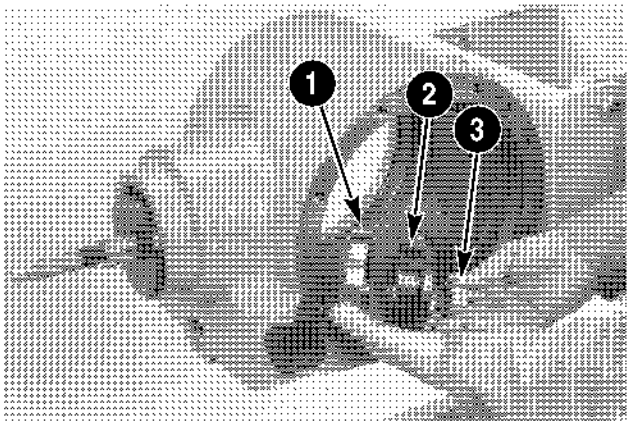


BP95F629

1. CAS24835, FORCING SCREW
2. 24836, SPECIAL NUT
3. CAS1940, DRIVER PLATE

Put the forcing screw, special nut, and driver plate in position on the front of the center section.

STEP 152

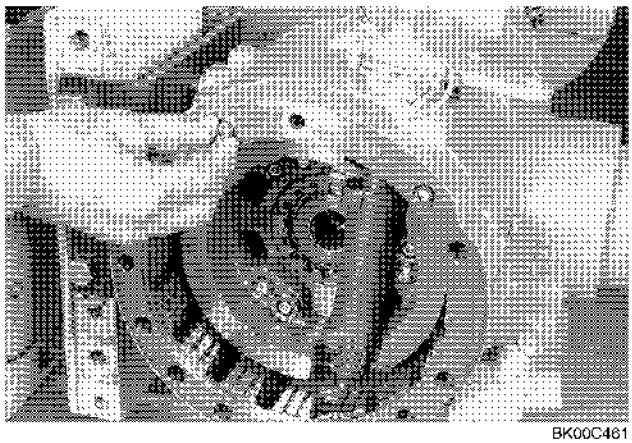


BP95F631

1. REAR BEARING RACE
2. CAS2371, INSTALLER PLATE
3. 22301, 3/4 - 16 UNF HEX NUT

Assemble the rear bearing race, the installer plate, and the hex nut on the forcing screw.

STEP 184

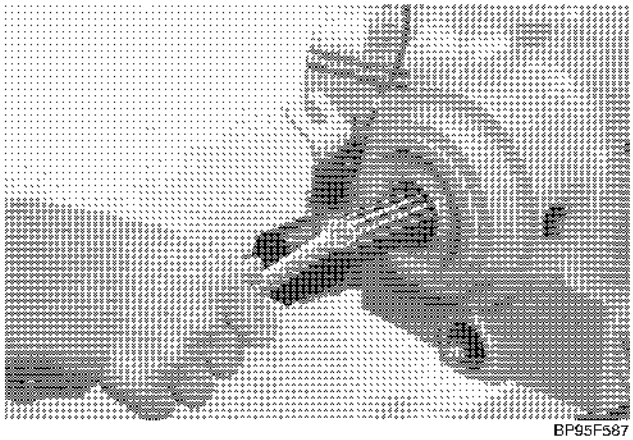


BK00C461

Remove the guide pins from the brake section.

IMPORTANT: *The following photos show the cover for the pinion gear shaft installed. Do not install the cover at this time.*

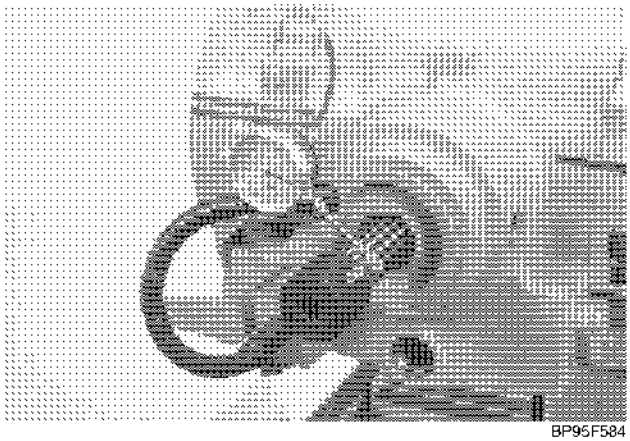
STEP 185



BP95F587

Put the CAS2375 on the pinion gear shaft. Tighten the cap screw that fastens the CAS2375 to the pinion shaft.

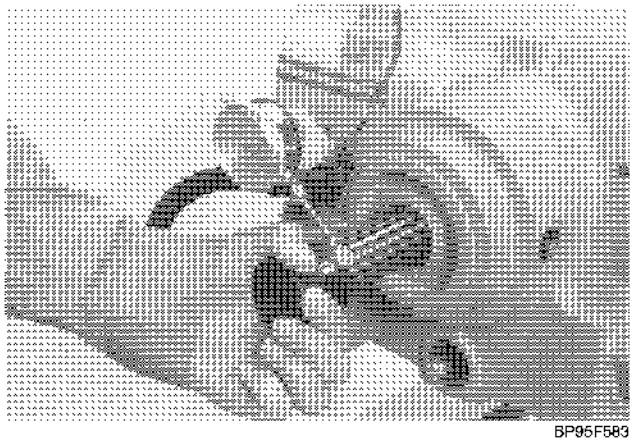
STEP 186



BP95F584

Put the dial indicator in position on the CAS2375 as shown.

STEP 187



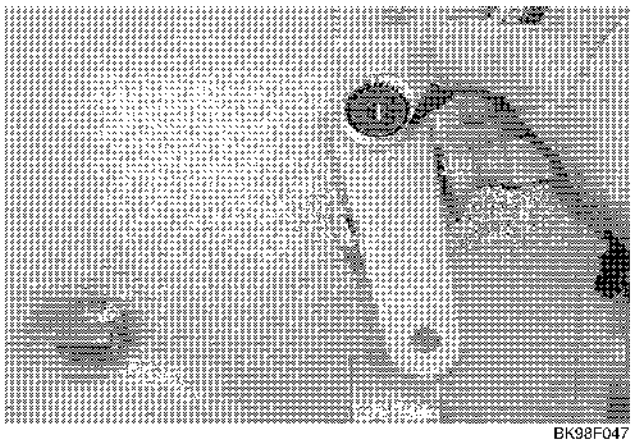
BP95F583

Use your hand and move the shaft back and forth to check for backlash.

STEP 188

The pinion gear backlash must be 0.20 to 0.28 mm (0.008 to 0.010 inch). If the backlash is not correct, do the appropriate procedure in step 189.

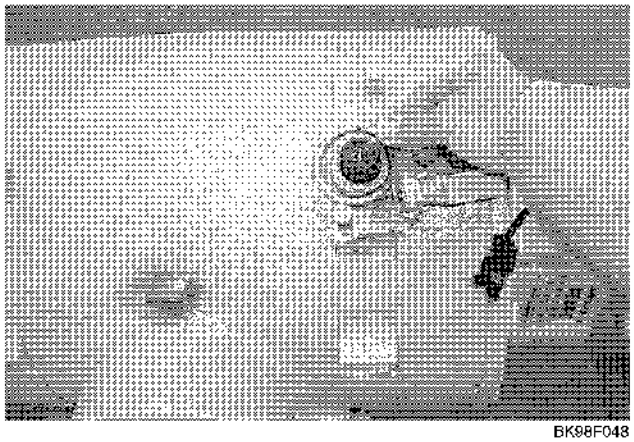
STEP 233



BK98F047

Put an alignment mark on the shaft and the parking brake lever.

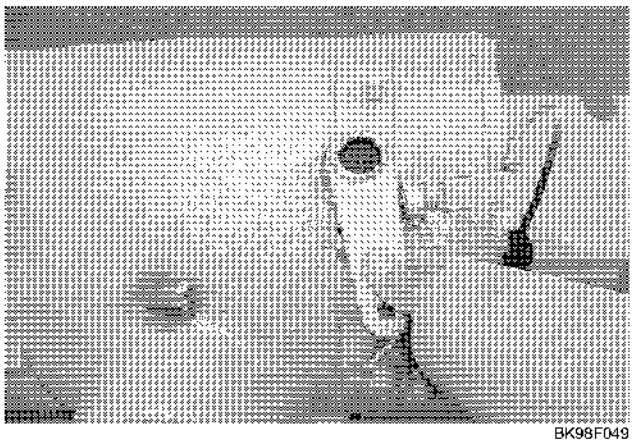
STEP 234



BK98F048

Remove the parking brake lever from the shaft. Put the spring in place on the shaft.

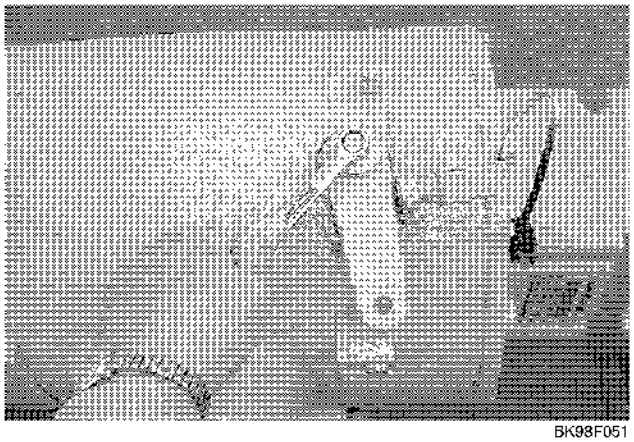
STEP 235



BK98F049

Apply molydisulfide grease to the splines on the shaft. Install the parking brake lever. Make sure the alignment marks are aligned.

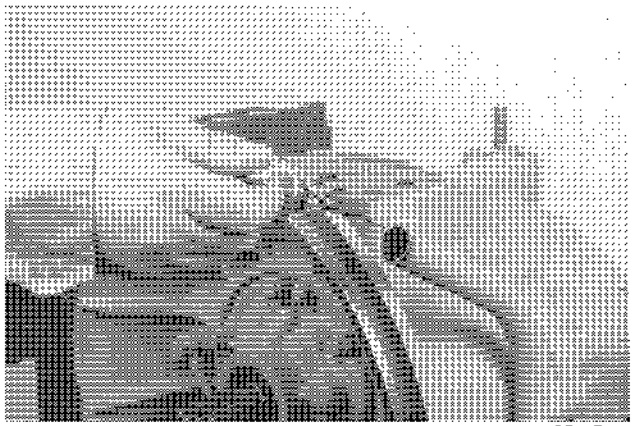
STEP 236



BK98F051

Install the washer and cap screw that fasten the parking brake lever in place.

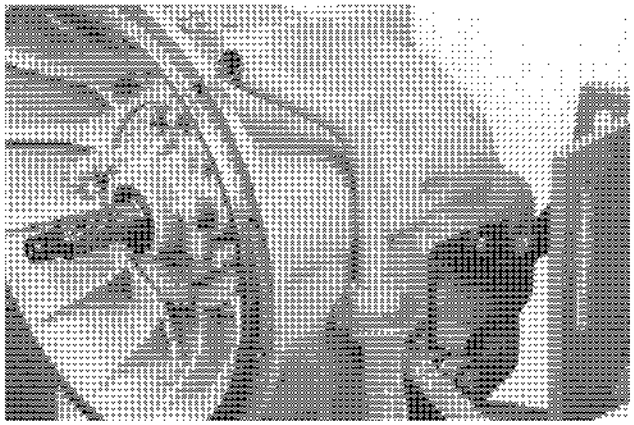
STEP 17



BP95F025

Remove the dipstick.

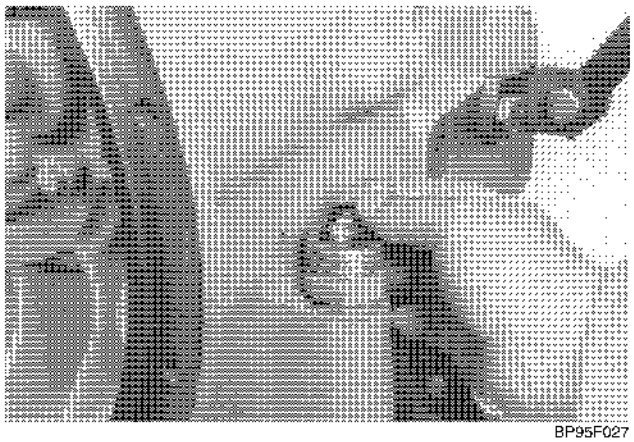
STEP 18



BP95F026

Remove the dipstick tube.

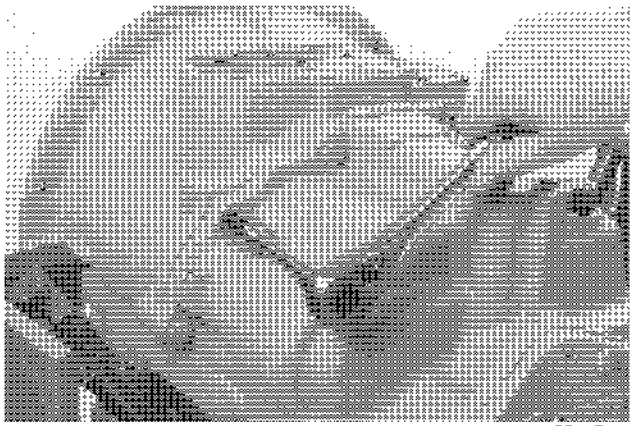
STEP 19



BP95F027

Remove the O-ring for the dipstick tube.

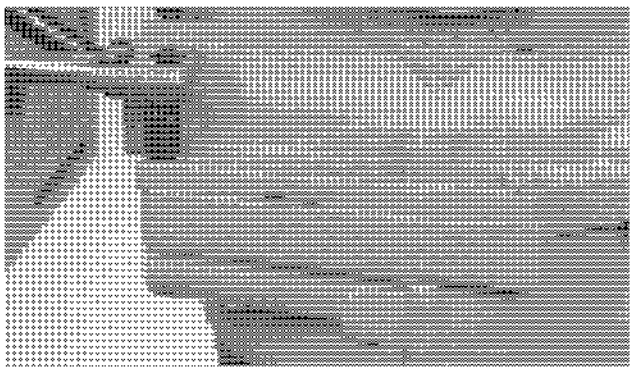
STEP 20



BP95F028

Remove all of the housing cap screws that are fastened from the rear housing to the front housing. There are 13 of these cap screws on the four-wheel drive and 14 on the two-wheel drive. On the two-wheel drive, two of the cap screws are longer than the others. Record the locations of these two.

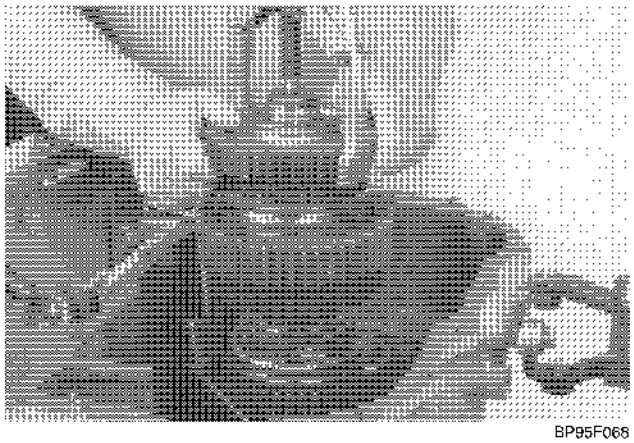
STEP 21



BP95F029

Rotate the transmission so that the front housing is up. On four-wheel drive transmissions only, there are three cap screws fastened from the front housing to the rear housing. Remove these cap screws.

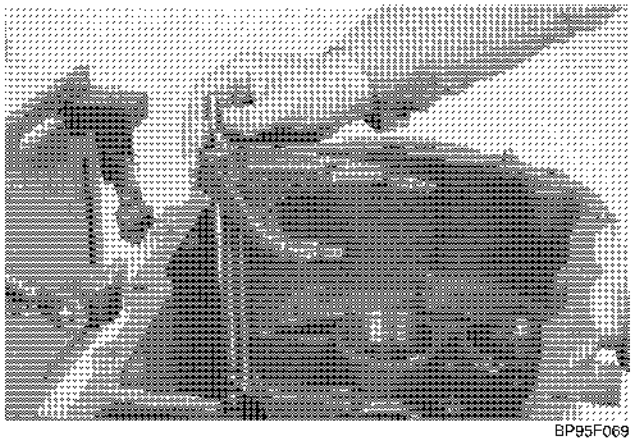
STEP 70



BP95F068

Continue to lift the secondary shaft until you can move the secondary shaft out of the shift forks. Then remove the secondary shaft.

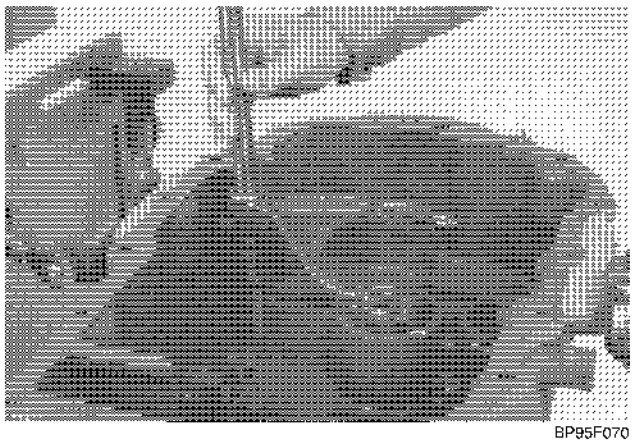
STEP 71



BP95F069

Remove the shift rod and fork assembly for first and second gear from the rear housing.

STEP 72

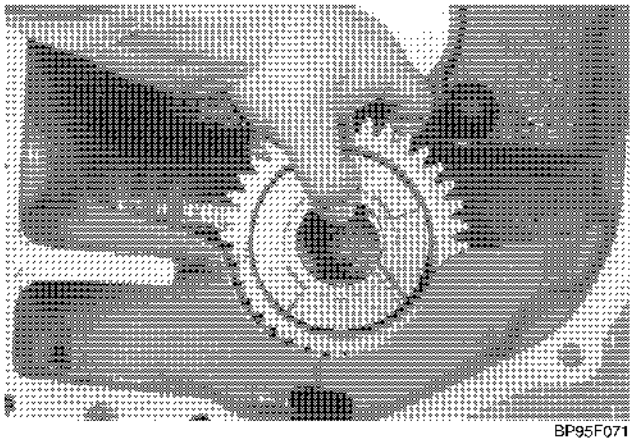


BP95F070

Remove the shift rod and fork assembly for third and fourth gear from the rear housing. Remember that this assembly was installed in the bore nearer the top of the rear housing.

NOTE: *Steps 73 through 75 are for four-wheel drive transmissions only. If you are working on a two-wheel drive transmission, go to step 76.*

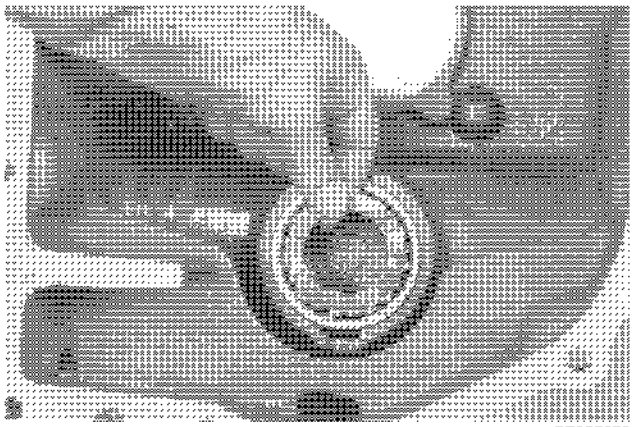
STEP 73



BP95F071

Remove the four-wheel drive clutch gear.

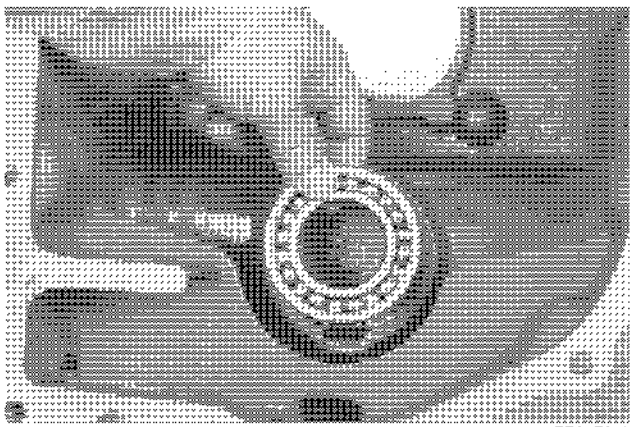
STEP 74



BP95F072

Remove the thrust washer.

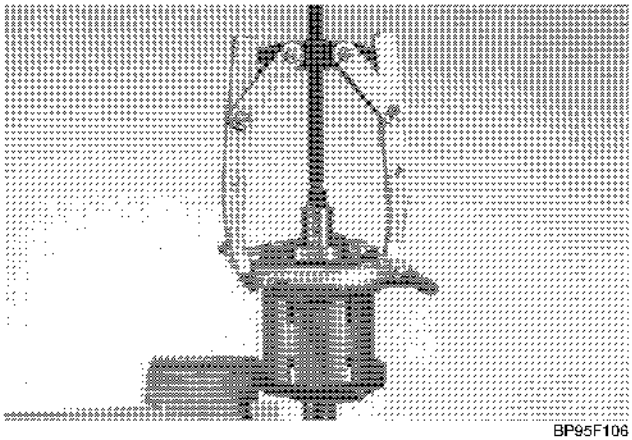
STEP 75



BP95F073

Remove the bearing.

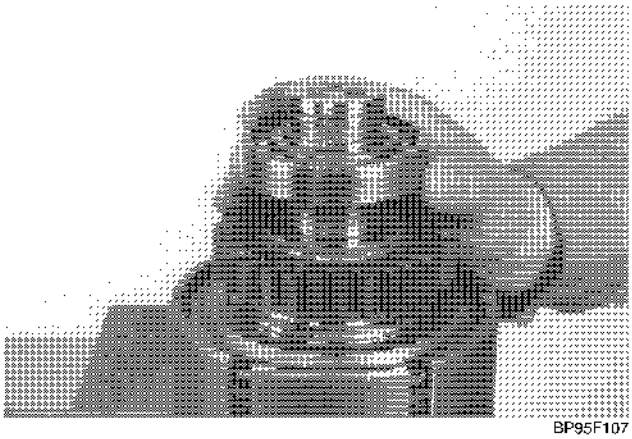
STEP 110



BP95F106

Install a bearing separator under the gear as shown. DO NOT install the bearing separator between the gear and the bearing. Install an acceptable puller on the bearing separator. Use a shaft protector between the puller and the end of the input shaft. Use molydisulfide grease to lubricate the shaft protector and the end of the puller. Make sure that you pull only until the bearing is free. Pulling any farther can damage the parts.

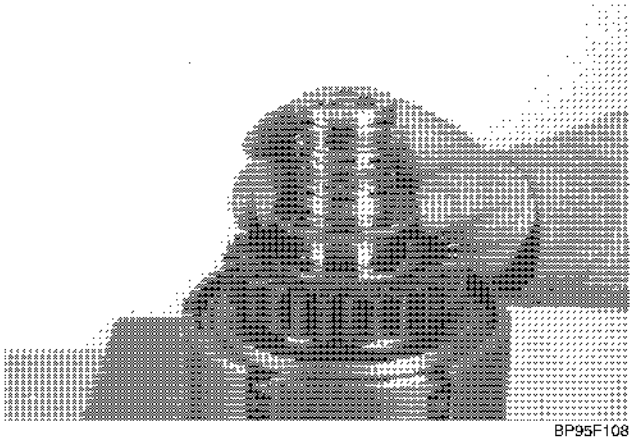
STEP 111



BP95F107

Remove the bearing.

STEP 112

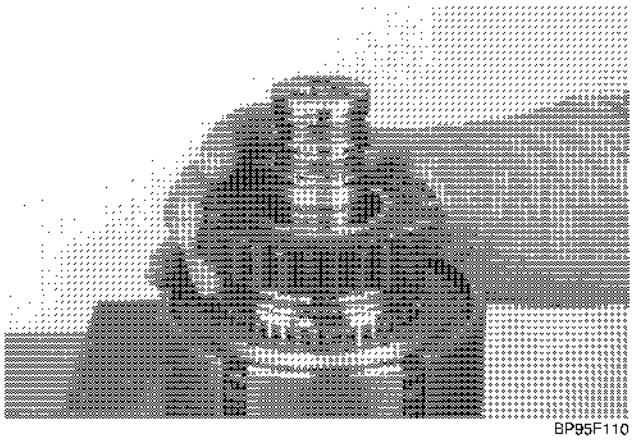


BP95F108

Remove the thrust washer.

NOTE: *It is possible that the gear moved partially out of the clutch pack when the bearing was removed. If this occurs, it can be difficult to remove the roll pin. Move the gear as necessary to remove the roll pin.*

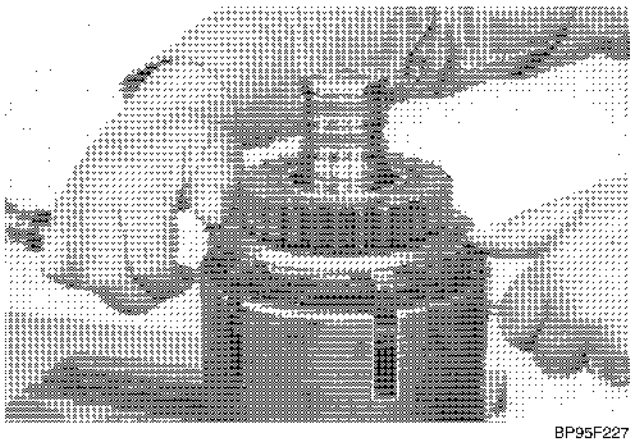
STEP 113



BP95F110

Remove the gear.

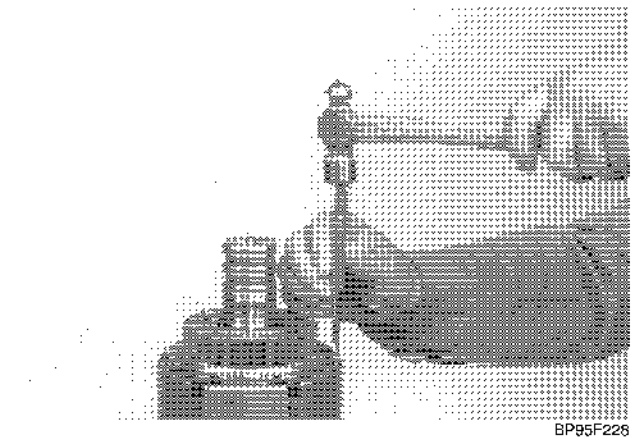
STEP 153



BP95F227

Use two screwdrivers in opposite slots in the clutch housing to support the clutch pack as you start the clutch pack into the clutch housing. Move the clutch pack down slowly and evenly, making sure that all the tabs are going into the slots. Make sure all of the tabs with reference marks are aligned in the slot in the housing with the reference mark. Also make sure that the gear moves down with the clutch pack.

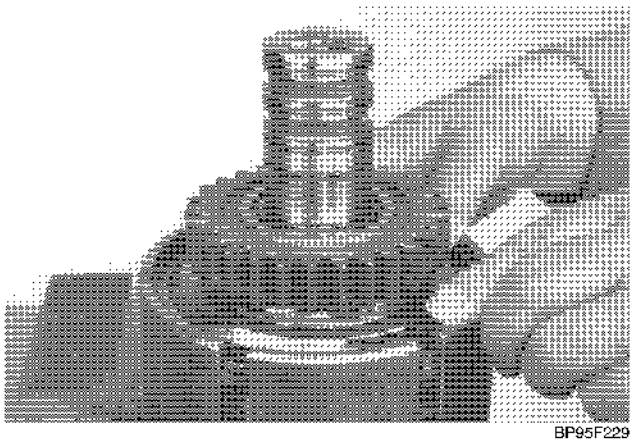
STEP 154



BP95F228

When all the clutch discs are down, and the gear is down as far as the thrust plate will permit, remove the screwdrivers. Use a punch and a hammer to move the thrust plate down evenly just far enough to get access to the snap ring groove in the clutch housing.

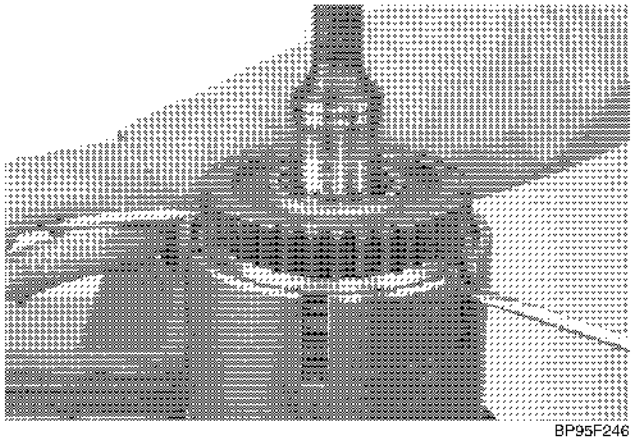
STEP 155



BP95F229

Install the snap ring.

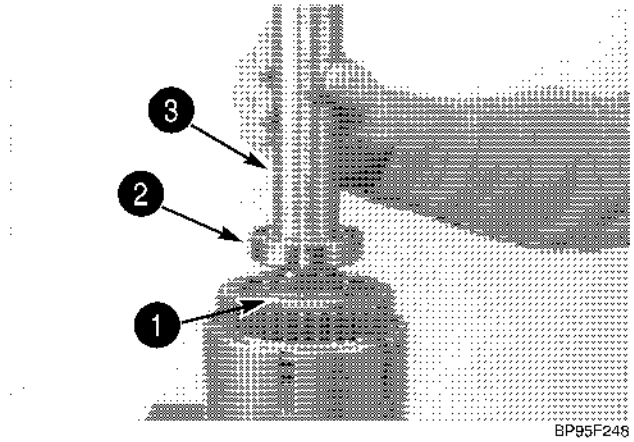
STEP 194



BP95F246

Use two screwdrivers to move the thrust plate up until the thrust plate is against the snap ring. There is a recess in the outer edge of the thrust plate. When the thrust plate is up all the way, the inner edge of the snap ring will fit in this recess.

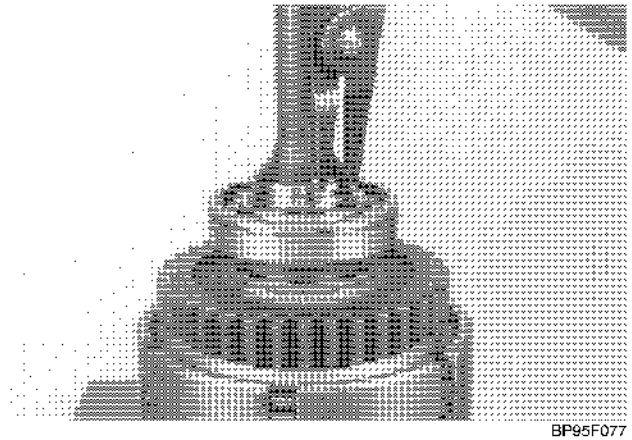
STEP 195



BP95F248

Use clean transmission oil to lubricate the spacer (1) and install the spacer (1) on the input shaft. Install the bearing (2) onto the input shaft. Use an acceptable driver (3) to drive the bearing onto the input shaft until the bearing (2) makes contact with the spacer (1).

STEP 196

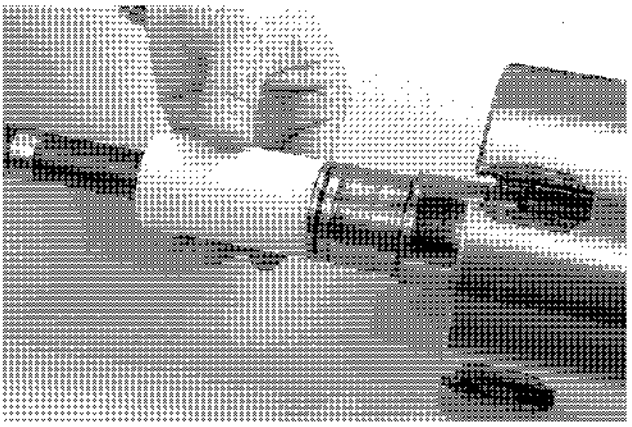


BP95F077

Install the snap ring.

NOTE: *For clarity of the Teflon sealing ring installation procedure the following photos do not show the clutch pack, gear, spacer, bearing, and snap ring installed on the input shaft. Steps 178 through 196 must be performed before installing the Teflon sealing ring on the input shaft.*

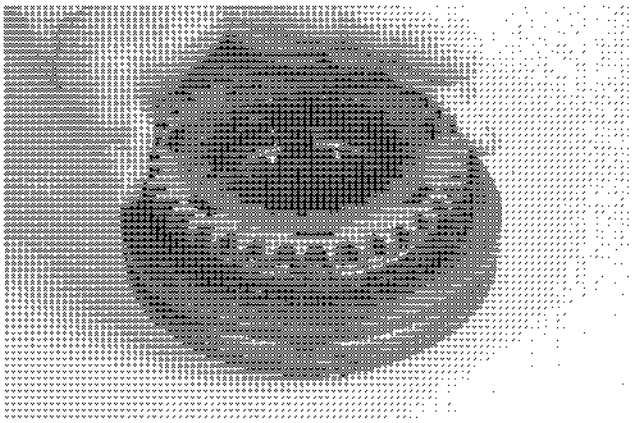
STEP 197



BK00E025

Install the CAS2771-4 spacer onto the input shaft with the chamfered end facing in.

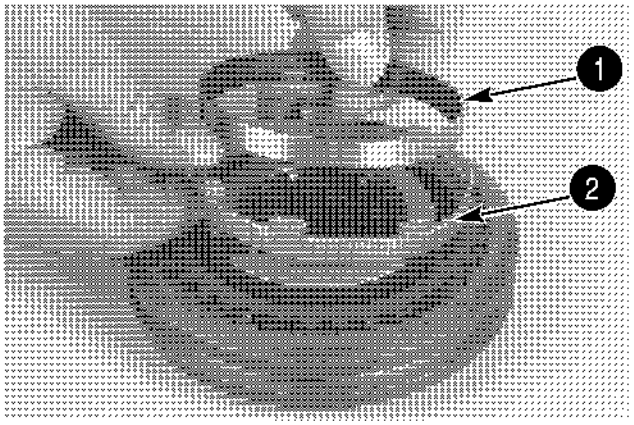
STEP 232



BP95F163

Turn the synchronizer assembly over and remove the synchronizer ring from the other side.

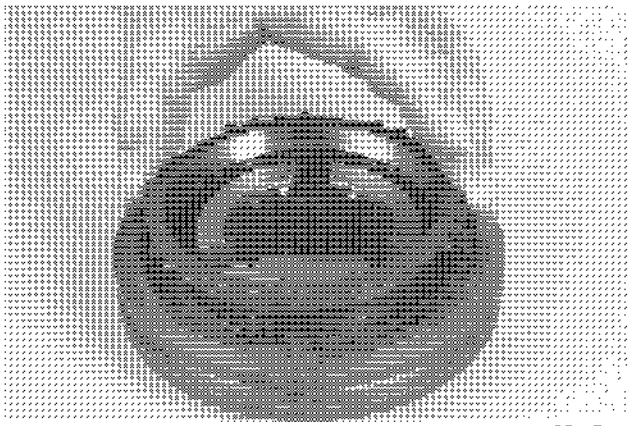
STEP 233



BP95F164

Remove the steel ring (1) and the bronze ring (2) together.

STEP 234

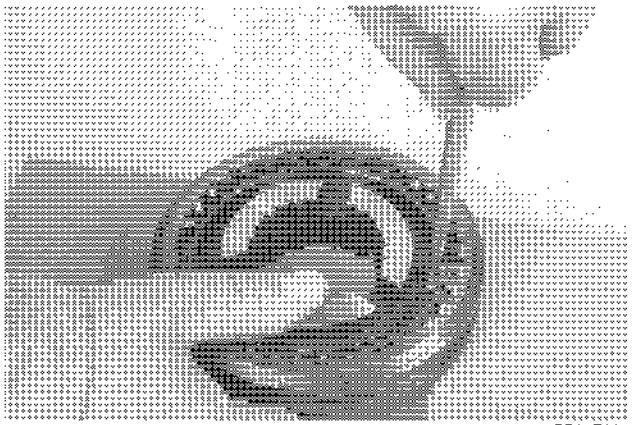


BP95F165

Remove the tapered friction ring.

NOTE: *The parts will fly out of the hub when you do the following step. Putting the synchronizer assembly in a cardboard box during this step can prevent loss of parts.*

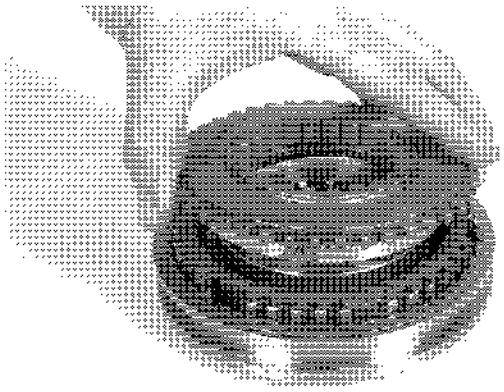
STEP 235



BP95F167

Support the sleeve on blocks. Push down on the hub while you use a punch to push the detent assemblies out of the sleeve and hub. Remove the sleeve from the hub.

STEP 273



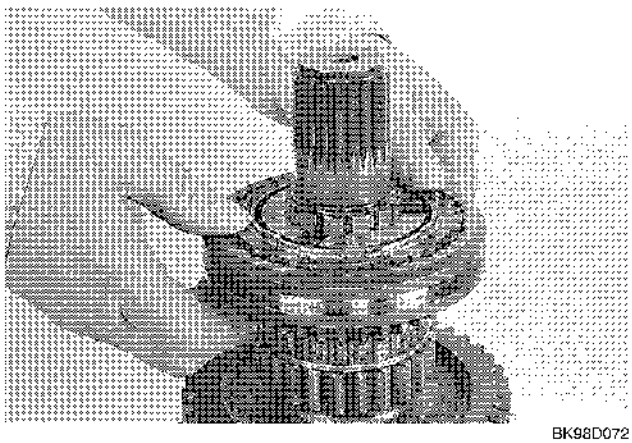
BK00C534

Use clean transmission oil to lubricate and install the clutch ring on each side of the synchronizer assembly.

STEP 274

Install the top synchronizer ring on the synchronizer assembly. Make sure that the teeth on the top synchronizer ring are aligned with the teeth on the inside of the sleeve. Push the sleeve up until the sleeve engages the teeth on the top synchronizer ring. To do this, you must use enough force to overcome the strength of the detent springs and balls. When the synchronizer ring and the sleeve are completely engaged, the detent must hold the sleeve in this position. Push the sleeve back down to the neutral position, turn the synchronizer assembly over, and repeat the procedure with the bottom synchronizer ring. If the sleeve does not engage the teeth smoothly or does not stay in position when moved to any of the three positions, the synchronizer assembly has damaged parts or was not assembled correctly. Disassemble the synchronizer assembly to find the problem.

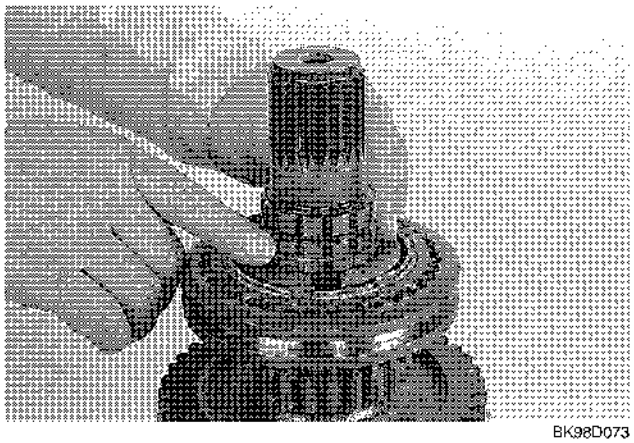
STEP 275



BK98D072

Install the synchronizer assembly onto the shaft.

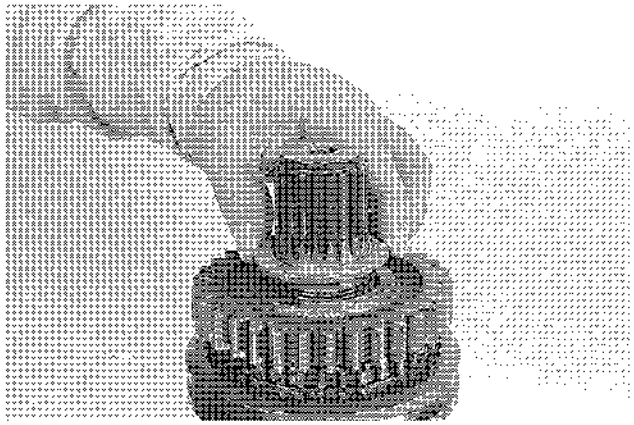
STEP 276



BK98D073

Install the snap ring above the synchronizer assembly.

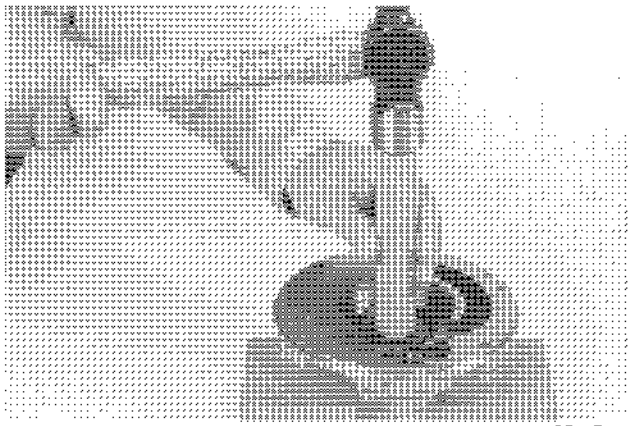
STEP 277



BK98D078

Use clean transmission oil to lubricate the thrust washer. Install third gear and the thrust washer onto the shaft.

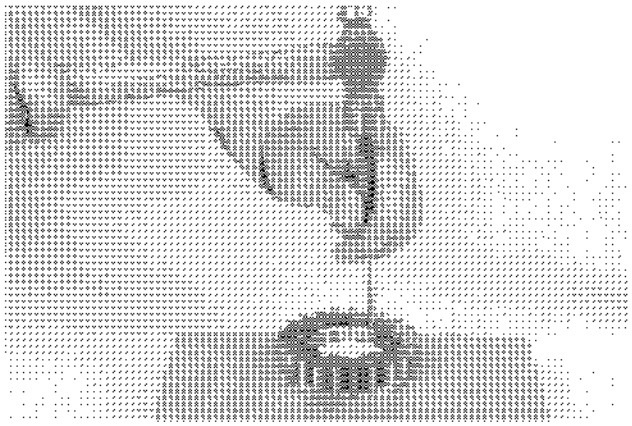
STEP 305



BP95F257

Turn the pump housing over and use blocks to support the pump housing. Use an acceptable driver to drive the bushing from the bore of the pump housing.

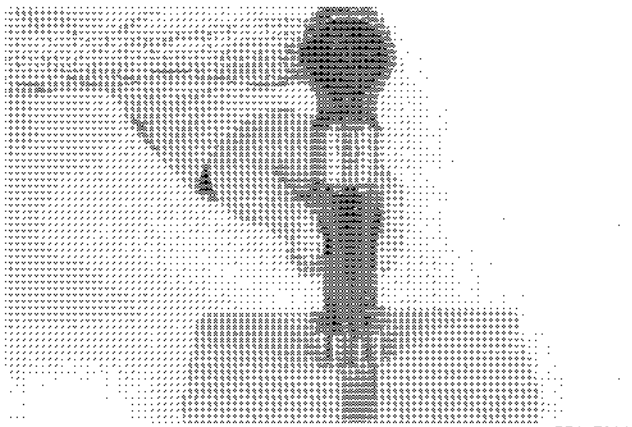
STEP 306



BP95F262

Support the large gear on blocks as shown. Use a punch and a hammer to drive the bushing from the large gear.

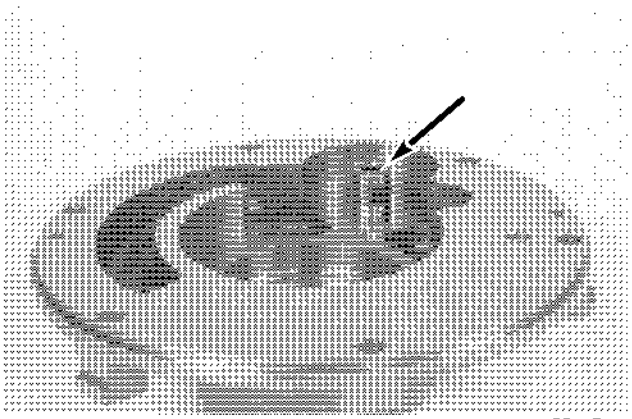
STEP 307



BP95F264

Use an acceptable driver to push the needle bearing out of the small gear.

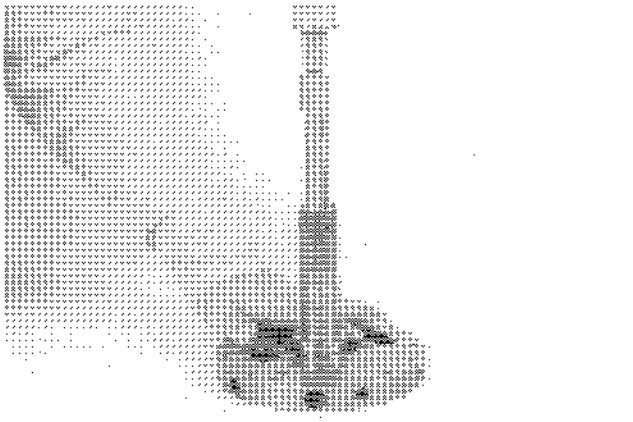
STEP 308



BP95F261

Remove the shaft for the small gear only if the shaft is damaged. The shaft will probably be difficult to remove.

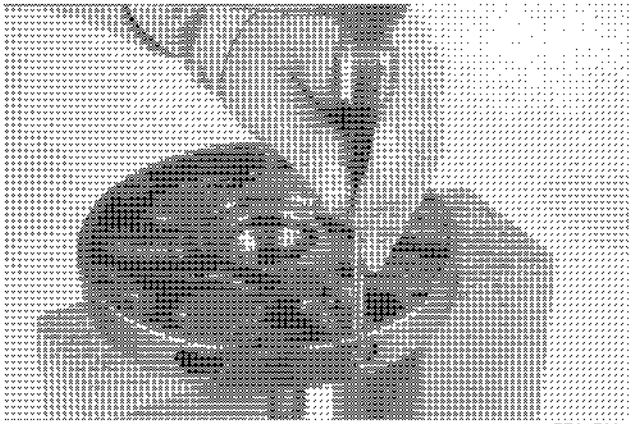
STEP 309



BP95F265

Use a blind hole puller and a slide hammer to pull the bushing from the shaft of the pump support.

STEP 310

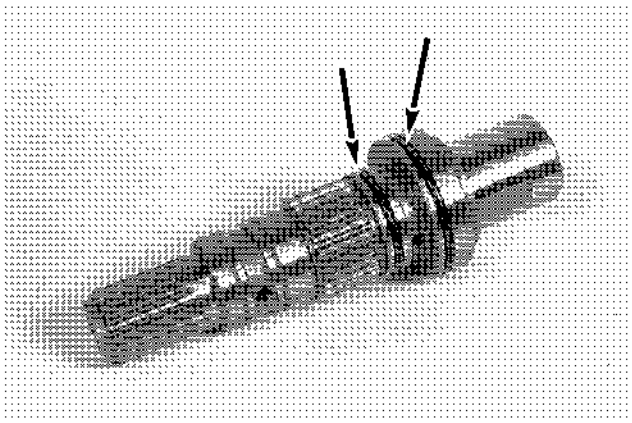


BP95F267

Remove the roll pin for the torque converter relief valve.

ASSEMBLY OF THE FOUR-WHEEL DRIVE SHAFT

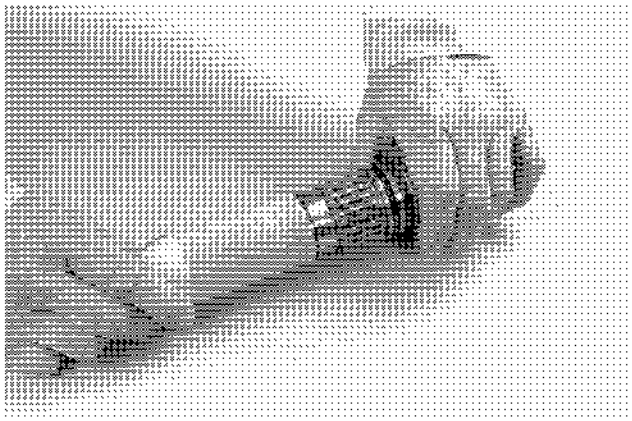
STEP 354



BK00C532

Install new O-rings on the shaft. Use clean transmission oil to lubricate the O-rings.

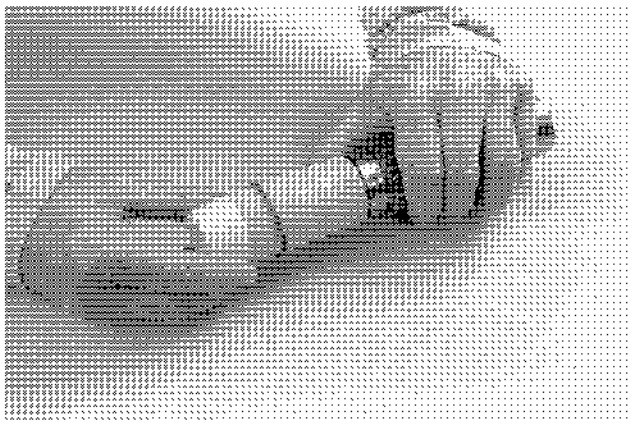
STEP 355



BK00E011

Install the CAS2771-2 expander/protector on the shaft.

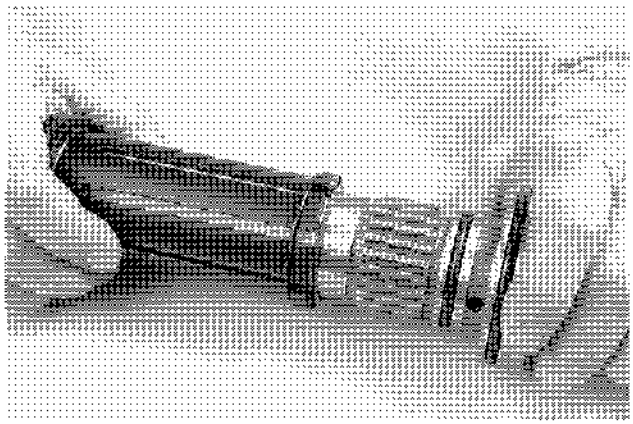
STEP 356



BK00E012

Heat the Teflon sealing ring to 80° to 100° C (176° to 212° F). Install the Teflon sealing ring onto the CAS2771-2 expander/protector.

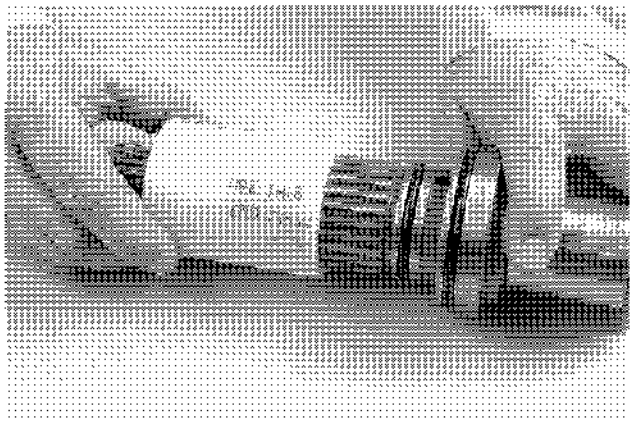
STEP 357



BK00E014

Install the CAS2327 pusher over the expander/protector and slide the sealing ring until it reaches the groove in the shaft. Remove the pusher and expander/protector from the shaft.

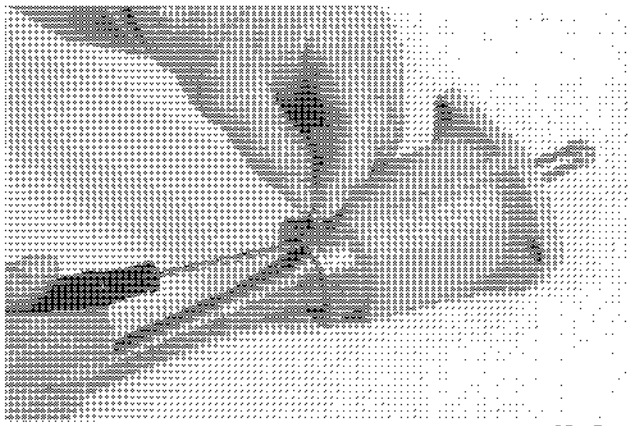
STEP 358



BK00E015

Install the end of the CAS2771-1 seal compressor with the deep chamfer onto the shaft and over the sealing ring. Use a back and forth twisting motion to allow the seal compressor to slip over the top of the sealing ring and seat the sealing ring into the groove. Be careful not to damage the sealing ring. After the sealing ring is seated in the groove, remove the seal compressor from the shaft.

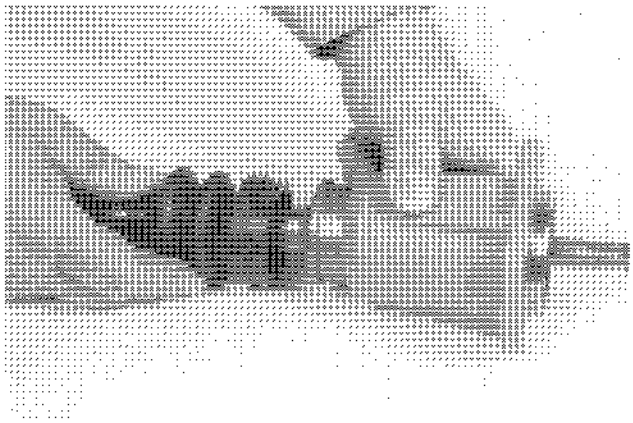
STEP 385



BP95F343

Install the pins through the holes in the shifter housing so that the pins engage the slots in the shift lever.

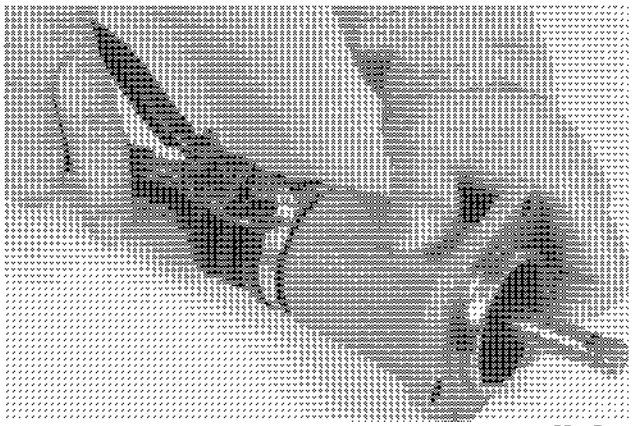
STEP 386



BP95F342

Install the boot so that the end of the boot fits over the ends of the pins. Be careful so that the pins do not fall out during this step.

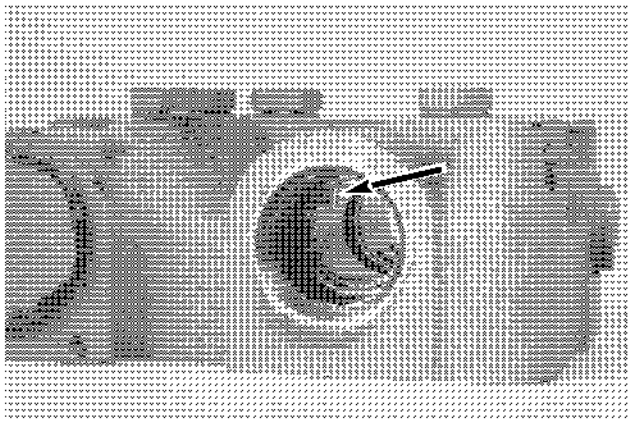
STEP 387



BP95F341

Install the band on the boot as shown. Use the side cutters to engage the catch on the band.

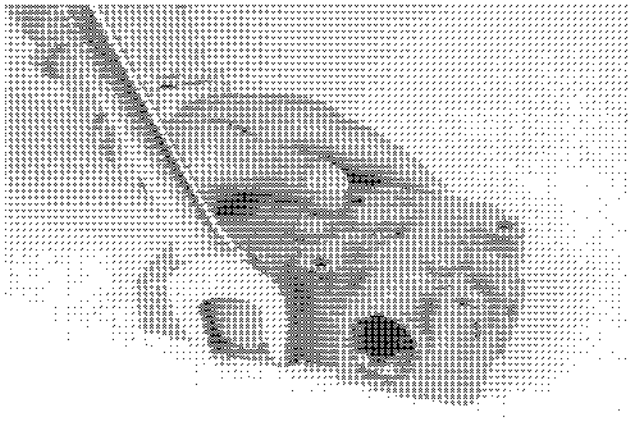
STEP 424



BP95F316

If necessary, remove the snap ring. If the snap ring is not damaged, removal is not necessary.

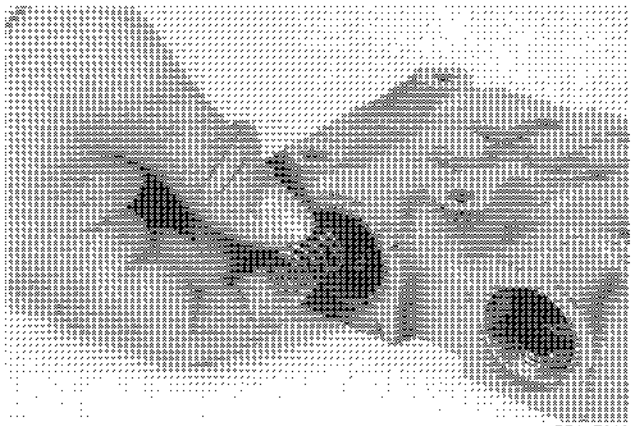
STEP 425



BP95F317

Remove the plug from the bore for the forward/reverse spool.

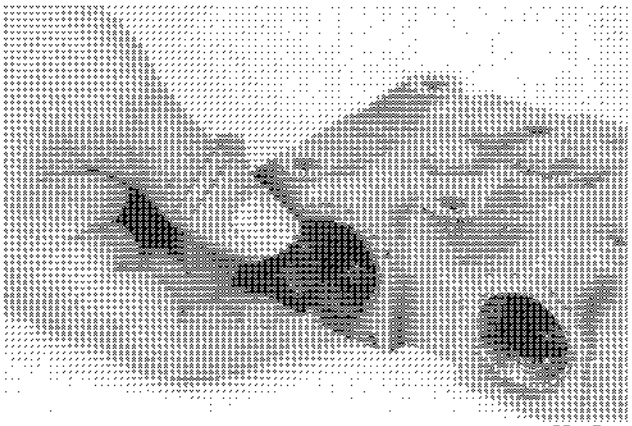
STEP 426



BP95F319

Remove the spring.

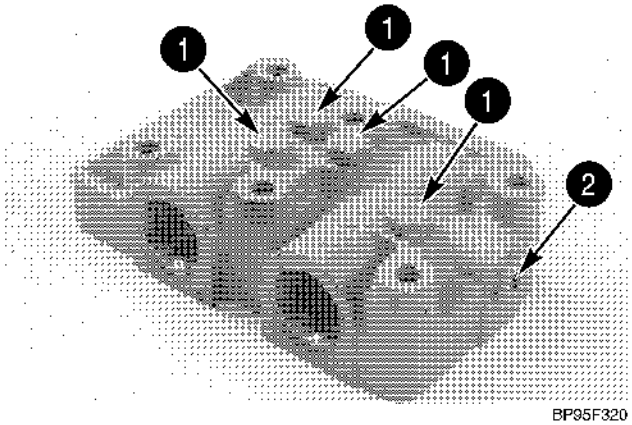
STEP 427



BP95F318

Remove the spring spacer.

STEP 428

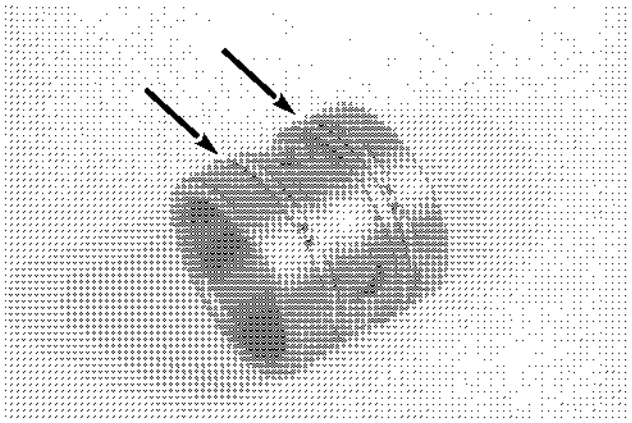


BP95F320

Remove the four hex head plugs (1) and the Allen head plug (2) only if the plugs are damaged or leaking. There are copper washers under the plugs.

NOTES

STEP 503

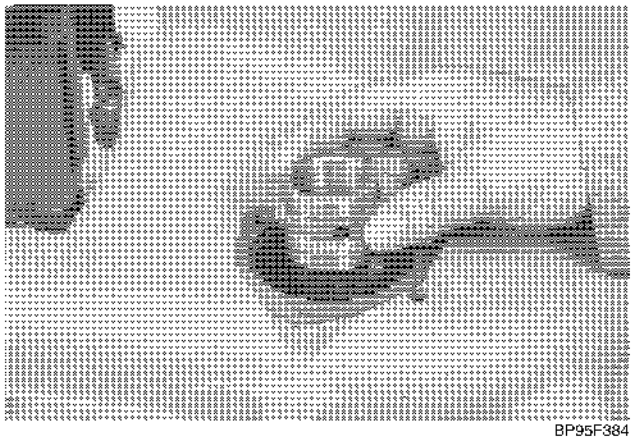


BP95F354

Install the two sealing rings on the collar for the four-wheel drive shaft. Turn the sealing rings on the collar so that the connecting end of each sealing ring is 180 degrees from the connecting end of the other sealing ring.

NOTE: *The connecting ends of the sealing rings in the photo above are shown aligned so that the sealing rings can be seen clearly.*

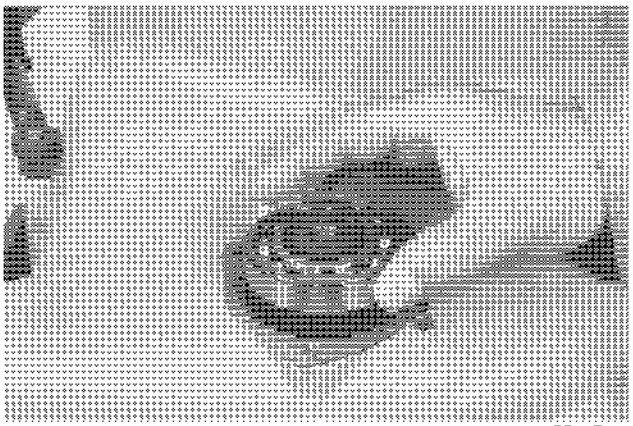
STEP 504



BP95F384

Use clean transmission oil to lubricate the collar for the four-wheel drive shaft. Install the collar on the four-wheel drive shaft.

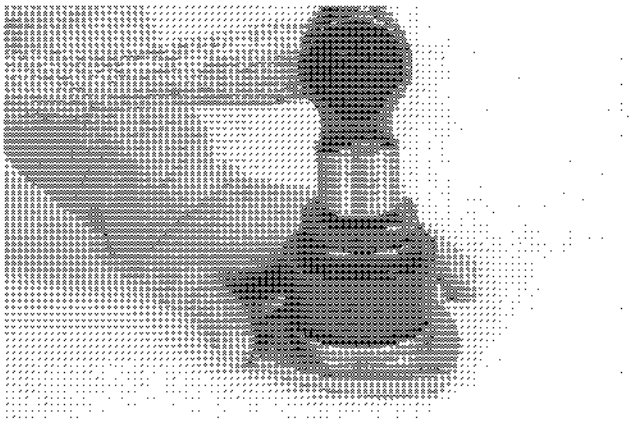
STEP 505



BP95F383

Use clean transmission oil to lubricate the bearing for the four-wheel drive shaft. Install the bearing on the four-wheel drive shaft.

STEP 506



BP95F353

Use the CAS-2381 special tool to install a new seal in the cover. Push just until the seal stops moving. DO NOT use excessive force. Fill the cavity under the lip of the seal with high temperature wheel bearing grease.

Inspection

1. Inspect the bores in the body (6) for scoring, pitting, or other damage. If the bores in the body (6) are damaged a new master cylinder must be used.

2. Check the tab in the spring seat (12). Push the tab down a small amount so that the tab will engage the end of the piston (8). to hold the check valve assembly in place. If the tab is broken, use a new master cylinder.

3. Inspect the flow valve (3), ball (5). check valve piston (8), piston (13), and the push rod (15) for scoring, pitting, or other damage. If the flow valve (3), ball (5), check valve piston (8), piston (13) or the push rod (15) are damage a new master cylinder must be used.

Assembly

1. Install the check valve seal (7) on the check valve piston (8).

2. Install the spring (11) on the spring seat (10).

3. Instal the check valve assembly in the spring (11). Engage the stem of the check valve piston (8) in the spring seat (12).

4. Install the check valve assembly on the piston (13). Push the check valve assembly onto the piston (13) until the tab in the spring seat (12) engages the end of the piston (13).

5. Install the seal (14) on the piston (13).

6. Lubricate the bore of the body (6) with clean hydraulic fluid.

7. Install the piston assembly into the bore of the body (6).

8. Push the piston assembly into the bore until the push rod (15) and washer (16) can be installed.

9. Install the push rod (15) and washer (16).

10. Install the snap ring (17).

11. Install the boot (18).

12. Install the lock nut and clevis on the push rod (15). Do not tighten the lock nut on the push rod at this time.

13. Install the ball (5) in the body (6).

14. Lubricate the flow valve seal (4) and the flow valve (3) with clean hydraulic oil. Install the flow valve (3) in the bore in the master cylinder. The flow valve (3) must be centered in the bore of the master cylinder.

15. Install a new gasket (2) on the flow valve adapter (1).

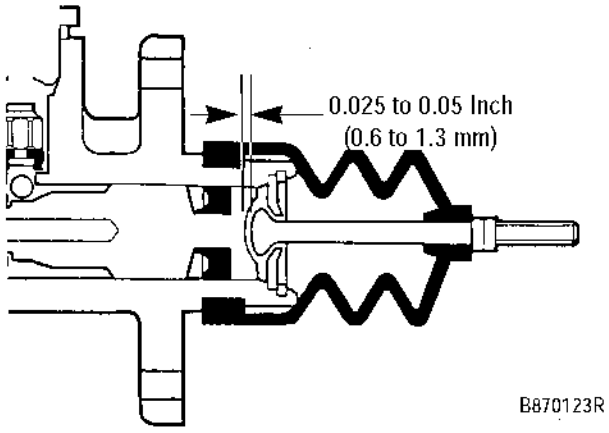
16. Carefully start the flow valve adapter (1) into the bore in the master cylinder by hand. If the flow valve adapter (1) cannot be turned into the master cylinder completely by hand remove the flow valve adapter (1) from the master cylinder and make sure that the flow valve (3) is in the center of the bore in the master cylinder.

17. Repeat step 16 until the flow valve adapter (1) can be turned completely into the master cylinder by hand.

18. Tighten the flow adapter (1) to 30 to 40 pound-feet (41 to 47 Nm).

19. See Section 7002 and install the master cylinder on the machine.

20. Depress the brake pedal and allow the piston to return. Adjust the push rod to piston clearance to 0.025 to 0.050 inch (0.6 to 1.3 mm). Turn the clevis clockwise to shorten or counterclockwise to lengthen. Tighten the lock nut against the clevis. See the illustration below.



1. 0.025 to 0.050 INCH (0.6 to 1.3 mm)

REMOVAL OF THE HYDRAULIC PUMP

STEP 1

Put identification tags on all disconnected hoses and fittings with caps and plugs.

STEP 2

Park the machine on a level surface. Lower the forks. Set the parking brake.

STEP 3

Remove the cap screws and grill from the back of the machine.

NOTE: *Removal of the radiator and hydraulic oil cooler is not required for this procedure.*

STEP 4

Loosen or remove the hydraulic reservoir filler cap. Disconnect hoses and fittings from both sides of the hydraulic pump.

STEP 5

Loosen and remove the cap screws that fasten the hydraulic pump to the engine support bracket.

STEP 6

Slide the hydraulic pump shaft out of the coupler and remove the hydraulic pump from the machine.

REMOVAL OF THE MANIFOLD BLOCK

STEP 1

Put identification tags on all disconnected hoses. Close disconnected hoses and fittings with caps and plugs.

STEP 2

Park the machine on a level surface.

STEP 3

Tilt the mast forward for easy access to the valve.

STEP 4

Apply the parking brake.

STEP 5

Lower the forks to the floor and stop the engine.

STEP 6

Loosen or remove the hydraulic reservoir filler cap. Disconnect the hoses from the fittings in the manifold. Install caps on the fittings and plugs in the tubes and hoses.

STEP 7

Loosen and remove the cap screws that fasten the manifold to the mast.

STEP 8

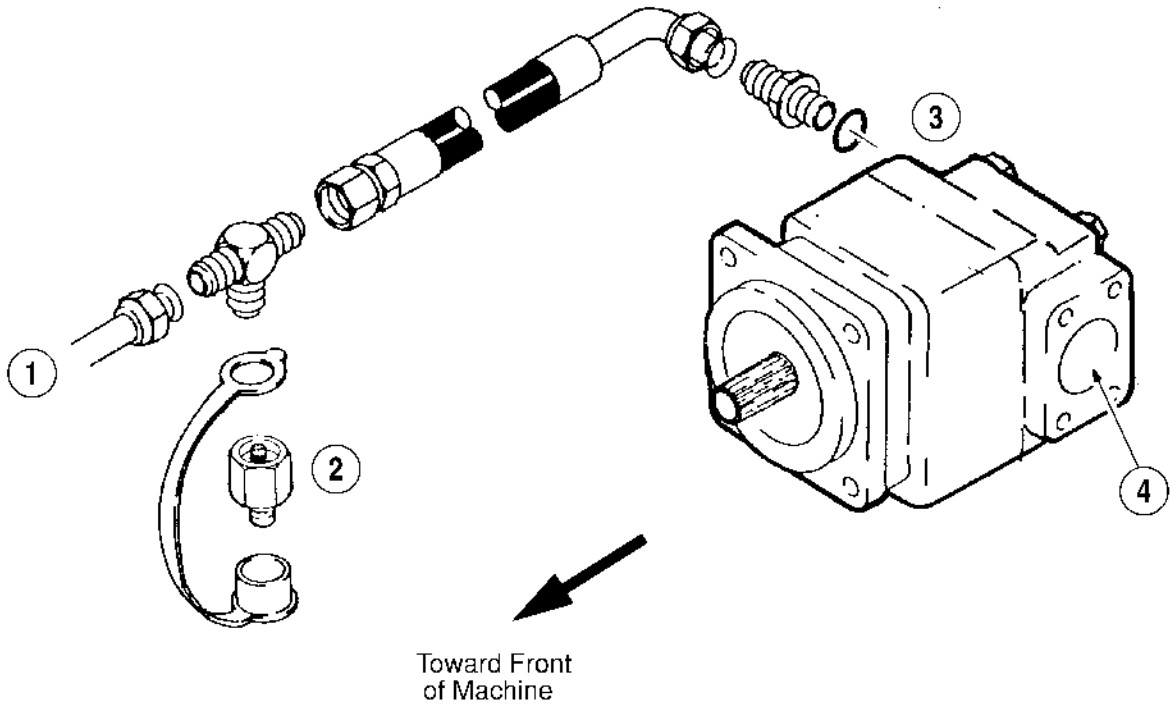
Remove the manifold from the mast.

RELIEF VALVE TESTS

Main Relief Valve

Pressure Check

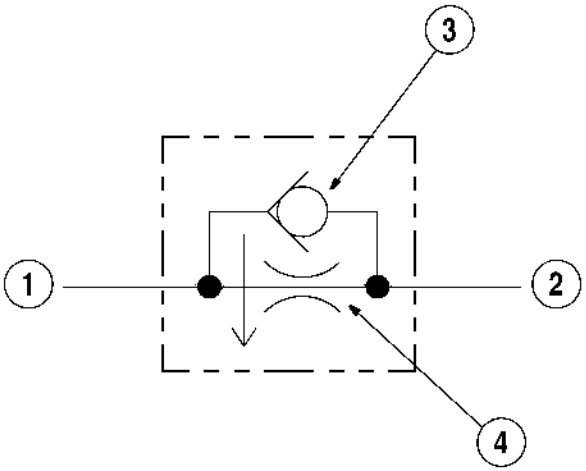
1. Park the machine on a level surface. Lower the forks or carraige to the floor.
2. The oil must be at operating temperature. To heat the oil, do the following steps:
   A. With the engine running at full throttle, hold the tilt control lever in the BACK position for 15 seconds.
   B. Put the tilt control lever in the NEUTRAL position for 15 seconds.
   C. Repeat steps A and B until the temperature of the oil is 49°C (120°F) or the side of the reservoir is very warm.
3. See the illustration below. Use a pressure gauge with a capacity of at least 281 bar (4000 psi). Connect the pressure gauge to the quick disconnect fitting at Test Port 1. The quick disconnect fitting is located inside the RH frame rail to the right of the engine.
4. Run the engine at full throttle. Hold the tilt control lever in the BACK position until the mast stops moving.
5. Hold the tilt control lever in the BACK position and read the pressure gauge. Then release the tilt control lever and decrease the engine speed to low idle. Stop the engine.
6. Compare the reading with the specification on page 3. If the reading is not correct, replace the main relief valve.



B9409094J

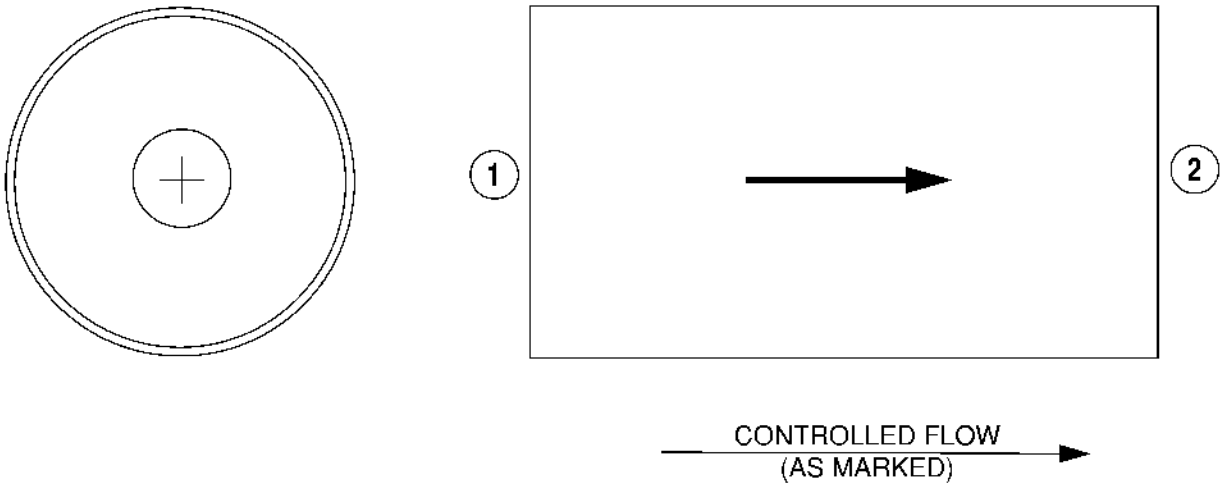
1. TO FLOW CONTROL PRIORITY VALVEt
2. TEST PORT 1
3. HYDRAULIC PUMP
4. FROM RESERVOIR

11 MANIFOLD VALVE (FLOW REGULATOR)



1. INLET/OUTLET
2. INLET/OUTLET
3. CHECK VALVE
4. RESTRICTOR (SEE SPECIFICATIONS)

Controls oil flow In reverse direction with a pressure setting defferential of 8.4 bar (120 psi) max at 150% of controlled flow. Surges are internally dampened (S.I.D.) for load lowering applications. This is a fixed, pressure compensated flow regulator.



CLEANING THE HYDRAULIC SYSTEM

1. Prepare the portable filter on page 3 by doing the following steps:

    a. Remove all the hydraulic oil from the inlet and outlet hoses for the portable filter.

    b. Remove the filter element from the portable filter.

    c. Remove all hydraulic oil from the portable filter.

    d. Clean the inside of the housing for the filter element.

2. You must know whether the contamination is microscopic or visible. See Types of Contamination on page 4.

3. If the contamination is microscopic:

    a. Check the maintenance schedule for the machine to learn if the hydraulic oil must be changed. If needed, change the hydraulic oil. See Section 1002 for specifications. Change the hydraulic filter.

    b. Do steps 6 through 38.

4. If the contamination is visible:

    a. Change the hydraulic oil and hydraulic filter. See Section 1002 for oil specifications.

    b. Do steps 5 through 38.

5. Check the amount of contamination in the hydraulic system by doing the following steps:

    a. Disassemble one cylinder in two different circuits. Check for damage to seals, scoring of the cylinder wall, etc. Repair the cylinders as necessary.

    b. If, in your judgment, the damage to the cylinders was caused by severe contamination and is not the result of normal wear, it is necessary to remove, clean and repair valves, pump, lines, cylinders, hydraulic reservoir, etc. in the hydraulic system.

6. Connect a vacuum pump to the hydraulic reservoir air breather hose. Start the vacuum pump.

7. Loosen and remove the drain plug from the reservoir.

8. See the fitting kit shown on page 3. Install the valve in the hole for the drain plug. Make sure that the valve is closed.

9. Stop the vacuum pump.

10. Connect the inlet hose for the portable filter to the valve that is installed in the hole for the drain plug.

11. Disconnect the vacuum pump from the filler cap opening on the hydraulic reservoir.

12. Install the outlet hose for the portable filter in the hydraulic reservoir.

13. Open the valve that is installed in the hole for the drain plug.

14. Move the switch for the portable filter to the ON position. Start and run the engine at 1500 rpm (r/min).

15. Run the portable filter for 10 minutes.

16. Continue to run the portable filter. Increase the engine speed to full throttle. Heat the oil to operating temperature by doing the following steps:

    a. Hold the bucket control lever in the ROLLBACK position for 15 seconds.

    b. Return the bucket control lever to NEUTRAL for 30 seconds.

    c. Repeat steps 17a through 18b until the oil in the hydraulic system is at operating temperature.

17. Continue to run the engine at full throttle. Continue to run the portable filter.

18. Operate each hydraulic circuit to completely extend and retract the cylinders. Continue to operate each hydraulic circuit two times, one after the other, for 45 minutes.

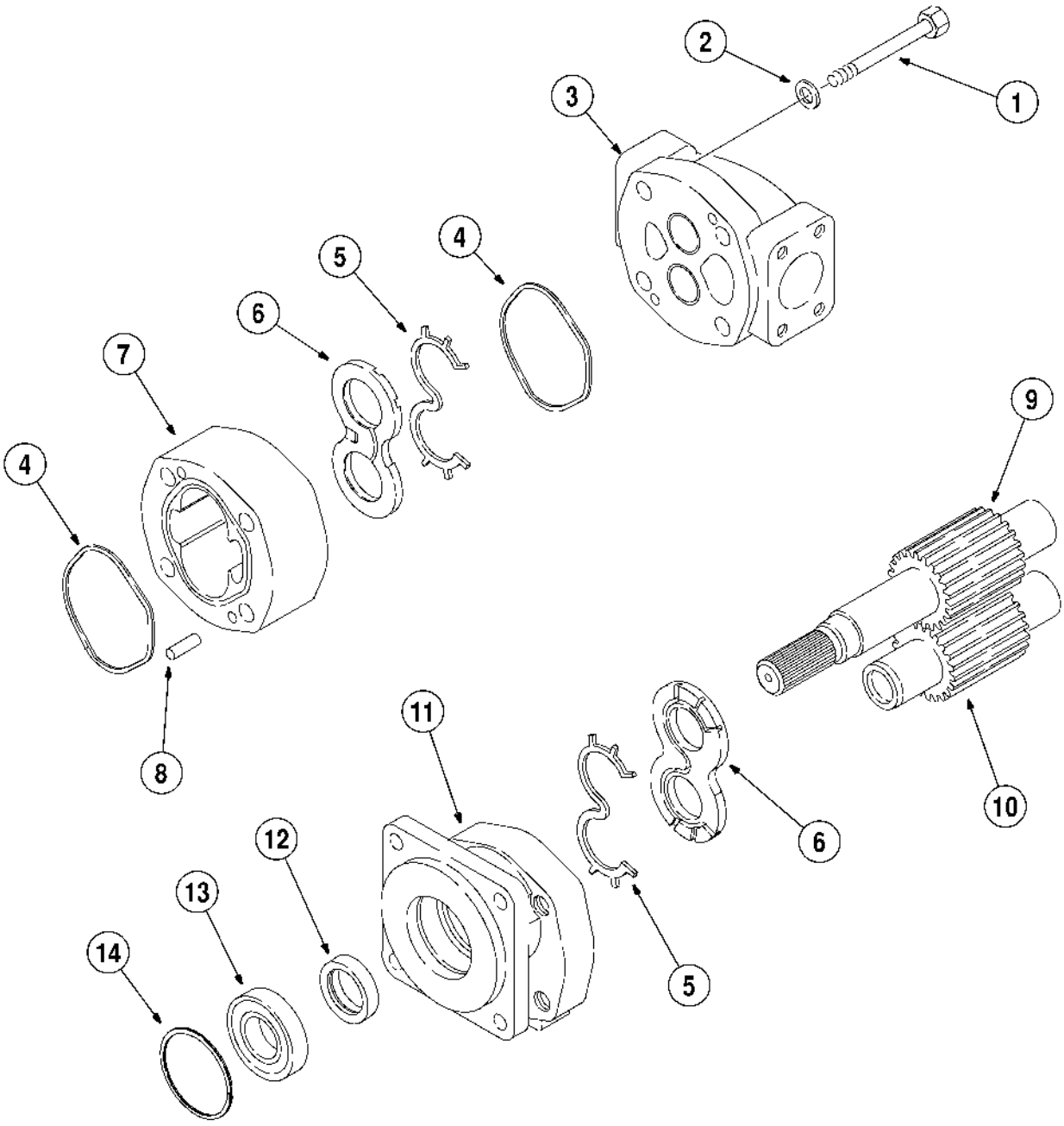
19. Decrease the engine speed to low idle.

20. Continue to run the portable filter for 10 minutes.

21. Stop the portable filter.

22. Stop the engine.

23. Remove the hose from the hydraulic reservoir.

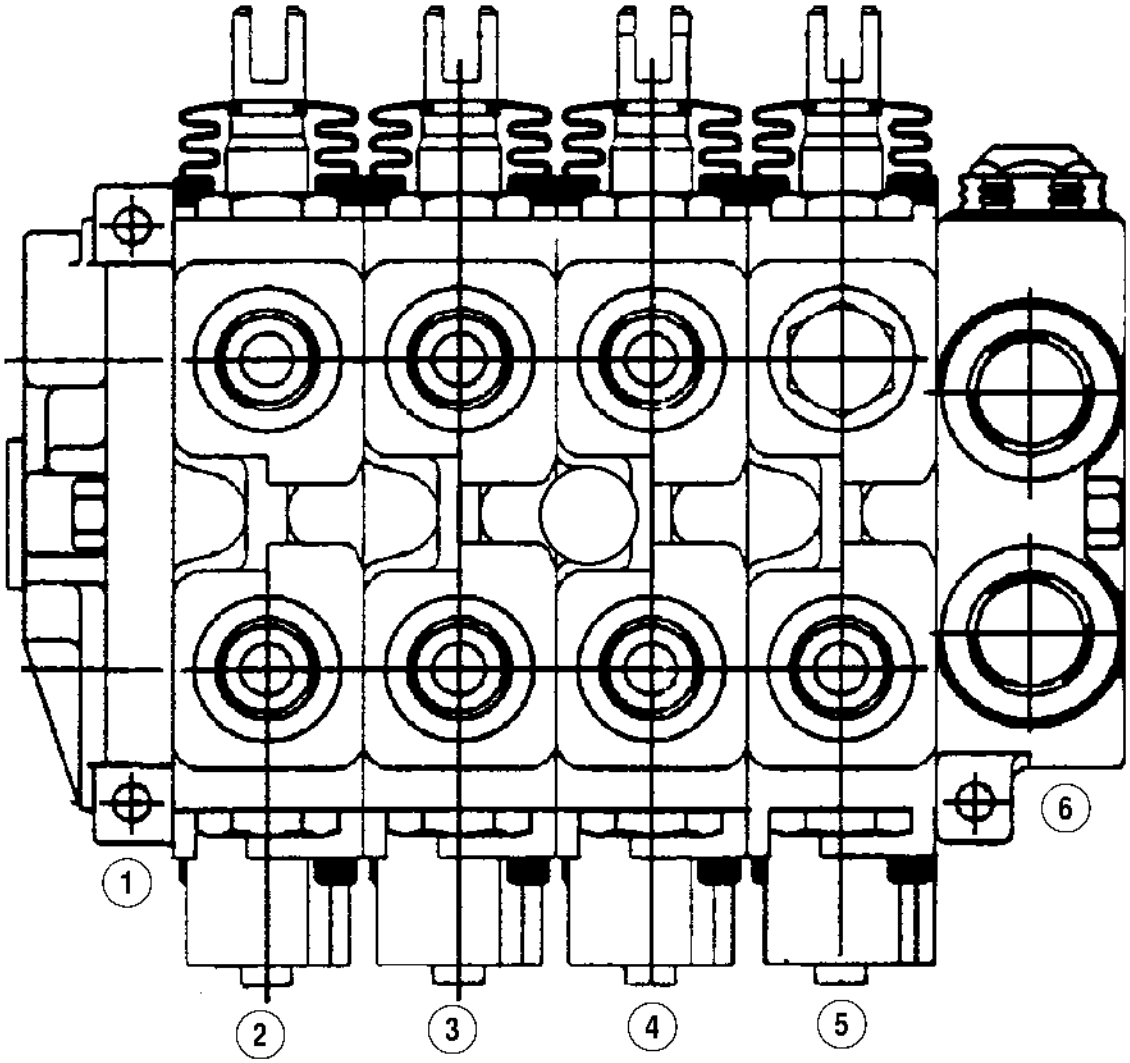


B9503168T

1. *Cap Screw*
2. *Flat Washer*
3. *Port End Cover*
4. *Quad Ring*
5. *Seal*
6. *Thrust Plate*
7. *Gear Housing*
8. *Dowel Pin*
9. *Drive Gear*
10. *Driven Gear*
11. *Shaft End Cover*
12. *Seal*
13. *Bearing*
14. *Snap Ring*

Hydraulic Pump - Exploded View

GENERAL INFORMATION



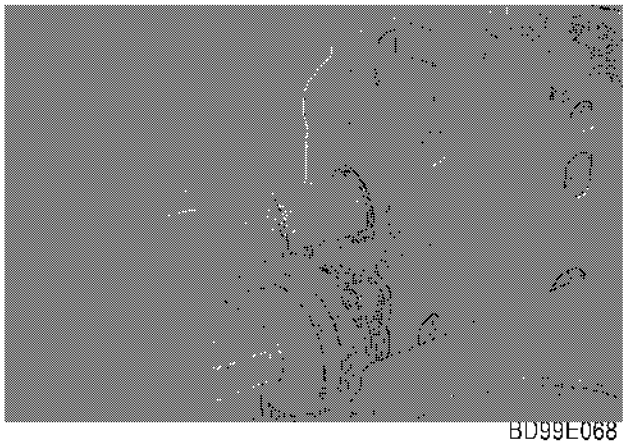
BS99F040

1. End Cover
2. Sideshift, Auxiliary Section
3. Auxiliary Section
4. Lift Section
5. Tilt Section
6. Inlet/Outlet Section

LIFT SECTION

Disassembly

STEP 29



BD99E068

Fasten the section in a vise with soft jaws. Loosen and remove the plug.

NOTE: *There is no spring and poppet with this plug. Repeat steps 11 through 28 for the rest of the disassembly.*

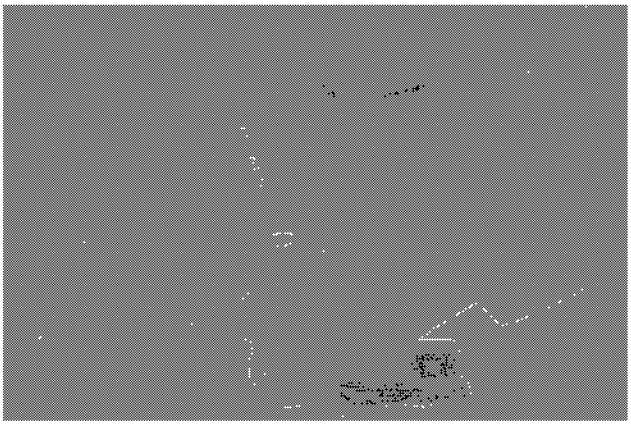
Assembly

NOTE: *Inspect all parts for wear and damage. See page 4.*

For assembly, do the reverse of disassembly.

Assembly

STEP 8



B835613M

Install and tighten the relief valve.

STEP 9 Rotate the valve body in the vise.

STEP 10

B835620M

Install the spool.

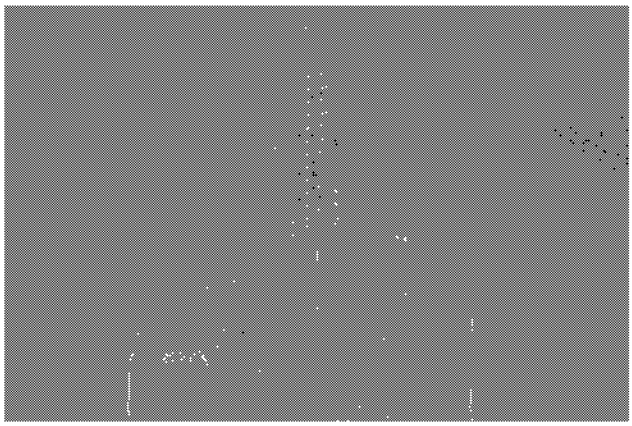
STEP 11

B835609M

Install and tighten the other reducer.

STEP 12 Rotate the valve body in the vise.

STEP 13



B835608M

Install the spring.

STEP 14

B835606M

Install and tighten the reducer.

11. Place washer (15) on bolt (16) and tighten bolt (16) .
12. Lubricate the inside of the tube (1) and the piston (11) with clean oil.
13. Push the tube (1) straight onto the piston (11).
14. Start the tube (1) onto the piston rod assembly. Be careful not to damage the wear ring and seal.
15. Lubricate the O-ring (9) on the gland (2) with clean oil.
16. When the piston (11) is in the smooth part of the tube (1), start the gland (2) into the tube (1)
17. Use a spanner wrench to turn the gland (2) into the tube (1). Tighten the gland (2).
18. If the hoses were removed with the cylinder, install new O-rings, if equipped, on the hose fittings. Lubricate the O-rings with clean oil. Install the hoses.

SPECIFICATIONS

Number of teeth on the flywheel	159
Engine speeds	
Low idle	900 to 925 r/min (rpm)
High idle (no load)	2360 to 2485 r/min (rpm)
High idle override	1 to 2 mm (.04 to .08 inch)
Brake pedal height	134 mm ±2 mm (5.27 inches ±.08 inch)
Brake pedal free travel	2 to 4 mm (.08 to .15 inches)

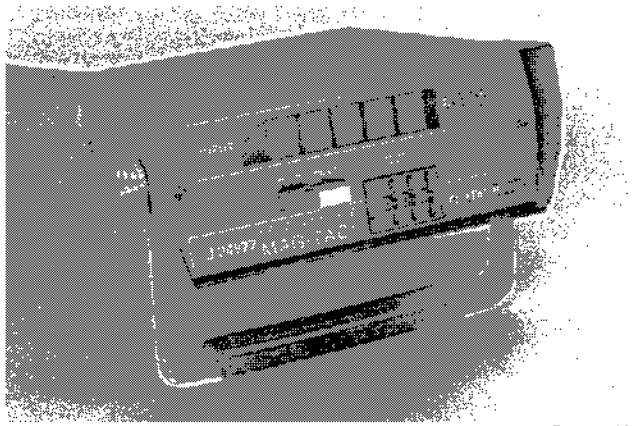
SPECIAL TOOLS

The special tool shown is used to check the engine r/min (rpm).

The tool must be programmed for the number of teeth on the flywheel. The machine has 159 teeth on the flywheel.

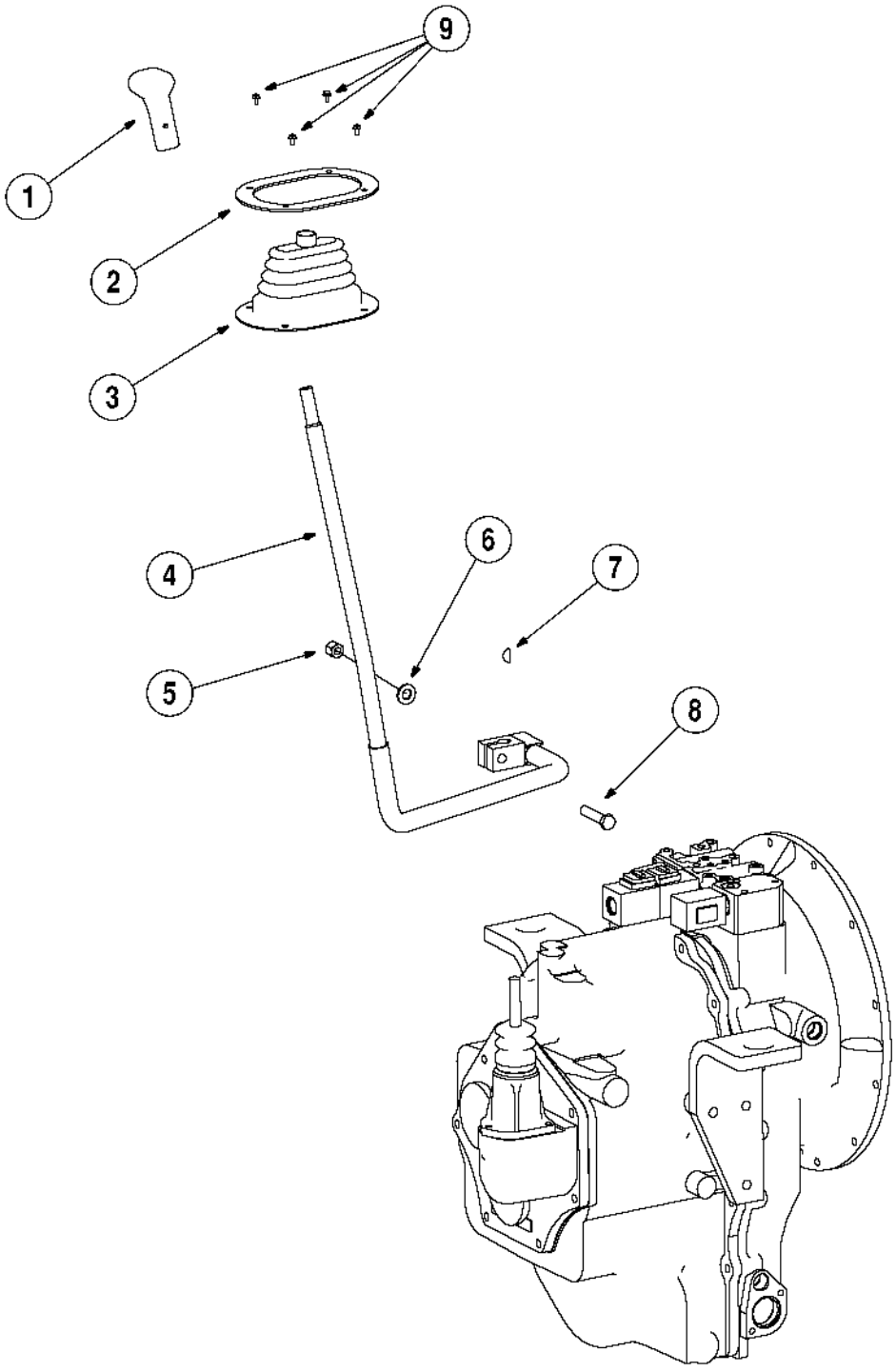
Install the magnetic sensor into the threaded hole in the flywheel housing. Turn the magnetic sensor clockwise until the sensor contacts the flywheel, then turn the sensor counterclockwise 1/2 to 3/4 of a turn and tighten the lock nut.

This tool is first used on page 4.



B875112M

CAS-10778



BS99B040

1. KNOB
2. RING
3. BOOT
4. LEVER
5. NUT
6. WASHER
7. KEY
8. BOLT
9. SCREW

ILLUSTRATION OF TRANSMISSION CONTROL LEVER

Section

9010

FORKLIFT MAST

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CASE CANADA CORPORATION
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Bur 7-15700

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