9350 Tractor Service Manual
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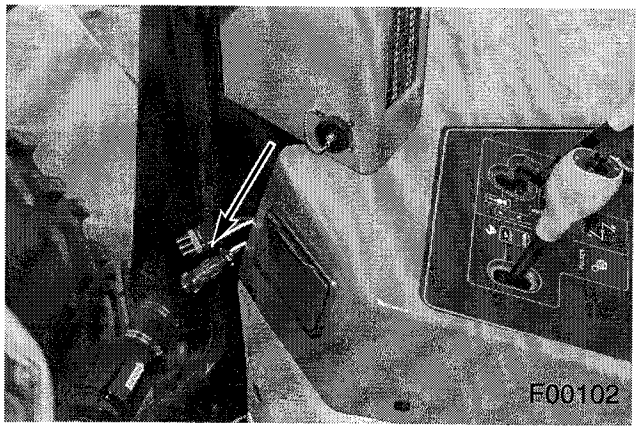
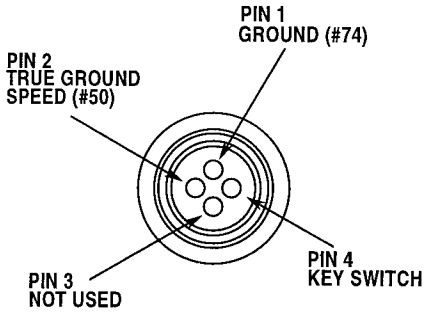
AUXILIARY POWER SUPPLY

Three 12 volt, circuit breaker protected male connector power leads are provided inside the RH side control console for connecting monitors or other equipment.



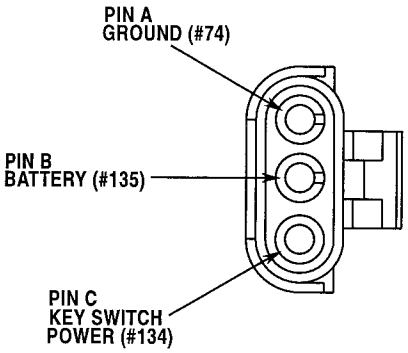
One 4-pin Amp connector is provided for monitors requiring true ground speed input. The diagram shows the connector pin numbers and usage.



95F59

Two 3-pin, circuit breaker protected Weather Pack connectors are also available to provide key switched, or battery power and ground. The diagram shows the connector pin usage.

The control console wraparound cover must be removed to access these power leads.



95F60

METRIC SIZE RADIAL TIRE PRESSURE AND LOAD CAPACITY CHART - U.S. Standard

25 MPH Travel Speeds

Tire Pressure - PSI		6	9	12	15	17	20	23
Tire Size	Wheels	lbs	lbs	lbs	lbs	lbs	lbs	lbs
420/80R46	S	2910	3520	4080	4680	5360	5840	6400
	D	2560	3100	3590	4110	4710	5140	5630
	T	2390	2890	3340	3830	4390	4790	5240
710/70R38	S	5360	6400	7400	8550	9650	10700	11700
	D	4710	5630	6500	7520	8490	9460	10280

METRIC SIZE RADIAL TIRE PRESSURE AND LOAD CAPACITY CHART - Metric

40 KPH Travel Speeds

Tire Pressure - kPa		41	62	83	104	117	138	159
Tire Size	Wheels	Kg	Kg	Kg	Kg	Kg	Kg	Kg
420/80R46	S	1323	1600	1855	2127	2680	2655	2909
	D	1164	1409	1632	1868	2141	2336	2559
	T	1086	1314	1518	1741	1995	2177	2382
710/70R38	S	2436	2909	3364	3886	4386	4864	5318
	D	2141	2559	2955	3418	3859	4300	4673

BAR AXLE WHEEL ADJUSTMENT
SPLIT BUSHING HUB

Use this procedure to change the tread settings:

1. Park the tractor on a solid level surface. Lift and support the tractor only high enough to allow the tire to clear so that the wheel can slide IN or OUT on the axle shaft.
2. Remove all paint, dirt and rust from the axle.
3. Remove the two outside bolts and washers from each bushing and replace with the special jack screws supplied with the tractor.

NOTE: *Oil the threads of the special jack screws before installing.*

4. Loosen and back out the center capscrew in each bushing 1/4 inch (6 mm).
5. Turn the axle until the keyway is on top.
6. Tighten the jack screws alternately and evenly to break loose the tapered bushing halves from the hub.
7. Adjust the wheel to the desired working position on the axle.
8. Remove the special jack screws and replace with the original capscrews and washers.
9. Starting with the center capscrew, tighten the capscrews for the bushing half with the key alternately and evenly to a final torque of 256 to 289 lb ft (347 to 392 Nm).

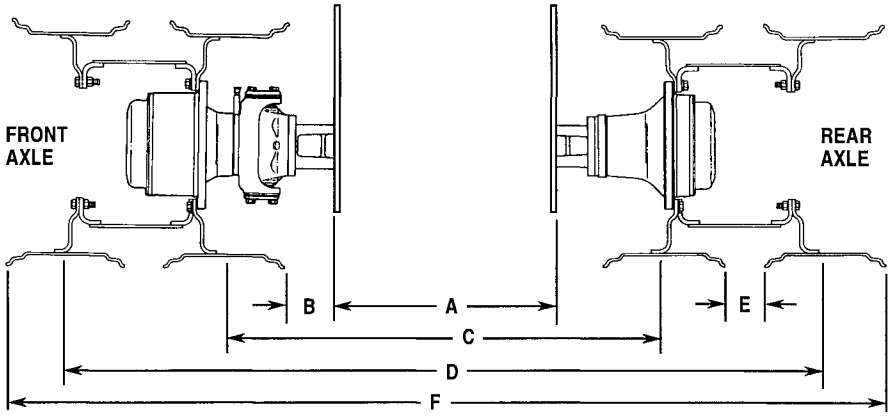
IMPORTANT: *The bushing half with the key must be tight against the face of the hub.*

10. In the same manner, tighten the capscrews in the plain bushing half to a final torque of 256 to 289 lb ft (347 to 392 Nm).
11. After the wheel spacing is completed, check the torque on all bolts after the first 30 minutes of operation and every 10 hours of operation until the bolt torque stabilize.

IMPORTANT: *Check all hub bushing retaining bolts for the specified torque after the first 30 minutes and then every 10 hours until the retaining bolts maintain the specified torque.*

WARNING: *In single wheel operation the tractor can become unstable at narrow tread setting and high speed. Always use dual wheels front and rear for hillside operation and avoid sharp uphill turns.* M300A

ONE METER ROW
(Narrow Spacer)



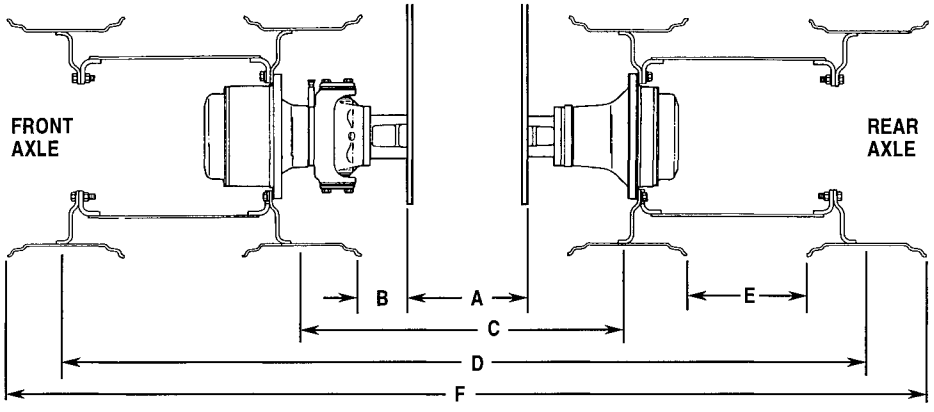
95F130 - 95F131

Tire Size	A	B	C	D	E	F
18.4-42	36 inch (914 mm)	12.3 inch (312 mm)	79 inch (2 000 mm)	130 inch (3 300 mm)	7.1 inch (180 mm)	149 inch (3 785 mm)

All wheel and hub mounting bolts must be tightened after the first 3 hours and then every 10 hours until the bolts maintain the correct specified torque.

WARNING: *In single wheel operation the tractor can become unstable at narrow tread setting and high speed. Always use dual wheels front and rear for hillside operation and avoid sharp uphill turns.* M300A

ONE METER ROW
(Wide Spacer)



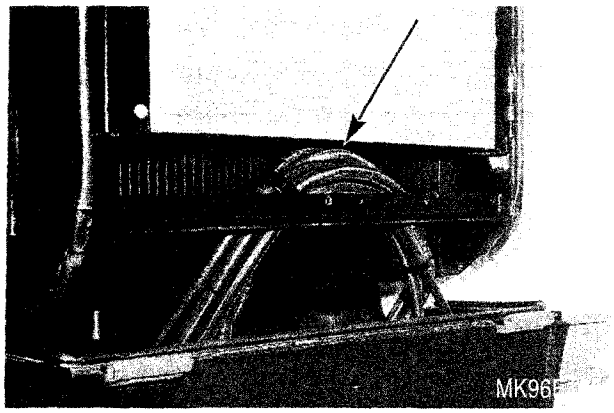
95F132 - 95F133

Tire Size	A	B	C	D	E	F
18.4-42	36 inch (914 mm)	12.3 inch (312 mm)	79 inch (2 000 mm)	158 inch (4 000 mm)	21.1 inch (536 mm)	177 inch (4 496 mm)

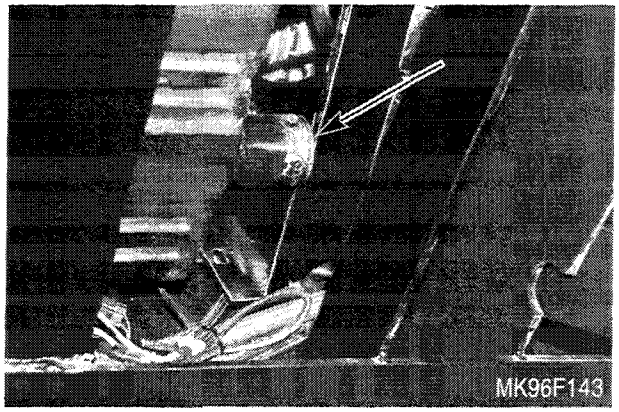
All wheel and hub mounting bolts must be tightened after the first 3 hours and then every 10 hours until the bolts maintain the correct specified torque.

WARNING: *In single wheel operation the tractor can become unstable at narrow tread setting and high speed. Always use dual wheels front and rear for hillside operation and avoid sharp uphill turns.* M300A

STEP 22

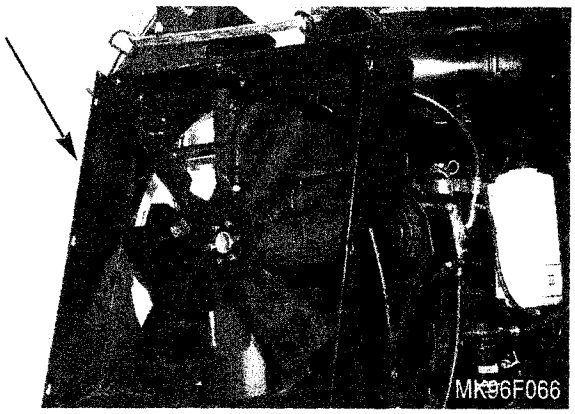


Lift the radiator and support assembly out of the tractor while guiding the condenser and hydraulic hoses through the bottom of the assembly.



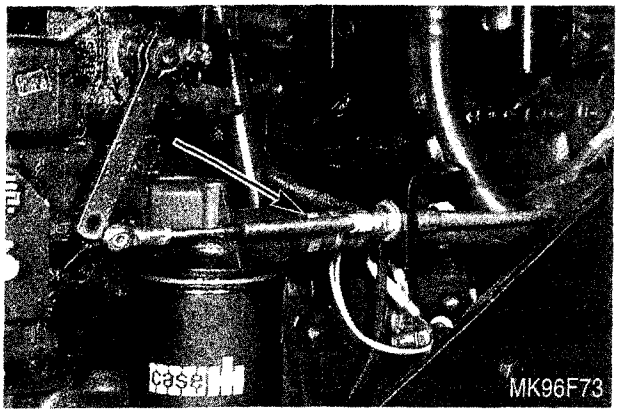
NOTE: *The clearance between the fan shroud and the lower radiator hose mounting tube is very tight. Guide the tube past the fan shroud as the radiator assembly is lifted out of the tractor.*

STEP 23



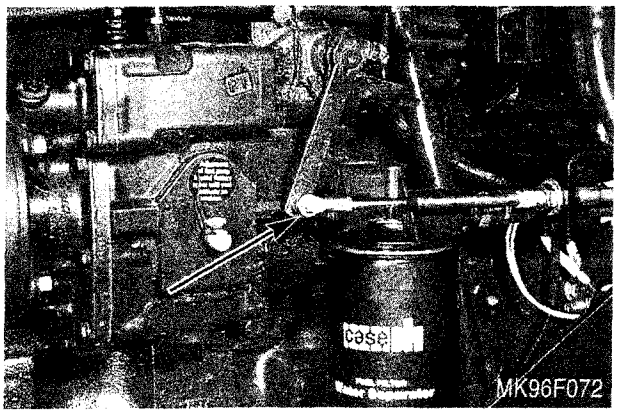
Remove the fan shroud.

STEP 94



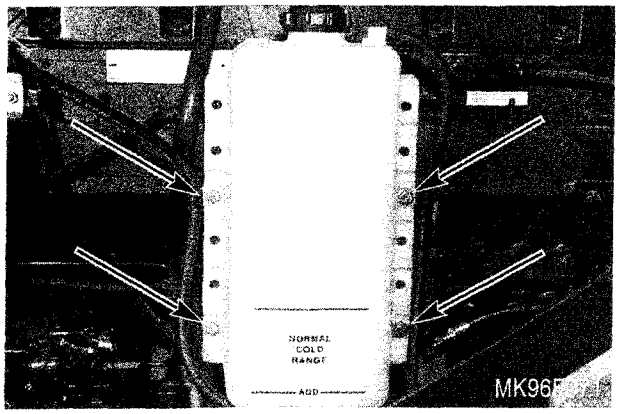
Install the throttle cable on the mounting bracket and tighten the jam nut.

STEP 95



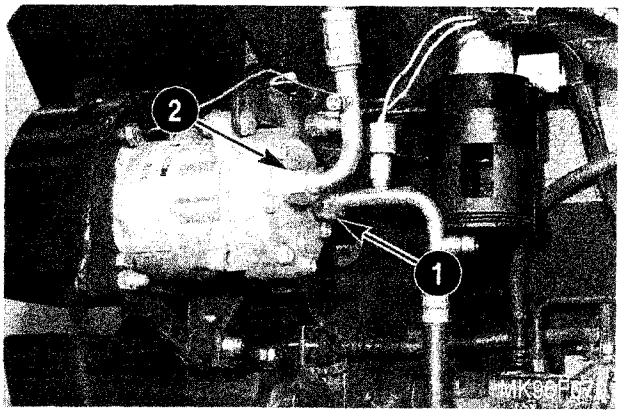
Install the throttle cable on the throttle lever.

STEP 96



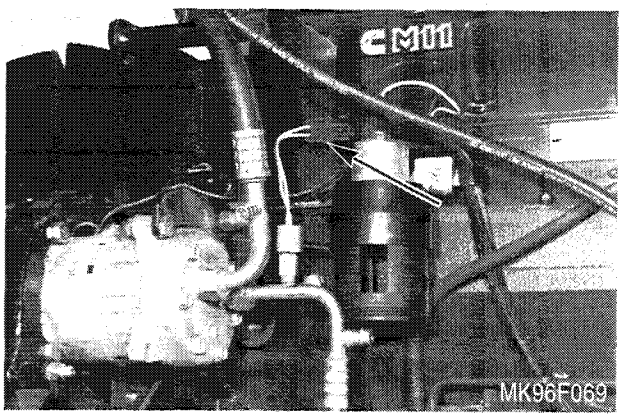
Install the coolant recovery reservoir. Tighten the four mounting bolts and nuts to a torque of 12 to 14 lb ft (16 to 19 Nm).

STEP 97

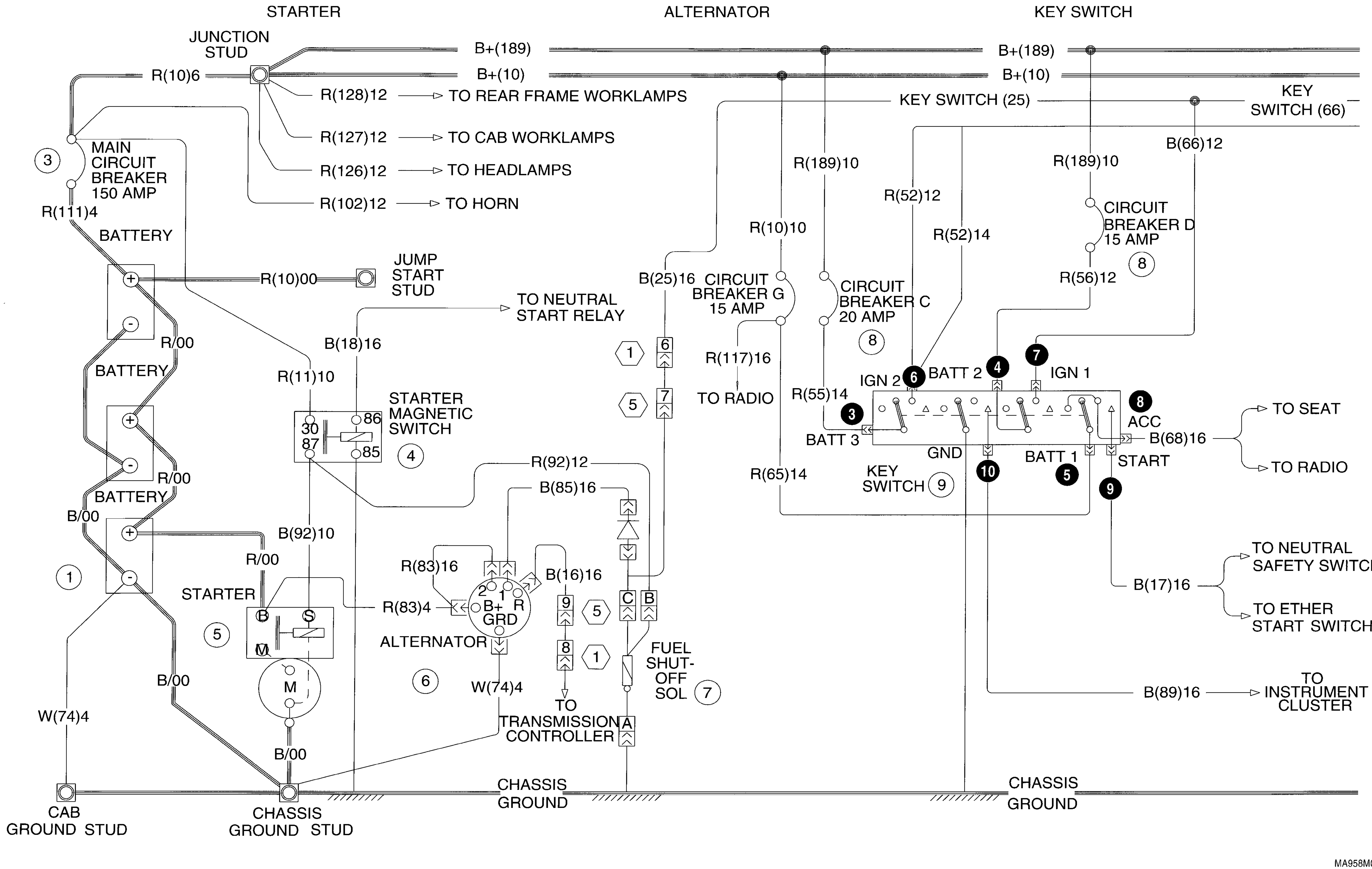


Lubricate the O-rings and fittings with clean PAG-20 refrigerant oil and install the discharge (Item 1) and suction (Item 2) hoses on the compressor.

STEP 98



Connect the high pressure switch wires to the engine wire harness.



STARTER
ALTERNATOR
KEY SWITCH
JUNCTION STUD
B+(189)
B+(10)
R(10)6
R(128)12 TO REAR FRAME WORKLAMPS
R(127)12 TO CAB WORKLAMPS
R(126)12 TO HEADLAMPS
R(102)12 TO HORN
KEY SWITCH (25)
KEY SWITCH (66)
B(66)12
R(189)10
R(52)12
R(52)14
R(10)10
CIRCUIT BREAKER D 15 AMP
R(56)12
B(25)16
CIRCUIT BREAKER G 15 AMP
CIRCUIT BREAKER C 20 AMP
R(117)16
TO RADIO
R(55)14
IGN 2
BATT 2
IGN 1
ACC
BATT 3
GND
BATT 1
START
B(68)16
TO SEAT
TO RADIO
R(65)14
KEY SWITCH
3
MAIN CIRCUIT BREAKER 150 AMP
R(111)4
BATTERY
R(10)00
JUMP START STUD
TO NEUTRAL START RELAY
B(18)16
R/00
BATTERY
R(11)10
STARTER MAGNETIC SWITCH
30
87
86
85
R(92)12
B(85)16
R/00
BATTERY
B/00
B(92)10
R/00
R(83)16
B(16)16
1
STARTER
R(83)4
B+
GRD
R
ALTERNATOR
FUEL SHUT-OFF SOL
W(74)4
TO TRANSMISSION CONTROLLER
B/00
W(74)4
B/00
B(17)16
TO NEUTRAL SAFETY SWITCH
TO ETHER START SWITCH
B(89)16
TO INSTRUMENT CLUSTER
CHASSIS GROUND
CHASSIS GROUND
CAB GROUND STUD
CHASSIS GROUND STUD
MA958M022

Left Warning Lamp

Test Points	Correct Reading	Possible Cause of Bad Reading
NOTE: *The key switch must be ON and the turn signal ON LH turn.*		
Terminal 9 for wire 46 Black to ground.	Alternating voltage	Bad turn signal switch. Bad circuit between terminal 6 and warning flasher.

Lamp Check

Test Points	Correct Reading	Possible Cause of Bad Reading
NOTE: *Move shift lever to forward position. Turn key switch to START position.*		
Terminal 14 for wire 89 Black to ground.	12 volts	Bad key switch. Bad circuit between terminal 10 and key switch.

Panel Lamps

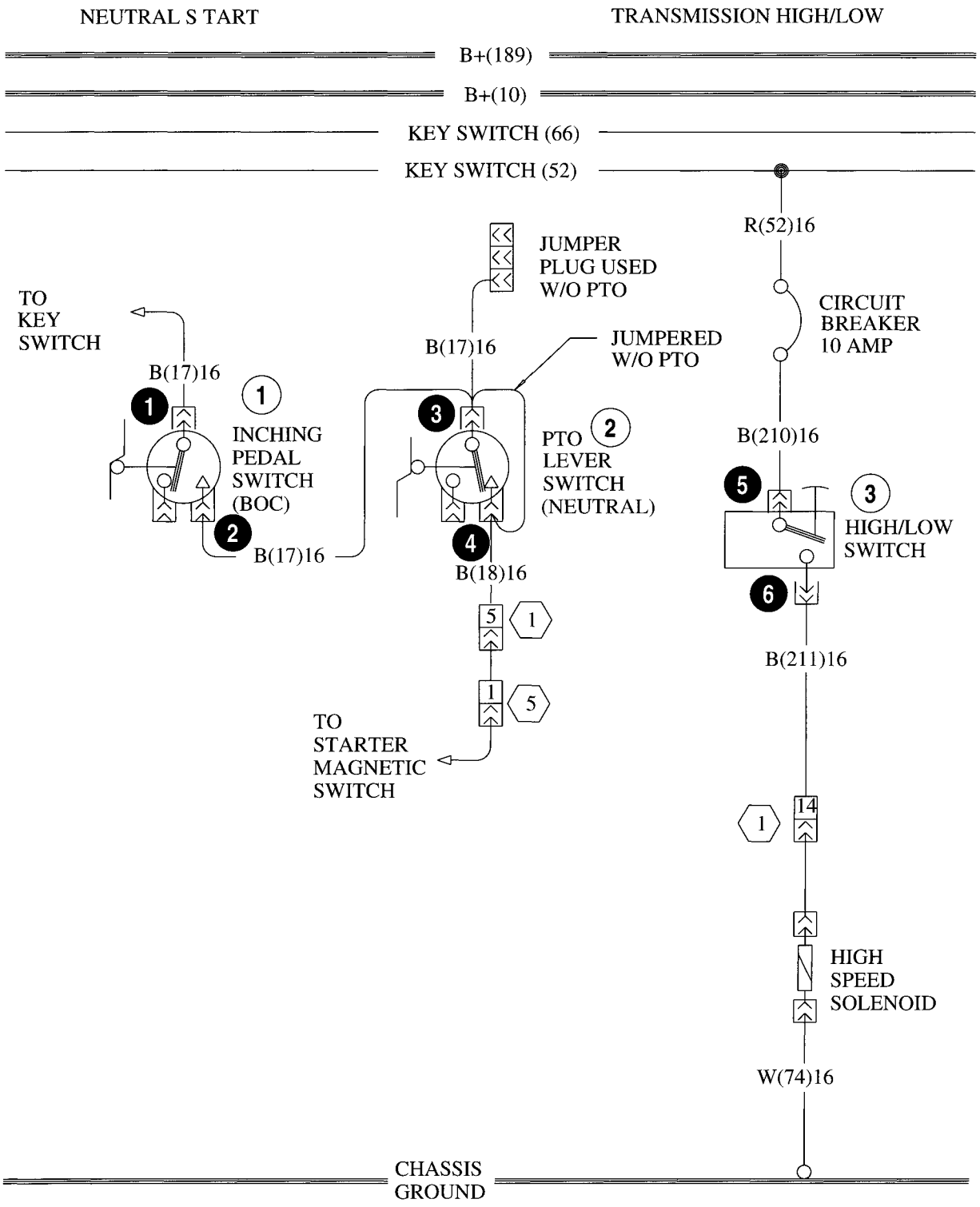
Test Points	Correct Reading	Possible Cause of Bad Reading
NOTE: *The key switch must be ON and the panel lamp switch must be ON.*		
Terminal 17 for wire 114 Black to ground.	12 volts	Bad panel lamp switch. Bad circuit between terminal 11 and panel lamp switch.

Engine Coolant Temperature Switch

Test Points	Correct Reading	Possible Cause of Bad Reading
NOTE: *Coolant temperature must be below 180°F (100°C).*		
Terminal 24 for wire 27 Black to ground.	No continuity	Bad coolant temperature switch. Bad circuit between terminal 9 and temperature switch.

Rear Differential Lock Indicator

Test Points	Correct Reading	Possible Cause of Bad Reading
NOTE: *Key switch must be ON and rear differential lock switch must be ON.*		
Terminal 23 for wire 241 Black to ground.	12 volts	Bad rear differential lock switch. Bad circuit between terminal 16 and differential lock switch.


NEUTRAL S TART
TRANSMISSION HIGH/LOW
B+(189)
B+(10)
KEY SWITCH (66)
KEY SWITCH (52)
R(52)16
JUMPER PLUG USED W/O PTO
CIRCUIT BREAKER 10 AMP
TO KEY SWITCH
B(17)16
JUMPERED W/O PTO
B(17)16
INCHING PEDAL SWITCH (BOC)
PTO LEVER SWITCH (NEUTRAL)
B(210)16
HIGH/LOW SWITCH
B(17)16
B(18)16
B(211)16
TO STARTER MAGNETIC SWITCH
HIGH SPEED SOLENOID
W(74)16
CHASSIS GROUND

MA95F090

Hourmeter

Test Points	Correct Reading	Possible Cause of Bad Reading
NOTE: *The key switch must be OFF.*		
Terminal 1 for wire 231 Black to ground.	Continuity	Bad Hourmeter relay. Bad circuit between terminal 1 and hourmeter relay.
NOTE: *Turn key switch ON.*		
Terminal 1 for wire 231 Black to ground.	No continuity	Bad hourmeter relay. Bad engine oil pressure switch.

Fuel Tank Sender

Test Points	Correct Reading	Possible Cause of Bad Reading
NOTE: *The key switch must be OFF.*		
Terminal 3 for wire 22 Black to ground.	Full 33 ohms Empty 240 ohms	Bad coolant temperature sender. Bad circuit between terminal 4 and ground.

Coolant Temperature Sender

Test Points	Correct Reading	Possible Cause of Bad Reading
NOTE: *The key switch must be OFF.*		
Terminal 4 for wire 140 Black to ground.	44 to 183 ohms	Bad fuel tank sender. Bad circuit between terminal 3 and fuel tank.

Hourmeter Relay

Test Points	Correct Reading	Possible Cause of Bad Reading
NOTE: *The key switch must be ON.*		
Terminal 86 for wire 66 Black to ground.	12 volts	Bad key switch. Bad circuit between key switch and terminal 85.
Terminal 85 for wire 21 Black to ground.	Continuity	Bad engine oil pressure switch. Bad circuit between hourmeter relay and ground.
Terminal 30 for wire 74 White to ground.	Continuity	Bad circuit between terminal 30 and ground.
Terminal 87 for wire 24 Black to ground.	Continuity	Bad hourmeter relay.
NOTE: *Turn key switch OFF.*		
Terminal 87A for wire 231 Black to ground.	Continuity	Bad hourmeter relay.

Travel Control Potentiometer

Test Points	Correct Reading	Possible Cause of Bad Reading
NOTE: *Disconnect the connector at the potentiometer. Tests will be made on the potentiometer.*		
Terminal A to terminal C.	9000 to 11000 ohms	Bad potentiometer.
Terminal A to terminal B.	Must vary from 0 to 10000 ohms plus/minus 10% as the potentiometer is moved from minimum to maximum.	Bad potentiometer.
NOTE: *If all readings are good, disconnect the 37 pin connector on the hitch control module and test the circuit between the hitch control module connector and the travel control potentiometer.*		
Terminal 18 for wire 289 Black to terminal A.	Continuity	Bad wire. Bad connection.
Terminal 13 for wire 291 Black to terminal B.	Continuity	Bad wire. Bad connection.
Terminal 25 for wire 290 Black to terminal C.	Continuity	Bad wire. Bad connection.

Load Control Potentiometer

Test Points	Correct Reading	Possible Cause of Bad Reading
NOTE: *Disconnect the connector at the potentiometer. Tests will be made on the potentiometer.*		
Terminal A to terminal C.	9000 to 11000 ohms	Bad potentiometer.
Terminal A to terminal B.	Must vary from 0 to 10000 ohms plus/minus 10% as the potentiometer is moved from minimum to maximum.	Bad potentiometer.
NOTE: *If all readings are good, disconnect the 37 pin connector on the hitch control module and test the circuit between the hitch control module connector and the travel control potentiometer.*		
Terminal 17 for wire 292 Black to terminal A.	Continuity	Bad wire. Bad connection.
Terminal 4 for wire 294 Black to terminal B.	Continuity	Bad wire. Bad connection.
Terminal 31 for wire 293 Black to terminal C.	Continuity	Bad wire. Bad connection.

HEADLAMPS, TAIL LAMPS, CAB WORK LAMPS, FRONT FRAME WORK LAMPS AND REAR FRAME WORK LAMPS SCHEMATIC

Radio

Test Points	Correct Reading	Possible Cause of Bad Reading
NOTE: *Disconnect the connector from the radio.*		
Terminal in radio connector for wire 117 Red to ground.	12 volts	Bad 15 amp circuit breaker. Bad circuit between the radio and the junction block (power).
Terminal in radio connector for wire 74 White to ground.	Continuity	Bad circuit between the radio and ground.
NOTE: *Put the key switch in the ON position.*		
Terminal for wire 68 Black to ground.	12 volts	Bad key switch. Bad circuit between the radio and the key switch.
Terminals in connector for wire 172 Black to wire 173 Black.	8 Ohms	Bad circuit to LH speaker. Bad LH speaker. Test the LH speaker.
Terminals in connector wire 174 Black to wire 175 Black.	8 Ohms	Bad circuit to RH speaker. Bad RH speaker. Test the RH speaker.
NOTE: *Disconnect the antenna wire connector from the radio.*		
Pin of disconnected antenna wire to ground.	No continuity	Antenna wire has contact with ground.
NOTE: *If the above readings are good replace the radio.*		

All Diodes

Test Points	Correct Reading	Possible Cause of Bad Reading
NOTE: *Disconnect the diode from the circuit.*		
Connect ohmmeter probes to diode terminals, then reverse the probes.	Continuity in one direction only.	Bad diode.

Front Wiper Park Relay

Test Points	Correct Reading	Possible Cause of Bad Reading
NOTE: *Front wiper/washer switch must be OFF (Park).*		
Terminal 30 for wire 52 Black to ground.	12 volts	Bad key switch. Bad circuit between front wiper park relay and key switch.
Terminal 86 for wire Black to ground.	12 volts	Bad front wiper/washer switch. Bad circuit between front wiper park relay and front wiper/washer switch.
Terminal 85 for wire 74 White to ground.	Continuity	Bad circuit between front wiper park relay and ground.
Terminal 87 for wire 176 Black to ground.	12 volts	Bad front wiper park relay.
NOTE: *Front wiper/washer switch must be on high position.*		
Terminal 87A for wire 28 Black to ground.	12 volts	Bad front wiper park relay.

Rear Wiper Motor

Test Points	Correct Reading	Possible Cause of Bad Reading
NOTE: *Rear wiper switch must be ON.*		
Terminal 2 for wire 29 Black to ground.	12 volts	Bad rear wiper switch. Bad circuit between terminal 2 and rear wiper switch.
NOTE: *Rear wiper switch must be OFF (Park).*		
❽ Terminal 1 for wire 28 Black to ground.	12 volts	Bad rear wiper switch. Bad circuit between terminal 3 and rear wiper switch.
Terminal for wire 74 White to ground.	Continuity	Bad circuit between rear wiper motor and ground.
NOTE: *If all readings are good and the rear wiper motor does not work, replace the rear wiper motor.*		

STEERABLE AXLE ERROR CODES

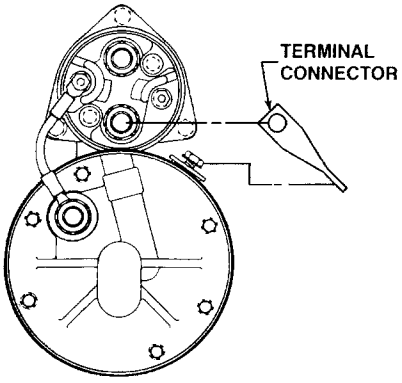
Error Codes	Meaning	Fail Mode	Solution
0.1	RAM check failed	H	Bad control box
0.2	PROM checksum doesn't match	H	Bad control box
0.3	EEPROM checksum doesn't match	C	Could attempt to calibrate, but may not fix problem
0.4	Articulation center calibration value out of range	C	Recalibrate
0.5	Front axle left calibration value out of range	C	Recalibrate
0.6	Front axle right calibration value out of range	C	Recalibrate
0.7	Internal watchdog timer test failed	H	Bad control box
1.0	Low system voltage (less than 9.8V, recoverable) (Error could also be caused by 8 volt regulator going out of range)	A	
1.1	High system voltage (greater than 18V, recoverable) (Error could also be caused by 8 volt regulator going out of range)	A	
1.2	5V regulator out of range (Error could also be caused by 8 volt regulator going out of range)	H	Bad control box
1.3	Driver for solenoid relay detected too much current going to the relay coil or the relay coil is open	H	
1.4	Voltage detected on one or more solenoids with the solenoid relay turned off	H	
1.5	Voltage on solenoids with combination switch set to articulation	H	
2.0	Open double selector solenoid (or driver line shorted to ground) In combination mode and (driver is on and current is < 0.25 A.) or driver is off and no voltage on high side of driver)	H	
2.1	Open load sense solenoid (or driver line shorted to ground) In combination mode and (driver is on and current is < 0.25 A.) or (driver is off and no voltage on high side of driver)	H	
2.2	Open makeup right solenoid (or driver line shorted to ground) In combination mode and (driver is on and current is < 0.25 A.) or (driver is off and no voltage on high side of driver)	H	
2.3	Open makeup left solenoid (or driver line shorted to ground) In combination mode and (driver is on and current is < 0.25 A.) or (driver is off and no voltage on high side of driver)	H	
2.4	Open double selector solenoid driver (Driver is on and current < 0.25 A. and voltage is on the high side of the driver)	H	Bad control box
2.5	Open load sense solenoid driver (Driver is on and current < 0.25 A. and voltage is on the high side of the driver)	d	Bad control box
2.6	Open makeup right solenoid driver (Driver is on and current < 0.25 A. and voltage is on the high side of the driver)	d	Bad control box

STARTING MOTOR TESTS

MAGNETIC SOLENOID SWITCH TEST

The battery must be fully charged and the starting motor completely assembled before making the following tests on the starter magnetic solenoid switch.

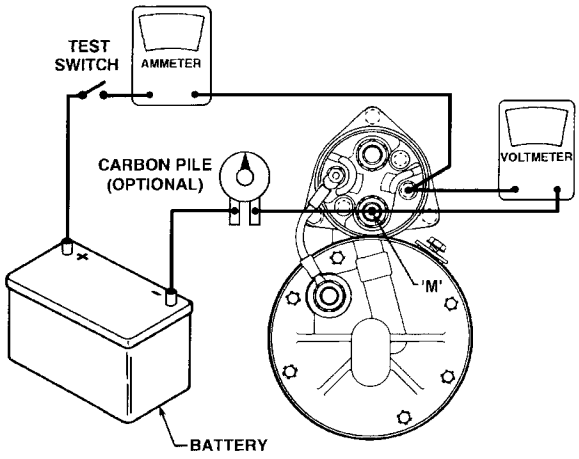
Make all connections and disconnections to the battery with the test switch open. Close the switch when ready to test.



MS96B098

NOTE: *These tests must be done with the terminal connector removed.*

1. Pull-in test



MS96B099

Make the electrical connections as shown. When the test switch is closed, the pinion must move out. When the switch is open the pinion must move in.

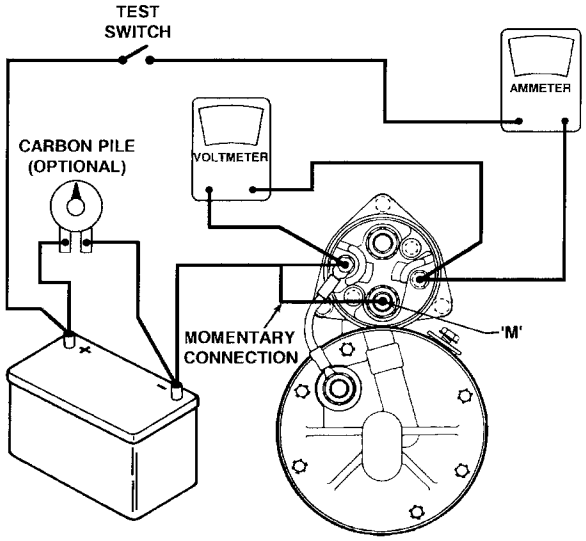
IMPORTANT: *To avoid excessive heating, leave the switch closed no more than 10 seconds at a time.*

Compare the volt and ammeter reading with the specifications of 5 volts and 34 to 46 amps. The voltage may be adjusted by a carbon pile in series between the battery and "M" terminal.

A high ammeter reading indicates a shorted pull-in winding and a low reading indicates excessive resistance.

If the reading is excessively high or low, replace the magnetic solenoid switch.

2. Hold-in test



MS96B100

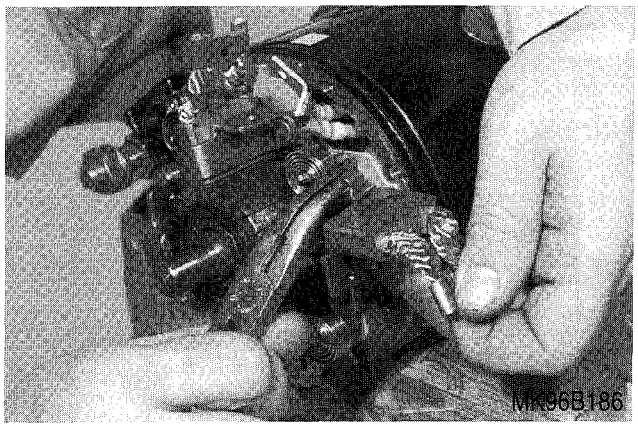
Make the electrical connections as shown. Momentarily connect the "M" terminal. When the "M" terminal is disconnected, the pinion should remain in the out position.

Compare the volt and ammeter reading with the specifications of 10 volts and 16.5 to 20 amps. The voltage may be adjusted by placing a carbon pile in parallel.

A high ammeter reading indicates a shorted hold-in winding and a low reading indicates excessive resistance.

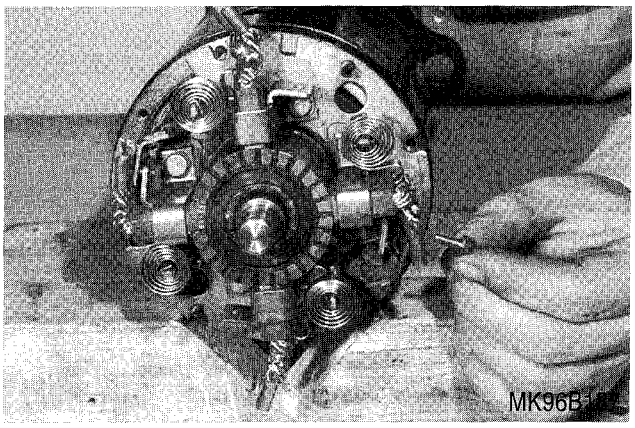
If the reading is excessively high or low, replace the magnetic solenoid switch.

STEP 65



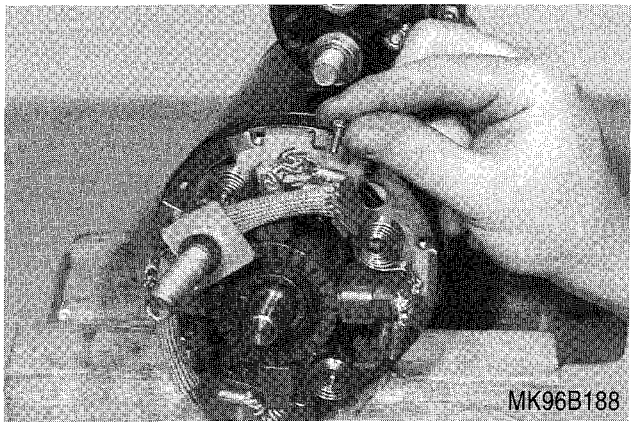
Lift the brush springs and install the four brushes.

STEP 66



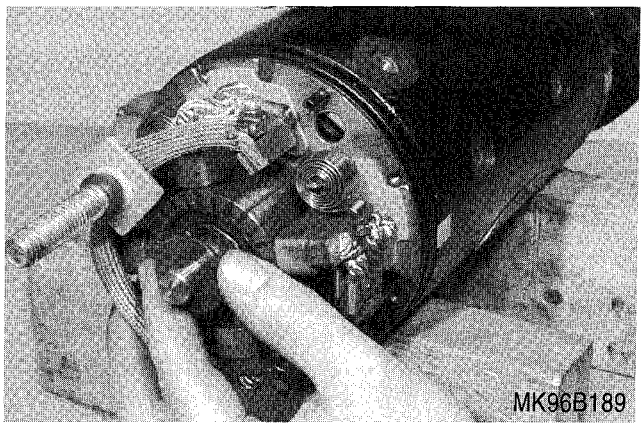
Locate each field coil terminal between the correct brush holder terminal and brush terminal. Install and tighten the brush lead screws to a torque of 2 to 4 lb ft (3 to 5 Nm).

STEP 67



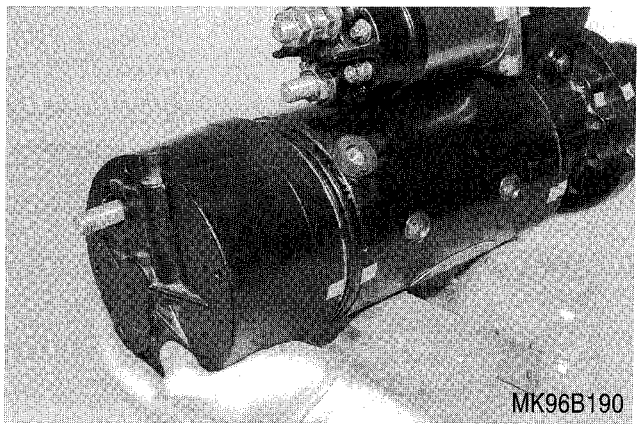
Install the lead terminal bolt as shown. Place the bolt terminals on top of the brush terminals. Install and tighten the two brush lead screws to a torque of 2 to 4 lb ft (3 to 5 Nm).

STEP 68



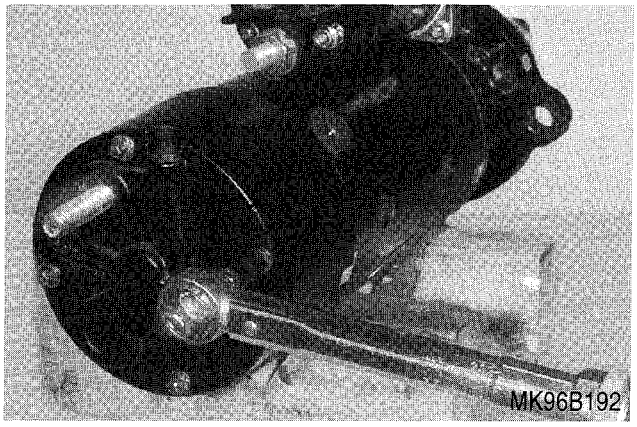
Install the thrust washer on the armature shaft.

STEP 69



Install the commutator end cover.

STEP 70



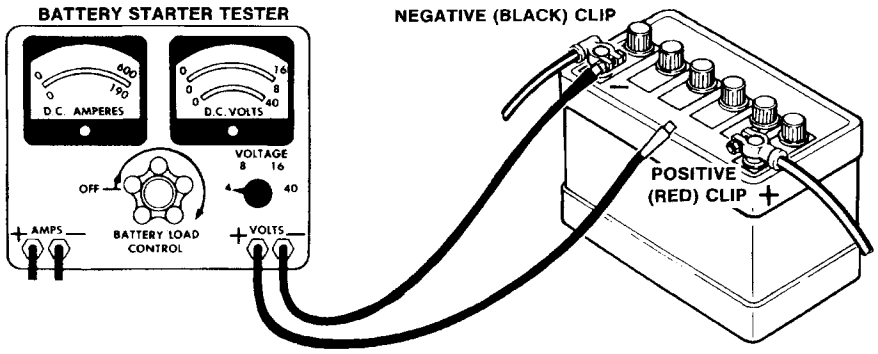
Install and tighten the four end cover screws to a torque of 6 to 9 lb ft (8 to 12 Nm).

BATTERY LEAKAGE TEST

Electrolyte, dirt, water, etc. on the top of a battery will cause the battery to discharge. This material on the top of a battery gives a path for current to flow, permitting the battery to discharge.

1. Turn the voltage switch on the tester to the 4 volt position.
2. Connect the negative wire of the volt meter to the negative post on the battery.
3. Move the positive wire of the volt meter around the surface of the battery. When moving the positive wire around the battery, do not contact the positive post or cell connector straps with the positive wire.
4. Check the volt meter for needle movement.

If the gauge needle indicated movement, the battery has foreign material on the case. When this condition is present, remove the battery from the vehicle. Clean the outside of the battery. Also clean the battery tray. When cleaning a battery, use a solution of baking soda or ammonia and water. Check and clean the battery cables if necessary.



MS96B077

BATTERY FAST CHARGING

IMPORTANT: *Before fast charging a battery, always completely test the battery. DO NOT fast charge a battery that has not passed the Three Minute Charge Test.*

Find the specific gravity reading of the battery in the Fast Charge Time Table. The time table will give you the maximum period of time that the battery can be fast charged. Set the rate of charge on the battery charger so that the voltage is not more than 15.5 volts for a 12 volt battery.

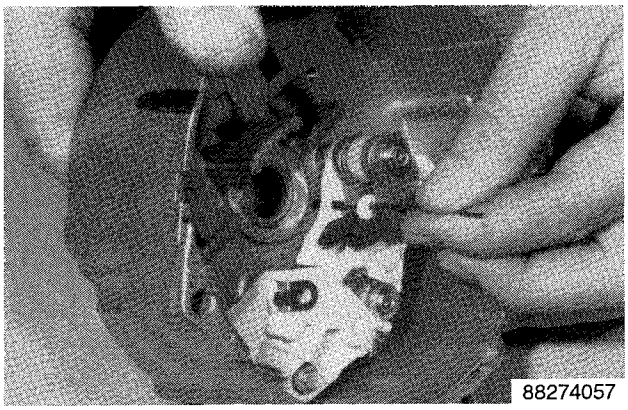
IMPORTANT: *Always disconnect the battery cables, before fast charging the battery. Fast charging a battery with the cables connected will damage the regulator.*

Always follow fast charging a battery with a period of time of slow charging. Slow charge the battery until the specific gravity reading of the electrolyte indicates the battery is fully charged.

FAST CHARGE TIME TABLE

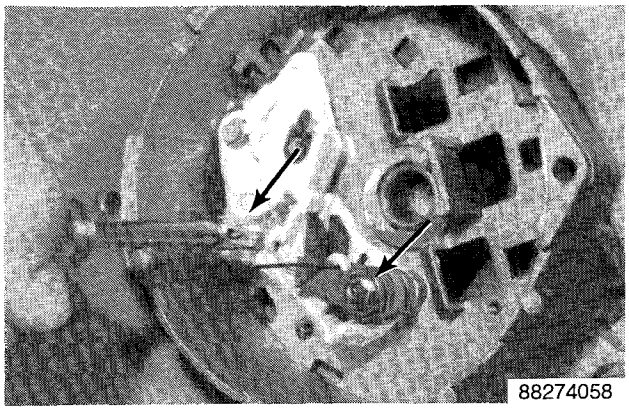
SPECIFIC GRAVITY TIME TABLE FOR CLIMATE ZONE Readings corrected to 80°F (27°C)			CAN BE FAST CHARGED UP TO:
FRIGID	TEMPERATE	TROPICAL	
1.150 or less	1.135 or less	1.110 or less	1 hour
1.150 1.175	1.135 1.160	1.110 1.130	3/4 hour
1.175 1.200	1.170 1.185	1.130 1.150	1/2 hour
1.200 1.225	1.185 1.210	1.150 1.170	1/4 hour
Above 1.225	Above 1.210	Above 1.170	Slow Charge

STEP 18



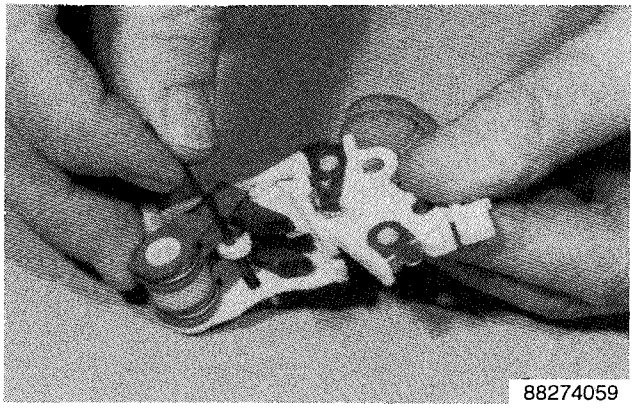
The brush holder assembly must be removed to service the brushes or to access the regulator for further checks. Hold the brushes in a retracted position and insert a brush retaining pin or wire to hold the brushes in retracted position.

STEP 19



Remove the insulated regulator attaching screw. Remove the brush holder pivot screw. Lift the brush holder assembly from the housing.

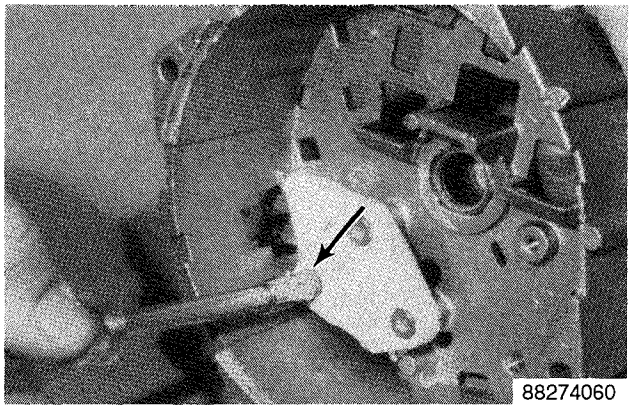
STEP 20



Carefully remove the brush retaining pin to release the brushes. Check the brushes and leads for excessive wear, breakage, etc. If necessary to replace brushes, remove brushes and spacer one at a time, placing the fingers around the springs to prevent loss.

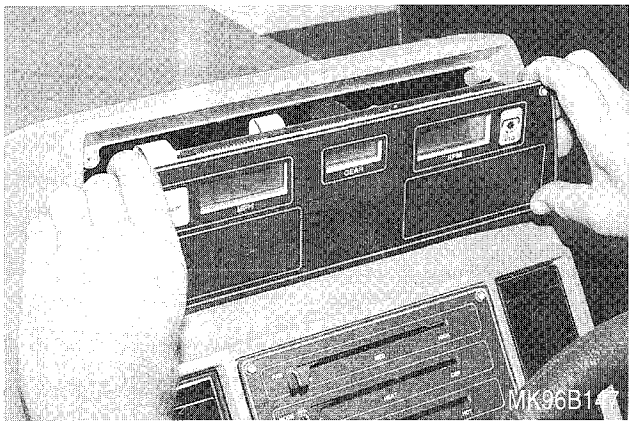
NOTE: *If necessary to replace the brushes, note the routing of lead wires and position of lead clips for reassembly. The brushes are identical but leads and clips are positioned differently. It may be necessary to spread the brush lead clips slightly to disengage the retaining tabs.*

STEP 21



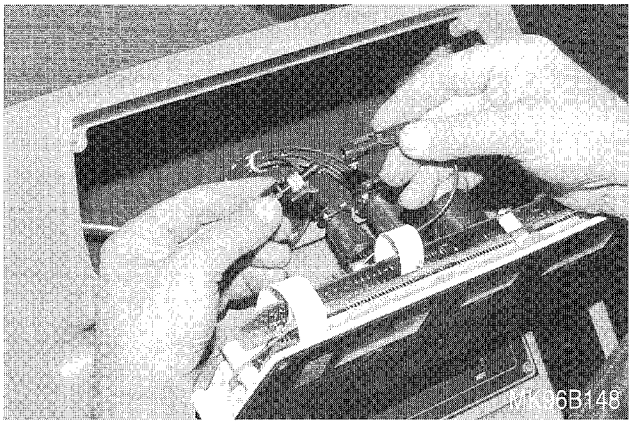
Remove the remaining regulator attaching (ground) screw. Replace the regulator if previous tests indicated a faulty regulator.

STEP 5



Tip the top side of the cluster outwards out of the housing.

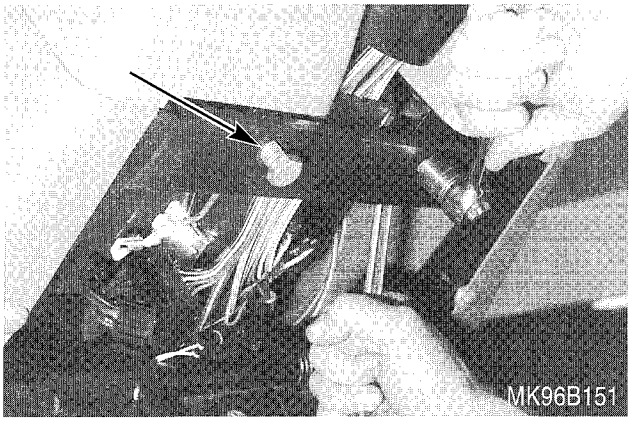
STEP 6



Disconnect the cluster single pin packard connector, and the wire harness connectors and remove the cluster assembly.

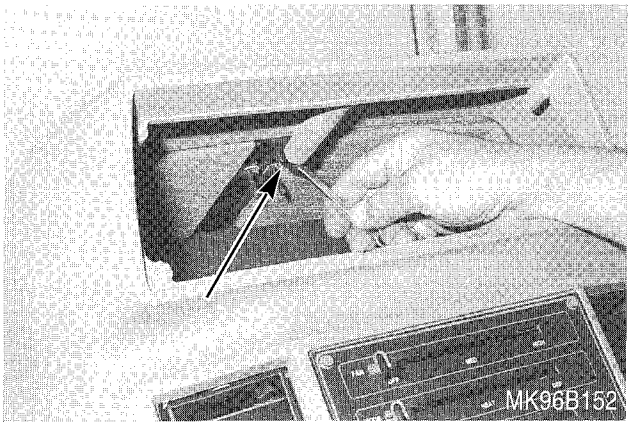
PLENUM CHAMBER FRONT COVER REMOVAL

STEP 7



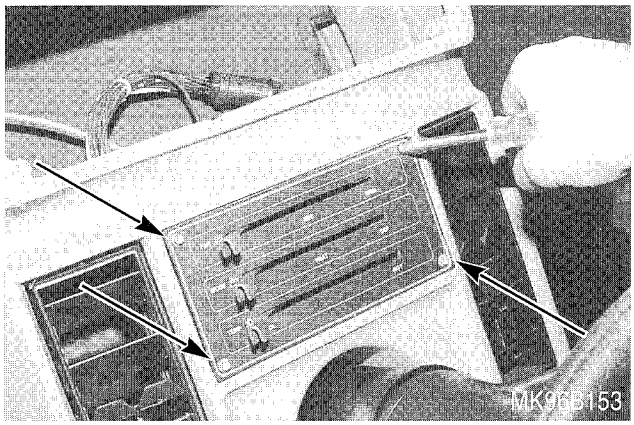
Loosen and remove the two lower plenum cover retaining bolts, nuts and flat washers.

STEP 8



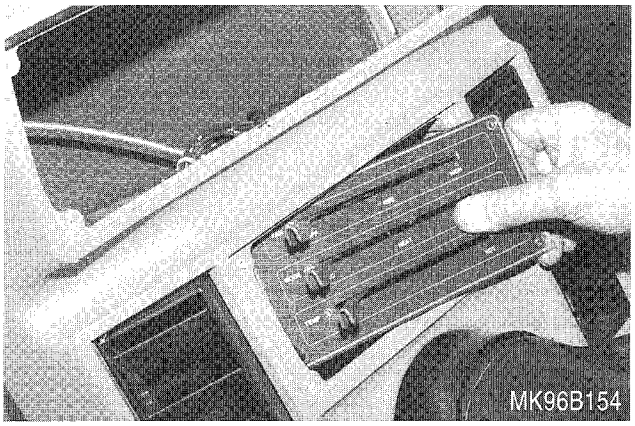
Remove the top center plenum cover retaining screw from within the instrument cluster opening.

STEP 9



Remove four climate control panel assembly mount screws.

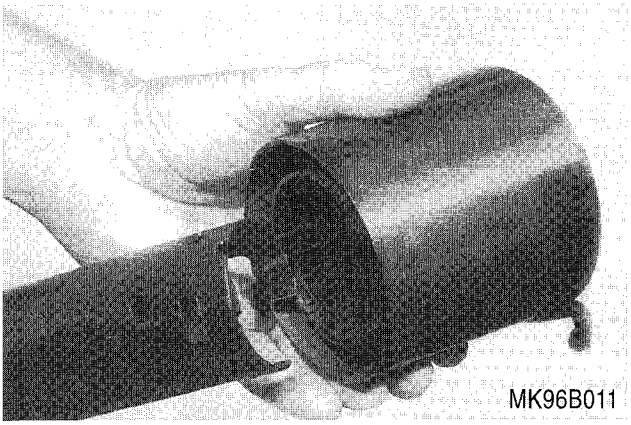
STEP 10



While pulling outward slightly on the front cover, carefully feed the climate control panel assembly through its opening in the cover.

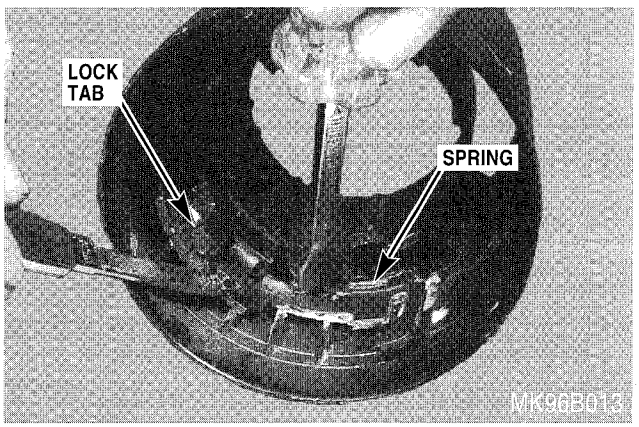
REMOVING THE KEY RELEASE LEVER

STEP 85



Pull the shroud (bowl) from the jacket.

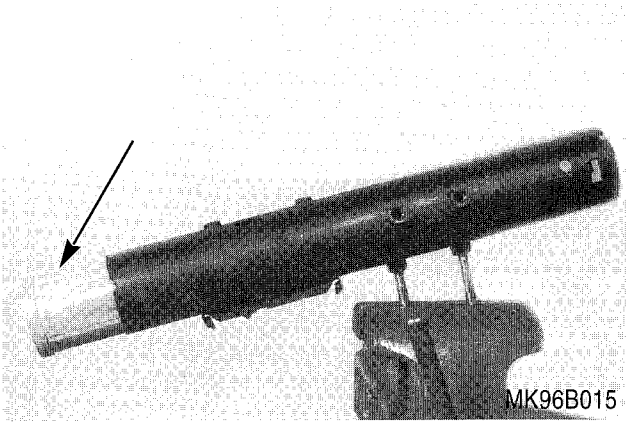
STEP 86



To remove the key release lever and spring from the bowl, use a thin knife blade to pry the ring locking tab outwards while at the same time lifting upwards on the bottom side of the release lever ring. Remove the lever and spring from the bowl.

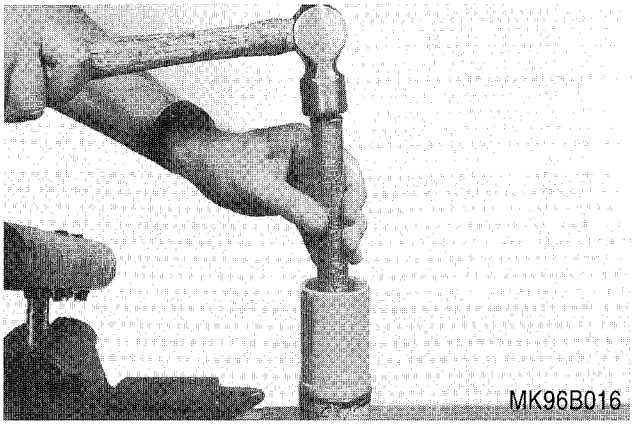
REMOVING THE LOWER JACKET BEARING

STEP 87



Use a long drift through the jacket to drive out the lower jacket bearing housing and bearing as one assembly.

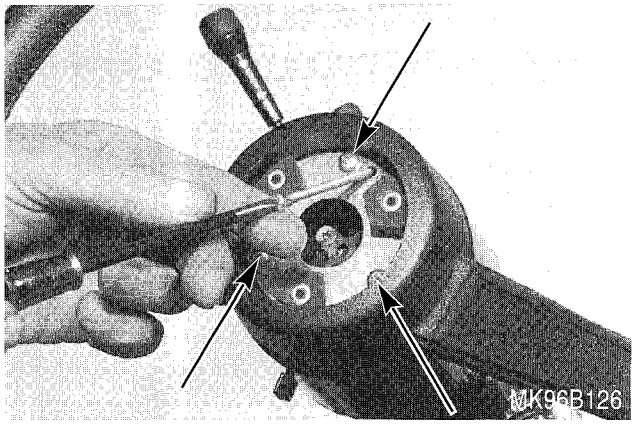
STEP 88



Support the bearing housing and drive out the bearing.

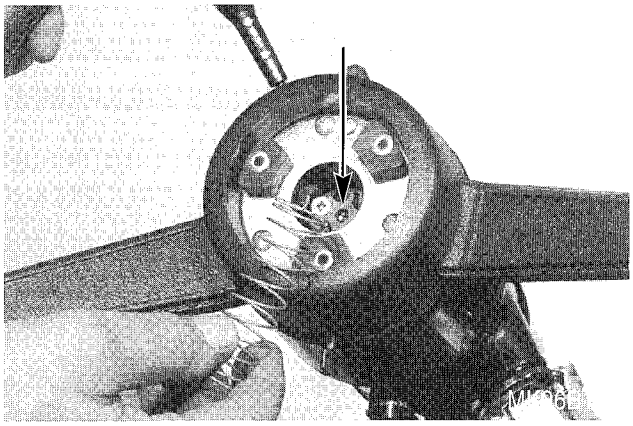
NOTE: *Clean and inspect all parts for cracks, distortion, damaged threads or too much wear before assembly.*

STEP 156



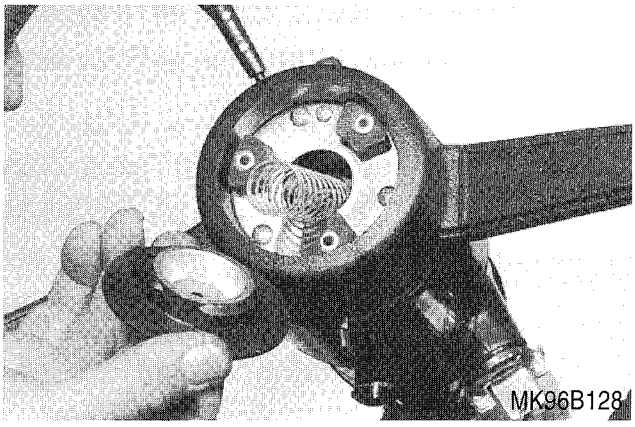
Install the base plate using three 5/8 inch and one 2-1/4 inch long screws.

STEP 157



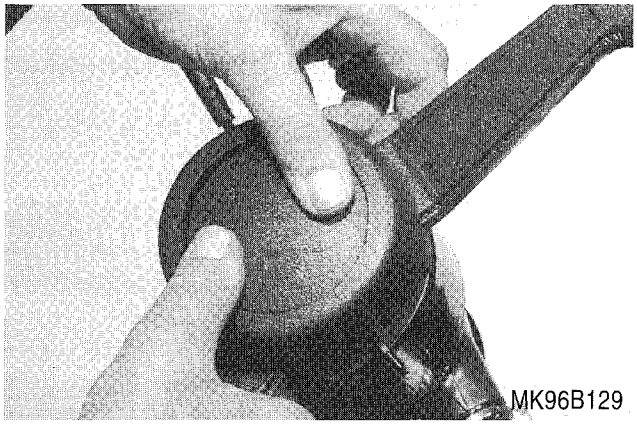
Install the horn button spring through the hole of the base plate so that the locating tab of the spring fits into the center hole of the lock bolt. Position the brass contact plate in the horn button.

STEP 158



Position the button and contact plate on top of the spring. Align the tabs of the button between the lugs of the base plate. Push the horn button down against the base plate.

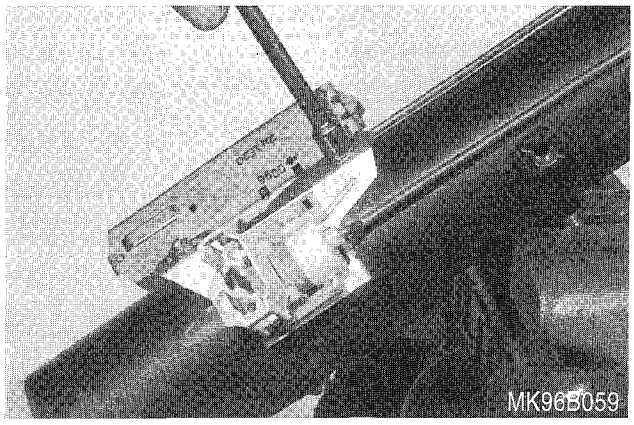
STEP 159



Use the palm of your hand or thumbs to turn the button clockwise far enough to engage the lugs of the base plate.

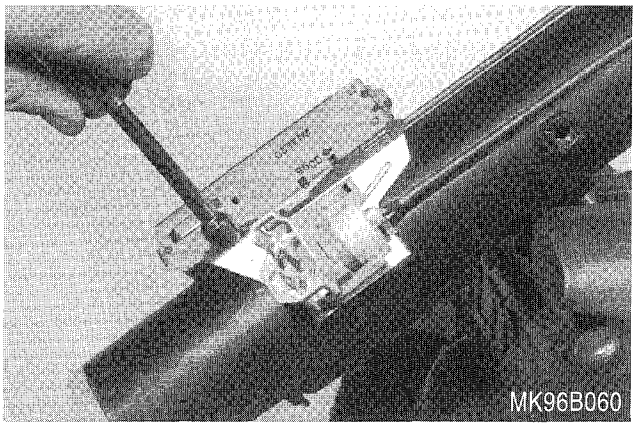
ADJUSTING THE KEY SWITCH

STEP 160



Remove the upper key switch and dimmer switch mount screw.

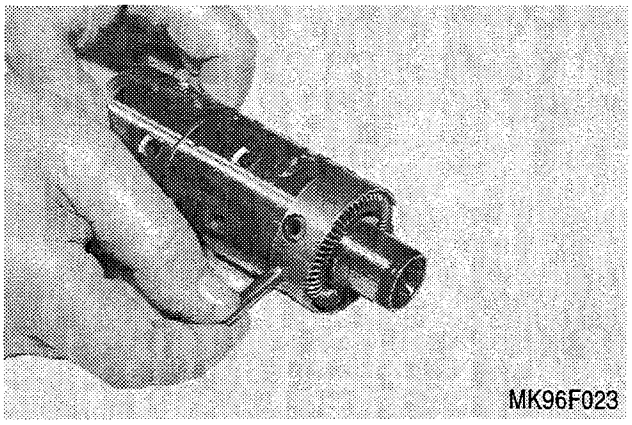
STEP 161



Remove the lower dimmer switch retaining nut and remove the dimmer switch.

NOTE: *The dimmer switch must be removed to adjust the key switch.*

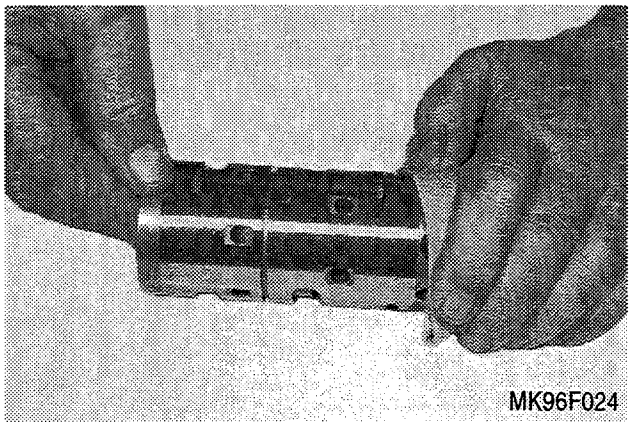
STEP 31



Push the centering pin from the spool and sleeve assembly.

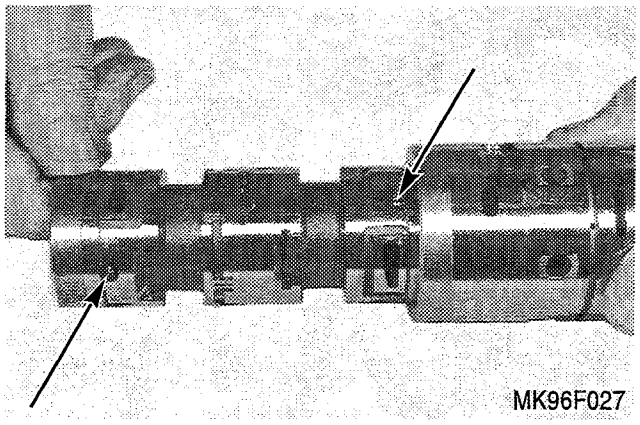
IMPORTANT: *Be sure the inner spool does not move fore or aft when removing the pin or the centering spring may release.*

STEP 32



Be sure the spool and sleeve are turned so the steel balls on the end of the centering spring are at the bottom. Use a shop towel and the cup of your hand over the centering spring end of the spool and sleeve assembly. Push the inner spool towards the spring end only enough to release the centering spring and two steel balls.

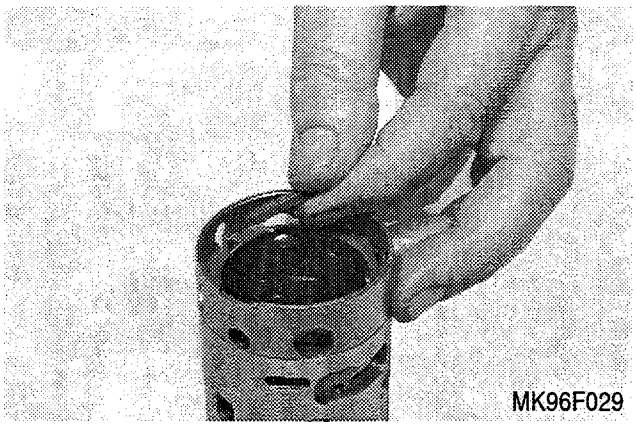
STEP 33



Four small steel ball valves are located in milled pockets of the spool. When the spool is pushed fore or aft these balls may fall out through the holes in the sleeve. Withdraw the spool from the meter end of the sleeve. Be careful not to lose any of the four steel balls.

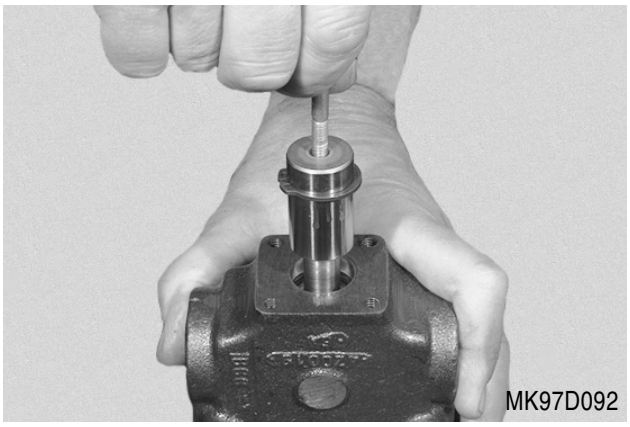
NOTE: *One milled pocket is located on the upper and lower end of the spool on opposite sides of each other.*

STEP 34



Remove the rectangular key from the sleeve.

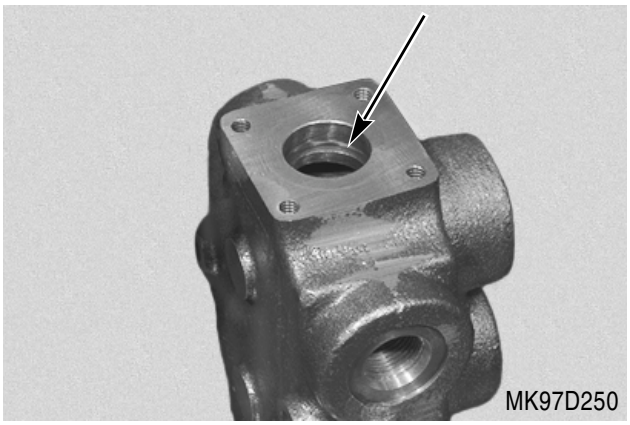
STEP 17



Screw one of the end cap retaining bolts into the end of the spool and carefully withdraw the spool from the valve body.

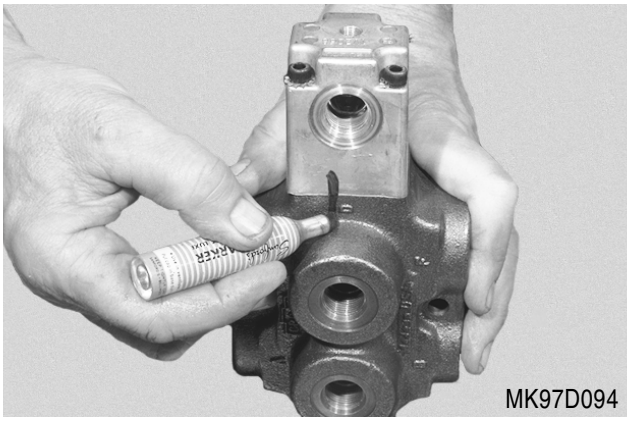
NOTE: *The spool snap ring need not be removed unless replacement is required.*

STEP 18



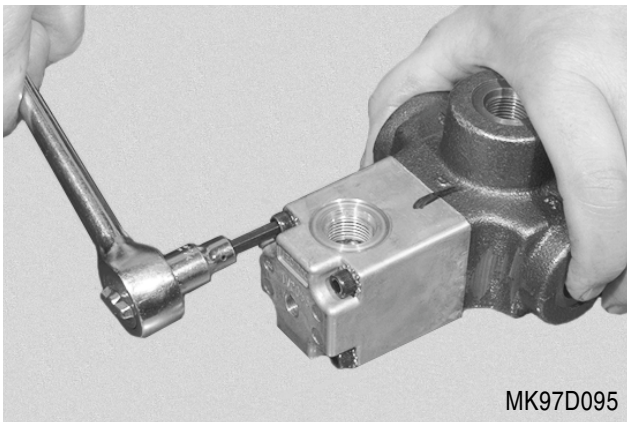
Remove the quad ring seal from within the bore of the valve body.

STEP 19



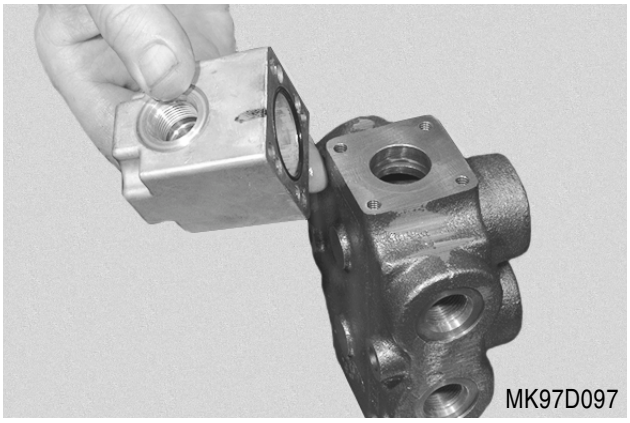
Put a mark on the solenoid cartridge housing and valve body.

STEP 20



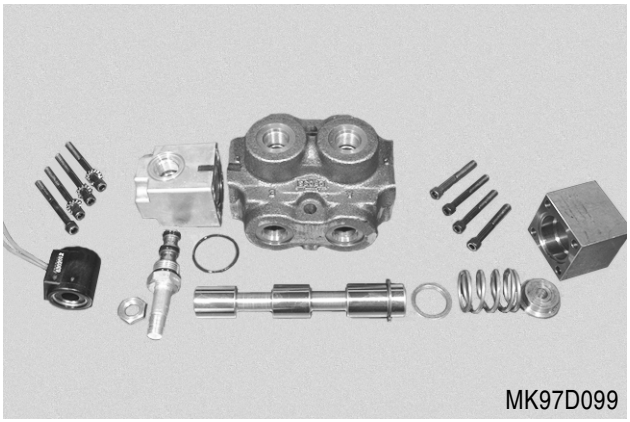
Remove the cartridge housing cap screws.

STEP 21



Remove the cartridge housing. Discard the O-ring.

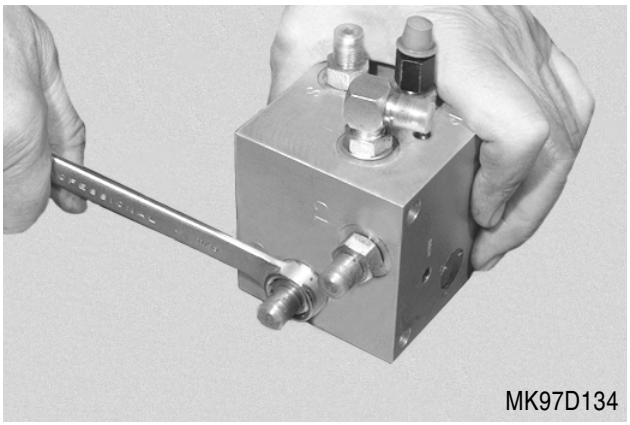
STEP 22



Clean and inspect all parts for damage or too much wear. Minor nicks or scratches on the spool may be removed with crocus cloth or fine emery paper.

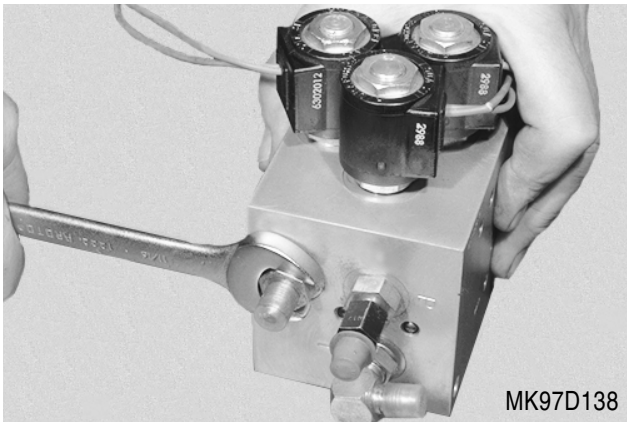
DISASSEMBLING THE MAKEUP VALVE

STEP 12



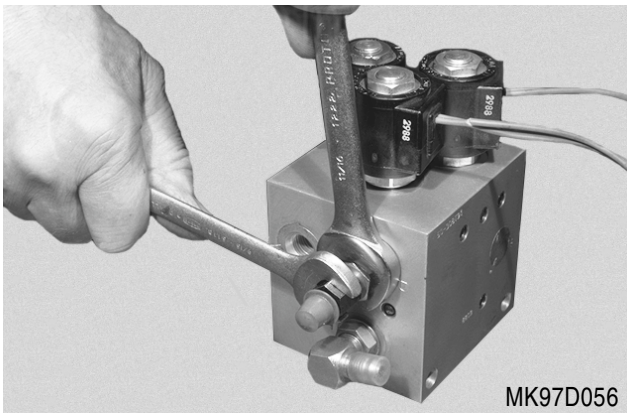
Remove the C1 and C2 port hose adaptor fittings from the valve body. Discard the O-ring.

STEP 13



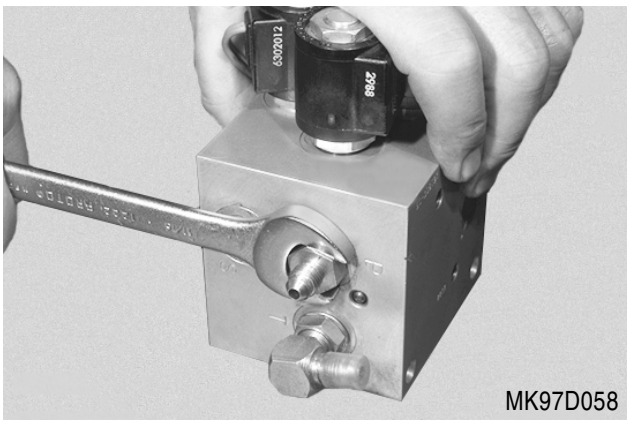
Remove the “S” port hose and adaptor fitting. Discard the O-ring.

STEP 14



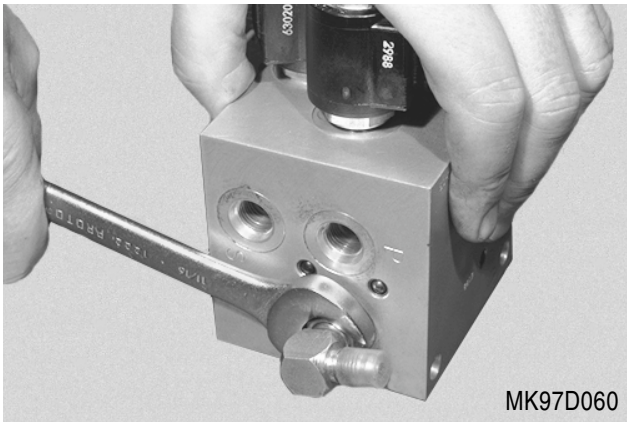
Remove the “P” port special orificed adaptor fitting.

STEP 15



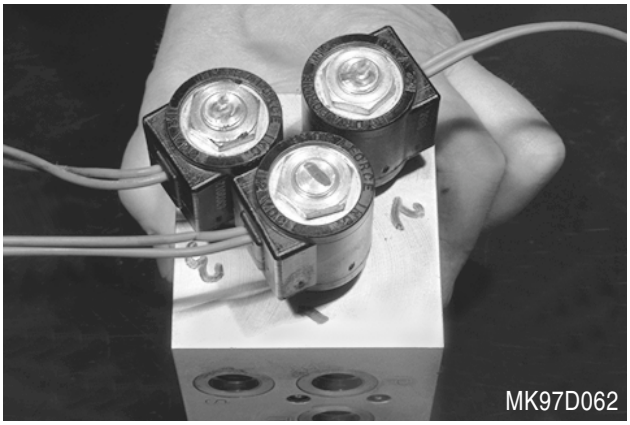
Remove the “P” port hose adaptor fitting. Discard the O-ring.

STEP 16



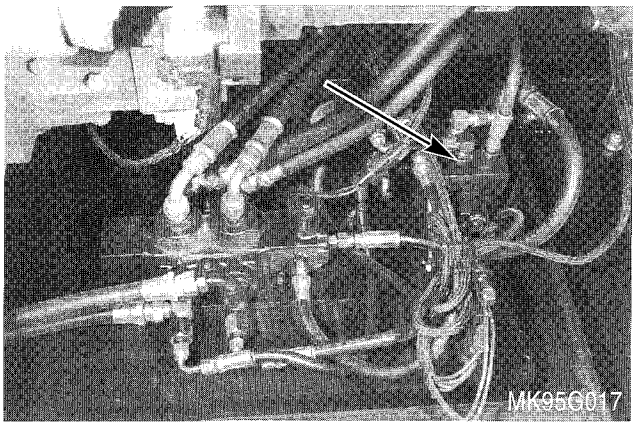
Remove the “T” port adaptor fitting. Discard the O-ring.

STEP 17

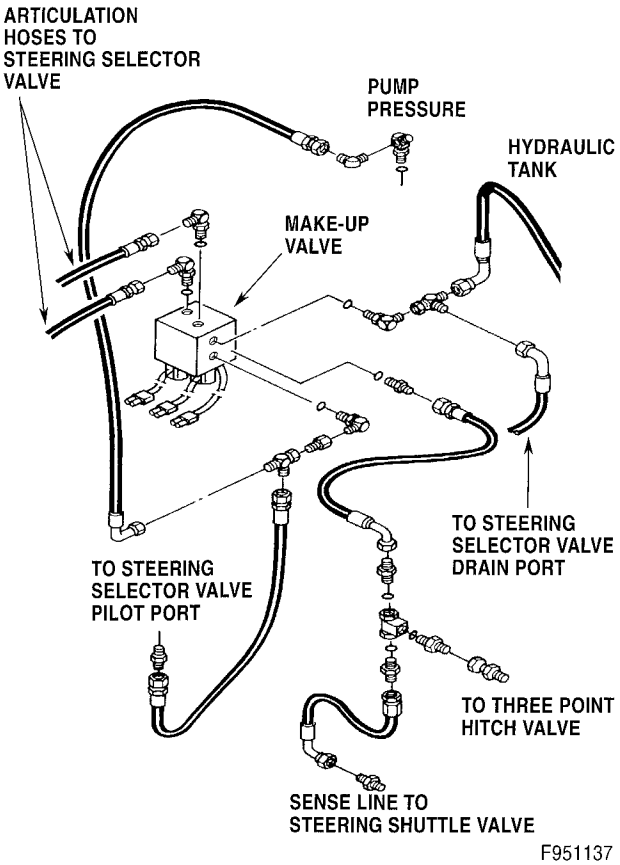


Mark each solenoid actuator coil and cartridge to valve body location for assembly reference.

ARTICULATION "MAKEUP" VALVE

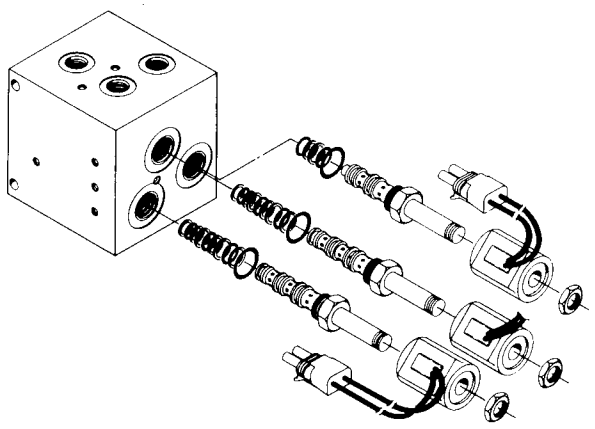


A second solenoid actuated valve is located inside the lower left side frame. This is the articulation makeup valve. The function of this valve is to self-correct and assure that articulation center (within 0.20 degrees in either direction) is obtained and maintained during the front axle steering mode because of implement side draft and varying tractor conditions that have a tendency to move the articulation joint away from center.



F951137

The makeup valve is totally controlled by the microprocessor and does not rely on oil flow from the hand operated steering pump.

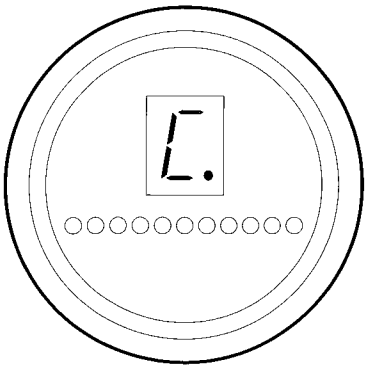


MS95F006

All solenoids on the makeup valve are supplied with 12 VDC power by a common circuit (wire No. 328). The microprocessor supplies the ground circuit to energize each valve solenoid as required to direct pressure oil to the articulation cylinders in order to maintain calibrated center.

NOTE: *Each time the operator creates a restart, either by turning the key switch off and back on, or by switching the steering selector switch, the microprocessor must sense that the articulation joint is within 0.20° of its calibrated center. This is done to eliminate any surprises before the operator has steering control. After this initial system "capture" (reset) the makeup valve will correct articulation up to 5° in either direction.*

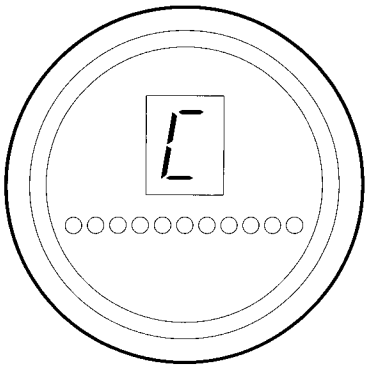
STEP 5



95F57

To clear the error codes from the controller, press and release the setup button until “C.” appears on the display.

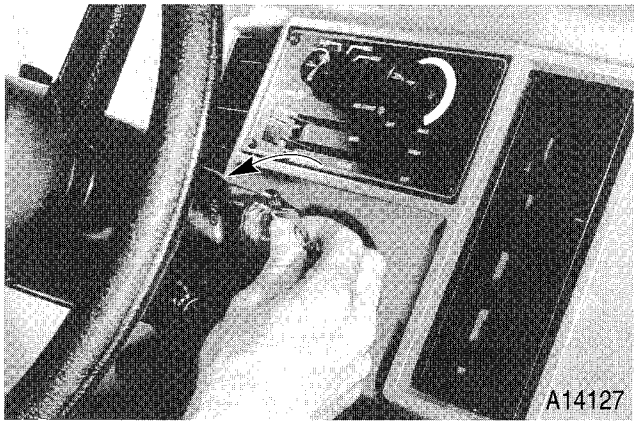
STEP 6



95F57

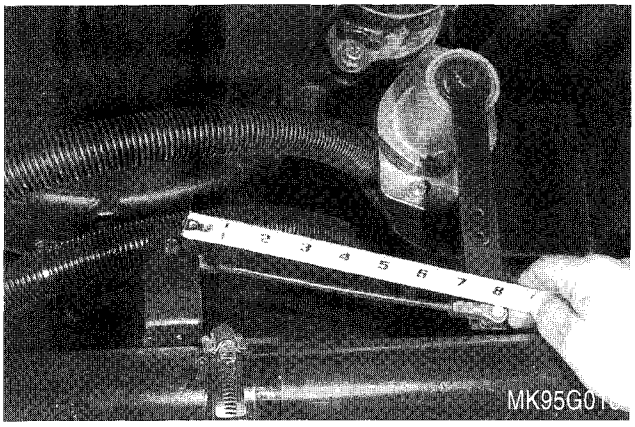
Press and hold the setup button until “C.” disappears and “C” appears without the decimal point.

STEP 7



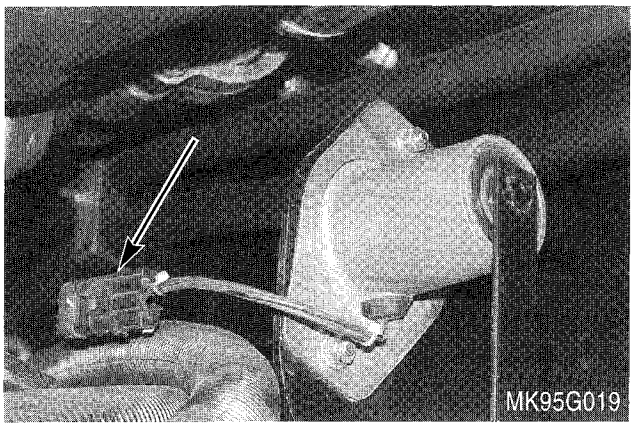
Turn the key switch to the OFF position.

STEP 3



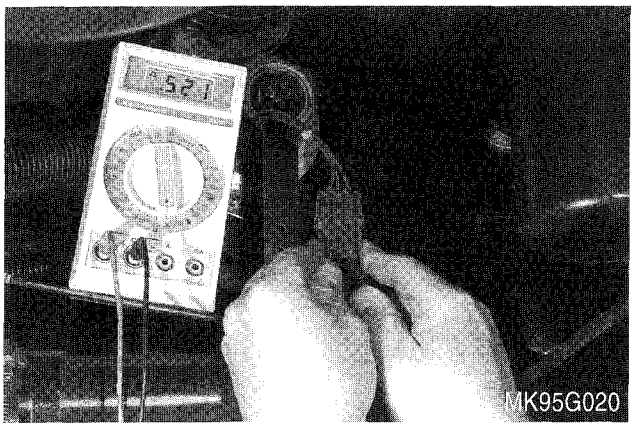
Shut down the engine. Check the potentiometer actuation link adjustment. If necessary, adjust the link to 8.00 inch (203.2 mm) between the center line of the rod ends.

STEP 4



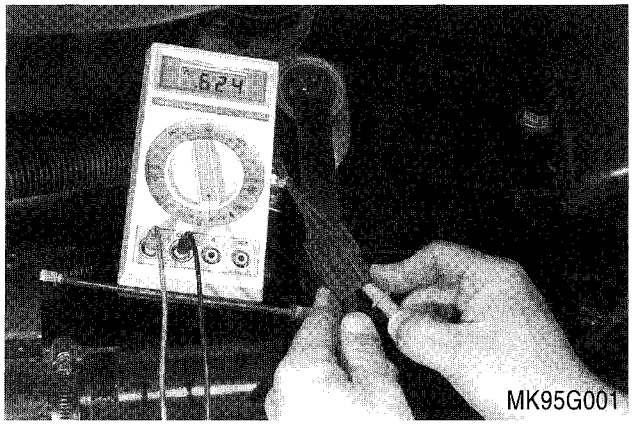
Disconnect the potentiometer wire harness connector.

STEP 5



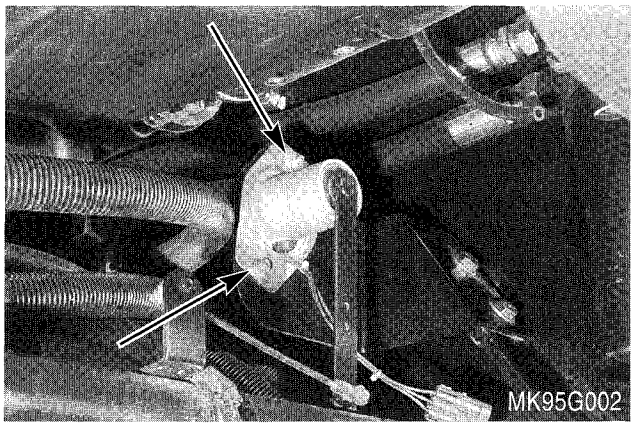
Set the multimeter to the 2K scale. Connect one multimeter test lead to the center terminal of the potentiometer and the second lead to either one of the outside terminals. Record the multimeter reading.

STEP 6



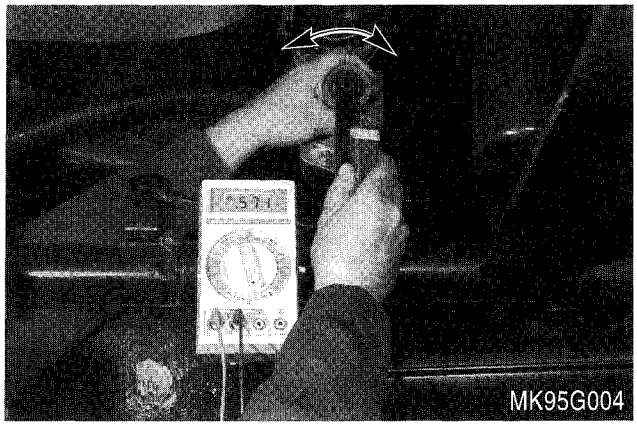
Alternate the test lead to the opposite outside terminal and the center (sense) terminal. Record and compare the reading to that obtained in Step 5. The readings must be within 10 to 20 ohms of each other.

STEP 7



To adjust (center) the potentiometer, loosen the two housing retaining ring bolts.

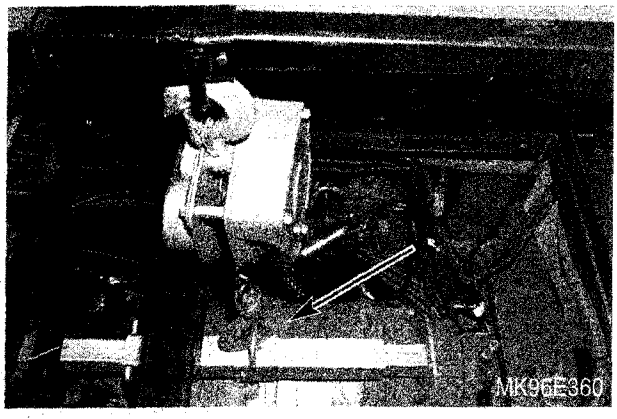
STEP 8



Rotate the housing slowly and carefully until the resistance between the center terminal of the potentiometer to either of the outside terminals on the potentiometer does not vary more than 10 to 20 ohms.

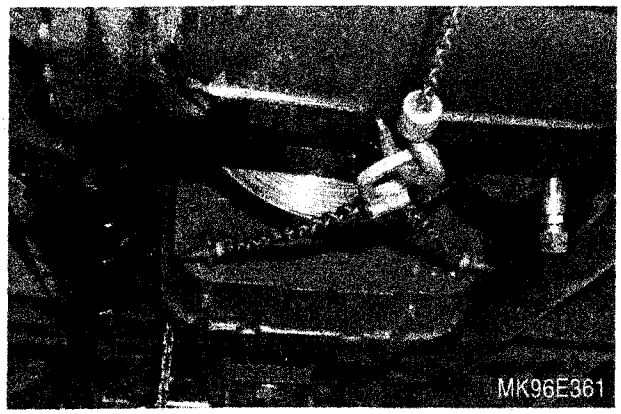
Error Codes	Meaning	Fail Mode	Solution
5.3	Articulation potentiometer sense voltage to low (Articulation potentiometer sense voltage < 0.65V)	H	Adjust or replace potentiometer
5.4	Articulation potentiometer low side voltage to high (Potentiometer limits articulation low > 0.82V)	H	Adjust or replace potentiometer
5.5	Articulation potentiometer low side voltage to low (Potentiometer limits articulation low < 0.65V)	H	Adjust or replace potentiometer
7.0	Makeup valves not responding properly	Error stack only	Check for wires connected to proper solenoids
8.0	Movement with no encoder period signals (recoverable)	0	Bad encoder, slipping or missing encoder belt, broken encoder wire
8.1	Movement with wrong encoder direction signal (recoverable)	0	Hydraulic hoses connected to the wrong ports. Bad encoder
8.2	Encoder signals are not in phase (recoverable)	0	Replace encoder
8.5	Front axle movement with double selector turned off	Error stack only	Hydraulic hoses connected to the wrong ports. Repair double selector valve.

STEP 45



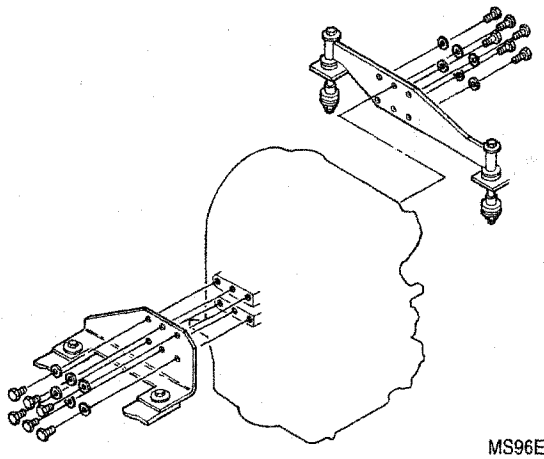
Remove the load rotor and lifting eye. Attach the hook from the hoist to the D-hook of the lifting bracket. Lift the transmission into the tractor

Be sure all wiring harnesses and hydraulic lines are clear of the transmission.



If equipped with a PTO, the transmission will have to be pulled forward approximately 8 inches as it is raised for the clutch housing to clear the rear frame crossmembers. Install two 58-301 lifting eye bolts (from the 58-293 Powershift Transmission Repair Kit) into the lower front housing. Connect a ratchet hoist between the front frame and the eye bolts. Raise the transmission and pull forward until the PTO clutch housing is above the rear frame lower crossmember. Use the ratchet hoist to position the transmission to install side transmission mounts.

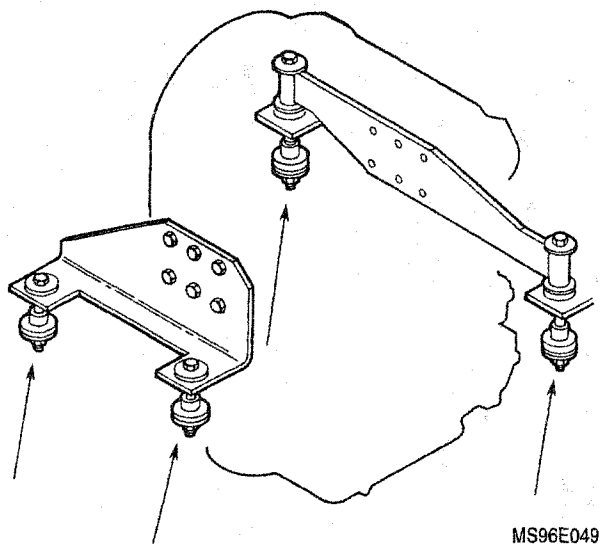
STEP 46



MS96E050

Use the hoist to align the mount brackets side bolts. Install the three upper bolts in the left bracket and the bolts on the right side bracket from above the transmission. Install the three lower bolts on the left bracket. Tighten the bolts to a torque of 190 to 215 lb ft (258 to 292 Nm). Lower the transmission until the full weight is on the side mounting brackets.

STEP 47

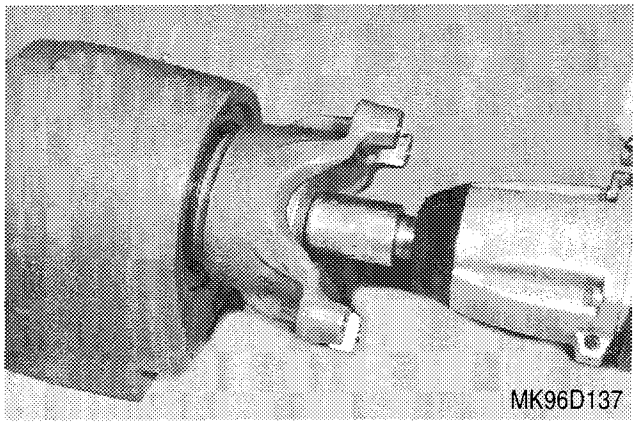


MS96E049

Tighten the LH and RH vertical mounting bolts to a torque of 136 to 153 lb ft (184 to 209 Nm).

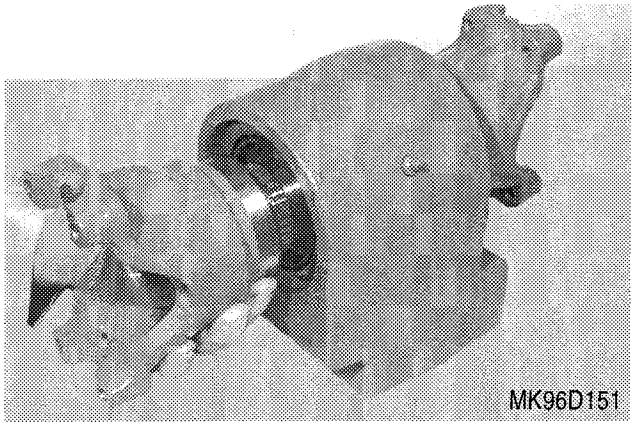
HANGER BEARING DISASSEMBLY

STEP 8



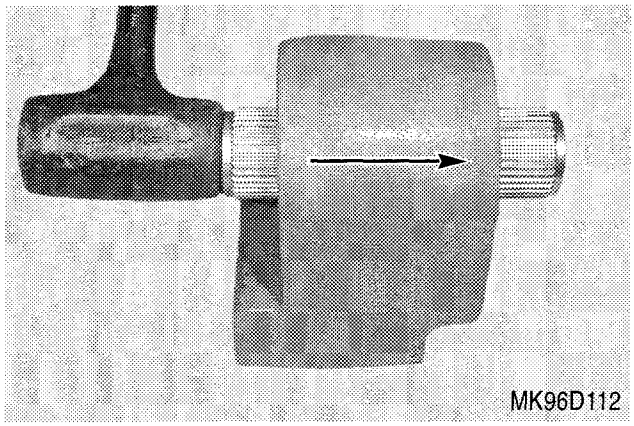
Remove the yoke retainer cap screws and retainers.

STEP 9



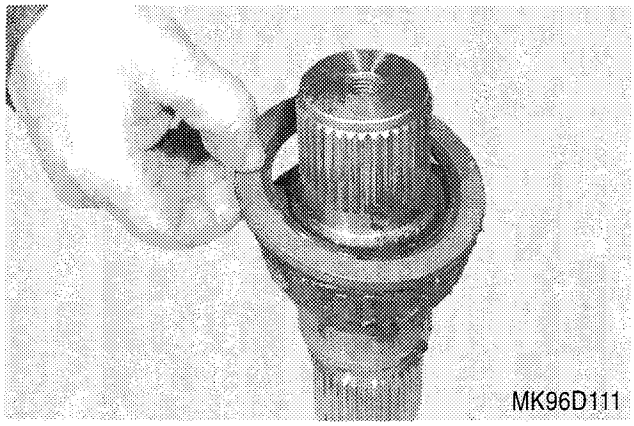
Remove the yokes from the hanger bearing.

STEP 10



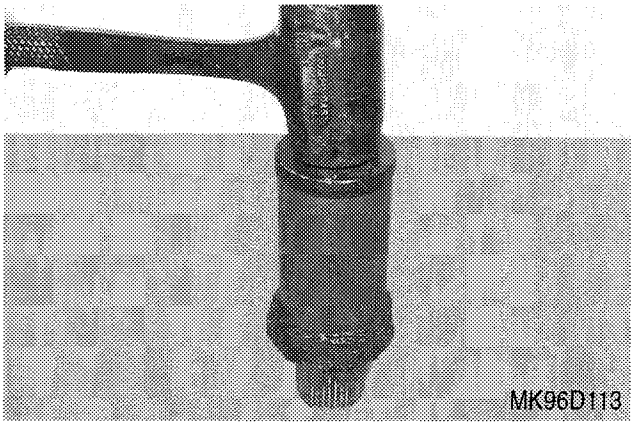
Drive or press the shaft out of the hanger bearing housing.

STEP 11



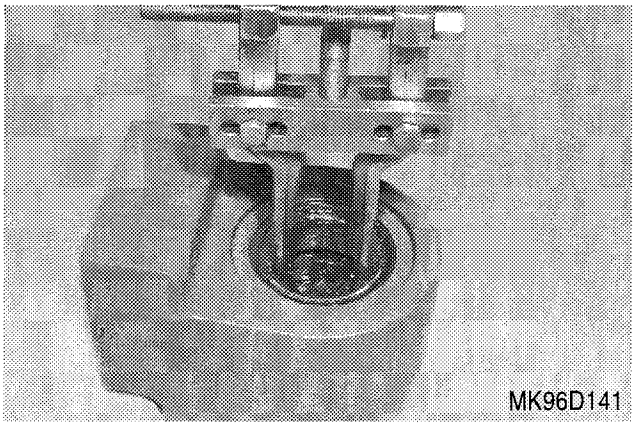
Remove the seal from the shaft. Discard the seal.

STEP 12



Use a sleeve with a 2.875 inch (73 mm) ID x 3.25 inch (82.55 mm) OD to drive or press the bearing cone off the shaft.

STEP 13



Using an internal bearing puller placed in the bearing cone inner race, remove the seal and bearing cone from the housing. Discard the seal.

AXLE SEAL REMOVAL

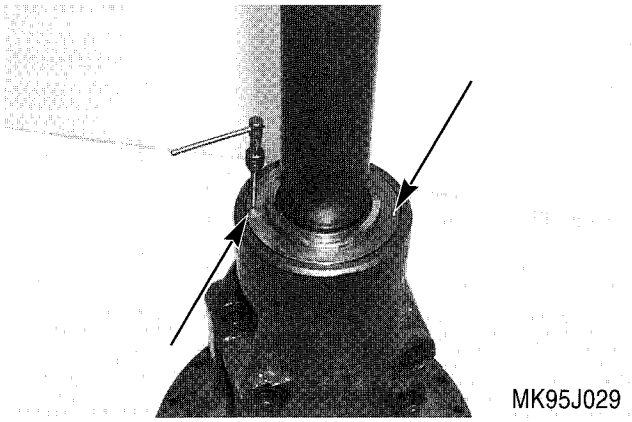
STEP 1

If only axle seal replacement is required, lift and support the affected axle wheel(s). Remove the wheel(s) and do the following:

> **WARNING:** *To prevent injury or death, use adequate jack stands and/or additional blocking to support the tractor. DO NOT rely on lifting devices alone to support the tractor. Use an appropriate lifting device to remove and install the wheels and hubs. Calcium Chloride filled tires are very heavy.* SM433

NOTE: *The following axle seal replacement procedures are shown with the final drive housing removed for photography purposes only.*

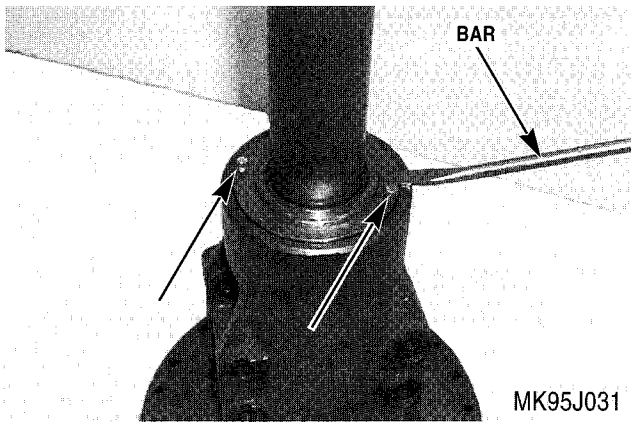
STEP 2



MK95J029

To remove the seal protection plate, drill and tap two 5/16 -18 holes in the center of the seal protection plate 180 degrees opposite each other.

STEP 3

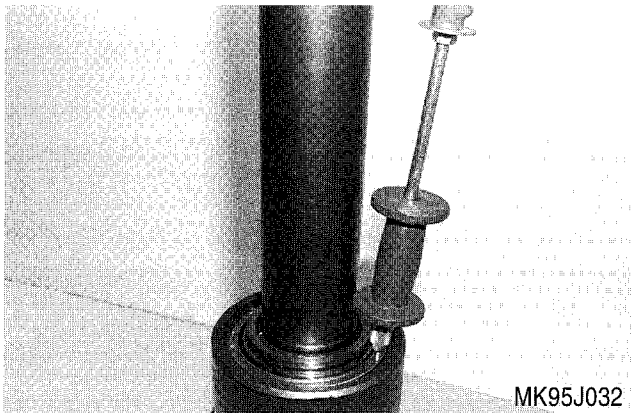


MK95J031

Install two 5/16 -18 x 1-1/2 inch threaded bolts into the tapped holes. Tighten the two bolts evenly to jack the seal protection plate outwards above the housing far enough to use a pry bar to remove the seal plate from the wear ring.

NOTE: *Be careful not to damage the seal wear ring. The seal protection plate will be damaged and must be replaced.*

STEP 4

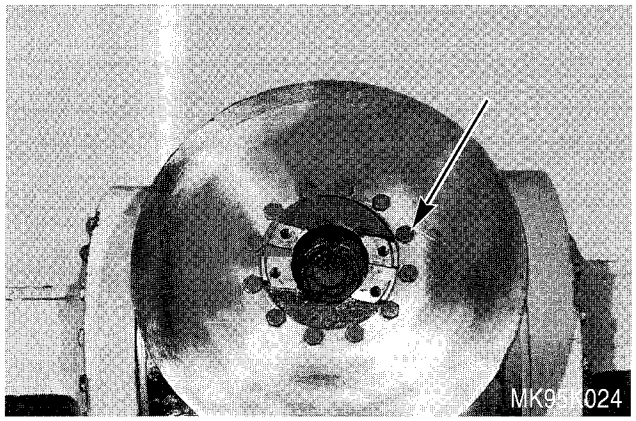


MK95J032

Use a slide hammer seal remover tool or a hook bar to remove the seal from the housing. Be careful not to damage the seal wear ring.

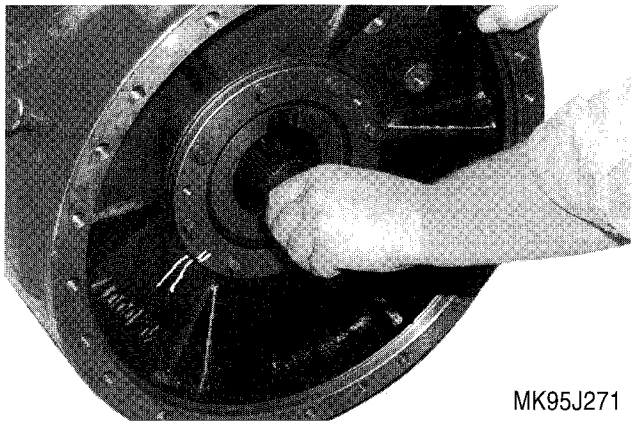
DIFFERENTIAL CARRIER DISASSEMBLY

STEP 77



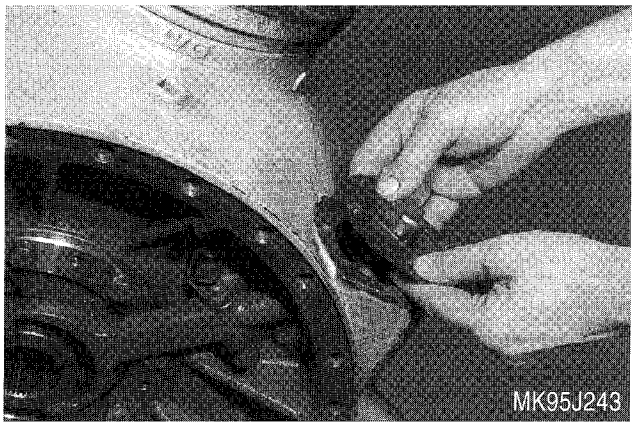
If equipped, remove the bolts securing the brake disk to the drive yoke. Remove the brake disk.

STEP 78



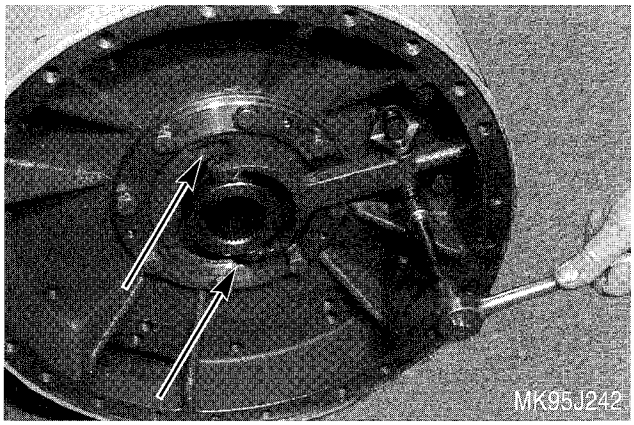
Remove the short axle shafts from each side of the differential.

STEP 79



If equipped, remove the seal from the differential lock shift lever.

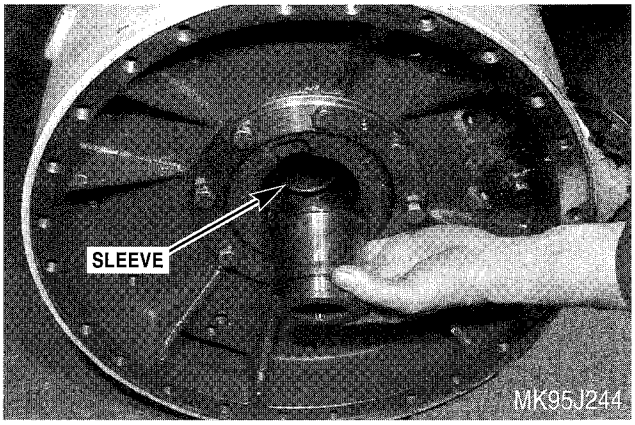
STEP 80



If equipped, remove the shift lever mount bracket bolts. Remove the shift lever and mount bracket assembly.

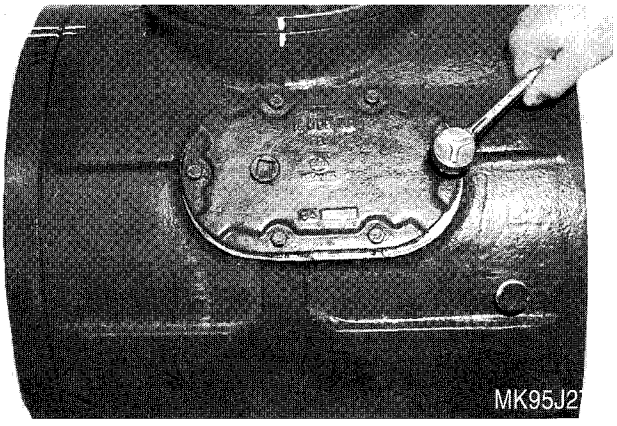
NOTE: *The differential bearing support cover indents must be positioned as shown for shift fork actuation when assembled.*

STEP 81



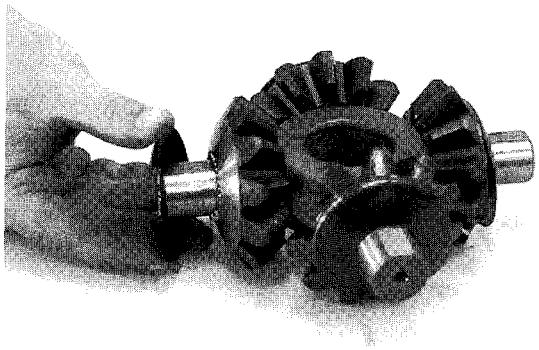
Remove the clutch gear and alignment sleeve.

STEP 82



Remove the inspection cover.

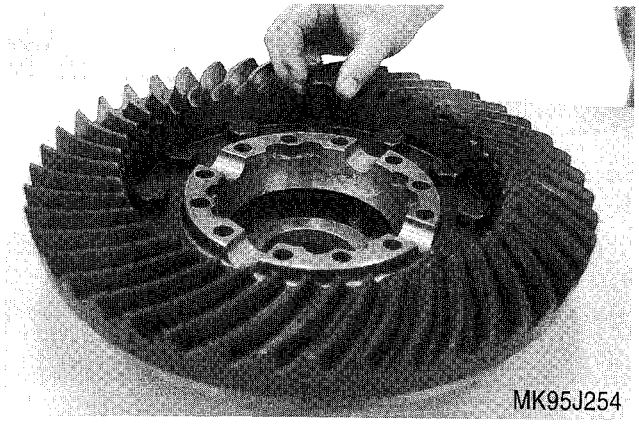
STEP 159



MK95J197

Lubricate and install the four thrust washers next to each spider gear.

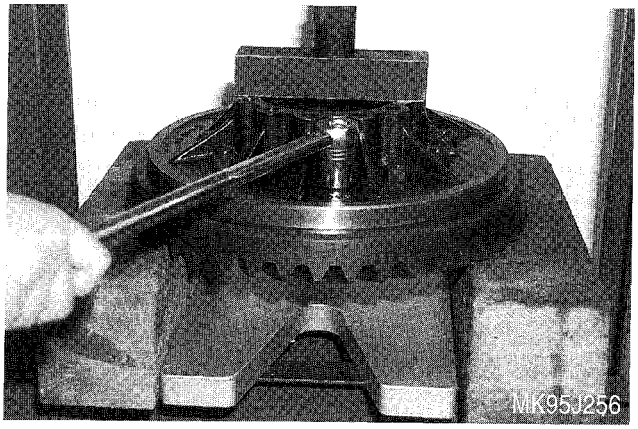
STEP 160



MK95J254

Position and align the ring gear on the flanged case half. Install the ring gear attaching bolts and nuts.

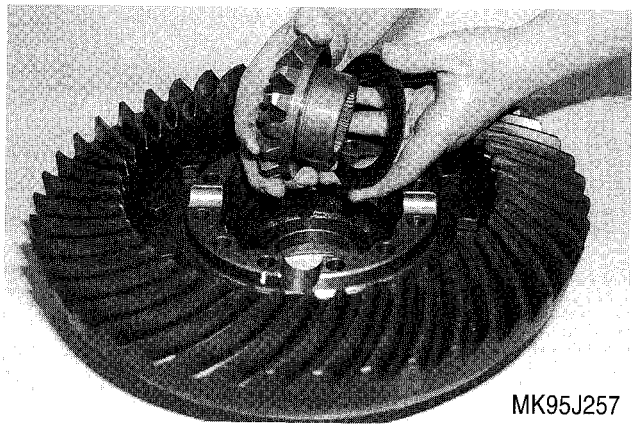
STEP 161



MK95J256

Position the ring gear on wood blocks on a press bed. Use the press to clamp the ring gear stationary on the blocks. Use a torque wrench to tighten the bolts alternately in a star configuration to 217 to 240 lb ft (294 to 324 Nm).

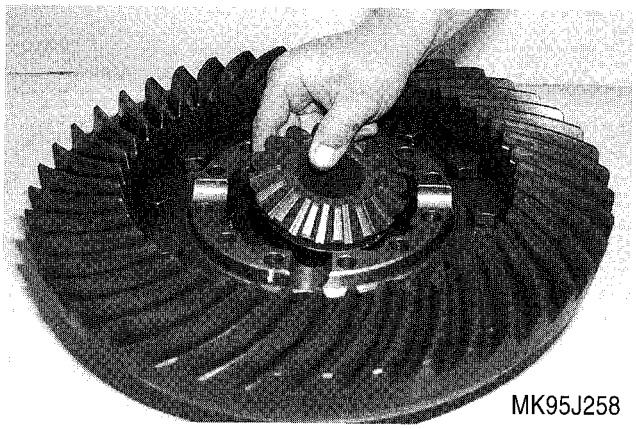
STEP 162



MK95J257

Lubricate and install a thrust washer (dimpled side to the gear) on the first side gear.

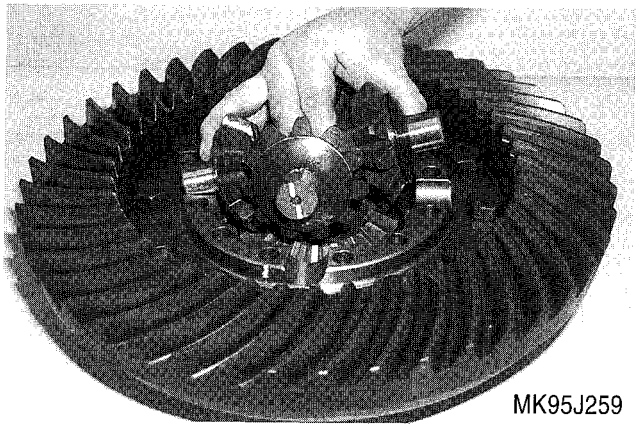
STEP 163



MK95J258

Install the side gear and thrust washer into the flanged case half.

STEP 164



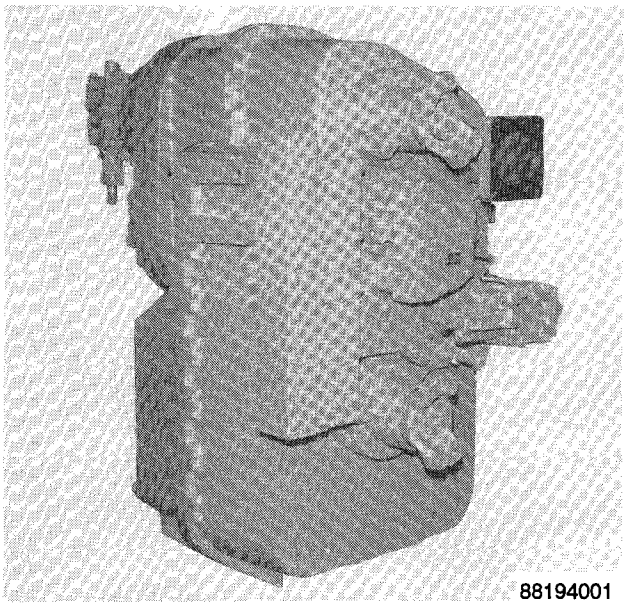
MK95J259

Install the cross and spider gear assembly into the case.

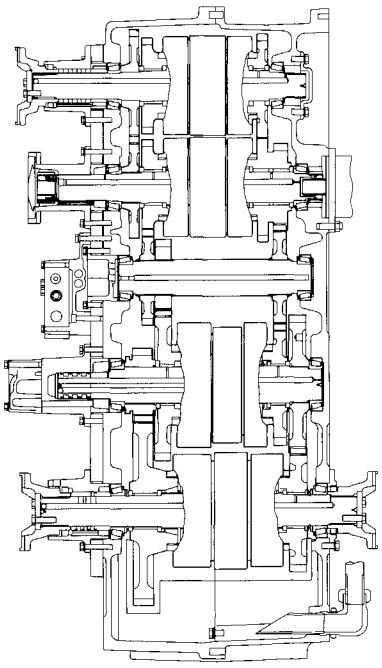
NOTE: Case Corporation reserves the right to make improvements in design or changes in specifications at any time without incurring any obligation to install them on units previously sold.

GENERAL INFORMATION AND POWER FLOW

GENERAL DESCRIPTION OF OPERATION



88194001



MB96A069

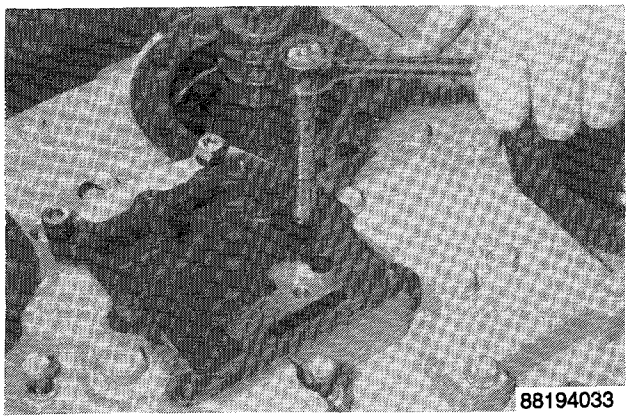
The PowerShift Transmission is hydraulically actuated and microprocessor computer controlled.

The transmission has a single countershaft and four other shafts in a vertical configuration. Two hydraulically actuated clutch packs are installed on each of the four shafts, providing a total of eight hydraulically operated clutch packs which are applied in various combinations to provide twelve speeds forward and three speeds in reverse.

All gears are in constant mesh. No torque converter is required for its operation. This is possible because of a foot operated modulatable master clutch incorporated into the front 9 inch clutch pack to provide smooth and controlled start-up in forward or reverse. Actuation of the master clutch foot pedal in any gear range, will interrupt electrical power to the clutch solenoid valves, thereby releasing the clutches and stopping power flow through the transmission.

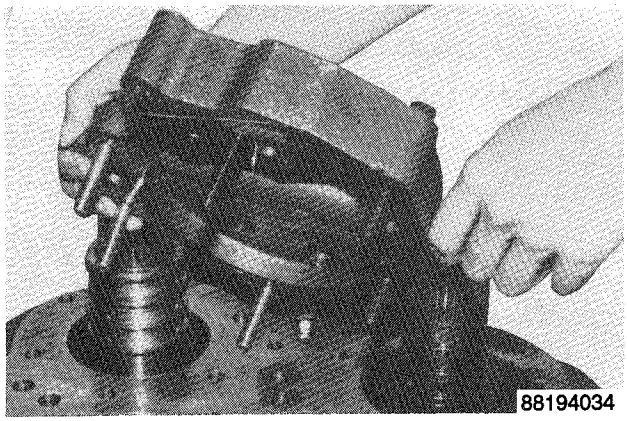
All shafts are located and supported by single row tapered roller bearings. The "front" bearing cups are shimmed between the cup and bearing retainer to adjust bearing clearance at the front side bearing cups only.

STEP 33



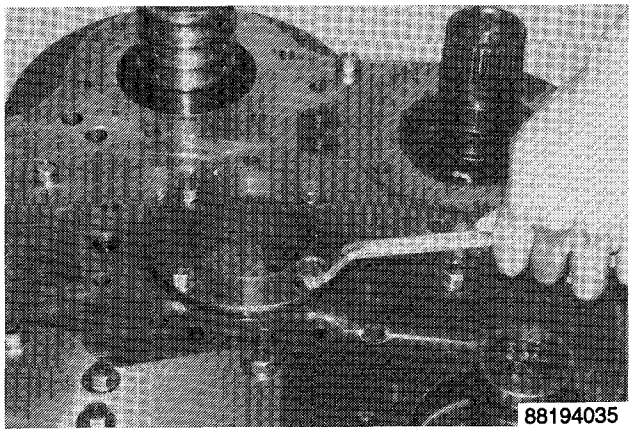
Remove the ditch plate mounting bolts.

STEP 34



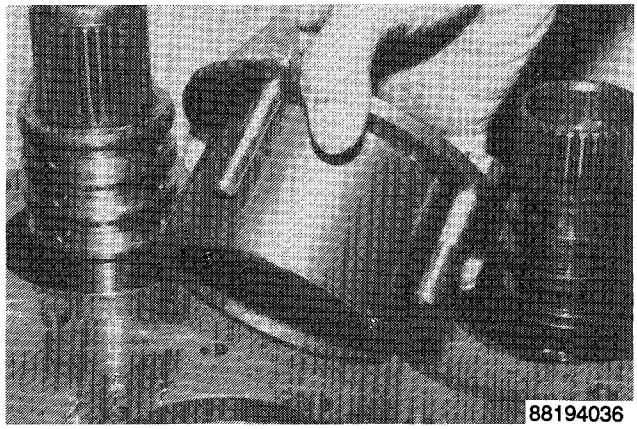
Remove the ditch plate.

STEP 35



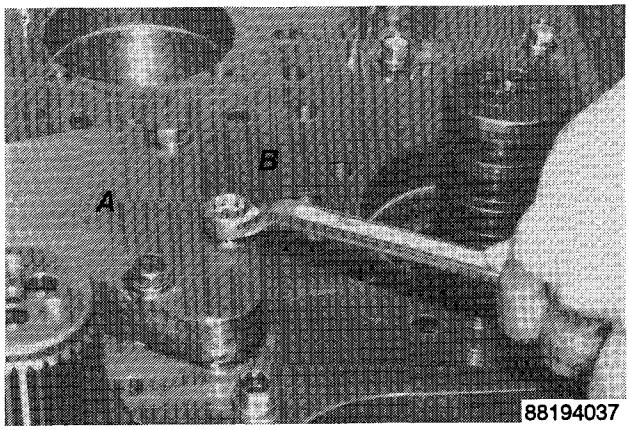
Remove the compound shaft bearing retainer mounting bolts.

STEP 36



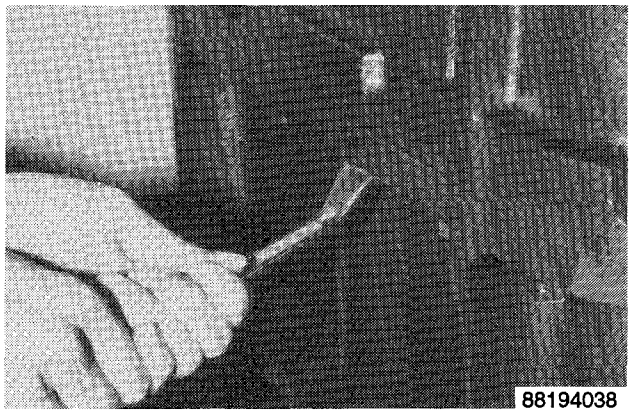
Remove the compound shaft bearing retainer and shims. Wire tie the shims to the retainer or label as COMPOUND SHAFT.

STEP 37



Remove the oil supply plate "B" and the oil plate "A", only if required to inspect the oil passages or replace the gasket. Refer to the section titled "Front Housing Disassembly and Assembly".

STEP 38



Remove the remaining top and bottom housing split line mounting bolts.

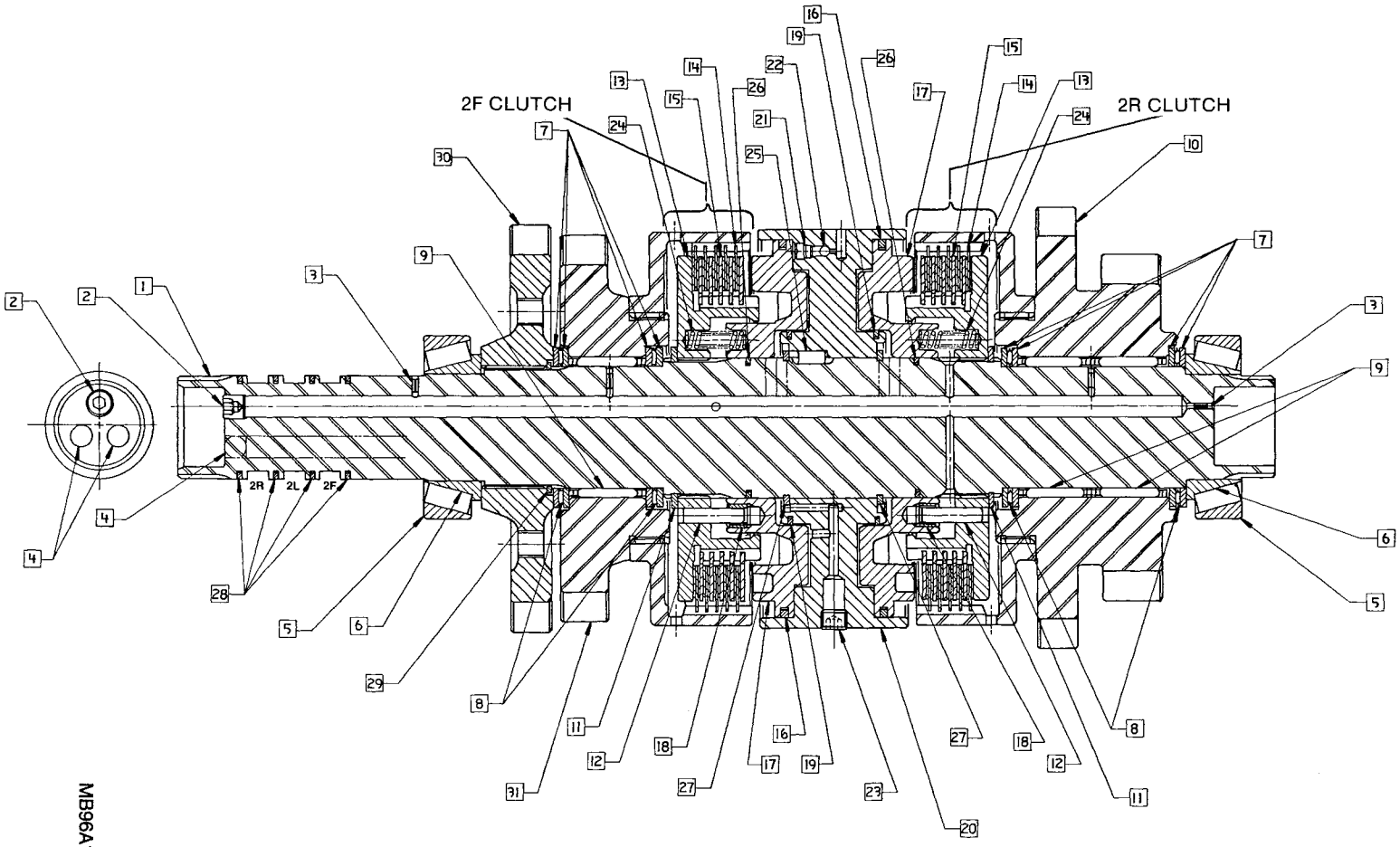
CHART "A"

DESIRED CLUTCH PACK PISTON TRAVEL (Clutch Pack Clearance)			
Desired Travel			
Clutch Pack Location		**9350, 9370 & 9380 Tractors mm**	**9310, 9330 Tractors mm**
1st Shaft	Front Rear	3.5 to 3.9 3.5 to 3.9	3.6 to 4.0 3.6 to 4.0
2nd Shaft	Front Rear	3.5 to 3.9 3.5 to 3.9	3.6 to 4.0 3.6 to 4.0
4th Shaft	Front Rear	2.5 to 2.9 2.5 to 2.9	2.6 to 3.0 1.85 to 2.25
5th Shaft	Front Rear	2.2 to 2.6 2.2 to 2.6	2.7 to 3.10 2.3 to 2.7

CHART "B"

CLUTCH STEEL PLATE SPECIFICATIONS		
Clutch Location	**Plate Diameter**	**Thickness Availability**
1st Shaft, front	7 inch	2.18 mm 2.4 mm
1st Shaft, rear	7 inch	2.18 mm 2.4 mm
2nd Shaft, front	7 inch	2.18 mm 2.4 mm
2nd Shaft, rear	7 inch	2.18 mm 2.4 mm
4th Shaft, front	9 inch	2.4 mm 2.6 mm
4th Shaft, rear	9 inch	2.4 mm 2.6 mm
5th Shaft, rear	8 inch	2.18 mm 2.4 mm
5th Shaft, rear	8 inch	2.18 mm 2.4 mm

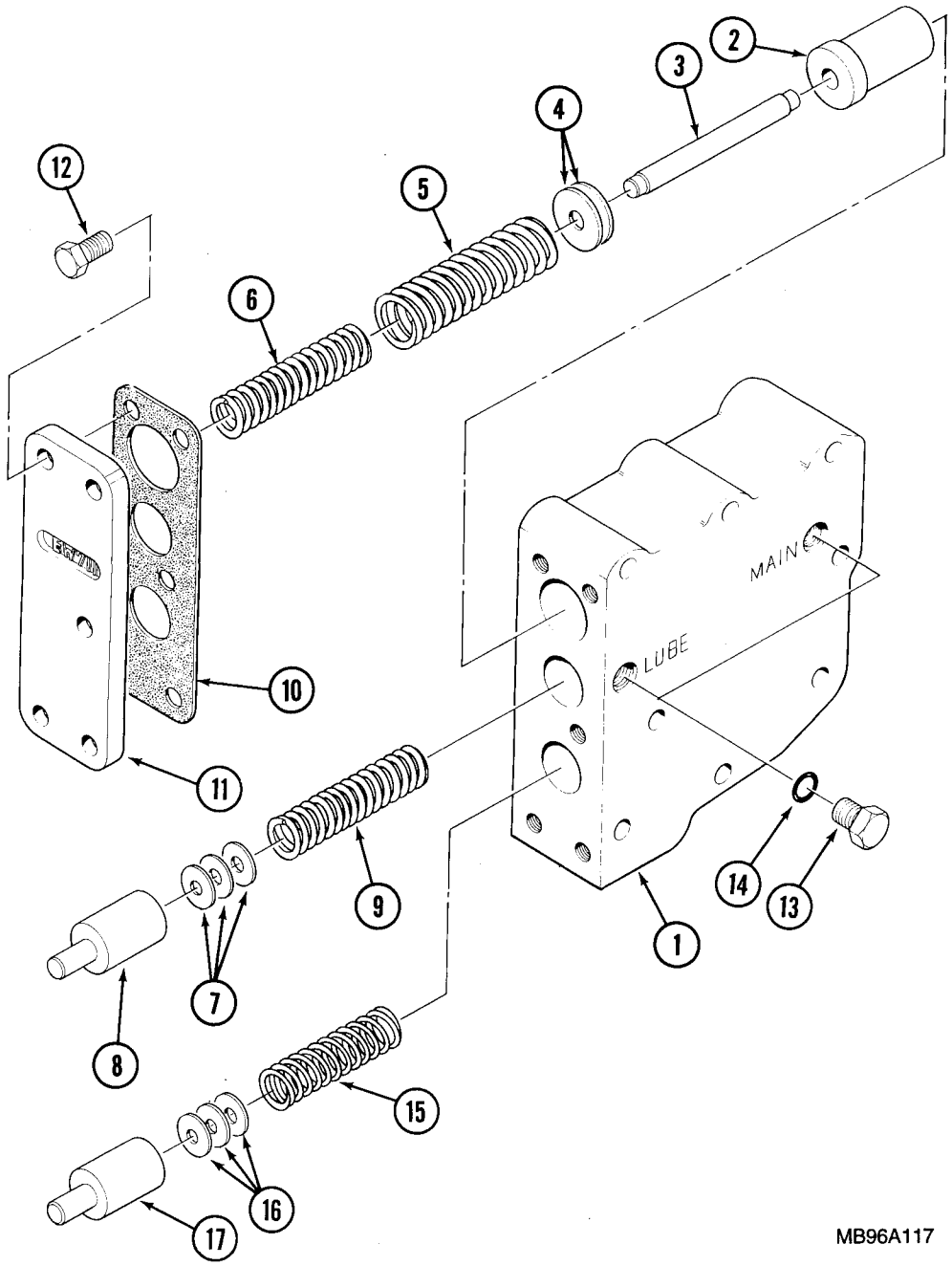
7 INCH CLUTCH ASSEMBLY (2ND SHAFT)
SECTIONAL VIEW



ITEM	QTY	DESCRIPTION
31	1	GEAR ASSEMBLY
30	1	GEAR
29	1	SNAP RING
28	4	SEALING RING
27	2	SNAP RING
26	2	SEALING RING
25	1	PIN, DOWEL
24	24	SPRING
23	4	PLUG
22	8	BALL
21	8	ORIFICE, PISTON
20	1	DRUM, REACTIONARY
19	2	SEALING RING
18	4	BUSHING, PILOT
17	2	PISTON, CLUTCH
16	2	SEALING RING
15	10	PLATE, STEEL
14	10	PLATE, FACED
13	2	HUB, CLUTCH
12	4	PIN, DOWEL
11	2	SNAP RING
10	1	GEAR ASSEMBLY
9	3	BEARING, ROLLER
8	4	BEARING, THRUST
7	8	WASHER, THRUST
6	2	BEARING, CONE
5	2	BEARING, CUP
4	2	BALL
3	4	PIN, SPRING
2	1	PLUG, ORIFICE
1	1	SHAFT

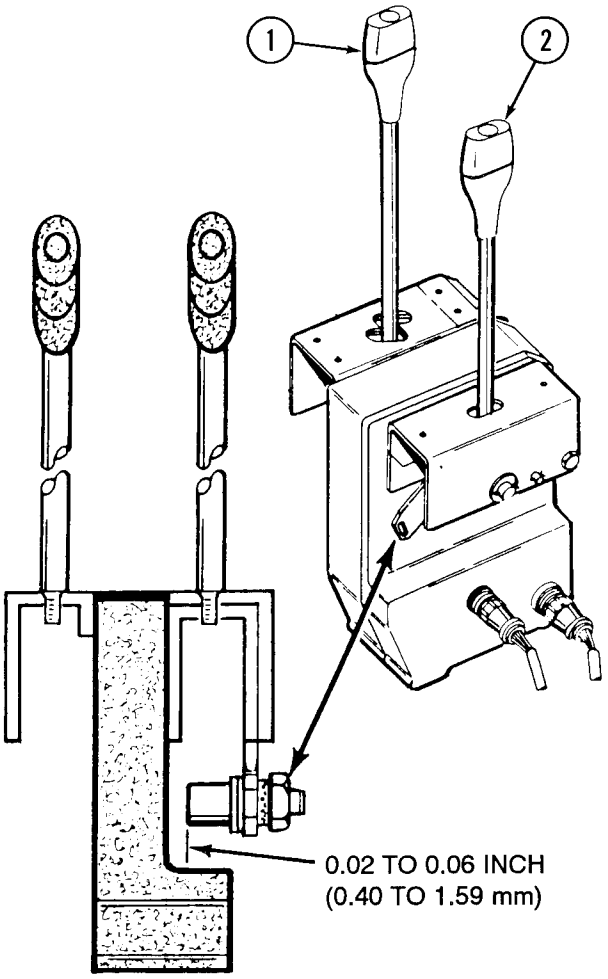
MB96A109

REGULATOR VALVE ASSEMBLY



1. VALVE BODY
2. REGULATOR SPOOL - MAIN PRESSURE
3. PRESSURE ROD
4. SHIMS
5. SPRING - OUTER
6. SPRING - INNER
7. SHIMS
8. REGULATOR SPOOL - LUBE PRESSURE
9. SPRING
10. COVER GASKET
11. COVER
12. COVER CAP SCREW
13. PLUG
14. O-RING
15. SPRING
16. SHIMS
17. REGULATOR SPOOL - MASTER CLUTCH LUBE PRESSURE

MODE AND PULSAR LEVER MAGNET ADJUSTMENT

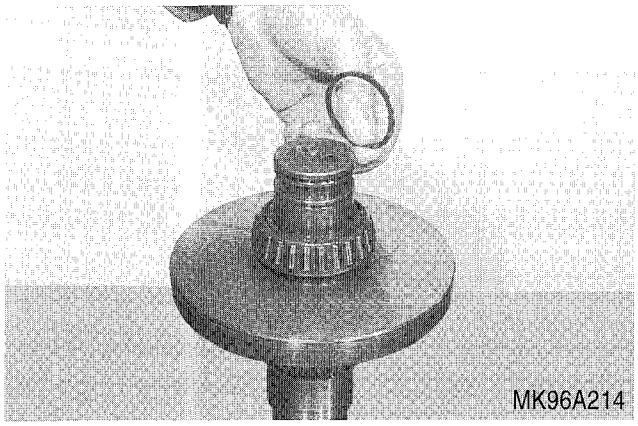


MB96A128

1. MODE LEVER
2. PULSE LEVER

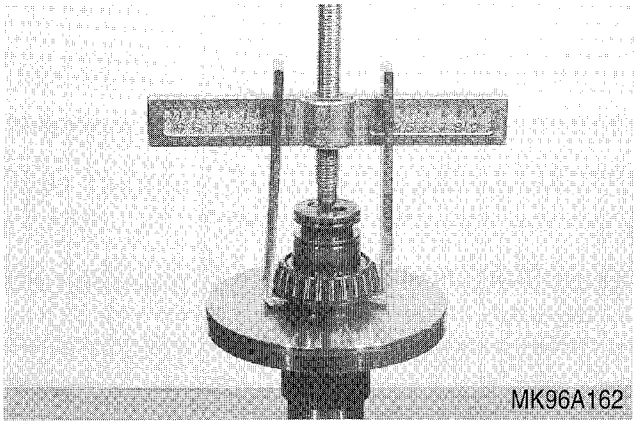
A magnet mounted on each lever (mode and pulsar) closes a reed switch inside the transmission controller when the lever is moved out of the neutral position. The magnet must have an air gap (distance between the magnet and the controller) of 0.02 to 0.06 inch (0.40 to 1.59 mm) for proper operation.

STEP 40



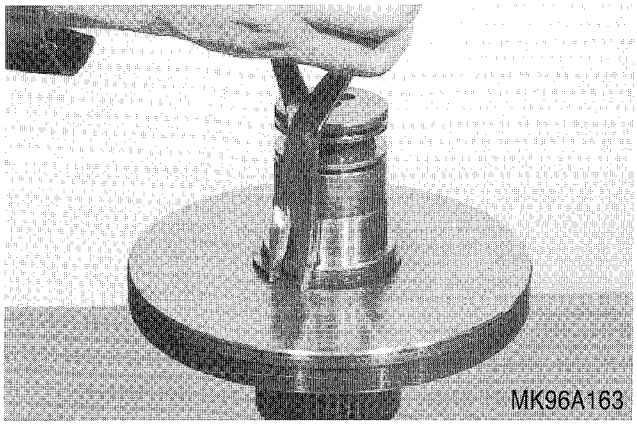
Reverse the shaft assembly and remove the seal rings.

STEP 41



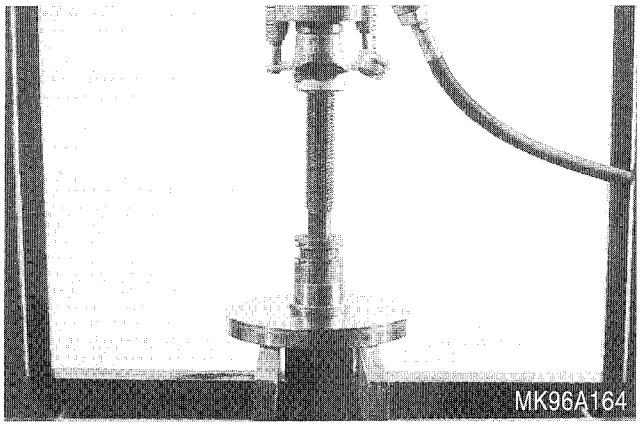
If necessary, use a puller to remove the tapered roller bearing.

STEP 42



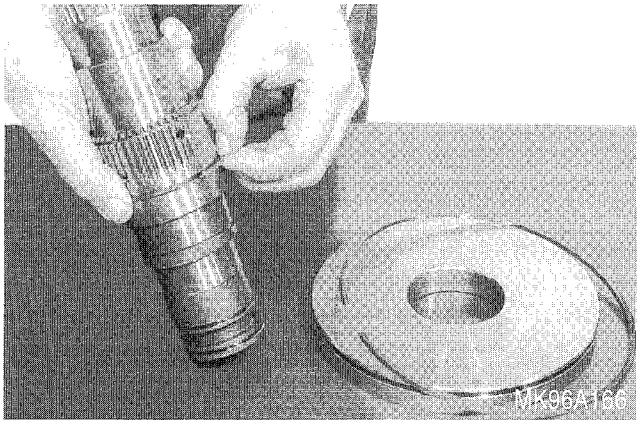
If necessary to replace the reaction plate, remove the snap ring from the shaft.

STEP 43



Use a press to carefully press the shaft through the reaction plate. Be careful not to lose the steel locating ball.

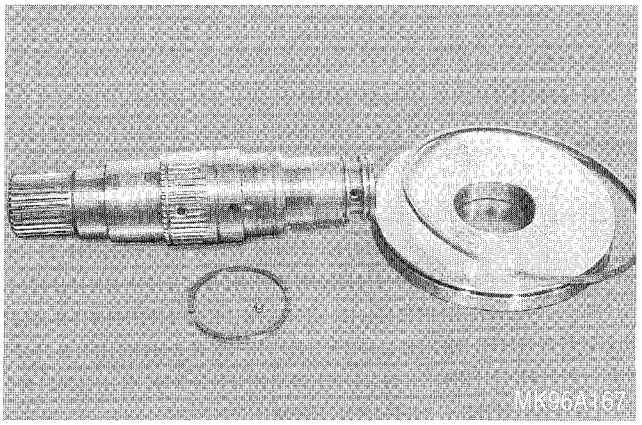
STEP 44



Remove the reaction plate and shaft seal rings.

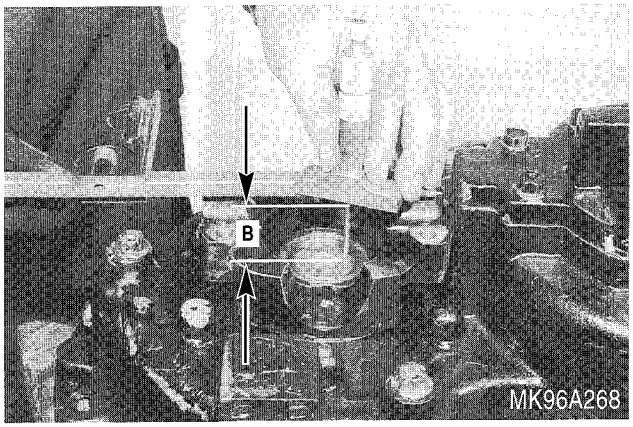
NOTE: *If the reaction plate is removed from the shaft for any reason a new plate must be installed.*

STEP 45



After the shaft is disassembled, clean and inspect all parts. Replace any damaged or worn parts.

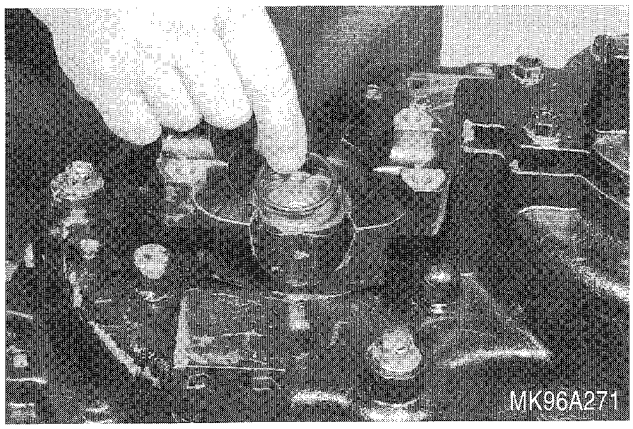
STEP 108



Measure the distance between the yoke surface and end of the output shaft, dimension "B". Calculate the difference between dimensions "A" and "B". Use a micrometer to measure and select a shim pack that will be 0.1 to 0.2 mm less than the calculated difference between dimensions "A" and "B".

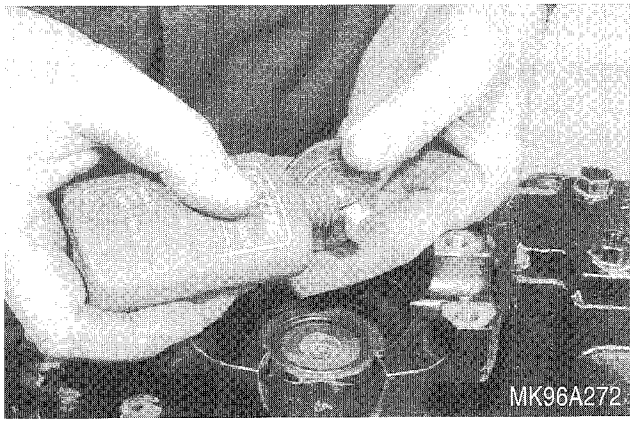
NOTE: *This will provide the necessary compression of the shaft O-ring for a proper seal.*

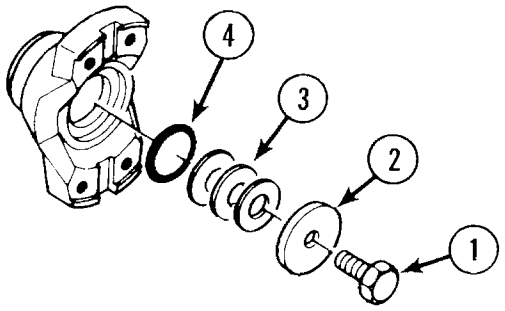
STEP 109



Lubricate and install the drive yoke O-ring seal.

STEP 110



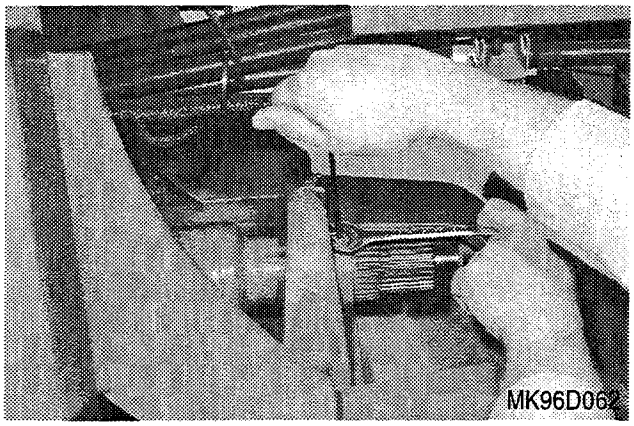


1. Bolt
2. Washer
3. Shims
4. O-ring

MS96A038

Install the drive yoke retainer washer and selected shims on the retainer bolt. Use Loctite 242 Thread Lock on the retainer bolt threads. Install and tighten the retainer bolt 145 to 195 lb ft (197 to 265 Nm).

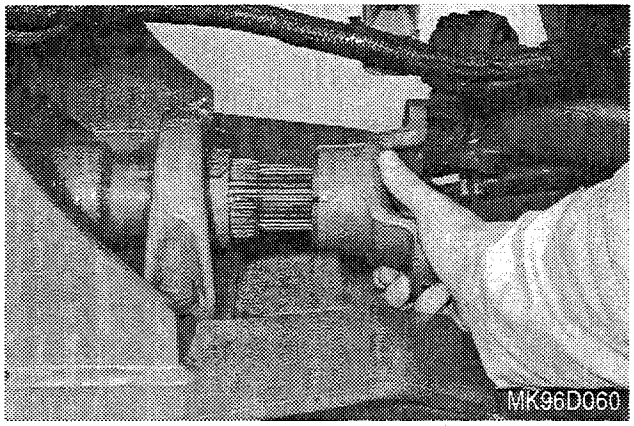
STEP 17



Bottom the set screw in the driveshaft keyway. Back the set screw off one full turn and tighten the jam nut.

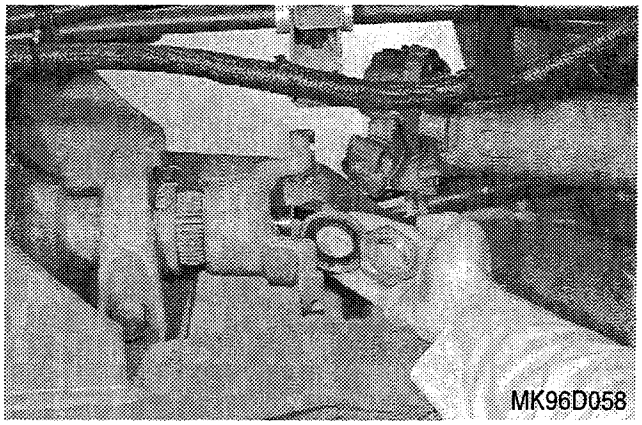
IMPORTANT: *This procedure must be followed to allow driveshaft to move freely in the bearing.*

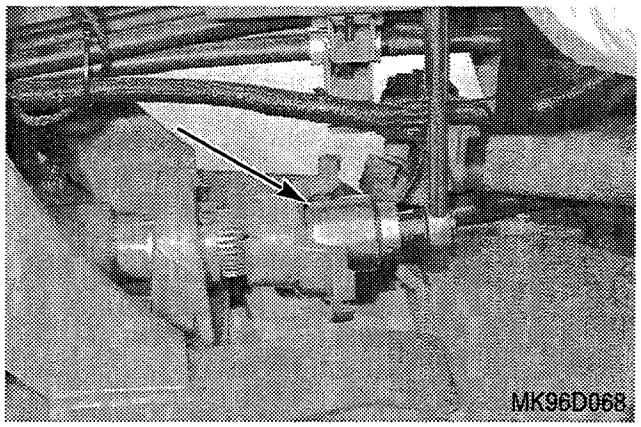
STEP 18



Install the yoke, align the marks made during disassembly.

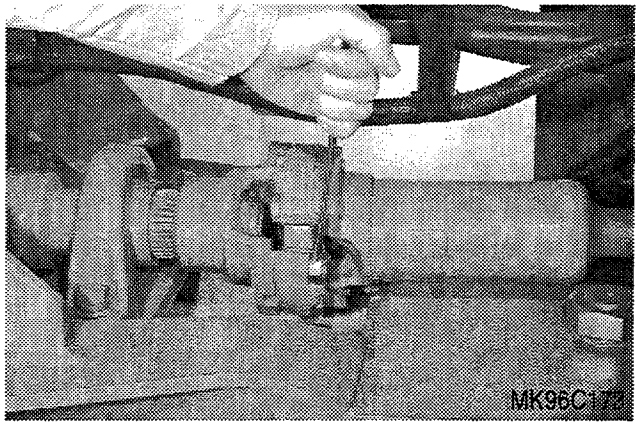
STEP 19





Install the washer and lock nut. Tighten the lock nut to a torque of 250 to 275 lb ft (339 to 373 Nm).

STEP 20

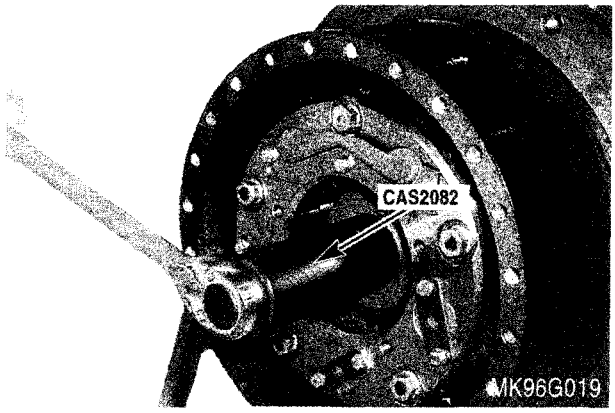


Connect the intermediate driveshaft to the yoke. Tighten the four bolts to one of the following torques:

9310, 9330 Tractors - 37 to 49 lb ft (50 to 66 Nm)

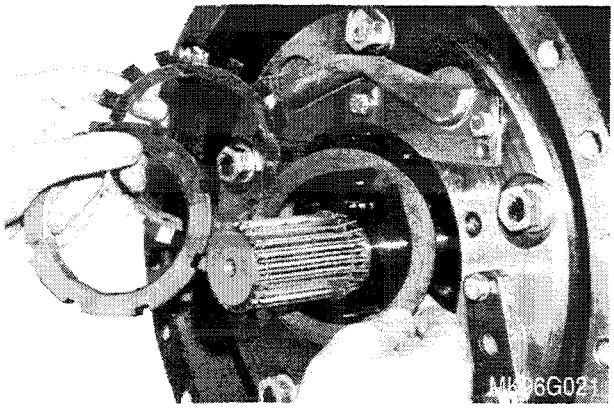
9350, 9370, 9380 Tractors - 70 to 80 lb ft (95 to 106 Nm)

STEP 9



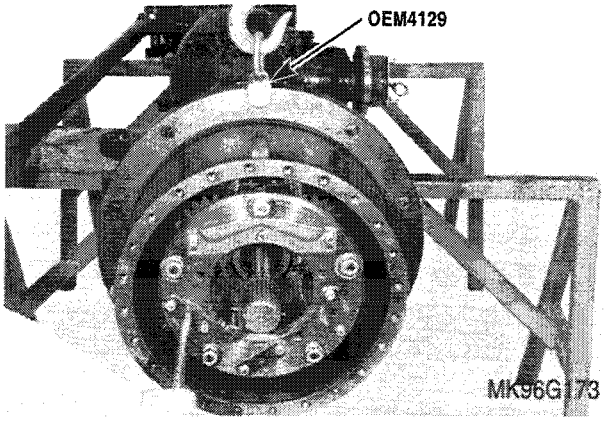
Use the CAS 2082 Long Socket to loosen and remove the spindle nut.

STEP 10



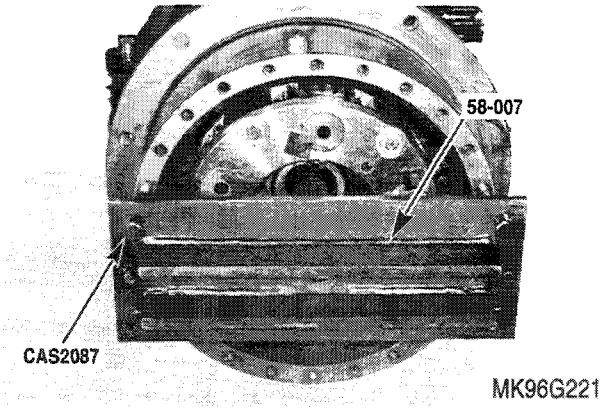
Remove the nut, lock ring and thrust washer from the spindle.

STEP 11



Connect a lifting device to the hub assembly.

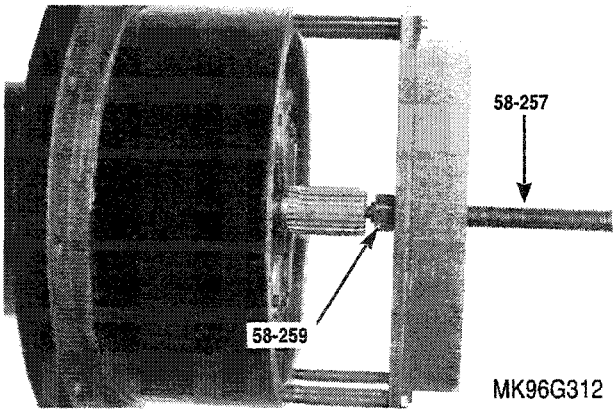
STEP 12



Assemble the 58-007 Puller Plate to the hub using four CAS 2087 Adaptor Bolts.

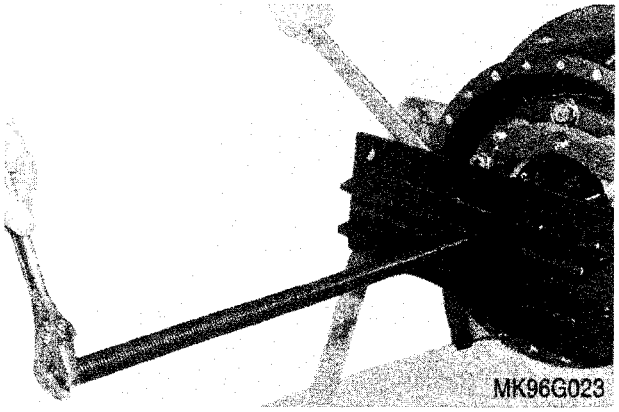
NOTE: *Screw each bolt into the hub flange an equal distance.*

STEP 13



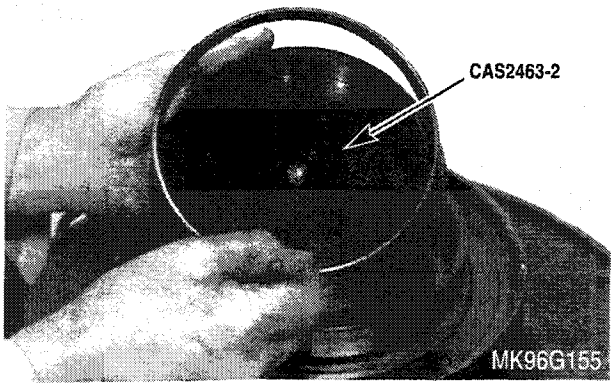
Install the 58-257 Forcing Screw through the plate with the 58-259 Nut on the back side of the plate.

STEP 14



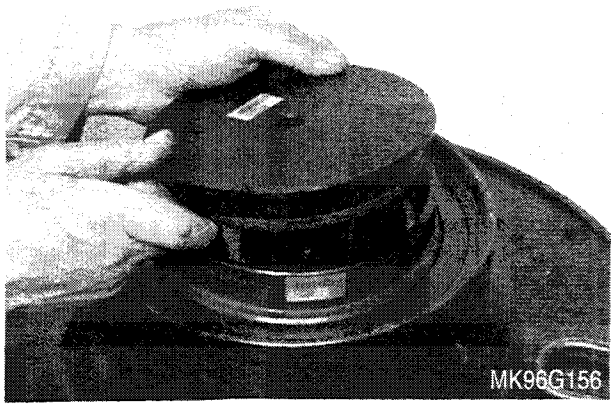
Hold the rear side nut while turning the forcing screw to pull the hub free of the spindle. Remove the puller plate fixture.

STEP 87



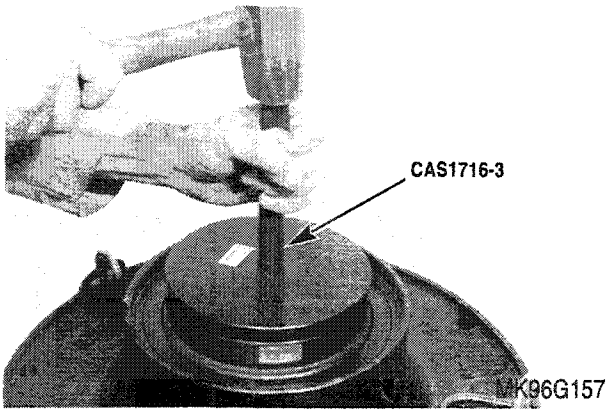
Lubricate and place a new spindle seal on the CAS 2463-2 Seal Driver so that the flat side of the seal is against the flange of the seal installer.

STEP 88



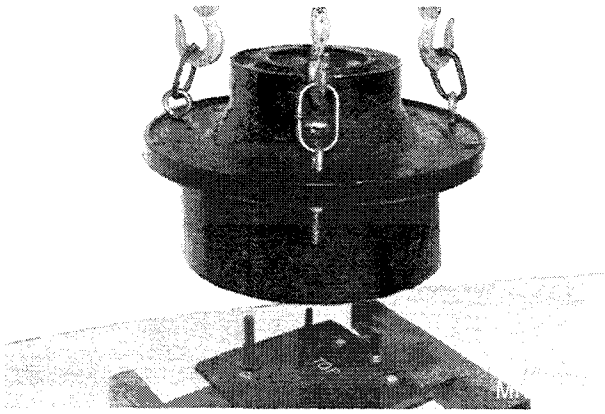
Set the CAS 2463-2 Seal Driver Tool with the new seal squarely into the CAS 2463-1 Tapered Guide Ring.

STEP 89



Use the CAS 1716-3 Handle and hammer to install the seal into the adjusting nut ring.

STEP 90



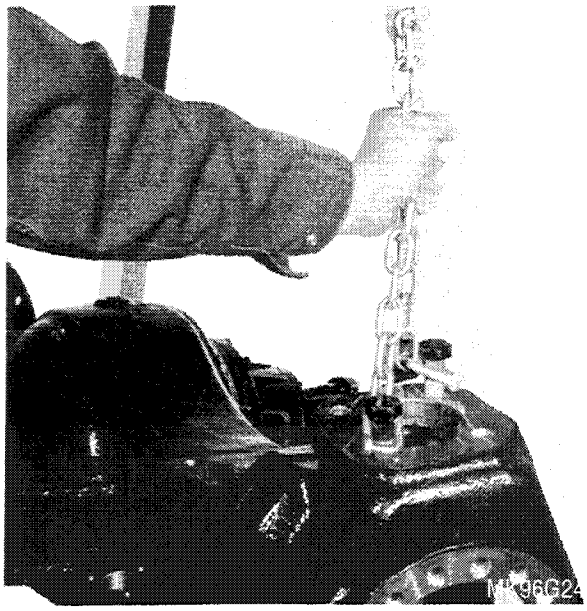
Lift the hub assembly from the holding fixture.

INSTALLING THE STEERING KNUCKLE (SWIVEL)

STEP 153

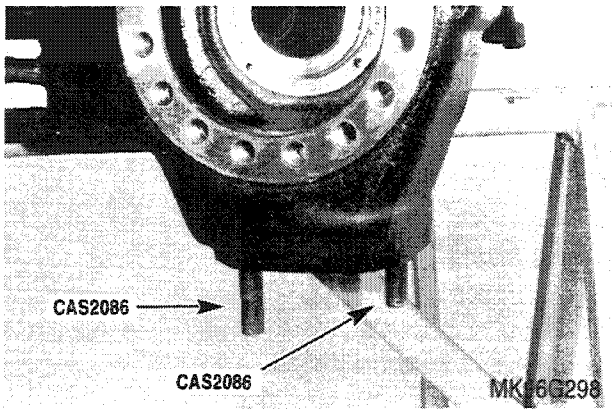
Install new dust seals on top of each trunnion bearing cup. Use a 3-15/16 inch Bearing/Seal Driver Plate to install the dust seals.

STEP 154



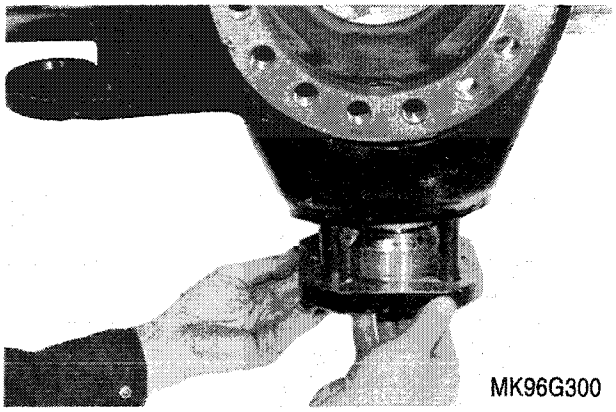
Lift and position the steering knuckle on the trunnion.

STEP 155



Install two CAS 2086 Aligning Studs into opposite holes of the lower king pin bore.

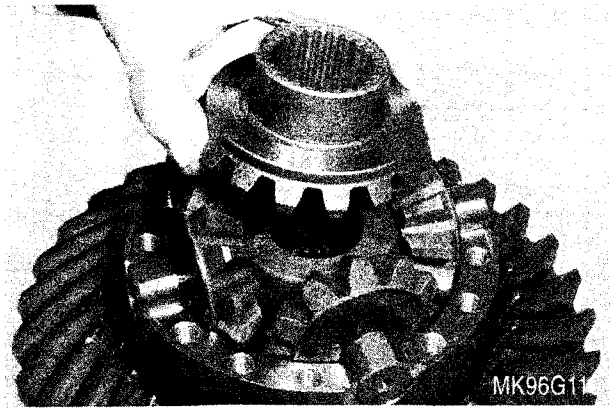
STEP 156



Lubricate the lower king pin bearing with clean grease. Install the king pin and bearing assembly over the pilot studs. Use a dead blow hammer to drive the king pin into the bore. Remove the pilot studs. Install and torque the retaining bolts 369 to 405 lb ft (500 to 550 Nm).

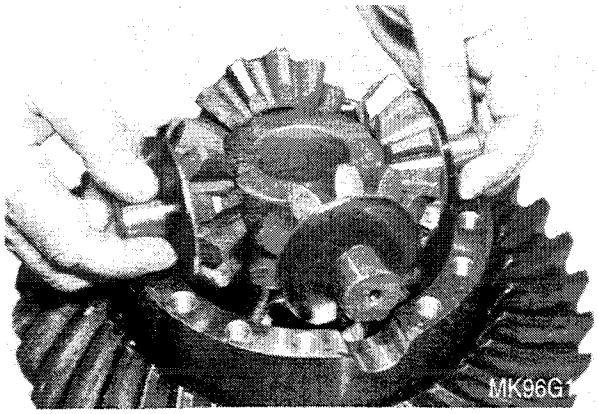
NOTE: *Install the king pins so that the match marks made at disassembly are in line.*

STEP 235



Remove the top side gear.

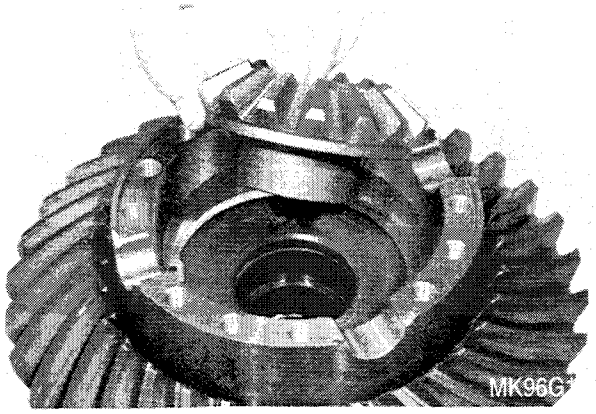
STEP 236



Remove the cross and spider gear assembly.

NOTE: *There are 29 uncaged needle roller bearings in each spider gear.*

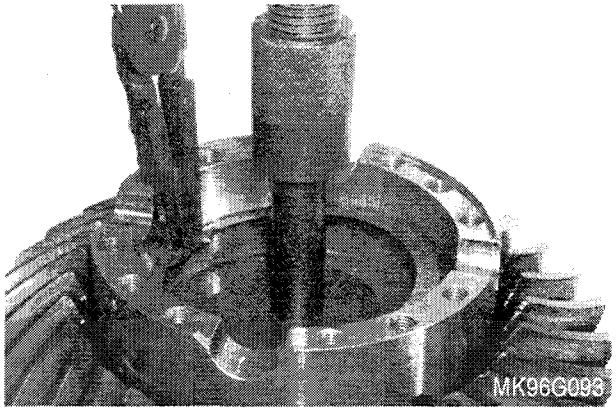
STEP 237



Remove the bottom side gear.

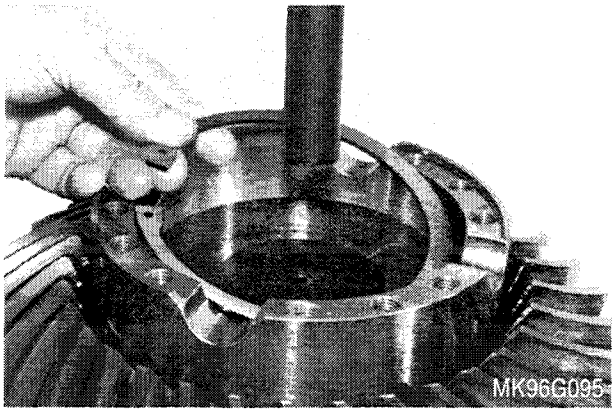
NOTE: *There is no thrust washer used on the bottom side gear.*

STEP 238



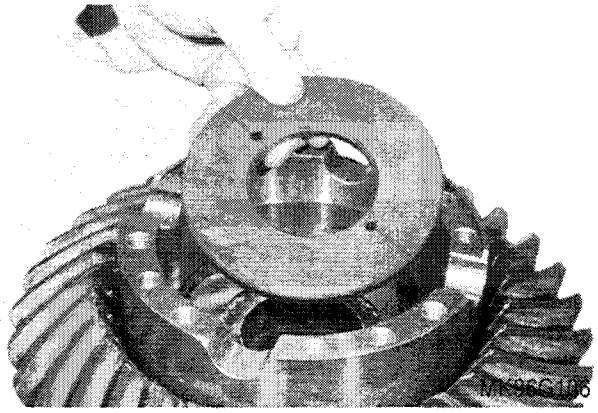
Put the flanged case half on a press bed. Place a 3-1/2 inch (89 mm) bearing driver plate on top of the clutch backing plate. Use the press to compress the clutch springs only enough to use a large internal snap ring pliers to remove the snap ring retaining the backing plate.

STEP 239



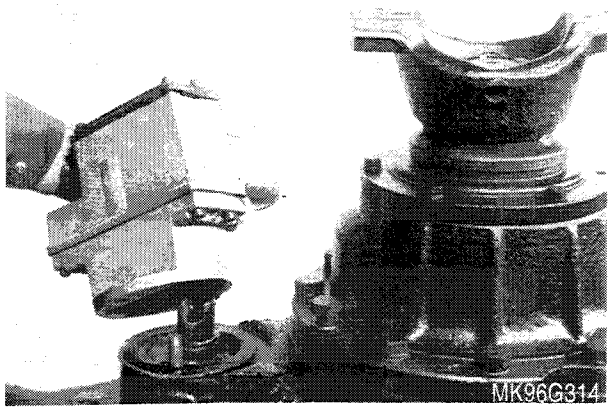
Remove the snap ring from the case.

STEP 240



Remove the thrust plate.

STEP 315

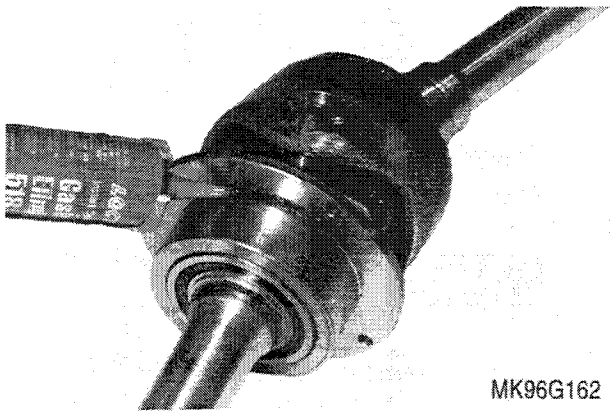


If equipped, install the limited shift electric shift motor. Be sure the motor engages the shift fork. Tighten the stud nut 35 to 45 lb ft (47 to 61 Nm).

INSTALLING THE AXLE SHAFT ASSEMBLIES

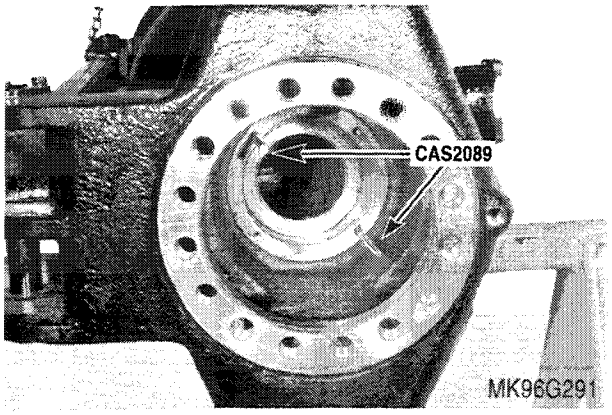
NOTE: *If the swivel knuckle is removed, install the axles before installing the swivel knuckle.*

STEP 316



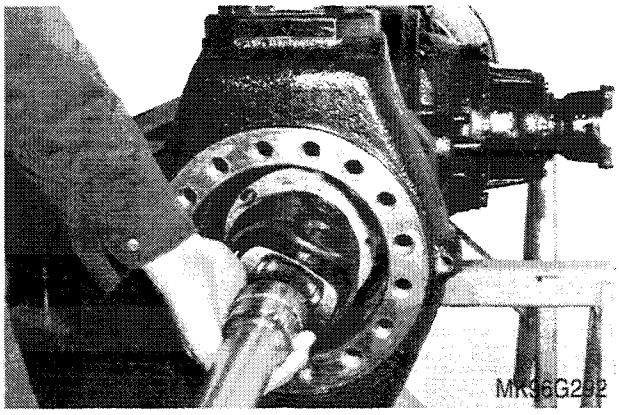
Put a continuous bead of Loctite 515 (or 518) Sealant around the radius of the mounting flange of the bearing carrier.

STEP 317



Install two CAS 2089 Alignment Studs opposite each other in the trunnion.

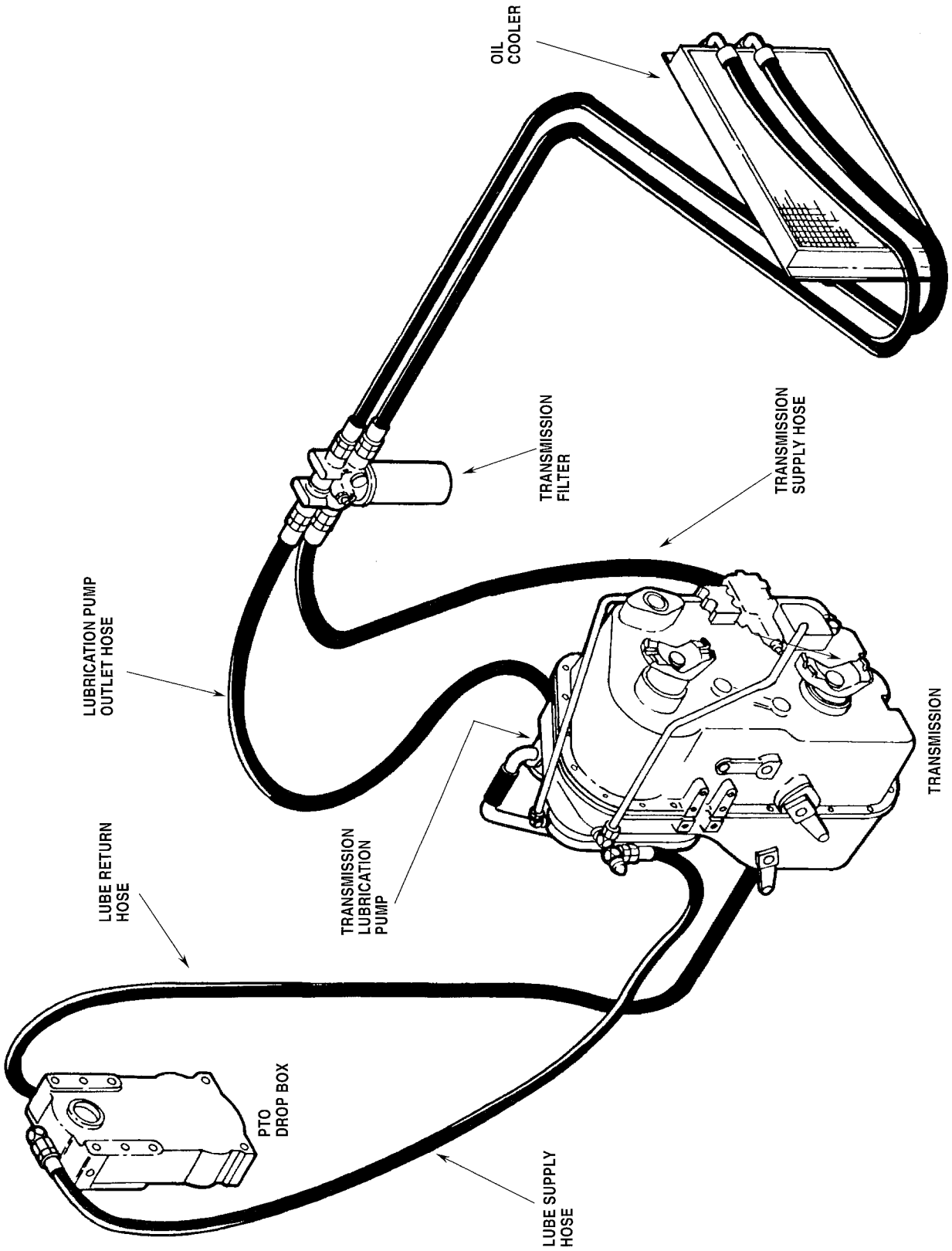
STEP 318



Install the axle and double U-joint assembly into the axle housing so that the axle engages the differential and the bearing carrier engages the alignment studs. Push the bearing carrier into the bore of the trunnion as far as possible.

IMPORTANT: *Do not let the outer axle shaft fall against the swivel knuckle and damage the machined seal and bearing surfaces. If necessary, use tape, shop rags or hose to protect the machine area of the shaft.*

SYNCHROSHIFT PTO DROP BOX LUBRICATION CIRCUIT



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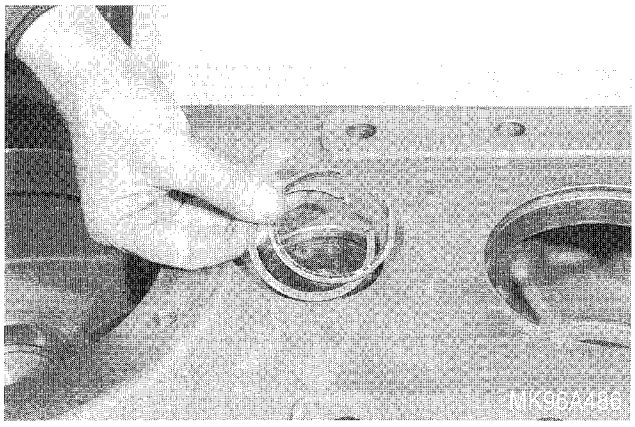
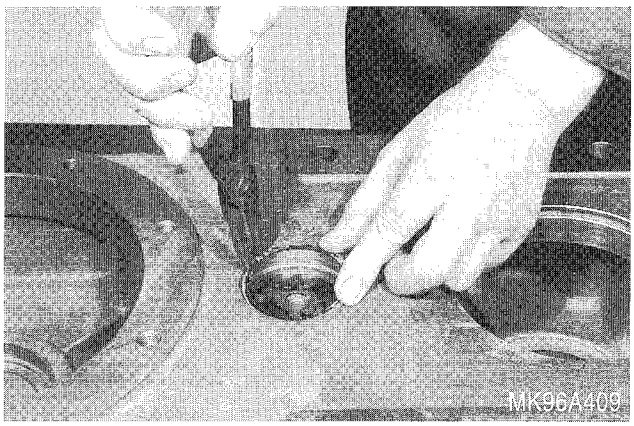
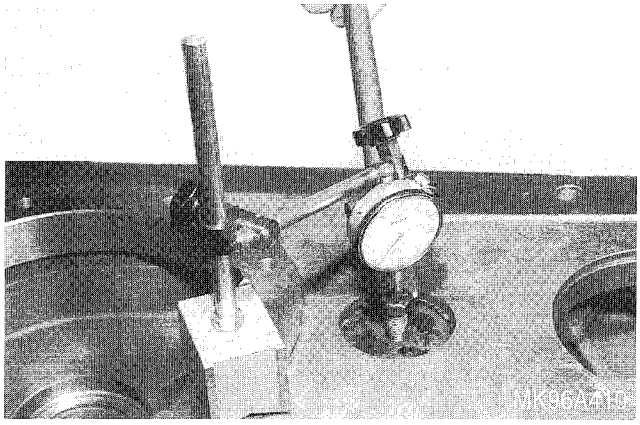
STEP 74





Install the two snap rings selected in Step 70. Be sure both snap rings are fully seated in the groove.

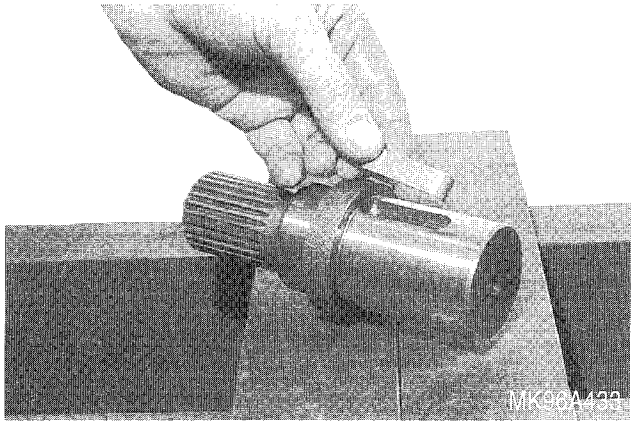
STEP 75



Repeat Step 67 to check for correct bearing end play.

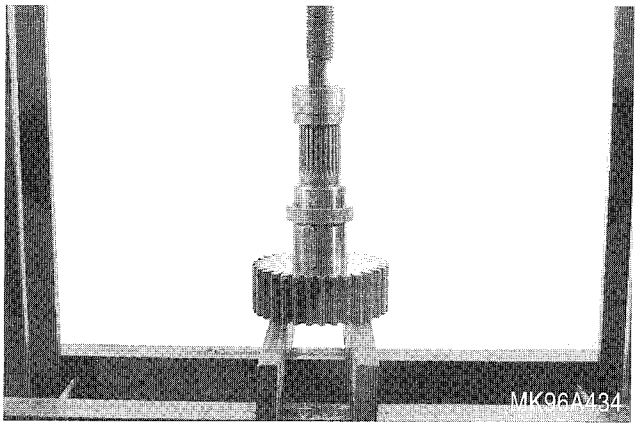
ASSEMBLING THE INPUT (TOP) SHAFT

STEP 76



Install the key in the drive gear key way.

STEP 77



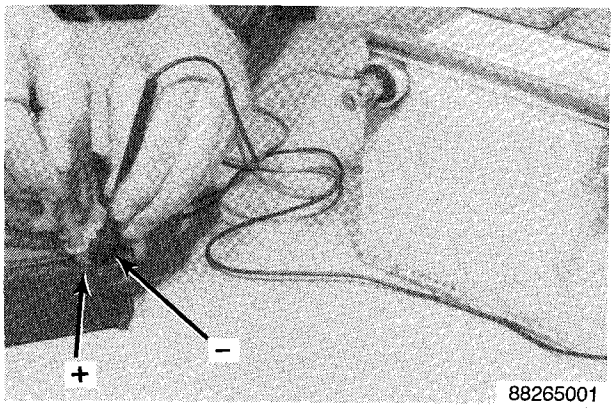
Use a press to install the shaft into the gear. Be sure the gear is fully seated on the shaft.

FRONT AND REAR DIFFERENTIAL LOCK ELECTRIC SHIFT MOTOR

NOTE: *The differential lock electric shift motor should only be removed after circuit testing indicates the unit is bad. See Section 4001 of this manual to test the wiring circuit and power relays. If testing indicates a fault in the electric shift unit, remove the unit and proceed as follows.*

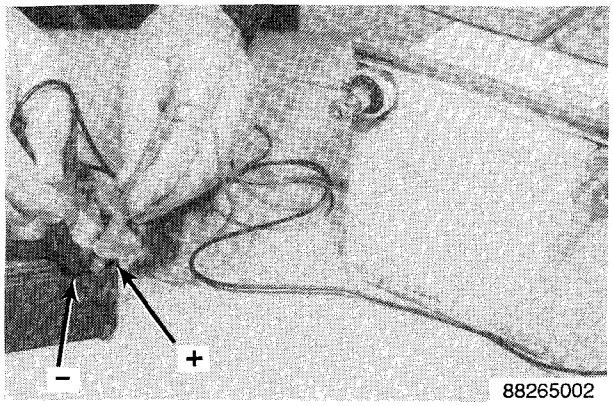
TESTING THE ELECTRIC SHIFT MOTOR

STEP 1



Connect a jumper wire between the center socket of the harness port in the cover and a 12 volt power supply ground. Apply 12 volt power to one of the outside ports and observe motor movement.

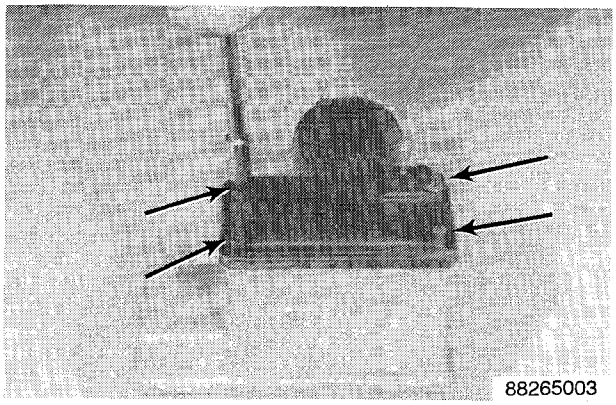
STEP 2



Apply 12 volt power to the opposite outside connector port and observe motor movement.

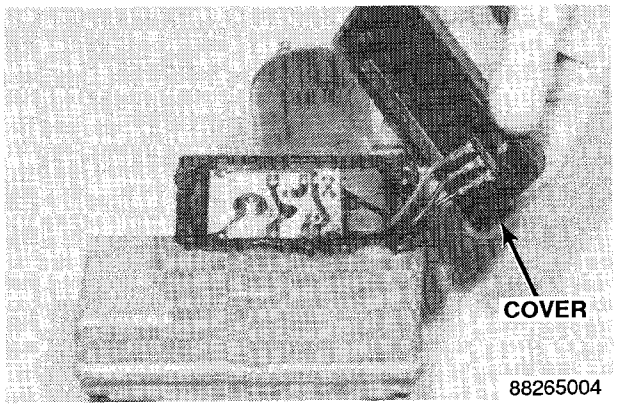
NOTE: *If the motor moved properly in both cases the problem may be due to a poor harness connection on the cover or a defective cover. If motor movement was not observed in one or both directions, proceed to Step 3.*

STEP 3

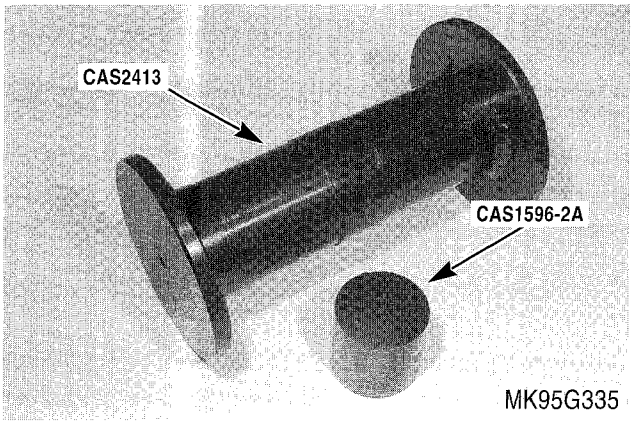


Remove the four hex head cover retaining screws.

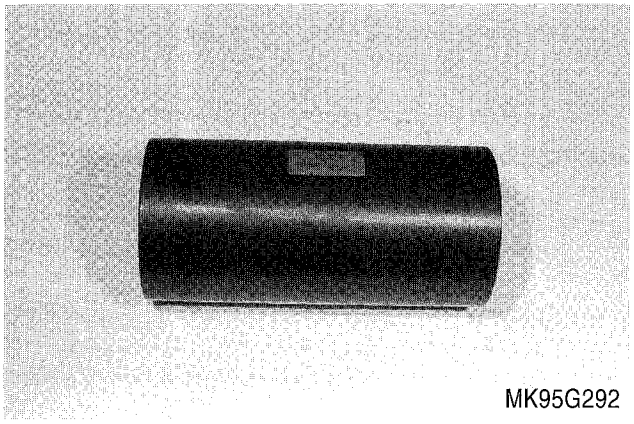
STEP 4



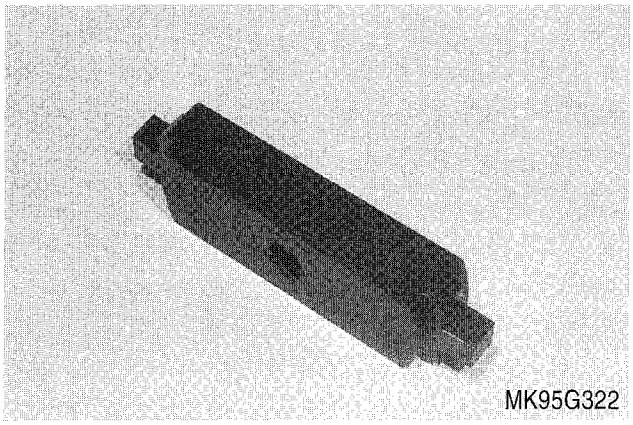
Remove the cover. It may be necessary to pry upwards carefully with the tip of a thin screwdriver to break the RTV sealing bond.



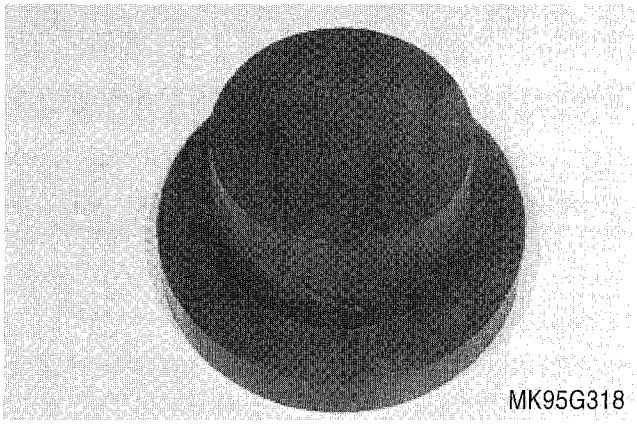
CAS 2413 PINION DEPTH GAUGE ARBOR
CAS 1596-2A GAUGE BLOCK



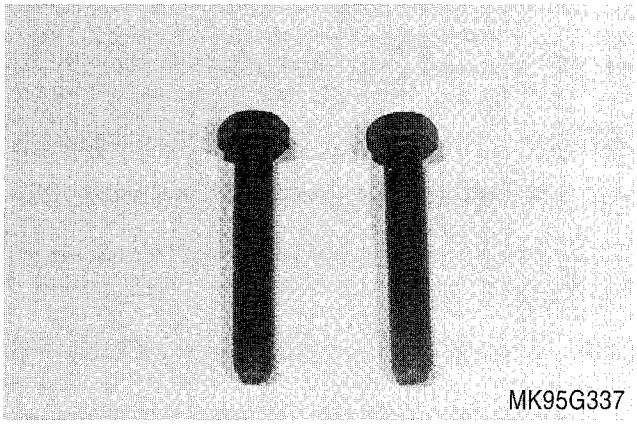
CAS 2414 PINION BEARING CONE INSTALLER



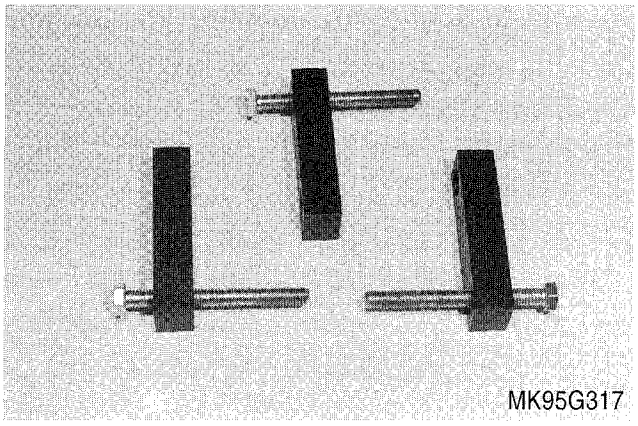
CAS 2415 DIFFERENTIAL BEARING PRELOAD WRENCH



CAS 2416 SPINDLE STEP PLATE



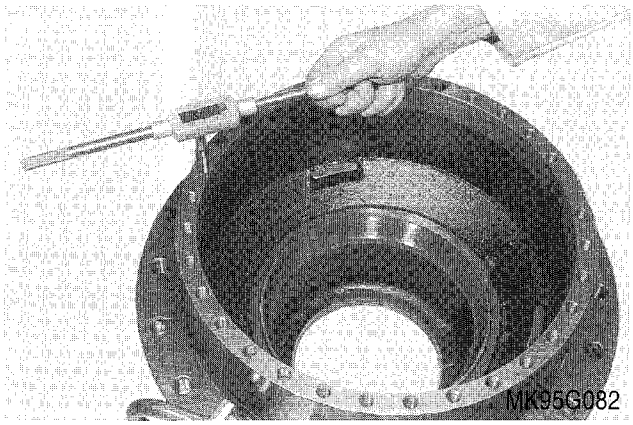
CAS 2417 METRIC FORCING SCREW SET



CAS 2418 PLANETARY CARRIER RETAINING BRACKET SET

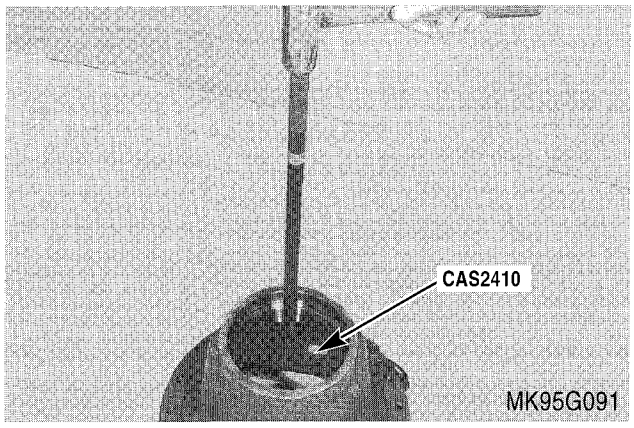
WHEEL HUB ASSEMBLY AND INSTALLATION

STEP 54



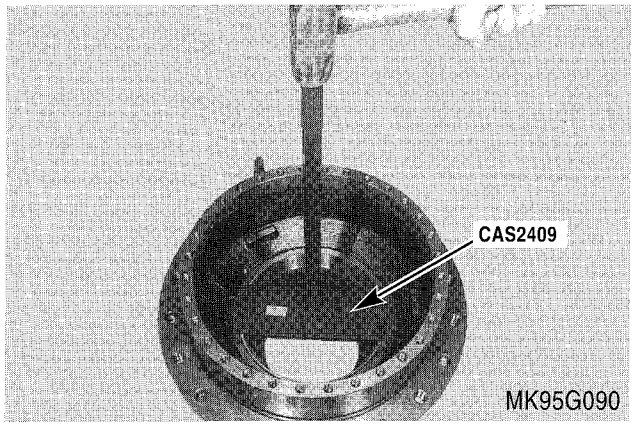
Use OEM 6285-14 (14 x 1.5 mm) Tap to clean the end cover attaching bolt holes of thread lock material. Clean the machined surface on the face of the hub of all old sealant. Use clean approved solvent to clean the wheel hub.

STEP 55



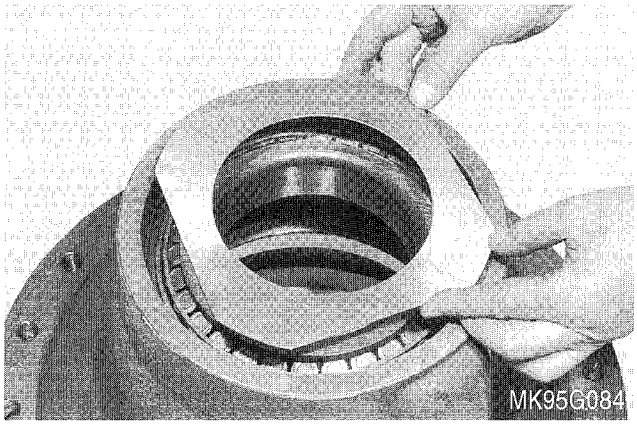
If removed, use CAS 2410 Bearing Cup Installer and CAS 2405 Handle to install the inner hub bearing cup.

STEP 56



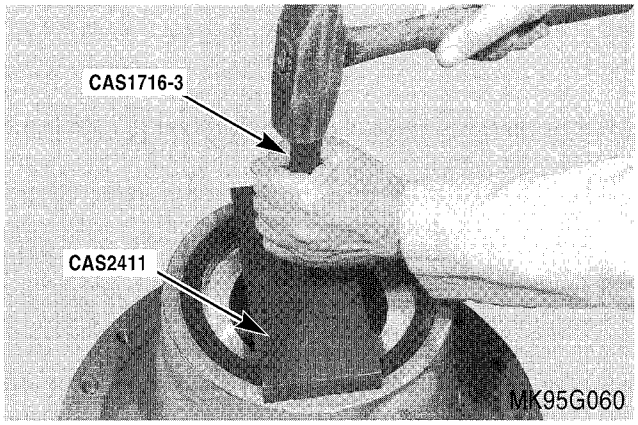
If removed, use CAS 2409 Bearing Cup Installer and CAS 2405 Handle to install the outer hub bearing cup.

STEP 57



Turn the hub to rest on the outer machined surface. Lubricate and install the inner bearing cone. Install the seal stripper plate on top of the bearing cone.

STEP 58

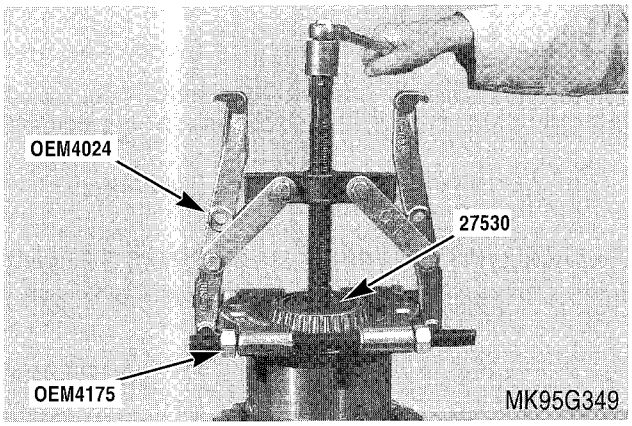


Lubricate the lips of a new hub seal with clean grease. Use CAS 2411 Hub Seal Installer and CAS 1716-3 Handle to drive in a new seal assembly.

NOTE: *This is a 2 piece seal, DO NOT separate the seal before installing.*

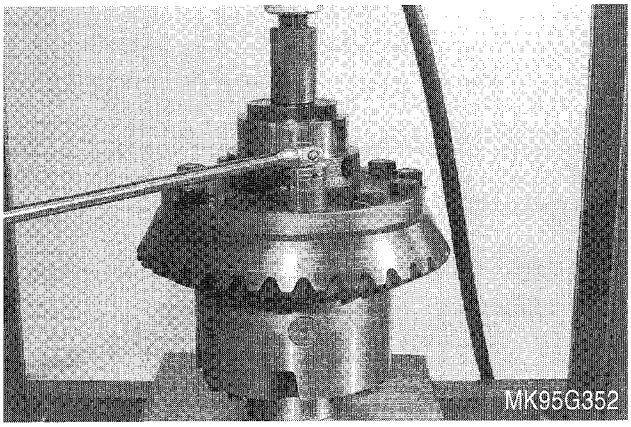
STANDARD DIFFERENTIAL DISASSEMBLY

STEP 129



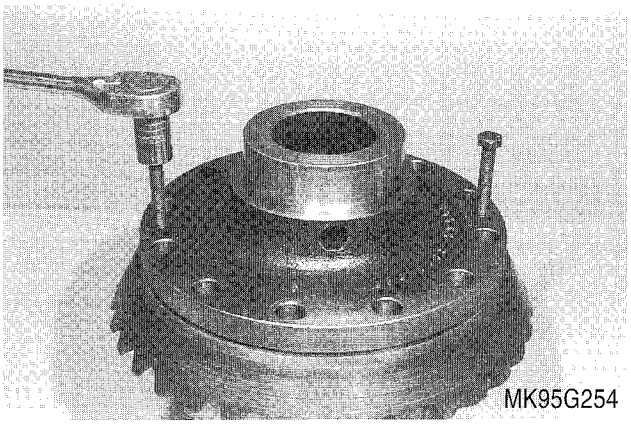
Use a split, knife edge bearing puller (OEM 4175) arrangement and step plate to remove each carrier side bearing cone.

STEP 130



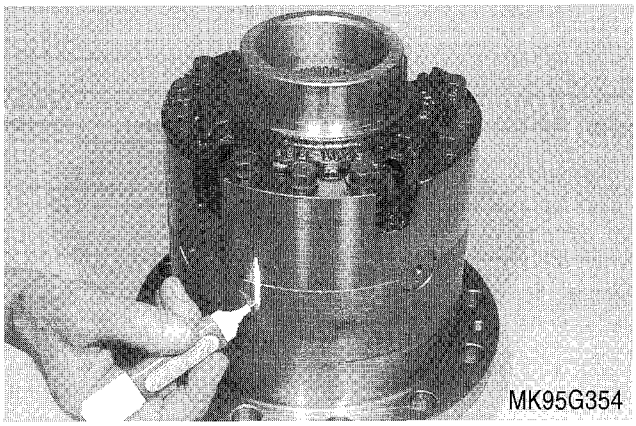
Clamp the differential stationary on a press bed. Remove the bolts securing the ring gear. The bolts are secured with thread lock material and may require heat to remove.

STEP 131



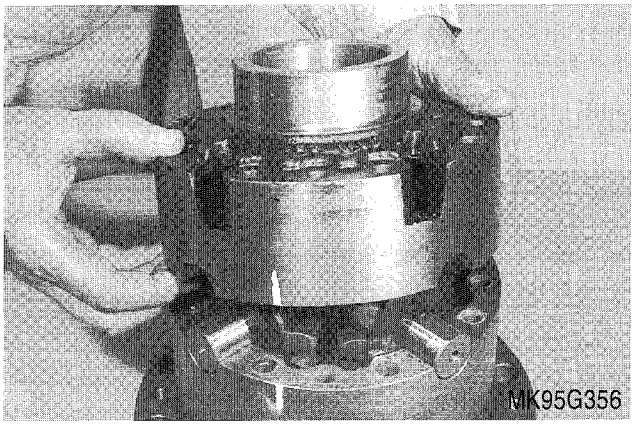
Use the CAS 2417 Threaded Bolts to push the ring gear from the flange of the case.

STEP 132



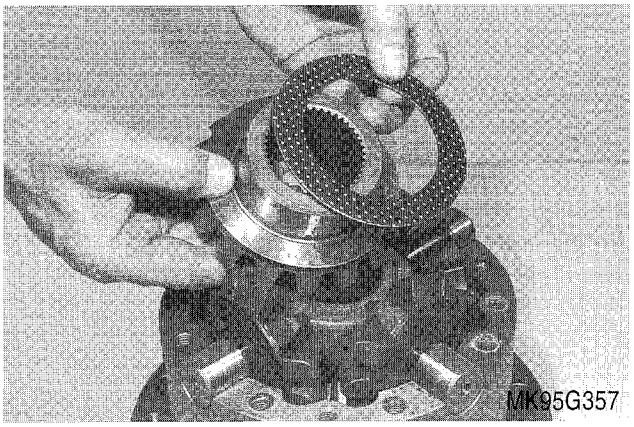
The differential case may or may not have a match mark. If no match marks are found, mark each case half. Remove the attaching bolts.

STEP 133



Separate the case halves.

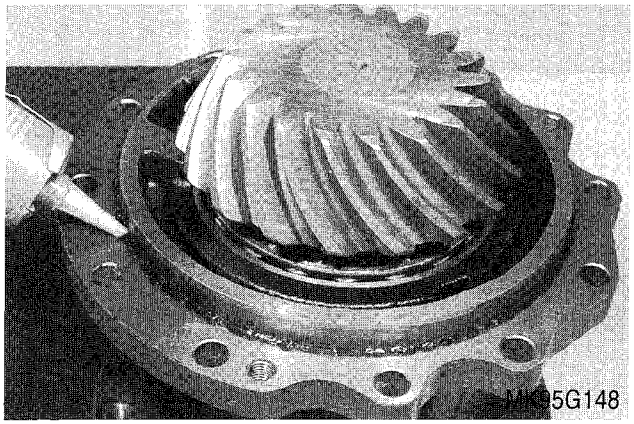
STEP 134



Remove the first side gear and thrust washer.

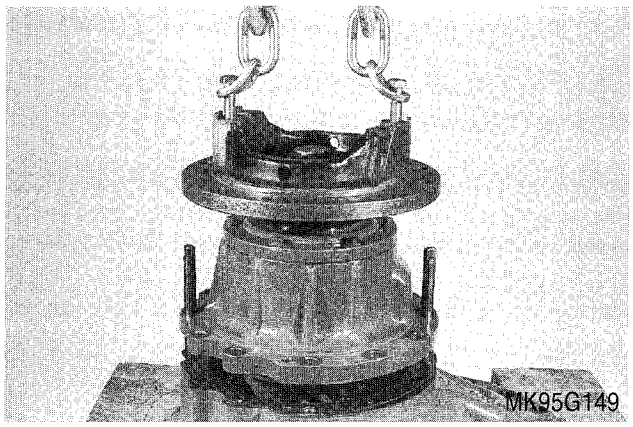
INSTALLING THE PINION CARRIER

STEP 210



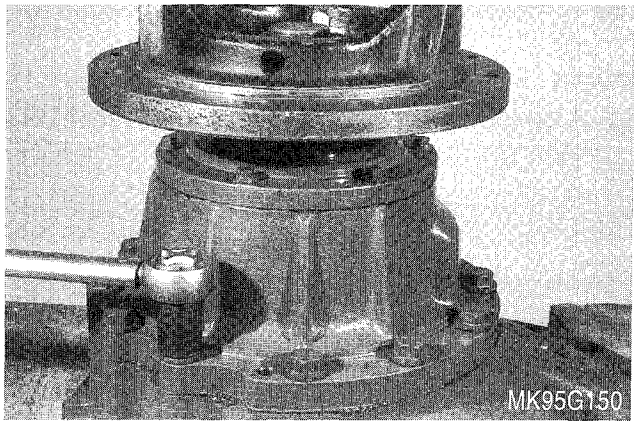
Put a small continuous bead of Loctite 515 Sealant around the ID of the pinion housing pilot flange.

STEP 211



Install the selected pinion depth shim pack and the pinion carrier assembly into the differential housing.

STEP 212

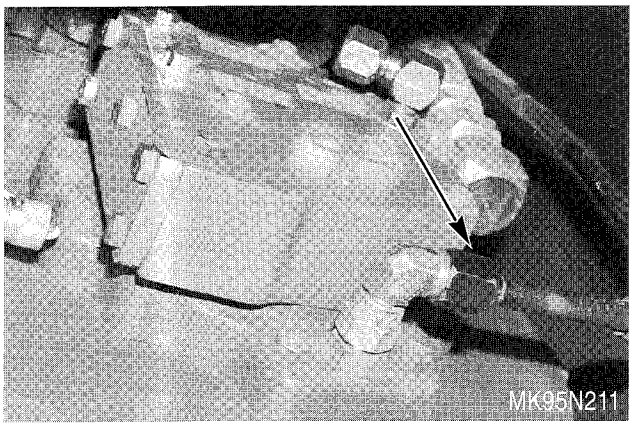


Use Loctite 242 Thread Lock on the pinion carrier retaining bolt threads. Install and tighten the bolts to a final torque of 88 to 103 lb ft (120 to 140 Nm).

SPECIAL TORQUE VALUES

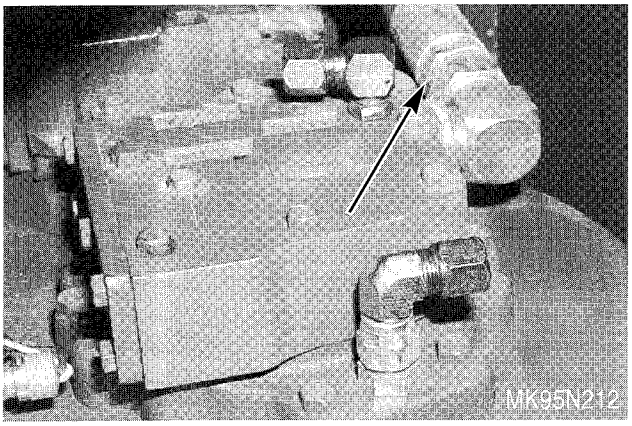
	U.S. Value	Metric Value
Driveshaft to Coupler Mount Bolts	110 to 132 lb ft	(149 to 179 Nm)
Dust Cover Mount Bolts	35 to 42 lb ft	(47 to 57 Nm)
Drive Coupler/Dust Slinger Mount Bolts	45 to 54 lb ft	(61 to 73 Nm)
Driveshaft Shield Bolts	17 to 21 lb ft	(23 to 28 Nm)
Universal Joint Flange Bolts	70 to 80 lb ft	(95 to 108 Nm)

STEP 27



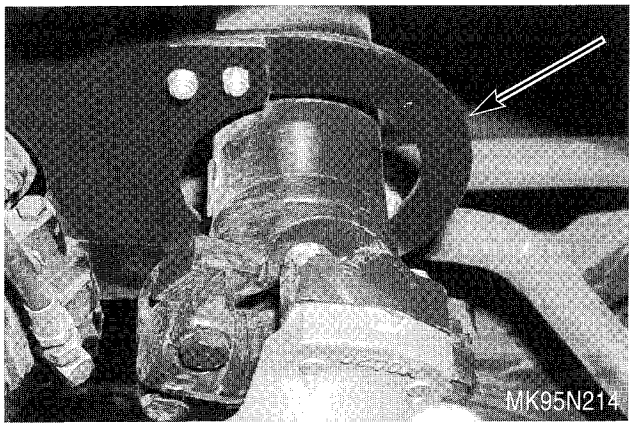
Remove the PTO lubrication supply tube and secure to the left side frame. Cap the transmission fitting and plug the tube.

STEP 28



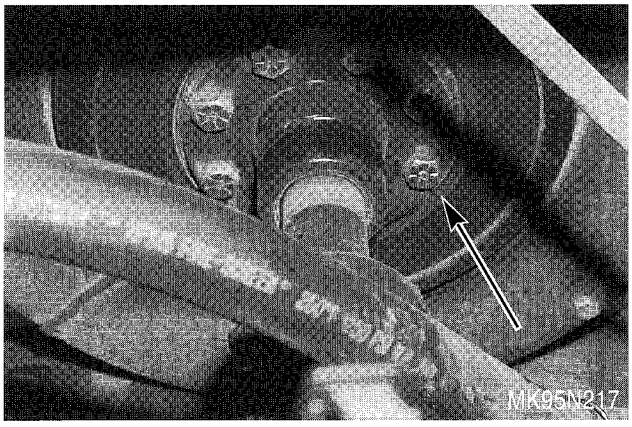
Remove the transmission pressure supply hose from the transmission. Plug the hose and cap the fitting.

STEP 29



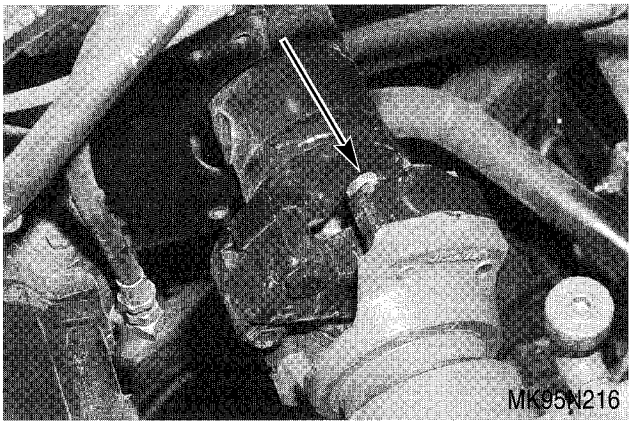
Remove the driveline guard.

STEP 30



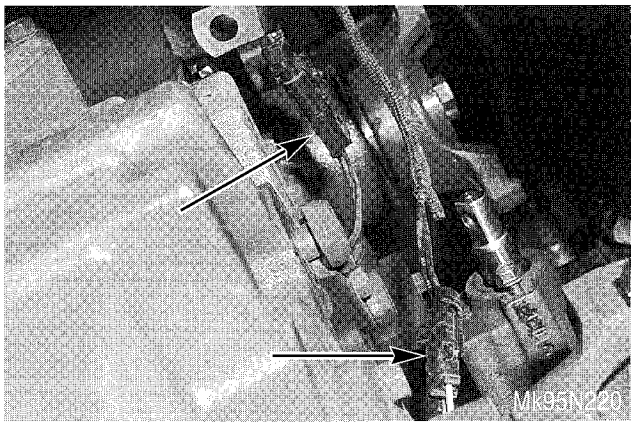
Remove the input drive shaft bolts from the engine flywheel.

STEP 31



Remove the u-joint cap retaining bolts from the input shaft yoke. Remove the drive shaft.

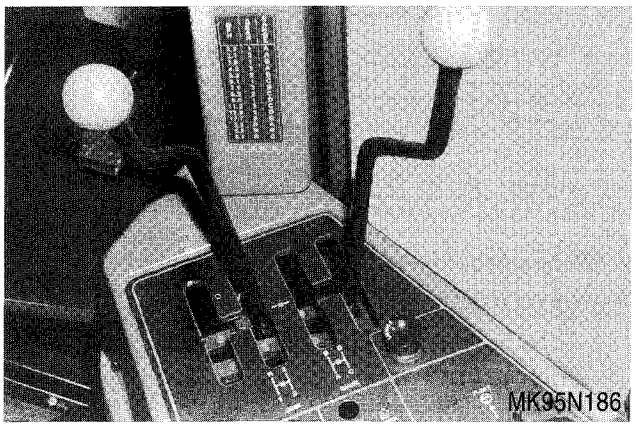
STEP 32



Disconnect the MPH sensor and the HM24 High-Low control valve wire harness connectors.

SHIFT LEVER CABLE ADJUSTMENT

STEP 92



Move both shift levers through all gear and range positions. The transmission shift arms must snap into their detent positions before the shift levers bottom out in the shift gates.

If adjustment is necessary:

1. Position all the shift arms on the transmission in the neutral detent position.

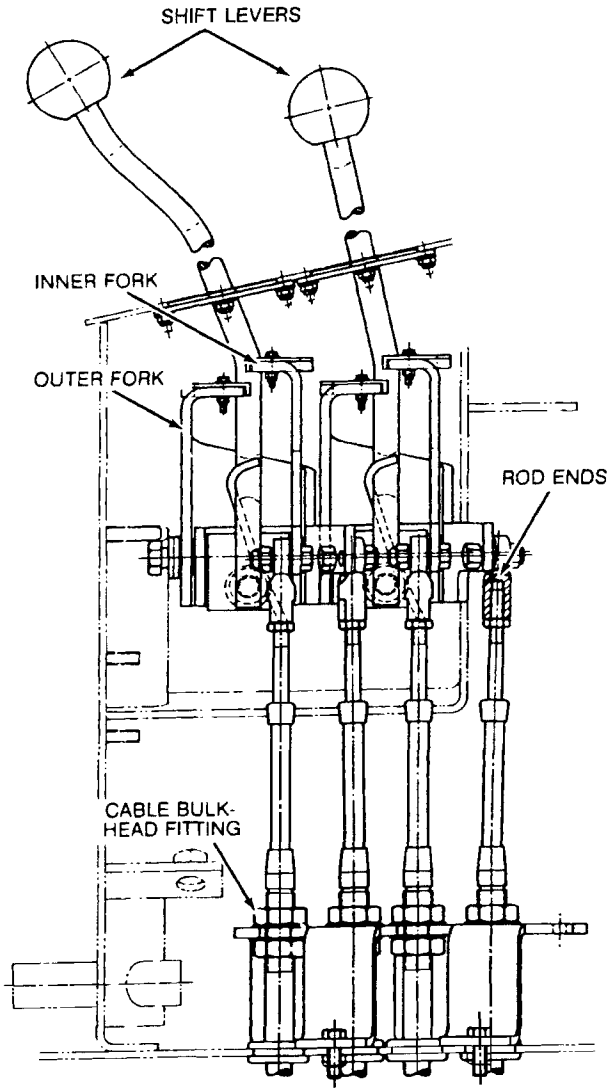
2. Adjust the rod ends so that the shift levers are centered in the neutral section of the shift gates. When the shift levers are moved side to side from the inner to the outer forks the levers must be centered in the slots.

3. Adjust the cable bulkhead fittings so that the cable travel is equal in both directions from the neutral position.

4. After adjustment the transmission shift arms must snap into their detent positions before the shift levers bottom out in the shift gates.

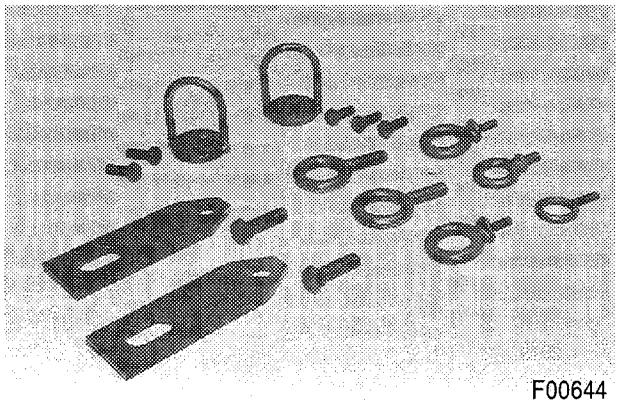
5. Remove the chock blocks.

6. Remove the blocking from under the rear wheels or start the tractor and drive off of the ramps and park on a level surface. Shut off the engine and check the transmission and hydraulic reservoir fluid level. Add HY-TRAN ® PLUS fluid as needed.



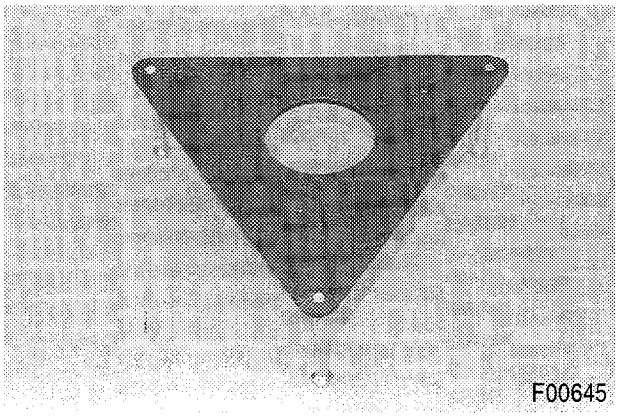
381L91

SPECIAL TOOLS



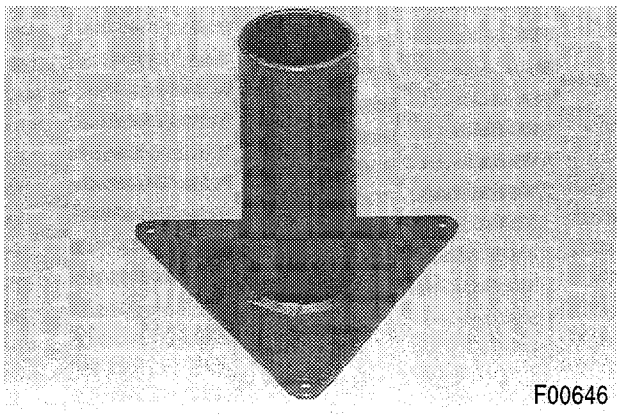
F00644

CAS 2195 SHAFT LIFTING ADAPTERS, CAS 2197 LIFTING KIT AND CAS 2198 LIFTING EYE BOLT SET



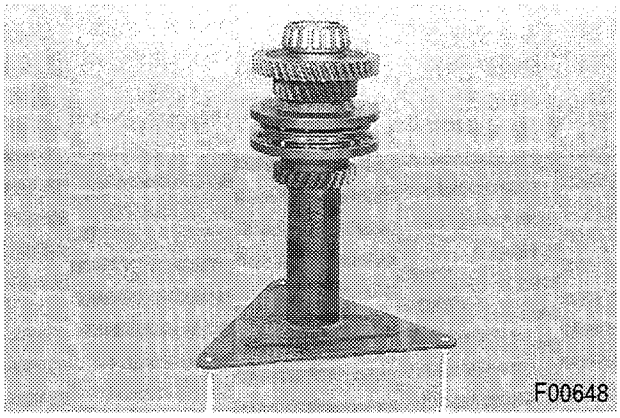
F00645

CAS 2199-1 SHAFT HOLDING FIXTURE BASE



F00646

CAS 2199-2 SHAFT HOLDING FIXTURE UPRIGHT



F00648

CAS 2199 SHAFT HOLDING FIXTURE BASE AND UPRIGHT AS USED TO SUPPORT A SHAFT FOR DISASSEMBLY

109F95

CAS 2428 BEARING PRESS SLEEVE

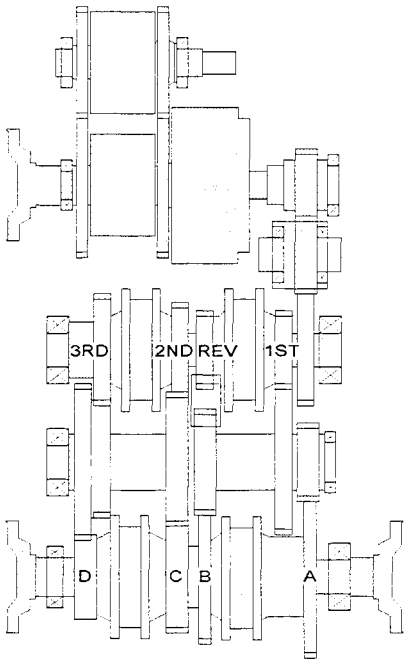
CHANGING SPEEDS

The transmission can be shifted from any forward gear (1, 2 3) - range (A, B, C, D) combination to any other forward gear - range combination or reverse gear to any range (A, B, C) on-the-go. Range D is mechanically locked out in reverse.

IMPORTANT: *The transmission must not be shifted from forward to reverse or reverse to forward while the tractor is moving.*

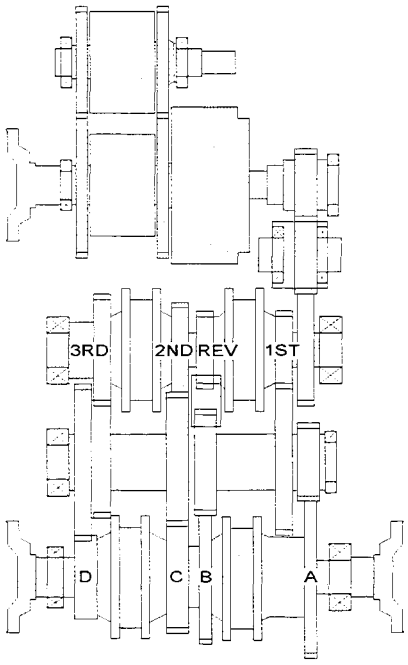
The master clutch can be modulated in all speeds and must be depressed during all speed changes.

The "2-A" speed is the second forward speed. The following forward speeds are shown in order of increasing speed.



POWER FLOW 2-A-L
GEAR RATIO 5.068

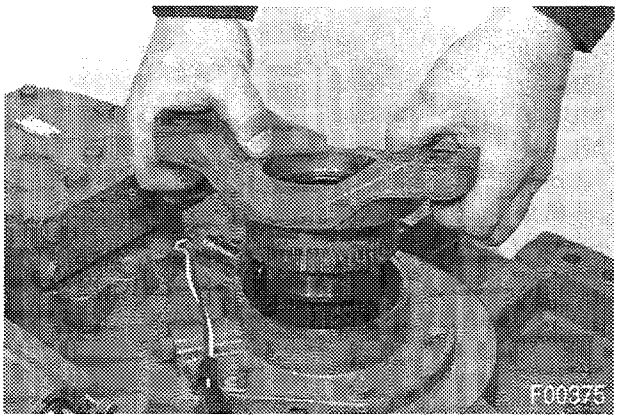
66F95



POWER FLOW 2-A-H
GEAR RATIO 4.712

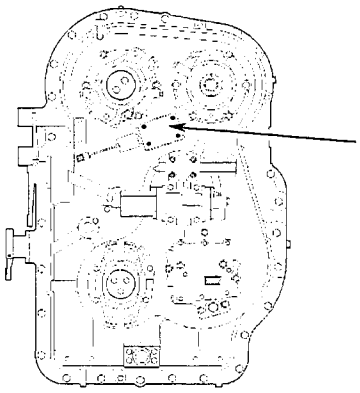
67F95

STEP 9



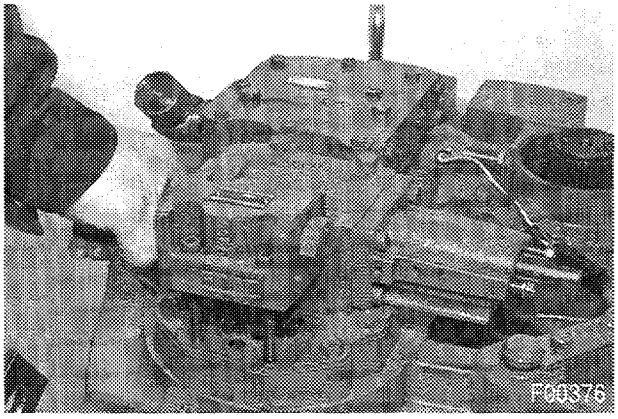
Repeat Step 8 to remove and label the front drive yoke.

STEP 10



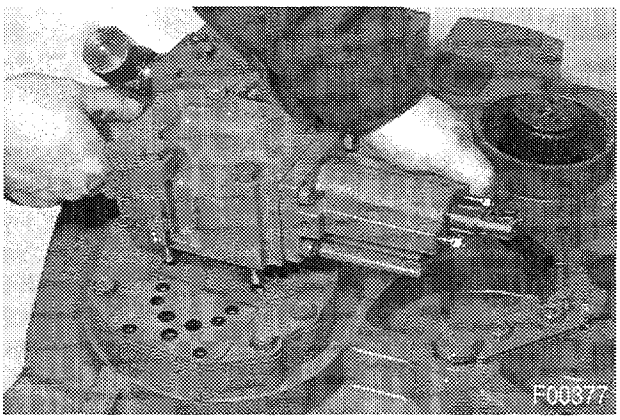
On the 24 speed transmission, remove the mounting bolts and High-Low control valve.

STEP 11



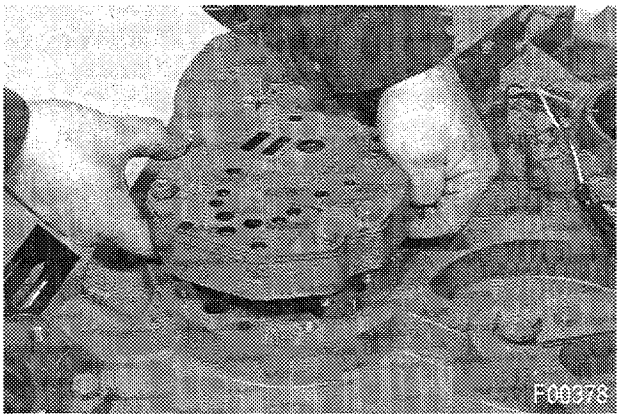
Remove the lock out valve assembly.

STEP 12



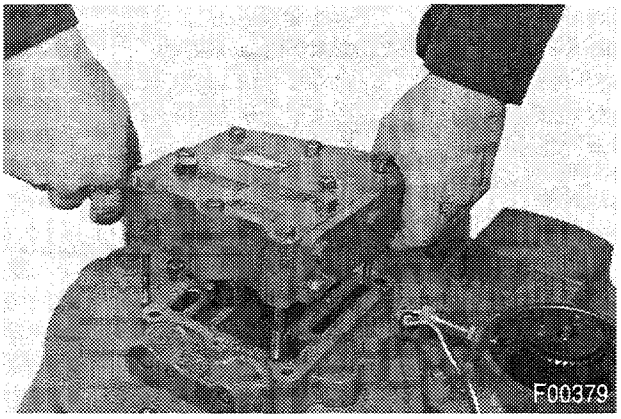
Remove the master clutch control valve assembly.

STEP 13



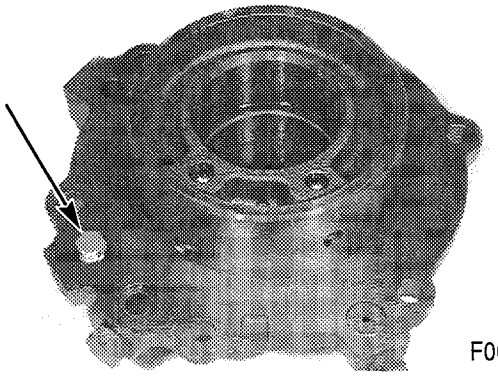
Remove the speed shaft bearing retainer and shims. Keep the shims with the retainer.

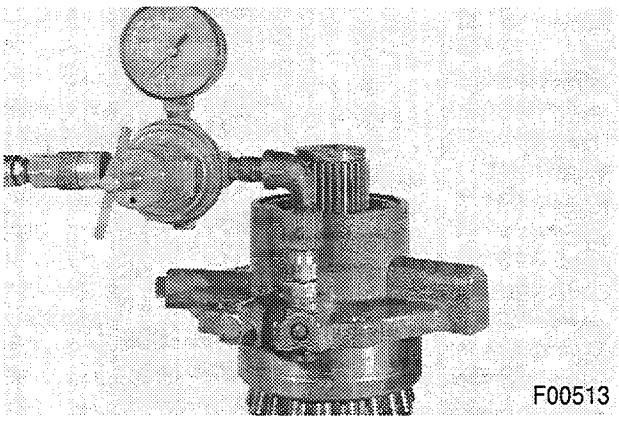
STEP 14



Remove the regulator valve assembly.

STEP 87


F00441


F00513

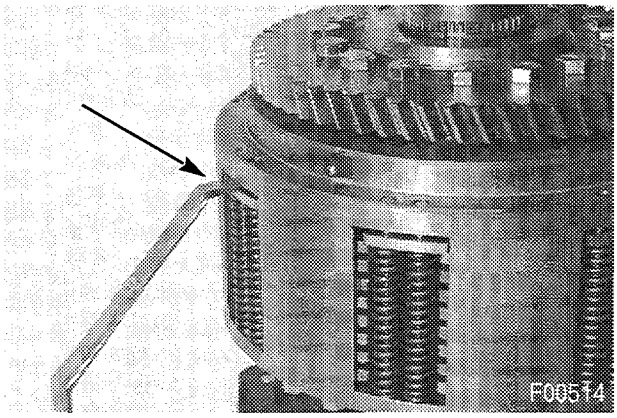
Use a 1/8 inch NPT tap to thread the master clutch pressure port of the input shaft bearing retainer. Temporarily install a plug in the port.

NOTE: *Remove any metal shavings from the port with clean solvent and compressed air.*

Install the input shaft bearing retainer. Connect a regulated air supply to the bearing retainer master clutch main pressure test port. Gradually increase the air pressure and rotate the master clutch assembly.

NOTE: *Some audible air leakage is normal. If there is excessive leakage by the shaft seals, install the bearing cup on the bearing to position the retainer.*

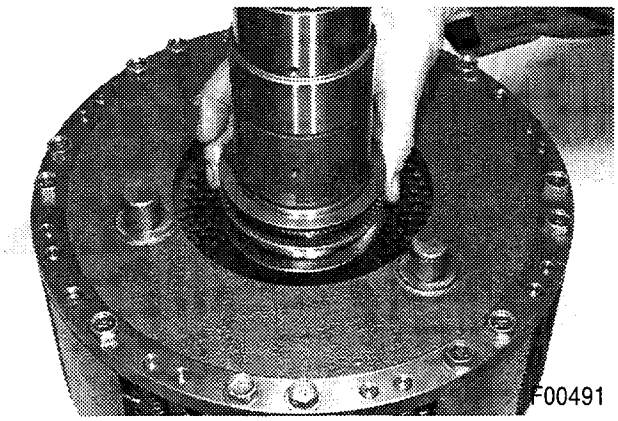
STEP 88


F00514

The master clutch piston must begin to move at approximately 40 PSI (275 kPa, 2.8 Bar). The piston must rise evenly on all sides. The master clutch piston must be at full extension at approximately 80 PSI (552 kPa, 5.5Bar). Check the master clutch for lock-up by trying to turn the clutch hub at 80 PSI (552 kPa, 5.5 Bar). Measure the piston travel in all eight openings of the drum with a feeler gauge. Piston travel must be 0.276 to 0.315 inch (7.0 to 8.0 mm).

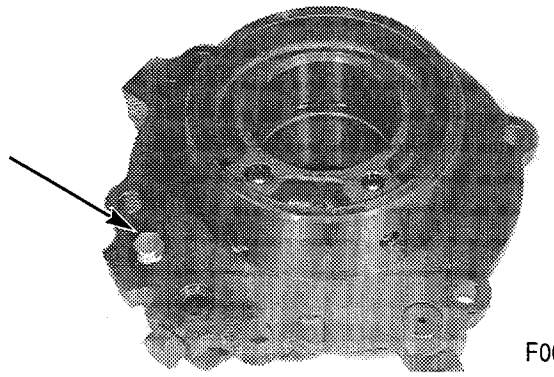
Adjust the piston travel by replacing the steel plates. The steel plates come in two thicknesses, 0.268 inch (6.8 mm) and 0.283 (7.2 mm).

STEP 89


F00491

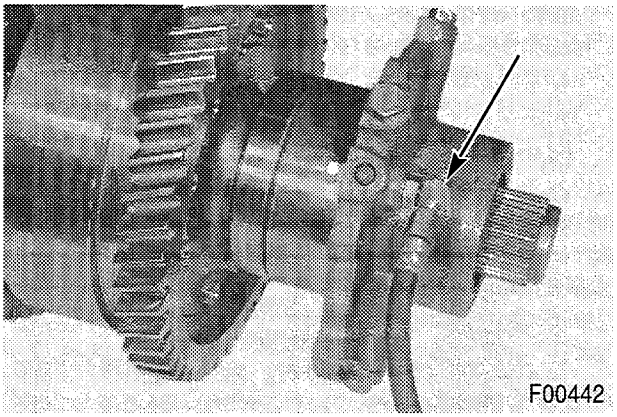
Install the clutch hub bearing retainer snap ring, thrust washer, thrust bearing and thrust washer.

STEP 163



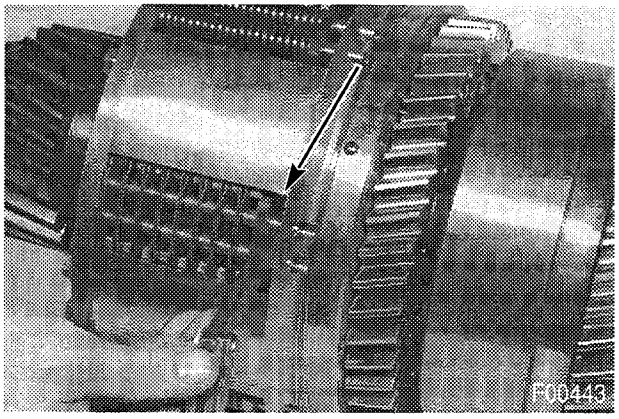
Use a 1/8 inch NPT tap to thread the clutch pressure port of the input shaft bearing retainer. Install a plug in the port.

STEP 164



Install an adaptor fitting to the main clutch pressure test port and connect to a regulated air supply. Install the bearing retainer assembly on the input shaft.

STEP 165



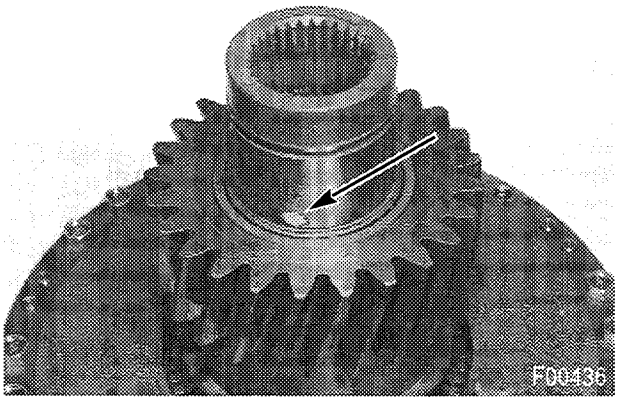
Gradually apply air pressure and rotate the master clutch assembly.

NOTE: *Some audible air leakage is normal.*

The master clutch piston must begin to move at approximately 40 PSI (275 kPa, 2.8 Bar). The piston must rise evenly from side to side. The piston must be at full extension at approximately 80 PSI (552 kPa, 5.5 Bar). Measure the piston travel with a feeler gauge. Piston travel must be within 0.276 to 0.315 inch (7.0 to 8.0 mm).

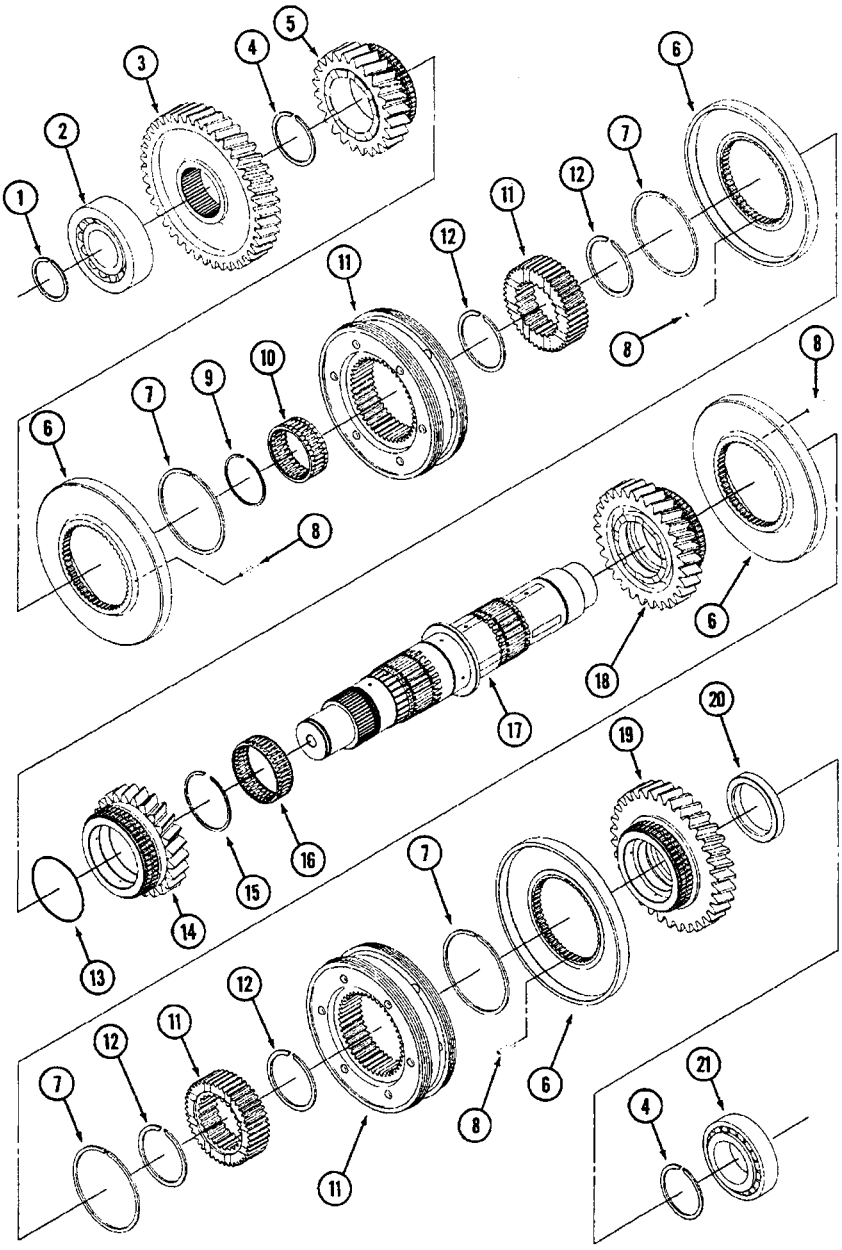
Adjust the piston travel by replacing the steel plates. The steel plates are available in two thicknesses, refer to the parts catalog for the correct plates.

STEP 166



Apply a small amount of Lubriplate No. 105 Assembly Grease to the anti-rotation ball seat. Install the steel ball.

SPEED SHAFT ASSEMBLY



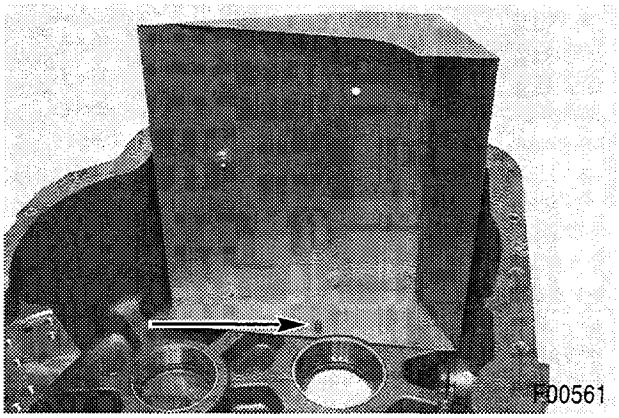
F946190

1. Select Snap Ring
2. Bearing
3. Driven Gear
4. Retaining Ring
5. 1st Gear
6. Synchro Disk
7. Snap Ring
8. Roll Pin
9. Retaining Ring
10. Needle Bearing
11. Synchro Assembly (Sleeve and Hub)
12. Retaining Ring
13. Retaining Ring
14. Reverse Gear
15. Retaining Ring
16. Needle Bearing
17. Speed Shaft
18. 2nd Gear
19. 3rd Gear
20. Thrust Spacer
21. Bearing

TRANSMISSION ASSEMBLY

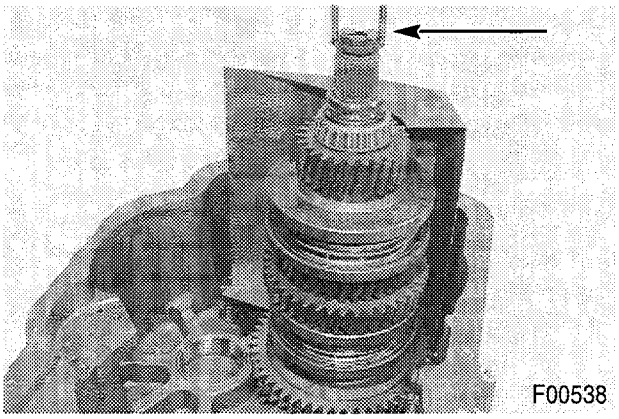
NOTE: *Prior to transmission assembly, be sure the front and rear housing sections are clean and that all sealant has been removed from the mating surfaces. The surfaces must be clean for a leak free seal. Use appropriate scraper and gasket remover. Do not use power brushes or sanders.*

STEP 285



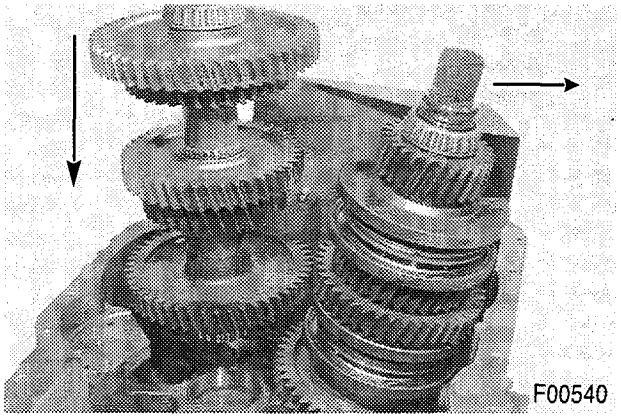
Install the oil baffle into the rear transmission housing. Be sure the hole in the baffle aligns with roll pin. The baffle will not move from side to side when properly installed. Do not install the mounting bolts.

STEP 286



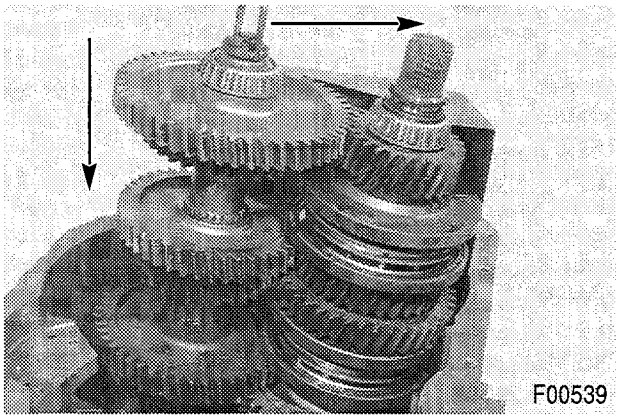
Install the CAS 2195-1 Shaft Lifting Adaptor onto the range (5th) shaft. Apply clean transmission fluid to the lower shaft bearings. Install the range shaft.

STEP 287

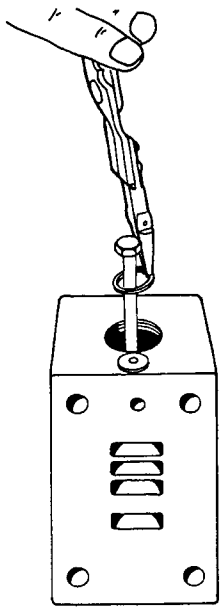


Install the CAS 2195-1 Shaft Lifting Adaptor to the center (4th) shaft. Apply clean transmission fluid to the lower shaft bearings. Tilt the range shaft and lower the center shaft into the housing until the driven 1st gear of the center shaft is on top of the A-range driven gear of the range shaft.

STEP 288



Tilt and mesh the center shaft into the range shaft and continue lowering the center shaft until both shafts are squarely in their bearing races.



161F95

7. Install a 1/4 NC x 3 inch cap screw into the valve spool. Push downward on the spool while removing the snap ring.

8. Remove the valve spool and spring. The spool and spring are non-serviceable, if they are broken or damaged the valve assembly must be replaced as a unit.

9. Inspect the parts and spool bore for scratches or bore. Light scoring or burrs can be removed with a very fine crocus cloth. Clean the spool with clean solvent, use compressed air to blow dry and oil the spool immediately. Inspect the spring for compressed or broken coils.

IMPORTANT: *If the spring has broken coils or burrs are removed from the spool bore the valve body must be thoroughly flushed with clean solvent.*

NOTE: *The valve body is not available as an individual part, it is only available as a complete valve assembly.*

ASSEMBLY

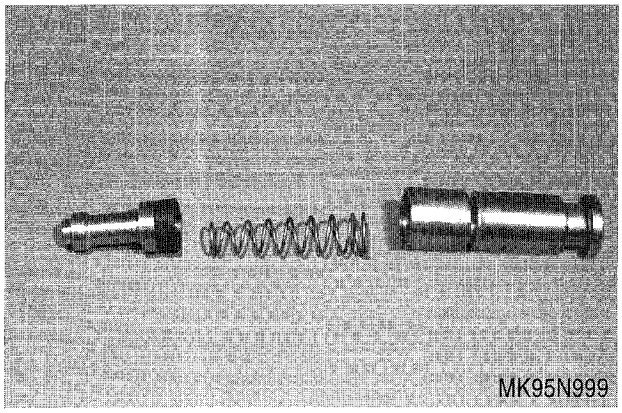
1. Install a new O-ring and the conical screen into the valve body.

2. Install the plug and O-ring seal. Tighten the plug to a torque of 8 to 9 lb ft (10 to 12 Nm).

3. Install the spring, lubricated spool and a new snap ring. Be sure the snap ring is fully seated. Push downward on the spool. The spool must move freely in the bore. Remove the cap screw from the spool.

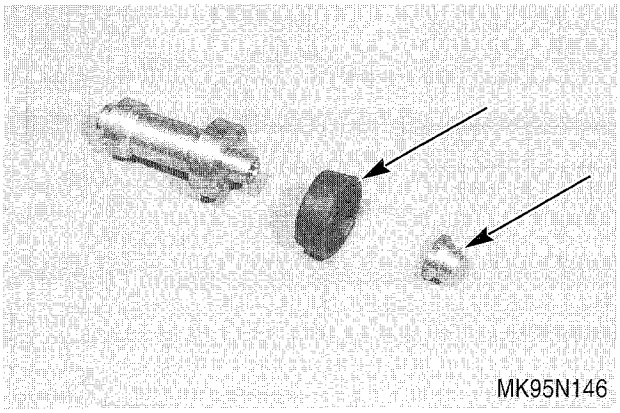
4. Install the solenoid assembly. Tighten the solenoid to a torque of 14 to 16 lb ft (19 to 22 Nm).

STEP 22



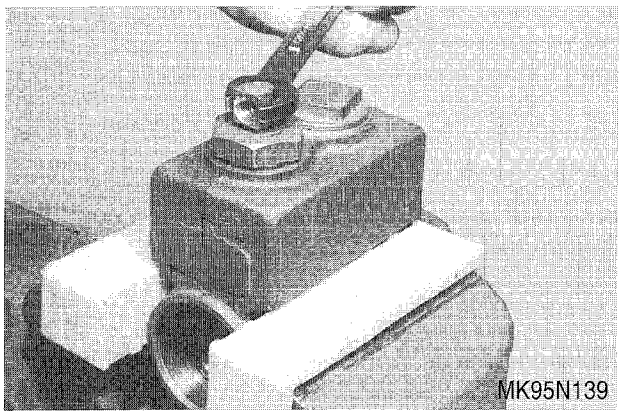
Remove the primary piston and return spring.

STEP 23



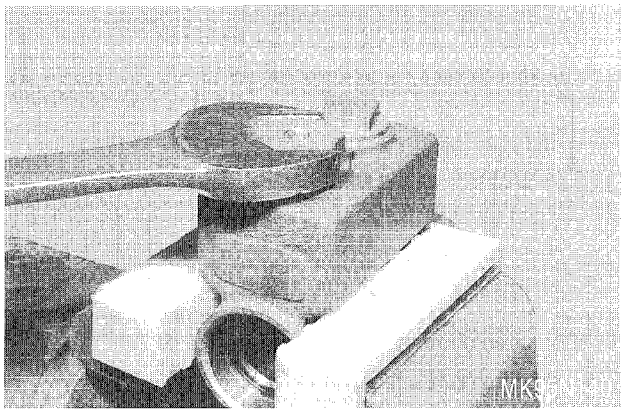
Remove and discard the spring retainer and cup seal from the piston.

STEP 24



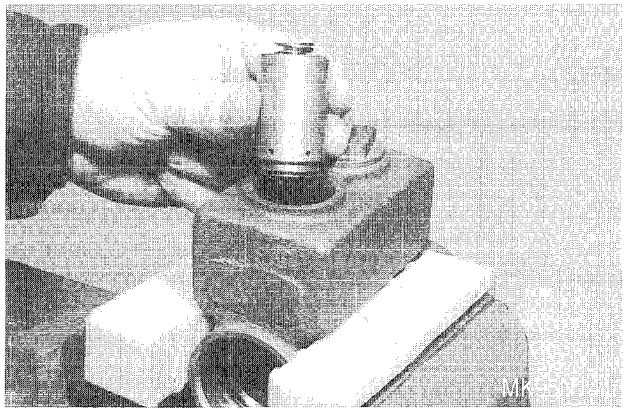
Remove the elbow fitting from the relief valve cover.

STEP 25



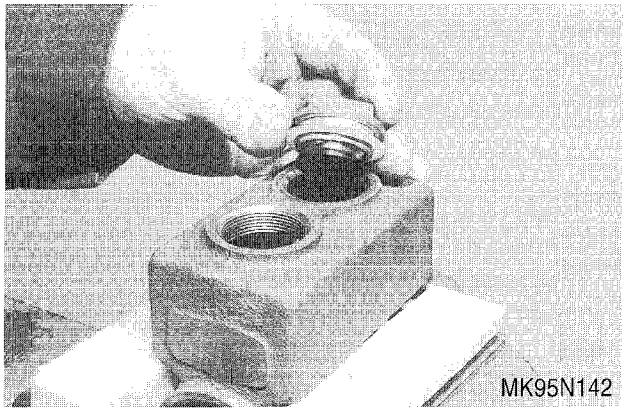
Remove the relief valve cover.

STEP 26



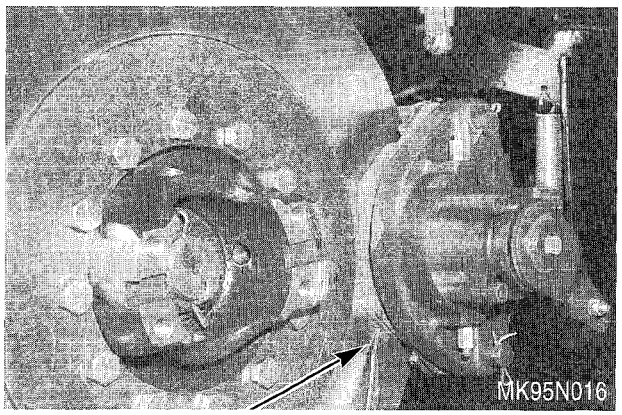
Remove the relief valve.

STEP 27



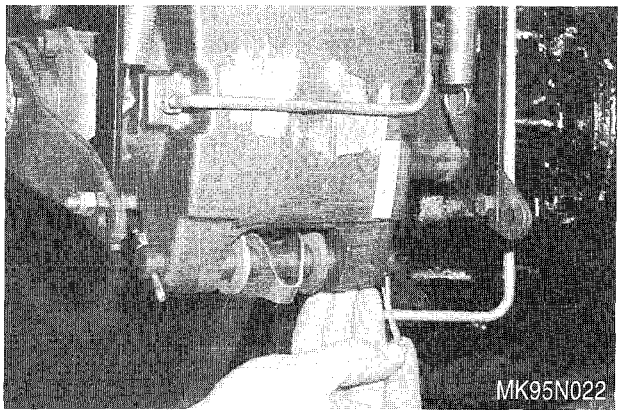
Remove the filler cap and discard the gasket.

STEP 5



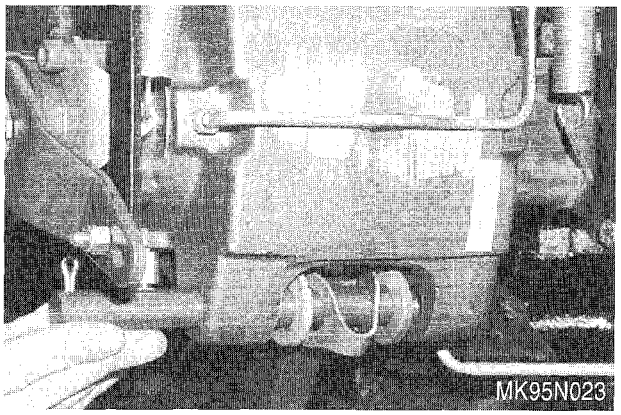
Using the flat side of a pry bar between the brake pad and disc, carefully work the piston back into the bore of the housing. This must be done on each side.

STEP 6



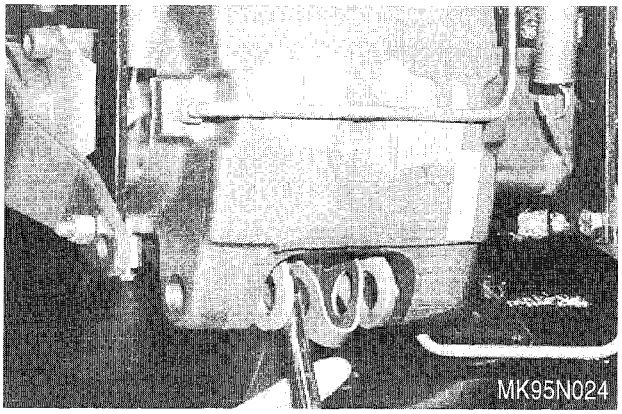
Remove one of the cotter pins from the lower brake pad retaining pin.

STEP 7



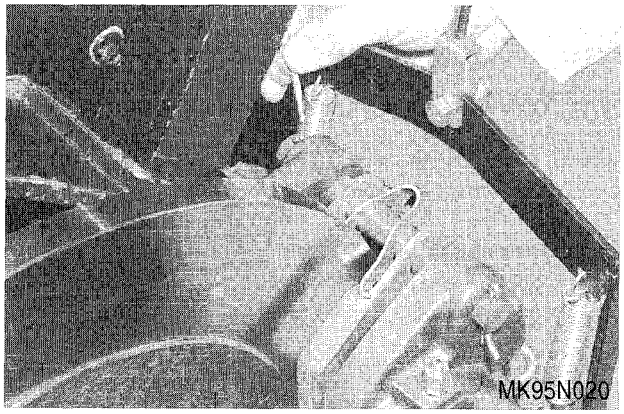
Remove the pin.

STEP 8



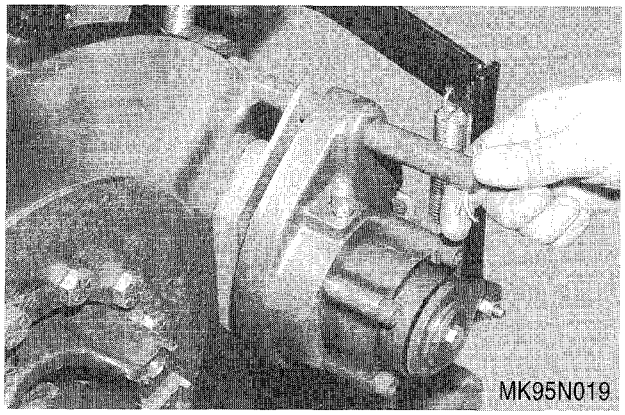
Remove and discard the return spring.

STEP 9



Remove one of the cotter pins from the upper brake pad retaining pin.

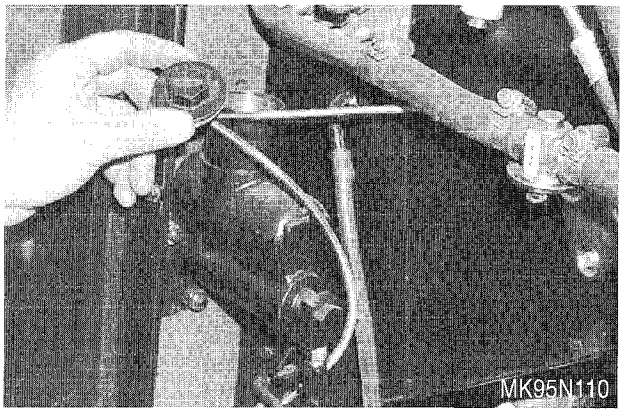
STEP 10



Remove the pin and return spring. Remove and discard the brake friction pads.

BRAKE CALIPER BLEEDING PROCEDURE

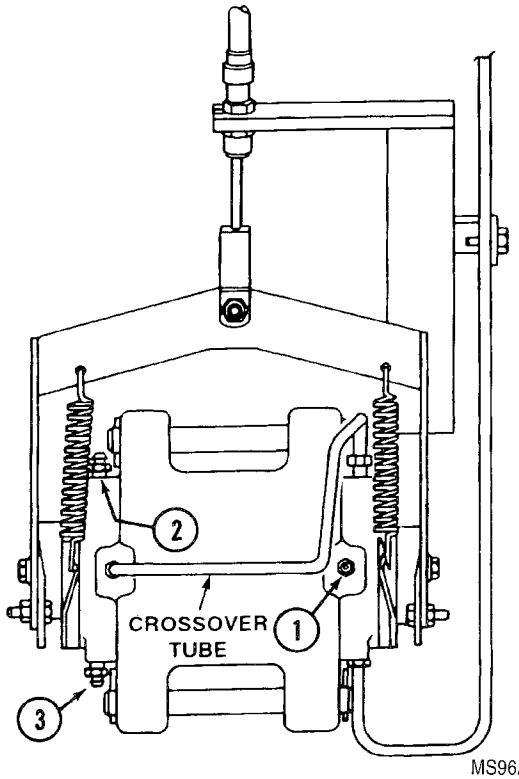
STEP 76



Remove the cap from the master cylinder. Fill the reservoir with DOT 3 brake fluid. Install the cap on the reservoir.

NOTE: *There are two methods of purging (bleeding) the air out of the brake system. PRESSURE bleeding is the preferred method and is the easiest procedure to do. The following steps describe the MANUAL bleeding procedure and will require a second person to assist.*

STEP 77



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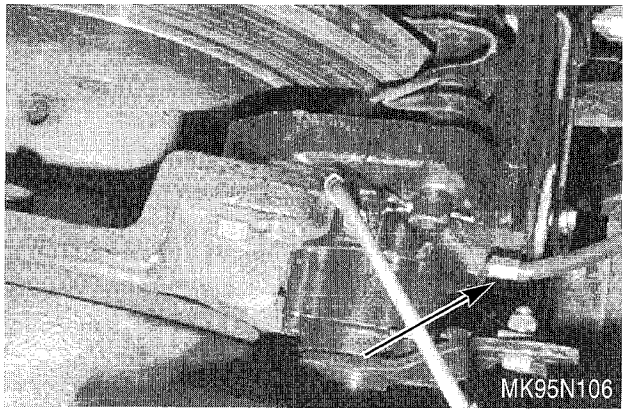
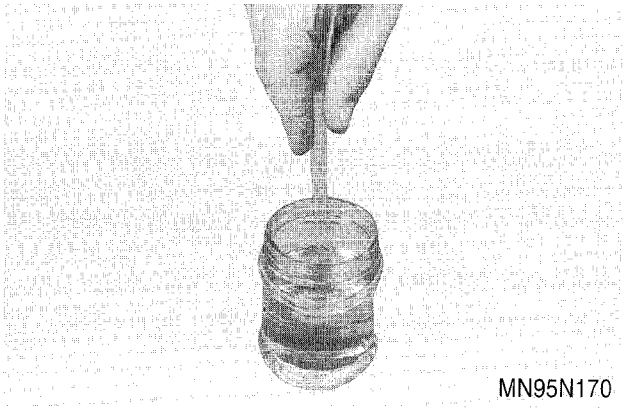
The brake caliper is fitted with three bleeder valves. Use the bleeder valves in the order shown to bleed the brake system. Always start with the bleeder valve that is closest to the master cylinder.

STEP 78



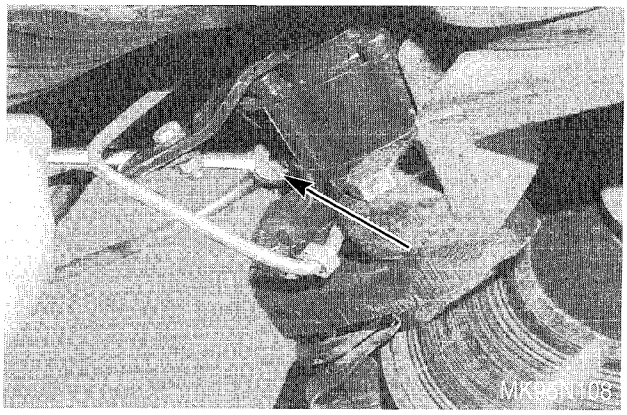
Connect a clear flexible tube to the nipple of the No. 1 bleeder valve.

STEP 79



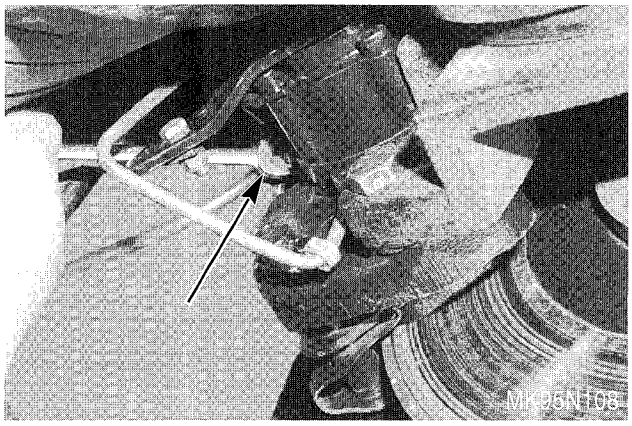
Put the other end of the tube into a jar containing a small amount of clean brake fluid. Be sure the end of the tube is submerged in the fluid.

STEP 80



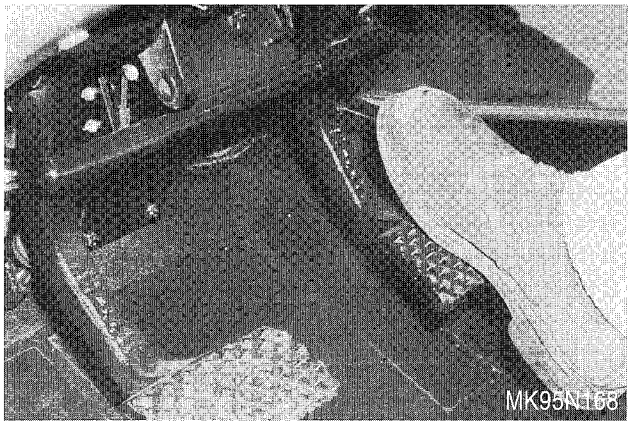
Depress (pump) the brake pedal several times. When the pedal is depressed from the top of stroke, open the No. 1 bleeder valve one-fourth turn.

STEP 46



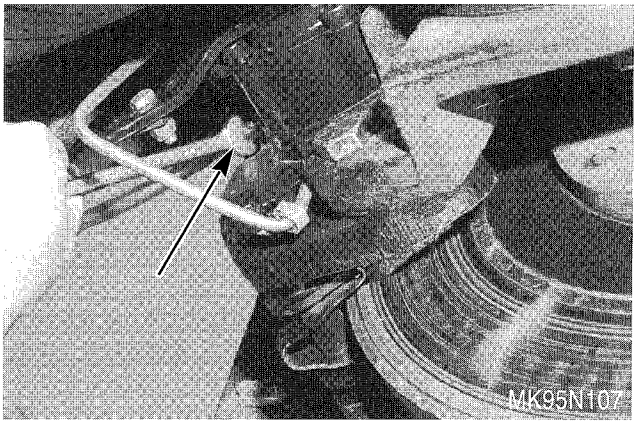
Depress (pump) the brake pedal several times. When the pedal is depressed from the top of stroke, open the No. 1 bleeder valve one-fourth turn.

STEP 47



Slowly depress and hold the brake pedal down and check for air bubbles rising in the bleeder jar fluid, indicating that air is being forced out of the system.

STEP 48



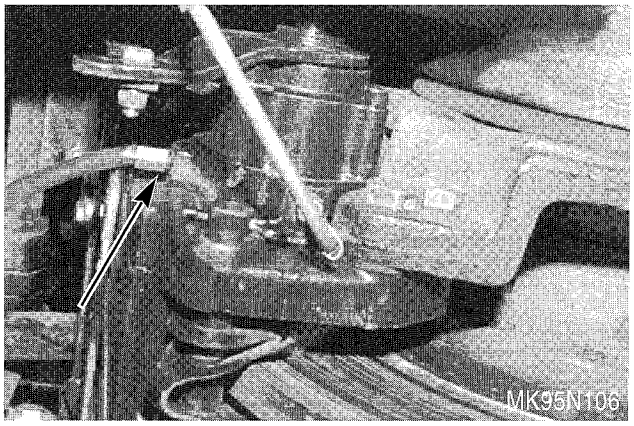
Close the bleeder valve when the brake pedal is held at the end of stroke.

IMPORTANT: *Always open the valve while the pedal is being depressed from the top of stroke and close the valve while the pedal is held at the bottom of stroke.*

STEP 49

Repeat Steps 46, 47 and 48 until the air bubbles stop. Add new fluid to the master cylinder reservoir as needed.

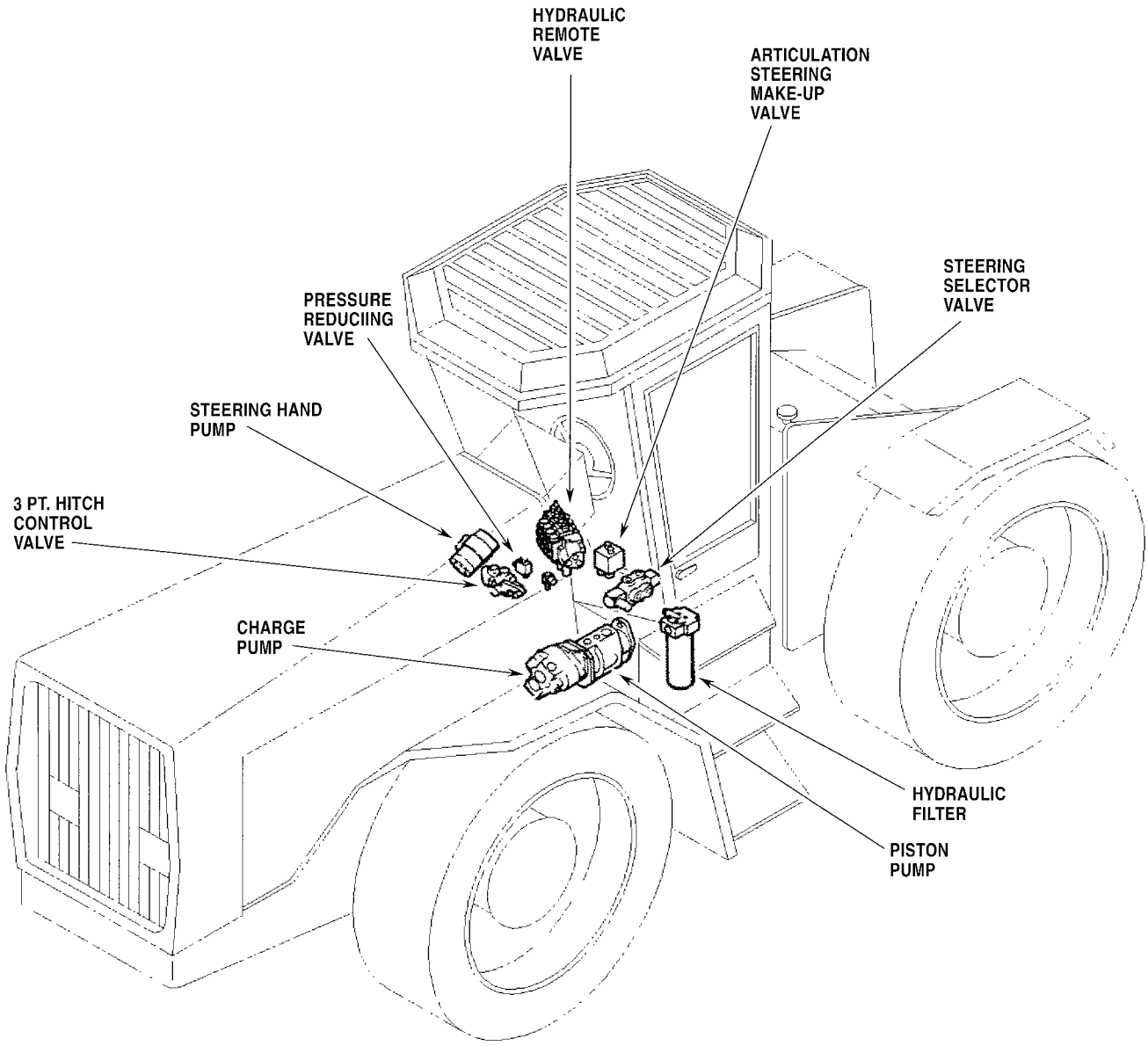
STEP 50



Remove the flexible tube from the No. 1 bleeder valve. Repeat Steps 45, 46, 47, 48 and 49 at the No. 2 and No. 3 bleeder valves until all air is removed from the system.

IMPORTANT: *Be sure to keep the reservoir filled with fluid.*

HYDRAULIC COMPONENT LOCATIONS



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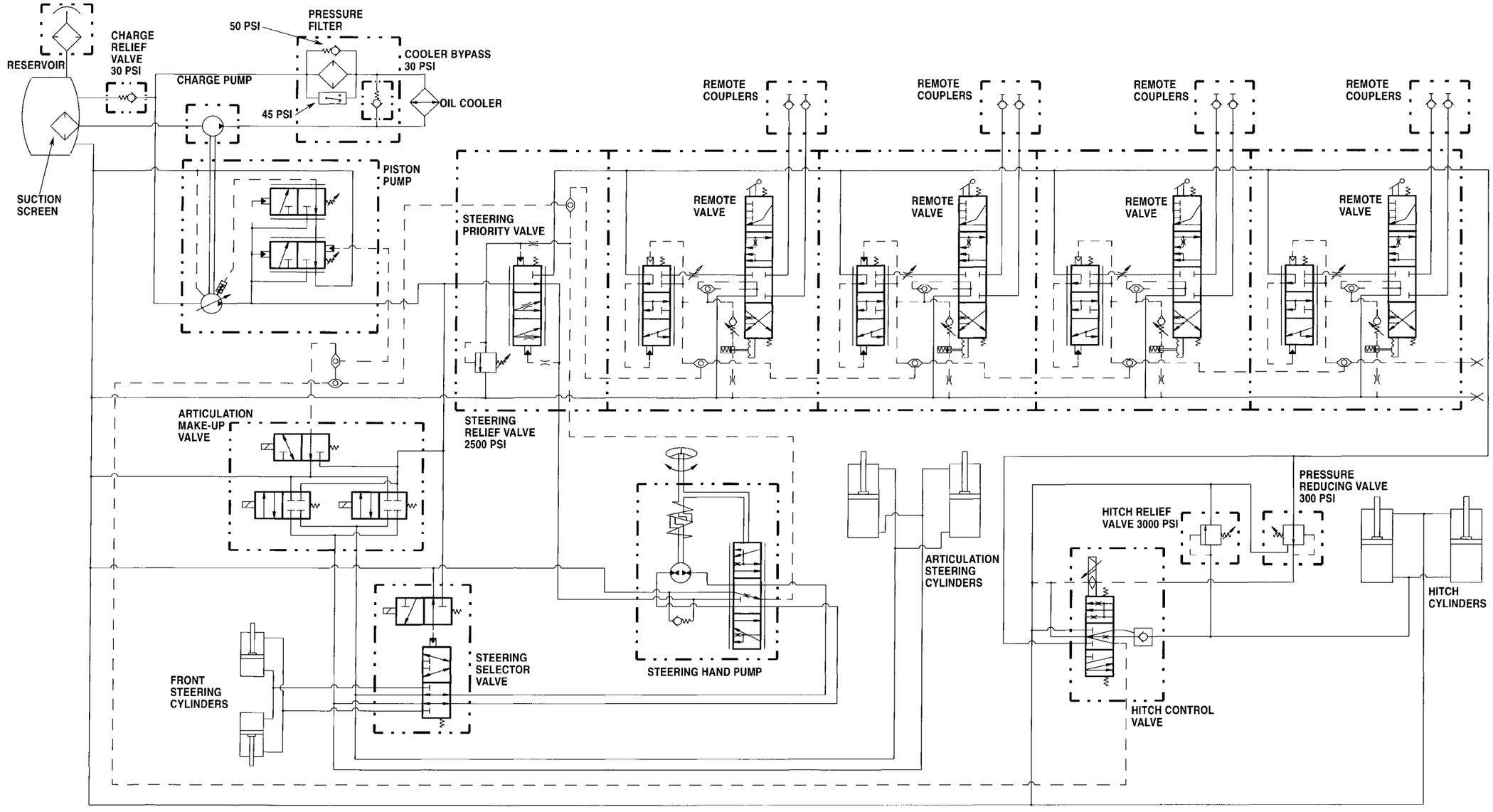
HYDRAULIC SYSTEM SCHEMATIC



MA95F070

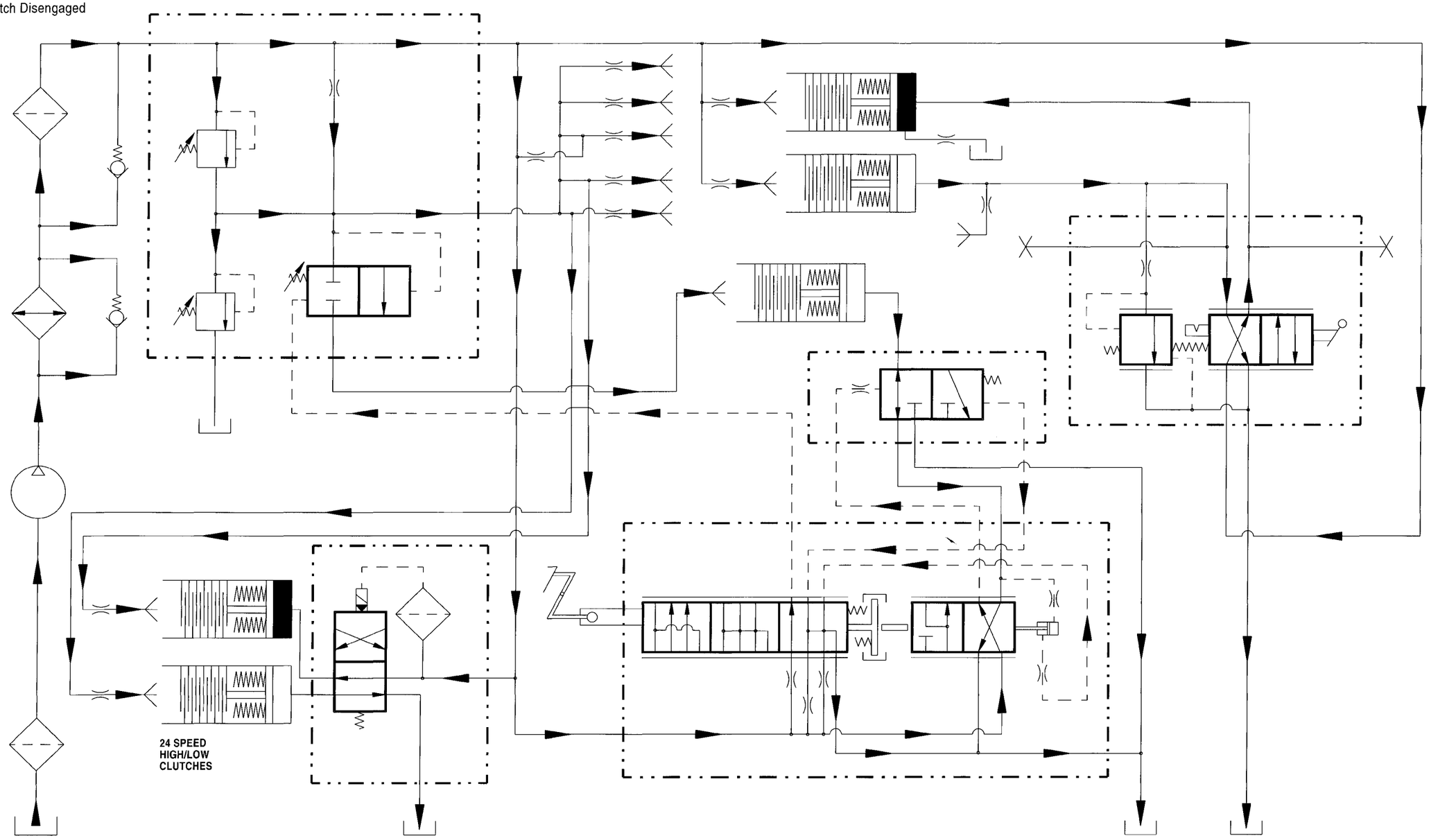
SYNCHROSHIFT TRANSMISSION HYDRAULIC SCHEMATIC

Engine Running

Inching Pedal Down

Lockout Valve Shifted

Clutch Disengaged

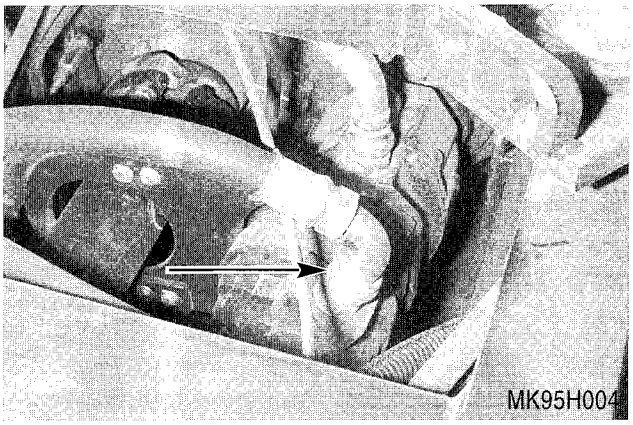


MA95F047

CHARGE PUMP PRESSURE TEST

WARNING: *Install the articulation cylinder locking blocks before performing any tests with the engine running.* SM438

STEP 1



Remove the hose from the pressure port of the charge pump.

STEP 2

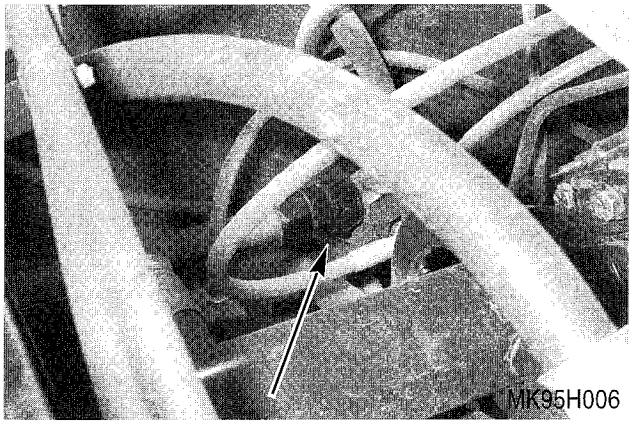
Install a 1-5/16 -12 F JIC swivel to 1-5/16 -12 M JIC tee fitting to the pressure port fitting.

STEP 3

Connect a 100 PSI (689 kPa, 6.9 bar) gauge and the hose to the tee fitting.

STEP 4

Start the engine and run at 2100 RPM until the hydraulic oil temperature is 130 to 150˚F (54 to 66˚C). The pressure gauge must read 25 to 35 PSI (192 to 241 kPa, 1.7 to 2.4 bar)



NOTE: *The 30 PSi (206 kPa, 2 bar) check valve in the return line controls charge pump pressure and cannot be adjusted or repaired. If it is defective it must be replaced.*

SPECIFICATIONS

Valve Spool Centering Spring
Free Length.....2.50 inch (63.50 mm)
Compress to 1.375 inch (34.925 mm)..... 18 to 22 lbs (80 to 98 N)

Detent Relief Spring
Free Length.....1.050 inch (26.670 mm)
Compress to 1.00 inch (25.400 mm)..... 8.5 to 10.5 lbs (38 to 47 N)

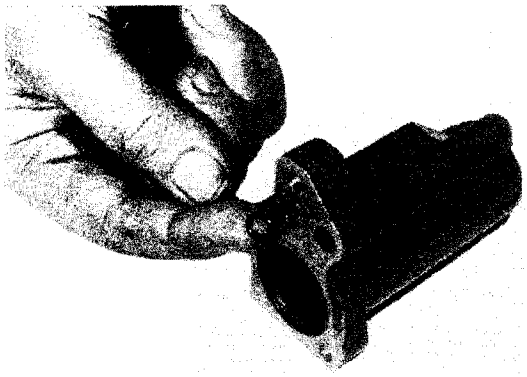
Flow Control Spool Outer Spring
Free Length..... 1.57 to 1.71 inch (39.878 to 43.434 mm)
Compress to 1.078 to 1.21 inch (27.178 to 30.734 mm) .....12.75 lbs (57 N)

Flow Control Spool Inner Spring
Free Length.....1.940 to 2.060 inch (49.276 to 52.324 mm)

Compensator Check Ball Spring
Free Length.....0.688 inch (17.475 mm)
Outside Diameter .....0.234 inch (5.944 mm)

DETENT HOUSING

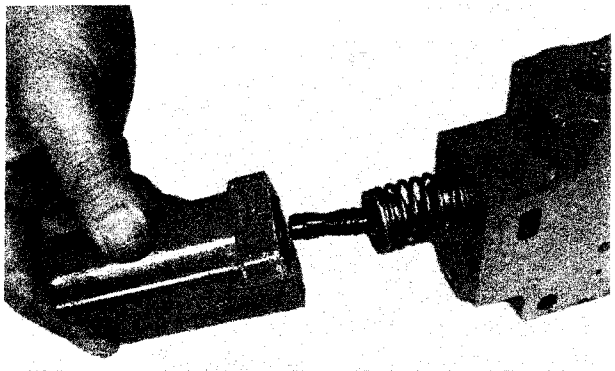
STEP 73



MK96E221

Lubricate and install the two small and one large new O-rings into the detent housing.

STEP 74

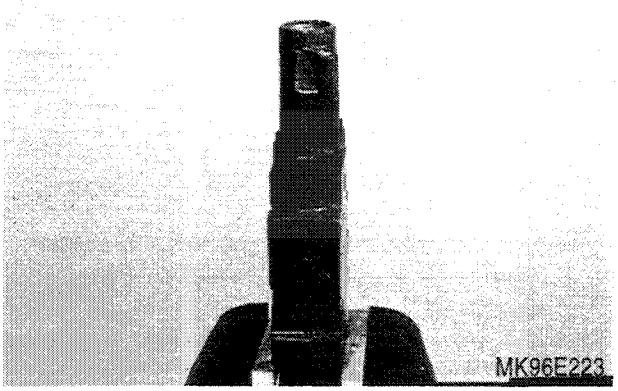


MK96E222

Install the detent housing and cap screws. Torque the cap screws to 8 lb ft (11 Nm).

IMPORTANT: *Coat the detent shaft liberally with lithium based grease to prevent sticking or rusting.*

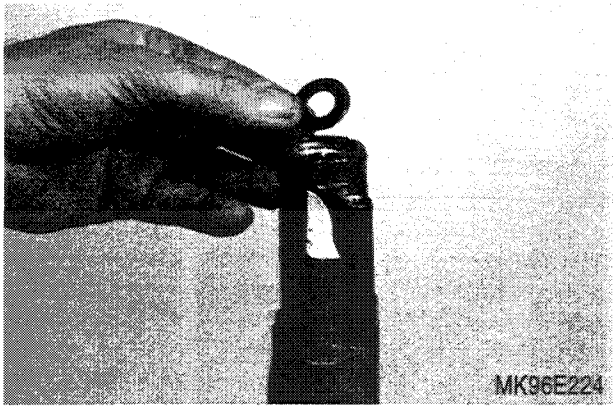
STEP 75



MK96E223

Clamp the valve assembly in a vise (detent housing end up).

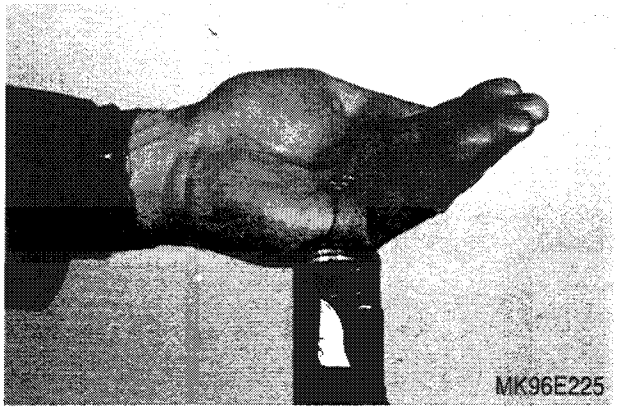
STEP 76



MK96E224

Install a new hardened washer in the detent bore of the housing over the detent shaft.

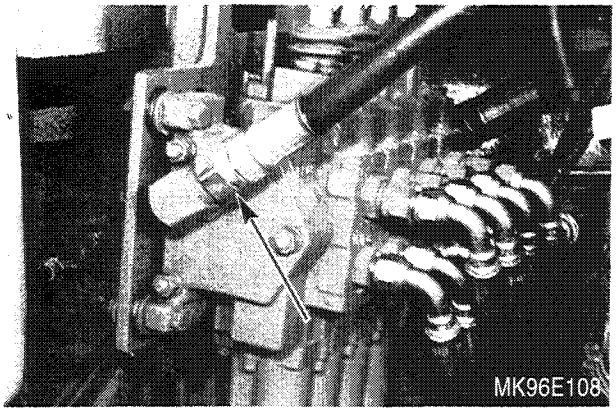
STEP 77



MK96E225

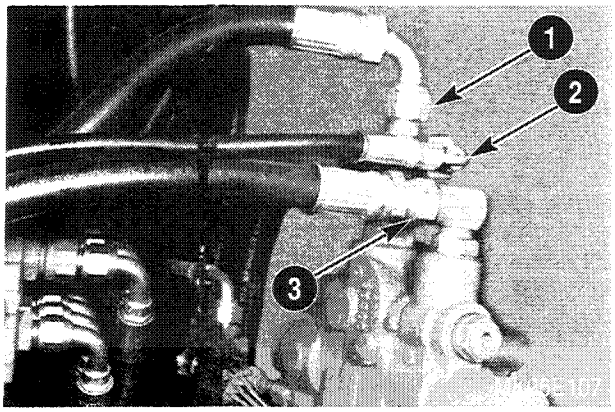
Install the eight steel balls into the detent bore.

STEP 141



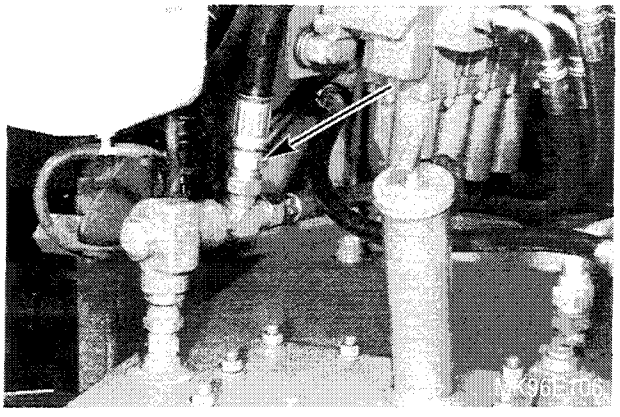
If equipped, install the TPH valve supply hose to the remote valve.

STEP 142



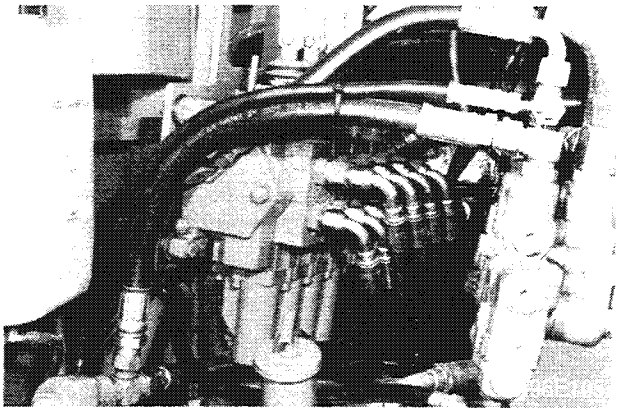
If equipped, install the TPH valve supply hose (Item 1), the pressure reducing valve supply hose (Item 2) and the TPH supply hose (Item 3) to the TPH control valve.

STEP 143



If equipped, install the TPH pressure hose to the TPH relief valve.

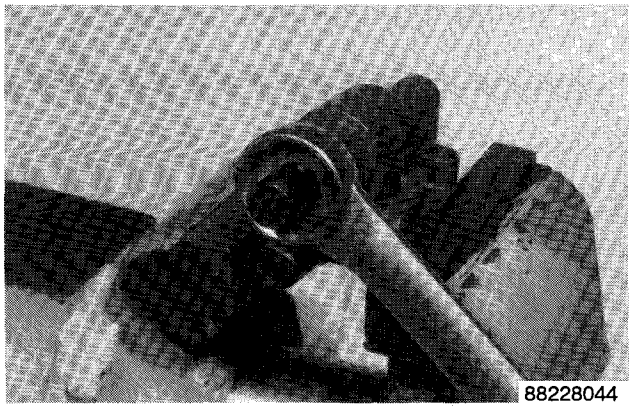
STEP 144



Start the engine and check for leaks. If no leaks appear continue to run the engine until the hydraulic fluid temperature is 130 to 150°F (54 to 66°C) and follow the procedure in Section 8000 to test and set detent kickout pressures.

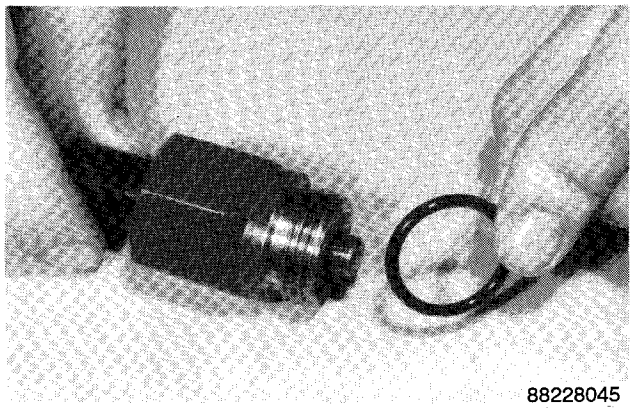
Check for leaks when pressure tests are complete.

STEP 46



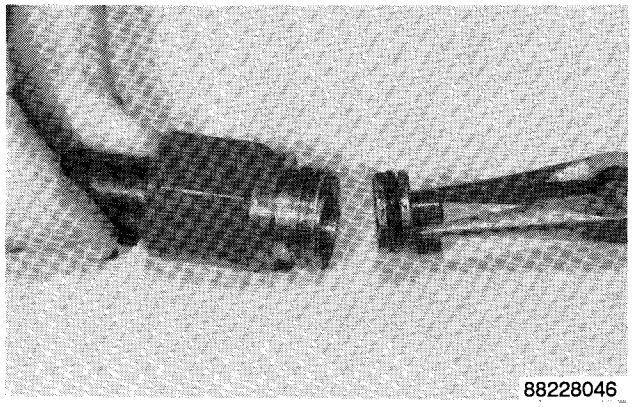
Remove the pressure adjustment cap from the compensator housing.

STEP 47



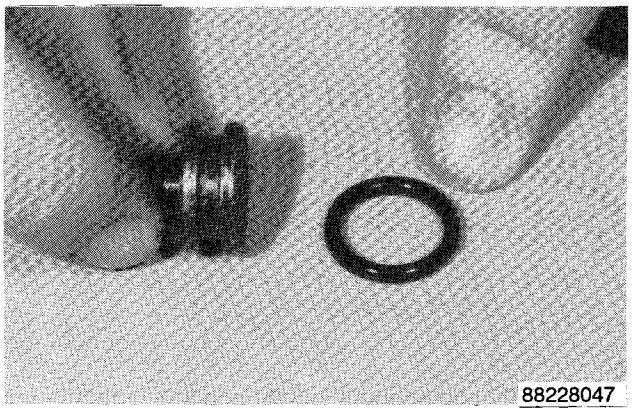
Remove and discard the o-ring from the pressure adjustment cap.

STEP 48



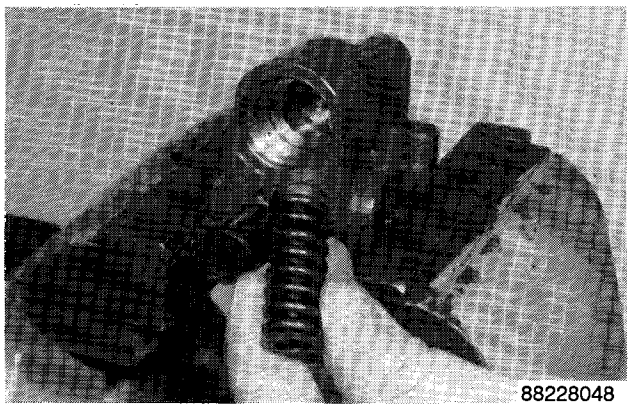
Pull the pressure spring follower from the pressure adjustment cap.

STEP 49



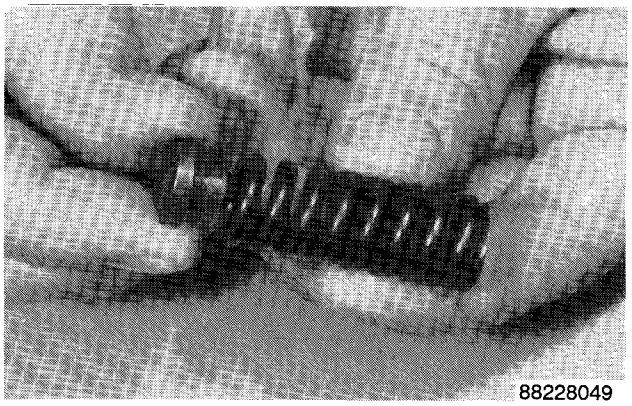
Remove and discard the o-ring from the spring follower.

STEP 50



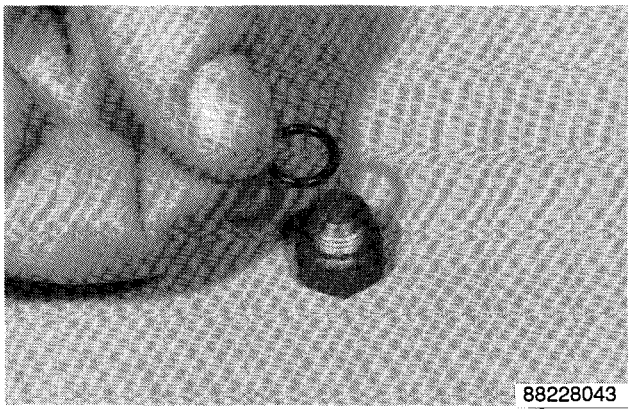
Remove the pressure compensator spring and spring pivot from the compensator housing.

STEP 51



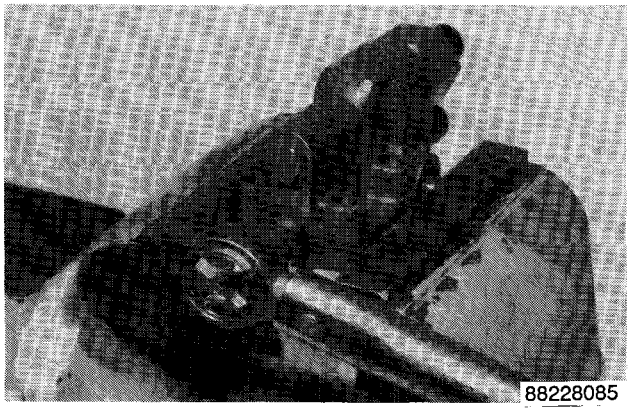
Remove the spring pivot from the compensator spring.

STEP 122



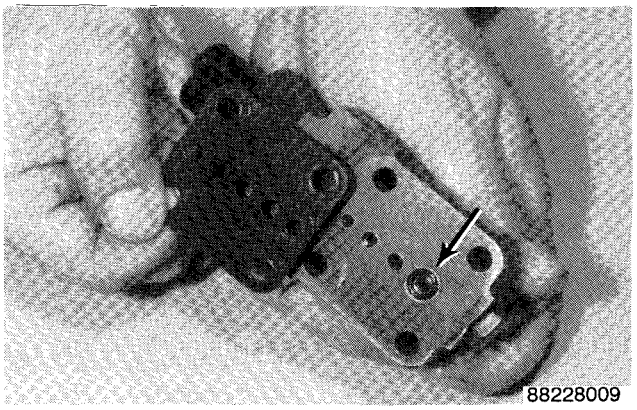
Lubricate and install new o-rings on the two compensator plugs.

STEP 123



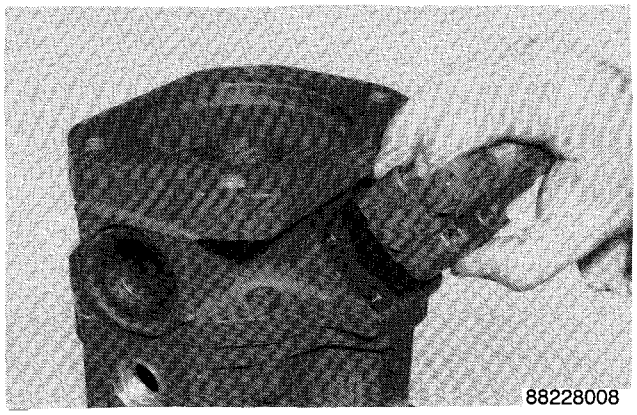
Install the plugs into the compensator housing. Tighten the plugs to a torque of 6 to 8 lb ft (8 to 11 Nm).

STEP 124



Install a new gasket and o-ring on the compensator assembly.

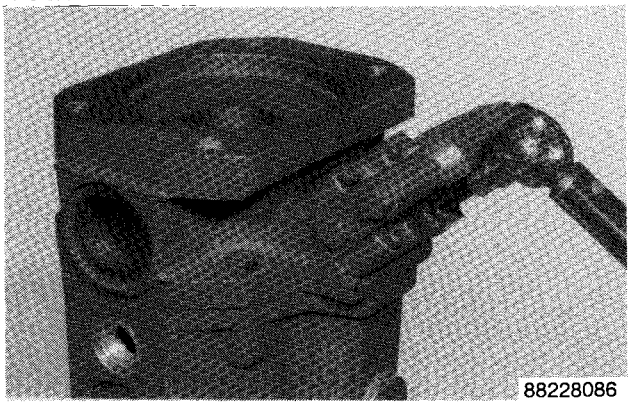
STEP 125



Install the compensator assembly on the piston pump.

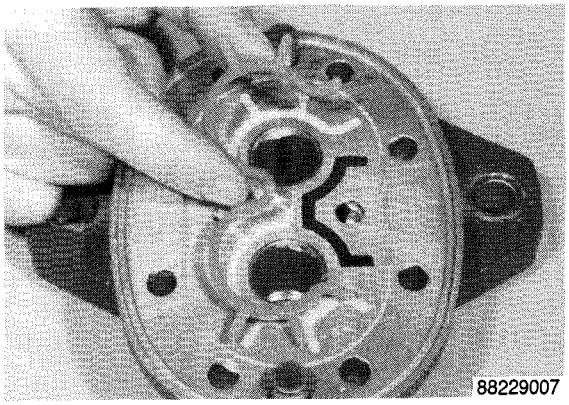
IMPORTANT: *It is very important to install the compensator assembly in the correct direction. The compensator plug end must point toward the discharge and case drain port.*

STEP 126



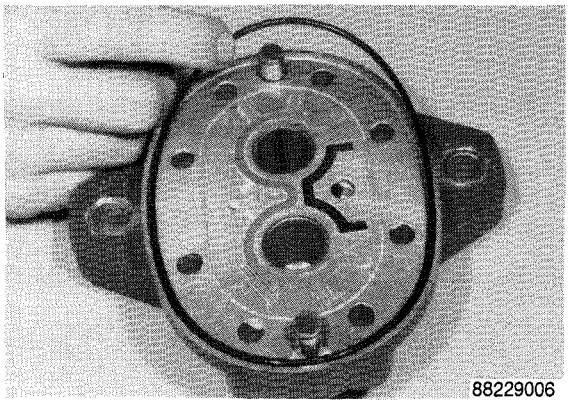
Install the four Allen head capscrews. Tighten the capscrews to a torque of 10 to 12 lb ft (14 to 16 Nm).

STEP 30



Lubricate the new nylon back-up gasket and place into the groove on the front plate. Place the "v" side down.

STEP 31



Lubricate the new large o-ring and place into the groove on the front plate.

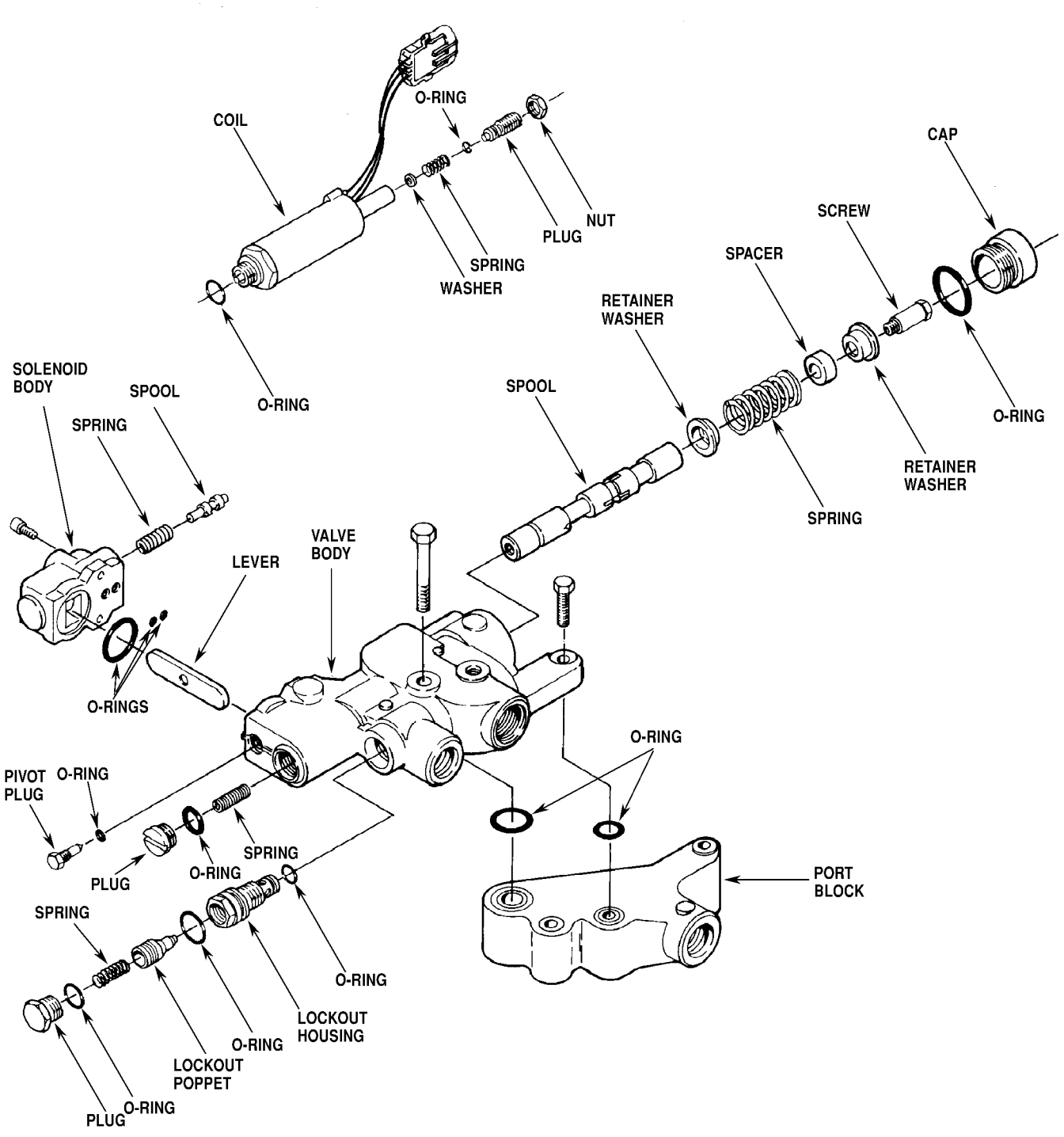
STEP 32

Clamp the front plate in a vise as shown.

Apply a thin coat of petroleum jelly to both milled gear pockets of the body. Install the body on the front plate with the half-moon cavities in the body facing away from the front plate. Be sure the body is fully seated over the dowel pins.

NOTE: *When the body is installed correctly the small half moon port cavity must be on the pressure side of the pump. Match the marks made across the body during disassembly.*

HITCH VALVE ASSEMBLY
(50-3321T91)

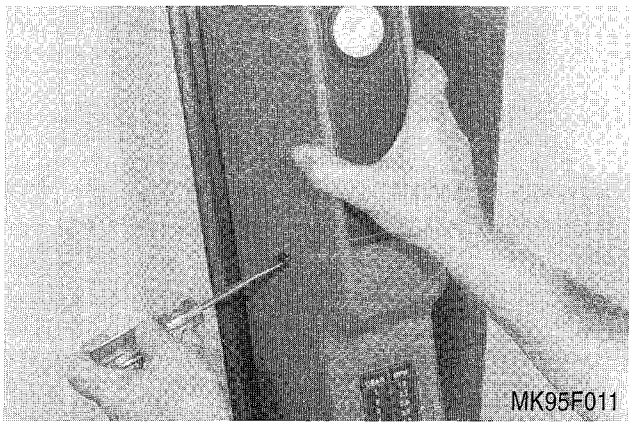


MS97E013

ELECTRONIC HITCH ALIGNMENT/CALIBRATION

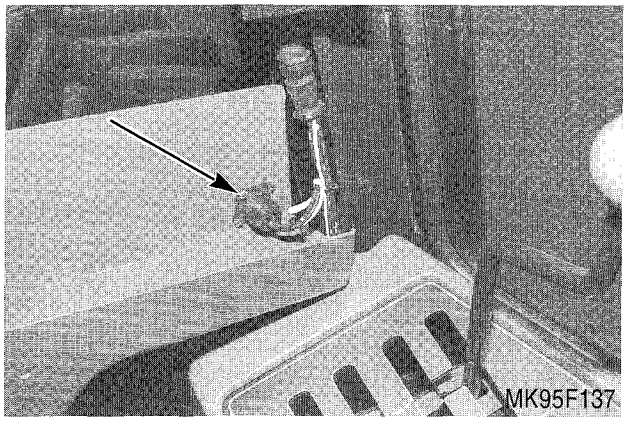
NOTE: *The batteries must be fully charged before starting the calibration procedure.*

STEP 1



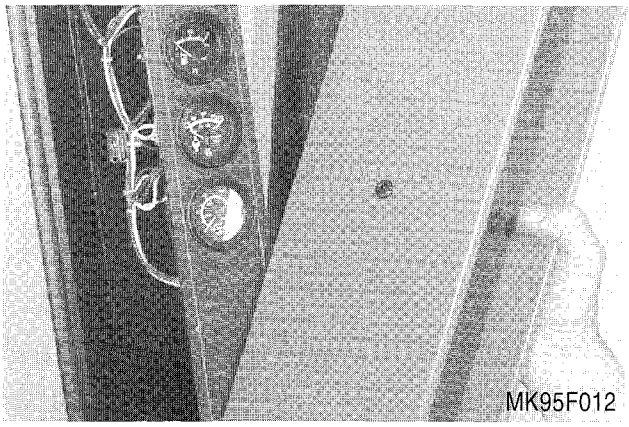
Turn each of the 6 ROPS post gauge panel trim cover fasteners 1/4 turn counterclockwise to release the cover.

STEP 2



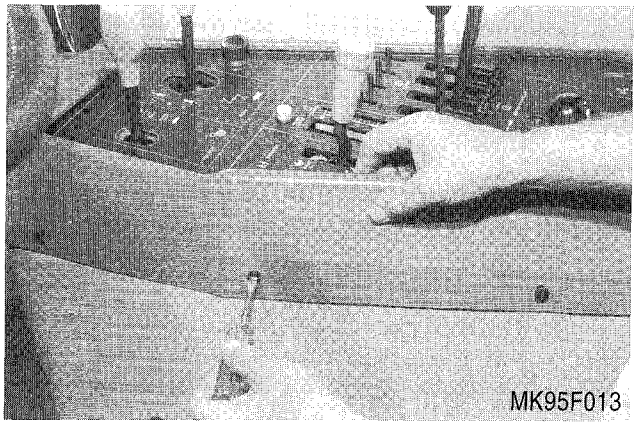
Unplug the auxiliary power connector wire harness from the console wire harness.

STEP 3



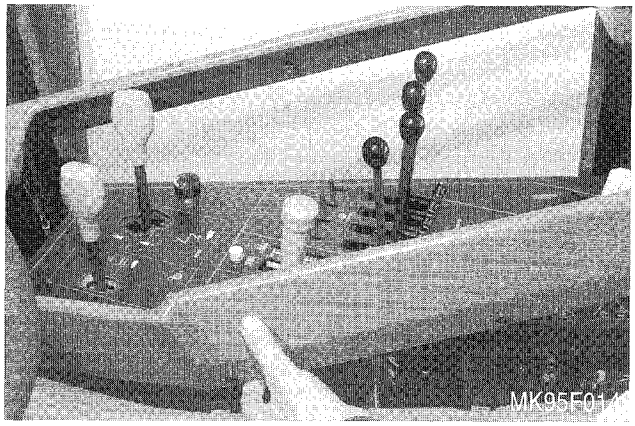
Remove the gauge panel trim cover.

STEP 4



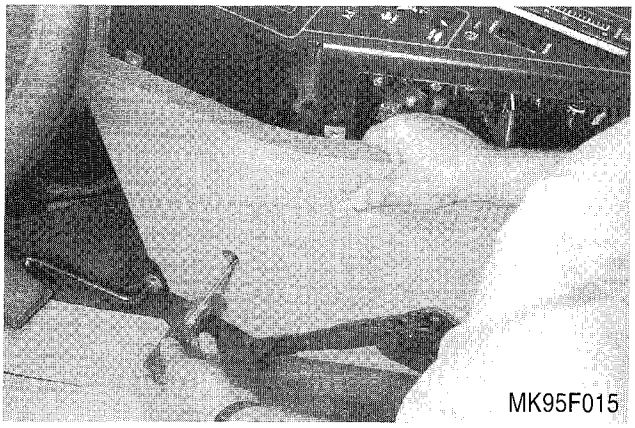
Turn each of the 7 right side control console trim cover fasteners 1/4 turn to release the cover.

STEP 5

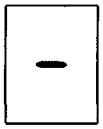
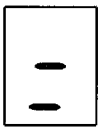


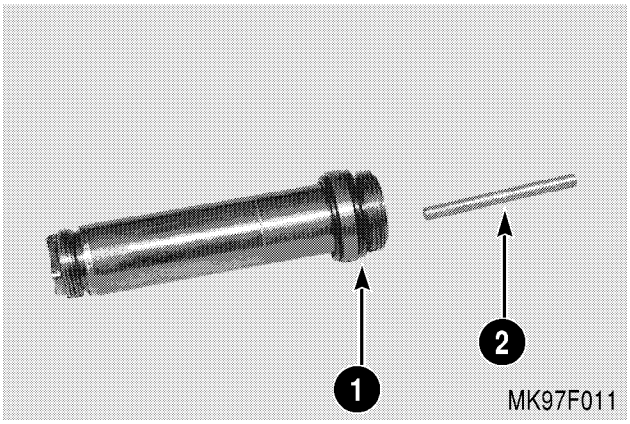
Remove the control panel trim cover.

STEP 6



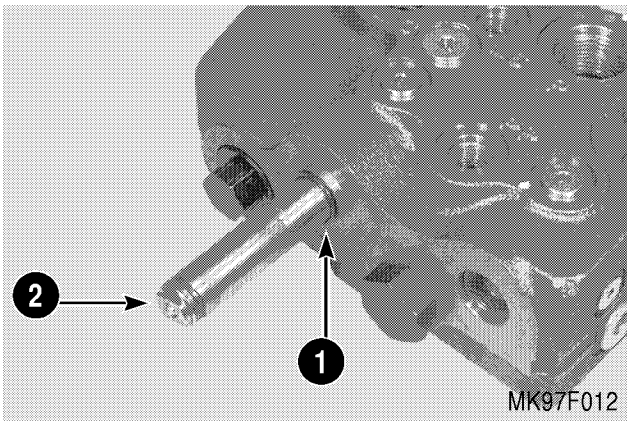
Release the 4 control console lower wraparound cover 1/4 turn fasteners.

CODE	CAUSE	MODE	SOLUTION
	Hitch RAISE/LOWER switch circuit failed. If the problem is intermittent the function is disabled until the next engine startup.	DEGRADED 1	Replace RAISE/LOWER switch. Test wire harness for damaged wires or connectors.
	Hitch drop speed circuit failure. Drop speed will be set to mid-range. Maximum drop rate can be achieved by using the LOWER MOMENTARY position on the RAISE/LOWER switch.	DEGRADED 1	Replace the drop speed potentiometer. Test wire harness for damaged wires or connectors.
	Hitch response speed circuit failure.	DEGRADED 1	Replace the hitch response speed potentiomer. Test wire harness for damaged wires or connectors.
	Hitch travel circuit failure. Travel will be set to maximum.	DEGRADED 1	Replace the hitch travel speed potentiometer. Test wire harness for damaged wires or connectors.
	Lamp circuit failure.	DEGRADED 1	Replace lamp. Test wires to lamp for damaged wires or connectors.
	Hitch position is above the upper limit. Hitch can be lowered by the control lever or by the rear remote switches.	DEGRADED 1	Capture the hitch and lower the hitch.
	Rear remote switches failure when: 1. The remotes are operated simultaneously. 2. A remote switch is operated before startup. 3. A remote switch is operated when the hitch is against the lower travel limit. 4 Remote switch LOWER is activated when the hitch is against the lower travel limit. 5 Remote switch RAISE is activated when the hitch is against the upper travel limit.	DEGRADED 1	Error code will stop when switch is released.
	LOWER MOMENTARY failure when: 1. LOWER MOMENTARY switch is operated before startup. 2. LOWER MOMENTARY switch is operated with the tractor in motion. 3. LOWER MOMENTARY switch is operated when the hitch is against the lower travel limit.	DEGRADED 1	Error code will stop when switch is released.
	Display circuit failure.		Replace display



Lubricate and install a new O-ring (1) on the solenoid. Install the solenoid pin (2) in the solenoid.

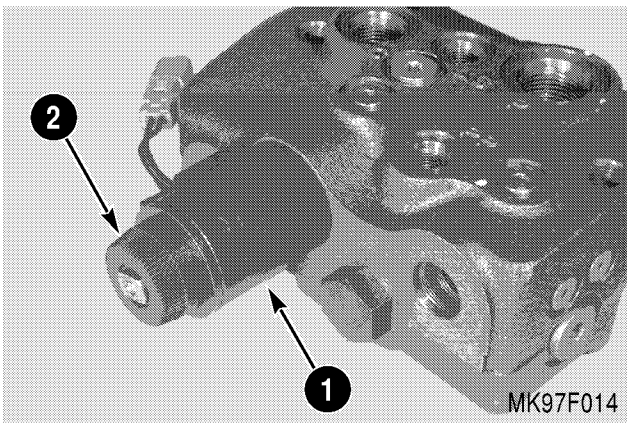
STEP 43



Install the LOWER solenoid (1) and tighten to a torque of 22 to 27 lb ft (30 to 36 Nm).

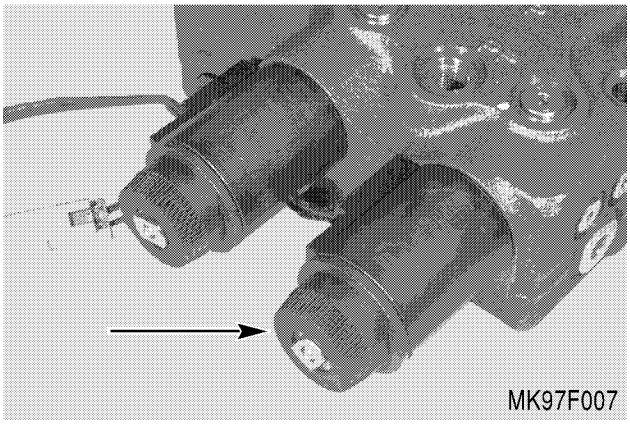
NOTE: *Use a wrench that fits securely on the flat areas (2) of the solenoid. A loose fit will round off the edges of the flat areas and make it more difficult to tighten to the proper torque.*

STEP 44



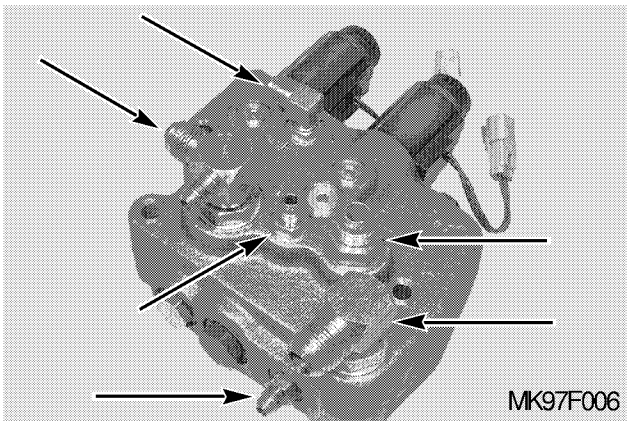
Install the coil (1) on the solenoid. Install and tighten the hand nut (2).

STEP 45



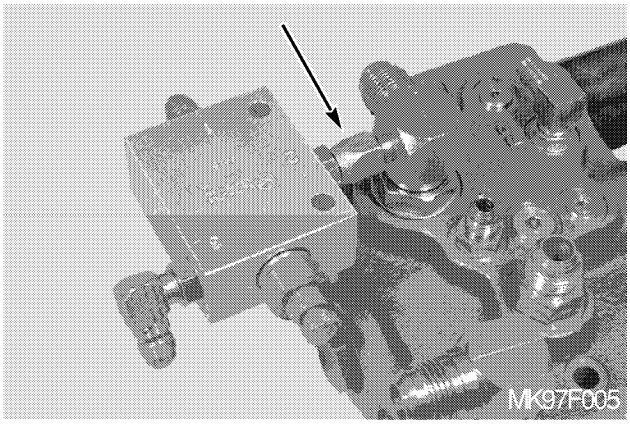
Repeat Steps 41 through 44 to install the RAISE solenoid pilot valve.

STEP 46



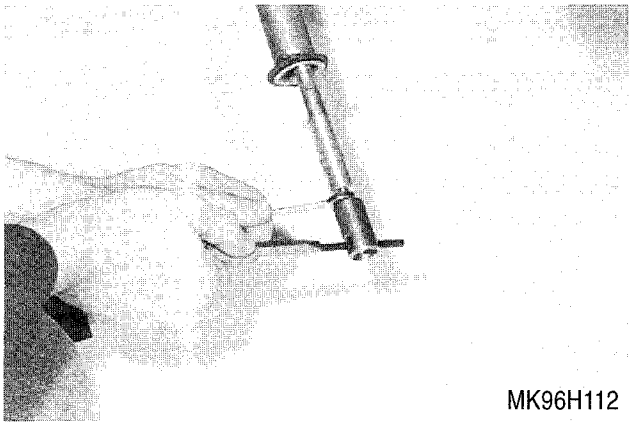
Install fittings with new O-rings on the ports. Align the elbow fitting with the marks made during disassembly.

STEP 47



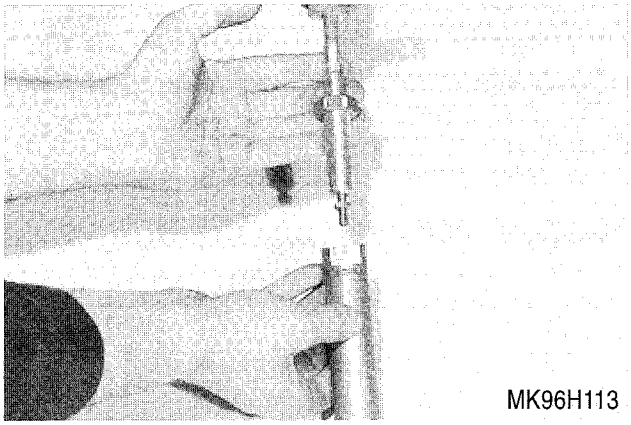
Install the pressure reducing valve on the inlet fitting. Do not tighten.

STEP 47



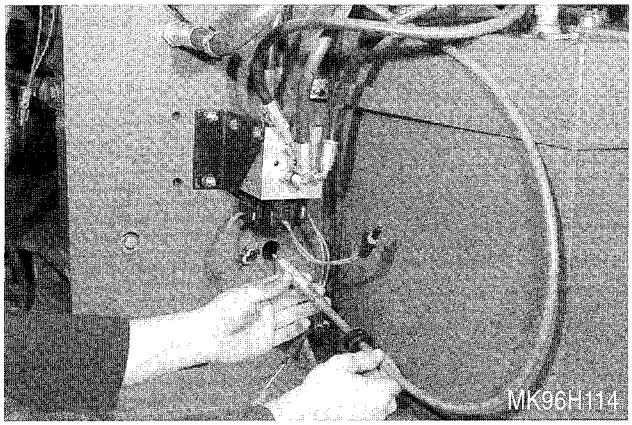
(9310, 9330 Tractors)
Loosen the lock nut for the cable connecting yoke. Remove the connecting yoke from the cable.

STEP 48



(9310, 9330 Tractors)
Remove the enclosure housing, retainer clamp, locknut, and protective sleeve from the cable.

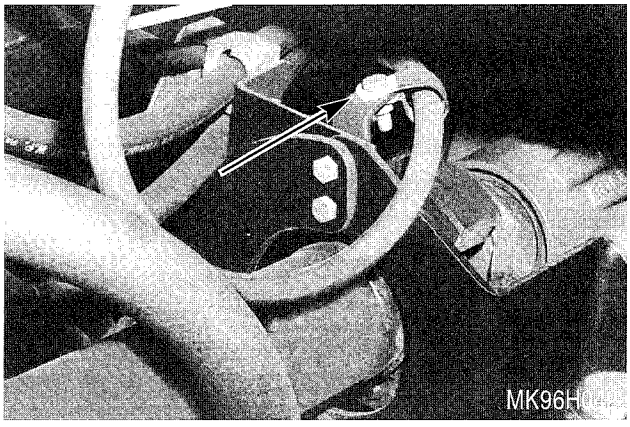
STEP 49



(9310, 9330 Tractors)
Remove the cable through the hole in the side of the frame.

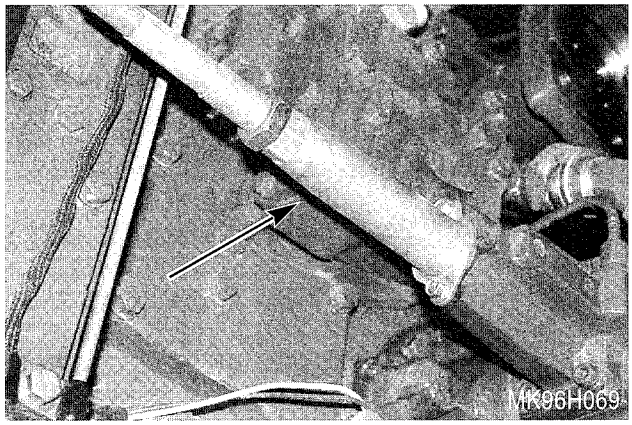
NOTE: *Remove the rubber grommet from the frame hole.*

STEP 50



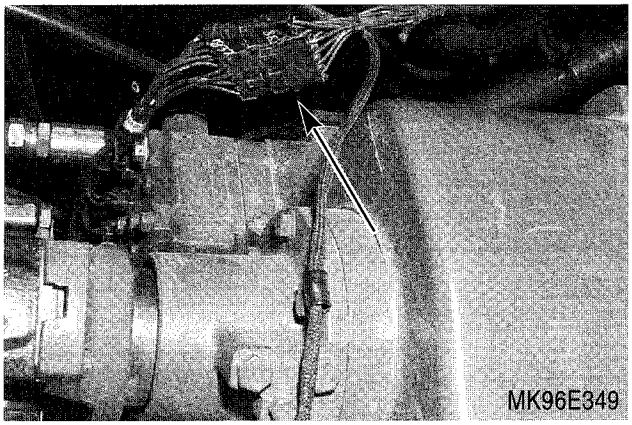
(9310, 9330 Tractors)
Remove the bolt for the master clutch cable support clamp.

STEP 51



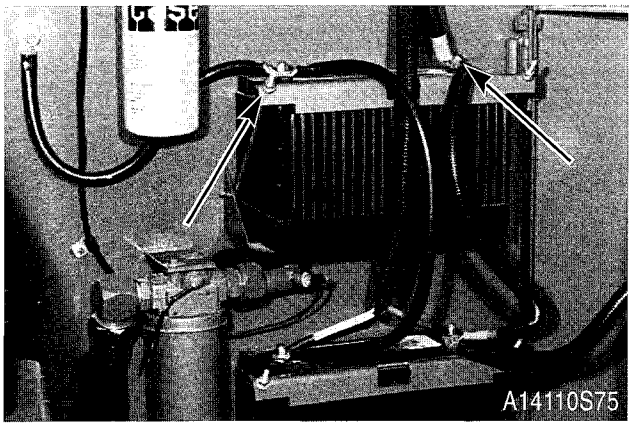
Repeat Steps 44 through 46 to disconnect the transmission master clutch control cable.

STEP 52



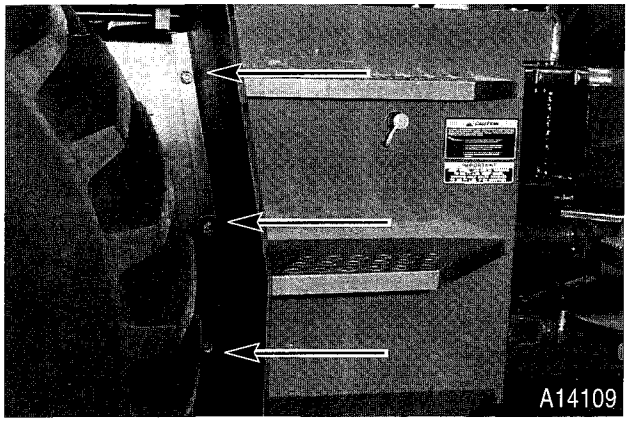
If equipped with the Powershift Transmission, disconnect the wire harness for the transmission solenoid bank.

STEP 107



Connect the primary battery cables to the upper battery. Connect the red cable to the battery positive terminal and the black cable to the negative terminal.

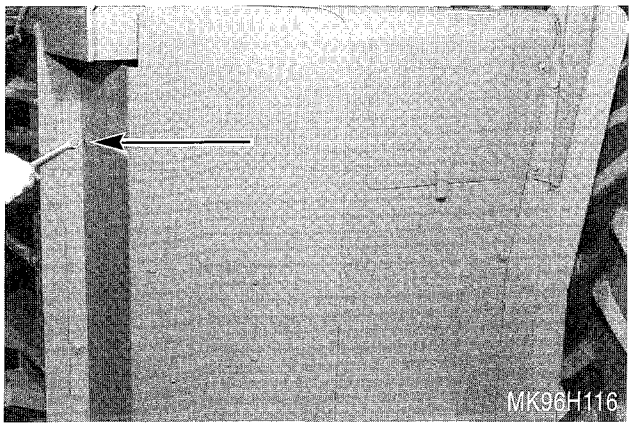
STEP 108



Close the battery compartment access door.

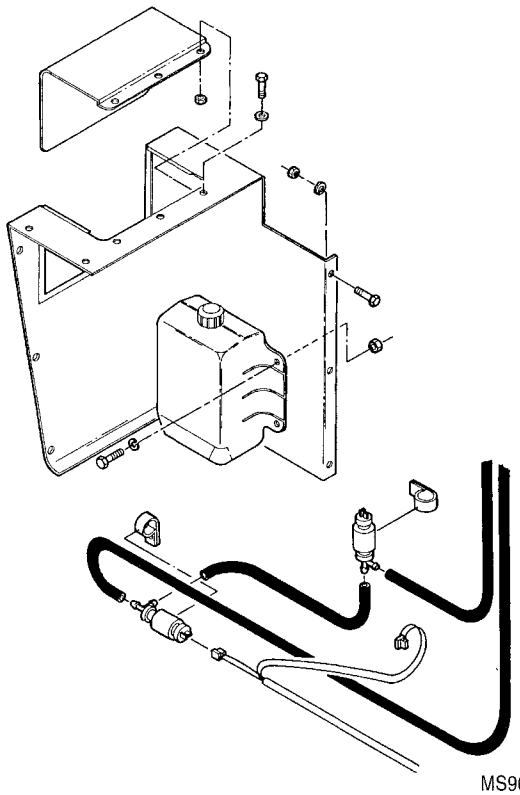
(9310, 9330, 9350 Tractors)
Install the access door retaining nuts and washers.

STEP 109

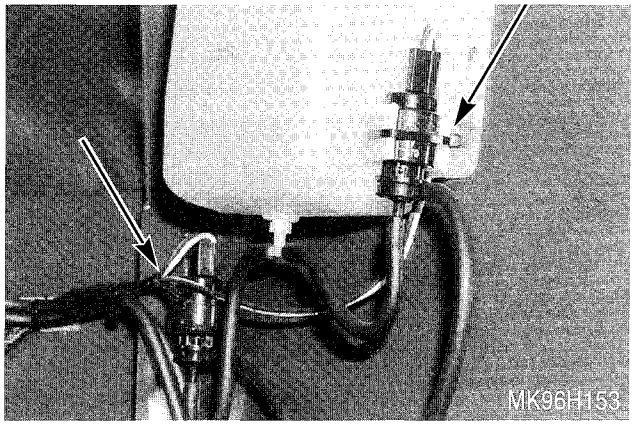


(9310, 9330 Tractors)
Install the hydraulic tank cover and the retaining bolts with flat washers.

STEP 110

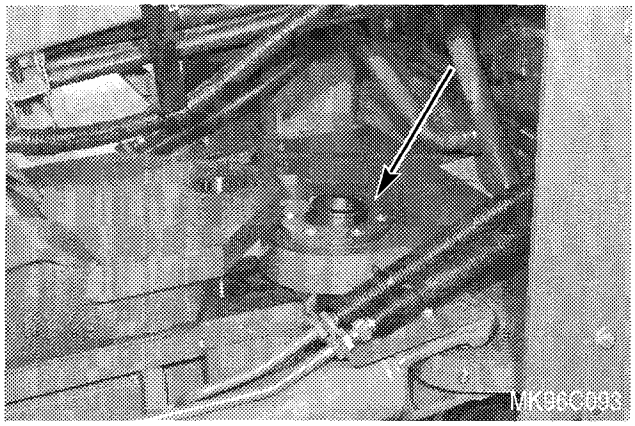


(9310, 9330 Tractors)
Install the windshield washer motor wire harness and outlet hoses onto the washer motors. Secure the hose to the stick-on support with a cable tie.



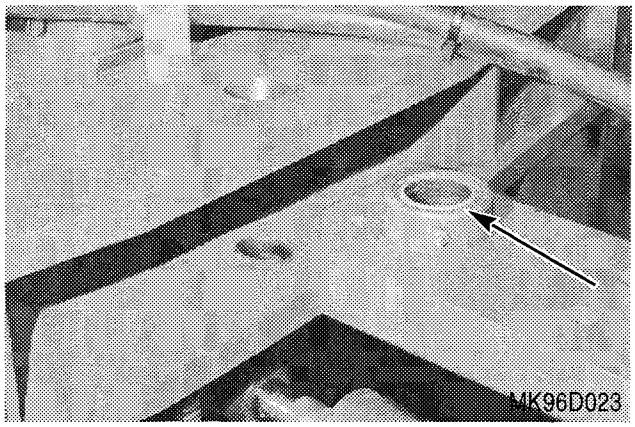
(9350, 9370, 93780 Tractors)
Route the hose for the windshield washer along the frame side plate to the washer pumps. Connect the hoses to the pumps and install the required cable ties.

STEP 28



Inspect the bottom hinge bearing. Replace if necessary. Refer to Step 30 for the correct bearing replacement procedure.

STEP 29



Inspect the front connecting link bushing. Replace if necessary. Refer to Step 31 for the correct bushing replacement procedure.

Section

9003

DRAWBAR REMOVAL

9350 Tractors

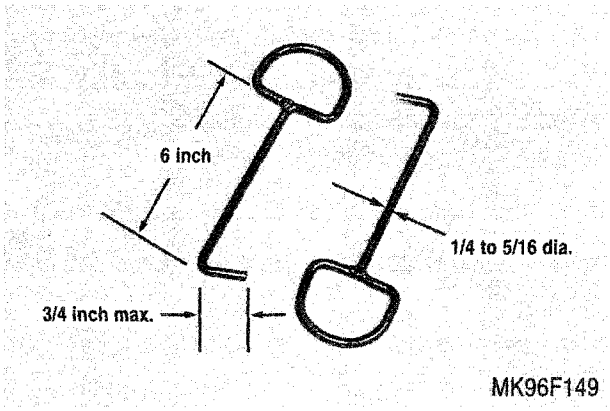
CASE CORPORATION

Printed in U.S.A.
Rac 8-83510
February, 1996

SPECIAL TORQUE VALUES

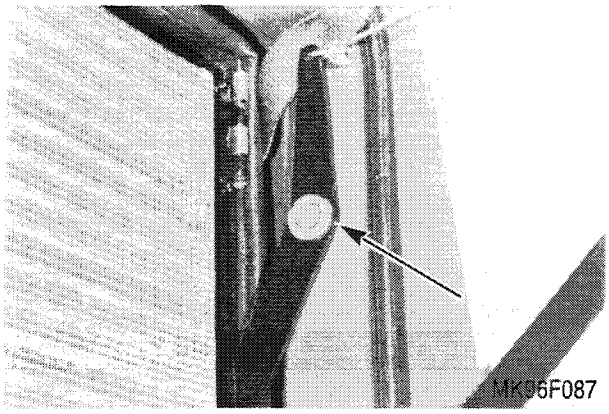
	U.S. Value	Metric Value
Radiator Mounting Bolts	12 to 14 lb ft	16 to 18 Nm
Fan Shroud Mounting Bolts	12 to 14 lb ft	16 to 18 Nm
Bottom and Side Fan Shield Mounting Bolts	12 to 14 lb ft	16 to 18 Nm
Hood Brace Stop Bolt	33 to 37 lb ft	45 to 50 Nm
Lift Assist Spring Mount Bolts	52 to 59 lb ft	70 to 80 Nm

SPECIAL TOOLS



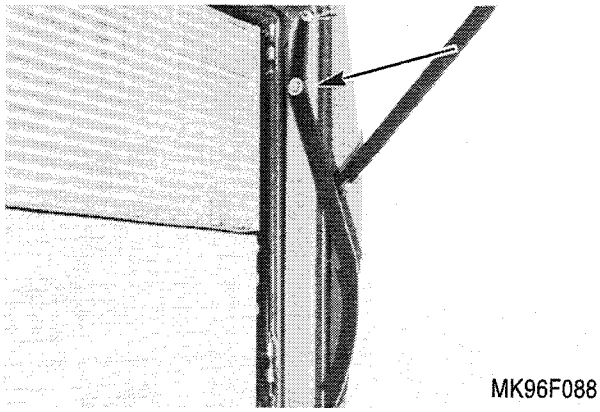
Radiator Removal Hooks

STEP 6



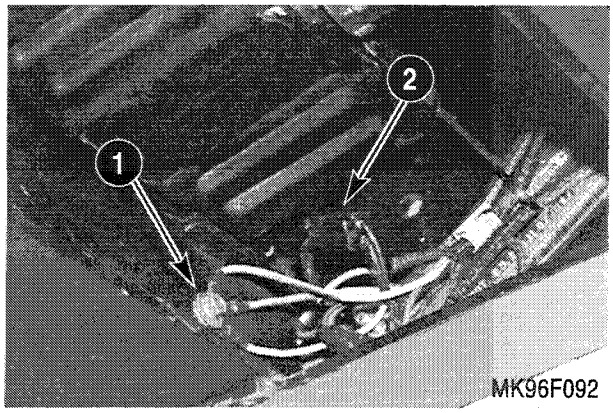
Remove the snap ring and washer from the hood brace pivot stud.

STEP 7



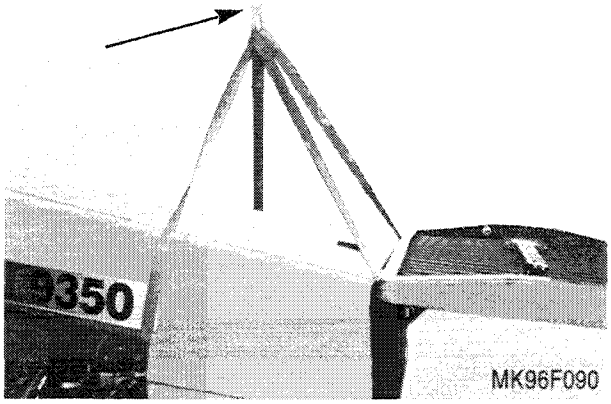
Remove the hood brace from the radiator mount frame. Use the washer and snap ring to secure the brace inside the grill frame.

STEP 8



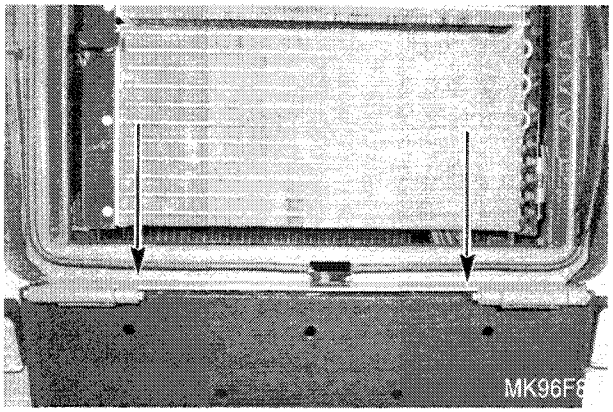
Remove the ground wire from the frame stud (Item 1) and disconnect the lighting wire harness connector (Item 2).

STEP 9



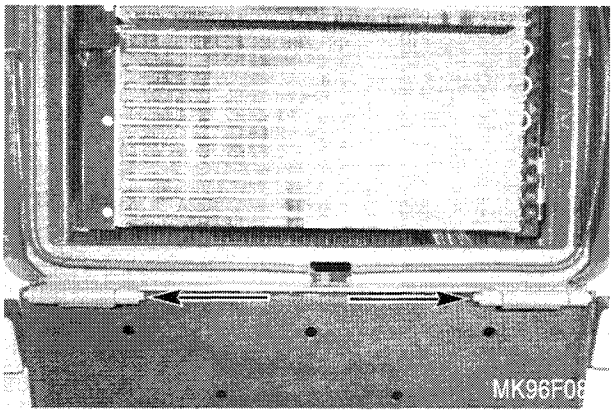
Connect an overhead hoist to the lifting straps.

STEP 10



Remove the roll pins from the hood hinge pins.

STEP 11

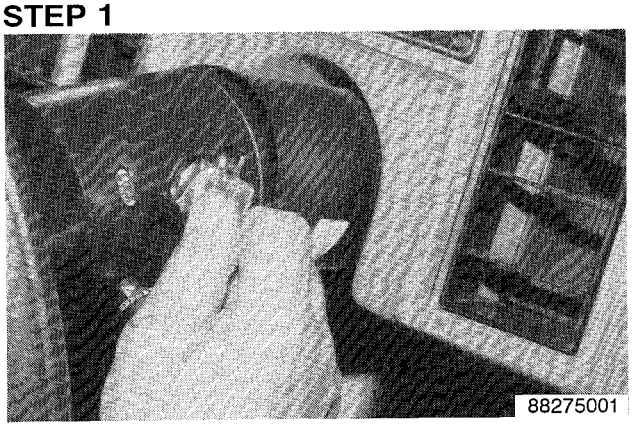


Remove the hood hinge pins.

HVAC BLOWER AND CLUTCH ELECTRICAL CIRCUIT "QUICK" CHECK

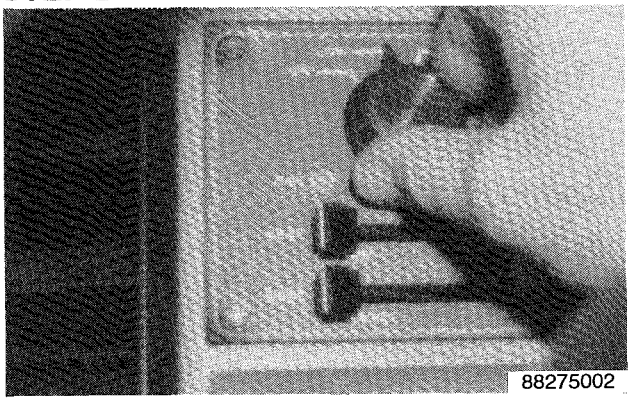
Do the following to determine if the HVAC System electrical system circuitry is complete.

STEP 1



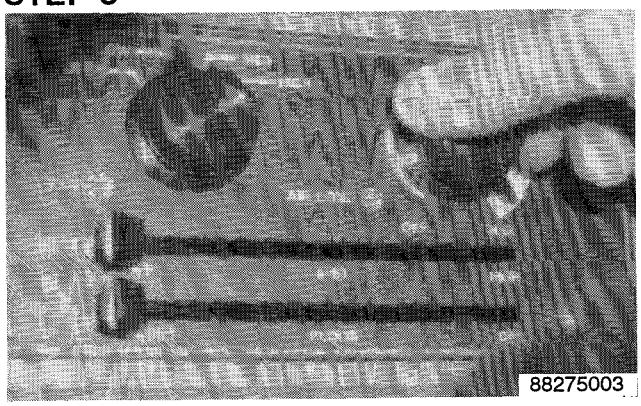
Turn the key start switch to the ON position. Do not start the engine.

STEP 2



Turn on the cab recirculation blower switch. The switch must give three different blower speeds; low, medium and high.

STEP 3

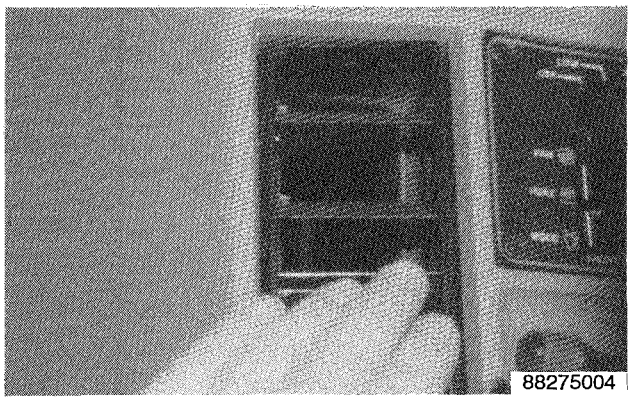


With the blower switch turned on, turn the thermostatic temperature control switch clockwise to the full on (cold) position. As the switch is turned, an audible click should be heard when the compressor electro-magnetic clutch engages. If necessary, turn the switch off and on two or three times to listen and check for compressor clutch engagement.

NOTE: *The recirculation blower switch must be turned on to supply power to the thermostatic control switch. If the blower works and the compressor clutch engages, it will indicate a complete electrical circuit for the air conditioning system. It also indicates the system has at least a partial refrigerant charge because the low pressure protection switch is OPEN to energize the compressor clutch. If a fault was detected during the quick test, electrical system troubleshooting must be done.*

PRESSURIZER BLOWER MOTOR

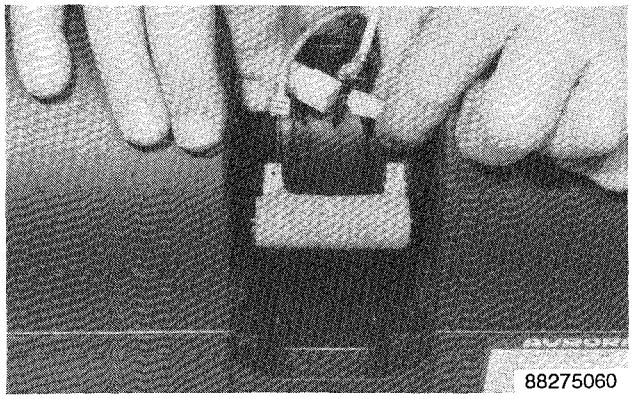
STEP 4



Turn off the recirculation blower switch. Start the engine and check for air flow through the air ducts. If air flow is present it will indicate the cab pressurizer blower motor is working. If the blower motor cannot be heard or if there is no air flow, troubleshoot the pressurizer blower motor circuit.

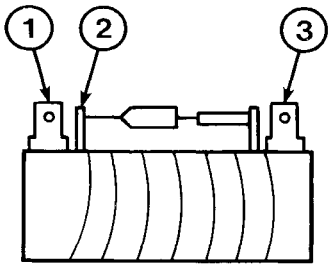
NOTE: *The engine must have oil pressure before the blower motor will run. This is because the blower motor is energized by the engine oil pressure switch through the hourmeter relay.*

STEP 68



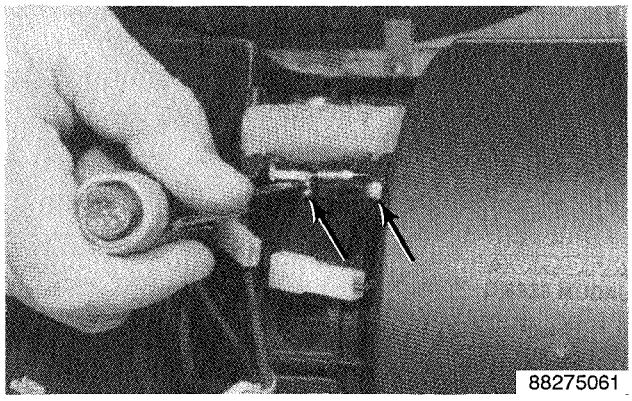
Mark and disconnect the wires from the resistor and blower motor. Use an ohmmeter to check the resistance.

Terminal 1 to 3 approximately 0.56 ohms
Terminal 2 to 3 approximately 0.16 ohms.



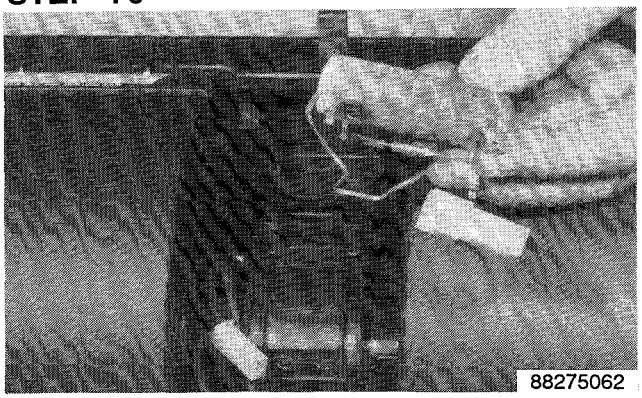
NOTE: *A faulty resistor will show high resistance or no continuity.*

STEP 69



To remove the resistor, remove the two blower motor retaining strap screws.

STEP 70



Lift the motor retaining strap and remove the resistor assembly. Install the resistor in the reverse order of removal and connect the wiring.

Section

9007

AIR CONDITIONER SYSTEM
Refrigerant Recovery, System Evacuation and Recharging

9300 Series Tractors

9007

CASE CORPORATION

Printed in U.S.A.
Rac 8-83560
March, 1996

Section

9008

AIR CONDITIONER COMPRESSOR

9300 Series Tractors

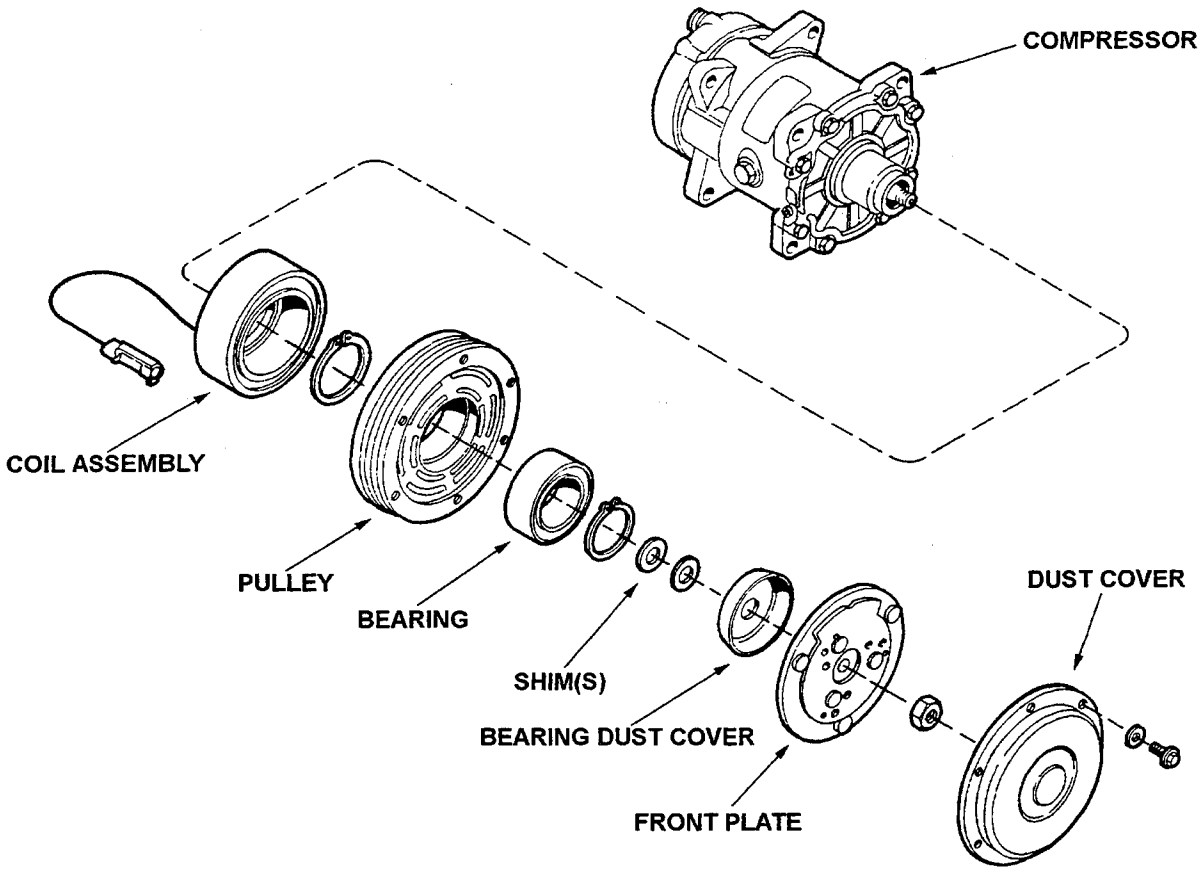
9008

CASE CORPORATION

Rac 8-83640

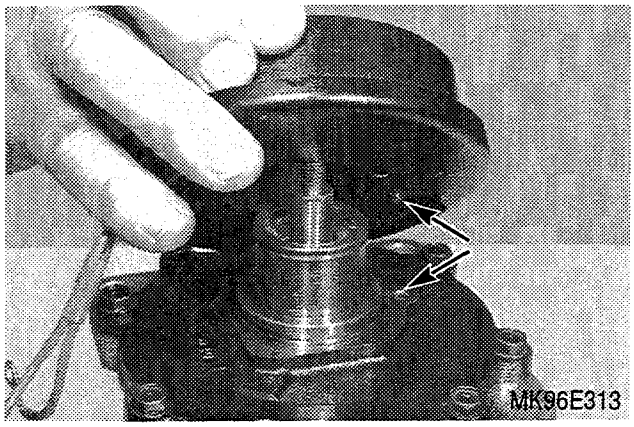
Printed in U.S.A.
May, 1996

CLUTCH ASSEMBLY (Exploded View)



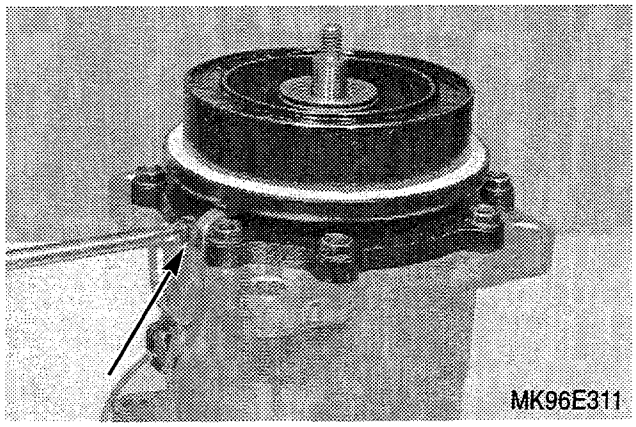
MS96E030

STEP 35



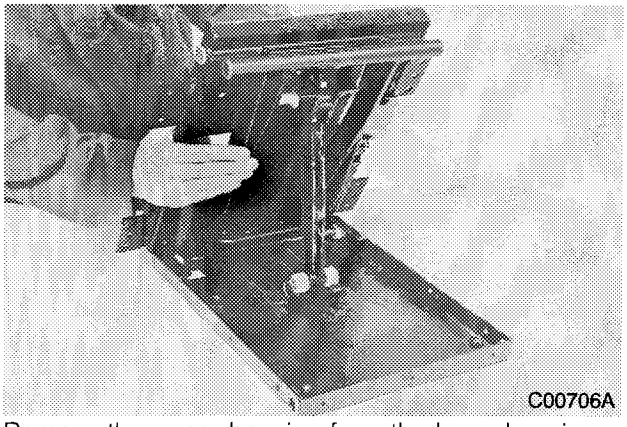
Install the clutch coil assembly. Align the locating dimple and pocket on the coil and housing so the coil will seat flush on the housing.

STEP 36



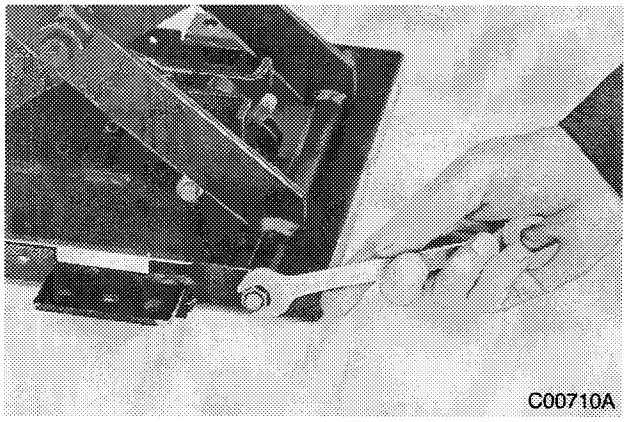
Install the screw to retain the clip for the coil lead wire.

STEP 20



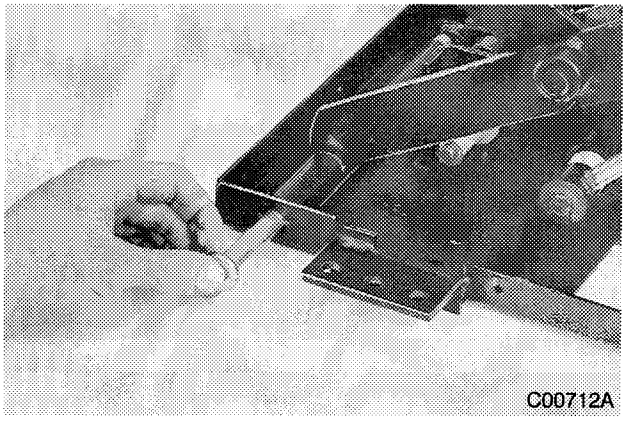
Remove the upper housing from the lower housing.

STEP 21



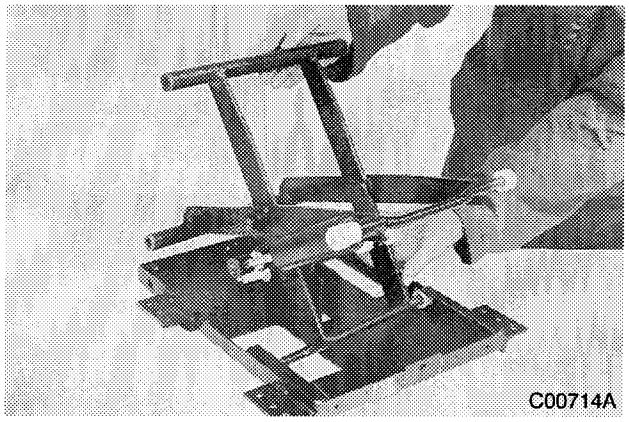
Remove the locknut from the suspension arm assembly retaining shaft.

STEP 22



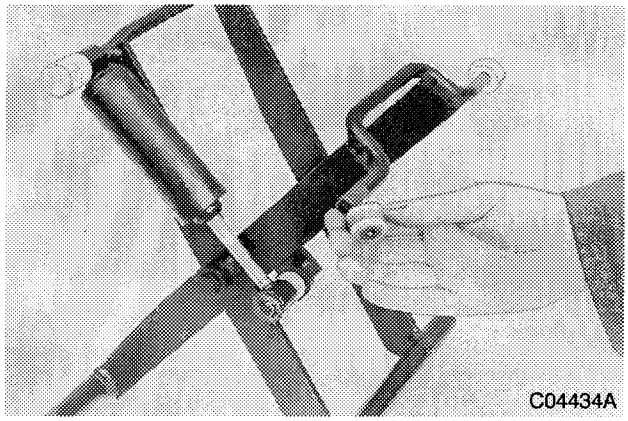
Remove the retaining shaft.

STEP 23



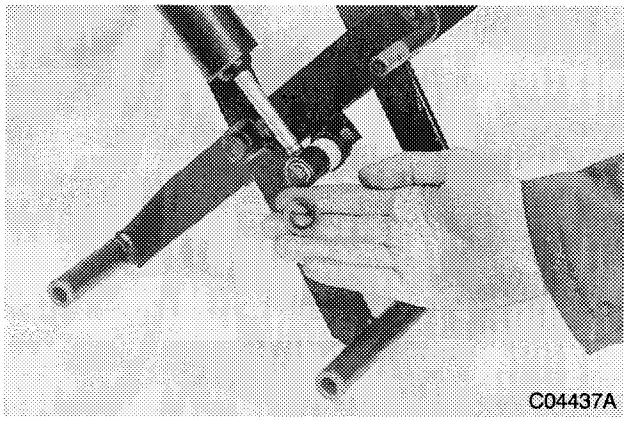
Remove the suspension arm assembly from the upper housing.

STEP 24



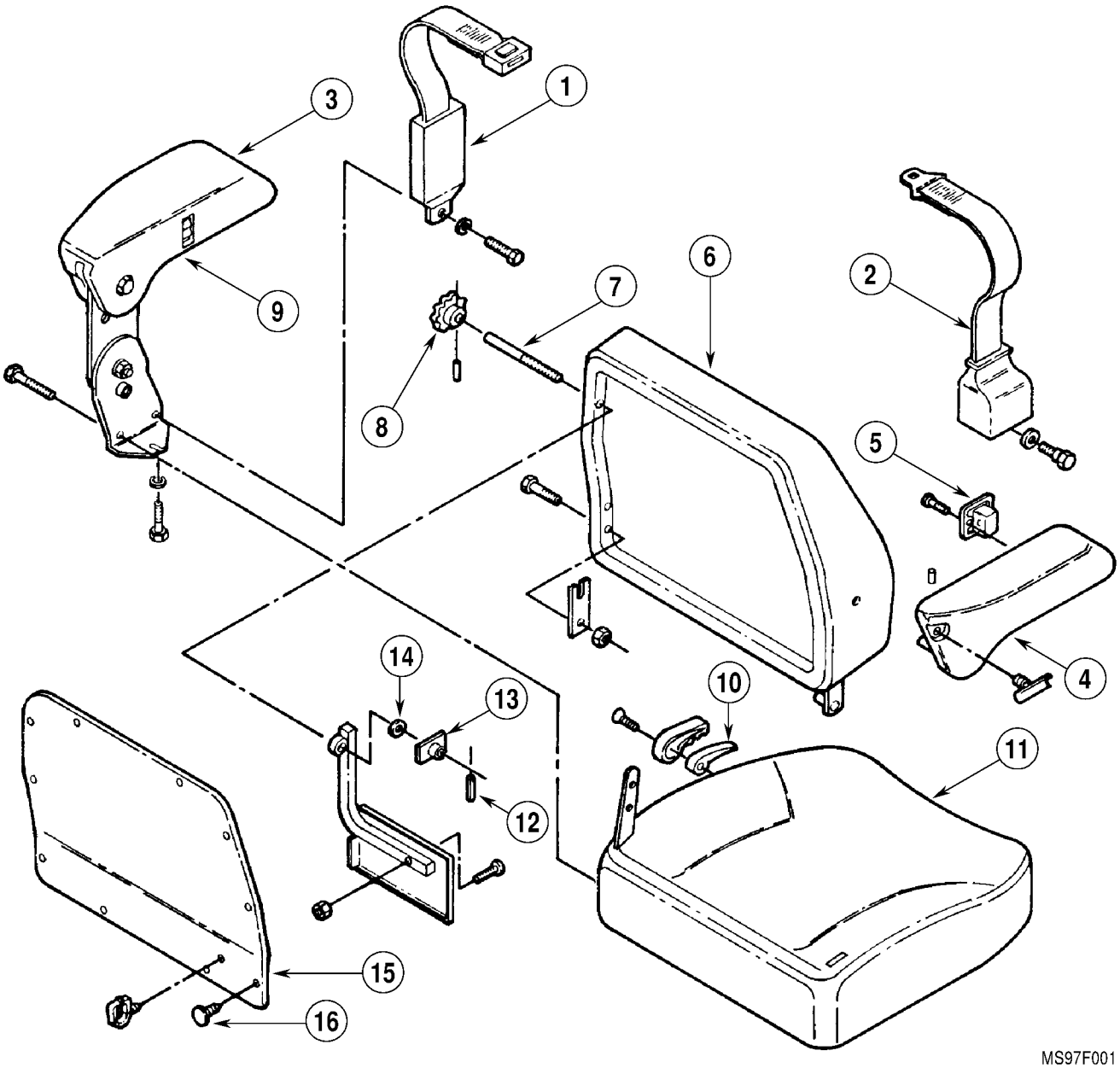
Remove the four rollers from the suspension arm assembly.

STEP 25



Remove the shock absorber retaining clip.

BACKREST AND SEAT CUSHION ASSEMBLY



MS97F001

1. LH Seat Belt
2. RH Seat Belt
3. LH Armrest Assembly
4. RH Armrest Assembly
5. Seat Height Adjustment Switch
6. Backrest
7. Threaded Shaft
8. Lumbar Control Knob
9. LH Armrest Adjusting Knob
10. Backrest Tilt Lever
11. Seat Cushion
12. Roll Pin
13. Nut
14. Rubber Bushing
15. Backrest Cover
16. Dart Clip Retainer

Section

9017

WEIGHTING THE 4WD TRACTOR

9300 Series 4WD Tractors

9017

CASE CORPORATION

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