ENGINE

Engine Model	2000 Z520INA	2100 Z6201NA	2200 Z7201NA	2300 Z7701NA	2400 Z7701T
SAE Hp (Flywheel)**	49	62	68	74	81
SAE Hp (PTO)***	43	54	60	66	72

** Net power at rated speed of 2200 rpm in accordance with SAE J1995.
*** Net power at rated speed of 2200 rpm in accordance with SAE J708.

Number of Cylinders	3	4	4	4	4
Displacement (Liter)	2.7 L	3.46 L	3.60 L	3.90 L	3.90 L
Bore	102 mm	100 mm	102 mm	102 mm	102 mm
Stroke	110 mm	110 mm	110 mm	120 mm	120 mm
Compression Ratio	17.0:1	17.0:1	17.0:1	17.0:1	17.0:1

ZT,SPEC,A -19-20DEC93

ELECTRICAL

Battery	12v, 125 Ah
Alternator	14v, 55 Amp
Starting Motor	12v, 2.9 kW
Battery Terminal Grounded	Negative

ZT,SPEC,B -19-11MAY94

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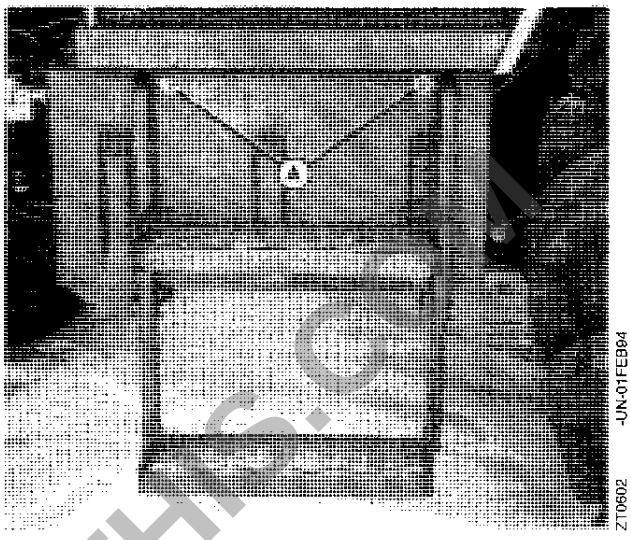
SEPARATING ENGINE FROM TRANSMISSION

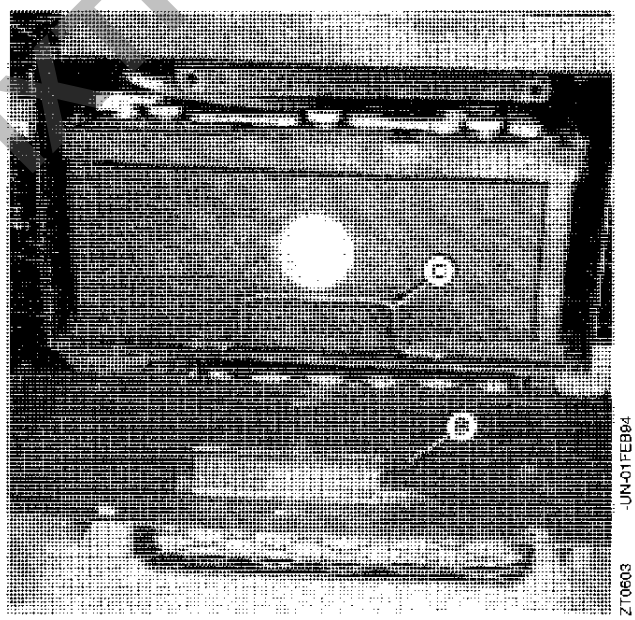
1. Remove bolts (A) from battery access cover.

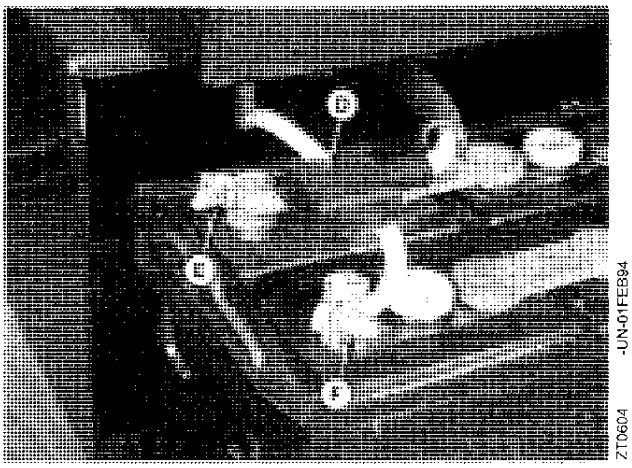
2. Pull out handle (C) until battery tray is against stop (B).

3. Remove cover (D) from positive cable.

4. Disconnect negative (-) cable (F) from battery and then disconnect the positive (+) cable (E) from battery.



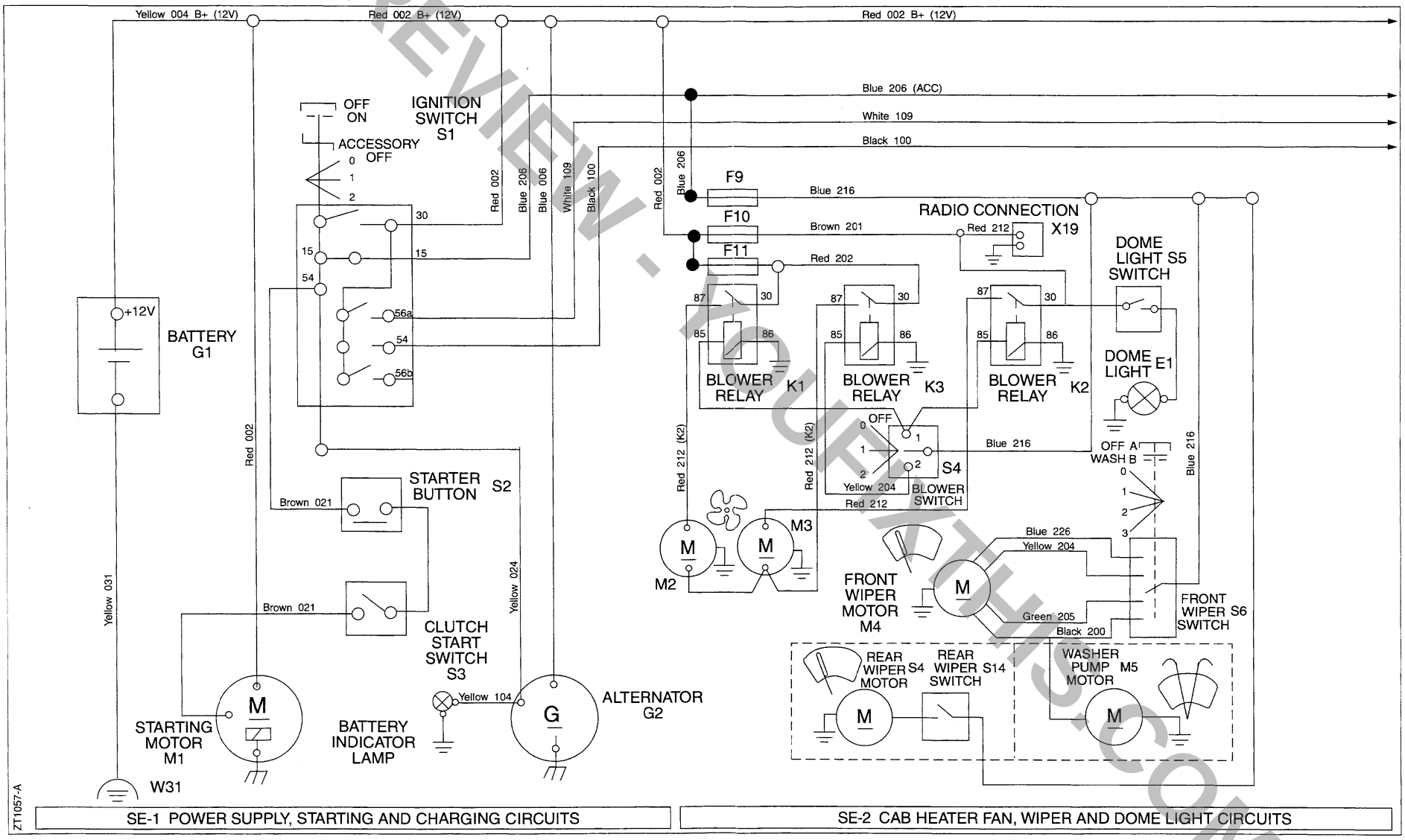




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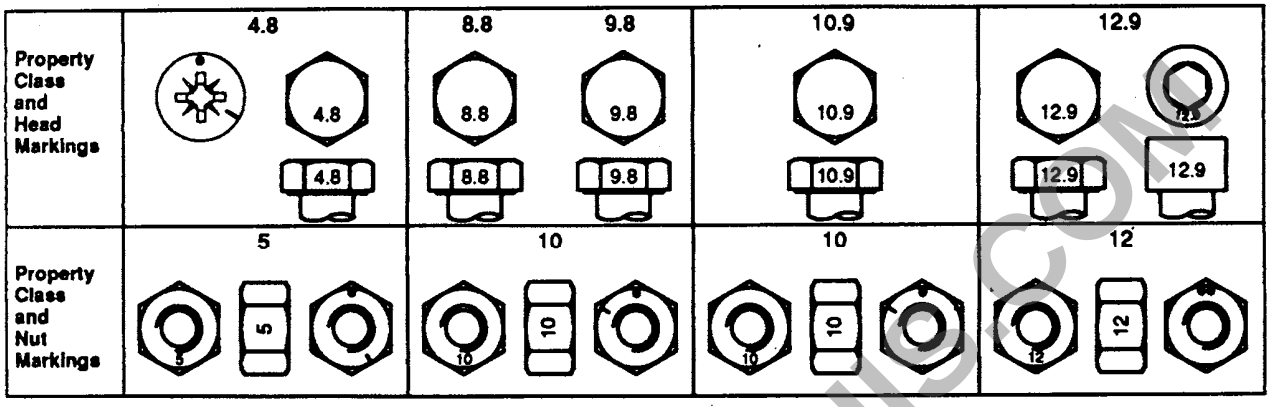
SYSTEM FUNCTIONAL SCHEMATIC



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METRIC BOLT AND CAP SCREW TORQUE VALUES



TS1163 -19-04MAR91

Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft
M6	4.8	3.5	6	4.5	9	6.5	11	8.5	13	9.5	17	12	15	11.5	19	14.5
M8	12	8.5	15	11	22	16	28	20	32	24	40	30	37	28	47	35
M10	23	17	29	21	43	32	55	40	63	47	80	60	75	55	95	70
M12	40	29	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	47	80	60	120	88	150	110	175	130	225	165	205	150	260	190
M16	100	73	125	92	190	140	240	175	275	200	350	225	320	240	400	300
M18	135	100	175	125	260	195	330	250	375	275	475	350	440	325	560	410
M20	190	140	240	180	375	275	475	350	530	400	675	500	625	460	800	580
M22	260	190	330	250	510	375	650	475	725	540	925	675	850	625	1075	800
M24	330	250	425	310	650	475	825	600	925	675	1150	850	1075	800	1350	1000
M27	490	360	625	450	950	700	1200	875	1350	1000	1700	1250	1600	1150	2000	1500
M30	675	490	850	625	1300	950	1650	1200	1850	1350	2300	1700	2150	1600	2700	2000
M33	900	675	1150	850	1750	1300	2200	1650	2500	1850	3150	2350	2900	2150	3700	2750
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2750	4750	3500

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical property class.

Fasteners should be replaced with the same or higher property class. If higher property class fasteners are used, these should only be tightened to the strength of the original.

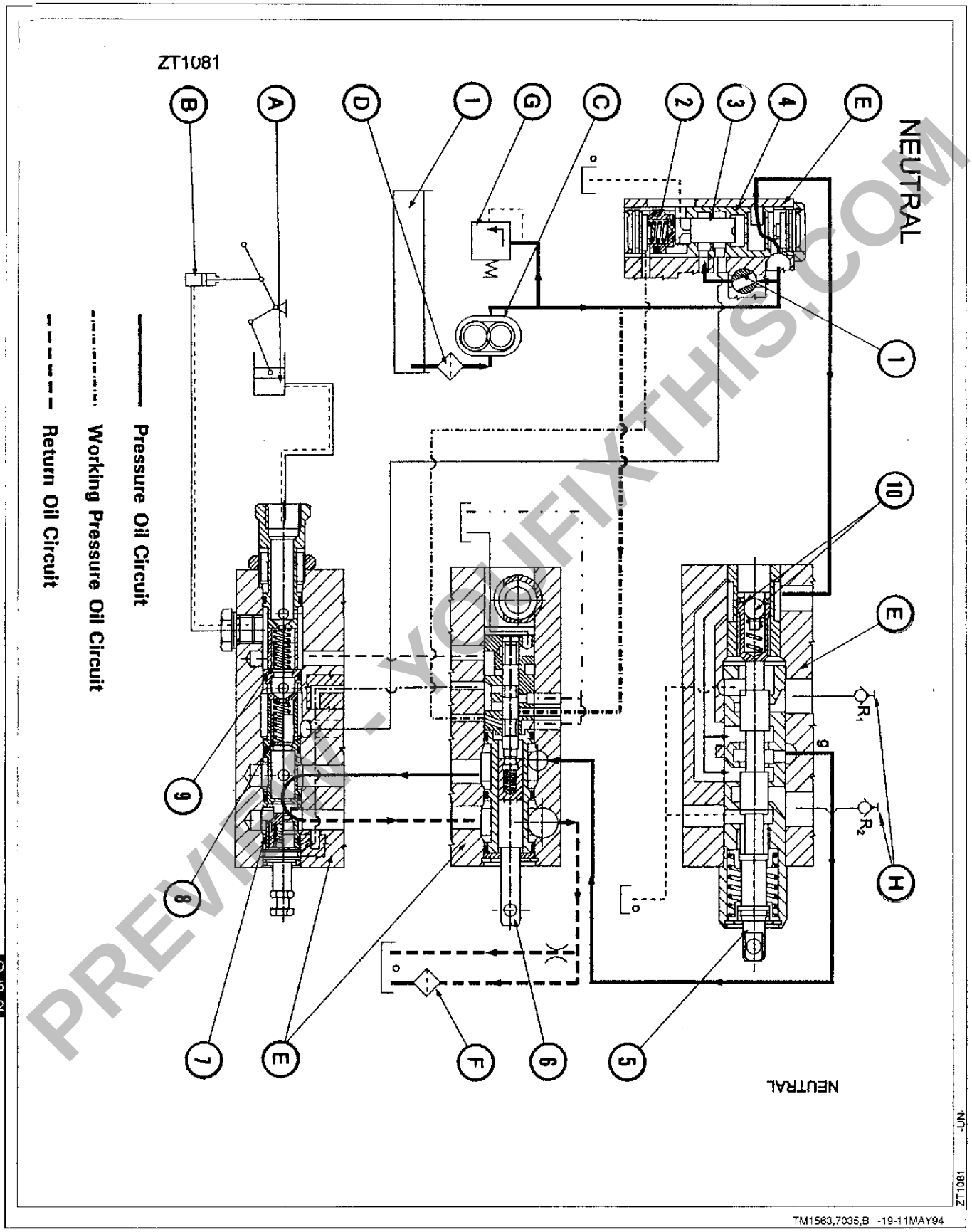
Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

[a] *"Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.*

DX,TORQ2 -19-16APR92

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REMOVE TRANSMISSION

1. Remove operator station. (See Section 90 Group 20 **Remove Operator Station**.

2. Separate engine from transmission (See Group 05 **Separating Engine From Transmission** in this section.

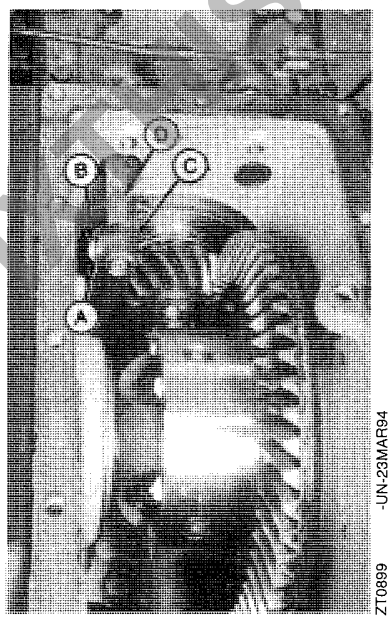
3. Remove hydraulic cover. (See Section 70 Group 10 **Remove Hydraulic Cover**).

TM1563,1510,A -19-11MAY94

4. Bend up tab on lock washer (A).

5. Remove cap screw (B) from shift fork (C).

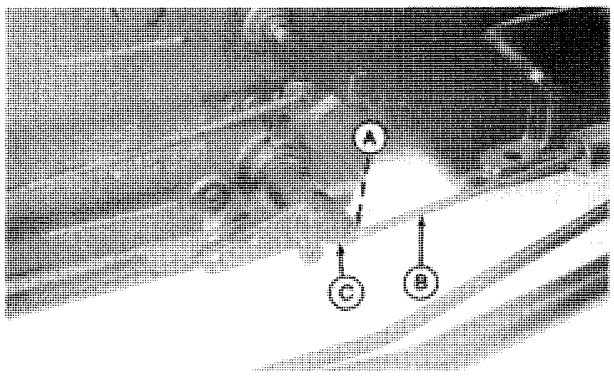
6. Remove shift fork (C) from shift rail (D).



ZT0899 -UN-23MAR94

TM1563,1510,B -19-11MAY94

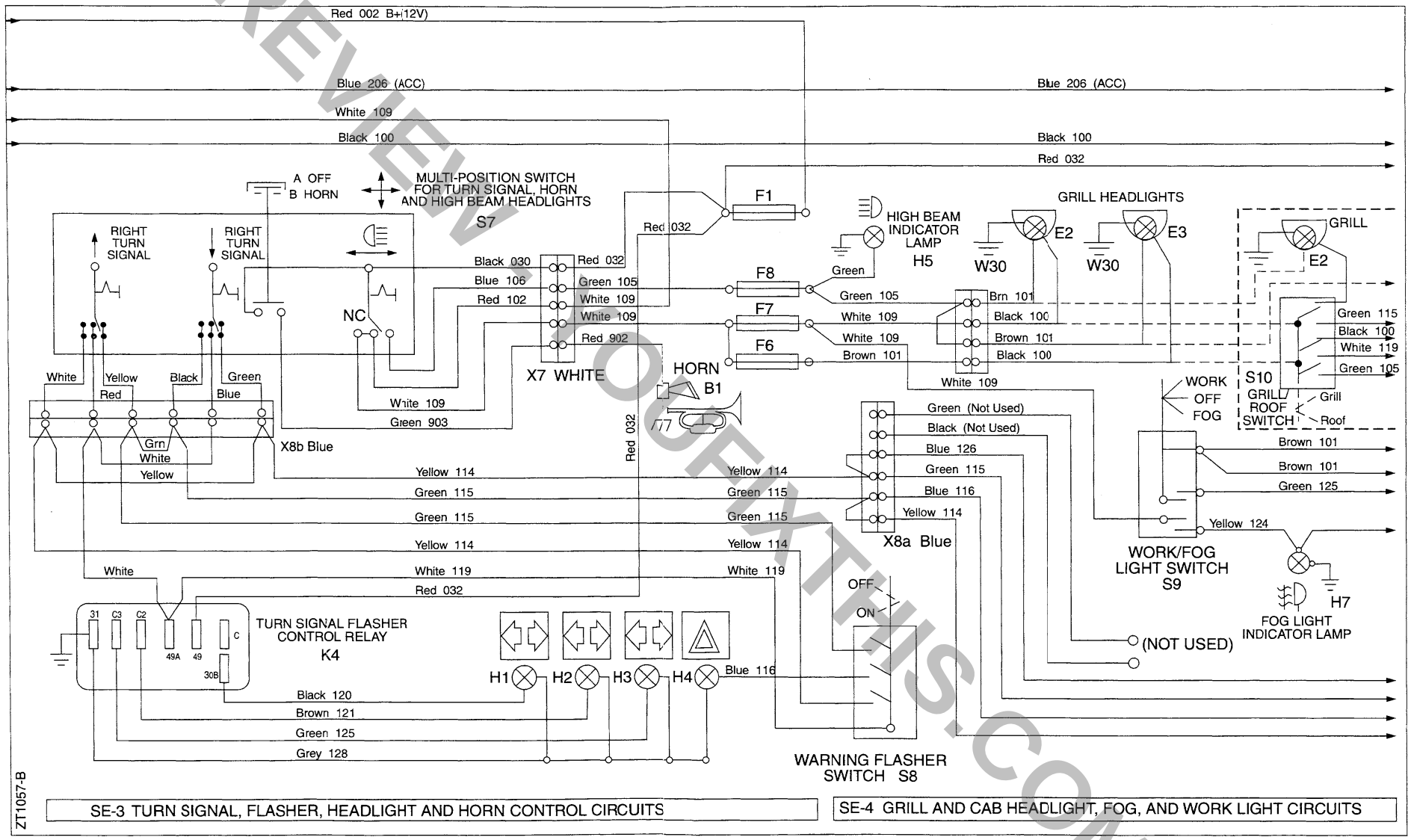
7. Remove snap ring (A) from park brake rod (B) and remove from lever (C).



ZT0900 -UN-23MAR94

TM1563,1510,C -19-11MAY94

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SE-3 TURN SIGNAL, FLASHER, HEADLIGHT AND HORN CONTROL CIRCUITS

SE-4 GRILL AND CAB HEADLIGHT, FOG, AND WORK LIGHT CIRCUITS

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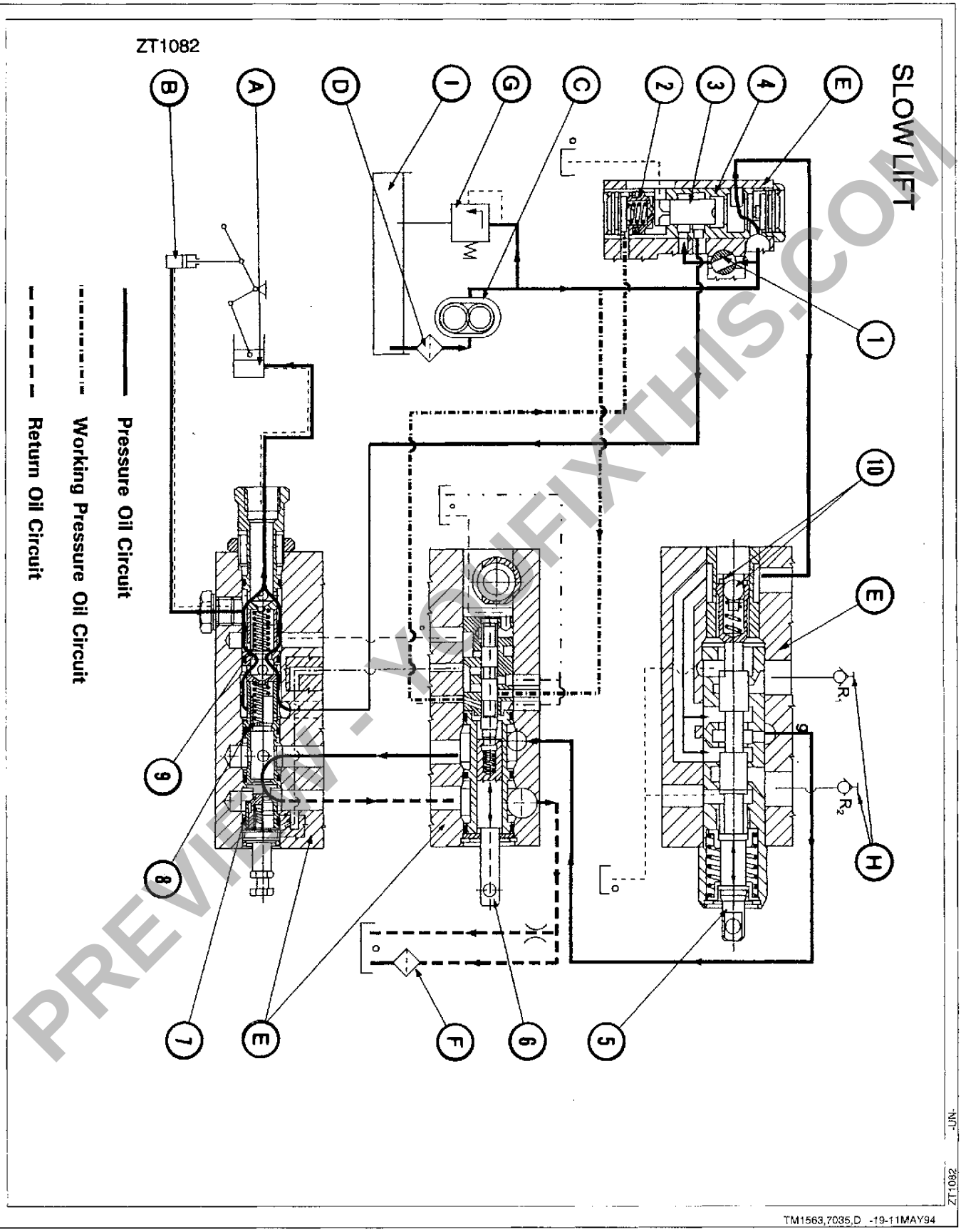
SPECIFICATIONS

Location	Hardware	Torque
Ring Gear	M10 x 30 Cap Screw	70 N·m (50 lb-ft)
Differential Carrier	M10 x 40 Cap Screw	42 N·m (30 lb-ft)
Axle Housing	M12 x 35 Cap Screw	105 N·m (75 lb-ft)

TM1563,5505,GA -19-28FEB94

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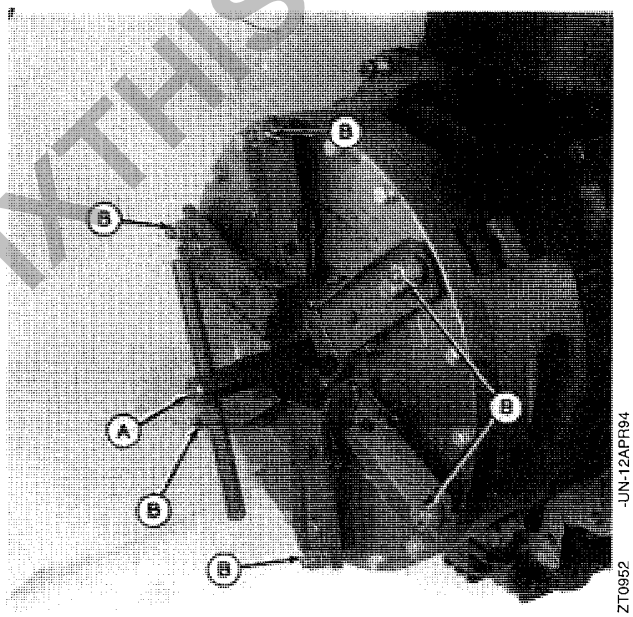
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1. Separate engine from transmission (See **Separating Engine From Transmission** Section 15, Group 05).

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CLUTCH REMOVAL FROM ENGINE

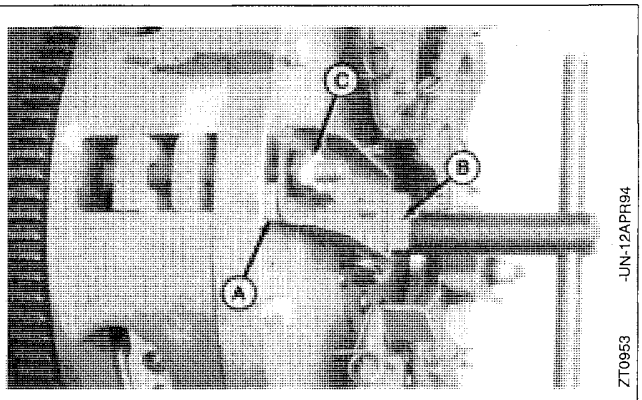
1. Insert clutch plate alignment tool (A) to aid in removal. Remove top lock nuts (B) from all the clutch fingers. **DO NOT** remove lower clutch finger nuts.



ZT0952 -UN-12APR94

TM1563,2010,B -19-11MAY94

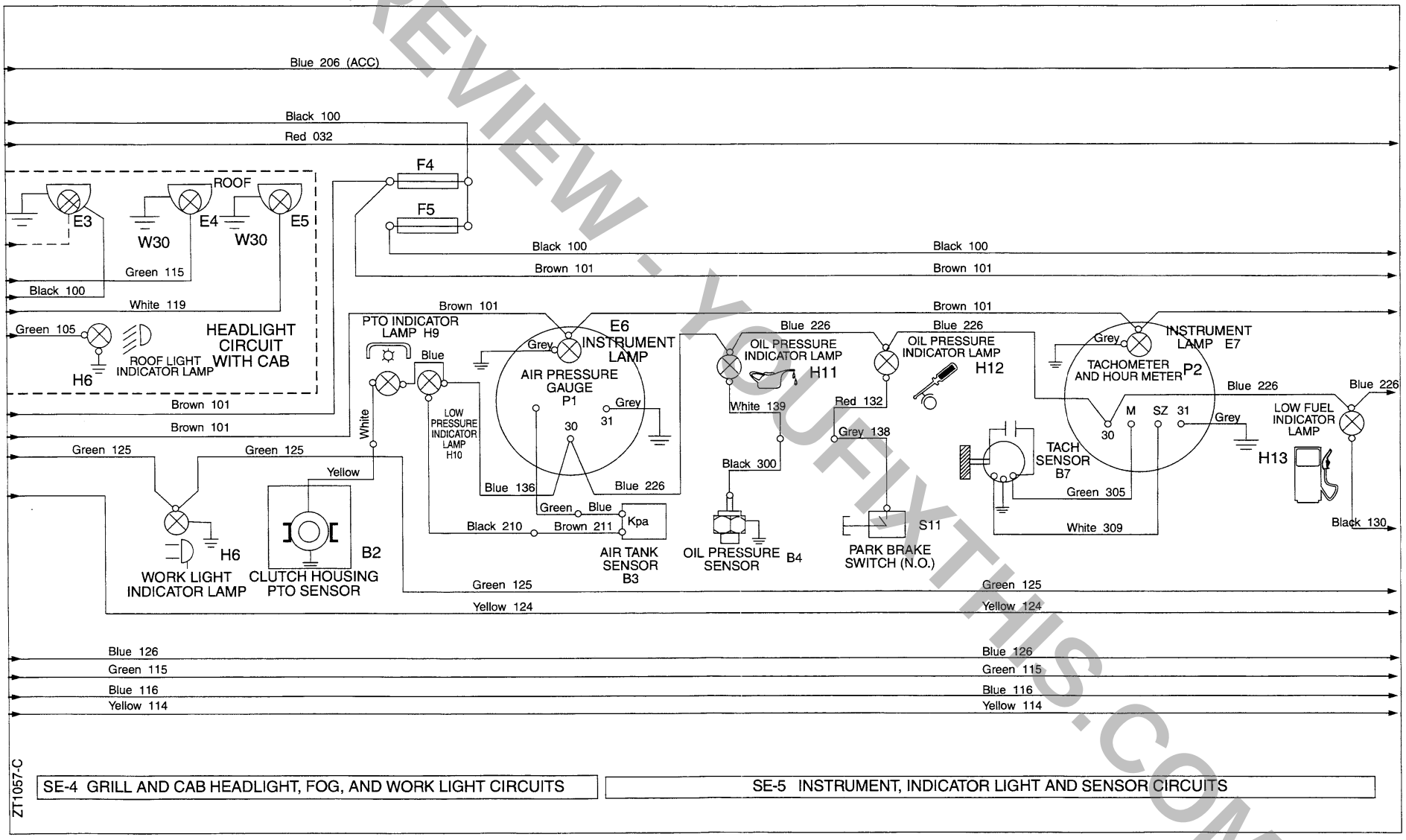
2. Place nut (A) under each clutch finger with a short tab (B). Tighten nut (C) to clamp nut (A) under finger.



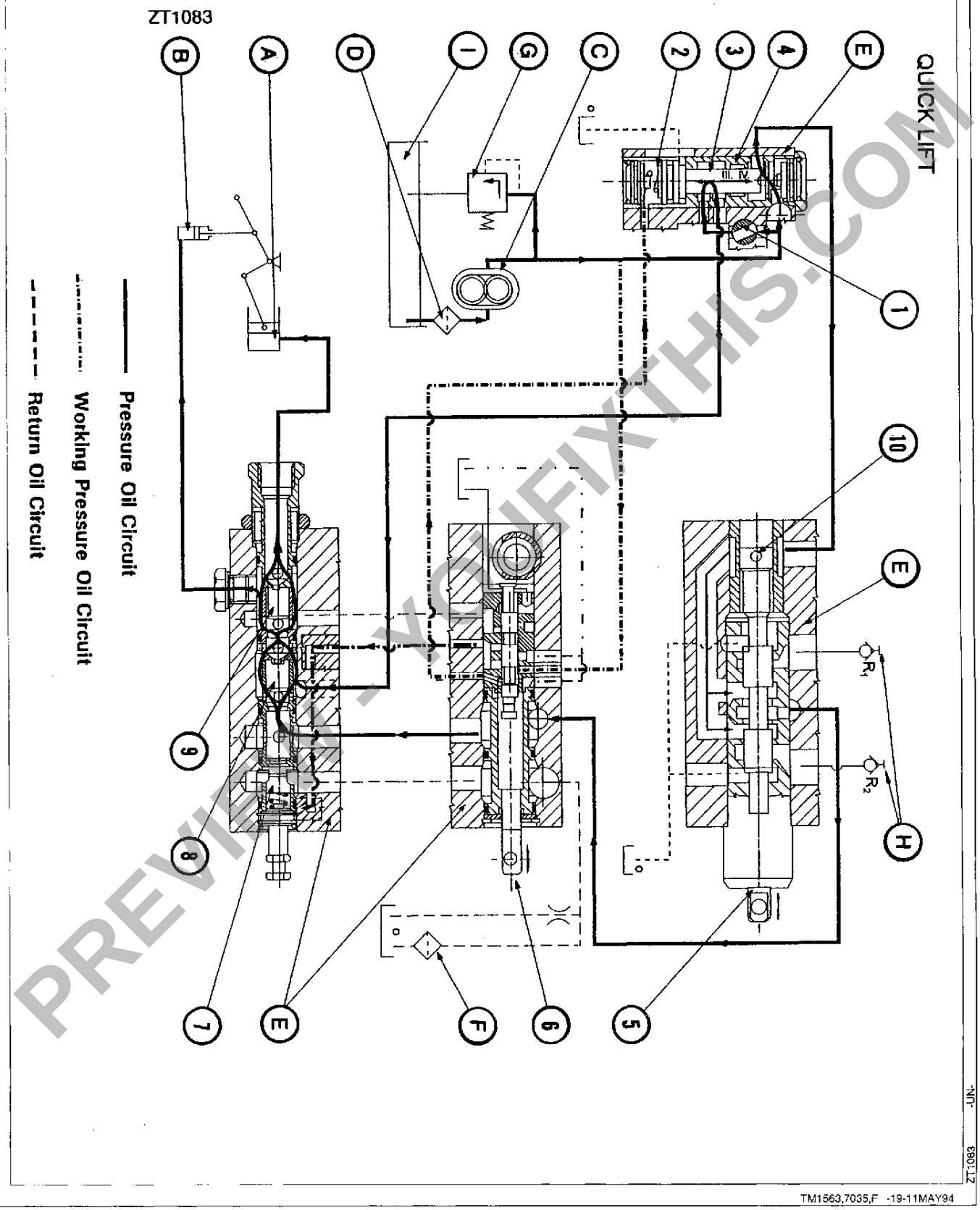
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05
05
1

HANDLE FLUIDS SAFELY—AVOID FIRES

When you work around fuel, do not smoke or work near heaters or other fire hazards.

Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Make sure machine is clean of trash, grease, and debris.

Do not store oily rags; they can ignite and burn spontaneously.



TS227 -UN-23AUG88

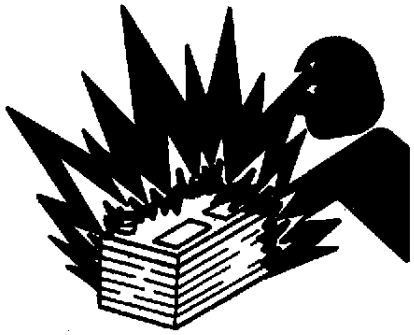
DX,FLAME -19-04JUN90

PREVENT BATTERY EXPLOSIONS

Keep sparks, lighted matches, and open flame away from the top of battery. Battery gas can explode.

Never check battery charge by placing a metal object across the posts. Use a volt-meter or hydrometer.

Do not charge a frozen battery; it may explode. Warm battery to 16°C (60°F).



TS204 -UN-23AUG88

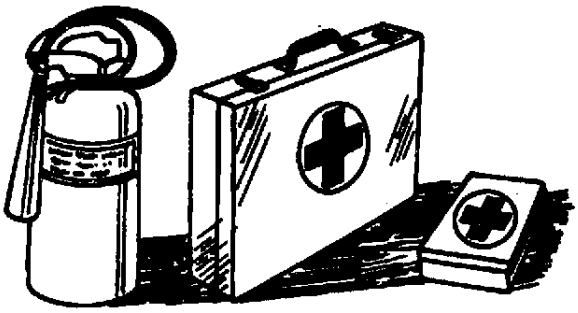
DX,SPARKS -19-03MAR93

PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.



TS291 -UN-23AUG88

DX,FIRE2 -19-03MAR93

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INDX 1

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Group 15—Open Station Floor
Group 20—Open Station Frame
Group 25—Cab

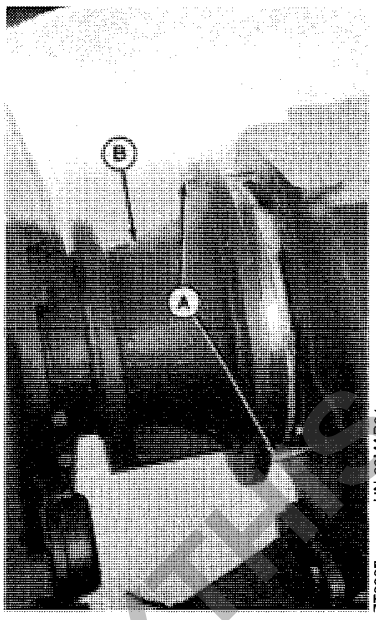
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15. Install two dowel bolts (A) in top and bottom of differential housing.

16. Remove final drive (B) from differential housing.

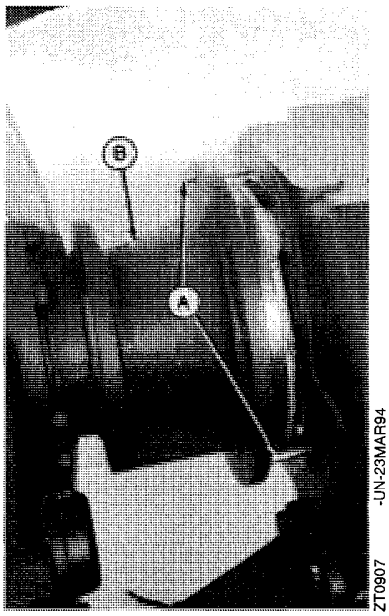


TM1563,1515,H -19-11MAY94

INSTALL FINAL DRIVES

1. Install two dowel bolts (A) in top and bottom of differential housing.

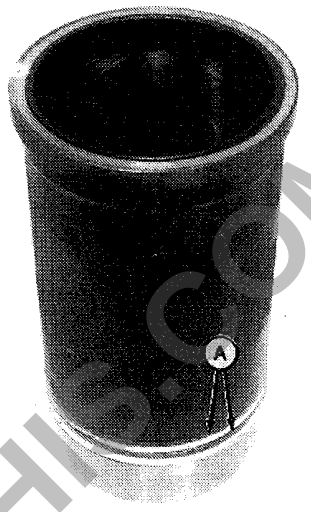
2. Install final drive (B) to differential housing.



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5. Remove cylinder liner O-ring seals (A) from liner.

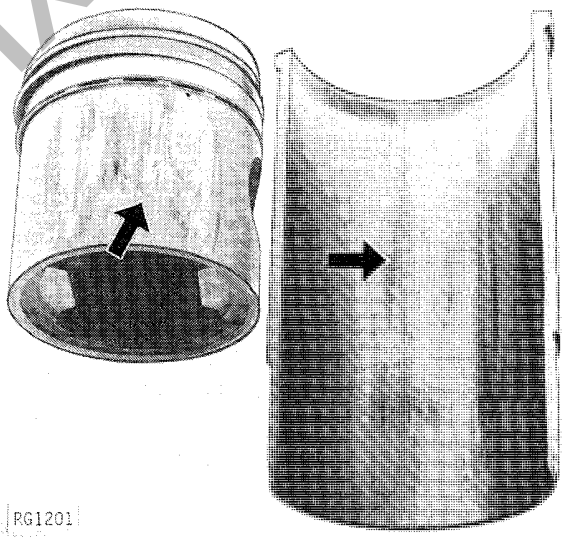


ZT1155 -UN-20APR94

TM1563,2030,Y -19-11MAY94

CLEAN AND INSPECT PISTONS, RINGS AND LINERS

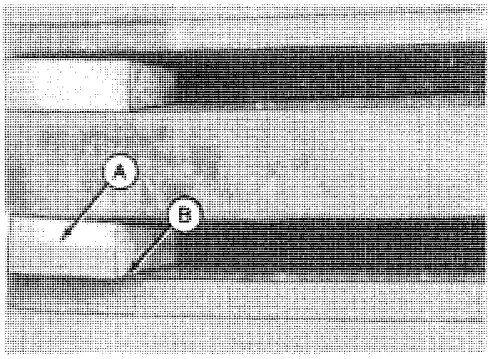
1. Match piston with correct liner and check for scoring (arrows). Wear of this type could be caused by: engine overheating, or foreign material entering the cylinder through the oiling system. Check for cracks or other obvious damage. Replace piston and liner if necessary.



RG1201 -UN-13DEC88

TM1563,2030,Z -19-11MAY94

2. Inspect rings of piston. If piston ring face (A) and ring land (B) have excessive wear, replace piston, liner and rings.

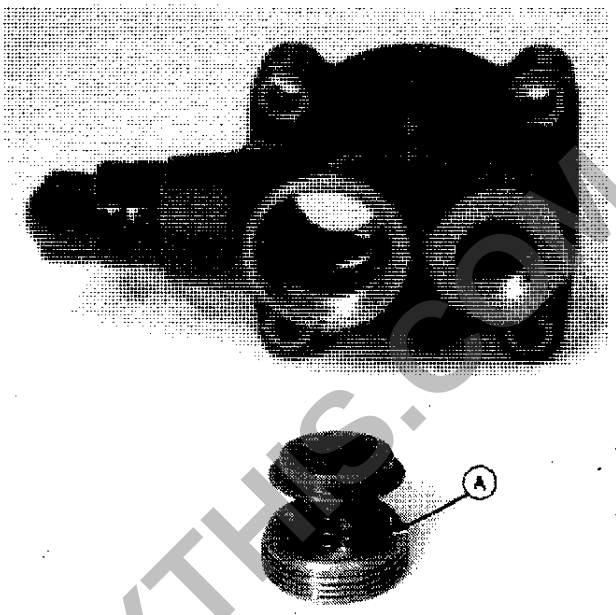


RG4378 -UN-13DEC88

TM1563,2030,AA -19-11MAY94

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2. Press valve assembly together with fingers, making sure disk valve and valve seat are pressed into the stop valve plate (A).

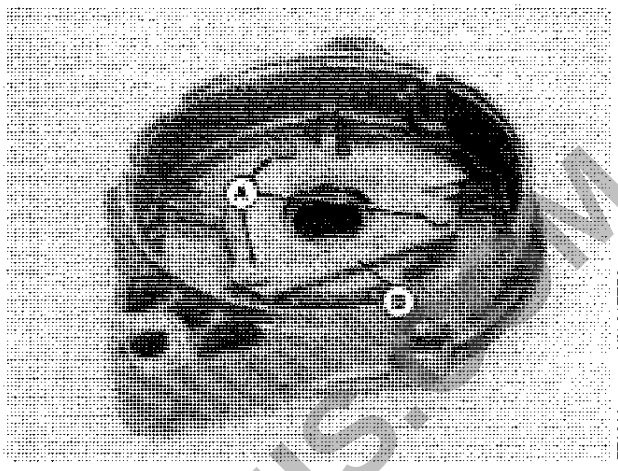


TM1563,2060,S -19-11MAY94

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4. Replace rivets (A), install bearing plate (B) and secure by flattening rivets.



TM1563,4030,S -19-03MAR94

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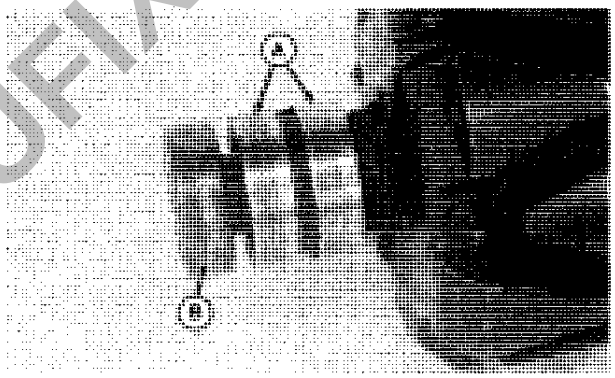
- **Rotor**

1. Inspect slip rings (A) of rotor for scoring or rough surface. Polish slip rings sparingly with No. 00 sand paper or 400 grit silicon carbide paper.

NOTE: DO NOT use cleaning solvent to clean slip rings, use compressed air only.

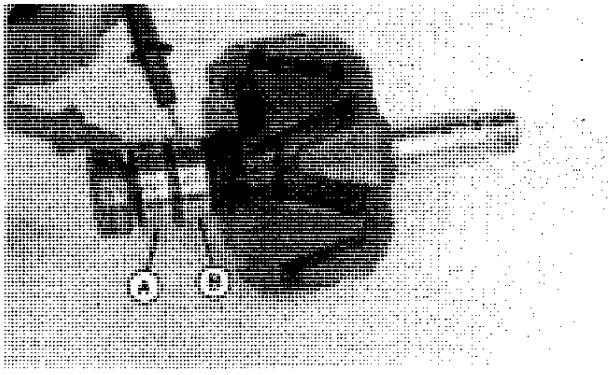
2. If slip rings are out of round, they can be turned down in a lathe to within 0.05 mm (0.002 in.) of total indicator reading, otherwise, replace the rotor.

NOTE: Remove bearing (B) before turning slip rings down in lathe.



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3. Use a volt/ohm meter to test for continuity from one slip ring (A) to the other (B). If test does not show continuity, replace rotor.



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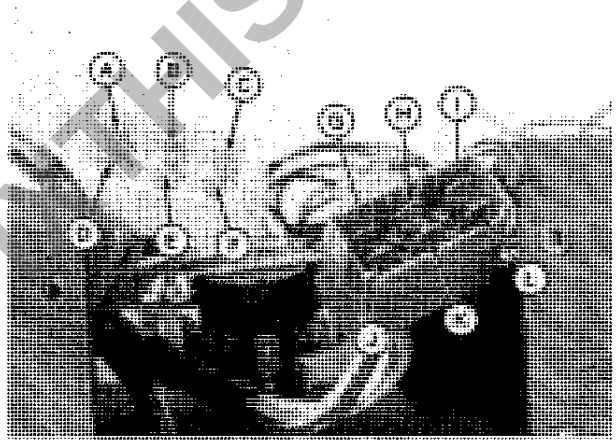
4. Raise panel and locate a white 6-pin connector, a blue 6-pin connector and a blue 4-pin connector forward of the steering wheel column. The white 6-pin connector will have wire colors of white, red, white, yellow, brown and green. Disconnect connectors and test the following ignition switch circuits.

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- **Instrument Circuit**

1. Set volt/ohm meter for diode sound test. Connect one meter lead to the red wire connection (B) of the white connector and the other meter lead to the blue wire connection (H) of the 6-point blue connector.

NOTE: There are two white 6-pin connectors in the harness area. Make sure meter is connected to the correct one.



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Color of Wires to White Connector

A—White
B—Red
C—White
D—Yellow
E—Brown
F—Green

Color of Wires to Blue Connector

G—Black
H—Blue
I—White
J—Green
K—Brown
L—Yellow

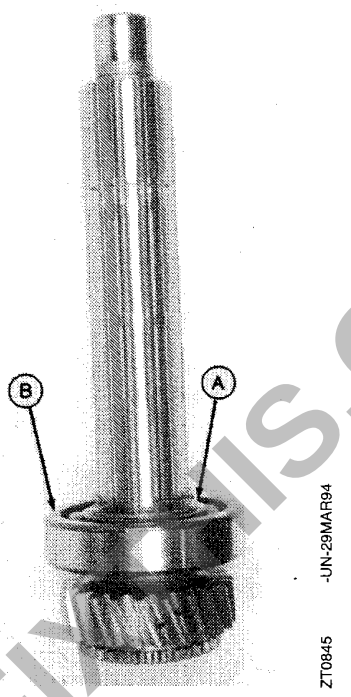
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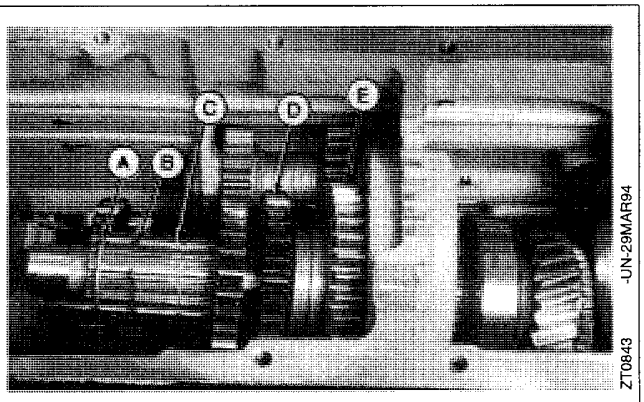
INSTALL TOP SPLINED SHAFT

1. Press bearing (B) on top splined shaft.
2. Install washers and snap ring (A).



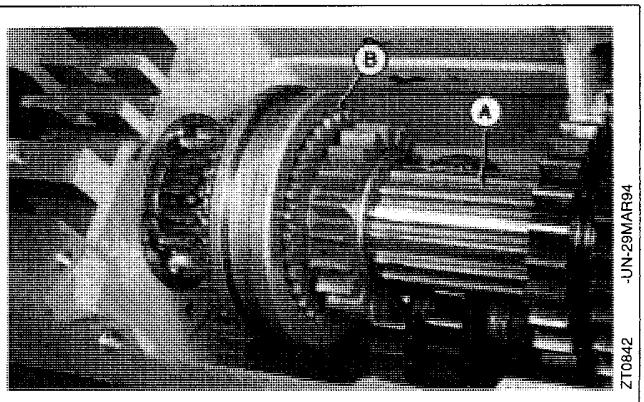
TM1563,5020,AU -19-11MAR94

3. Install top splined shaft (C) through rear bore of housing.
4. Install first-reverse gear (E) on shaft (C).
5. Install second-third gear (D) on shaft (C).
6. Install snap ring (B) on top splined shaft (C).
7. Install shim washer (A) on shaft (C).



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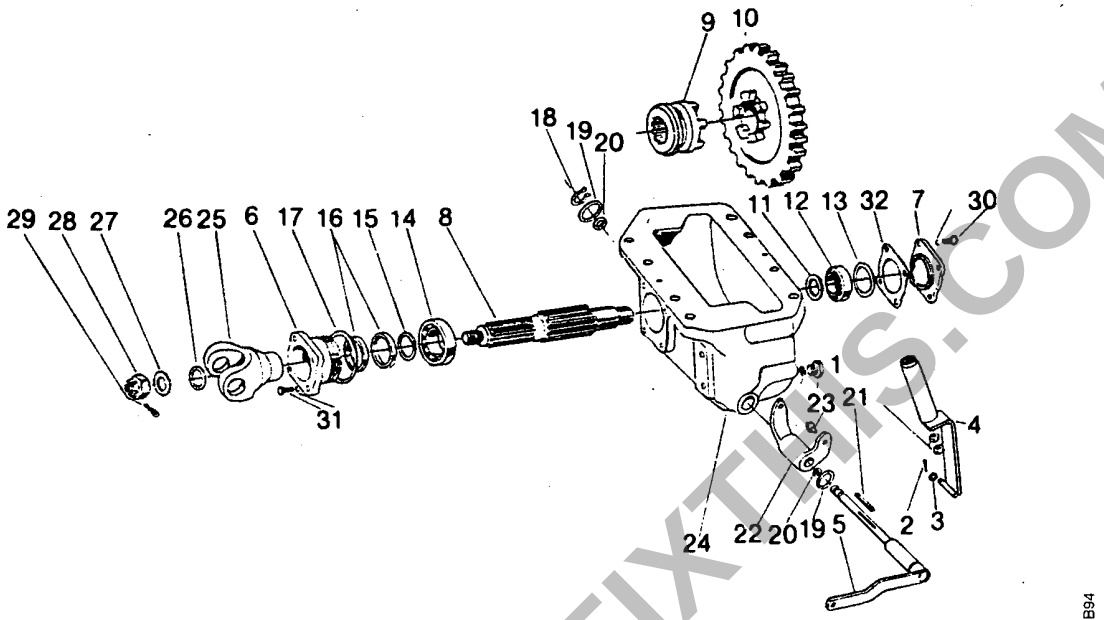
8. Install sychromesh clutch assembly (B) assembly on shaft (A).



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DISASSEMBLE DROP BOX



1—Plug
2—Cotter Pin
3—Washer
4—Linkage Pin
5—Shift Rod
6—Front Cover
7—Rear Cover
8—Shaft
9—Clutch Gear
10—Drive Gear
11—Spacer
12—Bearing
13—Shim
14—Bearing
15—Washer
16—Seal
17—O-Ring
18—Snap Ring
19—Washer
20—O-Ring
21—Key
22—Fork
23—Guide
24—Housing
25—Yoke
26—Seal
27—Washer
28—Nut
29—Cotter Pin
30—Bolt, M8 x 18 (4 used)
31—Bolt, M8 x 18 (4 used)

TM1563,5530,B -19-28FEB94

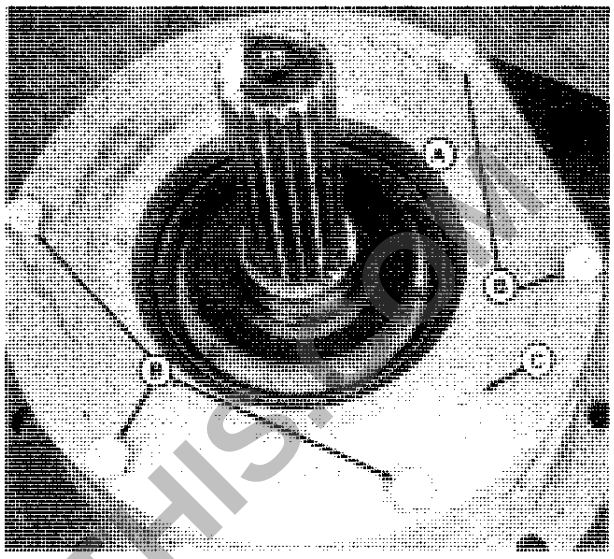
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30
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11. Install cover (C) with five M12 x 130 cap screws (B) and lock washer.

12. Install dust seal (A) over axle shaft.



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13. Install final drive (See Section 15 **Component Removal/Installation** Group 15 **Final Drives**).

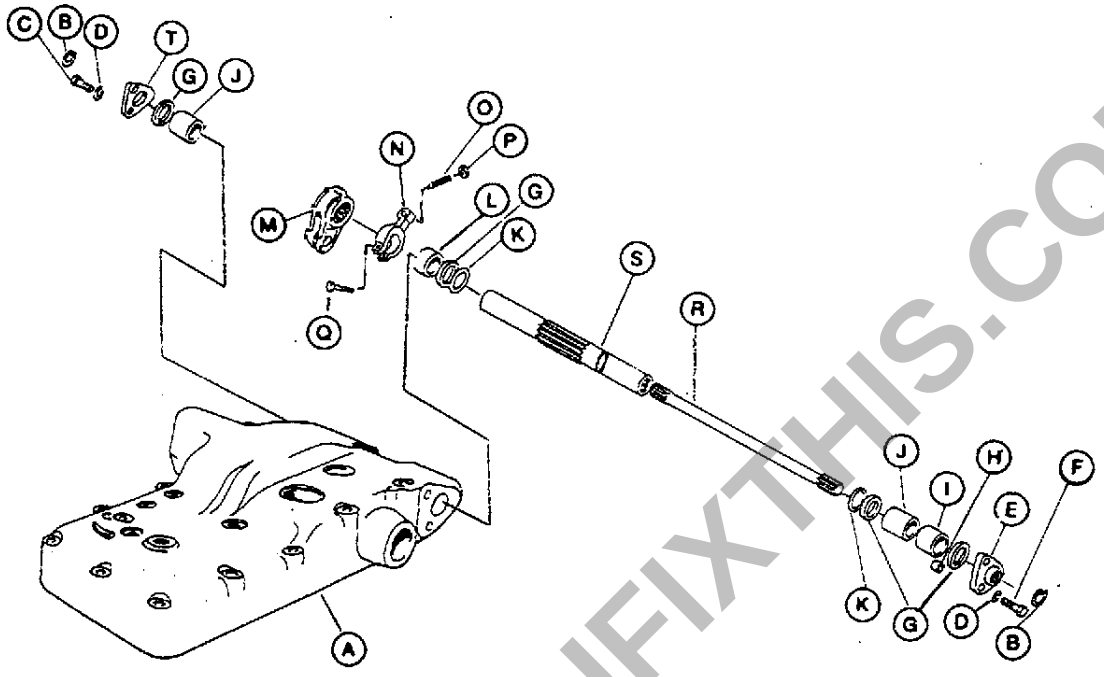
TM1563,6015,O -19-03MAR94

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7

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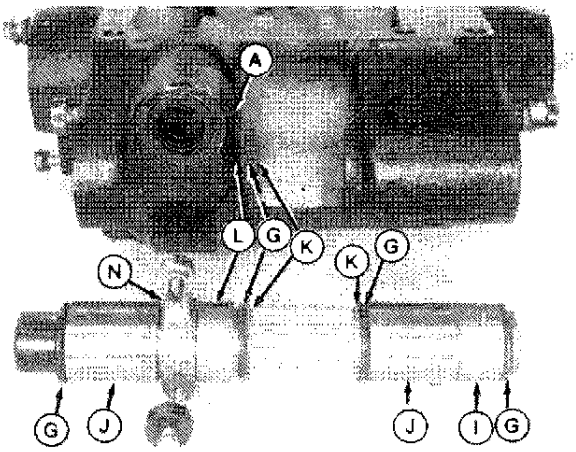
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REMOVE TORSION BAR



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A—Cover
B—Snap Ring
C—Bolt, M12 x 25 (2 used)
D—Lock Washer (4 used)
E—Hub
F—Bolt, M12 x 35 (2 used)
G—O-Ring (4 used)
H—Centering Tube
I—Bushing
J—Bushing (2 used)
K—Washer
L—Bushing
M—Lever
N—Stop Pin Lever
O—Stop Pin
P—Nut
Q—Clamp Bolt
R—Torsion Bar
S—Torsion Tube
T—Flange



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