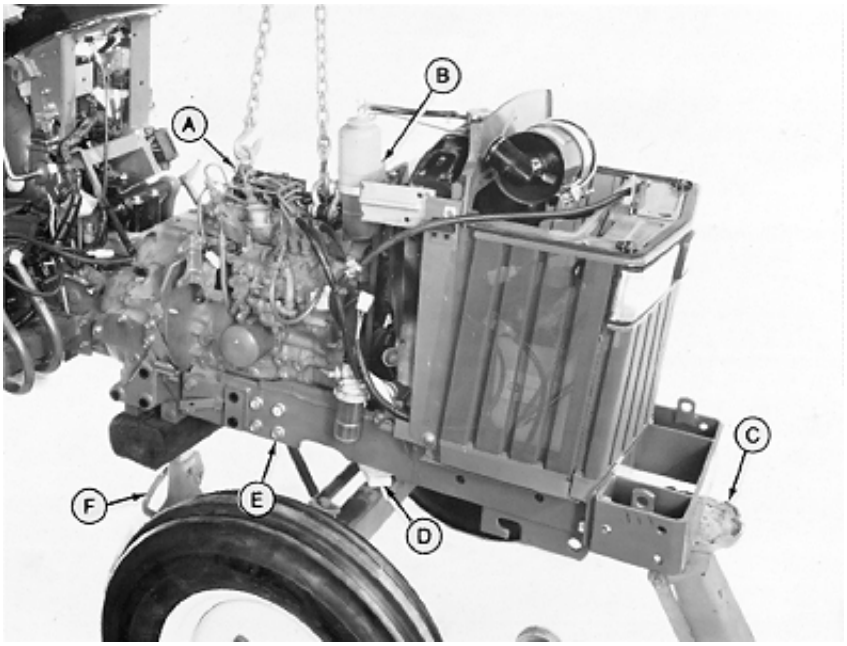
Contents

Continued on next page

	870	**970**	**1070**
ENGINE			
Make	Yanmar	Yanmar	Yanmar
Type	Diesel	Diesel	Diesel
Model	3TNA84-UJX	4TN84-RJX	4TN84-RJX
Horsepower (Net)	20.9 kW (28 hp)	24.6 kW (33 hp)	28.7 kW (38.5 hp)
PTO Horsepower	18.6 kW (25 hp)	22.4 kW (30 hp)	26.1 kW (35 hp)
Rated Engine Speed	2600 rpm	2600 rpm	2700 rpm
Operating Range	800—2775 rpm	800—2775 rpm	800—2875 rpm
Number of Cylinders	3	4	4
Displacement	1431 cm^3 (87.3 cu. in.)	1816 cm^3 (110.8 cu. in.)	1906 cm^3 (116.3 cu. in.)
Bore and Stroke	84 x 86 mm (3.31 x 3.39 in.)	84x 86 mm (3.31 x 3.39in.)	84 x 86 mm (3.31 x 3.39in.)
Compression Ratio	17.8:1	17.8:1	17.8:1
Fast Idle	2750—2800 rpm	2750—2800 rpm	2850—2900 rpm
Slow Idle	900—950 rpm	900—950 rpm	900—950 rpm
Start Aid	Air Heater	Air Heater	Air Heater
Firing Order	1-3-2-1	1-3-4-2-1	1-3-4-2-1
Timing	16° BTDC	16° BTDC	16° BTDC
Lubrication	Pressurized	Pressurized	Pressurized
Cooling System	Water Pump	Water Pump	Water Pump
Air Cleaner	Dry Type w/ Safety	Dry Type w/ Safety	Dry Type w/ Safety
Engine Shutoff	Key Switch	Key Switch	Key Switch
ELECTRICAL SYSTEM			
Type	12 Volt	12 Volt	12 Volt
Battery Size	447 Cold Cranking amps at -18°C	550 Cold Cranking amps at -18°C	550 Cold Cranking amps at -18°C
Alternator	20 Amp	20 Amp	20 Amp
FUEL SYSTEM			
Type	Direct Injection	Direct Injection	Direct Injection
Injection Pump Type	In-Line w/ Electric Shutoff	In-Line w/ Electric Shutoff	In-Line w/ Electric Shutoff
Fuel Consumption at 75% load (Mowing)	1.25 gal/hr (approx.)	1.47 gal/hr (approx.)	1.72 gal/hr (approx.)
9th Gear	17.1 km/h (10.6 mph)	18.3 km/h (11.4 mph)	19.8 km/h (12.3 mph)



A—Lifting Brackets (2 used)
B—Recovery Tank Assembly
C—Floor Jack
D—Wood Block (2 used)
E—Cap Screw (12 used)
F—Support Stand

23. Remove recovery tank assembly (B).

24. Remove rocker arm cover.

25. Install lifting brackets such as JDG19 or JT01748 Lifting Brackets (A).

26. Attach a hoist to engine.

27. Install support stand (F) under clutch housing.

28. Install a floor jack (C) under front weight support.

29. Install a wood block (D) between front axle and frame on both sides.

30. Remove six cap screws (E) from each side of frame.

31. Roll front end away from tractor.

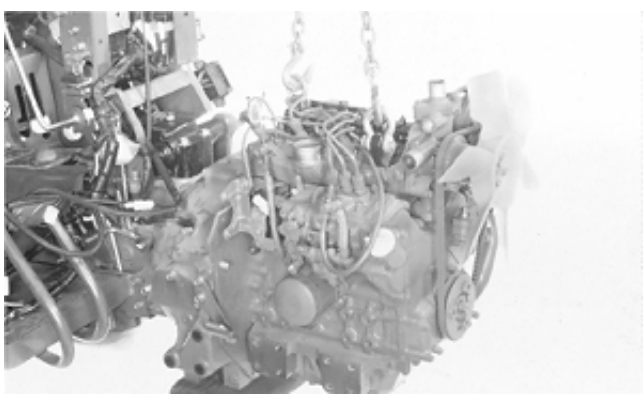
MX,2005DG,A6 -19-20OCT89

NOTE: Put transmission in neutral to ease clutch shaft alignment with engine during installation.

32. Put transmission shift lever in neutral.

33. Remove eight cap screws and lock washers. Remove engine.

34. Make repairs as necessary. (See CTM-3.)



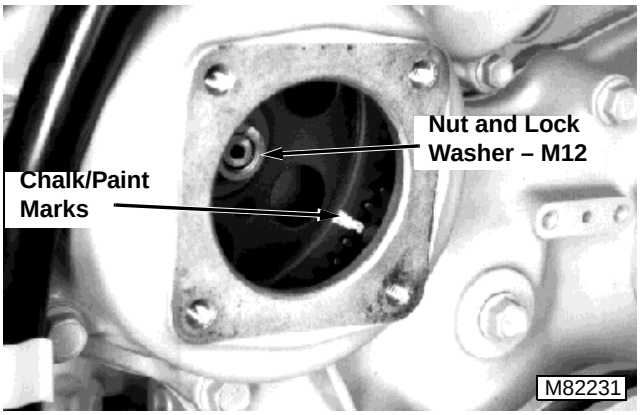
MX,2005DG,A7 -19-20OCT89

8. Remove three mounting nuts.

9. Remove four cap screws, washers, the cover and gasket.

10. Use chalk or paint to mark the injection pump gear to the idler gear.

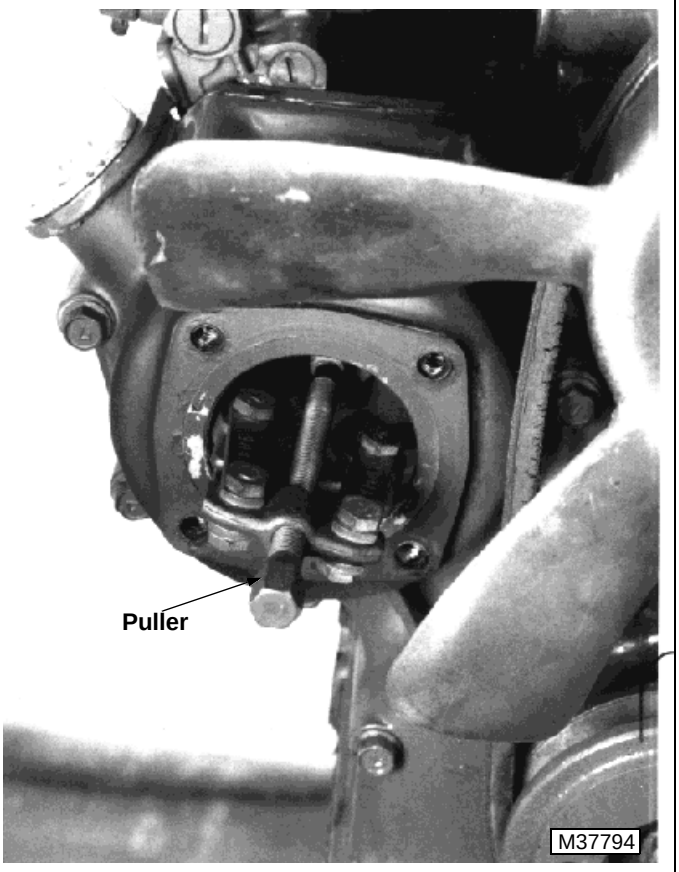
11. Remove the nut and lock washer.



12. Use a puller to remove the gear from the injection pump shaft.

13. Remove the injection pump and O-ring.

NOTE: **DO NOT** *attempt to service the injection pump or governor. If the unit is in need of repair, it must be serviced by a qualified fuel injection repair shop.*



INSTALLATION:

1. Install a new O-ring to the injection pump.

2. Put the injection pump onto the back of the gear cover mounting plate. Align the key on the shaft with the keyway in the gear. Be sure to align the marks on gears made during removal.

3. Install lock washer and nut. Tighten to specification.

4. Install a new gasket, cover, four washers and cap screws.

5. Install three mounting nuts. Do not tighten.

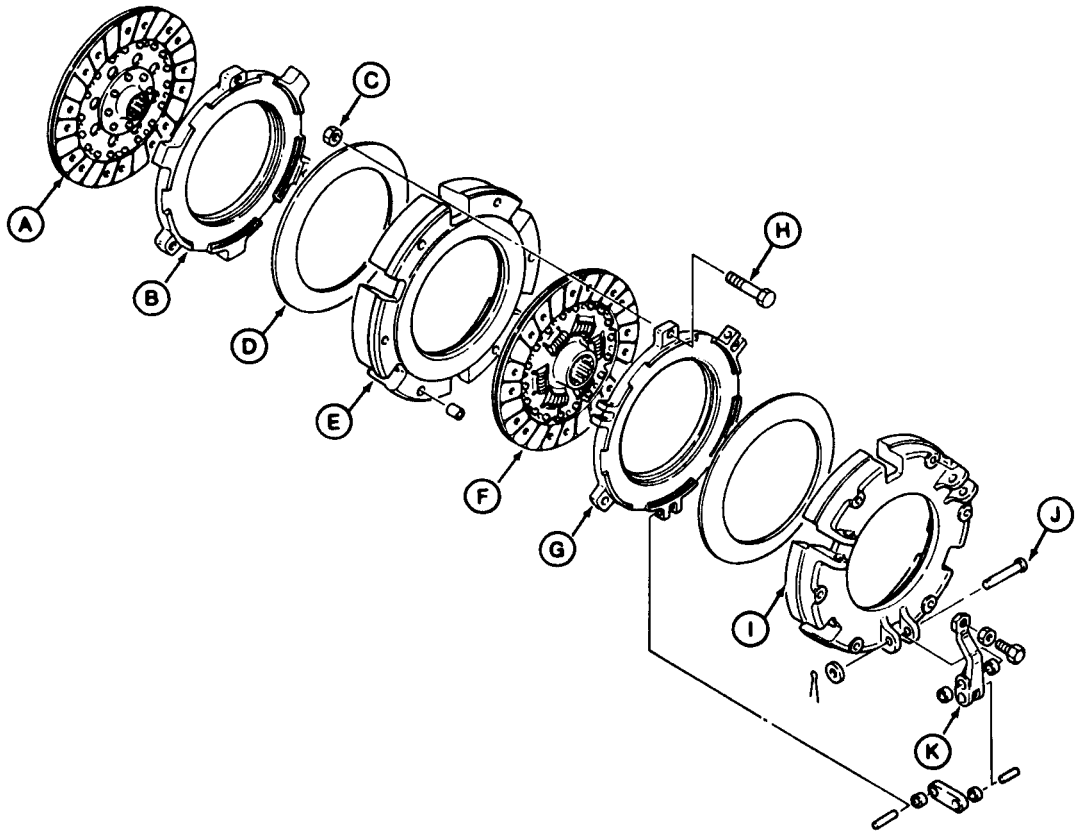
6. Align the timing marks on the mounting plate and injection pump to the same place as when removed. Tighten the mounting nuts to specifications.

7. Connect the fuel shutoff solenoid link.

8. Connect the fuel filter hoses.

9. Install fuel injection lines and tighten line clamp cap screws.

IMPORTANT: If the oil has been drained out of the fuel injection pump housing, add oil as necessary. The fuel injection pump can be damaged if operated without the proper amount of oil.



670/770/790 Shown

A—PTO Clutch Disk
B—Pressure Plate
C—Nut (3 used)
D—Spring Disk (2 used)
E—Cover
F—Traction Clutch Disk
G—Pressure Plate
H—Cap Screw (3 used)
I—Cover
J—Pin (3 used)
K—Clutch Finger (3 used)

2. Inspect drive surface of pressure plates (B and G) and cover (E) for distortion and scratches.

3. Measure flatness of drive surfaces using a straight-edge and feeler gauge. Replace pressure plates or cover if surfaces are not flat to within 0.2 mm (0.008 in.).

4. Clean any rust or oil from drive surfaces using a light abrasive.

5. Inspect clutch disks (A and F) for damage or wear. Replace if necessary.

6. Measure thickness of disks (A and F). Replace disks if less than specifications.

MINIMUM CLUTCH DISK THICKNESS

Disk (A) . . . . . 7.0 mm (0.270 in.)

Disk (F) . . . . . 7.6 mm (0.300 in.)

NOTE: Match up alignment marks made before disassembly.

7. Assemble clutch assembly. Install disk (F) with longer hub facing toward fingers (K).

8. Install cap screws (H) and nuts (C). Leave loose.

OTHER MATERIAL

Number	Name	Use
TY6305	Clean and Cure Primer	To clean and cure surfaces prior to application of adhesives or sealants.
TY6304	Flexible Sealant	To provide a seal between mating surfaces.
T43512	Thread Lock and Sealer (Medium Strength)	Apply to threads of outer drive and differential carrier mounting cap screws.

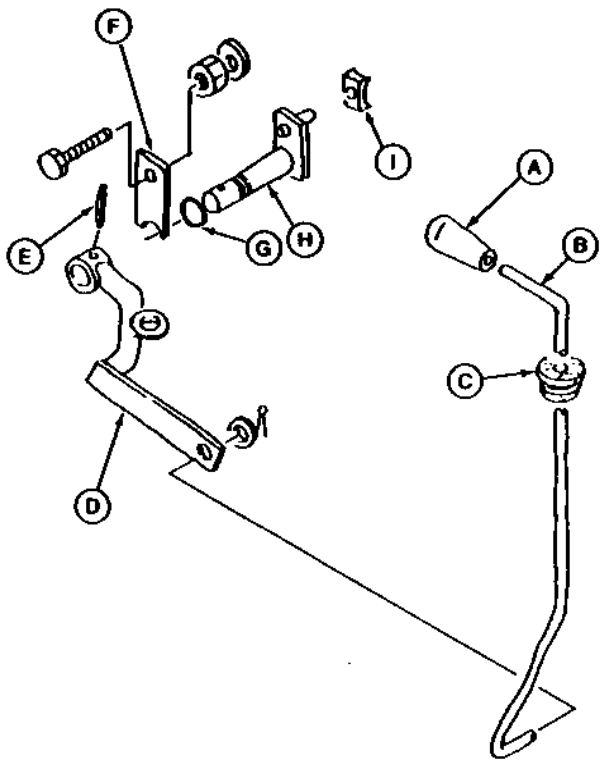
MX,5530DG,A1 -19-09OCT89

INSPECT AND REPAIR MFWD LEVER AND LINKAGE

Remove left-hand fender.

NOTE: To repair or replace parts (G, H and I), separate transmission from clutch housing. (See procedure in Group 10.)

A—Knob
B—Lever
C—Guide
D—Arm
E—Spring Pin
F—Plate
G—Packing
H—Arm
I—Shift Collar



M53531 -UN-20NOV89

MX,5530DG,A2 -19-26SEP89

REMOVE AND INSTALL STEERING COLUMN ASSEMBLY

1. For 670/770/790: Remove fuel tank. (See Section 20, Group 20.)

For 870/970: Remove engine shields and lower dash covers.

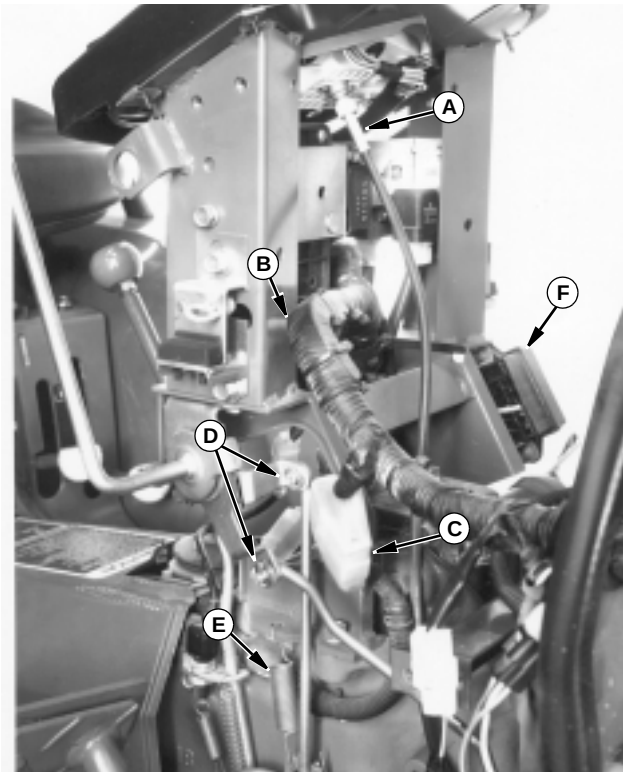
2. Remove hood. (See Section 80, Group 15.)

3. Remove steering wheel.

4. Disconnect cable (A), wiring harness (B), wiring connector (C), linkage (D) and spring (E).

5. Remove fuse holder (F).

6. Remove dashboard support.



670 shown

A—Hour Meter Cable
B—Wiring Harness
C—Wiring Connector
D—Throttle Control Linkage
E—Throttle Control Return Spring
F—Fuse Holder

1. Remove rockshaft case. (See procedure in this group.)

2. Disconnect feed back link from plate (O).

3. Inspect all parts for wear or damage. Replace as necessary.

NOTE: Bushings (B) are pressed in rockshaft housing.

4. Replace bushings (B) using a bushing driver set. Press new bushings into rockshaft housing so bushing outer edge is at least 7 mm (0.283 in.) below bore surface.

5. Apply clean transmission/hydraulic oil to all internal parts.

6. Install crank arm assembly (A) into rockshaft housing.

7. Install rockshaft (B), aligning marks (C).

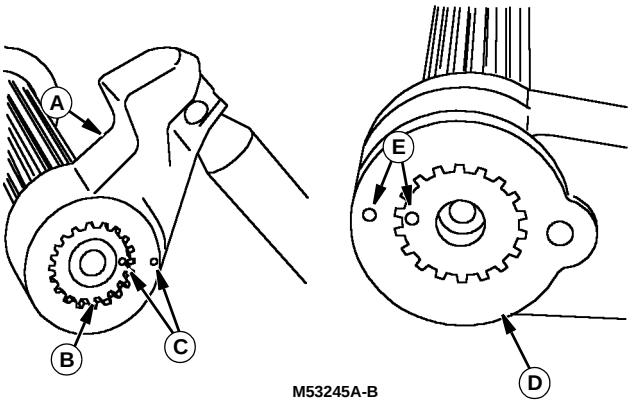
IMPORTANT: Be sure sleeves are installed tappered end first.

8. Install new O-rings, sleeves and washers.

9. Install lift arms (D) to rockshaft, aligning marks (E).

10. Install washer and plate. Tighten cap screws to 50 N•m (37 lb-ft)

11. Connect feed back link.



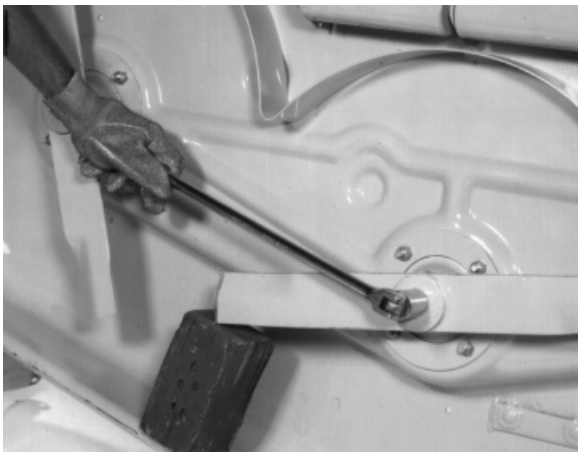
M53245A-B

A—Crank Arm Assembly
B—Rockshaft
C—Index Marks
D—Lift Arm
E—Index Marks

C **CAUTION: Blades may be sharp. When you handle blades, wear gloves, or wrap a shop cloth around blade.**

5. Put a block of wood between mower blade and deck.

6. Remove cap screw, washer, blade, and anti-wrap cup (if equipped).

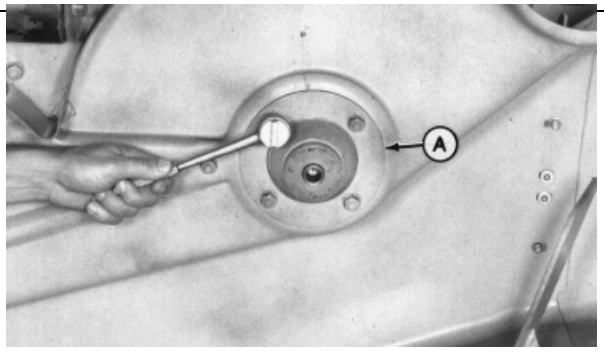


M35758

7. Remove nuts and carriage bolts.

8. Remove ring (A). Pull spindle assembly from mower deck.

60-In. Mower Shown



M37328

DISASSEMBLE SPINDLES—60/72-IN. MOWERS

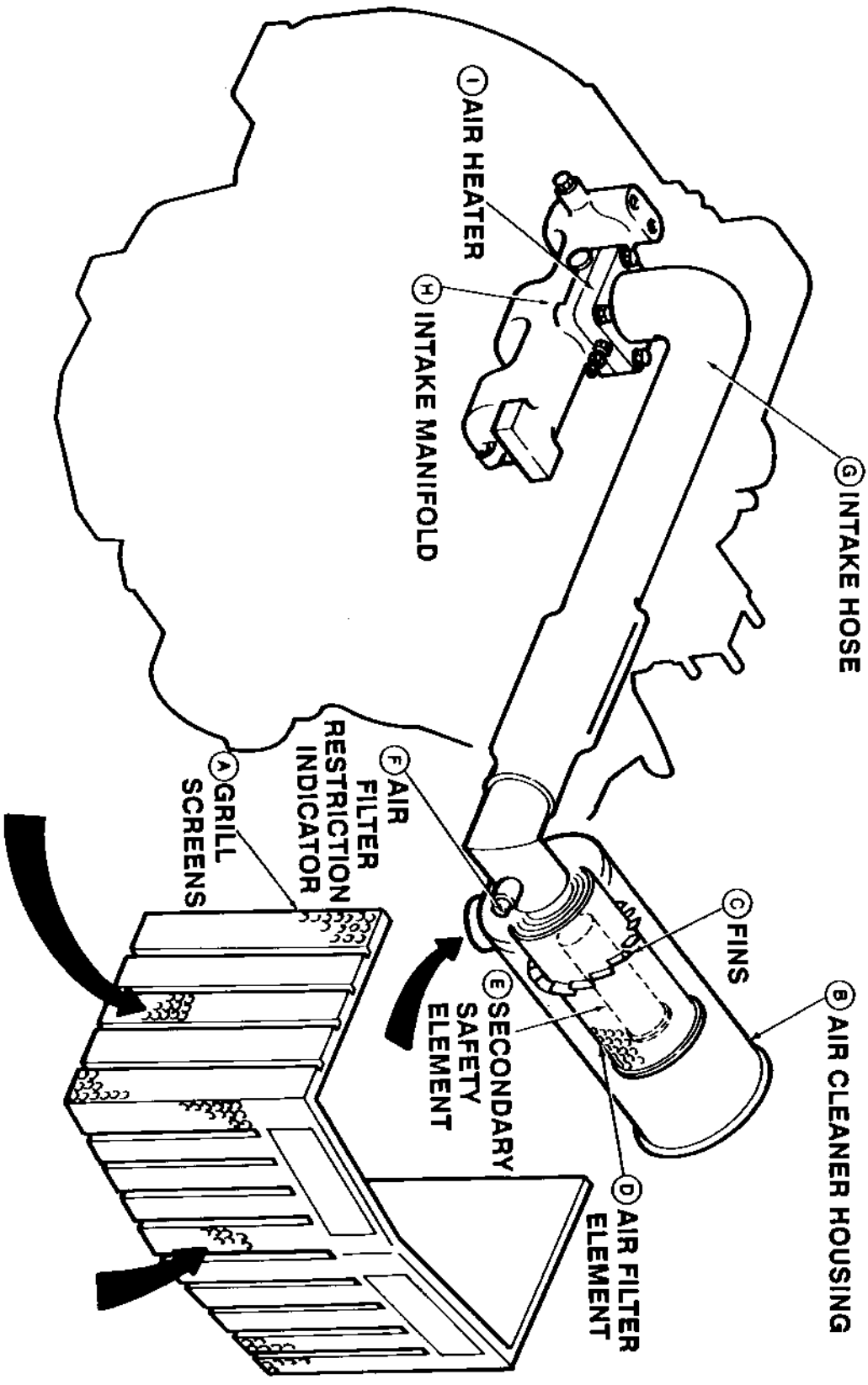
9. Clamp lower hub of spindle assembly in a vise.

10. Remove grease fitting.

M37329

3. Remove nut.

M37330



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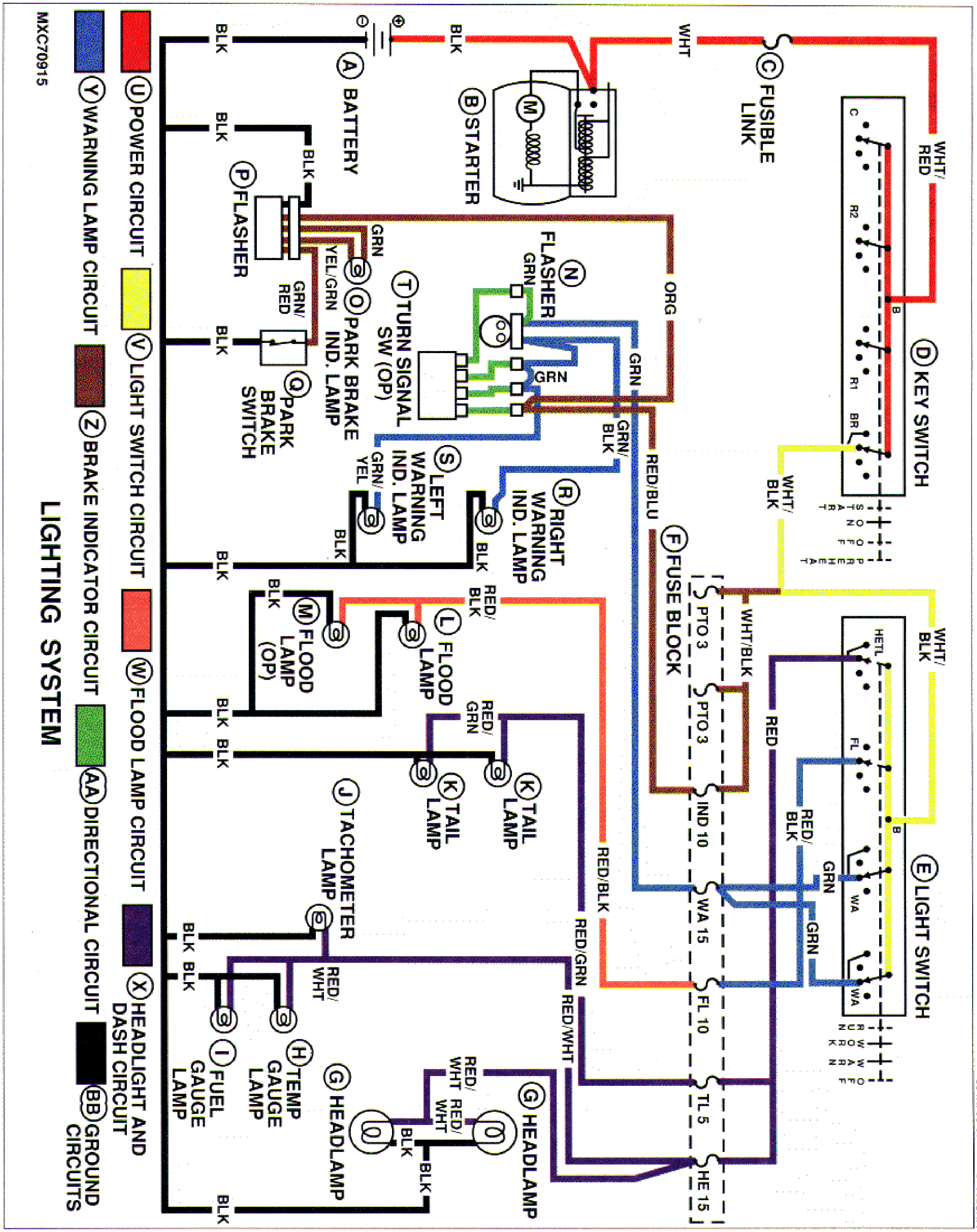
Slide No. 21

MX,22010DG,A3 -19-06DEC89

ENGINE USES EXCESS FUEL

TEST/CHECK POINT	NORMAL	IF NOT NORMAL
1. Air intake system	No restrictions-Grill screens and air cleaner element free of dirt and debris	Service. See Operators Manual.
2. Fuel	Diesel fuel of correct grade	Drain and replace with correct specifications. See Operators Manual.
3. Injectors Test spray pattern Test opening pressure	See CTM-3 for test procedures and specifications	Clean, adjust, repair or replace as required.
4. Load applied (not shown)	Within horsepower range of tractor	Reduce load. Shift to lower gear. Adjust implement.
5. Injection pump timing	See Tests and Adjustments for correct mark alignment	Set to specification.

MX,22015DG,A13 -19-12DEC89


LIGHTING SYSTEM
A BATTERY
B STARTER
C FUSIBLE LINK
D KEY SWITCH
E LIGHT SWITCH
F FUSE BLOCK
G HEADLAMP
H TEMP GAUGE LAMP
I FUEL GAUGE LAMP
J TACHOMETER LAMP
K TAIL LAMP
L FLOOD LAMP
M FLOOD LAMP (OP)
N FLASHER
O PARK BRAKE IND. LAMP
P FLASHER
Q PARK BRAKE SWITCH
R RIGHT WARNING IND. LAMP
S LEFT WARNING IND. LAMP
T TURN SIGNAL SW (OP)
U POWER CIRCUIT
V LIGHT SWITCH CIRCUIT
W FLOOD LAMP CIRCUIT
X HEADLIGHT AND DASH CIRCUIT
Y WARNING LAMP CIRCUIT
Z BRAKE INDICATOR CIRCUIT
AA DIRECTIONAL CIRCUIT
BB GROUND CIRCUITS
PTO 3
PTO 3
IND 10
WA 15
FL 10
TL 5
HE 15
WHT/RED
WHT/BLK
WHT/BLK
WHT/BLK
RED/BLU
RED/BLK
RED/BLK
RED/GRN
RED/WHT
RED/WHT
GRN/BLK
GRN/YEL
GRN/RED
YEL/GRN
ORG
GRN
RED
BLK
WHT
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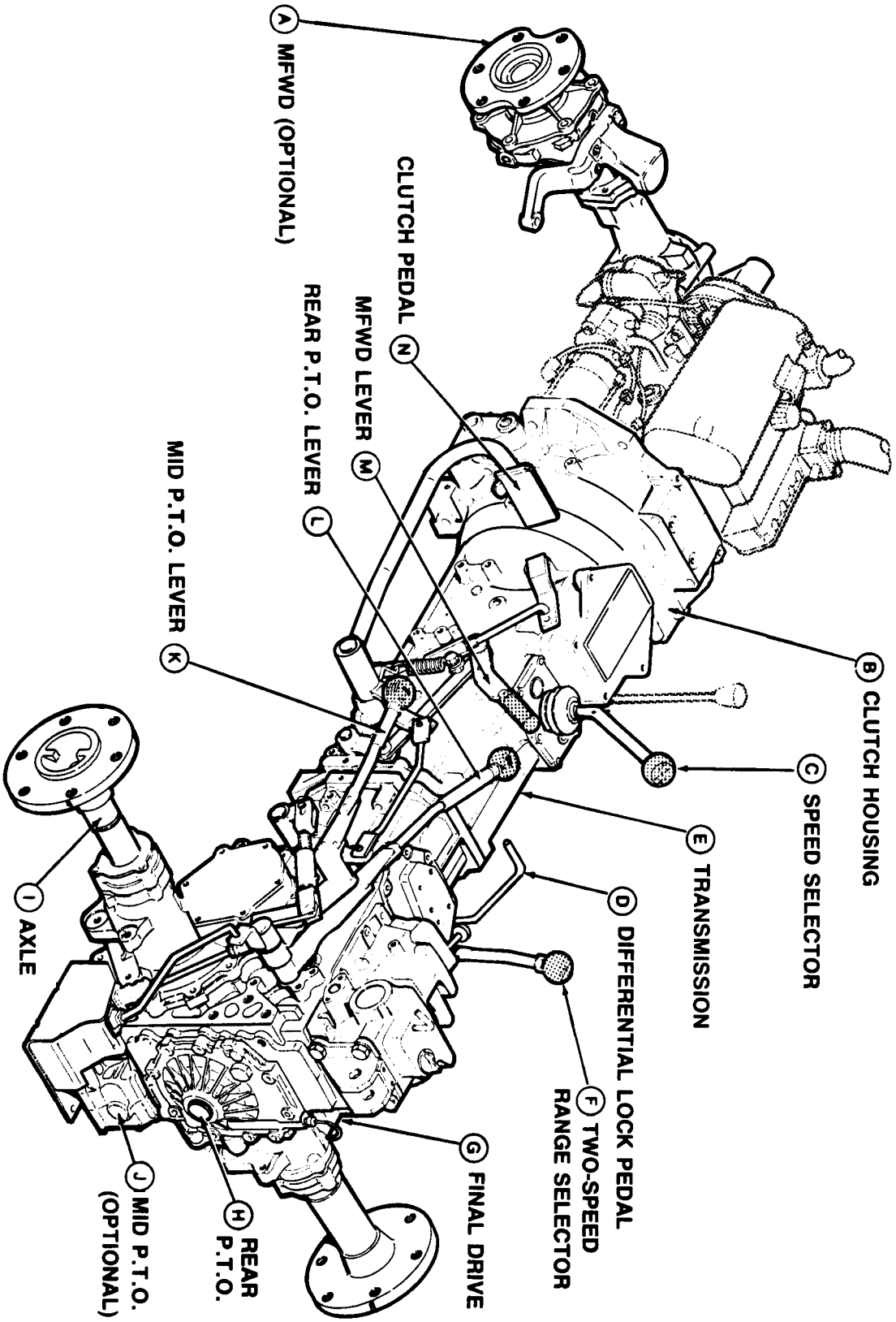

POWER TRAIN COMPONENT LOCATION

ISOLATE THE PROBLEM (DUAL STAGE CLUTCH)