SECTION 250—POWER TRAIN—670/770/790
Group 05—Component Location
Group 10—Theory of Operation
Group 15—Diagnosis and Test

SECTION 255—POWER TRAIN—870/970/1070
Group 05—Component Location
Group 10—Theory of Operation
Group 15—Diagnosis and Test

SECTION 260—STEERING AND BRAKES
Group 05—Component Location
Group 10—Theory of Operation
Group 15—Diagnosis and Test

SECTION 270—HYDRAULIC SYSTEM
Group 05—Component Location
Group 10—Theory of Operation
Group 15—Diagnosis and Test
Group 20—Schematic

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ALTERNATIVE LUBRICANTS

Additional information on cold weather operation is available from your John Deere dealer.

Conditions in certain geographical areas may require special lubricants and lubrication practices which do not appear in this operator's manual. If you have any questions, consult your John Deere dealer to obtain the latest information and recommendations.

O53,ALTER -19-05AUG86

LUBRICANT STORAGE

Your equipment can operate at top efficiency only if clean lubricants are used.

Use clean containers to handle all lubricants.

Store lubricants and containers in an area protected from dust, moisture, and other contamination.

O53,LUBST -19-29FEB88

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18.Connect cable (A).

19.Connect wiring connectors (C and G).

20.Power steering: Install hydraulic lines. (See procedure in Section 60, Group 10.)

21.Connect flange (F) and hose (B).

22.Install line clamp cap screws (D).

23.Manual steering: Connect drag link (E).

24.Install muffler and new gasket.

25.Install radiator and air cleaner hoses.

26.MFWD: Install drive shaft. (See procedure in Section 50, Group 30.)

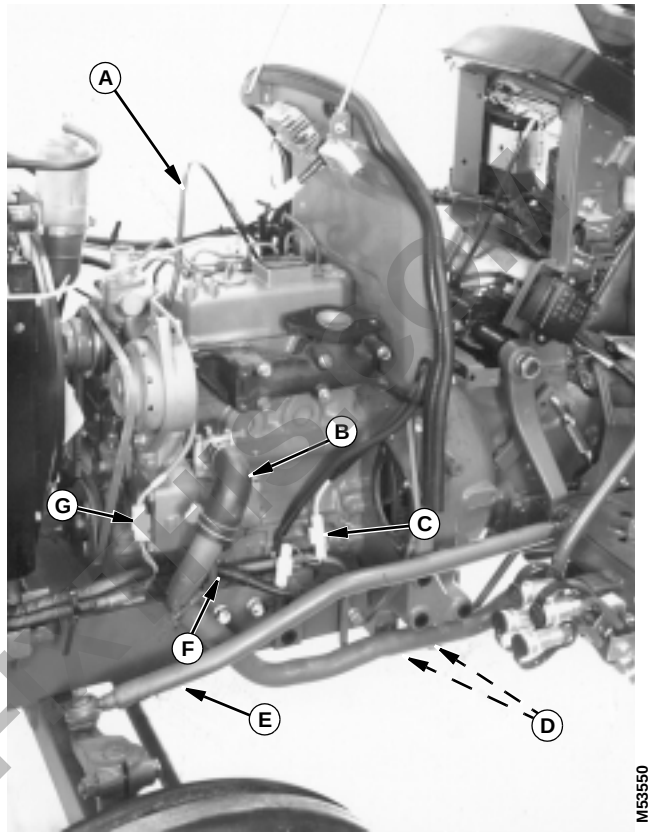
27.Install starter. (See procedure in Section 40, Group 10.)

28.Install fuel shut-off solenoid. (See procedure in Group 20.)

29.Install fuel tank. (See procedure in Group 20.)

30.Fill radiator with coolant to 4.8 L (3.1 qt.). (See Engine Coolant in Section 10, Group 20.)

31.Adjust throttle control linkage. (See Section 220, Group 15.)



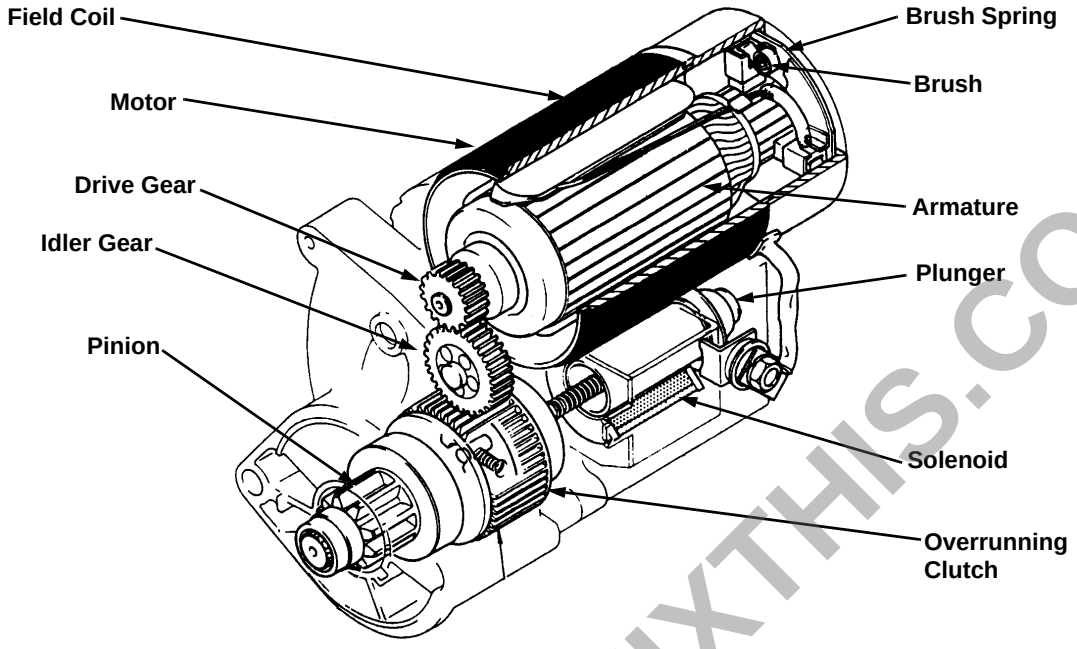
Left-Hand Side Shown

A—Hour Meter Cable
B—Pressure Line Hose
C—Fusible Link Connector
D—Cap Screws (2 used)
E—Drag Link
F—Supply Line Mounting Flange
G—Alternator Wiring Connector

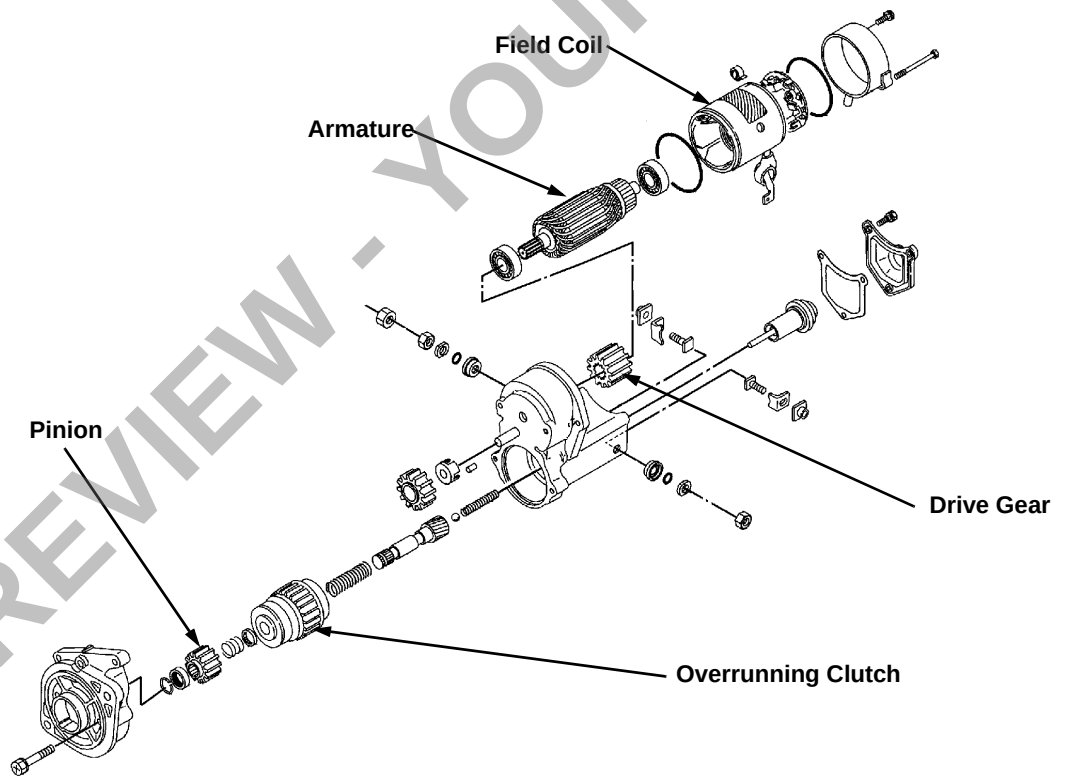
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STARTING MOTOR DISASSEMBLY AND ASSEMBLY



M94643



M91877

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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.

MX,5005DG,A1 -19-23OCT89

SEPARATE ENGINE FROM CLUTCH HOUSING

1. Remove fuel tank. (See procedure in Section 20, Group 20.)

2. Remove starter. (See procedure in Section 40, Group 10.)

3. MFWD: Remove drive shaft. (See procedure in Group 30.)

CAUTION: Muffler may be hot. Allow muffler to cool before removing.

4. Remove muffler and gasket.



TS271 -UN-23AUG88

MX,5005DG,A2 -19-23OCT89

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OTHER MATERIAL

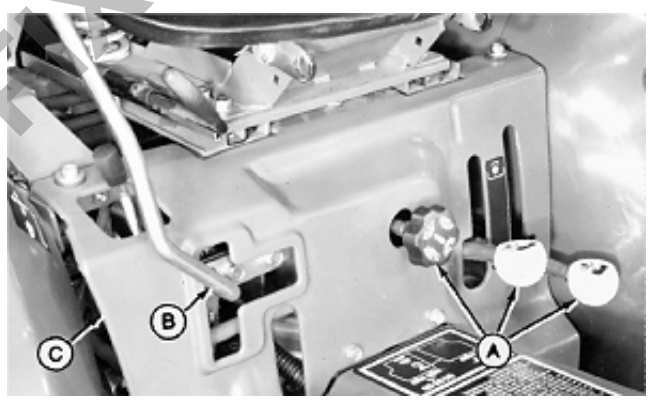
Number	Name	Use
TY6305	Clean and Cure Primer	To clean and cure surfaces prior to application of adhesives or sealants.
TY6304	Flexible Sealant	To provide a seal between mating surfaces.
T43512	Thread Lock and Sealer (Medium Strength)	Apply to threads of mounting cap screws.

MX,5015DG,A1 -19-04DEC89

50 15 1

REMOVE, INSPECT AND INSTALL REAR PTO LEVER AND SHIFT LINKAGE

1. Remove knobs (A).
2. Remove SCV lever (B), if equipped.
3. Remove panel (C).
4. Mid mount PTO: Remove control lever. (See Inspect and Repair Lever and Linkage in Group 35.)

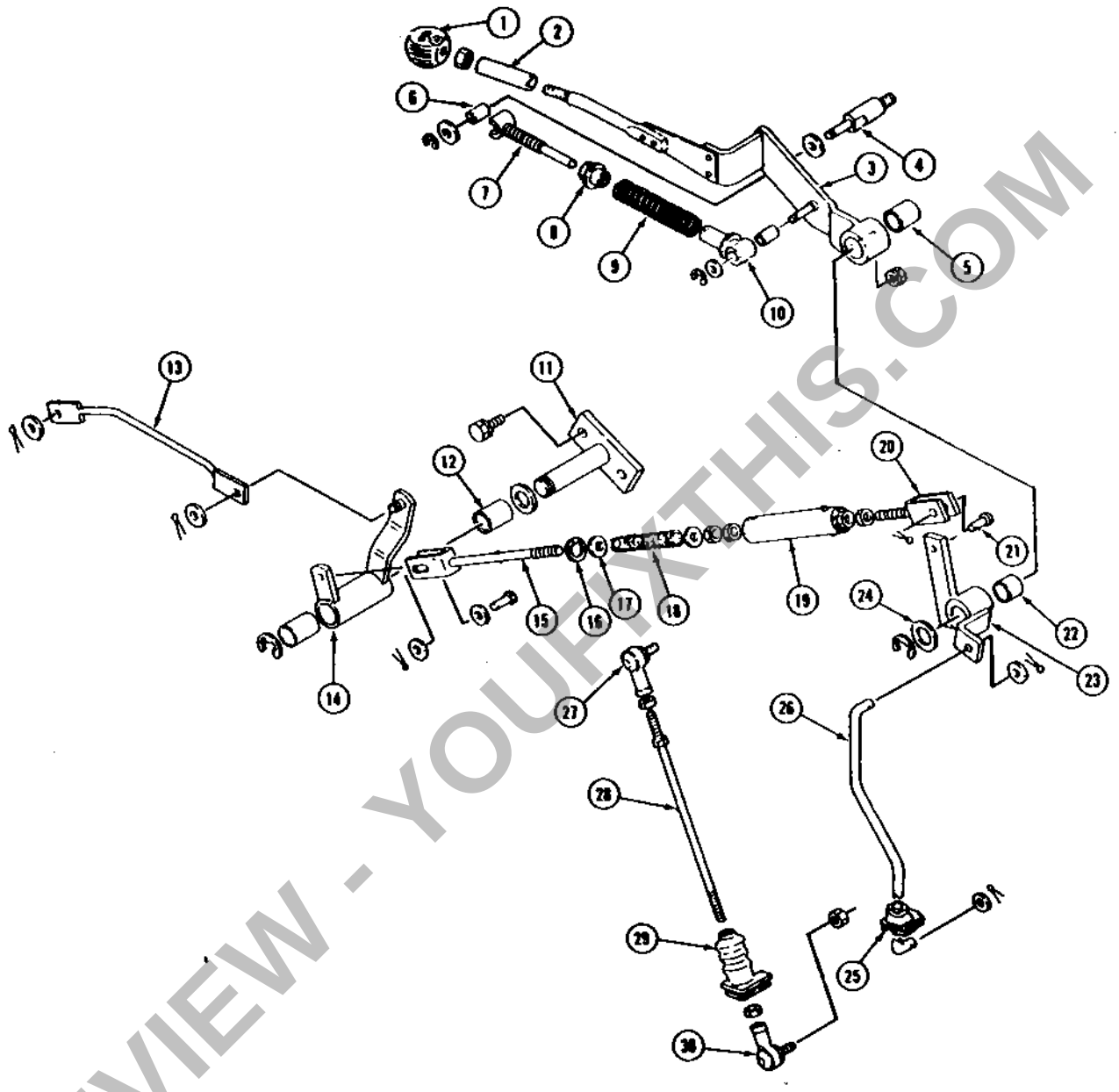


M53250 -UN-05JAN90

MX,5015DG,A2 -19-04DEC89

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M53532 -UN-20NOV89

1—Knob
2—Protection Tube
3—Lever
4—Special Bolt
5—Tube
6—Bushing (2 used)
7—Spring Rod
8—Spring Plate
9—Spring
10—Spring Plate
11—Shaft
12—Bushing (2 used)
13—Brake Rod
14—Mid Bellcrank
15—Brake Rod
16—Ring
17—Spacer
18—Spring
19—Spring Holder
20—Clevis
21—Pin
22—Bushing
23—Brake Arm
24—Spacer
25—Boot
26—Brake Rod
27—Ball Joint Socket
28—Rod
29—Boot
30—Ball Joint Socket

MX,5035DG,A3 -19-29SEP89

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24. Connect flange (A).

25. Install line (D).

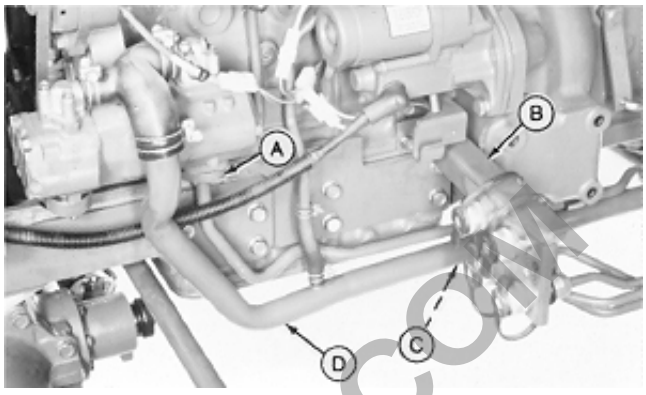
26. Install hydraulic line clamp cap screws (C).

27. Install bracket (B), if equipped with SCV.

28. Install dash, lower dash covers and engine side shields.

29. MFWD: Install drive shaft. (See procedure in Group 30 or 35.)

30. Fill transmission with proper oil. (See Section 10, Group 20.)



A—Hydraulic Pump Pressure Line Flange
B—SCV Coupler Mounting Bracket
C—Cap Screws (2 used)
D—Hydraulic Pump Suction Line

MX,5510DG,A11 -19-20NOV89

55
10
8

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15. Install outer drive assembly and gasket. Tighten cap screws (F) to specifications.

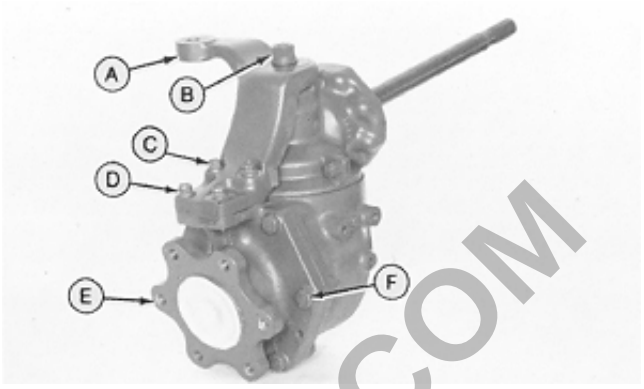
NOTE: Adjust backlash only if new parts are installed or the amount of shims are in question.

16. Adjust spindle pinion gear-to-outer drive gear backlash. (See procedure in this group.)

17. Install steering arm (A). Tighten cap screws (C and D) and nut (B) to specifications.

TORQUE SPECIFICATIONS

Cap Screws (F)	90 N·m (66 lb-ft)
Cap Screws (C and D)	51 N·m (36 lb-ft)
Nut (B)	187 N·m (138 lb-ft)



M53594 -UN-20NOV89

A—Steering Arm
B—Nut, Washer and Lock Washer
C—Cap Screw and Lock Washer (2 used)
D—Cap Screw and Lock Washer (2 used)
E—Outer Drive Assembly
F—Cap Screw and Lock Washer (2 used)

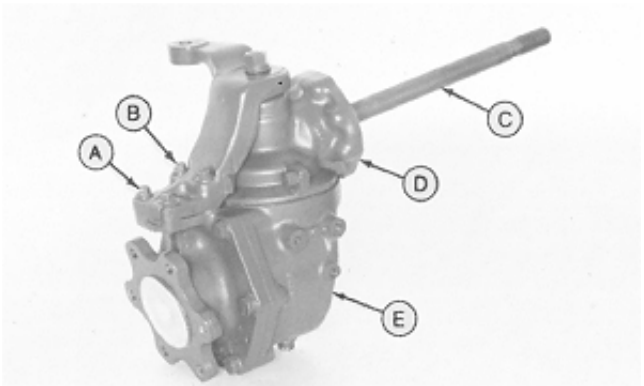
MX,5530DG,A14 -19-03OCT89

DISASSEMBLE, INSPECT AND ASSEMBLE SPINDLE HOUSING

1. Remove axle shaft assembly (C).

2. Remove cap screws and lock washers (A and B).

3. Use a lead hammer to break lower drive housing (D) loose from spindle housing (E). Remove spindle housing assembly.



M53595 -UN-20NOV89

A—Cap Screw and Lock Washer (2 used)
B—Cap Screw and Lock Washer (2 used)
C—Axle Shaft Assembly
D—Lower Drive Housing
E—Spindle Housing

MX,5530DG,A15 -19-03OCT89

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OTHER MATERIAL

Number	Name	Use
TY6299	Liquid Gasket Maker	Apply to crosshaft cover gasket.
T43512	Thread Lock and Sealer (medium strength)	Apply to steering housing-to-clutch housing cap screws.

MX,6005DG,A1 -19-11MAY89

SERVICE PARTS KITS

The following kits are available through your parts catalog:

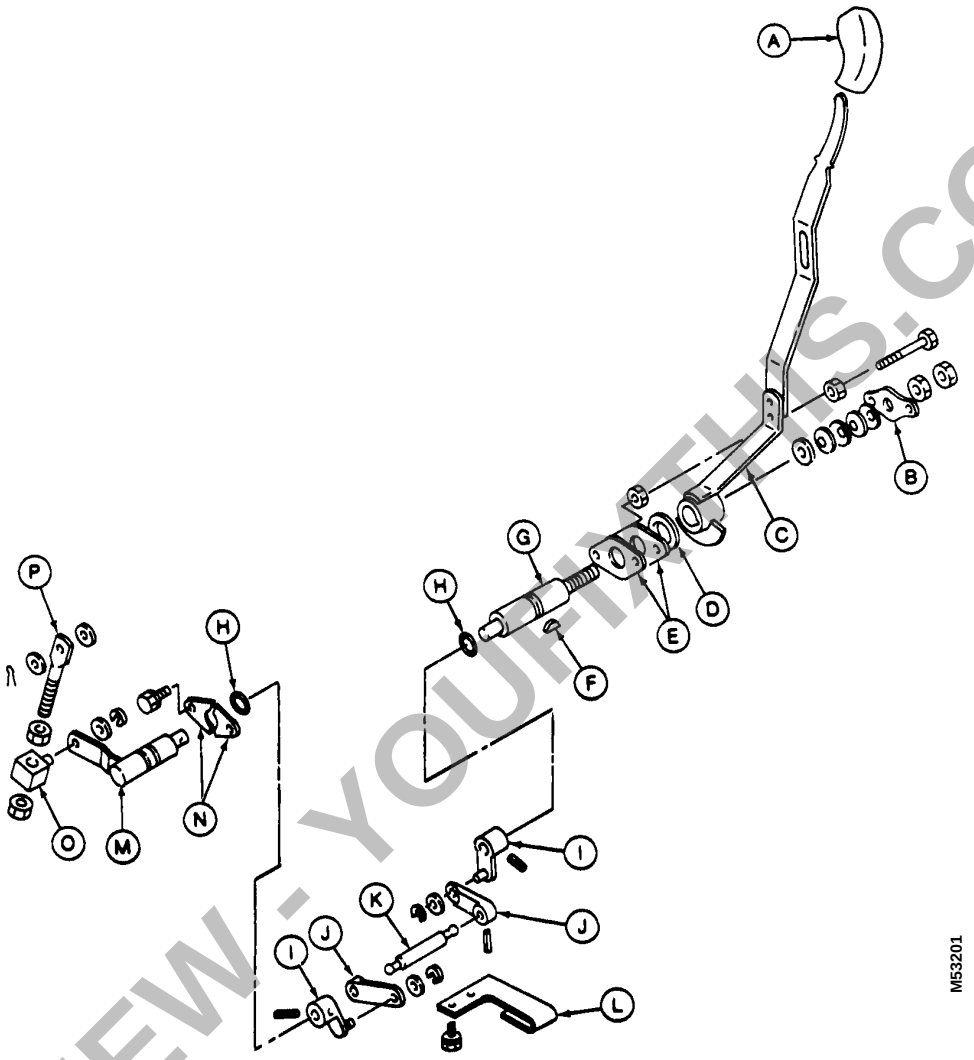
Adjusting Screw Shim Kit

MX,6005DG,A2 -19-11MAY89

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INSPECT AND REPAIR CONTROL LEVER AND LINKAGE



A—Knob	**E—Plates**	**I—Lever**	**M—Shaft**
B—Plate	**F—Woodruff Key**	**J—Bar**	**N—Holder**
C—Control Lever	**G—Shaft**	**K—Bar**	**O—Bar**
D—Friction Washer	**H—O-Ring (2 used)**	**L—Guide**	**P—Feed Back Rod**

NOTE: To inspect parts (G—M), rockshaft case must be removed.

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

2. Inspect friction washer (D) for wear or damage.

3. Inspect parts and replace as necessary.

4. Install shafts (G and M) with new O-rings (H).

5. Apply multipurpose grease to pivot end of bar (O) and rod (P).

6. Install rockshaft case. (See procedure in this group.)

7. Adjust position control lever linkage. (See Section 270, Group 15.)

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8. Install line assembly. Leave cap screws loose.

IMPORTANT: There must be one copper washer on each side of banjo connector when installing lines.

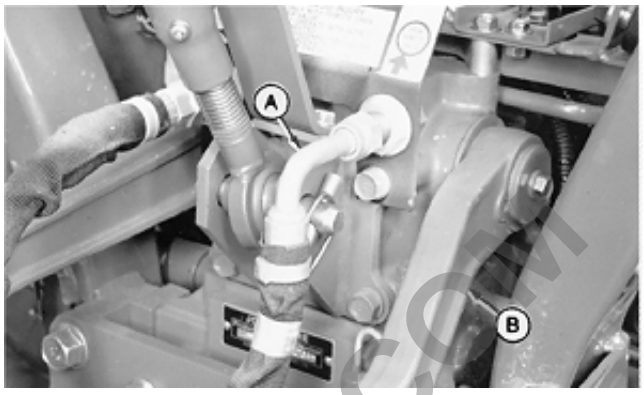
9. Install banjo connectors and new washers. Tighten fittings and bracket cap screws securely.

10. Install line clamps and center link.

IMPORTANT: Hydraulic hose must be reinstalled if an implement with open center valve is not installed.Hydraulic hose must be vertical to lift arms to eliminate lift arm from striking hose.

11. If removed, install hydraulic hose (A) vertical to lift arm (B).

12. Start tractor and raise rockshaft arms. Check and repair any leaks as necessary.



M53252 -UN-20NOV89

MX,7020DG,A2 -19-11JUL89

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BEFORE YOU START

This procedure is designed to perform a quick check of the machine in a step-by-step method. We recommend you perform these checks for the entire machine, then refer to individual system sections, for detailed procedures to isolate any problems noted during checkout. These procedures also provide a systematic method to evaluate trade-in equipment or to perform an annual checkout.

A large majority of typical machine problems can be resolved using operational diagnostics with the senses of “LOOK”, “LISTEN”, and “FEEL”.

Perform these checks on a level surface. Special tools are not required.

Begin with step one and read from left to right. Read the complete step, then perform the check. After completing checkout, refer to appropriate sections for correction of indicated problems.

MX,21005DG,A1 -19-06DEC89

; **COOLANT LEVEL CHECK**	 M70704 -UN-18DEC89	NORMAL: 25—51 mm (1—2 in.) in recovery tank, radiator full *LOOK: Check coolant for signs of engine oil or other contaminates.*	IF NOT NORMAL: Add proper coolant mix. Inspect hoses, pump, radiator, and connection for leaks. See Section 220 for Coolant Pressure Test. MX,21005DG,A2 -19-06DEC89
‘ **FAN AND BELT CHECK**	 M70706 -UN-18DEC89	NORMAL: Blades straight, with clearance from shroud and nearby components. Belt should deflect 13 mm (1/2 in.) with 11 kg (24 lb) force applied between alternator and engine pulleys.	IF NOT NORMAL: Repair, replace or adjust as required. MX,21005DG,A3 -19-06DEC89

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GOVERNOR OPERATION–770, 790, 870, 970, and 1070

A-High Idle Stop
B-Governor Spring
C-Tension Spring
D-Fuel Control Link
E-Control Rack
F-Flyweights
G-Enrichment Spring
H-Thrust Sleeve
I-Governor Lever Assembly
J-Low Idle Stop
K-Throttle Stop
L-Fuel Shutoff lever
M-Torque Spring Capsule

The injector pump governor is a mechanical, centrifugal flyweight type.

On the 670 tractor, the governor is contained in a housing mounted to the timing gear case. It is serviced separately from the injection pump.

On the 770, 790, 870, 970, and 1070 tractors, the governor is assembled to the injection pump and serviced with the injection pump.

The internal components and operation of each governor are similar to one another.

The flyweights (F) are mounted on the injection pump camshaft.

The flyweights move the thrust sleeve (H) in and out with changes in engine rpm.

The thrust sleeve works against a button surface on the governor lever (I).

The governor lever is connected to the injection pump control rack (E) by the fuel control link (D).

The governor spring (B) connects tension lever (C) to throttle lever (K).

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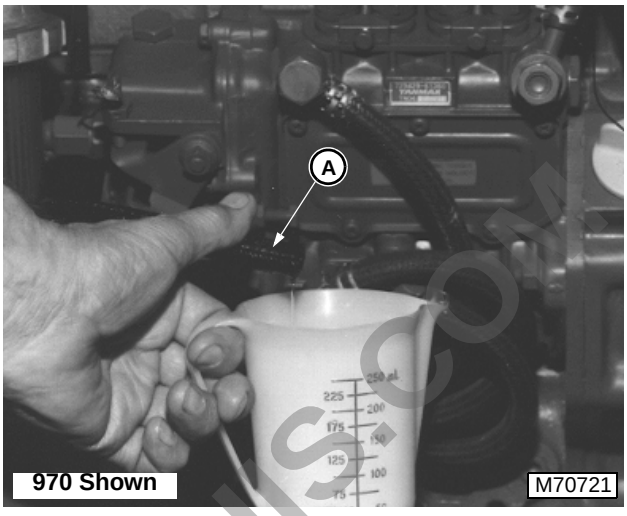
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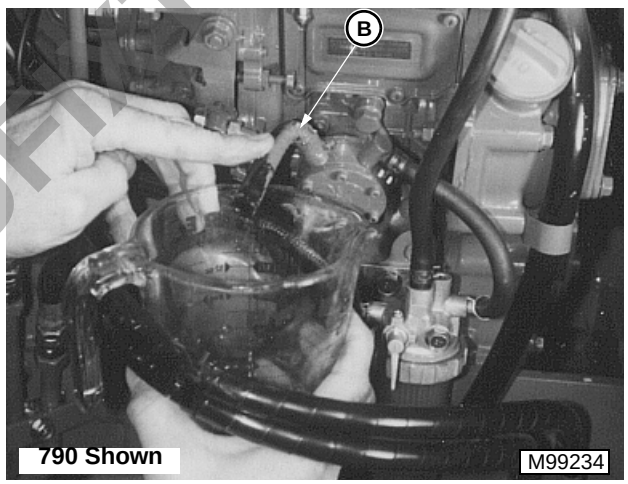
TEST FUEL TRANSFER PUMP

SPECIFICATION:
Fuel temperature for tests. . . . . 15–25°C (59–77°F)
Fuel flow for 15 sec. . . . . .50 mL (1.5 oz-in.)

1. Disconnect the fuel shutoff solenoid wire.

2. Disconnect fuel transfer pump outlet hose (A) from injection pump (670, 770,790) or fuel filter (870, 970, 1070). Collect fuel in graduated container as key switch is turned to “START” position to crank engine 15 seconds. Compare fuel amount to specifications.



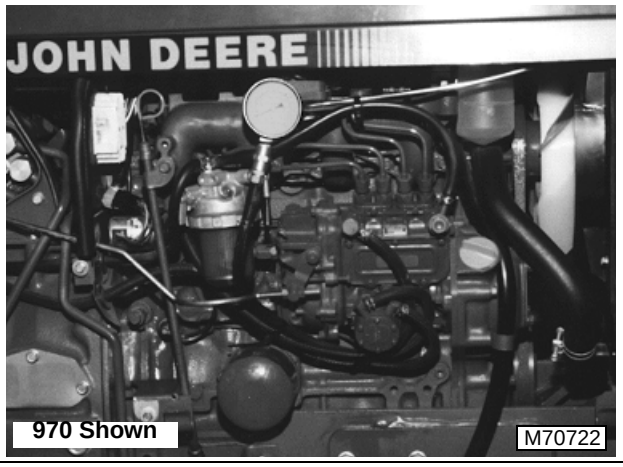


3. Connect gauge from JDG356 Fuel pump Pressure Test Kit to transfer pump outlet hose.

4. Turn key switch to “START” position and observe pressure reading as engine cranks.

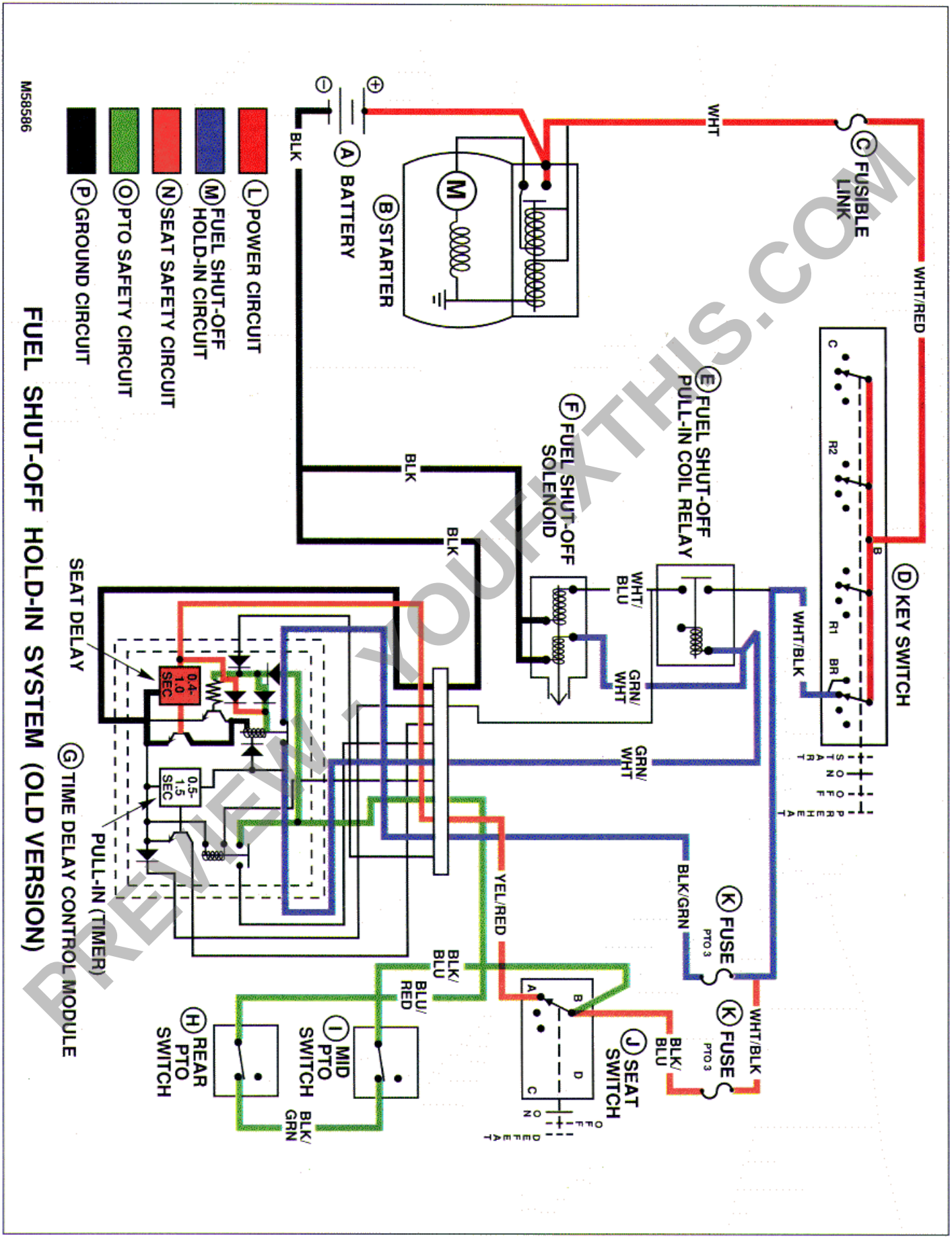
SPECIFICATION:
Fuel Pressure . . . . . 29 kPa (4.2 psi)

5. If flow or pressure readings do not match the specification, replace fuel transfer pump.



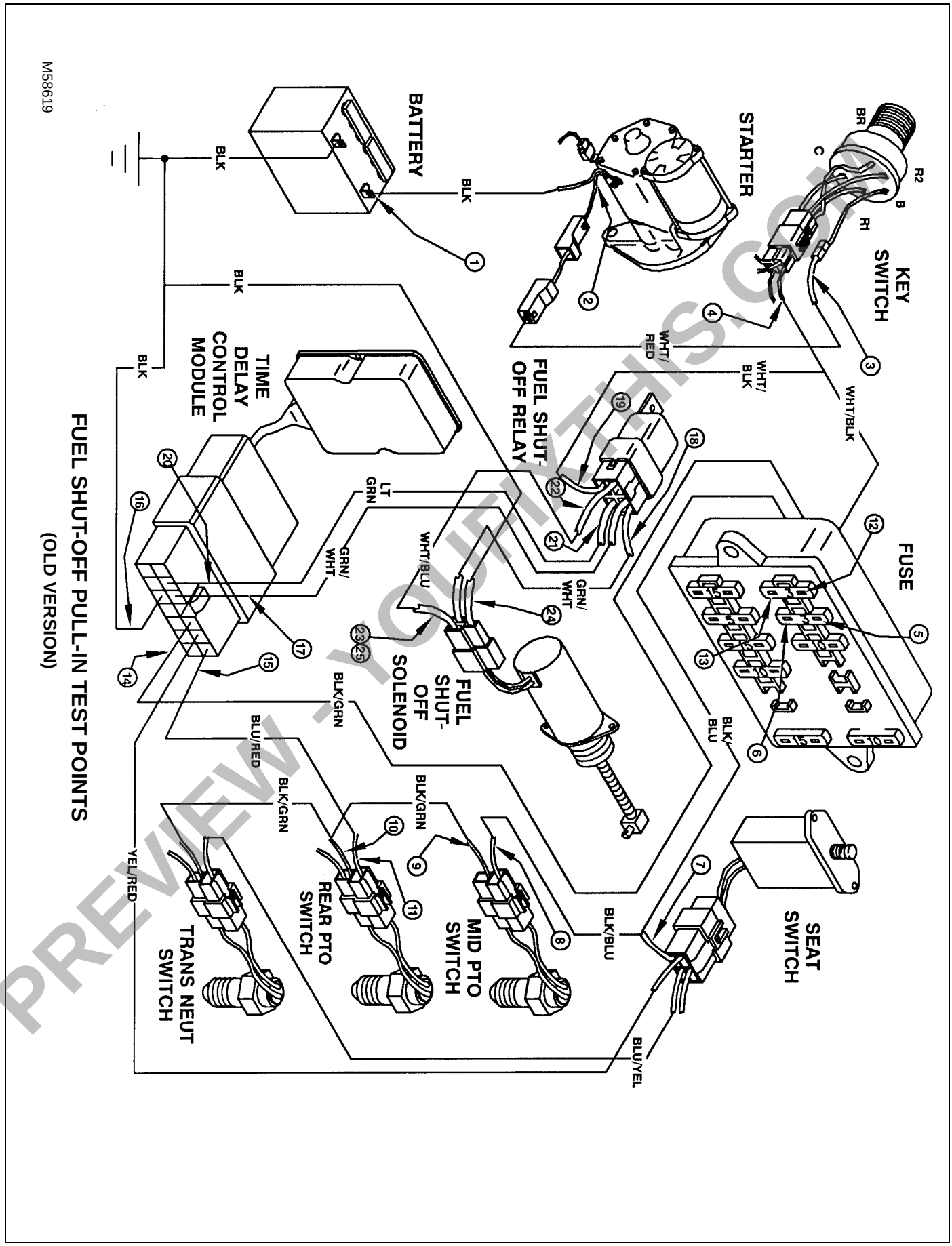
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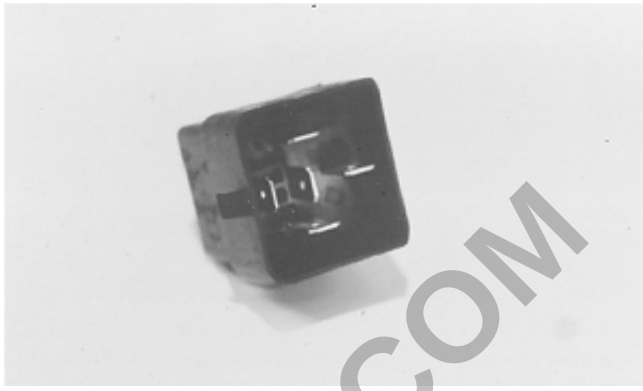
TEST FUEL SHUT-OFF RELAY

1. Apply voltage to terminal 85. Ground terminal 86.

2. Listen for relay to click.

3. There should be continuity between relay terminals 87 and 30. There should be not continuity between relay terminals 87A and 30.

4. Replace faulty relay.



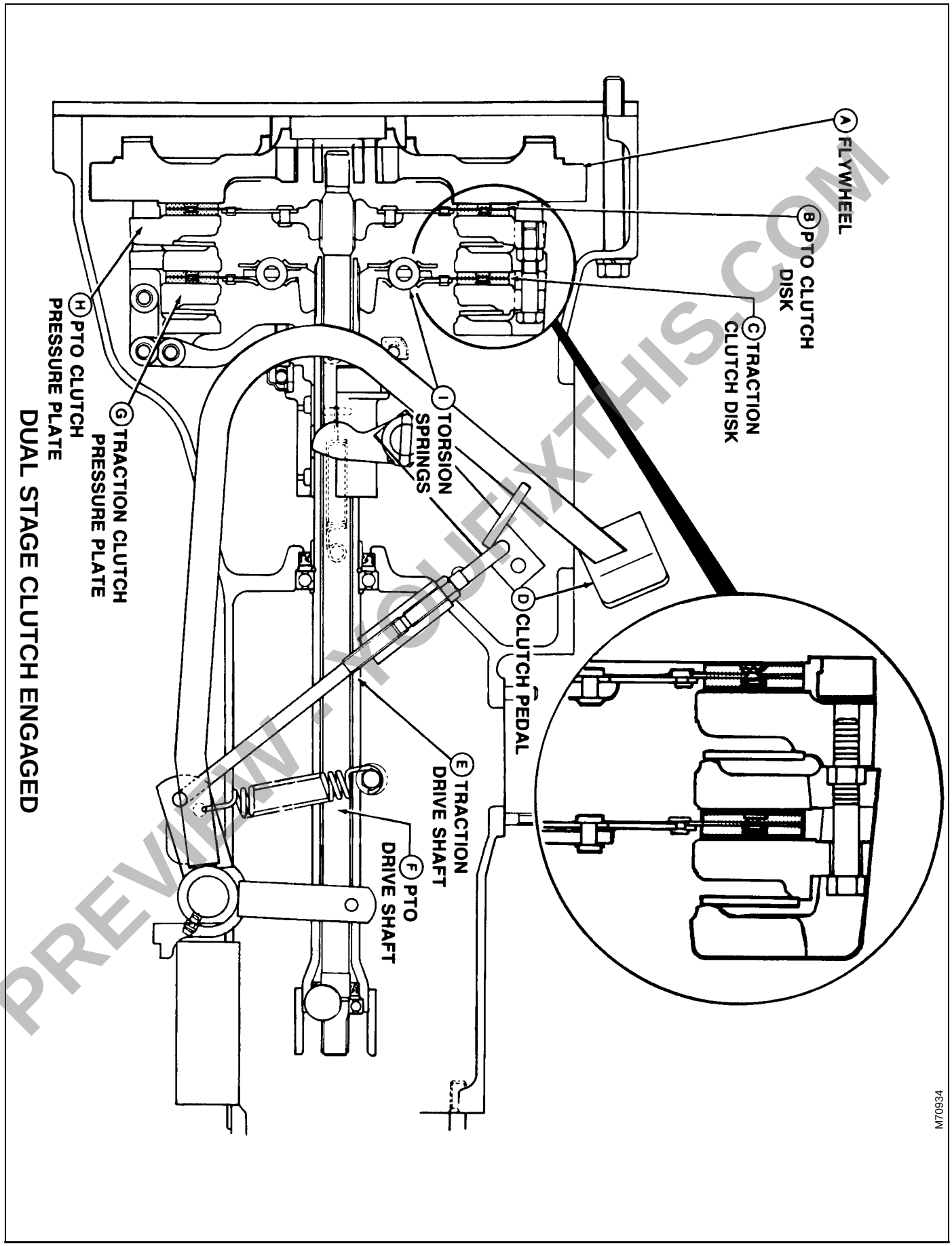
M53136 -UN-25AUG89

Slide No. 115

MX,24015DG,A50 -19-25SEP89

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DUAL STAGE CLUTCH ENGAGED

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CLUTCH COMPONENT LOCATION

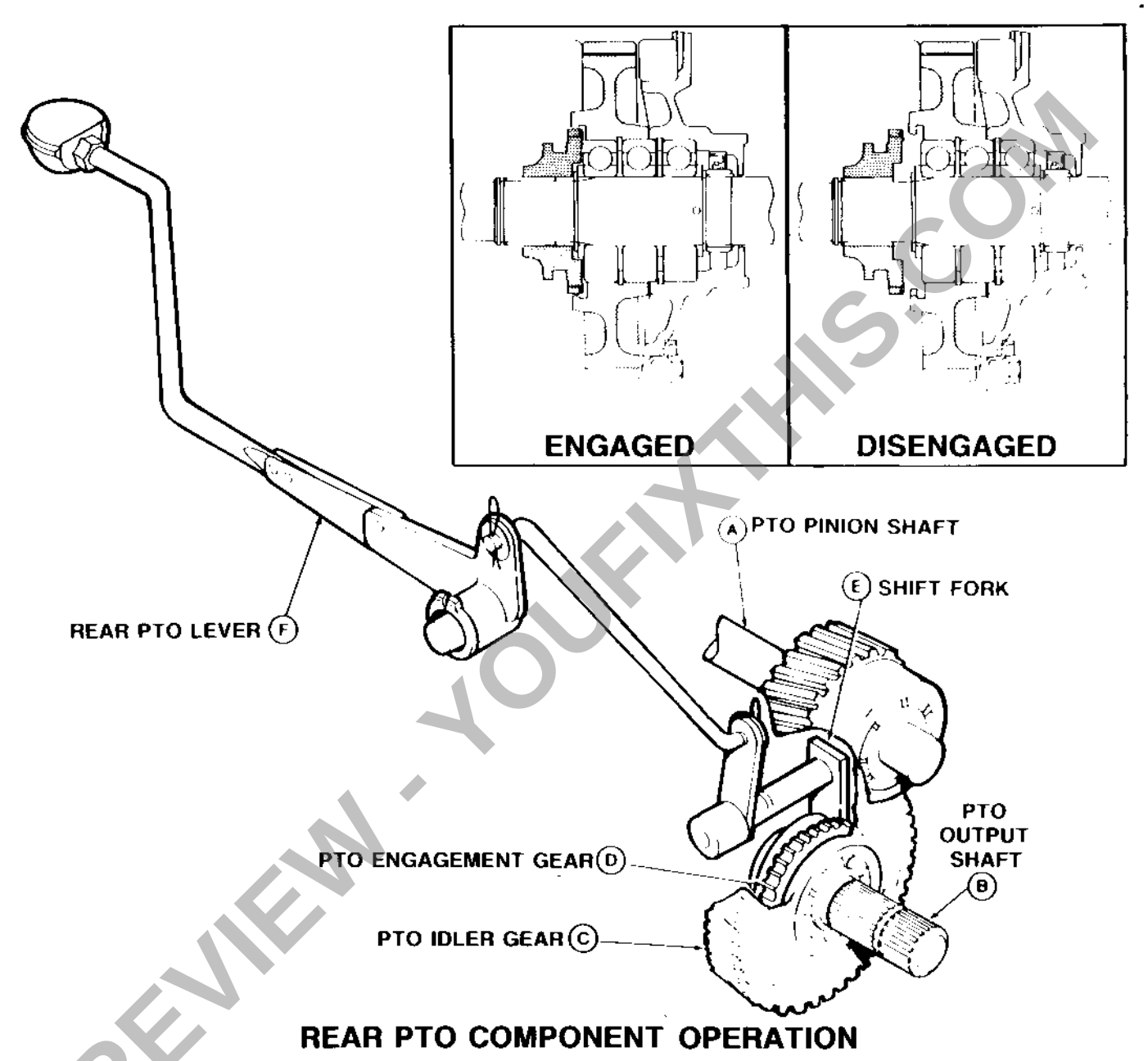
A—Clutch Housing
B—PTO Clutch Disks
C—Traction Clutch Disks
D—Release Bearing Fork
E—Release Bearing
F—Traction Shaft
G—PTO Shaft
H—Return Springs
I—Clutch Pedal
J—Release Arms

MX,25505DG,A4 -19-18OCT89

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REAR PTO OPERATION



REAR PTO COMPONENT OPERATION

A—PTO Pinion Shaft
B—PTO Output Shaft
C—PTO Idler Gear
D—PTO Engagement Gear
E—Shift Fork
F—Rear PTO Lever

Slide No. 183

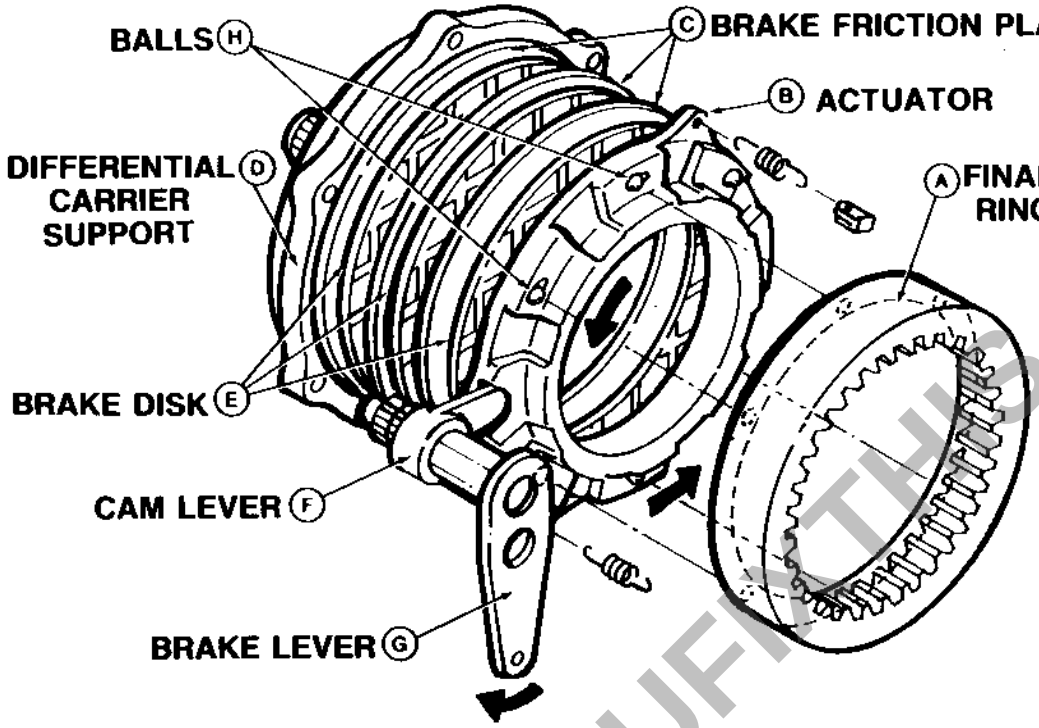
Power to the rear PTO is provided by the PTO pinion shaft. The PTO idler gear is splined to the PTO output shaft. The idler gear is in constant mesh with the pinion shaft. The PTO engagement gear connects the idler gear to the output shaft when engaged.

To engage the PTO the PTO lever is pushed down. This moves the shift fork rearward to force the PTO engagement gear into mesh with the PTO idler gear. Disengagement is done by moving the PTO lever up.

MX,25510DG,A19 -19-19OCT89

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DISK BRAKE OPERATION (870/970/1070)



A—Final Drive Ring Gear
B—Actuator
C—Brake Friction Plates
D—Differential Carrier Support
E—Brake Disks
F—Cam Lever
G—Brake Lever
H—Balls

Slide No. 277

The brakes on the 870, 970 and 1070 are mechanical wet disk type.

The differential carrier support and final drive ring gear are both secured in the final drive housing. The brake friction plates are held in place by tabs. The only rotating components are the brake disks since they are splined onto the differential output shafts. There are two disks on the 870 and 970 and three disks on the 1070.

When the brake pedal is applied the brake rod pulls the brake lever forward. This rotates the cam lever which rotates the actuator. The balls stay stationary in the socket on the final drive ring gear. The slot that the balls sit in on the actuator are ramped. As the actuator rotates the balls force it toward the carrier support. This compresses the disks between the friction plates and stops rotation of the differential output shaft.

When the brake pedal is released the return springs help pull the actuator back toward the ring gear.

Park brake operation is a locking device to hold the brake linkage in the brake position. This is explained on page 260-10-6.

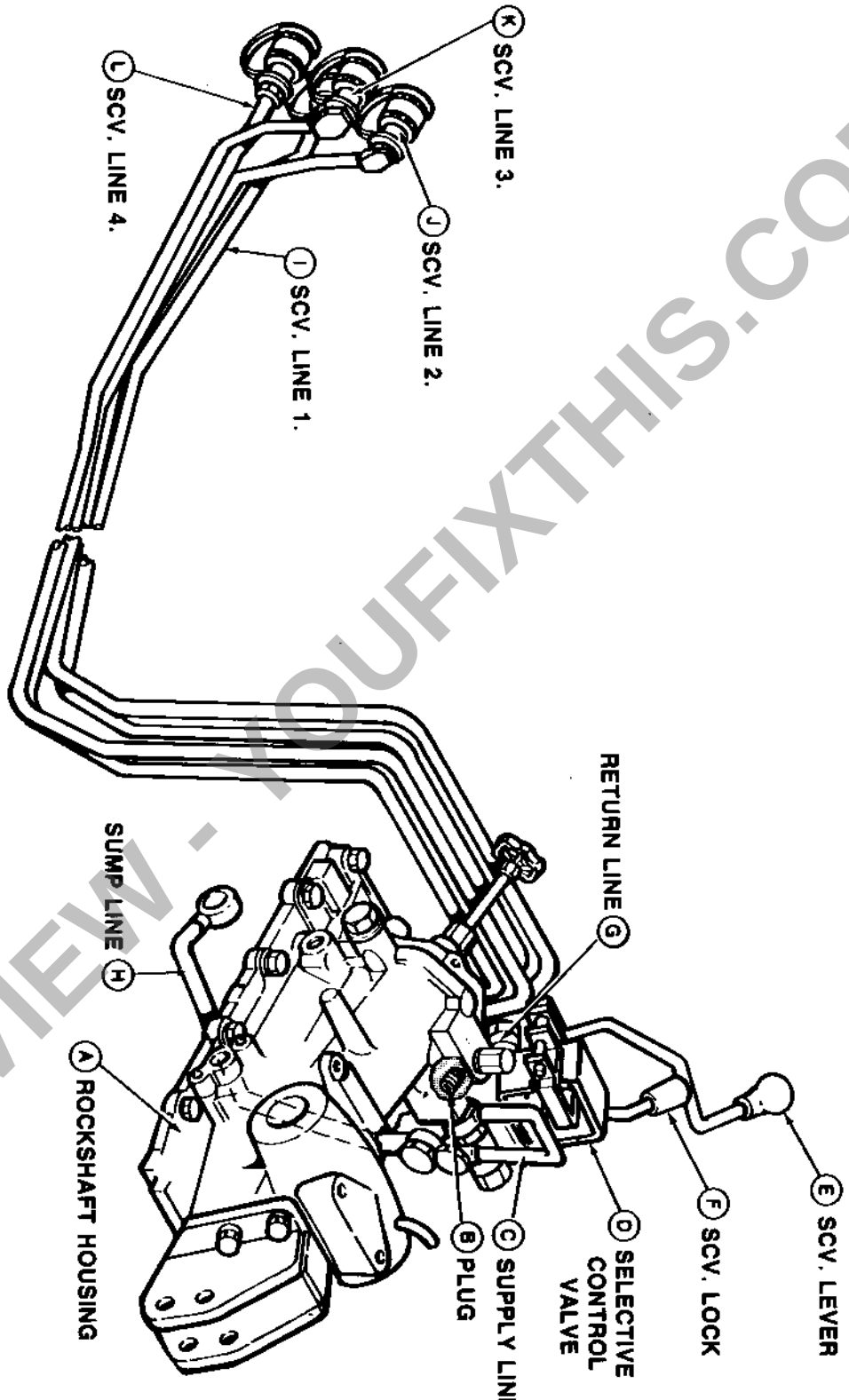
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M48406

870-970-1070 SELECTIVE CONTROL VALVE COMPONENTS



M48406 -19-09JAN90

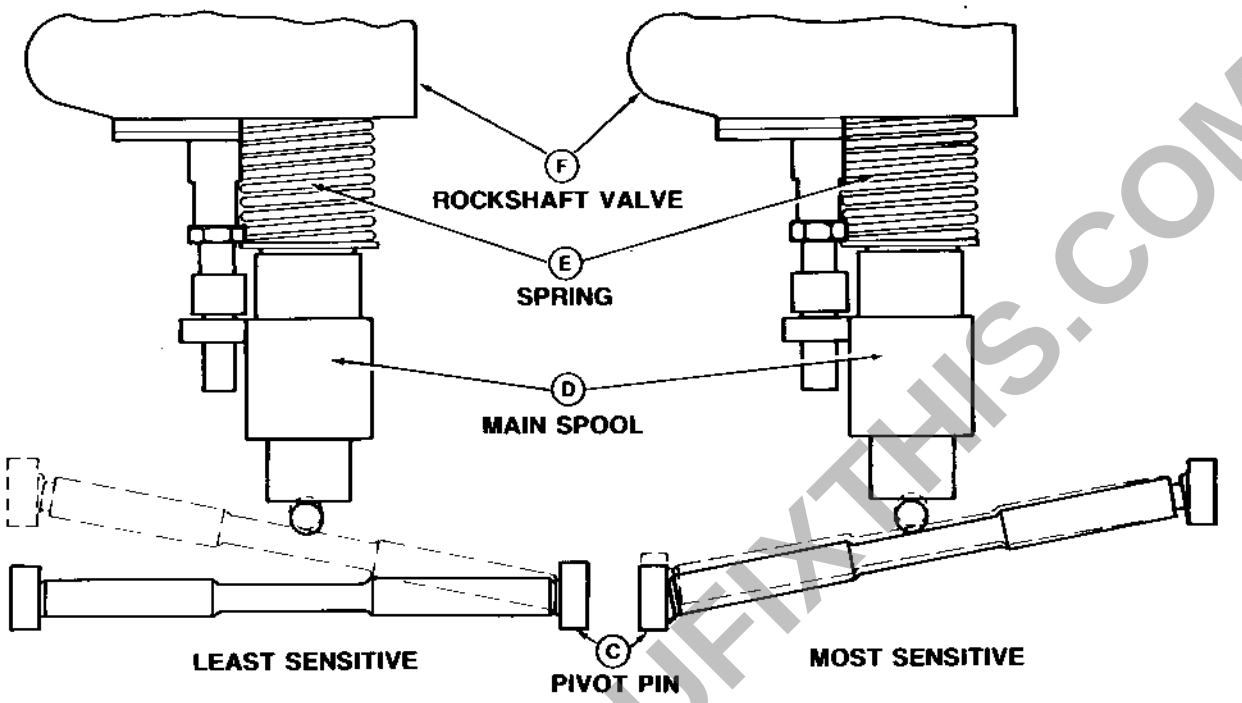
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MX,27005DG,A19 -19-19DEC89

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1070 ROCKSHAFT VALVE DRAFT SENSING LINKAGE OPERATION



DRAFT SENSING PIVOT PIN

M48430 -19-09JAN90

270 10 32

A—Draft Senstivity Lever
B—Draft Lever Arm
C—Pivot Pin
D—Main Spool
E—Spring
F—Rockshaft Valve
G—Feedback Arm
H—Draft Feedback Linkage
I—Center Link Attaching Bracket
J—Bracket Spring

Slide No. 229

The draft sensing linkage is used to automatically lift the implement if a heavy draft load is sensed on the 3-point hitch. The operator uses the draft sensing lever to determine how sensitive the system should be to change in draft load.

In the least sensitive position the draft control arm is moved rearward which positions the pivot pin a distance away from the draft feedback arm. If a force is felt at the center link the feedback linkage must move that distance before the pivot pin is moved. Once the feedback arm moves the left side of the pivot pin forward the valve main spool is forced forward. The rockshaft valve directs oil to the rockshaft cylinder and lifts the 3-point hitch.

The result is a reduced load on the center link because the implement is not operating as deep. If the draft load is reduced the feedback linkage allows the left side of the pivot pin to move rearward. The spring will force the main spool back dumping some rockshaft cylinder oil to sump and lowering the 3-point hitch back to the depth determined by the operator with the position sensing linkage.

In the more sensitive position this will occur with less draft load because the pivot pin is closed to the valve spool.

MX,27010DG,A32 -19-19DEC89

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