

## DIESEL FUEL SPECIFICATIONS

### DIESEL FUEL



In general, diesel fuels are blended to satisfy the low air temperature requirements of the geographical area in which they are sold.

In North America, diesel fuel is usually specified to **ASTM D975** and sold as either **Grade 1** for cold air temperatures or **Grade 2** for warm air temperatures.

If diesel fuels being supplied in your area **DO NOT** meet any of the above specifications, use diesel fuels with the following equivalent properties:

- Cetane Number 40 (minimum)

A cetane number **greater than 50 is preferred**, especially for air temperatures below  $-20\text{ }^{\circ}\text{C}$  ( $-4\text{ }^{\circ}\text{F}$ ) or elevations above 1500 m (5000 ft).

- Cold Filter Plugging Point (CFPP)

The temperature at which diesel fuel **begins to cloud or jell**. Use diesel fuels with a CFPP which is at least  $5\text{ }^{\circ}\text{C}$  ( $9\text{ }^{\circ}\text{F}$ ) below the expected low air temperature.

- Sulfur Content of 0.05% (maximum)

Diesel fuels for highway use in the United States now require sulfur content to be **less than 0.05%**.

If diesel fuel being used has a sulfur content **greater than 0.5%**, **reduce the service interval for engine oil and filter by 50%**.

Consult your local diesel fuel distributor for properties of the diesel fuel available in your area.



## WARNING

**California Proposition 65 Warning:** Diesel engine exhaust and some of its elements from this product are known to the State of California to cause cancer, birth defects, or other reproductive harm.

### DIESEL FUEL LUBRICITY

Diesel fuel must have adequate lubricity to ensure proper operation and durability of fuel injection system components. Fuel lubricity should pass a **minimum of 3300 gram load level** as measured by the **BOCLE** scuffing test.

### DIESEL FUEL STORAGE

**IMPORTANT: DO NOT USE GALVANIZED CONTAINERS—diesel fuel stored in galvanized containers reacts with zinc coating in the container to form zinc flakes. If fuel contains water, a zinc gel will also form. The gel and**

**flakes will quickly plug fuel filters and damage fuel injectors and fuel pumps.**

It is recommended that diesel fuel be stored **ONLY** in a clean, approved **POLYETHYLENE PLASTIC** container **WITHOUT** any metal screen or filter. This will help prevent any accidental sparks from occurring. Store fuel in an area that is well ventilated to prevent possible igniting of fumes by an open flame or spark, this includes any appliance with a pilot light.

**IMPORTANT: Keep all dirt, scale, water or other foreign material out of fuel.**

Keep fuel in a safe, protected area and in a clean, properly marked (“**DIESEL FUEL**”) container. **DO NOT** use deicers to attempt to remove water from fuel. **DO NOT** depend on fuel filters to remove water from fuel. It is recommended that a water separator be installed in the storage tank outlet. **BE SURE** to properly discard unstable or contaminated diesel fuel and/or their containers when necessary.

### ENGINE OIL

Use the appropriate oil viscosity based on the expected air temperature range during the period between recommended oil changes. Operating outside of these recommended oil air temperature ranges may cause premature engine failure.

The following John Deere oils are **PREFERRED**:

- **PLUS-50@—SAE 15W-40;**
- **TORQ-GARD SUPREME@—SAE 5W-30.**
- **TORQ-GARD SUPREME@—SAE 15W-40;**
- **UNI-GARD™—SAE 15W-40;**
- **UNI-GARD™—SAE 5W-30.**

The following John Deere oils are **also recommended**, based on their specified temperature range:

- **TURF-GARD@—SAE 10W-30;**
- **PLUS-4@—SAE 10W-30;**
- **TORQ-GARD SUPREME@—SAE 30.**
- **UNI-GARD™—SAE 10W-30;**
- **UNI-GARD™—SAE 30.**

Other oils may be used if above John Deere oils are not available, provided they meet one of the following specifications:

- SAE 15W-40—API Service Classification CF-4 or higher;
- SAE 5W-30—API Service Classification CC or higher;
- SAE 10W-30—API Service Classification CF or higher;
- SAE 30—API Service Classification CF or higher.
- CCMC Specification D4 or Mercedes Benz MB228.1 or higher.

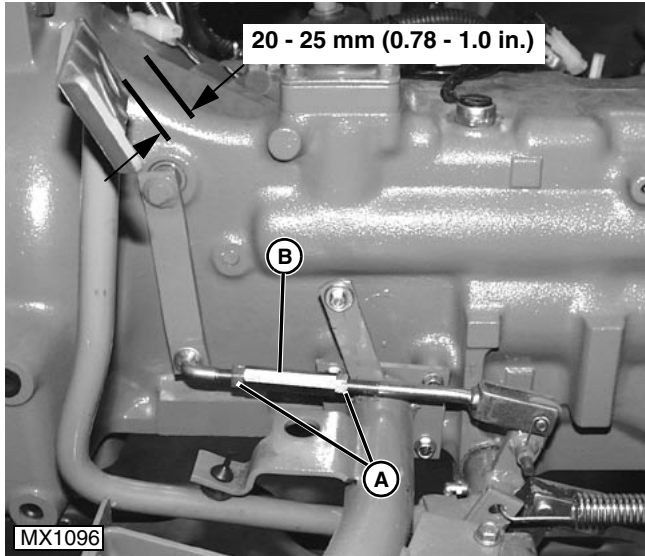
## TESTS AND ADJUSTMENTS

### CLUTCH PEDAL ADJUSTMENT

**Purpose:**

To make sure the traction clutch is fully engaged when the clutch pedal is released and fully disengaged when the pedal is depressed.

**Procedure:**



1. Check clutch pedal free travel.
2. If free travel is not to specification, loosen jam nuts (A) and adjust the turnbuckle (B) until free travel meets specification.

**Specification:** . . . . . 20 - 25 mm (0.78 - 1.0 in.)

### DIFFERENTIAL BACKLASH ADJUSTMENT

**Reason:**

To place the differential ring gear in proper relationship with the differential input pinion shaft.

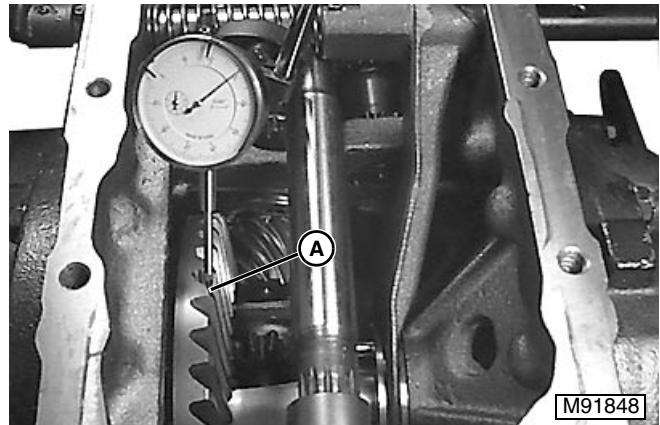
**IMPORTANT:** It is necessary to adjust the backlash if the ring gear and pinion was replaced, or if the backlash measurement is not within specification.

**Procedure:**

1. Access the differential ring gear.

2. While slowly rotating the differential housing carrier, use a soft faced mallet to lightly tap the face of the ring gear to move it and the carrier toward the left-side bearing cover.

*NOTE: This is to ensure that the carrier and bearings are seated.*



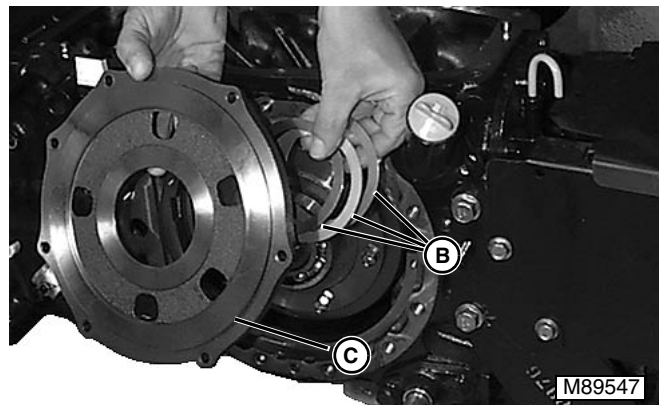
3. Attach a dial indicator to the transmission housing.
4. Locate the contact point of the dial indicator toward the outer part of the ring gear tooth (A) and as close to perpendicular to the tooth as possible.
5. While holding the differential pinion shaft stationary at the pinion, rotate the ring gear and note the backlash reading on the dial indicator.

**Specification:**

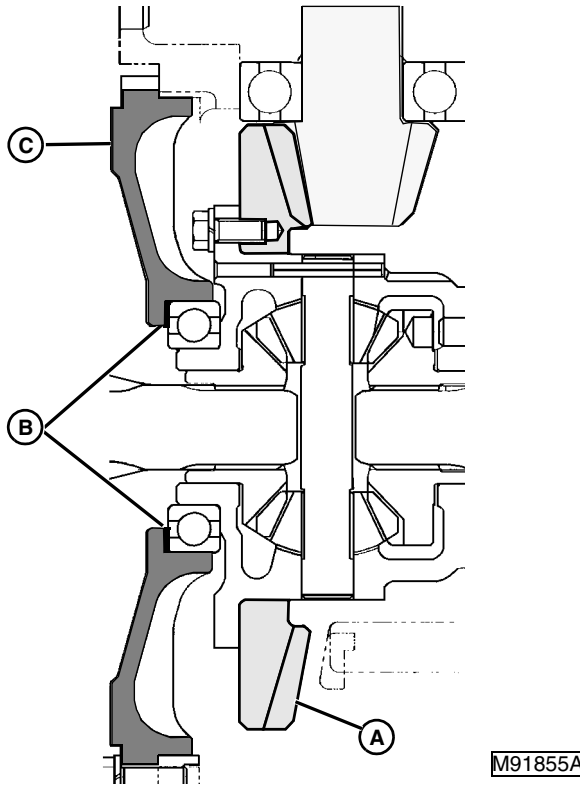
**Backlash** . . . . . 0.13 - 0.18 mm (0.005 - 0.007 in.)

**To Adjust Backlash:**

1. Remove the left side final drive. See "FINAL DRIVE" on page 42.



- The shim(s) (B) are located between the differential bearing carrier (C) and bearing. Remove shims to increase the backlash, or add shim(s) to decrease the backlash.



**NOTE:** Shims (B) are available in 0.1 mm (0.004 in.), 0.3 mm (0.012 in.), and 0.5 mm (0.020 in.) thicknesses.

- Install the differential bearing carrier.
- Recheck the backlash.

**NOTE:** If the backlash is within specification, finish installation of the differential bearing carrier and the final drive. If the backlash is not within specification, adjust the shim thickness until the backlash is within specifications.

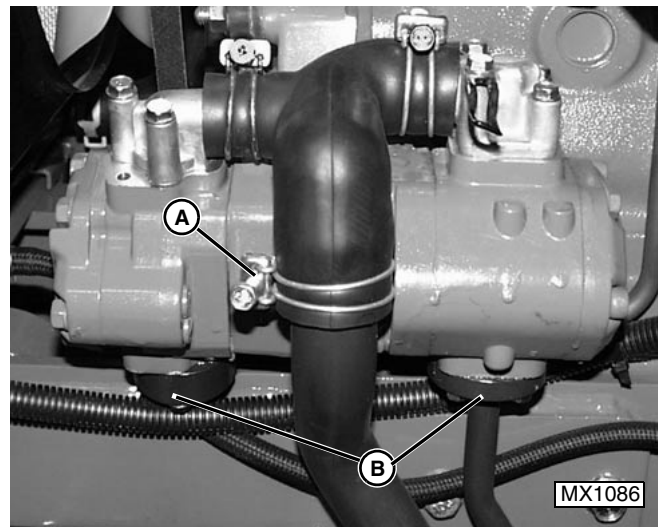
## REPAIR

### TRACTOR SPLITTING (FRONT)

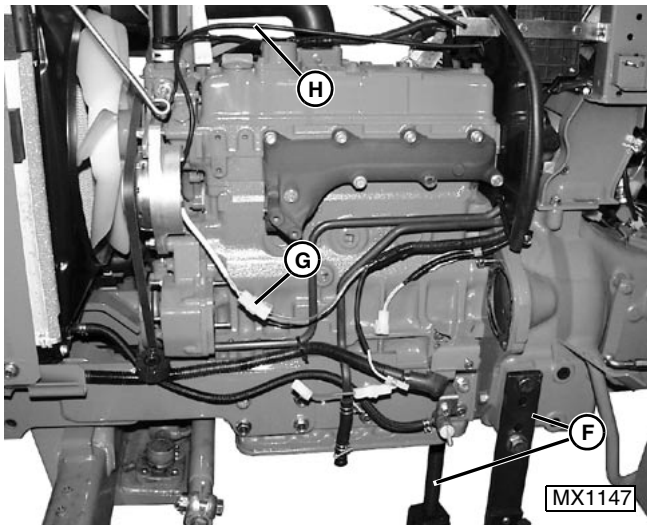
#### Procedure:

- Park tractor on a level surface. Engage park brake, shut off engine.
- Disconnect battery cables.
- Remove side panels.
- Remove hood.
- Remove lower control panel. (See "CONTROL PANEL" on page 8 in Miscellaneous Section.)
- Remove key switch panel.
- Remove starting motor.
- Remove muffler and gasket.
- 4-WD Models:** Disconnect and remove drive shaft.
- Models with SCV kit:** Disconnect front bracket securing hydraulic lines.
- Remove foot rests.
- Lower rockshaft and drain hydraulic oil from reservoir.

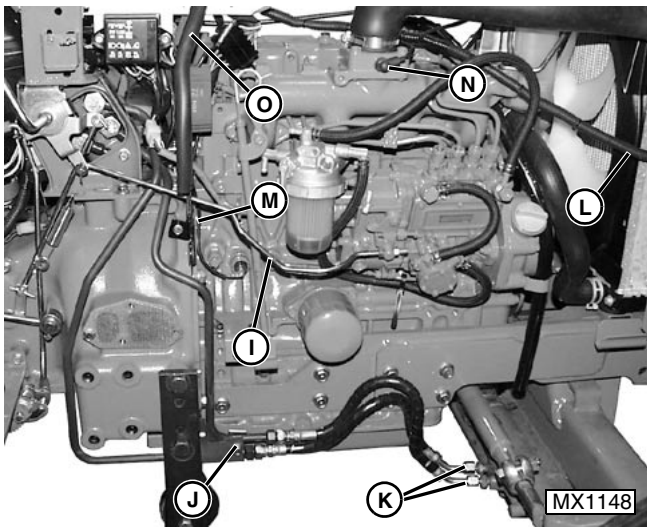
**NOTE:** Capacity of the hydraulic reservoir is **26 liters (6.9 gal)**.



- Put a drain pan under the pumps to catch remaining oil.
- Loosen clamp (A) and disconnect suction line from pumps. Remove suction tube from oil filter to pumps.
- Disconnect pressure tubes (B) from pump(s) and remove hydraulic pressure tubes from tractor.



16. Install splitting stands (F) on transmission tunnel.
17. Disconnect electrical connector (G) and tachometer cable (H).
18. Close shutoff valve on fuel filter.
19. Disconnect fuel lines and close openings with caps and plugs.



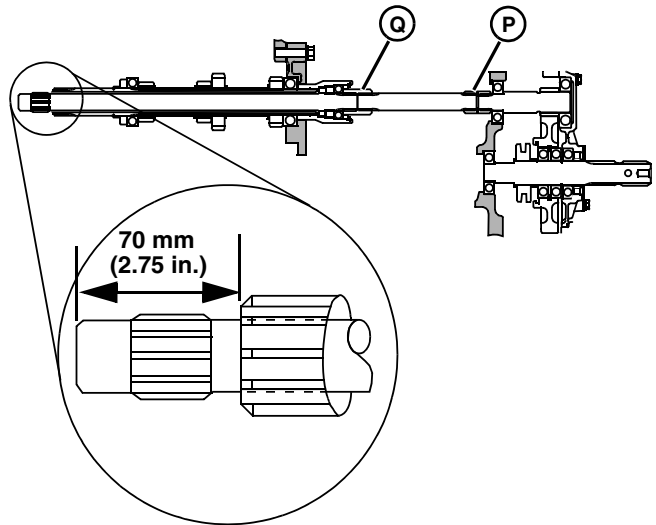
20. Remove throttle control rod (I).
21. Remove clamp (J) securing hydraulic lines to engine.
22. Disconnect hydraulic lines (K).
23. Remove wiring harness (L) connectors from headlights and pull wiring harness out from front.
24. Remove cap screw securing ground wire (M) to transmission tunnel.
25. Disconnect wire (N) from manifold heater.
26. Remove four cap screws securing air shield (O) to cylinder head.
27. Install splitting stands onto engine.

28. Loosen seven bolts securing transmission tunnel to engine.

**IMPORTANT:** When separating the engine, the splined coupling on the rear end or middle of the PTO shaft may fall off into transmission tunnel.

29. Slightly separate tunnel and engine, ensure all connections that may interfere all out of the way.
30. Remove all bolts securing sections and slowly separate engine from rear of tractor. As soon as possible, secure PTO shaft and keep it from moving forward with the engine.

**NOTE:** If the splined coupling (P) on the rear of the PTO shaft falls off, it can be accessed by removing the rear PTO. See "REAR PTO SHAFT ASSEMBLY" on page 51. If the splined coupling (Q) in the middle of the PTO shaft falls off, it can be accessed by removing the mid-PTO plate on the bottom of the transmission tunnel.

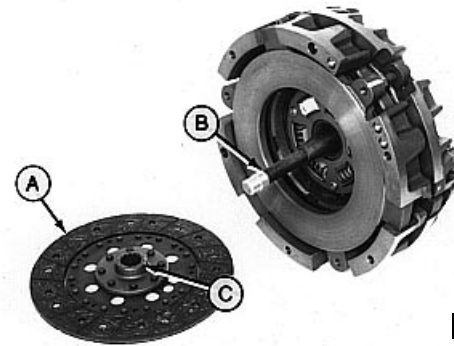


31. Verify that the PTO shaft couplings are engaged by measuring the distance that the PTO shaft extends out of the front of the drive shaft. The distance should be approximately **70 mm (2.75 in.)**. Engage the PTO and turn the front of the shaft to verify that the rear PTO output also turns.

#### Assemble Tractor Sections:

**NOTE:** Spines on all driveshafts and couplers must be aligned before tractor sections will slide together.

1. Align splines on drive shafts and engine flywheel.
2. Move tractor sections together and retain with nine cap screws. Tighten cap screws to **126 - 154 N•m (95 - 115 lb-ft)**.
3. Route electrical harness on rear half of tractor. Connect all electrical connectors attaching wiring harness to switches and lights on rear half of tractor. Fasten wiring harness to cable clips. Replace any plastic tie bands removed during disassembly.
4. Install key switch panel.
5. Install control panel. (See "CONTROL PANEL" on page 8 in Miscellaneous Section.)
6. Install hood. (See "HOOD" on page 8 in Miscellaneous Section.)
7. Install side panels.
8. Connect battery negative terminal.



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**Installation:**

1. Install clutch alignment tool (B) into clutch assembly.
2. Place PTO clutch disk (A) on alignment tool with long end of hub (C) facing toward clutch assembly.
3. Install clutch assembly with clutch alignment tool (A) still in place. There will be slight movement (clearance) between the straight (non-tapered) section of the tool hub and the traction clutch hub.

*NOTE: Thin tape could also be wrapped around the tool hub to better center the traction clutch.*

**DUAL STAGE CLUTCH**

**Removal:**

1. Separate engine from clutch housing. (See "TRACTOR SPLITTING (FRONT)" on page 20.)

**IMPORTANT:** Install clutch alignment tool in clutch assembly to keep PTO Clutch disk from falling from assembly.



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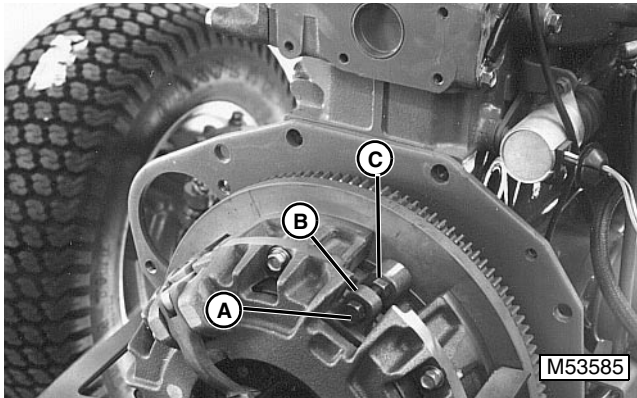
2. Insert clutch alignment tool (A) into hub and pilot bearing in flywheel. Use JDG689 Universal Clutch Alignment Tool Kit.
3. Remove six cap screws, washers and lock washers (B). Remove clutch assembly.
4. Inspect and repair clutch assembly and flywheel. (See procedure in this group.)



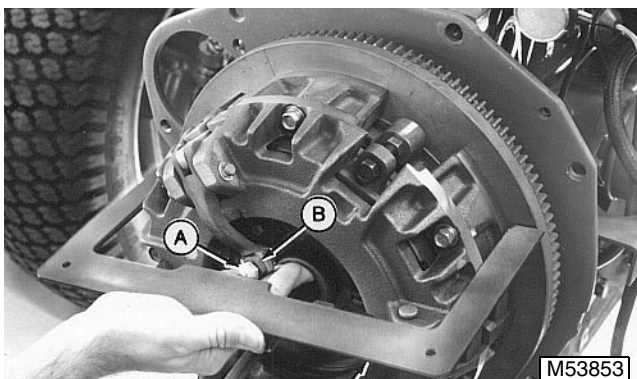
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4. Push the tapered end of the clutch alignment tool forward to hold the PTO clutch in place during tightening of the clutch assembly to the pressure plate. If closer centering is necessary, visually center the traction clutch within the pressure plate by aligning the clutch rivet heads so that they are equally spaced around the inside diameter of the pressure plate.
5. Install cap screws (B) and tighten to 22 N•m (16 lb-ft).
6. Remove clutch alignment tool.

7. Screw in cap screws (A).



- 8. Set clearance between cap screw head (A) and clutch hub (B) at **1.5 mm (0.060 in.)** using a feeler gauge.
- 9. Tighten nuts (C) to **18 N•m (159 lb-in)**. Recheck cap screw head clearance.

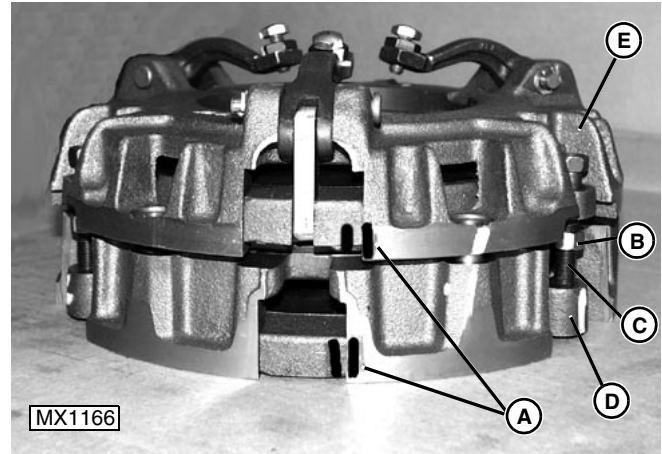


- 10. Adjust clutch finger screw (A) to touch raised center portion of tool.
- 11. Tighten nut (B) to **19 N•m (168 lb-in)**.
- 12. Repeat procedure for each clutch finger.
- 13. Install engine to clutch housing. See "Assemble Tractor Sections:" on page 21".
- 14. Adjust clutch pedal free-play. See "CLUTCH PEDAL ADJUSTMENT" on page 19.
  - If not equipped with a Clutch Adjusting Gauge, follow adjustment procedures and specifications below.

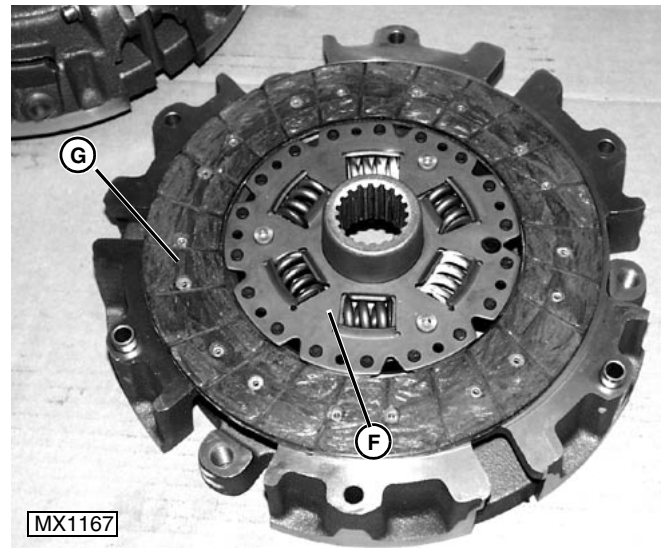
**Specifications:**

**Clutch Finger Screw-to-Flywheel** 113 mm (4.452 in.)  
**Tolerance** ..... 98.5 mm (3.878 in.)

**Repair:**



- 1. Mark clutch cover and pressure plates (A) for correct orientation during reassembly.
- 2. Loosen jam nuts (B) and turn cap screws (C) out of PTO pressure plate (D).
- 3. Lift cover (E) from assembly.



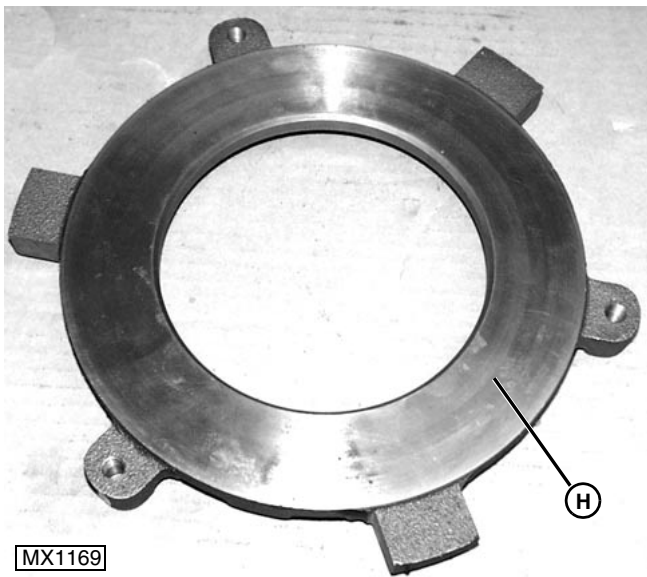
- 4. Lift out clutch disc (F). Inspect for wear or damage. Measure thickness of friction material (G). Replace clutch disc if below specification.

**Specification:**

**Minimum Friction Material Thickness**  
**Transmission Drive Clutch** ..... 7.6 mm (0.3 in.)  
**PTO Drive Clutch** ..... 7 mm (0.270 in.)



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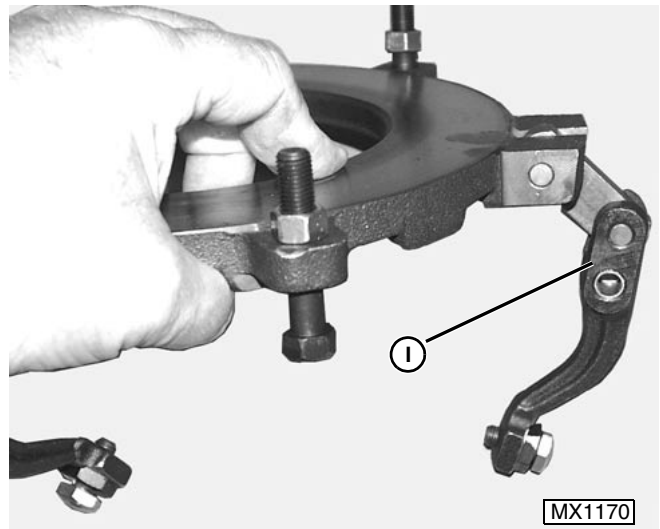
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5. Check friction area (H) of center pressure plates for grooves, cracks, and discoloration from heat. Place a straight edge across pressure plate and measure for flatness with a feeler gauge. Replace pressure plate(s) if surfaces are not within specification.

**Specification:**

**Pressure Plate Flatness**

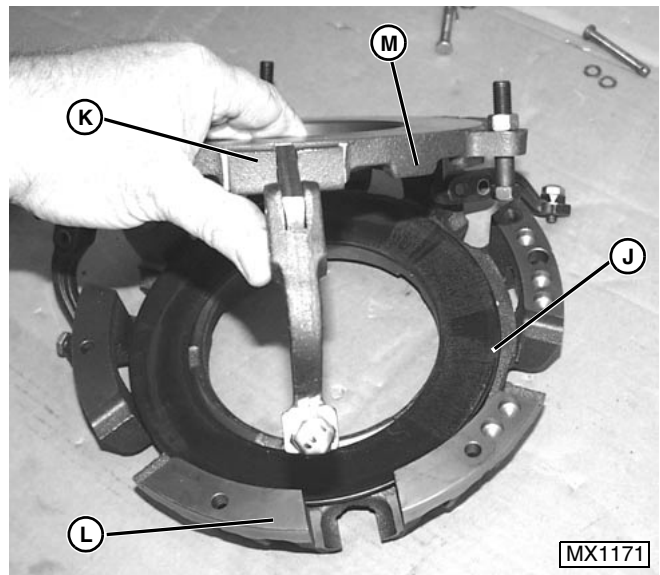
**Maximum. . . . . 0.2mm (0.008 in.)**



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6. Inspect levers, pins, and bushings (I) for wear or damage. Replace parts as needed.

**Assembly:**



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- 7. Install diaphragm (J) with raised side of outside diameter up toward friction plate.
- 8. Line up marks on plate (K) and cover (L) and lay plate into cover.
- 9. Make sure the diaphragm is centered in the plate and inside tabs (M) before securing levers to cover.



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