



# 8450-8650 Tractors



JOHN DEERE

## TECHNICAL MANUAL 8450-8650 Tractors

TM1355 (01MAY86) English

**TM1355 (01MAY86)**

LITHO IN U.S.A.  
ENGLISH



# 8450 - 8650 TRACTORS TECHNICAL MANUAL TM-1355 (DEC-85)

## CONTENTS—REPAIR SECTIONS

### PUBLICATION NUMBER CHANGE

This technical manual was formerly TM-1255. The number was changed to TM-1355 when engine information was removed. Some pages still carry the old publication number. For engine information, refer to engine component technical manual, CTM-1, 6466 Engines. This machine technical manual covers removal and installation of the engine components. The component manual covers basic repair of the engine.

### SECTION 10—GENERAL

- Group 00—Specification and Special Tools
- Group 05—Predelivery, Delivery and After-Sale Services
- Group 10—Tune-up
- Group 15—Lubrication

### SECTION 15—SEPARATION

- Group 00—Specifications and Special Tools
- Group 05—Front Drive
- Group 10—Fuel Tanks and Fenders
- Group 15—Front End
- Group 20—Front End and Engine From Clutch Housing
- Group 25—Engine
- Group 30—SOUND-GARD® Body
- Group 35—Front Hinge From Rear Hinge
- Group 40—Front Hinge
- Group 45—Clutch Housing
- Group 50—Rear Hinge
- Group 55—Torque Divider
- Group 60—Transmission
- Group 65—Final Drives

### SECTION 20—ENGINE REPAIR

- Group 01—6619A Specifications and Special Tools

- Group 05—Acquire Access to Cylinder Head, Valves and Camshaft
- Group 11—6619A Cylinder Head, Valves and Camshaft
- Group 15—Acquire Access to Cylinder Block, Liners, Pistons and Rods
- Group 21—6619A Cylinder Block, Liners, Pistons and Rods
- Group 25—Acquire Access to Crankshaft, Main Bearings and Flywheel
- Group 31—6619A Crankshaft, Main Bearings and Flywheel
- Group 35—Acquire Access to Lubrication System
- Group 41—6619A Lubrication System
- Group 45—Acquire Access to Cooling System
- Group 51—6619A Cooling System

### SECTION 30—FUEL AND AIR SYSTEM REPAIR

- Group 00—Specifications and Special Tools
- Group 05—Acquire Access to Air Intake System
- Group 10—Air Intake System
- Group 15—Acquire Access to Diesel Fuel System
- Group 20—Diesel Fuel System
- Group 25—Speed Control Linkage

### SECTION 40—ELECTRICAL REPAIR

- Group 00—Specifications and Special Tools
- Group 05—Harness Replacement
- Group 06—Connector Repair
- Group 10—John Deere Charging Circuit
- Group 15—Starter Circuit Repair
- Group 20—John Deere Starter Repair
- Group 21—DELCO-REMY Starter Repair
- Group 25—Lighting Circuit
- Group 30—INVESTIGATOR II™ Warning System and Digital Tach. Repair
- Group 35—Accessory Circuits

*All information, illustrations and specifications contained in this technical manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.*

COPYRIGHT® 1985  
DEERE & COMPANY  
Moline, Illinois  
All rights reserved  
A JOHN DEERE ILLUSTRATION  
Previous Edition Copyright © 1982, 1984  
DEERE & COMPANY

U10;010GEN AX1 281085

**CONTENT—CONTINUED****SECTION 50—POWER TRAIN REPAIR**

- Group 00—Specifications and Special Tools
- Group 05—Remove/Install Clutch Oil Pressure Valve Housing
- Group 10—Clutch Oil Pressure Regulating Valve Housing
- Group 15—Clutch Operating Piston Housing
- Group 20—PERMA CLUTCH™
- Group 25—QUAD-RANGE™ Planetary
- Group 30—Independent PTO
- Group 35—Torque Divider and Drive Shafts
- Group 40—QUAD-RANGE™ Transmission
- Group 45—Shift Lever Assembly
- Group 50—Front Differential
- Group 55—Rear Differential Housing
- Group 60—Differential Lock Valves
- Group 65—Final Drives
- Group 70—Transmission Oil Filter Relief Valve Housing
- Group 75—Transmission Oil Cooler and Thermal Relief Valve

**SECTION 60—STEERING/BRAKES REPAIR**

- Group 00—Specifications and Special Tools
- Group 05—Remove/Install Power Steering Components
- Group 10—Steering Column
- Group 15—Metering Pump
- Group 20—Steering Valve
- Group 25—Steering and Feedback Cylinders
- Group 30—Remove/Install Brake Valve and Brake Accumulator
- Group 35—Brake Valve
- Group 40—Brake Accumulator
- Group 45—Bleeding Brakes and Testing Brake Accumulator
- Group 50—Brake Pistons, Plates, and Disks

**SECTION 70—HYDRAULIC REPAIR**

- Group 00—Specifications and Special Tools
- Group 05—Charge Pump Assembly
- Group 10—Remove/Install Main Hydraulic Pump
- Group 15—Main Hydraulic Pump

- Group 20—Remove/Install Charge Circuit Valves and Attenuator
- Group 25—Charge Pump Control Valve
- Group 30—Hydraulic Filter Relief Valve Housing
- Group 35—Remove/Install HYDRA-CUSHIONED™ Seat Valve Assembly and Accumulator
- Group 40—Seat Valve Assembly
- Group 45—Remove and Install Pressure Control Valve
- Group 50—Pressure Control Valve
- Group 55—Remove/Install Rockshaft Components
- Group 60—Rockshaft Components
- Group 65—Lift Assist Cylinders
- Group 70—Draft Sensing Cylinders
- Group 75—Hitch Components
- Group 80—Remove/Install Selective Control Valves and Controls
- Group 85—Selective Control Valve and Coupler
- Group 90—Remote Cylinder
- Group 95—Transmission-Hydraulic System Clean-up Procedure

**SECTION 80—MISCELLANEOUS REPAIR**

- Group 00—Specifications and Special Tools
- Group 05—Wheels
- Group 10—Hinge Pins
- Group 15—Front Weight

**SECTION 90—OPERATOR STATION REPAIR**

- Group 00—Specifications and Special Tools
- Group 05—Air Conditioning System
- Group 06—Air Conditioning System Service
- Group 10—Heating System
- Group 15—HYDRACUSHIONED Seat
- Group 20—Miscellaneous Components

**SECTION 95—MISCELLANEOUS OPTIONS**

- Group 00—Specifications and Special Tools
- Group 40—Auxiliary Lighting
- Group 60—Auxiliary Steering System
- Group 61—Auxiliary Brake System
- Group 62—Auxiliary Trailer Brake
- Group 63—Miscellaneous Options

## INTRODUCTION

This manual is part of a total service support program.

### FOS Manuals—reference

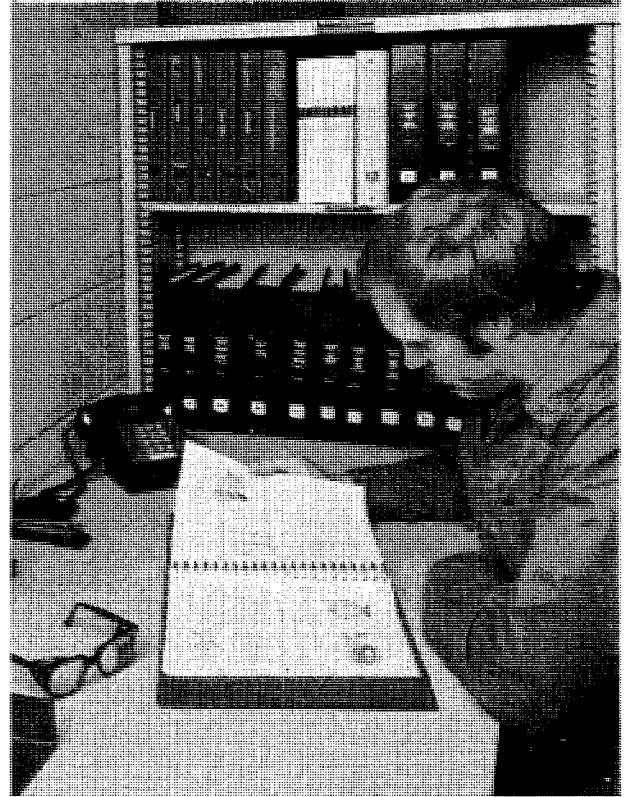
### Technical Manuals—machine service

### Component Manuals—component service

*Fundamentals of Service (FOS) Manuals* cover basic theory of operation, fundamentals of troubleshooting, general maintenance, and basic types of failures and their causes. FOS Manuals are for training new personnel and for reference by experienced technicians.

*Technical Manuals* are concise service guides for specific machines. Technical manuals are on-the-job guides containing only the vital information needed by an experienced service technician.

*Component Technical Manuals* are concise service guides for specific components. Component technical manuals are written as stand alone manuals covering multiple machine applications.



AB6;RW5559 053;INTRO2 030785

## FEATURES OF THIS TECHNICAL MANUAL

John Deere ILLUSTRATION format emphasizing illustrations and concise instructions in easy-to-use modules.

Emphasis on diagnosis, analysis, and testing so you can understand the problem and correct it.

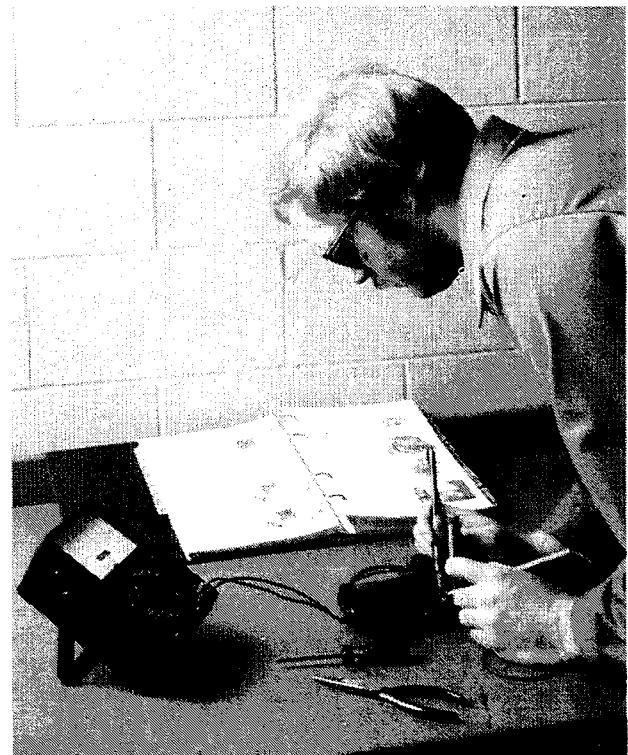
Diagnostic information presented with the most logical and easiest to isolate problems first to help you identify the majority of routine failures quickly.

Step-by-step instructions for teardown and assembly.

Summary listing at the beginning of each group of all applicable specifications, wear tolerances, torque values, essential tools, and materials needed to do the job.

An emphasis throughout on safety—so you do the job right without getting hurt.

This technical manual was planned and written for you—an experienced service technician. Keep it in a permanent binder in the shop where it is handy. Refer to it when you need to know correct service procedures or specifications.



AB6;RW5560 053;INTRO3 071085

## SAFETY AND YOU

This is the safety-alert symbol. When you see this symbol on the machine or in this manual, be alert to the potential for personal injury .



AB6;T81389 053;TMSAFE 071085

## IMPORTANT

The **IMPORTANT** message identifies potential problems which may cause consequential damage to tractor. Following recommended procedure will instruct technician how to avoid problem.

U10;010INT D 101281

## NOTES

The word *NOTE* is followed by a statement that identifies a qualification or exception to a previous statement. A "NOTE" may also identify nice-to-know information pertinent to, but not directly related to previous statement.

U10;010INT E 101281

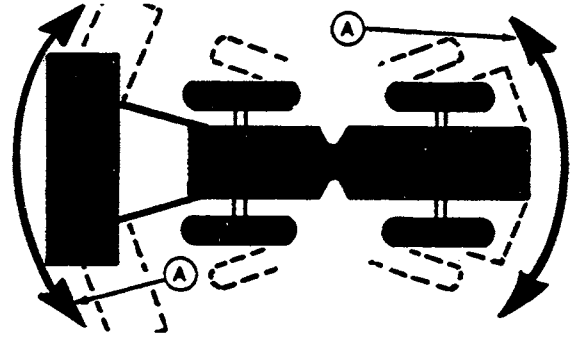
## STAY CLEAR OF MOVING TRACTOR

Always place transmission in PARK before dismounting. Leaving transmission in gear with engine stopped will NOT prevent the tractor from moving.

Be sure everyone is clear of tractor and attached equipment before starting engine or moving steering wheel. Tractor and equipment move (A), even with transmission in PARK. Some steering movement often occurs as engine starts.

Never try to get on or off a moving tractor.

When tractor is left unattended, lower implements to the ground, stop the engine, and remove the key.



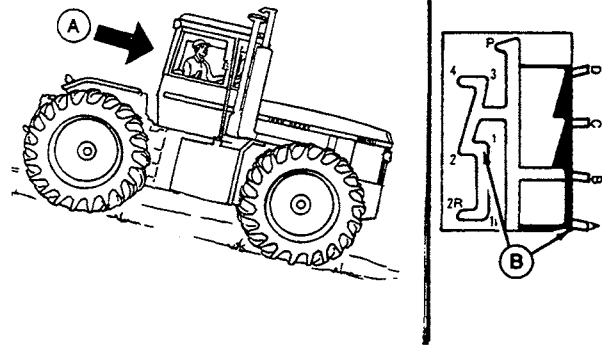
AJ7;RW8078 U01;STAY CLEAR1 281085

## SHIFT TO LOW GEAR ON HILLS

Shift to a low gear (B) before descending a steep hill (A), to improve your control of the tractor with little or no braking. Never coast downhill.

When driving on icy or graveled surfaces, reduce speed and be sure tractor is properly ballasted to avoid skidding and loss of steering control.

Additional ballast may be needed for transporting heavy integral implements. When implement is raised, drive slowly over rough ground, regardless of how much ballast is used.



AJ7;RW4421 U01;DRIVE SAFE 281085

### KEEP RIDERS OFF MACHINE

Only allow the operator on the machine. Keep riders off.

Riders on machine are subject to injury such as being struck by foreign objects and being thrown off of the machine. Riders also obstruct the operator's view resulting in the machine being operated in an unsafe manner.

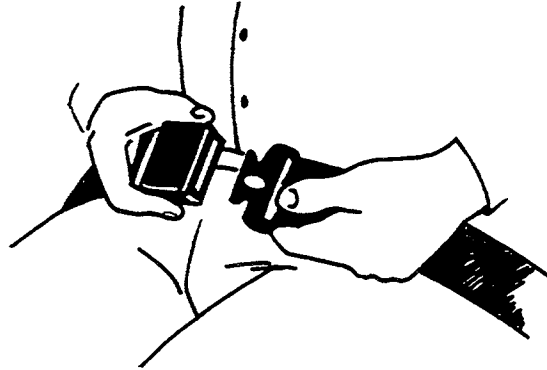


AB6;TS173 053;RIDER 261184

### USE SEAT BELT PROPERLY

Use a seat belt when you operate with a roll-over protective structure (ROPS) to minimize chance of injury from an accident such as an overturn.

Do not use a seat belt if operating without a ROPS.

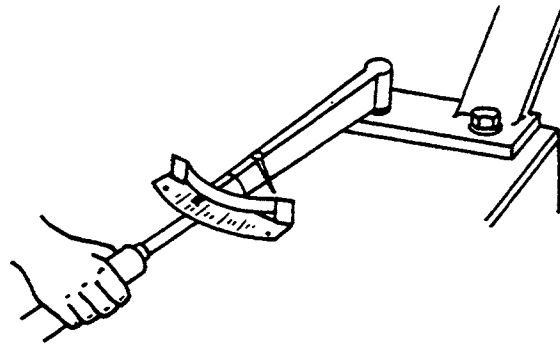


AB6;TS175 053;ROPS1 261184

### KEEP ROPS INSTALLED PROPERLY

Make certain all parts are reinstalled correctly if the roll-over protective structure (ROPS) is loosened or removed for any reason. Tighten mounting bolts to proper torque.

The protection offered by ROPS will be impaired if ROPS is subjected to structural damage, is involved in an overturn incident, or is in any way altered. A damaged ROPS should be replaced, not reused.



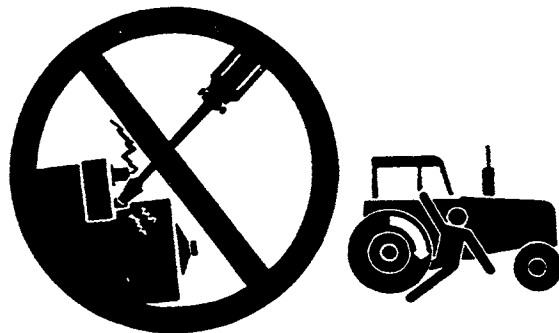
AB6;TS176 053;ROPS3 261184

### PREVENT MACHINE RUNAWAY

Avoid possible injury or death from machinery runaway.

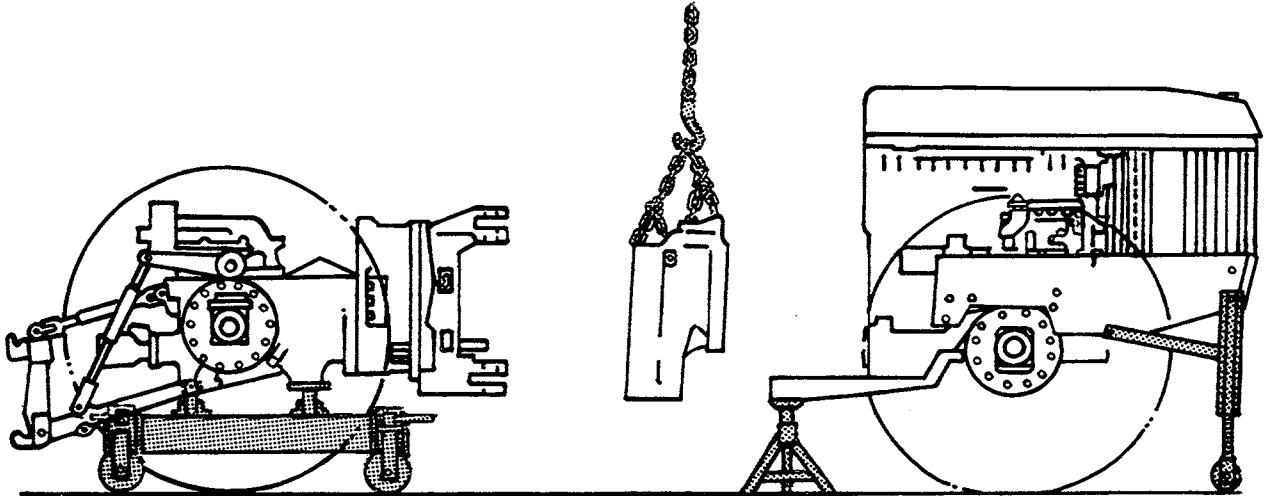
Do not start engine by shorting across starter terminals. Machine will start in gear if normal circuitry is by passed.

NEVER start engine while standing on ground. Start engine only from operator's seat, with transmission in neutral or park.



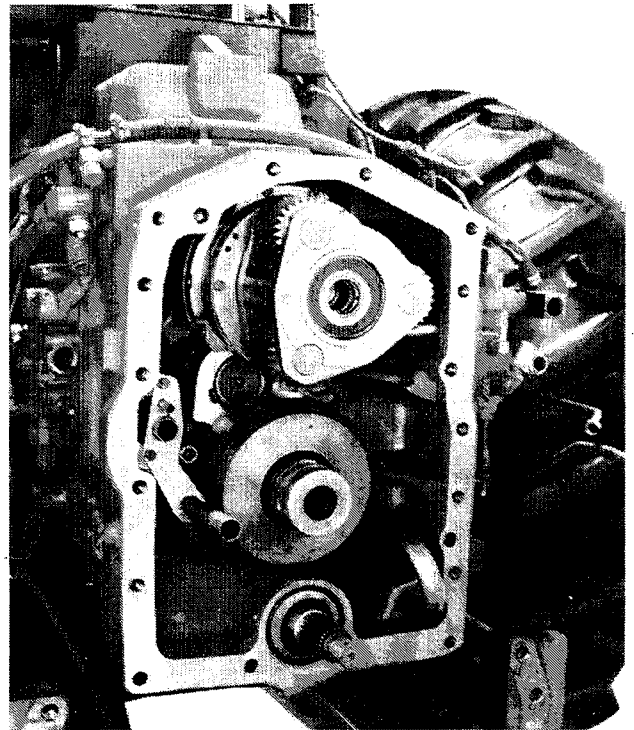
AB6;TS177 053;BYPAS1 210585

REMOVE CLUTCH HOUSING



AC7;RW3109 L U15;015045 AX1 140981

1. Remove front hinge. (See Remove Front Hinge in this section.)
2. Clutch housing separated from front hinge.

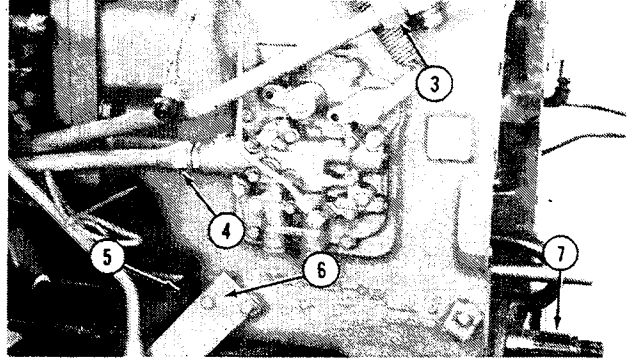


AC7;RW3110 U15;015045 BX1 120183



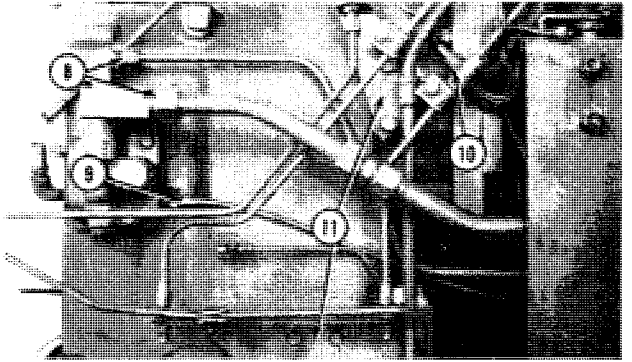
## Remove Clutch Housing

3. Disconnect oil cooler return line.
4. Disconnect oil cooler inlet line.
5. Disconnect front differential return line.
6. Disconnect bracket from clutch housing.
7. Remove front drive shaft.



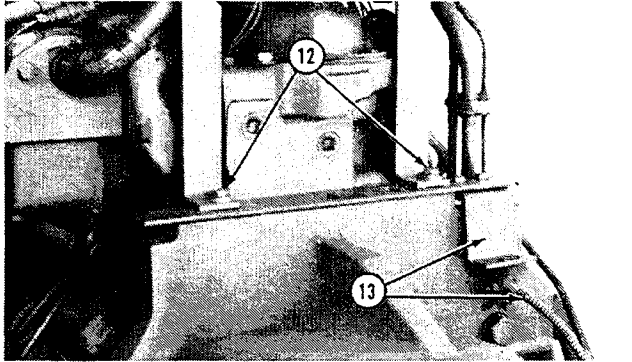
AC7/RW3111 U15:015045 CX1 140981

8. Disconnect charge pump control valve pilot line and outlet line.
9. Disconnect main pump seal bleed line.
10. Disconnect clutch temperature connector.
11. Disconnect brackets from clutch housing.



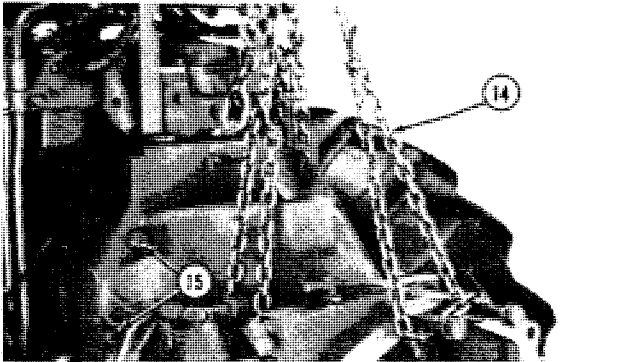
AC7/RW3112 U15:015045 DX1 140182

12. Remove cap screws securing steering valve bracket to clutch housing.
13. Remove throttle control linkage and bracket.



AC7/RW3113 U15:015045 EX1 140981

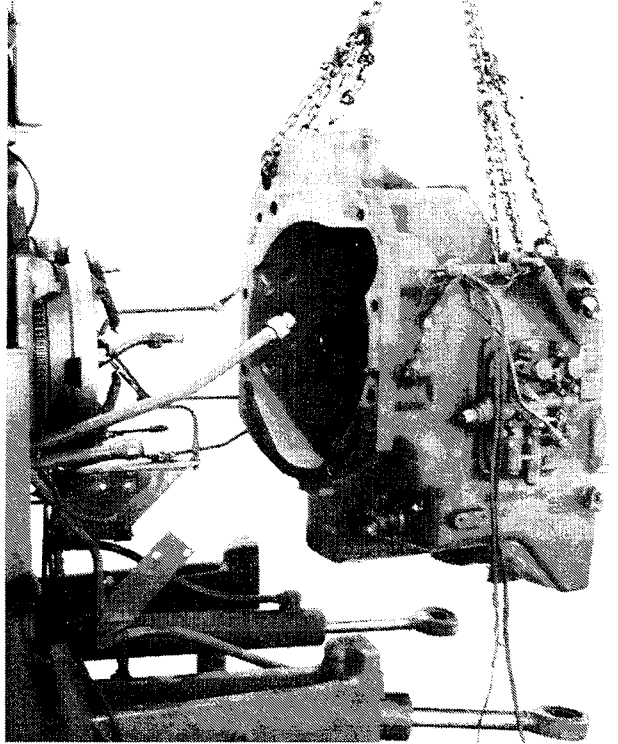
14. Attach chain and chain hoist to clutch housing.
15. Remove clutch housing-to-engine cap screws on right and left side.
16. (Not illustrated). Remove engine oil pan-to-clutch housing cap screws.



AC7/RW3114 U15:015045 FX1 140182

*Clutch Housing*

17. Carefully remove clutch housing from engine.



AC7/RW3115 U15/015045 GX1 140182

## INSTALL CLUTCH HOUSING

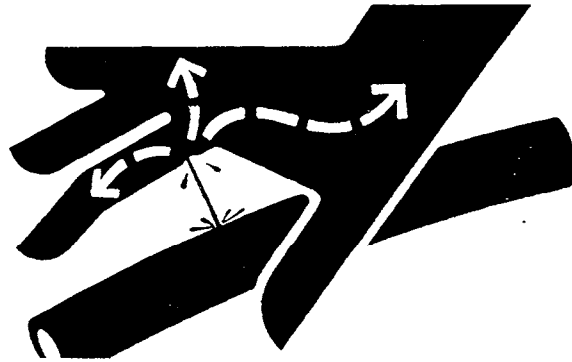
Reverse the removal steps given on the preceding pages and note the installation instructions that follow.

1. Refer to Section 50 for specific adjustments.
2. Clean joining surfaces and check O-rings before installing clutch housing to engine.
3. 8450:
  - a) Tighten clutch housing-to-engine cap screws to 407 N·m (300 ft-lbs).
  - b) Tighten engine oil pan-to-clutch housing cap screws to 115 N·m (85 ft-lbs).
4. 8650:
  - a) Tighten engine-to-clutch housing and engine oil pan-to-clutch housing to 407 N·m (300 ft-lbs).

**⚠ CAUTION:** Escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Keep hands and body away from pin holes and nozzles which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand.

If any fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type injury or gangrene may result.

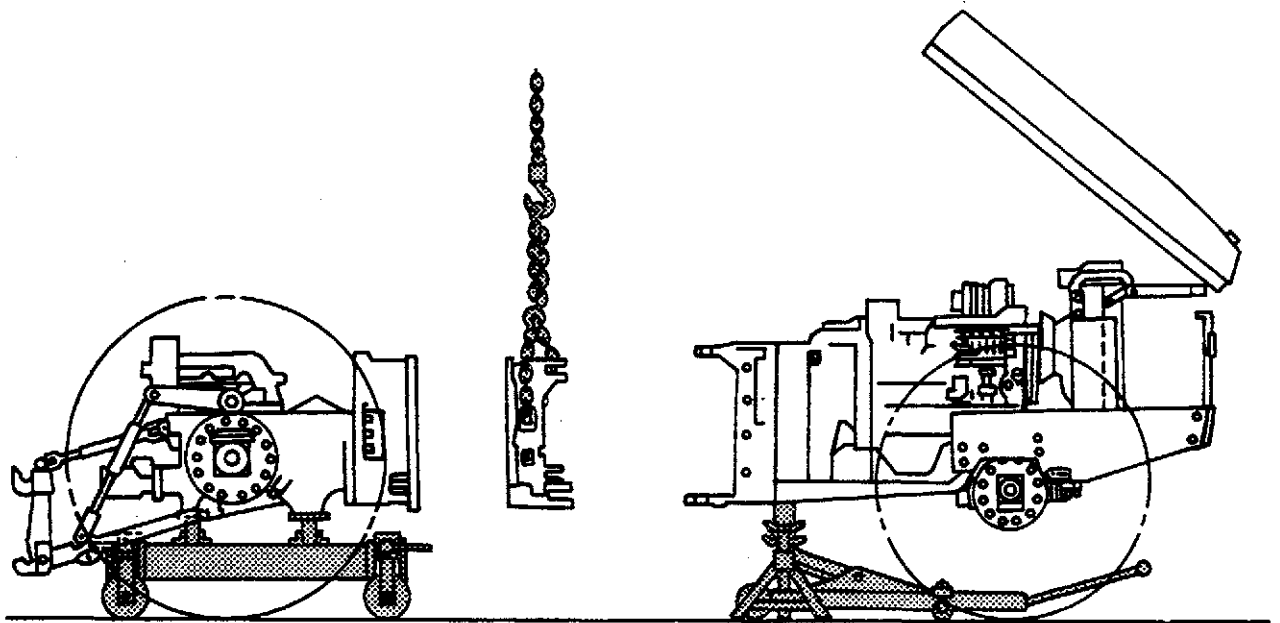
**⚠ CAUTION:** Remove hinge lock bars before driving tractor.



5. Check all fluid levels and test tractor operation.

AC7;X9811 U15;015045 HX1 221182

REMOVE REAR HINGE



A01,RW9104L U15:015050 AX1 100981



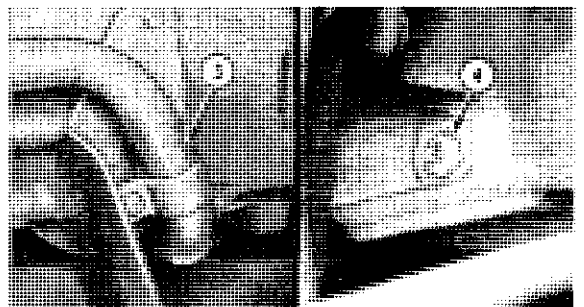
**CAUTION:** Whenever working in hinge area, insert hinge lock bars and remove key from tractor.

1. Install hinge lock bars on right and left side of hinge.
2. Disconnect battery ground cable.



A02,RW2473 U15:015065 BX1 020061

3. Drain transmission oil by pulling oil suction line from torque divider housing.
4. Drain transmission oil at differential drain plug after oil has stopped draining from torque divider housing.



A02,RW2474 U15:015065 CX1 120183

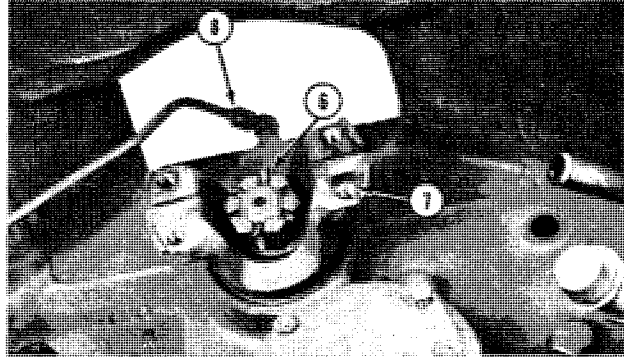
## Rear Hinge

5. Remove Front Hinge From Rear Hinge as instructed in this section.

6. Remove cotter key and nut from transmission input shaft.

7. Use JDT-27 Yoke Holding Tool to remove transmission input shaft yoke.

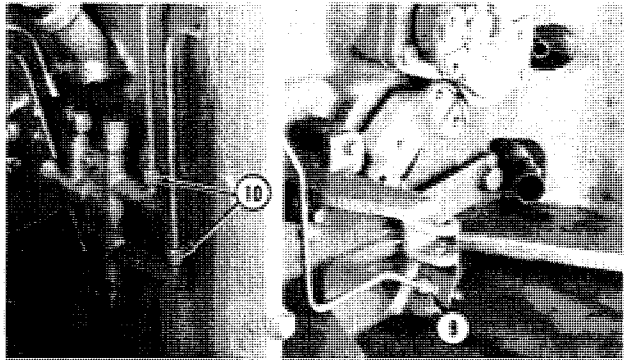
8. Disconnect differential lock return line.



AD1;RW3105 U15;015050 BX1 030283

9. Disconnect differential lock pressure line.

10. Disconnect pressure and return line from differential lock valve and remove lines from rear hinge.

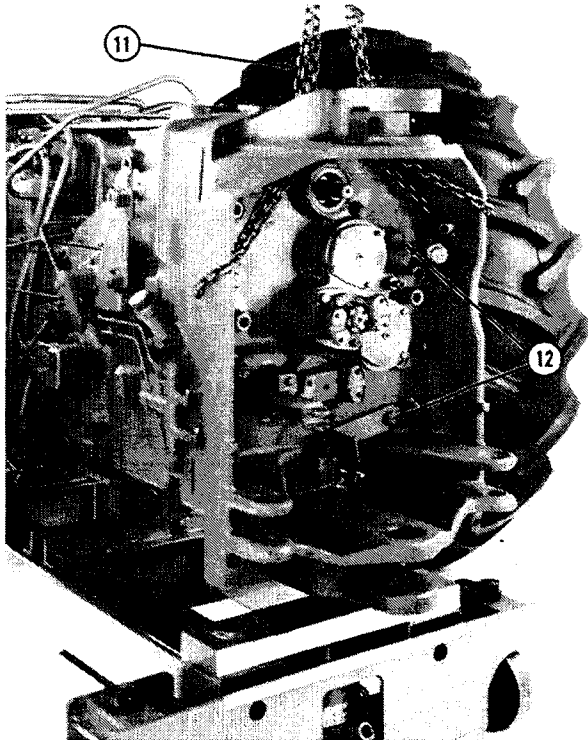


AD1;RW3106 U15;015050 CX1 100981

11. Secure chain and chain hoist to rear hinge.

12. Remove rear hinge-to-torque divider cap screws on right and left side.

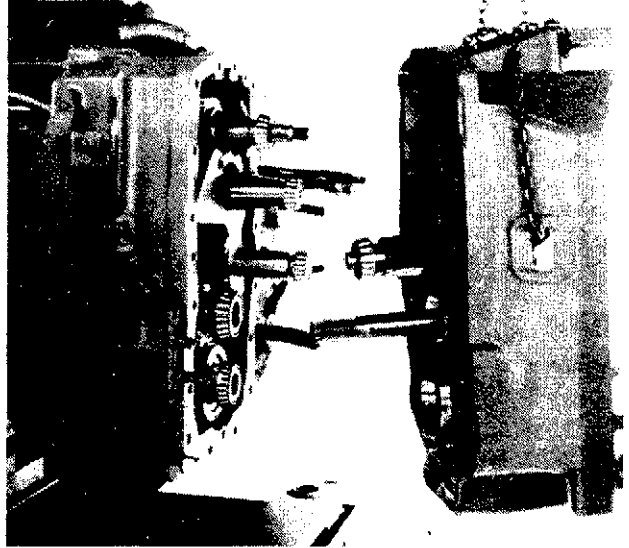
13. (Not Illustrated). Remove torque divider-to-rear hinge cap screws on right and left side.



AD1;RW3107 U15;015050 DX1 100981

*Remove Rear Hinge*

14. Slowly remove rear hinge from torque divider.



AD1:RW3108 U15:015090 EX1 300983

## INSTALL REAR HINGE

Reverse the removal steps on the preceding pages and note the installation instructions that follow.

1. Clean joining surfaces with a chlorinated solvent before applying LOCTITE® Plastic Gasket.

**IMPORTANT: Be sure there is no oil film on joining surfaces.**

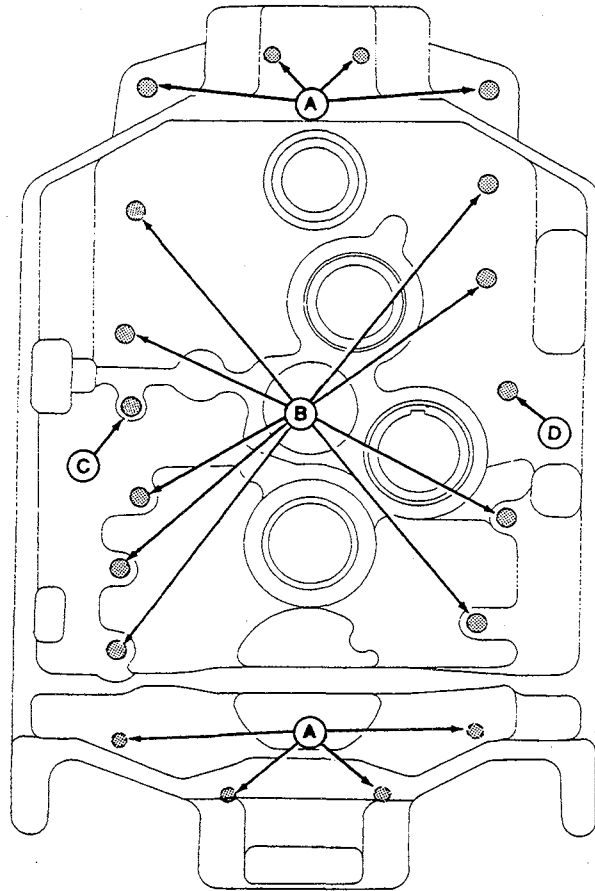
2. Tighten upper input gear yoke retaining nut to 542 to 746 N·m (400 to 550 ft-lbs).

3. Tighten rear hinge-to-torque divider housing cap screws to 475 to 545 N·m (350 to 400 ft-lbs).

4. Tighten torque divider-to-rear hinge cap screws to 407 N·m (300 ft-lbs).

5. Tighten U-joint guard cap screws to rear hinge to 508 N·m (375 ft-lbs).

*LOCTITE® is a trademark of the Loctite Compound Corporation.*



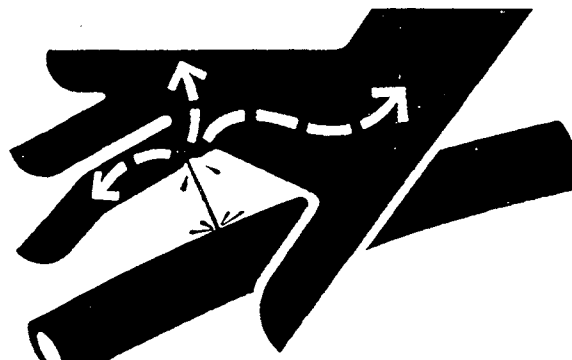
A— ¼ in. x 3-¼ in.  
B— ¼ in. x 5-½ in.

C— ¼ in. x 7-½ in.  
D— ¼ in. x 6-¾ in.

**⚠ CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Keep hands and body away from pin holes and nozzles which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand.**

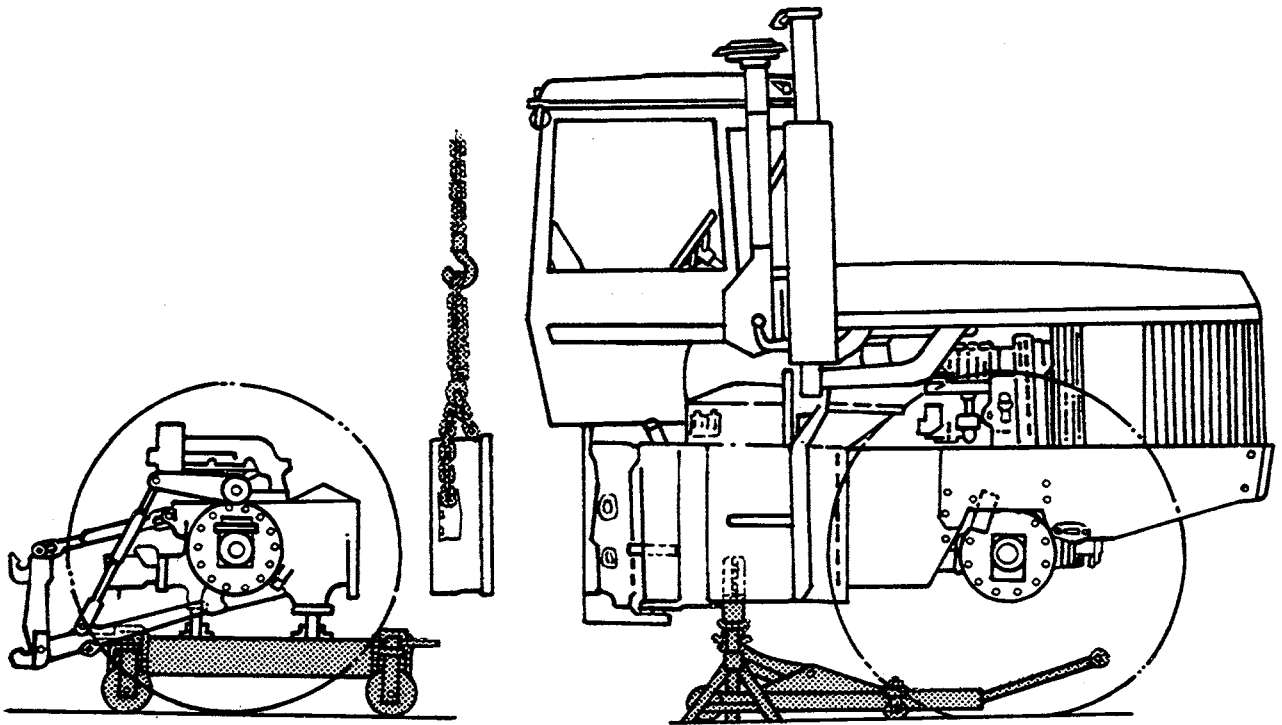
If any fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type injury or gangrene may result.

**⚠ CAUTION: Remove hinge lock bars before driving tractor.**



6. Check all fluid levels and test tractor operation.

REMOVE TORQUE DIVIDER

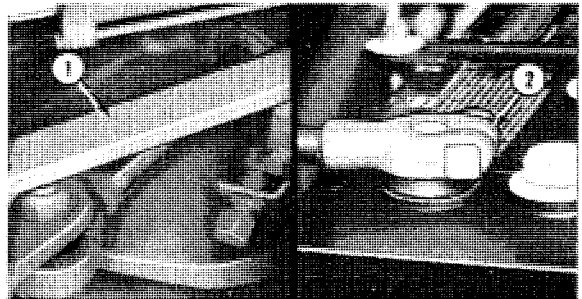


AD1;RW2491 U15;015055 AX1 080981



**CAUTION:** Whenever working in hinge area, insert hinge lock bars and remove key from tractor.

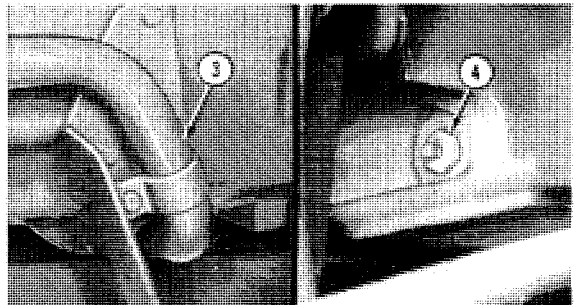
1. Install hinge lock bars on right and left side of hinge.
2. Disconnect battery ground cable.



A02;RW2473 U15;015065 BX1 080981

3. Drain transmission oil by pulling oil suction line from torque divider housing.

4. Drain transmission oil at differential drain plug after oil has stopped draining from torque divider housing.

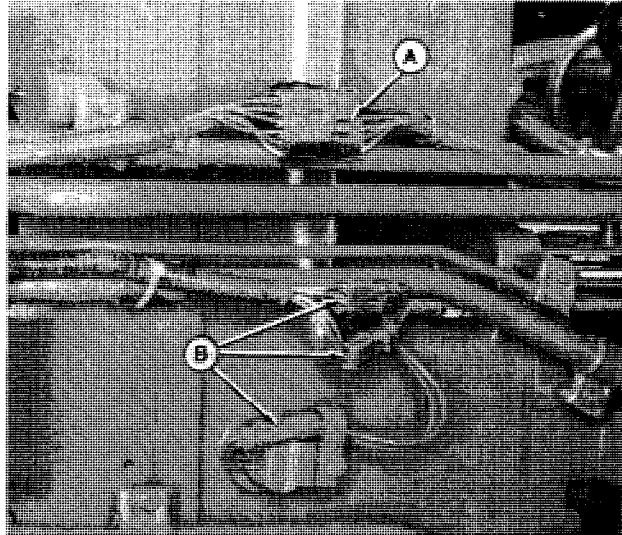


A02;RW2474 U15;015065 CX1 120183



*Torque Divider*

5. Disconnect rear lighting wiring harness (A).
6. Disconnect rear sensor wiring harness (B).
7. Remove rear fenders. (See Fuel Tanks and Fenders in this section.)

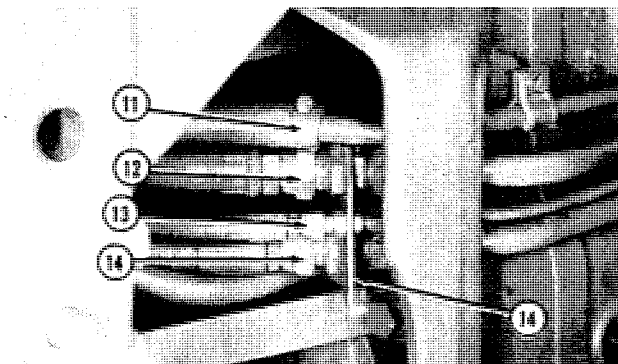


AD1;RW8699 U15;015060 BX1 120183

8. Remove left-hand fuel tank. (See Fuel Tanks and Fenders in this section.)
9. Relieve pressure before loosening hydraulic lines. Relieve by opening a brake bleed screw and pumping brake until pedal goes all the way down.
10. Plug all openings to prevent contaminants from entering system.

U15;015055 BX1 120183

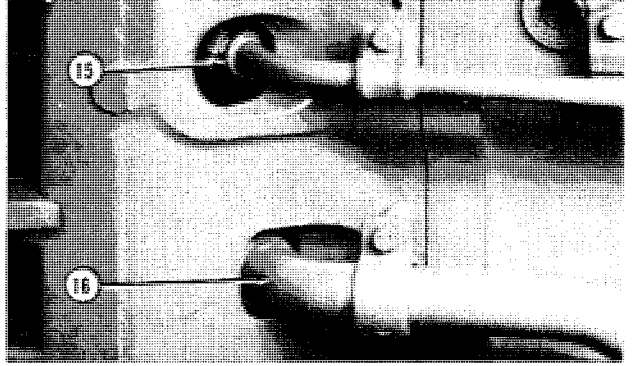
11. Disconnect transmission input lube line.
12. Disconnect rockshaft and SCV return line.
13. Disconnect brake line.
14. Disconnect main hydraulic pump pressure line and remove hydraulic line bracket.



AD1;RW2500 U15;015055 CX1 221182

*Torque Divider*

- 15. Disconnect transmission lube line.
- 16. Disconnect charge pump supply line.



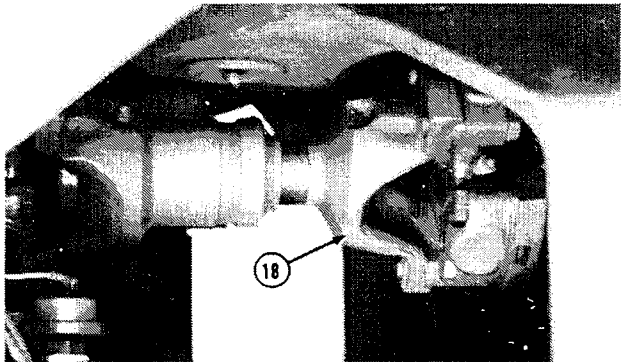
AD1;RW2501 U15;015055 DX1 221382

- 17. Remove driveshaft guards.
- NOTE: Mark guards for correct installation.*



AD1;RW2502 U15;015055 EX1 080981

- 18. Disconnect upper transmission U-joint from yoke at rear hinge.

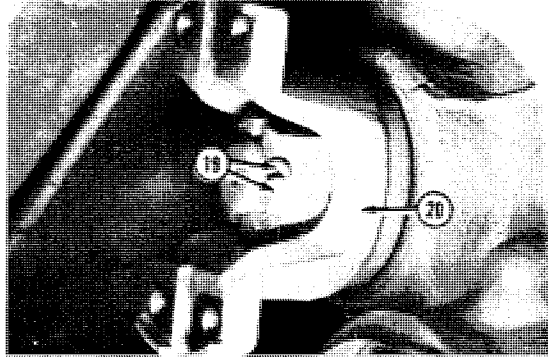


AD1;RW2503 U15;015055 FX1 080981

## Torque Divider

19. Remove cotter key and use JDT-27 Yoke Holding Tool to remove nut from transmission upper input shaft.

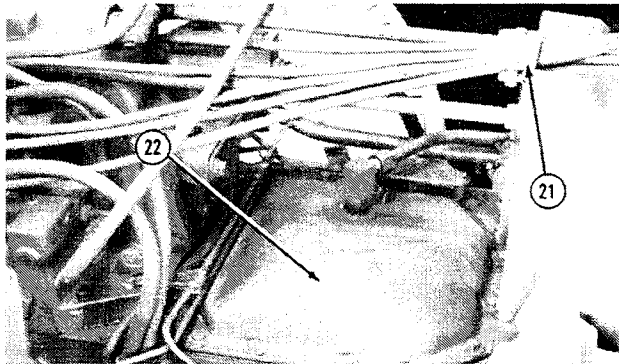
20. Remove transmission input shaft yoke.



AD1;RW2504 U15;015055 GX1 120183

21. Remove SCV and rockshaft cable clamp.

22. Remove transmission cover.

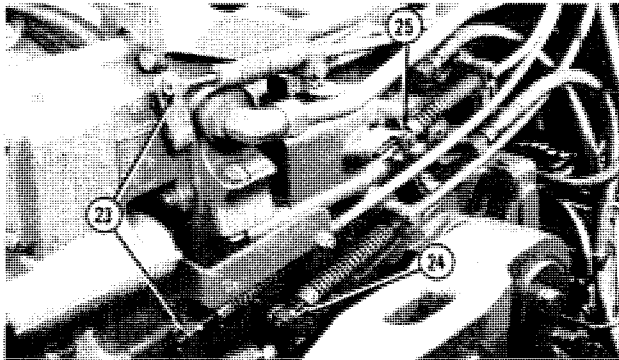


AD1;RW2489 U15;015060 GX1 080981

23. Disconnect No. 2 and No. 3 SCV cables from SCVs.

24. Disconnect rockshaft cable.

25. Disconnect load control cable.

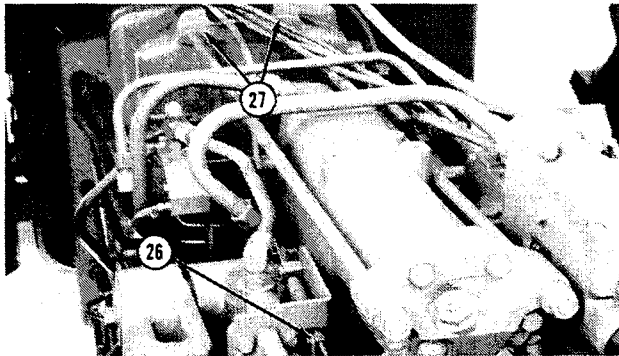


AD1;RW2490 U15;015060 HX1 080981

26. Disconnect No.1 SCV cable and pull all SCV, rockshaft and load control cables forward.

*NOTE: Tie rods do not need to be removed unless torque divider will be removed from transmission.*

27. Remove tie rods from torque divider.

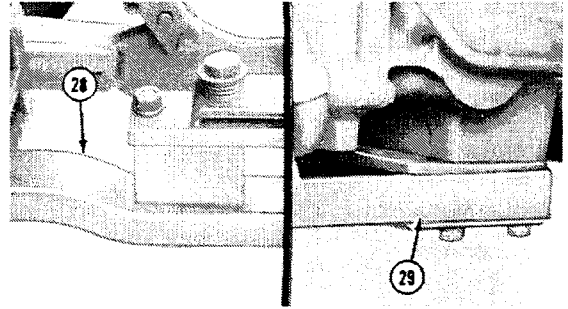


AD1;RW2491 U15;015060 IX1 120183

*Torque Divider*

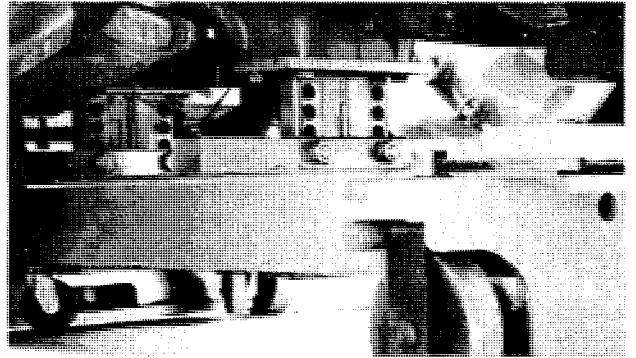
28. Remove drawbar.

29. Remove drawbar support.



AD1:RW2492 U15:015060 JX1 080981

30. Mount D-05150ST Heavy Duty Stand.

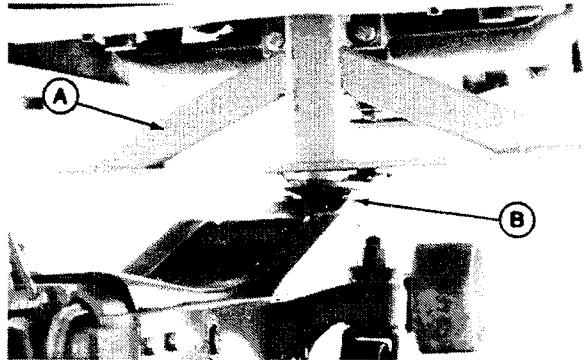


A01:RW2493 U15:015060 KX1 080981

31. (Not illustrated). Install JDG-253 Oscillating Stops to front axles to prevent tractor from tipping sideways during separation.

U15:015060 LX1 140182

32. Install D-05153ST Lifting Bracket (A) and place floor jack (B) under bracket for support.



AD1:RW2495 U15:015060 MX1 080981

**Thank you very much for  
your reading. Please Click  
Here. Then Get COMPLETE  
MANUAL. NO WAITING**



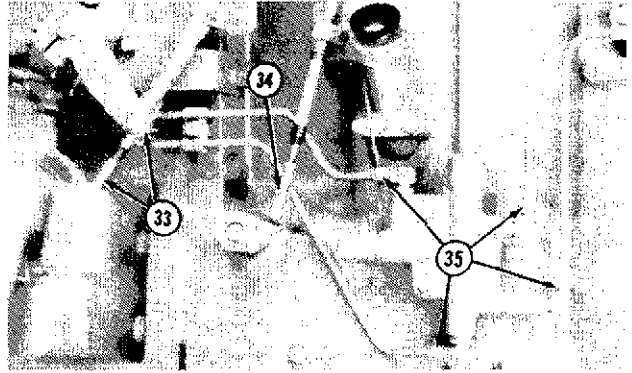
**NOTE:**

**If there is no response to  
click on the link above,  
please download the PDF  
document first and then  
click on it.**

## Torque Divider

33. Disconnect shifter cables and remove shifter bracket.
34. Disconnect park cable.
35. Disconnect differential lock lines from differential lock valves.

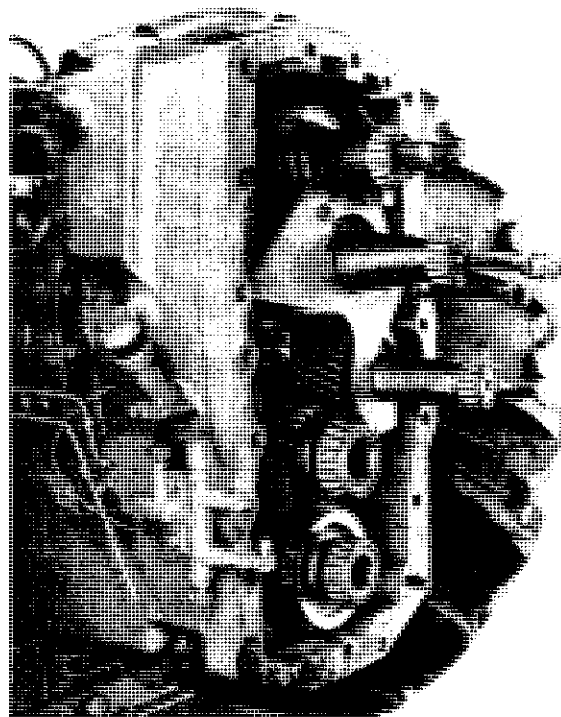
*NOTE: Disconnect harness at neutral start switch and pull harness, shifter cables and shifter bracket forward.*



AD1:RW2505 U15:015055 HX1 080981

36. (Not illustrated). Remove remaining rear hinge-to-torque divider cap screws.
37. Slowly remove transmission and torque divider from rear hinge.

**⚠ CAUTION: When rolling apart, take care to keep the PTO upper idler from binding.**

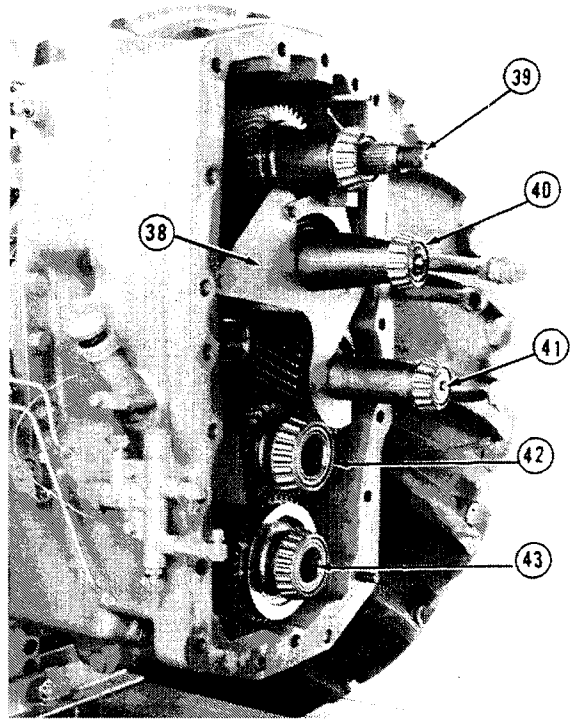


AD1:RW2505 U15:015055 HX1 080981

## Torque Divider

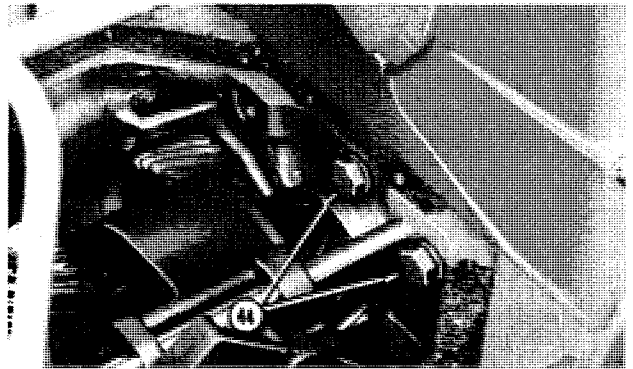
*NOTE: Torque divider may be removed without removing all shaves.*

38. Remove steady rest.
39. Remove transmission upper input shaft.
40. Remove input counter shaft.
41. Remove PTO upper idler shaft.
42. Remove PTO lower idler gear.
43. Remove PTO drive gear.



A01;RW2507 U15;015055 JX1 120183

44. Remove the two cap screws attaching transmission case-to-torque divider, located inside transmission case.



A01;RW2508 U15;015055 KX1 120183

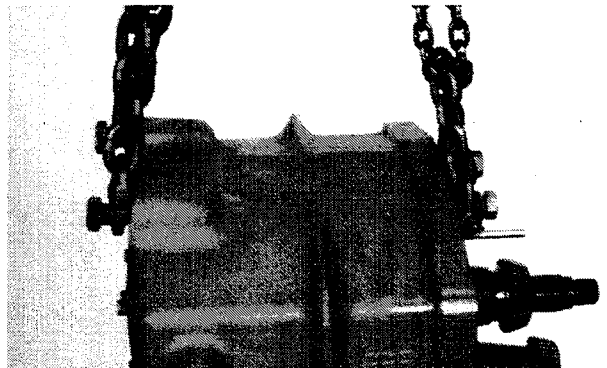
45. Connect lift chains to rear of torque divider using two cap screws in rockshaft tie rod holes.

46. Connect lift chain to front of torque divider using capscrews in top two mounting holes.



**CAUTION: Do Not apply excessive lifting force to support torque divider. Binding could occur during separation.**

47. Connect lifting chains to overhead hoist and support torque divider.

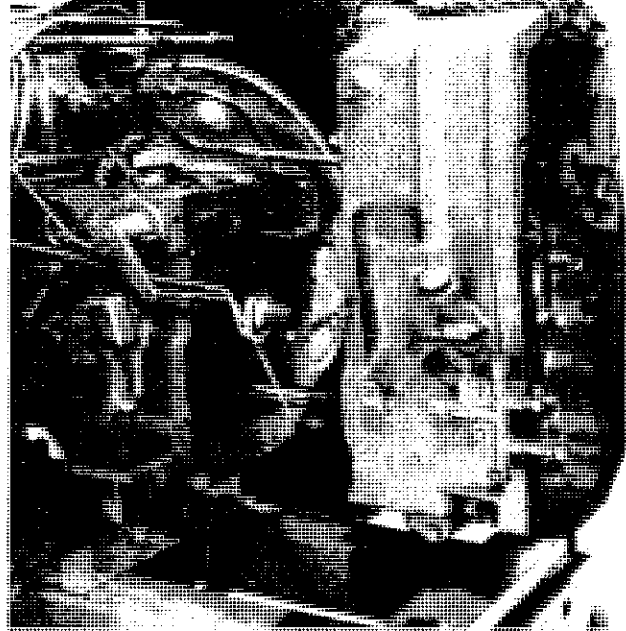


A01;RW2509 U15;015055 LX1 120183

*Torque Divider*

48. Remove torque divider-to-transmission and transmission-to-torque divider cap screws.

49. Remove torque divider from transmission.



AD1;RW2510 U15;015055 MX1 120183