VERSATILE

Service Manual

Combine
2000

Reprinted

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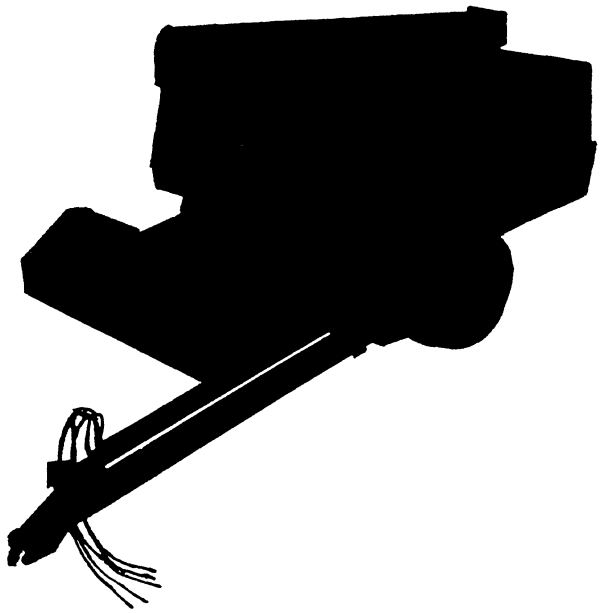
VERSATILE **2000 Combine**



PRINTED IN CANADA/4C/LG **97568** **JUNE 1985**

FOREWORD

This service manual provides instructions for troubleshooting, removal, inspection, replacement and overhaul of VERSATILE® Model 2000 Combine components.

The service manual should be used in conjunction with the parts manual for the specific model year. Consult the Operator's Manual for information on adjustments, troubleshooting and lubrication.

A table of contents precedes each section providing detailed coverage of the information contained within that section. The index at the end of the book should ease location of specific information.

REVISIONS AND ADDITIONS

The purpose of a loose leaf service manual is to enable us to keep the book updated.

When changes are made, pages will be forwarded to you marked either as replacement or additional pages.

Replacement pages will carry the same page number as the original. Discard the original page and insert the replacement page in its place. Added pages will carry the original page number plus an alphabetical suffix. Insert these pages after the existing page.

Please complete the feedback page at the back of the manual and return it to Versatile Farm Equipment Company. Such information will help us improve our service manuals in the future.

BE ALERT

Watch for this symbol. It identifies potential hazards to health or personal safety. It points out safety precautions. It means: ATTENTION – Be Alert. Your safety is involved.

BE ALERT

BE ALERT

BE ALERT

BE ALERT

Safety

Safety

This section contains general safety precautions which should be thoroughly studied and practised by all service personnel.

GENERAL SAFETY

1. Mount a fire extinguisher in the service area. Maintain it according to manufacturer's recommendations.

2. Never operate tractor and combine in a closed building. If it is necessary to do so, ensure building is well ventilated and use ducting to channel exhaust fumes outside.

3. Always keep clothing relatively tight and belted. Remove jewelry or any objects that might catch in moving parts.

4. Use ladder and handholds when inspecting grain tank.

5. Park combine on a clear, level area before servicing. Disconnect from tractor - lower hitch and rear stands to ground and block wheels.

HOIST SAFETY

1. Use a chain hoist and frame of adequate capacity to lift heavy components.

2. Protect yourself from injury when heavy components are being raised by doing the following:

   a. Do not stand on table when lifting.

   b. Keep hands away from pinch points where chain links or belts tighten.

   c. Do not let components swing and strike personnel or hoist frame as it leaves the ground.

   d. Keep support stands nearby and place under lifted item when the necessary height is reached.

   e. Do not go under any combine part supported by a hoist. Place support stands of adequate capacity under item before working on it.

MAINTENANCE SAFETY

1. Shut down tractor engine, set parkbrake, remove key and disconnect combine from tractor before servicing combine.

2. Always chock wheels and lock table cylinders UP before working on or under combine.

3. Never service, lubricate or clean combine while it is running.

4. Be alert when approaching combine while it is running.

5. Relieve all hydraulic pressure before servicing components. Use a piece of wood or cardboard and wear safety gloves and goggles when searching for hydraulic leaks.

6. Repair adhesive is very flammable. Keep adhesive and its vapors away from heat, sparks and flames.

7. During adhesive use and until vapor is dissipated, avoid using spark producing electrical equipment. Keep container closed when not in use.

8. Use adhesive only in a well ventilated area.

SECTION 1: SPECIFICATIONS

CLEANING

Fans

Type	Two, 6 blade centrifugal
Diameter	584 mm (22.9 in.)
Width	828 mm (32.5 in.)
Width between fans	130 mm (5 in.)
Speed	450 to 1 100 r/min

Shoe

Speed	263 cycle/min
Type	Opposed Action

Chaffer

Type	Adjustable Slat
Spacing	28.5 mm (1.12 in.)
Number	2
Length	1 524 mm (60 in.)
Width (each)	952 mm (37.5 in.)
Extension length	254 mm (10 in.)
Area	2.651 m^2 (4 110 $in.^2$) including 0.471 m^2 (731 $in.^2$) extension

Sieve

Type	Adjustable Slat
Spacing	28.5 mm (1.12 in.)
Number	2
Length	1 270 mm (50 in.)
Width (each)	952 mm (37.5 in.)
Area	2.185 m^2 (3 388 $in.^2$) ASAE

Total Cleaning Area . . . 4.897 m^2 (7 593 $in.^2$) ASAE

GENERAL

Wheel Tread	3 650 mm (143.7 in.)
Overall Length	9 700 mm (381.9 in.)
Overall Width	
Field	5 500 mm (216.5 in.)
Transport	4 400 mm (173.2 in.)
Shipping	3 657 mm (144 in.)
Overall Height	3 600 mm (141.7 in.)
Weight	
Empty	7 400 kg (16 265 lb)
Full	13 000 kg (28 500 lb)

GRAIN HANDLING

Clean Grain Elevators

Type	Roller chain with rubber cups
Chain type	CA550
Width	204 mm (8 in.)
Drive	Top drive

Return Elevator

Type	Roller chain with rubber cups
Chain	CA550
Width	127 mm (5 in.)
Drive	Top drive

Grain Tank

Capacity	7.72 m^3 (220 bu) approx
Levelling Augers	2

Unloading Auger

Diameter	356 mm (14 in.)
Unloading Time	100 sec
Length	4 800 mm (189 in.)
Speed	0.074 m^3 (2.1 bu) per second
Discharge Height	3 660 mm (144 in.)
Clearance Height	3 560 mm (140 in.)
Auger Positioning Control	Hydraulic
Auger Positioning Range	90° right to 180° left

SEPARATING

Rotors

Type	2 Axial
Rotor Diameter	533 mm (21 in.)
Rotor Speed	1 000 r/min
Rotor Length	2 383 mm (93.8 in.)
Pitch on Flighting	855 mm (33.7 in.)
Housing Diameter	635 mm (25 in.)
Separation Area	1.257 m^2 (1 914 $in.^2$) per housing

Auger Bed

Number	4
Diameter	127 mm (5 in.)
Length	1 288 mm (50 in.)
Speed	573 r/min

TABLE AND FEED ELEVATOR

Table Width . . . . . 3.65 m (12 ft)
Auger Diameter . . . . . 610 mm (24 in.)
Elevator Type . . . . . Three chain staggered slat
Elevator Width . . . . . 1 060 mm (41.7 in.)
Elevator Cleanout Door . . . . . 865 × 280 mm (34 × 11 in.)

THRESHING

Cylinder

Diameter . . . . . 821 mm (32.35 in.)
Length . . . . . 2 000 mm (78.75 in.)
Speed . . . . . 425 to 1 000 r/min
Type . . . . . Rasp Bar

Concave

Area . . . . . 11.115 m^2 (1 728 $in.^2$)
Clearance . . . . . 3 to 30 mm (.12 to 1.18 in.)
Type . . . . . 6 mm (0.24 in.) dia 14 mm (0.55) center-to-center

TRACTOR REQUIREMENT

Minimum PTO HP . . 130 hp (97 kW) at 1 000 r/min
Drawbar pin to PTO shaft . . . . . 510 mm (20 in.)
Hydraulic Couplers . . . . . 3 sets
Hydraulic Minimum Pressure . . . . . 12 400 kPa (1 800 psi) at zero flow
Electrical . . . . . 12 volt, 75 amp minimum negative ground

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

The manufacturer reserves the right to make changes or add improvements at any time without incurring any obligation to make such changes on machines manufactured previously.

SECTION 2: ELECTRICAL SYSTEM

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SECTION 2: ELECTRICAL SYSTEM

1 Introduction

This section contains information on the circuitry, circuit testing, and repair of the electrical system.

1.1 SPECIFICATIONS AND DATA

Lights . . . . . three 60 W worklamps; two taillights; two brakelights; two amber warning lights

Tractor Requirement . . . . . 12 volt 75 amp minimum negative ground

1.2 WIRING DIAGRAMS

Refer to Figure 2-1.

1.3 COMPONENT LOCATION

Refer to Figure 2-2.

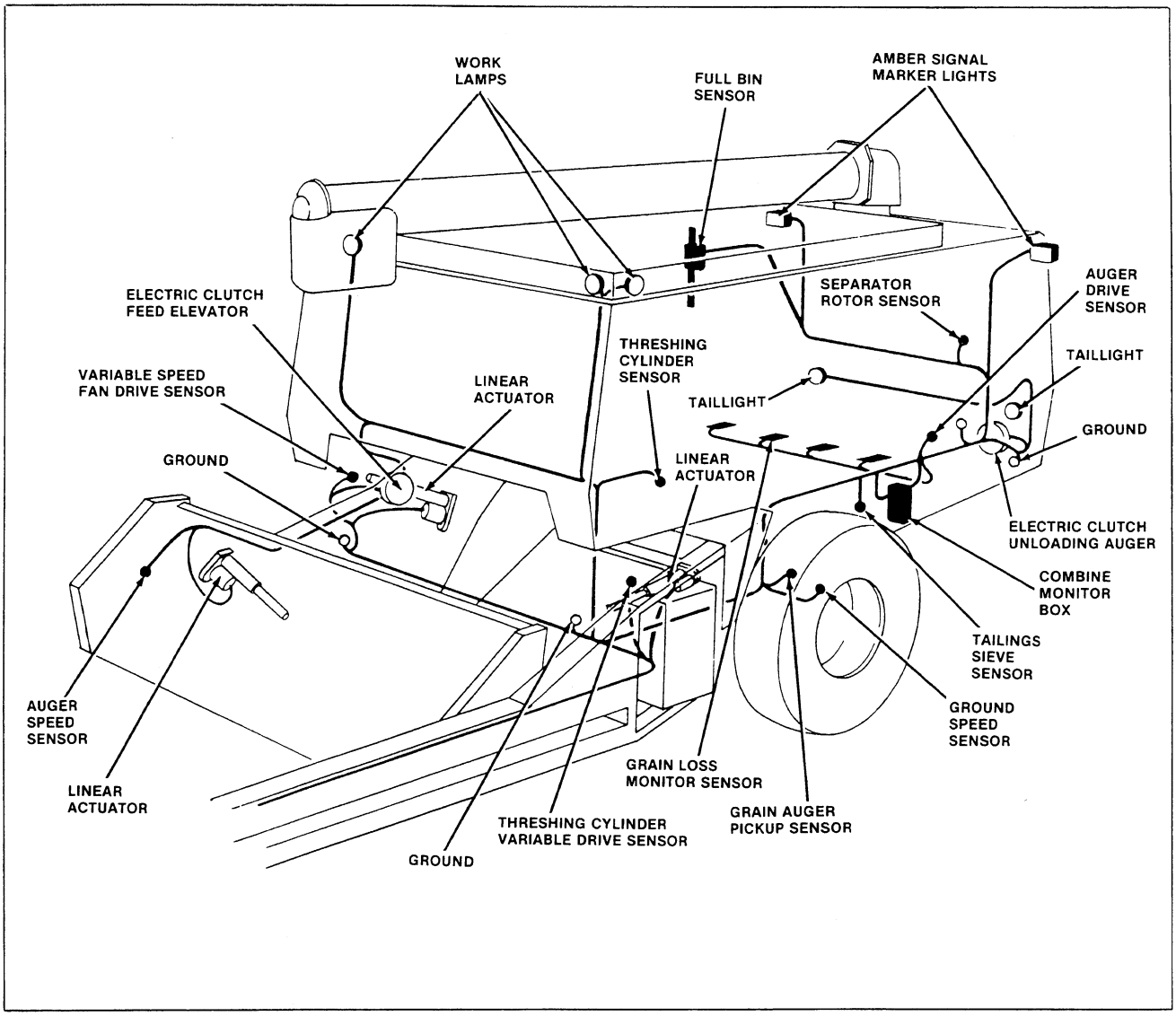
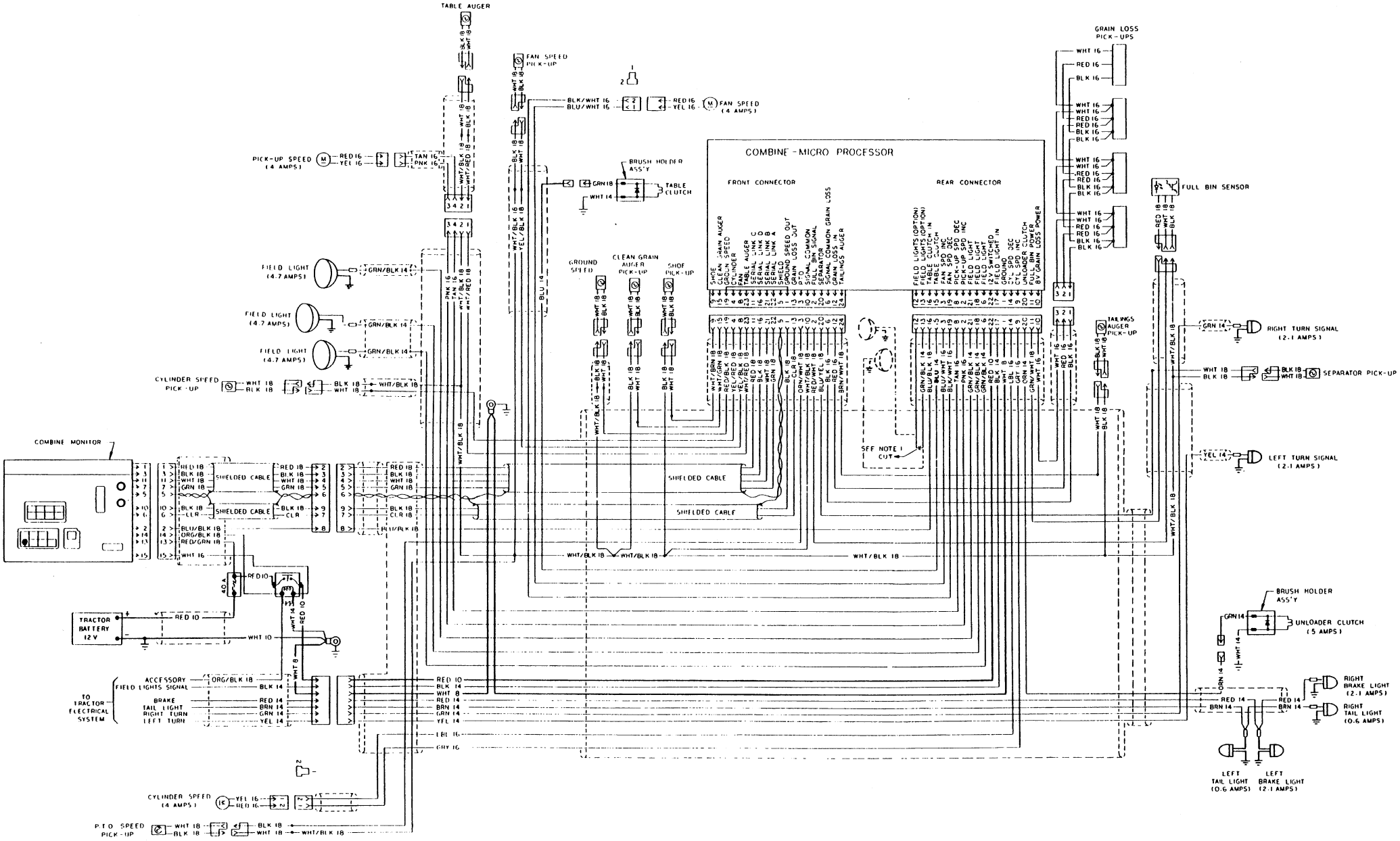


FIGURE 2-2: Electrical Components


COMBINE - MICRO PROCESSOR
FRONT CONNECTOR
REAR CONNECTOR
TABLE AUGER
FAN SPEED PICK-UP
FAN SPEED (4 AMPS)
PICK-UP SPEED (4 AMPS)
BRUSH HOLDER ASS'Y
TABLE CLUTCH
GROUND SPEED
CLEAN GRAIN AUGER PICK-UP
SHOE PICK-UP
GRAIN LOSS PICK-UPS
FULL BIN SENSOR
TAILINGS AUGER PICK-UP
FIELD LIGHT (4.7 AMPS)
FIELD LIGHT (4.7 AMPS)
FIELD LIGHT (4.7 AMPS)
CYLINDER SPEED PICK-UP
COMBINE MONITOR
SHIELDED CABLE
SHIELDED CABLE
SHIELDED CABLE
SEE NOTE 1 CUT
RIGHT TURN SIGNAL (2.1 AMPS)
SEPARATOR PICK-UP
LEFT TURN SIGNAL (2.1 AMPS)
BRUSH HOLDER ASS'Y
UNLOADER CLUTCH (5 AMPS)
RIGHT BRAKE LIGHT (2.1 AMPS)
RIGHT TAIL LIGHT (0.6 AMPS)
LEFT TAIL LIGHT (0.6 AMPS)
LEFT BRAKE LIGHT (2.1 AMPS)
TRACTOR BATTERY 12 V
40 A
TO TRACTOR ELECTRICAL SYSTEM
ACCESSORY FIELD LIGHTS SIGNAL
BRAKE TAIL LIGHT RIGHT TURN LEFT TURN
CYLINDER SPEED (4 AMPS)
P.T.O. SPEED PICK-UP

2 Electromagnetic Clutches

2.1 TESTING

1. Check fuse in combine monitor box. Replace if necessary. Refer to decal on combine monitor box door for fuse location.

2. Remove two screws from clutch magnet assembly and remove two elecrical connectors from magnet, noting position of connectors (Figure 2-3). Install screws.

3. Connect ohmmeter leads to screws and measure coil resistance. Resistance must be 2.6 ± 0.5 ohms or clutch magnet must be replaced.

IMPORTANT

Do not use a powered test lamp to test brushes assembly or diode may be damaged.

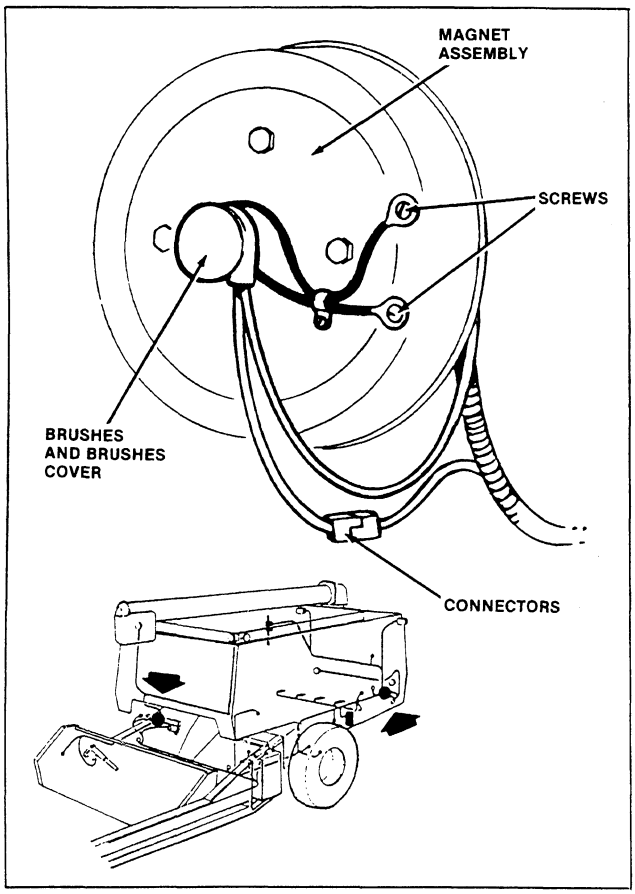


FIGURE 2-3: Electric Clutch

4. Remove and clean screws and connectors.

5. Install connectors and screws. Tighten securely.

6. Remove two screws from clutch brushes cover and remove cover.

7. Connect ohmmeter positive lead to brushes positive input terminal and negative lead to brushes negative input or output terminals. Resistance must be infinite or brushes diode is damaged and brushes assembly must be replaced.

8. Reverse ohmmeter leads attached in Step 6. Resistance must be less than 500 ohms or brushes assembly must be replaced.

9. Check circuit continuity between negative input and output terminals. If continuity is broken, brushes assembly or individual wires must be replaced.

IMPORTANT

Ensure continuity to ground is checked when checking circuit continuity.

10. Check circuit continuity between positive input and output terminals. If continuity is broken, brushes assembly or individual wires must be replaced.

11. Install electronic signal simulator to combine. Follow manufacturer's recommendations.

NOTE

Electronic signal simulator is required to test unloading auger clutch only.

12. Engage unloading auger override switch and listen for relay to "click", indicating relay is engaged. if relay does not "click", check LED beside relay. If LED is not lit, power is not reaching relay.

13. If LED is not lit, connect voltmeter probe to combine monitor rear harness; positive probe to pin 22 and negative to pin 1. If 12 (+ 2/ – 0) volts are present, combine monitor box is faulty and must be replaced.

14. If LED is lit, replace relay with another relay known to work. Repeat Step 11. If relay does not "click", combine monitor box is faulty and must be replaced. If new relay "clicks", replace old relay.

15. Check armature and magnet assemblies for scoring, pitting and galling. If these conditions exist, they may be repaired by machining the part.

IMPORTANT

Only machine part to a max. of 0.030 to remove damage.

2.2 TABLE CLUTCH

2.2.1 Disassembly

1. Disconnect and remove brushes assembly leads with open end wrench on slot between brushes assembly and clutch.

2. Remove clutch assembly with heavy duty gear puller.

3. Remove four flange screws securing magnet assembly to clutch (Figure 2-4). Remove magnet assembly.

4. Remove four capscrews, lockwashers and nuts securing remaining parts. Remove sprocket, outer hub, armature assembly and inner hub.

5. Remove internal and external snapring from outer hub and press bearing from hub.

2.2.2 Assembly

1. Chill bearings in deep freeze at -40° C (-40° F) for 1 hr.

2. Install bearings to outer hub and secure with internal and external snaprings (Figure 2-4).

3. Install sprocket and armature assembly to outer hub with four capscrews, lockwashers and nuts. Torque to 75 N·m (155 lbf ft).

4. Install magnet assembly to inner hub with four flange screws. Tighten securely.

5. Install inner hub and magnet assembly to outer hub. Ensure a gap of 1 to 2 mm (0.039 to 0.078 in.) exists between armature assembly and magnet assembly.

6. Press clutch on feeder drive gearbox shaft and install brushes assembly and leads to clutch.

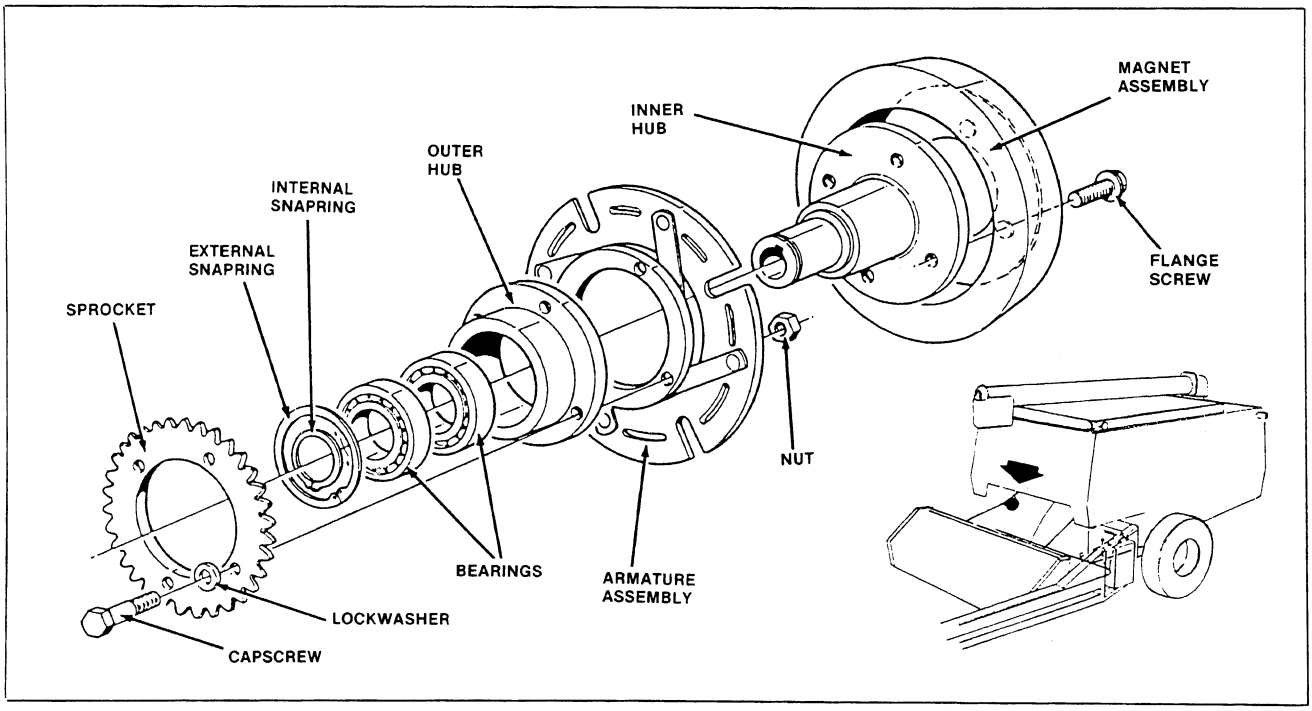


FIGURE 2-4: Table Clutch

2.3 UNLOADING AUGER CLUTCH

2.3.1 Disassembly

1. Remove brushes assembly leads and remove brushes assembly with open end wrench on slot between brushes assembly and clutch.
2. Remove unloading auger clutch from shaft with heavy duty gear puller.
3. Remove four flange screws securing magnet assembly to clutch (Figure 2-5). Remove magnet assembly.
4. Remove inner hub from clutch and remove four flange screws securing armature assembly to pulley.
5. Remove pulley from armature assembly.
6. Remove two snaprings and press two bearing from pulley.

2.3.2 Assembly

1. Chill bearings in deep freeze at -40° C (-40° F) for 1 hr.
2. Install bearing to pulley and secure with two snaprings (Figure 2-5).
3. Install armature assembly to pulley with four flange screws. Tighten securely.
4. Install inner hub to magnet assembly with four flange screws. Tighten securely.
5. Install inner hub to pulley and armature assembly ensuring a gap of 1 to 2 mm (0.39 to 0.078 in.) exists between magnet and armature assemblies.
6. Press clutch on unloading auger driveshaft and install brushes assembly and leads to clutch.

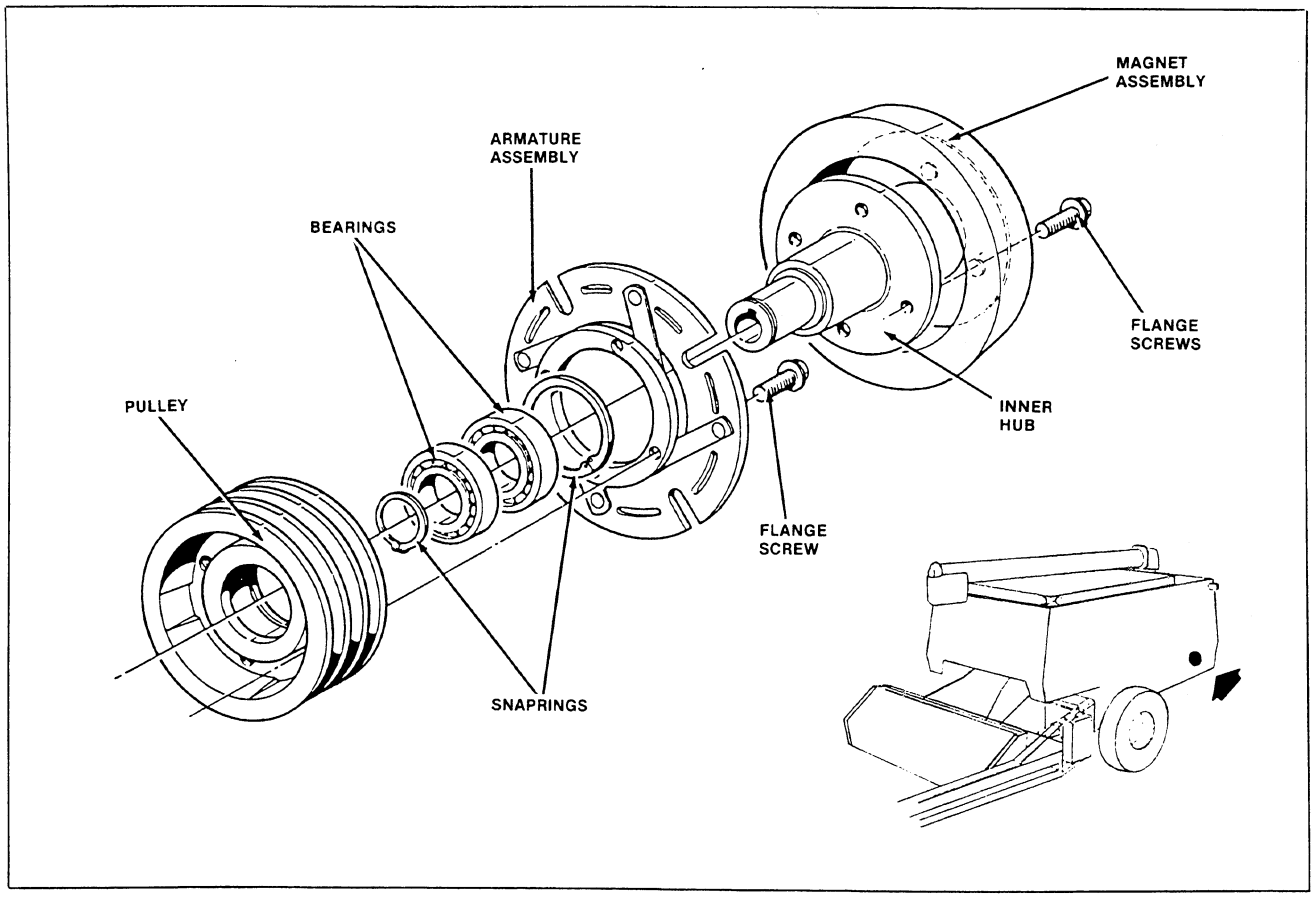


FIGURE 2-5:Unloading Auger Clutch

3 Lights

3.1 TESTING

The combine is equipped with three field lights with wiring provided for two additional 60 W lamps. The field lighting circuit is routed through the combine monitor box on the combine left side.

The brake, hazard and taillights are routed directly from the tractor electrical system through the trailer connector. The combine field lights are engaged automatically when the tractor field lights are turned on.

1. Check field light fuse in combine monitor box.
2. Check for burnt out lamps.
3. Check circuit for continuity.
4. Ensure lamp body is properly grounded.
5. **Field Lights Only:** Open monitor box on combine left side and have a helper engage and disengage field lights several times. Field lights relay should "click", as lights are engaged. If relay does not "click", observe LED beside relay. If relay is not lit, power is not reaching relay.

NOTE

Tractor keyswitch and field lights must be ON for combine field lights to work.

6. If LED is not lit, connect voltmeter to monitor box rear harness, positive probe to pin 22 and negative probe to pin1. If 12 (+2/–0) 2 volts are present, combine monitor box is faulty and must be replaced.
7. If LED is lit, replace relay with another relay known to be working. Repeat Step 4. If relay does not "click", combine monitor box is faulty and must be replaced. If new relay "clicks", replace old relay.

3.2 FIELD LIGHTS

3.2.1 Replacement

1. Disconnect plug from sealed beam lamp to combine wiring harness (Figure 2-6).
2. Pry lamp from rubber housing with a piece of stiff plastic or wood.

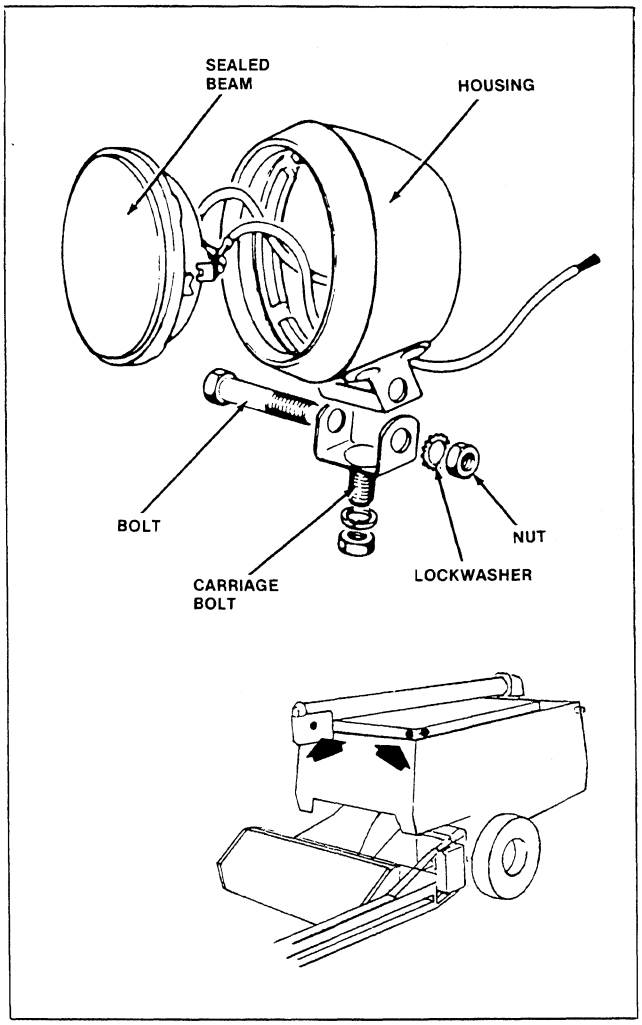


FIGURE 2-6: Field Light

3. Press lamp into rubber housing.
4. Connect plug from lamp to combine wiring harness.

3.3 WARNING LIGHTS

3.3.1 Replacement

1. Remove screws securing lens to lamp body. Remove lens (Figure 2-7). Replace lens if necessary.

2. Push bulb in and turn. Remove bulb.

3. Push new bulb in and secure by turning and releasing bulb.

4. Install lens to lamp body with screws. Do not overtighten or lens may be damaged.

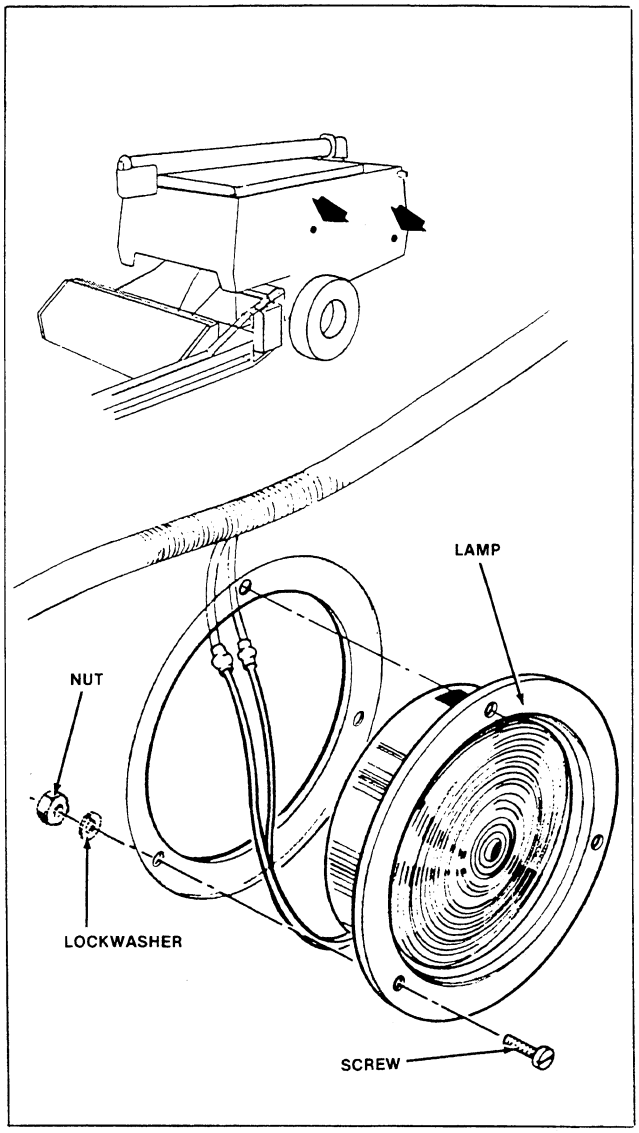


FIGURE 2-7: Taillight

4 Linear Actuators

4.1 TESTING

1. Check fuses in combine monitor box.

2. Check circuit for continuity with multimeter.

3. Connect a wire from the positive terminal of a 12 volt battery to linear actuator red lead wire and a wire from negative battery terminal to actuator yellow lead wire with a 15 amp circuit breaker connected in series. Linear actuator should extend or actuator is faulty and must be repaired or replaced (Figure 2-8).

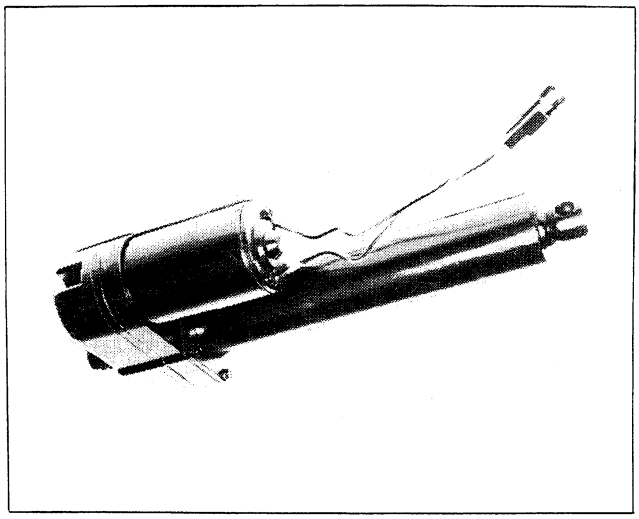


FIGURE 2-8: Linear Actuator

4. If circuit breaker trips while actuator is extending or retracting, check actuator wiring for faults.

5. Reverse battery terminal wires installed in Step 2. Linear actuator should retract or actuator is faulty and must be repaired or replaced.

6. Listen to linear actuator during extension and retraction. Sound should be steady and smooth with no grinding noises. If grinding noises occur, actuator gears may be damaged and require replacement.

7. Linear actuator motor must extend or retract actuator smoothly, without straining or motor may be worn and require replacement.

4.2 DISASSEMBLY

NOTE

All linear actuators are serviced the same way.

1. Remove clevis pins and cotterpins securing linear acutator to combine. Remove plug from actuator electric motor wires and remove linear actuator.

2. Remove four flange screws securing cover tube retaining plate to linear actuator rear housing and remove plate and cover tube (Figure 2-9).

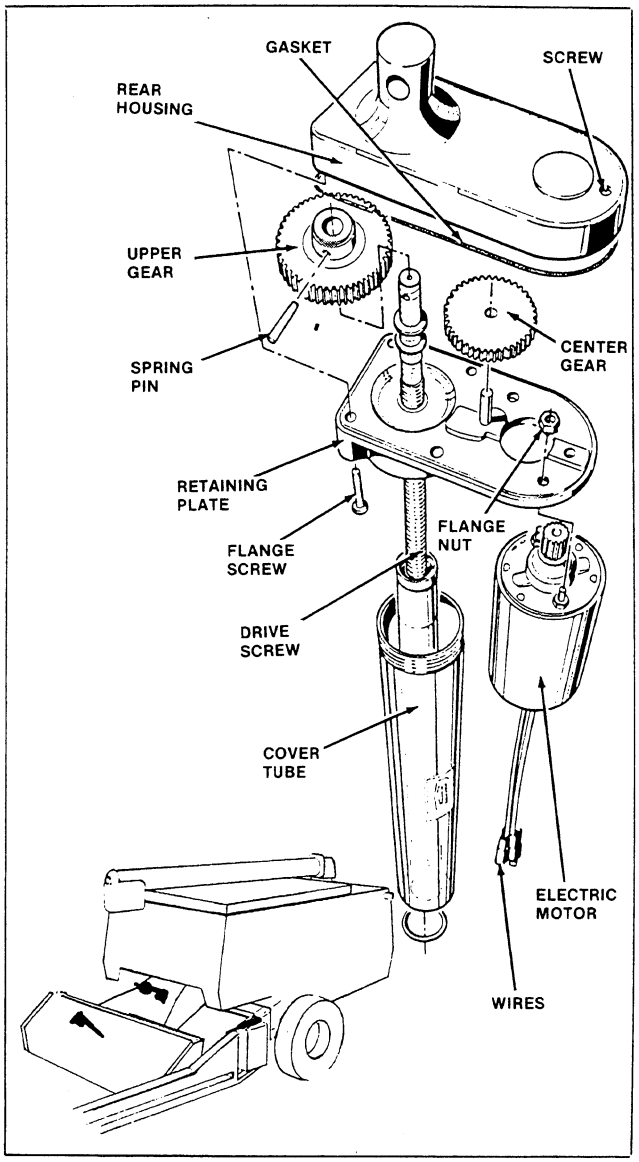


FIGURE 2-9: Linear Actuator

3. Remove screw on actuator rear housing and remove rear housing. Discard gasket.

4. Remove center gear from actuator and remove spring pin securing actuator upper gear. Remove upper gear.

5. Remove two flange nuts securing electric motor to actuator front housing and remove motor.

4.3 INSPECTION

1. Check gears for broken, worn or pitted teeth. Replace gears showing any of these conditions.

2. Check housings for cracks or warpage. Replace if necessary.

3. Check actuator drive screw for damaged or worn threads. Replace if necessary.

4.4 ASSEMBLY

1. Install electric motor to linear actuator with two flange nuts (Figure 2-9). Tighten securely.

2. Smear gears with multipurpose grease and install gears to actuator front housing. Secure top gear with spring pin.

3. Install actuator rear housing and gasket to front housing with screw. Tighten securely.

4. Install cover tube to actuator front housing and secure with cover plate and four flange screws. Tighten securely.

5. Install linear actuator to combine with two clevis pins and cotterpins.

6. Connect plug on wires from actuator electric motor to combine wiring harness.

5 Monitor System

5.1 MONITOR CIRCUITS

5.1.1 Testing

Power for the combine monitor system originates from the tractor electrical system and is controlled by the tractor keyswitch and the rear receptacle panel. The panel contains a sealed 40 amp circuit breaker, 1 amp diode, nine-pin plug, solenoid and a trailer connector. The panel is responsible for constant power for the monitor memory and switched power for remaining monitor functions. A serial link provides communication between the monitors and is routed from the receptacle panel nine-pin connector to the combine monitor box. If serial link is faulty, a "NO-LINE" message will appear on the cab monitor.

The cab monitor and combine monitor box are non-serviceable. If all circuits check out and faults point to a monitor, contact one of the following authorized service centers.

O'Donnel Griffin, Service Div.
252 Clifton Hill
Victoria 3068, Australia

Farmtronics
179 Trifunov Crescent
Regina, Saskatchewan
S4R 7C8

TRW Eagle Controls Div.
1405 W. Fullerton
Addison, Illinois
60101

1. Check that tractor electrical system is working and batteries are fully charged.

NOTE

Tractor battery terminal connections must be clean and secure and tractor electrical system must be functioning properly or monitor may malfunction. Never operate combine with tractor battery cables disconnected or monitor may be damaged.

2. Check tractor and combine fuses and ensure connections are secure and properly connected.

3. Check circuits between tractor and monitor for continuity. Ensure connectors are clean and fully connected.

4. Check fuses in combine monitor box on combine left side and cab monitor side.

5. Have a helper turn tractor keyswitch to ignition position. Listen to solenoid on receptacle panel, if solenoid does not "click", solenoid coil is faulty and solenoid must be replaced.

NOTE

It is not necessary to start tractor.

6. With tractor keyswitch on, connect voltmeter between two largest solenoid terminals and ground. Voltage at each terminal must be 12 (+2/−0) volts or solenoid internal contacts are faulty and solenoid must be replaced (Figure 2-10).

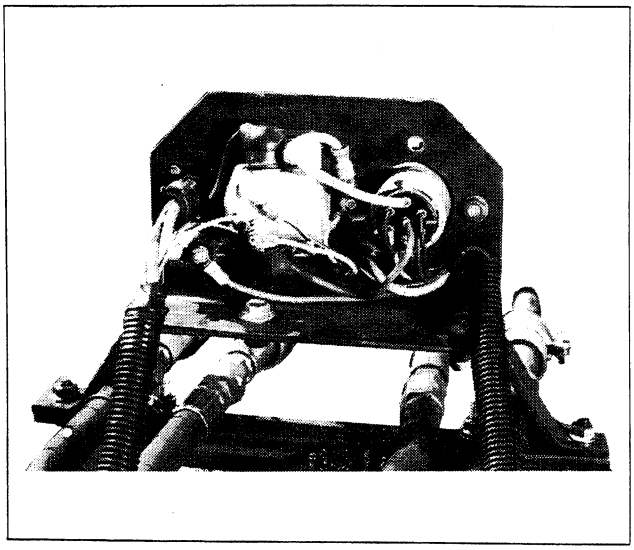


FIGURE 2-10: Combine Electrical Panel

7. Disconnect diode from receptacle panel and connect ohmmeter to diode, observe reading and reverse ohmmeter leads. Observe second reading. Resistance must be infinite for one reading and near zero for the second or diode is faulty and must be replaced.

8. If a "NO LINE" message appears on the cab monitor, check continuity of circuits between cab monitor and combine monitor box routed through nine-pin connector.

9. Install electronic signal simulator to combine. Follow manufacturer's recommendations.

10. Open combine monitor box and check operation of override switches. Refer to decal on monitor box door.

11. Listen to relays as they are activated. If relay does not "click", indicating circuit engagement, check LED beside relay.

12. If LED is not lit, disconnect rear harness to monitor box and install voltmeter to harness from tractor end. Install negative probe to pin 1 and positive probe to pin 22. If reading is 12 (+2/−0) volts, combine monitor box is faulty and must be replaced.

13. If 12 (+2/−0) volts is not present, check circuit continuity from monitor box to cab monitor and check tractor electrical system.

14. Connect a 12 volt test light to contacts on receptacle panel circuit breaker. Power should be available at both terminals on breaker.

15. If power is not available at both terminals, fault lies in tractor electrical system.

16. If power is available at only one terminal, wait for 5 min. and check again. If power is available after wait, fault has tripped circuit breaker. Check circuits for faults.

17. If after wait, power has not been restored to both terminals, circuit breaker is faulty and must be replaced.

6 Sensors

6.1 FULL BIN SENSOR

6.1.1 Testing

1. Install electronic signal simulator to combine. Follow manufacturer's recommendations.

2. Fully obstruct electronic eye in hollow of full bin sensor (Figure 2-11). Monitor display should read "FULL BIN".

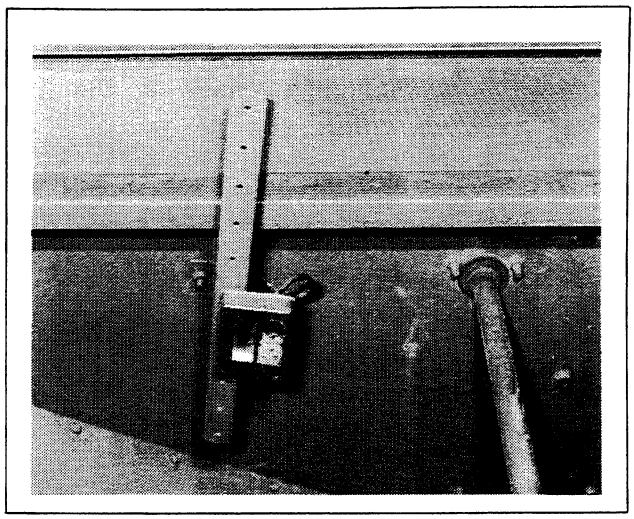


FIGURE 2-11: Full Bin Sensor

3. Connect voltmeter to green/white sensor power supply wire. Reading should be 12 volts or power is not reaching sensor.

4. If no power is available to sensor, check sensor circuit continuity.

NOTE

Ensure tractor battery connections are clean and secure.

5. If power is available to sensor, connect voltmeter to red/white sensor signal wire. Voltage should be zero with electronic eye obstructed and 5 volts with electronic eye open or sensor is faulty and must be replaced.

6.1.2 Replacement

1. Disconnect plug on full bin sensor leads (Figure 2-11).

2. Remove two wing nuts securing sensor to mounting bracket and remove sensor.

3. Install new sensor to desired level holes on mounting bracket and secure with two wing nuts.

4. Connect plug on sensor leads to combine wiring harness plug.

5. Test sensor operation.

6.2 GRAIN LOSS SENSORS

6.2.1 Testing

1. Set grain loss monitor to minimum sensitivity and have a helper tap grain loss sensor pad with finger (Figure 2-12). Monitor LED bargraph should jump from top to bottom and back.

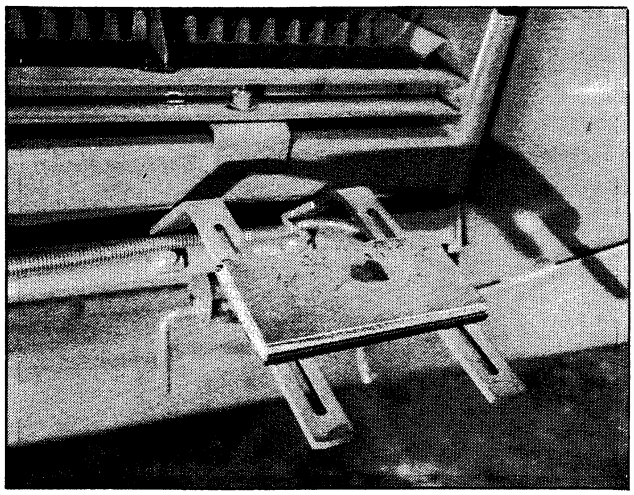


FIGURE 2-12: Grain Loss Monitor

2. If bargraph does not respond, connect voltmeter to grain loss sensor white power wire. Reading should be 8 volts or power is not reaching sensor.

3. If power is not reaching sensor, test circuit for continuity with multimeter.

IMPORTANT

Ensure tractor battery terminals are clean and secure.

4. If power reaches sensor, connect voltmeter to sensor red signal wire and black signal common wire. Drop seed on sensor pad from 25 cm (10 in.). Voltage should read between 1 and 5 volts or sensor is faulty and must be replaced.

6.2.2 Replacement

1. Remove nuts and lockwashers securing wires to grain loss sensor. Note position of wires and remove sensor (Figure 2-13).

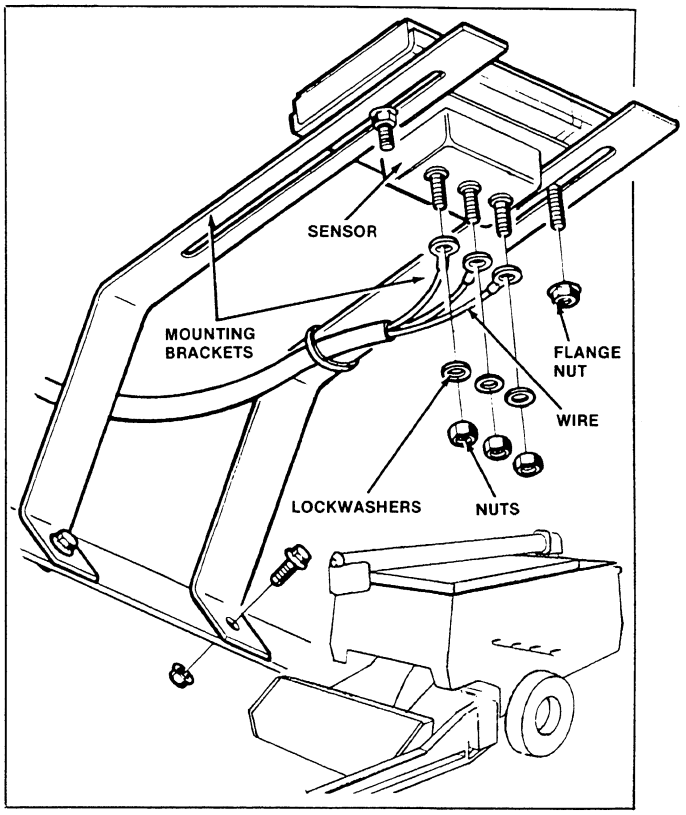


FIGURE 2-13: Grain Loss Sensor Pad Electrical Hook-up and Mounting

2. Remove two flange nuts securing sensor to mounting bracket and remove sensor.

3. Install new sensor to mounting bracket with two flange nuts. Tighten securely.

4. Install wires to positions noted in Step 1 and secure with lockwashers and nuts.

6.3 SHAFT SPEED SENSORS

6.3.1 Testing

The shaft speed sensors are magnetic pickups which measure shaft rotation speeds by counting the operating r/min of a holed disc, gear tooth, or shaft arm connected to a shaft. The discs and sensors measure the following shaft cylinder; clean grain auger; fan ground speed; PTO; separator; shoe; table auger and tailings auger.

1. Check sensor circuit for continuity with multimeter.

2. Check sensor resistance with ohmmeter. Resistance must be 470 ± 50 ohms or sensor is faulty and must be replaced.

3. Check clearance between sensor and disc. Clearance must be 2 mm (0.08 in.). Adjust by loosening two flange screws and sliding sensor into position and tightening flange screws (Figure 2-14).

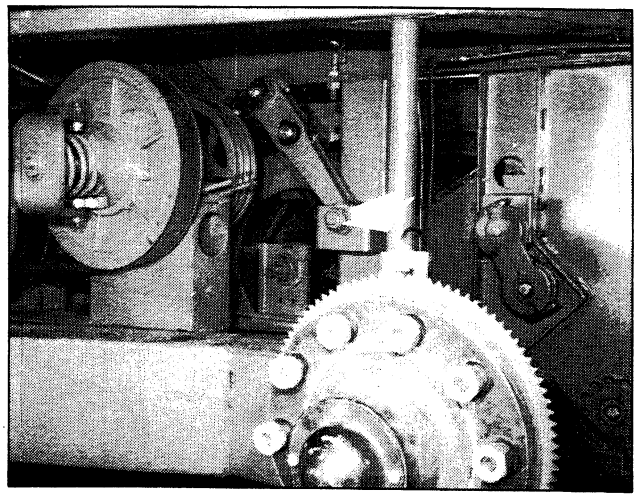


FIGURE 2-14: Ground Speed Sensor

4. **Cylinder and Fan Speed Circuits Only:** Install electronic signal simulator to combine. follow manufacturer's recommendations.

5. Engage override switches in combine monitor box and listen for relay to "click" indicating relay is engaged. If relay does not "click", check LED beside relay. If LED is not lit, power is not reaching relay.

6. If LED is not lit, connect voltmeter positive probe to combine monitor box rear harness pin 22 and negative probe to pin 1. If 12 (+2/−0) bolts are present, combine monitor box is faulty and must be replaced.

7. If LED is lit, replace relay with another relay known to be working. Repeat Step 4. If relay does not "click", combine monitor box is faulty and must be replaced. If new relay "clicks", replace old relay.

8. Check linear actuator. Refer to Para 4.1.

6.3.2 Replacement

NOTE

All shaft speed sensors except for ground speed are replaced the same way.

1. Disconnect plug on sensor wires (Figure 2-14).

2. Remove two flange screws securing sensor to mounting bracket and remove sensor.

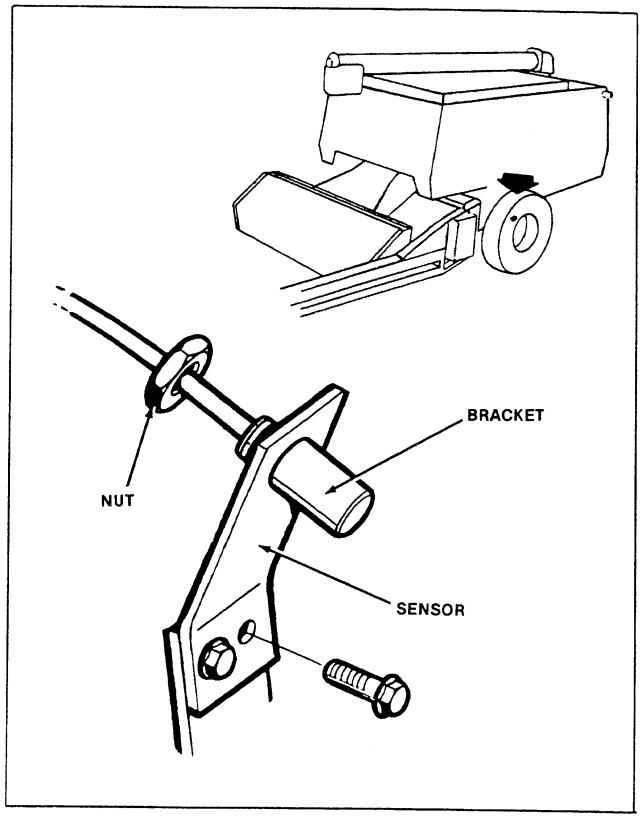


FIGURE 2-15:Ground Speed Sensor Mounting

3. Install new sensor to mounting bracket with two flange screws ensuring clearance between disc and sensor is 2 mm (0.08 in.). Tighten flange screws securely.

4. Connect plug on sensor wires to combine wiring harness.

5. **Ground Speed Sensor Only:** Disconnect plug on sensor wires.

6. Remove nut securing ground speed sensor to mounting bracket and remove sensor (Figure 2-15).

7. Install sensor to mounting bracket with nut so clearance between sensor and disc is 2 mm (0.08 in.). Tighten nut securely.

SECTION 3: HYDRAULIC SYSTEM

Table of Contents

SECTION 3: HYDRAULIC SYSTEM

1 Introduction

1.1 HYDRAULIC SCHEMATICS

Refer to Figure 3-1.

1.2 COMPONENT LOCATION

Refer to Figure 3-2.

2 Plumbing

2.1 LINES, HOSES AND FITTINGS

1. Relieve hydraulic pressure and disconnect combine from tractor hydraulic system before disconnecting any hydraulic lines or hoses.
2. Have a container ready to drain lines, hoses or components being disconnected.
3. Use a backing wrench when disconnecting hose or line fittings.
4. Use Loctite pipe thread sealant with teflon when installing tapered pipe thread fittings.
5. Inspect hoses and lines for wear and damage. Replace worn or damaged hoses or lines immediately.
6. Protect hoses or lines running through frames with coil sleeves or grommets to prevent damage.

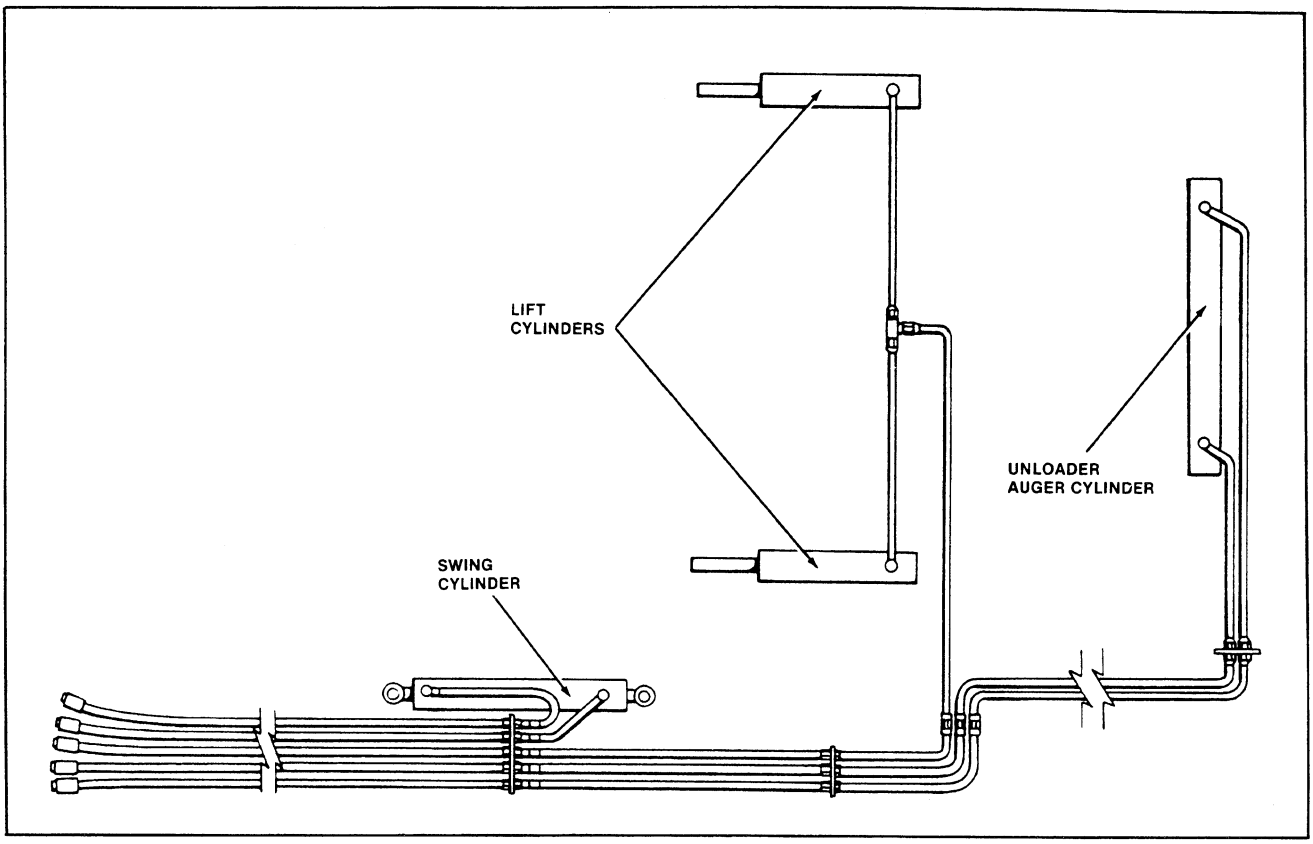


FIGURE 3-1: Combine Hydraulic Circuit

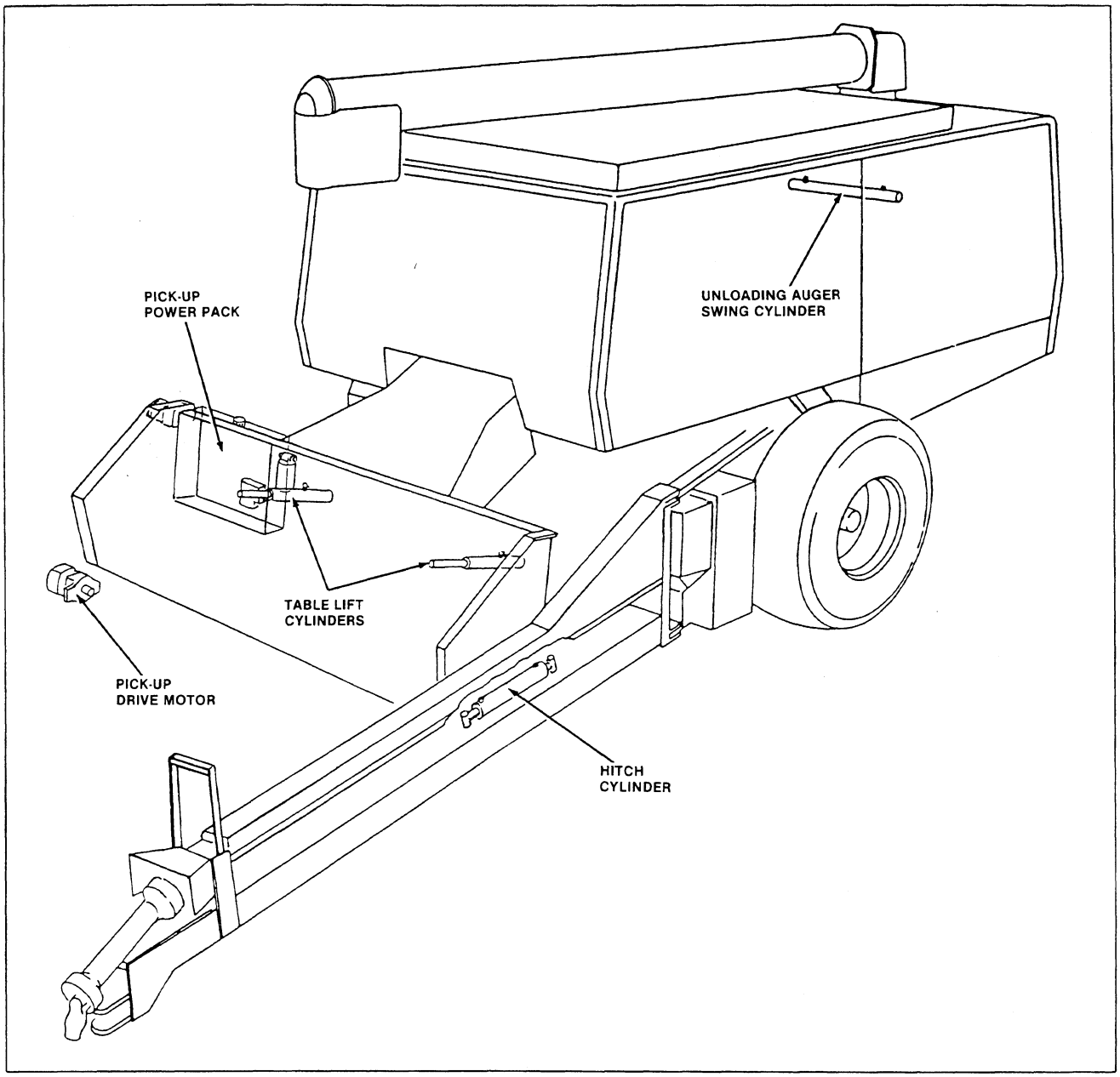


FIGURE 3-2: Hydraulic Component Location

3 Cylinders

3.1 HITCH SWING CYLINDER

3.1.1 Removal

1. Relieve hydraulic pressure and disconnect combine from tractor hydraulic system.
2. Remove fitting on hydraulic lines to hitch swing cylinder and plug hydraulic lines (Figure 3-3).
3. Remove cotterpin from cylinder retaining pin at cylinder rod end and remove pin.
4. Remove two locknuts, washers, spacers and pivot arm hitch pin from cylinder barrel end and remove cylinder.
5. Drain oil from cylinder.

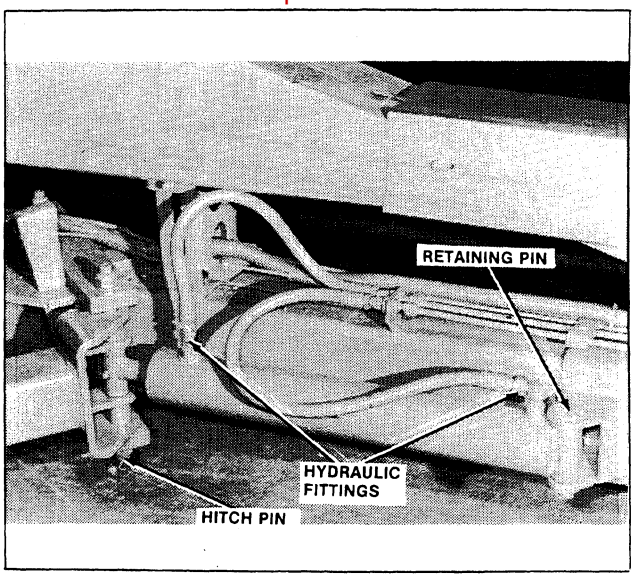


FIGURE 3-3: Hitch Swing Cylinder Removal

3.1.2 Overhaul

1. Remove head plate from cylinder rod end and pull rod assembly from cylinder (Figure 3-4).

2. Remove self-locking nut from rod and remove piston and seals.

3. Examine parts for wear and damage and replace parts if necessary.

4. Lubricate new seals with clean hydraulic oil and install seals and piston to rod. Tighten piston self-locking nut securely.

5. Install rod assembly to cylinder barrel and tighten cylinder head plate securely.

3.1.3 Installation

1. Install hitch swing barrel end to combine cross member assembly with pivot arm hitch pin, two spacers, washers and locknuts. Torque locknuts to 265 N·m (196 lbf ft); Figure 3-3.

2. Install cylinder rod end to combine tongue assembly with cylinder hitch pin and cotter-pin.

3. Fill cylinder at barrel end port with Dexron II transmission oil.

4. Install hydraulic hoses to cylinder. Coat fittings with Loctite pipe thread sealant with teflon and tighten fittings securely.

5. Connect combine to tractor hydraulic system and operate hitch swing cylinder. Bleed air from cylinder and check for leaks.

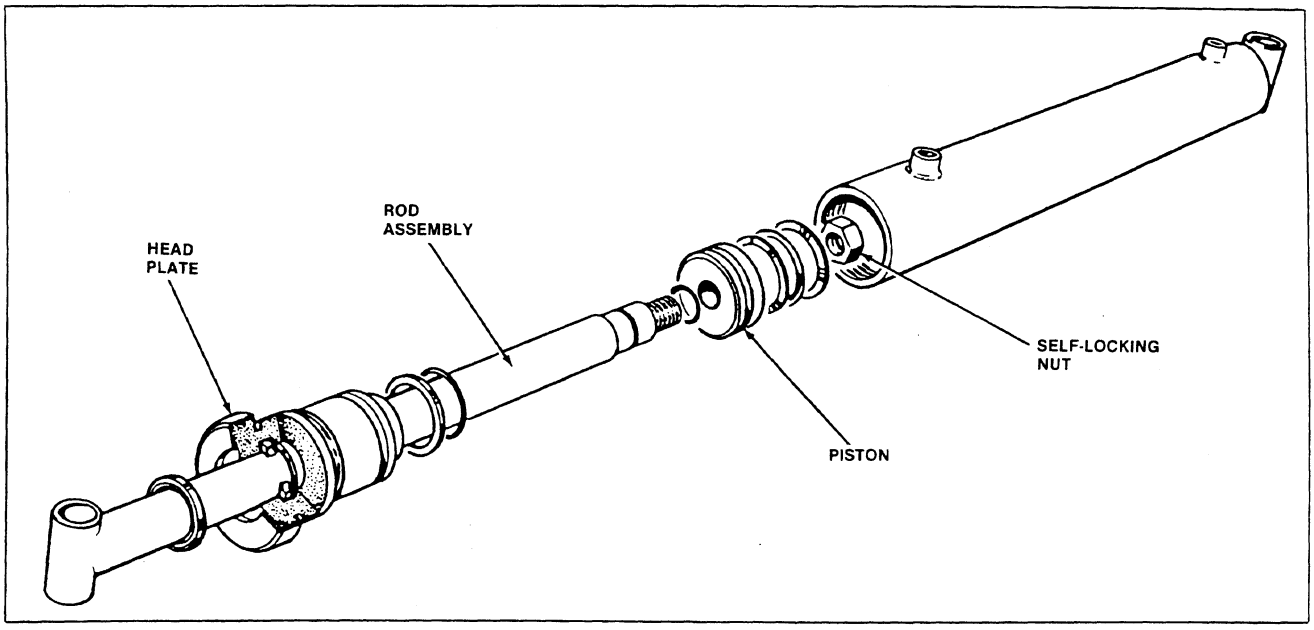


FIGURE 3-4: Hitch Swing Cylinder Disassembly