FORD

RIDING MOWER TRACTOR

MODELS: **09GN-2051/2052/2053**

40205130

REPAIR MANUAL

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RIDER MOWER TRACTORS R8 & R11 (Model 09GN-2051/2052/2053) **PAGE**

IMPORTANT: The replacement of any part on this product by other than the manufacturer's authorized replacement part may adversely affect the performance, durability or safety of this product.

The manufacturer reserves the right to make changes on and to add improvements upon its products at any time without notice or obligation. The manufacturer also reserves the right to discontinue manufacture of any product at its discretion at any time.

Notice to Serviceman in the State of California — The engine on this unit is NOT equipped with a spark arresting muffler.

IMPORTANT: USE OR OPERATION OF THIS ENGINE ON ANY FOREST COVERED, BRUSH COVERED, OR GRASS COVERED LAND WITHOUT A STATE APPROVED SPARK ARRESTOR IN EFFECTIVE WORKING ORDER CONSTITUTES A VIOLATION OF THE LAW OF THE STATE OF CALIFORNIA.

REAR ENGINE RIDER

INTRODUCTION

This manual contains service and maintenance instructions for Rear Engine Riders.It has been prepared to provide the information the serviceman needs to correctly service and maintain a rear engine rider. All sections of this manual should be carefully studied by the serviceman before beginning to work on the rider.

ALL WARNINGS used throughout this manual should be heeded and followed very closely. Failure to obey these rules could result in personal injury or death to yourself or others.

All references made to the left side, right side, front and rear are given from the operator's position.

SAFETY

Safety is No Accident . . . . . Be Alert!

This symbol is used to attract your attention to the safety precautions that should be understood by the servicemen to avoid accidents.

Please read and follow these instructions on safety procedures before servicing the rider.

PERSONAL CONSIDERATIONS

1. Never let shop rags, used for cleaning, lay around to become fire hazards.
2. Always use safety glasses when servicing or inspecting the rider.
3. Do not wear loose fitting clothing that might get caught in moving parts. Also, keep hands and feet away from moving parts.
4. Be certain that the work bench or support being used is strong enough. The weight of the part plus the force applied to it during assembly or disassembly may put a great strain on the bench or support.
5. Use jack stands or blocks to hold up the unit in any potentially dangerous positions required for access. Do not rely only on jack for support.

EQUIPMENT CONSIDERATIONS

1. Always disconnect spark plug wire and secure away from spark plug. This **must** be performed every time any servicing is done and will prevent accidental starting of engine.
2. Always store gasoline or flammable solvents used for cleaning in closed containers specifically designed for that purpose.
3. Before cleaning, servicing or inspecting rider, make certain all moving parts have stopped and engine and exhaust assemblies have cooled down.
4. Never operate rider without proper guards, plates or other safety protective devices in place.
5. Never store rider with gasoline in the tank inside a building where fumes may reach an open flame or spark. Allow engine to cool before storing in any enclosure.
6. Disengage power to attachment(s) and stop engine before servicing, repairing or making any adjustments.
7. Disengage power to attachment(s) when transporting or not in use.
8. Take all possible precautions when leaving the vehicle unattended, such as disengaging the power-take-off, lowering the attachment, shifting into neutral, setting the parking brake, stopping the engine and removing the key.
9. Do not change governor setting or over speed the engine.
10. Be certain that any part being removed is properly supported or held to prevent injury or damage.

OPERATIONAL CONSIDERATIONS

1. Do not start or run the engine indoors. Fumes from engine exhaust can kill.
2. Disengage all clutches and place gear shift lever in neutral before attempting to start engine.
3. Be sure that all parts are securely fastened before starting rider.
4. Be sure all tools and cleaning materials are removed before starting rider.
5. If the equipment should start to vibrate abnormally, stop engine and check immediately for the cause. Vibration is generally a warning of trouble.
6. If test running is required, make sure you are thoroughly familiar with the complete operation of the rider. Know how to stop the rider.
7. Never operate machine at high transport speeds on slippery surfaces. Use care when backing.
8. Never operate without good visibility or light.

Whenever you see this symbol  **it means:**
ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

IDENTIFICATION PLATE LOCATION:

The rear engine rider model and serial number identification plate is located on left side of main frame just behind mower deck lift lever. (Fig. 1)

Refer to engine manufacturer's engine literature for location of engine model and serial number.

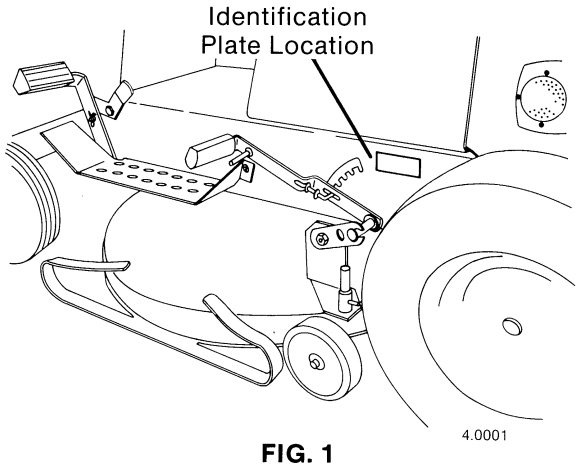


FIG. 1

LUBRICATION AND MAINTENANCE

LUBRICATION:

1. Engine - Check engine oil level before each engine operation. Change engine oil every 25 operating hours. Consult engine manufacturer's service manual for all lubrication and maintenance specifications.
2. Front Wheels - Grease with NLGI Grade 2 Lithium base EP grease (Ford 1T-M1C137-B), every 25 operating hours. (Fig. 2)

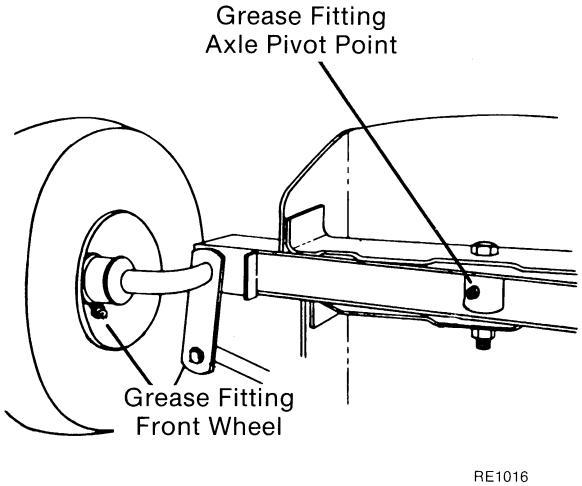


FIG. 2

3. Front Axle Pivot Point - Grease with NLGI Grade 2 Lithium base EP grease (Ford 1T-M1C137-B), every 25 operating hours. (Fig. 2)
4. Mower Deck Gauge Wheels - Oil shaft liberally, turning wheels to work oil in every 25 operating hours with SAE 30 oil. (Fig. 3)

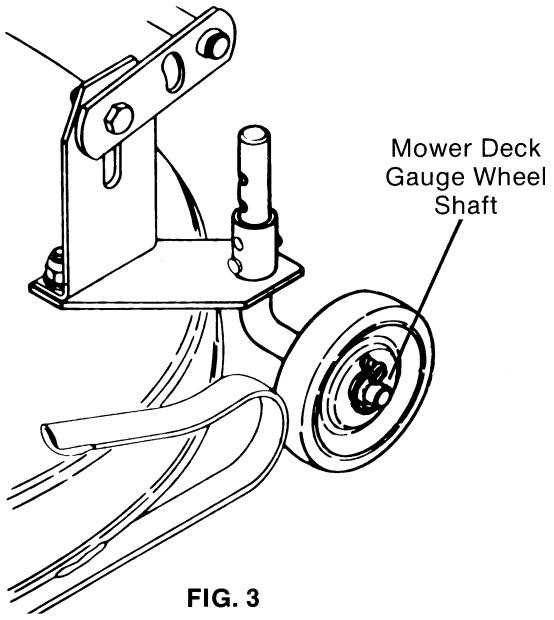


FIG. 3

5. All Other Pivot Points - Clean all pivot points and linkages and oil with SAE 30 oil every 25 operating hours.
6. Transmission and Differential - The transmission and differential are filled for life and should not require additional lubrication. Make periodic visual inspections for damage or leaks every 100 operating hours. If damage or leaks occur, consult transmission or differential manufacturer's service manual for proper lubrication and maintenance specifications. (transmission lubricant type - E.P. Lithium Grease, 12 ounces).

MAINTENANCE:

1. General - Make a visual inspection for loose or damaged parts. Damaged parts should be repaired or replaced.
2. Battery - Terminals should be tight and free of corrosion. Retainer rod should be snug over battery. Top of battery should be clean and dry. Check level of electrolyte. Add clean distilled water as needed.
3. Belts - Inspect for cracking, excessive wear and for proper tension. Refer to "ADJUSTMENTS AND SERVICING" section.
4. Tire Pressures - Recommended pressure for both front and rear tires is 14 p.s.i.

ADJUSTMENT AND SERVICING

ENGINE:

1. Refer to Engine Manufacturer's Service Manual for all adjustments and servicing information.
2. Maximum engine RPM high speed operation no load range is 3400 RPM to 3600 RPM.
3. **Engine Removal —**

WARNING: To avoid accidental starting, remove spark plug wire and secure away from spark plug.

A. Set parking brake and drain gas from fuel tank if tank is more than half full.

B. Turn ignition key "OFF". Remove battery retainer rod from battery and slide battery forward.

WARNING: To avoid burns, be careful not to short the positive (+) terminal of battery to the rider when removing from mounting.

C. Disconnect both battery cables from battery. Disconnect negative (-) terminal **first**. Remove battery from rider.

D. Disconnect throttle cable at engine, by loosening throttle cable clamp screw enough so that cable can be removed. Disconnect cable end from throttle speed control block. (Fig. 4)

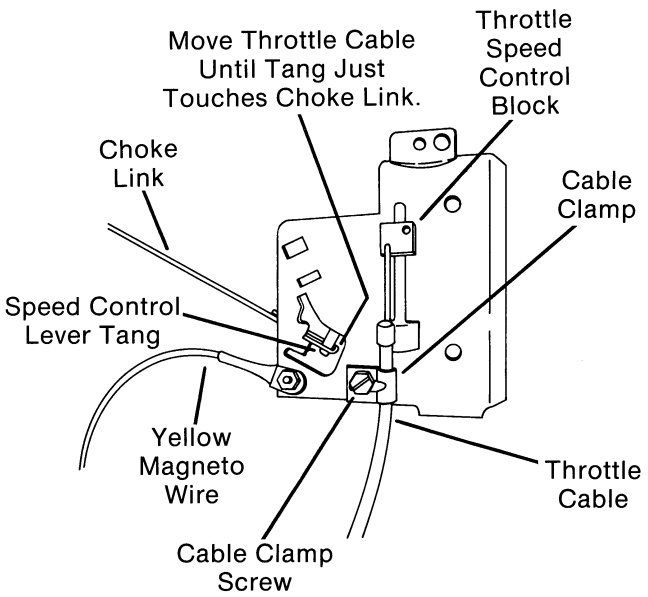


FIG. 4

E. Disconnect yellow wire to magneto at left rear corner of engine next to throttle cable clamp screw. (Fig. 4)

F. (Electric start only) Disconnect red starter wire and red alternator wire at connector at right rear corner of engine. (Fig. 5)

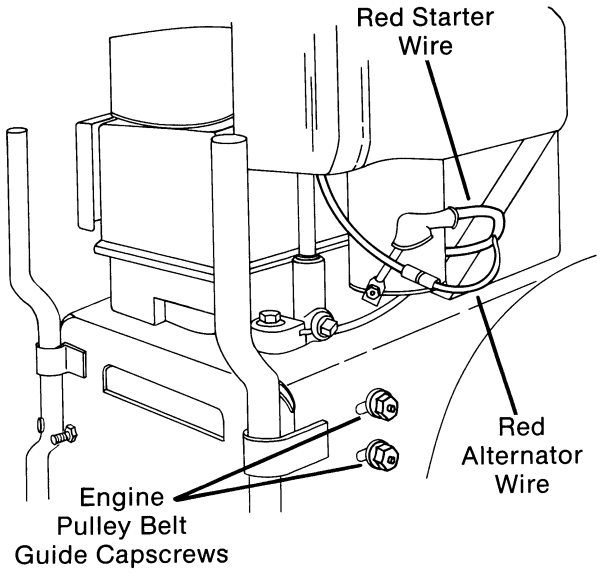


FIG. 5

WARNING: To avoid personal injury when raising or lowering the rear engine rider, make sure you are capable of handling the weight. When in doubt get assistance.

G. Raise front of rider up and stand on rear support bars. (Fig. 6)

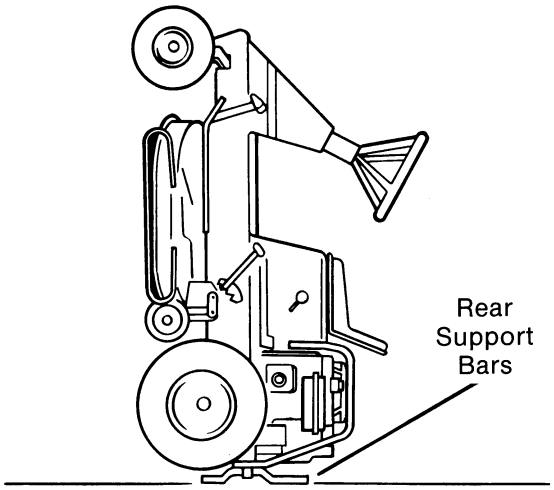


FIG. 6

H. Remove carriage bolts, washers and locknuts securing engine pulley belt guide and remove belt guide. (Fig. 5)

I. With mower drive lever disengaged, remove drive belt from engine pulley.

J. Remove nut securing traction drive idler pulley to idler bracket and remove pulley. (Fig. 7) Slip traction drive belt off engine pulley towards bottom of engine.

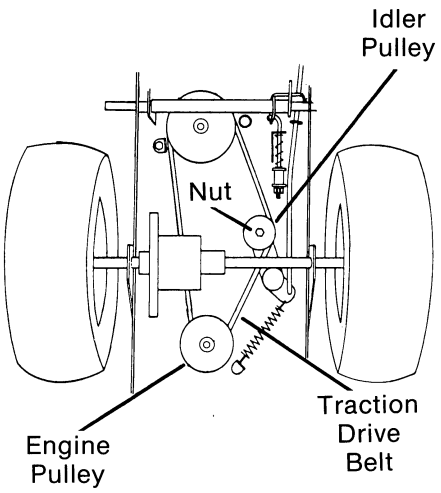


FIG. 7

K. Lower front of rider back to the ground.

L. Remove four bolts, locknuts and star washers securing engine to main frame.

M. Lift engine slightly and move forward. Reach under rear of main frame and remove traction drive belt from engine pulley.

N. Lift engine off main frame.

NOTE: Observe location and quantity of engine spacing washers under each mounting location.

O. Remove engine pulley capscrew and remove engine pulley from crankshaft.

P. To replace engine, reverse above procedure until you reach the point of connecting the throttle control cable. Then follow this adjustment procedure: Move throttle control lever up to the "FULL FAST" position (which is the detent before "START" position is reached). (Fig. 8) Attach end of throttle control cable to throttle speed control block and slip cable under cable clamp. Push throttle cable up until tang on speed control lever just touches choke link, as shown in (Fig. 4). Tighten cable clamp screw.

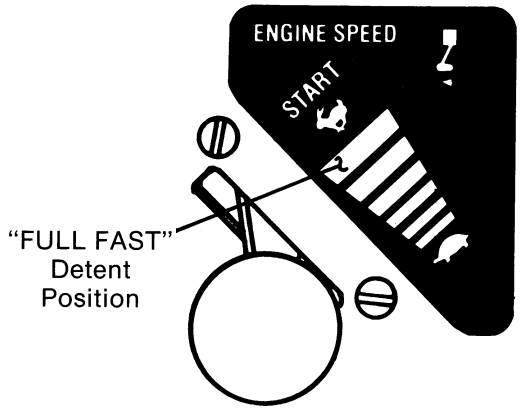


FIG. 8

NOTE: Also check mower drive belt adjustment per procedures under "BELTS".

Add gas and oil (if **new** engine) as prescribed by engine manufacturer. Start and test engine to insure that when throttle control lever is in the detent position, engine is running at its "FULL FAST" thottle speed. If it isn't, readjust throttle cable until "FULL FAST" throttle speed is reached.

MOWER DECK:

1. Mower Deck Removal and Replacement —

WARNING: To avoid accidental starting, remove spark plug wire and secure away from spark plug.

A. Remove center console tray.

B. Pull the mower drive lever to the disengaged position. (Fig. 9)

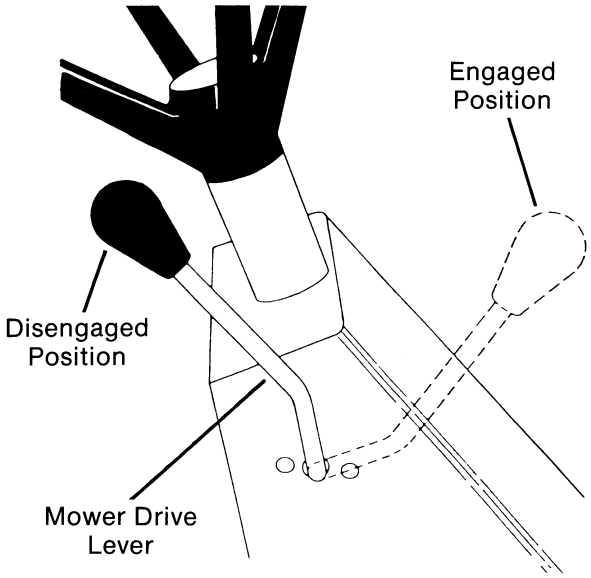


FIG. 9

C. Remove cotter pin and clevis pin securing blade engagement link to mower drive crank. (Fig. 10)

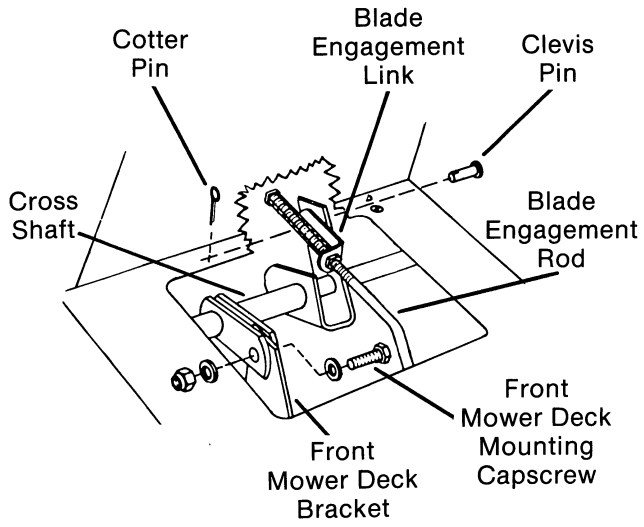


FIG. 10

D. Remove capscrew, washers and locknut securing cross shaft assembly to front mower deck bracket. (Fig. 10)

E. Remove capscrews, washers, bushings and locknuts securing left and right rear mower deck brackets to rear lift assembly. (Fig. 11)

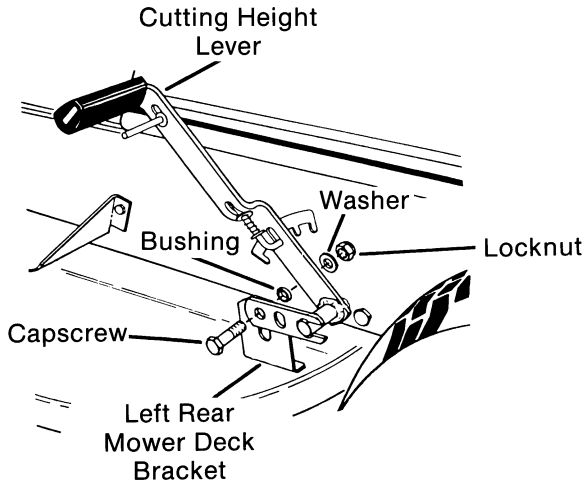


FIG. 11

F. Loosen, but do not remove, two locknuts securing engine pulley belt guide to main frame. (Fig. 5)

G. Slide engine pulley belt guide to the rear. Reach under rear of main frame and remove drive belt from engine pulley.

H. Lift blade engagement rod and rotate rod to the left to clear the cross shaft. (Fig. 10)

I. Lift front of rider up and push rider backwards over mower deck.

IMPORTANT — When remounting mower deck, belt should be routed above rear lift cross brace and differential when attaching belt to engine pulley.

J. To remount mower deck, reverse above procedure. Refer to "MOWER DRIVE BELT ADJUSTMENT" to set proper adjustment of mower drive belt.

NOTE: During remounting of mower deck, be sure blade engagement rod is positioned above the cross shaft. (Fig. 10)

2. Blade Removal and Replacement —

WARNING: To avoid accidental starting, remove spark plug wire and secure away from spark plug.

A. Set parking brake and drain gas from fuel tank if tank is more than half full.

B. Turn ignition key "OFF". Remove battery rod from retainer battery and slide battery forward.

WARNING: To avoid burns, be careful not to short the positive (+) terminal of battery to the rider when removing from mounting.

C. Disconnect both battery cables from battery. Disconnect negative (-) terminal **first**. Remove battery from rider.

WARNING: To avoid personal injury when raising or lowering the rear engine rider, make sure you are capable of handling the weight. When in doubt get assistance.

D. Raise front of rider up and stand on rear support bars. (Fig. 6)

E. Remove center locknut from spindle shaft. (Fig. 12)

NOTE: It may be necessary to block blade with a piece of wood to prevent blade rotation while loosening or tightening blade.

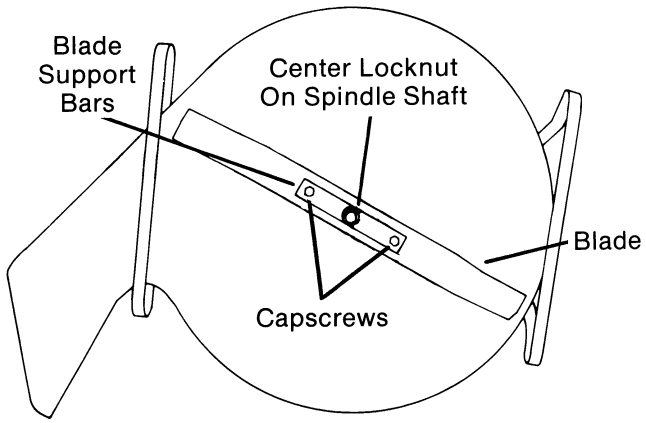


FIG. 12

F. Loosen, but do not remove, two capscrews holding blade support bars. (Fig. 12) Remove blade and blade support bars from spindle shaft.

G. To replace blade after balancing or sharpening, follow procedures below.

H. Put blade and blade support bars back on spindle shaft.

I. Replace center locknut and tighten to a torque of 50 ft./lbs.

J. Tighten two blade support bar capscrews to a torque of 60 ft./lbs.

IMPORTANT: The capscrews used to secure blade support bars to blade are Grade 5 type. Other types of capscrews should not be used as replacements.

K. Finish tightening center locknut on spindle shaft to a torque of 100 ft./lbs.

L. Lower rider back to the ground and refill fuel tank and test operation.

3. Blade Sharpening and Balancing —

A. Remove blade as described in procedure above.

B. Sharpen beveled edges of the blade, reference (Fig. 13) for correct dimensions and instructions.

NOTE: If more than ½" is removed from width of blade, replace with new blade.

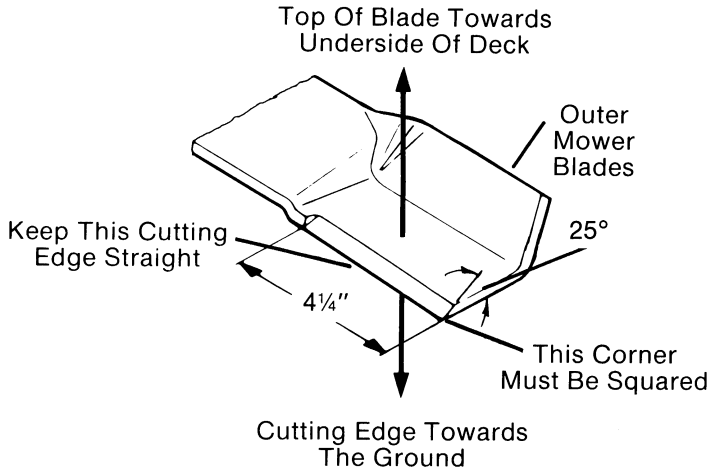


FIG. 13

C. After sharpening, check blade for balance by supporting blade as shown in (Fig. 14) using center hole as a guide. File or grind metal from heavy end of blade until blade balances.

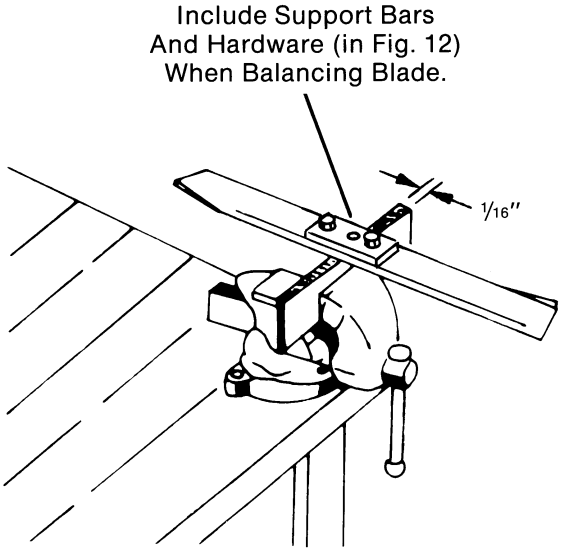


FIG. 14

D. Remount blade by following procedure above under "BLADE REMOVAL AND REPLACEMENT" starting with step "H".

4. Mower Spindle Removal and Replacement

WARNING: To avoid accidental starting, remove spark plug wire and secure away from spark plug.

A. Remove mower deck by following procedures in Step 1, "MOWER DECK REMOVAL AND REPLACEMENT".

B. Detach blade brake spring from blade engagement rod at idler bracket. Remove spring from mower deck. (Fig. 15)

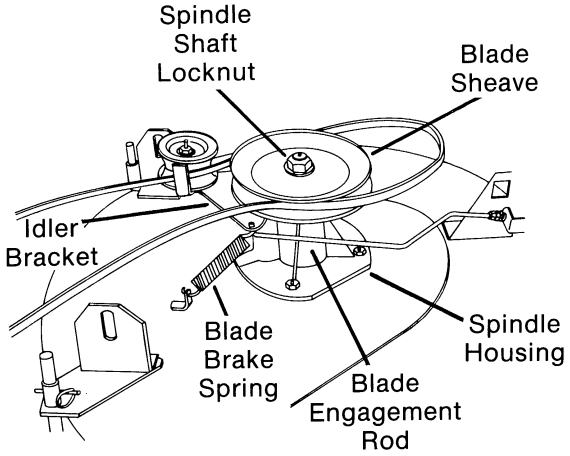


FIG. 15

C. Remove mower drive belt from around blade sheave.

D. Stand mower deck up on mower deck gauge wheels and brace or block deck in upright position.

E. Remove bottom center locknut securing blade to spindle shaft. (Fig. 12)

NOTE: It may be necessary to block blade with a piece of wood to prevent blade rotation while loosening or tightening blade.

F. Loosen, do not remove, two capscrews holding blade support bars to blade. (Fig. 12)

G. Remove blade with blade support bars, spinner cap and spacer from bottom of spindle shaft.

H. Holding bottom end of spindle shaft, remove top spindle shaft locknut holding blade sheave to spindle shaft. (Fig. 15)

NOTE: When reassembling blade sheave to spindle shaft. Torque top spindle shaft locknut to 100 ft./lbs.

I. Remove blade sheave and spacer from spindle shaft. (Fig. 15)

J. Spindle shaft and upper and lower bearings can now be removed from mower spindle housing.

K. At this time, all parts of mower spindle assembly can be checked for damage or excessive wear. Check following parts and replace if necessary. (Fig. 16)

a. upper and lower bearings for wear.

b. spindle shaft for sharp edges, gouges or stripped threads.

c. spindle housing for cracks.

d. blade sheave-check belt surfaces for residue, chips or nicks.

e. blade sheave brake pad on idler bracket for excessive wear.

f. idler pulley for excessive wear or radial play.

L. Reassemble mower deck spindle assembly by reversing above procedure and follow the special torque procedures below for tightening the blade.

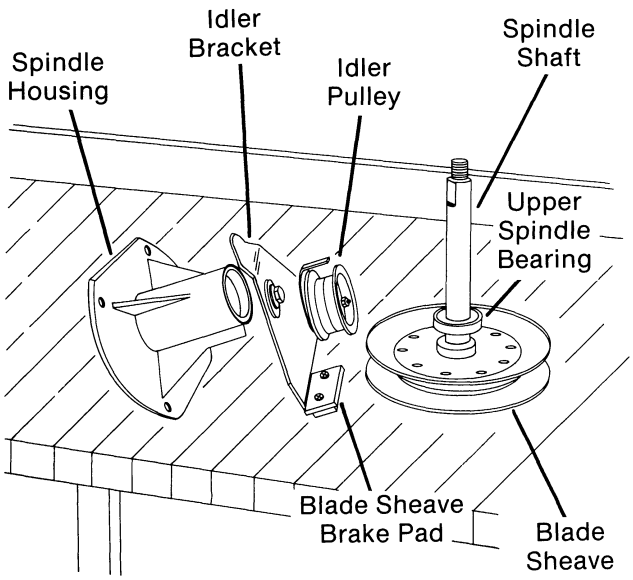


FIG. 16

M. Replace lower center locknut and tighten to a torque of 50 ft./lbs.

N. Tighten two blade support bar capscrews to a torque of 60 ft./lbs.

IMPORTANT:The capscrews used to secure blade support bars to blade are Grade 5 type. Other types of capscrews should not be used as replacements.

O. Finish tightening lower center locknut on spindle shaft to a torque of 100 ft./lbs.

P. Reassemble mower deck to rider by reversing procedures in Step 1, "MOWER DECK REMOVAL AND REPLACEMENT".

5. Mower Drive Brake Adjustment —

This adjustment is pre-set at the factory and should not normally need readjustment. If mower blade does not stop within the required 7 second safe stopping time, check brake pad for wear or readjust jam nuts on blade engagement rod, as follows:

A. Remove center console tray.

B. Turn ignition switch "OFF".

C. Push mower drive lever to the engaged position. (Fig. 9)

D. Loosen two jam nuts on blade engagement rod.

E. Turn jam nuts until the dimension shown in (Fig. 17) is achieved or until 7 second blade safe stopping time is met. (A test of the rider will have to be made with a stop watch with engine running at full speed and mower deck engaged to test stopping time).

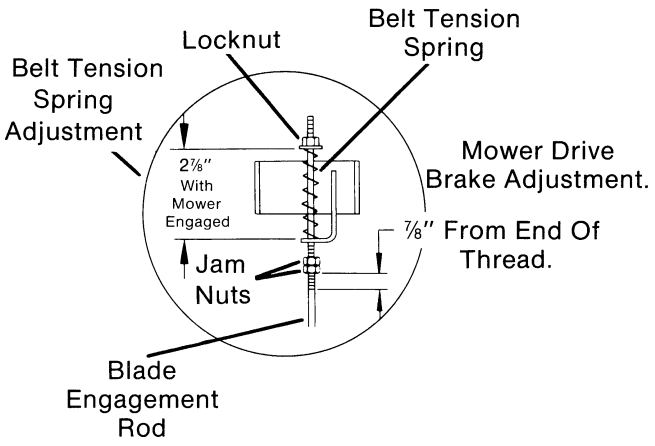


FIG. 17

F. Retighten jam nuts against each other and test unit.

BELTS:

These belts were designed and engineered to provide long, trouble-free service. If replacement is necessary, use **only** the belts recommended by manufacturer to be sure you have a belt that will provide the life and service required.

1. Mower Drive Belt Adjustment —

If belt has stretched and begins to slip under load, adjust belt as described below:

WARNING: To avoid accidental starting, disconnect spark plug wire and secure away from spark plug.

A. Move mower drive lever to the engaged position. (Fig. 9)

B. Looking through the slot, at the rear of main frame between support bars, towards front of rider. Check minimum clearance between the two sides of mower drive belt. (Fig. 18)

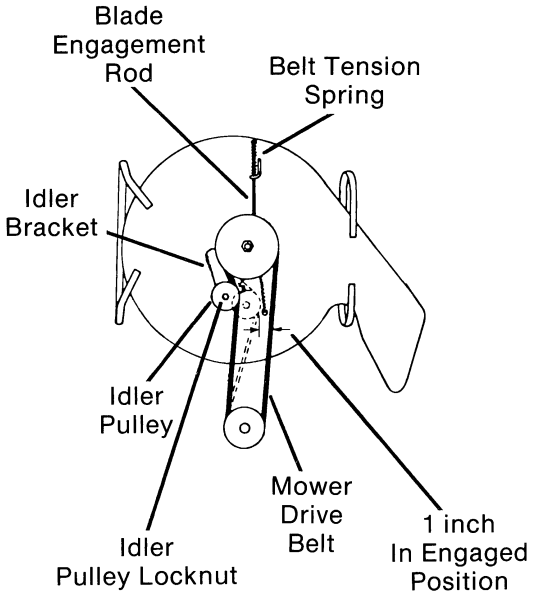


FIG. 18

C. If clearance between belt sides is less than 1 inch, adjust belt as follows:

a. Pull mower drive lever back to the disengaged position.

b. Loosen two nuts on each of the three mower deck brackets. (Fig. 19)

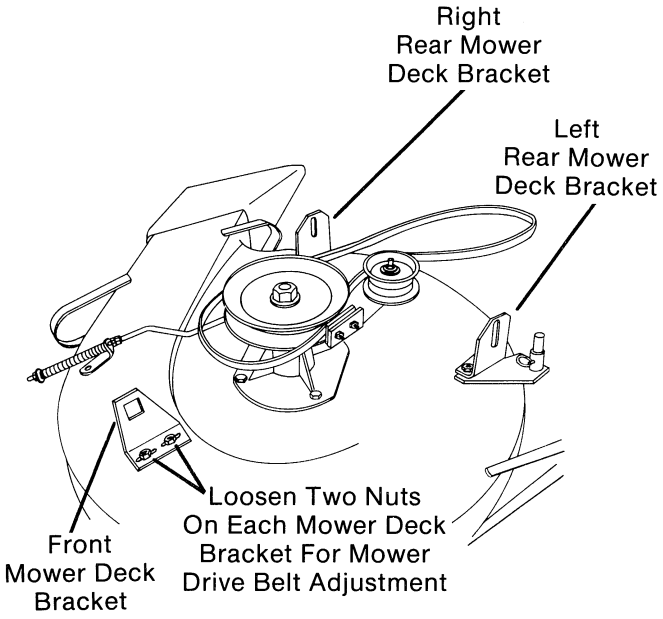


FIG. 19

c. Move each mower deck bracket toward the rear of mower deck. This will move spindle shaft toward front of rider, taking slack out of mower drive belt.

d. Tighten two nuts on each of the three mower deck brackets.

e. Engage mower drive lever and recheck minimum clearance (1 inch) between the two sides of mower drive belt. If clearance is still less than 1 inch, repeat above procedure until dimension is achieved.

D. At this time, mower belt tension spring should also be checked for proper adjustment. Follow procedures below:

a. Remove center console tray.

b. Turn ignition switch off and set parking brake.

c. Push mower drive lever to the engaged position.

d. Check belt tension spring adjustment as shown in (Fig. 17).

e. If spring needs readjustment, pull mower drive lever to the disengaged position and turn locknut on blade engagement rod and push mower drive lever to the engaged position and check dimension.

f. Repeat above procedure until dimension is achieved.

g. Replace center console tray.

2. Mower Drive Belt Replacement —

WARNING: To avoid accidental starting, remove spark plug wire and secure away from spark plug.

A. Remove mower deck from rear engine rider by following procedures under section, "MOWER DECK REMOVAL AND REPLACEMENT".

B. Detach blade brake spring from blade engagement rod at idler bracket. (Fig. 18)

C. Remove locknut holding idler pulley to idler bracket. (Fig. 18) Remove idler pulley and mower drive belt.

D. Install new mower drive belt and replace idler pulley back on idler bracket and secure with capscrew and locknut.

IMPORTANT — Powder new belt! (talcum or soap stone powder) Reassemble rear engine rider by completing steps E and F and start engine and engage mower drive lever and let rider run for approximately 15 min. to break new belt in.

E. Connect blade brake spring to blade engagement rod below idler bracket.

F. Reattach mower deck by reversing procedures under "MOWER DECK REMOVAL AND REPLACEMENT".

3. Traction Drive Belt Adjustment —

No adjustment is required. This belt is self adjusting by a spring loaded idler lever assembly. Periodically check idler lever assembly to be sure it is pivoting freely and providing tension. Check clutch spring to see that it isn't stretched or broken, replace if necessary.

4. Traction Drive Belt Replacement —

WARNING: To avoid accidental starting, remove spark plug wire and secure away from spark plug.

A. Remove mower deck from rear engine rider by following procedures under section, "MOWER DECK REMOVAL AND REPLACEMENT".

B. Set parking brake and drain gas from fuel tank if tank is more than half full.

C. Turn ignition key "OFF". Remove battery retainer rod from battery and slide battery forward.

WARNING: To avoid burns, be careful not to short the positive (+) terminal of battery to the rider when removing from mounting.

D. Disconnect both battery cables from battery. Disconnect negative (-) terminal **first**. Remove battery from rider.

WARNING: To avoid personal injury when raising or lowering the rear engine rider, make sure you are capable of handling the weight. When in doubt get assistance.

E. Raise front of rider up and stand on rear support bars.

F. Remove locknut that secures idler pulley to idler lever assembly and remove idler pulley. (Fig. 20)

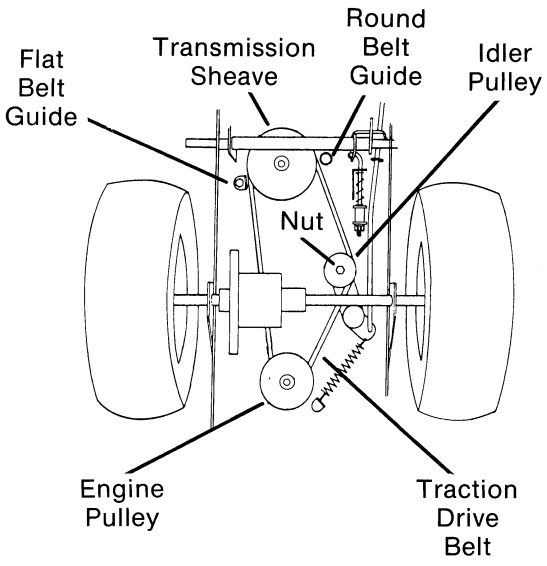


FIG. 20

G. Loosen locknut on capscrew holding flat belt guide and turn belt guide 90° clockwise. (Fig.20)

H. Remove capscrew holding round belt guide to main frame. (Fig. 20)

I. Remove traction drive belt from transmission and engine sheave. (Fig. 20)

J. Position new belt on transmission and engine sheaves.

K. Replace belt guides and idler pulley by reversing above procedures and remount mower deck by reversing procedure under section, "MOWER DECK REMOVAL AND REPLACEMENT".

IMPORTANT — Powder new belt! (talcum or soap stone powder) Reassemble rear engine rider by completing step "K" and start engine and engage rider in 1st gear and ride mower for approximately 10 min. to break new belt in.

TRACTION DRIVE BRAKE:

1. Brake Adjustment —

WARNING: To avoid accidental starting, remove spark plug wire and secure away from spark plug.

A. Set parking brake and drain gas from fuel tank if tank is more than half full.

B. Turn ignition key "OFF". Remove battery retainer rod from battery and slide battery forward.

WARNING: To avoid burns, be careful not to short the positive (+) terminal of battery to the rider when removing from mounting.

C. Disconnect both battery cables from battery. Discsonnect negative (-) terminal **first**. Remove battery from rider.

WARNING: To avoid personal injury when raising or lowering the rear engine rider, make sure you are capable of handling the weight. When in doubt get assistance.

D. Raise front of rider up and stand on rear support bars.

E. Check adjustment at brake adjustment rod. With brake "ENGAGED", spring should be compressed to dimension shown in (Fig. 21). If it isn't, turn locknut until dimension is achieved.

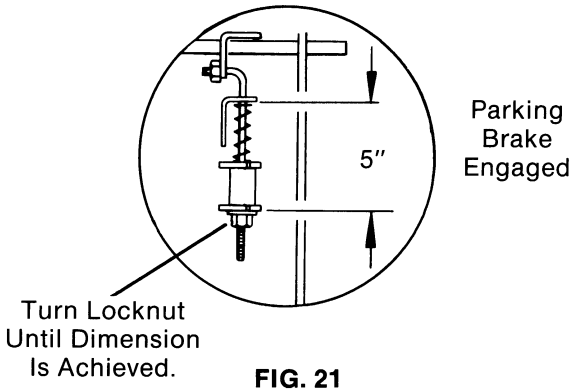


FIG. 21

F. Lower rider back to ground.

G. Place gear shift lever in "N" (neutral) position and disengage parking brake.

H. Holding inside jam nut at transmission, loosen outside jam nut on brake pad holder. (Fig. 22)

I. Turn inside jam nut clockwise to tighten brake.

J. To check adjustment, push rear engine rider forward while holding clutch/brake pedal down. If brake does not stop rear wheels, repeat step "I".

K. With clutch/brake pedal up, push rider forward. If brake pad drags against brake rotor, turn inside jam nut counterclockwise one half turn. Repeat procedure if brake pad still drags.

L. When adjustment is correct, hold inside jam nut and tighten outside jam nut against it.

M. Install battery back into rear engine rider and reattach spark plug wire and test unit.

2. Brake Pad Replacement —

Replace **both** brake pads when the thickness of either pad is less than the thickness of ignition key. The following procedure covers brake pad replacement.

WARNING: To avoid accidental starting, remove spark plug wire and secure away from spark plug.

WARNING: To avoid burns, DO NOT make this repair when engine is hot. Wait for engine and muffler to cool down before proceeding.

A. Raise seat and detach brake, return spring from top hole in transmission brake control arm. (Fig. 22)

B. Remove two taptite screws securing brake pad holder to transmission case. (Fig. 22)

C. Brake pad holder is now loose and outer brake pad can be removed. NOTE: Brake pad back-up plate may fall out at this time. (Fig. 22) Remember to replace plate when reassembling.

D. Pull brake disk off output shaft, inner brake pad will fall out of transmission case. (Fig. 22)

E. Replace brake pads with new parts and reassemble brake by reversing above procedure.

NOTE: It may be necessary to readjust brake engagement. Refer to procedures under "TRACTION DRIVE BRAKE ADJUSTMENT".

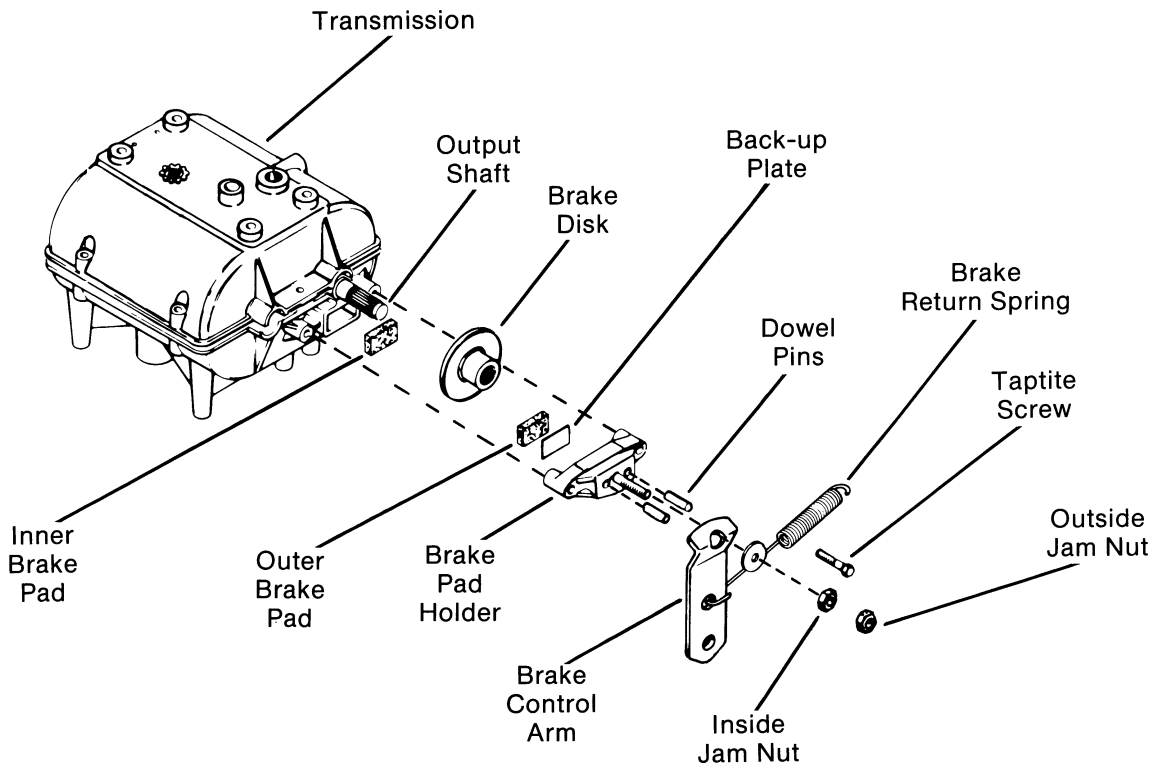


FIG. 22

TRACTION DRIVE CHAIN:

1. Chain Adjustment —

WARNING: To avoid accidental starting, remove spark plug wire and secure away from spark plug.

A. When drive chain is properly adjusted there should be approximately ¼" to ½" of movement when finger pressure is applied. If not, follow procedures below.

B. Loosen two nuts holding axle bearing plates to main frame, on both sides of rear engine rider. (Fig. 23)

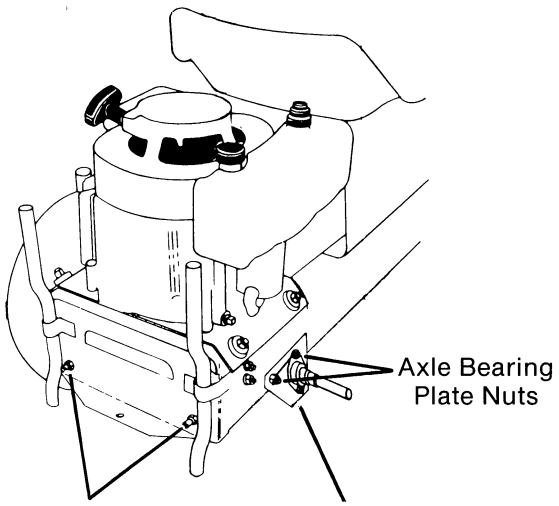


FIG. 23

C. Turn axle adjustment nuts clockwise to tighten chain or counterclockwise to loosen chain. (Fig. 23)

IMPORTANT — To keep axle aligned correctly, turn each nut exactly the same number of turns.

D. After adjustment, roll rider forward a foot at a time and check tension at several intervals and adjust as necessary.

E. When adjustment is complete, tighten two nuts at both axle bearing plates.

2. Chain Replacement —

WARNING: To avoid accidental starting, remove spark plug wire and secure away from spark plug.

A. Jack rear wheels of rider off the ground and support frame on jack stands.

B. Remove two capscrews holding chain guard to main frame. (Fig. 24) Remove chain guard.

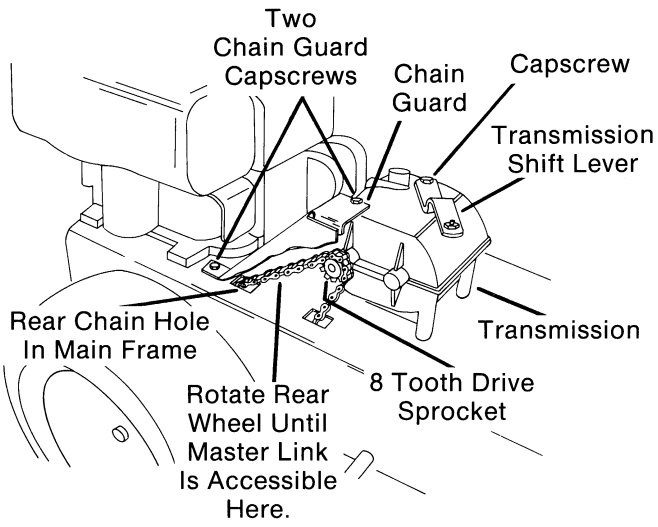


FIG. 24

C. If worn or damaged chain is still on rider, follow these procedures:

a. Rotate rear wheel until master link is accessible above main frame. (Fig. 24)

b. Remove master link clip and remove end of old chain closest to transmission sprocket, from master link. NOTE: DO NOT let end of old chain (with master link still attached) fall through rear chain hole in main frame.

c. Connect one end of new chain to master link and slowly and carefully pull end of old chain out over transmission sprocket until master link appears again. (Keep tension on new chain when pulling old chain out)

d. Remove old master link and replace with a new one.

e. Reattach chain guard and remove jack stands.

f. Check drive chain adjustment by following procedures in step 1 under "DRIVE CHAIN ADJUSTMENT".

D. If chain is no longer on unit, follow these procedures:

a. Inspect both transmission and differential drive sprocket for possible cause of damage or failure. Replace if necessary.

b. Insert one end of new chain through front chain hole in main frame and the other end through the rear chain hole. (Fig. 24) Drop chain over 8 tooth transmission drive sprocket.

c. Wrap chain around 45 tooth differential drive sprocket and secure chain ends with a new master link. (Fig. 25)

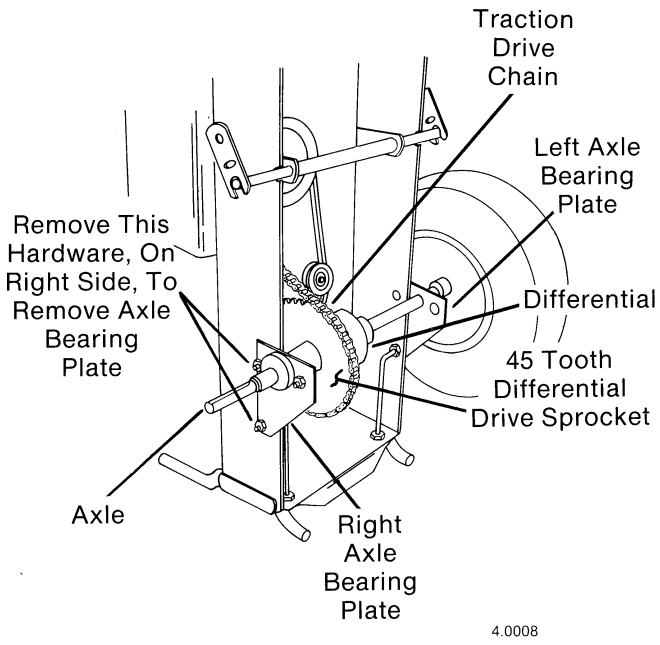


FIG. 25

d. Reattach chain guard and remove jack stands.

e. Check drive chain adjustment by following porcedures in step 1 under "DRIVE CHAIN ADJUSTMENT".

DIFFERENTIAL REMOVAL AND REPLACEMENT:

WARNING: To avoid accidental starting, remove spark plug wire and secure away from spark plug.

1. Jack rear wheels of rider off the ground and support frame on jack stands.
2. Remove snap rings, wheels, square keys and axle spacers from both sides of rear axle. (Fig. 25)
3. Rotate rear wheels until master connecting link is accessible on 45 tooth differential drive sprocket. Remove master link and unwrap chain from around sprocket. (Fig. 25)
4. Block or support differential, so when axle bearing hardware is removed differential will not fall and damage sprocket teeth.
5. Remove two top nuts and carriage bolt at right side axle bearing plate and slide axle bearing plate off axle. (Fig. 25)
6. Slide differential out of left axle bearing plate and service differential per manufactuer's specifications.
7. Replace differential by reversing above procedures.

TRANSMISSION REMOVAL AND REPLACEMENT:

WARNING: To avoid accidental starting, remove spark plug wire and secure away from spark plug.

1. Set parking brake and drain gas from fuel tank if tank is more than half full.
2. Turn ignition key "OFF". Remove battery retainer rod from battery and slide battery forward.

WARNING: To avoid burns, be careful not to short the positive (+) terminal of battery to the rider when removing from mounting.

3. Disconnect both battery cables from battery. Disconnect negative (-) terminal **first**. Remove battery from rider.
4. Remove mower deck from rear engine rider by following procedures under section "MOWER DECK REMOVAL AND REPLACEMENT".
5. Tilt seat up.
6. Remove capscrew and washers securing transmission shift lever to top of transmission. Move lever out of the way. (Fig. 24)
7. Remove two capscrews holding chain guard to main frame. Remove chain guard. (Fig. 24)
8. Detach brake return spring from top hole in transmission brake control arm. (Fig. 22)
9. Raise front of rider up and stand on rear support bars.
10. Open battery cover and secure open with vise grip or suitable clamp.

11. Disengage parking brake and rotate drive chain until master link is accessible. Remove chain from transmission sprocket.

    NOTE: It may be necessary to remove right rear wheel assembly to gain access to master link.

12. Remove locknut that secures traction drive idler pulley to idler lever assembly and remove idler pulley. (Fig. 26)

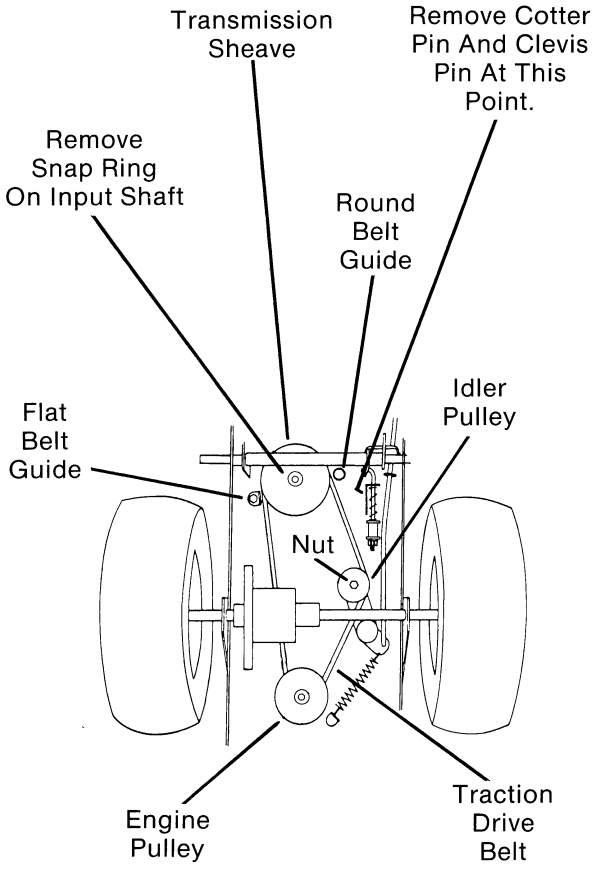


FIG. 26

13. Loosen locknut on capscrew holding flat belt guide and turn belt guide 90° clockwise. (Fig. 26)

14. Remove capscrew holding round belt guide to main frame. (Fig. 26) NOTE: This capscrew is also one of the capscrews holding transmission to main frame.

15. Remove traction drive belt from transmission sheave.

16. Remove cotter pin and clevis pin attaching transmission brake control arm to brake adjustment rod link. (Fig. 26)

17. Remove snap ring holding transmission sheave to transmission input shaft. (Fig. 26) Remove transmission sheave and woodruff key from input shaft.

18. Remove three remaining capscrews securing transmission to main frame.

19. Lift transmission out battery access hole and service transmission per manufacturer's specifications.

20. To replace transmission, reverse above procedures. Check both mower drive and traction drive belt adjustments and routings before restarting engine.

TRANSMISSION SHIFT LINKAGE ADJUSTMENT:

If shift lever does not properly engage in REVERSE, NEUTRAL, 1st or 5th gear, it may be necessary to readjust transmission shift linkage. Readjust linkage by following procedures below:

WARNING: To avoid accidential starting, remove spark plug wire and secure away from spark plug.

A. Turn ignition key "OFF". Open seat panel door. Remove battery retainer rod from battery and slide battery forward and set on top of main frame.

WARNING: To avoid burns, be careful not to short the positive (+) terminal of battery to the rider when removing from mounting.

B. Unclip both ball joint rod ends on shift rod from shift lever rod and transmission shift lever. (Fig. 27) Remove shift rod.

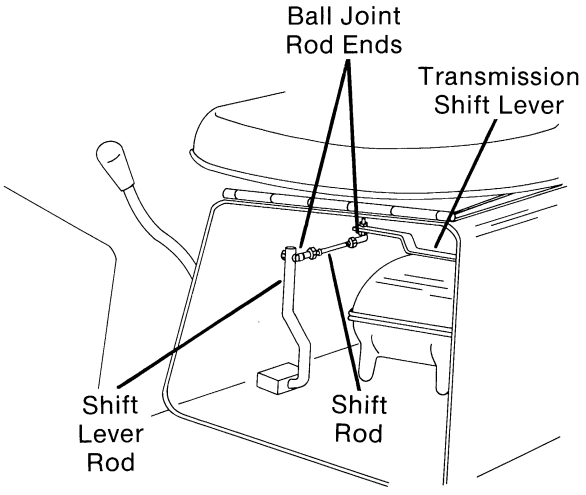


FIG. 27

C. Check adjustment or readjust rod ends on shift rod to dimension shown in (Fig. 28).

NOTE: When readjusting rod ends, proper alignment of rod ends must be maintained to install shift rod back into place. See (Fig. 28)

IMPORTANT: Do not adjust either rod end so there are less than four turns left on shift rod.

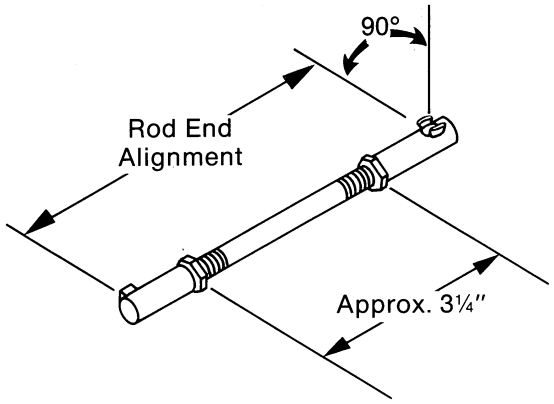


FIG. 28

D. Clip adjusted shift rod back onto ball joints on shift lever rod and transmission shift lever. (Fig. 27)

E. Run shift lever through all gears. If shift lever still does not properly or easily engage in all gears, remove shift rod and readjust rod ends until all gears are achieved.

F. Reassemble linkage by reversing above procedure.

THROTTLE CONTROL REMOVAL AND REPLACEMENT:

WARNING: To avoid accidental starting, remove spark plug wire and secure away from spark plug.

1. Disconnect throttle cable at engine, by loosening throttle cable clamp screw enough so that cable can be removed. Disconnect cable end from throttle speed control block. (Fig. 29)
2. Pull throttle control lever knob off throttle control lever.
3. Remove two pan head screws holding throttle control to left side of seat mounting frame.

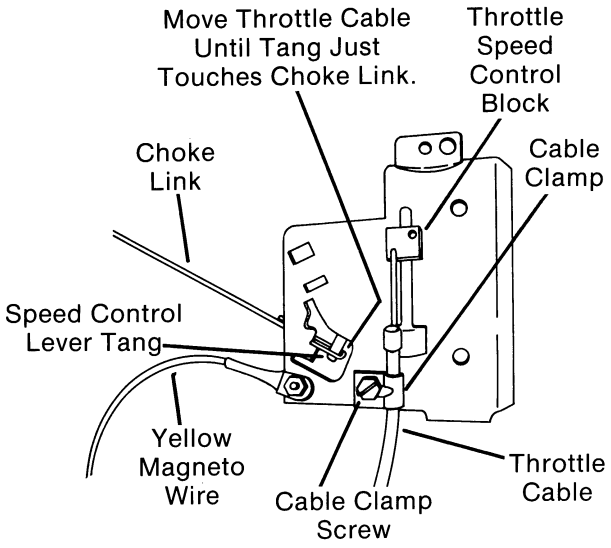


FIG. 29

4. Remove throttle control assembly and replace with new assembly.
5. Mount throttle control assembly to seat mounting frame with two pan head screws. Push knob onto lever.
6. Move throttle control lever to the "FULL FAST" position (which is the detent before "START" position is reached). (Fig. 30) Attach end of throttle control cable to throttle speed control block and slip cable under cable clamp. Push throttle cable up until tang on speed control lever just touches choke link as shown in (Fig. 29). Tighten cable clamp screw.

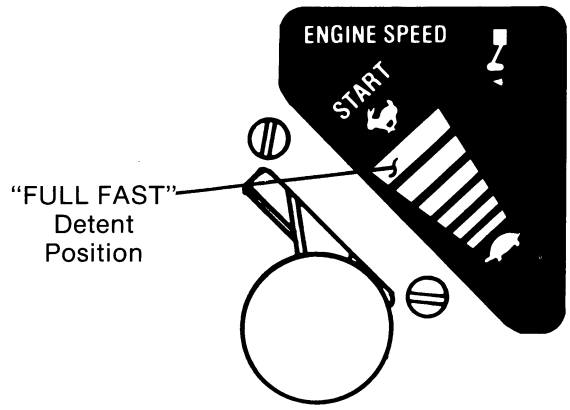


FIG. 30

7. Start and test engine to insure that when throttle control lever is in the detent position, engine is running at its "FULL FAST" throttle speed. If it isn't, readjust throttle cable until "FULL FAST" throttle speed is reached.

ELECTRICAL SYSTEM:

1. System Functions —

A. Recoil Start System Functions —

To start rear engine rider equipped with a recoil start system, the shift lever **must** be in "N" (neutral) and mower drive lever **must** be disengaged and ignition switch turned to the "ON" position. Recoil rope can now be pulled and engine will start.

The shift lever, mower drive lever and seat; actuate separate switches that are a part of the Safety Interlock System. This interlock system is provided for the safety of the operator and should not be tampered with.

The safety functions of the interlock system are as follows:

a. If either the shift lever is in gear or mower drive lever is engaged or both levers are in their operating positions, with ignition switch in "ON" position. Recoil rope can be pulled but engine will not start.

b. The seat switch is also an intregal part of safety interlock system. Should the operator leave the seat with engine running while either the shift lever is in gear or mower drive lever engaged, the engine will kill.

IMPORTANT: In some instances, it may be necessary for the serviceman to be off of operator's seat, with engine running, to make certain engine adjustments. This can be achieved by positioning shift lever in "N" (neutral) **and** disengaging mower drive lever. Special precautions should be taken by the serviceman when operating rider in this mode, as this is **NOT** a recommended method of operation for this rider.

WARNING: To avoid serious injury, DO NOT run engine without an operator in the seat except for necessary engine adjustments. KNOW HOW TO STOP THE ENGINE.

B. Electric Start System Functions —

The rear engine rider equipped with electric start system can be started one of two ways.

a. To start engine with ignition switch, the shift lever **must** be in "N" (neutral), and mower drive lever **must** be disengaged and ignition switch turned to the "START" position.

b. To start engine with recoil rope, the shift lever **must** be in "N" (neutral) and mower drive **must** be disengaged and ignition switch turned to the "ON" position. Recoil rope can now be pulled and engine will start.

The shift lever, mower drive lever and seat; actuate separate switches that are a part of the Safety Interlock System. This interlock system is provided for the safety of the operator and should not be tampered with.

The safety functions of the interlock system are as follows:

a. If either the shift lever is in gear, or mower drive lever is engaged, or both levers are in their operating positions, with ignition switch in "ON" position. Recoil rope can be pulled, but engine will not start **or** ignition switch can be turned to the "START" position and engine should not turn over.

b. The seat switch is also an intregal part of safety interlock system. Should the operator leave the seat with engine running while either the shift lever is in gear or mower drive lever engaged, the engine will kill.

IMPORTANT: In some instances, it may be necessary for the serviceman to be off of operator's seat with engine running to make certain engine adjustments. This can be achieved by positioning shift lever in "N" (neutral) **and** disengaging mower drive lever. Special precautions should be taken by the serviceman when operating rider in this mode, as this is **NOT** a recommended method of operating this rider.

WARNING: To avoid serious injury, DO NOT run engine without an operator in the seat except for necessary engine adjustments. KNOW HOW TO STOP THE ENGINE.

C. To stop the engine:

a. Move gear shift lever to "N" (neutral).

b. Disengage mower drive lever.

c. Depress clutch/brake pedal and set parking brake.

d. Turn ignition key to OFF. Remove key.

2. Battery —

The battery used is a 12 volt wet cell type.

WARNING: When the alternator is charging, an explosive gas is produced inside the battery; therefore, always check the electrolyte level with the engine stopped. DO NOT use an exposed flame and DO NOT smoke when checking the battery.

WARNING: The battery contains sulfuric acid which can cause severe burns. Avoid contact with skin, eyes or clothing.

FIRST AID:

External contact — Flush with water.

Internal Contact — Drink large quantities of water. Follow with Milk of Magnesia, beaten egg or vegetable oil. Call a physican immediately! IMPORTANT — In case of internal contact, **DO NOT** give fluids that would induce vomiting.

Eyes — Flush with water for at least 15 minutes and get medical attention immediately!

Battery Charging — If battery is dead, engine may be started with jumper cables and operated without damage to electrical system, with battery connected. IMPORTANT: Be certain jumper cables are connected positive to positive and negative from booster battery to the **engine block** not to negative terminal of battery.

Battery Removal —

WARNING: To avoid accidental starting, remove spark plug wire and secure away from spark plug.

A. Open seat panel door.

B. Turn ignition key "OFF". Remove battery retainer rod from battery and slide battery forward. (Fig. 31)

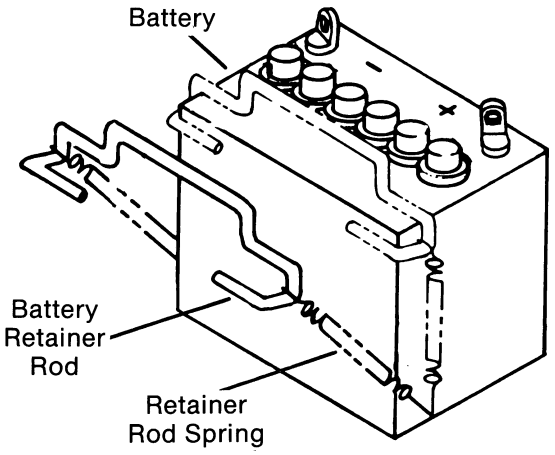


FIG. 31

WARNING: To avoid burns, be careful not to short the positive (+) terminal of battery to the rider when removing from mounting.

C. Disconnect negative (-) battery cable from negative terminal.

D. Dissconnect positive (+) battery cable (with protective cap) from positive battery terminal. Remove battery.

E. To replace battery, reverse above procedure.

3. Solenoid —

The starter solenoid is a sealed unit and serviced only as a complete assembly. To check for defective solenoid, follow procedures below to remove and test solenoid:

WARNING: To avoid accidental starting, remove spark plug wire and secure away from spark plug.

A. Remove battery as described in steps A thru D for "Battery Removal" above.

B. Disconnect all leads attached to solenoid.

IMPORTANT — Tag all leads to insure proper reinstallation. For further aid in reassembly, refer to "Electric Start Wiring Diagram".

C. Remove two capscrews, nuts and lockwashers securing solenoid to seat mounting frame. Remove solenoid (To replace solenoid, reverse above procedures).

D. Connect leads of continuity tester or ohmmeter to the "A" and "B" terminals of solenoid. (Fig. 32) If continuity exists or ohmmeter reads zero, replace solenoid. If no continuity exists, go on to step "E". Repeat this procedure two or three times to insure a positive test.

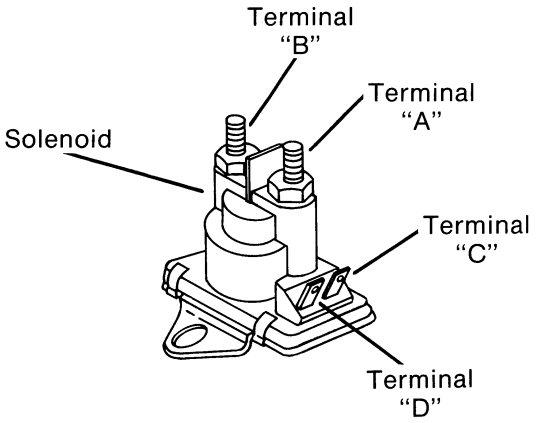


FIG. 32

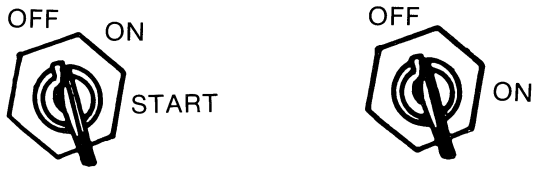
E. Using two 14 gauge jumper wires and 12 volt battery, connect one jumper wire to positive (+) battery terminal then to terminal "C" on solenoid. Connect other jumper wire to negative (-) battery terminal then to terminal "D" on solenoid. An audible click should be heard and continuity tester (still attached to solenoid terminals "A" and "B") should be brightly lit or ohmmeter should register zero ohms.

WARNING: Be sure to make the last jumper wire connection at the solenoid NOT at the battery. This will prevent a spark from igniting explosive gases at battery.

If poor or no continuity exists, replace solenoid. Repeat this procedure two or three times to insure a positive test.

4. Ignition Switch

Recoil Start System — ignition switch has two positions "OFF" and "ON". (Fig. 33)



Electric Start Ignition Switch

Recoil Start Ignition Switch

FIG. 33

Electric Start System — ignition switch has three positions "OFF", "ON" and "START". (Fig. 33)

For safety the rear engine rider is equipped with an automotive type ignition switch that controls all the electrical circuits. To check for defective ignition switch, follow procedures below to remove and test switch:

WARNING: To avoid accidental starting, remove spark plug wire and secure away from spark plug.

A. Turn ignition switch to "OFF" position and set parking brake.

B. Raise front of rear engine rider up far enough to gain access to front axle area and brace in this position with jack stands or suitable support.

C. Remove cotter pin holding mower drive engagement rod mower drive crank on cross shaft. (Fig. 34)

D. Remove cotter pin, special washers and flange bearing at bottom of steering shaft. (Fig. 34)

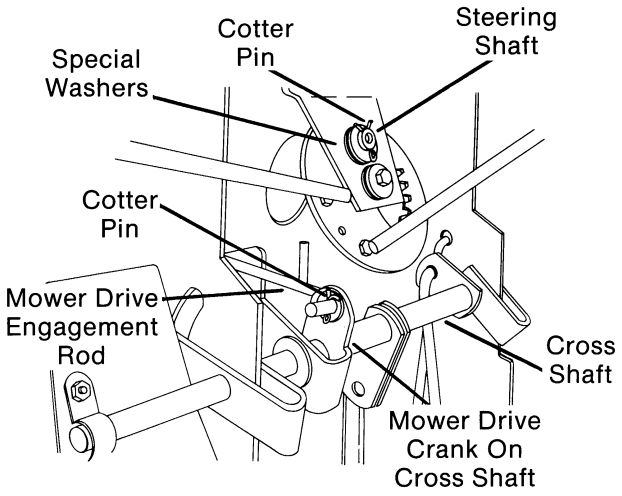


FIG. 34

E. Remove four machine screws holding steering stand to main frame. (Fig. 35) Raise steering stand guiding both mower drive engagement rod and steering shaft through holes in main frame.

NOTE: Ignition wiring may prevent removal of steering stand until wiring is unplugged from switch.

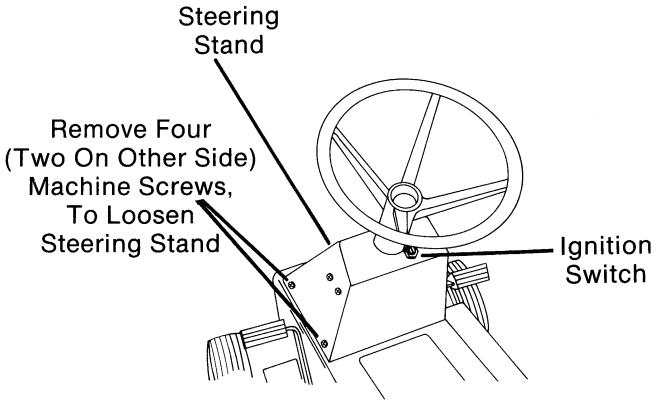


FIG. 35

F. Disconnect lead wire connector from rear of ignition switch and place steering stand on work bench.

G. Remove keys from ignition switch and remove jam nut securing ignition switch to steering stand. Switch may now be removed from steering stand.

STOP: For machines equipped with electric start, continue with procedures step "H". For machines equipped with recoil (manual) start, continue with procedures step"HH".

ELECTRIC START:

H. Replace key into ignition switch and begin continuity test with switch in "OFF" position.

I. Using continuity tester or ohmmeter, attach one lead to terminal "M" on ignition switch (Fig. 36) and touch all other terminals with other lead. Continuity should **only** appear between terminals "M" and "G". If continuity appears between any other terminals, switch is defective, replace switch.

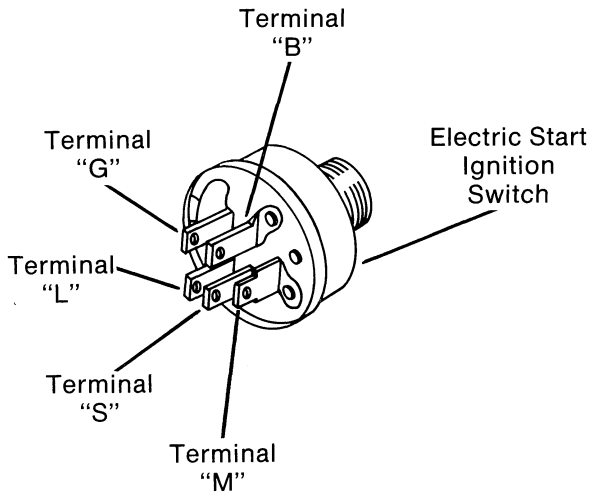


FIG. 36

J. Switch key to "ON" position and attach one lead to terminal "B" and touch all other terminals with other lead. Continuity should **only** appear between terminals "B" and "L". If continuity appears between any other terminals, switch is defective, replace switch.

K. Switch key to "START" position and attach one lead to terminal "B" and touch all other terminals with other lead. Continuity should **only** appear between terminals "B" and "S". If continuity appears between any other terminals, switch is defective, replace switch.

L. To reassemble switch back into steering stand, reverse procedures "A" thru "G"above.

MANUAL START:

HH. Replace key into ignition switch and begin continuity test with switch in "OFF" position. (Fig. 37)

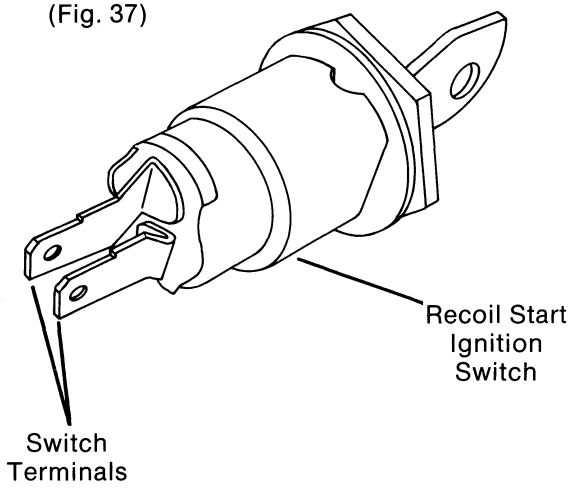


FIG. 37

II. Using continuity tester or ohmmeter, attach one lead to one switch terminal and other lead to other terminal continuity should appear with switch in "OFF" position.

JJ. Turn key to the "ON" position with leads still connected to switch terminals, there should be no continuity.

KK. If ignition switch fails to perform these tests, switch is defective, replace switch.

LL. To reassemble switch back into steering stand, reverse procedure "A" thru "G" above.

5. Interlock Switch System Check —

WARNING: To avoid accidental starting of engine and to avoid serious bodily injury, DO NOT disconnect, by-pass or remove any of the interlock safety switches. Proper operation of this system is mandatory for the safety of the operator.

The interlock micro switches control the safety aspects of the starting and stopping functions of the rear engine rider. Simple continuity tests should be made of the system if any of the following situations are present:

a. Engine will not crank to start.

b. Engine starts when either mower drive lever or shift lever are engaged.

c. Engine fails to stop when either mower drive lever or shift lever are engaged with operator off the seat.

Start continuity tests by first checking battery electrolyte levels, battery charge, battery terminal connections for corrosion, blown fuse and loose or broken wires at solenoid. If all of these conditions are good, proceed with continuity tests below:

WARNING: To avoid accidental starting, remove spark plug wire and secure away from spark plug.

A. Disconnect yellow magneto wire at left rear corner of engine. (Fig. 38)

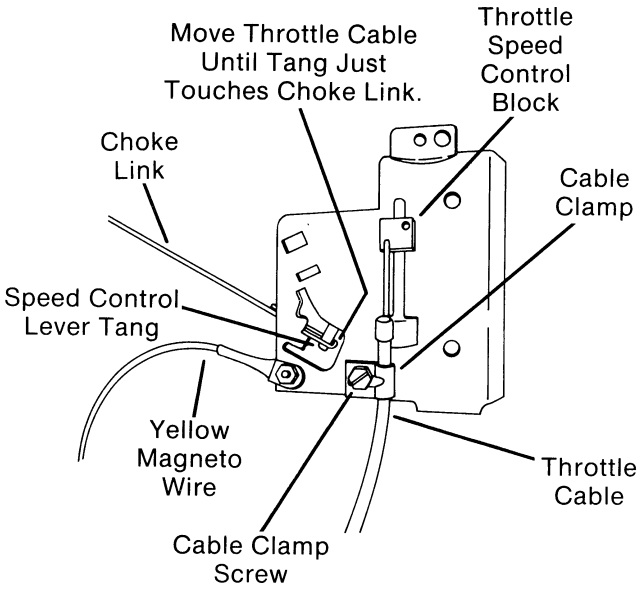


FIG. 38

B. Using ohmmeter or continuity tester, connect one probe to yellow magneto wire and other probe to engine mounting bolt (Ground).

C. With shift lever in "N" (neutral) and mower drive lever disengaged and operator off seat, turn ignition switch to the "ON"position. Continuity should **not** exist. If continuity **does** exist, go on to Step "D".

D. Repeat conditions in Steps "B" and "C", but this time raise seat and depress seat switch. Again, continuity should **not** exist. If continuity is present in this test and in test Step "C", then ignition switch may be defective. Follow procedure to test ignition switch under "ELECTRICAL SYSTEM—IGNITION SWITCH." If continuity was present only in Step "C", then interlock micro switches may be defective. Follow next procedures to test interlock micro switches.

E. Test shift lever micro switch by moving shift lever in REVERSE and tag and remove all wires from switch. Test switch for continuity as follows: (Fig. 39)

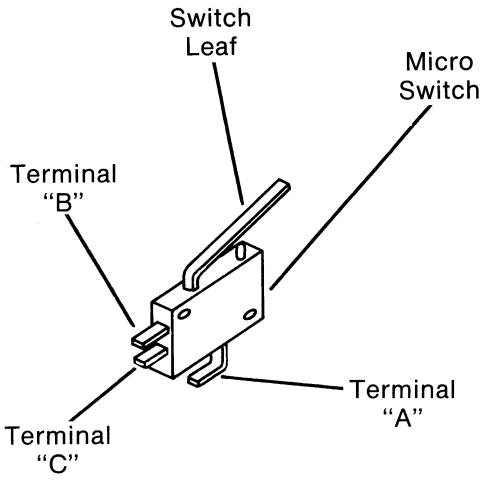


FIG. 39

a. Without leaf depressed.

Terminal Connections	Function
A to B	Continuity exists.
A to C	Continuity does **not** exist.

b. With leaf depressed.

Terminal Connections	Function
A to B	Continuity does **not** exist.
A to C	Continuity exists.

F. Test mower drive lever micro switch, located under main frame above front axle, by following above procedure. Position mower drive lever in engaged position and tag and remove all wires from switch to perform test.

G. Test seat switch by raising seat, disconnect all wires and remove switch from mounting. (Fig. 40) With switch plunger up, continuity should exist with plunger depressed, continuity should **not** exist.

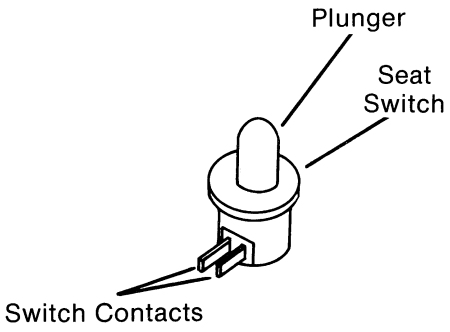


FIG. 40

H. If any of the interlock switches fail to meet their specific test, switch is defective and should be replaced.

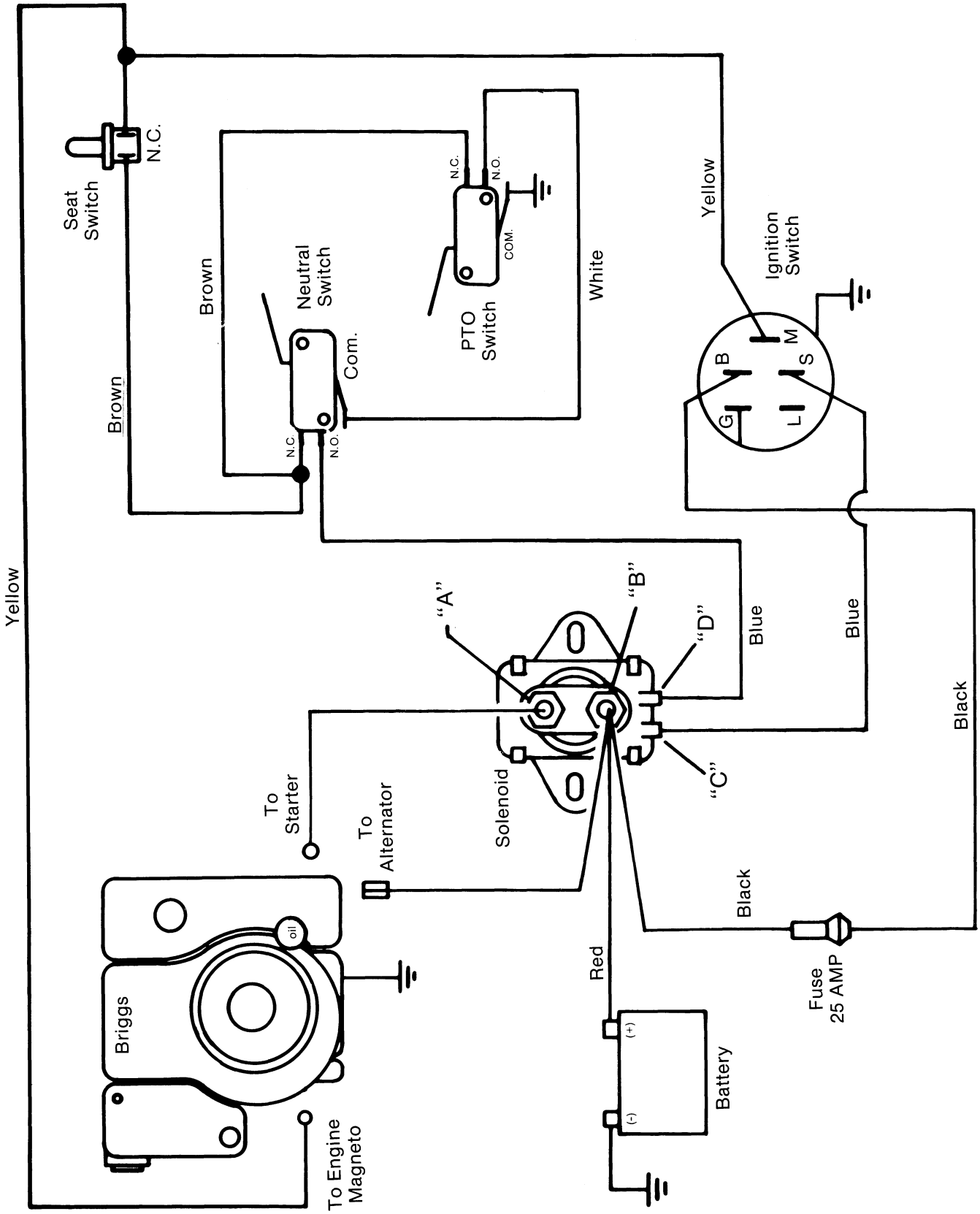
6. Fuse —

The fuse protects all electrical circuits except starter and magneto. Fuse holder is located in black wire attached to positive terminal at solenoid. The fuse may be one of the following three types: an automotive plug type Bussman ATC 25, Little Fuse 3AG 25, or a Bussman AGC 25. All fuses are rated at 25 amp capacity, and replacements are available at most service stations.

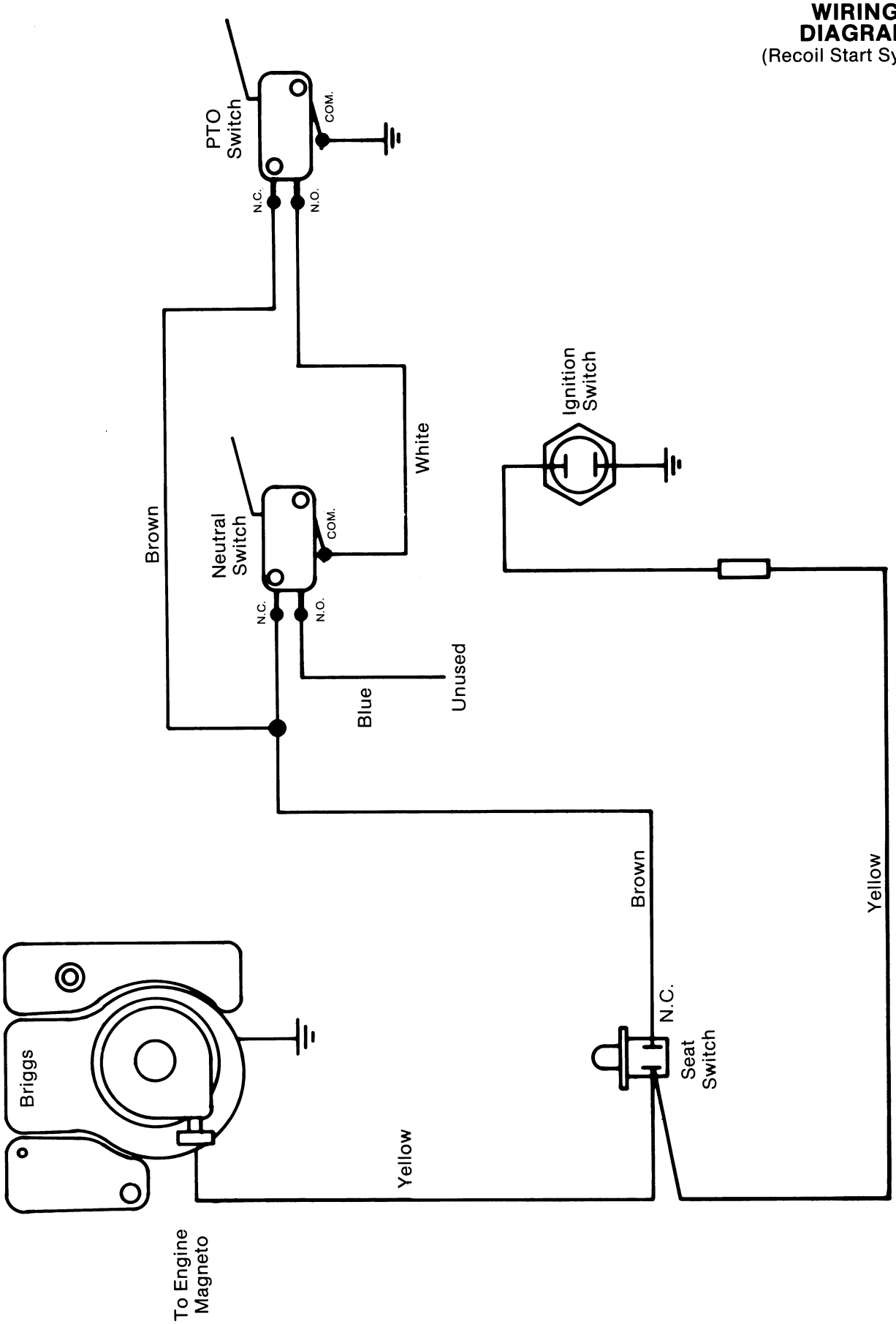
NOTE: To open fuse holder, push in on both ends of holder and turn ends in opposite directions, then pull apart.

Warning: To avoid electrical short, always disconnect negative (-) battery cable before removing fuse. Replace fuse, then battery cable.

WIRING DIAGRAM
(Electric Start System)



WIRING DIAGRAM
(Recoil Start System)



TROUBLE-SHOOTING

PROBLEM	REMEDY	REFERENCE
Engine will not crank to start.	1. Check or recharge battery.	1. ELECTRICAL SYSTEM — BATTERY
	2. Check wiring connections.	2. ELECTRICAL SYSTEM — WIRING DIAGRAM
	3. Replace blown fuse.	3. ELECTRICAL SYSTEM — FUSE
	4. Check ignition switch.	4. ELECTRICAL SYSTEM — IGNITION SWITCH
	5. Check interlock micro switches.	5. ELECTRICAL SYSTEM — INTERLOCK SWITCH
	6. Check solenoid.	6. ELECTRICAL SYSTEM — SOLENOID
	7. Check starting procedures.	7. ELECTRICAL SYSTEM — SYSTEM FUNCTIONS
Engine turns over but fails to start.	1. Fill fuel tank.	
	2. Contact authorized engine dealer.	
Engine starts with mower drive lever or shift lever engaged.	1. Check interlock micro switches.	1. ELECTRICAL SYSTEM — INTERLOCK SWITCH
	2. Check for grounded wire.	2. ELECTRICAL SYSTEM — WIRING DIAGRAM
	3. Check for improper wiring.	3. ELECTRICAL SYSTEM — WIRING DIAGRAM
Engine fails to stop.	1. Loose magneto wire.	1. ELECTRICAL SYSTEM — WIRING DIAGRAM
	2. Check for other loose wiring.	2. ELECTRICAL SYSTEM — WIRING DIAGRAM
	3. Check ignition switch.	3. ELECTRICAL SYSTEM — IGNITION SWITCH
Engine fails to stop with mower drive lever or shift lever engaged with operator off seat.	1. Loose magneto wire.	1. ELECTRICAL SYSTEM — WIRING DIAGRAM
	2. Check for bad ground.	2. ELECTRICAL SYSTEM — WIRING DIAGRAM
	3. Check interlock micro switches.	3. ELECTRICAL SYSTEM — INTERLOCK SWITCH
	4. Check seat switch.	4. ELECTRICAL SYSTEM — INTERLOCK SWITCH
No traction drive.	1. Release parking brake.	
	2. Check or replace traction drive belt.	2. BELTS — TRACTION DRIVE
	3. Wrong belt being used.	3. BELTS — TRACTION DRIVE
	4. Check belt routing.	4. BELTS — TRACTION DRIVE
	5. Check drive chain.	5. TRACTION DRIVE CHAIN
	6. Transmission needs repair or replacement.	6. TRANSMISSION REMOVAL AND REPLACEMENT
	7. Differential needs repair or replacement.	7. DIFFERENTIAL REMOVAL AND REPLACEMENT
	8. Check rear axle drive keys.	
Shift lever misalignment.	1. Transmission linkage needs adjustment.	1. TRANSMISSION SHIFT LINKAGE ADJUSTMENT

PROBLEM	REMEDY	REFERENCE
Traction drive brake fails to engage.	1. Brake pads need adjustment or replacement.	1. TRACTION DRIVE BRAKE — ADJUSTMENT — PAD REPLACEMENT
	2. Adjust brake control rod spring.	2. TRACTION DRIVE BRAKE — ADJUSTMENT
	3. Check engagement linkage.	
	4. Wrong belt being used.	4. BELTS — TRACTION DRIVE
Mower deck blade does not turn.	1. Check or replace mower drive belt.	1. BELTS — MOWER DRIVE BELT REPLACEMENT
	2. Belt engagement spring needs replacement.	2. BELTS — MOWER DRIVE BELT REPLACEMENT
	3. Belt off pulley.	
	4. Check belt routing.	4. BELTS — MOWER DRIVE
	5. Wrong belt being used.	5. BELTS — MOWER DRIVE
Traction drive brake engaged all the time.	1. Brake engagement spring needs adjustment.	1. TRACTION DRIVE BRAKE — ADJUSTMENT
	2. Brake pads need replacement.	2. TRACTION DRIVE BRAKE — ADJUSTMENT
Mower deck blade does not stop within 7 seconds safe stopping time.	1. Replace brake pads.	1. MOWER DRIVE BRAKE — ADJUSTMENT
	2. Readjust jam nuts on brake engagement rod.	2. MOWER DRIVE BRAKE — ADJUSTMENT

BOLT TORQUE SPECIFICATIONS

The following chart lists the standard torque specifications for all capscrews and thread forming screws used in this unit. Unless **special** torques are called for, all torque values must meet these specifications.

	TYPE OF CAPSCREW	SAE GRADE 2 		SAE GRADE 5 		SAE GRADE 5 		SAE GRADE 2 OR 5 ALSO THREAD FORMING SCREWS	
	TYPE OF FASTENER USED	STANDARD HEX NUT		STANDARD HEX NUT		CONE LOCKNUT		INTO TAPPED HOLE	
	TORQUE FACTOR	FT./LBS. MIN.	MAX.	FT./LBS. MIN.	MAX.	FT./LBS. MIN.	MAX.	FT./LBS. MIN.	MAX.
SCREW SIZE	1/4	5	7	9	11	5	7	5	7
	5/16	9	14	18	22	9	14	9	14
	3/8	16	24	30	40	16	24	16	24
	7/16	25	37	50	60	25	37	25	37
	1/2	38	57	75	95	38	57	38	57
	5/8	73	110	150	185	73	110	73	110