DS GASOLINE
MAINTENANCE & SERVICE MANUAL

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Damage to a vehicle or component thereof not resulting from a defect or which occurs due to unreasonable or unintended use, overloading, abuse or neglect (including failure to provide reasonable or necessary maintenance as outlined in the Owner's Manual), accident or alteration, including increasing the speed beyond factory specifications or modifications which affect the stability of the vehicle or the operation thereof, will void the warranty.

FOREWORD

CLUB CAR golf cars are designed and built for maximum efficiency and performance. Proper maintenance and repair is essential for the safe, reliable operation of the golf car. This Service Manual is intended to acquaint the mechanic with the disassembly, reassembly, maintenance, and trouble-shooting procedures required to provide optimum performance and longevity of the car. The information enclosed should be closely studied to avoid unnecessary repairs and to provide the owner with a sound, safer, more dependable vehicle.

It has been assumed that certain basic mechanical procedures are already known and understood by the reader. Without such basic knowledge, repairs or service to this golf car may render the vehicle unsafe. For this reason, we advise that all repairs and/or service be performed by an authorized CLUB CAR distributor's/dealer's representative or a CLUB CAR, INC. factory trained mechanic.

It is CLUB CAR, INC.'s policy to assist its distributors/dealers in building their service knowledge and facilities so they can give prompt, efficient service. CLUB CAR, INC. Golf Car Service Seminars, periodic service bulletins, this manual and other service publications, represent tangible efforts to provide golf car owners the best and most prompt service possible. This Service Manual covers all phases of golf car service, however, a unique situation sometimes arises when servicing a golf car. If a service question does not appear to be answered in this manual, you may contact the CLUB CAR, INC. Sales Engineering Department, P. O. Box 4658, Augusta, Georgia 30917-0658, USA, telephone 706/863-3000, for additional help.

This manual represents the most current information at time of publication. The Research and Engineering Departments of CLUB CAR, INC. are continually working to further improve all models manufactured by the company. These improvements may affect servicing procedures. Any modification and/or significant changes in specifications or procedures will be forwarded to all CLUB CAR distributors and dealers and will, when applicable, appear in future editions of this manual.

TABLE OF CONTENTS

WARNING:

READ ENTIRE MANUAL BEFORE ATTEMPTING TO SERVICE THIS VEHICLE.

SECTION I - SAFETY

Proper service and repair is important for the safe, reliable operation of all mechanical products. The service procedures described and recommended in this manual are safe, effective methods for performing all required service operations on the CLUB CAR DS Gasoline golf car.

This Service Manual has been prepared with two purposes in mind. First, it will acquaint the reader with the design and construction of the CLUB CAR DS gasoline golf car and all safety procedures. Second, it will assist him in performing safe, approved repair methods. All service personnel should read this entire manual **BEFORE** attempting to service this vehicle.

It is important to note that some statements throughout this manual are preceded by the words **DANGER, WARNING, CAUTION** or NOTE. Take special notice of these safety procedures. Safety procedures are essential and **MUST** be followed.

DANGER:

A danger indicates an immediate hazard which will result in severe personal injury or death.

WARNING:

A warning indicates an immediate hazard which could result in severe personal injury or death.

CAUTION:

A caution indicates hazards or unsafe practices which could result in minor personal injury or product or property damage.

NOTE: A note provides key information to make procedures easier or clearer.

GENERAL WARNINGS FOR ALL SERVICE PROCEDURES FOLLOW. SPECIFIC WARNINGS ARE LISTED THROUGHOUT THE MANUAL IN THE APPLICABLE AREA.

SERVICE PERSONNEL SHOULD BECOME VERY FAMILIAR WITH THESE SAFETY WARNINGS AND ADHERE STRICTLY TO THEM WHENEVER THEY ARE SERVICING THE VEHICLE.

WARNING:

Improper use of this vehicle or the failure to maintain it could result in decreased performance or severe personal injury.

Any modification or change to the vehicle which affects the stability, or increases the speed beyond the factory specifications could result in severe personal injury or death.

Do not wear loose clothing. Remove jewelry, such as rings, watches, chains, etc., before servicing.

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing this vehicle.

Turn key switch "Off", remove key, and place forward and reverse lever in "Neutral" position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

WARNING:

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

Moving parts — do not attempt to service the vehicle with engine running.

Hot — do not attempt to service hot engine or exhaust. Can cause extreme burns. Always allow engine and exhaust to cool prior to servicing.

Lift only one end of vehicle at a time. Chock the wheels and lock brakes prior to lifting. Use a suitable lifting device (i.e., chain hoist, hydraulic floor jack) with 1000 lb. minimum lifting capacity. DO NOT use lifting device to hold vehicle in elevated position. Always use approved jack stand of proper weight capacity to support vehicle.

Check the Owner's Manual for proper location of all warning labels and be sure they are in place.

DANGER:

Gasoline — Flammable — Explosive — Do Not Smoke. Keep sparks and flames away from the area of the vehicle.

Engine produces carbon monoxide which is an odorless, deadly poison. DO NOT OPERATE IN AN ENCLOSED AREA WITHOUT PROPER VENTILATION.

Battery — Explosive Gases. Keep sparks, flames, cigarettes away. Ventilate when charging or using in an enclosed space. Always wear approved eye protection when working on or near batteries and their connections.

Battery — Poison/Danger. Contains acid — Causes severe burns — Avoid contact with skin, eyes, or clothing.

Antidotes:

External — Flush with water. Call physician immediately.
Internal — Drink large quantities of milk or water. Follow with milk of magnesia or vegetable oil. Call physician immediately.
Eyes — Flush with water for 15 minutes. Call physician immediately.

SECTION II - GENERAL INFORMATION

SPECIFICATIONS

DIMENSIONS

Overall length	91.25 In.
Overall width	47.25 In.
Overall height	46 In.
Ground clearance	4.5 In.
Front wheel tread	34.5 In.
Rear wheel tread	38.5 In.
Wheel base	65.5 In.
Weight	622 Lbs. dry

PERFORMANCE

Speed	12-14 MPH, governed
Clearance circle (curb to curb)	17 feet, 6 inches
Seating capacity	2 persons

POWER TRAIN

Engine	4 cycle single cylinder, air cooled, 341 cc - 8.5 H.P.
Ignition	CDI electronic ignition
Carburetor	Float bowl with fixed jets and impulse fuel pump
Electrical system	12 volt, 325 cold cranking amp battery and 35 amp charging capacity starter-generator with reverse warning buzzer
Torque Converter	Automatic, variable speed, dry type
Transmission	Forward, reverse and neutral - fully synchromesh 1.03:1 ratio
Governor	Internally geared in transmission - centrifugal type
Drive Unit	Double reduction helical gear with 12.28:1 ratio
Final Ratio	12.64:1 ratio

OTHER

Steering	Self-adjusting rack and pinion
Frame chassis	Twin I-beam welded aluminum
Brakes	Mechanical brake cable system to individual drum brakes on each rear wheel. Park brake is automatically released.
Body	Fiber reinforced plastic (compression molded)
Suspension	Front and rear independent leaf springs with dual hydraulic shocks
Tires	18x8.50-8.00 tubeless, 4-ply rated
Tire Pressure	12-14 psi

OIL CAPACITIES

Engine	40 oz. (1.2 liter) SAE 30 or SAE 5W20, API Classification SE, SF, SD, or SE/CC
Transmission	20 oz. 80W-90 API Class GL-3 80W-90 AGMA Class 5EP
Drive Unit	22 oz. 80W-90 API Class GL-3 80W-90 AGMA Class 5EP
FUEL CAPACITY	7.4 gallon U.S./regular or unleaded gasoline

MODEL IDENTIFICATION

The serial number of your CLUB CAR is stamped on a data plate mounted on the frame directly under the right dash. (Example: AG9005-12345).

NOTE: Always mention this number when ordering parts or making inquiries **(Figure 2-1)**.

Figure 2-1

SAFETY COMMITTEE

If the golf car is to be rented or is part of a fleet, we strongly recommend that a safety committee be appointed. One of the main concerns of this committee should be the safe operation of the golf cars. This includes such things as where the golf cars should be driven, who should and who should not drive the golf cars, instructing all first time drivers in the controls and operation of the golf car, seeing that the golf cars are well maintained in safe driving condition and how the various rules are to be enforced. The safety committee should include all these items at a minimum and such others as the committee feels necessary or appropriate.

PRE-OPERATION CHECKLIST

It is the responsibility of the CLUB CAR distributor/dealer to inspect all cars and make any necessary adjustments prior to delivery to the new owner.

The following checklist has been provided to guide you through a quick but thorough inspection of the DS Gasoline Golf Car.

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing the car.

This inspection should be done upon receiving the vehicle, returning the vehicle from storage and periodically throughout the life of the vehicle to insure the safe and proper operating condition of the vehicle.

Visual Inspection - Look the car over thoroughly for the following:

General:
All the parts should be in place and properly installed. Be sure that all nuts, bolts and screws are tight. All hose clamps should be tight. Check the starter belt for tightness.

Warning Labels:
Check that all warning and operation labels are in place. (See Owner's Manual).

Tires:
Check tire pressure. It should be 12-14 psi.

Engine:
Check for proper engine oil level. (See Section VI, Engine.)

Fuel:
Check fuel level. (See page 2-3.)

Drive Unit:
Check lubricant level. (See page 11-1.)

Transmission:
Check lubricant level. (See page 10-1.)

CAUTION:

Be sure the plastic has been removed from the bottom of the seat before operating vehicle.

Performance Inspection - After you have familiarized yourself with the car's controls (See page 2-3) and have read and understood the driving instructions (See page 2-5), take the car for a test drive. Check the following:

Brakes:
Be sure that the brakes work properly. Both rear wheels should brake properly and the pedal should not go more than halfway to the floor. If it does, have brakes adjusted.

Park Brake:
The park brake should lock the wheels when latched and should release when the accelerator or brake pedal is pushed.

Steering:
The car should be easy to steer and should not have free play in the steering wheel.

Accelerator Pedal:

As the accelerator pedal is pushed, the park brake should release, the engine should start and the car should come smoothly up to full speed. When the pedal is released it should return to the original position and the engine should stop gradually.

Governor:

Check the speed of the car. It should run 12-14 MPH on a level surface.

Fuel Lines, Fittings & Tank:

Check fuel lines for proper routing and clearance with other vehicle components. Check for leaks in fittings, lines and tank. (See page 7-19.)

General:

Listen for any unusual noises such as squeaks or rattles. Check the car's ride and performance. Make all necessary adjustments or repairs following the procedures and warnings listed in this manual.

WARNING:

Any modification or change to the vehicle which affects the stability, or increases the speed beyond the factory specifications could result in severe personal injury or death.

FUELING INSTRUCTIONS

DANGER:

GASOLINE — FLAMMABLE — EXPLOSIVE — NO SMOKING.

Keep sparks and flames from the area of the car. ONLY service or repair in well ventilated area. Never pour gasoline into tank while engine is hot or running.

To avoid electric arc caused by static electricity, the fuel storage/pumping device must be grounded. If pump is not grounded, the vehicle must be grounded to the pump before and during the fueling operation.

1. Lift and remove seat bottom.
2. Fuel tank is located on passenger side of car. Remove fuel cap and fill the fuel tank with regular or unleaded gasoline.

   Do not use gasohol or gasolines with methyl alcohol blends.

CAUTION:

To allow for expansion, do not fill higher than one (1) inch from top of tank.

DANGER:

Be sure to clean up any spilled gas before operating vehicle.

3. Replace fuel cap on tank, being sure cap is tightly sealed to tank.
4. Replace seat bottom.

CONTROLS

WARNING:

If renting or loaning this car, make sure that the driver is familiar with all controls and operating instructions before allowing him to drive the car.

Key Switch - The key switch is mounted on the dash to the right of the steering column **(Figure 2-2)**. It has two (2) positions, "On" and "Off" which are clearly labeled. The key is removable in the "Off" position only.

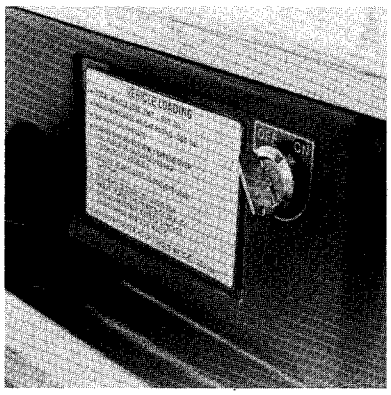


Figure 2-2

WARNING:

Turn key switch to "Off" and remove key when car is not in use to avoid unintentional starting of the car.

Forward-Reverse Control - The forward-reverse shift lever is located below and to the right of the driver's right knee on the seat support panel **(Figure 2-3)**. The lever has three (3) distinct positions: F (forward), N (neutral), and R (reverse). Rotate the lever toward the driver (F) to run the car in forward and toward the passenger (R) to run the car in reverse. When the lever is in the straight up or neutral (N) position, the car will not run and the engine will stop if shifted to this position while running.

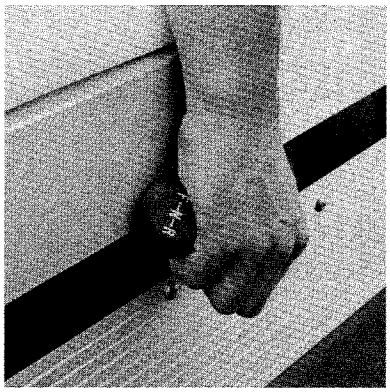


Figure 2-3

WARNING:

Do not shift forward and reverse lever while car is in motion. Always bring car to a full stop before shifting lever to avoid injury to an unsuspecting passenger and damage to the car.

Turn key switch off and place shift lever in neutral when leaving the car to avoid unintentional starting of the vehicle. Remove the key when vehicle is not in use.

Buzzer will sound when car is in reverse to warn anyone in the area.

Neutral Lock-Out - The golf car has a neutral lock-out circuit that prevents the driver from starting the car in neutral. If the car is started in forward or reverse and shifted to neutral the engine automatically stops running.

DANGER:

Engine produces carbon monoxide which is an odorless, deadly poison. DO NOT OPERATE IN AN ENCLOSED AREA WITHOUT PROPER VENTILATION.

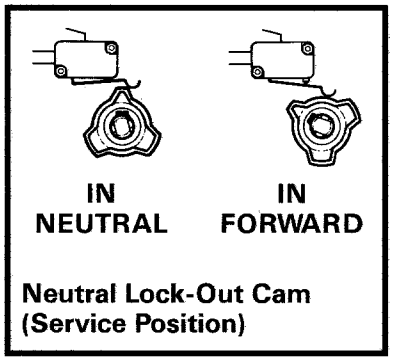
For the convenience of the trained and experienced mechanic, there is a neutral lock-out cam located on the back of the forward and reverse lever. If the neutral lock-out cam is pulled out approximately 3/8 of an inch and rotated one half turn until it snaps back into place, the cam will be in the SERVICE position **(Figure 2-4)**. This will allow the mechanic to run the car in neutral for certain maintenance procedures. With the cam in this position the car will not run if the forward and reverse lever is placed in the forward or reverse positions. To put the cam back into the OPERATE position, pull the cam out approximately 3/8 of an inch and rotate it one half turn until it snaps back into place **(Figure 2-5)**.

NOTE: If car will not run, check to be sure neutral lock-out cam is in OPERATE position.

WARNING:

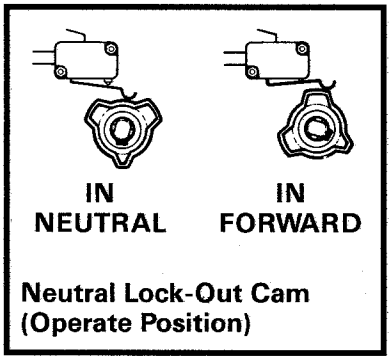
With cam in SERVICE position, car may move suddenly if forward and reverse lever is shifted or accidentally bumped while engine is running.

Chock front and rear wheels to prevent vehicle movement.



Neutral Lock-Out Cam (Service Position)

Figure 2-4



Neutral Lock-Out Cam (Operate Position)

Figure 2-5

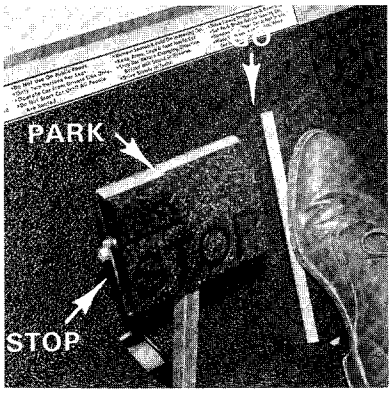


Figure 2-6

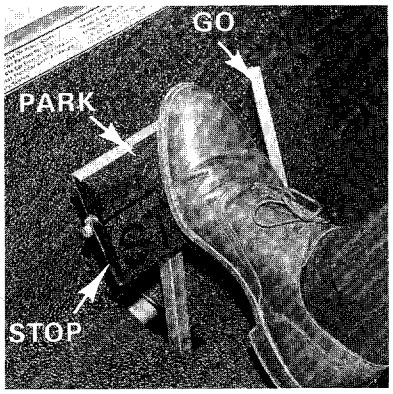


Figure 2-7

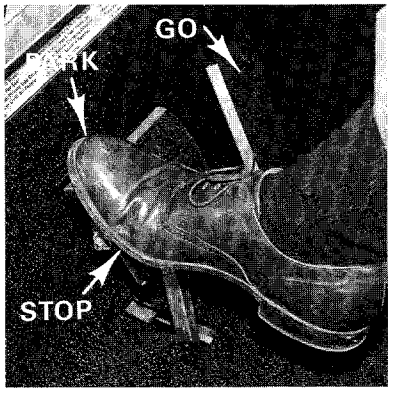


Figure 2-8

Accelerator Pedal - The accelerator pedal is the pedal on the right with the word "GO" molded in it **(Figure 2-6)**. When the key switch is "On" and the shift lever is in either forward or reverse and the accelerator is pushed, the parking brake will be automatically released and the engine will start. When the pedal is pushed further, the engine speeds up and the car will begin to move in the preselected direction (forward or reverse). Push the accelerator pedal further to increase vehicle speed. When the accelerator pedal is released, the engine will stop running.

NOTE: The DS Gasoline car is equipped with a governor to control the maximum speed and is set for 12-14 MPH on a level surface.

The accelerator pedal differs from that of an automobile in the following way: Depressing the accelerator will release the parking brake if engaged. Depressing the accelerator automatically starts the vehicle moving. Each time the accelerator pedal is released, the engine will quit running.

Figure 2-9

WARNING:

Do not tamper with the car's governor. To do so will void the limited warranty, result in damage to engine and other components and could result in severe personal injury or death due to unsafe speeds.

Brake Pedal - The brake pedal is the large pedal on the left with the word "STOP" molded in it **(Figure 2-7)**. To slow or stop the car, push the brake pedal with your right foot.

Parking Brake Pedal - The parking or park brake pedal is the small raised portion in the upper left corner of the brake pedal with the word "PARK" molded in it **(Figure 2-8)**. The words "Park Brake" are marked above this pedal. To set the park brake, push the brake pedal and firmly tilt the park brake portion of the pedal forward with foot.

Figure 2-10

The park brake pedal will release when the accelerator or brake pedal is pushed. The parking brake has many locking teeth so that the brake can be locked in several positions.

WARNING:

Always set the park brake before leaving the golf car to prevent the car from rolling.

Choke - The choke is located below and to the left of the driver's left knee on the seat support panel **(Figure 2-9)**. If on a cool morning the car is hard to start, simply push in the choke cover with your left hand to activate the choke. Release the choke after the engine starts and runs smoothly.

Oil Light - The DS Gasoline golf car is equipped with a dash mounted oil light above the steering column **(Figure 2-10)**. When the oil light is on, it indicates low engine oil. Oil should be added before further use. The car should never be driven if the oil light comes on and stays on. If the oil light goes on and off, you may proceed, but add oil at the first opportunity. If the oil level is correct and light stays on, have a trained and experienced mechanic check the car.

DRIVING INSTRUCTIONS

No one should drive the golf car without first being instructed in the proper operation and use of the golf car controls. An experienced operator should accompany each first time driver on a test drive before they operate the golf car alone. Only licensed drivers should be allowed to drive this vehicle. Do not drive under the influence of alcohol, drugs or medications.

WARNING:

If renting or loaning this golf car, make sure the driver is familiar with all controls and operating procedures before he attempts to drive the car.

This car is not specially equipped for handicapped persons. Be sure all persons can properly operate the car prior to allowing them to drive.

To insure safe operation of the DS Gasoline golf car, follow all of the procedures listed below exactly and in order. Read and understand all instructions prior to driving the car.

Starting the Car:

1. Enter the car.
2. Be sure everyone is seated.
3. Study and understand controls.
4. Read safety warnings located above pedals.
5. Make sure wheels are turned in desired direction.
6. Be sure nothing is in your path.
7. Turn key to "On" position.
8. Select direction by placing shift lever in desired position F = forward or R = reverse.
9. Slowly push accelerator pedal to increase speed. The park brake pedal will release when accelerator pedal is pushed.

WARNING:

No more than two people should be on the vehicle at one time.

Stop car before shifting forward and reverse lever. Failure to do so could result in injury to an unsuspecting passenger and damage to the golf car.

A buzzer will sound when the car is in reverse to warn anyone in the area.

WARNING:

When Driving The Car:

- **Operate the car from the driver's seat only**
- **Remain seated in moving car and hold on to prevent falls.**
- **Keep arms, legs, feet and entire body inside car to prevent getting them caught between the golf car and the ground or other objects.**
- **Drive slowly in turns and drive slowly straight up and down slopes to prevent turning over.**
- **Reduce speed for poor driving conditions such as wet grass or rough terrain to avoid losing control of the car.**
- **Do not use on public roads. This car is not designed or intended for street use and should not be licensed for use on public roads.**
- **Obey all local rules concerning golf cars.**
- **Cars should be driven only in specified areas by trained people.**

Stopping the Car - To stop the car, release the accelerator pedal and push the brake pedal with your right foot.

CAUTION:

When stopped on a hill, use the brakes to hold your position, not the accelerator pedal.

WARNING:

Driving through deep water may affect the brakes. Check their effectiveness by pressing the brake pedal gently. If the car does not slow down at the normal rate, continue to apply the brakes gently until they dry out and normal performance returns.

Parking and Leaving the Car

1. After stopping the car, firmly push park brake pedal until it locks. This will prevent the car from rolling.
2. Turn the key to "Off" and place shift lever in the straight up "Neutral" position when the car is not in use. This avoids unintentional starting of car. Remove key when the car is not in use.

WARNING:

Never stand in front of or behind car to avoid being struck by a golf car.

TOWING AND TRANSPORTING

Towing - All CLUB CARS are equipped with tow bar attaching points both front and rear. For breakdown towing and single-car towing, a light-duty tow bar is available. For multi-car towing, a heavy-duty tow bar is available. Observe all of the following warnings and precautions when towing.

WARNING:

Never tow a golf car on public streets or highways.

Use only approved CLUB CAR tow bars.

Extreme caution should be used when towing any golf car.

Do not exceed five (5) miles per hour towing speed.

Do not tow more than one (1) car with another CLUB CAR.

If more than one car must be towed, a properly fitted vehicle with tow hitch height of 11 inches should be used. Only heavy-duty tow bars should be used for multi-car towing. Never tow more than five (5) cars at one time.

Do not allow people in cars being towed.

Avoid sudden starts and stops and tight turns.

Turn key switch off and place shift lever in neutral when car is in tow.

Transporting On A Trailer - If your golf car must be transported over long distances or on public highways, it should be done on an approved trailer observing all the following warnings and precautions.

WARNING:

For use on public roads the trailer must meet all federal, state and local requirements such as taillights, brake lights, etc.

Always use an approved trailer that has a load rating of 1200 lbs. per golf car. (Example: A 2-car trailer should be rated at 2 x 1200 = 2400 lbs.).

The golf car should be securely tied down to the trailer. The golf car's key switch should be "Off", the shift lever in "Neutral" and the park brake firmly applied and locked.

When towing a trailer, normal speeds should be reduced and care should be used when turning a corner due to the added length of the trailer.

Never tow a golf car behind a passenger vehicle or truck unless it is on an approved trailer.

Remove the windshield before transporting a golf car on a trailer.

STORAGE

To prepare your golf car for extended off season storage:

WARNING:

Turn key switch to "Off", remove key and place forward and reverse lever in "Neutral" position.

1. Store in a cool place. This will prevent self discharge of the battery. If the battery appears to be weak, have it charged by a trained mechanic.

CAUTION:

Batteries in low state of charge will freeze at low temperatures.

WARNING:

Do not attempt to charge a battery if it is frozen or the case is bulged. Discard battery. Frozen batteries can explode.

2. Using a siphon with a suction device (**Figure 2-11**), drain all of the gas out of the tank into an approved gasoline container.

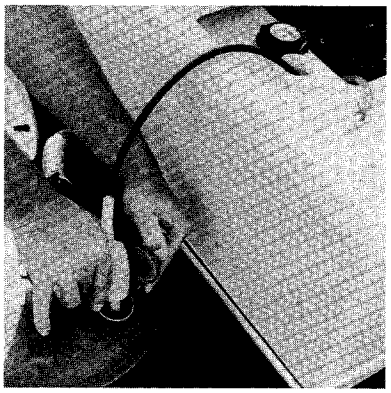


Figure 2-11

WARNING:

Never attempt to siphon gasoline using a hose without a built-in suction device.

Never attempt to siphon gasoline using your mouth.

DANGER:

Gasoline - Flammable - Explosive - Do Not Smoke. Keep sparks and flames away from area of cars.

Do not attempt to drain gasoline while engine is running or hot.

Store gasoline only in an approved gasoline container in a well-ventilated area. Keep out of reach of children. Keep sparks, fire and flames away from area of gasoline.

Engine produces carbon monoxide which is an odorless, deadly poison. DO NOT OPERATE IN AN ENCLOSED AREA WITHOUT PROPER VENTILATION.

3. Be sure the tank has been drained and the stored gasoline has been removed from the area. Place the forward and reverse lever in "Neutral". Place neutral lock-out cam in the SERVICE position. Run the engine until all of the gasoline has been drawn out of the fuel lines and carburetor. The engine will stall. Return neutral lock-out cam to the OPERATE position. Turn the key switch to the "Off" position and remove key.
4. To protect the engine, remove the spark plug and pour ½ ounce of SAE 10 weight oil into the engine through the spark plug hole. Rotate the engine several times and then reinstall the spark plug.

NOTE: When restarting engine, it may smoke excessively due to the oil added in step 4.

5. Increase the tire pressure to 20 psi.
6. Grease front suspension and do all quarterly periodic lubrication shown in lubrication chart.
7. Thoroughly clean body, seats and underside of car.
8. Do not latch the park brake. Block the wheels to prevent the car from rolling.

To Return Stored Cars To Service:

1. Fill the gas tank with regular or unleaded gasoline. (See Fueling Instructions, page 2-3.)
2. Readjust tire pressure to 12-14 psi.
3. Perform the pre-operation checks (See page 2-2) before returning the car to service.

SECTION III - PERIODIC MAINTENANCE

GENERAL INFORMATION

To ensure you have a trouble-free car or fleet operation and receive the maximum amount of revenue the car(s) can provide, it is very important to implement and follow an established preventive maintenance program on your car(s). This is the least expensive maintenance requirement. Preventive maintenance means regularly scheduled services which include certain maintenance procedures that are performed on the cars even though the cars are functional and in operation. A good preventive maintenance program can prevent more expensive repairs from being required.

To ensure trouble free operation, follow the instructions as outlined in the Periodic Service Schedule, Periodic Lubrication Chart and Periodic Service Chart in this manual.

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual. Refer to applicable section.

PERIODIC SERVICE SCHEDULE

The following charts outline recommended intervals for lubrication and maintenance operations.

A daily check of critical areas such as brake operation, accelerator operation, steering and tires should be performed. Any car that is not functioning correctly should be removed from use until it is properly repaired.

REGULAR INTERVAL	SERVICE	REFER TO SECTION
Daily	Check that all warning and operation labels are in place (See Owner's Manual)	
	Check brake pedal play and brake operations and adjust if necessary	XIII
	Check steering, linkages and adjust if necessary	XII
	Check tires for cuts, cracks and excessive wear	XII
	Check engine for proper operation	VI
	Check torque converter for proper operation	IX
	Check transmission for proper operation	X
	Check reverse warning buzzer for proper operation	V
	Check accelerator/governor linkage for free movement and return	VII
	Check transmission shift linkage	X
	Check engine air intake screen to be sure it is not clogged	VI
	Check to be sure park brake latches and releases properly	XIII
Weekly	Clean battery terminals and wash dirt off battery case	V
	Wash underside of car, engine compartment and torque converter	
	Check speed of vehicle	VII
	Check all electrical wires and grounds for tightness	V
	Inspect vehicle for loose hardware and tighten as required	
	Check all daily items listed above	
Monthly	Check tire pressure and adjust to 12-14 PSI	XII
	Check engine oil level	VI
	Check muffler and exhaust for leaks	VIII
	Check fuel tank, lines, pump and carburetor for fuel leakage	VII
	Check air intake expansion chamber for leaks, replace if necessary	VII
	Check all daily, and weekly items listed above	
Quarterly	Do quarterly lubrication as shown in lubrication chart	III
	Check all daily, weekly, and monthly items listed above	
Semi-Annual (Every 100 Rounds or 50 Hours of Operation)	Check air filter, replace as required	VII
	Check front wheel alignment	XII
	Adjust and clean brakes	XIII
	Check lubricant in drive unit	XI
	Check lubricant in transmission	X
	Check spark plug wire for damage and proper routing	VI
	Check starter-generator belt tension, adjust as required	V
	Check condition of muffler	VIII
	Inspect drive belt, replace as required	IX
	Check all daily, weekly, monthly, and quarterly items listed above	

PERIODIC SERVICE SCHEDULE

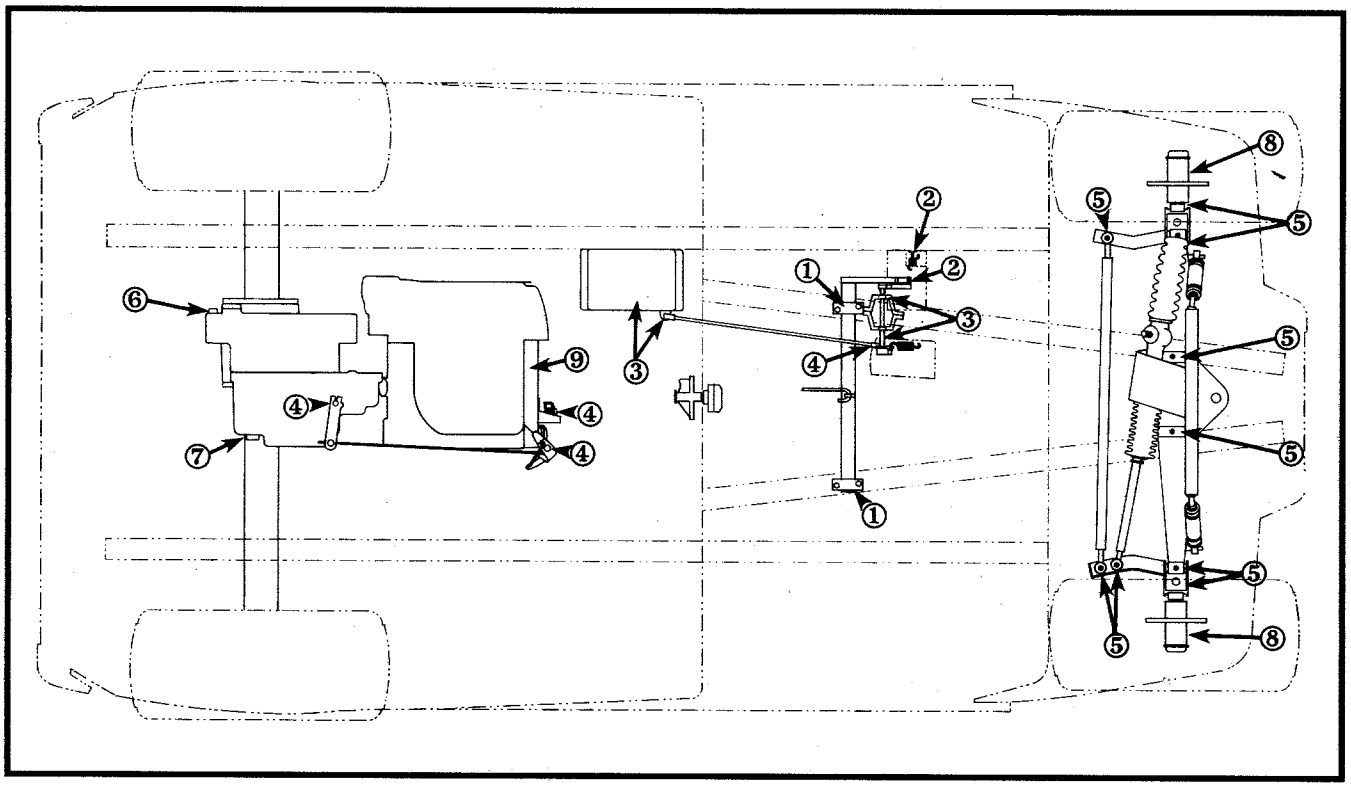
REGULAR INTERVAL	SERVICE	REFER TO SECTION
Annual (Every 200 Rounds or 100 Hours of Operation)	Inspect front wheel bearings and repack as necessary	XII
	Replace fuel filters	VII
	Inspect spark plug, clean and regap, replace as required	VI
	Change engine oil	VI
	Inspect starter-generator brushes, replace as required	V
	Check exhaust header/pipe flange connection gasket	VIII
	Check all daily, weekly, monthly, and quarterly items listed above	

WARNING:

If your periodic service inspection reveals any problems, do not operate vehicle until repairs are made. Failure to make necessary repairs could result in fire, severe personal injury or death.

PERIODIC LUBRICATION SCHEDULE AND LUBRICATION CHART

REGULAR INTERVAL	SERVICE	RECOMMENDED LUBRICANT
Quarterly	1. Brake Shaft Bearing	Dry Moly Lube CLUB CAR part #1012151
	2. Brake Linkage and Pivots	Dry Moly Lube CLUB CAR part #1012151
	3. Accelerator Push Rod Pivots	Dry Moly Lube CLUB CAR part #1012151
	4. Throttle and Governor Pivots	Dry Moly Lube CLUB CAR part #1012151
	5. Front Suspension (9 fittings)	Chassis Lube
Semi-Annually	6. Check/Fill Drive Unit to Level Plug	80-90 WT. API Class GL-3 or 80-90 WT. AGMA Class 5 EP Gear Lube
	7. Check/Fill Transmission to Level Plug	80-90 WT. API Class GL-3 or 80-90 WT. AGMA Class 5 EP Gear Lube
Annually	8. Inspect Front Wheel Bearings and repack as necessary	Chassis Lube
	9. Change Engine Oil	40 oz. SAE 30 or SAE 5W20 (See Figure 3-1)



ENGINE OIL

Use oil viscosity, as shown on the temperature chart for the expected air temperature range during the drain interval. Use premium quality engine oils meeting performance requirements of:

— API Service Classification SD, SE, SE/CC or SF.

Quality engine oils are blended, so additives are neither required nor recommended.

Some increase in oil consumption may be expected when SAE 5W20 oil is used. Check oil level frequently.

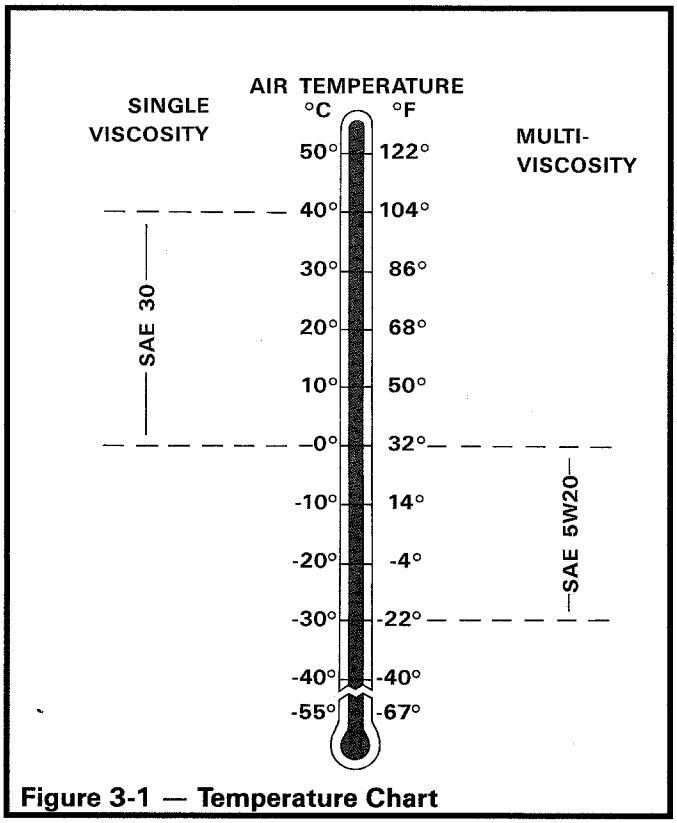


Figure 3-1 — Temperature Chart

PERIODIC SERVICE CHART

	DAILY	WEEKLY	MONTHLY	QUAR-TERLY	SEMI-ANNUAL	ANNUAL	COMMENTS
ACCELERATOR ACTUATOR ROD A. Check	X						Check for proper operation, adjust as necessary
AIR FILTER A. Check					X		Replace as required
AIR INTAKE HOSE A. Check				X			Check clamps for tightness, hose for cracks
BATTERY A. Check		X					Clean terminals and wash dirt from battery container Battery is maintenance free
BRAKES A. Check B. Adjust	X				X		Check pedal play and brake operation Clean and adjust brakes, replace shoes as necessary
CONTROL LINKAGE Accelerator Cable/ Pedal Choke Throttle Linkage Governor Linkage	 X X X X			 X X X			Check for proper operation daily Lubricate quarterly
DRIVE BELT A. Inspect					X		For wearing and glazing, replace as required

PERIODIC SERVICE CHART

	DAILY	WEEKLY	MONTHLY	QUAR-TERLY	SEMI-ANNUAL	ANNUAL	COMMENTS
DRIVE UNIT A. Check lubricant					X		Check/fill drive unit to level plug 80-90 WT API Class GL-3 or 80-90 WT AGMA Class 5 EP Gear Lube
ENGINE A. Check			X				Check for leaks around gaskets, fill plugs, etc.
ENGINE AIR INTAKE A. Check	X						Be sure engine air intake screen is not clogged with dry grass, mud or any obstacles
ENGINE GROUND WIRES A. Check			X				Be sure both ground wires are tight and properly connected
ENGINE OIL LEVEL A. Check B. Change oil			X			X	Use SAE 30 or SAE 5W20 (See Figure 3-1)
FRONT WHEEL BEARINGS A. Inspect						X	Inspect and check for free-play Repack and adjust as required, use chassis lube
FUEL LINES, TANK, PUMP AND CARBURETOR A. Inspect			X				Check for leaks
FUEL FILTERS A. Replace						X	
MUFFLER AND EXHAUST A. Inspect			X				Check for leaks
PARK BRAKE A. Check	X						Check to be sure park brake latches and releases properly
REVERSE BUZZER A. Check	X						Check for proper operation
SPARK PLUG A. Inspect						X	Inspect, clean and regap, replace as required
STARTER-GENERATOR BELT A. Check					X		Check belt tension, adjust as required Check for wear
STARTER-GENERATOR BRUSHES A. Check						X	Check brush length, replace as required

PERIODIC SERVICE CHART

	DAILY	WEEKLY	MONTHLY	QUAR-TERLY	SEMI-ANNUAL	ANNUAL	COMMENTS
STEERING							
A. Check	X						Check for proper operation
B. Lubrication (Spindles and Linkages)				X			Use chassis lube
TIRES							
A. Check for wear and damage	X						Examine for cuts, cracks and wear
B. Check tire pressure			X				Air pressure (12-14 psi) (18 psi for heavy loads)
TORQUE CONVERTER							
A. Check	X						Check for proper operation
B. Clean		X					Rinse with water
TRANSMISSION							
A. Check lubricant					X		Check/fill transmission to level plug 80-90 WT API Class GL-3 or 80-90 WT AGMA Class 5 EP Gear Lube
B. Shift linkage	X						Check for proper operation
WHEEL ALIGNMENT							
A. Check					X		Adjust as required

WARNING:

If your periodic service inspection reveals any problems, do not operate vehicle until repairs are made. Failure to make necessary repairs could result in fire, severe personal injury or death.

SECTION IV - TROUBLE-SHOOTING

Your DS Model Gasoline CLUB CAR will operate a long time without repairs if it is given proper care and preventive maintenance. The following check list will be helpful in identifying operating difficulties should they occur. The check list includes the symptom, probable causes and suggested checks to make. The procedures used in making these checks can be found in the sections of the Service Manual referred to.

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual. Refer to applicable section.

SYMPTOM AND CAUSE	REFER TO SECTION
ENGINE IS HARD STARTING	
1. Spark plug partially fouled or in poor condition.	VI - Engine
2. Spark plug wire damaged.	VI - Engine
3. Loose wire connection at CDI unit.	V - Electrical Circuit Testing
4. CDI unit failed.	V - Electrical Circuit Testing
5. Low cylinder compression.	VI - Engine
6. Water or dirt in fuel system and/or carburetor. Dirty or clogged fuel filters.	VII - Fuel System
7. Carburetor improperly adjusted.	VII - Fuel System
8. Starter-generator belt slipping.	V - Starter-Generator
ENGINE STARTS BUT RUNS IRREGULARLY OR MISSES	
1. Spark plug partially fouled or in poor condition.	VI - Engine
2. Spark plug wire damaged.	VI - Engine
3. CDI unit failed.	V - Electrical Circuit Testing
4. Water or dirt in the carburetor.	VII - Fuel System
5. Water or dirt in fuel system or dirty or clogged fuel filter.	VII - Fuel System
6. Fuel pump malfunction, fuel pressure to engine too low.	VII - Fuel System
7. Carburetor float adjustment incorrect.	VII - Fuel System
ENGINE TURNS BUT FAILS TO START	
1. Gasoline tank empty.	VII - Fuel System
2. Gasoline line or filters clogged.	VII - Fuel System
3. Fouled spark plug.	VI - Spark Plugs
4. Spark plug wire damaged.	VI - Spark Plugs
5. Loose wire connection at CDI.	V - Electrical Circuit Testing
6. CDI unit failed.	V - Electrical Circuit Testing
7. Engine flooded with gasoline as a result of overchoking.	II - Controls and Operation
8. Kill circuit grounded.	V - Electrical Circuit Testing
9. Fuel pump malfunction or failure.	VII - Fuel System
ENGINE OVERHEATS	
1. Fan screen partially blocked or plugged.	VI - Engine
2. Incorrect governor adjustment.	VII - Fuel System
ENGINE PRE-IGNITES	
1. Excessive carbon deposit on piston head, or in combustion chamber.	VI - Engine
2. Spark plug heat range is incorrect for the engine.	VI - Engine
3. Unsuitable or contaminated fuel.	VII - Fuel System
ENGINE HAS LOSS OF POWER	
1. Exhaust valve restricted with carbon deposit.	VI - Engine
2. Muffler or exhaust pipe plugged with carbon or other restriction.	VIII - Exhaust System
3. CDI unit failed.	V - Electrical Circuit Testing
4. Air filter dirty or clogged.	VII - Fuel System
5. Governor improperly adjusted.	VII - Fuel System
6. Throttle linkage out of adjustment.	VII - Fuel System

SYMPTOM AND CAUSE	REFER TO SECTION
ENGINE HAS LOSS OF POWER (Continued)	
7. Spark plug failed.	VI - Engine
8. Restricted fuel flow.	VII - Fuel System
9. Torque converter not backshifting properly.	IX - Torque Converter
SPARK PLUG FOULS REPEATEDLY	
1. Incorrect plug.	VI - Engine
2. Spark plug wire damaged.	VI - Engine
3. Unsuitable gasoline or incorrect (rich) fuel mixture.	VII - Fuel System
4. CDI unit failed.	V - Electrical Circuit Testing
5. Dirt entry.	VII - Fuel System
CARBURETOR FLOODS	
1. Inlet valve or seat leaking, dirty, worn or damaged.	VII - Fuel System
2. Float damaged and filled with gasoline.	VII - Fuel System
3. Incorrect float level setting.	VII - Fuel System
STARTER FAILS TO OPERATE	
1. Neutral lock-out cam is in the wrong position.	V - Electrical Circuit Testing
2. Fuse blown.	V - Starter Circuit
3. Battery dead.	V - Battery
4. Starting control circuit not operating.	V - Starter Circuit
5. Starter-generator failed.	V - Starter-Generator
6. Starter solenoid failed.	V - Starter Circuit
7. Accelerator micro switch failed.	V - Starter Circuit
8. Key Switch failed.	V - Starter Circuit
9. Neutral lock-out micro switch failed.	V - Neutral Lock-out Circuit
STARTER-GENERATOR DOES NOT CHARGE BATTERY	
1. Loose or broken wire in starter-generator circuit.	V - Starter-Generator
2. Generator field coil shorted.	V - Starter-Generator
3. Brushes worn or commutator dirty.	V - Starter-Generator
4. Starter-generator belt loose or slipping.	V - Starter-Generator
5. Voltage regulator failed.	V - Generator Circuit
6. Battery failed.	V - Battery
TRANSMISSION DOES NOT ENGAGE OR DISENGAGE SMOOTHLY	
1. Transmission shifter linkage binding or out of adjustment.	X - Transmission
2. Insufficient (low) level of lubricant in transmission or wrong type of lubricant in transmission.	X - Transmission
3. Internal gears damaged or worn.	X - Transmission
4. Synchronizer rings worn or damaged.	X - Transmission
EXCESSIVE VIBRATION	
1. Engine mounting bolts or nuts loose.	VI - Engine
2. Defective or worn engine mounts.	VI - Engine
3. Rubber snubber on inner frame worn or damaged.	VI - Engine
4. Misaligned muffler mounting clamp.	VIII - Exhaust System
5. Damaged drive belt or starter belt.	IX - Torque Converter
6. Damaged drive clutch.	IX - Torque Converter
7. Damaged driven clutch.	IX - Torque Converter
8. Damaged starter-generator pulley.	V - Starter-Generator
9. Misaligned clutches.	IX - Torque Converter
10. RPM setting incorrect.	VII - Fuel System
TORQUE CONVERTER DOES NOT SHIFT SMOOTHLY	
1. Drive belt worn, cracked, glazed or frayed.	IX - Torque Converter
2. Drive clutch malfunction.	IX - Torque Converter
3. Driven clutch malfunction.	IX - Torque Converter
4. Governor sticking.	X - Transmission
ENGINE WON'T QUIT RUNNING	
1. Kill circuit wire is disconnected from CDI.	V - Electrical Circuit Testing

SECTION V - ELECTRICAL SYSTEM

GENERAL INFORMATION

The electrical system on the DS Gasoline is a 12 volt DC negative ground system.

The electrical system consists of seven (7) readily-identifiable circuits. They are:

1. Starter circuit
2. Generator circuit
3. Engine ignition circuit
4. Engine kill circuit
5. Reverse buzzer circuit
6. Low oil warning circuit
7. Neutral lock-out circuit

Recognizing and understanding the function of each of these circuits will allow one to quickly isolate the source of an electrical problem.

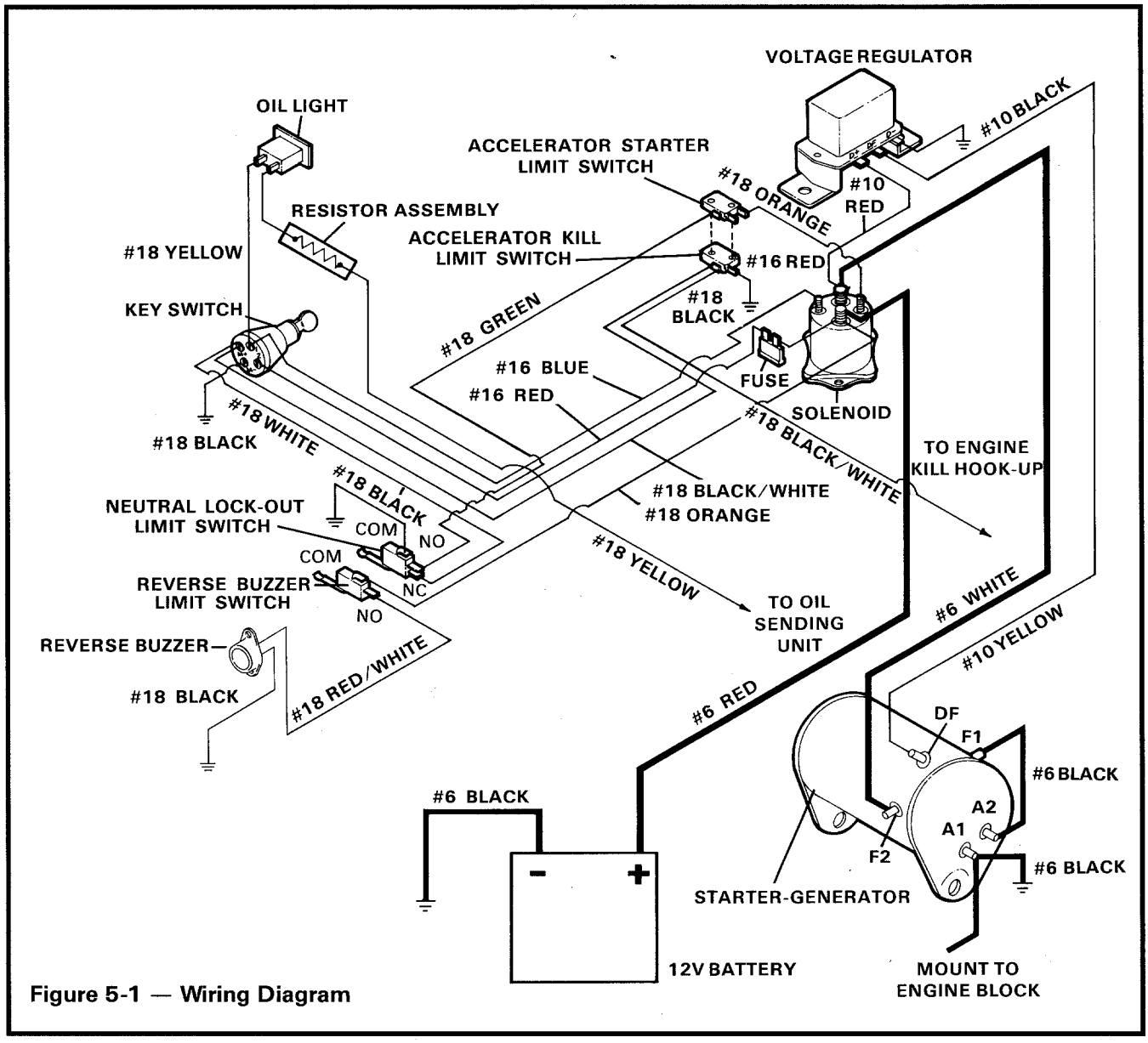


Figure 5-1 — Wiring Diagram

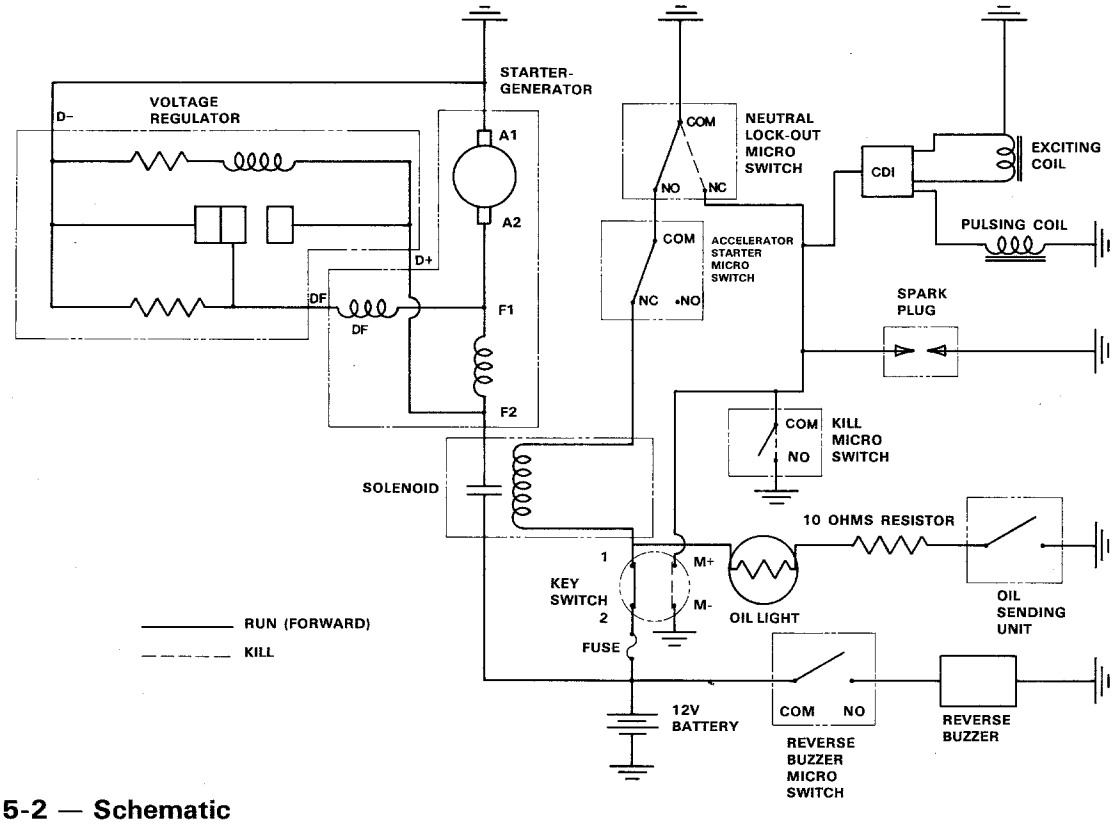


Figure 5-2 — Schematic

ELECTRICAL CIRCUIT TESTING

1) THE STARTER CIRCUIT

The starter circuit consists of a 12 volt battery, fuse, key switch, accelerator starter limit switch, neutral lock-out limit switch, solenoid and starter **(Figure 5-3)**.

The battery is the source of power for the system and the fuse protects the circuit should an electrical short occur.

With the key switch on, the accelerator pedal depressed and the neutral lock-out limit switch actuated, (see Neutral Lock-out Circuit, page 5-14), power is supplied to the solenoid which closes the circuit to the starter. The starter turns, cranking the engine through belt driven pulleys. Note that the starter circuit is completely independent of the ignition circuit. The battery does not supply power for ignition. The battery supplies power to the starter which in turn starts the engine rotating. Once the engine is running, the ignition circuit supplies power to the spark plug. (See Ignition Circuit, page 5-7.)

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing the vehicle.

Turn key switch off and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

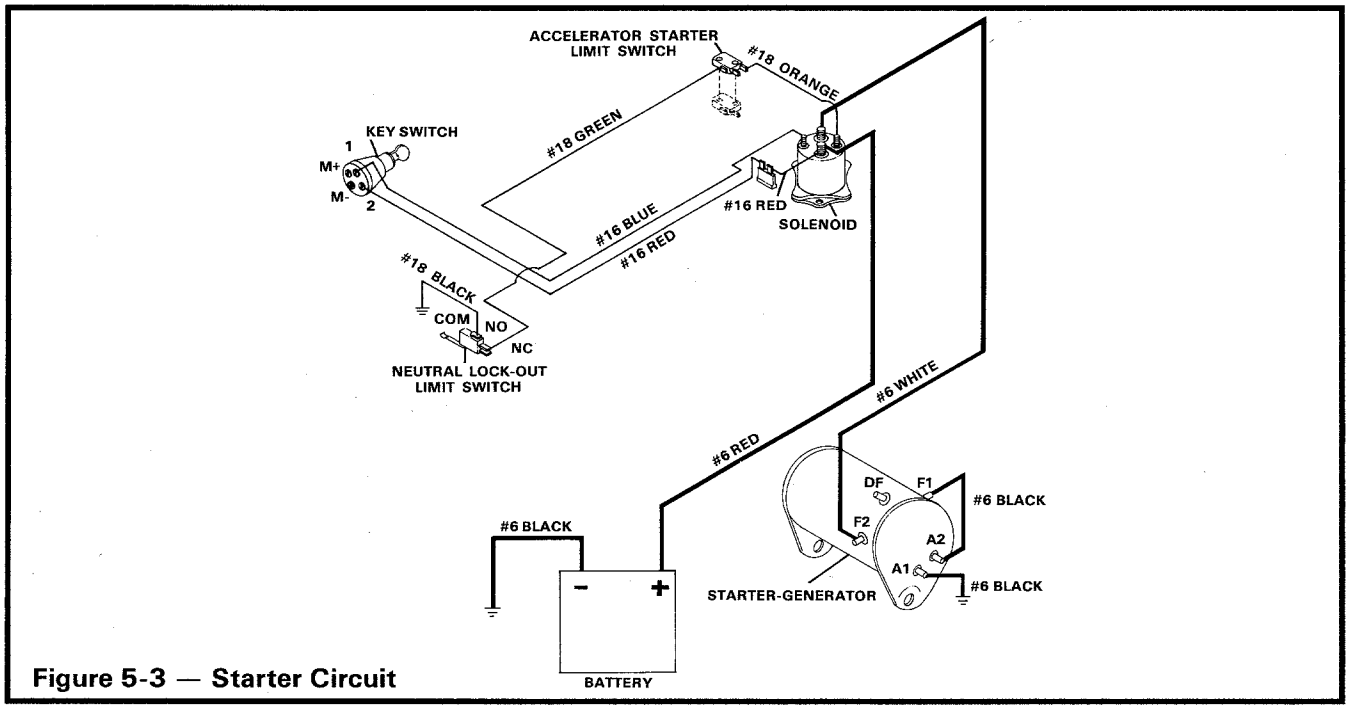


Figure 5-3 — Starter Circuit

To Test the Circuit:

ITEM	TEST	CORRECT READING	CORRECTIVE ACTION
Battery	1) Set VOM at Volts-DC-20 volt range-check battery (open circuit) voltage. Red probe positive (+). Black probe to negative (–). **(Figure 5-4)**	12.4 volts minimum	1) See BATTERY testing.
	2) Check for loose or corroded battery terminal connection.	---	2) Tighten and clean as necessary.

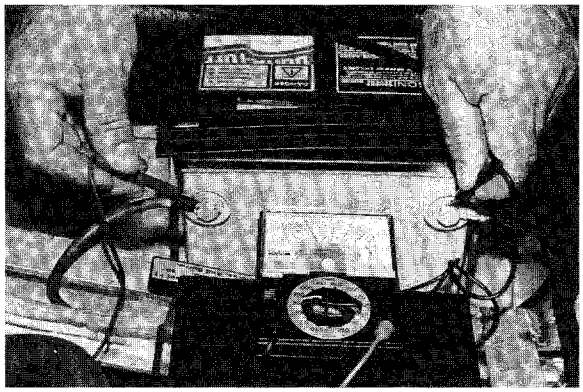


Figure 5-4

Fuse	1) Check for proper wiring and tight connections.	---	1) Rewire or tighten as necessary.
	2) Remove fuse. Set VOM on ohms (RX1) Check continuity.	Zero (0) ohms	2) Replace Fuse. NOTE: Check for worn insulation and/or bare wires touching frame or engine. Bare wires will cause a fuse to blow.

To Test the Circuit: (Continued)

ITEM		TEST	CORRECT READING		CORRECTIVE ACTION
Key Switch	1)	Check for proper wiring and tight connections.	---	1)	Rewire or tighten as necessary.
	2)	Set VOM on ohms (RX1). Check continuity across M- and M+ and across 1 and 2. **(Figure 5-5)**			
		Switch Off M- to M+	Zero (0)	2)	If reading is not correct. Replace key switch.
		1 to 2	Infinity (∞)		
		Switch On M- to M+	Infinity (∞)		
		1 to 2	Zero (0)		
Ground Straps	1)	Check continuity between A1 terminal of starter-generator and frame	Zero (0) ohms	1)	Check both ground straps and tighten terminals or replace ground straps.

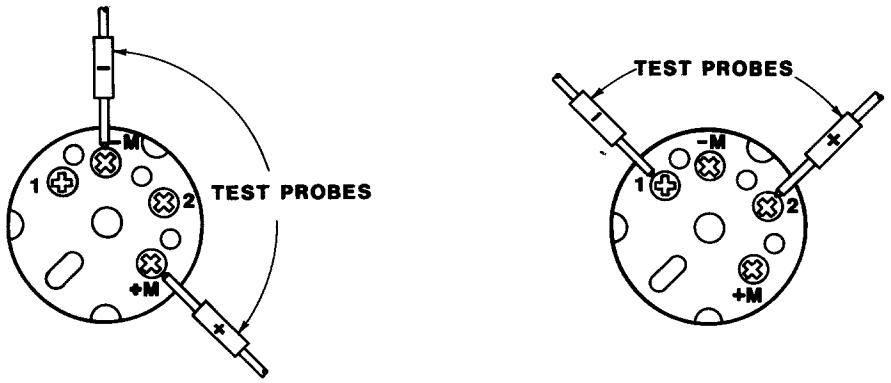


Figure 5-5 — Key Switch

Accelerator Starter Limit Switch	1)	Check for proper wiring and tight connections.	---	1)	Rewire or tighten as necessary.
	2)	Set VOM on ohms (RX1). Check continuity across common (COM), normally open (NO) and normally closed (NC). **(Figure 5-6)**			
		Lever not depressed COM to NC	Zero (0)	2)	If reading is not correct. Replace switch.
		COM to NO	Infinity (∞)		
		Lever depressed COM to NC	Infinity (∞)		
		COM to NO	Zero (0)		

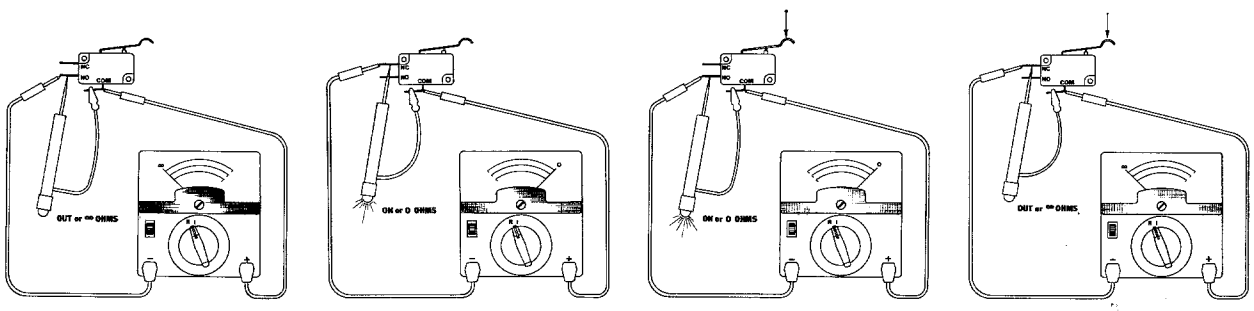


Figure 5-6 — Switch Test (Three Post)

To Test the Circuit: (Continued)

ITEM	TEST	CORRECT READING	CORRECTIVE ACTION
Solenoid	1) Check for proper wiring and tight connections	---	1) Rewire or tighten as necessary.
	2) Set VOM on ohms (RX1). Measure resistance across the small studs.	14 to 16 ohms	2) If reading is not within limits, replace solenoid.
	3) With battery disconnected and solenoid wires removed, measure continuity across large contact studs. **(Figure 5-7)**	Infinity (∞)	3) If meter reads less than infinity (∞), replace solenoid.
	4) Activate solenoid using 12 volt battery as shown in **Figure 5-7** and measure continuity across large contact studs.	Zero (0) ohms	4) If a higher reading is obtained, replace solenoid.
Starter	1) Check for proper wiring and tight connections.	---	1) Rewire or tighten as necessary.
	2) Set VOM on ohms (RX1). Check continuity across F2 and F1.	.006 ohms	2) If reading is not correct. See Starter Repair.
	3) If car still will not start		3) See Starter Repair.
Neutral Lock-out Limit Switch	1) See Neutral Lock-out Circuit Page 5-14		

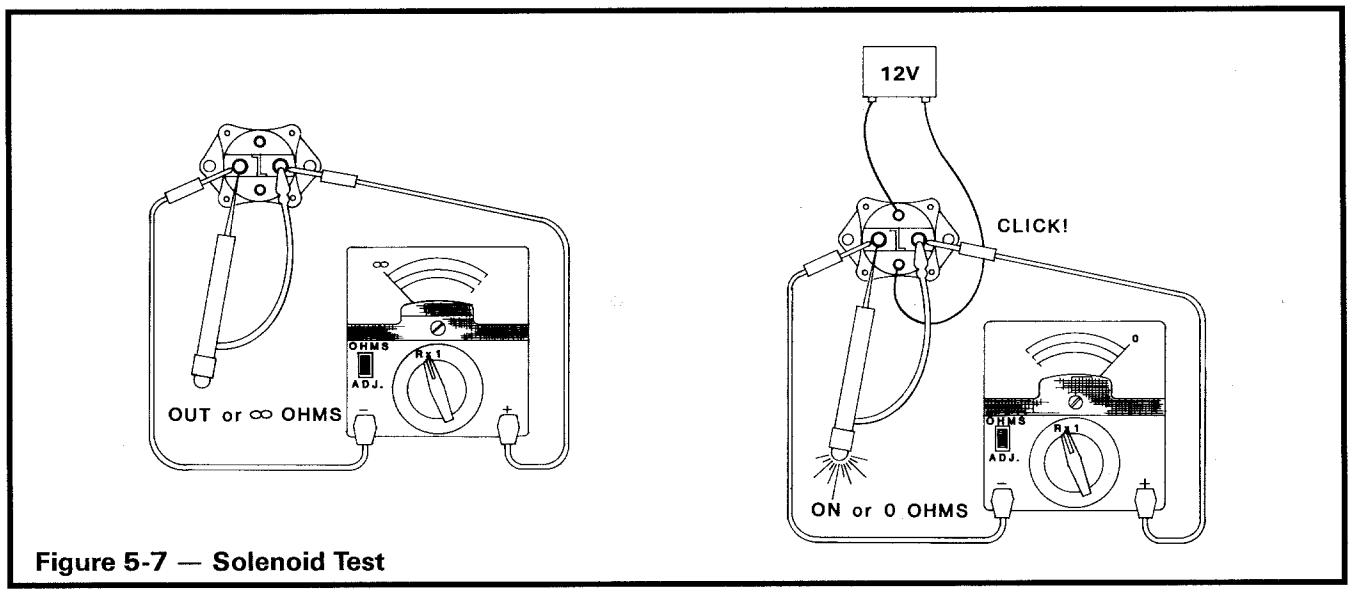


Figure 5-7 — Solenoid Test

2) THE GENERATOR CIRCUIT

The generator circuit consists of the starter-generator, voltage regulator, solenoid and battery **(Figure 5-8)**.

When power is first supplied to the starter-generator, it turns the engine at low RPM (approx. 700). Once the engine fires and starts running, the engine then drives the starter-generator. At any engine RPM over 1650 (3000 starter-generator RPM), the starter-generator functions as a generator supplying a charging current to the battery. The voltage regulator senses battery voltage and by opening and closing a set of points controls the amount of charge going to the battery to prevent overcharge.

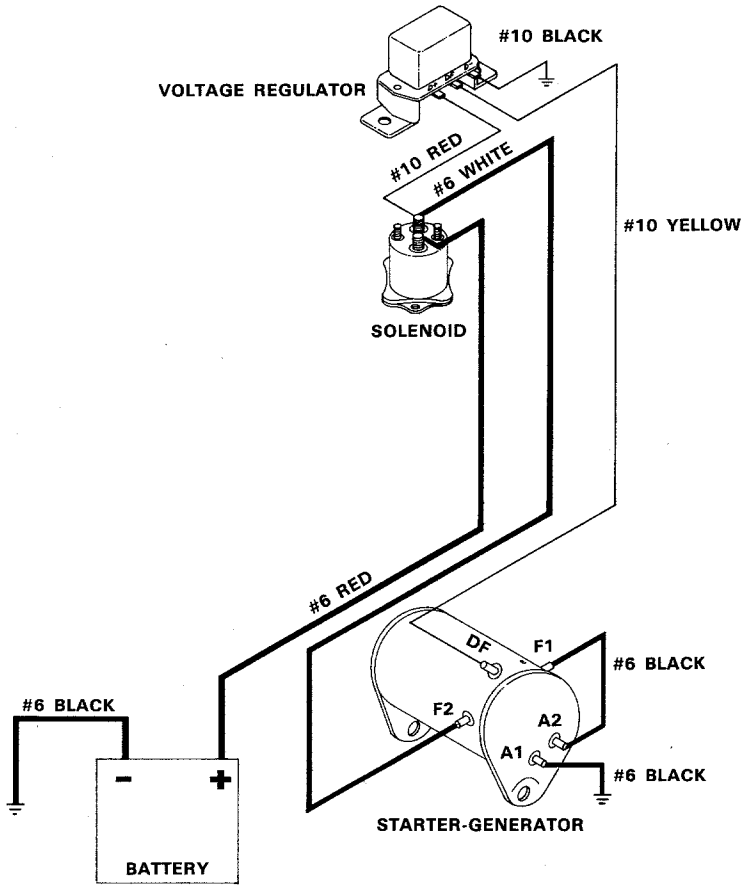


Figure 5-8 — Generator Circuit

WARNING:

Engine must be run to conduct certain generator circuit tests.

1. **Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.**
2. **Always wear eye protection when servicing the vehicle.**
3. **Chock wheels front and rear to prevent vehicle movement.**
4. **Place Forward and Reverse lever in "Neutral" and neutral lock-out cam in the SERVICE position. Prior to putting vehicle back into service, neutral lock-out cam must be returned to OPERATE position or car will not run.**
5. **HOT! Avoid area of hot engine and exhaust when working on vehicle. Can cause extreme burns.**
6. **Moving parts! Keep hands, clothing and all other objects away from moving parts. Do not wear jewelry or loose clothing.**

DANGER:

Engine produces carbon monoxide which is an odorless, deadly poison. DO NOT OPERATE IN AN ENCLOSED AREA WITHOUT PROPER VENTILATION.

To Test the Circuit:

ITEM	TEST	CORRECT READING	CORRECTIVE ACTION
Starter-Generator	1) Check for proper wiring and tight connections. **(Figure 5-8)**	---	1) Rewire or tighten as necessary.

To Test the Circuit: (Continued)

ITEM	TEST	CORRECT READING	CORRECTIVE ACTION
CAUTION:			
Do not ground the DF terminal with regulator wire (yellow wire) still attached.			
	2) Disconnect yellow wire on starter-generator DF terminal. Using a jumper wire, ground the DF terminal to terminal A1. **(Figure 5-9)** Set VOM at DC-20 Volt range. Measure voltage across battery terminals (+) (-). Run engine at 2000 RPM or higher. An increase in voltage should be recorded.	Voltage Rises	2) If voltage rises, test Voltage Regulator; if voltage does not rise, see Starter-Generator Repair.
Voltage Regulator	1) Check for proper wiring and tight connections. **(Figure 5-8)** 2) Check governed RPM 3) NOTE: Battery must be in good condition and fully charged. Run engine for several minutes to bring voltage regulator to operating temperature. Set VOM on DC-20 volt range. Measure voltage across D+ and D- terminals of voltage regulator.	--- 2750-2850 14.5V to 15.5V	1) Rewire or tighten if necessary. 2) Adjust governor. 3) If reading is between 14.5 and 15.5 volts, regulator is okay. If lower than 14.5 volts but rising steadily check battery condition. See Battery Testing. If lower than 14.5 volts and not rising or over 15.5 volts, see Voltage Regulator Adjustment.

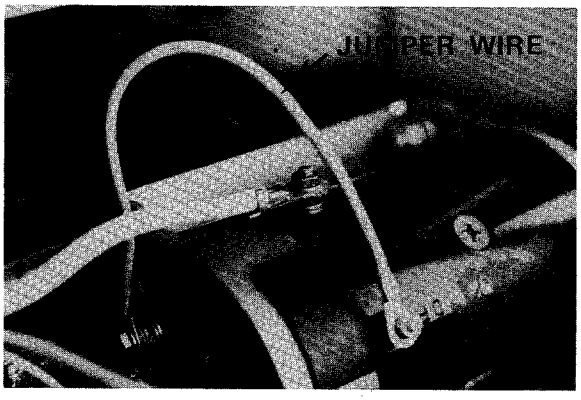


Figure 5-9

3) ENGINE IGNITION CIRCUIT

The engine ignition circuit is completely independent of all other circuits except the kill circuit. It consists of a magneto with an exciting coil and pulsing coil, a CDI control unit, and a spark plug **(Figure 5-10)**.

In the magneto, the exciting coil supplies the power for ignition and the pulsing coil provides a timing pulse to the CDI unit. The CDI control unit controls the timing and intensity of the spark. The spark plug ignites the fuel-air mixture in the combustion chamber.

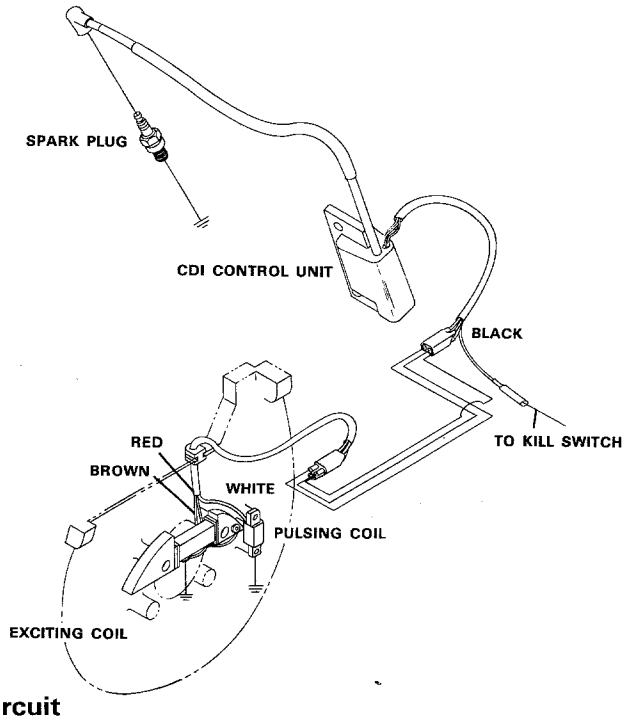


Figure 5-10 — Engine Ignition Circuit

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing the vehicle.

Turn key switch off and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

To Test the Circuit:

ITEM		TEST	CORRECT READING	CORRECTIVE ACTION
Ignition Circuit	1)	If engine has no spark, disconnect black kill circuit wire at CDI control unit.	---	If engine now runs, see Kill Circuit.
Exciting Coil	1)	Disconnect 3 prong coupling at the CDI control unit. Set VOM on ohms (RX10). Check resistance across red and brown wires leading from engine.	355 ohms* to 385 ohms	If reading is Infinity (∞) or low ohms, replace coil. See Engine, Section VI.
Pulsing Coil	1)	Set VOM at ohms (RX1). Check resistance across white wire leading from engine and ground.	57 ohms* to 73 ohms	A reading of Infinity (∞) or low ohms indicates defective coil. Replace coil. See Engine, Section VI.

*NOTE: Reading may vary if temperature is very hot or cold.

To Test the Circuit: (Continued)

ITEM	TEST	CORRECT READING	CORRECTIVE ACTION
Spark Plug	See Section VI, Engine.		
CDI Control Unit	If Kill Circuit, exciting coil, pulsing coil, spark plug and spark plug wire all check properly and spark is still not adequate, CDI is defective.		Replace CDI.

NOTE: When replacing CDI unit, remove the spark plug boot and spring to install on the new CDI. If the spark plug boot or spring is damaged, they must be ordered individually.

4) ENGINE KILL CIRCUIT

Since the engine exciting coil supplies the power for ignition, the proper way to stop the engine is to run this power to ground by-passing the ignition. Three switches in the car are wired for this purpose. They are the accelerator kill limit switch activated by the accelerator pedal, the key switch and the neutral lock-out limit switch activated by a cam on the back of the F&R lever. Thus, the engine can be stopped by releasing the accelerator pedal, turning the key switch off or shifting the car to neutral (when the neutral lock-out cam is in the OPERATE position).

DANGER:

Engine produces carbon monoxide which is an odorless, deadly poison. DO NOT OPERATE IN AN ENCLOSED AREA WITHOUT PROPER VENTILATION.

WARNING:

Do not shift forward and reverse lever to forward and reverse while neutral lock-out cam is in the SERVICE position and engine is running, car may move suddenly or lurch forward before engine stops.

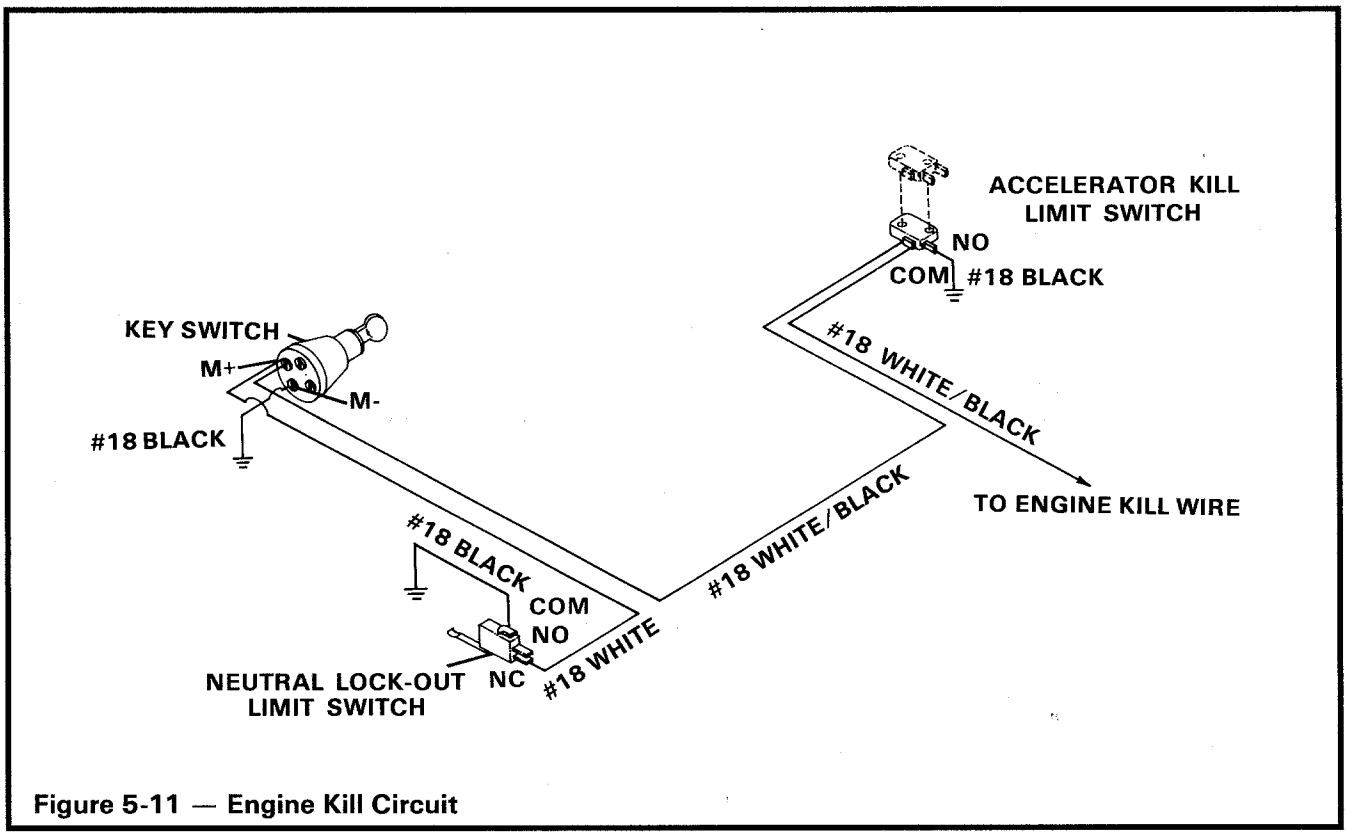


Figure 5-11 — Engine Kill Circuit

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing the vehicle.

Turn key switch off and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

To Test the Circuit:

ITEM	TEST	CORRECT READING	CORRECTIVE ACTION
Accelerator Kill Limit Switch	1) Check for proper wiring and tight connections 2) Set VOM on ohms (RX1). Check continuity across switch contacts. **(Figure 5-12)** Lever not depressed Lever depressed	--- Infinity (∞) Zero (0)	1) Rewire and tighten as necessary. 2) If reading is not correct replace switch.

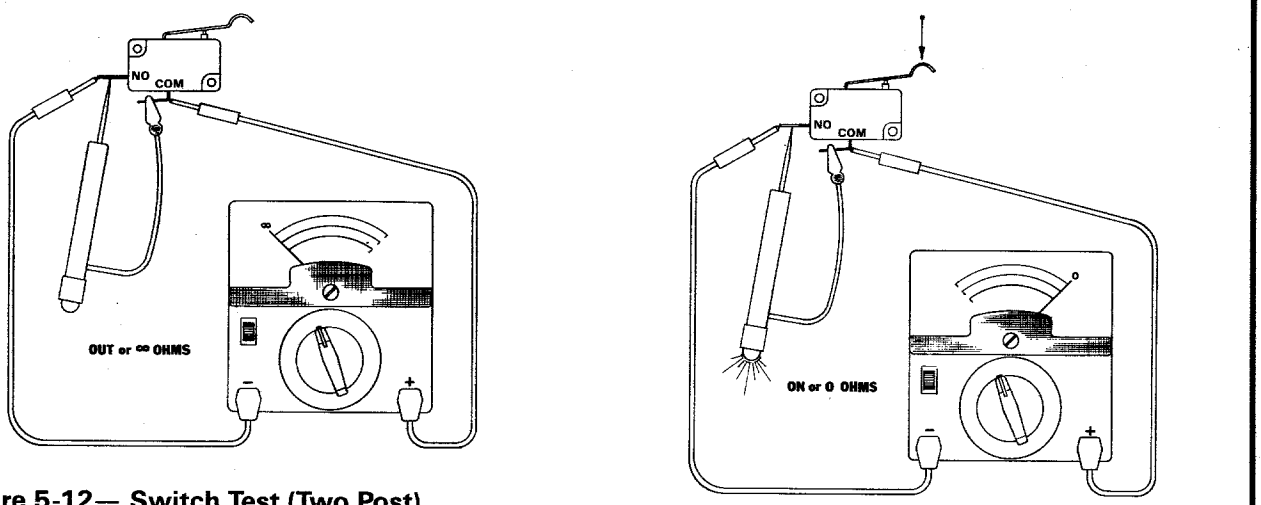


Figure 5-12— Switch Test (Two Post)

Key Switch	1) Check for proper wiring and tight connections 2) Set VOM on ohms (RX1) Check continuity across terminals M+ to M- Key off M+ to M- Key on M+ to M- **(Figure 5-13)**	--- Zero (0) Infinity (∞)	1) Rewire and tighten as necessary. 2) If readings are not correct replace switch.
Neutral Lock-Out Limit Switch	See Neutral Lock-out Circuit, P. 5-14		

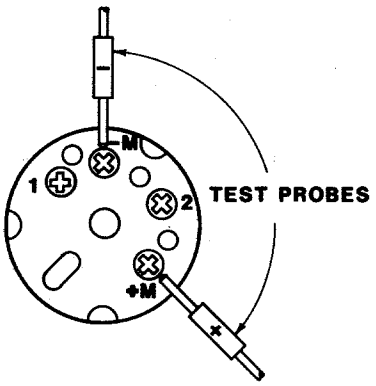


Figure 5-13 — Key Switch

5) THE REVERSE BUZZER CIRCUIT

The reverse buzzer is a safety warning device that sounds when the car is in reverse. Its function is to remind the operator not to leave the car in reverse and to warn anyone in the area the car is in reverse. The reverse buzzer picks up power from the solenoid. It is controlled by the reverse buzzer limit switch mounted on the forward and reverse actuator **(Figure 5-14)**.

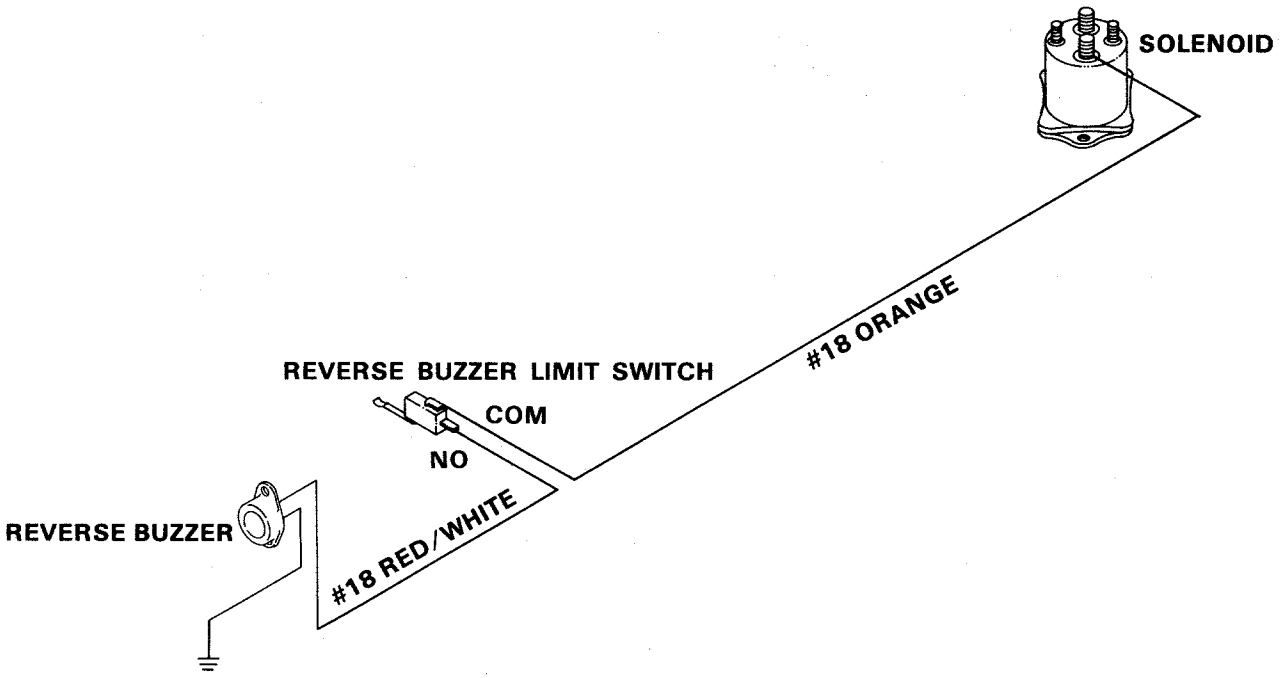


Figure 5-14— Reverse Buzzer Circuit

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing the vehicle.

Turn key switch off and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

To Test the Circuit:

ITEM	TEST	CORRECT READING	CORRECTIVE ACTION
Reverse Buzzer Limit Switch	1) If buzzer does not function and engine does not start, see Battery.	---	1) -----
	2) If engine starts but reverse buzzer does not function, check that forward and reverse actuator is activating switch.	Audible Click	2) If audible click is not heard when shifting to reverse, realign or replace switch.
	3) If switch is being actuated but buzzer does not function, set VOM on ohms (RX1). Check continuity across switch contacts. **(Figure 5-15)**	---	If reading is not correct replace switch.
	Lever not depressed	Infinity (∞)	
	Lever depressed	Zero (0)	
Reverse Buzzer	1) Check for proper wiring and tight connections.	---	1) Rewire and tighten as necessary.
	2) If wiring is proper and tight, but buzzer does not function.		2) Replace buzzer.

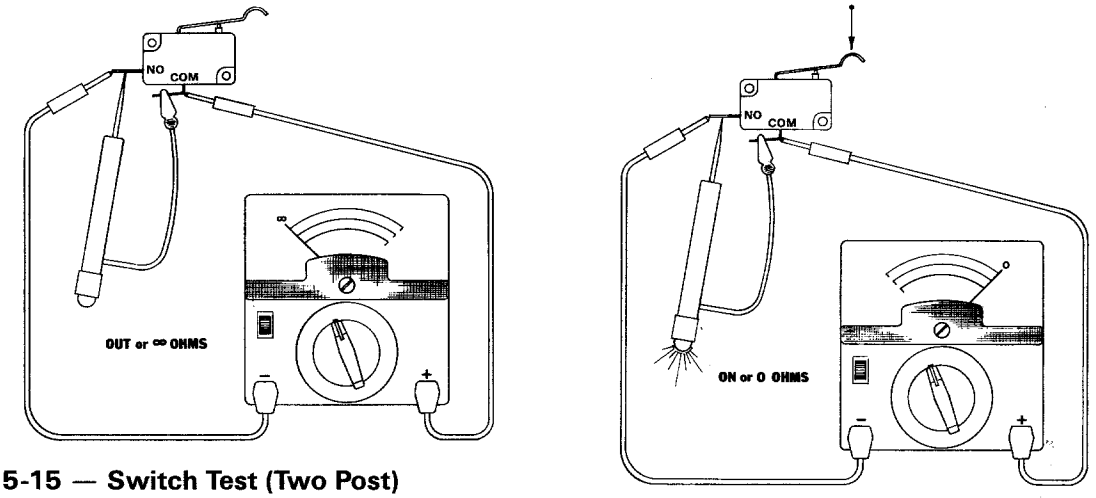


Figure 5-15 — Switch Test (Two Post)

6) LOW OIL WARNING CIRCUIT

The CLUB CAR DS Gasoline is equipped with a special circuit to activate a low oil warning light mounted on the dash when the level of engine oil becomes low. The circuit consists of an oil sending unit in the engine, a resistor connected to the oil light and a dash mounted oil light.

The oil light picks up power from the key switch only when the key switch is turned to the "on" position. When the oil level in the crankcase becomes low, the oil sending unit will complete the low oil warning circuit to ground and illuminate the oil light **(Figure 5-16)**.

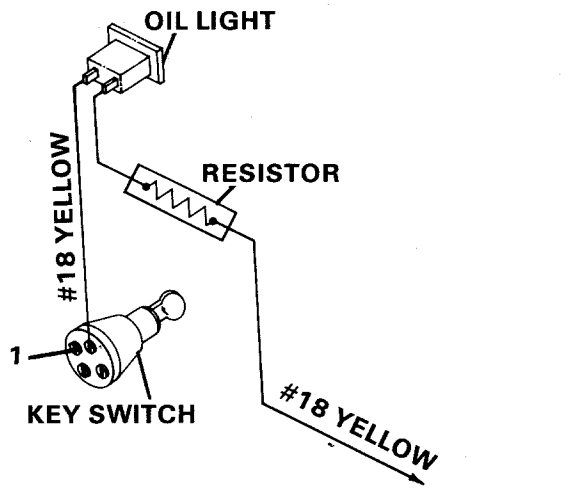


Figure 5-16 — Low Oil Warning Circuit

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing the vehicle.

Turn key switch off and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

To Test the Circuit:

ITEM	TEST	CORRECT READING	CORRECTIVE ACTION
Resistor	1) Using VOM, CLUB CAR part # 1011480, check resistance across the resistor.	9.5-10.5 ohms	Replace resistor.
Oil Light	1) Turn key switch to "off" position. Connect a jumper wire from the lower end of the resistor to ground as shown in **Figure 5-17**. Turn key switch to the "on" position.	Light is illuminated	Check wiring. If wiring is okay, change oil light.
	2) If oil light stays on, check oil level.	---	If oil level is low, add oil. If oil level is not low, see Oil Sending Unit.

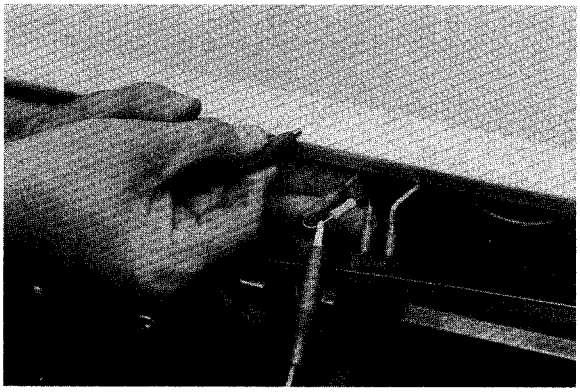


Figure 5-17

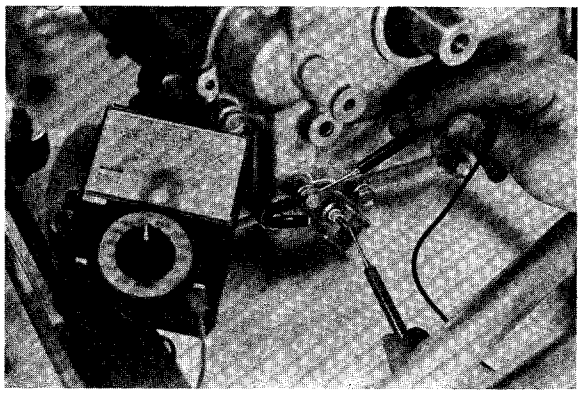


Figure 5-18

To Test the Circuit:

ITEM	TEST	CORRECT READING	CORRECTIVE ACTION
Oil Sending Unit	1) Check for tight connection at oil sending unit on engine.	---	Rewire and tighten if necessary.
	2) Check that engine oil level is correct.	---	Add oil as required.
	3) Disconnect lead from oil sending unit. Either drain sufficient oil to create low oil reading or tilt engine - fan side down. With VOM on ohms (RX1) check continuity between oil sending unit terminal and any ground on the engine. **(Figure 5-18)**	Zero (0) ohms	If reading is not correct, replace oil sending unit, see Engine Section VI.
	4) Disconnect lead from oil sending unit. Fill engine with oil to bring it to its proper level and be sure the engine is level. With VOM on ohms (RX1) check continuity between oil sending unit terminal and any ground on the engine. **(Figure 5-18)**	Infinity (∞)	If reading is not correct, replace oil sending unit. See Engine Section VI.

7) NEUTRAL LOCK-OUT CIRCUIT

An additional feature of the DS Gasoline golf car is a neutral lock-out circuit. It prevents the operator from starting the car in neutral. If the car is started in forward or reverse and shifted to neutral, the engine automatically stops running. For the convenience of the trained and experienced mechanic, there is a neutral lock-out cam located on the back of the forward and reverse lever. If the neutral lock-out cam is pulled out approximately ⅜ of an inch and rotated one-half turn until it snaps back into place, the car will be in the SERVICE position **(Figure 5-20)**. This will allow the mechanic to run the car in neutral for certain maintenance procedures. With the cam in the SERVICE position, the engine will not start if the forward and reverse lever is placed in the forward or reverse positions and the engine will stop running if the shift lever is moved out of the neutral position.

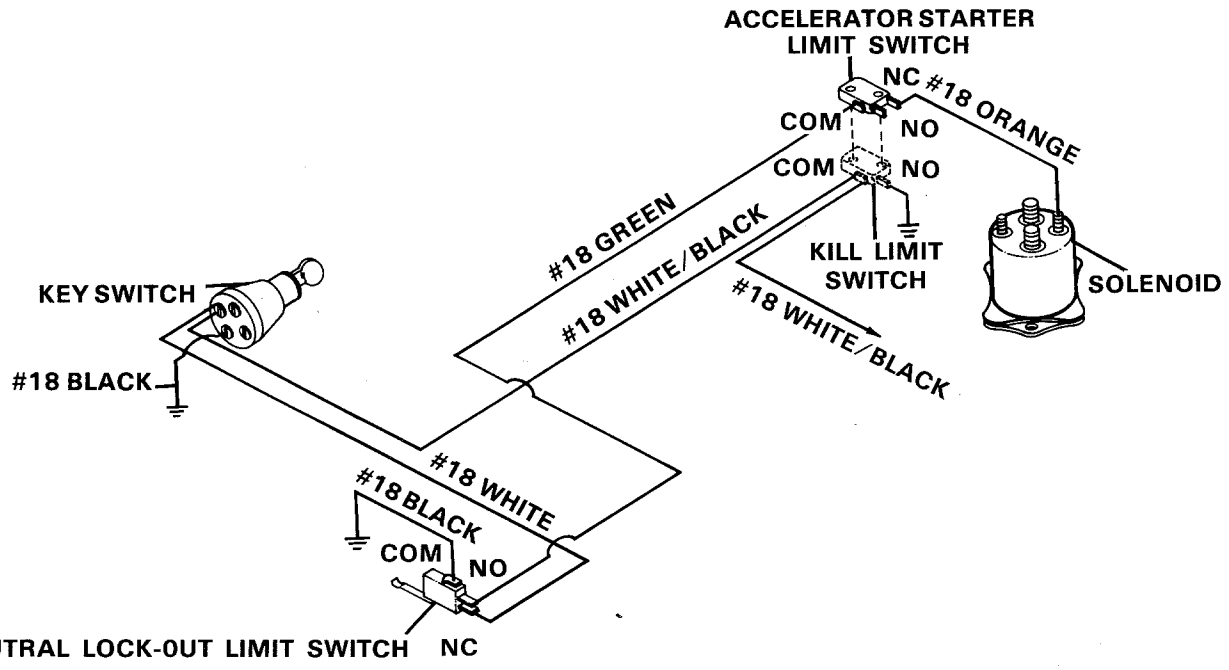


Figure 5-19 — Neutral Lock-Out Circuit

WARNING:

Do not shift forward and reverse lever to forward or reverse while neutral lock-out cam is in the SERVICE position and engine is running. Car may move suddenly or lurch forward before engine stops.

Chock wheels front and rear to prevent vehicle movement.

DANGER:

Engine produces carbon monoxide which is an odorless, deadly poison. DO NOT OPERATE IN AN ENCLOSED AREA WITHOUT PROPER VENTILATION.

To put the car back into the OPERATE position, pull the cam out approximately ⅜ of an inch and rotate it one-half turn until it snaps back into place **(Figure 5-21)**.

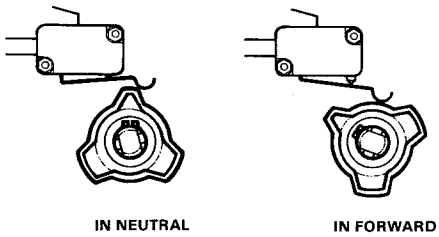


Figure 5-20 — Neutral Lock-Out Cam (Service Position)

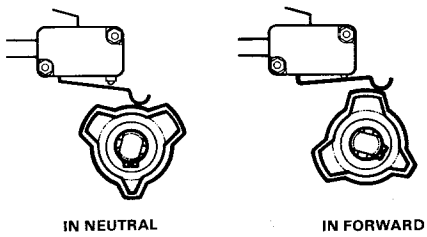


Figure 5-21 — Neutral Lock-Out Cam (Operate Position)

NOTE: If car will not run when forward and reverse lever is placed in forward or reverse, be sure neutral lock-out cam is in the OPERATE position.

The circuit consists of a neutral lock-out limit switch activated by the neutral lock-out cam located on the back of the forward and reverse assembly **(Figure 5-22)**.

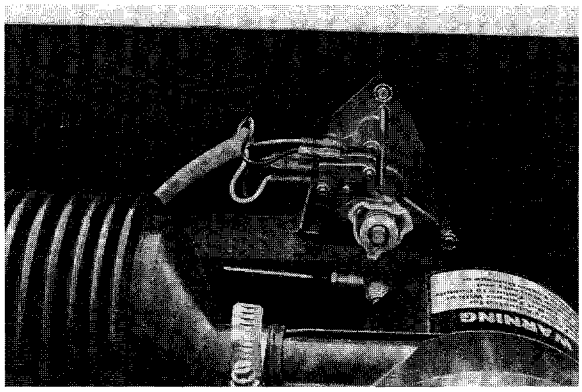


Figure 5-22

The neutral lock-out limit switch is the outer most switch from the body.

When the neutral lock-out cam is in the OPERATE position and the forward and reverse lever is in either forward or reverse, a lobe on the neutral lock-out cam depresses the neutral lock-out limit switch. In neutral, the limit switch is not depressed and the car will not start. The opposite is true when the neutral lock-out cam is in the SERVICE position. When the forward and reverse lever is in the neutral position, a lobe on the neutral lock-out cam depresses the neutral lock-out limit switch. In forward or reverse the neutral lock-out limit switch is not depressed and the car will not start.

The neutral lock-out limit switch is in both the starter circuit and the kill circuit. When the neutral lock-out limit switch is depressed, it closes the starter circuit to allow the starter to crank the engine and it also opens the kill circuit so the engine spark will go to the spark plug and not to ground. When the neutral lock-out limit switch is not depressed the starter circuit is open and the kill circuit is grounded.

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing the vehicle.

Turn key switch off and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

To Test the Circuit:

ITEM	TEST	CORRECT READING	CORRECTIVE ACTION
Neutral Lock-out Cam	1) Check to be sure the lobes on the cam are depressing the neutral lock-out limit switch as the F&R lever is being shifted.	The limit switch should make an audible "click" as it is depressed.	1) Check for wear on the cam lobes. Be sure cam has snapped fully back into place. If cam lobes still do not actuate the limit switch, replace cam. 2) Check limit switch.

To Test the Circuit: (Continued)

ITEM	TEST	CORRECT READING	CORRECTIVE ACTION
Neutral Lock-out Limit Switch	1) Check for proper wiring and tight connections.	---	1) Rewire or tighten as necessary.
	2) Using continuity tester or VOM on ohms (RX1), check continuity across common (COM) and normally open (NO) and across common (COM) and normally closed (NC). **(Figure 5-23)**		
	Lever not depressed COM to NC	Zero (0)	2) If reading is not correct, replace limit switch.
	COM to NO	Infinity (∞)	
	Lever depressed COM to NC	Infinity (∞)	
	COM to NO	Zero (0)	

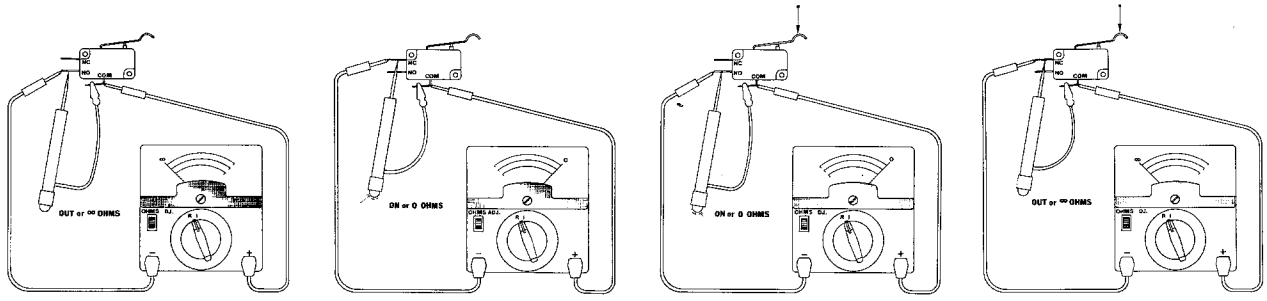


Figure 5-23— Switch Test (Three Post)

ELECTRICAL SYSTEM COMPONENTS

STARTER-GENERATOR

Removal

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing the vehicle.

Turn key switch off and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

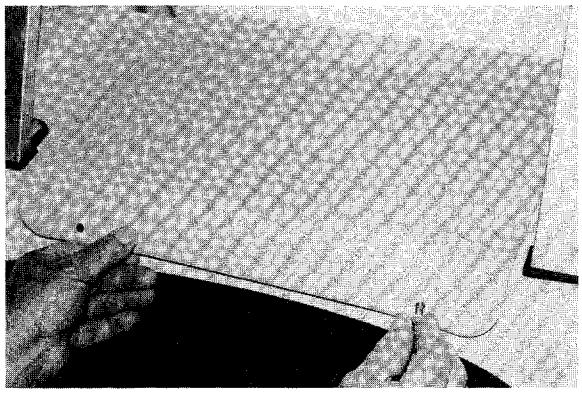


Figure 5-24

1. Remove access panel from body **(Figure 5-24)**.

2. Disconnect wires from starter-generator. Make sure wires are marked for reassembly **(Figure 5-25)**.

3. Remove lower mounting/adjusting bolt (24), washers (25, 31 and 32) and nut (33) and remove belt **(Figure 5-26)**.

4. Remove upper mounting bolts (9 and 13), nuts (8), lockwashers (7).

5. Remove starter-generator.

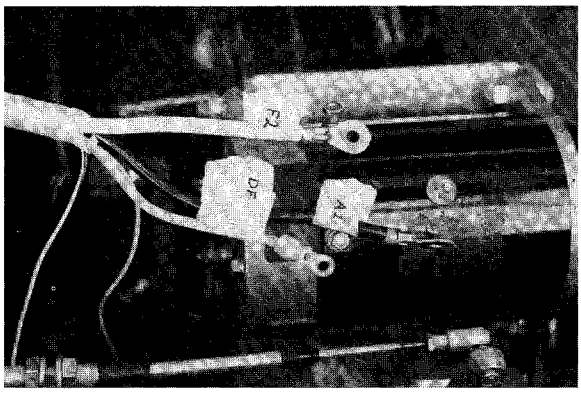


Figure 5-25

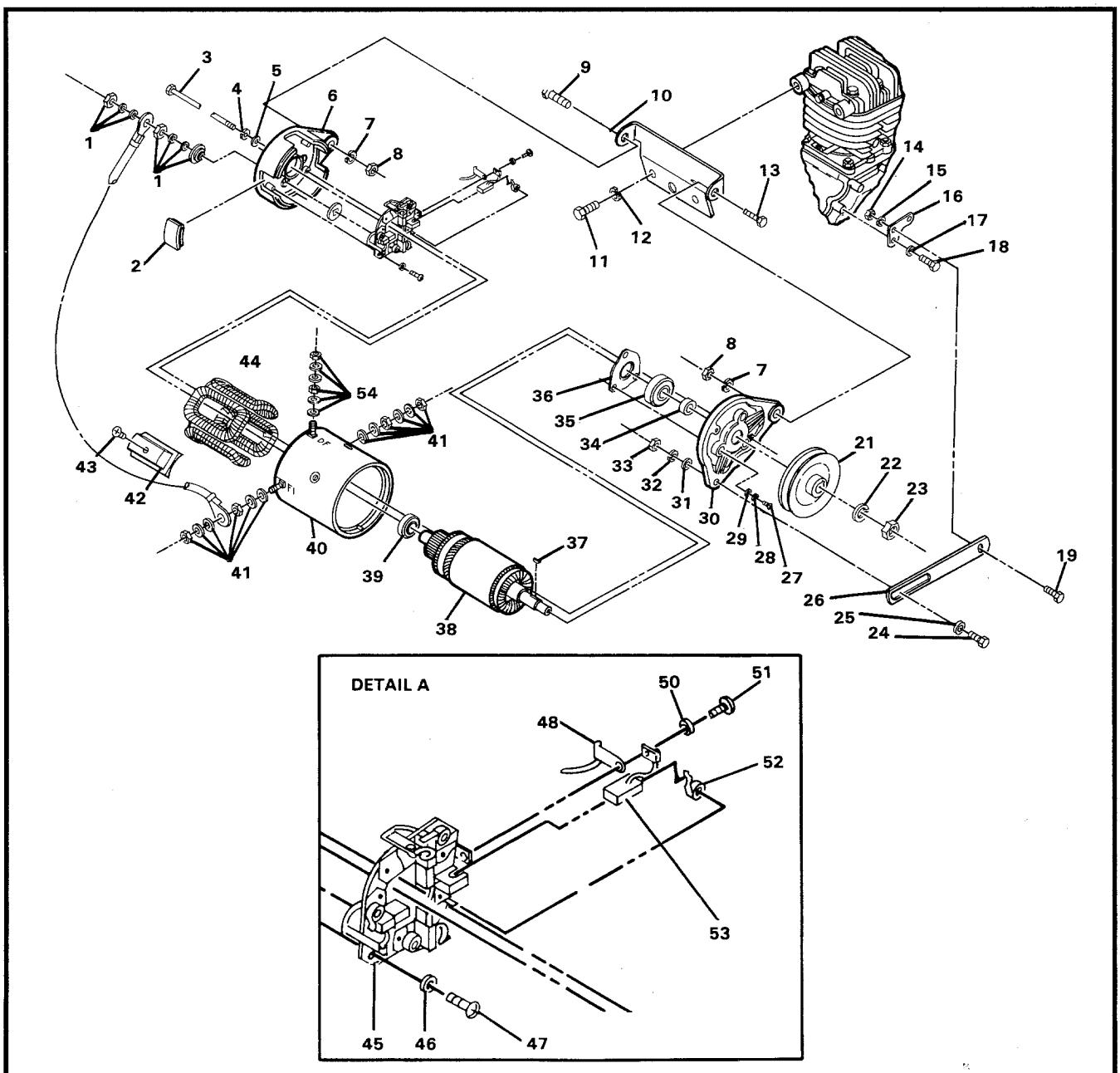


Figure 5-26 — Starter-Generator Assembly

Starter-Generator Testing

The following tests can be made using a VOM, CLUB CAR Part #1011480 or continuity tester, CLUB CAR Part #1011273 without disassembly of starter-generator.

Internally Grounded Starter-Generator

With continuity tester or VOM set at RX1, place one probe to ground on the starter-generator frame. Scratch through the paint to insure a good ground. Touch the other probe to the A1, A2, F1, F2, and DF terminals in turn. Tester should not light or VOM should not show continuity.

If the tester lights or meter moves when touching A1 or A2 terminals, this indicates a possible:

Grounded A1 or A2 terminal

Ground wire in brush area

Grounded armature/commutator

If the tester lights or meter moves when touching the F1, F2 or DF terminals, this indicates a possible:

Grounded F1, F2 or DF terminal

Grounded field coil

Armature Circuit Open

Place probes of tester or VOM set at RX1 on A1 and A2 terminals. Tester should light or VOM should read zero. Any other reading indicates:

Open or poor contact in brush assembly

Open armature windings

Field Circuit Open

Place probes of tester or VOM set at RX1 across F1 and F2 terminals. Tester should light or VOM should read zero. Any other reading indicates:

Open field coils or bad connections at terminals

Place probes of ohmmeter set at RX1 across DF and F1 terminals. Resistance should read 4.5 to 5.5 ohms. Replace field coils if any other reading is obtained.

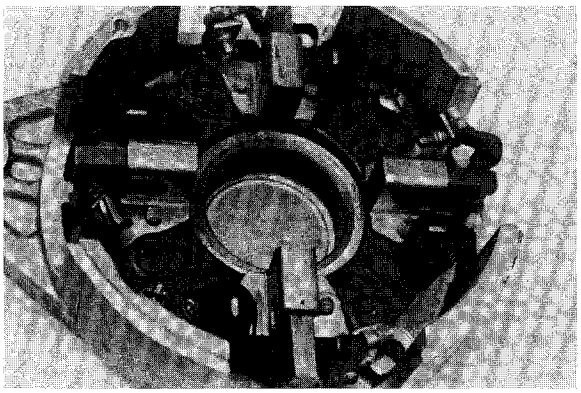


Figure 5-27

Disassembly

NOTE: If it is not necessary to remove brushes, they can be held away from commutator with brush springs **(Figure 5-27)**.

1. Remove two bolts (3) and washers (4 and 5), pull commutator end cover (6) free of starter frame (40) **Figure 5-26)**.
2. Remove brush covers (2), screws (51) and lockwasher (50), brush springs (52), and brushes (53).
3. Remove terminal nuts, washers and lockwasher (41 and 1), brush holder screws (47) and lockwasher (46) and brush holder (45).
4. To separate armature (38) from drive end cover (30), remove nut (23), lockwasher (22), pulley (21), shaft key (37), bearing retainer screws (27) and washers (28 and 29).
5. To separate commutator bearing (39) or drive end bearing (35) and spacer (34) from armature (38) use CLUB CAR bearing puller #1012811 and wedge attachment tool, #1012812 **(Figure 5-28)**.

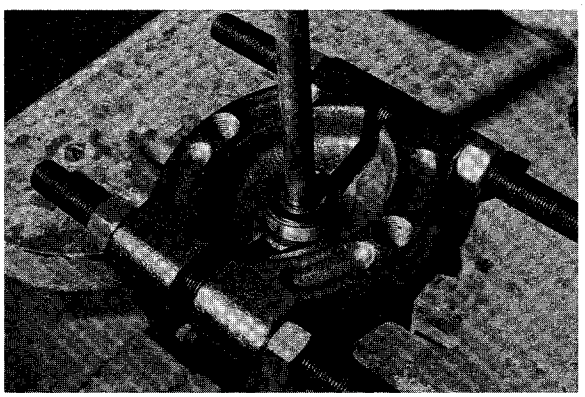


Figure 5-28

CAUTION:

Use care while pressing bearing from shaft to prevent damage to retainer plate.

6. Remove bearing retainer (36).

NOTE: Do not remove pole shoes unless electrical test indicates it is necessary. See TESTING FIELD COILS.

7. Remove pole shoe screws (43), pole (42), DF terminal hardware (54), F1 and F2 terminal hardware (41) and remove field coil (44).

Cleaning, Inspection and Repair

Testing Brushes

1. Visually inspect brushes. Replace brushes which are cracked or severely chipped.
2. Check brush length **(Figure 5-29)**. If any brush is worn to less than 5/8" when measured at its shortest point, new brushes are needed. Replace brushes in sets of four only.

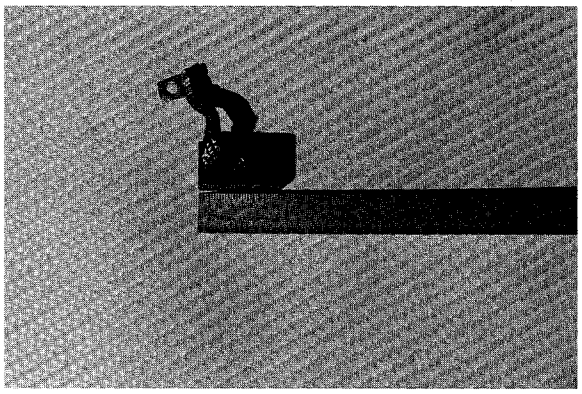


Figure 5-29

Brush Springs

1. Inspect springs. Replace springs which are discolored from heat (straw or bluish in color).
2. Test brush spring tension with a spring scale **(Figure 5-30)**. Replace springs which apply a force less than 24 ounces.

CAUTION:

When checking brush spring tension, do not pull springs beyond the point they would normally be if there were new brushes installed. Exerting excessive force, or pulling brush springs beyond normal resting point will damage springs.

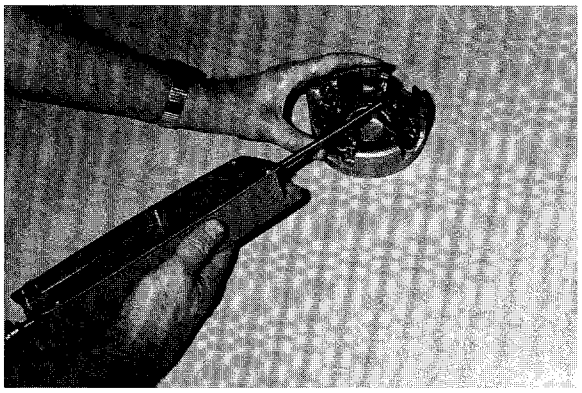


Figure 5-30

Visual Inspection of Armature

Obvious defects can be seen by examining the armature. If an armature has frayed or charred insulation, broken wires or thrown solder, it is obvious without testing that it should be replaced. Faults seen during the visual inspection can aid in diagnosing the original cause of failure.

Visually Check Armature For:

1. Burned, charred or cracked insulation.
2. Improperly cured varnish.
3. Thrown solder.
4. Flared armature windings.
5. Worn, burned or glazed commutator.
6. Loose or raised commutator bars.
7. Bruised/damaged armature core laminations.
8. Worn armature bearing or shaft.
9. Dirty or oily commutator.

Faults seen during the visual inspection can aid in diagnosing the original cause of failure.

Slight roughness of the commutator can be polished away with 4/0 or finer sandpaper.

CAUTION:

Never use emery cloth on the commutator. Particles of emery are conductive and may short circuit the commutator bars. Never use oil or lubricants on the commutator or brushes.

Armature Ground Test

NOTE: Before testing, wipe armature with clean rag and remove carbon dust and metal particles from between commutator bars.

CAUTION:

Do not submerge armature in solvent.

1. Place one test probe on the commutator and the other to the armature core. Continuity tester should not light or VOM should read infinity (∞) **(Figure 5-31)**.

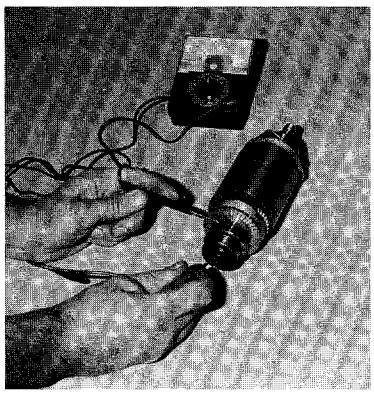


Figure 5-31

Visual Inspection of Field Coils

If the insulation on the field coils appears blackened or charred, the serviceability of the coils is questionable. Burned or scorched coil insulation indicates the motor has overheated due to overloads or grounded or shorted coil windings. Be sure pole shoes are tight.

Grounded Field Test

1. Attach continuity tester or VOM meter between F1 terminal and motor frame. Continuity tester should not light, ohmmeter should read infinity (∞).
2. If the continuity tester lights or the ohmmeter records a reading other than infinity (∞) the field is grounded and must be replaced.
3. Connect ohmmeter to DF terminal and housing. The ohmmeter should read infinity (∞) on scale.

Open Field Test

1. Set ohmmeter to RX1 scale. Connect ohmmeter to F1 and DF terminals. Resistance should read 4.5 to 5.5 ohms.
2. Set ohmmeter to RX1 scale. Connect ohmmeter to F1 and F2 terminals. Resistance should read zero ohms.
3. If readings are not correct replace field coils.

Reworking Starter-Generator

Any rework must be performed by a qualified, knowledgeable motor repairman. This information is provided for those qualified people.

Commutator diameter (minimum) — 1.535 inches

Concentric with armature shaft within — .002 inches

Limit depth of cut .005 inches when machining commutator

If undercut of segment insulator is less than .016 inches, then it should be undercut to .031 inches.

Dielectric — 500 VAC for one minute

Armature insulation resistance — 0.2 M Ω at 500 VDC

Starter field coil resistance — .006 Ω

Generator field coil resistance — 4.5-5.5 Ω

Assembly

1. Install field coil assembly (44) into frame (40) and secure using pole shoes (42) and pole screws (43). Tighten pole shoe screws to 9 ft.-lbs. torque **(Figure 5-26)**.

CAUTION:

Route field terminal wires so that they will not contact armature.

2. Install field coil wire terminals through housing.
3. See **Figure 5-26** for correct stacking of wire mounting bolt hardware.

CAUTION:

Use care while pressing bearing on shaft to prevent damage to bearing retainer (36).

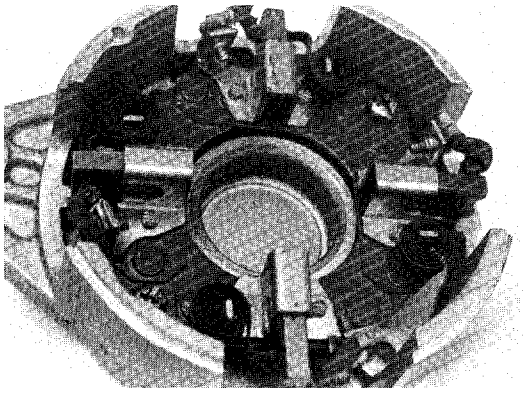


Figure 5-32

4. Install bearing retainer (36), on drive end of shaft, press bearing (35) onto shaft, press bearing (39) on commutator end of shaft.
5. Install brush springs (52), brushes (53), screw (51) and lockwasher (50) to brush holder (45) and fasten brush holder (45) to commutator end cover (6) with screws (47) and washer (46).
6. Install armature (48) into drive end cover (30), install bearing retainer screws (27) flat washer (29), lockwasher (28) and tighten bearing retainer screws (27).
7. Slide frame (40) over armature (38) and locate pins used for aligning. These locating pins in housing body should align with holes in end covers.

NOTE: Hold brushes away from commutator by lifting brush springs and pulling brushes back so the springs rest on the side of the brushes **(Figure 5-32)**.

8. Install commutator end cover (6) aligning cover hole with body pin. Install bolts (3), washers (4 and 5), terminal nuts, washers (41), and lockwasher (41 and 1), and brush covers (2).
9. Install spacer (34), shaft key (37), pulley (21), lockwasher (22), and nut (23). Tighten pulley nut (23) to 25-30 ft.-lbs. torque.

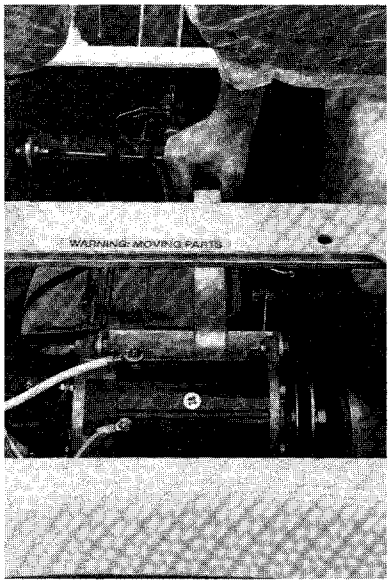


Figure 5-33

Installation

1. Align starter-generator with upper mounting bracket (10). Install mounting bolts (9 and 13) through starter and bracket. Install lockwashers (7), and nuts (8) finger tight **(Figure 5-26)**.
2. Install belt and lower mounting/adjusting bolt (24) washers (25, 31 and 32) and nut (33).
3. Adjust tension on starter-generator belt to obtain ⅛" deflection at the mid point of the pulleys with a 6 lb. load. Tighten lower mounting nut to 12 ft.-lbs. torque **(Figure 5-33)**.
4. Tighten upper mounting adjusting bolt to 12 ft.-lbs. torque.
5. Install yellow DF wire to DF terminal and torque to 26-35 in.-lbs.
6. Install white F2 wire from voltage regulator to F2 terminal and torque to 43-52 in.-lbs.

BELT ADJUSTMENTS

Belt tension should be checked periodically. If starter-generator slips when starter motor operates, adjust belt to correct tension.

Tension Adjustment

1. Install belt on starter-generator. Adjust tension on starter-generator belt to obtain ⅛ in. deflection at the mid point of the pulleys using 6 lbs. of pressure. Tighten nuts to 12 ft.-lbs. torque **(Figure 5-33)**.

VOLTAGE REGULATOR

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Adjustment

NOTE: It is not necessary to remove voltage regulator from the electrical box to adjust voltage.

1. Remove two screws and remove cover.
2. Loosen 7mm locknut on adjusting screw.
3. If voltage is too low, when running engine at 2750-2850 RPM, turn adjusting screw in (clockwise) until 14.5-15.5 volts are obtained **(Figure 5-34)**.
4. If voltage is too high, when running engine at 2750-2850 RPM, turn adjusting screw out (counterclockwise) until 14.5-15.5 volts are obtained.
5. Tighten 7mm locknut.
6. Install rubber gasket if removed.
7. Install cover and two screws.
8. Recheck voltage after reinstalling cover.

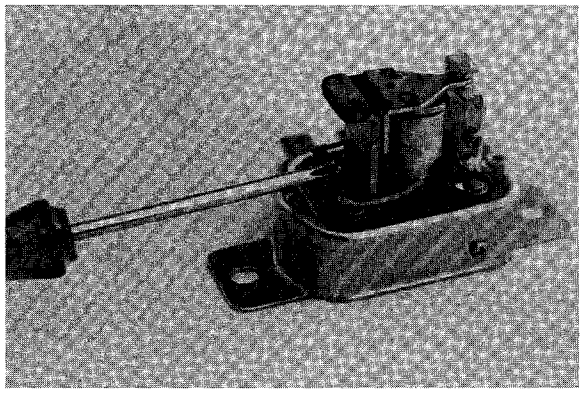


Figure 5-34

Removal

1. Remove seat from body.
2. Remove intake expansion chamber by loosening clamps at both ends.
3. Remove electrical box cover.
4. Disconnect wires from regulator.
5. Remove two bolts from regulator mounting tabs and remove regulator.

Installation

1. Install two bolts through regulator mounting tabs, tighten to 6 ft.-lbs. torque.

2. Connect wires to regulator terminals **(Figure 5-8 wiring diagram)**.
3. Install electrical box cover and torque to 10-15 in.-lbs.
4. Connect battery cables, positive (+) cable first.
5. Install intake expansion chamber.
6. Place forward and reverse lever in NEUTRAL position, place neutral lock-out cam in SERVICE position. Start the engine and check regulator for proper function as described under Voltage Regulator Testing.

KEY SWITCH

Removal

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

1. Remove plastic caps that cover metal screws on each side of center dash, remove both screws.
2. Insert screwdriver at top center of dash between dash and cowl brace.
3. Gently pry out center dash to remove from under edge of cowl brace, pull dash out to provide sufficient clearance to switch.
4. Unfasten nut from switch using key switch installation tool, CLUB CAR part # 1012801, and remove switch from dash.
5. Disconnect wires **(Figure 5-1)**.

Installation

Reverse removal procedure for installation.

Be sure wire terminals are tight and spray them with CLUB CAR battery protector spray, part #1014305.

Be sure nut is securely tightened to dash.

SOLENOID

Removal

WARNING:

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

1. Remove seat from body.
2. Remove intake expansion chamber.

3. Remove electrical box cover.
4. Remove wires from solenoid connections. **(Figure 5-1 wiring diagram).**
5. Remove two bolts from solenoid base plate, remove solenoid.

Installation

1. Install solenoid into electrical box, install two bolts and tighten to 6 ft.-lbs. torque.
2. Connect wires to solenoid terminals **(Figure 5-1 wiring diagram).**
3. Install electrical box cover and torque to 10-15 in.-lbs., then connect battery cables, positive (+) cable first.
4. Install intake expansion chamber.

FUSE

Replacing Fuse

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

1. Remove seat from body.
2. Remove intake expansion chamber.
3. Remove electrical box cover.
4. Disconnect wire terminals from fuse.

CAUTION:

Use 10 amp fuse only. If a fuse with a higher amp rating is used, damage to electrical system may occur.

Reverse this procedure for installation of fuse, electrical box cover and intake expansion chamber. Torque electrical box cover screw to 10-15 in.-lbs. Connect battery cables, positive (+) cable first. Install seat to body.

ACCELERATOR STARTER LIMIT SWITCH

Removal

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

WARNING:

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

1. Remove seat from body.
2. Remove intake expansion chamber.
3. Remove electrical box cover.
4. Disconnect wires from starter limit switch **(Figure 5-1)**.
5. Remove screws and limit switch.

NOTE: Starter limit switch is on top, kill limit switch is on bottom.

Installation

1. Install limit switch to electrical box with screws, connect wires to limit switch terminals **(Figure 5-1)**. Torque screws to 5 in.-lbs. Operate accelerator pedal to make sure that switch is actuated when pedal is released.

WARNING:

Do not over-tighten retaining screws. If screws are over-torqued, limit switches could be damaged.

2. Install electrical box cover, tighten cover bolt to 10-15 in.-lbs.
3. Install intake expansion chamber.
4. Connect battery cables, positive (+) cable first.
5. Install seat to body.

ACCELERATOR KILL LIMIT SWITCH

Removal

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing the vehicle.

Turn key switch off and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

1. Remove seat from body.
2. Remove intake expansion chamber..
3. Remove electrical box cover.

4. Remove limit switch retaining screws, lift first limit switch away to provide clearance to lift kill limit switch out of electric box.
5. Disconnect wires from terminals.

NOTE: Kill limit switch is on the bottom, accelerator limit switch is on top.

Installation

1. Connect wires on new limit switch, place back in position under top limit switch, hold in place by hand, insert screws through both limit switches.
2. Hold screws in place and install into threaded holes in electrical box, tighten screws. Torque screws to 5 in.-lbs. Operate accelerator pedal to make sure that switch is actuated when pedal is released.

WARNING:

Do not over-tighten retaining screws. If screws are over-torqued, limit switches could be damaged.

3. Install cover to electrical box, tighten bolt to 10-15 in.-lbs. torque.
4. Install intake expansion chamber.
5. Connect battery cables, positive (+) cable first.
6. Install seat to body.

NEUTRAL LOCK-OUT LIMIT SWITCH

General

The neutral lock-out limit switch is located on the back of the forward and reverse assembly. There are two limit switches located there, the outermost one is the neutral lock-out limit switch. The other limit switch is for the reverse buzzer.

Removal

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing the vehicle.

Turn key switch off and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

1. Remove seat from body.
2. Disconnect the green, white, and black wires from the neutral lock-out limit switch.
3. Remove two nuts and two washers from limit switch.
4. Remove limit switch from forward/reverse assembly **(Figure 5-35)**.

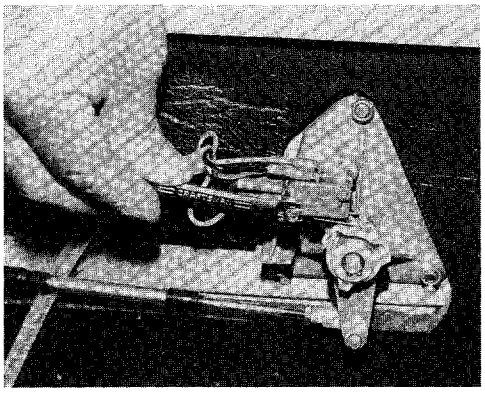


Figure 5-35

Installation

1. Install limit switch to forward/reverse assembly. Torque nuts to 5 in.-lbs. Place F&R lever in reverse to make sure that switch is actuated.

2. Connect the black wire to the common (COM) terminal. Connect the green wire to the normally open (NO) terminal and the white wire to the normally closed (NC) terminal.
3. Reconnect battery cables, positive (+) cable first.

DANGER:

Engine produces carbon monoxide which is an odorless, deadly poison. DO NOT OPERATE IN AN ENCLOSED AREA WITHOUT PROPER VENTILATION.

4. Turn key switch "On", shift forward/reverse lever to neutral, place neutral lock-out cam in OPERATE position and try to start engine. It should not start. Test drive car in both forward and reverse for proper operation.
5. Install seat to body.

NEUTRAL LOCK-OUT CAM

If the cam lobes have worn to the point where they will no longer actuate the neutral lock-out limit switch, the cam must be replaced.

Removal

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing the vehicle.

Turn key switch off and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

CAUTION:

Spring may suddenly release when snap ring is removed in step 2.

1. Remove seat from body.
2. Remove the external snap ring with a snap ring pliers.
3. Remove the plastic washer and spring.
4. Remove the cam.

Installation

1. Install cam **(Figure 5-36)**.
2. Install spring and plastic washer.
3. Install external snap ring on shaft.
4. Be sure snap ring is installed in groove on shaft.
5. Connect battery.
6. Install seat to body.

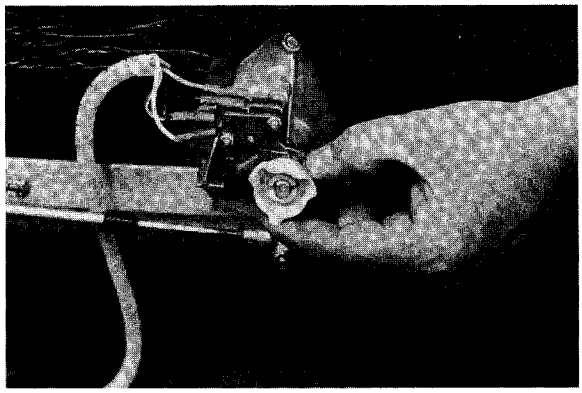


Figure 5-36

REVERSE WARNING BUZZER

Removal

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

WARNING:

Always wear eye protection when servicing the vehicle.

Turn key switch off and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

1. Remove center dash panel.
2. Disconnect buzzer red wire from harness. Remove screw (7) and nut (8) to disconnect buzzer black ground wire **(Figure 5-37)**.
3. Remove screws (2), nuts (5), lockwashers (3), and nylon washers (6) to remove buzzer.

Installation

1. Install nylon washers in frame holes as shown **(Figure 5-37)**.
2. Install screws (2), lockwashers (3), and nuts (5) through buzzer bracket tab and tighten to a torque of 3-4 in.-lbs.
3. Connect buzzer black ground wire to frame as shown with screw (7) and nut (8). Torque 7-8 in.-lbs.
4. Connect buzzer red wire to red/white wire from harness.

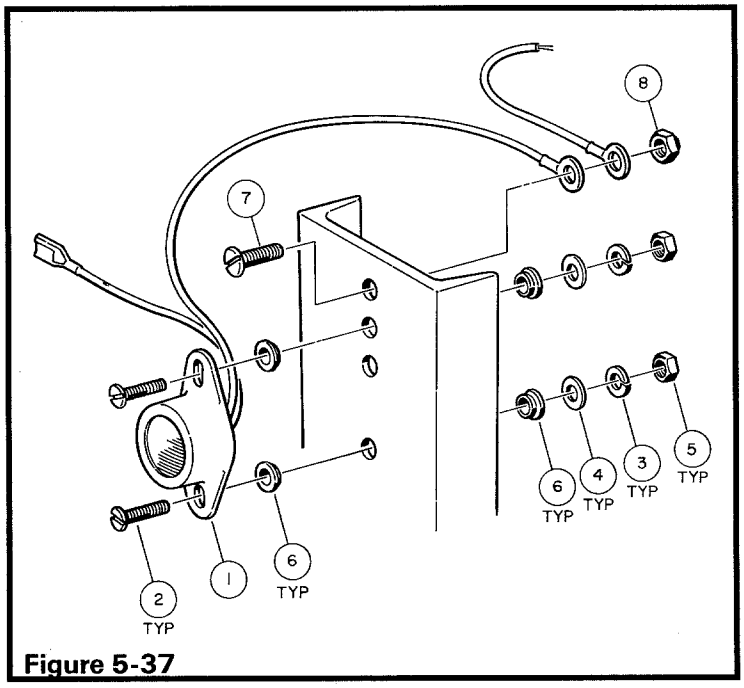


Figure 5-37

REVERSE BUZZER LIMIT SWITCH

Removal

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing the vehicle.

Turn key switch off and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

1. Remove seat from body.
2. Disconnect orange and red/white wires from reverse buzzer limit switch.
3. Remove two nuts and washers from neutral lock-out limit switch and slide neutral lock-out limit switch off screws.
4. Remove two nuts from reverse buzzer limit switch and slide reverse buzzer limit switch off screws.

Installation

1. Install reverse buzzer limit switch and then install two nuts up against limit switch. Torque to 5 in.-lbs.
2. Install the neutral lock-out limit switch and install two washers and two nuts. Torque to 5 in.-lbs. Place F&R lever in reverse to make sure that both switches are actuated.

3. Connect orange wire to common (COM) terminal and red/white wire to the normally open (NO) terminal of the reverse buzzer limit switch.
4. Connect battery cables, positive (+) cable first.
5. Shift forward/reverse lever to reverse, buzzer should function.
6. Install seat to body.

OIL WARNING LIGHT

Removal

WARNING:

Always wear eye protection when servicing the vehicle.

Turn key switch off and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

1. Remove plastic caps that cover metal screws on each side of center dash.
2. Unscrew both screws from center dash but do not remove.
3. Insert screwdriver at top center of dash between dash and cowl brace.
4. Gently pry center dash out from under edge or cowl brace, pull center dash away to provide sufficient clearance to oil light.
5. Disconnect wire and resistor from oil light.
6. Grasp the oil light assembly, compressing the two plastic lock tabs on unit, and push unit through dash **(Figure 5-38)**.

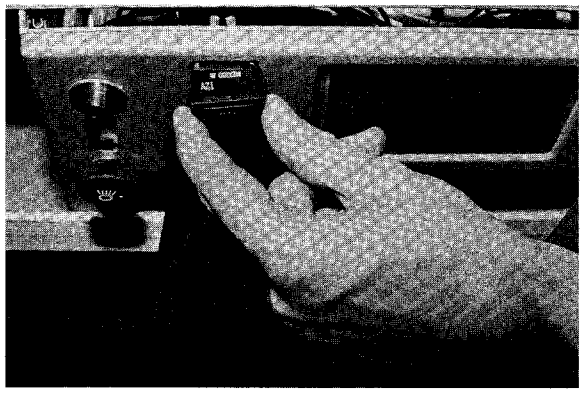


Figure 5-38

Installation

1. Push unit into hole in dash until plastic locks engage dash.
2. Connect wire and resistor to oil light.
3. Connect battery cables, positive (+) cable first.
4. Place jumper wire from bottom of resistor to ground. Turn key switch on and oil light should come on.
5. Remove jumper wire and light should go out.
6. Insert dash panel back into place.
7. Install screws and tighten.
8. Install the plastic caps that cover the metal screw heads on each side of center dash.

OIL LIGHT RESISTOR

The oil light resistor is connected to the back of the oil warning light.

Removal

1. Remove plastic caps that cover metal screws on each side of center dash.
2. Unscrew both screws from center dash but do not remove.
3. Insert screwdriver at top center of dash between dash and cowl brace.
4. Gently pry center dash out from under edge of bowl brace, pull center dash away to provide sufficient clearance to resistor.
5. Disconnect resistor from oil warning light and yellow wire, which goes to the oil sending unit.

Reverse this procedure for installation.

BATTERY

General Information

The battery on the DS Gasoline is a 12 volt, maintenance free battery that normally does not require periodic watering of the battery. However, service conditions may cause the battery to lose water. The water level can be checked by removing the vent caps. The water level should be to the level indicator or ½ inch above the top of the plates **(Figure 5-39)**.

The battery is designed to withstand some of the damaging effects of overcharging, but overcharging can still severely damage the battery.

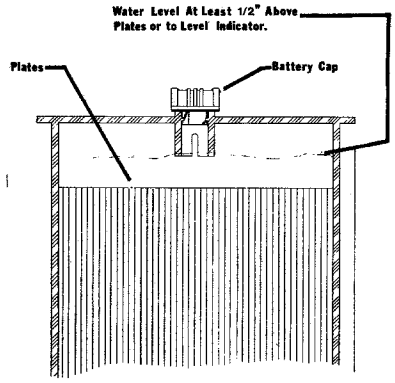


Figure 5-39 — Water Level

Visual Inspection and Maintenance

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing the vehicle.

DANGER:

Battery — Explosive Gases. Keep sparks, flames, cigarettes away. Ventilate when charging or using in an enclosed space. Always wear eye protection when working on or near batteries and their connections.

Battery — Poison/Danger. Contains acid — Causes severe burns — Avoid contact with skin, eyes, or clothing.

Antidotes:

External — Flush with water. Call physician immediately.

Internal — Drink large quantities of milk or water. Follow with milk of magnesia or vegetable oil. Call physician immediately.

Eyes — Flush with water for 15 minutes. Call physician immediately.

WARNING:

The vents require keeping the battery in an upright position to prevent electrolyte leakage. Tipping the battery beyond a 45° angle in any direction can allow a small amount of electrolyte to leak out the vent hole. Do not exceed this 45° angle when lifting, carrying or installing the battery because battery acid could cause severe personal injury when accidentally coming in contact with skin or eyes, or could damage clothing.

Check for obvious damage such as a cracked or broken case or cover that could permit loss of electrolyte. If physical damage is noted, replace battery.

Be sure battery holddowns are properly tightened. Torque to 9-14 in.-lbs. A loose holddown may allow the battery to become damaged from vibration or jarring. A holddown that is too tight may buckle or crack the battery case.

Testing the Battery

Equipment Required: hydrometer, VOM and 160 ampere load tester.

1. Take hydrometer readings of all six cells. If there is a 50 point difference between any two cells, recharge the battery and recheck the specific gravity. If 50 point difference still exists, replace battery.
2. Take a voltage reading of the battery, if it is less than 12.4 volts or the lowest specific gravity reading from step 1 is less than 1.225, recharge the battery. If battery voltage is greater than 12.4 volts and specific gravity is greater than 1.225, the problem is not with the battery. If the battery does not reach 12.4 volts or a cell is still less than 1.225 specific gravity after recharging, replace the battery.

NOTE: A fully charged battery in good condition should have all cells with at least 1.225 specific gravity, and there should be no greater than 50 points difference between any two cells and the open circuit voltage should be at least 12.4 volts.

3. To load test a battery, place a 160 amp load tester across the battery terminals.
4. Read voltage after 15 seconds and remove load tester.
5. Minimum voltage will determine if full charged battery is good. If voltage is below minimum, replace battery **(Figure 5-40)**.

If temperature is	70° (20° C and above)	60° F 16° C	50° F 10° C	40° F 4° C	30° F -1° C	20° F -7° C	10° F -12° C	0° F -18° C
Min. Voltage required is	9.6V	9.5V	9.4V	9.3V	9.1V	8.9V	8.7V	8.5V

Figure 5-40 — Voltage Requirements at Ambient Temperatures

Removal

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing the vehicle.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

DANGER:

Battery — Explosive Gases. Keep sparks, flames, cigarettes away. Ventilate when charging or using in an enclosed space. Always wear eye protection when working on or near batteries and their connections. For added protection, cover the top of each battery with a damp cloth.

Battery — Poison/Danger. Contains acid — Causes severe burns — Avoid contact with skin, eyes, or clothing.

Antidotes:

External — Flush with water. Call physician immediately.
Internal — Drink large quantities of milk or water. Follow with milk of magnesia or vegetable oil. Call physician immediately.
Eyes — Flush with water for 15 minutes. Call physician immediately.

1. Remove seat from body.
2. Remove intake expansion chamber.
3. Disconnect battery cables — negative (-) cable first.
4. Remove the two locknuts, washers and lift off the holddown.
5. Lift out battery.

Charging the Battery

DANGER:

Battery — Explosive Gases. Keep sparks, flames, cigarettes away. Ventilate when charging or using in an enclosed space. Always wear eye protection when working on or near batteries and their connections.

Battery — Poison/Danger. Contains acid — Causes severe burns — Avoid contact with skin, eyes, or clothing.

Antidotes:

External — Flush with water. Call physician immediately.
Internal — Drink large quantities of milk or water. Follow with milk of magnesia or vegetable oil. Call physician immediately.
Eyes — Flush with water for 15 minutes. Call physician immediately.

1. Attach positive charger cable (+) to positive (+) terminal on battery. (Thread 3/8-16 bolt into each terminal, if battery is removed from vehicle.)
2. Attach negative charger cable (–) to negative (–) terminal on battery.
3. Plug in charger.
4. Battery may be charged with a slow charge (3-10 amps) or a fast charge (20-30 amps). Charge until the specific gravity reaches 1.250.

WARNING:

If battery case feels hot (approximately 125° F or more) and/or emits gases and/or fluid boils from vents, STOP CHARGING AT ONCE. Do not disconnect the DC output leads from the battery when the charger is on. The resulting arcing between the DC leads and battery terminals could cause an explosion. If the charger must be stopped, disconnect the AC supply cord from the wall outlet before disconnecting the DC leads from the battery. Let battery cool to room temperature and resume charging battery at a lower amp rate. Failure to stop charging battery when these conditions are present could result in an explosion, personal injury and/or damage to the battery.

Follow all warnings and procedures supplied by battery charger manufacturers.

Installation

WARNING:

When placing battery in vehicle, do not tip beyond 45° angle in any direction to avoid electrolyte leakage.

Always wear eye protection when servicing the vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

DANGER:

Battery — Explosive Gases. Keep sparks, flames, cigarettes away. Ventilate when charging or using in an enclosed space.

Always wear eye protection when working near batteries.

1. Secure battery with holddown 'J' bolts, washers and nuts. Tighten both nuts fingertight, then torque to 9-14 in.-lbs.
2. Attach positive cable (+) to positive terminal on battery, attach negative cable (–) to negative terminal on battery. Tighten to 9-10 ft.-lbs. torque.
3. Reinstall intake expansion chamber.
4. Install seat to body.

Jump Starting the Engine

WARNING:

Make certain vehicles do not touch each other.

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing the vehicle.

DANGER:

Battery — Explosive Gases. Keep sparks, flames, cigarettes away. Ventilate when charging or using in an enclosed space. Always wear eye protection when working on or near batteries and their connections. For added protection, cover the top of each battery with a damp cloth.

Battery — Poison/Danger. Contains acid — Causes severe burns — Avoid contact with skin, eyes, or clothing.

Antidotes:

External — Flush with water. Call physician immediately.
Internal — Drink large quantities of milk or water. Follow with milk of magnesia or vegetable oil. Call physician immediately.
Eyes — Flush with water for 15 minutes. Call physician immediately.

1. Both batteries must be the same voltage (12V).
2. Position the vehicle with the booster battery adjacent to the vehicle with the discharged battery so booster cables can be easily connected to the batteries in both vehicles.
3. Connect each end of one cable to positive (+) terminals of each battery **(Figure 5-41)**.
4. Connect one end of the other cable to negative (–) terminal of the booster battery.

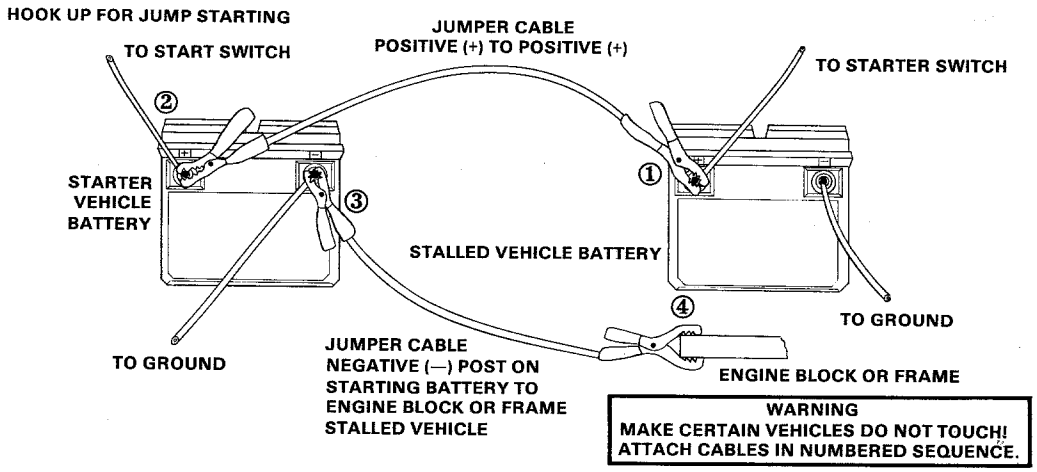


Figure 5-41 — Jump Starting the Engine

WARNING:

Do NOT connect negative (-) booster to negative post of stalled vehicle battery.

5. Connect the other end of the negative (-) cable to the car frame on vehicle with discharged battery. Keep away from battery.
6. Make certain that booster cables are clear of all belts and other moving parts.

WARNING:

Before attempting to start either engine, put the forward and reverse lever in the neutral position and place the neutral lock-out cam in the SERVICE position on both vehicles.

DANGER:

Engine produces carbon monoxide which is an odorless, deadly poison. DO NOT OPERATE IN AN ENCLOSED AREA WITHOUT PROPER VENTILATION.

7. Start engine on booster vehicle, let it run for a few minutes and then try to start the engine of the vehicle which has the discharged battery.
8. If the engine does not start after cranking for thirty seconds, STOP PROCEDURE. Cranking more than thirty seconds seldom starts the engine. Some mechanical adjustment must be made. See Section IV — Trouble-Shooting.
9. After starting, allow the engine to return to idle speed and do not allow the engine to stop, remove the negative (-) booster cable connection from the car frame. Then remove the other end of the cable from the booster battery.
10. Remove the positive (+) cable by disconnecting at the booster battery first and then disconnecting the other end from the discharged battery.
11. Continue to run engine at governed speed for 10-15 minutes.

Storage

1. Disconnect battery cables — negative (-) cable first.
2. Battery can remain in car.
3. Be sure battery is fully charged. If not, see CHARGING THE BATTERY.
4. Clean battery top and connections.
5. Fully charged battery should be stored in a cool environment. Batteries "self-discharge" when not in use. The colder the temperature, the slower they self-discharge; the higher the temperature the faster they self-discharge.

WARNING:

If battery is frozen or container is bulged, do not attempt to charge. Discard battery. Frozen batteries can explode.

CAUTION:

A battery in a lower state of charge (low specific gravity readings) will freeze at low temperatures (Figure 5-42).

State of Charge	Freezing Temperature		Risk of Sulfation
	F°	C°	
100%	-70°	-57°	Low
75%	-39°	-38°	Low
50%	-16°	-26°	Low
25%	-2°	-19°	Moderate
Discharged	+17°	-8°	High

Figure 5-42 — State of Charge Chart

6. Check the battery voltage every 8-10 weeks and recharge as necessary to bring the battery to 75%-100% charge to prevent battery sulfation and possible freezing.

GROUND STRAPS

There are two ground straps on the DS Gasoline which ground the engine to the frame. One of the ground straps is attached to the A1 terminal of the starter-generator and to the I-beam. The second ground strap attaches at one end to the bottom of the electrical box where the bolt which secures the voltage regulator comes through the bottom of the electrical box. The other end of this ground strap attaches to a boss on the engine **(Figure 5-43)**. Be sure these straps are securely connected at both ends of each strap.

WARNING:

If ground straps are not securely connected to frame, a potential fire hazard will exist. Be sure both straps are securely connected at all times.

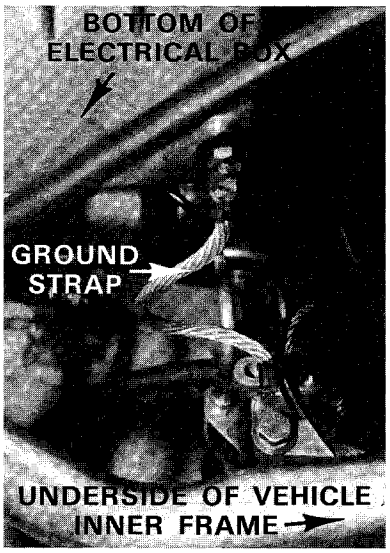


Figure 5-43

SECTION VI - ENGINE

GENERAL INFORMATION

The CLUB CAR DS Gasoline golf car uses a 4-cycle, single cylinder, air cooled engine. Unlike a 2-cycle engine where oil is mixed with the gasoline for lubrication purposes, the 4-cycle engine has an oil reservoir (crankcase) similar to automobiles, trucks, aircraft, heavy equipment, machinery and other applications designed for reliable heavy duty service. The oil supply is in the engine, **not** in the gas tank.

The engine has two major component assemblies; cylinder assembly and crankcase assembly.

The cast iron cylinder assembly includes intake and exhaust valves, piston, cylinder head, and gaskets. The cylinder and head are bolted to the engine crankcase. The crankcase assembly includes the crankshaft which is induction hardened carbon steel, main bearings, connecting rod, camshaft, dynamic balance shaft and bearings.

Ignition timing is produced electronically by a C.D.I. (Capacitive Discharge Ignition) system. The spark ignition is controlled by this solid state electronic system which automatically provides a strong spark to the plug for starting and all operating conditions.

The ignition system does not use breaker contact points and is virtually maintenance free, excluding the spark plug.

The engine is designed to provide long service life before major repairs are required, however, the engine, like all mechanical equipment, requires periodic preventive maintenance to be performed to ensure dependable, problem-free operation.

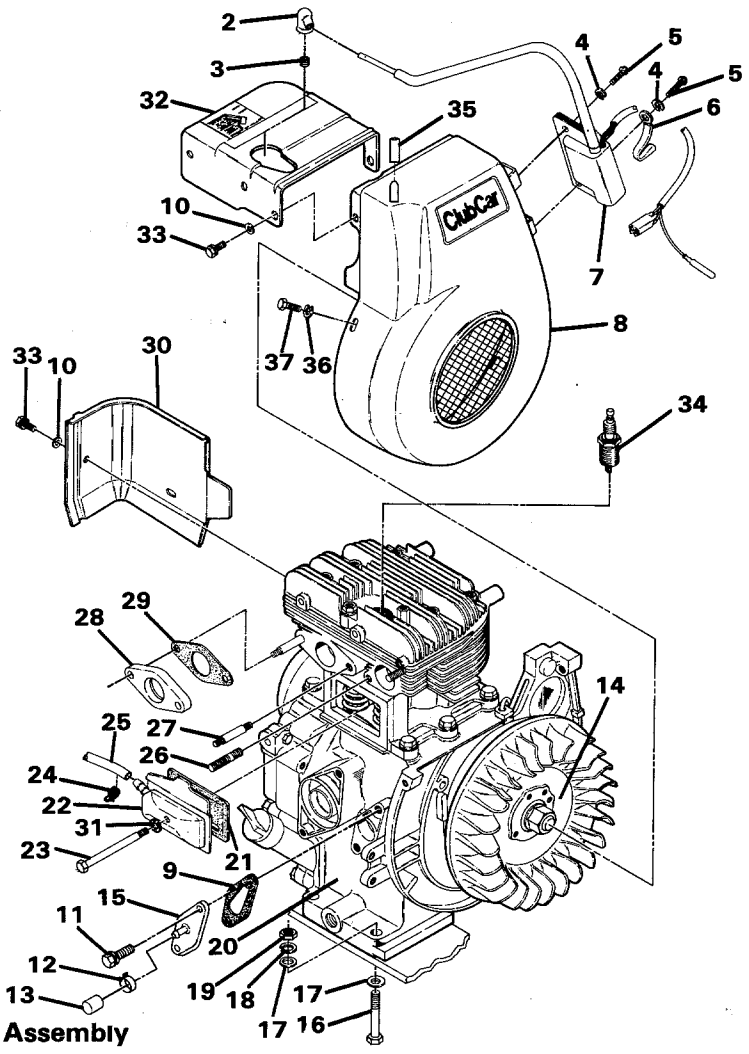


Figure 6-1 — Engine Assembly

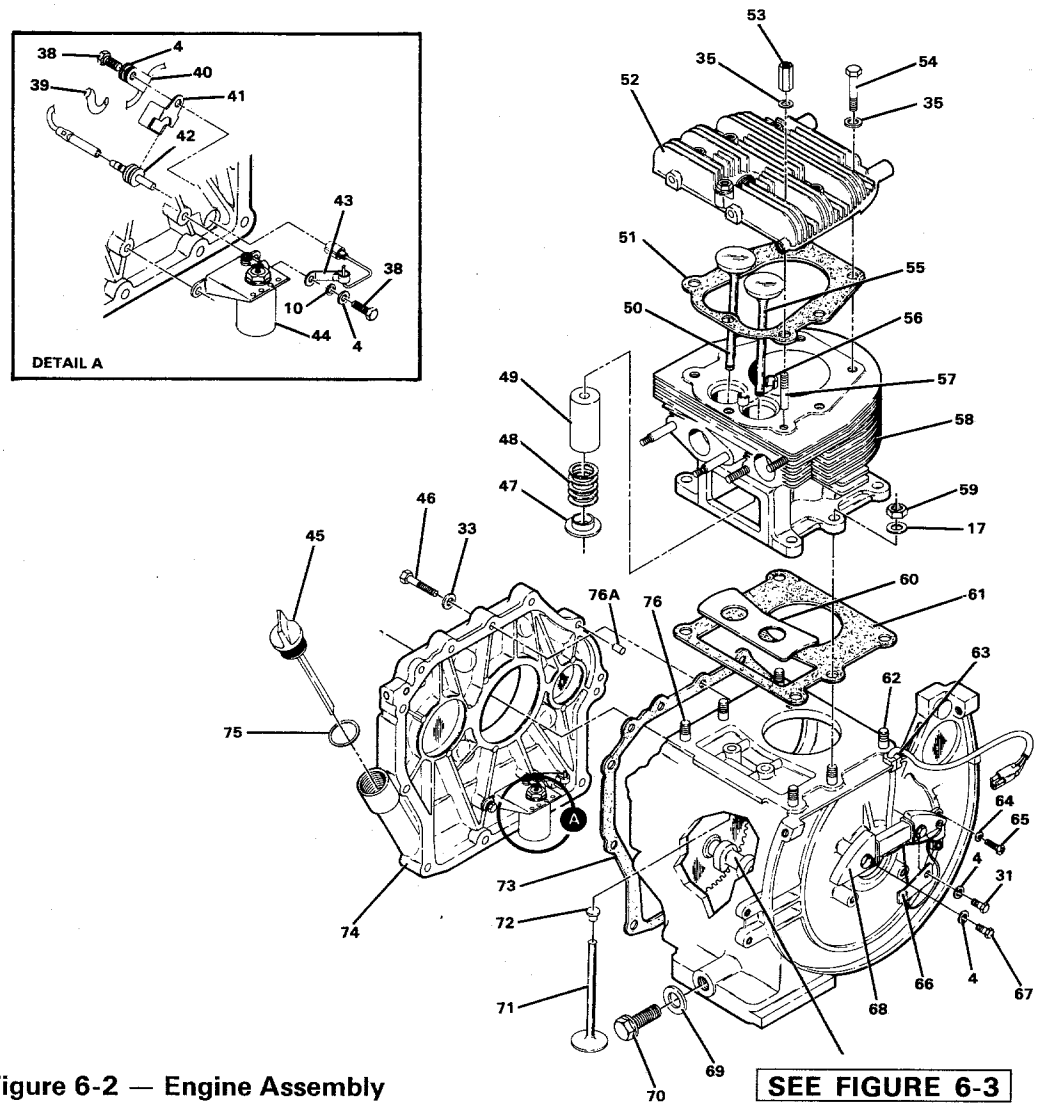


Figure 6-2 — Engine Assembly

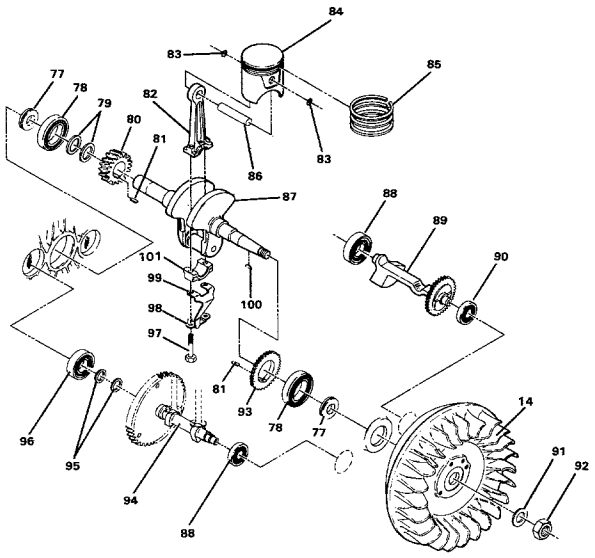


Figure 6-3 — Engine Assembly

SPECIFICATIONS

Type	4-cycle gasoline
Cooling	Air cooled
Cylinders	Single
Displacement	20.89 cu. in. (341 cc)
Bore	3.15 in. (80mm)
Stroke	2.68 in. (68mm)
Compression Ratio	6.0:1
Compression	100 P.S.I.
Maximum RPM	4000 RPM
Horsepower	8.5
Torque	13.16 ft.-lbs. @ 2600 RPM
Rotation	Counter-clockwise facing output shaft
Valve Timing	Camshaft gear to crankshaft gear
Ignition Spark Timing	Solid state electronic C.D.I. (capacitive discharge ignition) automatic advance 10° @ 1000 RPM, 25° @ 2000 RPM
Spark Plug	NGK BPM4A or Champion CJ8Y
Spark Gap	.023-.028 in.
Lubrication	Splash system, with low level oil warning light on dash
Oil Capacity	40 oz. SAE 30 or SAE 5W20 (See Figure 3-1)
Starting	Electric starter-generator, belt drive
Carburetor	Float bowl with fixed jets
Cylinder Head	Aluminum alloy with deep fins
Cylinder	Cast iron
Crankshaft	Carbon steel, induction hardened, with integral counter weights and crankpin
Main bearings	Ball bearing on each end of crankshaft, camshaft and dynamic balance shaft
Connecting Rod	Aluminum alloy
Piston	Aluminum alloy
Piston Rings	3 ring system, two compression and one oil
Valves	Heat-resisting steel forging, exhaust valve face is stellite material
Valve Seats	Heat-resisting steel exhaust seat. CU-CR cast iron intake seat
Valve Tappets	CR-MO steel forging

Wear Limitations:

NOTE: The following specifications are wear limitations and not design specifications. These parts should be replaced when worn to these limitations.

cylinder bore taper (top to bottom)	.006 in.	Std. 3.15 in. (80mm)
cylinder bore (out of round)	.001 in.	
piston to cylinder clearance	.010 in.	

top ring to ring groove clearance	.006 in.	
second ring to groove clearance	.006 in.	
oil ring (bottom) to ring groove clearance	.006 in.	
piston ring gap (all)	.039 in.	
piston pin to piston clearance	.002 in.	
connecting rod big end side play	.020 in.	
crank pin wear	.002 in.	standard crank pin - 1.259 in.
crank pin to connecting rod clearance	.004 in.	
crankshaft end play	0-0.012 in.	adjust with shims
cam shaft end play	0-0.012 in.	adjust with shims
cam lobe wear base radius	.570 in. or more	
cam lobe wear base lift	.265 in. or more	
valve spring free length	1.457 in.	
valve stem to valve guide clearance		
intake	.005 in.	
exhaust	.005 in.	
tappet to tappet guide clearance	.004 in.	

NOTE: The dynamic balancer, crankshaft and camshaft bearing play are not applicable because the bearings are heavy duty ball bearings that are pressed into each crankcase housing end; not on the shaft ends themselves. The bearings are lubricated from the oil in the engine crankcase.

Valve Tappet Adjustments/Clearances:

tappet clearance	.004-.008 in.	
intake valve open	54.5° BTDC	Engine cold with tappet clearance set at .004-.008 in.
intake valve closed	84.5° ABDC	
exhaust valve open	89.5° BBDC	
exhaust valve closed	49.5° ATDC	

Torques:

Cylinder Head Bolts	16-18 ft.-lbs.
Cylinder Bolts	25-29 ft.-lbs.
Connecting Rod Bolts	29-30 ft.-lbs.
Side Cover Bolts	14-16 ft.-lbs.
Flywheel Nut	60-65 ft.-lbs.
Spark Plug	15-20 ft.-lbs.
Flywheel Shroud Bolts	14-16 ft.-lbs.
Exhaust Header Nuts	6-8 ft.-lbs.
Crankcase Bolts	14-16 ft.-lbs.
Cylinder Head Shroud	8-10 ft.-lbs.
Engine Mounting Nuts	25-30 ft.-lbs.

SPARK PLUG

GENERAL INFORMATION

Spark plugs are selected to suit specific engine design and vehicle operating conditions. The spark plug is designed to give maximum life and efficient combustion of fuel. Original equipment plug number is NGK BPM4A. This is a Bantam type plug and an acceptable replacement is a Champion CJ8Y. The spark gap is .023-.028 in.

WARNING:

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

REMOVING SPARK PLUGS

Remove all dirt from plug base in head before removing plug. Use a ¾" deep well socket wrench or ¾" plug wrench to loosen the plug.

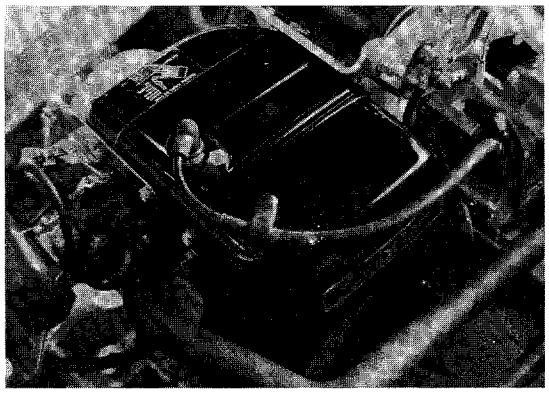


Figure 6-4

CLEANING, INSPECTION AND REPAIR

Examine the plug. The deposit on the plug base and electrode is an indication of the correct heat range and efficiency as well as a guide to the general condition of the engine, fuel and air mixture and ignition system. If all of the above conditions are proper, the spark plug should be a light brown color. There should be no bridging between the electrode and base and the electrode should not be eroded. Black color, excessive carbon and/or a wet plug indicate a too rich condition. White, burned or melted electrodes indicate a too lean condition or pre-ignition. Also examine the spark plug wire. Remove rubber boot and inspect internal spring for damage. Inspect spark plug wire for damage and be sure coil is securely attached to spark plug. Also be sure to route the wire through the clamp **(Figure 6-4)**.

TESTING SPARK PLUGS

Check the sparking ability of a cleaned and regapped plug on a sparking comparator if possible. Spark should be blue and strong and able to jump a 5/16 in. gap.

SETTING SPARK GAP

1. Before setting the spark gap on a used plug, pass a contact point file between the electrodes to produce flat, parallel surfaces to facilitate accurate gauging.
2. Use a wire type gauge. Bend the outside or grounded electrode so only a slight drag on the gauge is felt when passing it between the electrode. Never make adjustment by bending the center electrode. Set gap at .023-.028 inches.

INSTALLING SPARK PLUGS

NOTE: Before installing the plug, check the condition of threads in the cylinder head. Soften deposits in cylinder head threads with penetrating oil and clean out with a tap.

1. Install a new plug gasket and turn the plug down finger tight. Tighten spark plug to 15-20 ft.-lbs. torque.

ENGINE MOUNTING PLATE AND INNER FRAME

See Section XII - Steering and Suspension, Rear Suspension.

CYLINDER, VALVES, PISTON AND RINGS

GENERAL INFORMATION

Prior to attempting time consuming repairs to the Cylinder Assembly, a Cylinder Compression Test should be performed using a Standard Compression Tester. Normal compression is 100 PSI. Low compression (under 80 PSI) would normally indicate a problem in the Cylinder Assembly such as rings, gaskets, etc.

CYLINDER HEAD REMOVAL

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

Moving parts — do not attempt to service the vehicle with engine running.

Hot — do not attempt to service hot engine or exhaust. Can cause extreme burns. Always allow engine and exhaust to cool prior to servicing.

1. Remove seat from body.
2. Remove two bolts from throttle and governor linkage bracket **(Figure 6-5)**.
3. Remove linkage and bracket from head.

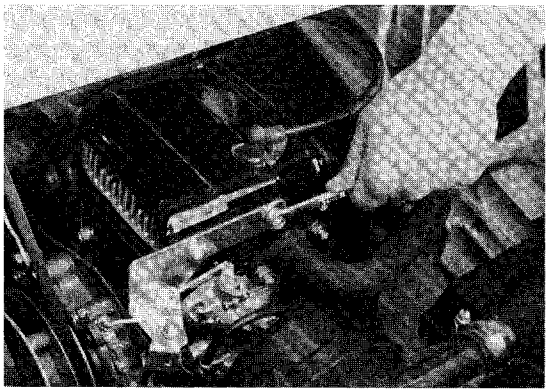


Figure 6-5

CAUTION:

Disconnect governor linkage rod from pivot to prevent possible damage/bending of rod.

4. Remove access panel door.
5. Disconnect wires from starter-generator. Identify wires for correct reassembly **(Figure 6-6)**.
6. Remove starter-generator mounting hardware. Lower bolts/nuts first, upper bolts/nuts last. Remove belt from pulley.

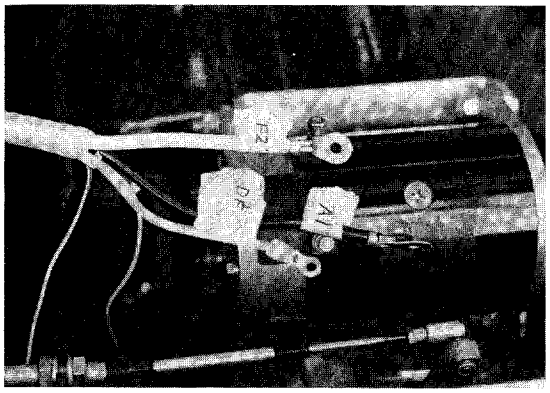


Figure 6-6

7. Lift starter-generator through access panel.
8. Remove two bolts from starter-generator mounting bracket and remove bracket.
9. Remove two nuts from exhaust header/manifold connection **(Figure 6-7)**.
10. Remove bolts/nuts from exhaust pipe connection to muffler, remove exhaust header/pipe.
11. Loosen air intake hose clamps, remove expansion chamber from air filter housing cover.
12. Remove three bolts and remove filter cover and filter.

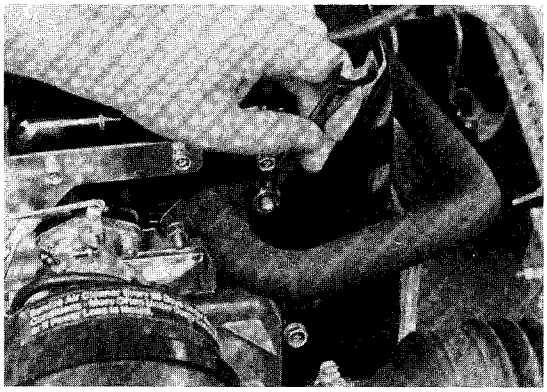


Figure 6-7

13. Remove bolt and nut from lower air filter housing brace **(Figure 6-8)**.
14. Remove crankcase ventilation tube from air filter housing.
15. Bend locking tabs away from bolts and remove two bolts mounting air filter housing to carburetor. Remove air filter housing **(Figure 6-9)**.
16. Disconnect fuel pump to carburetor gas line.

NOTE: Plug gas line to prevent gasoline draining from the line.

17. Disconnect fuel pump impulse line from engine.
18. Remove two nuts at intake manifold and remove carburetor.
19. Remove bolts (33) from head shroud. Remove shroud (1 and 30) **Figure 6-1)**.
20. Disconnect wire connection to CDI unit (7), remove CDI mounting bolts (5) to flywheel shroud and remove CDI.
21. Remove the bolts (37) from flywheel shroud. Remove shroud (8).
22. To remove cylinder head (52) **(Figure 6-2)**, remove the head bolts (54), in sequence **(Figure 6-10)**.

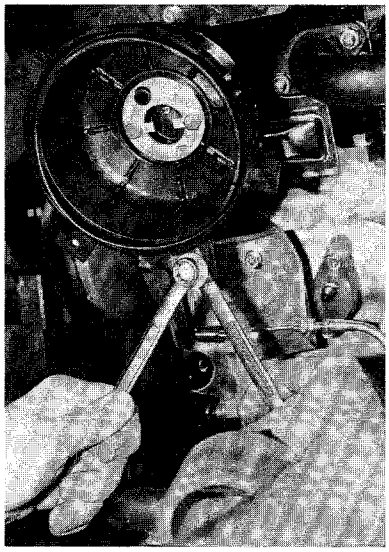


Figure 6-8

CAUTION:

Remove head bolts in numerical sequence, ¼ turn at a time, until all bolts are loose. If head bolt removal sequence is not followed, the cylinder head may be warped during removal.

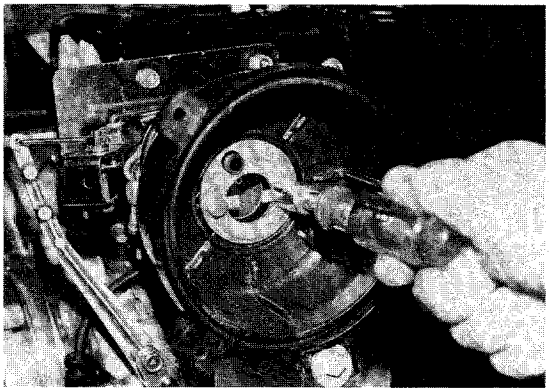


Figure 6-9

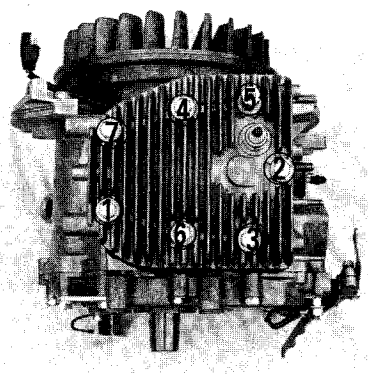


Figure 6-10

CLEANING AND INSPECTION

CYLINDER HEAD

1. Clean the head with a non-flammable solvent and dry thoroughly.
2. Bead blast or scrape carbon deposits from head. When scraping carbon deposits, be careful to avoid scratching or nicking the cylinder head **(Figure 6-11)**.
3. Inspect spark plug port threads for damage. If threads are damaged, replace the head.

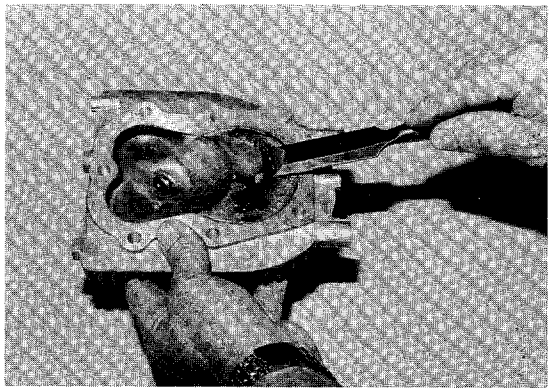


Figure 6-11

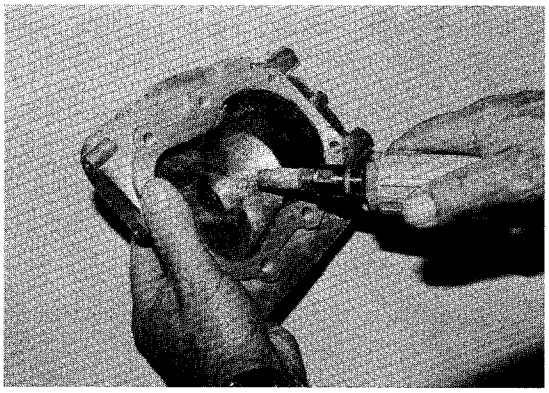


Figure 6-12

CAUTION:

Remove sharp edges from any damaged spots in the combustion chamber using a small grinder. Sharp edges in the combustion chamber may cause preignition. DO NOT remove any more material than is necessary or change the shape of the combustion chamber (Figure 6-12).

NOTE: See Cylinder Head Installation following cylinder installation and valve adjustment.

CYLINDER REMOVAL

1. Turn engine by hand until piston is at top dead center.
2. Loosen each cylinder nut (59) **(Figure 6-2)** ¼ turn, then repeat until all nuts are thoroughly loose. Remove all nuts and flat washers from studs.
3. Break gasket seal, between cylinder and crankcase.
4. Lift cylinder (58) off crankcase **(Figure 6-13)**.

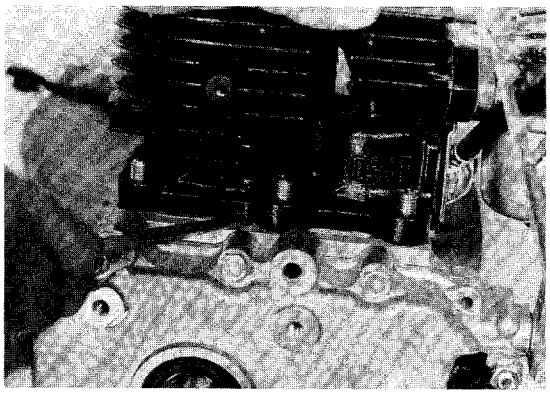


Figure 6-13

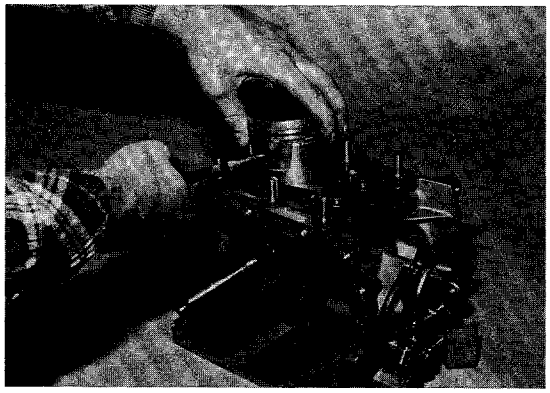


Figure 6-14

PISTON REMOVAL

1. Remove both piston pin retaining rings (83) **(Figure 6-3)** with needle nose pliers **(Figure 6-14)**.
2. Remove piston pin (86). Place punch against pin and tap lightly with a rubber mallet. Pin will slide out.

VALVE REMOVAL

1. Place cylinder on workbench upside down.
2. Remove collet (56) **(Figure 6-2)** from valve by depressing valve spring with wrench against cylinder **(Figure 6-15)**.
3. Lift out valve spring (48) and valve (50 or 55). Repeat same procedure for other valve.

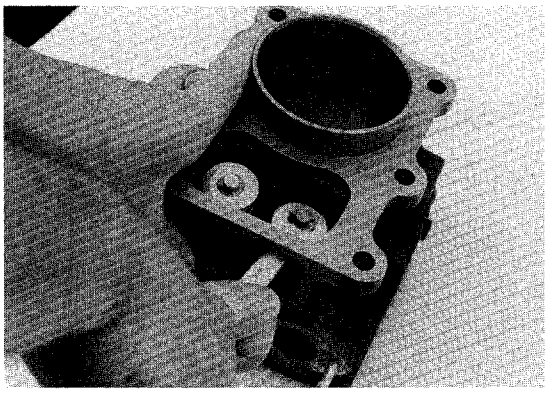


Figure 6-15

CLEANING AND INSPECTION

Cylinder

1. Clean thoroughly in a non-flammable solvent, dry thoroughly.
2. Inspect cylinder walls for scoring. Scored cylinder walls will require refinishing to oversize. See Cylinder Repair.
3. Scrape carbon deposits from the exhaust manifold and top of cylinder bore.

CAUTION:

Do not damage the cylinder.

Piston

1. Clean thoroughly in a non-flammable solvent.
2. Remove rings (85) **(Figure 6-2)** and clean all deposit from ring grooves.

NOTE: A piston ring groove cleaner should be used to remove deposits from ring grooves. Use caution not to damage the ring grooves while cleaning.

3. Scrape carbon deposits from the top of piston.

CAUTION:

Do not damage the piston.

Valves, Guides and Seats

1. Remove carbon deposits from valve. Inspect valve seating areas for depressions and pits. If valve is pitted, replace as described under Valve Replacement.

NOTE: The angle of the valve seat is 45° for both the exhaust and intake valves.

2. If valve can be reused, use fine grain valve grinding compound and reface valve and seat.

CAUTION:

Be sure to remove all grinding compound from valve and seat prior to installation of valve.

3. Clean guides with non-flammable solvent. Dry thoroughly.

NOTE: If exhaust valves are pitted, burned or excessively worn, they should be replaced. If the valves are not replaced under these conditions, the engine will not achieve the proper compression and will not operate properly.

CYLINDER REPAIR

Measuring Cylinder and Piston

1. If cylinder is in good condition, remove cylinder wall glaze with a No. 220 grit hone.

2. Measure cylinder bore ½ in. from TOP of bore, measuring from front to rear, then left to right, (4 point measurement). Record the measurements **(Figure 6-16)**.

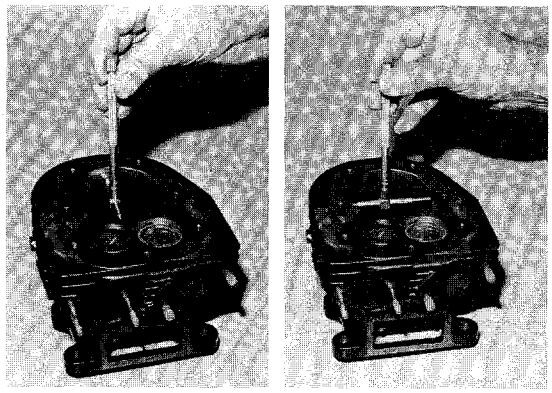


Figure 6-16

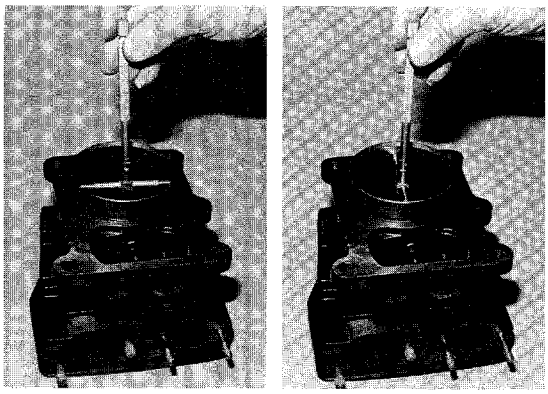


Figure 6-17

3. Measure cylinder bore ½ in. from BOTTOM OF BORE. Measuring from front to rear, then left to right (4 point measurement). Record the measurements **(Figure 6-17)**.
4. If the difference between front-to-rear and left-to-right measurements in Step 2 exceed 0.001 in. the cylinder is out of round, and should be rebored to the next oversize piston.
5. If the measurements in Step 3 vary more than .006 in. from the measurements in Step 2, the cylinder has excessive wear and should be rebored to the next oversize piston.
6. Measure piston at bottom of skirt, 90° from piston pin **(Figure 6-18)**.

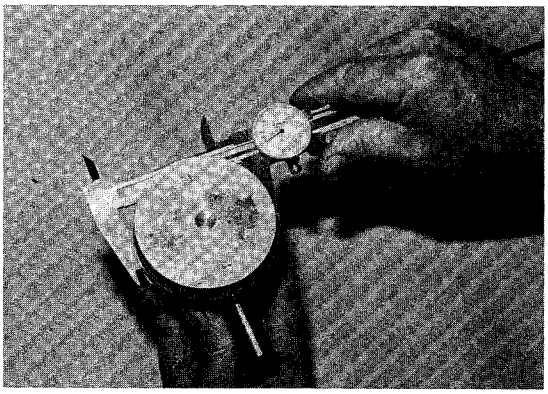


Figure 6-18

7. Subtract the measurement in Step 6 from Step 3 to obtain piston-to-cylinder clearance. If it exceeds .010 in., cylinder clearance is excessive and should be rebored to the next oversize piston.
8. If piston and cylinder are out of specifications (see Specifications), proceed to FITTING OVERSIZE PISTON IN CYLINDER. If they are within specs and not scored, new standard rings may be fitted after cylinder is refinished as in Step 1.

Fitting Oversize Piston in Cylinder

Pistons are available in standard, .010 and .020 oversize. The cylinder may be bored and final honed, or rough honed and final honed to fit any of the above pistons. Piston to cylinder clearance is .0006 in. to .0018 in. See MEASURING CYLINDERS AND PISTON.

Always measure the piston to be used in any given cylinder before machining because the cylinder must be final honed to match the piston.

1. Measure the cylinder to determine smallest size piston that can be used.
2. Measure new piston at bottom of skirt 90° from piston pin bore.
3. Bore or rough hone cylinder to same diameter as piston being used.
4. Final hone the cylinder to achieve desired piston clearance of .0006 in. to .0018 in.
5. After honing cylinder, wash it in warm water with a strong soap or detergent. Dry thoroughly to remove any abrasives from the pores in the cylinder.

CAUTION:

DO NOT wash in solvent. Solvent will allow any abrasives to work even deeper into the pores. Any abrasives not removed will cause a lapping action on both the piston and rings resulting in rapid wear.

6. Coat the cylinder with oil to provide lubrication and prevent rust.

NOTE: Once the cylinder and piston have been fitted, keep them together as a matched set to ensure proper clearance.

NOTE: New piston rings should always be used whether a new or used piston is being installed.

PISTON RINGS INSTALLATION

1. Replace rings (85) **(Figure 6-3)** by spreading the ends between your thumbs and slipping them over the top of the piston **(Figure 6-19)**.

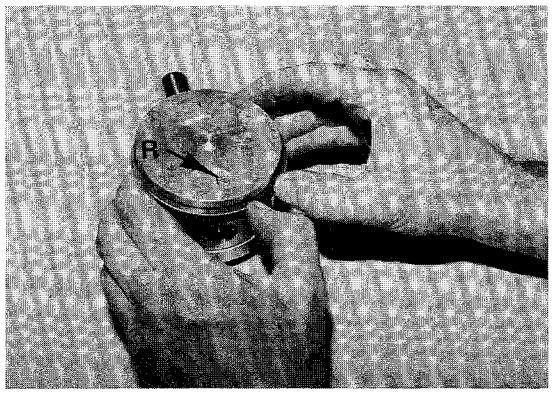


Figure 6-19

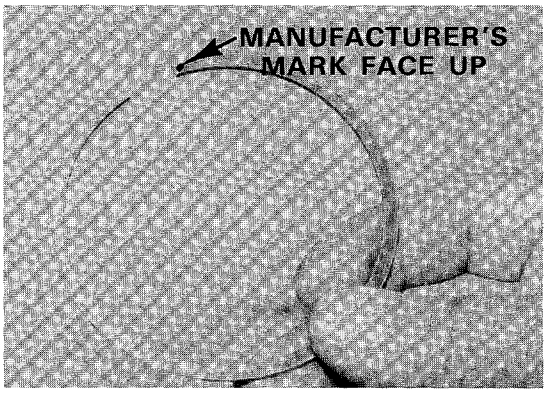


Figure 6-20

2. Put the slotted oil ring in the bottom groove, the unplated iron ring in the second groove and the chrome-plated compression ring in the top groove. The manufacturers' mark on the end of **each** ring must face upward **(Figure 6-20)**.

PISTON INSTALLATION

1. Apply a coating of oil in the piston pin rod hole and on piston pin (86).
2. Make sure mark (R) on top face of piston is on same side as the five raised letters on connecting rod **(Figure 6-19)**.
3. Install piston pin (86) through piston (84) and rod (82) and install new piston pin retaining rings (83).

CAUTION:

Install new piston pin retaining rings with the "tail" pointing straight up or down. The tail must be properly aligned or inertia may cause it to compress at the top or bottom of the piston stroke and fall out (Figure 6-21).

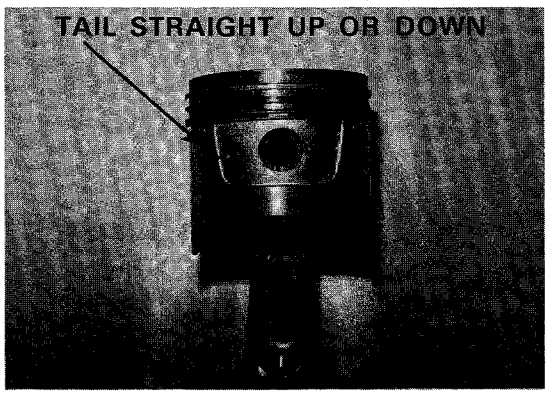


Figure 6-21

VALVE INSTALLATION

1. Insert exhaust (55) and intake valve (50) into their respective seats in cylinder, turn cylinder upside down, holding valves in place by hand.
2. Install valve springs (48) and retainer seats (47).
3. To install collets (56) to valve stems, compress valve spring with wrench and place both collet halves into groove in valve stem. Release wrench slowly until valve spring pressure locks collets in stem groove **(Figure 6-22)**.
4. Turn cylinder right side up and install tappet chamber cover and gasket to cylinder.

CYLINDER INSTALLATION

1. Make sure mark (R) on top face of piston is facing towards FLYWHEEL side of cylinder **(Figure 6-19)**.

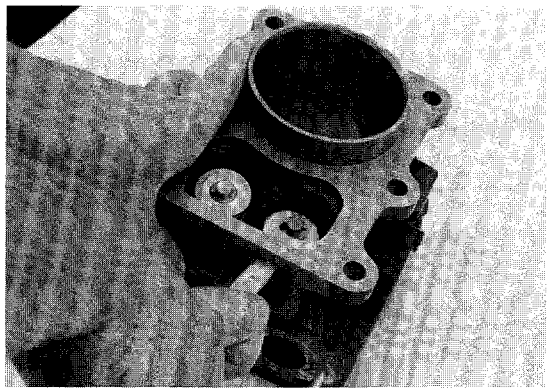


Figure 6-22

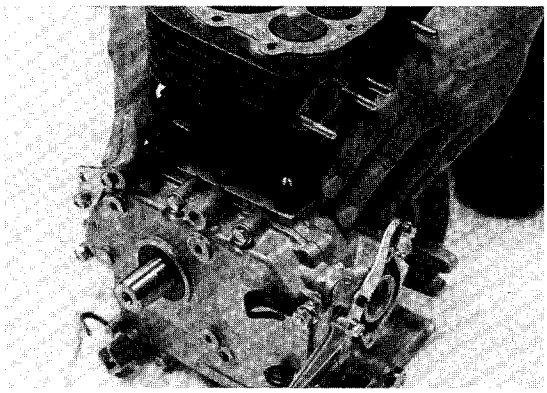


Figure 6-23

2. Ring gaps of top and third rings must face away from valves. Gap of second (middle) ring must face toward valves.
3. Install new gasket to crankcase (61) **(Figure 6-2)**, apply light coat of oil to cylinder wall, rotate crankshaft to lower piston to bottom of stroke.
4. Carefully lower cylinder down onto piston as far as top ring, compress ring with thumbs and lower cylinder over top ring **(Figure 6-23)**.
5. Repeat same procedure with second and third rings until cylinder rests on crankcase.
6. Install flat washers (17) and nuts (59), turn finger tight, tighten in criss-cross sequence to 25-29 ft-lbs. torque.

VALVE ADJUSTMENT

Valve clearance to tappet can be checked without removing the cylinder head. Valve clearance **MUST** be checked with engine **COLD**.

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

1. Remove spark plug.
2. Remove tappet chamber cover (22) **(Figure 6-1)**.
3. Rotate engine by hand to bring piston to TDC on compression stroke.
4. Check intake and exhaust valves to be sure both are closed.
5. Insert feeler gauge between each tappet (72) and valve stem (51 and 55) **(Figure 6-24)**.

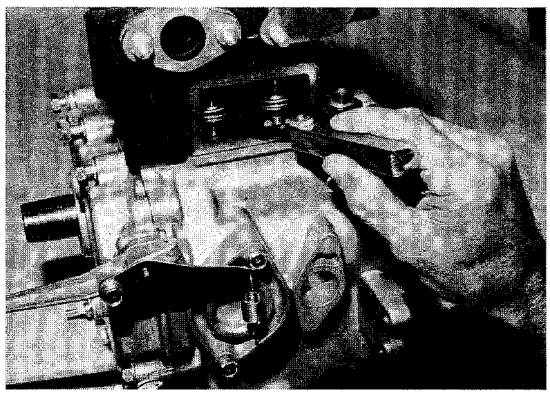


Figure 6-24

6. Proper clearance between intake valve and tappet is .004 to .008 in.
7. Proper clearance between exhaust valve and tappet is .004 to .008 in.
8. If new valves were installed, the clearance may be too small or too large. To bring valve clearance within specifications remove cylinder as described under Cylinder Removal.
9. Remove tappet cap.
10. Measure thickness of tappet cap head (72).
11. Using tappet cap chart, install new cap of proper thickness to bring clearance within specifications.

Tappet Cap Chart

Club Car Part No.	Metric Size	US Size
1012947	2.7 mm	.106 in.
1012948	2.9 mm	.114 in.
1012949	3.15 mm	.124 in.
1012950	3.4 mm	.134 in.
1012951	3.65 mm	.144 in.

EXAMPLES

1. Example: Clearance — Too Large
   Clearance between exhaust valve and tappet measure .015 in. as determined in Step 5 above. Clearance is .007 in. to .011 in. greater than specified clearance given in Step 7.

   Cap Head measures .106 in. as determined in Step 11. Therefore, a cap must be selected between .113 in. and .117 in. (.106 + .007 = .113 in., .106 + .011 = .117 in.)
   Choose Part No. 1012948
2. Example: Clearance — Too Small
   Clearance between intake valve and tappet measure .001 in. as determined in Step 5 above. Clearance is .003 in. to .007 in. less than specified clearance given in Step 6.

   Cap measures .129 in. as determined in Step 11. Therefore, a cap must be selected between .122 in. and .126 in. (.129 - .007 = .122 in., .129 - .003 = .126 in.)
   Choose Part No. 1012949

12. Install cylinder to crankcase as described under Cylinder Installation.
13. Install cylinder head, shrouds and carburetor as described under Cylinder Head installation.
14. Install tappet chamber cover (22) and gasket (21) **(Figure 6-1)** to cylinder, tighten bolts securely.
15. Connect gas line to carburetor, install new clamp.
16. Connect impulse line from fuel pump to engine.
17. Install air filter housing to carburetor, tighten bolts to 5-6 ft.-lbs. Bend lock tabs up against bolt.

NOTE: The flat of the hex head must line up with lock tab. The maximum final torque is 7 ft.-lbs.

18. Install crankcase ventilation tube to air filter housing with new clamp.
19. Connect battery cables, positive (+) cable first.
20. Place forward and reverse lever in NEUTRAL position, place neutral lock-out cam in SERVICE position.
21. Install spark plug into cylinder head. Connect plug wire to spark plug.

DANGER:

Engine produces carbon monoxide which is an odorless, deadly poison. DO NOT OPERATE IN AN ENCLOSED AREA WITHOUT PROPER VENTILATION.

22. Start engine, check for proper operation.

NOTE: Place neutral lock-out cam in OPERATE position for normal vehicle operation.

CYLINDER HEAD INSTALLATION

1. Install new gasket (51), head bolts (54) and washers (35) **(Figure 6-2)**, turn all bolts finger tight.
2. Follow cylinder head bolt torque sequence, tighten evenly, 5 ft.-lbs. at a time, to 16-18 ft.-lbs. torque **(Figure 6-25)**.

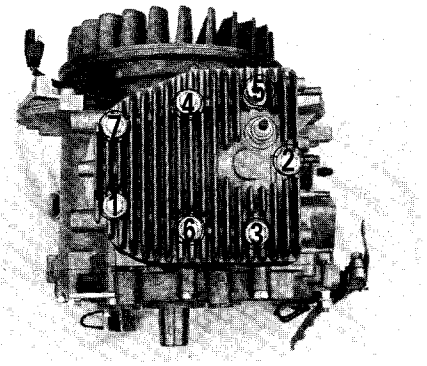


Figure 6-25

CAUTION:

Failure to follow numerical sequence of torquing head bolts as shown may cause head to warp.

3. Drain old oil from crankcase, install new oil to proper level.
4. Install head shroud, tighten bolts to 10 ft.-lbs. torque.
5. Install flywheel shroud (1), tighten bolts (37) to 14-16 ft.-lbs. torque **(Figure 6-1)**.
6. Install CDI unit (7) to flywheel shroud (8), connect CDI wire to magneto wire connection.
7. Install gasket and insulator (28) **(Figure 6-1)** to intake manifold studs. Install new gasket and carburetor, tighten nuts to 6-8 ft.-lbs. torque.
8. Install throttle/governor linkage mounting bracket to head, install governor rod to throttle pivot. Install throttle link to carburetor throttle.
9. Install air filter housing to carburetor with a new lock tab plate and bolts. Tighten bolts to 5-6 ft.-lbs. torque. Bend lock tabs up against bolt.

NOTE: The flat of the hex head must line up with lock tab. The maximum final torque is 7 ft.-lbs.

10. Install air filter housing brace to engine, leave finger tight.
11. Line up bolt holes on bracket and air filter housing.
12. Tighten the air filter housing brace to the engine. Torque bolts to 5-6 ft.-lbs.
13. Install bolt and nut which mount the air filter housing brace to the air filter housing and torque to 4-5 ft.-lbs.
14. Install crankcase ventilation hose to air filter housing.
15. Install air filter element and air filter housing cover, install three nuts and bolts. Torque to 25-30 in.-lbs.
16. Install air intake expansion chamber, tighten clamps securely.

CAUTION:

Support air filter housing when installing intake expansion chamber.

17. Install fuel line to carburetor with new clamp.
18. Connect impulse line from fuel pump to engine.
19. Install exhaust header and new gasket to exhaust manifold. Torque nuts to 6-8 ft.-lbs.
20. Install bolts, nuts, new gasket to exhaust pipe connection. Torque to 12-14 ft.-lbs.
21. Install starter-generator mounting bracket. Torque bolts to 14-16 ft.-lbs.
22. Install starter-generator with upper bolts first, lower bolt last. Finger tighten bolts.
23. Adjust tension on starter-generator belt to obtain 1/8 in. deflection at the mid-point of the pulleys using 6 lbs. pressure. Tighten lower mounting nut to 12 ft.-lbs. torque.

24. Tighten upper mounting bolts and nuts to 12-14 ft.-lbs. torque.
25. Reconnect starter-generator wires **(Figure 6-26)**.
26. Install new spark plug, gap to .023-.028. Connect spark plug wire to spark plug.
27. Connect battery cables, positive (+) cable first.
28. Place forward/reverse lever in NEUTRAL position, place neutral lock-out cam in SERVICE position

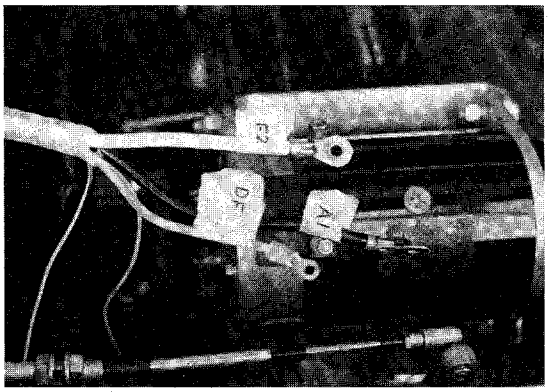


Figure 6-26

DANGER:

Engine produces carbon monoxide which is an odorless, deadly poison. DO NOT OPERATE IN AN ENCLOSED AREA WITHOUT PROPER VENTILATION.

29. Start engine, let engine warm up and check for proper operation.

NOTE: Place neutral lock-out cam in OPERATION position for normal vehicle operation.

CRANKCASE

To perform repairs on crankcase components, removal of the engine from the car is required.

ENGINE REMOVAL

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Hot — do not attempt to service hot engine or exhaust. Can cause extreme burns. Always allow engine and exhaust to cool prior to servicing.

1. Remove seat from body.
2. Remove air intake expansion chamber as described under Fuel System, Section VII.
3. Remove body, seat back/bag rack support as described under Body and Trim, Section XIV.
4. Remove fuel lines as described under Fuel System, Section VII.
5. Remove throttle cable from engine as described under Fuel System, Section VII.
6. Remove governor linkage as described under Fuel System, Section VII.
7. Disconnect starter-generator wires as described under Electrical, Section V.
8. Remove drive belts as described under Torque Converter, Section IX.
9. Remove drive clutch as described under Torque Converter, Section IX.
10. Remove exhaust header pipe as described under Exhaust System, Section VIII.
11. Remove starter-generator as described under Electrical, Section V.

12. Disconnect oil sending unit wire from engine crankcase.
13. Remove engine mounting hardware (16 and 17) **(Figure 6-1)**.
14. Lift engine from car.

Disassembly

1. Remove crankcase oil drain and filler plugs (45, 69 and 70), tip engine slightly to allow oil to drain thoroughly from crankcase. Dispose of engine oil properly.
2. Remove carburetor, throttle and governor linkage as described under Fuel System, Section VII.
3. Remove cylinder head and flywheel shrouds as described under Cylinder Head Removal.
4. Remove cylinder as described under Cylinder Removal.

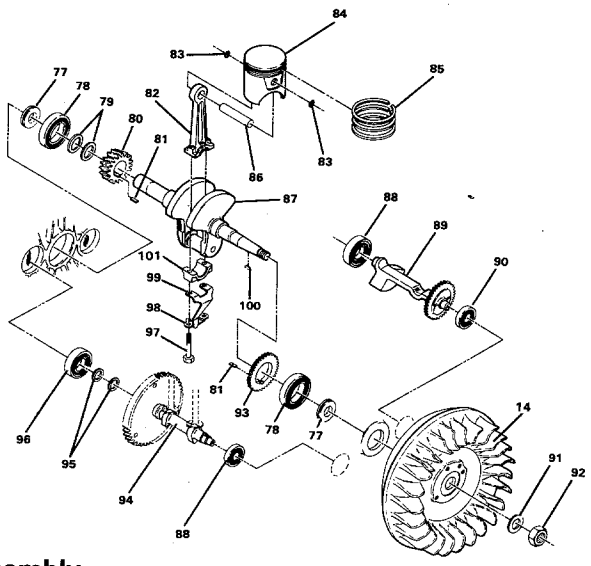


Figure 6-27 — Engine Assembly

Flywheel Removal

1. Remove flywheel nut (92) and lock washer (91) **(Figure 6-27)**.

CAUTION:

Flywheel nut is LEFT HAND threads. Turn nut clockwise to LOOSEN, counterclockwise to TIGHTEN.

2. Attach puller, CLUB CAR part number 1012802, to flywheel and remove **(Figure 6-28)**.

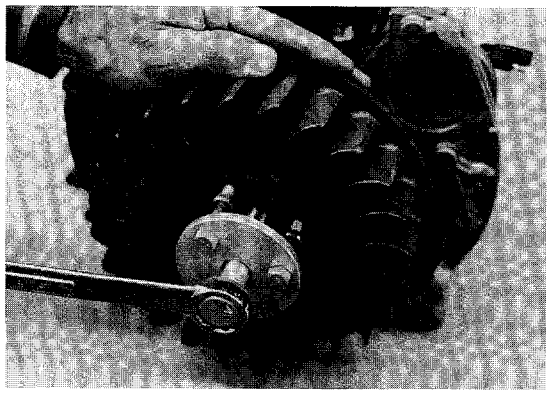


Figure 6-28

WARNING:

Failure to use proper flywheel puller could result in damage to engine and personal injury.

NOTE: Magnet should not be removed from flywheel.

End Case Removal

1. Remove all retaining bolts from case **(Figure 6-29)**.

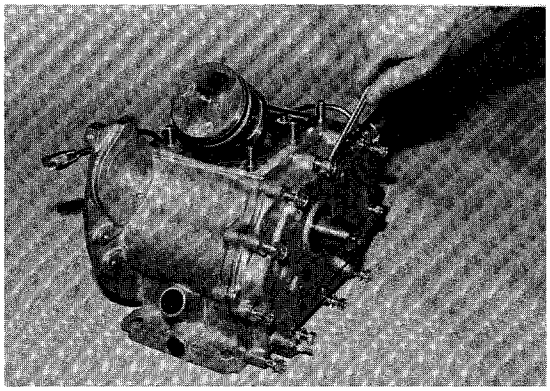


Figure 6-29

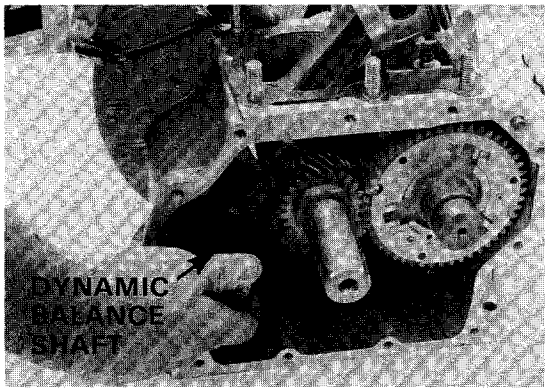


Figure 6-30

2. Tap end case lightly with a wood or plastic mallet to separate from crankcase.
3. Remove dynamic balance shaft (89) by pulling it out of crankcase **(Figure 6-30)**.
4. Lift and hold valve tappets away from cam lobes. Remove cam shaft (94) by carefully pulling it out. Identify the intake and exhaust tappets so that they can be installed in the proper position and remove tappets **(Figure 6-31)**.

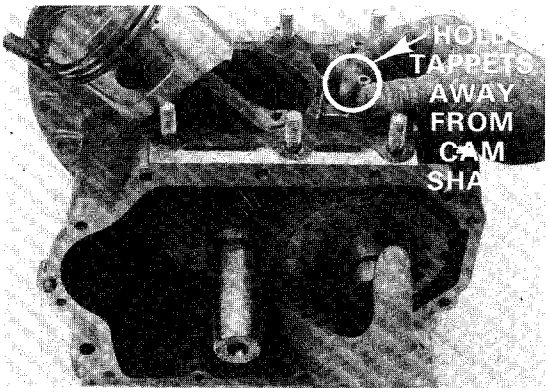


Figure 6-31

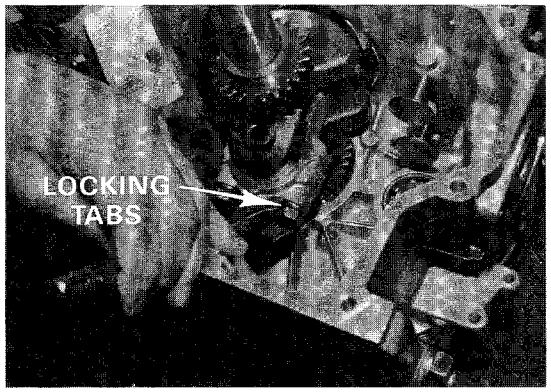


Figure 6-32

5. Turn crankshaft (87) to expose connecting rod bolts (97) **(Figure 6-32)**.
6. Bend down bolt lock tabs, remove bolts (97) **(Figure 6-32)**.
7. Remove connecting rod cap (101), lift piston and connecting rod out top of crankcase.

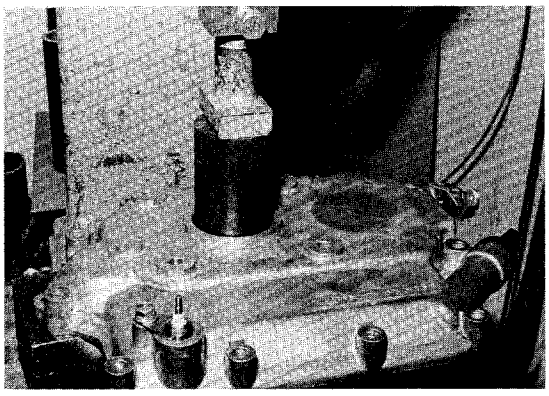


Figure 6-33

Oil Sending Unit Removal

1. Remove the wire from the oil sending unit connector (42) on the inside of the endcase **(Figure 6-2)**.
2. Remove the bolt (38), lockwashers (4), bracket (41) and clamp (40).
3. Remove the oil sending unit connector (42) and inspect the O-ring. If O-ring is damaged, it must be replaced.
4. Remove the bolts (38), lockwashers (4), flatwashers (10) and the clamp to remove the oil sending unit.

Crankshaft Removal

1. Grasp crankshaft (87) and remove from crankcase.

NOTE: It may be necessary to tap crankshaft lightly with a wood or plastic mallet to remove.

2. Remove oil seals (77) from crankcase and end case, if necessary **(Figure 6-33)**.

NOTE: Oil seals are destroyed when removed.

3. To remove bearings (78) at each end of crankshaft and camshaft, heat the aluminum case around bearing and pull bearing out with a slide hammer bearing puller.
4. Remove piston (84) from connecting rod (82) as described under Piston and Ring.

Cleaning and Inspection

1. Clean crankshaft, camshaft and crankcase housings in a non-flammable solvent.
2. Measure crank pin wear with micrometer. Standard size is 1.259.
3. If crank pin is worn more than .002 in., replace crankshaft **(Figure 6-34)**.

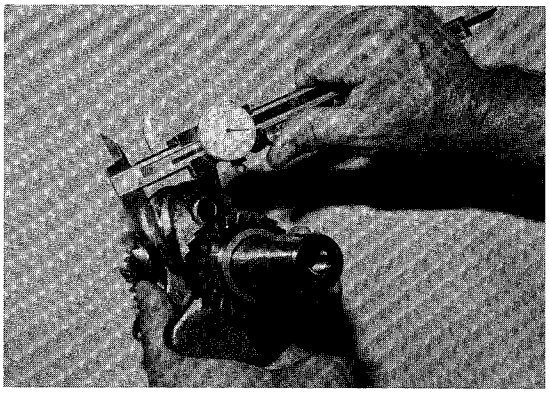


Figure 6-34

4. Measure crank pin to connecting rod clearance. If clearance exceeds .004 in., replace connecting rod **(Figure 6-35)**.

Oil Sending Unit Installation

1. Mount oil sending unit to endcase with bolts (38), lockwashers (4), and flatwashers (10). Install the clamp (43) on the side of the oil sending unit closest to the oil sending unit connector (42). Torque bolts to 9 ft.-lbs. **(Figure 6-2)**.
2. Install oil sending unit connector (42) through hole in endcase. Be sure groove in connector is on the outside of the endcase.
3. Install bracket (41) in groove and install the clamp (40), lockwasher (4) and bolt through bracket and into endcase. Torque to 9 ft.-lbs.
4. Install the female plug from the oil sending unit to the oil sending unit connector (42).

Crankcase Assembly

1. If bearing (78) were removed, be sure holes in crank and end case are clean. Heat cases around holes and press bearings into place **(Figure 6-36)**.
2. Install new oil seals (77) with proper seal tool **(Figure 6-37)**.

CAUTION:

Never reuse old seals. Always install new oil seals as failure to install new seals can result in oil leakage and serious damage or destruction of engine.

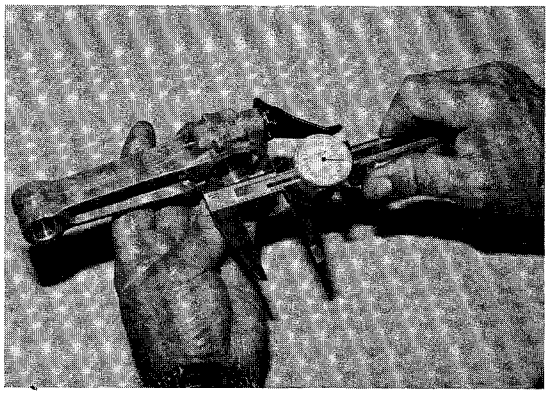


Figure 6-35

Figure 6-36

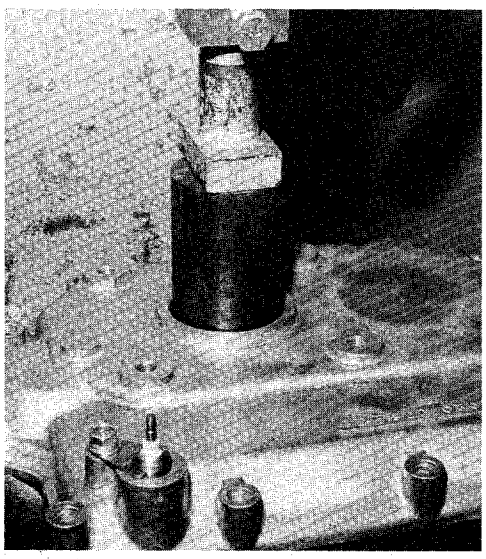


Figure 6-37

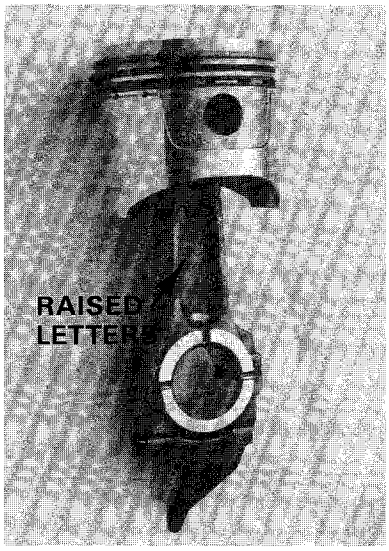


Figure 6-38

Figure 6-39

3. Clean crankshaft carefully; especially at each end where it rides on bearings. Install crankshaft (87) into bearing in crankcase.
4. Install piston (84) and pin (86) to connecting rod (82) as described under Piston and Rings.
5. Install piston/connecting rod assembly through top of crankcase, rod first. The five raised letters shown **(Figure 6-38) MUST** face flywheel.
6. Turn crankshaft to bottom of stroke (crankpin down). Oil the crankpin liberally, guide the bottom end of rod (101) onto crankpin.
7. Oil the inside of connecting rod cap and install cap so stamped numbers on cap align with similar markings on rod **(Figure 6-39)**.
8. Install oil splasher arm (99) and lock plate to rod cap so arm and bendable tabs face towards crankshaft output end.
9. Install connecting rod bolts (97), tighten to 29-30 ft.-lbs. torque. Bend lockplate tabs over bolt heads **(Figure 6-40)**.

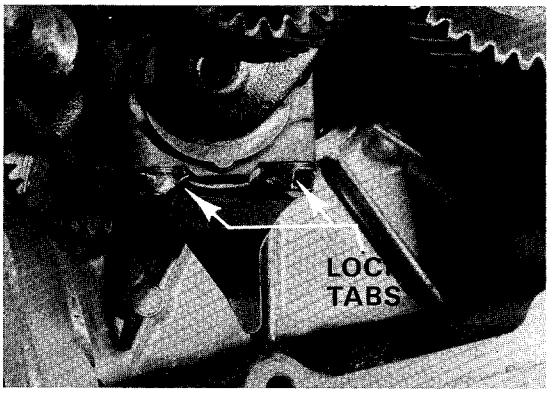


Figure 6-40

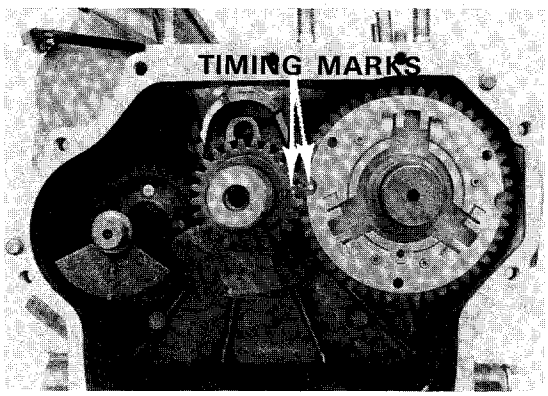


Figure 6-41

10. Install tappets (71) **(Figure 6-2)**. Be sure exhaust tappet is toward magneto, intake tappet toward output end. Hold tappets in place.
11. Install cam shaft (94) into crankcase bearing.
12. Align timing mark on cam shaft gear with timing mark on crankshaft gear **(Figure 6-41)**.
13. Install dynamic balance shaft (89) into crankcase bearing.

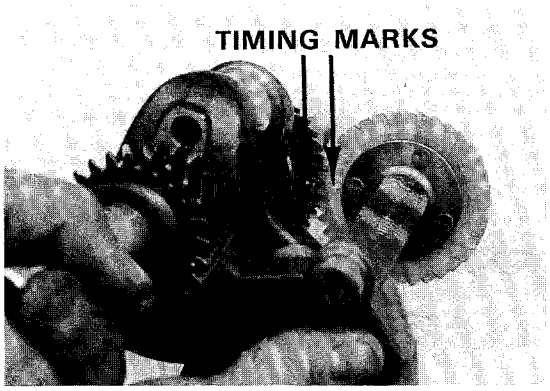


Figure 6-42

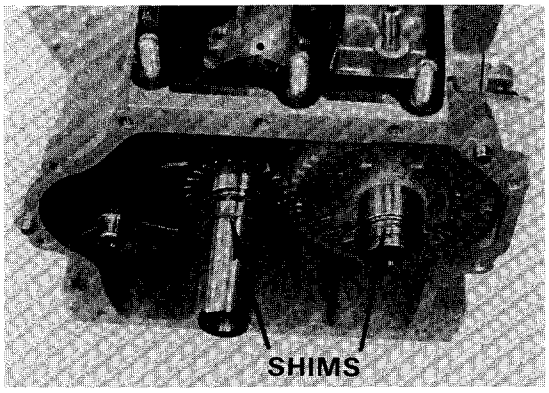


Figure 6-43

14. Align the timing mark on balance shaft gear with timing mark on crankshaft gear **(Figure 6-42)**.
15. Install one shim **each** on crankshaft (79) and cam shaft (95) **(Figure 6-43)**.
16. Install new housing gasket (73) over dowel pins (76A) to hold in place.
17. Align end case bearings with crankshaft, cam shaft and balance shaft ends and push together.

CAUTION:

Be careful when installing end case to prevent damage to end case oil seal.

18. Install bracket behind bolts 10 and 2 and finger tighten **(Figure 6-44)**.
19. Following numerical sequence, tighten bolts gradually to 14-17 ft.-lbs. torque **(Figure 6-44)**.
20. Recheck end play of output shaft after tightening. End play should be 0-.012 inches. If end play is greater than .012 inches, shims (79) must be added.

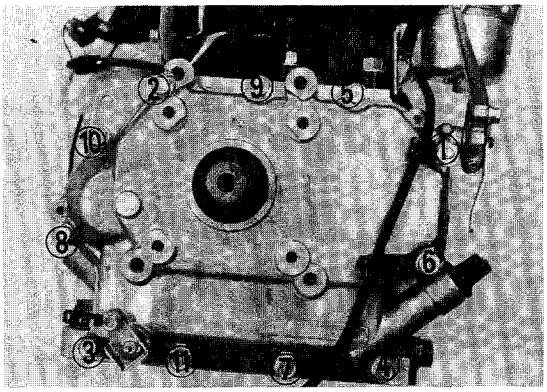


Figure 6-44

ENGINE ASSEMBLY

1. Install cylinder as described under Cylinder Installation.
2. Install cylinder head as described under Cylinder Head Installation.
3. Insert woodruff key (100) **(Figure 6-27)** into crankshaft keyway, align flywheel keyway to key, firmly push flywheel fully onto crankshaft.
4. Install lockwasher domed side out (91) and flywheel nut (92). Tighten to 60-65 ft.-lbs. torque.

CAUTION:

Flywheel nut is LEFT HAND threads, turn counterclockwise to TIGHTEN, clockwise to LOOSEN.

5. Install cylinder head shrouds as described under Cylinder.
6. Install carburetor as described under Fuel System, Section VII.
7. Install drive clutch as described under Torque Converter, Section IX.
8. Install engine in car, install engine mounting bolts, tighten to 20-22 ft.-lbs. torque.
9. Install drive belt as described under Torque Converter, Section IX.

10. Install exhaust header pipe as described under Exhaust System, Section VIII.
11. Install starter-generator and belt as described under Electrical, Section V.
12. Connect starter-generator and spark ignition wires as described under Electrical, Section V.
13. Connect fuel lines as described under Fuel System, Section VII.
14. Connect impulse line of fuel pump from engine.
15. Install air filter housing, filter and air intake expansion chamber as described under Fuel System, Section VII.
16. Install throttle cable and governor linkages as described under Fuel System, VII Engine Control Linkage.
17. Connect oil sending unit wire to unit attached to crankcase.
18. Install oil drain plug in crankcase, add 40 oz. oil to crankcase. (USE SAE 30 or 5W20. See Section III, Periodic Maintenance, Figure 3-1.)
19. Install body, trim, seatback, etc., as described under Body and Trim, Section XIV.
20. Check all hardware for proper torque/tightness.
21. Check engine oil level **(Figure 6-45)**.

CAUTION:

Engine must be in level position. Remove oil level gauge by unscrewing from crankcase. Check oil by inserting gauge into oil filler hole. DO NOT SCREW OIL GAUGE IN WHEN CHECKING. If oil does not reach the upper line (mark) of the gauge, add oil until it does. DO NOT OVERFILL WITH OIL. When oil is at proper level, screw oil gauge in and hand tighten securely.

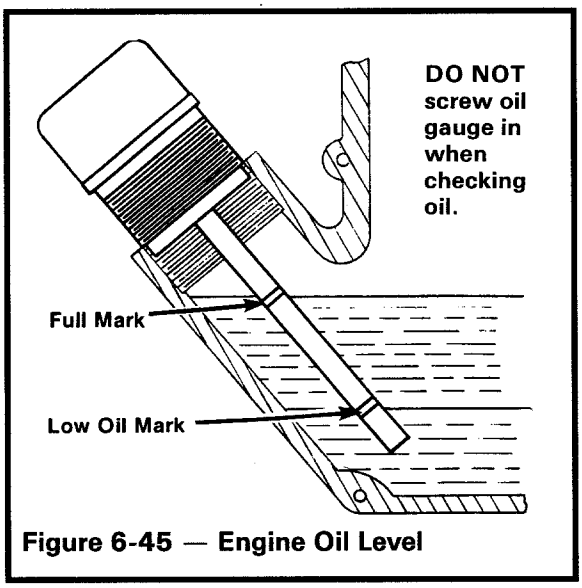


Figure 6-45 — Engine Oil Level

22. Install new spark plug, gap .023-.028, install plug wire to plug.
23. Connect battery cables (positive cable first).

DANGER:

Engine produces carbon monoxide which is an odorless, deadly poison. DO NOT OPERATE IN AN ENCLOSED AREA WITHOUT PROPER VENTILATION.

24. Place Forward/Reverse lever in NEUTRAL position, place neutral lock-out cam to SERVICE position.
25. If initial checks indicate engine is functional, place neutral lock-out cam in OPERATE position.
26. Test drive car to insure all systems are functional and correctly adjusted.

SECTION VII - FUEL SYSTEM

GENERAL INFORMATION

The golf car engine is equipped with a float bowl type carburetor with fixed jets that require no adjustment. Fuel is supplied to the carburetor by an external impulse fuel pump. Fuel is drawn from the gas tank, through the fuel filters and passes through the inlet valve into the float bowl. The fuel entering the bowl causes the float to rise until it shuts off the fuel valve, stopping flow at a level predetermined by the float level setting. The carburetor functions to atomize the fuel and feeds it into the cylinder as a combustible mixture.

CARBURETOR THEORY OF OPERATION

MAIN SYSTEM (Figure 7-1)

During the intake stroke of the piston, a negative pressure is created in the venturi of the carburetor which mixes fuel and intake air. In this venturi tube, the intake air has high velocity and low static pressure. Subsequently, fuel is drawn out of the carburetor float chamber, atomized to fine particles and drawn into the cylinder as a combustible mixture.

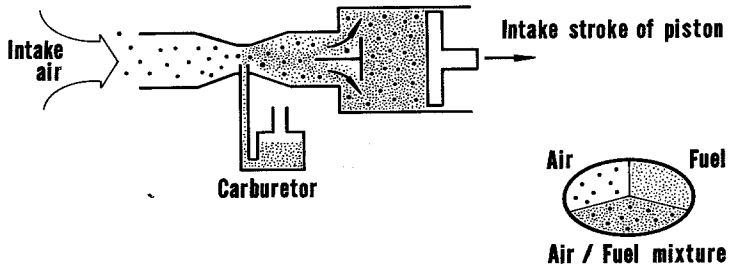


Figure 7-1

SLOW SYSTEM (Figure 7-2)

Slow speed running without load requires very low intake airflow. The throttle value (2) is almost closed in this state and as high negative pressure is created on the back side of the throttle value, intake air is drawn into this area. The intake air draws the fuel metered by the slow jet (6) from the carburetor float chamber. The combustible air and fuel mixture is adjusted by the pilot air jet needle value (8) and is drawn into the venturi and cylinder by the intake stroke of the piston.

CHOKE AND FRESH AIR INTAKE SYSTEM (Figure 7-2)

When cranking a cold engine, the spring loaded choke cover (1) is pushed in by hand, restricting the air flow to the venturi, which causes a very high vacuum pressure. Fuel is drawn into the venturi at a high rate, and a "fuel rich" mixture is produced.

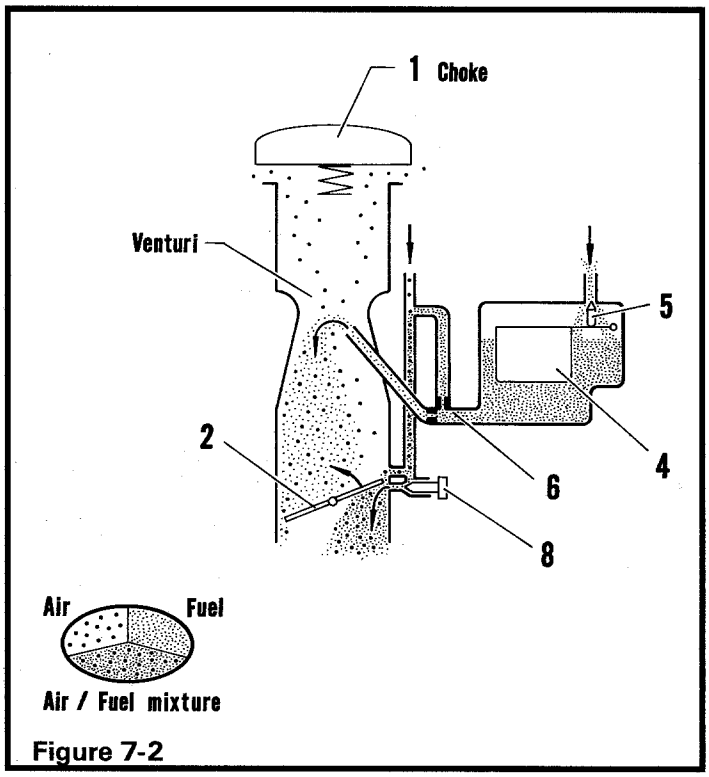


Figure 7-2

FLOAT SYSTEM (Figure 7-2)

The carburetor is a float bowl type. The fuel is supplied to the carburetor by an external impulse fuel pump. Fuel is drawn from the gas tank, through the fuel filters and passes through the inlet valve (5) into the float bowl. The fuel entering the bowl causes the float (4) to rise until it shuts off the inlet valve, stopping fuel at a level predetermined by the float level setting.

CARBURETOR COMPONENTS AND FUNCTION

MAIN SYSTEM (Figure 7-3)

The main system functions to supply fuel during medium and high speed running. Fuel is metered by the main jet and is drawn into the main nozzle. At this time, the air metered by the main air jet is mixed with the fuel through the main nozzle bleed hole, causing it to foam before reaching the venturi. This fuel mixed with air bubbles is again mixed with the air in the venturi which has been drawn through the air cleaner and becomes an optimum air-fuel mixture.

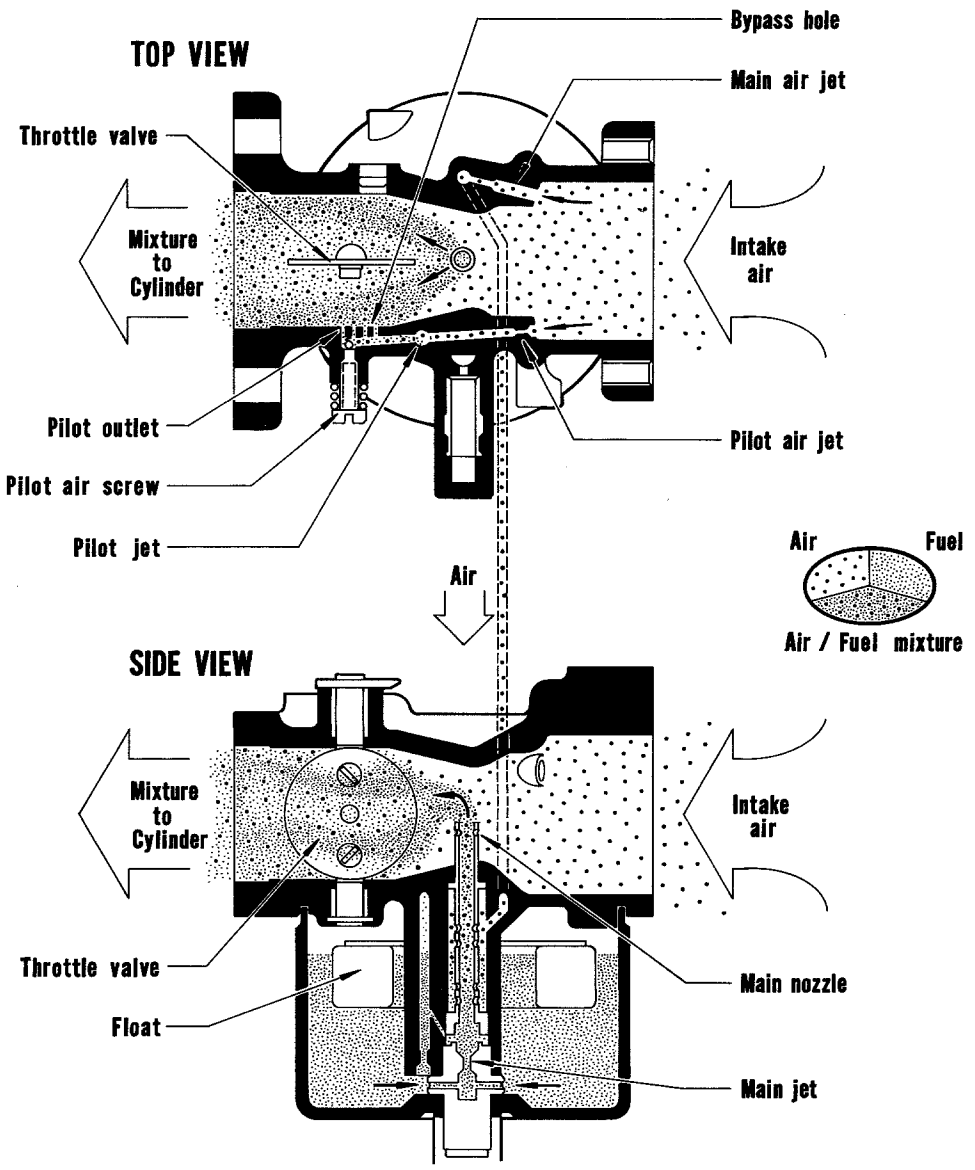


Figure 7-3

Manual No. 1015055 - Issue Date 1/90
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SLOW SYSTEM (Figure 7-4)

The slow system functions to supply fuel during idling and low speed running. The fuel is metered by the pilot jet and is mixed with the air which is metered by the pilot air jet. The air-fuel mixture is regulated by the pilot screw (needle valve) and is delivered through the pilot outlet and bypass. The fuel during idling is mainly supplied through the pilot outlet, and the engine RPM is adjusted by the throttle valve stop screw.

STANDARD JETTING

Idle Air Screw	1 Turn Open
Pilot Jet	45 (x 1/100 mm)
Main Jet	87.5 (x 1/100 mm)

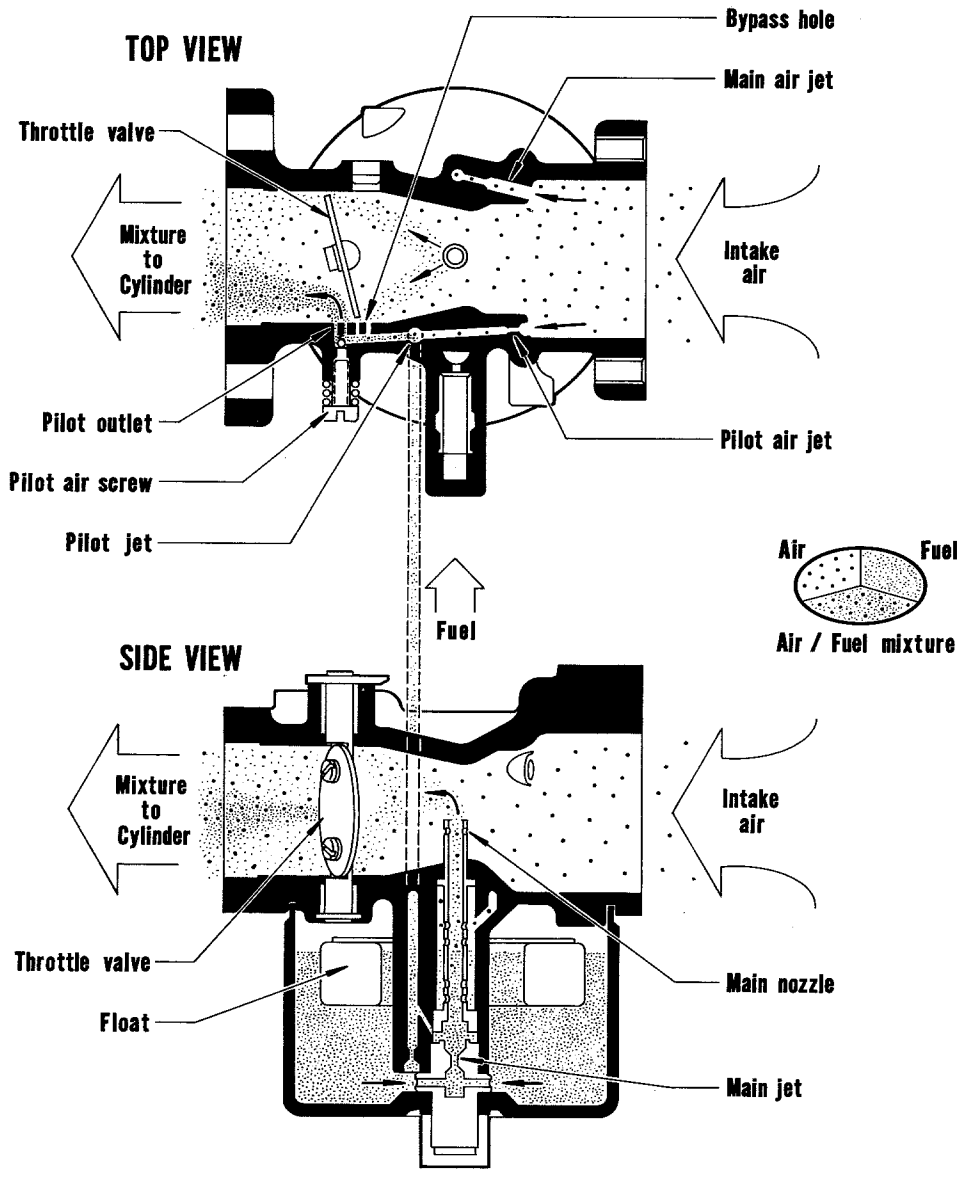

Figure 7-4

CHOKE SYSTEM

The choke system functions to start the engine in cold weather. The spring loaded choke cover is pushed in by hand, restricting air flow to the carburetor. This results in a "fuel rich" mixture. The cover is held in by hand until the engine starts, then the spring loaded choke is released and the engine runs normally.

FLOAT SYSTEM (Figure 7-5)

With the float chamber located just below the carburetor body, the float system functions to keep the fuel level in the float chamber at the correct level while the engine is running. The fuel enters into the float chamber from the tank through the needle valve (inlet valve). The fuel entering the bowl causes the float to rise until its shuts off the inlet valve, stopping fuel at a level predetermined by the float level setting.

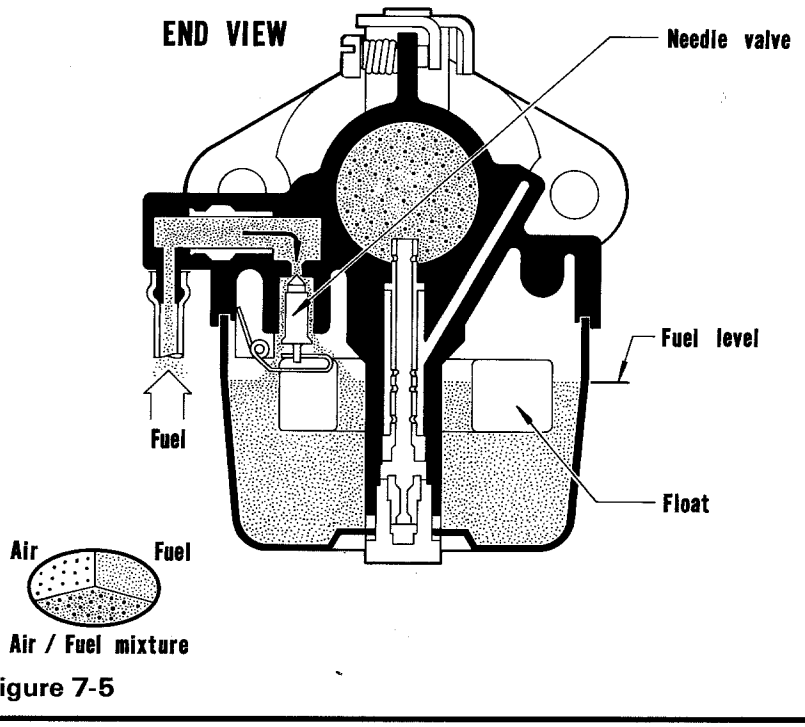

Figure 7-5

The only adjustments to the carburetor that may be required is for float level, see Float Level Adjustment.

CARBURETOR

Before suspecting the carburetor for poor engine performance, make sure the fuel and ignition systems are in proper operating condition by checking the following items:

1. Spark plug gap and condition. See Engine, Section VI.
2. Dirty air cleaner element. See Air Cleaner.
3. Fuel filters. See Fuel Filters.
4. Choke and air intake expansion chamber for any restriction of air flow. See Choke
5. Fuel pump. See Fuel Pump.
6. Check fuel lines from gas tank to filter to pump to filter to carburetor. See Fuel Tank.
7. Make sure the exhaust system is not restricted. See Exhaust System, Section VIII.

If the carburetor floods or leaks gas at float bowl gasket or carburetor overflow tube, the fuel inlet valve could be worn or the valve seat may be dirty. Other causes of this condition may be a damaged float that has filled with gasoline and sinks or an incorrectly adjusted float.

For elevations above 2000 feet, main jets other than standard operate more effectively. Therefore, the following chart lists the different elevations with the proper jet size. No adjustment is required for the pilot jet. If the car idles rough, back air screw out until it runs smoothly, usually no more than one additional turn.

PROPER JET SIZE CHART

ALTITUDE (Feet above Sea Level)	DS GASOLINE	CARRYALL-I/CARRYALL II/4-PASSENGER TOURALL
0-2000	87.5 (Std.)	92.5 (Std.)
2000-4000	85.0	90.0
4000-6000	82.5	87.5
6000-8000	80.0	85.0
8000-10000	77.5	82.5

Manual No. 1015055 - Issue Date 1/90
0190A00000

PROCEDURE FOR CHANGING MAIN JET

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Hot — do not attempt to service hot engine or exhaust. Can cause extreme burns. Always allow engine and exhaust to cool prior to servicing.

DANGER:

Gasoline — Flammable — Explosive — Do Not Smoke. Keep sparks and flames away from the area of the vehicle. Only service or repair in well-ventilated area.

1. Place a container underneath fuel bowl to catch fuel. Remove the nut (17) **(Figure 7-10)** and gasket (16) on the bottom of the fuel bowl. Remove fuel bowl (15). Dispose of fuel properly. Clean fuel bowl before reinstalling. See Inspection and Cleaning of Carburetor.
2. Remove main jet holder (14) with a 13mm wrench.
3. Remove main jet (13) from holder (14) with a screwdriver.
4. Replace main jet (13) with proper jet. (See Chart.) Screw jet in holder and tighten to 15-17 in.-lbs. torque.
5. Reinstall the main jet holder (14) into carburetor. Tighten jet holder to 115-127 in.-lbs. torque.
6. Reinstall fuel bowl with detent directly below fuel inlet. Make sure gasket (22) is seated properly, then put the gasket (16) and nut (17) back on. Be sure fuel bowl is centered and seated to gasket. Tighten nut to 7 ft.-lbs. torque.

DANGER:

Engine produces carbon monoxide which is an odorless, deadly poison. DO NOT OPERATE IN AN ENCLOSED AREA WITHOUT PROPER VENTILATION.

7. Place the neutral lock-out cam in the SERVICE position and run the car. Check for leaks at the top of the fuel bowl and around the bottom nut on the fuel bowl.
8. Place neutral lock-out cam in OPERATE position prior to returning car to service.

Removal

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

WARNING:

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

Hot — do not attempt to service hot engine or exhaust. Can cause extreme burns. Always allow engine and exhaust to cool prior to servicing.

DANGER:

Gasoline — Flammable — Explosive — Do Not Smoke. Keep sparks and flames away from the area of the vehicle.

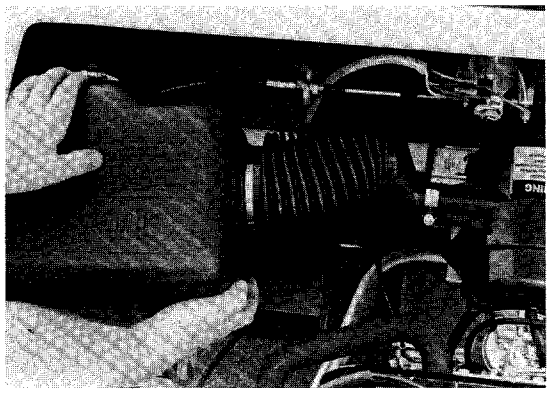

Figure 7-6

1. Remove seat from body.
2. Loosen intake expansion chamber hose clamps, remove intake expansion chamber from air filter housing cover. Support air filter housing cover when removing intake expansion chamber from air filter housing cover **(Figure 7-6)**.
3. Remove three bolts and nuts to remove filter housing cover and filter element.
4. Remove bolt from air filter housing brace **(Figure 7-7)**.
5. Remove crankcase ventilation tube from air filter housing.
6. Bend tabs down and remove two bolts mounting air filter housing to carburetor. Remove air filter housing **(Figure 7-8)**.
7. Disconnect gas line at carburetor.

NOTE: Plug gas line to prevent gasoline draining from line.

8. Remove two nuts, at intake manifold and slide carburetor off studs.

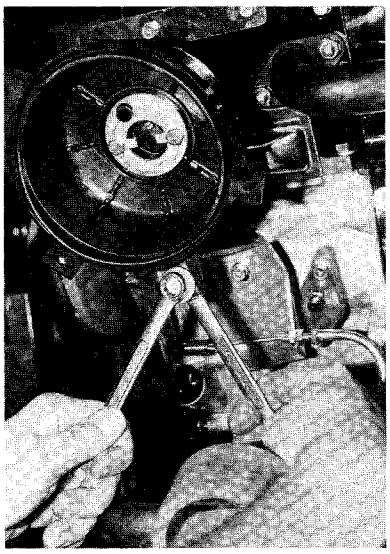

Figure 7-7

CAUTION:

Do not bend or damage the governor linkage rod as this will affect the adjustment after installation.

9. Disconnect throttle linkage and remove carburetor **(Figure 7-9)**.

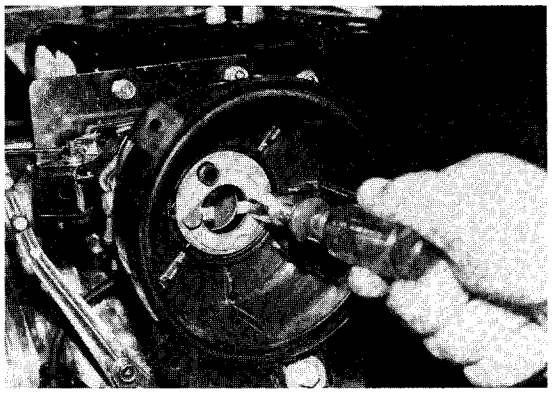

Figure 7-8

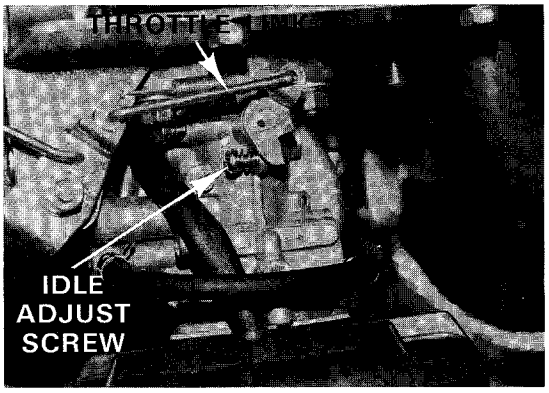

Figure 7-9

Disassembly

1. Place a container beneath fuel bowl to catch fuel. Remove cap nut (17) and gasket (16), remove float bowl (15) **(Figure 7-10)**.
2. Remove float shaft (19), float (18), float valve and seat (20) and gasket (21).

Inspection and Cleaning

1. Clean float bowl with a non-flammable solvent to remove any dirt or grime particles from bowl.

CAUTION:

After cleaning with solvent, dry the bowl with air. Be sure all lint, dirt and foreign matter have been removed from the bowl.

2. Clean any dirt from float valve passage and float valve seat, dry thoroughly.
3. Replace float if it is cracked or damaged.
4. Inspect main jet, nozzle and pilot jet to insure they are free of contamination. If clogged with contamination, replace.

NOTE: The float valve and seat are matched, should any parts be damaged or show signs of wear, a new float valve and seat should be installed.

Assembly

1. Install float valve gasket (21), float valve and seat (20). Tighten valve seat to 35 in.-lbs. torque.
2. Install float (18), and float shaft (19).

NOTE: At this time, check the float level as described under Float Adjustment.

3. Reinstall fuel bowl with detent directly below fuel inlet. Make sure gasket (22) is seated properly, then put the gasket (16) and nut (17) back on. Be sure fuel bowl is centered and seated to gasket. Tighten nut to 7 ft.-lbs. torque.

CAUTION:

Be sure fuel bowl is centered and seated to gasket.

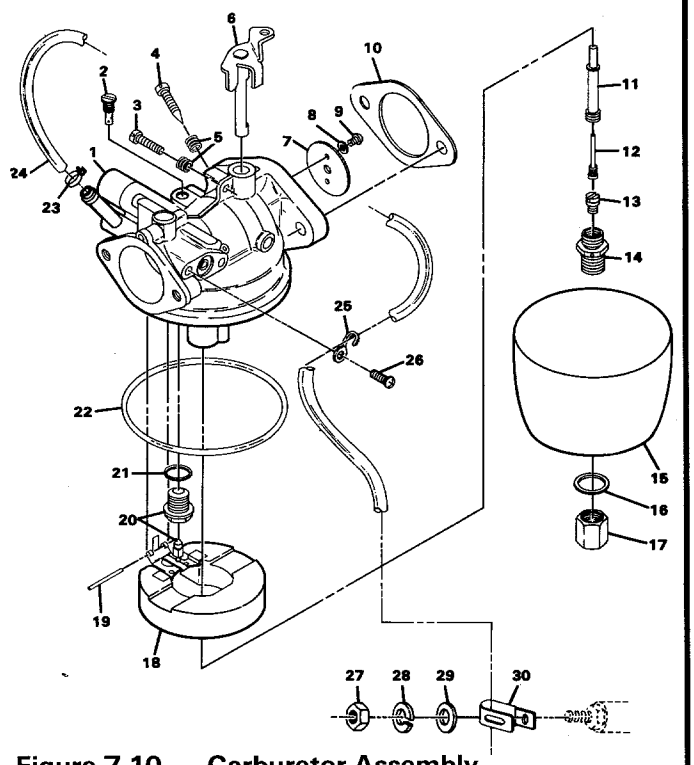

Figure 7-10 — Carburetor Assembly

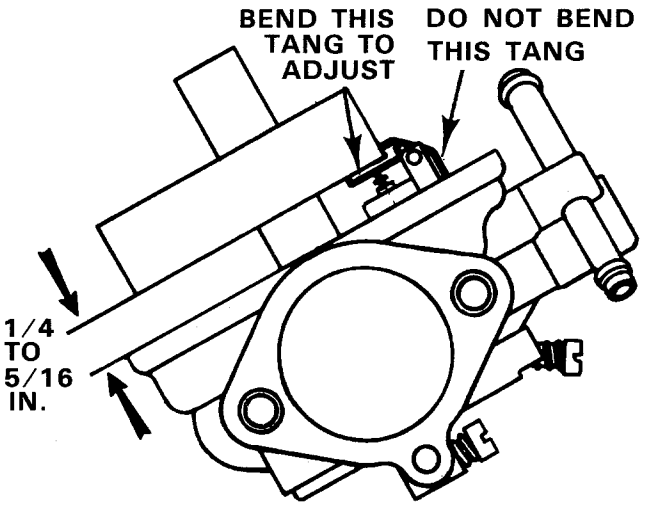

Figure 7-11 — Float Adjustment

Float Adjustment

1. Adjust the float level before installing the float bowl. With the carburetor in an inverted position, the float should be approximately 1/4 to 5/16 in. above the body in the carburetor when the tang on the float arm contacts the inlet needle **(Figure 7-11)**.

CAUTION:

If adjustment is necessary, always bend the tang which contacts the inlet needle. DO NOT bend the float arm itself.

Installation

1. Connect throttle linkage.
2. Install carburetor, using a new intake gasket, to manifold studs and fasten nuts. Tighten nuts to 6-8 ft.-lbs. torque.
3. Connect fuel line to carburetor. (See Fuel Lines, page 7-21, for proper routing of fuel lines.)
4. Install carburetor overflow tube over carburetor and through the clip on the opposite side of the carburetor. Then route it through the two clips on the end case of the engine. Be sure the overflow tube is fully enclosed in both clamps on end case of engine, but not pinched by the clamps.
5. Install filter housing to carburetor, with a new lock tab plate and bolts. Tighten bolts to 5-6 ft.-lbs. torque. Bend lock tabs up against bolt.

NOTE: The flat of the hex head must line up with the lock tab. The maximum final torque should be no more than 7 ft.-lbs.

6. Loosen the filter housing brace mounting bolt from the engine, leave fingertight.
7. Line up holes on air filter housing brace and air filter housing.
8. Tighten the filter housing brace mounting bolt to engine and torque to 5-6 ft.-lbs.
9. Install bolt and nut which mount the air filter housing brace to the air filter housing and torque to 4-5 ft.-lbs.
10. Install crankcase ventilation hose to filter housing.
11. Install filter and filter housing cover, hold in place and install three bolts and nuts to hold filter housing cover. Torque bolts to 25-30 in.-lbs.

CAUTION:

Support air filter housing when installing intake expansion chamber to air filter housing.

12. Install intake expansion chamber and tighten hose clamps.
13. Install spark plug wire to spark plug.
14. Connect battery cables, positive (+) cable first.
15. Place forward and reverse lever in NEUTRAL position, place neutral lock-out cam in SERVICE position.

NOTE: With the neutral lock-out cam in the SERVICE position, the car will not run if placed in forward or reverse position.

CAUTION:

Check governed speed. See High and Low Speed Adjustment. Page 7-13 & 7-14.

DANGER:

Engine produces carbon monoxide which is an odorless, deadly poison. DO NOT OPERATE IN AN ENCLOSED AREA WITHOUT PROPER VENTILATION.

16. Start engine. Check for leaks.
17. Return neutral lock-out cam to OPERATE position and take the car for a test drive.
18. Take the car for a test drive.

ENGINE CONTROL LINKAGE

GENERAL INFORMATION

For proper vehicle operation it is important that accelerator switch, governor linkage and throttle adjustments be made correctly and in proper sequence.

CAUTION:

Improper adjustment can result in poor vehicle performance and/or damage to engine components.

ACCELERATOR ROD

Removal

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Lift only one end of vehicle at a time. Chock the wheels and lock brakes prior to lifting. Use a suitable lifting device (i.e., chain hoist, hydraulic floor jack) with 1000 lb. minimum lifting capacity. DO NOT use lifting device to hold vehicle in elevated position. Always use approved jack stand of proper weight capacity to support vehicle.

1. Raise front of car with recommended lifting device, place jack stands under frame to support car.

DANGER:

Turn key switch off and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle. This will prevent the vehicle from running over you while disconnecting or adjusting the accelerator push rod.

2. Be sure key switch is off before disconnecting accelerator rod. Remove accelerator rod by disconnecting ball joint (12) from ball stud (11) on accelerator pedal and on actuator arm at electrical box **(Figure 7-12)**.

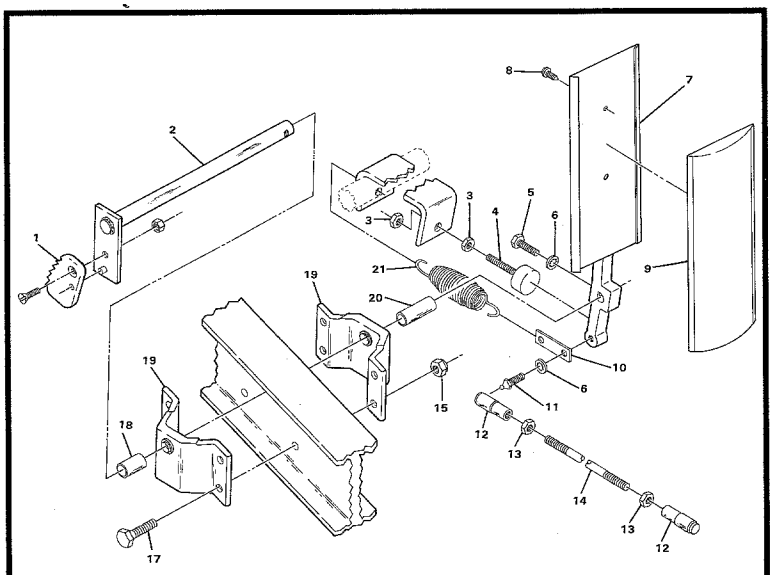

Figure 7-12 — Accelerator Pedal Assembly

Installation and Adjustment

1. Before installing accelerator rod, adjust pedal position. See Park Brake Adjustment, Section XIII Brake System.
2. Install ball joint on ball stud at accelerator pedal.
3. Remove seat from body.
4. Remove intake expansion chamber.
5. Remove electrical box cover.
6. Have a helper rotate the bell crank until both limit switches are actuated but not bottomed on the switch housing (leaving approximately a .025 in. gap) **(Figure 7-13)**.
7. While helper holds the bell crank in this position, with jam nuts loose adjust the accelerator rod to this length.

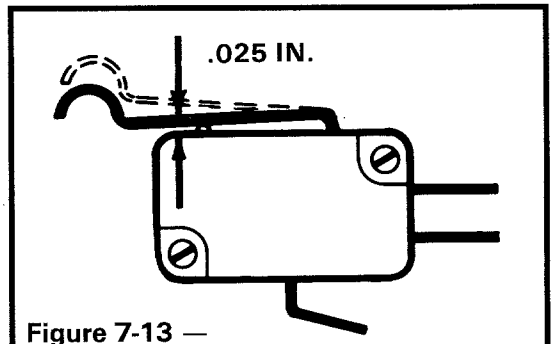

Figure 7-13 — Accelerator Limit Switch Clearance

CAUTION:

Be sure that an equal amount of threads are exposed on both ends of accelerator rod.

8. Install the accelerator rod on the bell crank ball joint.
9. For correct adjustment there should be at least a .025 in. gap between the limit switch housing and limit switch lever when accelerator pedal is not depressed **(Figure 7-13)**.

CAUTION:

If limit switch lever is bent, limit switch must be replaced.

10. Before tightening jam nuts, check rod adjustment for correct activation of switches by depressing and releasing accelerator pedal.
11. Using pliers to hold the ball joint, tighten jam nuts against ball joints at both ends of accelerator rod.
12. Recheck rod adjustment for proper switch activation.
13. Install electrical box cover and torque to 10-15 in.-lbs.
14. Install intake expansion chamber.
15. Install seat on body.

GOVERNOR LINKAGE

Removal

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Moving parts — do not attempt to service the vehicle with engine running.

1. Remove seat from body.
2. Loosen bolt (1) at governor arm (2) located on transmission **(Figure 7-14)**.
3. Remove retaining ring at governor rod (3) to pivot (4).
4. Remove rod (3) from plastic bushing in pivot (4) and remove rod.

CAUTION:

If governor rod is bent or damaged, it should be replaced to avoid engine damage or improper engine operation.

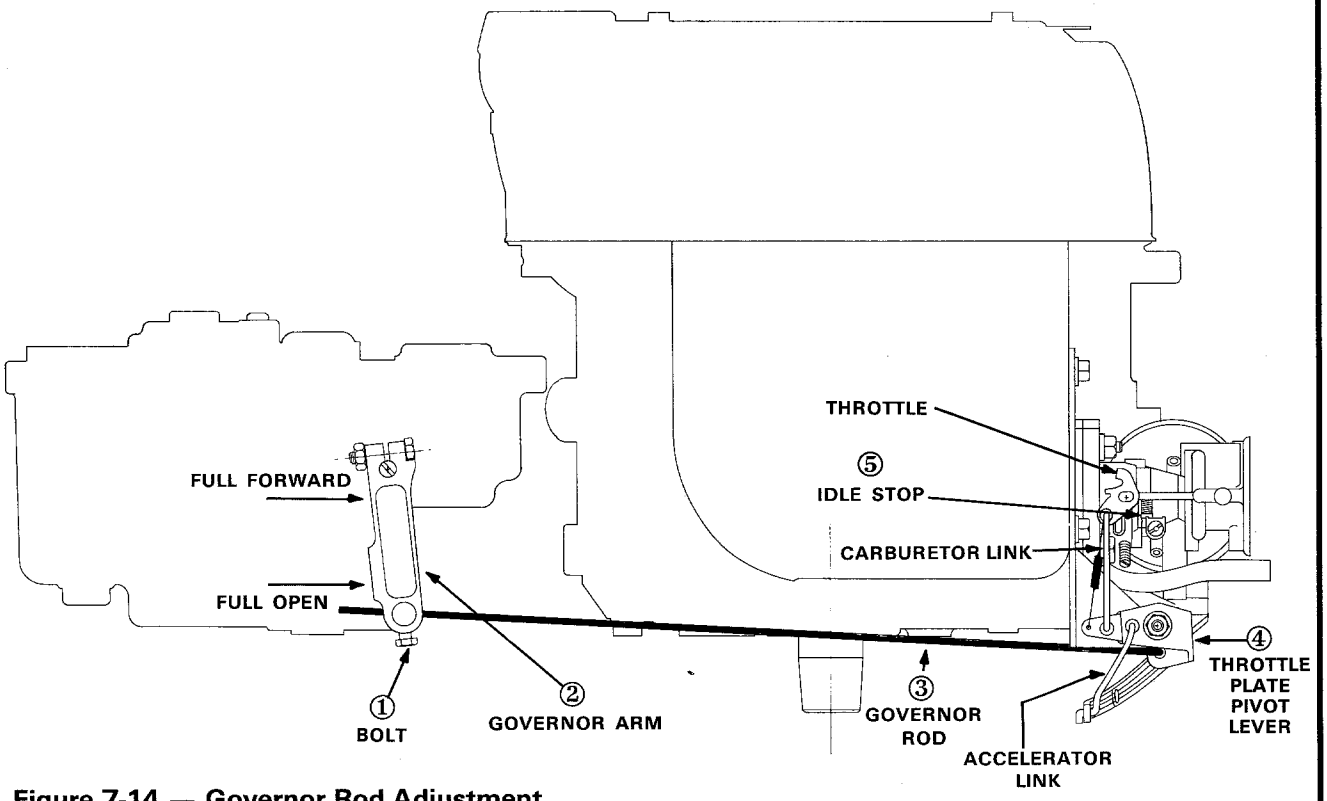

Figure 7-14 — Governor Rod Adjustment

Installation and Adjustment

1. Insert rod (3) through governor arm (2) at transmission.
2. Install rod (3) in throttle pivot (4) and install new retaining ring.
3. Manually place throttle in full open position and hold in place.
4. Manually push governor arm (2) to full forward position, hold in place, tighten bolt (1) at rod and governor arm. Torque bolt (1) to 26-35 in.-lbs.
5. Manually activate governor and check for free movement.

NOTE: When governor arm (2) is full forward, throttle MUST be in wide open position. When governor arm (2) is released, throttle should rest against idle stop (5).

6. See High and Low Speed Adjustment for proper RPM adjustment.

THROTTLE PLATE PIVOT LEVER

If the bushings in the throttle plate pivot lever are excessively worn, they should be replaced. There are three bushings in the throttle pivot, one in which the governor rod is inserted, one in which the carburetor link is inserted and one in which the accelerator link is inserted **(Figure 7-14)**.

Removal

1. Remove carburetor as described under Carburetor Removal.
2. Remove the retaining ring at the governor rod (3) to pivot (4).
3. Remove governor rod from throttle pivot.

CAUTION:

If governor rod is bent or damaged, it should be replaced to avoid engine damage or improper engine operation.

4. Remove nut, lockwasher and flat washer from top of throttle pivot.
5. Unscrew bolt from bottom of throttle pivot.
6. Remove the two short links. Note which link goes into each of the two bushings.
7. To remove bushings, they must be cut or drilled out.

Installation

1. To install bushings, bushing installation tool, CLUB CAR part # 1014163, must be used. Install the governor rod bushing in the slot and turn throttle plate pivot upside down. Install bushing installation tool in a drill. Rotate tool at approximately 1750 rpm and use moderate force to flair the bottom of the bushing. To install the carburetor link bushing or the accelerator link bushing, install the bushing from the bottom side. Set the throttle plate pivot lever on a workbench and flair the bushing as stated above.
2. Install the short links in the proper bushing as noted upon removal.
3. Install throttle pivot in position and install bolt through bottom of throttle pivot plate up into the treaded insert in bracket. Leave a .020-.060 inch gap between bottom of throttle pivot plate and bolt head.
4. Install flat washer, lockwasher and nut. While holding bolt head to prevent it from turning, torque nut to 52-69 in.-lbs.
5. Install governor rod into proper bushing **(Figure 7-14)**.
6. Install retaining ring to governor rod.
7. Install carburetor as described under Carburetor Installation.

THROTTLE CABLE

Removal

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

1. Remove seat from body.
2. Remove intake expansion chamber.
3. Remove electrical box cover and loosen cable housing retaining nuts at electrical box **(Figure 7-15)**.

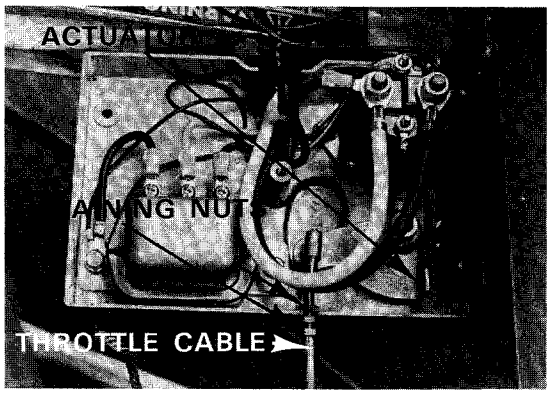

Figure 7-15

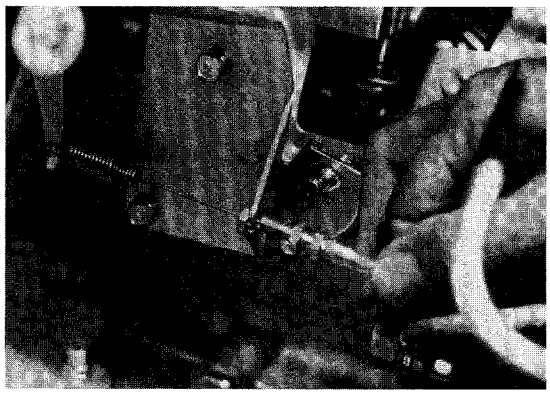

Figure 7-16

4. Disconnect cable ball socket from ball stud on actuator arm.
5. Loosen cable housing retaining nut on spring end of cable. Pull cable housing out of bracket and slide cable through the slot in bracket **(Figure 7-16)**.

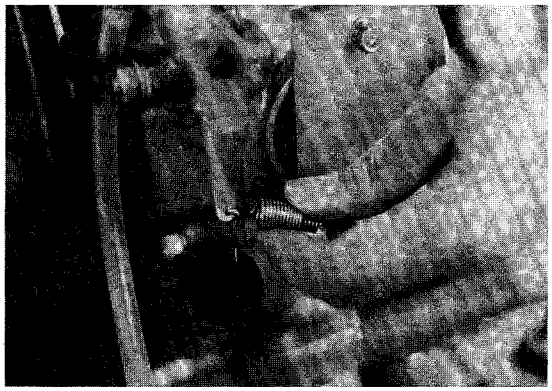

Figure 7-17

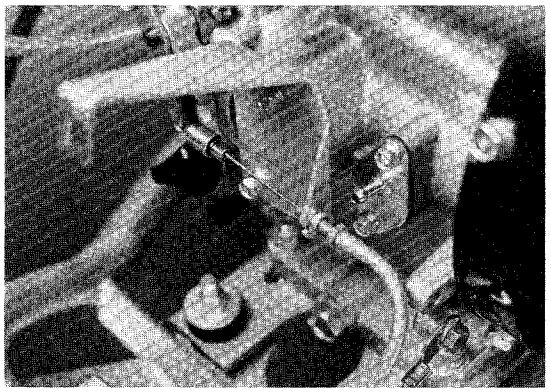

Figure 7-18

6. Unhook spring by rotating one-half turn and remove cable assembly **(Figure 7-17)**.

Installation

1. Install cable ball socket to ball stud on actuator arm in electrical box.
2. Place cable housing into bottom of slot in electrical box, with equal length of threads on inside and outside of retaining nuts **(Figure 7-15)**. Tighten fingertight.
3. Reconnect spring by inserting end of spring through hole in engine governor arm toward front of car **(Figure 7-17)**, then rotating it one-half turn to its proper position **(Figure 7-18)**.
4. Pull on cable housing and slide cable through slot in cable bracket **(Figure 7-16)**. Lock retaining nuts on throttle cable with equal length of thread on inside and outside of retaining nuts.

CAUTION:

If end of spring faces away from engine it may cause hand injury when checking oil.

5. Before installing cable fitting, proceed to LOW SPEED ADJUSTMENT for proper cable adjustment.

LOW SPEED ADJUSTMENT

WARNING:

Engine must be run to conduct certain tests and adjustment. The following safety procedures must be strictly followed to prevent damage to vehicle or personal injury.

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing this vehicle.

Chock wheels front and rear to prevent vehicle movement.

HOT! Avoid area of hot engine or exhaust when working on vehicle. Can cause extreme burns.

Moving parts! Keep hands, clothing and all other objects away from moving parts. Do not wear jewelry or loose clothing.

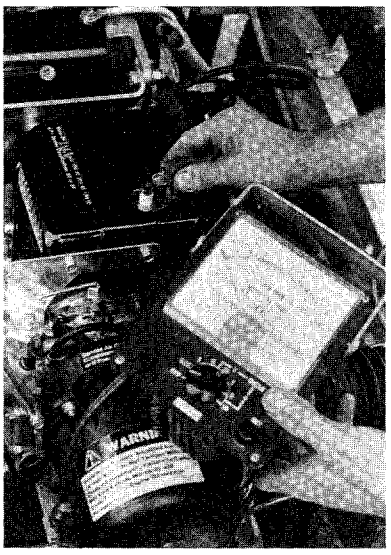

Figure 7-19

1. Check governor for proper adjustment (See Page 7-11).
2. Connect battery cables, positive (+) cable first.
3. Place forward and reverse lever in NEUTRAL position and place neutral lock-out cam in SERVICE position.
4. Connect tachometer, CLUB CAR part # 1012800. (Red wire to spark plug, black wire to spark plug wire.) **(Figure 7-19)** Keep induction coil away from engine.

NOTE: Even though engine is a 4-cycle, tachometer selector switch must be set to 2-cycle, 5000 RPM. Tachometer must be zeroed (set) by using control knob on lower right side of front panel.

5. Remove air intake expansion chamber and electrical box cover.
6. Run engine for about a minute before continuing.

7. Remove throttle cable ball socket from ball joint on actuator arm.

CAUTION:

Exhaust pipe will be hot, be careful not to touch pipe or it will cause severe burns.

8. Depress accelerator and check idle RPM. Idle speed should be 1100-1200 RPM.

NOTE: Be sure the engine is running and not just the starter-generator turning the engine over. If engine will not run, open the throttle by hand, and then close it back against the stop. If engine quits, the carburetor idle adjust screw needs to be adjusted.

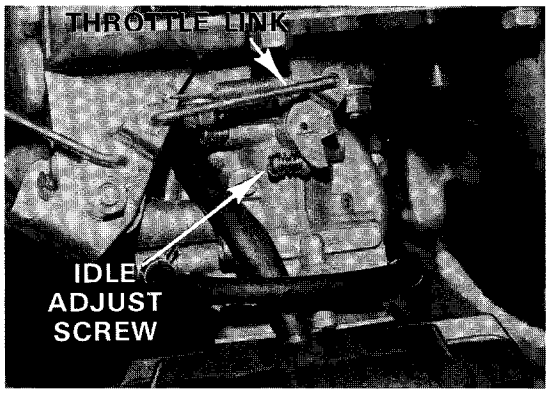

Figure 7-20

9. Set idle at carburetor idle adjust screw **(Figure 7-20)**.
10. Reconnect throttle cable ball socket to ball joint on actuator arm.

HIGH SPEED ADJUSTMENT

CAUTION:

During this procedure do not allow engine over-rev speed to exceed 4000 RPM. Continuous operation at or above this speed will cause engine damage.

1. Check governor for proper adjustment (See Page 7-11).
2. Connect battery cables, positive (+) cable first.

DANGER:

Engine produces carbon monoxide which is an odorless, deadly poison. DO NOT OPERATE IN AN ENCLOSED AREA WITHOUT PROPER VENTILATION.

3. Place forward and reverse lever in NEUTRAL position and place neutral lock-out cam in SERVICE position.
4. Connect tachometer, CLUB CAR part # 1012800. (Red wire to spark plug, black wire to spark plug wire.) **(Figure 7-19)** Keep induction coil away from engine.

NOTE: Even though engine is a 4-cycle, tachometer selector switch must be set to 2-cycle, 5000 RPM. Tachometer must be zeroed (set) by using control knob on lower right side of front panel.

5. With tachometer connected, check high speed RPM. Correct RPM should be 2750-2850 RPM with accelerator pedal pushed to floor.
6. To reduce RPM, loosen the cable retaining nut outside the electrical box and tighten the retaining nut inside the electrical box until desired RPM is reached. To increase RPM, loosen the cable retaining nut inside the electrical box and tighten the retaining nut outside the electrical box until desired RPM is reached.

CAUTION:

After making adjustments, be sure there is a minimum clearance of 1/16 in. between cable housing end and ball joint (Figure 7-21).

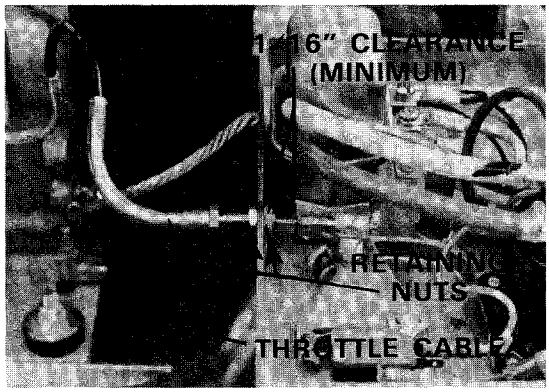

Figure 7-21

7. Be sure both retaining nuts are locked against electrical box. Recheck RPM, if RPM needs to be reduced or increased, go back to Step 6.
8. If more adjustment is required than cable housing allows, check to see that ball joint is properly seated on actuator and that the spring on the other end of cable is properly positioned.

9. If proper adjustment is not achieved, repeat Steps 6 and 7 making adjustment at the engine end of the cable.
10. Reinstall electrical box cover and torque bolt to 10-15 in.-lbs.
11. After proper RPM is attained, place neutral lock-out cam in OPERATE position.

CHOKE

General Information

The choke system is a very simple mechanism that does not use a cable and brackets. This means very little or no maintenance is required on the choke. The system consists of an assembly that is attached to the driver's side of the body and an air intake hose with a hose that is attached to the air filter housing cover, thus clean cool air from outside the engine compartment is drawn into the air cleaner intake. This feature increases engine horsepower and greatly extends air filter life.

When cranking a cold engine the spring loaded choke cover is pushed in by hand, restricting the air flow to the carburetor. The cover is held in by hand until the engine starts, then the spring loaded choke is released. The air flow to the engine is no longer restricted and the engine runs normally.

The choke assembly is preadjusted from the factory and does not require field adjustment. However, if the choke assembly is subjected to abuse or damage it may become necessary to replace the assembly.

Removal

WARNING:

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

1. Remove seat from body.
2. Loosen hose clamps on intake expansion chamber at choke assembly.
3. Remove air expansion chamber from choke assembly **(Figure 7-22)**.
4. Remove intake expansion chamber. Support air filter housing cover when removing intake expansion chamber.
5. Pull sound insulation around choke assembly over slightly to expose mounting hardware.
6. Remove nuts from studs on back side of choke. Remove choke assembly from body.

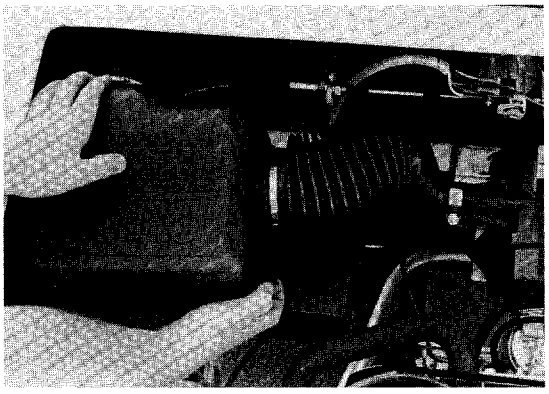

Figure 7-22

Installation

1. Install choke assembly to body, inserting studs through mounting holes.
2. Install nuts to studs, tighten to 48 in.-lbs. torque.
3. Prior to installing intake expansion chamber to choke assembly, orient clamp on chamber neck so clamp bolt is at top of neck, tighten hose clamp to allow for snug fit of intake chamber neck to choke. This aids installation in the confined area by helping to prevent rotation of clamp around chamber neck while tightening.
4. Install air intake hose to choke assembly, tighten hose clamps.
5. Check for proper operation.

AIR FILTER ELEMENT

General Information

The air cleaner should be serviced every six months — more frequent service may be necessary under extremely dirty operating conditions. Need for immediate servicing will be indicated by a loss of power, sluggish acceleration, or excessive exhaust smoke with engine running rough.

WARNING:

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

1. Remove seat from body.
2. Loosen air intake hose clamps at choke assembly and air filter housing cover.
3. Remove air intake hose from air filter housing. Support air filter housing when removing air intake hose.
4. Remove three bolts which retain the filter housing cover to the filter housing.
5. Remove filter and using a clean cloth, wipe the inside of the air filter housing to remove any dust or dirt that may be present **(Figure 7-23)**.

Figure 7-23

WARNING:

Do not allow any dirt particles to enter the carburetor.

6. Install a new filter and reverse this procedure for installation.

CAUTION:

Use only replacement air filter element, CLUB CAR part # 1013379. Use of other air cleaner elements may result in engine damage. If the air cleaner element is too short, the canister cover will contact before the element can seal, leaving space on either end for dirt to pass by the element and enter engine. This will damage the engine and void the warranty.

FUEL FILTERS

General Information

Fuel is supplied to a fuel pump and carburetor through flexible fuel hoses. Two in-line filters are installed in the line between the fuel tank and carburetor. Fuel filters, fuel lines and gas tank cap vent should be inspected on a periodic basis for leaks, clogged tank vent and clogged filters. The primary filter has a white element and the secondary filter has a blue element inside it.

The fuel filters should be replaced when necessary, but under no circumstances should the period of time between filter changes exceed one year.

Removal

WARNING:

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Always wear eye protection when servicing this vehicle.

DANGER:

Gasoline — Flammable — Explosive — Do Not Smoke. Keep sparks and flames away from the area of the vehicle.

WARNING:

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

1. Remove seat from body.

2. To remove primary fuel filter (12), remove clamps (11) and gas lines (10 and 13). Plug gas lines (10 and 13) to prevent gasoline from draining out of lines **(Figure 7-24 or 7-25)**.

3. To remove secondary fuel filter (21), remove clamps (11 and 17) and gas lines (20 and 22). Plug gas lines (20 and 22) to prevent gasoline from draining out of lines.

Installation

1. Install primary fuel filter (12) to fuel lines using new clamps. **(See Fuel Lines, page 7-22, for proper routing of fuel lines.)**

NOTE: The primary filter has a white element and the secondary filter has a blue element inside it.

2. Install secondary fuel filter (21) to fuel lines, using new clamps.

CAUTION:

The filters are marked with a flow direction arrow. Make sure arrow points in direction of gasoline flow from gas tank to carburetor.

3. Install spark plug wire to spark plug, connect battery cables, positive (+) cable first.

NOTE: This figure refers to vehicles with Serial Numbers less than AG8918-172353.

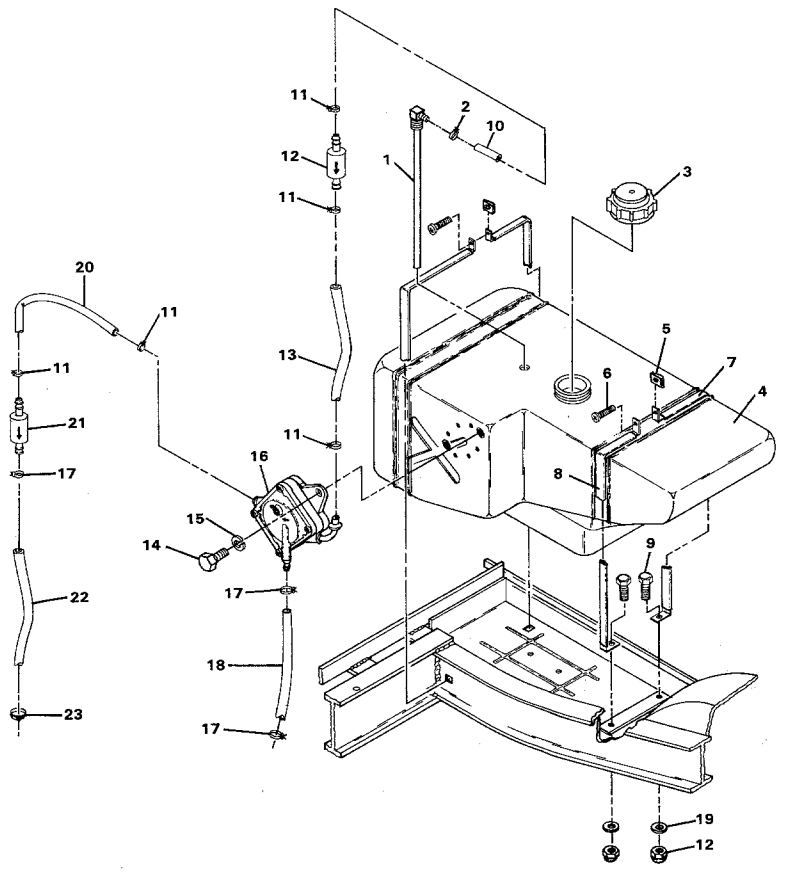

Figure 7-24 — Fuel Pump, Filters and Tank

DANGER:

Engines produce carbon monoxide which is an odorless, deadly poison. DO NOT OPERATE IN AN ENCLOSED AREA WITHOUT PROPER VENTILATION.

4. Place forward/reverse lever in NEUTRAL position and put the neutral lock-out cam in the SERVICE position, start engine, check for leaks.

WARNING:

Correct any leaks BEFORE putting vehicle in operation.

5. Place neutral lock-out cam in OPERATE position.

NOTE: This figure refers to vehicles with Serial Numbers above AG8918-172353.

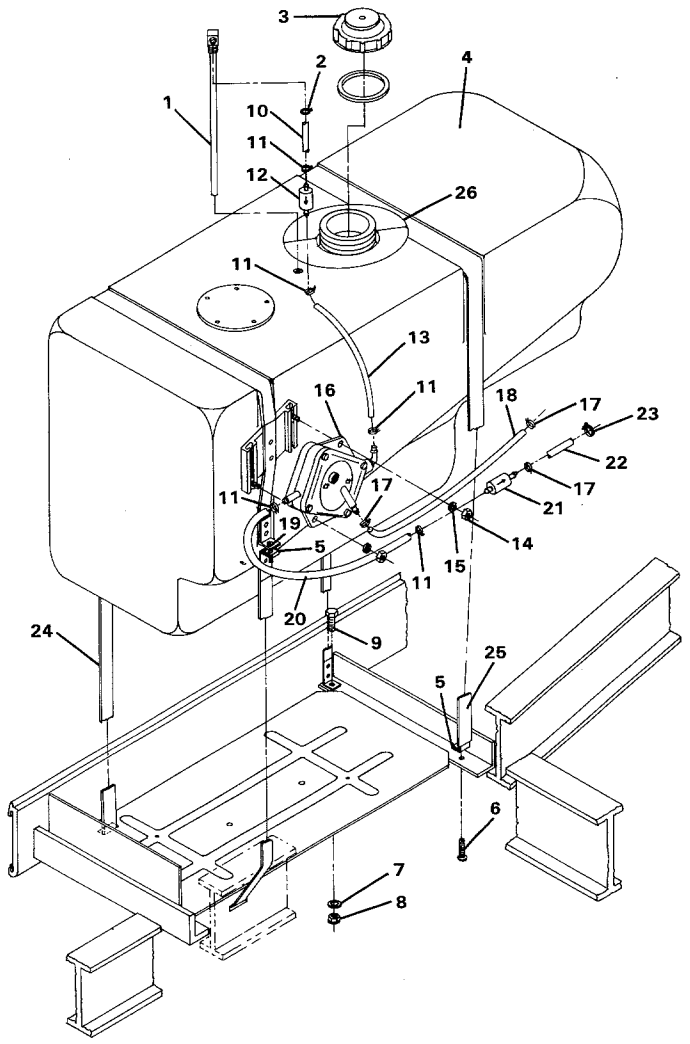

Figure 7-25 — Fuel Pump, Filters and Tank

FUEL PUMP

General Information

The DS Gasoline is equipped with an impulse fuel pump. If the fuel pump is not operating properly, perform the following tests:

- Check that all hose clamps are tight.
- Check the impulse line and fuel lines to be sure they are not damaged or plugged.
- Check the gasket where the impulse line connects to the engine to make sure it's not leaking or damaged.
- Check the air vent on the fuel pump to be sure it is not clogged with dirt **(Figure 7-27 or Figure 7-28)**.

To clean the air vent, the fuel pump must be disassembled.

Removal

WARNING:

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

DANGER:

Gasoline — Flammable — Explosive — Do Not Smoke. Keep sparks and flames away from the area of the vehicle.

1. Remove fuel pump (16) from fuel tank by removing bolts or nuts (14) and lockwashers (15) **(Figure 7-24 or Figure 7-25)**.
2. Lift fuel pump (16) from engine compartment.
3. Remove clamp (17) and remove impulse line (18) from fuel pump.
4. Disconnect fuel lines (13 and 20) from fuel pump and plug the gas lines to prevent gasoline from leaking.

WARNING:

Carefully drain the small amount of gasoline that may remain in the fuel pump and dispose of properly.

Disassembly

A fuel pump rebuild kit is available, CLUB CAR part # 1014524. This kit includes all gaskets, diaphragms and valves.

1. Remove the four screws (24) and lockwashers (25) from the front of the fuel pump **(Figure 7-26)**.
2. Remove the front cover (26) of the fuel pump while holding other parts of the fuel pump intact.
3. If the impulse gasket (27) and diaphragm (28) come off with the front cover, remove them while noting their orientation.

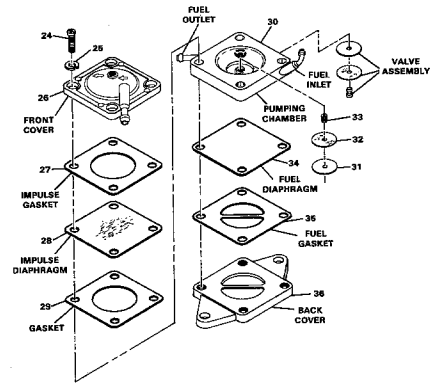

Figure 7-26 — Fuel Pump Assembly

CAUTION:

The gaskets and diaphragms must be reinstalled in the fuel pump exactly as they were removed or fuel pump may leak. If leaking occurs, all new gaskets and diaphragms must be installed.

4. Remove the impulse gasket and diaphragm (28) and the gasket (29) while noting their orientation.
5. Remove the pumping chamber (30).
6. Remove the back cover (36) and the fuel diaphragm (34) and gasket (35).
7. If a valve assembly (31 and 32) is damaged, the rubber retaining plug (33) and valve assembly (31 and 32) must be removed and replaced.

Cleaning and Inspection

1. Clean the front cover, pumping chamber, and back cover, in gasoline. Be sure vent on the front cover is clean on inside and outside **(Figure 7-26)**.

DANGER:

Gasoline — Flammable — Explosive — Do Not Smoke. Keep sparks and flames away from the area of the vehicle.

Only service or repair in well-ventilated area.

Dispose of gasoline properly.

2. Inspect valve assemblies (31, 32 and 33) and all gaskets and diaphragms for damage or tears.

Assembly

1. Install fuel gasket (35) and diaphragm (34) to back cover (36).
2. Install valve assemblies in pumping chamber **(Figure 7-26)**.

CAUTION:

If valve assemblies are not installed exactly as shown, the impulse fuel pump will not operate properly.

3. Install pumping chamber (30) on top of fuel diaphragm. Be sure the fuel inlet and the fuel outlet align with the arrows on the back of the back cover.
4. Install gasket (29), clear impulse diaphragm (28) and the paper impulse gasket (27) to the pumping chamber (30).
5. Install front cover (26) and four screws (24) and lockwashers (25) to assembly. Be sure arrows on front cover point from the fuel inlet to the fuel outlet. Torque screws to 26 in.-lbs.

Installation

1. Connect the fuel line (13) which comes from the primary fuel filter (12), to the fuel pump (16). Install a new clamp (11). **(See Fuel Lines, page 7-22, for proper routing of fuel lines.)**

NOTE: Be sure to install the fuel line (13), which comes from the primary fuel filter (12) to the INLET connection on the pump. The direction of fuel flow is indicated by the arrows on the fuel pump **(Figure 7-27)**.

2. Connect the fuel line (20) which goes to the carburetor to the output side of the fuel pump **(Figure 7-24 or Figure 7-25)**.
3. Reconnect the impulse line to the bottom inlet of the fuel pump with a new clamp (17).

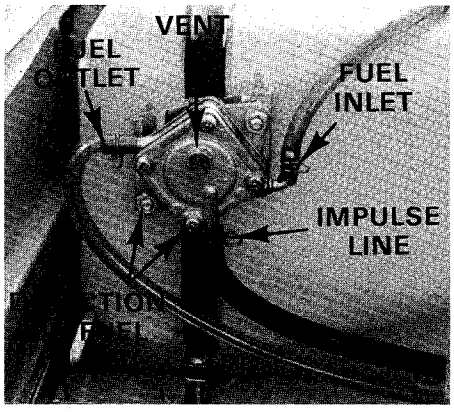

Figure 7-27

WARNING:

Do not overtorque bolts in step 4. Overtorquing bolts may damage inserts and could possibly cause fuel tank to leak.

4. Install the fuel pump (16) to the fuel tank and torque bolts to 16-21 in.-lbs.
5. Install fuel lines to primary filter.

DANGER:

Engines produce carbon monoxide which is an odorless, deadly poison. DO NOT OPERATE IN AN ENCLOSED AREA WITHOUT PROPER VENTILATION.

6. Place forward and reverse lever in NEUTRAL position and place neutral lock-out cam in SERVICE position. Start the engine and check for leaks. If fuel pump leaks, a rebuild kit, CLUB CAR part # 1013762, must be installed to replace all gaskets and diaphragms.

WARNING:

Correct any gasoline leaks before using vehicle.

7. Place neutral lock-out cam in OPERATE position.

FUEL TANK

General Information

The DS Gasoline is equipped with a high impact plastic 7.4 gallon gas tank. If vehicle is to be in extended off season storage, a gasoline stabilizer should be added to the fuel following the manufacturer's recommendations on the container or the tank should be drained.

WARNING:

If tank is damaged, do not repair. Replace tank. Follow tank removal and disposal procedure.

Two cartridge type fuel filters are located in the fuel supply line, one between tank and fuel pump and one between fuel pump and carburetor. If there is an indication of restricted fuel flow to the fuel pump or carburetor, the filters should be replaced.

CAUTION:

Add regular leaded or regular unleaded gasoline to tank. DO NOT PUT OIL IN GAS TANK.

Removal

DANGER:

Gasoline — Flammable — Explosive — Do Not Smoke. Keep sparks and flames away from the area of the vehicle.

WARNING:

Only trained people should repair or service this vehicle. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Do not add fuel while engine is running or hot.

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

1. Remove seat, seat back support and body. See Section XIV - Body and Trim.
2. Place suitable container under fuel tank to drain gasoline from tank.
3. Disconnect fuel line at filter connection and insert a plug.
4. Using a siphon with a suction device, drain **all** of the gas out of the tank into an approved gasoline container.

WARNING:

Never attempt to siphon gasoline using a hose without a built-in suction device.

Never attempt to siphon gasoline using your mouth.

5. Remove fuel pump (16) from fuel tank (4) by removing bolts or nuts (14) and lockwashers (15) **(Figure 7-24 or Figure 7-25)**.
6. Loosen straps by removing screws from strap bracket. In Figure 7-19, remove screws (6) from speed nuts (5). In Figure 7-20, remove screws (19 and 6) from speed nuts (5).
7. Lift tank out of frame.

Disposal

1. Remove cap from tank, rinse thoroughly with water and destroy.
2. In a ventilated area, flush tank with water to remove residual gas.
3. Turn tank over and let water drain completely from tank for 24 hours while tank sits in a ventilated area.
4. Dispose of tank properly.

Storage

1. Remove cap from tank.
2. Flush tank with water to remove all residual gas.
3. Turn tank over and let water drain completely from tank for 24 hours while tank sits in a ventilated area.
4. Store tank in upside down position in a ventilated area without cap installed.

Installation

1. Install tank into frame.
2. Place straps in slots on edge of tank and insert screws into the speed nuts and torque to 8-10 in.-lbs.

WARNING:

Do not overtorque bolts in step 3. Overtorquing bolts may damage inserts and could possibly cause fuel tank to leak.

3. Install fuel pump (16) to fuel tank (4). Torque bolts or nuts (14) to 16-21 in.-lbs.
4. Connect fuel line to primary fuel filter using new clamp. (See Fuel Lines, below, for proper routing of fuel lines.)
5. Install body. See Section XIV - Body and Trim.
6. Add gasoline to tank. DO NOT PUT OIL IN GAS TANK.

WARNING:

After installing tank and adding gasoline into tank, check all fuel lines carefully for leaks. Correct any leaks before using vehicle.

FUEL LINES

The fuel lines on the Carryall I must be properly routed, all hose clamps must be tight and the fuel lines should be kept clean.

WARNING:

Be sure fuel lines are the right length and properly routed. Failure to follow this warning could result in damage to the fuel line and a possible fire.

Fuel line #1 (see chart) runs directly from the fuel tank to the primary fuel filter. The primary fuel filter has an arrow indicating fuel direction. The primary filter has a white element inside it. Fuel line #2 runs directly to the fuel inlet of the fuel pump. Fuel line #3 runs from the fuel outlet of the fuel pump and through the clamp on the side of the crankcase of the engine to the secondary in-line fuel filter. See WARNING — Figure 7-28. The in-line secondary fuel filter has an arrow indicating fuel direction and has a blue element inside it. From the outlet of the secondary fuel filter, a black 2¼ inch fuel line, fuel line #4, runs straight to the carburetor. Small round dual wire clamps are used on all hose connections except the outlet of the secondary fuel filter and at the carburetor. A heavy single wire clamp is used at the outlet of the secondary fuel filter and a screw band clamp is used at the carburetor.

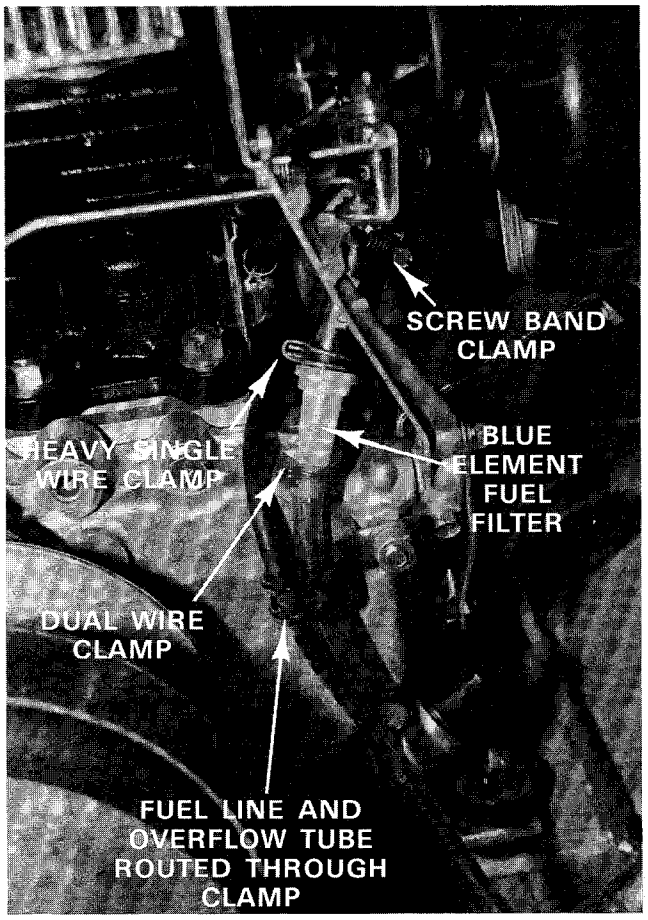

Figure 7-28

WARNING:

The fuel line must be fully enclosed by the clamp to prevent the fuel line from being damaged by rotating components. Fuel line must not be pinched.

FUEL LINE #	ROUTING	COLOR	LENGTH
1	Fuel tank to primary fuel filter	clear	2″
2	Primary fuel filter to fuel pump	clear	6″
3	Fuel pump to secondary fuel filter	clear	18″
4	Secondary fuel filter to carburetor	black	2¼″

SECTION VIII - EXHAUST SYSTEM

GENERAL INFORMATION

The exhaust system on the DS Gasoline is designed to provide a very quiet operation for the operator. Special vibration isolating mounts reduce transmitted vibration from the muffler. The muffler actually consists of a chamber that the exhaust gases, sound and heat travel through. The muffler is mounted at the rear of the vehicle to keep the heat, sound and exhaust gases away from the operator. If muffler replacement is required, it can be replaced without removing the body.

MUFFLER

REMOVAL

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing the vehicle.

Turn key switch off and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

Hot — do not attempt to service hot engine or exhaust. Can cause extreme burns. Always allow engine and exhaust to cool prior to servicing.

1. Remove seat from body.
2. Remove nuts (5), washers (4), and bolts (1) at exhaust pipe (8) connection **(Figure 8-1)**.
3. Remove nuts (12), washers (17), steel bushing (16), rubber mounts (13), and bolts (14) from muffler mounting bracket (11).
4. Remove muffler and clamp from vehicle.
5. Remove nut (15), washers (7), and "T"-bolt (6) and slide clamp off muffler.

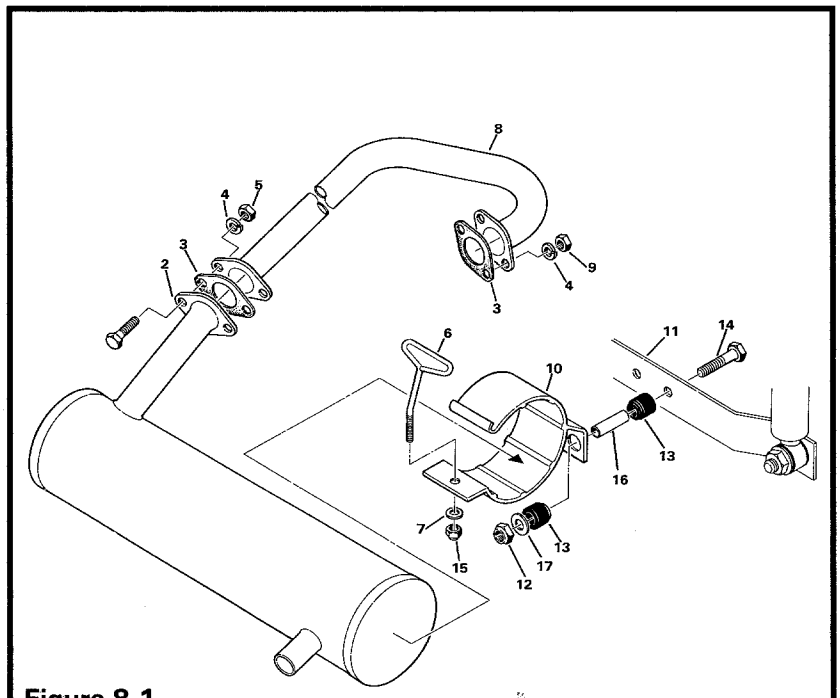

Figure 8-1 — Muffler Assembly

INSTALLATION

1. Slide muffler back into mounting clamp (10), install "T"-bolt (6), washers (7), and nut (15) and finger tighten.
2. Install muffler to bracket (11) using bolts (14), rubber mounts (13), steel bushings (16), washers (17) and new nuts (12).

CAUTION:

New nuts (12), CLUB CAR part # 0008754, must be used upon reinstallation to insure the muffler mounts do not loosen during operation. Failure to follow this procedure could cause exhaust system failure and warranty will be voided.

3. Tighten nuts (12) to 14-20 ft.-lbs.
4. Align muffler with exhaust header pipe (8), install new gasket (3).
5. Install hardware (1, 4, 5) through flange connection. Tighten to 12-14 ft.-lbs. torque.
6. Tighten muffler clamp hardware to 20-30 in.-lbs. torque.
7. Install spark plug wire to spark plug.
8. Connect battery cables, positive (+) cable first.

DANGER:

Engines produce carbon monoxide which is an odorless, deadly poison. DO NOT OPERATE IN AN ENCLOSED AREA WITHOUT PROPER VENTILATION.

9. Place Forward and Reverse lever in NEUTRAL, place neutral lock-out cam in SERVICE position, start engine, check for exhaust leaks and proper engine operation.

NOTE: After checks, place lock-out cam in OPERATE position for normal operation of vehicle.

MUFFLER VIBRATION MOUNTS

REMOVAL

WARNING:

Always wear approved eye protection when servicing the vehicle.

Turn key switch off and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

Hot — do not attempt to service hot engine or exhaust. Can cause extreme burns. Always allow engine and exhaust to cool prior to servicing.

1. Remove muffler as described under Muffler Removal.
2. Remove clamp (10), rubber isolating mounts (13) and steel bushing (16). **(Figure 8-1).**

INSTALLATION

Reverse Removal procedure for installation of rubber isolating mounts. Torque nuts to 14-20 ft.-lbs.

EXHAUST HEADER PIPE

REMOVAL

WARNING:

Always wear eye protection when servicing the vehicle.

Turn key switch off and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

Hot — do not attempt to service hot engine or exhaust. Can cause extreme burns. Always allow engine and exhaust to cool prior to servicing.

1. Remove nuts (9) and washers (4) from exhaust header connection to exhaust manifold **(Figure 8-1)**.
2. Remove nuts (5), washers (4), and bolts (1) at exhaust header connection to muffler.
3. Remove exhaust header (8) and gaskets (3).

INSTALLATION

1. Always install new gaskets (3) when replacing or repairing exhaust system components.
2. Be sure exhaust flange surfaces are clean and smooth when replacing gaskets.
3. Reverse Removal procedures for installation, tighten exhaust header pipe nuts to 14-16 ft.-lbs. torque.

SECTION IX - TORQUE CONVERTER

GENERAL INFORMATION

The torque converter consists of a drive clutch, driven clutch and drive belt. The drive clutch which is mounted to the engine is in the open position when the engine is at idle. Thus the belt is riding at a small diameter. The driven clutch mounted to the transmission is in the closed position — engine at idle — with the belt riding on a large diameter.

The speed ratio of the drive clutch to driven clutch is 3:5.1 at clutch engagement. Thus transmission input torque is increased by 3.5 to 1 but vehicle speed is slow. The result is good starting torque at slow speeds.

As engine speed increases, centrifugal weights force the drive clutch closed. The belt is forced to a large diameter. The belt pulls the driven clutch open to a smaller diameter. At governed speed, the speed ratio of drive to driven clutch is .87:1. Thus the vehicle is now at top speed but the engine is running at an efficient moderate speed due to the overdrive ratio of the torque converter.

On steep grades or under heavy loads where higher torque is required, the driven clutch is equipped with torque sensing ramp devices that force the driven clutch back closed and the drive clutch open, overcoming the force of the centrifugal weights. Thus an increase in axle torque is achieved with little or no change in engine RPM.

It is the combination of the torque converter action, the governor and engine tuning that gives the CLUB CAR gasoline vehicles unparalleled performance over any terrain.

The following special tools are required to properly disassemble and assemble the torque converter.

1. Drive clutch puller, CLUB CAR part # 1014496
2. Drive clutch hub puller, CLUB CAR part # 1014497
3. Clutch alignment tool, CLUB CAR part # 1014498
4. Driven clutch puller plug, CLUB CAR part # 1014507
5. Driven clutch cam puller, CLUB CAR part # 1014508
6. Driven clutch cam press on tool, CLUB CAR part # 1014505
7. Drive clutch holder tool, CLUB CAR part # 1015524.

All of these tools are available in a torque converter tool kit, CLUB CAR part # 1014510 **(Figure 9-1)**.

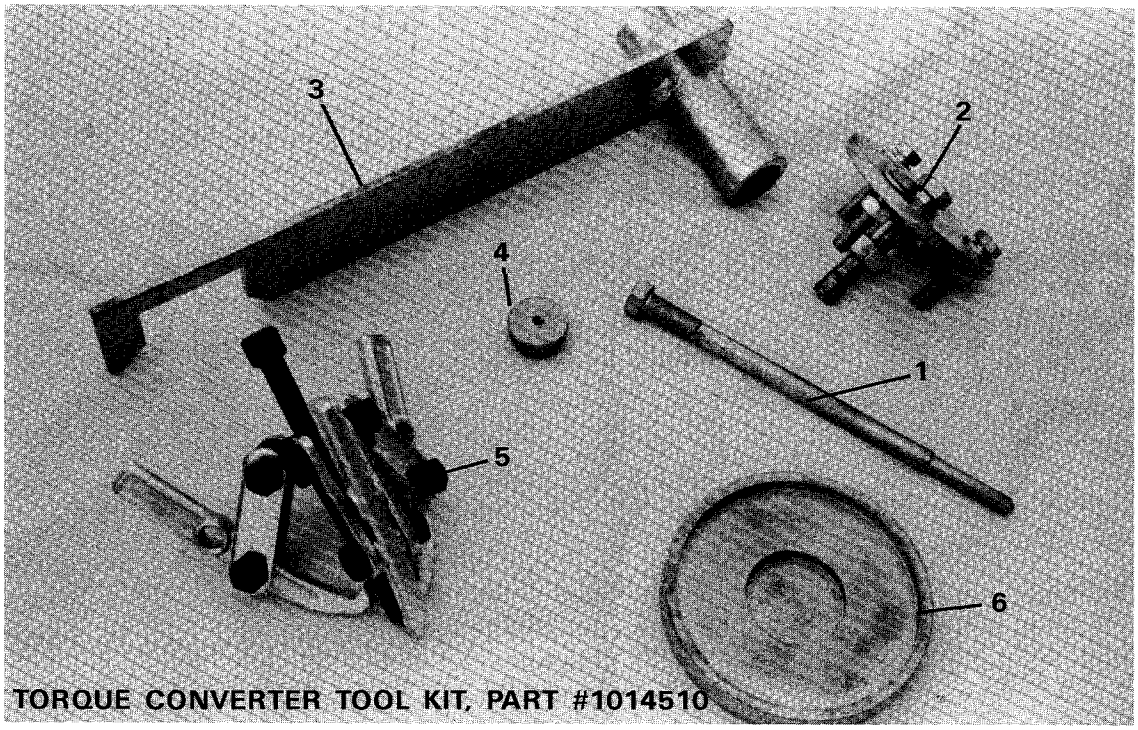

Figure 9-1

TROUBLE-SHOOTING

If torque converter is not operating properly:

1. Check the governor and throttle settings (See Section VII — Fuel System).
2. Check for dirt and dust buildup on the component parts of the driven clutch. Wash driven clutch off with water to remove dust and dirt. Drive vehicle and check for proper operation.
3. If washing the driven clutch does not solve the problem, the driven clutch must be disassembled and cleaned. Clean the plastic slide buttons (3) **(Figure 9-16)**.

DRIVE BELT

The drive belt should be inspected semi-annually for wear and/or glazing. If excessively worn, frayed or glazed, replace belt using CLUB CAR part # 1014081.

NOTE: As the drive belt wears, the engine RPM will tend to increase to make up for the change in ratio. This will keep the vehicle ground speed at 12-14 MPH.

REMOVING DRIVE BELT

WARNING:

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Moving parts — do not attempt to service the vehicle with engine running.

CAUTION:

Be sure fingers are not underneath belt when rolling belt off of driven clutch in step 1.

1. Grasp belt midway between the drive and driven clutches, lift upward on the belt to force the sheaves of the driven clutch apart, roll belt off the driven clutch **(Figure 9-2)**.
2. Remove belt from drive clutch.

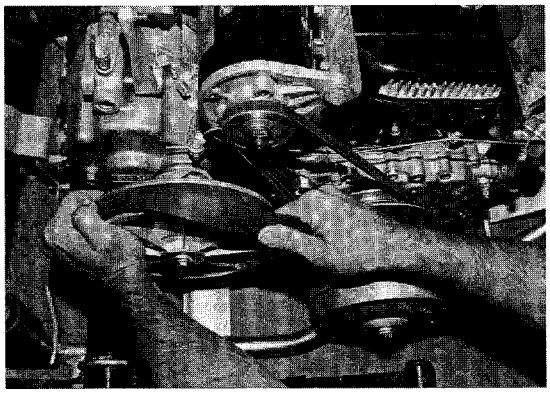

Figure 9-2

INSTALLING DRIVE BELT

1. Install new belt on drive clutch first. Start belt over the driven clutch last.
2. With belt started onto driven clutch, rotate clutches to allow belt to roll over driven clutch sheaves and onto clutch.

NOTE: When removing drive belt, remove belt from driven clutch first, drive clutch last. When installing drive belt, install on drive clutch first, driven clutch last.

DRIVE CLUTCH

REMOVAL

WARNING:

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

Moving parts — do not attempt to service the vehicle with engine running.

CAUTION:

Use extra care when handling drive or driven clutch. If either is dropped it will chip, dent or shatter and will not be properly balanced. If it is dropped, it will have to be replaced.

1. Remove seat from body.
2. Remove drive belt as described under Drive Belt.
3. Remove starter-generator service access panel.
4. Loosen starter-generator mounting and adjusting hardware and remove starter belt.
5. Remove drive clutch retaining bolt and washers **(Figure 9-3)**.
6. Remove complete drive clutch assembly by inserting drive clutch puller, CLUB CAR part # 1014496, and tighten bolt **(Figure 9-4)**. As the bolt is tightened, the complete drive clutch assembly will come free of the crankshaft. While supporting the drive clutch in your hand, back the bolt out of crankshaft.

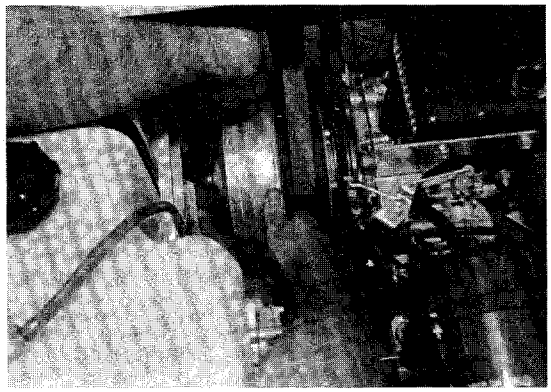

Figure 9-3

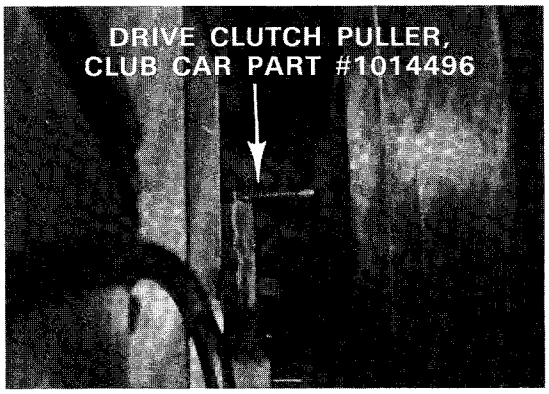

Figure 9-4

CAUTION:

Use of a hammer will damage drive clutch and affect clutch operation. Never pry or hammer on the clutch assembly.

CLEANING AND INSPECTION

1. Clean all parts with a brush or lint free cloth.

NOTE: Do not use solvents as this will damage the lubricating characteristics of the bushings.

2. Inspect for wear in area that drive belt contacts the surfaces of the sheaves. Severe wear will affect clutch operation. If any face has wear of .060" or more, they require replacement.
3. This clutch should not be lubricated as lubricants attract dirt and dust which interfere with the proper operation of the clutch.
4. The shaft of the fixed face assembly (1) should only be wiped lightly with a dry cloth while servicing. Use of a brush or steel wool will damage the surface.

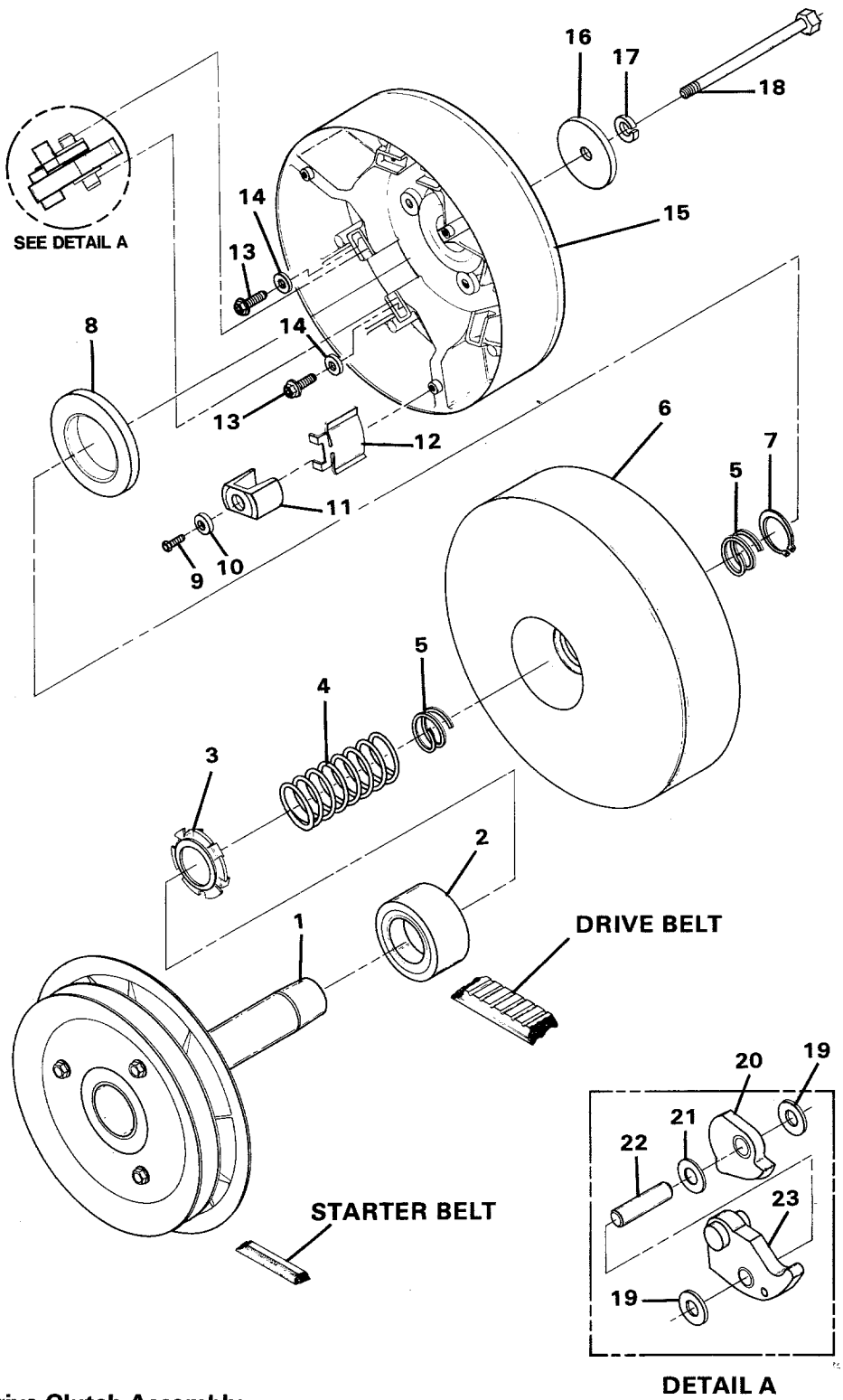

Figure 9-5 — Drive Clutch Assembly

Disassembly

CAUTION:

This clutch assembly is balanced as an assembly. Prior to disassembly, make a mark on the cover of the clutch and on the movable face casting so these marks can be lined up during reassembly in order to maintain balance.

1. Make a mark on the cover of the clutch and on the movable casting **(Figure 9-6)**. See Caution above.

2. Remove the cover (15) of the clutch by inserting center bolt of drive clutch hub puller tool, CLUB CAR part # 1014497, until bolt touches clutch and then back center bolt out one half turn. Insert the three small bolts into holes and tighten all three down evenly. Remove cover by unscrewing center bolt **(Figure 9-7)**.

3. Remove the thrust washer (8) from the movable face (6).

4. Remove the screw (9), flat washer (10), drive button take-up spring (12) and drive buttons (11) **(Figure 9-8)**.

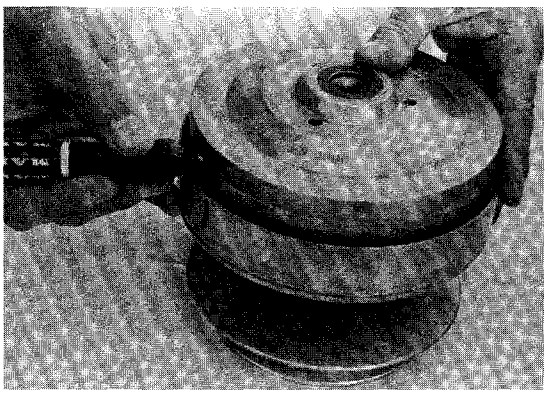

Figure 9-6

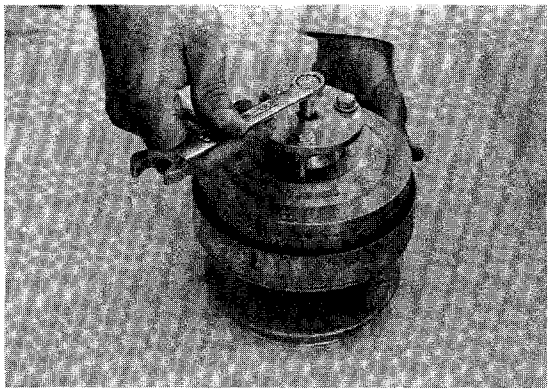

Figure 9-7

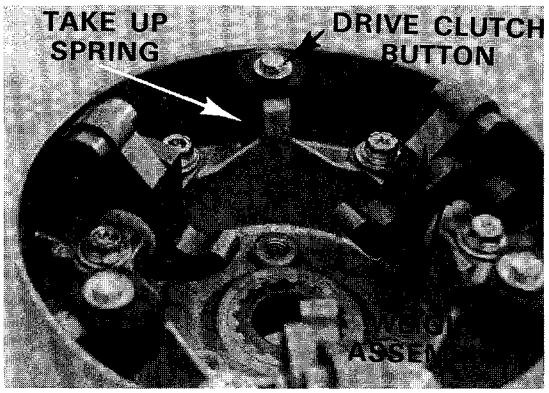

Figure 9-8

5. To remove the weights, remove the screws (13) and flat washers (14) **(Figure 9-9)**.

6. Pull on the weights and remove the pin (22) and weights together. Remove the plastic washers (19) and the weights will slide off the pin (22). Note the orientation of the secondary (20) and primary (23) weights to one another. Also retain the wave washer (21) that is between the two weights and note its orientation.

NOTE: If the movable face is removed from the fixed face hub, (step 7), the spiral wipers (5) must be replaced.

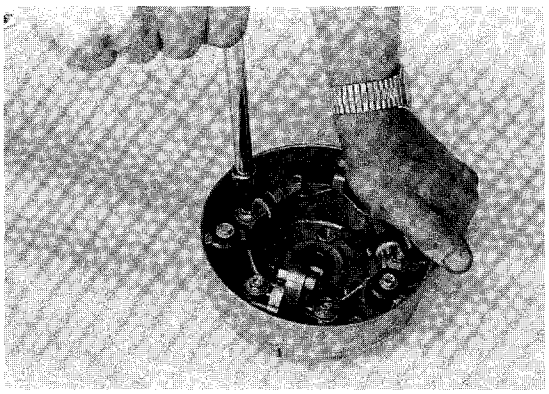

Figure 9-9

7. Remove the retaining ring (7) from the hub of the fixed face assembly (1) and slide the movable face (6) off.

8. Remove the spring (4) and spring retainer (3). Spring retainer can now be removed from spring, if necessary.

NOTE: Do not remove idler bearing unless it requires replacement as it will have to be replaced if removed.

9. Remove the idler bearing (2) **(Figure 9-10)**.

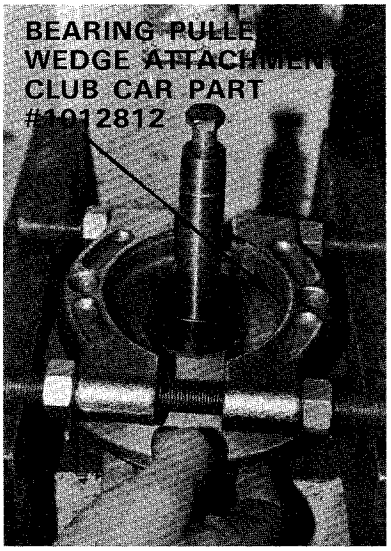

Figure 9-10

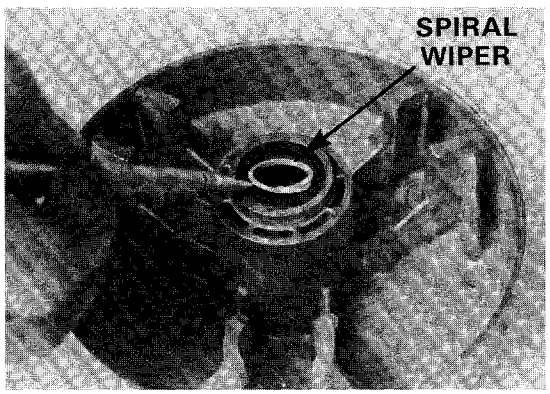

Figure 9-11

10. Using a scribe, remove the spiral wipers (5) from both ends of bore in fixed face assembly and discard **(Figure 9-11)**.

Inspection

1. Inspect the idler bearing (2) for smooth rotation or a damaged seal.

NOTE: It is normal for a small amount of grease to be present at edge of seal.

2. Inspect the bore of the movable face assembly (6) for scarring or wear. The movable face assembly must be replaced if the bore is worn to a diameter of .883 inches or larger.
3. Inspect the steel shaft on the fixed face assembly. There should be no measurable wear areas on the shaft. Replace if worn, scratched or damaged.
4. Inspect the thrust washer (8) for wear. If wear is more than .030", the washer can be turned over or washer must be replaced.
5. Inspect the primary weights (23) for wear. If primary weights show signs of touching the casting, the tip of the weight has worn past an acceptable level and primary weights must be replaced.
6. Inspect pin (22). There should be no measurable wear areas. Replace if worn, scratched or damaged.
7. Inspect the V-belt pulley sheaves for excessive wear or damage. If excessively worn or damaged, the entire fixed face drive assembly requires replacement.

Assembly

1. Press the idler bearing (2) onto hub of fixed face assembly (1). Press idler bearing by pressing on inner race of bearing only. Be sure cup side of bearing is away from fixed face.
2. Install the spring retainer (3) to the spring (4) using a pliers to attach it.
3. Install the spring assembly (3 and 4) into cup of idler bearing (2).
4. Install new spiral wipers (5) on both ends of bore of movable face assembly (6).
5. Install the movable face assembly (6) onto shaft of the fixed face assembly (1) and install the retaining ring (7). Rotate movable face assembly clockwise while installing onto shaft. Care must be taken to avoid damaging spiral wipers during assembly of movable face.
6. Install primary weight (23) to pins (22).
7. Install wave washer (21) to the pin (22) with the concave side towards the side of the primary weight (23) with the small pin protruding from it **(Figure 9-12)**.

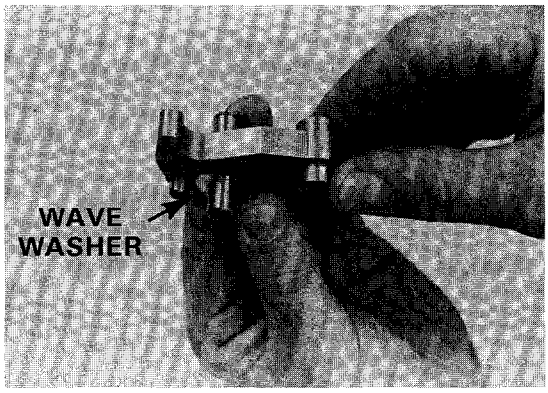

Figure 9-12

8. Install the secondary weight (20) to the pin (22) with pin protruding from secondary weight pointing away from primary weight. The wave washer (21) should be between the primary weight and secondary weight **(Figure 9-13)**.

9. Install the white flat washers (19) up against the outside of both weights. Center the weights on the pin **(Figure 9-14)**.

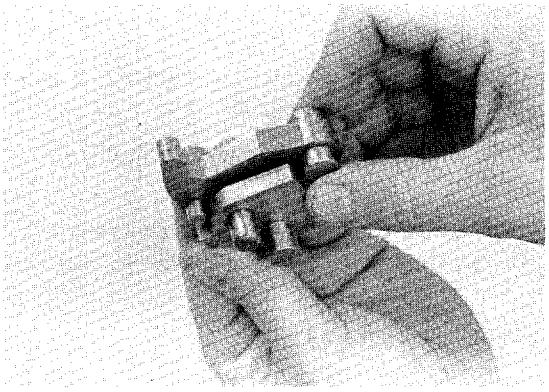

Figure 9-13

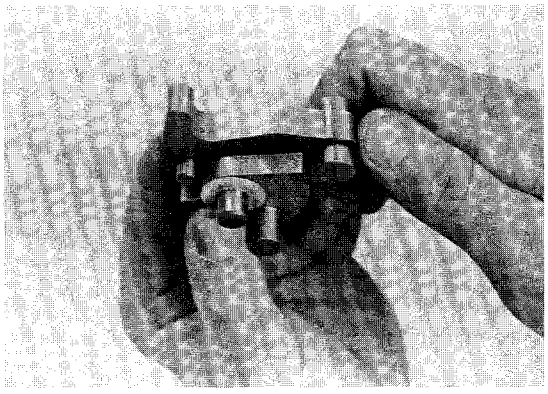

Figure 9-14

10. Install the pin (22) into the weight assembly slot in casting (15) and be sure the pin protrudes equally on both sides of the weights when installed.

11. Install the 1/4-20 screws (13) and washers (14). Torque to 10 ft.-lbs.

NOTE: There should be a .020" gap minimum between both ends of the pin and screws (13).

12. Install three drive button take-up springs (12) on the ribs of the cover. The spring must be installed on the counter clockwise side of the rib when looking at the rib **(Figure 9-15)**.

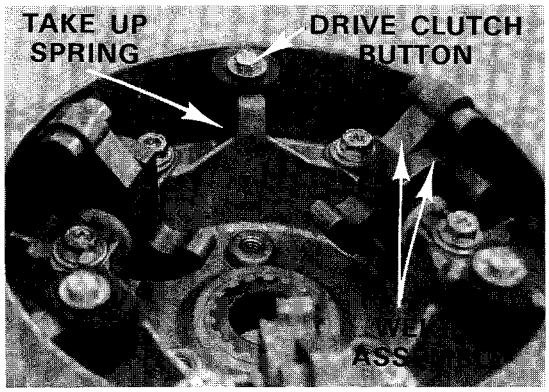

Figure 9-15

13. While compressing take-up spring, install drive button (11) over rib and take-up spring (12) in three places.

14. Install three flatwashers (10) and three #10-24 screws (9) into rib which retains the drive button (11). Torque screw to 30-36 in.-lbs.

15. Install thrust washer onto movable face assembly.

16. Install cover (15) into movable face assembly while aligning marks made in step one of disassembly and press on by hand.

Installation

1. Install drive clutch assembly onto crankshaft taper, install washer (16), lockwasher (17) and bolt (18). Start bolt (18) into crankshaft and thread by hand until finger tight. Tighten bolt (18) to 22-28 ft.-lbs. torque.

2. Install starter-generator belt, adjust belt tension, described under Belt Tension Adjustments. Tighten adjusting and mounting hardware to 14-18 ft.-lbs. torque.

3. Install drive belt as described under Drive Belt.

4. Connect battery cables, positive (+) cable first.

5. Connect spark plug wire to spark plug.

6. Drive vehicle and check for proper operation.

DRIVEN CLUTCH

REMOVAL

WARNING:

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

Moving parts — do not attempt to service the vehicle with engine running.

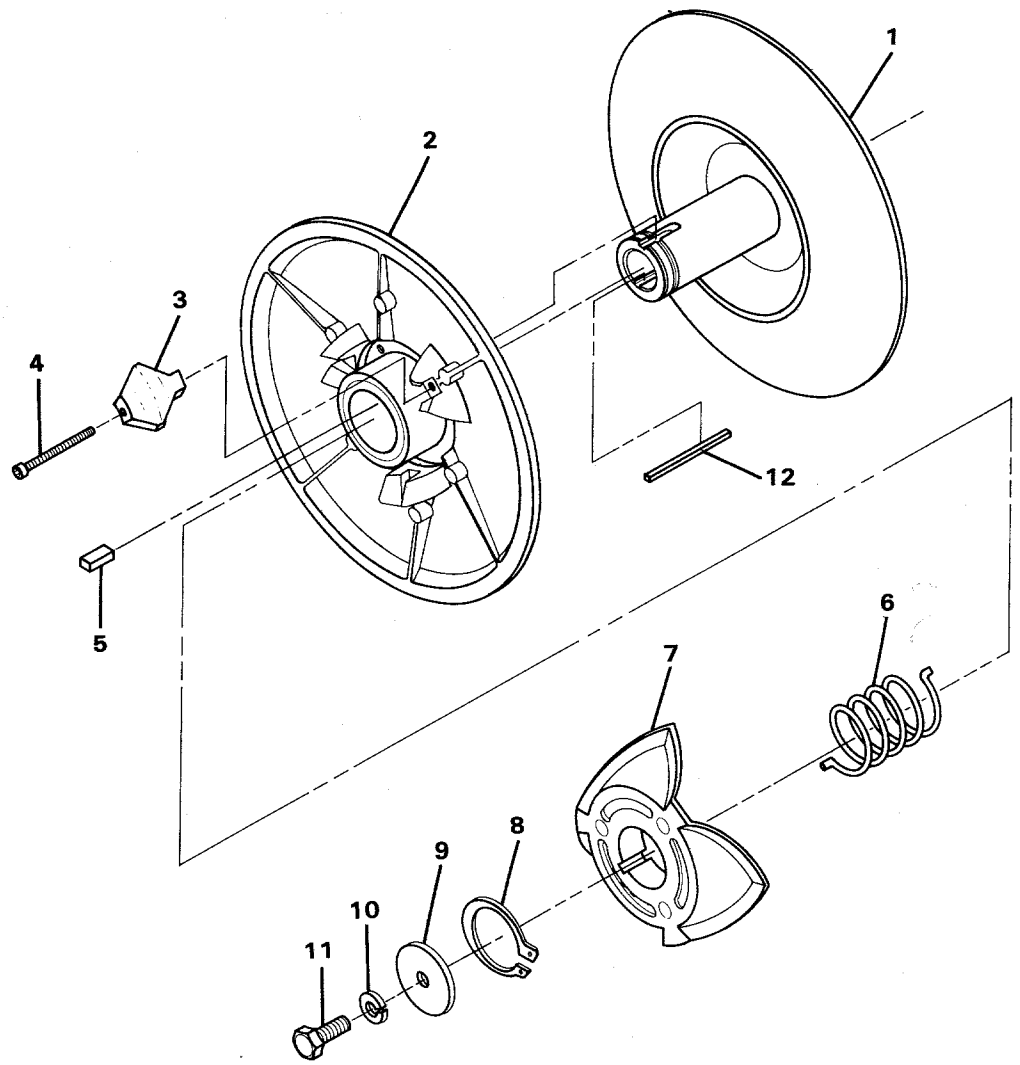

Figure 9-16 — Driven Clutch Assembly

1. Remove seat from body.
2. Remove drive belt as described under Drive Belt.
3. Remove center bolt (11), washer (9), lockwasher (10), from clutch shaft **(Figure 9-17)**.
4. Grasp driven clutch assembly and slide off shaft.
5. Retain key (12) in keyway **(Figure 9-18)**.

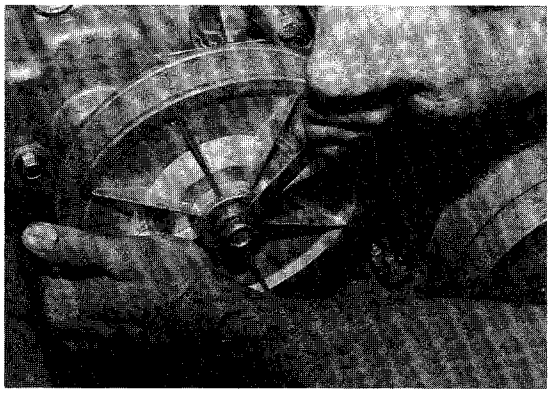

Figure 9-17

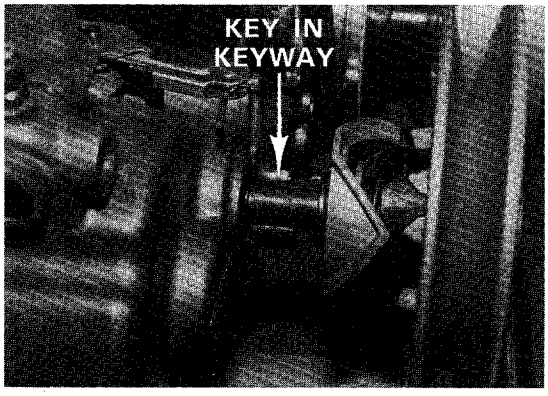

Figure 9-18

Disassembly

1. Using an external snap ring pliers, remove the retaining ring (8) **(Figure 9-19)**.

CAUTION:

Do not place fingers under cam when removing cam as the movable face may spin when cam buttons release from the cam ramps.

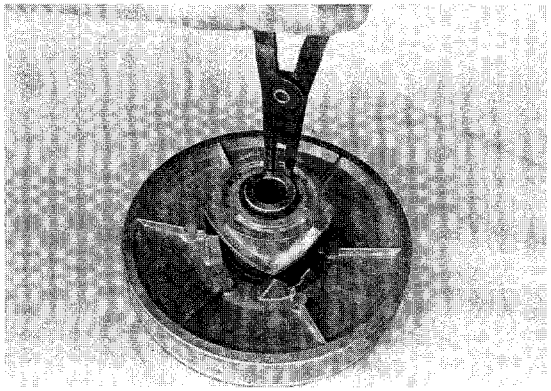

Figure 9-19

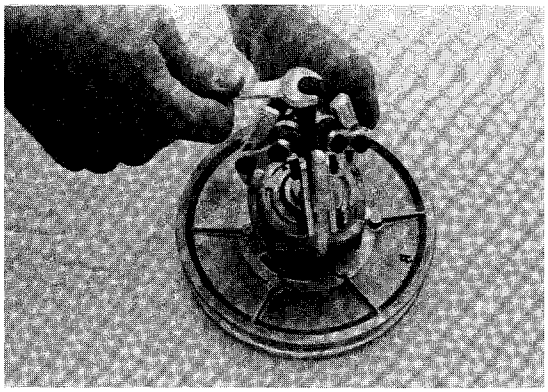

Figure 9-20

2. Place puller plug, CLUB CAR part #1014507, into the shaft bore and use a drive clutch cam puller, CLUB CAR part # 1014508, to remove the cam (7) from the fixed face hub (1) **(Figure 9-20)**. Retain the key (5).
3. Remove the spring (6).
4. Slide the movable face (2) off of the fixed face hub (1).

Inspection

1. Inspect the cam (7) for excessive wear and replace if necessary.
2. Inspect the drive buttons for excessive wear and replace if necessary. If drive buttons need to be replaced, remove socket head cap screws (4) and remove drive buttons (3).
3. Inspect the sheaves on the fixed and movable face assemblies. Sheaves must be replaced if worn more than .060 inches.
4. Inspect the bearing in the movable face and replace if bore diameter is larger than 1.384 inches. If bearing is worn over maximum diameter, entire movable face assembly must be replaced.
5. Inspect the shaft of the fixed face assembly for wear. There should be no measurable wear. Replace if worn, scratched or damaged.

Assembly

1. Install three drive buttons (3) in place. Install #8-32 socket head cap screws (4) with one drop of Loctite® 222 and torque to 7-9 in.-lbs.

2. Slide the movable face assembly (2) onto the fixed face hub (1).

3. Place the end of the spring (6) into the hole in the movable face assembly (2).

4. Install the key (5) into the keyway of fixed face assembly (1) shaft.

5. Holding the cam in position for assembly on shaft, install the other end of spring into the center spring hole of the cam (7). Rotate cam to align cam keyway with key (5) on fixed face assembly (1), start cam onto shaft approximately 1/4-3/8 inch.

6. Place cam press on tool, CLUB CAR part # 1014505, on cam **(Figure 9-21)**. Holding the fixed face assembly (1), firmly rotate the movable face assembly (2) 1/3 of a turn counter-clockwise and press cam (7) onto fixed face assembly.

7. Install the retaining ring (8).

8. Holding onto the cam, tap the end of the fixed face hub lightly with a plastic hammer until the cam (7) seats up against the retaining ring (8).

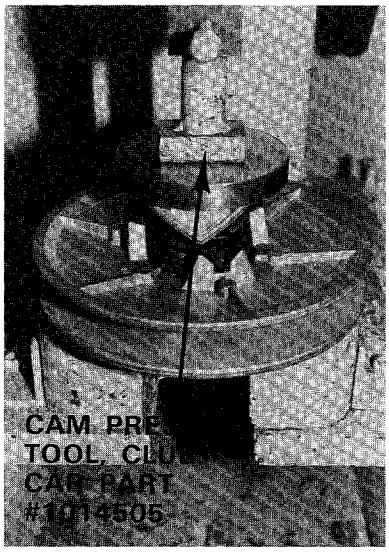

Figure 9-21

CAUTION:

Use of a metal hammer will damage shaft of fixed face assembly.

Installation

1. Install in reverse order of removal, torque center bolt to 12-14 ft.-lbs.

CLUTCH ALIGNMENT

WARNING:

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

Moving parts — do not attempt to service the vehicle with engine running.

If the engine or drive unit has been removed from the vehicle, the engine mounts were loosened or the vehicle seems to vibrate excessively, the clutch alignment should be checked. The clutch alignment tool, CLUB CAR part # 1014498, should be used to check clutch alignment.

1. Remove drive belt from clutches.
2. Remove driven clutch from the transmission.
3. Slide clutch alignment tool, CLUB CAR part # 1014498 onto shaft of transmission until it seats up against the transmission.
4. Reinstall driven clutch assembly bolt fingertight to hold alignment tool in place.
5. Swing the clutch alignment tool down to place it on the shaft of the drive clutch **(Figure 9-22)**.
6. The clutch alignment tool should come down over the center shaft bearing of the drive clutch. The alignment is within limits if it just touches the fixed face of the drive clutch or is no further than .060 inches from the fixed face **(Figure 9-23)**.

Figure 9-22

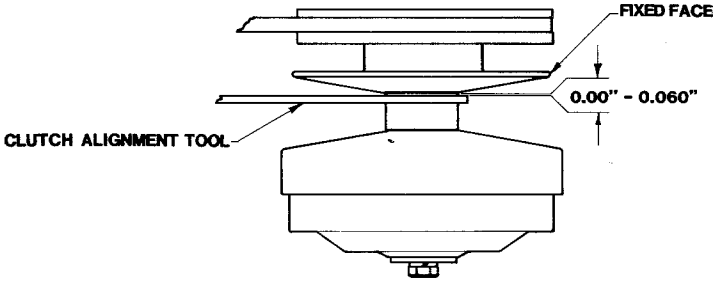

Figure 9-23 — Clutch Alignment Dimensions

7. The clutch alignment tool should also fit over the center shaft bearing of the drive clutch without having to force it. The clutch alignment tool can graze the front or rear of the drive clutch center shaft bearing and still be within alignment limits.
8. If the cluthes are out of alignment, the engine mounting bolts must be loosened and the engine moved to bring the clutches into alignment per steps 6 and 7 above.

NOTE: The engine mounting bolts which can be adjusted are the four bolts which fasten the engine to the engine mount plate. The engine isolator bolts cannot be adjusted.

9. Torque the engine mounting bolts to 22-25 ft.-lbs.
10. Recheck the clutch alignment.

SECTION X
TRANSMISSION AND GOVERNOR

GENERAL INFORMATION

The DS Gasoline car is equipped with a heavy-duty, fully synchronized transmission for forward and reverse direction operation. The transmission is mounted directly to the drive unit. Path of power transfer is from the engine to the drive clutch, to the driven clutch, to the forward and reverse transmission, to the drive unit, to the wheels. Thus the engine, the drive clutch and the driven clutch rotate in ONE DIRECTION ONLY. Reversing is accomplished through fully synchronized gears internal to the transmission. Engine and torque converter life is increased by not being subjected to reversing loads. The transmission is extremely durable and should require very little service under normal operating conditions.

The transmission has three positions, as controlled by the forward/reverse lever, neutral, forward and reverse **(Figure 10-1)**. A neutral lock-out circuit prevents the engine from being operated in the neutral position during normal operation.

NOTE: A special neutral lock-out cam is provided to allow maintenance personnel to run engine in NEUTRAL for certain tests and maintenance procedures. When the neutral lock-out cam is in SERVICE position, the car will not run in the forward or reverse positions.

Similar to all vehicles, the car should always be stopped before changing direction. The only service required on transmission is to maintain proper lubrication level. See Lubrication Chart, Section III.

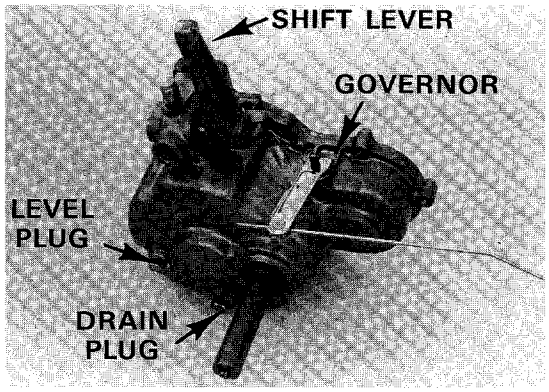

Figure 10-1

The governor system is a flyweight type. It is mounted inside the transmission and driven by the transmission gears. This type governor system measures ground speed of the vehicle directly. It is more reliable than other systems that measure engine RPM, sense drive belt or clutch cover position. Because the governor is inside the transmission, it is protected from abuse and damage that is common to external mounted governor systems.

Under normal operating conditions, weekly adjustment to the system should not be required. The speed of the vehicle should be checked on a weekly basis to ensure proper operation. If any of the governor linkage is removed for servicing other components, readjustment of the governor linkage is required. See Governor Adjustment, Section VII - Fuel System.

LUBRICATION

There are two plugs located on the input shaft side of the transmission. The upper plug, when the transmission is in the horizontal position, is used as a level indicator. The lube level should be even with the bottom of the hole. The lower plug is for draining the lube. When draining the lube, the level plug should be removed to drain faster. Be sure drain plug is reinstalled before filling. Torque plug to 25 ft.-lbs. Using a funnel, fill transmission with lube through level indicator hole. Fill with 20 oz. 80-90 WT. API Class GL-3 or 80-90 WT. AGMA Class 5 EP gear lube.

TRANSMISSION

REMOVAL

WARNING:

Only trained people should repair or service this car. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

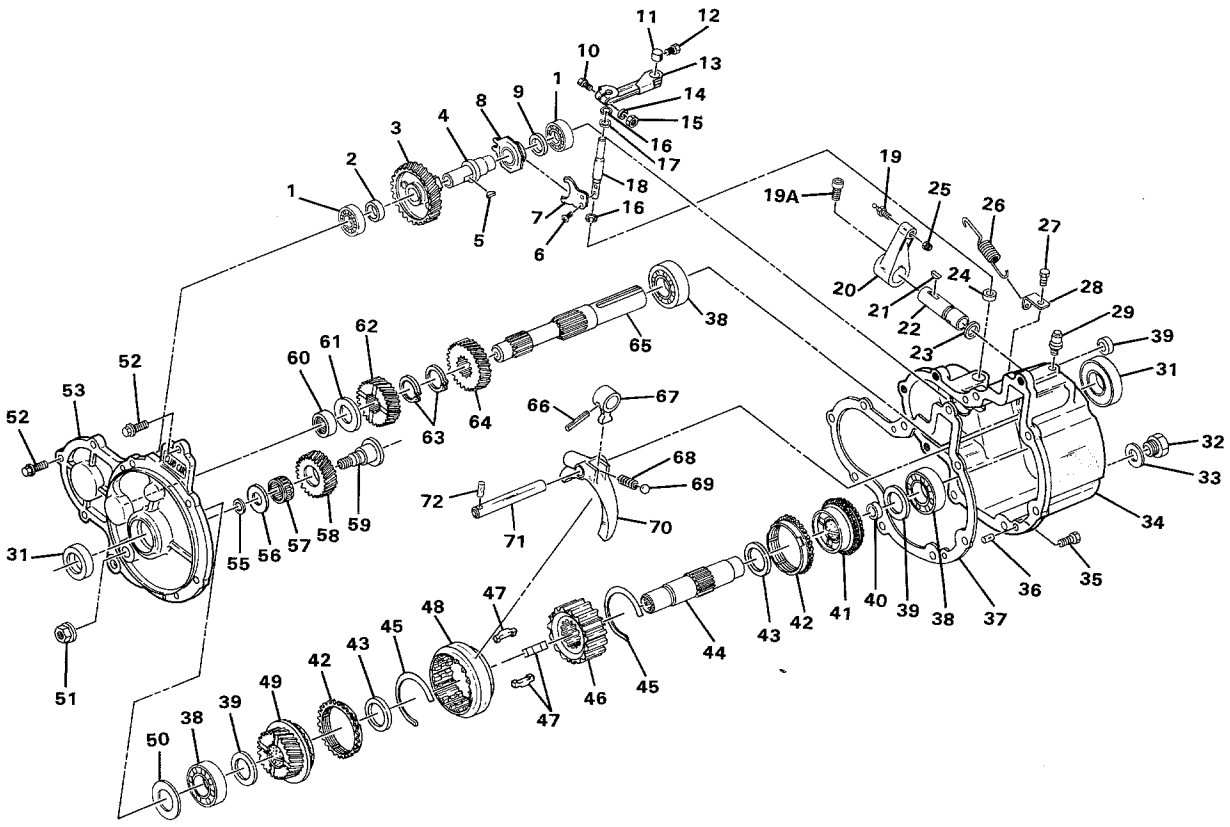

Figure 10-2 — Transmission and Governor Assembly

WARNING:

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/ connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

Moving parts — do not attempt to service the vehicle with engine running.

1. Remove seat and access panel.
2. Remove drive belt (See Section IX - Torque Converter).
3. With transmission in forward or reverse, remove retaining bolt on driven clutch **(Figure 10-3)**. Put transmission back in neutral after bolt removal.

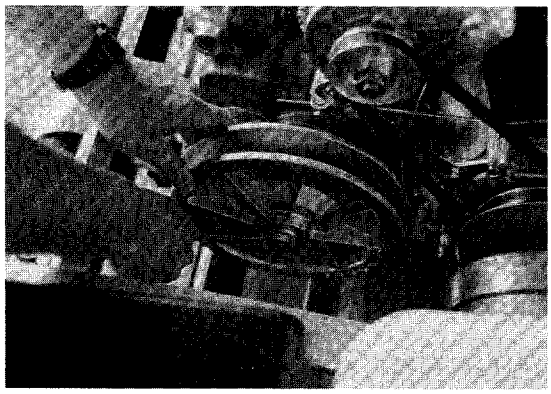

Figure 10-3

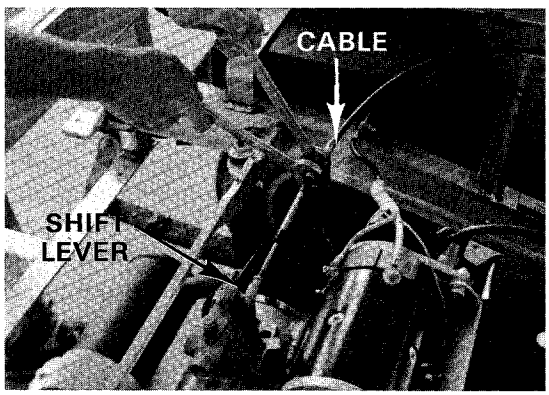

Figure 10-4

4. Remove driven clutch and key from transmission shaft.
5. Disconnect F&R shift cable from transmission lever **(Figure 10-4)**.
6. Remove transmission shifter arm (20).
7. Loosen bolt (12) on governor arm (13).
8. Remove four retaining bolts holding transmission to drive unit and slide transmission free from drive unit and governor rod **(Figure 10-5)**.

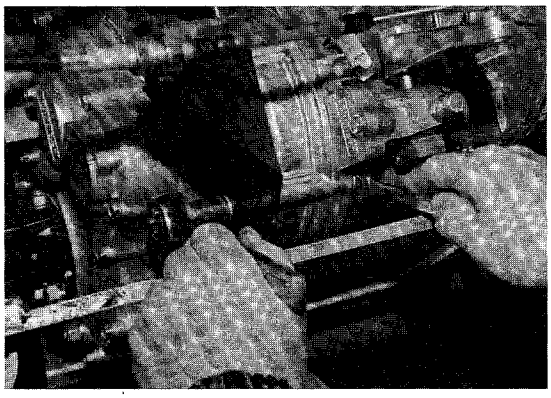

Figure 10-5

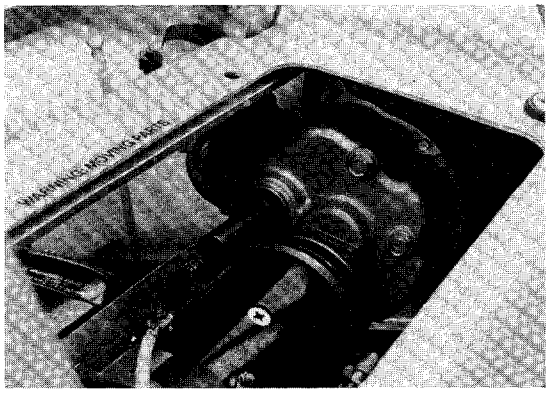

Figure 10-6

9. With transmission free, rotate transmission 180° from its mounted position as shown in **Figure 10-6**. Bring input shaft of transmission up and over the starter-generator while bringing it forward through seat opening.

DISASSEMBLY

If transmission is disassembled, the following tools will be required for reassembly:

1. Transmission oil seal tool, CLUB CAR part # 1014160
2. Governor shaft cap jig, CLUB CAR part # 1014104
3. Oil seal press jig, CLUB CAR part # 1014105
4. Internal governor arm alignment tool, CLUB CAR part # 1014107
5. External governor arm alignment tool, CLUB CAR part # 1014106

All of these tools are available in a transmission tool kit, CLUB CAR part # 1014115 **(Figure 10-7)**.

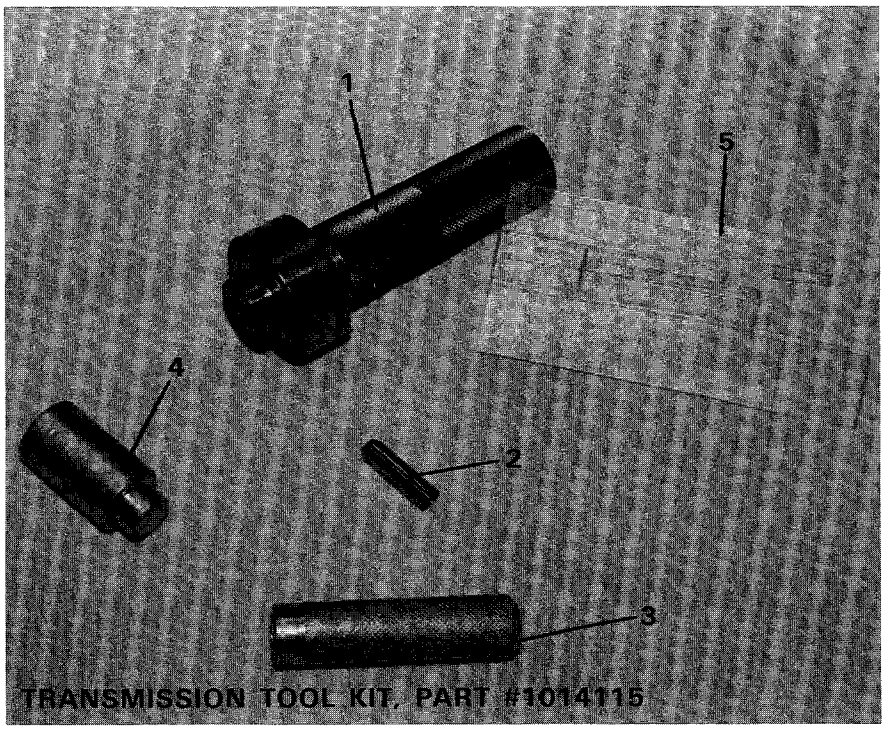

Figure 10-7

1. Remove drain plug (32) and gasket (33) and drain and dispose of oil properly **(Figure 10-2)**.
2. Remove spring bracket (28) and governor spring (26).
3. Remove external governor arm (13) by loosening nut (15) and sliding off governor shaft (18).
4. Secure transmission in a vise by clamping onto the clutch shaft. Use wood blocks between the shaft and the jaws of the vise to protect the shaft from damage.
5. Remove five retaining bolts (35 & 52) from the cover (53) of the transmission and remove the cover.
6. Remove gasket (37) and discard.

7. Remove the input shaft thrust washer (61) and the input shaft reverse gear (62).
8. Remove the main cluster (38-49) and the shift arm subassembly (66-72).
9. Release the jaws of the vise and remove the input shaft subassembly (38, 63-65).

Governor Disassembly

1. Remove entire governor gear assembly (1-5, 8, 9) by placing finger under governor gear (3) and pushing on weights to hold governor sleeve (8) in place **(Figure 10-8)**.
2. Remove spacer (9) and governor sleeve (8).
3. Remove bearing (1), spacer (2) and governor gear (3) from governor shaft (4) by pressing off.

CAUTION:

Do not press against bearing outer race.

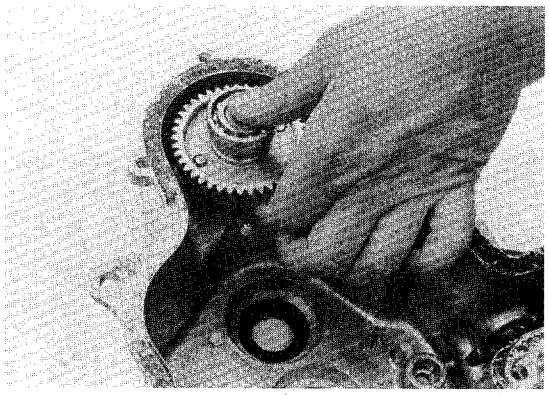

Figure 10-8

4. Remove key (5) from governor shaft (4).
5. Remove bearing (1) by tapping on gear case with a plastic hammer.
6. Remove two screws (6) from governor arm shaft (18) and remove internal governor arm (7).
7. Remove lower retaining ring (16) from governor arm shaft (18).

CAUTION:

Use care when removing lower retaining ring (16) to avoid causing burrs on governor arm shaft (18).

8. Remove governor arm shaft (18) by rotating back and forth. Oil seal (24) and upper retaining ring (16) will be removed with shaft.

CAUTION:

Do not use excessive force when removing governor arm shaft. Pulling sideways may damage or bend the shaft.

9. Remove upper washer (17) from governor arm shaft bore **(Figure 10-9)**.
10. Remove upper retaining ring from governor arm shaft (18).

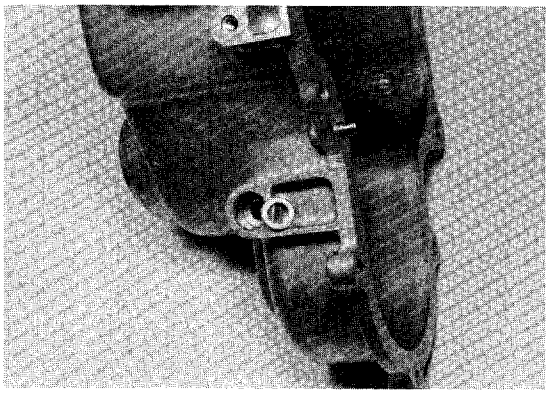

Figure 10-9

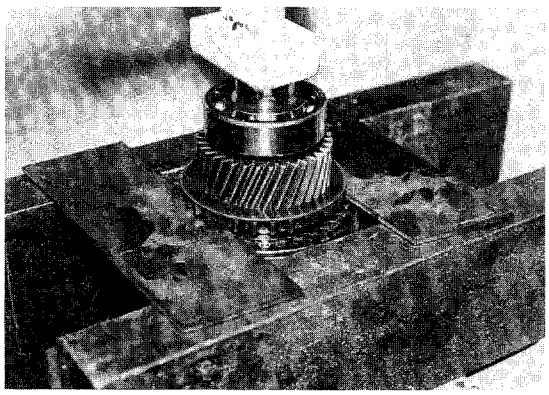

Figure 10-10

11. Remove and discard oil seal (24).

Main Cluster Disassembly

1. Place two flat bars no more than a .100 of an inch thick between the reverse gear (49) and synchronizer ring (42). Press on shaft and remove bearing (38), thrust washer (39), reverse gear (49), synchronizer ring (42) and thrust washer (43) **(Figure 10-10)**.
2. Slide clutch hub assembly (45-48) off shaft (44).

3. Place two flat bars no more than .100 inches thick between synchronizer ring (42) and forward gear (41) and press on shaft end using a socket. Remove bearing (38), thrust washer (39), forward gear (41), thrust washer (43) and synchronizer ring (42).

Clutch Hub Disassembly

1. Remove the two synchro springs (45) from both sides of the clutch hub assembly.
2. Slide the sleeve (48) off the clutch hub (46).
3. Remove the synchro inserts (47).

Input Shaft Disassembly

1. Using an external snap ring pliers, remove the two snap rings (63) from the input shaft (65).
2. Remove the input gear (64).
3. Press the bearing (38) off the shaft (65).

Shift Arm Disassembly

1. Remove shift rod (71).
2. Remove shifter ball (69) and shifter spring (68).
3. Remove roll pin (72).

Transmission Housing Disassembly

1. Press oil seal (31) from input shaft bore **(Figure 10-11)**.

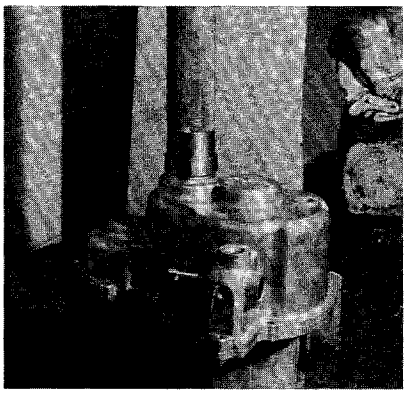

Figure 10-11

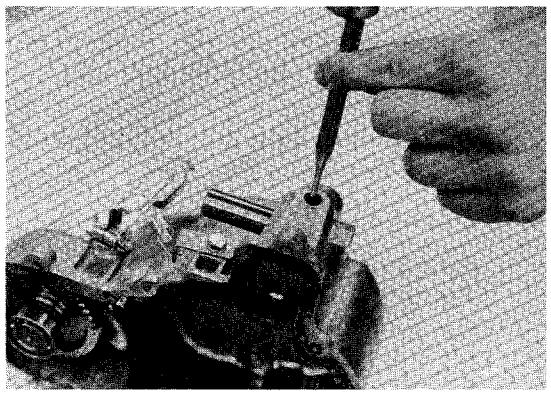

Figure 10-12

2. Remove air breather (29) and clean.
3. Remove roll pin (66) through air breather hole using a 5/32 inch punch **(Figure 10-12)**.

CAUTION:

Use of another size punch may damage the roll pin. This could make the removal of the roll pin very difficult.

4. Remove shifter shaft (22) and "O" ring (23) from shifter shaft.
5. Remove shifter arm lever (67).

Cover Disassembly

1. Remove flange nut (51) from cover (53).
2. Press idler shaft (59) out.
3. Remove "O" ring (55), thrust washer (56), needle bearing (57) and reverse idler gear (58) from idler shaft (59).
4. Press oil seal (31) from output shaft bore.

5. If needle bearing (60) is damaged, insert a flathead screwdriver between the outer race and retainer of the needle bearing **(Figure 10-13)**. Press in screwdriver by tapping on the end of the screwdriver and wrench the retainer free **(Figure 10-14)**. Remove the retainer and bearings and discard.

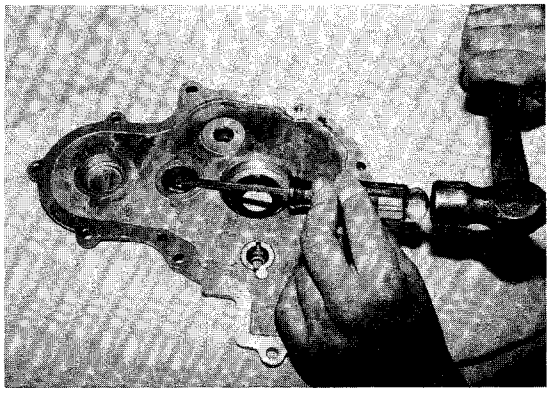

Figure 10-13

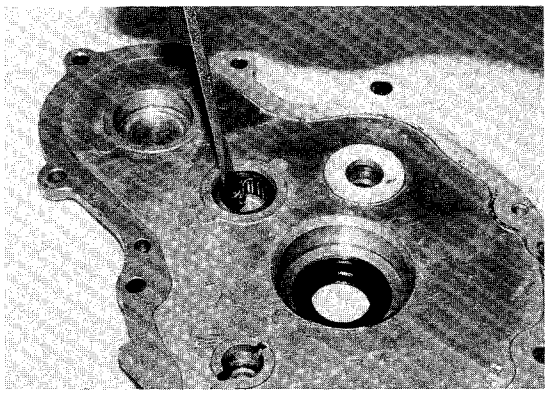

Figure 10-14

6. To remove the outer race, put a few drops of a loosening agent between the outer race and bearing seat. Use a slide hammer to remove the outer race and discard.

CAUTION:

If transmission cover is damaged or outer race of bearing cannot be removed, a new cover and bearing must be installed.

INSPECTION

1. Clean and inspect all components. Damaged or worn parts must be replaced.
2. Inspect all bearings and replace if:
   - rotation is not smooth
   - it is abnormally noisy
   - it is rusted, worn or there is a crack in the bearing
   - there is abnormal axial play
   - there is abnormal color change
   - there is extreme wear and pitting on the needle, ball or on the rolling surface
3. Gears should be inspected for tooth surface damage or fractures.

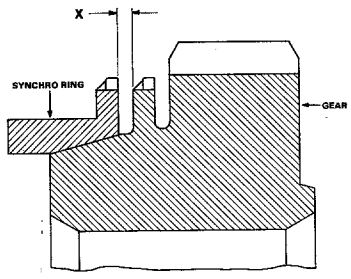

Figure 10-15 — Synchro Ring Clearance

4. Synchro teeth should be inspected for fractures, severe wear or damage.
5. Synchro-cone on forward and reverse gear should be checked for a rough or damaged surface.
6. Measure the distance **X** by pushing the synchro ring (42 & 43) onto the respective gear (49 & 41) **(Figure 10-15)**. The synchro ring should be replaced when **X** is .020 inches or less.
7. Thrust washer (43) clearance between shaft and inner diameter must be less than .008 inches. Replace if greater than .008 inches.
8. The governor sleeve (8) should be inspected. If the thickness, **t**, is less than .040 inches, replace the sleeve **(Figure 10-15)**.
9. Inspect clutch hub (46), inserts (47) and sleeve (48) and replace if severe wear or damage exists.
10. Inspect the shift rod (71) and replace if the diameter is less than .276 inches.
11. All oil seals should be replaced.

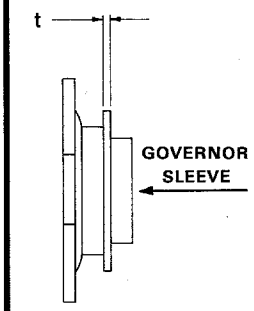

Figure 10-16 — Governor Sleeve Thickness

ASSEMBLY

Transmission Housing Assembly

1. Press oil seal (31) into the input shaft bore using transmission oil seal tool, CLUB CAR part # 1014160, until tool contacts housing surface.
2. If dowel pins (36) were removed, press new dowel pins into holes until the pin protrudes from the gasket surface .275 inches.

Cover Assembly

1. Press oil seal (31) into the output shaft bore using transmission oil seal tool, CLUB CAR part # 1014160. Oil seal should be flush with the outside cover surface.
2. Install the reverse idler gear (58), needle bearing (57), thrust washer (56) and "O" ring (55) onto the idler shaft.
3. If needle bearing (60) was removed. press in a new bearing.

CAUTION:

Do not press against inner race of bearing.

NOTE: Apply oil to needle bearing and grease around the "O" ring.

4. Install the idler shaft assembly into the cover. Torque nut to 36-50 ft.-lbs. Be sure reverse idler gear rotates freely **(Figure 10-17)**.

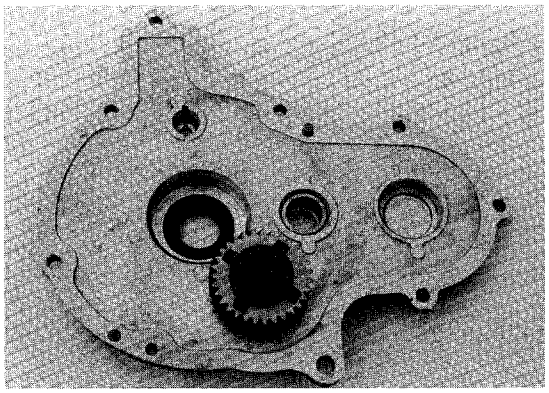

Figure 10-17

Input Shaft Assembly

1. Install the input gear (64) on input shaft (65). Install the two snap rings (63) onto the input shaft.

NOTE: The flat surface of the input gear should face the snap ring.

2. Press bearing (38) up against the input gear (64) on the input shaft.

Clutch Hub Assembly

1. Install the clutch hub (46) into the sleeve (48).
2. Install the three synchro inserts (47) with the lip of the synchro inserts facing the center of the hub. Hold the synchro inserts in place from underneath.
3. Install the synchro spring (45) under the lip of all three synchro inserts **(Figure 10-18)**. Install the other synchro spring on the other side of the clutch hub.

NOTE: The hooked end of the synchro spring should touch the inside of the sleeve.

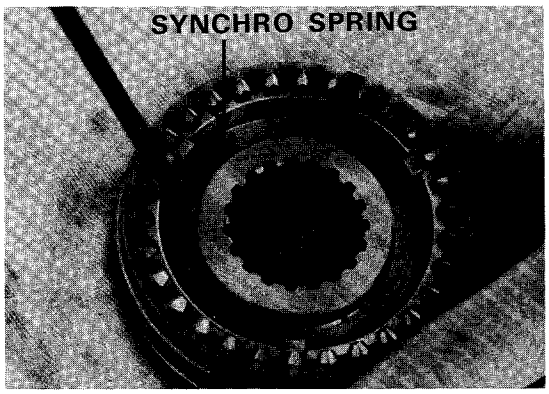

Figure 10-18

Main Cluster Assembly

NOTE: Apply transmission oil to the inside of gears (49 & 41) and synchronizer rings (42).

1. Install thrust washer (43), gear assembly (49) (wider gear), thrust washer (39) and ball bearing (38) on the end of the output shaft with the inner splines. Be sure gear rotates freely.
2. Install the synchronizer ring (42) on to the reverse gear (49).
3. Install the assembled clutch hub and sleeve on to the output shaft (44).
4. Install thrust washer (43), synchronizer ring (42), forward gear (41), thrust washer (39) and ball bearing (38) to the other end of the output shaft.

NOTE: Check to be sure the sleeve (48) can slide on the clutch hub (46).

Shifter Arm Assembly

1. Install roll pin (72) into shift rod (71) bore with pin protruding equally on both sides of rod (approximately .100 inches).
2. Install shifter spring (68) and shifter ball (69) into bore of shifter arm (70). With long arm of shifter arm on your right, push the shift rod (71) into the bore of the shifter arm (70). Using a punch to depress the shifter ball, insert the shift rod (71) to the center (Neutral) detent position.

Governor Assembly

1. Place upper washer (17) into governor shaft bore.
2. Install upper retaining ring (16) on to the governor arm shaft (18).
3. Lubricate the governor arm shaft (18) and governor shaft bore with new transmission lubricant.

NOTE: Grease or other lubricant should not be used.

4. Insert the governor arm shaft (18) in to governor shaft bore.
5. Install the lower snap ring (16) on to the governor arm shaft. Check to be sure the governor arm shaft rotates freely.
6. To install the oil seal (24), the governor shaft cap jig, CLUB CAR part # 1014104, and the oil seal press jig, CLUB CAR part # 1014105, are required. Place the governor shaft cap jig on the governor arm shaft. Slide the new oil seal (24) over the tool until the oil seal contacts the housing **(Figure 10-19)**. Remove governor shaft cap jig and use the oil seal press jig to push oil seal (24) into place **(Figure 10-20)**.

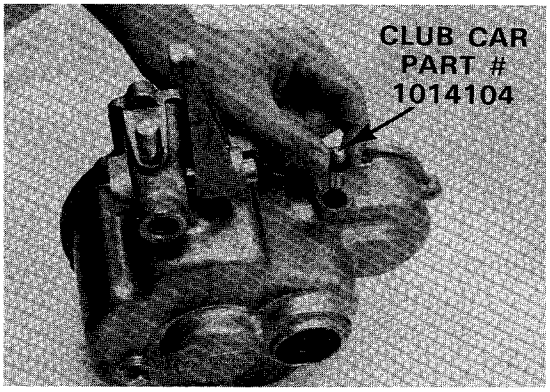

Figure 10-19

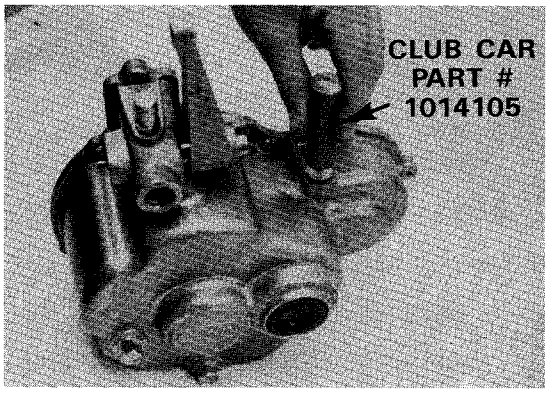

Figure 10-20

7. Press the ball bearing (1) into the housing (34).

CAUTION:

Do not press against inner race of bearing.

8. Install the internal governor arm alignment tool, CLUB CAR part # 1014107, into the inner race of ball bearing (1) **(Figure 10-21)**.

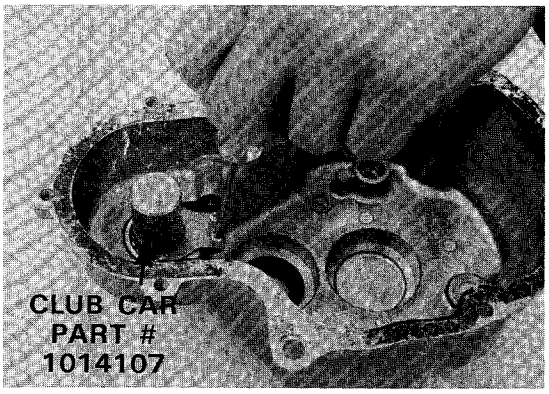

Figure 10-21

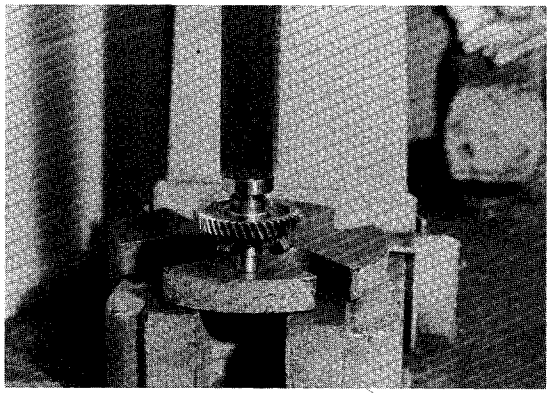

Figure 10-22

9. Place the internal governor arm (7) around the internal governor arm alignment tool. Install the two screws (6) with a drop of thread locking adhesive. Torque screws to 26 in.-lbs. Remove the internal governor arm alignment tool.

NOTE: Any excessive thread locking adhesive must be wiped off.

10. Install key (5) onto governor shaft (4) and install governor gear (3), thick spacer (2) and press bearing (1) onto shaft **(Figure 10-22)**.

CAUTION:

Do not press on outer race of bearing.

11. Hold the governor gear (3) with weights hanging down and insert governor sleeve (8) into weights while aligning the notch on sleeve with alignment pin **(Figure 10-23)**. Turn gear (3) over holding sleeve (8) in position and slide thrust washer (9) onto governor shaft (4).

NOTE: Check to be sure governor weights are inserted in governor sleeve properly.

12. Turn governor gear assembly over while holding thrust washer (9) and sleeve in place and install shaft into bearing (1) **(Figure 10-24)**.

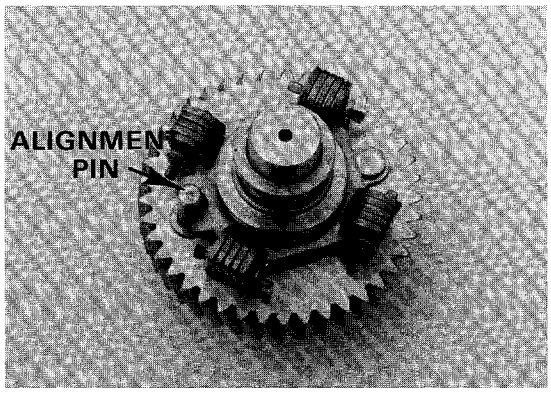

Figure 10-23

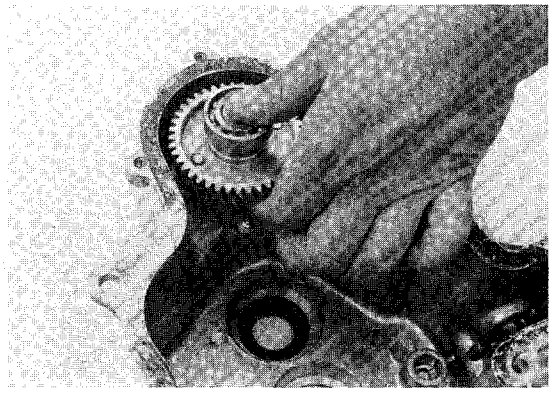

Figure 10-24

ASSEMBLY

1. Install "O" ring (23) in groove onto shifter shaft (22).
2. Hold shifter arm lever (67) inside case, with cam side facing towards the case, and install shifter shaft (22).
3. Install roll pin (66) through shifter arm lever (67) and shifter shaft (22) using a 5/32" punch.
4. Install air breather (29).
5. Install assembled input shaft into housing. Be sure bearing is fully seated into housing.
6. With output splines of main cluster assembly facing up, install the assembled shift arm onto the sleeve of the main cluster.
7. Install the main cluster in the housing. When installing, align the main cluster ball bearing (38) with the bearing bore in transmission housing and at the same time align the shift rod with its bore in the housing. Also seat the end of the shifter arm lever (67) into the socket of the shifter arm (70).
8. Install the gear (62) on to the input shaft.
9. Measure the distance from the gasket surface of the housing to the side of gear (62) **(Figure 10-25)**. Use the chart to determine which thrust washer to use.

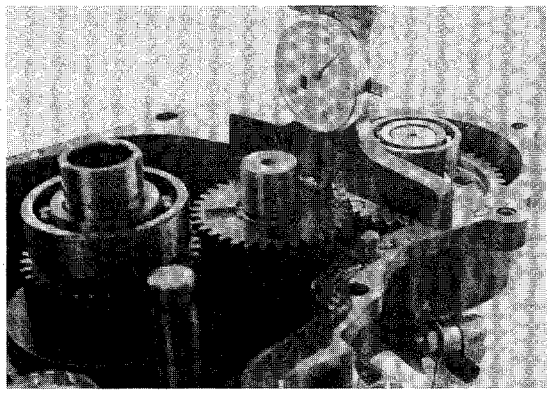

Figure 10-25

Measured Distance (in.)	THRUST WASHER CLUB CAR Part Number
less than .1260	1012723
more than .1260 but less than .1378	1012724
more than .1378	1012725

10. Install a new gasket (37) on the housing (34).

NOTE: Be sure gasket surface has been thoroughly cleaned.

11. Install assembled cover to housing. Reverse idler gear will mesh with input and output gears.
12. Install bolts (52 and 35) and torque to 5-7 ft.-lbs.
13. Install the governor arm pivot (11) to the external governor arm (13) with bolt (12).
14. Install bolt (10), washer (14) and nut (15) to external governor arm (13).
15. Place the external governor arm (13) on to the governor arm shaft (18). Do not tighten nut (15).
16. Place the external governor arm alignment tool on the transmission, CLUB CAR part # 1014106 **(Figure 10-26)**.
17. Press the external governor arm (13) until 0.27 inches of the governor arm shaft (18) extends above the governor arm.

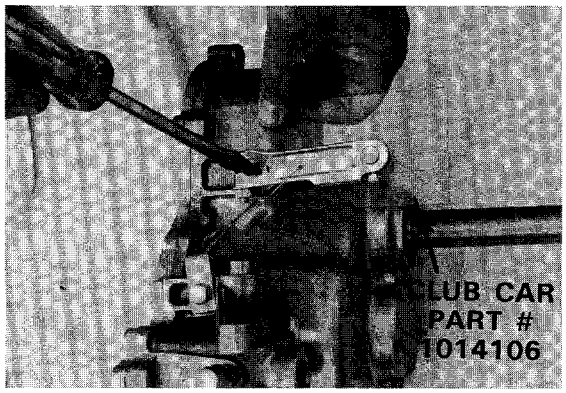

Figure 10-26

18. Using a flathead screwdriver, rotate the governor arm shaft (18) counterclockwise until it stops.
19. Align the external governor arm (13) with the red line on the external governor arm alignment tool. The red line should be in the center of the external governor arm shaft **(Figure 10-26)**. Before tightening, be sure the external governor arm is .27 inches below the top of governor arm shaft (18), and governor arm shaft (18) is in full counterclockwise position. Tighten nut (15) to 35-52 in.-lbs.

CAUTION:

Be sure steps 16-19 are followed carefully and exactly or the governor will not operate properly and possible damage to the engine may result.

20. Hook the governor spring (26) to the external governor arm (13).
21. Install the spring bracket (28) with bolt (27) but do not tighten bolt (27). Hook spring (26) to the spring bracket (27).
22. Position spring bracket so the spring is stretched approximately 0.10-0.12 inches in the assembled position. Tighten bolt (27) to 52 in.-lbs. with spring in this position.
23. Install the lower drain plug (32) and gasket (33) and torque to 25 ft.-lbs.
24. Install 20 ounces of 80-90 wt. API class GL-3 or 80-90 wt. AGMA 5 EP gear lube to transmission.
25. Install upper fill plug and gasket and torque to 25 ft.-lbs.

INSTALLATION

1. Install governor rod to transmission external governor arm and install the transmission to the spline of the drive unit.
2. Install the three retaining bolts, washers, F&R shifter cable bracket and nuts and mount the transmission to the drive unit. Torque nuts to 75-95 in.-lbs.
3. Install the short bolt into transmission and torque to 17 ft.-lbs.
4. Install the transmission shifter arm (20) **(Figure 10-2)**.
5. Connect the F&R shift cable to the transmission shifter arm.

6. Install driven clutch and key on transmission input shaft.
7. Install bolt with lockwasher and flatwasher and torque to 12-14 ft.-lbs.
8. Install drive belt. (See Section IX - Torque Converter.)
9. Install seat and access panel.
10. See Governor Rod Adjustment, Section VII - Fuel System.

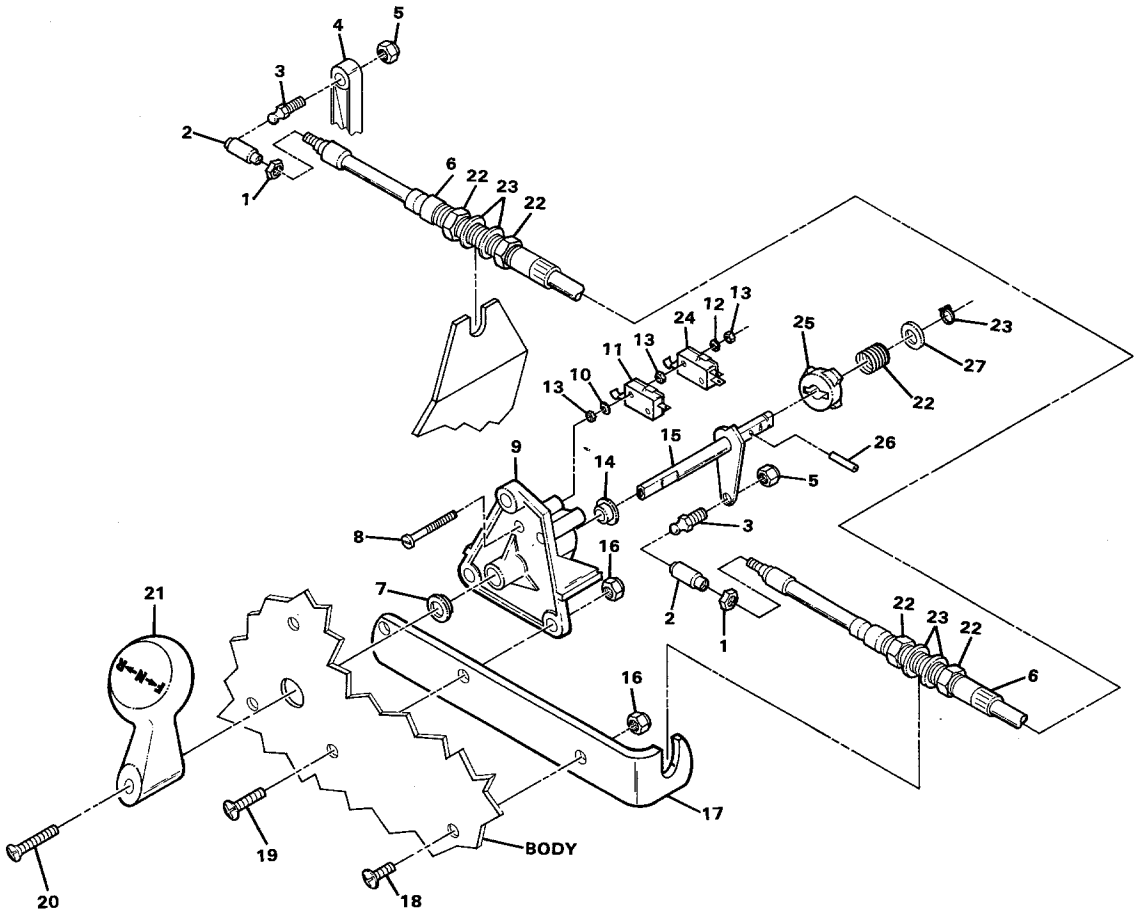

Figure 10-27 — F&R Shifter Assembly

F&R SHIFTER CABLE

If the F&R shifter cable is jammed or is damaged in any way, it must be replaced.

REMOVAL

1. Remove the ball joint socket (2) from the F&R shifter assembly (3) **(Figure 10-27)**.
2. Remove the ball joint socket (2) from the shift lever (4) on the transmission.
3. Loosen the retaining nuts (22) on both ends of the cable.
4. Remove cable from car.

INSTALLATION

1. Position cable under intake expansion chamber and back to transmission.
2. Install cable with retaining nut (22) and washer (23) on each side of the shift cable support bracket at the drive unit.
3. Install cable with retaining nut (22) and washer (23) on each side of the shift cable support bracket at the F&R shifter assembly.

4. Install the ball joint socket (2) on the shift lever (4) on the transmission.
5. Install the ball joint socket (2) on the F&R shifter assembly (3 and 5).

ADJUSTMENT

With the shift lever (4) of the transmission in neutral (straight up), the F&R handle (21) should be straight up. For minor adjustments the nut (1) may be loosened and the ball joint (2) rotated in the proper direction to get the proper adjustment.

CAUTION:

Be sure threads of rod are engaged in ball joint at least ¼ of an inch. If ball joint comes loose from the cable, the F&R shifter will not operate properly.

For major adjustments, the cable retaining nuts (22) must be loosened and adjusted. When the cable is properly adjusted, with the F&R handle (21) in the neutral (straight up) position, the shift lever (4) of the transmission will be in the neutral (straight up) position, also.

SECTION XI - DRIVE UNIT

GENERAL INFORMATION

Cars with a serial number greater than AG8611-92459 were equipped with drive unit, CLUB CAR part # 1013664 as original equipment.

CLUB CAR DRIVE UNIT, PART NUMBER 1013664

LUBRICATION

There are two plugs located on the lower half of the drive unit housing. The upper one, when drive unit is in horizontal position, is used as a level indicator. The lube level should be even with the bottom of the hole. The lower plug is for draining the lube. When draining the lube, the level plug should be removed to drain faster. Be sure drain plug is reinstalled before filling. Torque plugs to 18-25 ft.-lbs. Using funnel, fill drive unit with lube through level indicator hole. Fill with 22 oz. 80-90 WT. API Class GL-3 or 80-90 WT. AGMA Class 5 EP gear lube.

The lubricant level in the drive unit should be checked every six months or after each season.

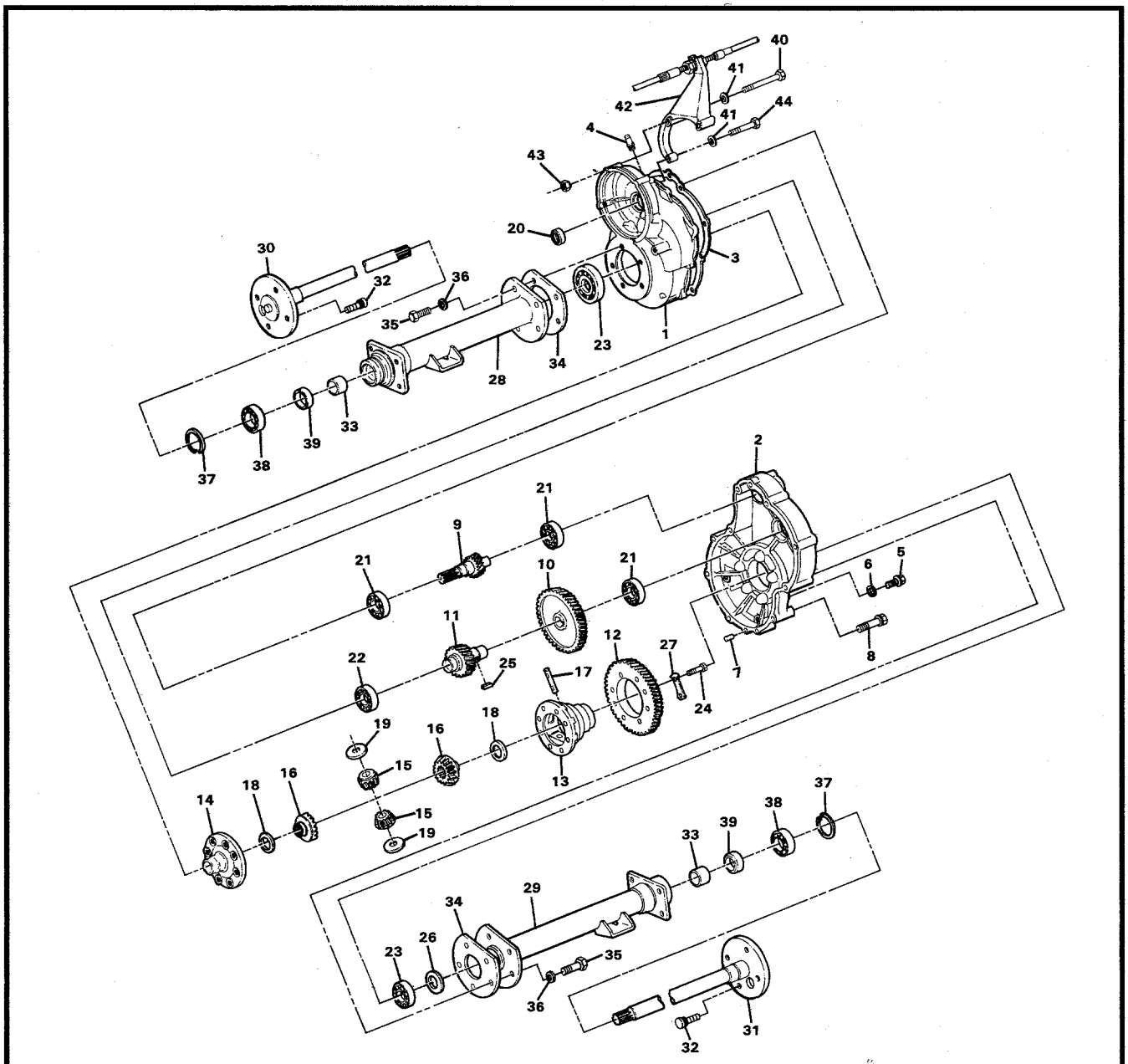

Figure 11-1 — CLUB CAR Drive Unit Assembly, Part Number 1013664

AXLE SHAFT

Removal

WARNING:

Only trained people should repair or service this vehicle. All people doing even small repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

Lift only one end of vehicle at a time. Chock the wheels and lock brakes prior to lifting. Use a suitable lifting device (i.e., chain hoist, hydraulic floor jack) with 1000 lb. minimum lifting capacity. DO NOT use lifting device to hold vehicle in elevated position. Always use approved jack stand of proper weight capacity to support vehicle.

1. Lift rear of car with chain hoist or floor jack, place chocks at front wheels. Place jack stands under axle tubes to support car.
2. Remove rear wheel and brake drum.
3. Remove internal retaining ring (37) from axle tube using internal snap ring pliers **(Figure 11-2)**.

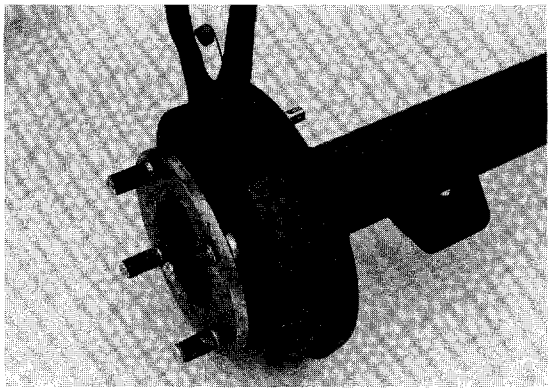

Figure 11-2

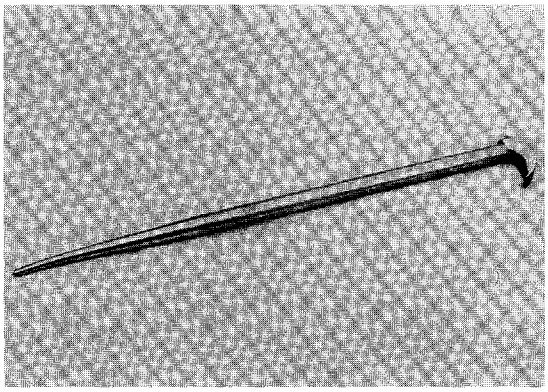

Figure 11-3

4. Axle, retaining ring and bearing assembly can now be removed by pulling axle straight out of housing.
5. Remove oil seal using 16" rolling wedge bar **(Figure 11-3)** by inserting underneath seal lip and prying seal out **(Figure 11-4)**.

CAUTION:

Do not scar or damage inner tube surfaces when removing oil seal, or tube may have to be replaced.

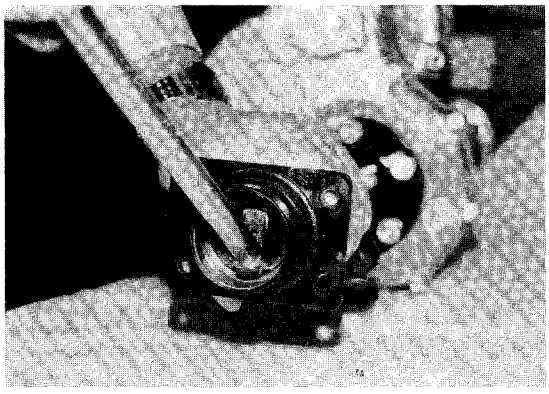

Figure 11-4

6. Inspect bearing (38). If bearing is damaged or worn, replace.

Bearing Removal

CAUTION:

If bearing is removed, it must be discarded and replaced.

Collar should only be removed twice. After the third removal, the shaft and collar will not give the proper fit.

Do not tighten bearing puller wedge attachment against axle shaft. It may damage axle shaft when pressing bearing and collar off.

1. Place bearing puller wedge attachment, CLUB CAR part # 1012812, on axle shaft between wheel mounting flange and bearing.
2. Press off the bearing (38) and collar (33) together **(Figure 11-5)**.

NOTE: It may be necessary to heat collar (33) to remove.

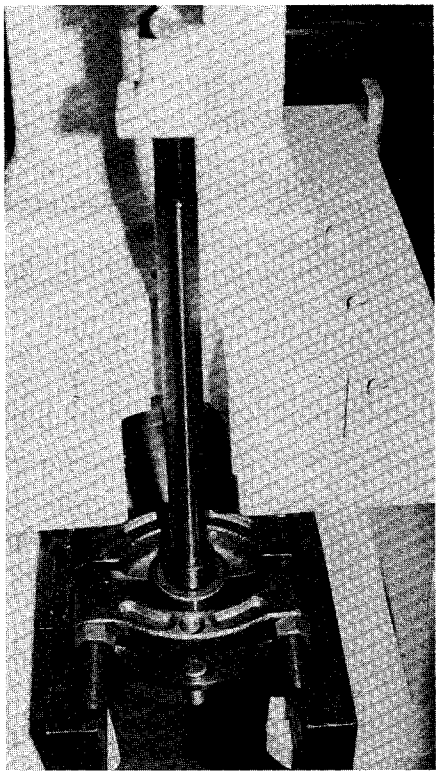

Figure 11-5

Bearing Installation

1. Place the snap ring (37) on shaft (30 or 31) if it was removed.
2. Apply two drops of Loctite® 271 to inside of collar (33).

CAUTION:

Apply Loctite® 271 to inside of collar, NOT TO SHAFT, so that Loctite® will be pushed away from bearing as collar and bearing are pressed on.

If Loctite® gets into or on bearing, bearing will have to be replaced.

3. Place bearing (38) and collar (33) on shaft.

NOTE: Bearing (38) is a sealed bearing.

CAUTION:

Do not tighten bearing puller wedge attachment against axle shaft in Step 3. It may damage axle shaft when pressing bearing and collar on.

4. Place bearing puller wedge attachment against collar (33) and press both the bearing (38) and collar (33) on.

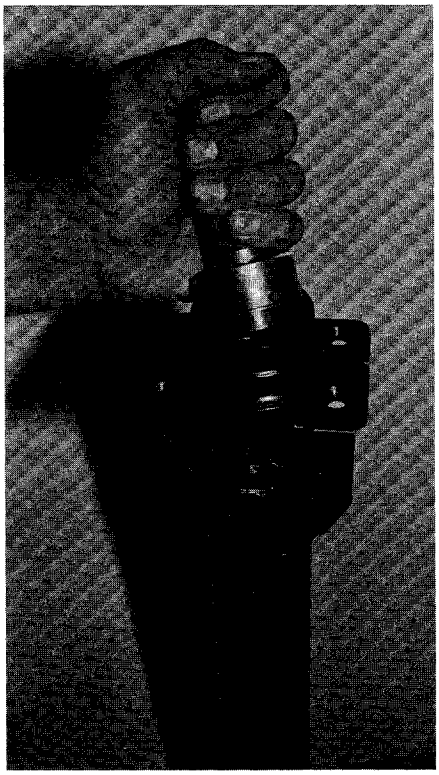

Figure 11-6

Installation

1. Clean bearing seat in axle tube (28 and 29) **(Figure 11-1)**.
2. Install new seal (39) in axle tube (28 and 29) with seal lip facing away from bearing. Place seal in tube and use drive unit axle seal tool, CLUB CAR part # 1014162, to press in with an arbor press until seal seats firmly **(Figure 11-6)**.
3. Clean splines and insert shaft (splined end first) through seal being careful not to damage seal. Advance shaft through inner bearing, rotate to align shaft splines with splined bore of differential side gear and push shaft in until bearing seats against shoulder in axle tube.
4. Install retaining ring (37) in axle tube with pliers.

WARNING:

Be sure retaining ring is properly seated in groove. If ring is not properly installed in ring groove, the axle assembly will separate from the drive unit and damage axle assembly and other components. Loss of vehicle control could result and cause severe personal injury.

DRIVE UNIT

Removal

WARNING:

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

Lift only one end of vehicle at a time. Chock the wheels and lock brakes prior to lifting. Use a suitable lifting device (i.e., chain hoist, hydraulic floor jack) with 1000 lb. minimum lifting capacity. DO NOT use lifting device to hold vehicle in elevated position. Always use approved jack stand of proper weight capacity to support vehicle.

1. Lift rear of car with chain hoist or floor jack, place jack stands under frame side stringers on each side forward of each rear wheel. Lower lifting device to let jack stands support car **(Figure 11-7)**.

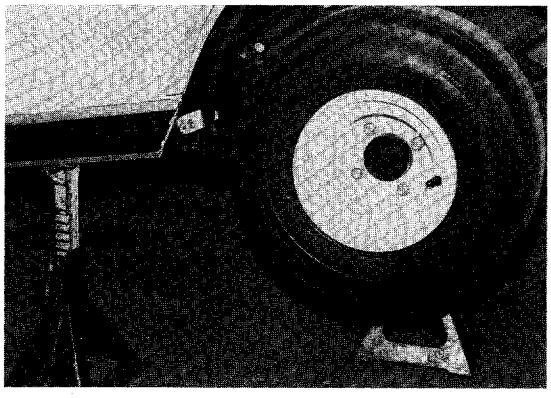

Figure 11-7

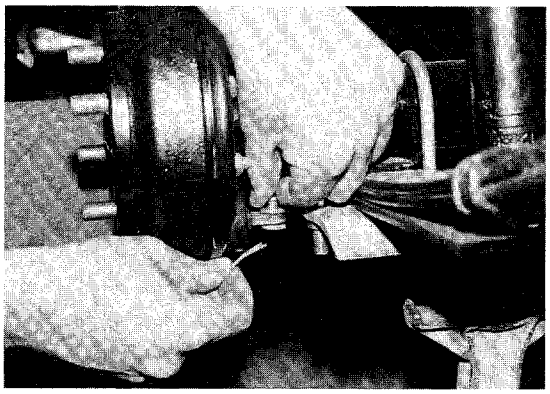

Figure 11-8

2. Remove wheels.
3. Remove cotter pins, brake cable clevis pins, cable retaining clips and disconnect brake cables **(Figure 11-8)**.
4. Remove shock absorbers from lower mounts **(Figure 11-9)**.

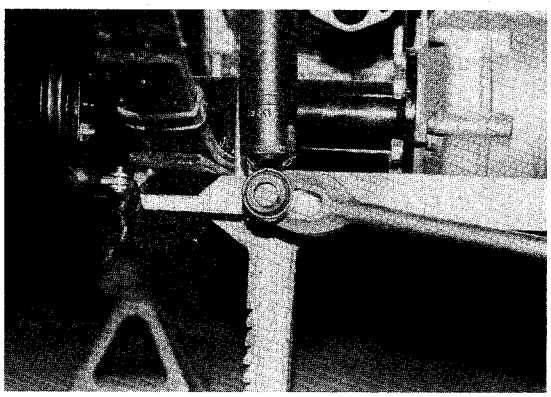

Figure 11-9

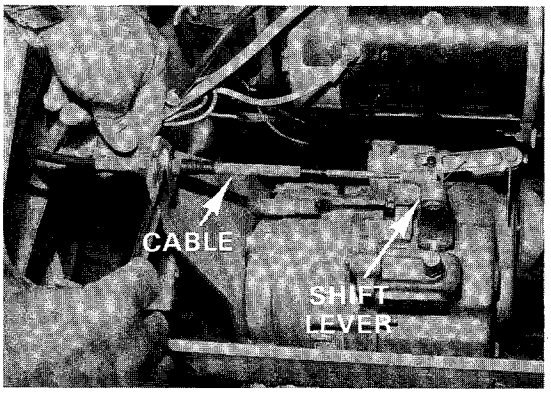

Figure 11-10

5. Remove transmission shifter cable assembly from bracket **(Figure 11-10)**.
6. Remove drive belt as described under Torque Converter, Section IX.

7. Remove governor rod from governor arm on transmission.
8. Remove bolts and nuts at exhaust pipe flange connection, remove bolts and nuts at muffler mounting bracket and remove muffler/bracket from car. See Exhaust System, Section VIII.
9. Place floor jack under engine mounting plate, raise slightly to make contact with engine mounting plate and place jack stands under inner frame spring retainer plates **(Figure 11-11)**.

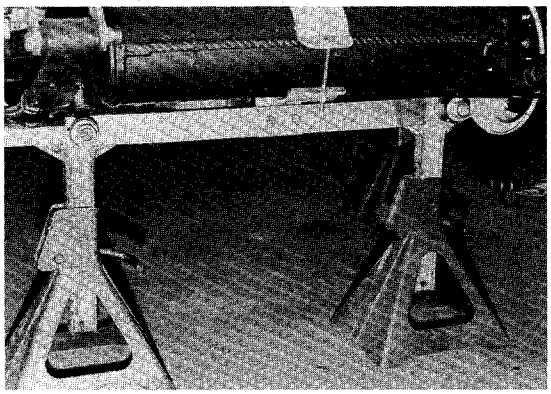

Figure 11-11

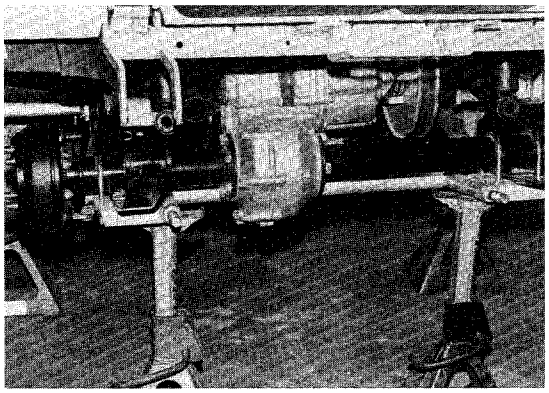

Figure 11-12

10. Remove lower spring shackle nuts and bolts.
11. Raise rear of car to permit leaf springs to clear shackles **(Figure 11-12)**.

CAUTION:

Drive unit assembly may rotate when both "U" bolts have been removed in step 12.

12. Remove nuts and lockwashers from "U" bolts on spring mounting plates.
13. Carefully remove drive unit, transmission and driven clutch as a unit from car.

Disassembly and Inspection

1. Remove driven clutch from transmission as described under Torque Converter, Section IX.
2. Remove transmission from drive unit as described under Transmission and Governor, Section X.
3. Drain lubricant from drive unit as described under Lubrication.
4. Remove axle shaft as described under Axle Shaft Removal.
5. If removal of brake assemblies is required, refer to Brakes, Section XIII.
6. To remove axle tube (28 and 29) from drive unit housing, unfasten nuts (35) and lockwashers (36) **(Figure 11-1)**.

NOTE: Shims are located between axle tube and differential cage bearing. Care should be used to avoid damaging shims. If shims are removed, set aside for reinstallation.

7. Remove seven bolts (8) which secure housing halves together.
8. Separate housings by pulling apart. If necessary, tap lightly on spline of input pinion with a rubber mallet to assist in separating halves.

CAUTION:

Use care in separating housings to prevent damage to mating housing seal surfaces.

9. Remove the input pinion gear by rocking intermediate gear assembly and pull input pinion gear out. Lift intermediate gear assembly and the differential cage gear unit simultaneously and remove **(Figure 11-13)**.

CAUTION:

Extreme care should be used when handling gears to avoid damage.

10. Remove bearings (21) from input pinion gear with bearing puller or arbor press. If oil seal (20) is damaged, replace.

CAUTION:

Do not reuse old bearings after removing, replace with new bearings.

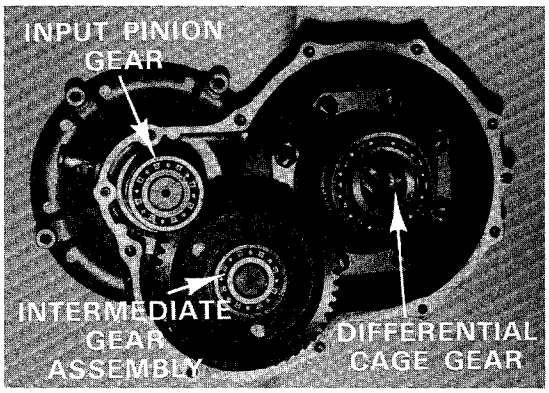

Figure 11-13

11. To disassemble intermediate gear assembly, press off bearing (21) and gear (10) together **(Figure 11-14)**.

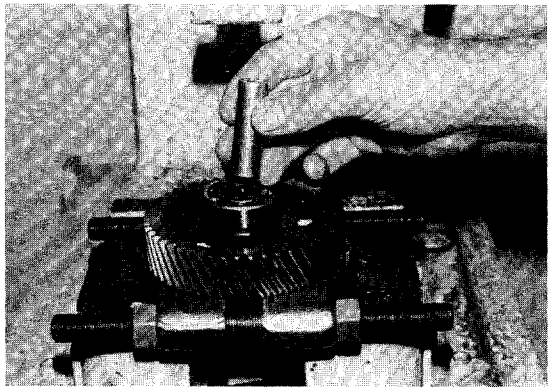

Figure 11-14

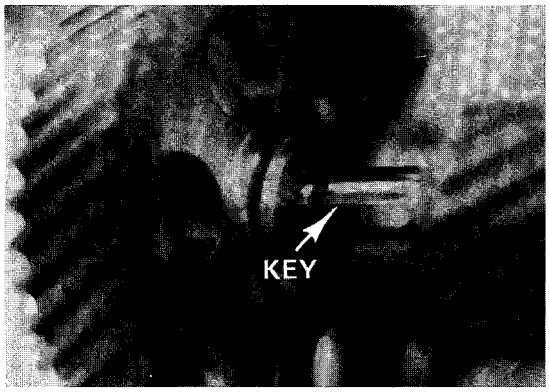

Figure 11-15

12. Remove the key (25) **(Figure 11-15)**.
13. Press bearing (22) off intermediate gear assembly.
14. Disassemble differential cage gear by bending down the bolt locking tabs (27) on the ring gear (12) **(Figure 11-16)**.

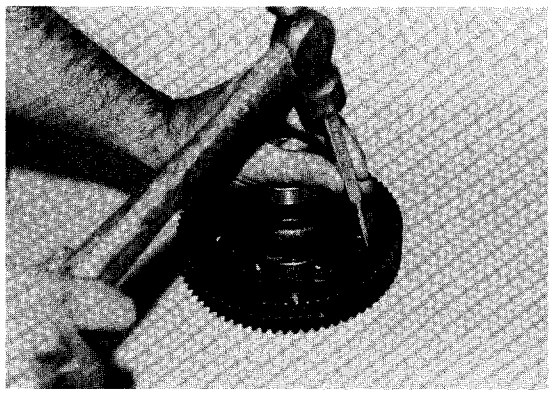

Figure 11-16

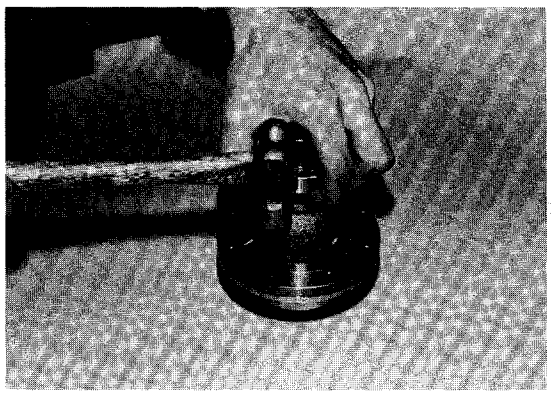

Figure 11-17

15. Remove eight hex bolts (24) which secure the ring gear (12) to the differential cage gear.
16. Remove ring gear (12). Retain dowel pin between the ring gear and differential cage for reassembly.
17. Separate housing of differential cage gear. If necessary, insert two of the hex bolts (24) back into differential gear unit. While holding slightly above bench, tap lightly on hex bolt head and differential cage gear will separate **(Figure 11-17)**. Remove bolts (24).

18. Remove differential pin (17) by pushing from one side **(Figure 11-18)**.
19. Remove idler gears (15) and thrust washers (19).
20. Remove differential side gears (16) and thrust washers (18) **(Figure 11-19)**.
21. Inspect bearings (23) of differential cage gear and replace if damaged. To remove, press bearings off.

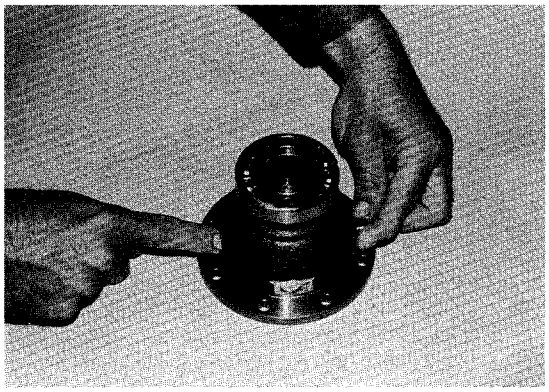

Figure 11-18

CAUTION:

Do not reuse old bearings after removing, replace with new bearings.

22. Inspect all parts for wear or damage. Any worn or damaged parts should be replaced.

NOTE: Damaged or worn gears should be replaced as sets.

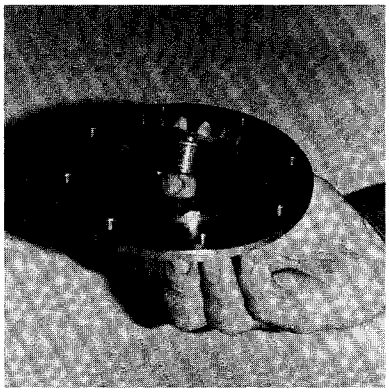

Figure 11-19

Assembly

NOTE: Gasket faces of housing must be clean and smooth. Gasket must not be torn or damaged in any way. Gasket must lay flat against gasket faces of housing.

All parts and housings should be wiped clean and dry before reassembly.

CAUTION:

Do not press against bearing outer race in Step 1.

1. If bearings (23) were removed during disassembly, reinstall new bearings (23) with a press.
2. Install differential side gears (16) with thrust washers (18) onto both halves of differential cage gear.
3. Install idler gears (15), thrust washers (19) and pin (17).
4. Apply a small amount of oil to all thrust washers and both ends of the pin (17).
5. Assemble the two halves of the differential cage gear (13 and 14) and reinstall the ring gear (12) while aligning dowel pin.
6. Reinstall the eight hex bolts (24) and the bolt locking tabs (27). Tighten bolts to 16-20 ft.-lbs. torque.
7. Bend up the edges of the bolt locking tabs (27) securely against flat of bold head to prevent the bolts from loosening and causing damage.
8. Press new bearing (22) onto intermediate gear assembly.
9. If large gear (10) was removed from intermediate gear, insert key (25) in shaft and press large gear (10) and bearing (21) onto shaft. Be sure key is properly positioned before attempting to press on large gear and bearing.
10. Press new bearing (21) onto input pinion gear.
11. Apply grease to lip of new oil seal (20) and install using drive unit pinion seal tool, CLUB CAR part # 1014161. Lip of oil seal should face to the inside of the drive unit housing. Make sure seal is firmly seated.
12. Install the differential cage gear, the intermediate gear assembly and the input pinion gear simultaneously. Be sure all bearings are firmly seated in the housing. Rotate the input shaft to check for smooth gear operation **(Figure 11-20)**.

13. Install both dowel pins (7) in place in drive unit housing (1) and place a new gasket (3) in position, aligning all holes.

14. Apply a gasket sealing compound to one side of the gasket and install the other half of the housing (2).

15. Install the seven bolts (8) and tighten to 60-78 in.-lbs. torque.

16. If axle tube (28 and 29) was removed, install shims (26) if they were removed during disassembly and new gasket (34) with gasket sealing compound on one side. Install tube (28 and 29) with five lock washers (36) and bolts (35). Torque bolts to 20-24 ft.-lbs.

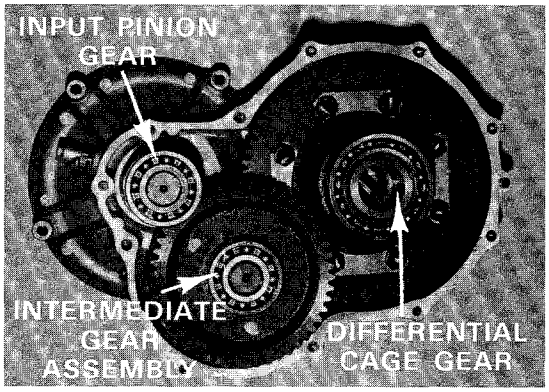

Figure 11-20

NOTE: If differential cage gear housing (13 and 14), drive unit housing (1 and 2) or axle tube (28 and 29) was replaced, see Shimming Procedure below.

17. Install brakes as described in Section XIII, Brakes.

18. Apply a small amount of grease to the lip of the oil seal (39). Clean splines on axle shaft (30 and 31) and insert shaft (splined end first) through seal being careful not to damage seal. Advance shaft through inner bearing, rotate to align shaft splines with splined bore of differential side gear and push shaft in until bearing seats against shoulder in axle tube.

19. Install retaining ring in axle tube with snap ring pliers.

WARNING:

Be sure retaining ring is properly seated in groove. If ring is not properly installed in ring groove, the axle assembly will separate from the drive unit and damage the axle assembly and other components. Loss of vehicle control could result and cause severe personal injury.

20. Be sure drain plug is installed, and torqued to 18-25 ft.-lbs. Using funnel, fill drive unit with lube through level indicator hole. Add 22 oz. of 80-90 WT. API Class GL-3 or 80-90 WT. AGMA Class 5 EP gear lube to drive unit.

21. Install transmission and F&R shifter cable bracket to drive unit as described under Transmission, Section X.

22. Install driven clutch as described under Torque Converter, Section IX.

SHIMMING PROCEDURE

If the differential cage (13 or 14), housing (1 or 2) or axle tube (28 or 29) has been replaced, the drive unit may need to be reshimmed. To determine whether reshimming is necessary, the drive unit must be completely assembled except for the short axle tube (29) and both axle shafts (30 and 31).

1. Stand the drive unit on the axle tube (28).

2. Using a depth gauge measure the distance from the gasket seal of the axle tube (gasket must be removed) to the outer race of the bearing (23) on the differential cage (13) **(Figure 11-21)**.

3. Use the chart below to determine whether shimming is required and, if so, how many shims should be used. Shims are CLUB CAR part # 1013781.

Distance from gasket seal surface to outer race of bearing (in.)	Shims Required
up to .134	0
.134-.142	1
.142-.150	2
.150-.155	3

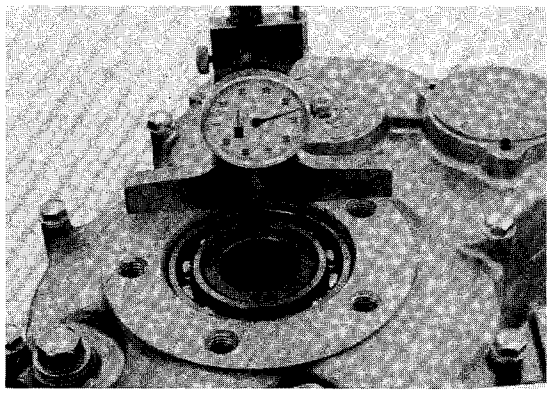

Figure 11-21

4. If shims are needed, they should be installed on top of the bearing (23) on the differential cage gear.
5. Install gasket (34) with gasket sealing compound on one side. Install the tube (29) with five lockwashers (36) and bolts (35). Torque bolts to 20-24 ft.-lbs.
6. Continue with Step 17 above.

Installation

1. With rear of car raised, jack stands in place, place drive unit assembly in position to engine inner frame.
2. Align center hole in saddle with pilot bolt in springs.
3. Install four "U" bolts, lockwashers and nuts. Use criss-cross sequence and tighten to 20-25 ft.-lbs. torque.
4. Lower main frame and guide leaf springs into rear spring shackles.
5. Insert bolts through spring shackles and bushings in leaf springs eyes and secure with locknuts.
6. If brake assemblies were removed, refer to Brakes, Section XIII to reinstall.
7. Reconnect brake cables.
8. Install transmission shifter cable bracket to drive unit and install shifter cable to bracket.
9. Install shock absorbers.
10. Install governor rod to governor arm and slide transmission in place and secure with four bolts. Adjust as described under Fuel System, Section VII.
11. Connect transmission shift cable assembly to shift lever on transmission.
12. Install muffler/pipe as described in Exhaust System, Section VIII.
13. Install drive belt on clutches as described under Torque Converter, Section IX.
14. Raise car sufficiently to remove jack stands, lower car to floor.
15. Install plug wire to spark plug, connect battery cables, positive (+) cable first.
16. Start engine, test drive car for proper operation.

SECTION XII
STEERING AND SUSPENSION

GENERAL INFORMATION

The steering is controlled by a steering wheel through a rack and pinion steering gear assembly.

The front suspension is composed of a transverse leaf spring assembly, two upper "A" frames with shock absorbers and two king pins attached to the front spindles.

The completely independent rear suspension is composed of two leaf springs controlled by two shock absorbers between the springs and frame. The engine is mounted on a free floating inner frame that moves with the suspension, with a rubber snubber mounted at the front of the inner frame to control inner frame motion.

STEERING

GENERAL INFORMATION

NOTE: There is no requirement for adjustment in the rack and pinion type gear. A spring loaded self adjusting mechanism is incorporated in the gear.

LUBRICATION

WARNING:

Only trained people should repair or service this vehicle. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Lift only one end of vehicle at a time. Chock the wheels and lock brakes prior to lifting. Use a suitable lifting device (i.e., chain hoist, hydraulic floor jack) with 1000 lb. minimum lifting capacity. DO NOT use lifting device to hold vehicle in elevated position. Always use approved jack stand of proper weight capacity to support vehicle.

Nine grease fittings are provided (one in each end of the "A" frame, one in the spindle housing, one in the ball joint on each end of tie rod and one in the ball joint of the steering drag link) and should be lubed every 90 days with a good quality chassis lubricant. (See Lubricant Chart, Section III).

CAUTION:

To insure proper lubrication of front suspension and steering linkages, raise front of vehicle to lubricate.

STEERING WHEEL

REMOVAL

WARNING:

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Lift only one end of vehicle at a time. Chock the wheels and lock brakes prior to lifting. Use a suitable lifting device (i.e., chain hoist, hydraulic floor jack) with 1000 lb. minimum lifting capacity. DO NOT use lifting device to hold vehicle in elevated position. Always use approved jack stand of proper weight capacity to support vehicle.

1. Remove operating instructions decal (18) from scorecard plate (20) to expose scorecard plate mounting screw (8) **(Figure 12-2)**.
2. Remove mounting screw (17) and scorecard plate (20).

3. Mark steering wheel position in relation to steering shaft so steering wheel can be replaced in exact position as originally installed.
4. Loosen steering wheel nut (23) and back off approximately ¼ inch. Do not remove yet.
5. Pull steering wheel loose from shaft with puller **(Figure 12-1)**.
6. Remove steering wheel nut (23) and washer (24) from shaft and remove steering wheel.
7. Dust seal (9) can be removed if necessary.

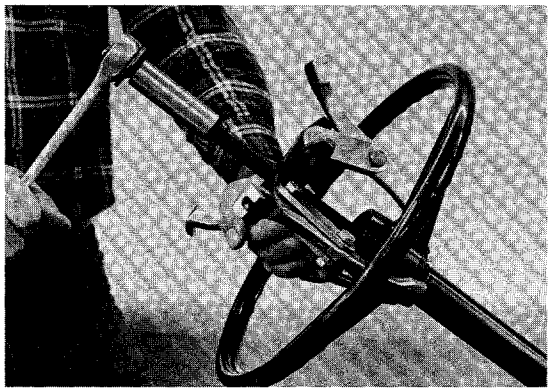

Figure 12-1

INSTALLATION

1. Be sure dust seal (9) is in place in steering shaft housing.

NOTE: Before installing steering wheel, apply a small amount of oil or anti-seize compound to steering shaft splines and taper to minimize corrosion and facilitate future removal of steering wheel.

2. Install steering wheel on splines of steering shaft, aligning reference marks (Step 3 - Steering Wheel Removal).
3. Install washer (24) and steering wheel nut (23) and torque to 7-10 ft.-lbs.
4. Install scorecard plate (20) and scorecard plate mounting screw (17).
5. Install new operating instructions decal (18).

STEERING COLUMN

WARNING:

Always wear eye protection when servicing the vehicle.

Turn key switch off, remove key and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables before servicing to avoid unintentional starting of the vehicle.

REMOVAL

1. Remove steering wheel as described in Steering Wheel Removal.
2. Remove bolt (28) and lockwasher (27) on upper universal joint and remove universal joint from steering column.
3. Remove nuts (16), washer (15) and bolts (11) from steering column tube (10) **(Figure 12-2)**.
4. Remove from car.

DISASSEMBLY

1. Remove the dust cover (9) from shaft (26).
2. While supporting the steering shaft (26) on a workbench, remove the snap ring (1) from the shaft (26).

NOTE: Prevent shaft (26) from sliding out of steering tube while removing snap ring (1).

3. Remove the washer (2), spring (3) and wedge (4).
4. Turn the steering column over and insert a flat tip screwdriver between the seal (8) and shaft (26). Pry the seal (8) out of bearing seat (6).

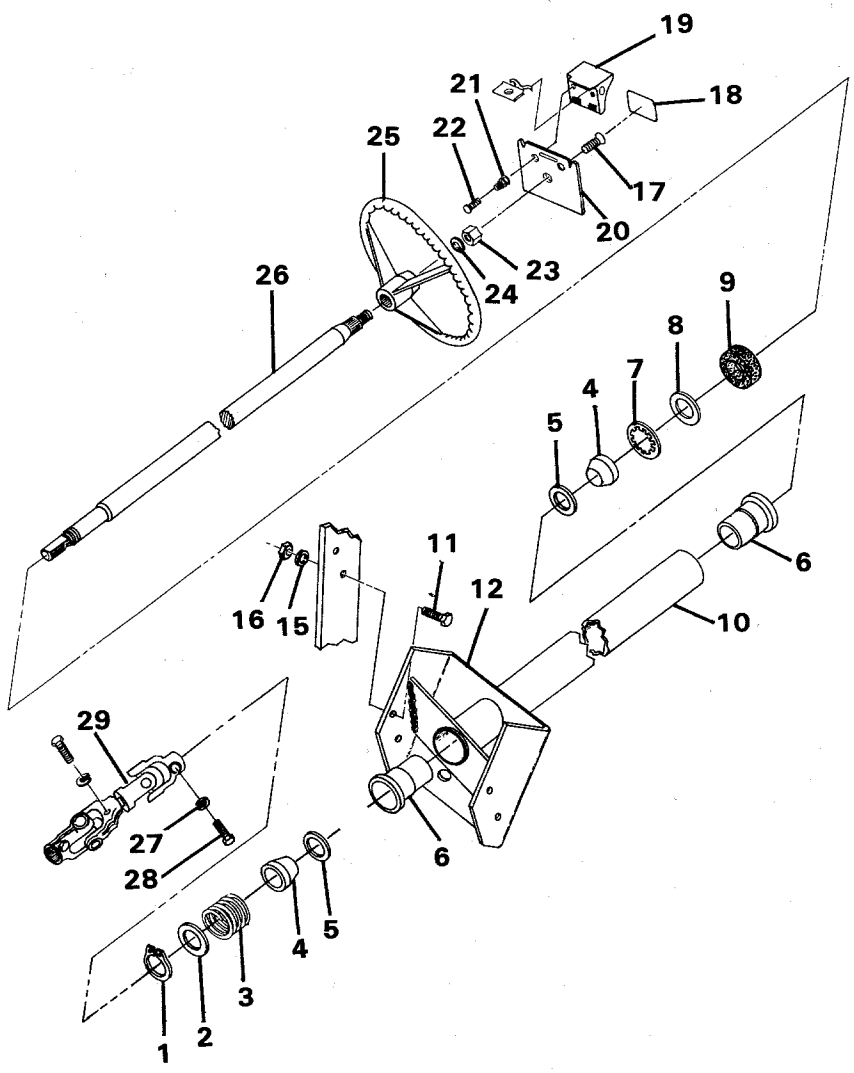

Figure 12-2 — Steering Assembly

NOTE: A new seal will be required for reassembly.

5. Slide the shaft (26) out of tube to expose the retaining ring (7). Use pliers and twist the retaining ring (7) until it breaks off. Remove the wedge (4).

NOTE: Do not attempt to reuse retaining ring for reassembly.

6. Remove the shaft (26) from the bottom of the tube.

7. Remove the bearing seat (6) by using the shaft (26) to push out the bearing seat from the opposite end of the steering tube (10).

8. To remove the bearing (5) from the bearing seats (6), insert a flat tip screwdriver between the bottom of the outer race of the bearing and the bottom lip of the bearing seat (6).

CAUTION:

Do not damage bearing or bearing seat upon removal of bearing.

ASSEMBLY

1. Insert the bearing seats (6) into the steering tube (10). Place a block of wood on top of the bearing seat (6) and tap lightly on wood block until the bearing seat is fully seated in the steering tube (10) **(Figure 12-2)**.

2. To press bearing (5) into bottom of bearing seat (6), use a metal tube approximately six inches long with a maximum outer diameter of 1-3/16" and a minimum inner diameter of 7/8". Be sure the bearing is installed in bearing seat as shown in Figures 12-3 and 12-4. This allows the wedges (4) to ride against the inner races of the bearings (5).

3. Install the wedge (4), spring (3), washer (2) and snap ring (1) onto the bottom end of the shaft (26) **(Figure 12-3)**.

4. Insert the shaft (26) from the bottom end of the steering tube (10).

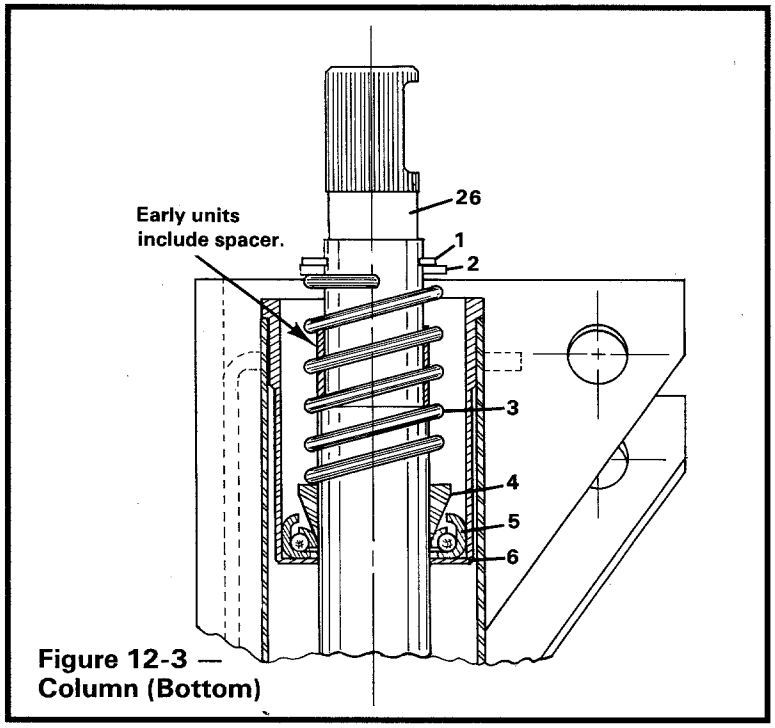

Figure 12-3 — Column (Bottom)

5. Turn the assembly over and place the shaft on bench. Install the wedge (4) and retaining ring (7) onto top of shaft (26). Be sure the prongs on the retaining ring (7) face up and away from the wedge (4). Use the same tube as was used in step 2 to press the retaining ring (7) onto the top of the shaft (26). The retaining ring should be pressed onto the shaft until 2.00-2.12 inches of the shaft extends from the top of the bearing seat in the steering tube **(Figure 12-4)**.

6. Press seal (8) into bearing seat (6) flush with end of the bearing seat (6). When pressing seal (8) into bearing seat, set the steering tube on a bench so all the pressure is exerted on the steering tube and not on the steering shaft.

7. Install dust cover (9)

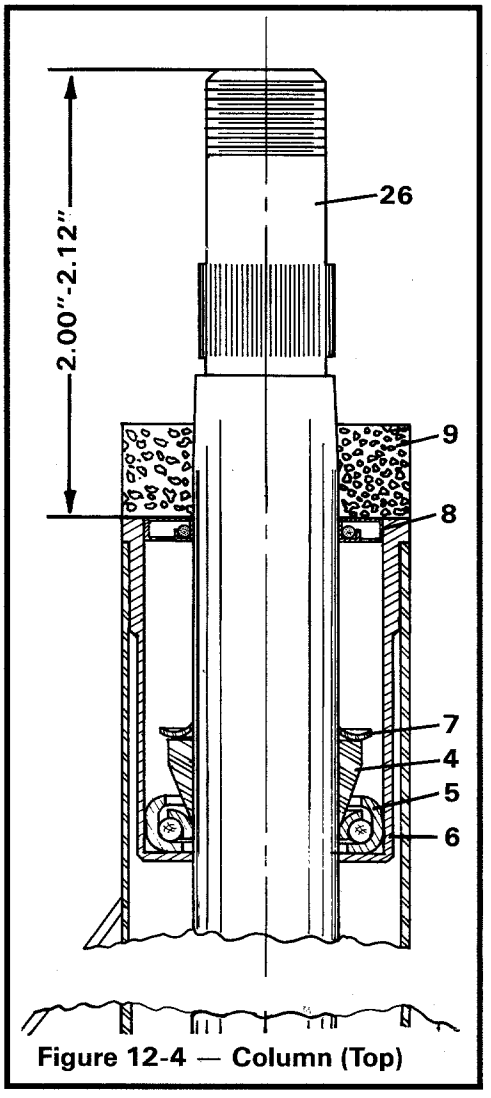

Figure 12-4 — Column (Top)

INSTALLATION

1. Apply a light coat of anti-seize and lubricating compound to both splined ends of steering column shaft for ease of reassembly and prevention of corrosion.

2. Reinstall column assembly through center dash panel using washers (45), nuts (16) and bolt (1) to attach column assembly to frame. Install the nuts on the bolts but do not tighten.

3. Install universal joint to steering column shaft. Align flat portion of steering shaft spline with bolt hole in universal joint before sliding spline into universal joint.

4. Install bolt (28) and lockwasher (27) on upper universal joint and tighten finger tight.

5. Tighten four nuts (13) to frame with 21-25 ft.-lbs. of torque.

6. Torque bolt (28) on upper universal joint to 21-25 ft.-lbs. **(Figure 12-5)**.

STEERING ADJUSTMENT

The vehicle should have the same turning radius to the left as when turning to the right. The procedure to correct a condition where the vehicle turns more sharply in one direction than the other is as follows:

1. Loosen nut (15) on bottom of ball joint (13) **(Figure 12-5)** and remove ball joint from hole in spindle, using ball joint removal tool **(Figure 12-6)**.

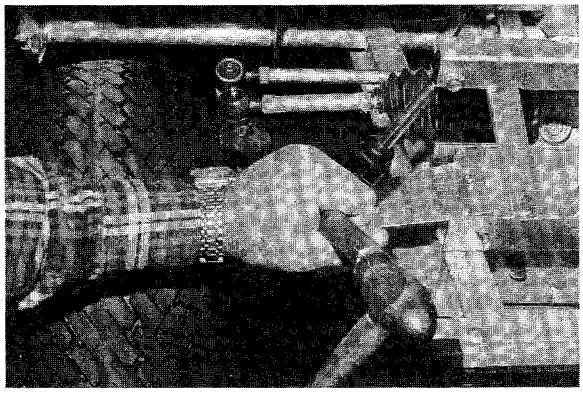

Figure 12-6

2. Turn steering wheel all the way to the left. Count the revolutions of the steering wheel when turned all the way to the right (about three revolutions). Then turn the steering wheel halfway between the two extremes.

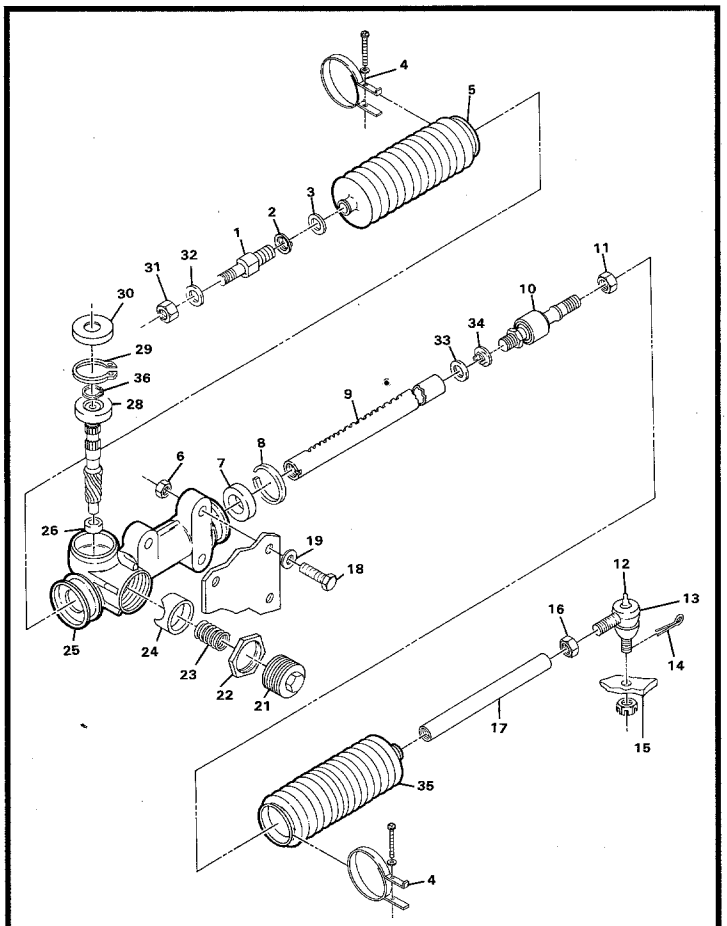

Figure 12-5 — Rack and Pinion Assembly

CAUTION:

The drag link rod has both left and right hand threads. The end of the drag link towards the spindle has left hand threads. The end of the drag link towards the rack has right hand threads. Care should be taken when servicing drag link rod to prevent damage to threaded parts.

WARNING:

Thread depth of tie rod ends into rods must not be less than 5/16 in. Failure to follow this procedure may cause rod end to separate from rods during adjustment or while vehicle is being operated causing loss of control and possible severe personal injury.

3. Manually turn the tires so they are pointed straight ahead. Drag link (17) should be lengthened or shortened by loosening nuts (11 and 16) and turning drag link so ball joint (13) will fit into spindle hole. Be sure tires are still pointed straight ahead as ball joint (13) is positioned. Do not push or pull on drag link as ball joint (13) is positioned.

4. Be sure stops on both left and right hand spindles hit the A-plate when tires are turned to the extreme left and right, respectively.

5. Torque nuts (11 and 16) to 18-24 ft.-lbs. **(Figure 12-7)**.

6. Reinstall nut (15) and cotter pin (14) on ball joint (13).

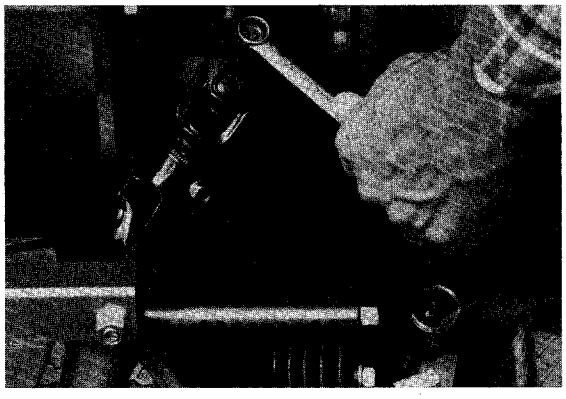

Figure 12-7

RACK AND PINION

REMOVAL

WARNING:

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Lift only one end of vehicle at a time. Chock the wheels and lock brakes prior to lifting. Use a suitable lifting device (i.e., chain hoist, hydraulic floor jack) with 1000 lb. minimum lifting capacity. DO NOT use lifting device to hold vehicle in elevated position. Always use approved jack stand of proper weight capacity to support vehicle.

1. Remove cowl as described under Body and Trim, Section XIV.
2. Remove cotter pin (14) and ball joint retaining nut (15) **(Figure 12-5)**.
3. Remove ball joint (13) from spindle assembly with ball joint removal tool **(Figure 12-6)**.
4. Remove bolts (18), washers (19) and nuts (6) from steering rack assembly mounting bracket.
5. Loosen bolt on upper universal joint, remove rack assembly and universal joints from vehicle.

DISASSEMBLY

WARNING:

Service to the rack and pinion must be done exactly as stated in this manual. Failure to follow the correct procedure can cause a loss of steering which may result in property damage and/or severe personal injury or death.

CAUTION:

Left hand threads on ball joint (13).

1. Remove ball joint (13) and check for excessive wear **(Figure 12-8)**.
2. Remove drag link (17).
3. Remove both bellows clamps (4).
4. Remove hex nut (11) and slide dust seal bellows (35) off.
5. Remove hex nut (31) and washer (32) and slide dust seal bellows (5) off.

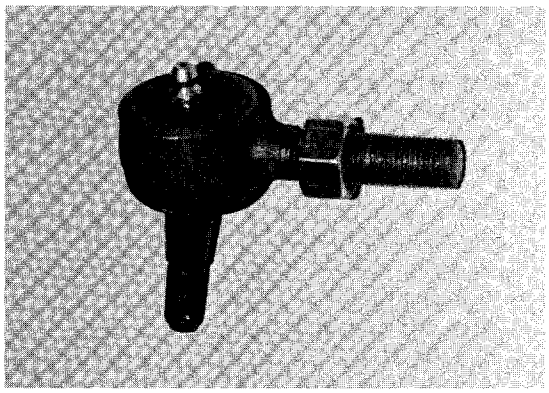

Figure 12-8

6. Remove the rack guide screw (21), rack screw locknut (22), rack guide pressure spring (23) and the rack guide (24).
7. Remove the universal joint assembly from pinion (27) by fully removing the bolt and sliding universal joint off.

NOTE: Dust seal (30) will have to be replaced if removed.

8. Remove dust seal (30) with a cotter key puller **(Figure 12-9)**.

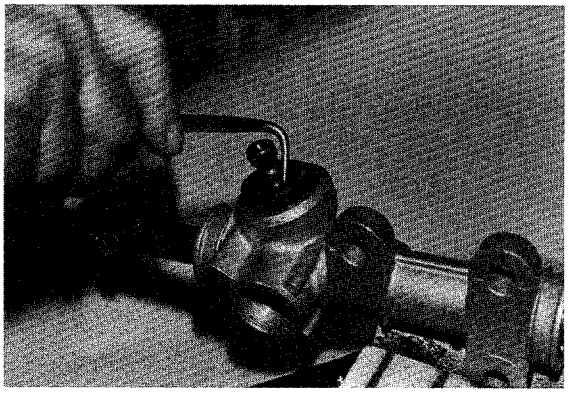

Figure 12-9

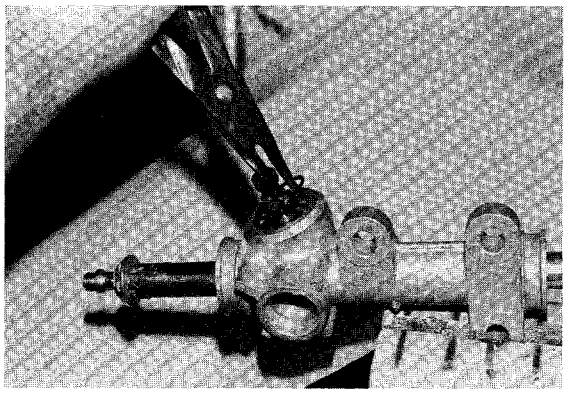

Figure 12-10

9. Remove internal snap ring (29) with a snap ring pliers **(Figure 12-10)**.
10. Reinstall universal joint on pinion (27) and place a large open end wrench under the universal joint. Tap wrench lightly with a hammer to remove pinion and bearing assembly **(Figure 12-11)**.
11. If ball bearing (28) has been damaged, remove external snap ring (36) and press bearing off **(Figure 12-12)**.
12. To remove rack (9) from housing (25), bend edges of washer (2) out.
13. Using two wrenches, one wrench on the rack (9) and one on the bolt stopper (1), remove bolt stopper from rack **(Figure 12-13)**.

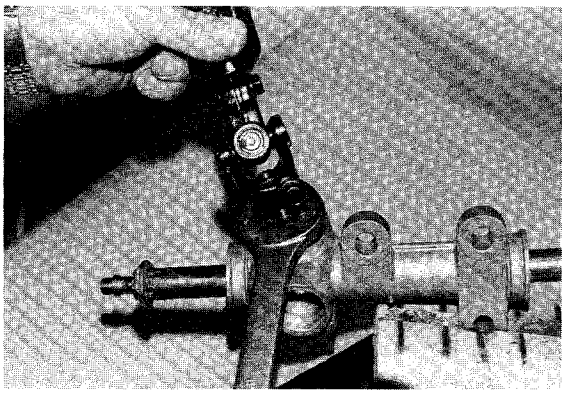

Figure 12-11

14. Remove the tie rod lockwasher (2) and the washer (3). Slide rack (9) out.
15. If ball joint (10) is excessively worn, remove ball joint (10) from rack (9) using two wrenches.

CAUTION:

Snap ring (8) may spring out when removed.

16. Inspect bushing (7) for excessive wear. If wear is excessive, remove snap ring (8) and remove bushing by pressing from opposite end of housing (25).

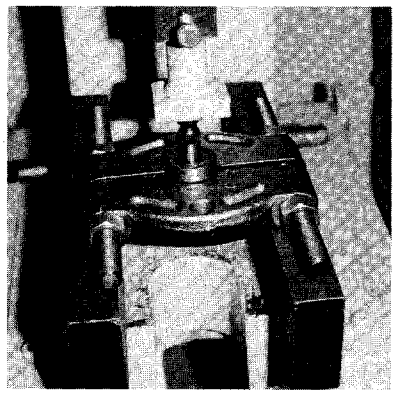

Figure 12-12

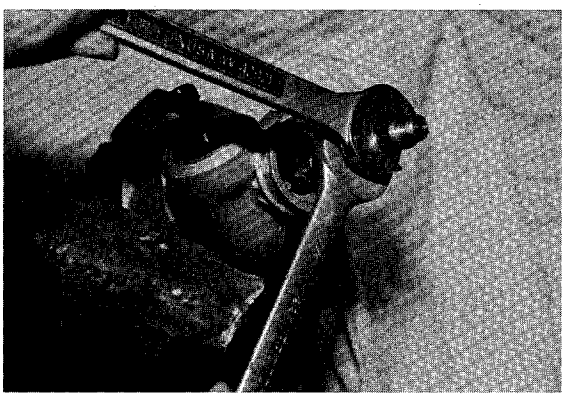

Figure 12-13

ASSEMBLY

1. Reinstall bushing (7) if it was removed. Press in evenly **(Figure 12-14)**. Reinstall snap ring (8).

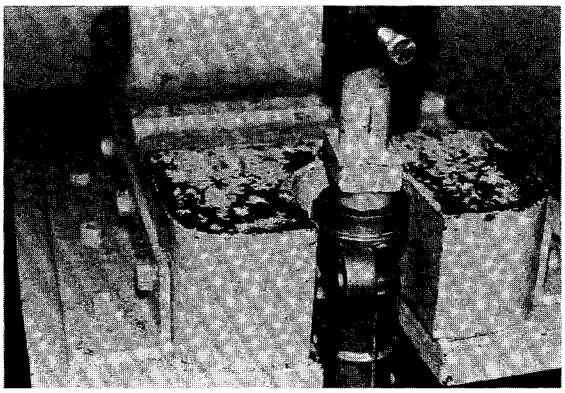

Figure 12-14

CAUTION:

Be sure tie rod lockwasher (2) aligns with slots in rack in step 2.

2. Reinstall washer (33), a new tie rod lockwasher (34) and ball joint (10). Tighten using two wrenches, one on the ball joint (10) and one on the rack (9). Torque ball joint (10) to 50-55 ft.-lbs.
3. Bend edges of lockwasher (34) up against ball joint (10).
4. Apply a liberal amount of grease to the teeth of the rack (9). Slide rack through bushing (7) and housing (25) and reinstall washer (3), tie rod lockwasher (2) and bolt stopper (1) to end of rack (9). Tighten using two wrenches, one on the rack and one on the bolt stopper (1). Torque bolt stopper (1) to 50-55 ft.-lbs.
5. Bend edges of lockwasher (2) up against bolt stopper (1).

CAUTION:

Do not press against bearing outer race in step 6.

6. If bearing (28) was removed, press on new bearing, exerting all pressure on the inner race. Grease bearing prior to installation. Reinstall the external snap ring (36).
7. If bearing (26) is damaged, the housing (20) and bearing (26) must be replaced as an assembly.
8. Reinstall the pinion (27) and bearing (28) assembly into housing (25). Be sure the rack's gear teeth will mesh with the gear teeth on the pinion. Rack (9) may need to be rotated slightly while lightly tapping on the pinion-bearing assembly with a rubber mallet.

CAUTION:

Do not force pinion-bearing assembly into housing or gear teeth and the small needle bearings may be damaged.

9. Reinstall the internal snap ring (29).
10. Press in a new dust seal (30) using a socket to apply pressure evenly **(Figure 12-15)**.
11. Apply a small amount of grease to the rack guide where it comes in contact with the rack (9).
12. Install a few drops of Loctite® 222 to threads of screw (21).
13. Reinstall rack guide (24), pressure spring (23) and screw (21). The screw (21) should be installed until tight then back off ⅛ of a turn. Install the locknut (22) to the screw (21) and torque to 40 ft.-lbs.
14. Reinstall the dust seal bellows (5) and hex nut (31) and washer (32). Torque hex nut (31) to 50-55 ft.-lbs.

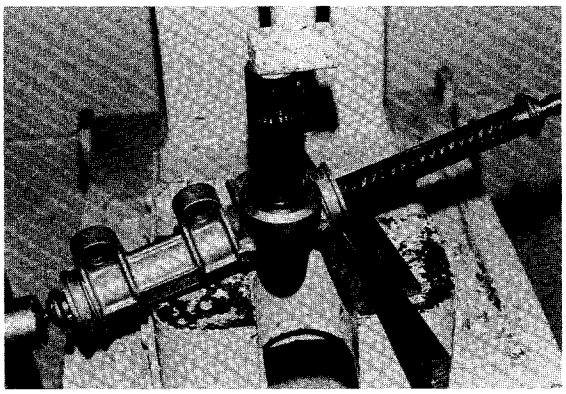

Figure 12-15

15. Reinstall the hex nut (11) and dust seal bellows (35).
16. Reinstall universal joint on pinion. Torque bolt to 21-25 ft.-lbs.
17. Reinstall both bellows clamps (4).
18. Reinstall drag link (17).

CAUTION:

Left hand threads on ball joint (13).

19. Reinstall ball joint (13).

NOTE: Turn the universal joint assembly by hand to be sure the rack and pinion is working properly. If it is too tight, loosen locknut (22) and back off screw (21) ¼ of a turn. Then tighten locknut (22) to 40 ft.-lbs.

20. See Steering Gear Adjustment.

INSTALLATION

1. Place rack in proper position to steering rack mounting bracket.
2. Install bolts (18), washers (19) and nuts (6) on steering rack assembly mounting bracket. Tighten to 25-30 ft.-lbs. torque.
3. Apply a light coat of anti-seize and lubricating compound to splined end of steering column shaft for ease of reassembly and prevention of corrosion.
4. Align flat portion of steering shaft spline with bolt hole in upper universal joint before sliding into upper universal joint. Install bolt on upper universal joint and tighten to 21-25 ft.-lbs torque.
5. See Steering Adjustment, page 12-5.

TIE ROD AND DRAG LINK

REMOVAL

WARNING:

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (—) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Lift only one end of vehicle at a time. Chock the wheels and lock brakes prior to lifting. Use a suitable lifting device (i.e., chain hoist, hydraulic floor jack) with 1000 lb. minimum lifting capacity. DO NOT use lifting device to hold vehicle in elevated position. Always use approved jack stand of proper weight capacity to support vehicle.

1. Remove cotter pins and ball joint retaining nuts.
2. Remove ball joints with ball joint removal tool **(Figure 12-6)**.
3. Unscrew drag link from steering rack. Remove ball joints from tie rod

INSTALLATION

1. Install ball joints into tie rods to sufficient thread depth (½ in.) before installing ball joints to spindle arms.

CAUTION:

Tie rods have right hand threads on one end and left hand threads on opposite end. Right hand threads identified by groove in tie rod.

WARNING:

Thread depth of tie rod ends into rods must not be less than 5/16 in. Failure to follow this procedure may cause ball joint to separate from rods during adjustment or while vehicle is being operated and severe personal injury may result.

2. Install ball joint end into spindle arms.
3. Install drag link rod onto threaded stud of steering rack assembly fully (right hand threads).
4. Install ball joint into drag link rod (left hand threads) to full thread depth.
5. Install ball joint to spindle arm riser. Install retaining nut and cotter pin.
6. See Toe-in Adjustment, page 12-12 and Steering Adjustment, page 12-5.

FRONT SUSPENSION

LUBRICATION

Nine grease fittings are provided (one in each end of the "A" frame, one in the spindle housing, one in the ball joint on each end of tie rod and one in the ball joint of the steering drag link) and should be lubed every 90 days with a good quality chassis lubricant. See Lubrication Chart, Section III.

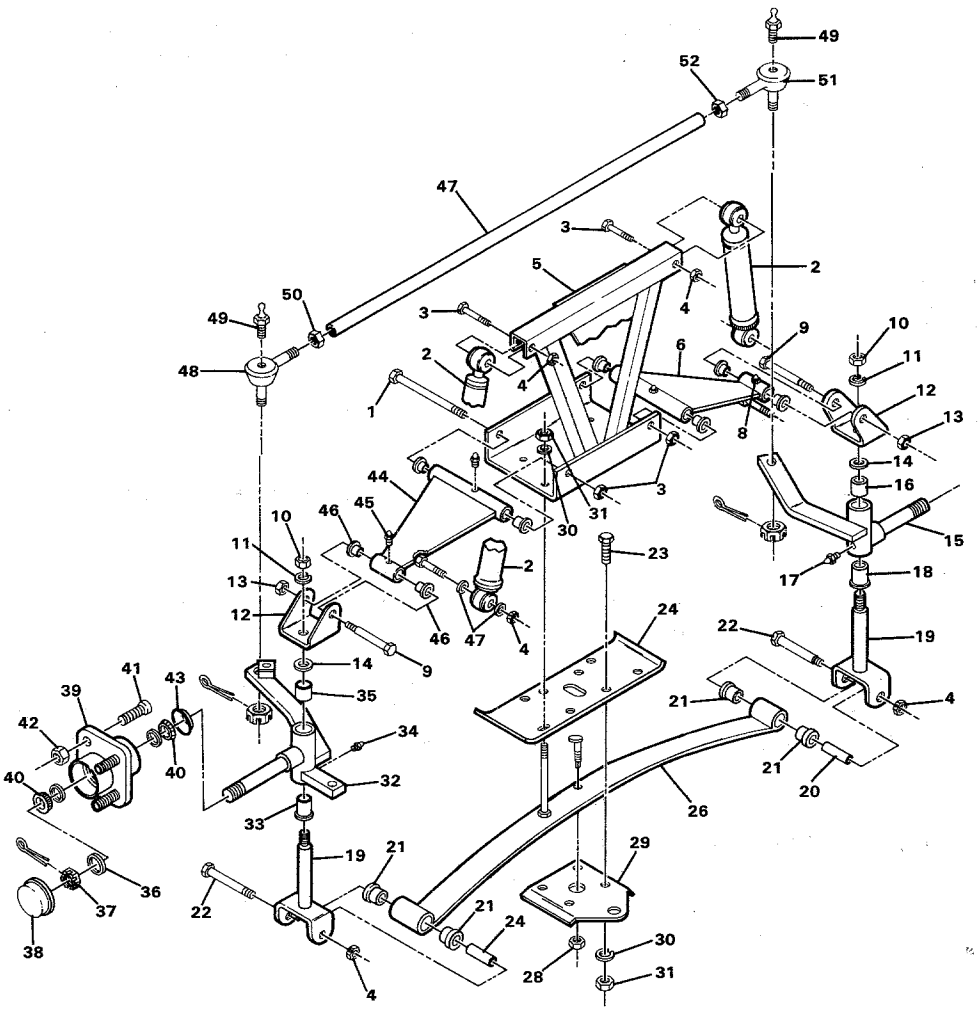

Figure 12-16 — Front Suspension Assembly

Manual No. 1015055 - Issue Date 1/90
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CAUTION:

To insure proper lubrication of front suspension and steering linkages, raise front of vehicle to lubricate.

WHEEL ALIGNMENT

WARNING:

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Lift only one end of vehicle at a time. Chock the wheels and lock brakes prior to lifting. Use a suitable lifting device (i.e., chain hoist, hydraulic floor jack) with 1000 lb. minimum lifting capacity. DO NOT use lifting device to hold vehicle in elevated position. Always use approved jack stand of proper weight capacity to support vehicle.

Wheel alignment is limited to equalizing the camber angle of each wheel and adjusting toe-in. There is also a drag link adjustment to equalize turning radius in both directions. See Steering Adjustment.

CAMBER ADJUSTMENT

1. Check each front wheel with a framing square. There should be an equal space between the tire and the framing square at the bottom of both tires **(Figure 12-17)**.
2. Loosen the four bolts (23) which secure the leaf spring (26) to the bottom spring plate (29) **(Figure 12-16)**.
3. Loosen the hex nut (28) on the adjustment eccentric (27) in the center of the spring.
4. Rotate the eccentric (27) with a 7mm wrench to shift the leaf spring (26) to provide equal space between tire and framing square on each side **(Figure 12-17)**.
5. After aligning both front wheels, torque the four spring retaining bolts (23) to 20-25 ft.-lbs. and roll vehicle backward one full tire revolution and recheck camber.
6. Torque the hex nut (28) on the adjustment eccentric (27) to 10 ft.-lbs.

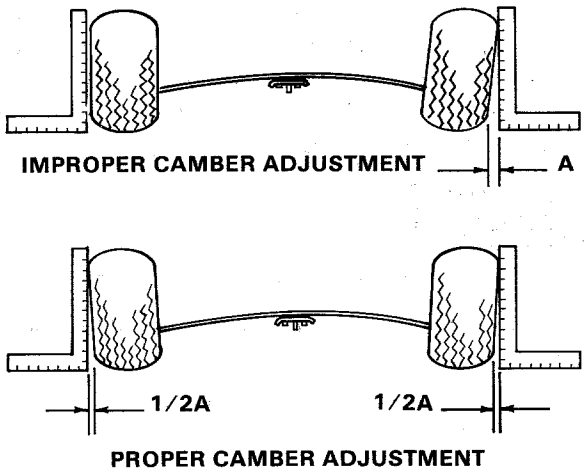


Figure 12-17 — Camber Adjustment

TOE-IN ADJUSTMENT

1. With the vehicle on a level surface, turn the steering wheel so that the front wheels point straight ahead.

2. Measure the distance between a known point on each front tire (middle tire rib, etc.) at exactly the same height, (center of wheel) both on front and rear of tires **(Figure 12-18)**.
3. Subtract the front measurement from the rear measurement. The difference is the toe-in. Proper toe-in is ⅜ inch to ⅛ inch.

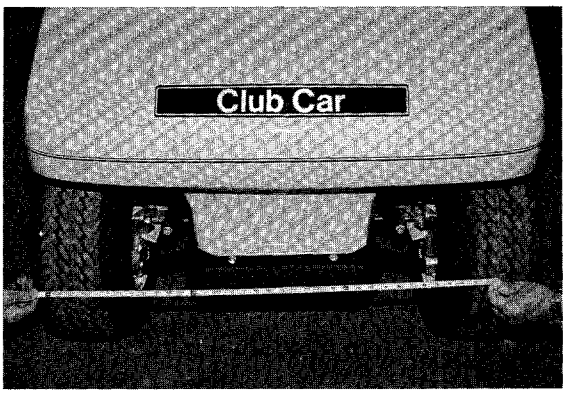


Figure 12-18

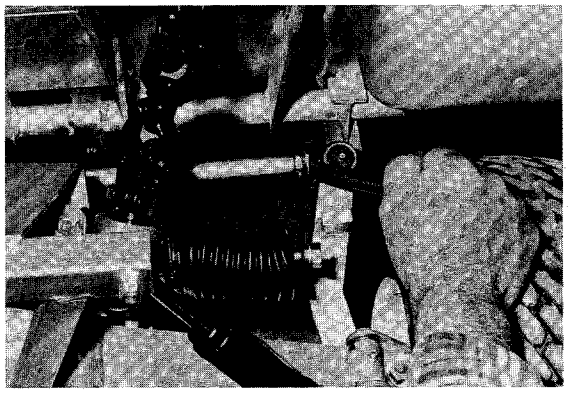


Figure 12-19

NOTE: Front measure should be ⅜ inch to ⅛ inch less than rear measurement.

4. If adjustment is necessary, loosen the locknuts on each tie rod end and rotate tie rod to increase or decrease toe-in **(Figure 12-19)**.

CAUTION:

Tie rods have right hand threads on one end and left hand threads on opposite end. Right hand thread identified by groove in tie rod.

5. Roll car backward one full tire revolution, then recheck toe-in. If toe-in is incorrect, go back to Step 4.
6. Retighten locknuts to 18-24 ft.-lbs. torque and recheck toe-in.
7. After toe-in adjustment is made, with wheels in the straight ahead position, the steering wheel should be at the center of its travel with equal turning radius from left to right.

NOTE: If turn radius is not equal in full left to full right turn, see Steering Adjustment

NOTE: If vehicle is equipped with permanent towing option, adjust by loosening the ball joint hex nut on the tow assembly and rotating the steering arm to achieve 16½" from centerline of right front tire to the closest edge of the hole in the towing lug.

FRONT SUSPENSION COMPONENTS

WARNING:

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Lift only one end of vehicle at a time. Chock the wheels and lock brakes prior to lifting. Use a suitable lifting device (i.e., chain hoist, hydraulic floor jack) with 1000 lb. minimum lifting capacity. DO NOT use lifting device to hold vehicle in elevated position. Always use approved jack stand of proper weight capacity to support vehicle.

REMOVING LEAF SPRING

1. Raise front of car with chain hoist or jack. Place jack stands under frame at front cross tube. Lower frame onto jack stands to support car.

2. Remove both front wheels.
3. Remove nuts (4) and bolts (22) from each king pin clevis (19) **(Figure 12-16)**.
4. Remove four bolts (23), four nuts (31), four lockwashers (30) and bottom spring plate (29).
5. Remove leaf spring.
6. Check condition of rubber inserts (21) and spacer (20) and replace if worn or damaged.

INSTALLING LEAF SPRING

1. Install rubber inserts (21) and spacers (20) in leaf spring eyes.
2. Install leaf spring, bottom spring plate (29), four bolts, (23), four lockwashers (30) and four nuts (31). Using criss-cross sequence, torque bolts to 20-25 ft.-lbs.
3. Install spring in king pin clevis with bolt (22) and nut (4). Torque to 15-18 ft.-lbs.
4. Install wheels. Torque wheel nuts to 50-60 ft.-lbs.
5. Adjust camber and toe-in as described in Wheel Alignment Procedure.

REMOVING KING PIN AND STEERING SPINDLE

1. Remove front hub as described on page 12-16.
2. Remove ball joints from spindle.
3. Remove nut (10) and lockwasher (11) from top of king pin (19) **(Figure 12-16)**.
4. Raise "A" frame clevis (12) from king pin (19).
5. Remove thrust washer (14).
6. Slide spindle off king pin.
7. Remove bolt (22) and nut (4) from king pin clevis.
8. Remove king pin (19).
9. Replace king pin and spindle if worn or damaged.
10. Check condition of bushings (33) and (35) and replace if necessary, by removing old bushings and pressing in new bushings. Ream bushings to .750 to .752 in. diameter. Reamer should be long enough to ream both bushings from one end.

INSTALLING KING PIN AND STEERING SPINDLE

1. Inspect all parts and replace as necessary.
2. Install king pin clevis over leaf spring eye and insert bolt (22) and install nut (4). Torque to 15-18 ft.-lbs. **(Figure 12-16)**.
3. Install steering spindle on king pin. Install thrust washer (14), "A" frame clevis (12), lockwasher (11) and nut (10). Torque to 25-30 ft.-lbs.
4. Attach ball joints to spindle arm. Install nut, tighten and install cotter pin.
5. Install front hub and wheel. See Front Wheel Bearings and Hubs.

REMOVING "A" FRAME

1. Remove wheel and tire.
2. Remove shoulder bolts (1 and 9) and nuts (3 and 13).
3. Remove lower shock absorber mounting nut (4) and washers (47) and slide shock absorber free of "A" frame.
4. Remove "A" frame.
5. Check condition of bushings (46) in "A" frame and replace if necessary.
6. Check shoulder bolts (1 and 9) and replace if worn or damaged.

INSTALLING "A" FRAME

1. Install "A" frame in reverse order of removal. Torque bolts to 16-20 ft.-lbs.
2. Install wheel and adjust camber as described in Wheel Alignment procedure.

INSPECTING AND REMOVING SHOCK ABSORBER

1. Check shock absorbers for fluid leakage at the point where the shaft enters the shock absorber body. Leaking shock absorbers should be replaced.
2. Remove nuts (4) and washers (47) attaching shock to "A" frame.
3. Remove nuts (4) and bolt (3) attaching shock to frame.
4. Remove shock absorber.

INSTALLING SHOCK ABSORBER

1. Install in reverse order of Removal.
2. Torque nuts to 15-18 ft.-lbs.

FRONT WHEEL BEARINGS AND HUBS

REMOVAL

1. Remove wheels as described on page 12-19.
2. To remove front wheel hubs, remove grease cap (1), cotter pin (2), axle nut (3) and flatwasher (8). Remove hub assembly (4) from axle **(Figure 12-20)**.

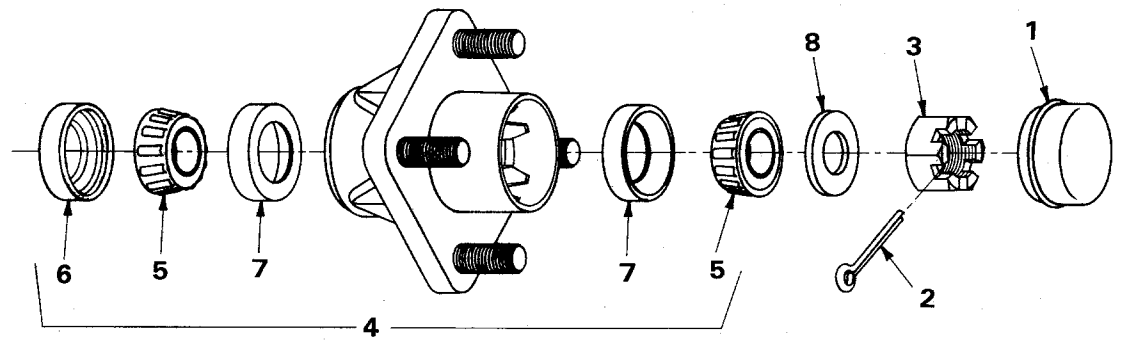


Figure 12-20 — Front Hub Assembly

3. To disassemble hub, pull out seal (6) and remove bearings (5) from hub.
4. If bearing cups (7) are worn or pitted, insert drift punch from opposite end of hub and lightly tap around bearing cup to remove.
5. Clean all parts and inspect for wear. Replace any damaged or worn parts.

INSTALLATION

1. Pack wheel bearings (5) with wheel bearing grease or chassis lube, making sure grease is forced between rollers.
2. If bearing cups (7) were removed, press in new cups squarely against stop in hub.
3. Install wheel bearings (5) inside hub and install new seal (6), with metal edge facing towards hub **(Figure 12-20)**.
4. Install hub assembly (4) and flatwasher (8) on axle and start nut (3).
5. Tighten axle nut (3) until hub is hard to turn, back off nut (3) until hub turns freely, install cotter pin (2).

NOTE: When cotter pin ends are bent over, be sure they do not contact the hub or dust cap.

6. Install dust cap (1).
7. Repeat procedure for opposite wheel. Install wheels and torque wheel rim mounting nuts to 50-60 ft.-lbs.

REAR SUSPENSION

GENERAL INFORMATION

The rear suspension is two mono leaf springs controlled by two shock absorbers attached between the springs and the frame. No adjustment or alignment is required.

WARNING:

Only trained people should repair or service this vehicle. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

Lift only one end of vehicle at a time. Chock the wheels and lock brakes prior to lifting. Use a suitable lifting device (i.e., chain hoist, hydraulic floor jack) with 1000 lb. minimum lifting capacity. DO NOT use lifting device to hold vehicle in elevated position. Always use approved jack stand of proper weight capacity to support vehicle.

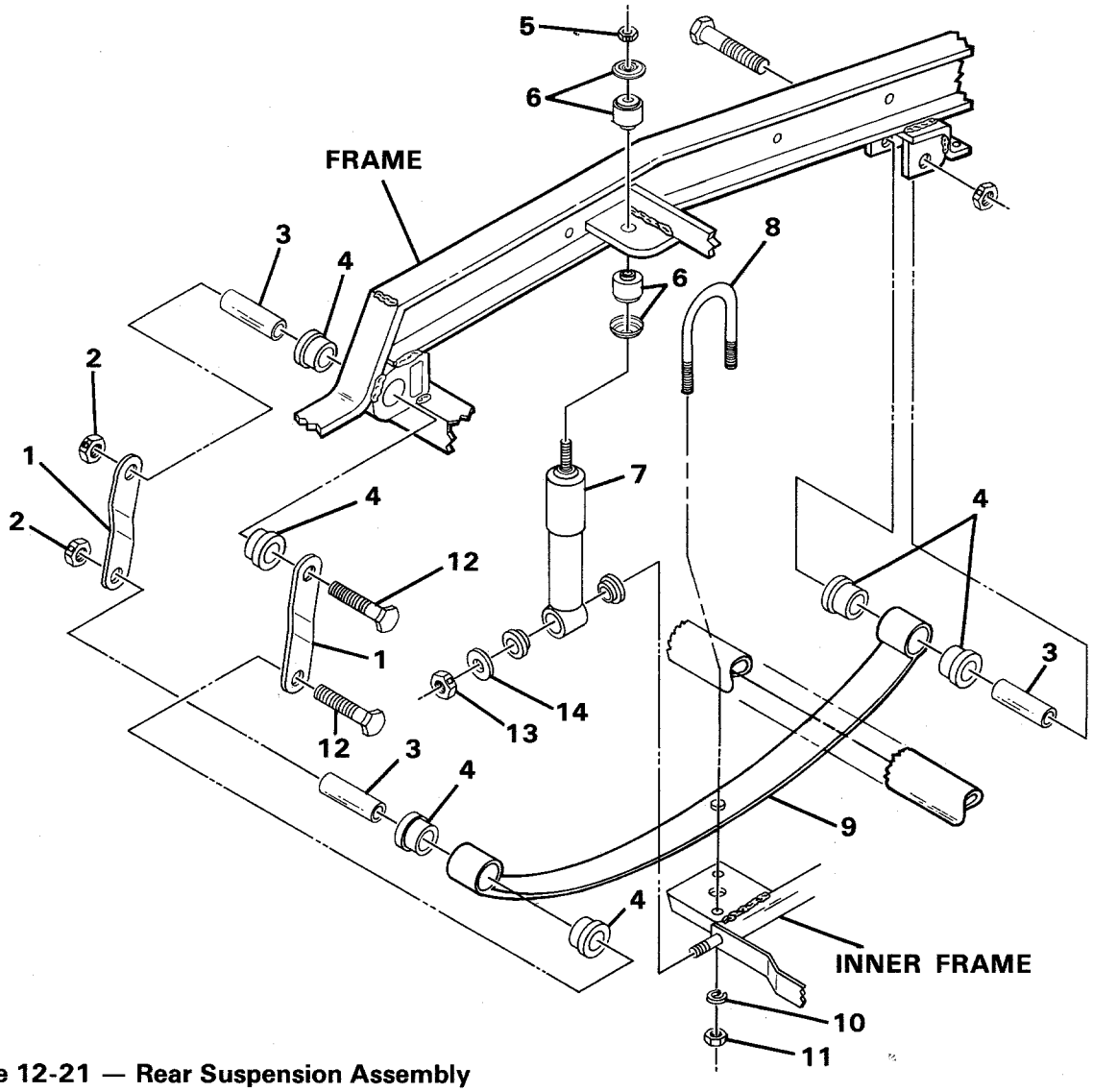


Figure 12-21 — Rear Suspension Assembly

INSPECTING AND REMOVING SHOCK ABSORBER

1. Check shock absorbers for fluid leakage at the point where shaft enters the shock absorber body. Leaking shock absorbers should be replaced.
2. To remove shock absorber, remove nut (5), cup washer and rubber bushing (6) from shock absorber stem.
3. Remove nut (13) and washer (14) from lower mounting stud.
4. Compress shock absorber and remove.

INSTALLING SHOCK ABSORBER

1. To install, reverse above procedure.
2. On upper shock absorber mount, tighten nut until rubber bushing expands to size of cup washer.
3. On lower mounts torque nuts to 50-60 ft.-lbs.

REMOVING LEAF SPRING

1. Use chain hoist, raise chassis and place jack stands under outside frame at front of rear tires on both sides to support car **(Figure 12-22)**.
2. Lower chassis onto jack stands.
3. Place jack stands at each rear side of inner frame **(Figure 12-23)**.
4. Remove tire and wheel assembly (on side that spring is to be removed).
5. Remove bolt (12) and nut (2) from lower rear spring shackle (1).
6. Remove cotter pin at brake lever/cable connection, remove clevis from brake lever, pull clevis away from lever **(Figure 12-24)**.
7. Remove upper nut (5), washer and rubber bushing (6) from shock absorber.
8. Remove nuts (11) and lockwashers (10) from U-bolt (8) at retainer plate.

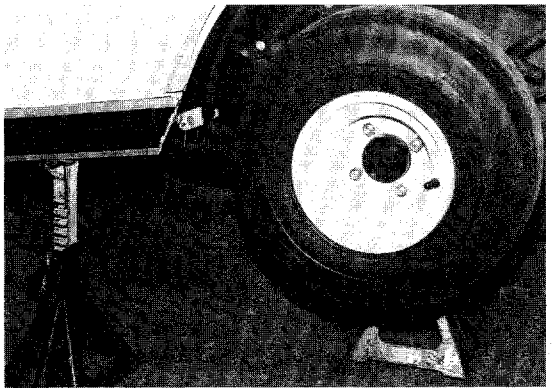


Figure 12-22

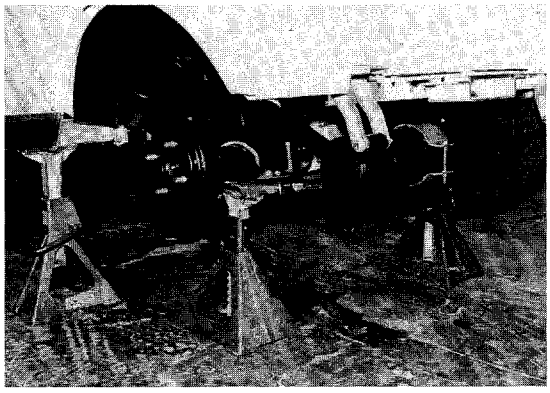


Figure 12-23

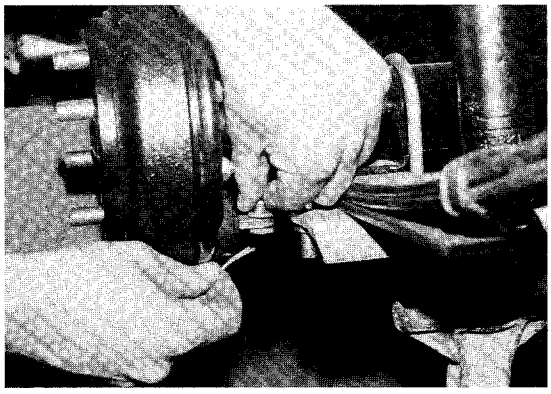


Figure 12-24

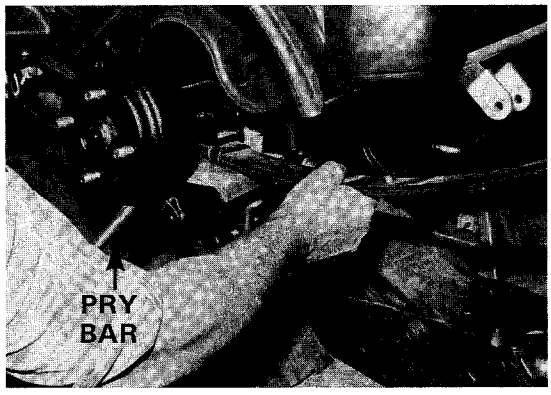


Figure 12-25

9. Remove nut and bolt from front of rear spring.
10. Use a small pry bar, insert between the bottom of brake cluster and spring retainer plate. Lift pry bar up to raise axle tube housing away from spring **(Figure 12-25)**.
11. Hold axle housing in this position, grasp spring and remove.
12. Inspect rubber bushings and spacers in spring eyes and replace if worn or damaged.

INSTALLING LEAF SPRING

Reverse Removal procedure for Installation.

1. Be sure to align axle saddle locating hole with leaf spring locating bolt.
2. Use criss-cross sequence to torque nuts on U-bolts to 15-20 ft.-lbs.

REMOVING RUBBER SNUBBER

1. Remove nuts (8), lockwashers (9) and bolts (12) from front of engine inner frame assembly **(Figure 12-26)**.
2. Remove plate (11) and rubber snubber (10). Replace snubber.

INSTALLING RUBBER SNUBBER

Install in reverse order of disassembly.

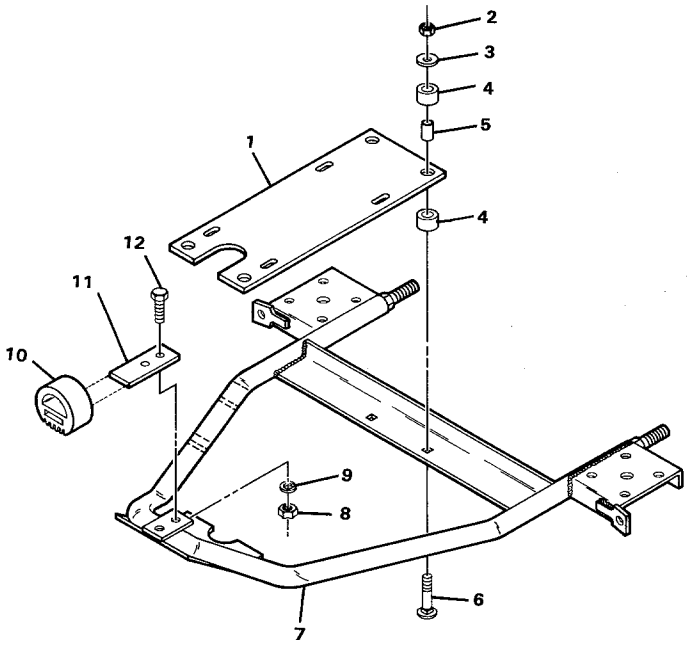


Figure 12-26 — Inner Frame Assembly

WHEELS AND TIRES

GENERAL INFORMATION

Maximum tire life and good handling qualities are directly related to proper wheel and tire care.

1. Keep tires inflated to 12-14 psi.
2. Keep axle nuts and wheel mounting nuts properly torqued.
3. Keep front end aligned and properly adjusted.

REMOVAL

1. Slightly loosen wheel rim mounting nuts.
2. Raise vehicle until tire clears floor.
3. Place jack stands under car frame.
4. Remove mounting nuts and wheel.

INSTALLATION

To install wheel to hub, reverse above procedure and torque wheel rim mounting nuts to 50-60 ft.-lbs.

REMOVING TIRE FROM RIM

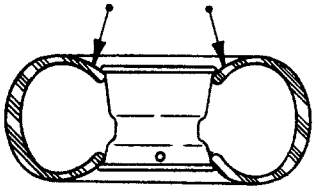
NOTE: Tire must be removed or installed from valve stem side of rim.

1. Remove tire and wheel assembly from car as described in preceding section.
2. Remove valve cap and valve core to free air from tire.
3. If tire machine is unavailable, loosen both tire beads by applying pressure to tire side walls. Step 1, **(Figure 12-27)**.
4. Push tire bead off of rim flange into rim well.
5. With valve stem side up, carefully start upper bead over edge of wheel rim with tire tool. Step II, **(Figure 12-27)**.

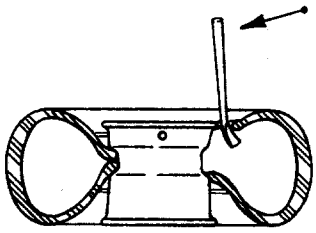
CAUTION:

Do not use excessive force when starting bead over edge of rim or tire bead may be damaged.

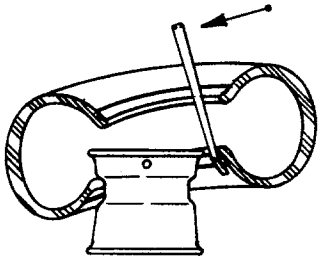
6. When top bead is free of rim, shift lower bead into rim well on one side of wheel and insert tire tool on opposite side. Pry lower bead over rim flange. Step III, **(Figure 12-27)**.



STEP I. FREE TIRE BEADS OF RIM



STEP II. REMOVE UPPER BEAD FROM RIM



STEP III. REMOVE LOWER BEAD FROM RIM

Figure 12-27 — Tire Removal Procedure

7. When lower bead is started over rim flange, tire can be removed the rest of the way by hand.

REPAIRING TIRE

In the event of a flat tire, remove wheel as described in preceding section and inflate tire to no more than 20 psi. Immerse tire in water to determine point of leak. Mark point where bubbles escape. Leak could be due to any of the following: punctured casing, faulty valve core, valve stem improperly seated in rim or tire bead improperly seated on rim. Small holes in casing can be plugged with a standard automotive tubeless tire repair kit available at most auto supply stores. When reason for loss of air has been determined, remove tire rim (See Removing Tire from Rim). For punctured tires, the standard tubeless tire repair procedure can be followed.

WARNING:

Keep hands, fingers, etc., from exposed areas between bead and rim while inflating or mounting tire.

1. Clean both tire beads to remove dirt or foreign matter.
2. Clean wheel rim where tire beads seat with a wire brush.

NOTE: Cleaning tire and rim is very important as tubeless tires require a perfect seal to seat.

3. Apply a liberal amount of tire mounting lubricant (soap and water solution) to both tire bead and rim flange.
4. Install tire on rim from valve stem side. If tire machine is unavailable, use rubber mallet and tire iron to install tire on rim.
5. Remove valve core and position tire so tire bead is seated on rim flange narrow bead seat.
6. Place tire upright against wall and push against tire on side opposite wall **(Figure 12-28)**. This three point contact will tend to bring bead out in contact with rim so that internal pressure is formed and beads snap into place when air is applied through valve stem.

Figure 12-28

WARNING:

A high pressure source over 100 psi should not be used. Caution must be used when reinflating or bringing a tire up to recommended pressure from a high pressure air supply. Due to the low pressure requirements of a small tire, overinflation may be reached almost instantly. Overinflation could cause the tire to explode, resulting in possible personal injury.

7. Inflate tire to 30 to 35 psi to seat tire on rim.
8. Quickly remove air pressure and install valve core.
9. Correct air pressure in tire to 12-14 psi and immerse in water to check for leaks.

SECTION XIII - BRAKES

GENERAL INFORMATION

The CLUB CAR is equipped with mechanical expanding shoe drum brakes on each rear wheel. A single pedal with an integral tip-over latching park brake activates the brakes through two equalized brake cables. The park brake is automatically released by depressing the brake pedal or accelerator pedal.

For safe operation, brake pedal free play should be maintained at ¾ to 1 in.

NOTE: Pedal free play is distance brake pedal will travel before brakes actuate.

When the pedal play exceeds this range, brake shoe adjustment **MUST** be made at each rear wheel.

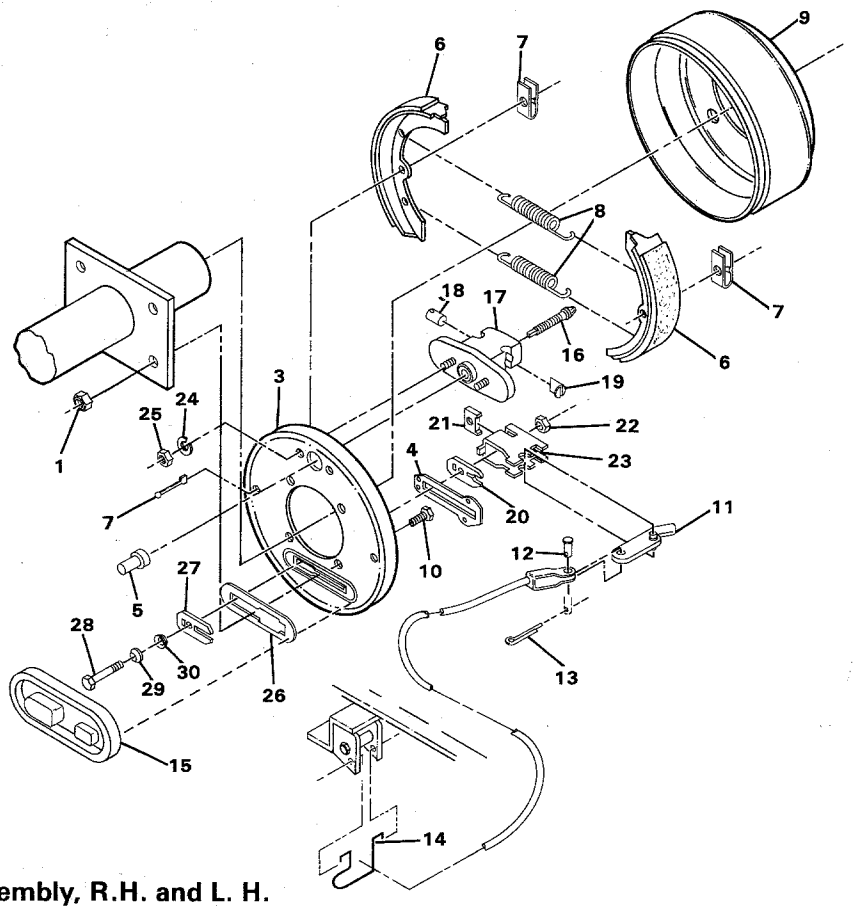


Figure 13-1 —
Brake Cluster Assembly, R.H. and L. H.

CLEANING BRAKE MECHANISMS

CAUTION:

Brake slides must be free to move side to side and brake shoes must be free to move up and down. If these mechanisms are clogged or jammed all adjustments made hereafter will be incorrect, therefore, it is necessary to clean and lubricate these components periodically.

WARNING:

Only trained people should repair or service this vehicle. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing this vehicle.

WARNING:

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Lift only one end of vehicle at a time. Chock the wheels and lock brakes prior to lifting. Use a suitable lifting device (i.e., chain hoist, hydraulic floor jack) with 1000 lb. minimum lifting capacity. DO NOT use lifting device to hold vehicle in elevated position. Always use approved jack stand of proper weight capacity to support vehicle.

1. Remove wheel and brake drum.
2. Wearing proper eye and respiratory protection, remove dust and dirt from the brake.

WARNING:

Since CLUB CAR brake shoes contain asbestos fiber and asbestos dust is created when these brake mechanisms are handled, do not use compressed air to clean brake mechanism. Inhalation of asbestos could result in severe personal injury or death. Clean with commercially available solvent spray in ventilated area while wearing eye protection and respiratory protection (OISHA/29 CFR - 1910.1001 or equivalent).

3. Move brake shoes (6) up and down, move brake slides (4) side to side.
4. If shoes do not move freely, move the shoes up and down and side to side with a large screwdriver. Lubricate with dry graphite, CLUB CAR part # 1012151, on the activating mechanisms (17) and slides (11) until shoes move freely. Remove boot (15) to spray inner slide (11) **(Figure 13-1)**.

WARNING:

Do not allow lubricant to contact brake shoes. Loss of brakes may result.

5. Reinstall drum and wheel and adjust brakes.

BRAKE SHOE ADJUSTMENT

CAUTION:

Do not adjust pedal play at the brake cable equalizer until adjustment has been made at each wheel.

1. Raise rear of car and support drive unit with jack-stands.
2. Loosen jam nuts on brake equalizer rod **(Figure 13-2)**, to provide slack in brake cables and allow brake levers to return to fully released position.
3. Remove rubber dust cover.
4. Turn the adjustment bolt clockwise until the wheel does not rotate freely **(Figure 13-3)**. (Use 7mm open end wrench or 8 pt. socket or brake adjustment tool, CLUB CAR part # 1013582.)

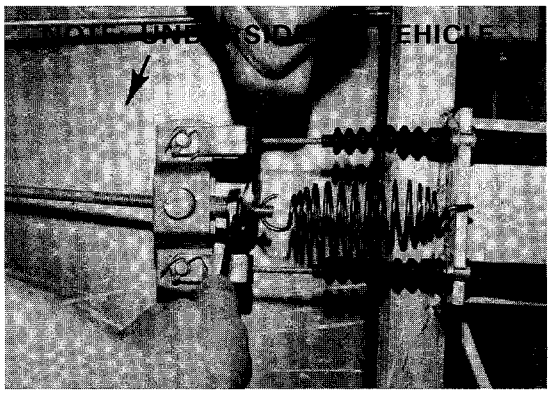


Figure 13-2

5. Turn adjustment bolt (16) counterclockwise approximately 5 clicks or until wheel turns freely. Replace rubber dust cover **(Figure 13-3)**.
6. Repeat procedure for the other wheel.
7. Adjust brake cable for proper pedal free play. (See Brake Pedal and Cable Adjustment.)
8. If brakes drag or are difficult to adjust, see Cleaning Brake Mechanisms.

BRAKE PEDAL AND CABLE ADJUSTMENT

Figure 13-3

WARNING:

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Lift only one end of vehicle at a time. Chock the wheels and lock brakes prior to lifting. Use a suitable lifting device (i.e., chain hoist, hydraulic floor jack) with 1000 lb. minimum lifting capacity. DO NOT use lifting device to hold vehicle in elevated position. Always use approved jack stand of proper weight capacity to support vehicle.

1. Adjust brake shoes as described above.
2. Correct brake pedal position is 6½" from floormat to back of brake pedal **(Figure 13-4)**.

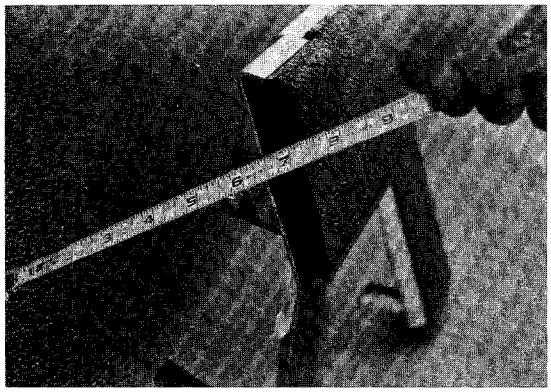


Figure 13-4

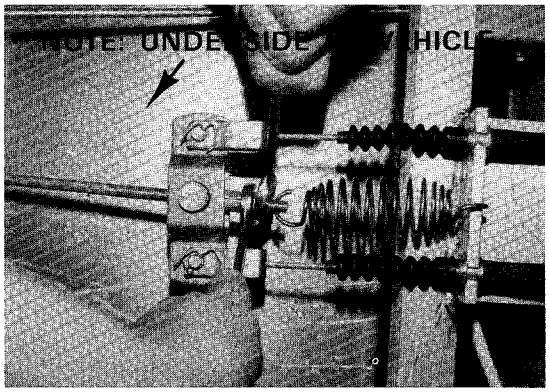


Figure 13-5

3. To adjust pedal position, loosen jam nuts on brake equalizer rod to provide slack in brake cables **(Figure 13-5)**.
4. Loosen jam nut on rubber pedal stop and rotate stop until pedal is 6½" from floormat **(Figure 13-6)**.
5. Tighten jam nut on rubber stop.
6. To adjust brake cables, turn jam nut on brake equalizer rod until brake pedal free play is between ¾" to 1" **(Figure 13-5)**.
7. With brake pedal in fully released position, car should roll freely without brake drag.

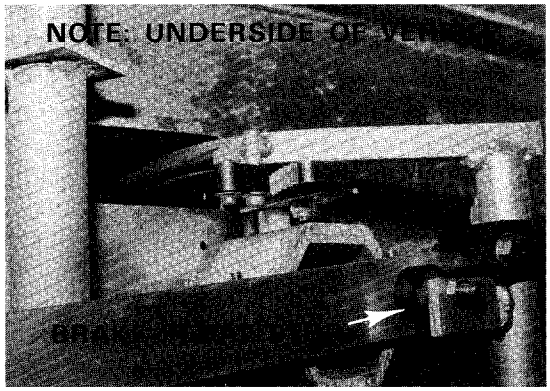


Figure 13-6

8. Tighten jam nuts on brake equalizer rod using two wrenches **(Figure 13-5)**.

PARK BRAKE ADJUSTMENT

WARNING:

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

1. Inspect park brake pawl and latch for excessive wear, grooves, cracks or chips. If either pawl or latch is damaged, they must be replaced.
2. Adjust brake shoes and brake cable as described above.

DANGER:

Turn key switch off and place forward and reverse lever in neutral or off position prior to servicing. Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle. This will prevent the vehicle from running over you while disconnecting or adjusting the accelerator push rod.

3. Disconnect push rod from accelerator pedal **(Figure 13-7)**.
4. Adjust accelerator stop to maintain 1/32 in. - 1/8 in. gap between brake latch (2) and brake pawl (3) **(Figure 13-8 and Figure 13-9)**.

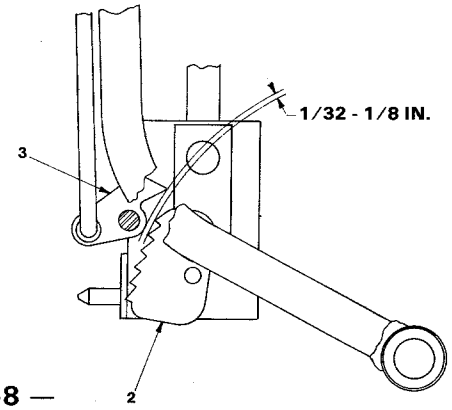


Figure 13-8 — Park Brake Adjustment

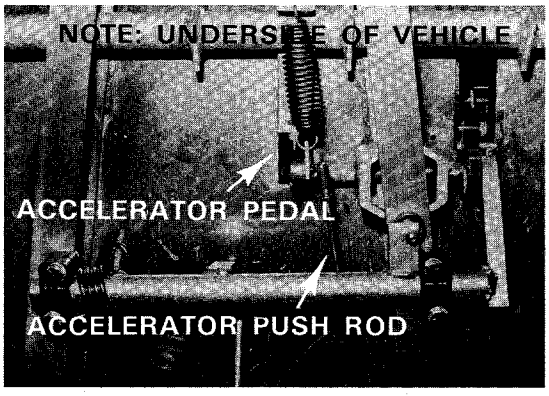


Figure 13-7

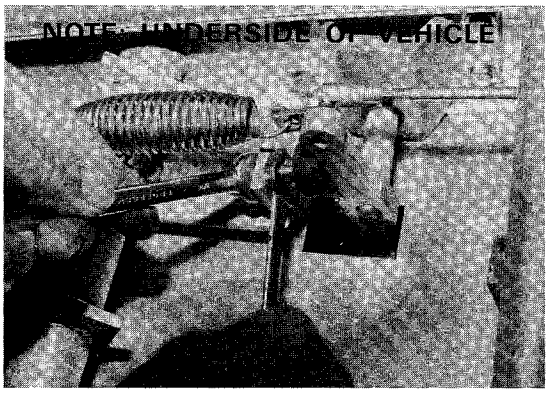


Figure 13-9

5. Brake pawl must fully engage notches in brake latch without pushing brake latch rearward when park brake is applied. To insure proper pawl engagement, measure distance from floor board to top of accelerator pedal before engaging park brake. **(Figure 13-10)**.

NOTE: After locking park brake, the accelerator pedal must return to the original measurement. If not, engagement is too deep and park brake rod must be adjusted.

6. To adjust park brake rod, snap ball joint from park brake pedal and rotate ball joint. Rotate ball joint clockwise to increase pawl to latch engagement, counterclockwise if accelerator pedal does not return to original position with park brake locked **(Figure 13-11)**.
7. Reconnect accelerator push rod.

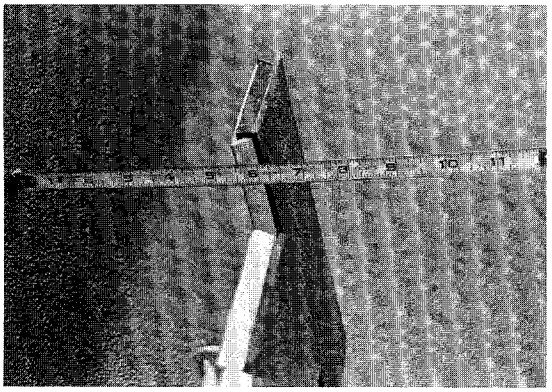


Figure 13-10

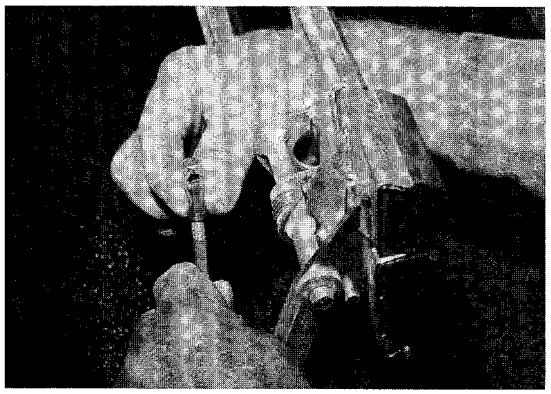


Figure 13-11

BRAKE SHOES

REMOVAL

WARNING:

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

1. Loosen the brake cable at the equalizer and turn the brake shoe adjusting screw (5) outward to retract the brake shoes (6) until the brake drum (9) clears the shoes **(Figure 13-15)**.
2. Remove wheel and brake drum. (Refer to Section XI - Drive Unit.)
3. Remove shoe retaining clip by rotating 90° while holding pin with needle nose plier **(Figure 13-12)**.

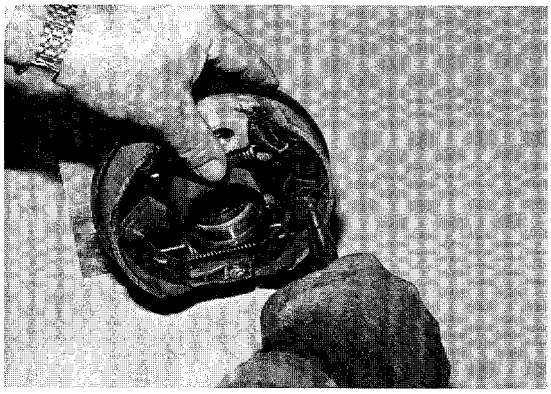


Figure 13-12

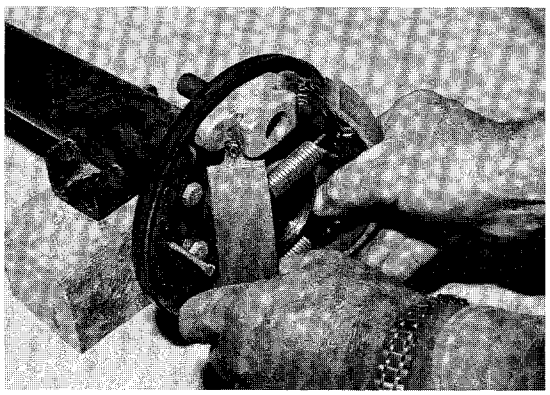


Figure 13-13

4. Remove shoes and springs as a unit by securely holding one shoe and pulling the opposite shoe out of the grooves in the actuator **(Figure 13-13)**.

INSTALLATION

1. Replace the shoes by reversing the above procedure.

NOTE: Narrow end of shoe backing plates must be installed in adjuster, tapered end must be installed in actuator **(Figure 13-14)**.

2. Install brake drum and wheel.

3. Adjust brake shoes as previously described under Brake Shoe Adjustment.

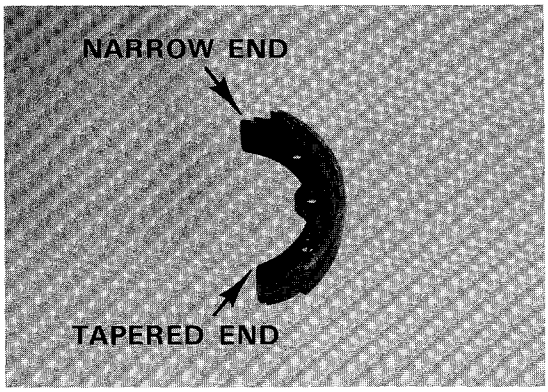


Figure 13-14

BRAKE ASSEMBLY

REMOVAL

WARNING:

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

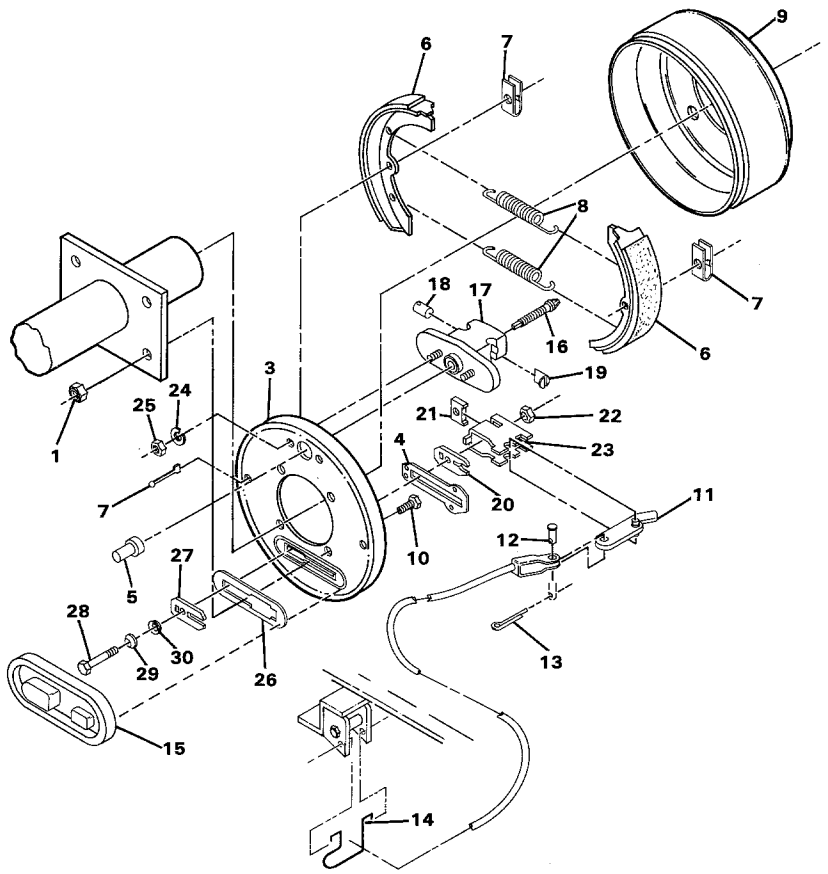


Figure 13-15 — Brake Cluster Assembly, R.H. and L.H.

1. Loosen the brake cable at the equalizer.
2. Remove wheel, brake drum and axle. (Refer to Section XI - Drive Unit.)
3. Remove cotter pin (13) and clevis pin (12) from brake cable.
4. Remove four bolts (10), and locknuts (1) that mount brake assembly to drive unit.
5. Brake assembly can now be removed from drive unit.

INSTALLATION

1. Install in reverse order of disassembly.
2. Be sure bolts (10) and locknuts (1) are grade 8.
3. Torque bolts 27-33 ft.-lbs.

WARNING:

Be sure retaining ring is properly seated in groove. If ring is not properly installed in ring groove, the axle assembly will separate fron the drive unit and damage the axle assembly and other components. Loss of control of the vehicle could result in severe personal injury or death.

4. Adjust brakes as previously described in this section.

BRAKE PEDAL ASSEMBLY

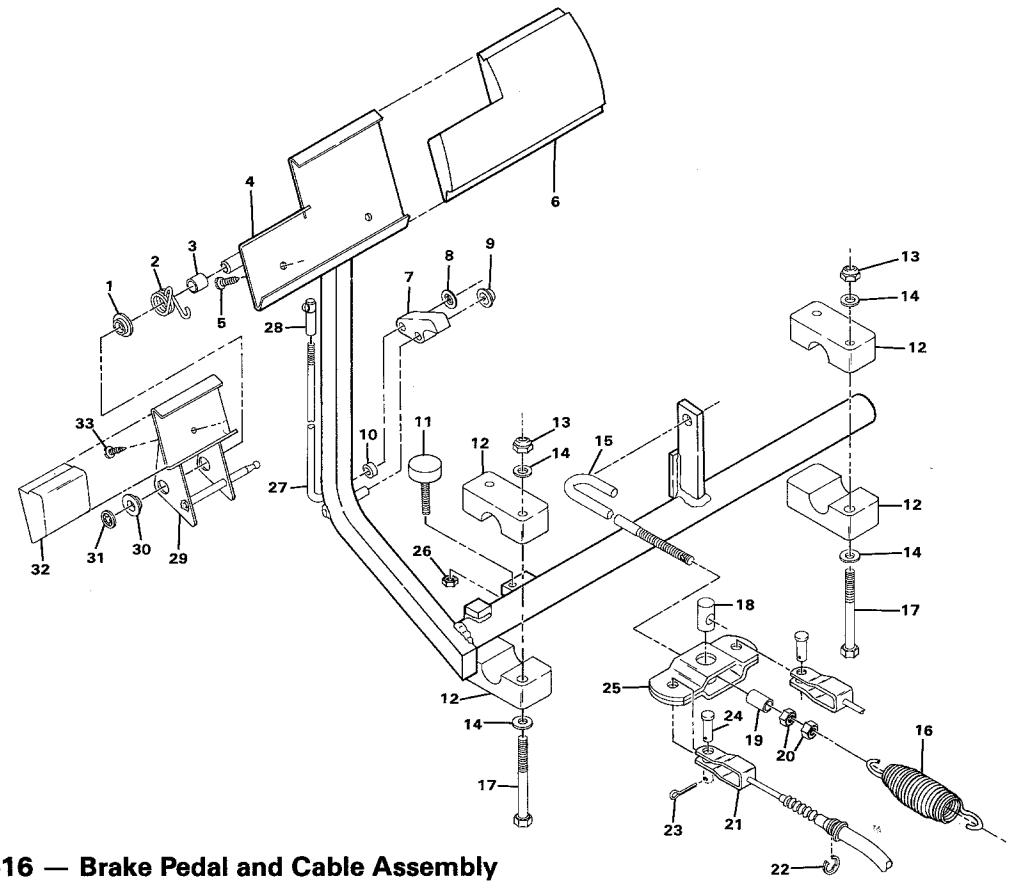


Figure 13-16 — Brake Pedal and Cable Assembly

REMOVAL

WARNING:

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Lift only one end of vehicle at a time. Chock the wheels and lock brakes prior to lifting. Use a suitable lifting device (i.e., chain hoist, hydraulic floor jack) with 1000 lb. minimum lifting capacity. DO NOT use lifting device to hold vehicle in elevated position. Always use approved jack stand of proper weight capacity to support vehicle.

1. Remove the pedal return spring (16) from the equalizer rod **(Figure 13-16)**.
2. Loosen brake equalizer rod jam nuts (20) and unhook rod (15) from pedal shaft.
3. Remove nut (26) and brake stop (11).
4. Remove nuts (13), flatwashers (14), bolts (17), and bearing blocks (12).
5. Lift pedal assembly up through floor board.
6. To remove park brake pawl (7), remove push-on retainer nuts (8 and 9).

NOTE: New retaining nuts must be used for reassembly.

7. To remove park brake pedal (29), remove push-on retainer nut (31), unhook torsion spring (2) and slide pedal off shaft.
8. Inspect all parts for wear or damage and replace as necessary.

INSTALLATION

1. Reassemble and install in reverse order.
2. Lubricate all pivots and bushings with WD-40® or dry graphite lubricant, CLUB CAR part # 1012151.
3. Adjust brakes as previously described in this section.

SECTION XIV - BODY AND TRIM

NOTE: All vehicles with a serial number greater than 8746-132928 are equipped with a reaction injection molded polymer cowl.

GENERAL INFORMATION

WARNING:

Only trained people should repair or service this vehicle. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

The CLUB CAR is equipped with a compression molded fiber reinforced plastic (FRP) body and a reaction injection molded polymer cowl.

Use a mild soap or detergent with a sponge or soft cloth for normal cleaning.

CAUTION:

Do not use harsh detergents or cleaning solvents which contain ammonia, aromatic solvents or alkali materials on the body, cowl or seat.

PERIODIC MAINTENANCE

BODY AND COWL

Minor scratches or blemishes in the body or cowl can be buffed out using most commercially available polishing compounds and polishes.

Battery acid, fertilizers, tars, asphalt, creosote, paint or chewing gum should be removed immediately to prevent possible stains.

CAUTION:

Battery acid will cause permanent blemishes. Do not let battery acid from battery caps or hydrometer get on body or cowl. Wash off immediately.

COWL REPAIR

Minor damage to cowl can be repaired using CLUB CAR'S Flexible Epoxy Kit, part # 1014963. Contact CLUB CAR'S Customer Service Dpeartment or your local CLUB CAR Distributor/Dealer for kits or replacement cowls.

WARNING:

EPOXY RESIN: In case of skin contact, wash thoroughly with soap and water. In case of eye contact, flush immediately with large amounts of water, get medical attention immediately. If taken internally, induce vomiting; get medical attention immediately.

WARNING:

AMINE HARDENER: Avoid contact with skin, eyes or mucous membranes. In case of contact, flush thoroughly with water and get prompt medical attention. Do not take internally. If swallowed, give large quantities of water or milk. Get medical attention immediately.

Use in well-ventilated area. Avoid breathing of vapor.

KEEP OUT OF REACH OF CHILDREN.

Wear a respirator approved for dust and mist when cutting, sanding, painting or repairing cowl.

1. Using clean rags, clean thoroughly for a considerable distance in every direction around the damaged area **(Figure 14-1)**.
2. If damaged area has ragged edges, cut or grind away all loose material. Cut a V-shaped groove on the top side on all edges of the repair area **(Figure 14-2)**. Sand all the area to be repaired on top side only with 40 grit sandpaper.

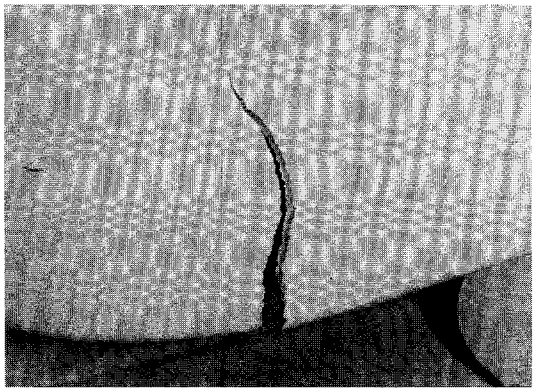


Figure 14-1

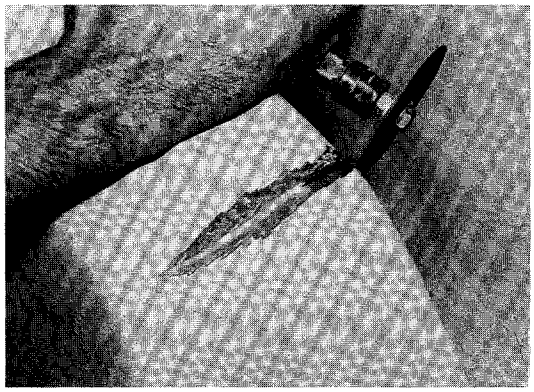


Figure 14-2

3. A large patch or tear should be repaired by using masking tape over the painted side of the hole or tear. Extend the tape at least 2" to 3" beyond the edge of the break **(Figure 14-3)**. The back side of the damaged area should be cleaned thoroughly with a clean rag.
4. Size the fiberglass mat to extend at least 2" to 3" beyond the edge of the break.

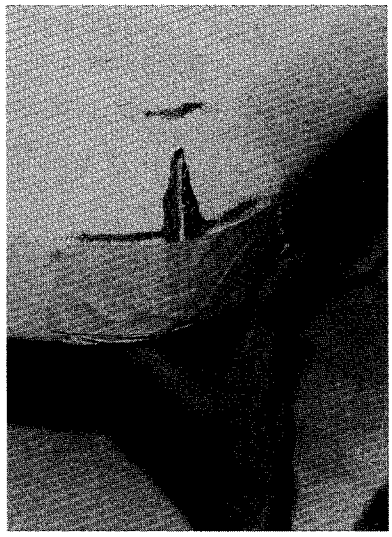


Figure 14-3

DANGER:

EPOXY RESIN-AMINE HARDENER MIXTURE

CAUSES EYE IRRITATION. MAY CAUSE SKIN IRRITATION. HARMFUL IF SWALLOWED.

Do not get in eyes, on skin or in mouth. Flush eyes with running water for 15 minutes. CALL A PHYSICIAN. Wipe off skin and wash thoroughly with soap and water. Do not take internally. If swallowed, induce vomiting. CALL A PHYSICIAN. Rinse mouth with water. Contains epoxy-resin, tertiary-amines, polymercaptans and polyamides.

KEEP AWAY FROM CHILDREN.

5. Mix equal amounts of enough resin and hardener to completely fill the damaged area. Spread the mixture over the back side of the damaged area using a putty knife or spreader **(Figure 14-4)**. Apply the sized fiberglass mat to the top of this epoxy mixture pressing down to eliminate air pockets **(Figure 14-5)**. Apply additional resin and hardener mixture until the fiberglass mat is completely saturated.

Figure 14-4

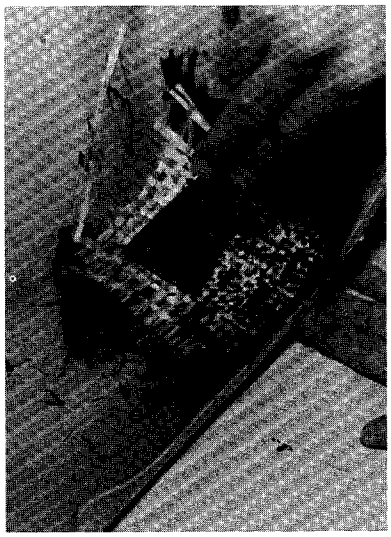


Figure 14-5

6. After the epoxy has cured for a minimum of 20 to 30 minutes, remove the masking tape from top surface of cowl. If needed, apply an excess of resin and hardener mixture, building it higher than the surface to be finished, to allow for sanding **(Figure 14-6)**.

Figure 14-6

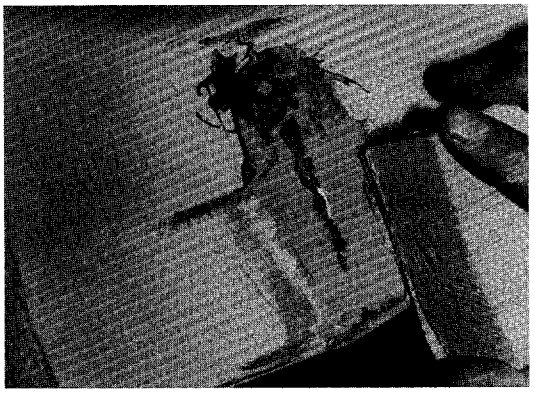


Figure 14-7

7. Use 80 grit sandpaper to rough the epoxy to the proper level and contour **(Figure 14-7)**. Use 240 sandpaper to smooth out the finish and duplicate the original surface **(Figure 14-8)**. If additional filling is required, the adhesive can be used again as filler.

8. Apply four (4) medium coats of CLUB CAR'S Surface Primer, part # 1015163, flashing 3 to 5 minutes between coats. Air dry primer overnight or 12 hours.

9. Sand primed area with fine 600 grit sandpaper being careful not to sand through primer.

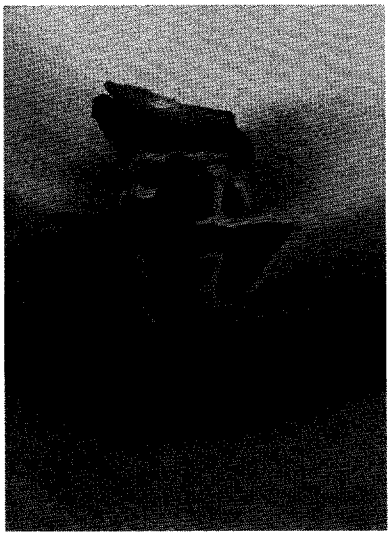


Figure 14-8

10. Paint the repaired area with matching spray paint available from CLUB CAR. Hold the can about 12-14 inches away from repaired surface and coat with light, even strokes **(Figure 14-9 and Figure 14-10)**.

Figure 14-9

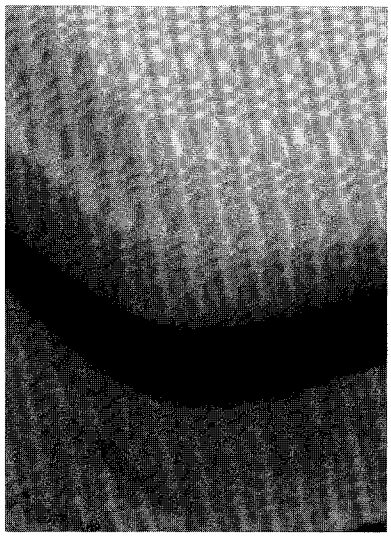


Figure 14-10

BODY REPAIR

Minor damage to the body can be repaired by using CLUB CAR's fiberglass repair kit, CLUB CAR part # 1012093. Contact CLUB CAR's Customer Service Department or your local CLUB CAR Distributor/Dealer for this kit or replacement body.

WARNING:

FLAMMABLE SUBSTANCE. KEEP AWAY FROM HEAT AND OPEN FLAME.

Contains polyester resins and methyl ethyl ketone peroxide. Methyl ethyl ketone peroxide causes severe burns.

RESIN: In case of skin contact, wash thoroughly with soap and water. In case of eye contact, flush immediately with large amounts of water, get medical attention immediately. If taken internally, do not induce vomiting. Get medical attention immediately.

LIQUID HARDENER (METHYL ETHYL KETONE PEROXIDE): Avoid contact with skin, eyes or mucous membranes. In case of contact, flush thoroughly with water. Get prompt medical attention. If swallowed, give large quantities of water or milk. Get medical attention immediately.

Use in well-ventilated area. Avoid breathing of vapor.

KEEP OUT OF REACH OF CHILDREN.

Wear a respirator approved for dust and mist when cutting, sanding, painting or repairing fiberglass.

1. Clean up the damaged area by chipping out all small pieces. Cut all cracks with a hack saw blade just beyond the end of the crack **(Figure 14-11)**.

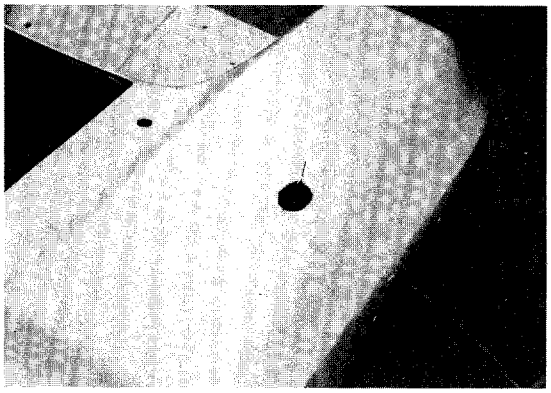


Figure 14-11

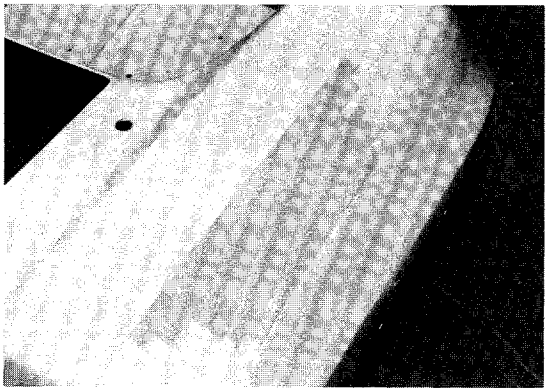


Figure 14-12

2. Sand the area 2-3 inches beyond the damaged area. Clean front and back of body. All oil, dirt, and moisture should be cleaned from the area.
3. Apply masking tape to damaged area on the painted side of the body. The tape should completely cover the damaged area including cracks **(Figure 14-12)**. Turn cowl upside down.
4. Following manufacturer's instructions, mix enough resin and hardener to cover the damaged area and at least two inches beyond **(Figure 14-13)**. Cover the entire area with this mixture.

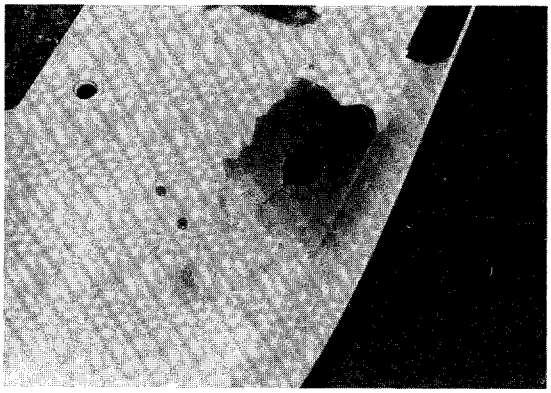


Figure 14-13

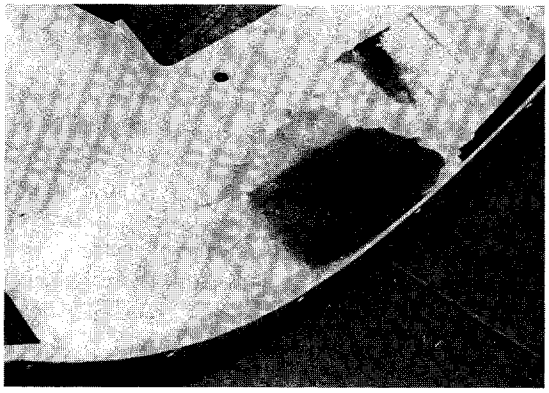


Figure 14-14

5. Cut a piece of fiberglass cloth or mat that will extend beyond the damaged area at least 2 inches on all sides. Lay this cloth or mat over the damaged area.
6. Saturate the fiberglass mat with resin/hardener mixture **(Figure 14-14)**.
7. Let cure for at least an hour. Overnight would be better.
8. After curing, turn body over and remove masking tape.
9. Clean and sand surrounding area **(Figure 14-15)**.
10. Hole or cracks should be filled with body filler. Use a squeegee to spread body filler out evenly and uniformly. Allow to cure **(Figure 14-16)**.

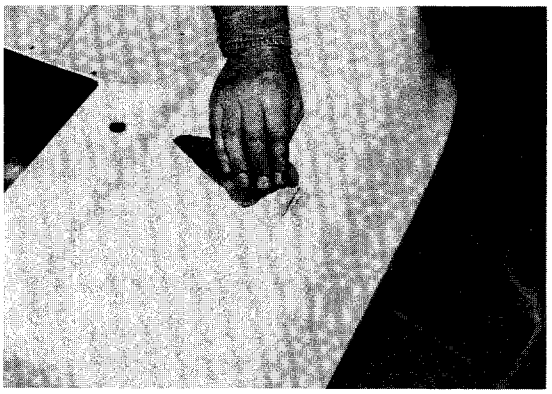


Figure 14-15

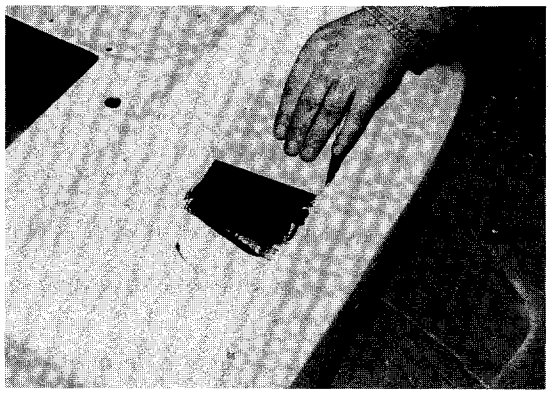


Figure 14-16

11. Test plastic filler by touching with fingertips; as soon as the filler does not show finger marks, it is ready to start shaping with a wood rasp. When the filler is ready to be shaped, it will flake very evenly when the rasp is used; if the rasp gums up, wait another minute and test again. Do not let a large amount of body filler harden completely or it will require a great deal of grinding to cut the filler down to the desired shape.

12. After the body filler has been shaped to the approximate desired shape, sand with sandpaper. Begin with 80 grit coated sandpaper and go to 240 or 320 grit coated sandpaper as the final finish is approached **(Figure 14-17)**.

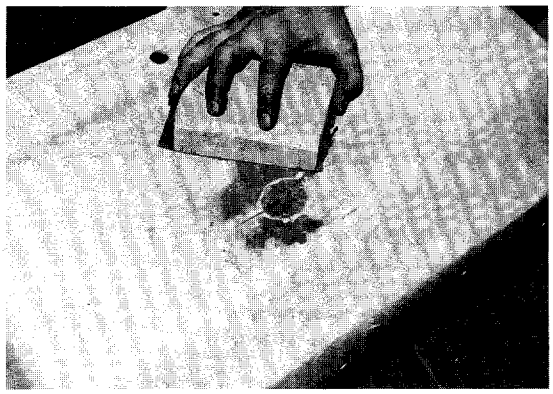


Figure 14-17

Figure 14-18

13. Paint the repaired area with matching spray paint, available from CLUB CAR. Hold the can about 12-14 inches away from repaired surface and coat with light, even strokes **(Figure 14-18)**.

14. If surface appears rough, it may help to put a few drops of water over the area and sand again with 320 grit coated sandpaper. This should prevent scratching while sanding. Wipe dry and clean and lightly recoat the surface with spray paint **(Figure 14-19)**.

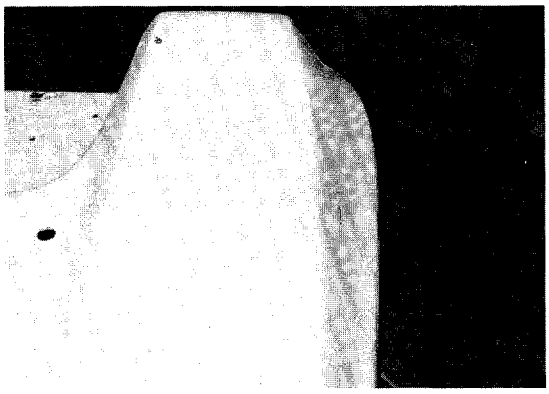


Figure 14-19

SEAT

Proper cleaning of the seat will make the seat last longer. Mild soap or detergent with a sponge or soft cloth for normal cleaning is recommended. For stubborn or imbedded dirt, a soft bristle brush may be used.

FRONT COWL (Figure 14-20)

REMOVAL

WARNING:

Only trained people should repair or service this vehicle. All people doing even simple repairs or service should follow the correct procedures and obey the warnings listed in this manual.

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

WARNING:

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/ connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

Remove spark plug wire to avoid accidental start-up of engine when servicing vehicle.

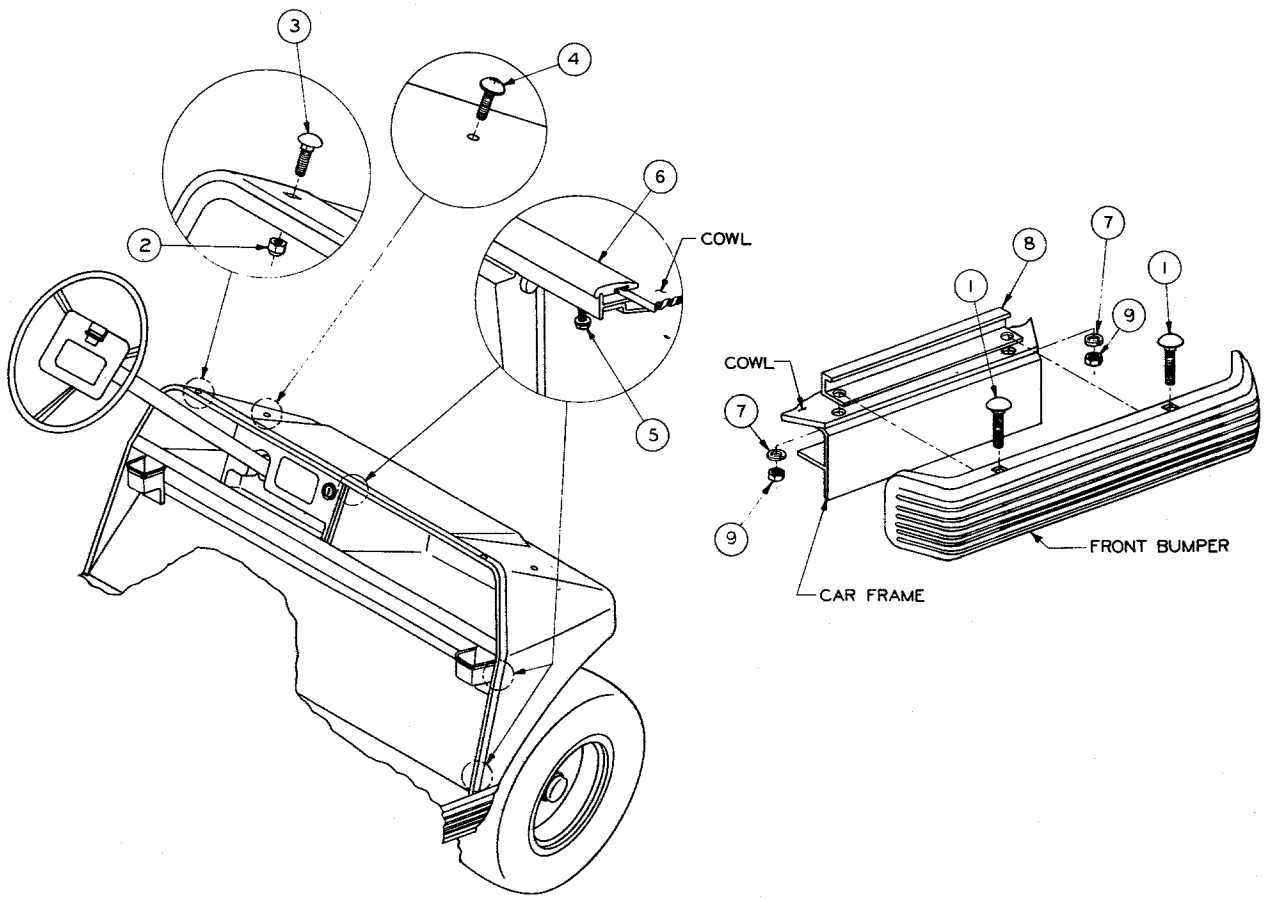


Figure 14-20 — Cowl Removal

1. Remove carriage bolts (1), lockwashers (7) and hex nuts (9) to remove front bumper from cowl and car frame. Retain trim strip (8).
2. Remove carriage bolts (3) and locknuts (2) from cowl trim. Remove bolts (4) from top of cowl.
3. Loosen (do not remove) flange lock screws (5) holding cowl trim (6) against cowl.
4. Pull cowl from under cowl trim (6) and lift from car.

INSTALLATION

1. Reverse procedure outlined above to install.

BODY AND SEAT (Figure 14-21)

REMOVAL

WARNING:

Always wear eye protection when servicing this vehicle.

Turn key switch off, remove key, and place forward and reverse lever in neutral or off position prior to servicing.

Disconnect battery cables — negative (-) first — to avoid accidental start-up of engine/vehicle when servicing vehicle.

Frame ground — do not allow wrench or other metal object to contact frame when disconnecting/connecting battery cables or other electric wiring. Never allow positive wire to touch frame, engine, inner frame or other metal vehicle component.

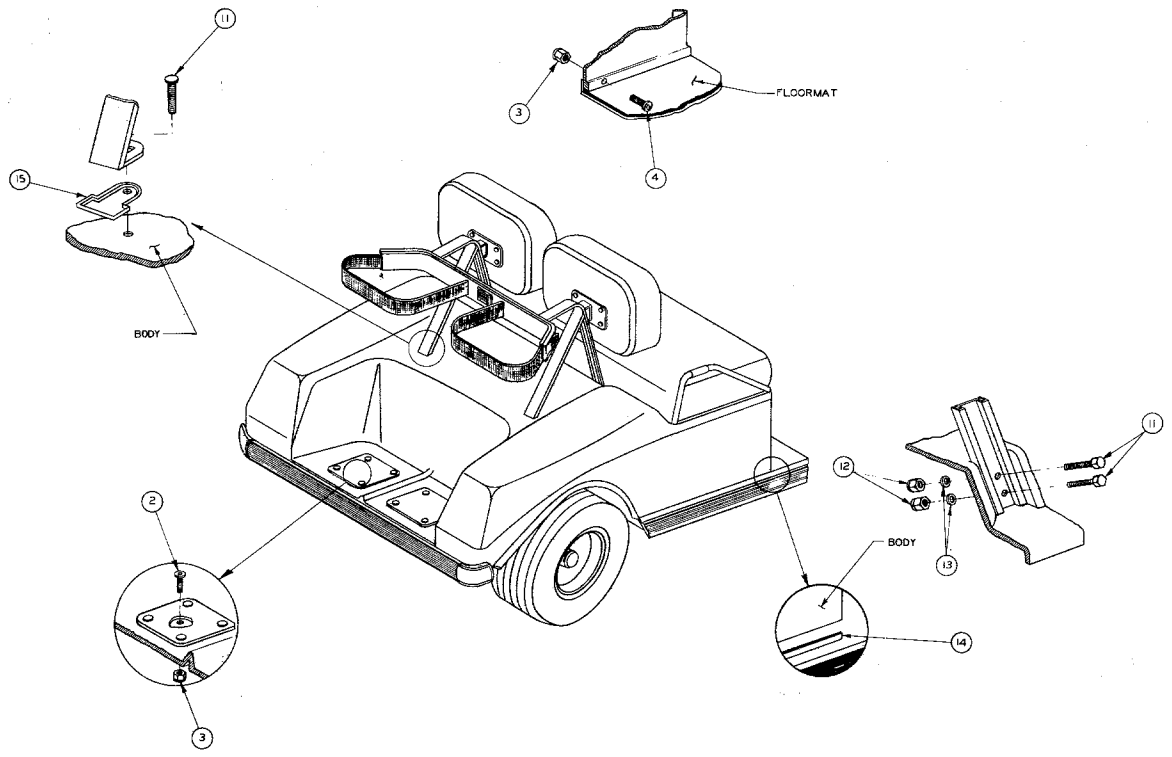


Figure 14-21 — Body and Seat Removal

NOTE: Rear bumper does not have to be removed to remove body.

1. Remove seat from body.
2. Remove two bolts (2) and locknuts (3) located under mats in bagwell bottom **(Figure 14-22)**.
3. Remove two bolts (4) and locknuts (3) located at body kick plate **(Figure 14-23)**.
4. Remove screw and slide F and R handle from shaft.

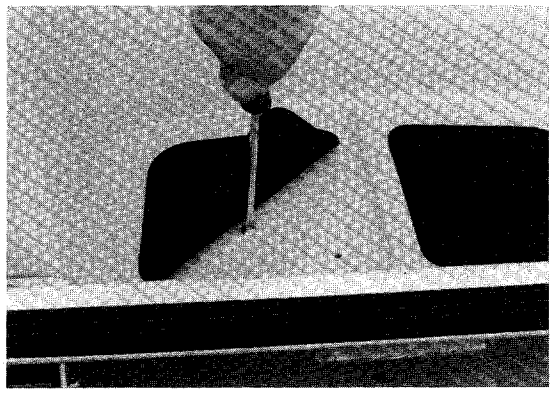


Figure 14-22

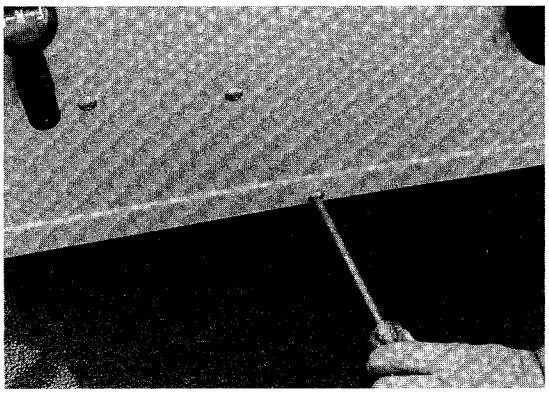


Figure 14-23

5. Remove three bolts, hex nuts and lockwashers and disengage forward and reverse shift lever assembly from body. Set F&R assembly on I-beam.
6. Remove shifter cable from slotted mounting bracket **(Figure 14-24)**.

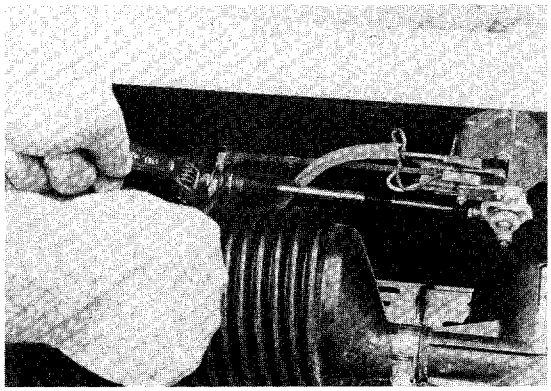


Figure 14-24

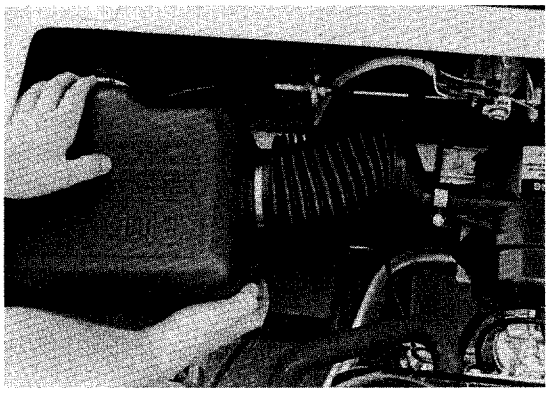


Figure 14-25

7. Loosen air intake expansion chamber at choke assembly and remove air intake expansion chamber from choke **(Figure 14-25)**.
8. Remove 2 carriage bolts and nuts located at the rear of both seat back mounting plates **(Figure 14-26)**.
9. Remove 4 bolts (11), locknuts (12) and flatwashers (13) at the front of both seat back mounting plates.
10. Lift seat back assembly from car. Retain seat back assembly mounting pads.
11. Lift body from car.

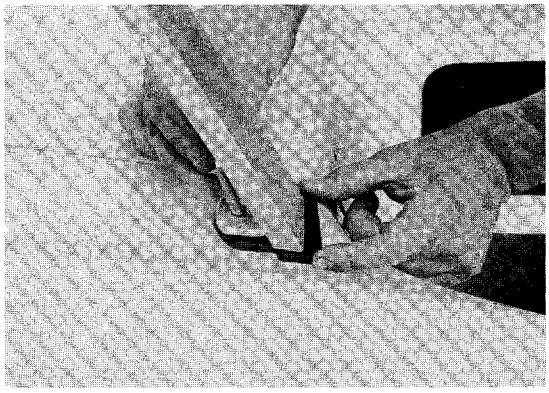


Figure 14-26

INSTALLATION

1. Be careful to properly install vinyl trim (14) between body bottom edge and frame side stringer on both sides. It is recommended to glue vinyl trim to body.

NOTE: Install mounting pads between body and seat back assembly **(Figure 14-26)**.

2. Install body and seat using reverse procedure.

BODY SOUND INSULATION

REMOVAL

1. Remove body as described under Body and Seat Removal.
2. Inspect for integrity and adherence to body of sound insulating foam.
3. If damaged or loose, remove from body by scraping with putty knife or with wide paint scraper.

INSTALLATION

1. Be sure that body is thoroughly clean and dry before installing new foam.
2. Install new foam by removing protective paper backing from adhesive surface.
3. Position foam and press firmly into place.
4. Install body as described under Body Installation.

FLOORMAT

REMOVAL

1. Remove brake and accelerator pedals (refer to Section XIII - Brakes).
2. Loosen 2 bolts in body kick plate **(Figure 14-23)** and remove rear edge of floormat from between body and floor panel.
3. Remove top edge of floormat from overlapping flange under dash.
4. Lift mat from car.

INSTALLATION

1. Reverse the above procedure for mat installation.

NOTE: Be sure floor mat retaining tabs near body kickplate are inserted in floorboard slots.

NOTES

NOTES

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