CUSHMAN™

Repair & Service Manual

GASOLINE POWERED UTILITY VEHICLE

632905

ISSUED MAY 2013

REVISED MAY 2015

Read all of Section B and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

TABLE OF CONTENTS FOR SECTION 'A'

LIST OF ILLUSTRATIONS

Read all of Section B and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

TABLE OF CONTENTS FOR SECTION 'B'

LIST OF ILLUSTRATIONS

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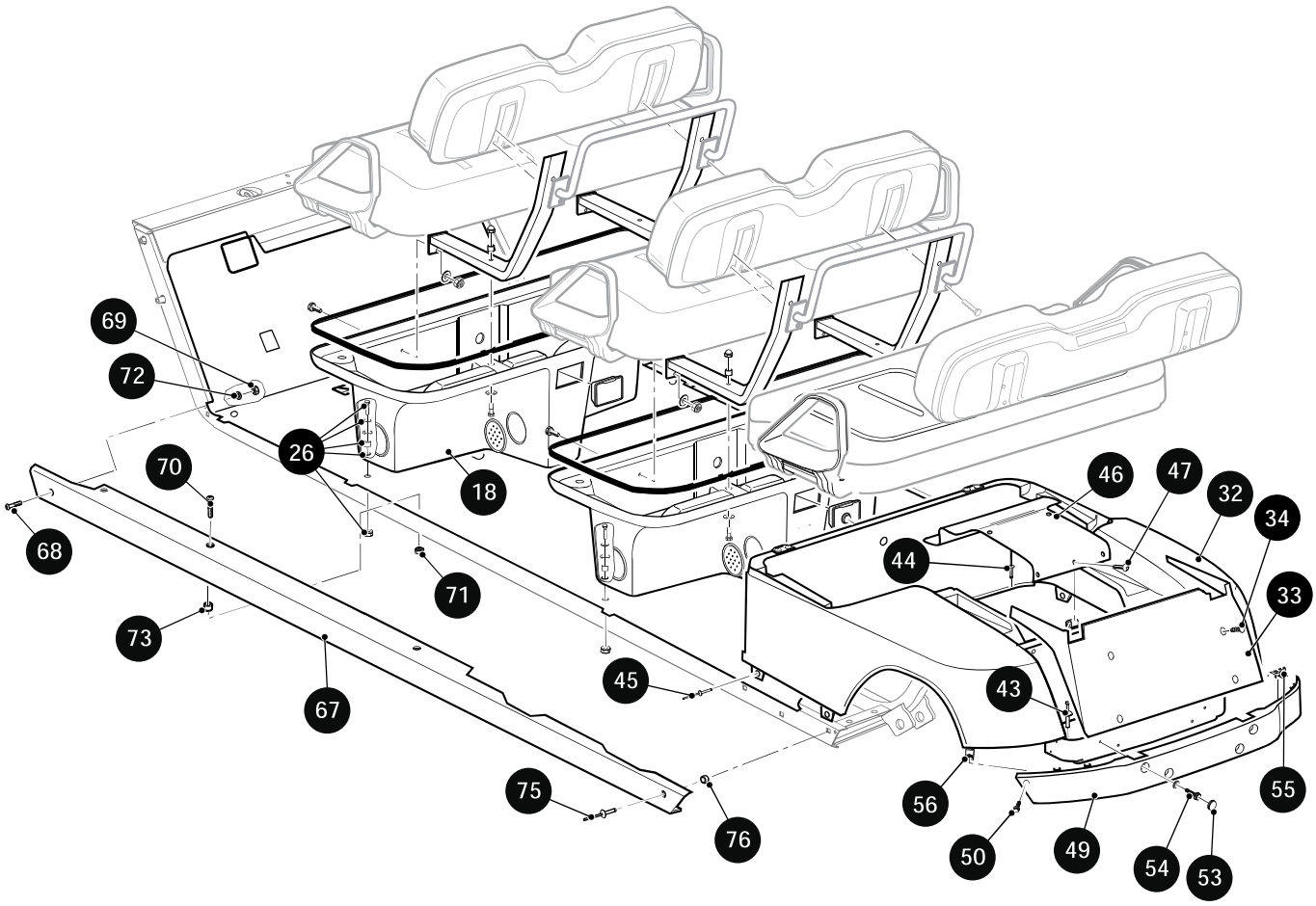

Fig. 3 Body Components (Seats and Rear Body)

Read all of Section B and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

WHEEL AND TIRE SERVICE

Tools List	Qty.
Lug Wrench, 3/4"	1
Impact Wrench	1
Impact Socket, 3/4"	1
Torque Wrench, ft. lbs.	1

⚠ WARNING

To prevent injury caused by a broken socket, use only sockets designed for impact wrench use. Never use a conventional socket.

Tire condition should be inspected per the Periodic Service Schedule. Inflation pressures should be checked when the tires are cool. When removing wheels with an impact wrench, use only impact sockets. Regular sockets are not designed for impact pressures exerted by power tools.

⚠ WARNING

A tire explosion can cause severe injury or death. Never exceed inflation pressure rating on tire sidewall.

To prevent tire explosion, pressurize tire with small amount of air applied intermittently to seat beads. Never exceed the tire manufacturer's recommendation when seating a bead. Protect face and eyes from escaping air when removing valve core.

Use caution when inflating tires. Due to the low volume of these small tires, overinflation can occur in a matter of seconds. Overinflation could cause the tire to separate from the wheel or cause the tire to explode, either of which could cause personal injury.

Do not use low inflation pressure tires on any E-Z-GO vehicle. Do not use any tire which has a recommended inflation pressure less than the inflation pressure recommended in Owner's Manual

Use caution when inflating tires. Due to the low volume of these small tires, over inflation can occur in a matter of seconds. Over inflation could cause the tire to separate from the rim or cause the tire to explode, either of which could cause personal injury.

Tire inflation should be determined by the condition of the terrain. See **GENERAL SPECIFICATIONS** section for recommended tire inflation pressure. For outdoor applications with major use on grassy areas, the following should be considered. On hard turf, it is desirable to have a **slightly** higher inflation pressure. On very soft turf, a lower pressure prevents tires from cutting into the turf. For vehicles being used on paved or hard surfaces, tire inflation pressure should be in the higher allowable range, but under no condition should inflation pressure be higher than recommended on tire sidewall. **All four tires** should have the same pressure for optimum handling characteristics. Be careful not to over inflate. Due to the low volume of these small tires, over inflation can occur in a matter of seconds. Be sure to install the valve dust cap after checking or inflating.

Tire Repair

The vehicle is fitted with low pressure tubeless tires mounted on one piece rims.

Generally, the most cost effective way to repair a flat tire resulting from a puncture in the tread portion of the tire is to use a commercial tire plug.

NOTICE

Tire plug tools and plugs are available at most automotive parts outlets and have the advantage of not requiring the tire be removed from the wheel.

If the tire is flat, remove the wheel and inflate the tire to the maximum recommended pressure for the tire. Immerse the tire in water to locate the leak and mark with chalk. Insert tire plug in accordance with manufacturer's specifications.

If tire is to be removed or mounted, the tire changing machine manufacturer's recommendations must be followed in order to minimize possibility of personal injury.

⚠ WARNING

To prevent injury, be sure mounting/demounting machine is anchored to floor. Wear OSHA approved safety equipment when mounting/demounting tires.

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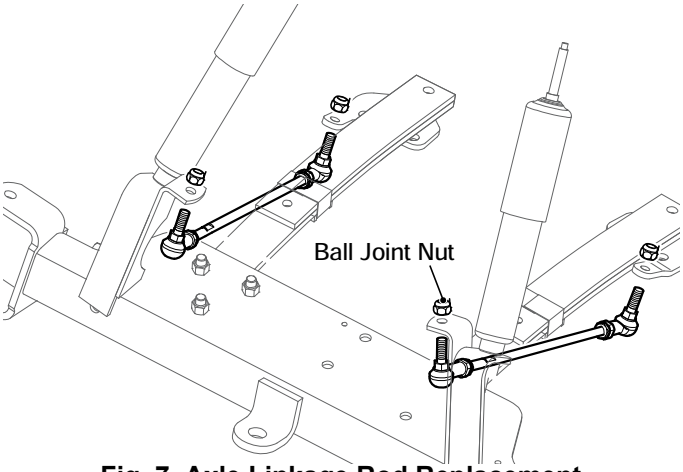

Fig. 7 Axle Linkage Rod Replacement

Front Spring Replacement

Tool List	Qty.
Jack Stands	4
Ratchet	1
Socket, 3/4"	1
Socket, 5/8"	1
Wrench, 5/8"	1
Torque Wrench ft. lbs.	1
Tape Measure	1

NOTICE

Failure of a single spring will result in overstressing the other spring; therefore, replace front springs as a set.

The following procedure will replace one spring at a time.

Loosen front wheels. Lift and support front of vehicle per SAFETY section. In addition, support front axle with jack stands. Remove front wheels.

To detach driver side spring:

Fully loosen the two rack and pinion unit lock nuts (15), one near the bellows and one on the rear side of the rack and pinion unit, until only one thread is engaged (Ref Fig. 6). Remove the lock nut (15) and washer (14) from the long bolt (20) and discard lock nut. The rack and pinion unit is now loose.

Remove the two 1 3/4" long bolts (18) and lock nuts (19) securing driver side spring to axle and discard lock nuts (19).

Hold nut (21) with wrench and loosen long bolt (20). Note location of washer (22) and thread long bolt out as far as possible to remove the washer, nut and spacer (23). Then pull long bolt and spring plate (24) from axle and spring. Retain above items (20 - 24) for assembly at their original locations.

Pull upper driver side of floor mat out of plastic trim retainer and away from floor. Locate and remove hardware (25 - 27) securing rear of spring (17) to vehicle frame and discard lock nuts (27).

⚠ CAUTION

To prevent stress and possible damage to the rack and pinion unit, the driver side spring must be mounted to the axle with the hardware (20 - 23) installed in its original location (Ref Fig. 6).

Driver side spring installation is the reverse order of disassembly making sure to install the long bolt (20), spring plate (24), spacer (23), nut (21) and washer (22) in their original locations. Use new lock nuts (15, 19, 27) to secure the rack and pinion unit (16), two short bolts (18) and rear bolts (25).

To detach passenger side spring:

Remove the hardware (18, 19, 24, 28) securing the front of the passenger side leaf spring (17) to the axle (3) and discard lock nuts (19) (Ref Fig. 6).

Pull upper passenger side of floor mat out of plastic trim retainer and away from floor. Locate and remove hardware (25 - 27) securing rear of spring (17) to vehicle frame and discard lock nuts (27).

Using new lock nuts (19, 27), install passenger side spring in the reverse order of disassembly.

NOTICE

After the springs are replaced, the axle will need to be aligned to the frame. Unless the axle has been replaced, wheel alignment will not be affected; however, it is always good practice to check wheel alignment any time the front-end components are replaced or adjusted.

When front springs are replaced, the front axle must be aligned to the frame. The distance from the center bolt at rear of left spring to the center bolt at front of right spring must be the same as the distance from the center bolt at rear of right spring to the center bolt at front of left spring (Ref Fig. 8). Tighten the spring hardware (21, 19, 27) first and rack and pinion unit hardware (15) next to 35 - 50 ft. lbs. (50 - 70 Nm) torque.

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Steering Wheel Replacement (Continued)

Loosen the steering wheel retaining nut (6) two to three turns (Ref Fig. 23). DO NOT REMOVE NUT AT THIS TIME. Apply upward pressure to the steering wheel. Place a plastic faced hammer against the steering wheel nut and strike plastic faced hammer sharply with a ball peen hammer.

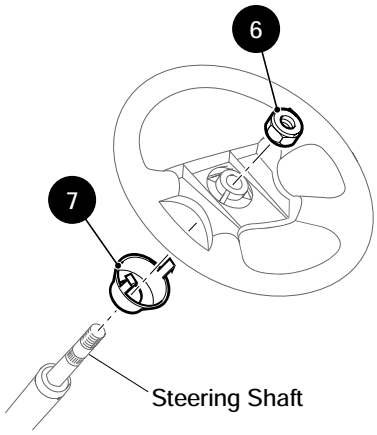

Fig. 23 Steering Wheel Replacement

⚠ CAUTION

Do not strike steering nut or end of steering shaft directly with ball peen hammer. Internal damage to rack and pinion unit can result.

When steering wheel is loosened, remove retaining nut and remove steering wheel.

Prior to replacement, assemble the replacement steering wheel by aligning the retaining tabs on the rear collar hub (7) with slots in back of steering wheel. Squeeze tabs to allow insertion of hub. **Do not force**. Squeeze hub on top and bottom to fully seat.

Replace steering wheel by first lightly coating the splines of the steering shaft with a commercially available anti-seize compound. With the vehicle wheels in the straight ahead position, align the steering wheel on the steering shaft and slide wheel on shaft. Tighten the steering wheel nut (6) to 15 - 20 ft. lbs. (20 - 27 Nm) torque.

Inspect the four retaining tabs on the clipboard (5) for white stress lines (Ref Fig. 22). If stress lines are present, replace clipboard. Install by carefully pressing, first the top two, then the bottom two retaining tabs into the matching slots in steering wheel.

Steering Shaft and Column Replacement

Tool List	Qty.
Ratchet	1
Socket, 3/4"	1
Socket, 13 mm	1
Ratchet	1
Socket, 9/16"	1
Snap RIng Pliers	1
Bearing Separator	1
Gear Puller	1
Arbor Press	1
Bearing Driver Set	1
Torque Wrench, ft. lbs.	1
Torque Wrench, in. lbs.	1
Wheel Bearing Grease	AR

To remove steering shaft (4) (Ref Fig. 24), remove the steering wheel (Ref. “Steering Wheel Replacement” on page E - 16).

Loosen front wheels. Lift and support front of vehicle per SAFETY section and remove front wheels.

Remove the bolt (1) and washer (2) that secures the intermediate shaft (3) to the steering shaft (4).

Steering Shaft

Remove the four bolts (5) and washers (6) that secure the steering column (7) to the chassis and remove the column.

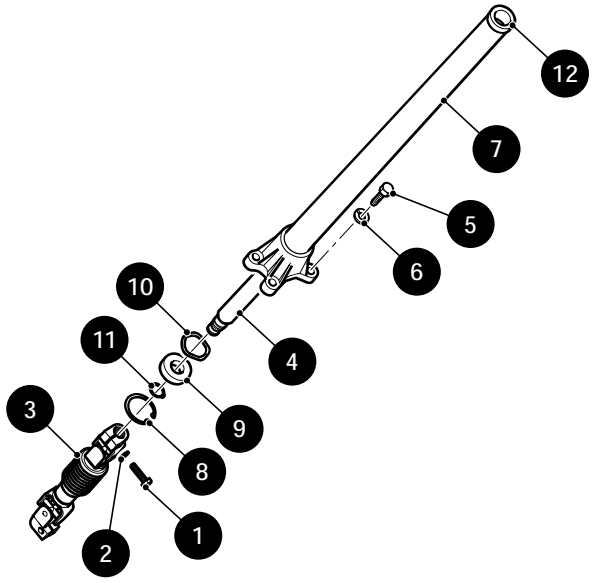

Fig. 24 Steering Shaft and Column

Remove large retaining ring (8) on bottom end of column and pull shaft and bearing (9) out as an assembly. Slide

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TABLE OF CONTENTS FOR SECTION 'G'

SECTION TITLE **PAGE NO.**

LIST OF ILLUSTRATIONS

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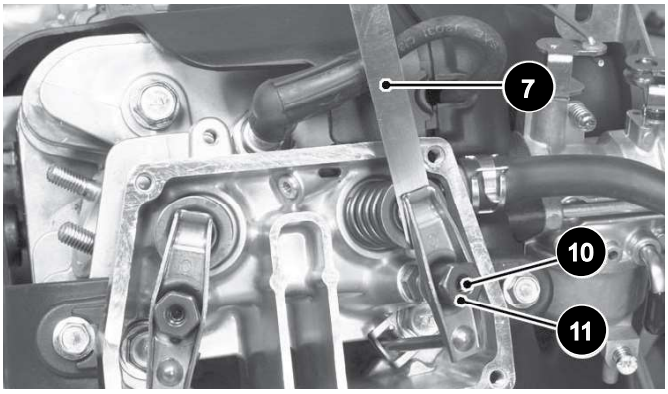

Fig. 21 Valve Clearance Adjustment

Valve Clearance (when cold): Inlet, Exhaust 0.10 - 0.15 mm (0.004 - 0.006 in.)

Loosen the lock screw (10) using the 3 mm Allen bit and the adjusting nut (11). Insert the feeler gauge (7) between the rocker arm and the valve stem end and move the adjusting nut (11) until the feeler gauge begins to bind between the rocker arm and the valve stem end.

Hold the adjusting nut (11) in place using a wrench and tighten the lock screw (10) to the specified torque.

ITEM	TORQUE SPECIFICATION
10	61 in. lbs (6.9 Nm)

⚠ CAUTION

Do NOT overtighten.

Remeasure any clearance that was adjusted. Readjust if necessary.

Replace the Rocker Cover (6), gasket and the four bolts (5). Tighten the bolts to secure the cover in place.

ENGINE REMOVAL

Tool List **Qty.**

Torque Wrench, ft. lbs 1
Socket, 10 mm 1
Socket, 12 mm 1
Socket, 14 mm 1
Socket, 1/2" 1
Socket, 5/8" 1
Impact Socket, 19 mm 1
Wrench, 8 mm 1
Wrench, 10 mm 1
Wrench, 12 mm 1
Wrench, 13 mm 1
Wrench, 14 mm 2
Wrench, 15 mm 1
Wrench, 19 mm 1
Combo Wrench, 19 mm 1
Pliers 1
Extension 6" 1
Ratchet 1
Flat Ratchet 1
Impact Tool 1
Straight Blade Screwdriver 1
Drip Pan 1

This section covers the removal and installation of the engine, for information on rebuilding the engine please see the Engine Shop Rebuild Manual for this vehicle.

NOTICE

In the following text, there are references to removing/installing bolts etc. Additional hardware (nuts, washers etc.) that are removed must always be installed in their original positions unless otherwise specified. Non specified torque specifications are as shown in the table contained in Section “A”.

This operation will remove the engine through the top of the engine compartment. The weight of the engine exceeds normal OSHA limits for one person; therefore, a second person or an engine hoist will be needed to remove the engine. If a hoist is employed, it will be necessary to remove the sun top.

1. Disconnect Battery ground wire.
2. Disconnect air hose at carburetor.
3. Jack up rear of vehicle as directed in Section B of this manual. Use jack stands for stability.
4. Remove the drive belt by rotating clutch toward rear of vehicle when the belt is slipped off the top of the clutch. Remove belt from vehicle.
5. Disconnect the ’DF’ wire from starter using 8mm wrench, lay harness out of the way.
6. Remove the ground strap from the Starter/Generator using a 10 mm socket.
7. Remove the Starter/Generator (See Starter/Generator Replacement in this section).
8. Remove the two bolts between muffler and Starter/Generator bracket using a flat ratchet.
9. Remove the ground strap at the crankcase using the 10 mm socket. Route ground strap through bracket and under the throttle rod and cover.
10. Remove the bracket holding the pulse line with a 6" extension and a 10 mm socket. Remove bracket and unsnap the ignition wire from the harness.

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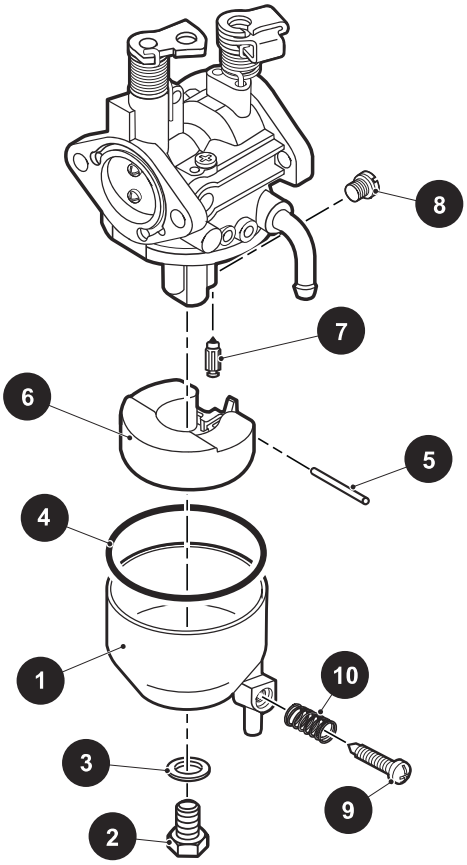

Fig. 6 Carburetor Disassembly

Float Level Alignment *(Ref. Fig. 7)*

NOTICE

The float level cannot be adjusted but should be inspected for proper alignment (Ref. Fig. 7).

Turn carburetor upside down. Remove the bowl. With the carburetor inverted, the 'B' side top edge of a properly adjusted float will be slightly above parallel to the bowl gasket surface and both sides of the float will be level with each other (Ref. Fig. 7). If the sides of the float are not parallel or if the 'B' side of the float is not slightly above parallel with the bowl gasket surface then the float should be replaced. Reinstall the bowl, washer and the screw. Check for fuel leaks.

Check for free movement of the choke shaft before installing the carburetor. Lubricate the bushings with WD-40® oil or equivalent.

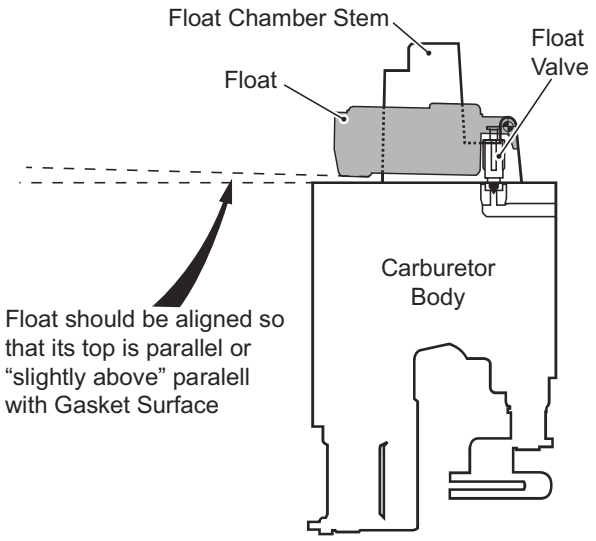

Fig. 7 Float Adjustment

Carburetor Installation

WARNING

To prevent possible injury from explosion or fire, check for clogged or kinked hoses. Clogged or kinked carburetor hoses are not only detrimental to the proper operation and performance of the vehicle, but can also be a safety hazard in the case of fuel leaking on a hot engine Air Cleaner

CAUTION

Do not let the carburetor vent hose become clogged or kinked. Engine heat will cause the fuel in the carburetor bowl to expand and may result in fuel being expelled from the carburetor if unable to vent through the vent tube.

Replace carburetor in reverse order of disassembly. Use a new gasket to ensure sealing of carburetor. Tighten hardware to 50 - 70 in. lbs. (6 - 8 Nm) torque (Ref. Fig. 6).

FUEL PUMP

The fuel pump is mounted on a bracket attached to the seat support near the gasoline tank on the passenger side and is operated by crankcase pressure impulses from the engine. As the piston moves up in the cylinder,

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TABLE OF CONTENTS FOR SECTION 'K'

SECTION TITLE **PAGE NO.**

LIST OF ILLUSTRATIONS

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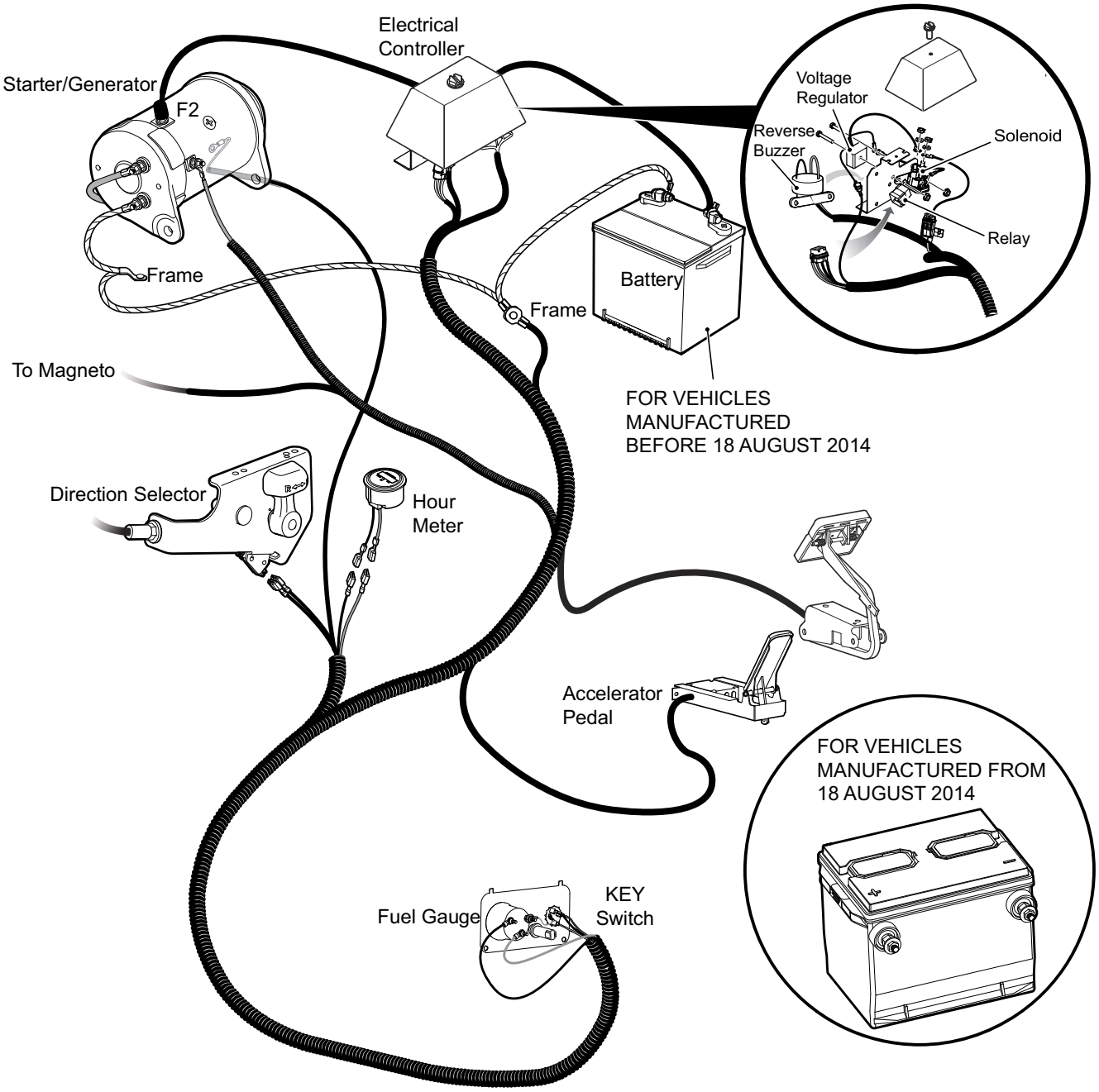

Fig. 2 Electrical System (Physical Location)

⚠ CAUTION

Do not arc spark plug wire to ground. Connect to a known good spark plug and ground plug to a clean metal surface (muffler, cylinder, etc.). Permanent damage may be caused to the coil or ignitor if the plug is not grounded properly.

If the engine will **not** run, but the starter will turn the engine, proceed as follows:

1. Check for loose terminals, wires and connections.
2. Check for an electrical discharge through the spark plug wire as follows:
   Using a spark plug that is known good, and with a spark plug installed in the cylinder, place on a clean

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TABLE OF CONTENTS FOR SECTION 'M'

LIST OF ILLUSTRATIONS

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⚠ WARNING

Never reuse any excess fluid or return to the original container. Dispose of brake fluid properly.

Brake fluid should never be returned to the original container and reused due to the possibility of contamination by dirt, grease, moisture or used brake fluid which could cause failure of the braking system. Dispose of in accordance with Federal, state and local codes.
Attach a short length of clear hose to the caliper bleed valve and insert the other end into a suitable clean container containing fresh, clean brake fluid (Ref. Fig. 6) Check the fluid level in the master cylinder frequently during this operation to prevent air from entering the lines.

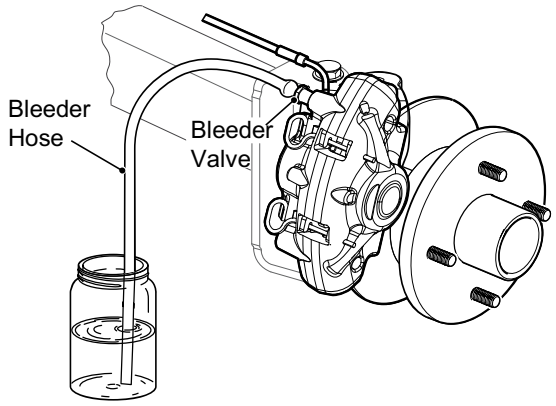

Fig. 6 Bleeder Valve

Starting with the passenger side rear brake and going to the driver side rear brake, bleed the brakes using the following procedure:

The bleeder valve at the caliper must be closed at the end of each stroke and before the brake pedal is released to insure that air cannot enter the system. It is also important that the brake pedal be returned to full ‘up’ position.

Open the bleeder valve and have an assistant depress brake pedal **gently** until fluid flows into container. Close the bleeder valve and have the assistant slowly release the brake pedal. Repeat the process until no bubbles can be seen leaving the bleeder valve. Close the valve and repeat at other side. After bleeding, check fluid level using a mechanics mirror and a flashlight. Add fluid if the level has fallen below 1/4” from the top of the reservoir and inspect for visible fluid leaks.

PARKING BRAKE

The rear brake includes a parking feature consisting of a wheel brake lever and strut. The wheel brake lever is applied by a cable attached to the parking brake lever (hand or foot operated). The parking brake is used to retain the vehicle when stationary. It may also be used as an emergency brake in the event of hydraulic system failure. Parking brake is attached with reed switch, which is activated by magnetic field. The magnet, which is attached to the lever, opens and closes the reed switch. Switch on the park brake lever turns on the warning buzzer when the lever is up.

The hand operated parking brake lever is located at the right side of the driver in the console between the front seats. when parking brake lever is in vertical position the brake is engaged, if it is in horizontal position then brake is released (Ref. Fig. 7).

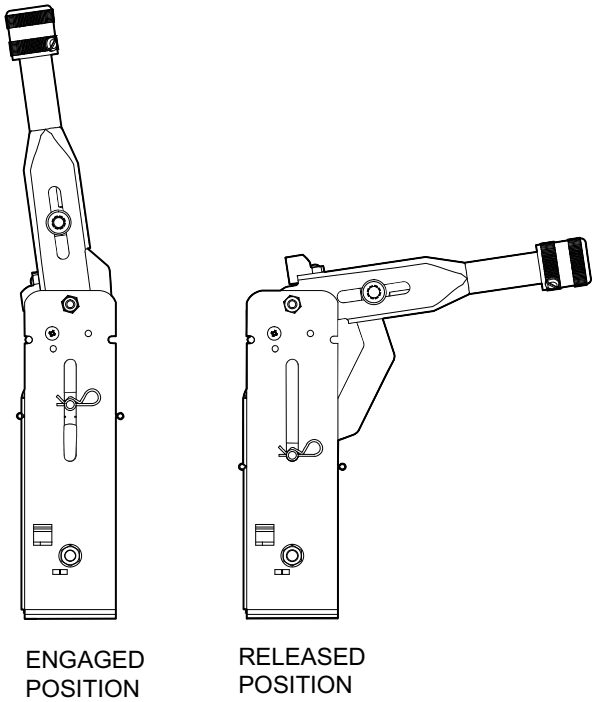

Fig. 7 Parking Brake Position

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TOP AND WINDSHIELD

⚠ WARNING

The top does not provide protection from roll over or falling objects.

The windshield does not provide protection from tree limbs or flying objects.

The top and windshield are designed for weather protection only.

Clean with lots of water and a clean cloth. Minor scratches may be removed using a commercial plastic polish or Plexus plastic cleaner available from Service Parts.

Trailering

⚠ WARNING

To reduce the possibility of severe injury or death while transporting vehicle:

Secure the vehicle and contents.

Never ride on vehicle being transported.

Always remove windshield before trailering.

Maximum speed with sun top installed is 50 mph (80 kph).

If the vehicle is to be transported at highway speeds, the sun top must be removed and the seat bottom secured. When transporting vehicle below highway speeds, check for tightness of hardware and cracks in sun top at mounting points. Always remove windshield when transporting. Always check that the vehicle and contents are adequately secured before transporting. The rated capacity of the trailer or truck must exceed the weight of the vehicle (see GENERAL SPECIFICATIONS for vehicle weight) and load. Lock the park brake and secure the vehicle using ratchet tie downs.

SHUTTLE 8 SUN TOP

Tool List	Qty.
Plastic faced mallet	1
Wrench, 1/2"	2
Wrench, 9/16"	2
Hex wrench, 7/32"	1
Straight blade screwdriver	1

Rear Support Installation

Using a plastic faced hammer, tap end caps (5) into the top of the rear struts (3, 4) (Ref. Fig. 1) (See Detail A and B).

At driver side of vehicle, align the holes in the rear strut (3) with the holes in the seat back support bracket, being sure that the open end of the strut faces the front of the vehicle as shown (See Detail A).

Insert bolt (6) and washer (7) through the seat back support bracket. Place nylon washer (8) between seat back support bracket and rear strut. Secure with washer (7) and lock nut (9) at outer side of rear strut as shown. Finger tighten hardware to allow for adjustment.

Repeat procedure with rear strut (4) at passenger side of vehicle.

Front Struts

Remove and discard the four bolts from the front cowl (See Detail C).

At the upper hole (both sides of vehicle), install the front strut (2) with bolt (15) and lock washer (14) on the outside of strut, and a spacer (13) between the front cowl and strut. Finger tighten hardware to allow for adjustment.

At the lower hole, secure the strut with bolt (15) and lock washer (14) on the outside of strut, and two washers (12) between the front cowl and strut as shown. Finger tighten hardware to allow for adjustment.

Sun Top

Place sun top onto struts (See Detail D).

At front of vehicle, secure sun top loosely with bolts (11), washers (18), spacers (20), washers (18) and lock nuts (19). Finger tighten hardware to allow for adjustment.

At rear of vehicle, insert bolts (10), washers (18) and secure with washers (18) and lock nuts (19) (See Detail B).

Tighten all hardware to 13 - 15 ft. lbs. (18 - 20 Nm) torque.

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TABLE OF CONTENTS FOR SECTION 'S'

SECTION TITLE **PAGE NO.**

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Condition	Possible Cause	Correction
STEERING PULLS TO ONE SIDE	Incorrect tire pressure	Inflate to recommended pressure
	Dragging wheel brakes	Service brake system
	Suspension component failure	Repair
	Alignment incorrect	Align