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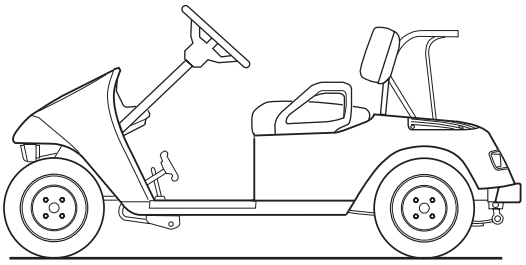

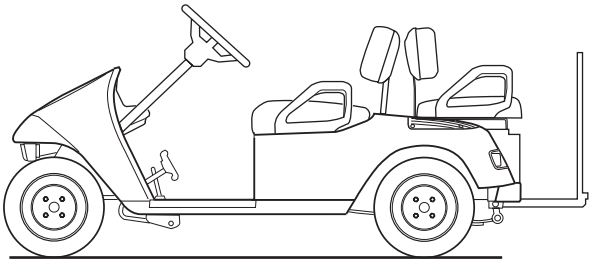

GASOLINE POWERED GOLF CARS

REVISED DATE : JANUARY 2007

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6.2.6 As required in 6.2.4, the manufacturer shall be contacted to secure new nameplates, warnings, or safety labels, as necessary, which shall be affixed in their proper place on the golf car if and as designated in the owner's manual.

1 Fuels handling and storage/battery charging

7.1 Ventilation

Maintenance and storage areas shall be properly ventilated to avoid fire hazards in accordance with applicable fire codes and ordinances.

Ventilation for internal combustion engine golf cars shall be provided to remove flammable vapors, fumes and other flammable materials. Consult applicable fire codes for specific levels of ventilation.

Ventilation for electric-powered golf cars shall be provided, to remove the accumulation of flammable hydrogen gas emitted during the charging process. Because of the highly volatile nature of hydrogen gas and its propensity to rise and accumulate at the ceiling in pockets, a minimum of 5 air changes per hour is recommended for multiple vehicles and one air change per hour may be adequate for one vehicle. The controlling party shall consult applicable fire and safety codes for the specific ventilation levels required.

See NGCMA Golf Car Safety Storage Guidelines and SAE J1718.

7.2 The controlling party shall require battery changing and charging facilities and procedures to be in accordance with applicable ordinances or regulations.

7.3 The controlling party shall supervise the storage and handling of liquid fuels in accordance with ANSI/NFPA 30.

7.4 Storage and handling of liquefied petroleum gas fuels shall be in accordance with ANSI/NFPA 58.

7.5 The controlling party shall periodically inspect charging and storage areas or facilities and review procedures to be certain that the procedures in 7.1 through 7.4, inclusive, are being followed.

8 Operating safety rules and practices (Operator qualifications)

8.1 It is recommended that only persons qualified under the rules of the regulatory authority be allowed to operate a golf car. Qualifications may include proof of insurance, minimum age requirement or other appropriate requirements.

8.2 The controlling party shall display the operation and safety instructions as recommended by the golf car manufacturers and the golf course safety rules in a conspicuous place near the golf car rental area or golf car pick-up area, or on each golf car, or both. It is also recommended that the warning "Do not operate golf car when under the influence of intoxicating or mind altering substances", be posted in a conspicuous location.

END OF ANSI/NGCMA Z130.1-2004

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

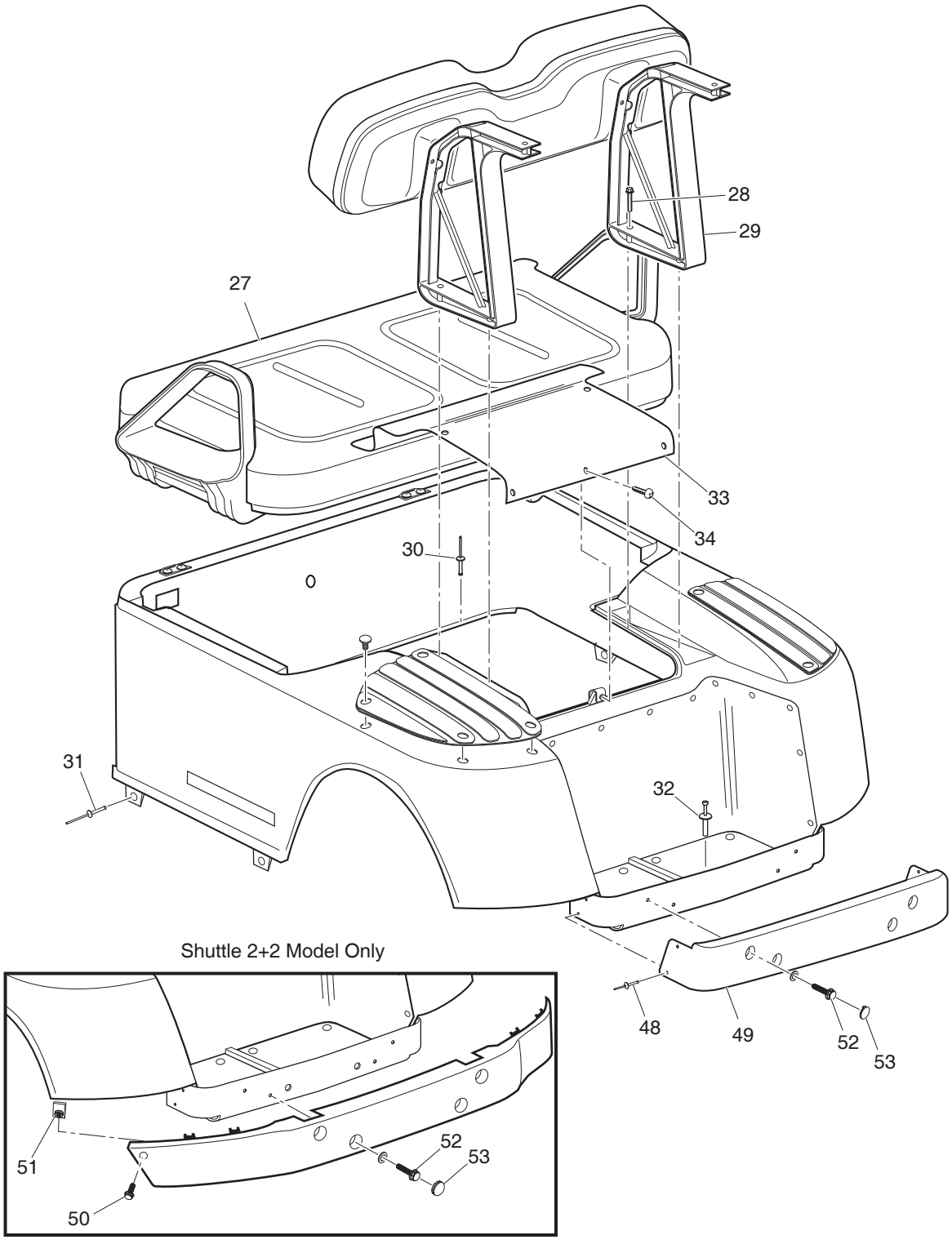

Fig. 3 Body Components (Rear)

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STEERING

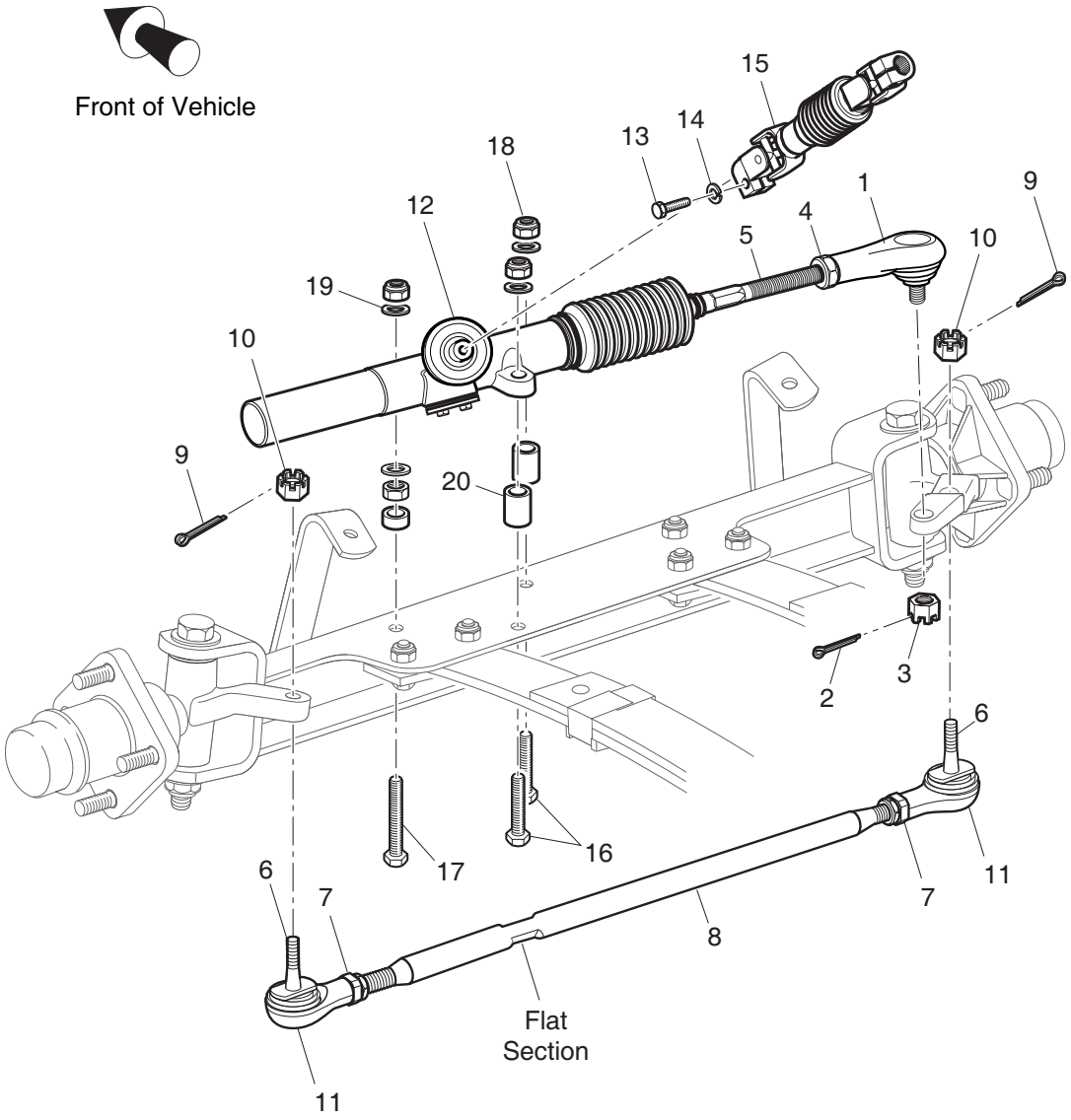

Fig. 11 Steering Components

Rack Ball Joint Replacement

Tool List	Qty. Required
Needle nose pliers	1
Wrench, 11/16"	1
Ball joint separator	1
Plastic faced hammer	1
Tape measure	1
Wrench, 3/4"	1
Torque wrench, 1/2" drive, ft. lbs.	1
Socket, 11/16", 1/2" drive	1

To remove rack ball joint (1), loosen passenger side front wheel and lift and support front of vehicle per SAFETY section (Ref. Fig. 11 on Page E-9).

Remove passenger side front wheel and turn steering wheel fully to the left.

Remove the cotter pin (2) and loosen the castellated nut (3) until rack ball joint (1) threads are protected. Using a ball joint separator as a lever, apply pressure to ball joint and tap nut with plastic faced hammer to release ball joint from passenger side spindle arm. Remove nut from ball joint and ball joint from spindle arm.

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For further engine information, see Four Cycle Engine Shop Rebuild and Service Parts Manual, P/N 27615-G01.

POWERTRAIN MAINTENANCE

Access the powertrain by raising or removing seat. Some service procedures may require the vehicle be lifted. Refer to LIFTING THE VEHICLE in section 'B' for proper lifting procedure and safety information.

Checking the Oil Level

⚠ CAUTION

Do not overfill engine. Too much oil may cause smoking or allow oil to enter the air filter enclosure.

The oil should be checked with the engine warm. The vehicle should be on a level surface with the parking (PARK) brake engaged. Allow adequate time for oil to drain into the crankcase before checking.

Remove the dipstick and wipe off the entire area indicated with a lint free cloth (Ref. Fig. 1 on Page G-1).

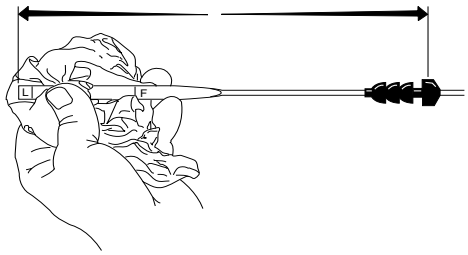

Fig. 1 Clean Entire Dipstick

Insert the dipstick **fully** into the dipstick hole and remove. Examine the level of the oil on the dipstick.

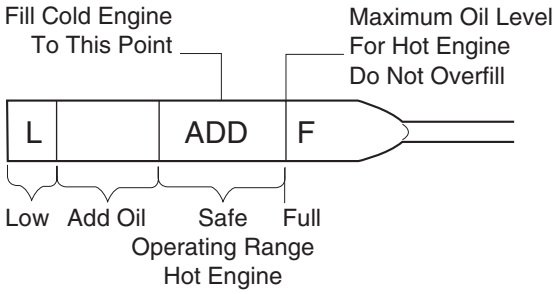

Fig. 2 Check Oil Level on Dipstick

The engine can be operated safely as long as oil is within the safe operating range as indicated on the dip stick. **Do not operate vehicle if oil level is below the safe area indicated on the dipstick.**

Oil should be added to bring the level into the safe operating range. Remember that oil expands as it gets hot, **Do not overfill** (Ref. Fig. 2 on Page G-1). Check that the oil cap is firmly in place.

NOTE

When adding oil between oil changes, do not mix brands and viscosity grades of oil.

Both the oil dipstick and fill cap must be in place before operating the engine. Failure to install the dipstick and fill cap will result in oil becoming contaminated and/or oil being discharged into the engine compartment.

Changing the Oil

Tool List	Qty. Required
Socket, 3/8" drive, 10 mm	1
Ratchet, 3/8" drive	1
Extension, 3/8" drive, 8"	1
Oil drain pan	1

For maximum performance and longevity, the engine oil should be replaced after the first 100 hours of operation. After the initial oil change, it should be changed every 125 hours of operation or semi-annually, whichever comes first.

The selection of oil is dependent upon the service that the vehicle will perform. Most vehicles require 10W-30 oil, whereas vehicles used at capacity or near capacity load applications will utilize 10W-40 oil after a break-in period of 100 hours (Ref. Fig. 3 on Page G-1).

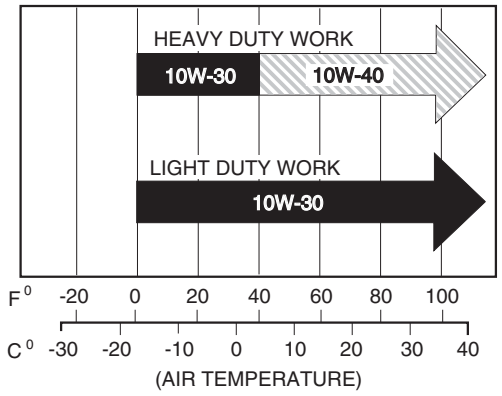

Fig. 3 Oil Viscosity Chart

NOTE

If vehicle is to be stored over winter months, it can be stored with old oil left in engine. The oil should be changed as part of spring maintenance. This will remove any moisture that has accumulated during storage.

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

All readings should be compared with the engine manufactures specification. Engine cylinder specifications are usually provided for unseated rings. As a general rule, the compression will increase twenty pounds above the rated PSI for an engine with seated rings. Compression readings twenty pounds below the rated PSI indicates poor cylinder sealing.

Compression Test Readings

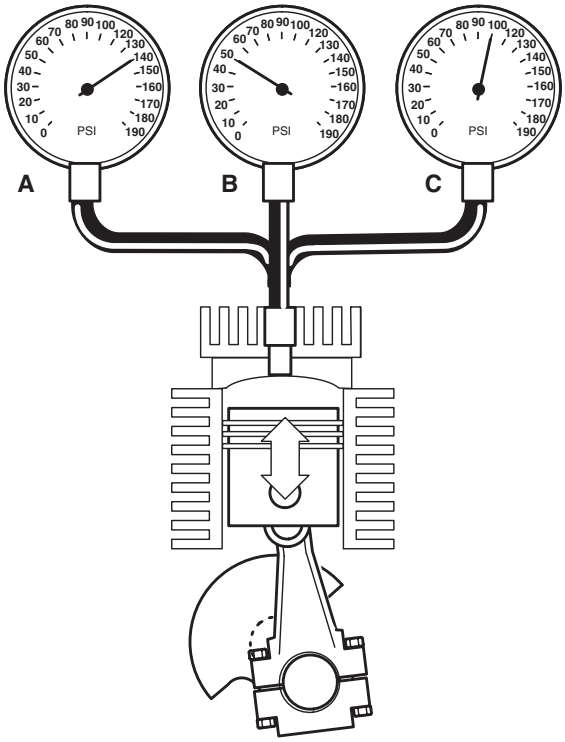

Fig. 22 Compression Gauge

a) Indicates 140 psi (965 kPa) (Ref. Fig. 22 on Page G-11). Compression is good and the engine may be new or rebuilt. If the engine is new or rebuilt, the compression will rise to approximately 160 psi (1100 kPa) as the rings seat. If the engine has had extensive use, a reading of 140 psi (965 kPa) may indicate that the engine compression is in decline and may need to be rebuilt when compression falls to approximately 125 psi (860 kPa).

b) Indicates 50 - 60 psi (345 - 415 kPa). The rings are in very bad condition or leaking valves are indicated. Pour approximately one half ounce of thirty weight oil into the cylinder through the spark plug hole and recheck. If the compression increases 10 psi (70 kPa) or more the rings are in poor condition. If little or no increase in compression is indicated, the valves are leaking.

c) Indicates 100 psi (690 kPa). This indication could be an engine with many hours of use. Adding oil to the cylinder and rechecking should cause an increase in compression. If so, a top end overhaul should be considered. Refer to Engine Rebuild manual, part number 27615-G01.

ENGINE REMOVAL

Tool List	Qty. Required
Socket, 10 mm, 3/8" drive	1
Socket, 12 mm, 3/8" drive	1
Socket, 1/2", 3/8" drive	1
Socket, 5/8", 3/8" drive	1
Open end wrench, 9/16"	2
Open end wrench, 5/16"	1
Extension 3", 3/8" drive	1
Extension 6", 3/8" drive	1
Ratchet, 3/8" drive	1
Straight blade screwdriver	1
Phillips screwdriver	1
Side cutters	1

NOTE

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 suntop.

Safety

⚠ WARNING

To prevent the possibility of personal injury, disconnect the negative (-) battery cable before starting engine removal.

Disconnect the negative cable at the battery.

Remove and plug the fuel line at the fuel pump.

Skid Plate Removal

Remove the skid plate by cutting the wire tie that secures the shift cables to the skid plate and remove the four bolts (14) that secure the plate to the bottom of the engine (Ref. Fig. 24 on Page G-13). Do not operate vehicle without skid plate installed.

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

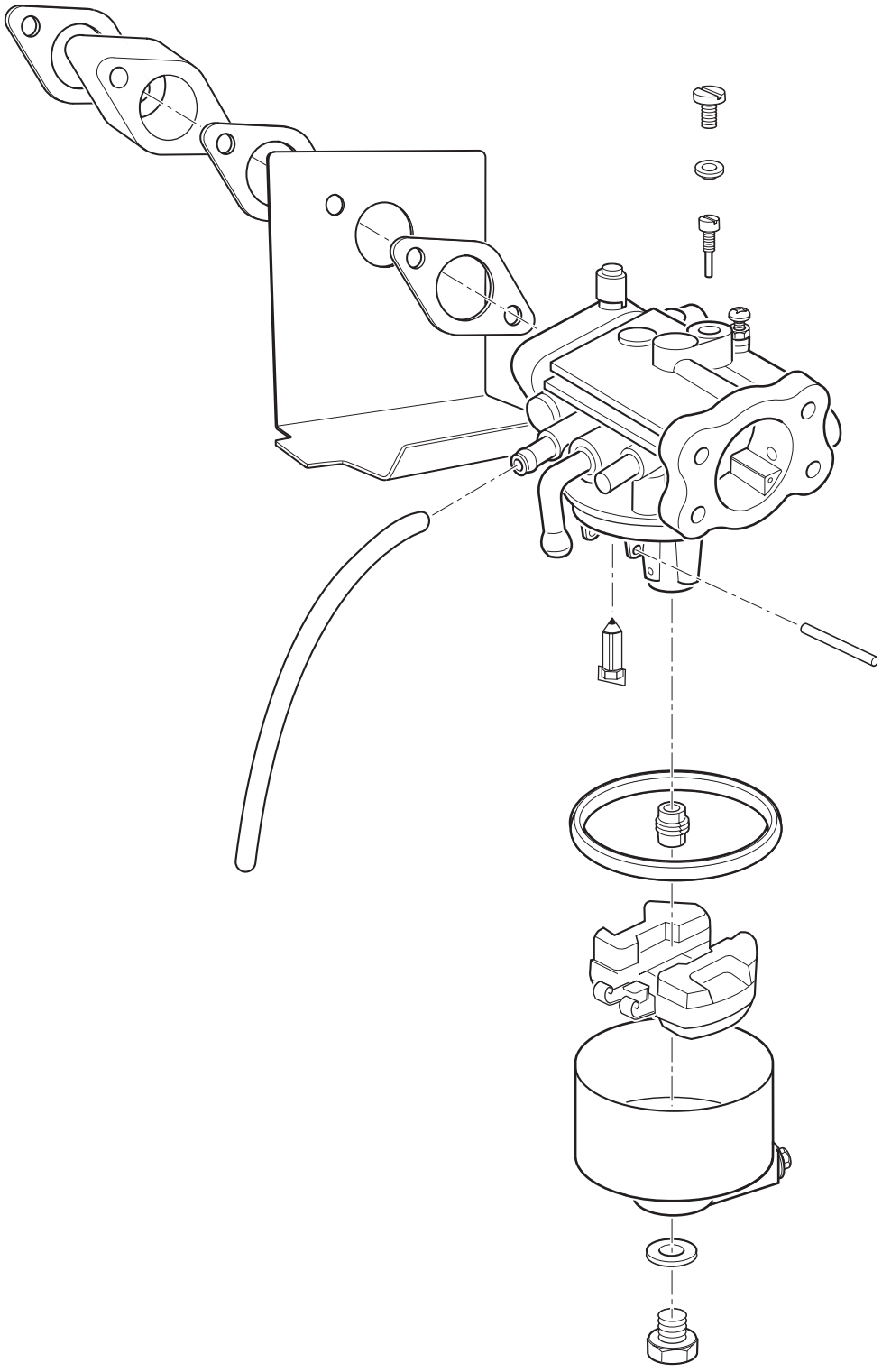

Fig. 5 Carburetor

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

⚠ WARNING

To prevent burns and other possible injuries:

Disable the electrical system before attempting to remove the drive belt to prevent the engine from inadvertently starting.

Be sure that the engine and exhaust components have cooled before attempting any service.

Do not allow fingers to become trapped between the belt and clutch sheave.

Use only sockets designed for use with an impact wrench. Never use a socket intended for use with hand tools.

Remove the drive belt (1). (Refer to 'Removing The Drive Belt' procedure elsewhere in this section.) Remove the Starter/Generator belt (Refer to 'Starter/Generator Removal' in ENGINE section.)

Remove the clutch bolt (2), lock washer (3) and pilot washer (4) (Ref. Fig. 2 on Page J-2). Insert a greased clutch puller and tighten (clockwise) using an impact wrench which will remove the clutch from the engine crankshaft.

NOTE

In some extreme cases, the clutch may not separate from the crankshaft. Remove the clutch puller and fill the cavity with grease. Replace the clutch puller and tighten it with the impact wrench. The combined mechanical and hydraulic effect will remove the clutch. Remove all excess grease.

Drive Clutch Installation

⚠ CAUTION

Do not install the bolt with an impact wrench.

Clean both the engine crankshaft and the drive clutch bore. Slide the clutch onto the engine crankshaft and rotate the clutch while lightly pushing the moveable sheave in and out several times to seat the clutch with the tapered crankshaft (Ref. Fig. 2 on Page J-2).

Install the lock washer (3) and the large pilot washer (4) onto the clutch bolt (2).

Apply thread sealant to the threads of the clutch bolt and install and tighten to 40 - 44 ft. lbs. (54 - 60 Nm) torque.

Driven Clutch Removal

Tool List	Qty. Required
External snap ring pliers	1
Socket, 5/8", 1/2" drive	1
Ratchet, 1/2" drive	1
Thread locking sealant	AR
Phillips screwdriver	1
Torque wrench, 1/2" drive, ft. lbs.	1

Remove the drive belt (1) (Refer to 'Removing The Drive Belt' procedure elsewhere in this section).

Remove the clutch bolt (5), the lock washer (6) and the pilot washer (7) and slide the clutch from the rear axle input shaft.

Driven Clutch Repair

NOTE

Parts must be reassembled in same position as their original position. Mark all components to facilitate accurate reassembly.

Some minor field repairs may be made to the driven clutch. Remove the retaining ring (8) and remove the torque ramp (Ref. Fig. 2 on Page J-2). Remove the spring (10) and the moveable sheave (11).

Inspect the shaft for signs of wear and inspect the bushings for signs of deterioration. If there is wear to the point of causing vibration, the clutch must be replaced.

Torque Ramp Buttons

Remove any fragments and dirt. Remove the ramp button (12) by removing the screw (13) (Ref. Fig. 2 on Page J-2). The buttons are replaced by inserting a new button and screw and tightening firmly. It is good practice to replace all buttons as a set.

Driven Clutch Assembly

Assemble the moveable sheave (11) to the fixed sheave (14) and insert the spring (10) in the pilot hole in the moveable sheave (Ref. Fig. 2 on Page J-2). Insert the other end of the spring in the torque ramp (9) and rotate the ramp counterclockwise 140° before engaging the splines and inserting the retaining ring (8).

Driven Clutch Installation

Coat the rear axle input shaft with a light coating of anti-seize compound and slide the clutch onto the shaft (Ref. Fig. 2 on Page J-2). Install the lock washer (6) and pilot washer (7) to the clutch bolt (5) and apply thread sealant to the threads of the clutch bolt. Install the bolt and tighten to 14 - 17 ft. lbs. (19 - 23 Nm) torque.

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

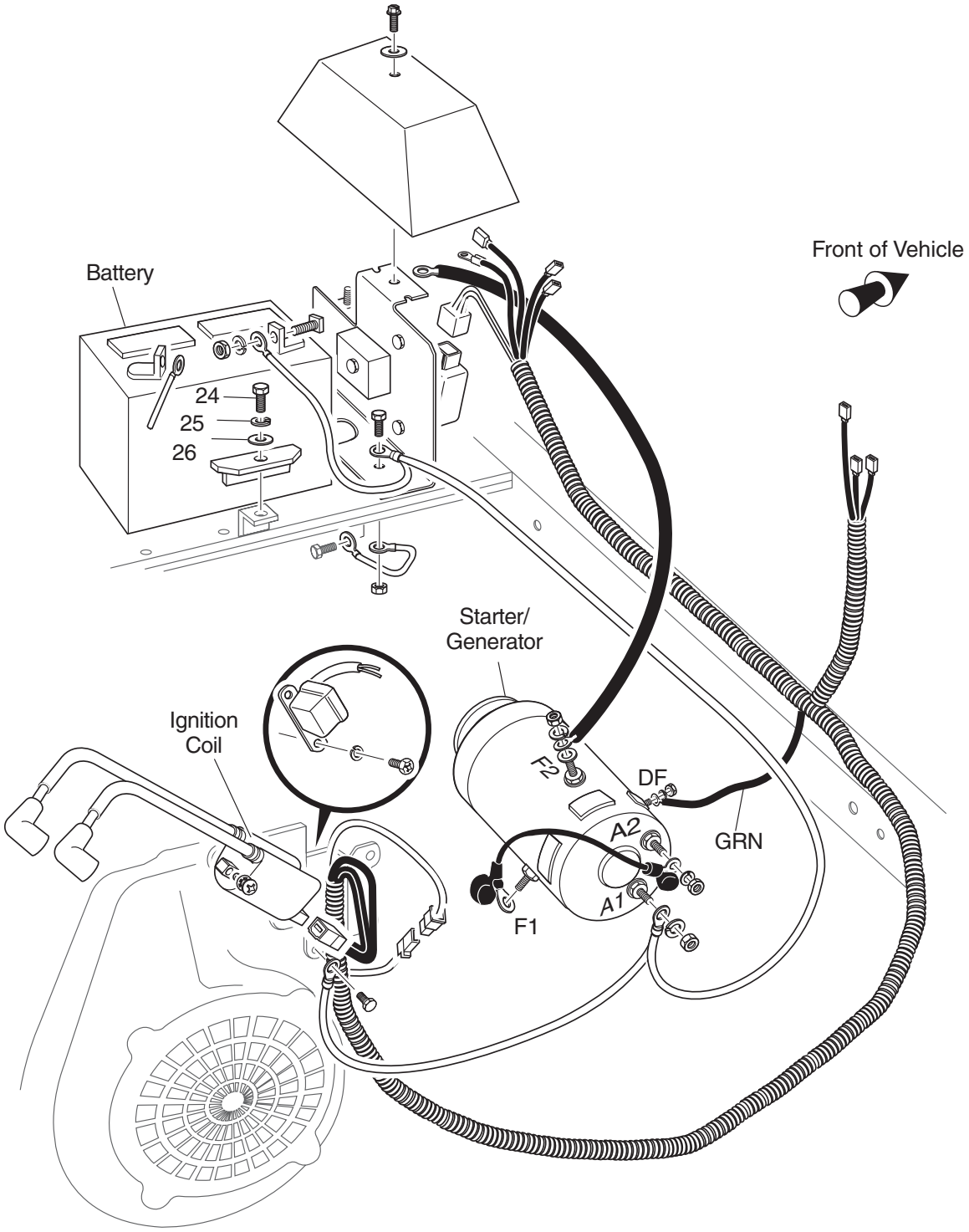

Fig. 2 Electrical System (Physical Location)

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may indicate wheel brakes not adjusting, wear in the cables and linkages or initial break-in of components. Not enough pedal free travel may indicate improper adjustment of the wheel brake or the brake linkage. Either condition can prevent the brakes from adjusting properly.

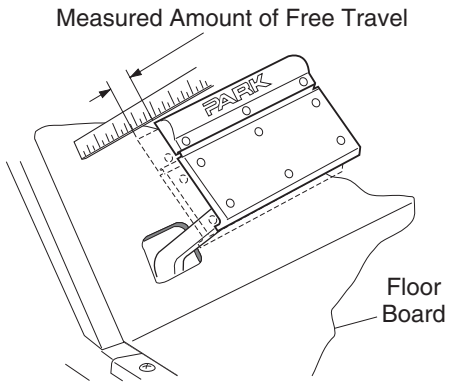


Fig. 9 Checking for Excessive Free Travel

NOTE

Adjustment of free travel depends on manufacturing date.

The correct brake pedal free travel setting varies depending on the date of manufacture. Older models (latch arm without a 1/4" (6 mm) diameter hole in the lower portion (Ref. Fig. 8 on Page M-8)) should be set to 2" – 2 1/4" (5 - 6.5 cm) free travel. Starting model year 2001 (with a 1/4" (6 mm) diameter hole in the lower end of the latch arm), free travel should be set to 7/8" - 1 1/8" (2.2 - 2.9 cm) (Ref. Fig. 9 on Page M-9).

The parking brake latching force may be checked as a verification after setting brake pedal free travel. The preferred method of checking parking brake latching force is to place a 'bathroom' scale on the service and parking brake pedals. Using both feet, press the scale down evenly against the parking brake pedal until it latches. The parking brake should latch between 65 and 75 lbs. (29 - 34 kg) indicated on the scale (Ref. Fig. 20 on Page M-15).

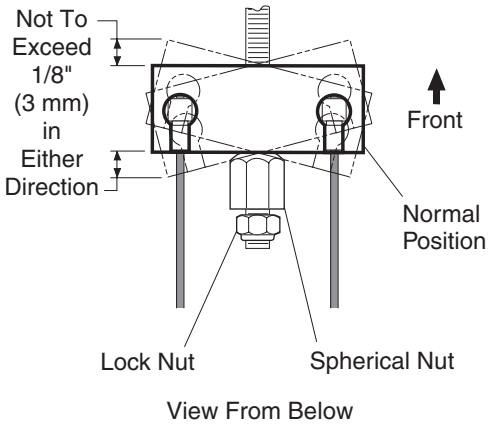
Adjust brake pedal free travel as described in 'MAINTENANCE AND REPAIRS' if required.

4. **Inspect the brake cables.**
   Inspect for damage to the outer cable, fraying of the inner cable or lack of free motion when the pedal is applied and released. Inspect the brake cable supports to be sure the cables are properly secured. If any of these conditions are found, replace both cables and equalizer as a set.

5. **Check the clevis pins.**
   Check clevis pins attaching the brake cables to the brake lever. They must be loose when the brake pedal has been released (Ref. Fig. 19 on Page M-15). If the clevis pins are not loose, but brake pedal free travel is correctly adjusted and the brake cables move freely, the problem is likely in the wheel brake.

6. **Inspect the brake cable equalizer linkage.**
   Inspect for signs of corrosion, damage, wear or excessive misalignment (Ref. Fig. 10 on Page M-9). Replace if corrosion, damage, or wear is found.

7. **Inspect the compensator assembly.**
   Inspect for damage, corrosion or wear. Replace the complete assembly if problems are found. In general, no adjustment will be needed, as the spring assembly is factory calibrated. With the parking brake disengaged check that the compensator spring length is 3 15/16" (10 cm) (Ref. Fig. 10 on Page M-9). If an adjustment is required, it should be made at the nuts at the spring facing the front of the vehicle. Tighten the jam nut firmly after adjusting.



NOTE: This dimension is factory pre-set with the parking brake disengaged and is not to be changed.

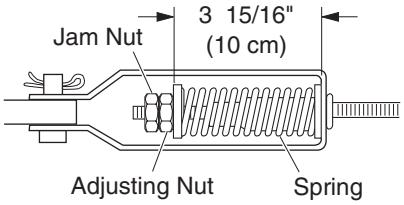


Fig. 10 Equalizer and Compensator

8. **Inspect parking brake pedal hinge.**
   Check for broken or rusted springs and correct retention of the hinge pin. Operate parking brake pedal to confirm smooth operation of the hinge mechanism (Ref. Fig. 11 on Page M-10).

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

Adjust the brake pedal free travel. “Adjusting Brake Pedal Free Travel” on Page M 14

Brake Cable and Equalizer Assembly Removal and Installation

NOTE

The brake cables and equalizer are only serviceable as a complete assembly.

Remove the cotter pins and clevis pins connecting the brake cables to the brake levers. Remove the retaining rings connecting the brake cables to their brackets at the axle (rear of cable) and at the frame (front of cable). Loosen and remove the jam nut and the spherical nut on the equalizer link (Ref. Fig. 26 on Page M-19). Inspect the hardware and replace if needed. Remove the brake cable and equalizer assembly and discard.

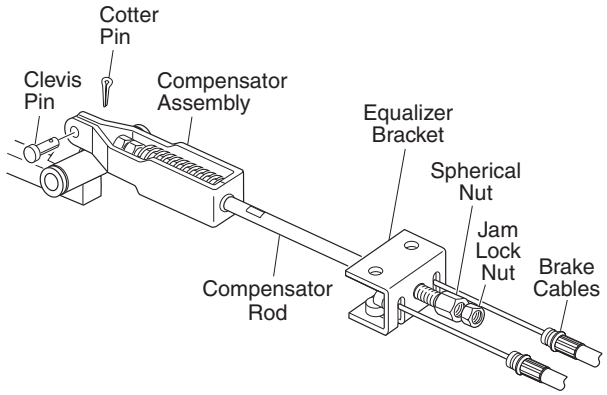


Fig. 26 Brake Cable, Equalizer and Compensator

Slide the equalizer link of the new assembly over the compensator rod. Loosely install the spherical nut and new locking jam nut. Insert the cables into the frame and axle brackets. Install new retaining rings. Connect the cables to the brake levers using new clevis pins and new cotter pins.

Adjust the brake pedal free travel. “Adjusting Brake Pedal Free Travel” on Page M 14

Compensator Assembly, Removal and Installation

Disconnect the compensator assembly from the brake pedal by removing the cotter pin and clevis pin (Ref. Fig. 26 on Page M-19).

Loosen and remove the jam nut and the spherical nut connecting the compensator rod to the equalizer link. Remove the compensator assembly.

Installation is the reverse of removal. Use new cotter pins in the clevis pin.

Adjust the brake pedal free travel. “Adjusting Brake Pedal Free Travel” on Page M 14

Brake Pedal Removal and Installation

Disconnect the compensator assembly (1) from the brake pedal by removing the cotter pin (2) and the clevis pin (3). Unplug the wiring harness on models equipped with brake lights. Unhook the torsion spring (4) by inserting a thin blade screwdriver between the small hook and the bracket. Move the hook back and to the side to release the torsion spring (Ref. Fig. 27 on Page M-19).

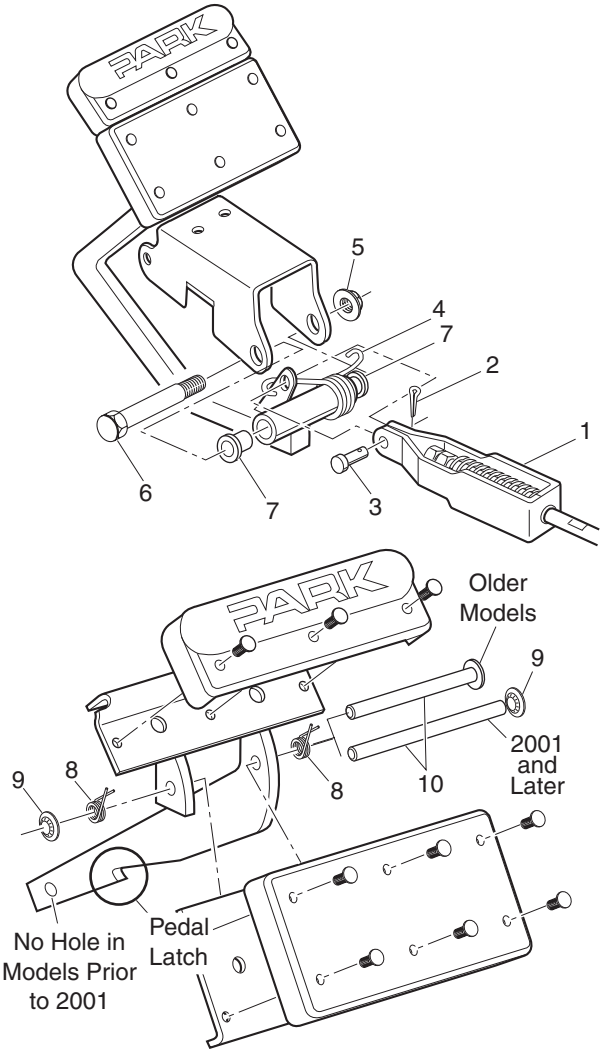


Fig. 27 Brake Pedal Removal and Installation

Remove the lock nut (5), the shoulder bolt (6) and remove the brake pedal.

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SHUTTLE 2+2 SUN TOP

Rear Support Installation

1. Tap end caps (item 7) into top of the rear support (items 1 and 2) with rubber mallet (Ref. Fig. 2 on Page Q-4) (See Detail D).

2. At driver side, align holes in the rear support (item 1) with holes in seat back support bracket, making sure that the open end of support faces the rear of vehicle as shown.

3. Insert bolts (item 3) through washers (item 4) and seat back support bracket. Place nylon washers (item 5) between seat back support bracket and rear support. Secure with washers (item 4) and lock nuts (item 6) as shown (see Detail A). ***Finger tighten hardware.***

4. Repeat procedure with rear support (item 2) at passenger side of vehicle.

Front Support Installation

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

2. At the upper hole (both sides of vehicle), install the front strut (item 9) with bolt (item 10) and black lock washer (item 11) on the outside of strut, and a spacer (item 12) between the front cowl and strut. ***Finger tighten hardware.***

3. At the lower hole, secure the strut with bolt (item 10) and black lock washer (item 11) on the outside of strut, and two black w3ashers (item 13) betwen the front cowl and strut. ***Finger tighten hardware.***

Sun Top Installation

1. Position sun top (item 1) onto struts (See Detail C).

2. At front support, secure sun top loosely with bolts (item 16) washers (item 4), spacers (item 17), washers (item 18) and lock nuts (item 6). ***Finger tighten hardware.***

3. At the rear of vehicle, secure top loosely with bolt (item 20), washers (item 4) and lock nut (item 6).

4. Insert bolt (item 19) and washer (item 4) through the other hole. Place spacer (item 21) between sun top and strut. Secure with washer (item 4) and lock nut (item 6).

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

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