A Textron Company

RXV

TECHNICIAN'S REPAIR AND SERVICE MANUAL

Gasoline Powered Vehicle

647701-A

ISSUED OCTOBER 2015 REVISED JANUARY 2016

SAFETY

For any questions on material contained in this manual, contact an authorized representative for clarification.

Read and understand all labels located on the vehicle. Always replace any damaged or missing labels.

On steep hills, vehicles may coast at faster speeds than those encountered on a flat surface. To prevent loss of vehicle control and possible injury, speeds should be limited to no more than the maximum level ground speed indicated in GENERAL SPECIFICATIONS. Limit speed by applying the service brake.

Catastrophic damage to drivetrain components due to excessive speed may result from driving the vehicle above specified speed. Damage caused by excessive speed may cause a loss of vehicle control, is considered abuse and will not be covered under warranty.

For towing/transporting vehicle, refer to TRANSPORTING VEHICLE section.

If the vehicle is to be used in a commercial environment, signs similar to the ones illustrated should be used to warn of situations that could result in an unsafe condition.

NOTICES, CAUTIONS, WARNINGS AND DANGERS

Observe the **NOTICES, CAUTIONS, WARNINGS,** and **DANGERS;** be aware that servicing a vehicle requires mechanical skill and a regard for conditions that could be hazardous. Improper service or repair may damage the vehicle or render it unsafe for use.

NOTICE

Address practices not related to personal injury.

⚠ CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

⚠ WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

NOTICE

The exhaust emissions of this vehicle engine complies with regulations set forth by the Environmental Protection Agency (EPA) of the United States of America (USA) at time of manufacture. Significant fines could result from modifications or tampering with the engine, fuel, ignition or air intake systems.

⚠ WARNING

Engine exhaust from this product contains chemicals known, in certain quantities, to cause cancer, birth defects, or other reproductive harm.

Battery posts, terminals and related accessories contain lead and lead compounds. Wash hands after handling.

NOTICES, CAUTIONS AND WARNINGS CONTINUED ON INSIDE OF BACK COVER.

REPAIR AND SERVICE MANUAL

GASOLINE POWERED
GOLF CARS AND PERSONAL VEHICLES

RXV GOLF CAR
RXV FREEDOM™
RXV SHUTTLE 2+2

STARTING MODEL YEAR 2016

CALIFORNIA Proposition 65 Warning

WARNING: Motor vehicles may contain fuels, oils and fluids, battery posts, terminals, and related accessories which contain lead, lead compounds and other chemicals identified by the State of California to potentially cause cancer, birth defects and other reproductive harm. These chemicals are found in vehicles, vehicle parts and accessories, both new and replacements. During maintenance, these vehicles generate used oil, waste fluids, grease, fumes and particulates, all identified by the State of California to potentially cause cancer, birth defects, and other reproductive harm.

Never modify the vehicle in any way that will alter the weight distribution of the vehicle, decrease its stability or increase the speed beyond the factory specifications. Such modifications can cause serious personal injury or death. Textron Specialized Vehicles prohibits and disclaims responsibility for any such modifications or any other alteration which would adversely affect the safety of the vehicle.

Textron Specialized Vehicles reserves the right to incorporate engineering and design changes to products in this manual, without obligation to include these changes on units sold previously.

The information contained in this manual may be revised periodically by Textron Specialized Vehicles, and therefore is subject to change without notice.

TEXTRON SPECIALIZED VEHICLES DISCLAIMS LIABILITY FOR ERRORS IN THIS MANUAL, and SPECIFICALLY DISCLAIMS LIABILITY FOR INCIDENTAL AND CONSEQUENTIAL DAMAGES resulting from the use of the information and materials in this Manual.

These are the original instructions as defined by 2006/42/EC.

CONTACT US:

Textron Specialized Vehicles
1451 Marvin Griffin Road
Augusta, Georgia, USA 30906-3852

This vehicle has been designed and manufactured in the United States of America (USA). The standards and specifications listed in the following text originate in the USA unless otherwise indicated.

The use of non-Original Equipment Manufacturer (OEM) approved parts may void the warranty.

Overfilling battery may void the warranty.

Tampering with or adjusting the governor to permit vehicle to operate above factory specifications will void the vehicle warranty.

When servicing engines, all adjustments and replacement components must be per original vehicle specifications in order to maintain the United States of America Federal and State emission certification applicable at the time of manufacture.

BATTERY PROLONGED STORAGE

Battery self-discharge over time. The rate of self-discharge varies depending on the ambient temperature, the age and condition of the battery.

Fully charged battery will not freeze in winter temperatures unless the temperature falls below -75°F (- 60°C).

BATTERY DISPOSAL

Lead-acid battery is recyclable. Return whole scrap battery to distributor, manufacturer or lead smelter for recycling. For neutralized spills, place residue in acid-resistant containers with absorbent material such as sand. Dispose of in accordance with local, state and federal regulations for acid and lead compounds. Contact local and/or state environmental officials regarding disposal information.

SAFETY INFORMATION

This manual contains recommended maintenance procedures from the manufacturer. Follow these procedures and fault isolation information to get the best service from the product. To decrease the risk of personal injury or property damage, obey all the information in this manual.

GENERAL

Many vehicles are used for a variety of tasks beyond their original intended use; therefore it is impossible to anticipate and warn against every possible combination of circumstances that may occur. Warnings cannot replace good common sense and prudent driving practices. Common sense and prudent driving practices do more to decrease the risk of accidents and injury than warnings and instructions can provide.

The manufacturer strongly suggests anyone operating the vehicle read the entire owner's guide provided with the purchase of the vehicle, paying particular attention to the CAUTIONS, WARNINGS and DANGERS within.

For any questions or concerns, contact the closest representative, or write to the address on the back cover of this publication, Attention: Customer Care Department.

Textron Specialized Vehicles (TSV) reserves the right to make design changes without obligation to make these changes on units previously sold and the information contained in this manual is subject to change without notice.

TSV is not liable for errors in this manual or for incidental or consequential damages that result from the use of the material in this manual.

This vehicle conforms to the current applicable standard for safety and performance requirements.

This vehicle is designed and manufactured for off-road use. It does not conform to Federal Motor Vehicle Safety Standards and is not equipped for operation on public streets. Some communities may permit these types of vehicles to be operated on their streets on a limited basis and in accordance with local ordinances.

Ensure all electrical accessories are grounded directly to the battery (-) post. **Never use the chassis or body as a ground connection.**

Refer to GENERAL SPECIFICATIONS for vehicle seating capacity. Do not exceed number of occupants indicated.

⚠ WARNING

Never modify the vehicle in any way that will alter the weight distribution of the vehicle, decrease its stability, increase the speed or extend the stopping distance beyond the factory specification. Such modifications can result in serious personal injury or death.

Do not change the vehicle in any manner that changes the weight distribution, decreases stability, increases speed or extends the necessary distance to stop more than the factory specification. TSV is not responsible for changes that cause the vehicle to be dangerous.

Do not let anyone below the height of 59 inches (150 cm) operate the vehicle.

GENERAL OPERATION

ALWAYS:

- Use the vehicle in a responsible manner.
- Read and observe all warnings and operation instruction labels affixed to the vehicle.
- Follow all safety rules established in the area where the vehicle is being operated.
- When there is a risk of lightning, leave the vehicle and look for a safe location to wait until the lightning has stopped.
- Reduce speed to compensate for poor terrain or conditions.
- Apply service brake to control the speed on steep grades.
- Reduce speed in damp or wet areas.
- Reduce speed and use caution when approaching sharp or blind turns.

- Reduce speed and use caution when driving over loose terrain.
- Reduce speed and use caution when driving in areas where pedestrians are present.
- Keep enough distance between vehicles to stop safely.

MAINTENANCE

ALWAYS:

- Replace damaged or missing warning, caution or information labels.
- Service the vehicle in accordance with the manufacturer's periodic service schedule.
- Make sure that repairs are performed by trained and qualified personnel.
- Follow the manufacturers maintenance procedures.
- Use insulated tools within the battery area to decrease the risk of sparks or battery explosion.
- Use specified replacement parts. DO NOT use replacement parts of lesser quality.
- Use recommended tools.
- Make sure tools and procedures not specified by the manufacturer will not be a safety risk to personnel or operation of the vehicle.
- Use wheel chocks and support the vehicle on jack stands. Never get under a vehicle that is supported by a jack. Lift the vehicle in accordance with the manufacturer's instructions.
- Make sure you service the vehicle in an area away from open flame or sparks.
- Know that a vehicle in need of repair does not operate correctly and can be dangerous to operate.
- After completing repairs or maintenance, test the vehicle in a safe area where there are no vehicles or pedestrian traffic.
- Make sure you record and keep all of the maintenance history of the vehicle.

VENTILATION

ALWAYS:

- Always store gasoline vehicles in a well ventilated area. Good ventilation decreases the risk of gasoline fumes accumulating.
- Never fuel a vehicle in an area that is subject to flame or spark. Pay particular attention to natural gas or propane water heaters and furnaces.
- Never work around or operate a vehicle in an environment that does not allow ventilation of exhaust gases from the area. Carbon monoxide is a dangerous gas that can cause unconsciousness and is potentially lethal.

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

GENERAL INFORMATION AND ROUTINE MAINTENANCE

SERIAL NUMBER LABEL LOCATION

Three serial number and manufacture date code labels are on the vehicle. One of the labels is found on the steering column, the second label is found on the frame member under the front splash shield on the driver side, and the third is found on the passenger side frame rail at the rear of the vehicle (Figure. 1).

Design changes occur continuously. When you order service parts, the PIN number, manufacture date code or serial number must be available.

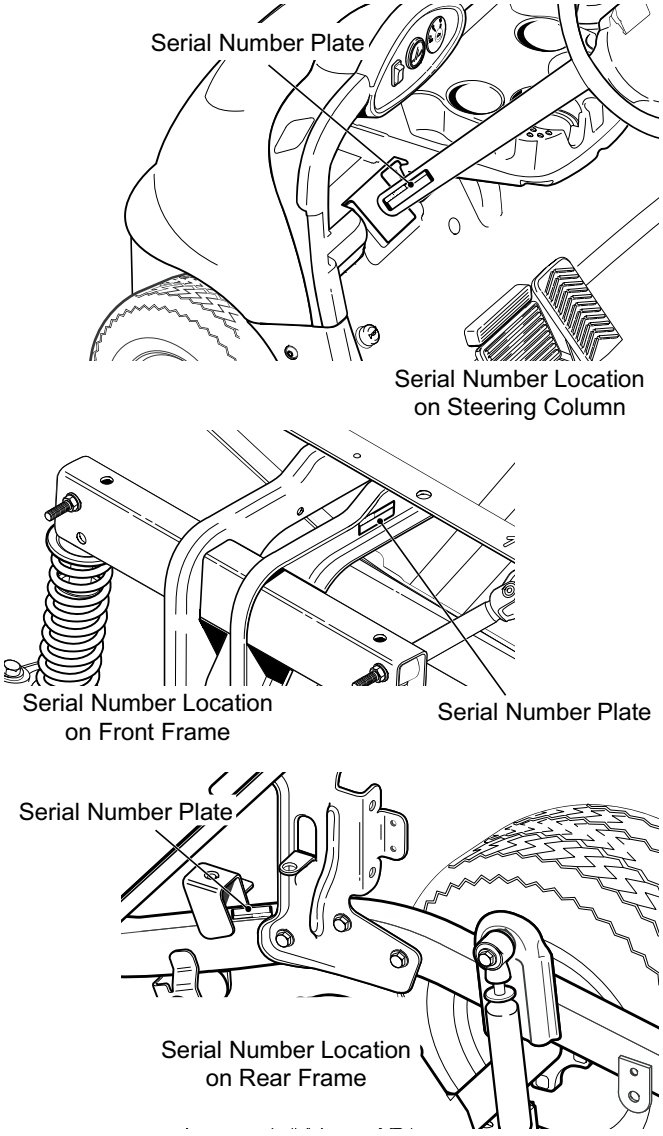


Figure. 1 Serial Number Locations

VEHICLE WITH A DISCHARGED BATTERY

⚠ WARNING

To decrease the risk of severe injury or death from accidental movement, do not use jumper cables to start a vehicle.

The vehicle has a starter/generator and does not idle. When you start the engine, the starter/generator functions as a starter and with the engine running, it functions as a generator.

The generator can keep the battery charged with the short run times with this type of vehicle. The generator will not charge a discharged battery.

When the engine starts, the clutches engage and cause the vehicle to move making jump starting both dangerous and impractical.

Since the engine stops when the accelerator is released, **jump starting should not be attempted.**

If the battery has discharged, charge it with a 12V charger that is rated at 10 amps or less and according to instructions supplied by the manufacturer of the charger.

STARTING VEHICLE ON A HILL

⚠ WARNING

To decrease the risk of roll-back, do not release the service brake until the engine has started.

⚠ CAUTION

Do not use the accelerator and engine to hold the vehicle on a hill. Doing so will cause early and excessive wear to the drive train components.

To decrease the risk of permanent damage to the drive train, do not allow roll-back when you start the vehicle on a hill.

Put left foot on service brake and release the parking brake. Press the accelerator with right foot and release the service brake.

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

SERVICING THE VEHICLE

⚠ WARNING

To decrease the risk of severe injury or death, resulting from improper servicing techniques, observe the following WARNINGS:

Do not attempt any type of servicing operations before reading and understanding all notices, cautions and warnings in this manual.

The drive wheels must be lifted and supported on jack stands before you do any service to the powertrain when the engine is in operation.

Wear eye protection when you service the vehicle. Be careful when you do work around battery, use solvents or compressed air.

To decrease the risk of electrical arc, which can cause a battery explosion, disable all electrical loads from the battery before you remove the battery wires.

To decrease the risk of engine damage, do not operate the vehicle at full throttle for more than 5 seconds with the drive wheels lifted off the ground.

The vehicle owner and service technician must carefully follow the procedures recommended in this manual. The preventative maintenance, applied at recommended intervals, keeps the vehicle dependable and decreases the costs for the repairs.

In any product, components will eventually fail to perform properly as the result of normal use, age, wear or abuse.

It is virtually impossible to anticipate all possible component failures or the manner in which each component may fail.

A vehicle requiring repair indicates the vehicle is no longer functioning as designed and should be considered potentially hazardous. Use extreme care when working on a vehicle. When diagnosing, removing or replacing any components that are not operating properly, consider the safety of yourself and those around you, should the component move unexpectedly.

Some components are heavy, spring loaded, highly corrosive, explosive, may produce amperage or reach high temperatures. Gasoline, carbon monoxide, battery acid and hydrogen gas could result in serious bodily injury to the technician/mechanic and bystanders, if not treated with the utmost caution. Be careful not to place hands, face, feet or body in a location that could expose them to injury should an unforeseen dangerous situation occur.

Always use the appropriate tools listed in the tool list and wear approved safety equipment.

Before a new vehicle is put into operation, do the items shown in the INITIAL SERVICE CHART.

Item	Service Operation
Battery	Charge battery.
Seats	Remove protective plastic covering.
Brakes	Check operation and adjust if necessary.
	Establish new vehicle braking distance.
Tires	Check pressure.
Fuel	Fill tank with correct fuel.
Engine	Check oil level.

Figure. 2 Initial Service Chart

FUEL

⚠ WARNING

To decrease the risk of severe injury or death from improper fuel handling:

Do not smoke near the fuel tank.

Do not add fuel near open flame or electrical items which can cause a spark.

Always handle gasoline in a well ventilated area.

Always wear eye protection to protect against splashed fuel and fuel vapors.

Always allow enough space for the expansion of gasoline. Leave at least 1 inch (2.5 cm) of space below bottom of filler neck.

Inspect the fuel cap, tank and other components for leaks or damage that can cause a hazardous condition.

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

⚠ CAUTION

Oxygenated or reformulated gasoline, is mixed with alcohols or ethers. Excessive amounts of these blends can damage the fuel system or cause performance problems. If any operating problems occur, use gasoline with a lower percentage of alcohol or ether.

Use clean regular grade unleaded fuel. The Ethanol blend fuel up to 10% is permitted.

Do not use gasoline that contains methanol.

High altitude or heavy use/load applications can benefit from higher octane gasoline.

FUEL TANK

The fuel tank is located under the seat, on the passenger side of the vehicle. Fill tank with fresh, clean, automotive grade, unleaded, 87 octane (minimum) gasoline. Heavy use/load applications may benefit from higher octane gasoline.

Early Production Fuel Tank

⚠ WARNING

Always allow enough space for the expansion of gasoline. Leave at least 1-inch (2.5 cm) of space below bottom of filler neck.

Early production fuel tanks can be identified by the location of the fuel cap which is located in the middle of the top of the tank as shown.

Early production fuel tanks require enough space for the expansion of the gasoline. Leave at least 1-inch (2.5 cm) of space below the bottom of the filler neck

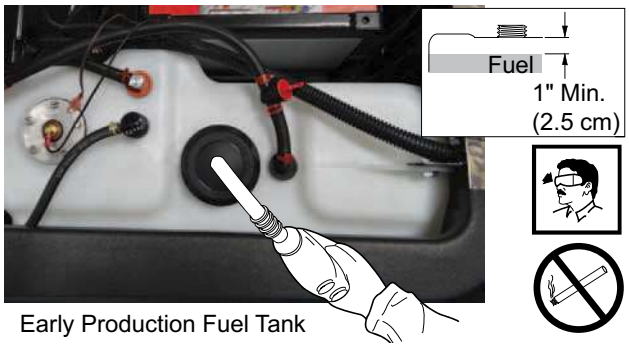


Figure. 3 Fuel Tank

Late Production Fuel Tank

Late production fuel tanks can be identified by the location of the fuel cap which is located in the rear of the top of the tank as shown

Late production fuel tanks are designed to allow for fuel expansion and do NOT require space below bottom of filler neck

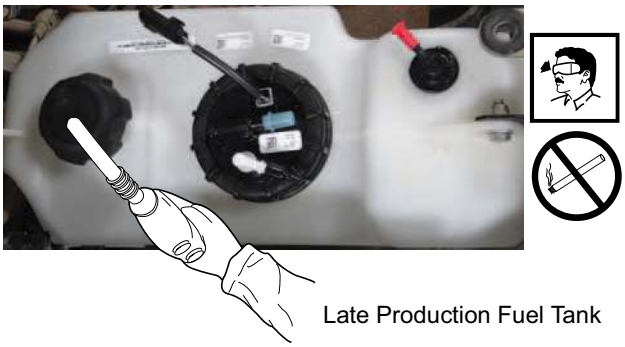


Figure. 4 Fuel Tank

⚠ WARNING

When refueling, inspect the fuel tank cap for leaks or breaks in the housing that could result in fuel spillage.

To prevent a possible explosion, do not smoke near the fuel tank or refuel near open fire or electrical items which could produce a spark.

Always wear safety glasses while refueling to prevent possible injury from gasoline or gasoline vapor.

Do not handle fuel in an area that is not adequately ventilated. Do not permit anyone to smoke in an area where vehicles are being fueled.

BATTERY

⚠ CAUTION

Heavy use of accessories drains the battery which can leave insufficient reserve to start the vehicle.

The vehicle uses a starter/generator to start the engine and charge the battery. The engine will not idle. The battery does not charge while the vehicle is stopped. Do not operate lights and other accessory items excessively while the vehicle is stopped.

The generator can supply 35 amps. Operation of all

accessories can cause the discharge of the battery even if the engine is running and the generator is operating. Discharging the battery is known as deep cycling. The battery is not a deep cycle model. It is a starting battery. Multiple deep cycling causes early failure of the battery.

If the battery has discharged, charge it with a 12-volt charger that is rated at 10 amps or less and according to instructions supplied by the manufacturer of the charger.

ROUTINE MAINTENANCE

This vehicle will give years of satisfactory service, providing it receives regular maintenance. Refer to the Periodic Service Schedule for appropriate service intervals.

NOTICE

Some maintenance items must be serviced more frequently on vehicles used under severe driving conditions.

POWERTRAIN MAINTENANCE

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

For maintenance procedures relating to the engine, speed control, fuel system, transmission, and rear axle or suspension refer to the particular section. See TABLE OF CONTENTS for section location.

BRAKES

⚠ WARNING

Always inspect the pedal travel before you operate a vehicle to confirm some brake function is found.

Make sure you do all brake tests in a safe location with regard to the safety of all personnel.

NOTICE

A subtle loss of performance can occur over time; therefore, it is important to establish the standard stopping distance with a new vehicle.

The Periodic Brake Performance Test should be performed regularly as an evaluation of braking system performance. It is useful as a method of identifying subtle loss of performance over time.

For test method and brake service, refer to BRAKES section.

TIRES

Be sure to reinstall the valve dust cap after checking or inflating the tire.

For additional information, refer to WHEELS AND TIRES section.

LIGHT BULB REPLACEMENT

Refer to ELECTRICAL section for information regarding light bulb replacement.

TRANSPORTING VEHICLE

Towing

⚠ WARNING

Do not ride or allow other people on the vehicle being towed.

Do not try to tow the vehicle with ropes, chains or any device other than a tow bar approved by the factory.

Do not tow a single vehicle at speeds in excess of 12 mph (19 kph).

Do not exceed 5 mph (8 kph) while towing multiple vehicles.

Do not tow more than three vehicles at a time.

Do not tow the vehicle on highways.

Neutral Lock

To decrease the risk of the driven clutch turning the rear wheels during service operations, a neutral lock is located on the direction selector.

To operate: Turn key switch to OFF and lift the seat. Pull out and rotate the neutral lock pin handle so that the pointed portion of the handle is to the side of the direction selector cam. Move the direction selector towards the area between F and R. During that motion, the pin will snap into the hole in the direction selector mounting bracket preventing any movement.

When in this position, the direction selector remains

locked in the neutral position. To unlock the direction selector, pull the neutral lock pin handle out and rotate until the pointed portion of the handle fits into the hole in the direction selector cam.

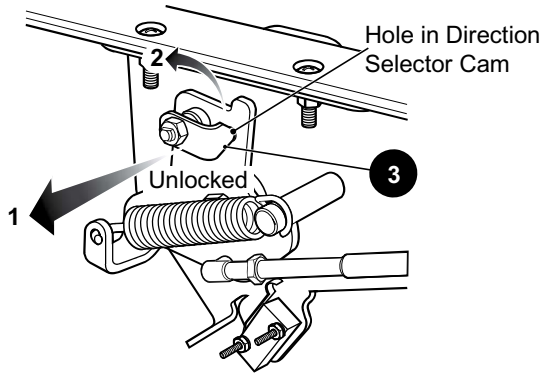


Figure. 5 Neutral Lock

Hauling

⚠ WARNING

Make sure you secure the vehicle and all items before you transport a vehicle on a trailer.

Do not allow any people on a vehicle being transported on a trailer.

Remove the windshield before you transport a vehicle on a trailer.

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

If you transport the vehicle on a trailer at highway speeds, the canopy must be removed and the seat bottom secured.

When you transport the vehicle on a trailer below highway speeds, check for tight hardware and cracks in canopy at the mounting points.

The rated capacity of the trailer or truck must be more than the weight of the vehicle and load plus 1000 lbs. (454 kg). See GENERAL SPECIFICATIONS for the weight of the vehicle.

Secure the vehicle to the trailer with ratchet tie downs.

CANOPY AND WINDSHIELD

⚠ WARNING

The canopy does not supply protection from roll-over or falling objects.

The windshield does not supply protection from tree branches or moving objects.

The canopy and windshield supply some protection from the elements, but do not keep the operator and passenger dry in heavy rain.

Clean the windshield with lots of water and a clean cloth. Minor scratches may be removed using a commercial plastic polish or Plexus plastic cleaner.

WINTER OR PROLONGED STORAGE

⚠ WARNING

Do not handle fuel in an area that is not adequately ventilated. Do not smoke near the fuel tank or refuel near open flame or electrical items which could produce a spark.

Store vehicle in a clean, dry area. Do not store in same area as a stove, furnace, water heater, or other appliance that uses a pilot light or has a device that can create a spark.

When refueling, inspect the fuel cap for leaks or breaks that could result in fuel spillage.

Always wear safety glasses while refueling to decrease the risk of possible eye injury from gasoline or gasoline vapor.

Keep hands, clothing and jewelry away from moving parts.

Use care not to contact hot objects.

Raise the rear of the vehicle and support on jack stands before attempting to run the engine.

Preparing the engine for a prolonged storage period (30 days or more) calls for a few simple steps to decrease the risk of a build up of varnish and gum in the carburetor and corrosion in the engine.

- Turn the Key Switch to OFF position, and leave the Forward/Reverse switch in the NEUTRAL position during storage.
- Perform all required routine maintenance per the Periodic Service Schedule.
- Properly inflate the tires to recommended pressure (psi) stated on sidewall of tires.
- Place the Forward/Reverse handle in the NEUTRAL position engage the neutral lock.
- Turn the fuel shut-off valve to the closed (OFF) position.

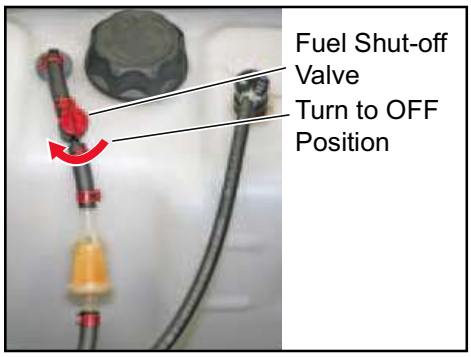


Figure. 6 Fuel Shut-off Valve Position

- With proper ventilation, run engine until the remaining fuel in carburetor and fuel lines is depleted and the engine stalls.
- Return the neutral lock to the OPERATE position.
- Loosen, but do not remove the carburetor drain screw. Drain any fuel remaining in bowl into an approved container and pour the fuel collected into the vehicle fuel tank. Add Sea Foam™ (4 oz. for a full tank of fuel) to stabilize fuel and install the tank cap securely.
- Tighten the carburetor drain screw.
- Remove spark plug and pour about 1/2 oz. (15 ml) of SAE 10 - 30 weight oil or Fogging oil into the cylinder. Rotate the crankshaft by hand several times, then install the spark plug.
- Do not engage the park brake, but secure the car from rolling.
- While engine is still warm, change oil.
- Clean body, chassis and engine of debris, mud, chaff or grass.

VEHICLE CLEANING AND CARE

⚠ WARNING

Read and understand all instructions supplied by the manufacturer of the pressure washer before use.

⚠ CAUTION

When you clean the outside of the vehicle with a pressure washer, do not use more than 700 psi pressure. Keep a minimum distance of 12 inches from the spray nozzle to the painted surface. Do not clean the plastic parts with abrasive solvents.

Make sure you use correct methods and cleaning materials to decrease the risk of damage to the outside of the vehicle. The use of more than 700 psi water pressure can cause injury to anyone in the area or damage to vehicle.

Clean the windshield with water and a clean cloth. Remove small scratches with a plastic polish or Plexus® plastic cleaner, available from the service parts department.

Apply a soap and water solution with a sponge or soft brush to clean the vinyl seats and plastic or rubber trim. Dry with a cloth.

Use a commercially available vinyl and rubber cleaner to remove oil, tar, asphalt, shoe polish, etc.

Wash the vehicle frequently with cool water and mild detergent to protect the painted surfaces.

Apply wax that is for clear coat automotive finishes to improve the appearance and protection of the painted surfaces. Do not apply wax to matte finish surfaces.

Materials used as fertilizers or for dust control can collect on the bottom of the vehicle. These materials will cause corrosion of components, unless cleaned with water. Clean areas where mud or dirt can collect. Loosen the sediment that is packed in closed areas to help with removal. Be careful not to damage the paint.

VEHICLE CARE PRODUCTS

To help maintain the vehicle, the manufacturer has several products, available through a local Distributor, an authorized Branch, or the Service Parts Department, among them are:

- Touch-up paint specially formulated to match vehicle colors for use on both metal and TPE (plastic) bodies. (Contact a service parts representative for availability).

- Multi-purpose Battery Protectant (P/N27619G01) formulated to form a long-term, flexible, non-tacky, dry coating that will not crack, peel or flake over a wide temperature range.
- Use windshield and plastic protectant (P/N 606314) to remove minor scratches from windshield.

HARDWARE

Periodically, inspect the vehicle for loose fasteners. Use care when tightening fasteners, refer to the following table for torque values (Figure. 7).

Standard:

- Grade 2 hardware is unmarked.
- Grade 5 hardware can be identified by the three marks on the hex head.
- Grade 8 hardware is identified by six marks on the head.

The class specification is marked on metric hardware.

TORQUE SPECIFICATIONS

ALL TORQUE FIGURES ARE IN FT. LBS. (Nm)
Unless otherwise noted in text, tighten all hardware in accordance with this chart.
This chart specifies 'lubricated' torque figures. Fasteners that are plated or lubricated when installed are considered 'wet' and require approximately 80% of the torque required for 'dry' fasteners.

BOLT SIZE	1/4"	5/16"	3/8"	7/16"	1/2"	9/16"	5/8"	3/4"	7/8"	1"
Grade 2	4 (5)	8 (11)	15 (20)	24 (33)	35 (47)	55 (75)	75 (102)	130 (176)	125 (169)	190 (258)
Grade 5	6 (8)	13 (18)	23 (31)	35 (47)	55 (75)	80 (108)	110 (149)	200 (271)	320 (434)	480 (651)
Grade 8	6 (8)	18 (24)	35 (47)	55 (75)	80 (108)	110 (149)	170 (230)	280 (380)	460 (624)	680 (922)
BOLT SIZE	M4	M5	M6	M8	M10	M12	M14			
Class 5.8 (Grade 2)	1 (2)	2 (3)	4 (6)	10 (14)	20 (27)	35 (47)	55 (76.4)			
Class 8.8 (Grade 5)	2 (3)	4 (6)	7 (10)	18 (24)	35 (47)	61 (83)	97 (131)			
Class 10.9 (Grade 8)	3 (4)	6 (8)	10 (14)	25 (34)	49 (66)	86 (117)	136 (184)			

Figure. 7 Torque Specifications

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

Notes:

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

SAFETY

NOTICES, CAUTIONS, WARNINGS AND DANGERS

Read the **NOTICES, CAUTIONS, WARNINGS** and **DANGERS** in this manual. The person who services a vehicle requires mechanical skill and experience to see possible hazardous conditions. Incorrect service or repairs can cause damage to the vehicle or make the vehicle dangerous to operate.

NOTICE

A NOTICE indicates and describes information not related to personal injury.

⚠ CAUTION

A CAUTION indicates a dangerous condition that can cause injury that is not life threatening.

⚠ WARNING

A WARNING indicates a dangerous condition that can cause death or serious injury.

⚠ DANGER

A DANGER indicates a dangerous condition that will cause death or serious injury.

IMPORTANT SAFETY WARNING

Normal use, age, wear or abuse can cause some components on the vehicle to fail.

The manufacturer cannot know all possible component failures or the methods that failures can occur.

A vehicle in need of repair does not operate correctly and can be dangerous.

Be careful when you service the vehicle. Be aware of your safety and the safety of other persons in the area, if the vehicle unexpectedly moves.

Some components are heavy, spring loaded, corrosive, explosive, can cause high amperage or get hot. Battery acid and hydrogen gas can cause injury. Do not put your hands, face, feet or body in a location that can expose them to injury if an unexpected situation occurs.

Always use the correct tools shown in the tool list and wear approved safety equipment.

MODIFICATIONS TO VEHICLE

Do not modify the vehicle in any manner that will change the weight distribution of the vehicle.

⚠ WARNING

Changes to the weight distribution or the center of gravity decreases the stability of the vehicle and can cause it to easily turn over.

GENERAL MAINTENANCE

⚠ WARNING

Always use correct service procedures. Never do any type of service procedure before you read and understand all notices, cautions, warnings and dangers in this manual.

When any maintenance procedure or inspection is done, use caution to make sure the technician or any person in the area is safe. Use caution to decrease the risk of damage to the vehicle.

Always read and understand the full applicable manual section (chapter) before you do any inspection or service.

BEFORE SERVICING VEHICLE

Before attempting to inspect or service a vehicle, be sure to read and understand the following warnings:

⚠ WARNING

Remove all jewelry before you work on the vehicle.

Do not allow loose clothing or hair to contact the moving parts.

Do not touch hot objects.

Before you engage or adjust the power-train, lift and support the vehicle on the jack stands.

Wear OSHA approved clothing and eye protection when working on anything that could expose the body or eyes to potential injury. In particular, use care when working around battery, using compressed air or solvents.

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

Always remove the key from key switch before you disconnect an active circuit.

When you connect the battery cables, pay particular attention to the polarity of the battery terminals. Do not confuse the positive and negative cables.

Engage the parking brake, except when the power-train must be allowed to rotate or the brake system needs service.

If repairs are to be made that will require welding or cutting, the battery must be removed.

Open flame or sparks can cause an explosion. Keep all flammable materials away from the battery.

Never operate the starter with the spark plugs removed unless the ignition system has been disabled and the engine and exhaust are cold. Fuel expelled from the cylinders could be ignited by the ignition system or the hot exhaust system.

Never work on an engine that is hot.

Never test the ignition system without either connecting the spark plug lead to a tester or spare grounded spark plug.

If the spark function is to be observed at the spark plug, be sure to install a spare spark plug into the open cylinder before operating the starter.

Never test the function of a fuel pump near a hot engine or other source of flame or combustion.

Never confuse the hoses to and from the fuel pump. Confirm that the carburetor and pulse lines are correctly installed before you start the engine (see FUEL SYSTEM section).

Use insulated wrenches to decrease the risk of the possibility of a dropped wrench causing a short-circuit if it falls across the battery terminals.

Aerosol containers of battery terminal protectant must be used with extreme care. Insulate any metal container to decrease the risk of the container from contacting battery terminals which could result in an explosion.

Never work around or operate a vehicle in an environment that does not ventilate exhaust gases from the area.

Exhaust gas (carbon monoxide) is deadly.

Carbon monoxide is an odorless gas that is formed as a natural part of the incomplete combustion of hydrocarbon fuels. Carbon monoxide is a dangerous gas that can cause unconsciousness and is potentially lethal.

The following are symptoms of carbon monoxide inhalation:

Dizziness

Vomiting

Intense headache

Muscular twitching

Weakness and sleepiness

Throbbing in temples

If experiencing any of these symptoms, get fresh air immediately.

Battery Removal and Installation

Tool List	Qty.
Insulated Wrench, 1/2”	1
Socket, 1/2”	1
Extension, 12"	1
Ratchet	1
Torque Wrench, in. lbs.	1
Battery Carrier	1

NOTICE

Hardware that is removed must be installed in its original position unless otherwise specified. If the torque values are not specified, refer to the Torque Specifications table in the GENRAL INFORMATION AND ROUTINE MAINTENANCE section.

At the battery, remove the negative (-) cable before removing the positive (+) cable. Remove the screw (2) from the battery hold down and remove the battery (Figure. 1).

Connect the positive (+) battery cable first and then connect the negative (-) battery cable.

Install the battery in reverse order of removal.

Tighten the bolt (1) and screw (2) to torque value specified below.

Item	Torque Specification
1	70 - 90 in. lbs. (8 - 10 Nm)
2	27 - 44 in. lbs. (3 - 5 Nm)

Be sure to remove all corrosion from the terminals and hardware. After installing the battery, coat terminals with a commercially available terminal protectant.

⚠ WARNING

Be careful when you use aerosol containers near battery terminals. Use a metal container that has insulation to decrease the risk of an explosion.

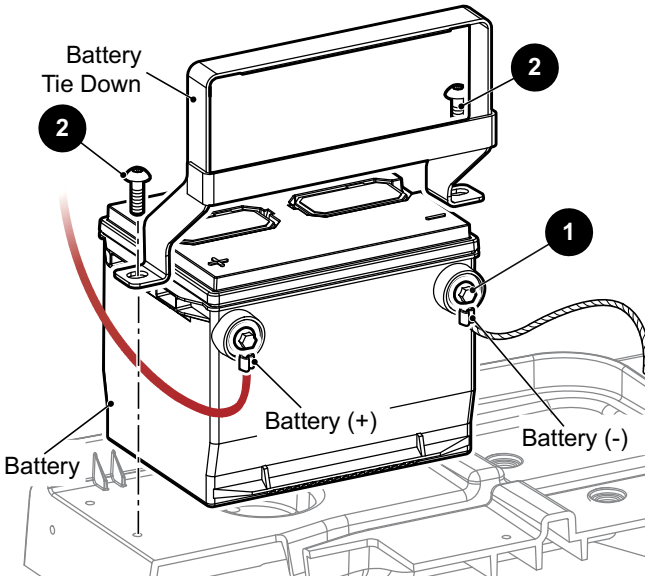


Figure. 1 Battery Removal

LIFTING THE VEHICLE

Tool List **Qty.**

Floor Jack 1
Jack Stands 4
Wheel Chocks.....4

You must lift the front, the rear or the entire vehicle for some service and maintenance operations.

⚠ WARNING

The vehicle is not stable during the lifting process.

Make sure the vehicle is on a hard and level surface.

Never get under a vehicle that is supported by a jack only.

Make sure a vehicle that is supported on jack stands is stable before you get under the vehicle.

Put wheel chocks in front and behind the wheels that remain on the ground.

Do not allow any person in or on the vehicle being lifted.

Remove payload from vehicle before lifting. No person(s) should be in or on the vehicle while lifting.

⚠ CAUTION

When you lift the vehicle, put the jack and jack stand at the areas indicated only (Figure. 2).

How to lift the entire vehicle:

1. Install wheel chocks in front and behind each front wheel.
2. Center the jack under the bagwell.
3. Put a block of wood between the jack and rear bumper. Lift the vehicle enough to place two jack stands under the frame where the leaf spring mounting brackets are welded to the frame.
4. Lower the jack and test the stability of the vehicle on the two jack stands.
5. Place the jack under the center front just behind the bumper.
6. Lift the vehicle and place two jack stands under the frame where the instrument panel support is attached to the frame.

7. Lower the jack and test the stability of the vehicle on the jack stands.

How to lift the rear of the vehicle only:

1. Install wheel chocks in front and behind each front wheel.
2. Center the jack under the bagwell.
3. Put a block of wood between the jack and rear bumper. Lift the vehicle enough to place two jack stands under the frame where the leaf spring mounting brackets are welded to the frame.
4. Lower the jack and test the stability of the vehicle on the two jack stands.

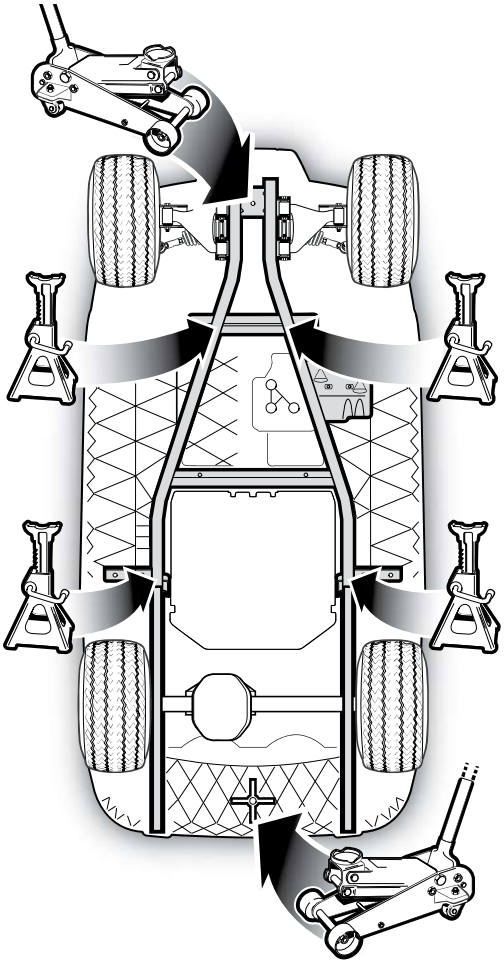


Figure. 2 Lifting the Vehicle

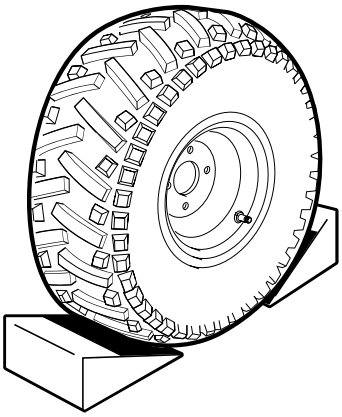


Figure. 3 Wheel Chocks

How to Lift the Front of the Vehicle Only:

1. Install wheel chocks in front and behind each rear wheel.
2. Place the jack under the center front just behind the bumper.
3. Lift the vehicle and place two jack stands under the frame where the instrument panel support is attached to the frame.
4. Lower the jack and test the stability of the vehicle on the two jack stands.

Lower the Vehicle:

1. Lift the vehicle enough to remove the jack stands.
2. Carefully lower the vehicle to the ground with the jack.

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

Notes:

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

Notes:

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

BODY

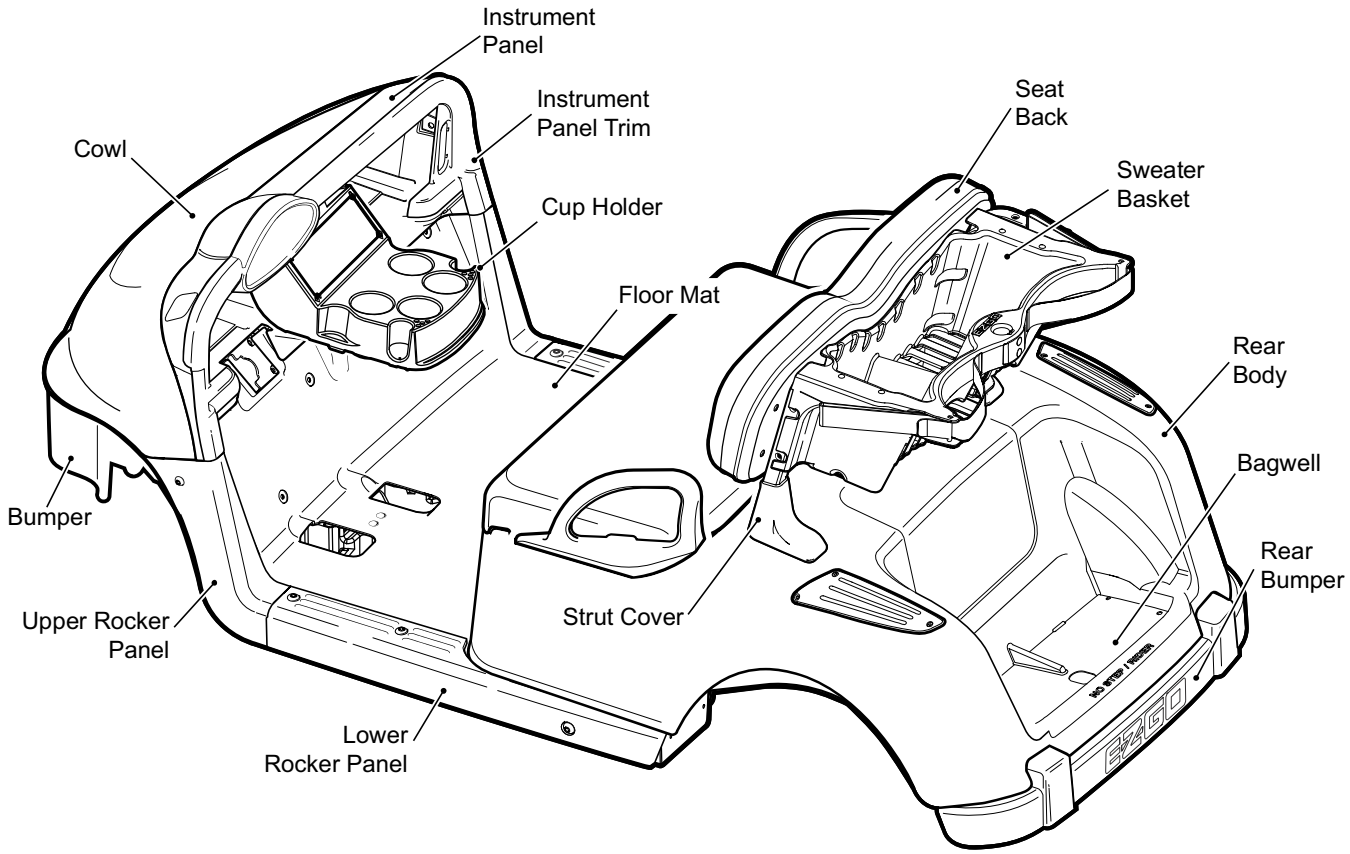


Figure 1 Body

GENERAL

NOTICE

Vehicle accessories, such as the canopy and windshield, need to be removed before removing many body components.

Hardware that is removed must be installed in its original position unless otherwise specified. If the torque values are not specified, refer to the Torque Specifications table in the GENRAL INFORMATION AND ROUTINE MAINTENANCE section.

⚠ WARNING

To decrease the risk of injury or death from a battery explosion, battery should always be removed before any servicing that could generate sparks or repairs that require welding or cutting.

Body component replacement can be accomplished with a minimum of specialized tools. Most body components are held in place with removable hardware such as nuts, bolts and screws. Ratchet rivets are used to secure items such as the floormat to the floorboard.

To remove ratchet rivets, slide a notched pry bar under the head of the rivet and press downward on the bar to pull the rivet from the hole (Figure 1).

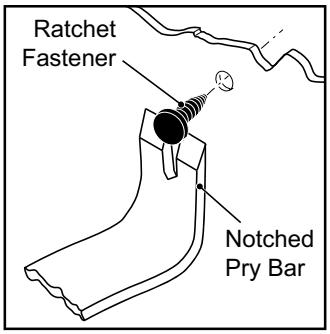


Figure 2 Ratchet Rivet Removal

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

BODY COMPONENT REPLACEMENT

Front Bumper

Tool List **Qty.**

Socket, 15 mm....1
Ratchet....1
Torx Bit, T-30....1
Torque Wrench, in. lbs....1

1. Remove two hex nuts (1) and washers (2) securing the top of the bumper (3) to the front strut mounting bolts (Figure 3).
2. Remove the bolt (4) and washer (5) securing the bottom of the bumper (3) to the bumper bracket (6).
3. Pull the top of the bumper (3) forward and off of the bolts. Lift the bumper (3) upward to clear the frame channel between the front struts. Pull the lower edge of the bumper down and away from the vehicle.

Installation is reverse order of removal. Replace any worn or damaged hardware as required. It is recommended that all lock nuts be replaced after the fifth removal.

Item	Torque Specification
1	27 - 44 in. lbs (3 - 5 Nm)
4	37 - 45 in. lbs (4 - 5 Nm)

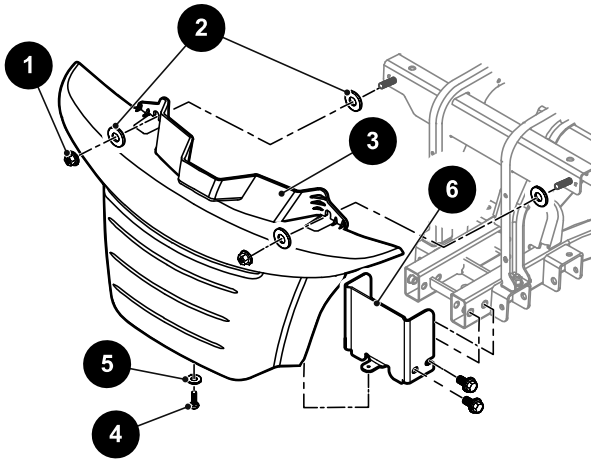


Figure 3 Front Bumper

Rocker Panels

Tool List **Qty.**

Torx Bit, T-45IP....1
Ratchet....1
Torque Wrench, in. lbs....1

1. Remove the lower rocker panel (1) by removing three torx screws (3) (Figure 4).
2. Remove the upper rocker panel (2) by removing the two remaining torx screws (3).

Removal is the same for both sides of the vehicle.

Installation is reverse order of removal. Replace any worn or damaged hardware as required. It is recommended that all lock nuts be replaced after the fifth removal.

Item	Torque Specification
3	27 - 44 in. lbs (3 - 5 Nm)

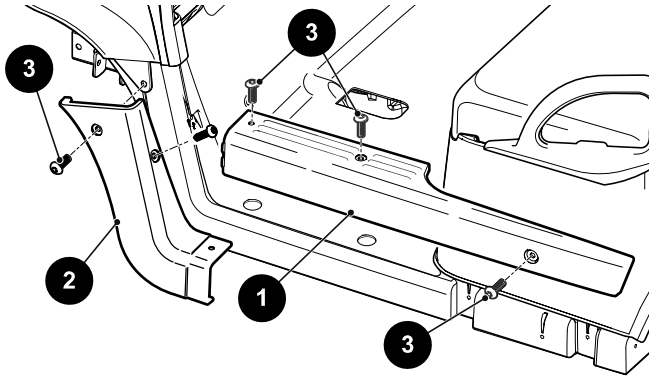


Figure 4 Rocker Panel Removal

Floormat

Tool List **Qty.**

Notched Pry Bar....1

The upper and lower rocker panels must be removed before removing the floormat.

1. Remove six ratchet rivets (5) securing the floormat to the floorboard (4). (Figure 5).
2. Pull the edge of the floormat from under the edge of the instrument panel and lift over accelerator and brake pedals.

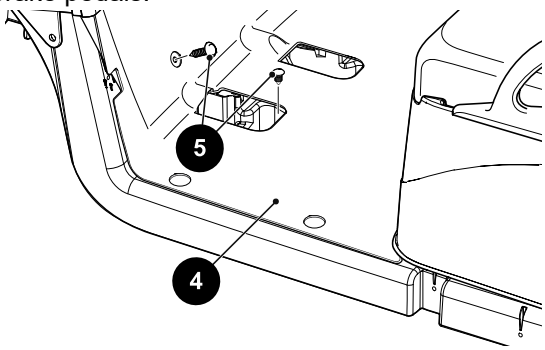


Figure 5 Floormat Fastener Removal

Installation of the floormat will require new ratchet rivets. Install two short ratchet rivets in the upper corners of floormat (Figure 6).

Installation is reverse order of removal. Replace any worn or damaged hardware as required.

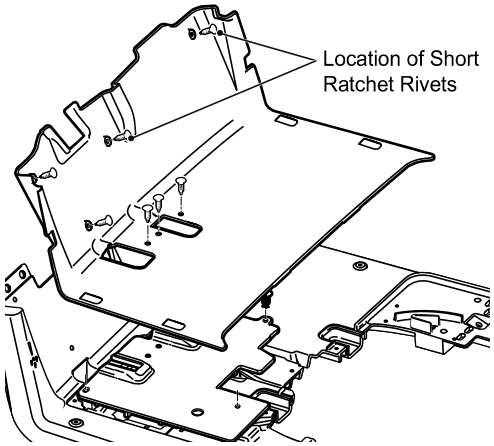


Figure 6 Floormat

Cowl and Instrument Panel

Tool List	Qty.
Torx Bit, T-45	1
Torx Bit, T-30	1
Torx Bit, T-27IP	1
Torx Bit, T-50IP	1
Insulated Wrench, 1/2”	1
Ratchet	1
Torque Wrench, in. lbs.	1
Torque Wrench, ft. lbs.	1
Long Needle Nose Pliers	1

⚠ WARNING

Using an insulated wrench, disconnect the battery cable at the negative (BL-) battery terminal.

If the vehicle is equipped with a canopy and windshield, remove these items before proceeding. Instructions for removal of the canopy and windshield are located in the WEATHER PROTECTION section. Remove the upper and lower rocker panels and the floormat as described.

1. Remove four torx screws (11) securing the trim panel (12) to the instrument panel (13) and cowl (14) (Figure 7).
2. Locate the tab in the fender well area, under the cowl. The tab extends from the instrument panel (13) through a slot in the cowl. Squeeze the tabs together and push to the back of the vehicle while pulling forward on the cowl. Repeat for the other side. Remove the cowl.
3. Loosen the trim panel (12) by pulling it away from the instrument panel along the upper edge. Grip the ball holder with both hands and pull away from the instrument panel (13). Move to the other side of the vehicle and grip the ball holder on that side with both hands and pull it away from the instrument panel (13).
4. Disconnect the wires to the instruments located in the trim panel. Remove the trim panel.

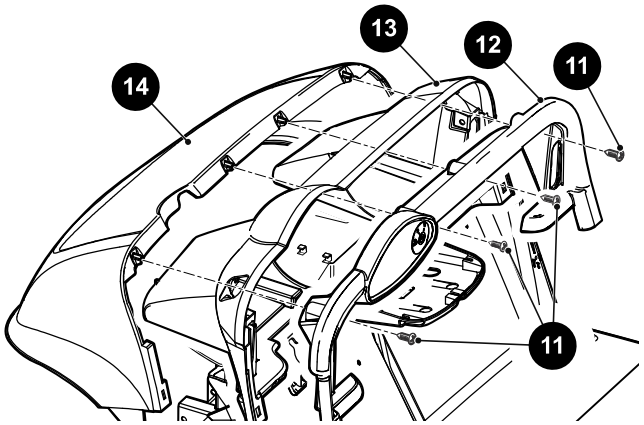


Figure 7 Cowl and Instrument Panel Trim

5. Remove three self-threading screws (20) securing the cup holder assembly (15) to the instrument panel (13). Remove the cup holder. Disconnect the turn signal flasher unit and the brake switch relay if the vehicle is equipped with turn signals and brake lights (Figure 8).

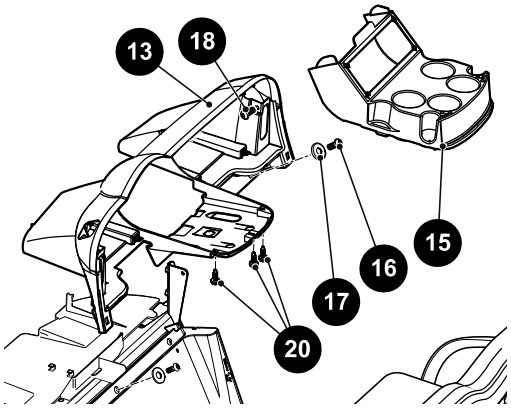


Figure 8 Instrument Panel and Cup Holder

6. Remove four torx screws (16) and flat washers (17) securing the instrument panel (13) along its lower edge and the two torx screws (18) located near the top of the instrument panel; one on each side. The instrument panel (13) can now be removed.

⚠ WARNING

To decrease the risk of the possibility of injury or death, the correct safety label must be on the instrument panel cup holder at all times.

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

Installation is reverse order of removal. Replace any worn or damaged hardware as required.

Tighten the torx screws (11, 16, 18) to the torque value specified below.

Item	Torque Specification
11	27 - 44 in. lbs. (3 - 5 Nm)
16	20 - 25 ft. lbs. (28 - 34 Nm)
18	13 - 16 ft. lbs. (18 - 22 Nm)

Front Splash Guard

Tool List **Qty.**

Notched Pry Bar 1

Remove the upper and lower rocker panels, cowl, instrument panel trim and instrument panel.

Remove two ratchet rivets (22) securing front splash guard (21) to vehicle (Figure 9).

Installation is reverse order of removal. Replace any worn or damaged hardware as required.

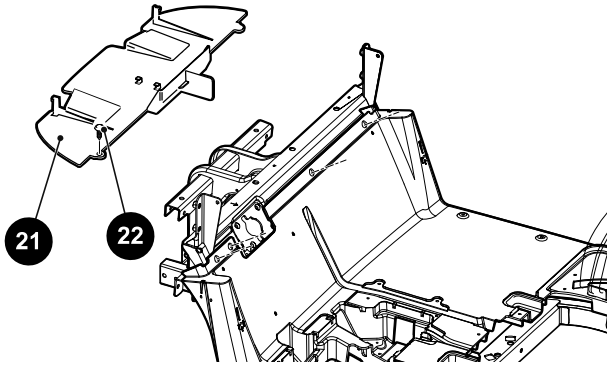


Figure 9 Front Splash Guard

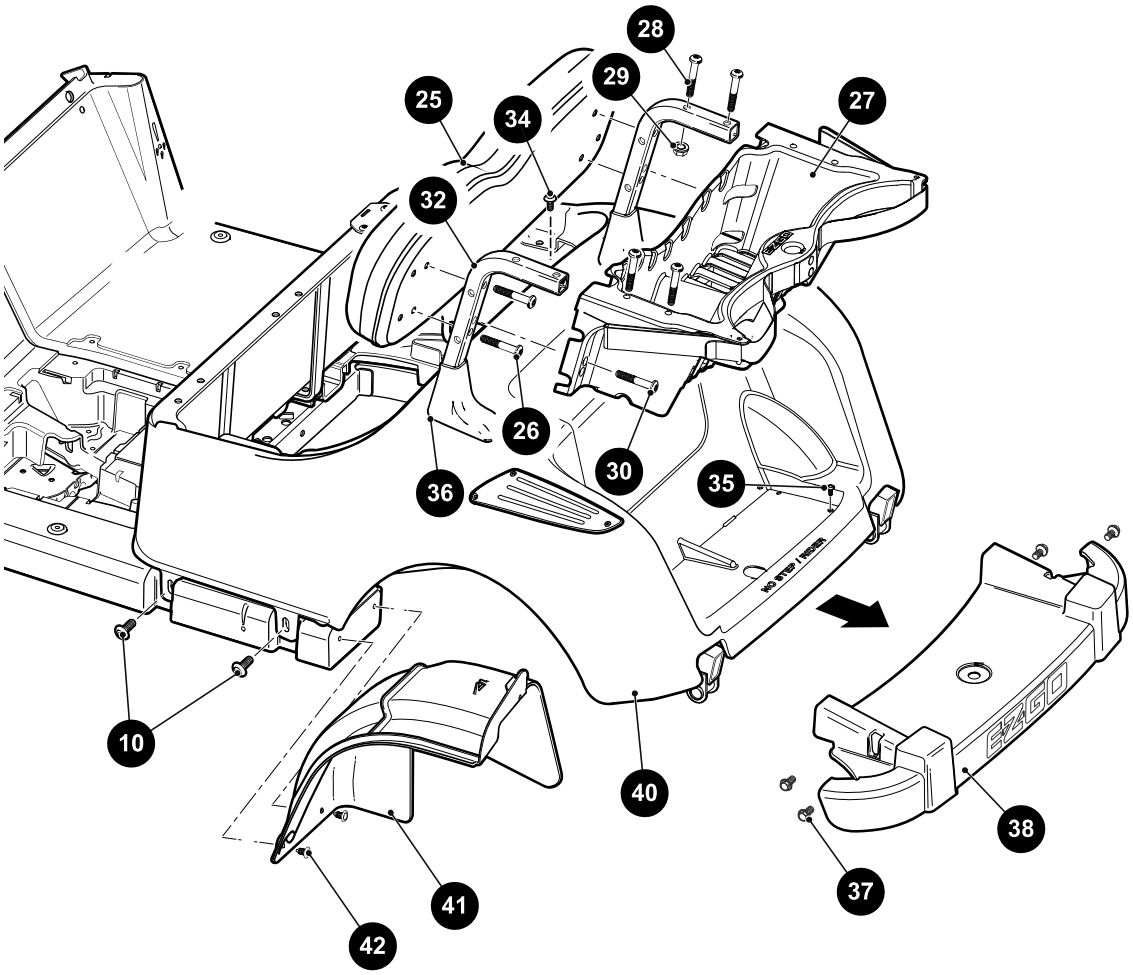


Figure 10 Golf Car Rear Body, Sweater Basket, Rear Bumper and Fender Liner

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

Sweater Basket

Tool List **Qty.**

Torx Bit, T-47IP 1
Socket, 15 mm, Deep-well 1
Ratchet 2
Ratchet Extension, 6" 1
Torque Wrench, ft. lbs. 1

1. Remove four torx screws (28) and flanged nuts (29) on the top edge of the sweater basket assembly (27) (Figure 10).
2. Remove two torx screws (30) securing the back of the sweater basket (27) to the seat back supports.
3. Slide the sweater basket assembly (27) off the seat back supports (32).

Installation of the sweater basket is in reverse order of its removal. Replace any worn or damaged hardware with new as required. It is recommended that all lock nuts be replaced after the fifth removal.

Tighten the nuts (29), screws (30) to the torque value specified below.

Item	Torque Specification
29	4 - 6 ft. lbs. (6 - 8 Nm)
30	13 - 16 ft. lbs. (18 - 22 Nm)

Seat Back Assembly

Tool List **Qty.**

Torx Bit, T-45IP 1
Ratchet 1
Torque Wrench, ft. lbs 1

Remove four torx screws (26) that secure the seat back assembly (25) to seat back supports (32) (Figure 10).

Installation of the seat back assembly is in reverse order of its removal. Replace any worn or damaged hardware. It is recommended that all lock nuts be replaced after the fifth removal.

Tighten the screws (26) to the torque value specified below.

Item	Torque Specification
26	13 - 16 ft. lbs. (18 - 22 Nm)

Fender Liner

Tool List **Qty.**

Notched Pry Bar 1

The fender liner can be removed without removing the rear body of the vehicle (Figure 10).

Remove four ratchet rivets (42) that secure the liner (41) to the frame of the vehicle. Two ratchet rivets (42) are located on the lower front edge of the fender liner (41). The two remaining are located along the inside surface above the wheel.

Installation is in the reverse order of removal. Replace any worn or damaged hardware.

Rear Body

Tool List **Qty.**

Torx Bit, T-45IP 1
Torx Bit, T-47IP 1
Torx Bit, T-50 1
Ratchet 1
Insulated Wrench, 1/2” 1
Torque Wrench 1

Remove the lower and upper rocker panels and the sweater basket. Fold the back edge of the floormat toward the front of the vehicle. If the vehicle is equipped as a 2 + 2 with a rear facing seat or with a canopy and windshield, these must also be removed (Figure 10).

1. Raise and remove the seat bottom assembly from the vehicle. Remove four torx screws (26) securing the seat back (25) to the seat back supports (32) (Figure 10).
2. Using an insulated wrench, disconnect the battery cable at the negative (-) battery terminal.
3. Remove the two torx head screws that secure the controller splash shield to the body on the passenger side of the vehicle.
4. Remove the two strut covers (36) by sliding the covers up and off of the struts.
5. Disconnect the wires from the charging receptacle to the battery and unplug the wire to the main wiring harness. Remove two torx screws (33) securing each hinge plate (32) along the front edge of the rear body then remove both hinge plates.
6. Remove two inner torx screws (34) from the back edge of seat opening in the rear body.
7. Remove four torx screws (10) from the lower edge of the rear body, two on the driver side and two on the passenger side.
8. Remove two torx screws (35) from the bagwell floor.
9. It is recommended that the removal of the rear body is done using two people, one on each side of the vehicle.

10. Lift the rear body, pivot the seat opening upward and towards the back of the vehicle to clear the seat back supports.

Installation is reverse order of removal of removal. Replace any worn or damaged hardware. It is recommended that all lock nuts be replaced after the fifth removal.

Tighten the screws (26, 30, 33, 34) to the torque value specified below.

Item	Torque Specification
26, 30, 33, 34	13 - 16 ft. lbs. (18 - 22 Nm)

Rear Bumper

Tool List **Qty.**

Ratchet 1
Ratchet Extension, 9" 1
Universal Joint 1
Socket, 15mm 1
Torx Bit, T-47IP 1
Torque Wrench, ft. lbs 1

The rear bumper (38) can be removed without removing the rear body of the vehicle (Figure 10).

1. Remove two torx head screws (35) from the bag well floor. If the rear body has been removed from the vehicle go to step 2.
2. Remove four hex head bolts (37) securing the rear bumper (28) to the vehicle frame.
3. Pull the rear bumper (28) backward off the frame while lifting the rear edge of the body.

Installation is in the reverse order of removal. Replace any worn or damaged hardware.

Tighten the screws (35), bolts (37) to the torque value specified below.

Item	Torque Specification
35	6 - 9 ft. lbs. (8 - 12 Nm)
37	10 - 13 ft. lbs. (14 - 17 Nm)

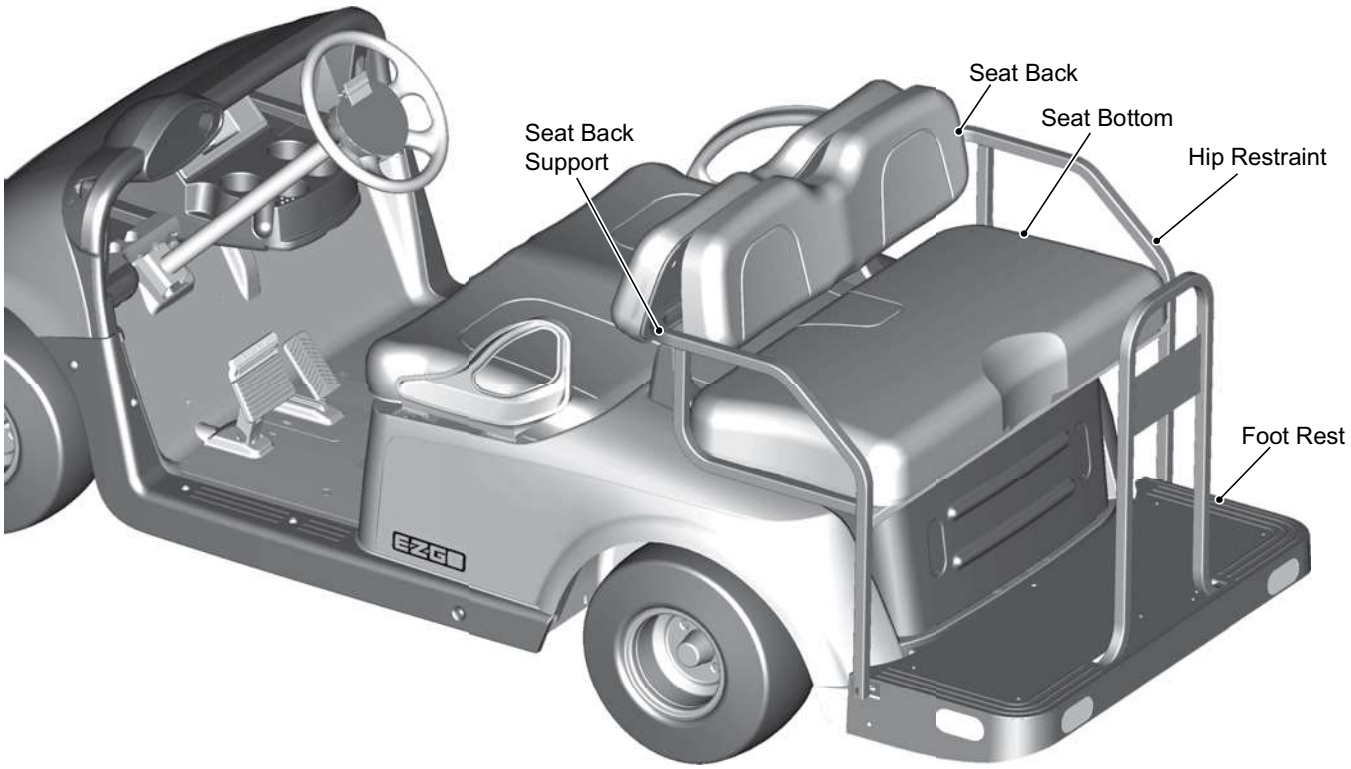


Figure 11 2 + 2 Rear Facing Seat and Foot Rest

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

2 + 2 REAR FACING SEAT AND FOOT REST

Tool List	Qty.
Torx Bit, T-45 IP	1
Socket, 15 mm	1
Ratchet	1
Torque Wrench, ft. lbs.	1
Wrench, 15 mm	1

1. Remove four hex head bolts (10) that secure the seat bottom (11) to the hip restraints (12) (Figure 12).
2. Lift the seat bottom (11) up and remove it from the vehicle.
3. Loosen the torx head bolts (23) and nuts (22) that secure the seat back mounting brackets and hip restraint to the seat back support (24) (Figure 15).

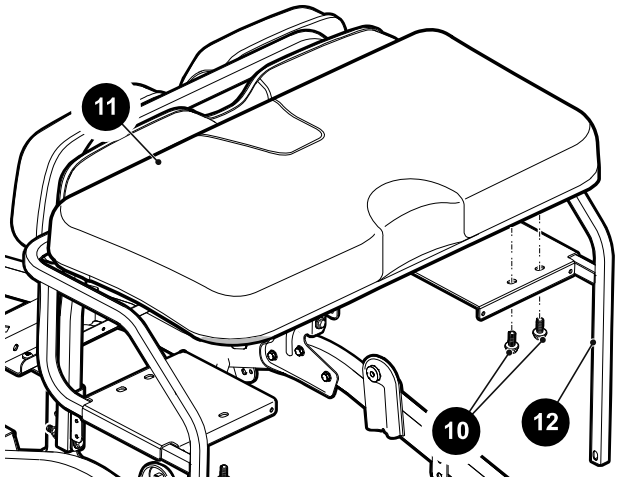


Figure 12 Rear Facing Seat Bottom

4. Slide the seat back assembly (45) with the brackets attached towards the back of the vehicle and remove it from the vehicle (Figure 13).
5. To separate the seat back assembly (45) from the mounting brackets (42), remove two torx screws (43) from each bracket (42).

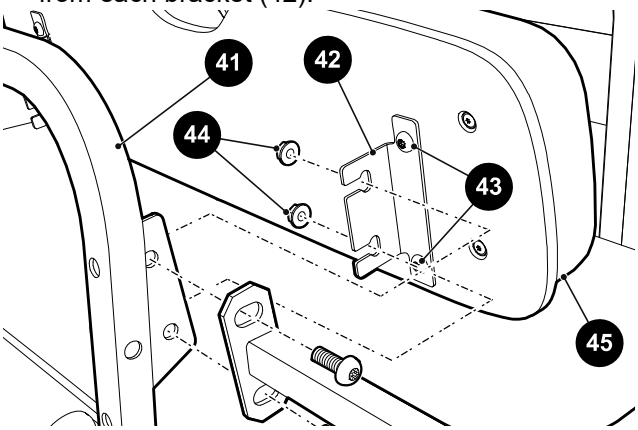


Figure 13 Rear Facing Seat Back

6. Remove the hex head bolt (20) and nut (21) from the lower leg of the driver side hip restraint (Figure 14).

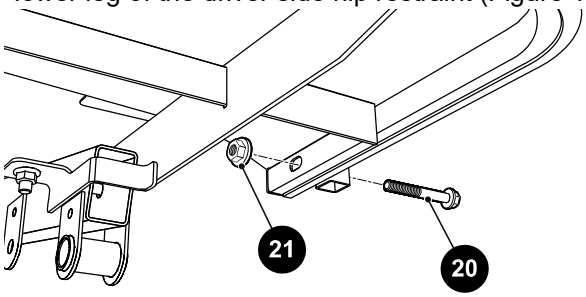


Figure 14 Rear Facing Seat Hip Restraint

7. Remove the hex nuts (22) from the torx head bolts (23) that secure the hip restraint (25) to the seat back support (24).
8. Hold or support the hip restraint (25) before removing the torx head bolts (23), when these bolts are removed the hip restraint is free from the vehicle (Figure 15).
9. Repeat steps 6 - 8 for the removal of the passenger side hip restraint.

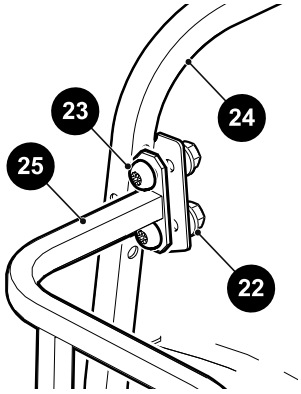


Figure 15 Upper Hip Restraint Bolts

10. Remove four torx head bolts (25) that secure the front seat back to the seat back support bracket (Figure 16).

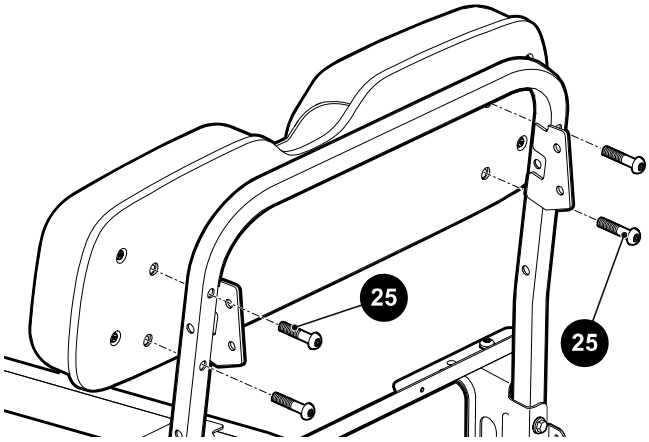


Figure 16 Front Seat Back

11. Remove two torx head bolts (28) from the bagwell floor (Figure 17).

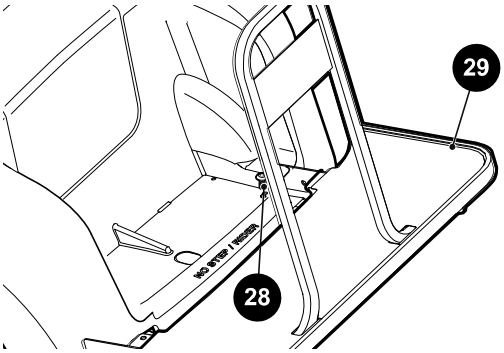


Figure 17 Rear Facing Seat Foot Rest

12. Loosen four hex head bolts (30). Support the rear foot rest (29) before removing the bolts (30) closest to the rear of the vehicle completely. When the bolts are removed the foot rest assembly (29) may be removed from the vehicle by sliding it backward and off of the two remaining bolts (Figure 18).

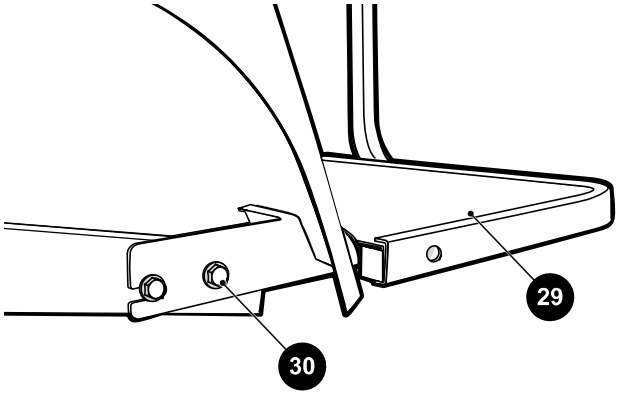


Figure 18 Foot Rest Removal

13. Remove four hex head bolts (31) and nuts (32) that secure the seat back support (33) to the frame. Slide the seat back support up until it clears the rear body.

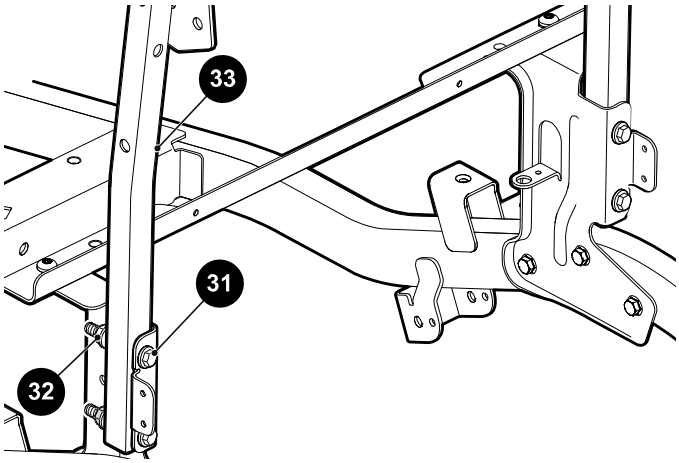


Figure 19 Seat Back Support

Installation is reverse order of removal. Replace any worn or damaged hardware with new as required.

Tighten the screws (28, 25), bolts (10), to the torque value specified below.

Item	Torque Specification
28	8 - 9 ft. lbs. (10 - 12 Nm)
10	16 - 20 ft. lbs (19 - 24 Nm)
25	15 - 19 ft. lbs (18 - 22 Nm)
22, 30	32 - 36 ft. lbs. (38 - 43 Nm)

FLOORBOARD

Tool List **Qty.**

Torx Bit, T-50.....1
Ratchet 1
Insulated Wrench, 1/2”.....1
Torque Wrench, ft. lbs. 1

Before the floorboard can be removed, the lower and upper rocker panels, floormat, pedal cover, accelerator and brake pedal assemblies, instrument panel with trim, seat back, sweater basket and rear body must be removed. If the vehicle is equipped with a canopy and windshield or a 2 + 2 rear facing seat, these must also be removed.

1. Remove the two torx screws (44) securing the front seat support frame (45) to the floorboard (48) (Figure 20).
2. Remove two torx socket head cap screws (46) and washers (47) that secure the floorboard (48) to the vehicle frame

Installation is reverse order of removal. Replace any worn or damaged hardware with new as required.

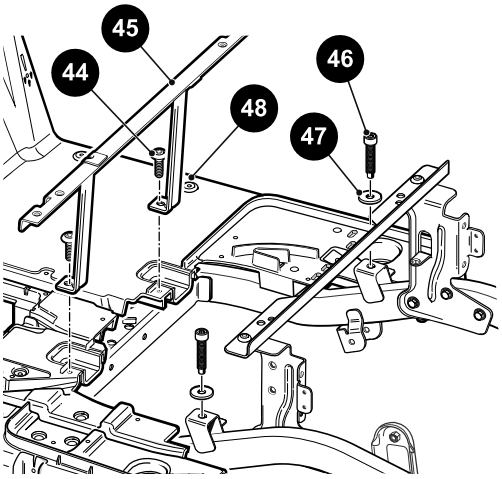


Figure 20 Seat Support and Floorboard

Tighten the screws (44, 46) to the torque value specified below.

Item	Torque Specification
44, 46	13 - 16 ft. lbs. (18 - 22 Nm)

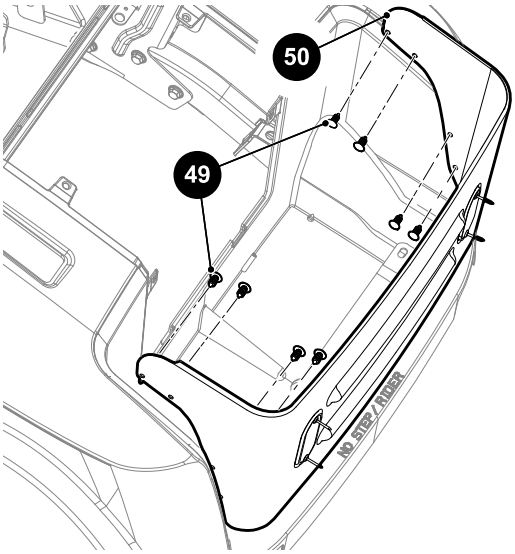


Figure 21 Bagwell Closeout

Bagwell Closeout

Tool List **Qty.**

Notched Pry Bar 1

Remove the ratchet rivets (49). Remove the bagwell closeout (50) (Figure 21).

NOTICE

Installation is in the reverse order of removal. Replace any worn or damaged hardware.

BODY CARE MAINTENANCE

Cleaning

Tools and Supplies List **Qty.**

Soft Clean Cotton Cloth 1
Mild Soap ..... A/R

The body panels are painted and have a clear coat finish applied.

For a light cleaning, spray the vehicle with a mist of water and wipe clean with a soft cotton cloth.

1. Spray the body with a low pressure hose to rinse off any loose dust and dirt.
2. Wash the vehicle with a solution of mild soap and water using a soft cotton cloth. *Do **not** use abrasive cleaners or solvents.*

Apply clear coat safe automotive car wax to revive lost luster as needed.

⚠ CAUTION

Test the wax on an inconspicuous area before applying to the entire vehicle. Buff the wax by hand. Do not use a power buffer to remove wax from the body panels.

PAINTING

Follow the paint manufacturer's recommendations for specific painting procedures and information.

⚠ WARNING

All painting must be done in an area with adequate ventilation to safely disperse harmful vapors.

Wear eye protection and a respirator to protect from overspray and airborne mist.

⚠ CAUTION

Provide protection from overspray to vehicle and surrounding area.

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

Minor Scratches

To repair minor scratches, the manufacturer of the Durashield™ body panels recommends the following steps be taken:

1. Thoroughly clean the surface to be repaired with alcohol, and allow to dry.
2. Use a brush to apply a minimum of two coats of touch up paint to damaged area. Allow 30 - 45 minutes between coats; increase to 45 - 60 minutes in higher humidity. The painted area should be slightly above the surface of the part.
3. Use 400 grit “wet” sand paper to blend painted area level with the surface of the part being repaired.
4. Use a polishing compound (3M Finesse or automotive grade) to renew gloss and to further blend and transition newly painted surface.
5. Clean with alcohol, and allow to dry.
6. (Optional but recommended) Apply clear coat to renew and protect depth of finish.
7. Wax or polish with Carnauba base product, available at any automotive parts distributor. Do not wax flat finishes.

Larger Scratches

To repair large scratches, the manufacturer of the Durashield™ body panels recommends the following steps be taken:

1. Thoroughly clean the surface to be repaired with alcohol, and allow to dry.
2. Apply tape to area surrounding damaged area to decrease the risk of over spray of paint.
3. Shake the aerosol touch up paint a minimum of one minute to mix thoroughly and achieve the best color match.
4. Apply paint in light even overlapping strokes. Multiple coats can be applied to provide adequate coverage and finish.
5. Allow paint to dry overnight.
6. Use 400 grit “wet” sand paper to blend painted area level with the surface of the part being repaired.
7. Use a polishing compound (3M Finesse or automotive grade) to renew gloss and to further blend and transition newly painted surface.
8. Clean with alcohol, and allow to dry.
9. (Optional but recommended) Apply clear coat to renew and protect depth of finish.
10. Wax or polish with Carnauba base product, available at any automotive parts distributor. Do not wax flat finishes.

Complete Panel Repair

In situations where large panels or areas must be painted, touch up paint is not recommended. In such cases professional painting or panel replacement is necessary. Body panel replacement is sometimes more cost effective than painting. If the decision to paint is chosen, it can be accomplished by any automotive body panel repair shop with experience in painting thermoplastic elastomer (TPE) panels. TPE is a common material in modern automobile body panels, and all body panel repair shops should be familiar with the materials and processes required.

The finish will include an application of a primer coat, a base color coat, and a clear coat.

Most paint manufacturers can perform a computer paint match to assure accurate color matching.

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

Notes:

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

Notes:

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

WHEELS AND TIRES

WHEEL AND TIRE SERVICE

Tool List	Qty.
Lug Wrench, 3/4”	1
Impact Wrench	1
Impact Socket, 3/4”	1
Torque Wrench, ft. lbs.	1

⚠ WARNING

To decrease the risk of tire explosion, add small amounts of air to the tire at intervals to seat the tire beads. Over inflation of small tires can occur in a few seconds.

Do not over inflate the tires. Excess pressure can cause the tire to separate from the wheel or explode.

Protect face and eyes when removing a tire valve core.

Use only sockets made for use with impact wrenches to decrease the risk of injury caused by a broken socket.

Do not use tires that have a recommended tire inflation pressure less than the tire pressure recommended in the vehicle owner's guide.

Use caution when you inflate the tires. Because of the low volume of the small tires, over inflation can occur in seconds. Over inflation can cause the tire to separate from the wheel or cause a tire explosion.

The general recommended tire inflation pressure is 18-22 psi. Tire inflation pressure can be adjusted for the condition of the terrain.

For outdoor applications with primary use on areas with grass, consider the following:

- Slightly higher tire inflation pressure is suitable on hard turf
- A lower pressure decreases the risk of tires cutting into a soft turf

For hard surfaces or pavement, tire inflation pressure must be in the higher allowed range, but not more than recommended on the tire sidewall.

All four tires must have the same pressure for best control qualities. Always install the valve stem cap after you check or inflate the tires.

Tire Repair

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

The most cost effective way to repair a flat tire with a puncture in the tread portion of the tire is to use a commercial tire plug.

For large holes and cuts, replace the tire.

NOTICE

Tire plug tools and plugs are available at automotive outlets. The tires do not have to be removed from the wheel to install the tire plugs.

If the tire is flat, lift the vehicle and remove the wheel. Refer to the SAFETY section for the lifting procedure and safety information. Inflate the tire to maximum recommended pressure. Submerge the tire in water to find the leak, and mark with chalk. Insert the tire plug in accordance with manufacturers specifications.

If the tire is being removed or mounted, the tire-changing machine manufacturers recommendations must be followed to minimize the possibility of personal injury. Be sure to place tire on wheel correctly. The arrow on the tire indicates direction of rotation when moving forward.

⚠ WARNING

To decrease the risk of injury, make sure the mounting/demounting machine is anchored to the floor. Wear OSHA approved safety equipment when mounting/demounting tires.

Follow all instructions and safety warnings provided by the mounting/demounting machine manufacturer.

Wheel Installation

⚠ CAUTION

To decrease the risk of component damage, do not tighten lug nuts to more than 85 ft. lbs. (115 Nm) torque.

NOTICE

Always follow the cross-sequence pattern when you install the lug nuts to make sure the wheel is evenly seated against the hub.

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

For models with a 1/4" wheel spacer, reinstall spacer before installing wheel/tire.

With the valve stem to the outside of wheel, install the wheel onto the hub with lug nuts.

Finger tighten lug nuts (1) in the cross sequence pattern as shown (Figure 1). Continue to tighten the lug nuts in 20 ft. lbs. (27 Nm) increments to the torque value specified below.

Item	Torque Specification
1	50 - 85 ft. lbs. (68 - 115 Nm)

Continue to follow the cross-sequence pattern until the correct torque is reached.

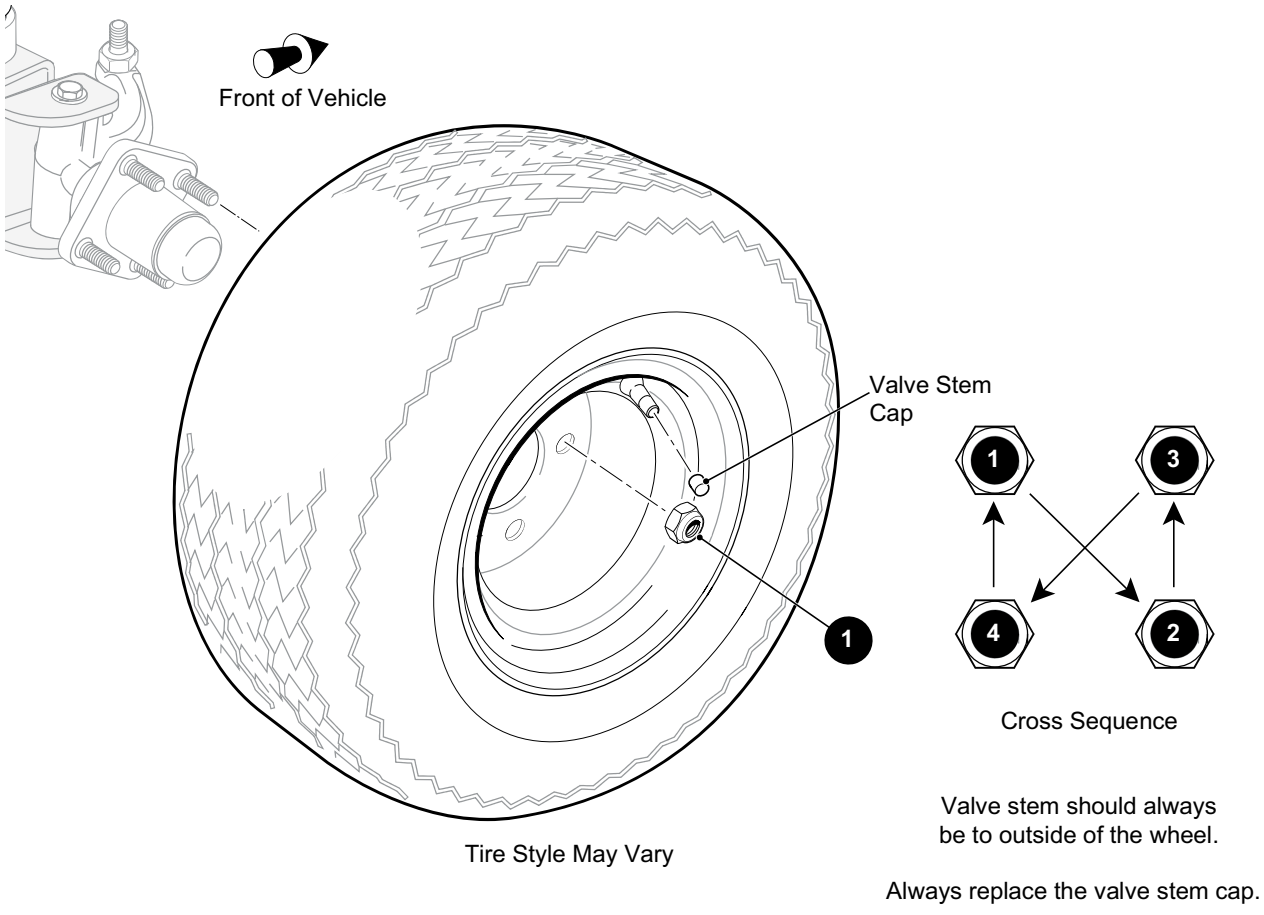


Figure 1 Wheels and Tires

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

Notes:

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

Notes:

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

FRONT SUSPENSION AND STEERING

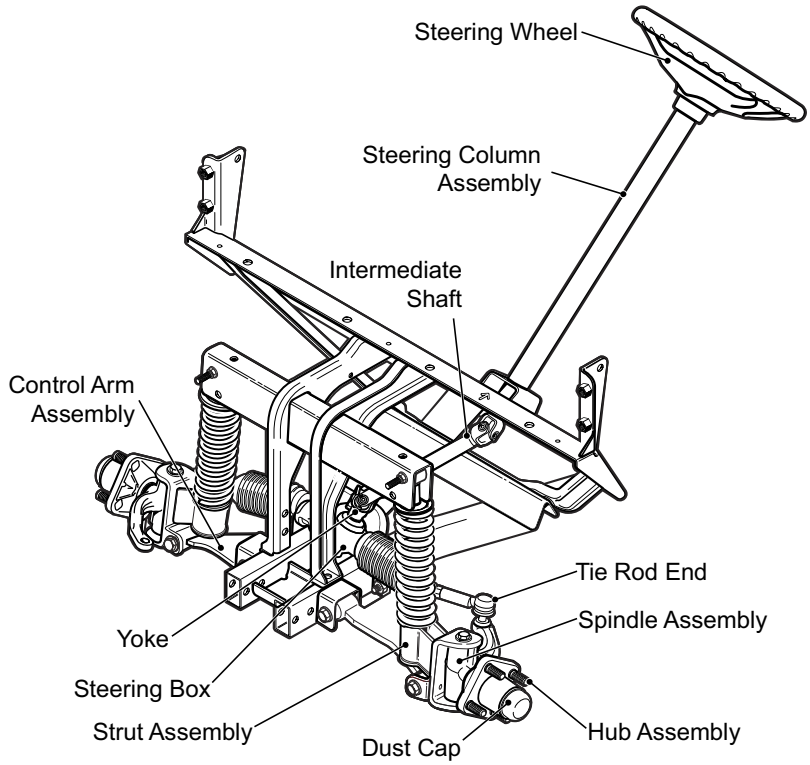


Figure 1 Front Suspension and Steering

NOTICE

Hardware that is removed must be installed in its original position unless otherwise specified. If the torque values are not specified, refer to the Torque Specifications table in the GENRAL INFORMATION AND ROUTINE MAINTENANCE section.

⚠ WARNING

To decrease the risk of possible injury or death, follow the lifting procedure in the SAFETY section. Place wheel chocks in front and behind the rear wheels. Check the stability of the vehicle on the jack stands before starting any repair procedure. NEVER work on a vehicle that is supported by a jack alone.

MAINTENANCE

Routine maintenance of the front suspension and steering consists of:

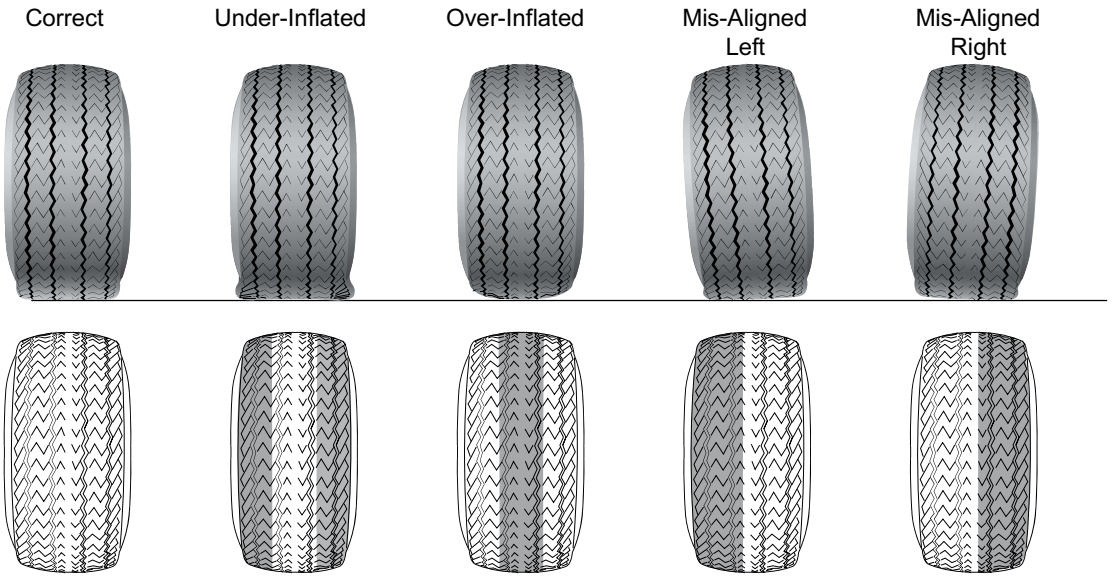
- Periodic inspections for loose, worn or damaged components
- Alignment checks

Routine examination of the tires will provide an indication if an alignment is required.

Tire Wear Diagnosis

It is important to evaluate wear patterns on tires to diagnose common suspension and tire problems. A tire that is correctly inflated and aligned will show even wear over the entire tread area. An under inflated tire will show wear on the outer edges of the tread. Over inflation will result in wear at the center of the tread. Wear on either side of a correctly inflated tire indicates a tire that is out of alignment. The toe-in may be correct, but if the toe-in has not been set with the wheels in line with the body of the vehicle, it will result in scuffing of the tire tread.

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



Indicates areas of excessive tire wear

NOTE: Illustrations are distorted for clarity. Due to the low weight of the vehicle and low inflation pressures, tire shape will be less pronounced.

Figure 2 Tire Wear

Wheel Alignment

Tool List	Qty.
Tape Measure	1
Paint Marker, White	1
Wrench, 12 mm Open End	1
Wrench, 17 mm	1
Crowfoot Wrench, 12 mm	1
Torque Wrench, ft. lbs.	1
Socket, 18 mm	1
Ratchet	1

1. Lift the front of the vehicle and support on jack stands as instructed in the SAFETY section.
2. Rotate each wheel and scribe a paint line around the circumference of the tire at the center of the tread pattern.
3. Lower vehicle with the tires in the straight ahead position.
4. Roll vehicle forward approximately five feet to allow the tires to obtain their normal running position.
5. Measure the distance between the paint lines at both the front and rear of the tires. The measurement taken at the front of the tires should be 0" - 1/8” (0 - 3 mm) less than the rear measurement.

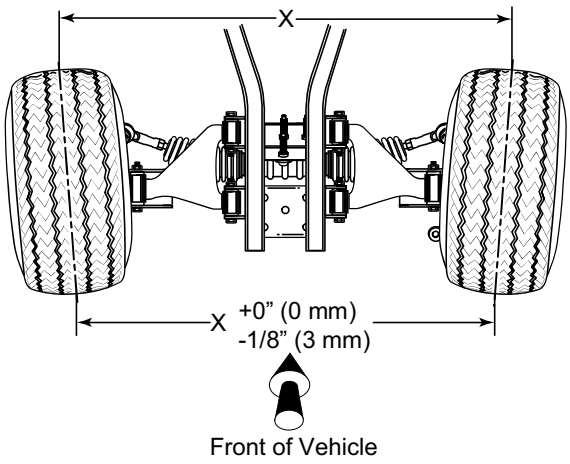


Figure 3 Wheel Alignment

6. To adjust the wheel alignment, loosen the tie rod jam nut (1) and turn the tie rods an equal number of turns until the correct alignment is achieved. ***Failure to turn both tie rods the same number of turns will result in poor turning radius*** (Figure 4)***.***
7. Tighten the tie rod jam nuts (1) to torque value specified below.

Item	Torque Specification
1	37 - 44 ft. lbs (50 - 60 Nm)

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

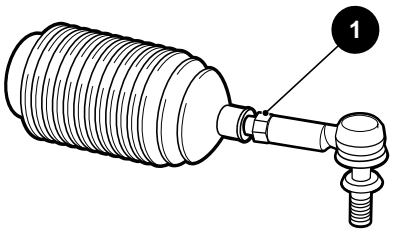


Figure 4 Tie Rod Jam Nut

Hub Assembly

Tool List **Qty.**

Socket, 24 mm 1
Ratchet 1
Torque Wrench, ft. lbs. 1
Flat Blade Screwdriver 1
Ball Peen Hammer 1

Remove the front wheel(s) as described in the WHEELS AND TIRES section.

1. Remove the dust cap (1) by tapping around the cap flange using a flat blade screwdriver and a ball peen hammer (Figure 5).
2. Remove the lock nut (2).
3. Remove hub (3) by sliding it off of the spindle.
4. Clean spindle (4) thoroughly with solvent and inspect spindle threads. If threads are damaged, replace the spindle.

Installation is reverse order of removal. Replace worn or damaged hardware as required. Lock nuts must be replaced after a maximum of five removals

Item	Torque Specification
2	90 - 96 ft. lbs (123 - 131 Nm)

Spindle Assembly

Tool List **Qty.**

Wrench, 16 mm 1
Socket, 16 mm 1
Socket, 18 mm Deep-well 1
Ratchet 1
Torque Wrench, ft. lbs. 1
Ball Joint Separator 1
Ball Peen Hammer 1

Remove the front wheel(s) as described in the WHEELS AND TIRES section.

1. Remove the hub assembly as described in the previous section.
2. Loosen the nut (21) securing the tie rod end (22) to the spindle arm until it is flush with the end of the tie rod end (Figure 5).
3. Using a ball joint separator as a lever, apply pressure to the ball joint and tap the spindle arm sharply with the hammer to release the tie rod end from the spindle arm.
4. Remove the nut (21) and the tie rod end (22) from the spindle arm.
5. Remove hex nut (9) and hex head bolt (8), remove the spindle assembly (4 and 5).

Install hub assembly in the reverse order of removal. Replace worn or damaged hardware as required. Lock nuts must be replaced after a maximum of five removals.

Tighten nut (9) to torque value specified below**.**

Item	Torque Specification
9	71 - 79 ft. lbs (96 - 107 Nm)

Struts

Tool List **Qty.**

Wrench, 15mm 1
Socket, 15mm Deep-Well 1
Ratchet 1
Torque Wrench, ft. lbs. 1

Remove the front bumper as shown in the BODY section. Remove the front wheel(s) as described in the WHEELS AND TIRES section.

1. Loosen the nut (21) securing the tie rod end (22) to the spindle arm until it is flush with the end of the tie rod end.
2. Using a ball joint separator as a lever, apply pressure to the ball joint and tap the spindle arm sharply with the hammer to release the tie rod end from the spindle arm.
3. Remove the nut (21) and the tie rod end (22) from the spindle arm.
4. Remove hex nut (9) and hex head bolt (8). The spindle and hub assemblies (1 - 7) can then be removed as a single unit.
5. Remove the hex head bolt (11) securing lower end of strut to control arm (13).
6. Remove the hex nut (20) and the hex head bolt (19) securing the top of the strut to the frame.

Install spindle assembly in the reverse order of removal. Replace worn or damaged hardware as required. Lock nuts must be replaced after a maximum of five removals.

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

Tighten the nuts (20) to torque value specified below.

Item	Torque Specification
20	20 - 25 ft. lbs (27 - 34 Nm)

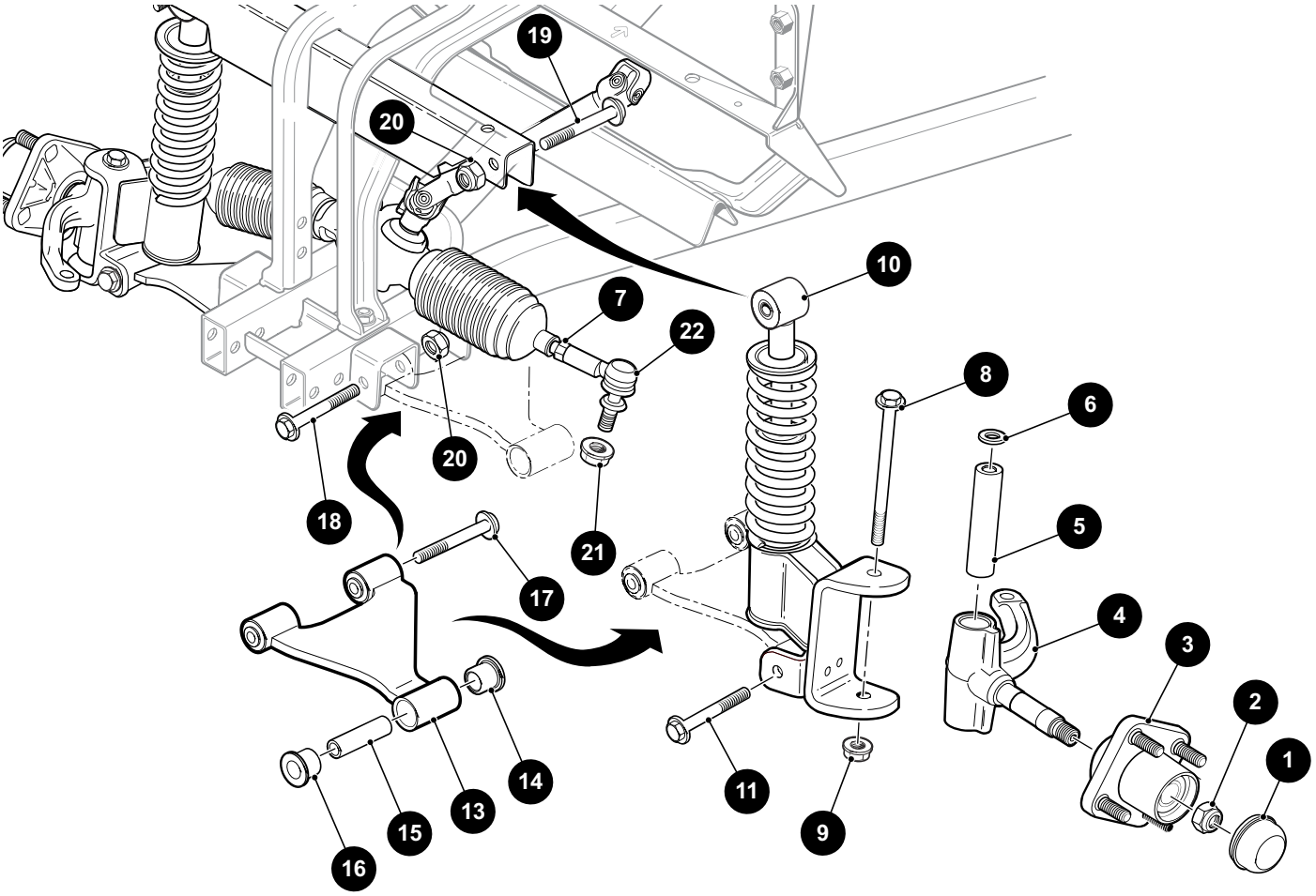


Figure 5 Hub, Spindle, Strut and Control Arm Assemblies

Control Arm Assembly

Tool List **Qty.**

Wrench, 15 mm 1
Socket, 15 mm..... 1
Ratchet 1
Torque Wrench, ft. lbs..... 1

Remove the front bumper as shown in the BODY section. Remove the front wheel(s) as described in the WHEELS AND TIRES section.

1. Remove the hex head bolt (11) securing the control arm (13) to the strut (10) (Figure 5).
2. Remove bushings (14,16) from control arm (13), retain sleeve (15).
3. Inspect the sleeve (15) for wear or pitting. Replace if sleeve (15) shows signs of wear or pitting.
4. Remove two hex head bolts (17, 18) securing the control arm to the frame brackets.

Installation is reverse order of removal. Replace worn or damaged hardware.

NOTICE

When reinstalling the urethane bushings (14, 16) coat the contact surfaces with a commercially available anti-seize compound. Make sure that compound does not get on the bolt or nut threads.

Tighten the bolts (11, 17, 18, 19) to the torque value specified below.

Item	Torque Specification
11, 17, 18	20 - 25 ft. lbs (27 - 34 Nm)
19	20 - 25 ft. lbs (34 - 41 Nm)

Clipboard and Steering Wheel

Tool List **Qty.**

Socket, 24 mm 1
Ratchet 1
Torque Wrench 1
Plastic Faced Hammer 1
Ball Peen Hammer 1

NOTICE

To maintain correct orientation when replacing steering wheel, turn the wheels straight ahead.

⚠ CAUTION

To decrease the risk of damage to the clipboard (2) perform the following removal procedure. Do not use a screwdriver to push or pry the retaining tabs.

1. Pull straight up on the lower edge of the clipboard (2) to release the two retaining tabs (Figure 6).
2. Using thumb for leverage as shown, reach from underneath the steering wheel (1) with fingertips to pull down, and then push up to release the two top clipboard (2) retaining tabs.

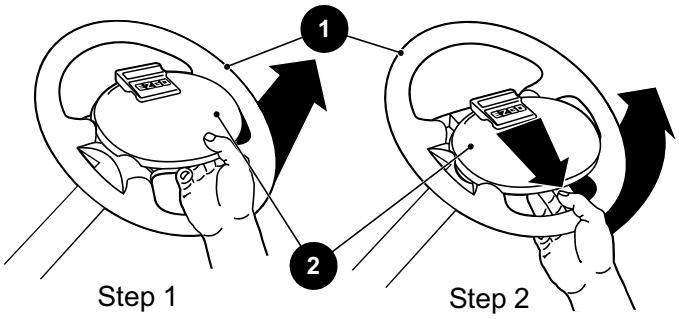


Figure 6 Clipboard Removal

3. Loosen the steering wheel (3) retaining nut (2) two or three turns. **Do not remove nut at this time** (Figure 8).
4. Apply upward pressure to the steering wheel (3) by placing a plastic faced hammer against the steering wheel retaining nut. Strike the plastic faced hammer sharply with a ball peen hammer. **Do not strike the steering wheel retaining nut or the end of the steering shaft directly with the ball peen hammer** (Figure 7).

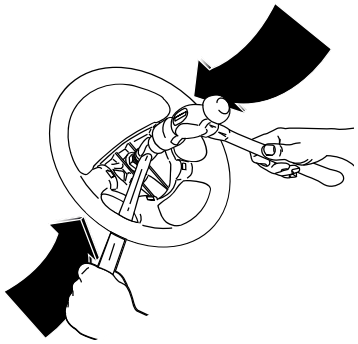


Figure 7 Loosen Steering Wheel

5. When steering wheel is loosened, remove the retaining nut (2) and steering wheel (3) (Figure 8).

Installation

1. Coat steering shaft splines lightly with a commercially available anti-seize compound.
2. Position the steering wheels (3) straight ahead.
3. Align the steering wheel (3) on the steering shaft and push into place (Figure 8).

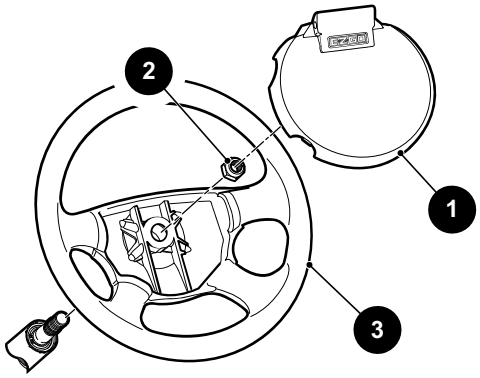


Figure 8 Steering Wheel

4. Install steering wheel retaining nut (2), and tighten nut (2) to torque value specified below.

Item	Torque Specification
2	15 - 20 ft. lbs (20 - 27 Nm)

5. Inspect the four retaining tabs on the clipboard (1) for white stress lines. If stress lines are present, replace clipboard with a new one.
6. Carefully press the top two tabs into the matching slots in the steering wheel, then press the bottom two tabs into the matching slots in the steering wheel.

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

Steering Column Assembly and Yoke

Tool List	Qty.
Wrench, 17 mm	1
Ratchet	1
Hex Bit, 8 mm	1
Torx Bit, T-45 IP	1
Torque Wrench, ft. lbs	1

Remove the front bumper as shown in the BODY section. Remove the front wheel(s) as described in the WHEELS AND TIRES section.

1. Disconnect wiring for turn signals (if equipped) as described in the ELECTRICAL section.
2. Remove the lower cross bolt (8) from the yoke (Figure 9).

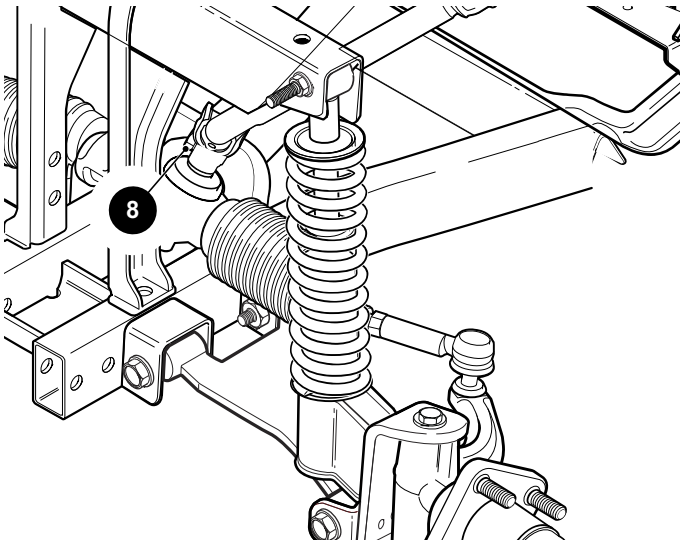


Figure 9 Lower Cross Bolt

3. Remove four torx head screws (9) securing steering column assembly to vehicle frame (Figure 10).

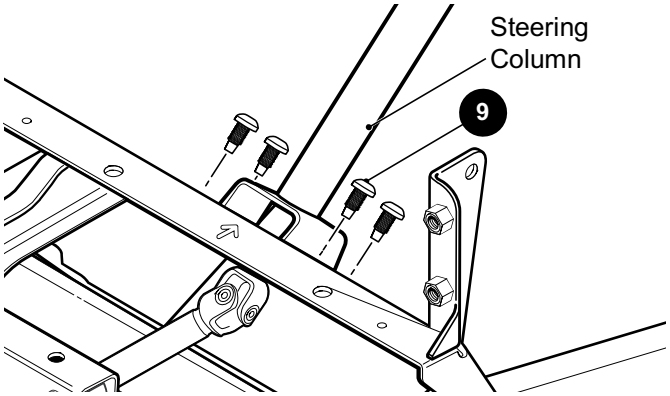


Figure 10 Steering Column Assembly Screws

4. Loosen the upper cross bolt (10) on the yoke. Slide the yoke upward on the intermediate shaft to disengage from the steering box pinion (Figure 11).
5. Turn the steering column assembly to the left 10° to disengage the locking tabs. Lift the steering column with intermediate shaft and yoke out of vehicle. Make note of the location of the notch in the steering column mounting bracket (up or down).
6. To separate the yoke from the intermediate shaft, remove the upper cross bolt (10), lock washer (12) and nut (11). Pull the yoke off of the intermediate shaft splines.

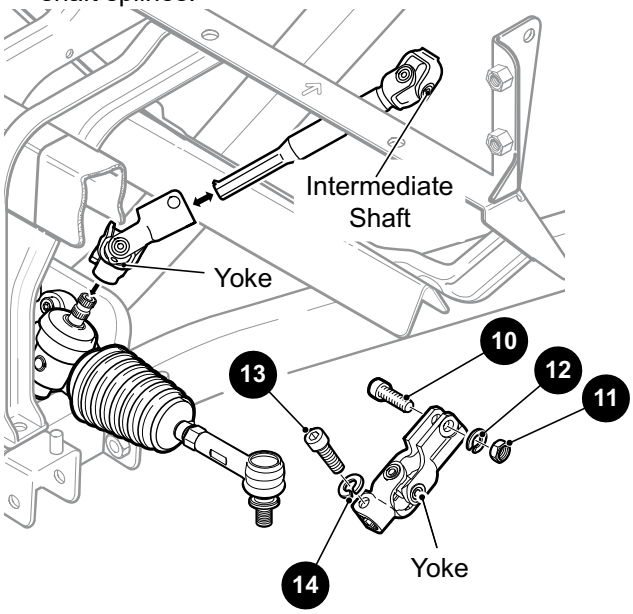


Figure 11 Upper Cross Bolt

7. Apply a commercially available anti seize compound to the splines of the intermediate shaft and install the yoke onto the shaft. Do not tighten the upper cross bolt (10), washer (12) and nut (11).
8. To install the steering column assembly, align the locking tabs on the mounting bracket with the slots in the frame. Turn the assembly to the right 10° to align the mounting holes. Make sure that the notch on the steering column assembly mounting bracket is in the same orientation as it was before removal (up or down).
9. Install the four torx screws (9) finger tight and then tighten to the toque specified.(Figure 10).
10. Apply a commercially available anti-seize compound to the splines of the steering box pinion before installing the yoke. Do not install the lower cross bolt (8) at this time (Figure 9).
11. To align the steering wheel with the front wheels, use the following procedure:
    a. Install the front wheels if they were removed.
    b. Remove the jack stands and lower the vehicle to the ground.
    c. Push the vehicle five feet backward and then five feet forward.

d. If the steering wheel is not oriented properly, remove the yoke from the steering box pinion and turn the steering wheel to the correct orientation.

e. Install the yoke on the spline of the steering box pinion.

12. Install the lower cross bolt (13) through the unthreaded portion of the yoke. Make sure the lock washer (14) is in place.
13. Tighten the upper cross bolt (10) and nut (11). Make sure the lock washer (12) is in place. Tighten the lower cross bolt (13) to the torque value specified below.

Item	Torque Specification
9	20 - 25 ft. lbs. (27 - 34 Nm)
11, 13	22 - 27 ft. lbs. (30 - 36 Nm)

Tie Rod End / Ball Joint

Tool List **Qty.**

Socket, 16 mm 1
Ratchet 1
Torque Wrench, ft. lbs. 1
Ball Joint Separator 1
Ball Peen Hammer 1

Inspect the tie rod end or ball joint by grasping the end and checking for vertical motion. If the tie rod moves up or down, this is an indication that the ball joint is worn and requires replacement.

Raise and support the vehicle as described in the SAFETY section. Remove the front wheels as described in the WHEELS AND TIRES section.

1. Loosen the jam nut (7) securing the tie rod end to the spindle arm (Figure 5).
2. Using a ball joint separator as a lever, apply pressure to the ball joint and tap the spindle arm sharply with the ball peen hammer to release tie rod from the spindle arm.
3. Remove the jam nut (7) and remove the tie rod end from the spindle arm.
4. Measure the length of the threaded part of the tie rod end to the jam nut or count the number of turns that it takes to remove the tie rod end.
5. Install the new tie rod end the same number of turns counted when removing the old tie rod end, or to the same measured length of the threaded part of the tie rod end to the jam nut.
6. Install the tie rod end into the spindle (4).
7. Tighten the jam nut (7) against the tie rod end.
8. Replace the other tie rod end if necessary.
9. Check the wheel alignment and correct if necessary. The procedure for alignment is detailed at the beginning of this section.

Steering Box

Tool List **Qty.**

Torx Bit, T-45 IP 1
Ratchet 1
Torque Wrench, ft. lbs. 1
Ball Joint Separator 1
Ball Peen Hammer 1

Raise and support the vehicle as described in the SAFETY section. Remove the front wheels as described in the WHEELS AND TIRES section.

1. Loosen the nut (21) securing the tie rod (22) end to the spindle arm (Figure 5).
2. Using a ball joint separator as a lever, apply pressure to the ball joint and tap the spindle arm sharply with the ball peen hammer to release tie rod from spindle arm.
3. Remove the nut (21) and remove the tie rod end from the spindle arm.
4. Repeat steps 1 through 3 for the remaining tie rod end.
5. Remove the lower cross bolt securing the yoke to the steering box pinion.
6. Loosen the upper cross bolt securing the yoke to the intermediate shaft.
7. Remove the yoke from the steering box pinion by sliding it up the intermediate shaft.
8. Remove three torx head screws (15) securing the steering box (16) to the vehicle frame (Figure 12).
9. Remove steering box from the driver side of the vehicle.

Installation is reverse order of removal. Replace worn or damaged hardware.

Tighten the screws (15) to the torque value specified below.

Item	Torque Specification
15	20 - 25 ft. lbs (27 - 34 Nm)

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

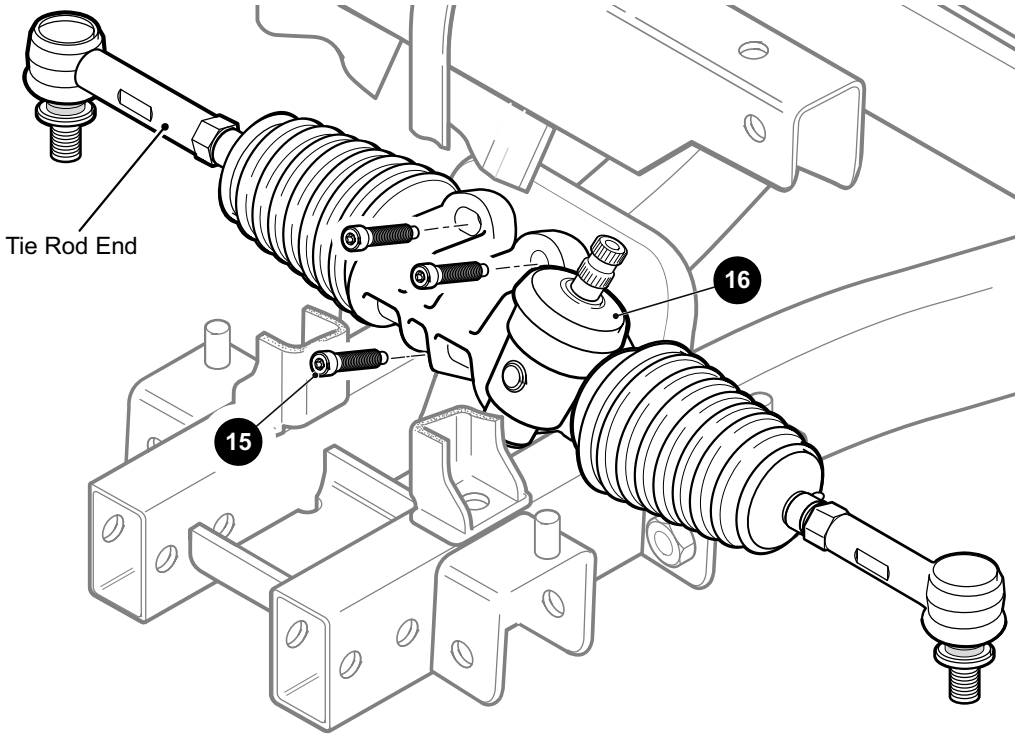


Figure 12 Steering Box

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

Notes:

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

Notes:

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

SPEED CONTROL

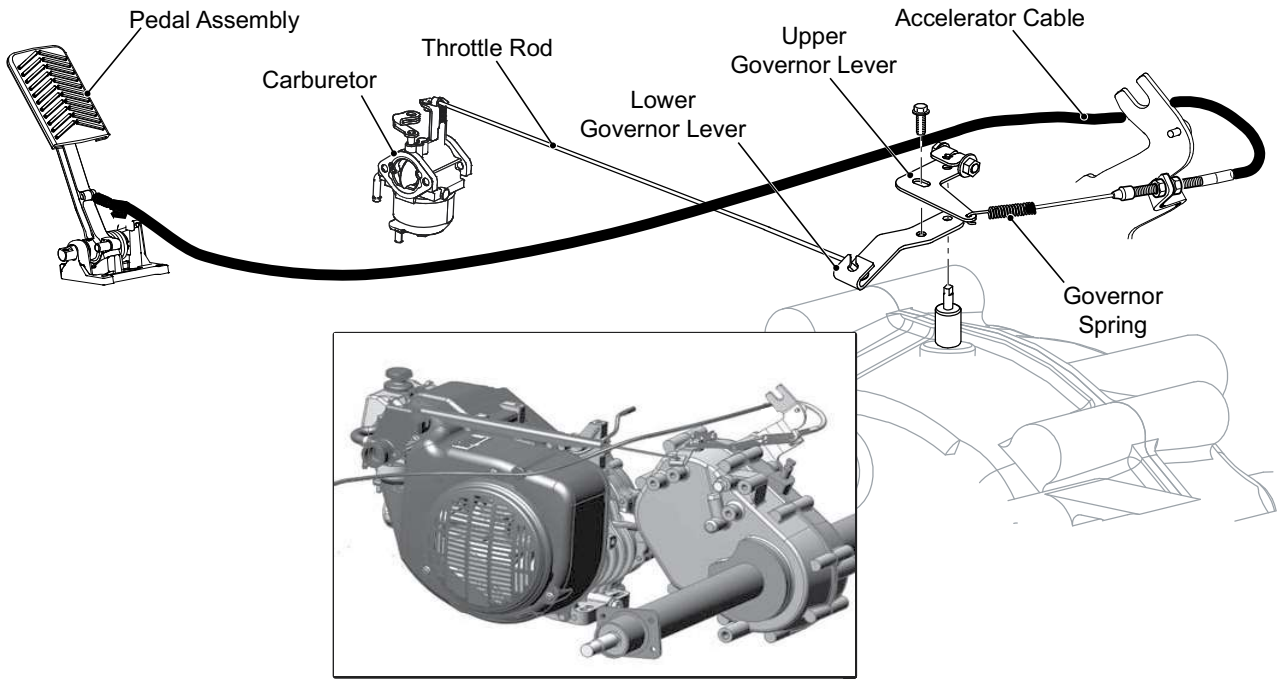


Figure 1 Accelerator and Speed Control System

NOTICE

The linkages that control the accelerator mechanism, governor and carburetor are designed to operate as an integrated assembly. Any adjustment to one portion of the system will have an effect on the other components within the system.

Hardware that is removed must be installed in its original position unless otherwise specified. If the torque values are not specified, refer to the Torque Specifications table in the GENRAL INFORMATION AND ROUTINE MAINTENANCE section.

⚠ WARNING

To decrease the risk of possible injury or death, follow the lifting procedure in SAFETY section. Place wheel chocks in front and behind the rear wheels. Check the stability of the vehicle on the jack stands before starting any repair procedure. Never work on a vehicle that is supported by a jack alone.

SYSTEM OPERATION

Pedal Box Operation

When you press the accelerator, the accelerator rod moves towards the rear of the vehicle by overcoming the resistance of the accelerator return spring (Figure 1).

As the accelerator pedal moves, the parking brake is released, the micro switch closes and activates the ignition circuit.

The rear end of the accelerator rod is joined to the micro switch cam which connects to the accelerator cable.

As the micro switch cam moves to the rear it pulls the accelerator cable, which pulls against the governor spring.

When the accelerator cable pulls against the accelerator cable/governor spring, the spring extends until it overcomes the resistance exerted by the governor mechanism. As the governor spring overcomes these forces, the governor arm moves and the motion is transferred through linkage rod to the carburetor throttle plate.

Governor Operation

Until the vehicle reaches its governed speed, the vehicle will continue to accelerate in relation to the accelerator pedal position.

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

When the governed speed is reached, the ground speed governor in the rear axle assembly operates against the accelerator cable/governor spring and closes the throttle lever until the correct governed speed is achieved (Figure 1).

It is the force of the accelerator cable/governor compression spring in response to accelerator pedal and governor lever position which controls the position of the throttle plate.

The compression spring provides cushioning of sudden changes in throttle linkage position to provide smooth power transmission.

⚠ WARNING

Driving above governed speed could cause a loss of vehicle control and possible injury or death.

Tampering with or adjusting the governor or other speed control components will void the warranty.

FAULT TESTING

Erratic acceleration and performance that does **not** include a notable increase in governed speed, can indicate the need for a linkage adjustment.

Symptoms that include an increase in governed speed indicate:

- A possible governor failure within the rear axle
- Worn components in the governor system
- Improper adjustment of linkage system

NOTICE

Other factors can affect the performance characteristics of the vehicle but they must be investigated only after you confirm the linkage adjustment.

SPEED CONTROL

Tool List	Qty.
Phillips Screwdriver	1
Flat Blade Screwdriver	1
Needle Nose Pliers	1
Slip Joint Pliers	1
Open End Wrench, 10 mm	2
Ratchet	1
Socket, 15 mm	1
Torque Wrench, in. lbs.	1
Torque Wrench, ft. lbs.	1

⚠ WARNING

Remove the negative (-) battery cable from the battery to decrease the risk of the vehicle moving and the possible personal injury that may result. Refer to SAFETY section for additional cautions and warnings.

NOTICE

Be sure to follow the sequence indicated when making linkage adjustments.

Throttle Rod Removal

To remove the throttle rod from the carburetor throttle plate (Figure 2), twist the plastic connector (1) counter-clockwise away from the throttle rod. Line up the slot with the tabs on the rod. Remove the rod from the carburetor throttle lever by lifting up (2).

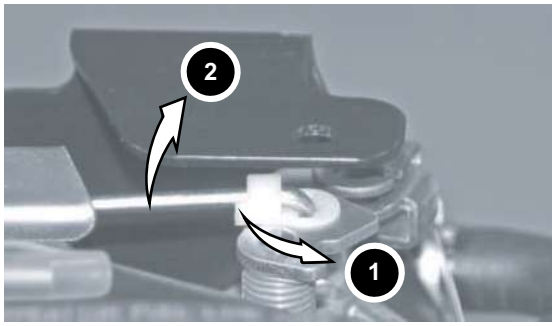


Figure 2 Throttle Rod Adjustment

Throttle Rod Adjustment

To adjust the throttle rod (17), loosen the bolt (18) between the two governor levers and turn lower governor lever (19) to the left by 10° until the carburetor throttle plate is fully open. Rotate upper governor lever (20) counter-clockwise until it stops.

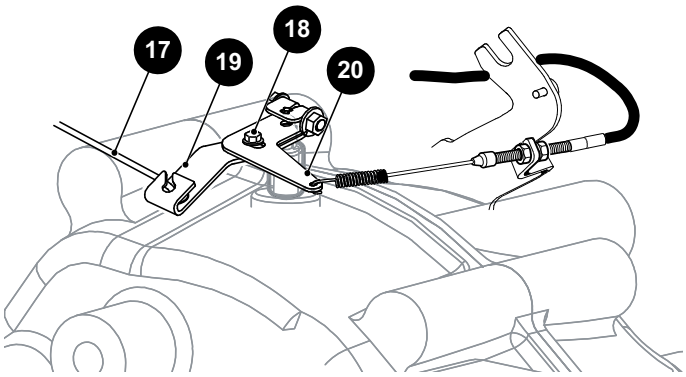


Figure 3 Throttle Rod Adjustment

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

Tighten the bolt (18) to the torque value specified below.

Item	Torque Specification
18	60 - 72 in. lbs (7 - 8 Nm)

Accelerator Cable Removal at Governor

To remove the accelerator cable (9) from the governor, loosen the nuts (13) securing the cable (9) to the accelerator cable bracket (14) at the rear axle and unhook the spring from the upper governor lever (15).

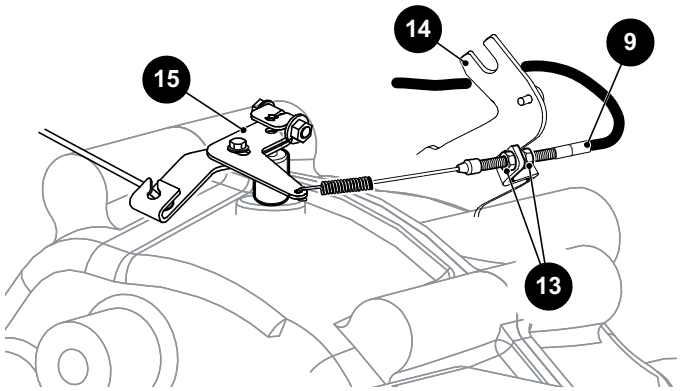


Figure 4 Accelerator Cable at Governor

Accelerator Cable Removal and Installation at Pedal

To access the accelerator cable at the accelerator pedal, remove the upper rocker panels, the lower rocker panels and the floormat. Remove four ratchet rivets (1) securing the pedal cover (2) to the floorboard and remove the cover from the pedal area (Figure 5).

To remove the accelerator cable from the accelerator pedal remove the rubber snap-in holding the cable to the floorboard (Figure 6). Rotate the cable upward until the bullet lifts out of the slot in the pedal arm. Remove any wire ties holding the cable and loosen the nuts securing the cable to the accelerator cable bracket at the rear axle and lift cable from bracket. Unhook cable from the accelerator compression spring and yoke.

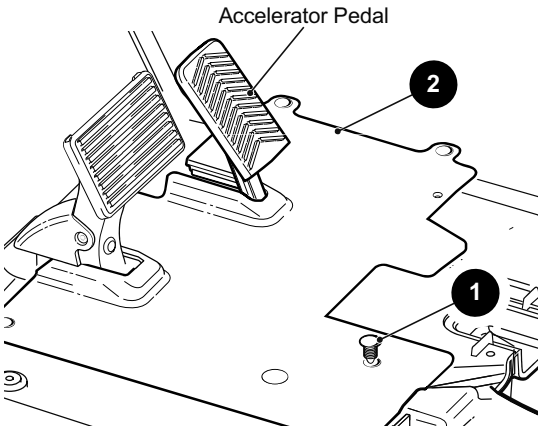


Figure 5 Accelerator Pedal Access

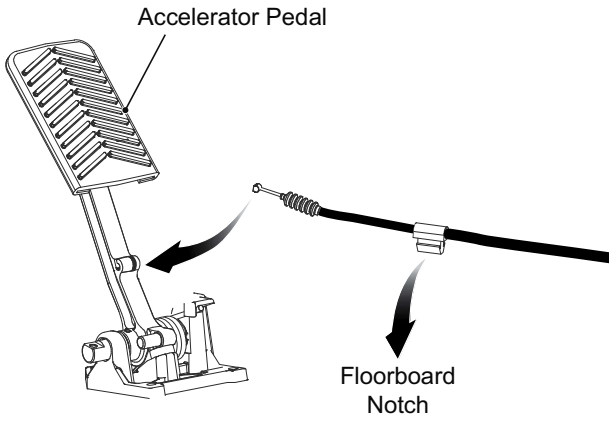


Figure 6 Accelerator Cable Installation

Installation of the accelerator cable is the reverse order of removal.

Accelerator Pedal Arm Adjustment

Tool List	Qty.
Needle Nose Pliers	1
Phillips Screwdriver	1
Open End Wrench, 9/16"	1
Open End Wrench, 1/2"	1
Open End Wrench, 7/16"	1
Open End Wrench, 3/8"	1
Allen Wrench, 1/8"	1

Lift front of vehicle using procedures and safety information in SAFTEY section.

Confirm the accelerator pedal arm contacts the accelerator pedal bracket when in the released position (Figure 6).

Road Test

Connect the negative (-) battery cable to the battery pack.

Test drive the vehicle and confirm that the compression spring adjustment results in the maximum governed speed specified in the GENERAL SPECIFICATIONS section.

Determine speed by measuring the time it takes to travel a known set distance with vehicle at maximum speed. Enter time and distance into this formula to calculate speed:

- Rate (in MPH) = (Distance in feet / 5280) / (Time in seconds / 3600)
- Rate (in KPH) = (Distance in meters / 1000) / (Time in seconds / 3600).

For example:

- (300 ft. / 5280) / (13.6 sec. / 3600) = 15 MPH
- (100 m / 1000) / (15 sec. / 3600) = 24 KPH.

If the speed is not within the specified speed range, stop the vehicle and adjust the governor compression spring as described in procedure above.

Tightening the spring results in a speed increase, while loosening it will result in a speed decrease.

Repeat the test and adjustment until the factory recommended governed speed is achieved.

Install new safety seal on governor after calibrating the vehicle.

Accelerator Pedal Assembly

Tool List **Qty.**

Ratchet 1
Hex Bit, 5 mm 1
Torx Bit, T-20 1
Torx Bit, T-30 1
Torque Wrench, in. lbs. 1
Torque Wrench, ft. lbs. 1
Notched Pry Bar 1
Insulated Wrench, 9/16” 1
Loctite® 242 ..... A/R

The accelerator pedal assembly is a modular unit. The only serviceable items contained in the assembly are the pedal pad and the throttle switch. The complete pedal assembly may be replaced as a unit.

To access the pedal assembly, remove the upper rocker panels, the lower rocker panels and the floormat. Remove four ratchet rivets (1) securing the pedal cover (2) to the floorboard and remove the cover from the pedal area. cover (Figure 5).

Remove the brake kick-off linkage bolt (1) and disconnect the accelerator cable (2) as described on the previous page (Figure 7).

Remove three torx screws (3) and two self tapping screws (6) (one each side of the pedal) securing the accelerator pedal assembly to the floorboard and the two torx screws (4) from the throttle switch (5). Remove the pedal assembly (Figure 7).

Position the pedal assembly in the floorboard, aligning the three mounting holes with the floorboard inserts. Install three torx screws (3) but DO NOT tighten. Slide the pedal assembly towards the front of the vehicle as far as it will go.

Install the kick-off linkage bolt (1) and tighten the linkage bolt (1) and the screw (3) to the torque value specified below.

Item	Torque Specification
1	15 - 17 ft. lbs (20 - 23 Nm)
3	17- 26 in. lbs (2 - 3 Nm)

With the brake pedal in the full upright position, slide the accelerator pedal towards the rear of the vehicle until there is 1/8" (3.2 mm) gap (measured perpendicular to the brake pedal arm) between the end of the kick-off linkage rod (12) and the brake pedal arm.

Tighten the three torx screws (3). Install two self tapping screws (7) in the two previously unused holes (in front of and behind the pedal) in the accelerator pedal assembly base and tighten the screws (7) to the torque value specified below.

Item	Torque Specification
7	15 - 20 in. lbs (1.7 - 2.3 Nm)

Route wires for the accelerator pedal switch through the floorboard channel. Plug the wire harness into the throttle switch.

Install the pedal cover, floor mat and rocker panels. Replace worn or damaged hardware as required.

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

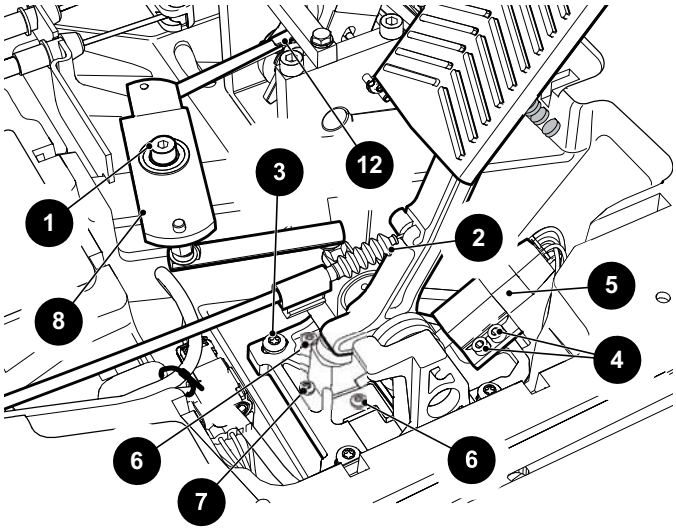


Figure 7 Accelerator Pedal

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

Notes:

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

ENGINE

GENERAL

For further engine information, see Engine Shop Rebuild and Service Parts Manual.

FOUR CYCLE ENGINE

Engine Specifications

Engine Model FJ400-D
Type.....Four Cycle, Overhead Valve
Number Of Cylinders.....1
Displacement.....401 cc
Rated Horsepower.....13 hp
Spark Plug Type.....NGK BPR2ES
Spark Plug Gap..... .028" - .031" (.70 - .80 mm)
Cooling.....Forced Air Cooled
Oil Filter.....Cartridge Type Full Flow Filter
Oil Pump.....Positive Displacement Pump

Engine Description

The engine is an air cooled, 4-stroke, OHV, single cylinder gasoline engine. It incorporates a pressure fed oil pump with a cartridge type full flow oil filter and a counter rotating balance shaft.

POWERTRAIN MAINTENANCE

Access the power-train require raising or removing the seat. Some service procedures require the vehicle to be lifted.

Refer to lifting the vehicle in the SAFETY section for proper lifting procedure and safety information.

Checking the Oil Level

⚠ CAUTION

Do not overfill engine. Too much oil may cause engine to smoke or cause spark plug fouling.

NOTICE

Vehicles with the leaf springs mounted on top of the rear axle will have an oil dipstick with a H stamped into the top.

The oil should be checked with the engine warm. The vehicle should be on a level surface with the parking brake engaged (Figure 1). Allow adequate time for oil to drain into the crankcase before checking.

Remove the dipstick and wipe off the entire area with a lint free cloth.

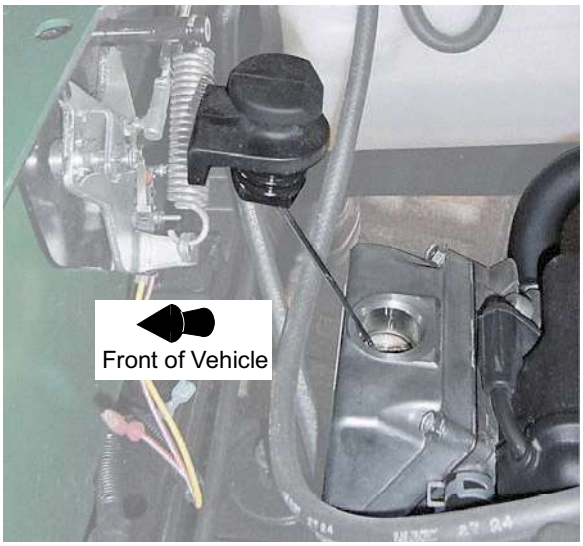


Figure 1 Oil Dipstick

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

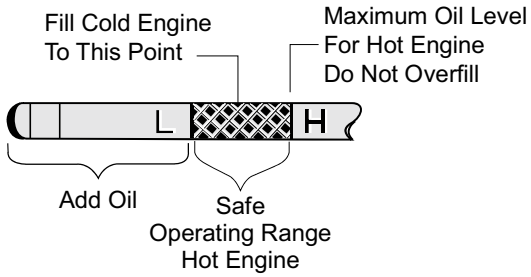


Figure 2 Check Oil Level on Dipstick

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** (Figure 2). Check that the oil cap is firmly in place.

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

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

Changing the Oil

Tool List	Qty.
Socket, 19 mm	1
Ratchet	1
Extension, 8"	1
Oil Filter Wrench	1
Oil Drain Pan	1

For maximum performance and longevity, the engine oil should be replaced after the first 8 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 (Figure 3).

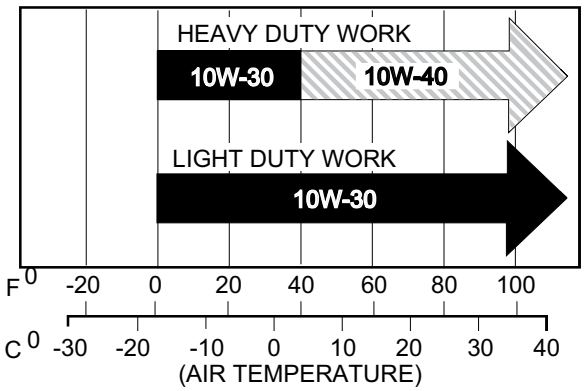


Figure 3 Oil Viscosity Chart

NOTICE

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 to remove any moisture that has accumulated during storage.

⚠ WARNING

Engine fluids can be hot and contact with the skin can cause severe burns. Wear rubber gloves to protect skin from exposure to the old oil and degreaser.

The oil should be changed with engine warm. Park vehicle on a level surface, engage parking brake and remove key (Figure 4).

Figure 4 Cleaning Top of Engine

⚠ WARNING

Be careful of hot oil when drained. It may be hot enough to burn you severely.

Wipe the top of the engine clean with a cloth. Remove the oil fill cap.

Place the oil drain pan under the oil drain plug (1) (Figure 5) found at the rear of the engine base. Remove the drain plug (1). Allow the oil to drain into the drain pan.

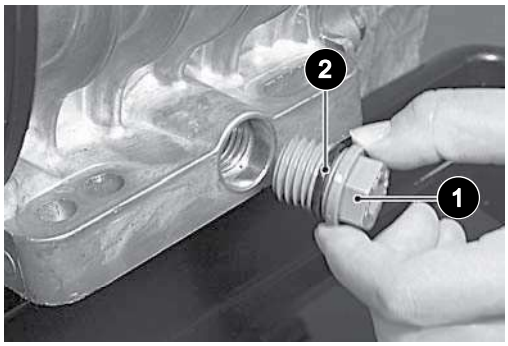


Figure 5 Oil Drain Plug

Before installing the drain plug (1), clean the area around the drain plug mount with a lint free cloth. Inspect the drain plug (1) for damage; replace if necessary (Figure 5). If the O-ring (2) on the drain plug is damaged, replace it with a new one. Tighten the drain plug (1) to the torque value specified below.

Item	Torque Specification
1	61 in. lbs (7 Nm)

At the first oil change, **small** metal particles can be present. This is normal and a result of the engine break-in period. Inspect the filter at every oil change. The presence of large metal chips can indicate possible damage to the engine.

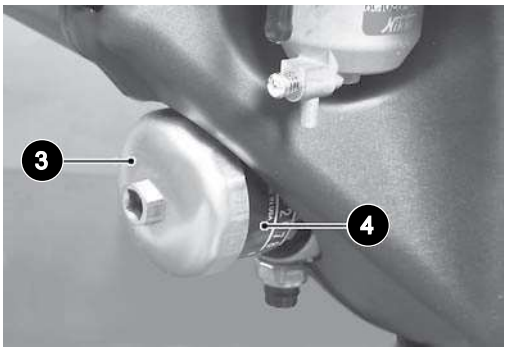


Figure 6 Remove Oil Filter

Clean the area around filter. Place the oil drain pan under the filter area. Remove the filter (4) from the engine and allow the oil to drain into the oil drain pan (Figure 6).

The O-ring (5) may have remained on engine (6) or filter (7) (Figure 7). If the O-ring (5) remained on the engine surface (6), remove it and discard with the filter (7).

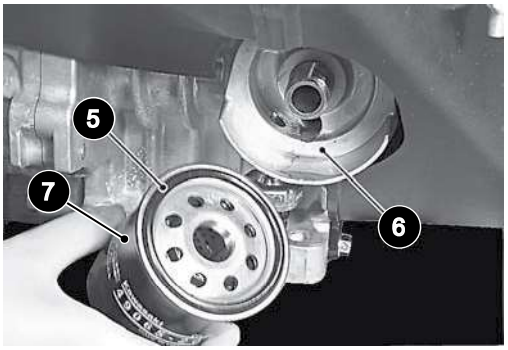


Figure 7 Inspect Oil Filter

Inspect the new oil filter for any defects. Apply engine oil to the oil filter O-ring (5). Install the oil filter onto the engine until the seal contacts the mounting surface of the engine. Turn the filter 2/3 to 3/4 rotation by HAND. Pour the specified type and amount of oil into the oil filler opening.

Oil capacity is 1 1/3 quarts (1.3 liters). Add slightly less than 1 1/3 quarts (1.3 liters) to allow for possible residual oil left in engine (Figure 8). The oil must be high quality oil that meets or exceeds API SF, SG, CC standards. Check the oil level on the dipstick. Oil should be slightly below H to allow for expansion. If necessary, continue to add oil slowly and allow time for oil to flow down into engine. Check the oil level on dipstick. **Do not overfill**.

⚠ CAUTION

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

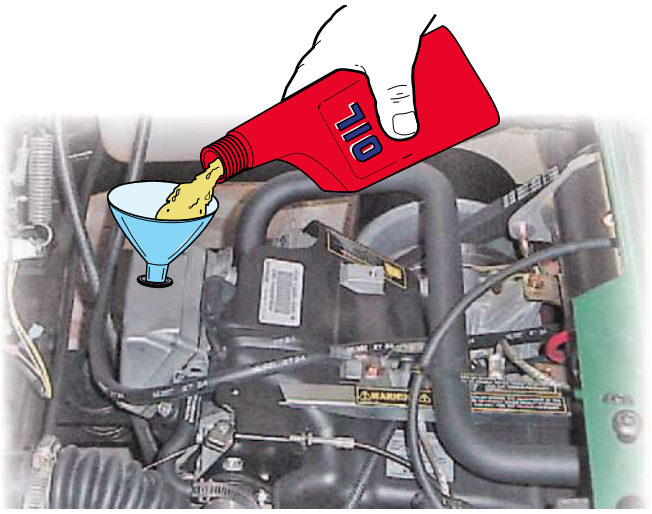


Figure 8 Add Engine Oil

NOTICE

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

Start the vehicle, allow the engine to run for a few minutes to fill up the oil filter. Stop the vehicle on a level surface, set the park brake and remove the key. Check for oil leaks at the drain plug and oil filter. Tighten the drain plug or oil filter if a leak is found. Check the oil level on the dipstick, add oil if necessary.

Like all liquids, oil increases in volume when warm. The full H mark on the dipstick is calibrated for an engine at operating temperature. When the engine is cold, the oil will be below the full mark. The engine can be operated safely as long as the oil is within the safe operating range as indicated on the dipstick. **Do not operate vehicle if oil level is below the safe area indicated on the dipstick.**

AIR FILTER INSPECTION/REPLACEMENT

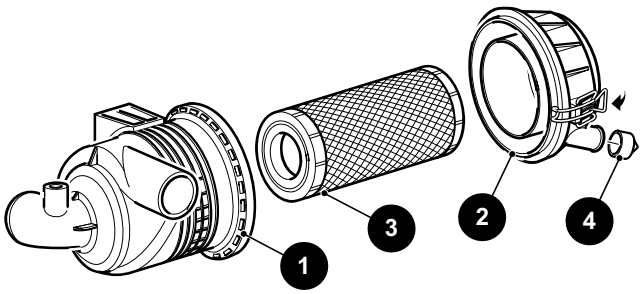


Figure 9 Air Filter Assembly

NOTICE

The air filter assembly on the vehicle is a dry unit. Do not use oil on the filter element or any part of the unit.

To access the air filter, raise the seat. Unsnap two clips that secure the cover (2) to the canister (1) and remove the cover. Remove the air filter element (3) and clean the inside of the cover, canister and dust collector (4) (Figure 9).

Inspect the air filter element (3) and replace it in accordance with the PERIODIC SERVICE SCHEDULE.

Install the air filter element (3) and install the cover (2). Be sure the cover is properly seated and all clips are fastened securely.

Clean the Air Filter Element

⚠ CAUTION

Do not use compressed air to clean the air filter; doing so will damage the filter which may result in damage to the engine.

If the element is in acceptable condition, loose dirt may be removed by tapping the filter lightly. DO NOT use oil on the filter element or any part of the unit.

Install the element in the same way it was removed, being sure that the cover clips are fastened securely.

STARTER/GENERATOR BELT TENSION

Tool List **Qty.**

Belt Tension Gauge 1
Wrench, 3/4” 1
Wrench, 9/16” 2
Ratchet 1
Socket, 3/4” 1

The starter/generator belt tension should be checked after the first 15 - 20 hours and set to 75 - 80 lbs. (34 - 36 kg).

⚠ WARNING

At no time during installation of belt, should the belt tension exceed 160 lbs (73 kg).

⚠ CAUTION

During installation, the belt must not be rolled over the edges of the starter/generator or drive clutch pulleys. Excessive stretch in belt may cause cord failure.

NOTICE

A loose belt can cause audible vibration and squeal.

Tighten a **new** starter/generator belt to 110 - 130 lbs. (50 - 59 kg) tension when a gauge is applied half way between the two pulleys (Figure 10).

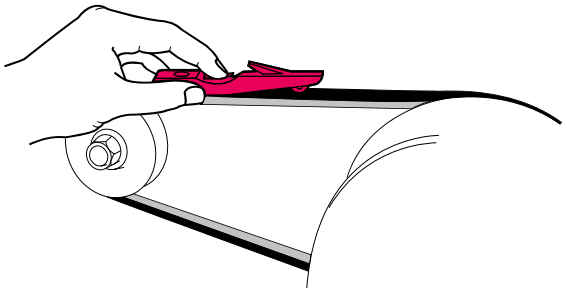


Figure 10 Checking Belt Tension with Gauge

A **new** belt may be checked manually. A maximum deflection of 3/8” (10 mm) is acceptable (Figure 11).

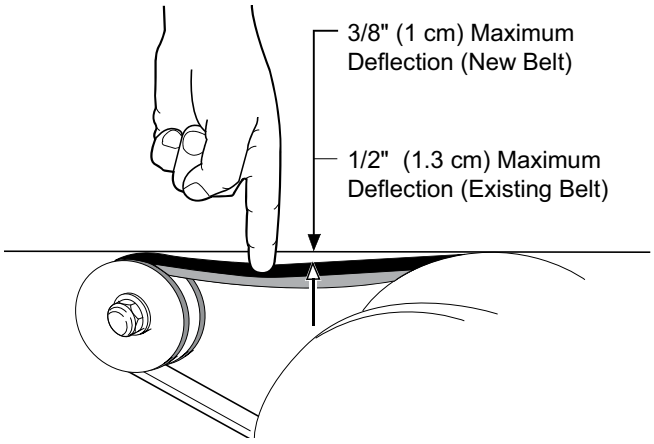


Figure 11 Checking Belt Tension with Finger

Tighten an existing belt to 75 - 80 lbs. (34 - 36 kg) tension using the same technique and inspect for cracking or wear. A maximum deflection of 1/2” (13 mm) acceptable.

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

Adjusting the Belt

Loosen the two pivot bolts (13) and nuts (14) on the starter/generator. Hold the lower nut (11) and loosen the upper nut (12) on the starter/generator adjusting bolt.

Move the lower nut (11) up or down the adjustment bolt until proper belt tension is achieved. Hold the lower nut (11) in place and tighten the upper jam nut (12) against it the lower nut to the specified torque value (Figure 12).

Using a socket and open end wrench, tighten the starter/generator pivot bolts (13) and nuts (14) to the torque value specified below.

Item	Torque Specification
12, 14	30 - 35 ft. lbs. (40 - 48 Nm)

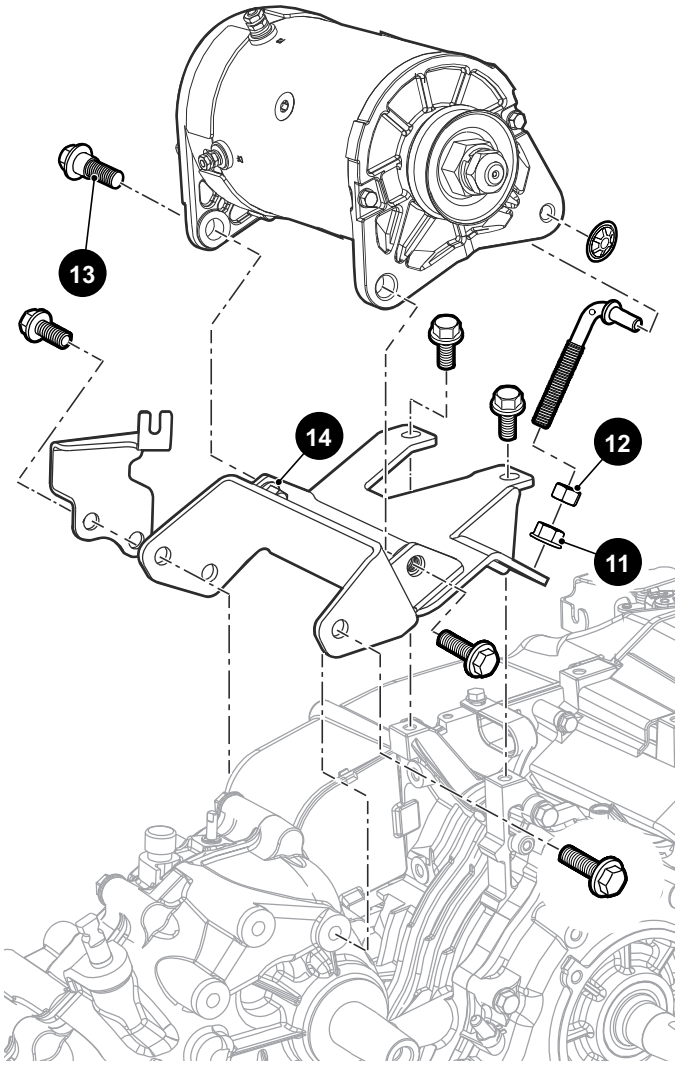


Figure 12 Starter/Generator

STARTER/GENERATOR REPLACEMENT

Tool List	Qty.
Wrench, 8 mm	1
Wrench, 10 mm	1
Wrench, 13 mm	1
Wrench, 15mm	1
Wrench, 14 mm	2
Ratchet	1
Socket, 13 mm	1
Socket, 15 mm	1
Torque wrench, ft. lbs.	1
Insulated Wrench, 1/2”	1

⚠ WARNING

To decrease the risk of personal injury, disconnect negative (-) battery cable before beginning starter/generator removal.

Disconnect the negative (-) battery cable.

Remove the wires connected to the starter/generator. Loosen the jam nut (11) and the adjusting nut (12) securing the starter/generator adjuster until the starter/generator belt can be removed from the drive clutch. Remove the starter/generator pivot bolts (13) and lift starter/generator from the vehicle (Figure 12).

Install the starter/generator pivot bolts (13) and hardware loosely in place and install the belt. Tighten a new starter/generator belt per STARTER/GENERATOR BELT TENSION earlier in this section.

Tighten jam nut (12) and the pivot bolts (13) and nuts (14) to the torque value specified below.

Item	Torque Specification
12, 14	30 - 35 ft. lbs. (40 - 48 Nm)

Install the wires as shown below and tighten the terminals firmly into place. Reconnect the battery.

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

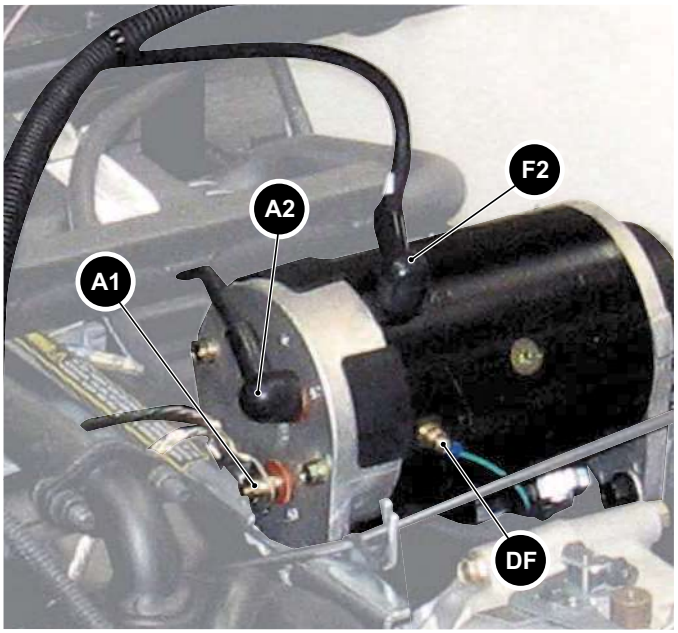


Figure 13 Starter/Generator Wire Connections

From	To
A1	Ground
A2	Terminal F1 on Starter/Generator
F1	Terminal A2 on Starter/Generator
F2	Terminal A on Solenoid
DF	Green wire to Voltage Regulator

Figure 14 Starter/Generator Wiring

COOLING SYSTEM CLEANING

At least once a year, or more often under adverse conditions, the cooling system should be cleaned. Cleaning will assure an adequate supply of air to the cooling fins. Compressed air may be used for routine cooling system maintenance (Figure 15).

Operation in wet or damp weather or over freshly cut grass may result in a variety of debris accumulating and adhering to the internal shroud and fins of the cooling system.

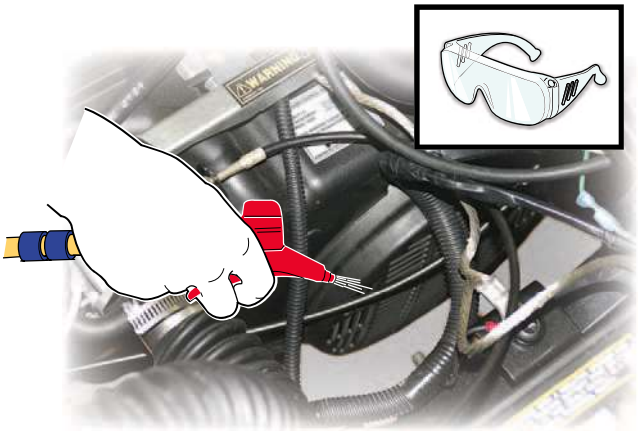


Figure 15 Cleaning Cooling System with Air

SPARK PLUG

Tool List **Qty.**

Spark Plug Socket,13/16” 1
Feeler Gauge, Wire Type.....1
Ratchet 1
Extension 1
Torque Wrench, ft. lbs. 1
Anti-Seize Compound.....1

This engine uses Spark Plug NGK BPR2ES with a gap of .028" - .031" (.70 - .80 mm). Using a 13/16” spark plug socket or wrench, remove the spark plug at 125 hours or semi-annually and clean and re-gap. The spark plug should be properly gapped and replaced in the cylinder head. Tighten the spark plug to the torque value specified below (Figure 16).

Item	Torque Specification
Spark Plug	16 ft. lbs. (22 Nm)

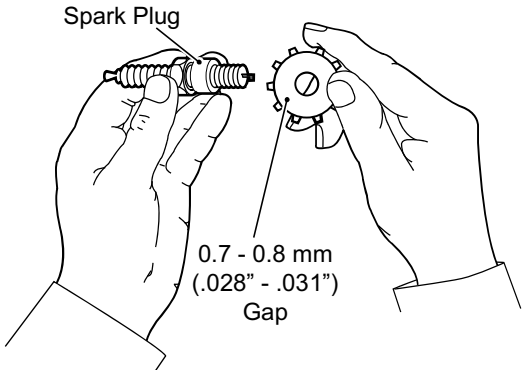


Figure 16 Gapping the Spark Plug

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

A fouled spark plug is indicated by an electrode with a wet, black appearance. A fouled plug can be caused by:

- Dirty air filter element
- Restrictions in the air intake system
- Incorrect valve adjustment
- Spark plug wire in poor condition
- Poor quality fuel

⚠ CAUTION

Use care not to over-tighten the plug. Over-tightening can cause damage to the aluminum cylinder head threads.

Remove and inspect the spark plug at intervals indicated in the Periodic Service Schedule. Spark plug should be properly gapped.

CYLINDER HEAD

Compression Leak Down Test

Tool List	Qty.
Ratchet	1
Spark Plug Socket	1
Extension, 6"	1
Leak Down Gauge with Plug Adapters	1
Air Compressor	1

Before measuring compression, do the following:

- Be sure the battery is fully charged.
- Thoroughly warm up the engine so that engine oil between the piston and cylinder wall will help seal compression as it does during normal running.
- Stop the engine.

Disconnect the spark plug cap and remove the spark plug keeping the engine throttle and the choke valve fully open.

1. Remove the oil dipstick/fill cap and the spark plug.
2. Rotate the crankshaft to position the cylinder to be tested 10°-15° past TDC so that the exhaust valve is closed.
3. Lock the crankshaft in position with a strap wrench wrapped around the drive clutch.
4. Select the spark plug adapter that fits the spark plug hole.
5. Connect the leak down gauge.
6. Turn the regulator knob counterclockwise to zero out the incoming pressure.
7. Connect the compressed air hose and turn the regulator knob clockwise to pressurize the cylinder.
8. Compare the reading of the compression gauge with the setting on the regulator to obtain the leak down percentage.
9. Repeat the process for the next cylinder.

Record the leakage percentage for each cylinder. Maximum leak down should run no more than 10 - 15%.

Listen to see if air is escaping through the carburetor, the oil filler or the exhaust. Air leaking through the carburetor or throttle body indicates poor sealing of the intake valve. Leaking from the tail pipe indicates poor exhaust valve sealing. Air leaking around the outside of the head gasket flange indicates a blown head gasket.

Rocker Cover Removal

Tool List	Qty.
Ratchet	1
Extension 6”	1
Socket, 10 mm	1

1. Remove the four bolts (5) securing the rocker cover.
2. Remove the rocker cover (6) and the gasket.

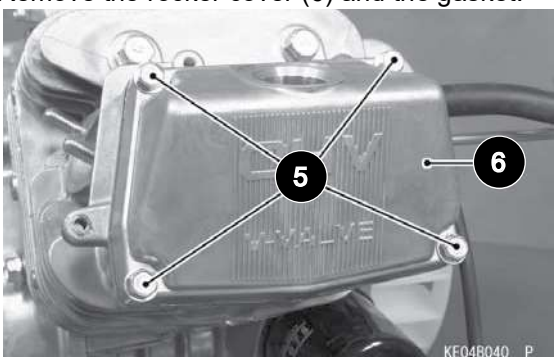


Figure 17 Rocker Cover

Valve Clearance Inspection

Tool List	Qty.
Allen Bit, 3 mm	1
Ratchet	1
Extension, 6”	1
Feeler Gauge	1
Wrench, 14 mm	1
Torque Wrench, in. lbs.	1

NOTICE

Valve clearance must be checked when the engine is cold (at room temperature).

With the rocker cover removed, place the piston at TDC of the compression stroke by turning the crankshaft in its rotational direction.

Check the valve clearance with a feeler gauge (7). Measure the valve clearance between the rocker arm (8) and the valve stem end.

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

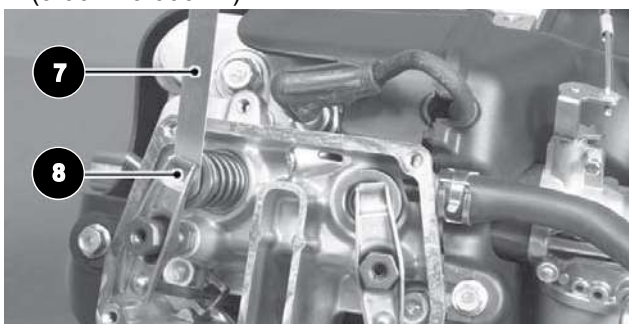


Figure 18 Measure Valve Clearance

If the valve clearance is incorrect, adjust it.

Valve Clearance Adjustment

Turn the crankshaft in the proper direction until the piston is at TDC of the compression stroke.

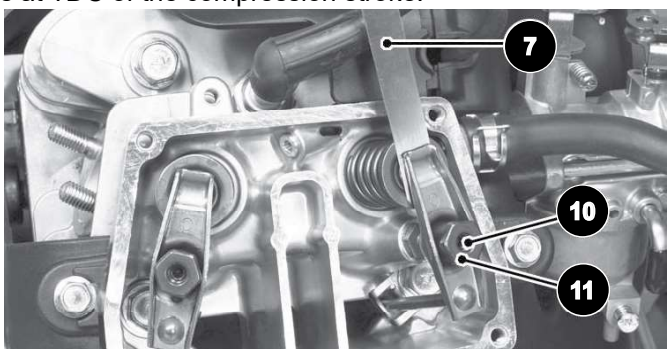


Figure 19 Valve Clearance Adjustment

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 torque value specified below.

Item	Torque Specification
10	61 in. lbs (6.9 Nm)

⚠ CAUTION

Do NOT over-tighten.

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
Insulated Wrench, 1/2” 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
Combination 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, see the Engine Shop Rebuild Manual for this vehicle.

NOTICE

Hardware that is removed must be installed in its original position unless otherwise specified. If the torque values are not specified, refer to the Torque Specifications table in the GENRAL INFORMATION AND ROUTINE MAINTENANCE section.

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 canopy.

1. Disconnect the negative (-) battery cable.
2. Disconnect air hose at the carburetor.

3. Lift rear of vehicle as directed in the SAFETY section. Use jack stands for stability.
4. Remove the drive belt by rotating clutch toward the rear of vehicle when the belt is slipped off the top of the clutch. Remove belt from vehicle.
5. Disconnect the DF wire from the starter, lay harness out of the way.
6. Remove the ground strap from the starter/generator.
7. Remove the starter/generator (See STARTER/GENERATOR REPLACEMENT in this section).
8. Remove the two bolts between the muffler and the starter/generator bracket.
9. Remove the ground strap at the crankcase. Route the ground strap through bracket and under the throttle rod and cover.
10. Remove the bracket holding the fuel pulse line. Remove bracket and unsnap the ignition wire from the harness.
11. Disconnect the pulse line from the fuel pump.
12. Disconnect the fuel line from the carburetor inlet. Use a drip pan to catch any fuel leakage.
13. Remove the throttle rod cover. Remove the throttle rod at the carburetor choke plate to remove the retaining tab from the throttle rod and lift the throttle rod out of the hole. Remove the throttle rod at the rear by rotating 45 degrees from the bracket and lift through the bracket slot. Remove the rod from the vehicle.
14. Loosen nuts on the choke cable. Close the choke plate and remove the cable from the slot.
15. Remove both bolts from the starter/generator bracket. Move the throttle bracket away from engine.
16. Remove the muffler bolts from the muffler stack.
17. Remove the passenger side hub cap if equipped, and remove the wheel and tire assembly.
18. Set the park brake and place the direction selector in the forward position to place tension on the clutches.
19. Access the driven clutch from the passenger side of the vehicle and remove the bolt from the driven clutch.
20. Install the clutch puller bolt until it bottoms out.
21. Remove the clutch and the clutch puller bolt.
22. To remove the drive clutch, remove the bolt from the center of the drive clutch.
23. Raise the power-train with the floor jack so that the clutch puller bolt clears the spring hanger. Remove the front eye-bolt from the spring hanger. Install the clutch puller bolt and remove the drive clutch from the shaft. Remove the clutch puller bolt.
24. Remove the four bolts from the engine support bracket connecting the engine to the differential and the engine to the inner frame.
25. Remove the bolts from the bottom of the skid plate. Access the forward two nuts through the oil drain access hole.

Controls and Wiring

Unplug the wiring harness from the engine. Cut the wire tie securing the accelerator cable to the engine.

Removing the Engine from the Vehicle

NOTICE

Place suitable blocks under the engine frame for support. Although the blocks are not required for engine removal, they will help maintain the alignment of the frame and simplify engine installation.

It is not necessary to remove the muffler as part of the engine removal.

Engine Installation

⚠ CAUTION

When you install the fuel and pulse lines, pay particular attention to assure that the lines are connected correctly.

It is important to follow the assembly sequence recommended for the mounting hardware.

1. With the assistance of a hoist or another person, lower the engine into position over the engine support castings.
2. Install one rear horizontal and one front bottom engine bolt through the casting and engine and finger tight.
3. Install the remaining horizontal engine bolts and finger tight. Remove the front bottom bolt and reinstall the skid plate finger tight.
4. Tighten the bottom and horizontal mounting bolts to 45 ft. lbs. (60 Nm) torque.
5. The remaining installation is in the reverse order of disassembly using standard torque specifications.

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

DRIVE CLUTCH REMOVAL

⚠ WARNING

To decrease the risk of personal injury, use only impact sockets when using an impact wrench.

Insert a clutch puller bolt (P/N 608429) into the clutch and hand tighten for several turns. Remove the clutch by driving it off with the impact wrench and the clutch puller bolt.

NOTICE

In extreme cases, the clutch may be resistant to removal. In such cases the clutch removal tool should be removed and the cavity filled with grease. Install the clutch puller and use the impact wrench to drive off the clutch. The combination of hydraulic pressure (grease) and the impact wrench will remove the most stubborn clutch. To decrease the risk of damage to the clutch, be sure to remove all grease from the body of the clutch since grease penetrating the seal may cause premature clutch failure.

It is not necessary to remove the engine to remove the clutch. Refer to the **CONTINUOUSLY VARIABLE TRANSMISSION** section for removal and installation.

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

Notes:

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

Notes:

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

FUEL SYSTEM

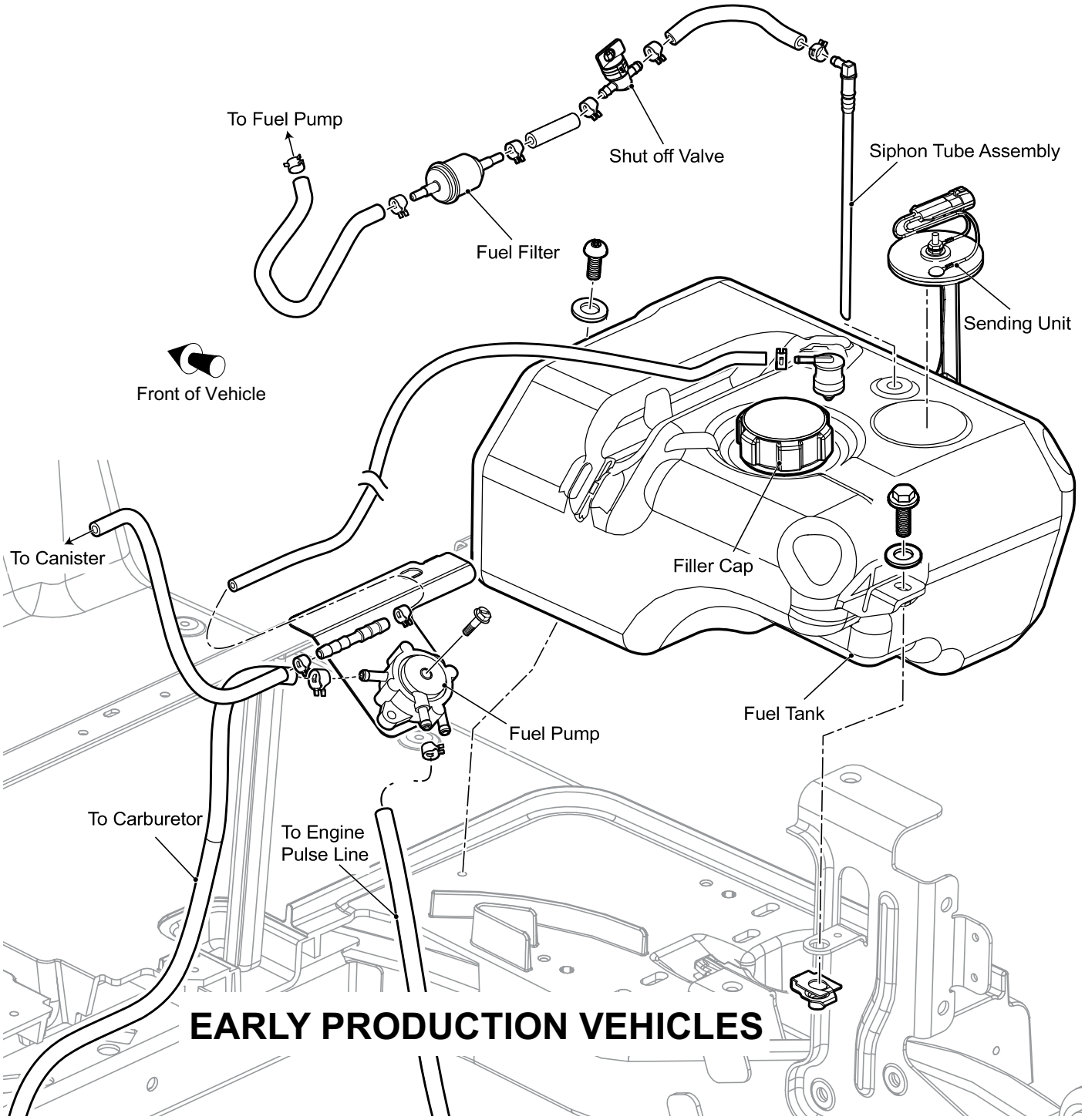


Figure 1 Fuel System

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

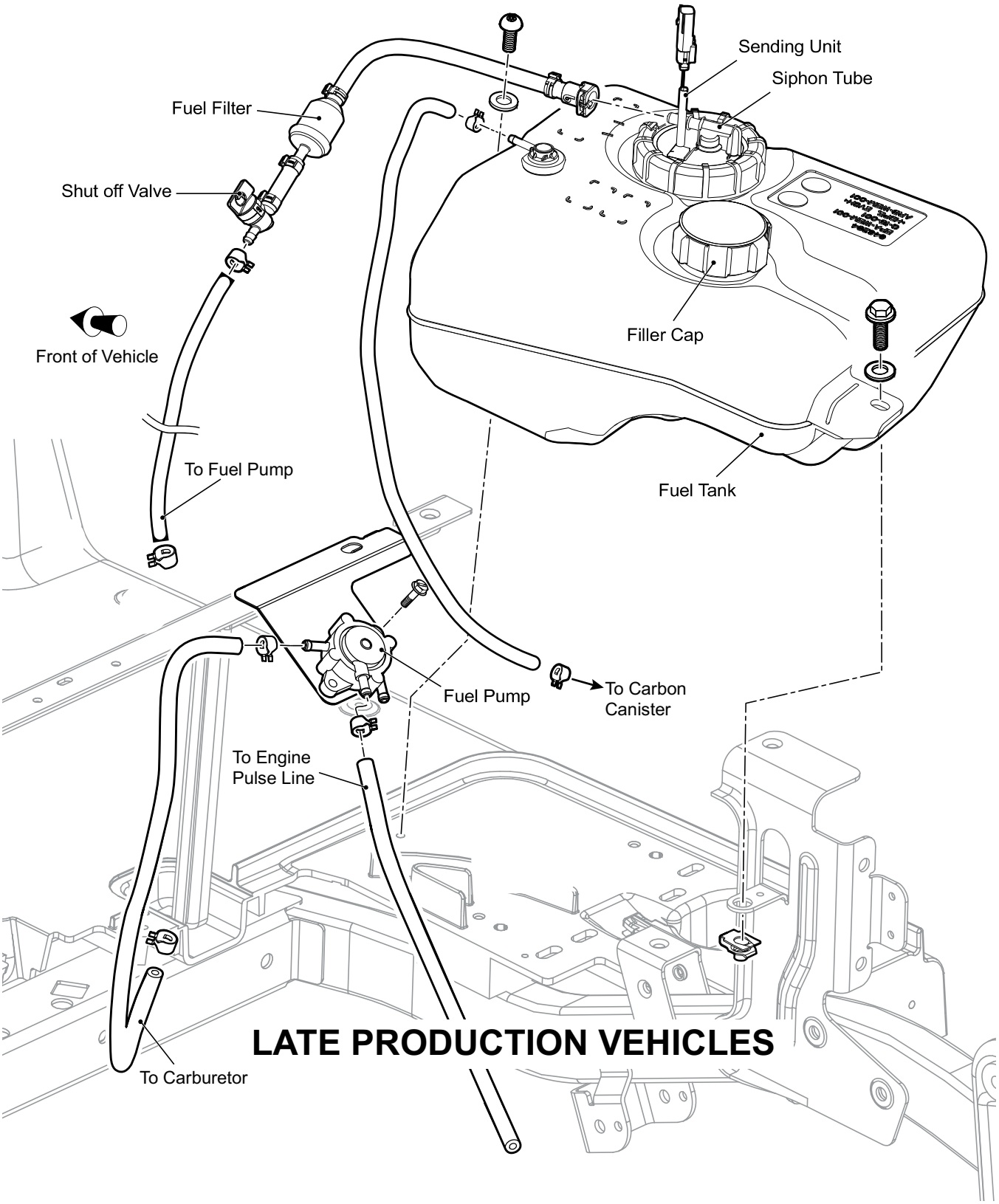


Figure 2 Fuel System

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

GENERAL

NOTICE

Hardware that is removed must always be installed in its original position unless otherwise specified. If torque values are not specified, refer to the Torque Specifications table in the GENERAL INFORMATION AND ROUTINE MAINTENANCE section.

The fuel system consists of a fuel tank, fuel lines, fuel filter, fuel pump, carburetor and CARB Canister (Figure 1) (Figure 2) (Figure 3).

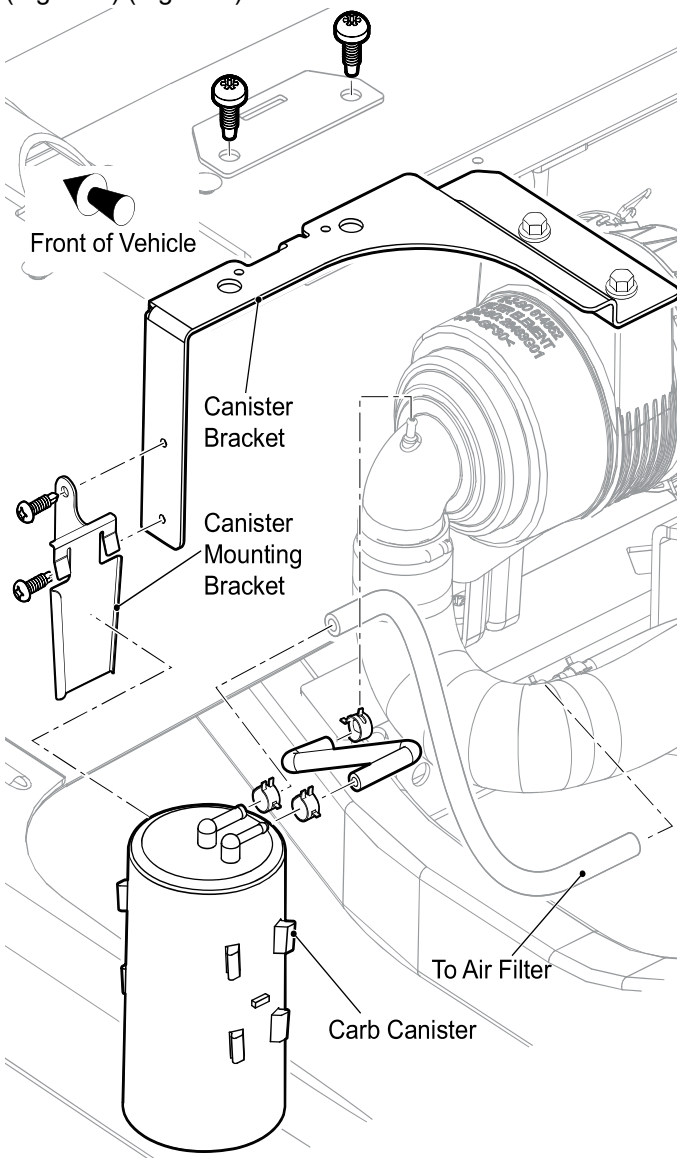


Figure 3 Canister Mounting

WARNING

To decrease the risk of serious injury or death resulting from a possible explosion, do not smoke near the fuel tank or refuel near open flame or electrical items which could produce a spark.

Always wear safety glasses while refueling to decrease the risk of possible eye injury from gasoline or gasoline vapor.

When refueling, inspect the fuel cap for leaks or breaks that could result in fuel spillage.

Do not handle fuel in an area that is not adequately ventilated. Do not permit anyone to smoke in an area where vehicles are being fueled.

The fuel tank is located under the passenger seat (Figure 1) (Figure 2).

Fill tank with fresh, clean, automotive grade, unleaded, 87 octane (minimum) gasoline. High altitude or heavy use/load applications may benefit from higher octane gasoline.

Early Production Fuel Tank

CAUTION

Do not over fill the fuel tank. Allow adequate space for the expansion of gasoline. Leave at least 1" (2.5 cm) space below bottom of filler neck.

Early production tanks can be identified by the sending unit and the siphon tube as shown in (Figure 1).

Early production fuel tanks require enough space for the expansion of the gasoline. Leave at least 1-inch (2.5 cm) of space below the bottom of the filler neck.

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

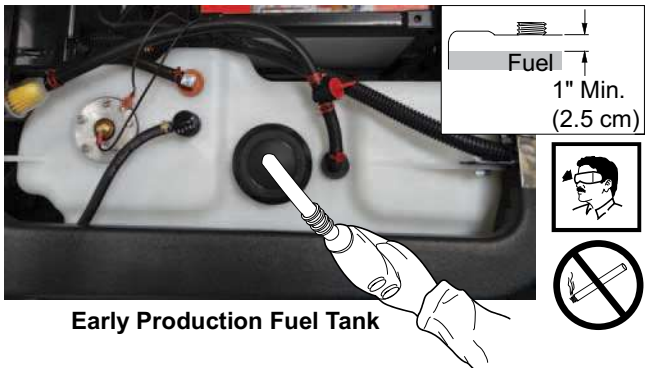


Figure 4 Fuel Tank

Late Production Fuel Tank

Late production tanks can be identified by the sending unit and the siphon tube as shown in (Figure 2).

Late production fuel tanks are designed to allow for fuel expansion and do NOT require space below bottom of filler neck.

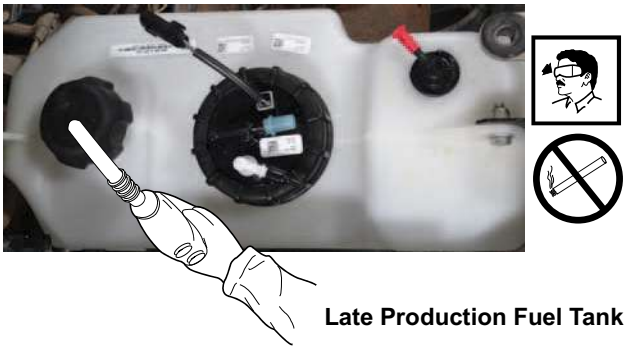


Figure 5 Fuel Tank

CARBURETOR OPERATION

The carburetor consists of four different systems:

- Float System
- Pilot Jet System
- Main Jet System
- Choke System

Float System

The float chamber is located on the underside of the carburetor. The correct fuel level is maintained by means of the float and needle valve.

As the fuel flows from the fuel pump, it must pass through the needle valve and into the float chamber. As the fuel enters the float chamber, the float starts to rise against the needle valve. When the buoyancy of the float exceeds the fuel pressure on the needle valve, the float closes the needle valve. The float maintains the correct fuel level within the float chamber and it is not adjustable. As fuel is consumed from the float chamber, the float drops which allows the needle valve to admit additional fuel.

Pilot Jet System

The pilot jet system function is to deliver fuel to the engine during low speed operation. The fuel flow is determined by the pilot jet size and the setting of the pilot screw.

Main Jet System

The main jet system function is to deliver fuel to the engine during acceleration and heavy load conditions. Fuel flow is determined by the main jet size. Air is mixed with fuel that passes through the bleed opening in the main nozzle. This mixture passes into the carburetor venturi as atomized air/fuel is mixed with intake air and delivered to the engine.

Choke System

The choke functions to make initial starting of the engine easier in cold weather conditions. The choke plate restricts the air flow into the carburetor which enriches the air/fuel ratio.

Carburetor Service

Be sure that the ignition system is functioning correctly before determining that servicing the carburetor is required. Refer to the ELECTRICAL section for ignition system information.

Choke Operation

Pull the choke knob (10) out to operate the choke (Figure 6). Check that the cable operates smoothly and that the cable returns when the knob is released. The motion should be smooth throughout the operating range. If there is any binding or sharp bends, the choke cable assembly must be replaced.

NOTICE

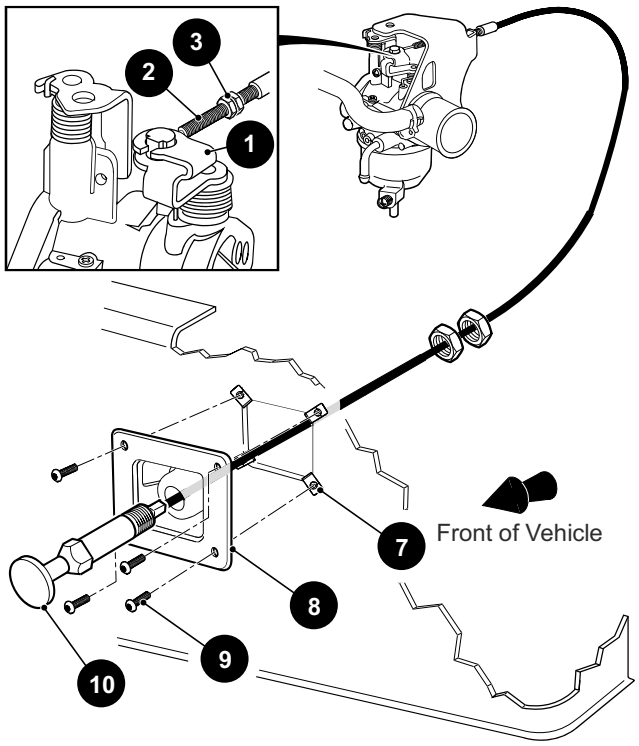
Do not attempt to lubricate the choke cable. Lubricant tends to retain dirt on the moving parts which will cause premature deterioration of the cable.

⚠ WARNING

To decrease the risk of an ignition spark which could ignite gasoline from the fuel system and result in personal injury, the negative (-) battery cable must be removed from battery (refer to SAFETY section).

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

FOR VEHICLES MANUFACTURED FROM JANUARY 3, 2016



FOR VEHICLES MANUFACTURED UNTIL JANUARY 2, 2016

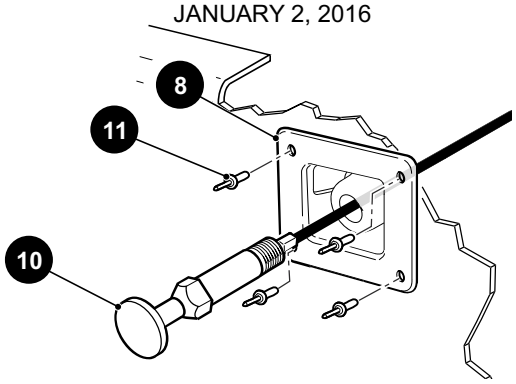


Figure 6 Choke Cable Attachment

Choke Adapter Installation

Tool List	Qty.
Pop Rivet Tool	1
Phillips Screwdriver	1

For vehicles manufactured until January 2, 2016: To remove the choke adapter (8), drill out the four rivets (11). To install the new choke adapter (8), install the barrel clips (7) on to the four sides of the cutout provided on the front of rear body and install the new choke adapter (8) using the screws (9) as shown (Figure 6).

For vehicles manufactured from January 3, 2016: To remove the choke adapter (8), remove the four screws (9), securing the choke adapter (8). Installation is the reverse order of removal. Replace any worn or damaged hardware.

Tighten the screws (9) to the torque specified below.

Item	Torque Specification
9	27 - 35 in. lbs. (3 - 4 Nm)

FUEL SYSTEM COMPONENT SERVICE AND REPLACEMENT

Choke Cable and Housing Removal

Tool List	Qty.
Open End Wrench, 10 mm	2
Open End Wrench, 7/8”	1

Loosen the nuts (3) that secure the choke cable to the choke cable bracket (5) (Figure 6) (Figure 7). Lift the choke cable and housing (2) clear of the bracket and position it so that the bullet end of the choke cable can be removed from the carburetor choke plate (1).

At the seat panel, remove the nut (6) securing the outer cable to the bezel (8). Slide the nut, off the end of the choke cable and pull the choke cable out through the seat wrap. Remove the choke cable bezel (8) from the seat panel (Figure 6).

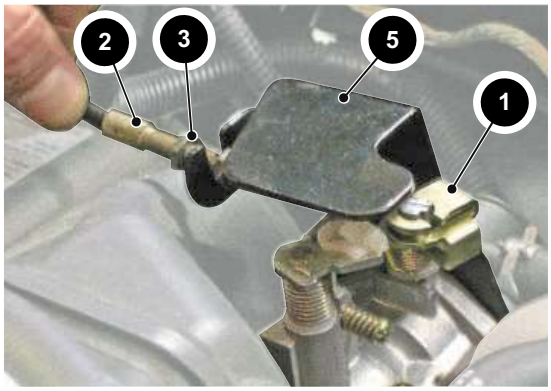


Figure 7 Choke Cable and Housing

Choke Cable and Housing Installation

NOTICE

Hardware that is removed must be installed in its original position unless otherwise specified. If the torque values are not specified, refer to the Torque Specifications table in the GENRAL INFORMATION AND ROUTINE MAINTENANCE section.

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

Feed the choke cable assembly (4) through the hole in the bezel (8) (Figure 6). Insert the cable and bezel into the seat panel and through the air cleaner intake and install the bezel (8) and nut (6) finger tight. Slide the threaded portion of the housing through the carburetor mounted bracket (5) and attach the nuts (3) to the choke cable housing finger tight. Insert the choke cable bullet into the choke arm (1) hole and release. Make sure that the choke and choke knob are both in the open position.

Adjust the position of the curved portion of the cable housing to ensure that the cable does not contact other moving parts. Check the cable to be sure that there are no sharp bends or kinks in the cable before firmly tightening the nuts at both ends of the cable.

Carburetor Removal

Tool List	Qty.
Socket, 10 mm	1
Ratchet	1
Extension, 3”	1
Parallel Jaw Pliers	1
Straight Blade Screwdriver	1
Phillips Screwdriver	1
Torque Wrench, in. lbs.	1

Loosen the hose clamps (1) from each end of the air intake hose (2). Remove hose (2) ().

Disconnect the fuel line (12) from the carburetor and plug the fuel line. Disconnect the solid linkage from the carburetor throttle lever. Refer to SPEED CONTROL section. Remove the choke cable from the choke lever swivel.

Remove the nuts (13), PCV valve (14), gaskets (15) and choke bracket (16) and slide the carburetor (11) from the engine studs (10).

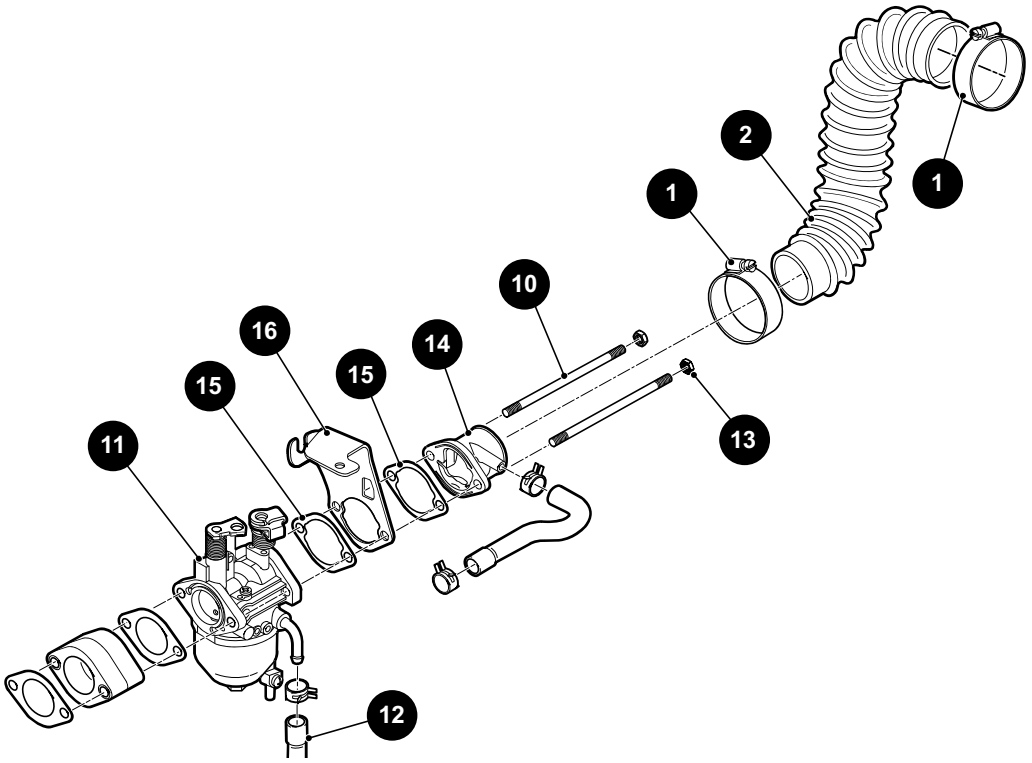


Figure 8 Carburetor Operation

Carburetor Disassembly

Tool List	Qty.
Socket, 12 mm	1
Ratchet	1
Pliers	1
Straight Blade Screwdriver (narrow)	1

NOTICE

Before you disassemble the carburetor, drain the fuel bowl and clean the outside of the carburetor thoroughly.

Take care when you disassemble the carburetor or removing the jets. Most carburetor malfunctions are due

to wear or clogging of internal passages with foreign material. DO NOT bend the float pin during removal. Refer to “Carburetor fault diagnosis’ on page 134.”.

Remove the float bowl (1) by removing the retaining screw (2) and washer (3) (Figure 9).

Inspect the bowl gasket (4) for nicks or cuts. Carefully press out the float pin (5), remove the float (6) and the inlet valve (7). Inspect the inlet valve for wear at its tip.

Remove the main jet (8).

Use solvent to wash all parts and blow through all passages with compressed air. Replace all gaskets and any parts which show significant wear or damage. The drain screw (9) and spring (10) can be used to drain the fuel from the bowl without removing the bowl.

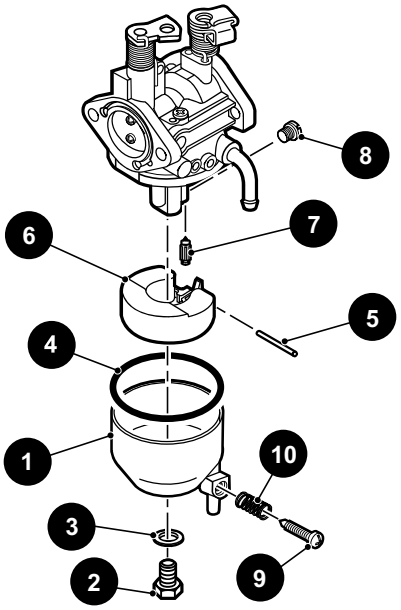


Figure 9 Carburetor Disassembly

Float Level Alignment

NOTICE

The float level cannot be adjusted but should be inspected for proper alignment.

Turn the 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 (Figure 10). 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.

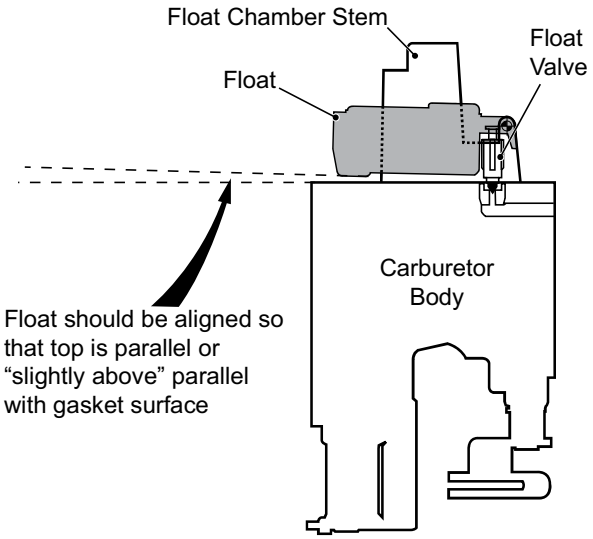


Figure 10 Float Adjustment

Carburetor Installation

⚠ WARNING

To decrease the risk of 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.

⚠ 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 the carburetor in reverse order of removal. Use a new gasket to ensure sealing of carburetor. Tighten hardware to torque value specified below (Figure 9).

Item	Torque Specification
Hardware	50 - 70 in. lbs. (6 - 8 Nm)

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

FUEL PUMP

The fuel pump is mounted on a bracket attached to the seat support near the fuel tank. It is operated by crankcase pressure impulses from the engine. As the piston moves up in the cylinder, a negative pressure moves the diaphragm within the fuel pump (10). This movement draws fuel from the fuel tank (26) into the fuel pump (10) chamber. This action also closes the outlet valve which prevents fuel back flowing from the carburetor.

As the piston moves down in the cylinder, a positive pressure is formed in the crankcase which causes the diaphragm to move in the opposite direction (away from the engine). This action forces the inlet valve to close and the outlet valve to open and supply fuel to the carburetor float bowl.

Fuel Pump Replacement

Tool List	Qty.
Socket, 3/8”	1
Ratchet	1
Pliers	1
Straight Blade Screwdriver	1

CAUTION

Attempting to operate engine with lines reversed will cause fuel enter the crankcase and dilute the oil with possible engine damage.

NOTICE

The length of the pulse hose from the fuel pump is important for efficient pump operation. To replace the hose, make sure to replace with a hose of the same length and approved material.

Observe and identify the supply and pulse hoses. Remove the hoses and plug the fuel lines (44). Remove the fuel pump (10) by removing the two screws that secure it to the bracket located on the seat support frame (Figure 11).

Installation is in the reverse order of removal. Be sure to connect the pulse line to the correct location on the pump.

Fuel Lines and Filter

Tool List	Qty.
Pliers	1
Straight Blade Screwdriver	1

The fuel is supplied to the fuel pump (10, 26) and carburetor through flexible fuel hoses. An in-line filter (7, 13) is installed in the hose between the fuel tank (26, 3) and the fuel pump (10, 26) (Figure 11) (Figure 12).

WARNING

If a test to determine fuel/vapor presence or flow is required, the ignition system must be disabled. Remove the spark plug wire in order to decrease the risk of an ignition spark that could ignite the fuel/vapor. Never permit smoking or an open flame in an area that contains fuel/vapor. Clean up all fuel spills immediately.

Early Production Vehicles

Frequently check the fuel filter (7), tank (26), hoses (19, 6, 17) and cap (3) for leaks or signs that the cap vent or filter have become clogged (Figure 11). The filter must be replaced periodically.

Late Production Vehicles

Frequently check the fuel filter (13), tank (3), hoses (7, 5, 9) and cap (4) for leaks or signs that the cap vent or filter have become clogged (Figure 12). The filter must be replaced periodically.

Refer to PERIODIC SERVICE SCHEDULE section.

CAUTION

The filter (7, 13) is marked with a flow direction arrow. Be sure that the arrow points towards the fuel pump.

WARNING

To decrease the risk of injury from explosion or fire, never attempt to repair a damaged or leaking fuel tank. It must be replaced.

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

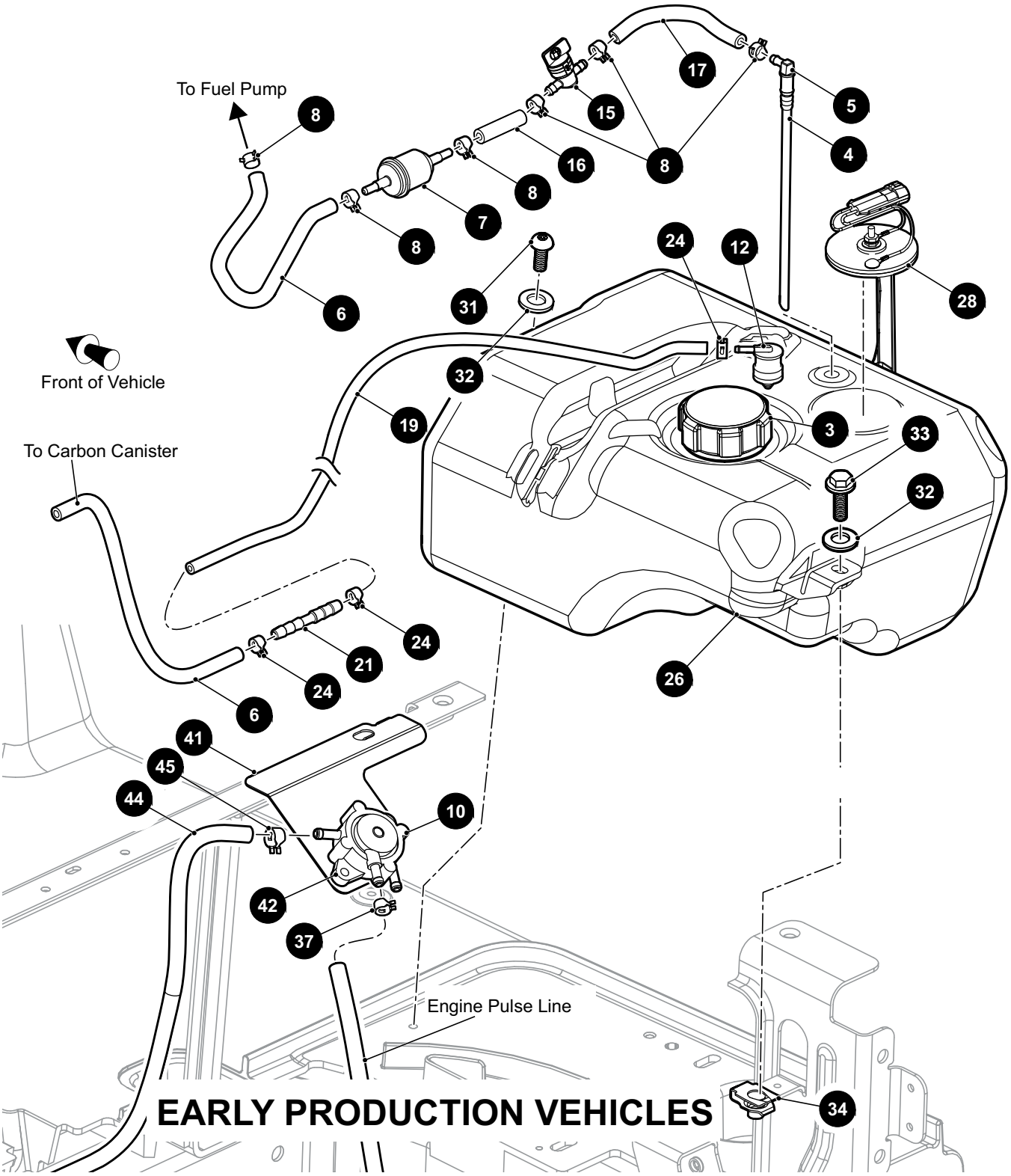


Figure 11 Fuel lines, fuel tank and filter

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

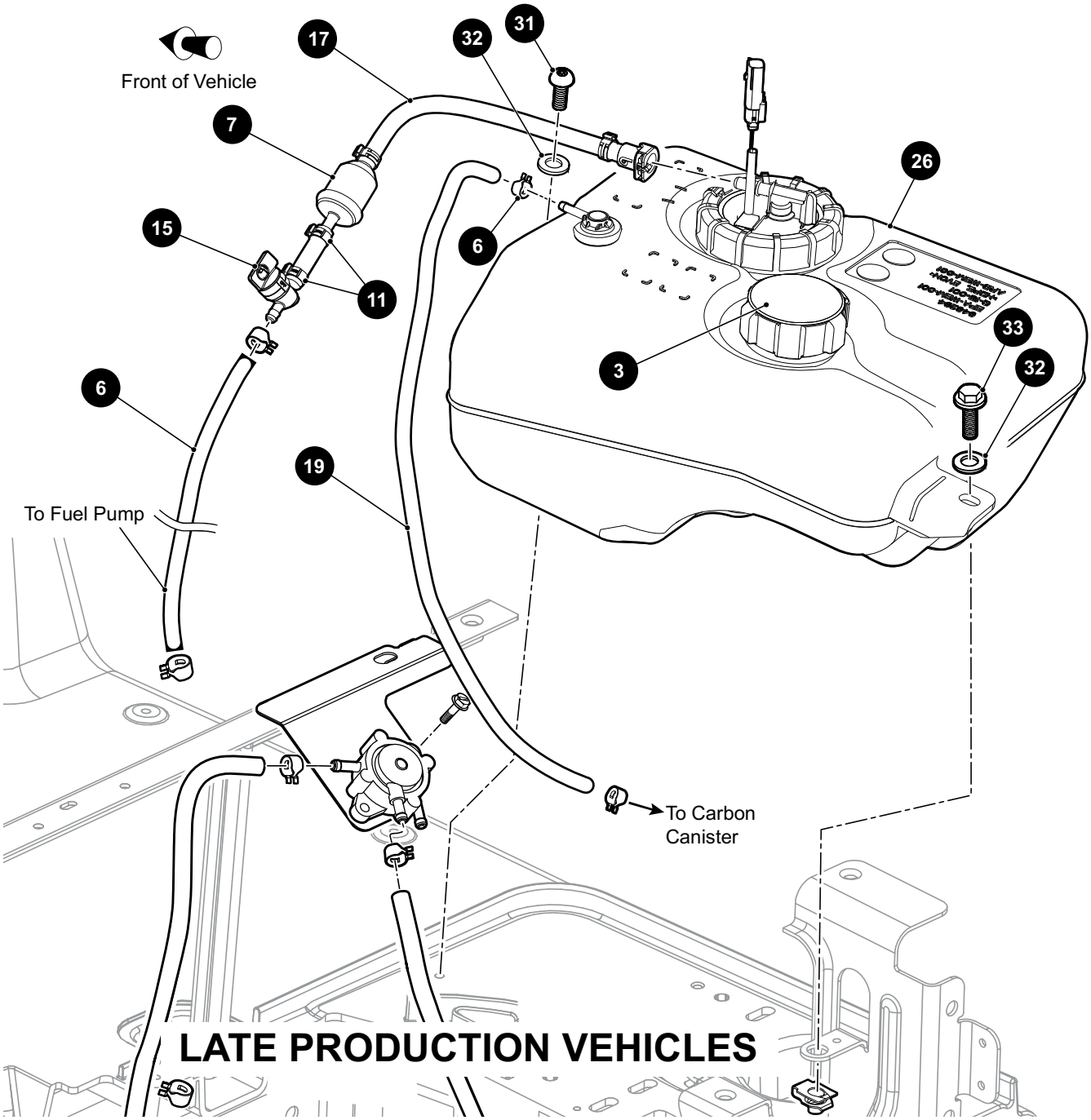


Figure 12 Fuel lines, fuel tank and filter

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

FUEL TANK REMOVAL

Tool List **Qty.**

Wrench, 5/16” 1
Socket, 5/16” 1
Ratchet 1
Drip Pan 1
Insulated wrench, 1/2” 1

Wear eye protection. Disconnect the negative (-) battery wire. Turn off the fuel shut off valve (15). Disconnect the fuel line (17) at the fuel pickup and the line to the CARB canister, Always monitor for fuel leakage from the fuel line. Always use a drip pan and dispose of spent fuel safely.

Remove bolt (33) and washer (32). Remove screw (31) and washer (32). Remove the tank.

Installation is in reverse order of removal.

Item	Torque Specification
33	97 - 132 in. lbs (11 - 15 Nm)
31	26 - 44 in. lbs (3 - 5 Nm)

CARBON CANISTER

Tool List **Qty.**

Flat Blade Screwdriver 1

To remove the CARB canister (7), disconnect hoses (6, 8) from the cannister, press the tabs on the mounting bracket and lift upward on the canister.

To install a CARB canister (7), position the canister ears above the mounting bracket (2) and push against the bracket (2) and downward so that the canisters ears slide into the channels on the bracket. Make sure that the canister is seated completely and the retaining tabs are clear of the canister ears. Connect the hoses.

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

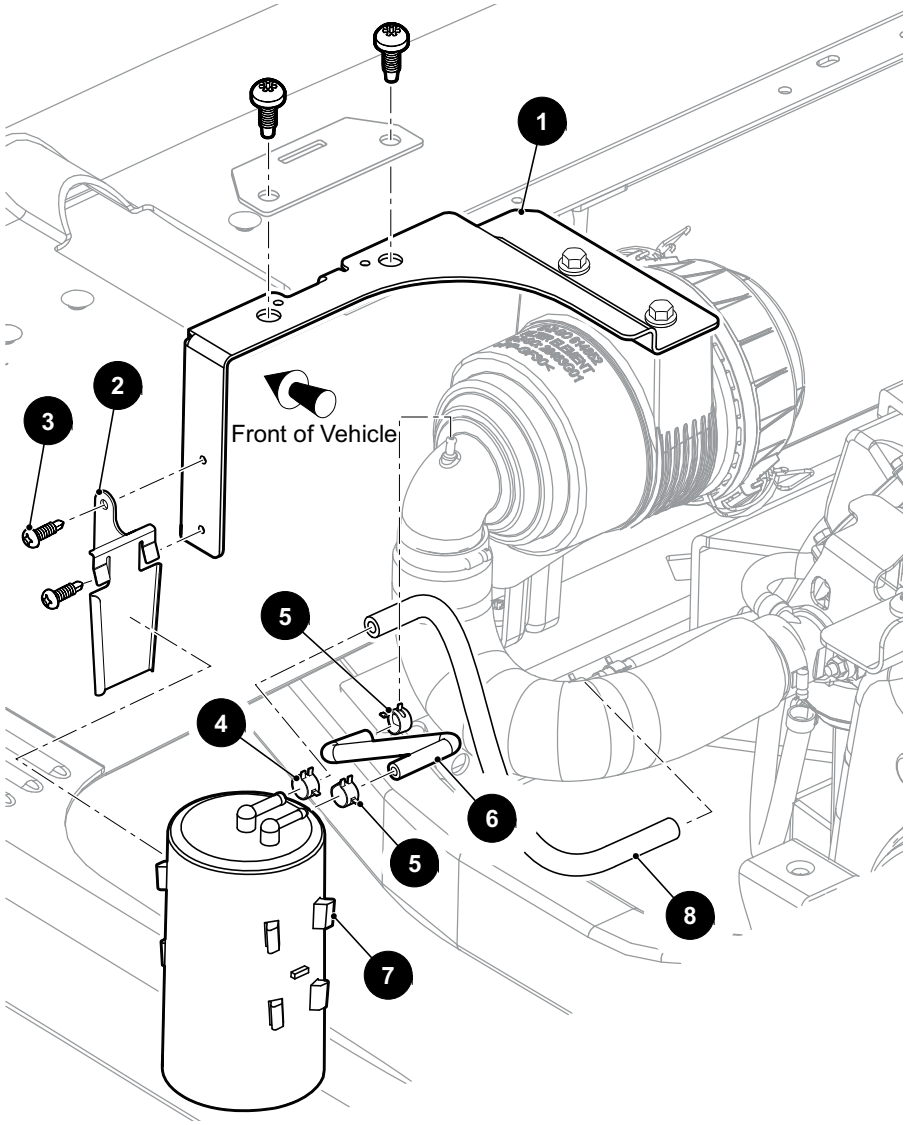


Figure 13 CARB Canister and CARB Hoses installation

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

Notes:

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

Notes:

CONTINUOUSLY VARIABLE TRANSMISSION (CVT)

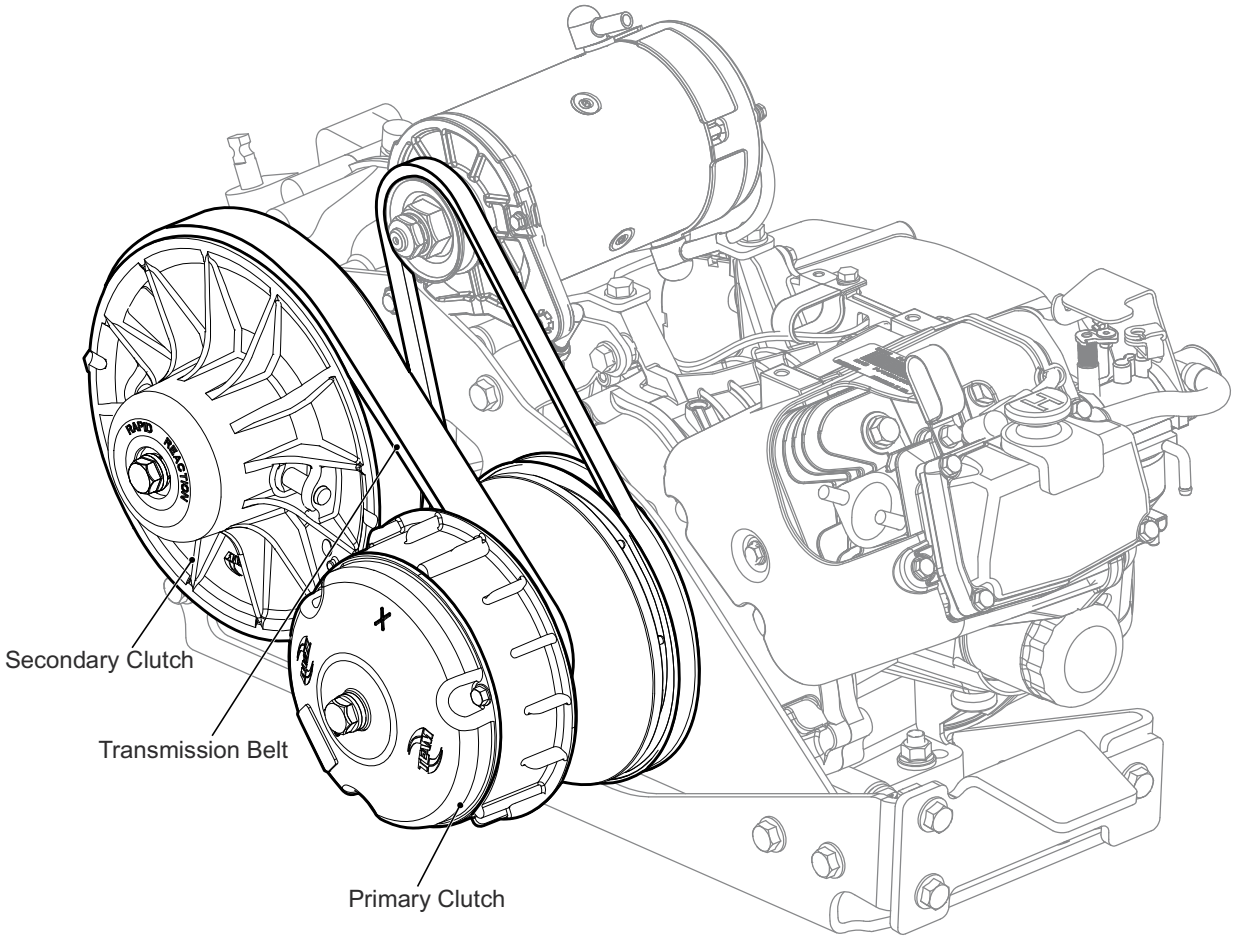


Figure 1 Continuously Variable Transmission System (CVT)

GENERAL

The power transmission from the engine to the rear axle is with a continuously variable transmission (CVT). The CVT has two matched clutch units joined by a transmission belt (Figure 1). The engine mounted primary clutch is a centrifugal unit that responds to engine speed and the rear axle mounted secondary clutch is a load sensing unit.

CLUTCHES

Primary Clutch

When the accelerator is pressed, the engine speed is increased which causes the cams (weights) within the centrifugal primary clutch to move outwards and force the movable sheave inwards. The transmission belt is engaged by the clutch sheaves and begins to rotate.

As the engine speed continues to increase, the primary clutch sheave continues to move inwards forcing the transmission belt to the outer diameter of the primary clutch sheaves, which increases the speed of the belt. The ratio is greatly decreased and supplies maximum speed.

When the accelerator is released, the engine speed decreases and the cams apply less pressure on the movable sheave, which is forced outwards against the cams by a compression spring. The transmission belt disengages from the clutch sheave when engine speed is decreased to the point where the cams apply less force than the spring.

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

Secondary Clutch

The secondary clutch sheaves are closed at rest which results in the transmission belt being held at the outer diameter of the secondary clutch. The secondary clutch has no weights but is held closed by a torsion spring which is joined to the movable secondary assembly.

As the transmission belt starts to rotate, the secondary clutch starts to rotate. As the speed of the primary clutch increases and the belt starts to climb the sheaves, the secondary clutch responds by being forced open in order to permit the belt to ride lower in the secondary clutch sheaves. The sheaves overcome the pressure applied by the torsion spring and cam.

As the secondary clutch slows, the belt rides lower in the primary clutch sheaves. The secondary clutch compensates by closing in response to the torsion spring and cam.

Increased Load

When a vehicle traveling at governed speed begins to climb a grade or is subjected to other increased load conditions, a change in wheel speed is detected by the clutch system and the transmission belt seeks a position where it can achieve adequate friction to overcome the load change.

The belt moves outwards on the secondary clutch which closes due to the torsion spring that moves the movable sheave against the torque ramps. The movement of the transmission belt overcomes some of the centrifugal force applied by the cams in the primary clutch.

This forces the belt lower into the primary clutch which increases the drive ratio. This down-shifting applies more torque to the rear axle without an appreciable change to the engine speed since the governor opens the carburetor in direct the response to the decrease in ground speed.

Equilibrium

The CVT functions because the primary and secondary clutches maintain equilibrium. The clutch sets are adjusted to the vehicle that they are designed to operate. Changes in vehicle weight or desired performance characteristics require that both clutches be adjusted to the needs of the vehicle and stay compatible with each other.

Removing the Transmission Belt

With the vehicle on level ground, remove the transmission belt by pulling the belt to the top which will cause the secondary clutch sheaves to open and loosen the belt tension (Figure 2).

The belt can be moved off to the secondary clutch.

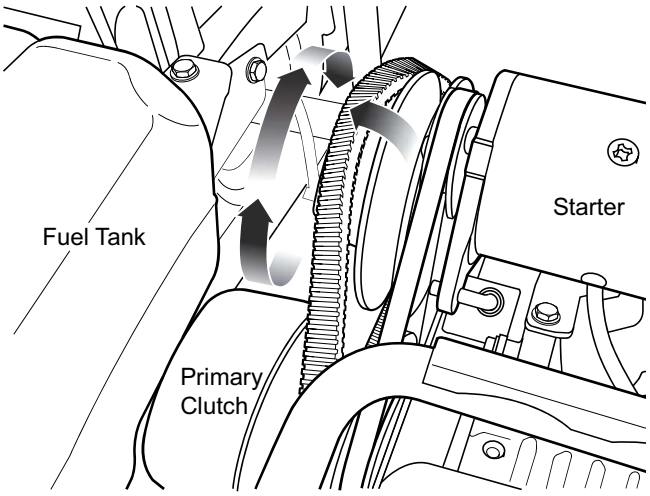


Figure 2 Removing the Transmission Belt

Transmission Belt Service

The transmission belt will require no service unless the vehicle has been operated in an very dusty or muddy location in which case it must be washed with plain water. If the belt becomes frayed or badly worn, it must be replaced.

Primary Clutch Removal

Tool List	Qty.
Plastic Faced Hammer	1
Clutch Puller, (P/N 608429)	1
Wrench, 18mm	1
Socket, 18mm	1
Impact Socket, 19mm	1
Impact Wrench (Air or Electric)	1
Ratchet	1
Extension, 8”	1
Thread Locking Adhesive	AR
Torque Wrench, ft. lbs.	1

⚠ WARNING

To decrease the risk of burns and other injuries:

Disconnect the negative (-) battery cable to keep the engine from accidentally starting before removing the transmission belt.

Make sure that the engine and exhaust components have become cool before you work on the vehicle.

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

Do not allow the 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 CVT belt (1) (Figure 3). Remove the Starter/Generator belt (Refer to Starter/Generator Removal in ENGINE section).

Remove the bolt (2) from the center of the primary clutch (Figure 3).

Raise the vehicle frame with the floor jack and allow the power-train to drop so that the clutch puller bolt clears the spring hanger. Remove the front eye-bolt from the spring hanger. Install the clutch puller bolt using the impact tool and universal joint, remove the primary clutch from the shaft. Remove the clutch puller bolt.

NOTICE

In some case the clutch can 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.

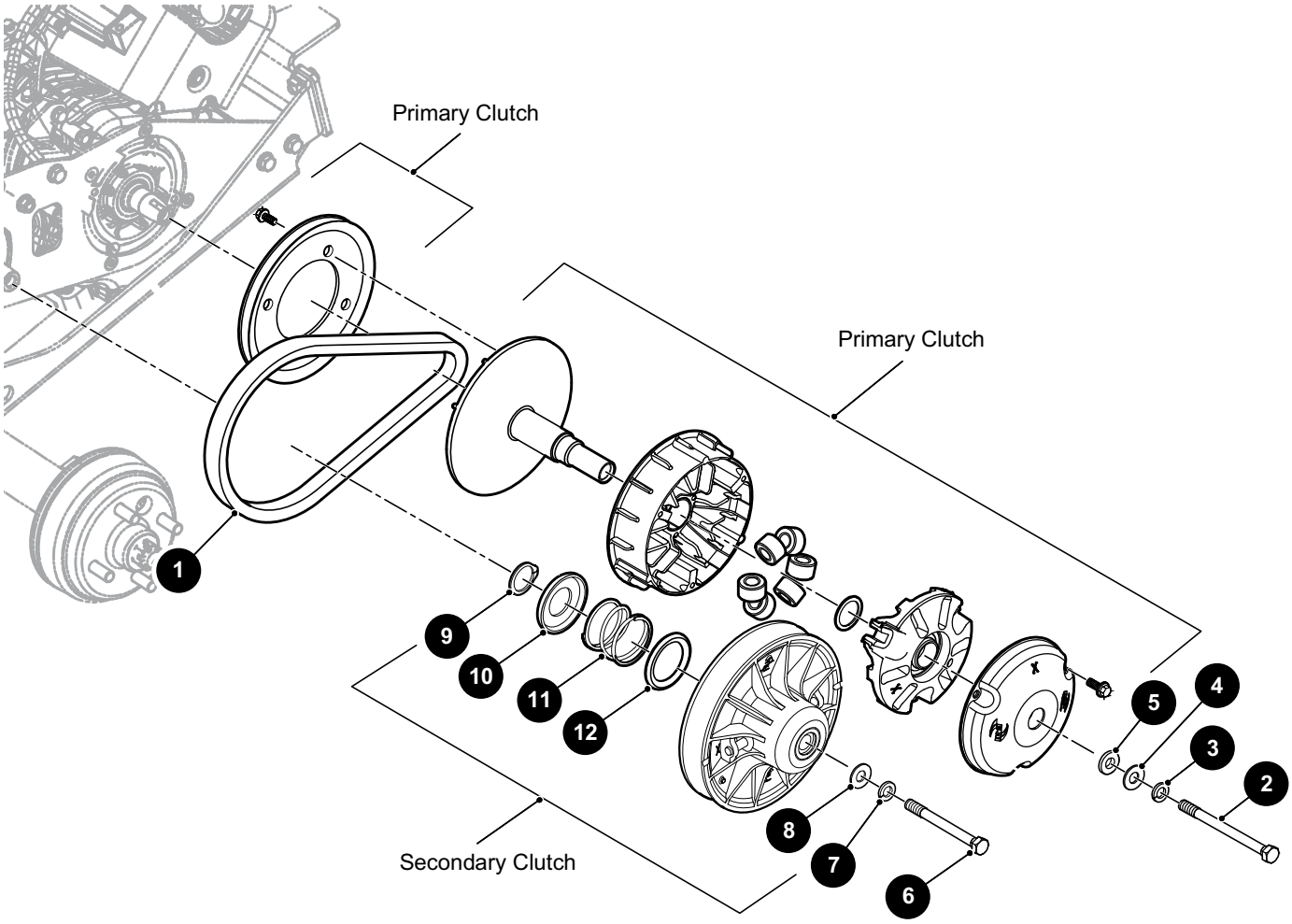


Figure 3 CVT Components

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

Primary Clutch Installation

CAUTION

To decrease the risk of damage to the clutch, be sure to remove all grease from the body of the clutch since grease penetrating the seal can cause premature clutch failure or belt slip.

Do not install the bolt (2) with an impact wrench.

To hold the clutch, do not use a pry bar inserted through the drive clutch as this may damage the components.

Clean both the engine crankshaft and the primary clutch bore. Slide the clutch onto the engine crankshaft and rotate the clutch while lightly pushing the movable sheave in and out several times to seat the clutch on the tapered crankshaft (Figure 3).

Install the lock washer (3), conical washer (4) and clutch washer (5) onto the clutch bolt (2).

Apply thread locking adhesive to the threads of the clutch bolt (2) and install. Tighten the bolt to the torque value specified below.

Item	Torque Specification
2	55 - 62 ft. lbs. (74 - 84 Nm)

Secondary Clutch Removal

Tool List	Qty.
Plastic Faced Hammer	1
Clutch Puller, (P/N 608429)	1
External Snap Ring Pliers	1
Wrench, 18mm	1
Socket, 18mm	1
Impact Socket, 19mm	1
Impact Wrench (Air or Electric)	1
Ratchet	1
Thread Locking Adhesive	AR
Phillips Screwdriver	1
Torque Wrench, ft. lbs.	1

Remove the transmission belt (1) See “Removing The Transmission Belt”.

Remove the passenger side hub cap if equipped and remove the wheel and tire assembly.

Set park brake and place direction selector in F to place tension on clutches.

Access the secondary clutch from the passenger side of the vehicle and remove the bolt (6), lock washer (7) and conical washer (8) from the secondary clutch.

Install the clutch puller bolt until it bottoms out.

Remove the clutch, then remove the clutch puller bolt and slide the clutch from the rear axle input shaft.

Secondary Clutch Repair

NOTICE

The parts must be assembled again in same position as their original position. Mark all components to facilitate accurate reassembly. Some small field repairs may be made to the secondary clutch.

Remove the retaining ring (9) and remove the outer spring retainer (10) (Figure 3). Remove the spring (11), inner retainer spring (12) and the movable sheave (13).

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

Secondary Clutch Assembly

Assemble the movable sheave (13) to the fixed sheave (14) and insert the spring (11) and inner retainer spring (12) in the pilot hole in the movable sheave (Figure 3).

Insert the other end of the spring in the outer retainer spring (10) and rotate counterclockwise 140° before engaging the splines and inserting the retaining ring (9).

Secondary Clutch Installation

Apply a layer of anti-seize compound on the rear axle input shaft and slide the clutch on to the shaft.

Install lock washer (7) and conical washer (8) to the clutch bolt (6) and apply thread locking adhesive to the threads of the clutch bolt.

Install the clutch bolt and tighten to the torque value specified below.

Item	Torque Specification
6	55 - 62 ft. lbs. (74 - 84 Nm)

STORAGE

If the vehicle is to be out of service for an extended period of time, the clutches must not be coated with a protecting spray. The primary clutch sheaves can develop some surface rust that is removed within a few minutes of running time. The secondary clutch is aluminum and does not need any maintenance.

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

Notes:

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

Notes:

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

DIRECTION SELECTOR

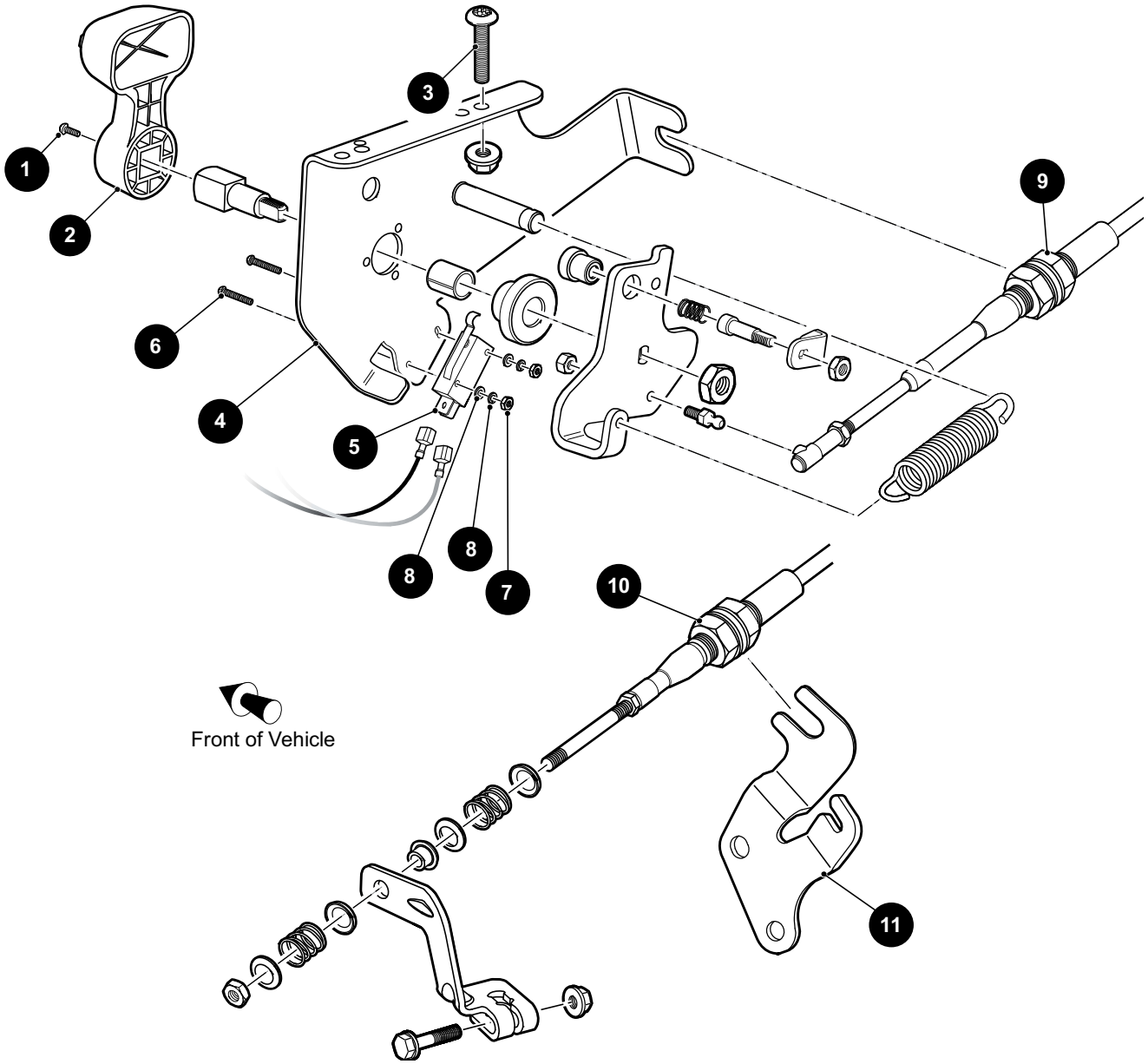


Figure. 1 Direction Selector

DIRECTION SELECTOR

Before you remove a suspected faulty micro switch, make sure the electrical wires are firmly attached and the wires are in good condition.

Removing Direction Selector

Tool List	Qty.
Torque Wrench, in. lbs	1
Ratchet	1
Socket, 7/16”	1
Socket, 5/16”	1
Wrench, 7/16”	1
Wrench, 5/16”	1
Phillips Screwdriver	1
Digital Volt Ohm Meter (DVOM)	1

NOTICE

Always observe the following warnings when working on or near a battery.

⚠ WARNING

To decrease the risk of an electrical arc that can cause an electrical explosion, make sure that the key switch is off and all electrical accessories are turned off before you start work on the vehicle.

Never disconnect an active circuit at a battery terminal.

The negative (-) battery cable must be removed before you start work on the vehicle.

Use insulated wrenches to decrease the possibility of a dropped wrench causing a short-circuit, which could result in an explosion and severe personal injury or death.

Before you remove the direction selector switch from the body, the negative (-) battery cable must be disconnected to decrease the risk of the possibility of electrical spark or shorting out the battery, either of which could result in an explosion and severe personal injury or death.

Remove screw (1) securing the handle (2) to the direction selector shaft, and remove handle (Figure. 1). Loosen the hardware (3) attaching the direction selector bracket (4) to the seat frame and remove direction selector from body.

Replacing a Micro Switch

To replace a micro switch (5), remove the attaching hardware (Figure. 1). Carefully remove the two electrical wires from the switch and attach to the new switch. Use a DVOM and test the switch to ensure it is operational before continuing. Once it is determined that the switch is functional, continue reassembly of micro switch to the direction selector bracket (4) with screws (6), nuts (7) and washers (8). Tighten nuts (7) to the torque value specified below.

Item	Torque Specification
7	8 - 11 ft. lbs. (.7 - .9 Nm)

Shift Cable Adjustment

The single cable direction selector is a mechanical device that operates a cable connected to the rear axle. The cable is sealed and does not require lubrication. Required adjustment should be minimal.

Set the direction selector to the reverse (R) position.

Adjust the cable (9) at the forward cable mount until the directions selector cam contacts the reverse stop and when moved to forward (F) contacts the forward stop. A small gap of less than 1/8 inch is permissible when the direction selector is set to forward.

If more adjustment is required, adjust the threaded fitting (10) at the axle mounting bracket (11).

Lubricate the direction selector and linkage moving parts periodically.

Neutral Lock Operation

The neutral lock is located on the direction selector.

To operate neutral lock:

Turn the key switch to OFF, place direction selector in R and remove seat. Pull out (1) and rotate (2) the neutral lock pin handle so that the pointed portion of the handle is over the side of the direction selector cam (Figure. 2). Move direction selector lever toward the area between F and R. During that motion, the pin will snap into the hole in the direction selector mounting bracket (12), preventing any movement of the lever.

When in this position, the direction selector remains locked in the neutral position.

⚠ WARNING

To decrease the risk of fingers becoming pinched in the direction selector mechanism, hold direction selector lever when releasing neutral lock pin handle.

To unlock the direction selector, pull the neutral lock pin handle out and rotate until the pointed portion of the handle fits into the hole (3) in the direction selector cam.

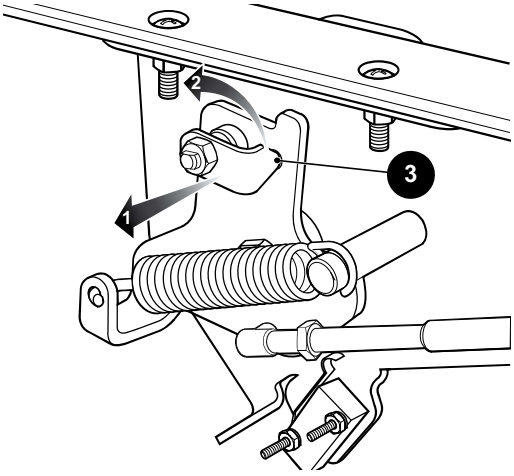


Figure. 2 Neutral Lock

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

Notes:

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

Notes:

ELECTRICAL

CIRCUITS AND CONTROLS

The electrical system is a 12 volt negative ground system consists of:

- Battery
- Starter/generator
- Voltage regulator
- Solenoid
- Magneto
- Fuse
- Key switch

⚠ WARNING

To decrease the risk of injury or death from accidental movement of vehicle, all tests performed requiring starter/generator or engine to rotate must be performed with the vehicle lifted (see SAFETY section) or the neutral lock engaged (see GENERAL INFORMATION AND ROUTINE MAINTENANCE section).

Follow the lifting procedure in SAFETY section. Place wheel chocks in front and behind the front wheels. Check the stability of the vehicle on the jack stands before starting any repair procedure. Never work on a vehicle that is supported by a jack alone.

STARTER

When starting the engine, the field coils are in series with the armature and the starter/generator operates as a motor (Figure 2). This circuit is controlled by a key switch, fuse, accelerator limit switch and a solenoid. With the key in the ON position, battery current is available to the accelerator limit switch which remains open until the accelerator pedal is pressed. When the pedal is pressed, the plunger on the switch is released, the contacts close and the ignition circuit is energized. Battery current then energizes the solenoid which closes the contacts and energizes the starter circuit. The starter/generator now functions as a starter to start the engine.

GENERATOR

When the engine is running, the starter/generator functions as a generator. This is used for charging the battery and for the ignition system. Generated output is controlled by the voltage regulator at 14.25 - 14.75 V, without regard to engine speed. However, the charging current will vary depending on the condition of the battery. If it is fully charged, current is controlled at 3 to 5 amps.

WIRING

⚠ WARNING

Before performing any test of wiring components, disconnect the battery cables from the battery to decrease the risk of electrical shock or explosion (see procedure in SAFETY section).

Electrical tests of the wiring for continuity may be made with a DVOM (Digital Volt Ohm Meter) available through the Service Parts Department (P/N 27481G01). Any DVOM may be used, however the controls, displays and features may vary depending on the make and model. Set the meter selector to the ohms scale and check continuity between each circuit component as indicated. Example: If a switch is open or if there is a break in the wiring, the meter will display a visual signal. If an analog meter is used it will read infinity (∞).

TESTING THE IGNITION CIRCUIT

NOTICE

This section assumes the fuel system is functioning and the engine is receiving fuel.

Tool List	Qty.
DVOM	1
Spark Plug (NGK BPR2ES)	1
Spark Plug Tester	1

⚠ WARNING

To decrease the risk of personal injury, never operate the starter unless both spark plugs are installed or the ignition system is disabled. Fuel drawn into the cylinders will be expelled through the spark plug opening and could be ignited by the ignition system or another source, resulting in a fire.

The engine incorporates a magneto type ignition system. There is no distributor.

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

The engine can be stopped by turning the key switch to the **OFF** position. When the accelerator pedal is released, the limit switch contacts open and the ignition circuit is de-energized.

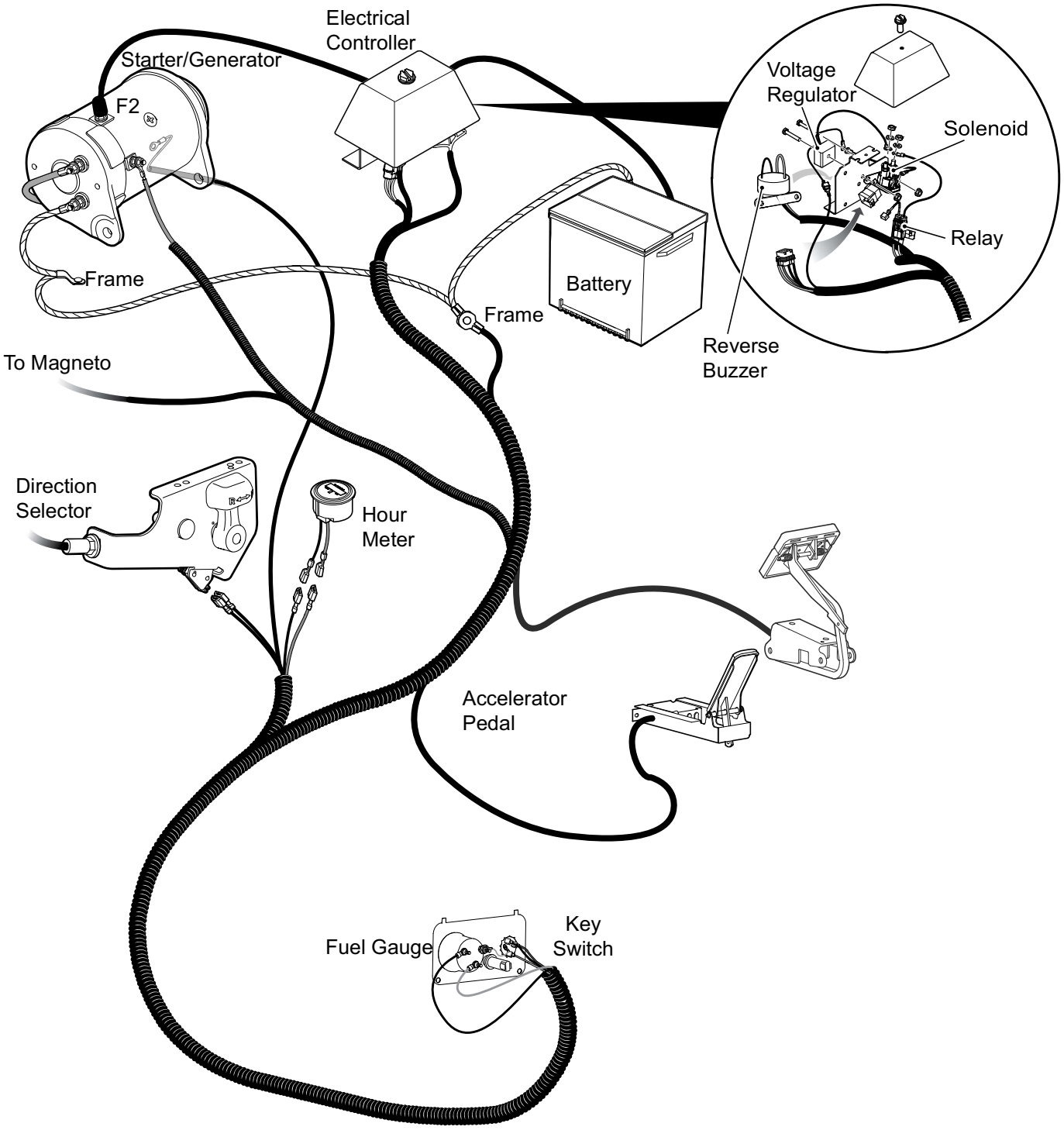


Figure 1 Electrical System (Physical Location)

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

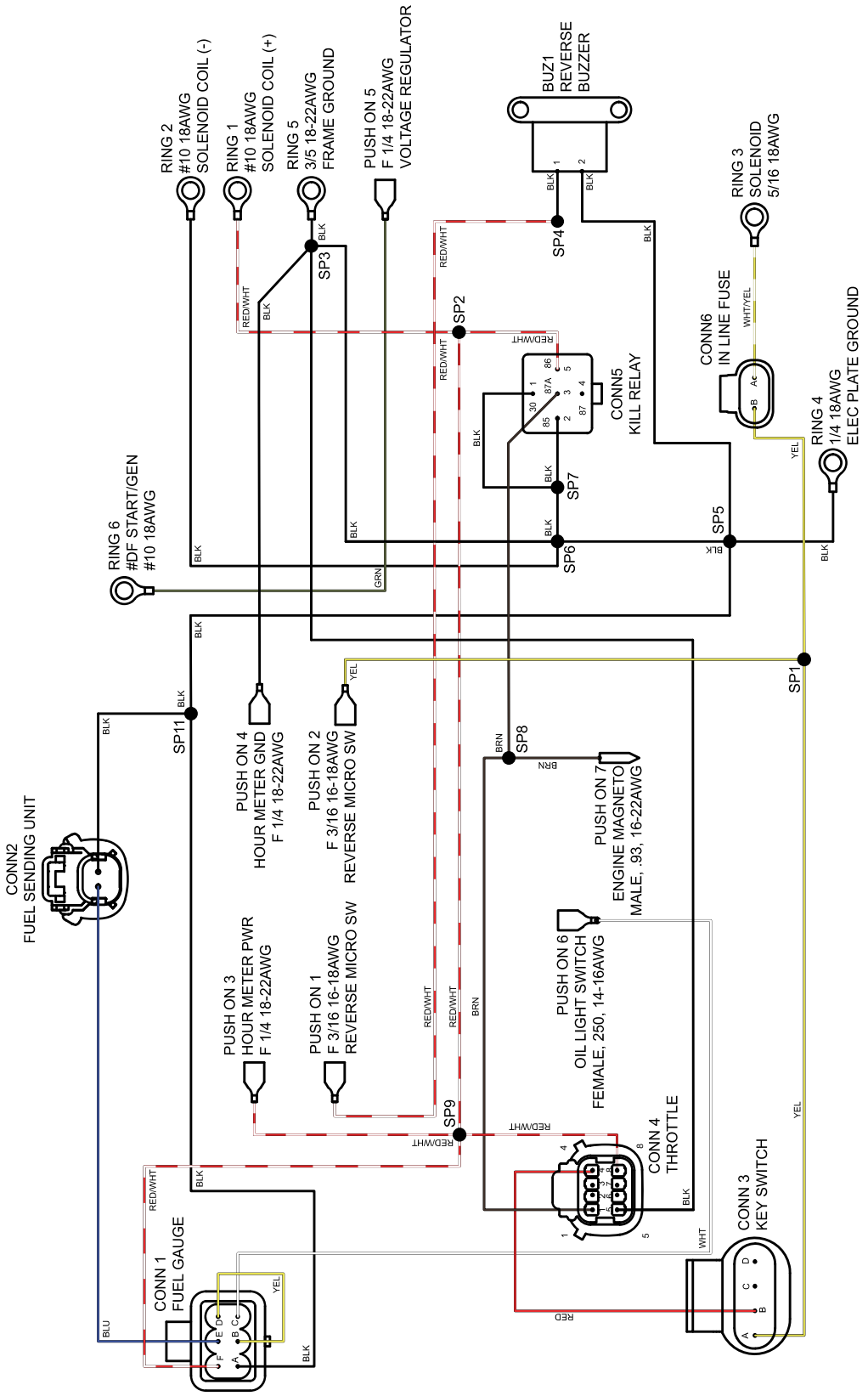


Figure 2 Main Harness Wiring Diagram

⚠ 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 igniter 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:
   a. Use a spark plug that is known good, and with a spark plug installed in the cylinder, place the spark plug on a clean grounded engine surface, (muffler, cylinder, etc.).
   b. Turn the engine over with the starter.
   c. Look for a blue electrical arc at the spark plug electrode.
3. If there is either a weak arc or no arc, try a new spark plug, then check the condition and the tightness of the spark plug wire. Check plug wires by substituting them with good ones.
4. Replace the plug if necessary. Gap the spark plug .028" - .030" (.71 - .76 mm) using a wire type spark plug gauge.

Testing the Magneto

Set the meter to the ohms scale and measure the resistance as shown in the following illustrations:

- A normal reading with the negative lead on A and the positive lead on B would be 2 - 18 KΩ.
- A normal reading with the negative lead on A and the positive lead on C would be 2 - 18 KΩ.
- A normal reading with the negative lead on B and the positive lead on A would be ∞.
- A normal reading with the negative lead on B and the positive lead on A would be ∞.
- A normal reading with the negative lead on C and the positive lead on A would be 2 - 18 KΩ.
- A normal reading with the negative lead on C and the positive lead on B would be 10 - 30 KΩ.

If readings obtained are out of the above ranges, replace the magneto.

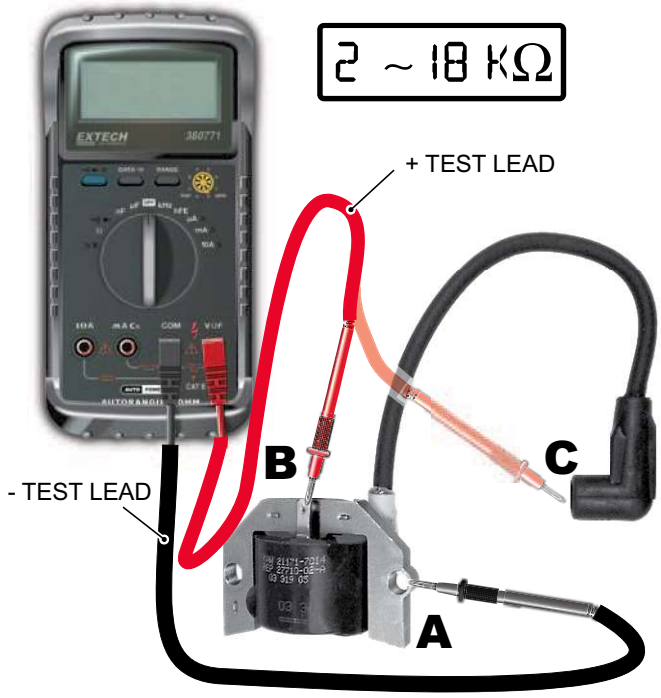


Figure 3 Resistance Between A - B and A - C

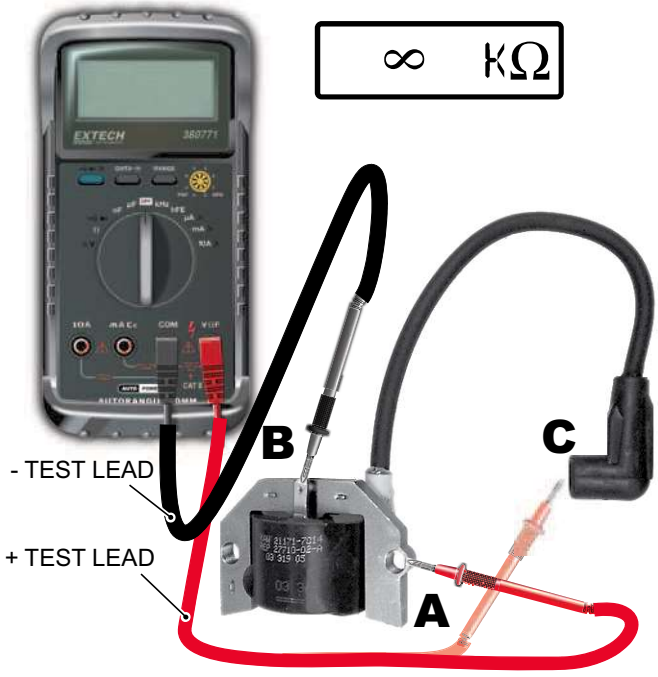


Figure 4 Resistance Between B - A and B - C

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

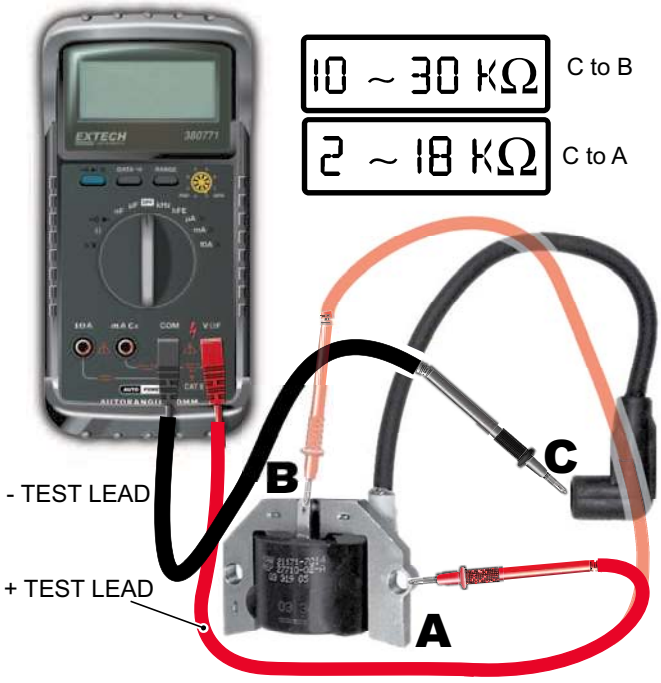


Figure 5 Resistance Between C- B and C - A

TESTING THE STARTING CIRCUIT

⚠ WARNING

To decrease the risk of injury resulting from vehicle inadvertently starting, disconnect battery for steps 1 through 8 (see SAFETY section).

Tool List **Qty.**

DVOM..... 1

If the engine does **not** start, proceed as follows:

1. Check the battery for a voltage reading which should be between 12.2 and 12.5 volts. Inspect for loose or dirty battery post connections.
2. Check for a blown in line fuse and replace if necessary.
3. Check for loose wires at all terminal connections.
4. Check the complete electrical system for correct circuitry (Figure 2).
5. Inspect for worn insulation or bare wires touching the frame. Bare wires will cause a short circuit.
6. Check for continuity through the key switch. Set the DVOM to the ohms (Ω) scale. Detach wires. Place positive (+) probe on one terminal and negative (-) probe on the other terminal. The reading on the meter should be “0” Ω with the switch key in the **ON** position and a visual signal (∞) with the switch in the **OFF** position. If the meter does not register, replace the switch. Reconnect the wires.
7. Turn the key switch to **OFF.**
   a. Place one probe of the DVOM (set to ohms scale) on the red wire at the solenoid. Place the other probe on the key switch terminal with the blue wire.
   b. Press the accelerator and observe the DVOM. A reading of less than 2 Ω indicates a good limit switch. A reading of greater than 2 Ω indicates that the switch terminals should be checked. A reading of infinity a visual signal (•) indicates that the switch must be replaced. Connect the battery.
8. Check the starting solenoid operation. Turn the key switch to the **ON** position.
   a. Place the DVOM (set to the appropriate DC volts scale) negative (-) probe on terminal A of the solenoid. Place the positive (+) probe on terminal B. The DVOM should indicate approximately 12 V.
   b. Press the accelerator pedal. The DVOM will indicate “0” voltage if the solenoid contacts are closed.
   c. If “0” voltage is not indicated while the accelerator pedal is pressed, replace the solenoid.

TESTING THE CHARGING CIRCUIT

Tool List **Qty.**

DVOM.....1

⚠ WARNING

To decrease the risk of injury resulting from vehicle inadvertently starting, the drive belt must be removed or entire vehicle must be lifted (see procedure in SAFETY section).

The charging circuit consists of a starter/generator, voltage regulator and battery . The solenoid must be functional in order to start the vehicle, but is not considered part of the charging circuit.

If the battery charge is inadequate (less than 11 VDC), proceed as follows:

1. Check the battery voltage and inspect for loose or corroded terminal posts and connections. Check electrolyte level.
2. Check charging circuit component terminals for proper, clean, tight connections.
3. Check for charging voltage as follows:

a. Raise the vehicle (see procedure in SAFETY section) so that both rear wheels are free to rotate.

b. With the engine off, measure the voltage at the battery's terminals by placing the negative (-) probe on the negative (-) post and the positive (+) probe on the positive (+) post of the battery. Note the reading.

c. Attach the DC voltmeter across the regulator's red and black leads.

d. Start the engine and accelerate to governed speed.

e. The meter should read higher than before starting the engine. In a reasonable amount of time, the reading should settle between 14 and 15 volts, indicating the regulator is functioning properly.

f. If no increase over battery voltage is observed, there is a malfunction in the charging circuit.

g. If the reading is **above** 15 volts, check to assure the wiring harness and generator field winding (green lead) is not grounded. If it is not, replace the regulator.

h. If the reading is **below** 14 volts, disconnect the regulator's green field wire from the system harness. Temporarily connect the green field wire to ground. If the voltage rises above its prior reading, replace the regulator.

i. If the above procedures do not correct the problem, check for faults in the vehicles wiring harness and/or generator.

INSPECTION

1. Inspect the commutator for wear or damage.
2. Inspect the brush assembly for wear and damage to the brush holder insulators. Check the brushes for length, approximately 11/16" (17 mm) or to the line marked on the brush and signs of carbonization.
3. Inspect the armature for distortion or broken wires.
4. Inspect the field coil insulators and lead wire.
5. Check the bearings for free rotation and lack of end play on shaft. Replace if necessary.

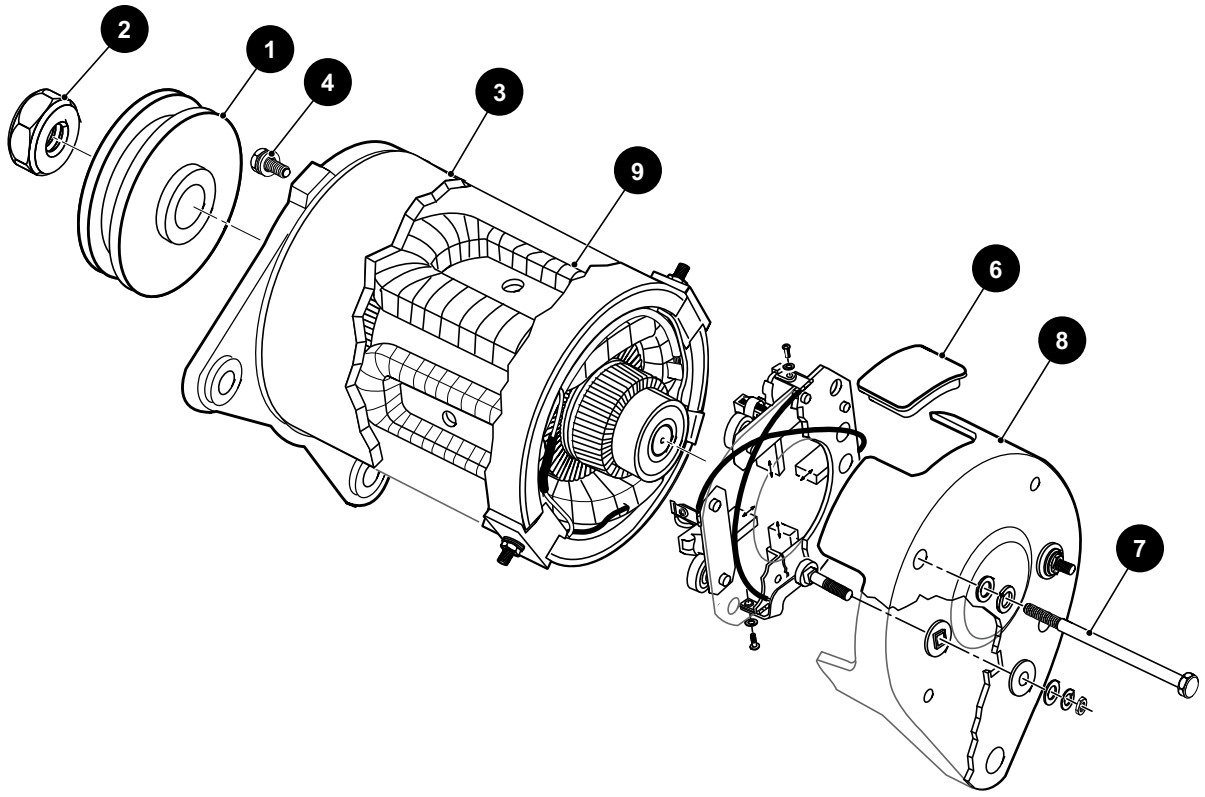


Figure 6 Starter/Generator

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

STARTER/GENERATOR

Starter/Generator Removal

See ENGINE section.

Disassembly

Tool List	Qty.
DVOM	1
Wrench, 24mm	1
Wrench, 10mm	1
Wrench, 6mm	1
Wrench, 5mm	1
Socket, 10mm	1
Phillips Screwdriver	1
Two Jaw Puller	1
Straight Blade Screwdriver	1
Ratchet	1
Torque Wrench, ft. lbs.	1
Torque Wrench, in. lbs	1
Clean Cloth	1

NOTICE

In general, starter/generator service is best performed by trained motor technicians who have the knowledge and equipment to overhaul the unit. Some checks and repairs however, can be accomplished by a skilled mechanic. Make your own evaluation of the equipment and skills available before starting disassembly.

Hold the pulley (1) and remove the pulley nut (2). Remove the pulley, screws (4) and front cover (3) (Figure 6).

Remove the brush covers (6) by prying out with a screwdriver. Pull up on the brush springs and move to the side of brushes, slide the brushes out approximately 1/4" (6 mm) (Figure 7). Remove the through bolts (7) and the rear cover (8). Remove the frame and field coils (9). Remove the 5mm screws from the brush holder and 6 mm nuts from A1 and A2 terminals. Remove the brush holder. If the bearing needs to be replaced, use an automotive style two jaw puller to remove the bearing from armature (Figure 8)

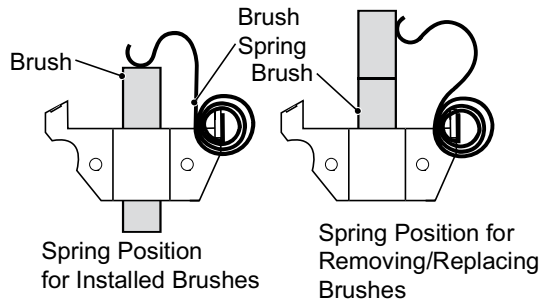


Figure 7 Starter/Generator Brush Removal

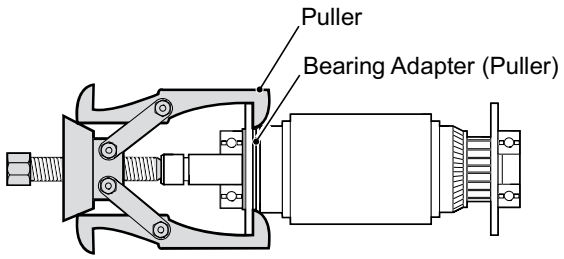


Figure 8 Bearing Removal

Repair and Replacement

1. Clean commutator with a soft, clean cloth.
2. Replace any damaged or cracked brush holders or brushes worn to less than 11/16" (17mm) in length or to the line marked on the brush.
3. Test the insulation between the core and the commutator segments and shaft with a circuit tester. If continuity is indicated, the insulation is defective and the armature must be replaced.
4. With the brushes removed, using a DVOM, check the field coils for continuity between F1 and F2 and DF and F1. If an open circuit exists, replace the field coils. Check for continuity between all four terminals and the frame (outer shell). If continuity is indicated, the field coils are grounded against the frame and the field coils must be replaced.
5. Clean all parts to be reinstalled. Installation is reverse order of removal. Tighten bolts and nuts to the following values:
   - 4 mm - torque to 15 - 21 in. lbs. (1.6 - 2.3 Nm)
   - 5 mm - torque to 30 - 43 in. lbs. (3.3 - 4.8 Nm)
   - 6 mm - torque to 52 - 74 in. lbs. (6.7 - 8.3 Nm)
   - 14 mm - torque to 33 - 40 in. lbs. (3.7 - 4.5 Nm)

Tighten **terminal nuts** to the following torques:

- F1 - F2 - torque to 43 - 52 in. lbs. (4.8 - 6.7 Nm)
- DF - torque to 26 - 35 in. lbs. (2.9 - 3.9 Nm)

VOLTAGE TEST FOR BATTERY

Battery voltage can be checked using a voltmeter. Attach the negative (-) lead of the DVOM to the ground terminal of the battery. The positive (+) lead is then attached to the positive battery terminal. The voltage reading obtained should be 12 volts or above. If the reading is below 12 volts, the battery requires either charging or replacement.

⚠ WARNING

Hydrogen gas formed during battery charging is explosive.

Avoid any electrical spark or open flame near battery.

NOTICE

If the temperature of the battery or the ambient temperature is below 60° F (15.55° C), the capacity of the battery will be less. It will require more time to charge.

Voltage on a cold battery increases faster, therefore decreases the charging rate.

Fully charge new battery or battery that have been in storage before testing or installing in vehicle.

⚠ CAUTION

Do not overcharge battery.

STORAGE OF BATTERY

A battery that is removed from service for storage must be cared for as follows:

For battery removal, see Battery Removal in SAFETY section. Charge fully. Cover terminals with petroleum jelly to decrease the risk of oxidation (use commercially available battery protector when installed in vehicle). Store in a cool place not below 32° F (0° C) or above 80° F (27° C) battery should be charged every 30 days using a 2 amp trickle charger.

DVOM (DIGITAL VOLT OHM METER)

The DVOM shown (Figure 9) is representative only. The actual model may vary depending on availability, and is available through the Service Parts Department as P/N 27481-G01. For the purpose of this section, the red probe (+) and black probe (-) are used. Any DVOM may be used, however the controls, displays, accuracy and features may vary depending on the make and model. Always follow the meter manufacturer's recommendations and instructions for the use and care of the meter.

Figure 9 DVOM

FAULT TESTING

Knowledge of use of wiring diagrams and a Digital Volt Ohm Meter (DVOM) is necessary to effectively determine fault within the circuits that include the horn, lighting, brake/turn signals and gauges.

The wiring diagram shows the path followed by a voltage or signal from its origination point to its destination. Each wire is indicated by color and is divided into the main harness and the dash harness.

Knowledge of simple logic fault testing will decrease the number of steps required to isolate the problem.

Example 1: If the vehicle does not start and none of the lights function (or burn dimly), test the battery before trying to determine fault within the lighting circuit.

Example 2: If a problem occurs in the lighting circuit that causes only one of the headlights to fail, it is not necessary to check the battery wiring or the fuse since voltage is present. Check the headlight that is not operating. If power is found at the connector and the ground wiring is satisfactory, it is a burned out bulb or a poor contact between the connectors and the headlight.

If power is not present but the other headlight functions, a wiring problem is indicated between the two headlights.

In some cases where battery voltage is expected, the easiest way to test the circuit is to set the DVOM to DC volts and put the negative (-) probe on the negative battery terminal. Move the positive (+) probe to each wire terminal starting at the battery and moving out to the device that is not working. Check both sides of all switches and fuses.

When no battery voltage is found, the problem is between the point where no voltage is detected, and the last place that voltage was detected. In circuits where no voltage is expected, the same procedure can be used except that the DVOM is set to continuity. Place the negative (-) probe on a wire terminal at the beginning of the circuit and move toward the device that is not working with the positive (+) probe. When continuity is no longer indicated, a failed conductor or device is indicated.

POWER SUPPLY

Tool List **Qty.**

DVOM..... 1

1. Check for loose or bare wires:

   Check for loose wires at each terminal connection and for worn insulation or bare wires touching the frame. **Bare wires may cause a short circuit**.

NOTICE

If any DVOM readings indicate a faulty wire, it is recommended that the condition of the terminals and wire junction be examined. A faulty wire must be replaced with one of the same gauge and color, wired between the correct components, and wire tied to the harness bundle. The faulty wire should be cut back close to the harness and the ends protected with vinyl electrical tape.

2. Check battery condition:

   Check for adequate battery volts (nominal 12 VDC) by setting DVOM to 30 VDC range and place the red probe (+) on the battery post with the green wire attached. Place the black probe (-) on the battery post with the black wire attached. A reading of 11 VDC or greater indicates adequate battery condition. No reading indicates (a) a poor connection between the probes and the battery terminals; (b) a faulty DVOM. A voltage reading below 11 volts indicates poor battery condition and the vehicle should be recharged before proceeding with the test.

NOTICE

Due to the resistance of the wires involved within the harness, voltage readings may be somewhat lower than battery voltage. A reading of 1 volt below battery voltage is acceptable.

3. Check power wire:

   Firmly attach the black probe (-) to the battery post with the black wire attached and the red probe (+) to the green wire terminal at the fuse block. A reading of battery voltage indicates that the power wire is in good condition.

NOTICE

The power wire supplies power to the entire fuse block.

4. Check fuse:

   Place the red probe (+) to each wire terminal on the fuse block. A reading of battery voltage indicates that the fuse is in good condition. No reading indicates a faulty fuse; replace with a good 15 amp fuse.

ACCESSORY WIRING

After determining that there is power to the fuse panel, and the fuse is good, continue checking the circuit using the procedures previously used to check the power supply, i.e. loose or rusted connections, bare wires, continuity of the wiring from terminal to terminal, operating condition of switch, etc.

Use the wiring diagram (Figure 12) to check correct wiring and wire routing. If there is power at the fuse end of the wire, there must also be power at the other end of the wire at the switch or electrical accessory, and eventually at the ground connection. Electricity must flow from the fuse panel through the full length of the circuit to the ground connection. Any interruption of electrical flow must be corrected, whether by repairing or replacing the wire, the switch or accessory.

LIGHT BULB REPLACEMENT

⚠ CAUTION

To decrease the risk of premature bulb failure, do not allow your fingers to contact new bulbs. Use clean, dry paper or paper towels to touch the glass part of the bulb.

Headlight (if equipped)

Make sure that the vehicle key switch is in the OFF position and the key has been removed.

- Disconnect the accessory harness (5) from the light bulb.
- Turn the headlight bulb (3) clockwise and pull to remove.
- Align the new bulb with the opening in the back of the headlight assembly.
- Turn the bulb (3) counter clockwise until it stops.
- Connect the accessory harness (5) to the light bulb (3).

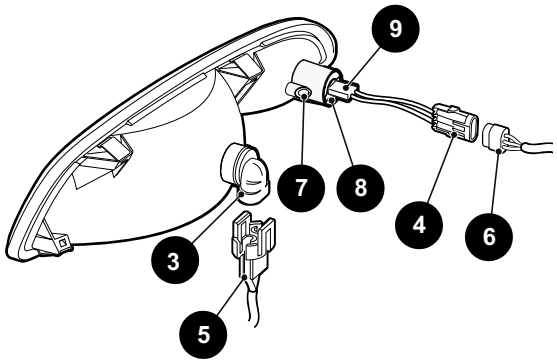


Figure 10 Headlight replacement

Turn Signal (if equipped)

Make sure that the vehicle key switch is in the OFF position and the key has been removed.

- Remove the phillips head screw (7) and turn the retaining collar (8) to align with the turn signal bulb housing (9).
- Grip the turn signal bulb housing (9) and pull backward to remove housing from the headlight assembly.
- Remove the bulb from the housing and replace with a new one.
- Push turn signal housing (9) into headlight assembly firmly, making sure that it is seated completely.
- Turn the retaining collar (8) to secure the bulb housing and install the phillips head screw (7) to secure in place.

Taillight (if equipped)

Make sure that the vehicle key switch is in the OFF position and the key has been removed.

- Remove the two phillips head screws (10) that secure the lens (11) to the taillight assembly.
- Remove the light bulb.
- Install the new light bulb.
- Install the lens (11) and secure in place with the two phillips head screws (10).

Replacement bulbs are available from a local Distributor, an authorized Branch or the Service Parts Department.

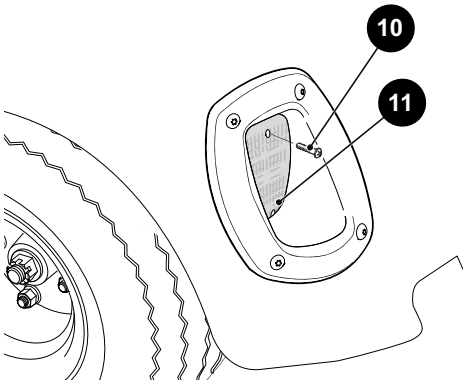


Figure 11 Taillight replacement

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

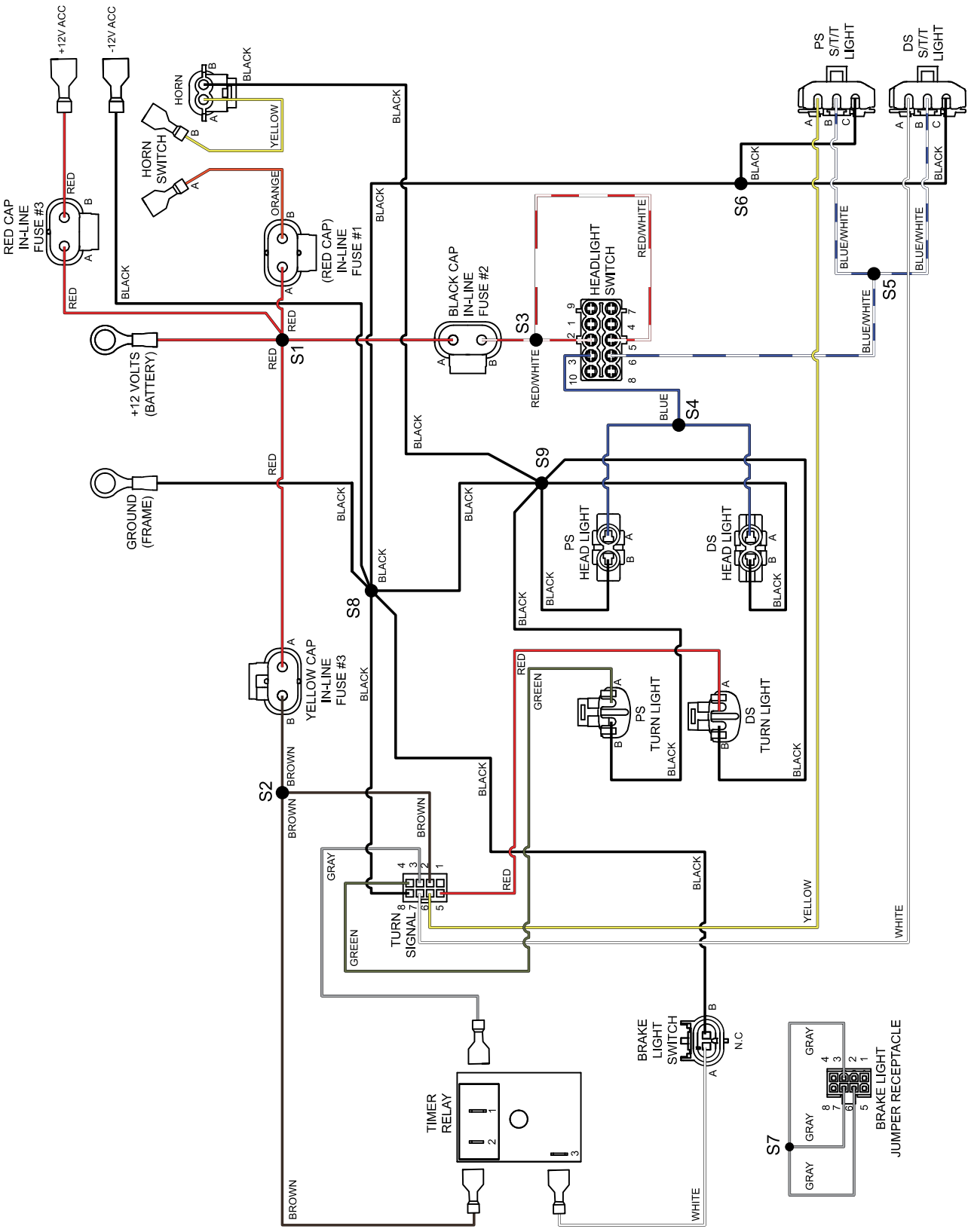


Figure 12 Accessory Wiring Diagram

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

Notes:

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

BRAKES

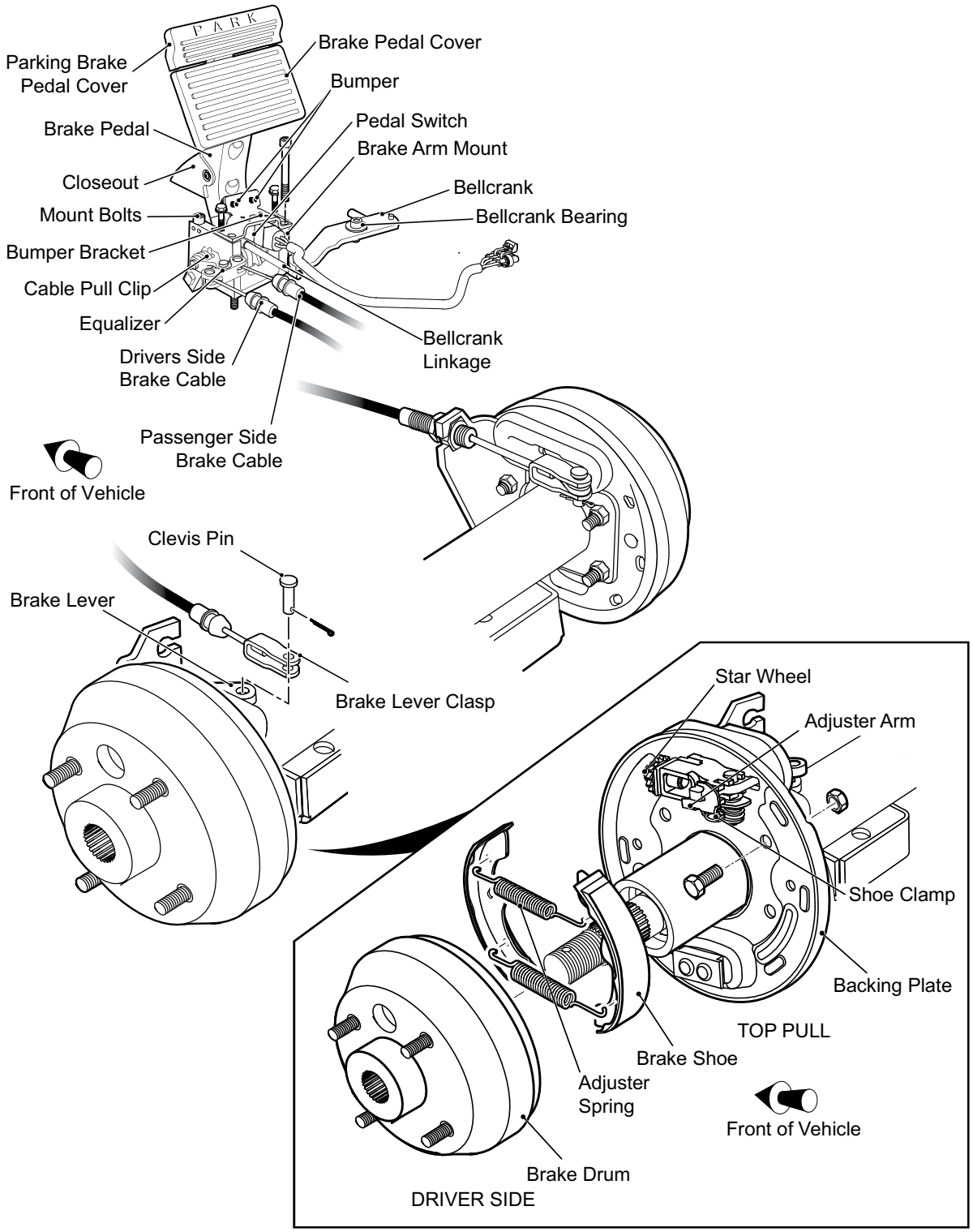


Figure 1 Mechanical Brake System

BRAKE SYSTEM OVERVIEW

General Description

This vehicle has a mechanically activated rear drum brake system. The brake system has a service brake and parking brake pedal, parking brake release linkage, equalizer link, brake cables and wheel brake assemblies which adjusts automatically (Figure 1).

Although the brake system is same as an automobile, it is **different in important ways**. The system operates in a very severe environment. The Fertilizer, dust, grass clippings, tree roots and other objects can cause corrosion and damage to the brake components. Different from automotive hydraulic brakes, mechanical brakes depend on the travel of the brake cables to move the brake shoes against the brake drums. The travel of the brake cables is governed by the brake pedal. If the cables can not travel far enough to absorb the tension (free travel) in the system and still apply the shoes to the drums, the braking effort at the wheel brake will not be enough. The self adjusting mechanism in the wheel brakes needs enough cable travel at the wheel brake to work reliably. When the brake is released, there must be slack in the system so the brakes will release completely and the adjusters will function. Free pedal travel, pedal force, shoe to drum clearance and sudden stop ability are closely related. It is very important to keep the correct connections to make sure braking performance and the best wheel brake adjustment.

How the Service Brake Works

When you release the service brake pedal, the equalizer link is pulled, which is connected to the brake cables (Figure 1). The first part of the pedal travel removes tension from the system. Continued motion of the brake pedal pulls both the left and right brake cables. Each brake cable pulls a brake lever which pushes the rear brake shoe against the brake drum. When the rear shoe contacts the brake drum, it can no longer move rearward. Additional pedal (and cable) travel causes the actuator bracket (moving anchor) to move and applies force to the front shoe, pushing it against the brake drum. The force applied to the front and rear shoes is approximately equal. When the shoes contact the brake drum, the shoes try to move in the direction of drum rotation. This movement cause in the normal brake shoe wear patterns.

Equalizer Link

The equalizer link balances braking between the driver and passenger sides of the vehicle. Variations in wheel brake adjustment, cable friction and manufacturing tolerances may cause the equalizer to be slightly misaligned. This misalignment is normal.

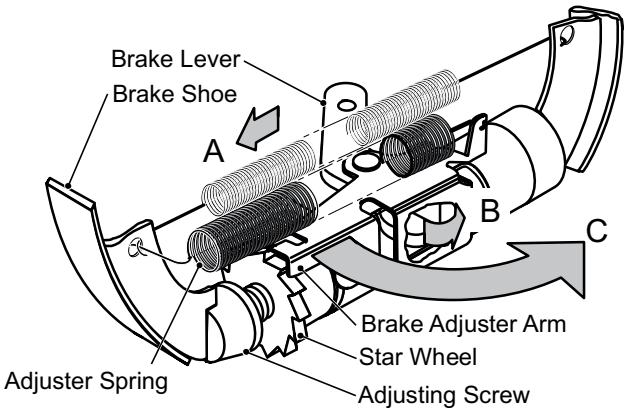


Figure 2 Wheel Brake Adjustment

Brakes adjust only while the vehicle is moving.

When you press the brake pedal, the brake lever moves toward the front of the vehicle (A).

The other end of the brake lever moves to the rear of the vehicle (B) where it contacts the brake adjuster arm, causing it to move.

The brake adjuster arm moves away from the star wheel (C). The amount of adjuster travel is limited by the amount of brake shoe travel required to contact the brake drum. The amount of travel increases as the brake shoe lining wears.

When the brake pedal is released, the adjuster spring retracts the brake adjuster arm which contacts the star wheel. Note that adjustment only takes place when the brake pedal is released while the vehicle is in motion.

If the brake shoes have worn far enough to permit the brake adjuster arm to contact the next tooth of the star wheel, the star wheel will be advanced by the tension applied to the adjuster arm by the adjuster spring.

If the brake shoes have not worn enough to permit the brake adjuster arm to contact the next tooth of the star wheel, the brake adjuster arm will move on the flat of the star wheel. The star wheel does not rotate and no adjustment occurs.

Automatic Adjuster Mechanism

⚠ CAUTION

Never manually adjust the brakes at the star wheel. Doing so will cause permanent damage to the adjuster assembly and result in a gradual loss of brakes.

The wheel brakes are equipped with an automatic adjuster mechanism that is designed to compensate for brake shoe wear and eliminate the need for manual brake shoe adjustment. Do not manually adjust the brakes by

prying back the adjuster arm and turning the star wheel. Permanent damage to adjuster will result.

Adjustment takes place only when the brake is fully applied and released **while the vehicle is moving** (Figure 2). It is very important that the brake cables permit the brake levers to release fully when the brake pedal is in the released position.

How the Parking Brake Works

The parking brake is operated by a smaller pedal which extends across the top of the service brake pedal. It is attached to the service brake pedal with a hinge pin and is spring loaded.

Pressing the parking brake pedal moves the latch arm against the catch bracket. As the parking brake is pressed, the service brake is applied until the notch in the latch arm engages with the catch bracket. The service brake pedal is held in the applied (down) position by the catch bracket. The latch arm is held in position by the tension in the brake linkage. The parking brake can be released by two methods:

1. Pressing the service brake, which permits the spring loaded parking brake pedal to return to its original position, disengaging the latch arm from the catch bracket. This is the preferred method which minimizes wear on components.
2. Pressing the accelerator pedal rotates the kick-off cam which forces the pedal latch arm to move away from the catch bracket. The spring loaded parking brake pedal returns to its original position, releasing the brake.

Kick-Off Actuating Linkage

The kick-off actuating linkage may require periodic adjustment to compensate for the normal wear. Replacement of any linkage components will also require an adjustment.

FAULT TESTING AND INSPECTION

New Vehicles

A new vehicle will experience an initial break-in of components which includes the brake cables and brake shoes. In this break-in period, it is common for the brake pedal free travel to change (and the force needed to engage the parking brake). This timing changes with terrain and the drive habits of the operators. When this occurs, the brake linkage must be adjusted. See Adjusting Brake Pedal Free Travel. After the initial break-in period, no further adjustments should be necessary until routine maintenance is scheduled.

Fault Testing and Inspection Procedures

To find the problem in the mechanical brake system, inspect the brake pedal and linkage to find worn or damaged parts per the Fault Diagnosis Table. Then, do the Periodic Brake Performance Test to evaluate the brake system performance. Based on the results of the inspection and tests, refer to the Fault Diagnosis section to evaluate symptoms and repairs. If necessary, disassemble the wheel brake to find and correct internal faults.

For removal or replacement of parts and adjustments referred to in this section of the manual are described in detail under MAINTENANCE AND REPAIRS.

⚠ CAUTION

Satisfactory brake performance does not decrease the need for routine brake tests and inspection as shown on the Periodic Service Schedule. Correct brake operation depends on periodic maintenance.

Brake Pedal and Linkage Inspection

1. **Inspect brake pedal return bumper.**
   Be sure that the brake pedal is contacting the pedal return bumper when released, that the bumper is in good condition (Figure 3).

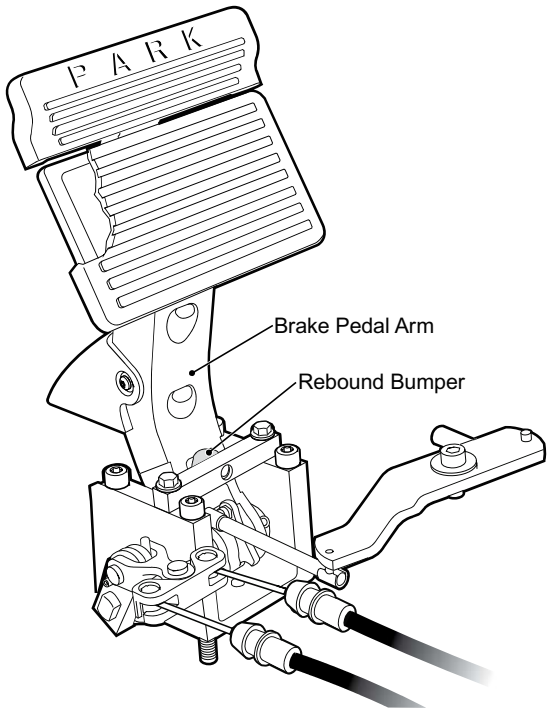
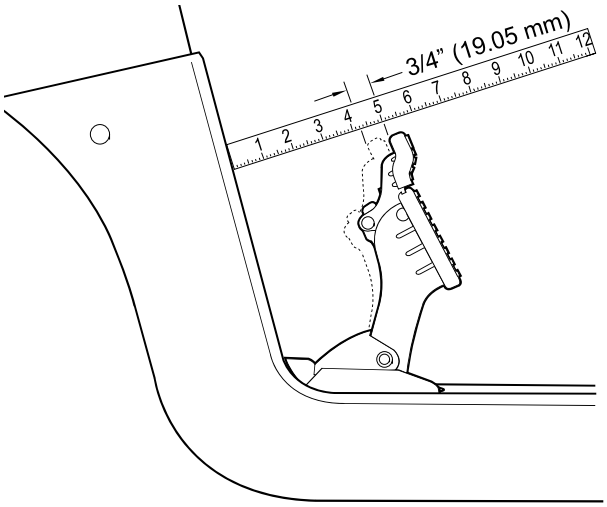


Figure 3 Brake Pedal Inspection

2. **Check brake pedal return.**
   Apply the brake pedal and release. Check that the brake pedal arm rests against the pedal bumper

when released. If the pedal does not return fully or is sluggish, the brake pedal bushings and pivot bolt should be inspected (Figure 3).

3. **Check the brake pedal free travel.**
Brake pedal free travel is the distance the pedal moves from rest to the point at which the brake shoes first contact the brake drums. This should not be confused with the light resistance that is felt as the brake pedal is depressed enough to remove slack from the compensator and cables. Too much pedal free travel 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 decrease the risk of the brakes from adjusting properly.



To Measure and Correct Brake Pedal Free Travel:
1. Release Parking Brake
2. Hold a 12" ruler perpendicular with the floor mat and close enough to the pedal to take a reading.
3. Free travel distance should be around 3/4 inch.
4. Adjust Brake Cable Bracket hardware to allow for correct Free Travel Distance.

Figure 4 Checking for Excessive Free Travel

The correct brake pedal free travel setting should be set to 3/4" (1.9 cm) (Figure 4).

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 pin and snap ring attaching the brake cables to the brake levers. They must be loose when the brake pedal has been released . 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. Replace if corrosion, damage, or wear is found.

7. **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.

8. **Check the condition and operation of the parking brake latching mechanism.**
The parking brake should latch firmly and release as soon as the accelerator pedal is depressed.

9. **Inspect the parking brake kick-off cam.**
Look for wear and for correct adjustment. With the parking brake engaged and fully latched.

10. **Inspect kick-off cam linkage and bushings.**
Check for wear and damage. The kick-off cam pivot and bushings should move freely and be free of corrosion. The kick-off cam should rotate when the accelerator pedal is depressed.

Periodic Brake Performance Test (PBPT)

⚠ WARNING

To decrease the risk of severe injury or death caused from driving a vehicle with poorly operating brake system, the braking system must be correctly maintained. All driving brake tests must be done in a safe location for the safety of all personnel.

The Periodic Brake Performance Test (PBPT) must be done according to specifications (see Periodic Service Schedule in the GENERAL INFORMATION AND ROUTINE MAINTENANCE section) for inspection of braking system performance. The PBPT is a good method for identifying subtle loss of brake performance over time. It is also useful as part of the fault diagnosis.

Before you do this test, inspect the brake pedal and linkage. Correct any problems found including adjusting the brake pedal free travel if needed.

The purpose of this test is to compare the braking performance of the vehicle to the braking performance of new or "known to be good" vehicles or verify acceptable stopping distance (see below). Actual stop distances will be

influenced by weather conditions, terrain, road surface condition, accurate vehicle weight (accessories installed) and vehicle speed. No specific braking distance can be reliably specified. The test is completed by locking the parking brake to remove different pedal pressures and to include the effects of linkage mis-adjustment. Significant changes or differences in braking performance will be seen because of mis-adjustment.

Establish the acceptable stopping distance by testing a new or “known to be good” vehicle and recording the stopping location or stopping distance. For fleets of vehicles, several vehicles should be tested when new and the range of stopping locations or distances recorded.

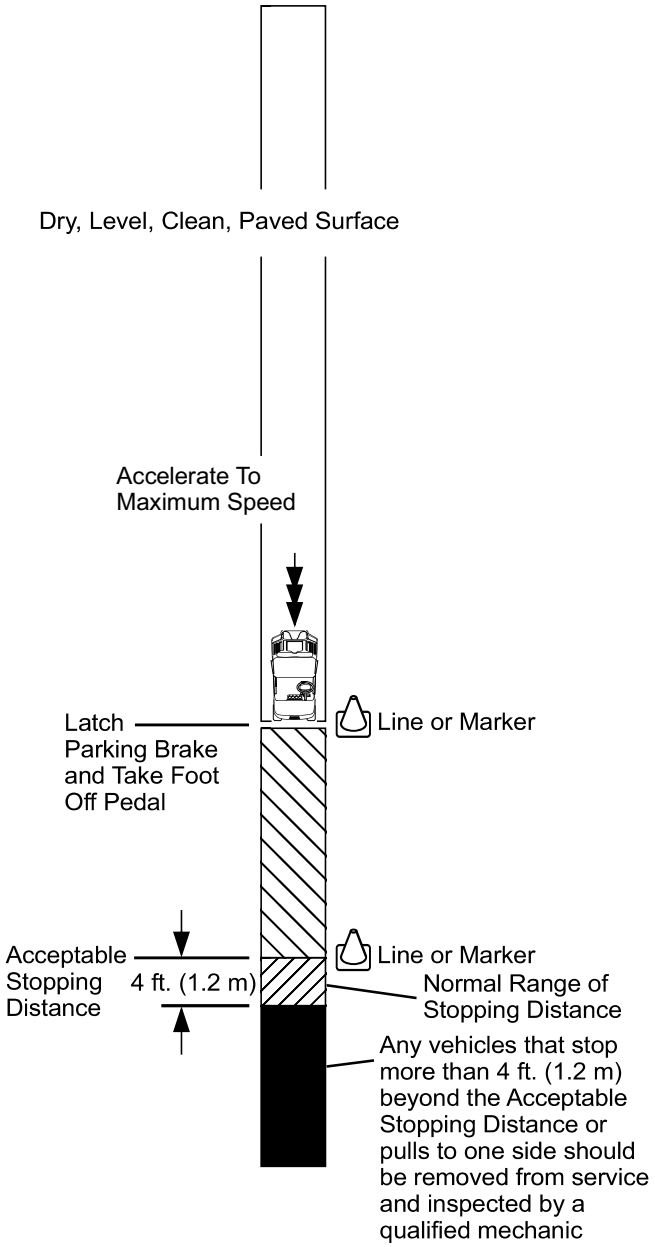


Figure 5 Periodic Brake Performance Test

NOTICE

Over time, a subtle loss of performance can occur; therefore, always establish the standard with a new vehicle.

Drive the vehicle at maximum speed on a flat, dry, clean, paved surface (Figure 5). Quickly press the brake pedal to lock the parking brake at the line or marker in the test area and remove foot from pedal. The vehicle should stop quickly. The wheel brakes may or may not lock. Observe the location where the vehicle stopped or measure the distance from the point where the brakes were latched to where the vehicle stopped. The vehicle must stop within the “normal” range of measured distances. If the vehicle stops more than 4 ft. (1.2 m) beyond the acceptable stop distance or pulls to one side, the vehicle has failed the test.

Repeat test two more times.

If the vehicle does not pass two of three Periodic Brake Performance Tests, do the Aggressive Stop Test 10 times as shown below, then repeat the Periodic Brake Performance Test three more times (second set of three).If the vehicle passes two of three Periodic Brake Performance Tests, make sure that the clevis pins at the brake levers are loose. If they are loose, return the vehicle to service. If they are tight, adjust free travel. (Figure 10) Then repeat the Periodic Brake Performance Tests. If the vehicle fails, remove from service and refer to Wheel Brake Inspection, to determine the reason for failure.

Aggressive Stop Test

⚠ WARNING

To decrease the risk of serious injury or death, all brake tests must be done in a safe location for the safety of all personnel.

Always do a visual inspection and inspect the pedal travel before you operate a vehicle to confirm some braking function is present.

The purpose of this test is to attempt to completely expand and release the brake adjusters on a vehicle that has failed the first set of Periodic Brake Performance Tests. It is important that the technician or mechanic make sure the test is performed in a non-congested area for the safety of all personnel.

To do an Aggressive Stop Test, equally load both sides of the vehicle (Figure 6) and apply maximum force and travel to the service brake pedal while moving. Do not lock the parking brake. Do this a total of 10 times with the first few at slow speed. If the brake function is enough or

improves, increase speed for the remaining tests. Before the end of the tests, both wheels must lock at approximately the same time and slide straight.

NOTICE

The brake adjuster mechanism must expand and release completely to function. With light usage this may not occur, even though the vehicle stops acceptably. The adjuster will function most consistently with aggressive braking.

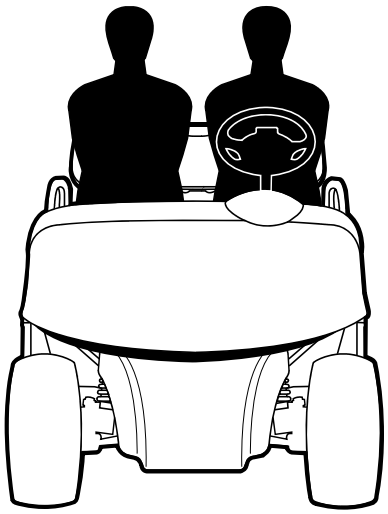


Figure 6 Equally Load Vehicle

Wheel Brake Inspection

⚠ WARNING

Wear a dust mask and eye protection when you do work on wheel brakes. Do not use pressurized air to blow dust from brake assemblies. Replace both brake shoes on both wheels if any shoes are worn below .06" (1.5 mm) thickness at any point.

⚠ CAUTION

Do NOT touch any of the wheel brake mechanism except as shown.

Do NOT use a commercial brake cleaner unless the full brake has been disassembled.

1. Remove the brake drums.
   Do not disturb adjuster mechanisms. Remove excess dust and dirt from the drum with a brush.

⚠ WARNING

The drum must not be machined to remove grooves on the friction surface. Machining the drum will make the wall too thin and cause the drum to fail. Drum failure will cause a loss of braking capacity which can cause severe injury or death.

2. Inspect the brake drum.
   Look for a blue coloration or blistered paint that can indicate that it has overheated. Check for grooves on the friction surface. Check for an area worn below the rest of the friction surface indicating excessive wear. Inspect the splines for surface damage, wear and corrosion. If any of these problems are found, the drum must be replaced.
3. Remove any brake dust from the wheel brake assembly with a brush.
4. Visually inspect the axle seal for oil leakage and the condition of the thrust washer. If the oil is found, see REAR AXLE section.
5. Confirm the inner brake drum washer is found and check its condition. Replace damaged or missing component.

⚠ WARNING

If one wheel brake assembly needs replacement, the second must also be replaced.

⚠ CAUTION

Use care when you handle the adjuster arm. Excessive force will damage the adjuster and both wheel brake assemblies will need to be replaced.

6. Visually check the condition and operation of the adjuster mechanism.
   Inspect the brake lever for damage or wear. Test the adjuster function as follows:
   Push the front brake shoe in the direction of the rear of the vehicle and hold in position.
   Operate the brake lever.
   Observe the brake adjuster arm and note if the arm engages the star wheel and tries to rotate it (Figure 7).

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

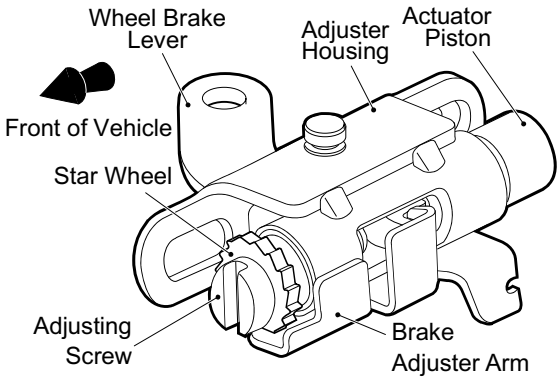


Figure 7 Adjuster Mechanism

If the adjuster arm **engages and turns** the star wheel, continue. If the arm **does not engage** the star wheel, it has been damaged and both wheel brake assemblies must be replaced.
If the adjuster arm engages star wheel but **does not rotate it**, the adjuster assemblies must be replaced with new color-coded adjusters. Note the location of the two Teflon coated washers (Figure 8).

7. Check the condition and operation of the moving anchor assembly.
   Operate the brake lever to check for free motion. The adjuster assembly and brake lever must move smoothly from front to back on the backing plate. If the moving anchor assembly is damaged or jams against the backing plate, replace both of the wheel brake assemblies.

⚠ WARNING

A backing plate assembly that shows any indication of galling or gouging is not repairable and must be replaced with a new wheel brake assembly. Always replace the wheel brake assemblies in pairs.

8. Inspect the backing plate.
   Inspect for gouges, galling or other damage, particularly where the backing plate is contacted by the brake shoes and by the moving anchor assembly. Replace both backing plates if any gauges or galling is found.
9. Measure the brake shoe thickness.
   Measure the most worn area. The brake shoe thickness must not be less than .060" (1.5 mm) at any point on the shoe. It is normal for the shoes to show more wear at the leading and trailing edges (Figure 8). If the brake shoe thickness is approaching. .060" (1.5 mm), it is recommended that the shoes be replaced. It is recommended that the brake shoe springs and brake adjusters be replaced when installing new brake shoes.
10. Inspect the brake shoe springs.
    Make sure that they are not broken or damaged and are correctly installed. The hooked end of the adjuster spring is installed through the front of the front shoe and the opposite end connected to the adjuster with the hook end pointing out. The brake shoe springs must be installed with the light spring closest to the adjuster mechanism with the hook installed down through the rear brake shoe and up through the front brake shoe. The heavy top spring is installed with both spring hooks installed down through the brake shoes (Figure 9).

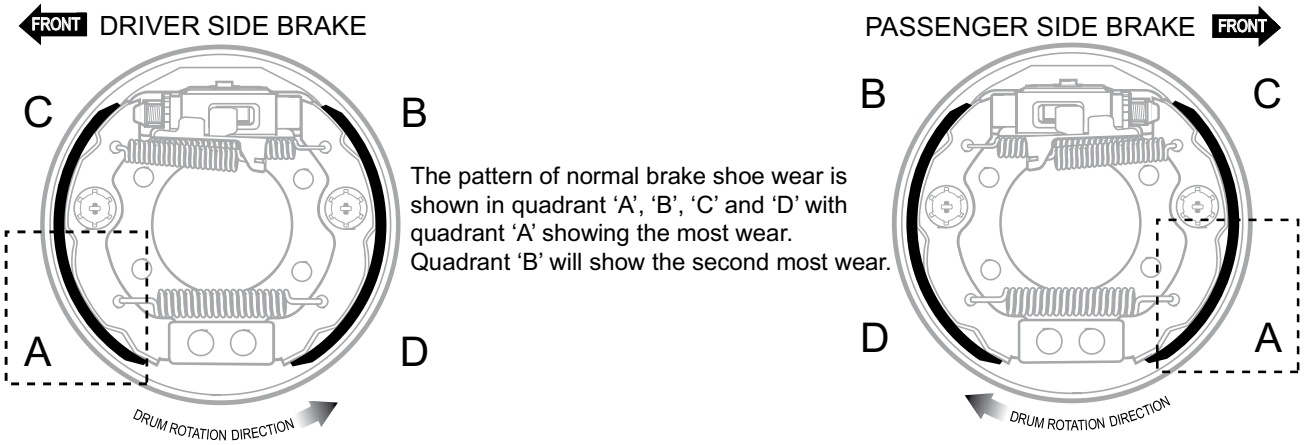


Figure 8 Brake Shoe Wear

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

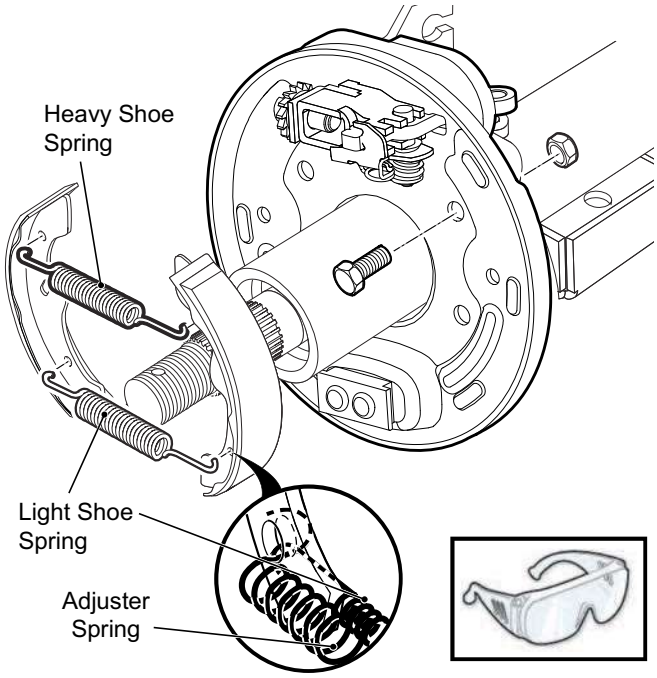


Figure 9 Orientation of Brake Shoe Springs

11. Repeat procedure at the opposite wheel brake.
12. Check/adjust brake pedal free travel.
    When the brake system is serviced or needs parts replaced, the brake pedal free travel must be checked and adjusted. See 'Adjusting Brake Pedal Free Travel'. This includes all linkage and wheel brake components.

MAINTENANCE AND REPAIRS

Tool List **Qty.**

Hydraulic Floor Jack 1
Scale 1
Jack Stands 4
Wheel Chocks 4
Socket, 1/2" 1
Socket, 3/4" 1
Socket, 11/16" 1
Socket, 15/16" 1
Socket, 1 1/8" 1
Socket, 1/4" 1
Torque Wrench, ft. lbs. 1
Torque Wrench, in. lbs. 1
Extension, 6" 1
Ratchet 1
Open End Wrench, 1/4" 1
Open End Wrench, 1/2" 1
Open End Wrench, 5/8" 1
Straight Blade Screwdriver 1
Straight Blade Screwdriver, Narrow 1
Pliers 1
Vernier/Dial Calipers 1
Plastic Tipped Hammer 1
Puller (P/N 15947G1) 1
Pry Bar 1
Dust Mask 1
Emery Cloth 1

Parts Replacement vs. Repair

Some maintenance or repair tasks require a lot of labor to do correctly. Assessment of the condition of worn components is critical to the operation of the brake system. In some cases, component replacement can be more cost effective than the removal, cleaning, inspection and reassembly of the component.

Adjusting Brake Pedal Free Travel

⚠ CAUTION

Brake pedal free travel MUST be checked and adjusted any time that the brake system is serviced or when parts are replaced.

Brake pedal free travel is the distance the pedal travels from rest to the point at which the brake cables start to move the brake levers. This should not be confused with the light resistance that is felt as the brake pedal is pressed enough to remove slack from the compensator and cables. Correct adjustment of free travel is essential to proper brake function. Too much pedal free travel will limit braking capability. Too little pedal free travel may cause the brakes to drag (not fully released). Either condition can decrease the risk of the brakes from adjusting properly.

⚠ WARNING

This procedure will adjust the brakes and seat brake system components. The brake system can not be effective for the first few applications of the brake pedal.

Pre-adjust service brake pedal free travel to the correct setting by loosening the jam nut and adjust the spherical nut (Figure 10). Tighten the jam nut to the torque value specified below.

Item	Torque Specification
Jam Nut	10 - 11 ft. lbs. (14 - 15 Nm)

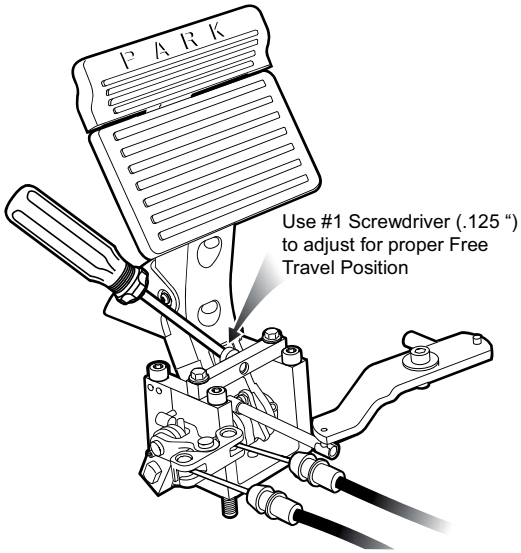


Figure 10 Free Travel Adjustment

The correct brake pedal free travel should be set to 3/4” (1.9cm).

Press the brake pedal aggressively 4 - 6 times to establish known free travel.

⚠ WARNING

All brake tests must be done in a safe location with regard for the safety of all personnel.

In a safe location free from personnel and vehicles, drive the vehicle at slow speed and apply the brakes aggressively. As the brakes adjust and stop the vehicle effectively, start driving at maximum speed and brake aggressively 10 times.

At the passenger side brake adjust the free travel as noted above if it has changed.

Drive again and brake aggressively 10 times.

Repeat the previous step(s) until the pedal free travel does not change during the aggressive braking.

Perform the Periodic Brake Performance Test as described and return the vehicle to service if brake performance is satisfactory.

Brake Drum Removal and Installation

Remove the dust cap (1) to get access to the castellated nut (2) and the cotter pin (3).

Remove the cotter pin and castellated nut as shown.

NOTICE

Do not apply the brake when removing the nut as the shoes may not fully retract preventing removal of the brake drum.

Remove washer (4).

Slide the brake drum (5) from the axle shaft. If required, tap the drum with a plastic faced hammer to loosen it from the axle shaft or use drum puller (P/N 15947G1).

⚠ CAUTION

Use care when raising the adjuster arm. Too much force will damage the adjuster and require that both wheel brake assemblies be replaced.

If the drum does not slide from the brake assembly, the brake shoes must be retracted. Rotate the hub so that the hole in the drum is directly over the brake mechanism. Use a small straight blade screwdriver to lift the adjuster arm above the star wheel.

Loosen the star wheel to retract the brake shoes and remove the brake drum.

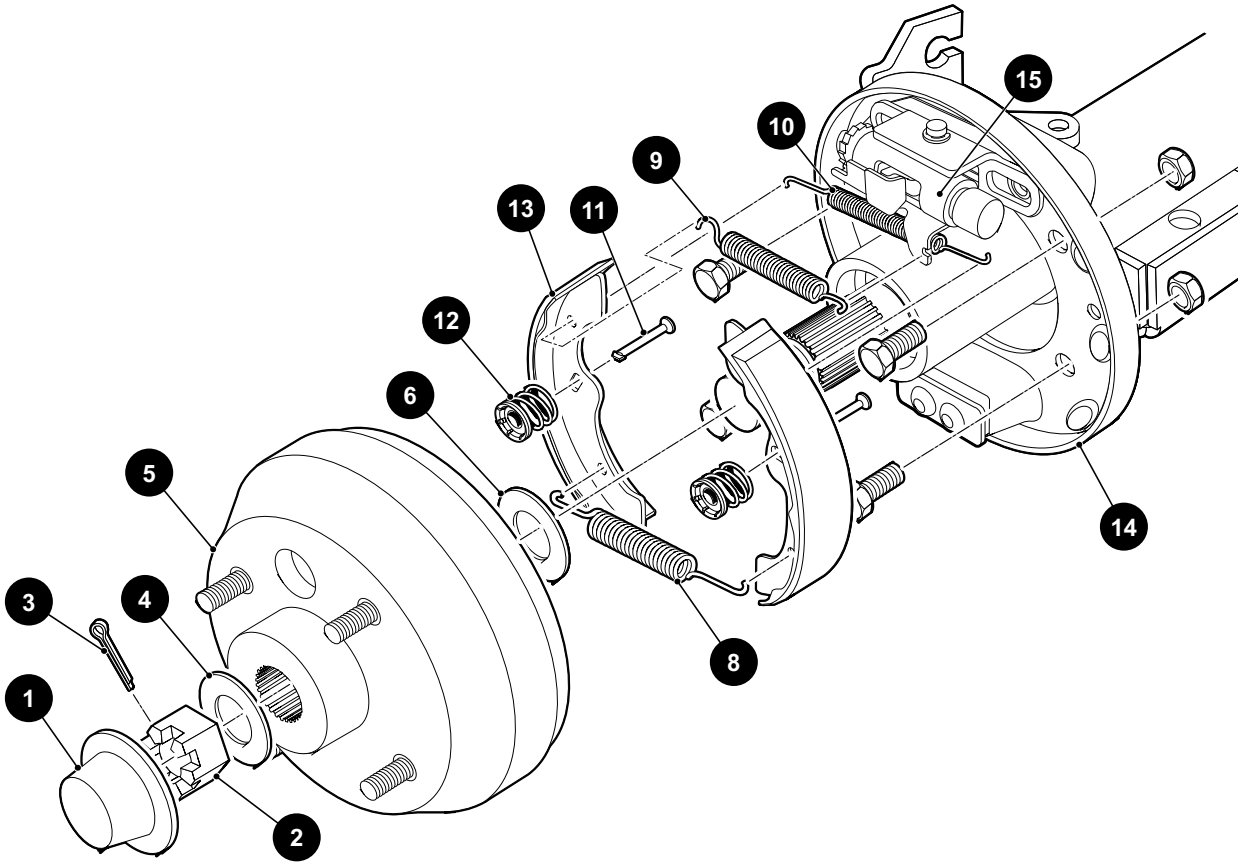


Figure 11 Brake Assembly

NOTICE

Pay particular attention to the location of the inner brake drum washer (6) inside the brake drum, which can be on the axle shaft or attached to the rear of the drum hub. This washer must be installed again when the brake is assembled again.

To install the brake drum, clean the axle shaft and the splines on the brake drum to remove dirt, grease and foreign matter. Apply a small amount of anti-seize compound to the axle spline. Install the inner brake drum washer (6) and slide the brake drum (5) into position.

Make sure the nose of drum hub extends past the end of the axle splines. If not, remove drum and install one additional inner brake drum washer (total of 2) to get necessary clearance.

⚠ CAUTION

Do not back off nut to install cotter pin.

Install the remaining hardware and tighten the nut to 80-90 ft. lbs. (108 - 122 Nm) torque. Continue to tighten until a new cotter pin can be installed through the castellated nut and the hole in the axle. Maximum torque is 140 ft. lbs. (190 Nm).

Wheel Brake Service

Wheel brake service consists of disassembly, cleaning, inspection, lubrication and re-assembly of the wheel brake. Worn or damaged components must be replaced. Wheel brake service is required periodically as a preventive maintenance measure (see Periodic Service Schedule). The wear rate of brake shoes and required service intervals will vary based on usage, terrain and other conditions. It is recommended that wheel brake service be performed periodically on a sample of vehicles within the service fleet to establish the most efficient and effective service interval.

Remove the brake drum as described in ‘Brake Drum Removal and Installation.

⚠ WARNING

Wear eye protection and a mask when cleaning brake components. Do not use compressed air to remove brake dust from brake assembly.

⚠ CAUTION

Do NOT use a commercial brake cleaner unless the entire brake has been disassembled.

Remove any accumulated brake dust with a brush.

Remove the brake shoes. See 'Brake Shoe and Adjuster Replacement'.

Clean backing plate with a commercial brake cleaner. Allow to dry completely.

⚠ CAUTION

It is important that the friction areas between the backing plate and the brake shoes be lubricated. Be careful not to allow lubricant to contact the braking portion of the brake shoes or the friction surface of the brake drum. Use only recommended lubricants.

Lubricate the backing plate friction points of the shoes and moving anchor with Multi Purpose Grease (MPG) lubricant (Figure 12).

Install the actuator components, adjuster components and brake shoes. See 'Brake Shoe and Adjuster Replacement' If the brake shoes and drum are not to be replaced, sand the friction surfaces lightly with emery cloth to remove any foreign material.

⚠ CAUTION

Be sure that the adjusting screw is turned into the star wheel nut until only 1 - 2 threads are exposed (Figure 15). If the brake shoes are replaced, replace the three brake springs and the adjuster components.

Replace the springs one side at a time, using the other side as a guide.

Install brake drum as described in Brake Drum Removal and Installation.

Repeat on other side of vehicle.

Adjust the brake pedal free travel.

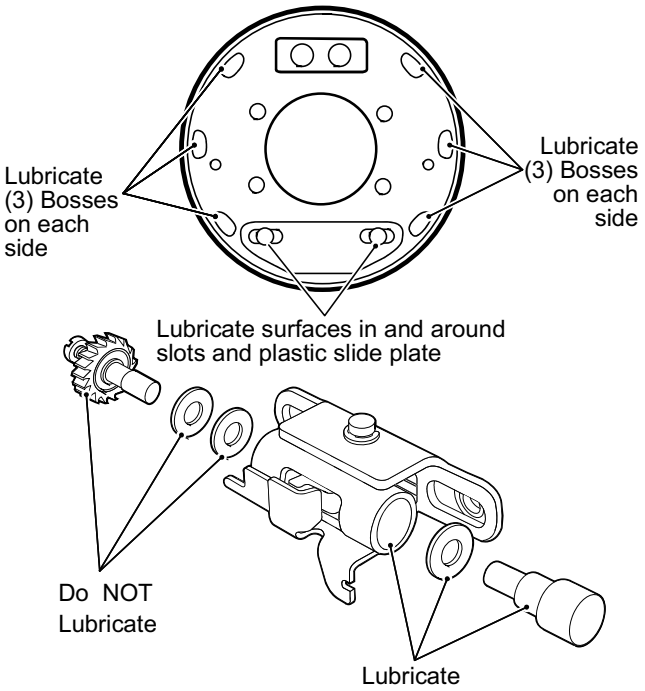


Figure 12 Wheel Brake Lubrication Points

Backing Plate/Entire Wheel Brake Assembly Removal and Installation

Remove the four bolts (1) and lock nuts (2) securing the wheel brake backing plate to the flange (3) on the axle tube (Figure 13).

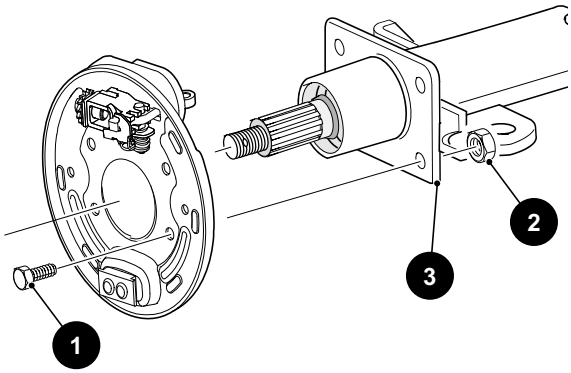


Figure 13 Backing Plate Removal and Installation

Remove the clevis pin securing the brake cable to the brake lever.

Installation is the reverse of removal. Connect the brake cable to the wheel brake with the clevis pin installed from the top down and a new cotter pin. Install the brake assembly or backing plate to the axle tube flange. Install new hardware.

Tighten the lock nut to the torque value specified below.

Item	Torque Specification
2	23 - 28 ft. lbs. (31 - 38 Nm)

Brake Shoe and Adjuster Replacement

NOTICE

It is recommended that when brake shoes are replaced, the adjusters and springs also be replaced. It is good practice to do one side at a time, using the other side for reference.

Remove the three brake shoe springs and discard (1, 2, 3). Note the location of the heavy spring and the adjuster spring (Figure 14). Hold the shoe clamp pin (4) and compress and rotate the shoe clamp (5) 90° to release it from the shoe clamp pin. Remove the brake shoes, adjuster and remaining components.

Clean the backing plate with a commercial brake cleaner. Allow to dry completely. Lubricate the friction points of the shoes and moving anchor with Multi Purpose Grease (MPG) lubricant (Figure 12).

⚠ CAUTION

Be sure that the adjusting screw is threaded into the star wheel nut until only 1 - 2 threads are exposed.

Install adjuster mechanism (driver side silver, passenger side gold). Make sure that the two Teflon coated washers are installed as shown (Figure 12). The adjusting screw must be threaded into the star wheel nut until only 1 - 2 threads are exposed (Figure 15).

Install the actuator piston. Make sure the hardened shim washer is installed as shown (Figure 12).

Always replace both brake shoes on both wheels as a set. Install the shoes as indicated and install the shoe clamp (5) over the shoe clamp pin (4) and rotate 90° to lock them in place (Figure 14).

Install new brake shoe and adjuster springs. The hooked end of the adjuster spring is installed through the front of the front shoe as shown (Figure 14). The opposite end of the adjuster spring is connected to the adjuster with the hook end facing out. The brake shoe springs must be installed with the light spring closest to the adjuster mechanism with the hook installed down through the rear brake shoe and up through the front brake shoe. The heavy top spring is installed with both spring hooks installed down through the brake shoes. Make sure that the brake operates correctly.

Install the brake drum. See Brake Drum Removal and Installation.

Repeat on other side of vehicle.

Adjust the brake pedal free travel. See 'Adjusting Brake Pedal Free Travel'.

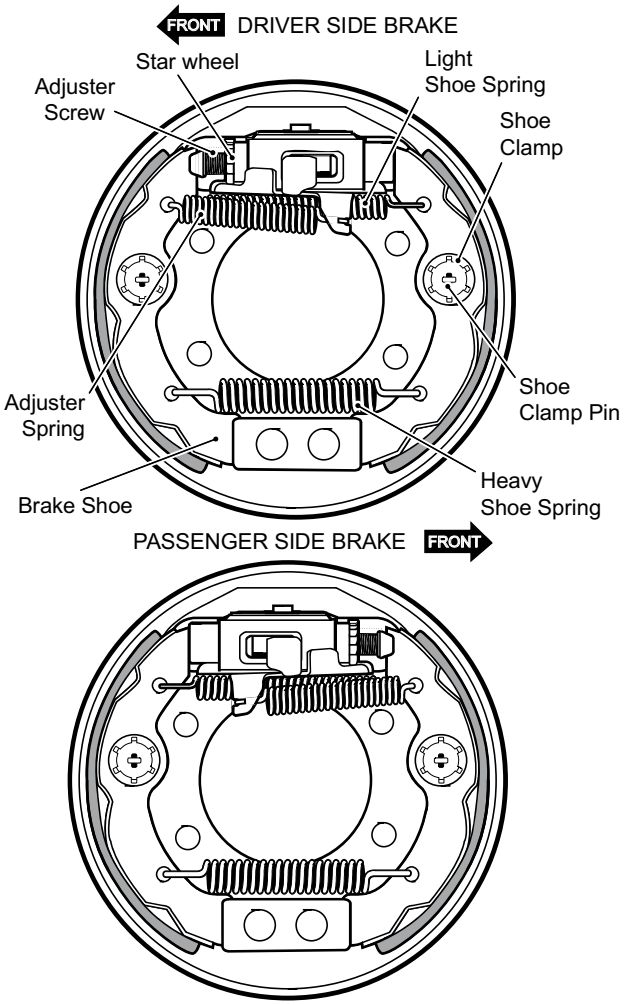


Figure 14 Brake Shoes and Springs

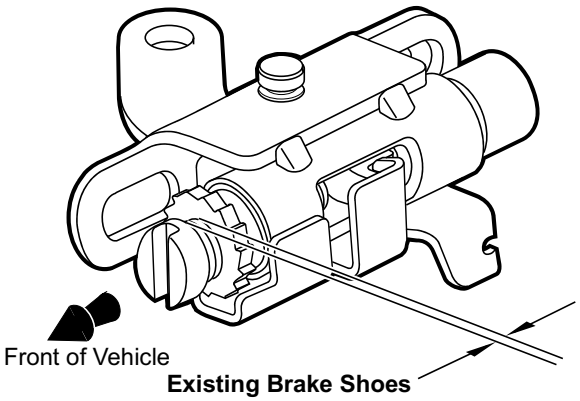


Figure 15 Setting Adjuster Screw

Brake Cable Snap Ring Removal

Rotate the ring to find the crease. Insert a flathead screwdriver into the crease and twist screwdriver counterclockwise to pry ring apart and free brake cable.

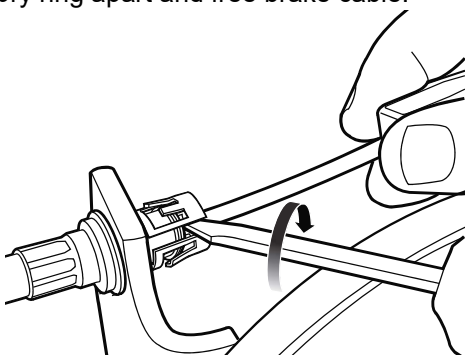


Figure 16 Brake Cable Snap Assembly Removal and Installation

Brake Cable and Equalizer Assembly Removal and Installation

NOTICE

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

Remove the cotter pins and clevis pins to connect 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 (Figure 17). Inspect the hardware and replace if needed. Remove the brake cable and equalizer assembly and discard.

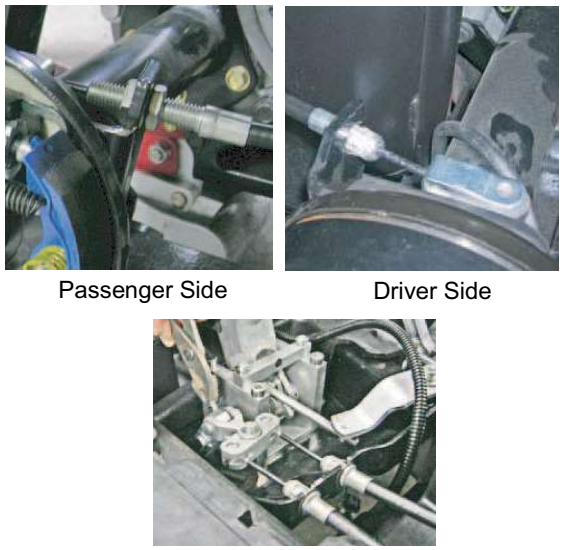


Figure 17 Brake Cable, Equalizer and Compensator

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. See 'Adjusting Brake Pedal Free Travel' on page 102.

Brake Pedal Assembly Replacement

Tool List	Qty.
Ratchet	1
Torx Bit, T-45IP	1
Torque Wrench, in. lbs.	1
Wrench, 6mm	1
Notched Pry Bar	1
Insulated Wrench, 1/2"	1
Flat Blade Screw Driver	1

⚠ WARNING

Using an insulated wrench, disconnect the battery cable at the negative (-) BL- battery terminal.

To access the pedal assembly, remove the upper rocker panels, the lower rocker panels and the floormat (refer to page C2 for removal of rocker panels and floormat).

1. Remove four rivets (15) securing pedal cover (14) to floorboard.
2. Remove pedal cover (14).

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

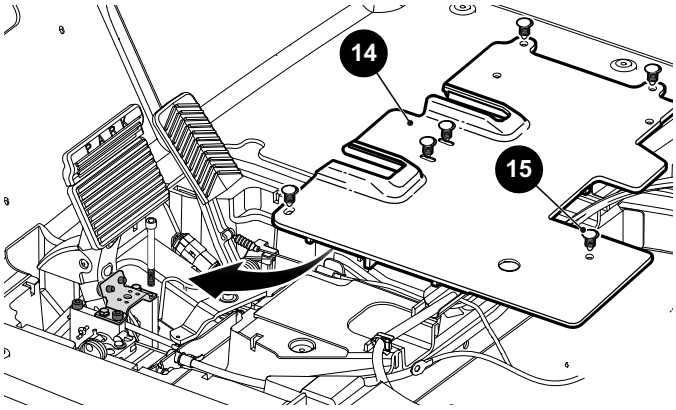


Figure 18 Pedal Cover

3. Remove four screws (6) securing the brake pedal assembly to the floorboard. (Figure 19)
4. Disconnect the wires from the brake enable switch (8).
5. Disconnect the accelerator pedal kick-off linkage (1) from the cam by removing the bolt (4).
6. Disconnect the equalizer (2).
7. Remove the c-clip (10) from the pivot pin (9) to release the equalizer and brake cables.
8. Place pedal assembly in position on the floorboard and secure with four socket head bolts (6) and tighten to torque value specified below.

Item	Torque Specification
6	14.7 - 15.8 ft. lbs. (20 - 21.5 Nm)

9. Reinstall both the brake cables (11 and12) into equalizer (2) refer page M13.
10. Reconnect the accelerator brake pedal kick-off linkage (1). For adjusting the Brake Pedal free travel refer page M9.
11. Reconnect the Wires and brake enable switch (8) oriented as shown.
12. Install the pedal cover (14), using new rivets (15), replace the floormat and rocker panels.Replace any worn or damaged hardware with new as required.

BRAKE FAULT TESTING

For brake fault testing, refer to fault testing section in the manual only after the thorough visual inspection, Periodic Brake Performance Test (PBPT), and Aggressive Stop Test have been performed.

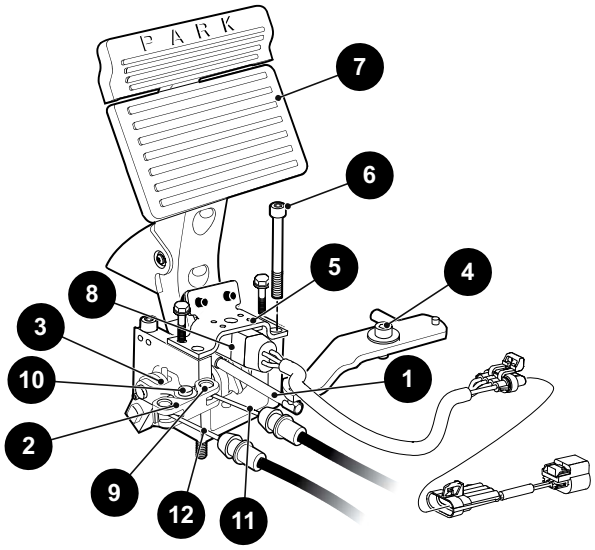


Figure 19 Brake Pedal

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

Notes:

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

Notes:

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

REAR SUSPENSION

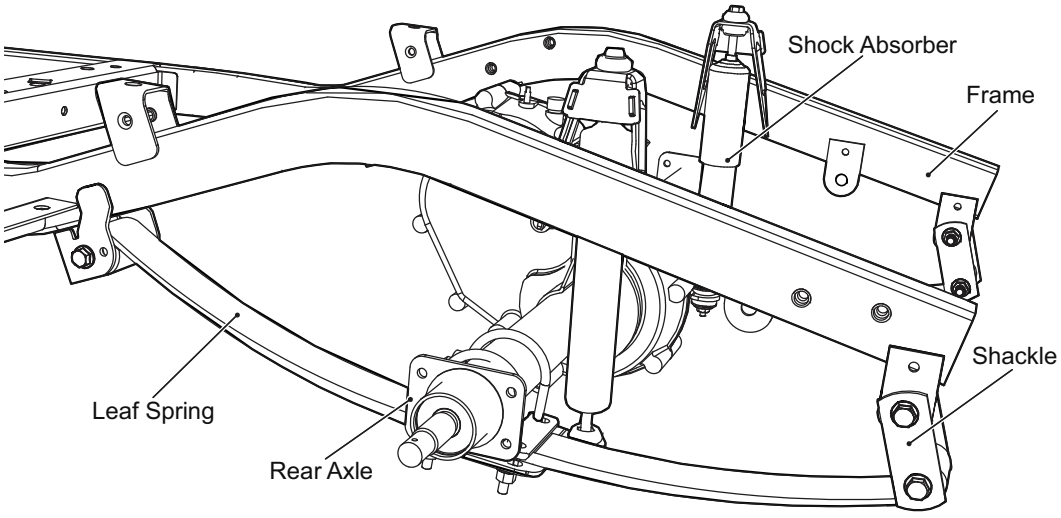


Figure 1 Rear Suspension

REAR SUSPENSION

NOTICE

Hardware that is removed must be installed in its original position unless otherwise specified. If the torque values are not specified, refer to the Torque Specifications table in the GENRAL INFORMATION AND ROUTINE MAINTENANCE section.

General

Tool List	Qty.
Wheel Chocks	4
Jack Stands	4
Floor Jack	1
Wrench, 1/2”	1
Wrench, 9/16”	1
Wrench, 3/4”	1
Socket, 1/2”	1
Socket, 9/16”	1
Socket, 9/16”, Deep-well	1
Extension, 3"	1
Ratchet	1
Torque Wrench, ft. lbs.	1
Torque Wrench, in. lbs	1

The rear suspension includes the rear axle and the attachments that secure it to springs and shock absorbers (Figure 1). This section includes removal and replacement of the springs, shock absorbers and the rear axle assembly.

Disassembly and maintenance of the rear axle assembly is shown in the REAR AXLE section.

Shock Absorber

Tool List	Qty.
Wheel Chocks	4
Jack Stands	4
Floor Jack	1
Insulated Wrench, 1/2”	1
Torx Bit, T-27	1
Wrench,15 mm	1
Socket, 15 mm	1
Ratchet	1
Torque Wrench, ft lbs.	1

⚠ WARNING

To decrease the risk of personal injury, follow the lifting procedure in the SAFETY section. Position the wheel chocks in front and behind front wheels and check stability of vehicle on jack stands before starting any repair procedure. Never work on a vehicle that is supported by a jack alone.

1. Remove the two Torx head screws that secure the rear access panel.
2. Remove the rear access panel.
3. Raise the rear of the vehicle in accordance with the instructions provided in SAFTEY section and support the rear of the vehicles on the outer ends of the rear bumper.
4. Access the lower end of the shock absorber (5) and remove the hex nut (4), shock absorber washer (3)

and shock absorber bushing (2) from shock mount plate (5) (Figure 2).

5. Access from the upper end of the shock absorber (5) and remove the hex nut (4), shock absorber washer (3) and shock absorber bushing (2).
6. Compress and remove the shock absorber (5).

Install shock absorber in the reverse order of removal.

Tighten the hex nut (4) till shock absorber bushing (2) expand to the diameter of shock absorber washer (3).

NOTICE

Removal and installation of the shock absorber is the same for both sides of the vehicle.

Replace any worn or damaged hardware with new as required.

Rear Leaf Spring

Tool List	Qty.
Wheel Chocks	4
Jack Stands	4
Floor Jack	1
Wrench, 15 mm	1
Insulated Wrench, 1/2”	1
Socket, 15 mm	1
Ratchet	1
Torque Wrench	1

NOTICE

If both leaf springs are to be replaced and the rear axle is not being removed, it is important to remove and replace one leaf spring at a time. It is recommended that leaf springs be replaced in pairs.

Removal

1. Raise the rear of the vehicle in accordance with the instructions provided in SAFTEY Section.
2. Place a floor jack under the center section of the rear axle and raise the jack just enough to place a second set of jack stands under the axle tubes.
3. Remove the two hex nuts (4), shock absorber bushing (2) and shock absorber washer (4) from the U-bolt (1) on the axle allowing the leaf spring plate (18) to slide off of the U-bolt (1).
4. Remove the hex head bolts (15) and nuts (11) from the shackle plates (12) at the rear of the frame. Remove the flanged bushings (13) and spacers (14) as well.
5. Remove the hex head bolt (7) and nut (10) from the forward leaf spring mounting bracket. The leaf spring (16) can now be removed from the vehicle.
6. Remove the rubber bushing (6) from the leaf spring.
7. Retain the axle bracket (17) and leaf spring plate (18) removed for future use.

Installation

1. Install the rubber bushing (6) in the end of the leaf spring (16) and place the leaf spring in the forward mounting bracket.
2. Install the hex head bolt (7) and nut (10) to secure the forward end of the leaf spring in the bracket.
3. Apply a commercially available anti-seize compound to the flanged bushings (13).
4. Install one set of the flanged bushings (13) and spacer (14) in the rear frame mounting holes.
5. Position the shackle plates (12) over the bushings and install the hex head bolt (15) and nut (11).
6. Install the remaining pair of flanged bushings (13) and spacer (14) in the leaf spring (16). Position the leaf spring between the shackle plates (12) and install the hex head bolt (15) and nut (11).
7. Align the pin on the leaf spring (16) with the hole in the axle bracket (17), shock absorber bushing (19) and shock absorber washer (20). Install the leaf spring plate (18) on to the U-bolt (1). Secure plate in place with two hex nuts (4).
8. Tighten the hex nut (3) until shock absorber bushing (2) expands to the diameter shock absorber washer(4).

NOTICE

Removal and installation of the shock absorber is the same for both sides of the vehicle.

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

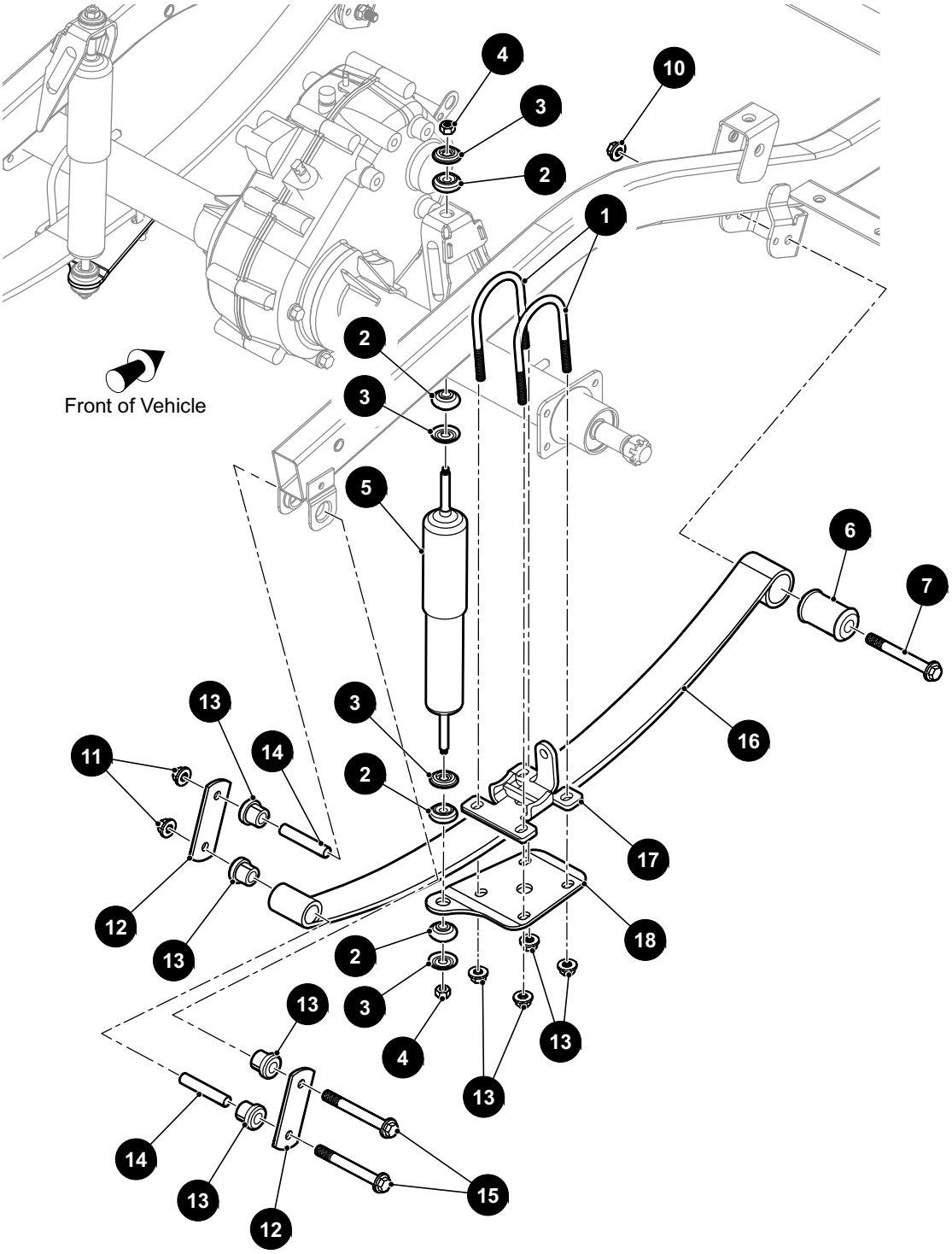


Figure 2 Rear Suspension

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

Notes:

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

REAR AXLE

For further axle information, see Four Cycle Trans-axle Shop Rebuild and Service Parts Manual.

See REAR SUSPENSION section for axle removal.

NEUTRAL LOCK

To decrease the risk of the secondary clutch from turning the rear wheels during service operations and to decrease the risk of wear to the belt while being towed, a neutral lock is located on the direction selector.

To operate neutral lock (Figure 1):

1. Turn the key switch to OFF.
2. Place direction selector in R and remove seat.
3. Pull out (1) and rotate (2) the neutral lock pin handle so that the pointed portion of the handle is to the side of the direction selector cam.
4. Move direction selector lever towards the area between F and R. During that motion, the pin will snap into the hole in the direction selector mounting bracket, preventing any movement of the lever. When in this position, the direction selector remains locked in the neutral position.

⚠ WARNING

The neutral lock is a spring loaded mechanism.To decrease the risk of possibility of fingers becoming pinched in the direction selector mechanism, hold direction selector lever when releasing neutral lock pin handle.

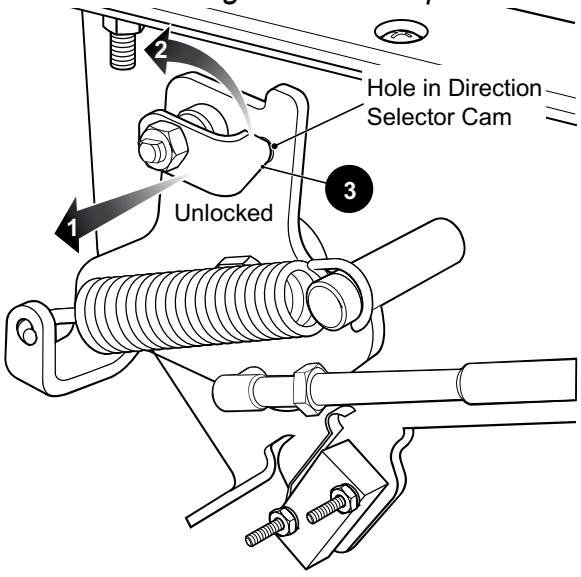


Figure 1 Neutral Lock (Direction Selector)

Activate the direction selector by pulling the neutral lock pin handle out and rotate until the pointed portion of the handle fits into the hole (3) in the direction selector cam.

The rear axle is provided with a lubricant level check plug located on the driver side at the rear of the housing (Figure 2). Unless leakage of rear axle lubricant is evident, an annual lubricant check is sufficient.

Checking the Lubricant Level

Tool List	Qty.
Socket, 13 mm	1
Ratchet	1
Funnel	1

NOTICE

For vehicles with LSD axle, add 2 ounce of friction modifier during refill.

Clean the area around the check and fill plugs. Remove the check plug. The correct lubricant level is **just** below the bottom of the threaded hole. If lubricant is to be added, remove the fill plug and add lubricant using a funnel. Add lubricant slowly until lubricant starts to seep from the check plug hole. Install the check plug and the fill plug. In the event that the lubricant is to be replaced, a drain plug is provided at the bottom of the differential housing. Capacity of axle is 51 ounces (1.5 liters).

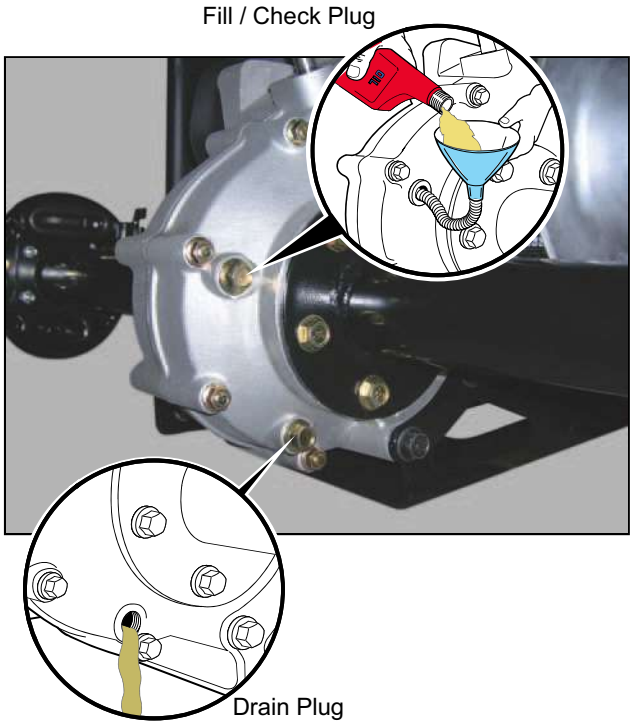


Figure 2 Add, Check and Drain Rear Axle Lubricant

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

REAR AXLE DISASSEMBLY

⚠ CAUTION

The rear axle is a precision assembly, and therefore any repair or replacement of parts must be done with extreme care in a clean environment. Before attempting to perform any service on the axle, read and understand all of the following text and illustrations before disassembling the unit.

Handle all gears with extreme care since each is part of a matched set. Damage to one will require replacement of the entire set or result in an unacceptably high noise level.

Snap rings must be removed/installed with care to decrease the risk of damage to the bearings, seals and bearing bores.

NOTICE

It is recommended that whenever a bearing, seal or O-ring is removed, it be replaced with a new one regardless of mileage. Always wipe the seals and O-rings with a light oil before installing.

⚠ WARNING

To decrease risk of personal injury or death, follow the lifting procedure in SAFETY section. Place wheel chocks in front and behind the front wheels and check the stability of the vehicle on the jack stands before starting any repair procedure. Never work on a vehicle that is supported by a jack alone.

Axle Shaft Removal and Disassembly

Tool List	Qty.
Arbor Press	1
Bearing Separator	1
Needle Nose Pliers	1
Internal Snap Ring Pliers	1
Slide Hammer, P/N 18753G1	1

For brake drum removal, Refer to BRAKES section.

Remove the outer snap ring from the axle tube (Figure 3).

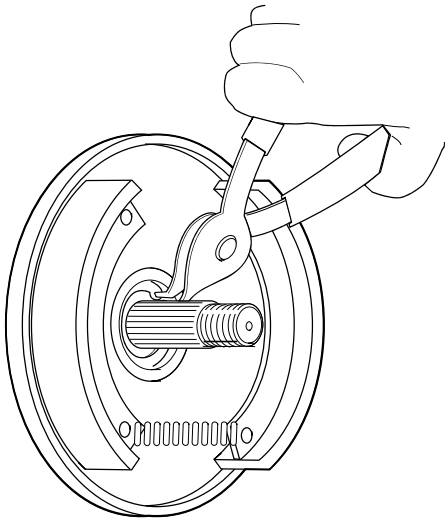


Figure 3 Removing/Installing Outer Snap Ring

Attach a slide hammer to the axle shaft thread and remove the axle and bearing from the axle tube (Figure 4).

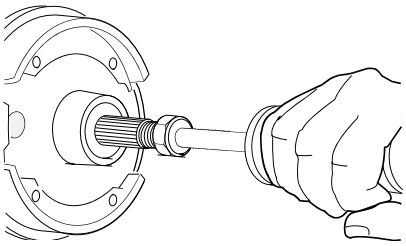


Figure 4 Removing/Installing Axle Shaft

Remove the bearing by supporting the inner race of the bearing on an arbor press bed and apply pressure to the threaded end of the axle shaft (Figure 5).

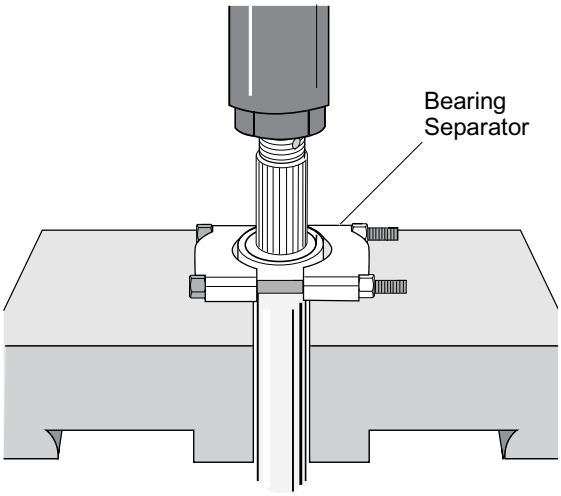


Figure 5 Pressing Bearing from Axle Shaft

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

Axle Shaft Seal Removal and Replacement

Tools List	Qty.
Internal Snap Ring Pliers	1
Seal Puller	1
Plastic Faced Hammer	1
Ratchet	1
Torque Wrench, ft. lbs.	1
Socket, 14 mm	1

Using snap ring pliers, remove the bearing retaining ring (1) from the end of axle tube (2) (Figure 6).

Carefully pull the axle shaft (3) and bearing out of the tube.

Using a 14 mm socket, remove the hardware (4) attaching the axle tube to the casing and carefully lift the tube from the casing studs.

Using seal puller, remove the axle shaft seal (5) from the casing.

⚠ CAUTION

Use care to decrease the risk of damage to the inner surface of axle tube at the sealing area.

Replace the seal by lightly tapping around the circumference with a plastic faced hammer. Tighten bolts (4) to 26 - 31 ft. lbs. (35 - 42 Nm) torque.

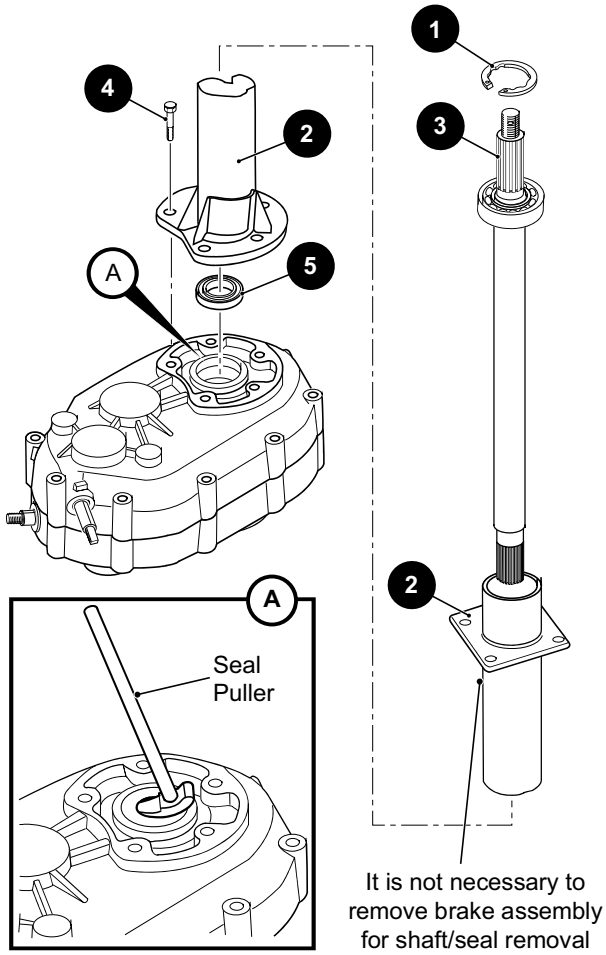


Figure 6 Removing/Installing Seal

Axle Shaft Replacement

Carefully insert the axle shaft and bearing through the oil seal. Rotate the shaft until the spline engages with the differential side gears. Install the outer snap ring.

Coat the outboard spline of the axle with an anti-seize compound. Install the brake hub and drum, thrust washer, nut and new cotter pin (Figure 7).

NOTICE

Tighten the castellated axle nut to 70 ft. lbs. (95 Nm) torque minimum. Continue to tighten until the slot in the nut aligns with the cotter pin hole.

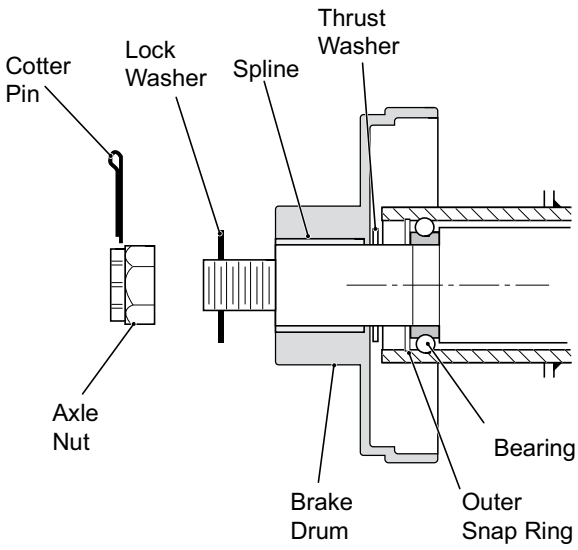


Figure 7 Cut Away of Outer Bearing and Brake Drum

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

Notes:

WEATHER PROTECTION

Figure 1 Canopy and Windshield

CANOPY AND WINDSHIELD

⚠ WARNING

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

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

The canopy and windshield are for weather protection only.

Clean the windshield with water and a clean cloth. Remove minor scratches with a commercial plastic polish or Plexus plastic cleaner, available from the service parts department.

Transporting the Vehicle

⚠ WARNING

To decrease the risk of personal injury to occupants of other highway vehicles, be sure that the vehicle and contents are secured to trailer.

Do not ride on a vehicle being transported.

Remove the windshield before transporting.

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

If the vehicle is being transported on a trailer at highway speeds, remove the windshield and canopy and secure the seat bottoms. Always check that the vehicle and contents are secured before transporting the vehicle.

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

The rated capacity of the trailer must be more than the weight of the vehicle (see GENERAL SPECIFICATIONS for vehicle weight) and load. Engage the parking brake and secure the vehicle to the trailer with ratchet tie downs.

WINDSHIELD

Tool List	Qty.
Torx Bit, 50 IP	1
Ratchet	1
Torque Wrench, in. lbs.	1
Rubber Mallet	1
Flat Screwdriver	1

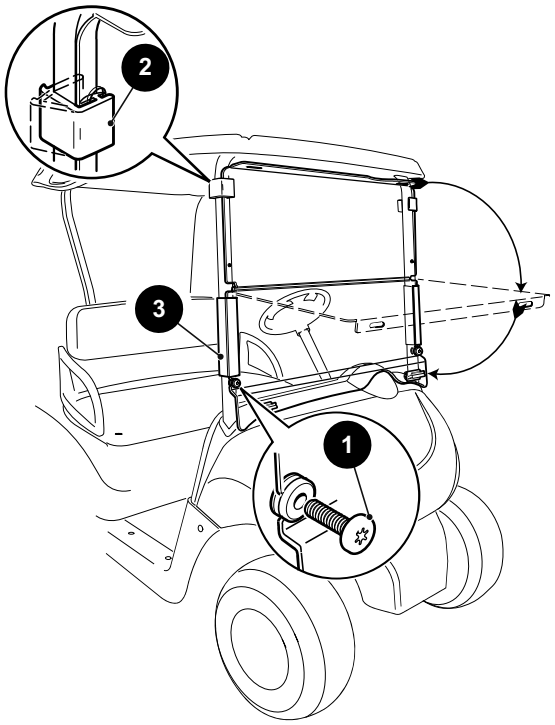


Figure 2 Windshield

CAUTION

Do not over tighten or compress the windshield grommets when installing on windshield.

1. Remove two screws (1) from the lower portion of the windshield (Figure 2).
2. Release the rubber latches (2) and fold the top portion of the windshield down.
3. Carefully pull the outer edge of the windshield sash (3) forward and slide the flat screw driver into the opening. Pull towards the front of the vehicle separating the sash from the front strut. Repeat for the other side.
4. To reinstall the windshield, hang the windshield on the front strut using the rubber latches (2) on the top portion of the windshield.
5. Align the holes in the lower section with the holes in the front strut. Alignment guides (long thin screwdriver or bolts) may be helpful in keeping the holes aligned as the windshield is carefully pushed onto the front strut.
6. Install two screws (1) and tighten the screws (1) to the torque value specified below.

Item	Torque Specification
1	124 - 142 in. lbs (14 - 16 Nm)

GOLF CAR TOP

Tool List	Qty.
Socket, 15 mm	1
Ratchet	1
Ratchet Extension	1
Wrench, 15 mm	1
Torque Wrench, in. lbs.	1
Flat Screwdriver	1

If vehicle is equipped with a windshield remove it before working with the top.

Removal

1. Remove six hex nuts (1) and the hex bolts (2) securing the top to the struts (Figure 3).
2. Lift the top off of the struts and set it aside.
3. Remove the access cover (5) by sliding a flat screwdriver under the edge of it and prying it away from the instrument panel, repeat for the other side.
4. Remove the two hex bolts (6) from each side that secure the front strut to the vehicle, lift the strut up until it clears the instrument panel and cowl.
5. Remove the rubber grommets (7) from the front strut holes if they did not come off with the struts.
6. Remove four hex nuts (3) from inside the sweater basket then remove the four hex bolts (4) that slide through the rear top strut, lift the strut up to clear the sweater basket. Repeat for the other side

Installation

1. Place the rubber grommets (7) into the holes in the front cowl making sure that they are oriented properly for each side. The grommet should follow the contour of the body.
2. Position the front strut with the bend angled to the rear of the vehicle, slide the strut through the grommets and into position. Looking through the access

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

holes, align the holes in the strut with the holes in the frame and insert the hex bolts (6).

3. Position the rear struts so that they are bent to the outside of the vehicle and the top legs point to the front of the vehicle. Align the mounting holes in each strut with the matching holes in the sweater basket and seat back support, install the hex bolts (5) and nuts (4) finger tight only.
4. Place the top onto the struts and install six hex bolts (2) down through the top and struts, place the nuts (1) on finger tight.
5. Make sure that the grommets (7) on the front strut are in place.
6. Tighten the hex bolts (2, 6) and hex nuts (4) to the torque values specified below.

Item	Torque Specification
2, 4	71 - 98 in. lbs (8 - 11 Nm)
6	177 - 203 in. lbs (20 - 23 Nm)

7. Replace the access covers (5) in the instrument panel.

⚠ CAUTION

DO NOT over tighten fasteners. Exceeding the specified torque value will crush the strut tubes.

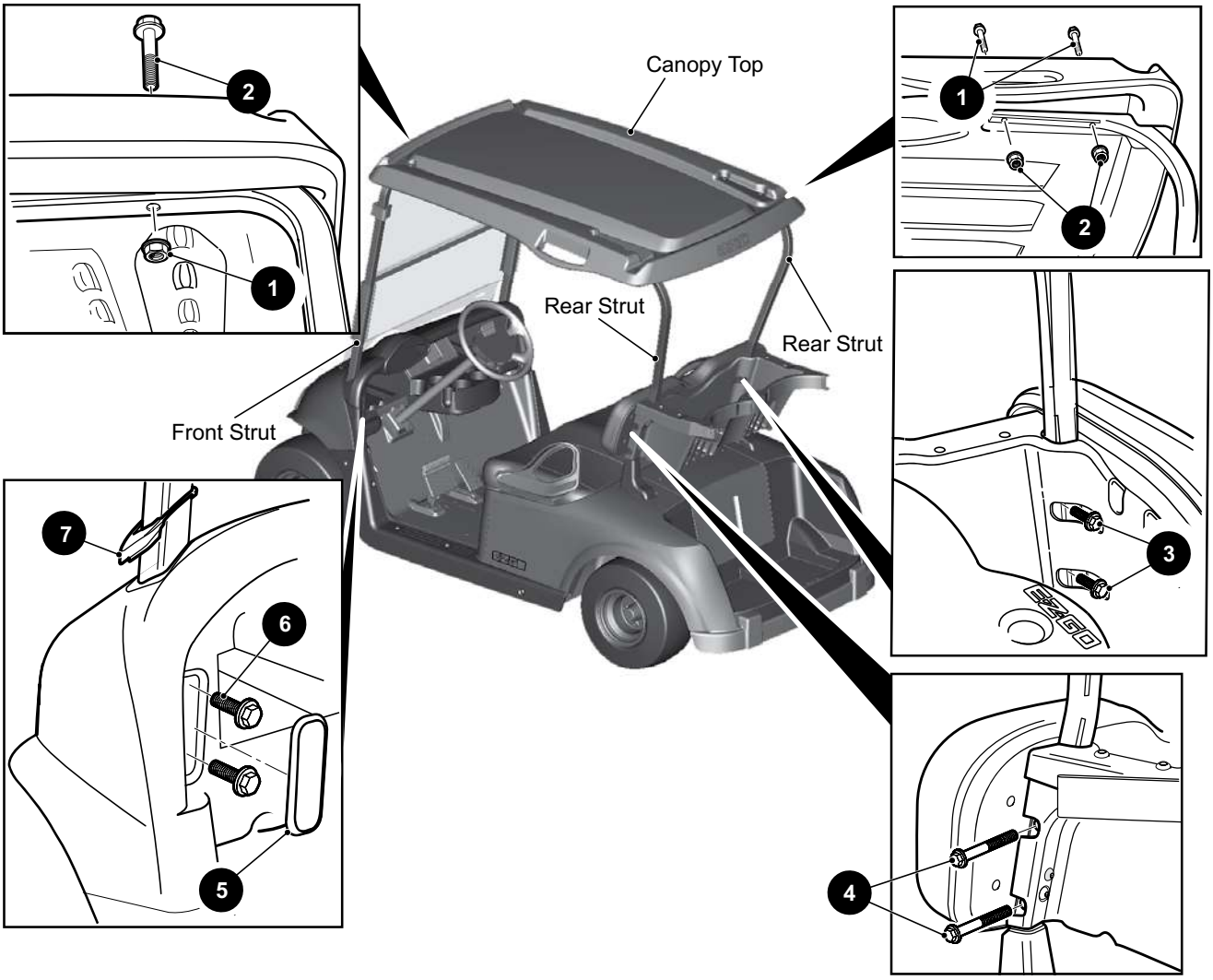


Figure 3 Golf Car Canopy

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

2 + 2 CANOPY

Tool List	Qty.
Socket, 15 mm	1
Ratchet	1
Ratchet Extension	1
Wrench, 15 mm	1
Torque Wrench, in. lbs.	1
Flat Screwdriver	1

If vehicle is equipped with a windshield remove it before working with the top.

Removal

1. Remove four hex nuts (10) and the hex bolts (8) securing the rear of the top (3) to the struts (5 and 6).
2. Remove two hex nuts (10) and hex bolts (13) with spacers (12) securing the top (3) at the front to the strut (4).
3. Lift the top (3) off of the struts and set it aside.
4. Remove the access cover (1) by sliding a flat screwdriver under the edge of it and prying it away from the instrument panel, repeat for the other side.
5. Remove the two hex bolts (11) from each side that secure the front strut to the vehicle, lift the strut (4) up until it clears the instrument panel and cowl.
6. Remove the rubber grommets (14 and 15) from the front strut holes if they did not come off with the struts.
7. Remove two hex bolts (9) from one rear strut (5 or 6) then, repeat for the other side.

Installation

1. Place the rubber grommets (14 and 15) into the holes in the front cowl making sure that they are oriented properly for each side. The grommet should follow the contour of the body.
2. Position the front strut (4) with the bend angled to the rear of the vehicle, slide the strut through the grommets and into position. Looking through the access holes align the holes in the strut with the holes in the frame and insert the hex bolts (11). Do not tighten hardware.
3. Position the rear struts (5 and 6) so that they are bent to the outside of the vehicle and the top legs point to the rear of the vehicle. Align the mounting holes in each strut with the matching holes in the seat back support, install the hex bolts (9) finger tight only.
4. Place the top onto the struts and install two hex bolts (13) and spacers (12) at the front through the struts, place the nuts (10) only finger tight.
5. Install four hex bolts (8) and hex nuts (10) through the rear struts (5 and 6) only finger tight.
6. Make sure that the grommets (14 and 15) on the front strut (4) are in place.
7. Tighten the hex bolts (9, 11) and hex nuts (10) to the torque values specified below.

Item	Torque Specification
10	133 - 159 in. lbs (15 - 18 Nm)
9, 11	177 - 203 in. lbs (20 - 23 Nm)

8. Replace the access covers (1) in the instrument panel.

⚠ CAUTION

DO NOT over tighten fasteners. Exceeding the specified torque value will crush the strut tubes.

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

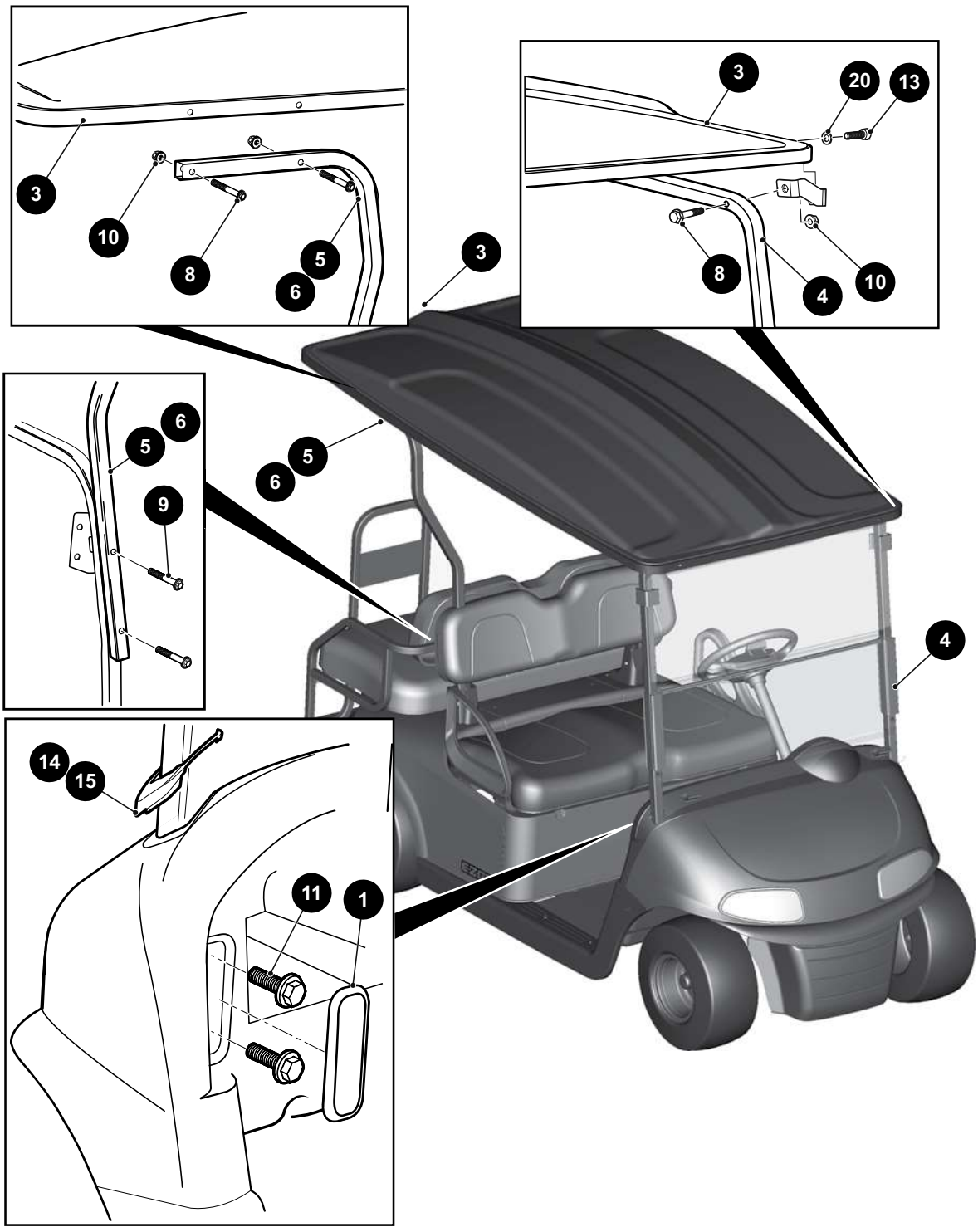


Figure 4 2 + 2 Canopy

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

REAR VIEW MIRROR WITH CANOPY

Tool List	Qty.
Wrench, 12mm	1
Wrench, 15mm	1
Ratchet Handle, 3/8”	1
Drive T-45 Torx Bit, 3/8”	1
Phillips Bit, #2	1
Wheel Chocks	1

Mirror Bracket Installation

- Attach the mirror bracket (2) to the strut by feeding the torx bolt (3) through the existing slot located on left and right front strut (Figure 6) (Figure 7).
- Place mirror bracket (2) up to strut and feed bolt (3) through existing hole in the mirror bracket (2).
- Secure mirror bracket (2) tightly to strut using the nut (4). Be sure to point mirror bracket outwards from the vehicle

Figure 5 Rear View Mirror

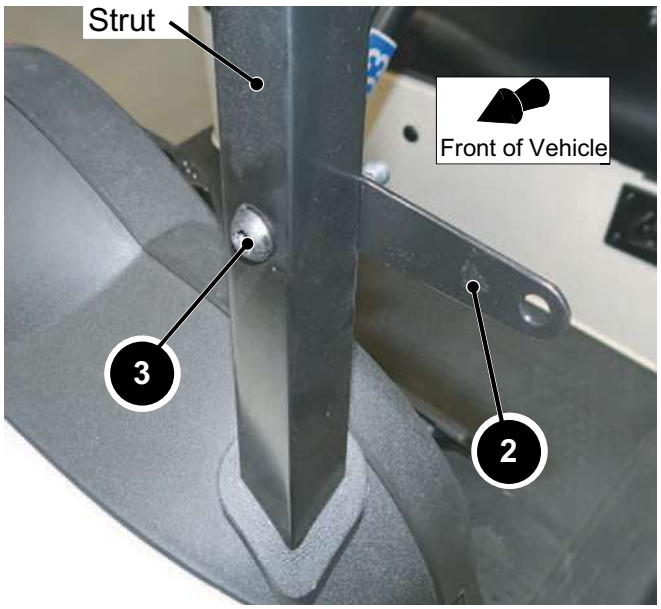


Figure 6 Mirror brackets Installation

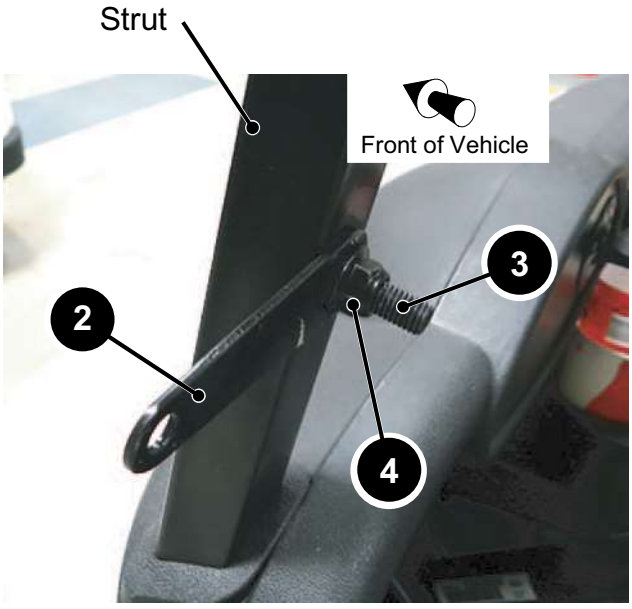


Figure 7 Mirror brackets Installation

Mounting Mirror to Bracket

- Remove the bolt that is already attached to the mirror’s mounting arm. Keep the bolt for later installation.
- Slide the mirror’s mounting arm into open slot on bracket (2).
- Using the existing bolt from mirror (1), secure mirror to mirror bracket (2) .
- Use Phillips bit to adjust the direction of the mirror

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

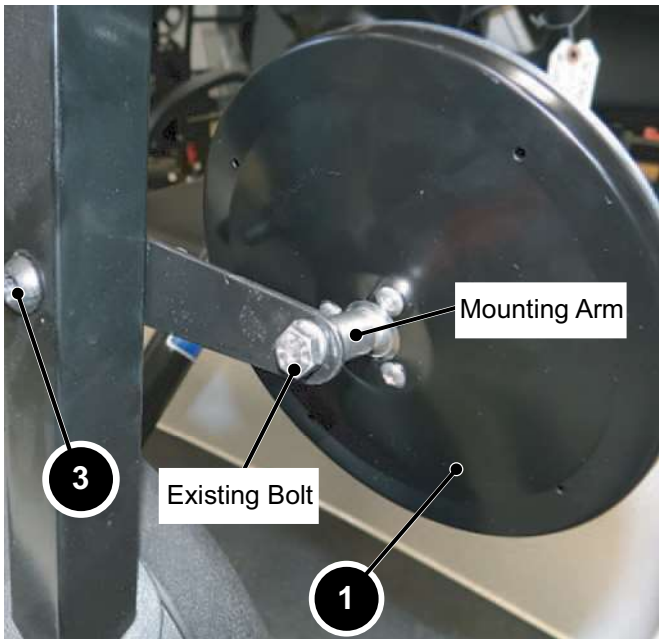


Figure 8 Mounting Mirror to Bracket

REAR VIEW MIRROR WITHOUT CANOPY

Tool List	Qty.
Socket, 15 mm	1
Ratchet	1
Ratchet Extension.	1
Wheel Chock	4

- Remove driver side plugs from dash (Figure 9).

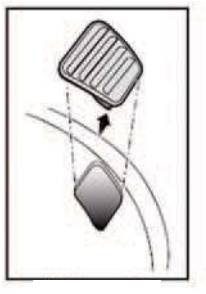


Figure 9 Dash plug removal

- Slide driver-side grommet approximately 12 in. (305 mm) up driver-side of front strut.
- Remove driver-side, passenger-side panels and Hex head bolts from dash (Figure 10).
- Lower front strut (1) into openings revealed.
- Insert existing bolts (4) through upper and lower holes, and secure to pre-installed weld nuts. Access holes through openings revealed in previous steps.
- Tighten the bolt (4) to the torque value specified below

Item	Torque Specification
4	15 - 17 ft. lbs (20 - 23 Nm)

- Replace dash panels.
- To install rear view mirror. See “Mirror Bracket Installation” on page 124. and See “Mounting Mirror to Bracket” on page 124.

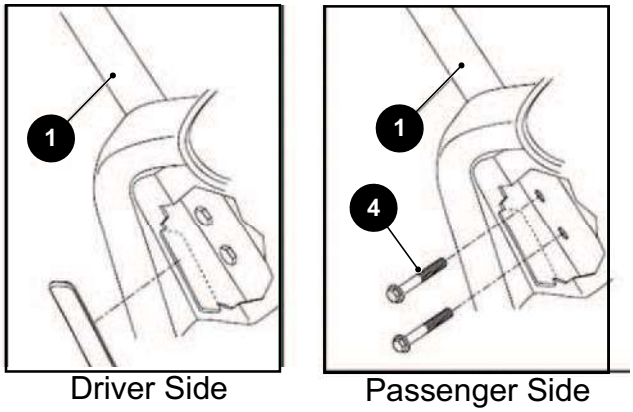


Figure 10 Side Panel removal form dash

- Place the cap (2) on the top of the strut (Figure 11).

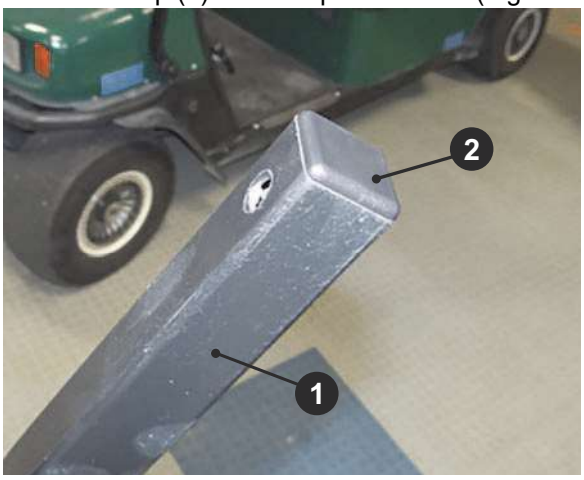


Figure 11 Strut with end cap

- Completed mirror and strut is as shown below (Figure 12).

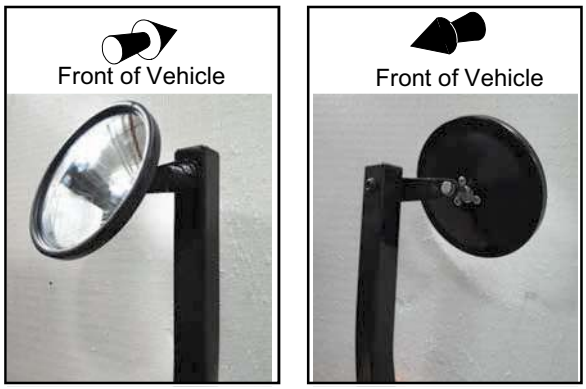


Figure 12 Strut with Rear View Mirror installed.

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

Notes:

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

Notes:

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

FAULT TESTING

GASOLINE VEHICLE PERFORMANCE

Condition	Possible Cause	Correction
STARTER DOES NOT TURN	Weak or bad battery	Recharge or replace as necessary
	Terminals are loose or corroded	Clean and tighten
	Poor wiring connections	Repair or replace wire and/or connections
	Faulty ignition switch	Repair or replace ignition switch
	Blown fuse	Investigate cause and replace fuse
	Solenoid faulty	If no audible 'click' is heard, check power and ground. Replace solenoid if power and ground is good
	Accelerator switch	Check continuity
	Starter/generator terminals are loose or corroded	Tighten or clean
	Leads are broken or faulty ground	Check for breaks at bend or joint. Replace cable
	Field coils are open	Replace fields
	Armature coil is open	Replace armature
STARTER TURNS SLOWLY	Terminals are loose or corroded	Tighten or clean
	Weak battery	Charge battery
	Leads are nearly broken or connections are faulty	Check for any defect of leads at bend or joint. Replace wire leads
	Mechanical problem inside starter/generator	Check
	Internal engine damage	Inspect and repair
	Crankcase over filled with oil	Drain and fill to recommended level with approved oil
STARTER ROTATES BUT VEHICLE WILL NOT START OR HARD TO START	Weak Battery	Charge or replace as necessary
	Corroded or loose battery connections	Clean and tighten battery connections. Apply a coat of battery protectant to terminals
	Check for adequate fuel level	If necessary, fill with correct grade gasoline to 1"(2.5cm) below bottom of filler neck
	No spark at spark plug. Broken or disconnected spark plug wire	Check and replace if required
	Spark plug fouled	Clean or replace
	Broken or disconnected coil wires	Check or replace
	Faulty magneto	Check or replace
	Incorrect spark plug gap/type	Set gap correctly

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

Condition	Possible Cause	Correction
	Fuel pump faulty	Repair or replace
	Fuel line clogged or clamp loose	Clean or replace if required
	Cracked or broken fuel line	Replace with new hose
	Main jet blocked	Clean jet
	Throttle lever motion restricted	Check all linkages
	Dirt or water in fuel line or carburetor	Clean lines and carburetor. Replace filter
	Clogged fuel filter	Check and replace if required
	Incorrect carburetor float setting	Check/replace float
	Engine flooded	Push choke in. Clean/or replace spark plugs
	Engine fuel starved	Use choke and push in as soon as engine runs smoothly
	Air intake tube is blocked	Repair or clean
	Clogged air filter	Wash or replace as required
	Plugged muffler or pipe	Repair or replace
	Low compression in engine	Check and repair
ENGINE RUNS ROUGH OR LOSS OF POWER	Dirty or clogged air filter element	Replace as required
	Incorrect choke adjustment	Adjust choke
	Dirty or incorrectly gapped spark plug	Clean plug and set gap
	Faulty magneto	Check and/or replace
	Leak in carburetor gasket	Inspect and replace if required
	Faulty ignition wiring	Repair/replace correct wiring
	Spark plug wire	Test and replace if necessary
	Incorrect valve lash	Check and adjust if required
	Weak or damaged valve springs	Replace
	Damaged intake/exhaust valves	Replace
	Incorrect carburetor float setting	Check/replace float
	Dirt or water in fuel line, carburetor	Clean lines, carburetor and replace filter
	Plugged fuel tank vent	Clean or replace vent cap
	Muffler damaged or plugged	Repair or replace
	Fuel pump vent dirty	Clean and replace if required
	Fuel pump has a ruptured diaphragm	Replace
	Low compression	Check engine
	Poor quality of fuel	Drain and replace with correct clean fuel

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

Condition	Possible Cause	Correction
POOR LOW SPEED PERFORMANCE	Plugged gas tank vent	Clean or repair
	Choke on	Push choke in
	Carburetor float level incorrect	Check/replace float
	Clutches not shifting out	Replace clutch/clutches
	Fuel pump faulty	Repair or replace
	Insufficient fuel level	Add fuel
	Air leak at carburetor gasket	Repair component
	Spark plug fouled	Clean or replace
	Weak spark	Check magneto
	Incorrect valve lash	Check and adjust
	Belt slipping	Check belt and clutch surfaces Replace belt or clean clutches
	Faulty accelerator adjustment	Check and adjust
	Faulty governor adjustment	Check and adjust
POOR MIDRANGE OR HIGH SPEED PERFORMANCE	Spark plug fouled	Clean or replace
	Weak spark	Check magneto
	Carburetor float not level	Adjust
	Incorrect or plugged main jet	Check size for appropriate altitude. Clean
	Dirty air filter	Clean or replace
	Brake dragging	Perform brake maintenance
	Low compression	Check engine
	Governor not adjusted properly	Adjust
	Faulty accelerator adjustment	Check and adjust
	Faulty governor adjustment	Check and adjust
ENGINE OVERHEATING	Foreign matter in cylinder fins and blower housing	Clean
	Damaged blower housing or fins	Replace
	Damaged or plugged muffler	Repair or replace
	Inadequate oil supply	Check oil system, inspect oil pump, change oil, fill to correct level
	Heavy loads	Lighten load
	Incorrect fuel	Use correct seasonal blend fuel. Do not use old fuel

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

Condition	Possible Cause	Correction
REPEATED SPARK PLUG FOULING	Wrong spark plug type	Replace with correct spark plug
	Wrong spark plug gap	Check and adjust if required
	Faulty magneto	Check and replace if required
	Excessive ring blow by	Check/replace rings
	Poor quality gasoline	Use correct fuel, check bulk storage tank for proper storage and handling
	Air leak allowing dirt to enter system	Repair
	Choke sticking closed	Repair
	Wrong main jet for conditions (high altitude operations)	Replace with correct altitude jet for conditions
CARBURETOR FLOODS ENGINE	Inlet valve/seat dirty	Clean or replace
	Fuel contamination	Clean fuel system/carburetor
	Incorrect float level	Adjust
	Clogged air filter element	Clean or replace
EXCESSIVE SMOKING	Wrong oil weight	Replace with recommended oil
	Dirty oil	Change
	Crankcase overfilled with oil	Drain and fill to recommended level
	Clogged PCV valve	Replace
	Piston rings worn or broken	Replace
	Valves worn	Replace
	Valve seals or valve guides worn	Replace
BACKFIRING	Accelerator limit switch out of adjustment	Adjust
	Loose muffler or leaking gasket	Repair
	Carburetor throttle lever motion restricted	Repair
	Carburetor throttle lever not closing fully	Adjust
	Throttle stop preventing throttle from closing fully	Adjust
	Incorrect adjustment of accelerator, governor and carburetor linkages	Adjust
	Carburetor throttle lever shaft bent	Replace or rebuild carburetor
	Faulty plug wire	Replace
	Faulty magneto	Replace

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

Condition	Possible Cause	Correction
ERRATIC, SURGING, OR SUDDEN CHANGE IN GOVERNED SPEED	Damaged governor spring	Replace
	Problem with adjustment of accelerator, governor and carburetor linkage	Adjust
	Bent governor arm	Repair or replace
	Bent governor shaft	Replace
	Governor failure within the rear axle	Repair

FUEL ACCUMULATION IN THE CRANKCASE

FUEL DISTRIBUTION	Dirty Carburetor	Clean or replace.
	Clogged carburetor vents	Remove carburetor and clean with solvent
	Carburetor float sticking	Disassemble and correct per the service manual
	Faulty fuel pump	Check for correct output. Verify fuel is not returning through the pulse line. Clean vent screen.
	Faulty accelerator adjustment/function	Correct per the service manual
	Dirty or restricted air filter	Replace and clean air box
	High pressure in the fuel system	Check fuel cap for venting. Make sure carburetor vent tubes are venting
	Over choking or faulty choke setting	Instruct operator or adjust to limit choke to 3/4 blade travel
	Wrong carburetor jet for the altitude	Verify per the altitude chart.
MECHANICAL	Faulty Ignition system	Check ignition output per the service manual.
	Low or unbalanced compression	Perform compression or leak down test. Refer to the service manual for the specification.
	Poor valve sealing	Verify by compression or leak down test
OPERATION AND APPLICATION	Engine not reaching full temperature	Increase run time intervals to build higher cylinder temperature
	Continuous use at 1/4 throttle or less at low engine speed	Instruct operator
	Wide open throttle cranking	Instruct operator per operator's manual
	Long and continuous down hill use	Down hill use without the accelerator partially pressed will flood the cylinder with fuel due to no ignition present
	Poor fuel quality	Do not use old fuel. Add stabilizer for extended storage. Have fuel tested for contaminants.
	Use of summer blend fuel in the winter	Correct with fresh fuel

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

CARBURETOR

Condition	Possible Cause	Correction
OVERFLOW/LEAK	Worn inlet valve or dirty valve seat	Replace valve or clean valve seat
	Worn float mounting tang	Replace float
	Worn float pin	Replace pin
	Damaged float bowl gasket	Replace gasket
	Damaged float	Replace float
POOR LOW SPEED PERFORMANCE	Clogged pilot port	Clean pilot port
	Clogged low speed jet	Clean low speed jet
	Loose low speed jet	Tighten jet
POOR FUEL ECONOMY	Loose jets	Tighten jets
	Choke not opening fully	Adjust choke
	Dirty air cleaner	Clean/replace air filter
	Poor fuel quality	Replace with fresh fuel
POOR ACCELERATION	Clogged fuel passages	Clean fuel passages
	Clogged low speed jet or bleed tube	Clean
	Fuel level too low	Adjust float
	Dirty air cleaner	Clean/replace air filter
HARD STARTING	Choke plate not operating properly	Adjust choke system
	Dirty carburetor	Clean carburetor
	Loose carburetor	Tighten carburetor
	Fuel overflow	Inspect float and valve. Repair or replace
	Faulty fuel pump	Replace fuel pump
	Poor fuel quality	Replace with fresh fuel
POOR HIGH SPEED OPERATION	Fuel pump faulty	Replace fuel pump
	Loose main jet	Tighten main jet
	Incorrect fuel level in float bowl	Adjust float
	Dirt in fuel tank or hoses	Clean
	Clogged fuel filter	Replace fuel filter
	Clogged main jet or main jet air passage	Clean jet
	Dirty air filter	Clean/replace filter element
ABNORMAL COMBUSTION (FUEL MIXTURE)	Dirty carburetor	Clean carburetor
	Dirt in fuel tank, hoses or filter	Clean or replace
	Clogged air or fuel filter	Replace
	Poor fuel quality	Replace with fresh fuel

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

Condition	Possible Cause	Correction
LOSS OF POWER (INSUFFICIENT FUEL)	Faulty fuel pump	Replace fuel pump
	Dirty carburetor	Clean carburetor
	Dirt in fuel tank or hoses	Clean
	Clogged fuel filter	Replace fuel filter
	Air leak in system	Check mounting hardware and gaskets. Repair or replace
LOSS OF POWER (INSUFFICIENT AIR)	Dirty air cleaner	Clean/replace filter element
	Throttle linkage	Adjust or Repair
	Blocked air inlet	Clean fuel filter
SURGING	Governor linkage	Refer to SPEED CONTROL section

STARTER / GENERATOR

Condition	Possible Cause	Correction
STARTER IS NOISY	Bolts are loose	Tighten
	Starter/generator has foreign matter inside	Clean starter/generator interior
	Bearings are faulty	Replace
	Bearings contain foreign matter	Replace
	Bearing needs grease	Replace
RECTIFICATION IS IMPERFECT	Load exceeds specification	Adjust load to specification
	Armature bent	Repair or replace if necessary
	Brushes are worn beyond limits	Replace
	Commutator is excessively rough	Smooth with emery cloth
	Incorrect voltage output	Check and replace any components if required
	Commutator is dirty with oil or dust	Clean with a cleaner and dry cloth
	Field coil is shorted or broken	Repair or replace
GENERATOR DOES NOT CHARGE	Corroded or loose battery connections	Clean and tighten battery connections
	Incorrect voltage regulator output	Replace
	Poor voltage regulator ground connection	Repair
	Open or short circuit	Repair or replace
	Faulty starter/generator	Repair starter/generator

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

SUSPENSION AND STEERING

Condition	Possible Cause	Correction
UNEVEN TIRE WEAR	Incorrect tire pressure	Inflate to recommended pressure
	Improper alignment (Incorrect toe in)	Align front tires
	Damaged or worn components	Replace
STIFF STEERING	Rusted or contaminated king pin sleeve or bushings	Replace or clean
	Bent rack	Remove rack and place on flat surface with rack teeth up; If a .015" (.381 mm) feeler gauge will pass under the rack, the rack must be replaced
PLAY IN STEERING	Steering wheel loose	Inspect splines - replace steering wheel if required; tighten steering wheel nut
	Steering components worn	Replace
	Loose wheel bearings	Adjust or replace
VIBRATION	Steering components worn	Replace
	Loose wheel bearings	Adjust or replace
	Out of round tires, wheels, or brake drums	Inspect and replace if out of round
	Loose lug nuts	Tighten to 50 - 85 ft. lbs. (68 - 115 Nm)
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

BRAKE SYSTEM

Condition	Possible Cause	Correction
FAILS BRAKE PERFORMANCE TEST BY STOPPING IN A LONGER DISTANCE THAN NORMAL	Wheel brake failure due to severely worn or damaged components	Replace all severely worn or damaged components
	Brake pedal not returning Brake not adjusting	Check for binding of brake pedal, if necessary adjust/replace the brake pedal Check/adjust for brake pedal free travel Check/replace brake cables Check/replace brake adjusters Check/replace pedal pivot
	Brake shoes wet	Check and make sure brake shoes are dry
	Brake cables damaged or sticky	Check brake cable and replace if sticky or damaged
	Brake shoes severely worn	Replace
	Brake shoes glazed	Sand shoes with emery cloth provided that shoes have .06" (1.5 mm) min. material

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

Condition	Possible Cause	Correction
	System not adjusted properly	Check and adjust per manual
	End of brake cable loose from anchor brackets	Check and repair
IN EXCESS OF 1" (2.5 CM) FREE PEDAL TRAVEL (SOFT PEDAL)	Cracked brake drum	Replace
	Low pedal force at parking brake latch	Adjust per manual
	Brake cables damaged	Replace
	Brake return bumper out of adjustment	Adjust per manual
	End of brake cable loose from anchor brackets	Check and repair
	Wheel brake failure due to severely worn or damaged components	Replace all severely worn or damaged components
LESS THAN 3/4" (1.9 CM) FREE PEDAL TRAVEL (HARD PEDAL)	System not adjusted properly	Adjust per manual
	High pedal force at parking brake latch	Adjust per manual
	Brake cables damaged or sticky	Check brake cable and replace if sticky or damaged
	System not adjusted properly	Check and adjust per manual
	Wheel brake failure due to severely worn or damaged components	Replace all severely worn or damaged components
NEITHER WHEEL LOCKS WHEN PARK BRAKE IS LATCHED. (NOTE: AT FULL SPEED THE WHEELS MAY NOT LOCK, BUT SHOULD BRAKE AGGRESSIVELY).	Incorrect cable adjustment	Return to factory specification
	Excessive brake pedal free travel	Adjust per manual
UNEQUAL BRAKING (ONE WHEEL LOCKS WHILE OTHER ROTATES)	Wheel not locking/not adjusting	Check brake operation of wheel that is **not** locking Adjust per manual
	Sticky/dragging cable	Check for brake lever return Adjust such that brake levers return at equal rate - (Indication of dragging cable)
	Cracked brake drum	Replace
	Brake shoes wet or glazed	Check and make sure shoes are dry
NEITHER WHEEL LOCKS	Rusted or sticky brake pivot hardware	Replace
	Brake system requires complete adjustment	Adjust entire system
	Brake pedal not returning	Check for binding of brake pedal, if necessary adjust/replace the brake pedal Check/adjust brake pedal free travel
GRABBING BRAKES (OVERSENSITIVE)	Moisture has caused surface rust on drums	Apply moderate force to pedal while at maximum level ground speed to remove rust until condition is relieved.
	Brake pivot binding	Check and replace poor components

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Condition	Possible Cause	Correction
PARKING BRAKE HARD TO LATCH	Inadequate free play	Adjust pedal free travel at spherical nut and check that wheel brake actuators are returning fully.
	Sticky/dragging cable	Check for brake lever return Adjust such that brake levers return at equal rate - (Indication of dragging cable)
	Dragging shoes	Check/adjust wheel brakes
PARKING BRAKE WILL NOT STAY LATCHED	Excessive wear	Check for worn latch mechanism, if necessary replace the worn or damaged components.

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Notes:

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Notes:

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GENERAL SPECIFICATIONS

MODEL: RXV
TYPE: GASOLINE POWERED FLEET GOLF CAR
MODEL YEAR: 2016
Part No:. 638541G01

PRODUCT SPECIFICATION

CONFIGURATION HIGHLIGHTS

Engine: 13.5 hp (10.1 kW) Exceeds SAE J1940 Standard, 4 cycle, 24.5 ci (401 cc) single cylinder, air-cooled by Kawasaki

- **Valve Train:** Overhead valve
- **Lubrication:** Pressurized oil system, spin-on oil filter
- **Balancer:** Internal counter rotating balance shaft
- **Fuel System:** Fixed float bowl with remote pulse fuel pump
- **Ignition:** Electronic spark/magneto
- **Air Cleaner:** Replaceable dry cartridge

Electrical: Starter/Generator, solid-state regulator, 12 Volt maintenance free battery (425 CCA, 60 minute reserve)
Drive Train: Automatic, continuously variable transmission (CVT)
Brakes: Dual rear wheel mechanical self-adjusting drum brakes. Single point park brake release with self-compensating system
Transaxle: Differential with helical gears, ground speed governor, forward/reverse
Body Protection: 360° energy transfer bumpers maximize vehicle protection from minor impact

PRODUCT OVERVIEW

Dimensions	
Overall Length	94.5 In (240 cm)
Overall Width	47.0 in (119 cm)
Overall Height (No Canopy)	45.7 in (116 cm)
Overall Height (With Canopy)	68.5 in (174 cm)
Wheel Base	65.7 in (167 cm)
Front Wheel Track	35.5 in (90 cm)
Rear Wheel Track	38.0 in (97 cm)
Gnd Clearance @ Differential	3.3 in (8 cm)

Vehicle Power	
Power Source	4 Cycle 24.5 cu in (401 cc). Low E OHV
Valve Train	Single Cylinder OHV
Horsepower (kW)	13.5 hp (10.1 kW) Exceeds SAE J1940 Std.
Electrical System	Starter/Generator. Solid State Regulator
Batteries (Qty, Type)	One, 12 Volt Maintenance Free
Key or Pedal Start	Pedal
Air Cleaner	Industrial Rated Dry Filter
Lubrication	Pressurized Oil System
Oil Filter	Spin On
Cooling System	Air Cooled
Fuel Capacity (Early Prod.)	5.9 Gallon (23.1 L) tank
Fuel Capacity (Late Prod.)	5.2 Gallon (19.8 L) tank
Drive Train	Continuously variable transmission (CVT)
Transaxle	Differential with helical gears
Gear Selection	Forward - Reverse
Rear Axle Ratio	11.42:1 (Forward) 15.78:1 (Reverse)

Performance	
Seating Capacity	2 Person
Dry Weight	697 lb (316 kg)
Curb Weight	747 lb (339 kg)
Vehicle load capacity	800 lb (360 kg)
Outside Clearance Circle	19.0 ft (5.8 m)
Intersecting Aisle Clearance	N/A
Speed (Level Ground)	12 mph ± 0.5 mph (19.3 kph ± 0.8 kph)
Towing Capacity	3 E-Z-GO Golf Cars with approved tow bars

Steering & Suspension	
Steering	Double Ended Rack & Pinion
Front Suspension	Independent A-Arm Coil Over Shock
Rear Suspension	Mono-Leaf Springs With Hydraulic Shocks
Brake	Rear Wheel Mechanical Self-Adjusting Drums
Parking Brake	Self-compensating, single point engagement
Front Tires	18 x 8.50 - 8 (4 Ply Rated)
Rear Tires	18 x 8.50 - 8 (4 Ply Rated)

Body & Chassis	
Frame	Welded Steel. DuraShield™ powder coat
Body & Finish	Injection molded TPO
Standard Color	Forest Green

CE Noise, Vibration & Harshness	
Noise	Sound pressure; continued A-weighted ≤ 70 dB(a)
Vibration, WBV	Highest value of weighted acceleration less than 2.5 m/s²
Vibration, HAV	Highest value of weighted acceleration less than 2.5 m/s²

Uncertainty of measurement is 0.98 m/s². Measurement methods were applied per ISO 2631 & ISO 5349 standards under conditions of typical vehicle surfaces.

Some items shown may be optional equipment

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

A Textron Company

MODEL: RXV FREEDOM™
TYPE: GASOLINE POWERED PERSONAL GOLF CAR
MODEL YEAR: 2016
Part No:. 638543G01

PRODUCT SPECIFICATION

CONFIGURATION HIGHLIGHTS

Engine: 13.5 hp (10.1 kW) Exceeds SAE J1940 Standard, 4 cycle, 24.5 ci (401 cc) single cylinder, air-cooled by Kawasaki

- **Valve Train:** Overhead valve
- **Lubrication:** Pressurized oil system, spin-on oil filter
- **Balancer:** Internal counter rotating balance shaft
- **Fuel System:** Fixed float bowl with remote pulse fuel pump
- **Ignition:** Electronic spark/magneto
- **Air Cleaner:** Replaceable dry cartridge

Electrical: Starter/Generator, solid-state regulator, 12 Volt maintenance free battery (425 CCA, 60 minute reserve)
Drive Train: Automatic, continuously variable transmission (CVT)
Brakes: Dual rear wheel mechanical self-adjusting drum brakes. Single point park brake release with self-compensating system
Transaxle: Differential with helical gears, ground speed governor, forward/reverse
Body Protection: 360° energy transfer bumpers maximize vehicle protection from minor impact

PRODUCT OVERVIEW

Dimensions	
Overall Length	94.5 In (240 cm)
Overall Width	47.0 in (119 cm)
Overall Height (No Canopy)	45.7 in (116 cm)
Overall Height (With Canopy)	68.5 in (174 cm)
Wheel Base	65.7 in (167 cm)
Front Wheel Track	35.5 in (90 cm)
Rear Wheel Track	38.0 in (97 cm)
Gnd Clearance @ Differential	3.3 in (8 cm)

Vehicle Power	
Power Source	4 Cycle 24.5 cu in (401 cc)
Valve Train	Single Cylinder OHV
Horsepower (kW)	13.5 hp (10.1 kW) Exceeds SAE J1940 Std.
Electrical System	Starter/Generator. Solid State Regulator
Batteries (Qty, Type)	One, 12 Volt Maintenance Free
Key or Pedal Start	Pedal
Air Cleaner	Industrial Rated Dry Filter with Remote Intake
Lubrication	Pressurized Oil System
Oil Filter	Spin On
Cooling System	Air Cooled
Fuel Capacity (Early Prod.)	5.9 Gallon (23.1 L) Tank
Fuel Capacity (Late Prod.)	5.2 Gallon (19.8 L) Tank
Drive Train	Continuously variable transmission (CVT)
Transaxle	Differential with helical gears
Gear Selection	Forward - Reverse
Rear Axle Ratio	11.42:1 (Forward) 15.78:1 (Reverse)

Performance	
Seating Capacity	2 Person
Dry Weight	697 lb (316 kg)
Curb Weight	747 lb (339 kg)
Vehicle load capacity	800 lb (360 kg)
Outside Clearance Circle	19.0 ft (5.8 m)
Intersecting Aisle Clearance	N/A
Speed (Level Ground)	19 mph ± 0.5 mph (31 kph ± 0.8 kph)
Towing Capacity	3 E-Z-GO Golf Cars with approved tow bars

Steering & Suspension	
Steering	Double Ended Rack & Pinion
Front Suspension	Independent A-Arm Coil Over Shock
Rear Suspension	Mono-Leaf Springs With Hydraulic Shocks
Brake	Rear Wheel Mechanical Self-Adjusting Drums
Parking Brake	Self-compensating, single point engagement
Front Tires	18 x 8.50 - 8 (4 Ply Rated)
Rear Tires	18 x 8.50 - 8 (4 Ply Rated)

Body & Chassis	
Frame	Welded Steel. DuraShield™ powder coat
Body & Finish	Injection molded TPO
Standard Color	Forest Green

CE Noise, Vibration & Harshness	
Noise	Sound pressure; continued A-weighted ≤ 70 dB(a)
Vibration, WBV	Highest value of weighted acceleration less than 2.5 m/s²
Vibration, HAV	Highest value of weighted acceleration less than 2.5 m/s²

Uncertainty of measurement is 0.98 m/s². Measurement methods were applied per ISO 2631 & ISO 5349 standards under conditions of typical vehicle surfaces.

Some items shown may be optional equipment

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A Textron Company

MODEL: SHUTTLE™ 2+2 RXV
TYPE: GASOLINE PERSONNEL CARRIER
MODEL YEAR: 2016
Part No:. 638545G01

PRODUCT SPECIFICATION

CONFIGURATION HIGHLIGHTS

Engine:13.5 hp (10.1 kW) Exceeds SAE J1940 Standard, 4 cycle, 24.5 ci (401 cc) single cylinder, air-cooled by Kawasaki

- Valve Train: Overhead valve
- Lubrication: Pressurized oil system, spin-on oil filter
- Balancer: Internal counter rotating balance shaft
- Fuel System: Fixed float bowl with remote pulse fuel pump
- Ignition: Electronic spark/magneto
- Air Cleaner: Replaceable dry cartridge

Electrical:	Starter/Generator, solid-state regulator, 12 Volt maintenance free battery (425 CCA, 60 minute reserve)
Drive Train	Automatic, continuously variable transmission (CVT)
Brakes:	Dual rear wheel mechanical self-adjusting drum brakes. Automatic single point park brake release with self-compensating system
Transaxle:	Differential with helical gears, ground speed governor, forward/reverse
Body Protection:	360° energy transfer bumpers maximize vehicle protection from minor impact

PRODUCT OVERVIEW

Dimensions	
Overall Length	105.5 in (268 cm)
Overall Width	47.0 in (119 cm)
Overall Height (No Canopy)	45.7 in (116 cm)
Overall Height (With Canopy)	74.0 in (188 cm)
Wheel Base	65.7 in (167 cm)
Front Wheel Track	35.5 in (90 cm)
Rear Wheel Track	38.0 in (97 cm)
Gnd Clearance @ Differential	3.3 in (8 cm)

Performance	
Seating Capacity	4 Person
Dry Weight	790 lb (360 kg)
Curb Weight	850 lb (385 kg)
Vehicle load capacity	720 lb (325 kg)
Outside Clearance Circle	19.0 ft (5.8 m)
Intersecting Aisle Clearance	N/A
Speed (Level Ground)	14 mph ± 0.5 mph (23 kph ± 0.8 kph)
Towing Capacity	N/A

Vehicle Power	
Power Source	4 Cycle 24.5 cu in (401 cc)
Valve Train	Single Cylinder OHV
Horsepower (kW)	13.5 hp (10.1 kW) Exceeds SAE J1940 Std.
Electrical System	Starter/Generator. Solid State Regulator
Batteries (Qty, Type)	One, 12 Volt Maintenance Free
Key or Pedal Start	Pedal
Air Cleaner	Industrial Rated Dry Filter
Lubrication	Pressurized Oil System
Oil Filter	Spin On
Cooling System	Air Cooled
Fuel Capacity (Early Prod.)	5.9 Gallon (22.1 L) Tank
Fuel Capacity (Late Prod.)	5.2 Gallon (19.8 L) Tank
Drive Train	Continuously variable transmission (CVT)
Transaxle	Differential with helical gears
Gear Selection	Forward - Reverse
Rear Axle Ratio	11.42:1 (Forward) 15.78:1 (Reverse)

Steering & Suspension	
Steering	Double Ended Rack & Pinion
Front Suspension	Independent A-Arm Coil Over Shock
Rear Suspension	Multi-Leaf Spring with Hydraulic Shocks
Brake	Rear Wheel Mechanical Self-Adjusting Drums
Parking Brake	Self-compensating, single point engagement
Front Tires	18 x 8.50 - 8 (4 Ply Rated)
Rear Tires	18 x 8.50 - 8 (4 Ply Rated)

Body & Chassis	
Frame	Welded steel. DuraShield™ powder coat
Body & Finish	Injection molded TPO
Standard Color	Forest Green

CE Noise, Vibration & Harshness	
Noise	Sound pressure; continued A-weighted ≤
Vibration, WBV	Highest value of weighted acceleration less than 2.5 m/s²
Vibration, HAV	Highest value of weighted acceleration less than 2.5 m/s²

Uncertainty of measurement is 0.98 m/s². Measurement methods were applied per ISO 2631 & ISO 5349 standards under conditions of typical vehicle surfaces.

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E-Z-GO
A Textron Company

MODEL: RXV SHUTTLE™ 2+2 High Speed Gas
TYPE: GASOLINE PERSONNEL CARRIER
MODEL YEAR: 2016
Part No:. 638547G01

PRODUCT SPECIFICATION

CONFIGURATION HIGHLIGHTS

Engine: 13 hp (9.7 kW) Exceeds SAE J1940 Standard, 4 cycle, 24.5 ci (401 cc) single cylinder, air-cooled by Kawasaki

- **Valve Train:** Overhead valve
- **Lubrication:** Pressurized oil system, spin-on oil filter
- **Balancer:** Internal counter rotating balance shaft
- **Fuel System:** Fixed float bowl with remote pulse fuel pump
- **Ignition:** Electronic spark/magneto
- **Air Cleaner:** Replaceable dry cartridge

Electrical:	Starter/Generator, solid-state regulator, 12 Volt maintenance free battery (425 CCA, 60 minute reserve)
Drive Train:	Automatic, continuously variable transmission (CVT)
Brakes:	Dual rear wheel mechanical self-adjusting drum brakes. Automatic single point park brake release with self-compensating system
Transaxle:	Differential with helical gears, ground speed governor, forward/reverse
Body Protection:	360° energy transfer bumpers maximize vehicle protection from minor impact

PRODUCT OVERVIEW

Dimensions	
Overall Length	105.5 in (268 cm)
Overall Width	47.0 in (119 cm)
Overall Height (No Canopy)	45.7 in (116 cm)
Overall Height (With Canopy)	74.0 in (188 cm)
Wheel Base	65.7 in (167 cm)
Front Wheel Track	35.5 in (90 cm)
Rear Wheel Track	38.0 in (97 cm)
Gnd Clearance @ Differential	3.3 in (8 cm)

Vehicle Power	
Power Source	4 Cycle 24.5 cu in (401 cc)
Valve Train	Single Cylinder OHV
Horsepower (kW)	13 hp (9.7 kW) Exceeds SAE J1940 Std.
Electrical System	Starter/Generator. Solid State Regulator
Batteries (Qty, Type)	One, 12 Volt Maintenance Free
Key or Pedal Start	Pedal
Air Cleaner	Industrial Rated Dry Filter
Lubrication	Pressurized Oil System
Oil Filter	Spin On
Cooling System	Air Cooled
Fuel Capacity (Early Prod.)	6.2 Gallon (23.5 L) Tank
Fuel Capacity (Late Prod.)	5.2 Gallon (19.8 L) Tank
Drive Train	Continuously variable transmission (CVT)
Transaxle	Differential with helical gears
Gear Selection	Forward - Reverse
Rear Axle Ratio	11.42:1 (Forward) 15.78:1 (Reverse)

Performance	
Seating Capacity	4 Person
Dry Weight	790 lb (360 kg)
Curb Weight	850 lb (385 kg)
Vehicle load capacity	720 lb (325 kg)
Outside Clearance Circle	19.0 ft (5.8 m)
Intersecting Aisle Clearance	N/A
Speed (Level Ground)	17.5 mph ± 0.5 mph (28.5 kph ± 0.8 kph)
Towing Capacity	N/A

Steering & Suspension	
Steering	Double Ended Rack & Pinion
Front Suspension	Independent A-Arm Coil Over Shock
Rear Suspension	Multi-Leaf Spring with Hydraulic Shocks
Brake	Rear Wheel Mechanical Self-Adjusting Drums
Parking Brake	Self-compensating, single point engagement
Front Tires	18 x 8.50 - 8 (4 Ply Rated)
Rear Tires	18 x 8.50 - 8 (4 Ply Rated)

Body & Chassis	
Frame	Welded steel. DuraShield™ powder coat
Body & Finish	Injection molded TPO
Standard Color	Forest Green

CE Noise, Vibration & Harshness	
Noise	Sound pressure; continued A-weighted ≤ 70 dB(a)
Vibration, WBV	Highest value of weighted acceleration less than 2.5 m/s²
Vibration, HAV	Highest value of weighted acceleration less than 2.5 m/s²

Uncertainty of measurement is 0.98 m/s². Measurement methods were applied per ISO 2631 & ISO 5349 standards under conditions of typical vehicle surfaces.

Some items shown may be optional equipment

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

APPROXIMATE VEHICLE DIMENSIONS

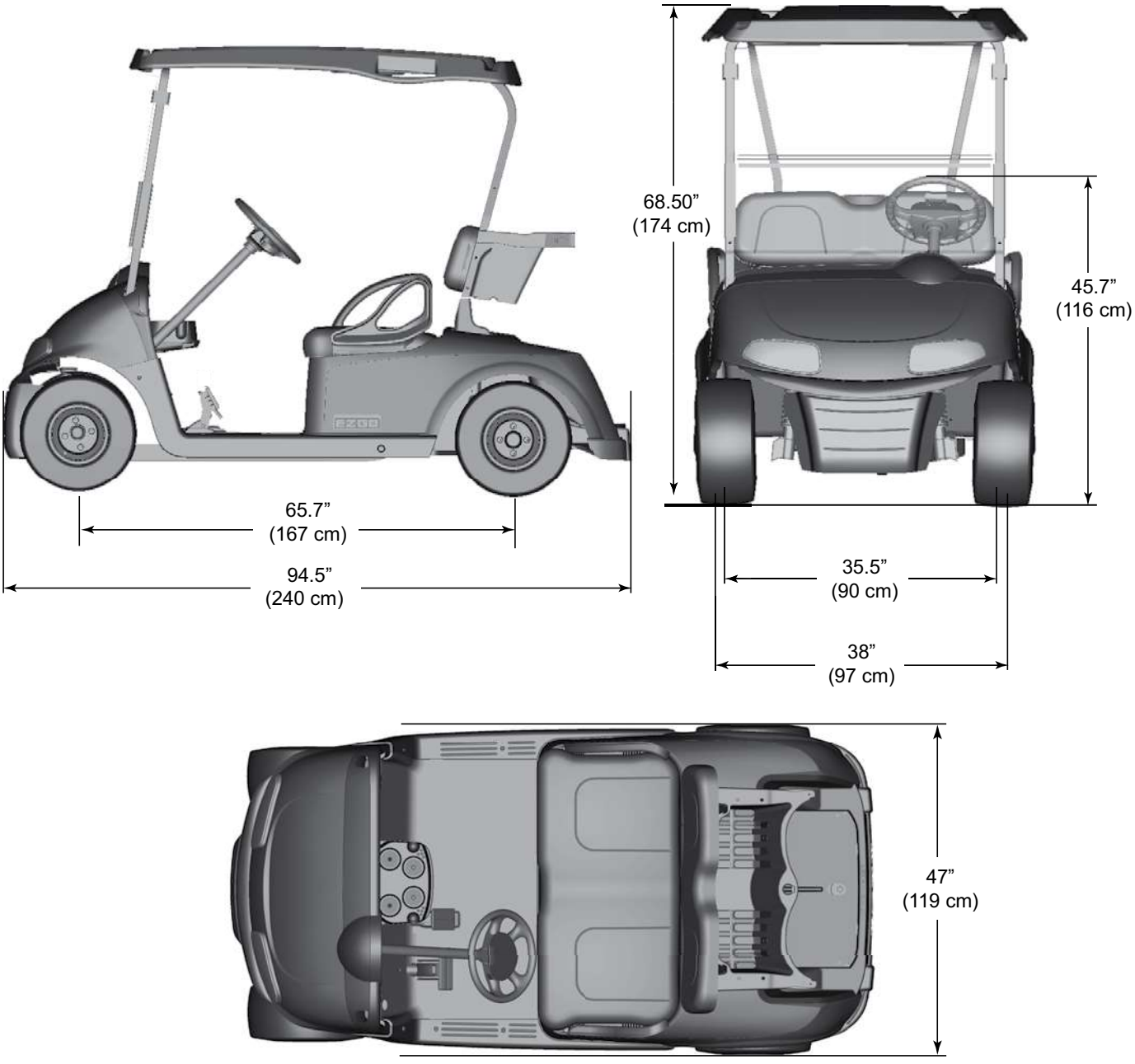

Fig. 1 Fleet and Freedom Vehicle Dimensions

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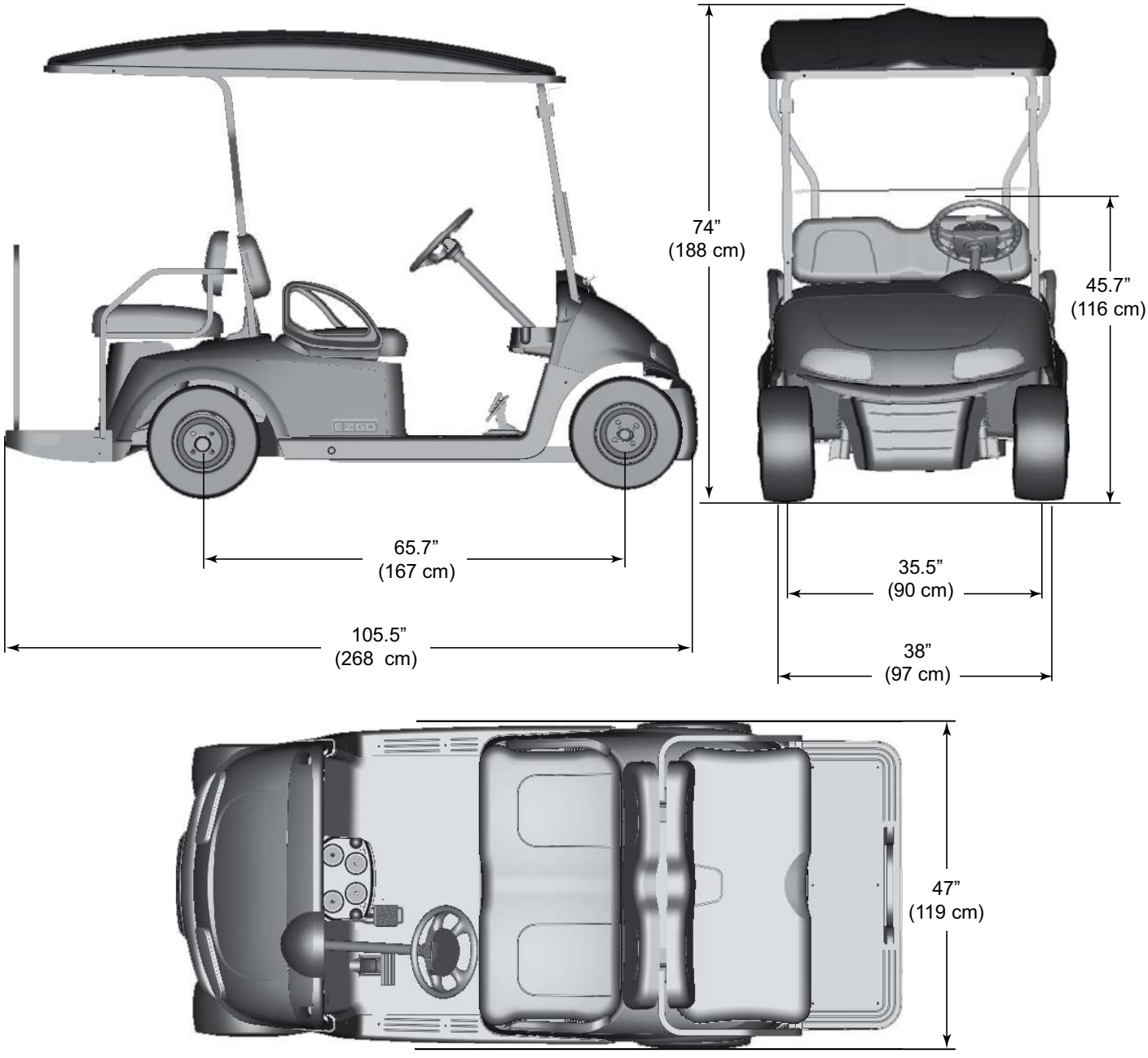

Fig. 2 Shuttle 2 + 2 Vehicle Dimensions

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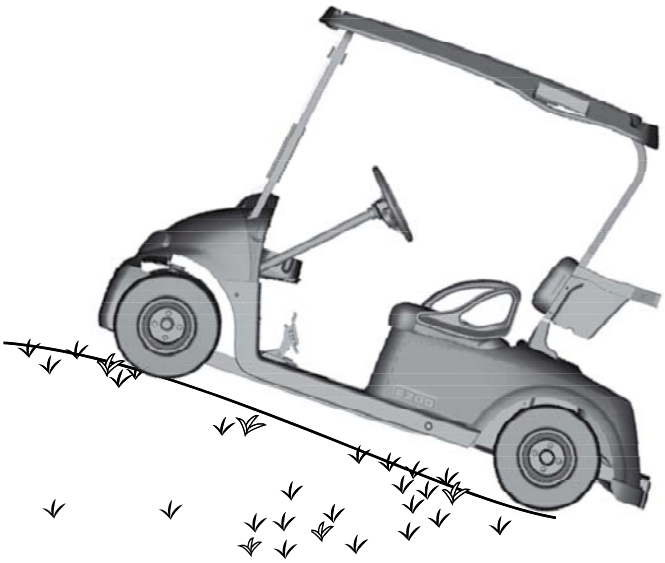
TURNING DIAMETER AND INCLINE INFORMATION

RECOMMENDED MAX SIDE TILT
25% GRADE OR 14° MAX



RECOMMENDED MAX RAMP
25% GRADE OR 14° MAX

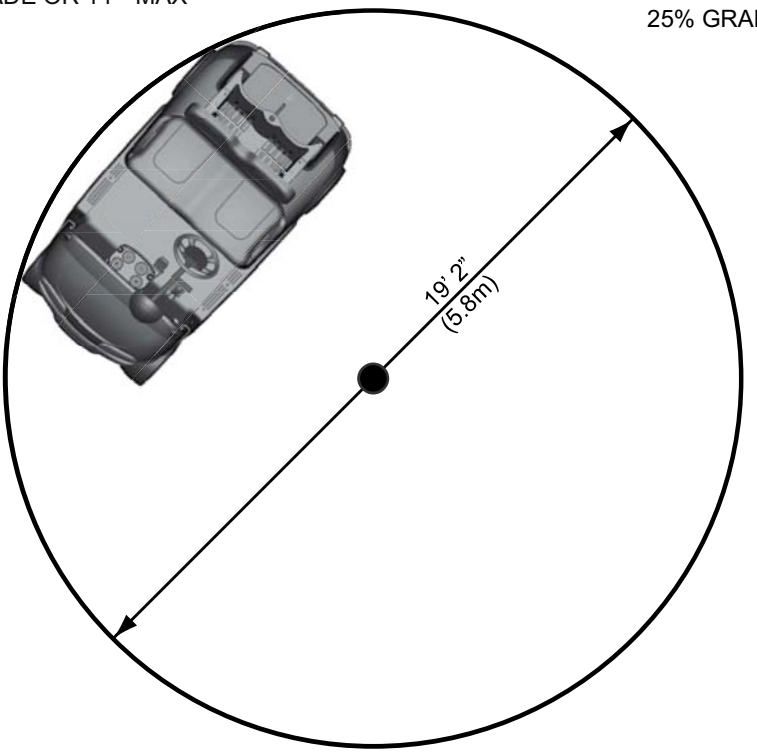


Fig. 3 Vehicle Incline Specifications and Turning Diameter

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Notes:

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PERIODIC SERVICE SCHEDULE

PERIODIC SERVICE SCHEDULE

✓ - CHECK **C&A** - CHECK & ADJUST **CL** - CLEAN **R** - REPLACE

REMARKS	before each use DAILY	WEEKLY	20 rnds/20 hrs 100 miles/160 kms MONTHLY	60 rnds/60 hrs 300 miles/500 kms QUARTERLY	125 rnds/125 hrs 600miles/1000 kms SEMI-ANNUAL	250 rnds/250 hrs 1200miles/2000 kms ANNUAL	5 YEARS
Tires - pressure, condition of tires and rims	✓	✓	✓	✓	✓	✓	
Hardware - loose or missing	✓	✓	✓	✓	✓	✓	
Reverse Warning Indicator	✓	✓	✓	✓	✓	✓	
Overall Vehicle Condition	✓	✓	✓	✓	✓	✓	
Battery - charge condition, loose terminals, corrosion, hold down and hardware	✓	✓	CL	CL	CL	CL	
Brake (Mechanical) - smooth operation	✓	✓	✓	✓	✓	✓	
Brakes - aggressive stop test			C&A	C&A	C&A	C&A	
Parking Brake - operation, does it hold on a hill	✓	✓	C&A	C&A	C&A	C&A	
Accelerator - smooth operation	✓	✓	✓	✓	✓	✓	
Starter/Generator Belt - tension, wear, cracks		✓	✓	✓	✓	✓	
Wiring - loose connections, broken or missing insulation			✓	✓	✓	✓	
Carburetor Linkage - attachment			C&A	C&A	C&A	C&A	
Carburetor						CL	
Direction Selector - attachment and mechanism			C&A	C&A	C&A	C&A	
Cooling Fan - build up of debris on blower housing screen	CL	CL	CL	CL	CL	CL	
Engine Oil ** - oil level	C&A	C&A	C&A	C&A	C&A	C&A	
Engine Oil ** and Filter - drain and change					R	R	
Engine - noise, vibration, acceleration, oil leaks			C&A	C&A	C&A	C&A	
Valves - check cold - Ref: Repair and Service Manual						C&A	
Cylinder Head and Piston - remove carbon							CL
Choke Cable - smooth movement and adjustment			C&A	C&A	C&A	C&A	
Cooling Fan - buildup of foreign matter inside housing and fins			CL	CL	CL	CL	
Steering Assembly - excessive play, loose or missing hardware			✓	✓	✓	✓	

**Initial oil change after 8 hours of run time.

NOTE: Some maintenance items must be serviced more frequently on vehicles used under severe driving conditions.

PERIODIC SERVICE SCHEDULE

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

REMARKS	before each use DAILY	WEEKLY	20 rnds/20 hrs 100 miles/160 kms MONTHLY	60 rnds/60 hrs 300 miles/500 kms QUARTERLY	125 rnds/125 hrs 600miles/1000 kms SEMI-ANNUAL	250 rnds/250 hrs 1200miles/2000 kms ANNUAL	5 YEARS
Tie Rods - excessive play, bent rods, loose or missing hardware			✓	✓	✓	✓	
Rear Axle - fluid level, oil leakage, noise, loose or missing hardware			✓	✓	✓	✓	
Rear Axle - replace fluid							R
Rear Suspension - shock oil leakage, worn bushings, loose or missing hardware				✓	✓	✓	
Front Suspension - strut oil leakage, excessive play in hubs or kingpins, worn bushings, loose or missing hardware			✓	✓	✓	✓	
Front Wheel Alignment - unusual tire wear				C&A	C&A	C&A	
Fuel Level	✓	✓	✓	✓	✓	✓	
Fuel System - leaks at tank, cap, system lines for cracks/deterioration, filters, pump				✓	✓	✓	
Fuel Filter						R	
Spark Plug						R	
Throttle/Governor Linkage - operation and governed speed				✓	✓	✓	
Air Filter Element - check and replace as necessary					✓	✓	
Drive Belt - cracks, frayed, excessive wear					✓	✓	

**Initial oil change after 8 hours of run time.

NOTE: Some maintenance items must be serviced more frequently on vehicles used under severe driving conditions.

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

Notes:

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

Notes:

NOTICE

Read the following information and warnings before operating vehicle:

⚠ WARNING

To prevent personal injury or death, observe the following:

When vehicle is to be left unattended, engage parking brake, move direction selector to neutral, turn key to OFF position and remove from key switch.

Drive vehicle only as fast as terrain and safety considerations allow. Consider environmental factors which effect the terrain and the ability to control the vehicle.

Avoid driving fast down hill. Sudden stops or change of direction may result in loss of control. Use brake to control speed when traveling down an incline.

Use extra care and reduced speed when driving on poor surfaces, such as loose dirt, wet grass, gravel, etc.

All travel should be directly up or down hills; use extra care if ever forced to drive across an incline.

Stay in designated areas and avoid steep slopes. Activate the parking brake when the vehicle is parked.

Keep feet, legs, hands and arms inside vehicle at all times.

Avoid extremely rough terrain.

Check area behind the vehicle before operating in reverse.

Make sure direction selector is in correct position before starting the vehicle.

Slow down before and during turns. All turns should be executed at reduced speed.

Always bring vehicle to a complete stop before shifting direction selector.

See GENERAL SPECIFICATIONS for vehicle load and seating capacity.

In any product, components will eventually fail to perform properly as the result of normal use, age, wear or abuse.

It is impossible to anticipate all possible component failures or the manner in which they may fail.

A vehicle requiring repair indicates that it is no longer functioning as designed and therefore should be considered potentially hazardous.

Use extreme care when working on vehicle. When diagnosing, removing or replacing any components that are not operating properly, take time to consider the safety of yourself and others around you should the component move unexpectedly.

Some components are heavy, spring loaded, highly corrosive, explosive, may produce high amperage or reach high temperatures. Battery acid and hydrogen gas could result in serious bodily injury to the technician/mechanic and bystanders if not treated with utmost caution. Do not put hands, face, feet or body in a location that could expose them to injury should an unexpected situation occur.

Always use the tools listed in the tool list and wear approved safety equipment.

⚠ WARNING

Before working on vehicle, remove all jewelry (rings, watches, necklaces, etc.).

Be sure no loose clothing or hair can contact moving parts.

Do not touch hot objects.

Raise rear of vehicle and support on jack stands before running or adjusting powertrain.

Wear eye protection when working on or around the vehicle. In particular, use care when working around the battery, using solvents, or compressed air.

Hydrogen gas forms when charging battery. Do not charge the battery without adequate ventilation.

Do no permit open flame or smokers in an area being used for charging the battery. A concentration of 4% hydrogen gas or more is explosive.

Textron Specialized Vehicles,
1451 Marvin Griffin Road, Augusta, Georgia 30906-3852 USA

Service Parts Manuals, as well as Repair and Service Manuals
are available from a local Distributor, an authorized Branch,
TSV Genuine Parts and Accessories Department or at www.shopezgo.com.