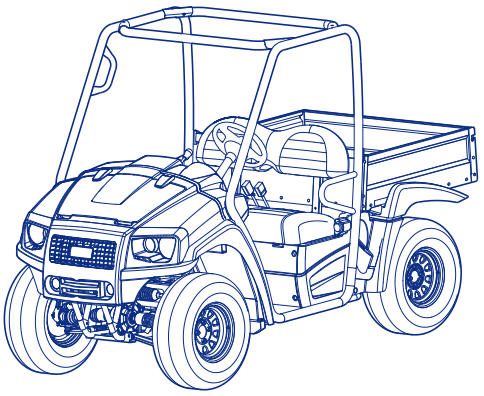
NEW HOLLAND

Rustler™ 115



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NEW HOLLAND AGRICULTURE

SAFETY DETAILS

To ensure the safety of those servicing these vehicles, and to protect the vehicles from possible damage resulting from improper service or maintenance, the procedures in this manual must be followed.

It is important to note that throughout this manual there are statements labeled DANGER, WARNING, or CAUTION. These special statements relate to specific safety issues, and must be read, understood, and heeded before proceeding with procedures. There are statements labeled NOTE, which provide other essential service or maintenance information.

PERSONAL SAFETY

⚠ DANGER

- **A DANGER indicates an immediate hazard that will result in severe personal injury or death. The color associated with Danger is RED.**

⚠ WARNING

- **A WARNING indicates an immediate hazard that could result in severe personal injury or death. The color associated with Warning is ORANGE.**

⚠ CAUTION

- **A CAUTION with the safety alert symbol indicates a hazard or unsafe practice that could result in minor personal injury. The color associated with Caution is YELLOW.**

MACHINE SAFETY

CAUTION

- **A CAUTION without the safety alert symbol indicates a potentially hazardous situation that could result in property damage.**

A CAUTION, without the safety alert symbol, is intended for machine and property safety. It is used throughout this manual followed by specific instructions to prevent machine or property damage. Failure to follow these CAUTION messages could result in machine or property damage.

INFORMATION

NOTE: *Instructions that clarify steps, procedures, or other information in this manual.*

4.5. Plug the fuel tank vent nipple so that it is air tight. The manufacturer recommends using a slip-on vinyl cap.

5. Remove both spark plugs, and pour 1/2 ounce (14.2 mL) of SAE 10 weight oil through each of the two spark plug holes. Rotate the engine crankshaft by hand several times, then install both spark plugs.
6. Change engine oil. **See Engine Oil and Filter Change on page 10-7.**
7. Disconnect the battery cables, negative (–) cable first. **See WARNING "To avoid unintentionally starting..." in General Warning on page 1-2.**
8. The battery should be clean and free of corrosion. Wash the battery top and terminals with a solution of baking soda and water (1 cup (237 mL) baking soda per 1 gallon (3.8 L) of water). Rinse the solution off the battery. Do not allow this solution to enter the battery. Be sure the terminals are tight. Let the terminals dry and then coat them with Battery Terminal Protector Spray (P/N CLC1014305).
9. Adjust the tires to the recommended tire pressure. Section 2 — Vehicle Specifications
10. Perform semiannual periodic lubrication. **See Periodic Maintenance on page 10-1.**
11. Thoroughly clean the front body, rear body, seats, cargo bed, engine compartment, and underside of vehicle.
12. Do not engage the park brake. Chock the wheels to prevent the vehicle from rolling.

RETURNING THE STORED VEHICLE TO SERVICE

1. Make sure the key switch is in the OFF position and the Forward/Reverse handle is in the NEUTRAL position. Chock the wheels.
2. Restore the fuel system to operation**.**
   2.1. Remove the plug from the fuel tank vent.
   2.2. Connect the vent tube to the fuel tank vent.
3. Connect the battery cables, positive (+) cable first, and tighten the terminals to 80 in-lb (9 N·m). Coat terminals with Battery Terminal Protector Spray (P/N CLC1014305).
4. Completely open the fuel shut-off valve **(Figure 3-7, Page 3-4)**. Ensure the valve is fully open. A partially closed fuel shut-off valve combined with the use of the choke can result in a fouled spark plug and engine failure.
5. Place the Forward/Reverse handle in the NEUTRAL position. Crank the engine until fuel is pumped into the carburetor and the fuel lines and the engine starts. Turn the engine off. **See following NOTE.**

NOTE: *Due to the oil added to the gasoline engine in preparation for storage, the engine may smoke excessively for a short time when it is run for the first time after storage.*

6. Perform the Pre-Operation and Daily Safety Checklist and the Performance Inspection on page 10-2.

LIFTING THE VEHICLE

See General Warning on page 1-2.

LIFTING ONLY THE FRONT

1. Place vehicle on a level surface.
2. Turn the key switch OFF and remove the key. Place the Forward/Reverse handle in NEUTRAL and set the park brake. Chock the rear wheels.

4. Remove bolts located under hood, inside front cargo compartment on front top edge **(Figure 4-7, Page 4-6)**.

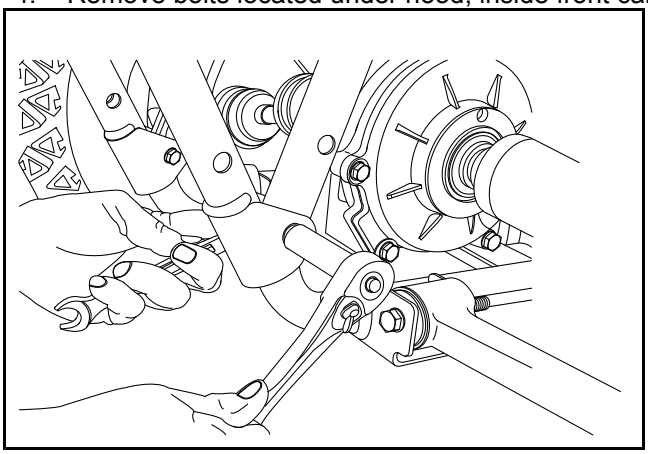

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Figure 4-8 Front Cowl Removal – loosening lower fascia mounting frame bolts

5. Loosen, but do not remove, lower front fascia mounting frame bolts **(Figure 4-8, Page 4-7)**.

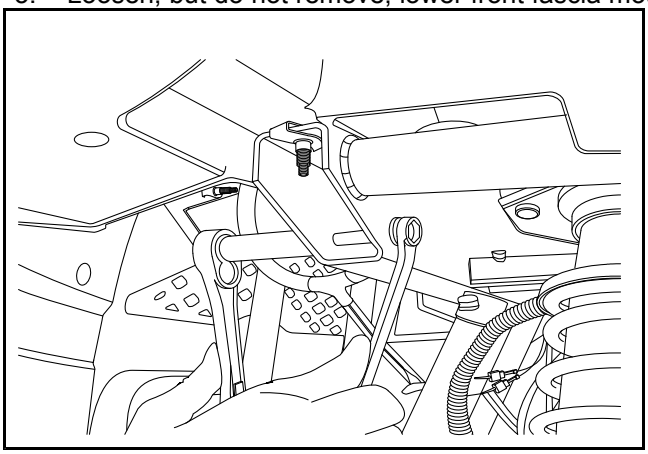

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Figure 4-9 Front Cowl Removal – unbolting upper fascia mounting frame

6. Remove upper front fascia mounting frame bolts **(Figure 4-9, Page 4-7)**.

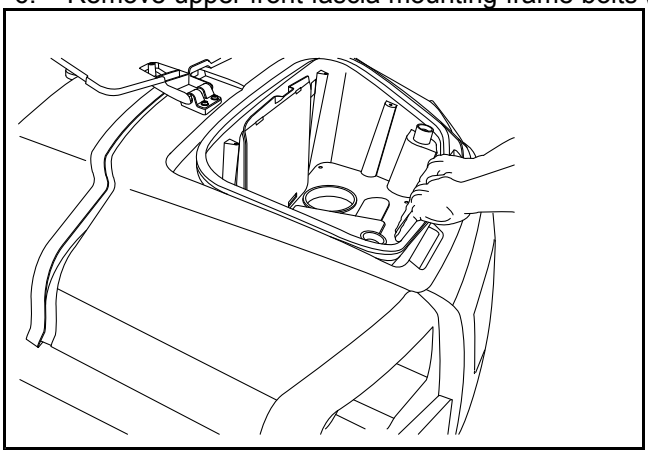

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Figure 4-10 Front Cowl Removal – separating cowl from dash groove

7. Grip cowl and pull cowl forward slightly to disengage the cowl from the dash groove **(Figure 4-10, Page 4-7)**.

ROPS INSTALLATION

NOTE: *Do not tighten the hardware until after the ROPS assembly is competed.*

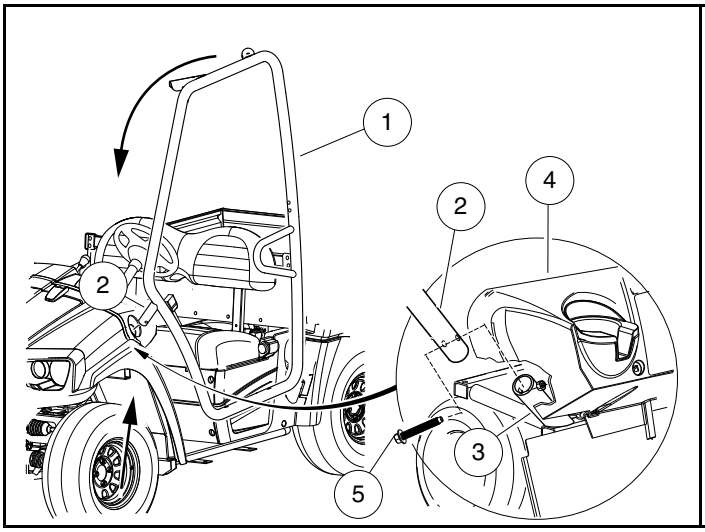

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Figure 4-30 Side-Tube and Front Support

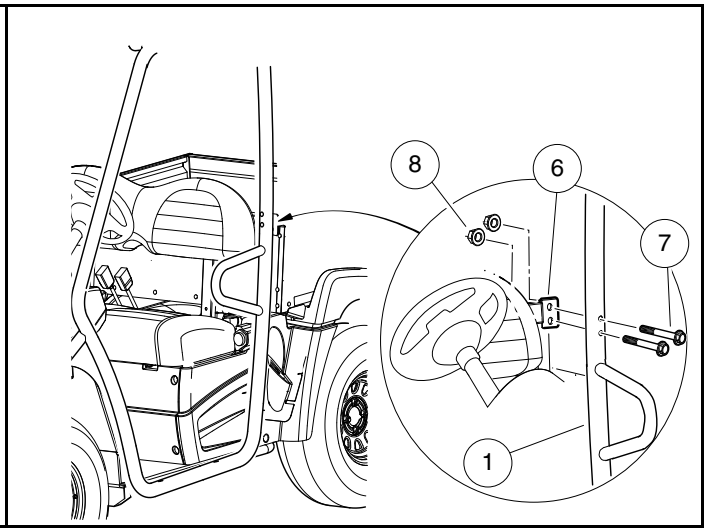

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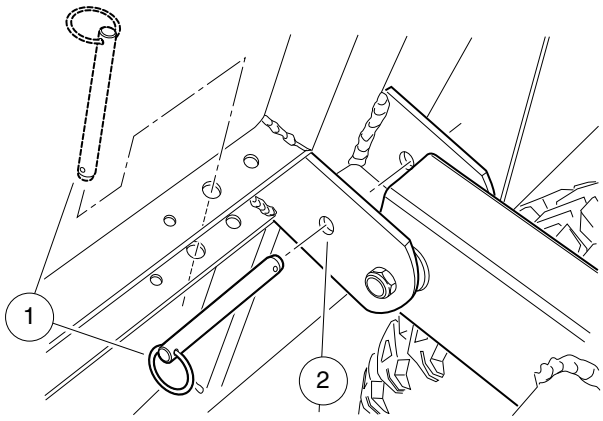
Figure 4-31 Side-Tube and Seat Back Support

1. Position the ROPS side-tube (1) to the drivers-side of the vehicle **(Figure 4-29, Page 4-16)**.
2. Tilt the top of the side-tube (1) forward while inserting the side tube support (2) into the (vehicle) frame support (3) (to the outside of the dashboard (4) **(Figure 4-30, Page 4-17)**.
3. From under the front drivers-side wheel well, loosely secure the forward support of the side-tube to the frame support with one M10 x 1.5-65 black flanged head bolt (5) (there is a weld nut affixed to the frame support).
4. Position the rear of the side-tube (1) to the seat back support (6) and loosely secure with two M10 x 1.5-65 black flanged head bolts (7) and two M10 x 1.5 flanged locknuts (8) **(Figure 4-31, Page 4-17)**. **See following NOTE.**

NOTE: *Make sure the bolt heads are oriented to the inside of the ROPS structure.*

It may be necessary to tap the ROPS with a rubber mallet in order for it to align properly.

5. Loosely secure the bottom of the side tube to the two tabs (18) on the vehicle with two M10 x 1.5-65 black flanged head bolts (9) and two M10 x 1.5 flanged locknuts (10) **(Figure 4-29, Page 4-16)**.
6. Repeat steps 2.1 through 2.5 on the passenger-side of the vehicle.
7. Position the top front cross tube (11) to both side tubes so the warning decals (20,21) are visible to the driver. Loosely secure with two M10 x 1.5-65 black flanged head bolts (12) and two M10 x 1.5 flanged locknuts (13).
8. Loosely secure the top rear cross tube (14) to both side tubes with two M10 x 1.5-65 black flanged head bolts (15) and two M10 x 1.5 flanged locknuts (16).
9. Tighten the cross tube hardware (12,13,15,16) and forward support hardware (5) to 25-30 ft-lb (33.9-40.7 N·m). **See following CAUTION.**
10. Tighten the hardware (9,10) on the bottom of the side tube and the hardware to the seat back support (7,8) to 15-18 ft-lb (20.3-24.4 N·m). **See following CAUTION.**



1. Locking Pin 2. Bed Locking Pin Holes

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Figure 5-11 Bed Locking Pin

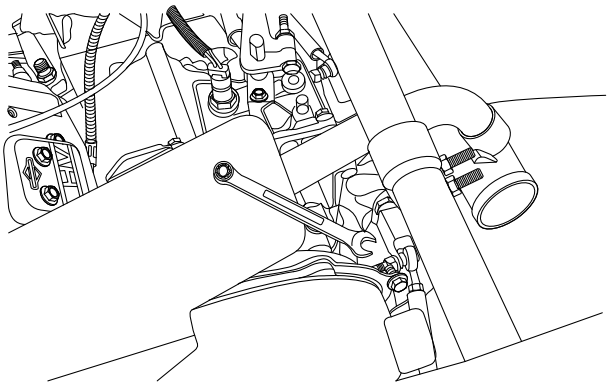

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Figure 5-12 Remove Exhaust Heat Shield

5. Detach accelerator cable extension spring **(Figure 5-13, Page 5-5)**.
6. Loosen cable clamp that secures accelerator cable **(Figure 5-14, Page 5-5)**. This will allow additional travel so that the cable can be disconnected at pedal.

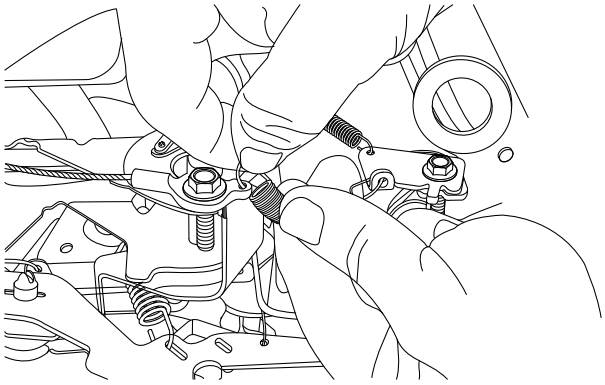

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Figure 5-13 Detach Accelerator Cable Extension Spring

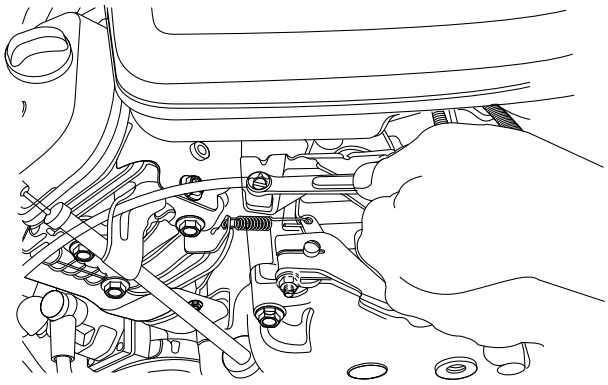

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Figure 5-14 Loosen Cable Clamp

7. Remove the screw securing the cable end to the bellcrank **(Figure 5-15, Page 5-6)**.
8. Under the front cowl, disconnect the Z-shaped end of the accelerator cable from the pedal **(Figure 5-16, Page 5-6)**.
9. Compress the tines of the cable anchor and pull the cable from the mounting bracket.
10. If equipped, note location and number of wire ties securing cable to chassis. Cut wire ties and remove cable.

Park Brake Inspection

- Engage the park brake handle. When latched, the park brake should lock the wheels and hold the vehicle stationary (on incline of 20% or less). If not, adjust the park brake. **See Park Brake Adjustment on page 6-24.**
- Check the park brake cables, equalizer and linkage for damage. The cables should not come in contact with the rear wheels, tires or suspension.

Brake Disc and Pad Inspection

- Inspect each brake disc. They should not be warped or have excessive scores or heat checks. Each disc should be at least 0.150 inches (3.8 mm) at the thinnest point.
- Inspect each caliper. They should not hold the brake pads tightly against the disc when not in use.
- Inspect the brake pads for wear. The pads should not be glazed or soiled with grease or brake fluid. There should be at least 0.020 inches (0.5 mm) of brake pad material at the thinnest point. **See following WARNING.**

⚠ WARNING

- **Use only approved replacement brake pads and/or shoes designed for this vehicle.**
- **Use only DOT 5 brake fluid.**
- **Do not pump brake pedal without fluid in the reservoir or master cylinder.**

MASTER CYLINDER REPLACEMENT

See General Warning on page 1-2.

Master Cylinder Removal

⚠ WARNING

- **To perform this procedure, the hydraulic system must be opened. As a result, the brakes must be bled after the correct installation of the brake components. Failure to bleed the brakes could result in decreased braking performance due to air being trapped in the hydraulic system. Use only DOT 5 brake fluid. See Bleeding the Hydraulic Brake System on page 6-16.**

1. Chock the tires.
2. Use a flare-nut wrench to disconnect the brake hoses at the master cylinder **(Figure 6-18, Page 6-15)**. **See following NOTE.**

NOTE: *Place a plastic bag around the master cylinder to catch brake fluid before the brake hose is removed. Once the hose is removed, wrap the bag around the master cylinder to prevent debris from entering the brake hose port.*

3. Cover the fittings on the brake hoses with plastic bags and wire ties to keep any dirt or debris from entering the hydraulic brake system.
4. Remove bow tie locking pin and clevis pin from master cylinder push rod **(Figure 6-19, Page 6-15)**.

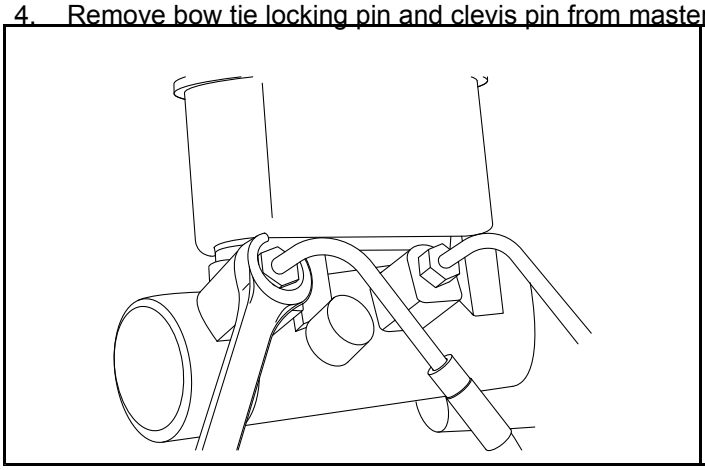

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Figure 6-18 Brake Hoses At Master Cylinder

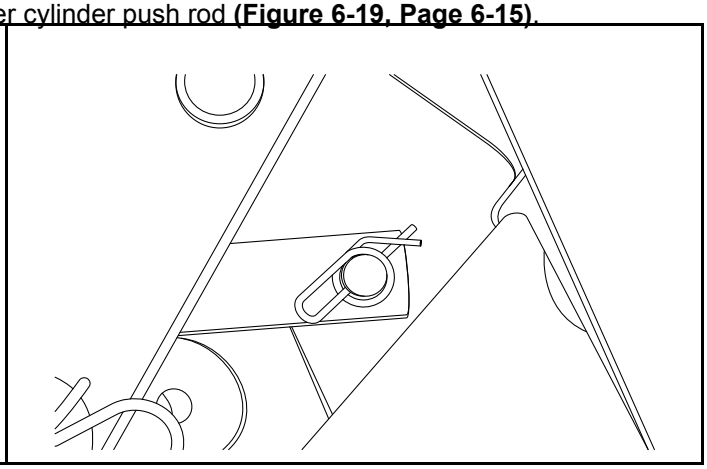

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Figure 6-19 Disconnect Master Cylinder Linkage

5. Remove the two bolts and locknuts that secure the master cylinder to the chassis **(Figure 6-20, Page 6-15)**.

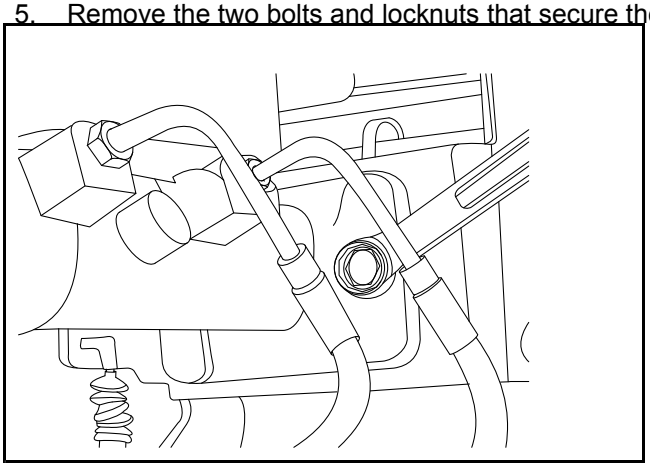

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Figure 6-20 Master Cylinder Mounting Hardware

2. Loosen, but do not remove the jam nut on the caliper park brake lever **(Figure 6-42, Page 6-25)**.
3. To adjust, thread in and finger-tighten the adjustment bolt. Proper adjustment is achieved when the bolt stops turning because it is seated against the caliper piston. Do not tighten further.
4. Tighten the jam nut on the caliper lever to 144 in-lb (16.3 N·m) while holding the adjustment bolt stationary.
5. Repeat steps 2 through 4 for the opposite park brake assembly.
6. Inspect the brake system to ensure that both the hydraulic brake system and the park brake system are adjusted and operating correctly before the vehicle is returned to service. **See Brake System Inspection on page 6-4.**

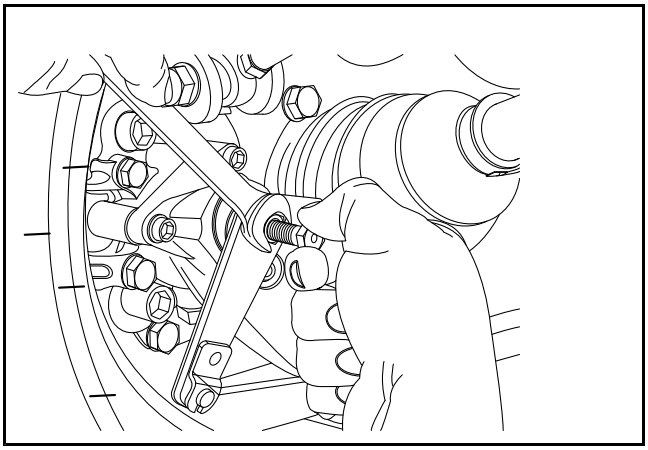

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Figure 6-42 Park Brake Lever At Rear Caliper

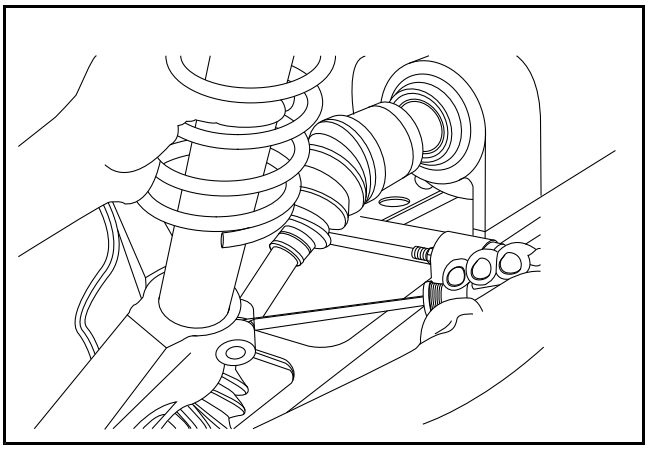
Park Brake Cable Adjustment

CAUTION

- **Perform the following procedure only on a level surface. To avoid injury or property damage, ensure that the path of the vehicle is clear before the vehicle is pushed.**

NOTE: *Adjust rear brake calipers/park brake levers before adjusting park brake cables.*

1. Chock the wheels, release the park brake, and place the Forward/Reverse handle in the NEUTRAL position.
2. With the park brake released, remove handle grip and loosen the set screw that locks the adjustment knob at the end of the park brake handle **(Figure 6-22, Page 6-20)**.
3. Turn the adjustment knob to tighten the park brake cables until the slack is removed.
4. With the vehicle on flat ground and the Forward/Reverse handle in the NEUTRAL position, engage the park brake handle. If the handle can not engage, loosen the cables with the adjustment knob until the handle engages with moderate effort.
5. Push the vehicle by hand. If the wheels move easily when the vehicle is pushed, continue tightening the adjustment knob until the vehicle resists rolling easy and firm resistance is achieved. If the knob runs out of adjustment before the park brake functions properly, use the following procedure:
   5.1. At rear caliper, loosen the jam nut while holding the adjustment bolt stationary **(Figure 6-42, Page 6-25)**.
   5.2. Tighten adjustment bolt two full revolutions.
   5.3. Tighten the jam nut on the caliper lever to 144 in-lb (16.3 N·m) while holding the adjustment bolt stationary.
   5.4. At park brake handle, loosen adjustment knob one full revolution and check park brake.
   5.5. If the park brake does not hold on a substantial grade (30%), repeat steps 5.1 through 5.3, but only tighten the adjustment bolt 1/4 turn until the park brake holds and effort to engage it is acceptable. If effort to engage it is too great, repeat step 5.4, but only loosen the adjustment knob 1/4 turn. Repeat, as necessary, until effort to apply park brake is acceptable and vehicle holds on a substantial grade (30%).
6. Release the park brake handle and engage it again. The vehicle should not be movable with one person pushing it.



1014
Figure 7-13 Pry Open Steering Knuckle To Remove Strut

STRUT INSTALLATION

1. Install the strut by reversing the removal procedure. **See following NOTE.**

NOTE: *Ensure tab on strut is aligned with the slot in the steering knuckle* ***(Figure 7-14, Page 7-9)****.*

When installing struts and shocks, make sure front struts have identical part numbers and rear shocks have identical part numbers.

2. Tighten the two lock nuts to 15.5 ft-lb (21 N·m).
3. Tighten the pinch bolt and lock nut to 37 ft-lb (50 N·m).
4. Install wheel and lower vehicle. **See Wheel Installation, Section 8, Page 8-2.**

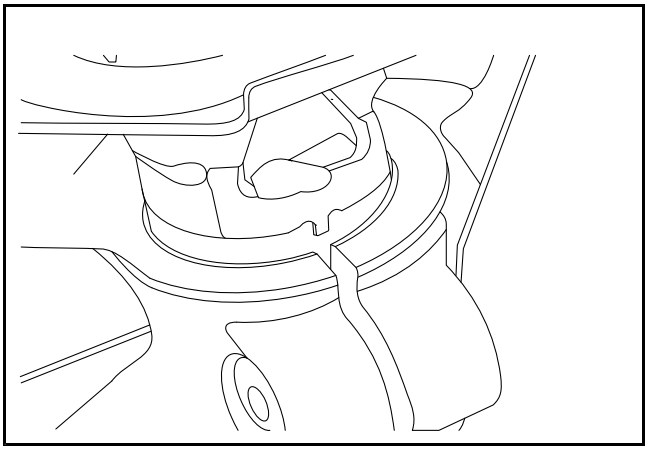


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Figure 7-14 Align Tab and Slot

STEERING KNUCKLE REMOVAL

1. Turn the key switch OFF and remove the key. Place the Forward/Reverse handle in NEUTRAL and set the park brake. Chock the wheels.
2. Disconnect the battery cables and spark plug wires as instructed. **See WARNING "To avoid unintentionally starting..." in General Warning on page 1-2.**
3. Pry out the thin axle nut flange where it is staked to the groove in the halfshaft **(Figure 7-15, Page 7-10)** and loosen the axle nut **(Figure 7-16, Page 7-10)**.

⚠ DANGER

- **See General Warning on page 1-2.**

⚠ WARNING

- **See General Warning on page 1-2.**

REAR SHOCK REMOVAL

1. Turn the key switch OFF and remove the key. Place the Forward/Reverse handle in NEUTRAL and set the park brake. Chock the wheels.
2. Disconnect the battery cables and spark plug wires as instructed. **See WARNING "To avoid unintentionally starting..." in General Warning on page 1-2.**
3. Lift and support the rear of the vehicle on jack stands and remove the rear wheel. **See Lifting The Vehicle, Section 3, Page 3-5.**
4. Raise the cargo bed and secure with the bed locking pin. **See Cargo Bed, Section 4, Page 4-21.**
5. Remove the bolt securing the rear shock absorber to the trailing arm **(Figure 9-1, Page 9-1)**.
6. Remove the lock nut and bolt securing the rear shock absorber to the chassis **(Figure 9-2, Page 9-2)**.

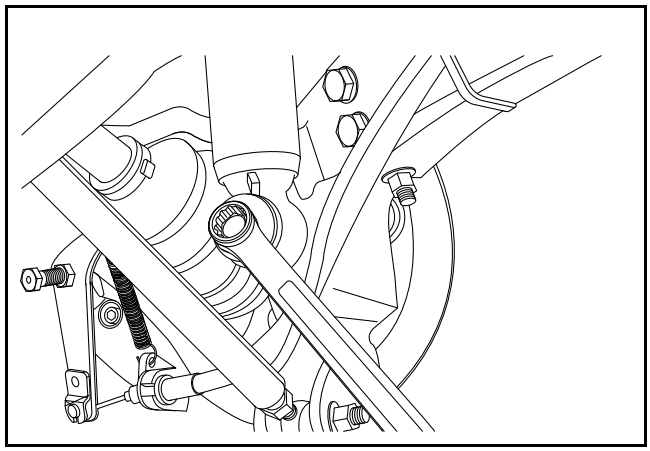

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Figure 9-1 Lower Shock Bolt

PERFORMANCE INSPECTION

After you have familiarized yourself with the vehicle controls and have read and understood the driving instructions, take the vehicle for a test drive.
Use the following list, in addition to the Pre-Operation and Daily Safety Checklist on page 10-2, as a guide to inspect the vehicle daily for proper operation. Any problems should be corrected by a dealer or a trained technician.

- **Forward/Reverse Control:** Check for proper operation.
- **Brakes:** Be sure the brakes function properly. When brake pedal is fully pressed under moderate pressure, the vehicle should come to a smooth, straight stop. If the vehicle swerves or fails to stop, have the brake system checked and serviced as required. When the brake pedal is fully pressed under heavy pressure, the pedal should feel firm and the distance between the back of the pedal and the floorboard should be a minimum of 1.25 inches (3.2 cm). Brakes must be maintained so the brake pedal cannot be pressed to the floorboard under any circumstance.
- **Park brake:** When latched, the park brake should lock the wheels and hold the vehicle stationary on an incline of 20% or less. To adjust park brake, see Park Brake Cable Adjustment on page 6-25. Adjust until park brake locks wheels and holds the vehicle stationary on an incline of 20% or less.
- **Reverse buzzer:** If equipped with a reverse buzzer, the reverse buzzer should sound as a warning when the Forward/Reverse handle is in the REVERSE position.
- **Steering:** The vehicle should be easy to steer and should not have any play in the steering wheel.
- **Accelerator:** After starting the engine with the key switch and placing the Forward/Reverse handle in the FORWARD position, the vehicle should accelerate smoothly to full speed as the accelerator pedal is pressed. When the pedal is released it should return to the original position, and the engine should idle. This vehicle operates at reduced speed in reverse.
- **Governor:** Check maximum vehicle speed. The vehicle should operate in forward at a maximum speed of 25 mph (40 km/h) on a level surface.
- **Differential Lock Control:** Check for proper operation.
- **Front Axle Disconnect Control:** Check for proper operation.
- **General:** Listen for any unusual noises such as squeaks or rattles. Check the vehicle's ride and performance. Have a dealer or a trained technician investigate anything unusual.

PERIODIC SERVICE SCHEDULE

See General Warning on page 1-2.

⚠ WARNING

- **Service, repairs, and adjustments must be made per instructions in the appropriate maintenance and service manual.**

NOTE: *If the vehicle is constantly subjected to heavy use or severe operating conditions, the preventive maintenance procedures should be performed more often than recommended in the Periodic Service and Lubrication Schedule.*

Both the Periodic Service Schedule and the Periodic Lubrication Schedule must be followed to keep vehicle in optimum operating condition.

TABLE CONTINUED ON NEXT PAGE

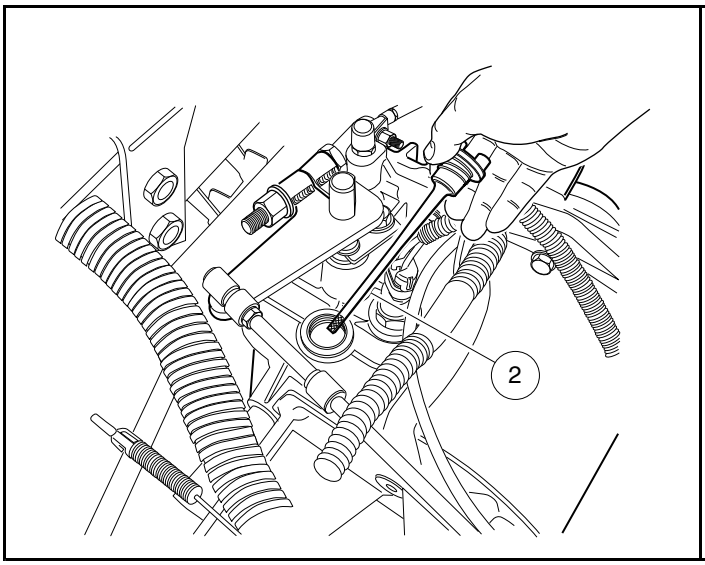

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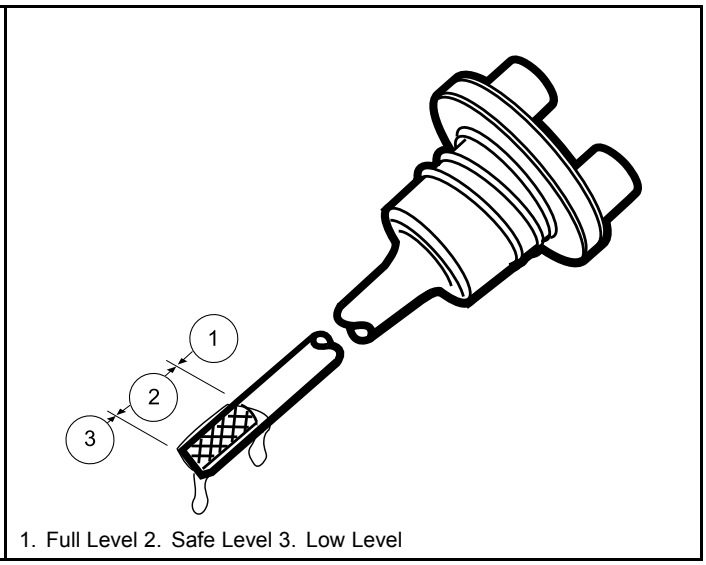
Figure 10-12 Rear Transaxle Dipstick



1. Full Level 2. Safe Level 3. Low Level

824

Figure 10-13 Rear Transaxle Lubricant Level Check

AIR INTAKE SYSTEM

AIR FILTER REPLACEMENT

The air filter should be inspected periodically and replaced when necessary. Filter changes should not exceed the recommended interval. **See Periodic Service Schedule on page 10-3.** More frequent service may be required in extremely dirty operating environments. In the event of a loss of power, sluggish acceleration, or a roughly running engine, service the air filter immediately.

Air Filter Removal

1. Raise the cargo bed, remove the center plastic access panel (1) **(Figure 10-3)** and locate the air filter housing.
2. Release both housing retaining clips **(Figure 10-14)**.
3. Lift the housing cover up off of the air filter housing.
4. Remove knob (1) and plate (2). Carefully remove the foam pre-cleaner (3) and air filter cartridge (4) assembly to prevent debris from entering carburetor. **See following NOTE.**

NOTE: *To clean foam pre-cleaner, separate it from cartridge and wash in liquid detergent and water. Squeeze dry in a clean cloth. The air filter cartridge and foam pre-cleaner are specifically designed for this engine. Use only engine-compatible air filter cartridges and foam pre-cleaners designed for your engine. Do not oil the foam pre-cleaner.*

TROUBLESHOOTING GUIDE		
SYMPTOM	**POSSIBLE CAUSES**	**REFER TO**
Charge coil does not charge battery.	Loose or broken wire in the starter circuit	Test Procedure 5 – Starter Control Circuit on page 11-14
	Charge coil is shorted (failed closed)	Test Procedure 10 – Charge Coil on page 11-24
	25-amp fuse is blown	Test Procedure 2 – Fuse on page 11-11
	Voltage Regulator failure	Test Procedure 11 – Voltage Regulator on page 11-24
	Battery failed	Test Procedure 1 – Battery on page 11-8
Transmission does not engage or disengage smoothly.	Transmission shifter linkage is binding or is out of adjustment	Forward/Reverse Shifter Cable Adjustment in Clutches section
	Idle RPM Setting is set too high	Engine section
	Insufficient (low) level of lubricant or wrong type of lubricant in transmission	**See Gearcase Lubrication on page 10-11.**
	Internal gears are damaged or worn	Transaxle section
	Synchronizer rings are worn, damaged or jammed	Transaxle section
Excessive vehicle vibration.	Engine mounting nuts or bolts are loose	Engine section
	Misaligned muffler mounting clamp	Exhaust System section
	Damaged drive belt	Clutches section
	Damaged drive clutch	Clutches section
	Damaged driven clutch	Clutches section
	RPM setting is incorrect	Engine section
Torque converter does not shift smoothly.	Drive belt is worn, cracked, glazed, or frayed	Clutches section
	Drive clutch malfunction	Clutches section
	Driven clutch malfunction	Clutches section
	Governor is sticking	Engine section
Engine won't stop running.	Kill circuit wire is disconnected from the ignition coil	Test Procedure 13 – Engine Kill Wire on page 11-25
	Key switch failure	Test Procedure 4 – Key Switch (Starter Circuit) on page 11-13
Low oil warning light stays on.	Oil level sensor failure	See the Briggs & Stratton Vanguard engine manual (P/N CLC103568101).
	Shorted wire harness wire(s)	Test Procedure 9 – Wire Continuity on page 11-24
Hour meter does not function.	Failed low oil warning light or oil pressure sensor	Test Procedure 17 – Low Oil Warning Light Circuit on page 11-29
	Oil pressure switch failed closed	See the Briggs & Stratton Vanguard engine manual (P/N CLC103568101).
	Failed hour meter	Test Procedure 20 – Hour Meter on page 11-32

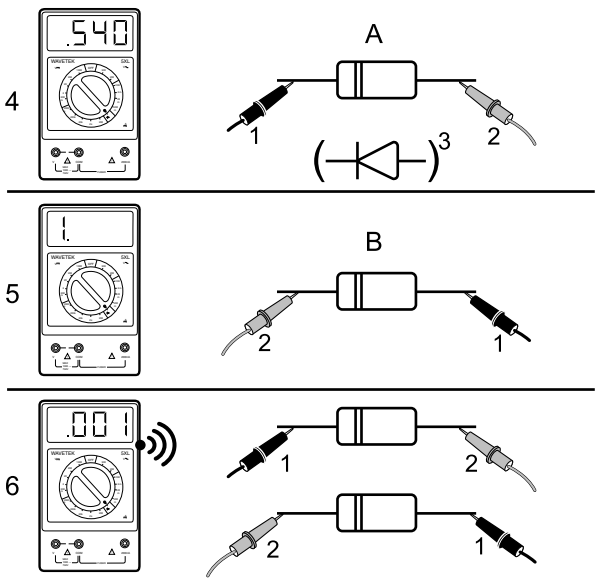
TABLE CONTINUED ON NEXT PAGE

TEST PROCEDURE 7 – Wire Harness Diodes

See General Warning on page 1-2.

A diode is designed to conduct current in one direction only. Depending on the application, diodes are used in the vehicle to control electrical system logic, or to help protect relay and switch contacts from excessive arcing. **See following NOTE.**

NOTE: *If a diode conducts current in both directions, the diode has failed closed. If a diode will not conduct current in either direction, the diode has failed open* ***(Figure 11-16, Page 11-17)****.*



1. VOM Black Lead
2. VOM Red Lead
3. Wiring Diagram Symbol with Diode Stripe Orientation
4. Good Diode (Probe Scenario A) - Conducts Current and Shows Continuity
5. Good Diode (Probe Scenario B) - No Continuity
6. Bad Diode - Meter Beeps In Either Direction (Probe Scenarios A and B)

1127

Figure 11-16 Basic Diode Information

The wire harness is equipped with several in-line diodes. The following table describes each diode's function in the electrical system, the location in the wire harness, and the symptom(s) of a diode failure.

TEST PROCEDURE 14 – Grounded Kill Wire

See General Warning on page 1-2.

NOTE: *Keep the battery connected while performing this test procedure.*

1. Turn the key switch OFF and remove the key. Place the Forward/Reverse handle in the NEUTRAL position. Chock the wheels.
2. Disconnect the white/black stripe wire (w83) from the spade terminal on the engine located above the voltage regulator **(Figure 11-35, Page 11-26)**.

NOTE: *Disconnecting the engine kill wire removes the engine ignition circuit from the vehicle start/stop circuit.*

3. Turn the key switch to the START position and release it after the engine starts. If the engine starts and continues to idle, check the kill wire for grounding. **See Test Procedure 13 – Engine Kill Wire on page 11-25. See following WARNING.**

⚠ WARNING

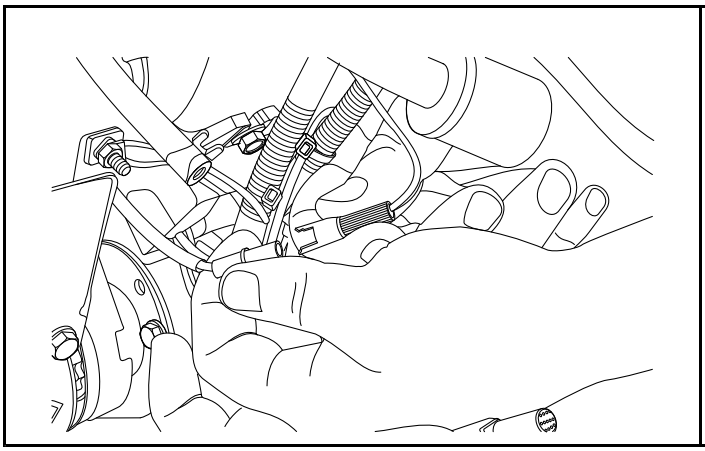
- **When the white/black engine kill wire is disconnected, the engine will not stop running immediately after the key switch is turned to the OFF position. It may be necessary to pull and hold the choke handle until the engine stops running.**

4. Also check the key switch for proper operation. **See Test Procedure 15 – Key Switch (Engine Kill Circuit) on page 11-27. See preceding WARNING.**
5. If the engine does not run, reconnect the white/black stripe wire (w83) to the engine and proceed to Test Procedure 12 – Ignition Spark on page 11-25.

TEST PROCEDURE 15 – Key Switch (Engine Kill Circuit)

See General Warning on page 1-2.

1. Turn the key switch OFF and remove the key. Place the Forward/Reverse handle in NEUTRAL and set the park brake. Chock the wheels.
2. Disconnect the battery cables and spark plug wires as instructed. **See WARNING "To avoid unintentionally starting..." in General Warning on page 1-2.**
3. Raise the hood and remove the access panel.
4. Remove the wire harness connector from the key switch.
5. Place the red (+) probe on the (M) terminal and the black (–) probe on the (G) terminal. With the key switch OFF, the reading should indicate continuity. With the key switch turned ON, the reading should indicate no continuity. If either reading is incorrect, replace the key switch **(Figure 11-37, Page 11-28)**.
6. Reconnect the wire harness to the key switch. Ensure that the connector is installed correctly and is tight. If it is not, repair or replace as necessary.



985
Figure 12-2 Disconnect Carburetor Solenoid Red Wire

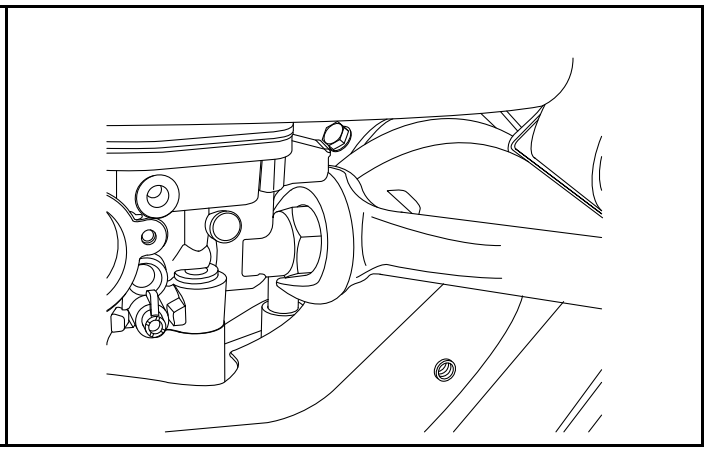


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Figure 12-3 Carburetor Solenoid Removal

CARBURETOR SOLENOID INSTALLATION

1. Install the carburetor solenoid and tighten to 168 in-lb (19 N·m). **See the Briggs & Stratton Vanguard engine manual (P/N CLC103568101).**
2. Connect the white bullet connector in the carburetor solenoid red wire.
3. Install the small front cover panel on the engine.
4. Connect the battery cables, positive (+) cable first, and tighten the terminals to 80 in-lb (9 N·m). Coat terminals with Battery Terminal Protector Spray (P/N CLC1014305). Connect the spark plug wires to the spark plugs.

VOLTAGE REGULATOR

See General Warning on page 1-2.

TESTING THE VOLTAGE REGULATOR

See Test Procedure 11 – Voltage Regulator on page 11-24.

VOLTAGE REGULATOR REMOVAL

1. Turn the key switch OFF and remove the key. Place the Forward/Reverse handle in NEUTRAL and set the park brake. Chock the wheels.
2. Disconnect the battery cables and spark plug wires as instructed. **See WARNING "To avoid unintentionally starting..." in General Warning on page 1-2.**
3. Disconnect the 2-pin connector **(Figure 12-4, Page 12-4)** and the red wire **(Figure 12-5, Page 12-4)**from the voltage regulator.
4. Remove the voltage regulator mounting screws and remove the voltage regulator **(Figure 12-6, Page 12-4)**.

Mineral Content

For the longest battery life, distilled water should be used in the battery. However, if tap water is going to be used, contact your local water department to be sure mineral contents are below the levels listed in the following table. **See following NOTE.**

NOTE: *Contact your local water department for mineral content analysis.*

IMPURITY	ALLOWABLE CONTENT (PARTS PER MILLION)
Suspended matter	Trace
Total solids	100.0
Calcium and magnesium oxides	40.0
Iron	5.0
Ammonia	8.0
Organic matter	50.0
Nitrates	10.0
Nitrites	5.0
Chloride	5.0

Battery Removal

See General Warning on page 1-2.

1. Turn the key switch OFF and remove the key. Place the Forward/Reverse handle in NEUTRAL and set the park brake. Chock the wheels.
2. Disconnect the battery cables and spark plug wires as instructed. **See WARNING "To avoid unintentionally starting..." in General Warning on page 1-2.**
3. Remove the battery hold-down located on the bottom of the battery.
4. Remove the battery. **See following WARNING.**

⚠ WARNING

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

Charging the Battery

See General Warning on page 1-2.

1. Charge the battery with an automotive type 12-volt battery charger. Follow all warnings and procedures supplied by the battery charger manufacturer.
2. Attach the charger, positive (+) cable to the positive (+) battery post and negative (–) cable to the negative (–) battery post.
3. The battery may be charged with a slow charge (3-10 amps) or a fast charge (20-30 amps). Charge until the specific gravity reaches 1.250.**See following WARNING.**

⚠ WARNING

- **If the battery case feels hot (approximately 125 °F (52 °C) or more), emits gases, or fluid boils from vents, stop charging immediately. Failure to stop charging battery when any of these conditions are present could result in an explosion, personal injury and/or damage to the battery.**

WARNING CONTINUED ON NEXT PAGE

⚠ DANGER

- **See General Warning on page 1-2.**

⚠ WARNING

- **See General Warning on page 1-2.**

FUEL LINES

See General Warning on page 1-2.

The fuel lines must be properly routed and all hose clamps must be tight. The fuel lines should be kept clean. **See following NOTE and WARNING.**

NOTE: *Use only 1/4-inch hoses with SAE J30R7 rating to replace the fuel lines.*

⚠ WARNING

- **Make sure fuel lines are the correct length and are properly routed. Failure to heed this warning could result in damage to the fuel lines and fire.**

FUEL FILTER

See General Warning on page 1-2.

One in-line filter is installed between the fuel tank and the fuel pump. Fuel filters, fuel lines, and the fuel tank vent should be inspected periodically for leaks and replaced when necessary. Filter changes should not exceed the recommended interval. **See Periodic Service Schedule on page 10-3.** Replace the fuel filter as specified. **See the Briggs & Stratton Vanguard engine manual (P/N CLC103568101).**

FUEL PUMP

See General Warning on page 1-2.

Procedures for inspection, removal, and installation can be found in the engine manual. **See the Briggs & Stratton Vanguard engine manual (P/N CLC103568101).**

⚠ DANGER

- **See General Warning on page 1-2.**

⚠ WARNING

- **See General Warning on page 1-2.**

MUFFLER REMOVAL

1. Turn the key switch OFF and remove the key. Place the Forward/Reverse handle in NEUTRAL and set the park brake. Chock the wheels.
2. Disconnect the battery cables and spark plug wires as instructed. **See WARNING "To avoid unintentionally starting..." in General Warning on page 1-2.**
3. Loosen the clamp securing the exhaust pipe in the muffler **(Figure 15-1, Page 15-1)**. **See following WARNING.**

⚠ WARNING

- **Hot! Do not attempt to service hot engine or exhaust system. Failure to heed this warning could result in severe burns.**

4. Remove the nut and bolt securing the bottom of the muffler to the chassis **(Figure 15-2, Page 15-1)**.
5. Pull the muffler off of the exhaust pipe and remove from vehicle.

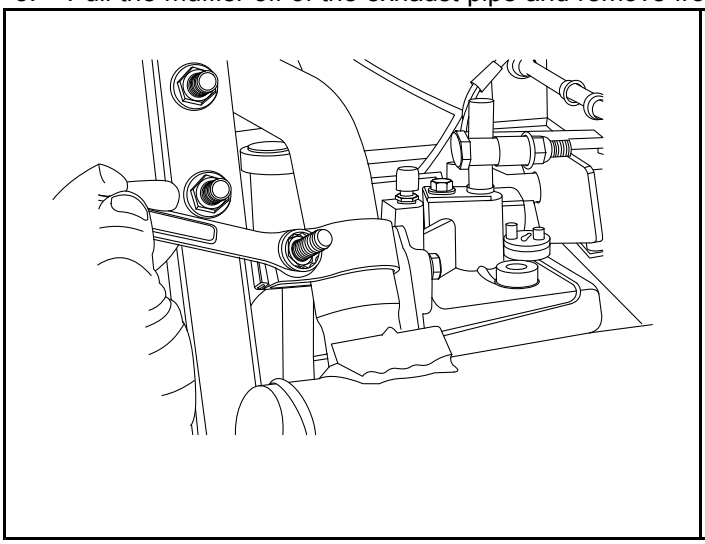

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Figure 15-1 Muffler Clamp

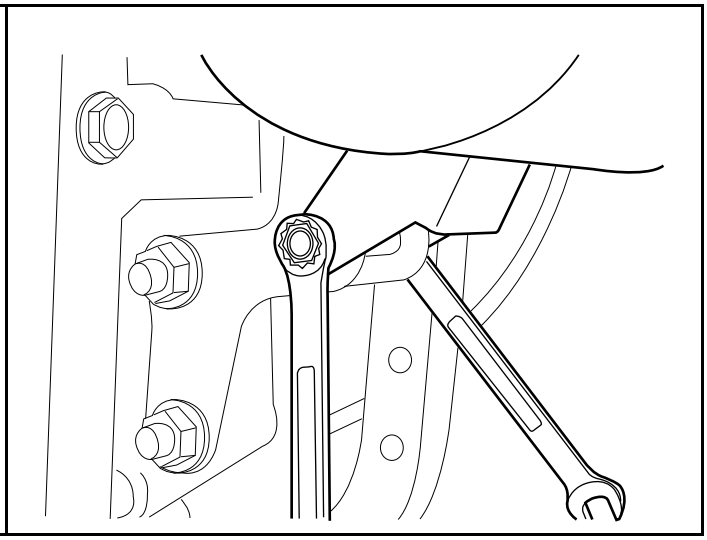

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Figure 15-2 Muffler Mounting Hardware

MUFFLER INSTALLATION

1. Installation is the reverse of removal.
2. Tighten the lock nut to 200 in-lb (22.4 N·m).

ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Thrust Washer	20	Dip Stick
2	Idler Gear	21	O-Ring
3	Differential Pin	22	Case Bolt
4	Spring Pin	23	Input Shaft Bearing
5	Thrust Washer	24	Input Shaft
6	Diff. Side Gear – thin	25	Gear
7	Diff. Side Gear – thick, with teeth	26	Washer
8	Oil Seal	27	Snap Ring
9	Cir-clip	28	Input Shaft Bearing
10	Output Shaft	29	Seal Sleeve
11	Output Shaft Flange (driver-side)	30	Oil Seal
12	Output Shaft Flange (passenger-side)	31	Level Check Plug
13	Flange Bolt	32	O-Ring
14	Gasket	33	Bearing
15	Output Shaft Bearing	34	Ring Gear Bolt
16	Dowel Pin	35	Differential Carrier
17	Drain Plug	36	Differential Lock Slider
18	Drain Plug Seal	37	Ring Gear
19	Dowel Pin	38	Bearing

2. Remove eight bolts, securing front drive housing to transaxle, and remove front drive unit **(Figure 17-28, Page 17-13)**.

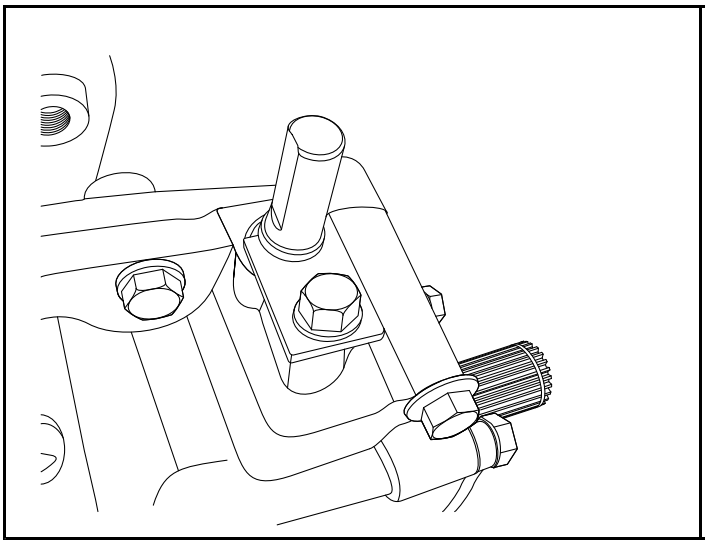

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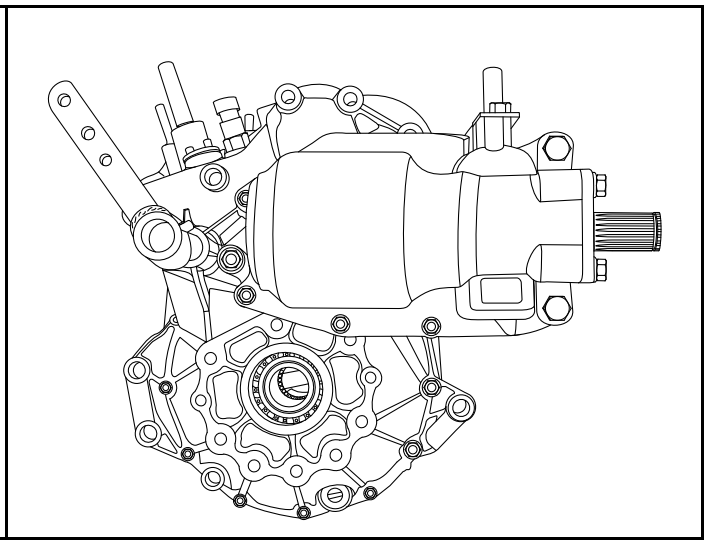
Figure 17-27 Remove Keeper Plate



1472

Figure 17-28 Remove Front Drive Unit

3. Remove four bolts and PTO shaft cap **(Figure 17-29, Page 17-13)**.
4. Pull shift shaft up and remove shift block from shift arm **(Figure 17-30, Page 17-13)**.

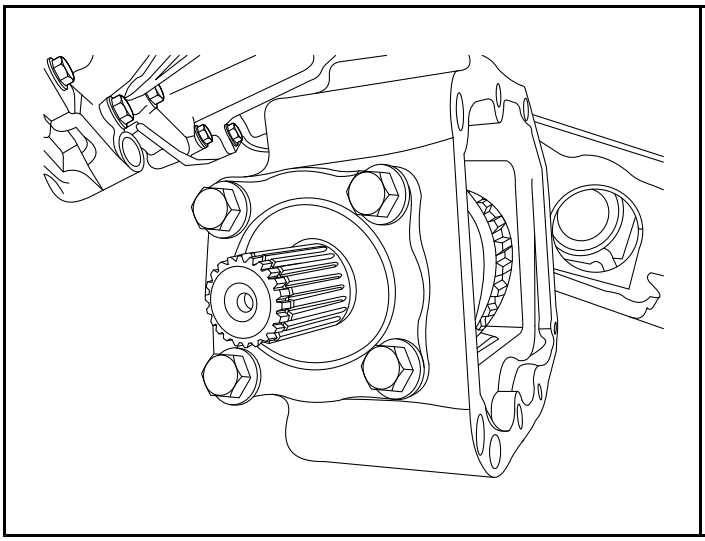


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Figure 17-29 Remove PTO Shaft Cap

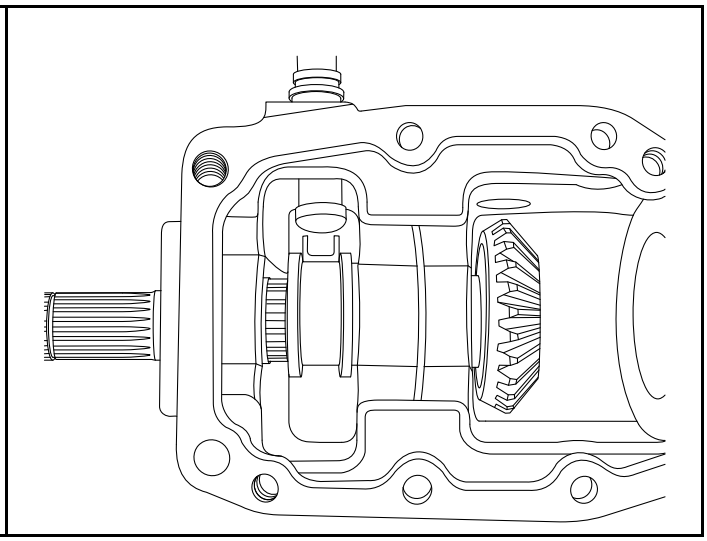

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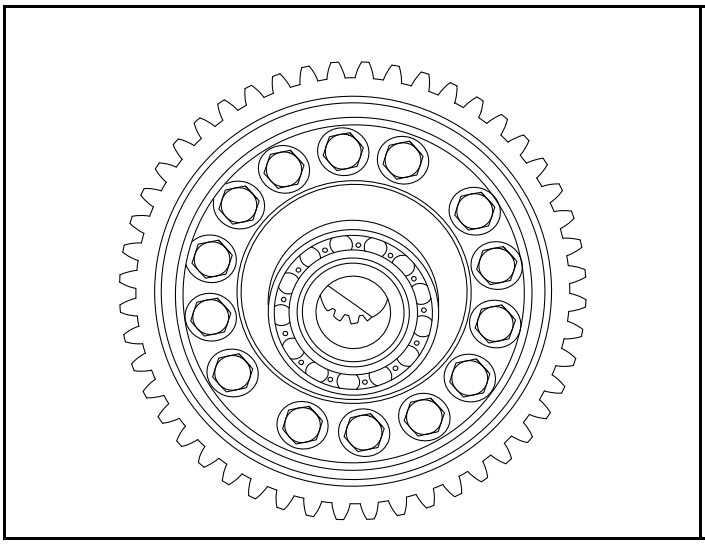
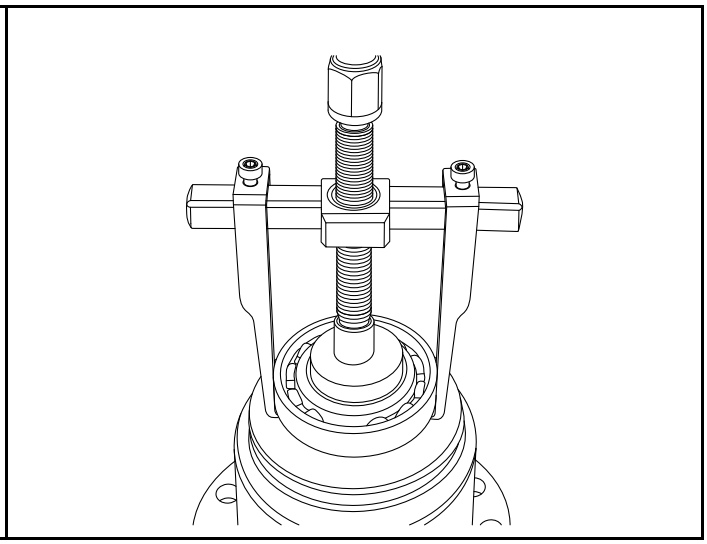
Figure 17-30 Remove Shift Block From Shift Arm

5. Remove outer PTO shaft **(Figure 17-31, Page 17-14)**.
6. Remove shift shaft **(Figure 17-32, Page 17-14)**.

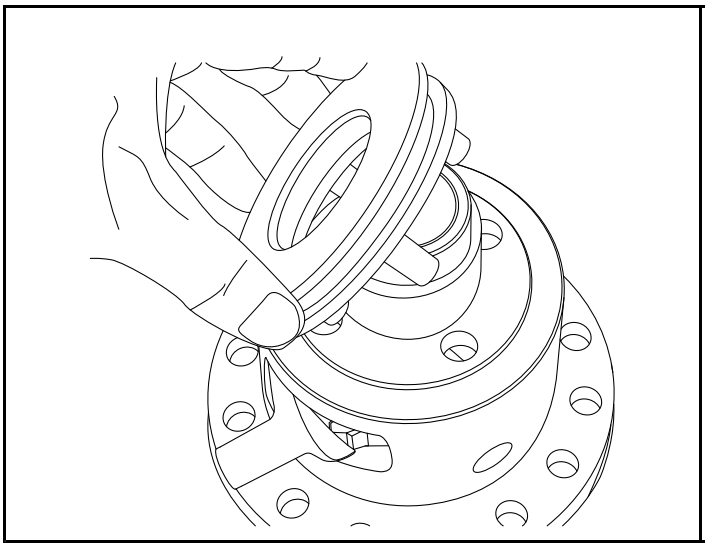


1509
Figure 17-65 Remove Ring Gear Bolts

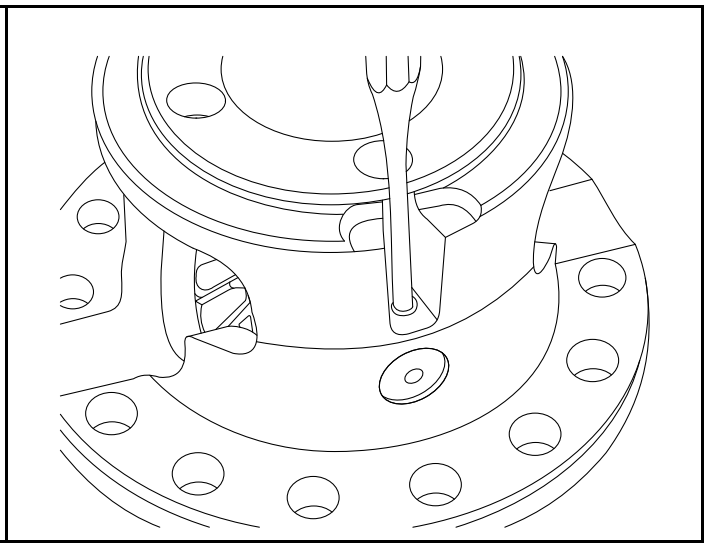


1510
Figure 17-66 Pull Bearing from End with Slider

3. Remove differential lock slider **(Figure 17-67, Page 17-23)**.
4. Drive out spring pin to release pinion shaft **(Figure 17-68, Page 17-23)**.

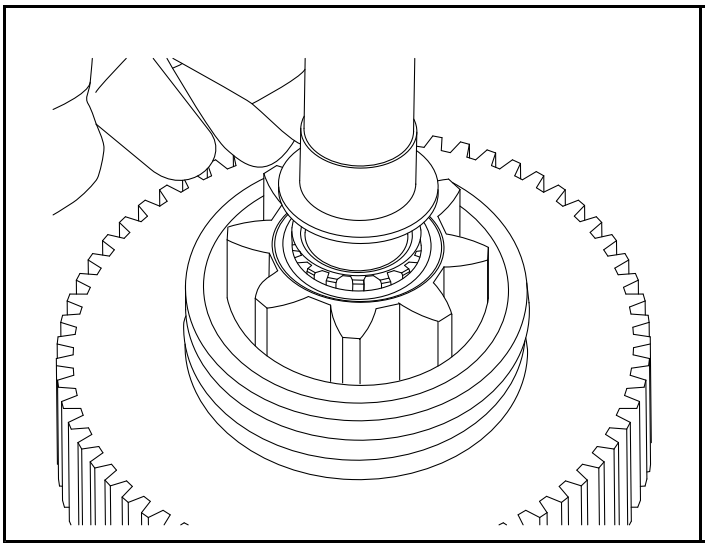


1511
Figure 17-67 Remove Differential Lock Slider

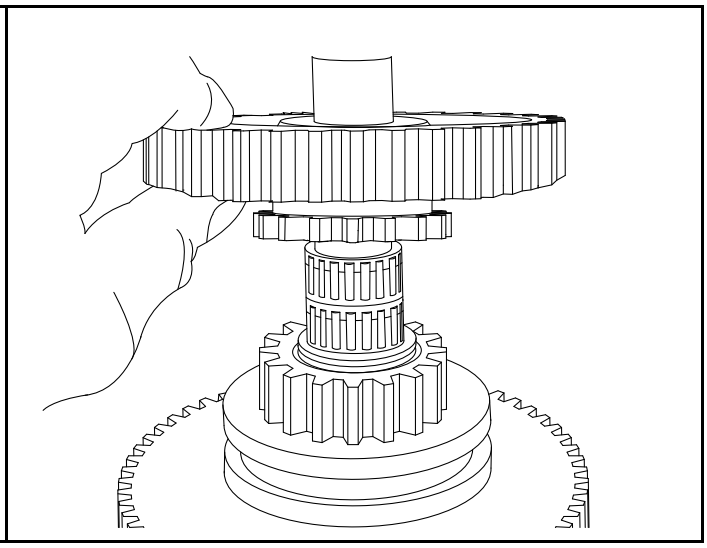


1512
Figure 17-68 Remove Pin Securing Pinion Shaft

5. Drive pinion shaft from differential **(Figure 17-69, Page 17-24)**.
6. Note gear orientation and remove two idler gears and thrust washers first. Then remove two differential side gears and thrust washers **(Figure 17-70, Page 17-24)**.



1543
Figure 17-98 Splined Collar Snap Ring and Washer



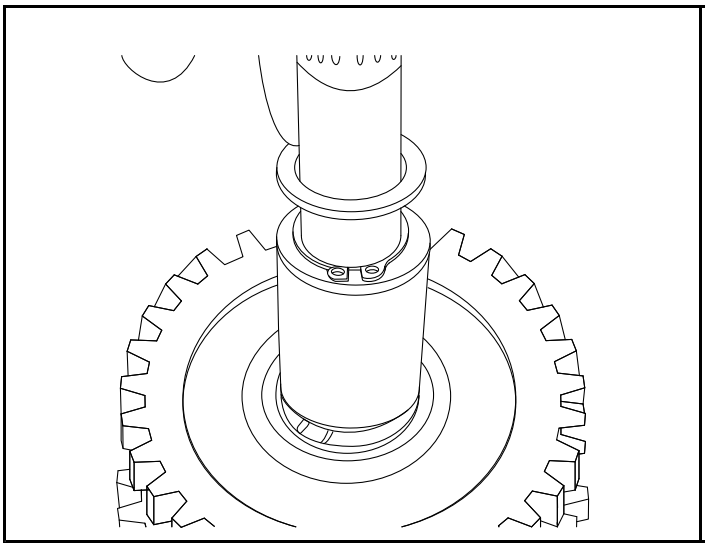
1544
Figure 17-99 Add Bearings and Reverse Gear

6. Assemble in order, washer, collar, snap ring and washer **(Figure 17-100, Page 17-33)**. **See following NOTE.**

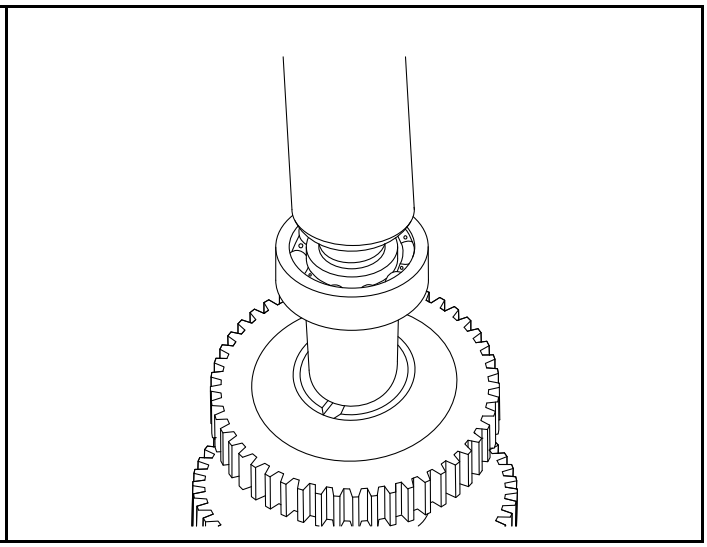
NOTE: *Orient snap ring with the sharp corner edge toward the washer.*

7. Press bearing onto shaft **(Figure 17-101, Page 17-33)**. **See following NOTE.**

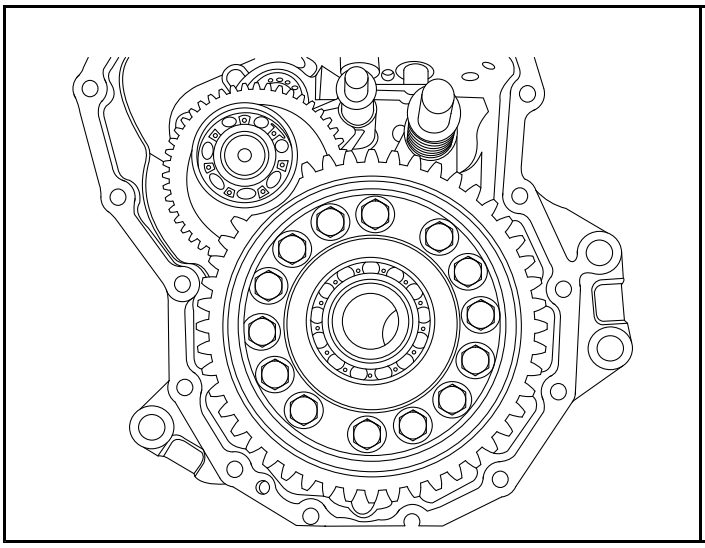
NOTE: *Push against inner race of bearing.*



1545
Figure 17-100 Secure Reverse Gear with Washers, Collar and Snap Ring



1546
Figure 17-101 Press Bearing onto Reduction Shaft



1579

Figure 17-134 Install Differential

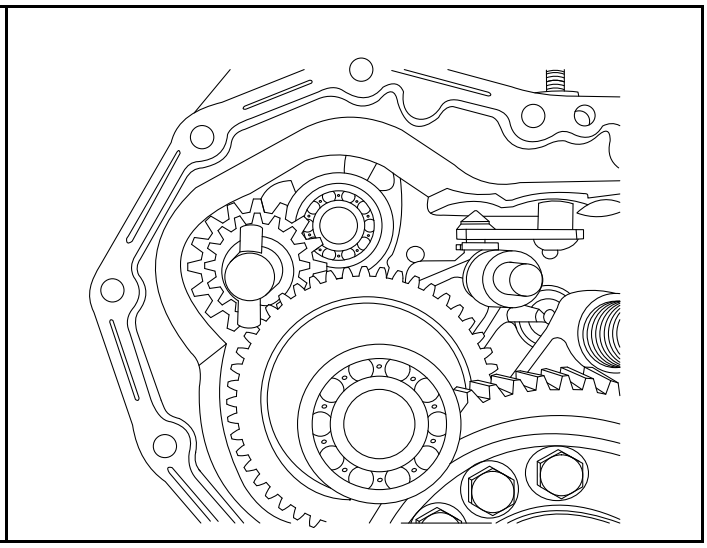


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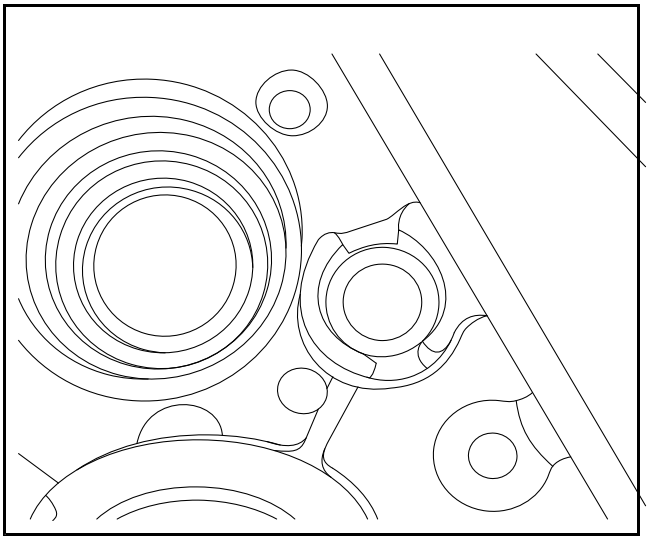
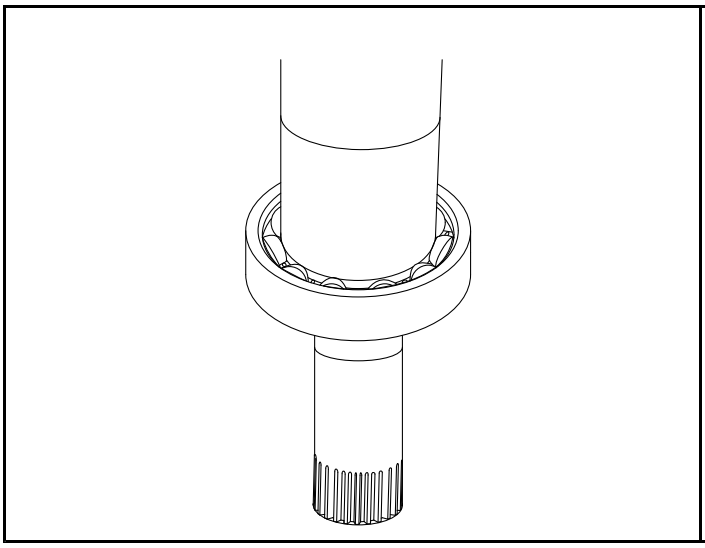
Figure 17-135 Install Idle Shaft Assembly



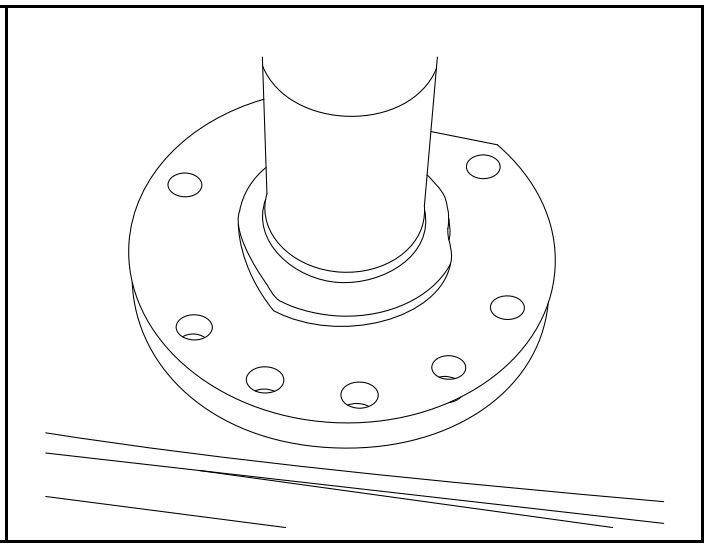
1581

Figure 17-136 Groove For Pin in Idle Shaft

9. Install input shaft assembly into case **(Figure 17-137, Page 17-44)**.
10. Lubricate two o-rings with grease and install into shift arm grooves **(Figure 17-138, Page 17-44)**.

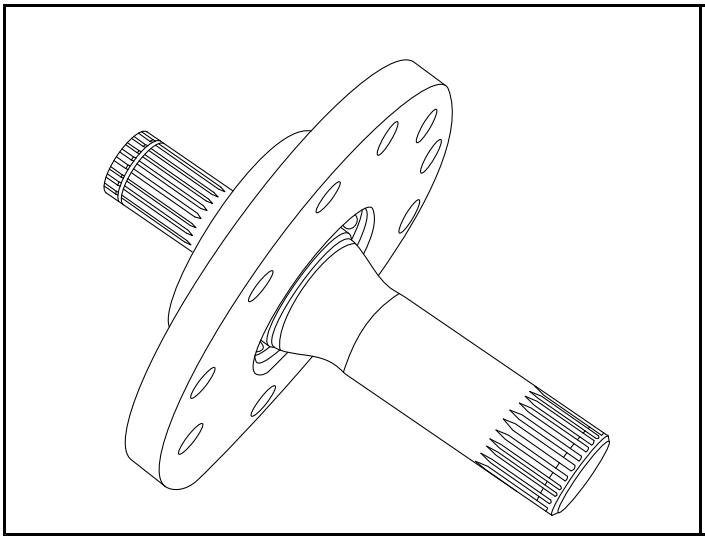


1616
Figure 17-171 Press Bearing Onto Output Shaft

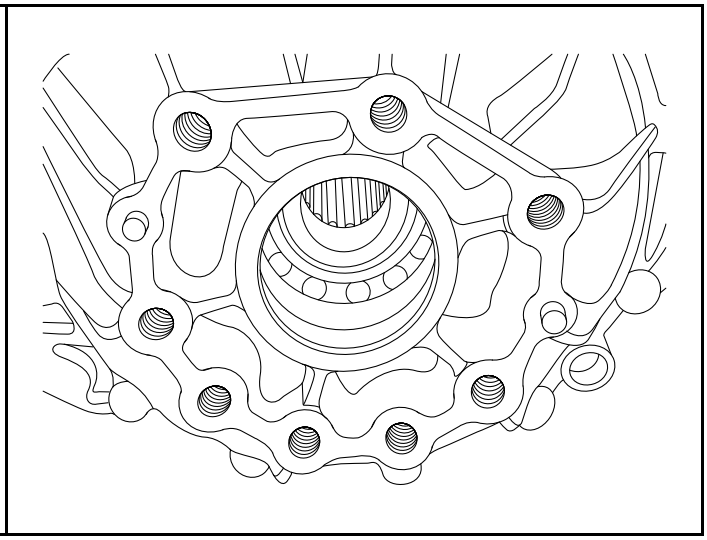


1617
Figure 17-172 Press Oil Seals Into Output Shaft Flanges

3. Apply grease to oil seals and install output shafts through flanges **(Figure 17-173, Page 17-53)**.
4. If necessary, install two dowel pins into each side of case **(Figure 17-174, Page 17-53)**.
5. Place gasket onto case.

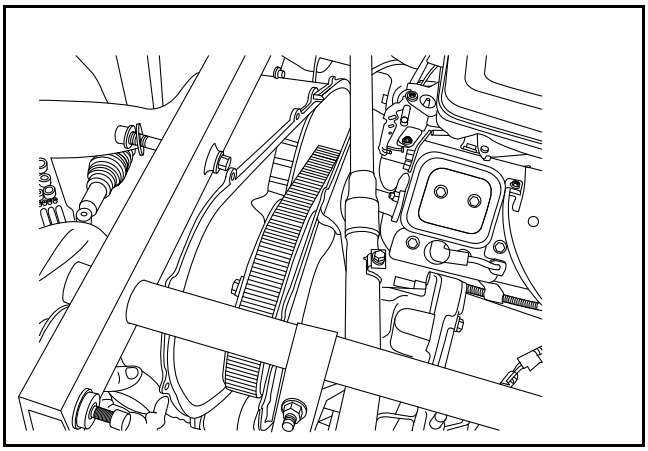


1618
Figure 17-173 Install Output Shaft Through Flange



1619
Figure 17-174 Dowel Pins and Gasket

6. Install output shaft assemblies into case and secure with bolts **(Figure 17-175, Page 17-54)**. Tighten bolts, in a criss-cross pattern, to 38 ft-lb (52 N·m) **(Figure 17-176, Page 17-54)**.



1118

Figure 18-3 Remove Outer Clutch Cover

OUTER CLUTCH COVER INSTALLATION

1. If reinstalling cover, clean thoroughly before proceeding.
2. Inspect cover seal, if equipped, and repair or replace as needed.
3. Place outer clutch cover against the inner clutch cover and align holes **(Figure 18-3, Page 18-3)**.
4. Secure with bolts previously removed and tighten to 78 in-lb (8.8 N·m) **(Figure 18-2, Page 18-2)**.
5. Install the clutch cover intake hose, if equipped **(Figure 18-1, Page 18-2)**.
6. Install the rear shock absorber on the driver side. **See Rear Shock Installation, Section 9, Page 9-2.**
7. Install the exhaust pipe heat shield. Tighten bolts to 78 in-lb (8.8 N·m).
8. Place bed locking pin in the stowed position and lower the cargo bed. **See Cargo Bed, Section 4, Page 4-21.**
9. Connect the battery cables, positive (+) cable first, and tighten the hardware to 80 in-lb (9 N·m). Coat terminals with Battery Terminal Protector Spray (P/N CLC1014305). Connect the spark plug wires to the spark plugs.

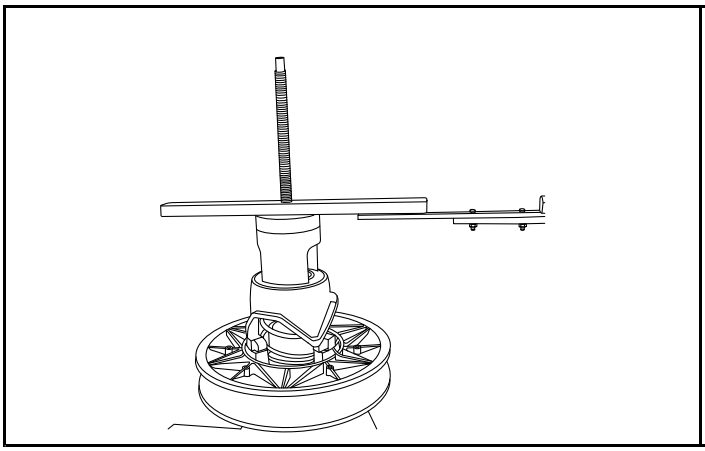
DRIVE BELT

The drive belt should be inspected periodically for wear and glazing. **See Periodic Service Schedule, Section 10, Page 10-3.** If it is excessively worn, frayed, or glazed, replace the belt.

As the drive belt wears, top speed will decrease but low-end torque will not.

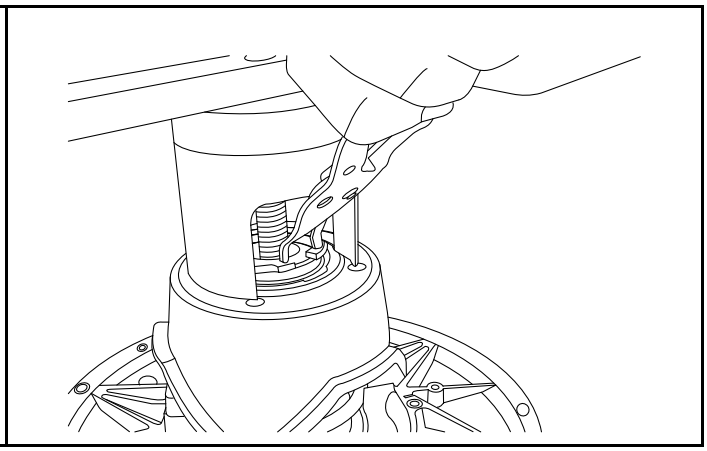
DRIVE BELT REMOVAL

1. Turn the key switch OFF and remove the key. Place the Forward/Reverse handle in NEUTRAL and set the park brake. Chock the wheels.
2. Disconnect the battery cables and spark plug wires as instructed. **See WARNING "To avoid unintentionally starting..." in General Warning on page 1-2.**
3. Remove the exhaust pipe heat shield.
4. Remove the driver side rear shock absorber. **See Rear Shock Removal, Section 9, Page 9-1.**
5. Remove the clutch cover intake hose and the clutch cover. **See Outer Clutch Cover Removal, Section 18, Page 18-2.**



1201

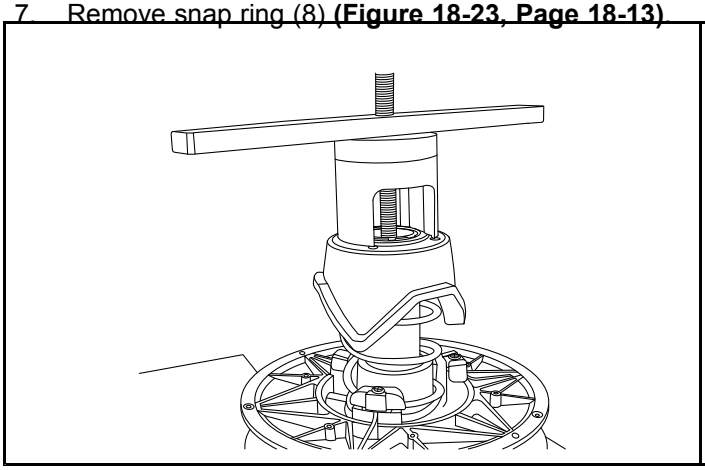
Figure 18-22 Use Spring Compression Handle To Compress Spring



1204

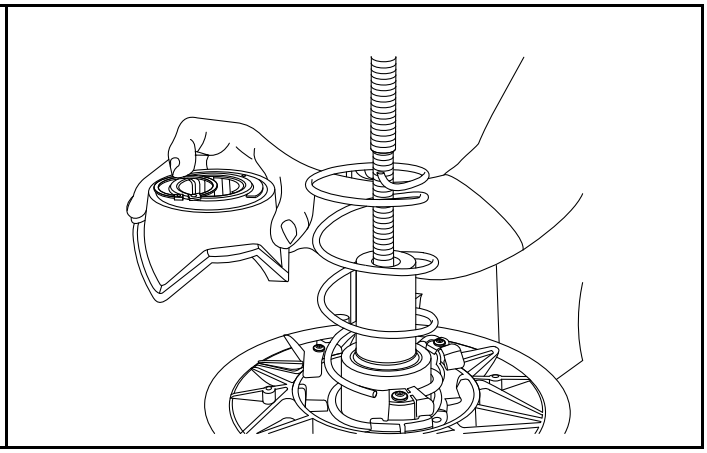
Figure 18-23 Remove Snap Ring

6. Thread the spring compression handle down onto the threaded rod enough to release the pressure on the snap ring (8) **(Figure 18-22, Page 18-13)**.
7. Remove snap ring (8) **(Figure 18-23, Page 18-13)**.



1205

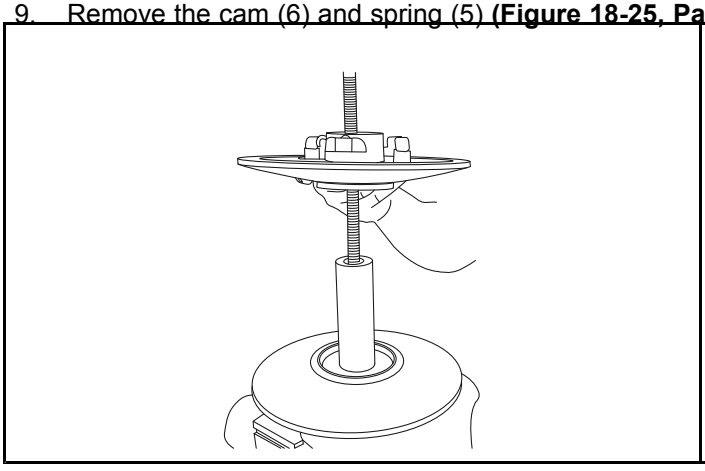
Figure 18-24 Release Spring Tension



1206

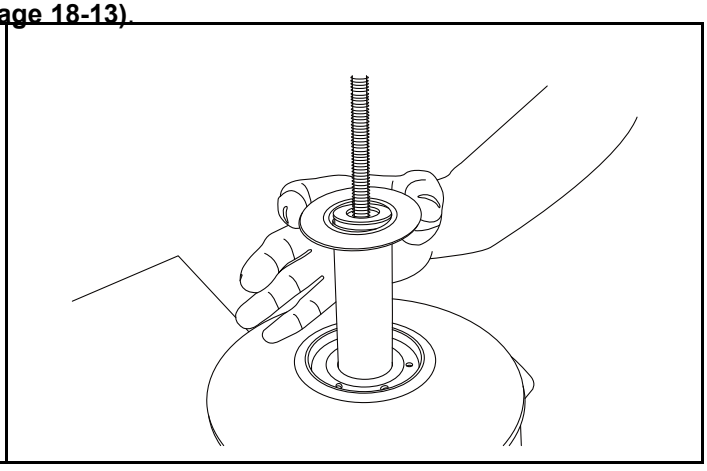
Figure 18-25 Remove Cam And Spring

8. Slowly remove the compression handle **(Figure 18-24, Page 18-13)**. The collar, cam (6) and moveable sheave (4) will rise and release tension on the spring (5).
9. Remove the cam (6) and spring (5) **(Figure 18-25, Page 18-13)**.



1207

Figure 18-26 Remove Sheave



1208

Figure 18-27 Remove Washer