



ARIENS
THE KING OF SNOW

Sno-Thro[®]

Service Guide

Deluxe Series

Models

921045 – Deluxe 24
(SN 000101 +)

921046 – Deluxe 28
(SN 000101 +)

921047 – Deluxe 30
(SN 000101 +)

921048 – Deluxe 28 SHO
(SN 000101 +)

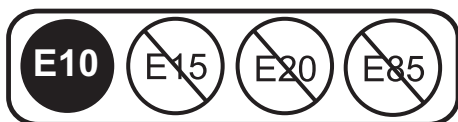
921049 – Deluxe 30 EFI
(SN 000101 +)

921323 – Deluxe 24 CE
(SN 000101 +)

921324 – Deluxe 28 CE
(SN 000101 +)

921325 – Deluxe 30 CE
(SN 000101 +)

921326 – Deluxe 28 Track CE
(SN 000101 +)



EN ENGLISH

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WELCOME

Before operating or servicing the unit, carefully and completely read the Operator's Manual and engine manual provided with the unit at time of purchase. They contain important safety instructions and information about unit controls.

Have Questions or Need Assistance?

ariensstore.com (Dealer Locator)

ariens.custhelp.com (Self-Support)

A parts manual and an operator's manual for your unit are available for free download or purchase at ariens.com.

Ariens recommends using only genuine Ariens replacement parts on this unit. Using unauthorized parts may adversely affect the performance, durability or safety of this unit and may void the warranty. Installing unauthorized parts will not automatically void the warranty; however, the warranty will not apply if the installation and use of unauthorized parts damages the unit. The Ariens warranty applies solely to defects in Ariens materials and / or factory workmanship. Ariens disclaims liability for any claims or damages – whether warranty, property damage, personal injury or death – arising from using unauthorized replacement parts.

Be aware of your mechanical aptitude when applying information in this manual for service and / or repairs. If you are not comfortable or capable of completing service and / or repairs to the machine, take the machine to an authorized Ariens service dealer.

SAFETY

Read these safety rules and follow them closely. Failure to follow these rules could lead to loss of control of unit, severe personal injury or death to you or bystanders, or result in damage to property or the machine.

PRACTICES & LAWS

Practice usual and customary safe working precautions. Learn applicable rules and laws in your area. Always follow the practices set forth in this manual.

EMISSION CONTROL SYSTEM

This equipment and/or its engine may include exhaust and evaporative emissions control system components required to meet U.S. Environmental Protection Agency (EPA) and/or California Air Resources Board (CARB) regulations. Tampering with emission controls and components by unauthorized personnel may result in severe fines or penalties. Emission controls and components can only be adjusted by an Ariens Company dealer or an authorized engine manufacturer's service center. Contact your Ariens Company Equipment Retailer concerning emission controls and component questions.

REQUIRED OPERATOR TRAINING



Read and understand the Operator's Manual and decals on the unit. This information is for your safety and the proper use of your equipment. Failure to follow these instructions and warnings may cause death or serious

injury. If you have purchased this product from an Ariens dealer, the dealer can provide you with training.

Familiarize yourself and any other operators with all controls and the safe use of the features of this unit. If you loan, rent or sell this product to others, provide them with all manuals.

If you have any questions, please call our customer support line at 920-756-4688 or contact us at www.ariens.com. Do not use this equipment if, after reading the Operator's Manual and the on-board decals, you have any questions about the safe use of this product.



WARNING: AVOID INJURY. This snow thrower is capable of crushing or amputating body parts. Failure to observe the safety instructions in the manuals and on decals could result in serious injury or death.

ALWAYS disengage auger, stop unit and engine, remove key and allow moving parts to stop before leaving operator's position.

SAFETY ALERT SYMBOL



This is the safety alert symbol. It means:

- **ATTENTION!**
- **YOUR SAFETY IS INVOLVED!**

When you see this symbol:

- **BECOME ALERT!**
- **OBEY THE MESSAGE!**

SIGNAL WORDS

The safety alert symbol above and signal words below are used on decals and in this manual. Read and understand all safety messages.

1. Danger



DANGER: Indicates an IMMINENTLY HAZARDOUS SITUATION! If not avoided, WILL RESULT in death or serious injury.

2. Warning



WARNING: Indicates a POTENTIALLY HAZARDOUS SITUATION! If not avoided, COULD RESULT in death or serious injury.

3. Caution



CAUTION: Indicates a POTENTIALLY HAZARDOUS SITUATION! If not avoided, MAY RESULT in minor or moderate injury. It may also be used to alert against unsafe practices.

4. Notice

NOTICE: Indicates information or procedures that are considered important but not hazard related. If not followed, property damage could result.

5. Important

IMPORTANT: Indicates general reference information worthy of special attention.

SAFETY DECALS

The safety decals on your machine are visual reminders of the important safety information in this manual. All messages on your unit must be fully understood and carefully followed. Safety decals on the machine are explained below.

Always replace missing or damaged safety decals. Replacement decal information is in the parts manual for your machine. Decals can be ordered from your dealer. See Figure 1 for safety decal locations.

Safety Decal Locations

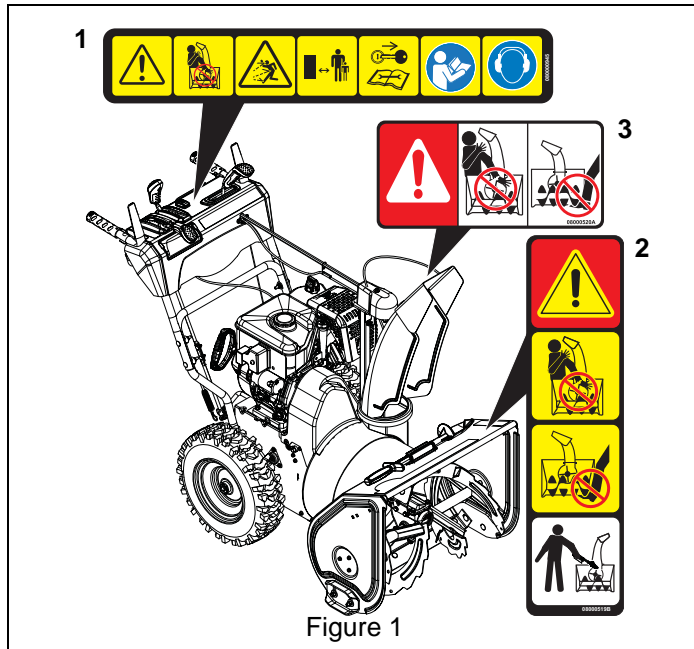


Figure 1

Safety Decal Descriptions

1. CAUTION!



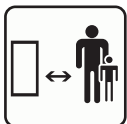
Danger!



Only use clean-out tool to clear blockages. NEVER use your hands.



NEVER direct discharge towards persons or property that may be injured or damaged by thrown objects.



Keep people away from unit while operating. Keep children out of work area and under watchful care of a responsible adult.



Stop engine, remove key, and read manual before making any repairs or adjustments.



Read Operator's Manual.



Wear appropriate hearing protection.

2. DANGER!



Danger!



ROTATING PARTS! Only use clean-out tool to clear blockages. NEVER use your hands.



High-speed auger/impeller rotates below discharge opening. Wait for all moving parts to stop before removing clogs or servicing.



3. DANGER!



Danger!

ROTATING PARTS! Keep clear of auger while engine is running.

- Read Operator's Manual.
- Allow operation only by properly-trained adult, never children.
- Stop engine and remove ignition key prior to leaving the operator's position for any reason.
- Keep all controls, guards and safety devices properly serviced and functional.
- NEVER direct discharge towards persons or property that may be injured or damaged by thrown objects.

SAFETY RULES

The following safety instructions are based on the B71.3 specifications of the American National Standards Institute in effect at the time of production.

Training

Read, understand and follow all instructions on the machine and in the manual(s) before operating this unit. Be thoroughly familiar with the controls and the proper use of the equipment. Know how to stop the unit and disengage the controls quickly.

Never allow children to operate or play on or near the equipment. Never allow adults to operate the equipment without proper instruction.

Keep the area of operation clear of all persons, particularly small children. Be alert and shut off unit if children enter area.

Exercise caution to avoid slipping or falling, especially when operating the snow thrower in reverse.

Always remove key and/or wire from spark plug before assembly, maintenance or service. Unintentional engine start up can cause death or serious injury.

Complete a walk-around inspection of the unit to understand the unit, your work area and all safety decals.

Understand how to operate all controls, the functions of all controls and how to STOP in an emergency.

Preparation

Always check overhead and side clearances carefully before operation.

Always be aware of traffic when operating near streets or along curbs.

Thoroughly inspect the area where the equipment is to be used and remove all doormats, sleds, boards, toys, wires and other foreign objects.

Disengage all clutches and shift into neutral before starting the engine.

Use extension cords and receptacles as specified by the manufacturer for all units with electric drive motors or electric starting motors.

Handle fuel with care; it is highly flammable.

- Use an approved fuel container.
- Never add fuel to a running engine or hot engine.
- Fill fuel tank outdoors with extreme care. Never fill fuel tank indoors.
- Never fill containers inside a vehicle or on a truck or trailer bed with a plastic liner. Always place containers on the ground, away from your vehicle, before filling.
- When practical, remove gas-powered equipment from the truck or trailer and refuel it on the ground. If this is not possible, then refuel such equipment on a trailer with a portable container, rather than from a gasoline dispenser nozzle.
- Keep the nozzle in contact with the rim of the fuel tank or container opening at all times, until refueling is complete. Do not use a nozzle lock-open device.
- Replace gasoline cap securely and wipe up spilled fuel.
- If fuel is spilled on clothing, change clothing immediately.

Adjust the auger / impeller housing height to clear gravel or crushed rock surface.

Never attempt to make any adjustments while the engine is running (except when specifically recommended by manufacturer).

Always allow unit and engine to adjust to outdoor temperature before clearing snow.

Operation

Disengage all controls before starting engine.

Never leave a running unit unattended. Always stop engine and remove key before leaving unit to prevent unauthorized use.

Do not put hands or feet near or under rotating parts. Keep clear of the discharge opening at all times.

Moving and/or rotating parts can cut off body parts such as fingers or a hand. NEVER place your hands, other body part or clothing near any moving parts while unit is running.

Always keep hands away from all pinch points.

Do not touch parts which might be hot from operation. Allow parts to cool before attempting to maintain, adjust or service.

Thrown objects can cause injury. Check for weak spots on docks, ramps or floors. Avoid uneven work areas and rough terrain and stay alert for hidden hazards.

Exercise extreme caution when operating on or crossing gravel drives, walks or roads. Stay alert for hidden hazards or traffic.

After striking a foreign object, stop the engine, remove the wire from the spark plug, disconnect the cord on electric motors, thoroughly inspect the snow thrower for any damage, and repair the damage before restarting and operating the snow thrower.

If the unit should start to vibrate abnormally, stop the engine and check immediately for the cause. Vibration is generally a warning of trouble.

Stop the engine whenever you leave the operating position, before unclogging the auger / impeller housing or discharge chute, and when making any repairs, adjustments or inspections.

When cleaning, repairing or inspecting the snow thrower, stop the engine and make certain the auger / impeller and all moving parts have stopped. Disconnect the spark plug wire and keep the wire away from the plug to prevent someone from accidentally starting the engine.

Do not run the engine indoors, except when starting the engine and for transporting the snow thrower in or out of the building. Open the outside doors; exhaust fumes are dangerous.

Never operate the snow thrower without proper guards, and other safety protective devices in place and working.

Always stand clear of the discharge area when operating this unit.

Never direct the discharge toward people or areas where injury or property damage can occur from thrown objects. Keep children and others away.

Do not overload the machine capacity by attempting to clear snow at too fast a rate.

Never operate the machine at high transport speeds on slippery surfaces. Look behind and use care when operating in reverse.

Do not operate in reverse unless absolutely necessary. Always back up slowly and look down and behind before and while backing.

Do not carry passengers.

Disengage attachment when not in use and when traveling from one work area to another.

Disengage power to the auger / impeller when snow thrower is transported or not in use.

Use only attachments and accessories approved by the manufacturer of the snow thrower (such as wheel weights, counterweights or cabs).

This product is equipped with an internal combustion engine. Do not use unit on or near any unimproved, forest-covered or brush-covered land unless exhaust system is equipped with a spark arrester meeting applicable local, state or federal laws. A spark arrester, if used, must be maintained in effective working order by operator.

Never operate the snow thrower without good visibility or light. Always be sure of your footing, and keep a firm hold on the handles. Walk; never run.

Never operate unit after or during the use of medication, drugs or alcohol. Safe operation requires complete and unimpaired attention at all times.

Never allow anyone to operate this unit when their alertness or coordination is impaired.

Never touch a hot engine or muffler.

Avoid contact with sharp edges; sharp edges can cut.

Do not throw snow higher than necessary.

Clearing a Clogged Discharge Chute

Hand contact with the rotating auger / impeller inside the discharge chute is the most common cause of injury associated with snow throwers. Never use your hand to clean out the discharge chute.

To clear the chute:

1. SHUT THE ENGINE OFF!
2. Wait 10 seconds to be sure the auger / impeller blades have stopped rotating.
3. Always use a clean-out tool, not your hands.

Maintenance and Storage

Secure unit so it will not tip over during maintenance.

Before cleaning, removing clogs or making any inspections, repairs, etc., disengage clutch(es), stop engine, remove key, allow moving parts to stop and hot parts to cool.

Check shear bolts and other bolts at frequent intervals for proper tightness to be sure the equipment is in safe working condition.

Check clutch and brake operation frequently.

Do not change engine governor settings and do not over-speed engine.

Adjust and service as required. Motion of drive wheels and auger / impeller must stop quickly when clutch levers are released.

Always maintain unit in safe operating condition. Damaged or worn out muffler can cause fire or explosion.

Keep unit free of ice or other debris. Clean up oil or fuel spills.

Always keep protective structures, guards, and panels in good repair and secured in place. Never modify or remove safety devices.

Never store the machine with fuel in the fuel tank inside a building where ignition sources are present such as hot water heaters, space heaters or clothes dryers. Close fuel valve and allow the engine to cool completely before storing in any enclosure or covering the unit.

Always refer to operator's manual for important details if the snow thrower is to be stored for an extended period.

Maintain or replace safety and instruction labels as necessary.

Run the machine a few minutes after throwing snow to prevent freeze-up of the auger / impeller.

Personal Protection

Do not operate the equipment without wearing adequate winter garments. Avoid loose fitting clothing that can get caught in moving parts. Wear footwear that will improve footing on slippery surfaces.

Wear adequate safety gear, including safety glasses with side shields and protective gloves.

Do not wear loose clothing or jewelry, and tie back hair that may get caught in rotating parts.

NEVER attempt to unclog or clean unit while engine is running. Rotating auger / impeller can cause serious injury.

Protect eyes, face and head from objects that may be thrown from unit. Wear appropriate hearing protection.

Always wear safety glasses or eye shields during operation or while performing an adjustment or repair to protect eyes from foreign objects that may be thrown from the machine.

Slope Operation

Exercise extreme caution when operating on slopes. DO NOT operate on steep slopes. DO NOT clear snow across the face of slopes; go up and down. Keep all movement on slopes slow and gradual.

Use a slow speed to avoid stops or shifts on slopes. Avoid starting or stopping on a slope. Do not park unit on a slope unless absolutely necessary. When parking on a slope always block the wheels.

Do not operate near drop-offs, ditches, or embankments. Unit can suddenly turn over if a wheel is over the edge of a cliff or ditch, or if an edge caves in.

Fuel

DO NOT run engine in an enclosed area. Always provide good ventilation. Fumes from engine exhaust can cause injury or death.

Fuel is highly flammable and its vapors are explosive. Handle with care. Use only an approved gasoline container with an appropriately-sized dispensing spout.

No smoking, no sparks, no flames. Always allow engine to cool before servicing.

Never fill fuel tank when engine is running or hot from operation.

Never fill or drain fuel tank indoors.

Replace fuel cap securely and clean up spilled fuel.

Never fill fuel containers inside a vehicle or on a truck or trailer bed with a plastic liner. Always place containers on the ground away from your vehicle before filling.

When practical, remove gas-powered equipment from the truck or trailer and refuel it on the ground. If this is not possible, then refuel on a trailer with a portable container, rather than from a gasoline dispenser nozzle.

Keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete. Do not use a nozzle lock-open device.

If fuel is spilled on clothing, change clothing immediately.

Properly remove fuel before tipping unit up onto housing to avoid spills.

Towing/Transporting

Always stop engine, remove key and close fuel valve or drain fuel when transporting unit on a truck or trailer.

Use extra care when loading or unloading unit onto trailer or truck. Secure unit chassis to transport vehicle. Never secure from rods or linkages that could be damaged. Do not transport machine while engine is running.

Accessories

Use only Ariens Company-recommended attachments or accessories that are designed for your unit and that are appropriate to your use and can be used safely in your application.

DRAINING FUEL SYSTEM

1. Move unit to an open, well-ventilated area with no flames or sparks.
2. Remove fuel tank cap and siphon fuel into a clean gasoline container.
3. Reinstall fuel tank cap and tighten.
4. Start engine to burn remaining fuel in fuel system and leave engine running until it “runs dry” and stops. Refer to Operator’s Manual for engine start procedure.
5. Stop engine, remove key and close fuel valve.

SERVICE POSITION

See Figure 2.



WARNING: AVOID INJURY. Before placing unit in service position, drain fuel from tank and fuel system. See *Draining Fuel System* on page 7. Make sure unit is secure and will not tip.

NOTICE: NEVER store unit in service position.

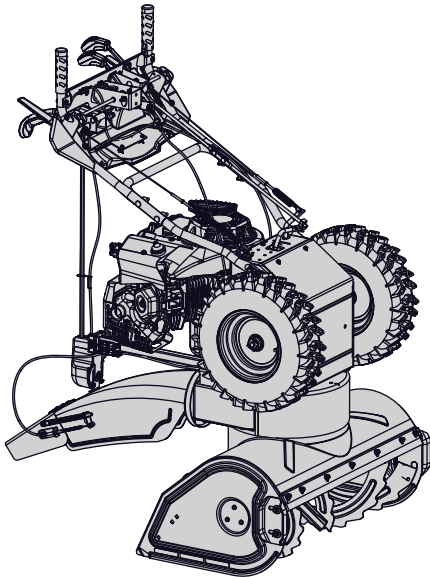


Figure 2

SEPARATE HOUSING FROM FRAME

Remove Auger Housing

IMPORTANT: Save all hardware for reinstallation.

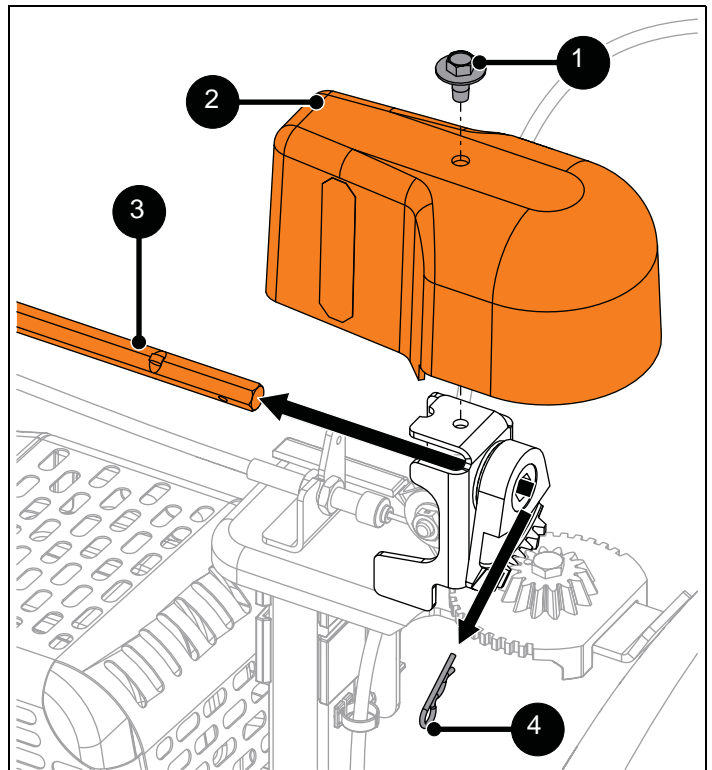
1. Stop engine, remove key and wait for moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Remove hardware retaining chute gear cover to chute pedestal and remove cover.

IMPORTANT: For Models 921045, 921046, 921047, 921048, 921049, 921323, 921324, 921325, advance to step 7.

Model 921326

See Figure 3.

1. Remove hairpin from hex rod and remove hex rod from chute gears.



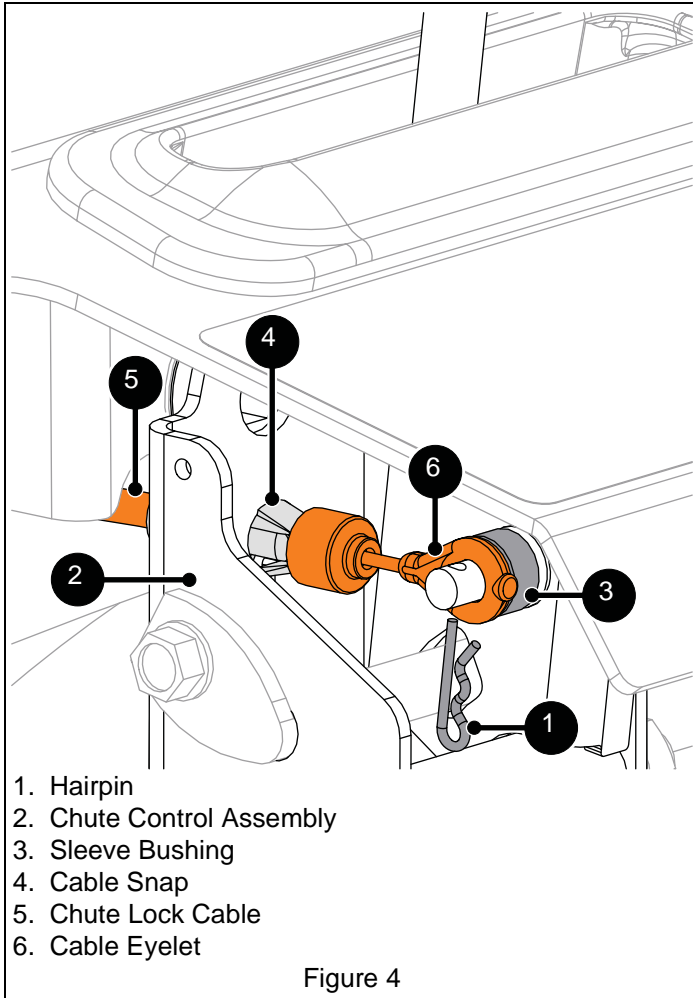
1. Tapping Screw
2. Chute Gear Cover
3. Hex Rod
4. Hairpin

Figure 3

See Figure 4.

2. Remove hairpin and cable eyelet from chute control assembly.
3. With a pliers, squeeze tabs on cable snap and remove from chute control assembly.
4. Guide cable end through lower hole in chute control assembly and through hole in dash panel.

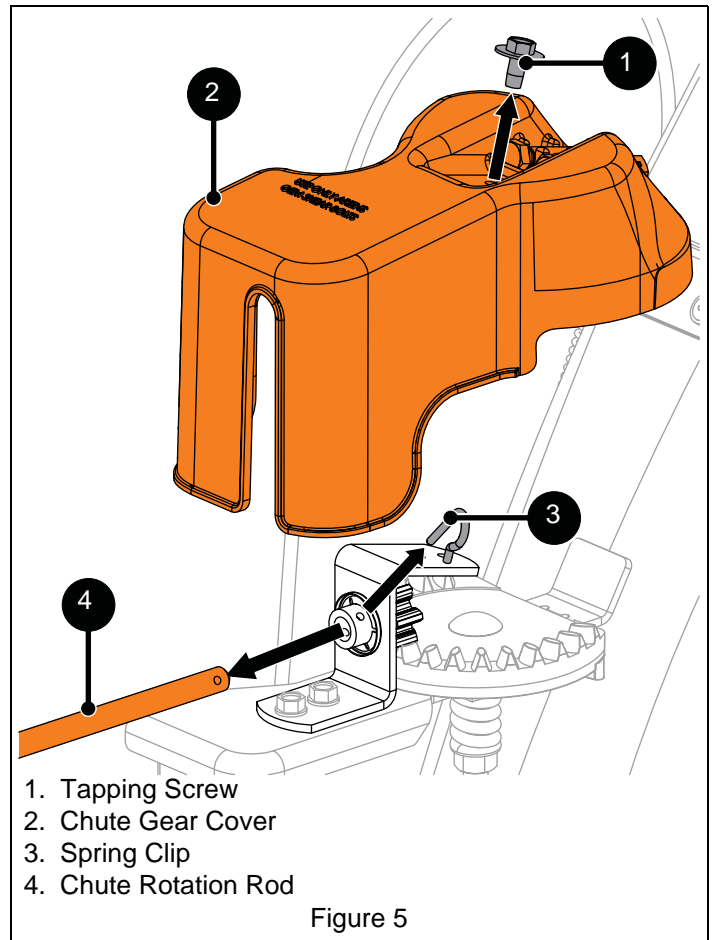
IMPORTANT: Reinstall hairpin to chute control assembly so parts are not misplaced.



5. Remove hex rod from dash panel.
6. Advance to step 9.

Models 921045, 921046, 921047, 921048, 921049, 921323, 921324, 921325

7. Remove spring clip from chute rotation rod and remove rod from chute gears. See Figure 5.



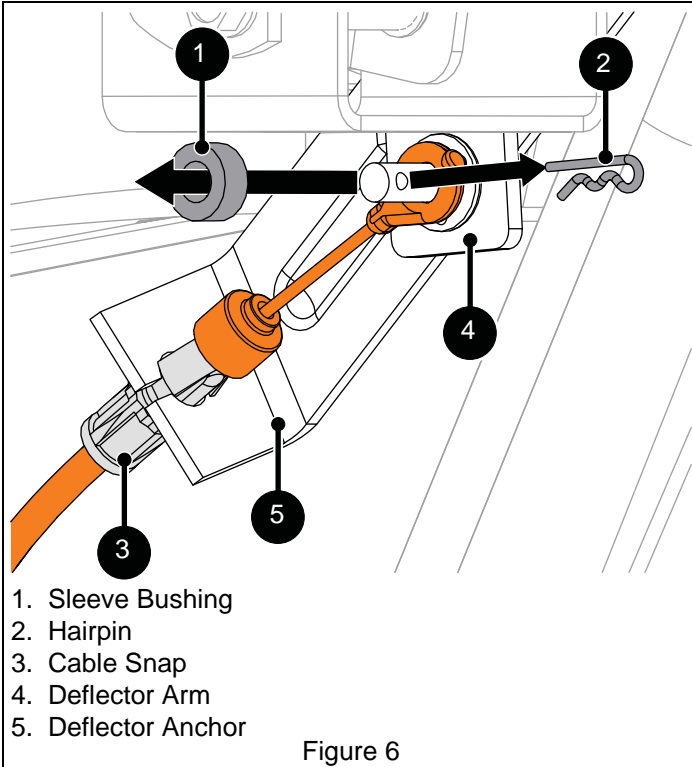
8. Remove chute rotation rod from dash panel.

All Models

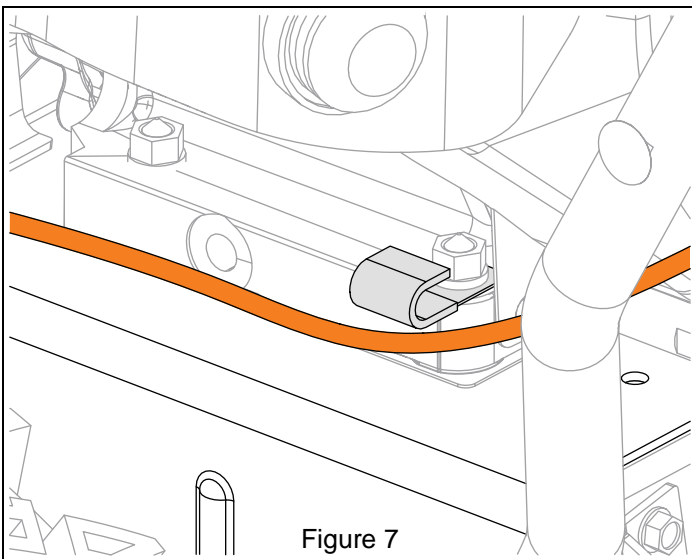
See Figure 6.

9. Remove hairpin, sleeve bushing and cable eyelet from deflector arm under dash panel.
10. With a pliers, squeeze tabs on cable snap and remove from deflector anchor.

IMPORTANT: Reinstall sleeve bushing and hairpin so parts are not misplaced.

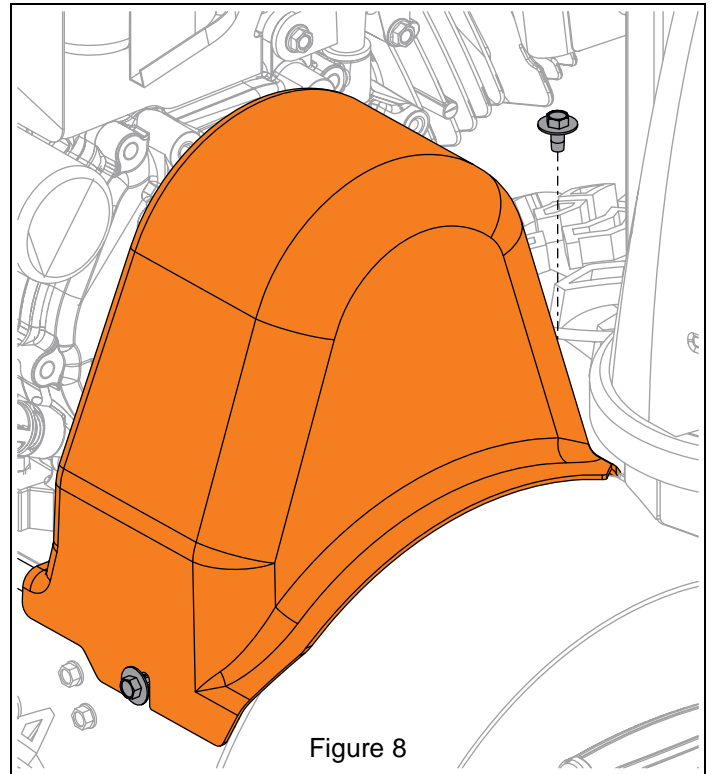


11. Remove chute deflector cable from J-clamp on engine mount. See Figure 7.

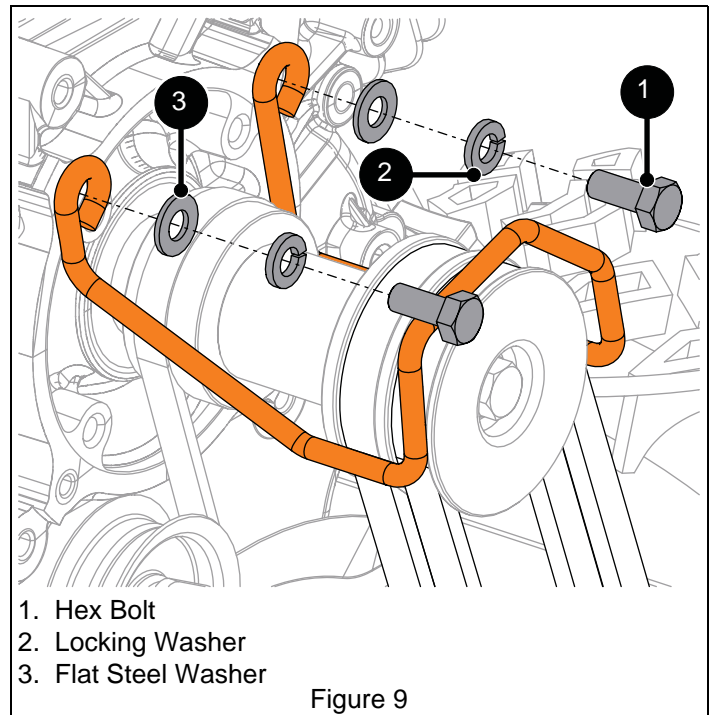


See Figure 8.

12. Remove tapping screw securing left side of belt cover to frame.
13. Loosen, but DO NOT remove tapping screw securing right side of belt cover to frame and remove belt cover.



14. Remove hardware retaining belt finger to engine and remove belt finger. See Figure 9.





WARNING: AVOID INJURY. Attachment sheave edges are sharp. Wear thick gloves to remove belts from attachment sheave.

See Figure 10.

15. Remove attachment drive belts from attachment sheave.

To assist belt removal, slowly pull recoil starter handle while gently guiding belts out of attachment sheave.

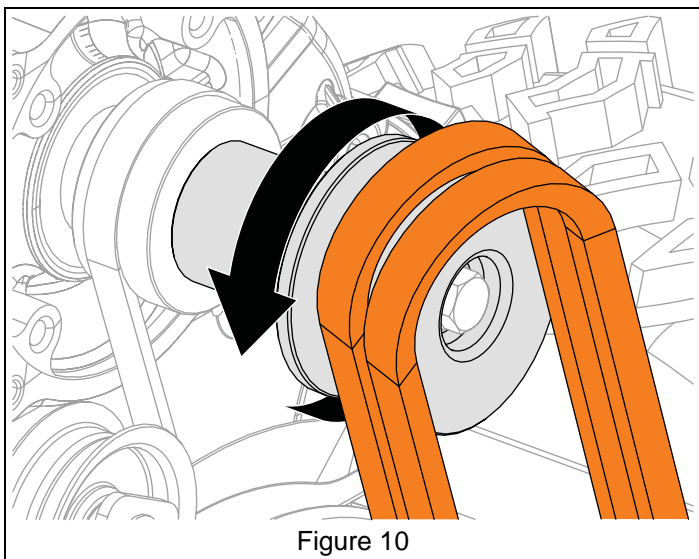


Figure 10

See Figure 11.

16. Position support, such as a trash can, under handlebars so tractor / frame remains upright when separated from auger housing.
17. Chock or block wheels to prevent tractor / frame movement.

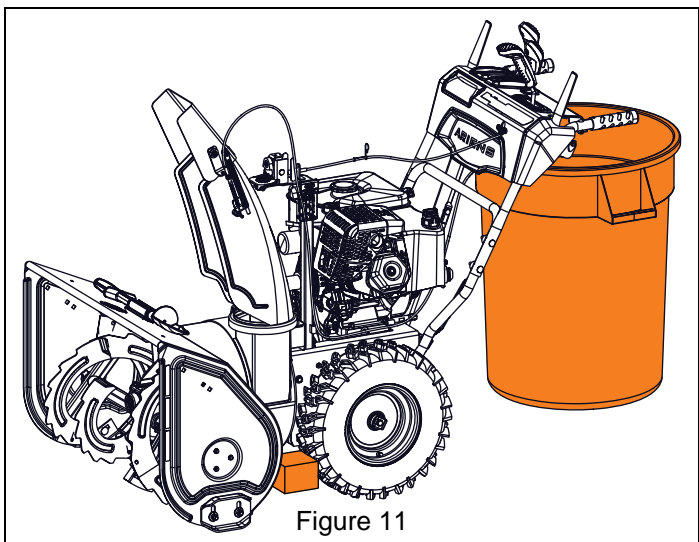


Figure 11

See Figure 12.

18. Remove hardware securing auger housing to frame.
19. Lift auger housing rear slightly to disengage from mount rod and separate from unit.

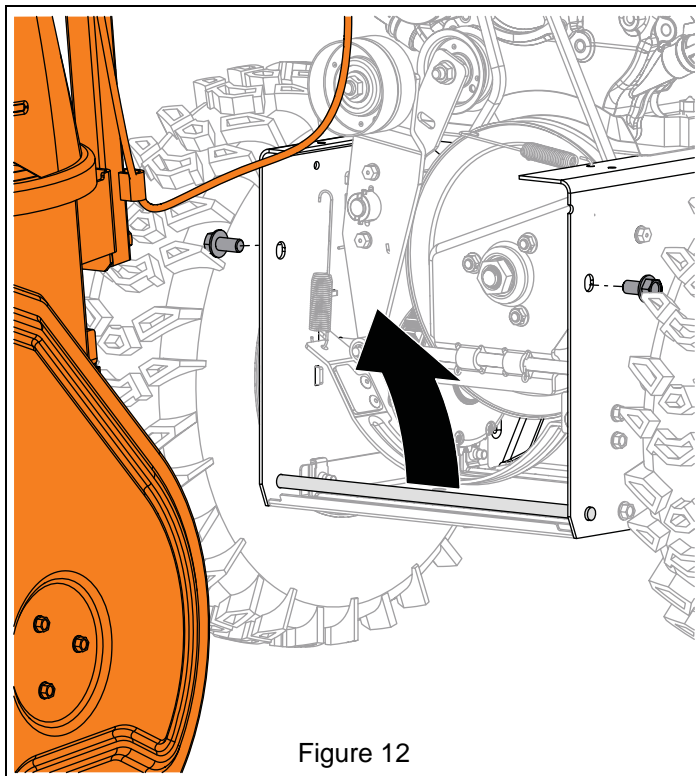


Figure 12

Reinstall Auger Housing

See Figure 13.

1. With assistance from an adult helper, engage attachment clutch lever so attachment brake will not obstruct attachment drive pulley in step 2.
2. Tilt auger housing rear up and lower mount brackets onto mount rod.

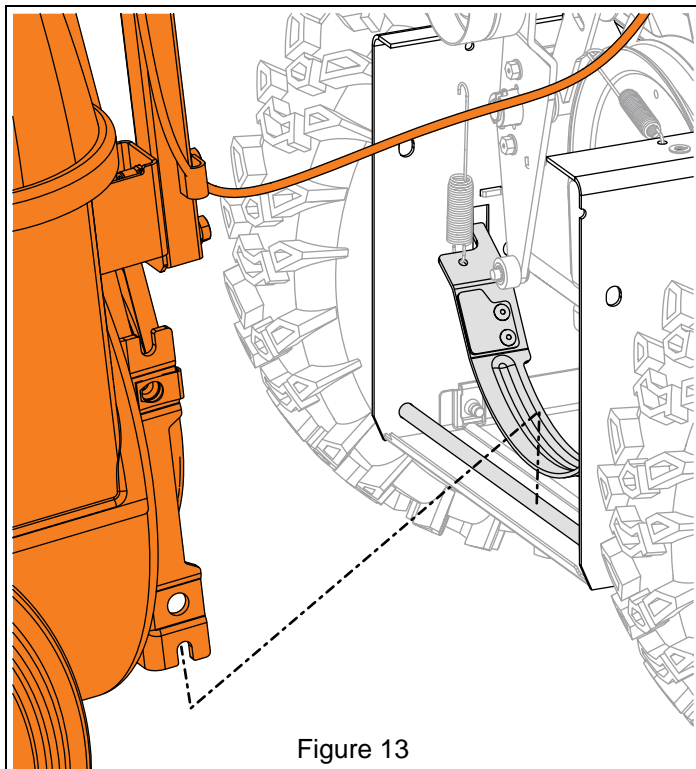


Figure 13

3. Release attachment clutch lever.
4. Align holes in mount brackets with holes in frame and secure housing to frame with two hex bolts, but DO NOT tighten.

IMPORTANT: Unit must be on a flat, level surface during steps 5 – 7.

5. Check tire pressure and adjust if necessary. Refer to Operator's Manual for specification.
6. Torque hex bolts installed in step 4 to 33.8 – 70.1 N•m (24.9 – 51.7 lb-ft).
7. Loosen skid shoe hardware and adjust skid shoes. Refer to Operator's Manual for adjustment procedure.

See Figure 14.



WARNING: AVOID INJURY. Attachment sheave edges are sharp. Wear thick gloves to install belts onto attachment sheave.

8. Reinstall attachment drive belts onto attachment sheave.

To assist belt installation, slowly pull recoil starter handle while gently guiding belts onto attachment sheave.

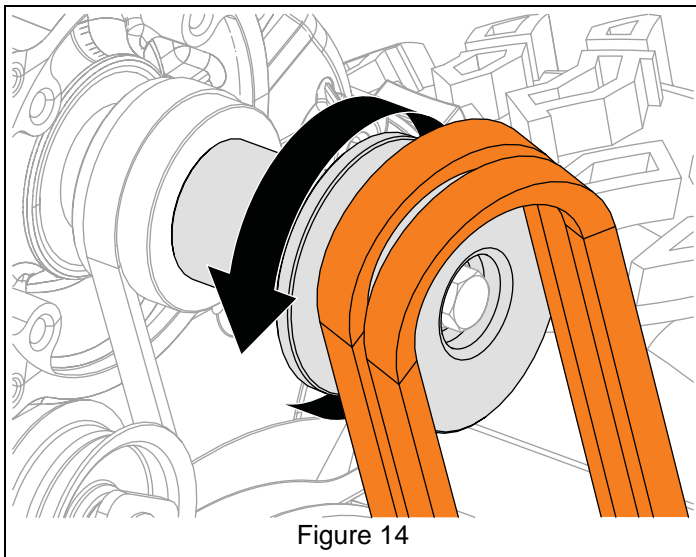


Figure 14

See Figure 15.

9. Reinstall belt finger and secure with two flat steel washers, two locking washers and two hex bolts.
10. Check belt finger clearance:
 - Engage attachment clutch lever and make sure belt finger located opposite belt idler is less than 3.2 mm (1/8") from belt, but not touching the belt.
 - If needed, adjust clearance by loosening hex bolts, repositioning belt finger, and tightening bolts.

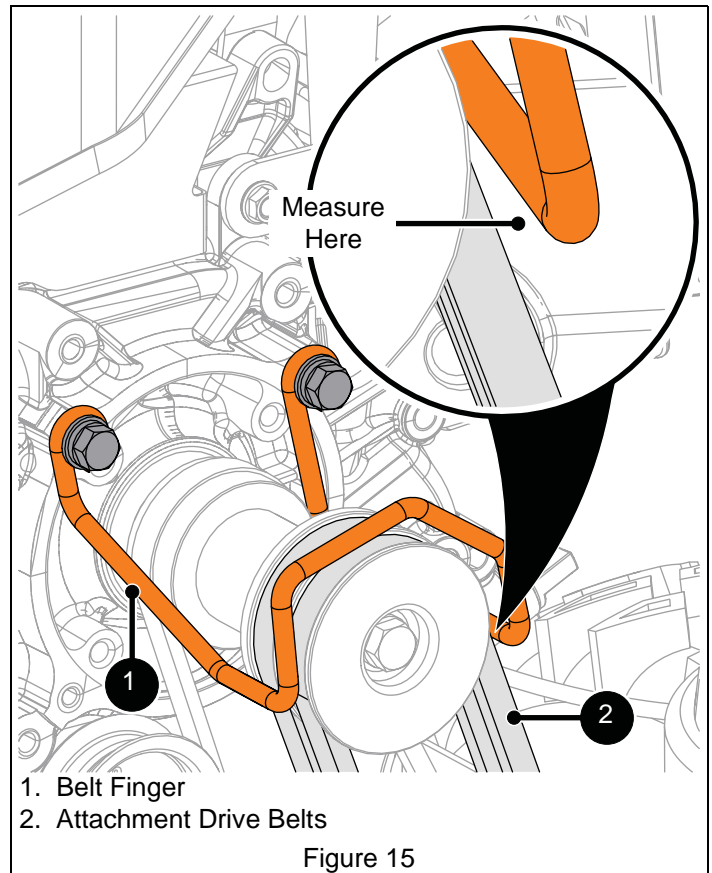


Figure 15

11. Reinstall belt cover and secure left side with tapping screw. Position right side under tapping screw and tighten.

IMPORTANT: For Model 921326, advance to step 15.

Models 921045, 921046, 921047, 921048, 921049, 921323, 921324, 921325

12. Reinstall short end of chute rotation rod into dash panel until opposite end clears chute gears.
13. Insert chute rotation rod into chute gear and secure with spring clip.
14. Advance to step 20.

Model 921326

15. Insert hex rod end without ears into dash panel until opposite end clears chute gears.
16. Position discharge chute facing forward.
17. Position chute rotation lever upright and insert hex rod through chute gear until it stops. Secure with hairpin.
18. Insert chute lock cable through hole in dash panel and insert cable snap into chute control assembly.
19. Remove hairpin from chute control assembly and reinstall cable eyelet onto assembly. Reinstall hairpin. See Figure 4.

All Models

20. Reinstall gear cover and secure with tapping screw.
21. Reinstall chute deflector cable into J-clamp on engine mount.

22. Reinstall deflector cable snap onto deflector anchor.
23. Remove sleeve bushing and hairpin from deflector arm and reinstall cable eyelet onto deflector arm. Reinstall sleeve bushing and hairpin. See Figure 6. Reconnect spark plug wire.

IMPORTANT: Check all adjustments after first use.



WARNING: AVOID INJURY. Auger / impeller must stop within 5 seconds when attachment clutch lever is released.

BOTTOM COVER REMOVAL

IMPORTANT: Save all hardware for reinstallation.



WARNING: AVOID INJURY. Before placing unit in service position, drain fuel from tank and fuel system. See *Draining Fuel System* on page 7. Make sure unit is secure and will not tip.

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Place unit in service position. See *Service Position* on page 7.
4. Remove hardware retaining bottom cover to frame and remove cover. See Figure 16.

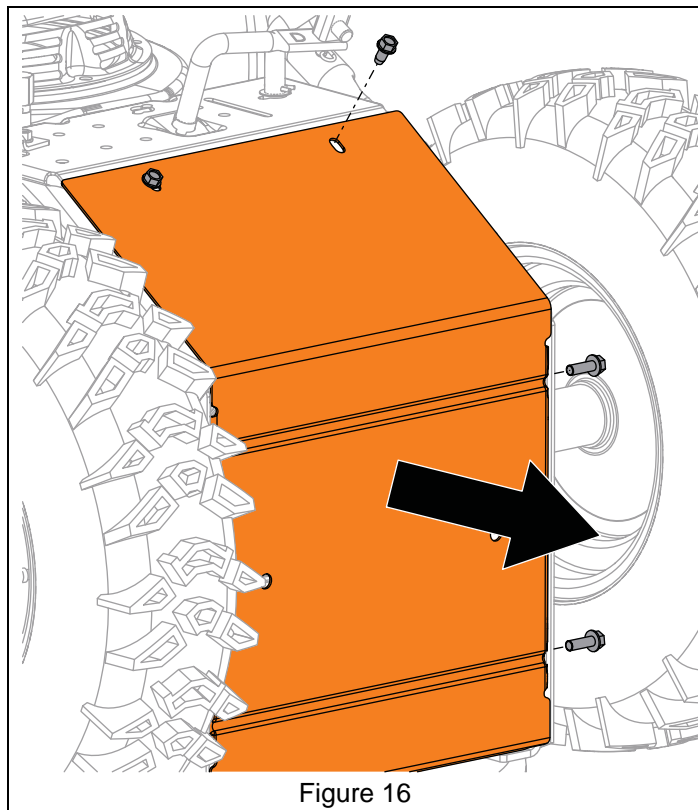


Figure 16

IMPORTANT: For track models, track angle must be in the “Raised Position” to remove bottom cover. Refer to Operator’s Manual. See Figure 17.

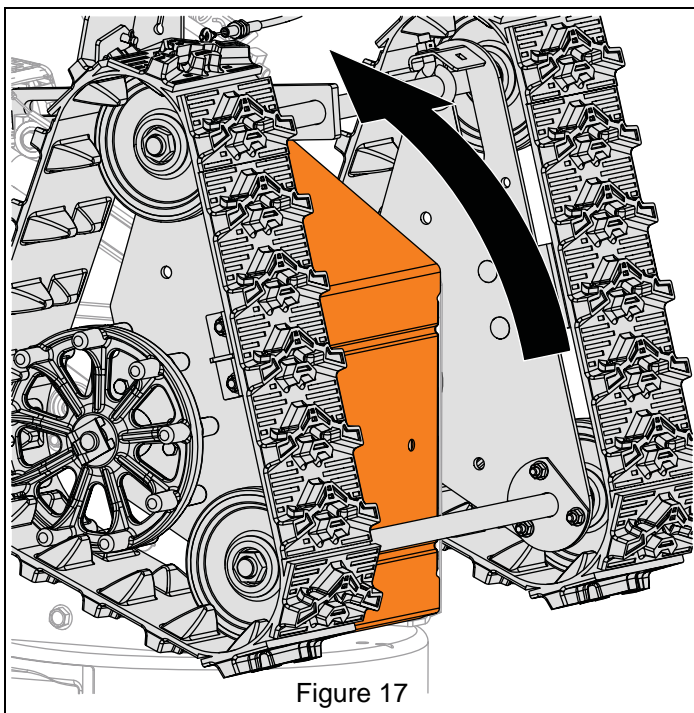


Figure 17

Install Bottom Cover

1. Reinstall bottom cover and secure with two tapping screws and four hex bolts.
2. Return unit to operating position.

ATTACHMENT DRIVE BELT REPLACEMENT

Remove Attachment Drive Belts

IMPORTANT: Save all hardware for reinstallation.

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Remove auger housing. See *Separate Housing From Frame* on page 7.
4. Remove attachment drive belts from attachment drive pulley. See Figure 18.

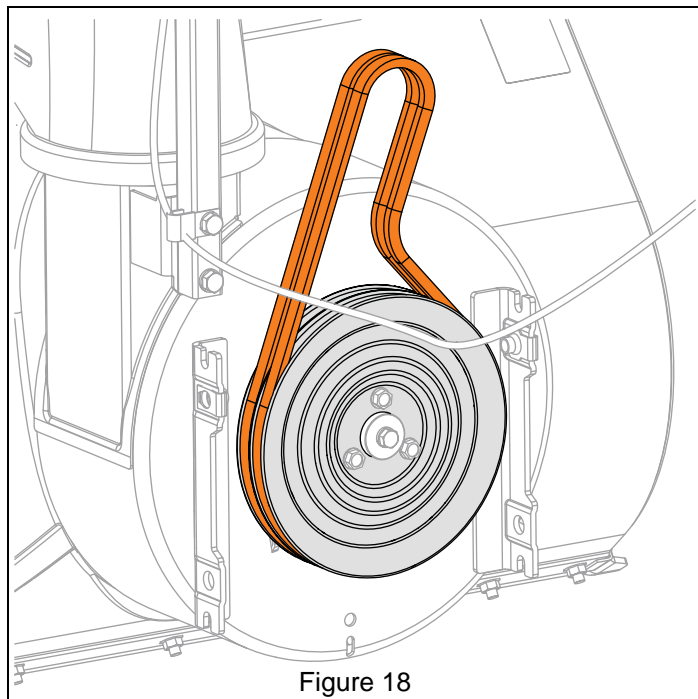


Figure 18

Install Attachment Drive Belts

1. Install belts onto attachment drive pulley.
2. Reinstall auger housing to frame. See *Reinstall Auger Housing* on page 10.

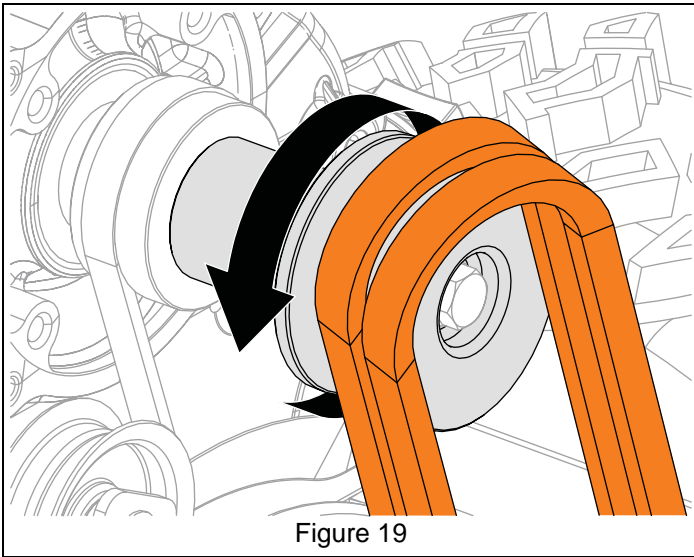
TRACTION DRIVE BELT REPLACEMENT

Remove Traction Drive Belt

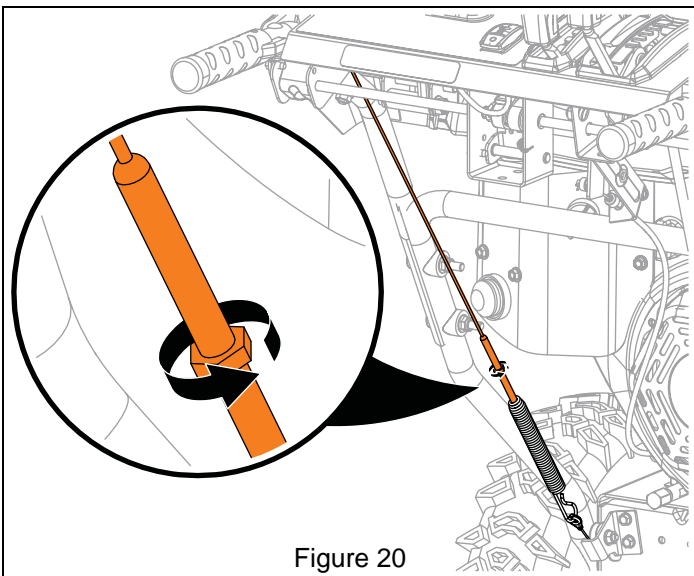
IMPORTANT: Save all hardware for reinstallation.

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Remove belt cover and belt finger as shown in Figure 8 and Figure 9.
4. Slowly pull recoil starter handle while gently guiding attachment belts off engine sheave. See Figure 19.

To assist belt removal, slowly pull recoil starter handle while gently guiding belts out of attachment sheave.

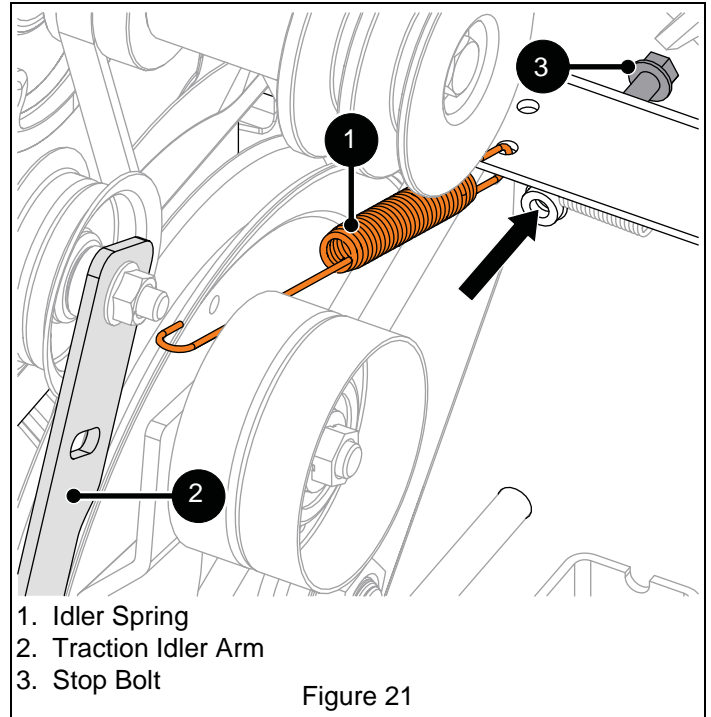


5. Loosen traction drive clutch cable. See Figure 20.



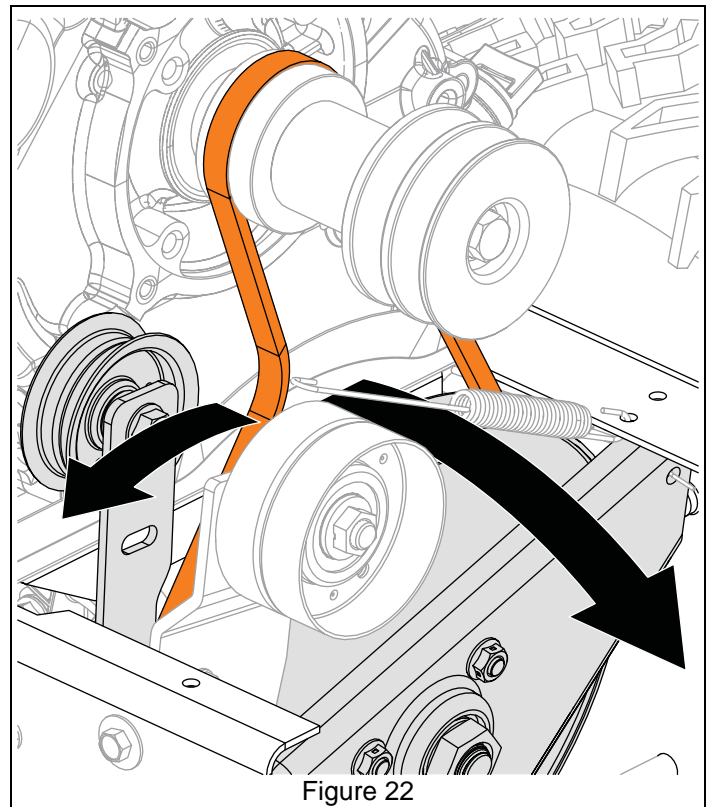
See Figure 21.

6. Disconnect idler spring from traction idler arm.
7. Remove stop bolt from frame.



See Figure 22.

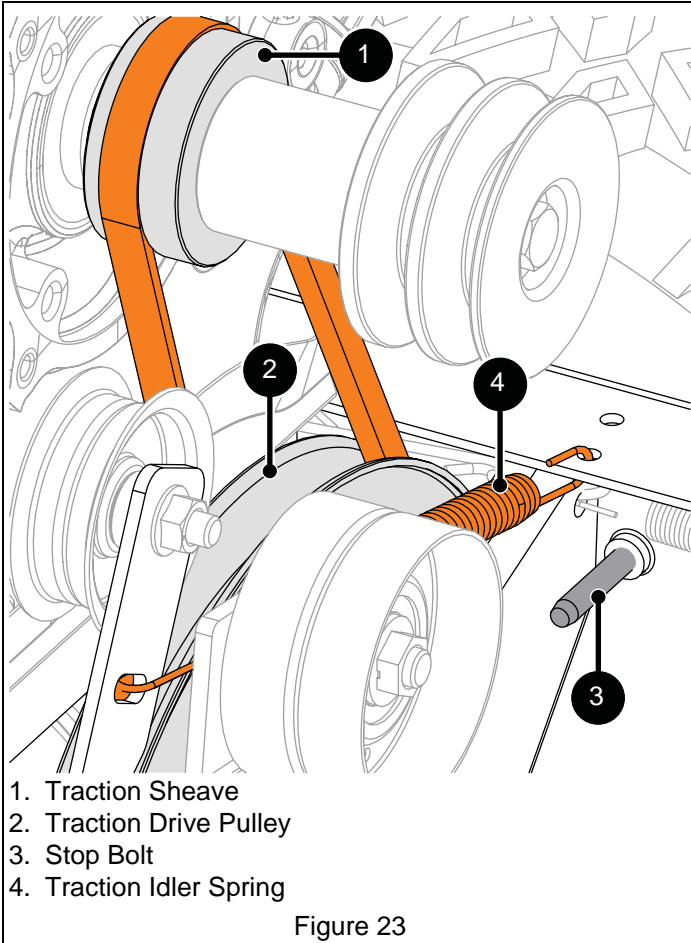
8. Rotate traction idler arm away from belt and rotate swing gate assembly forward.
9. Remove belt.



Install Traction Drive Belt

See Figure 23.

1. Install belt onto traction sheave and around traction drive pulley.
2. Return swing gate assembly to upright position and reinstall stop bolt.
3. Reinstall traction idler spring onto traction idler arm.



4. Reinstall attachment drive belts onto attachment sheave.

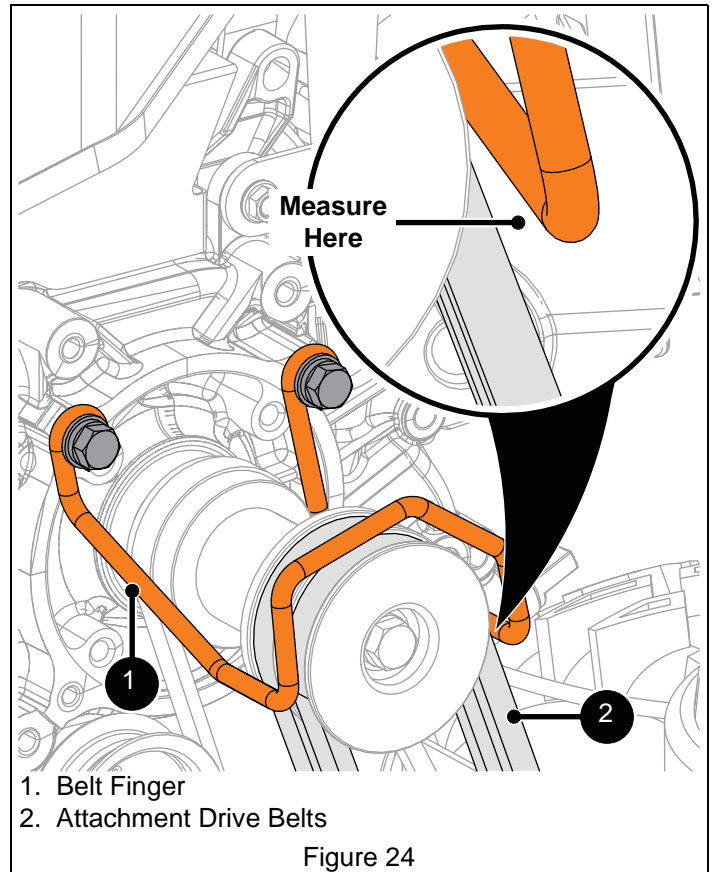
To assist belt installation, slowly pull recoil starter handle while gently guiding belts onto attachment sheave.

See Figure 24.

5. Reinstall belt finger and secure with two flat steel washers, two locking washers and two hex bolts.

6. Check belt finger clearance:

- Engage attachment clutch lever and make sure belt finger located opposite belt idler is less than 3.2 mm (1/8") from belt, but not touching the belt.
- If needed, adjust clearance by loosening hex bolts, repositioning belt finger, and tightening bolts.



7. Adjust traction drive clutch. Refer to Operator's Manual for adjustment procedure.
8. Reconnect spark plug wire.

IMPORTANT: Check all adjustments after first use.

ATTACHMENT BRAKE REPLACEMENT

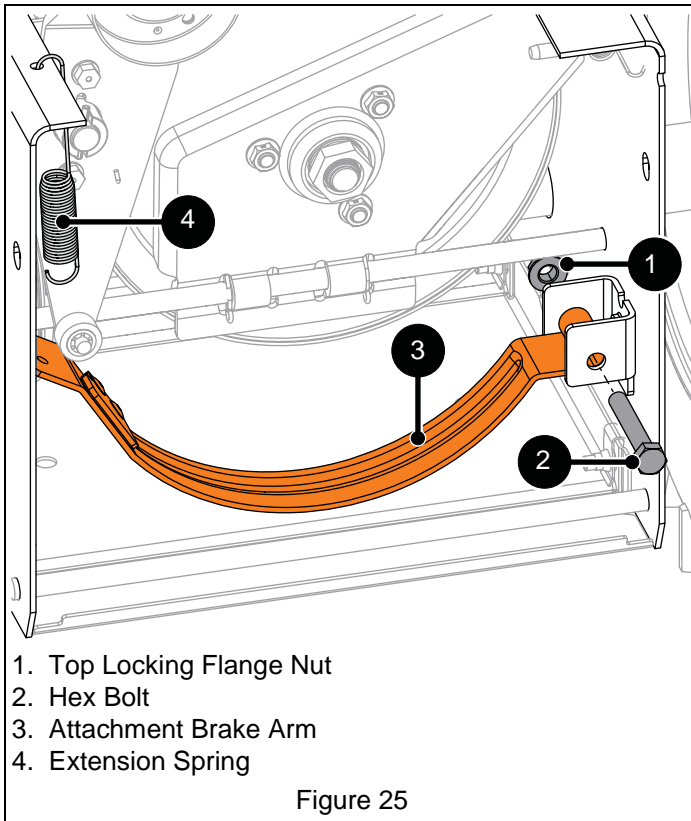
Remove Attachment Brake

IMPORTANT: Save all hardware for reinstallation.

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Remove auger housing. See *Separate Housing From Frame* on page 7.

See Figure 25.

4. Disconnect extension spring from attachment brake arm.
5. Remove hardware retaining attachment brake arm to brake mount bracket.
6. Remove brake arm.



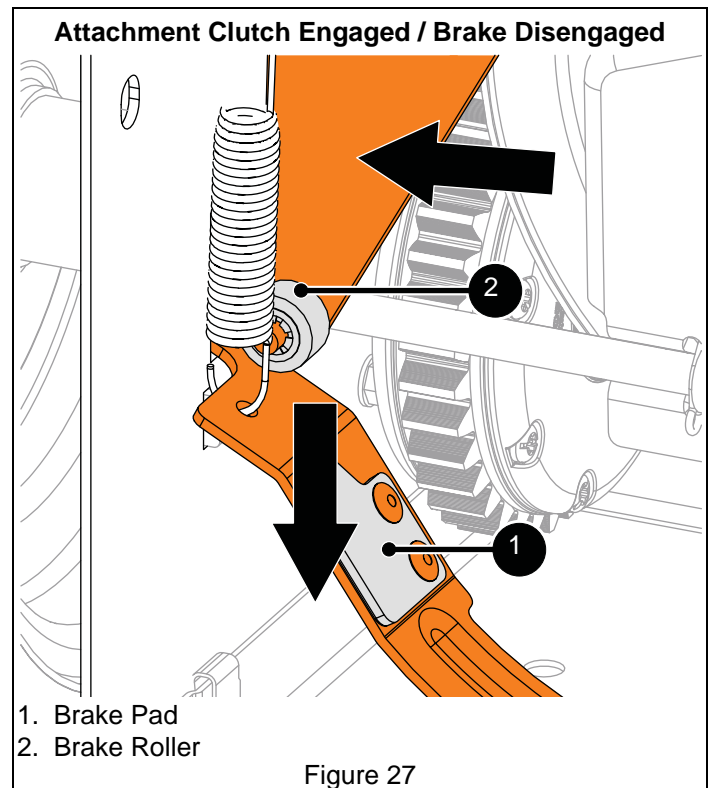
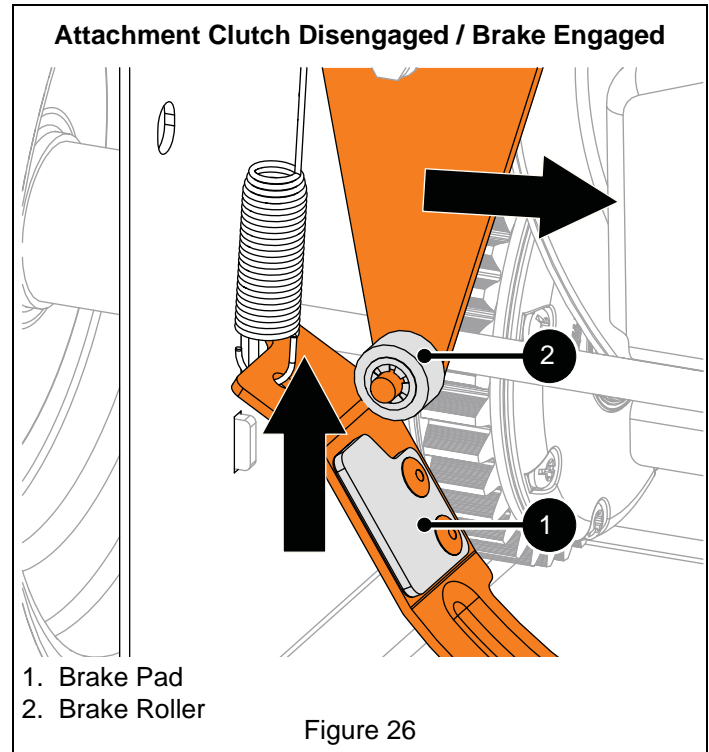
Install Attachment Brake

1. Position pivoting end of attachment brake arm in brake mount bracket and secure with one hex bolt and top locking flange nut, but **DO NOT** overtighten.
2. With flathead screwdriver or similar pry bar, reconnect extension spring to attachment brake arm.

See Figures 26 and 27.

3. Engage and disengage attachment clutch to verify brake roller on attachment idler does not interfere with brake pad.

IMPORTANT: Make sure brake roller does not bind.



4. Reinstall auger housing to frame. See *Reinstall Auger Housing* on page 10.



WARNING: AVOID INJURY. Before placing unit in service position, drain fuel from tank and fuel system. See *Draining Fuel System* on page 7. Make sure unit is secure and will not tip.

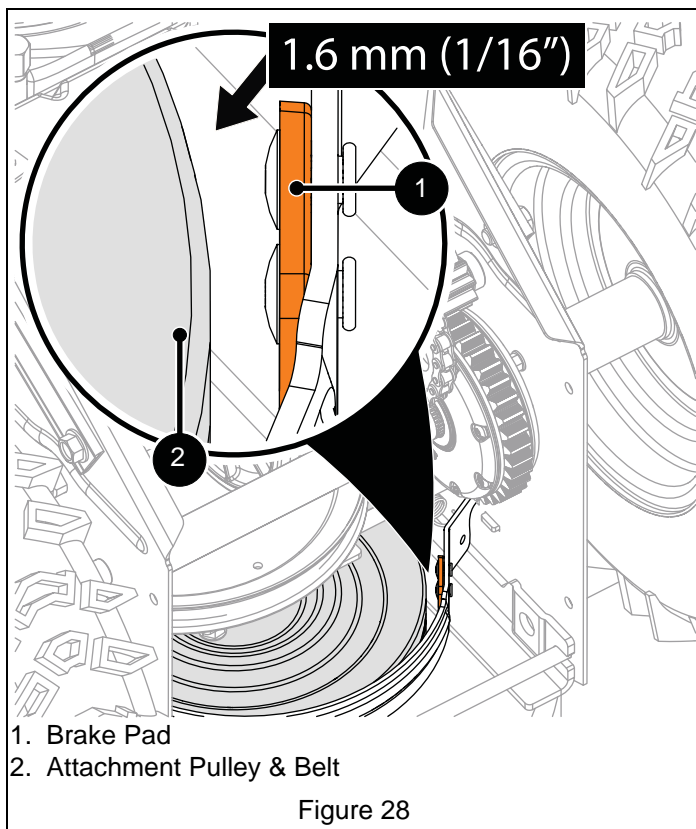
5. Place unit in service position and remove bottom cover. See *Service Position* on page 7 and *Bottom Cover Removal* on page 12.

See Figure 28.

6. Check attachment brake:

- When attachment clutch is disengaged, brake must contact attachment belt or pulley, whichever is closest.
- When attachment clutch is engaged, brake must be more than 1.6 mm (1/16") away from attachment belt or pulley, whichever is closest.

IMPORTANT: If attachment clutch / brake is out of adjustment, refer to Operator's Manual for adjustment procedure.



7. Reinstall bottom cover and secure with two tapping screws and four hex bolts.
8. Return unit to operating position.
9. Reconnect spark plug wire and fill fuel tank.

IMPORTANT: Check all adjustments after first use.



WARNING: AVOID INJURY. Auger / impeller must stop within 5 seconds when attachment clutch lever is released.

FRICITION DISC REPLACEMENT

Remove Friction Disc

IMPORTANT: Save all hardware for reinstallation.

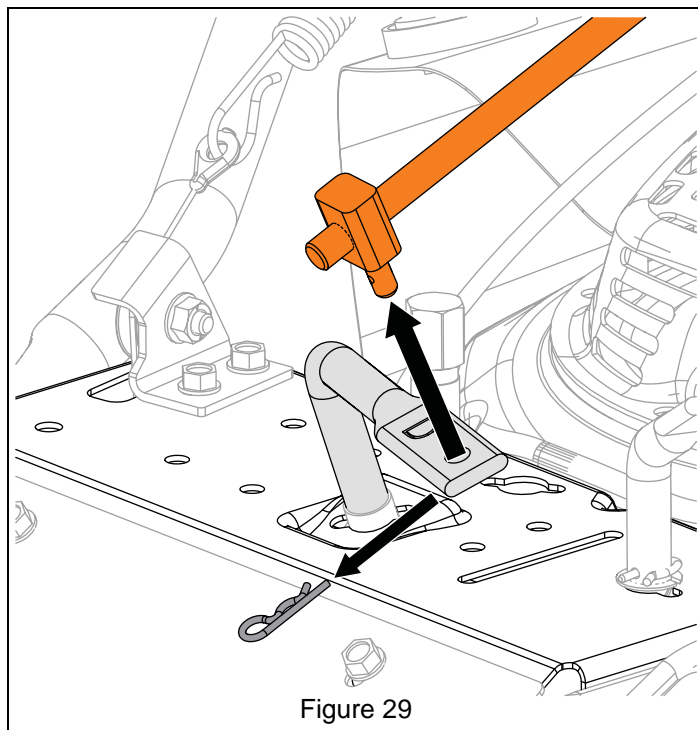


WARNING: AVOID INJURY. Before placing unit in service position, drain fuel from tank and fuel system. See *Draining Fuel System* on page 7. Make sure unit is secure and will not tip.

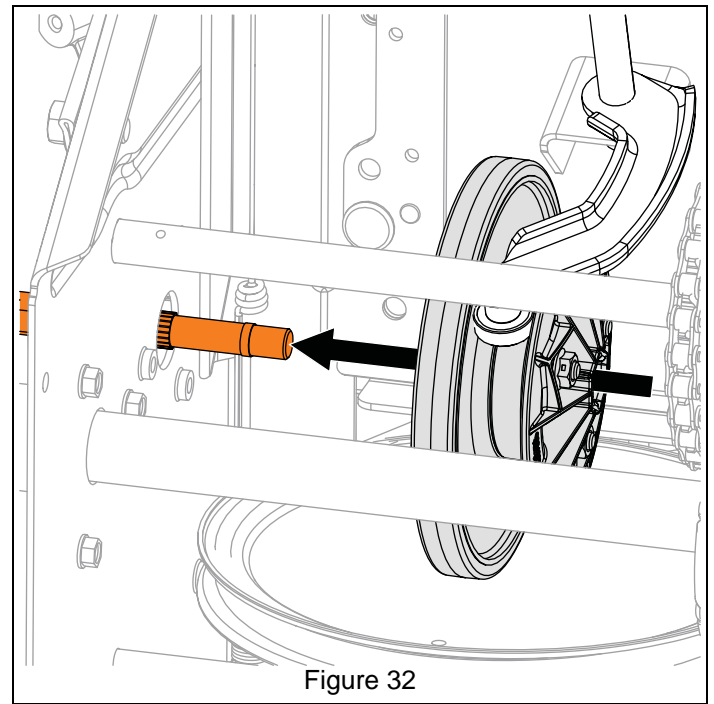
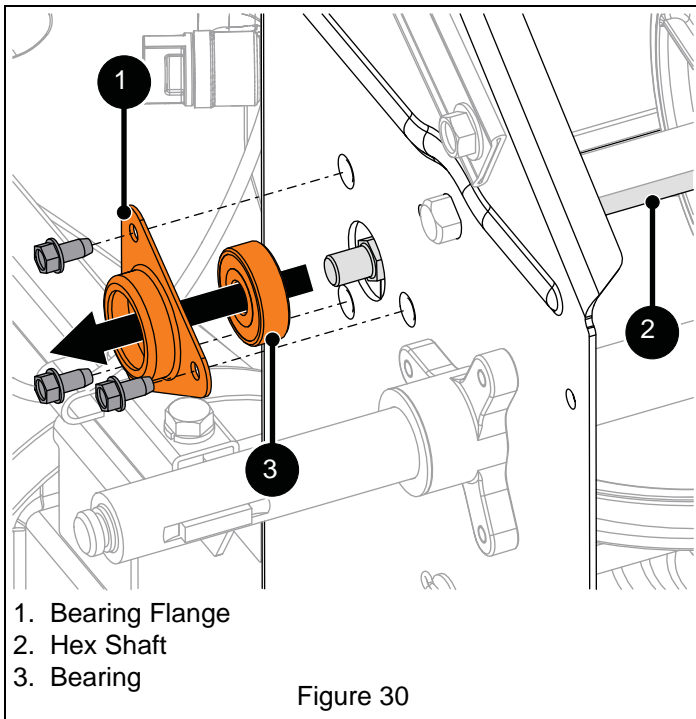
1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Place unit in service position and remove bottom cover. See *Service Position* on page 7 and *Bottom Cover Removal* on page 12.

See Figure 29.

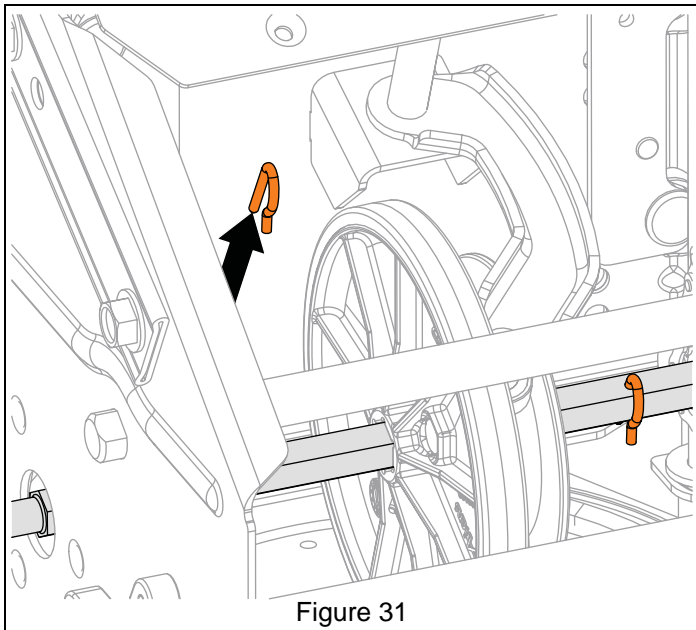
4. Remove hairpin securing adjustment pivot pin to shift arm.
5. Remove adjustment pivot pin from shift arm.



6. Remove snap clips from axle ends and remove wheels.
7. Remove hardware securing bearing to left side of frame and remove bearing. See Figure 30.



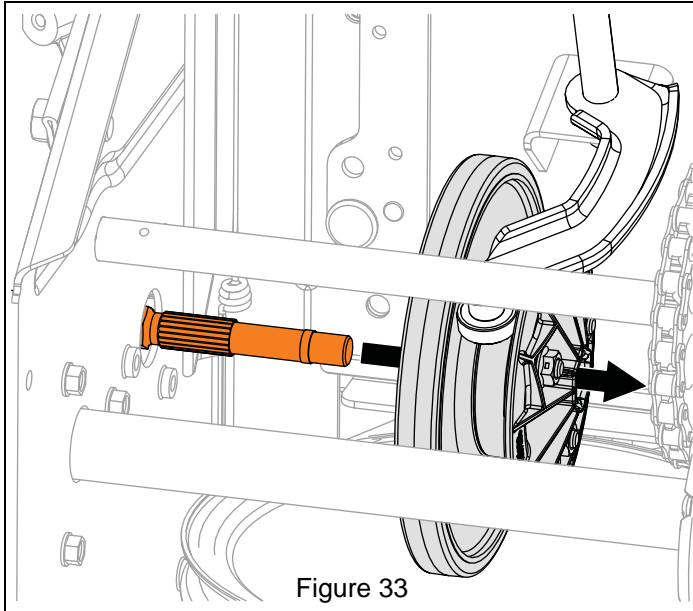
8. Remove two spring clips from hex shaft. See Figure 31.



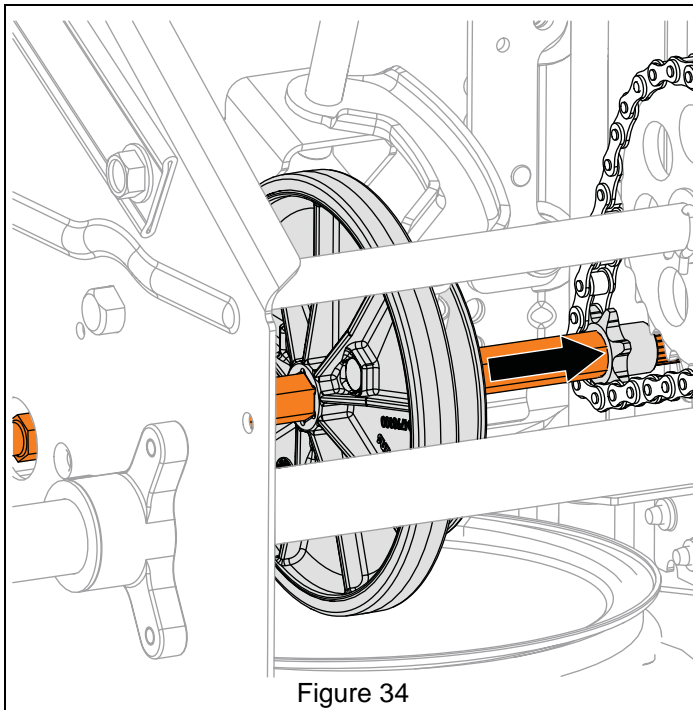
9. Remove hex shaft from friction disc assembly and remove friction disc assembly. See Figure 32.

Install Friction Disc

1. Install friction disc assembly around shift fork roller bearing and align with hex shaft. See Figure 33.

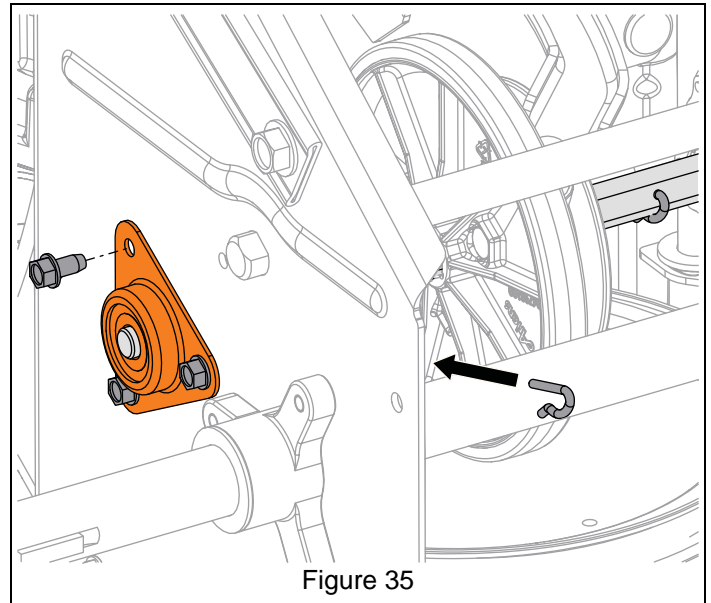


2. Reinstall hex shaft through friction disc, pinion sprocket and into frame. See Figure 34.



See Figure 35.

3. Reinstall spring clips into hex shaft.
4. Reinstall bearing onto hex shaft end.
5. Reinstall bearing flange over bearing and secure to frame with three tapping screws.



6. Reinstall adjustment pivot pin onto shift arm and secure with hairpin.
7. Reinstall bottom cover and secure with two tapping screws and four hex bolts.
8. Reinstall wheels onto axle and secure with snap clips.
9. Return unit to operating position.
10. Fill fuel tank and reconnect spark plug wire.
11. Adjust speed selector lever. Refer to Operator's Manual for adjustment procedure.

IMPORTANT: Check all adjustments after first use.

HEX SHAFT BEARING REPLACEMENT

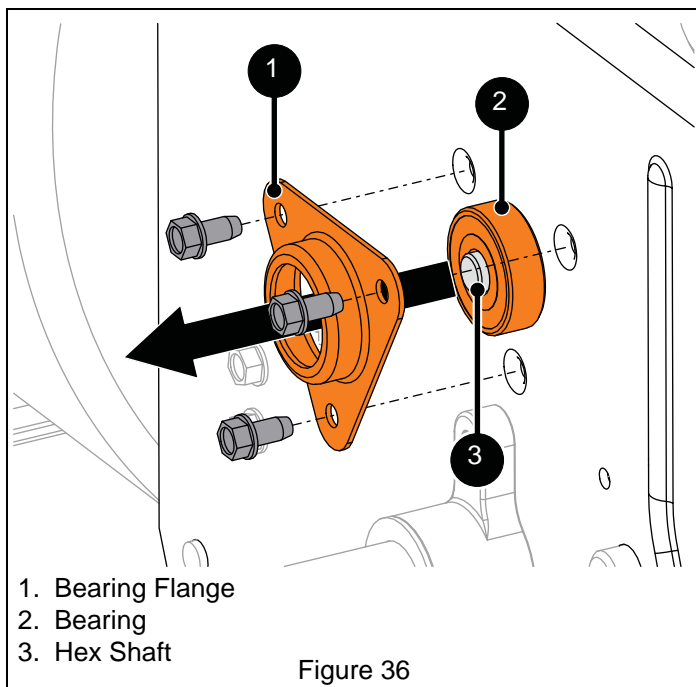
Remove Bearing

IMPORTANT: Save all hardware for reinstallation.

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.

See Figure 36.

3. Remove hardware retaining bearing flange to frame and remove flange.
4. Remove bearing from hex shaft.



Install Bearing

1. Install bearing onto hex shaft end.
2. Install bearing flange over bearing and secure to frame with three tapping screws.

SWING GATE REPLACEMENT

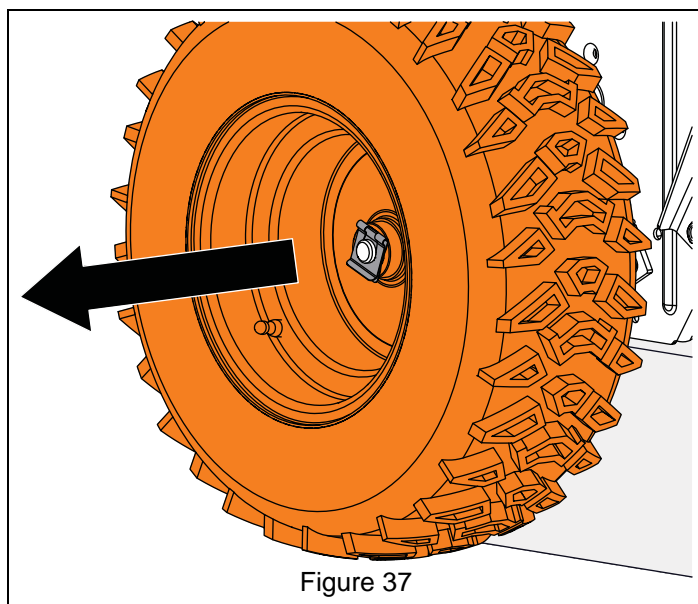
Remove Swing Gate Assembly

IMPORTANT: Save all hardware for reinstallation.

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Remove auger housing. See *Separate Housing From Frame* on page 7.
4. Remove traction drive belt. See *Remove Traction Drive Belt* on page 14.

See Figure 37.

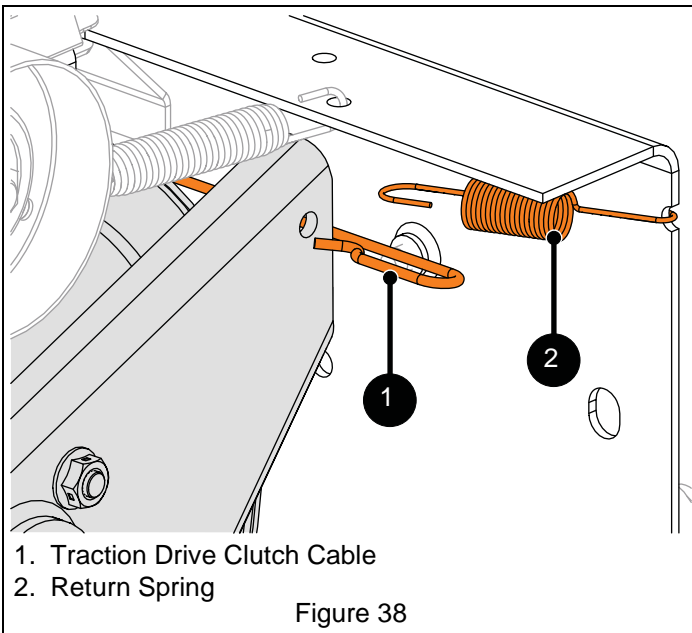
5. Position tractor / frame on a support, such as wood blocks, so wheels are off the ground. Make sure unit is secure and will not tip.
6. Remove snap clip from axle ends and remove wheels.



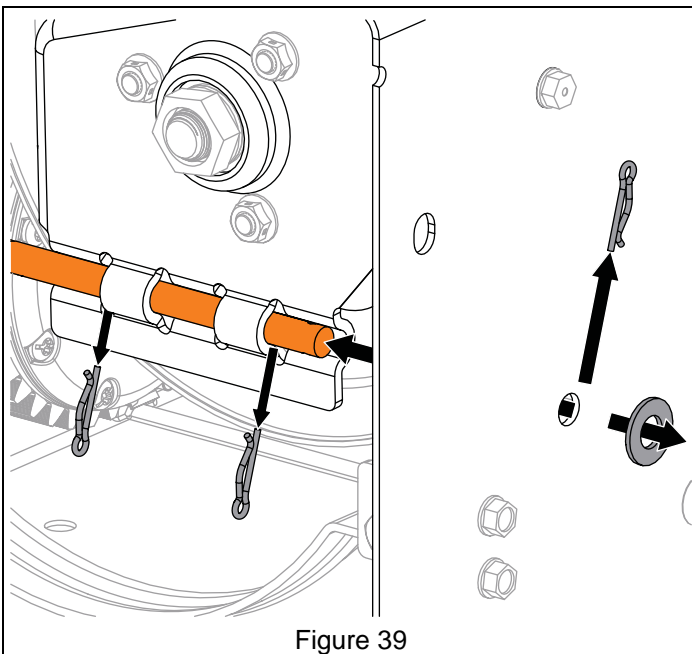
See Figure 38.

7. Disconnect traction drive clutch cable and return spring from swing gate.

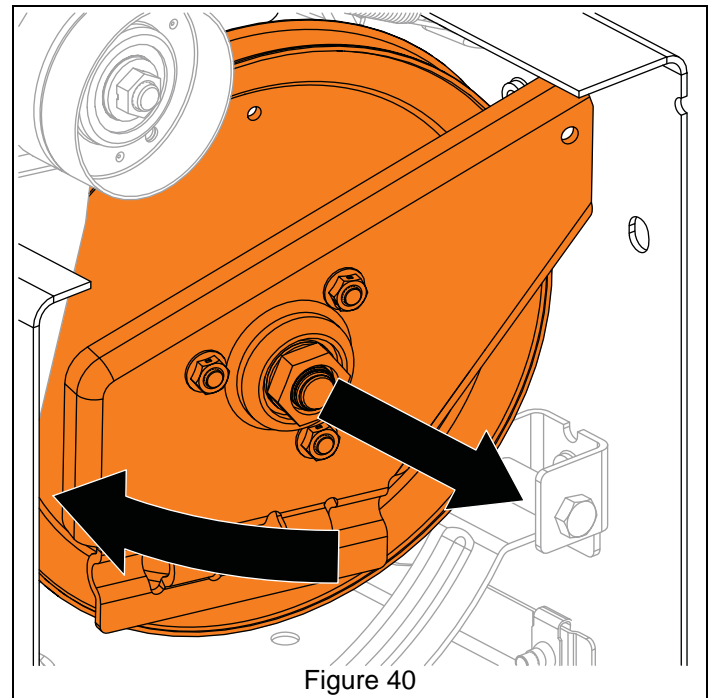
IMPORTANT: To gain more cable slack, traction drive clutch cable may need to be removed from traction clutch lever. See Figure 69.



8. Remove three hairpins and one flat steel washer from pivot rod and remove pivot rod. See Figure 39.



9. Remove swing gate assembly. See Figure 40.

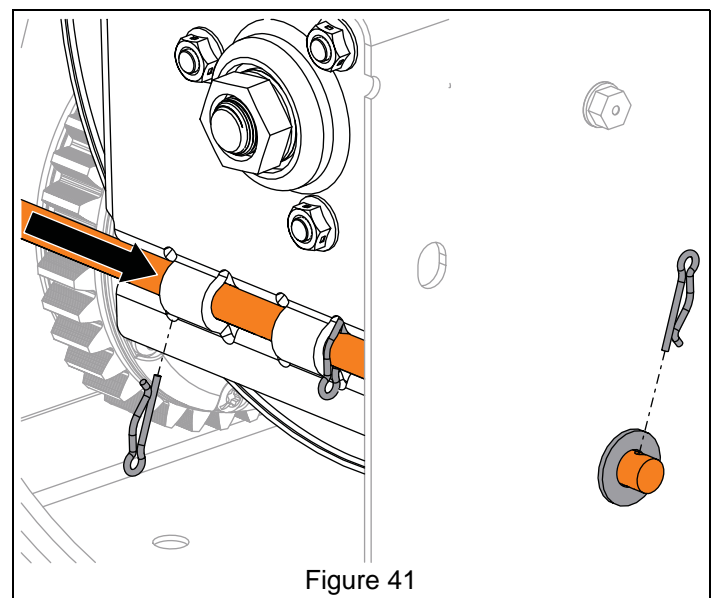


Install Swing Gate Assembly

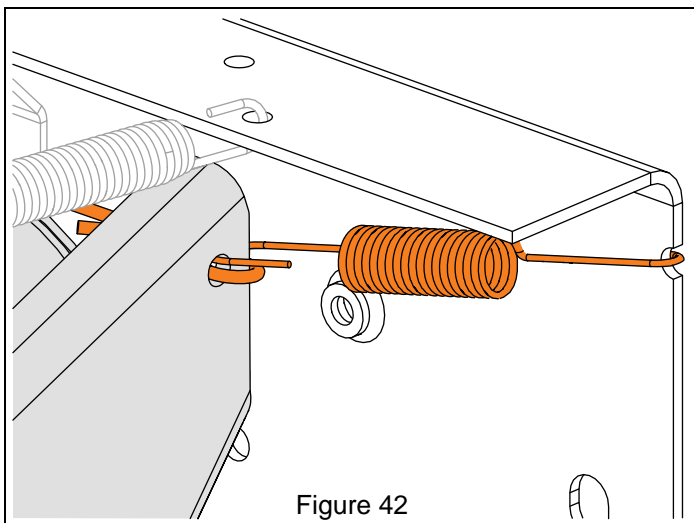


WARNING: AVOID INJURY. Wear thick gloves; traction drive pulley and engine sheave edges are sharp.

1. Position swing gate assembly inside frame and align with pivot rod holes.
2. Reinstall pivot rod through swing gate and secure with one flat steel washer and three hairpins. See Figure 41.



3. Reconnect traction drive clutch cable and return spring to swing gate. See Figure 42.



IMPORTANT: If traction drive clutch cable was removed from traction clutch lever, reinstall cable to lever. See Figure 69.

4. Reinstall traction belt. See *Install Traction Drive Belt* on page 15.
5. Reinstall auger housing to frame. See *Reinstall Auger Housing* on page 10.
6. Adjust traction drive clutch. Refer to Operator's Manual for adjustment procedure.
7. Reconnect spark plug wire.

IMPORTANT: Check all adjustments after first use.

AUGER REPLACEMENT

Remove Auger

IMPORTANT: Save all hardware for reinstallation.

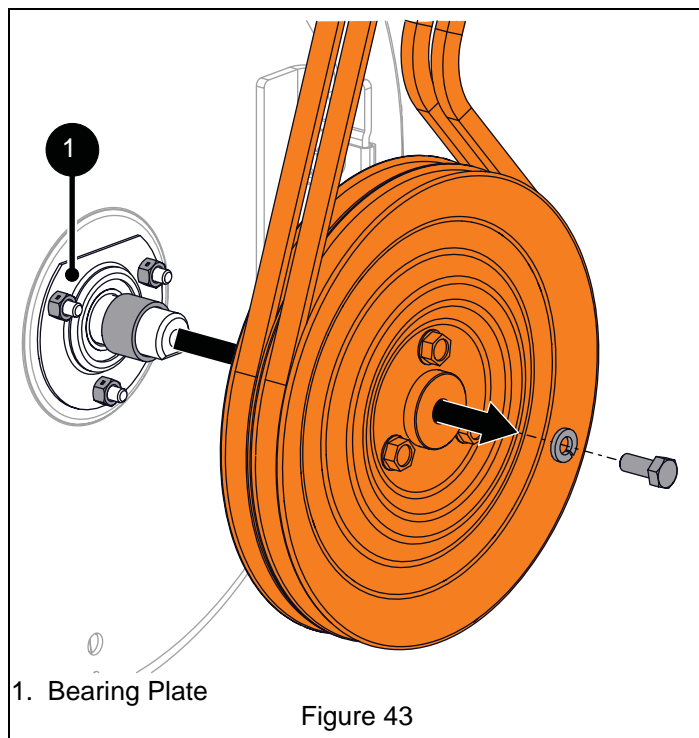
1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Remove auger housing. See *Separate Housing From Frame* on page 7.

See Figure 43.



CAUTION: AVOID INJURY. Attachment drive pulley edges are sharp. Wear gloves when handling pulley.

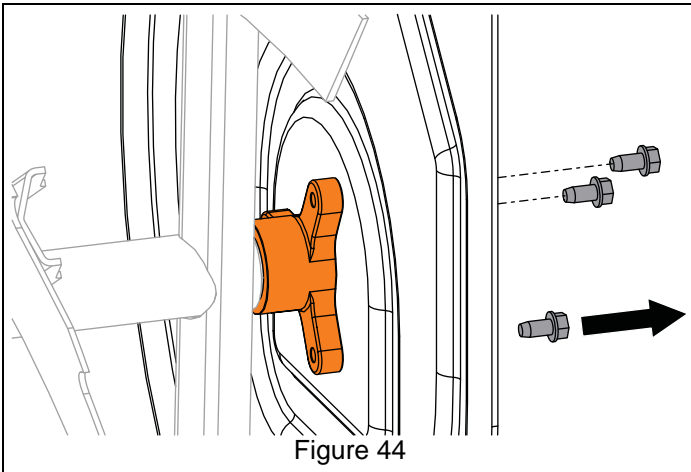
4. Hold attachment drive pulley in place and remove hardware securing pulley to impeller shaft.
5. Remove pulley and spacer from impeller shaft.
6. Loosen, but DO NOT remove hardware securing bearing plate to auger housing.



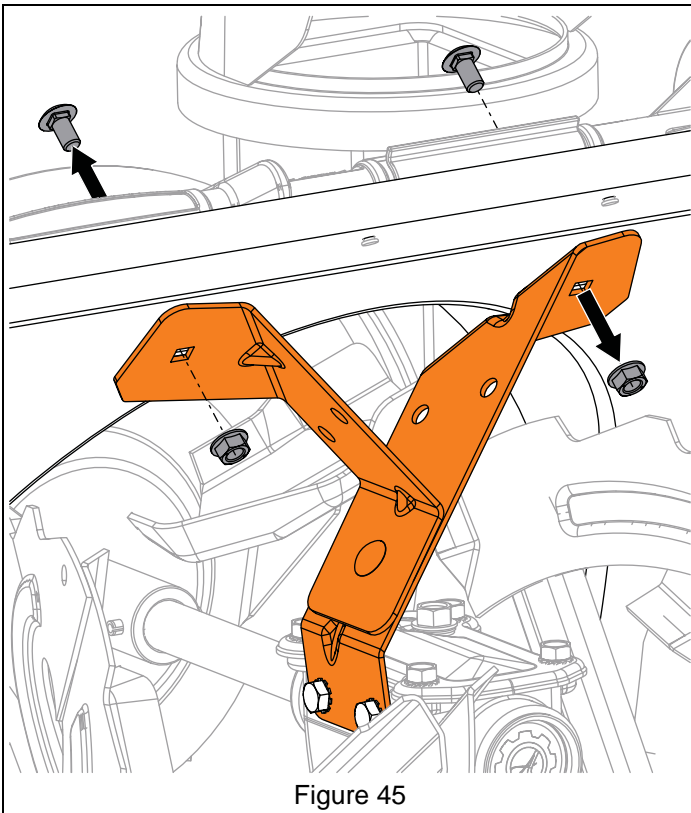
1. Bearing Plate

Figure 43

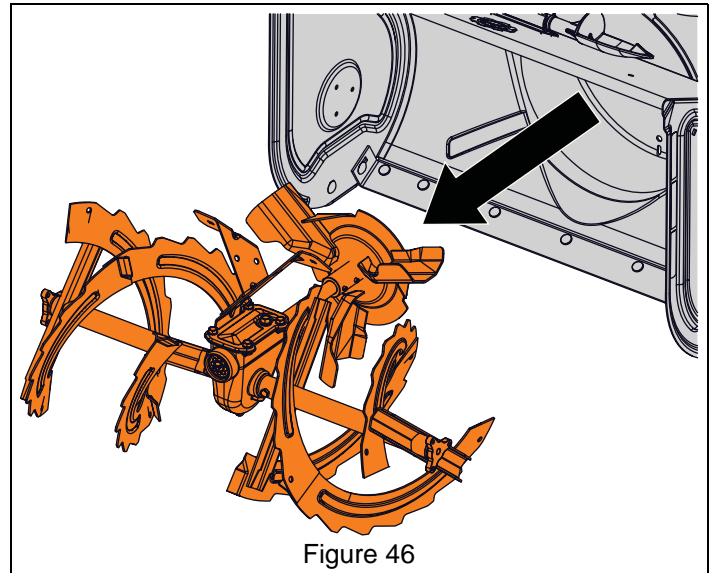
7. Remove hardware retaining support bushings to auger housing. See Figure 44.



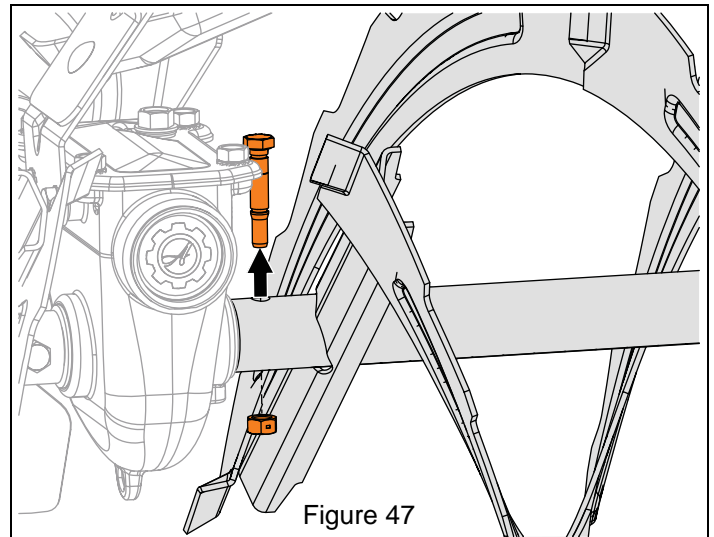
8. Remove hardware retaining gearcase support brackets to housing. See Figure 45.



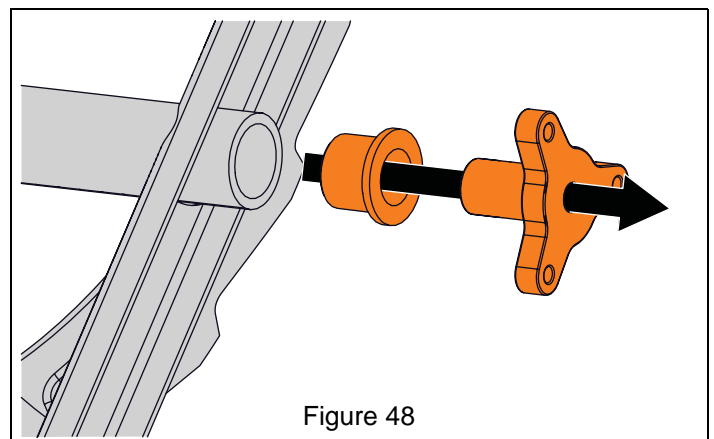
9. Remove auger assembly from housing. See Figure 46.



10. Remove shear bolt from auger shaft. See Figure 47.



11. Remove support bushing and flange bushing from auger shaft end. See Figure 48.



See Figure 49.

12. Remove auger. Use of penetrating oil or heat may be necessary to remove auger.

NOTICE: If rust is present on auger shaft, remove with sand paper and wipe clean with oil.

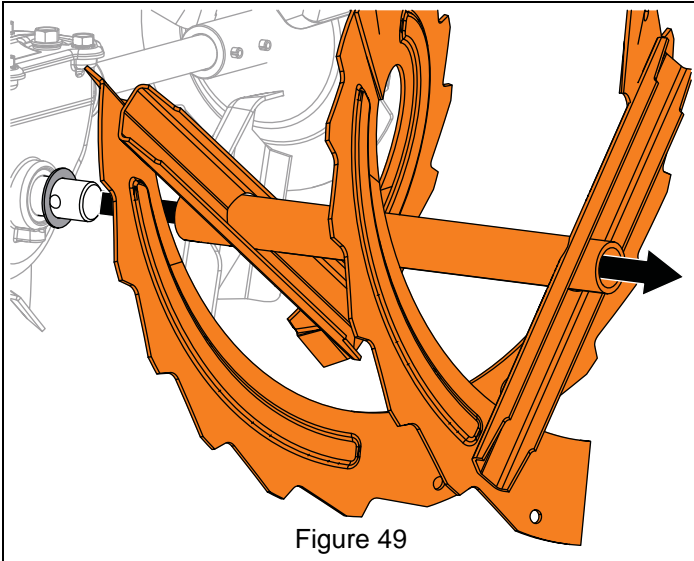


Figure 49

Install Auger

See Figure 50.

1. Install auger onto auger shaft with auger kickers facing gearcase.

IMPORTANT: Make sure auger helix direction matches the original auger orientation.

2. Apply grease to grease zerk
3. Align holes in auger with holes in auger shaft and reinstall shear bolt. Torque bolt to 7.9 – 16.5 N•m (5.8 – 12.2 lb-ft). If torque wrench is unavailable, tighten until bolts no longer spin freely. DO NOT overtighten.

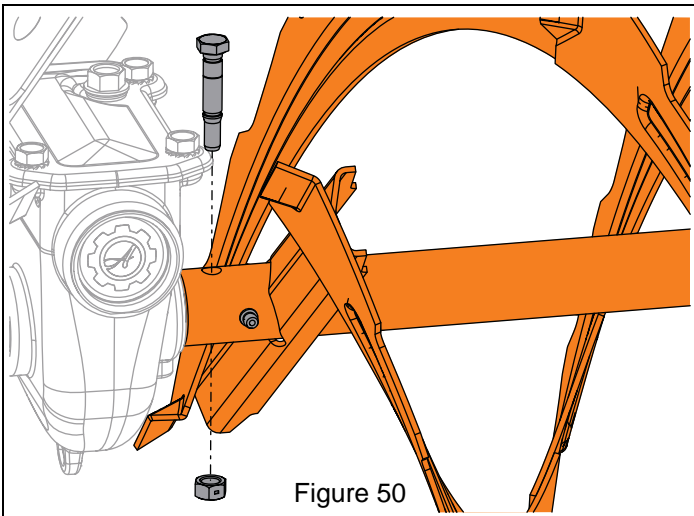


Figure 50

4. Reinstall flange bushing and support bushing onto auger shaft end. See Figure 51.

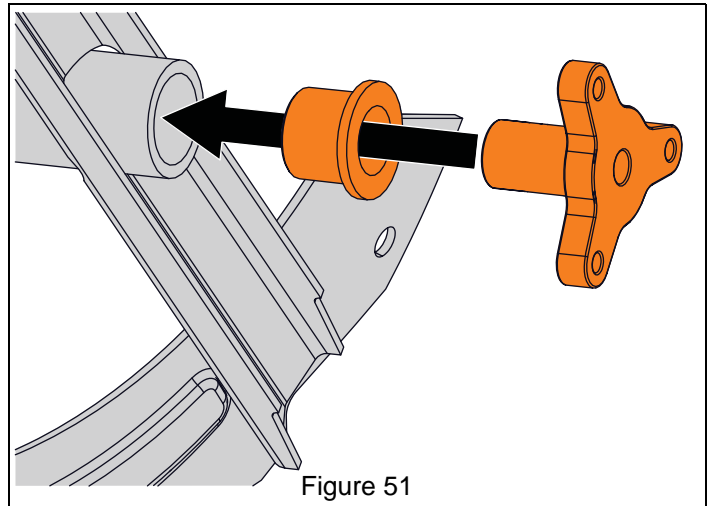


Figure 51

5. Reinstall auger assembly into housing so impeller shaft is seated in ball bearing at housing rear. See Figure 52.

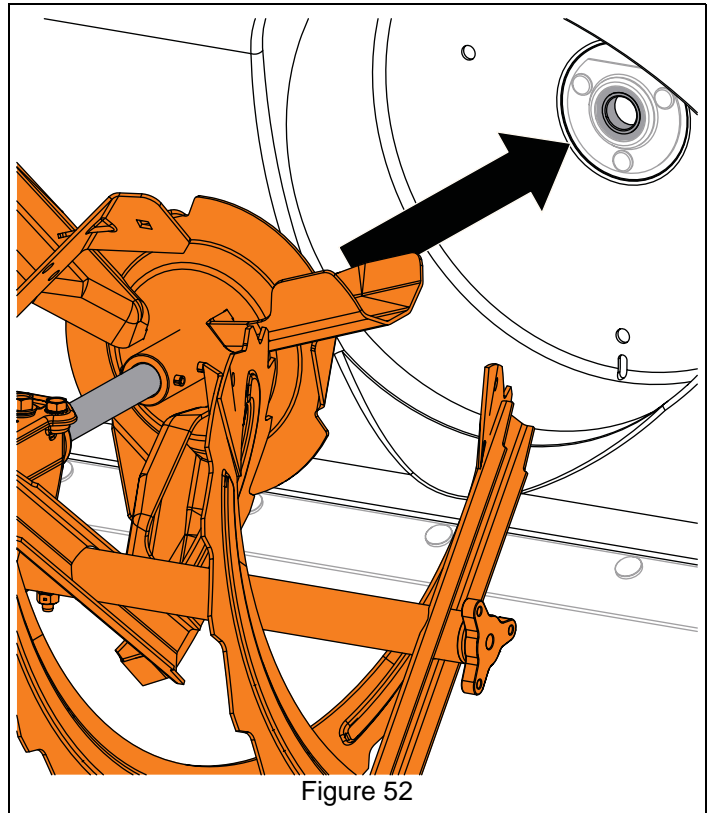


Figure 52

6. Secure support brackets to auger housing with two round head square neck bolts and two top locking flange nuts. See Figure 53.

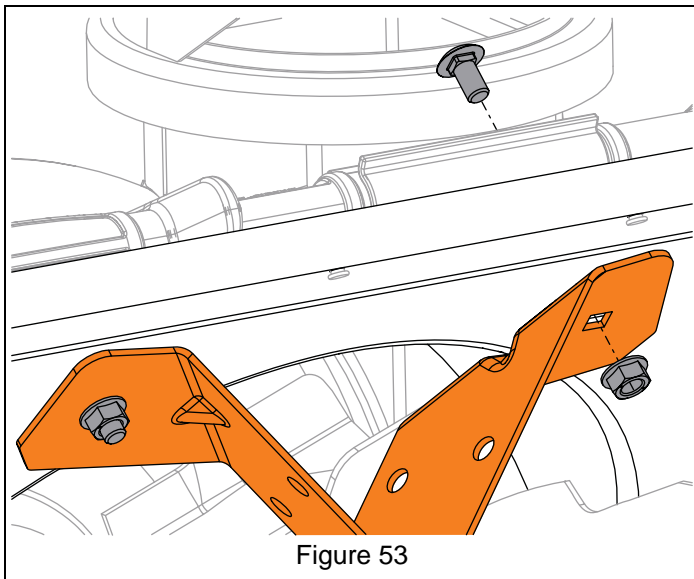


Figure 53

7. Secure support bushings to auger housing with six tapping screws. See Figure 54.

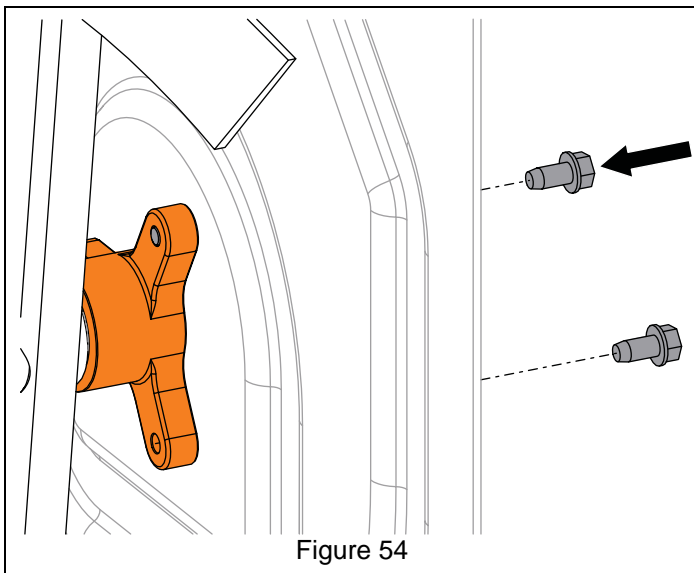


Figure 54

See Figure 55.

8. Tighten three hex nuts retaining bearing plate.
9. Apply a thin layer of anti-seize to impeller shaft end.
10. Reinstall spacer bushing onto impeller shaft end.
11. Reinstall attachment drive pulley onto impeller shaft and secure with locking washer and hex bolt. Torque to 7.9 – 16.5 N•m (5.8 – 12.2 lb-ft).

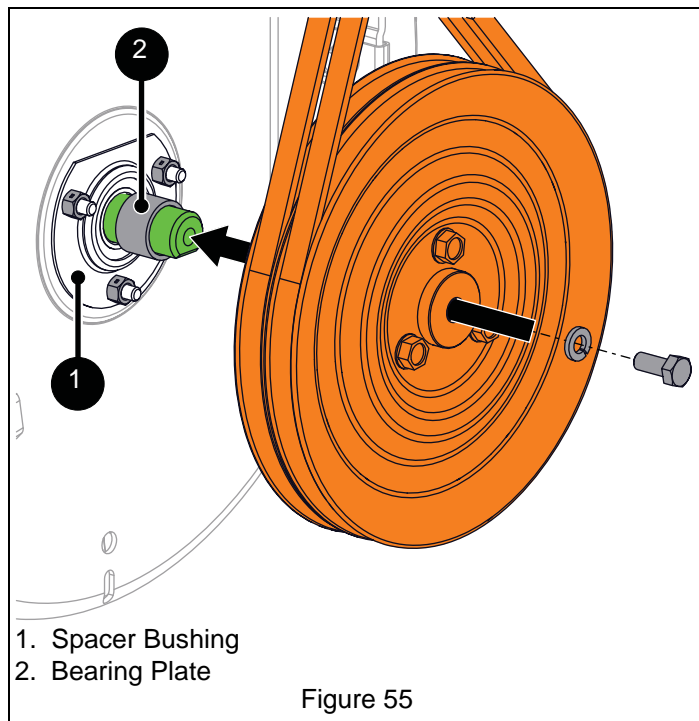


Figure 55

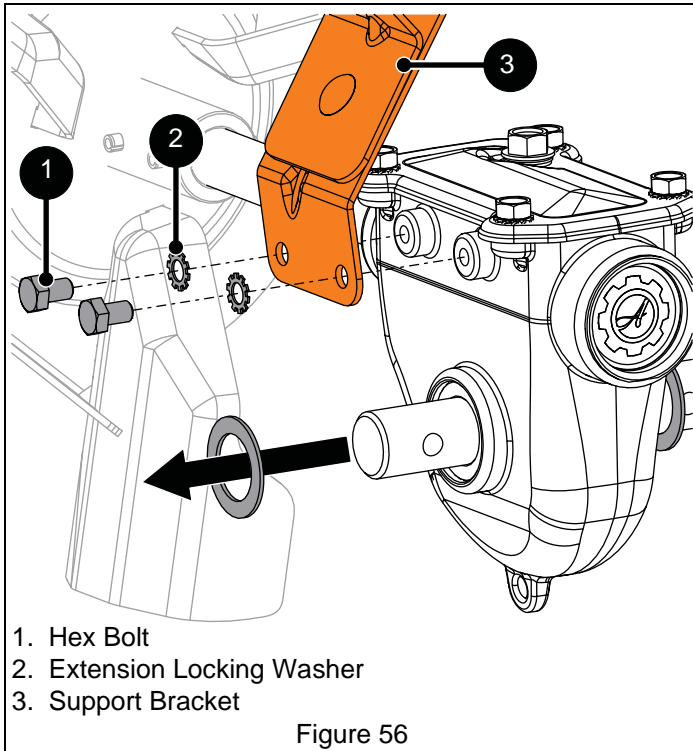
12. Reinstall housing to frame. See *Reinstall Auger Housing* on page 10.
13. Reconnect spark plug wire.

AUGER GEARCASE REPLACEMENT

Remove Gearcase Assembly

IMPORTANT: Save all hardware for reinstallation.

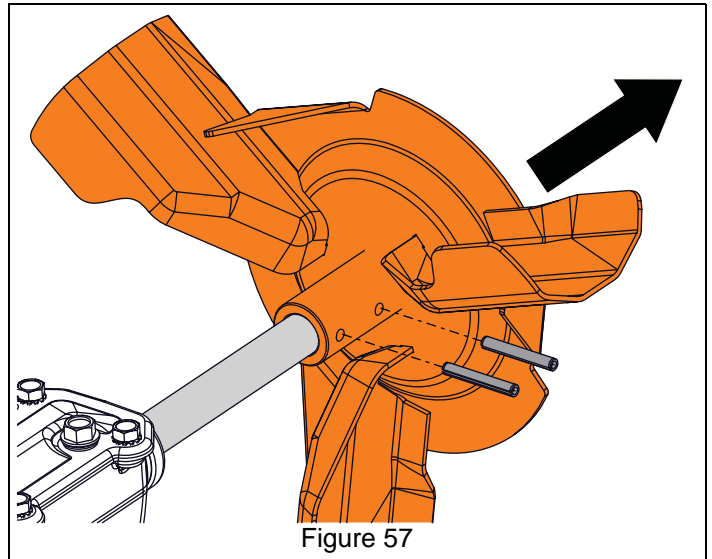
1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Remove augers. See *Remove Auger* on page 22. See Figure 56.
4. Remove hardware retaining support brackets to gearcase and remove brackets.
5. Remove two flat steel washers from auger shaft.



See Figure 57.

6. Remove two roll pins retaining impeller to impeller shaft and remove impeller.

IMPORTANT: Use of penetrating oil or heat may be necessary to remove impeller.



Install Gearcase Assembly

1. Install impeller onto impeller shaft.
2. Align holes in impeller with holes in impeller shaft and reinstall roll pins.
3. Reinstall one flat steel washer onto each auger shaft end.
4. Reinstall support brackets to gearcase and secure with two extension locking washers and hex bolts. See Figure 56.
5. Reinstall augers. See *Install Auger* on page 24.
6. Reconnect spark plug wire.

IMPELLER REPLACEMENT

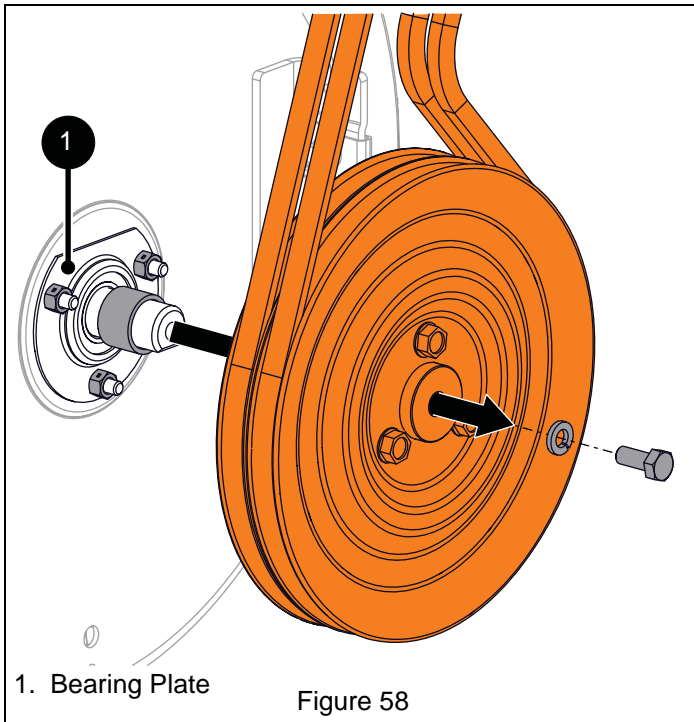
Remove Impeller

IMPORTANT: Save all hardware for reinstallation.

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Remove auger housing. See *Separate Housing From Frame* on page 7.

See Figure 58.

4. Remove hardware securing attachment drive pulley to impeller shaft.
5. Remove pulley and spacer from impeller shaft.
6. Loosen, but DO NOT remove bearing plate hardware.



7. Remove hardware securing auger bushings to auger housing. See Figure 44.
8. Remove auger assembly from housing. See Figure 46.

See Figure 57.

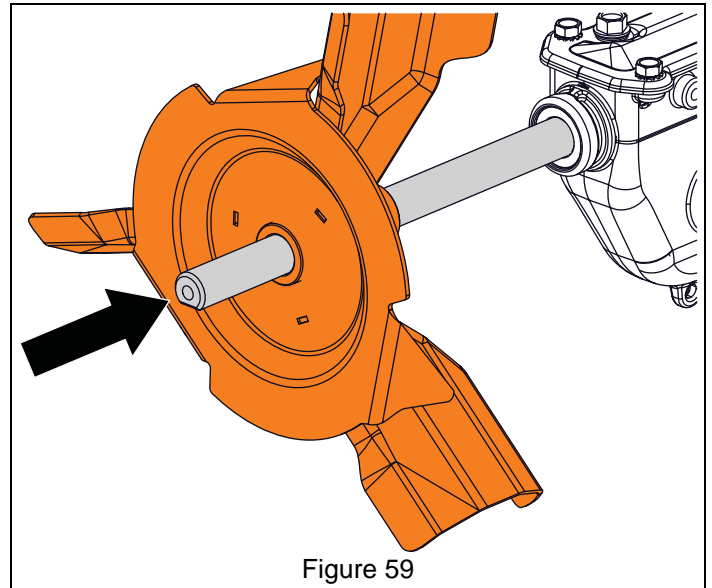
9. Remove two roll pins securing impeller to impeller shaft and remove impeller.

IMPORTANT: Use of penetrating oil or heat may be necessary to remove impeller.

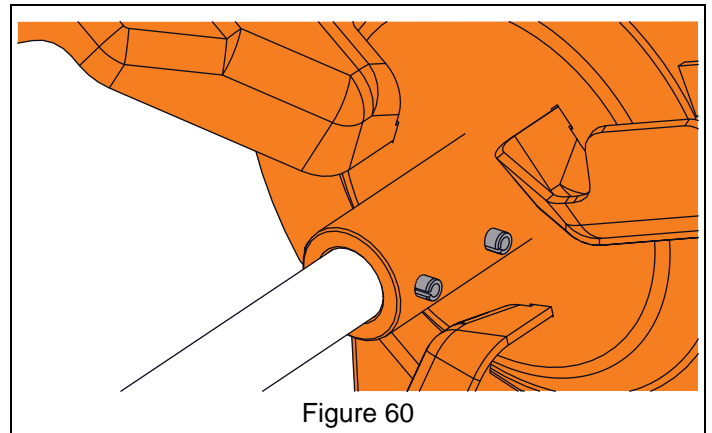
Install Impeller

See Figure 59.

1. Apply a thin layer of anti-seize to impeller shaft.
2. Install impeller onto impeller shaft.



3. Align impeller with holes in impeller shaft and reinstall roll pins. See Figure 60.



4. Reinstall auger assembly into housing so impeller shaft is seated in ball bearing at housing rear. See Figure 52.
5. Secure support bushings to auger housing with six tapping screws. See Figure 61.

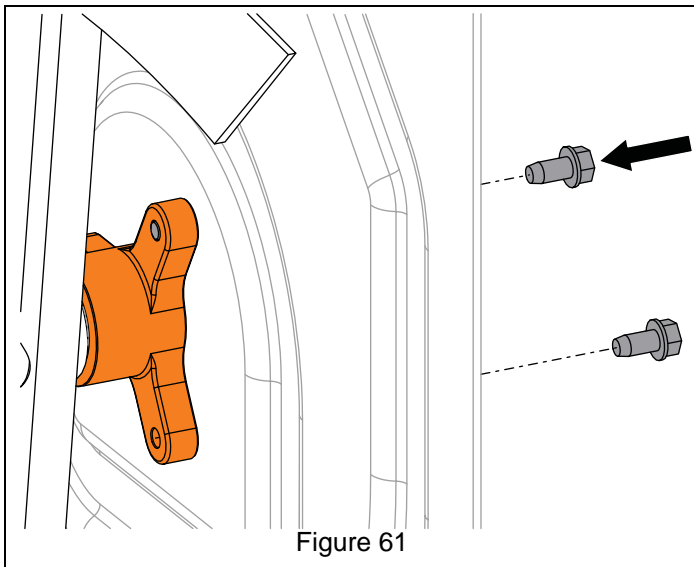


Figure 61

See Figure 62.

6. Tighten three hex nuts securing bearing plate to housing.
7. Apply a thin layer of anti-seize to impeller shaft end.
8. Reinstall spacer bushing onto impeller shaft end.
9. Reinstall attachment drive pulley onto impeller shaft and secure with locking washer and hex bolt. Torque to 7.9 – 16.5 N•m (5.8 – 12.2 lb-ft).

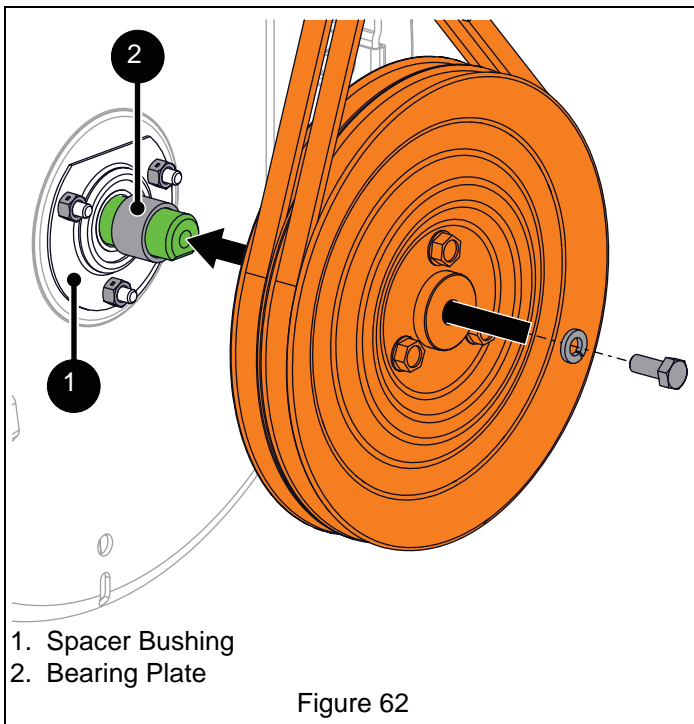


Figure 62

10. Reinstall auger housing to frame. See *Reinstall Auger Housing* on page 10.
11. Reconnect spark plug wire.

ENGINE REPLACEMENT

Remove Engine

IMPORTANT: Save all hardware for reinstallation.

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Drain gasoline from fuel system and tank. See *Draining Fuel System* on page 7.
4. Remove belt cover. See Figure 8.
5. Remove hardware securing belt finger to engine and remove belt finger. See Figure 9.
6. Disconnect idler spring from traction drive idler arm and remove spring. See Figure 63.

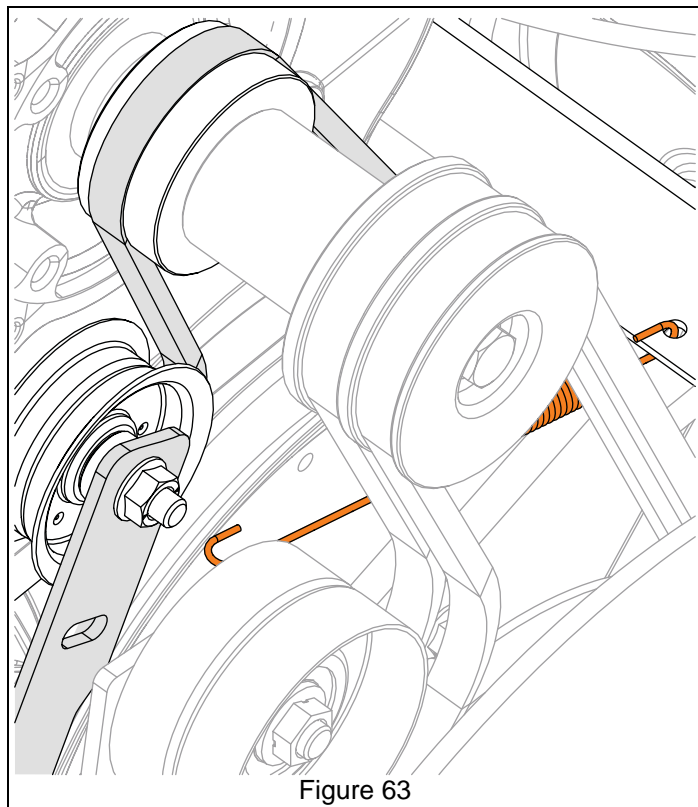


Figure 63

See Figure 64.

7. Remove hardware securing engine mount to frame.
8. Remove J-clamp and chute deflector cable from engine mount.

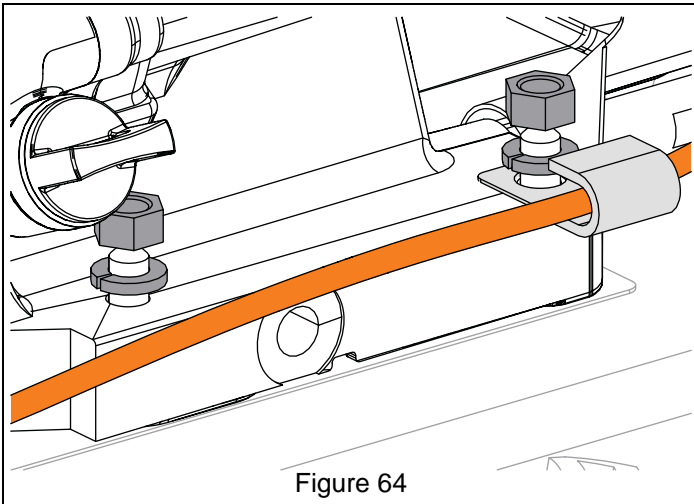


Figure 64



WARNING: AVOID INJURY. Engine is heavy. NEVER lift engine without a suitable lifting device or adult assistant.

9. Using a suitable lifting device or help from an adult assistant, lift engine and tilt forward slightly to relieve tension from belts. Remove belts from engine sheaves.
10. Lower engine onto a flat, level surface.

See Figure 65.

11. Remove hardware securing attachment sheave to crankshaft.
12. Remove attachment sheave, traction sheave and nylon washer from crankshaft.

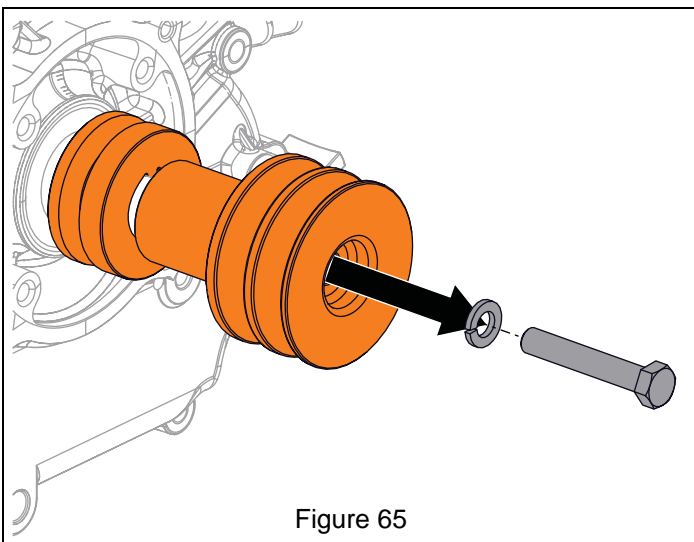


Figure 65

Install Engine



WARNING: AVOID INJURY. Engine is heavy. NEVER lift engine without a suitable lifting device or adult assistant.

1. Using a suitable lifting device or help from an adult assistant, lift engine and lower onto bolts in frame.
2. Position belts over crankshaft.
3. Reinstall J-clamp to left rear engine mounting position.
4. Secure engine mount to frame with four locking nuts. Torque to 11.9 – 17.9 N•m (8.8 – 13.2 lb-ft).

See Figure 66.

5. Reinstall traction sheave onto crankshaft.
6. Reinstall traction drive belt onto traction sheave.
7. Reinstall attachment sheave onto crankshaft.

IMPORTANT: Traction sheave must be reinstalled in the orientation shown in Figure 66.

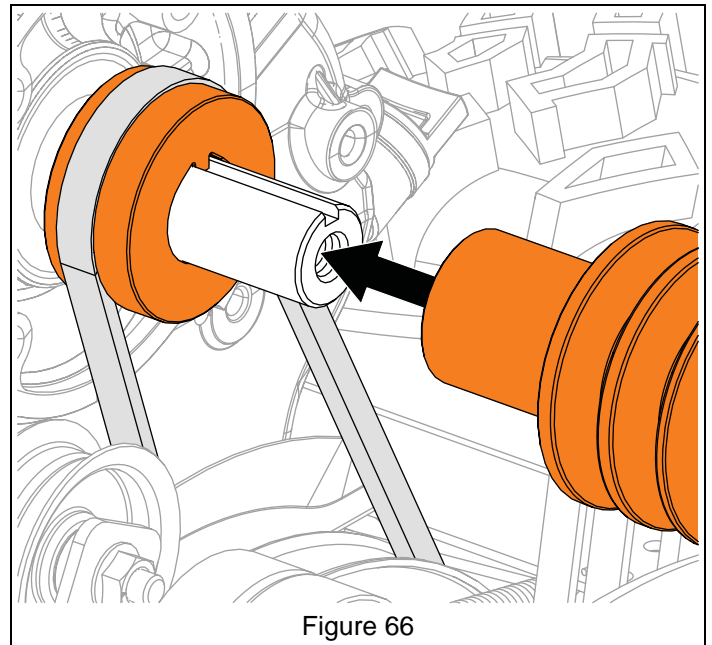


Figure 66

See Figure 67.

8. Reinstall idler spring to traction idler arm.
9. Secure attachment sheave to crankshaft with one locking washer and hex bolt.

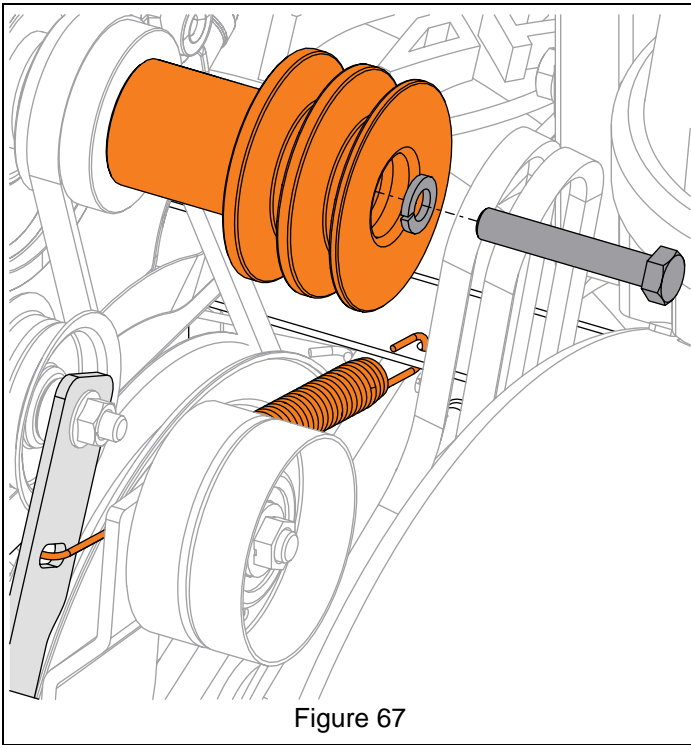


Figure 67



WARNING: AVOID INJURY. Attachment sheave edges are sharp. Wear thick gloves to install belts onto attachment sheave.

See Figure 68.

10. Reinstall attachment drive belts onto attachment sheave.

To assist belt installation, slowly pull recoil starter handle while gently guiding belts into attachment sheave.

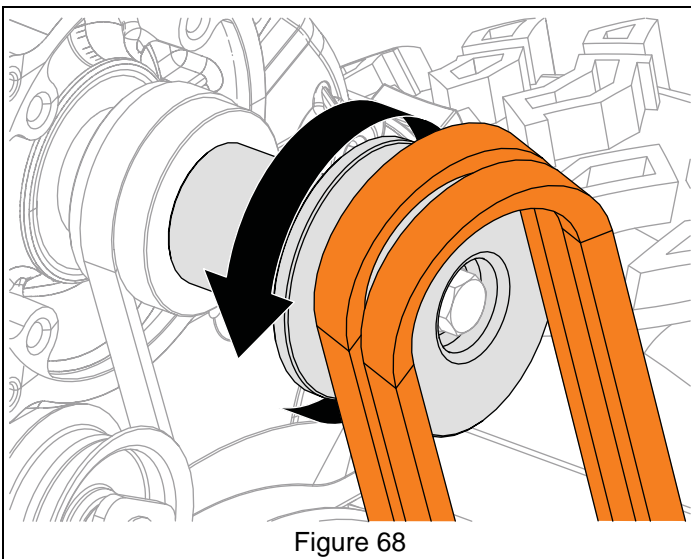


Figure 68

11. Reinstall belt finger and secure with two flat steel washers, two locking washers and two hex bolts as shown in Figure 9.
12. Check belt finger clearance:
 - Engage attachment clutch lever and make sure belt finger located opposite belt idler is less than 3.2 mm (1/8") from belt, but not touching the belt.
 - If needed, adjust clearance by loosening hex bolts, repositioning belt finger, and tightening bolts.
13. Reinstall belt cover and secure left side to frame with one tapping screw. Position right side of belt cover under tapping screw and tighten.
14. Reinstall chute deflector cable into J-clamp. Bend clamp slightly to secure cable in clamp.
15. Reconnect spark plug wire and fill fuel tank.

TRACTION DRIVE CABLE REPLACEMENT

Remove Traction Drive Clutch Cable

IMPORTANT: Save all hardware for reinstallation.

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Loosen traction drive clutch cable.
4. Under dash panel, remove hardware retaining upper traction clutch cable to clutch lever and remove cable. See Figure 69.

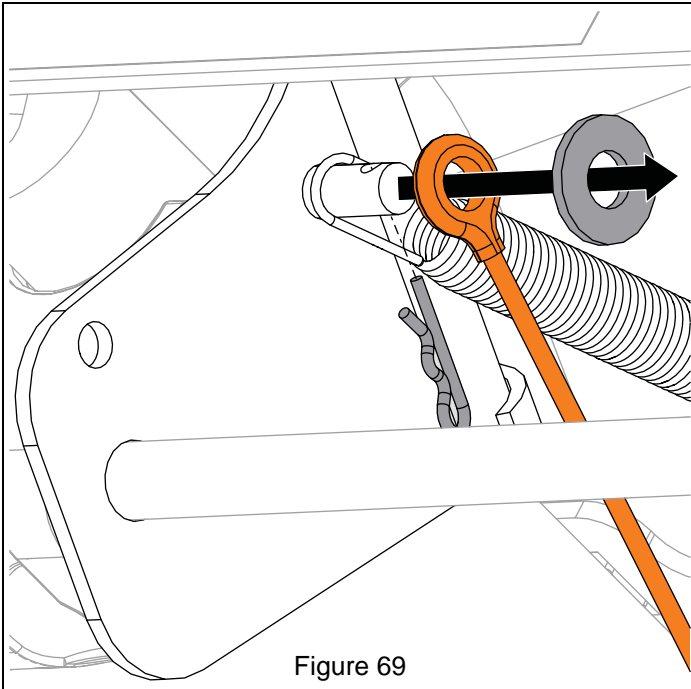


Figure 69

See Figure 70.

5. Disconnect lower traction drive cable from upper traction drive cable.
6. Loosen, but DO NOT remove shoulder bolt retaining cable pulley to cable pulley bracket.

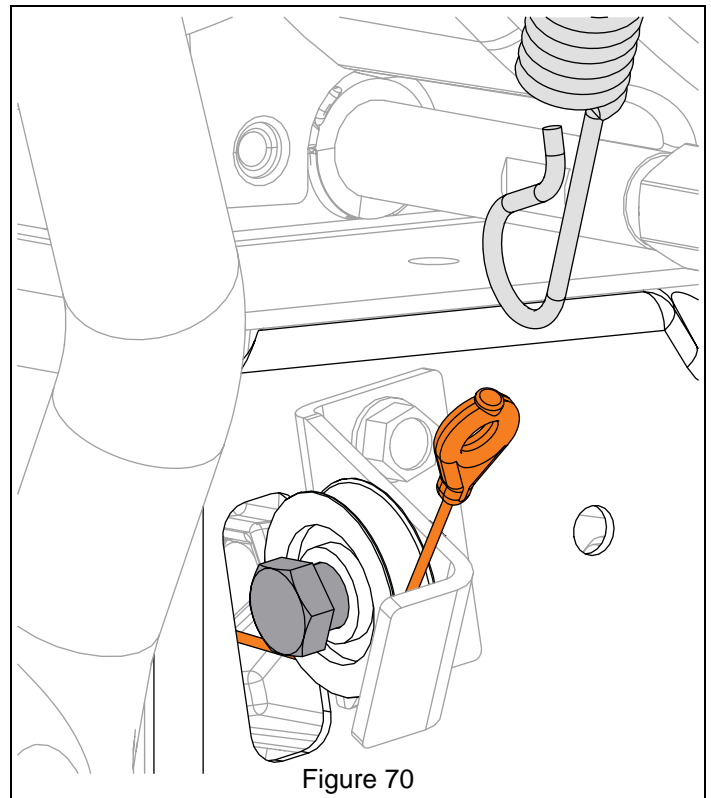


Figure 70

7. Remove belt cover. See Figure 8.
8. Remove lower traction clutch cable hook from swing gate. See Figure 71.

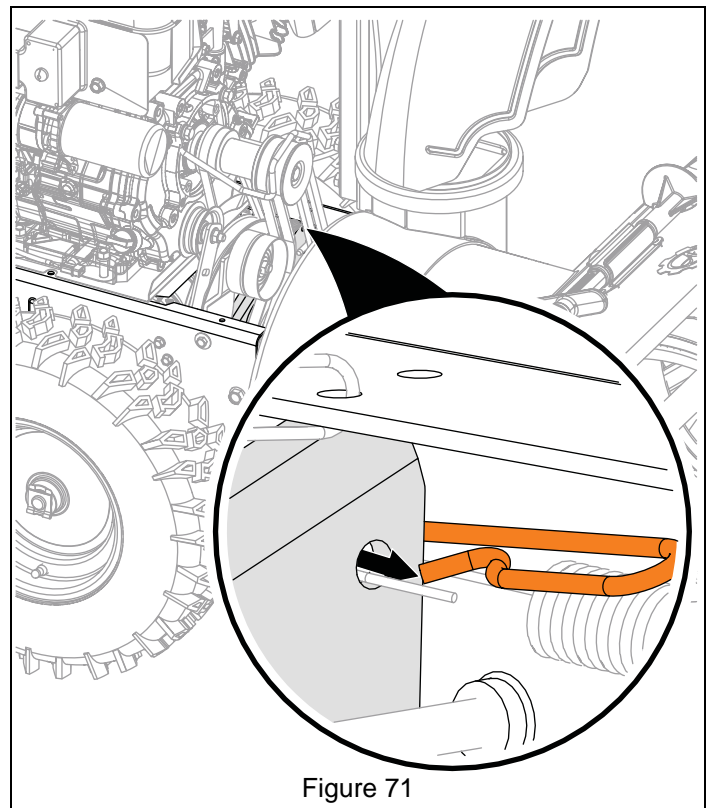


Figure 71

9. Remove cable.

Install Traction Drive Clutch Cable



WARNING: AVOID INJURY. Before placing unit in service position, drain fuel from tank and fuel system. See *Draining Fuel System* on page 7. Make sure unit is secure and will not tip.

1. Rotate unit to service position and remove bottom cover. See *Service Position* on page 7 and *Bottom Cover Removal* on page 12.
- See Figure 72.
2. Route cable end with spring hook through hole in back cover.
 3. Install cable end onto swing gate.

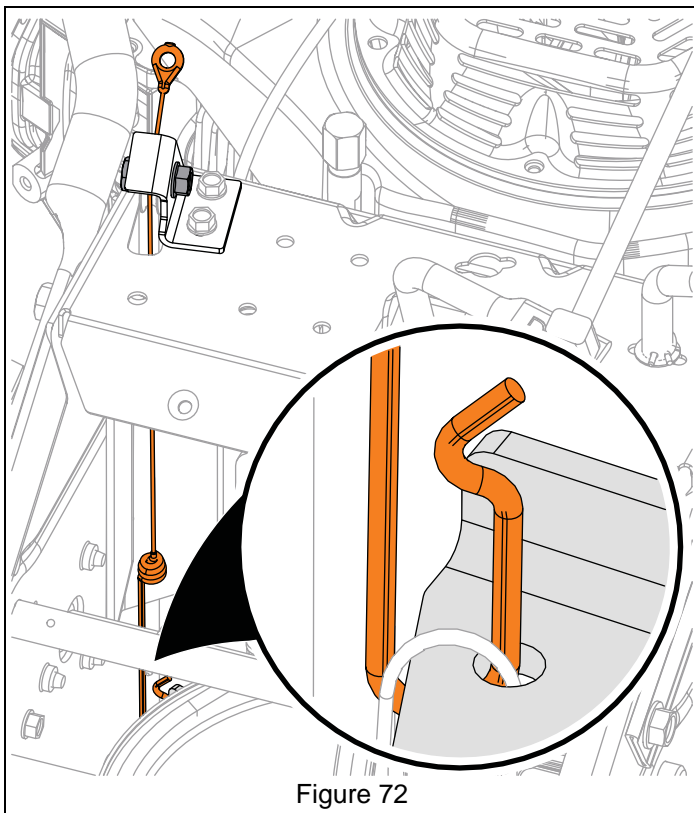


Figure 72

See Figure 73.

4. Align cable with cable pulley and tighten shoulder bolt.
5. Reconnect lower traction clutch cable to upper traction clutch cable.

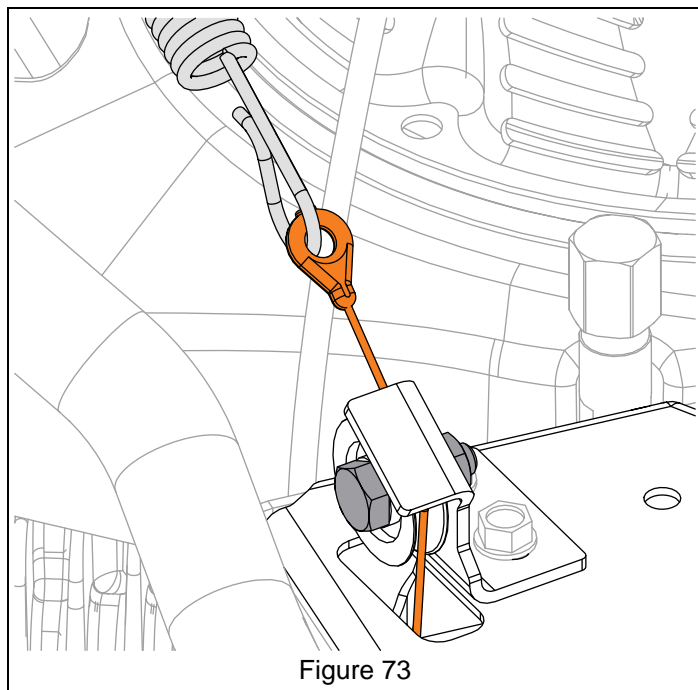


Figure 73

6. Reinstall bottom cover and secure with two tapping screws and four hex bolts.
7. Reinstall upper traction clutch cable to traction clutch lever. Secure with one flat steel washer and hairpin. See Figure 69.
8. Return unit to operating position.
9. Adjust traction drive clutch. Refer to Operator's Manual for adjustment procedure.
10. Reconnect spark plug wire and fill fuel tank.

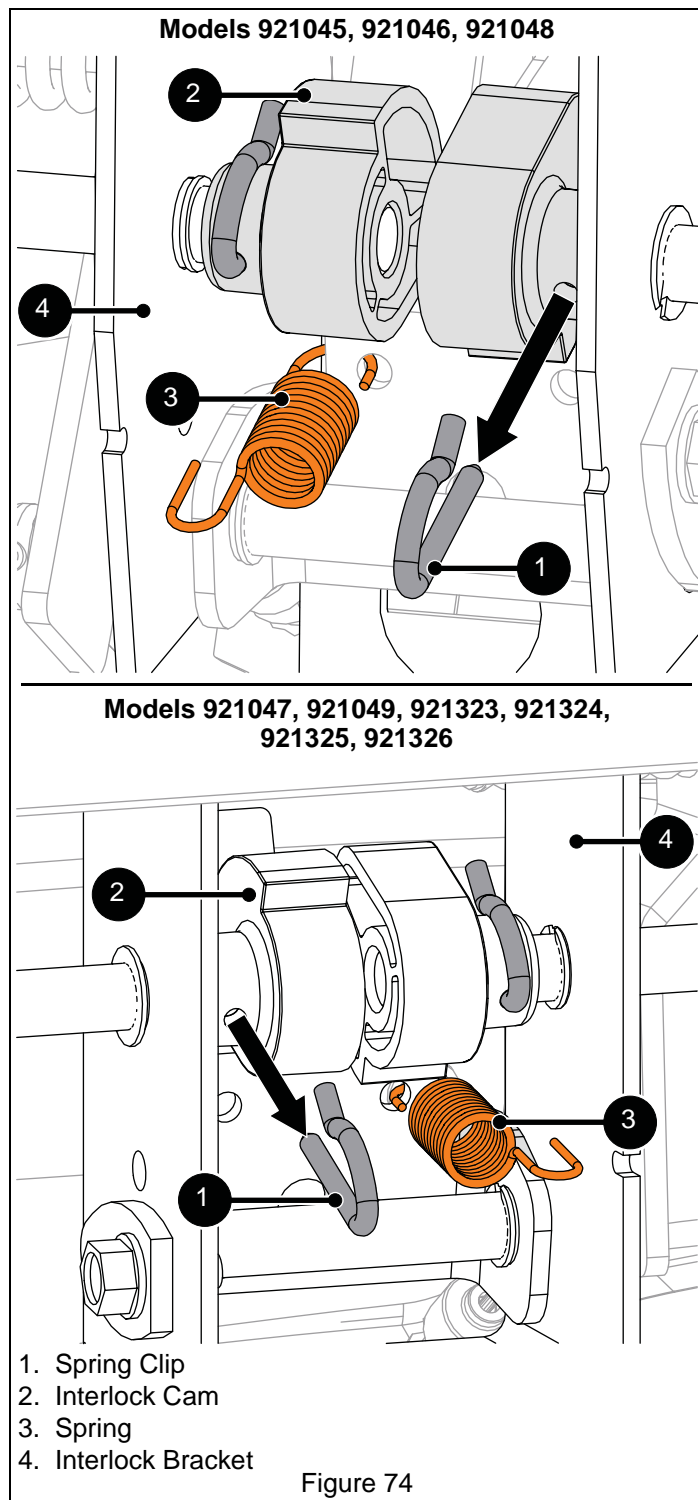
IMPORTANT: Check all adjustments after first use.

DUAL-HANDLE INTERLOCK CAM REPLACEMENT

Remove Interlock Cam

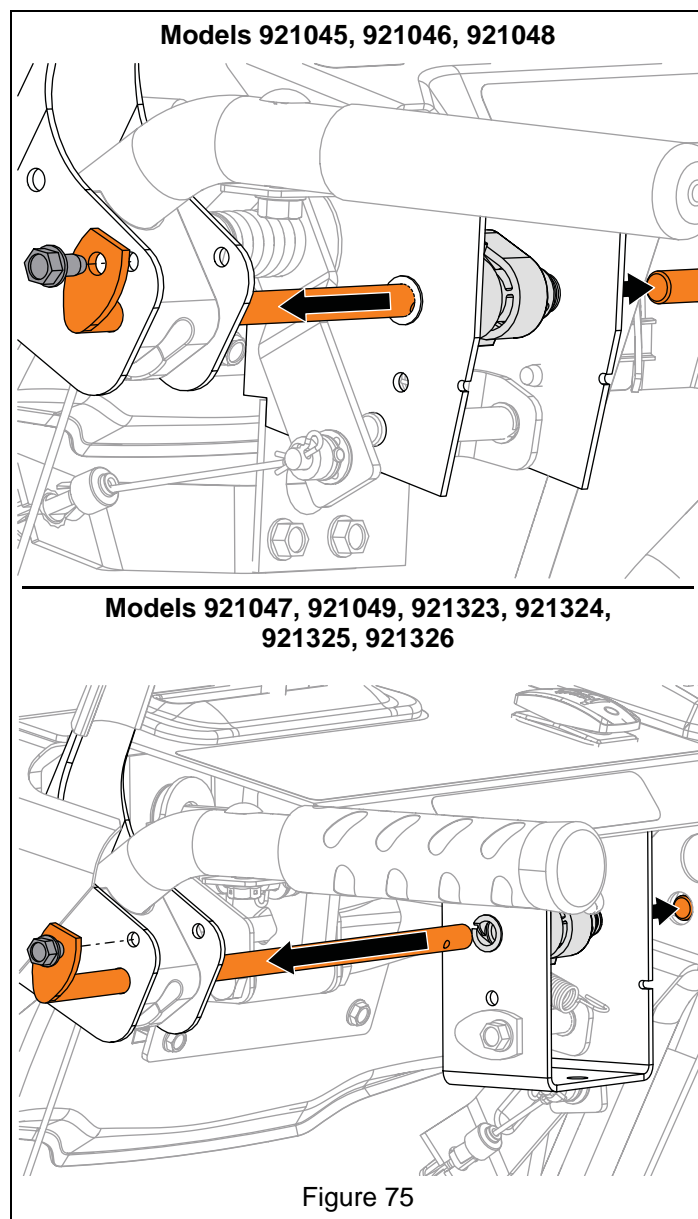
IMPORTANT: Save all hardware for reinstallation.
See Figure 74.

1. Disconnect spring from interlock bracket.
2. Remove two spring clips securing interlock cams to camshafts.



IMPORTANT: Interlock cams will fall from camshafts in next step.

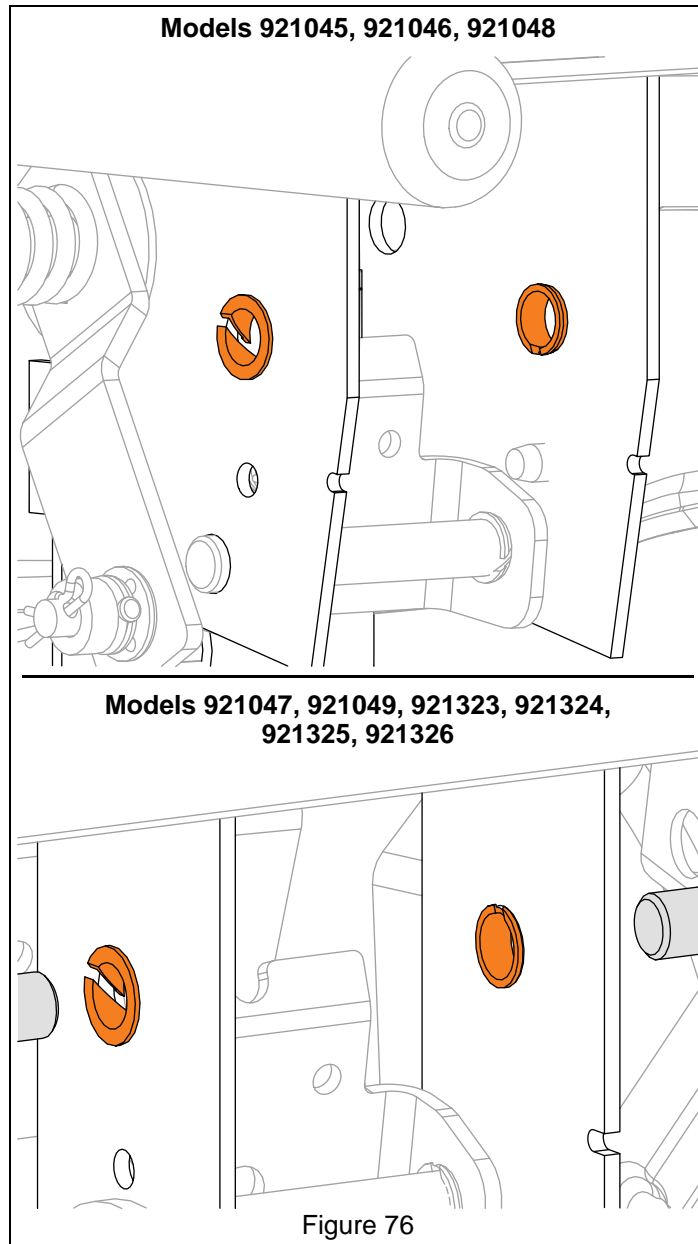
3. Remove hardware retaining camshafts to clutch levers and remove camshafts. See Figure 75.



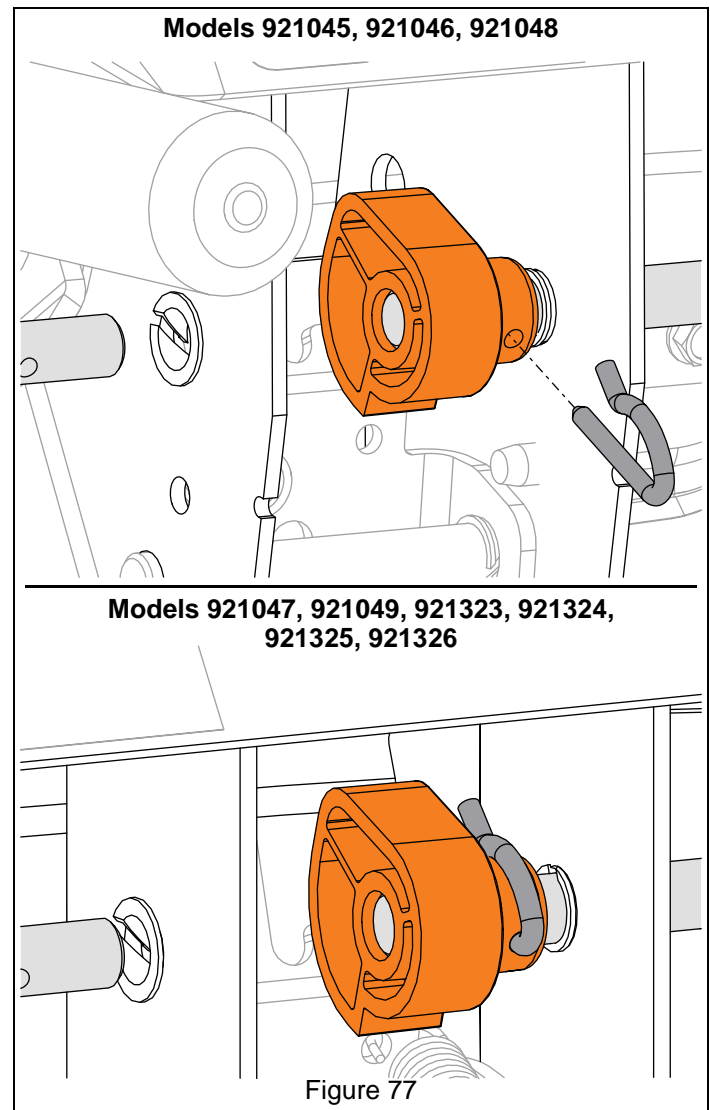
4. Remove cams.

Install Interlock Cams

IMPORTANT: Make sure nylon bushings are seated in interlock bracket. See Figure 76.



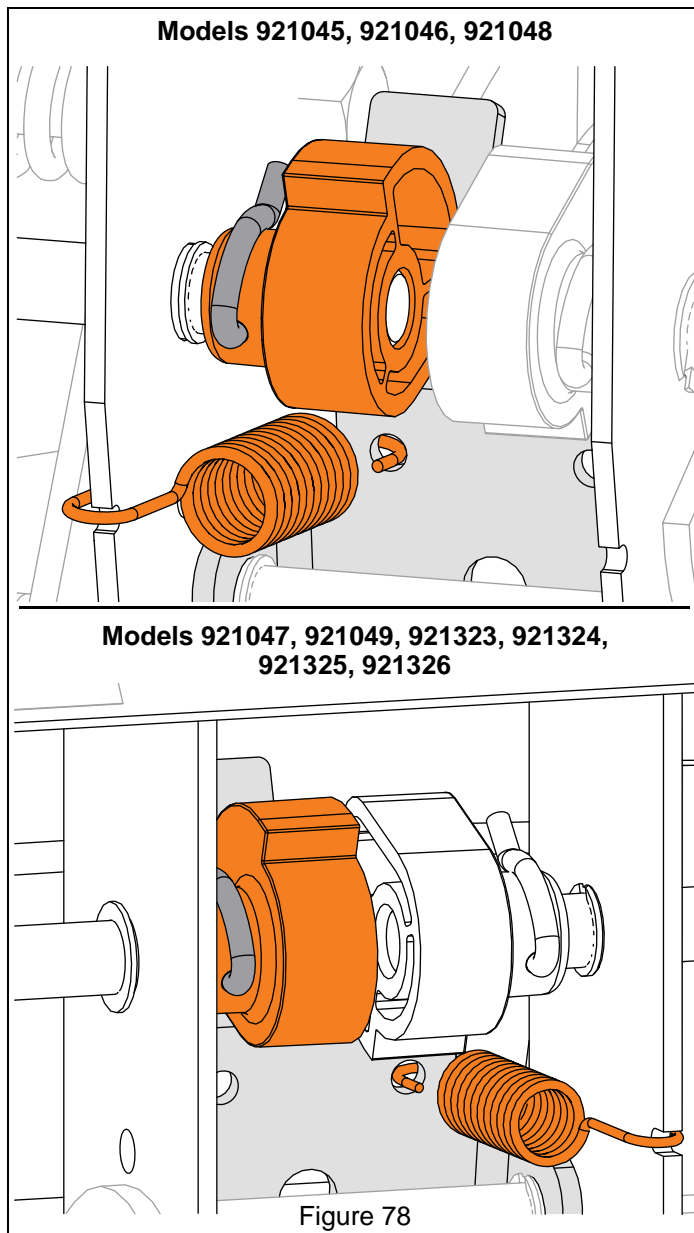
1. Reinstall right camshaft through interlock bracket and secure to clutch lever with one tapping screw.
2. Install interlock cam onto camshaft so flat edge is positioned downward. Secure with spring clip. See Figure 77.



3. Position left interlock cam inside interlock bracket and align with left camshaft.
4. Insert camshaft through cam.
5. Secure camshaft to clutch lever with one tapping screw.

See Figure 78.

6. Rotate cam so flat edge is positioned upward and secure with spring clip.
7. Reconnect spring to interlock bracket.



8. Check dual-handle interlock function. Refer to Operator's Manual for test procedure.

IMPORTANT: If dual-handle interlock continues to malfunction, see your Ariens dealer.

AXLE BUSHING REPLACEMENT

Remove Left Axle Bushing

IMPORTANT: Save all hardware for reinstallation.

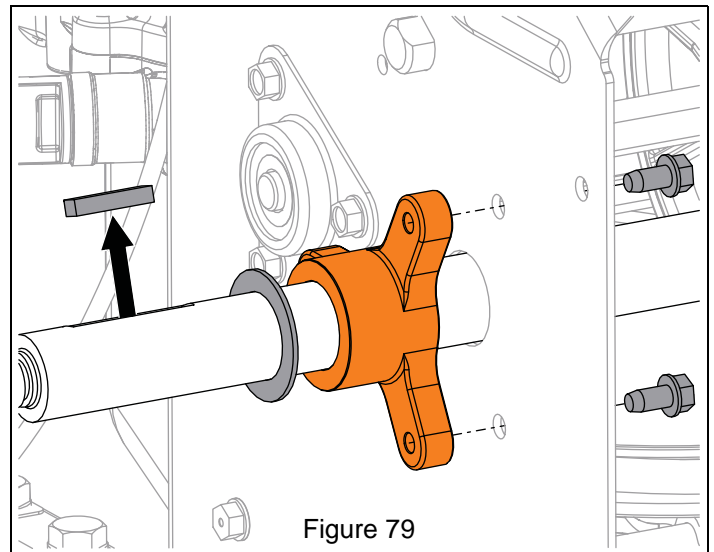


WARNING: AVOID INJURY. Before placing unit in service position, drain fuel from tank and fuel system. See *Draining Fuel System* on page 7. Make sure unit is secure and will not tip.

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Place unit in service position and remove bottom cover. See *Service Position* on page 7 and *Bottom Cover Removal* on page 12.
4. Remove snap clips from left axle end and remove wheel.

See Figure 79.

5. Remove key and flat steel washer from axle.
6. Remove hardware securing axle bushing to frame and remove bushing.



Install Left Axle Bushing

1. Install bushing onto axle and secure to frame with three tapping screws from inside frame.
2. Reinstall flat steel washer and key onto axle.
3. Reinstall bottom cover and secure with two tapping screws and four hex bolts.
4. Reinstall wheel and secure with snap clip.
5. Return unit to operating position.
6. Reconnect spark plug wire and fill fuel tank.

Remove Right Axle Bushing

IMPORTANT: Save all hardware for reinstallation.



WARNING: AVOID INJURY. Before placing unit in service position, drain fuel from tank and fuel system. See *Draining Fuel System* on page 7. Make sure unit is secure and will not tip.

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Place unit in service position and remove bottom cover. See *Service Position* on page 7 and *Bottom Cover Removal* on page 12.
4. Remove snap clips from axle ends and remove wheels.

See Figure 80.

5. Remove E-ring from axle end.
6. Hold differential gear in place and remove axle from differential.

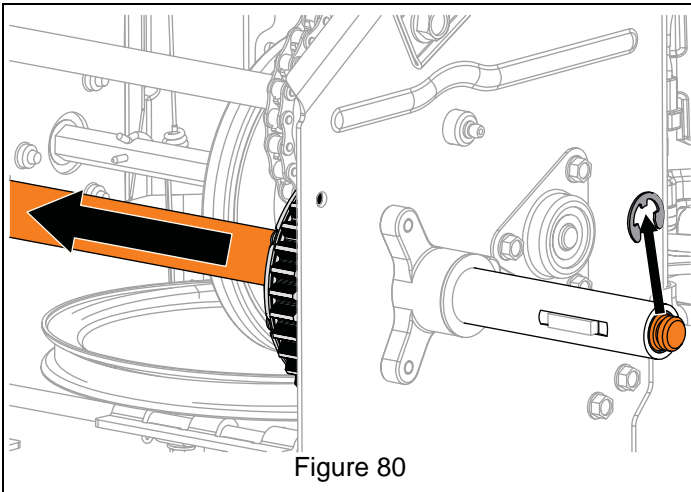


Figure 80

See Figure 81.

IMPORTANT: Two flat steel washers will fall when short axle is removed.

7. Hold differential gear and remove short axle.
8. Remove differential gear.

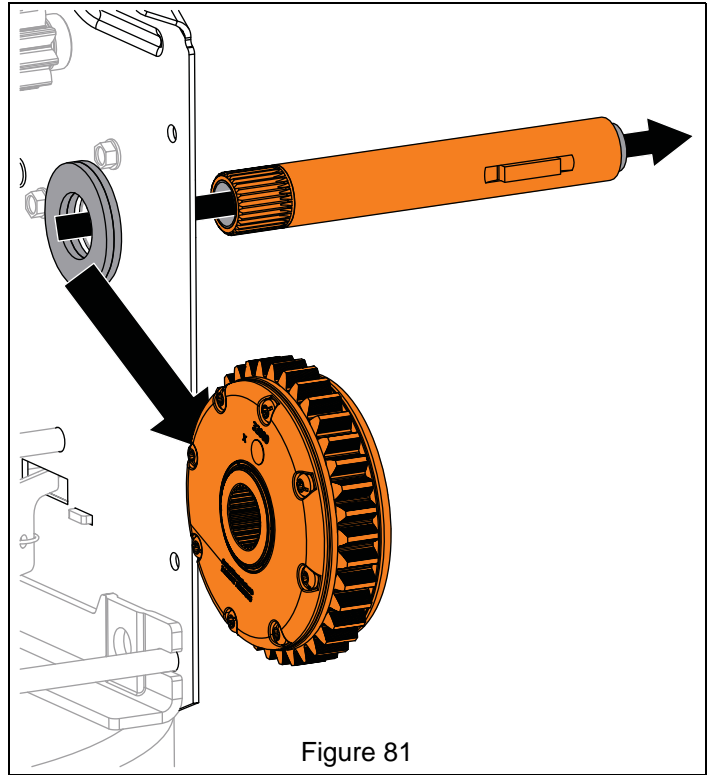


Figure 81

9. Remove hardware securing axle bushing to frame and remove bushing. See Figure 82.

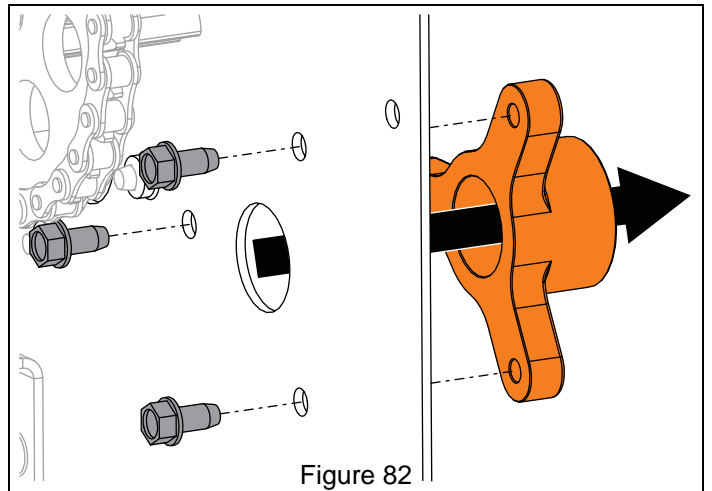
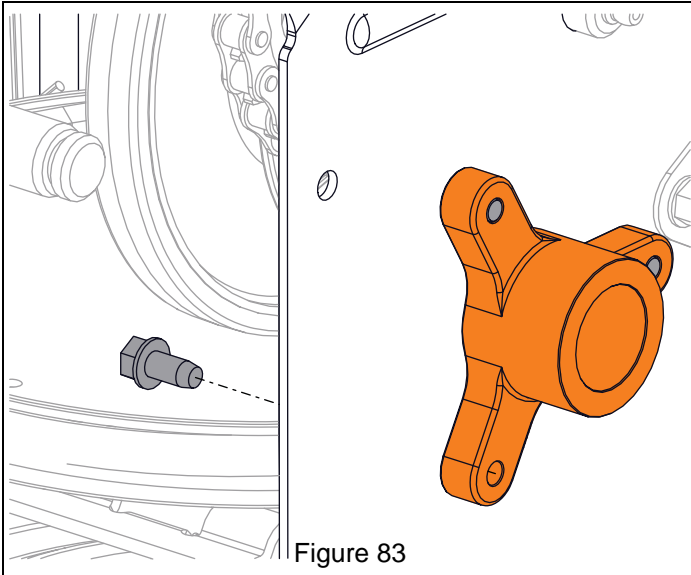


Figure 82

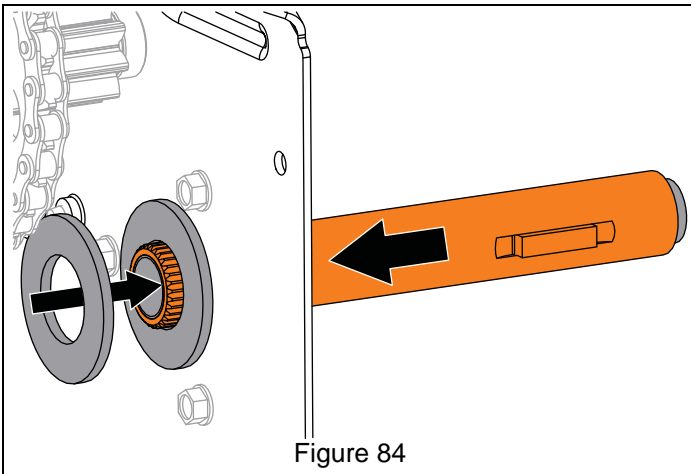
Install Right Axle Bushing

1. Secure bushing to frame exterior with three tapping screws from inside frame. See Figure 83.

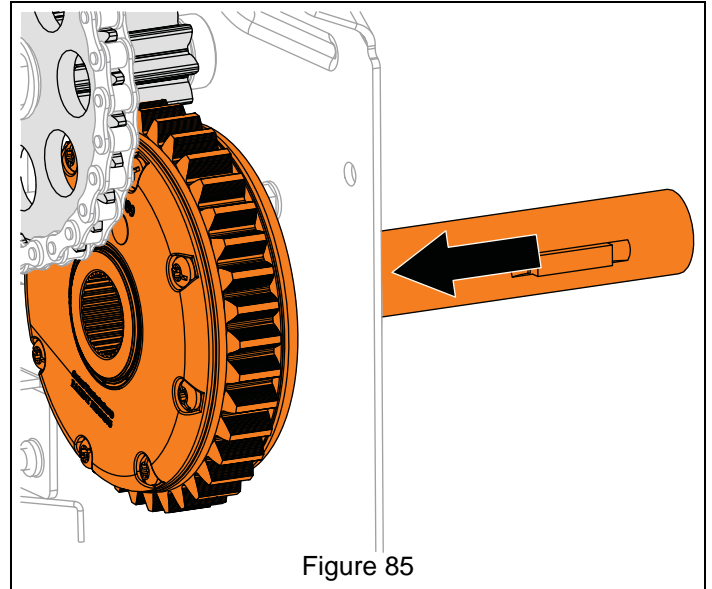


See Figure 84.

2. Reinstall short axle until a small portion of axle is through frame.
3. Reinstall two flat steel washers onto axle.

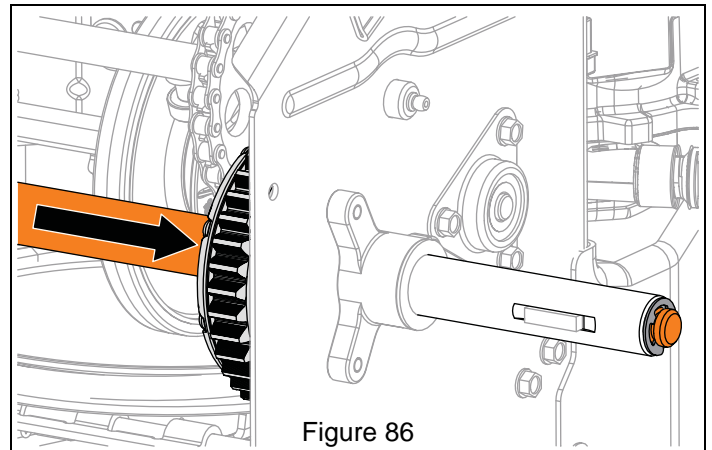


4. Align differential gear with pinion gear and short axle. Reinstall short axle into differential. See Figure 85.



See Figure 86.

5. Reinstall long axle into differential gear.
6. Reinstall E-ring onto axle end.



7. Reinstall bottom cover and secure with two tapping screws and four hex bolts.
8. Reinstall wheels and secure with snap clips.
9. Return unit to operating position.
10. Reconnect spark plug wire and fill fuel tank.

FLANGE BUSHING REPLACEMENT

IMPORTANT: Save all hardware for reinstallation.



WARNING: AVOID INJURY. Before placing unit in service position, drain fuel from tank and fuel system. See *Draining Fuel System* on page 7. Make sure unit is secure and will not tip.

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Place unit in service position and remove bottom cover. See *Service Position* on page 7 and *Bottom Cover Removal* on page 12.
4. Remove snap clip from right axle end and remove right wheel.

See Figure 87.

5. Remove spring clip from pinion shaft.
6. Move pinion shaft to the right.

IMPORTANT: Flat steel washer on pinion shaft will fall when shaft is removed.

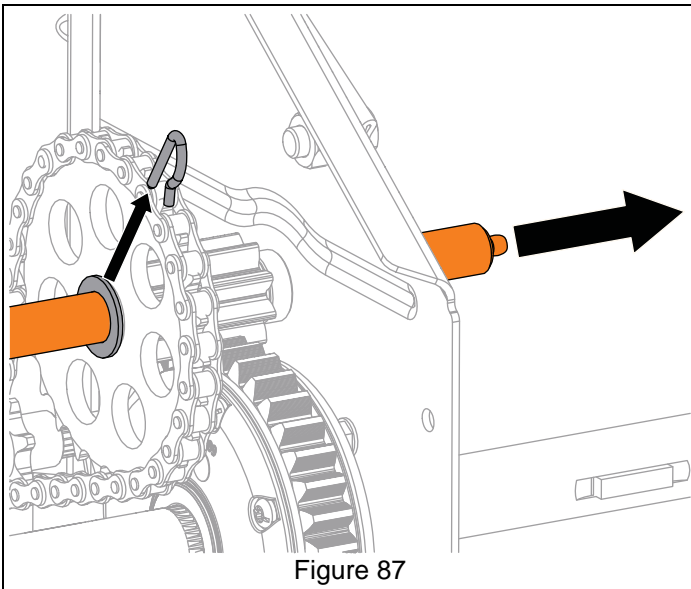


Figure 87

See Figure 88.

IMPORTANT: Sleeve bushing between pinion gear and frame will fall when pinion shaft is removed.

7. Remove pinion shaft.
8. Remove pinion gear from chain.

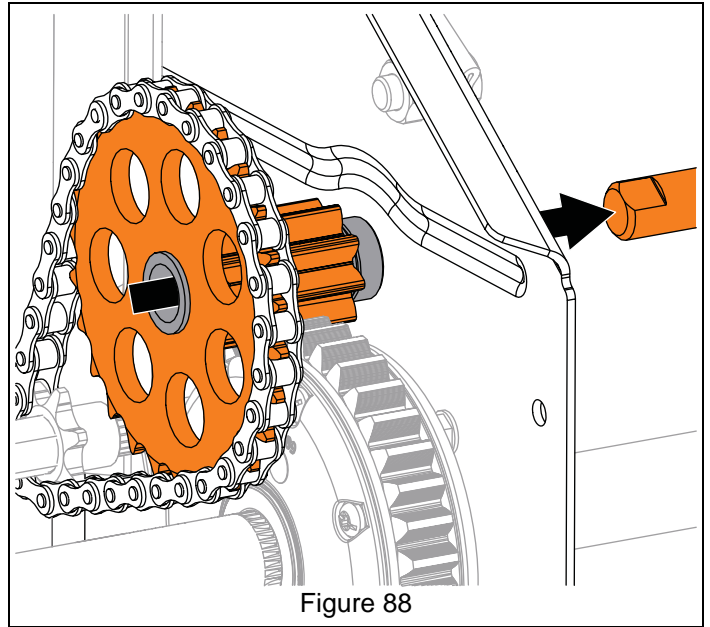


Figure 88

9. Remove flange bushings from pinion gear. See Figure 89.

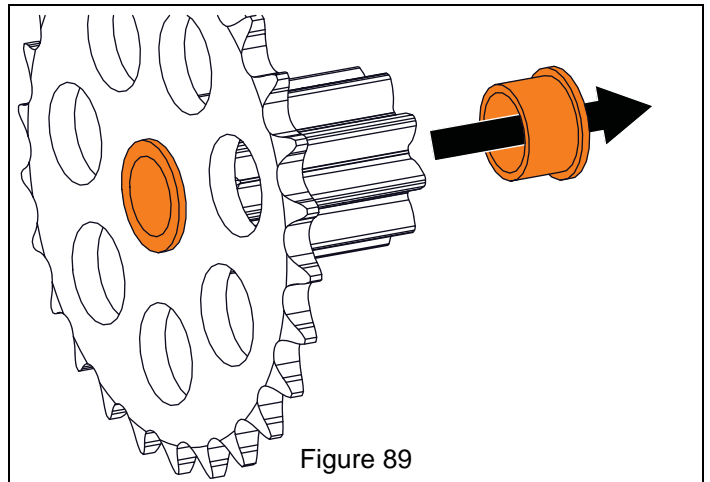


Figure 89

Install Flange Bushings

1. Install flange bushings into pinion gear.
- See Figure 90.
2. Reinstall pinion gear into chain and align with differential gear.
 3. Position sleeve bushing between pinion gear and frame.
 4. Reinstall pinion shaft through frame, sleeve bushing and pinion gear.
 5. Reinstall one flat steel washer onto pinion shaft.

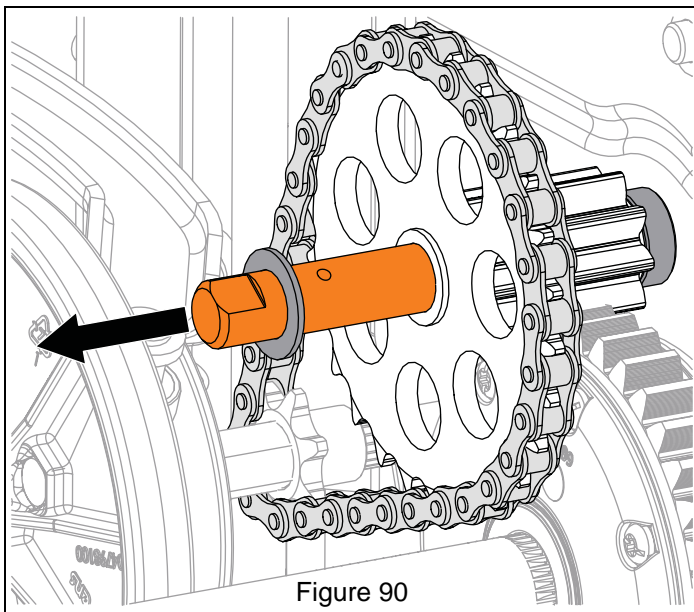


Figure 90

6. Insert pinion shaft end into left side of frame.
7. Position flat steel washer against pinion gear and reinstall spring clip. See Figure 91.

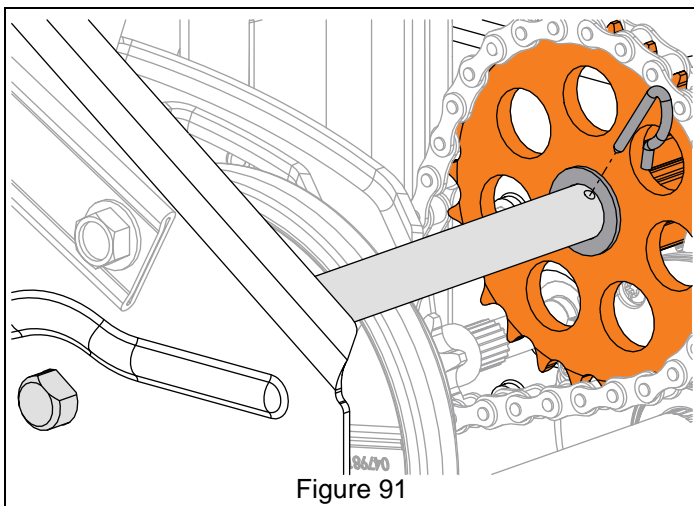


Figure 91

8. Reinstall bottom cover and secure with two tapping screws and four hex bolts.
9. Reinstall wheel and secure with snap clip.
10. Return unit to operating position.
11. Reconnect spark plug wire and fill fuel tank.

DIFFERENTIAL GEAR REPLACEMENT

Remove Differential Gear

IMPORTANT: Save all hardware for reinstallation.



WARNING: AVOID INJURY. Before placing unit in service position, drain fuel from tank and fuel system. See *Draining Fuel System* on page 7. Make sure unit is secure and will not tip.

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
 2. Disconnect spark plug wire from engine.
 3. Place unit in service position and remove bottom cover. See *Service Position* on page 7 and *Bottom Cover Removal* on page 12.
 4. Remove snap clips from axle ends and remove wheels.
- See Figure 92.
5. Remove E-ring from axle end.
 6. Hold differential gear in place and remove long axle from differential.

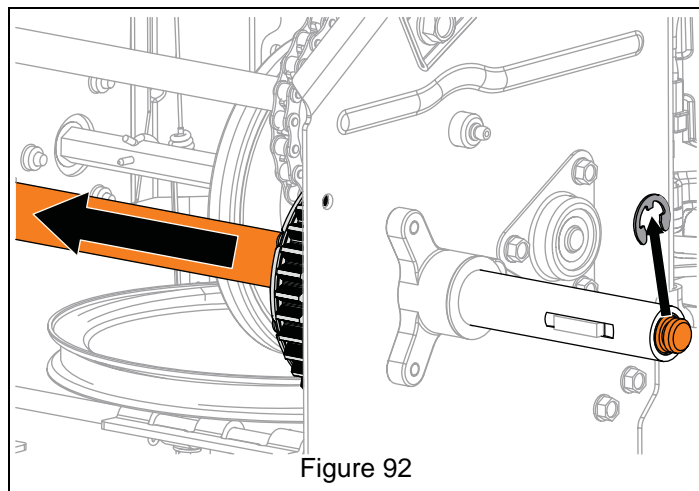


Figure 92

See Figure 93.

IMPORTANT: Two flat steel washers will fall when short axle is removed.

7. Hold differential gear in place and remove short axle.
8. Remove differential.

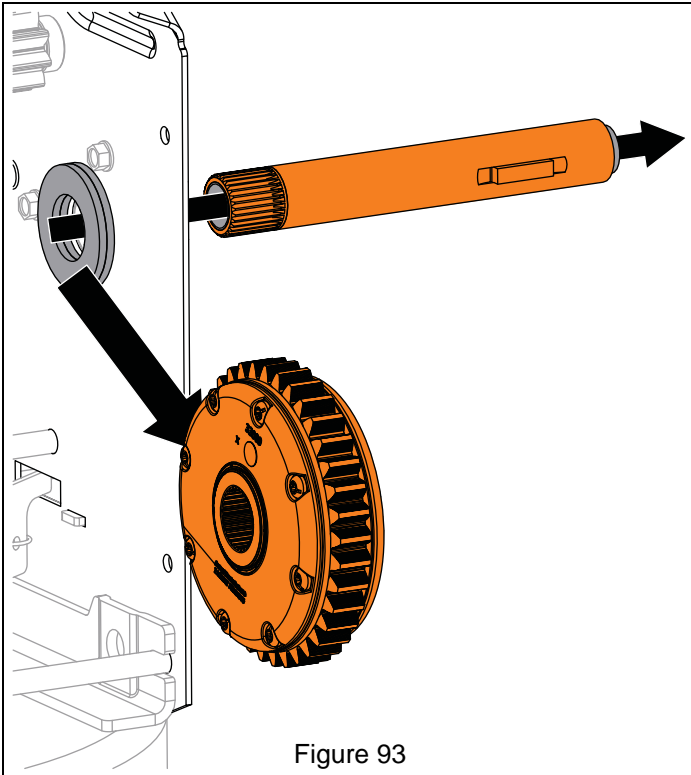


Figure 93

Install Differential Gear

See Figure 94.

1. Reinstall short axle until a small portion of axle is through frame.
2. Reinstall two flat steel washers onto axle.

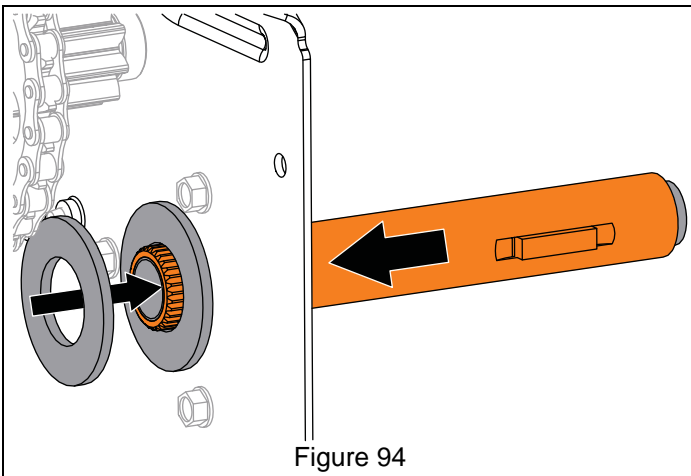


Figure 94

3. Align differential gear with pinion gear and short axle. Reinstall short axle into differential. See Figure 95.

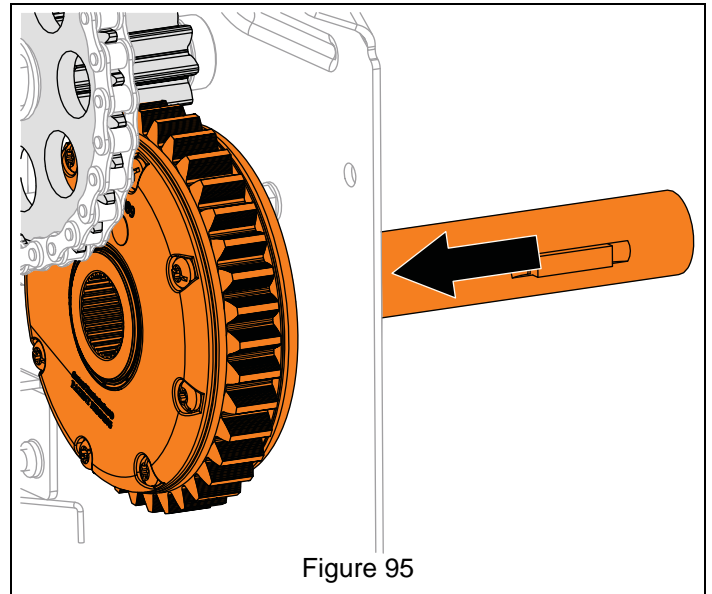


Figure 95

See Figure 96.

4. Reinstall long axle into differential gear.
5. Reinstall E-ring onto axle end.

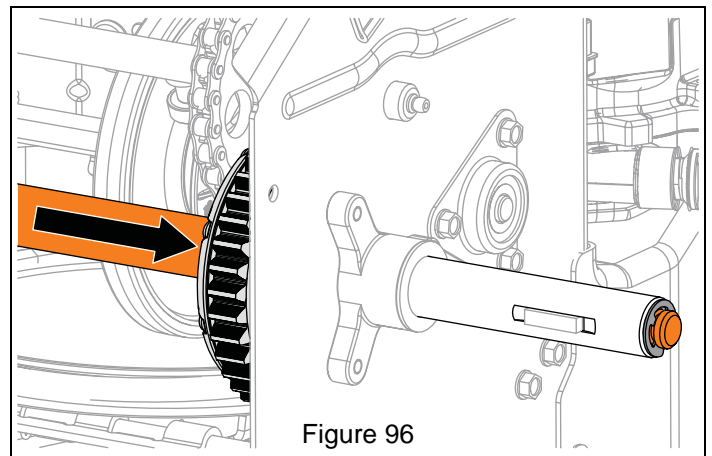


Figure 96

6. Reinstall bottom cover and secure with two tapping screws and four hex bolts.
7. Reinstall wheels onto axle and secure with snap clips.
8. Return unit to operating position.
9. Reconnect spark plug wire and fill fuel tank.

CHUTE GEAR REPLACEMENT

Remove Chute Rotation Gear

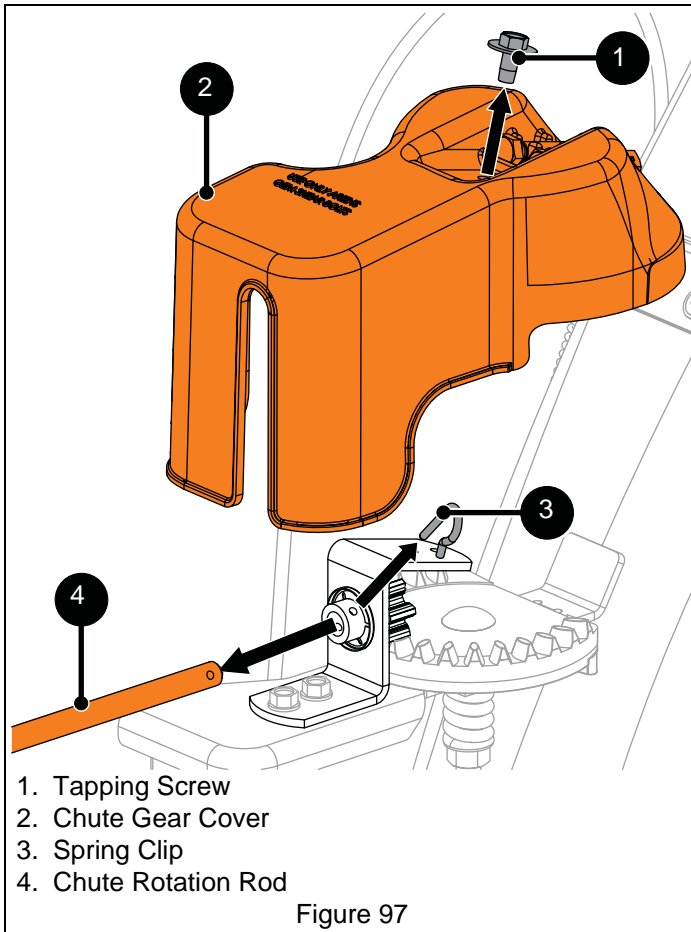
Models 921045, 921046, 921047, 921048, 921049,
921323, 921324, 921325

IMPORTANT: Save all hardware for reinstallation

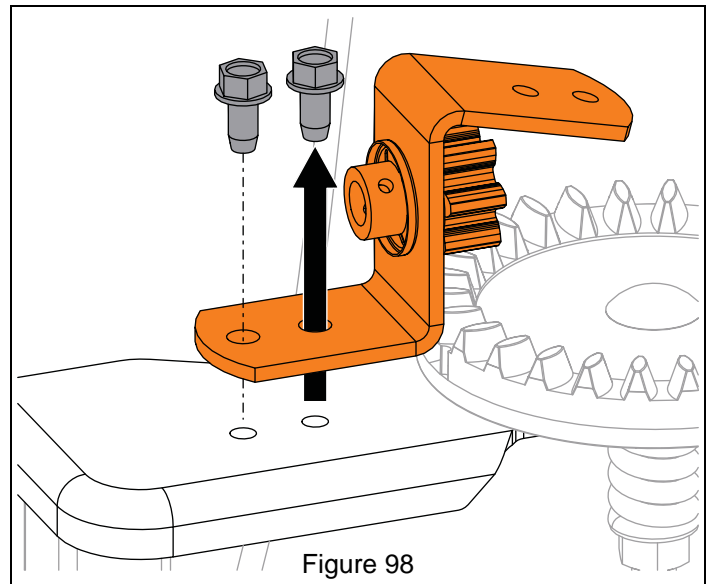
1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.

See Figure 97.

3. Remove hardware retaining chute gear cover and remove cover.
4. Remove spring clip from chute rotation rod and remove rod from chute gears.

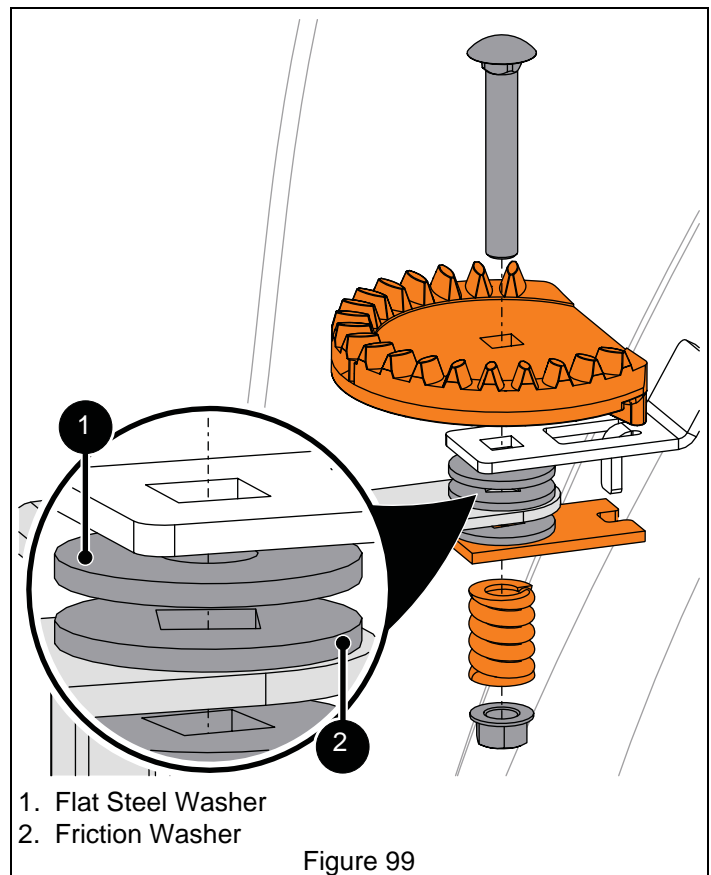


5. Remove hardware securing actuation gear bracket to pedestal plate and remove bracket. See Figure 98.



IMPORTANT: Support discharge chute so it remains upright.

6. Remove hardware retaining chute rotation gear to pedestal plate and remove gear. See Figure 99.



IMPORTANT: Flat steel washer and friction washer may remain in original positions. See detailed view in Figure 99.

Remove Chute Rotation Gear

Model 921326

IMPORTANT: Save all hardware for reinstallation

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Position discharge chute facing forward.

See Figure 100.

4. Remove hardware retaining chute gear cover and remove cover.
5. Remove hairpin from hex rod and remove hex rod from chute gears.

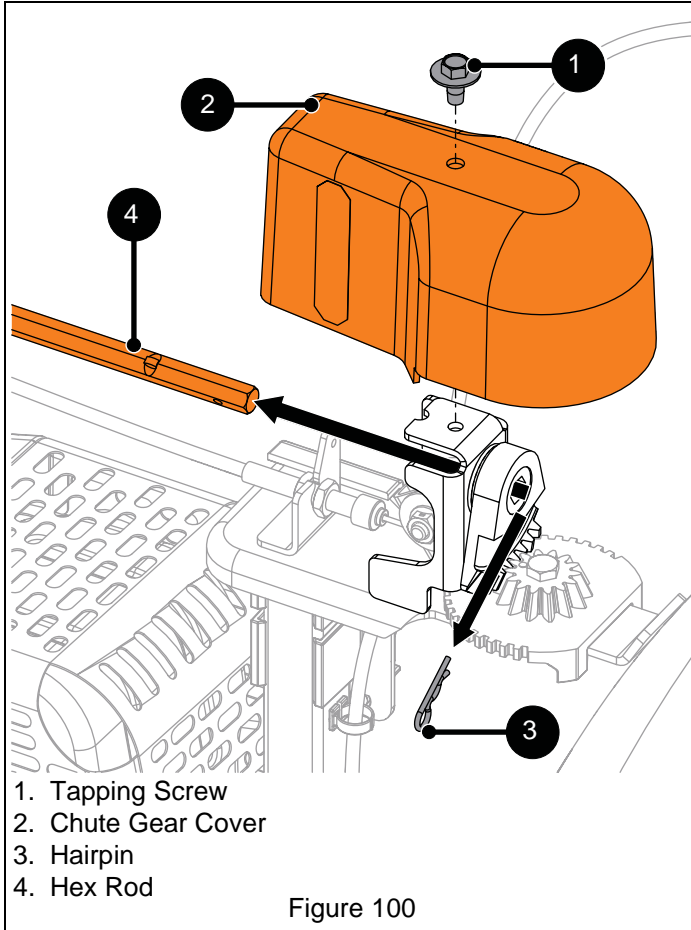


Figure 100

IMPORTANT: Support discharge chute so it remains upright.

6. Remove hardware retaining chute rotation gear to pedestal plate and remove gear. See Figure 101.

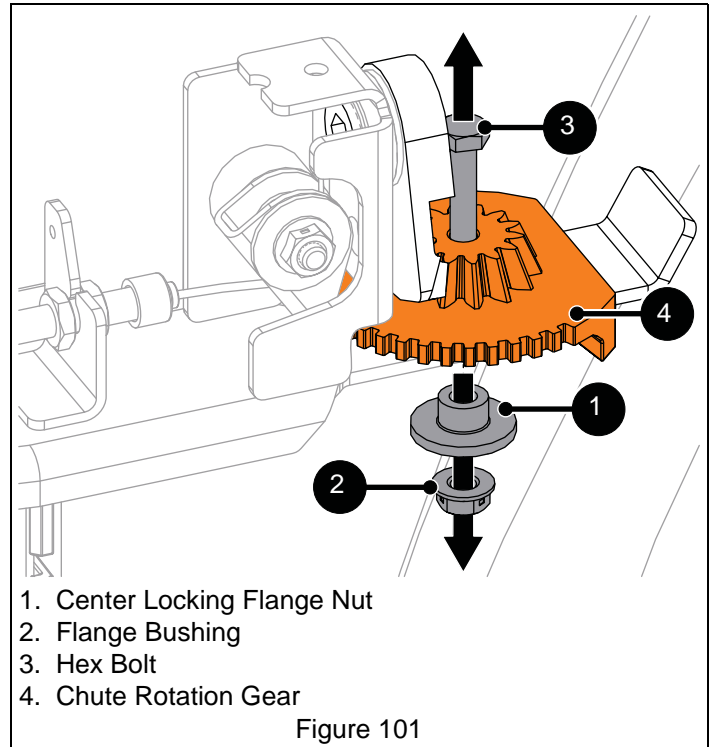


Figure 101

Install Chute Rotation Gear

Models 921045, 921046, 921047, 921048, 921049, 921323, 921324, 921325

IMPORTANT: Make sure discharge chute is positioned forward.

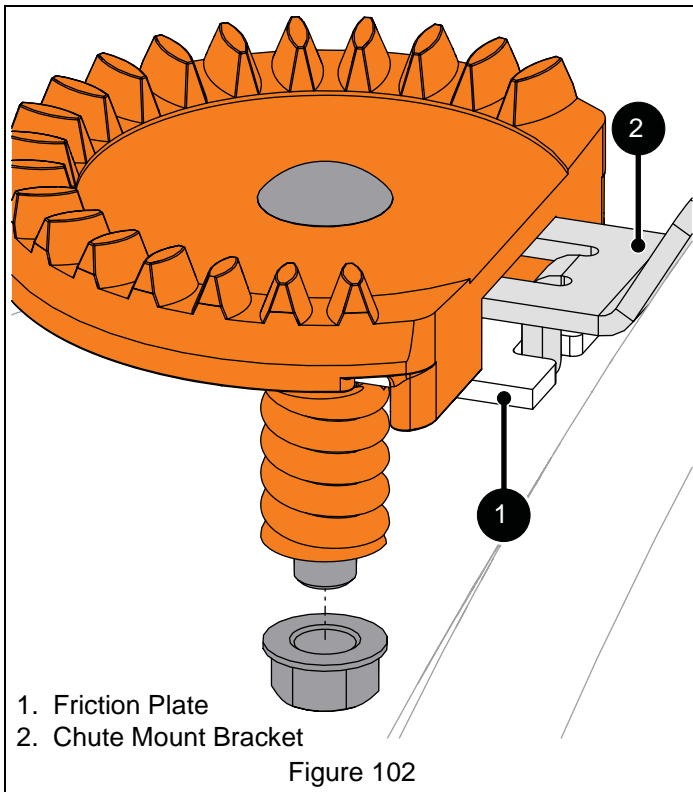
See Figure 102.

1. Position chute rotation gear over chute mount bracket so edge is square with bracket.

IMPORTANT: Make sure flat steel washer and friction washer are positioned between chute mount bracket and pedestal plate. See Figure 99.

2. Insert round head square neck bolt through chute rotation gear.
3. Install friction plate and compression spring onto round head square neck bolt and secure with top locking flange nut.

IMPORTANT: Make sure notch in friction plate aligns with tab on chute mount bracket.



4. Reinstall actuation gear bracket to pedestal plate and secure with two tapping screws.
5. Reinstall chute rotation rod into chute gear and secure with spring clip.
6. Reinstall chute gear cover and secure with tapping screw.
7. Adjust discharge chute. Refer to Operator's Manual for adjustment procedure.
8. Reconnect spark plug wire.

IMPORTANT: Check all adjustments after first use.

Install Chute Rotation Gear

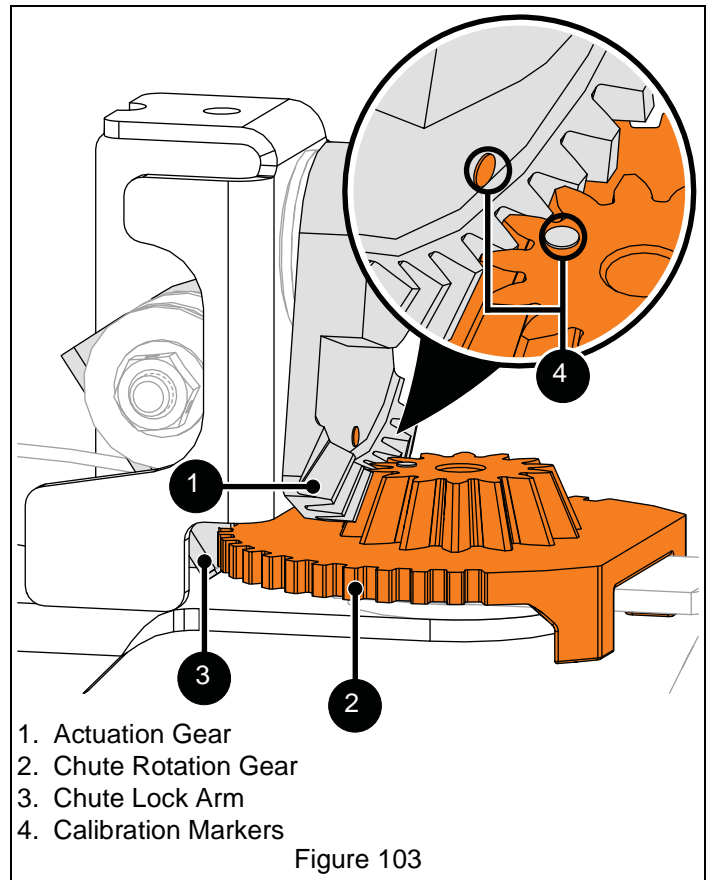
Model 921326

IMPORTANT: Make sure discharge chute is positioned forward.

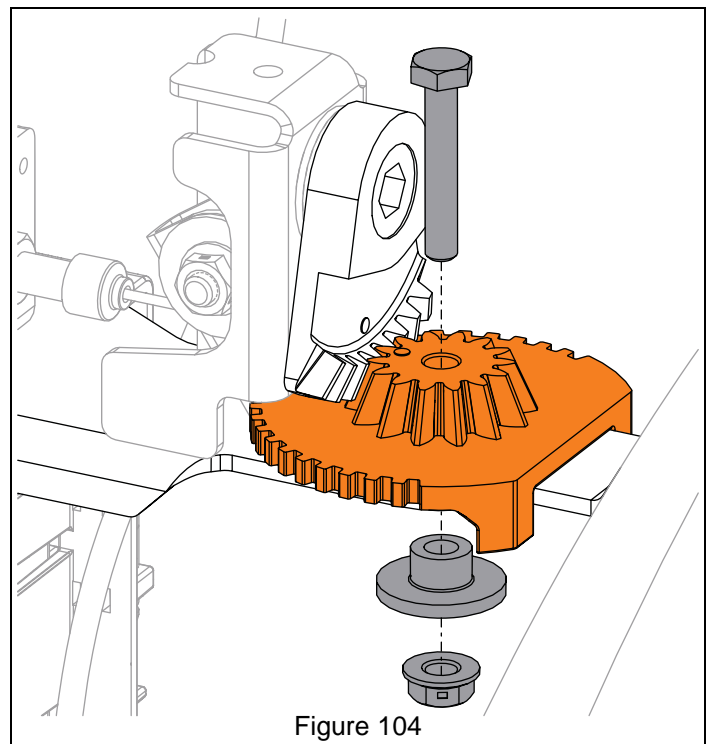
See Figure 103.

1. Position actuation gear so gear teeth are at lowest position.
2. Install chute rotation gear so midpoint of gear teeth is seated in chute lock arm.

IMPORTANT: Make sure calibration markers on actuation gear and chute rotation gear align.



3. Secure chute rotation gear with one hex bolt, one flange bushing and locking nut. See Figure 104.



4. Position chute rotation lever upright and discharge chute facing forward.

5. Reinstall hex rod into chute gears and secure with hairpin.
6. Reinstall chute gear cover and secure with tapping screw.
7. Adjust discharge chute. Refer to Operator's Manual for adjustment procedure.
8. Reconnect spark plug wire.

IMPORTANT: Check all adjustments after first use.

Remove Actuation Gear

Models 921045, 921046, 921047, 921048, 921049, 921323, 921324, 921325

IMPORTANT: Save all hardware for reinstallation.

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
 2. Disconnect spark plug wire from engine.
- See Figure 105.
3. Remove hardware retaining chute gear cover to chute pedestal and remove cover.
 4. Remove spring clip from chute rotation rod and remove rod from chute gears.

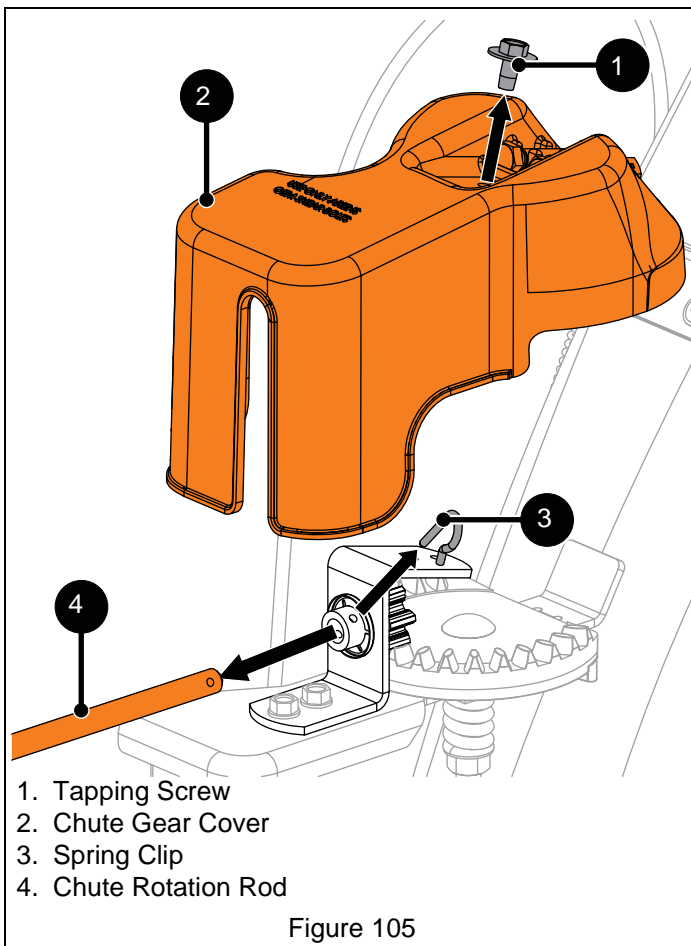


Figure 105

5. Remove hardware securing actuation gear bracket to pedestal plate and remove bracket. See Figure 98.

See Figure 106.

6. Remove push nut from actuation gear and discard.

7. Remove actuation gear from actuation gear bracket.
8. Remove flat steel washer from actuation gear.

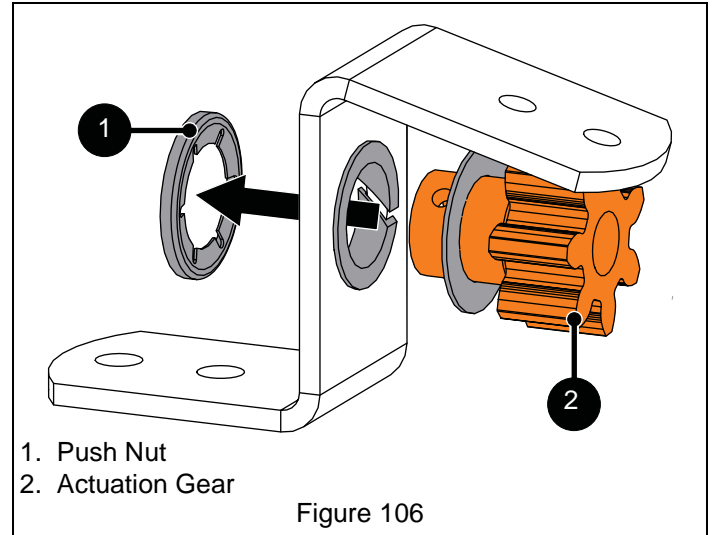


Figure 106

Remove Actuation Gear

Model 921326

IMPORTANT: Save all hardware for reinstallation.

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Remove chute rotation gear. See *Remove Chute Rotation Gear* on page 42.

See Figure 107.

4. Remove actuation gear and two flat steel washers from chute gear bracket.

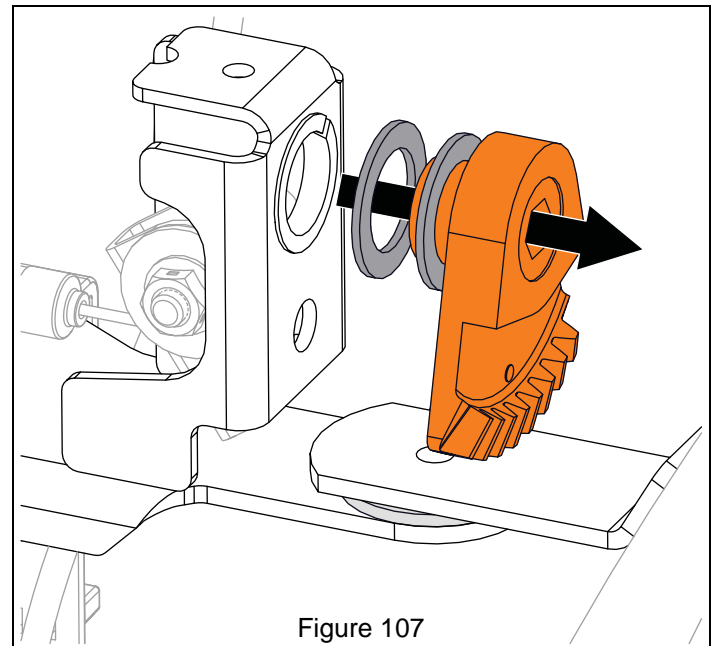


Figure 107

Install Actuation Gear

Models 921045, 921046, 921047, 921048, 921049, 921323, 921324, 921325

1. Install one flat steel washer onto actuation gear and insert gear through actuation gear bracket.
2. Install push nut onto actuation gear so it is tight against actuation gear bracket.
3. Reinstall actuation gear bracket to pedestal plate and secure with two tapping screws.
4. Reinstall chute rotation rod into chute gear and secure with spring clip.
5. Reinstall chute gear cover and secure with tapping screw.
6. Adjust discharge chute. Refer to Operator's Manual for adjustment procedure.
7. Reconnect spark plug wire.

IMPORTANT: Check all adjustments after first use.

Install Actuation Gear

Model 921326

1. Install two flat steel washers onto actuation gear.
2. Install actuation gear into chute gear bracket.
3. Reinstall chute rotation gear. See *Install Chute Rotation Gear* on page 43.

SCRAPER BLADE REPLACEMENT

Remove Scraper Blade

IMPORTANT: Save all hardware for reinstallation.



WARNING: AVOID INJURY. Before tipping unit onto handlebars, drain fuel from tank and fuel system. See *Draining Fuel System* on page 7. Make sure unit is secure and will not tip.

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Remove hardware securing scraper blade ends to auger housing. See Figure 108.

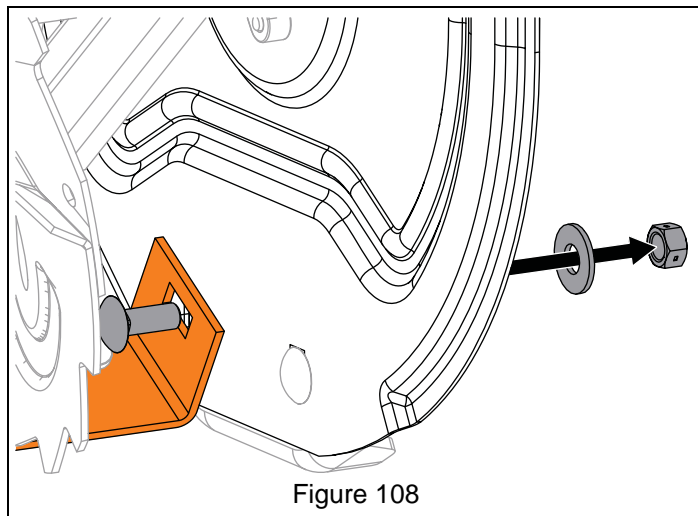


Figure 108

See Figure 109.

4. Slowly tip unit back so it rests on handlebars.
5. Remove remaining hardware securing scraper blade to auger housing and remove scraper blade.

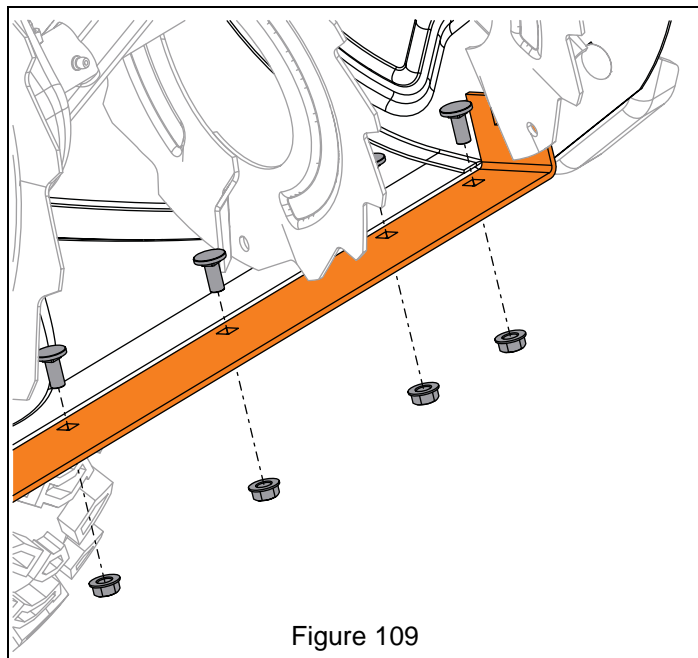


Figure 109

Install Scraper Blade

1. Position scraper blade inside auger housing and align with holes in housing.
2. Insert seven flat head square neck bolts through scraper blade from inside housing. Secure with seven top locking flange nuts.
3. Insert two round head square neck bolts through scraper blade ends and skid shoes from inside housing. Secure with two flat steel washers and two hex nuts.
4. Return unit to operating position.
5. Adjust scraper blade and skid shoes. Refer to Operator's Manual for adjustment procedures.
6. Reconnect spark plug wire and fill fuel tank.

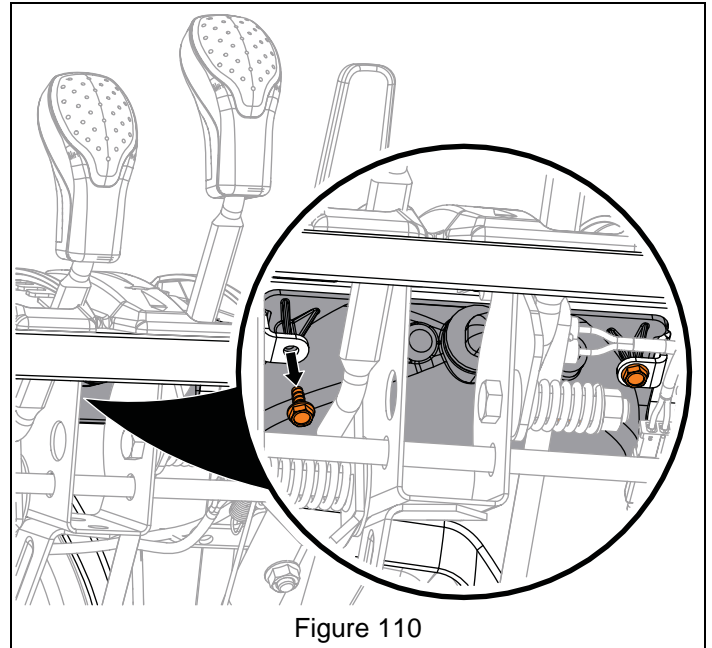
IMPORTANT: Check all adjustments after first use.

HEADLIGHT REPLACEMENT

Remove Bulb

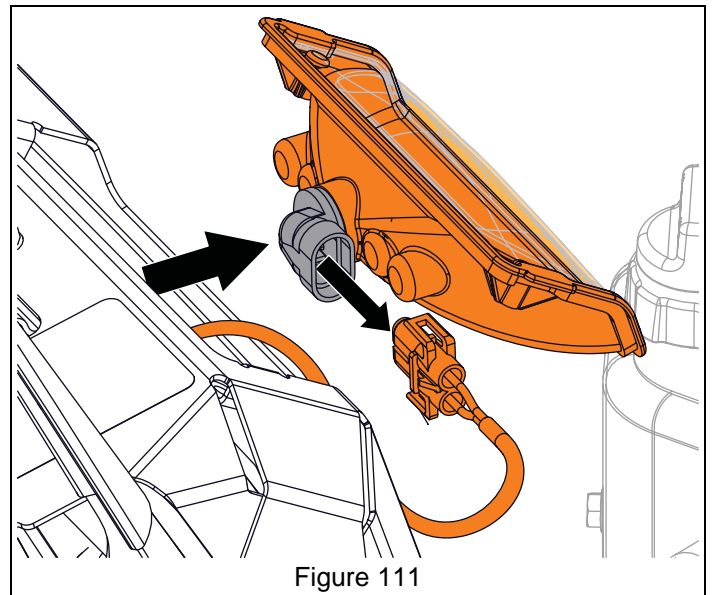
IMPORTANT: Save all hardware for reinstallation.

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Remove hardware securing headlight to dash panel. See Figure 110.



See Figure 111.

4. Remove headlight from dash panel.
5. Disconnect wire harness from bulb.



6. Turn bulb one-eighth turn counterclockwise and remove from headlight housing. See Figure 112.

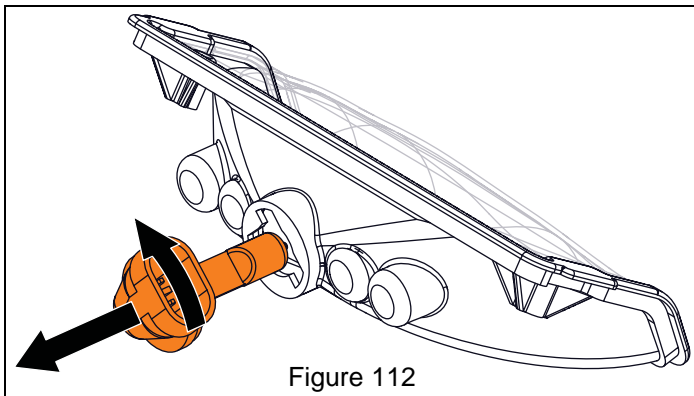


Figure 112

Install Bulb

NOTICE: DO NOT touch new bulb with bare hands; wear gloves. Body oil on a headlight bulb can increase bulb temperature and reduce life of the bulb.

1. Install bulb into headlight housing and turn one-eighth turn clockwise.
2. Connect bulb to wire harness.
3. Reinstall headlight housing into dash panel and secure with two tapping screws.

IMPORTANT: Reconnect spark plug wire.

GEARCASE REBUILD

Disassemble Gearcase

IMPORTANT: Save all parts for reassembly, unless otherwise specified.

1. Remove gearcase. See *Remove Gearcase Assembly* on page 26.
2. Remove any rust, if present, from auger and impeller shafts with sandpaper. Wipe clean with oil.
3. Remove drain plug and seal washer from gearcase. See Figure 113.

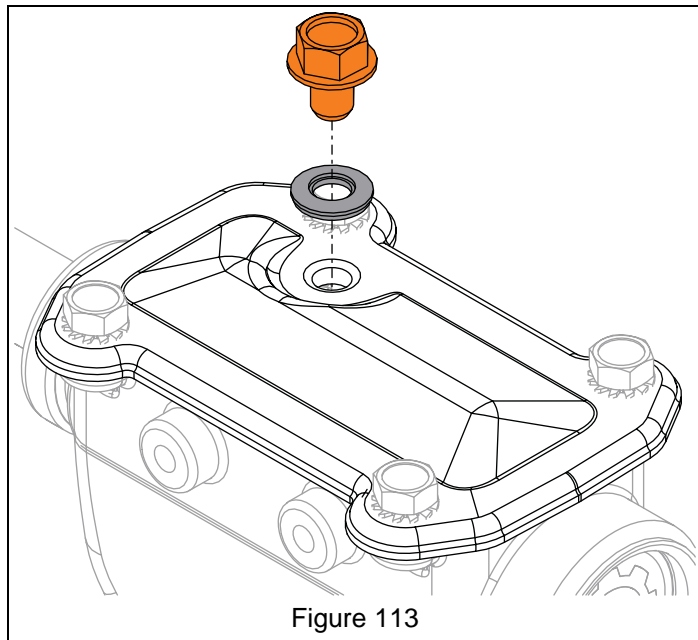
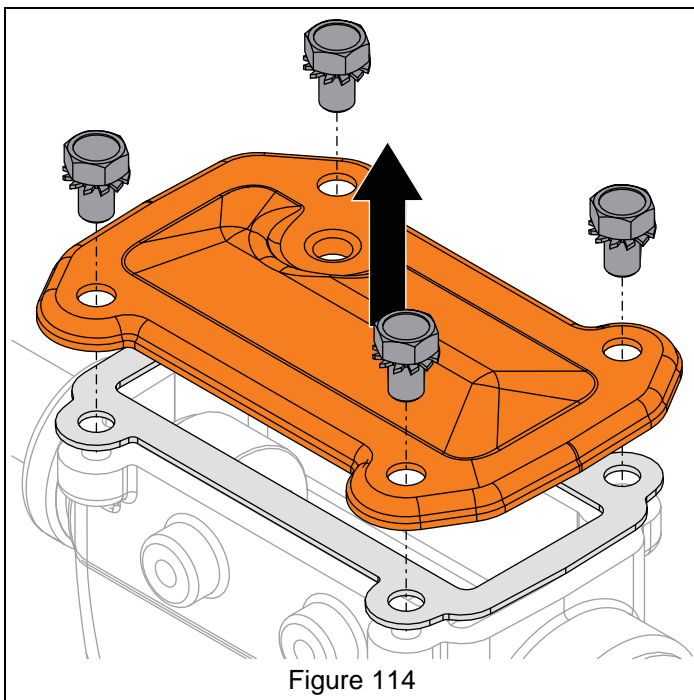


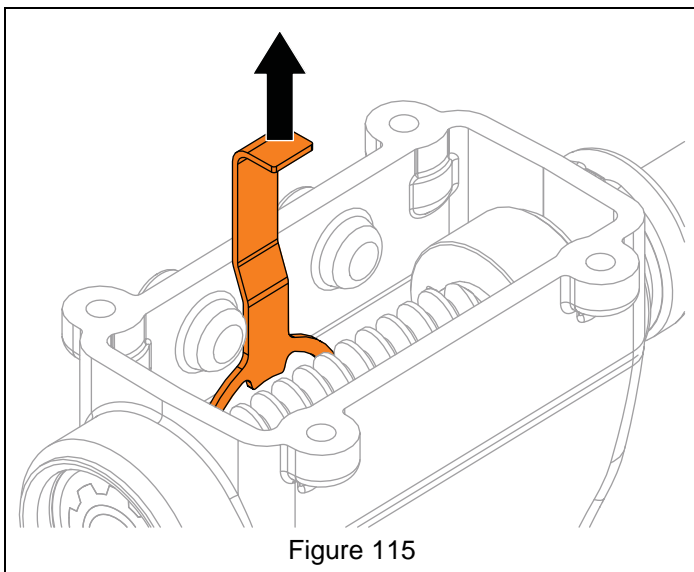
Figure 113

See Figure 114.

4. Remove hardware retaining gearcase cover and remove cover.
5. Remove gasket and drain gearcase.

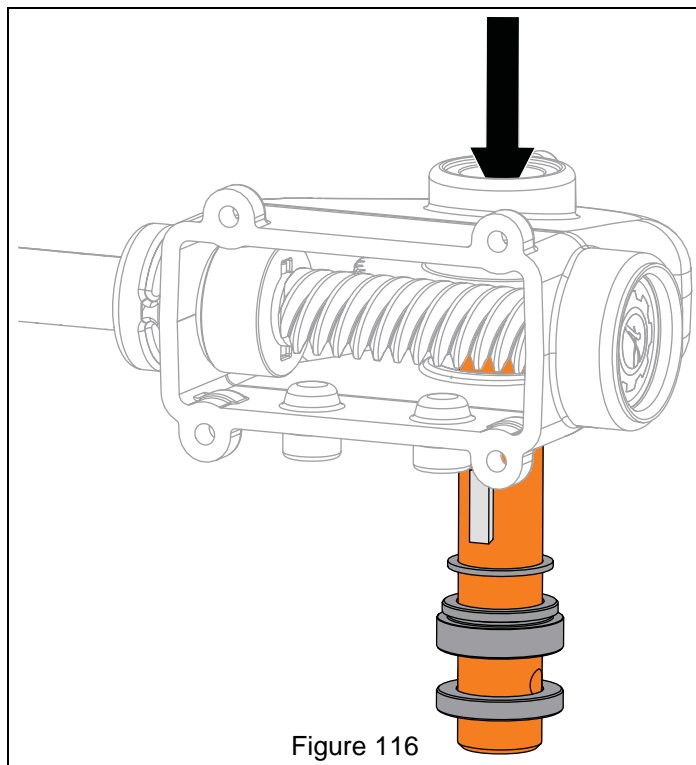


6. Remove bushing retainer from gearcase. See Figure 115.

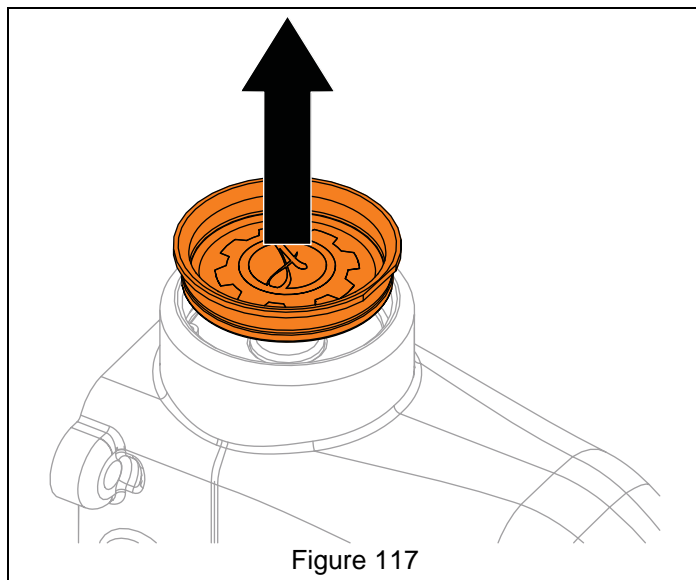


See Figure 116.

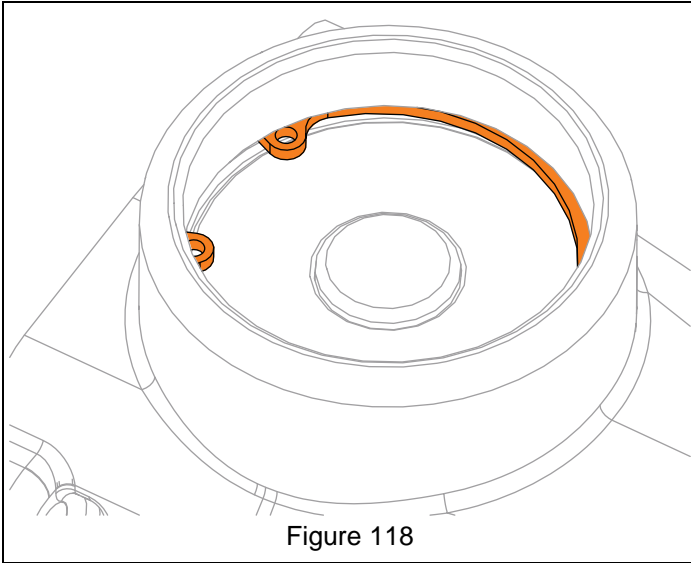
7. Press auger shaft through the right side of gearcase.
NOTICE: DO NOT strike auger shaft end; use a press.
8. Remove seal, bushing and washer from auger shaft.



9. With a flathead screwdriver or similar pry bar, remove front seal cover and discard. See Figure 117.



10. With a snap ring pliers, remove retaining ring. See Figure 118.

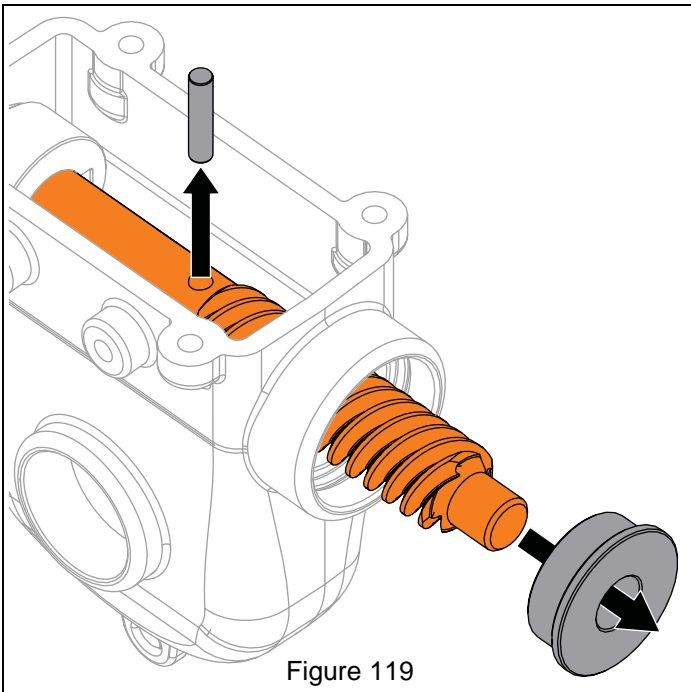


See Figure 119.

11. With a driver, strike impeller shaft end until shaft is through front of gearcase.

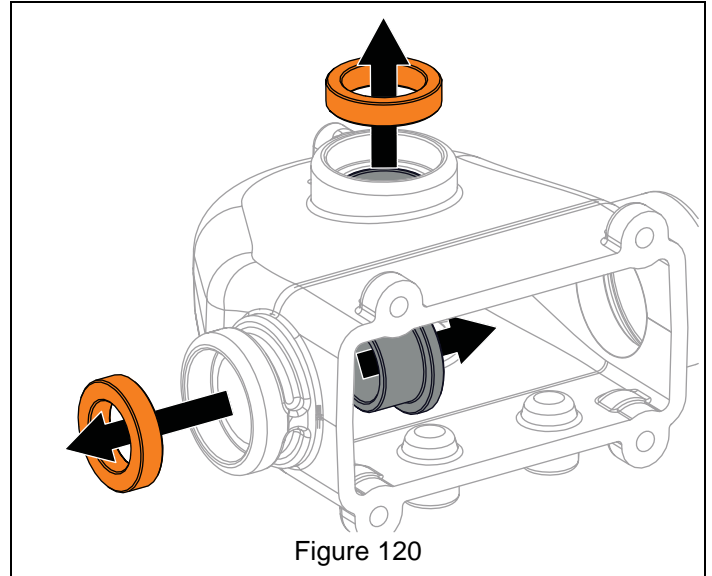
NOTICE: DO NOT strike impeller shaft end without using a driver.

12. Remove pin and bushing from impeller shaft.



13. Remove impeller shaft from gearcase and remove all loose parts from inside gearcase.

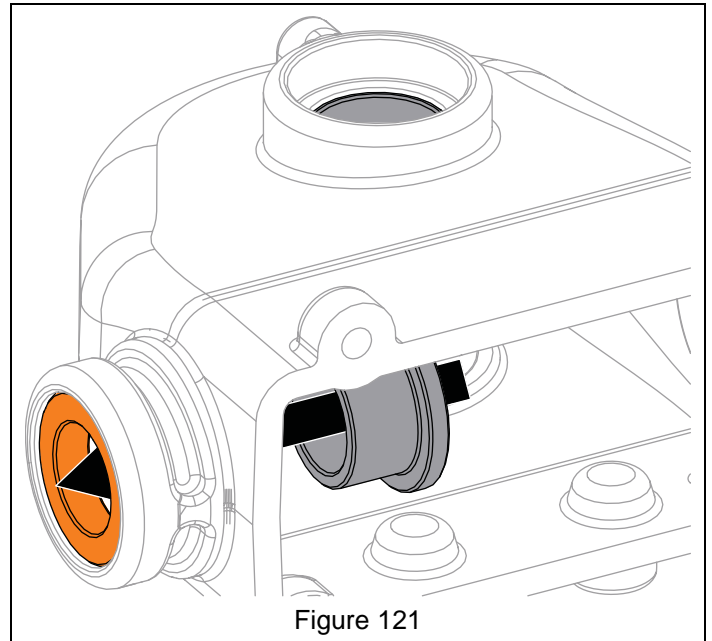
14. Remove seals and flange bushings from gearcase. See Figure 120.



Assemble Gearcase

See Figure 121.

1. Press rear seal into gearcase until flush with gearcase exterior.
2. Reinstall right and rear flange bushings.



IMPORTANT: Gear is symmetrical and may be installed in either orientation.

3. Install gear into gearcase.

See Figure 122.

4. Reinstall impeller shaft through gearcase front and reinstall thrust collar onto impeller shaft end.
5. Wrap a seal protector over impeller shaft end and reinstall shaft through gearcase seal. Remove seal.

NOTICE: Unprotected seals can be damaged when installed over rough edges in shaft, such as holes.

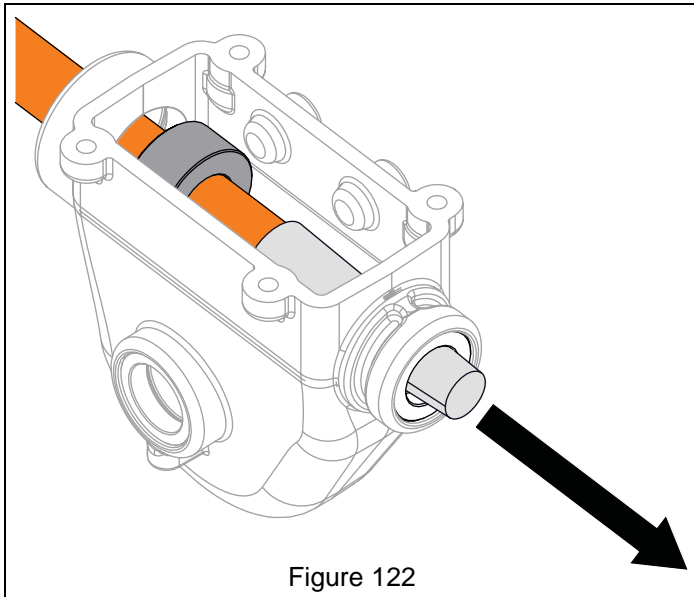


Figure 122

See Figure 123.

6. Reinstall pin into impeller shaft. Turn shaft so pin is horizontal.
7. Reinstall thrust collar over pin and position impeller shaft as far to gearcase rear as possible.

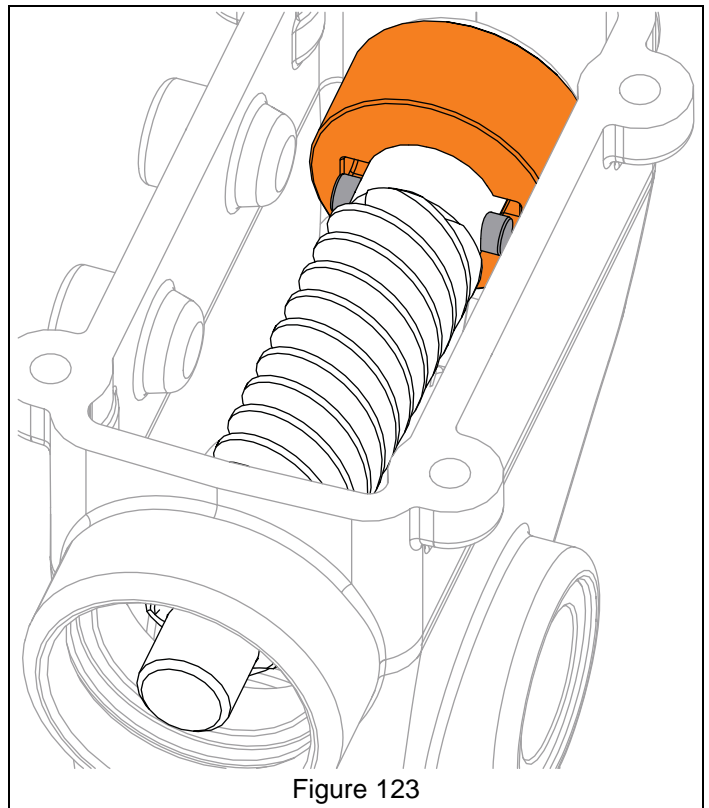


Figure 123

8. Reinstall flange bushing onto impeller shaft end. With a driver, strike bushing until positioned just below retaining ring groove. See Figure 124.

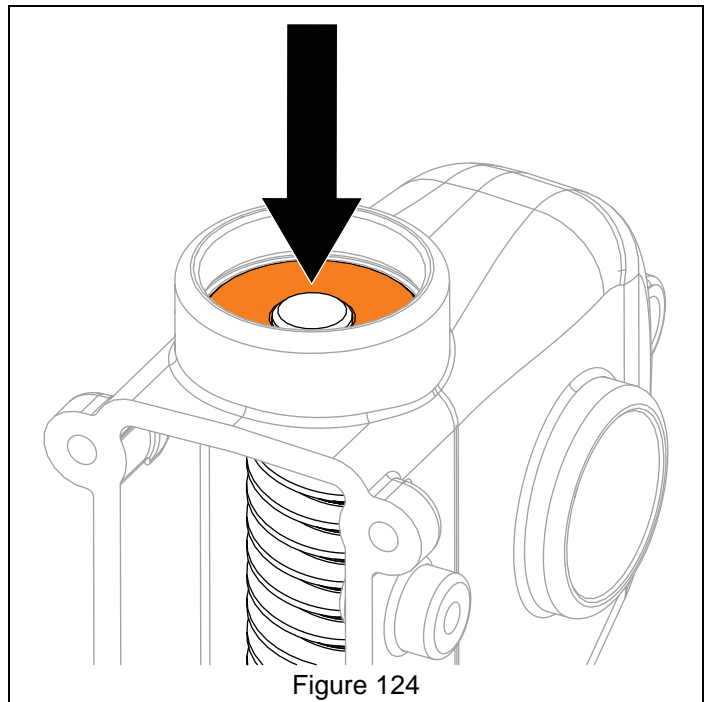


Figure 124

9. Reinstall retaining ring. See Figure 125.

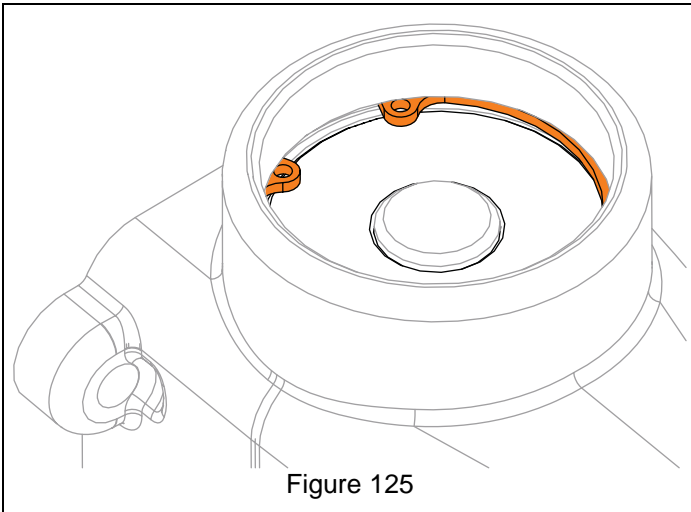


Figure 125

10. Turn impeller shaft by hand to make sure shaft rotates easily.

See Figure 126.

11. Reinstall one flat steel washer into left side of gearcase.

12. Align washer with gearcase hole and reinstall auger shaft through gear.

IMPORTANT: Make sure auger shaft key aligns with gear keyway.

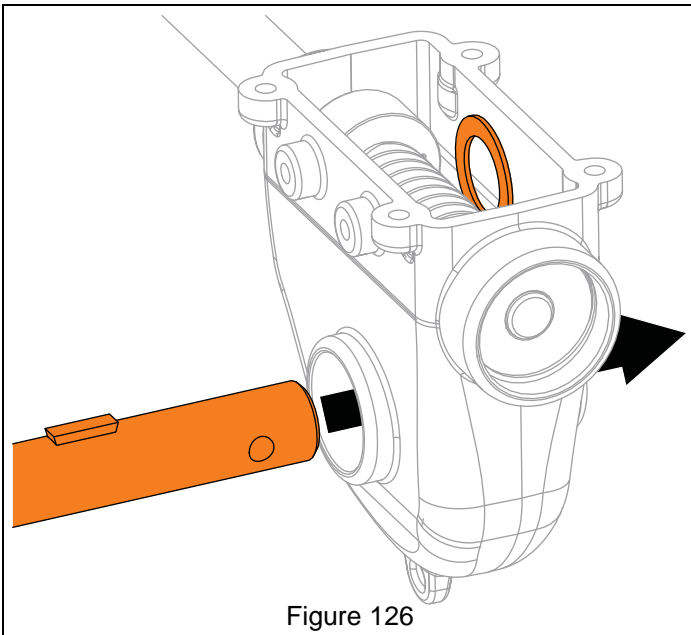


Figure 126

See Figure 127.

13. Reinstall one flat steel washer and bushing onto right auger shaft end.

IMPORTANT: Stepped-down side of bushing **MUST** be positioned toward gearcase.

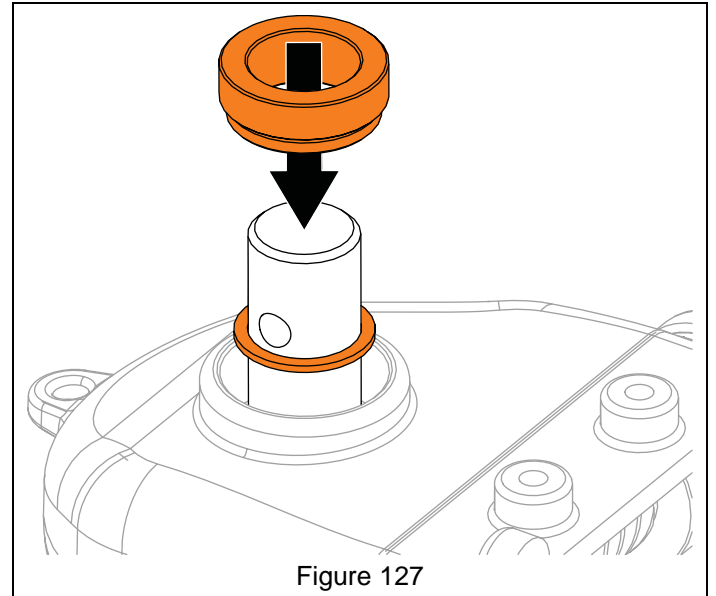


Figure 127

14. With a driver, such as a 1 1/4" deep-well socket, drive bushing into gearcase until groove is just beyond interior gearcase wall. See Figure 128.

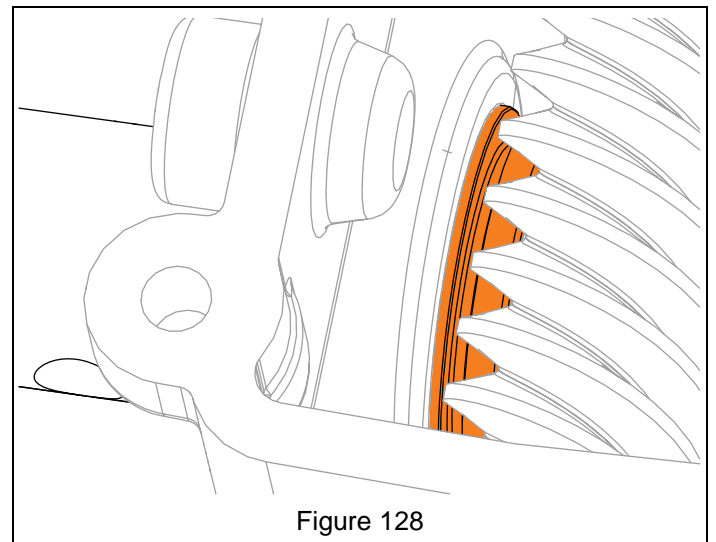


Figure 128

See Figure 129.

15. Wrap seal protector around each auger shaft end so they cover the shear bolt holes.

NOTICE: Unprotected seals can be damaged when installed over rough edges in shaft, such as holes.

16. Install gearcase seals over seal protectors and press into gearcase until each seal is flush with gearcase exterior.
17. Remove seal protectors.

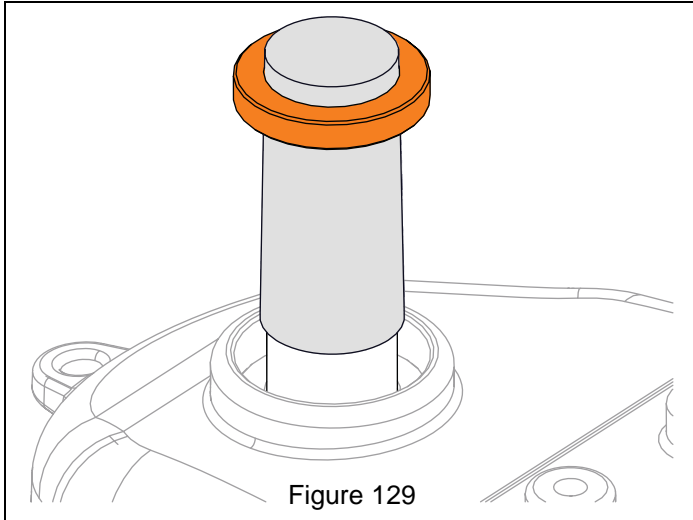


Figure 129

18. Turn auger shaft by hand to make sure shaft rotates easily.
19. Reinstall bushing retainer into flange bushing groove. See Figure 130.

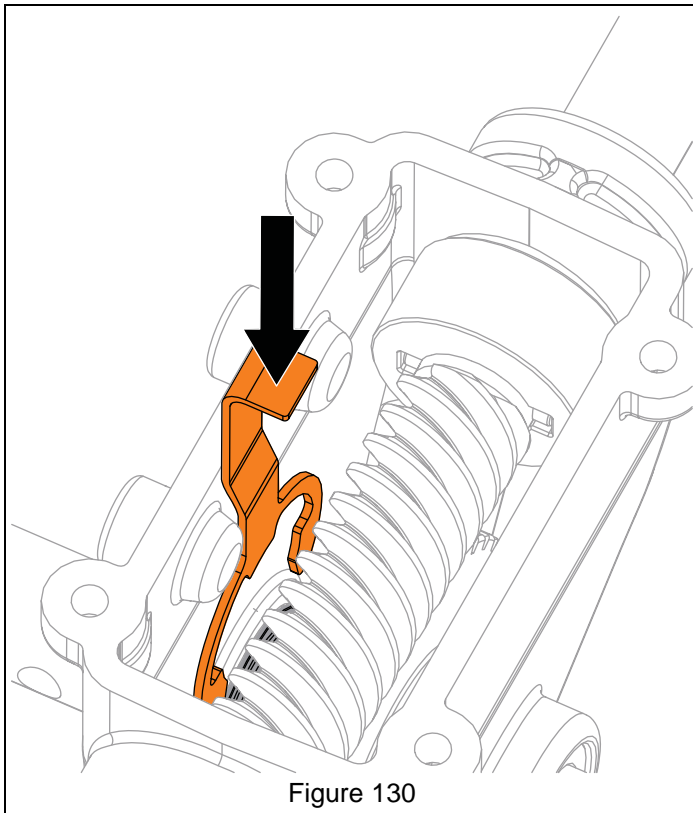


Figure 130

See Figure 131.

20. Reinstall gearcase gasket.
21. Secure cover to gearcase with four external tooth locking washer bolts.

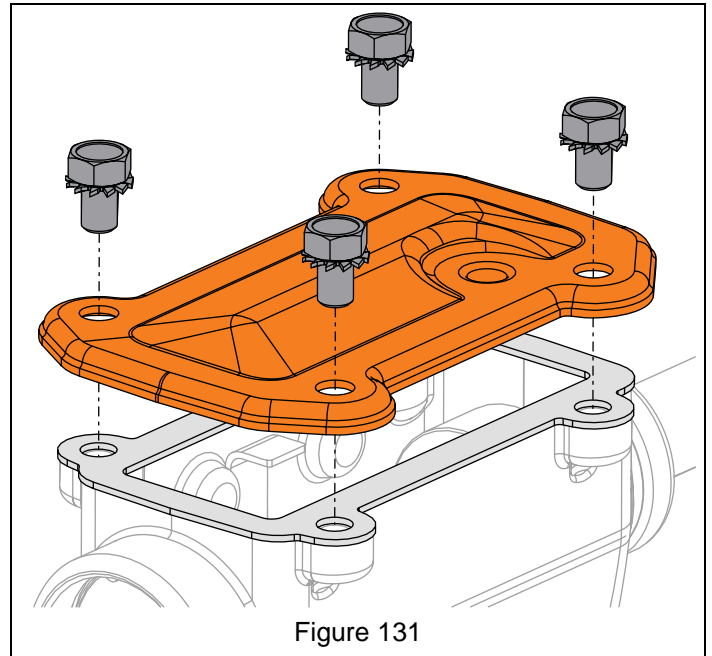


Figure 131

See Figure 132.

22. Press a new front cover into gearcase.
23. Add gearcase oil. Oil level MUST be 6.1 – 6.7 cm (2.4 – 2.6") from the flat surface of the gearcase cover.

IMPORTANT: Ariens recommends using only Ariens L3 synthetic severe duty gear lube. Using other lubricants will not automatically void unit warranty, but the warranty will not cover damage caused by using unauthorized lubricants. Refer to the Operator's Manual for your unit for the service part numbers.

24. Reinstall seal washer (rubber side down) and oil fill plug. Torque to 9 N•m (80 lb-in). DO NOT over-torque.

TRACK DRIVE WHEEL REPLACEMENT

Model 921326

Remove Track Drive Wheel

IMPORTANT: Save all hardware for reinstallation.



WARNING: AVOID INJURY. Before placing unit in service position, drain fuel from tank and fuel system. See *Draining Fuel System* on page 7. Make sure unit is secure and will not tip.

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Place unit in service position. See *Service Position* on page 7.
4. Remove flange nuts from eye bolts around rear track axle to release track tension. See Figure 133.

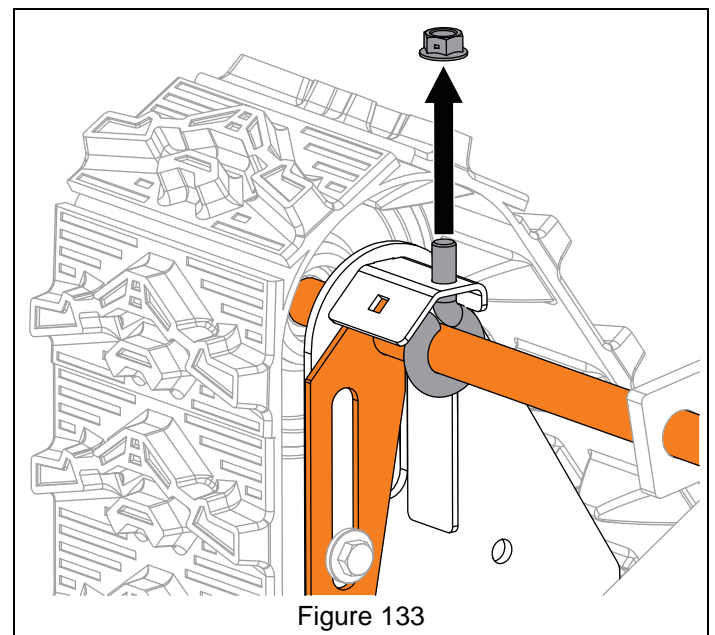


Figure 133

See Figure 134.

5. Remove snap clip retaining track drive wheel to drive axle and remove drive wheel.

IMPORTANT: Be aware of key on axle ends. If key is removed, reinstall key.

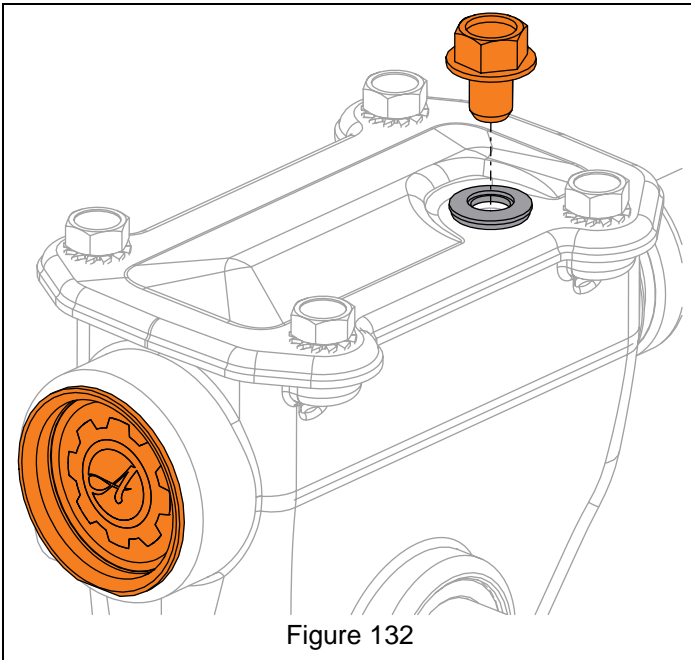


Figure 132

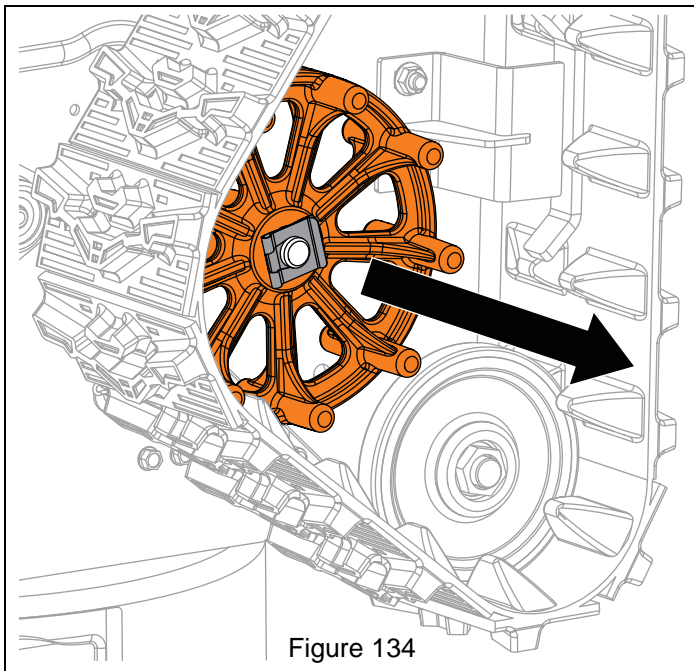


Figure 134

TRACK REPLACEMENT

Model 921326

Remove Track

IMPORTANT: Save all hardware for reinstallation.



WARNING: AVOID INJURY. Before placing unit in service position, drain fuel from tank and fuel system. See *Draining Fuel System* on page 7. Make sure unit is secure and will not tip.

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Place unit in service position. See *Service Position* on page 7.
4. Remove track drive wheel. See *Remove Track Drive Wheel* on page 53.
5. Remove track from carriage assembly. See Figure 136.

Install Track Drive Wheel

1. Install track drive wheel onto axle.
 2. Align drive wheel with track center and secure with snap ring.
- See Figure 135.
3. With assistance from an adult helper, pull rear track axle up so eye bolts insert through tension brackets. Secure with center locking flange nuts.

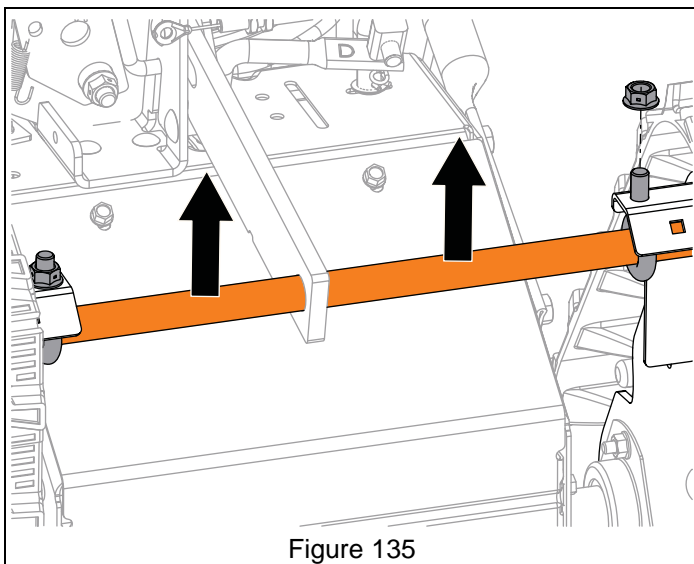


Figure 135

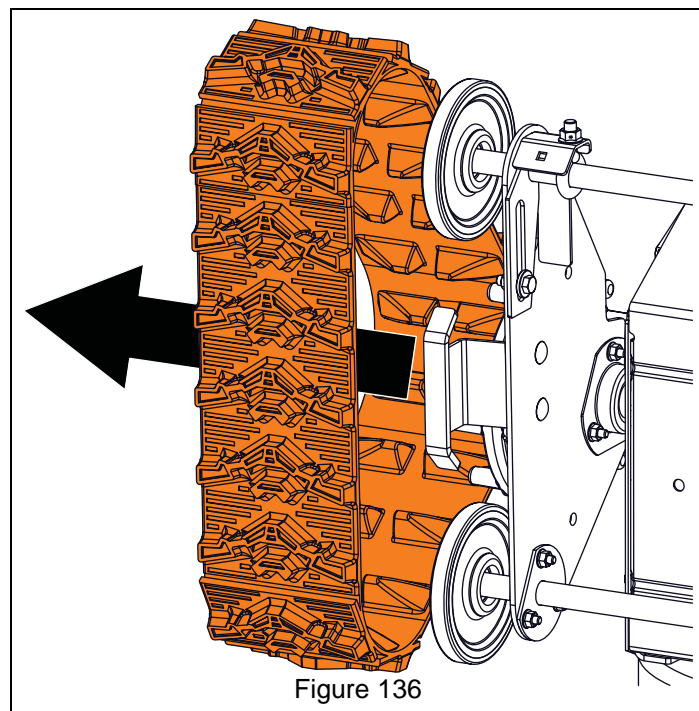


Figure 136

4. Return unit to operating position.
5. Reconnect spark plug wire and fill fuel tank.
6. Adjust track tension. Refer to Operator's Manual for adjustment procedure.

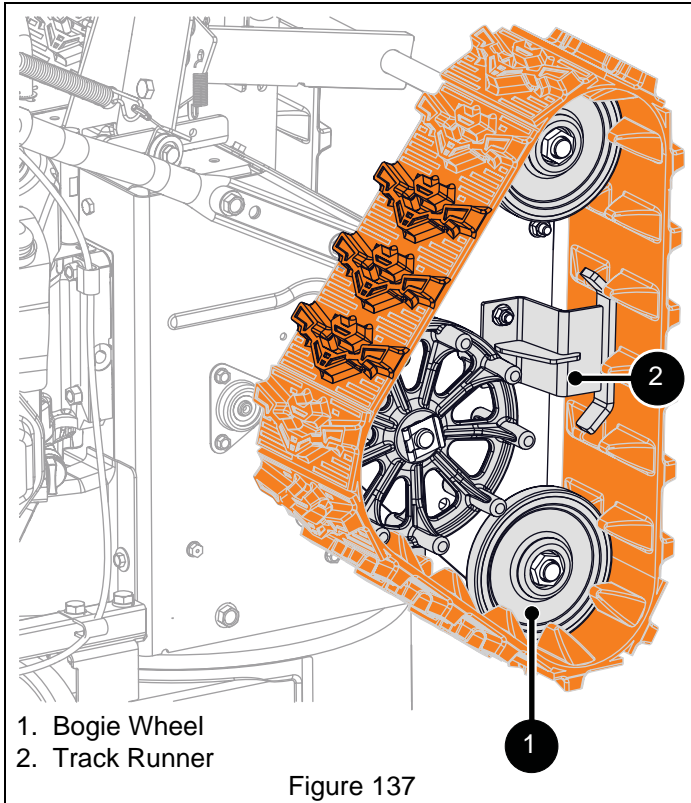
IMPORTANT: Check all adjustments after first use.

Install Track

See Figure 137.

IMPORTANT: Tracks are directional and MUST be installed with treads in the orientation shown in Figure 137.

1. Install track onto carriage assembly so bogie wheels and track runner are seated in track center.
2. Reinstall track drive wheel. See *Install Track Drive Wheel* on page 54.



3. Return unit to operating position.
4. Reconnect spark plug wire and fill fuel tank.
5. Adjust track tension. Refer to Operator's Manual for adjustment procedure.

IMPORTANT: Check all adjustments after first use.

BOGIE WHEEL REPLACEMENT

Model 921326

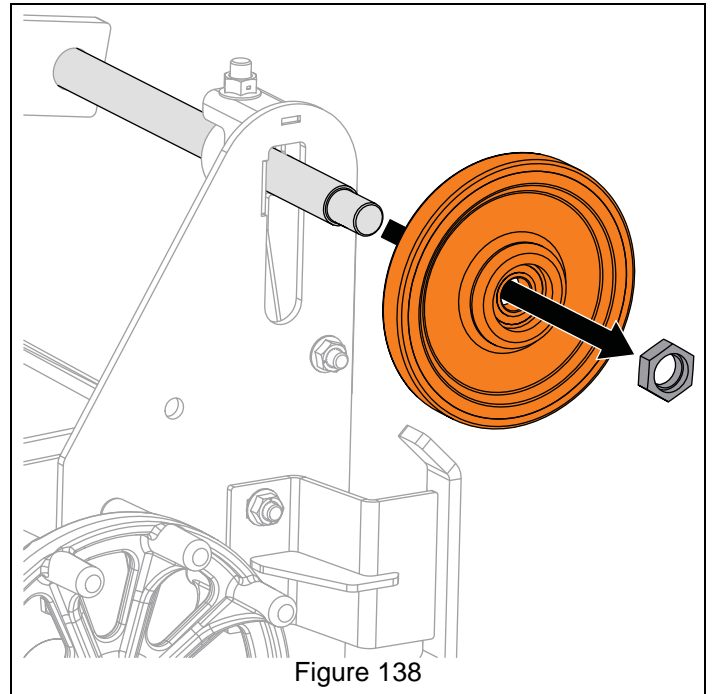
Remove Bogie Wheel

IMPORTANT: Save all hardware for reinstallation.



WARNING: AVOID INJURY. Before placing unit in service position, drain fuel from tank and fuel system. See *Draining Fuel System* on page 7. Make sure unit is secure and will not tip.

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Place unit in service position. See *Service Position* on page 7.
4. Remove track. See *Remove Track* on page 54.
5. Remove hex nut securing bogie wheel to track axle and remove bogie wheel. See Figure 138.



Install Bogie Wheel

1. Install bogie wheel onto track axle and secure with hex nut, but DO NOT overtighten.

IMPORTANT: Bogie wheel should spin freely.

2. Reinstall track. See *Install Track* on page 55.
3. Return unit to operating position.
4. Adjust track tension. Refer to Operator's Manual for adjustment procedure.
5. Reconnect spark plug wire.

IMPORTANT: Check all adjustments after first use.

TRACK BEARING REPLACEMENT

Model 921326

Remove Bearing From Left Side of Unit

IMPORTANT: Save all hardware for reinstallation.



WARNING: AVOID INJURY. Before placing unit in service position, drain fuel from tank and fuel system. See *Draining Fuel System* on page 7. Make sure unit is secure and will not tip.

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
 2. Disconnect spark plug wire from engine.
 3. Place unit in service position. See *Service Position* on page 7.
 4. Remove tracks. See *Remove Track* on page 54.
 5. Remove bottom cover. See *Bottom Cover Removal* on page 12.
- See Figure 139.
6. Remove E-ring from axle end.
 7. Hold differential gear in place and remove long axle from differential.

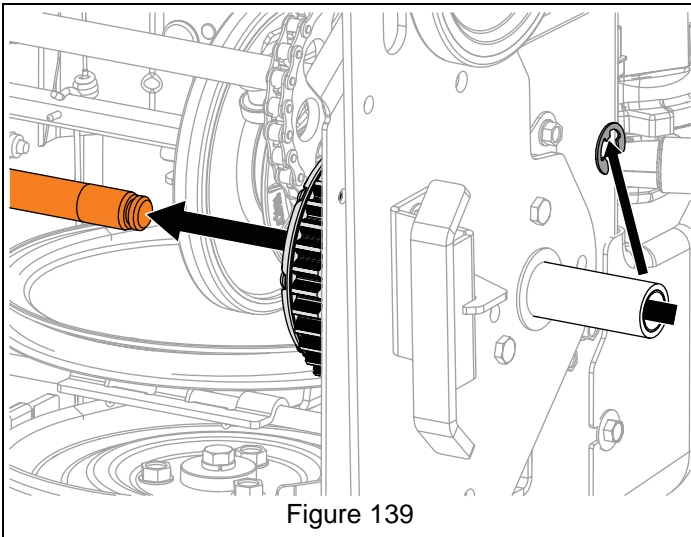


Figure 139

See Figure 140.

8. Remove axle.

IMPORTANT: Be aware of flat steel washer on axle.

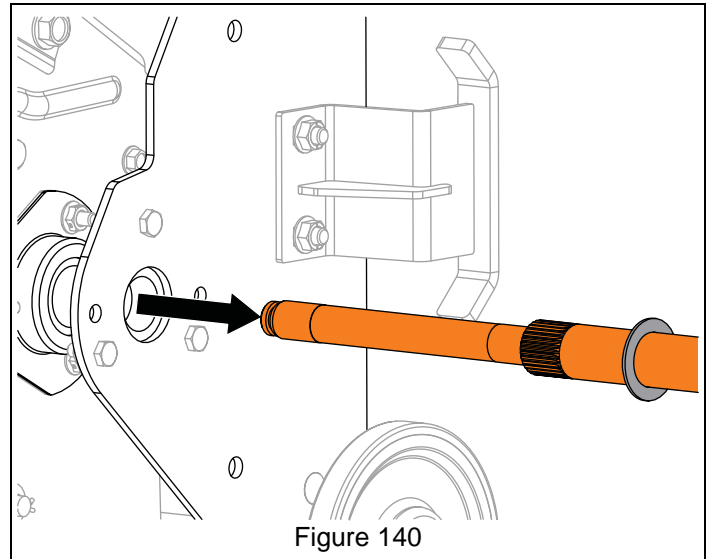


Figure 140

9. Loosen, but DO NOT remove hardware securing mount plates to carriage side plates. See Figure 141.

IMPORTANT: Loosen mount plates on both sides of unit.

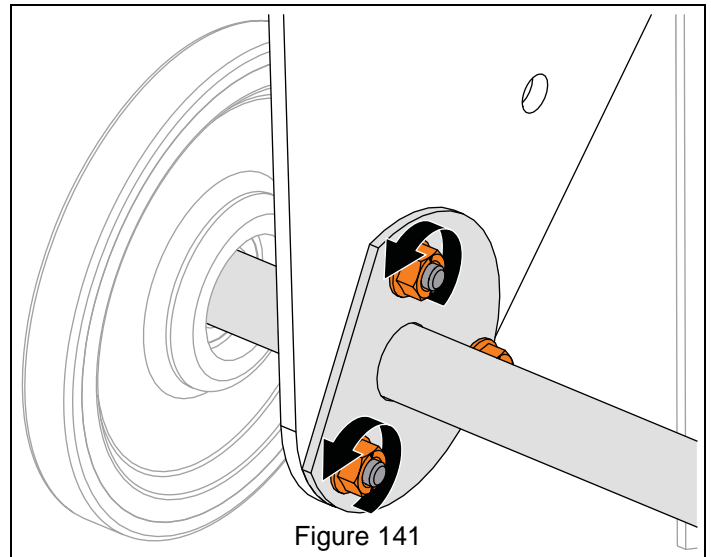


Figure 141

10. Remove sleeve bushing seated between bearing flanges on side plate and frame. See Figure 142.

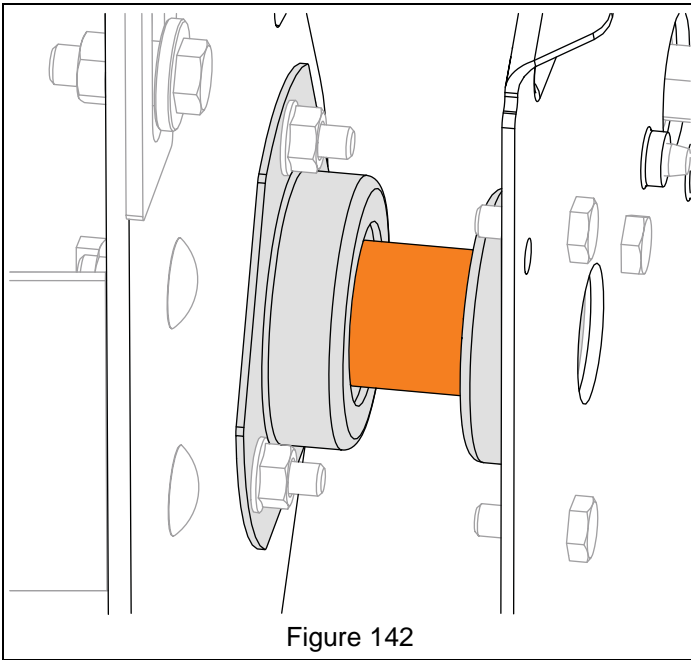


Figure 142

11. Remove hardware retaining bearing flange(s) and remove flange(s).

IMPORTANT: Bearing plate is not a wear item and does not need replacement unless damaged.

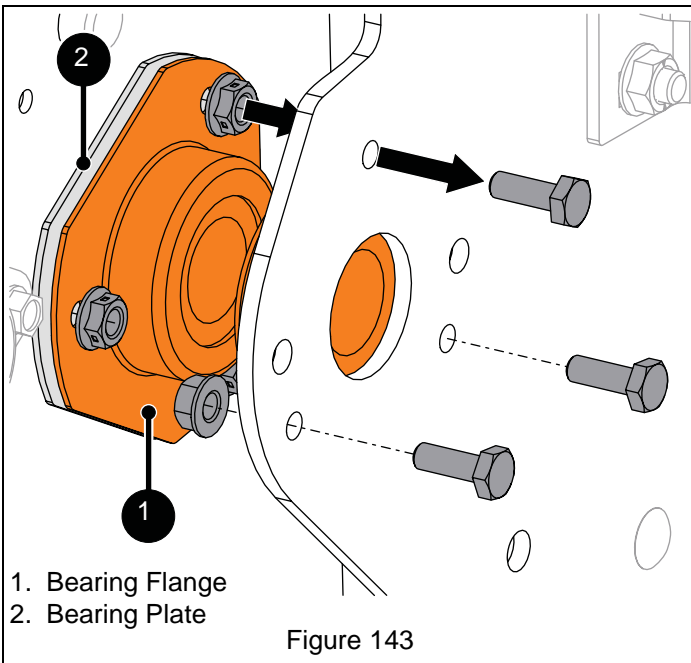


Figure 143

Install Bearing to Left Side of Unit

IMPORTANT: Bearing plates are ONLY installed with flange bearings on frame. Bearing plates are NOT installed with flange bearings on side plates.

1. Install flange bearing and secure with three hex bolts and three locking nuts. Tighten hardware.
2. Reinstall sleeve bushing between flange bearings on side plate and frame.

3. Reinstall stepped-down end of long axle through side plate, frame and into differential gear. See Figure 144.

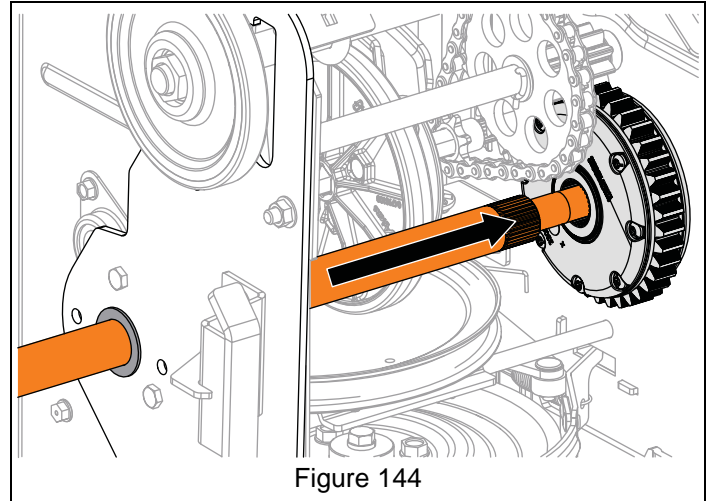


Figure 144

4. Reinstall E-ring onto axle end. See Figure 145.

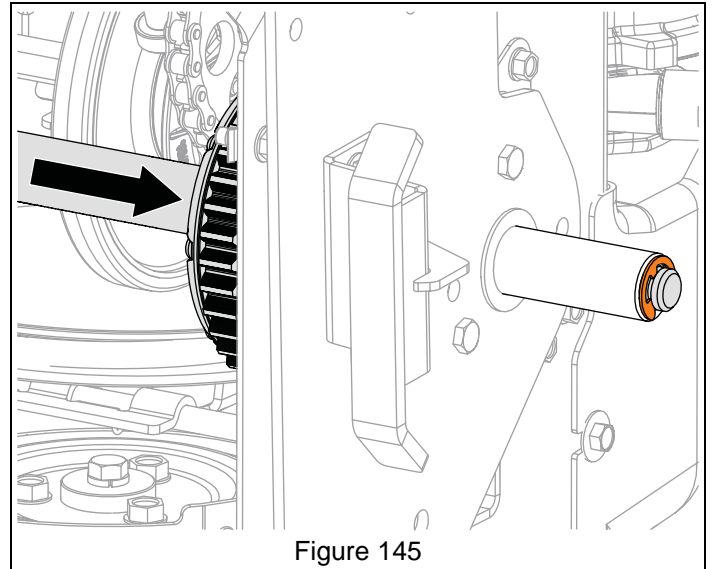


Figure 145

5. Tighten six locking nuts securing mount plates to track carriage.
6. Reinstall bottom cover and secure with six hex bolts.
7. Reinstall track drive wheels. See *Install Track Drive Wheel* on page 54.
8. Reinstall tracks. See *Install Track* on page 55.
9. Return unit to operating position.
10. Reconnect spark plug wire and fill fuel tank.
11. Adjust track tension. Refer to Operator's Manual for adjustment procedure.

IMPORTANT: Check adjustments after first use.

Remove Bearing From Right Side of Unit

IMPORTANT: Save all hardware for reinstallation.



WARNING: AVOID INJURY. Before placing unit in service position, drain fuel from tank and fuel system. See *Draining Fuel System* on page 7. Make sure unit is secure and will not tip.

1. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
2. Disconnect spark plug wire from engine.
3. Place unit in service position. See *Service Position* on page 7.
4. Remove tracks. See *Remove Track* on page 54.
5. Remove bottom cover. See *Bottom Cover Removal* on page 12.
6. Remove E-ring from axle end and remove axle from differential, but DO NOT completely remove axle from unit. See Figure 139.

See Figure 146.

IMPORTANT: Two flat steel washers will fall when short axle is removed from differential gear.

7. Hold differential gear in place and remove short axle.
8. Remove differential gear.

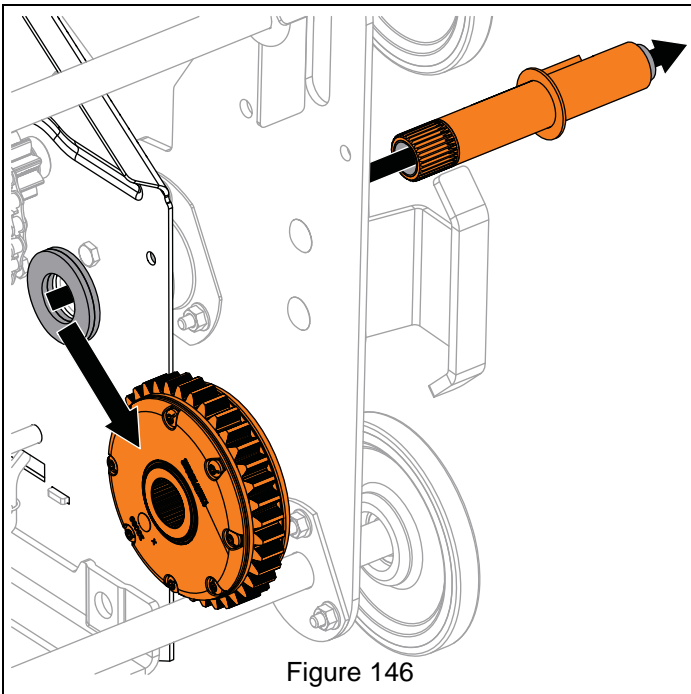


Figure 146

IMPORTANT: Make sure sleeve bushings remain in short axle ends.

See Figure 147.

9. Loosen, but DO NOT remove hardware securing mount plates to carriage side plates.

IMPORTANT: Loosen mount plates on both sides of unit.

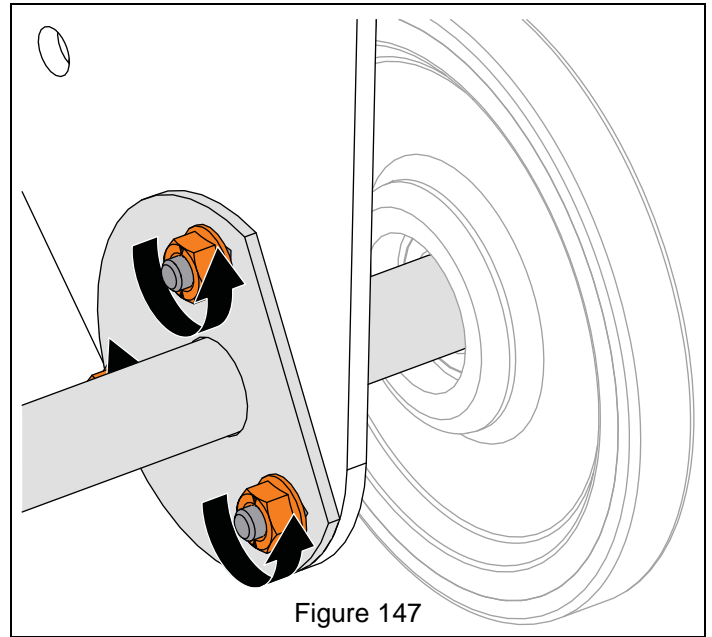


Figure 147

10. Remove sleeve bushing seated between flange bearings on side plate and frame. See Figure 148.

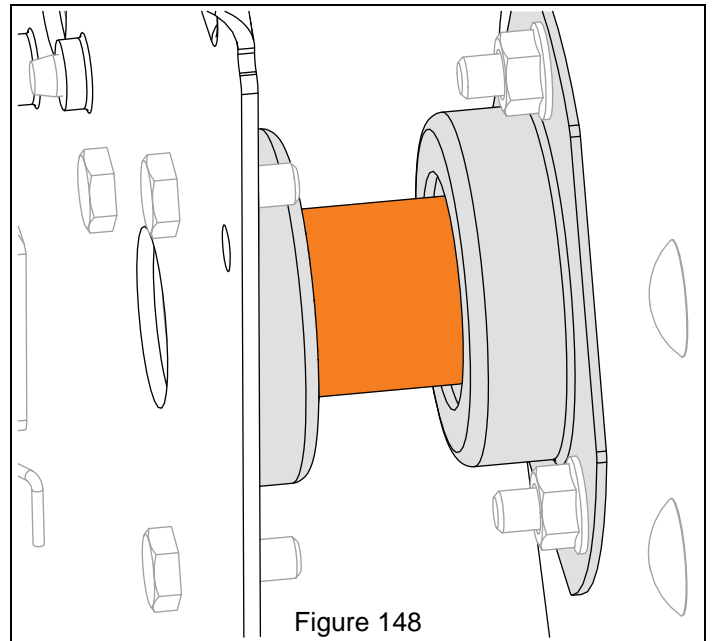
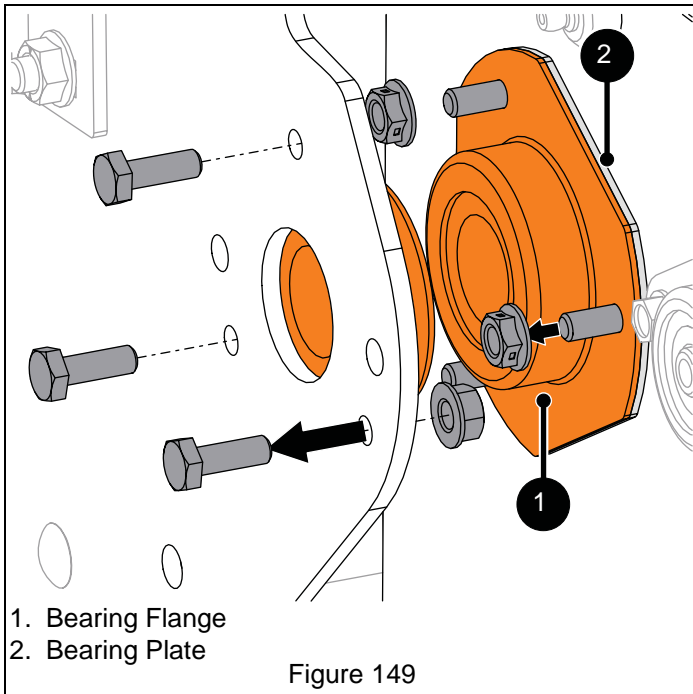


Figure 148

See Figure 149.

11. Remove hardware retaining bearing flange(s) and remove bearing(s).

IMPORTANT: Bearing plate is not a wear item and does not need replacement unless damaged.



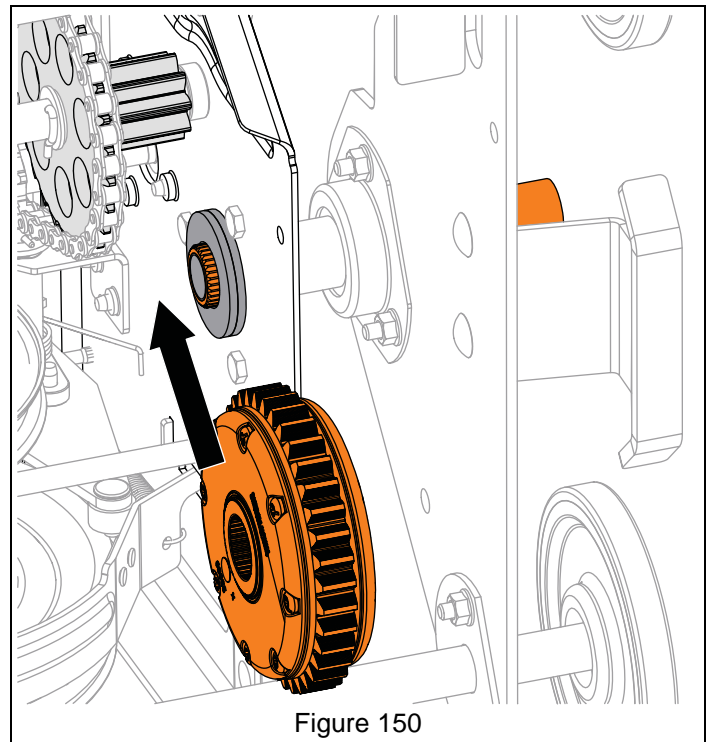
Install Bearing to Right Side of Unit

IMPORTANT: Bearing plates are ONLY installed with bearing flanges on frame. Bearing plates are NOT installed with bearings on side plates.

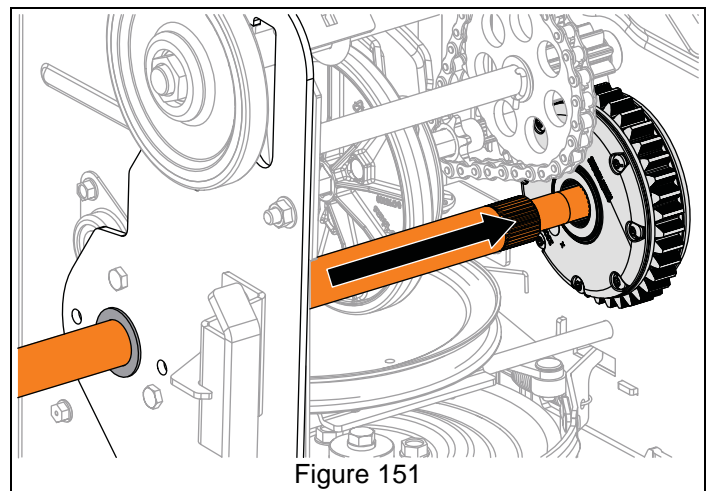
1. Install flange bearings and secure with three hex bolts and three locking nuts. Tighten hardware.
2. Reinstall sleeve bushing between flange bearings on side plate and frame.

See Figure 150.

3. Reinstall short axle until a small portion of axle is through frame.
4. Reinstall two flat steel washers onto short axle.
5. Align differential gear with pinion gear and short axle and reinstall axle into differential.



6. Reinstall long axle into differential gear. See Figure 151.



7. Reinstall E-ring onto axle end.
8. Tighten six locking nuts securing mount plates to track carriage.
9. Reinstall bottom cover and secure with six hex bolts. Tighten hardware.
10. Reinstall track drive wheels. See *Install Track Drive Wheel* on page 54.
11. Reinstall tracks. See *Install Track* on page 55.
12. Return unit to operating position.
13. Reconnect spark plug wire and fill fuel tank.
14. Adjust track tension. Refer to Operator's Manual for adjustment procedure.

IMPORTANT: Check all adjustments after first use.

EFI REPLACEMENT COMPONENTS

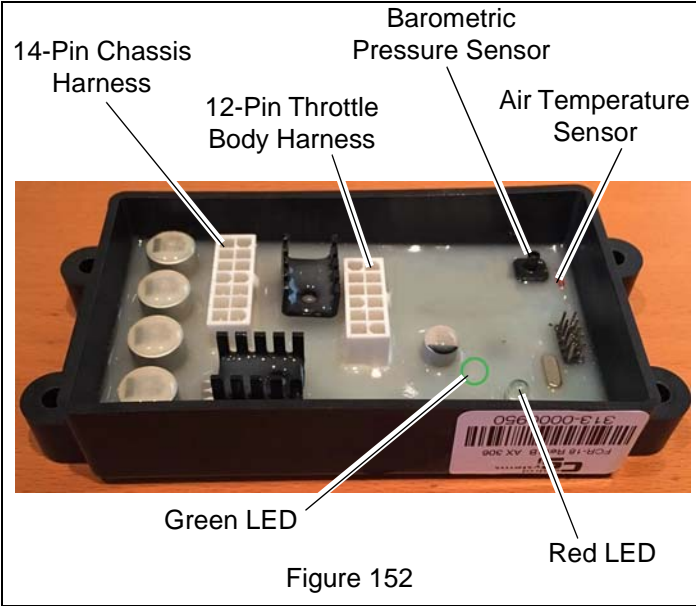
See Figure 152.

Model 921049

Ariens recommends using only genuine Ariens replacement parts on this unit. Using unauthorized parts may adversely affect the performance, durability or safety of this unit and may void the warranty. Click the **Parts Diagrams by Parts Radar** link at www.ariens.com for replacement part numbers of the items listed below:

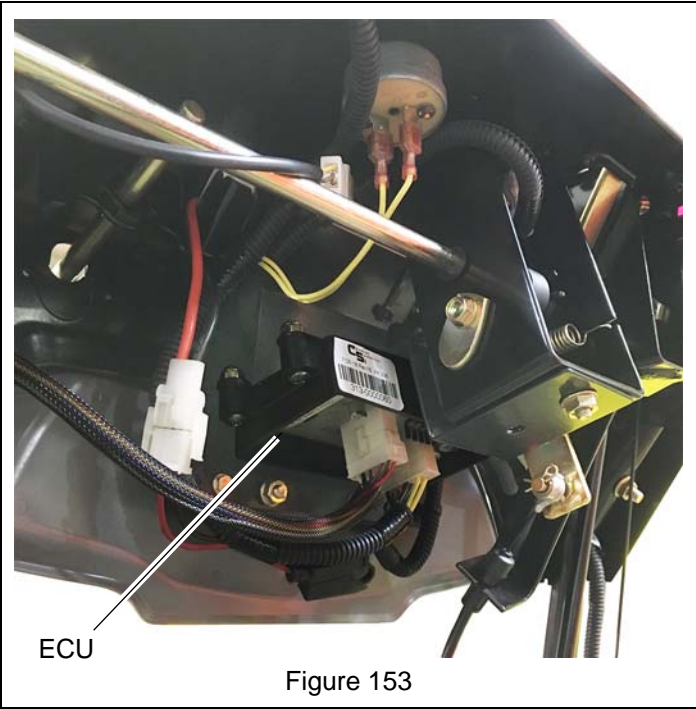
- ECU
 - Barometric Pressure Sensor
 - Air Temperature Sensor
- Throttle Body Assembly
 - Throttle Plate Servo Motor
 - Fuel Injector
 - Fuel Pressure Sensor
 - Engine Temperature Sensor
- Battery
- Fuel Pump
- Inline Fuel Filter

IMPORTANT: Replacement part sub components are not available as individual parts.



EFI TROUBLE CODE IDENTIFICATION

Trouble Code	Problem	Correction
16	Low Battery Voltage	Check charging system and battery.
21	Barometer Pressure Sensor Failure	Replace ECU.
22	Engine Temperature Sensor Failure	Check engine temperature sensor and wiring.
27	Low Fuel Pressure	Check fuel level.
28	High Battery Voltage	Check charging systems.
Green LED is Constant (not blinking)	Low Battery Voltage or Faulty ECU	Check battery voltage. If voltage is 7.2 – 8.4 volts DC, replace ECU. If battery measures lower than 7.2 volts DC, charge battery.
LEDs are dim.	Low Battery Voltage	Check battery voltage and charging system. Battery should measure 7.2 – 8.4 volts DC.
No LEDs Illuminated	No Battery Voltage	Check battery voltage and charging system. Battery should measure 7.2 – 8.4 volts DC.



CHECKING TROUBLE CODES

The blinking red LED light on the ECU displays trouble codes. Its sequence indicates a particular system malfunction by blinking as many times as the first digit of a trouble code, pausing, and then blinking as many times as the second digit of a trouble code.

For example, the red LED will indicate low fuel pressure (27) by blinking twice, pausing, and blinking seven more times.

IMPORTANT: Be aware that more than one trouble code may be present.

A blinking green LED indicates the ECU processor is operating correctly, even if a sub-component of the ECU (e.g.: barometric pressure sensor) has failed. A constant illuminated green (not blinking) LED indicates the ECU may be experiencing a low battery voltage condition or need replacement. See *EFI Trouble Code Identification* on page 60.

Visually inspect the red LED to verify trouble codes.

To read trouble codes more easily, place a mirror under the ECU to view LED reflection.

IMPORTANT: If no trouble code is present, but engine is not operating normally, See *Diagnostics for Non-Trouble Codes* on page 64.



Figure 154

TROUBLE CODE DIAGNOSTICS

NOTICE: Before performing diagnostic tasks, be aware of the screw on the bottom of the throttle body that adjusts the servo offset. The servo offset calibrates the throttle body at the factory using a flow bench and should NEVER be touched. If it is tampered with, the engine will run poorly and void the warranty. See Figure 155.



Figure 155

Code 16: Low Battery Voltage

1. Charge the battery. Refer to Operator's Manual.
2. Start the engine. Refer to Operator's Manual.
3. Check charging system at the battery.
 - a. With a multi-meter set to volts DC, back probe the battery terminals. At full throttle (3600 RPM), the reading should be 7.5 – 8.4 volts DC.

If voltage measures less than 7.5 volts, check charging system at the engine. Advance to step 5.

IMPORTANT: If the engine is cold, it is normal for the engine speed to be 100 – 200 RPM higher until operating temperature is reached.

4. Stop the engine. Refer to Operator's Manual.
 - b. Check the battery. With the engine off, the battery voltage should be 7.2 – 8.4 volts DC. See Figure 156.

If voltage measures less than 7.2 volts after charging, replace battery.



Figure 156

5. Back probe the engine stator output connector. See Figure 157.

- a. Start the engine. Refer to Operator's Manual.
- b. At full throttle (3600 RPM), the stator output MUST be 11.5 – 14 volts AC.

If AC voltage measure less than 11.5 volts, remove flywheel and replace stator.

If stator output is within range and battery is not charging, check ECU wiring for damage. Replace ECU if necessary.

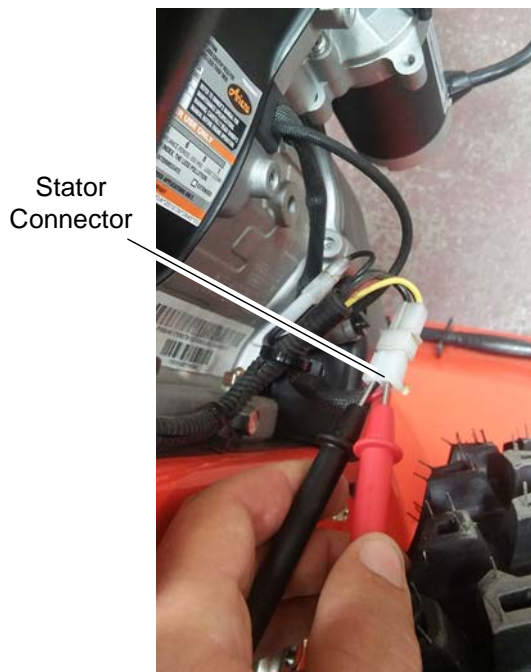


Figure 157

Code 21: Barometer Sensor

See Figure 152.

This trouble code indicates the barometric pressure sensor has failed. When the barometric sensor fails, the engine will not adjust to altitude changes, but will continue to operate at a default altitude of 800 feet above sea level.

Engine may continue to operate with a failed barometric pressure sensor, but may not operate at optimal performance. If barometric pressure sensor fails, replace ECU.

Code 22: Engine Temperature Sensor

See Figure 152.

If the sensor is damaged or has failed, the engine may not run smoothly because the ECU cannot adjust for engine temperature changes.

The temperature sensor and engine components can be visually inspected for engine temperature issues:

1. Check engine cooling fan and engine cooling fins for debris or damage.
2. Check the temperature sensor wiring from the throttle body to the mounting boss on the side of the cylinder. Make sure connection is secure. See Figure 158.



Figure 158

3. Check wiring and connection from the throttle body to the ECU for damage.

If no damage is visible, replace throttle body assembly.

Code 27: Low Fuel Pressure

Low fuel pressure is usually a result of an empty fuel tank, but could also be from a clogged fuel filter or faulty fuel pump.

Attempt engine start and check for trouble code re-occurrence after each of the following steps. Refer to Operator's Manual for engine starting instructions.

1. Check fuel level and fill fuel tank completely if not already full.
2. Check fuel lines to ensure there are no leaks or kinks.
3. Check inline fuel filter for debris and blockage. See Figure 159.



CAUTION: AVOID INJURY. Fuel lines are pressurized; wear safety glasses.

Inline Fuel Filter



Figure 159

4. Check fuel pump wiring to ensure it is connected correctly. See Figure 160.

Fuel Pump Wires



Figure 160

See Figure 161.

5. Remove the fuel pump wires, turn ignition key to the ON position and measure the fuel pump voltage. Voltage output should measure 7.2 – 8.4 volts DC.

IMPORTANT: Fuel pump voltage **MUST** be measured within 30 seconds of the ignition switch being turned to the ON position.

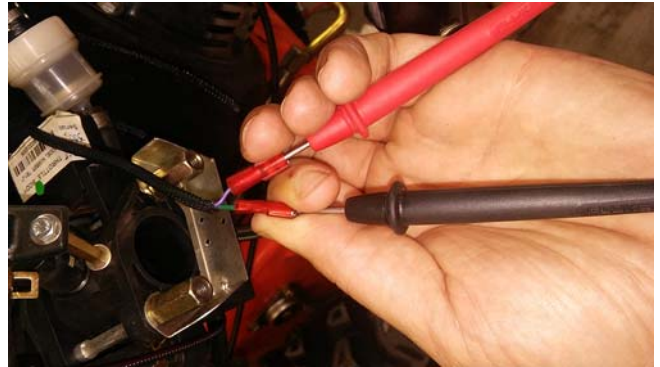


Figure 161

If voltage measures less than 7.2 volts, check the battery voltage by probing the green wire on the ECU 12-pin connector. See Figure 162.

- If low voltage or no voltage is present, replace the ECU.
- If voltage is present, inspect the green wire between the 12-pin connector and throttle body for a pinched or broken wire. If the wire has no damage, replace the throttle body assembly.
- If voltage measures 7.2 – 8.4 volts, turn ignition key to OFF position, reconnect fuel pump wires and turn key back to ON position. Fuel pump should make a “humming” noise.

If fuel pump is silent, the pump may have failed. Check fuel pump:

1. Drain fuel from fuel system and tank. See *Draining Fuel System* on page 7.
2. Remove pump from tank.
3. Reconnect pump wires.
4. Turn the ignition key to the ON position and listen for a “humming” noise.

If fuel pump is silent, replace fuel pump.

If voltage is within range and fuel pump is operating normally, the fuel pressure sensor is defective. Replace the throttle body assembly. See Figure 167.

Connector Pin Designations

12-Pin Throttle Body Harness

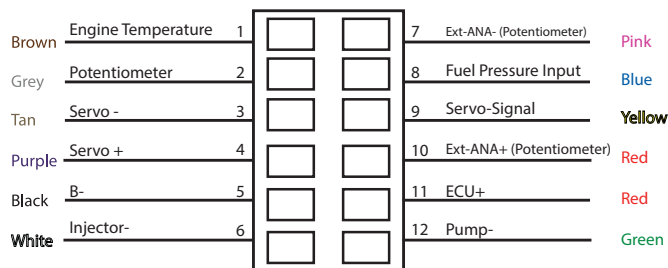


Figure 162

Code 28: High Battery Voltage

This trouble code will activate if ECU detects a higher voltage from the stator.

1. Start the engine. Refer to Operator's Manual.
2. Set a multi-meter to volts AC and probe the red and black stator connector wire. The output should be 11.5 – 14 volts AC at full throttle (3600 RPM).

If stator output measures over 14 volts, replace stator. If output is within range, advance to step 3. See Figure 157.

IMPORTANT: If the engine is cold, it is normal for the engine speed to be 100 – 200 RPM higher until operating temperature is reached.

3. Set a multi-meter to volts DC and probe the battery connector at the battery terminals. With the engine running at full throttle (3600 RPM), the output should be 7.2 – 8.4 volts DC.

If DC output is higher than 8.4 volts, replace ECU. See Figure 156.

If DC output is within range and red trouble code persists, replace ECU.

DIAGNOSTICS FOR NON-TROUBLE CODES

Engine Starts and Loses Power

If the engine starts and loses power immediately, this is usually an indication that the ECU does not detect an RPM signal. The RPM signal is generated by the stator, which also powers the hand warmers, headlight and charges the ECU battery.

A common cause for RPM signal failure may be a ground short in the AC output wire coming from the stator to the ECU. Another possible cause may be a defect in the engine-charging system.

Engine No-Start Condition

If the engine does not start, check for system power.

1. Check spark plug.
 - a. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
 - b. Disconnect the spark plug cap and remove debris from the spark plug area.
 - c. Remove spark plug.
 - d. Inspect the spark plug. Spark plug gap MUST be 0.7 – 0.8 mm (0.027 – 0.030"). Replace if the electrodes are worn or if the insulator is cracked or chipped.
 - e. Position spark plug against engine block and pull recoil starter handle to check for spark. If no spark is present, replace spark plug.
 - f. Reinstall spark plug and finger tighten. Turn an additional 1/4 turn after spark plug is seated.
 - g. Reinstall spark plug cap and make sure it is correctly positioned onto the spark plug.
2. Check the battery. Battery should have 7.2 – 8.4 volts DC, depending on when the battery was most recently charged. Extremely low voltage could cause a no-start condition without triggering a trouble code. If battery has low voltage, connect battery charger to battery. Also check the inline fuse on the battery cable.

If battery measures below specification after charging, replace battery.

3. Check the ECU status. With battery voltage between 7.2 – 8.4 volts DC, check if the green ECU status light is blinking at a consistent rate.

IMPORTANT: If battery measures below 7.0 volts, ECU LEDs may appear dim or will not illuminate red or green LEDs. If green LED is constant, (not-blinking) see *EFI Trouble Code Identification* on page 60.

4. Check fuel pump output.
 - a. Remove the heater box.
 - b. Check voltage at fuel pump. See *Code 27: Low Fuel Pressure* on page 63 for voltage readings.
 - c. Remove fuel hose from fuel pump outlet and attach a suitable length of fuel hose to the fuel pump outlet that can safely reach a clearly marked fuel container.

- d. With battery voltage between 7.2 – 8.4 volts DC, turn the key to the ON position for 10 seconds to pump fuel into the container. Fuel should measure approximately 160 mL (5 oz.).

If fuel amount measures less than 160 mL, remove the fuel pump and check the pre-filter for blockage. If filter is clean, replace fuel pump. See Figure 163.



Figure 163

- b. Set a multi-meter to volts DC and probe each terminal with the red probe and contact the black probe to engine block. With the ignition key in the ON position, each terminal should measure 7.2 – 8.4 volts DC. See Figure 165.

If voltage is within range and the fuel injector is not operating correctly with the key in the ON position, replace throttle body assembly.



Figure 165

IMPORTANT: If replacing fuel pump, wet the fuel system:

- a. Fill fuel tank full.
- b. Cycle ignition key to the ON position, then to the OFF position. Repeat.

IMPORTANT: Cycling the ignition key multiple times may inject excessive amounts of fuel into the throttle body and “flood” the engine. A flooded engine may require more starting attempts than normal.

5. Remove connector to the injector.

- a. Move gray slide upward until it stops. Gently compress gray slide and remove connector. See Figure 164.



Figure 164

- c. If no voltage is present at the injector, check voltage at both the red and white wires on the 12-pin ECU connector. See Figure 166.



Figure 166

If no voltage is present at the ECU, replace ECU. If voltage is present at the ECU, check wires for kinks or damage. If damage is present repair wires if possible, or replace throttle body. See Figure 167.



Figure 167

Surging Run Condition

If the AC output wire from the engine charging system is damaged, it may cause an intermittent short. This will result in erratic running such as the engine over revving or “popping” through the exhaust.

1. Check the engine wiring and wiring under the handlebar to verify that it is not damaged.

Engine Speed Does Not Change

If engine speed does not change when using the potentiometer (throttle control), check the following:

1. Set a multi-meter to ohms and measure the potentiometer resistance. See Figures 168 and Figure 169.
 - a. Unplug the 14-pin connector from the ECU.
 - b. Position the red probe on the terminal of the red wire at the potentiometer (Pin 5 in Figure 168) and the black probe on the terminal of the green / white wire.

The potentiometer output should measure 0 – 5000 ohms. If ohm reading measures close to 0 at full throttle and close to 5000 at low-idle, potentiometer is operating normally. If ohm reading stays constant at either position, replace potentiometer.

14-Pin Connector Pin Designations

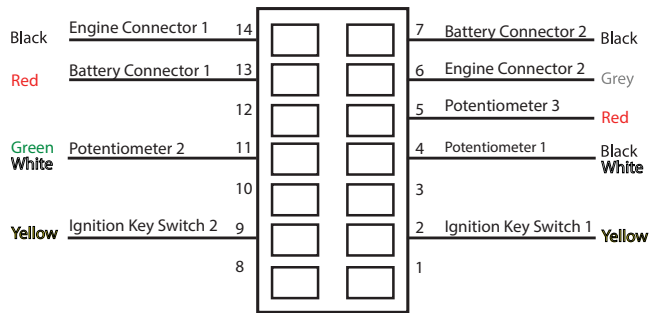


Figure 168

2. With a multi-meter, measure the volts DC of the red wire.
 - a. With engine off, reconnect the 14-pin connector to the ECU.
 - b. Position the red probe on the terminal of the red wire at the potentiometer (Pin 5 in Figure 168). Also see Figure 169.
 - c. Position the black probe on the engine block.
 - d. Turn ignition key to ON position.
 - e. Turn the potentiometer from low-idle to full throttle. Voltage to the red wire should measure 4.90 – 5.0 volts DC at both low-idle and full throttle positions.
- If voltage measures less than 4.90, replace ECU.

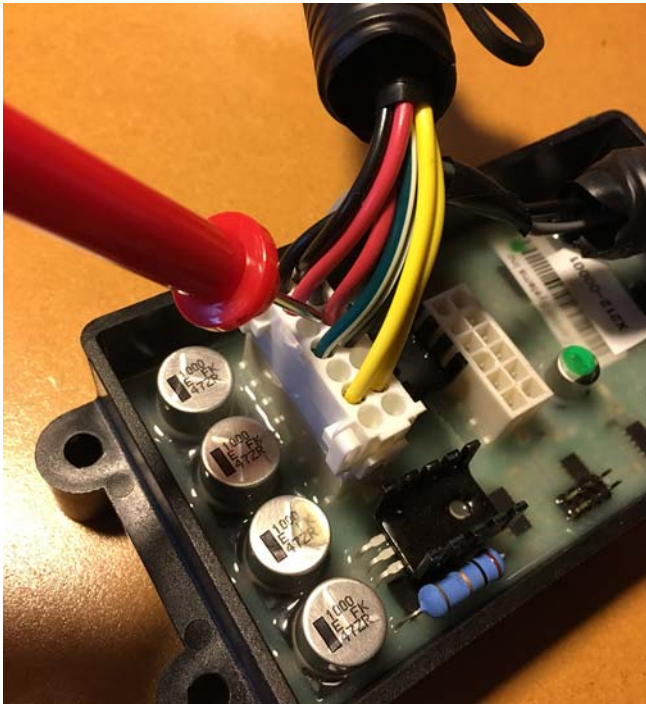


Figure 169

3. With a multi-meter, measure the volts DC of the green / white wire. See Figure 170.
 - a. With engine off, position the red probe on the terminal of the green / white wire.
 - b. Position the black probe on the engine block.
 - c. Turn ignition key to ON position.
 - d. Turn the potentiometer from low-idle to full throttle.
- Voltage to the green / white wire should measure close to 0.01 volts DC at low-idle and close to 5.0 volts at full throttle.
- If voltage does not vary between low-idle and full throttle, replace the ECU.

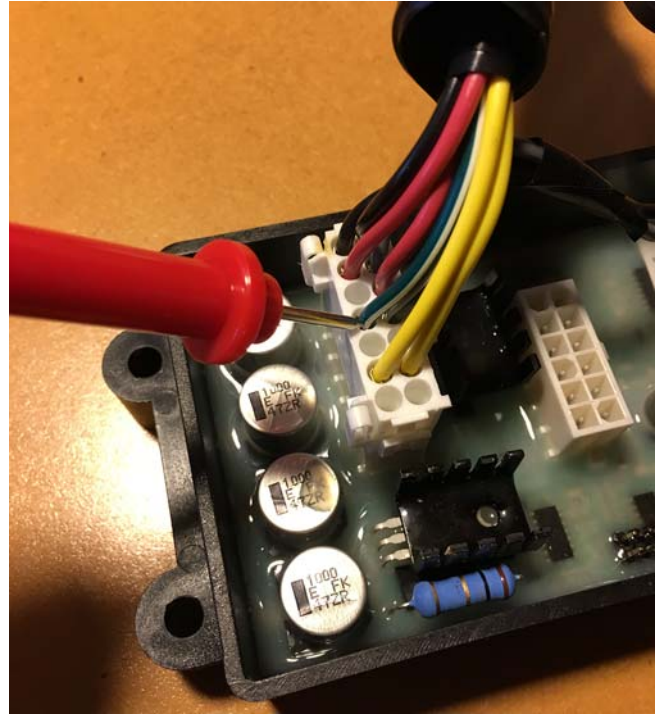


Figure 170

SERVICE RECORD

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