

2026

OPERATOR'S MANUAL



ZR/Riot/Norseman/M — 400

p/n: 653-00060

6/25

ORIGINAL INSTRUCTIONS

This vehicle can be hazardous to operate.

A snowmobile is a very high performance vehicle. Because it does accelerate rapidly and is capable of very high speeds, it should not be operated by a novice or an inexperienced operator. Never accelerate rapidly or drive at high speed beyond the limits of visibility or without being totally familiar with the terrain and what lies in front of you. Obey speed limits and never operate at speeds that do not allow adequate maneuvering and stopping distances. Read and study the entire Operator's Manual and Snowmobile Safety Handbook.

Failure to follow this warning could result in personal injury to yourself or others. For your safety, understand and follow all the warnings contained in this Operator's Manual and on the labels on this vehicle.

Keep this Operator's Manual with this vehicle at all times. If you lose your manual, contact your authorized dealer for a free replacement. The labels should be considered permanent parts of the vehicle. If a label comes off or becomes hard to read, contact your authorized dealer for a free replacement. Contact Arctic Cat Service Department, 601 Brooks Ave, Thief River Falls, MN 56701, for proper registration information.

FAILURE TO FOLLOW THE WARNINGS CONTAINED IN THIS MANUAL CAN RESULT IN SERIOUS INJURY OR DEATH.

The Operator's Manual, Snowmobile Safety Handbook, and Snowmobile Decals display important information:



The Safety Alert Symbol means **ATTENTION! BE ALERT! YOUR SAFETY IS INVOLVED.**



WARNING

WARNING identifies personal safety-related information. Follow the directive because it deals with the possibility of serious personal injury or even death.

CAUTION

CAUTION, without the safety alert symbol, identifies unsafe practices which may result in snowmobile-related damage. Follow the directive because it deals with the possibility of damaging part or parts of the snowmobile.

■ **NOTE:**

A **NOTE** identifies supplementary information worthy of particular attention.

Personal Injury

- To avoid injury to yourself and others, **NEVER** operate the snowmobile without first reading and understanding this manual and the Snowmobile Safety Handbook; then follow the instructions and heed the warnings given.
- **USE COMMON SENSE.**
- **DON'T DRINK and DRIVE.**
- **STAY IN CONTROL at ALL TIMES.**
- **TELL YOUR FRIENDS.** If you see a friend operating a snowmobile recklessly, at excessive speeds, while intoxicated, or in other unsafe ways, don't wait until it is too late to warn of the consequences of snowmobile misuse. Such conduct endangers everyone. **TAKE AN ACTIVE ROLE IN THE SAFETY OF YOURSELF AND OTHERS.**

California Proposition 65



WARNING

The Engine Exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

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Foreword

Congratulations! You have chosen a quality Arctic Cat Snowmobile designed and assembled to give dependable service. Be sure, as the owner/operator of an Arctic Cat Snowmobile, to become thoroughly familiar with its basic operation, maintenance, and off-season storage procedures. Read this manual and the accompanying Snowmobile Safety Handbook before operating the snowmobile to learn safe and proper use of your new Arctic Cat Snowmobile. Always operate the snowmobile within your level of skill and current terrain conditions.

This manual covers operator-related maintenance, operating instructions, and off-season storage instructions. If major repair or service is ever required, contact an authorized Arctic Cat Snowmobile dealer for professional service.

At the time of publication, all information and illustrations were technically correct. Some illustrations used in this manual are used for clarity purposes only and are not designed to depict actual conditions. Because Arctic Cat Inc. constantly refines and improves its products, no retroactive obligation is incurred.

This Operator's Manual should be considered a permanent part of the snowmobile and must remain with the snowmobile at the time of resale. If the snowmobile changes ownership more than once, contact Arctic Cat Inc., Service Department, 601 Brooks Ave, Thief River Falls, MN 56701, for proper registration information.

Every Arctic Cat Snowmobile meets or exceeds the standards of the Snowmobile Safety and Certification Committee and displays the SSCC decal. Arctic Cat Inc. endorses and encourages the safe use of all snowmobiles. Always wear a helmet and eye protection. Drive with caution, observe all state and local regulations, and respect the rights of others. International Snowmobile Manufacturers Association (ISMA) members like Arctic Cat do their part to improve trails, sponsor events, and generally support the sport of snowmobiling. As a member of the National Snowmobile Foundation, Arctic Cat Inc. promotes snowmobiling through education, charity, and research programs.

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Warning Labels & Information

This snowmobile comes with labels containing important safety information. Anyone who rides the snowmobile should read and understand this information before riding. The labels should be considered as permanent parts of the snowmobile. If a label comes off or becomes hard to read, contact your authorized dealer for a replacement.

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WARNING

SEVERE INJURY OR EVEN DEATH MAY RESULT IF ANY OF THE FOLLOWING ARE IGNORED.

THIS VEHICLE IS DESIGNED FOR OPERATOR ONLY. Before operating this snowmobile, all operators must read, understand, and follow the information contained in the Operator's Manual and all Warning decals.

This vehicle is designed for adult use only. It is capable of high speeds and should not be operated by children or inexperienced riders.

Wear an approved helmet, eye protection and appropriate snowmobile clothing.

Before starting engine, check throttle, brake, and steering for proper operation.

To stop engine in an emergency, push the emergency stop switch down.

Stay clear of the rotating track. Entanglement may result.

Do not operate this vehicle on public roads.

Avoid contact with hot or moving parts. Turn engine off before opening hood. Leave all shields in place.

After refueling, secure fuel tank cap before sitting on or operating this vehicle. Do not store this vehicle in an enclosed area with a full tank of gas.

Check brake fluid level and pad wear before each use or brake loss can result. Loss of brakes can result in severe injury or even death.

Excessive repetitive use of the hydraulic brake for high speed stops will cause overheating of the brake fluid and premature brake pad wear which will result in an unexpected loss of brakes.

Use only DOT4 brake fluid from a sealed container. Clean filler cap before removing.

The brake lever lock is not a parking brake and should not be applied for periods exceeding 5 minutes. Longer time periods can cause loss of brake lock.

Refer to Operator's Manual for more information and instructions. A free Operator's Manual for this model is available upon written request.

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CAUTION

The engine must be properly warmed up before high speed operation or severe engine damage may occur. Do not operate the engine at more than half throttle until the engine has reached normal operating temperature. If this vehicle is equipped with a battery, it should be removed before turning vehicle onto its side to prevent battery acid spillage.

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WARNING

Use a solid tongue hitch when towing objects to avoid injury due to sudden stops.

Do not stand near or behind rotating track. Personal injury could result.

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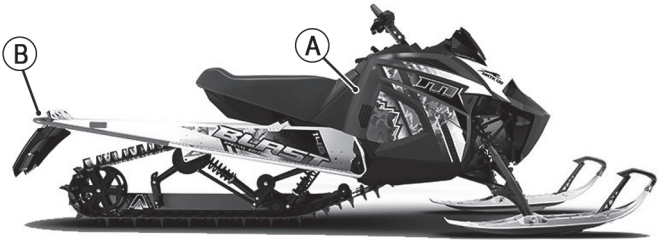
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WARNING

Do not run engine without this shield in place or with drive belt removed. Do not attempt any adjustment with engine running.

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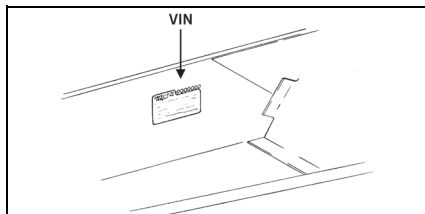


SNO-WL7

General Information

Snowmobile Identification

The Arctic Cat Snowmobile has two important identification numbers. The Vehicle Identification Number (VIN) is stamped into the tunnel near the right-side footrest and on a decal beneath the seat. The decal (on top of the tunnel) also displays pertinent production information. The Engine Serial Number (ESN) is stamped into the crankcase of the engine.



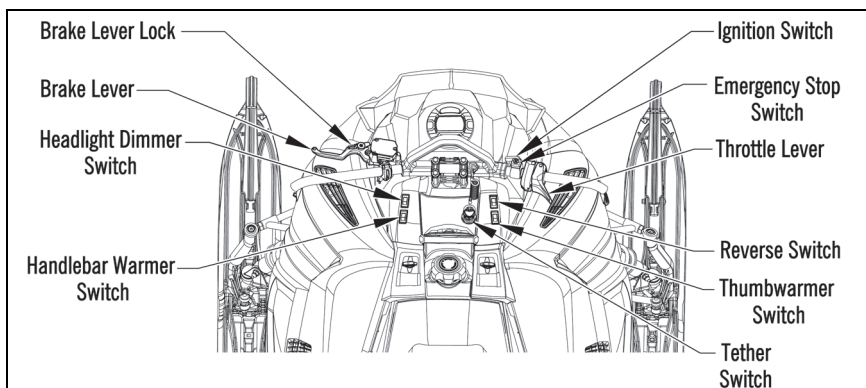
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These numbers are required by the dealer to complete warranty claims properly. No warranty will be allowed by Arctic Cat Inc. if the engine serial number or VIN is removed or mutilated in any way.

Always provide the snowmobile name, VIN, and ESN when contacting an authorized Arctic Cat Snowmobile dealer for parts, service, accessories, or warranty. If the complete engine must be replaced, ask the dealer to notify Arctic Cat for correct registration information.

Control Locations

Shown below are the typical control locations for Arctic Cat snowmobiles. Location of a specific control will vary according to model.



0753-412

Gasoline — Oil Recommended Gasoline

CAUTION

Do not use white gas or gasoline containing methanol. Only Arctic Cat-approved gasoline additives should be used.

The recommended gasoline to use in this snowmobile is minimum 91 octane (R+M)/2 Non-Oxygenated (Non-Ethanol) gasoline for optimum performance.

91 octane gasoline with a maximum 10% ethanol is acceptable but reduced engine performance may be experienced.

CAUTION

If a situation arises wherein 91 octane gasoline is not available, 87 octane gasoline can be substituted in an emergency; however, the prolonged usage of 87 octane gasoline can cause severe engine damage.

Gasolines containing more than 10% ethanol are not acceptable gasoline for use in this snowmobile. Do not use gasolines containing methanol.

Recommended Injection Oil

The recommended oil to use in the oil-injection system is Arctic Cat C-TEC2 Synthetic 2-Cycle Oil. This oil is specially formulated and meets all of the lubrication requirements of the Arctic Cat C-TEC2 snowmobile engine.

CAUTION

Any oil used in place of the recommended oil could cause serious engine damage.

Filling Gas Tank

Since gasoline expands as its temperature increases, the gas tank must be filled to its rated capacity only. Expansion room must be maintained in the tank particularly if the tank is filled with cold gasoline and then moved to a warm area.

Also, if the snowmobile is to remain on a trailer after filling the gas tank, the bed of the trailer must be maintained level to prevent gasoline from draining out through the gas tank vent hose.

WARNING

Always fill the gas tank in a well-ventilated area. Never add gasoline to the snowmobile gas tank near any open flames or with the engine running. DO NOT SMOKE while filling the gas tank. Do not sit on the snowmobile without first installing the gas tank cap.

Engine Break-In

The Arctic Cat engine (when new) requires a short break-in period before the engine is subjected to heavy load conditions.

The break-in period occurs in two stages. Stage One occurs during the first 18 minutes of a new engine's run time where the ECM provides additional oil to the engine, along with limiting engine RPM to 6500 RPM. Stage Two occurs after the completion of Stage One and eliminates the engine RPM limiter. However, Stage Two still provides additional oil to the engine for the remainder of 5.7 hours. This additional oil is less than the amount added during Stage One.

Premixing fuel and oil during the break-in period is not required. Due to the oil delivery control strategy of the electronic oil pump, the oil pump will automatically compensate and deliver a richer fuel-oil ratio during the engine break-in period.

Drive Belt Break-In

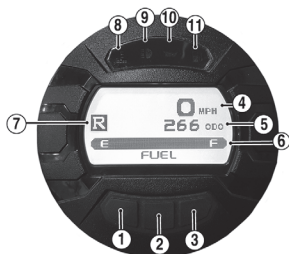
Drive belts require a break-in period of 25 miles (40 km). Drive the snowmobile for 25 miles (40 km) at 3/4 throttle or less. By revving the engine up and down (but not exceeding 60 mph [96 km/h]), the exposed cord on the side of a new belt will be worn down. This will allow the drive belt to gain its optimum flexibility and will extend drive belt life.

■ **NOTE:** Before starting the snowmobile in extremely cold temperatures, the drive belt should be removed and warmed up to room temperature. Once the drive belt is at room temperature, install the drive belt.

CAUTION

Never run the engine with the drive belt removed. Excessive revving of the engine could result in serious engine damage and drive clutch failure.

Gauge



ZR-393A

1. Left Button — Shifts top display through speedometer and RPM.
2. Middle Button — Shifts middle display through speedometer, RPM, clock, odometer, trip 1, trip 2, and engine hours.
3. Right Button — Shifts bottom display through coolant temperature, battery voltage, intake air temperature, exhaust temperature, and fuel level.
4. Speedometer/Tachometer Display — Indicates approximate vehicle speed in MPH or KM/H when the speedometer function is selected, and RPM when the tachometer function is selected. Press the Left Button to change which parameter is being displayed. With speedometer selected, press and hold the Left Button to shift between standard (MPH/miles/Fahrenheit) and metric (km/h/kilometers/Celsius).
5. Engine Hour Meter/Odometer/Trip Meter/Speedometer/Tachometer/Clock Display — Displays engine hours, odometer, trip meter, speedometer, tachometer, or clock. Press the Middle Button to change which parameter is being displayed. The Engine Hour Meter and Odometer cannot be reset. To reset the trip meter, select the Trip Meter; then press and hold the Middle Button until the trip meter display reads 0.
6. Coolant Temperature/Battery Voltage/Intake Air Temperature/Exhaust Temperature/Fuel Level Display — Displays coolant temperature, battery voltage, intake air temperature, exhaust temperature and fuel quantity. Press the Right Button to change which parameter is being displayed. Press and hold the Right Button to see the actual values associated with the mode selected.
7. Gear Position Indicator — Indicates the gear the transmission is in.
8. Coolant Temperature Indicator — When the snowmobile is started, this indicator will flash and LOW TEMP will be displayed until the engine reaches operating temperature.

With the clock mode selected, press and hold the Left Button to set the clock. The option of selecting the 12-hour or 24-hour clock is available; press the Left Button to alternate between the two modes. Next, press the Middle Button to set the clock. Press the Left or Right Button to set the hours; then press the Middle Button to set the minutes. Press the Left or Right Button to set the minutes. When the proper time has been set, press the Middle Button to return to the main gauge display.

If the coolant temperature rises above operating temperature, the indicator will flash at 158° F (70° C). Once the coolant temperature reaches the specified temperature of 167° F (75° C), the temperature sensor will signal the ECM to go into rich mode to protect the engine while overheating. At this time, the indicator will cease flashing and will remain continuously illuminated.

CAUTION

If the indicator is continuously illuminated, stop the engine immediately and allow it to cool down. If unable to either determine or remedy the problem, take the snowmobile to an authorized Arctic Cat Snowmobile dealer for service. If not under warranty, this service is at the discretion and expense of the snowmobile owner.

9. High Beam Indicator — The indicator is on whenever the high beam mode is selected by the headlight dimmer switch.
10. Low Oil Indicator — The indicator is designed to alert the snowmobile operator when the oil in the oil injection tank gets below a prescribed level. Once the indicator illuminates during operation of the snowmobile, the operator must periodically monitor the level of oil in the reservoir and must fill the reservoir the next time gasoline is added to the gas tank.
11. Fuel Level Indicator — The indicator will display whenever gas is low in the fuel tank.

Diagnostic Codes

Diagnostic codes are activated by the ECM and may be displayed on the digital gauge for a number of reasons.

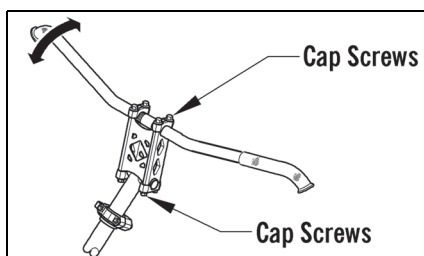
If a code is displayed while the engine is running, the ECM is receiving input that is outside of its established parameters. If a code has been activated, take the snowmobile to an authorized Arctic Cat Snowmobile dealer for service. If not under warranty, this service is at the discretion and expense of the snowmobile owner.

Code	Trouble
P0112	Intake Air Temp Sensor 1 Circuit Low
P0113	Intake Air Temp Sensor 1 Circuit High
P0117	Coolant Temp Sensor 1 Circuit Low
P0118	Coolant Temp Sensor 1 Circuit High
P0122	Throttle Position Sensor Circuit Low
P0123	Throttle Position Sensor Circuit High
P0217	Engine Coolant Over Temp Condition
P0261	Cylinder 1 Injector Circuit Low
P0324	Knock Control System Error
P0327	Knock Control 1 Circuit Low
P0328	Knock Control 1 Circuit High
P0351	Ignition Coil (A) Primary/Secondary
P0545	Exhaust Temp Sensor Circuit Low
P0546	Exhaust Temp Sensor Circuit High
P1000	Oil Pump Flow Not Programmed
P1001	Injector 1 Offset Not Programmed
P1003	Oil Pump Outlier
P1005	Regulator Voltage Circuit Low
P1006	Regulator Voltage Circuit High
P1007	Fuel Pump Circuit Low
P1008	Fuel Pump Circuit High

Code	Trouble
P1009	Speed Sensor Malfunction
P1324	Knock Control System Activated
P1329	Knock Sensor Loose Detection
P1636	Crank Angle Sensor Circuit
P1639	Exhaust Valve Position Sensor Circuit Low
P1640	Exhaust Valve Position Sensor Circuit High
P1645	Exhaust Valve System Malfunction
P1646	Exhaust Valve Actuator Self-Cleaning Open Error
P1647	Exhaust Valve Actuator Short Error
P1755	Engine RPM Sensor Circuit Malfunction
P2228	Barometric Pressure Sensor (A) Circuit Low
P2229	Barometric Pressure Sensor (A) Circuit High
P2600	Coolant Pump "A" Control Circuit/ Open
P3001	Control Module Improper Shutdown
U0132	Lost Communication with Suspension Control Module
U0155	LCD Gauge Communication Lost
U1000	Vehicle Not Registered or Invalid PIN Entered
U1001	Vehicle Not Registered and Vehicle Limits Enabled

Handlebar Tilt

1. Remove the handlebar cover (if equipped); then loosen the eight cap screws securing the handlebar caps to the riser and the riser to the steering post.



ONS-069

2. Adjust the handlebar to operator's desired position, tighten the cap screws evenly to 20 ft-lb (27 N-m), and check steering for maximum right/left turning capabilities.

■ **NOTE:** Do not rotate the handlebar to a position that allows air to enter the brake system.

WARNING

Tighten cap screws according to specifications to prevent unexpected "movement" of the handlebar during operation over rough terrain. **DO NOT** position the handlebar so steering (maximum right/left turning capabilities) or throttle and brake controls are affected.

Exhaust System

The exhaust system is designed to reduce noise and to improve the total performance of the engine. If any exhaust system component is removed from the engine and the engine is run, severe engine damage will result.

Air-Intake Silencer

Used in conjunction with the fuel intake system is a specially designed air-intake silencer. The purpose of the silencer is to quiet the intake of fresh air. Since the fuel intake system is calibrated with the air-intake silencer in place, the engine must never be run with the silencer removed. Performance will not be improved if the air-intake silencer is removed. In contrast, severe engine damage will occur.

Cooling System

These snowmobiles are equipped with a closed liquid cooling system for engine cooling. The cooling system should be inspected daily for leakage and damage. Also, the coolant level should be checked daily. If leakage or damage is detected, take the snowmobile to an authorized Arctic Cat Snowmobile dealer for service. If not under warranty, this service is at the discretion and expense of the snowmobile owner.

When filling the cooling system, use an ethylene glycol-based coolant/water mixture which will satisfy the coldest anticipated weather conditions of your area in accordance with the coolant manufacturer's recommendations.

■ **NOTE:** If operating on low snow, ice, or hard-packed snow conditions, it is recommended that Ice Scratchers (p/n 5639-897) be installed and engaged to reduce wear strip wear and engine overheating.

For checking/filling cooling system, refer to the Coolant Level sub-section in the Maintenance section.

Battery (Electric Start)

It is extremely important that the battery be maintained at full charge at all times and that the battery connections be clean and tight. If charging the battery becomes necessary, refer to Battery sub-section in the Maintenance section.

WARNING

If at any time the battery is removed/disconnected and a jumper pack will be used to start the snowmobile, always use the key or emergency stop switch to turn the engine off. Never disconnect the jumper pack with the engine running. Failure to do this will cause damage to the voltage regulator/rectifier.

Jump-Starting

■ **NOTE:** Arctic Cat does not recommend jump-starting a snowmobile with a dead battery, but rather to remove the battery, service it, and correctly charge it; however, in an emergency, it may be necessary to jump-start a snowmobile. If so, use the following procedure to carefully and safely complete this procedure.

WARNING

Improper handling or connecting of a battery may result in severe injury including acid burns, electrical burns, or blindness as a result of an explosion. Always remove rings and watches. Any time service is performed on a battery, the following must be observed: keep sparks, open flame, cigarettes, or any other flame away. Always wear safety glasses. Protect skin and clothing when handling a battery. When servicing a battery in an enclosed space, keep the area well-ventilated.

1. On the snowmobile to be jump-started, slide any terminal boots away.
2. Inspect the battery for any signs of electrolyte leaks, loose terminals, or bulging sides. Leaking or bulging battery cases may indicate a frozen or shorted battery.

WARNING

If any of these conditions exist, DO NOT attempt to jump-start, boost, or charge the battery. An explosion could occur causing serious injury.

3. Inspect the vehicle to be used for jump-starting to determine if voltage and ground polarity are compatible. The vehicle must have a 12-volt DC, negative ground electrical system.

CAUTION

Always make sure the electrical systems are of the same voltage and ground polarity prior to connecting jumper cables. If not, severe electrical damage may occur.

4. Move the vehicle to be used for the jump-start close enough to ensure the jumper cables easily reach; then set and lock the brakes, shut off all electrical accessories, and turn the ignition switch OFF.

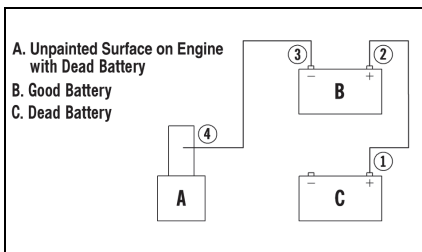
■ NOTE: Make sure all switches on the snowmobile to be jump-started are turned OFF.

5. Disconnect all external accessories such as cell phones, GPS units, and radios on both vehicles.

CAUTION

Failure to disconnect electronic accessories during jump-starting may cause system damage due to power spikes.

6. Attach one clamp of the positive (red) cable to the positive (+) terminal (1) of the dead battery (C) being careful not to touch any metal with the other clamp; then attach the other clamp of the positive (red) cable to the positive (+) terminal (2) of the good battery (B).



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■ NOTE: Some jumper cables may be the same color but the clamps or ends will be color-coded red and black.

7. Attach one clamp of the negative jumper cable (black) to the negative (-) terminal (3) of the good battery (B); then attach the other clamp of the negative (black) jumper cable (4) to an unpainted metal surface (A) on the engine or frame well away from the dead battery and fuel system components.

WARNING

Never make the final connection to a battery as a spark could ignite hydrogen gases causing an explosion of the battery resulting in acid burns or blindness.

8. Stand well away from the dead battery and start the vehicle with the good battery. Allow the vehicle to run for several minutes applying some charge to the dead battery.
9. Start the snowmobile with the dead battery and allow it to run for several minutes before disconnecting the jumper cables.
10. Remove the jumper cables in opposite order of hook-up (4, 3, 2, 1). Be careful not to short cables against bare metal.

■ NOTE: Have the battery and electrical system checked prior to operating the snowmobile again.

Drive Clutch and Driven Clutch

The drive clutch and driven clutch do not require lubrication; therefore, no special maintenance is required by the snowmobile owner except for periodic cleaning.

When operating the snowmobile at high altitudes, it may be necessary to change certain component parts of the drive clutch and/or the driven clutch. See an authorized Arctic Cat Snowmobile dealer for further information.

WARNING

If you become aware of higher than normal clutch engagement or unusual shift patterns, see your authorized Arctic Cat Snowmobile dealer immediately. Do not operate the snowmobile until the clutches have been serviced and/or repaired.

CAUTION

DO NOT attempt to service the drive clutch and driven clutch. The drive clutch and driven clutch must be serviced by an authorized Arctic Cat Snowmobile dealer only.

Drive Clutch/Driven Clutch Alignment

The alignment between the drive clutch and driven clutch is set at the factory. Normally, no adjustment is necessary as long as neither the drive clutch nor the driven clutch is removed or disassembled. However, if premature drive belt wear is experienced or if the drive belt turns over, the drive clutch/driven clutch alignment must be checked. Take the snowmobile to an authorized Arctic Cat Snowmobile dealer for this service. If not under warranty, this service is at the discretion and expense of the snowmobile owner.

Fuel Pump

The fuel pump is designed to provide adequate amount of gas to the injectors at all throttle settings. If a fuel delivery problem is suspected, take the snowmobile to an authorized Arctic Cat Snowmobile dealer. If not under warranty, this service is at the discretion and expense of the snowmobile owner.

Track

Accelerated wear strip and track clip wear caused by operating on ice or hard-packed snow conditions is NOT covered under Arctic Cat Inc. warranty policy.

■ **NOTE:** If regularly operating on ice or hard-packed snow conditions, Performance Wear Strips (p/n 6639-448/864) may be installed at the expense of the snowmobile owner.

■ **NOTE:** If operating on ice or hard-packed snow conditions, it is recommended that Ice Scratchers (p/n 5639-897) be installed to reduce wear strip wear and engine overheating.

Track Studs

■ **NOTE:** Stud or hooker plate installation will void track and tunnel warranty.

■ **NOTE:** Arctic Cat does not recommend studding a track greater than a 1.6-inch lug.

■ **NOTE:** Stud installation can be performed by the snowmobile owner if qualified to do so. If the owner does not feel qualified, take the snowmobile to an authorized Arctic Cat Snowmobile dealer for this service. This service is at the discretion and expense of the snowmobile owner.

WARNING

When installing studs on a single-ply track, it is important to use Arctic Cat-approved studs (proper head diameter). If approved studs (proper head diameter) are not used, studs could tear free of the track causing possible injury or even death. Consult an authorized Arctic Cat Snowmobile dealer for information.

For proper installation, use the following procedure:

1. On Riot/Norseman models, use stud template (p/n 8639-234) and mark the desired stud pattern to be used. On ZR models, use stud template (p/n 8639-421) and mark the desired stud pattern to be used. On Riot Touring models, use stud template (p/n 7639-564) and mark the desired stud pattern to be used.

2. Using the proper-sized stud hole drill bit, drill out the stud holes.
3. Push the stud through the hole from inside the track; then place the domed support plate and lock nut on the exposed stud.
4. Using a wrench to secure the stud, tighten the lock nut on the exposed stud.

It is also recommended that whenever studs are installed on a track, carbide wear bars should be installed on the skis. Carbide wear bars complement the track studs to balance steering control under these conditions. The length of the carbide on the wear bars should be proportionate to the number of track studs (i.e., small number of track studs = short length of carbide and many track studs = long length of carbide). The proper proportion between the number of studs and carbide length on the wear bar will maintain steering balance.

⚠ WARNING

Never rotate a damaged track under power and never perform track measurements, adjustments, and/or maintenance with the engine running.

⚠ WARNING

Always balance the snowmobile with the proper proportion between the number of studs and carbide length on the wear bars. Do not "over drive" conditions; use common sense in all operating conditions.

CAUTION

Do not use studs that are more than 9.525 mm (0.375 in) longer than the track lug height.

⚠ WARNING

Do not operate a snowmobile with loose studs as they may be thrown from the track. Always use a shielded safety stand whenever performing any maintenance or adjustments.

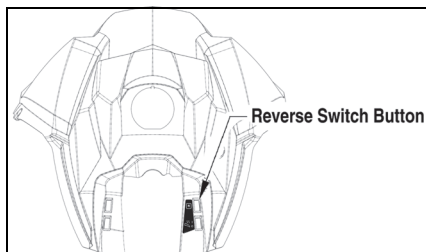
⚠ WARNING

DO NOT stand behind the snowmobile or near the rotating track. NEVER run the track at high speed when the track is suspended.

Reverse Operation

The engine reverse function offers the operator the convenience of being able to back up the snowmobile rather than having to turn the snowmobile around by hand. This feature, under most situations, should not be used to free a stuck snowmobile as it will tend to dig the skis deeper into the snow. Always use minimal speed when operating in reverse.

Shifting Into Reverse



ONS-314

1. Always warm up the engine for 2-3 minutes prior to shifting into reverse. The reverse function is canceled when engine temperature is below or above normal operating range.
2. Shift only with the engine at idle RPM and the snowmobile completely stopped.
3. If attempting to shift into reverse at too high engine RPM (above 3000 RPM), the reverse function will be canceled. This indicates the reverse switch button was pressed at too high RPM. The operator must reduce engine RPM below 3000 and press the button a second time.
4. Upon pressing the reverse switch button, the reverse function will make up to three attempts to engage into reverse. If the function is not completed after the third attempt, the engine will shut down.

CAUTION

Never shift into reverse while the snowmobile is moving forward as it is hard on the driven clutch.

Operating in Reverse

1. When reverse is engaged, a reverse icon will illuminate in the speedometer/tachometer and a reverse alarm will sound.
2. If the throttle lever is compressed before complete reverse engagement, the engine may shut down. Always wait for the reverse icon to illuminate and the reverse alarm to sound before backing up.
3. The system will not shift until the button is released. Also, the reverse function will cancel if operated in reverse longer than 5 minutes.



WARNING

Do not use high speed when backing up. Control could be lost and injury could occur.

CAUTION

Do not use high speed when backing up. Damage to the drive belt and driven clutch components may occur.

4. To shift into forward, stop the snowmobile and allow the engine to idle; then press the reverse button and release. The forward selection will be complete.
5. After shifting from reverse to forward (or from forward to reverse), apply the throttle slowly and evenly to allow the driven clutch to engage properly.
6. The reverse function is canceled whenever the engine is shut off.

CAUTION

After reversing in deep powder snow conditions, make sure the snowflap does not become "caught up" in the track. Track and/or snowflap damage may occur.

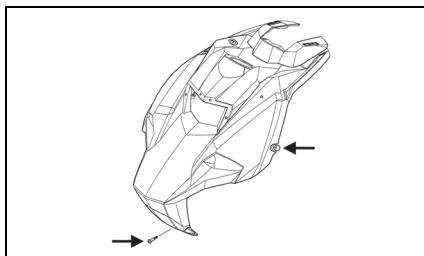
CAUTION

If the snowmobile is equipped with ice scratchers, the scratchers must be disengaged or component damage will occur.

Access Panel/Hood

To remove the access panel and hood, use the following procedure:

1. Rotate the two quarter-turn fasteners to the vertical position; then pull the top of the side panel out, slide the panel forward to remove it from the skid plate.
2. Remove the Torx screw securing the front of the hood to the chassis; then loosen the two quarter-turn fasteners securing the hood. Disconnect the hood harness and remove the hood.



ONS-305

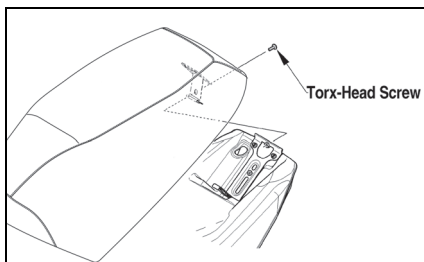
To install the hood and access panels, use the following procedure:

1. Position the hood onto the snowmobile and connect the hood harness connector. Secure the two front quarter-turn fasteners and the Torx screw on the front of the hood.
2. Install the access panels into the skid plates; then close the access panels and secure with the four quarter-turn fasteners.

Removable Seat

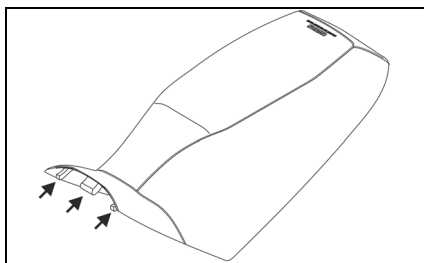
ZR/Riot/Norseman

To remove the seat, remove the screw from the underside of the seat. Then lift the back of the seat and move it up and rearward to remove it.



ONS-332

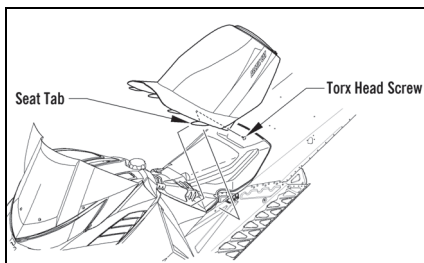
To install the seat, route the front tab on the seat through the seat-base hold-down bracket; then install the seat and secure using the cap screw.



ONS-328

M

To remove the seat, remove both Torx-head screws from the side of the seat; then remove the four tabs on the seat base from the lower console. Pull back and remove the seat cover and foam.

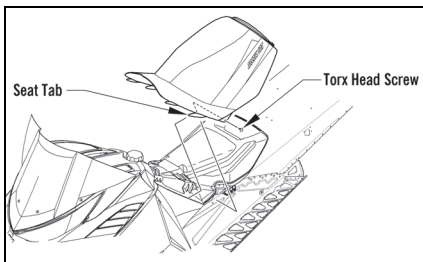


0747-530

To install the seat, follow this procedure:

1. Position the seat foam into the seat cover by first aligning the front of the foam with the front of the seat base/cover; then wrap the rear of the seat base/cover over the rear of the seat foam. Cover the sides of the seat foam with the seat base/cover and secure using the Velcro strap.

2. Slide the rear of the seat cover with foam over the rear of the gas tank; then slide the four tabs into the four holes in the lower console and secure to the tunnel using two self-tapping screws. Do not over tighten.



0747-530

■ **NOTE:** To ease the installation of the seat cover, carefully pry up the rear of the gas tank so the seat cover can easily slide around the rear of the gas tank.

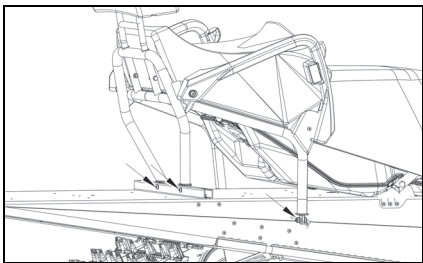
Passenger Seat (Riot Touring)

■ **NOTE:** If additional cargo is being added, maximum weight on the snowmobile (operator/passenger/cargo) should not exceed the maximum limitation set for each snowmobile. See the chart in the Suspension — Overload Springs sub-section in the Maintenance section for details. Also, the overload springs should be engaged.

⚠ WARNING

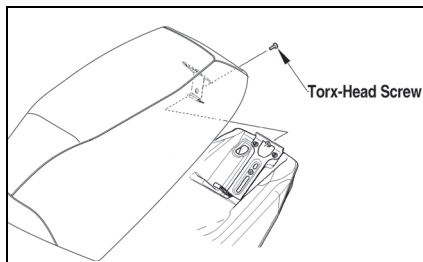
Make sure the rear seat is securely locked in place before carrying a passenger or personal injury may result.

To remove the rear seat, remove the four cap screws and nuts securing the rear seat frame to the rear and side brackets. Remove the seat assembly.



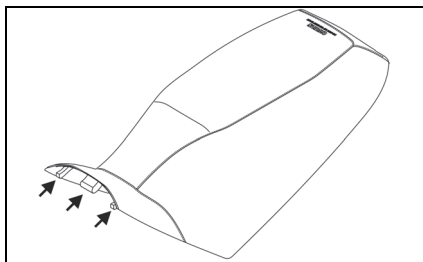
0755-116

To remove the operator seat, remove the screw from the underside of the seat. Then lift the back of the seat and move it up and rearward to remove it.



ONS-332

To install the operator seat, route the front tab on the seat through the seat-base hold-down bracket; then install the seat and secure using the cap screw.



ONS-328

To install the passenger seat, secure the seat frame to the top bracket using two Black Machine Screws (M6 x 35 mm) and two M6 Black Flange Nyloc Nuts. Tighten to 96 in-lb (10.8 N-m).

Secure the seat frame to the two side tunnel brackets using two Black Machine Screws (M6 x 25 mm) and two M6 Black Flange Nyloc Nuts. Tighten to 96 in-lb (10.8 N-m).

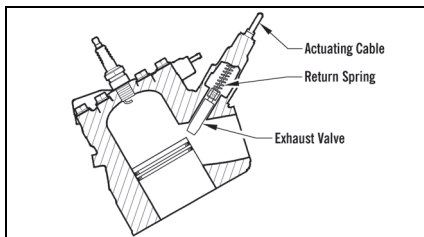
Towing

If the snowmobile is to be towed by another snowmobile, do not tow using the loops in the skis. The tow rope should be attached to the lower A-arms.

Arctic Power Valve (APV) System

This RPM-controlled servomotor (servo) actuated system adjusts the size of the exhaust port to provide peak performance throughout the RPM range.

The system consists of an exhaust valve assembly mounted to the exhaust side of the cylinder and connected by a cable to an electronic servo mounted beneath the hood.



0747-751

At low RPM, the exhaust valve is held in the DOWN position by a return spring. This gives the engine a “low port” exhaust design calibrated to provide maximum low RPM power and improve fuel economy at trail speeds.

At high RPM, the exhaust valve is raised. This creates a “high port” exhaust design calibrated to provide maximum performance at high RPM.

■ **NOTE:** If the servomotor cycles three times and then shuts down, the exhaust valve may be sticking.

■ **NOTE:** Take the snowmobile to an authorized Arctic Cat Snowmobile dealer for this service. This service is at the discretion and expense of the snowmobile owner.

Exhaust-Controlled Timing (ECT) System

This system automatically adjusts the ignition timing to provide maximum performance through a variety of operating conditions. The ECM receives input on engine RPM (demand) and exhaust pipe temperature (engine condition) and adjusts the ignition timing accordingly. This system is not adjustable and is maintenance free.

If a system fault is suspected, use an ohmmeter to check continuity of the exhaust pipe temperature sensor located in the expansion chamber. A reading of either 0 ohm or infinity indicates a failed sensor.

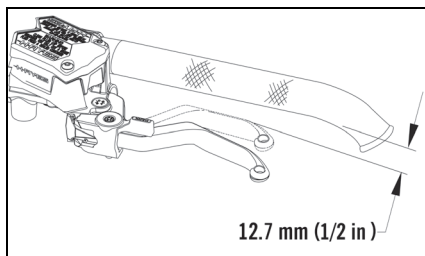
■ **NOTE:** A disabled ECT system WILL NOT cause engine damage; however, a failed ECT system will have slower throttle response and may produce slightly less top-end performance.

Operating Instructions

Starting and Stopping Engine

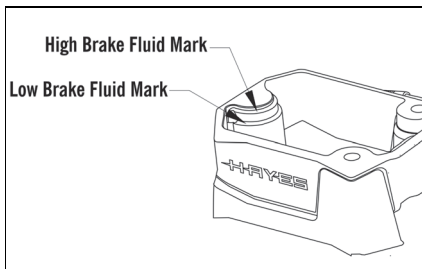
It is imperative that the brake system be checked for wear and proper operation and that all safety checks found in the accompanying Snowmobile Safety Handbook be performed before attempting to start the engine. After the engine has been started, check the headlights (high and low beam), taillight, and brake light to be sure they are working properly and adjusted correctly. Make sure all lights are clean to provide maximum illumination. The headlight and taillight must be clean and must be illuminated whenever the engine is running.

1. Test the operation of the brake system by compressing the brake lever. The brake lever must feel firm when compressed; then while holding the brake lever in the compressed position, measure the distance between the brake lever and the handlebar. The distance must be greater than 12.7 mm (1/2 in).



0752-475

2. With the brake fluid reservoir in a level position and the cover removed, check the fluid level. The brake fluid level must be at the high brake fluid mark in the reservoir.



0752-476

3. If the brake fluid is below the high brake fluid mark, add Arctic Cat-approved DOT 4 brake fluid until the fluid is at the recommended level. Install and secure the reservoir cover. Do not allow moisture to contaminate the brake system.

CAUTION

Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the snowmobile.



WARNING

Do not overfill the brake fluid reservoir. Overfilling the reservoir may cause the brake system to hydraulically lock. Use only Arctic Cat-approved brake fluid.



WARNING

Do not start the engine if the brake system is not functioning properly. Service the brake system or have it properly repaired prior to operating the snowmobile. Serious personal injury or even death may occur if the brake system is not operating properly.

4. Test the throttle control lever by completely compressing and releasing it several times. The lever **MUST** return to the idle position quickly and completely.

CAUTION

Always check the coolant level before starting the engine.

5. Move the emergency stop switch to the UP or RUN position.

6. Insert key into ignition switch; then rotate key to the RUN position.

■ **NOTE:** When a cold engine is being started, **DO NOT COMPRESS THE THROTTLE CONTROL LEVER.** If the throttle control lever is compressed, the engine will not start because the fuel/air mixture will be too lean.

7. If using manual start, pull the recoil handle slowly until resistance is felt; then give a short quick pull. Repeat until the engine starts.

■ **NOTE:** In extremely cold weather, pull the recoil handle slowly two to three times to begin the starting procedure.

CAUTION

To avoid damaging the recoil starter, **DO NOT** pull the recoil rope to its limit or release the recoil handle from an extended position. Allow the rope to rewind slowly.

8. If using electric start, rotate the key to the START position; then when the engine starts, release the key.

CAUTION

Do not continuously run the starter for more than 5 seconds at a time.

■ **NOTE:** When the engine starts, allow it to warm up properly. Idle the engine several minutes until the engine has reached normal operating temperature. Do not idle the engine for excessively long periods of time.

9. There is a “cold drive-away” function incorporated within the engine. This function is active until the engine reaches operating temperature.

CAUTION

It is extremely important that the engine be properly warmed up before subjecting the engine to high speed operation or heavy loads. The engine should be allowed to idle at least 3-4 minutes before being operated at more than 1/2 throttle. In extremely cold conditions, the warm-up time will be longer. Cold seizure and piston scuffing caused by insufficient warm-up will not be covered by warranty. Also, do not idle the engine for excessively long periods of time.

10. Flooding — If the engine does not start but seems ready to start, engage the brake lever lock; then compress the throttle control lever fully and try to start the engine. When the engine starts, release the throttle control lever immediately. After the warm-up, release the brake lever lock.

■ **NOTE:** If the engine fails to start during the attempt with the throttle control lever compressed, remove the spark plug, and clean and dry it thoroughly, or install a new properly gapped, recommended spark plug.

11. To shut off the engine, turn the ignition key to the OFF position or push the emergency stop switch to the DOWN position.

Braking

The following items are items that the operator must be familiar with when operating this snowmobile and its hydraulic brake system. Important additional information on the proper maintenance of the brake system is found in the Maintenance section.

1. Use the brakes wisely. Each time the brakes are applied in all hydraulic brake systems (including automotive applications), heat is transferred to the brake fluid. The amount of heat transferred during high speed stops and/or repetitive use may be high enough to boil the brake fluid and cause the brakes to either fade or may cause an unexpected loss of brakes.

If this occurs, the brake fluid requires a cool-down period before the brakes will again function properly. This cool-down period will vary depending upon the ambient air temperature and the temperature of the brake fluid. If loss of brakes has occurred because of high fluid temperatures, do not operate the snowmobile until the cool-down period has expired and brake lever firmness has returned.

WARNING

Excessive, repetitive use of the hydraulic brake for high-speed stops will cause overheating of the brake fluid and premature brake pad wear which will result in an unexpected loss of brakes.

2. Be sure to maintain the brake fluid at the proper level and take care not to get any moisture in the system as moisture in the brake fluid lowers the boiling point. If the brake fluid is ever boiled (by high speed stops or repetitive use) or if moisture is allowed to enter the system, it must be changed. Never substitute or mix different types or grades of brake fluid.

WARNING

Use only Arctic Cat-approved DOT 4 brake fluid. Never substitute or mix different types or grades of brake fluid. Brake loss can result. Check brake fluid level and pad wear before each use. Brake loss can result in severe injury or even death.

3. Never ride the brake. Even maintaining minimal pressure on the brake lever will cause the brake pads to drag on the disc and may overheat the brake fluid.
4. The brake lever lock is not a parking brake and should not be applied for periods exceeding 5 minutes. NEVER OPERATE THE SNOWMOBILE WITH THE BRAKE LEVER LOCK ENGAGED.

WARNING

The brake lever lock maintains the brake lever in the compressed position and maintains pressure against the brake disc; however, after a period of time, the pressure applied to the brake disc may relax below the amount required to hold the snowmobile stationary.

5. Pumping the brake lever is permissible; however, if pumping the brake lever more than twice is necessary to obtain the necessary stopping power, immediately take the snowmobile to an authorized Arctic Cat Snowmobile dealer for service. If not under warranty, this service is at the discretion and expense of the snowmobile owner.
6. When new brake pads are installed, a "burnishing" process is required.

Emergency Stopping

There are several methods of stopping or slowing the snowmobile under a variety of situations. Identified in the following chart are the ways a snowmobile may be brought to a stop and the effectiveness under normal conditions.

Item	Function
Emergency Stop Switch	interrupts ignition circuit
Throttle/Ignition Monitor Switch	interrupts ignition circuit
Ignition Switch	interrupts ignition circuit
Brake	slows the drive system
Tether	interrupts ignition circuit

Throttle/Ignition Monitor Switch

The throttle control is equipped with a monitor switch for safety purposes which will stop the engine when a loss of return spring force occurs. If ice forms in the throttle system or if there is some other malfunction of the throttle system resulting in a loss of return spring force, the monitor switch will stop the engine when the throttle control lever is released.

WARNING

If any malfunction of the throttle system occurs (such as freezing in fluffy snow) and the monitor switch does not shut off the engine, press down on the emergency stop switch IMMEDIATELY to stop the engine. DO NOT start the engine until the malfunction in the throttle system has been located and corrected.

If the snowmobile engine stops abruptly when the throttle control lever is released and the activation of the monitor switch is suspected, use the following procedure:

1. Rotate the ignition key to the OFF position.
2. Remove ice and snow from the throttle system and wait 5-10 minutes for the engine heat to thaw ice from the throttle system.
3. Test the throttle control lever by compressing and releasing it several times. The lever **MUST** return to the idle position quickly and completely.

■ **NOTE:** If the throttle control lever operates properly and the engine does not start, compress the throttle lever slightly (approximately 1/8 throttle) and try starting the engine. If the engine now starts and stops when the throttle lever is released, take the snowmobile to an authorized Arctic Cat Snowmobile dealer for service. If not under warranty, this service is at the discretion and expense of the snowmobile owner.

WARNING

If the throttle control lever does not work properly, DO NOT ATTEMPT TO START THE ENGINE.

4. If the throttle control lever operates properly, rotate the ignition key to the RUN position and go through normal starting procedures.

■ **NOTE:** If the throttle control lever operates properly and the engine does not start, a malfunctioning monitor switch may be the problem. Take the snowmobile to an authorized Arctic Cat Snowmobile dealer for service. If not under warranty, this service is at the discretion and expense of the snowmobile owner. However, if a dire emergency exists wherein the engine must be started, disconnect the throttle monitor switch located in the right-side handlebar control.

■ **NOTE:** If disconnection of the throttle monitor switch is needed to start the engine, take the snowmobile to an authorized Arctic Cat Snowmobile dealer for service as soon as possible. If not under warranty, this service is at the discretion and expense of the snowmobile owner.

WARNING

Under no circumstances should disconnection of the throttle control wiring harness be used as a substitute for the monitor switch during normal operation of the snowmobile. Personal injury and damage could occur if the throttle system malfunctions or if the operator is unable to stop the engine in an emergency. If the snowmobile must be operated with a disconnected throttle control wiring harness, EXTREME CAUTION MUST BE TAKEN. NEVER EXCEED 10 MPH (16 KM/H) WITH THE THROTTLE CONTROL WIRING HARNESS DISCONNECTED.

■ **NOTE:** The monitor switch is now bypassed. All other ignition/electrical features (ignition switch, emergency stop switch, headlight, taillight, and brake light) will operate properly.

Varying Altitude Operation

Operating a snowmobile at varying altitudes requires changes in performance components. These changes affect drivetrain components.

For altitude information, see the appropriate specifications sheet.

■ **NOTE:** Just as important as calibrating the snowmobile for higher altitudes is recalibrating the snowmobile when going to lower altitudes.

These models are initially set up at the factory for operation between 0-3000 feet (0-915 m) elevation.

■ **NOTE:** Drivetrain changes can be made by the snowmobile owner if qualified to do so. If the owner does not feel qualified, take the snowmobile to an authorized Arctic Cat Snowmobile dealer for this service. This service is at the discretion and expense of the snowmobile owner.

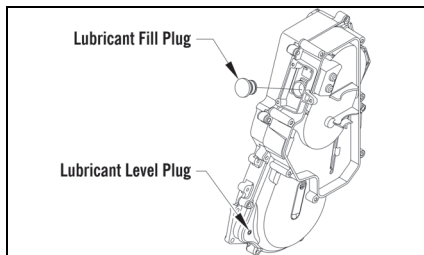
Lubrication

Chain Case

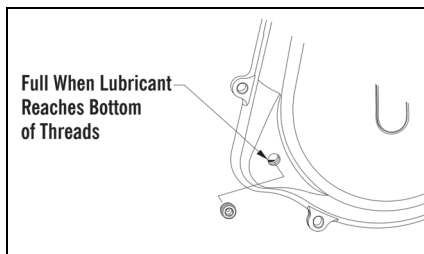
Checking Lubricant Level

■ **NOTE:** The snowmobile must be on a level surface for this procedure.

1. Remove the level plug from the chain case cover. The lubricant should be level with the bottom threads of the level plug hole.



0753-159



0753-158

■ **NOTE:** Adding lubricant can be done by the snowmobile owner if qualified to do so. If the owner does not feel qualified, take the snowmobile to an authorized Arctic Cat Snowmobile dealer for this service. This service is at the discretion and expense of the snowmobile owner.

2. If the lubricant level is low, remove the fill plug and add Synthetic Chain Lube through the fill plug hole. When the lubricant reaches the bottom threads of the level plug hole, install the level plug. Tighten to 60 in-lb (7 N-m).

Replacing Lubricant

■ **NOTE:** Replacing the lubricant can be done by the snowmobile owner if qualified to do so. If the owner does not feel qualified, take the snowmobile to an authorized Arctic Cat Snowmobile dealer for this service. This service is at the discretion and expense of the snowmobile owner.

1. Place the snowmobile on a level surface. Remove both access panels and the hood; then remove the exhaust resonator.
2. Place a drain pan under the chain case; then loosen the screws securing the chain case cover/oil tank assembly to the chain case housing starting with the bottom screws first.
3. Remove all screws; then swing the chain case out of the way.
4. Inspect all chain case components along with the cover seal for nicks or damage.
5. Wipe the chain case cover and housing free of old oil; then install the cover and secure using the previously removed screws. Tighten to 108 in-lb (12 N-m).
6. Remove the level plug from the chain case cover.
7. Remove the fill plug from the chain case cover and add Synthetic Chain Lube through the fill plug hole. When the lubricant reaches the bottom threads of the level plug hole, install the level plug. Tighten to 60 in-lb (7 N-m).
8. Install the exhaust resonator and secure using the previously removed hardware.
9. Install the hood and both access panels.

Rear Suspension

This procedure should be done every 40 operating hours.

■ **NOTE:** Arctic Cat recommends that Arctic Cat Low-Temp Grease be used for this procedure.

Lubricate all grease fittings with low-temperature grease.

Maintenance

Periodic Maintenance Checklist			
Item	Interval	Page	Remarks
Battery	Daily	9,23	Check for proper charge and tight connections
Brake System	Daily	26	Check for binding, leakage, and proper operation; lever firmness, travel, caliper, disc, and pads
Chain Case	Daily	20	Check lube level and for leakage
Cooling System	Daily	9,22	Check for leakage, damage, obstructions, coolant level
Drive Belt	Daily Monthly	29	Check for wear, cracks, and fraying Check length and width dimensions
Headlight & Taillight/Brake Light	Daily	34	Check for proper operation and cleanliness
Hoses	Daily	—	Check for damage, leakage, and wear
Oil-Injection System	Daily	—	Check for leakage, damage, and injection/engine oil level
Ski Wear Bars	Daily	35	Check for wear and damage
Steering System	Daily	—	Check for proper operation, tightness of bolts, and binding
Stop Switch	Daily	—	Check for proper operation
Throttle Control System	Daily	18	Check for binding, sticking, proper operation, throttle cable tension, and wear
Electrical Wiring	Weekly	—	Check for wear, damage, and tight connections
Exhaust System	Weekly	9	Check for damage, leakage, and obstructions
Fuel System — Tank, Pump, and Vent Hose	Weekly	—	Check for damage, wear, obstructions, and leakage
Nuts, Bolts, Fasteners	Weekly	—	Check tightness
Recoil Starter	Weekly	—	Check rope for wear, fraying, and proper operation
Shock Absorbers	Weekly	—	Check for fluid leakage and damage
Suspension	Weekly	33	Check for damage, loose components, and proper adjustment
Track Tension/Alignment	Weekly	30,32	Check/adjust as necessary
Wear Strips	Weekly	36	Check for wear and damage
Wires & Cables	Weekly	—	Check for wear, damage, and fraying
APV System	Monthly	15	Check as necessary
Drive Clutch/Driven Clutch	Monthly	11	Check for damage, binding, and wear/remove drive belt, clean drive clutch/driven clutch
Heat Exchangers	Monthly	—	Check for wear, leakage, and damage
Rear Suspension	Monthly	20	Grease
Air Silencer	Seasonal	—	Inspect/clean
Chain Case — Lubricant	Seasonal	20	Replace
APV Side Valve	3500 mi (5600 km)	15	Dealer inspect/clean
Spark Plug	1000 mi (1600 km)	23	Inspect/clean; Replace as necessary

California Proposition 65



WARNING

The Engine Exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

The longevity and safety of the snowmobile can be increased by making periodic checks of the items in the preceding checklist.

If, at any time, abnormal noises, vibrations, or improper working conditions of any component of this snowmobile are detected, **DO NOT OPERATE THE SNOWMOBILE**. Take the snowmobile to an authorized Arctic Cat Snowmobile dealer for inspection and adjustment or repair. If not under warranty, this service is at the discretion and expense of the snowmobile owner.

The snowmobile should be taken to an authorized Arctic Cat Snowmobile dealer at the end of each snowmobiling season for general inspection and for off-season storage servicing. This inspection and servicing is at the expense of the snowmobile owner.

Fuel System

WARNING

Whenever any maintenance or inspection is made on the fuel system in which there may be fuel leakage, there should be no welding, smoking, open flames, etc., in the area.

Gasoline Additives

Fuel de-icer can be used for all models. Periodic use of the injector cleaner is recommended especially in the last tank of gasoline before storage. Arctic Cat Fuel Stabilizer (p/n 0436-907) should also be added to the last tank of gasoline before storage.

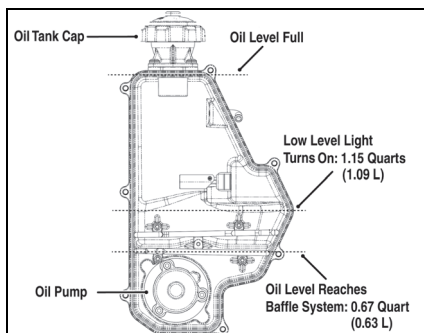
Fuel Pickup Valves

If ever there is a restricted fuel flow and a pickup valve is suspected, take the snowmobile to an authorized Arctic Cat Snowmobile dealer for this service. If not under warranty, this service is at the discretion and expense of the snowmobile owner.

Checking/Adding Engine Oil

The oil level may be checked by visually looking down into the tank or adding oil when the oil light turns on display on the gauge.

The oil tank (when filled to the bottom of the filler neck) has a capacity of 3.25 quarts (3.08 L). The oil light will turn on when the oil level is down to 1.15 quarts (1.09 L). If the oil level reaches 0.67 quart (0.63 L), air can be introduced to oil pump cavity during vehicle operation causing the risk of engine seizure.



SNO-874A

1. Park the snowmobile on a level surface; then remove the right-side access panel.
2. Remove the oil tank cap and add the appropriate oil through the filler neck making sure to fill only to the bottom of the filler neck.

CAUTION

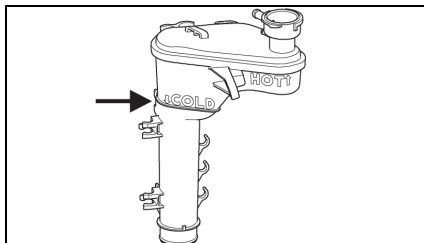
Care must be taken not to over-fill the oil tank.

Coolant Level

■ **NOTE: Use Arctic Cat Antifreeze – 60/40 Extended Life (p/n 2436-871).**

■ **NOTE: Always check the coolant level with the engine cold.**

Locate the coolant tank behind the expansion chamber. If the coolant needs to be added, fill the coolant tank up to the cold fill line located on the tank.



747-545A

CAUTION

After operating the snowmobile for the initial 5-10 minutes, stop the engine, allow the engine to cool down, and check the coolant level. Add coolant as necessary.

Spark Plug

■ **NOTE:** Always use the recommended spark plug in the engine. See the appropriate specifications sheet for correct spark plug gap.

CAUTION

If adjusting spark plug gap is necessary, do not use the center electrode as a leverage point. Damage to the plug may occur.

1. Remove the springs securing the expansion chamber to the exhaust manifold and resonator.
2. Move the expansion chamber out of the way to access the spark plug.
3. Remove the spark plug cap from the plug.
4. Using a spark plug wrench, remove the plug.
5. Install the plug and finger-tighten.
6. Tighten the spark plug to 19 ft-lb (25.8 N-m); then install the spark plug cap.
7. Place the expansion chamber into position and secure to the exhaust manifold and resonator with the springs.

Battery (Electric Start)

These sealed batteries after being in service require regular cleaning and recharging in order to deliver peak performance and maximum service life. The following procedures are recommended for cleaning and maintaining sealed batteries. Always read and follow instructions provided with battery chargers and battery products.

■ **NOTE:** Battery maintenance may be done by the snowmobile owner if qualified to do so. If the owner does not feel qualified, take the snowmobile to an authorized Arctic Cat Snowmobile dealer for this service. This service is at the discretion and expense of the snowmobile owner.

To remove and charge the battery, use the following procedure:

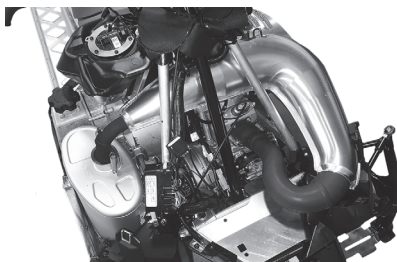
⚠ WARNING

Improper handling or connecting of a battery may result in severe injury including acid burns, electrical burns, or blindness as a result of an explosion. Always remove rings and watches. Any time service is performed on a battery, the following must be observed: keep sparks, open flame, cigarettes, or any other flame away. Always wear safety glasses. Protect skin and clothing when handling a battery. When servicing a battery in an enclosed space, keep the area well-ventilated.

⚠ WARNING

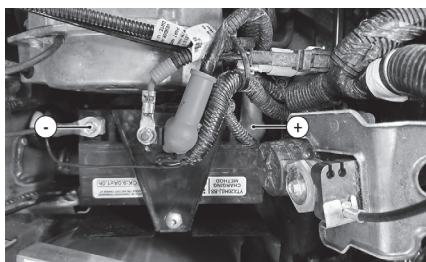
Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the state of California to cause cancer and reproductive harm. Wash hands after handling.

1. Remove both access panels and the hood.
2. Remove the springs securing the resonator and the expansion chamber; then disconnect the temperature sensor from the main harness. Remove both the expansion chamber and the resonator.



ZR-387

3. Remove the negative battery cable and ground wire; then remove the positive cable.



ZR-528

4. Remove the screw securing the battery hold-down bracket; then remove the battery from the snowmobile.

⚠ WARNING

Avoid spillage and contact with skin, eyes, and clothing.

CAUTION

Do not charge the battery while it is in the snowmobile with the battery terminals connected.

5. Thoroughly wash the battery with soap and water; then using a wire brush, clean the battery posts and cable ends removing all corrosive buildup. Replace damaged cables or cable ends.

■ **NOTE:** If battery posts or cable ends have a build-up of white/green powder residue, apply water and baking soda to neutralize acid; then flush off with warm soapy water.

CAUTION

Do not remove the seal strip on a sealed battery.

⚠ WARNING

Battery acid is harmful if it contacts eyes, skin, or clothing. Care must be taken whenever handling a battery.

6. Using a multimeter, test the battery voltage. The meter must read no less than 12.8 DC Volts for a fully charged battery.

■ **NOTE:** At this point if the meter reads as specified, the battery may be returned to service (see step 9).

7. If the meter reads less than specified voltage, charge the battery using the following guidelines:

- A. When using an automatic battery charger, always follow the charger manufacturer's instructions.
- B. When using a constant-current battery charger, use the following Battery Charging Chart.

CAUTION

Never exceed the standard charging rate.

⚠ WARNING

An overheated battery could explode causing severe injury or death. Always monitor charging times and charge rates carefully. Stop charging if the battery becomes very warm to the touch. Allow it to cool before resuming charging.

Battery Charging Chart (Constant-Current Charger)

Battery Voltage (DC)	Charge State	Charge Time Required (at 1.5-2.0 Amps)
12.8-13.0	100%	None
12.5-12.8	75%-100%	3-6 hours
12.0-12.5	50%-75%	5-11 hours
11.5-12.0	25%-50%	13 hours (minimum)
11.5 or less	0-25%	20 hours (minimum)

■ **NOTE:** If the battery voltage is 11.5 DC Volts or less, some chargers may "cut off" and fail to charge. If this occurs, connect a fully charged booster battery in parallel (positive to positive and negative to negative) for a short period of time with the charger connected. After 10-15 minutes, disconnect the booster battery leaving the charger connected and the charger should continue to charge. If the charger "cuts off," replace the battery.

8. After charging the battery for the specified time, remove the battery charger and allow the battery to sit for 1-2 hours.
9. Connect the multimeter and test the battery voltage. The meter should read no less than 12.8 DC Volts. If the voltage is as specified, the battery is ready for service.
13. Install the battery hold-down bracket into the battery bracket and secure using the existing screw. Tighten securely.
14. Install the resonator and expansion chamber, and secure using the existing springs.
15. Install the hood and access panels.

■ **NOTE: If voltage in step 8 is below specifications, charge the battery an additional 1-5 hours; then retest. The battery is ready for service.**

10. Place the battery into position in the snowmobile; then coat the battery posts and cable ends with a light coat of multi-purpose grease.

CAUTION

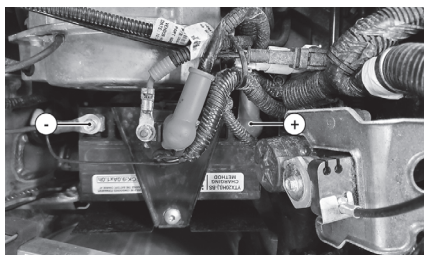
Before installing the battery, make sure the ignition switch is in the OFF position.

11. Secure the red positive cable to the positive terminal on the battery using a cap screw, lock washer, and a flat washer. Tighten securely.
12. Secure the main black negative cable and the small black negative cable to the battery using a cap screw, lock washer, and a flat washer. Tighten securely.

CAUTION

Connecting cables in reverse (positive to negative and negative to positive) can cause serious damage to the electrical system.

■ **NOTE: Ensure the harness wires and cables are routed properly as noted during removing battery procedure.**



ZR-528

Fuses

Fuses protect the snowmobile electrical system from overloading. If electrical parts in the snowmobile are not working, the system may have been overloaded and caused a blown fuse. Before repairing or replacing any electrical part, check the appropriate fuses. If a fuse blows (opens a circuit), all the parts of the snowmobile that use that circuit will not work.

Once which fuse to check has been determined, perform the following steps:

1. Open the right-side access panel and locate the fuse block. Remove the fuse block cover.



ZR-394

■ **NOTE: There are spare fuses beneath the fuse block cover.**

2. Remove the suspected fuse.

■ **NOTE: Fuse function descriptions are next to the fuse contacts in the fuse block.**

3. Look through the clear side of the fuse to see if the element inside is burned or separated. If it is, the fuse is blown and should be replaced with a fuse of the correct amperage rating.

WARNING

Always replace a fuse with one having the same specified amperage rating. Using a fuse with a higher rating can cause severe wire damage and could start a fire.

4. Install the fuse block cover and close the access panel.

Even after replacing a fuse, it may continue to blow if the cause of the overload is not determined. If the fuse continues to blow, take the snowmobile to an authorized Arctic Cat Snowmobile dealer for service. If not under warranty, this service is at the discretion and expense of the snowmobile owner.

Brake System

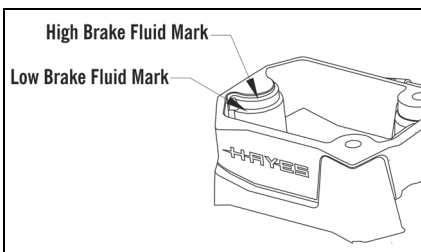
Arctic Cat recommends that the brake system (brake lever, fluid reservoir, hose, caliper, pads, and brake disc) be checked daily for fluid leakage, wear, or damage and for proper operation. Also, the brake fluid level must be checked every time before starting the engine.

WARNING

DO NOT operate the snowmobile when the brake lever lock is engaged or when any component in the brake system is damaged, worn, or adjusted improperly. If the snowmobile is operated and the brake system is not functioning properly, severe personal injury could result.

Checking/Adding Brake Fluid

1. With the brake fluid reservoir in a level position and the cover removed, check the fluid level. The brake fluid level must be at the high brake fluid mark in the reservoir.



0752-476

2. If the brake fluid is below the high brake fluid mark, add Arctic Cat-approved DOT 4 brake fluid until the fluid is at the recommended level. Install and secure the reservoir cover. Do not allow moisture to contaminate the brake system.

CAUTION

Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the snowmobile.

WARNING

Do not overfill the brake fluid reservoir. Overfilling the reservoir may cause the brake system to hydraulically lock. Use only Arctic Cat-approved DOT 4 brake fluid. Never substitute or mix different types or grades of brake fluid. Brake loss can result. Brake loss can result in severe injury or even death.

Changing Brake Fluid

The brake fluid must be changed on a regular basis and whenever the brake fluid has been overheated or contaminated. The brake fluid should be changed every 1000 miles (1600 km) or at the end of the snowmobiling season, whichever occurs first. Take the snowmobile to an authorized Arctic Cat Snowmobile dealer for this service. This service is at the discretion and expense of the snowmobile owner.

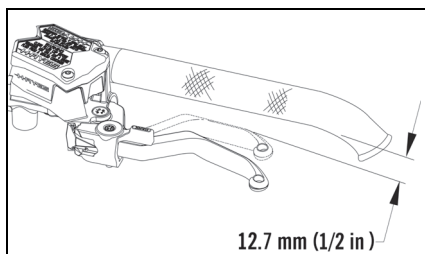
Checking Brake Lever Travel

Before each use, check the brake lever travel using the following procedure:

1. Compress the brake lever fully.

■ **NOTE:** Do not pump the brake lever as it will produce an inaccurate reading.

2. Measure the distance between the brake lever and the handlebar. The distance must be greater than 12.7 mm (1/2 in).



0752-475

3. If the resultant distance is less than specified, take the snowmobile to an authorized Arctic Cat Snowmobile dealer for service. If not under warranty, this service is at the discretion and expense of the snowmobile owner.

WARNING

Do not operate the snowmobile if the compressed distance between the brake lever and the handlebar is less than 12.7 mm (1/2 in). Brake loss may occur. Brake loss can result in severe personal injury.

Bleeding Brake System

If the brake lever feels spongy when applied, the brake system may need to be bled. To bleed the brake, use the following procedure:

■ **NOTE:** The brake system may be bled by the snowmobile owner if qualified to do so. If the owner does not feel qualified, take the snowmobile to an authorized Arctic Cat Snowmobile dealer for this service. This service is at the discretion and expense of the snowmobile owner.

1. Remove the reservoir cover and (if necessary) fill the reservoir to the high brake fluid mark with Arctic Cat-approved DOT 4 brake fluid.

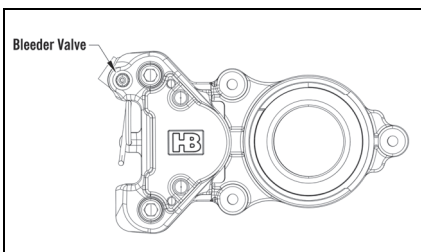
CAUTION

Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the snowmobile.

WARNING

Use only Arctic Cat-approved DOT 4 brake fluid. Any substitute may result in a loss of brakes.

2. Slide a piece of flexible tubing over the ball of the bleeder valve and direct the other end into a container.



0755-018

3. Slowly compress the brake lever until maximum pressure is attained; then hold the lever in the compressed position to maintain pressure. Open the bleeder valve to release the fluid and air. When the fluid stops, close the bleeder valve; then release the brake lever.
4. Repeat step 3 until the brake fluid flows free of air bubbles.

■ **NOTE:** It may be necessary to refill the reservoir during the bleeding process. Never allow the brake fluid to go below the low brake fluid mark in the reservoir.

5. When the brake fluid is free of all air and the brake lever feels firm when compressed, fill the reservoir to the high brake fluid mark; then install and secure the cover. Remove the tube from the bleeder valve.

Checking/Changing Brake Pads

The condition of the brake pads must be checked daily and changed if worn or damaged. To check and change the brake pads, use the following procedure:

■ **NOTE:** The brake pads may be changed by the snowmobile owner if qualified to do so. If the owner does not feel qualified, take the snowmobile to an authorized Arctic Cat Snowmobile dealer for this service. This service is at the discretion and expense of the snowmobile owner.

■ **NOTE:** When installing new brake pads, always install them as a set. Never install just one pad or use brake pads which have been used in another snowmobile.

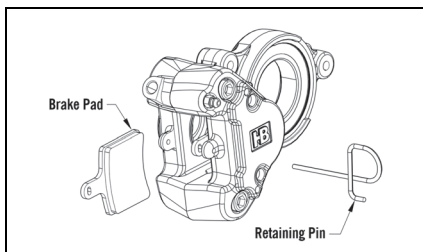
1. Remove the brake fluid reservoir cover; then remove most of the brake fluid from the reservoir. Install the cover.

CAUTION

Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the snowmobile.

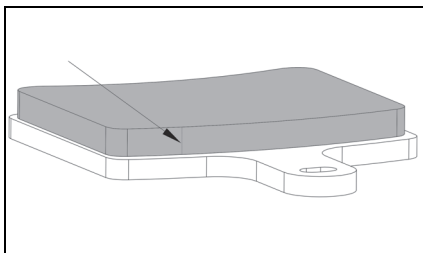
■ **NOTE:** The above procedure will allow room for the fluid from the caliper when the pistons are pushed into the caliper for installing new brake pads. Replacing the cover will prevent fluid spillage.

2. Open the left-side access panel.
3. Remove the Torx-head screws securing the brake shield to the belt guard mount; then remove the cap screws securing the brake shield to the brake caliper.
4. Carefully move the shield out of the way; then remove the hairpin clip securing the brake pads to the caliper assembly.
5. Pull the brake pads out of the caliper assembly.



0755-019

6. Measure the thickness of the brake pad. The brake pad thickness must be greater than 1.0 mm (0.04 in). If the brake pad thickness is less than specified, replacement of both pads is necessary.



0755-099

7. Position the outer brake pad into the caliper; then install the hairpin clip into the caliper assembly.
8. Repeat for the inner pad; then secure the pad with the hairpin clip.
9. Remove the reservoir cover and remove the remaining fluid; then fill the reservoir with fresh fluid and install the cover.
10. Pump the brake lever to ensure correct positioning of the brake pads and proper brake lever travel; then release.

■ **NOTE:** If brake lever travel is not within specification, bleed the brake system.

11. Remove the reservoir cover and fill the reservoir (if necessary) to the proper level with fresh brake fluid; then install the cover.
12. Secure the brake shield; then close and secure the left-side access panel.

■ **NOTE:** When new brake pads are installed, a "burnishing" process is required (see Burnishing Brake Pads sub-section).

Burnishing Brake Pads

After changing brake pads, the new brake pads must be burnished to achieve full braking effectiveness. Braking distance will be extended until brake pads are properly burnished.

To properly burnish the brakes, use the following procedure:

1. Choose an area sufficiently large to safely accelerate to 30-40 mph (48-64 km/h) and to brake to a stop.

WARNING

If this procedure is done using a shielded jack stand, be sure the operator is wearing the tether in case the snowmobile falls from the stand.

2. Accelerate to 30-40 mph (48-64 km/h); then compress brake lever to decelerate to a stop.

■ **NOTE:** Lightly apply the brake lever to come to an easy stop; do not over-apply brakes or “lock up” the track.

3. Repeat procedure 10-15 times allowing some cooling between stops.

■ **NOTE:** Do not repeat too soon or too aggressively as to get the brake disc “red hot.”

WARNING

Do not attempt sudden stops or put yourself into a situation where a sudden stop will be required until the brake pads are properly burnished.

■ **NOTE:** This procedure stabilizes the pad material and extends the life of the pads.

Drive Belt

The drive belt transfers power from the drive clutch to the driven clutch. If the belt is worn, cracked, or stretched, maximum power will not be transmitted and the belt could also fail and therefore must be replaced. Periodic checks (at least once a month under normal usage) of two drive belt specifications are essential.

■ **NOTE:** Drive belts should be purchased from an authorized Arctic Cat Snowmobile dealer, as Arctic Cat drive belts are made to exact specifications and of quality material. Belts made by other manufacturers may not be of the same specifications or quality and, therefore, usage could result in poor performance and premature belt failure.

■ **NOTE:** Before starting the snowmobile in extremely cold temperatures, the drive belt should be removed and warmed up to room temperature. Once the drive belt is at room temperature, install the drive belt.

Also, new drive belts have a break-in period of 25 miles (40 km). After installing a new drive belt, drive the snowmobile for 25 miles (40 km) at 3/4 throttle or less. By revving the engine up and down (but not exceeding 60 mph [100 km/h]), the exposed cord on the side of a new belt will be worn down. This allows the drive belt to gain its optimum flexibility and will extend drive belt life.

CAUTION

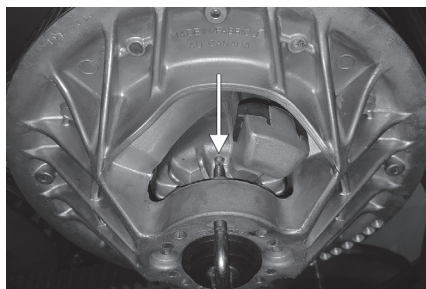
Never run the engine with the drive belt removed. Excessive revving of the engine could result in serious engine damage and drive clutch failure.

■ **NOTE:** Changing a drive belt can be done by the snowmobile owner if qualified to do so. If the owner does not feel qualified, take the snowmobile to an authorized Arctic Cat Snowmobile dealer for this service. This service is at the discretion and expense of the snowmobile owner.

Removing

1. Set the brake lever lock; then remove the left-side access panel.
2. Thread the Belt Removal/Installation Tool (**not included with the snowmobile**) clockwise into the driven clutch until the movable sheave opens far enough to remove the drive belt. Remove the belt and the tool.

■ **NOTE:** When inserting the tool, make sure the tool is seated on the flat portion of the movable sheave and not on the rib or the cam shoe boss. The movable sheave may need to be rotated in order to correctly align the tool with the flat portion of the sheave.



ZR-401

3. When the sheaves are apart, pull up on drive belt and roll belt over stationary sheave until it is free of the driven clutch.
4. When the belt is free of driven clutch, remove the belt from the drive clutch.

Installing

1. Place the belt (so the arrow is pointing toward the front of the snowmobile) between the sheaves of the drive clutch.
2. With the driven clutch sheaves fully apart, roll the belt over the stationary sheave.
3. With the drive belt properly positioned in the drive clutch and driven clutch, turn the belt tool counter-clockwise and roll the belt back and forth to allow the driven clutch sheaves to fully close.
4. After the belt is installed properly, install the left-side access panel.
5. Release the brake lever lock.

Track Tension

Track tension is directly related to the overall performance of the snowmobile. If the track is too loose, it may slap against the tunnel causing wear or it may “ratchet” on the track drive sprockets. If extremely loose, the idler wheels may climb over the track lugs forcing the track against the tunnel causing the track to “lock.” Arctic Cat recommends that the track tension be checked daily during the first 300 miles (480 km) of operation and once a week thereafter and adjusted according to need. The track will stretch and take a “set” during break-in. Track deflection must be maintained within the recommended range.



WARNING

Track tension must be properly maintained. Personal injury could result if a track is allowed to become excessively loose.

Checking Track Tension

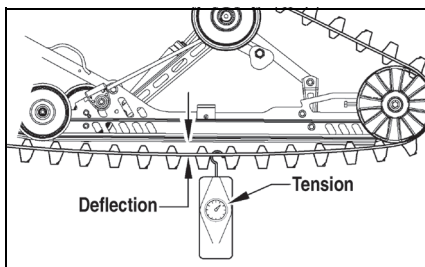
ZR/Riot/Norseman



WARNING

DO NOT attempt to check or adjust track tension with engine running. Turn ignition key to the OFF position. Personal injury could result from contact with a rotating track.

1. Remove excess ice and snow buildup from the track, track drive sprockets, and the inside of the skid frame.
2. Elevate the snowmobile on a shielded safety stand high enough to use a spring scale.
3. At the midpoint of the track (shock pad), hook a spring scale around a track clip; then pull down on the scale to 20 lb (9 kg). Measure the deflection (distance) between the bottom of the wear strip and the inside surface of the track clip. Measurement should be 2 in (50 mm).



0753-172

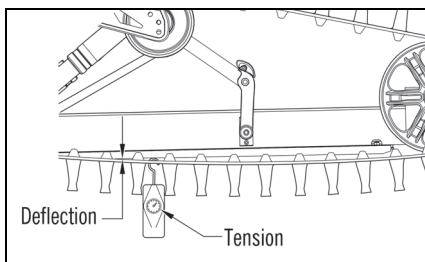
■ **NOTE:** Measurement is from the bottom of the wear strip at the point of the shock pad on the slide rail.

M

⚠ WARNING

DO NOT attempt to check or adjust track tension with engine running. Turn ignition key to the OFF position. Personal injury could result from contact with a rotating track.

1. Remove excess ice and snow buildup from the track and track drive sprockets.
2. Elevate the snowmobile on a shielded safety stand high enough to use a spring scale.
3. At the midpoint of the track (shock pad), hook a spring scale around a track clip; then pull down on the scale to 25 lb (11.3 kg). Measure the deflection (distance) between the bottom of the wear strip and the inside surface of the track clip. Measurement should be 2 in (50 mm).

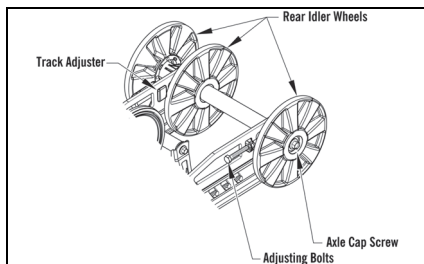


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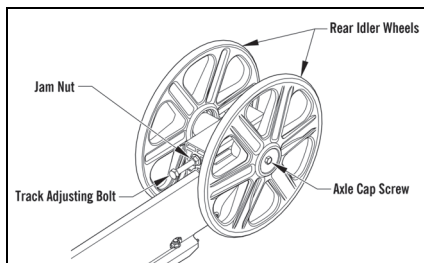
Adjusting Track Tension

■ **NOTE:** To ensure proper track tension adjustment, perform all adjustments on both sides of the snowmobile.

1. Loosen the idler wheel axle cap screws.



0755-004



0755-299

2. If the deflection (distance between the bottom of the wear strip and the inside surface of the track clip) exceeds specifications, tighten the adjusting bolt(s) to take up excessive slack in the track.
3. If the distance between the bottom of the wear strip and the inside surface of the track clip is less than specified, loosen the adjusting bolts to increase the slack in the track.

CAUTION

Always maintain track tension within recommended specification.

4. Check track alignment.
5. On ZR/Riot/Norseman models, after proper track tension is obtained, tighten the idler wheel axle cap screws to 34 ft-lb (46 N-m); then tighten the adjusting bolts securely against the axle.

6. On M models, after proper track tension is obtained, tighten the idler wheel axle cap screws to 34 ft-lb (46 N-m); then tighten the adjusting bolt and jam nut securely against the axle/rail.

■ **NOTE:** Since track tension and track alignment are interrelated, always check both even if only one adjustment seems necessary.

WARNING

Always make sure the adjusting bolts are snug against the axle and the idler wheel cap screws are tightened to specifications. Failure to do so could cause the track to become extremely loose and, under some operating conditions, allow the idler wheels to climb over the track lugs forcing the track against the tunnel causing the track to “lock.” If a track “locks” during operation, severe personal injury could result.

Track Alignment

Proper track alignment is obtained when the rear idler wheels are equal distance from the inner track drive lugs. Excessive wear to the idler wheels, drive lugs, and track will occur if the track is improperly aligned. Arctic Cat recommends that the track alignment be checked once a week or whenever the track tension is adjusted.

Checking Track Alignment

WARNING

Make sure the ignition key is in the OFF position and the track is not rotating before checking or adjusting track alignment. Personal injury could result if contact is made with a rotating track.

1. Remove excess ice and snow buildup from the track, track drive sprockets, and the inside of the skid frame.

2. Position the tips of the skis against a wall; then using a shielded safety stand, raise the rear of the snowmobile off the floor making sure the track is free to rotate.

WARNING

The tips of the skis must be positioned against a wall or similar object.

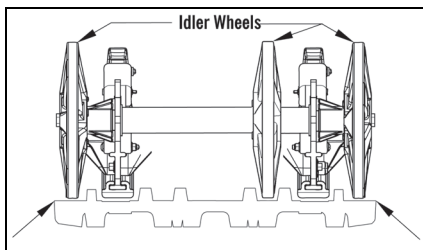
WARNING

DO NOT stand behind the snowmobile or near the rotating track. **NEVER** run the track at high speed when the track is suspended.

3. Start the engine and accelerate slightly. Use only enough throttle to turn the track several revolutions. **SHUT ENGINE OFF.**

■ **NOTE:** Allow the track to coast to a stop. **DO NOT** apply the brake because it could produce an inaccurate alignment condition.

4. When the track stops rotating, check the relationship of the idler wheels and the outside of the track. If the idler wheels are an equal length from the outside of the track, no adjustment is necessary.



0755-003

5. If the idler wheels are not centered, an adjustment is necessary.

■ **NOTE:** There is no track alignment on M models.

Adjusting Track Alignment

1. On the side of the track which has the inner track drive lugs closer to the rear idler wheel, loosen the idler wheel axle cap screw; then rotate the adjusting bolt clockwise 1 to 1-1/2 turns.

2. Check track alignment and continue adjustment until proper alignment is obtained.

■ **NOTE: Make sure correct track tension is maintained after adjusting track alignment.**

3. After proper track alignment is obtained, tighten the idler wheel axle cap screw to 34 ft-lb (46 N-m); then tighten the adjusting bolts securely against the axle.

⚠ **WARNING**

Always make sure the adjusting bolts are snug against the axle and the idler wheel cap screws are tightened to specifications. Failure to do so could cause the track to become extremely loose and, under some operating conditions, allow the idler wheels to climb over the track lugs forcing the track against the tunnel causing the track to “lock.” If a track “locks” during operation, severe personal injury could result.

4. Field test the track under actual conditions.
5. After the field test, check the alignment of the track. If additional adjustment is necessary, repeat Adjusting Track Alignment procedure.

Suspension

The suspension should be adjusted for the operational needs and riding preference of the operator.

On models with rear suspension springs, the springs influence the load carrying capability of the snowmobile and should be adjusted for the weight and riding preference of the operator.

Adjusting Rear Spring Preload

ZR/Riot/Norseman

Proper adjustment of rear spring preload is necessary to get the most desirable ride. The chart is designed to help in setting up rear spring preload; however, riding style is the single greatest factor in determining rear spring requirements.

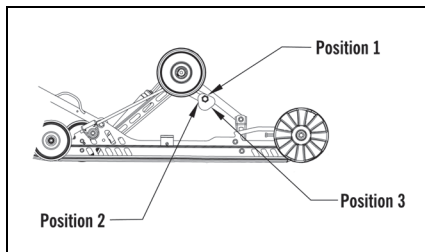
Rider Weight	Cam Position
Up to 150 lb (68 kg)	1
150-200 lb (68-91 kg)	2
Over 200 lb (91 kg)	3

■ **NOTE: These cam position settings are suggestions only. Personal riding style will greatly influence cam position settings. Spend time to determine setting preferences.**

Rear spring preload adjustment is accomplished by rotating the adjusting cams. Position 3 provides the stiffest ride, and Position 1 is for the lightweight operator or slow-speed trail riding. Position 2 is for the average operator under normal conditions. Always rotate the cam from the lighter position to the heavier position.

CAUTION

Never force the adjustment cams from the low position to the high position. Cam damage may occur.



0755-005

Overload Springs (Riot Touring)

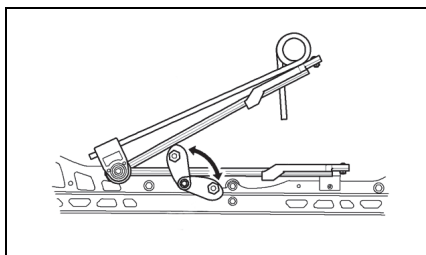
When either carrying a heavy load or riding 2-up, the overload springs should be engaged by rotating the spring tension blocks to the UP position. The spring tension blocks lock in an over-center position when engaged.

■ **NOTE:** Arctic Cat recommends that the overload springs be engaged whenever a load on the snowmobile (operator/passenger/cargo) exceeds 136 kg (300 lb).

CAUTION

There are weight limitations for these snowmobiles. If additional cargo is being added, maximum weight on the snowmobile (operator/passenger/cargo) should not exceed 170 kg (375 lb). Also, the overload springs should be engaged.

To either engage or disengage the spring tension blocks, use the spark plug socket and a screwdriver to adjust the spring block to the desired position. Make sure both spring blocks are in the same position (either engaged or disengaged).

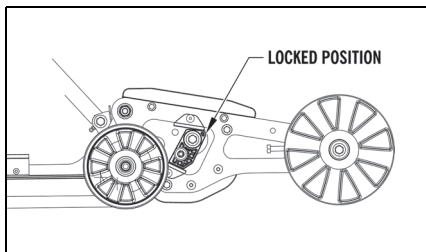


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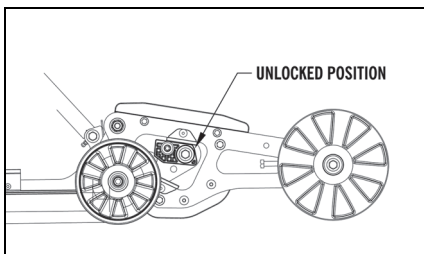
Articulating Skid Frame (Norseman)

The rear articulating portion of the skid frame has two skid frame blocks which allow the skid frame to be locked or articulate.

To allow the rear of the skid frame to articulate, pull out the knob on the left side block and rotate the knob and adjustment block up and forward until it locks into the upper mounting hole.



0755-182



0755-183

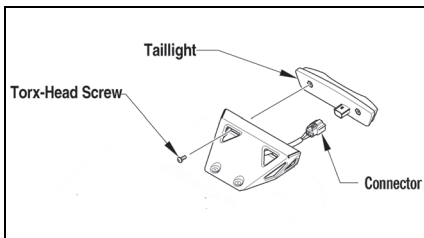
Lights

For the correct headlight bulb and/or taillight/brake light LED, see the appropriate specifications sheet.

Removing and Installing Taillight/Brake Light

These models are equipped with an LED taillight/brake light. If the LED fails, it must be replaced.

1. Disconnect the taillight harness connector.



746-097B

2. Remove the two Torx-head screws securing the taillight to the bracket.
3. Connect the taillight harness connector; then secure the taillight to the bracket with the two Torx-head screws.

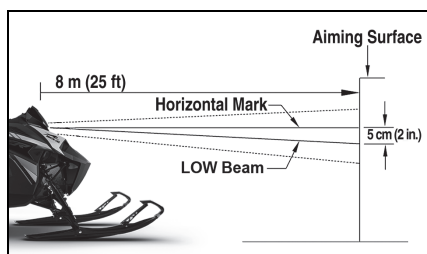
Adjusting Headlight Aim

The headlight can be adjusted for vertical aim of the HIGH/LOW beam. The geometric center of LOW beam zone is to be used for vertical aiming.

1. Position the snowmobile on a level floor so the headlight is approximately 8 m (25 ft) from an aiming surface (wall or similar surface).

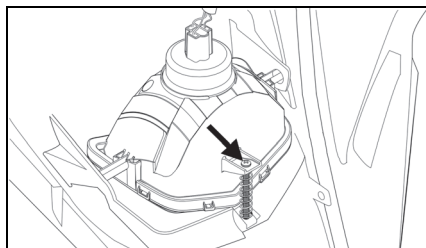
■ **NOTE:** There should be an “average” operating load on the snowmobile when adjusting headlight aim.

2. Measure the distance from the floor to midpoint of the headlight.
3. Using the measurement obtained in step 2, make a horizontal mark on the aiming surface directly in front of the headlight.
4. Make a vertical mark which intersects the horizontal mark on the aiming surface directly in front of the headlight.
5. Engage the brake lever lock and start the engine. Move the headlight dimmer switch to the LOW beam position. DO NOT USE HIGH BEAM.
6. Observe the headlight beam aim. Proper aim is when the most intense beam is centered on the vertical mark 5 cm (2 in) below the horizontal mark on the aiming surface.



ZR-356

7. Adjust the headlight using the screw on the bottom of the headlight until correct aim is obtained. Shut off the engine; then disengage the brake lever lock.



0752-957

Ski Wear Bars

The ski wear bar is a replaceable bar attached to the underside of the ski. The purpose of the wear bar is to assist in turning the snowmobile, to minimize ski wear, and to maintain good steering control. If the snowmobile is operated primarily in deep snow, ski wear bar wear will be minimal; however, if the snowmobile is operated on terrain where the snow cover is minimal, the ski wear bar will wear faster. To maintain positive steering characteristics, Arctic Cat recommends that the ski wear bars be checked before each use and replaced if worn beyond 1/2 of the original diameter.

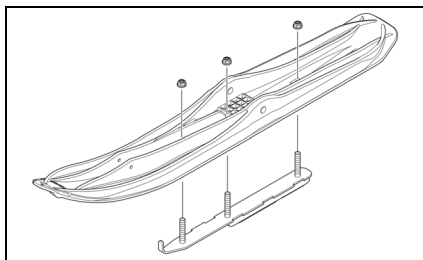
Ski wear bars are available from an authorized Arctic Cat Snowmobile dealer.

WARNING

Operating the snowmobile with excessively worn ski wear bars may result in a loss of steering control.

Removing

1. Elevate the front of the snowmobile.
2. Remove the lock nuts securing the wear bar to the ski.



ONS-312

3. Remove the wear bar from the ski.

Installing

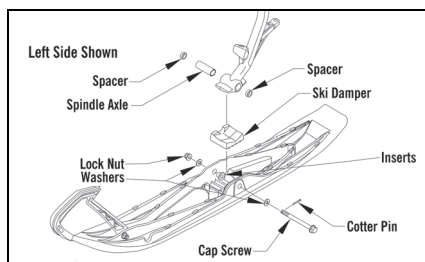
1. Move the wear bar into position on the bottom of the ski.
2. Align the wear bar studs with the holes in the ski; then install the lock nuts. Tighten to 15 ft-lb (20 N-m).

Adjusting Ski Stance

■ **NOTE:** Local laws and/or regulations as to maximum width of the ski stance on these snowmobiles may be applicable. Always comply with the maximum width laws and/or regulations when adjusting ski stance.

■ **NOTE:** On ZR/Riot/Norseman models, ski stance can be increased/decreased by 2.5 cm (1.0 in). On M models, ski stance can be increased/decreased by 5 cm (2.0 in).

1. Place the front of the snowmobile on a support stand.
2. Remove the cotter pin; then remove the nut and cap screw securing the ski assembly to the spindle. Remove the ski. Account for the ski damper, inserts, and washers.
3. To increase ski stance, place ski stance spacers to the outside of the spindle and adjust the ski damper.



0752-477

4. To decrease ski stance, place ski stance spacers to the inside of the spindle and adjust the ski damper.
5. Apply a low-temperature grease to the non-threaded portion of the cap screw; then slide the cap screw through the ski accounting for the ski damper, inserts, and washers.

■ **NOTE:** Install the cap screw so the nut will be located to the inside of the ski.

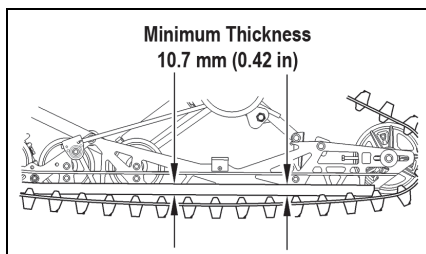
6. Apply red Loctite 271 to the threads of the cap screw; then tighten the nut to 45 ft-lb (61 N-m).

7. Place the cotter pin into the ski cap screw and spread the pin.

8. Repeat procedure for the other ski.

Rail Wear Strips

Arctic Cat recommends that the wear strips be checked weekly and replaced as necessary. Measure the wear strips at 25.4 cm (10 in) intervals. Wear strips must be 10.7 mm (0.42 in) thick or thicker.



0745-807

If wear strip measurements are less than specified, replacement of both wear strips is necessary to prevent premature track clip wear and possible track damage. Take the snowmobile to an authorized Arctic Cat Snowmobile dealer for this service. This service is at the discretion and expense of the snowmobile owner.

Each time a new set of wear strips are installed, they should be tempered. Temper the wear strips by driving the snowmobile for approximately a mile on a hard pack trail; then immediately drive into deep snow and allow the wear strips to cool. Repeat the procedure (warming up the wear strips; then cooling them down) two or three times.

■ **NOTE:** The rail wear strips will wear rapidly if the snowmobile is operated on terrain on which the snow cover is minimal. Loose snow is required to cool and lubricate the wear strips and prevent accelerated wear.

■ **NOTE:** If operating on ice or hard-packed snow conditions, it is recommended that Ice Scratchers (p/n 5639-897) be installed to reduce wear strip wear and engine overheating.

Preparation for Storage

Prior to storing the snowmobile, it must be properly serviced to prevent corrosion and component deterioration. An authorized Arctic Cat Snowmobile dealer should perform this service; however, the owner/operator can perform this service if desired. This service is at the discretion and expense of the snowmobile owner. To prepare the snowmobile for storage, Arctic Cat recommends the following procedure:

1. Clean the seat cushion with a damp cloth and a Vinyl Protectant.
2. Clean the snowmobile thoroughly by hosing dirt, oil, grass, and other foreign matter from the skid frame, tunnel, hood, and belly pan. Allow the snowmobile to dry thoroughly. DO NOT get water into any part of the engine.
3. Place the rear of the snowmobile up on a shielded safety stand.
4. Carefully pry the intake boots partially over the throttle body inlets; then start the engine and allow to idle.
5. Spray an Engine Storage Preserver into the intakes until the engine exhaust starts to smoke heavily or until the engine starts to drop in RPM. Turn engine off. Install the intake boots.

CAUTION

Do not run the engine without the belt guard in place and secured.

6. Plug the exhaust system outlet with steel wool.
7. With the ignition switch in the OFF position:
 - A. Disconnect the high tension lead from the spark plug; then remove the plug, connect it to the lead, and ground the spark plug on the cylinder head.

CAUTION

Never crank the engine over without grounding the spark plug. Damage to coils and ECM may result.

B. Pour 29.5 mL (1 fl oz) of SAE 30 petroleum-based oil into each spark plug hole and pull the recoil starter handle slowly about 10 times.

C. Install the spark plug and connect the high tension lead.

8. Fill the gas tank to its rated capacity; then add Arctic Cat Fuel Treatment (p/n 2436-868) to the gas tank following directions on the container for the stabilizer/gasoline ratio. Tighten the gas tank cap securely.
9. With the snowmobile level, check the lubricant level in the chain case. If low, add chain lube through the fill plug hole.
10. Remove the drive belt from the drive clutch/driven clutch. Lay the belt on a flat surface or slide it into a cardboard sleeve to prevent warping or distortion during storage.
11. Clean and inspect the drive clutch and driven clutch.
12. Apply light oil to the upper steering post bushing and shafts of the shock absorbers.
13. Lubricate the rear suspension with low-temperature grease.
14. Tighten all nuts, bolts, and cap screws making sure all nuts, bolts, and cap screws are tightened securely. Make sure all rivets holding the components together are tight. Replace all loose rivets.
15. Clean and polish the hood, console, and chassis with cleaner. DO NOT USE SOLVENTS. THE PROPELLANT WILL DAMAGE THE FINISH.
16. Disconnect the battery cables making sure to disconnect the negative cable first; then clean the battery posts and cables. Charge the battery.

CAUTION

Sealed batteries require charging if left for extended non-start periods. Arctic Cat recommends trickle charging once a month using a CTEK Battery Maintainer (p/n 7639-503/504). Follow the manufacturer's instructions and cautions.

17. If possible, store the snowmobile indoors. Raise the track off the floor by blocking up the back end making sure the snowmobile is secure. Loosen the track adjusting bolts to reduce track tension. Cover the snowmobile with a machine cover or a heavy tarpaulin to protect it from dirt and dust.

18. If the snowmobile must be stored outdoors, position the snowmobile out of direct sunlight; then block the entire snowmobile off the ground making sure the snowmobile is secure. Loosen the track adjusting bolts to reduce track tension. Cover with a machine cover or a heavy tarpaulin to protect it from dirt, dust, and rain.

CAUTION

Avoid storing in direct sunlight and using a plastic cover as moisture may collect on the snowmobile causing corrosion.

Preparation after Storage

Taking the snowmobile out of storage and correctly preparing it for another season will ensure many hours of trouble-free snowmobiling. Arctic Cat recommends the following procedure:

1. Clean the snowmobile thoroughly. Polish the exterior of the snowmobile.
 2. Clean the engine. Remove the steel wool from the exhaust system. Check exhaust system and air-intake silencer for obstructions.
 3. Inspect all control wires and cables for signs of wear or fraying. Replace if necessary. Use cable ties or tape to route wires and cables away from hot or rotating parts.
 4. Inspect the drive belt for cracks and tears. Check belt specifications. Replace if damaged or worn. Install the drive belt.
- **NOTE: If the old belt is worn but in reasonable condition, retain it with the snowmobile as a spare in case of emergency.**
5. Inspect all fuel hoses and oil hoses for deterioration or cracks; replace if necessary. Make sure all connections are tight; then fill the oil-injection reservoir with the recommended 2-cycle oil.
 6. Inspect the spark plug. Replace, gap, or clean as necessary.
 7. Tighten all nuts, bolts, and cap screws making sure all nuts, bolts, and cap screws are tightened securely.
 8. If not done during preparation for storage, lubricate the rear suspension with low-temperature grease.
 9. Check the coolant level and all coolant hoses and connections for deterioration or cracks. Add properly mixed coolant as necessary.
 10. Charge the battery until fully charged; then connect the battery cables making sure to connect the positive cable first. Test the electric start system.
 11. Inspect the entire brake system, all controls, headlight, taillight, brake light, ski wear bars, and headlight aim; adjust or replace as necessary.
 12. Adjust the track to the proper tension and alignment.

Limited Warranty

Arctic Cat Inc. (hereinafter referred to as Arctic Cat) extends a limited warranty as described below on each new Arctic Cat Snowmobile it assembles and on each genuine Arctic Cat Snowmobile part and accessory assembled and sold by an authorized Arctic Cat Snowmobile dealer. The limited warranty on an Arctic Cat Snowmobile is extended to the original retail purchaser for the time periods described below; however, the balance of the remaining warranty may be transferred to another party unless the purchase is for commercial use (see below). Warranty coverage is only available in the country in which the original retail purchase occurs to the original retail purchaser resident in that country or to a transferee resident in that country of the balance of the remaining warranty.

Arctic Cat warrants only the products it assembles and/or sells and does not warrant that other products will function properly when used with an Arctic Cat Snowmobile or will not damage the Arctic Cat Snowmobile. Arctic Cat does not assume any liability for incidental or consequential damages.

Arctic Cat will repair or replace, at its option, free of charge (including any related labor charges), any parts that are found to be warrantable in material or workmanship. This repair work MUST be done by an authorized Arctic Cat Snowmobile dealer. No transportation charges, rental charges, or inconvenience costs will be paid by Arctic Cat. The warranty is validated upon examination of said parts by Arctic Cat or an authorized Arctic Cat Snowmobile dealer. Arctic Cat reserves the right to inspect such parts at its factory for final determination if warranty should apply.

The warranty periods are as follows:

1. For snowmobiles used for recreational purposes:

—If purchased between May 1 and November 30, warranty expires ONE (1) YEAR from December 1 of the current year.

—If purchased between December 1 and April 30, ONE (1) YEAR from the date of sale.

2. For snowmobiles used for commercial purposes (including rental operations), ONE (1) YEAR from the date of invoice and/or 5000 MILES whichever comes first (non-transferable).

3. THIRTY (30) DAYS from date of sale of snowmobile on Arctic Cat supplied batteries.

Exclusions to this warranty include normal wear, abuse (i.e. a track run on marginal snow conditions without proper lubrication or additional idler wheels), and the following parts:

Fuel Filter	Light Bulbs	Windshield	Drive Belt	Torn or Punctured Upholstery
Wear Bars	Brake Pads	Spark Plugs	Drive Clutch/Driven Clutch	Wear Parts
Wear Strips	Shock Absorber(s)*		Non-Warning Decals	

*Limited to one (1) year or 1000 miles of "normal" riding conditions — replace for defective or leaking shock, corroded or pitted shaft, peeling chrome.

■ **NOTE: Snowmobiles that are factory equipped with FOX shocks and experience a shock failure within the factory warranty period (1 year) must not be tampered with. Only the "Schrader" (air pressure) valve is serviceable during the warranty period. Failures (air leaks) must be confirmed by following the test procedure as shown in the service manual. Any other tampering with the shock will void the FOX warranty.**

The following will VOID Arctic Cat's warranty:

1. Failure to perform the proper break-in procedure and all related maintenance, storage procedures (if stored for extended periods), and/or service as recommended in the Operator's Manual.
2. Repairs and/or adjustments by anyone other than an authorized Arctic Cat Snowmobile dealer.
3. Use of an improper fuel mixture ratio.
4. Use of improper carburetor jets.
5. Use of improper gasoline, lubricating oils, or spark plugs.
6. An accident or subjecting the snowmobile to misuse, abuse, or negligent operation.
7. Any modification, addition, or removal of parts unless instructed to do so by Arctic Cat.
8. Use of the snowmobile in any way for racing purposes.
9. Removal of the engine for use in another vehicle.
10. Removal or mutilation of the Vehicle Identification Number or Engine Serial Number.
11. Use of parts not sold or approved by Arctic Cat.
12. Track and tunnel damage resulting from either ice stud or hooker plate installation.
13. Damage due to improper transportation.

Arctic Cat shall not be responsible for and this limited warranty excludes recovery of economic, punitive, consequential and incidental damages, lost profits, and loss of use. Some states or provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you. Arctic Cat's aggregate liability may not exceed the price of the product. The law of the State of Minnesota shall apply to all claims or disputes, exclusive of its conflicts of law provisions.

IMPLIED WARRANTY EXCLUSION AND DISCLAIMER

To the fullest extent permitted by law, Arctic Cat excludes and disclaims all implied warranties of merchantability and fitness for a particular purpose.

If you are not satisfied with warranty service or repairs, you should contact Arctic Cat at: 1-800-279-2281.

Warranty Procedure/Owner Responsibility

At the time of sale, an Owner Registration form is to be completed by the selling dealer and consumer. The receipt of the registration form by Arctic Cat is a condition precedent to warranty coverage. It is the selling dealer's responsibility to retain and/or submit the appropriate copies of the form to the appropriate place(s) to initiate warranty coverage.

The dealer will furnish to the consumer a signed copy of the form which must be presented to the dealer when requesting warranty service. The registration form is the consumer's proof of ownership and warranty eligibility. The form is used by the dealer to validate the warranty claim. Retain your copy of the form and keep it in a safe place.

When warranty repair is suspected, the snowmobile should be taken to the selling dealer, who has the primary responsibility to perform warranty repairs. Subject to the limitations set forth in the Limited Warranty, in the event the selling dealer has ceased to do business, you have moved, or you are in a location away from your selling dealer, warranty may be performed by any authorized Arctic Cat Snowmobile dealer.

The authorized Arctic Cat Snowmobile dealer will examine the snowmobile or part to determine if, in his opinion, a warrantable condition exists. If a warrantable condition appears to exist, the dealer will repair or replace, at Arctic Cat's option, free of charge, including any related labor costs, all parts that are found to be warrantable and any other parts which the warrantable part caused to be damaged. You, the consumer, will then be asked to sign a warranty form to ensure Arctic Cat that the warranty work was actually performed.

It is the consumer's responsibility to maintain and service the snowmobile in accordance with Arctic Cat's recommendations in the Operator's Manual. To protect yourself and your snowmobile, follow all safety and service tips. Arctic Cat will NOT warrant repairs required as a result of not performing standard operator maintenance, storage procedures, and service as outlined in the Operator's Manual.

Should you have any questions concerning the warranty, contact an authorized Arctic Cat Snowmobile dealer.

Arctic Cat Inc., 601 Brooks Ave, Thief River Falls, MN 56701 1-800-279-2281

U.S. EPA Emission Control Statement/ Warranty Coverage (U.S. Only)

STATEMENT/WARRANTY

Arctic Cat warrants to the original retail purchaser, and each subsequent purchaser, that all U.S. EPA-certified Arctic Cat snowmobiles are designed, built, and equipped to conform to all U.S. EPA Emission Control Regulations. Please read the following information completely.

Your authorized Arctic Cat snowmobile dealer will repair or replace any defective emission-related component at no cost to you during the warranty period. You may have non-warranty service performed by any repair establishment that uses equivalent components. The regulations provide significant civil penalties for tampering that causes your snowmobile to no longer meet U.S. EPA emission standards.

Arctic Cat further warrants that the engine and its emission-related components are free from defects in materials or workmanship that could cause the engine to fail to comply with applicable regulations during the warranty period.

If you have any questions about this information, or the emission warranty coverage statement, contact your local authorized Arctic Cat snowmobile dealer.

WARRANTY PERIOD

The emission warranty period for this snowmobile begins on the same date as the standard warranty coverage and continues for 30 months or 2500 miles, whichever comes first.

COMPONENTS COVERED

The emissions warranty covers major emissions control components and emission-related components listed as follows:

Engine Management and Sensors

Barometric Pressure Sensor
Camshaft Position Sensor
Engine Control Module (ECM)
Engine Coolant Temperature Sensor
Intake Air Temperature Sensor
Manifold Absolute Pressure Sensor
Throttle Position Sensor

Fuel/Air System

Fuel Injectors
Fuel Pressure Regulator
Fuel Pump
Carburetor(s)
Throttle Bodies
Oxygen Sensor
Crankcase Ventilation System
ISC Valve
Gas Tank
Gas Tank Cap
Fuel Line

Ignition System

Ignition Coil
Knock Sensor System
Crankshaft Position Sensor
Exhaust Temperature Sensor
Capacitive Discharge Ignition (CDI) Module
Magnet Pick-Up
Spark Plugs

Miscellaneous Items Used in Aforementioned Systems

Connectors
Switches
Grommets
Clamps
Hoses
Ties
Gaskets
Wiring

OWNER'S RESPONSIBILITIES

The owner of any snowmobile warranted under this Arctic Cat Emission Control Statement is responsible for the proper maintenance and use of the snowmobile in accordance with Arctic Cat's recommendations in the Operator's Manual.

For U.S. EPA Emission Control Warranty coverage questions, contact Arctic Cat at 1-800-279-2281.

NOTES

Change of Address, Ownership, or Warranty Transfer

Arctic Cat Inc. keeps on file the current name and address of the owner of this vehicle. This allows Arctic Cat to reach the current owner with any important safety information which may be necessary to protect customers from personal injury or property damage. Please make sure a copy of this form is completed and returned to Arctic Cat Inc. if you move or if the vehicle is sold to another party.

This form may also be used to transfer the unused portion of the original warranty to a second party. In order to transfer warranty, fill out this form completely; then return a copy of this form to Arctic Cat Inc. Arctic Cat will then process the application and issue warranty for the balance of the time remaining of the original warranty. Warranty coverage is only available in the country in which the original retail purchase occurs to the original retail purchaser resident in that country or to a transferee resident in that country of the balance of the remaining warranty. This form may also be scanned and emailed to arcticcatwarranty@arcticcat.com.

- ☐ Address Change
- ☐ Ownership Change
- ☐ Warranty Transfer

CHANGE OF ADDRESS/OWNERSHIP/WARRANTY TRANSFER TO:

Name _____

Address _____

City/State (Province) _____

Zip Code (Postal Code) _____

Phone () _____

Email _____

Year and Model _____

Vehicle Identification Number (VIN) _____

Fold Back

CHANGE OF ADDRESS/OWNERSHIP

Place
Stamp
Here

ARCTIC CAT INC.
PRODUCT SERVICE AND WARRANTY DEPT.
601 BROOKS AVE
THIEF RIVER FALLS MN 56701

Reference Information

Write the appropriate information for your Arctic Cat Snowmobile in the spaces below.

Always use these numbers when referring to your snowmobile.

Model: _____

Date of Purchase: _____

Vehicle Identification Number: _____

Engine Serial Number: _____

Your Arctic Cat Dealer: _____

Address: _____

Phone: _____

Parts and Accessories

When in need of replacement parts, oil, or accessories for your Arctic Cat Snowmobile, be sure to only use GENUINE ARCTIC CAT PARTS, OIL, AND ACCESSORIES. Only genuine Arctic Cat parts, oil, and accessories are engineered to meet the standards and requirements of your Arctic Cat Snowmobile. For a complete list of accessories, refer to the current Arctic Cat Accessory Catalog. To aid in service and maintenance procedures on these snowmobiles, an Illustrated Parts Manual and a Service Manual are available through your local Arctic Cat Snowmobile dealer.

