FOREWORD

This Arctic Cat Service Manual contains service and maintenance information for the Model Year 2008 Arctic Cat 2-Stroke Snowmobiles. This manual is designed to aid service personnel in service-oriented applications.

This manual is divided into sections. The sections cover specific snowmobile components or systems and, in addition to the standard service procedures, includes assembling, disassembling, and inspecting instructions. When using this manual as a guide, the technician should use discretion as to how much disassembly is needed to correct any given condition.

The service technician should become familiar with the operation and construction of the components or systems by carefully studying the complete manual. This will assist the service technician in becoming more aware of and efficient with servicing procedures. Such efficiency not only helps build consumer confidence but also saves time and labor.

All Arctic Cat publications and snowmobile decals display the words Warning, Caution, and Note to emphasize important information. The symbol ⚠ **WARNING** identifies personal safety-related information. Be sure to follow the directive because it deals with the possibility of severe personal injury or even death. The symbol ⚠ **CAUTION** 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. The symbol ■ **NOTE:** identifies supplementary information worthy of particular attention.

At the time of publication, all information, photographs, and illustrations were technically correct. Some photographs and 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.

All materials and specifications are subject to change without notice.

Keep this manual accessible in the shop area for reference.

Product Service and Warranty Department
Arctic Cat Inc.

ISMA
International Snowmobile Manufacturers Association

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SECTION 1 — GENERAL INFORMATION/ SPECIFICATIONS

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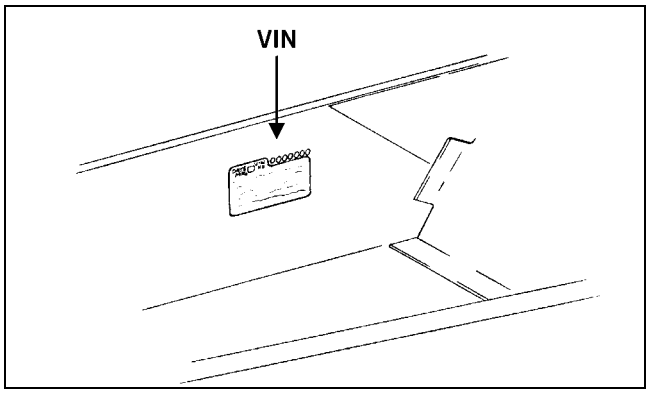
Snowmobile Identification

The Arctic Cat Snowmobile has two important identification numbers. The Vehicle Identification Number (VIN) is stamped into the tunnel near the right-side footrest. The Engine Serial Number (ESN) is stamped into the crankcase of the engine.



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■NOTE: The VIN also appears on a decal beneath the seat (Crossfire/M-Series) or attached to the right-side tunnel (remaining models). The decal also displays pertinent production information.

These numbers are required 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.

Recommended Gasoline and Oil

RECOMMENDED GASOLINE (Carbureted Models)

The recommended gasoline to use in these snowmobiles is 87 octane regular unleaded.

■NOTE: In many areas, oxygenates (either ethanol or MTBE) are added to the gasoline. Oxygenated gasolines containing up to 10% ethanol or up to 15% MTBE are acceptable gasolines; however, whenever using oxygenated gasolines, the carburetor main jet must be one size larger than the main jet required for regular unleaded gasoline. For example, if a 220 main jet is recommended for regular unleaded gasoline, a 230 main jet must be installed if using an oxygenated gasoline.

When using ethanol blended gasoline, it is not necessary to add a gasoline antifreeze since ethanol will prevent the accumulation of moisture in the fuel system.

⚠ CAUTION

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

RECOMMENDED GASOLINE (EFI Models)

The recommended gasoline to use in these snowmobiles is 87 octane regular unleaded. In many areas, oxygenates (either ethanol or MTBE) are added to the gasoline. Oxygenated gasolines containing up to 10% ethanol or up to 15% MTBE are acceptable gasolines. Do not use gasolines containing methanol.

■NOTE: For optimum performance, do not exceed the recommended 87 octane gasoline. Using a higher octane gasoline will not increase overall performance.

⚠ CAUTION

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

RECOMMENDED OIL

The recommended oil to use in the oil-injection system is Arctic Cat 50:1 Injection Oil (for standard models) or Arctic Cat Synthetic APV 2-Cycle Oil (for APV models). The oil is specially formulated to be used either as an injection oil or as a pre-mix oil (for carbureted model break-in) and meets all of the lubrication requirements of the Arctic Cat snowmobile engine.

Break-In Procedure

The Arctic Cat 2-stroke engine (when new or rebuilt) requires a short break-in period before the engine is subjected to heavy load conditions. Arctic Cat requires that the first tankful of fuel be premixed at a 100:1 ratio in all oil-injection models.

During the break-in period, a maximum of 1/2 throttle is recommended; however, brief full-throttle accelerations and variations in driving speeds contribute to good engine break-in.

⚠ CAUTION

DO NOT exceed the one (1) tankful limitation of a 100:1 gas/oil break-in mixture. Continuous use of a gas/oil mixture, unless consistently operating in extremely cold conditions (-26°C/-15°F or colder), could cause spark plug fouling and excessive carbon buildup. A 100:1 gas/oil mixture must be used in conjunction with the oil-injection system to ensure adequate engine lubrication in extremely cold conditions.

Genuine Parts

When replacement of parts is necessary, use only genuine Arctic Cat parts. They are precision-made to ensure high quality and correct fit.

High Altitude Operation

Operating a snowmobile at varying altitudes requires changes in performance components. These changes affect drive train components (on all models) and carburetion components (on carbureted models).

High altitude information decal(s) are located beneath the hood of the snowmobile.

⚠ CAUTION

On carbureted models, carefully follow the Main Jet Chart recommendations for proper main jet selection for altitude, temperature, and gasoline being used.

The M-Series snowmobiles are initially set up at the factory for operation between 6000-9000 feet. Consult the appropriate specifications for this information.

Following are basic high altitude theories for clutching, engine, suspension, and track.

CLUTCHING

As altitude changes, engine horsepower changes with it. As you go up in altitude, the engine loses horsepower. Because of this, the constant velocity transmission (CVT) system needs to be changed to compensate for the horsepower loss.

At altitudes above 5000 ft, clutch engagement RPM is normally higher than the standard setting. This is due to the horsepower loss at altitude as opposed to what would be seen for horsepower at sea level. The engine will lose peak horsepower but will also lose horsepower at engagement speed. For this reason, higher engagement speeds are usually needed at altitude in order to attain acceptable acceleration. This higher engagement speed can be attained several ways. Some of the methods will affect other characteristics of CVT operation, so you must be careful what you change. Drive clutch springs are the most common way to increase engagement speed; however, by simply changing the cam arms to a lighter weight from the heavier sea level cam arm, you will gain some engagement speed.

Then there are other more complicated methods such as engagement notches and changing the position of the cam arm center of gravity in relation to the roller. This is called “tucking the weight” and can be used, but, like the engagement notch, it can hurt belt life.

The driven clutch will also play a part in CVT tuning for high altitude operation. A steeper helix angle in the driven clutch will mean a quicker up-shift. A shallower angle will mean a slower up-shift. If the up-shift is too quick, due to a very steep helix, RPM will be pulled down under the peak operating RPM of the engine (where the horsepower is) and performance will suffer. The engine may even bog. If you have a helix that is too shallow, the engine may over-rev or have poor acceleration. Usually, angles shallower than the sea level calibrations work best. The driven spring will also affect driven clutch tuning. Tighten the spring, and RPM will increase. Loosen the spring, and RPM will decrease. The spring should be used to fine-tune and complement the helix selection.

Carburetor calibration changes for high altitude operation will have an effect on the CVT system and how it operates. It is important that you understand the basics of CVT operation in order to make the correct high altitude CVT calibration changes.

ENGINE

Engines generate more horsepower at sea level than they do at higher altitudes. There are many reasons for this, but the biggest reason is that the higher you go, less oxygen is available for the engine to use during its combustion process. Less oxygen means it needs less fuel to obtain the correct air/fuel ratio to operate properly. This is why the fuel ratio has to be recalibrated. At high altitude, engines operate as though they have a lower compression ratio. This, along with less oxygen and less fuel, means that the engine generates slightly less horsepower at higher altitudes.

The carbureted models will also have lower pressure applied to the float chamber because of pressure changes in the atmosphere between high altitude and sea level. All of these characteristics will become more evident the higher the altitude.

It will be necessary to make changes to the fuel systems (carbureted models) and drive systems that support engine operation as altitude changes.

SUSPENSION

The different riding styles of the individual operator, the varying snow conditions, and the type of terrain are all factors that affect the suspension at high altitude. Trail riding versus powder riding versus combination riding will all require different suspension settings.

The normal setting for front ski suspension is as little spring pre-load tension as possible for powder snow riding. This will allow the skis to float across the snow with the least amount of resistance. Trail riding will require more spring tension to carry the varying load more effectively. There are many different settings and spring tensions to consider when adjusting for riding style and snow conditions.

The rear suspension has a number of spring settings that produce different riding characteristics.

The front arm spring and shock will also affect the ride and handling when either on a trail or in powder snow. A strong spring setting on this shock will cause the snowmobile to tend to "dig" more when riding in the powder rather than climbing up on top of the snow. But, it will work more effectively when riding on a trail. A softer spring setting will allow the front of the rear suspension to collapse much quicker and change the angle of the track to the snow. A more gradual angle will tend to raise the snowmobile up on the snow rather than digging into it.

There are many variables and adjustments that are possible to the rear suspension depending on snow conditions, riding style, and type of terrain. These adjustments can be made to individualize the snowmobile to the riding style of the operator.

M-Series/Crossfire

As snow cover and riding conditions change, there are several different adjustments that can be made to change the ride and handling characteristics for operator preference. Located on the front suspension arm are limiter straps. They limit the amount of "fallout" the front arm can have. These straps may be adjusted in or out due to conditions and riding style. The more the straps are brought up, the more steering power the operator has due to the amount of ski pressure.

Another adjustment that can be made on the rear suspension is the front shock spring tension. As trail conditions change, the spring pre-load may be used to decrease the chance of the front end "bottoming out." With a stiffer spring pre-load, the ride of the snowmobile will improve on the trail but will affect the performance in the deep powder snow. In deep powder snow, the stiffer spring pre-load will cause the front-end to "dig" and possibly take longer for it to plane off. There are several different-rate springs available for different riding styles and terrain conditions.

On the standard models the front shock springs are also individually adjustable for the terrain conditions and driving style of the operator. The spring adjuster has been set at the factory so the correct amount of threads are exposed between the spring adjuster and the shock housing as an initial setting. Additional ski pressure can be obtained by tightening the spring tension; ski pressure can be decreased by relaxing spring tension. There are springs with different spring rates available for operator choice and snow conditions. There is a limit as to how far you can pre-load the springs before "coil bind" takes effect. This is when the wire on the spring actually runs into itself and causes binding. Equal adjustments should be maintained on both sides of the snowmobile. On the Sno Pro models with air shocks, they are individually adjustable for the terrain conditions and driving style of the operator. The ski shocks are preset at 4.6 kg/cm^2 (65 psi) as an initial setting on the Crossfire Sno Pro models or at 4.2 kg/cm^2 (60 psi) on the M-Series Sno Pro models. The rear arm shock is preset at 9.8 kg/cm^2 (140 psi) on the M-Sereis Sno Pro. It is possible to "fine tune" the shocks to match the operator's weight, riding style, and terrain conditions.

■NOTE: Care should be taken to have equal pressure in the shocks before operating the snowmobile.

Finally, track tension should be looked at to make sure that it is within recommended specifications to affect the efficiency of the snowmobile. On models with the torque sensing link, the track is actually tightening as the suspension moves through its range of motion causing the track to sag in the middle and rub on the top part of the rear suspension arm.

TRACK

Carefully matching the riding requirements to the type of track will ensure the maximum use of all available engine power. Lug height and track durometer are the two main concerns when selecting a track for various riding styles.

There are tracks with lug heights from 0.750 in. up to 2.25 in. to accommodate various snow conditions. Generally, the deeper the snow, the taller the lug. It must be noted that the installation of any deep-lug track may reduce top end speed and promote premature wear strip wear in marginal snow conditions.

Durometer is a measurement of how hard a rubber is. The lugs on most tracks range between 60 and 80 durometer. On the durometer scale, the higher the number, the harder the lugs. For riding in deep powder, a softer 60 durometer track works best. The softer rubber allows the track to "give" a little and pack the snow creating lift rather than digging its way straight down. When hill-climbing, the harder lug of an 80 durometer track works the best due to penetrating the hard snow creating more bite.

Some tracks come with a dual durometer rating, such as a track with a 80/60 durometer rating. The lugs on this track are 80% 80 durometer rubber, and the top 20% is made of the softer 60 durometer rubber. This track is designed to be a good all-around track for riding mostly in deep powder but can climb the occasional hard snow hill.

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. To prepare the snowmobile for storage, Arctic Cat recommends the following procedure:

1. Clean the seat cushion with a damp cloth and Arctic Cat 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.

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