



FOREWORD

This Arctic Cat Service Manual contains service, maintenance, and troubleshooting information for the 2012 Arctic Cat 350 ATV model. The complete manual is designed to aid service personnel in service-oriented applications.

This manual is divided into sections. Each section covers a specific ATV component or system and, in addition to the standard service procedures, includes disassembling, inspecting, and assembling 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 each component or system by carefully studying the complete manual. This manual 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 ATV publications and decals display the words Warning, Caution, Note, and At This Point 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. A **CAUTION** identifies unsafe practices which may result in ATV-related damage. Follow the directive because it deals with the possibility of damaging part or parts of the ATV. The symbol  **NOTE:** identifies supplementary information worthy of particular attention. The symbol  **AT THIS POINT** directs the technician to certain and specific procedures to promote efficiency and to improve clarity.

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

TABLE OF CONTENTS

Note: To navigate through this manual, use the PAGE UP/PAGE DOWN buttons on the keyboard, click on the Table of Contents bookmarks on the left side of the screen, or click the blue text below. To return to this page, click the Manual Table of Contents button at the bottom of each page.

General Information	2	Gas Tank	73
General Specifications	2	Oil Filter/Oil Pump	75
Torque Specifications	3	Testing Oil Pump Pressure	75
Torque Conversions (ft-lb/N-m)	4	Oil Cooler	76
Break-In Procedure	4	Troubleshooting	77
Gasoline - Oil - Lubricant	4	Electrical System	78
Genuine Parts	5	Electrical Connections	78
Preparation For Storage	5	Battery	78
Preparation After Storage	6	RPM Limiter	79
Periodic Maintenance	7	Testing Electrical Components	79
Periodic Maintenance Chart	7	Accessory Receptacle/Connector	79
Lubrication Points	8	Brakelight Switch (Pressure)	79
Air Filter	8	Oil Temperature and Cooling Fan Switches	80
Valve/Tappet Clearance	9	Fan Motor	80
Testing Engine Compression	10	Fuse Block/Power Distribution Module	81
Spark Plug	10	Ignition Coil	82
Muffler/Spark Arrester	11	Speed Sensor	82
Adjusting Throttle Cable	11	Ignition Switch	83
Adjusting Engine RPM (Idle)	12	Handlebar Control Switches	84
Engine/Transmission Oil - Filter	12	Gear Position Switch	84
Front Differential/Rear Drive Lubricant	13	Stator Coil	84
Tires	13	Starter Relay	85
Driveshaft/Coupling	14	Starter Motor	85
Nuts/Bolts/Cap Screws	14	CDI Unit	86
Ignition Timing	14	Regulator/Rectifier	86
Lights	14	Lights	86
Shift Lever	16	Ignition Timing	88
Frame/Welds/Racks	16	Troubleshooting	89
Hydraulic Brake Systems	16	Drive System	91
Burnishing Brake Pads	18	Front Differential	91
Checking/Replacing V-Belt	18	Drive Axles	100
Engine/Transmission	22	Rear Gear Case	102
Troubleshooting	23	Hub	102
Removing Engine/Transmission	26	Hand Brake Lever/Master Cylinder Assembly	103
Top-Side Components	28	Hydraulic Brake Caliper	104
Removing Top-Side Components	28	Troubleshooting Drive System	107
Servicing Top-Side Components	31	Troubleshooting Brake System	107
Installing Top-Side Components	38	Suspension	108
Left-Side Components	42	Shock Absorbers	108
Removing Left-Side Components	42	Front A-Arms	108
Servicing Left-Side Components	44	Rear A-Arms	109
Installing Left-Side Components	45	Wheels and Tires	110
Right-Side Components	46	Troubleshooting	111
Removing Right-Side Components	46	Steering/Frame/Controls	112
Servicing Right-Side Components	49	Steering Post/Tie Rods	112
Installing Right-Side Components	50	LCD Gauge	113
Center Crankcase Components	53	Handlebar Grip	114
Separating Crankcase Halves	53	Throttle Control	114
Disassembling Crankcase Half	54	Steering Knuckles	115
Servicing Center Crankcase Components	55	Measuring/Adjusting Toe-Out	117
Assembling Crankcase Half	60	Front Rack	117
Joining Crankcase Halves	62	Front Bumper Assembly	118
Installing Engine/Transmission	63	Front Body Panel/Fender	118
Fuel/Lubrication/Cooling	67	Exhaust System	119
Electric Choke	67	Rear Body Panel/Rack	120
Carburetor	67	Seat	121
Throttle Cable Free-Play	73	Troubleshooting	122
Engine RPM (Idle)	73		



General Information

■NOTE: Some photographs and illustrations used in this manual are used for clarity purposes only and are not designed to depict actual conditions.

General Specifications

CHASSIS	
Brake Type	Hydraulic w/Brake Lever Lock and Auxiliary Brake
Tire Size	Front - 24 x 8-12 Rear - 24 x 10-12
Tire Inflation Pressure	27.6 kPa (4 psi)
MISCELLANY	
Spark Plug Type	NGK CR8E
Spark Plug Gap	0.7-0.8 mm (0.028-0.031 in.)
Gas Tank Capacity (rated)	15.1 L (4.0 U.S. gal.)
Rear Drive Capacity	250 ml (8.5 fl oz)*
Front Differential Capacity	275 ml (9.3 fl oz)**
Engine Oil Capacity	3.3 L (3.5 U.S. qt) - Overhaul 2.8 L (3.0 U.S. qt) - Change
Gasoline (recommended)	87 Octane Regular Unleaded
Engine Oil (recommended)	Arctic Cat ACX All Weather (Synthetic)
Differential/Rear Drive Lubricant	SAE Approved 80W-90 Hypoid
Drive Belt Width (minimum)	28.5 mm (1.12 in.)
Brake Fluid	DOT 4
Taillight/Brakelight	12V/5W/21W
Headlight	12V/35W (4)
FUEL SYSTEM	
Carburetor Type	Keihin CVK34
Main Jet	112
Slow Jet	38
Pilot Screw Setting (turns)	2 1/2
Jet Needle	NLGB
Idle RPM (engine warm)	1250-1350
Starter Jet	75
Float Height	17 mm
Throttle Cable Free-Play (at lever)	3-6 mm (1/8-1/4 in.)
IGNITION	
Ignition Timing	10° BTDC @ 1500 RPM
Spark Plug Cap	4000-6000 ohms
Ignition Coil Resistance (primary)	Less than 1 ohm (terminal to terminal)
(secondary)	2900-3400 ohms (high tension - plug cap removed - to ground)
Ignition Coil Peak Voltage (primary/CDI)	250-375 DC volts (black/yellow to black)
MAGNETO	
Stator Coil Resistance (trigger) (charging)	90-110 ohms (green to blue) Less than 1 ohm (black to black)
Peak Voltage (trigger)	7.8-9.3 volts (green to blue)
AC Generator Output (no load)	60 AC volts @ 3000 RPM (black to black)
Generator Output (approx)	220W @ 5000 RPM

Specifications subject to change without notice.

* One inch below plug threads.

** At the plug threads.

CRANKSHAFT	
Connecting Rod (small end) (max)	20.021 mm
Connecting Rod (big end side-to-side) (max)	0.7 mm
Connecting Rod (big end width)	21.95-22.00 mm
Connecting Rod (small end deflection) (max)	3.0 mm
Crankshaft (web-to-web)	60.9 mm
Crankshaft Runout (max)	0.03 mm
CYLINDER, PISTON, AND RINGS	
Piston Skirt/Cylinder Clearance	0.060-0.073 mm
Piston Diameter 15 mm from Skirt End	80.98-81.00 mm
Piston Ring Free End Gap (max) (1st) (2nd)	11.6 mm 10.1 mm
Bore x Stroke	81.0 x 71.2 mm
Cylinder Trueness (max)	0.01 mm
Piston Ring End Gap - Installed (min)	0.15 mm
Piston Ring to Groove Clearance (max) (1st/2nd)	0.06 mm
Piston Ring Groove Width (1st) (2nd) (oil)	1.01-1.03 mm 1.21-1.23 mm 2.01-2.03 mm
Piston Ring Thickness (1st) (2nd)	0.97-.99 mm 1.17-1.19 mm
Piston Pin Bore (max)	20.008 mm
Piston Pin (min)	19.994 mm
VALVES AND GUIDES	
Valve Face Diameter (intake) (exhaust)	30.6 mm 27.9 mm
Valve/Tappet Clearance (cold engine) (intake) (exhaust)	0.10 mm 0.23 mm
Valve Guide/Stem Clearance (max) (intake) (exhaust)	0.10 mm 0.30 mm
Valve Guide/Valve Stem Deflection (Wobble Method) (Max)	0.035 mm
Valve Face Radial Runout (max)	0.15 mm
Valve Guide Inside Diameter	5.000-5.012 mm
Valve Stem Outside Diameter (intake) (exhaust)	4.975-4.990 mm 4.951-4.970 mm
Valve Stem Runout (max)	0.10 mm
Valve Head Thickness (min)	2.30 mm
Valve Face/Seat Width (min) (intake/exhaust)	0.99 mm
Valve Seat Angle (intake/exhaust)	45°
Valve Spring Free Length (min)	40.4 mm
Valve Spring Tension @ 31.1 mm	21.4 kg (47.18 lb)
CAMSHAFT AND CYLINDER HEAD	
Cam Lobe Height (min) (intake/exhaust)	33.53 mm
Camshaft Journal Oil Clearance (max)	0.040 mm
Camshaft Journal Holder (right & center) (left)	21.98-22.04 mm 17.48-17.53 mm
Camshaft Journal Outside (right & center) (left)	21.97-21.98 mm 17.47-17.48 mm
Camshaft Runout (max)	0.03 mm
Rocker Arm Inside Diameter	12.000-12.018 mm
Rocker Arm Shaft Outside Diameter	11.975-11.987 mm
Cylinder Head/Cover Distortion (max)	0.05 mm

Torque Specifications

EXHAUST COMPONENTS			
Part	Part Bolted To	Torque ft-lb N-m	
Exhaust Pipe	Engine	20	27
Spark Arrester	Muffler	48 in.-lb	5.5
ELECTRICAL COMPONENTS			
Coil	Frame	12	16
Starter Motor Positive Cable	Starter Motor	8	11
CHASSIS COMPONENTS			
Footrest	Frame (8 mm)	20	27
Bumper	Frame (8 mm)	20	27
SUSPENSION COMPONENTS (Front)			
A-Arm	Frame	35	47
Knuckle	Ball Joint	35	47
Shock Absorber	Frame	35	47
Shock Absorber	Upper A-Arm	35	47
Knuckle	A-Arm	35	47
SUSPENSION COMPONENTS (Rear)			
Shock Absorber (Upper)	Frame	35	47
Shock Absorber (Lower)	Lower A-Arm	35	47
A-Arm	Frame	35	47
Knuckle	A-Arm	35	47
ENGINE/TRANSMISSION			
Clutch Shoe**	Crankshaft	147	199
Clutch Cover/Housing Assembly	Crankcase	8	11
Left-Side Cover	Crankcase	8	11
Crankcase Half (6 mm)	Crankcase Half	10	13.5
Crankcase Half (8 mm)	Crankcase Half	21	28
Cylinder Nut	Crankcase Half	8	11
Cylinder Head (Cap Screw)	Crankcase	28	38
Cylinder Head Nut	Cylinder	20	27
Cylinder Head (6 mm)	Cylinder	8	11
Cylinder Head (8 mm)	Cylinder	20	27
Cylinder Head Cover	Cylinder Head	8	11
Oil Pump Drive Gear**	Crankshaft	63	86
Driven Pulley Nut**	Driveshaft	147	199
Ground Cable	Engine	8	11
Output Shaft Flange Nut	Output Shaft	74	101
Magneto Rotor Nut	Crankshaft	107	146
Cam Sprocket**	Camshaft	11	15
Valve Adjuster Jam Nut	Valve Adjuster	7	9.5
Starter Motor	Crankcase	8	11
Oil Fitting	Engine	8	11
Starter One-Way Clutch	Flywheel	26	35
Oil Pump*	Crankcase	8	11
Movable Drive Face Nut**	Clutch Shaft	147	199
Oil Cooler Hose Clamps	Engine/Oil Cooler	30 in.-lb	3.4
Valve Inspection Cover	Cylinder Head Cover	8	11
STEERING COMPONENTS			
Steering Post Bearing Housing	Frame	20	27
Handlebar Cap	Steering Post	20	27
Lower Steering Post Bearing Cap Screw	Steering Post	40	54
Tie Rod End**	Steering Post Arm	30	41

DRIVE TRAIN COMPONENTS			
Part	Part Bolted To	Torque ft-lb N-m	
Engine Mounting Through-Bolt	Frame	38	52
Front Differential	Frame/Differential Bracket	38	52
Output Flange	Rear Output Flange Joint	20	27
Input Shaft Housing	Differential Housing	18	25
Pinion Housing	Gear Case Housing	18	25
Differential Housing Cover***	Differential Housing	18	25
Drive Bevel Gear Nut**	Shaft	59	80
Driven Bevel Gear Nut**	Driven Shaft	59	80
Thrust Button	Gear Case Cover	8	11
Hub Nut	Shaft/Axle (max)	200	272
Oil Drain Plug	Front Differential/Rear Drive	45 in.-lb	5
Oil Fill Plug	Front Differential/Rear Drive	16	22
Oil Drain Plug	Engine	20	27
Rear Drive Input Shaft Housing	Differential Housing	23	31
Lock Collar	Differential Housing	125	169
Wheel (Steel)	Hub	40	54
Wheel (Aluminum)	Hub	80	108
Rear Drive Gear Case	Frame	38	52
Engine Output Flange	Rear Gear Case Input Flange	20	27
BRAKE COMPONENTS			
Brake Disc*	Hub	15	20
Brake Hose	Caliper	20	27
Brake Hose	Master Cylinder	20	27
Brake Hose	Auxiliary Brake Cylinder	20	27
Master Cylinder (Rear)	Frame	8	11
Master Cylinder Clamp (Front)	Master Cylinder	5.5	8
Hydraulic Caliper****	Knuckle	20	27
Auxiliary Brake Pedal	Pivot	20	27

* w/Blue Loctite #243

** w/Red Loctite #271

*** w/Green Loctite #609

****w/"Patch Lock"

Torque Conversions (ft-lb/N-m)

ft-lb	N-m	ft-lb	N-m	ft-lb	N-m	ft-lb	N-m
1	1.4	26	35.4	51	69.4	76	103.4
2	2.7	27	36.7	52	70.7	77	104.7
3	4.1	28	38.1	53	72.1	78	106.1
4	5.4	29	39.4	54	73.4	79	107.4
5	6.8	30	40.8	55	74.8	80	108.8
6	8.2	31	42.2	56	76.2	81	110.2
7	9.5	32	43.5	57	77.5	82	111.5
8	10.9	33	44.9	58	78.9	83	112.9
9	12.2	34	46.2	59	80.2	84	114.2
10	13.6	35	47.6	60	81.6	85	115.6
11	15	36	49	61	83	86	117
12	16.3	37	50.3	62	84.3	87	118.3
13	17.7	38	51.7	63	85.7	88	119.7
14	19	39	53	64	87	89	121
15	20.4	40	54.4	65	88.4	90	122.4
16	21.8	41	55.8	66	89.8	91	123.8
17	23.1	42	57.1	67	91.1	92	125.1
18	24.5	43	58.5	68	92.5	93	126.5
19	25.8	44	59.8	69	93.8	94	127.8
20	27.2	45	61.2	70	95.2	95	129.2
21	28.6	46	62.6	71	96.6	96	130.6
22	29.9	47	63.9	72	97.9	97	131.9
23	31.3	48	65.3	73	99.3	98	133.3
24	32.6	49	66.6	74	100.6	99	134.6
25	34	50	68	75	102	100	136

Break-In Procedure

A new ATV and an overhauled ATV engine require a “break-in” period. The first 10 hours (or 200 miles) are most critical to the life of this ATV. Proper operation during this break-in period will help assure maximum life and performance from the ATV.

During the first 10 hours (or 200 miles) of operation, always use less than 1/2 throttle. Varying the engine RPM during the break-in period allows the components to “load” (aiding the mating process) and then “unload” (allowing components to cool). Although it is essential to place some stress on the engine components during break-in, care should be taken not to overload the engine too often. Do not pull a trailer or carry heavy loads during the 10-hour break-in period.

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.

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.

After the completion of the break-in period, the engine oil and oil filter should be changed. Other maintenance after break-in should include checking of all prescribed adjustments and tightening of all fasteners.

Gasoline - Oil - Lubricant

RECOMMENDED GASOLINE

The recommended gasoline to use is 87 minimum octane regular unleaded. In many areas, oxygenates (either ethanol or MTBE) are added to the gasoline. Oxygenated gasolines containing up to 10% ethanol, 5% methane, or 5% MTBE are acceptable gasolines.

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

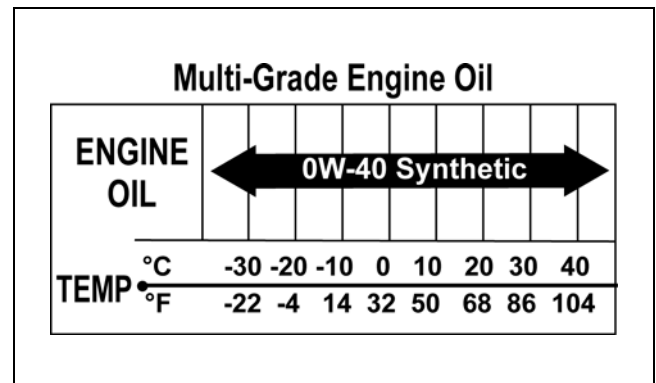
Do not use white gas. Only Arctic Cat approved gasoline additives should be used.

RECOMMENDED ENGINE/ TRANSMISSION OIL

CAUTION

Any oil used in place of the recommended oil could cause serious engine damage. Do not use oils which contain graphite or molybdenum additives. These oils can adversely affect clutch operation. Also, not recommended are racing, vegetable, non-detergent, and castor-based oils.

The recommended oil to use is Arctic Cat ACX All Weather synthetic engine oil, which has been specifically formulated for use in this Arctic Cat engine. Although Arctic Cat ACX All Weather synthetic engine oil is the only oil recommended for use in this engine, use of any API certified SM 0W-40 oil is acceptable.



OILCHARTJ

RECOMMENDED FRONT DIFFERENTIAL/REAR DRIVE LUBRICANT

The recommended lubricant is Arctic Cat Gear Lube or an equivalent gear lube which is SAE approved 80W-90 hypoid. This lubricant meets all of the lubrication requirements of the Arctic Cat ATV front differentials and rear drives.

CAUTION

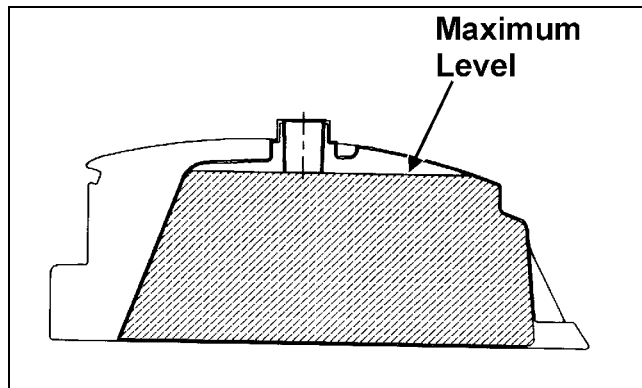
Any lubricant used in place of the recommended lubricant could cause serious front differential/rear drive damage.

FILLING GAS TANK

⚠ WARNING

Always fill the gas tank in a well-ventilated area. Never add fuel to the ATV gas tank near any open flames or with the engine running. DO NOT SMOKE while filling the gas tank.

Since gasoline expands as its temperature rises, 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.



ATV0049B

⚠ WARNING

Do not overflow gasoline when filling the gas tank. A fire hazard could materialize. Always allow the engine to cool before filling the gas tank.

Tighten the gas tank cap securely after filling the tank.

⚠ WARNING

Do not over-fill the gas tank.

Genuine Parts

When replacement of parts is necessary, use only genuine Arctic Cat ATV parts. They are precision-made to ensure high quality and correct fit. Refer to the Illustrated Parts Manual for the correct part number, quantity, and description.

Preparation For Storage

CAUTION

Prior to storing the ATV, it must be properly serviced to prevent rusting and component deterioration.

Arctic Cat recommends the following procedure to prepare the ATV for storage.

1. Clean the seat cushion (cover and base) with a damp cloth and allow it to dry.
2. Clean the ATV thoroughly by washing dirt, oil, grass, and other foreign matter from the entire ATV. Allow the ATV to dry thoroughly. DO NOT get water into any part of the engine or air intake.
3. Either drain the gas tank or add Fuel Stabilizer to the gas in the gas tank. Remove the air filter housing cover and air filter. Start the engine and allow it to idle; then using Arctic Cat Engine Storage Preserver, rapidly inject the preserver into the air filter opening for a period of 10 to 20 seconds. Stop the engine. Install the air filter and housing cover.

CAUTION

If the interior of the air filter housing is dirty, clean the area before starting the engine.

■NOTE: At this point, drain the carburetor float chamber.

4. Plug the exhaust outlet on the muffler with a clean cloth.
5. Apply light oil to the upper steering post bushing and plungers of the shock absorbers.
6. Tighten all nuts, bolts, cap screws, and screws. Make sure rivets holding components together are tight. Replace all loose rivets. Care must be taken that all calibrated nuts, cap screws, and bolts are tightened to specifications.
7. Turn the gas tank valve to the OFF position.
8. Disconnect the battery cables; then remove the battery, clean the battery posts and cables, and store in a clean, dry area.
9. Store the ATV indoors in a level position.

CAUTION

Avoid storing outside in direct sunlight and avoid using a plastic cover as moisture will collect on the ATV causing rusting.

Preparation After Storage

Taking the ATV out of storage and correctly preparing it will assure many miles and hours of trouble-free riding. Arctic Cat recommends the following procedure to prepare the ATV.

1. Clean the ATV thoroughly.
2. Clean the engine. Remove the cloth from the muffler.
3. Check all control cables for signs of wear or fraying. Replace if necessary.
4. Change the engine/transmission oil and filter.

5. Charge the battery; then install. Connect the battery cables.

CAUTION

The ignition switch must be in the OFF position prior to installing the battery or damage may occur to the ignition system.
--

CAUTION

Connect the positive battery cable first; then the negative.

6. Check the entire brake systems (fluid level, pads, etc.), all controls, lights, and headlight aim; adjust or replace as necessary.
7. Tighten all nuts, bolts, cap screws, and screws making sure all calibrated nuts, cap screws, and bolts are tightened to specifications.
8. Check tire pressure. Inflate to recommended pressure as necessary.
9. Make sure the steering moves freely and does not bind.
10. Check the spark plug. Clean or replace as necessary.

Periodic Maintenance

This section has been organized into sub-sections which show common maintenance procedures for the Arctic Cat ATV.

SPECIAL TOOLS

A number of special tools must be available to the technician when performing service procedures in this section. Refer to the current Special Tools Catalog for the appropriate tool description.

Description	p/n
Compression Tester Kit	0444-213
Oil Filter Wrench	0644-389
Tachometer	0644-275
Timing Light	0644-296
Valve Clearance Adjuster	0444-178

■NOTE: Special tools are available from the Arctic Cat Service Parts Department.

Periodic Maintenance Chart

A = Adjust I = Inspect C = Clean L = Lubricate D = Drain R = Replace T = Tighten

Item	Initial Service After Break-In (First Mo or 100 Mi)	Every Day	Every Month or 100 Miles	Every 3 Months or 300 Miles	Every 6 Months or 500 Miles	Every Year or 1500 Miles	As Needed
Battery	I		I				C
Fuses				I			R
Air Filter/Drain Tube	I	I	C*				R
Valve/Tappet Clearance	I				I		A
Engine Compression						I	
Spark Plug	I			I			R (4000 Mi or 18 Mo)
Muffler/Spark Arrester					C		R
Gas/Vent Hoses	I	I					R (2 Yrs)
Throttle Cable	I	I			C-L		A-R
Carburetor Float Chamber				D*			
Engine Idle RPM	I				I		A
Engine-Transmission Oil Level		I					A
Engine-Transmission Oil/Filter	R			R*/R**/R***			
Front Differential/Rear Drive Lubricant	I		I				R (4 Yrs)
Tires/Air Pressure	I	I					R
Steering Components	I	I		I			R
V-Belt	I				I		R
Suspension (Ball joint boots, drive axle boots front and rear, tie rods, differential and rear drive bellows)	I	I					R
Nuts/Cap Screws/Screws	I		I				A
Ignition Timing						I	
Lights	I	I					R
Switches	I	I					R
Shift Lever					I		A-L
Handlebar Grips		I					R
Handlebar	I	I					R
Gauges/Indicators	I	I					R
Frame/Welds/Racks	I				I		
Electrical Connections	I				I		C
Complete Brake System (Hydraulic & Auxiliary)	I	I		C			L-R
Brake Pads	I			I*			R
Brake Fluid	I			I			R (2 Yrs)
Brake Hoses	I			I			R (4 Yrs)

* Service/Inspect more frequently when operating in adverse conditions. ** When using an API certified SM 5W-50 oil.

*** When using Arctic Cat ACX All Weather synthetic oil, oil change interval can be increased to every 1,000 miles or every year.

Lubrication Points

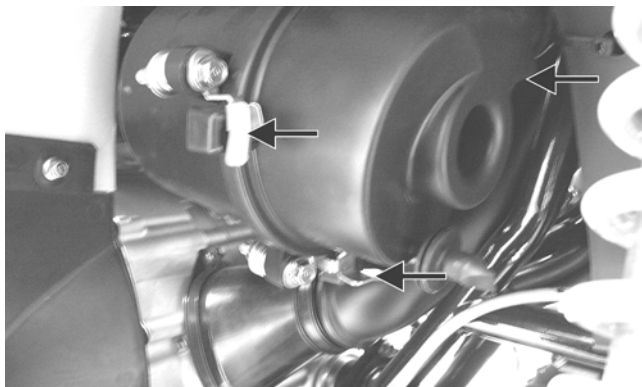
It is advisable to lubricate certain components periodically to ensure free movement. Apply light oil to the components using the following list as reference.

- A. Throttle Lever Pivot/Cable Ends
 - B. Brake Lever Pivot/Cable Ends
 - C. Auxiliary Brake Cable Ends
-
-

Air Filter

CLEANING AND INSPECTING FILTER

1. Rotate the three locking tabs free of the lugs on the air filter cover; then rotate the cover forward and away from the filter housing.

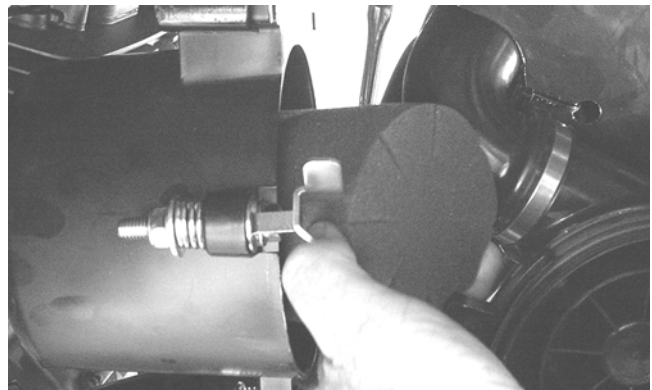


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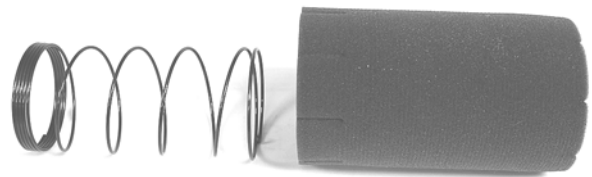


KC147

2. Remove the foam filter element from the air filter housing and separate the foam element from the spring.



KC148



KC143

3. Fill a wash pan larger than the element with a non-flammable cleaning solvent; then dip the element in the solvent and wash it.

■ **NOTE: Foam Air Filter Cleaner and Foam Air Filter Oil are available from Arctic Cat.**

4. Dry the element.
5. Put the element in a plastic bag; then pour in air filter oil and work the oil into the element. Insert the forming spring into the element with the closely wrapped end of the spring toward the open end of the element.

CAUTION

A torn air filter element can cause damage to the ATV engine. Dirt and dust may get inside the engine if the element is torn. Carefully examine the element for tears before and after cleaning it. Replace the element with a new one if it is torn.

6. Clean any dirt or debris from inside the air cleaner. Be sure no dirt enters the carburetor.
7. Place the filter assembly in the air filter housing making sure it is properly positioned and properly seated with the filter element straight in the housing.

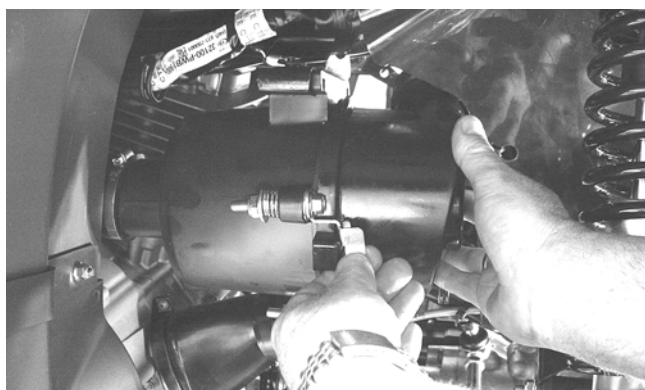


KC147

CAUTION

Failure to properly seat and align the filter element may cause severe engine damage.

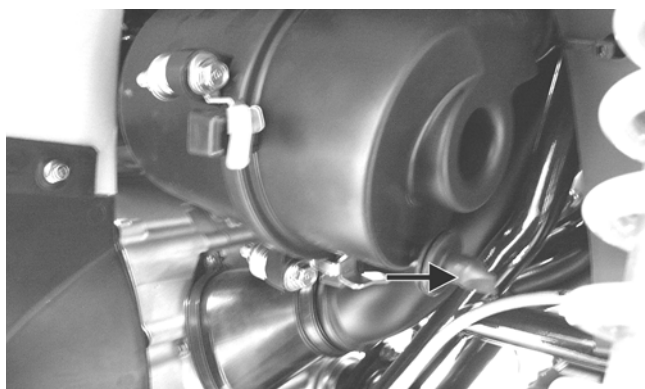
8. Install the air filter housing cover and secure with the locking tabs.



KC123

CHECKING AND CLEANING DRAIN

1. Inspect the drain on the filter housing cover and clean out any dirt or debris.



KC0056C

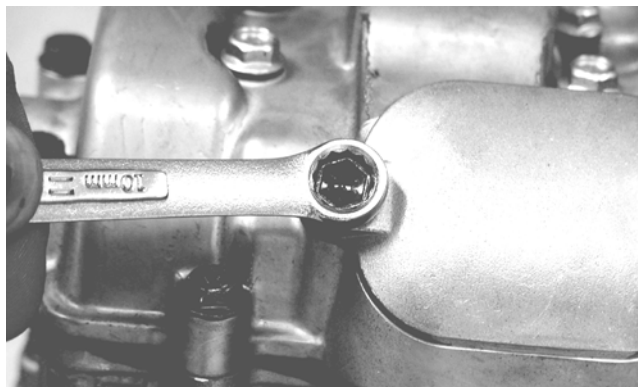
2. Replace any drain that is cracked or shows any signs of hardening or deterioration.
3. Wipe any accumulation of oil or gas from the filter housing and drain.

Valve/Tappet Clearance

To check and adjust valve/tappet clearance, use the following procedure.

■ **NOTE:** The seat, left-side and right-side engine covers, and gas tank must be removed for this procedure.

1. Remove the timing inspection plug and spark plug; then remove the valve inspection covers (for more detailed information, see Engine/Transmission - Servicing Top-Side Components).



CF005

2. Rotate the crankshaft to the TDC position on the compression stroke.

■ **NOTE:** At this point, the rocker arms and adjuster screws must not have pressure on them.

Feeler Gauge Procedure

Using a feeler gauge, check each valve/tappet clearance. If clearance is not within specifications, loosen the jam nut and rotate the tappet adjuster screw until the clearance is within specifications. Tighten each jam nut securely after completing the adjustment.

CAUTION

The feeler gauge must be positioned at the same angle as the valve and valve adjuster for an accurate measurement of clearance. Failure to measure the valve clearance accurately could cause valve component damage.

VALVE/TAPPET CLEARANCE

Intake	0.076-0.127 mm (0.003-0.005 in.)
Exhaust	0.152-0.203 mm (0.006-0.008 in.)