2013 Snowmobile

SERVICE MANUAL

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16. 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, ventilated tarpaulin to protect it from dirt and dust.

17. 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, ventilated 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 assure many miles and hours of trouble-free snowmobiling. Arctic Cat recommends the following procedure:

CAUTION

On the 570 cc if the gas in each carburetor float chamber was not drained prior to storage, the carburetors must be cleaned before starting the engine.

1. Clean the snowmobile thoroughly. Polish the exterior of the snowmobile.

2. Clean the engine. Remove the cloth from the exhaust system. Check exhaust system and air 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 (see Section 6).

■NOTE: If the old belt is worn but in reasonable condition, retain it with the snowmobile as a spare in case of emergency.

5. On the 570 cc, inspect the in-line fuel filter and replace if necessary; then adjust the carburetors and choke cable.

⚠ WARNING

Be sure to tighten the swivel adapter jam nuts securely. If a jam nut isn't tightened, the adjuster can rotate out of the carburetor cap causing the piston valve not to return to the full-closed position.

6. Adjust the throttle cable. Inspect all fuel hoses and oil hoses for deterioration or cracks; replace if necessary. Make sure all connections are tight.

7. On the 2-stroke, fill the oil-injection reservoir with the recommended 2-cycle oil; then inspect each spark plug. Replace, gap, or clean as necessary.

■NOTE: On the 2-stroke models after prolonged storage, Arctic Cat recommends one tankful of 100:1 gas/oil mixture be used in conjunction with the oil-injection system to ensure proper lubrication.

8. Tighten all nuts, bolts, and cap screws making sure all calibrated nuts, bolts, and cap screws are tightened to specifications.

9. If not done during preparation for storage, lubricate the rear suspension with an all-temperature grease. On the Bearcat/F-Series/T-Series, lubricate the spindles and steering arm with an all-temperature grease.

10. On liquid cooled models, check the coolant level and all coolant hoses and connections for deterioration or cracks. Add properly mixed coolant as necessary.

11. On the 570 cc, clean the engine cooling fins and vents.

12. On electric start models, charge the battery; then connect the battery cables making sure to connect the positive cable first. Test the electric start system.

13. Inspect the entire brake system, all controls, headlight, taillight, brake light, ski wear bars, and headlight aim; adjust or replace as necessary.

14. Adjust the track to the proper tension and alignment.

After Break-In Checkup/ Checklist

Certain areas require adjustment after the break-in period in order to obtain peak performance. These areas are the following.

CARBURETOR JETTING (570 cc) — Altitude, temperature, and the use of oxygenated gasoline affect the carburetion needed for optimum engine performance. The carburetor main jets must be changed in conjunction with changes in operating altitude, oxygenated gasoline usage, and temperature.

DRIVE BELT DEFLECTION — Drive belt deflection is very important to the snowmobile. Even if it is checked and is correct when the snowmobile is set up, it does change (more so during the break-in period). This is because the rubber engine mounts and the rubber snubber on the torque link will all take a "set" during the first 100 miles allowing the distance between the drive clutch and driven clutch to shorten. When this happens, the snowmobile will appear to have a too long drive belt. To add to this, the drive belt itself wears and stretches somewhat leading to a low-end performance problem and, if not corrected, causes premature drive belt wear.

After the break-in period, drive belt deflection should be checked according to the instructions given in Section 6 of this manual.

DRIVE CLUTCH/DRIVEN CLUTCH ALIGNMENT — The alignment between the drive clutch and driven clutch are set at the factory. Normally, no adjustment is necessary; however, if premature drive belt wear or poor performance is experienced, the drive clutch/driven clutch alignment must be checked.

Torque Specifications

■**NOTE: Torque specifications have the following tolerances:**

Torque (ft-lb)	Tolerance
0-15	±20%
16-39	±15%
40+	±10%

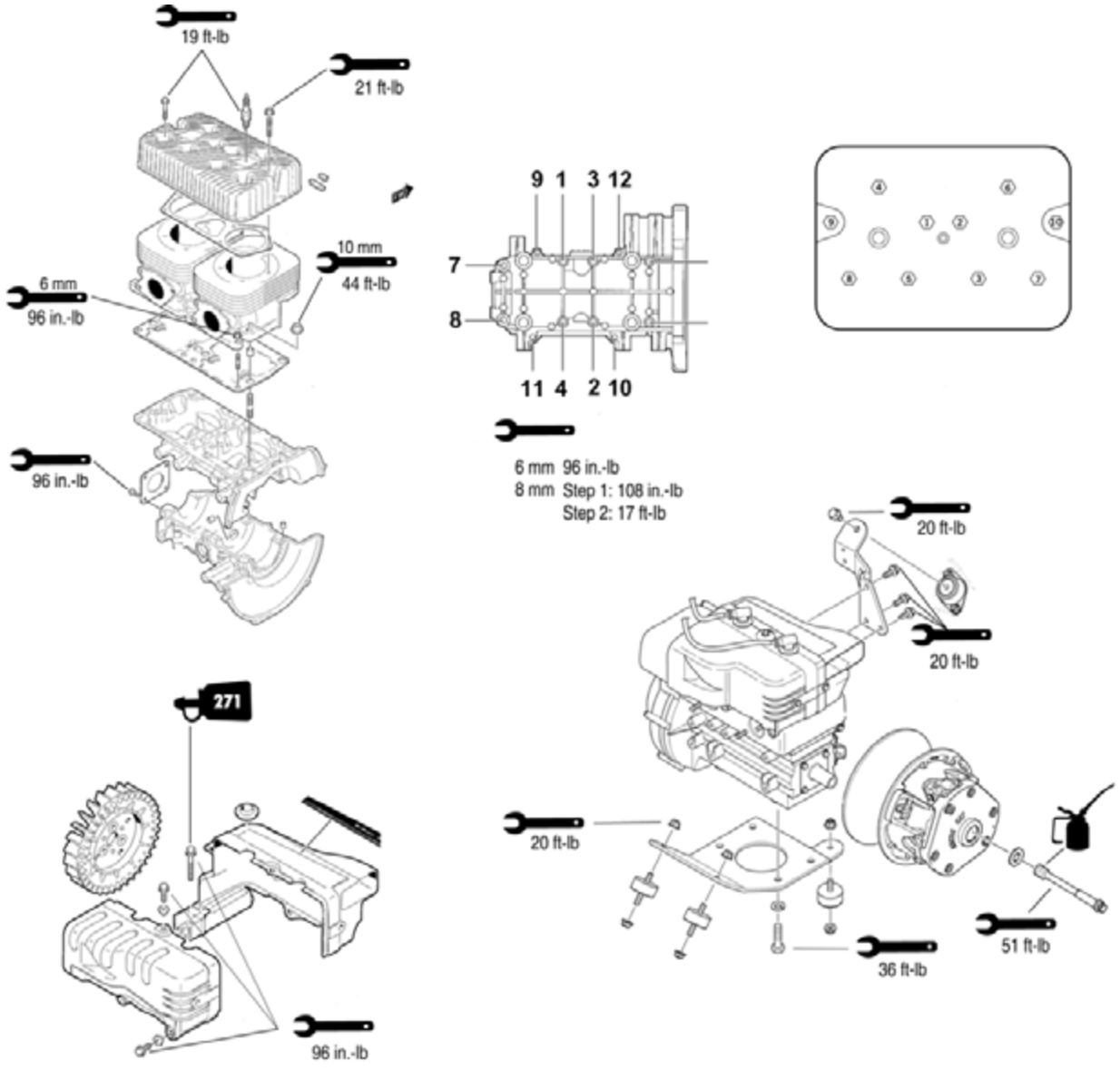
DRIVE SYSTEM		
Bearcat/F-Series/T-Series		
Item	**Secured to**	**Torque ft-lb**
Drive Clutch ***	Engine	51
Drive Clutch Cover	Movable Sheave	120 in.-lb
Cam Arm Pin Lock Nut	Cam Arm Pin	11
Cam Arm Set Screw*	Cam Arm	19 in.-lb
Drive Clutch*	Ring Gear	22
Driven Clutch	Input Shaft	32
Movable Sheave	Torque Bracket	72 in.-lb
Gear Case	Chassis	20
Gear Case Cover	Gear Case	12.5
Gear Case Drain/Fill Plug	Gear Case	15
Shift Actuator	Gear Case	41 in.-lb
Output Shaft	Driveshaft	70
Brake Disc	Driveshaft	120
Brake Caliper	Chassis	20
Brakeline	Caliper	10.5
Brakeline	Master Cylinder	21
Speedometer Sensor Bracket	Brake Caliper	17
F/M/XF		
Drive Clutch***	Engine	51
Drive Clutch Cover	Movable Sheave	120 in.-lb
Cam Arm Pin Lock Nut	Cam Arm Pin	11
Cam Arm Set Screw	Cam Arm	19 in.-lb
Driven Clutch	Driven Shaft	20
Top Sprocket	Driven Shaft	25
Movable Sheave	Torque Bracket	72 in.-lb
Chain Case (Cap Screw)	Chassis	96 in.-lb
Chain Case (Torx-Head Screw)	Chassis	12
Chain Case Cover	Chain Case	12
Shift Actuator (1100 cc)	Chain Case Cover	36 in.-lb
Brake Caliper	Chassis	25
Outside Caliper Housing	Inside Caliper Housing	25
Brakeline	Caliper	25
Brakeline	Master Cylinder	25
Brake Caliper	Shield Cover	96 in.-lb
Adapter Sleeve Ring Nut	Driven Shaft	50

STEERING/FRONT SUSPENSION/CHASSIS		
F/M/XF		
Item	**Secured to**	**Torque ft-lb**
Ski	Spindle	35
Ski	Wearbar	96 in.-lb
Ski	Ski Handle	54 in.-lb
Handlebar Adjuster Block (Standard)	Post	15
Handlebar Adjuster (Sno Pro)	Post	15
Steering Support	Mounting Block	96 in.-lb
Steering Post (F/XF/M 1100)	Steering Stop Bracket	43
Steering Tie Rod	Steering Post	35
Steering Tie Rod	Steering Arm	20
Steering Post Cap	Riser Block	120 in.-lb
Steering Post (M 800 SP/HCR)	Mounting Bracket	20
Tie Rod	Steering Post	20
Tie Rod	Steering Tie Rod Bracket	20
Tie Rod	Spindle Arm	32
Steering Support	Spar	12
Steering Support	Upper Console	30 in.-lb
Steering Arm	Chassis	96 in.-lb
A-Arm (Upper)	Chassis	23
A-Arm (Lower)	Chassis (Front)	55
A-Arm (Lower)	Chassis (Rear)	45
A-Arm	Spindle	45
Shock Absorber	Spindle	32
Shock Absorber	Chassis	32
Sway Bar Link	A-Arm/Sway Bar Link	23
Sway Bar Mounting Bracket	Chassis	96 in.-lb
Bearcat/F-Series/T-Series		
Ski	Spindle	32
Ski	Wearbar	108 in.-lb
Ski	Ski Handle	54 in.-lb
Shock Mount Frame	Suspension Mounting Bracket	96 in.-lb
Steering Post*	Suspension Mounting Bracket	35
Steering Tie Rod	Steering Post Arm	35
Tie Rod	Spindle	30
Steering Arm	Suspension Mounting Bracket	20
Drag Link**	Steering Arm	12
Tie Rod	Drag Link	35
Tie Rod End	Drag Link	35
A-Arm	Suspension Mounting Bracket	32
A-Arm (Upper)	Spindle	32
Lower A-Arm Retainer**	Spindle	13
Spindle Arm**	Spindle	30
Sway Bar Mounting Bracket	Suspension Mounting Bracket	120 in.-lb
Shock Absorber	Shock Mounting Frame	32
Upper Bearing Bracket	Support Plate	96 in.-lb
Shock Absorber	Spindle	32
Rear Bumper	Chassis	96 in.-lb
Rear Rack (BC XT)	Tunnel	20
Front Bumper (BC XT)	Suspension Mounting Bracket	32
Front Bumper (BC XT)	Shock Mounting Bracket	120 in.-lb

* w/Green Loctite #609
** w/Blue Loctite #243
*** w/Oil

Assembly Schematic - 570 cc

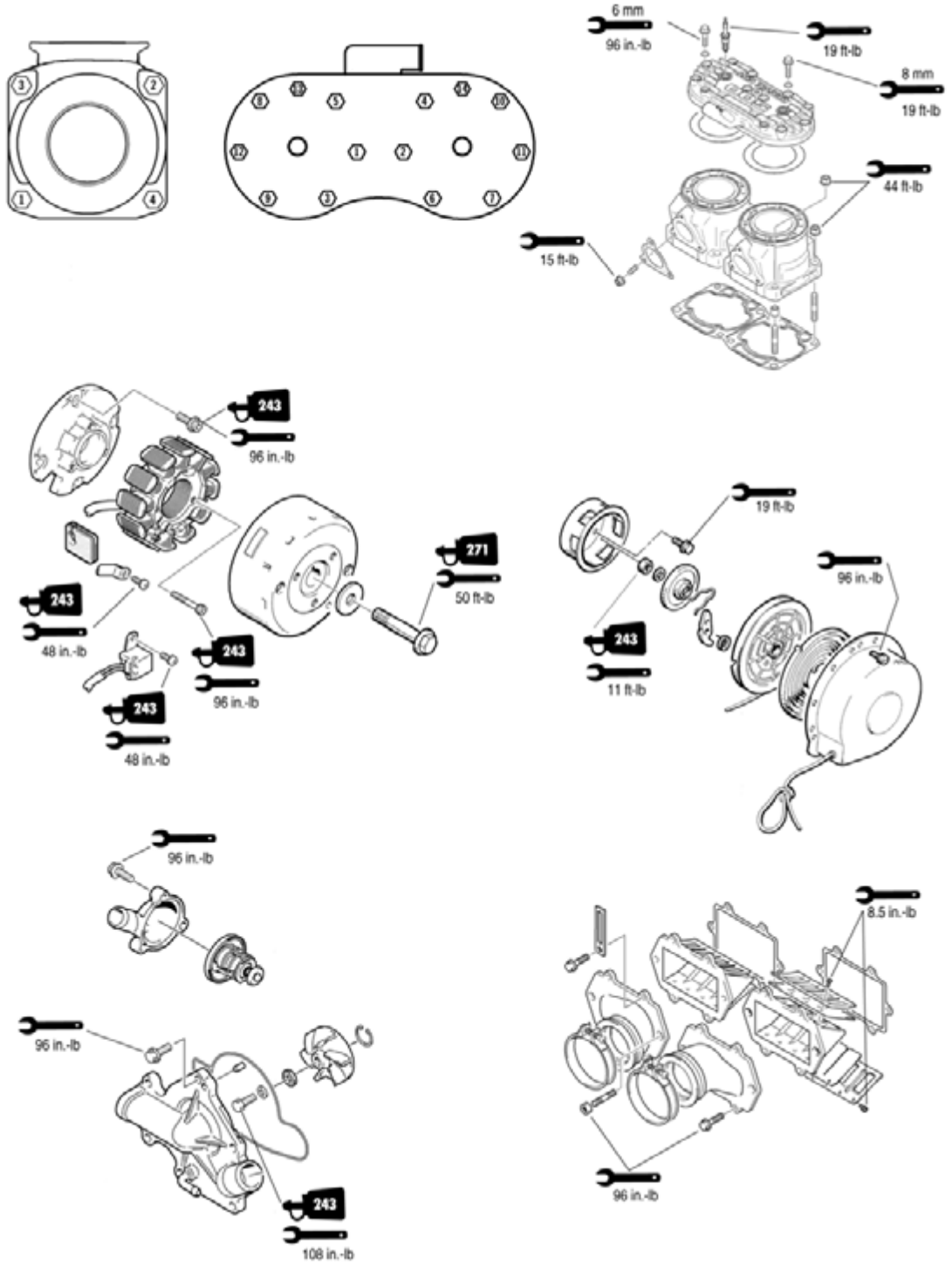
Torque Specification Tolerances	
Torque (ft-lb)	**Tolerance**
0-15	±20%
16-39	±15%
40+	±10%



570-ENG12

Assembly Schematic - 500 cc

Torque Specification Tolerances	
Torque (ft-lb)	**Tolerance**
0-15	±20%
16-39	±15%
40+	±10%



500CC1A12

Engine Removing/ Installing - Bearcat Z1 XT/TZ1

This engine section has been organized into sub-sections showing a progression for the removing/installing of the Arctic Cat 1100 cc (Bearcat Z1 XT/TZ1) engine. For consistency purposes, this section shows a complete and thorough progression; however, for efficiency it may be preferable to remove only those components needing to be addressed. Also, some components may vary from model to model. The technician should use discretion and sound judgment.

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

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

SPECIAL TOOLS

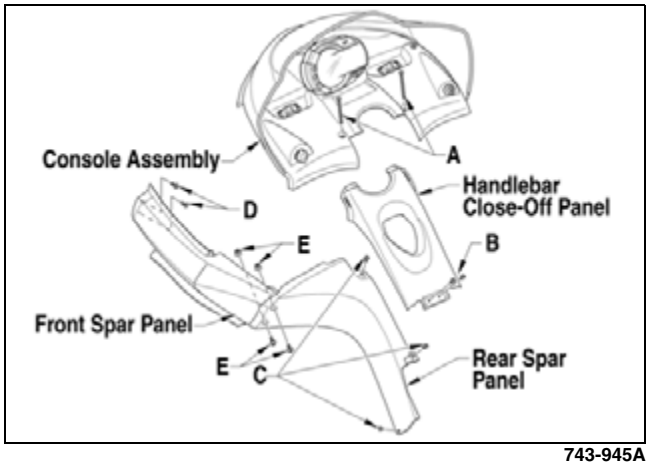
A number of special tools must be available to the technician when servicing the engine.

Description	p/n
Drive Clutch Puller	0744-062
Exhaust Spring Pliers	0644-391
Exhaust Spring Pliers	0644-397
Drive Belt Deflection Tool	0644-412
Drive Clutch Spanner Wrench	0644-136
Drive Clutch Bolt Tool	0644-281

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

Removing

1. Remove the hood and the right- and left-side access panels.
2. Remove the two torx-head cap screws (A) securing the console to the chassis; then lift up the rearward end of the console and disconnect the console harness plug-in. Remove the console.



743-945A

3. Remove the two screws securing the handlebar close-off panel (B); then remove the three screws (C) securing the left- and right-side rear spar panels to the seat support tubes. Remove the screws (D) securing the front spar panels to the front bumper; then remove the spar panels.

■NOTE: On the turbo model, only the console and cap screws (E) securing the left-front spar panel have to be removed.

4. Remove the seat (see Section 8).
5. Disconnect oxygen sensor connector; then remove the springs securing the exhaust pipe and resonator to the engine and chassis. Remove the exhaust assembly and account for exhaust gaskets and springs.

■NOTE: On the non-turbo models, the hairpin clip and tab washer must be removed to remove the resonator from the chassis.

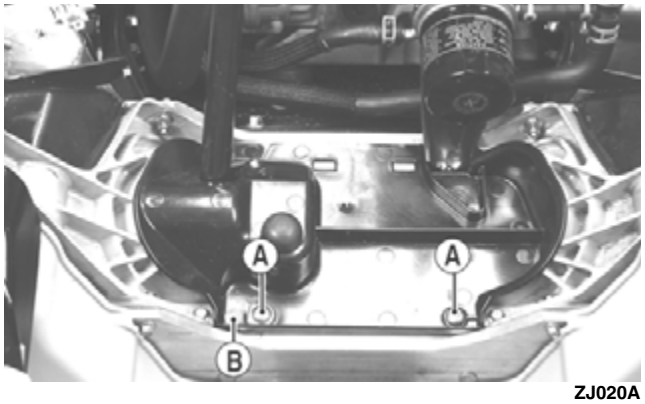
TZ101A

6. Remove the negative cable from the battery; then remove the positive cable. Remove the hardware securing the battery to the tray; then remove the battery.
7. Remove the hose clamp from the coolant hose (A) connecting the water pump to the right side of the oil cooler; then clamp off the coolant hose. With a drain pan positioned under the coolant hose, remove the hose from the water pump; then release the clamp. Tip the hose downward allowing the coolant to drain completely.

TZ074A

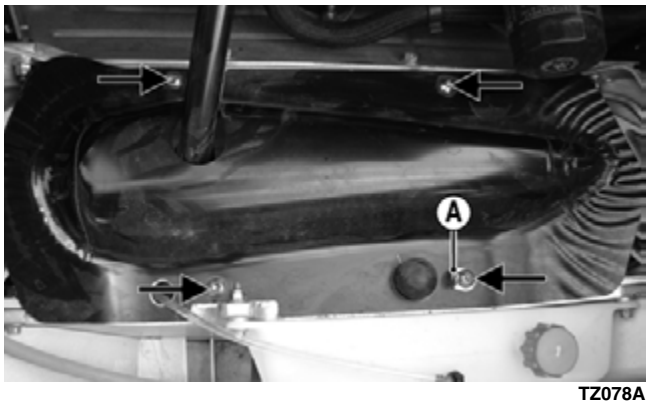
8. Using Drive Clutch Bolt Tool, remove the 12-mm Allen-head cap screw and washer securing the drive clutch to the crankshaft.

22. Install the close-off cover to the front end with the two cap screws (A) noting the mounting tab (non-turbo only) (B) is installed with the right-side cap screw. Tighten cap screws securely.



ZJ020A

■NOTE: On the Bearcat Z1 XT, install the close-off panel; then with the mounting tab (A) on the left front cap screw, secure the panel with the four cap screws.



TZ078A

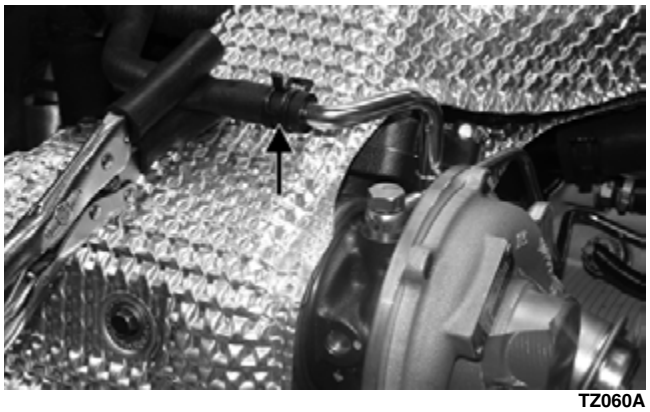
23. Place the resonator into position in the chassis and install the two springs securing the resonator to the chassis; then install the exhaust pipe and secure to the manifold and resonator with six springs.

■NOTE: On the non-turbo models, secure the resonator to the upper frame with the tab washer and hairpin clip.

24. Connect the harness plug-in for the oxygen sensor.

■NOTE: Steps 25-28 are for the turbo model only.

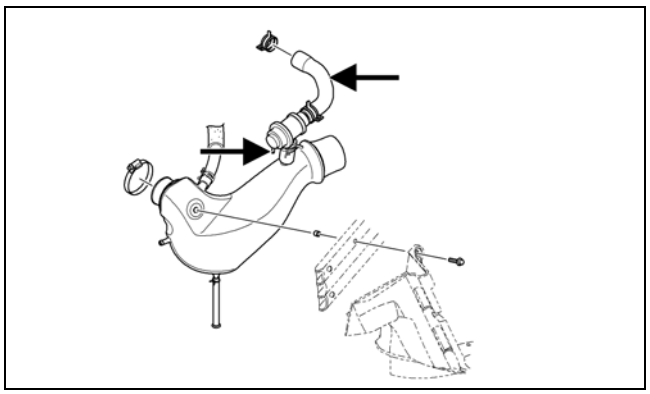
25. Install the upper heat shield; then connect the coolant return hose to the turbo and secure with the hose clamp.



TZ060A

■NOTE: To aid in coolant bleeding procedure, do not secure the upper heat shield to the manifold at this point.

26. Connect the air bypass hose and the air bypass control valve hose to the intake pipe and secure with the clamps.



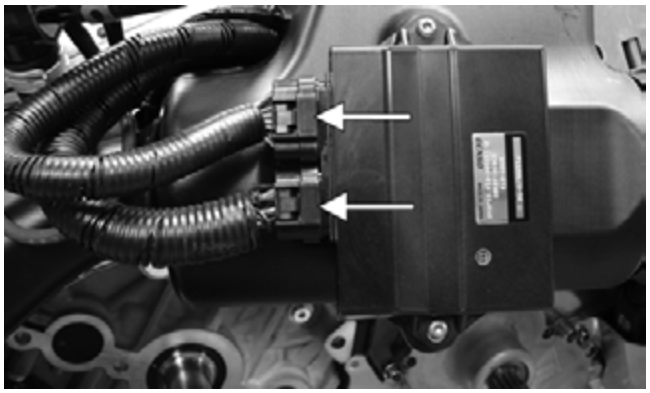
743-983A

27. Install the hose from the waste gate control valve to the elbow fitting of the turbocharger and secure with the clamp.

TZ086B

28. Position the intercooler into the grommets of the mounting bracket; then connect the intercooler hoses to the turbo and to the intake plenum. Tighten all hose clamps securely.

29. Connect the harness connector to the ECM.



TZ072A

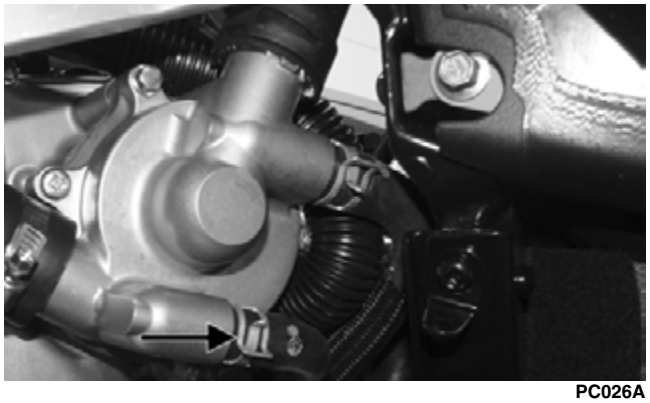
■NOTE: Before installing the drive clutch, be sure to wipe both the crankshaft taper and clutch mounting taper clean using a clean towel.

■**NOTE: On the turbo models, the shock mounting bracket support, left front spar, and heat shield are removed as an assembly.**

20. Remove the MAG-side chassis support. Account for and note the location and orientation of the resonator spring tab and resonator support bracket.

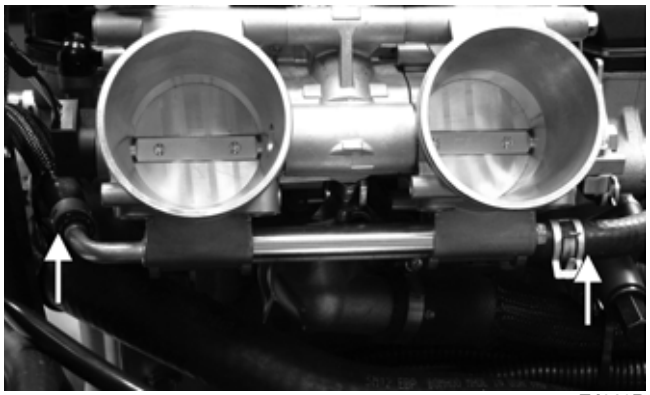
PC210A

21. Clamp off the coolant bypass hose and remove the hose from the water pump; then add a length of hose to the bypass hose and route the hose out of the exhaust opening of the skid plate. Drain the remaining coolant.



PC026A

22. Remove the throttle body coolant hoses.



ZJ018B

PC211A

23. Disconnect the harness connectors from the coolant temperature sensor (A), oil pressure switch (B), and air pressure sensor (C).

PC028A

24. Loosen the clamps and remove the drain and vent hoses and the throttle body coolant hose from the coolant/oil separator tank; then remove the tank from the bracket on the engine.

PC032

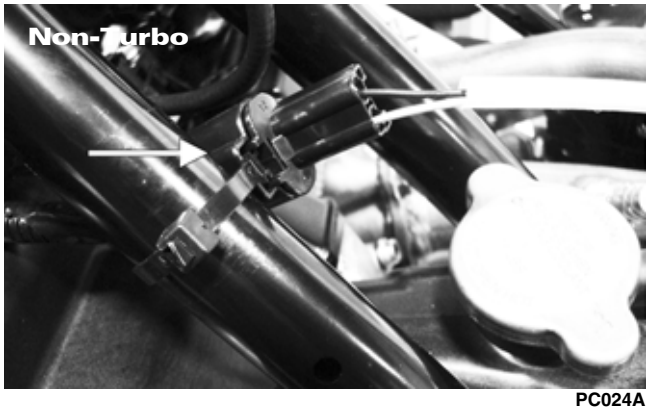
■**NOTE: Steps 25-27 are for the non-turbo models only.**

25. Loosen the clamps securing the air silencer to the throttle bodies; then disconnect the harness connector from the air temperature sensor and remove the air silencer.

33. Position the exhaust pipes and resonator into the chassis and install and secure the MAG and PTO exhaust flanges (with new gaskets) to the cylinder head with the flange nuts. Tighten evenly to 17 ft-lb.

34. With the resonator properly installed to the chassis support, install the spring securing the resonator to the mounting tab.

■NOTE: With the exhaust system installed, connect the oxygen sensor to the harness connector.



PC024A

PC241A

35. Install and secure the drive clutch with the cap screw (lightly coated with oil); then tighten the cap screw to 51 ft-lb.

CAUTION

When installing the drive clutch, do not tighten the clutch cap screw with any kind of impact tool. Tighten cap screw using a hand torque wrench only. Failure to do so could result in stationary sheave damage.

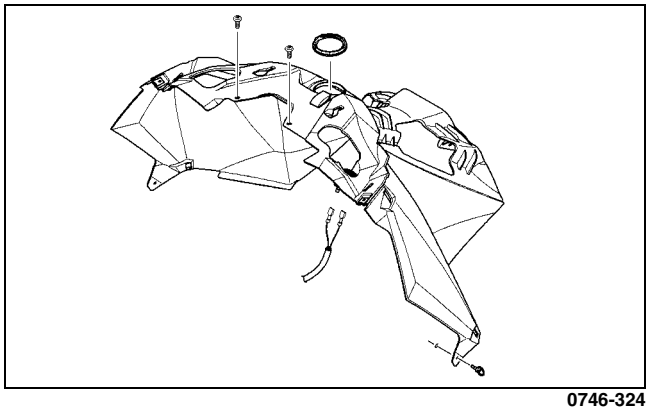
36. Install the drive belt (see Section 6); then install and secure the driven clutch (see Section 6).

37. Install the rear belt guard and connect the two harness connectors to the ECM; then lock the fuse block into the bracket of the front belt guard.

38. Install the gas tank (see Section 4).

PC027A

39. Install and secure the lower console to the skid plate with the ¼ turn screws; then install the upper console over the gas tank and install and tighten the retaining nut to the neck of the gas tank.

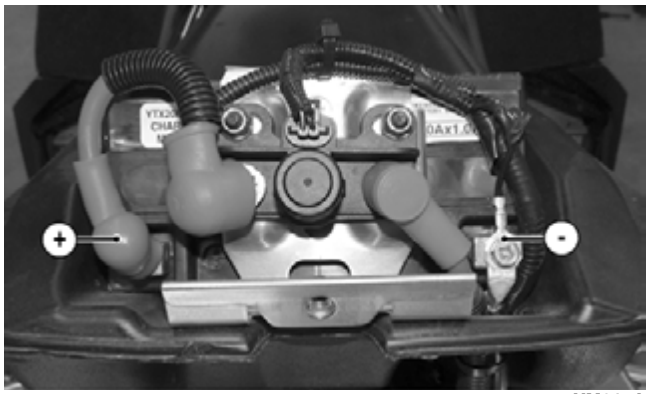


0746-324

40. Connect the wires to the reverse alarm; then install the two screws securing the console to the steering bracket.

■NOTE: On the LXR/LTD models, connect the harness connector to the seat heater switch before securing the upper console.

41. Connect the battery cables (positive first) and the ground wire to the battery; then connect the solenoid harness to the solenoid.

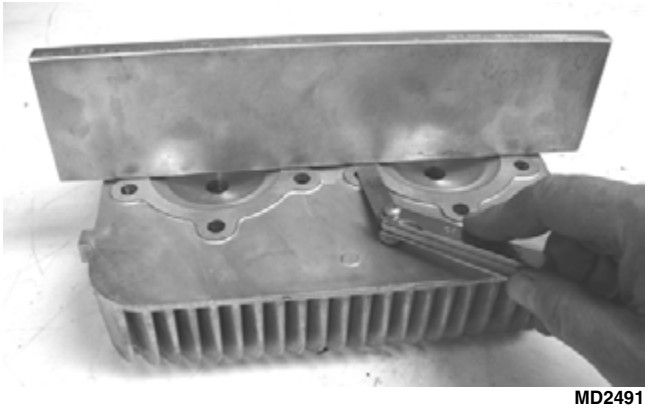


XM015A

■NOTE: On the LXR/LTD models, connect the seat heater harness connector.

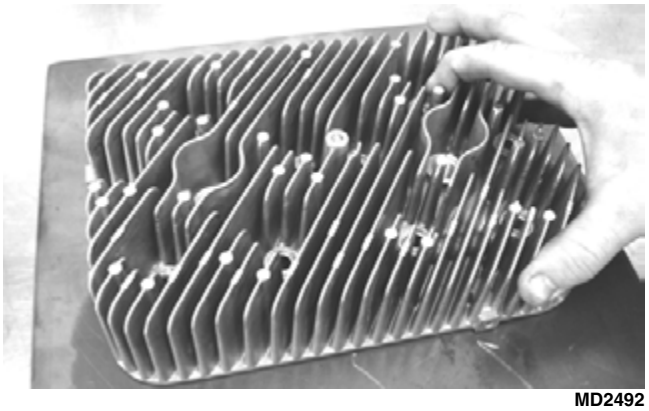
42. Install the seat (see Section 8).

43. Elevate the front of the snowmobile until the tunnel heat exchangers are angled upward towards the engine.



MD2491

4. Place the cylinder head on a Surface Plate covered with #400 grit wet-or-dry sandpaper. Using light pressure, move each cylinder head in a figure eight motion. Inspect the sealing surface for any indication of high spots. A high spot can be noted by a bright metallic finish. Correct any high spots before assembly by continuing to move the cylinder head in a figure eight motion until a uniform bright metallic finish is attained.



MD2492

CAUTION

Water or parts-cleaning solvent must be used in conjunction with the wet-or-dry sandpaper or damage to the sealing surface may result.

CYLINDERS

1. Using a non-metallic carbon removal tool, remove carbon buildup from the exhaust ports.
2. Wash the cylinders in parts-cleaning solvent.
3. Inspect the cylinders for pitting, scoring, scuffing, and corrosion. If marks are found, repair the surface with a Ball Hone and honing oil.

■NOTE: To produce the proper 45° crosshatch pattern, maintain a low drill RPM. If honing oil is not available, use a lightweight, petroleum-based oil. Thoroughly clean the cylinders and reed valves after honing using detergent soap and hot water and dry with compressed air; then immediately apply oil to the cylinder bores. If a bore is severely damaged or gouged, the cylinder must be replaced.

4. Place the head surface of each cylinder on the surface plate covered with #400 grit wet-or-dry sandpaper. Using light pressure, move each cylinder in a figure eight motion. Inspect the surface for any indication of high spots. A high spot can be noted by a bright metallic finish. Correct any high spots before assembly by continuing to move the cylinder in a figure eight motion until a uniform bright metallic finish is attained.

CAUTION

Water or parts-cleaning solvent must be used in conjunction with the wet-or-dry sandpaper or damage to the sealing surface may result.

PISTON ASSEMBLY

1. Using a non-metallic carbon removal tool, remove the carbon buildup from the dome of each piston.
2. Take an old piston ring and snap it into two pieces; then grind the end of the old ring to a 45° angle and to a sharp edge. Using the sharpened ring as a tool, clean carbon from the ring-grooves. Be sure to position the ring with its tapered side up.

CAUTION

Improper cleaning of the ring-grooves by the use of the wrong type of ring-groove cleaner will result in severe damage to the piston.

3. Inspect each piston for cracks in the piston pin and skirt areas.
4. Inspect each piston for seizure marks or scuffing. If scuffing or seizure marks are too deep, replace the piston.
5. Inspect the perimeter of each piston for signs of excessive “blowby.” Excessive “blowby” indicates worn piston rings or an out-of-round cylinder.

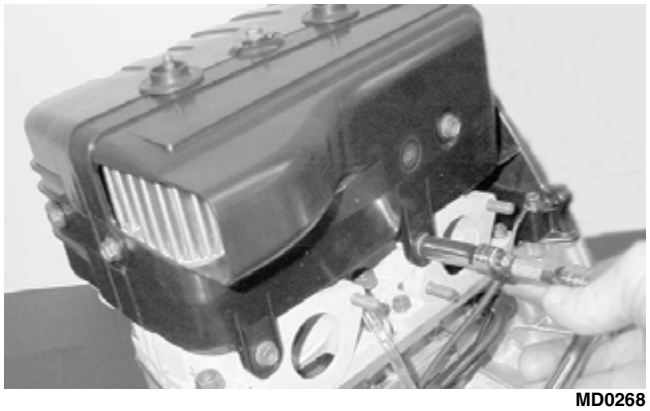
CRANKCASE

1. Wash the crankcase halves in parts-cleaning solvent.

■NOTE: Before washing the crankcase halves, make sure the four bearing dowel pins have been removed and accounted for.

2. Inspect the crankcase halves for scoring, pitting, scuffing, or any imperfections in the casting.
3. Inspect all threaded areas for damaged or stripped threads.
4. Inspect the bearing areas for cracks or excessive bearing movement. If evidence of excessive bearing movement is noted, the crankcase must be replaced.
5. Inspect the bearing dowel pins for wear.
6. Inspect the sealing surfaces of the crankcase halves for trueness by placing each crankcase half on the surface plate covered with #400 grit wet-or-dry sandpaper. Using light pressure, move each half in a figure eight motion. Inspect the sealing surfaces for any indication of high spots. A high spot can be noted by a bright metallic finish. Correct any high spots by continuing to move the half in a figure eight motion until a uniform bright metallic finish is attained.

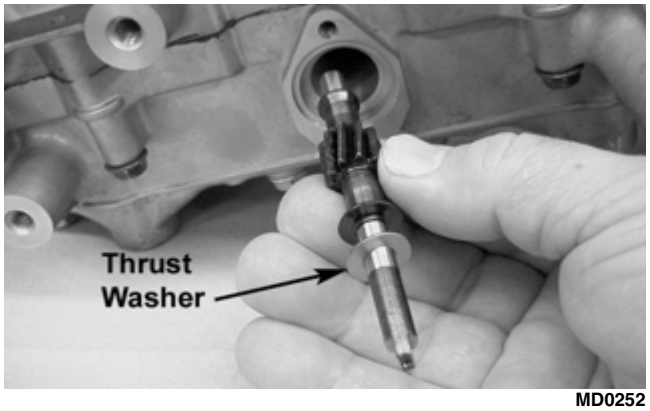
MD0269



MD0268

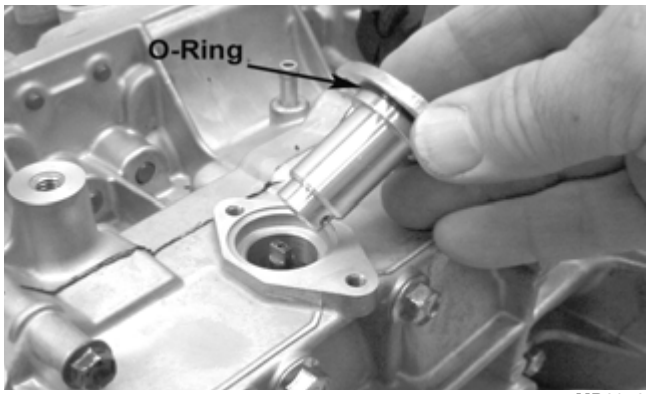
26. Lubricate the oil-injection pump driveshaft; then while rotating the driveshaft, install it and the thrust washer into the lower crankcase half.

■NOTE: When installing the oil-injection pump driveshaft, make sure the thrust washer is installed.



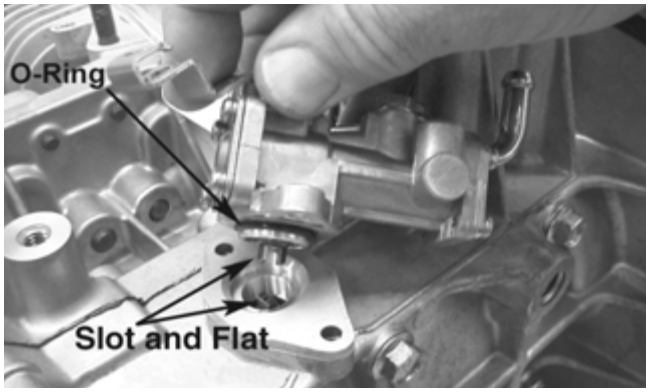
MD0252

27. With a new O-ring (lightly coated with oil) in place, install the oil-injection pump driveshaft retainer.



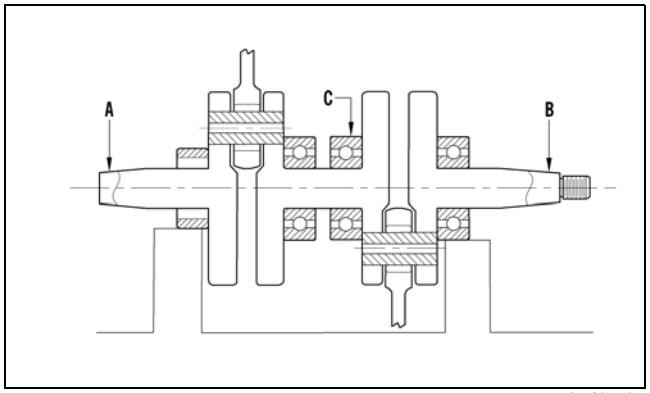
MD0273

28. With a new O-ring (lightly coated with oil) in place, install the oil-injection pump aligning the slot on the oil pump with the flat on the end of the oil-injection pump driveshaft. Tighten the Allen-head cap screws (coated with blue Loctite #243) to 48 in.-lb.



MD0294

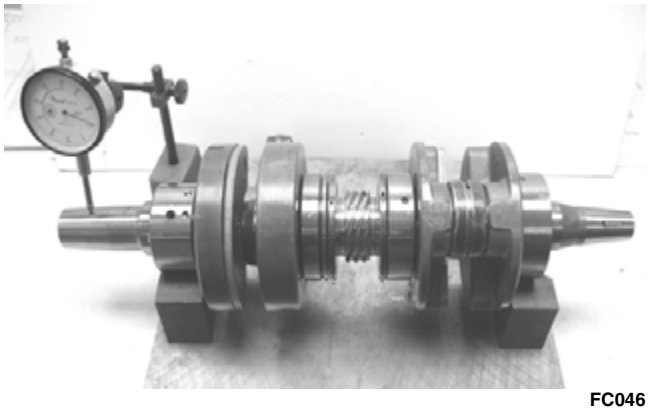
29. Install the first set of intake gaskets (coated with High-Temp Sealant), heat deflector, remaining gaskets, insulators, and flanges. Secure with nuts and washers and tighten the nuts (threads coated with red Loctite #271) to 15 ft-lb.



0742-727

■NOTE: For runout location point specifications, see Crankshaft Runout/Repair Specifications in Section 1 of this manual.

3. Position the indicator contact point against the crankshaft location point B (MAG-end) from the crankshaft end. Zero the indicator and rotate the crankshaft slowly. Note the amount of crankshaft runout (total indicator reading).



FC046

4. Position the indicator contact point against the crankshaft at location point C (center). Zero the indicator and rotate the crankshaft slowly. Note the amount of crankshaft runout (total indicator reading).
5. If runout exceeds 0.002 in. at any of the checkpoints, the crankshaft must be either straightened or replaced.

Assembling

■NOTE: The use of new gaskets and seals is recommended when assembling the engine.

■NOTE: Prior to assembling the engine, use parts cleaning solvent and compressed air and thoroughly clean the threaded holes of the crankcase and cylinders to properly tighten.

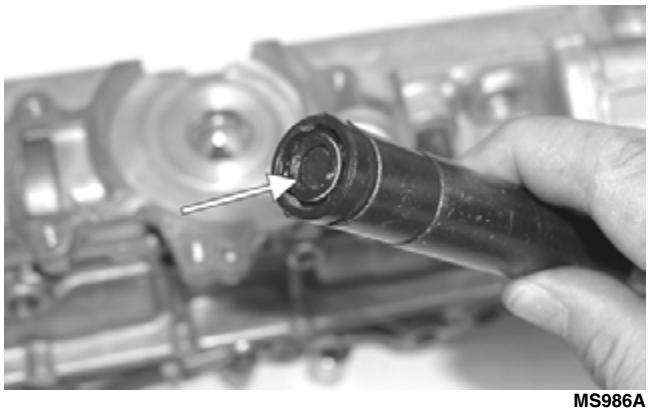
⚠ WARNING

Always wear safety glasses when drying components with compressed air.

■NOTE: When the use of a lubricant is indicated, use Arctic Cat Synthetic APV 2-Cycle Oil.

1. Apply a thin coat of grease to the inner seal lips of the water pump seal.
2. Using the seal driver, position the inner water pump shaft seal onto the seal driver and gently tap the seal down into position.

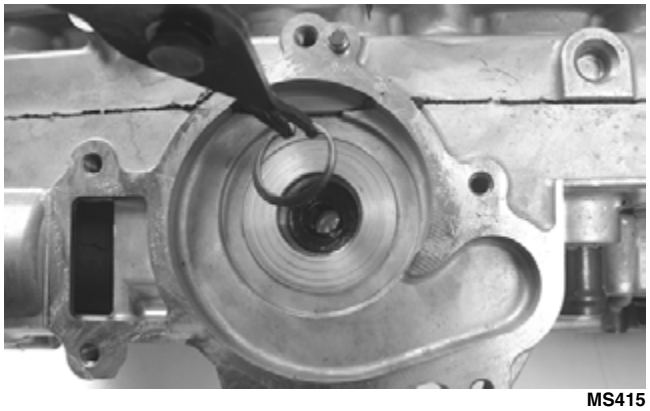
■NOTE: Grease must be applied to the lips of the inner seal before installation.



MS986A

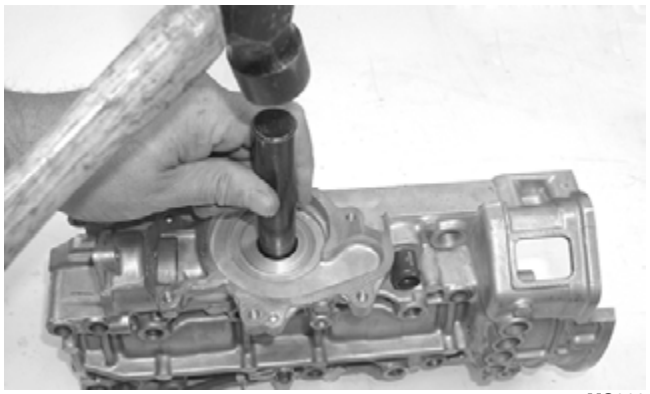
■NOTE: The seal must be installed with its spring side towards the crankshaft.

3. Install the snap ring securing the inner seal in the crankcase.



MS415

4. Using the seal driver, carefully install the outer water pump seal. Gently tap the seal down into position until it seats itself against its flange.



MS988

5. Position the upper crankcase half upside-down on two wooden blocks; then install the C-ring, the four bearing retaining pins, and the two crankcase dowel pins.

13. Using Piston Pin Puller and medium Extractor Nut, remove the piston pins from both pistons.

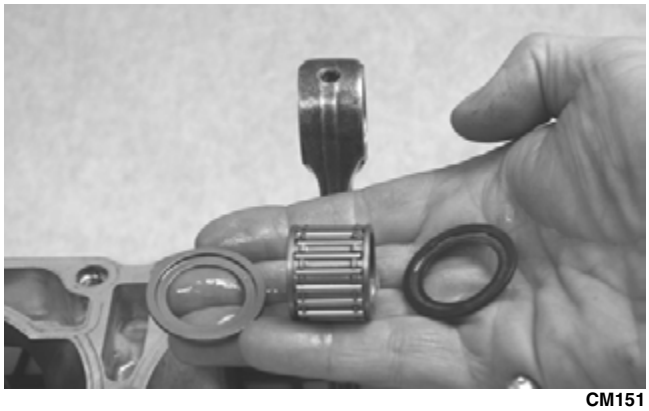
■NOTE: For proper assembly, keep all MAG-side components and all PTO-side components separated. Assemble them on their proper sides.

CM150

CAUTION

DO NOT use any type of punch to drive the piston pin free of the piston; damage may result. Use a piston-pin puller only.

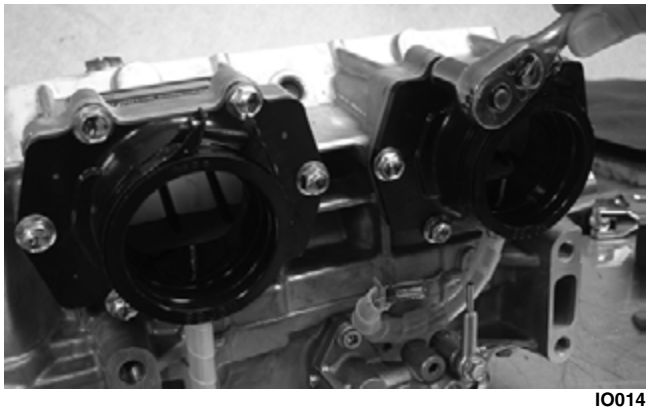
14. Lift the pistons clear of the connecting rods and remove the small-end connecting-rod bearings (account for two washers); then remove the piston rings. Keep each piston with its rings; keep each piston pin and bearing together as a set.



CM151

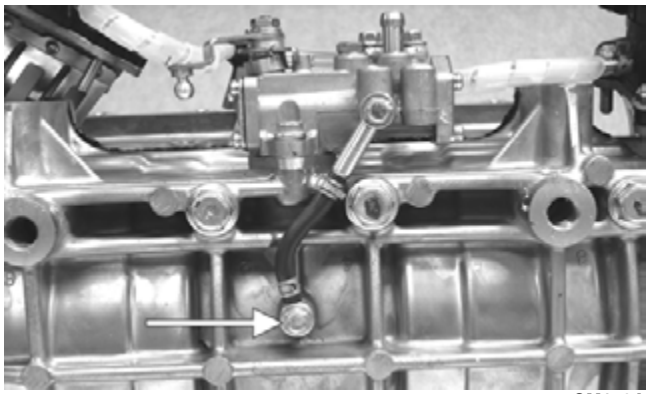
■NOTE: Place a suitable length of rubber hose around the connecting rods to prevent the connecting rods from damaging the crankcase.

15. Disconnect the intake flange oil lines from the oil pump; then remove the cap screws securing the intake flanges. Remove the intake flanges and reed valve assemblies.



IO014

16. Remove the lower union cap screw securing the lower check valve assembly to the crankcase; then remove the two screws securing the oil-injection pump to the crankcase. Remove the pump, retainer, and O-ring and account for the two gaskets from the lower union.



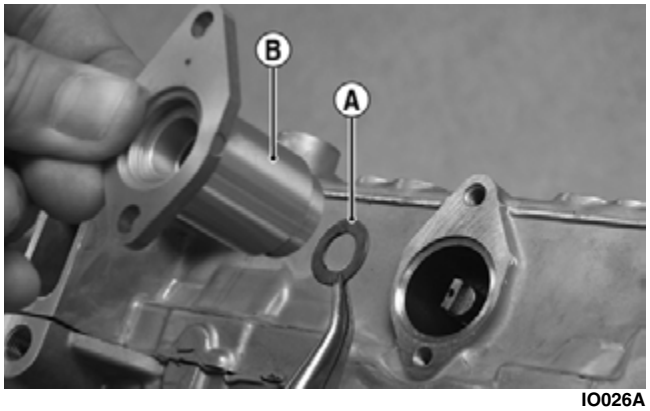
CM153A

IO015A

17. Remove the four cap screws securing the thermostat cap; then remove the cap, gasket, and thermostat.

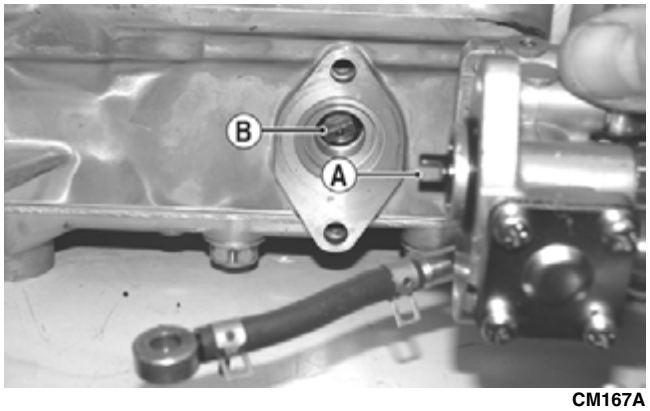
IO025A

16. Position the shim (A) on the oil-injection pump end of the driveshaft; then install the oil-injection pump retainer (B) with a new O-ring.



IO026A

17. With the new O-ring (lightly coated with oil) in place, install the oil-injection pump making sure the pump shaft slot (A) and pump driven gear shaft (B) align. Secure with two screws (coated with blue Loctite #243). Tighten the two screws to 96 in.-lb.

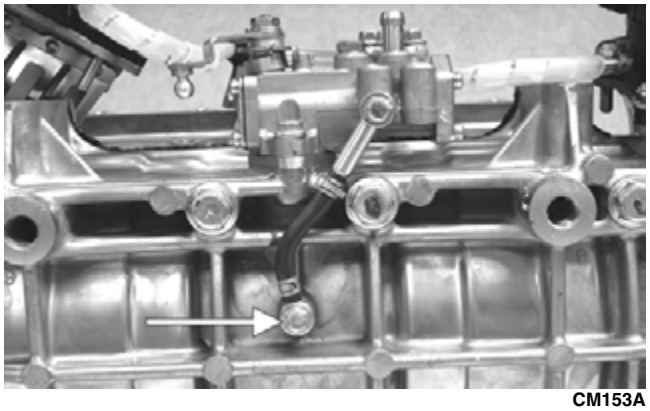


CM167A

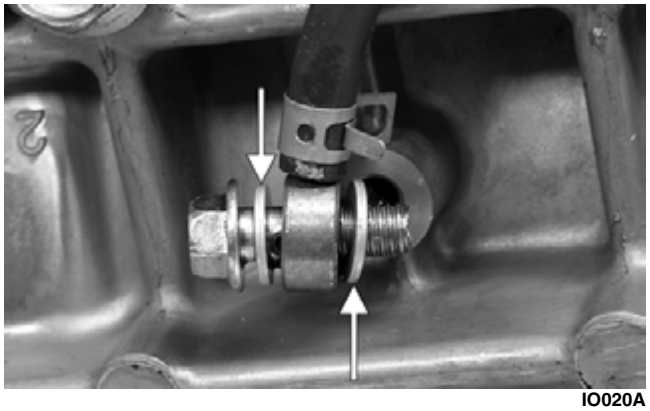
CAUTION

Be sure the oil-injection pump/water pump driveshaft is properly aligned with the slot of the oil-injection pump. The pump will be damaged if these two components are not aligned.

18. Place the lower union assembly (with new gaskets) into position and secure with the gaskets and union cap screw. Tighten to 48 in.-lb.



CM153A

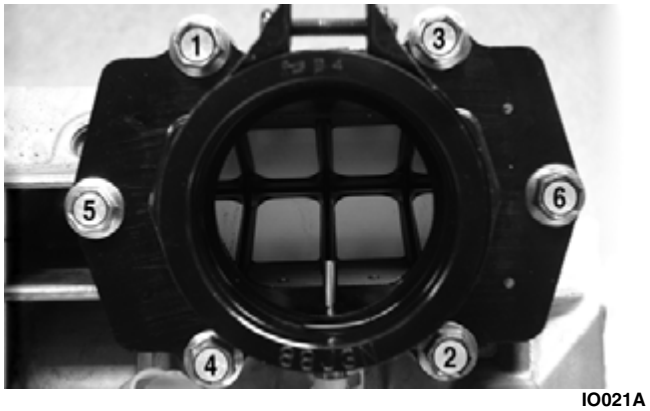


IO020A

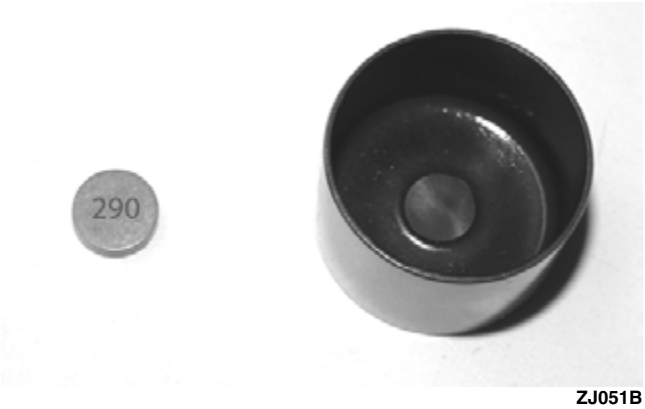
CAUTION

Always use new gaskets and assure that a gasket is in place on each side of the union prior to securing the union cap screw to the crankcase.

19. With new gaskets, install the reed valve assemblies and intake flanges using the pattern shown. Tighten to 96 in.-lb; then secure the intake flange oil hoses to the oil pump and secure with the clamps.

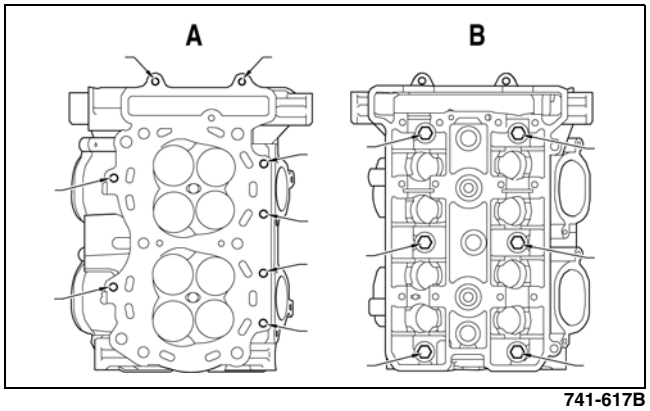


IO021A



ZJ051B

21. Remove the six nuts and two cap screws (A) from outside the cylinder head; then remove the six cap screws (B) from inside the cylinder head. Remove the head and account the gasket and two dowel pins.

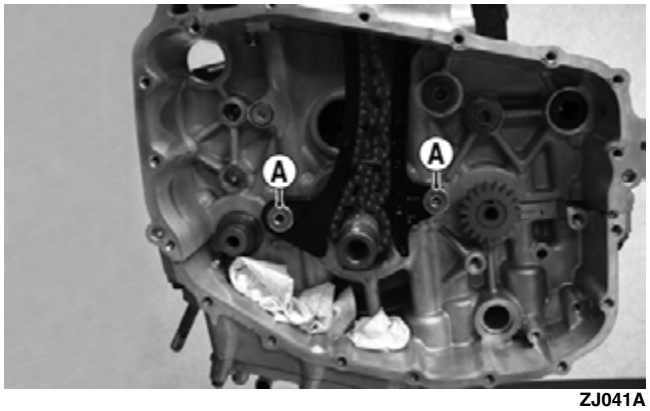


741-617B

■NOTE: If removing the oil cooler, remove the union bolt securing the cooler to the engine; then remove the oil cooler and account for a washer and an O-ring.

ZJ040

22. Remove the Allen-head cap screws (A) securing the front and back timing chain tension guides to the engine; then remove the guides and account for the timing chain and the washers located between the tension guides and engine.



ZJ041A

23. Remove the fourteen cap screws securing the oil pan to the engine; then remove the oil pan and note the location of the different-length cap screws for assembling purposes.

24. Tip the engine upside down; then remove the 28 cap screws securing the upper and lower crankcase halves. Using a soft hammer, gently tap around the bottom half until it separates.

■NOTE: Note the location of the different-length cap screws for assembling purposes.

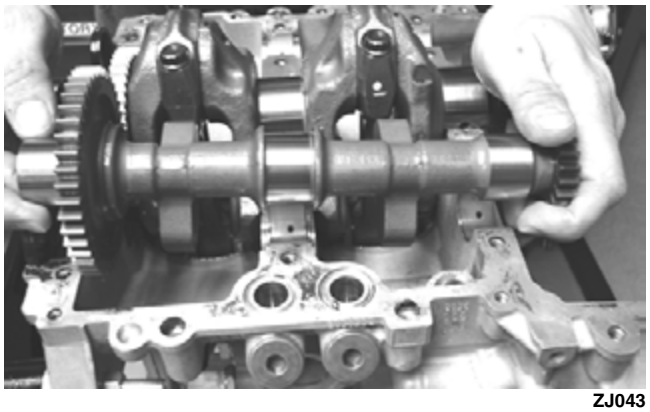
CAUTION

DO NOT drive any tool between halves to separate the crankcase. Damage to the sealing surfaces will result.

25. After separating the crankcase halves, account for two O-rings and three dowel pins.

26. For easier access to components, rotate the crankshaft to the bottom-dead-center position (connecting rod caps straight up).

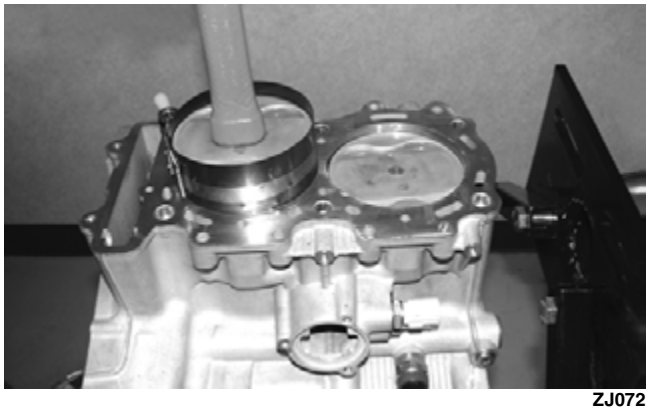
27. Remove the front and rear crank balancers from the engine and account for the two end seals.



ZJ043

28. On each connecting rod, remove the two connecting rod cap screws; then remove the connecting rod cap. Account for the two connecting rod bearings.

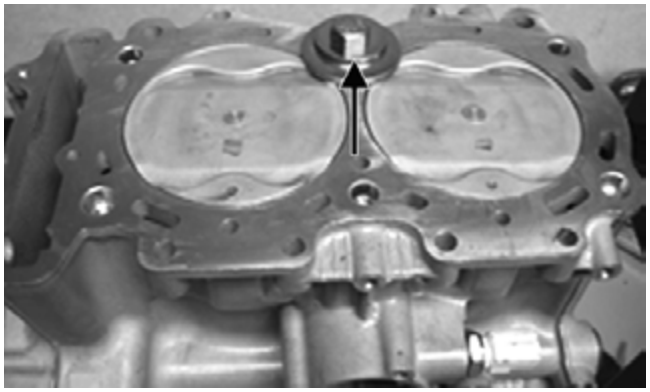
4. Using Ring Compressor and a soft hammer/hammer handle, carefully drive each piston into the cylinder until the top of the piston is flush with the engine case.



ZJ072

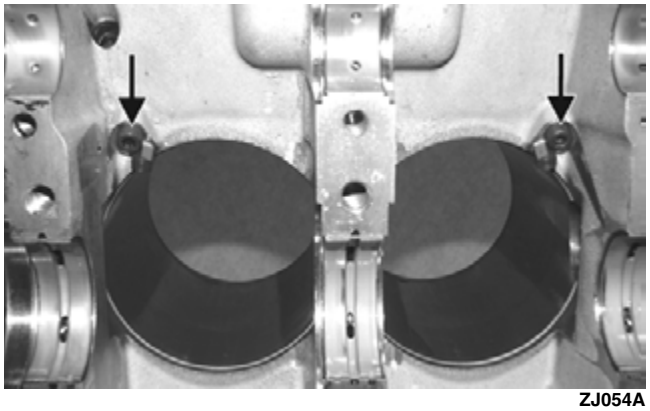
5. Rotate the engine to the upside down position for installing the crankshaft and counterbalancers.

■NOTE: Install a cap screw and large washer to the cylinder head cap screw hole between pistons to avoid any chance of the pistons sliding out of the cylinder.



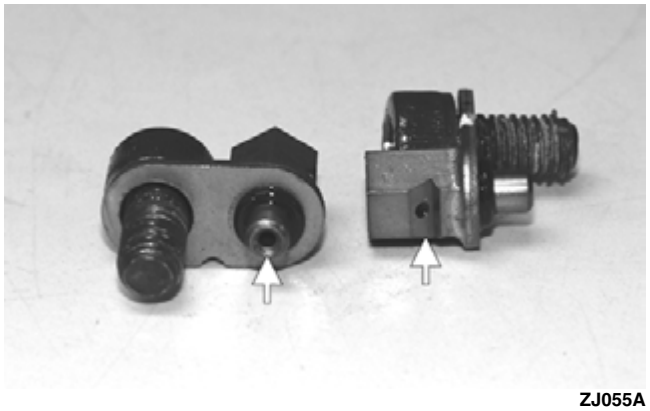
ZJ073A

6. With new O-ring, install the piston cooling jets with Allen-head cap screws; then tighten to 84 in.-lb.



ZJ054A

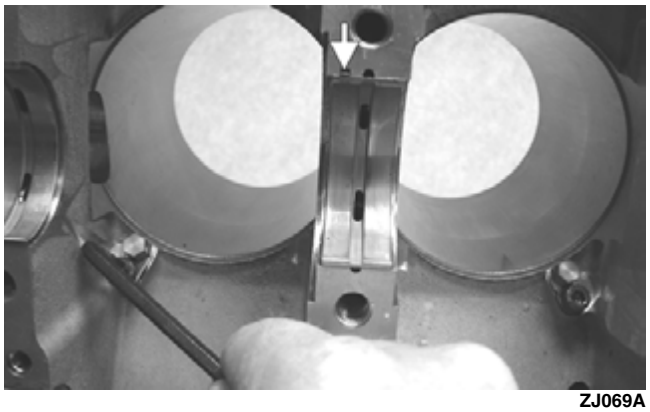
■NOTE: Prior to installing the jets, make sure the orifices are clear of any debris or contaminants.



ZJ055A

7. With the proper bearings selected, install the half-bearings into the upper engine case; then lubricate the bearing faces liberally with engine-assembling grease taking care not to get any grease between the engine case and bearing.

■NOTE: Make sure the tabs of the bearings are properly seated to the notches in the upper engine case.



ZJ069A

CAUTION

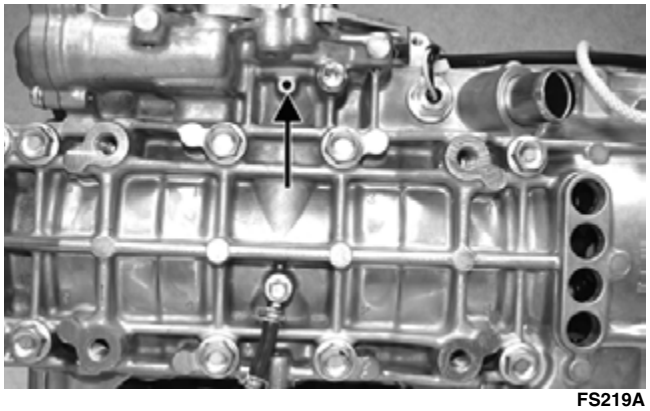
Prior to lubricating the bearings and journals, make sure all surfaces are cleaned thoroughly and dried with compressed air to avoid contaminants between the bearings and shaft surface.

■NOTE: At this point, remove the connecting rod caps.

8. Lubricate the lips of the crankshaft seal with grease and install the crankshaft seal over the PTO end of the crankshaft with the spring side of the seal directed toward the crankshaft; then install the crankshaft.

■NOTE: Position the crankshaft at bottom-dead-center for assembling purposes.

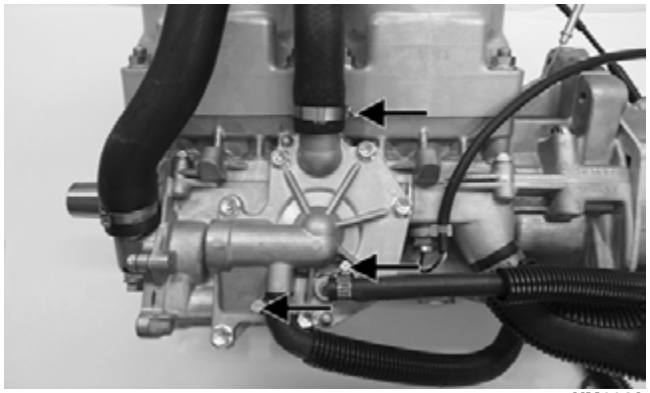
Problem: Engine Backfires	
Condition	**Remedy**
1. **Throttle/ignition monitor switch** adjusted incorrectly	1. Adjust throttle cable free-play — service spring
2. **Spark plugs** fouled — damaged	2. Clean — gap — replace spark plugs
3. **Spark plug heat range** too hot	3. Install lower heat-range spark plugs
4. **High tension wires/coil** shorting	4. Service — replace high tension wires/coil
5. **Carburetor-to-cylinder** air leak	5. Repair — replace gaskets — intake flanges service intake ports
6. **Carburetors** adjusted incorrectly — dirty — damaged — loose	6. Troubleshoot — tighten carburetors
7. **Gas/air mixture** incorrect — too lean	7. Adjust jetting
8. **Oil-injection pump** malfunctioning — adjusted incorrectly	8. Replace — bleed — adjust oil-injection pump
Problem: Engine Four-Cycles (Floods Excessively)	
Condition	**Remedy**
1. **Carburetors** adjusted incorrectly — dirty — damaged	1. Troubleshoot — clean carburetors
2. **Gas/air mixture** incorrect	2. Adjust jetting
3. **Oil-injection pump** malfunctioning — adjusted incorrectly	3. Replace — bleed — adjust oil-injection pump
4. **Air silencer** obstructed	4. Remove obstruction
Problem: Engine Stops Gradually	
Condition	**Remedy**
1. **In-line fuel filter** obstructed — damaged	1. Remove obstruction — replace in-line fuel filter
2. **Fuel hose** obstructed — broken — pinched	2. Remove obstruction — replace — repair fuel hose
3. **Head gasket(s)** burned out	3. Replace head gasket(s) — service cylinders — head
4. **Cylinder head** loosening	4. Tighten cylinder head cap screws
5. **Spark plugs** loose	5. Tighten spark plugs
6. **Impulse hose** cracked	6. Replace impulse hose
7. **High tension wires/coil** faulty	7. Service — replace high tension wires/coil
Problem: Engine Stops Suddenly	
Condition	**Remedy**
1. **In-line fuel filter** obstructed — damaged	1. Remove obstruction — replace in-line fuel filter
2. **Fuel hose** obstructed — broken — pinched	2. Remove obstruction — repair — replace fuel hose
3. **CDI unit** faulty	3. Replace CDI unit
4. **Ignition coil** faulty	4. Replace ignition coil
5. **Charge coil (1)** faulty	5. Replace coil
6. **Charge coil (2)** faulty	6. Replace coil
7. **Gas-tank vent — hose** obstructed — damaged	7. Remove obstruction — replace vent — hose
8. **Engine** seized	8. Service engine
9. **Throttle/ignition monitor switch** faulty — throttle cable adjusted incorrectly	9. Replace throttle control — adjust throttle cable free-play — adjust — connect — replace carburetor safety switches
Problem: Engine Fails to Stop (Continues to Run, Even with All Switches Off)	
Condition	**Remedy**
1. **CDI unit** shorted to ground	1. Replace CDI unit
2. **Main wiring harness four-prong connector** disconnected	2. Connect four-prong connector



FS219A

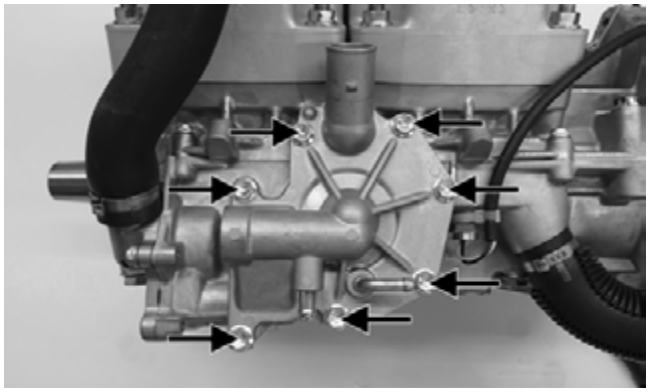
■NOTE: When servicing the water pump, use Water Pump Bearing and Seal Tool Kit and Oil Seal Protector Tool.

1. Loosen the clamps securing the coolant hoses to the water pump; then remove the hoses.



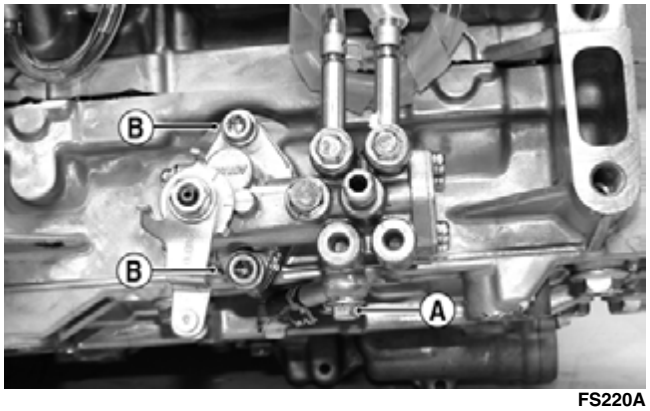
XM114A

2. Remove the seven cap screws securing the water pump cover; then remove the cover and account for the O-ring seal and two dowel pins.



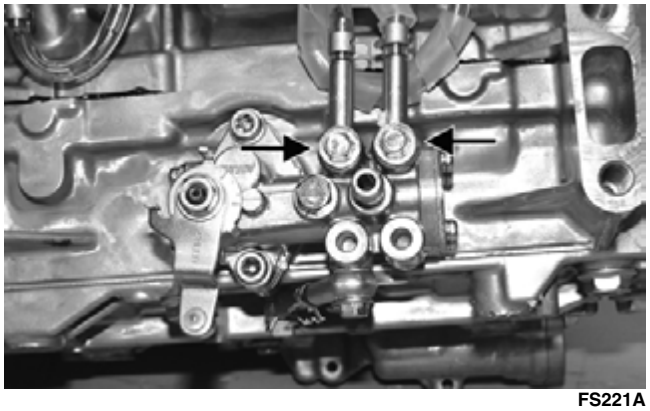
XM113A

3. Remove the cap screw (A) securing the lower check valve to the oil pump and account for the two gaskets; then remove the two cap screws (B) securing the oil pump to the engine. Remove the pump.



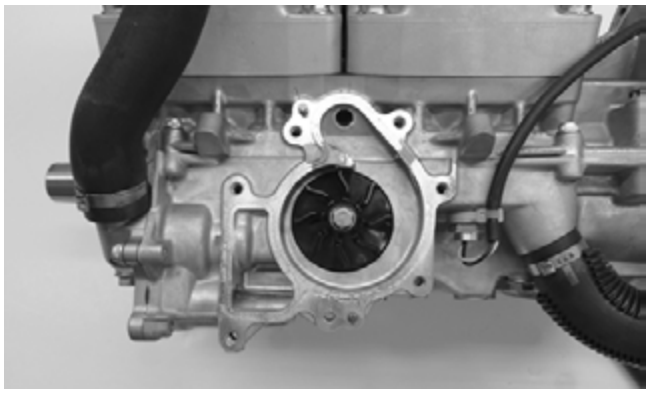
FS220A

■NOTE: Leave the two upper check valves secured to the pump.



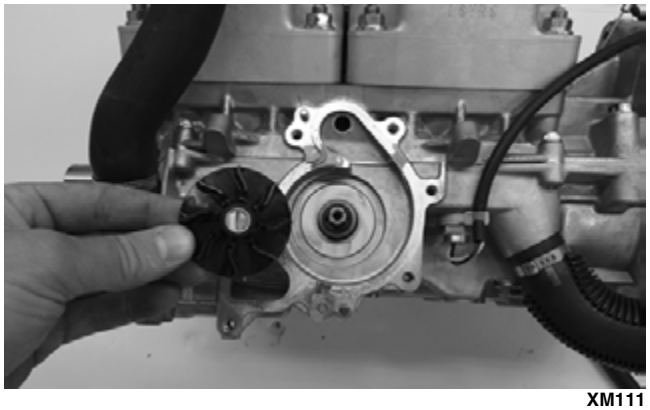
FS221A

4. Remove the cap screw securing the impeller. Account for the rubber washer and gasket behind the cap screw.



XM112

5. Remove the impeller from the shaft.



XM111

5. Check the coolant level. Add coolant as required to the coolant tank (coolant tank should be filled to coolant level line). Repeat procedure until coolant level stabilizes in the coolant tank.

CAUTION

The cooling system must be properly filled. If the system isn't properly filled, piston damage will occur.

■NOTE: If coolant is required, mix coolant for a temperature of -36°C (-34°F). Follow mixing recommendations of the manufacturer of the coolant.

■NOTE: At this point on the F-Series, secure the console with the torx-head screws.

INSPECTING COOLANT HOSES AND CLAMPS

All coolant hoses and connections should be checked annually for deterioration, cracks, and wear.

All coolant hoses and clamps should be replaced every four years.

INSPECTING THERMOSTAT

1. Inspect the thermostat for corrosion, wear, or spring damage.
2. Using the following procedure, inspect the thermostat for proper operation.
   a. Suspend the thermostat in a container filled with water; then heat the water and monitor the temperature with a thermometer.
   b. The thermostat should open at 30°C (86°F). Once the thermostat starts to open, remove the thermostat and allow it to cool down verifying it has returned to the fully closed position.

CAUTION

Never heat the thermostat to the fully open position or damage to the thermostat may occur.

Liquid Cooling System (1100 cc)

The liquid cooling system consists of a heat exchanger, water pump, and thermostat. The system should be inspected for leaks or damage whenever an overheating problem is experienced.

DRAINING COOLING SYSTEM

1. Open the right-side access panel.
2. Remove the hardware securing the exhaust resonator; then remove the resonator.
3. Remove the hose clamp from the coolant hose (A) connecting the water pump to the right side of the oil cooler. Clamp off the coolant hose; then with a drain pan positioned under the coolant hose, remove the hose from the water pump and tip the hose downward allowing the coolant to drain completely.

SNO-728A

4. Apply 5-8 psi to the coolant system through the coolant overflow tube and continue until the coolant stops draining from the system.

FILLING/BLEEDING COOLING SYSTEM

1. Remove the left- and right-side access panels and hood; then on the Bearcat/T-Series, remove the torx-head screws securing the console.

■NOTE: On F/M/XF models, place the hood along side the snowmobile; then using Hood Harness Extension, connect the hood to the main harness.

2. On the Bearcat/T-Series, move the console up and forward; then with the harness connected, securely position the console on the snowmobile.

CAUTION

Use care not to allow the console harness to come into contact with the exhaust pipe during this procedure.

3. On Bearcat models, remove the headlight support bracket/heat shield.
4. On the T-Series Turbo model, loosen the cap screws securing the heat shield to the exhaust manifold/turbocharger; then using a deep socket and hammer, tap the washers making sure that the washers are free from the head of the cap screws. Remove the cap screws and move the heat shield to access the bleed screw.

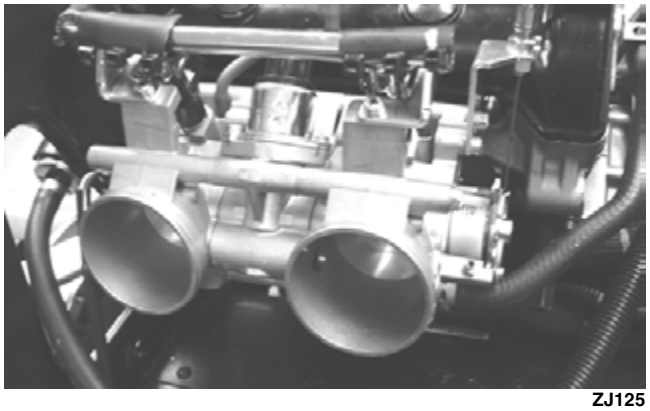
CAUTION

Make sure the washers are free from the heat shield cap screws or damage to the heat shield will occur.

5. Loosen the bleed screw and add coolant into the filler neck until coolant is visible at the bleed screw; then tighten the bleed screw and add coolant to the coolant reservoir Full-Cold line.

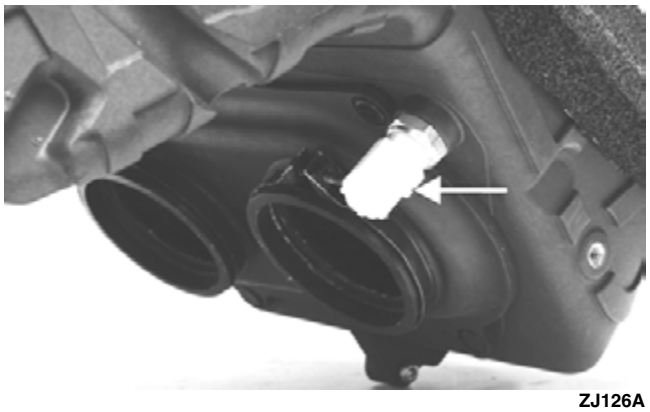
CAUTION

The cooling system must be properly filled. If the system isn't properly filled, engine damage will occur.



ZJ125

13. Remove the air temperature sensor from the air silencer.



ZJ126A

14. Split the protective foil at the seam of the air silencer; then remove the retaining clips securing the dual intake boot to the air silencer.

15. Remove the seven machine screws and separate the air silencer halves.

16. Inspect the air silencer thoroughly for any foreign material; then clean the air silencer with soap and water. Dry the air silencer thoroughly prior to installing.

INSTALLING

1. Join the air silencer halves and secure with the seven machine screws; then install the dual intake boot and secure with retaining clips.

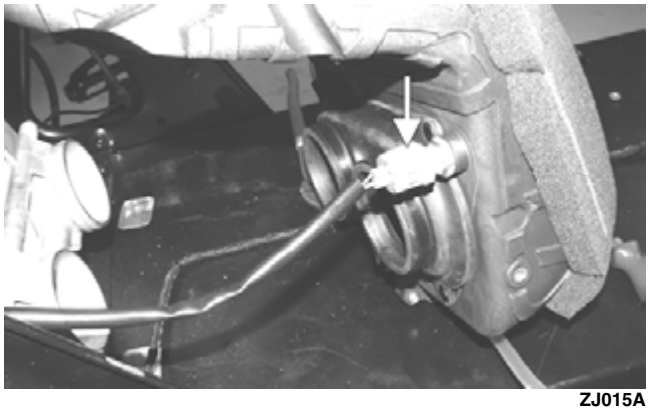
2. Install the air temperature sensor.

■NOTE: Before installing the air silencer, make sure the gasline hose is routed over the air silencer.

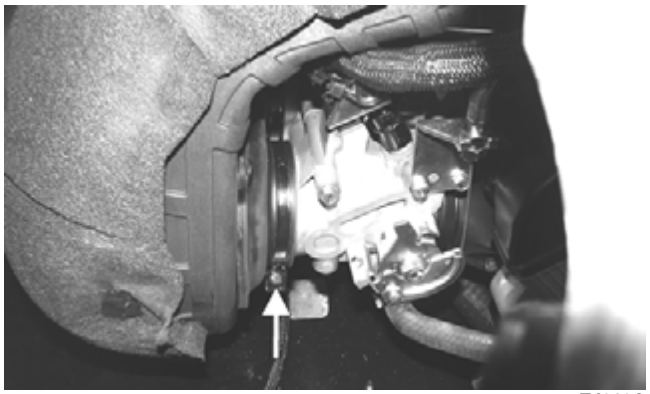
3. Connect the air temperature sensor harness plug into the sensor on the air silencer; then with screws of the flange clamps directed properly as noted during removing, install the air silencer and secure to the chassis with the two torx-head cap screws. Secure the flange clamps to the throttle body.

■NOTE: To aid in installing the air silencer, apply a coat of alcohol on the insides of the intake boot openings.

■NOTE: Install the air silencer at an angle positioning it to the PTO-side throttle body first and tightening its clamp; then working it back and forth and with an angle tool, slide the mag-side air silencer boot onto the throttle body and tighten its clamp. Once in place and secured, carefully inspect that the boots are properly seated to the throttle bodies.

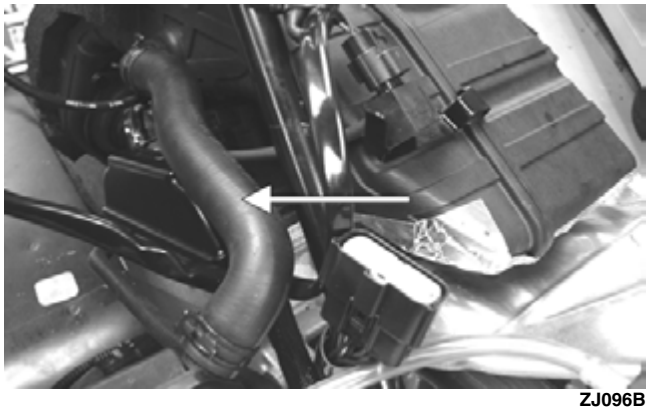


ZJ015A



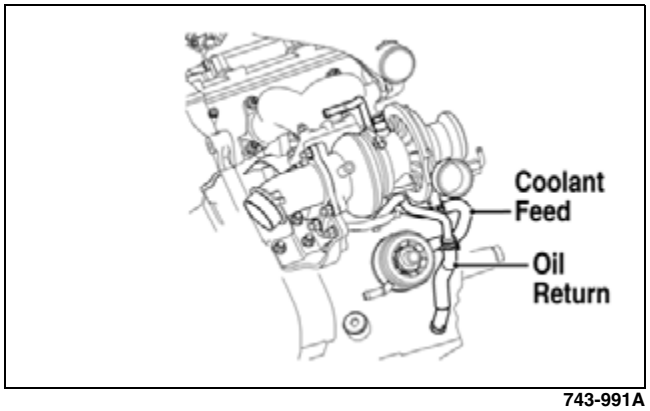
ZJ013A

4. Install the breather hose connecting the air silencer to the separator tank; then connect the harness plug to the sensor.



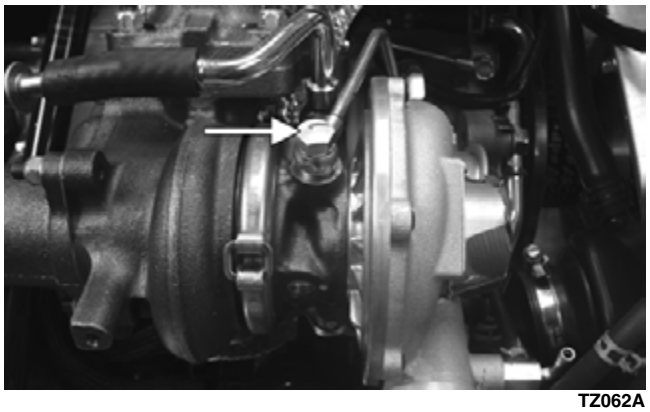
ZJ096B

■NOTE: Before placing the gas tank into position on the chassis, install the gasline hose to the tank, push down on the connector until it snaps into place, and route the vent hose to its proper position as noted during removing.



743-991A

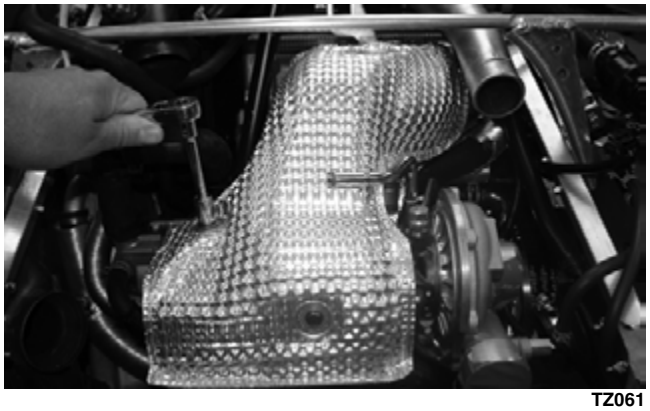
9. With the turbocharger secured, connect the top oil feed pipe with the banjo bolt and two new crush washers. Tighten to 11 ft-lb.



TZ062A

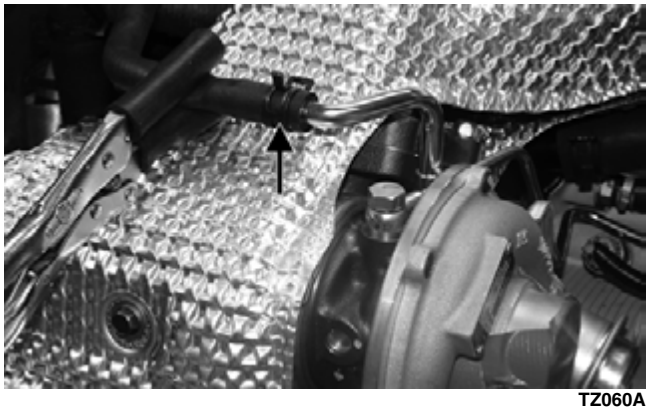
10. Install the exhaust pipe and secure with the five exhaust springs.

11. Install the upper heat shield and secure to the exhaust manifold and turbocharger with the four cap screws. Tighten to 56 in.-lb.



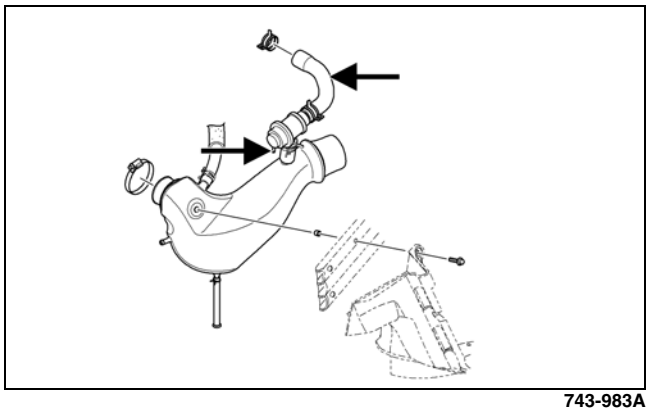
TZ061

12. Connect the coolant return hose to the turbocharger and secure with the hose clamp.



TZ060A

13. Connect the air bypass hose and the air bypass control valve hose to the intake pipe and secure with the clamps.

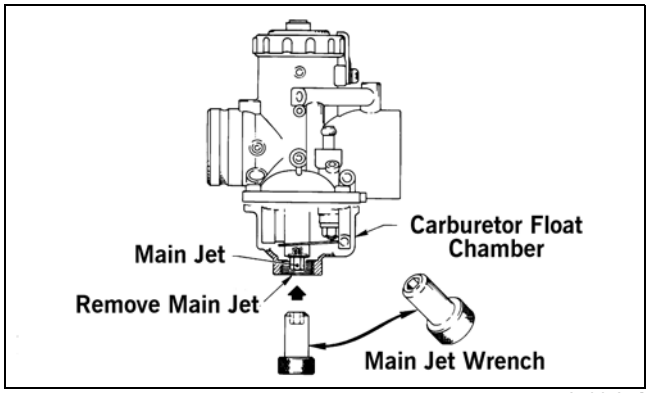


743-983A

14. Install the hose from the waste gate control valve to the elbow fitting of the turbocharger and secure with the clamp.

TZ086B

15. Connect the air silencer hose to the turbocharger and secure with the clamp; then secure the air silencer to the right-side upper frame with the cap screw.



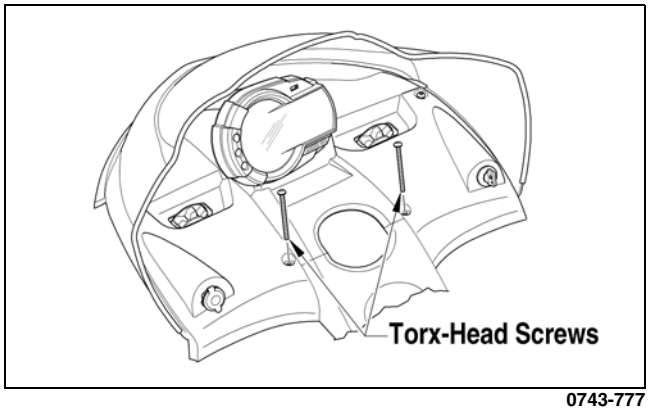
0728-054

5. Install and secure each carburetor.

Carburetor

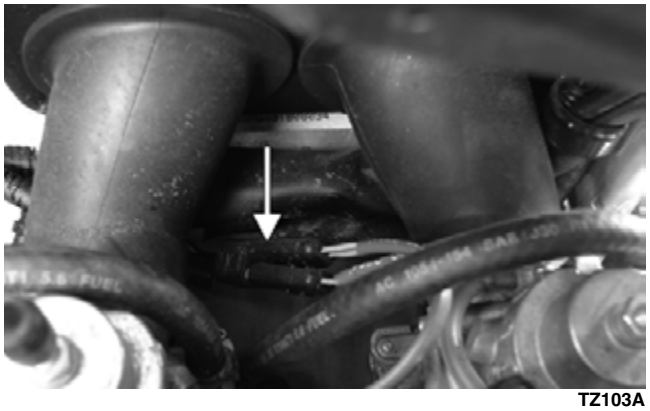
REMOVING

1. Remove the hood and left-side access panel; then remove the torx-head screws securing the console.



0743-777

2. Lift the rear of the console and disconnect the console/main harness plug-in; then remove the console.
3. Disconnect the safety switch wiring harness connector from the main wiring harness; then remove the brass choke-cable housing from the carburetor.



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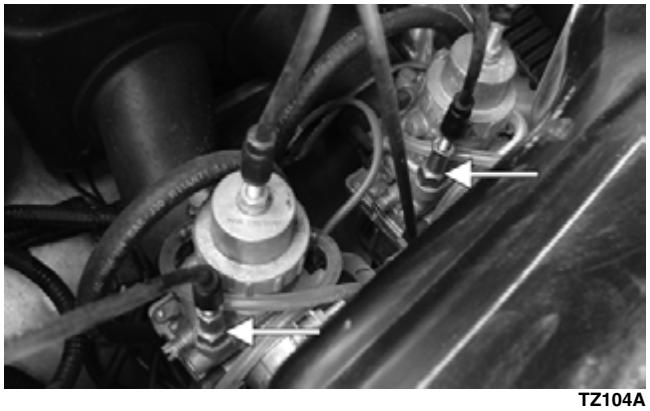
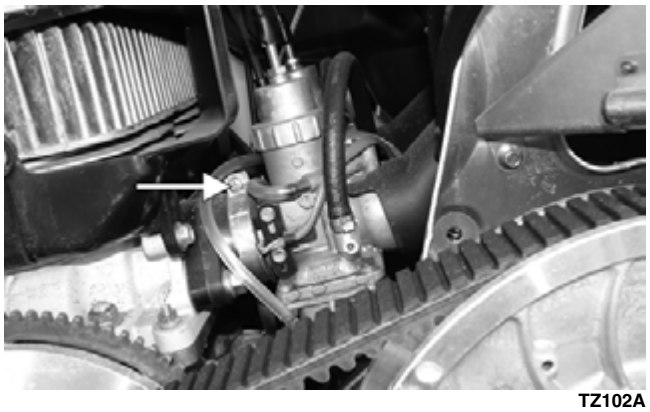


TZ104A

4. Loosen the carburetor-flange clamp; then remove the carburetor.



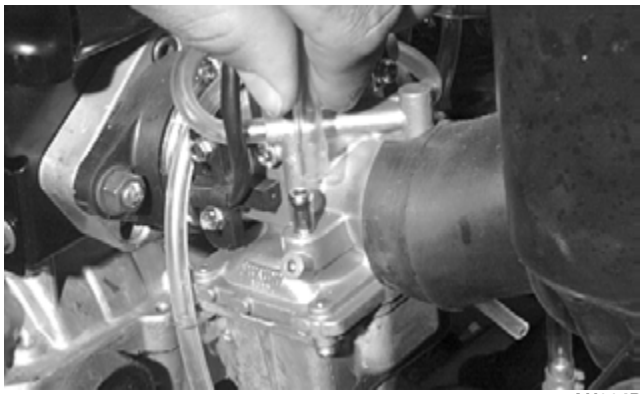
TZ102A

■NOTE: Slide the carburetor into the air silencer boot until free of the flange; then remove carburetor.

CAUTION

Keep MAG-side and PTO-side carburetors identified for installing purposes.

5. Remove the clamp and disconnect the fuel hose from the carburetor inlet fitting; then loosen the lock plate screw and remove the lock plate from the mixing body top.



AH284D

6. Remove the mixing body top by rotating it counterclockwise; then remove the top with spring and piston valve assembly from the carburetor.

Fuel System (EFI)

INTRODUCTION

The Arctic Cat EFI System operates off a series of coils located on the stator and is made up of the following components.

1. An engine control module (ECM) calculates input from sensors (air temperature sensor, coolant temperature sensor, throttle position sensor, ignition timing sensor (2-stroke), barometric pressure sensor (2-stroke), and on the 800/1100 cc turbo models, a knock sensor) to provide the engine with the correct fuel mixture and timing for optimum operation.
2. Charge coils (1 and 2), located on the stator, provide AC voltage to the ECM/CCU/regulator/rectifier where AC voltage is converted to DC voltage.
3. A fuel pump coil located on the stator operates the low voltage, high output fuel pump. At cranking speed, the high output fuel pump provides enough fuel to charge the fuel rail.
4. An injector coil located on the stator provides the injectors with DC voltage for operation through the ECM.
5. A lighting coil located on the stator plate provides output to the CCU (500 cc) or regulator/rectifier (800 cc) to operate accessories and the lighting system.

FLOODED ENGINE

If the engine should become flooded, set the brake lever lock, compress the throttle lever to the full-open position, and crank the engine over until it starts and clears itself. Release the brake lever lock.

FUEL SYSTEM

The fuel is first drawn into the electric fuel pump through multiple pick-up valves and hoses. The fuel is then routed through a high-pressure fuel hose to the fuel rail.

The fuel pressure is maintained in the fuel rail by the fuel regulator. With the fuel pressure maintained at a constant psi, the ECM evaluates the information it receives from the electrical sensors and opens the injectors for precise periods of time (pulse widths) to meet engine demands.

■NOTE: The entire EFI system depends on all coils functioning properly on the stator.

Individual Components

ECM

The ECM is the brain of the EFI system. It uses sensor inputs to determine the correct fuel/air ratio for the engine given the existing conditions of altitude and temperature.

If any of the sensors should fail while the engine is running, the ECM will sense a problem and go into a "fail safe" mode. This is an over-rich condition and will greatly reduce performance. However, the engine will be protected from a possible lean condition and engine damage.

The ECM is equipped with a self-diagnostic system utilizing the service icon in the speedometer/tachometer and remains illuminated when a problem exists with any of the sensors. The technician can determine the problem sensor by reading the code shown on the readout screen and applying it to the ECM Diagnostic Codes chart (see Self-Diagnostic System/Codes in this section).

■NOTE: The ECM cannot be repaired.

On 2-stroke models if the ECM is not receiving current from one of the output coils on the stator, that circuit will not operate. Coils on the stator are the charge coils operating the ECM, the injector coil which operates the injectors, the fuel pump coil which operates the fuel pump, and the lighting coil/chassis control unit operating all accessories and the lighting system.

■NOTE: On the 500 cc, the ECM is coded with a letter (A-B-C). On the 800 cc, the ECM is coded with symbols (■-●-▲). When replacement of the ECM is necessary, the ECM must be replaced with an ECM of the same code.

Removing (800 cc)

1. Remove the expansion chamber.
2. Remove the two torx-head screws securing the rear portion of the ECM heat shield; then remove the shield.
3. Disconnect the wire harness leads from the ECM; then remove the two cap screws securing the ECM. Remove the ECM.

Installing (800 cc)

1. Secure the ECM to the chassis using the existing cap screws; then connect the wiring harness to the ECM.
2. Secure the front of the ECM heat shield into the tabs; then secure the back of the ECM heat shield using the existing torx-head screws. Install the expansion chamber.

■NOTE: Make sure all connectors are clean and tight. Apply dielectric grease to all connectors.

Removing (Bearcat/F-Series/T-Series)

1. Disconnect the wiring harness lead from the ECM.
2. Remove the two screws securing the ECM to the left-front upper frame; then remove the ECM.

Installing (Bearcat/F-Series/T-Series)

Secure the ECM to the left-front upper frame with the screws; then connect the wiring harness to the ECM.

■NOTE: Make sure all connectors are clean and tight. Apply dielectric grease to all connector seals.

Removing (F/M/XF 1100 cc)

1. Remove the left-side access panel; then remove the retaining ring securing the lower console.
2. Remove the two wiring connectors from the ECM; then remove the ECM mounting bracket from the rear belt guard.

■**NOTE: Before removing the fuel filter, take note of the filter inlet and outlet for installing purposes.**

REMOVING (F/M/XF)

1. Remove both access panels, hood, seat, and gas tank to access the fuel filter.

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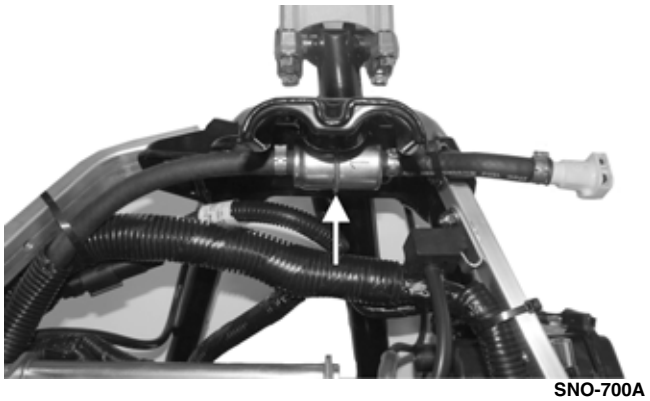


SNO-700A

2. Disconnect the gasline hose from the fuel pump.
3. Remove the hose clamps and discard; then slowly remove the fuel hoses from the fuel filter. Dispose of the excess fuel from the filter properly.

■**NOTE: Inspect the hoses for any signs of cracking, cuts, or wear points. Replace if necessary.**

INSTALLING (F/M/XF)

1. Place new hose clamps on the gasline hoses; then with the fuel pump inlet and outlet oriented correctly, connect the gasline hose to the fuel pump.

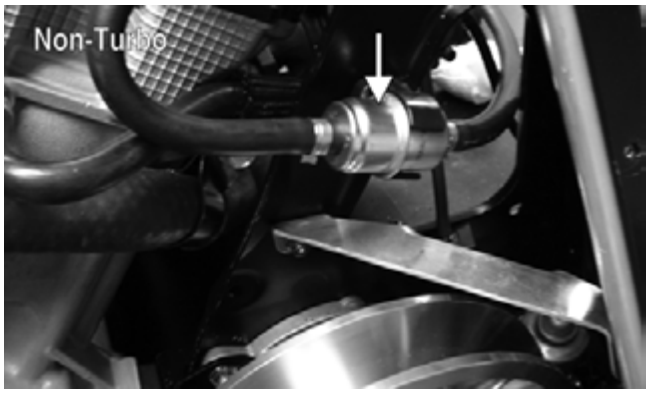
■**NOTE: On the turbo models, insert the filter making sure the lip sits between the tab and clamp.**

SNO-1021

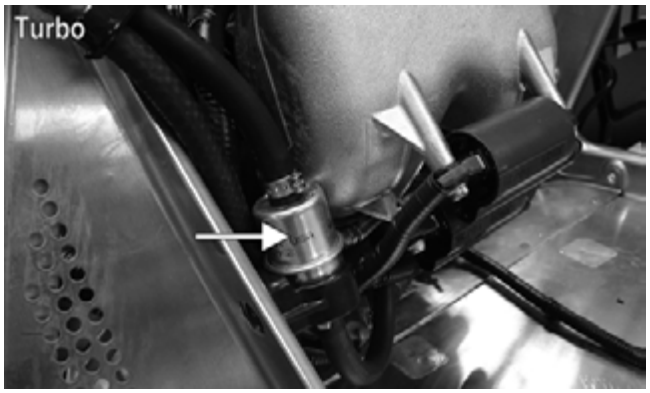
2. Install the gas tank, seat, hood, and access panels; then start the engine and inspect the gasline hoses and filter for any signs of leaks.

REMOVING (Bearcat/T-Series)

1. Open the left-side access panel; then remove the fuel filter from the bracket.



ZJ135B



TZ118A

2. Remove the hose clamps and discard; then slowly remove the gasline hoses from the fuel filter. Dispose of the excess fuel from the filter properly.

■**NOTE: Inspect the fuel lines thoroughly for any signs of cracking, cuts, or wear points.**

INSTALLING (Bearcat/T-Series)

1. Place new hose clamps on the gasline hoses; then with the fuel pump inlet and outlet oriented correctly, connect the gasline hoses to the fuel pump. Secure with the hose clamps.
2. Secure the fuel filter to the fuel filter bracket; then start the engine and inspect the fuel hoses and filter for any signs of leaks.
3. Close the left-side access panel.

Fuel Pump (F/M/XF)

TESTING

1. Remove the seat assembly (see Section 8); then remove the upper and lower console panels.

3. Move the throttle lever to the wide open position. The meter must read OL (infinite resistance). If the meter reads less than 1000 ohms, replace the control assembly.

4. Connect the ohmmeter leads as shown below.

Engine	Wire	Wire
500/800 cc	Black/Blue	Violet/Red
570 cc	Black	Violet/Red
1100 cc	Red/Green	Red/Violet

5. On 1100 cc models, with the emergency stop switch in the off position, the meter must read OL (infinite resistance). If the meter reads less than 1000 ohms, replace the control assembly. With the emergency stop switch in the (RUN) position, the meter must read less than 1 ohms. If the meter reads OL (infinite resistance), replace the control assembly.

6. On 500/570/800 cc models, with the emergency stop switch in the off position, the meter must read less than 1 ohm. If the meter reads OL (infinite resistance), replace the control assembly. With the emergency stop switch in the (RUN) position, the meter must read OL (infinite resistance). If the meter reads less than 1000 ohms, replace the control assembly.

Main Wiring and Safety Switches (570 cc)

1. Check the wire connections at the ignition key switch and at the emergency stop switch. If any of the connections appear dirty or corroded, clean with contact cleaner and compressed air; then apply Dielectric grease to all non-pin connectors and connect all wires and squeeze connections until they are securely locked.

■NOTE: To access the electrical connectors, the console must be removed.

2. Disconnect the main wiring harness connector coming from the engine. Using an ohmmeter, connect one lead to the black wire in the connector of the main harness. Connect the remaining ohmmeter lead to the violet/red wire in the connector of the main harness.

3. With all switches in the RUN position, the meter must read infinite resistance (OL). If the meter reads less than 1 ohm resistance, proceed to Emergency Stop Switch and Ignition Switch sub-sections in this section and the following Carburetor Safety Switches.

Carburetor Safety Switches (570 cc)

1. If the meter read infinite resistance (OL) in the previous test, disconnect the carburetor safety switches one at time and test for a closed circuit.

2. Attach the two ohmmeter leads to the two leads coming from each carburetor switch. The meter must read less than 1 ohm resistance.

3. If the meter reads infinite resistance (OL), the switch must either be adjusted or replaced (proceed to the following Synchronizing Carburetor Safety Switches). If the meter reads less than 1 ohm resistance, see Ignition Switch sub-section in this section.

Synchronizing Carburetor Safety Switches (570 cc)

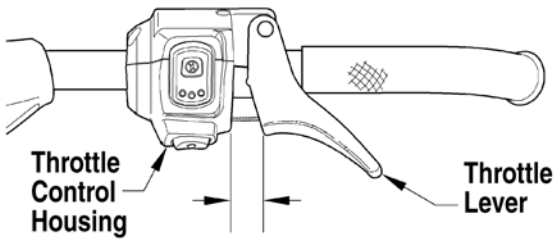
Before synchronizing the carburetor safety switches, verify the idle speed screws are adjusted equally and the piston valves are synchronized. The carburetor safety switches affect ignition spark at idle only. If ignition spark problems are observed at partial or full-throttle positions, the problem is not with the carburetor safety switches.

1. Inspect the cable free-play gap between the throttle lever and the control housing at idle. Adjust the throttle cable swivel adapter at the top of each carburetor for 0.030-0.060 in. cable free-play gap between the throttle lever "nibs" and the control housing. While observing if there is any cable free-play gap, apply slight pressure to the throttle lever to take up any cable slack that may be present. However, do not apply enough pressure to actually raise the carburetor slides during this adjustment. After cable free-play is properly adjusted, tighten the jam nut on each carburetor securely.

2. To determine which switch needs adjusting, disconnect both carburetor safety switches from the main wiring harness connector.

3. Connect a digital ohmmeter to one carburetor safety switch connector; then compress the throttle lever while observing the meter reading and measure the gap between the throttle lever and control housing at the moment the meter reading changes from open to closed. Repeat this step for the other carburetor safety switch.

■NOTE: The correct throttle lever/control housing gap is a range of 0.375-0.500 in. the moment the meter reading changes from open to closed. A switch that changes from open to closed before the other one is the switch that must be raised to attain safety switch synchronization.



Gap of 0.375-0.500 in. between the Throttle Switch Body and Throttle Lever when Safety Switches open and close

742-349A

4. If an adjustment is necessary, loosen the switch bracket screws, move the switch up, tighten the screws, and then reset using step 3.

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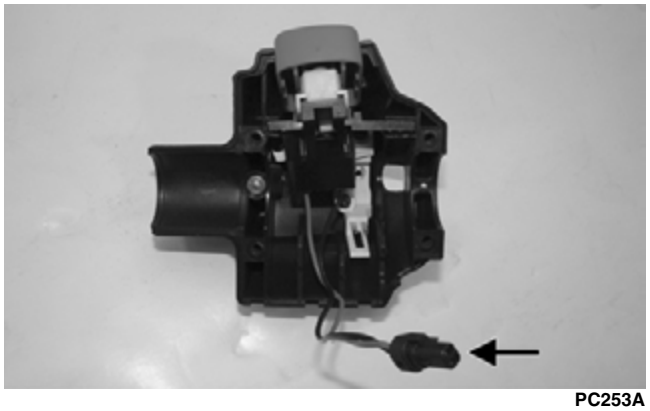


PC253A

4. With the switch in the OFF position, the meter must read OL (infinite resistance) (4-stroke) or less than 1 ohm resistance (2-stroke).
5. With the switch in the RUN position, the meter must read less than 1 ohm resistance (4-stroke) or OL (infinite resistance) (2-stroke).

■NOTE: If the meter does not show as specified, troubleshoot or replace the switch/component, the connector, or the switch wiring harness.

Starter Relay Solenoid

TESTING

■NOTE: The electric start solenoid may be tested using either one of the following methods.

Method #1

1. Disconnect the solenoid connector from the main wiring harness.
2. Place the ohmmeter leads across the solenoid coil terminals. The ohmmeter must read 3-5 ohms.

■NOTE: An in-line ammeter would measure between 2 and 4 amps of solenoid coil current flow with the battery connected.

CAUTION

NEVER connect an in-line ammeter with the large starter cables because the 200 amps of current flow will instantly damage most ammeters.

Method #2

1. Using the multimeter set to the DC Voltage position, check the relay as follows.
2. Connect the red tester lead to the positive battery terminal; then connect the black tester lead to the starter cable connection on the starter relay. The meter must show battery voltage.

■NOTE: Engage the brake lever lock and place the emergency stop switch in the RUN position.

3. Engage the starter while observing the multimeter. The multimeter should drop to 0 volts and a "click" should be heard from the relay.

■NOTE: If a "click" is heard and more than 1 volt is indicated by the multimeter, replace the starter relay. If no "click" is heard and the multimeter continues to indicate battery voltage, proceed to step 4.

4. Disconnect the two-wire plug from the starter relay; then connect the red tester lead to the green wire and the black tester lead to the black wire.
5. Depress the starter button and observe the multimeter.

■NOTE: If battery voltage is indicated, replace the starter relay. If no voltage is indicated, check fuse or relay.

Fuse

TESTING

1. Remove the fuse from the fuse holder.
2. Connect the ohmmeter across the fuse end-caps.
3. The ohmmeter must read less than 1 ohm of resistance.

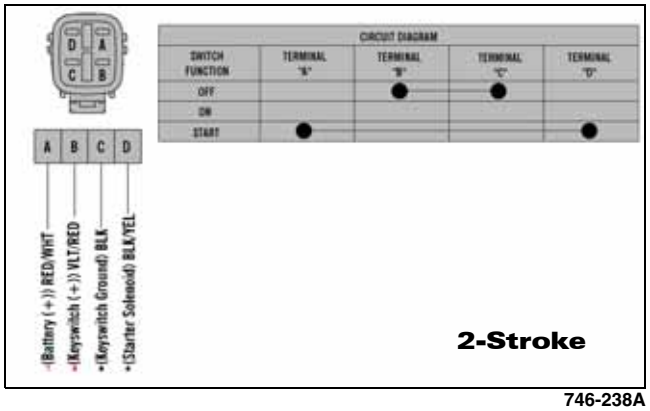
Ignition Switch

TESTING

CAUTION

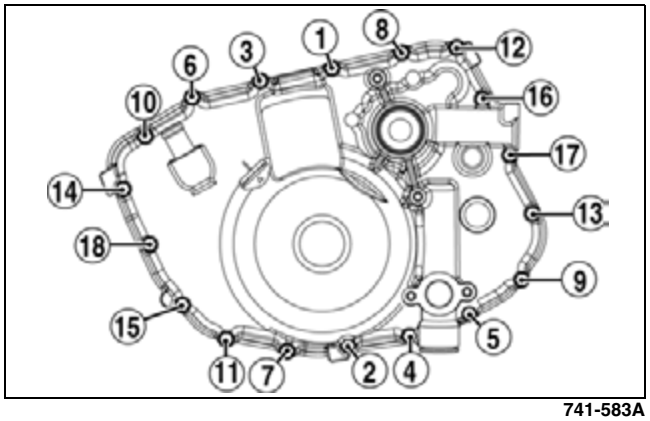
To prevent ohmmeter damage when testing circuits on snowmobiles equipped with an electric start, be sure to disconnect the battery before testing.

1. Disconnect the wiring harness from the ignition switch; then remove the switch from the console.
2. Using the ohmmeter, test the connections indicated in the following charts. If the meter reads more than one ohm of resistance between connected terminals or less than 1 ohm of resistance on non-connected terminals, the switch must be replaced.



2-Stroke

746-238A



741-583A

■**NOTE: Assure the oil pump seal is in place prior to installing the magneto cover.**


ZJ151A

4. Install the coolant hoses to the water pump, oil cooler, and separator tank; then secure the hoses with the clamps.

■**NOTE: Steps 5-6 are for the Bearcat/T-Series only.**

5. Place the oil tank into position in the chassis and install the breather hose; then secure with the clamp. With the hoses routed properly, install the supply/return oil hoses to the tank; then secure the hoses with new clamps.

■**NOTE: Assure the O-rings are properly seated in the supply/return oil hose fittings.**


ZJ248A

6. Secure the oil tank to the chassis with the three cap screws; then tighten securely.


ZJ146A

7. On the F/M/XF, secure all coolant hoses and oil hoses using the existing clamps; then secure the left-side support using the existing cap screws and nuts. Tighten securely.


SNO-728

8. Install the resonator and secure using existing hardware.

■**NOTE: At this point, fill and bleed the oil and cooling systems (see Section 3).**

Ignition Timing (2-Stroke)

■**NOTE: The ignition timing is not adjustable, but it can be checked and/or verified.**

CHECKING

1. Connect a timing light to the MAG-side spark plug lead.
2. Using a shielded safety stand, raise the rear of the snowmobile off the floor and start the engine. Gradually increase the engine speed to the specified RPM; the pointer should align with the proper timing mark on the flywheel (see Section 1).

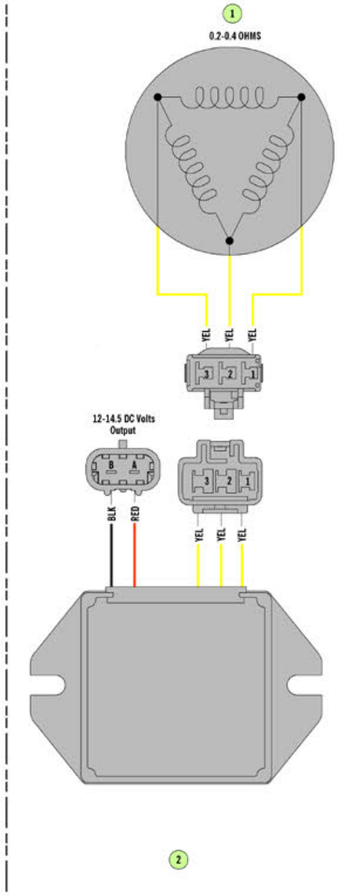
Brakelight Switch

TESTING/REMOVING

■**NOTE: On the F-Series/T-Series models to access the brakelight switch connector, the two rear console torx-head screws must be removed and the console must be lifted upward and forward.**

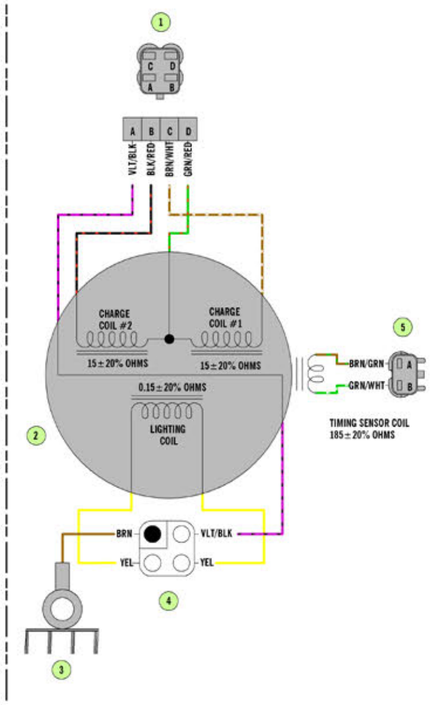
STATOR DIAGRAM 4-STROKES

1. STATOR
2. REGULATOR/RECTIFIER



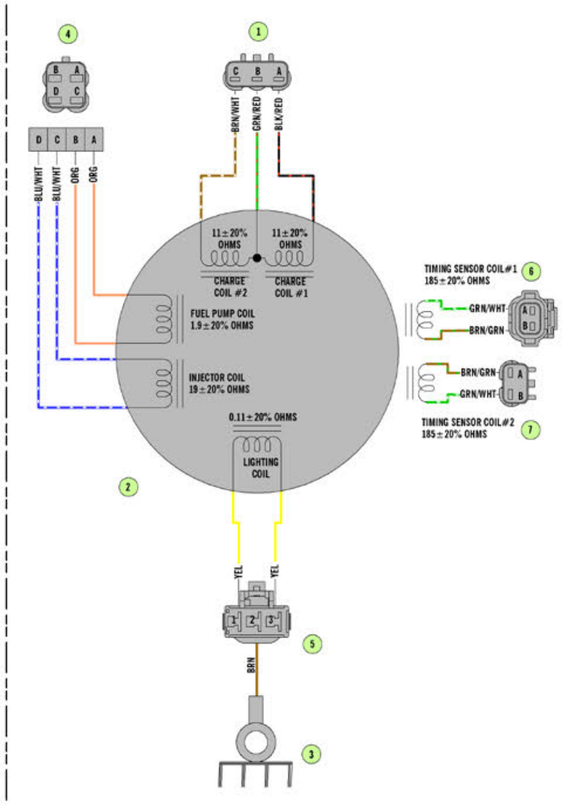
MAGNETO DIAGRAM 570 SERIES

1. COIL, CHARGE
2. MAGNETO
3. GROUND, CHASSIS
4. CONNECTOR, ENGINE
5. SENSOR, TIMING



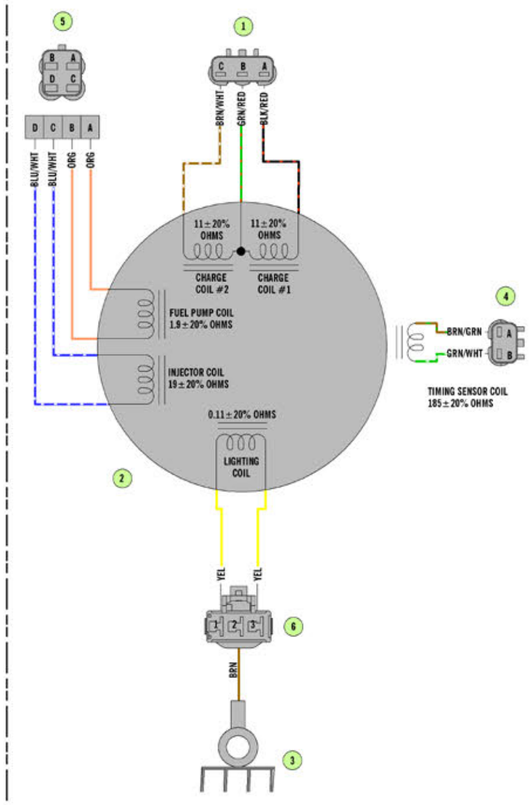
MAGNETO DIAGRAM 800

1. COIL, CHARGE
2. MAGNETO
3. GROUND, CHASSIS
4. COILS, FUEL PUMP/INJECTOR
5. COIL, LIGHTING
6. SENSOR, TIMING #1
7. SENSOR, TIMING #2



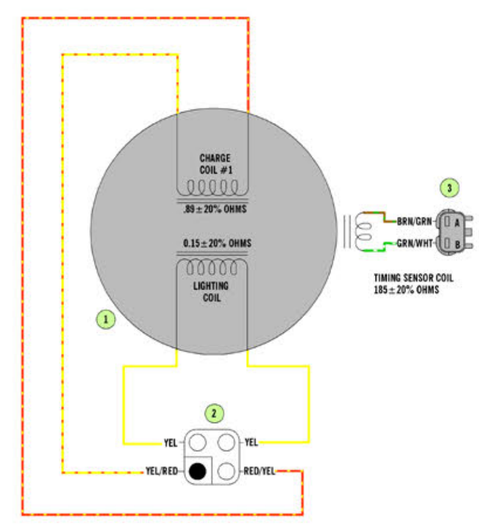
MAGNETO DIAGRAM 500

1. COIL, CHARGE
2. MAGNETO
3. GROUND, CHASSIS
4. SENSOR, TIMING
5. COILS, FUEL PUMP/INJECTOR
6. COIL, LIGHTING



MAGNETO DIAGRAM 600 RACE

1. MAGNETO
2. CONNECTOR, ENGINE
3. SENSOR, TIMING

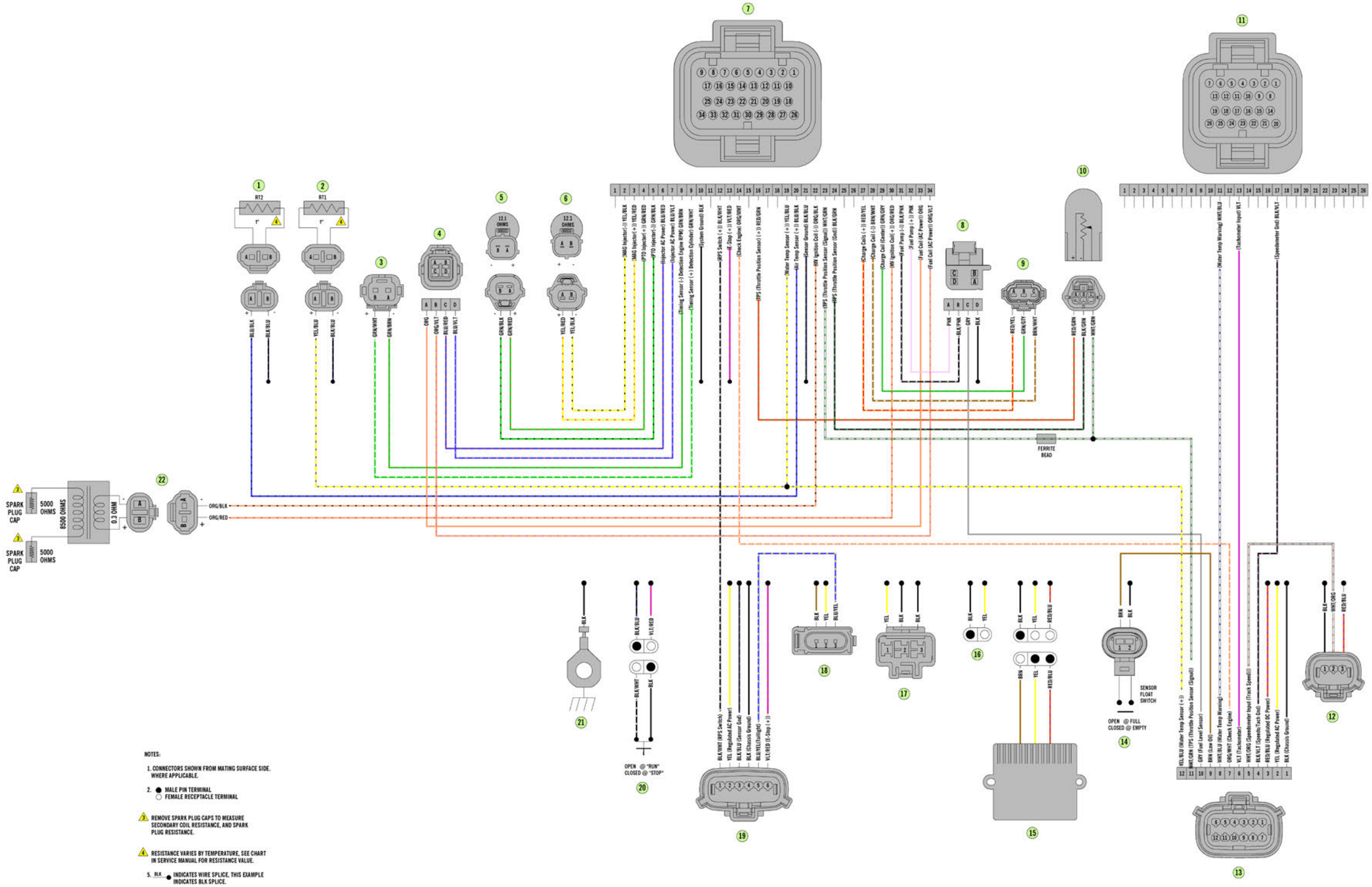


NOTES:

1. CONNECTORS SHOWN FROM MATING SURFACE SIDE. WHERE APPLICABLE.
2. ● MALE PIN TERMINAL
   ○ FEMALE RECEPTACLE TERMINAL

Ignition/Main Harness
(p/n 1686-628)
Sno Pro 500

1. SENSOR, AIR TEMPERATURE
2. SENSOR, COOLANT TEMPERATURE
3. SENSOR, TIMING
4. CONNECTOR, FUEL PUMP INJECTOR COILS
5. INJECTOR, PTO
6. INJECTOR, MAG
7. CONNECTOR, ECU #1
8. FUEL PUMP
9. CONNECTOR, CHARGE COIL
10. SENSOR, THROTTLE POSITION
11. CONNECTOR, ECU #2
12. CONNECTOR, SPEED SENSOR
13. CONNECTOR, HOOD HARNESS
14. SENSOR, OIL LEVEL
15. REGULATOR, AC
16. CONNECTOR, ACCESSORY
17. CONNECTOR, MAGNETO
18. CONNECTOR, TAILLIGHT
19. CONNECTOR, HANDLEBAR HARNESS
20. SWITCH, TETHER
21. GROUND, CHASSIS
22. COIL, HV IGNITION

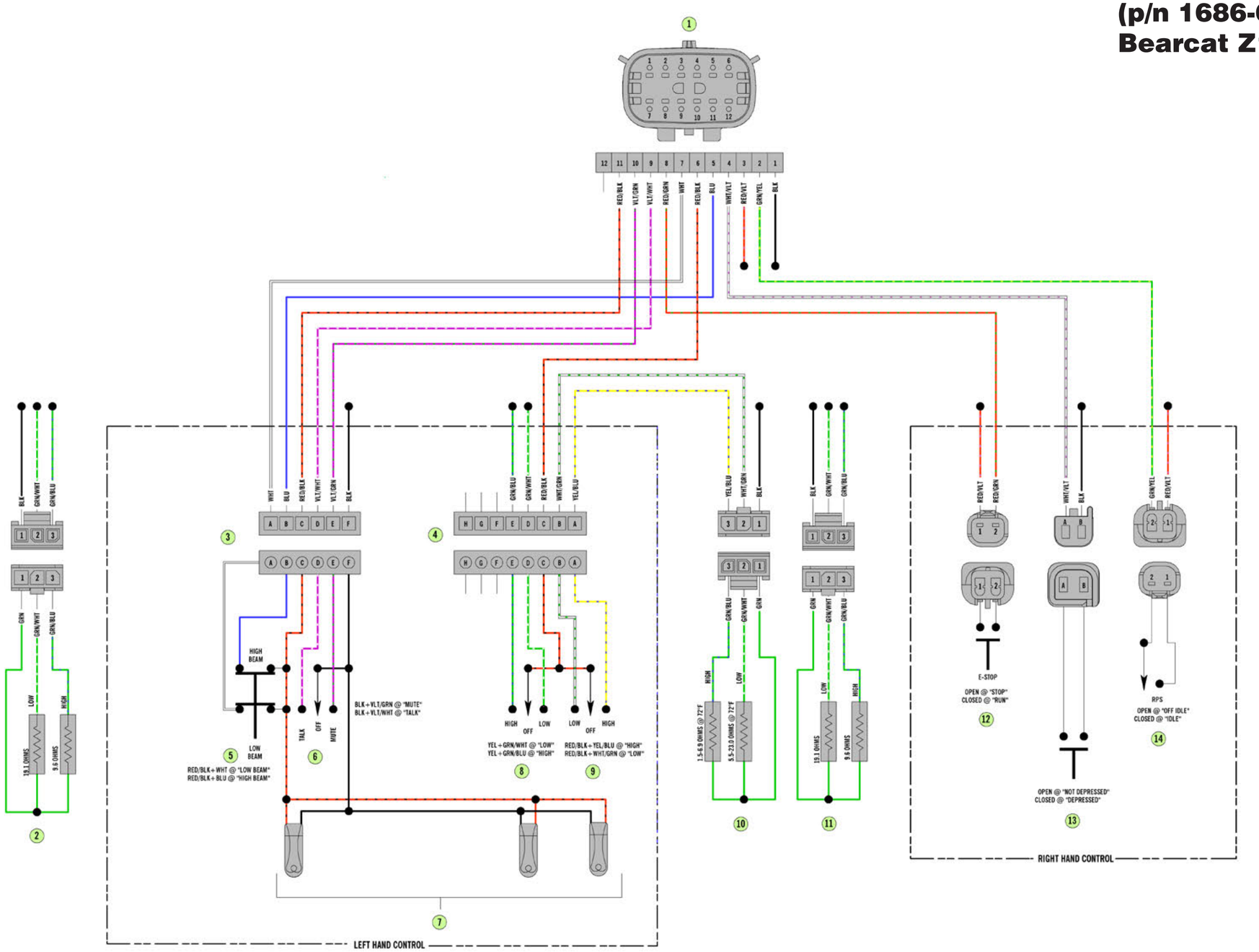


NOTES:

1. CONNECTORS SHOWN FROM MATING SURFACE SIDE. WHERE APPLICABLE.
2. ● MALE PIN TERMINAL
   ○ FEMALE RECEPTACLE TERMINAL
3. REMOVE SPARK PLUG CAPS TO MEASURE SECONDARY COIL RESISTANCE, AND SPARK PLUG RESISTANCE.
4. RESISTANCE VARIES BY TEMPERATURE, SEE CHART IN SERVICE MANUAL FOR RESISTANCE VALUE.
5. BLK ● INDICATES WIRE SPLICE, THIS EXAMPLE INDICATES BLK SPLICE.

Handlebar Harness
(p/n 1686-652)
TZ1/LXR/Turbo LXR
(p/n 1686-653)
Bearcat Z1 XT/GS/LTD

1. CONNECTOR, HANDLEBAR
2. ELEMENT, LH HANDWARMER
3. CONNECTOR, HEADLIGHT CONTROL
4. CONNECTOR, WARMER CONTROL
5. SWITCH, HEADLIGHT
6. SWITCH, PTT/MUTE
7. BULBS, SWITCH
8. SWITCH, HANDWARMER
9. SWITCH, THUMBWARMER
10. ELEMENT, THUMBWARMER
11. ELEMENT,RH HANDWARMER
12. SWITCH, EMERGENCY STOP
13. SWITCH, SHIFT
14. MICROSWITCH, RPS



NOTES:

1. CONNECTORS SHOWN FROM MATING SURFACE SIDE. WHERE APPLICABLE.
2. BLK ● INDICATES WIRE SPLICE. THIS EXAMPLE INDICATES BLK SPLICE.

Drive Train/Track/Brake Systems

This section has been organized into sub-sections for servicing drive train, track, and brake systems; however, some components may vary from model to model. The technician should use discretion and sound judgment when removing and installing components.

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

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

SPECIAL TOOLS

A number of special tools must be available to the technician when servicing the drive train, track, and brake systems.

Description	p/n
Drive Clutch Bolt Tool	0644-281
Driven Shaft Bearing Spanner Wrench Kit - Socket	0644-516
Bearing Removal and Installation Tool	0644-167
Movable Sheave Bearing Tool	0644-594
Brake Disc Socket Wrench	0644-481
Clutch Alignment Bar (Bearcat/F-Series/T-Series)	0644-496
Clutch Alignment Bar (F/M/XF)	0644-428
Drive Clutch Puller	0744-062
Drive Clutch Spanner Wrench	0644-136
Driven Clutch Compressor Tool	0644-444
Driven Clutch Puller	0644-469
Clutch Alignment Bar (Parallelism)	0644-509
Rear Suspension Spring Tool	0144-311
Reverse Gear Adjustment Gauge	0644-244
Roller Pin Removal Tool	0644-276
Gear Case Drain Fitting	0644-552
Deep Socket	0444-237
Brake Caliper Bearing Puller	0744-067
Movable Sheave Bearing Installation/Removal Tool	0644-594

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

CAUTION

Never attempt to substitute any other drive clutch puller for the recommended puller or severe clutch damage will occur.

Drive Belt

If the drive belt is longer than specified, the drive clutch and driven clutch will not achieve full shift ratio. This will result in poor acceleration and a decrease in top speed.

If the drive belt is shorter than specified, the starting ratio will be higher causing the belt to slip. A too-short drive belt will cause a bog on engagement and will not allow the engine to reach peak RPM.

■NOTE: A thinly-worn drive belt may produce the same effect as one that is too long.

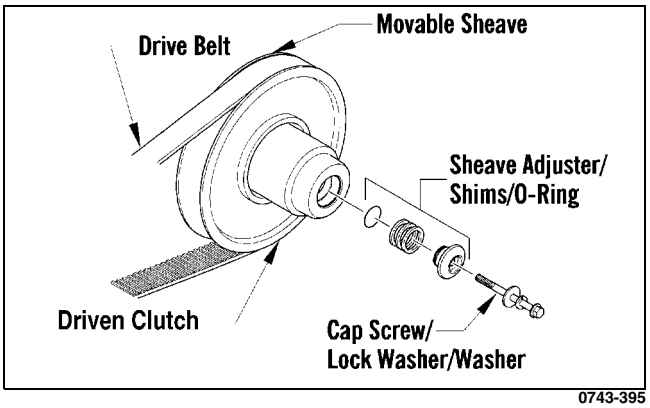
■NOTE: A stiff belt causes a HP loss to the track. As a belt warms up, it gets more flexible and transmits power with less HP loss.

■NOTE: When installing a new drive belt, see After Break-In Checkup - Drive Belt Break-In in Section 1.

REMOVING

1. With the engine off, open the left-side access panel; then remove the belt guard. On the F/M/XF, loosen the 1/4 turn screws on the lower console.
2. Remove the cap screw, lock washer and sheave adjuster from the end of the driven clutch; then remove the cap screw, lock washer, and washer from the adjuster.

■NOTE: Assure that the shims and O-ring are not removed from the adjuster.



0743-395

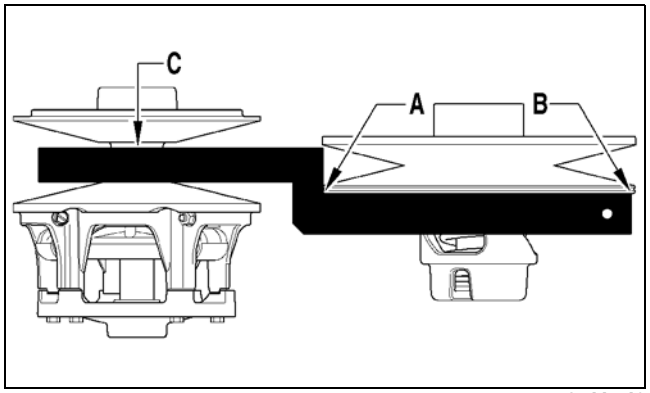
3. Reverse the adjuster and install the cap screw without washers into the adjuster. Install the sheave adjuster and cap screw onto the driven clutch; then tighten the cap screw until the movable sheave opens far enough to allow the belt to be removed.
4. Remove the drive belt from the driven clutch first; then from the drive clutch.

INSTALLING

1. Place the drive belt (so the arrow is pointing toward the front of the snowmobile) on the drive clutch; then between the sheaves of the driven clutch.
2. Install the sheave adjuster in its original position (beveled side out); then install the cap screw, lock washer, and washer into the driven clutch. Tighten the cap screw to 32 ft-lb (Bearcat/F-Series/T-Series) or 20 ft-lb (F/M/XF).

CAUTION

Do not apply Loctite to the driven clutch cap screw or component damage may occur.



0744-549

CORRECTING OFFSET

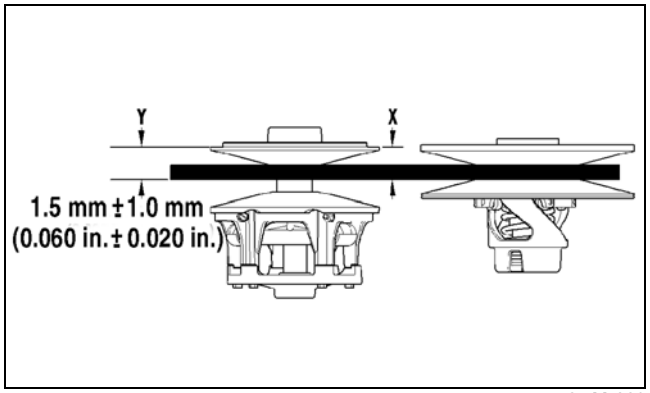
1. To correct offset, the driven clutch must be moved laterally on the input shaft. Remove the cap screw and washers securing the driven clutch.

■NOTE: If the driven clutch is tight on the shaft, pull the driven clutch off using the Driven Clutch Puller.

2. To move the driven clutch inward on the shaft, remove alignment washer(s) from the gear/chain case side of the clutch.
3. To move the driven clutch outward on the shaft, install additional alignment washer(s) on the gear/chain case side of the clutch.
4. Arrange washers to obtain correct offset; then install driven clutch, cap screw, and washers.
5. Install the drive belt (see Drive Belt in this section).

CHECKING PARALLELISM (Bearcat/T-Series 1100 cc)

1. With the engine off, remove the drive belt (see Drive Belt in this section); then open the driven sheaves and place the Parallelism Bar between the sheaves. Release the sheaves.
2. Check the parallelism of the drive clutch/driven clutch using the parallelism bar and reference points X and Y with the parallelism bar between the driven sheaves. Using a caliper or a machinist's scale, measure X and Y from the back side of the parallelism bar to the back side of the drive clutch sheave. Measurement Y must be 0.060 in. ± 0.020 in. more than measurement X, but Y must not exceed measurement X by more than 0.100 in.

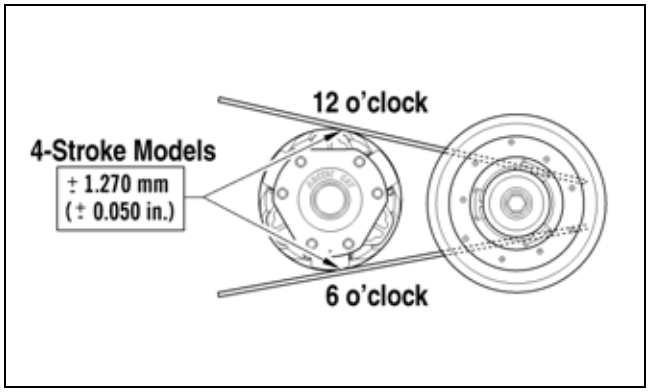


0744-609

3. If parallelism is not within specifications, the parallelism must be corrected by first loosening all the engine mounting bolts (left side, front, and right top rear). Then, pry the front of the engine towards the MAG-side of the engine compartment. Next tighten the left-side mounting bolts followed by the front and right-top rear bolts. Re-check the parallelism. If still out of specification, repeat correction procedure.
4. Install the drive belt (see Drive Belt in this section).

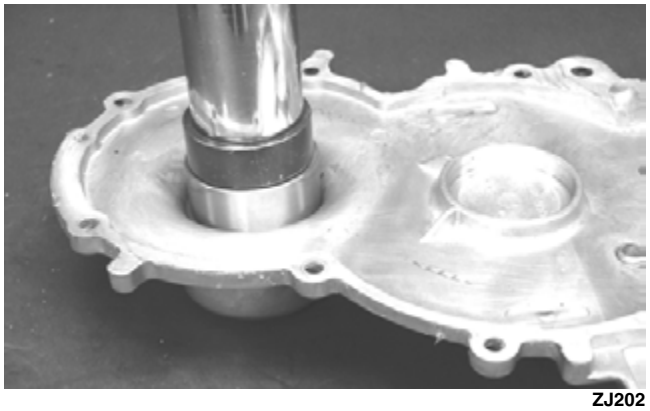
VERTICAL PARALLELISM (Bearcat/T-Series 1100 cc)

1. With engine off, remove the drive belt (see Drive Belt in this section).
2. With the driven clutch sheaves open far enough to install the Parallelism Bar into the driven clutch so the parallelism bar lies vertical between the driven clutch sheaves on the driven cam.
3. Using a digital caliper, measure from the top back (12 o'clock) of the drive clutch to the alignment bar.
4. Zero the digital caliper; then do the same procedure (step 3) for the bottom side (6 o'clock) of the drive clutch.
5. If drive clutch alignment is out of specification, loosen the cap screw securing the engine bracket to the front right engine mount enough to install an appropriate number of engine shims to equal ±1.270 mm (± 0.050 in.).



0745-193

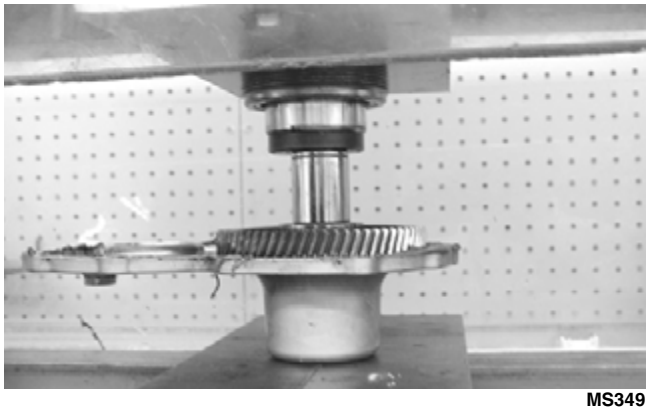
6. Once the drive clutch offset is corrected, tighten cap screw to 25 ft-lb from step 5.
7. Install drive belt (see Drive Belt in this section).



ZJ202

ZJ204

10. Using a suitable press, install the input shaft to the gear case cover.

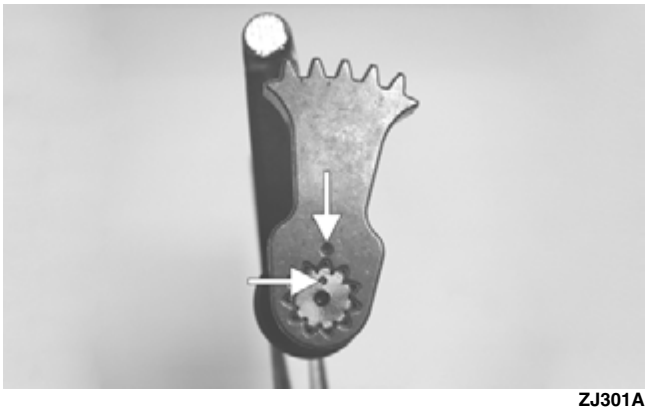


MS349

11. Install the first retaining ring onto the shift fork shaft; then install a new oil seal.

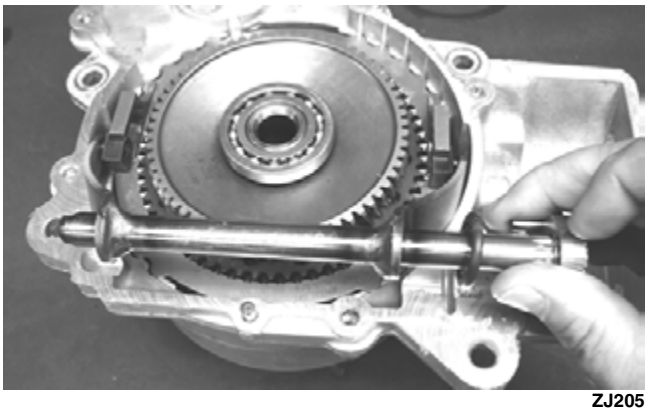
■NOTE: Apply a film of grease to the oil seal prior to installing.

12. With the alignment marks properly positioned, install the shift fork arm to the shaft. Secure the arm with the remaining retaining ring.



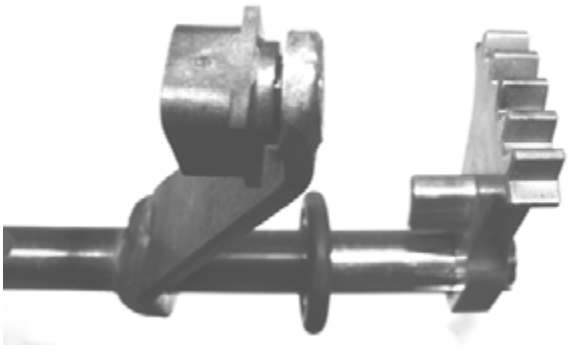
ZJ301A

13. Install the slider blocks to the shift fork assembly; then install the fork assembly into the slider and gear case.



ZJ205

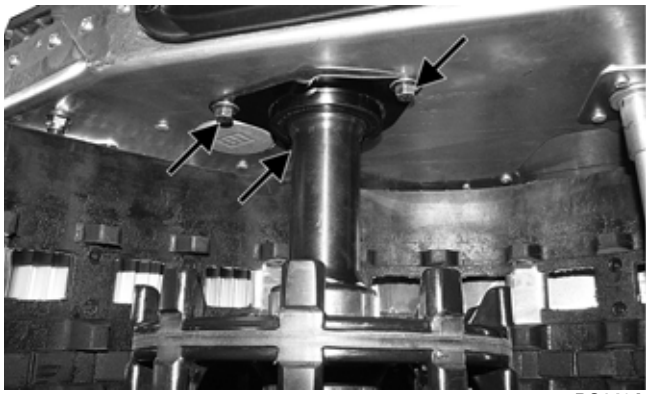
■NOTE: Make sure to install the slider blocks with the rounded end up and the raised edges facing to the outside of each other.



ZJ302

14. With the dowel pins and new gasket in place, install the cover to the gear case and secure with the torx-head cap screws; then in a crisscross pattern, tighten to 100 in.-lb.

22. Remove the cap screws securing the inner caliper to the tunnel; then remove the inner caliper.



PC148A

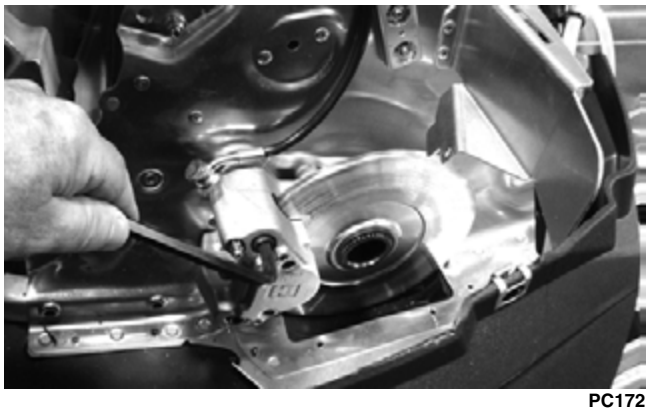
23. Pull the driveshaft out to the left; then drop out of tunnel right side first.

PC147

■NOTE: If the calliper does not remove from the driveshaft easily, proceed to step 24.

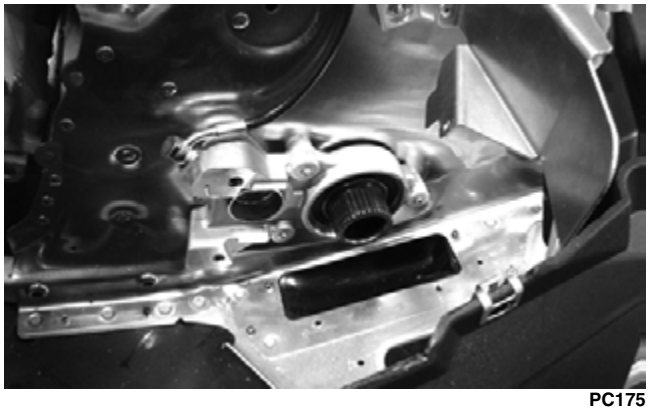
24. Remove the brake pads; then remove the outer brake caliper. Account for a rubber seal.

■NOTE: Place an absorbent towel under the caliper to absorb slight amount of brake fluid. Do not compress the brake lever.



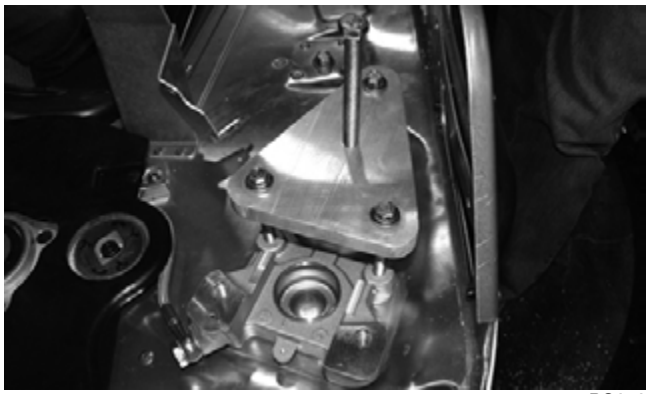
PC172

25. Remove the retaining ring securing the brake disc to the driveshaft and remove the brake disc.



PC175

■NOTE: It may be necessary to use Brake Caliper Bearing Puller (p/n 0744-067) to remove the caliper/bearing assembly.



PC151

■NOTE: If the chain case needs to be removed, remove all self-tapping screws and machine screws with lock nuts.

CLEANING AND INSPECTING CHAIN CASE

1. Inspect sprockets and chain(s) for excessive wear or stretching.

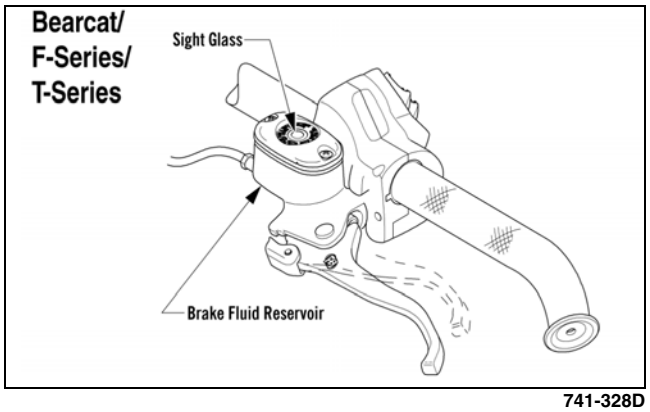
PC159

2. Inspect bearings and gears for roughness or chipping.

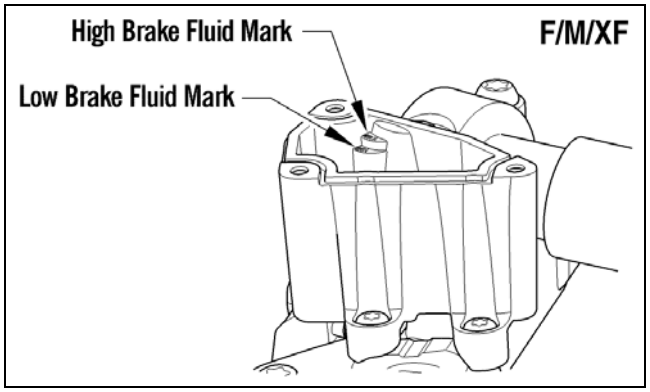
■NOTE: If bearing replacement is necessary, the chain case must be removed from the tunnel and an appropriate press utilized to remove and install bearings.

CHECKING AND ADDING BRAKE FLUID

1. With brake fluid reservoir in a level position and the cover removed (F/M/XF only), check the fluid level. The brake fluid level must be visible in the sight glass (Bearcat/F-Series/T-Series) or at the high mark in the reservoir (F/M/XF).



741-328D



0745-817

2. If the brake fluid level is low, add Arctic Cat approved 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 approved brake fluid. Never substitute or mix different types or grades of brake fluid. Brake loss may occur. Brake loss can result in severe injury or even death.

CHANGING BRAKE FLUID

The brake fluid must be changed on a regular basis and/or whenever the brake fluid has been overheated or contaminated. The brake fluid should be changed every 1000 miles or at the end of the snowmobiling season, whichever occurs first.

Arctic Cat recommends the removal and disassembly of the brake caliper assembly when changing the brake fluid (see appropriate Brake Caliper/Brake Disc/Driveshaft Bearing in this sub-section).

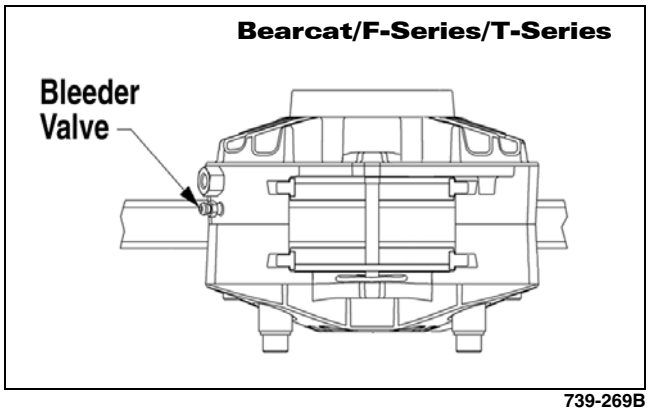
CAUTION

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

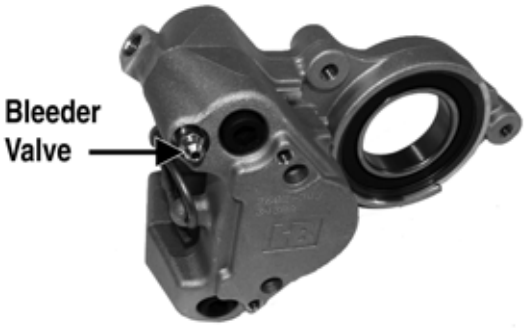
⚠ WARNING

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

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



739-269B



PC223A

2. Slowly compress the brake lever and hold. Open the bleeder valve to release the fluid; then compress the brake lever repeatedly until all brake fluid is expelled. Close the bleeder valve.

3. Add new approved brake fluid to the reservoir; then compress the brake lever and hold. Open the bleeder valve. Repeat the compression until brake fluid flows free of air bubbles and appears clean.

■NOTE: It may be necessary to refill the reservoir a number of times to eliminate all air bubbles in the system.

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

5. Bleed the brake system (see Bleeding Brake System in this sub-section).

PC200

■**NOTE: Never reuse bearings that have been removed. Always use new bearings.**

■**NOTE: If the caliper housings were separated, they must be secured together with the seal installed between the inner and outer housings.**

9. Position a piece of wood between the pistons. Using low-pressure compressed air, blow into the caliper brake hose fitting to loosen the brake pistons.

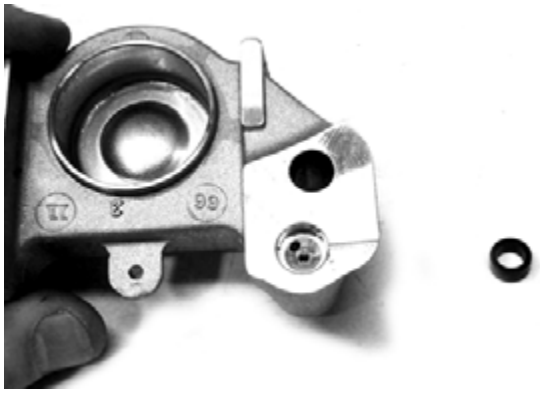
⚠ WARNING

Always wear safety glasses when using compressed air.

PC221A

10. Remove the two screws securing the caliper halves. Discard the seal.

PC219A



PC173

11. Remove the pistons (A) and O-rings (B); then discard the O-rings.

PC220A

Cleaning and Inspecting

1. Inspect the brake pistons for gouges, cracks, pitting, scuffing, or corrosion. If any of these conditions exist, replace the piston.

■**NOTE: The inner and outer caliper housings are not serviceable components. If either or both are defective or damaged, the complete caliper assembly must be replaced.**

2. Clean the piston outer surface by using a soft Scotch-Brite pad and clean brake fluid as a cleaner.

CAUTION

Do not use any sharp cleaning tool on the piston surface or in the O-ring groove as it may cause damage.

AF230

FRONT ARM LIMITER STRAPS

Under no circumstances should the front arm limiter strap be lengthened. If lengthened, it may cause shock absorber travel problems.

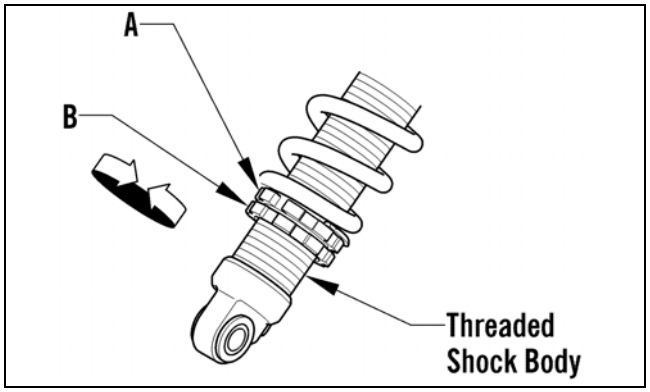
The two limiter straps can be shortened to suit driving style and some test driving time. With the rear arm in its present mounting location, no advantage has been noted from changing the strap length. If the front arm straps are shortened, the result will be more ski pressure and aggressive steering.

REAR ARM SHOCK SPRING (M/XF)

Proper adjustment of rear arm shock absorber spring preload is necessary to get the most desirable ride.

The rear arm shock spring is adjustable for the terrain conditions and driving style and weight of the operator. The spring adjuster nut has been set at the factory so the correct amount of threads are exposed between the adjuster nut and the threaded shock body as an initial setting.

Rear spring pre-load adjustment is accomplished by loosening the adjuster nut locking collar (B) from the adjuster nut (A) and using the Spring Adjuster Tool from the tool kit, rotating the adjuster nut in whichever direction is desired. Tighten the locking collar against the adjuster nut.



0745-159

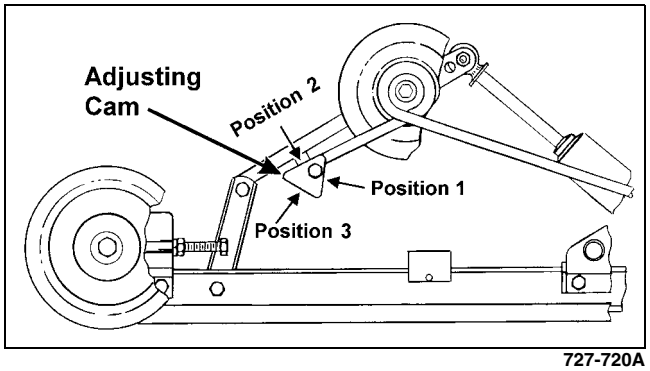
REAR ARM SPRING TENSION (Bearcat/F/F-Series/T-Series)

The rear spring tension is adjusted for the weight of the driver. Three possible adjustments exist.

1st block position - set for up to 150 lb

2nd block position - set for 150 to 200 lb

3rd block position - set for over 200 lb



727-720A

■NOTE: When making any changes to the front or rear suspension, the change should be made at both ends to keep the suspension balanced. For example, installing stiffer springs in front may require installing the next step stiffer spring in back to keep everything in balance.

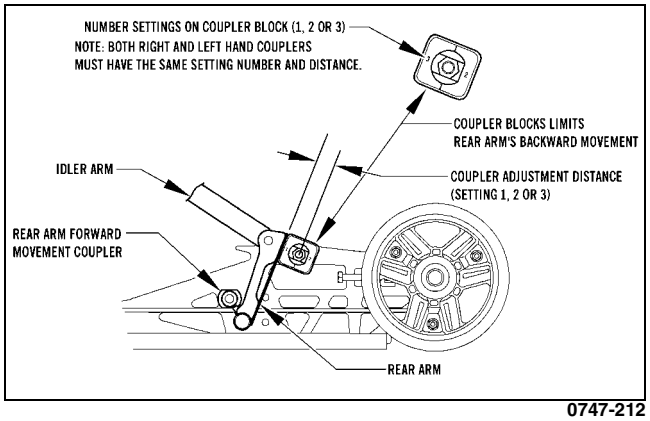
ADJUSTING REAR ARM COUPLER

The rear arm coupler provides advantages over the standard suspension.

First, with the coupler system, ski lift under acceleration is greatly reduced which provides improved handling. Second, when riding through rough terrain, the rear suspension arm receives some needed assistance from the front arm shock and spring as the rear arm is fully collapsed and locked up by the coupler blocks. The front arm then starts to collapse the shocks and spring which assist the rear springs. The result is a smoother ride for the operator.

If additional coupler action is desired, the coupler blocks can be set to the number 2 or 3 position. Each of the coupler blocks has three positions numbered on the inside surface of the block. When changing the block position, change both to the same number. To make the coupler adjustment, follow the procedure below.

1. Loosen the two cap screws that secure the coupler blocks to the inside of the suspension rails.
2. Rotate the coupler blocks to the desired position making sure both are set the same.



0747-212

3. Place a 4-in. block of wood under the rear of the suspension just in front of the rear idler wheels to assist in collapsing the suspension.
4. Collapse the rear suspension until the rear arm is firmly against the coupler blocks aligning the two blocks squarely with the arm. While in this position, tighten the two cap screws securely.

5. Remove the cap screw and lock nut securing the rear arm to the idler arm. Account for the aluminum axle and bushing assemblies.

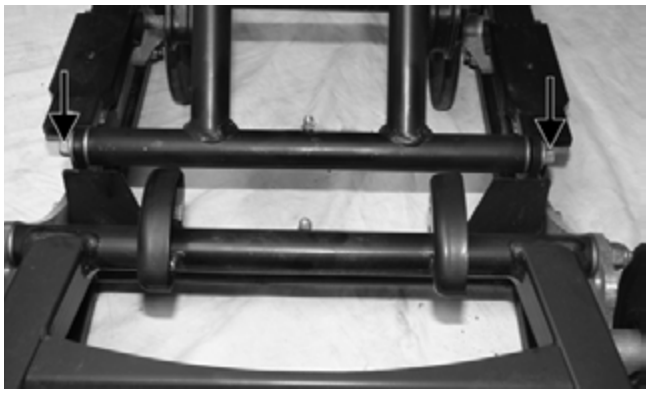
SC022A

CLEANING AND INSPECTING

1. Closely inspect the rear arm/idler arm tubing and brackets for cracks or unusual bends.
2. Clean the bearings with a clean cloth.
3. Inspect each idler wheel for cracks or damage.
4. Inspect the bushings (located in the arm pivot area) for wear or damage.
5. Inspect all welds and the tubing of the upper arm for cracks or unusual bends.
6. Inspect the two adjusting cams for damage.
7. If an idler wheel bearing must be replaced, see Idler Wheels/Mounting Blocks - Cleaning and Inspecting in this sub-section.

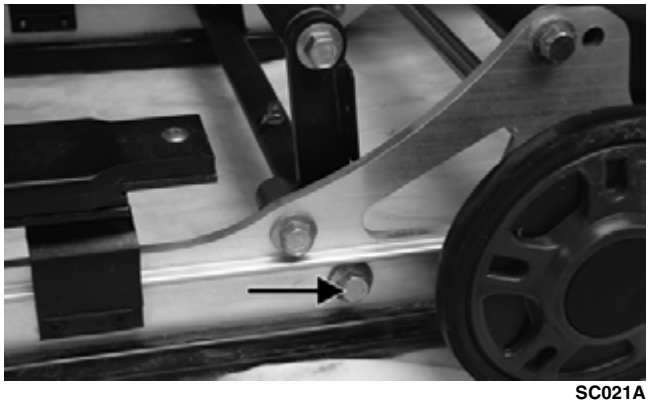
ASSEMBLING

1. Install the rear arm onto the idler arm with an aluminum axle, bushing assemblies, and two cap screws (coated with blue Loctite #243). Tighten only until snug.



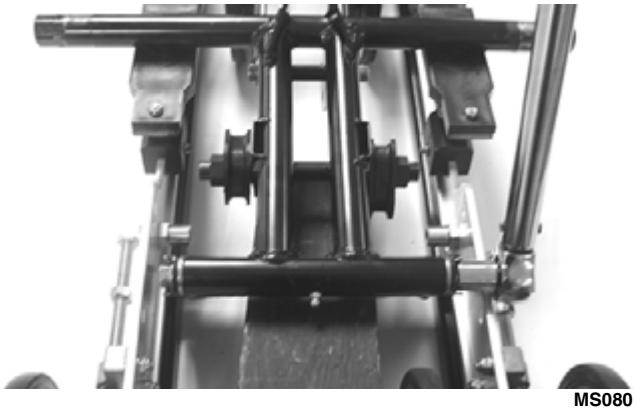
SC022A

2. Place the rear arm assembly into position. Secure with a cap screw, washer, and lock nut. Tighten to 40 ft-lb.



SC021A

3. Place a support beneath the rear arm; then tighten the cap screws (from step 1) to 40 ft-lb.

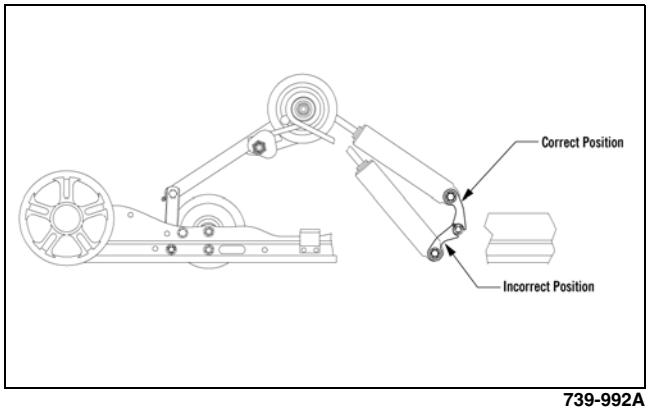


MS080

4. Position the shock links in the appropriate holes of the idler arm brackets (as noted during disassembling). Place a spacer between the center of the brackets. Insert the axle links into the upper shock link eyelets; then insert the cap screw through the eyelets. Secure with a cap screw, washer, and lock nut. Tighten securely.

MS031

SC023A



739-992A

■NOTE: To aid in centering the front arm with the hole in the tunnel, position the skid frame and track at a 45° angle to the bottom of the tunnel.

4. Install the rear of the skid frame and the track into position in the tunnel.
5. Align the rear arm assembly with the appropriate hole in the tunnel. Secure the rear arm assembly with a cap screw. TIGHTEN ONLY UNTIL SNUG.
6. Tip the snowmobile onto the other side; then align the rear arm assembly with the appropriate hole in the tunnel. Secure the offset arm assembly with a cap screw, lock washer, and flat washer. TIGHTEN ONLY UNTIL SNUG.

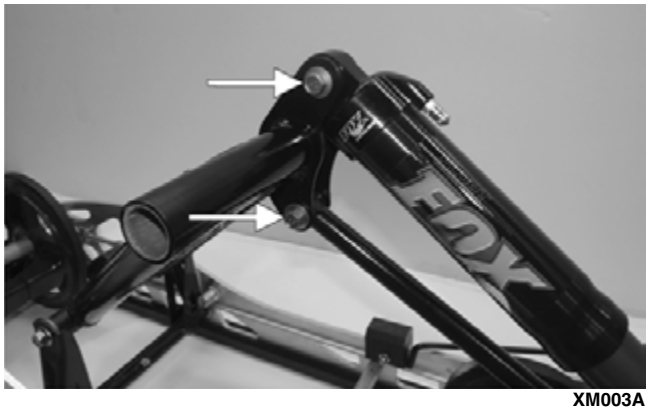
■NOTE: Do not install the short legs of the rear springs onto the adjusting cams at this time.

7. At this time, place the snowmobile to the upright position; then tighten both rear arm mounting cap screws to 40 ft-lb.

■NOTE: At this point, tighten all remaining skid frame mounting hardware to 40 ft-lb.

8. Using the Rear Suspension Spring Tool, install the short legs of the rear springs onto the adjusting cams making sure the cams are in the same adjustment positions.
9. Adjust track tension and alignment (see Track Tension and Track Alignment in Section 6).

2. Remove the cap screw and lock nut securing the upper shock eyelet to the idler arm; then remove the cap screw and lock nut securing the rear shock link to the idler arms.



XM003A

3. Remove the cap screws and lock nuts securing the rear arm shock absorber and shock link to the offset arm.

XM004A

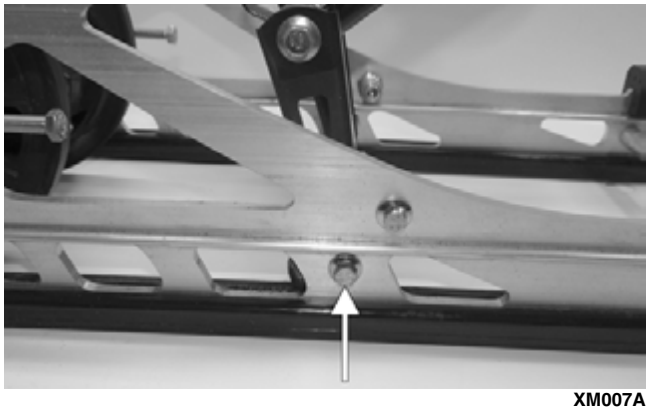
■NOTE: With the rear arm shock and shock link removed, account for the four sleeves.

4. Remove the cap screw and lock nut securing the rear arm to the idler arm. Account for the aluminum axle and flared bushings.

XM006A

■NOTE: To loosen and remove the remaining cap screw from the rear arm/idler arm, it may be necessary to reinstall the cap screw.

5. Remove the cap screw and lock nut securing the rear arm to the slide rail. Account for the bushings and axle tube.



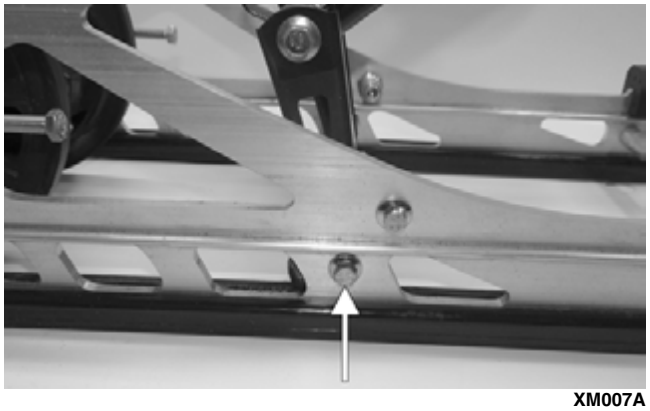
XM007A

CLEANING AND INSPECTING

1. Clean the bearings with a clean cloth.
2. Inspect each idler wheel for cracks or damage.
3. Inspect the bushings (located in the arm pivot area) for wear or damage.
4. Inspect all welds and the tubing of the upper arm for cracks or unusual bends.
5. Inspect the two adjusting cams for damage.
6. Rotate the idler wheel bearings (by hand) and check for binding or roughness.
7. If a bearing must be replaced, see Idler Wheels/ Mounting Blocks - Cleaning and Inspecting in this sub-section.

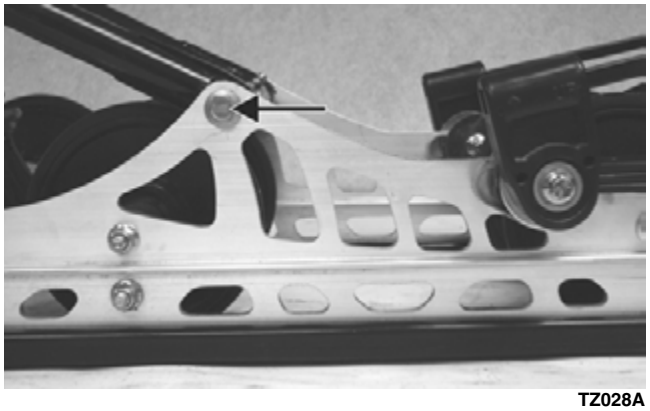
ASSEMBLING

1. Place the rear arm assembly into position between the slide rails. Secure with existing cap screws. Tighten to 20 ft-lb.



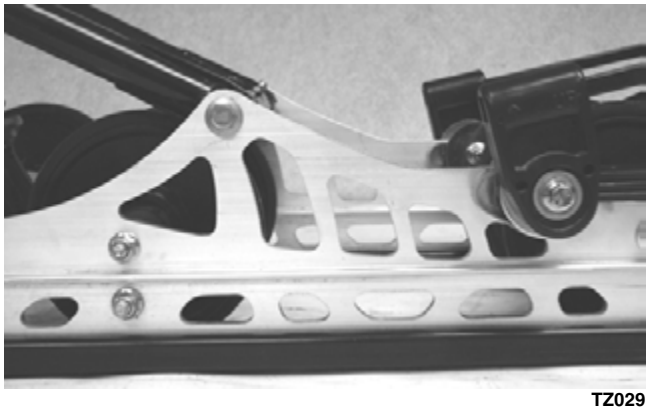
XM007A

2. Install the idler arm onto the rear arm with an aluminum axle, bushing assemblies, and two cap screws. Tighten to 40 ft-lb.

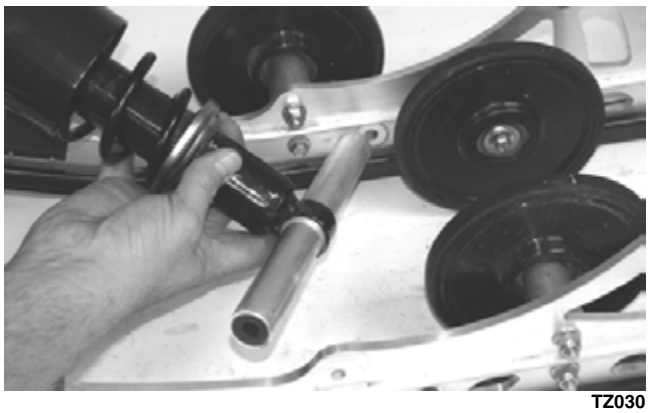


TZ028A

4. Remove the front arm and account for the front arm axle.
5. Remove the front outer idler wheel and mounting block from the side of the slide rail in which the front arm shock axle cap screw was installed.
6. Remove the cap screws, washer, and lock nut from the front shock axle; then from the side that the idler wheel and mounting block was removed, tap the assembly forward far enough for the axle assembly to clear the slide rails. Account for an axle, two spacers, and two shim washers.



TZ029



TZ030

INSPECTING

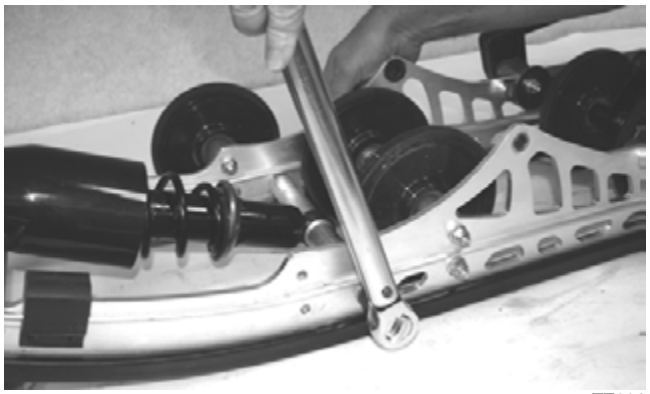
1. Inspect all front arm weldments for cracks or unusual bends; then inspect the front arm mounting brackets for cracks and for elongated holes.
2. Closely inspect all tubing for cracks or unusual bends.
3. Inspect the bearings, bushings, and front arm spacers for wear or damage.
4. Inspect the shock absorber for damage and for any signs of oil leakage especially at the point where the shock shaft enters the shock body.
5. Inspect the shock absorber eyelet welds (at each end) for any cracks, signs of separation, or for unthreading.

INSTALLING

1. With the rubber bushing in place, install the axle into the lower shock eyelet bushing assembly; then install the two shim washers and two spacers.

■NOTE: Applying a light film of lubricant to the rubber bushing will aid in installing.

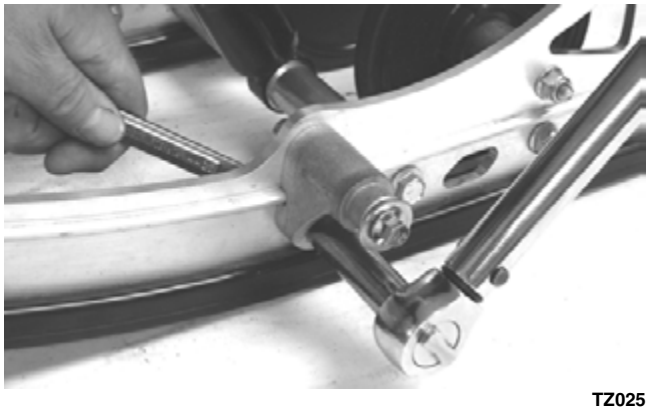
2. Position the front arm shock axle assembly on the skid frame making sure the spacers and washers are properly positioned. Secure with the cap screw, washer, and a new lock nut. Tighten to 40 ft-lb.



TZ031

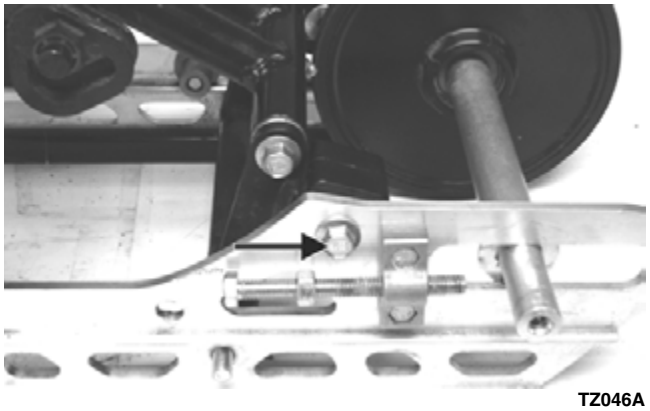
3. On the side that the idler wheel and mounting block were removed from, secure the mounting block on the slide rail with a cap screw and lock nut. Tighten to 20 ft-lb.

■NOTE: For proper alignment, install an idler wheel cap screw and lock nut into the top mounting block hole prior to tightening.



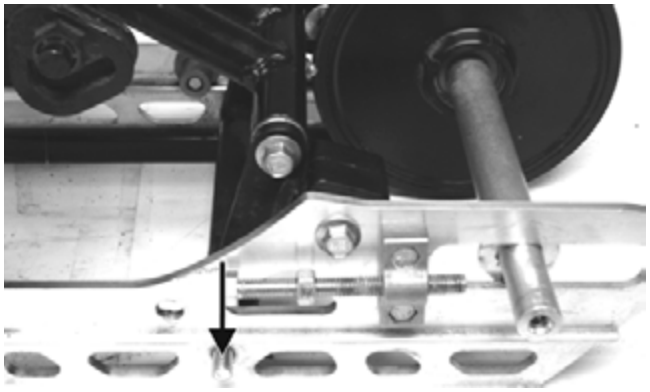
TZ025

4. Secure the idler wheel to the mounting block with a cap screw and a lock nut. Tighten cap screw to 20 ft-lb.



TZ046A

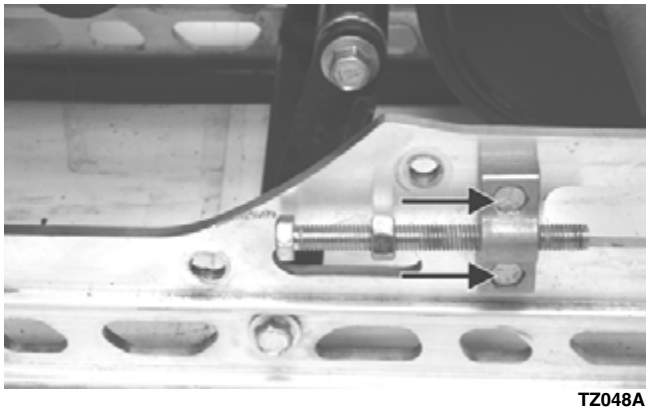
14. Remove the lock nut from the cap screw securing the rear arm assembly to the slide rail.



TZ046B

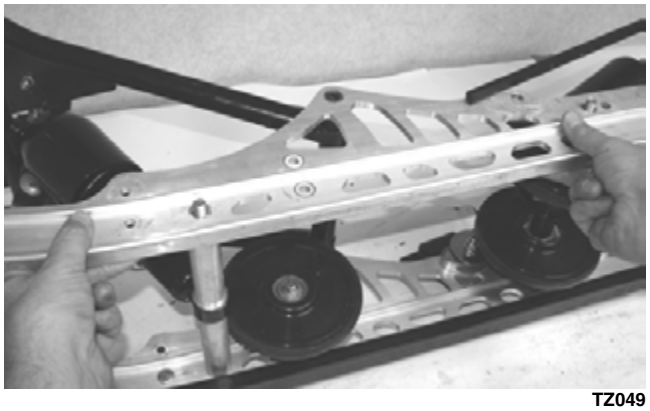
■NOTE: If removing the cap screw is necessary to replace the slide rail, install the cap screw from the opposite side into the assembly to secure the components and aid in replacing the slide rail.

15. Remove the torx-head cap screws and lock nuts securing the track adjuster bracket.



TZ048A

■NOTE: At this point, the slide rail should be free of the skid frame components and can be removed.



TZ049

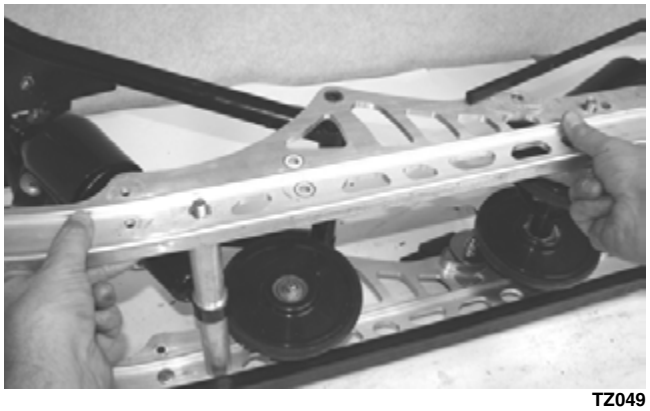
■NOTE: If the shock pad must be replaced, refer to Shock Pads at the beginning of this procedure.

INSPECTING

1. Inspect the slide rail for cracks, elongated holes, or unusual bends.
2. Inspect the wear strip for wear. The wear strip must be 0.42 in. thick or thicker. If the wear strip measurement is less than specified, replacement of both wear strips is necessary.
3. Inspect the front arm slider bumpers for cracks or wear.

INSTALLING

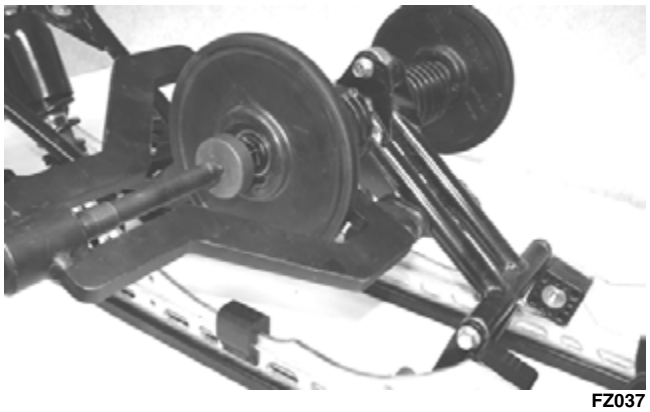
1. With the slide rail assembly on its side, place the slide rail to the front shock axle, rear arm pivot/idler wheel assembly, and rear arm cap screws; then secure the cap screws with lock nuts. Finger tighten only.



TZ049

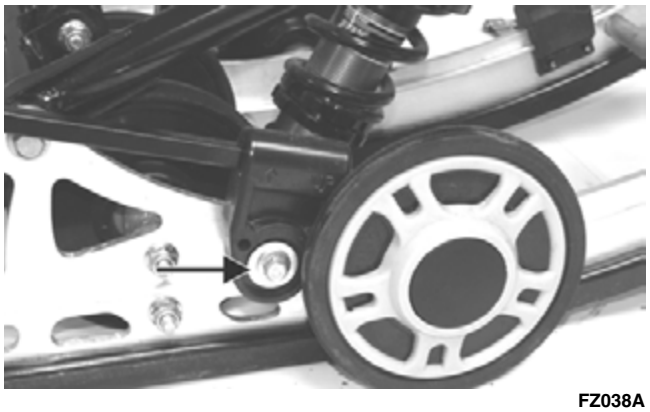
2. Secure the track adjuster bracket with the cap screws and lock nuts. Tighten to 120 in.-lb.
3. Secure the front arm to the slide rail with the cap screws and lock nuts. Tighten to 40 ft-lb.

4. Remove the idler wheel using Idler Wheel Puller Kit.



FZ037

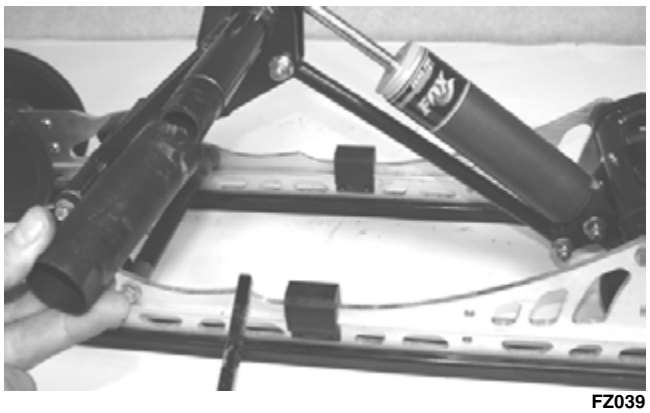
5. Remove the cap screw, flat washer, and lock nut securing the spring slide to the slide rail. Account for the spring slide and all mounting hardware.



FZ038A

MS014

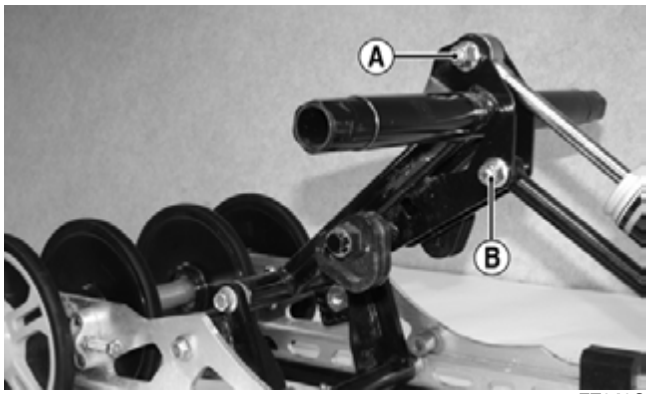
6. Remove the spring and sleeve from the idler arm.



FZ039

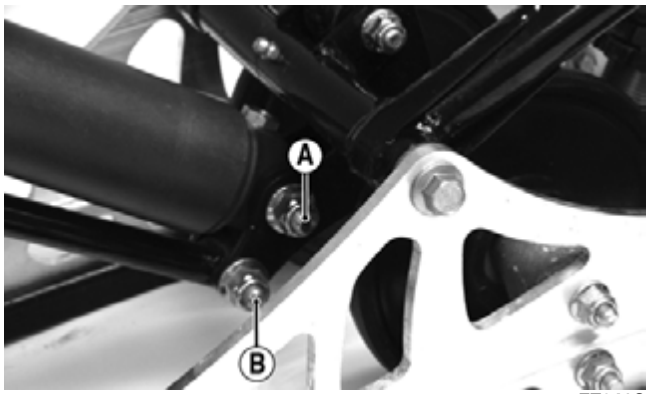
■**NOTE: Use the same procedure for the other side.**

7. Remove the cap screw (A) and lock nut securing the upper shock eyelet to the idler arm; then remove the cap screw (B) and lock nut securing the upper shock link to the idler arm. Account for the cap screws, lock nuts, and sleeves.



FZ040C

8. Remove the cap screw (A) and lock nut securing the rear arm shock absorber to the rear shock pivot; then remove the cap screw (B) and lock nut securing the shock absorber link to the pivot and account for the cap screws, lock nuts, and sleeves.

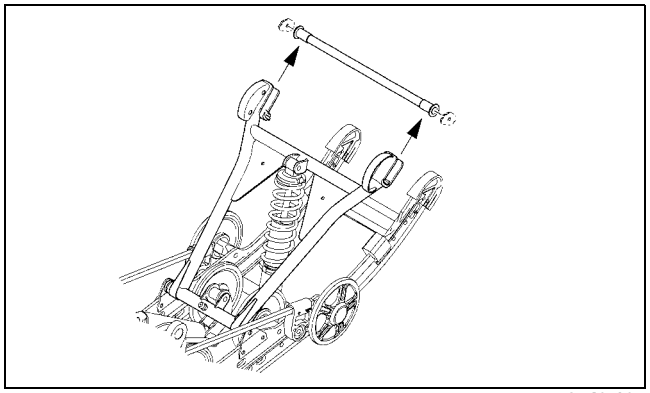


FZ041C

9. Remove the cap screw securing the rear arm to the idler arm. Account for the aluminum axle.

FZ085B

10. Remove the cap screw and lock nut securing the rear arm to the slide rail. Account for the serrated axles and axle tube.



0742-187

■**NOTE: To aid in centering the front arm with the hole in the tunnel, position the skid frame and track at a 45° angle to the bottom of the tunnel.**

4. Push the rear of the skid frame and the track into the tunnel.
5. Align the rear arm assembly with the appropriate hole in the tunnel. Secure the rear arm assembly with a cap screw, lock washer, and flat washer. AT THIS TIME, TIGHTEN ONLY UNTIL SNUG.
6. Tip the snowmobile onto the other side; then align the offset arm assembly with the appropriate hole in the tunnel. Secure the rear arm assembly with a cap screw, lock washer, and flat washer. AT THIS TIME, TIGHTEN ONLY UNTIL SNUG.

■**NOTE: Do not install the short legs of the rear springs onto the adjusting cams at this time.**

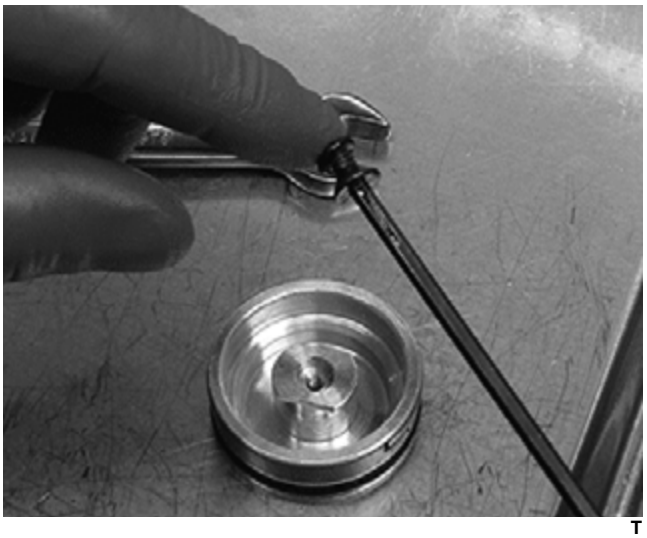
7. At this time, place the snowmobile to the upright position; then tighten both rear arm assembly mounting cap screws to 40 ft-lb.
8. Using the Rear Suspension Spring Tool, install the short legs of the rear springs onto the adjusting cams making sure the cams are in the same adjustment positions.
9. Adjust track tension deflection (see Track Tension in Section 6) and track alignment (see Track Alignment in Section 6).

CAUTION

After proper track tension and alignment have been attained, make certain that the rear axle assembly is tightened to specifications or component damage will occur.

S

17. Remove the IFP bleed screw and set aside.



T

18. Using the new seals from the appropriate seal rebuild kit, replace all IFP seals.

U

V

19. Pour the shock oil out of the “piggy-back” body assembly.

W

20. Using a 5/8-in. wrench, remove the LSC assembly from the eyelet, thoroughly clean the assembly, replace the O-rings, and install the assembly into the eyelet. Tighten to 14 ft-lb.

WWW

7. Assuring that the LCS adjuster screw is rotated fully open (counterclockwise), fill the shock body with Fox High V1 Race Oil; then rotate the LCS adjuster screw fully closed (clockwise).

XXX

8. Back out the rebound adjuster on the shaft assembly; then by inserting the long end of an Allen wrench into the shaft post, depress the metering rod lightly until the metering rod moves away from the jet.

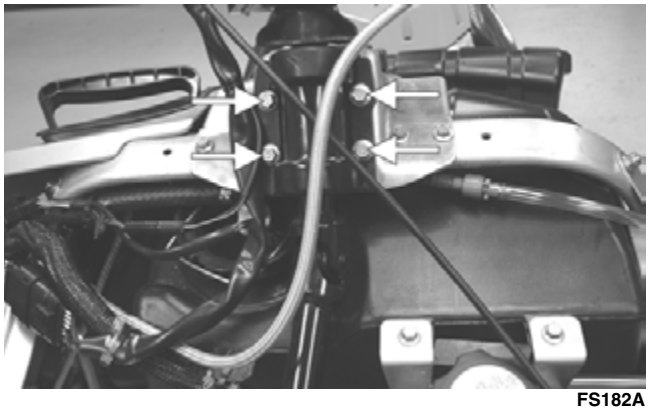
9. While holding the negative spring and spacer at the top of the shaft with one hand, insert the shaft and bearing assembly into the shock lower taking care not to spill oil into the air sleeve. Very slowly push the shaft down into the oil while rotating and "wiggling" the shaft until there are no bubbles rising in the oil.

YYY

10. Using a rubber mallet, gently tap the shaft to allow trapped air to escape from between the piston and valve shims.

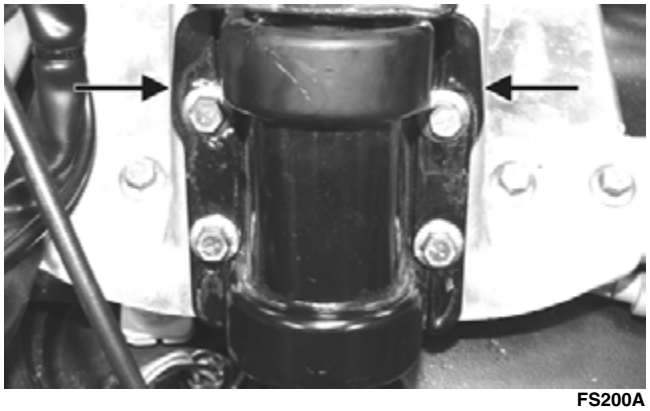
ZZZ

NOTES



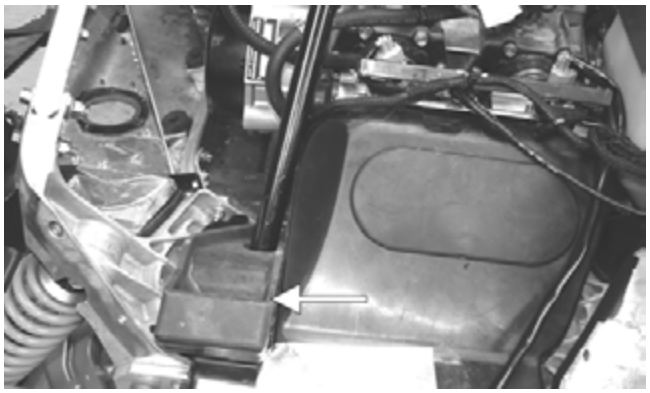
FS182A

■**NOTE: When installing the bracket plates, the wider end of the plate must be directed up.**



FS200A

4. On the Bearcat 570/F-Series/T-Series, place the rubber exhaust bumper into position on the air silencer.

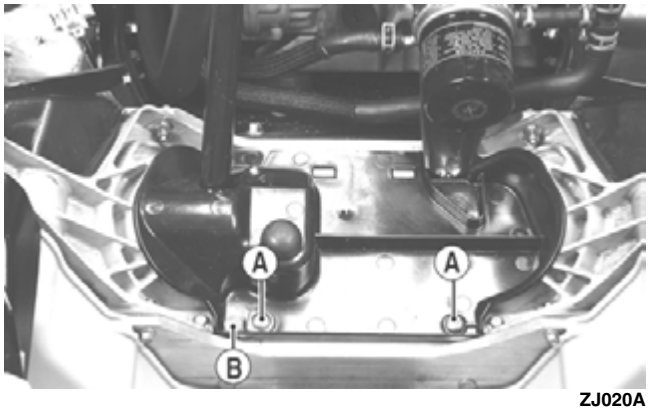


FS203A

5. Place gaskets on the resonator and exhaust manifold; then install the expansion chamber. Secure the chamber to manifold and upper frame with the springs.

6. On the standard models, place the handlebar/adjuster block onto the steering post; then secure the handlebar to the steering post with the adjuster caps, four cap screws, and lock nuts. Tighten cap screws securely.

7. On the non-turbo TZ1, install the front end close-off cover; then with the exhaust pipe mounting tab (B) installed to the right-side cap screw, tighten the cap screws (A) securely.

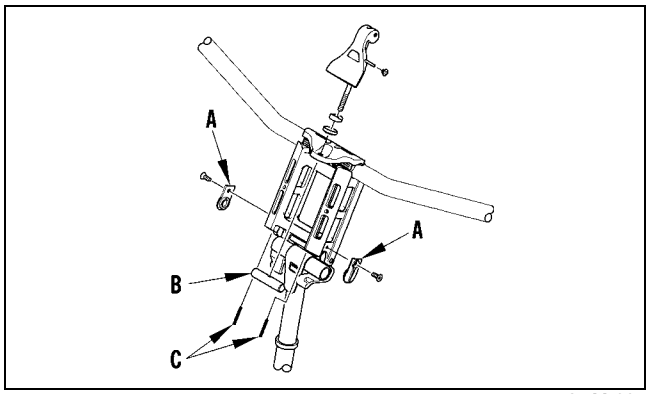


ZJ020A

■**NOTE: On the turbo model, position the intercooler into the grommets of the mounting bracket; then connect the intercooler hoses to the turbo and to the intake plenum. Tighten all hose clamps securely.**

■**NOTE: Steps 8-12 are for the LXR models.**

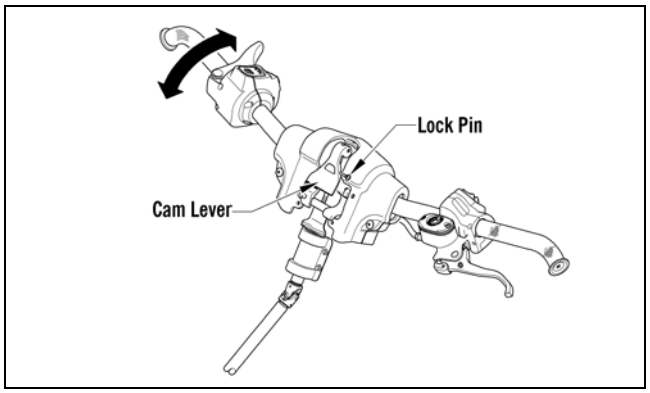
8. Install the handlebar riser block assembly to the steering post; then secure the assembly with the retainers (A) and set screws.



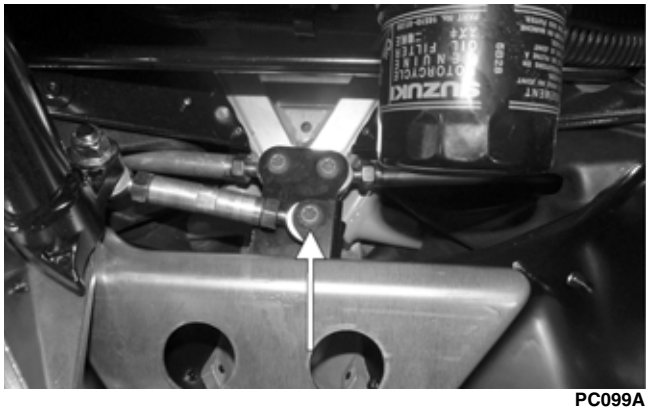
0744-927

9. With the lock rod (B) and springs (C) in place, thread the cam lever into the lock rod far enough to hold the handlebar in position.

10. Depress the lock pin, lift up on the cam lever, and swing the handlebar up and rotate to the desired position; then press down on the cam lever until the lock pin is properly positioned. Check steering for maximum right/left turning capabilities.

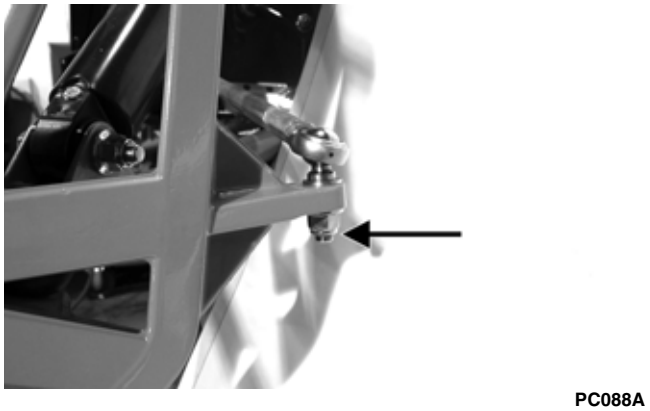


0741-427



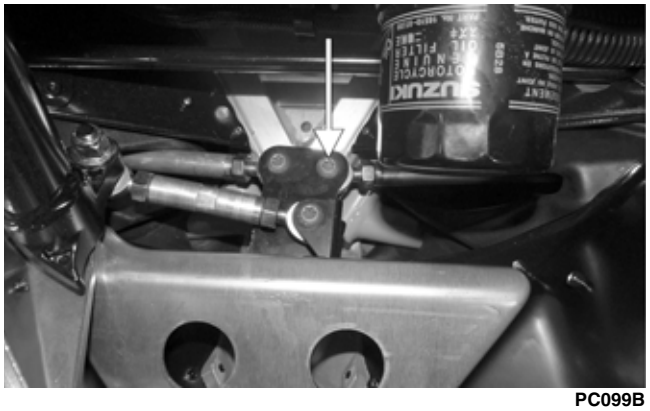
PC099A

4. Slide the steering tie rod through the steering boot and into the snowmobile; then place the steering tie rod into the spindle arm with the washer. Secure with a new nyloc nut. Tighten to 32 ft-lb.



PC088A

5. Secure the steering tie rod to the steering tie rod bracket with the screw and new nyloc nut. Tighten to 20 ft-lb.

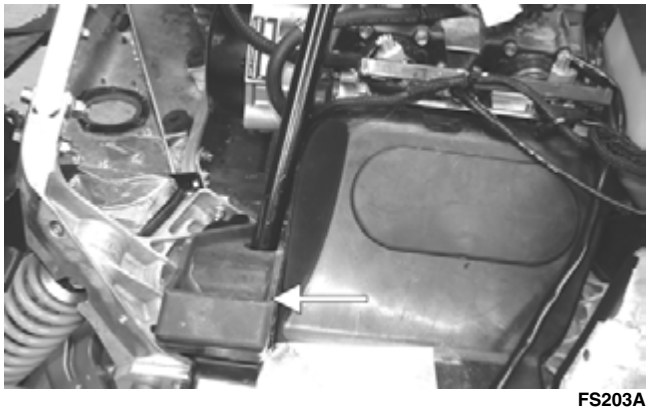


PC099B

Steering Tie Rod (Bearcat/ F-Series/T-Series)

REMOVING

1. Remove the springs securing the expansion chamber; then remove the expansion chamber from the engine compartment. Account for the two gaskets and the rubber exhaust bumper.



FS203A

2. Remove and discard the lock nut securing the steering tie rod to the steering post; then remove the cap screw and lock nut securing the left-side inner tie rod and steering tie rod to the drag link. Discard the lock nut.

FS260A

INSPECTING

1. Inspect the ball joints for damaged threads or wear.
2. Inspect the tie rod for damage, unusual bends, or wear.

INSTALLING

1. Thread the jam nuts onto the ball joints; then equally thread the ball joints onto the steering tie rod.

■NOTE: There must be an approximate equal number of threads exposed on each ball joint.

2. Place the tie-rod assembly into position; then rotate the steering tie rod until the holes in the ball joints align with the holes in the steering post and the drag link.
3. Secure the steering tie rod to the steering post with the new lock nut and tighten to 35 ft-lb; then secure the steering tie rod and left-side inner tie rod to the drag link with the cap screw (threads coated with green Loctite #609) and new lock nut. Tighten to 35 ft-lb.
4. Ensure correct handlebar/ski alignment (adjust steering tie rod as necessary); then tighten the jam nut (coated with blue Loctite #243) to 13 ft-lb.

⚠ WARNING

Neglecting to lock the tie rod by tightening the jam nuts may cause loss of snowmobile control and possible personal injury.

13. Tighten all steering/suspension components (from steps 5-7 and 9-12) in the following sequence and to the indicated torque values:

Step 5	Lock Nut (G) - RH	32 ft-lb
Step 6	Lock Nut (E) - RH	32 ft-lb
Step 7	Lock Nut (H) - RH	20 ft-lb
Step 9	Lock Nut (G) - LH	32 ft-lb
Step 10	Lock Nuts (E) - LH	32 ft-lb
Step 11	Lock Nut (H) - LH	20 ft-lb
Step 12	Lock Nut (B)	35 ft-lb

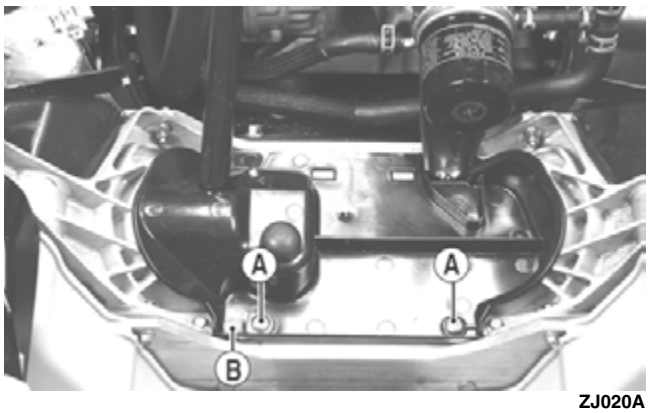
14. Tighten the cap screws and lock nuts (K) and (L) securing the suspension mounting bracket to the chassis (from step 2) to 30 ft-lb (upper) and 12 ft-lb (lower).

15. With the sleeves in place on the sway bar, position the sway bar links (D) onto the sway bar; then install the sway bar/links onto the left-side/right-side lower A-arm pins.

16. Secure the sway bar to the suspension mounting bracket with the sway bar mounting brackets and lock nuts (C). Tighten securely.

■NOTE: Steps 17-20 are for the 1100 cc models only.

17. Install the close-off cover; then with the exhaust pipe mounting tab (B) installed to the right-side cap screw, secure the cover with the two torx-head cap screws (A). Tighten securely.



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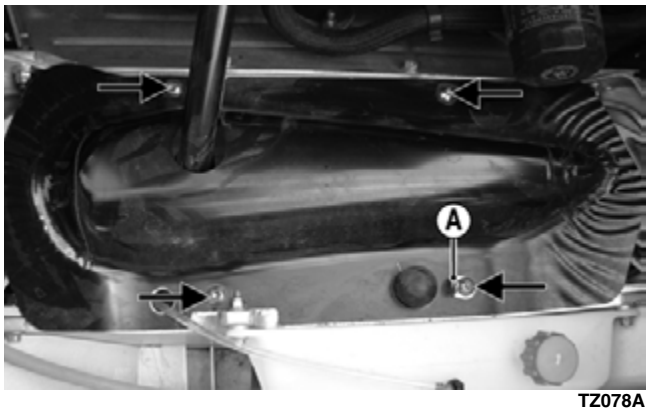
■NOTE: On the Bearcat Z1 XT, remove the four cap screws securing the close-off panel and account for the exhaust pipe mounting tab (A) from left front cap screw.

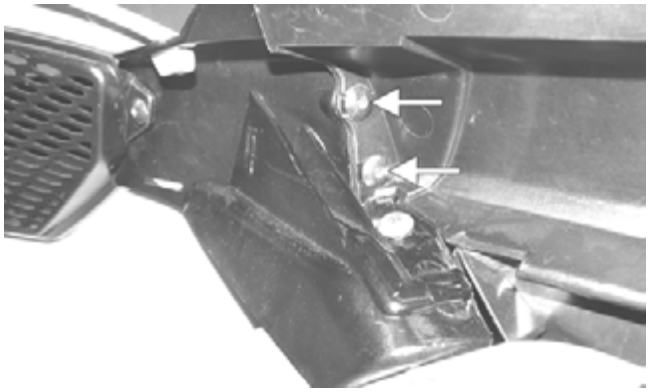


TZ078A

18. Install the exhaust pipe; then secure the pipe to the resonator, manifold, and mounting tab with exhaust springs.

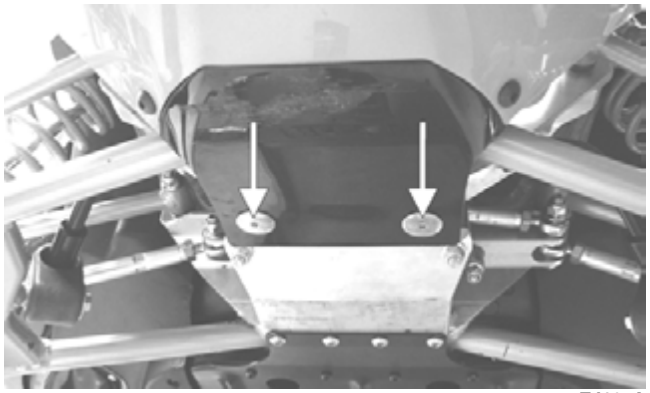
■NOTE: On the turbo models, position the intercooler into the grommets of the mounting bracket; then connect the intercooler hoses to the turbo and to the intake plenum. Tighten all hose clamps securely.

19. To install the front bumper assembly, first secure the bumper to the left-side and right-side panels with the self-tapping screws.



ZJ166B

20. Secure the bottom of the assembly to the suspension mounting bracket with the two body screws and lock nuts. Tighten securely; then install the hood.



ZJ167A

■NOTE: On the F5 to finalize the installing of the front suspension mounting bracket, proceed to Air Silencer (F5) sub-section in Section 3 and follow INSTALLING procedure.

Front Bumper (F/M/XF)

REMOVING/INSTALLING

1. Remove all torx-head screws securing the front bumper; then remove the bumper.

2. With the bumper in position, install all torx-head screws. Tighten securely.

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