

1987 Arctic Cat Jag-Panther-Super Jag[®] Service Manual

ARCTIC CAT[®]

Get on it.



FOREWORD

This manual contains service, maintenance, and troubleshooting information for the 1987 Jag, Super Jag, and Panther Snowmobiles. The manual is designed to aid service personnel in service-oriented application and may be used as a textbook for service training.

The manual is divided into sections. Each section of the manual covers a specific snowmobile component or system and, in addition to the standard service procedures, includes assembling, disassembling, and inspecting instructions. A troubleshooting section is also included in this manual.

The service technician should become familiar with the operation and construction of each component or system of the Jag, Super Jag, and Panther by carefully studying this manual. This manual will assist the service technician in becoming more aware of and efficient with servicing procedures. Such efficiency not only helps build consumer confidence but also saves time and labor.

The procedures in this manual include the complete disassembly of the 1987 Jag, Super Jag, and Panther components. When servicing, the technician should use discretion as to how much disassembly is needed to correct any given condition.

The manual uses the words Warning, Caution, and Note to emphasize certain information. The symbol **▲ WARNING ▲** identifies personal safety-related information. Therefore, be sure to read the directive because it deals with the possibility of personal injury. The symbol **● CAUTION ●** identifies snowmobile-related information. Be sure to read the directive because it deals with the possibility of damaging a part or parts of the snowmobile. If the directive is violated, the snowmobile will usually sustain major damage. The symbol **■ NOTE:** identifies supplementary information worthy of particular attention.

At the time of publication, all information, photographs, and illustrations were technically correct. Because Arctco, Inc. constantly refines and improves its products, no retroactive obligation is incurred.

All materials and specifications subject to change without notice.

Keep this manual accessible in the shop area for reference.

Service Department

CERTIFIED PARTS
CORPORATION

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SECTION 1 — GENERAL INFORMATION

1

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Specifications*

ENGINE AND DRIVE		JAG 340	JAG 440	PANTHER	SUPER JAG
Engine Model		AF34A6	AG44A8	AL50A6	AG44A8
Displacement	cc (cu in.)	339 (20.68)	431 (26.29)	500 (30.5)	431 (26.29)
Bore x Stroke	mm (in.)	60 x 60 (2.362 x 2.362)	65 x 65 (2.559 x 2.559)	70 x 65 (2.756 x 2.559)	65 x 65 (2.559 x 2.559)
Compression Ratio		6.8:1	6.5:1	6.5:1	6.5:1
Piston-Ring End Gap Range	mm (in.)	0.15-0.80 (0.006-0.031)	0.20-0.83 (0.008-0.033)	0.20-0.83 (0.008-0.033)	0.20-0.83 (0.008-0.033)
Piston Skirt/Cylinder Clearance Range	mm (in.)	0.058-0.15 (0.0023-0.006)	0.084-0.15 (0.0033-0.006)	0.084-0.15 (0.0033-0.006)	0.084-0.15 (0.0033-0.006)
Piston Pin Diameter Range	mm (in.)	15.994-16.000 (0.6297-0.6299)	15.994-16.000 (0.6297-0.6299)	17.995-18.000 (0.7085-0.7087)	15.994-16.000 (0.6297-0.6299)
Piston - Pin Bore Diameter Range	mm (in.)	15.996-16.004 (0.6298-0.6301)	15.996-16.004 (0.6298-0.6301)	17.998-18.006 (0.7086-0.7089)	15.996-16.004 (0.6298-0.6301)
Connecting-Rod Small End Diameter Range	mm (in.)	21.00-21.01 (0.8268-0.8273)	21.00-21.01 (0.8268-0.8273)	23.00-23.01 (0.9056-0.9059)	21.00-21.01 (0.8268-0.8273)
Crankshaft End Play Range	mm (in.)	0.05-0.10 (0.002-0.004)	0.05-0.10 (0.002-0.004)	0.05-0.10 (0.002-0.004)	0.05-0.10 (0.002-0.004)
Crankshaft Runout (max.) (Total Indicator Reading)	mm (in.)	0.05 (0.002)	0.05 (0.002)	0.05 (0.002)	0.05 (0.002)
Cylinder Trueness (max.)	mm (in.)	0.1 (0.0039)	0.1 (0.0039)	0.1 (0.0039)	0.1 (0.0039)
Drive Clutch/Driven Pulley Offset	mm (in.)	35 (1.365)	35 (1.365)	35 (1.365)	35 (1.365)
Center-to-Center Distance	cm (in.)	28 (11.375)	28 (11.375)	25.9 (10.2)	25.9 (10.2)
Engagement Speed		3600-4000	3600-4000	3600-4000	3600-4000
Peak RPM		6500-6700	6000-6200	7000-7200	6000-6200
Ramp	p/n	0646-026	0146-414	0146-414	0146-414
Spring (Green)	p/n	0146-068	0146-068	0146-068	0146-068
Weight	p/n	0146-166	0146-104	0146-104	0146-104
Chain Pitch		70	68	68	68
Sprocket Ratio		20 x 39	20 x 35	20 x 35	20 x 35
Lighting Coil Output @ 3000 RPM		12V/150W	12V/150W	12V/150W	12V/150W
Ignition Type		CDI/NCI	CDI/NCI	CDI/NCI	CDI/NCI
Spark Plug		NGKBR8ES	NGKBR9ES	NGKBR9ES	NGKBR9ES
Brake Type		Mechanical Disc w/Parking Brake			
Track Width	cm (in.)	38 (15)	38 (15)	40.5 (16)	40.5 (16)
Overall Track Length	cm (in.)	295 (116)	295 (116)	307 (121)	396 (156)
Track Length on Ground	cm (in.)	94 (37)	94 (37)	94 (37)	96.5 (38)
Drive Belt	p/n	0227-100	0227-100	0227-030	0227-030

CARBURETOR		JAG 340	JAG 440	PANTHER	SUPER JAG
Type		VM30	VM34	VM34	VM34
Main Jet**		200	300	300	300
Pilot Jet		25	22.5	27.5	22.5
Needle Jet		P-4 (169)	Q-0 (166)	P-8 (166)	Q-0 (166)
Jet Needle		5DP7-3	6DH2-3	6DH7-3	6DH2-3
Pilot Air Screw (Turns out)		1½ ± ¼	1½ ± ¼	1½ ± ¼	1½ ± ¼
CHASSIS		JAG 340	JAG 440	PANTHER	SUPER JAG
Length w/Skis	cm (in.)	258 (101.5)	258 (101.5)	267 (105)	322 (127)
Length w/o Skis	cm (in.)	233 (92)	233 (92)	241 (95)	297 (117)
Height w/Windshield	cm (in.)	110 (43.2)	110 (43.2)	110 (43.2)	110 (43.2)
Height w/o Windshield	cm (in.)	76 (30)	76 (30)	76 (30)	76 (30)
Overall Width	cm (in.)	95.2 (37.5)	95.2 (37.5)	95.2 (37.5)	95.2 (37.5)
Ski "Center-to-Center" Distance	cm (in.)	76 (30)	76 (30)	76 (30)	76 (30)
MISCELLANY		JAG 340	JAG 440	PANTHER	SUPER JAG
Curb Weight (approx.)	kg (lb)	202 (445)	204 (449)	205 (451)	214 (470)
Dry Weight (approx.)	kg (lb)	181 (400)	183 (404)	186 (410)	193 (425)
Fuel Tank Capacity	l (U.S. gal)	28.4 (7.5)	28.4 (7.5)	26.8 (7.1)	26.8 (7.1)
Oil Tank Capacity	l (U.S. qt)	3.3 (3.5)	3.3 (3.5)	1.7 (1.8)	1.7 (1.8)
Chain Case Level	ml (fl oz)	236 (8)	236 (8)	236 (8)	236 (8)
Gasoline Octane (rating)		88 minimum	88 minimum	88 minimum	88 minimum
Engine Oil		Arctco/Arctic Cat Injection Oil			
Chain Case Lubricant		Arctco/Arctic Cat Chainlube			
Grease		Low Temperature			
Taillight/Brakelight	p/n	0109-460	0109-460	0109-460	0109-460
Headlight	p/n	0109-735	0109-735	0109-735	0109-735
Ignition Timing** 18° BTDC @ 6000 RPM	mm (in.)	1.860 (0.073)	2.032 (0.080)	2.032 (0.080)	2.032 (0.080)
Spark-Plug Gap	mm (in.)	0.7 (0.028)	0.7 (0.028)	0.7 (0.028)	0.7 (0.028)
Gas/Oil Mixture (Break-In)		50:1 + Oil Injection			
Gas/Oil Mixture (After Break-In)		None - (Oil Injection)			

*Specifications subject to change without notice.

**Warm engine specifications.

Break-In Procedure

New and overhauled Panther, Jag, and Super Jag snowmobile engines require a short break-in period (1 tankful of fuel). During the break-in period, pre-mix the first tank of fuel at a 50:1 ratio in conjunction with the oil-injection system. When using the snowmobile, a maximum of 1/2 throttle is recommended. However, brief full-throttle acceleration and variations in driving speed contribute to good engine break-in.

Following the break-in period, the carburetor main jet should be changed in accordance with the Main Jet Chart.

Recommended Gasoline

The recommended gasoline to use is 88 minimum octane regular leaded. DO NOT use gasolines containing either methanol or more than 5% ethanol.

● CAUTION ●

DO NOT use gasolines containing either methanol or more than 5% ethanol. Also, gasoline additives, gasohol, methanol alcohol, and white gas **MUST NOT BE USED**; they will eventually cause engine damage.

Recommended Oil

The recommended oils to use are either Arctco Injection Oil or Arctic Cat Injection Oil. These oils are specially formulated to meet the lubrication requirements of the Arctic Cat engine.

Genuine Parts

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

Summer Storage

Prior to storing the snowmobile for the summer, it must be properly serviced to prevent rusting and component deterioration. If a customer desires you to prepare the snowmobile for storage, use the following procedure:

1. Remove the passenger strap; then remove the seat cushion from the tunnel. Clean the seat cushion with a damp cloth and store in a dry place.
2. Clean the snowmobile thoroughly by hosing dirt, oil, grass, and other foreign matter from the skid frame, tunnel, hood, and belly pan. Allow the snowmobile to dry thoroughly. DO NOT get water into any part of the engine.
3. Place the rear of the snowmobile up on a jack-stand. Remove the intake silencer boot from the carburetor.
4. Start the engine and allow to idle. With the engine idling, spray a two-cycle engine preserver into the carburetor until the engine exhaust starts to smoke heavily, or until the engine starts to drop in rpm. Install the intake silencer boot.
5. Drain fuel from the carburetor float bowl; then drain the fuel tank of all gasoline.
6. Remove the primer line from the T-fitting where it attaches to the fuel line. Place the end of the primer line into a small container of two-cycle oil and pump the primer button until oil is seen in the line going to the intake manifold or carburetor. Install the primer line on the T-fitting.
7. Plug the hole in the exhaust system with a clean cloth.

8. With the ignition switch key in the OFF position.
 - A. Disconnect the high tension wires from the spark plugs; then remove the plugs.
 - B. Pour 29.5 ml (1 fl oz) of SAE #30 petroleum-based oil into each spark plug hole and pull the recoil handle slowly about 10 times.
 - C. Install spark plugs and connect the high tension wires.
9. Every three years or 2000 miles, drain the chain case lubricant by removing the chain-case cover and seal. Allow the lubricant to flow onto rags placed in the belly pan. Inspect chain, sprockets, chain tensioner, and pads for wear and the chain for proper tension. Install chain-case cover and seal and pour 236 ml (8 fl oz) of either Arctco Chainlube or Arctic Cat Chainlube into the filler hole.
10. Remove the drive belt from the drive clutch/driven pulley. Lay the belt on a flat surface or slide it into a cardboard sleeve to prevent warping or distortion during storage.
11. Clean and inspect the drive clutch and driven pulley.
 1. Apply light oil to the upper steering post bushing, ski spindles and bolts, front and rear pivot bushings of the ski frame, and plungers of the shock absorbers.
13. Lubricate the rear suspension arm with a low-temperature grease. On the Jag, lubricate the lower steering post assembly with a low-temperature grease.
14. Lightly sand the bottom of the skis; then using black paint p/n 0652-004, paint the entire bottom of the skis.
15. Tighten all nuts, bolts, and screws making sure all calibrated nuts and bolts are tightened to specifications. Make sure rivets holding components together are tight. Replace all loose rivets.
16. Clean and polish the hood, console, and chassis with an automotive-type cleaner wax. **DO NOT USE SOLVENTS OR SPRAY CLEANERS. THE PROPELLENT WILL DAMAGE THE FINISH.**
17. If possible, store the snowmobile indoors. Raise the track off the floor by blocking up the back end making sure the snowmobile is secure. Loosen the track-adjustment bolts to reduce track tension. Cover the snowmobile

with a machine cover or a heavy tarpaulin to protect it from dirt and dust.

18. If the snowmobile must be stored outdoors, block the entire snowmobile off the ground making sure the snowmobile is secure. Loosen the track-adjustment bolts to reduce track tension. Cover with a machine cover or a heavy tarpaulin to protect it from dirt, dust, and rain.

NOTE: Avoid using a plastic cover as moisture will collect on the snowmobile causing rusting.

1

Preparation After Storage

Taking the snowmobile out of summer storage and correctly preparing it for another season will assure many miles and hours of trouble-free snowmobiling. To prepare the snowmobile, use the following procedure:

1. Clean the snowmobile thoroughly. Polish the exterior of the snowmobile using an automotive-type cleaner wax.
2. Clean all engine cooling fins and vents. 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, worn, or not within specifications. Install drive belt.
5. Inspect the in-line fuel filter and replace if necessary. Fill the fuel tank with the correct fuel and the oil-injection tank with Injection Oil.
6. Inspect brake-lever travel, brake puck/brake disc clearance, all controls, headlight, taillight, brakelight, ski alignment, ski wear-bars, and headlight aim; adjust or replace as necessary.
7. Inspect the spark plugs. Replace, gap, or clean as necessary.

8. Adjust the track to the proper tension and alignment. Lock the jam nuts.
9. Adjust the carburetor, throttle cable, and choke cable.
10. Tighten all nuts, bolts, and screws making sure all calibrated nuts and bolts are tightened to specifications.

SECTION 2 — ENGINE

2

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Engine Specifications

		JAG 340	JAG 440	PANTHER	SUPER JAG
Engine Model		AF34A6	AG44A8	AL50A6	AG44A8
No. of Cylinders		2	2	2	2
Engine Lubrication		Oil Injection			
Starter System		Manual Recoil			
Bore x Stroke	mm (in.)	60 x 60 (2.362 x 2.362)	65 x 65 (2.559 x 2.559)	70 x 65 (2.756 x 2.559)	65 x 65 (2.559 x 2.559)
Displacement	cc (cu in.)	339 (20.68)	431 (26.29)	500 (30.5)	431 (26.29)
Compression Ratio		6.8:1	6.5:1	6.5:1	6.5:1
Piston-Ring End Gap Range	mm (in.)	0.15-0.80 (0.006-0.031)	0.20-0.83 (0.008-0.033)	0.20-0.83 (0.008-0.033)	0.20-0.83 (0.008-0.033)
Piston Skirt/Cylinder Clearance Range	mm (in.)	0.058-0.15 (0.0023-0.006)	0.084-0.15 (0.0033-0.006)	0.084-0.15 (0.0033-0.006)	0.084-0.15 (0.0033-0.006)
Piston Pin Diameter Range	mm (in.)	15.994-16.000 (0.6297-0.6299)	15.994-16.000 (0.6297-0.6299)	17.995-18.000 (0.7085-0.7087)	15.994-16.000 (0.6297-0.6299)
Piston-Pin Bore Diameter Range	mm (in.)	15.996-16.004 (0.6298-0.6301)	15.996-16.004 (0.6298-0.6301)	17.998-18.006 (0.7086-0.7089)	15.996-16.004 (0.6298-0.6301)
Connecting-Rod Small End Diameter	mm (in.)	21.00-21.01 (0.8268-0.8273)	21.00-21.01 (0.8268-0.8273)	23.00-23.01 (0.9056-0.9059)	21.00-21.01 (0.8268-0.8273)
Crankshaft End Play Range	mm (in.)	0.05-0.10 (0.002-0.004)	0.05-0.10 (0.002-0.004)	0.05-0.10 (0.002-0.004)	0.05-0.10 (0.002-0.004)
Crankshaft Runout (max.) (Total Indicator Reading)	mm (in.)	0.05 (0.002)	0.05 (0.002)	0.05 (0.002)	0.05 (0.002)
Cylinder Trueness (max.)	mm (in.)	0.1 (0.0039)	0.1 (0.0039)	0.1 (0.0039)	0.1 (0.0039)

Removing Engine

NOTE: Procedures designated "A" are for the Jag 340, Jag 440, and Super Jag; procedures designated "B" are for the Panther.

1. Open the clutch shield; then remove the drive belt.
2. Remove the bolt and lock washer securing the drive clutch to the crankshaft; then using either the Arctic Drive Clutch Puller and an impact wrench or a breaker bar and a Spanner Wrench (p/n 0144-007), tighten the puller. If the drive clutch will not release, sharply strike the head of the puller. Repeat complete procedure until the clutch releases.

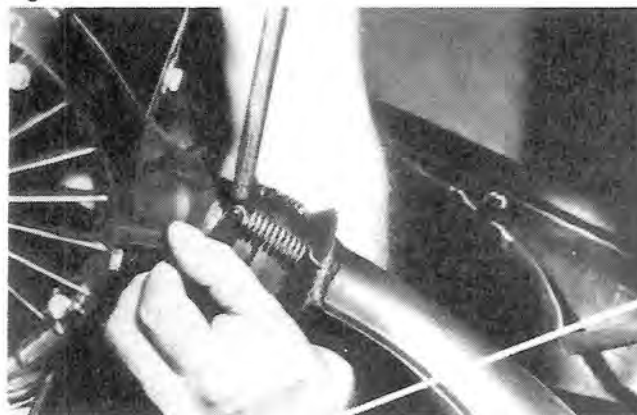
Fig. 2-1



NOTE: Before installing the clutch puller, apply oil to the threads of the puller and a small amount of grease to the tip of the puller.

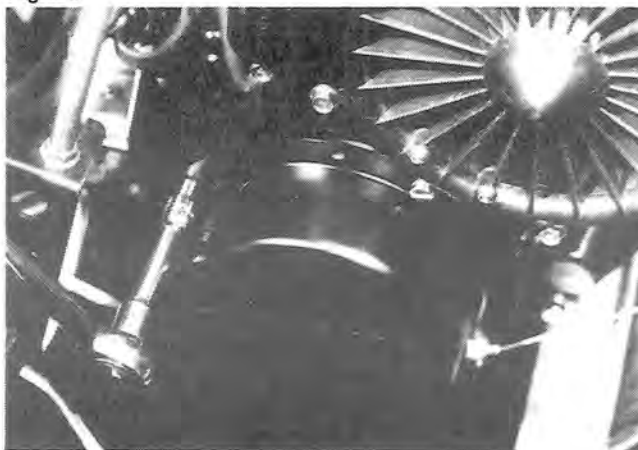
3. Remove the clutch from the engine compartment.
4. A. Remove the three springs securing the exhaust manifold to the muffler; then remove the two springs securing the muffler to the front end and remove the muffler.
- B. Remove the three springs securing the exhaust manifold to the pulse charger; then remove the two springs securing the pulse charger to the brackets.

Fig. 2-2



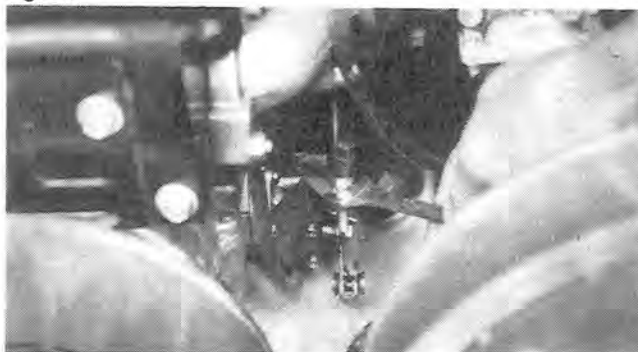
5. Remove the four bolts and lock washers securing the recoil; then remove recoil. Leave recoil in the engine compartment.

Fig. 2-3



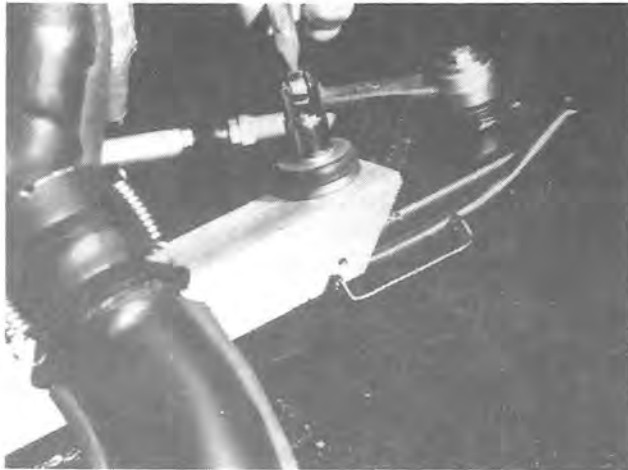
6. Disconnect the main wiring harness.
7. Disconnect the impulse hose from the crankcase.
8. Disconnect the oil-injection cable from the injection pump; then loosen the carburetor-flange clamp and slide carburetor off flange and air-intake silencer. Disconnect the oil-supply hose from the pump and plug the hose to prevent oil drainage.

Fig. 2-4



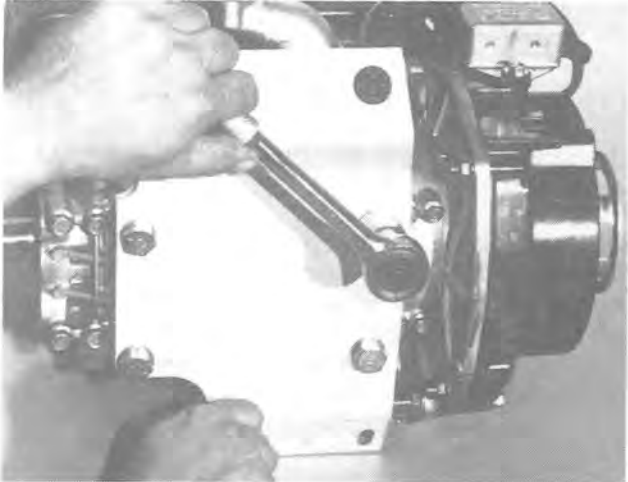
9. Remove the two cap-lock screws securing the rear of the engine plate to the front end. Account for two female mounts and cup washers.
10. Remove the two cap-lock screws securing the engine support to the front end. Account for two female mounts and cup washers.

Fig. 2-5



11. Lift the engine w/plate assembly out of the engine compartment.
12. Remove the four bolts and lock washers securing the plate assembly to the engine; then separate engine and plate assembly.

Fig. 2-6



Disassembling Engine (Jag 340, Jag 440, and Super Jag)

1. Remove the nuts securing the exhaust manifold; then remove the exhaust manifold. Account for two gaskets.
2. Remove the 14 bolts, lock washers, and washers securing the top and exhaust-side cooling shrouds.

Fig. 2-7



3. Disconnect the spark-plug caps from the spark plugs. Lift the top cooling shroud off the engine and slide the exhaust-side cooling shroud off the exhaust-manifold studs. Account for two exhaust manifold/shroud gaskets.

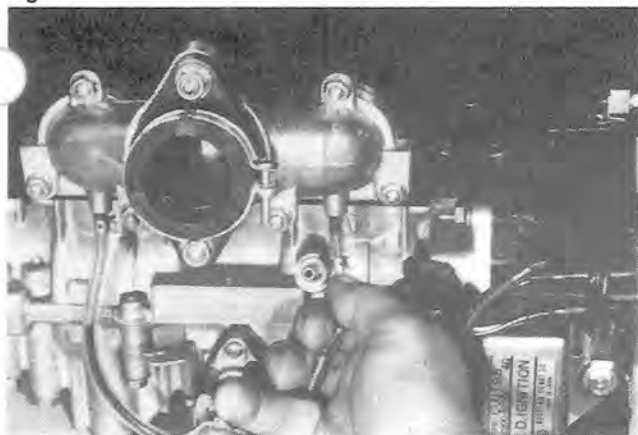
Fig. 2-8



B155

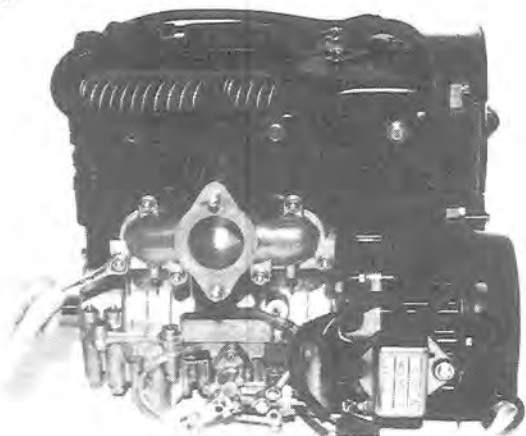
4. Disconnect the two oil-injection hoses from their fittings on the intake manifold.

Fig. 2-9



5. Remove the six nuts securing the intake manifold and remove the manifold w/flange from the engine. Discard the two gaskets.

Fig. 2-10



6. Remove the intake-manifold cooling shroud from the engine. Discard the two gaskets.
7. Using a spanner wrench to secure the crankshaft, remove the three bolts and lock washers securing the starter pulley to the flywheel. Remove the starter pulley; then carefully pry the fan-belt drive pulley from its seated position on the flywheel and remove.

Fig. 2-11



8. Temporarily install the starter pulley on the flywheel with three bolts. Using a spanner wrench to secure the crankshaft, loosen and remove the flywheel nut and washers.

Fig. 2-12

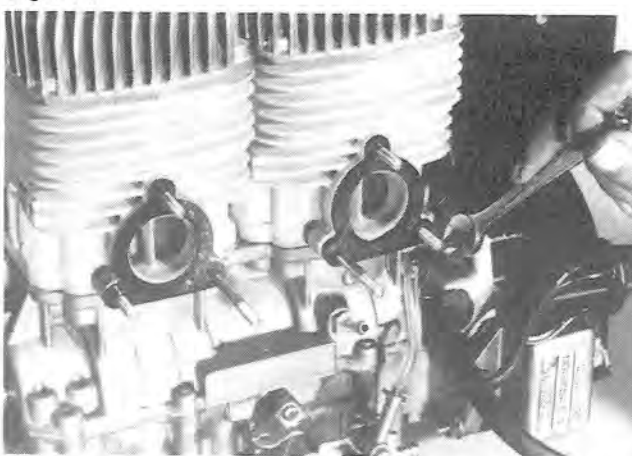


NOTE: If an impact wrench is being used, use of a spanner wrench will not be necessary.

9. Remove the three bolts securing the starter pulley to the flywheel and remove the pulley.
10. Remove the four nuts securing the fan case to the crankcase; then remove the PTO-side bolt and washer securing the CDI unit. Remove the fan case. Remove (if in need of replacement) the ignition coil and CDI unit from the fan case.

NOTE: For further servicing of the axial fan components, see page 33.

Fig. 2-13



11. Install a protective cap onto the end of the crankshaft.

NOTE: A protective cap can be made by welding a 3 mm (1/8 in.) washer on one side of a spare flywheel nut.

Fig. 2-14



● CAUTION ●

To prevent damage to the crankshaft, thread a protective cap onto the crankshaft. The puller must bottom on the cap and not on the crankshaft. Also, do not thread puller bolts more than 12.7 mm (1/2 in.) into the flywheel. Damage to the coils may result.

12. Using the Arctic Flywheel Puller (p/n 0144-310) or suitable equivalent, remove the flywheel from the crankshaft by tightening the puller bolt, striking the head of the puller bolt with a brass hammer, and tightening again. Repeat procedure until the flywheel is free. Account for the key in the end of the crankshaft.

Fig. 2-15



NOTE: To ensure the cleanliness of the flywheel magnets, place the flywheel (with the magnets facing upward) on a clean bench.

13. Scribe a line on the stator plate and crankcase to aid in assembly; then remove the two screws, lock washers, and washers securing the stator plate.

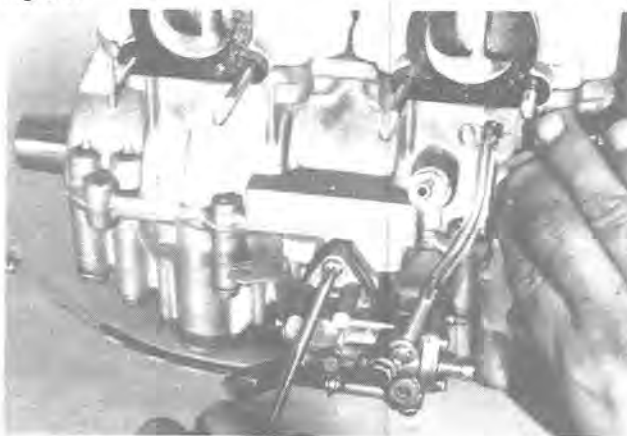
NOTE: The two stator plate screws have had LOCTITE applied to the threads during assembly. Before removing them, apply a sharp blow to the head of each screw to break the LOCTITE loose. If this isn't done, the screws can be very difficult to remove.

Fig. 2-16



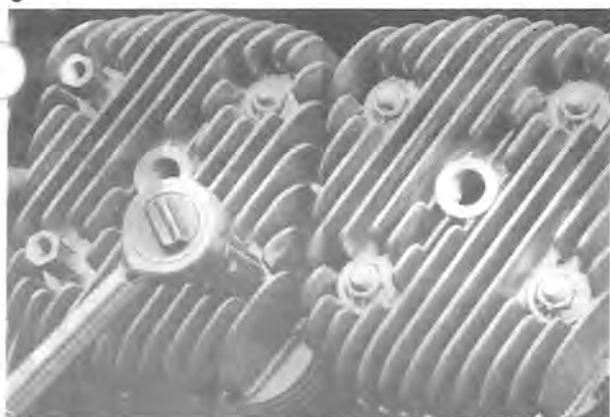
14. Remove the stator plate from the engine.
15. Remove the two bolts, lock washers, and washers securing the oil-injection pump; then remove the pump, retainer, shim, and gear. Account for two gaskets.

Fig. 2-17



16. Remove the spark plugs.
17. Remove the eight nuts securing the cylinder heads to the cylinders. Remove the heads and account for two gaskets.

Fig. 2-18



18. Using a rubber hammer, gently tap the cylinders and remove from the crankcase by lifting them straight up off their studs. Discard the two gaskets.

● CAUTION ●

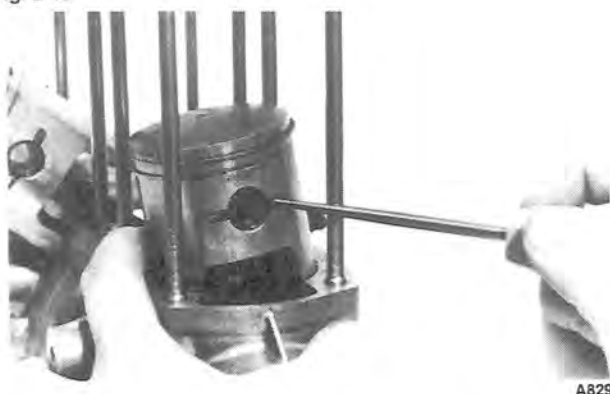
When removing a cylinder, make sure to support the piston so it will not be damaged.

Using a felt-tipped marker, mark an M on the MAG-side cylinder and piston and a P on the PTO-side cylinder and piston.

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

20. Remove the PTO-side piston-pin circlip from the PTO-side piston; remove the MAG-side piston-pin circlip from the MAG-side piston.

Fig. 2-19



A829

Using the Arctic Piston-Pin Puller (p/n 0144-003), remove the piston-pins from both pistons.

Fig. 2-20



A830

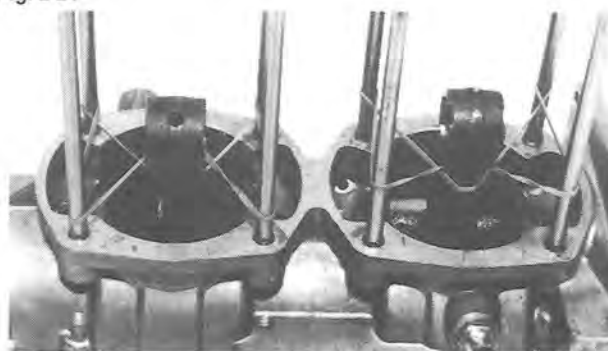
● CAUTION ●

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

22. Lift the pistons clear of the connecting rods and remove the small end connecting-rod bearings; then remove the piston rings. Keep each piston with its rings; keep each piston, pin, and bearing together as a set.

NOTE: Place rubber bands over the connecting rods and around the cylinder studs. This will keep the connecting rods from damaging the crankcase.

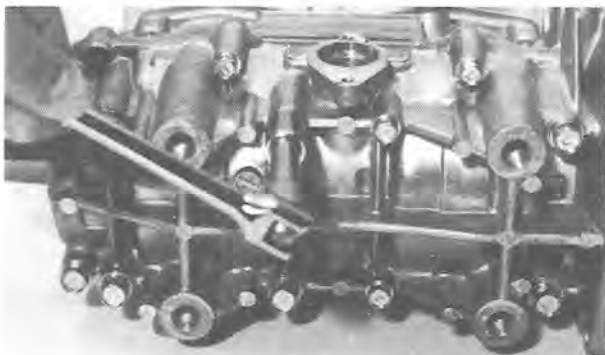
Fig. 2-21



A831

23. Remove the 14 bolts, lock washers, and washers securing the crankcase halves. Note the position of the different-sized bolts.

Fig. 2-22



B160

24. Using a rubber or plastic-tipped hammer, separate the crankcase halves. Account for the dowel pins.

● CAUTION ●

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

25. Remove the rubber bands holding the connecting rods, lift the crankshaft free from the crankcase half, and slide the two crankshaft seals off the crankshaft. Account for a C-ring.

Disassembling Engine (Panther)

1. Remove the nuts securing the exhaust manifold; then remove the exhaust manifold. Account for two gaskets.
2. Remove the 12 bolts, lock washers, and washers securing the top and exhaust-side cooling shrouds.

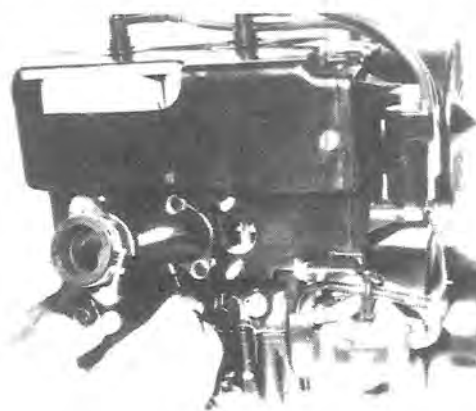
Fig. 2-23



022

3. Disconnect the spark-plug caps from the spark plugs.
4. Loosen the clamps; then pull the two oil-injection hoses from their fittings on the intake manifold. Remove the four nuts that secure the intake manifold to the engine and remove the manifold. Remove and discard all intake gaskets.

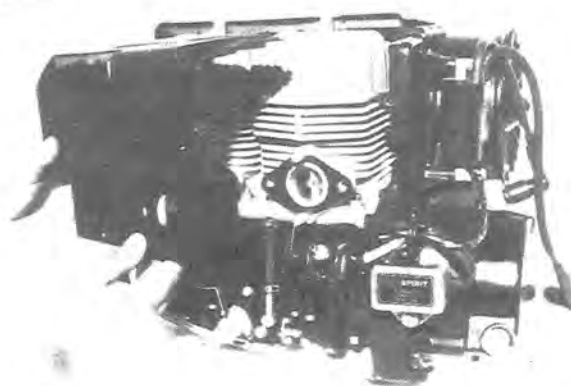
Fig. 2-24



023

5. Remove the intake-manifold cooling shroud from the engine. Remove the intake gaskets from behind the shroud and discard.

Fig. 2-25



024

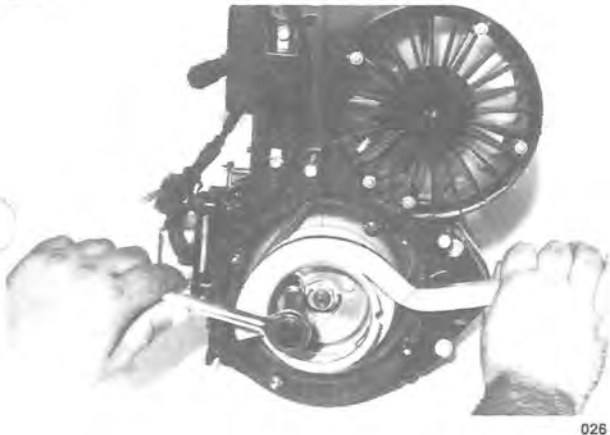
6. Lift the upper cooling shroud from the engine. Slide the exhaust-side cooling shroud off the exhaust-manifold studs. Account for the two exhaust gaskets behind the shroud.

Fig. 2-26



7. Using a spanner wrench to secure the crankshaft, remove the three bolts and lock washers that secure the starter pulley and fan pulley to the flywheel; then remove the starter pulley.

Fig. 2-27



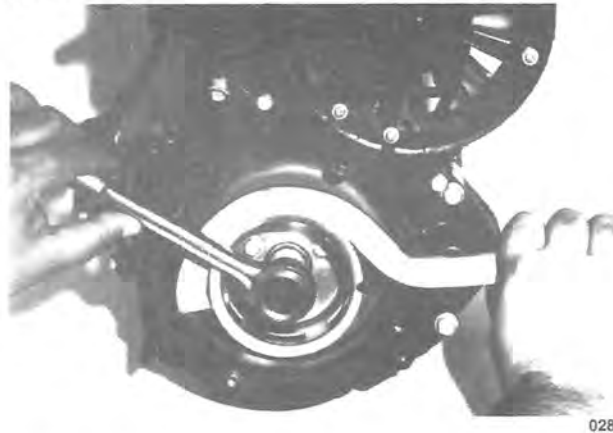
8. Using a screwdriver, pry the fan pulley free of the flywheel and remove.

Fig. 2-28



9. Temporarily install the starter pulley on the flywheel with three bolts. Using a spanner wrench to secure the crankshaft, loosen and remove the flywheel nut and washers. Remove the starter pulley from the flywheel.

Fig. 2-29



10. Remove the six nuts securing the fan housing to the magneto backing plate and slide the fan housing free of the engine. Remove (if in need of replacement) the CDI unit and ignition coil from the fan housing.

Fig. 2-30



NOTE: For further servicing of the axial fan components, see page 33.

11. Install a protective cap onto the end of the crankshaft.

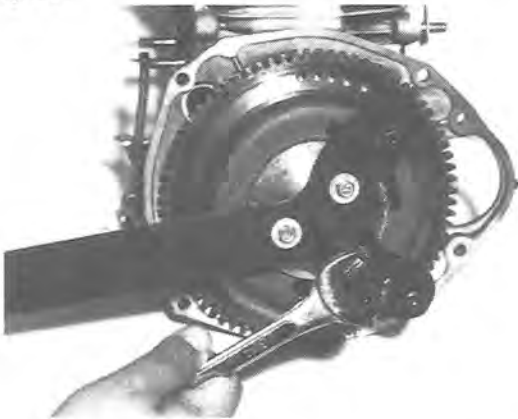
NOTE: A protective cap can be made by welding a 3 mm (1/8 in.) washer on one side of a spare flywheel nut.

● CAUTION ●

To prevent damage to the crankshaft, thread a protective cap onto the crankshaft. The puller must bottom on the cap and not on the crankshaft. Also, do not thread puller bolts more than 12.7 mm (1/2 in.) into the flywheel. Damage to the coils may result.

12. Using the Arctic Flywheel Puller or suitable equivalent, remove the flywheel from the crankshaft by tightening the puller bolt, striking the head of the puller bolt with a brass hammer, and tightening again. Repeat procedure until the flywheel is free. Account for the key in the end of the crankshaft.

Fig. 2-31



030

NOTE: To ensure the cleanliness of the flywheel magnets, place the flywheel (with the magnets facing upward) on a clean bench.

13. Scribe a line on the stator plate and crankcase to aid in assembly; then remove the two screws, lock washers, and washers securing the stator plate to the crankcase.

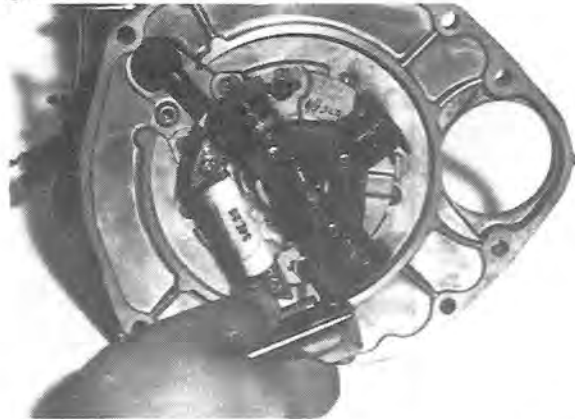
NOTE: The two stator plate screws have had LOCTITE applied to the threads during assembly. Before removing them, apply a sharp blow to the head of each screw to break the LOCTITE loose. If this isn't done, the screws can be very difficult to remove.

Fig. 2-32



031

Fig. 2-33



032

14. Loosen the screw that secures the wire retainer bracket. Remove the wiring grommet from the magneto case and remove the stator plate from the engine.

Fig. 2-34



033

15. Using an impact screwdriver, remove the eight screws securing the magneto case to the crankcase. Using a plastic hammer, tap on the backside of the magneto case to free it from the crankcase.

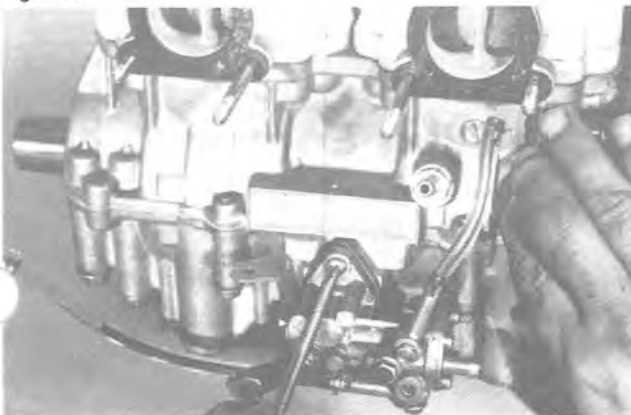
NOTE: Before removing the screws, apply a sharp blow to the head of each screw to break the LOCTITE loose. If this isn't done, the screws can be very difficult to remove.

Fig. 2-35



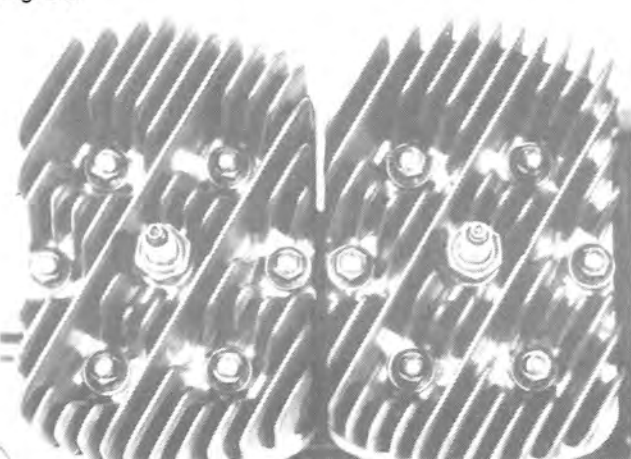
16. Remove the two bolts, lock washers, and washers securing the oil-injection pump; then remove the pump, retainer, shim, and gear. Account for two gaskets.

Fig. 2-36



17. Remove the spark plugs.
18. Remove the 12 nuts securing the cylinder heads to the cylinders. Remove the heads and account for two gaskets.

Fig. 2-37



19. Remove the four cylinder base nuts from each cylinder. Using a rubber hammer, gently tap on the side of each cylinder and remove from crankcase by lifting straight up off the studs. Remove and discard gaskets.

Fig. 2-38



2

● CAUTION ●

When removing a cylinder, make sure to support the piston so it will not be damaged.

20. Using a felt-tipped marker, mark an M on the MAG-side cylinder and piston and a P on the PTO-side cylinder and piston.

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

21. Remove the PTO-side piston-pin circlip from the PTO-side piston; remove the MAG-side piston-pin circlip from the MAG-side piston.

Fig. 2-39



037

22. Using the Arctic Piston-Pin Puller (p/n 0144-003), remove the piston pins from both pistons.

Fig. 2-40

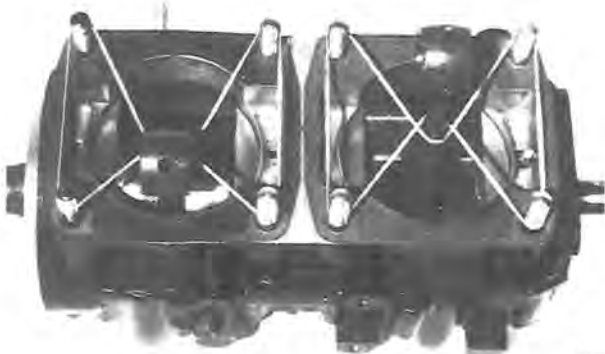


038

23. Lift the pistons clear of the connecting rods and remove the small end connecting-rod bearings; then remove the piston rings. Keep each piston with its rings; keep each piston, pin, and bearing together as a set.

NOTE: Place rubber bands over the connecting rods and around the cylinder studs. This will keep the connecting rods from damaging the crankcase.

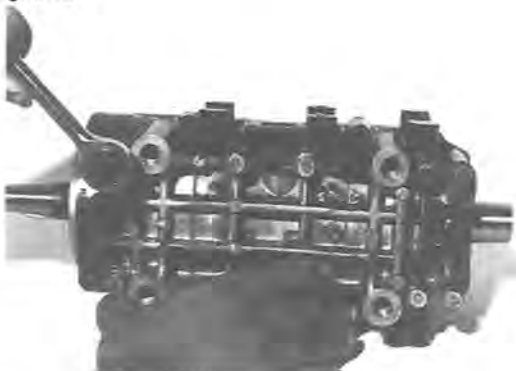
Fig. 2-41



039

24. Remove the 14 bolts, lock washers, and washers securing the crankcase halves. Note the position of the different-sized bolts.

Fig. 2-42



25. Using a rubber or plastic-tipped hammer, separate the crankcase halves. Account for the dowel pins.

● CAUTION ●

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

24. Remove the rubber bands holding the connecting rods, lift the crankshaft free from the crankcase half, and slide the two crankshaft seals off the crankshaft. Account for a C-ring. Be sure to prevent the connecting rods from dropping onto the sealing surface of the lower crankcase half.

Cleaning and Inspecting Engine

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

CYLINDER HEADS

1. Using a non-metallic carbon removal tool, remove any carbon buildup from the combustion chambers being careful not to nick, scrape, or damage the combustion chambers or the sealing surface.
2. Inspect the spark-plug holes for any damaged threads. Repair damaged threads using a "heli-coil" insert.
3. In turn, place each cylinder head on a surface plate covered with #400 grit wet-or-dry sandpaper. Using light pressure, move the 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.

Fig. 2-43



● CAUTION ●

Water or 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 cleaning solvent.
3. Inspect the cylinders for pitting, scoring, scuffing, and corrosion. If marks are found, repair the surface with a surface hone with #500 grit stones and honing oil.

Fig. 2-44



NOTE: To produce the proper 60° "cross-hatch" pattern, use a low rpm drill (600 rpm) at the rate of 30 strokes per minute. If honing oil is not available, use a lightweight petroleum-based oil. Thoroughly clean cylinders after honing using

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 will have to be replaced.

4. Place the head surface of each cylinder on a 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 cleaning solvent must be used in conjunction with the wet-or-dry sandpaper or damage to the sealing surface may result.

2

PISTON ASSEMBLY

1. Using a non-metallic carbon removal tool, remove carbon buildup from the dome of each piston.
2. Inspect each piston for cracks in the piston pin and skirt areas.
3. Inspect each piston for seizure marks or scuffing. Repair with #400 grit wet-or-dry sandpaper and water or honing oil.

Fig. 2-45

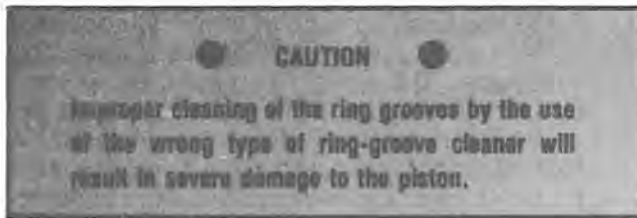


A840

NOTE: If scuffing or seizure marks are too deep to correct with the sandpaper, it may be necessary to replace the piston.

4. Inspect the perimeter of each piston for signs of excessive "blowby". Excessive "blowby" indicates worn piston rings or an out-of-round cylinder.

- Using a piece of an old "keystone-type" ring, clean each piston-ring groove. Make sure the letter stamped on the top (inclined surface) of the ring faces upward.



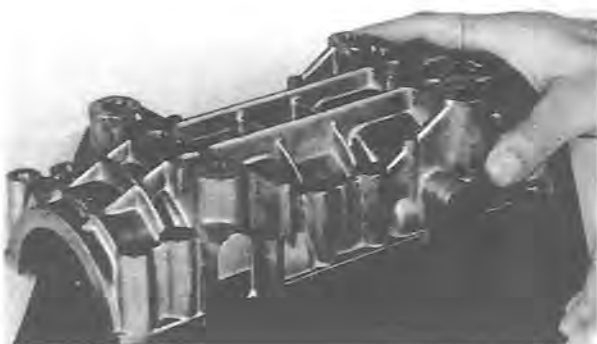
CRANKCASE

- Wash the crankcase halves in cleaning solvent.

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

- Inspect crankcase halves for scoring, pitting, scuffing, or any imperfections in the casting.
- Inspect all threaded areas for damaged or stripped threads.
- Inspect the bearing areas for cracks or excessive bearing movement. If evidence of excessive bearing movement is noted, repair by peening the bearing area in a pinking (saw tooth) pattern using a center punch.
- Inspect the bearing dowel pins for wear.
- Inspect the sealing surfaces of the crankcase halves for trueness by placing each crankcase half on a surface plate covered with #400 grit wet-or-dry sandpaper. Using light pressure, move each half in a figure eight motion. Inspect the sealing surface for any indication of high spots. A high spot can be noted by a 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.

Fig. 2-46



A519

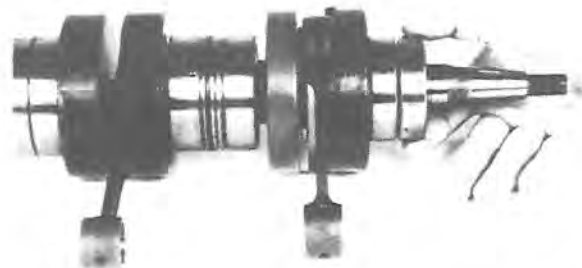
CAUTION

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

CRANKSHAFT

- Wash the crankshaft w/bearings in cleaning solvent.
- Inspect the bearings for wear, scoring, scuffing, damage, or discoloration. Rotate the bearings. Bearings must rotate freely and must not bind or feel rough. If any abnormal condition is noted, replace the bearing.

Fig. 2-47



A521

NOTE: To replace crankshaft bearings, use a Bearing Puller to remove the bearings. To install a bearing, squirt oil into the bearing; then using a propane torch, heat the inner race of the bearing (until slight smoke is noted coming from the bearing) and slide it onto the crankshaft making sure the dowel-pin hole in the outer race is properly positioned and will align with its hole in the crankcase.

Fig. 2-48



A656

Fig. 2-49



A659

● CAUTION ●
DO NOT overheat the bearing.

3. Inspect the connecting-rod bearings by rotating them. Bearings must rotate freely and must not bind or feel rough. If a connecting-rod bearing must be replaced, the connecting-rod and crank pin must also be replaced.

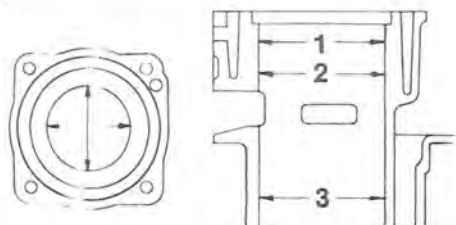
NOTE: Lubricate bearings thoroughly prior to assembly.

Measuring Critical Components

CYLINDER TRUENESS

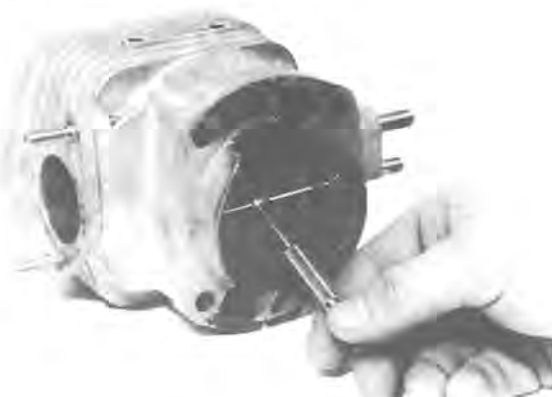
1. Measure each cylinder in the three locations shown from front to back and side to side for a total of six readings. The trueness (out-of-roundness) is the difference between the highest and lowest reading. Maximum trueness (out-of-roundness) must not exceed specifications listed.

Fig. 2-51



0726-307

Fig. 2-50



CYLINDER TRUENESS LIMIT

mm	in.
0.1	0.0039

2

PISTON SKIRT/CYLINDER CLEARANCE

1. Measure each cylinder front to back about 2.5 cm (1 in.) from the bottom of each cylinder.
2. Measure the corresponding piston diameter at a point 1 cm (0.394 in.) above the piston skirt at a right angle to the piston-pin bore. Subtract this measurement from the measurement in step 1. The difference (clearance) must be within specifications.

Fig. 2-52



A671

PISTON SKIRT/CYLINDER CLEARANCE RANGE

	mm	in.
Jag 340	0.058-0.15	0.0023-0.0060
Jag 440	0.084-0.15	0.0033-0.0060
Panther	0.084-0.15	0.0033-0.0060
Super Jag	0.084-0.15	0.0033-0.0060

PISTON-RING END GAP

1. Place each piston ring in the wear portion above the exhaust port of its respective cylinder. Use the piston to position each ring squarely in each cylinder.
2. Using a feeler gauge, measure each piston-ring end gap. Acceptable ring end gap must fall within specifications.

Fig. 2-53



PISTON-RING END GAP RANGE		
	mm	in.
Jag 340	0.15-0.80	0.006-0.031
Jag 440 & Super Jag	0.20-0.83	0.008-0.033
Panther	0.20-0.83	0.008-0.033

PISTON PIN AND PISTON-PIN BORE

1. Measure the piston pin diameter in several places. If any measurement varies by more than 0.02 mm (0.001 in.), the piston pin and bearing must be replaced as a set.

Fig. 2-54



A674

PISTON PIN DIAMETER RANGE		
	mm	in.
Jag 340, Jag 440, & Super Jag	15.994-16.000	0.6297-0.6299
Panther	17.995-18.000	0.7085-0.7087

2. Insert a snap gauge into each piston-pin bore; then remove the gauge and measure it with a micrometer. Diameter must be within specifications. Take two measurements to ensure accuracy.

Fig. 2-55



A676

PISTON-PIN BORE DIAMETER RANGE		
	mm	in.
Jag 340, Jag 440, & Super Jag	15.996-16.004	0.6298-0.6301
Panther	17.998-18.006	0.7086-0.7089

CONNECTING-ROD SMALL END

1. Insert a snap gauge into each connecting-rod small end bore; then remove the gauge and measure it with a micrometer. Diameter must be within specifications.

Fig. 2-56



CONNECTING-ROD SMALL END DIAMETER RANGE		
	mm	in.
Jag 340, Jag 440, & Super Jag	21.00-21.01	0.8268-0.8273
Panther	23.00-23.01	0.9056-0.9059

CRANKSHAFT RUNOUT

1. Using a set of V-blocks, support the crankshaft on a surface plate.

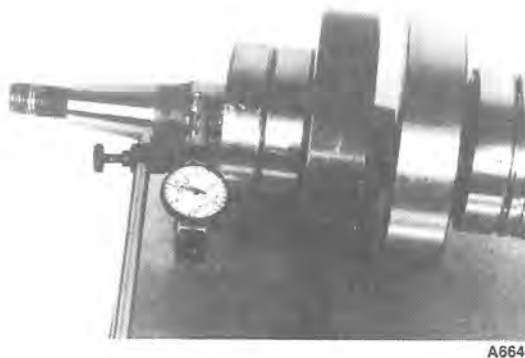
NOTE: The V-blocks should support the crankshaft on the outer bearings.

2. Mount a dial indicator and base on the surface plate. Position the indicator contact point against the crankshaft distance A (PTO end) from the crankshaft counterweight. Zero the indicator and rotate the crankshaft slowly. Note the amount of crankshaft runout (total indicator reading).

Jag 340, Jag 440, & Super Jag	mm	in.
A	37.6	1.50
B	25.4	1.00
Panther	mm	in.
A	41.3	1.62
B	41.3	1.62

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

Fig. 2-57



A664

4. If runout exceeds specifications at either end, the crankshaft must be either straightened or replaced.

CRANKSHAFT RUNOUT (Total Indicator Reading)		
	mm	in.
Maximum	0.05	0.002

ASSEMBLING ENGINE (Jag 340, Jag 440, & Super Jag)

NOTE: When use of a silicone sealer is indicated, use either RTV Silicone Sealant or Three Bond Sealant.

1. Install the C-ring and the six dowel pins into the lower crankcase half.
2. Lubricate the inner lips of the crankshaft oil seals with grease; then slide the seals onto the crankshaft making sure the spring side of each seal faces the center of the crankshaft.

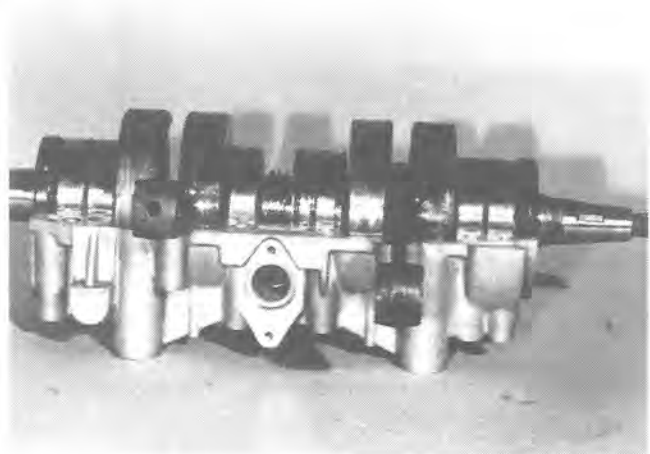
Fig. 2-58



A685

3. Apply oil to the crankshaft bearings; then install the crankshaft into the lower crankcase half. Be sure the alignment hole in each bearing is positioned over its respective dowel pin in the crankcase; then seat the crankshaft.

Fig. 2-59

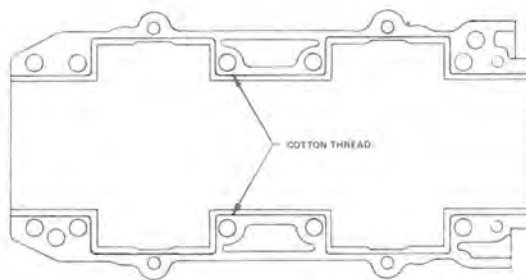


● CAUTION ●

If the bearings are not properly seated during assembly, the crankcase halves will not bolt together tightly and engine damage will result.

4. Apply a thin coat of silicone sealer to the crankcase sealing surfaces; then lay a length of #50 cotton thread next to the inner edge of and along the full length of the lower crankcase half.

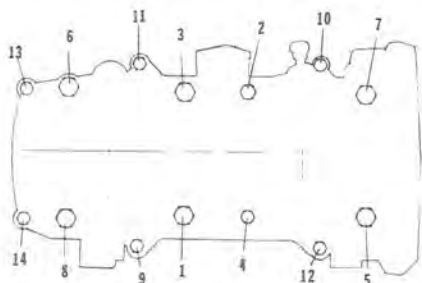
Fig. 2-60



0725-549

5. Assemble the crankcase halves making sure the dowel pins are properly positioned; then apply LOCTITE LOCK N' SEAL to the crankcase bolts.
6. Install the 14 crankcase bolts, lock washers, and washers making sure the proper-sized bolts are in the proper holes. Tighten in three steps the 8 mm bolts to 1.8-2.2 kg-m (13-16 ft-lb) and the 6 mm bolts to 0.8-1.2 kg-m (6-9 ft-lb) using the pattern shown.

Fig. 2-61



0726-412

NOTE: Secure the connecting rods with rubber bands on the cylinder studs.

7. Install the piston rings on each piston so the letter on the top (inclined surface) of each ring faces the dome of the piston.

Fig. 2-62



E454

● CAUTION ●

Incorrect installation of the piston rings will result in engine damage.

8. Apply oil to the connecting-rod small end bearings; then install the small-end bearings.
9. Place each piston over the connecting rod so the arrow on the piston dome points toward the exhaust port; then secure with a piston pin.

NOTE: Apply oil to the piston pin before installing.

10. Install the circlips so the open end is directed either down or up.

Fig. 2-63



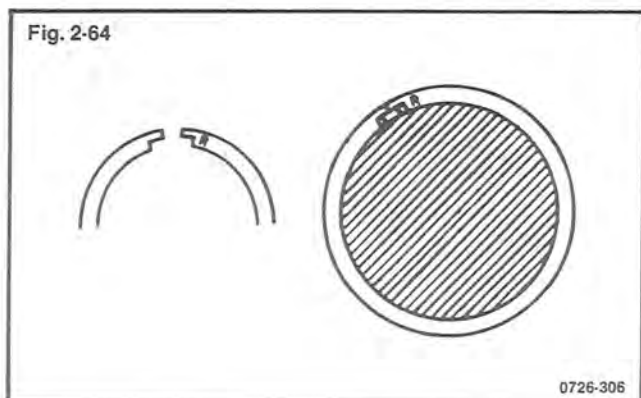
B324

● CAUTION ●

Make sure circlips are firmly seated and the open end is directed either down or up before continuing with assembly.

11. Apply a thin coat of silicone sealer to both sides of each cylinder-base gasket; then install gaskets onto the crankcase making sure each gasket aligns with crankcase transfer passages.
12. Rotate each piston ring until the ring ends are properly positioned on either side of the ring keeper; then apply oil to the piston assemblies and cylinder bores. Remove the rubber bands from the connecting rods.

NOTE: Apply a generous amount of oil to the surfaces of the pistons, rings, and cylinder bores.



13. In turn on each piston, place a piston holder (or suitable substitute) beneath the piston skirt and square the piston in respect to the crankcase; then using a ring compressor or the fingers, compress the rings and slide the cylinder over the piston. Remove the piston holder and seat the cylinder firmly onto the crankcase.

Fig. 2-65

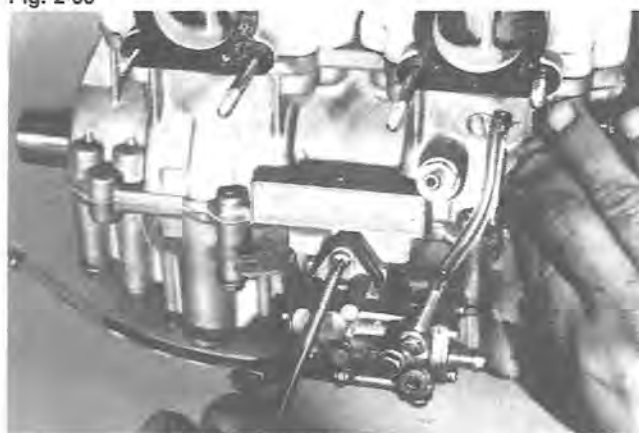


14. Place each head w/gaskets into position and install the eight nuts. DO NOT TIGHTEN AT THIS TIME.

NOTE: To properly align the cylinders on the crankcase, the intake manifold must first be installed and torqued before the cylinder nuts are tightened. When the intake manifold is secured to the cylinders, the cylinders, intake manifold, and upper crankcase will be properly aligned.

15. Install the spark plugs and tighten to 2.5-3.0 kg-m (18-22 ft-lb).
16. Apply a thin coat of silicone sealer to both sides of the oil-injection pump gaskets. In order, install the gear, shim, gasket, retainer, gasket, and oil-injection pump. Secure with two bolts, lock washers, and washers. Tighten and then torque to 0.7 kg-m (5 ft-lb).

Fig. 2-66

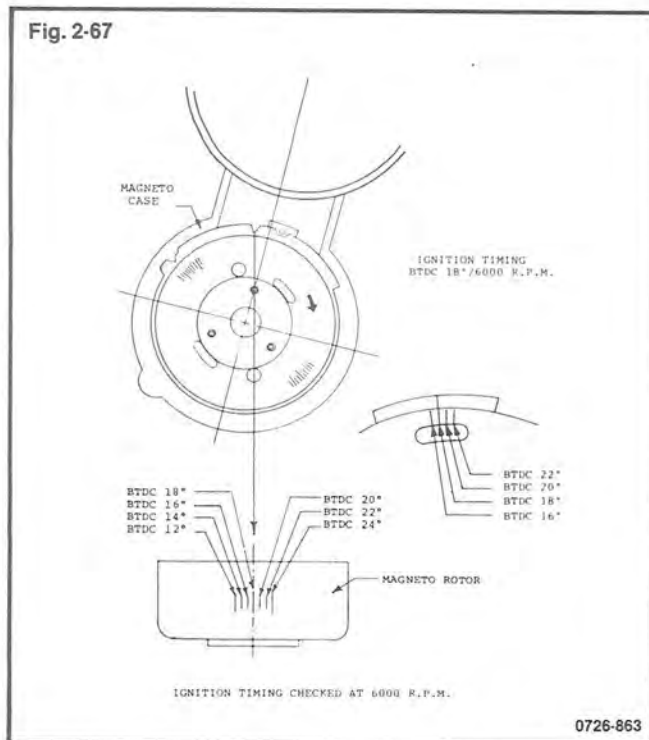


CAUTION

Be sure the gear is properly aligned with the slot of the oil-injection pump shaft. The injection pump will be damaged if these two parts are not aligned.

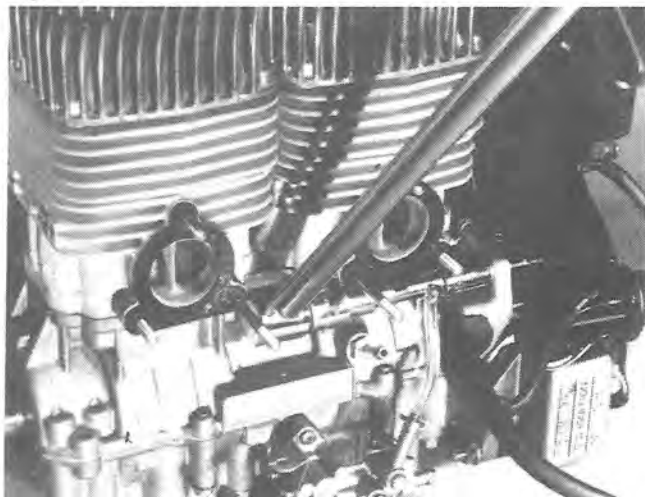
17. If removed, secure the ignition coil and CDI unit to the fan case.
18. Align the marks made during disassembly; then secure the stator plate with two socket-head cap screws (coated with LOCTITE LOCK N' SEAL), lock washers, and washers.

Fig. 2-67



19. Install the key in the crankshaft and slide the flywheel onto the crankshaft making sure the keyways match.
20. Place the fan case into position and secure with four nuts. Tighten the nuts to 1.5-1.9 kg-m (11-14 ft-lb).

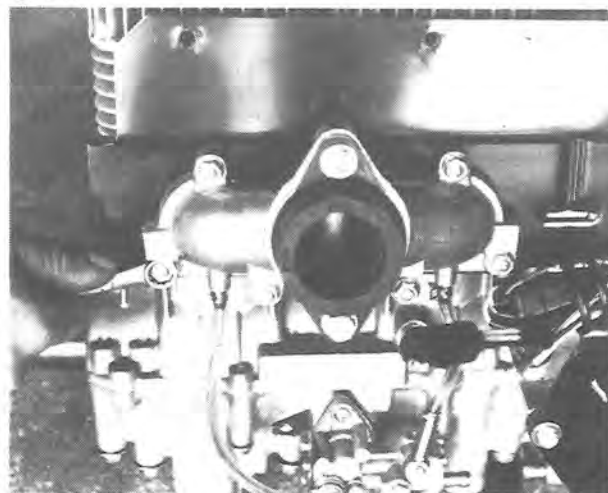
Fig. 2-68



21. Secure the CDI unit to the crankcase with the bolt and lock washer.
22. Apply a thin coat of silicone sealer to both sides of the four intake-manifold gaskets; then in order, install a gasket (one on each port), shroud, gasket (one on each port), and the intake manifold.

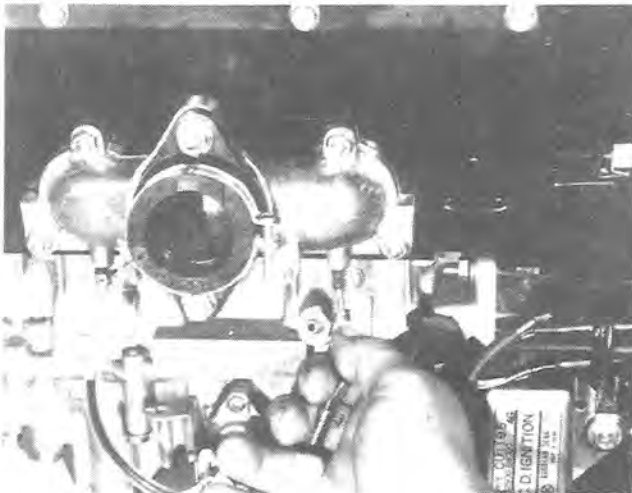
23. Secure the intake manifold with six nuts. Tighten nuts in three steps to 0.8-1.2 kg-m (6-9 ft-lb).

Fig. 2-69



24. Tighten the head nuts in three steps using a crisscross pattern to 1.8-2.2 kg-m (13-16 ft-lb).
25. Attach the oil injection hoses to the intake manifold. Tighten screw clamps.

Fig. 2-70



26. Test the engine for air leaks using the following procedure:
 - a. Install an intake-manifold port plug and tighten the flange clamp securely.

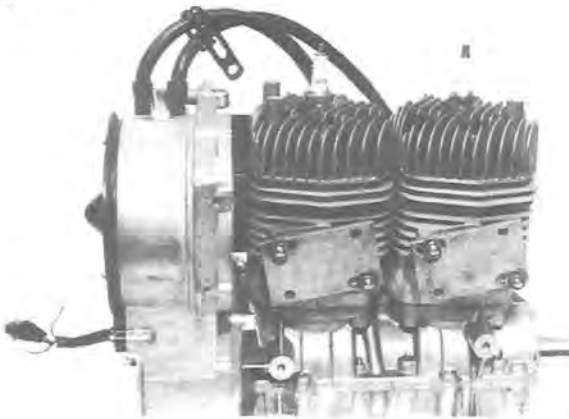
Fig. 2-71



A873

- b. Place a rubber plug and cover on each exhaust port and secure.

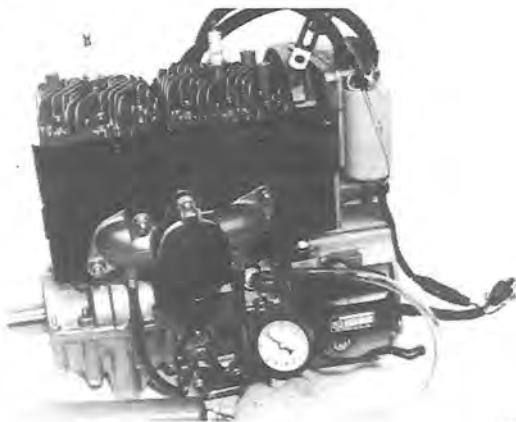
Fig. 2-72



A875

- c. Connect a tester pump to the impulse fitting on the crankcase; then pressurize the crankcase to 12 psi and close the valve.

Fig. 2-73



A876

● CAUTION ●

DO NOT exceed 15 psi of pressure or damage to the seals will result.

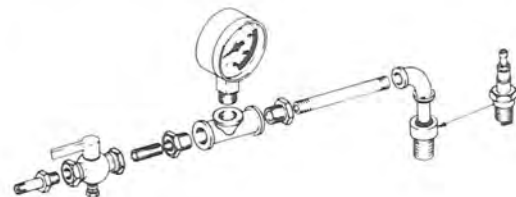
- d. Monitor the pressure gauge. Pressure must not drop at a rate of more than 1 psi per minute.
- e. If the pressure drops faster than specified, inspect for an air leak with soapy water or completely submerge the pressurized engine in clean fresh water. Repair as needed.

● CAUTION ●

When submerging the engine to test for air leaks, the CDI unit should be removed to avoid damage.

NOTE: A pressure tester can be made by drilling out an old spark plug and brazing a fitting to it; then install a tee (with a gauge), valve, and a valve stem. When using this type of pressure tester, the impulse fitting must be plugged and the pressure tester must be installed in one of the spark plug holes with that piston in the BDC position.

Fig. 2-74



0725-108

27. Temporarily secure the starter pulley on the flywheel with three bolts. Install the flywheel washer, lock washer, and nut. Apply LOCTITE LOCK N' SEAL to the crankshaft threads before installing the nut. Using a spanner wrench to secure the crankshaft, torque the flywheel nut to 9.0-11.0 kg-m (65-79 ft-lb).

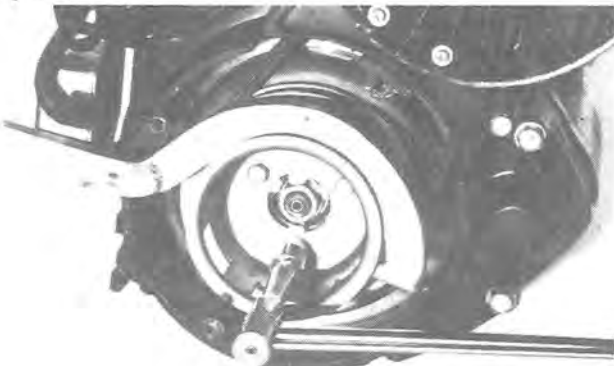
Fig. 2-75



011

28. Remove the starter pulley. Position the fan belt drive pulley into the belt. Align the starter pulley holes with those in the belt pulley. Start one of the bolts into the flywheel, then rotate the belt pulley and starter pulley in a counterclockwise rotation. When you feel the pulley pivot on the bolt installed, rock the pulleys backward or forward until the remaining bolt holes align. Install the remaining two bolts and tighten evenly. Torque the three bolts to 0.8-1.2 kg-m (6-9 ft-lb).

Fig. 2-76



012

29. Place an exhaust-manifold gasket on each exhaust port making sure the metal side of the gasket faces the cylinder and slide the exhaust-side cooling shroud onto the exhaust-port studs; then place the upper cooling shroud into position and secure the shrouds with 14 washers, lock washers, and bolts. Tighten the bolts to 0.4-0.7 kg-m (3-5 ft-lb). Connect the spark-plug caps.

Fig. 2-77



30. Place an exhaust-manifold gasket on each exhaust port making sure the metal side of each gasket faces away from the cylinder; then install the exhaust manifold. Secure with the nuts and tighten to 1.5-1.9 kg-m (11-14 ft-lb).

Assembling Engine (Panther)

NOTE: When use of a silicone sealer is indicated, use either RTV Silicone Sealant or Three Bond Sealant.

1. Install the C-ring and dowel pins into the lower crankcase half.
2. Lubricate the inner lips of the crankshaft oil seals with grease; then slide the seals onto the crankshaft making sure the spring side of each seal faces the center of the crankshaft.

Fig. 2-78



A685

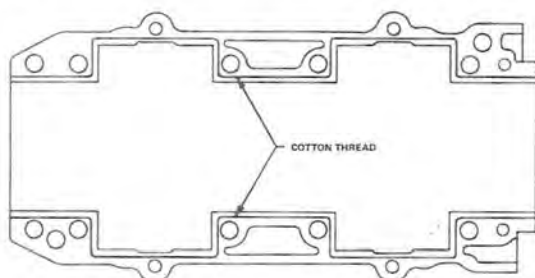
3. Apply oil to the crankshaft bearings; then install the crankshaft into the lower crankcase half. Be sure the alignment hole in each bearing is positioned over its respective dowel pin in the crankcase; then seat the crankshaft.

CAUTION

If the bearings are not properly seated during assembly, the crankcase halves will not bolt together tightly and engine damage will result.

4. Apply a thin coat of silicone sealer to the crankcase sealing surfaces; then lay a length of #50 cotton thread next to the inner edge of and along the full length of the lower crankcase half.

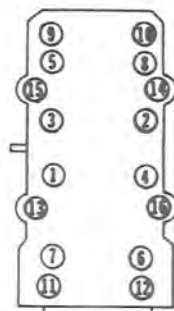
Fig. 2-79



0725-549

5. Assemble the crankcase halves making sure the dowel pins are properly positioned; then apply LOCTITE LOCK N' SEAL to the crankcase bolts.
6. Install the 16 crankcase bolts, lock washers, and washers making sure the proper-sized bolts are in the proper holes. Tighten in three steps the 8 mm bolts to 1.8-2.2 kg-m (13-16 ft-lb) and the 6 mm bolts to 0.8-1.2 kg-m (6-9 ft-lb) using the pattern shown.

Fig. 2-80



0725-321

NOTE: Secure connecting rods with rubber bands on the cylinder studs.

7. Install the piston rings on each piston so the letter on the top (inclined surface) of each ring faces the dome of the piston.

Fig. 2-81



E454

CAUTION

Incorrect installation of the piston rings will result in engine damage.

8. Apply oil to the connecting-rod small end bearings; then install the small-end bearings.
9. Place each piston over the connecting rod so the arrow on the piston dome points toward the exhaust port; then secure with a piston pin.

NOTE: Apply oil to the piston pin before installing.

10. Install the circlips so the open end is directed either down or up.

Fig. 2-82



B329

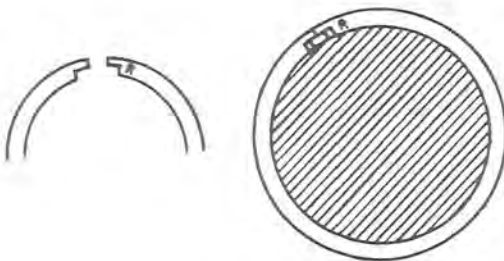
● CAUTION ●

Make sure circlips are firmly seated and the open end is directed either down or up before continuing with assembly.

11. Apply a thin coat of silicone sealer to both sides of each cylinder-base gasket; then install gaskets on the crankcase.
12. Rotate each piston ring until the ring ends are properly positioned on either side of the ring keeper; then apply oil to the piston assemblies and cylinder bores. Remove the rubber bands from the connecting rods.

NOTE: Apply a generous amount of oil to the surface of the pistons, rings, and cylinder bores.

Fig. 2-83



0726-306

13. In turn on each piston, place a piston holder (or suitable substitute) beneath the piston skirt and square the piston in respect to the crankcase; then using a ring compressor or the fingers, compress the rings and slide the cylinder over the piston. Remove the piston holder and seat the cylinder firmly onto the crankcase.

Fig. 2-84



041

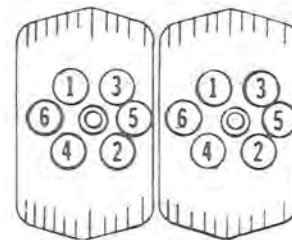
14. Install the four cylinder base nuts, flat washers, and lock washers. DO NOT TIGHTEN AT THIS TIME.
15. Temporarily install the intake manifold and secure with four nuts and lock washers to "square" the cylinders. Torque the intake manifold nuts to 1.8-2.2 kg-m (13-16 ft-lb).
16. With the intake manifold in place, torque the cylinder-base nuts in three steps to 3.0-4.0 kg-m (22-29 ft-lb) using a crisscross pattern. Remove the intake manifold.
17. Place each head w/gasket into position and install the twelve nuts, washers, and lock washers. Tighten in three steps to 1.8-2.2 kg-m (13-16 ft-lb) using the torque pattern shown.

Fig. 2-85



042

Fig. 2-86



0725-320

18. Install the spark plugs and tighten to 2.5-3.0 kg-m (18-22 ft-lb).
19. Apply a thin coat of silicone sealer to both sides of the oil-injection pump gaskets. In order, install the gear, shim, gasket, and oil-injection pump. Secure with two bolts, lock washers, and washers. Tighten and then torque to 0.7 kg-m (5 ft-lb).

Fig. 2-87



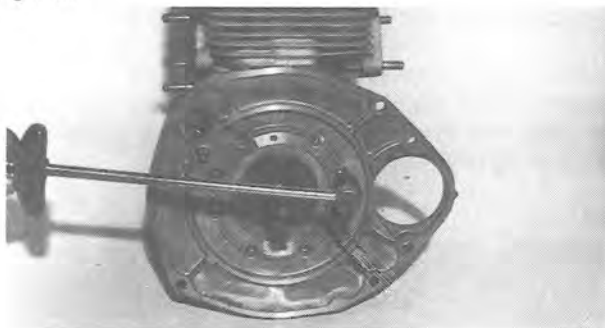
035

● CAUTION ●

Be sure the gear is properly aligned with the slot of the oil-injection pump shaft. The injection pump will be damaged if these two parts are not aligned.

20. Place the magneto case into position and secure with eight screws coated with LOCTITE LOCK N' SEAL. Tighten to 0.35 kg-m (31 in-lb).

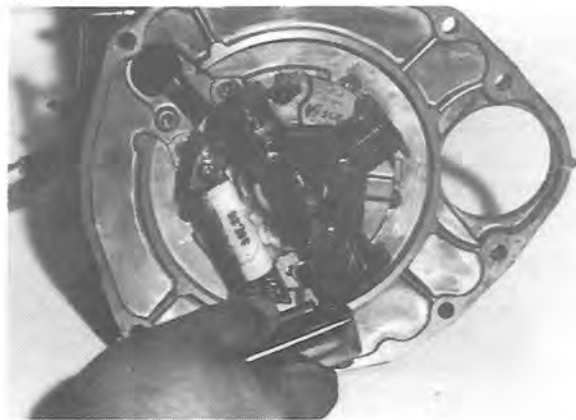
Fig. 2-88



045

21. Insert the stator plate wiring harness through the magneto case opening and place the stator plate into position. Align the stator plate timing marks and secure with two screws (coated with LOCTITE LOCK N' SEAL), lock washers, and washers.

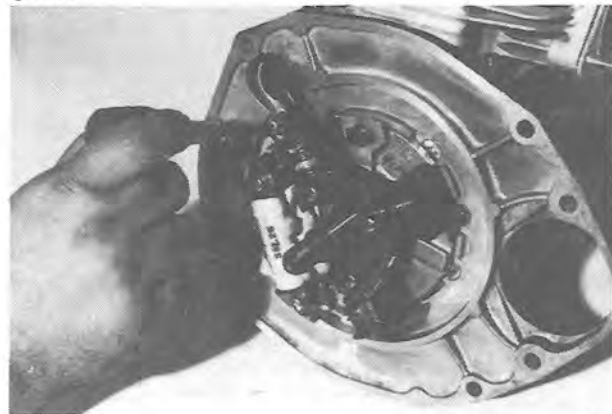
Fig. 2-89



032

22. Position the wiring harness clamp over wiring harness and secure with screw. Install grommet.

Fig. 2-90



033

23. Install the flywheel key in the crankshaft keyway and slide the flywheel onto the crankshaft making sure the keyways match. Install the flat washer, lock washer, and flywheel nut. Apply LOCTITE LOCK N' SEAL to the crankshaft threads before installing the nut.

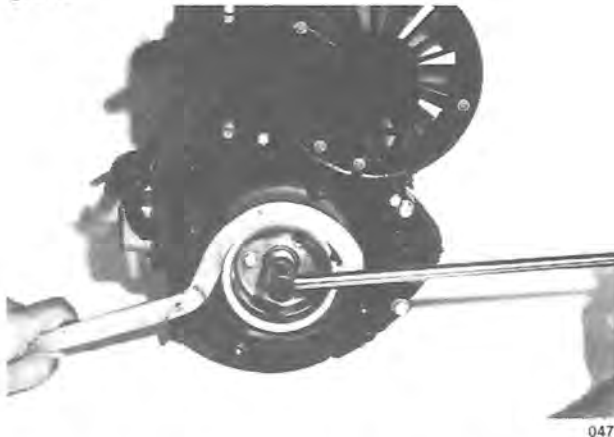
Fig. 2-91



046

24. Place the fan housing into position and secure with five nuts. Torque the six nuts to 1.5-1.9 kg-m (11-14 ft-lb).
25. Temporarily install the starter pulley on the flywheel with three bolts. Using a spanner wrench to secure the flywheel, torque the flywheel nut to 9.0-11.00 kg-m (65-79 ft-lb).

Fig. 2-92



047

26. Install an intake gasket lightly coated with silicone sealer on each cylinder. Install an exhaust gasket on each cylinder with its metal side positioned towards the cylinder exhaust flange. Install the cooling shrouds and secure with 12 screws, lock washers, and washers.
27. Install the outer intake gaskets lightly coated with silicone sealer on each cylinder next to the cooling shroud. Slide the intake manifold into position and torque the four nuts in three steps 1.5-1.9 kg-m (11-14 ft-lb) using a criss-cross pattern.
28. Slide the two oil-injection hoses onto the fittings on the intake manifold. Be certain all hose clamps are in place; then tighten the screw clamps.

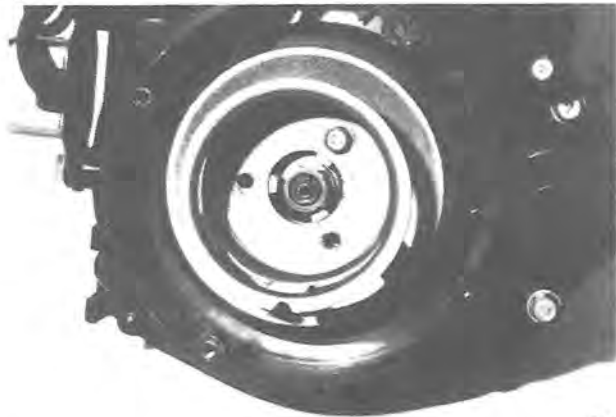
Fig. 2-93



043

29. Pressure test the engine, see step 26 on page 26.
30. Remove the starter pulley. Position the fan belt onto the fan-belt drive pulley; then place the fan-belt drive pulley and the starter pulley into position on the flywheel. Align one hole in the flywheel with one of those in the starter pulley and belt pulley and start a bolt finger-tight only.

Fig. 2-94



048

31. Rotate the starter and drive pulleys counter-clockwise, causing the pulleys to pivot on the single bolt installed. As you feel the pulleys pivot, watch for the remaining two holes in the pulleys to align with those in the flywheel. Install the remaining two bolts and tighten evenly until the belt pulley is firmly seated against the flywheel. Torque the three bolts to 0.8-1.2 kg-m (6-9 ft-lb).

Fig. 2-95



049

32. If removed, secure the CDI unit and external coil to the fan housing. Torque the bolts to 0.8-1.2 kg-m (6-9 ft-lb). Connect all wires following the color code of each. Attach the two spark plug high tension leads to the spark plugs.

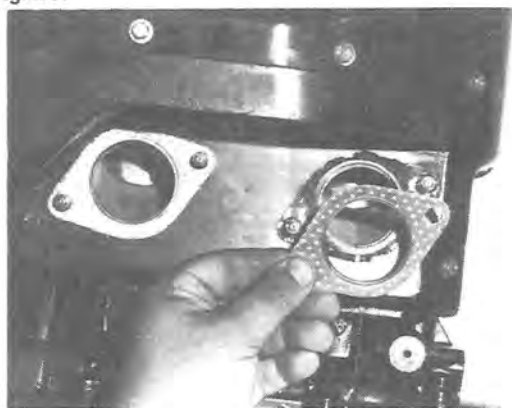
Fig. 2-96



050

33. Install an exhaust gasket on each cylinder with the metal side positioned out and away from the cooling shroud. Slide the exhaust manifold into position, securing with four nuts and lock washers. Torque the four nuts in three steps 1.5-1.9 kg-m (11-14 ft-lb).

Fig. 2-97

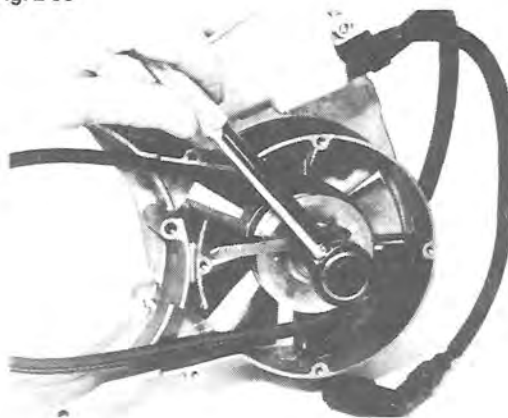


044

Disassembling Axial Fan

1. Remove the fan cover.
2. Using the Arctic Fan Holder (p/n 0144-113), remove the nut, lock washer, and washer securing pulley halves.

Fig. 2-98



A907

CAUTION

Care must be taken when using the Arctic Fan Holder to avoid damaging the fan case.

3. Slide the outer pulley half, shim(s), fan belt, and inner pulley half off the shaft and account for the key. Account for the fan belt.

Fig. 2-99



A908

4. Remove the fan w/shaft.
5. Drive the bearings from the fan case and account for the spacer between the bearings.

Fig. 2-100



A910

NOTE: A circlip is positioned between the bearings. The bearings must be driven from the center to the outside of the fan case.

6. Remove the circlip from the fan case.

Fig. 2-101



A911

Inspecting Axial Fan

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

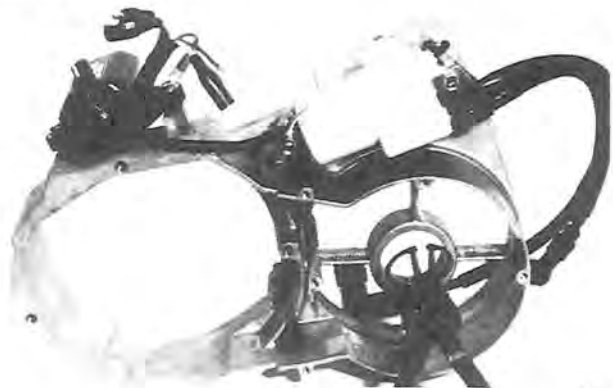
1. Inspect fan case and shaft threaded areas for damage or stripped threads; then check shaft keyway and key for excessive wear.

2. Inspect the fan for broken, bent, or damaged vanes.
3. Inspect bearings for smooth rotation.
4. Inspect pulley halves for cracks, gouges, or other damage.
5. Inspect the fan belt for cracks, tears, or fraying.

Assembling Axial Fan

1. Install the circlip into the groove of the fan case.

Fig. 2-102



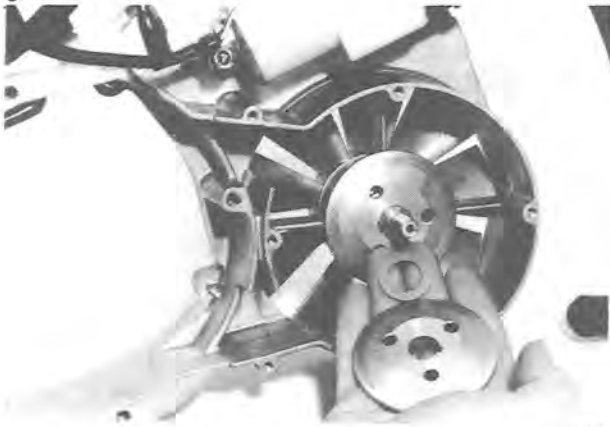
A911

2. Press a bearing into the fan case until it is "seated" against the circlip.
3. From the opposite side of the fan case, install the spacer and press the remaining bearing into the fan case until it is "seated".

NOTE: The spacer is positioned between the two fan-case bearings.

4. Insert the fan w/shaft through the fan bearings.
5. Install the key into the shaft.
6. Slide the inner pulley half, required shim(s), fan belt, and outer pulley half onto the shaft.

Fig. 2-103



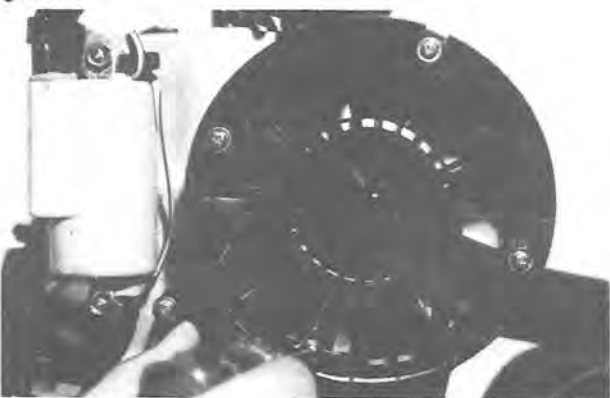
A913

7. Using the Arctic Fan Holder, secure the pulley with a washer, lock washer, and nut. Tighten the nut to 2.5-4.0 kg-m (18-29 ft-lb).
8. Affirm proper fan-belt tension; adjust if necessary.
9. Install the fan cover.

Checking Axial Fan-Belt Tension

1. Remove the screws, lock washers, and washers securing the fan cover.

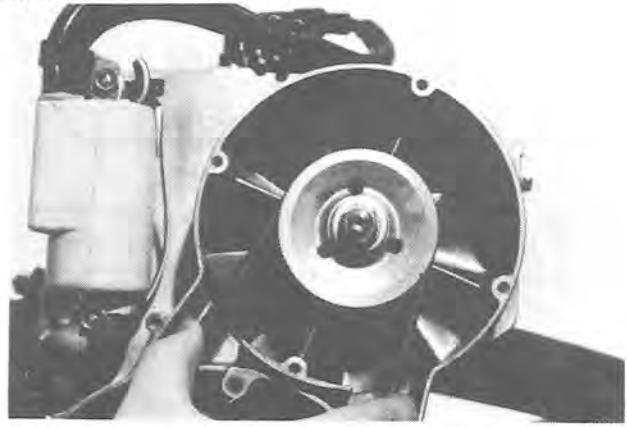
Fig. 2-104



B074

2. Squeeze the belt at midspan and observe the belt deflection. The maximum belt deflection on either side must not exceed 6 mm (1/4 in.). If the deflection is not within specifications, adjust the belt tension.

Fig. 2-105



B075

3. Install the fan cover.

Adjusting Axial Fan-Belt Tension

1. Remove the fan cover.
2. Using the Arctic Fan Holder (p/n 0144-113), remove the nut, lock washer, and washer securing the pulley halves.
3. Slide the outer pulley half off the shaft and account for any shim(s).
4. Add or remove shim(s) to attain correct belt tension.

NOTE: To increase belt tension, remove shim(s); to decrease belt tension, install shim(s).

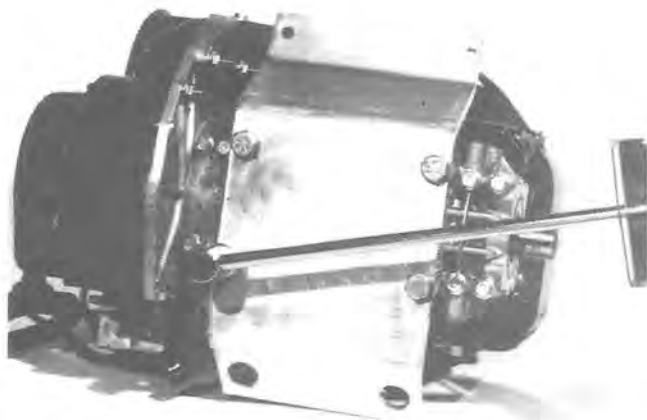
5. Install the fan belt and the outer pulley half on the shaft and, using the Arctic Fan Holder, secure pulley with a washer, lock washer, and nut.
6. Affirm fan-belt tension; adjust if necessary.
7. Install fan cover.

Installing Engine

NOTE: Procedures designated "A" are for the Jag 340, Jag 440, and Super Jag; procedures designated "B" are for the Panther.

1. Place the plate assembly into position on the engine and secure with four bolts and lock washers. Tighten to 7.6 kg-m (55 ft-lb).

Fig. 2-106



2. Place the engine w/plate assembly into position in the engine compartment and secure the engine support to the front end with two cap-lock screws making sure the female mounts and cup washers are properly positioned. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 2-107



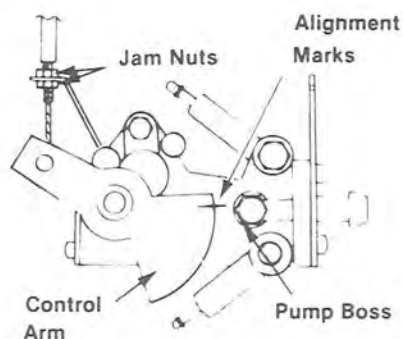
3. Secure the rear of the engine plate to the front end with two cap-lock screws making sure the female mounts and cup washers are properly positioned. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 2-108



4. Connect the oil-supply hose to the oil-injection pump; then place the carburetor into position and secure with the flange clamp. Connect the oil-injection linkage; then check oil-injection system synchronization.

Fig. 2-109



0726-559

5. Connect the impulse hose to the crankcase.
6. Connect the main wiring harness.
7. Place the recoil into position and secure with four bolts and lock washers. Tighten bolts to 0.7 kg-m (5 ft-lb). Secure hood cable.

Fig. 2-110



8. A. Place the muffler into position and secure to the exhaust manifold with three springs and to the muffler bracket with two springs.
- B. Place the pulse charger into position and secure to the exhaust manifold with three springs. Secure the main body of the pulse charger to the chassis brackets using the two large springs. Seal the expansion chamber ball joints with RTV 732 or equivalent.

NOTE: Do not overapply the RTV 732 Sealer.

Fig. 2-111



9. Place the drive clutch into position on the crankshaft and secure with the bolt and lock washer. Tighten to 7.6-8.3 kg-m (55-60 ft-lb).
10. Install the drive belt and close the clutch shield.
11. Check drive clutch/driven pulley alignment.
12. Bleed the oil-injection system.

13. Check ignition timing.
14. Test drive the snowmobile.

CAUTION

If the engine had a major overhaul or if any major part was replaced, proper engine break-in procedures (including installation of the proper main jet) must be followed.

SECTION 3 — FUEL SYSTEM

3

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Carburetor Specifications *

	Jag 340	Super Jag Jag 440	Panther
Number of Carburetors	1	1	1
Type	VM30	VM34	VM34
Main Jet	200	300	300
Pilot Jet	25	22.5	27.5
Needle Jet	P-4 (169)	Q-0 (166)	P-8 (166)
Jet Needle	5DP7-3	6DH2-3	6DH7-3
Piston Valve	CA 3.0	CA 2.5	CA 2.5
Pilot Air Screw (turns out)	1 1/2 ± 1/4	1 1/2 ± 1/4	1 1/2 ± 1/4

*Low Altitude Specifications

Pre-Maintenance Checks

Before troubleshooting the fuel system, several simple checks should be performed. Many times what appears to be a serious problem is only a minor one.

1. Remove the in-line fuel filter; then plug the hose to prevent drainage. If the filter is dirty, either backflush with cleaning solvent or replace the filter.

Fig. 3-1



0726-065

2. Remove the plug from the hose; then install a new or cleaned filter making sure the arrow on the filter is directed toward the fuel pump.

3. Check the hoses to ensure that all hoses are correctly connected; then check the hoses for cracks. If any cracks are evident in the hoses, replace the hoses making sure the hoses aren't against any hot or moving parts. Hoses must fit tightly. If hoses do not fit tightly, cut 6 mm (1/4 in.) from the end of the hose and install.
4. Check the impulse hose for correct connections on both the fuel pump and crankcase fittings. Hose must fit tightly.
5. Check carburetor vent for obstructions; remove any obstructions.
6. Check fuel-tank vent and hose for obstructions; remove any obstructions.

Removing Carburetor

1. Loosen the screw and lock washer securing the mixing-body-top cover.
2. Remove the mixing body top by rotating it counterclockwise; then remove the top with spring, plate, jet needle w/E-ring, and piston valve from the carburetor.

Fig. 3-2



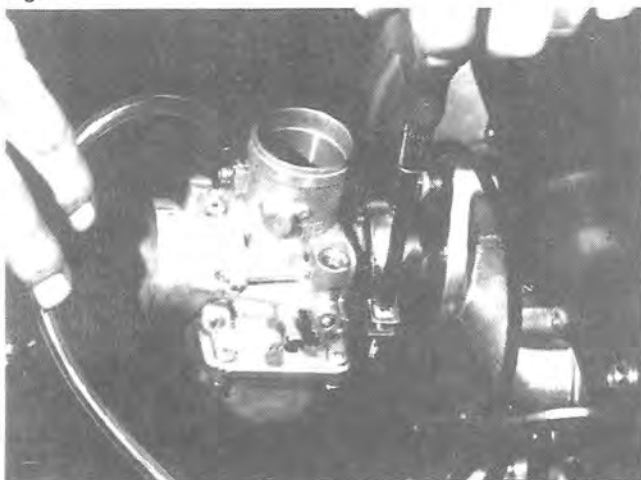
3. Remove the brass choke-cable housing from the carburetor. Account for a washer.

Fig. 3-3



4. Disconnect the fuel hose from the carburetor inlet fitting. Plug hose to prevent gas drainage.
5. Remove the air-intake silencer boot.
6. Loosen the carburetor-flange clamp; then remove carburetor.

Fig. 3-4



Disassembling Carburetor

1. Remove the four screws and lock washers securing the float chamber; then remove the float chamber and gasket.

Fig. 3-5



2. Remove the caps from the float towers; then remove the floats. Remove the drain plug and O-ring.

NOTE: Step 2 only needs to be done if the floats appear to be damaged.

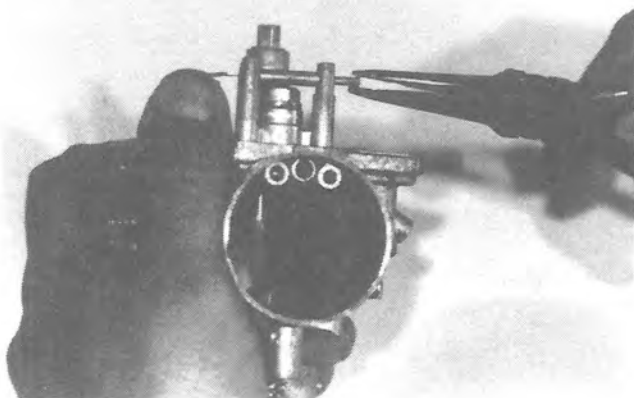
Fig. 3-6



3. Remove the float-arm pin; then remove the float arm.

NOTE: Pin can only be removed from one side. Pin must be removed from its flattened side.

Fig. 3-7



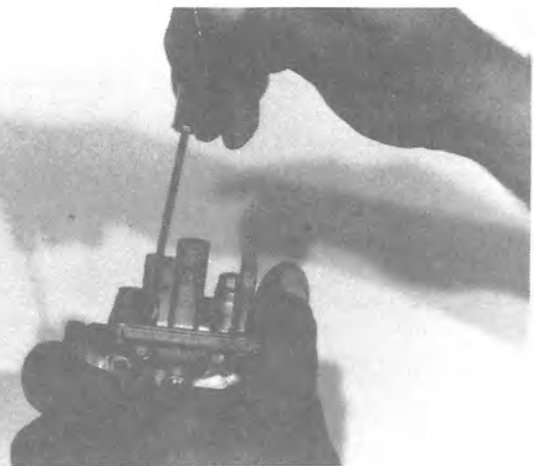
4. Remove the inlet needle valve; then remove the seat and washer.
5. Remove the main jet and washer from the needle jet; then from the top of the carburetor, remove the needle jet.

Fig. 3-8



6. Remove the pilot jet.

Fig. 3-9



7. Remove the pilot air screw and spring.

Fig. 3-10



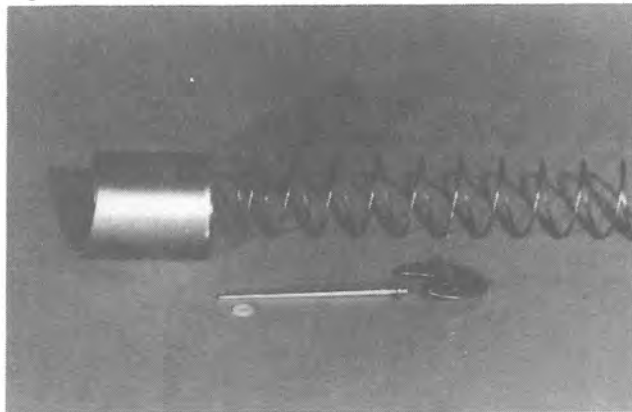
8. Remove the throttle stop screw and spring.

Fig. 3-11



9. Remove the throttle cable from the piston valve; then remove the piston valve. Account for the jet needle w/E-ring, washer, plate, spring, and top. Remove the E-ring from the jet needle.

Fig. 3-12



10. Separate the choke plunger assembly from the choke cable by compressing the spring and removing the plunger from the cable; then remove the spring. Thread the plunger cap off the cable.

Cleaning Carburetor

CAUTION

DO NOT place any non-metallic parts in parts cleaning solvent because damage or deterioration will result.

1. Place all metallic parts in a wire basket and submerge in carburetor cleaner.
2. Soak parts for about 30 minutes; then rinse with fresh parts-cleaning solvent.
3. Wash all non-metallic parts with soap and water. Rinse thoroughly.
4. Dry all components with compressed air only, making sure all holes, orifices, and channels are unobstructed.



WARNING

When drying components with compressed air, be sure to protect eyes from the cleaning solvent.

CAUTION

DO NOT use wire or small drill bits to clean carburetor orifices, holes, or channels. Distorted or damaged orifices, holes, or channels can result in poor carburetor operation.

Inspecting Carburetor

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

1. Inspect the carburetor body for cracks, nicks, stripped threads, and any other imperfections in the casting.
2. Inspect the piston valve for cracks, score marks, or imperfections in the casting.
3. Inspect the condition of the piston-valve spring.
4. Inspect floats for damage.
5. Inspect gaskets and washers for distortion, tears, or noticeable damage.
6. Inspect tips of the throttle stop screw, jet needle, pilot air screw, and the inlet needle valve for wear, damage, or distortion.
7. Inspect the pilot jet and main jet for obstructions or damage.

NOTE: If the pilot jet is obstructed, the mixture will be extremely lean at idle.

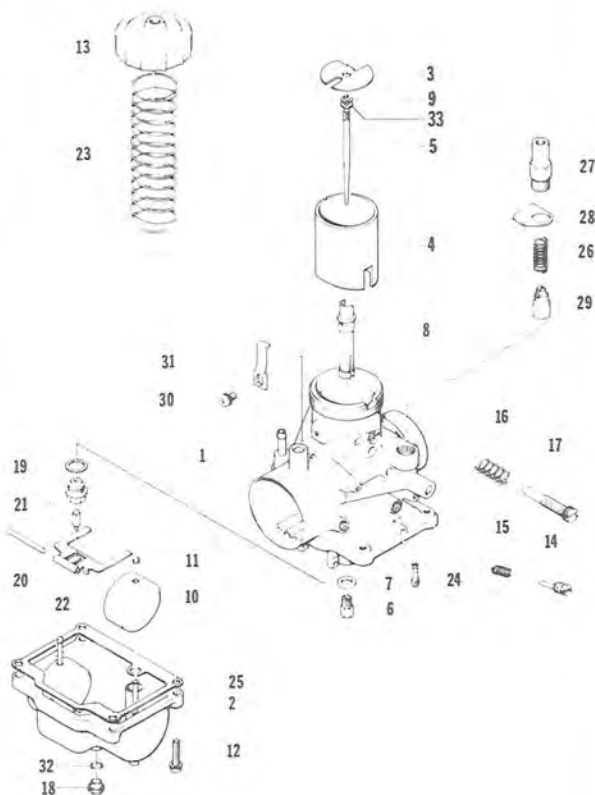
8. Inspect choke plunger and seat for wear or damage.
9. Inspect carburetor-mounting flange for damage and tightness.

CAUTION

An air leak between the carburetor and engine will cause severe engine damage.

Assembling Carburetor

Fig. 3-13



KEY

- | | |
|-------------------------|---------------------------|
| 1. Mixing Body Assembly | 18. Drain Plug |
| 2. Float Chamber | 19. Washer |
| 3. Plate | 20. Float Pin |
| 4. Piston Valve | 21. Needle Valve Assembly |
| 5. Jet Needle | 22. Float Arm |
| 6. Main Jet | 23. Spring |
| 7. Washer | 24. Pilot Jet |
| 8. Needle Jet | 25. Gasket |
| 9. E-Ring | 26. Spring |
| 10. Float | 27. Cap |
| 11. Cap | 28. Washer |
| 12. Screw | 29. Starter Plunger |
| 13. Mixing Body Top | 30. Screw |
| 14. Pilot Air Screw | 31. Plate |
| 15. Spring | 32. O-Ring |
| 16. Spring | 33. E-Ring Washer |
| 17. Throttle Stop Screw | |

0700-064

1. Install the throttle stop screw and spring.

Fig. 3-14



2. Install the pilot air screw and spring. Turn clockwise until lightly seated; then back out 1½ turns as an initial setting.

Fig. 3-15



CAUTION

DO NOT force the pilot air screw when seating. Forcing the screw will result in damage to the carburetor body.

3. Install the pilot jet.

Fig. 3-16



4. Insert the needle jet into position from the top of the carburetor making sure the groove in the needle jet is aligned with the pin in the mixing body; then place the main jet and washer into position and secure.

Fig. 3-17



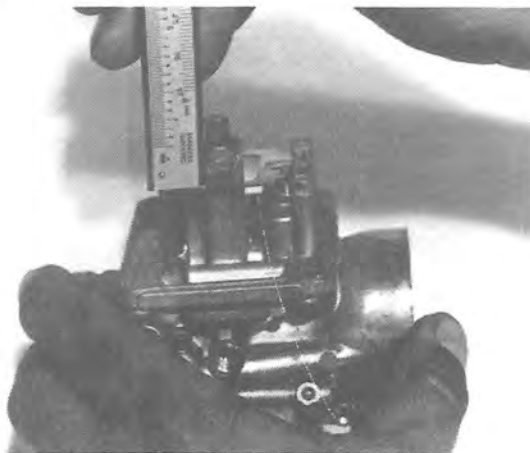
5. Place the seat and washer into position and secure; then install the inlet needle valve.
6. Place the float arm into position and secure with the pin.

Fig. 3-18



7. Check the float arm height. Using a caliper, measure the distance from the gasket surface to the top of the float arm (with the carburetor inverted). If measurement is not within specifications, adjust by bending the actuating tab.

Fig. 3-19



Float Arm Height	mm	in.
	22-24	0.87-0.95

8. Place the O-ring and drain plug into position and secure; then place the floats into position making sure word UP is properly positioned. Press the caps onto the float towers.

Fig. 3-20



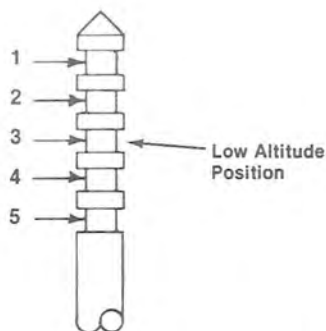
9. Place the gasket and float chamber into position and secure with the four screws and lock washers.

Fig. 3-21



10. Place the E-ring into the third position (for low altitude operation) on the jet needle; then from the bottom of the jet needle, slide the E-ring washer up against the E-ring. Place the mixing top into position on the throttle cable. Slide the spring over the cable and compress. Position the cable end into the piston valve slot, drop the jet needle down into the piston valve, and place the locking plate down over the top of the jet needle. Release the spring.

Fig. 3-22



0725-266

11. Thread the plunger cap onto the choke cable. Place the spring over the cable end and compress. Position the cable end into the starter plunger and release the spring.

Installing Carburetor

1. Place the carburetor into position in the flange and air silencer boot; then tighten the flange clamp making sure the carburetor is level and correctly positioned in the alignment notch of the flange.

Fig. 3-23



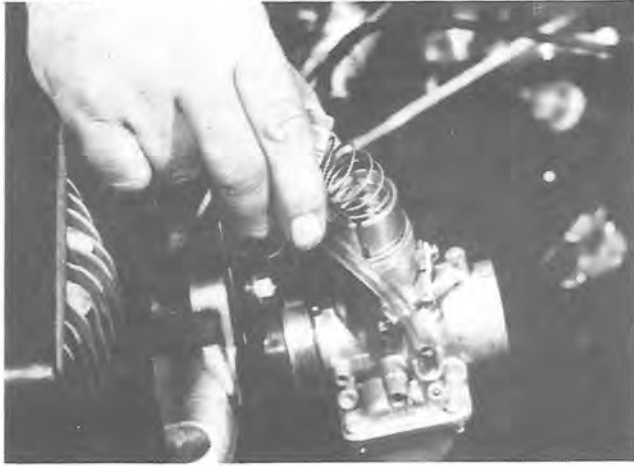
2. Connect the fuel hose to the carburetor inlet fitting.
3. Thread the brass choke-cable housing into the carburetor and secure making sure the washer is properly positioned. Bend the lock tab of washer to secure.

Fig. 3-24



4. Place the slide valve into position making sure the full-length groove in the piston valve is aligned with the pin in the mixing chamber bore; then secure the mixing body top.

Fig. 3-25



5. Secure the mixing body top by tightening the screw and lock washer making sure the mixing-body-top plate is properly positioned.
6. Adjust carburetor.

Adjusting Carburetor

● CAUTION ●

The air-intake silencer must be in position whenever the engine is run. If the silencer is removed and the engine is run, a lean condition will result. Therefore, DO NOT run the engine when the air-intake silencer is removed.

1. Be sure ignition switch key is in the OFF position and the parking brake is set.
2. Loosen the jam nut securing the choke-cable adjuster. Rotate the choke-cable adjuster to obtain 1.5 mm (1/16 in.) free play between the choke-lever and choke-cable nut, when choke lever is in the DOWN position. Lock the adjuster in place by bottoming the jam nut against the brass plunger cap.

Fig. 3-26



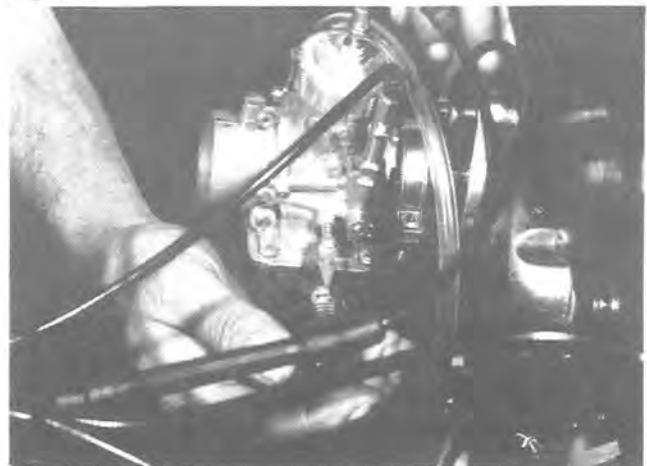
3. Loosen jam nut securing the swivel adapter.

Fig. 3-27



4. Rotate the swivel adapter clockwise until free play is felt in the throttle lever.
5. Remove the air-intake silencer boot.
6. Rotate the throttle stop screw counterclockwise until its spring is fully extended. Rotate the screw clockwise until the screw contacts the piston valve; then squeeze throttle lever to half throttle and rotate an additional 1½ turns.

Fig. 3-28



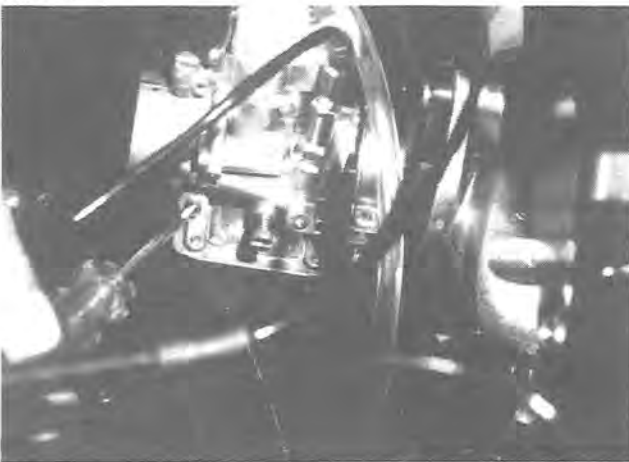
7. Rotate the swivel adapter until no free play is felt in the throttle lever. Lock the swivel adapter by bottoming the jam nut.
8. Compress the throttle lever and using the fingers, check to make sure the piston clears the carburetor bore on the backside of the slide.

Fig. 3-29



9. Carefully rotate the pilot air screw clockwise until lightly seated.

Fig. 3-30



CAUTION

DO NOT overtighten the pilot air screw when seating; damage will result.

10. Rotate the pilot air screw counterclockwise $1\frac{1}{2}$ turns from the seated position.

NOTE: Synchronize the oil-injection system before starting the snowmobile.

11. Install the air-intake silencer boot.
12. With the snowmobile on a shielded safety stand, start the snowmobile engine and thoroughly warm up. "Fine tune" the throttle stop screw and the pilot air screw until the engine idles smoothly at the desired rpm (2000-2500 rpm is recommended).

NOTE: If the engine does not start after the carburetor has been adjusted, repeat steps 4 and 7 because the throttle/ignition monitor switch may not be correctly tensioned. If all the throttle-cable slack is not "taken up", the monitor switch will prevent the ignition system from firing the spark plugs.

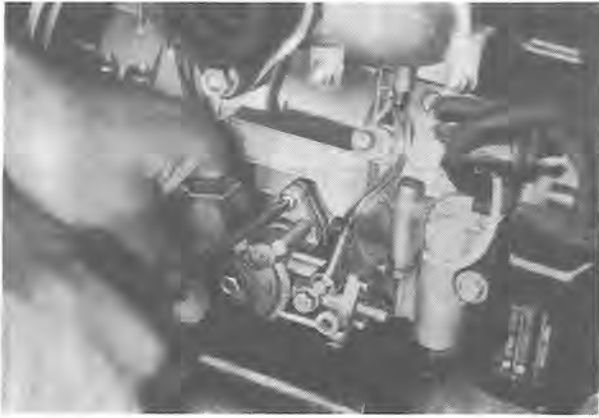


DO NOT operate the snowmobile when any component in the throttle system is damaged, frayed, kinked, worn, or improperly adjusted. If the snowmobile is operated when the throttle system is not functioning properly, personal injury could result.

Removing Oil-Injection Pump

1. Remove carburetor.
2. Disconnect the oil-supply hose from the pump and plug to prevent oil drainage.
3. Remove the two oil delivery hoses to the intake manifold.
4. Disconnect the oil-injection cable.
5. Remove the two bolts, lock washers, and washers securing oil-injection pump and retainer to the crankcase.

Fig. 3-31



6. Remove the oil-injection pump. Account for a gasket. Remove the retainer. Account for a gasket.

NOTE: Since the pump is a non-serviceable component, if a problem occurs with the oil-injection pump, the complete pump assembly must be replaced.

Installing Oil-Injection Pump

1. Apply silicone sealer to both sides of the retainer gasket; then place gasket and retainer into position on the crankcase.
2. Apply silicone sealer to the oil-injection pump gasket; then place gasket and pump into position making sure the oil-injection pump gear is correctly aligned with the oil-injection pump drive gear.
3. Secure pump with two bolts, lock washers, and washers. Tighten bolts to 0.7 kg-m (5 ft-lb).
4. Attach the two oil-injection pump delivery hoses to the fittings on the bottom of the intake manifold. Tighten screw clamps.
5. Connect the oil-injection cable to the pump.
6. Connect oil-supply hose to the pump inlet fitting and tighten clamp.
7. Bleed oil-injection system.
8. Install carburetor.
9. Check oil-injection system synchronization.

Synchronizing Oil-Injection Pump

CHECKING

To check the oil-injection system synchronization, use the following procedure:

1. With the ignition switch key in the OFF position, move the throttle lever to the wide-open-throttle position.
2. Check the alignment of the mark on the pump housing and the mark on the control arm. If marks align, the oil-injection system is synchronized with the carburetor and no adjustment is necessary. If the marks do not align, adjust synchronization.

Fig. 3-32

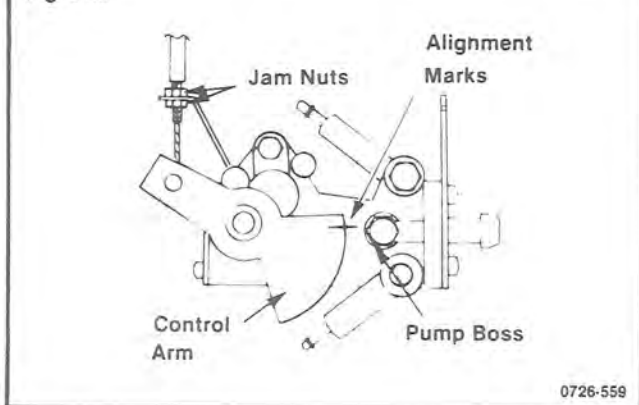
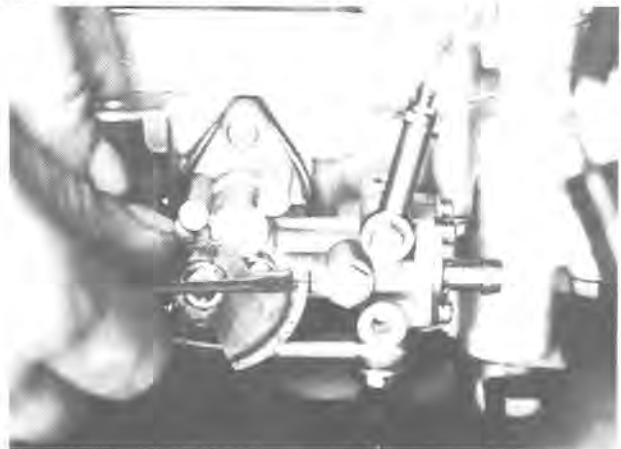


Fig. 3-33



ADJUSTING

To adjust the oil-injection system synchronization, use the following procedure:

1. Loosen the jam nut securing the cable adjuster.
2. Move the throttle lever to the wide-open-throttle position.

Fig. 3-34



3. Rotate the cable adjuster in the proper direction until alignment is achieved.
4. Lock the jam nut to secure adjustment.

TESTING OIL-INJECTION PUMP

1. Connect the Oil Injection Usage Tool (p/n 0644-007) filled to the top line with injection oil to the oil-injection pump.
2. Start the engine and run the engine at 3,000 rpm for **3 minutes** with the control arm in the full closed position. Check the amount of oil used against the specifications on the chart.
3. Run the engine at 3,000 rpm for **2 minutes** while holding the control arm in the full open position. Check the amount of oil used against the specifications on the chart.

MODEL	FULL-CLOSED @ 3 Minutes	FULL-OPEN @ 2 Minutes
Jag, Super Jag	1.40 - 2.05 cc	3.4 - 4.2 cc
Panther	1.40 - 2.10 cc	3.6 - 4.4 cc

4. If the oil-injection pump does not meet the specifications, replace the pump.

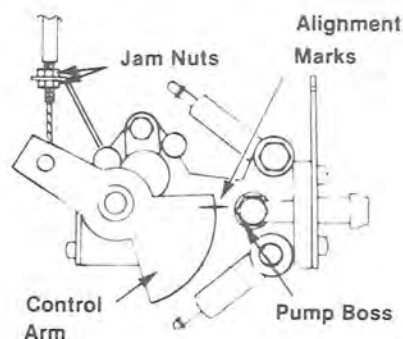
Bleeding Oil-Injection System

CAUTION

Whenever bleeding the oil-injection system, use a 50:1 gas/oil mixture in the gas tank to ensure adequate engine lubrication. Failure to use the 50:1 mixture during oil-injection system bleeding will result in severe engine damage.

1. Fill oil reservoir with either Arctco or Arctic Cat Injection Oil.
2. Place a shop towel below the oil-injection pump bleed screw and remove the bleed screw from the pump. Allow oil to flow through the oil-supply hose until the hose is filled with oil and free of air; then install bleed screw.

Fig. 3-35



0726-559

3. Using a shielded safety stand, raise the rear of the snowmobile off the floor. Start the engine and allow it to idle.
4. While idling the engine, pull the control arm upward to the wide-open position.



WARNING



Keep hands and clothing from all moving or rotating parts.

5. Idle the engine until oil flows to the top of both oil-delivery hoses, shut the engine off.

Fuel Pump

The fuel pump is a serviceable item; therefore, it may be either replaced as a complete unit or may be rebuilt. To test the fuel pump pressure, use the following procedure:

1. Using a tee, connect a pressure gauge between the fuel pump and the carburetor.
2. Using a shielded stand, raise the rear of the snowmobile off the floor and check the pressure at various engine rpm. If the pressure is not within specifications, either service or replace the fuel pump.

RPM	PSI	g/cm ²
1000-2000	3.0-3.5	200-240
3000-4000	3.5-4.5	240-310
5000-6000	4.5-5.0	310-350

Air-Intake Silencer

The air-intake silencer is a specially designed component used to silence the incoming fresh air and also to catch the fuel that "spits back" out of the carburetor. The carburetor is calibrated with the air-intake silencer in position; therefore, the engine must never be run for any length of time with the air-intake silencer removed.

INSPECTING AND CLEANING

NOTE: The air-intake silencer should not be disassembled.

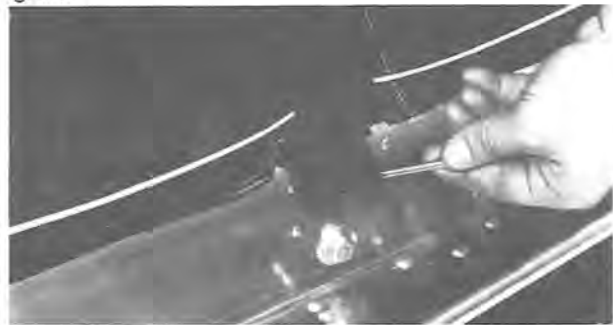
1. With the silencer removed, check for holes or cracks in the silencer.
2. Periodically clean the silencer by blowing fresh air through it.
3. Wash the silencer intake foam in parts cleaning solvent, shake out, and allow to dry before installing.

Removing Fuel Tank

1. Pull the passenger strap toward either side of the snowmobile and remove the pin securing the strap; then remove the seat cushion from the tunnel.

NOTE: On the Jag, remove the two nuts found under the rear of the tunnel; on the Panther and Super Jag, unsnap the snaps to remove the seat cushion.

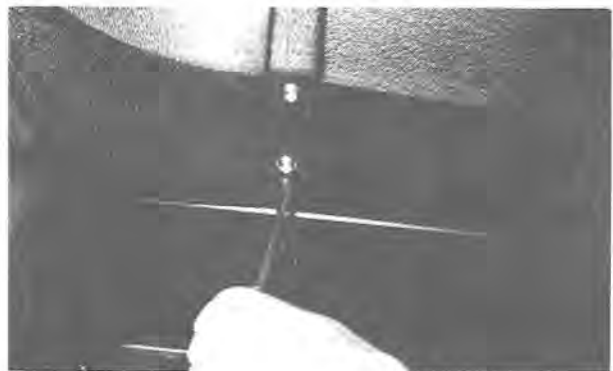
Fig. 3-36



B261

2. On the Panther and Super Jag, remove the four machine screws securing the sides of the console; then remove the two machine screws, nuts, and washers securing the top of the console.

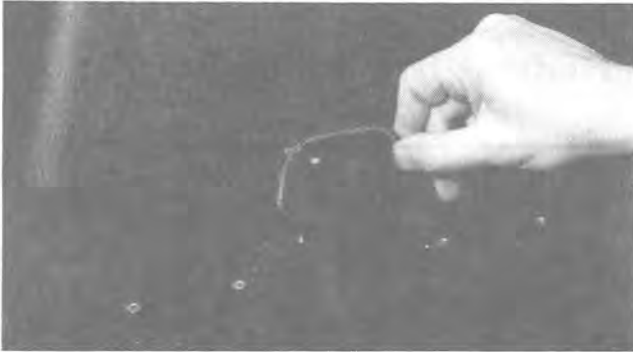
Fig. 3-37



B360

3. On the Panther and Super Jag, remove the fuel cap and spill seal.
4. Remove the spring securing the fuel tank to the tunnel.

Fig. 3-38



B361

5. Remove the vent hose and fuel hose from the tank and plug the fittings to prevent drainage; then raise the console to allow removal of the tank and remove the tank.

Installing Fuel Tank

1. Raise console to allow installation of the tank and place the fuel tank into position; then install the vent hose and fuel hose.
2. Secure the tank to the tunnel with the spring.

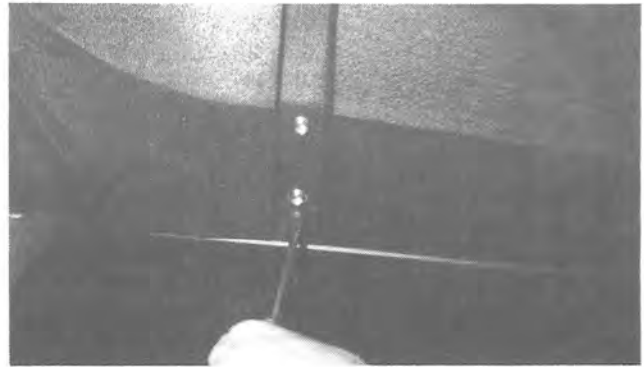
Fig. 3-39



B361

3. On the Panther and Super Jag, install the spill seal and fuel cap; then secure the top of the console with two machine screws, washers, and nuts and the sides of the console with four machine screws.

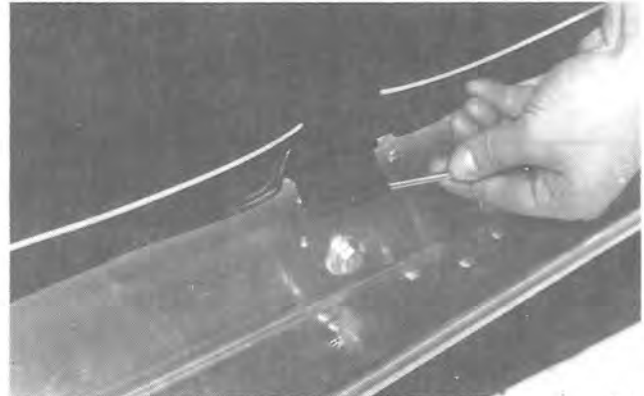
Fig. 3-40



B360

4. Place the seat cushion into position. Secure the Panther and Super Jag seat with the snaps. Secure the Jag seat with the two nuts located on the rear, bottom side of the tunnel. Place the passenger strap into position and secure with the pin. Correctly position pin by firmly pulling up on the strap.

Fig. 3-41



B261

MAIN JET CHART*

ALTITUDE - FEET (METERS)	←RICHER	JAG 340			LEANER→
Over 8000 (Over 2438)	160	150	140	140	
5000-8000 (1524-2438)	180	170	160	150	
0-5000 (0-1524)	210	200	190	180	
ALTITUDE - FEET (METERS)	←RICHER	PANTHER · SUPER JAG · JAG 440			LEANER→
Over 8000 (2438)	250	240	230	220	
5000-8000 (1524-2438)	270	260	250	240	
0-5000 (0-1524)	300	290	280	270	
TEMPERATURE — Fahrenheit (Celsius)	- 40 to - 20 (- 40 to - 29)	- 20 to 0 (- 29 to - 18)	0 to + 20 (- 18 to - 7)	+ 20 to + 40 (- 7 to + 4)	

NOTE: Operating any of these snowmobiles over 1524 m (5000 ft), requires raising the jet needle circlip 1 clip position. Also, operating the PANTHER at 1524 m (5000 ft) or more, requires installing a 3.0 slide. In addition to these carburetor changes, changes in clutching are required if any of these snowmobiles is operated at 1220 m (4000 ft) or higher.

*After the break-in period the main jet should be changed in accordance to the main jet chart.

SECTION 4 — DRIVE SYSTEM

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Drive Belt

The belt dimensions and construction are two factors that influence the performance of the drive system. The two belt dimensions that are important to the performance of the snowmobile are the outside circumference and the width. Both of these dimensions will influence shifting characteristics.

If the drive belt is longer than specified, the drive clutch and driven pulley will not have the full shift ratio. Also, a too-long drive belt will cause poor acceleration and a decrease in top speed. A belt that is shorter than specified will cause a loss in performance and a bog on engagement as the drive clutch and driven pulley will have a different shift pattern because they are in different ratios than conditions for which they were originally matched.

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

Drive belt construction has an influence on the way the drive clutch and driven pulley will shift and on the amount of power that will be transmitted through the system. ONLY ARCTCO OR ARCTIC CAT DRIVE BELTS SHOULD BE USED. Different brands of belts may not have the same construction causing more friction or more slippage when the belt is wedged between the sheaves and, thus, a loss in efficiency.

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

SPECIFICATIONS

Item	Jag 340-Jag 400	Super Jag-Panther
Belt p/n	0227-100	0227-030
Outside Circumference (Range)	115-116 cm 45 5/16-45 11/16 in.	110-111 cm 43 5/16-43 11/16 in.
Width (Range)	34.1-35.7 cm 1 11/32-1 13/32 in.	34.1-35.7 cm 1 11/32-1 13/32 in.

Drive Clutch

SPECIFICATIONS

	JAG 340	JAG 440	PANTHER	SUPER JAG
Drive Clutch p/n	0725-012	0725-014	0725-015	0725-014
Weight p/n	0146-166	0146-104	0146-104	0146-104
(Grams)	(10.600)	(9.750)	(9.750)	(9.750)
(Grams)	0146-286(A)	0146-286(A)	0146-278(A)	0146-286(A)
(Grams)	(8.800)	(8.800)	(6.475)	(8.800)
(Grams)	0146-105(B)	0146-105(B)	0146-279(B)	0146-123(B)
(Grams)	(7.858)	(7.858)	(5.457)	(6.992)
Spring p/n	0146-068	0146-068	0146-068	0146-068
Color	Green	Green	Green	Green
Ramp p/n	0646-026	0146-414	0146-414 0646-012(A) 0646-012(B)	0146-414
Roller p/n	0146-421	0146-421	0146-421	0146-421
Arm p/n	0646-028	0646-028	0646-0280	0646-028
Engagement RPM	3600-4000	3600-4000	3600-4000	3600-4000
Peak RPM	6500-6700	6000-6200	7000-7200	6000-6200
Offset Measurement	34.7 mm 1.365 in.	34.7 mm 1.365 in.	34.7 mm 1.365 in.	34.7 mm 1.365 in.
Center-to-Center Distance	25.9 cm 10.2 in.	25.9 cm 10.2 in.	25.9 cm 10.2 in.	25.9 cm 10.2 in.

A = 1220-2440 m (4000-8000 ft)

B = 2440 m (8000 ft) and above

REMOVING

1. Open the clutch shield and remove the drive belt.
2. Remove the plug from the belly pan.
3. Using an impact wrench, remove the bolt and lock washer securing the drive clutch to the crankshaft.
4. Using an Arctic Drive Clutch Puller and an impact wrench (or a breaker bar and a spanner wrench), tighten the puller. If the drive clutch will not release, sharply strike the head of the puller. Repeat complete procedure until clutch releases.

Fig. 4-1



5. Remove the clutch from the engine compartment.

CHECKING BEARING WEAR

The clearance between the hex shaft and bearing is critical for correct drive clutch operation. The flats on the drive clutch are directly associated with the large bearing area.

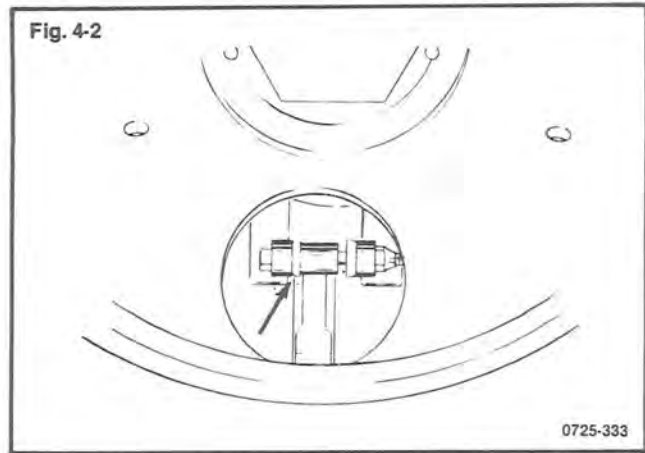
The maximum allowable bearing wear is limited by the clearance between the ramp and inside surface of the roller arm.

If the bearing appears worn, roller arm and ramp clearance can be visually inspected by looking into the clutch, or the clutch can be removed from the crankshaft and measured. To check bearing wear, use either of the following procedures:

Visual Inspection Procedure

1. While rotating the drive clutch clockwise and counterclockwise, inspect the inside surfaces of the roller arm; there must not be any contact between the roller arm and ramp.

Fig. 4-2



2. If there is no contact between the roller arm and ramp, the maximum allowable drive-clutch bearing wear is within tolerance. The drive clutch is acceptable.
3. If there is contact between the roller arm and ramp, the drive-clutch bearing wear is not within tolerance and the drive clutch movable sheave and housing bearings must be replaced.

Measurement Method Procedure

1. Remove the drive clutch from the crankshaft.
2. Remove housing (cover) and spring.

Fig. 4-3



WARNING



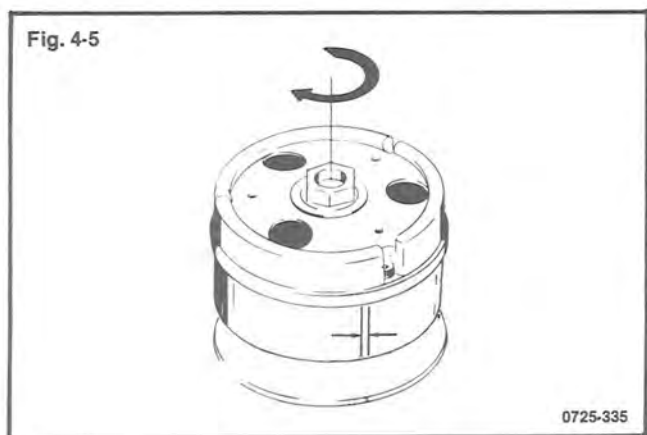
The housing must be held down or personal injury may result.

3. Install housing and secure with three socket-head cap screws.

4. Keeping the stationary sheave fixed, rotate the movable sheave counterclockwise until all clearance is taken up. Using a scribe and tri-square, scribe a line on the movable sheave.



5. Keeping the stationary sheave and tri-square fixed, rotate the movable sheave clockwise until all clearance is taken up. Using the scribe and tri-square, scribe another line on the movable sheave.
6. Using a caliper or scale, measure the distance between the two scribed lines.
7. If distance between the two scribed lines is less than 4 mm (0.156 in.), the drive-clutch bearing wear is within tolerance and the drive clutch is acceptable.

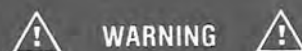


8. If distance between the two scribed lines is more than 4 mm (0.156 in.), the maximum allowable drive-clutch bearing wear is not within tolerance. Drive clutch movable sheave and housing bearings must be replaced.

DISASSEMBLING

1. Firmly hold the housing (cover) to the movable sheave; then remove the three socket-head cap screws and washers securing the housing to the movable sheave. Remove housing. Note the balance marks on the movable sheave and housing to aid in assembly.

Fig. 4-6



WARNING



The housing must be held down or personal injury may result.

Fig. 4-7



2. Remove the spring; then remove the cup washer.

Fig. 4-8



A969

3. Scribe a line from the spider assembly to the movable sheave; then loosen the three jam nuts and the three set screws holding spider assembly on the hex shaft.

Fig. 4-9



A970

Fig. 4-10



A971

4. Push spider toward stationary sheave; then remove the split ring halves from the groove in the hex shaft.

Fig. 4-11



A972

5. Slide spider and movable sheave off hex shaft. Note the position of the split ring retainers to aid in assembly.

Fig. 4-12



A973

6. Remove the three lock nuts and bolts securing the weights, the rollers, and the bushings to the spider arms; then slide rollers w/bushings from between the swing arms.

NOTE: The spider assembly should only be disassembled if it is found that the arm, pin, or bushings need replacement.

Fig. 4-13



015

NOTE: A complete roller kit w/bushings must be installed even if only one roller assembly is worn or damaged.

7. Inspect the swing arms for wear in the area of the swing arm pin bushings (located at either end of the pin). Inspect the swing arms for signs of wear or cracking. Check each thrust washer located on either side of the swing arm for wear. If any of these parts need replacement, disassemble the spider.
8. Remove the snap ring from each end of the swing arm pin.

Fig. 4-14



9. Using a hex wrench, remove the set screw from the backside of each swing arm; then slide the pin out of the spider.

Fig. 4-15



AA050

NOTE: If the swing arm pin is removed for any reason, we recommend to replace the pin, arm, thrust washers, and bushings with new parts. Never reuse any one of these parts without replacing them all as a set.

10. Remove the two bushings from the spider using special tool kit p/n 0644-001.

Fig. 4-16



11. After removing the bushings, inspect the area from which they were removed closely. If there is any sign of cracking or damage, replace the spider.
12. Using a 9/64-in. hex wrench, remove the socket-head cap screws securing the ramps to the movable sheave.

Fig. 4-17



A975

NOTE: A complete set of ramps must be installed even if only one ramp is worn or damaged.

CLEANING

1. Using parts-cleaning solvent, wash grease, dirt, and foreign matter off all parts. Dry the parts with compressed air.
2. If drive belt dust accumulation is present on the stationary sheave or on the movable sheave Duralon bushing, remove the accumulation using parts-cleaning solvent only.

CAUTION

DO NOT use steel wool or a wire brush to clean components having a Duralon bushing; damage will result if bushing is contacted with the steel wool or a wire brush.

INSPECTING

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

1. Inspect stationary sheave, movable sheave, and housing for cracks and imperfections in the castings.
2. Inspect the spider for cracks and imperfections in the casting. Arms, weights, and rollers must not be damaged or worn.
3. Inspect the ramp settings on the inside of the movable sheave for wear and cracks.
4. Inspect the spring for proper compression qualities. Spring compression must be within the range of 123-137 lb @ 2.187 in.
5. Inspect the ramps for any uneven wear pattern.
6. Inspect all threaded areas for any cracked or stripped threads.
7. Inspect the hex shaft; no burrs or rough edges are to be evident. Use a fine file to remove any burrs or rough edges. Thoroughly clean and dry the hex shaft if any filing was done.
8. Inspect bushing for any cracks or excessive gouging.

REPLACING BUSHINGS

Drive clutch bushings can be replaced using the Bushing Installation Tool (p/n 0644-006) and the following instructions:

Removing Outer Cover Bushing

1. Using a 3/32 in. hex wrench, remove the three set screws that lock the hex bushing to the cover.

Fig. 4-18



2. Turn the clutch cover over and set it into the sleeve support.
3. Using the hex shaft driver, drive or press the hex bushing down and out.

Fig. 4-19



4. Inspect the cover bushing area for any signs of cracks or fatigue. If any sign of cracks or fatigue is present, replace the cover.

Installing Outer Cover Bushing

1. Set the cover upside down on a solid, flat surface.
2. Set the cover hex bushing into position in the cover.

Fig. 4-20



3. Slide the hex shaft driver into the triangular-shaped bushing locator (with the machined ring located nearest the triangular plate).

Fig. 4-21



4. Position the hex shaft driver into the bushing and slide the triangular-shaped bushing locator plate down into position. Place the single, locating pin of the bushing locator into one of the three cover pin holes.

Fig. 4-22



5. Check to be sure the hex bushing is located squarely in the cover; then drive or press the bushing into position until it is flush with the outer cover surface.

NOTE: If you are using a hammer to install the bushing, use a heavy brass or plastic hammer to prevent damage to the hex shaft driver.

6. With the bushing in place, position the pilot drilling tool down into the bushing on the outside of cover. Using a No. 25 drill bit, drill three new holes (3/4 in. in depth) into the cover and bushing.

Fig. 4-23



● CAUTION ●

The pilot tool must be used to properly locate the holes.

7. Using a 10-24 tap, tap the three new holes.

Fig. 4-24



8. Apply LOCTITE (red) to the threads of the three set screws and install them into the three newly threaded holes.
9. Using a small punch, stake the top of the three holes to prevent the set screws from backing out.

Fig. 4-25



Removing Movable Sheave Bushing

1. Using a 3/32 in. hex wrench, remove the three set screws from the movable sheave.
2. Set the movable sheave upside down on top of the sleeve support. The sleeve support must be used to support the area around the bushing as the bushing is being either driven or pressed out of the sheave.

Fig. 4-26



3. Using the hex shaft driver, drive or press the hex bushing down and out.

Fig. 4-27



4. Inspect the movable sheave bushing area for any signs of cracks or fatigue. If any sign of cracks or fatigue is present, replace the movable sheave.

Installing Movable Sheave Bushing

1. Set the movable sheave into position on the sleeve support.

NOTE: One end of the sleeve support has been machined to match the angle of the movable sheave. This end of the tool must support the face of the sheave.

Fig. 4-28



2. Set the movable sheave bushing into position; then position the hex shaft driver and triangular-shaped bushing locator over the bushing.

Fig. 4-29



3. Locate the single, locking pin of the bushing locator in one of the three holes of the movable sheave and slide the hex shaft driver into the new bushing.

Fig. 4-30

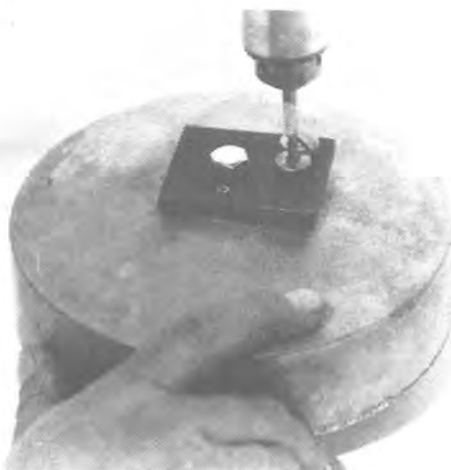


4. Check to be sure the bushing is positioned squarely in the sheave; then drive or press the bushing into the movable sheave.

NOTE: The movable sheave bushing area has a step machined into it. Drive or press the bushing into sheave until you feel the bushing seat against the step.

5. With the bushing in place, position the pilot drilling tool into the bushing from the outside of the sheave. Using a No. 25 drill bit, drill three new set screw holes through sheave and bushing.

Fig. 4-31

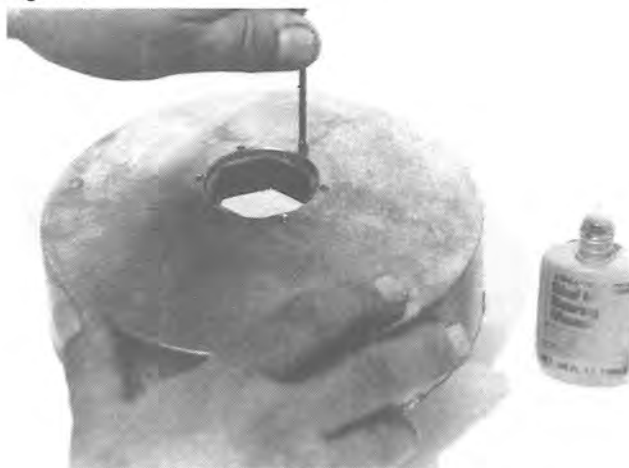


6. Using a 10-24 tap, tap the three new holes. Apply LOCTITE (red) to the threads of the set screws and install.

Fig. 4-32



Fig. 4-33



7. Using a small punch, stake the top and bottom of the holes to prevent the set screws from backing out.

Fig. 4-34



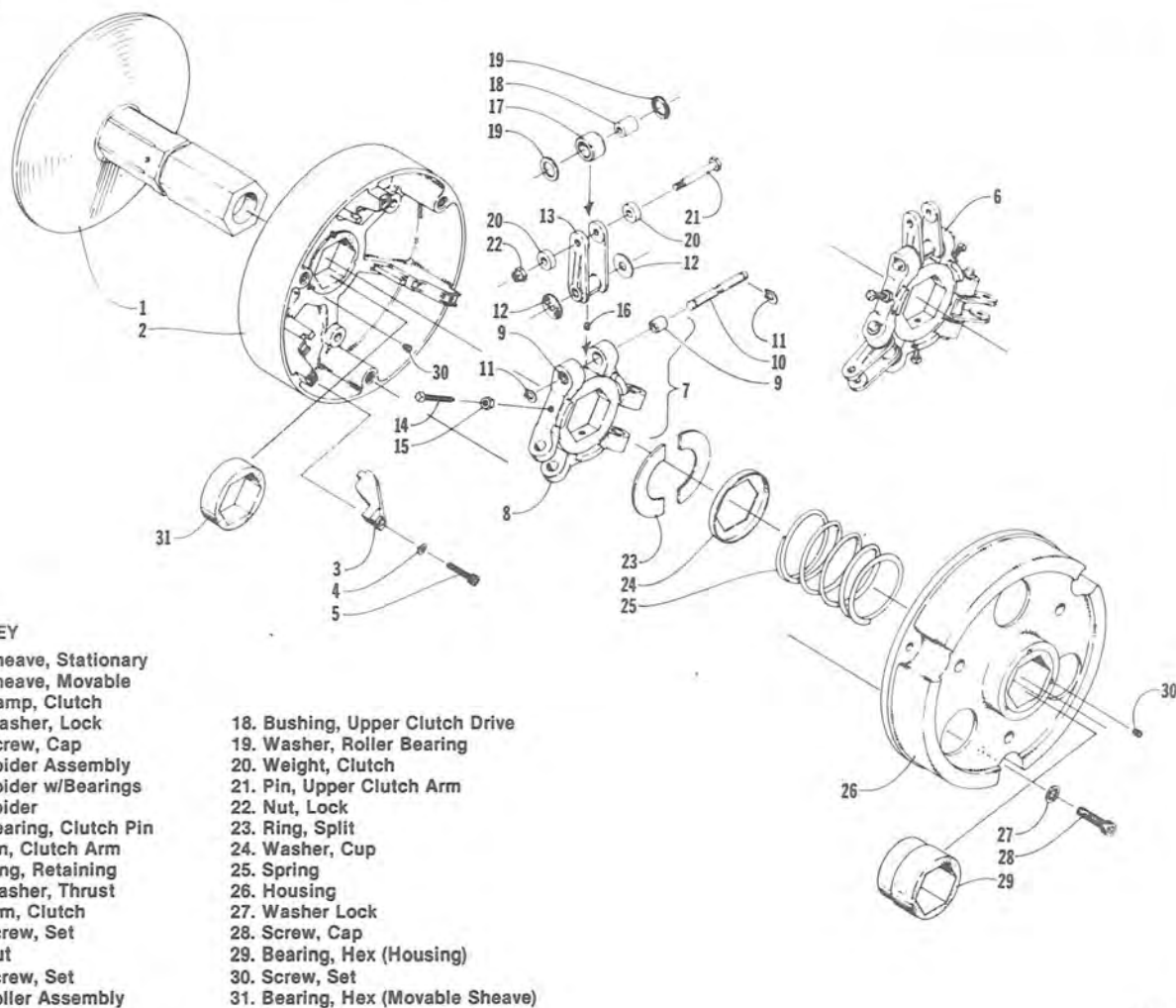
Fig. 4-35



8. Check the face of the sheave in the area of the three newly drilled holes. If any sharp edges are found, smooth area using fine emery paper.

ASSEMBLING

Fig. 4-36



0727-325

1. Install the ramps in the movable sheave and secure.

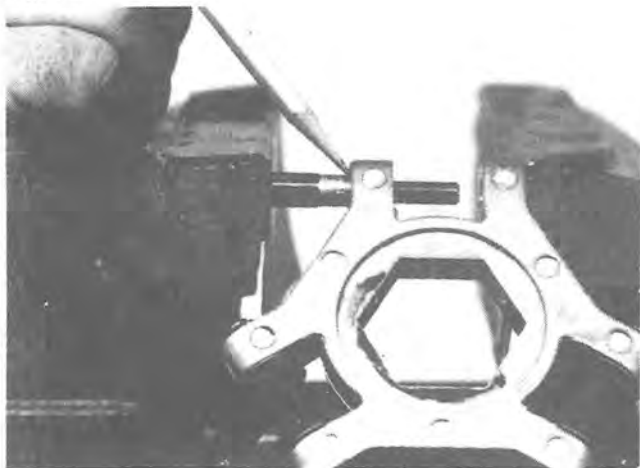
Fig. 4-37



A975

2. Slide the movable sheave onto the stationary sheave making sure balance marks on both sheaves are aligned.
3. Assemble the spider using the following procedure:
 - A. Press the new bushings into the spider pin bosses. Use care to start the bushing straight and press slowly to prevent damage to the bushings. If the inner surface of bushing is damaged, it must be replaced.

Fig. 4-38



- B. Position the swing arm between the spider bosses with a thrust washer on each side of the arm. Slide the pin into position leaving enough room at either end of the pin to install the new snap rings.

NOTE: The thrust washers must be installed with the metal side of the washer next to the swing arm.

- C. Apply LOCTITE 609 or Perma-Lok HL138 to the threads of the set screw; then install the set screw making sure the groove in the pin is aligned with the set screw.

● CAUTION ●

The groove in the pin must align with the set screw.

Fig. 4-39



AA050

- D. Using a good snap-ring pliers, install the new snap rings. Be sure the snap rings are seated in the pin groove.

Fig. 4-40



- E. Slide a metal bushing into each roller and position a thrust washer on each side with the bearing surface of the washer facing the roller. Insert the roller assembly between the arm.

Fig. 4-41



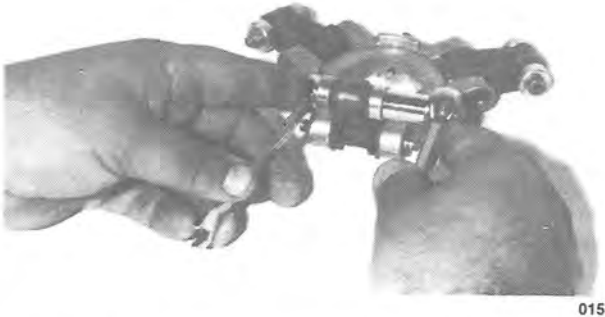
021

- F. Slide a weight onto the bolt; then push the bolt w/weight through the roller arm and roller assembly. Install the remaining weight and self locking nut.

NOTE: The heads of the 3 bolts must all be positioned from the right side of the roller arm. If this isn't done, the clutch will be out of balance.

- G. Tighten the lock nut to 0.4-0.5 kg-m (35-45 in.-lb). Apply LOCTITE LOCK N' SEAL to the threads of the bolt before installing nut. Perform steps B-G to the remaining two roller assemblies.

Fig. 4-42



015

4. Slide the spider assembly onto the hex shaft with the split ring retainers directed up. Make sure lines made during disassembly are aligned.

Fig. 4-43



A973

5. Install the split ring halves in the groove of the hex shaft.

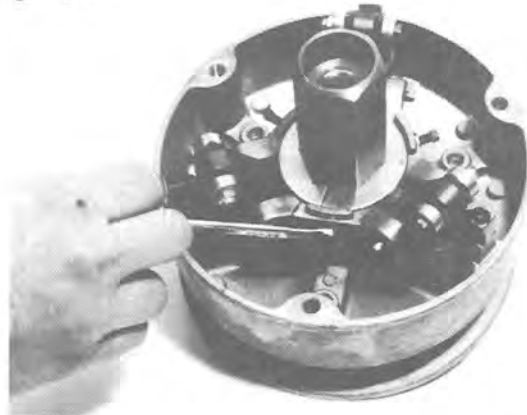
Fig. 4-44



A972

6. Pull the spider up against the split ring halves; then tighten the set screws. Lock the set screws by bottoming the jam nuts.

Fig. 4-45



A971

NOTE: To ensure that the set screws seat properly, tighten, then back out 1/4 turn, and tighten again.

7. Slide the cup washer and spring onto the hex shaft.

Fig. 4-46



A969

8. Place the housing on the spring and align the balance marks with those on the stationary and movable sheaves.

Fig. 4-47



9. Push down the housing and lift up the movable sheave until contact is made; then install the three socket-head cap screws. Be sure to use care when installing housing so the Duralon bushing is not damaged. Tighten and then torque the screws to 2.1-2.4 kg-m (15-17 ft-lb).

Fig. 4-48



INSTALLING

1. Place the drive clutch into position on the crankshaft.
2. Install the bolt and lock washer. Tighten the bolt to 7.6-8.3 kg-m (55-60 ft-lb).

Fig. 4-49



3. Check alignment between the drive clutch and driven pulley.
4. Install the drive belt and secure the clutch shield.
5. Install plug in the belly pan.

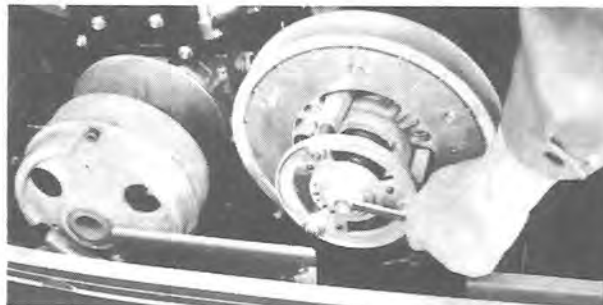
Driven Pulley

Specifications	Jag 340	Super Jag Jag 440	Panther
Cam Angle	48-44°	49°	51°
Spring Color	Black	Black	Yellow
Adjustment Hole Position	3rd	3rd	3rd

REMOVING

1. Open the clutch shield.
2. Remove the drive belt.
3. Remove the cap-lock screw and washer; then account for and note the position of any alignment washers.

Fig. 4-50



4. Slide the driven pulley off the driven shaft; then remove pulley from the engine compartment. Remove the stub shaft from the driven pulley.

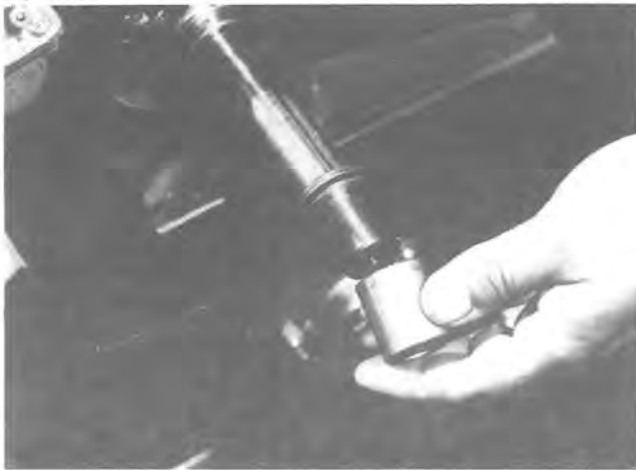
Fig. 4-51



B453

5. Remove the key, alignment washers, and spacer from the driven shaft.

Fig. 4-52



DISASSEMBLING

1. Scribe a line across all driven pulley components to ensure correct assembly and pulley balance.

Fig. 4-53



B454

2. Place the driven pulley on a work fixture so the retainer bracket is directed upward.

Fig. 4-54



B455

NOTE: To aid in driven pulley servicing, use a roll of duct tape as a work fixture. The work fixture will increase stability of the pulley and decrease the spring tension during the repair procedure.

3. Remove the three lock nuts securing the retainer bracket; then carefully slide the retainer bracket off the stationary shaft allowing the spring to release tension.

Fig. 4-55



B456

4. Remove the spring.

Fig. 4-56



B458

5. Slide the movable sheave off the stationary shaft; then remove the washers located between the sheaves.

Fig. 4-57



B459

Fig. 4-58



B460

6. Remove the three cap-socket screws and lock washers securing the torque bracket to the stationary sheave; then remove torque bracket. Account for the spacer found under the torque bracket on Jag 340.

Fig. 4-59



B463

7. Using a pliers, remove the buttons from the retainer bracket.

Fig. 4-60



B464

CLEANING

1. Using parts-cleaning solvent, wash grease, drive belt dust, and foreign matter off all parts.

CAUTION

Do not use steel or a wire brush to clean driven pulley components. A wire brush or steel wool will cause the sheaves to be gouged (thus, the drive belt may not slide properly between sheaves) and decreased performance and possible accelerated drive belt wear will result.

INSPECTING

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

1. Inspect the buttons for damage, cracks or wear.
2. Inspect the sheaves for any gouges, cracks, or other damage. Also inspect threaded areas of sheaves for damaged or stripped threads.
3. Inspect the torque bracket for cracks or damage. The ramp portions of the bracket must be free of gouges and damage. Minor scratches may be repaired using #320 grit wet-or-dry sandpaper.

Fig. 4-61



B465

4. Inspect spring for distortion, crystallization, or breaks.
5. Inspect the retainer bracket and spring mounting holes for cracks, damage, or wear.
6. Inspect the retainer bracket and movable sheave bearings for wear. For each respective bearing, measure the outside diameter of the sheave shaft and the inside diameter of the sheave bearings. Compare the readings. Clearance between the shaft and the respective bearing must not exceed 0.5 mm (0.020 in.). If the clearance exceeds the specification, the bearing must be replaced.

Fig. 4-62



B466

Fig. 4-63



BEARINGS

Removing

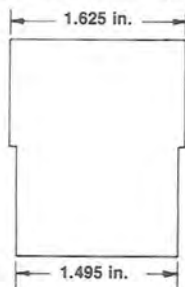
To remove driven pulley bearings, use the following procedure:

NOTE: To remove the movable sheave bearing, heat must be applied around the bearing.

1. Place the movable sheave or retainer bracket flat on a press.
2. Using an appropriately sized bearing driver, press the bearing out.

Fig. 4-64

Bearing Driver Diameter Specifications



0726-821

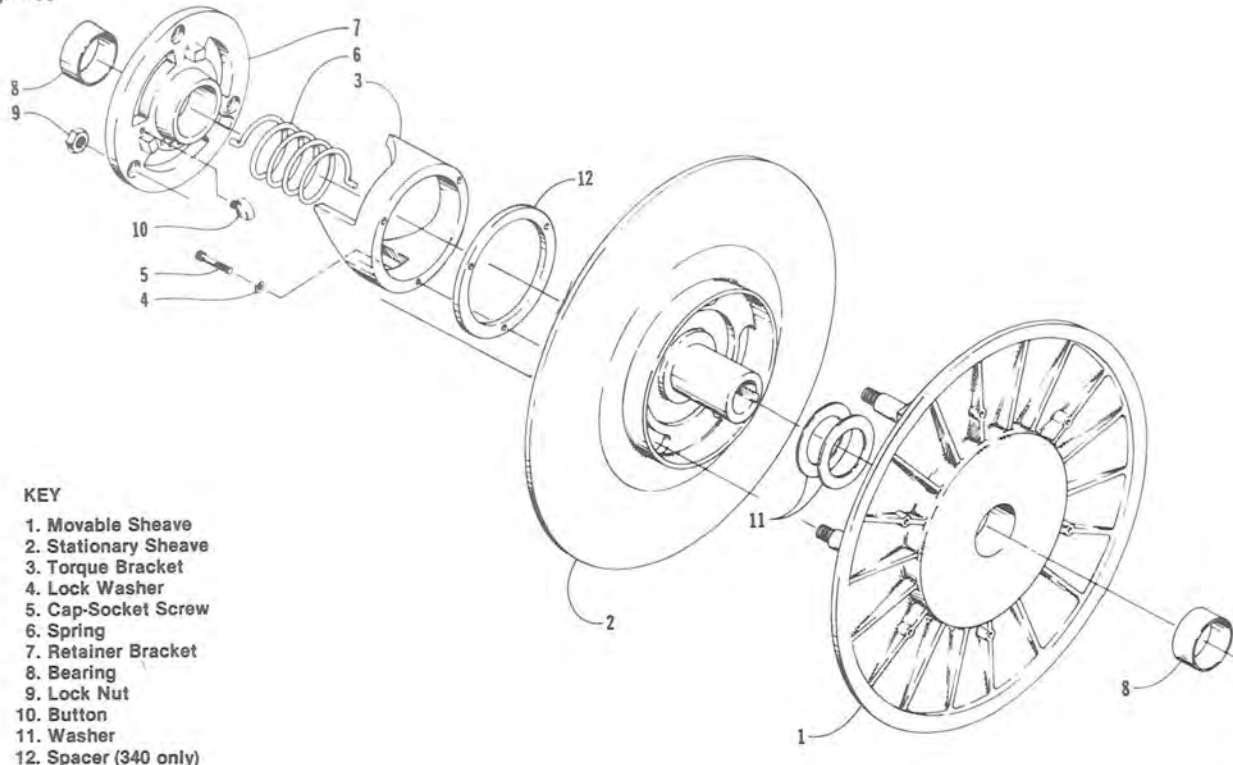
Installing

NOTE: Before installing the bearing, apply **LOCTITE STUD N' BEARING MOUNT** to the outside face of the bearing.

1. Place the movable sheave or retainer bracket flat on a press.
2. Using an appropriately sized bearing driver, press the bearing into position. The bearing must be flush with both sides of the bearing boss.
3. Wipe off excess LOCTITE.

ASSEMBLING

Fig. 4-65



KEY

- 1. Movable Sheave
- 2. Stationary Sheave
- 3. Torque Bracket
- 4. Lock Washer
- 5. Cap-Socket Screw
- 6. Spring
- 7. Retainer Bracket
- 8. Bearing
- 9. Lock Nut
- 10. Button
- 11. Washer
- 12. Spacer (340 only)

0727-385

1. Install the buttons in retainer bracket.
2. Place the torque bracket into position on the stationary sheave (and either align scribed line made during disassembly or make sure the degree number on the torque bracket aligns with the part number on the stationary sheave). Install the three cap-socket screws and lock washers. DO NOT tighten at this time.

NOTE: On the Jag 340, be sure to position the spacer beneath the torque bracket.

Fig. 4-66



A1001

3. Place the washers on the stationary sheave shaft.

Fig. 4-67



B460

4. Align the scribed line made during disassembly; then slide movable sheave onto the stationary sheave shaft.

Fig. 4-68



B459

5. Place the sheaves on a work fixture (roll of duct tape, etc.).
6. Place the spring over the stationary sheave hub and hook the turned down end of the spring into the hole in the casting of the stationary sheave.

Fig. 4-69



B458

7. Place the retainer bracket over the spring and hook the turned up end of the spring in the 3rd hole (standard spring tension) of the bracket.
8. While holding the sheaves from rotating, grasp the retainer bracket and rotate it approximately 120° clockwise until the mounting holes align; then push retainer bracket into position and install the three lock nuts. Tighten the lock nuts to 1.5-1.8 kg-m (11-13 ft-lb).

NOTE: The line made during disassembly should be aligned.

Fig. 4-70



B457

9. Rotate the movable sheave to ensure movement without binding.
10. Rotate the torque bracket until it is tight against the 3 buttons; then using a long hex wrench, tighten the three cap-socket screws securing the torque bracket.

Fig. 4-71

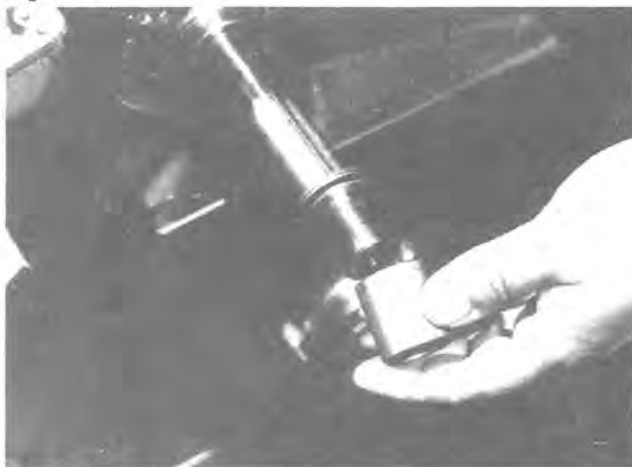


AI003

INSTALLING

1. Install the alignment washers that were removed.
2. Slide the driven shaft spacer onto the end of the driven shaft.

Fig. 4-72



3. Install the key in the driven shaft keyway; then place the stub shaft into the driven pulley.

Fig. 4-73



B453

NOTE: A small amount of LOCTITE ANTI-SEIZE COMPOUND applied to the driven shaft will aid in future driven pulley removal.

4. Place the driven pulley into position on the driven shaft.

5. Install any alignment washers removed; then secure the driven pulley with a cap-lock screw and washer. Tighten the cap-lock screw to 2.6-3.3 kg-m (19-24 ft-lb).

Fig. 4-74



6. Check drive clutch/driven pulley alignment; adjust as necessary.
7. Install the drive belt; then secure the clutch shield.

Drive Clutch/ Driven Pulley

CHECKING PARALLELISM/OFFSET

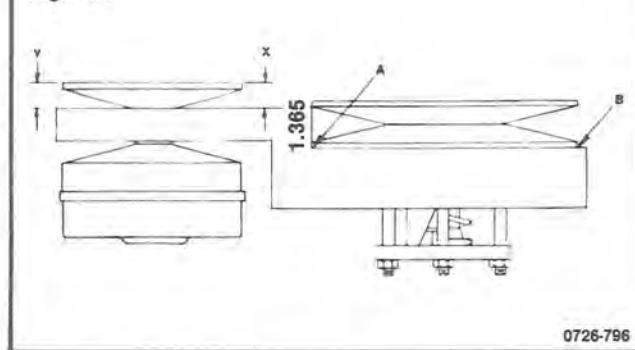
If premature drive belt failure is experienced or if the drive belt turns over, parallelism/offset must be checked. Also, parallelism/offset must be checked whenever either the drive clutch or driven pulley is serviced. To check the parallelism/offset, use the following procedure:

1. Open the clutch shield and remove the drive belt.
2. Install the Clutch Alignment Bar between the drive clutch sheaves and against the outside edge of the driven pulley stationary sheave.
3. Allow the alignment bar to rest on the drive clutch shaft.

NOTE: The alignment bar must extend beyond the front edge of the drive clutch.

4. With the bar against the outside edge of the driven pulley stationary sheave at points A and B, the bar should just clear the inside edge of the stationary sheave of the drive clutch and rest on the stationary shaft. If the bar will not either clear the inside edge or is more than 1.5 mm (0.060 in.) from the inside edge, the offset needs to be adjusted.

Fig. 4-75



5. Check parallelism of the drive clutch/driven pulley using the alignment bar and reference points X and Y with the alignment bar against the driven pulley at points A and B. Using a calipers or a machinist's scale, measure X and Y from the back side of the alignment bar. Measurements X and Y must be equal or measurement Y must be more than measurement X but must not exceed measurement X by more than 1.6 mm (0.062 in.).

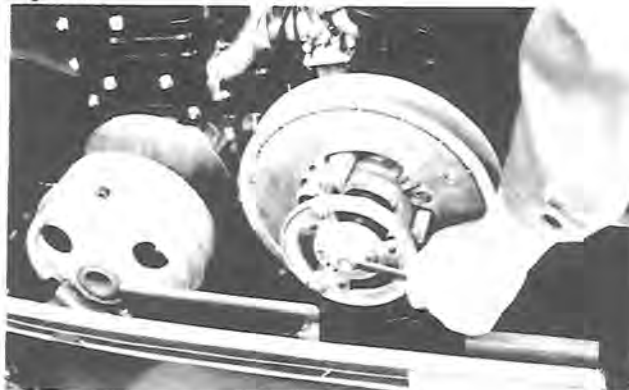
NOTE: The offset must be correct before checking parallelism.

6. If either the offset or parallelism is other than specified, proceed to Correcting Parallelism/Offset.

CORRECTING PARALLELISM/OFFSET

1. To correct offset, the driven pulley must be moved laterally on the driven shaft. Remove the cap-lock screw and washers securing the driven pulley; then remove the driven pulley.

Fig. 4-76



2. To move the driven pulley inward on the shaft, remove spacer and washer(s) as required. Be sure to install the spacer before installing the driven pulley.

Fig. 4-77

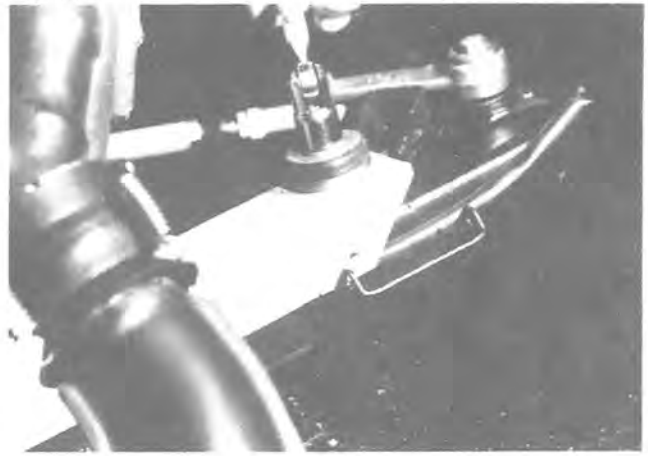


3. To move the driven pulley outward on the shaft, add additional alignment washer(s) behind the driven shaft spacer.

NOTE: When the correct offset is attained, use the large and small alignment washers to correctly position the driven pulley on the driven shaft. Arrange washers to allow the least amount of "float" on the driven shaft. A maximum of one washer thickness "float" is allowable.

4. Install driven pulley and secure with a cap-lock screw and washers. Tighten screw to 2.6-3.3 kg-m (19-24 ft-lb).
5. To correct parallelism, minor adjustments can be made by shimming the rear motor mounts or by moving the engine on the engine plate.
6. Loosen the two front cap-lock screws securing the angle support to the front motor mounts.

Fig. 4-78



7. Loosen the two rear cap-lock screws securing the engine plate to the motor mounts.

Fig. 4-79

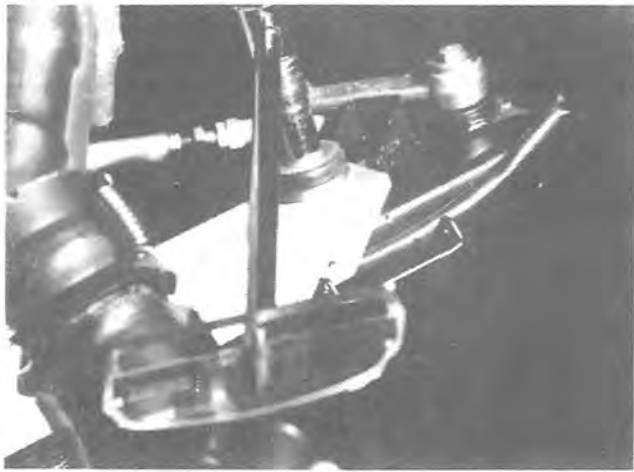


8. If measurement Y is less than or equal to measurement X, insert a shim between the left rear motor mount and the front end.

NOTE: Shims can be made by slotting an appropriately sized flat washer.

9. If measurement Y exceeds measurement X by more than 1.6 mm (0.062 in.), insert a shim between the right rear motor mount and the front end.
10. In order, tighten the rear motor mount cap-lock screws and the front motor mount cap-lock screws to 3.2 kg-m (23 ft-lb).

Fig. 4-80



11. Check both offset and parallelism to ensure accuracy and make further adjustments as necessary.
12. Install the drive belt and secure the clutch shield.

Drive Train

DISASSEMBLING

1. On the Panther, remove the pulse charger from the engine compartment. Account for the 5 springs.

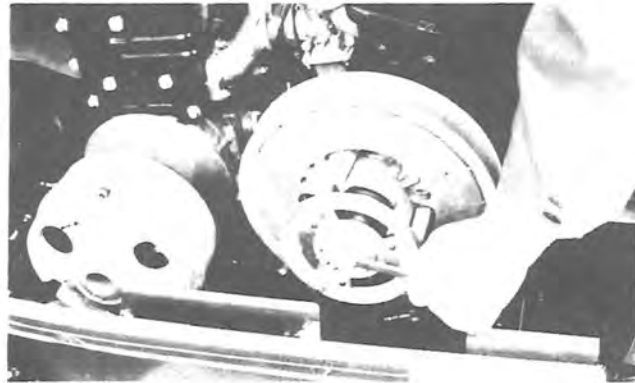
Fig. 4-81



2. Open the clutch shield and remove the drive belt.

3. Remove the cap-lock screw and washer securing the driven pulley; then account for and note the position of any alignment washers.

Fig. 4-82



4. Slide the driven pulley off the driven shaft; then remove driven pulley from the engine compartment. Remove the key, alignment washers, and spacer from the driven shaft. Account for the stub shaft.
5. Remove the four bolts and lock washers securing chain-case cover, remove the cover and seal, and allow the lubricant to flow onto rags placed in the belly pan.

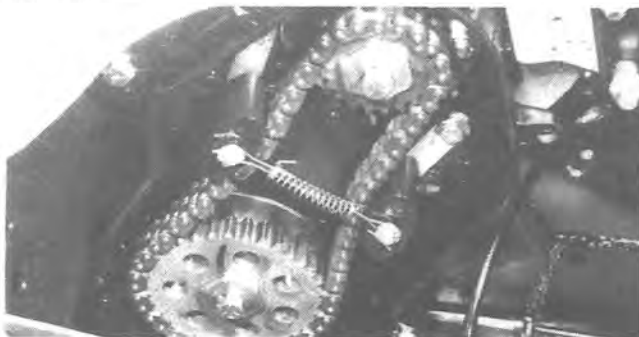
Fig. 4-83



B474

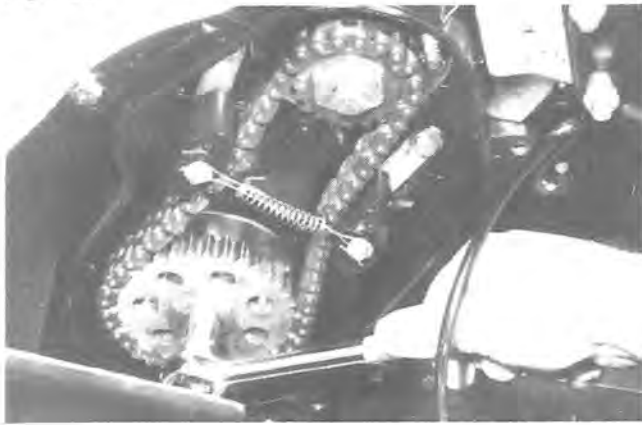
6. Remove cotter pins and washers securing tensioner spring to the link pins; then remove spring and pads.

Fig. 4-84



7. Remove the cap-lock screws and washers securing both top and bottom sprockets.

Fig. 4-85



8. Slide both sprockets w/chain off the shafts.

NOTE: If a sprocket will not slide off a shaft, thread cap-lock screw back into the shaft; then use a puller to loosen the sprocket. The cap-lock screw is used for bottoming the puller bolt.

9. Remove the six lock nuts and bolts securing the upper and lower MAG-side flange plates. Remove flange plates, seals, and upper bearing.

NOTE: It may be necessary to use heat to loosen the LOCTITE securing the bearing to the driven shaft. If heat is used, examine the bearing seal for any damage before installation.

Fig. 4-86



B090

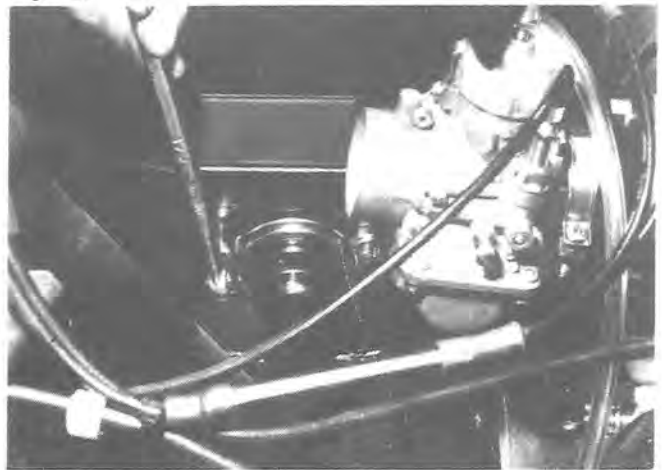
10. Loosen the set screw on the PTO-side driveshaft collar. Drive the collar clockwise (opposite shaft rotation) until it is free.

NOTE: A fine file should be used to remove any burrs left by the collar set screw.

11. Remove the three lock nuts and bolts securing the PTO-side driven shaft flange plates.

NOTE: It is necessary to use an extension and universal joint to remove the rear lock nut from upper flange plate.

Fig. 4-87



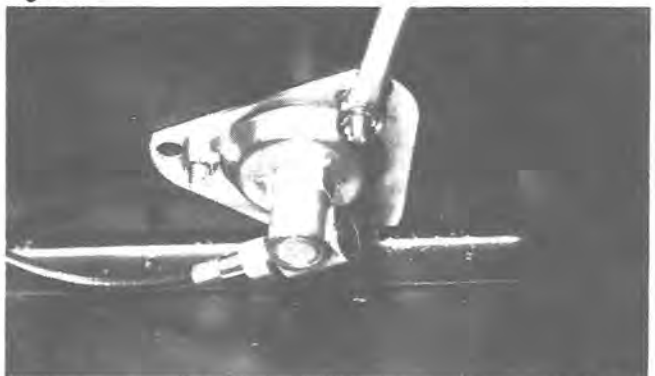
12. Force the driven shaft toward the PTO-side (rotating the shaft to prevent the brake disc from binding on the shaft) until brake disc is free. Account for the two keys.

13. Continue to slide the driven shaft until it is out of the PTO side. Account for a bearing, two flange plates, and the PTO-side driveshaft collar.

14. Remove the skid frame from the tunnel (see Track/Suspension—Removing Skid Frame section).

15. On all models except the Jag 340, remove the three PTO-side lock nuts and bolts securing the driveshaft-bearing flange plates and drive adaptor. Remove drive adaptor and cable.

Fig. 4-88



B475

16. Tap the driveshaft toward the chain case to unseat MAG-side bearing. Remove bearing.

17. Slide the driveshaft toward the MAG side until the PTO end of the driveshaft is out of its mounting hole. Tilt the end of the driveshaft away from the tunnel and slide the driveshaft free of the tunnel. Remove track.

Fig. 4-89



B096

18. Scribe a line on the driveshaft along the edge of the bearing and each sprocket to aid in assembly. Loosen the set screw on the collar, drive the collar clockwise until free, and remove the bearing and flange plates from the driveshaft.
19. Press the three sprockets off the driveshaft.
20. Remove the six socket-head cap screws and lock nuts securing the brake disc to the hub; then separate disc and hub.

Fig. 4-90



B193

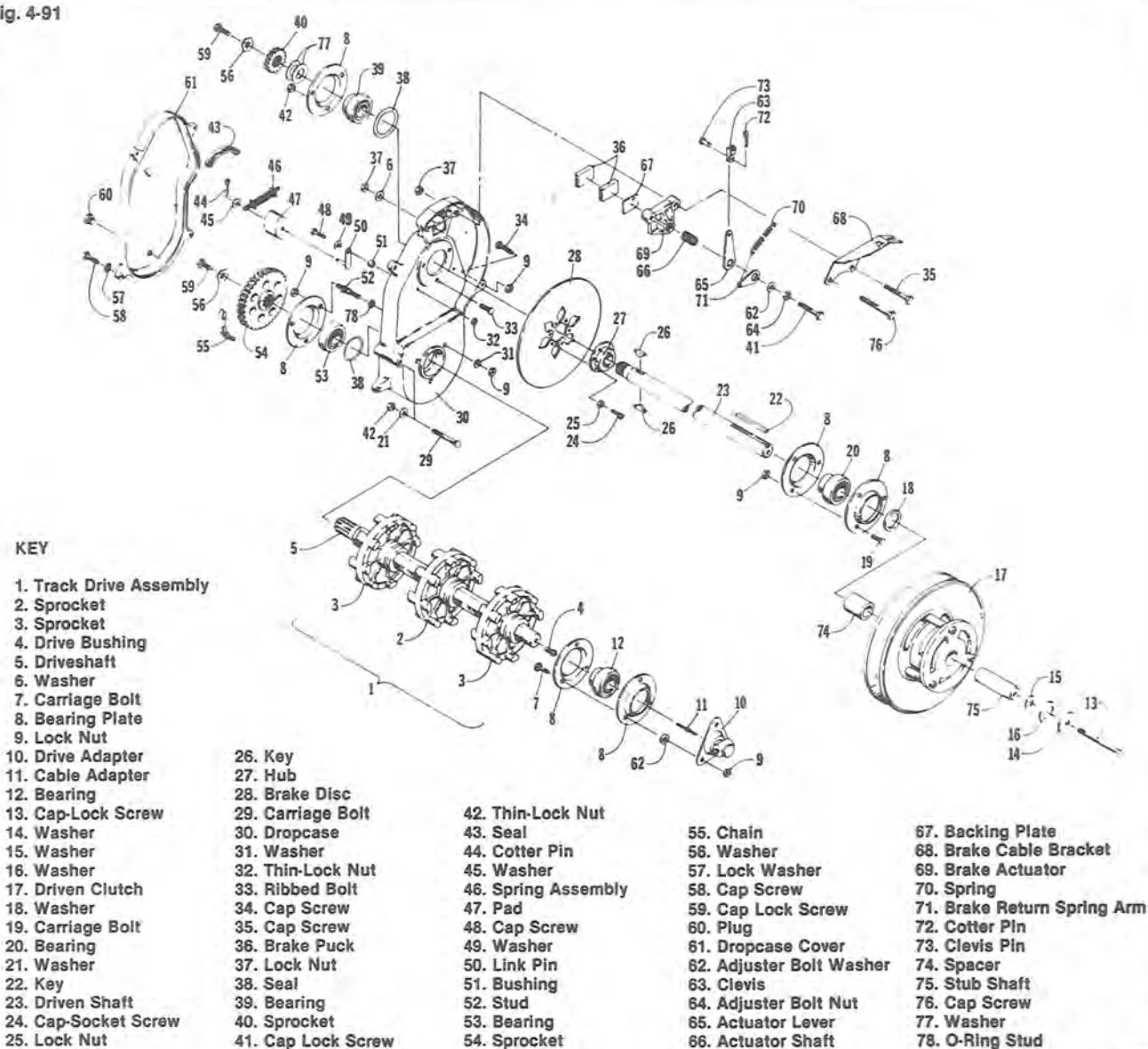
2. Wash all non-metallic components with soap and water.
3. Inspect driveshaft and driven shaft for damaged splines or stripped threads.
4. Inspect bearings for any roughness or damage.
5. Inspect seals for any breaks or damage.
6. Inspect the track for cuts, gouges, or wear.
7. Inspect the keyways in the driven shaft and the brake hub for wear or damage.
8. Inspect the brake disc for wear or cracks.
9. Inspect chain, sprockets, and chain tensioner components for wear or damage.
10. Inspect the track drive sprockets for wear or damage.

CLEANING AND INSPECTING

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

1. Thoroughly wash all metallic components in parts-cleaning solvent. Dry using compressed air.

Fig. 4-91



0727-350

1. Secure the hub to the brake disc with the six socket-head cap screws and lock nuts. Tighten lock nuts to 0.4 kg-m (36 in.-lb).

Fig. 4-92



2. Press the sprockets on the driveshaft noting the timing marks on the sprockets and the scribed lines for proper sprocket placement; then assemble the driveshaft components (flange plates, bearing, and collar). Do not tighten the collar at this time. Place track into position.

NOTE: Make sure all sprockets are installed correctly ensuring correct timing of both the center and outer sprockets. The bearing is positioned between the flange plates. Sprockets are marked with the letter "T" on one drive tooth for timing purposes.

3. Lift track and driveshaft assembly into position; then push splined end of driveshaft through its mounting hole in chain case.

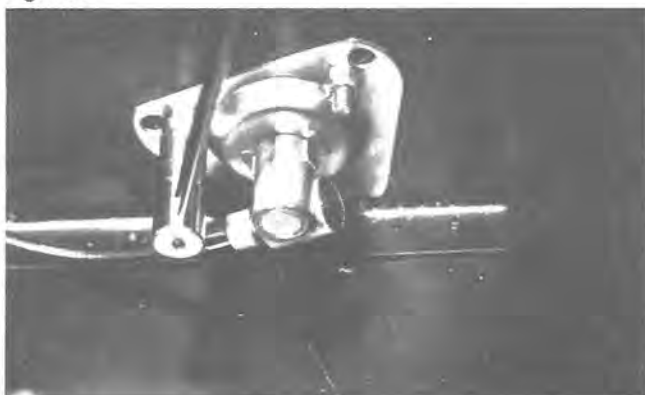
Fig. 4-93



B096

4. Swing PTO end of driveshaft up; then align holes in the flange plates with holes in tunnel. On all models except the Jag 340, place the cable and drive adaptor into position.
5. Insert three bolts from the inside of the tunnel through flange plates, tunnel, and drive adaptor. Secure with three lock nuts. Tighten to 2.2-2.5 kg-m (16-18 ft-lb).

Fig. 4-94

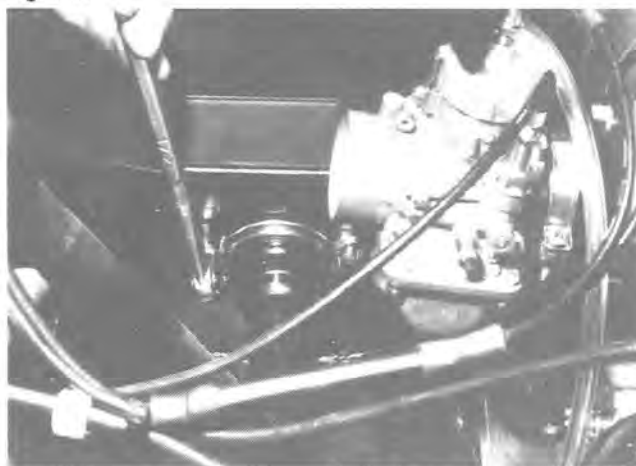


B476

6. Slide MAG-side bearing onto driveshaft (inner race flange must be positioned toward drive chain); then install seal and flange plate. Secure with three bolts and lock nuts. Tighten to 2.2-2.5 kg-m (16-18 ft-lb).
7. Place the lower sprocket onto splines. Secure with a cap-lock screw (coated with LOCTITE LOCK N' SEAL) and pyramidal-tooth washer. Tighten to 2.2-2.5 kg-m (16-18 ft-lb).
8. Place the splined end of the driven shaft through the bearing support. Next, install the two brake disc keys in the shaft keyways.
9. Position the brake disc between the brake pucks and slide the shaft with keys through the disc hub. (see Fig. 4-91).

10. On the PTO-side, install the lock collar, flange plate, bearing and flange plate. Secure with three carriage bolts and lock nuts. Tighten to 2.2-2.5 kg-m (16-18 ft-lb).

Fig. 4-95



11. On the MAG-side of the driven shaft, apply Scotch-Bond Adhesive 4174 to the bearing seating area adjacent to the shaft splines. Install the bearing, seal, and flange plate and secure with three bolts and lock nuts. Tighten to 2.2-2.5 kg-m (16-18 ft-lb).
12. Loop the chain around the lower sprocket and slide the upper sprocket w/chain onto the driven shaft. Secure upper sprocket with a cap-lock screw (coated with LOCTITE LOCK N' SEAL) and pyramidal-tooth washer. Tighten sprocket to 2.6-3.3 kg-m (19-24 ft-lb). On PTO-side bearing, drive the driven shaft bearing collar in the direction of rotation to lock bearing; then tighten set screw.

Fig. 4-96



AF006

13. Tip machine on its side and swing the track from the tunnel. On the PTO-side of the track driveshaft, slide the lock collar onto the bearing; then using a drift punch, drive the collar in the direction of rotation until tight. Tighten the set screw.

Fig. 4-97



B477

14. Install the skid frame (see Track/Suspension—Installing Skid Frame section.).
15. Check alignment of the sprockets using the following procedure:
 - a. Place a straightedge against the faces of the sprockets.
 - b. Using a feeler gauge, check for clearance along the faces of both sprockets. If clearance exceeds 0.8 mm (0.030 in.), shimming is necessary.

Fig. 4-98

0.8 mm
(0.030 in.)



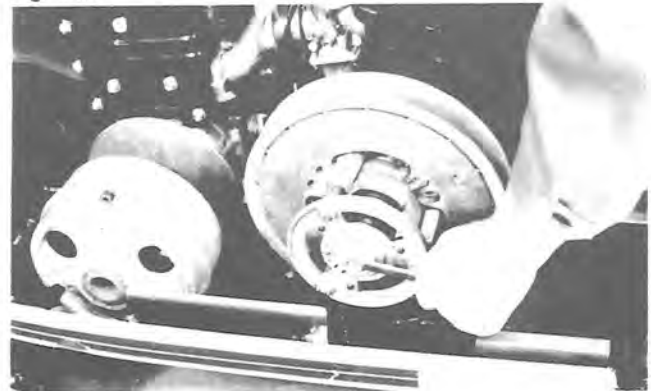
0725-171

NOTE: Sprockets can only be shimmed out.

16. Apply a light coat of grease or LOCTITE ANTI-SEIZE COMPOUND to the driven shaft; then install the driven shaft alignment washers (as required), spacer, and key. Install the driven pulley w/stub shaft, alignment washers (as required), washer, and cap-lock screw. Tighten cap-lock screw to 2.6-3.3 kg-m (19-24 ft-lb).

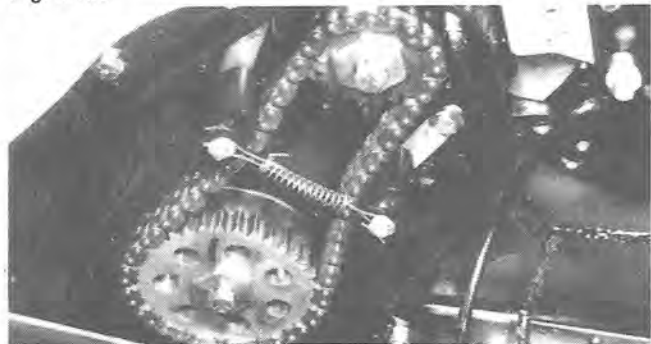
NOTE: Make sure keyways match when installing driven pulley. Arrange washers to allow the least amount of "float" on the driven shaft. A maximum of 1.5 mm (0.060 in.) "float" is allowable.

Fig. 4-99



17. Check alignment of the drive clutch/driven pulley.
18. Tip the snowmobile onto the PTO side using cardboard to prevent scratching the belly pan; then install the pads and spring and secure with two washers and cotter pins.

Fig. 4-100



19. Pour 236 ml (8 fl oz) of Chainlube into the chain case.
20. Place chain-case cover seal and chain-case cover into position and secure with four bolts and lock washers.

Fig. 4-101



B474

21. Install drive belt and secure the clutch shield.
22. On the Panther, install the pulse charger and secure with the springs.

Fig. 4-102



NOTE: Apply RTV 732 to the ball joints of the exhaust system.

Brake System

REMOVING

1. Remove the two cap screws and lock nuts securing the brake caliper assembly from the chain case, account for a flat washer (where oil tank is mounted).

Fig. 4-103



NOTE: Stationary brake puck should remain in position unless replacement is necessary.

2. Loosen the brake cable flange nut; then slide cable free of bracket.

Fig. 4-104



3. Remove the spring.

Fig. 4-105



4. Remove the cotter key securing brake cable clevis; then remove clevis pin accounting for clevis. Disconnect cable from clevis.

Fig. 4-106



DISASSEMBLING

1. Remove the movable puck and plate from the caliper assembly.

Fig. 4-107



2. Remove the spiral w/actuator lever and spring actuator lever from the caliper assembly.

Fig. 4-108



3. Remove the adjusting bolt w/jam nut and washer from the spiral; remove the jam nut and account for two actuator levers.

Fig. 4-109



CLEANING AND INSPECTING

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

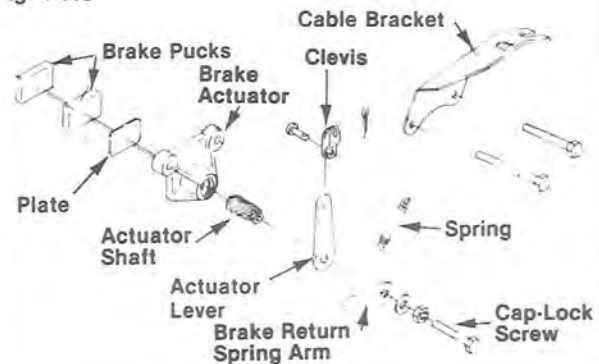
1. Wash all brake components with parts-cleaning solvent and dry thoroughly.

2. Inspect all brake components for signs of wear, fatigue, cracks, or stripped threads.
3. Inspect the spring for cracks, stretching, or unusual bends.
4. Inspect the brake pucks for wear. Pucks must be at least 6.2 mm (0.245 in.) in width.

NOTE: When replacing brake pucks, replace both pucks as a set.

ASSEMBLING

Fig. 4-110



1. Install the stationary brake puck on the chain case using LOCTITE SUPERBONDER ADHESIVE or equivalent.
2. On the adjusting bolt, install the jam nut and washer.
3. Thread the spiral into the caliper assembly until it becomes flush with puck plate contact point; then place actuator lever and spring lever on to the spiral.

NOTE: Actuator levers must be positioned so proper spring tension and cable length are attained.

Fig. 4-111



4. Thread the adjusting bolt assembly into the spiral until the end of the bolt is flush with the end of the spiral.
5. Finger tighten jam nut against flat washer.
6. In caliper assembly, install the plate and movable brake puck.

Fig. 4-112



INSTALLING

1. Place the clevis onto the end of the brake cable; then place the clevis into position on the actuator lever and secure with a clevis pin and cotter key.

● CAUTION ●
Make sure clevis has free movement.

2. Position the brake cable onto the cable bracket so a flange nut is positioned on each side of the bracket. Tighten the jam nuts securely making sure they are centered on the brake cable end.

Fig. 4-113



3. Connect the return spring to the cable bracket and to the spring actuator lever.

4. Place the brake assembly and cable bracket into position on the chain case. Secure spacers and bracket with two cap screws and lock nuts; tighten lock nuts to 3.2 kg-m (23 ft-lb).

Fig. 4-114



NOTE: The forward cap screw is slightly longer. Secure the oil tank bracket with the forward cap screw. The washer is positioned on the outside of the oil tank bracket.

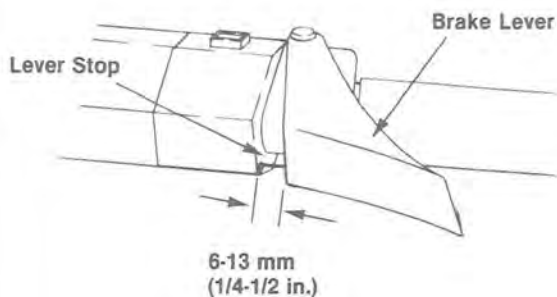
5. Check and adjust brake lever travel.

BRAKE LEVER TRAVEL

! WARNING !
Make all brake lever travel adjustments with the adjusting bolt only!

1. Rotate the brake disc alternately forward and backward while slowly compressing the brake lever.
2. At the point where the disc is locked, check the distance between the brake lever and the lever stop. The distance must be within a range of 6-13 mm (1/4-1/2 in.).

Fig. 4-115



0726-099

3. To decrease brake lever travel (set up the brake), loosen the adjusting bolt jam nut; then tighten the adjusting bolt and check brake lever travel distance periodically until correct travel distance is attained.

Fig. 4-116



● CAUTION ●

Do not attempt to adjust the brake with the flange nuts on the brake cable bracket. Incorrect brake adjustment may occur causing possible brake failure.

4. To increase brake lever travel (loosen the brake), loosen the adjusting bolt jam nut; then loosen the adjusting bolt and check brake lever travel distance periodically until correct travel distance is attained.
5. Tighten the jam nut after adjustment is completed.

NOTE: When the adjusting bolt threads bottom on the jam nut, both brake pucks must be replaced.

SECTION 5 — ELECTRICAL SYSTEM

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Electrical Specifications

DESCRIPTION	TEST VALUE	TEST CONNECTIONS	
	RESISTANCE TEST	+	-
Ignition Coil Primary	0.22 ohm $\pm$ 15%	white/blue	black/white
Secondary	5850 ohms $\pm$ 20%	high tension lead	high tension lead
Charge Coil	160 ohms $\pm$ 20%	red/white	black/white
Trigger Coil	17 ohms $\pm$ 20%	red/white	black/red
Lighting Coil	0.22 ohm $\pm$ 20%	yellow	yellow
Spark-Plug Cap	5000 ohms $\pm$ 20%	cap	cap
DESCRIPTION	Output Test*	+	-
Ignition Coil	80 HIGH	high tension lead	ground
CDI Unit	75 HIGH	white/blue	black/white
Charge Coil	38 HIGH	red/white	black/white
Trigger Coil	85 LOW	red/white	black/red
Lighting Coil	80 LOW	yellow	yellow
DESCRIPTION	JAG 340	JAG 440-SUPER JAG	PANTHER
Lighting Coil Output	12V/150W	12V/150W	12V/150W
Spark Plug	NGKBR8ES	NGKBR9ES	NGKBR9ES
Spark-Plug Gap	0.7 mm (0.028 in.)	0.7 mm (0.028 in.)	0.7 mm (0.028 in.)
Ignition Timing**	18° BTDC @ 6000 RPM	18° BTDC @ 6000 RPM	18° BTDC @ 6000 RPM
	1.860 mm (0.073 in.)	2.032 mm (0.080 in.)	2.032 mm (0.080 in.)

*With CDI Model 1L Tester.

**Timing to be checked only with engine at normal operating temperature.

Testing Ignition System

The ignition system (KOKUSAN DENKI CDI) used is of the "closed" type. The "closed" ignition system offers a safety advantage to the consumer in that ignition is dependent on a complete circuit for its ground. If the circuit is broken (connection should lose contact or a connector should become pulled apart), ignition is lost and the engine will instantly stop.

The troubleshooting procedure for the standard "non-closed" ignition system cannot be used for the "closed" ignition system and the following procedure must be used.

1. Remove the spark plugs and visually check condition. Replace any fouled plug. Attach the spark plugs to the high tension leads and ground them on the cylinder heads.

Fig. 5-1



B167

NOTE: Make sure all switches are in the ON position.

CAUTION

Never crank the engine over without grounding the spark plugs. Damage to coils and/or CDI unit may result.

2. Crank the engine over quickly and check for spark. If no spark is present, check to make sure throttle cable is properly tensioned by compressing the throttle control. While holding the throttle control in this position, crank the engine over and check for spark. If spark is now present, adjust throttle-cable tension to remove slack from the cable. If no spark is present, proceed to step 3.
3. Disconnect the main wiring harness from the engine; then using a short piece of wire, jump the black and brown wires in the engine four wire plug. Crank the engine over. If spark is present, the problem is either one or more of the following:
 - a. Defective ignition switch.
 - b. Defective emergency stop switch.
 - c. Defective safety switches in throttle-control handle.
 - d. Corroded or loose wire connection at the throttle-control handle, ignition switch, or main wiring harness.

To check these possible causes, proceed to Testing Main Wiring and Safety Switches. If no spark is present, proceed to Testing Ignition Coil Output.

Testing Main Wiring and Safety Switches

1. Check wire connections at ignition switch and at the throttle-control handle for tightness and cleanliness. If connections appear dirty or corroded, clean with fine sandpaper and compressed air; then connect all wires and squeeze connections with a pliers for added tightness. Using an ohmmeter, connect one lead to the black wire in the main wiring harness. Connect the other ohmmeter lead to the brown wire in the harness.
2. With all switches in the ON position, the meter must read CLOSED.

3. If meter reads OPEN, disconnect the ignition switch and connect the ohmmeter leads to each of the probes on the back of the switch. If the meter reads OPEN (with switch in ON position), replace the switch. If the meter reads CLOSED, proceed to step 4.
4. Disconnect the connector from the throttle-control handle. Connect one ohmmeter lead to each of the two probes located on the front end of the throttle control. With the emergency stop switch, located on top of the control, in the ON (pulled-up) position, the meter must read CLOSED.

Fig. 5-2



5. Again, check to be sure throttle cable is properly tensioned by compressing the throttle lever and if needle goes from OPEN to CLOSED, throttle-cable slack must be removed. If the meter reads OPEN, replace the throttle control. If the meter reads CLOSED, the problem is in the main wiring harness; therefore, repair or replace the main wiring harness.

Testing Brakelight and Headlight Dimmer Switches

NOTE: On the Super Jag, disconnect the four prong plug and use the color codes listed in the chart on page 90 to test the switches. Removal of the handlebar pad is not necessary.

1. Cut cable ties and roll the handlebar pad forward exposing wires.
2. Disconnect the wire plug from the brake and headlight dimmer switches.
3. Beginning from the front, the four terminals correspond to the following chart:

Terminal	Corresponding Wire Color	Wire Usage
1	Yellow	Power Supply
2	Blue	Headlight - High Beam
3	White	Headlight - Low Beam
4	Red	Brakelight

4. To test the brakelight switch, connect one ohmmeter lead to the number 1 terminal; then connect the other lead to the number 4 terminal.

Fig. 5-3



B499

5. With the brake lever compressed, the meter must read CLOSED. With the brake lever released, the meter must read OPEN. If the meter does not read as specified, the brakelight switch is defective and must be replaced.
6. To test the headlight dimmer switch, use the tester connections indicated in the following chart. If the meter does not read as specified, the headlight dimmer switch is defective and must be replaced.

Position	Lead to Terminal	Lead to Terminal	Meter Reading
High Beam	1	2	CLOSED
High Beam	1	3	OPEN
Low Beam	1	2	OPEN
Low Beam	1	3	CLOSED

Fig. 5-4



B500

NOTE: If either the headlight dimmer switch or the brakelight switch is defective, the switch control must be replaced in its entirety.

Testing Ignition Coil Output

Before testing ignition coil output, after testing the main wiring harness and safety switches, all wiring harnesses must be connected. Also, check to be sure all switches (ignition switch and emergency stop switch) are in the ON position. Ignition coil output may be tested by using either one of the following procedures:

To test ignition coil output using the Electro-Specialties Model 1L Tester, use the following procedure:



WARNING



For safety purposes raise the rear of the snowmobile off the floor using a shielded safety stand.

1. Remove the resistor spark plug and the spark-plug cap from the MAG-side cylinder; then install an NGK B8EV plug with a non-resistor-type spark-plug cap (or a metal connector).
2. Connect the MM-1 adapter to the spark-plug wire. Attach the red tester lead to the engine.

● CAUTION ●

Spark plugs must be installed or damage to the coils and/or CDI unit may result.

3. Set the tester on 80 HIGH scale. Crank the engine over quickly. If the tester light illuminates, output is satisfactory. If the tester light fails to illuminate, proceed to Testing CDI Unit Output. Test 3 times for conclusive results.

To visually test ignition coil output, use the following procedure:

1. Remove the spark plugs from the cylinders; connect to the high tension leads and ground on the cylinder head(s).
2. Crank the engine over quickly and inspect for a bright blue spark. If a bright blue spark is present, ignition coil output is satisfactory. If no spark is present, proceed to Testing CDI Unit Output.

Testing CDI Unit Output

1. Disconnect the double-wire plug from the CDI unit to the ignition coil.
2. Using the wire adapter harness, connect the yellow tester lead to the white/blue lead in the double-wire plug; connect the red tester lead to the black/white lead in the double-wire plug.
3. Set the tester on 75 HIGH scale. Crank the engine over quickly. If the tester light illuminates, CDI unit output is satisfactory. This pinpoints the ignition coil, spark plugs, or spark-plug caps as being defective if ignition coil output was not satisfactory. Test 3 times for conclusive results. Before replacing the ignition coil (if the ignition coil seems to be the problem), make sure its connections are not corroded or loose. If the tester light fails to illuminate, proceed to Testing Charge Coil Output.

Testing Charge Coil Output

1. Disconnect the triple-wire plug from the CDI unit to the magneto.
2. Connect the red tester lead to the red/white wire in the triple-wire plug; connect the yellow tester lead to black/white lead.
3. Set the tester on 38 HIGH scale. Crank the engine over quickly. If the tester light illuminates, charge coil output is satisfactory; then proceed to Testing Trigger Coil Output. If the tester light fails to illuminate, replace the charge coil. Test 3 times for conclusive results.

Testing Trigger Coil Output

1. Disconnect the triple-wire plug from the CDI unit to the magneto; disconnect the single black wire outside the triple-wire plug.
2. Connect the red tester lead to the red/white wire in the triple-wire plug; using the wire adapter harness, connect the yellow tester lead to the black/red wire in the triple-wire plug.
3. Set the tester on 85 LOW scale. Crank the engine over quickly. If the tester light illuminates, trigger coil output is satisfactory. If the tester light fails to illuminate, replace the trigger coil. Test 3 times for conclusive results.

NOTE: If the trigger and charge coils tested out satisfactory but the tester light did not illuminate in the CDI Unit Output Test, replace the CDI unit.

Testing Lighting Coil Output

1. Disconnect the four-wire plug from the magneto.
2. Connect the red tester lead to one of the yellow wires; connect the yellow tester to the other yellow wire.
3. Set the tester on 80 LOW scale.
4. Crank the engine over quickly. If the test light illuminates, lighting coil output is satisfactory. Test 3 times for conclusive results.
5. If the tester light fails to illuminate, the lighting coil wires should be checked for breaks, corrosion, and looseness. If the connections are tight and free of corrosion, replace the lighting coil.

Testing Electrical Resistances

NOTE: Most resistance tests of the engine electrical components can be made using a multimeter.

Replace any component that does not have a test value within specifications.

IGNITION COIL (PRIMARY)

1. Disconnect the double-wire plug from the CDI unit to the ignition coil.
2. Set the selector on the X1 position; then touch the leads and zero the meter.
3. Connect one meter lead to the white/blue lead; connect the other meter lead to the black/white lead.

Fig. 5-5



4. Ignition coil primary resistance must be $0.22 \text{ ohm} \pm 15\%$.

IGNITION COIL (SECONDARY)

1. Remove the spark-plug caps from the high tension wires.
2. Set the selector on the X1K position; then touch the leads and zero the meter.
3. Connect one meter lead to each high tension wire.

Fig. 5-6



4. Ignition coil secondary resistance must be $5850 \text{ ohms} \pm 20\%$.

CHARGE COIL

1. Disconnect the triple-wire plug from the CDI unit to the magneto.
2. Set the selector on the X100 position; then touch the leads and zero the meter.
3. Connect one meter lead to the red/white lead; connect the other meter lead to the black/white lead.

Fig. 5-7

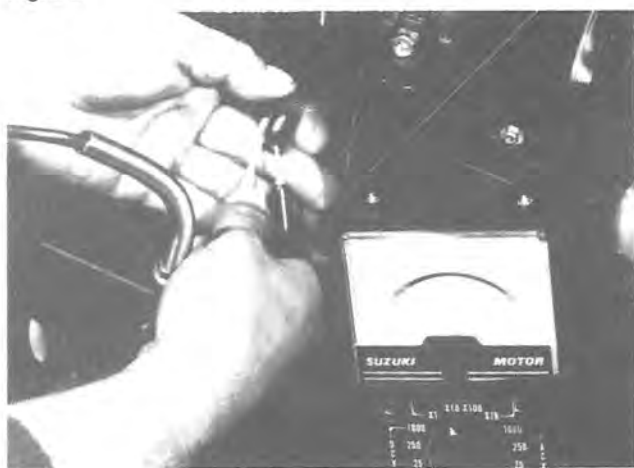


4. Charge coil resistance must be $160 \text{ ohms} \pm 20\%$.

TRIGGER COIL

1. Disconnect the triple-wire plug from the CDI unit to the magneto.
2. Set the selector on the X10 position; then touch the leads and zero the meter.
3. Connect one meter lead to the black/red lead; connect the other meter lead to the red/white lead.

Fig. 5-8



4. Trigger coil resistance must be $17 \text{ ohms} \pm 20\%$.

LIGHTING COIL

1. Disconnect the main wiring harness from the engine.
2. Set the selector on the X1 position; then touch the leads and zero the meter.

3. Connect one meter lead to a yellow lead; connect the other meter lead to the other yellow lead.

Fig. 5-9



4. Lighting coil resistance must be $0.22 \text{ ohm} \pm 20\%$.

SPARK-PLUG CAP

1. Remove spark-plug cap from high tension wire.
2. Set the selector on the X1K position; then touch the leads and zero the meter.
3. Connect one meter lead to one end of the cap; connect the other meter lead to the other end of the cap.

Fig. 5-10



B170

4. Spark-plug cap resistance must be $5000 \text{ ohms} \pm 20\%$.

Testing Low Oil Light Sending Unit

The low oil light sending unit is a magnetic switch. Its operation is based on a doughnut magnet located around the inside diameter of a 1/2 in. hole in a plastic float. The switch, located in the stem of the sending unit, is positioned through the hole in the float. When the float drops to the lower part of the stem, the magnet closes electrical contacts (located in the stem) allowing current to pass on to the light in the console.

If the sending unit should fail, it must be replaced. To test the sending unit, use the following procedure:

1. Remove the sending unit from the oil tank by twisting and pulling it upwards. Wipe oil from the sending unit with a cloth.
2. Unplug the sending unit wires from the wiring harness.
3. Using an ohmmeter, set the scale selector knob on X1K position.
4. Touch each of the meter leads to one of the two wires coming from the sending unit. With the sending unit in its normal position (float end down), the meter should read CLOSED.
5. If the meter reads OPEN, double check to make sure you have made good contact with each of the wires coming from the sending unit. If the meter still reads OPEN, replace the sending unit.
6. While maintaining contact between the meter leads and the sending unit, raise the float up. The meter must read OPEN. If the meter reads CLOSED, replace the sending unit.
7. If the sending unit tested out satisfactory, but the light in the console doesn't illuminate with only a small amount of oil in the oil tank, check the bulb in the console.
8. If the bulb is in good condition, you will need to check for voltage at the connection where the sending unit plugs into the wiring harness. Using a voltmeter set on the 50 ACV scale, start the engine and allow to idle. Touch the red lead of the voltmeter to the red wire in the two prong connector. Touch the black lead to the black lead in the wiring harness. At idle, the meter should read 5 to 6 volts (A.C.). If no voltage is present, but the

lights on the snowmobile operate normal, either check the wiring harness for a broken wire or replace the harness.

Checking Ignition Timing

NOTE: Procedures designated "A" are for the Jag 340, Jag 440, and Super Jag; procedures designated "B" are the for Panther.

NOTE: Engine timing is to only be checked after the engine has been run long enough to reach operating temperature. Run the engine 5 to 8 minutes at a fast idle in a well-ventilated area.

1. A. Remove the six screws and lock washers securing fan cover.
B. Remove the cap screws securing the fan belt cover.

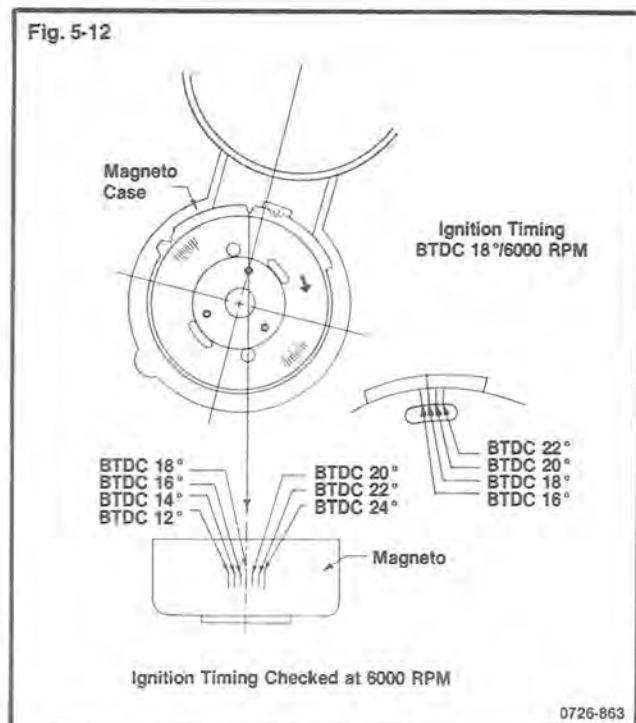
Fig. 5-11



2. Connect a timing light and tachometer to the MAG-side spark-plug lead.
3. Using a shielded safety stand, raise the rear of the snowmobile off the floor and start the engine and allow the engine to warm up to normal operating temperature. Gradually increase the engine speed to 6000 rpm; the pointer should align with the 18° BTDC timing mark on the flywheel.

NOTE: Check timing with the engine at normal operating temperature.

Fig. 5-12



4. If timing is not correct, adjust timing.

Adjusting Ignition Timing

1. Remove the recoil, starter pulley, and fan drive pulley.
2. Loosen the two screws securing the stator plate and rotate the stator plate in the proper direction to attain correct timing.

NOTE: Rotate the stator plate clockwise to retard the timing or counterclockwise to advance the timing. The stamped marks on the stator plate at the upper socket-head cap screw mounting hole are to be used for timing.

3. Tighten the screws securing the stator plate.
4. Install the fan drive pulley (making sure the fan belt is properly positioned), starter pulley, and the recoil.
5. Affirm timing for accuracy and adjust if necessary.

NOTE: Timing is to be checked on a hot engine. Timing will retard two degrees after the engine reaches normal engine operating temperature.

Testing Voltage Regulator

1. Using a shielded safety stand, raise the rear of the snowmobile off the floor.
2. Using a multitester, connect the red tester lead to a yellow lead and the black tester lead to a brown lead in the accessory harness connector.
3. Connect a tachometer to the engine to monitor rpm.
4. Set the selector on the 25 ACV position; then start the engine and allow it to idle. The meter must read 11-13 volts.
5. Increase engine speed to 2500-2700 rpm. The meter must read 11-13 volts. If the meter reads more than 13 volts, replace the voltage regulator.

Servicing Starter Motor

(Jag 340-Jag 440-Super Jag)

5

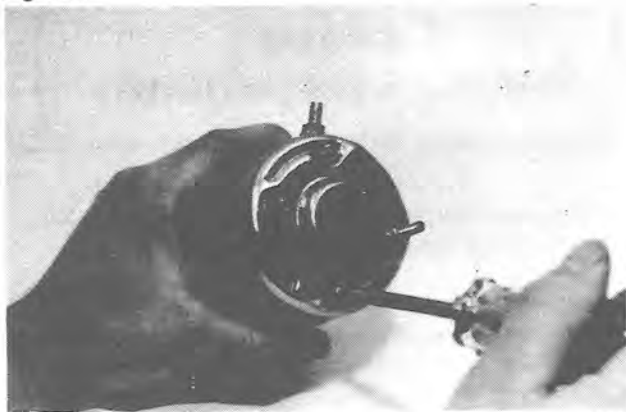
REMOVING

1. Disconnect the battery.
2. Remove the nut and lock washer securing the positive cable; then remove cable.
3. Remove the two bolts and lock washers securing front cover to the magneto case.
4. Remove the two bolts and lock washers securing starter-motor bracket to the crankcase; then remove the starter motor w/bracket.
5. Remove the two nuts and lock washers securing the bracket to the starter motor; then remove the bracket.

DISASSEMBLING

1. Remove the two screws and lock washers securing dust cover; then remove cover and gasket.

Fig. 5-13



B267

2. Remove the two long bolts and lock washers; then loosen the terminal nut.

Fig. 5-14



B268

3. Remove the E-ring and washer securing the armature shaft; then remove armature shaft assembly and rear cover.

Fig. 5-15



B269

● CAUTION ●

When removing the rear cover, make sure the terminal stays with the yoke as it is connected to the field magnets.

4. Slide the stopper down the shaft, remove the retaining ring, and remove the stopper and spring.
5. Remove the pinion assembly and front cover. Account for any washers.

Fig. 5-16



CLEANING AND INSPECTING

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

1. Thoroughly clean all components with a clean cloth and compressed air.
2. Inspect all threaded areas for damaged or stripped threads.
3. Inspect the brush holder assembly and brushes for damage or wear.

NOTE: Using a caliper, measure the length of the brushes. If any brush measurement is less than 7.5 mm (0.30 in.), replacement is necessary.

Fig. 5-17



E543

4. Inspect all wires for cracks, wear, or damage.
5. Inspect the commutator end of the armature for any burned spots or damage.

NOTE: If the commutator is only slightly burned or damaged, it may be repaired with #00 grit sandpaper. If it is severely burned or damaged, it may have to be turned down in a lathe.

CAUTION

DO NOT use emery cloth because metallic particles may become imbedded in the commutator.

6. Inspect the commutator end of the armature for buildup in the grooves. Buildup in the grooves may be removed by carefully undercutting the grooves with a properly-ground hacksaw blade.

Fig. 5-18



E544

7. Inspect the armature for damage, wear, or signs of contact with the field magnets.

8. Inspect the pinion assembly for damage or wear.
9. Inspect the armature for shorting. Use a multimeter and the following procedure:
 - a. Set the selector on the X1K position; then touch the leads and zero the meter.
 - b. Touch the black tester lead to the armature shaft.
 - c. Using the red tester lead, probe the commutator end of the armature. The meter indicator should not move. If the indicator moves, the armature is grounded and must be replaced.

Fig. 5-19



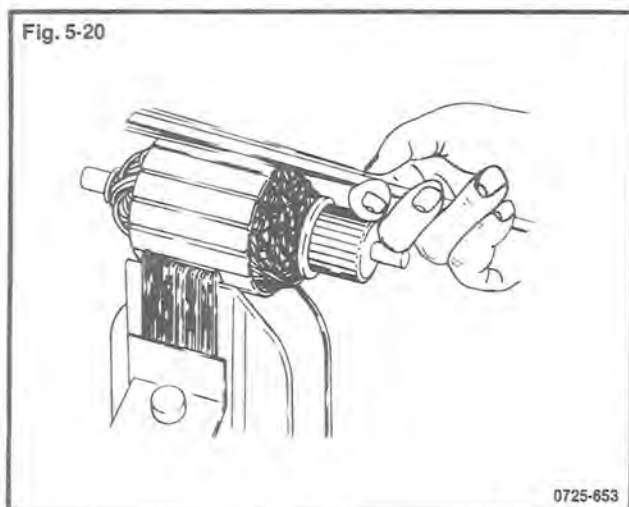
E454

10. Inspect the field winding for shorting. Use a multimeter and the following procedure:

NOTE: The brush holder must not contact the frame and field assembly during this test.

- a. Set the selector on the X1K position; then touch the leads and zero the meter.
- b. Touch the red tester lead to the insulated starter terminal.

- c. Touch the black tester lead to the frame and field assembly. The meter indicator should not move. If the indicator moves, field winding is grounded and must be replaced.
 11. Inspect the ground of the ground brushes using a multitester and the following procedure:
 - a. Set the selector on the X1K position; then touch the leads and zero the meter.
 - b. Touch the black tester lead to a ground brush.
 - c. Touch the red tester lead to the brush holder. The meter indicator should move to the right. If the indicator does not move to the right, solder the ground-brush wire to the holder or replace the brush assembly.
- NOTE:** Use only a rosin-core solder when soldering the brush connections.
- d. Perform this test on the other ground brush.
12. Inspect the armature for shorting. Use a "growler" and the following procedure:
 - a. Place the armature in the "growler".
 - b. While holding a metal strip over the armature, rotate the armature an entire revolution. If the metal strip vibrates at any point on the armature, the armature is shorted and must be replaced.



ASSEMBLING

1. In turn on the armature shaft, place the washers, front cover, and pinion assembly.

NOTE: Make sure the fiber washer is positioned next to the cover.

2. Place the spring and stopper into position; then slide the stopper down the shaft and install the retaining ring.

Fig. 5-21



E542

3. Slide the armature assembly into the yoke; then compress the brushes and slide brush holder assembly onto the commutator end of the armature.
4. Place the rear cover into position and secure with the washer and E-ring.

Fig. 5-22



B270

5. Place the two long bolts and lock washers into position and tighten securely. Tighten the terminal nut.

Fig. 5-23



B268

6. Place the dust cover and gasket into position and secure with two screws and lock washers.

Fig. 5-24



B267

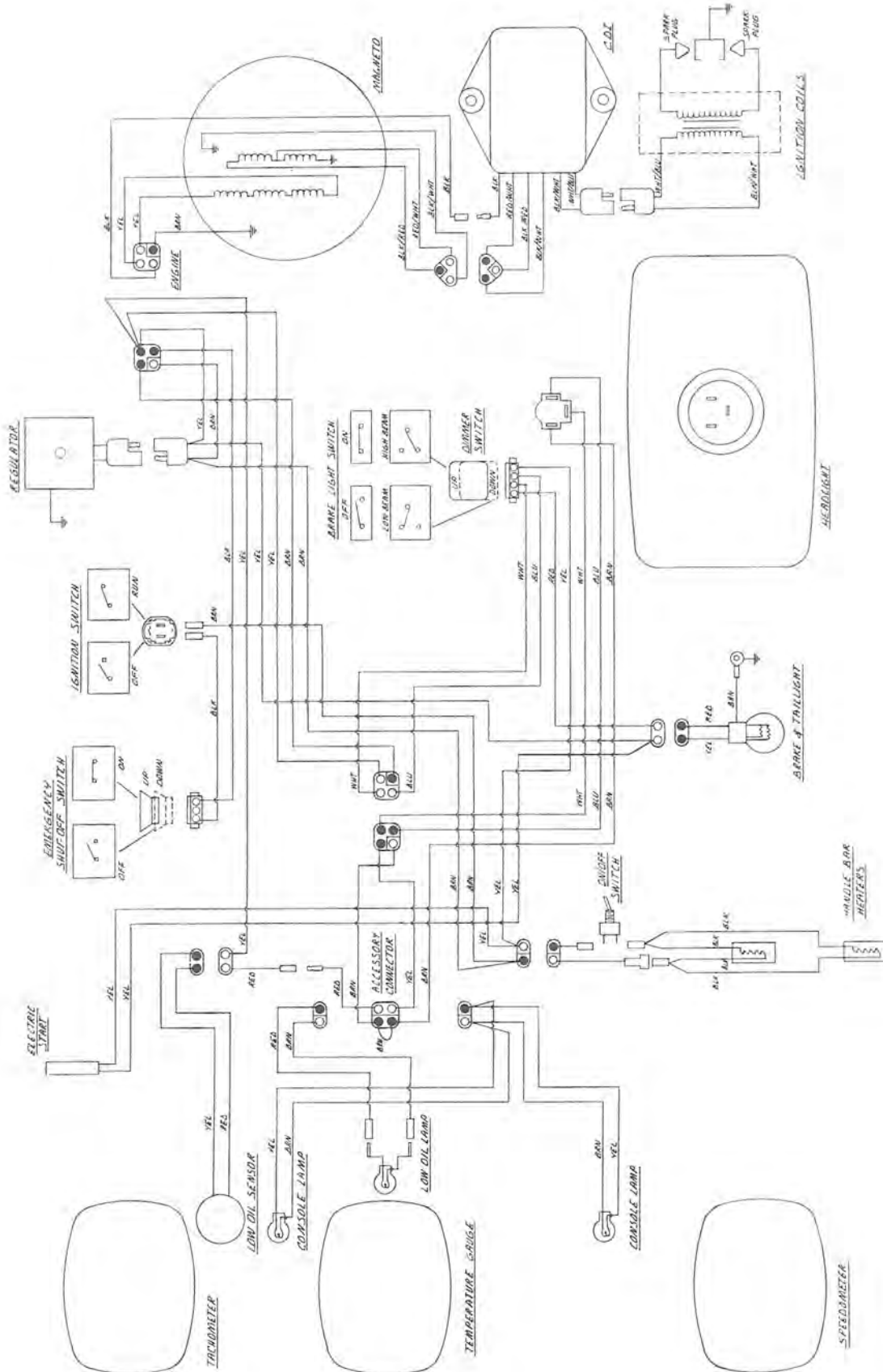
INSTALLING

1. Place the bracket into position on the starter motor and secure with two nuts and lock washers.
2. Place the starter motor w/bracket into position and secure the bracket to the crankcase with two bolts and lock washers.
3. Secure the front cover to the magneto case with two bolts and lock washers.
4. Place the positive cable onto the terminal and secure with a nut and lock washer.
5. Connect the battery.

Fig. 5-25

WIRING DIAGRAM

Jag 340-Jag 440



SECTION 6 — STEERING AND BODY

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Removing and Disassembling Throttle Switch

1. Remove the cable ties securing the handlebar pad; then roll the pad back exposing control wires and cable.
2. Using a sharp knife, cut the grip from the handlebar. Using a solvent, clean the old adhesive from the handlebar.
3. Remove the retaining ring, seals, and pin securing throttle lever to the throttle switch.

NOTE: On the Super Jag, account for a small flat washer found under the retaining ring.

Fig. 6-1



B026

4. Disconnect throttle cable from the seat in throttle lever and remove lever; then remove the retaining ring and slide cable free of throttle switch.
5. Disconnect harness from throttle switch.

Fig. 6-2



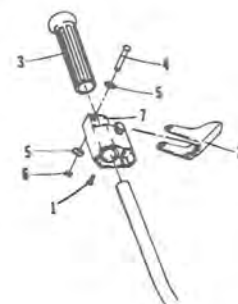
B028

NOTE: On the Super Jag, disconnect the two prong connector near the steering post support.

6. Remove the tapping screw securing throttle switch on handlebar; then slide switch off handlebar.

Assembling and Installing Throttle Switch

Fig. 6-3



KEY

1. Tapping Screw
2. Lever
3. Grip
4. Pin
5. Seal
6. Retaining Ring
7. Throttle Assembly

0726-471

1. Slide throttle switch onto the handlebar; then secure with a tapping screw.
2. Slide throttle cable into groove of throttle switch and secure with retaining ring.
3. Connect end of throttle cable to the seat of the throttle lever.
4. Secure throttle lever with pin, seals, and retaining ring.

NOTE: On the Super Jag, install the small flat washer under the E-clip.

Fig. 6-4

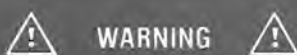


B026

NOTE: Apply a light coat of water-resistant grease to the seals before installing seals.

5. Connect the throttle switch harness to the throttle switch (two prong connector on the Super Jag).

NOTE: Switch harness must be properly connected. If switch harness is not connected, the engine will not start.



WARNING

Compress throttle control lever to ensure free movement. If throttle cable sticks or binds, correct the problem before the snowmobile is operated.

6. Apply Handlebar Adhesive to the bore of the handlebar grip and using a rubber hammer, drive the grip into position.
7. Place the handlebar pad into position and secure with cable ties.

Removing and Disassembling Brake Control

1. Remove the cable ties securing the handlebar pad; then roll the pad forward exposing control wires and cable.
2. Using a sharp knife, cut the grip from the handlebar. Using a solvent, clean the old adhesive from the handlebar.
3. Remove the retaining ring and pin securing brake lever and parking brake actuator to brake control. Remove the parking brake actuator and parking brake actuator spring.

NOTE: On the Super Jag, remove the retaining ring and pin to remove the parking brake actuator and spring.

Fig. 6-5



B030

4. Disconnect brake cable from the seat in brake lever and remove lever; then slide brake cable free of brake control.
5. Disconnect the wiring harness from the brake control.
6. Remove the machine screw securing brake control to the handlebar; then slide brake control off handlebar.

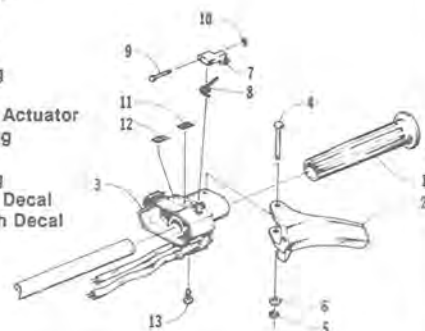
Assembling and Installing Brake Control

Fig. 6-6

Super Jag

KEY

1. Handlebar Grip
2. Brake Lever
3. Brake Switch
4. Pin
5. Retaining Ring
6. Washer
7. Parking Brake Actuator
8. Actuator Spring
9. Pin
10. Retaining Ring
11. Parking Brake Decal
12. Dimmer Switch Decal
13. Screw



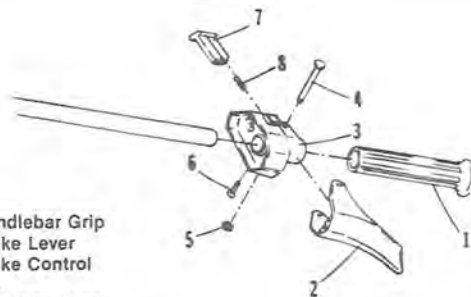
0727-410

Fig. 6-7

Jag 340-Jag 440-Panther

KEY

1. Handlebar Grip
2. Brake Lever
3. Brake Control
4. Pin
5. Retaining Ring
6. Machine Screw
7. Parking Brake Actuator
8. Spring



0726-210

1. Slide brake control onto the handlebar; then secure with a machine screw.

Fig. 6-8



B031

2. Slide brake cable into groove of brake control.
3. Connect end of brake cable to the seat of the brake lever.
4. Place the parking brake actuator and parking brake actuator spring into position on the brake control; then secure the brake lever, actuator, and spring with the pin and retaining ring.

NOTE: On the Super Jag, place the actuator and spring into position on the brake control and secure with the pin and retaining ring.

Fig. 6-9



B030

5. Connect the brake control wiring harness.
6. Apply Handlebar Adhesive to the bore of the handlebar grip and using a rubber hammer, drive the grip into position.



WARNING

The handlebar adhesive is extremely flammable. The product contains acetone and vapors released can be easily ignited. Keep away from heat, sparks, and open flame. Use only in area with adequate ventilation. Avoid prolonged breathing of vapor. Avoid eye and skin contact. Keep container closed when not in use.

7. Place the handlebar pad into position and secure with cable ties.

Removing Steering Post

NOTE: For convenience the engine may be removed for this procedure.

1. Remove the two carriage bolts and lock nuts securing steering-post bracket to the tunnel.

Fig. 6-10



B271

2. Remove the two bolts and lock nuts securing the tie-rod ends to the steering post.

Fig. 6-11



B273

3. On the Panther and Super Jag, remove the four bolts and lock nuts securing the caps to the block; then remove the caps and the handlebar assembly. Account for the adjusting block.

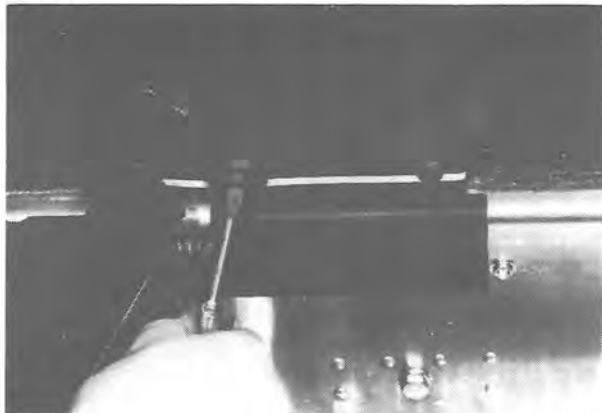
Fig. 6-12



B176

4. Remove the passenger strap and seat cushion; then remove the screws securing the console.

Fig. 6-13



B262

5. Remove the two carriage bolts and lock nuts securing the upper steering-post bracket and backing plate.

Fig. 6-14



B274

6. Move the console rearward; then remove the steering post.

Installing Steering Post

1. Place the steering post into position and secure the upper steering-post bracket and backing plate with the two carriage bolts and lock nuts. Tighten to 1.4 kg-m (10 ft-lb).
2. Place the console into position and secure. Install the seat cushion and passenger strap.

Fig. 6-15



B261

3. Secure the lower steering-post bracket to the tunnel with the two carriage bolts and lock nuts. Tighten to 2.5 kg-m (18 ft-lb).

Fig. 6-16



B272

4. Lubricate the steering-post brackets with a light oil. On the Jag, lubricate the steering post grease fitting. Check steering post for free movement.
5. On the Panther and Super Jag, place the adjusting block, handlebar assembly, and caps into position; then secure with four bolts and lock nuts. Tighten the bolts and lock nuts evenly to 1.4 kg-m (10 ft-lb).

Fig. 6-17



B177

6. Secure the tie-rod ends to the steering post with two bolts (coated with LOCTITE LOCK N' SEAL) and lock nuts. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 6-18



B273

NOTE: Tie rods must be attached to the lower side of the steering post.

Removing and Disassembling Ski

1. Remove the lock nut; then remove the bolt securing ski assembly to the spindle. Remove ski. Account for the damper.

Fig. 6-19



B276

2. Remove the lock nut and bolt securing shock absorber to the saddle.

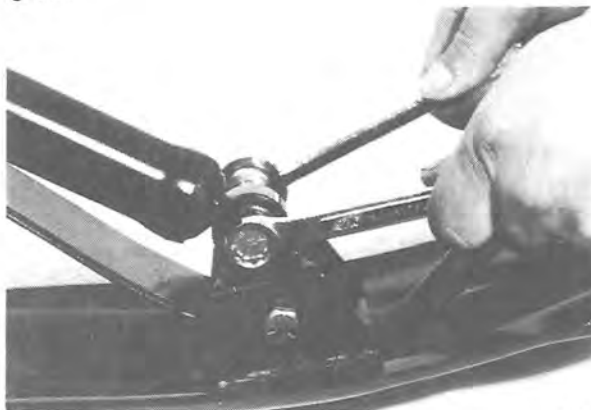
Fig. 6-20



B277

3. Remove the lock nut and bolt securing shock absorber to the front-mount bracket; then remove shock absorber.

Fig. 6-21



B279

4. Place ski in a vise and compress spring approximately 2.5 cm (1 in.).
5. Remove bolt and lock nut holding front of the spring and spring-slide saddle to the front-mount bracket. Slowly release the vise. Remove spring-slide saddle. Account for a sleeve.

Fig. 6-22



B281

6. Remove bolt and lock nut holding spring to rear-mount bracket. Remove ski w/wear-bar.
7. Remove the two bolts and lock nuts securing liner, block, and saddle to the spring.
8. Remove the rivets securing the ski bumper; then remove ski bumper.
9. Remove the lock nut and washer securing the wear-bar to the ski; then pry the wear-bar 2.5 cm (1 in.) from the ski. Insert a wooden block behind the stud and drive the wear-bar forward until the rear of the wear-bar is free. Remove wear-bar from the ski.

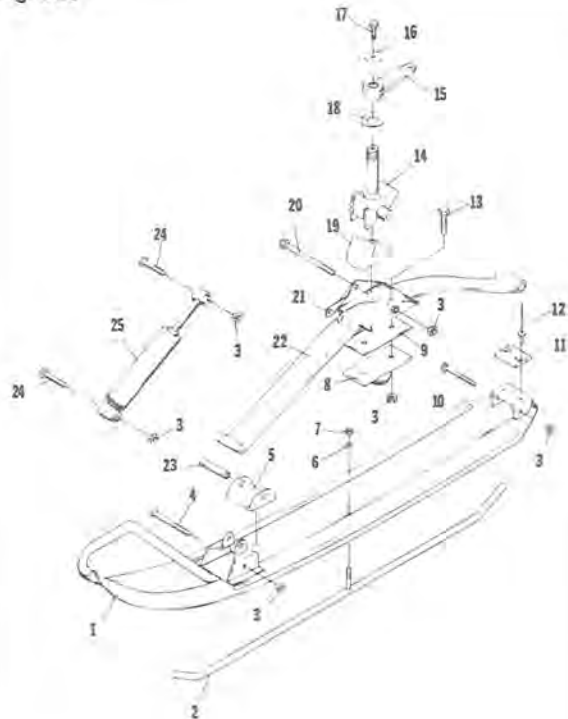
Inspecting Ski

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

1. Inspect welded areas for cracks or deterioration.
2. Inspect threaded areas for stripping and damage.
3. Inspect spring-mount holes for damage or elongation.
4. Inspect ski for abnormal bends or cracks.
5. Inspect ski springs for bends or cracks.
6. Inspect shock-absorber body and plunger for nicks, cracks, and bends.
7. Inspect shock absorber by quickly compressing and extending the plunger while firmly holding the body. Resistance must be felt in both directions.
8. Inspect shock-absorber seal areas for signs of fluid leakage.
9. Inspect saddle mounting holes for damage or wear.
10. Inspect all bolts for wear and damage.

Assembling and Installing Ski

Fig. 6-23



KEY

- | | | |
|-------------|--------------------|--------------------|
| 1. Ski | 10. Bolt | 19. Damper |
| 2. Wear-Bar | 11. Bumper | 20. Bolt |
| 3. Lock Nut | 12. Rivet | 21. Saddle |
| 4. Bolt | 13. Bolt | 22. Spring |
| 5. Saddle | 14. Spindle | 23. Sleeve |
| 6. Washer | 15. Spindle Arm | 24. Bolt |
| 7. Lock Nut | 16. Washer | 25. Shock Absorber |
| 8. Block | 17. Cap-Lock Screw | |
| 9. Liner | 18. Washer | |

0700-329

NOTE: All horizontal lock nuts are to be positioned toward the center of the snowmobile.

1. Insert the front end of the wear-bar into the front-mounting hole in the ski; then swing wear-bar toward the ski. Using a wooden block, drive the wear-bar into position making sure the rear end of the wear-bar is positioned in the rear-mounting hole; then secure with a washer and lock nut.
2. Rivet the ski bumper to the ski.

3. Place saddle into position on the top of the spring making sure the threaded area will face the center of the snowmobile; then on the bottom of the spring, place the liner and block. Secure with two bolts and lock nuts coated with LOCTITE LOCK N' SEAL. Tighten to 2.9-3.6 kg-m (21-26 ft-lb).
4. Install the end of the spring in the rear-mount bracket and secure with a bolt and lock nut coated with LOCTITE LOCK N' SEAL. Tighten lock nut to 2.8 kg-m (20 ft-lb).
5. Place spring-slide saddle and spring into position; then insert sleeve through spring-slide saddle.
6. Place ski in a vise and compress the spring until bolt and lock nut can be installed; then install bolt and lock nut (coated with LOCTITE LOCK N' SEAL). Tighten to 2.9-3.6 kg-m (21-26 ft-lb). Release the vise.

Fig. 6-24



B282

NOTE: Do not overtighten as spring binding may result.

7. Secure the stationary end of the shock absorber to the front-mount bracket with a bolt and lock nut. Tighten to 4.5-5.3 kg-m (32-38 ft-lb).

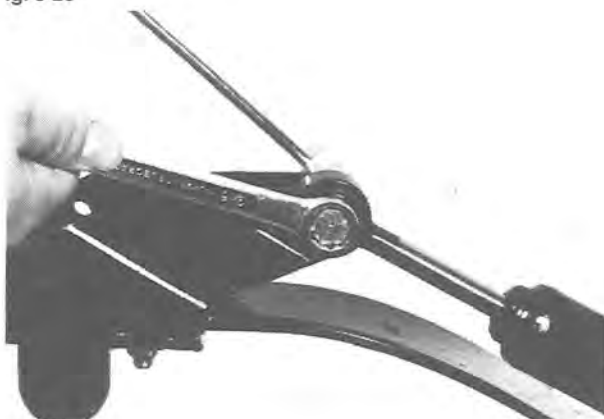
Fig. 6-25



B280

8. Secure the movable end of the shock absorber to the saddle with a bolt and lock nut. Tighten to 4.4-5.3 kg-m (32-38 ft-lb).

Fig. 6-26



B278

9. Place ski assembly and damper into position on spindle and secure with a bolt; tighten to 2.9-3.6 kg-m (21-26 ft-lb). Thread a lock nut on to the bolt; tighten to 2.9-3.6 kg-m (21-26 ft-lb).

NOTE: Threaded hole in ski saddle must be positioned toward the center of the snowmobile.

Fig. 6-27



B276

Removing and Disassembling Tie Rods

1. Remove the lock nuts and bolts securing tie-rod ends to spindle arms.

Fig. 6-28



B283

2. Remove the lock nuts and bolts securing tie-rod ends to the steering post.

Fig. 6-29



B273

3. Remove tie rod assemblies.
4. Loosen the jam nuts securing the tie-rod adjusting studs.
5. Remove tie-rod ends from the adjusting studs; then remove adjusting studs w/jam nuts.
6. Remove jam nuts from the adjusting studs.

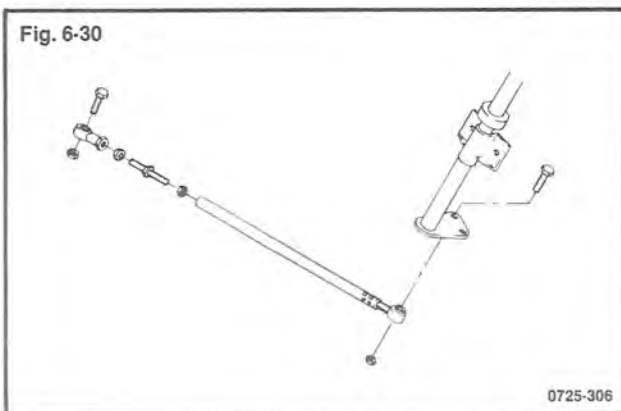
Inspecting Tie Rods

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

1. Inspect tie rods for damaged threads or wear.
2. Inspect tie-rod ends for cracks or wear.

Assembling and Installing Tie Rods

Fig. 6-30



0725-306

1. Install jam nuts on the adjusting studs.

NOTE: Since each adjusting stud has both right and left hand thread, each jam nut can be installed on only its end.

2. Install the adjusting studs on the tie rods; then install tie-rod ends on the adjusting studs.
3. Place tie-rod assemblies into position making sure adjusting studs are toward the spindle arms.
4. Secure tie-rod ends to steering post with two bolts (coated with LOCTITE LOCK N' SEAL) and lock nuts. Tighten and then torque to 3.2 kg-m (23 ft-lb).

NOTE: The tie-rod ends must be attached to the lower side of the steering post.

- Secure tie-rod ends to the spindle arms with two bolts (coated with LOCTITE LOCK N' SEAL) and lock nuts. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 6-31



B401

- Check ski alignment; adjust as necessary.

Removing Spindle/ Spindle Bushings

- Remove the ski.

NOTE: For convenience, the drive clutch may be removed to replace the PTO-side spindle/spindle bushings.

- Remove the cap-lock screw and washer securing spindle arm to the spindle.

Fig. 6-32



- Remove spindle arm from spindle. Account for any washers.
- Remove spindle from the bushings.

NOTE: If the spindle sticks in the bushings, use a 1/2 in. diameter brass punch and drive the spindle out.

- Using a punch, drive the bushings out of the front end.

Installing Spindle/ Spindle Bushings

- Install the bushings into the front end making sure they are seated.

NOTE: To install the bushings, use an appropriately sized bolt 4 1/2 in. long, two large washers, a nut, and the following procedure:

- Slide a washer onto the bolt; then slide on one bushing.

Fig. 6-33



B051

- Place bolt w/bushing into position; then slide the other bushing and washer onto the bolt.
 - Thread the nut onto the bolt and draw the bushings into position by tightening the nut.
- Using a 0.750/0.751-in. diameter ream or a brake hone, ream the inside of the bushings so the spindle will turn freely.
 - Slide the spindle into position and place any washers removed during removal into position; then slide spindle arm onto the spindle.

NOTE: The spindle arm should point toward the rear of the snowmobile and 4 1/2 ° inward when the ski is in the straight-ahead position.

- Secure the spindle arm to the spindle with a cap-lock screw and washer coated with LOC-TITE LOCK N' SEAL. Tighten to 1.8 kg-m (13 ft-lb).

Fig. 6-34



NOTE: Install the drive clutch if removed.

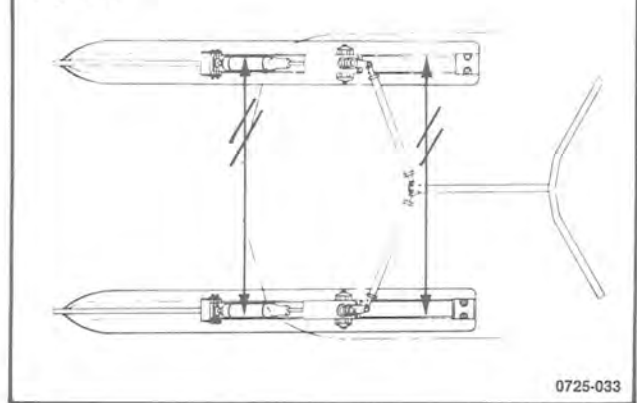
- Install the ski.
- Check ski alignment; adjust as necessary.

Checking Ski Alignment

Ski alignment must be checked and adjusted whenever any component of the steering is replaced.

- Turn the handlebar to the straight-ahead position.
- Measure the distance to the outside edges of the leaf springs. Make sure one measurement is taken behind the front-mount bracket and the other measurement is taken ahead of the rear-mount bracket.

Fig. 6-35



NOTE: Ski alignment is correct when the skis are parallel to each other (equal measurements front and rear) or when the skis have maximum of 6 mm (1/4 in.) "toe out" (front measurement 6 mm (1/4 in.) more than rear measurement).

- If ski alignment is not as specified, adjust alignment.

Adjusting Ski Alignment

- Turn the handlebar to the straight-ahead position.
- Visually examine to determine which ski is out of alignment; then adjust the appropriate ski.
- Loosen the adjusting stud jam nut.

Fig. 6-36



NOTE: The inside jam nut is “left-hand” thread. Care should be taken to rotate in the proper direction.

4. Adjust the ski by rotating the adjusting stud. Rotating the MAG-side (right) adjusting stud clockwise will “toe out” the ski; whereas, rotating the PTO-side (left) adjusting stud clockwise will “toe in” the ski.

Fig. 6-37



The adjusting stud must be threaded at least 12.7 mm (1/2 in.) into the tie rod and tie rod end to assure maximum steering linkage strength.

5. When the ski alignment is correct, apply LOC-TITE LOCK N' SEAL to the threads and lock the adjusting stud in place by tightening both jam nuts. Tighten one jam nut against the tie rod and the other jam nut against the tie-rod end.

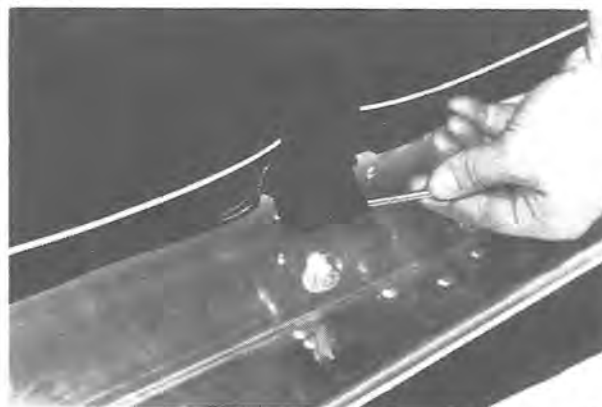


Neglecting to lock a tie rod and a tie-rod end may cause loss of snowmobile control and possible personal injury.

Removing Console (Panther-Super Jag)

1. Pull the recoil rope; then tie a slipknot in the recoil rope near the recoil case. Slowly allow the rope to retract to the knot.
2. Untie the knot in the end of the recoil rope; then remove handle from rope.
3. Remove the push nut securing recoil bushing; then remove bushing.
4. Remove the knurled nut securing the choke cable; then remove the choke cable. Disconnect the wires from the ignition switch, handlebar heater switch, and low oil lamp.
5. Disconnect the speedometer drive cable; then disconnect the wires from the speedometer.
6. Remove the oil-level line from the console; then remove the console door.
7. Remove the passenger strap and seat cushion.

Fig. 6-38



B261

8. Remove the four machine screws securing the sides of the console; then remove the two machine screws, washers, and lock nuts securing the console to the front end.

Fig. 6-39



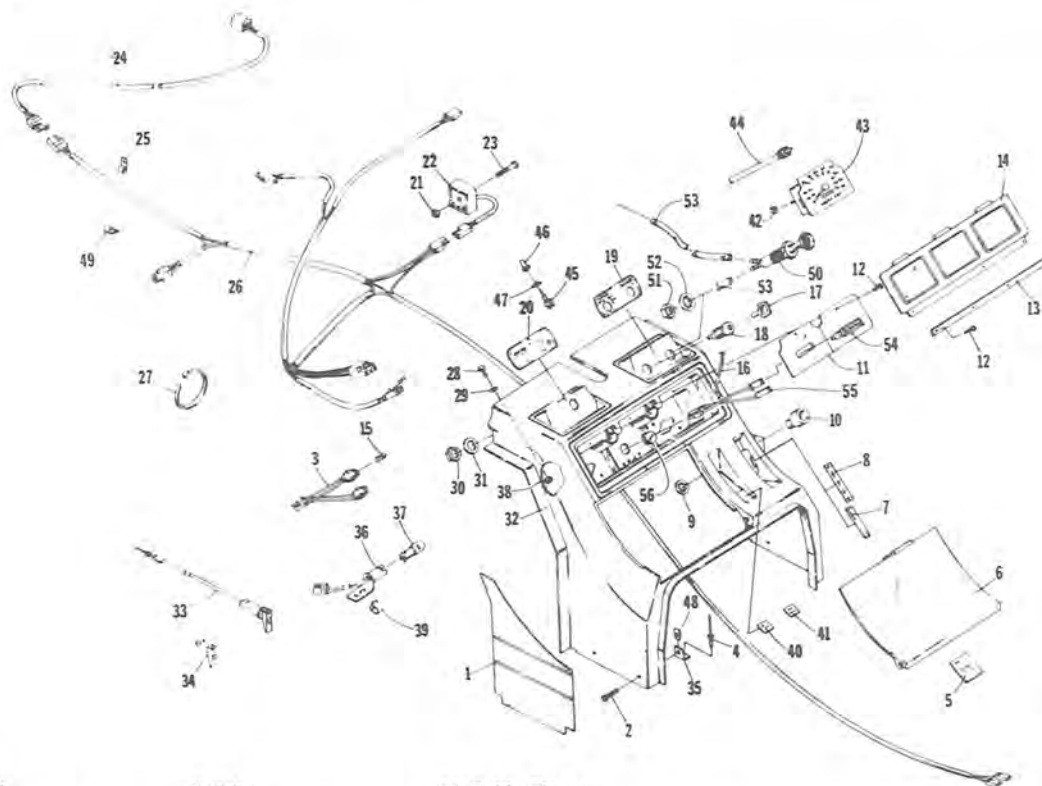
B360

9. Remove primer hoses from primer. Plug delivery hose to prevent drainage from the tank.

10. Remove the console.
11. Remove the four tapping screws securing trim strip and console lens. Remove strip, lens, and gasket. Remove the speedometer.
12. Remove the two screws securing console plate; then remove console plate.
13. Remove the nut and lock washer securing the primer; then remove primer.
14. Remove the nut securing ignition switch and handlebar heater switch; then remove switches.

Installing Console (Panther-Super Jag)

Fig. 6-40



KEY

- | | | | | |
|----------------------|-----------------------|---------------------|-----------------------|----------------------|
| 1. Decal | 13. Trim | 25. Cable Clamp | 37. Bulb | 47. Lock Washer |
| 2. Machine Screw | 14. Lens | 26. Main Harness | 38. Lock Nut | 48. Speed Nut |
| 3. Socket Assembly | 15. Bulb | 27. Cable Tie | 39. Clip | 49. Cable Clip |
| 4. Rivet | 16. Pinstripe | 28. Machine Screw | 40. Decal | 50. Fuel Primer |
| 5. Decal | 17. Key | 29. Washer | 41. Decal | 51. Jam Nut |
| 6. Console Door | 18. Ignition Switch | 30. Ignition Nut | 42. Nut | 52. Lock Washer |
| 7. Oil-Gauge Backing | 19. Decal | 31. Ignition Washer | 43. Speedometer | 53. Primer Hose |
| 8. Decal | 20. Decal | 32. Console | 44. Speedometer Cable | 54. Low Oil Lamp |
| 9. Push Nut | 21. Thin-Lock Nut | 33. Choke Cable | 45. Toggle Switch | 55. Oil Lamp Harness |
| 10. Recoil Bushing | 22. Regulator | 34. Choke Lever Kit | 46. Nut | 56. Grommet |
| 11. Console Plate | 23. Bolt | 35. Bracket | | |
| 12. Tapping Screw | 24. Headlight Harness | 36. Light Assembly | | |

0727-353

1. Install the oil-gauge backing and decals on the console.
2. Place the trim strip and console lens into position and secure with four tapping screws.
3. Place console plate into position and secure with two screws.
4. Place the speedometer into position and secure.
5. Place the handlebar heater switch into position and secure.
6. Slide the ignition switch and the choke cable through the console; secure the choke cable with a knurled nut and the ignition switch with the ignition nut and washer. Connect the wires to the ignition switch, handlebar heater switch, and low oil lamp.
7. Place the primer into position and secure with lock washer and nut. Move console into position and attach the hoses to the primer.

NOTE: The hose going to the intake manifold must be attached to the straight fitting of the primer.

8. Place the oil-level line into position; then install the console door.
9. Connect the speedometer drive cable; then connect the wires to the speedometer.
10. Secure the sides of the console with four machine screws and the top with two machine screws, washers, and lock nuts.

Fig. 6-41



B360

11. Install the seat cushion and passenger strap.
12. Install recoil bushing and secure with push nut.

13. Thread the recoil rope through the recoil bushing and recoil handle. Tie a knot in the end of the recoil rope. Pull the rope to remove the slipknot near the recoil case; then allow the rope to retract.

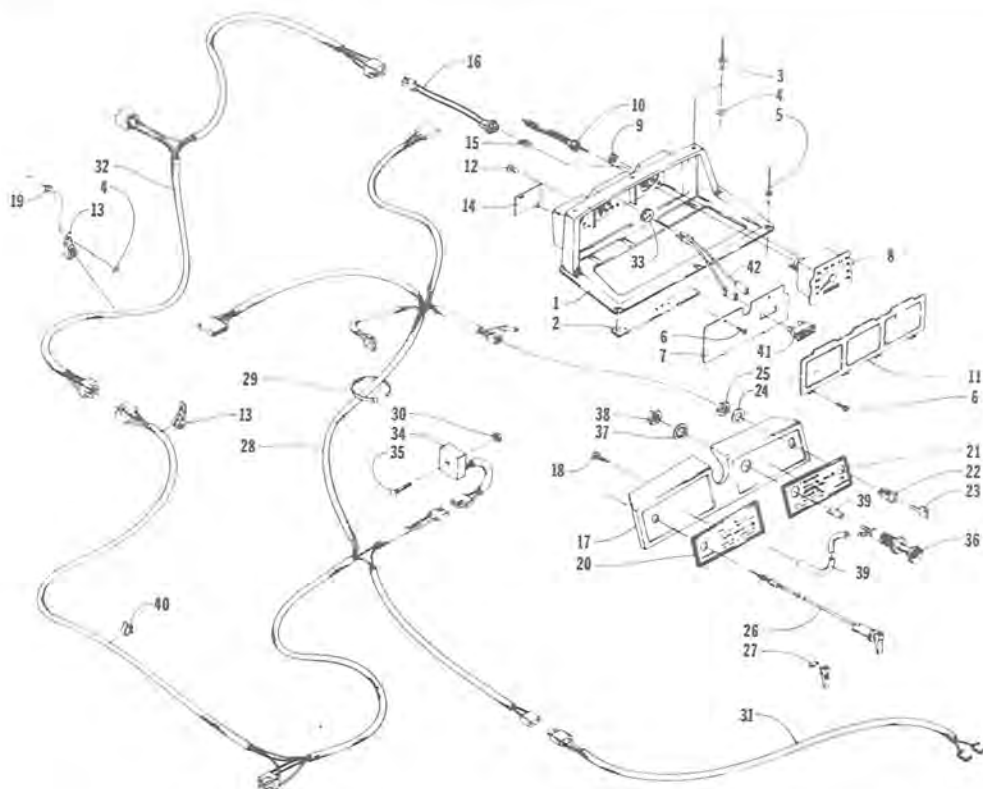
Removing Console (Jag)

NOTE: Not all steps will be applicable to the Jag 340.

1. Remove the wires from the ignition switch and low oil lamp.
2. Remove the knurled nut securing the choke lever housing and pull housing from console.
3. Remove the four screws from the backside of the console.
4. Pull console out from its mounting position just far enough to disconnect the primer hoses. Remove the hoses from the primer and plug to prevent drainage.
5. Remove the vent hose from the console clips.
6. Remove console.
7. Remove the nut and lock washer securing the primer; then remove primer.

Installing Console (Jag)

Fig. 6-42



KEY

- 1. Panel, Instrument
- 2. Foam, Panel
- 3. Rivet
- 4. Washer
- 5. Rivet
- 6. Screw, Tapping
- 7. Plate, Inst. Panel
- 8. Speedometer *

- 9. Nut *
- 10. Cable, Speedometer *
- 11. Lens, Inst. Panel
- 12. Rivet, Expansion
- 13. Clamp, Cable
- 14. Plate, Cover
- 15. Bulb
- 16. Socket Assembly

- 17. Console
- 18. Screw, Self Tapping
- 19. Rivet
- 20. Decal, Console - L.H.
- 21. Decal, Console - R.H.
- 22. Switch, Ignition
- 23. Key
- 24. Washer, Ignition

- 25. Nut, Ignition
- 26. Cable, Choke
- 27. Kit, Choke Lever
- 28. Harness, Main Ignition
- 29. Tie, Cable
- 30. Thin-Lock Nut
- 31. Taillight Harness
- 32. Headlight Harness
- 33. Grommet

- 34. Regulator
- 35. Ribbed Machine Screw
- 36. Fuel Primer *
- 37. Lock Washer *
- 38. Jam Nut *
- 39. Primer Hose *
- 40. Wiring Harness Clip
- 41. Low Oil Lamp *
- 42. Oil Lamp Harness *

0727-352

*Jag 440 only

NOTE: Not all steps will be applicable to the Jag 340.

1. Install the primer and secure using the lock washer and large nut.
2. Place the console into position and secure vent hose. Connect the two hoses to the primer.

NOTE: The hose going to the intake manifold must be attached to the straight fitting of the primer.

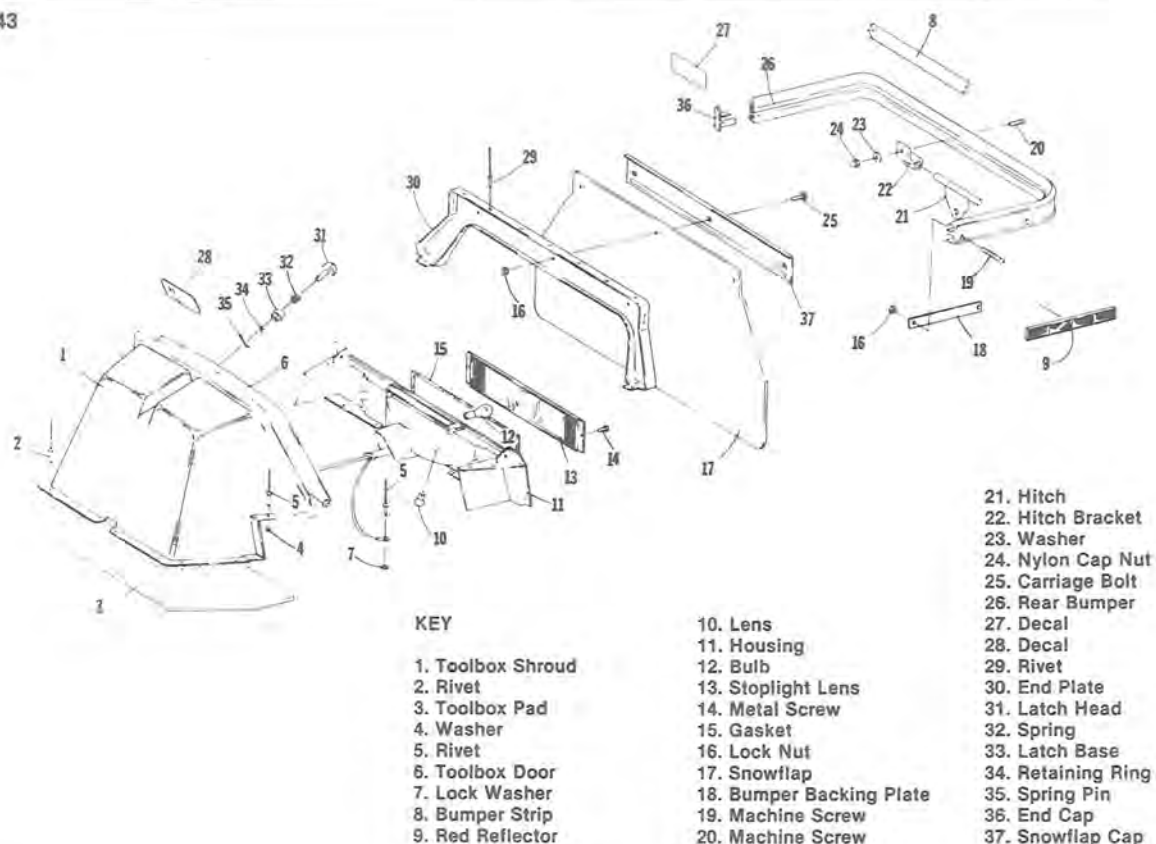
3. Place choke housing into position and secure with knurled nut.

4. Secure console using the four screws.

5. Attach the ignition switch and low oil lamp wires.

Removing & Installing Tunnel Components

Fig. 6-43



REMOVING TOOLBOX AND TAILLIGHT— Panther-Super Jag

1. Remove the seat cushion.
2. Remove the toolbox pad.
3. Chisel or drill out the rivets securing the toolbox shroud to the tunnel; then remove the two metal screws and washers securing taillight assembly to the toolbox and remove toolbox.

NOTE: Remove the rivets securing the taillight to the toolbox.

4. Disconnect wiring harness from taillight; then remove the rivet securing the ground wire.
5. Remove the two metal screws securing taillight lens; then remove lens, gasket, and bulb.

INSTALLING TOOLBOX AND TAILLIGHT— Panther-Super Jag

1. Install the bulb; then install the gasket and lens and secure with two metal screws.
2. Connect the wiring harness; then rivet the ground wire to the tunnel.
3. Rivet the toolbox shroud to the tunnel; then secure the taillight assembly to the toolbox with two metal screws.
4. Install the toolbox pad.

NOTE: Secure the taillight to the toolbox with rivets.

5. Install the seat cushion and passenger strap.

REMOVING REAR BUMPER, END PLATE, CAP, AND SNOWFLAP

1. Remove the seat cushion; then remove the reflectors and bumper tape. Remove the four machine screws and lock nuts securing rear bumper and bumper plates to the tunnel. Remove the rear bumper and bumper plates.
2. Remove the end caps.
3. Remove the three carriage bolts and lock nuts securing snowflap and cap; then remove cap and snowflap.
4. Chisel or drill out the rivets securing end plate to the tunnel; then remove plate.

INSTALLING REAR BUMPER, END PLATE, CAP, AND SNOWFLAP

1. Place end plate into position and secure with rivets.
2. Place snowflap and cap into position and secure with three carriage bolts and lock nuts.
3. Install the end caps.
4. Place the rear bumper and bumper plates into position; then secure with the four machine screws and lock nuts. Install the seat cushion, bumper tape, and reflectors.

REMOVING BELLY PAN, HOOD, AND FRONT BUMPER

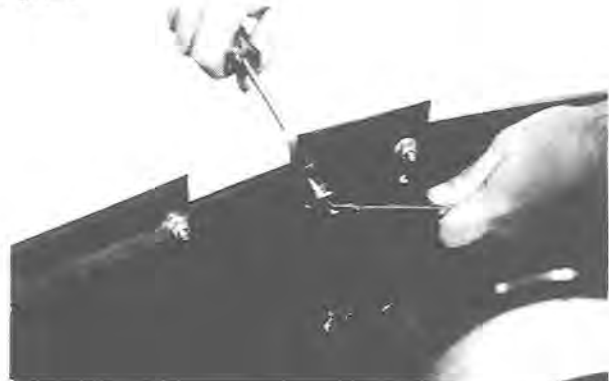
1. Remove the hood cable and hood cable spring.
2. Disconnect the headlight harness, remove the two E-rings securing the hood to the hinges, and remove hinge pins. Remove hood.

Fig. 6-44



3. Remove the 18 machine screws and lock nuts securing bumper to the belly pan; then remove bumper. Account for washers, end caps, hood channels, and plug.

Fig. 6-45



4. Remove the rivets securing hood hinges and reinforcement strip to belly pan; then remove hinges and reinforcement strip.
5. Remove the rivets securing belly pan to the front end.
6. Remove skis.
7. On the Jag, remove machine screws, washers, and lock nuts securing the toolbox; then remove the toolbox.
8. Remove the cap-lock screws and washers securing the spindle arms to the spindles and drive the spindles out of the bushings; then remove belly pan.

Fig. 6-46

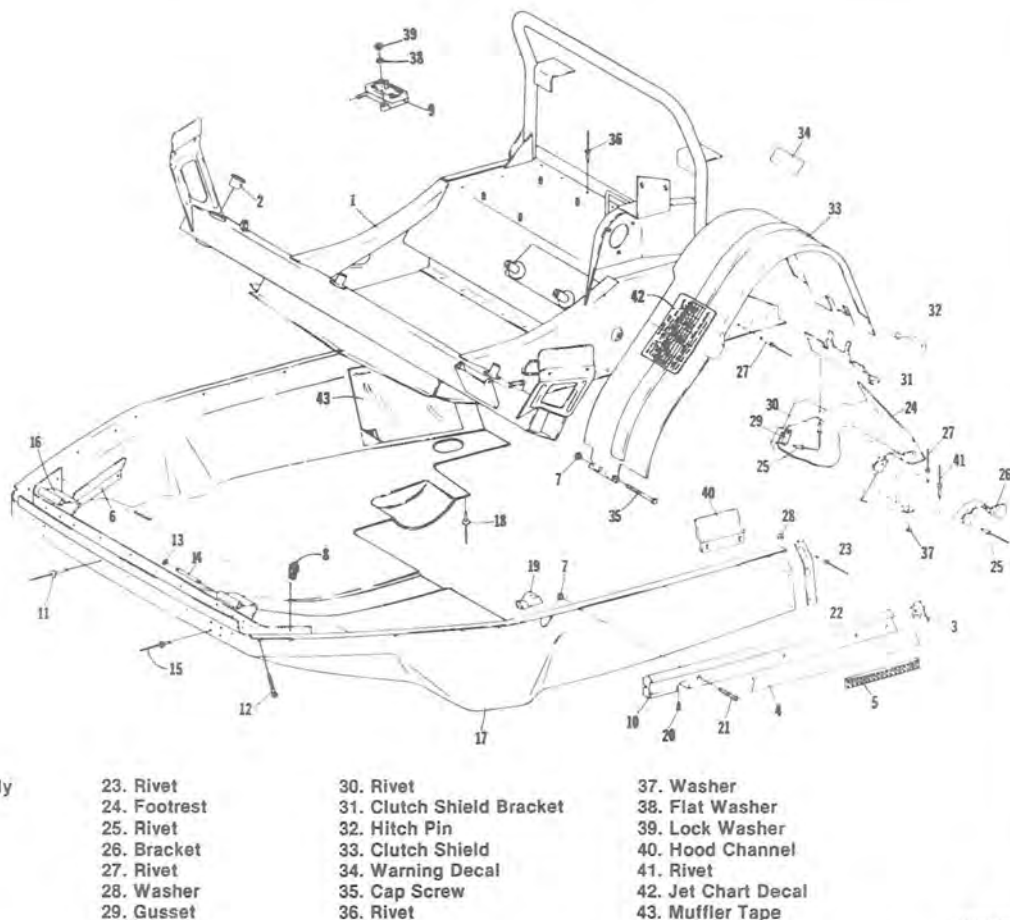


INSTALLING BELLY PAN, HOOD, AND FRONT BUMPER

Fig. 6-47

KEY

- 1. Front End Assembly
- 2. Bushing
- 3. Bumper Cap
- 4. Bumper Tape
- 5. Reflector
- 6. Hood Channel
- 7. Lock Nut
- 8. Cable Clamp
- 9. Fuel Pump
- 10. Bumper
- 11. Rivet
- 12. Machine Screw
- 13. E-Ring
- 14. Hinge Pin
- 15. Rivet
- 16. Hinge Support Assembly
- 17. Belly Pan
- 18. Rivet
- 19. Plug
- 20. Self Tapping Screw
- 21. Machine Screw
- 22. Trim



0700-321

1. Place the belly pan into position and secure with rivets.
2. Place the spindles into position and secure spindle arms to the spindles with two cap-lock screws and washers coated with LOC-TITE LOCK N' SEAL. Tighten to 1.8 kg-m (13 ft-lb).

3. Install skis.
4. Place the hood hinges and reinforcement strip into position and secure with rivets.
5. Place the front bumper into position and secure with 18 machine screws, washers, and lock nuts making sure the hood channels are properly positioned. Install the end caps.

Fig. 6-48



B286

Fig. 6-49



B289

6. Place the hood into position and install hinge pins and E-rings. Connect the headlight harness.
7. Secure hood cable and hood cable spring.
8. On the Jag, place the toolbox into position and secure with two machine screws, lock nuts, and four washers.
9. Thoroughly clean the bumper surface; then place the reflectorized strip into position. Trim the ends of the strip to match contour of the bumper.
10. Install reflectors.

Removing Windshield and Headlight

1. Remove the machine screws securing windshield and remove the windshield and trim strips. Account for the expansion nuts and snap and caps.
2. Disconnect the headlight harness.
3. Remove the rivets securing the headlight bracket to the hood.
4. Remove headlight assembly from the bracket by removing the four adjusting screws, adjusting nuts, and springs.

Installing Windshield and Headlight

1. Secure headlight assembly to the bezel with four adjusting screws, adjusting nuts, and springs.
2. Secure bracket to hood with rivets.
3. Connect the headlight harness.
4. Install expansion nuts in the holes of the hood. Place the windshield and trim strips in position and secure with the machine screws. Make sure the snap and caps are properly positioned.

NOTE: Tighten the screws starting from the center and working outward.

5. Adjust headlight aim.

Adjusting Headlight Aim

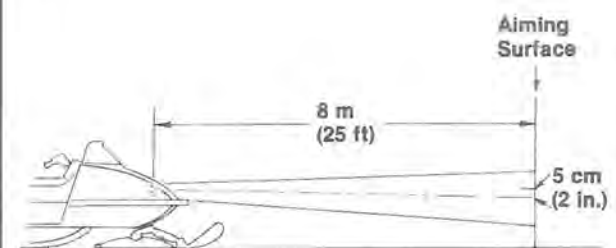
The headlight can be adjusted for vertical and horizontal aim of the HIGH/LOW beam. The geometric center of the HIGH beam light zone is to be used for vertical and horizontal aiming.

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

NOTE: There should be an "average" operating load on the snowmobile when adjusting headlight aim.

2. Measure the distance from the floor to midpoint of the headlight.
3. Using the measurement obtained in step 2, make a horizontal mark on the aiming surface.
4. Make a vertical mark which intersects the horizontal mark on the aiming surface directly in front of the headlight.
5. Start the engine. Move the headlight dimmer switch to the HIGH beam position. DO NOT USE LOW BEAM.

Fig. 6-50



0725-082

6. Observe the headlight beam aim. Proper aim is when the most intense beam is centered on the vertical mark 5 cm (2 in.) below the horizontal mark on the aiming surface.
7. Adjust the four adjusting screws until the correct aim is obtained.

SECTION 7 — TRACK/SUSPENSION

7

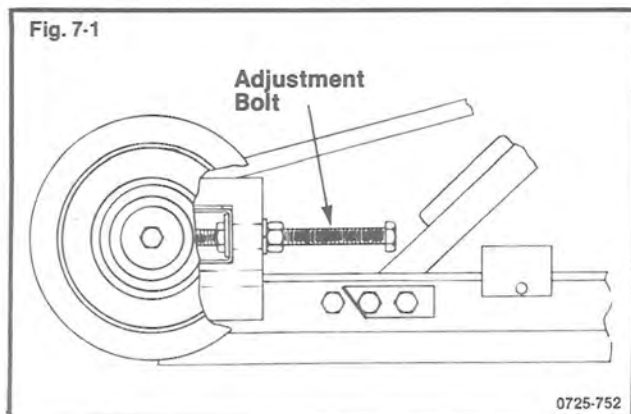
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Removing Skid Frame

1. Loosen the two track-tension adjustment bolts.

Fig. 7-1



2. Remove the four bolts and lock washers securing the skid frame to the tunnel.

Fig. 7-2



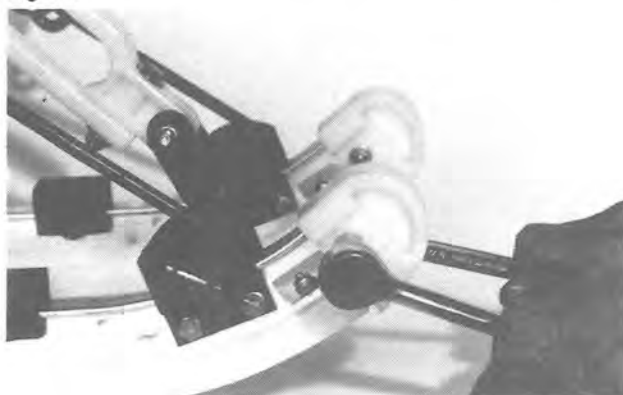
3. Tip the snowmobile onto one side. Use a piece of cardboard to protect against scratching.
4. Remove the skid frame.

NOTE: When removing the skid frame, it isn't necessary to unlock or disconnect the rear suspension springs.

Disassembling Skid Frame

1. Remove cap-screw and lock nut securing the end caps to the slide rail. Remove end caps.

Fig. 7-3



2. Remove the lock nuts and machine screws securing the wear strips to the rails.

Fig. 7-4



3. Using a piece of wood and a hammer, drive the wear strips off the slide rails.

Fig. 7-5



● CAUTION ●

Be sure to use a piece of wood or a rubber hammer to remove the wear strips from the rails. If a steel hammer is used, the bottom of the rails may be nicked and damaged.

4. Remove the cap-lock bolts and large washers securing rear idler wheels to rear axle.

Fig. 7-6



AG003

5. Slide the rear idler wheels and spacer washers off the rear axle.

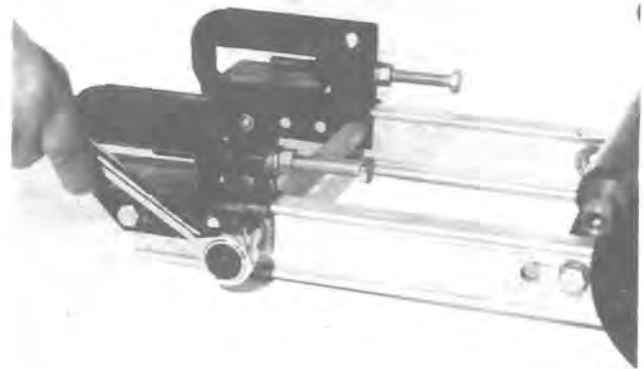
Fig. 7-7



AG065

6. Remove the axle from the axle housing.
7. Remove the four bolts and lock nuts securing the axle housings; then slide the housings off the rails.

Fig. 7-8



AG005

NOTE: On the Super Jag, be sure to note the location of the rear rail support when removing axle housings. Support must be located between front mounting holes.

8. Remove the two cap screws securing the forward spring support brackets and rollers to the idler wheels. Grasp the spring and retaining bracket and slide the bracket off the idler wheel shaft.

Fig. 7-9



AG033

NOTE: By following step 8, the spring tension can easily be removed from the rear suspension spring. Spring tension may also be reduced by removing the spring from the rear adjustment block using special tool (p/n 0144-311).

9. Remove the two cap screws securing the shock absorber to the rear arm. Remove the shock absorber.

Fig. 7-10



AG034

10. Remove the bolt securing the rear arm to the slide rails. Slide the rear arm back off the rails.

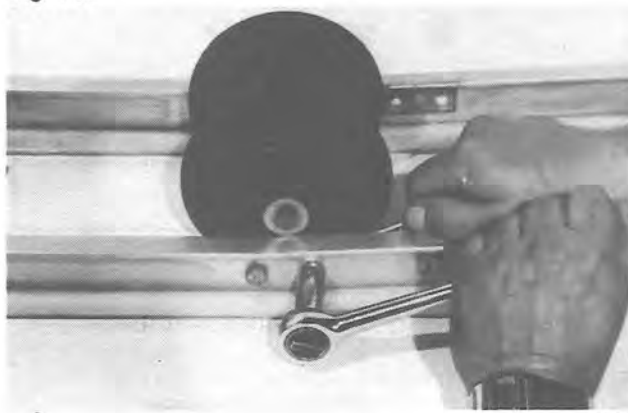
Fig. 7-11



AG035

11. Remove the single bolt securing the two rear idler arm pieces together; then separate pieces. Account for inner axles.
12. Remove the pins and push nuts securing the rear arm stops to the rails and remove stops.
13. On the Super Jag, remove the four bolts and lock nuts securing the rear idler wheels to the rails. Remove idler wheel support brackets, shaft, wheels, and spacers from between the skid frame rails.

Fig. 7-12



AG036

14. On the Super Jag, remove the four bolts and nuts securing the center idler wheel crossbrace to the rails. Slide the crossbrace off the rear of the rails.

Fig. 7-13



AG063

15. Remove the nuts securing the front suspension spring eyebolts; then remove the eyebolts. Slide the front springs off the front arm.

Fig. 7-14



AG043

16. Remove the bolt and lock nut securing the front-arm stop to the crossbrace. Remove the bolt, washers, and lock nut securing the front-arm stop to the front arm; then remove the front-arm stop.

Fig. 7-15



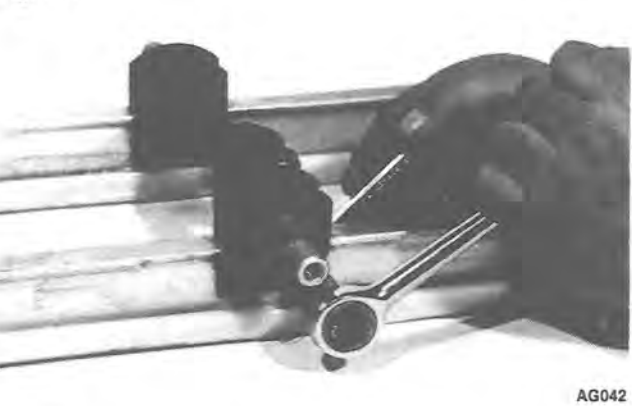
17. Remove the bolt and lock nut securing the front arm to the front arm mounting brackets. Remove the arm and account for the axles.

Fig. 7-16



18. Remove the four bolts and lock nuts securing the front-arm brackets to the slide rails; then remove the brackets.
19. Remove the four bolts and lock nuts securing the shock mounting crossbrace to the slide rails. Slide the brace rearward off the rails.

Fig. 7-17



20. On the Super Jag, remove the four bolts and nuts securing the front idler wheel brackets. Remove brackets, wheels, spacers, and axles.

Fig. 7-18



21. Remove the four bolts and lock nuts securing the front crossbrace to the slide rails. Slide the crossbrace off the front of the rails.
22. Remove the push nuts and pins securing the front shock pads to the slide rails; then remove the pads.

Cleaning Skid Frame

1. Wash metallic components in parts-cleaning solvent and dry thoroughly.
2. Wash plastic components in soap and water only; then dry thoroughly.
3. Sand and apply touch-up paint to all rusted and chipped areas.

Inspecting Skid Frame

NOTE: It is very important that a close inspection is made on all parts. Simple cleaning isn't enough as this area involves safety of the operator. All welded areas should be closely inspected for any signs of cracking or fatigue. All mounting holes should be checked for wear. All lock nuts should be replaced and torqued to specifications. Inspect all bushings, axles, and mounting brackets for wear and cracks. If a part appears questionable, replace the part.

1. Inspect all mounting bolts for any signs of thread damage, bending, bolt stretch, and wear. If any of these conditions are found, replace the bolt.
2. Inspect all axles for signs of cracking or wear. Check each axle for tightness in its bushings.
3. Inspect front and rear arms in welded areas and entire length for any signs of cracks. Replace arms if any cracks are found.
4. Inspect all idler wheel bearings. Turn each bearing by hand and check for smoothness. If a bearing feels rough, replace the wheel and bearing as a set.
5. Inspect all idler wheel mounting axles for straightness.
6. Inspect all springs for abnormal bends or cracks.
7. Inspect all mounting brackets for bending, wear, and cracks.
8. Inspect the skid-frame rails for unusual bends.
9. Measure the rail wear-strips at 25.4 cm (10 in.) intervals. Wear-strips must be 10.7 mm (0.42 in.) thick or thicker. If any measurement is less than specified, replace the wear-strips as a set.

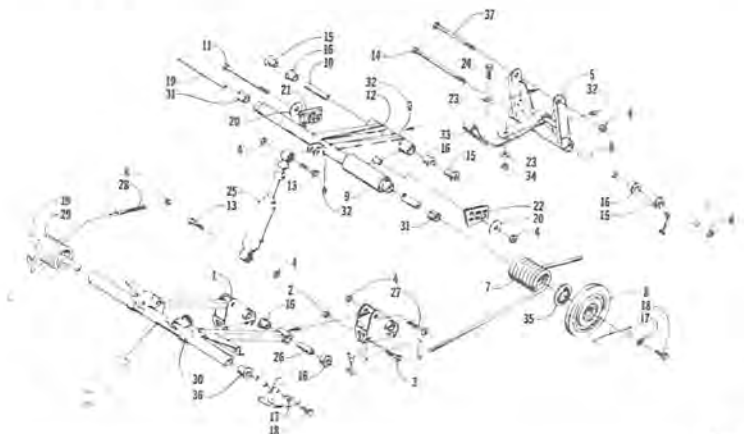
Assembling Skid Frame

Fig. 7-19

Jag-Panther

KEY

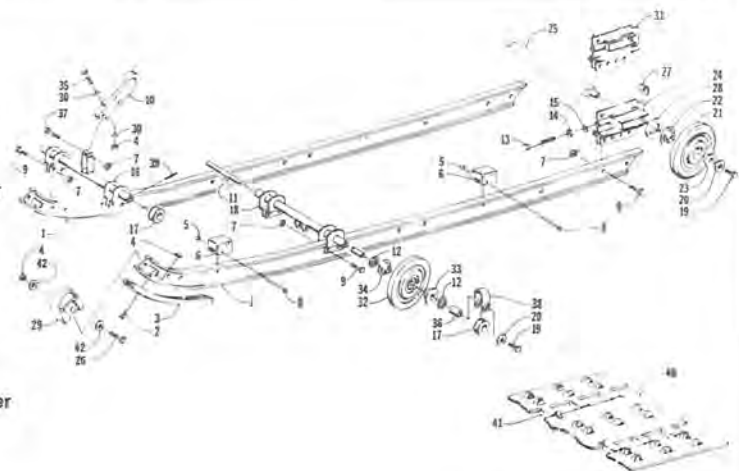
- | | |
|-----------------------|------------------------|
| 1. Bracket, Front Arm | 20. Washer |
| 2. Nut, Lock | 21. Block, Adjusting |
| 3. Screw, Cap | 22. Block, Adjusting |
| 4. Nut, Lock | 23. Washer, Flat |
| 5. Arm, Rear | 24. Screw, Cap |
| 6. Axle | 25. Shock Absorber |
| 7. Spring, Rear | 26. Spacer |
| 8. Wheel, Idler | 27. Screw, Machine |
| 9. Sleeve, Spring | 28. Eyebolt |
| 10. Axle, Idler Arm | 29. Spring, Front |
| 11. Screw, Cap | 30. Arm, Front |
| 12. Arm, Idler | 31. Bearing |
| 13. Screw, Cap | 32. Fitting, Grease |
| 14. Screw, Cap | 33. Strap, Limiter |
| 15. Axle, Serrated | 34. Nut, Lock |
| 16. Bushing | 35. Spacer, Spring |
| 17. Washer, Lock | 36. Bushing, Front Arm |
| 18. Screw, Cap | 37. Screw, Cap |
| 19. Axle, Inner | |



0727-344

KEY

- | | |
|-------------------------------|----------------------------|
| 1. Rail, Formed | 22. Insert, Wheel |
| 2. Screw, Machine | 23. Insert, Wheel |
| 3. Strip, Wear | 24. Housing, Rear Axle |
| 4. Nut, Lock | 25. Axle, Rear |
| 5. Nut, Push | 26. Screw, Cap |
| 6. Pad, Shock | 27. Plate/Nut |
| 7. Nut, Lock | 28. Washer, Rectangular |
| 8. Rivet, Solid | 29. Nose Piece, Rail |
| 9. Screw, Cap | 30. Washer |
| 10. Stop, Arm | 31. Housing, Rear Axle |
| 11. Axle, Inner | 32. Wheel, Idler |
| 12. Washer | 33. Insert, Wheel |
| 13. Screw, Cap | 34. Insert, Wheel |
| 14. Nut, Hex | 35. Screw, Cap |
| 15. Washer, Lock | 36. Tube, Spring Roller |
| 16. Crossbrace, Front | 37. Screw, Cap |
| 17. Roller, Suspension Spring | 38. Strap, Spring Retainer |
| 18. Crossbrace, Shock Mount | 39. Pin, Spring |
| 19. Screw, Cap-Lock | 40. Track Assembly |
| 20. Washer | 41. Clip, Guide |
| 21. Wheel, Idler | 42. Washer, Flat |



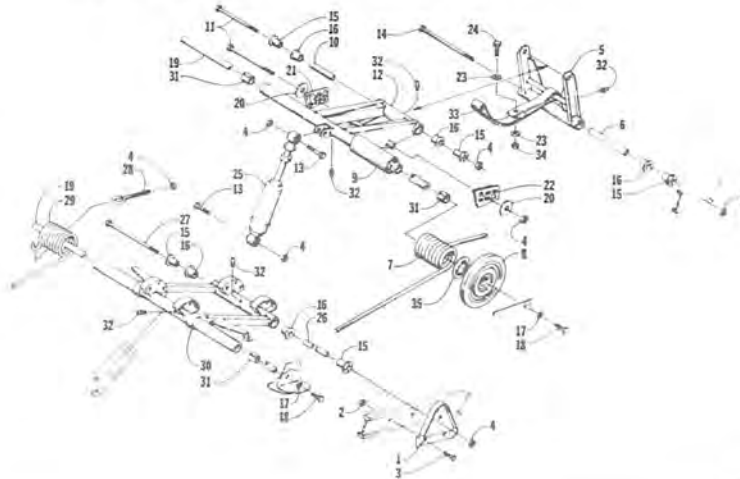
0727-341

Fig. 7-20

Super Jag

KEY

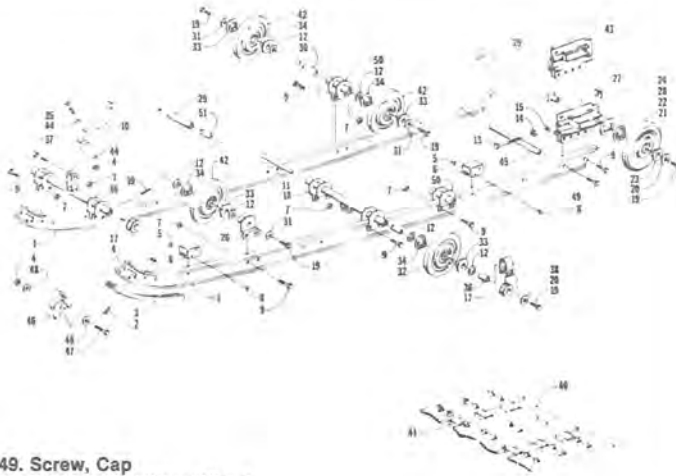
- | | |
|-----------------------|----------------------|
| 1. Bracket, Front Arm | 19. Axle, Inner |
| 2. Nut, Lock | 20. Washer |
| 3. Screw, Cap | 21. Block, Adjusting |
| 4. Nut, Lock | 22. Block, Adjusting |
| 5. Arm, Rear | 23. Washer, Flat |
| 6. Axle | 24. Screw, Cap |
| 7. Spring, Rear | 25. Shock Absorber |
| 8. Wheel, Idler | 26. Axle, Front Arm |
| 9. Sleeve, Spring | 27. Screw, Cap |
| 10. Axle, Idler Arm | 28. Eyebolt |
| 11. Screw, Cap | 29. Spring, Front |
| 12. Arm, Idler | 30. Arm, Front |
| 13. Screw, Cap | 31. Bearing |
| 14. Screw, Cap | 32. Fitting, Grease |
| 15. Axle, Serrated | 33. Strap, Limiter |
| 16. Bushing | 34. Nut, Lock |
| 17. Washer, Lock | 35. Spacer, Spring |
| 18. Screw, Cap | |



0727-280

KEY

- | | |
|-------------------------------|------------------------------|
| 1. Rail, Formed | 25. Axle, Rear |
| 2. Screw, Machine | 26. Support, Auxiliary Wheel |
| 3. Strip, Wear | 27. Plate/Nut |
| 4. Nut, Lock | 28. Washer, Rectangular |
| 5. Nut, Push | 29. Spacer |
| 6. Pad, Shock | 30. Axle, Idler Wheel |
| 7. Nut, Lock | 31. Washer |
| 8. Rivet, Solid | 32. Wheel, Idler |
| 9. Screw, Cap | 33. Insert, Wheel |
| 10. Stop, Arm | 34. Insert, Wheel |
| 11. Axle, Inner | 35. Screw, Cap |
| 12. Washer | 36. Tube, Spring Roller |
| 13. Screw, Cap | 37. Screw, Cap |
| 14. Nut, Hex | 38. Strap, Spring Retainer |
| 15. Washer, Lock | 39. Pin, Spring |
| 16. Crossbrace, Front | 40. Track Assembly |
| 17. Roller, Suspension Spring | 41. Clip, Guide |
| 18. Crossbrace, Shock Mount | 42. Wheel, Idler |
| 19. Screw, Cap-Lock | 43. Housing, Rear Axle |
| 20. Washer | 44. Washer |
| 21. Wheel, Idler | 45. Support, Rear Rail |
| 22. Insert, Wheel | 46. Nose Piece, Rail |
| 23. Insert, Wheel | 47. Screw, Cap |
| 24. Housing, Rear Axle | 48. Washer, Flat |



49. Screw, Cap
50. Bracket, Auxiliary Wheel
51. Axle, Inner

0727-278

- Slide the front pads into position. Install pins and secure with push nuts.
- Slide the front crossbrace into the rail from the front and secure with four bolts and new lock nuts. Torque to 2.4 kg-m (17 ft-lb).

Fig. 7-21



AG062

- On the Super Jag, install the front idler wheels, spacer, washers, axles, and mounting brackets. Secure the mounting brackets to the rails with four bolts and lock nuts torqued to 2.4 kg-m (17 ft-lb).
- From the rear of the rails, slide the shock mounting brace into position; then secure to the rails with four bolts and lock nuts. Tighten to 2.4 kg-m (17 ft-lb).
- Install the front arm mounting brackets. Secure with four bolts and lock nuts torqued to 2.4 kg-m (17 ft-lb).
- Position axles and spacer into the lower front arm mounting tube and place between mounting brackets. Secure the front arm to the mounting brackets with a long bolt and new lock nut torqued to 4.2 kg-m (30 ft-lb).

7. Secure the front-arm stop to the front arm with bolt, two washers, and lock nut. Nut should be positioned on bottom side of front-arm stop. Torque the bolt to 1.1 kg-m (8 ft-lb).

Fig. 7-22



AG061

8. Secure the front arm stop to the crossbrace with a bolt and lock nut torqued to 1.1 kg-m (8 ft-lb). Check to make sure the stop is free to pivot.

Fig. 7-23



AG060

9. Place front springs into position on front arm and on front crossbrace rollers. Attach eyebolts to springs and secure eyebolts to front arm with lock nuts. Tighten so 12 mm (½ in.) of thread shows behind each nut.
10. On the Super Jag, slide the center crossbrace onto the rear of the rails and into position. Secure with four bolts and lock nuts torqued to 2.4 kg-m (17 ft-lb). **DO NOT INSTALL THE IDLER WHEELS AT THIS TIME.**
11. On the Super Jag, position the center idler wheel mounting brackets into position on the slide rails and secure with four bolts and lock nuts torqued to 2.4 kg-m (17 ft-lb).
12. On the Super Jag, lubricate the center idler wheel axle with a good low-temperature grease and start into either of the mounting

brackets. Arrange a washer, idler wheel, spacer, washer, idler wheel, and washer onto the axle and slide axle through all components and remaining mounting brackets. Secure with two large flat washers and cap screws torqued to 2.4 kg-m (17 ft-lb).

13. Place the rear shock pads into position and secure to the slide rails with pins and push nuts.
14. Assemble the axles and spacer in the upper rear arm and slide into position on lower arm. Secure upper arm to lower arm with a single long bolt and lock nut torqued to 4.2 kg-m (30 ft-lb).
15. Slide the rear arm assembly into position from the rear of the rails. Secure to the rails with a single long bolt and lock nut torqued to 4.2 kg-m (30 ft-lb).
16. Place the rear arm limiter strap around the bottom and upper arm. Secure strap with two flat washers on either side of the strap and a bolt and lock nut. Torque the lock nut to 1.1 kg-m (8 ft-lb).
17. Place the rear shock into position and secure to upper rear arm and center crossbrace with two bolts and lock nuts torqued to 4.2 kg-m (30 ft-lb).
18. Place the rear suspension springs onto the rear arm. Press the rear idler wheel into position on the rear arm.
19. Place the rear spring onto the adjustment block. Grasp the long portion of the spring and place it along with its roller and retainer on the center idler wheel shaft. Secure idler wheels and spring retainer to axle with cap screws torqued to 2.4 kg-m (17 ft-lb).
20. Slide the rear axle housings onto the slide rails and secure with four cap screws and lock nuts torqued to 2.4 kg-m (17 ft-lb). Be sure the wide portion of the axle housings are positioned out on each rail.

Fig. 7-24



AG031

21. Slide the rear axle through the housing; then position a spacer washer on either end of the axle and slide the rear wheels into position. Secure the idler wheels to the rear axle with two bolts and cap screws torqued to 2.4 kg-m (17 ft-lb).
22. Apply grease to the rails and wear strips; then using a hammer and a block of wood, drive the wear strips into position from the rear of the rails. Secure wear strips with two machine screws and lock nuts.
23. Place the end caps into position on the end of each slide rail. Secure each with a bolt and lock nut tightened to 1.1 kg-m (8 ft-lb).
24. Using a low-temperature grease, lubricate all grease fittings.

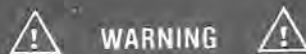
Installing Skid Frame

1. Tip snowmobile onto one side using a piece of cardboard to protect against scratching.
2. Pull track away from the tunnel at a 45 degree angle and install skid frame. Slide inner axles through front and rear arms of skid frame.
3. Move the front arm into position with front mounting hole in tunnel. Slide lock washer onto bolt; then secure front arm to tunnel. Thread bolt in only halfway. **DO NOT TIGHTEN AT THIS TIME.**
4. Slide the skid frame and track into the tunnel.
5. Tip the snowmobile onto the opposite side and secure front arm to tunnel using step 3.
6. Swing the rear of the frame into position and secure rear arm to tunnel with remaining two bolts; then set the snowmobile upright and torque all four mounting bolts to 3.2 kg-m (23 ft-lb).

NOTE: If the rear arm doesn't align with its mounting holes, it can be pried forward using a long bar. Place the bar against upper track wear clip and arm.

Check and adjust track alignment and tension.

Track Tension



WARNING

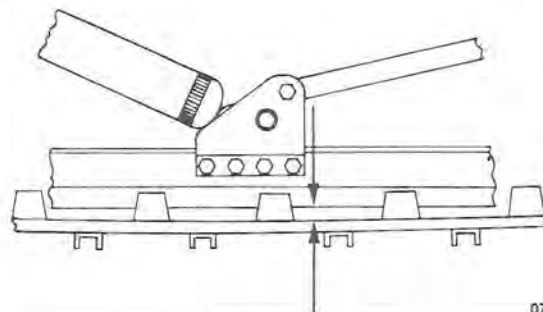


Shut engine off and make sure ignition switch key is in the OFF position.

1. Raise the rear of the snowmobile off the floor.
2. Using moderate pressure (9 kg or 20 lb), press track down at mid-span and measure distance between bottom of the wear-strip and inside surface of the track. Track deflection must be within specifications.

Track Tension	mm	in.
New (100 miles or less)	13-19	1/2 - 3/4
Old (100 miles or more)	25-32	1 - 1 1/4

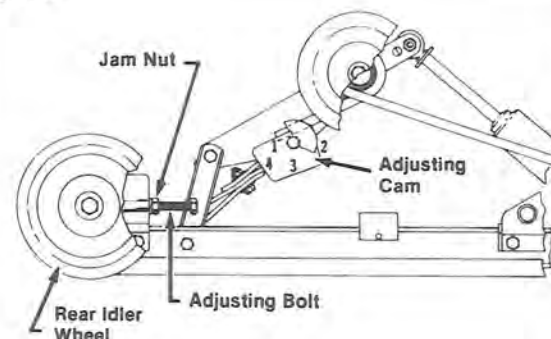
Fig. 7-25



NOTE: When the track is new, it will stretch slightly and take a "set" within the first 100 miles of operation.

3. If measurement is not as specified, loosen the jam nuts of the adjustment bolts.

Fig. 7-26



4. If measurement obtained in step 2 is more than specified, tighten adjusting bolts. If measurement obtained is less than specified, loosen adjustment bolts. When measurement is within specified range, lock adjustment by bottoming the jam nuts against the axle housings.

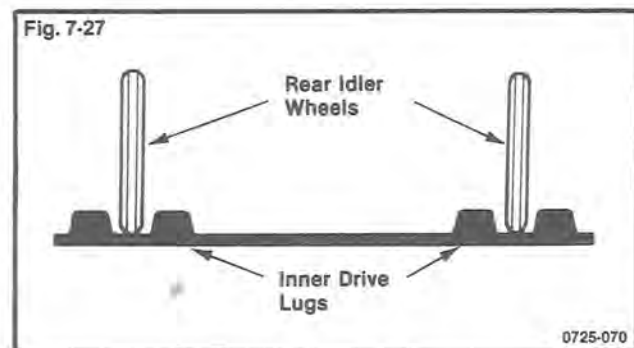
NOTE: Slide your hand along the inside of the tunnel and vigorously push the underside of the track up and down. Track must not hit top of tunnel or slap skid frame.

5. After correct track tension is obtained, check track alignment.

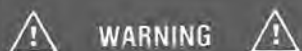
NOTE: Track tension and track alignment are interrelated; always check both even if only one adjustment seems necessary. Always establish correct track tension before checking and/or adjusting alignment.

Track Alignment

Proper track alignment is when the rear idler wheels are equidistant from the inner drive lugs on the inside surface of the track.



1. Using a shielded safety stand, raise the rear of the snowmobile off the floor making sure the track is free to rotate.



WARNING

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

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

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

3. When the track stops rotating, check the relationship of the rear idler wheels and the track inner drive lugs. If the distances from the idler wheels to the inner drive lugs are the same on both sides, no adjustment is necessary.
4. If the distances from the idler wheels to the inner drive lugs are not the same on both sides, proceed to step 5.
5. On the side of the track which has the inner drive lugs closer to the rear idler wheel, loosen the adjustment bolt jam nut; then rotate the adjustment bolt clockwise 1-1/2 turns.
6. Check track alignment and make necessary adjustments until proper alignment is obtained.

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

7. After proper track alignment is obtained, lock adjustment bolt jam nut against the axle housing.
8. Field test the track under actual conditions.
9. After the field test, check track alignment and track tension; adjust if necessary.

Adjusting Suspension

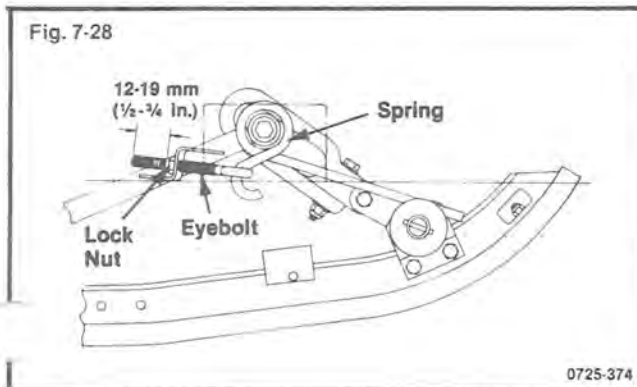
The suspension should be adjusted for the operator only. The rear springs should be adjusted for the weight and riding preference of the operator. The optimum adjustment on the rear springs prevents the suspension from "bottoming out" on all but the most severe bumps. The springs should not be adjusted so stiffly that the suspension will not work properly under normal conditions. A good test of a properly adjusted suspension is the operator should just be able to "bottom" the suspension when jumping up and down on the rearmost part of the running board.

The front spring adjustment primarily influences the way the snowmobile performs in snow and the effort required to steer the snowmobile. The optimum setting for the front spring (when spring tension is sufficiently stiff to prevent the suspension from collapsing in deep snow but not so stiff that steering becomes ineffective), is when 12-19 mm ($\frac{1}{2}$ - $\frac{3}{4}$ in.) of thread is apparent behind each lock nut.

FRONT SPRING

To adjust spring tension, tighten or loosen the lock nut on the eyebolt connected to the spring until desired tension is attained.

Perform this procedure on both sides to maintain equal adjustment on both springs.



NOTE: When the lock nut is tightened, spring tension is increased; when the lock nut is loosened, spring tension is decreased.

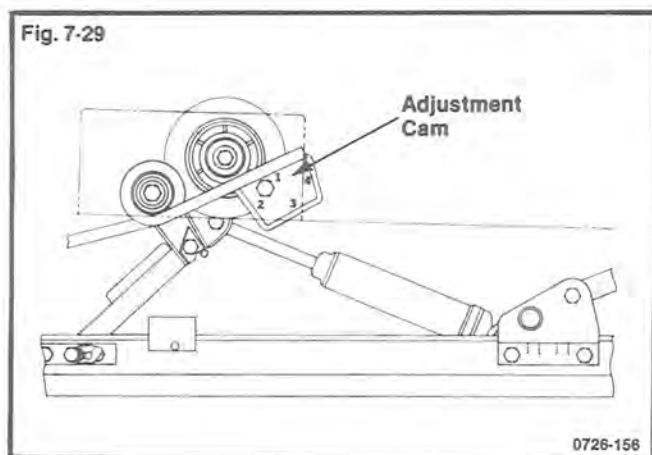


At least two threads must be maintained on the eyebolt behind the lock nut. Failure to maintain this distance may result in personal injury.

REAR SPRING

Rear spring tension adjustment is accomplished by rotating the adjustment cam. Each cam is numbered 1-4 for easy identification with position 4 providing the stiffest ride and position 1 for the light driver or slow speed trail driving. Positions 2 and 3 are for the average operator under normal conditions with position 3 providing the stiffer ride.

To rotate the cam, insert the handle from the spark-plug wrench into one of the holes in the adjustment cam. Rotate the handle until the cam is in the desired position. Make the adjustment on the other cam making sure both cams are adjusted equally.



CAUTION

DO NOT rotate the adjustment cam directly from position 1 to position 4. Always adjust in numerical sequence. Cam failure or damage may result if the cam is rotated directly from position 1 to position 4.

SECTION 8 — RECOIL STARTER

8

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Removing

1. Tie a slipknot in the recoil rope below the console and allow the rope to slowly retract against the recoil case.
2. Remove the knot at the handle and remove the handle; then thread rope through the recoil bushing in the console.
3. Remove the four bolts and lock washers securing recoil assembly to the magneto-case cover.

Disassembling

1. Clamp the recoil in a vise.
2. Rotate the recoil roller counterclockwise until the notch of the roller is near the recoil rope guide in the case. Guide the rope into the notch and slowly allow the roller to retract until all recoil spring tension is released.

Fig. 8-1



B522

3. While exerting downward pressure on the drive plate, remove the nut and washer.

Fig. 8-2



B523

4. Slowly release the drive plate and lift the drive plate w/spring clip free of the recoil roller.
5. Remove the spring clip from the drive plate.

Fig. 8-3



B524

6. Remove the pawl; then remove the pawl spring.

Fig. 8-4



B525

7. Carefully lift the recoil free of case making sure the recoil spring does not accidentally disengage from the recoil case.

8. Remove the recoil spring from the recoil case by lifting the spring end up and out. Hold remainder of recoil spring with thumbs and alternately release each thumb to allow the recoil spring to gradually release from the recoil case.

NOTE: Do not remove the recoil spring unless replacement is necessary. It should be visually inspected in place to save time.

9. Unwind the rope from the recoil roller, untie the knot, and remove the rope.

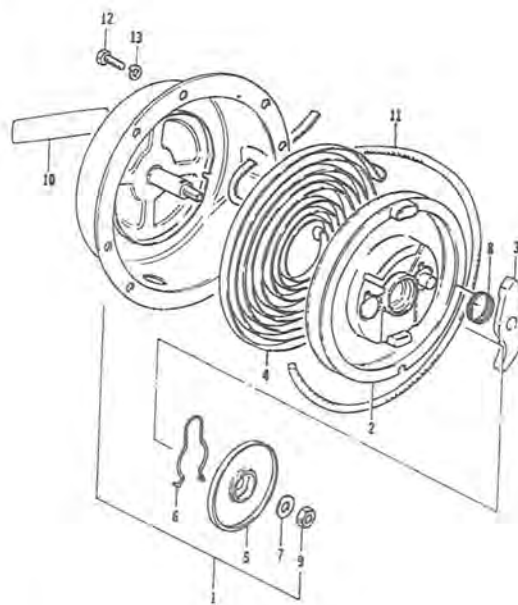
Inspecting

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

1. Inspect all springs, washers, and pawl for wear or damage.
2. Inspect the recoil roller and case for cracks or damage.
3. Inspect the center hub for wear, cracks, or damage.
4. Inspect the recoil rope for breaks or fraying.
5. Inspect the recoil spring for cracks, crystallization, or abnormal bends.
6. Inspect the handle for damage, cracks or deterioration.

Assembling

Fig. 8-5



KEY

- | | |
|----------------------------|-----------------|
| 1. Recoil Starter Assembly | 8. Spring |
| 2. Roller | 9. Nut |
| 3. Pawl | 10. Decal |
| 4. Spring | 11. Rope |
| 5. Drive Plate | 12. Bolt |
| 6. Spring Clip | 13. Lock Washer |
| 7. Washer | |

0720-152

1. Hook the end of the recoil spring around the mounting lug in the recoil case.
2. Insert the recoil spring into the recoil case winding it in a counterclockwise direction until the complete recoil spring is installed.

NOTE: Recoil spring must seat evenly in the recoil case.

3. Insert the rope through the hole in the recoil roller and tie a knot in the end; then wrap rope counterclockwise around roller leaving about 1/2 m (20 in.) of rope free of roller.
4. Apply a low-temperature grease to the spring and hub.
5. Align the hook in the end of the recoil spring with the notch in the recoil roller.

6. Carefully slide the recoil over hub and engage the spring with the roller.
7. Install the pawl spring making sure the end is properly installed in the hole in the recoil roller; then install the pawl making sure the pawl spring is properly preloaded.

Fig. 8-6



B525

8. Slide end of recoil rope through rope guide of the case; then tie a slipknot in the recoil rope.
9. Place the spring clip into position on the drive plate making sure the head of the clip is opposite the flat of the inner hole. Apply a low-temperature grease to the drive plate.

Fig. 8-7

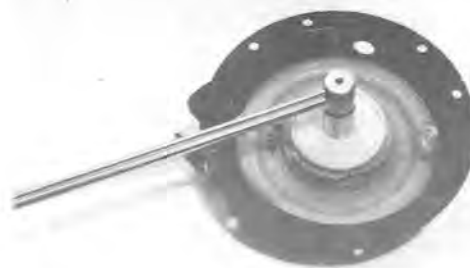


B524

10. Place the drive plate into position making sure the flat of the inner hole is correctly positioned in the hub; then secure drive plate with washer and nut. Tighten to 1.0 kg-m (7 ft-lb).

NOTE: Apply **LOCTITE LOCK N' SEAL (red)** to the threads before installing.

Fig. 8-8



B526

11. With about 1/2 m (20 in.) of rope exposed, hook the rope in the notch of the recoil roller.
12. Rotate the recoil roller four or five turns counterclockwise; then release the recoil rope from the notch and allow the rope to retract.
13. Pull recoil rope out two or three times to check for correct tension.

NOTE: Increasing the rotations in step 12 will increase spring tension; decreasing the rotations will decrease spring tension.

Installing

1. Place recoil assembly into position against the magneto case.
2. Secure recoil with four bolts and lock washers. Tighten to 0.7 kg-m (5 ft-lb).

NOTE: Before tightening the bolts, slowly pull recoil rope until the pawl engages; then tighten bolts. This will center the recoil on the magneto case.

3. Thread recoil rope through recoil bushing in the console and install the handle. Secure with a knot.
4. Release the slipknot in the rope.

SECTION 9 — AIDS FOR MAINTENANCE

9

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Special Tools

P/N	DESCRIPTION	SUPPLIER
0133-043	Imprinter	Arctco-CPC
0144-003	Piston Pin Puller	Arctco-CPC
0144-007	Flywheel Spanner Wrench	Arctco-CPC
0144-009	Engine Timing Gauge	Arctco-CPC
0144-053	Multitester	Arctco-CPC
0144-109	Ramp Grinding Holder	Arctco-CPC
0144-110	Arctic Clutch Puller	CPC
0144-113	Fan Holder	Arctco-CPC
0144-122	Surface Plate	CPC
0144-127	Pressure Testing Kit	Arctco-CPC
0144-135	Comet Clutch Puller	Comet
0144-136	Comet Grunt Tool	Comet
0144-301	Track Clip Tool	Arctco-OTC
0144-302	Bearing Remover (Crankshaft)	Arctco-OTC
0144-303	Bearing Tool Adapter Kit	OTC
0144-305	Cylinder Hone Set	Arctco-OTC
0144-306	Ignition Test Plug	OTC
0144-307	Mikuni Carburetor Tool Set	Arctco-OTC
0144-308	Spark Tester	Arctco-OTC
0144-309	Snowmobile Dolly	Arctco-OTC
0355-109	Snowmobile Dolly	CPC
0144-310	Flywheel Puller/Spanner Wrench	Arctco-OTC
0144-311	Rear Suspension Spring Tool	Arctco-OTC
0636-069	Sealant, Gasket	Arctco
0636-070	Sealer, Crankcase	Arctco
0636-071	Adhesive, H/B Grip	Arctco
0636-092	Copper Coat	Arctco
0644-001	Spider Repair Tool Kit	Arctco-OTC
0644-002	Shock Spring Installation Tool	Arctco-OTC
0644-003	Clutch Alignment Bar	Arctco-OTC
0644-005	Spider Removal Tool Set (Comet)	Arctco-OTC
0644-006	Arctic Clutch Bushing Installation Tool	Arctco-OTC
0644-008	Timing Light	Arctco
0644-009	Clutch Puller (Comet)	Arctco-OTC
0144-135	Clutch Puller (Comet)	CPC

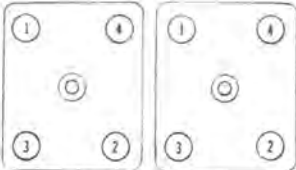
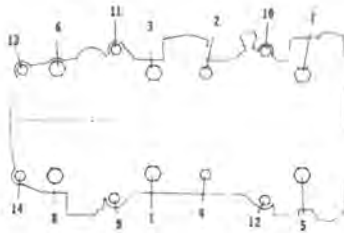
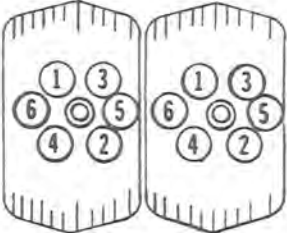
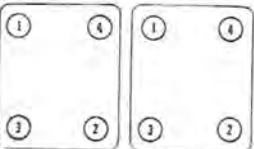
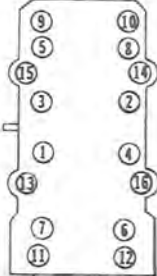
P/N	DESCRIPTION	SUPPLIER
0644-010	Clutch Puller (Arctic)	Arctco-OTC
0644-012	Wrench, Cylinder Base 14mm	OTC
0644-013	Wrench, Cylinder Base 12mm	OTC
0644-014	Track Stud Hole Drill	Arctco
0644-016	Surface Plate	Arctco
0644-018	Stud Runner 6mm	Arctco
0644-019	Stud Runner 8mm	Arctco
0644-020	Stud Runner 10mm	Arctco
0644-022	V Blocks	Arctco
0644-023	Carburetor Synchronizing Tool Adapters	Arctco
0644-027	Carburetor Synchronizing Tool	Arctco
0644-028	Engine Tachometer	Arctco
0644-029	Flywheel Puller	Arctco
0644-030	Rear Shock Adjuster	Arctco-OTC
0644-031	Rear Spring Adjuster	Arctco-OTC
0144-112	Flywheel Puller	CPC
0144-080	Bearing Puller	CPC
0144-227	Clutch Alignment Bar	CPC
	Model 1L CDi Tester	ESI
0133-417	Imprinter Ink Roller	Arctco
0644-033	Multitester	Arctco
0644-034	Engine Compression Tester	Arctco
0644-035	Ball Hone (60-64 mm)	Arctco
0644-036	Ball Hone (65-70 mm)	Arctco
0644-037	Ball Hone (72-74 mm)	Arctco
0644-038	T-nut Tool	Arctco
0644-041	Rigid Hone	Arctco
0644-042	Rigid Hone Stone Set (2.5-2.7 in.)	Arctco
0644-043	Rigid Hone Stone Set (2.7-4.1 in.)	Arctco
0644-044	Alcohol Test Kit	Arctco
0644-046	Ignition Analyzer	Arctco
0134-971	RTV Silicone	CPC
0132-105	Gasket Compound	CPC
0644-007	Oil Injection Usage Tool	Arctco

Engine Bolt Torque Specifications

Item	Jag 340-Jag 440-Super Jag		Panther	
	kg-m	ft-lb	kg-m	ft-lb
Cylinder-Head Nuts	1.8-2.2	13-16	2.0-2.5	14.5-18
Cylinder-Base Nuts	N/A	N/A	3.0-4.0	22-29
Crankcase - 6 mm	0.8-1.2	6-9	0.8-1.2	6-9
- 8 mm	1.8-2.2	13-16	1.8-2.2	13-16
Exhaust-Manifold Nuts	1.5-1.9	11-14	1.5-1.9	11-14
Intake-Manifold Nuts	0.8-1.2	6-9	1.5-1.9	11-14
Intake-Flange Nuts	1.8-2.2	13-16	1.8-2.2	13-16
Magneto-Case Screws	0.7-1.0	5-7	0.7-1.0	5-7
Flywheel Nut	9.0-11.0	65-79	9.0-11.0	65-79
Engine-Mounting Bolts	6.9-7.6	50-55	6.9-7.6	50-55
Fan-Case Nuts	1.8-2.2	13-16	1.8-2.2	13-16
Mounts	2.8-3.5	20-25	2.8-3.5	20-25

N/A = Not Applicable

Engine Torque Patterns

CYLINDER HEAD	CYLINDER BASE	CRANKCASE
Jag  0725-318		 0726-412
Panther  0725-320	 0726-318	 0725-321

General Bolt Torque Specifications

SIZE	SAE GRADE 2 ASSEMBLY TORQUE		SAE GRADE 5 ASSEMBLY TORQUE		SAE GRADE 8 ASSEMBLY TORQUE	
	DRY	LUB	DRY	LUB	DRY	LUB
8-32	19 in.-lb	14 in.-lb	30 in.-lb	22 in.-lb	41 in.-lb	31 in.-lb
8-36	20 in.-lb	15 in.-lb	31 in.-lb	23 in.-lb	43 in.-lb	32 in.-lb
10-24	27 in.-lb	21 in.-lb	43 in.-lb	32 in.-lb	60 in.-lb	45 in.-lb
10-32	31 in.-lb	23 in.-lb	49 in.-lb	36 in.-lb	68 in.-lb	51 in.-lb
1/4-20	66 in.-lb	50 in.-lb	8 ft-lb	75 in.-lb	9 ft-lb	10 ft-lb
1/4-28	76 in.-lb	56 in.-lb	10 ft-lb	86 in.-lb	14 ft-lb	12 ft-lb
5/16-18	11 ft-lb	8 ft-lb	17 ft-lb	13 ft-lb	25 ft-lb	18 ft-lb
5/16-24	12 ft-lb	9 ft-lb	19 ft-lb	14 ft-lb	28 ft-lb	20 ft-lb
3/8-16	20 ft-lb	15 ft-lb	30 ft-lb	23 ft-lb	45 ft-lb	33 ft-lb
3/8-24	23 ft-lb	17 ft-lb	35 ft-lb	25 ft-lb	50 ft-lb	35 ft-lb
7/16-14	32 ft-lb	24 ft-lb	50 ft-lb	35 ft-lb	70 ft-lb	55 ft-lb
7/16-20	36 ft-lb	27 ft-lb	55 ft-lb	40 ft-lb	80 ft-lb	60 ft-lb
1/2-13	50 ft-lb	35 ft-lb	75 ft-lb	55 ft-lb	110 ft-lb	80 ft-lb
1/2-20	55 ft-lb	40 ft-lb	90 ft-lb	65 ft-lb	120 ft-lb	90 ft-lb

NOTE: Lub indicates lubricants or plating on fasteners.

Torque Conversions

kg-m x 7.235 = ft-lb
ft-lb x 0.1383 = kg-m

ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m
1	0.1	21	2.9	41	5.7	61	8.4	81	11.2
2	0.3	22	3.0	42	5.8	62	8.6	82	11.3
3	0.4	23	3.2	43	5.9	63	8.7	83	11.5
4	0.6	24	3.3	44	6.1	64	8.9	84	11.6
5	0.7	25	3.5	45	6.2	65	9.0	85	11.8
6	0.8	26	3.6	46	6.4	66	9.1	86	11.9
7	1.0	27	3.7	47	6.5	67	9.3	87	12.0
8	1.1	28	3.9	48	6.6	68	9.4	88	12.2
9	1.2	29	4.0	49	6.8	69	9.5	89	12.3
10	1.4	30	4.2	50	6.9	70	9.7	90	12.5
11	1.5	31	4.3	51	7.1	71	9.8	91	12.6
12	1.7	32	4.4	52	7.2	72	10.0	92	12.8
13	1.8	33	4.6	53	7.3	73	10.1	93	12.9
14	1.9	34	4.7	54	7.5	74	10.2	94	13.0
15	2.1	35	4.8	55	7.6	75	10.4	95	13.1
16	2.2	36	5.0	56	7.7	76	10.5	96	13.3
17	2.4	37	5.1	57	7.9	77	10.7	97	13.4
18	2.5	38	5.3	58	8.0	78	10.8	98	13.6
19	2.6	39	5.4	59	8.2	79	10.9	99	13.7
20	2.8	40	5.5	60	8.3	80	11.1	100	13.8

SECTION 10 — TROUBLESHOOTING

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Engine

Problem: Engine Does Not Start	Condition	Remedy
A. No Spark At Spark Plugs	1. Ignition switch malfunctioning—switch not in RUN position 2. Wiring harness shorting—disconnected 3. Emergency stop switch in DOWN position—switch malfunctioning 4. Throttle/ignition monitor switch adjusted incorrectly—malfunctioning 5. Spark plugs fouled—damaged 6. Spark-plug caps damaged—leaking—shorting 7. High tension wires/coil loose—grounded—defective 8. CDI unit defective 9. Charge coil defective 10. Trigger coil defective 11. Flywheel magnets weak	1. Replace ignition switch—turn switch to RUN position 2. Repair—replace—connect wiring harness 3. Move switch to UP position—replace throttle switch 4. Adjust throttle cable tension—replace throttle switch 5. Clean—replace spark plugs 6. Replace spark-plug caps 7. Service—replace high tension wires/coil 8. Replace CDI unit 9. Replace charge coil 10. Replace trigger coil 11. Replace flywheel
B. No Fuel At Cylinders	1. Fuel tank empty 2. Fuel hose broken—pinched 3. Fuel-tank vent—hose obstructed 4. In-line fuel filter obstructed—damaged 5. Fuel pump malfunctioning—defective 6. Impulse hose cracked—broken—pinched—disconnected 7. Carburetor(s) adjusted incorrectly—dirty—damaged 8. Primary compression absent	1. Fill tank 2. Replace—service hose 3. Remove obstruction—replace vent—hose 4. Remove obstruction—replace in-line fuel filter 5. Replace—clean fuel pump 6. Replace—connect impulse hose 7. Troubleshoot carburetor(s) 8. Repair—replace damaged—worn engine components
C. Miscellany (Fuel Does Not Ignite)	1. Carburetor-to-cylinder air leak 2. Carburetor adjusted incorrectly—dirty—damaged 3. Gasoline contaminated 4. Engine flooded	1. Replace—service gaskets—intake flange—manifold—connect oil delivery hose—service intake ports 2. Troubleshoot carburetor 3. Clean tank and entire delivery system 4. Troubleshoot carburetor—clean—replace air-intake silencer

Problem: Engine Does Not Start (cont.)	Condition	Remedy
Miscellany (Fuel Does Not Ignite)	5. Compression low 6. Timing adjusted incorrectly 7. Oil-injection pump malfunctioning—adjusted incorrectly	5. Repair—replace damaged—worn engine components 6. Time ignition 7. Replace—bleed—adjust oil-injection pump
Problem: Engine Does Not Idle	Condition	Remedy
	1. Carburetor(s) adjusted incorrectly—dirty—damaged 2. Fuel pump malfunctioning—defective 3. Impulse hose cracked—broken 4. Air-intake silencer obstructed—damaged	1. Troubleshoot carburetor(s) 2. Replace—clean fuel pump 3. Replace impulse hose 4. Remove obstruction—replace air-intake silencer
Problem: Engine Loses Power	Condition	Remedy
	1. Fuel-tank vent—hose obstructed 2. Fuel hose cracked—broken—pinched 3. In-line fuel filter obstructed—damaged 4. Carburetor(s) adjusted incorrectly—dirty—damaged—loose 5. Muffler obstructed—disconnected—damaged 6. Air-intake silencer obstructed—disconnected—damaged 7. Exhaust ports carboned 8. Spark plugs fouled—damaged 9. High tension wires/coil loose—defective 10. Spark-plug caps leaking—shorting 11. Timing adjusted incorrectly 12. Compression low 13. Charge coil defective 14. Trigger coil defective 15. CDI unit defective 16. Oil-injection pump malfunctioning—adjusted incorrectly	1. Remove obstruction—replace vent—hose 2. Replace—service fuel hose 3. Remove obstruction—replace in-line fuel filter 4. Troubleshoot—tighten carburetor(s) 5. Remove obstruction—connect—replace muffler 6. Remove obstruction—connect—replace air-intake silencer 7. Clean exhaust ports 8. Clean—replace spark plugs 9. Service—replace high tension wires/coil 10. Replace spark-plug caps 11. Time ignition 12. Repair—replace damaged—worn engine components 13. Replace charge coil 14. Replace trigger coil 15. Replace CDI unit 16. Replace—bleed—adjust oil-injection pump
Problem: Engine Overheats	Condition	Remedy
	1. Cooling fins—shroud obstructed 2. Spark plug heat range too hot 3. Coolant low—absent 4. Radiator obstructed—damaged 5. Carburetor(s) adjusted incorrectly—jetted incorrectly—dirty	1. Remove obstruction 2. Install lower heat-range spark plugs 3. Add coolant 4. Remove obstruction—replace radiator 5. Troubleshoot—clean carburetor(s)

Problem: Engine Overheats (cont.)	Condition	Remedy
	6. Carburetor-to-cylinder air leak 7. Drive system (drive clutch—driven pulley—track—drive belt) adjusted incorrectly—worn—damaged 8. Rings/grooves carboned 9. Exhaust ports obstructed 10. Muffler obstructed 11. Fuel mixture incorrect 12. Primary compression low—absent 13. Timing adjusted incorrectly 14. Axial fan blades broken—bent—fan belt broken—stretched. 15. Gasoline octane too low 16. Water pump—thermostat damaged—defective	6. Replace—repair gaskets—intake flange(s)—manifold—service intake ports 7. Troubleshoot—adjust drive system 8. Clean—replace rings—pistons 9. Remove obstruction 10. Remove obstruction 11. Replace with correctly mixed fuel 12. Repair—replace damaged—worn engine components 13. Time ignition 14. Repair—replace axial fan components. 15. Use 88 minimum octane regular leaded 16. Replace water pump—thermostat
Problem: Engine Backfires	Condition	Remedy
	1. Throttle/ignition monitor switch adjusted incorrectly 2. Spark plugs fouled—damaged 3. Spark plug heat range too hot 4. High tension wires/coil shorting 5. Carburetor-to-cylinder air leak 6. Carburetor(s) adjusted incorrectly—dirty—damaged—loose 7. Fuel mixture incorrect 8. Oil-injection pump malfunctioning—adjusted incorrectly	1. Adjust throttle cable tension—service spring 2. Clean—replace spark plugs 3. Install lower heat-range spark plugs 4. Service—replace high tension wires/coil 5. Repair—replace gaskets—intake flanges—manifold—service intake ports 6. Troubleshoot—tighten carburetor(s) 7. Replace with correctly mixed fuel 8. Replace—bleed—adjust oil-injection pump
Problem: Engine Four-Cycles (Floods Excessively)	Condition	Remedy
	1. Carburetor(s) adjusted incorrectly—dirty—damaged 2. Fuel mixture incorrect 3. Oil-injection pump malfunctioning—adjusted incorrectly	1. Troubleshoot—clean carburetor(s) 2. Replace with correctly mixed fuel 3. Replace—bleed—adjust oil-injection pump

Problem: Engine Stops Suddenly	Condition	Remedy
	1. In-line fuel filter obstructed—damaged 2. Fuel hose obstructed—broken—pinched 3. CDI unit defective 4. Ignition coil defective 5. Charge coil defective 6. Trigger coil defective 7. Fuel-tank vent—hose obstructed—damaged 8. Engine seized 9. Throttle/ignition monitor switch defective	1. Remove obstruction—replace in-line fuel filter 2. Remove obstruction—repair—replace fuel hose 3. Replace CDI unit 4. Replace ignition coil 5. Replace charge coil 6. Replace trigger coil 7. Remove obstruction—replace vent—hose 8. Overhaul engine 9. Replace throttle control
Problem: Engine Stops Gradually	Condition	Remedy
	1. In-line fuel filter obstructed—damaged 2. Fuel hose obstructed—broken—pinched 3. Head gasket(s) burning out 4. Cylinder head(s) loosening 5. Spark plugs loosening 6. Impulse hose cracked 7. High tension wires/coil defective	1. Remove obstruction—replace in-line fuel filter 2. Remove obstruction—replace—repair fuel hose 3. Replace head gasket(s)—service cylinders—head(s) 4. Tighten cylinder-head nuts 5. Tighten spark plugs 6. Replace impulse hose 7. Replace high tension wires/coil
Problem: Engine Fails To Stop—Even With All Switches In The Off Position	Condition	Remedy
	1. C.D.I. unit shorted	1. Replace C.D.I. unit

Fuel System

Problem: Carburetor (0-1/4 Opening)	Condition	Remedy
A. Too Rich	1. Plunger will not seat 2. Pilot air screw too far in 3. Pilot air passage obstructed—damaged 4. Float/inlet needle obstructed—damaged—adjusted incorrectly 5. Pilot jet loose	1. Adjust—service—replace choke cable—plunger assembly 2. Adjust pilot air screw 3. Remove obstruction—replace pilot air screw—carburetor 4. Remove obstruction—replace inlet needle—float—adjust float tab 5. Tighten pilot jet
B. Too Lean	1. Plunger remains seated 2. Pilot air screw too far out—damaged 3. Throttle valve sticks open—damaged—worn 4. Pilot Jet—outlet obstructed 5. Float/inlet needle obstructed—damaged—adjusted incorrectly	1. Adjust—service—choke cable—plunger assembly 2. Adjust—replace pilot air screw 3. Service—replace throttle valve—throttle cable—spring 4. Remove obstruction 5. Remove obstruction—replace inlet needle—float—adjust float tab
Problem: Carburetor (1/4-3/4 Opening)	Condition	Remedy
A. Too Rich	1. Pilot air screw too far in 2. Needle jet—jet needle worn—adjusted incorrectly—incorrect 3. Pilot air passage obstructed—damaged 4. Pilot jet loose 5. Float/inlet needle obstructed—damaged—adjusted incorrectly 6. Main jet loose—too large 7. Primary air passage obstructed	1. Adjust pilot air screw 2. Replace—adjust needle jet—replace jet needle 3. Remove obstruction—replace pilot air screw—carburetor 4. Tighten pilot jet 5. Remove obstruction—replace inlet needle—float—adjust float tab 6. Tighten—replace main jet 7. Remove obstruction
B. Too Lean	1. Pilot air screw too far out—damaged 2. Needle jet obstructed 3. Pilot Jet—outlet—main jet obstructed 4. Float/inlet needle obstructed—damaged—adjusted incorrectly	1. Adjust—replace pilot air screw 2. Remove obstruction 3. Remove obstruction 4. Remove obstruction—replace inlet needle—float—adjust float tab
Problem: Carburetor (3/4—WOT Opening)	Condition	Remedy
A. Too Rich	1. Main jet loose—too large 2. Float/inlet needle obstructed—damaged—adjusted incorrectly 3. Needle jet—jet needle worn—adjusted incorrectly—incorrect	1. Tighten—replace with smaller main jet 2. Remove obstruction—replace inlet needle—float—adjust float tab 3. Replace—adjust needle jet—replace jet needle

Problem: Carburetor (3/4-WOT Opening) (cont.)	Condition	Remedy
B. Too Lean	1. Main jet obstructed—too small 2. Float/inlet needle obstructed—damaged—adjusted incorrectly 3. Needle jet—jet needle obstructed	1. Remove obstruction—replace with larger main jet 2. Remove obstruction—replace inlet needle—float—adjust float tab 3. Remove obstruction
Problem: General Fuel System	Condition	Remedy
A. Engine Cuts Out At High RPM	1. Inadequate fuel delivery 2. In-line fuel filter obstructed—damaged 3. Fuel contaminated 4. Fuel-tank vent—hose obstructed	1. Replace fuel pump—impulse hose 2. Remove obstruction—replace in-line fuel filter 3. Replace fuel—de-ice—clean carburetor 4. Remove obstruction—replace vent—hose
B. One Cylinder Runs Lean	1. Carburetor-to-cylinder air leak 2. Carburetor(s) not aligned 3. Air-intake silencer obstructed—damaged 4. Primary compression low 5. Carburetors not synchronized	1. Repair—replace gaskets—flange—manifold—service intake ports—tighten clamp(s) 2. Align carburetor(s) 3. Remove obstruction—replace air-intake silencer 4. Troubleshoot engine 5. Synchronize carburetors

Drive Clutch/ Driven Pulley

Problem: Drive Clutch Engagement	Condition	Remedy
A. Before Specified RPM	1. Spring weak 2. Spider assembly loose	1. Replace spring 2. Tighten spider assembly set screws
B. After Specified RPM	1. Drive clutch components dirty 2. Rollers—ramps worn—damaged 3. Bushing worn—damaged 4. Bearing/movable sheave clearance excessive 5. Spider assembly loose	1. Clean drive clutch components 2. Replace rollers—ramps 3. Replace bushing 4. Replace bearing/movable sheave 5. Tighten spider assembly set screws

Problem: Maximum Drive Clutch RPM	Condition	Remedy
A. Too High	1. Drive clutch components dirty	1. Clean drive clutch components
B. Too Low	1. Spring weak 2. Rollers—ramps worn—damaged	1. Replace spring 2. Replace rollers—ramps
Problem: Midrange Shift-Up	Condition	Remedy
A. Too Quickly (Lowers RPM)	1. Drive clutch spring weak 2. Driven pulley spring weak 3. Spring preload tension inadequate 4. Center-to-center distance too close 5. Driven pulley bushing (bearing) worn—damaged	1. Replace drive clutch spring 2. Replace driven pulley spring 3. Increase spring preload tension 4. Adjust center-to-center distance 5. Replace movable sheave
B. Too Slowly (Raises RPM)	1. Drive clutch components dirty 2. Driven pulley components dirty 3. Spring preload tension excessive 4. Shoe-ramp slides worn excessively 5. Driven pulley bushing (bearing) worn—damaged	1. Clean drive clutch components 2. Clean driven pulley components 3. Decrease spring preload tension 4. Replace shoe-ramp slides 5. Replace movable sheave
Problem: Excessive Belt Deposits	Condition	Remedy
	1. Offset adjusted incorrectly 2. Drive clutch/driven pulley sheaves rough—damaged—dirty 3. Driven pulley movable sheave travel impaired 4. Driven pulley bushing (bearing) worn—dirty	1. Adjust offset 2. Repair—replace—clean drive clutch/driven pulley sheaves 3. Service driven pulley 4. Clean bushing—replace movable sheave
Problem: Excessive Belt Drag—Impaired Drive Clutch Disengagement	Condition	Remedy
	1. Drive clutch components—dirty—damaged 2. Drive belt does not meet measurement specifications	1. Clean—replace drive clutch components 2. Replace drive belt
Problem: Engine RPM Suddenly Increases—Drive Clutch Vibrates	Condition	Remedy
	1. Spider-arm pin bent—damaged 2. Spider arm damaged—broken 3. Weight bolt broken 4. Drive clutch out of balance	1. Replace spider assembly 2. Replace spider assembly 3. Replace bolt 4. Align—replace components

Problem: Driven Pulley Vibrates	Condition	Remedy
	1. Sheave rivets loose—broken 2. Driven pulley out of balance	1. Replace sheave 2. Service—replace driven pulley

Drive Belt

Problem: Drive Belt Glazed	Condition	Remedy
	1. Drive belt does not meet measurement specifications 2. Drive clutch spring tension inadequate 3. Drive clutch components dirty—damaged 4. Offset—parallelism—center-to-center distance adjusted incorrectly	1. Replace drive belt 2. Replace drive clutch spring 3. Clean—replace drive clutch components 4. Adjust offset—parallelism—center-to-center distance
Problem: Drive Belt Lugs Torn Off—Frayed—Worn In One Spot	Condition	Remedy
	1. Drive belt does not meet measurement specifications 2. Offset—parallelism—center-to-center distance adjusted incorrectly 3. Drive clutch engagement—idle rpm too high 4. Drive clutch components dirty—damaged 5. Driven pulley/shaft rotation impaired	1. Replace drive belt 2. Adjust offset—parallelism—center-to-center distance 3. Service drive clutch—reduce idle rpm 4. Clean—replace drive clutch components 5. Service driven pulley/shaft—chain-case components

Track

Problem: Track Edge Frayed—Drive Lugs Worn	Condition	Remedy
	1. Track alignment adjusted incorrectly	1. Align track
Problem: Track Worn Adjacent To Outer Drive Lugs	Condition	Remedy
	1. Track tension adjusted incorrectly 2. Rear idler wheels dirty—damaged	1. Adjust track tension 2. Clean—replace idler wheels
Problem: Track Ratchets—Slaps Tunnel	Condition	Remedy
	1. Track tension adjusted incorrectly (too loose) 2. Drive sprockets misaligned—damaged	1. Adjust track tension 2. Align—replace sprockets
Problem: Wear-Strip Wear Excessive	Condition	Remedy
	1. Slide rail bent—broken—damaged 2. Track alignment adjusted incorrectly	1. Repair—replace slide rail 2. Adjust track alignment

Light System

Problem: Bulbs Burn Out Repeatedly	Condition	Remedy
	1. Voltage regulator malfunctioning—damaged—defective—not connected	1. Replace—connect regulator
Problem: Complete Lighting System Failure	Condition	Remedy
	1. Wiring harness connectors disconnected—damaged 2. Lighting coil defective	1. Connect—replace harness—connectors 2. Replace lighting coil

