

SPRINTFIRE-SNOWFIRE SNOWMOBILES

TECHNICAL MANUAL TM-1269 (Feb-82)

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DIA/100982

INTRODUCTION

This technical manual is part of a twin concept of service:

FOS Manuals — for reference

Technical Manuals — for actual service

The two kinds of manuals work as a team to give you both the general background and technical details of shop service.

Fundamentals of Service (FOS) Manuals cover basic theory of operation, *fundamentals* of trouble shooting, *general* maintenance, and *basic* types of failures and their causes. FOS Manuals are for training new people and for reference by experienced technicians.

Technical Manuals are concise service guides for a *specific* machine. Technical Manuals are on-the-job guides containing only the vital information needed by an experienced technician.

Some features of this technical manual:

Table of contents at front of manual

Exploded views showing parts relationship

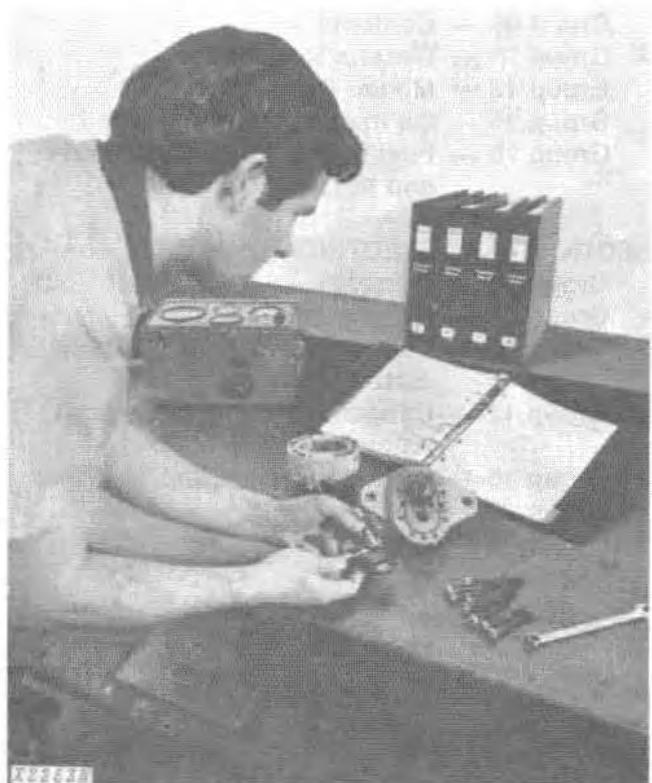
Photos showing service techniques

This technical manual was planned and written for you — an experienced technician. Keep it in a permanent binder in the shop where it is handy. Refer to it whenever in doubt about correct service procedures or specifications.

Using the technical manual as a guide will reduce error and costly delay. It will also assure you the best in finished service work.

 **CAUTION:**

This safety alert symbol followed by the word "caution" identifies important safety messages in this manual. When you see this symbol, be alert to the possibility of personal injury and carefully read the message that follows.



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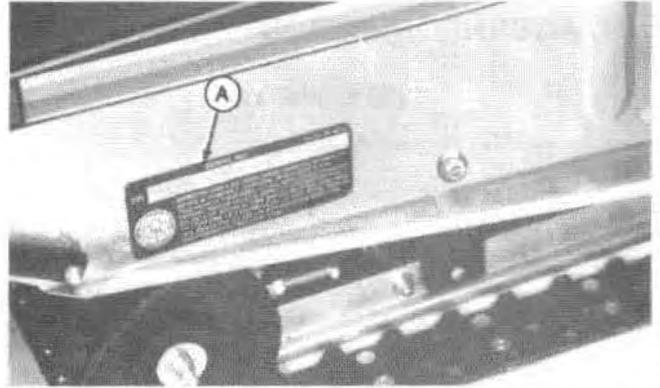
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PRODUCT IDENTIFICATION NUMBER

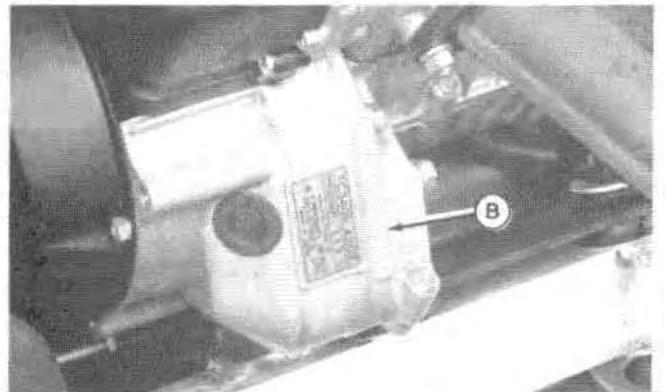
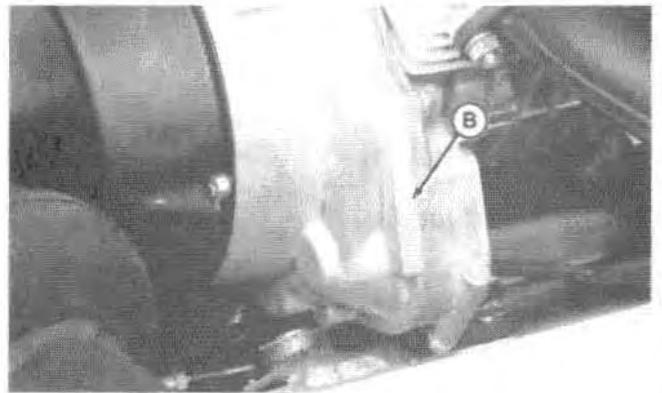
The PIN number (A) is stamped into the rear right-hand side of the tunnel.



M30823/1005D/A/100982

ENGINE SERIAL NUMBER

The engine serial number (B) is located on the right front of the flywheel housing.



M30823/M30887/1005D/B/100982

Machine Identification

VINTAGE INFORMATION

1982 Model Year

Snowfire Snowmobile

PIN Number J34XL 190,001M
Code No. (Type) J34XL
Engine Manufacturer* John Deere
"Fireburst"™
Engine Model No. TB340A - Piston-Ported

1983 Model Year

Snowfire Snowmobile

PIN Number J34XM 222,001M
Code No. (Type) J34XM
Engine Manufacturer* John Deere "Fireburst"™
Engine Model No. TB340A - Piston-Ported

1982 Model Year

Sprintfire Snowmobile

PIN Number J34LL 190,001M
Code No. J34LL
Engine Manufacturer* John Deere
"Fireburst"™
Engine Model No. TC340E - Piston-Ported

1983 Model Year

Sprintfire Snowmobile

PIN Number J34LM 222,001M
Code No. (Type) J34LM
Engine Manufacturer* John Deere "Fireburst"™
Engine Model No. TC340E - Piston-Ported

*Manufactured for John Deere by Kawasaki Heavy Industries, Japan.

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Specifications

SUSPENSION

SuspensionSlide Rail
 Drive SprocketsForged Polyethylene
 Track MaterialRubber
 Track Width381 mm (15 in.)
 Track DriveDirect

CHASSIS AND BODY

TunnelAluminum
 PanThermoplastic Rubber
 HoodSheet Molded Compound
 WindshieldPolycarbonate
 Overall Length2489 mm (98 in.)
 Overall Width950 mm (37.4 in.)
 Overall Height965 mm (38.0 in.)
 Weight (Approx.)
 Snowfire141 kg (310 lb.)
 Sprintfire150 kg (330 lb.)

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SNOWFIRE ENGINE SPECIFICATIONS

ITEM	SPECIFICATIONS
Engine Model No.	TB340A
Manufacturer	John Deere
Type of Engine	Fireburst™ Two-Stroke, Air-cooled
Number of Cylinders	Two
Cylinder Sleeve	Chrome
Bore (mm)	60
Stroke (mm)	60
Displacement (cc)	339
Compression Ratio	6.9:1
Ignition Type	Capacitor Discharge
Ignition Manufacturer	Kokusan
Lighting Coil Output	12-volt, 120 Watt
Carburetor Manufacturer	Mikuni
Carburetor Model No.	VM30/138
Starting System	Recoil Start

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SPRINTFIRE ENGINE SPECIFICATIONS

ITEM	SPECIFICATIONS
Engine Model No.	TC340E
Manufacturer	John Deere
Type of Engine	Fireburst™ Two-Stroke, Air-cooled
Number of Cylinders	Two
Cylinder Sleeve	Chrome
Bore (mm)	60
Stroke (mm)	60
Displacement (cc)	339
Compression Ratio	7.0:1
Ignition Type	Capacitor Discharge
Ignition Manufacturer	Kokusan
Lighting Coil Output	12-volt, 160 Watt
Carburetor Manufacturer	Mikuni
Carburetor Model No.	VM32/230
Starting System	Recoil Start

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TUNE-UP GUIDE

Operation	Specification	Reference
Replace Spark Plugs	Test for spark Spark Gap (0.635 mm) 0.025 in. DO NOT regap — replace	Section 40, Group 10 Section 40, Group 12
Time Ignition System	Align mark on stator with crankcase separation	Section 40, Group 10 Section 40, Group 12
Adjust Carburetor	Select main jet Adjust float height Adjust choke plunger Adjust throttle cable Adjust idle mixture Adjust idle screw	Section 30, Group 12

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ADJUSTMENTS

ADJUSTMENT	SPECIFICATION	REFERENCE
Brake	Section 50, Group 30
Sheave Alignment	Section 50, Group 20
Track	Section 60, Group 15
Skis	Section 60, Group 20

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SPARK PLUG RECOMMENDATIONS

The only spark plug recommended for the Snowfire Snowmobile is a Champion ON-3 (AM55045) (Canada) or Champion N-3 (AM52432) United States.

The only spark plug recommended for the Sprintfire Snowmobile is a Champion QN-2 (AM55044).

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BREAK-IN PERIOD (SNOWFIRE)

1. Do not exceed 48 km/h (30 mph) for the first 40 km (25 miles).
2. Do not force the machine at full throttle in deep snow. An occasional short burst of power on hard-packed snow will not be harmful.
3. Use a 40:1 mix of gasoline and oil for the first tank of fuel and a 50:1 mix thereafter.

1020D/A/100982

BREAK-IN PERIOD (SPRINTFIRE)

1. Do not exceed 48 km/h (30 mph) for the first 40 km (25 miles).
2. Do not force the machine at full throttle in deep snow. An occasional short burst of power on hard-packed snow will not be harmful.
3. Use a 50:1 mix of gasoline and oil for the first tank of fuel and also fill the oil tank with oil. After break-in use gasoline in fuel tank and 2-cycle oil in oil tank.

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FUEL

Gasoline must be of regular or premium grade with an anti-knock index of 88 or higher. Leaded gasoline is preferred but un-leaded gasoline is acceptable.

Mix gasoline and oil in a separate container. Never mix gasoline and oil in the snowmobile fuel tank. Gasoline and oil mixture that has been stored should be agitated thoroughly before using.

Use John Deere Gasoline Storage Stabilizer (TY6295) or equivalent in fuel tank when storing snowmobile. Gasoline storage stabilizer should always be used when storing snowmobile to prevent carburetor varnishing and partial plugging of carburetor jets. Either of these conditions could cause the engine to run lean and result in piston seizure and engine failure.

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CAPACITY

FUEL TANK

Snowfire20.8 L (5-1/2 U.S. gal.)

Sprintfire18.9 L (5.0 U.S. gal.)

OIL TANK (Sprintfire)2.4 L (5.0 U.S. pt.)

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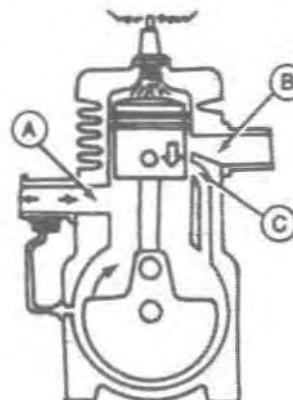
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POWER STROKE

NOTE: Power, exhaust and fuel transfer all occur on the downstroke and compression and intake occur on the upstroke.

Slightly before top-dead center (TDC) ignition occurs. Pressure of the burning gases pushes the piston down providing power to turn the crankshaft.

As the piston moves down it exposes the exhaust (B) and transfer ports (C). The intake port (A) remains closed.

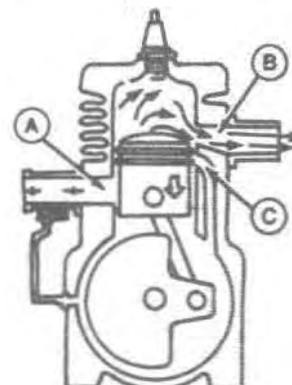


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EXHAUST STROKE

The exhaust port, is uncovered first. Hot gases, under pressure from combustion, escape through the open exhaust port.

A—Intake Port
B—Exhaust Port
C—Transfer Port



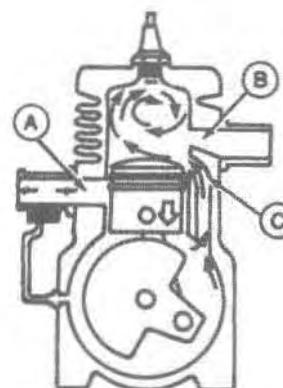
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FUEL TRANSFER STROKE

After uncovering the exhaust port, the piston moves down, exposing the transfer port. The intake port is still closed.

The downward movement of the piston pressurizes the crankcase and forces the fuel-air mixture in the crankcase up and out the transfer port into the combustion chamber. This new charge of fuel and air helps drive out any remaining exhaust gases.

A—Intake Port B—Exhaust Port C—Transfer Port

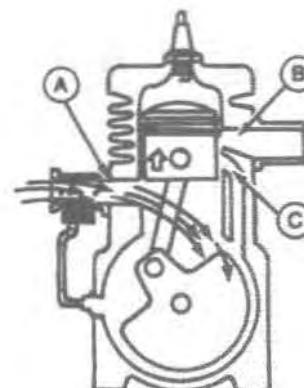


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COMPRESSION AND INTAKE STROKE

As the piston moves up it closes off the transfer (C) and exhaust port (B) and opens the intake port (A). This also creates a partial vacuum in the crankcase. Atmospheric pressure forces a new charge of fuel and air from carburetor through intake port to the crankcase.

The piston moving up also compresses the fuel-air mixture in the combustion chamber. Just before the piston reaches TDC, a spark from the spark plug ignites the mixture and it starts to burn.



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DIAGNOSE MALFUNCTIONS

Engine Will Not Start.

- Carburetor and/or fuel pump faulty.
- Spark plugs fouled or faulty.
- Coil weak or faulty.
- Fuel line obstructed.
- Head gasket leaking.
- Electrical connections loose.
- No engine compression.

Engine Starts With Difficulty.

- Carburetor out of adjustment.
- Choke not functioning properly.
- Spark plugs fouled.
- Ignition coil weak.
- Fuel mixture incorrect.
- Ignition out of time.
- Water in fuel system.
- Drive belt too tight.

Engine Won't Crank.

- Piston seized.
- Crankshaft seized to bearings.
- Connecting rod broken.
- Faulty recoil starter.

Engine Will Not Idle Properly.

- Carburetor idle adjustments incorrect.
- Spark plugs fouled.
- Head gasket leaking.
- Fuel mixture incorrect.
- Crankshaft seal leaking.
- Impulse tube to fuel pump obstructed or leaking.
- Drive belt too tight.

Engine Misses At High Speed.

- Spark plugs fouled.
- Ignition out of time.
- Fuel pump faulty.
- Head gasket leaking.
- Ignition coil weak.
- Incorrect main jet in carburetor.
- Impulse tube to fuel pump obstructed or leaking.

Engine Overheated.

- Wrong main jet in carburetor.
- Ignition out of time.
- Spark plugs incorrect.
- Air leak in intake system or crankcase.
- Engine idling for long period of time.
- Cooling fins obstructed or damaged.
- Coolant pump damaged.
- Coolant leak in cooling system.

Engine Runs Rough And Smokes.

- Improper fuel mixture.
- Choke plunger not seated.
- Muffler obstructed.
- Water in fuel.

Engine Kicks Back And Backfires.

- Ignition out of time.
- Flywheel key sheared.
- Lean fuel mixture.

Engine Loses Power Or Acceleration.

- Carburetor out of adjustment.
- Engine overheating.
- Ignition out of time.
- Ignition coil weak.
- Fuel mixture incorrect.
- Muffler obstructed.
- Running on one cylinder.
- Restricted in-line fuel filter.
- Belt too loose.

Starter Pawls Not Extending When Rope is Pulled.

- Friction spring broken allowing friction plate to rotate.
- Retaining nut loose.

Starter Pawls Not Returning When Rope is Released.

- Return spring broken.
- Return spring not assembled properly.

Starter Rope Not Returning.

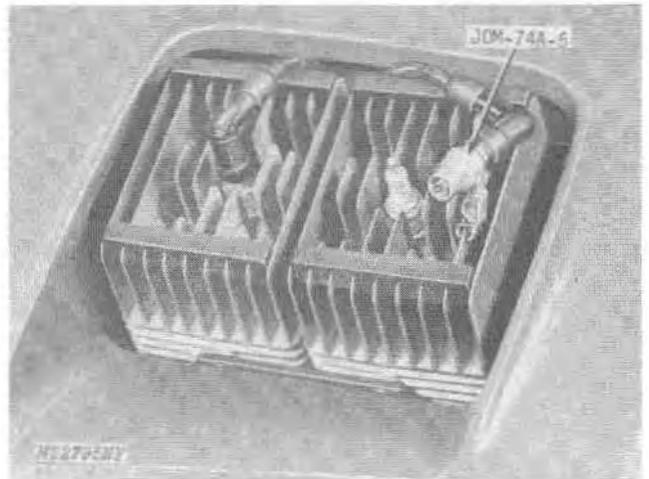
- Main spring broken or unhooked.
- No lubrication between friction plate and washer.
- Too much lubrication between friction plate and washer.

ENGINE SPARK TEST

1. Ground JDM-74A-5 Tester Plug to the engine.
2. Connect high tension lead to the tester plug.
3. Turn the key switch to the "ON" position.
4. Pull the recoil start rope and check tester plug for spark.
5. Check both cylinders.
6. If CDI system cannot fire the tester plug, ignition system difficulties exist. See Section 40.

⚠ CAUTION: High energy ignition systems can produce injurious electrical shock. DO NOT hold spark plugs, leads or connectors in your hand to check for spark.

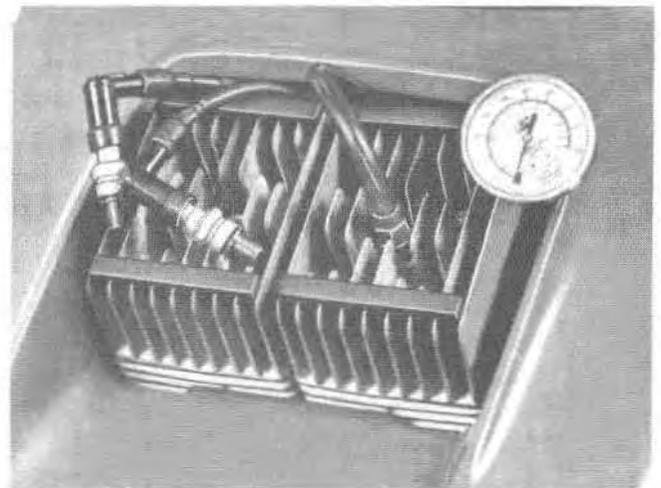
7. If spark is good and engine does not start, make compression test and check fuel supply.



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ENGINE COMPRESSION TEST

1. Remove spark plugs.
2. Install compression gauge in one of the spark plug holes.
3. With ignition "OFF" and choke "OFF," hold throttle in open position.
4. Pull recoil start and crank engine vigorously. Test both cylinders for compression.
5. Engine compression pressure should be 758-890 kPa (110-130 psi) and should not vary by more than 69 kPa (10 psi) between cylinders. Minimum pressure for a used engine is 690 kPa (100 psi).
6. If compression pressure is low, check for head gasket leakage, worn or stuck piston rings, damaged pistons or damaged cylinder walls.

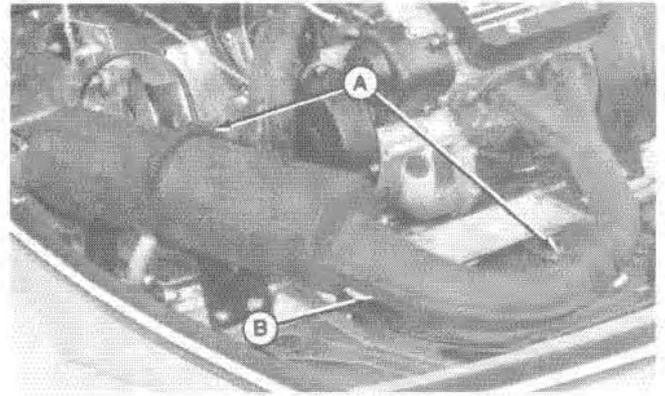


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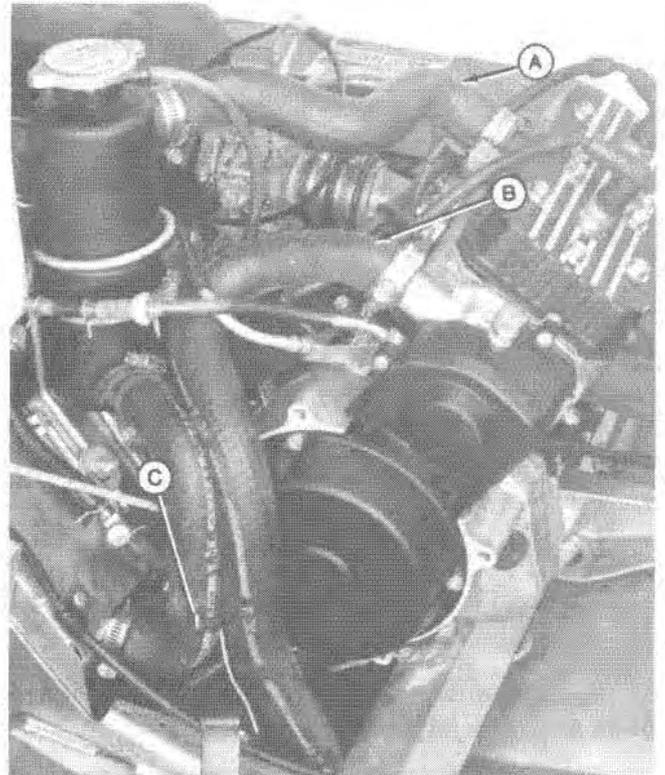
REMOVE ENGINE

1. Remove hood.
2. Drain cooling system.
3. Remove springs (A) securing muffler (B). Remove muffler.



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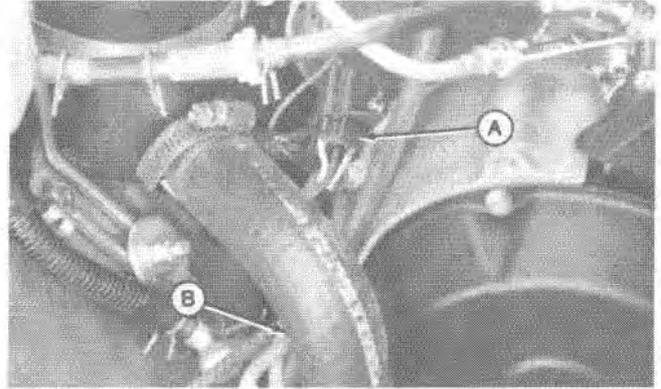
4. Disconnect hoses (A and B) from engine.
5. Clip tie strap (C) holding wiring to hose. Pull hoses down, away from engine.



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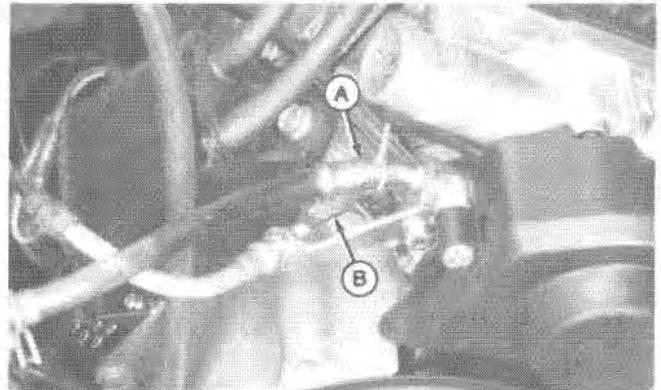
Sprintfire Engine

6. Disconnect wiring harness (A).
7. Tie a knot in recoil start rope (B) to hold it. Remove handle.



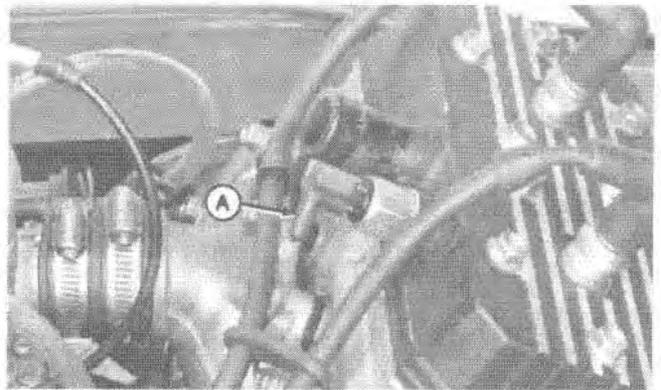
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8. Disconnect oil injection line (A). Plug end of line.
9. Disconnect oil injection pump cable (B).



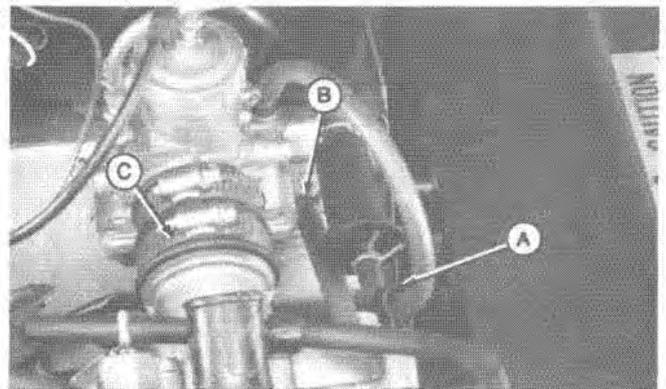
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10. Disconnect red wire (A) from temperature sender.



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11. Remove fuel line from clamp (A).
12. Disconnect fuel pump impulse line (B).
13. Loosen carburetor clamp (C).
14. Remove drive sheave and belt.
15. Remove driven sheave to provide easier access to bolts securing engine to base.
16. Remove four bolts securing engine to engine base. Lift off engine.



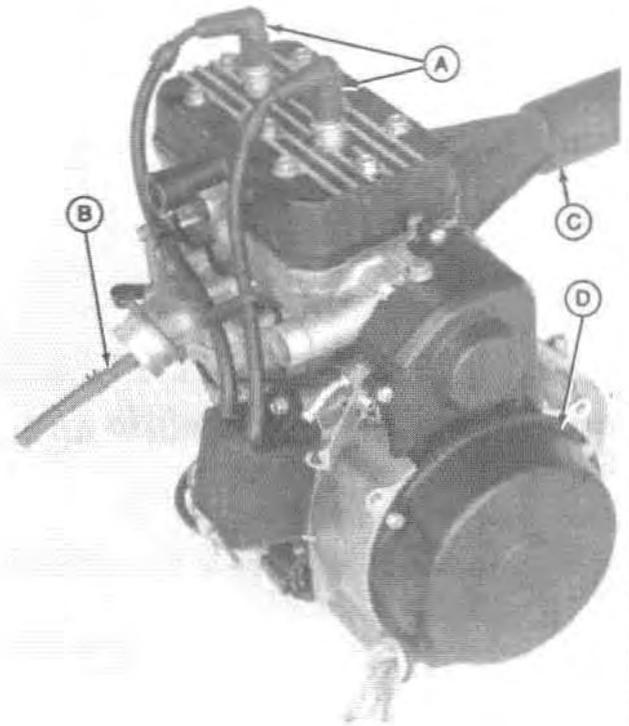
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REMOVE EXTERIOR COMPONENTS

1. Disconnect spark plug leads (A). Remove spark plugs.
2. Remove fuel pump in pulse line (B).
3. Remove exhaust manifold (C) and gaskets.
4. Remove recoil starter (D).

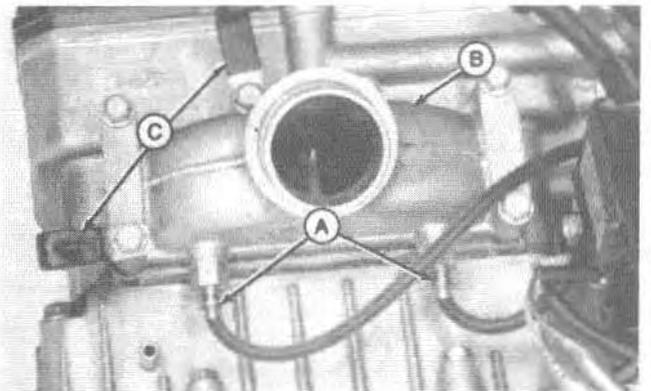
A - Spark Plug Leads
B - Fuel Pump Impulse Line

C - Exhaust Manifold
D - Recoil Starter



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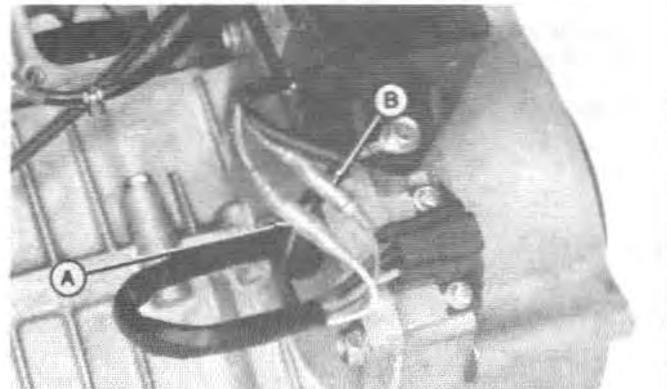
5. Remove oil injection pump lines (A) from intake manifold (B).
6. Note position of clamps (C) before removing intake manifold, front gasket, insulator, and rear gasket.



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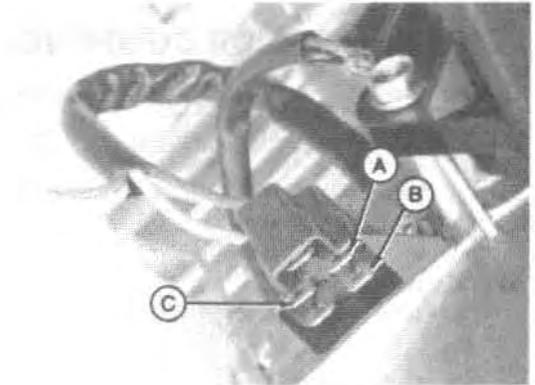
DISCONNECT WIRING

1. Disconnect white lead (A) and red lead (B).



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2. Note position of leads in connector. Disconnect brown lead (A), green with white lead (B), and yellow lead (C).



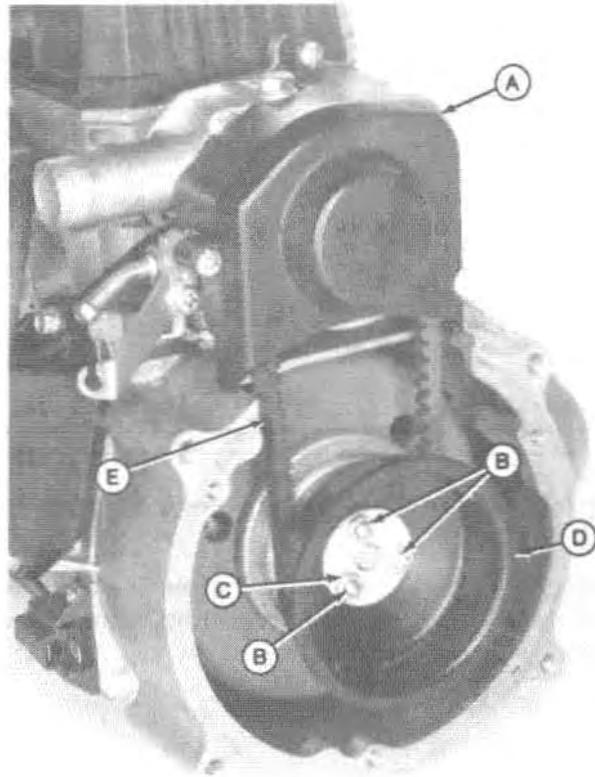
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REMOVE OIL INJECTION PUMP AND FLYWHEEL HOUSING

1. Remove water pump cover (A).
2. Remove three nuts (B), plate (C), and front half of pulley (D). Remove belt (E).

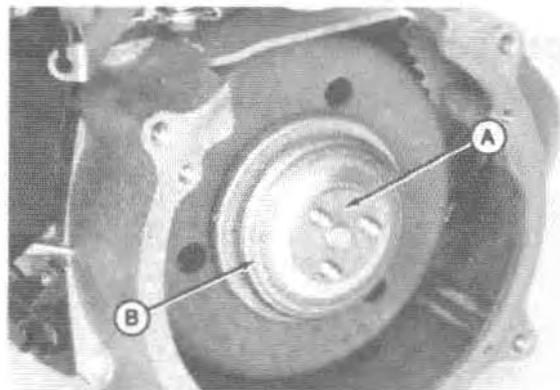
A - Cover
B - Nuts
C - Plate

D - Front Half of Pulley
E - Belt



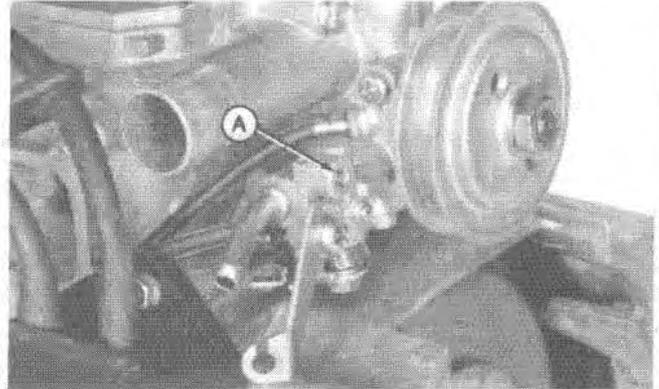
M31350/2010DIW/100982

3. Note number of shims (A) and remove. Remove back half of pulley (B).
4. Remove spacer.



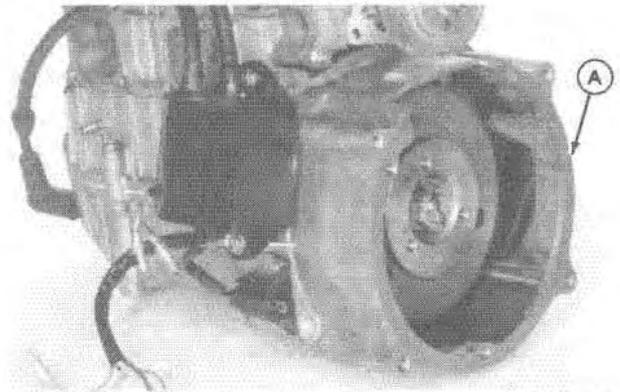
M31351/2010DIU/100982

5. Remove oil injection pump (A). Don't lose ring.



M31352/2010D/M/100982

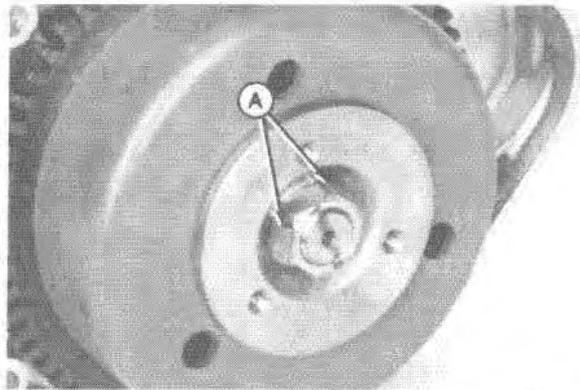
6. Remove flywheel housing (A).



M31353/2010D/N/100982

REMOVE FLYWHEEL

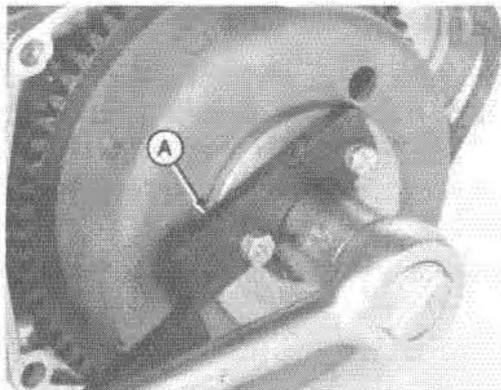
1. Bend back tabs on locking plate (A).



M31354/2010D/O/100982

NOTE: Elongate holes in JDM-64-1 Flywheel Holding Tool (A) if necessary.

2. Using JDM-64-1 Flywheel Holding Tool (A), remove flywheel nut and locking plate.

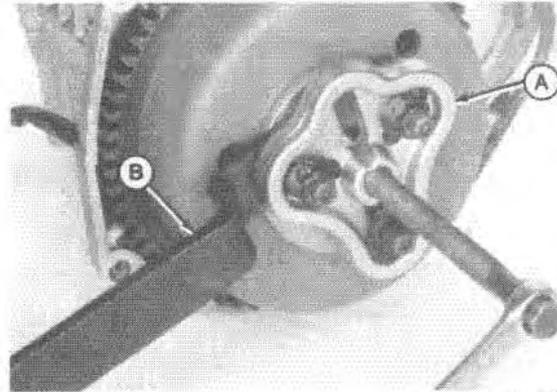


M31355/2010D/P/100982

IMPORTANT: Do not strike flywheel with a hammer. Strike puller bolt with a plastic or wood mallet.

3. Using JDM-9 Puller (A) and JDM-64-1 Flywheel Holding Tool (B), remove flywheel (C).

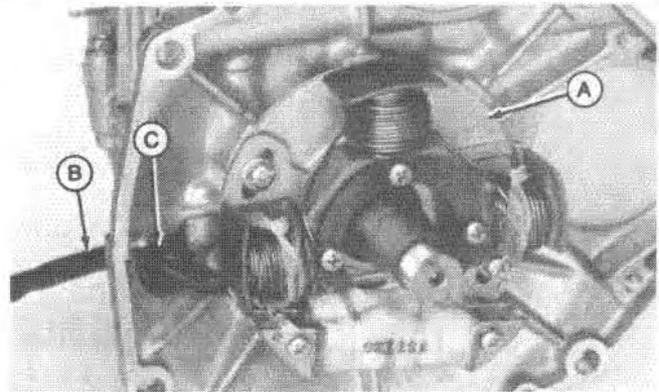
4. Remove key from crankshaft keyway.



M31356/2010D/Q/100982

REMOVE STATOR

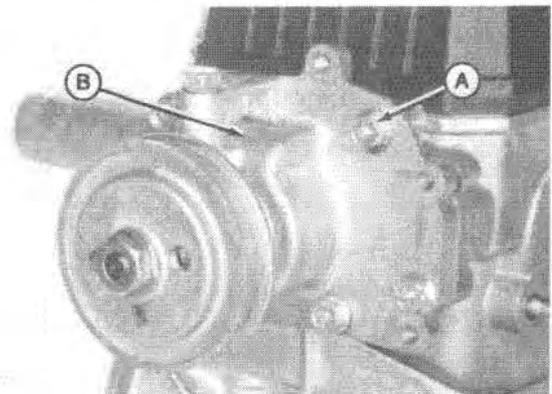
1. Remove stator (A). Pull leads (B) and grommet (C) through crankcase.



M31357/2010D/R/100982

REMOVE WATER PUMP

1. Remove five screws (A), water pump (B), and gasket.



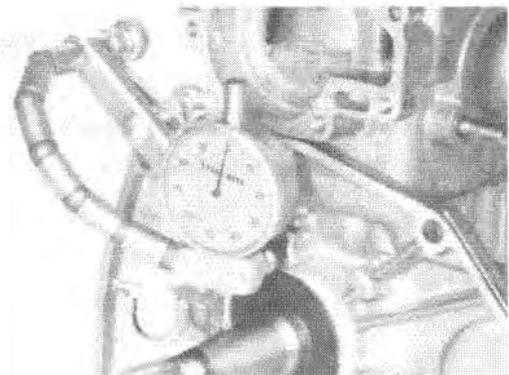
M31358/2010D/S/100982

CHECK CRANKSHAFT RUNOUT

1. Install a dial indicator at junction of crankshaft tapered and parallel sections. Be sure end of indicator does not pass over crankshaft keyway.

2. Rotate crankshaft to check runout. Maximum permissible runout is (0.051 mm) 0.002 in.

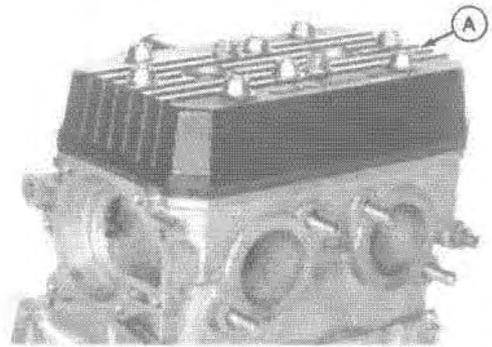
3. Replace crankshaft assembly if not within limits.



M31359/2010D/T/100982

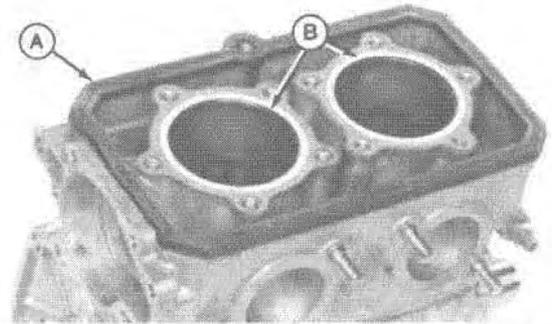
REMOVE CYLINDER HEAD AND CYLINDERS

1. Remove cylinder head (A).



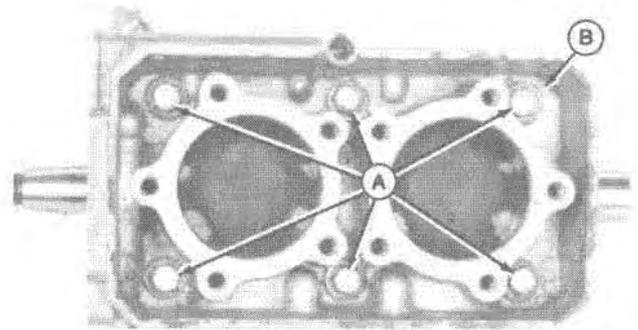
M31360/20100/L/1100982

2. Remove water seal gasket (A) and two head gaskets (B).



M31345/20100/L/1100982

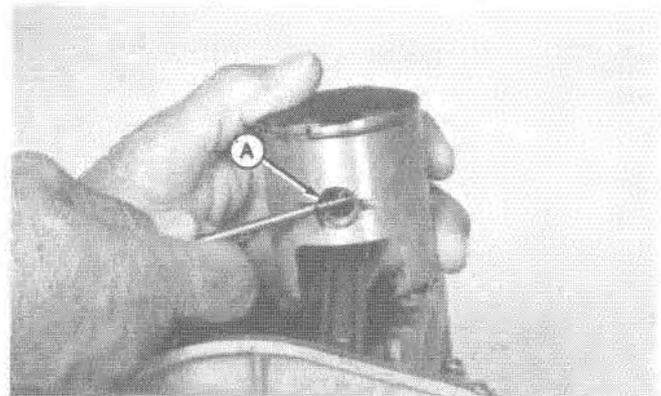
3. Remove six cylinder head cap screws (A), cylinders (B), and gasket.



M31561/20100/V/100982

REMOVE PISTONS

1. Remove piston pin retainers (A) with an awl. Discard retainers.

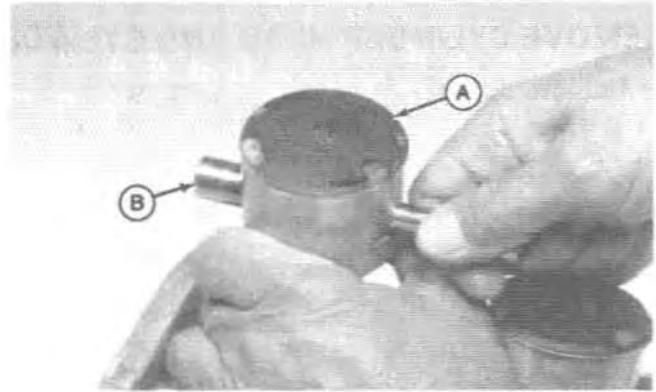


M31362/2010D/W/100982

Sprintfire Engine

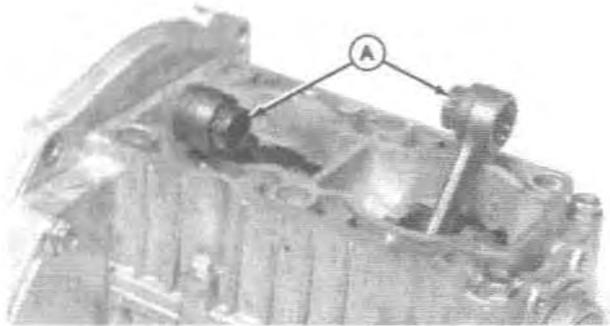
2. Warm piston (A) with your hands. Push piston pin (B) out. If piston pin can't be pushed out by hand, use JDM-7 Tool Set with JDM-32 Guide.

3. Remove piston. Mark piston and pin so they can be reinstalled in the same cylinder.



M31365/2010D/X/100982

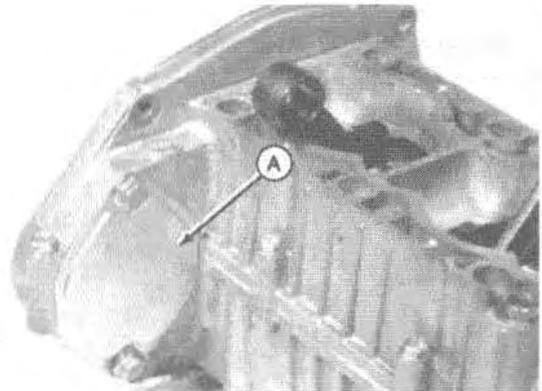
4. Remove piston pin needle bearings (A). Retain with piston and pin from which they were removed.



M31364/2010D/Y/100982

REMOVE CRANKSHAFT

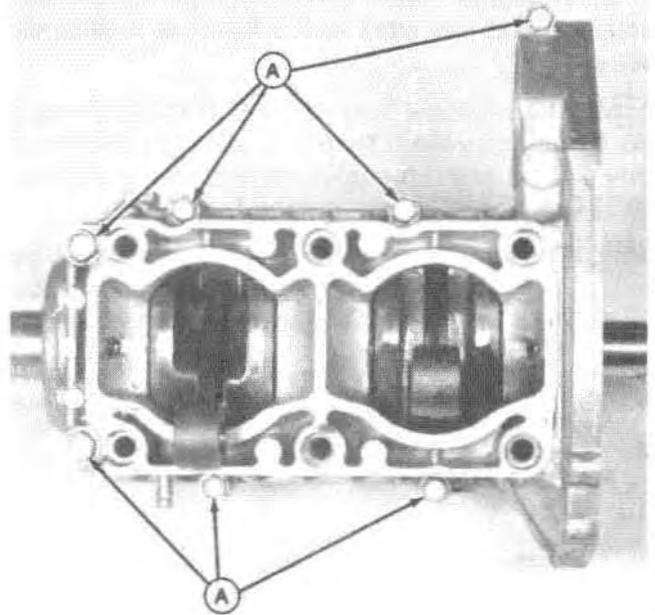
1. Remove cover (A).



M31365/2010D/Z/100982

Sprintfire Engine

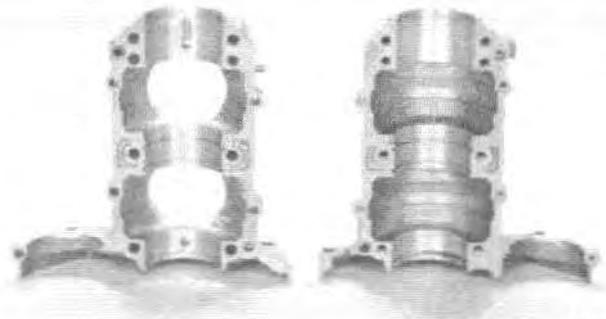
2. Remove seven cap screws (A).
3. Separate crankcase halves, using a plastic hammer or wood mallet. DO NOT pry apart with a screwdriver.
4. Lift out crankshaft.



M31366/2010D/AA/100982

INSPECT CRANKCASE

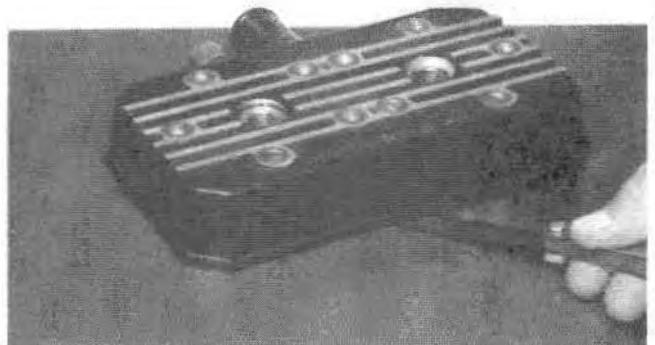
1. Clean sealer off crankcase sealing surface. Inspect sealing surface for deep scratches, pitting, or scoring.
2. Check bearing surfaces and retainer slots for wear or conditions that could cause leaks. Minor indication of bearing outer race rotation is normal.
3. If crankcase needs to be replaced, replace both halves. They are only available as a matched set.



M31367/2010D/AB/100982

INSPECT CYLINDER HEAD

1. Carefully scrape carbon from cylinder head with a soft metal (non-ferrous) scraper.
2. Use a spark plug tap (14 mm) to clean carbon from spark plug threads.
3. Put cylinder head on surface plate. Check at various points around the head with a 0.0254 mm (0.001 in.) feeler gauge. If there is any distortion, replace cylinder head.



M31368/2010D/AC/100982

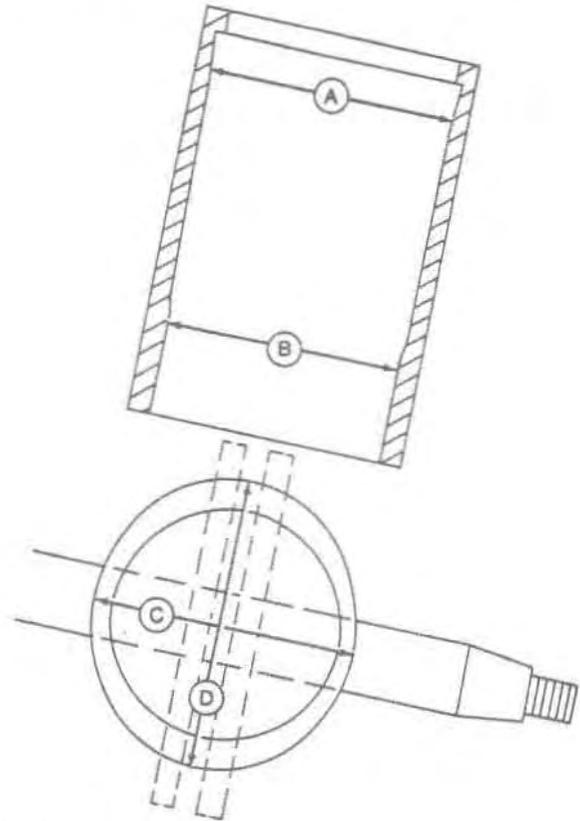
INSPECT CYLINDERS

1. Clean gasket material from cylinder surface and carbon from exhaust port with a soft metal (non-ferrous) scraper.
2. Measure cylinder bore at C and D at top of ring travel (A). Measure cylinder bore at C and D at bottom of ring travel (B). If any dimension exceeds wear tolerance of 60.134 mm (2.3675 in.), replace cylinder.

IMPORTANT: The Sprintfire engine cylinders can be deglazed only. DO NOT hone because no oversize pistons or rings are provided for parts.

A - Top of Ring Travel Zone
B - Bottom of Ring Travel Zone

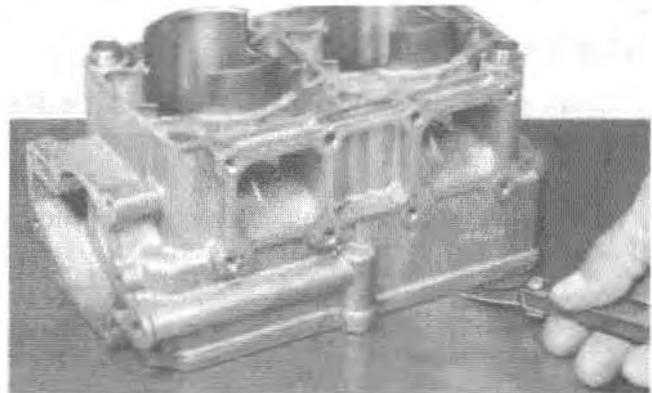
C - Parallel to Crankshaft
D - Right Angle to Crankshaft



M23493

M23455/20100/AD/100982

3. Put cylinder on a surface plate. Check at various points around cylinder with a 0.0254 mm (0.001 in.) feeler gauge. If there is any distortion, replace cylinder.



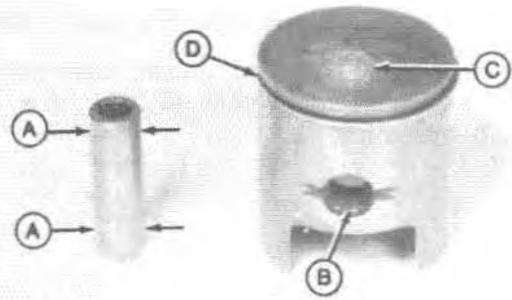
M51365/20100/AE/100982

INSPECT PISTONS AND RINGS

1. Measure piston pin (A) in the two locations shown. If dimension is less than 15.96 mm (0.6283 in.), replace piston pin.
2. Measure piston pins bore (B) on both sides of piston. If either dimension exceeds 16.08 mm (0.6331 in.), replace piston (C).
3. Remove piston ring (D) with a ring expander. Clean ring grooves with a ring groove cleaning tool.
4. Check piston (C) for pits, scores, and corrosion. Replace piston if necessary. Clean any carbon deposit from top of piston.
5. Measure piston diameter at a right angle to piston pin bore (B). If dimension is less than 59.82 mm (2.3551 in.), replace piston (C).

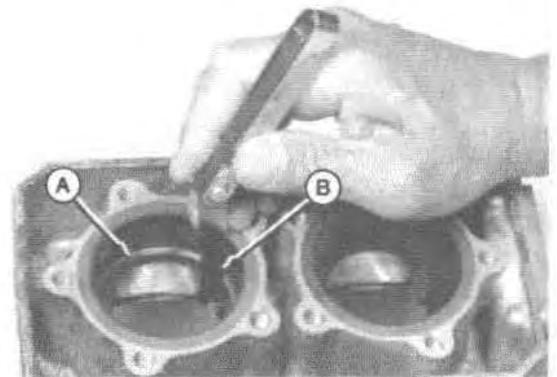
A - Piston Pin
B - Piston Bore

C - Piston
D - Piston Ring



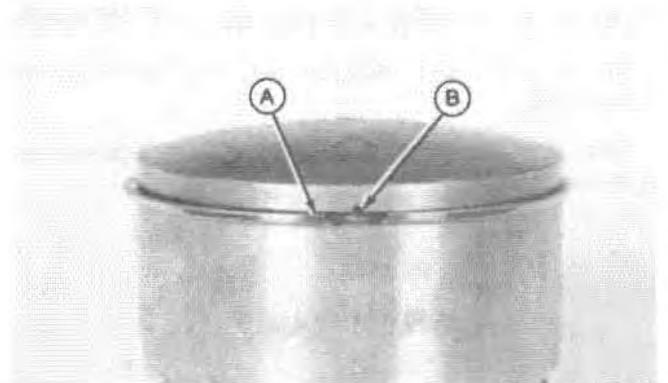
M31373/20100/AF/100982

6. Use a piston to push ring (A) into a cylinder that has been inspected and proven correct. Push it into bore 25.4 mm (1 in.) below top of bore.
7. Measure ring end gap (B). End gap should be 0.2 to 0.4 mm (0.008 to 0.016 in.) If end gap is incorrect, the ring (A) is incorrect or worn. Replace ring.



M31371/20100/AG/100982

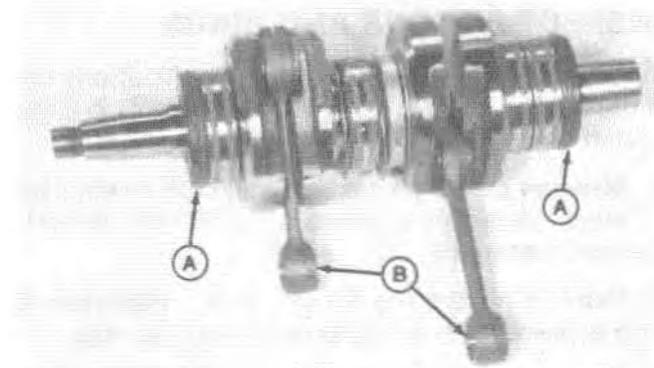
8. Gently spread new ring with hands and slide ring on piston. Angled surface of ring (A) should be facing upward. Be sure ring gap is positioned over locating pin (B) of piston.



M31372/20100/AH/100982

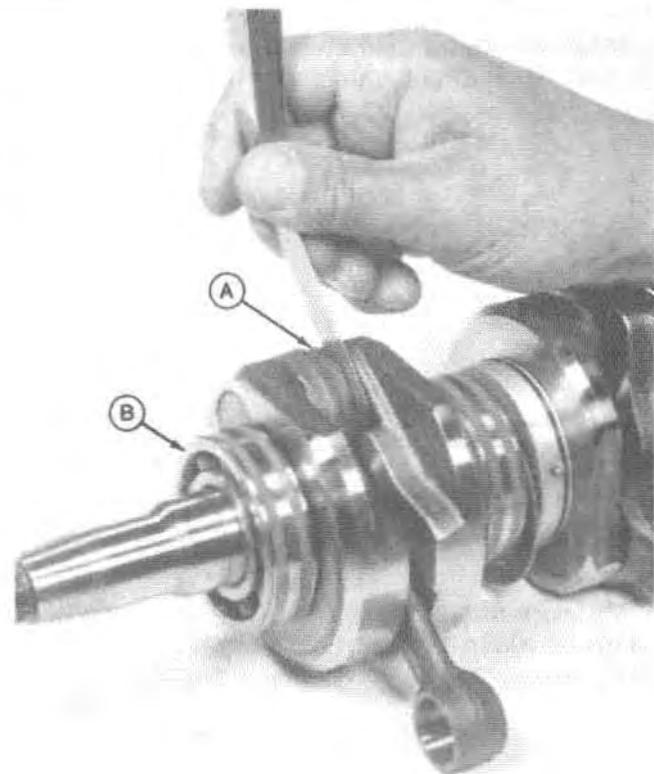
INSPECT CRANKSHAFT

1. Remove crankshaft seals (A). Replace if damaged.
2. Measure connecting rod inside diameter (B). If diameter exceeds 20.05 mm (0.7894 in.), replace crankshaft assembly.



M31373/2010D/AJ/100982

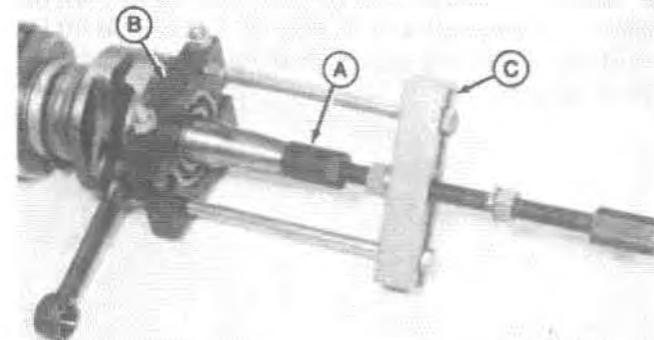
3. Move connecting rod to one side. Measure clearance (A) on opposite side with a feeler gauge. If clearance exceeds 0.70 mm (0.0276 in.), replace crankshaft.
4. Rotate each crankshaft bearing (B). If any rotate roughly or are frozen, they are damaged. If outer bearings are damaged, replace them. If inner bearings are damaged, replace crankshaft assembly.



M31374/2010D/AJ/100982

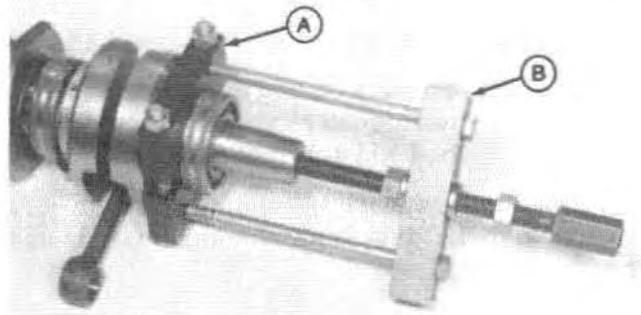
REPLACE OUTER CRANKSHAFT BEARINGS

1. Install JDM-33-1 Adapter (A) on flywheel end of crankshaft.
2. Use JDM-8-1 (B) and JDM-8-2 (C) to remove bearing from crankshaft.



M31375/2010D/AK/100982

3. Use JDM-8-1 (A) and JDM-8-2 (B) to remove bearings from PTO end of crankshaft.



M31376/2010DIAL/100982

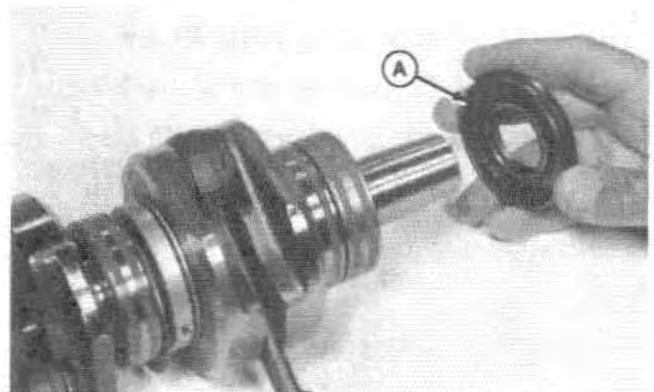
INSTALL NEW BEARINGS

4. To install NEW bearings, heat them in oil or use a bearing heater. Bearings will then slide on crankshaft. No tool is required.

201DD/AM/100982

INSTALL CRANKSHAFT SEALS

1. Put oil seals (A) (lip inward) on crankshaft. Lubricate seals.



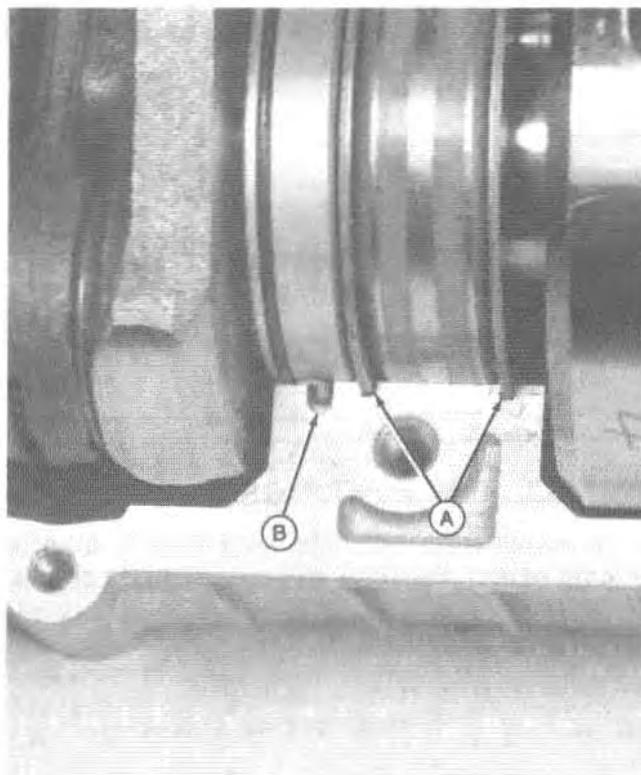
M31379/2010D/AC/100982

INSTALL CRANKSHAFT

1. Install crankshaft in lower crankcase half.

IMPORTANT: Spacers (A) and locating pin (B) must be positioned as shown or upper crankcase half will not fit on lower crankcase half.

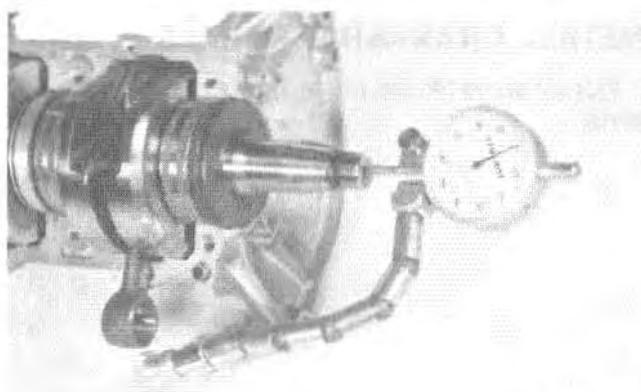
2. Check that spacers (A) are in grooves in lower crankcase half. Check that locating pin (B) is in notch in lower crankcase half.



M31360/2010D/APY100982

CHECK CRANKSHAFT END PLAY

1. Install a dial indicator on end of crankshaft.
2. Tap opposite end of crankshaft with plastic mallet. End play should not exceed 0.55 mm (0.0216 in.).
3. There is no adjustment for end play. If end play is over specification, replace crankshaft and/or crankcase.

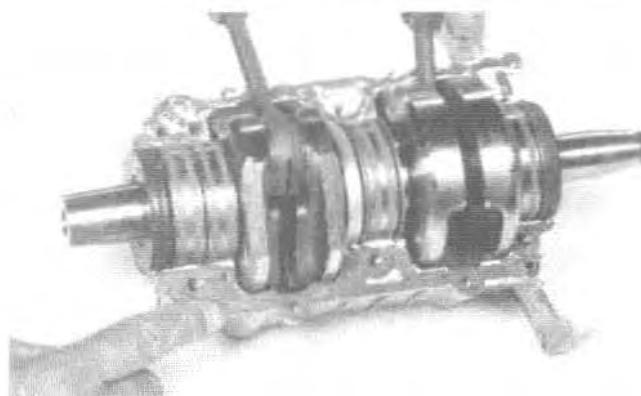


M31361/2010D/AQ100982

INSTALL UPPER CRANKCASE HALF

IMPORTANT: Do not let sealer enter interior of crankcase halves.

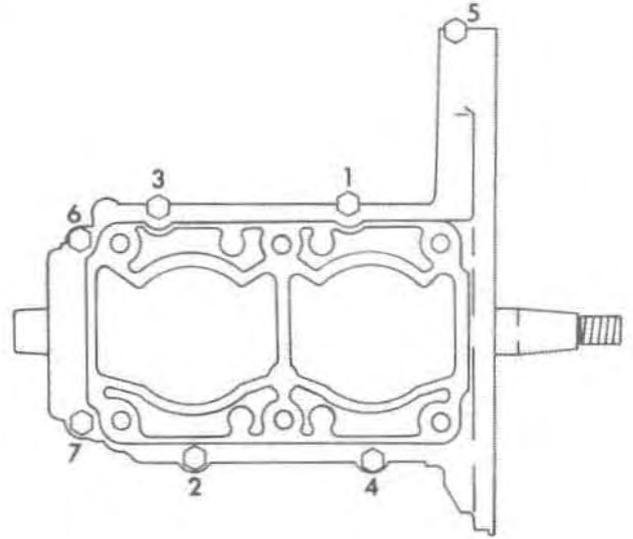
1. Apply an even coat of M64850 Silicon Rubber Adhesive to sealing surfaces of both crankcase halves.



M31362/2010D/AR100982

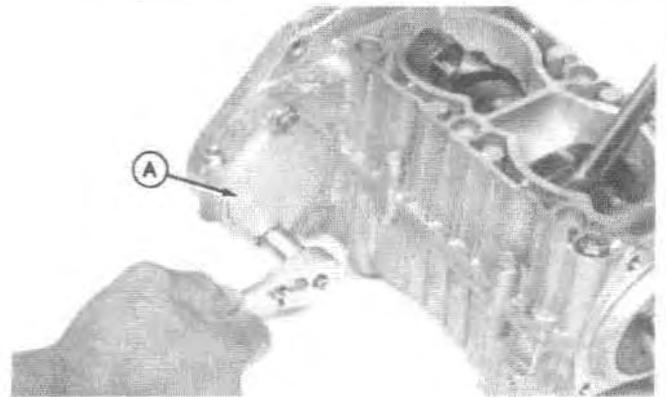
Sprintfire Engine

2. Install upper crankcase half on lower crankcase half. Torque crankcase cap screws in sequence shown. Tighten M-6 cap screw to 6 N·m (4 lb-ft) and M-8 cap screws to 22 N·m (16 lb-ft) torque.



M32006/2010D/AR1/100982

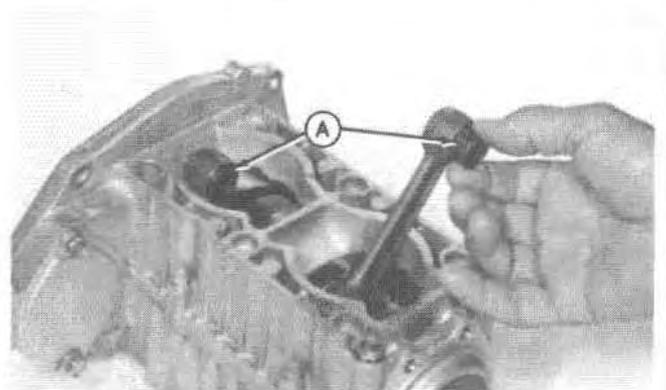
3. Install cover (A).



M31377/2010D/AR2/100982

INSTALL PISTONS

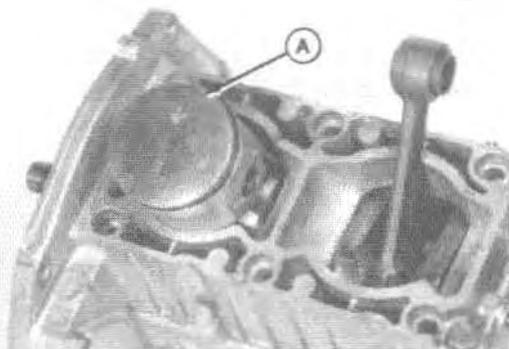
1. Put needle bearings (A) in connecting rod.



M31383/2010D/AS/100982

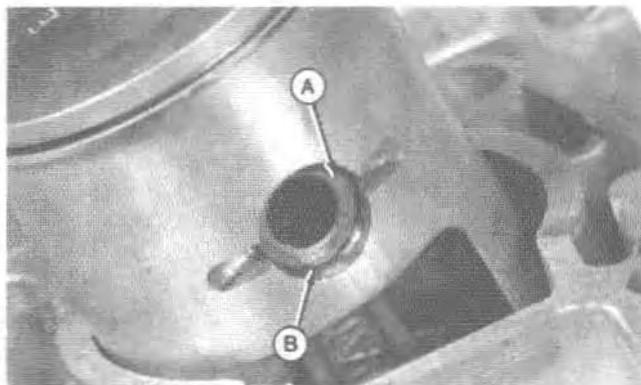
Sprintfire Engine

2. Install piston (A) over connecting rod with arrow and "E" pointing toward exhaust side.



M31384/2010D/AT/100982

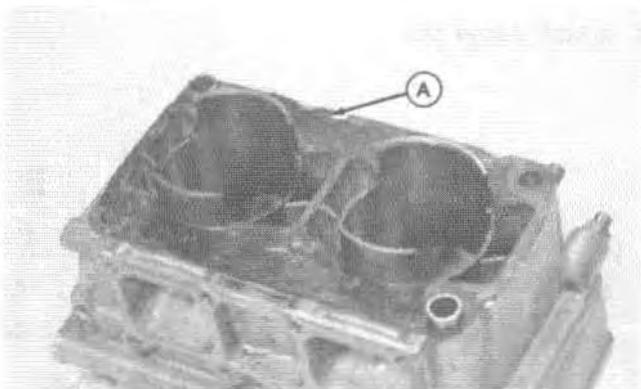
3. Push piston pin (A) into piston and connecting rod. Install new retainers (B). Be sure retainer is seated and in position. DO NOT lose a retainer in the crankcase.



M31385/2010D/AU/100982

INSTALL CYLINDERS AND CYLINDER HEAD

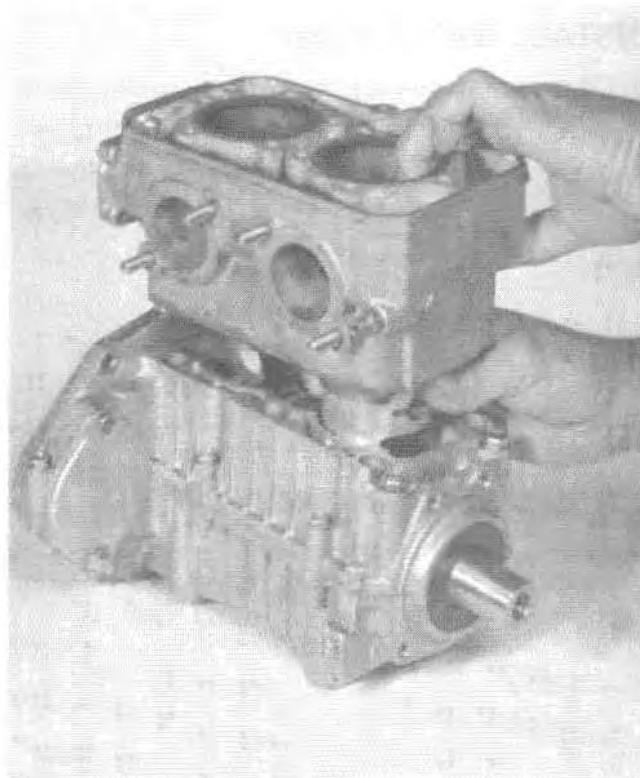
1. Install new cylinder base gasket (A) on cylinders. Use M64850 Silicon Rubber Adhesive to hold gasket in place.



M31388/2010D/AV/100982

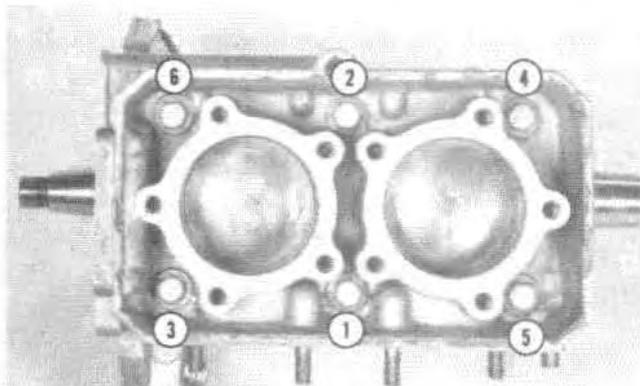
NOTE: If piston rings are not located correctly, piston ring and cylinder damage will occur.

2. Center piston ring end gaps over pin of piston. Compress rings with your fingers as you install cylinder.



M31375/2010D/AV110098Z

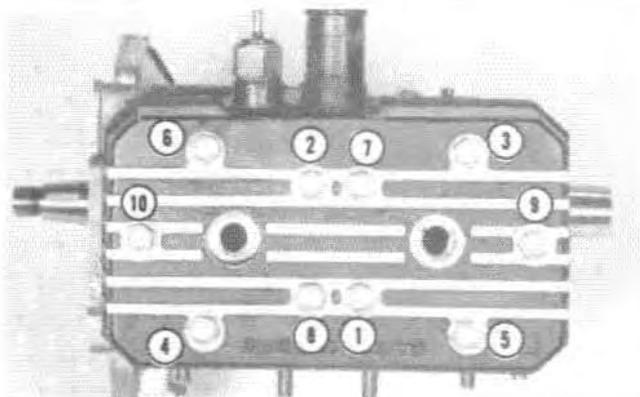
3. Install six cap screws. Tighten to 22 N-m (16 lb-ft) torque in sequence shown.



M31387/2010D/AW10098Z

4. Install new head gaskets, water seal gasket, and cylinder head.

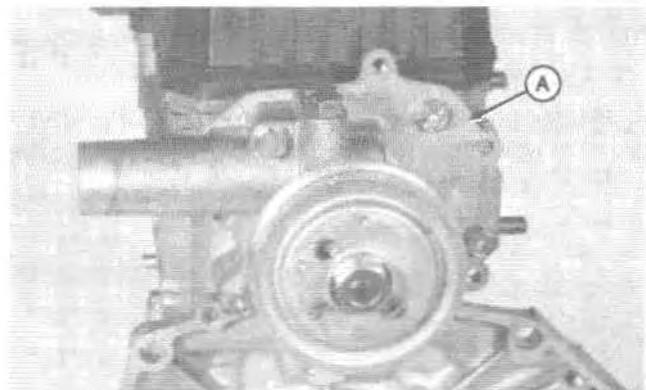
5. Install 10 cap screws. Tighten to 22 to 24 N-m (16 to 18 lb-ft) torque in sequence shown.



M31388/2010D/AX10098Z

INSTALL WATER PUMP

1. Coat sealing surface of water pump (A) with M64850 Silicon Rubber Adhesive.
2. Install new gasket, water pump (A), and five screws.



M31389/2010D/AY/100982

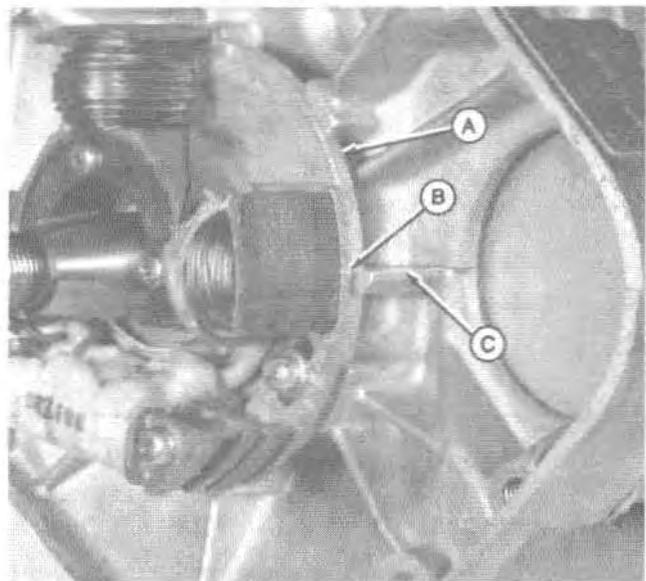
INSTALL STATOR (TIME IGNITION)

1. Feed leads through opening in crankcase. Install grommet (A).



M31390/2010D/AZ/100982

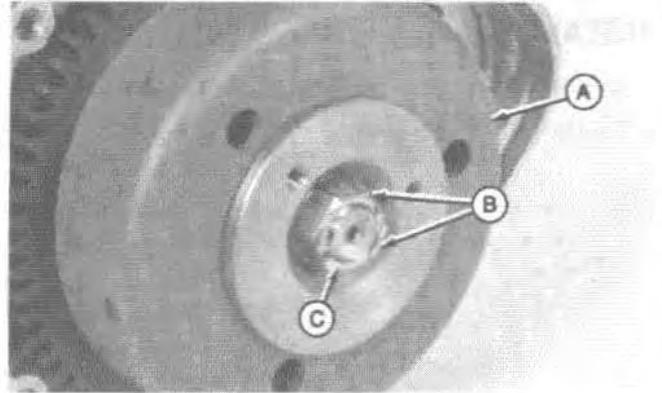
2. Install stator (A). Be sure to align timing mark (B) on stator with crankcase separation line (C).



M31391/2010D/BA/100982

INSTALL FLYWHEEL

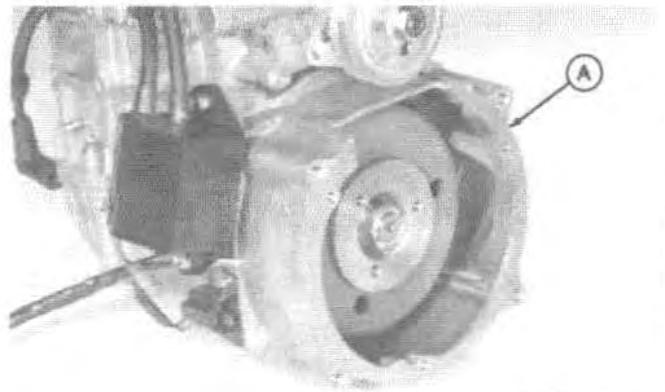
1. Install key in crankshaft keyway. Align keyway and install flywheel (A) on crankshaft.
2. Install locking plate (B) and flywheel nut (C). Replace locking plate if damaged during removal.
3. Use JDM-64-1 Flywheel Holding Tool to hold flywheel. Tighten flywheel nut (C) to 81 N·m (60 lb-ft) torque.
4. Bend locking plate (B) down around flywheel nut.



M31392/2010D/BB/100982

INSTALL FLYWHEEL HOUSING

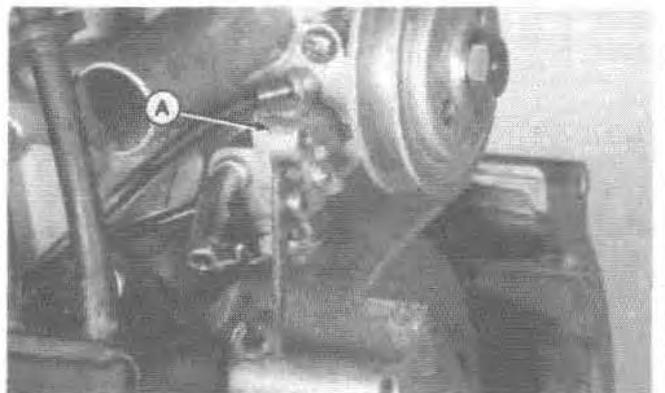
1. Install flywheel housing (A).



M31394/2010D/BD/100982

INSTALL OIL INJECTION PUMP

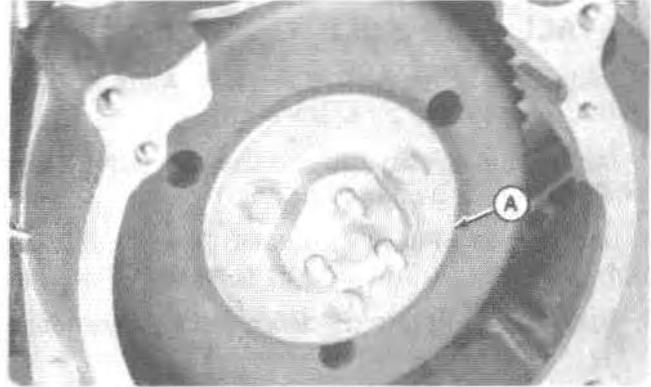
1. Coat sealing surface of oil injection pump (A) with M64850 Silicon Rubber Adhesive.
2. Install ring and oil injection pump (A).



M31395/2010D/BE/100982

INSTALL WATER PUMP BELT

1. Install spacer (A) with three cap screws.
2. Install shims and back half of pulley.



M31306/2010D/BF1100982

NOTE: When tightening nuts (D) slowly rotate the engine to prevent binding of the belt (A).

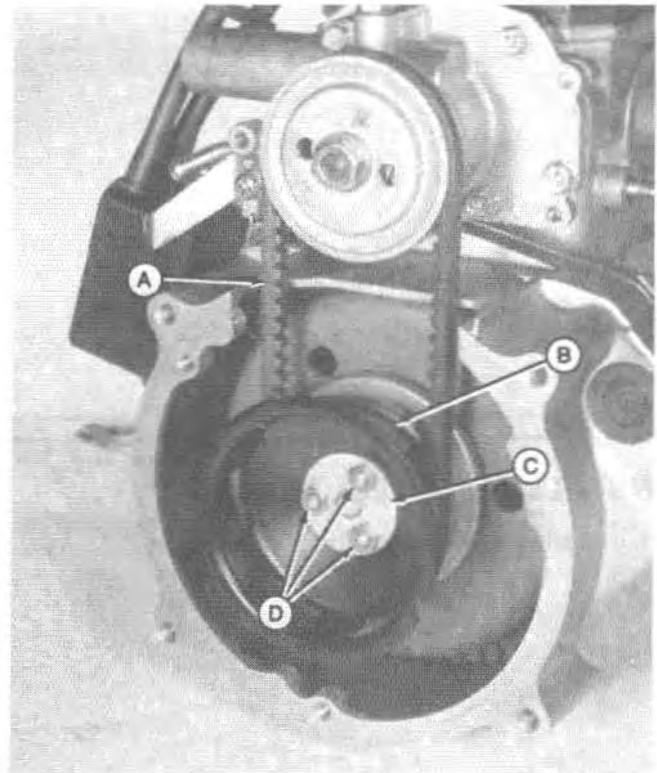
3. Install belt (A), front half of pulley (B), plate (C), and three nuts (D).

A - Belt

B - Front Half of Pulley

C - Plate

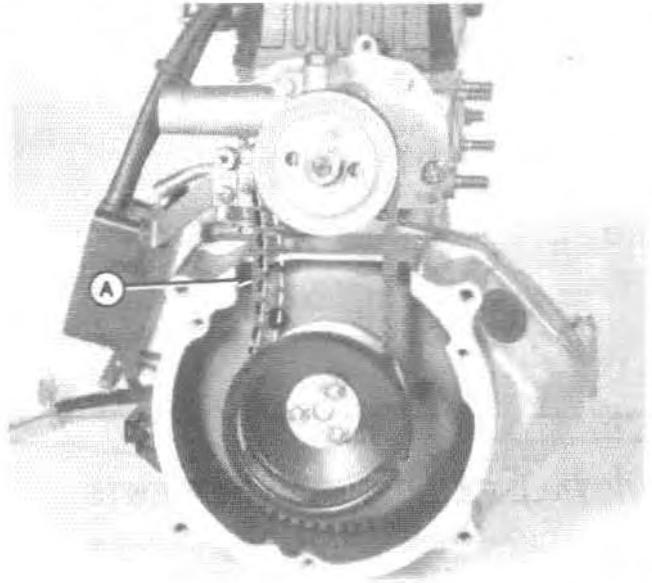
D - Nuts



M31397/2010D/BG1100982

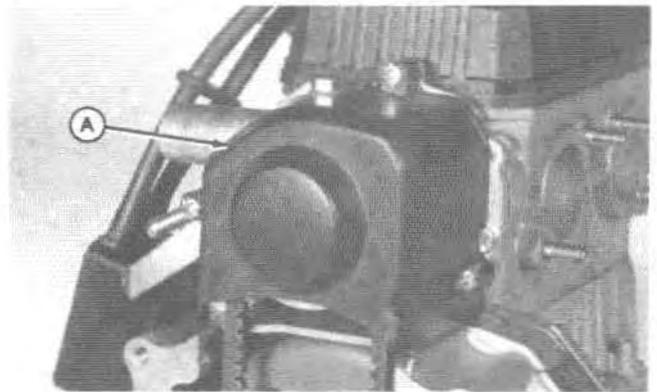
Sprintfire Engine

4. Check belt tension. Deflection (A) should not be more than 10 mm (3/8 in.). Add or remove shims behind pulley to adjust belt tension.



M31398/2010D/BH/100982

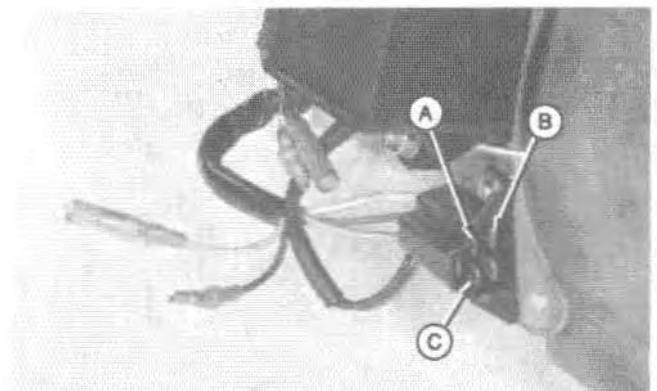
5. Install water pump cover (A).



M31399/2010D/BH/100982

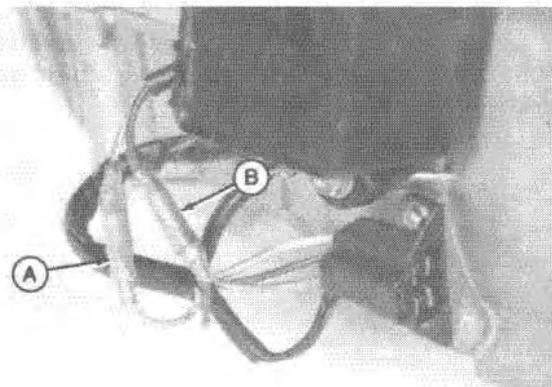
CONNECT WIRING

1. Connect brown lead (A), green with white lead (B), and yellow lead (C).



M31400/2010D/BH/100982

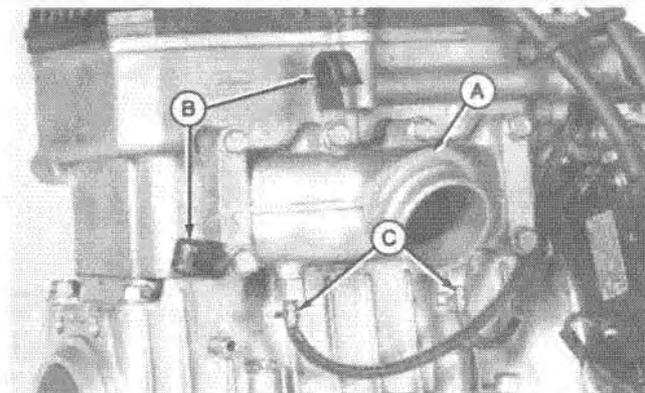
2. Connect white lead (A) and red lead (B).



M31401/2010D/BK/100982

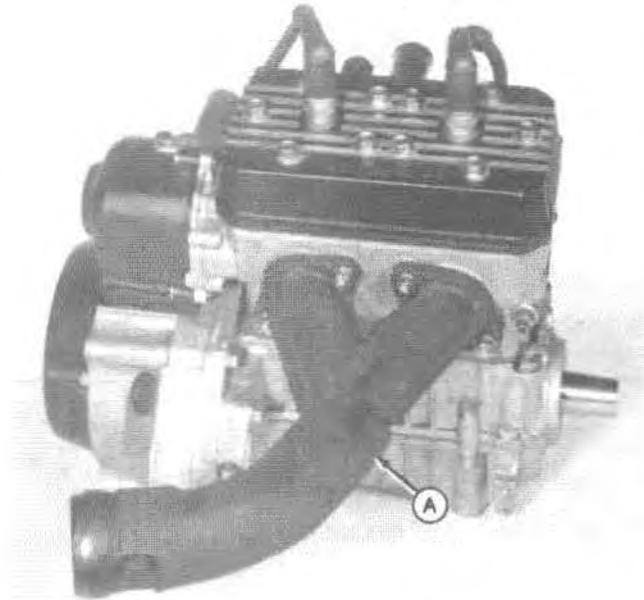
INSTALL EXTERIOR COMPONENTS

1. Install new rear gasket (rear gasket has a solid center), insulator, new front gasket (open in the center), and intake manifold (A). Clamps (B) should be positioned as shown.
2. Tighten six cap screws to 6 to 8 N·m (4 to 6 lb-ft) torque.
3. Connect oil injection pump lines (C) to intake manifold (A). Lines should be positioned as shown.



M31402/2010D/BL/100982

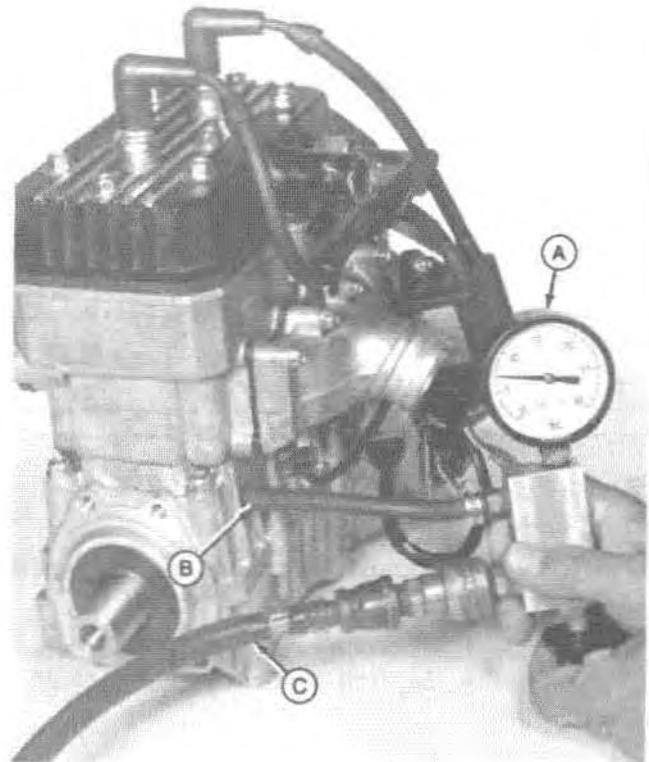
4. Install recoil starter.
5. Install exhaust manifold (A) with new gaskets. Tighten four cap screws to 13 to 16 N·m (10 to 12 lb-ft) torque.
6. Install fuel pump impulse line.
7. Install spark plugs. Tighten to 27 N·m (20 lb-ft) torque.
8. Install spark plug leads.



M31403/2010D/BN/100982

PRESSURE TEST ENGINE

1. Place rubber sheet between exhaust manifold and cylinders.
2. Place rubber sheet between intake manifold and cylinders. Tighten cap screws to 6 N·m (4 lb-ft) torque.
3. Connect pressure regulator (A) to impulse fitting (B).
4. Close regulator valve.
5. Connect shop air (C) to regulator (A).
6. Open valve until gauge reads 48 kPa (7 psi). Then, close valve.
7. Gauge needle should not drop below 35 kPa (5 psi) for at least 10 seconds.
8. If needle drops before 10 seconds, open valve to maintain 48 kPa (7 psi). Apply a liquid soap solution to seals and seams to locate leaks.



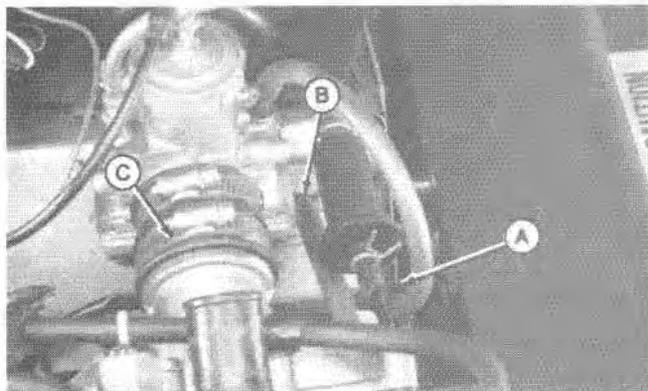
M31404/2010D/BN/100982

INSTALL ENGINE

1. Place engine in snowmobile.
2. Install and tighten engine bolts.
3. Install driven sheave and drive sheave. (Section 50, Group 12.)
4. Check center distance alignment. (Section 50, Group 20.)
5. Check clutch alignment. (Section 50, Group 20.)
6. Install drive belt.

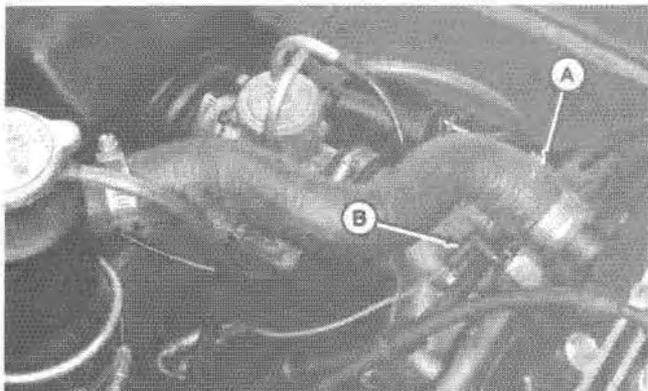
M3100/BO/100982

7. Connect carburetor to intake manifold.
8. Connect fuel pump impulse line.
9. Install fuel line in clamp.



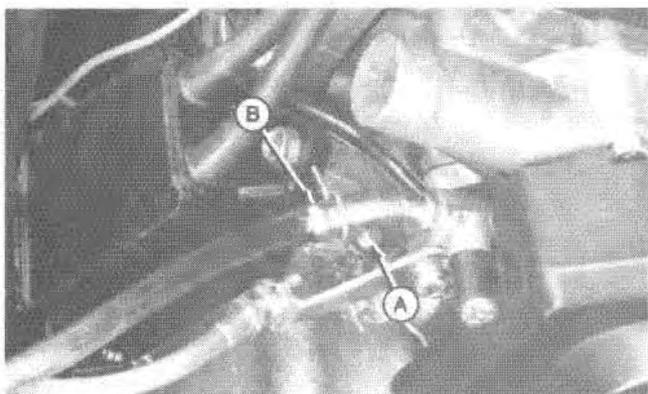
M31344/2010D/DP/100982

10. Install hose (A) on engine.
11. Connect red wire (B) to temperature sender.



M31406/2010D/BQ/100882

12. Connect oil injection pump cable (A). Time oil injection pump. (Section 30, Group 15.)
13. Remove plug from oil injection line. Connect oil injection line (B).
14. Bleed oil injection line running from oil tank to oil injection pump. (Section 30, Group 15.)

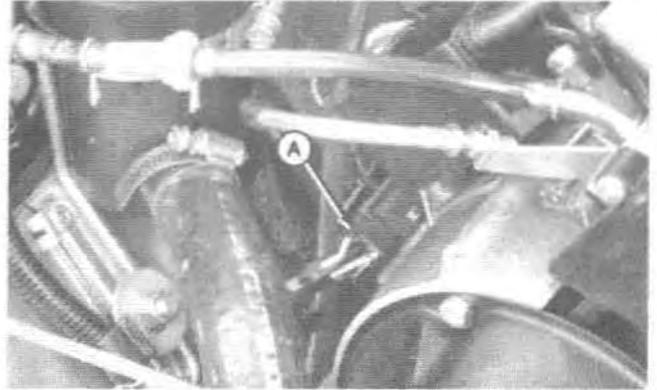


M31407/2010D/BA/100982

Sprintfire Engine

15. Install recoil starter handle, and release knot in recoil starter rope.

16. Connect wiring harness connector (A).



M31408/2010D/BS/100982

17. Install hose (A) from heat exchanger to water pump. Secure wiring (B) to hose, using a tie strap.



M31409/2010D/BT/100982

18. Install muffler and springs securing muffler to exhaust manifold.

19. Fill cooling system.

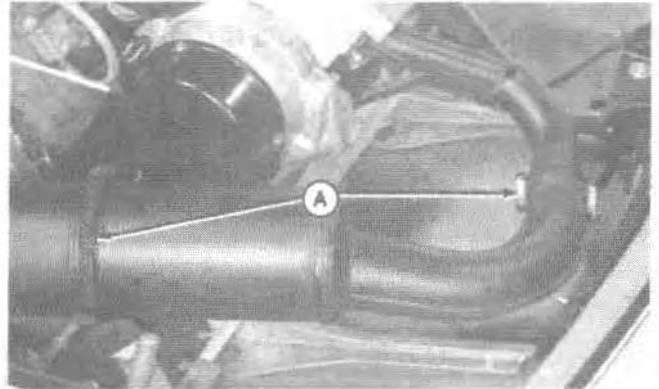
20. Install hood.

2010D/BU/100982

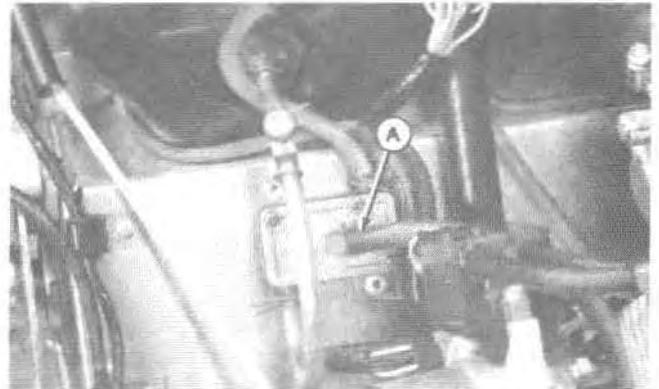


REMOVE ENGINE

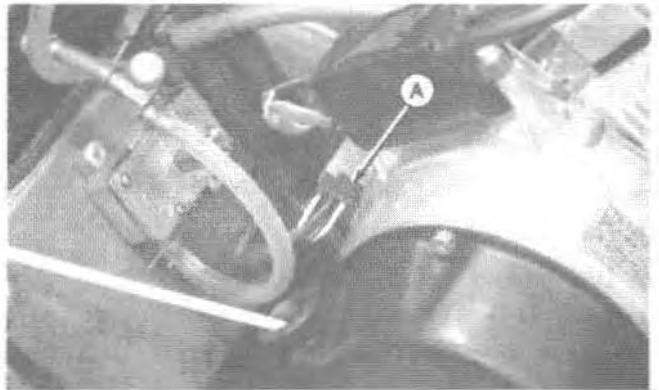
1. Remove hood.
2. Remove springs (A) securing muffler to exhaust manifold. Remove muffler.
3. Remove drive sheave (Section 50).



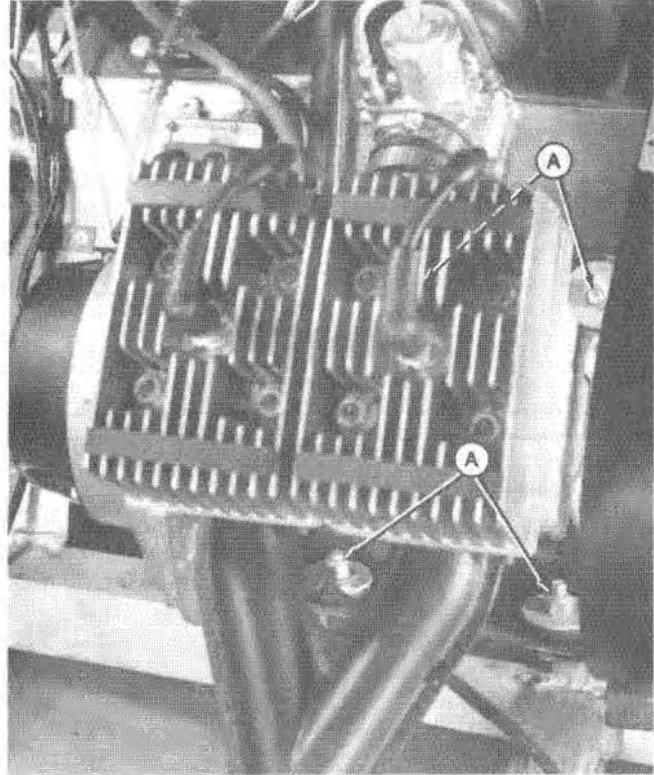
4. Disconnect fuel pump impulse line (A).



5. Disconnect wiring harness connector (A).
6. Tie a knot in recoil start rope to hold it and remove handle.
7. Loosen carburetor clamps.



8. Remove engine mount nuts (A), and lift out engine.



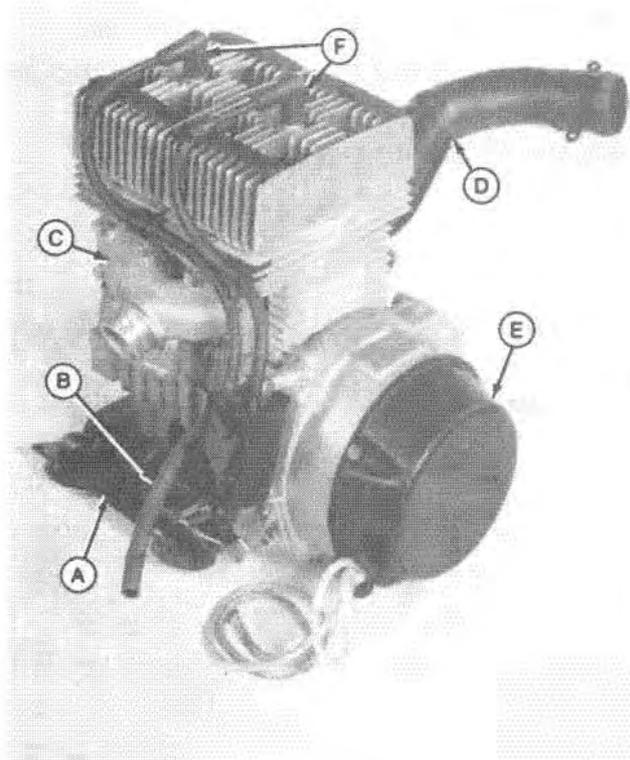
M31413/2012D/D/100962

REMOVE EXTERIOR COMPONENTS

1. Remove engine base (A).
2. Remove fuel pump impulse line (B).
3. Remove intake manifold (C) and exhaust manifold (D).
4. Remove recoil starter (E).
5. Disconnect spark plug leads (F).

A - Engine Base
B - Fuel Pump Impulse Line
C - Intake Manifold

D - Exhaust Manifold
E - Recoil Starter
F - Spark Plug Leads

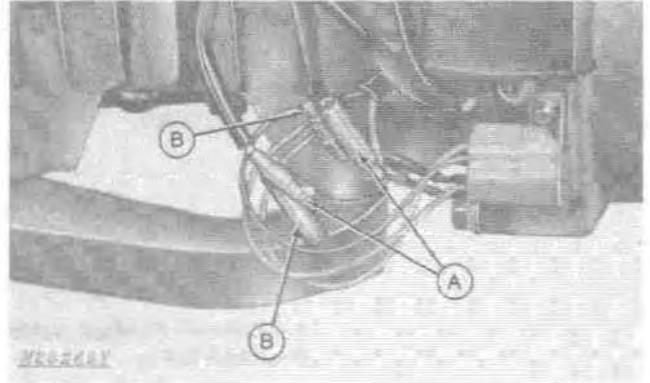


M31414/2012D/E/100982

DISCONNECT WIRING

1. Disconnect red and white leads.

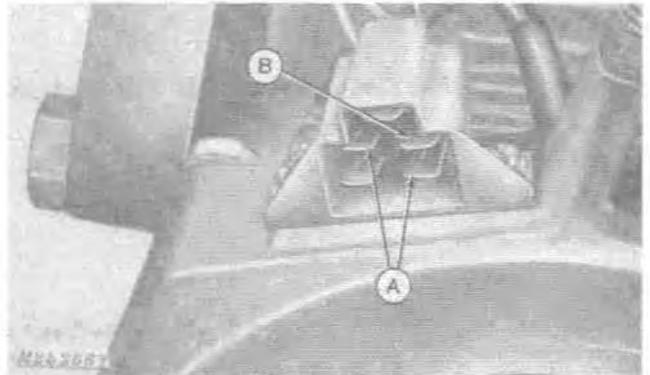
A—White
B—Red



M25266/2012/F/100982

2. Disconnect one brown and two yellow leads from connector. Mark their location for reassembly.

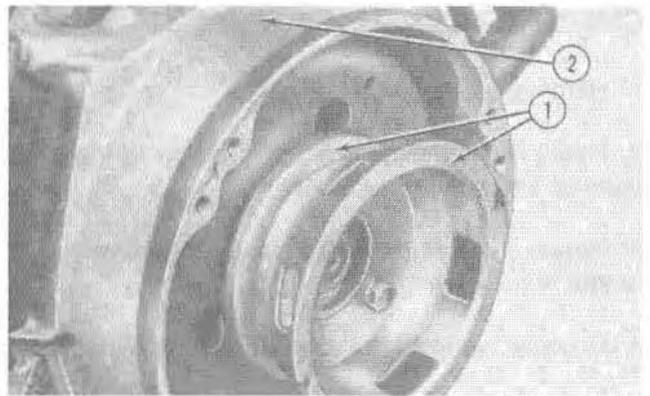
A—Yellow
B—Brown



M25266/2012/G/100982

REMOVE FLYWHEEL HOUSING

1. Remove starter pulley and spacer.
2. Remove flywheel housing.



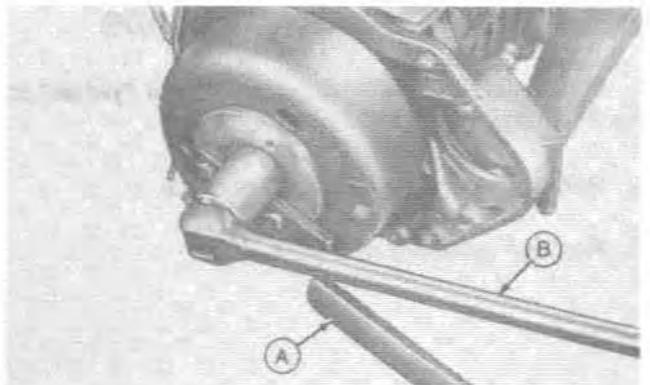
M25267/2012/H/100982

REMOVE FLYWHEEL

1. Bend up tangs on locking plate.
2. Remove flywheel nut and locking plate.

NOTE: Modify JDM-64-1 Flywheel Holding Tool by drilling out holes to (9.5 mm) 3/8 inch. Elougate holes to fit flywheel.

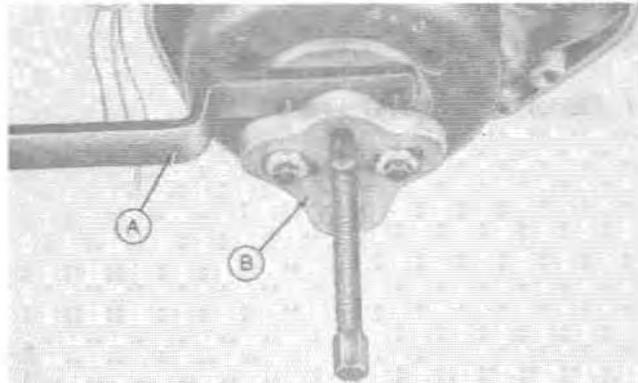
A—JDM-64-1 Flywheel Holding Tool
B—Breaker Bar



M25269/2012/I/100982

3. Remove flywheel.

NOTE: Do not strike flywheel with a hammer. Strike puller bolt with a plastic or wood mallet.

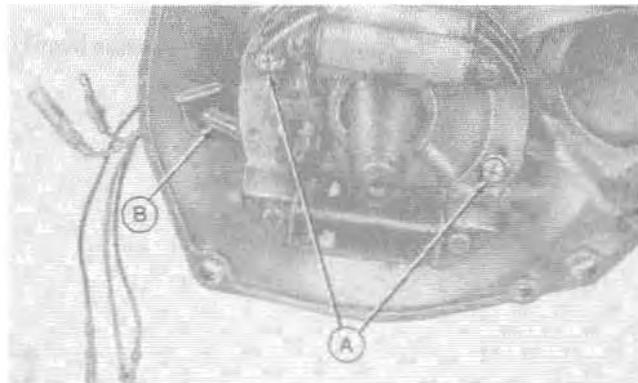


A—JDM-64-1 Flywheel Holding Tool
B—JDM-9 Puller

M25299/2012/J/100982

REMOVE STATOR

Remove stator. Pull leads and grommet through crankcase.

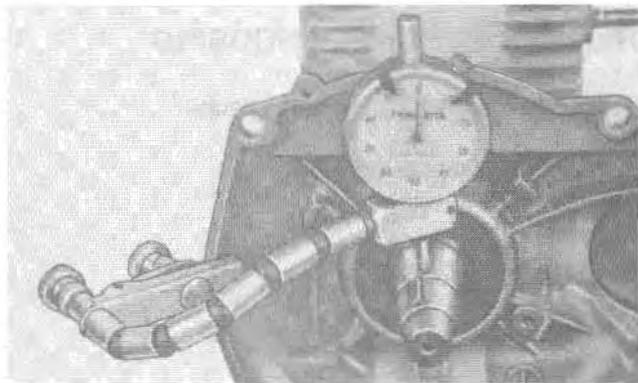


A—Stator Screws
B—Grommet

M25270/2012/R/100982

CHECK CRANKSHAFT RUNOUT

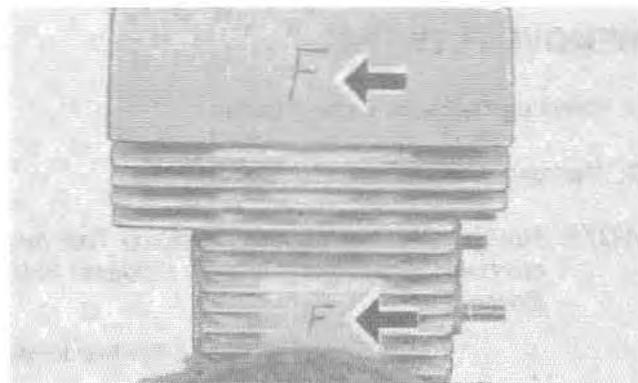
1. Remove spark plugs.
2. Install a dial indicator at the junction of the crankshaft tapered and parallel sections.
3. Rotate crankshaft to check runout. Maximum permissible runout is (0.051 mm) 0.002 in.
4. Replace crankshaft assembly if not within limits.



M25271/2012/L/100982

REMOVE CYLINDERS AND HEADS

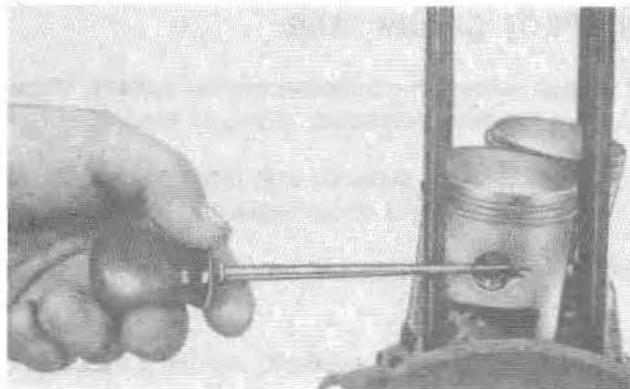
1. Mark cylinders and heads. Use "F" for flywheel and "P" for PTO end.
2. Remove cylinder heads and gaskets.
3. Remove cylinders and gaskets.



M25272/2012/M/100982

REMOVE PISTONS

1. Remove piston pin retainer with an awl. Discard retainers. Use NEW retainers for assembly.

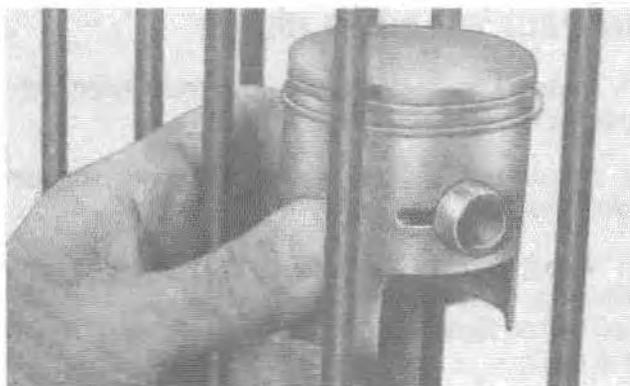


M25273/2012/P/100982

2. Warm piston with your hands and push piston pin out.

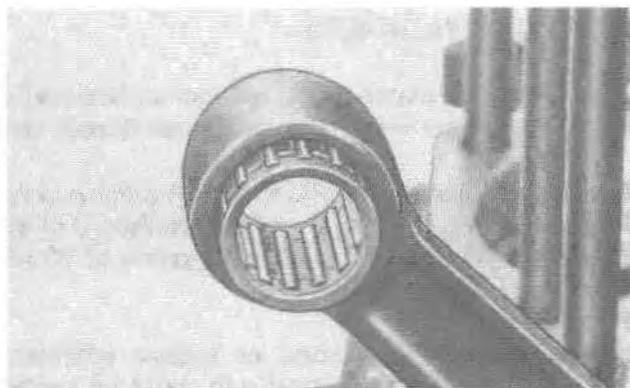
NOTE: If pin can't be pushed out by hand, use JDM-7 Tool Set with JDM-32 Guide

3. Remove piston.



M25274/2012/O/100982

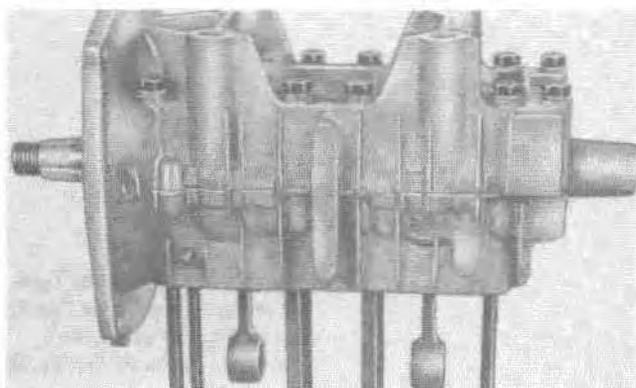
4. Remove piston pin needle bearings.



M25275/2012/P/100982

REMOVE CRANKSHAFT

1. Set crankcase on a bench.
2. Remove crankcase bolts.
3. Separate crankcase halves using a plastic or wood mallet. DO NOT pry apart with a screwdriver.
4. Lift crankshaft out of upper crankcase half.



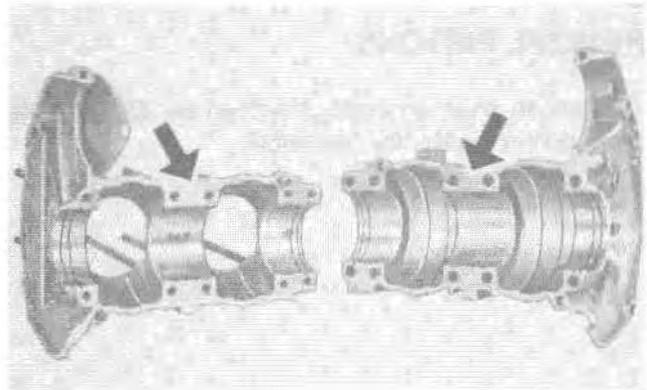
M25276/2012/O/100982

INSPECT CRANKCASE

1. Clean sealer off crankcase sealing surface. Inspect this surface for deep scratches, pitting or scoring.
2. Check bearing surfaces and retainer slots for wear or conditions that could cause leaks.

NOTE: Minor indication of bearing outer race rotation is normal.

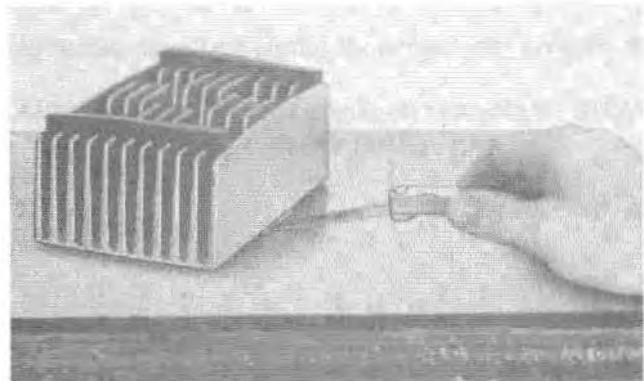
Crankcase halves are available only as a matched set.



M252770018/R1100982

INSPECT CYLINDER HEADS

1. Carefully scrape carbon from cylinder head with a soft metal (non-ferrous) scraper.
2. Use a spark plug tap (14 mm) to clean carbon from spark plug threads.
3. Check cylinder head for flatness on a surface plate. Check at various points around head with a (0.0254 mm) 0.001 inch feeler gauge. If there is any distortion, replace the head.

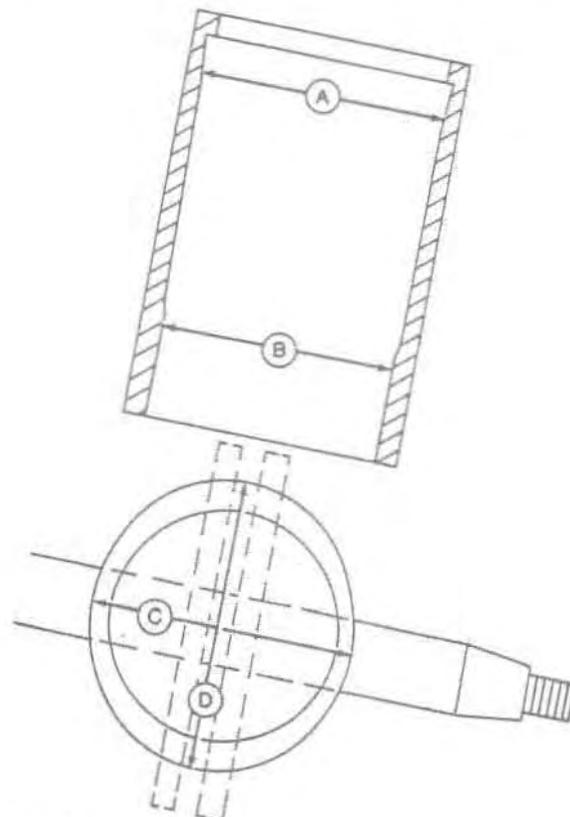


M252762012/S1100982

INSPECT CYLINDERS

1. Clean gasket material from cylinder surface and carbon from exhaust port with a soft metal (non-ferrous) scraper.
2. Measure cylinder bore at C and D in position A of cylinder. Measure cylinder bore at C and D in position B of cylinder. If any dimension exceeds wear tolerance of 60.134 mm (2.3675 in.), replace cylinder.

IMPORTANT: Do not hone or rebores cylinder. It is chrome-plated and must be replaced if out of specification.



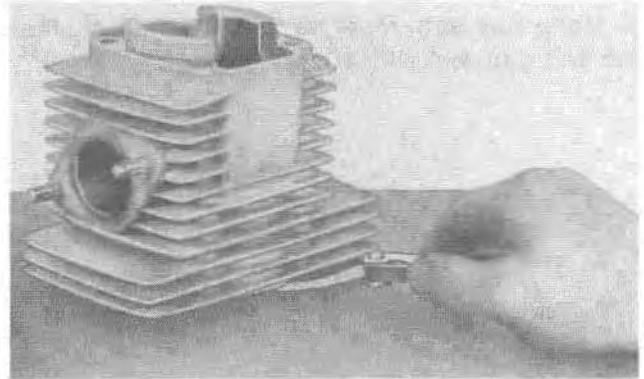
- A—Top of Ring Travel Zone
- B—Bottom of Ring Travel Zone
- C—Parallel to Crankshaft
- D—Right Angle to Crankshaft

M23493

M23493/2012/T1100982

Snowfire Engine

3. Set cylinder on a surface plate and check at various points around cylinder with a (0.0254 mm) 0.001 inch. feeler gauge. If there is any distortion, replace the cylinder.



M25261/2012/U/100982

INSPECT PISTON AND RINGS

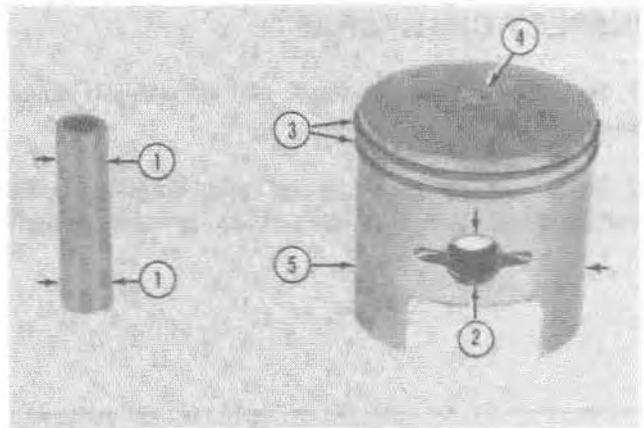
1. Measure piston pin in two locations. If dimension is less than 15.96 mm (0.6283 in.), replace pin.

2. Measure piston pin bore dimension on both sides of piston. If either dimension exceeds 16.08 mm (0.6331 in.), replace piston.

3. Remove the piston rings with a ring expander and clean ring grooves with a ring groove cleaning tool.

4. Check piston for being pitted, scored or corroded. Replace it if necessary. Clean any carbon deposit from top of piston.

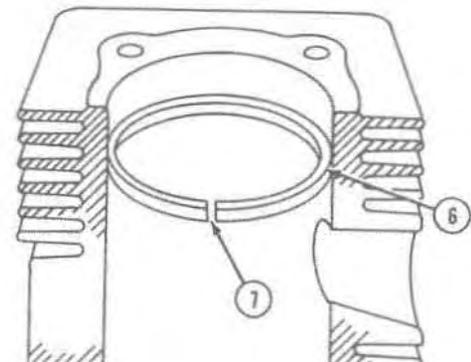
5. Measure the piston diameter at a right angle to the piston pin bore. If dimension is less than 59.82 mm (2.3551 in.), replace piston.



M23494/2012/V/100982

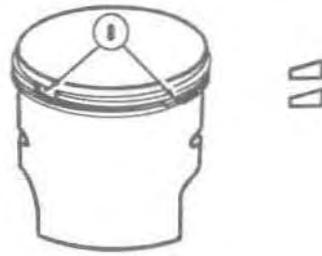
6. Use a piston to push the ring into a cylinder that has been inspected and proven correct. Push it into bore 25.4 mm (1 in.) below top of bore.

7. Measure the ring end gap. End gap should be 0.28 to 0.40 mm (0.011 to 0.019 in). If end gap is incorrect, the ring is incorrect or worn. Replace it.



M23495/2012/W/100982

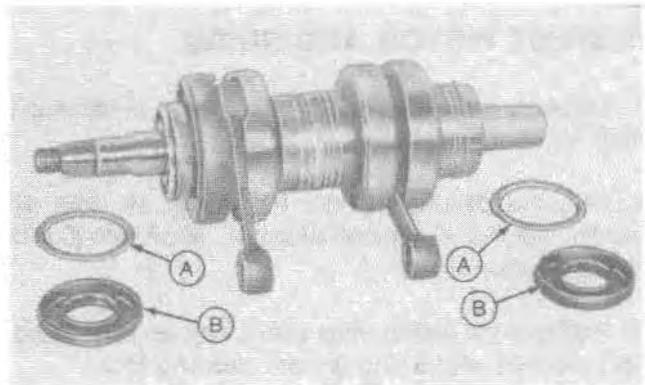
8. Make sure both rings are located so that pins are in the end gap and widest part of ring gap is up.



M32012/2012D/9/100982

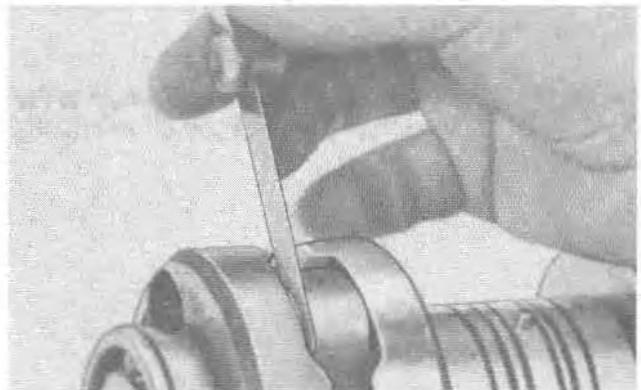
INSPECT CRANKSHAFT

1. Remove crankshaft seals and retainers. Replace the seals if they are damaged.
2. Measure the connecting rod inside diameter. If diameter exceeds specification, replace the crankshaft assembly.



M25283/2012/Y/100982

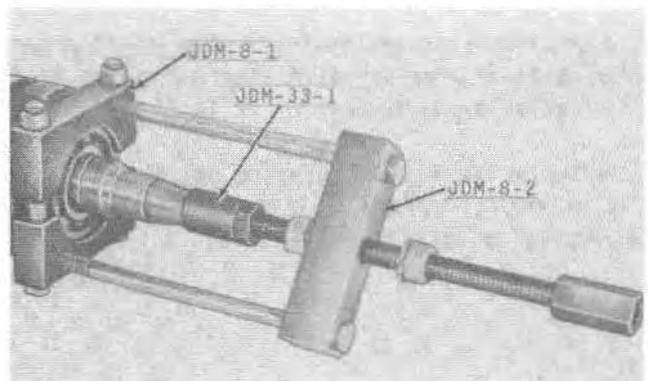
3. Move the connecting rod to one side and measure the clearance on opposite side with a feeler gauge. If clearance exceeds 0.70 mm (0.0276 in.), replace the crankshaft.
4. Rotate the five crankshaft bearings. If any rotate roughly or are frozen, they are damaged. The outside bearings can be replaced but the inner bearings can be replaced only with a crankshaft assembly.



M25284/2012/Z/100982

REPLACE OUTER CRANKSHAFT BEARINGS

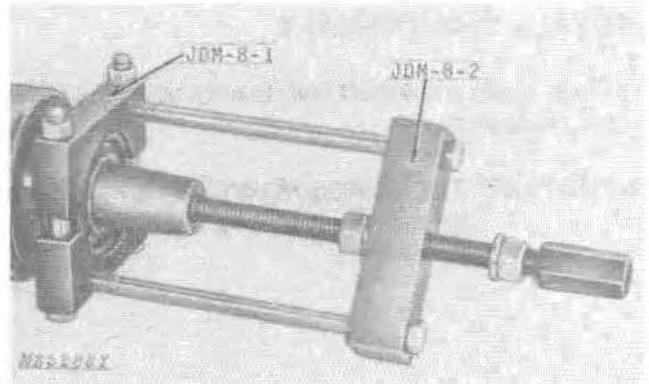
1. Install JDM-33-1 Adapter on crankshaft.
2. Use JDM-8-1 and JDM-8-2 to remove bearing from crankshaft.



M25285/2012/AA/100982

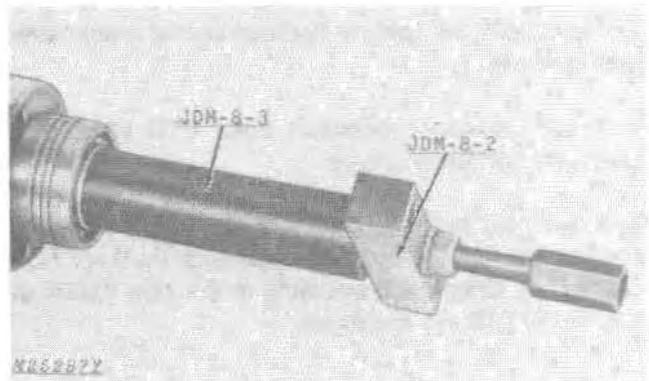
Snowfire Engine

3. Use JDM-8-1 and JDM-8-2 to remove bearings from crankshaft.



M25286r2012/BB/10/982

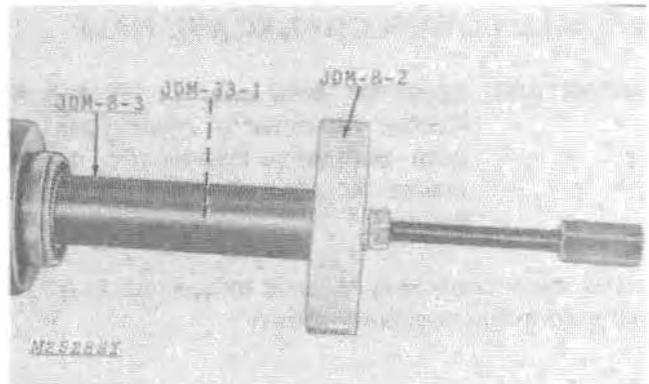
4. Use JDM-8-3 and JDM-8-2 to install bearings on crankshaft.



M25287r0012/CD/100982

5. Install JDM-33-1 Adapter on crankshaft.

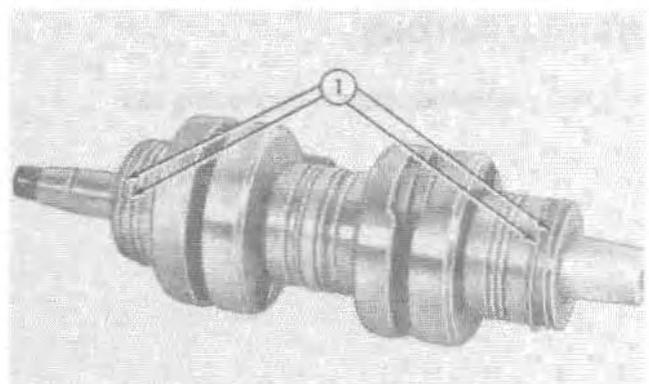
6. Use JDM-8-3 and JDM-8-2 to install bearing on crankshaft.



M25288r0012/CD/100982

INSTALL CRANKSHAFT SEALS

1. Place retainers and oil seals (lip inward) on crankshaft. Lubricate seals.

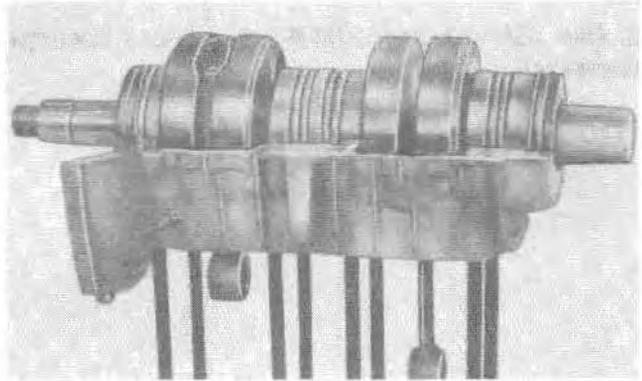


M25289r2012/EE/100982

INSTALL CRANKSHAFT

1. Place upper crankshaft half on work bench as shown and install crankshaft.

IMPORTANT: The locating pin on the center crankshaft spacer must fit into the hole in the upper crankcase.

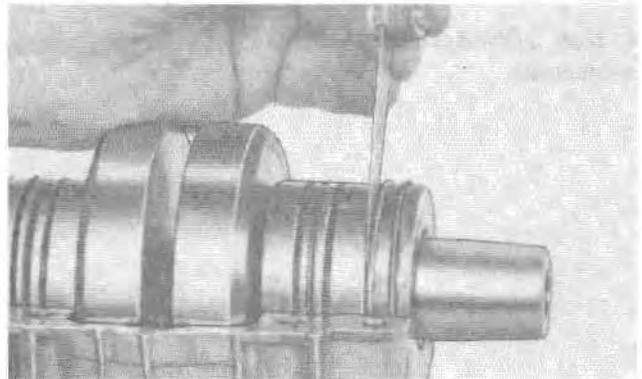


M25290/2012/FF/100982

2. Tap crankshaft toward flywheel end of crankcase with a plastic mallet.

3. Check clearance between outer PTO bearing and retainer, with a feeler gauge.

4. If end play exceeds 0.77 mm (0.030 in.) shims must be added between the two outer bearings on the PTO end of crankshaft. Shims are available in 0.1 mm (0.004 in.) and 0.3 mm (0.010 in.) thickness.

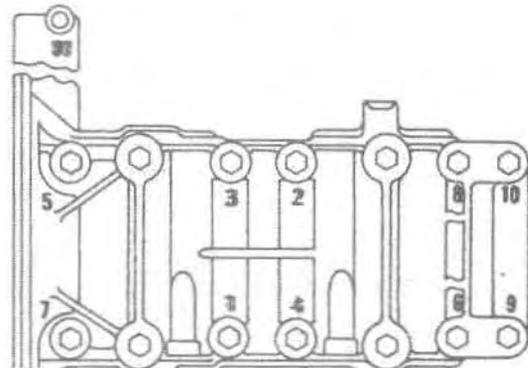


M25251/2012/GG/100982

INSTALL LOWER CRANKCASE HALF

IMPORTANT: Apply an even coat of M64850 Silicon Rubber Adhesive to sealing surfaces of both crankcase halves. Do not permit sealer to enter interior of crankcase halves.

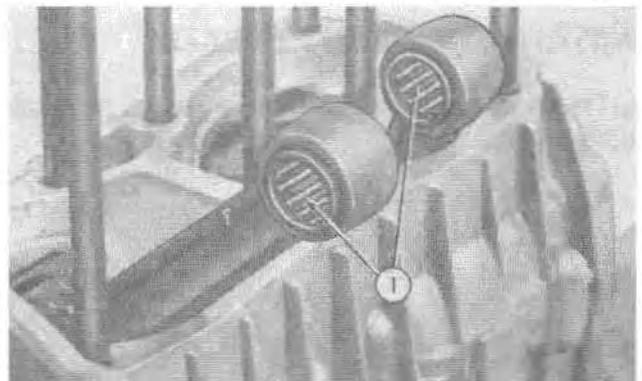
Install lower crankcase half and torque nuts to 22 N·m (16 lb-ft) in the sequence shown.



M23506/2012/HH/100982

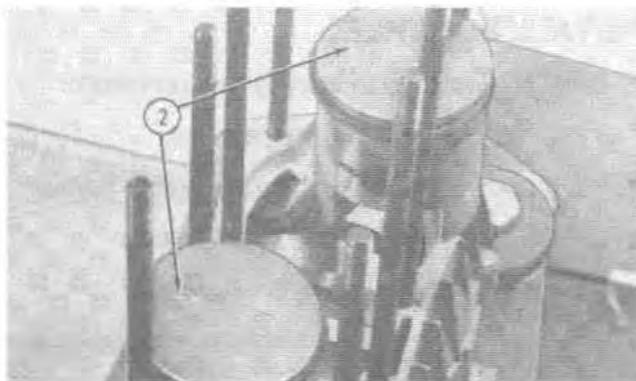
INSTALL PISTONS

1. Place needle bearings in connecting rod.



M25292/2012/II/100982

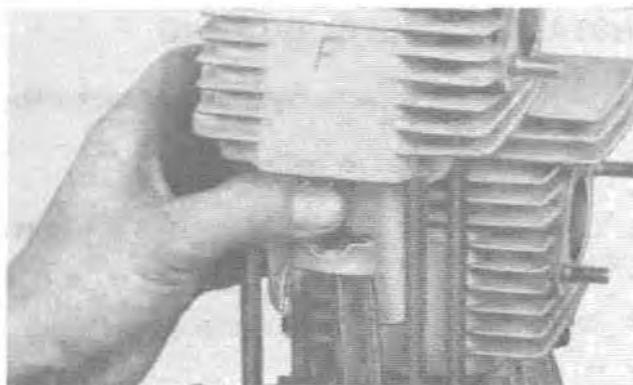
2. Set piston over connecting rod with arrow pointing toward exhaust side.
3. Push piston pin into piston and connecting rod and install new retainers.
4. Place new cylinder gaskets on crankcase.



M25293/2012/JJ/100982

INSTALL CYLINDERS AND HEADS

1. Make sure piston rings end gaps are centered over pin. Compress the rings with your fingers as you install the cylinder.

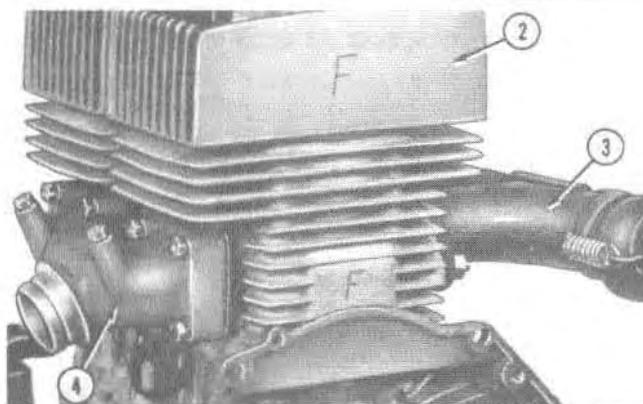


M25294/2012/KK/100982

2. Install cylinder leads and gaskets. DO NOT tighten hardware.

NOTE: Use a criss-cross pattern when tightening all hardware.

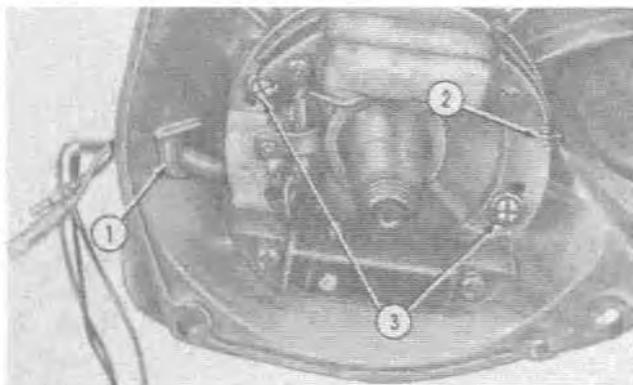
3. Install exhaust manifold and gaskets. Tighten hardware to 14 to 16 N·m (10 to 12 lb-ft).
4. Install intake manifold and gaskets. Tighten hardware to 6 to 8 N·m (4 to 6 lb-ft) torque.
5. Tighten cylinder head hardware to 22 N·m (16 lb-ft) torque.



M25295/2012/D/LL/100982

INSTALL STATOR (TIME IGNITION)

1. Guide stator leads through grommet and set stator against crankcase.
2. Align longest mark on stator with top of ridge on crankcase.
3. Tighten stator screws.



M25296/2012/MM/100982

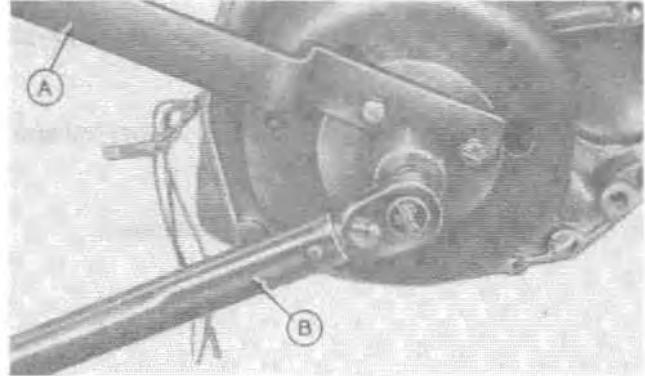
INSTALL FLYWHEEL

1. Install flywheel key in keyway on crankshaft.
2. Install flywheel, lock washer and nut.

NOTE: Lock washer has a tang to engage keyway.

3. Tighten flywheel nut to 81 N·m (60 lb-ft).
4. Bend tabs on lockwasher to secure nut.

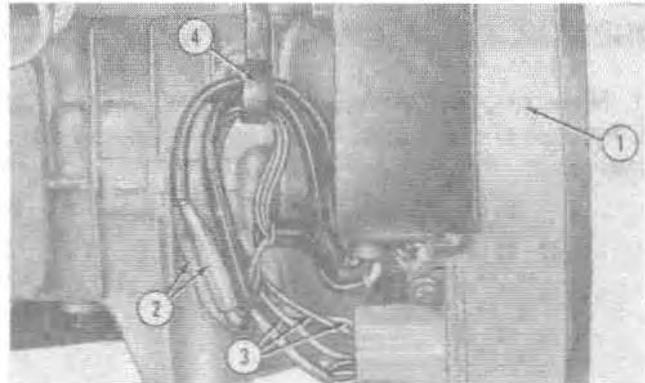
A—JDM-64-1 Flywheel Holding Tool
B—Torque Wrench



M25297/2012/NN/100982

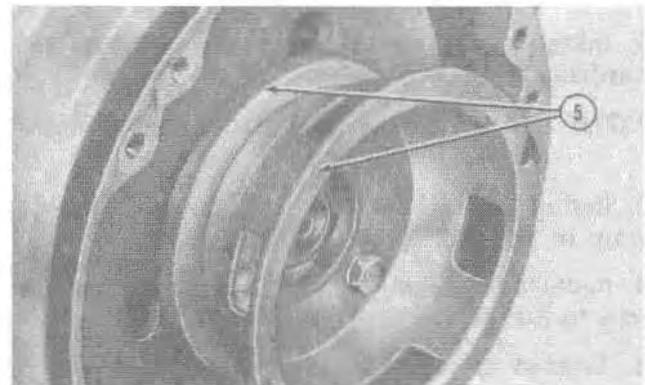
INSTALL FLYWHEEL HOUSING

1. Install flywheel housing, install wire harness clamp.
2. Connect red lead and white lead.
3. Install two yellow and one brown lead in connector as marked when removed.
4. Secure wiring harness with clamp.



M25298/2012/OO/100982

5. Install flywheel spacer (lip edge inward) and starter cup.



M25299/2012/PP/100982

INSTALL EXTERIOR COMPONENTS

1. Install recoil starter (A).
2. Install fuel pump impulse line (B).
3. Install engine base (C). DO NOT tighten bolts.
4. Install spark plugs. Tighten spark plugs to 27 N·m (20 lb-ft) torque. Connect spark plug leads (D).

A - Recoil Starter
B - Fuel Pump Impulse Line

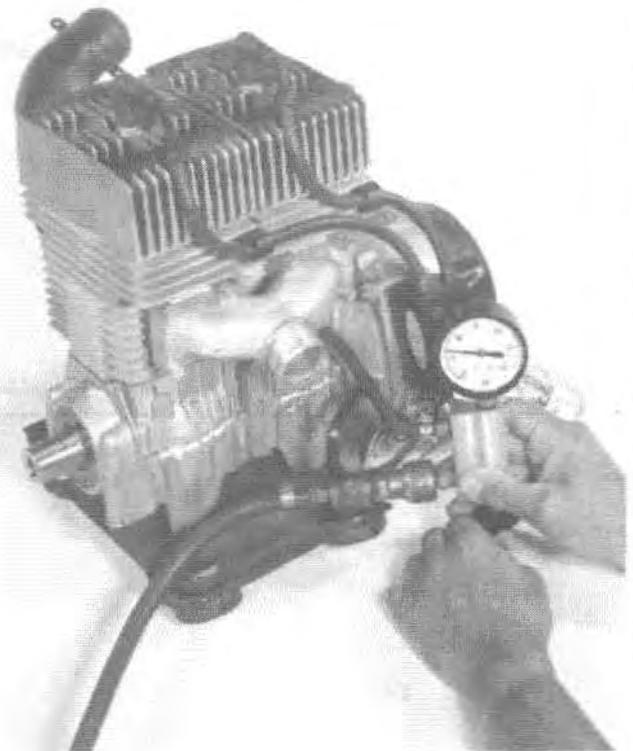
C - Engine Base
D - Spark Plug Leads



M31415/2012D/QG/100982

PRESSURE TEST ENGINE

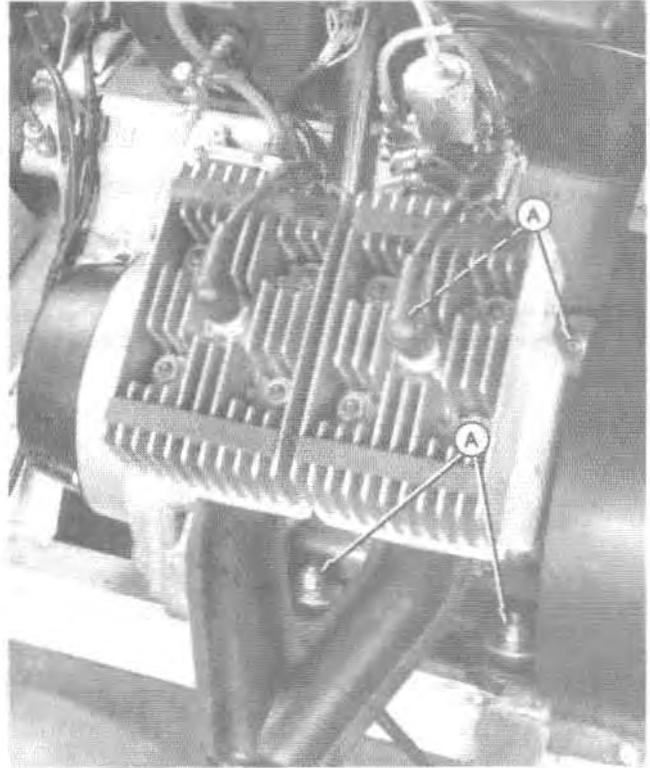
1. Place rubber sheet (A) between exhaust manifold and cylinder.
2. Place rubber sheet (A) between intake manifold and cylinders. Torque bolts to 5.8 N·m (4.3 lb-ft).
3. Connect pressure regulator to impulse fitting.
4. Close regulator valve.
5. Connect shop air (B) to regulator.
6. Open valve until gauge reads 48 kPa (7 psi). Then, close valve.
7. Gauge needle should not drop below 35 kPa (5 psi) for at least 10 seconds.
8. If needle drops before 10 seconds, open valve to maintain 48 kPa (7 psi). Apply a liquid soap solution to seals and seams to locate leaks.



M31416/2012D/RR/100982

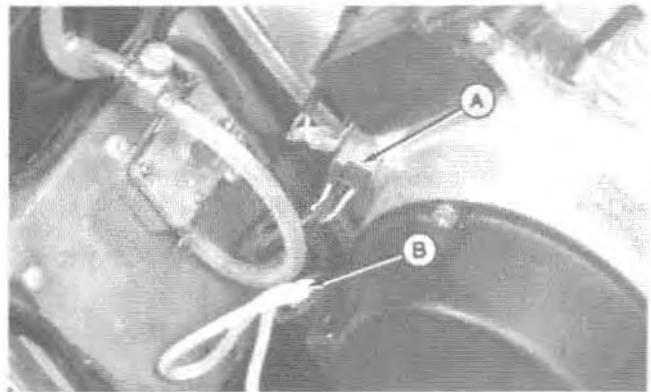
INSTALL ENGINE

1. Place engine in snowmobile.
2. Install engine mounting bolts (A). Tighten rear bolts to 61 to 75 N·m (45 to 55 lb-ft) torque. Tighten front bolts to 47 N·m (35 lb-ft) torque.
3. Install drive sheave.
4. Check clutch alignment.
5. Connect carburetor to intake manifold.



M3141700120/55/1029E2

6. Connect wiring harness connector (A).
7. Install handle and release knot (B) in recoil start rope.



M3141800120/TT/1009E2

8. Connect fuel impulse line (A) to fuel pump.



M3141900120/UU/1009E2

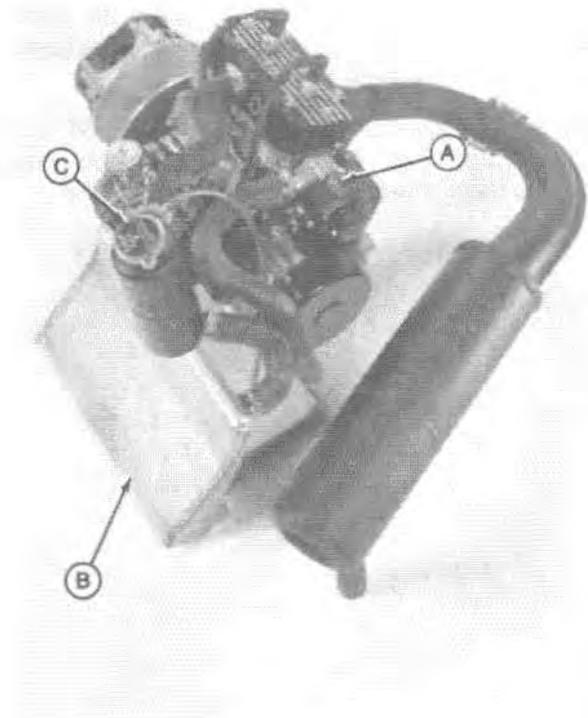
Snowfire Engine

9. Install muffler.
10. Install muffler springs.
11. Install hood.

20120-VV1100982

Snowfire Engine

GENERAL INFORMATION



The pressurized liquid cooling system has a centrifugal pump (A) and tunnel mounted heat exchanger (B).

System capacity is approximately 4.7 L (5 U.S. qt.).

A coolant temperature warning light is incorporated in the system and will turn on if the temperature reaches 96°C (205°F). The radiator cap (C) releases pressure at 82.7 to 89.6 kPa (12 to 13 psi) allowing the cooling system to overflow.

The pump is attached to the engine and driven by a belt from a pulley on the crankshaft.

IMPORTANT: Running on hard packed snow or ice or pulling loads may cause overheating. If the coolant temperature warning light goes on, reduce load and immediately run in loose snow or shut off engine.

The coolant is a 50-50 mixture of ethylene glycol anti-freeze and water. This mixture should give approximately a -40°C (-40°F) protection for the system. Do not exceed the 50-50 mixture.

Check the coolant with a hydrometer, when the engine is completely warmed up. Do not add anti-freeze before checking the coolant.

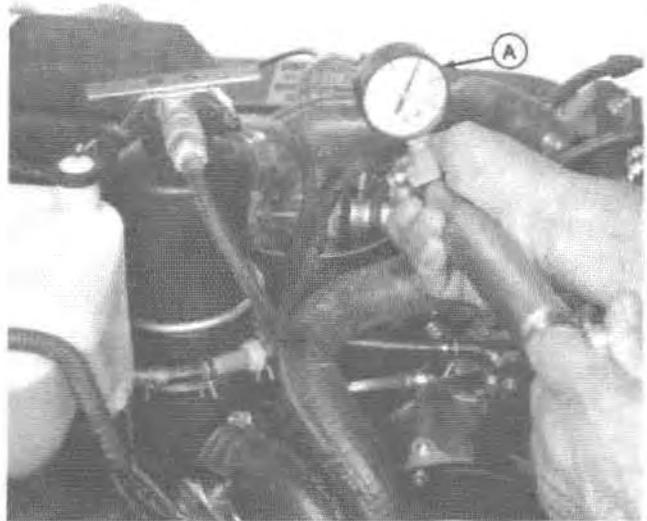
IMPORTANT: Do not use anti-freeze containing a radiator stop leak or add stop leak to the system.

M3142D(01)4D(A)100M2

TESTING SYSTEM

⚠ CAUTION: Allow system time to cool. Then, loosen filler cap to relieve pressure before removing cap.

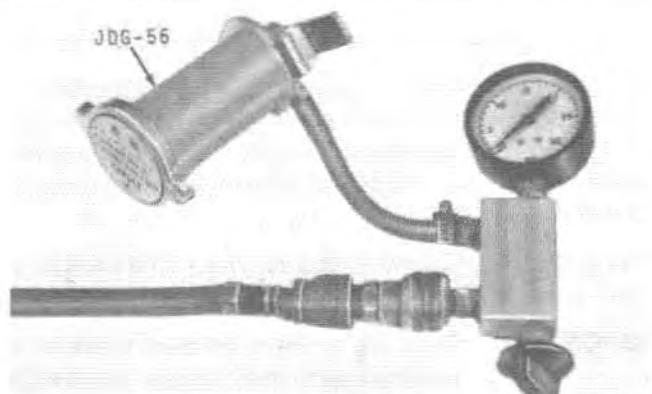
Pump system pressure to approximately 138 kPa (20 psi) on the gauge (A). Pressure should hold steady. If pressure falls, there is a leak in the system.



M31421/2014D/B/100982

TESTING FILLER CAP

Cap should release at 82.7 to 89.6 kPa (12 to 13 psi).



M25320/2014D/C/100982

DRAINING COOLING SYSTEM

NOTE: Normally the system needs to be drained and refilled only every two years.

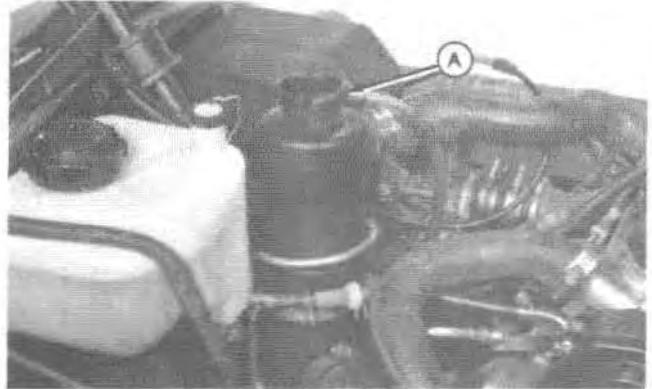
1. Remove drain screw (A) and pressure cap.
2. Remove lower hose from heat exchanger.
3. Raise rear of snowmobile slightly to drain system. Replace drain screw and lower hose.
4. Wash engine and compartment with clean water.



M31422/2014D/D/100982

FILLING COOLING SYSTEM

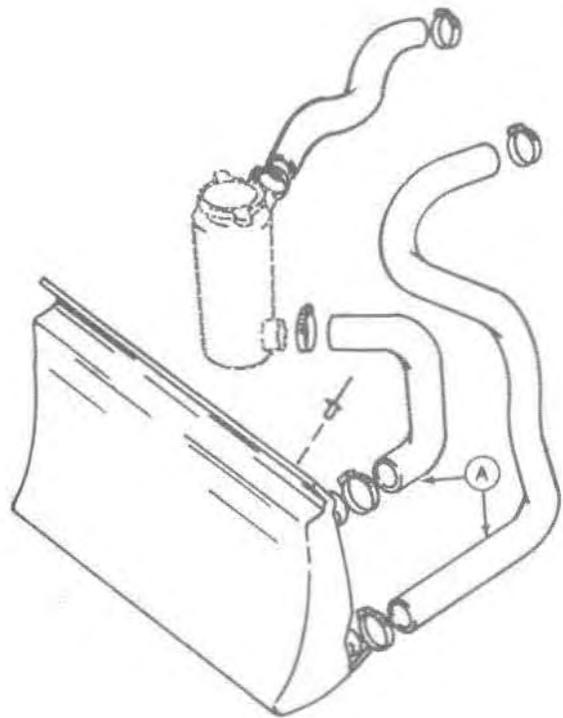
1. Level snowmobile.
2. Connect hose to heat exchanger. Replace drain screw.
3. Fill the system with a 50-50 solution of ethylene glycol anti-freeze and water to bottom of filler neck on surge tank (A). System capacity is approximately 4.7 L (5 U.S. qt.).
4. Check all hose connections for leaks.
5. Block up track so engine can be run safely. Start engine and check for coolant flowing in system. There will be a swirling action in the top of the surge tank when coolant is flowing. Install pressure cap.



M31423/2014D/E1100952

REPLACING HEAT EXCHANGER

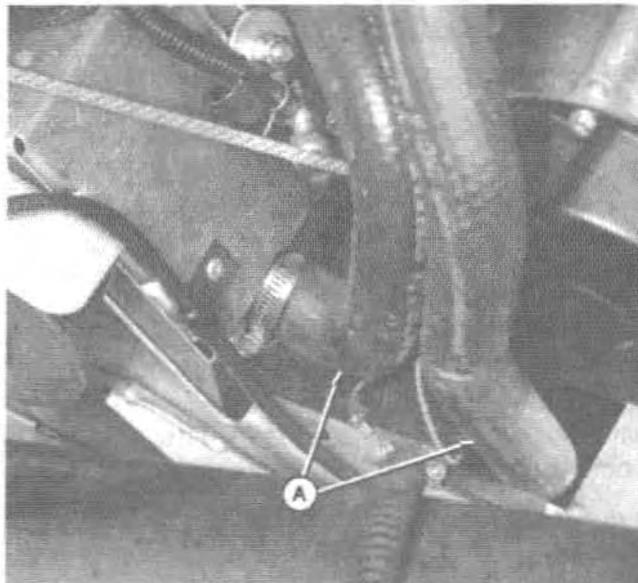
1. Drain cooling system. Remove hoses (A) from exchanger.
2. Remove suspension.
3. Remove track.
4. Remove and replace heat exchanger.



M31424/2014D/F1100982

Cooling System (Sprintfire)

5. Connect hoses (A).
6. Replace track and suspension.
7. Fill cooling system.



M31425/2014D/G/100882

REMOVE STARTER

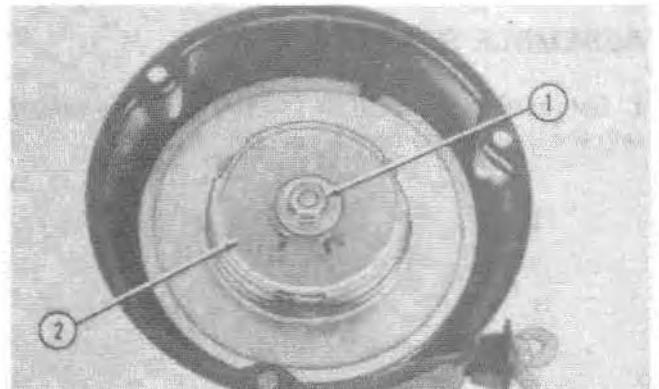
1. Pull on rope, tie a knot in rope, and remove handle.
2. Remove recoil starter.

2015D/A/100982

REPAIR STARTER

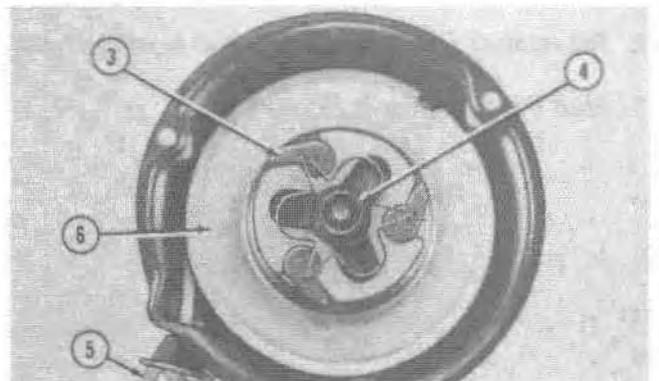
CAUTION: Recoil starter parts are under spring pressure. Wear safety glasses and use care during disassembly and assembly.

1. Press down on retainer cover and remove nut, lock-washer and large washer.
2. Slowly lift off retainer cover.



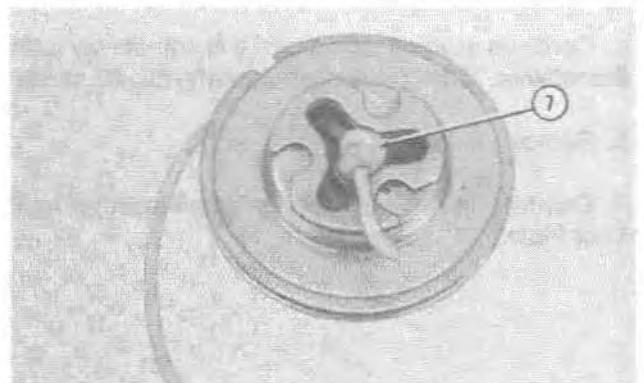
M23533/2017/B/100982

3. Remove pawls and pawl springs.
4. Remove return spring, center spring and washer.
5. Untie knot in rope and release it.
6. Rotate recoil reel back and forth to release spring and slowly remove reel from housing.



M23534/2017/C/100982

7. Pull on knotted end of rope to remove it.

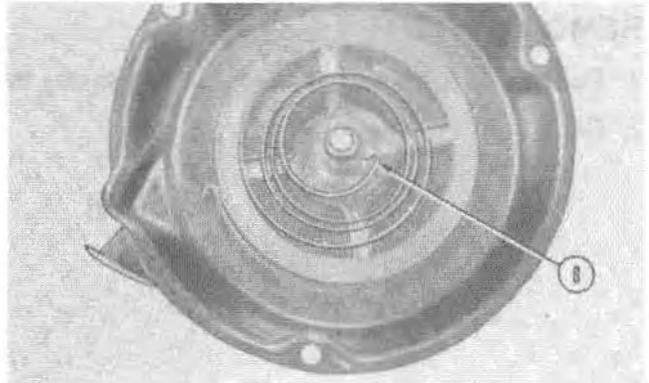


M23535/2017/D/100982

Recoil Starter

IMPORTANT: Inspect the recoil spring for damage. Do not remove it unless it must be replaced. Spring will unwind during removal.

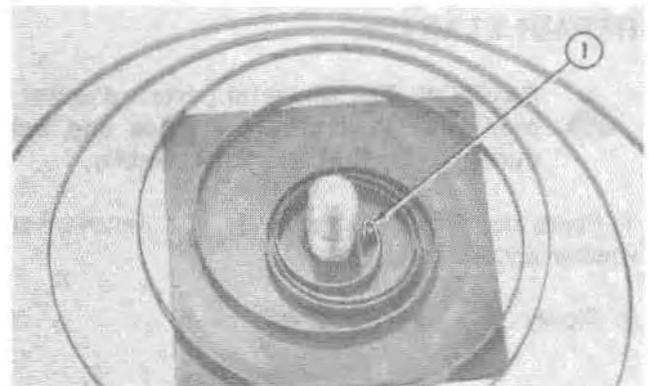
8. Use a long object to pry up on center of spring until it springs out of housing.



MZ3536/2017/E/100982

ASSEMBLE STARTER

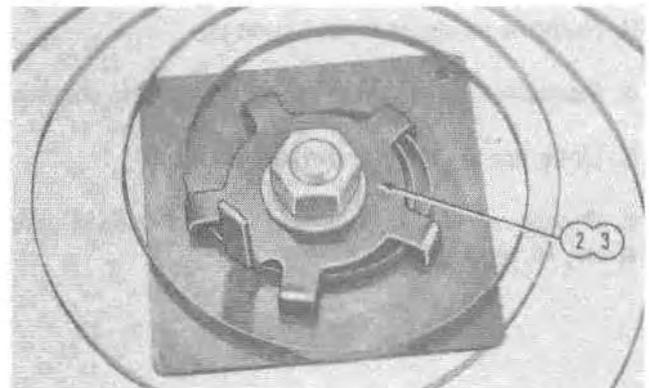
1. Set recoil spring on JDM-113 Starter spring winding tool with the inner bend hooked on pin.



MZ3537/2017/F/100982

2. Set retainer over spring and install washer and nut.

3. Start rotating retainer clockwise.

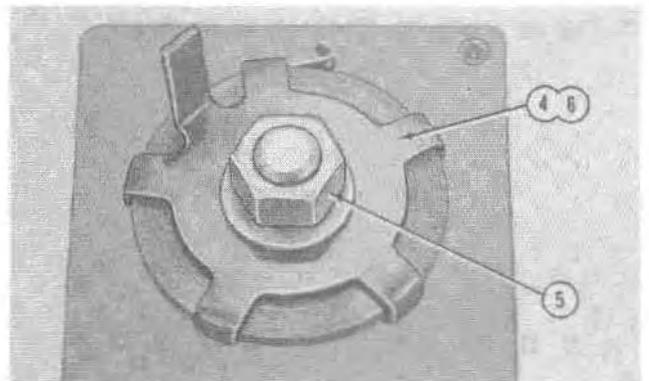


MZ3538/2017/G/100982

4. Continue winding spring until it is completely gathered in the retainer. Then, release retainer and allow it to spin freely.

5. Remove nut and washer.

6. Carefully lift retainer (with spring encased) from Winding Tool Plate.

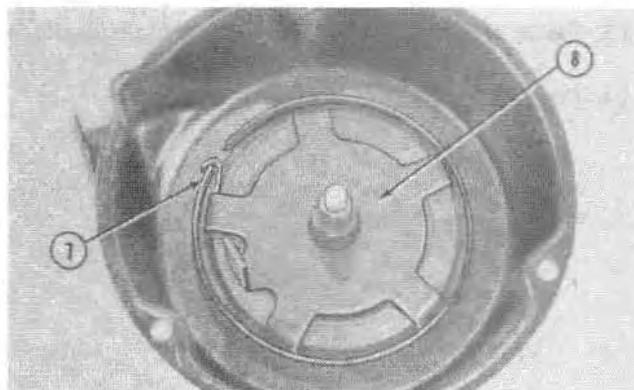


MZ3539/2017/H/100982

Recoil Starter

7. Set recoil spring in housing and connect bent end to notch.

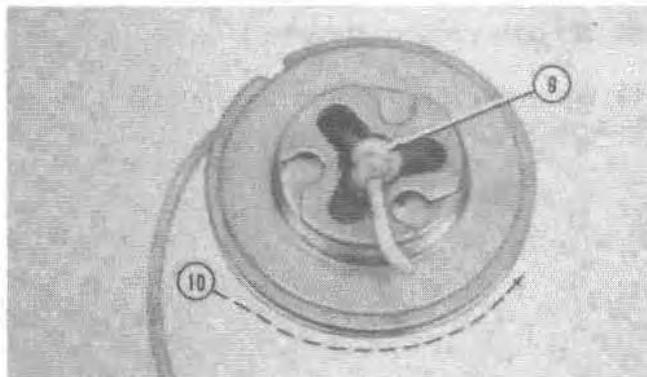
8. Hold spring down and remove retainer.



M23540/2017/R/100982

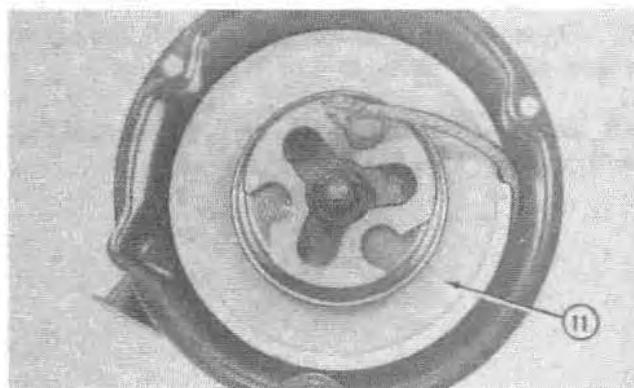
9. Tie a knot in one end of rope and guide the other end through hole in recoil reel until knot is seated.

10. Wind rope counterclockwise around recoil reel.



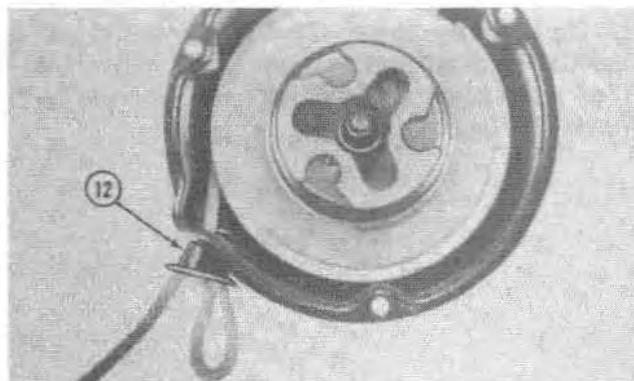
M23541/2017/U/100982

11. Hold end of rope in notch and install recoil reel. Rotate reel back and forth until you feel it catch in recoil spring and fall into position.



M23542/2017/K/100982

12. Rotate recoil at least one full turn counterclockwise. Then, guide rope through hole and tie a knot to hold rope in place.

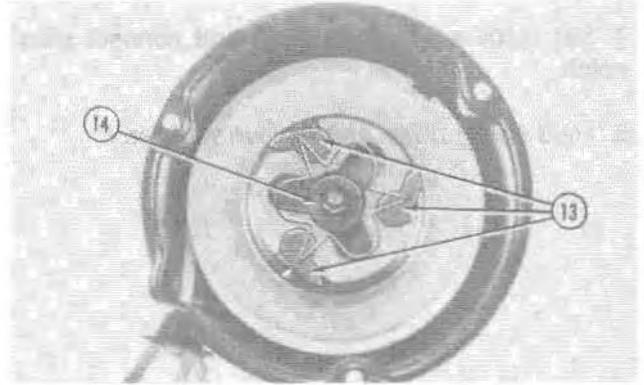


M23543/2017/L/100982

Recoil Starter

13. Place starter pawls on reel and install pawl springs.

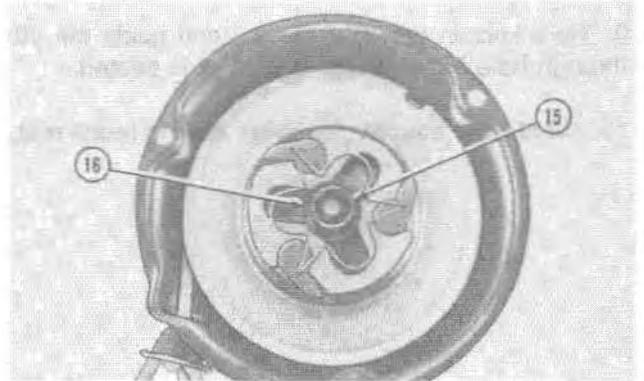
14. Install washer over center post.



M23544/2017/M/100982

15. Set center spring over post.

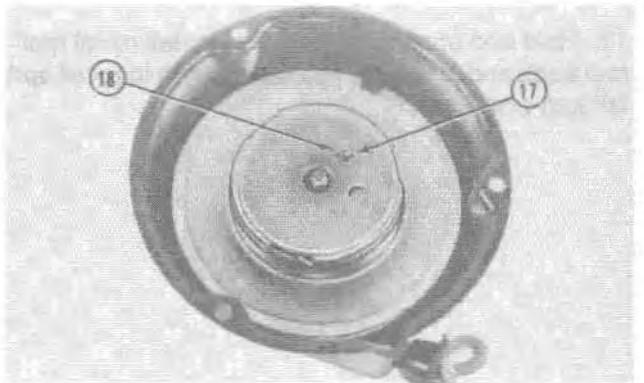
16. Set return spring over center spring and connect the straight end to a hole in the reel.



M23545/2017/P/100982

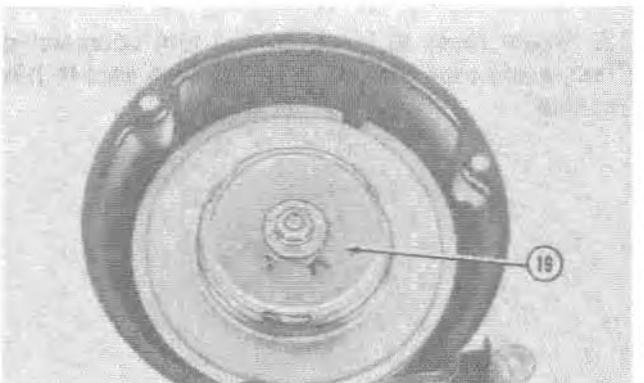
17. Set spring cover in a position so that the notch shown aligns with the curved end of return spring.

18. Use a wire or small screwdriver to connect the curved end of return spring in the notch.



M23546/2017/D/100982

19. Do not press down. Carefully rotate the spring cover counterclockwise until notches align with starter pawls. Then, press down and install flat washer (dimpled side down) lockwasher and nut. Tighten nut.



M23547/2017/P/100982

INSTALL STARTER

1. Install recoil starter.
2. Guide end of rope through rope guides and install handle. Remove knot in rope.

20150/Q/100982



SPRINTFIRE ENGINE SPECIFICATIONS

Item	New Part Dimension	Wear Tolerance
Cylinder Bore	60.05 to 60.07 mm (2.3637 to 2.3645 in.)	60.15 mm (2.3675 in.)
Connecting Rod Small End Diameter	20.003 to 20.014 mm (0.7875 to 0.7880 in.)	20.05 mm (0.7894 in.)
Connecting Rod Side Clearance	0.4 to 0.5 mm (0.0157 to 0.0197 in.)	0.70 mm (0.0276 in.)
Crankshaft Runout	0.05 mm (0.0020 in.)	0.08 mm (0.0032 in.)
Piston at Skirt (5 mm from bottom)	59.960 to 59.980 mm (2.3606 to 2.3614 in.)	59.85 mm (2.356 in.)
Piston Pin Bore	16.001 to 16.005 mm (0.6299 to 0.6301 in.)	16.08 mm (0.6331 in.)
Piston Pin	15.994 to 16.000 mm (0.6297 to 0.6299 in.)	15.96 mm (0.6283 in.)
Ring End Gap	0.2 to 0.4 mm (0.008 to 0.016 in.)	
Crankshaft OD PTO End	30 mm (1.1811 in.)	
Crankshaft End Play	Max. 0.55 mm (Max. 0.0216 in.)	
Compression Pressure	758 to 890 kPa (7.5 to 8.9 bar) (100 to 130 psi) 69 kPa (0.7 bar) (10 psi) between cylinders	621 kPa (6.2 bar) (90 psi) min.

2020D/A/100982

SPARK PLUG SPECIFICATION — SPRINTFIRE

John Deere FIREBURST engine spark plugs are Champion QN-2 (AM55044) (Canada) or Champion N2 (AM52640) (United States).

2020D/B/100982

TORQUE FOR HARDWARE — SPRINTFIRE

Location	Torque
Crankcase Halves:	
M6.....	6 N·m (4.3 lb-ft)
M8.....	22 N·m (16 lb-ft)
Cylinder-to-Crankcase.....	22 N·m (16 lb-ft)
Cylinder Head.....	22 to 24 N·m (16 to 18 lb-ft)
Intake Manifold.....	6 to 7 N·m (4.3 to 5.0 lb-ft)
Exhaust Muffler.....	14 to 16 N·m (10 to 11.6 lb-ft)
Flywheel-to-Crankshaft.....	81 N·m (60 lb-ft)
Spark Plug.....	27 N·m (20 lb-ft)
Engine Base Nuts:	
Rear.....	61 to 75 N·m (45 to 55 lb-ft)
Front.....	47 N·m (35 lb-ft)

2020D/C1/00982

Specifications

SNOWFIRE ENGINE SPECIFICATIONS

Item	New Part Dimension	Wear Tolerance
Cylinder Bore	60.04 to 60.059 mm (2.3637 to 2.3645 in.)	60.134 mm (2.3675 in.)
Connecting Rod Small End Diameter	20.003 to 20.014 mm (0.7875 to 0.7880 in.)	20.05 mm (0.7894 in.)
Connecting Rod Side Clearance	0.4 to 0.5 mm (0.0157 to 0.0197 in.)	0.70 mm (0.0276 in.)
Crankshaft Runout	0.05 mm (0.0020 in.)	0.08 mm (0.0032 in.)
Piston at Skirt	59.961 to 59.980 mm (2.3607 to 2.3614 in.)	59.82 mm (2.3551 in.)
Piston Pin Bore	15.999 to 16.005 mm (0.6299 to 0.6301 in.)	16.08 mm (0.6331 in.)
Piston Pin	15.994 to 16.000 mm (0.6297 to 0.6299 in.)	15.96 mm (0.6283 in.)
Ring End Gap	0.28 to 0.48 mm (0.011 to 0.019 in.)	
Crankshaft OD PTO end	30 mm (1.1811 in.)	
Crankshaft End Play	Max. 0.770 mm (Max. 0.0303 in.)	
Compression Pressure	758 to 890 kPa (7.5 to 8.9 bar) (110 to 130 psi) 69 kPa (0.7 bar) (10 psi) between cylinders	621 kPa (6.2 bar) (90 psi) min.

2020D/E/100982

SPARK PLUG SPECIFICATION — SNOWFIRE

John Deere FIREBURST engine spark plugs are Champion ON-3 (AM55045) (Canada) or Champion N3 (AM52432) (United States).

2020D/E/100982

TORQUE FOR HARDWARE — SNOWFIRE

Location	Torque
Crankcase Halves.....	22 N·m (16 lb-ft)
Cylinder-to-Crankcase.....	22 N·m (16 lb-ft)
Cylinder Head.....	22 to 24 N·m (16 to 18 lb-ft)
Intake Manifold.....	6 to 8 N·m (4.3 to 5.8 lb-ft)
Exhaust Manifold.....	14 to 16 N·m (10 to 12 lb-ft)
Flywheel-to-Crankshaft.....	81 N·m (60 lb-ft)
Spark Plug.....	27 N·m (20 lb-ft)
Engine Base Nuts:	
Rear.....	61 to 75 N·m (45 to 55 lb-ft)
Front.....	47 N·m (35 lb-ft)

2020D/F/160982

Section 30 FUEL SYSTEM

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3000D/A/100982



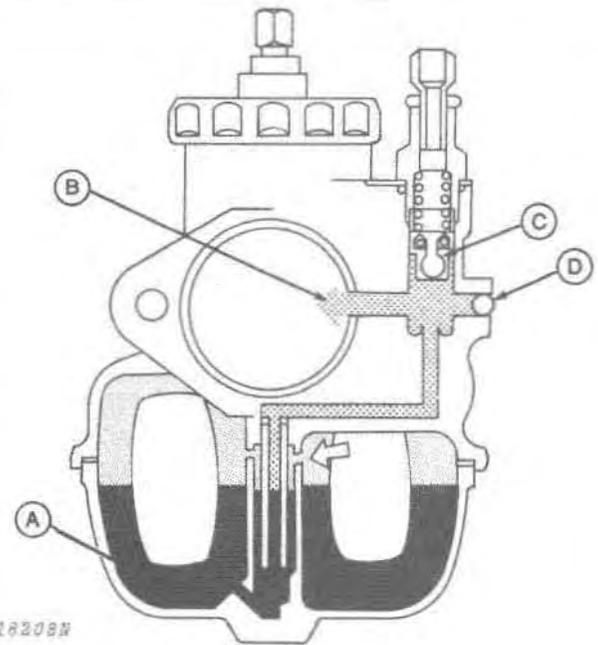
CHOKE SYSTEM (Slide Valve)

The choke system consists of the starter jet and choke plunger (C). This system eliminates the need for a choke in the carburetor bore, thereby increasing efficiency and providing easier starting.

NOTE: The throttle valve must be closed for starting. The choke system requires negative pressure in the inlet pipe in order to function.

The system is opened and closed by the choke plunger (C). Moving the choke lever on the left-hand panel up lifts the choke plunger and opens the choke system.

Fuel (A) is metered through the starter jet and mixed with air (D) in the emulsion tube. This mixture flows into the plunger area, mixes with more air from the air intake (D) and is then drawn into the engine through the carburetor throat.



M18208/3005/D4/100982

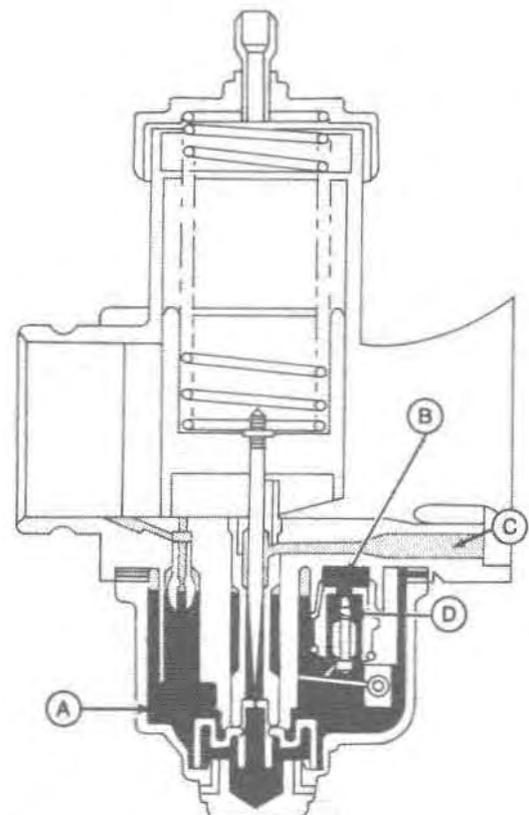
FLOAT SYSTEM (Slide Valve)

The float system consists of two independent floats and a needle valve. The system maintains fuel at a constant level in the float chamber.

A fuel level drop in the float chamber causes the floats and float arm to drop. Fuel under pressure from the fuel pump is forced around the needle valve (D) and into the float chamber.

As fuel in the float chamber approaches the correct level, the floats raise contacting the float arm. The float arm moves the needle valve against the valve seat, stopping fuel flow into the float chamber.

Under operating conditions, the fuel level and floats position themselves so that inward flow of fuel to the carburetor is equal to the outward flow of fuel to the engine.



- A—Fuel
- B—Fuel Inlet
- C—Air
- D—Needle Valve

M18309N

PILOT SYSTEM (Idle and Slow Speed) (Slide Valve)

The pilot system, consists of the pilot jet, air screw, pilot outlet and bypass. The ratio of fuel-air mixture for idling and slow speed is controlled by the pilot jet and air screw.

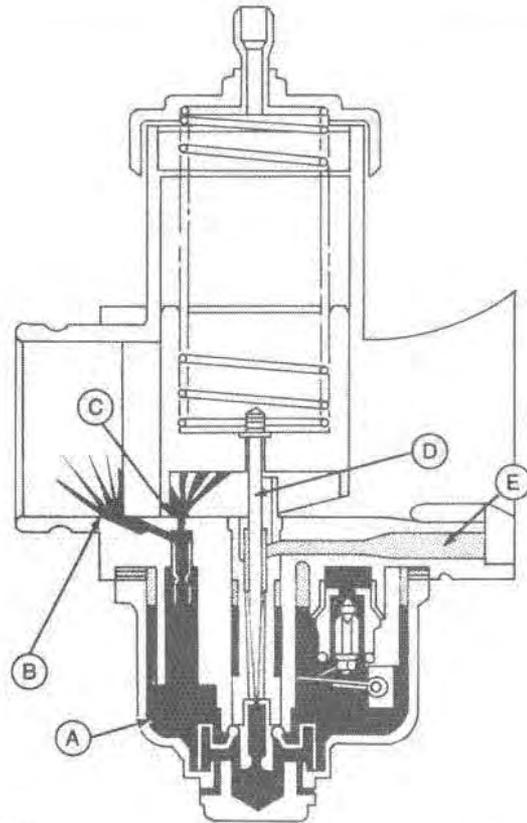
The system controls the fuel-air mixture from idle or closed throttle position until the throttle valve is opened sufficiently to allow the main system to function.

At idle speed the throttle valve is closed and the air velocity through the needle jet is low. This low pressure is not enough to draw fuel from the needle jet of the main system.

Fuel during idle is supplied by the pilot outlet (C) and bypass (B). Fuel metered by the pilot is mixed with air (E) from the air intake and bypass before the fuel enters the carburetor bore.

As the throttle valve is opened wider for low-speed operation, the pilot outlet (C) cannot supply the required fuel. The fuel then enters the carburetor bore through the bypass (B) as well as the pilot outlet (C).

- | | |
|----------------|----------------|
| A—Fuel | C—Pilot Outlet |
| B—Pilot Bypass | D—Jet Needle |
| | E—Air |



M18210N

M18210/3005/E1/100982

MAIN SYSTEM (Slide Valve)

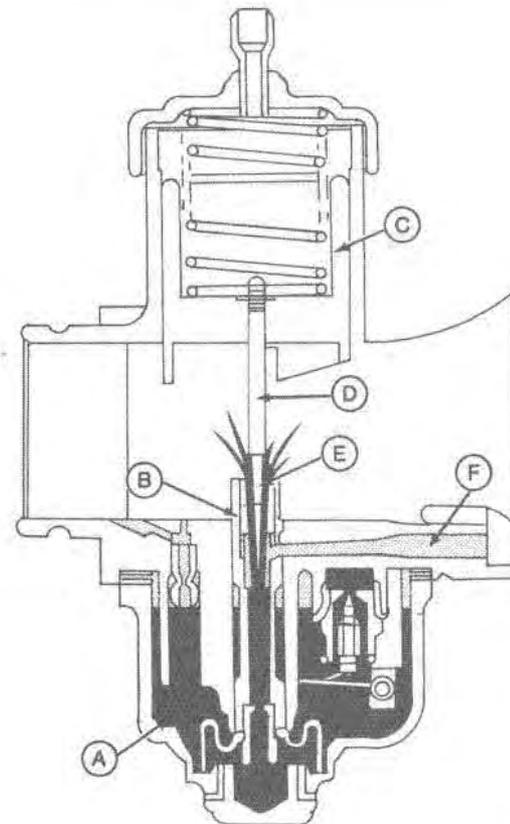
The main system starts to function when the throttle valve (C) is opened about 1/4 of the way. Opening the throttle valve causes the jet needle (D) to move up. This increases air flow through the needle jet (B), thereby increasing negative pressure which causes a sucking action to take place.

From 1/4 to 3/4 open throttle, the fuel passes through the main jet and is metered in the clearance between the needle jet (B) and jet needle (D). The fuel is then mixed with air that is metered (E) through the air intake, thereby atomizing the fuel. This mixture is then mixed with air flowing through the main bore before entering the engine.

During this operation the cutaway (slant) of the throttle valve (C) controls the negative pressure on the needle jet (B), thereby regulating the amount of fuel that is injected into the engine.

When the throttle valve is fully opened for high speed operation, fuel is metered entirely by the main jet.

- | | |
|------------------|----------------|
| A—Fuel | D—Jet Needle |
| B—Needle Jet | E—Metered Here |
| C—Throttle Valve | F—Air |



M18211N

M18211/E2/100982

DIAGNOSE MALFUNCTIONS

Carburetor Too Rich

Float level incorrect.
Dirt under inlet needle valve.
Silencer restricted.
Wrong main jet.
Choke system adjusted incorrectly.
Jet needle clip positioned incorrectly.
Air jet restricted.

Carburetor Too Lean

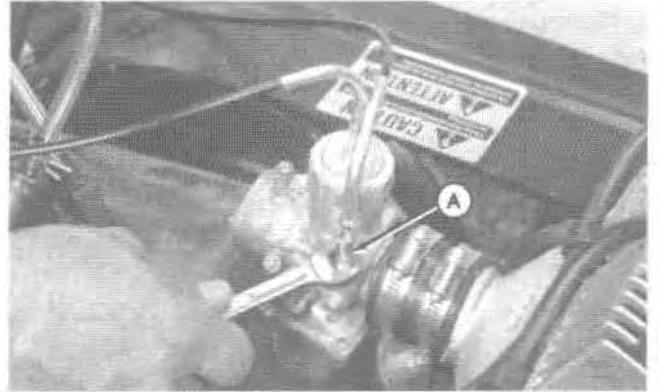
In-line fuel filter plugged or restricted.
Dirty fuel pickup strainer in fuel tank.
Fuel pump impulse line plugged.
Hole in fuel impulse line.
Jet needle clip positioned incorrectly.
Wrong main jet.
Faulty fuel pump.
Pinched fuel lines.
Hole in intake silencer boot.
Head gasket leaking.
Operating with air intake silencer removed.
Air leakage at intake manifold gaskets.
Air leakage at crankshaft seals or crankcase mating surfaces.
Inlet needle valve restricted.

3005-U1100982



REMOVE CARBURETOR

1. Remove air intake silencer.
2. Disconnect fuel line from carburetor.
3. Remove choke plunger assembly (A).



M32000/3012D/A/100982

4. Remove throttle valve assembly (A).
5. Remove carburetor.

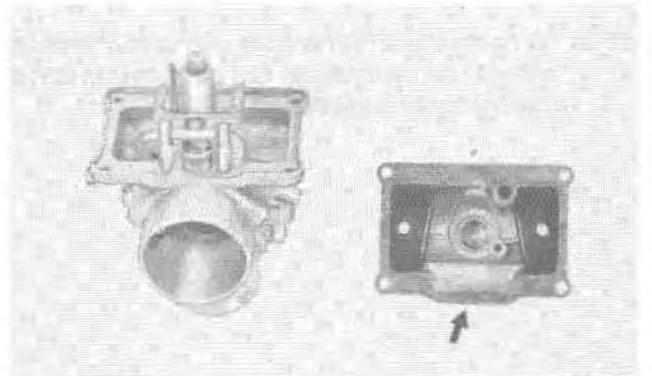


M32091/3012D/B/100982

DISASSEMBLE CARBURETOR

⚠ CAUTION: Use care when draining fuel. Avoid fires due to smoking or careless maintenance practices.

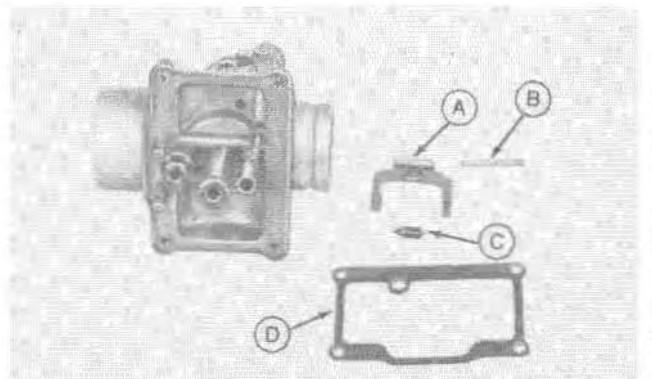
1. Drain fuel from the float bowl.
2. Remove throttle stop screw and air screw.
3. Remove float chamber with floats.
4. Use a 6 mm socket to remove main jet.



M22581/3010/C/100982

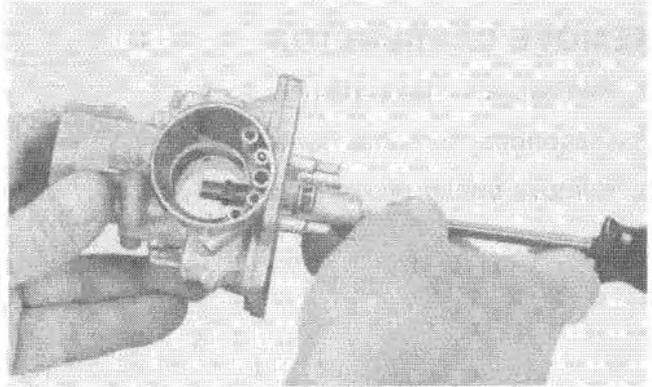
5. Remove float arm pin (B), float arm (A), and inlet needle valve (C).

A—Float Arm
B—Float Arm Pin
C—Inlet Needle Valve
D—Gasket



M22682/3010/D/100982

6. Remove needle jet by pushing from the bottom with an awl.



M22683/3010/E/100982

CLEAN CARBURETOR

IMPORTANT: Never clean jets or passages with small drills or wire.

1. Place carburetor parts in PT503 Cleaner or its equivalent. Do not put gaskets in cleaner.
2. Parts should remain in cleaner for 1 to 2 hours. Remove and rinse with solvent.
3. Dry parts with compressed air. Be sure all holes are open. DO NOT use rags or paper to dry parts. Lint may plug jets or passages.

NOTE: Rinse mixing chamber body and float chamber in hot water. This neutralizes the corrosive action of the cleaner on the aluminum.

3010F/100982

INSPECT CARBURETOR

1. Check mixing chamber body and float chamber for cracks or damage.
2. Check all springs for damage or distortion.
3. Check throttle stop screw and air screw for seating surface damage or stripped threads.
4. Check main jet and pilot jet for damage or stripped threads.

NOTE: Main jet and pilot should be clean and shiny. Any abrasions will cause a lean fuel-air mixture and possible engine damage.

5. Remove retainer and inlet valve. Check seating surface on inlet valve and seat for damage. Retainer should not bind or hinder movement of inlet valve.

6. Check needle jet and jet needle for damage. Jet needle should slide freely within the needle jet.

NOTE: E-ring on the jet needle should be installed in the middle groove.

7. Install floats in float chamber. Move floats up and down to be sure they are not binding on guides.

8. Check float arm and float pin to be sure arm doesn't bind on pin.

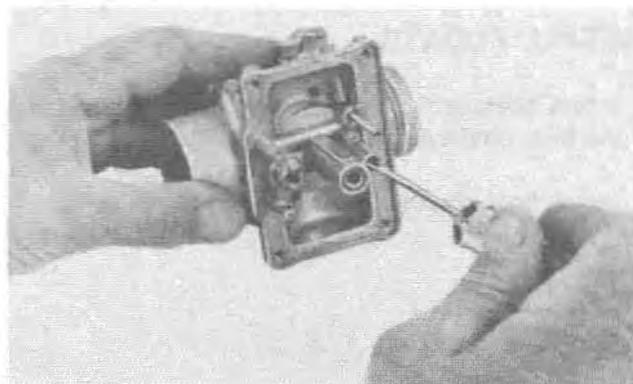
9. Check choke plunger for free movement in passage

- 10 Place throttle valve in mixing chamber body. Move valve up and down to check for sticking or wear. Be sure guide pin in mixing chamber body is not broken off. This would allow throttle valve to rotate, causing erratic engine operation.

3010G100962

INSTALL PILOT JET

1. Install and tighten pilot jet.



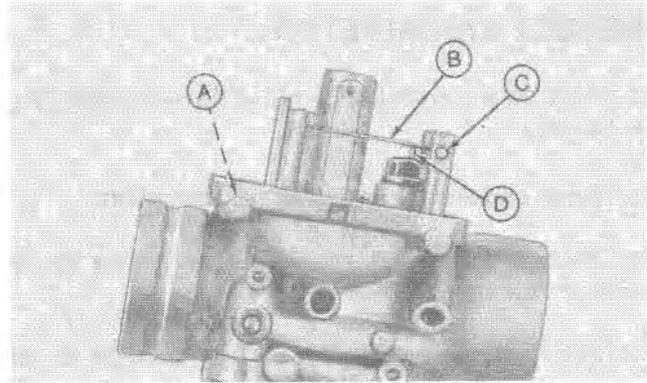
M22684/3010/H/100962

INSTALL NEEDLE VALVE AND FLOAT ARM

1. Install gasket (A).
2. Install new washer on valve seat and install seat. Install inlet needle valve (D) with point down.
3. Install float arm (B) and secure with float arm pin (C).

A—Gasket
B—Float Arm

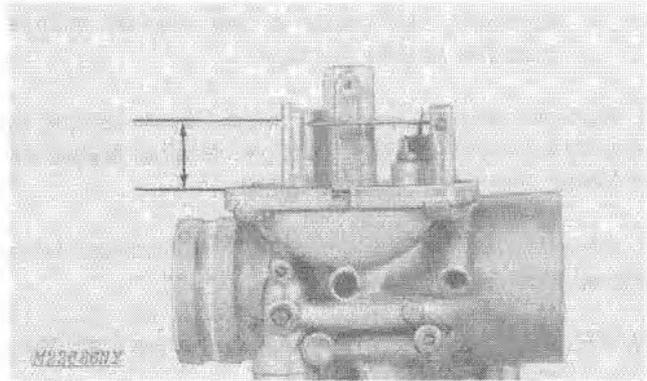
C—Float Arm Pin
D—Inlet Needle Valve



M22685/3010/L/100982

FLOAT LEVEL ADJUSTMENT

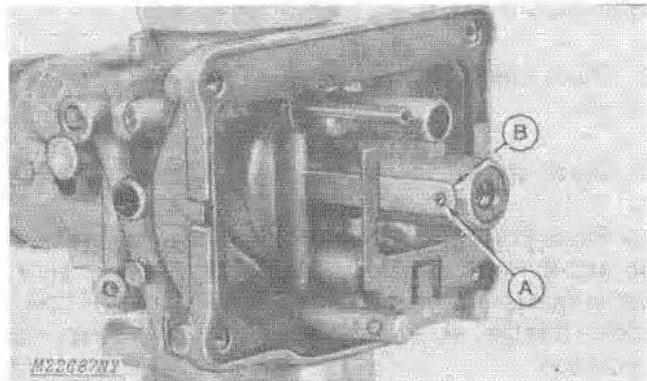
1. With carburetor inverted, the edge of the body should be parallel with the float arm.
2. If adjustment is necessary, bend only the actuating tab, not the float arm.



M22685/3010/L/100982

INSTALL NEEDLE JET

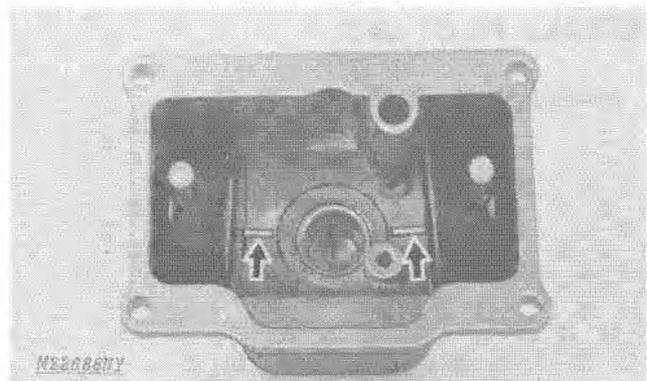
1. Install needle jet with notch of needle jet (B) aligned with pin in bore (A).
2. Install main jet.



M22687/3010/K/100982

INSTALL FLOATS

1. Install floats with pins on floats down and to the inside of the float chamber.
2. Install float chamber on mixing chamber body.



M22686/3010/L/100982

INSTALL AIR SCREW AND THROTTLE STOP SCREW

1. Install air screw spring and air screw.
2. Turn air screw in until it just seats. DO NOT force it.
3. Back air screw out 1 turn (Snowfire), 1-3/4 turns (Sprintfire).
4. Install throttle stop screw spring and stop screw.
5. Turn throttle stop screw in until it is just flush with inside of the bore.

30120/M1100962

INSTALL CARBURETOR

1. Position carburetor in rubber mount and secure with clamp.
2. Connect fuel line to carburetor.

30108/V100987

INSTALL THROTTLE VALVE

1. Install E-ring in middle groove of jet needle.
NOTE: Groove No. 1 provides lean midrange operation; groove No. 5 provides rich midrange operation.
2. Guide throttle cable through cap, spring and slot in throttle valve. Slide cable end into narrow part of slot in throttle valve.
3. Install plate between spring and throttle valve with tab on plate in slot of throttle valve. This locks cable to the throttle valve.
4. Compress throttle valve spring and tighten cap to body.



M32092/3012D/O100082

INSTALL CHOKE PLUNGER

1. Be sure choke lever is down.
2. Guide choke cable through cap and spring. Hook end button in choke plunger.
3. Place washer on carburetor body. Install the assembly and tighten cap.



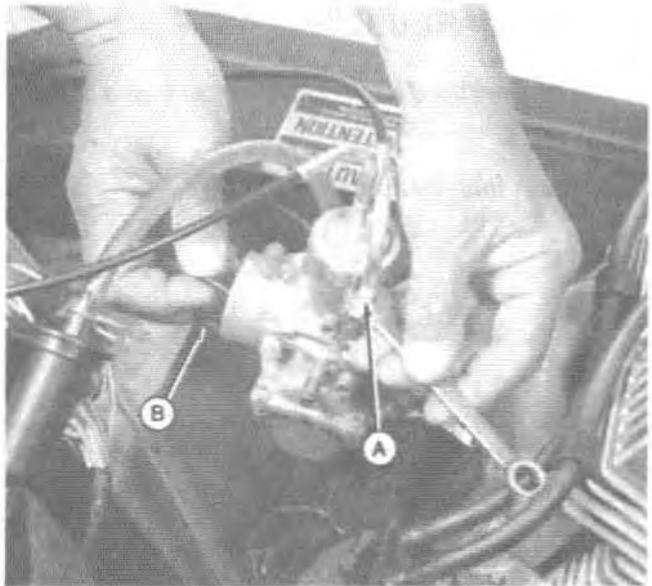
M32093/3012D/R/100982

ADJUST CHOKE

1. Move choke lever to the first "UP" position.
2. Loosen jam nut and turn adjusting sleeve (A) clockwise to seat choke plunger.
3. Install JDM-75 Choke Gauge (B) with flat "UP" into the plunger air hole.
4. Turn adjusting sleeve (A) counterclockwise to bring the choke plunger "up." Continue turning sleeve until choke gauge (B) slides further into air hole, indicating that the choke plunger has raised approximately 1/2 the diameter of the plunger air hole.
5. Tighten jam nut.

NOTE: When choke lever is down, the choke plunger should be all the way down in the bore. The choke lever should still have slight freeplay.

IMPORTANT: If the choke plunger is not down tight in the bore, the carburetor will run "RICH." This will cause a problem when finding the correct main jet for top engine performance.

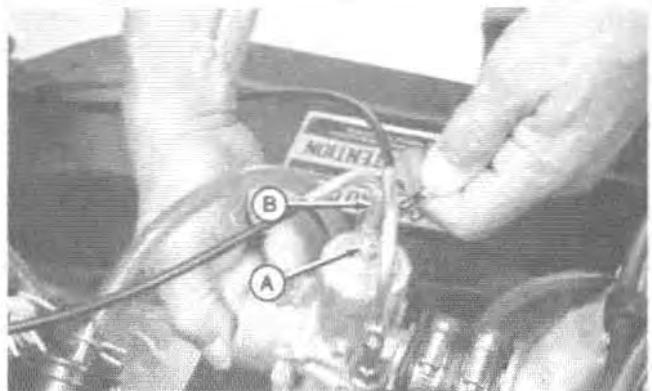


M32094/3012D/Q/100982

ADJUST THROTTLE CABLE

1. Remove air silencer. Lock the throttle lever against the handgrip.
2. Place finger in throat of carburetor. Loosen jam nut (A) and turn adjusting sleeve (B) until the backside of the throttle valve is flush with inside of bore. Tighten jam nut.

NOTE: When the throttle valve is adjusted correctly, no part of the valve will restrict air flow through the carburetor throat.



M32095/3012D/R/100982

Mikuni Carburetion

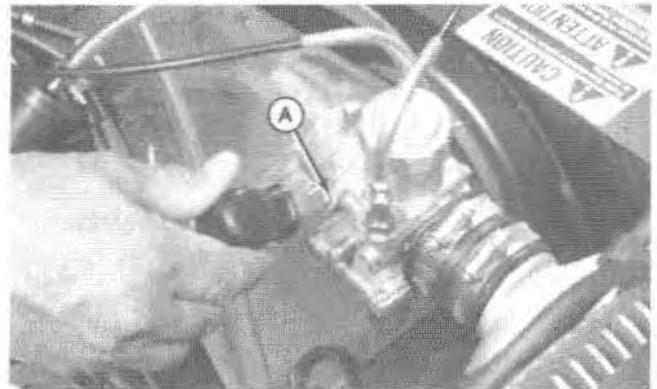
3. Turn throttle stop screw (A) in until tip is flush with inside of the bore.
4. Release throttle lever and allow throttle valve to fully seat in the bore.
5. Turn throttle stop screw in until screw contacts throttle valve. Turn screw in two additional turns for preliminary idle speed adjustment.
6. Look into the throat of the carburetor and slowly compress the throttle lever. The throttle valve should begin to rise.



M32096/3012D/S/1100982

NOTE: If throttle movement does not occur, repeat Steps 1 through 6.

7. Turn pilot air screw (A) in until a slight seating resistance is felt.
8. Back air screw out 1 turn (Snowfire); 1-3/4 turns (Sprintfire).
9. Check engine idle speed as follows:
 - a) Install air intake silencer and run engine to warm it up.
 - b) Turn throttle stop screw to obtain idle speed of 2000 to 2100 rpm.



M32097/3012D/T/1100982

IMPORTANT: DO NOT use the pilot air screw to set engine idle. Be sure pilot air screw is adjusted as explained in Steps 7 and 8.

CARBURETION RECOMMENDATIONS (SNOWFIRE)

Temperature	Component	Sea Level to 1219 m (4000 ft.)
Below -18°C (0°F)	Main Jet	170
Above -18°C (0°F)	Main Jet	160*
All Temperatures	Jet Needle	5DP7-3
	Needle Jet	(169) P-2
	Throttle Valve	2.5
	Pilot Jet	30
	Air Screw	1 Turn Open
	Idle Speed	2000-2100 rpm

*Factory Installed.

IMPORTANT

The Snowfire snowmobile is not recommended for use at altitudes above 1219 m (4000 ft.). Do not operate at temperatures above -5°C (+40°F) engine damage will occur.

3012DU11009E2

CARBURETION RECOMMENDATIONS (SPRINTFIRE)

Temperature	Component	Sea Level to 1219 m (4000 ft.)	1219 to 2438 m (4000 to 8000 ft.)	2438 m and Above (8000 ft.)
Below -18°C (0°F)	Main Jet	175	155	130
Above -18°C (0°F)	Main Jet	165*	145	120
All Temperatures	Jet Needle	6DH4-2	6DH4-2	6DH4-2
	Needle Jet	(159) P-4	(159) P-4	(159) P-4
	Throttle Valve	2.5	2.5	2.5
	Pilot Jet	30*	35	30
	Air Screw	1-3/4 Turns Open	1-1/2 Turns Open	1-1/2 Turns Open
	Idle Speed	2000-2100 rpm	2400-2500 rpm	2400-2500 rpm

*Factory Installed.

3012DU11009E2

TEST OIL INJECTION PUMP

1. Disconnect the in-line fuel filter from the fuel tank line.

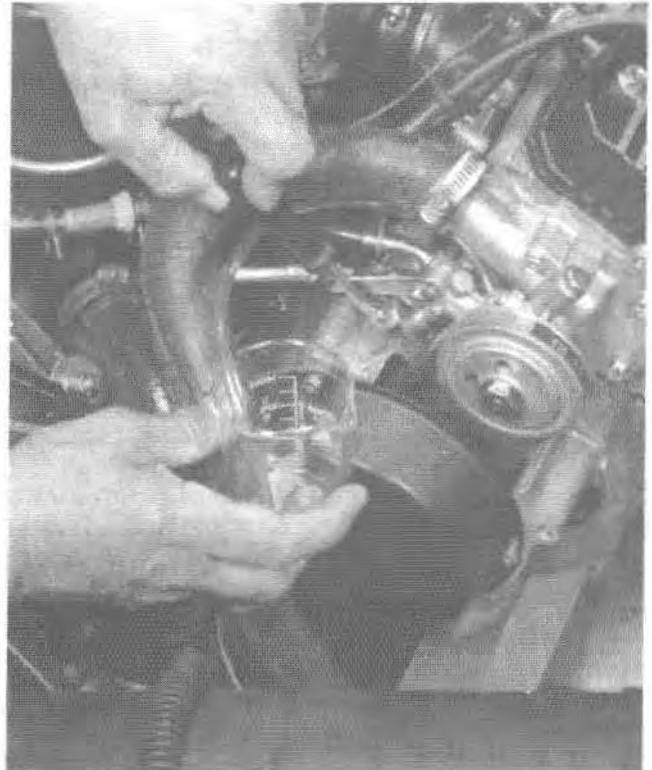


CAUTION: Use care when disconnecting in-line filter. Avoid fires due to smoking or careless maintenance practices.

2. Connect auxiliary fuel tank (with 50:1 pre-mix fuel) to the in-line fuel filter.

3015D/A/100982

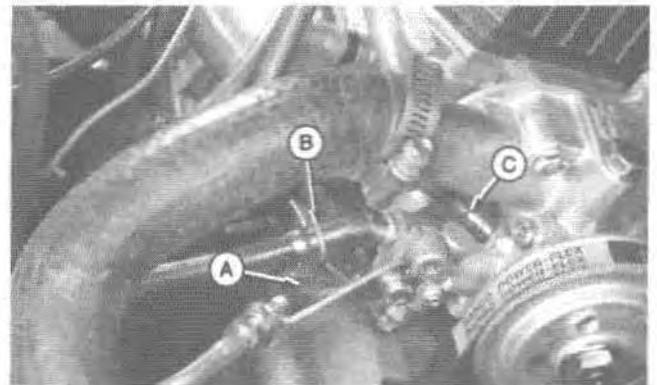
3. Remove pump cover and disconnect oil pump output lines at the pump.
4. Install separate oil lines to each outlet and place end of each in a calibrated glass beaker.
5. Start and run engine at 3000 rpm.
6. Hold the pump lever in the wide open position. Measure the output from each port. The output should be 1.4 cc per minute. Replace pump if output is below specification.
7. Shut-off engine.
8. Connect lines to pump discharge ports.
9. Remove auxiliary fuel tank and connect in-line filter.
10. Install pump cover.



M32098/3015D/Br/100982

REMOVE OIL INJECTION PUMP

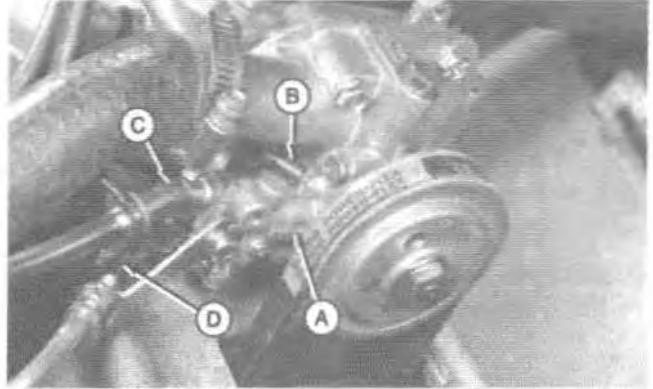
1. Remove pump cover.
2. Disconnect control cable (A) from bracket and control lever.
3. Remove inlet oil line (B) from pump and plug line to prevent leakage.
4. Remove oil lines (C) from pump discharge ports.
5. Remove oil injection pump from coolant pump.



M32099/3015D/C/100982

INSTALL OIL INJECTION PUMP

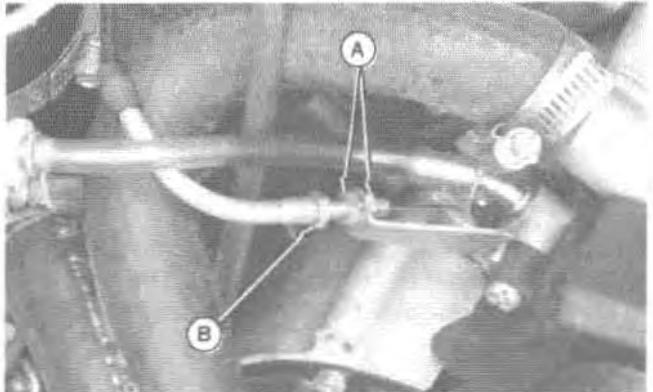
1. Install new O-ring in pump flange.
2. Install oil injection pump (A) to coolant pump. Torque cap screws to 6 N·m (4.5 lb-ft).
3. Install oil lines (B) to pump discharge ports.
4. Install inlet oil line (C) to pump.
5. Install control cable (D) to control lever and bracket.



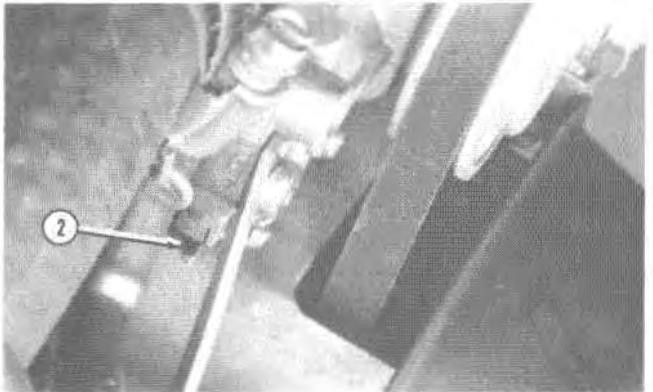
ADJUST CONTROL CABLE

IMPORTANT: Adjust the oil injection pump lever to move at exactly the same time that the carburetor throttle valve starts to move. Never run the engine without oil supply to the oil pump, even if premix is used. If oil pump runs dry, pump failure will result.

1. Loosen jam nut (A) of oil injection pump cable. Back sleeve (B) out to tighten cable or in to loosen cable.



2. Adjust cable so straight edge of oil pump control arm aligns with vertical mark on oil pump body. Tighten jam nut.
3. Press throttle lever on handgrip and observe throttle valve and oil injection pump control lever. Both should start to move at exactly the same time.



IMPORTANT: Lubricate throttle cable once each season with LPS or WD-40. Hold the throttle lever against the handgrip and allow lubricant to run down cable. DO NOT use engine oil or silicone spray. These lubricants may destroy the plastic components of the throttle cable or cause control cable to become sticky in cold temperatures.

FUEL PUMP, FUEL TANK, SCREEN AND IN-LINE FUEL FILTER**FUEL TANK**

The fuel tank (Snowfire) has a capacity of 20.8 L (5-1/2 U.S. gal.) and the (Sprintfire) has a capacity of 18.9 L (5.0 U.S. gal.).

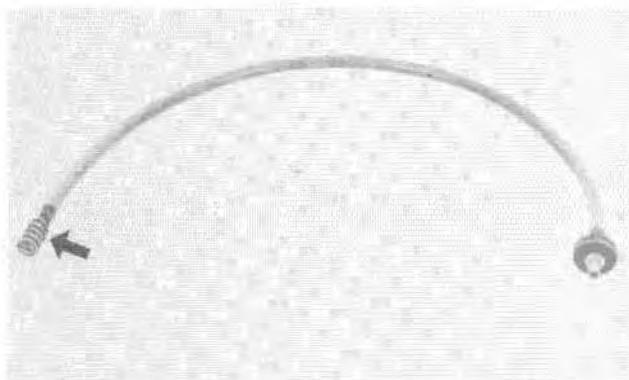
The fuel pickup line in the tank is connected to a screen. The in-line fuel filter is located in the fuel line between the fuel pump and carburetor.

The in-line fuel filter contains a nylon screen. Pulsation of the screen shakes loose contamination which settles at the base of the filter cone.

3020D/W/100982

CLEAN OR REPLACE SCREEN

1. Disconnect fuel line to fuel pump from fitting and remove fitting with pickup line from tank.
2. Remove pickup screen from end of line.
3. Clean screen with solvent and compressed air. Replace screen if it is damaged.
4. Replace gasket on fuel line fitting.



M22694/J015/B-100982

REMOVE AND CLEAN FUEL TANK

1. Disconnect fuel line. Remove seat and tank hold-down clips. Slide tank rearward to remove.
2. If tank is damaged, replace it.
3. Tank can be cleaned with solvent and compressed air.

3015/D/100982

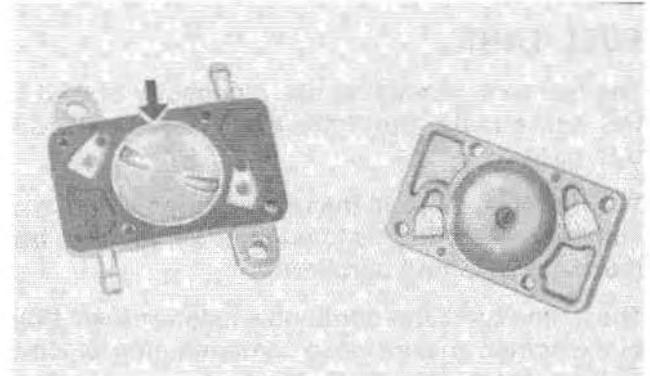
IN-LINE FUEL FILTER

Change the filter annually or when contamination starts to build up at the base of the cone.

3015/D/100982

FUEL PUMP

1. The fuel pump is non-serviceable.
2. Remove fuel line from pump at the carburetor.
3. With ignition off, pull recoil start handle and check fuel flow.
4. If fuel flows from line, pump is functioning. If it does not flow from the line, disassemble pump and check diaphragm.



M22895/3015/E/100982

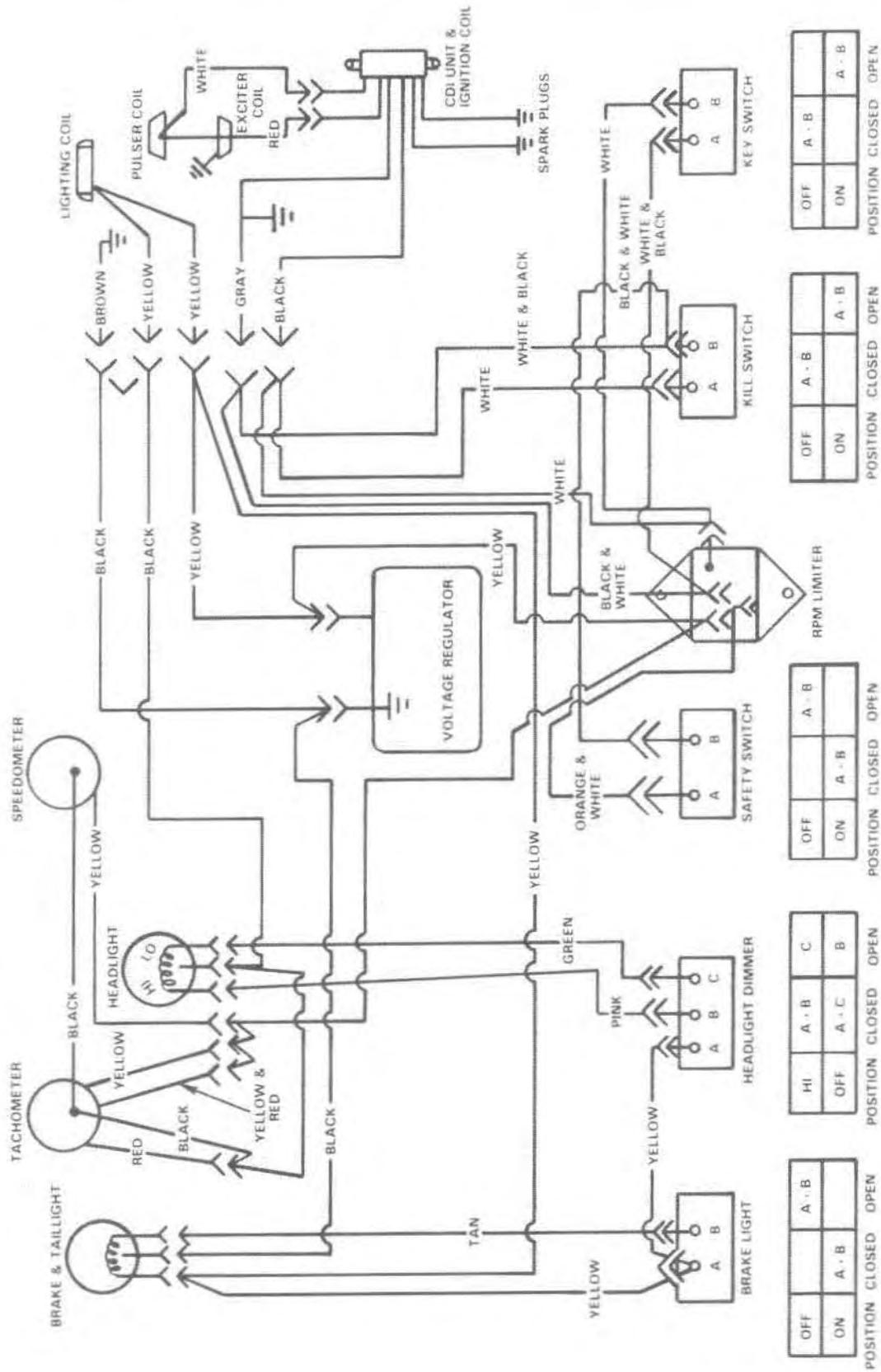
Section 40 ELECTRICAL SYSTEM

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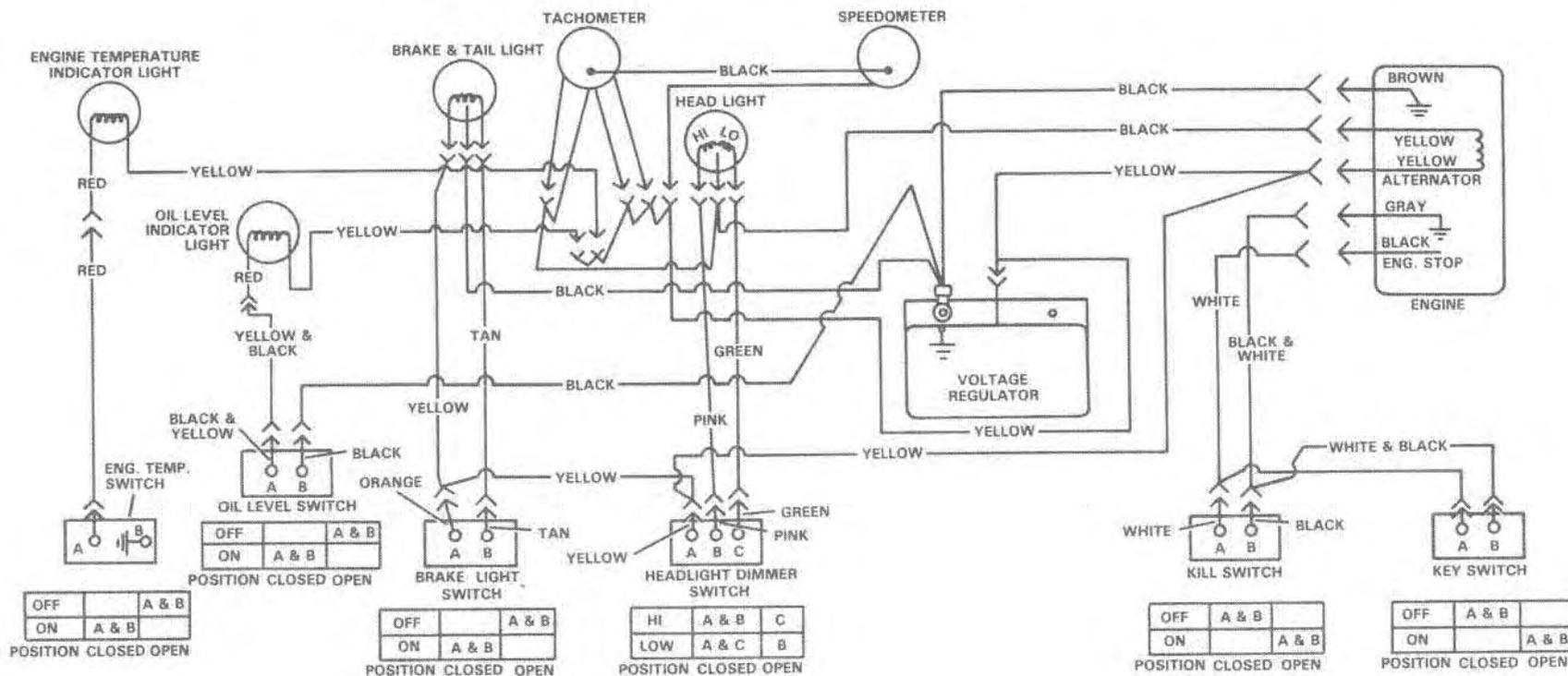


SNOWFIRE ELECTRICAL SYSTEM

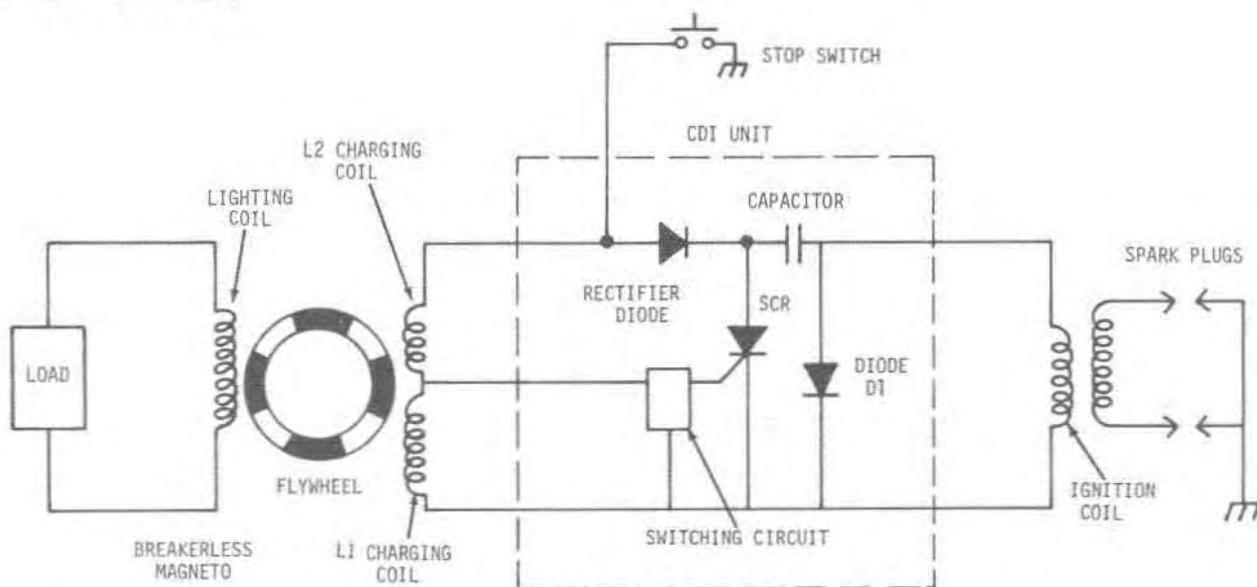


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SPRINTFIRE ELECTRICAL SYSTEM



IGNITION SYSTEM



M22007

The Capacitor Discharge Ignition (CDI) features a breakerless magneto, two capacitor charging coils, a CDI unit and one ignition coil.

As the four-pole-magnet flywheel rotates, the magnets within the flywheel rotate past the capacitor charging coils, generating AC current within the coils. The charging coils also supply two ignition signals per revolution to the switching circuit in the CDI unit.

The alternating current from the charging coils passes through a diode in the CDI unit which acts as a 1/2 wave rectifier to change the AC current to DC current to charge the capacitor.

When the capacitor is fully charged, a signal from the charging coils to the switching circuit triggers the gate in the SCR (Silicon Controlled Rectifier) allowing the energy stored in the capacitor to be released to the ignition coil.

The ignition coil "steps-up" the electrical energy to a level high enough to fire the spark plugs.

The DI diode in the CDI unit is connected in parallel with the primary winding of the ignition coil to prolong arc duration time as the spark plugs fire.

Both spark plugs fire simultaneously.

M22007/4005D/C/100982

DIAGNOSE MALFUNCTIONS

Lighting System

Lights Will Not Light

Electric connections loose or wires damaged.
Alternator faulty.
Bulbs burned out.
Voltage regulator faulty.

Brake Light Will Not Light

Brake light switch faulty.
Electrical connections loose or wires damaged.
Bulb burned out.

Bulbs Burn Out Often

Wrong type bulbs used.
Voltage regulator faulty.

Lights Too Bright or Too Dim

Voltage regulator faulty.
Defective alternator.

Ignition System

Engine Hard To Start

Spark plugs fouled or defective.
Engine not timed properly.
Electrical connections loose or corroded.

Engine Misfires

Speed limiter system malfunctioning.
Spark plugs fouled or defective.
Electrical connections loose or corroded.
Engine not timed properly.

Engine Overheating

Engine not timed properly.

Engine Backfires and Runs Unevenly.

Engine not timed properly.
Speed limiter system malfunctioning.

TEST IGNITION WITH JDM-74 TESTER

CAUTION: Capacitor discharge ignition systems can produce injurious electrical shock. Always stop engine before touching or working on any ignition components. **DO NOT** hold spark plugs, leads or connectors in your hand to check for spark.

IMPORTANT: Never use a 12-volt test light on CDI ignition systems or the system will be destroyed.

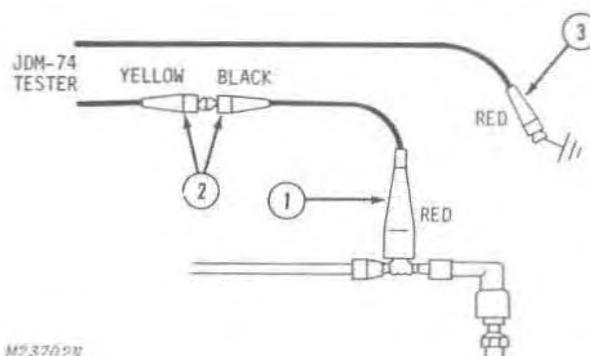
Before testing:

1. Make sure all connections are clean and tight.
2. Check all wiring for damage.
3. Install new spark plugs.
4. Read and understand all test procedures.
5. Perform all tests in sequence.
6. Test ignition and kill switches before performing tests on ignition. They must be functioning properly.

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TEST NO. 1 - CDI AND COIL OUTPUT

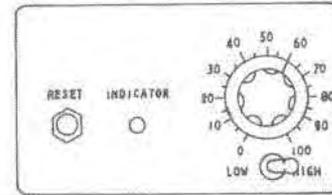
1. Connect test adapter (red end) to either spark plug cable (close to plug) as shown.
2. Connect JDM-74 Tester yellow lead to test adapter (black end).
3. Connect JDM-74 Tester red lead to ground.



M23702N

M23702/40100IB1100982

4. Set tester for "HIGH" range.
 5. Turn test dial to "60".
 6. Turn key switch "ON" and place emergency stop switch in center position.
 7. Crank engine with starter rope and observe tester indicator light.
- NOTE: If engine starts, allow it to idle while observing indicator. Then, shut engine off.*
8. Push reset button and repeat Step 6 twice.
 9. Repeat procedure on remaining spark plug.



Test Results

Indicator lights on both spark plugs.

Ignition system is OK. Remove test leads and check for other causes.

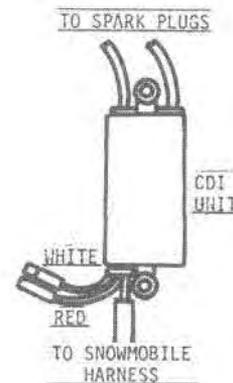
Indicator does not light on one or both spark plugs.

Remove test leads and proceed to Test No. 2.

M25593/4010D/C/100982

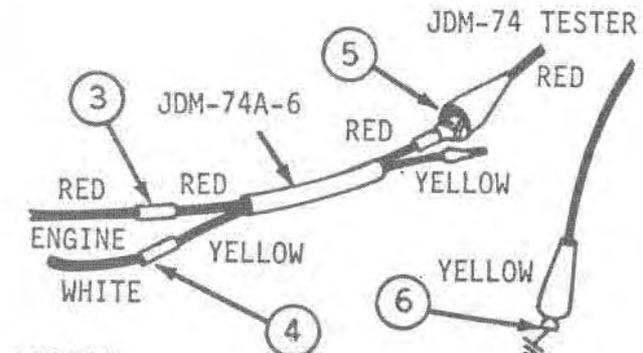
TEST NO.2 - EXCITER COIL OUTPUT

1. Disconnect white CDI lead from engine harness.
2. Disconnect red CDI lead from engine harness.



M28439/4012D/100982

3. Connect JDM-74A-6 Test Harness red lead to engine harness red lead.
4. Connect JDM-74A-6 Test Harness yellow lead to engine harness white lead.
5. Connect JDM-74 Tester red lead to JDM-74A-6 Test harness red lead.
6. Connect JDM-74 Tester yellow lead to engine ground.



M25594

M25594/M012E/100982

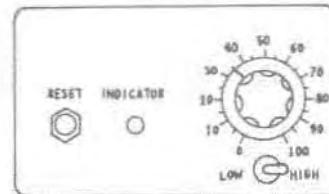
Capacitor Discharge Ignition (Sprintfire)

7. Set tester for "HIGH" range. Turn dial to 35.
8. Crank engine with starter rope and observe indicator. Push reset button and repeat twice.

Test Results

Indicator lights: Proceed to Test No. 3.

Indicator does not light: Remove test leads and replace exciter coil.

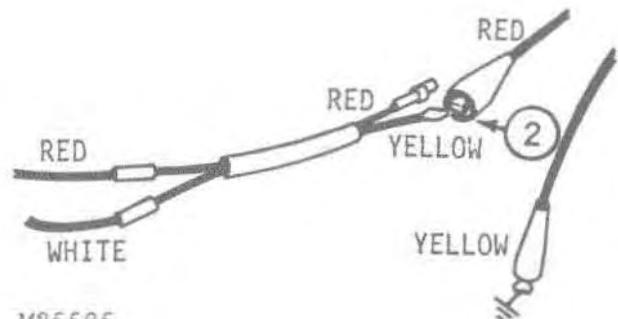


M25596

M254264010D/F/100982

TEST NO. 3 - PULSER COIL

1. Disconnect JDM-74 Tester red lead from JDM-74A-6 test harness red lead.
2. Connect JDM-74 Tester red lead to JDM-74A-6 test harness yellow lead.



M25595

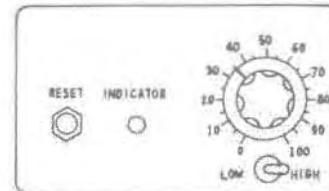
M255954012IG/100982

3. Set tester for "HIGH" range. Turn dial to 35.
4. Crank engine with starter rope and observe indicator. Push reset button and repeat twice.

Test Results

Indicator lights: Remove test leads and replace CDI unit.

Indicator does not light: Replace pulser coil.



M25596

M254264010D/H/100982

REMOVE FLYWHEEL AND STATOR

1. Remove muffler.
2. Tie a knot in recoil start rope to hold it and remove handle.
3. Remove drain screw (A) and drain cooling system.
4. Cut tie strap securing wiring to coolant hose.



M314224010D/100982

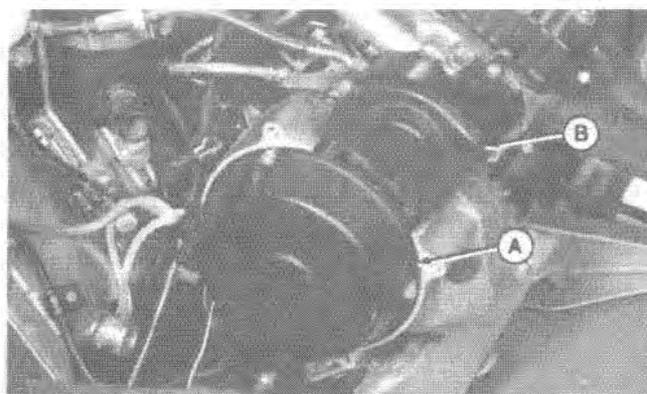
Capacitor Discharge Ignition (Sprintfire)

5. Remove hose (A) from water pump and bend hose down out of the way.
6. Remove hose (B) from surge tank to the heat exchanger.
7. Lock throttle lever against handgrip. This moves oil injection pump control lever away from flywheel housing, to allow removing housing.



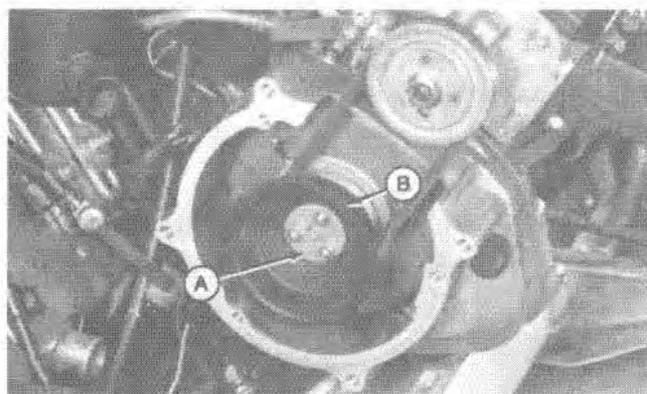
M29904/4010D/J/100982

8. Remove recoil starter (A) and water pump cover (B).



M29983/4010D/K/100982

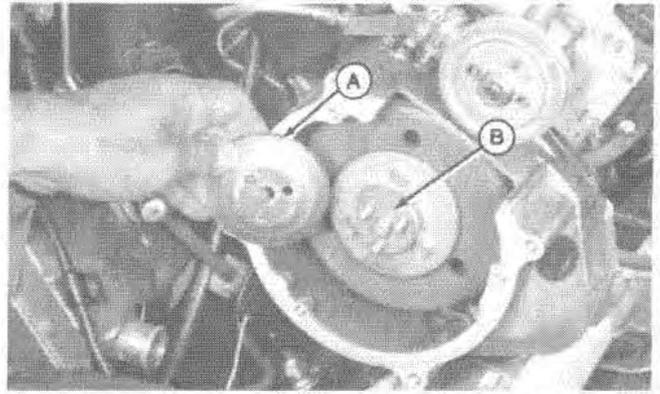
9. Remove plate (A) and starter pulley (B).
10. Remove drive belt.



M34124/4010D/K/100982

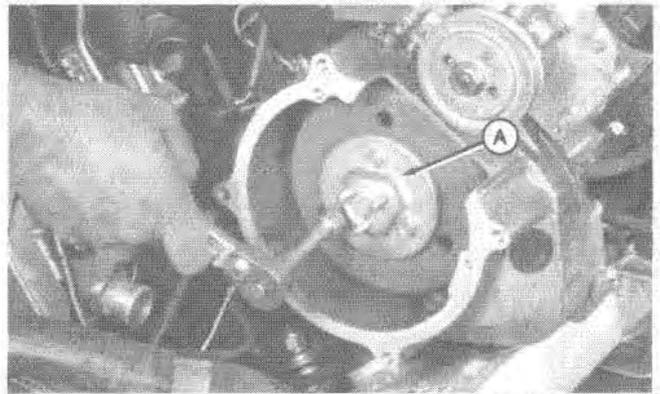
Capacitor Discharge Ignition (Sprintfire)

11. Remove rear half of pulley (A) and shims (B).



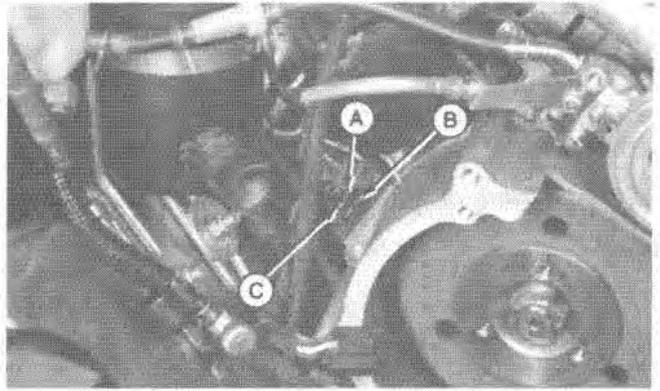
M29984/4010D/L/100982

12. Remove spacer (A).
13. Remove spark plug wires from plugs.
14. Disconnect wiring harness from engine connector.



M29985/4010D/R/100982

15. Remove brown lead (A), green/white lead (B) and yellow lead (C) from connector. Mark location for reassembly.
16. Disconnect red and white ignition leads.
17. Remove flywheel housing with CDI unit and connector.



M29986/4010D/N/100982

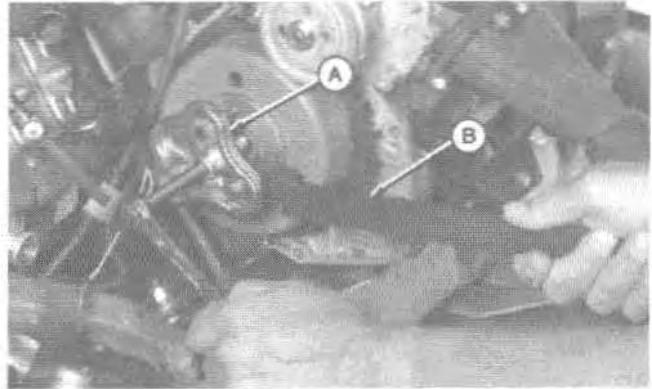
18. Bend up tangs on locking plate.
19. Use JDM-104 Flywheel Holding Tool (A). Remove flywheel nut and locking plate.
- NOTE: It may be necessary to modify JDM-104 Flywheel Holding Tool by elongating holes to fit flywheel holes.*



M29987/4010D/O/100982

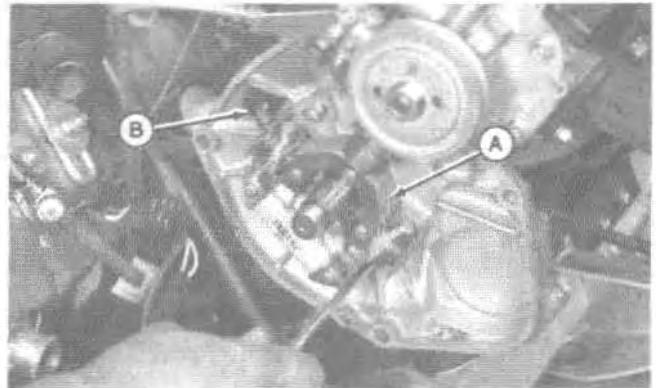
20. Remove flywheel. DO NOT strike flywheel with a hammer. Strike puller bolt with a plastic or wood mallet.

- A - JDM-9 Puller
- B - JDM-104 Flywheel Holding Tool



M29989-40100-PI100982

21. Remove stator (A). Pull leads and grommet (B) through crankcase.



M29989-40100-Q100983

INSTALL STATOR AND FLYWHEEL (TIME IGNITION)

1. Guide stator leads through grommet and set against crankcase.
2. Align mark on stator (A) with crankcase separation.
3. Tighten stator screws.

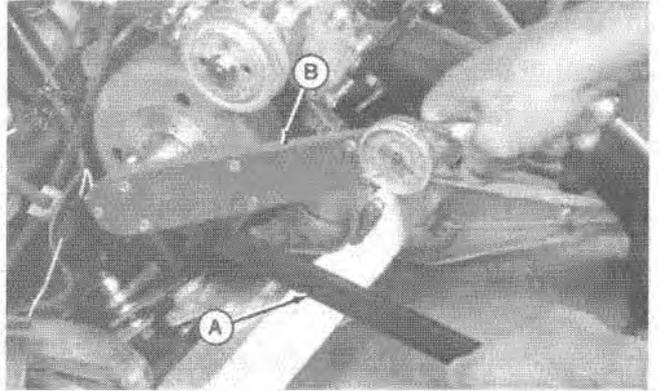


M29989-40100-R100982

Capacitor Discharge Ignition (Sprintfire)

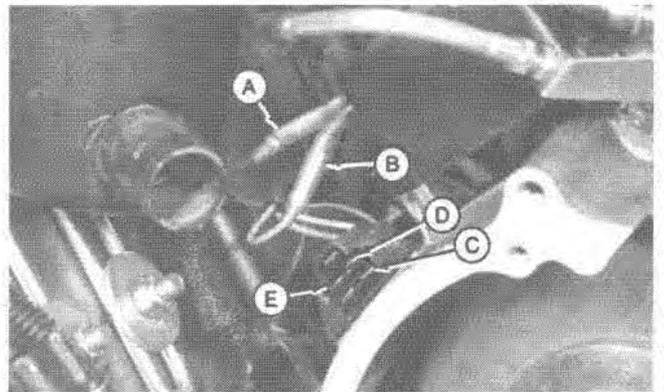
4. Install flywheel key in keyway on crankshaft. Install flywheel lock plate and nut. Torque nut to 81 N·m (60 lb-ft). Bend tangs on lock plate.

A - JDM-104 Flywheel Holding Tool
B - Torque Wrench



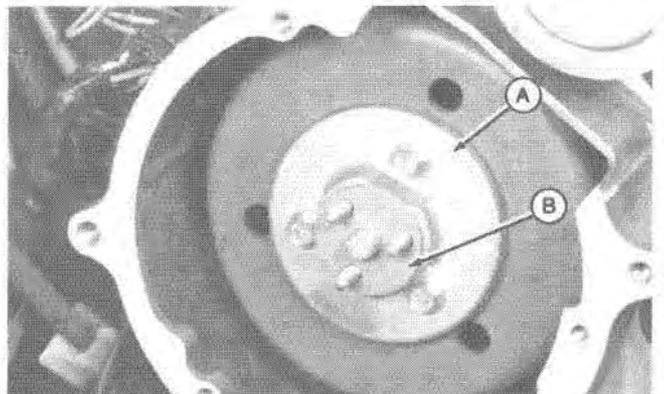
M29991/4010D/S/100982

5. Install flywheel housing.
6. Connect red lead (A) and white lead (B). Install green/white lead (C), brown lead (D) and yellow lead (E) in connector.
7. Install wiring harness to connector.



M32125/4010D/T/100982

8. Install spark plug wires to plugs.
9. Install spacer (A) and shims (B).
10. Install rear half of pulley.



M32125/4010D/U/100982

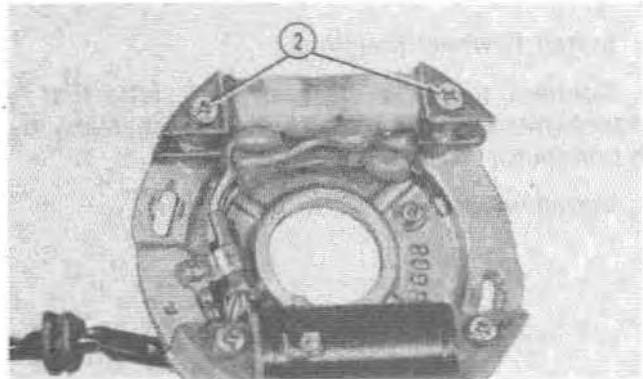
Capacitor Discharge Ignition (Sprintfire)

10. Install belt.
11. Install starter pulley and plate.
12. Install recoil starter and water pump cover.
13. Release throttle lever on handgrip.
14. Install hoses from heat exchanger to water pump and surge tank. Secure wiring with tie strap.
15. Fill cooling system. Use a 50-50 solution of ethylene glycol anti-freeze and water.
16. Install handle and release knot in rope.
17. Install muffler.

40100/V/100982

REPLACE PULSER AND EXCITER COILS

1. Remove flywheel.
2. Remove screws.

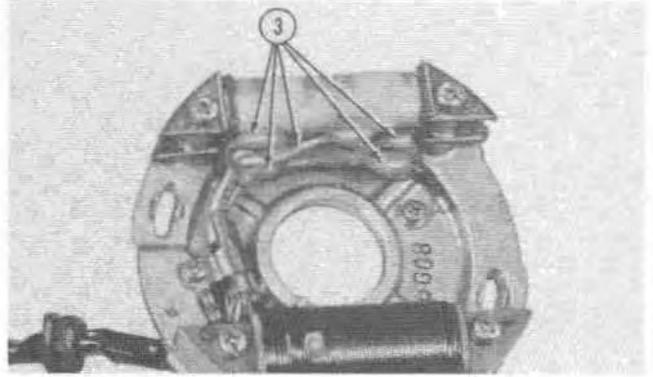


M25436/4012/V/100982

3. Chip epoxy seal from connections on coil being replaced.
4. Unsolder connections and remove coil.
5. Solder leads to new coil with rosin core (high temperature) solder.
6. Seal connections with a two part epoxy.

IMPORTANT: Make sure all exposed metal is covered thoroughly.

7. Mount exciter coil and pulser coil (in that order) on stator plate.
8. Make sure curvature of coils aligns with curve of stator plate; then, tighten screws.



M25437/4012/W/1009R2



CAPACITOR DISCHARGE IGNITION (SNOWFIRE)

TEST IGNITION WITH JDM-74 TESTER

CAUTION: Capacitor discharge ignition systems can produce injurious electrical shock. Always stop engine before touching or working on any ignition components. **DO NOT** hold spark plugs, leads or connectors in your hand to check for spark.

IMPORTANT: Never use a 12-volt test light on CDI ignition systems or the system will be destroyed.

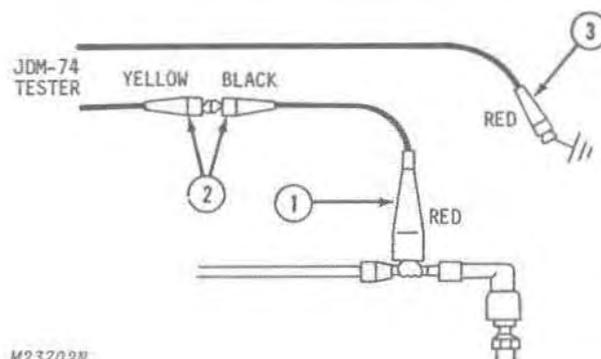
Before testing:

1. Make sure all connections are clean and tight.
2. Check all wiring for damage.
3. Install new spark plugs.
4. Read and understand all test procedures.
5. Perform all tests in sequence.
6. Test ignition and kill switches before performing tests on ignition. They must be functioning properly.

4012IA/100982

TEST NO. 1 - CDI AND COIL OUTPUT

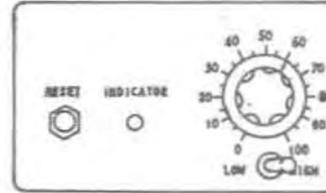
1. Connect test adapter (red end) to either spark plug cable (close to plug) as shown.
2. Connect JDM-74 Tester yellow lead to test adapter (black end).
3. Connect JDM-74 Tester red lead to ground.



M23702/4012/B/100982

Capacitor Discharge Ignition (Snowfire)

4. Set tester for "HIGH" range.
5. Turn test dial to "60".
6. Turn key switch "ON" and place emergency stop switch in center position.
7. Crank engine with starter rope and observe tester indicator light.



NOTE: If engine starts, allow it to idle while observing indicator. Then, shut engine off.

8. Push reset button and repeat Step 6 twice.
9. Repeat procedure on remaining spark plug.

Test Results

Indicator lights on both spark plugs:

Ignition system is OK. Remove test leads and check for other causes.

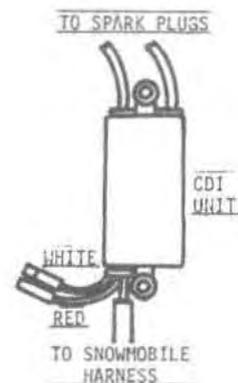
Indicator does not light on one or both spark plugs:

Remove test leads and proceed to Test No. 2.

M25593/4012/D/100982

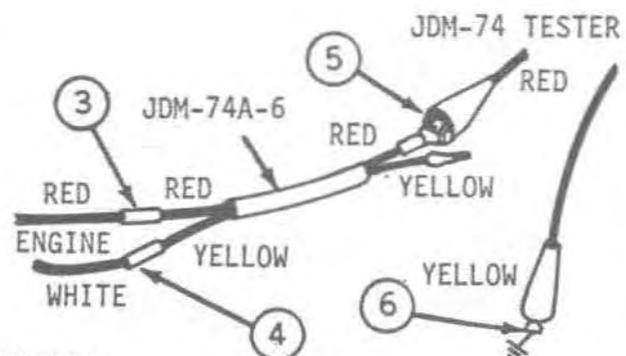
TEST NO.2 - EXCITER COIL OUTPUT

1. Disconnect white CDI lead from engine harness.
2. Disconnect red CDI lead from engine harness.



M26439/4012/D/100982

3. Connect JDM-74A-6 Test Harness red lead to engine harness red lead.
4. Connect JDM-74A-6 Test Harness yellow lead to engine harness white lead.
5. Connect JDM-74 Tester red lead to JDM-74A-6 Test harness red lead.
6. Connect JDM-74 Tester yellow lead to engine ground.



M25594

M25594/4012/E/100982

Capacitor Discharge Ignition (Snowfire)

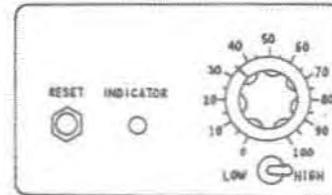
7. Set tester for "HIGH" range. Turn dial to 35.
8. Crank engine with starter rope and observe indicator. Push reset button and repeat twice.

Test Results

Indicator lights: Proceed to Test No.3

Indicator does not light: Remove test leads and replace exciter coil.

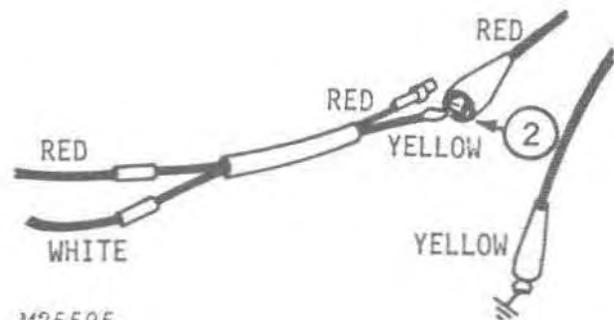
M25426



M25426/4012/R/100982

TEST NO. 3 - PULSER COIL

1. Disconnect JDM-74 Tester red lead from JDM-74A-6 test harness red lead.
2. Connect JDM-74 Tester red lead to JDM-74A-6 test harness yellow lead.



M25595

M25595/4012/G/100982

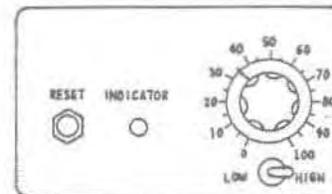
3. Set tester for "HIGH" range. Turn dial to 35.
4. Crank engine with starter rope and observe indicator. Push reset button and repeat twice.

Test Results

Indicator lights: Remove test leads and replace CDI unit.

Indicator does not light: Replace pulser coil.

M25426



M25426/4012/H/100982

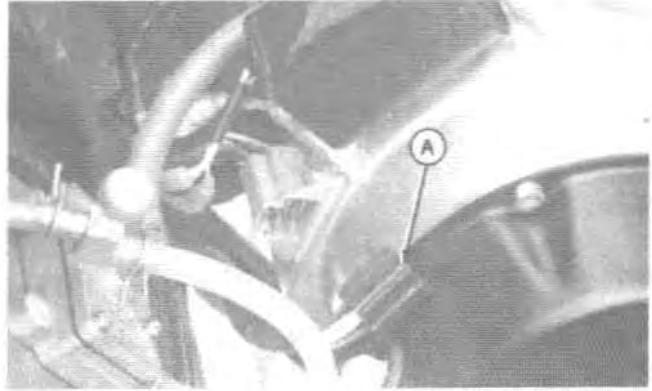
REMOVE FLYWHEEL AND STATOR

1. Remove springs securing muffler to exhaust manifold.
2. Remove muffler.
3. Tie a knot in recoil start rope to hold it and remove handle.

4012D/100982

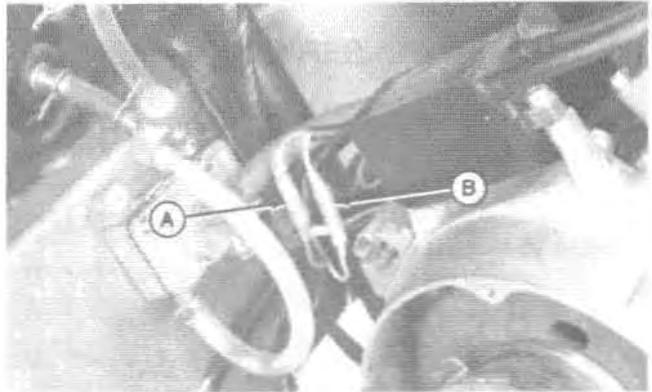
Capacitor Discharge Ignition (Snowfire)

4. Disconnect wiring harness connector (A).
5. Disconnect spark plug leads.
6. Remove recoil starter.



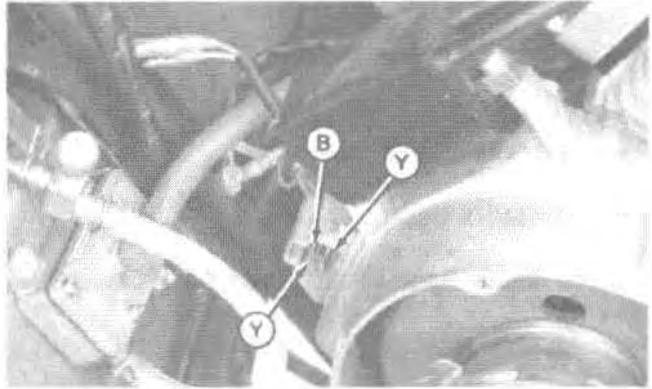
M30188/4012D/J/100982

7. Disconnect red lead (A) and white lead (B).



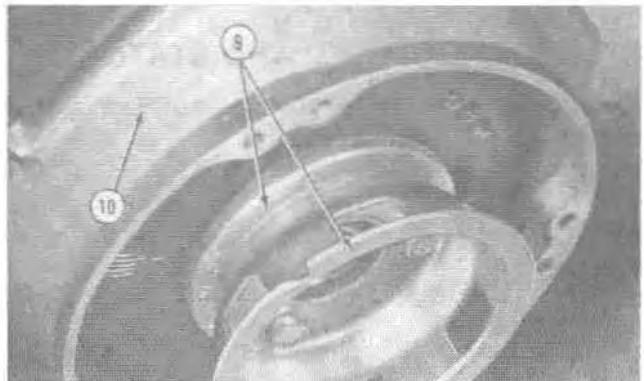
M30188/4012D/R/100982

8. Disconnect one brown (B) and two yellow leads (A) from connector. Mark their location for reassembly.



M30170/4012D/L/100982

9. Remove starter pulley and spacer.
10. Remove flywheel housing.
11. Bend up tangs on locking plate.

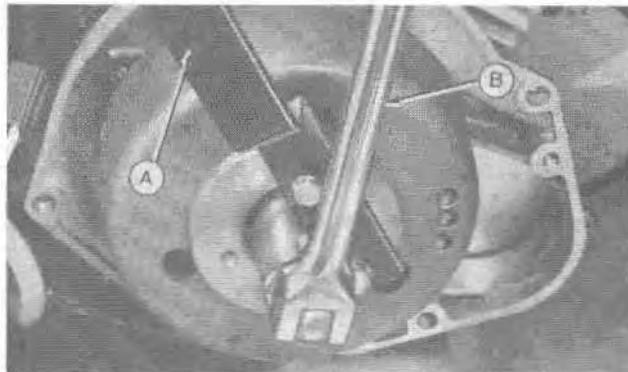


M25429/4012/M/100982

Capacitor Discharge Ignition (Snowfire)

12. Use JDM-64-1 Flywheel Holding Tool (A). Remove flywheel nut and locking plate.

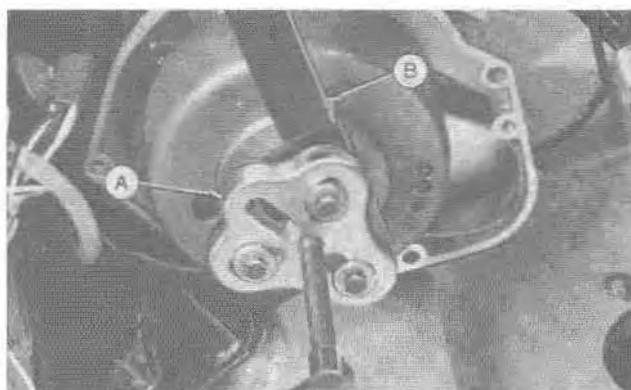
NOTE: Modify JDM-64-1 Flywheel Holding Tool by drilling out holes to 9.5 mm (3/8 in). Elongate holes to fit flywheel.



M2543D/4012/R/100982

13. Remove flywheel.

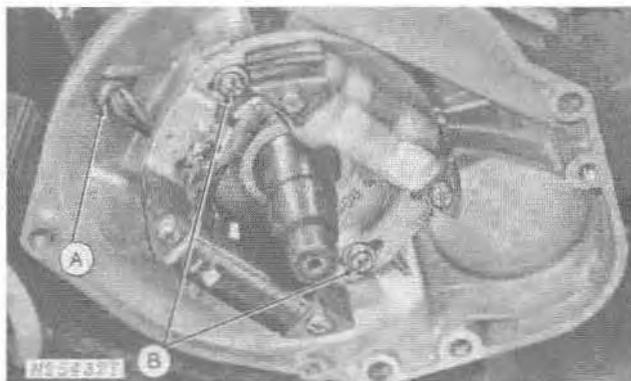
NOTE: DO NOT strike flywheel with a hammer. Strike puller bolt with a plastic or wood mallet.



A—JDM-9 Puller
B—JDM-64-1 Flywheel Holding Tool

M2844D/4012/O/100982

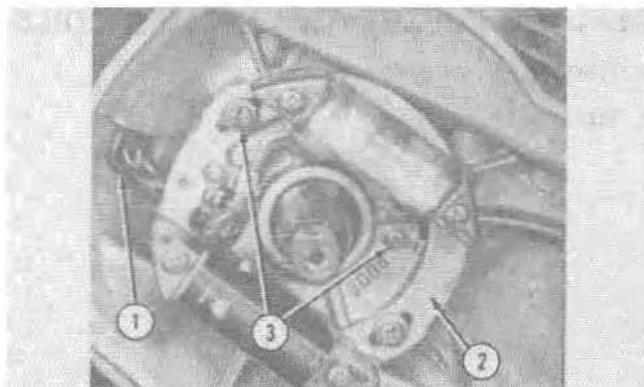
14. Remove stator (B). Pull leads and grommet (A) through crankcase.



M2543D/4012/P/100982

INSTALL STATOR AND FLYWHEEL (TIME IGNITION)

1. Guide stator leads through grommet and set against crankcase.
2. Align longest mark on stator with top of ridge on crankcase.
3. Tighten stator screws.
4. Install flywheel key in keyway on crankshaft. Install flywheel, lock washer and nut.



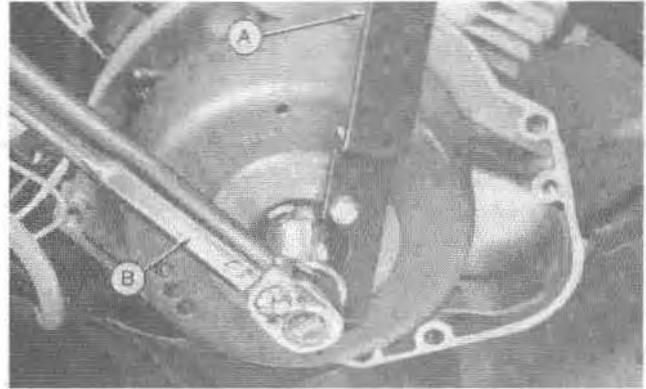
M2844I/4012/Q/100982

Capacitor Discharge Ignition (Snowfire)

5. Install flywheel. Torque nut to 81 N·m (60 lb-ft).
6. Bend tabs on lock washer to secure nut.
7. Install flywheel housing.
8. Connect red lead and white lead.
9. Install two yellow and one brown lead in connector as marked when removed.
10. Secure wire harness with clamp.

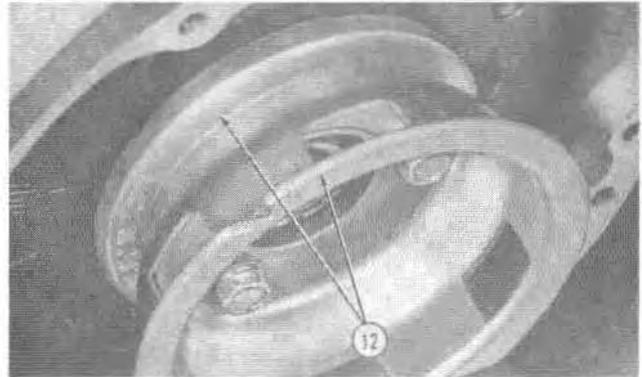
A—JDM-64-1 Flywheel Holding Tool

B—Torque Wrench



M25442/4012/R/100982

11. Install flywheel spacer (lip edge inward) and starter cup.
12. Install recoil starter.
13. Connect spark plug leads.



M25435/4012/R/100982

14. Connect wire harness connector.
15. Install handle and release knot in recoil start rope.
16. Install muffler and springs.

4012D/7/100982

REPLACE PULSER AND EXCITER COILS

1. Remove flywheel.
2. Remove screws.

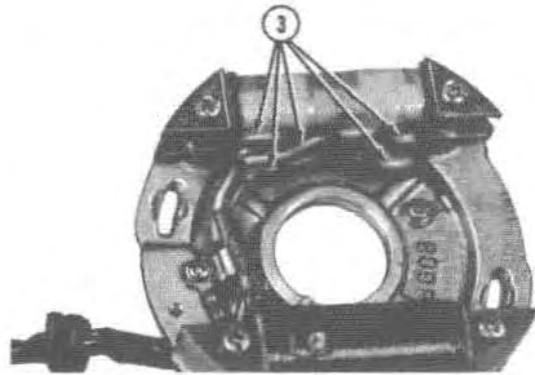
4012D/U/100982

Capacitor Discharge Ignition (Snowfire)

3. Chip epoxy seal from connections on coil being replaced.
4. Unsolder connections and remove coil.
5. Solder leads to new coil with rosin core (high temperature) solder.
6. Seal connections with a two part epoxy.

IMPORTANT: Make sure all exposed metal is covered thoroughly.

7. Mount exciter coil and pulser coil (in that order) on stator plate.
8. Make sure curvature of coils aligns with curve of stator plate; then, tighten screws.



M254374012/Wr100982



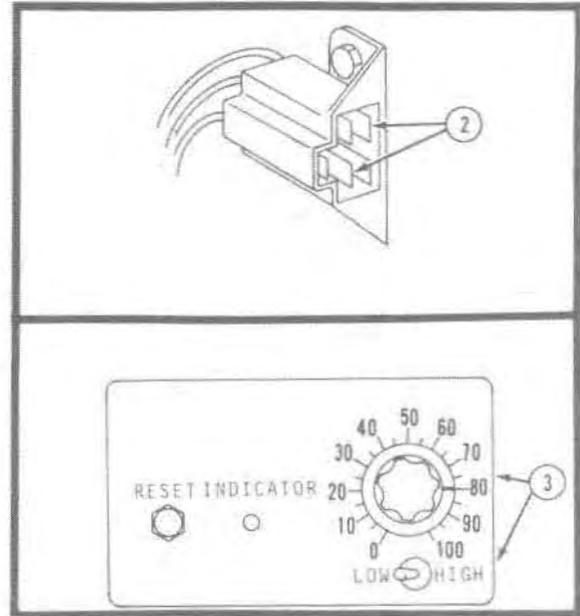
TEST ALTERNATOR

1. Disconnect wiring from engine connector.
2. Connect JDM-74 Tester between the two yellow leads.
3. Set tester dial at "80" on the "LOW" circuit (Snowfire) and at "80" on the "LOW" circuit (Sprintfire).
4. Crank engine with starter rope and observe tester indicator light.
5. Push reset button and repeat Step 4 twice.

Test Results

Indicator Lights: Alternator is O.K.

Indicator Does Not Light: Alternator is defective.



M23726/4015D/A1/00982

TEST VOLTAGE REGULATOR AND LIGHTING COIL

If all lights burn out at engine speeds above idle, the voltage regulator is defective. Replace voltage regulator.

If lights will not light at any engine speed, check the voltage regulator and lighting coil as follows:

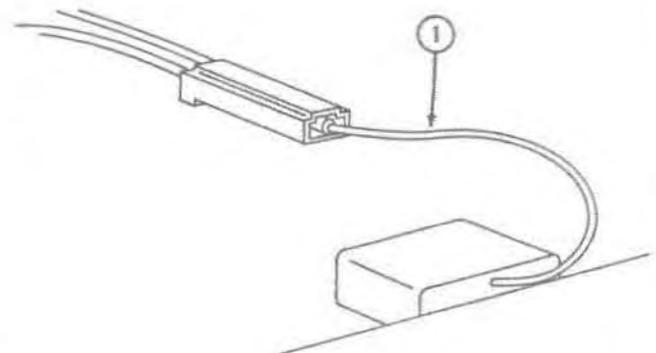
1. Disconnect the yellow lead from the voltage regulator.
2. Start the engine and allow it to idle.

IMPORTANT: Do not run engine above idle speed or all light bulbs will burn out.

Test Results

Lights Light: Replace the voltage regulator.

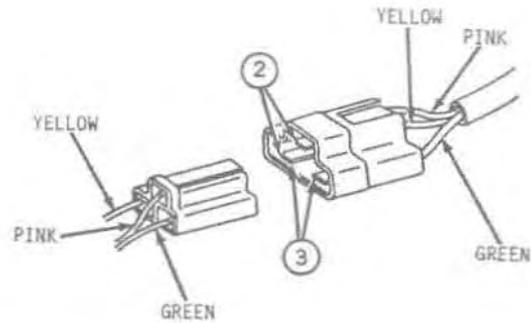
Lights Do Not Light: Test the alternator. If alternator tests OK, replace voltage regulator.



M257271A/17B/100982

TEST HEADLIGHT DIMMER SWITCH

1. Disconnect headlight coupler from wiring harness.
2. Connect flashlight tester between pink and yellow leads. Actuate dimmer switch to high beam. Test light should light.
3. Connect flashlight tester between green and yellow leads. Actuate dimmer switch to low beam. Test light should light.



Test Results

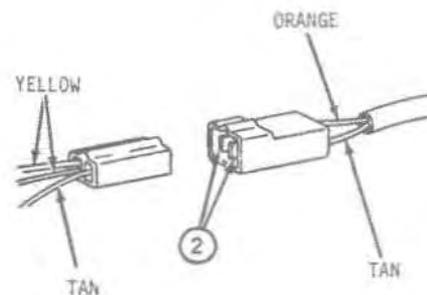
If test light does not react as stated in Steps 2 and 3, the wiring or the dimmer switch is defective.

M25307

M25307/A017/D/100982

TEST BRAKE LIGHT SWITCH

1. Disconnect brake light coupler from wiring harness.
2. Connect a flashlight tester between the orange and tan leads. Test light should light when brake is applied and go off when brake is released.



Test Results

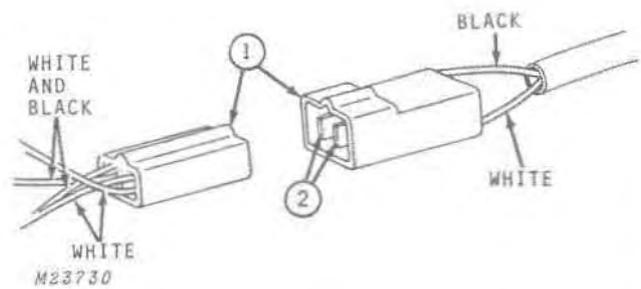
If test light does not react as stated in Step 2, the wiring or the brake light switch is defective.

M25308

M25308/4017/D/100982

TEST ENGINE KILL SWITCH

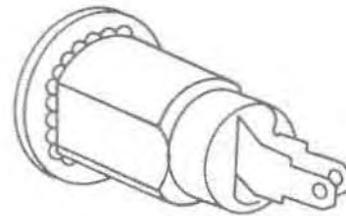
1. Disconnect engine kill switch coupler from wiring harness.
2. Connect a flashlight tester between black lead and white lead. Tester should light when kill switch is actuated and go out when kill switch is released.



M23730/4017E/100982

TEST IGNITION SWITCH

1. Remove coupler from ignition switch.
2. Connect a flashlight tester between the switch terminals. Test light should light with the key switch in the "ON" position and light should go out with key switch in the "OFF" position.



M23731/4017F/100982

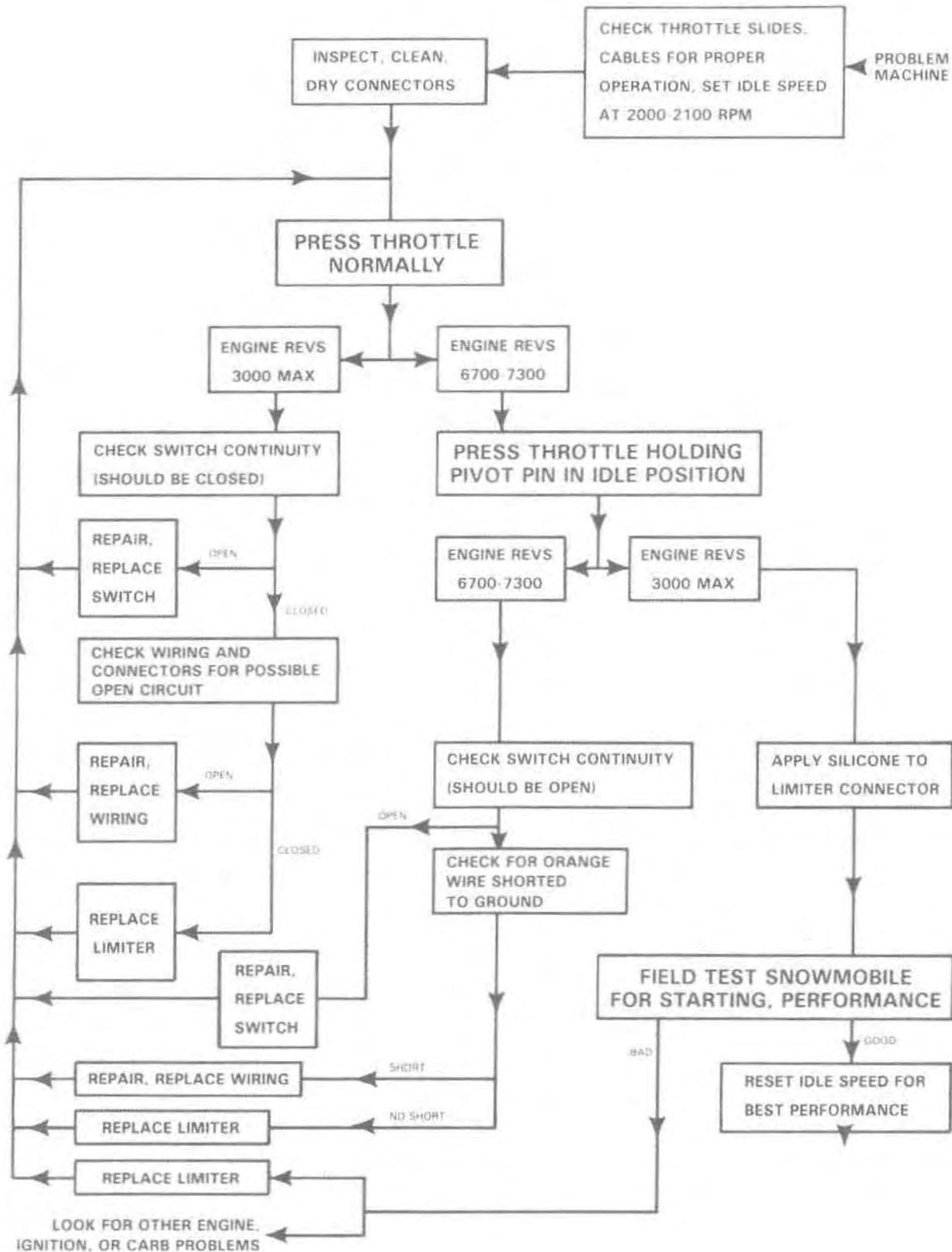
TEST SPEED LIMITER SYSTEM (SNOWFIRE)

Either or all of the following malfunctions can occur.

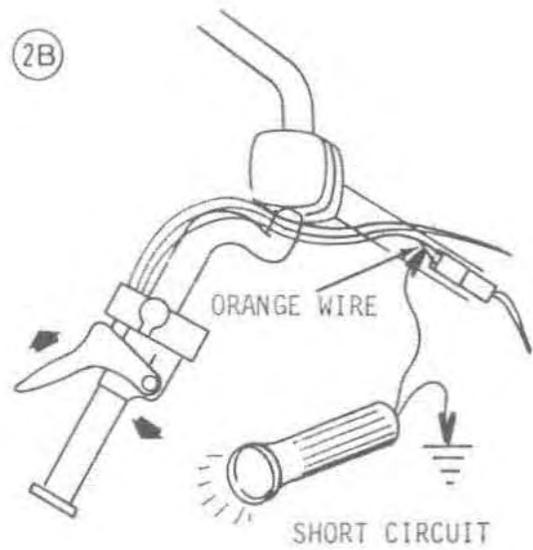
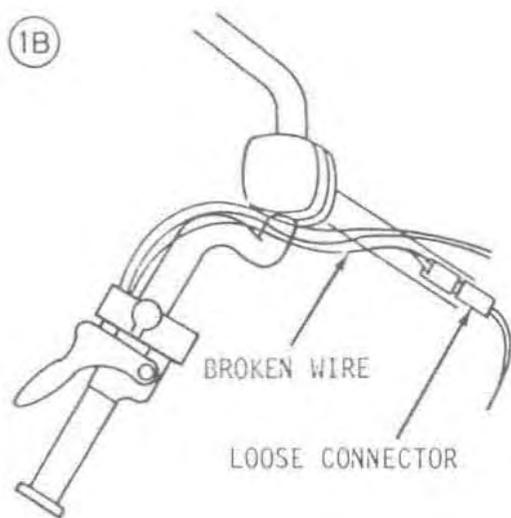
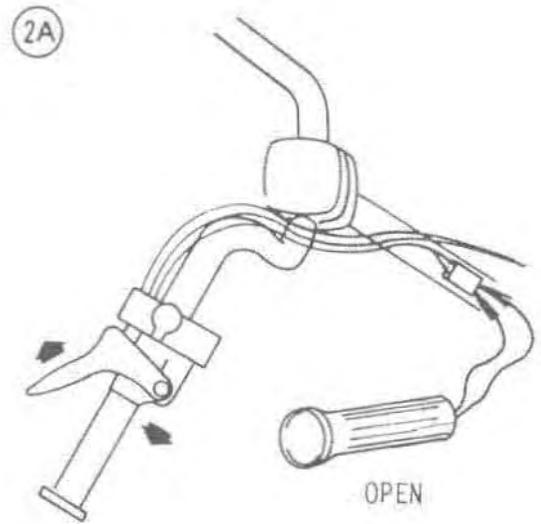
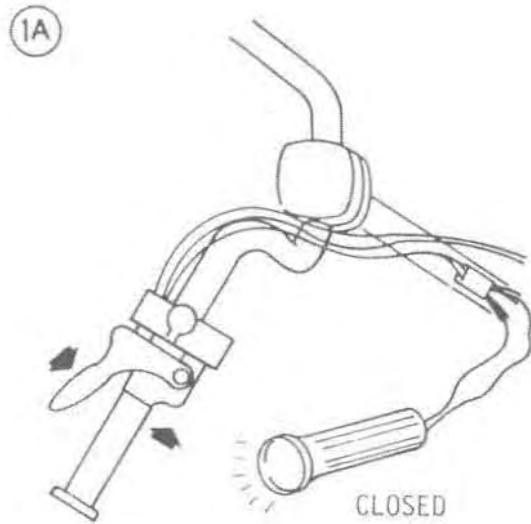
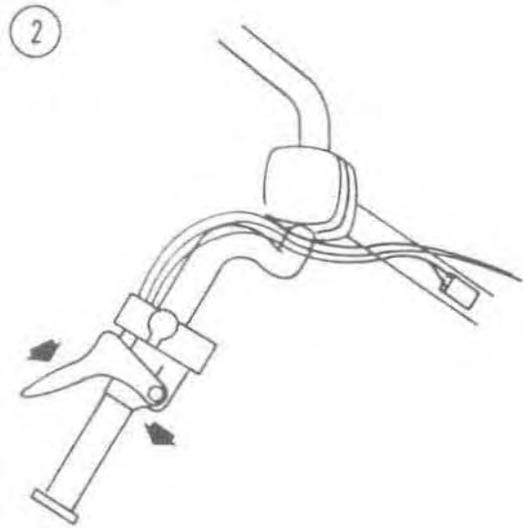
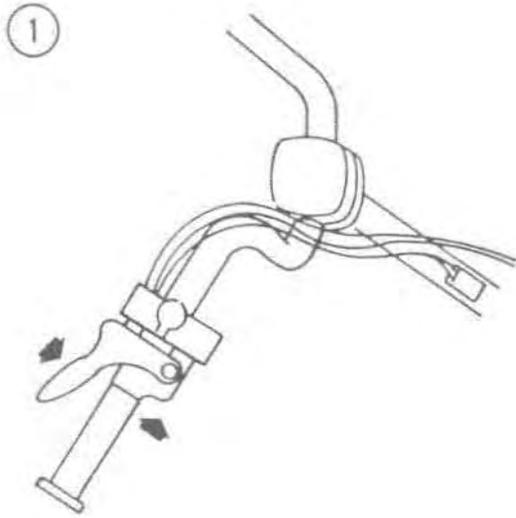
1. Engine speed remains above 3000 rpm if the throttle slide sticks open when throttle lever is released.
2. Engine is difficult to start, idles and performs poorly.
3. Limiter is affecting ignition from either failure or wet conditions.
4. Unplug wiring harness from speed limiter.
5. Inspect connectors and repair or replace corroded or damaged wires.
6. Clean and dry wiring harness and connections.
7. Support rear of snowmobile so track clears ground. Reconnect wiring to limiter and use Diagnosis Flow Chart to check system.

4015D/G/100982

RPM LIMITER DIAGNOSIS FLOW CHART



M32014/4015D/H/100982



M32015/4015D/1100982



SPECIFICATIONS

SPRINTFIRE ENGINE

Item	Specification
Spark Plug	Champion QN-2
Spark Plug Gap	0.635 mm (0.025 in.) (DO NOT REGAP)
Ignition (CDI) Timing	Kokusan Align mark on stator with crankcase separation
Alternator Output	160 Watt
Ignition Coil Resistance	NA
Exciter Coil Resistance	NA
Pulser Coil Resistance	NA
Lighting Coil Resistance	NA

SNOWFIRE ENGINE

Item	Specification
Spark Plug	Champion ON-3
Spark Plug Gap	0.635 mm (0.025 in.) (DO NOT REGAP)
Ignition (CDI) Timing	Kokusan Align mark on stator with crankcase separation
Alternator Output	120 Watt
Ignition Coil Resistance	5700 ohms \pm 15%
Exciter Coil Resistance	160 ohms \pm 20%
Pulser Coil Resistance	17 ohms \pm 20%
Lighting Coil Resistance	0.18 ohms \pm 20%

40200/A/100982

LIGHT BULB CHART

Location	Size	John Deere Part No.
Headlight	12-Volt	AM53887
Stop-Taillight	12-Volt	AM52619
Speedometer Light	12-Volt	AM52847
Tachometer Light	12-Volt	AM52847
Coolant Light	12-Volt	AM55550
Oil Level Light	12-Volt	AM55550

40200/B/100982

TORQUE SPECIFICATIONS

Item	Torque
Stator Screws	1.4 N·m (5 lb-ft)
Flywheel Nut	81.4 N·m (60 lb-ft)

40200/C/100982



Section 50 POWER TRAIN

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50001A/10082



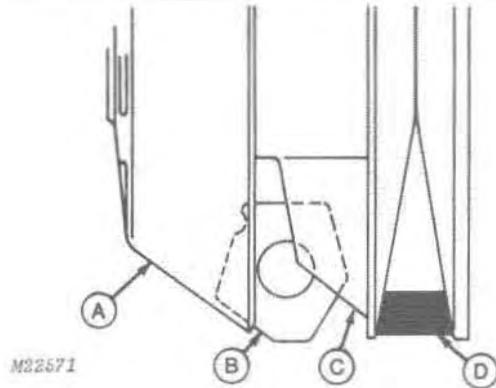
94C DRIVE SHEAVE

The 94C drive sheave is used on the Snowfire Snowmobile. It is mounted on the engine crankshaft and functions as a centrifugally-operated clutch and variator.

Increasing engine speed causes the centrifugally-actuated wedges (B) in movable face (C) to move out against cover (A). This action forces the sheave halves together, engaging drive belt (D) with the sheave.

When the engine reaches top rpm, the sheave halves are as close together as possible. The drive belt continues to ride out as engine speed increases and the sheave halves come together. This action provides a smooth transition from slow to fast snowmobile travel speed.

- A - Cover
- B - Wedge
- C - Movable Face
- D - Drive Belt



M22571/5005D/B/100982

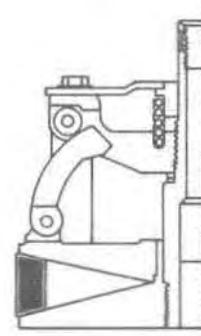
102C DRIVE SHEAVE

The 102C drive sheave is used on the Sprintfire Snowmobile. It is mounted on the engine crankshaft and functions as a centrifugally-operated clutch and variator.

When stopped or at idle speed, the sides of the sheave do not contact the drive belt, thus providing a de-clutched position.

Increasing engine speed causes the centrifugally-actuated arms (B) in movable face (A) to swing out against spider rollers (C) on fixed face (D). This action forces the sheave halves together, engaging the drive belt with the sheave and starts snowmobile movement.

- A - Movable Face
- B - Arms
- C - Spider Rollers
- D - Fixed Face

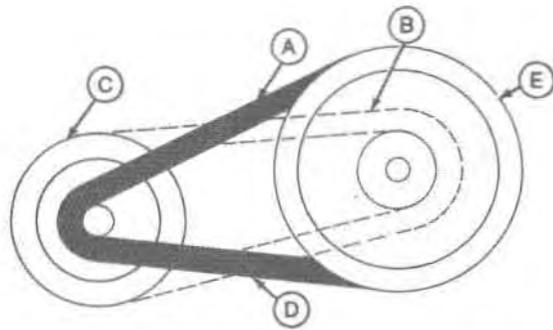


M23572/5005D/C/100982

JOHN DEERE DRIVEN SHEAVE

The drive sheave (C) is spring-loaded in the low-speed position (A). Increased speed causes the drive belt (D) to ride out on the drive sheave (C). The driven sheave (E) opens against spring tension, allowing the drive belt to ride deeper in the driven sheave (E).

- A - Low-Speed Position
- B - High-Speed Position
- C - Drive Sheave
- D - Drive Belt
- E - Driven Sheave



The driven sheave (A) does more than act as a take-up for the action of the drive sheave. The driven sheave is also "torque-sensitive". The driven sheave rides on the cam bracket (H) as it opens to obtain high-speed position.

Normal rotational force on the cam bracket (H) works to keep the driven sheave in the low speed position (F).

If an increased load or high torque requirement occurs (such as climbing a steep hill) after the snowmobile is up to speed, the cam bracket (H) in the driven sheave forces the sheave halves together, obtaining a slower travel speed (I) while maintaining high engine rpm (C) for increased torque.

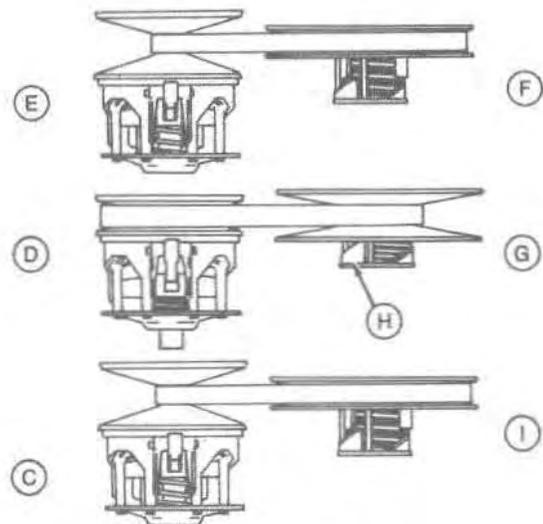
The top and bottom drawings have the same drive belt position. Increased speed of the engine in the lower drawing, causes a difference in the output speed of the driven sheave.



M25573

B A
Driven Sheave W/94C Drive Sheave

- A - Driven Sheave
- B - Drive Sheave
- C - High Engine rpm
- D - Low Engine rpm
- E - Low Engine rpm
- F - Low Output Speed
- G - High Output Speed
- H - Cam Bracket
- I - Medium Output Speed



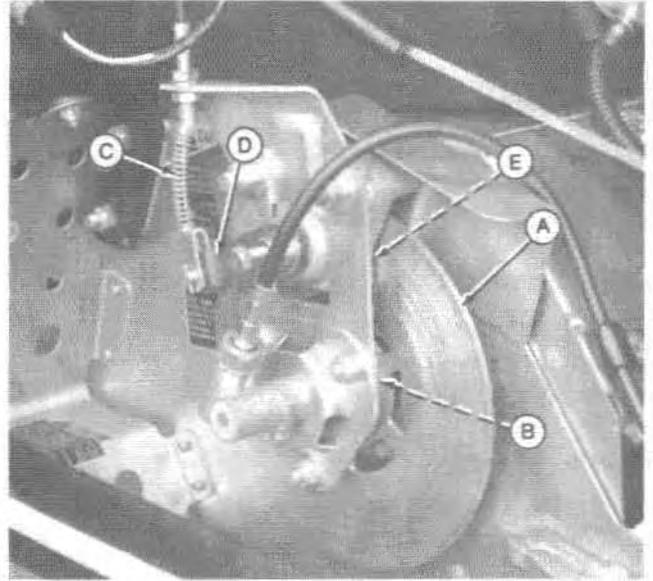
M25639

B A
Driven Sheave W/102C Drive Sheave

BRAKES

The mechanical disk brake (A) operates on the drive shaft (B) and is actuated by brake cable (C). When the brake is applied, the cam on brake arm (D) moves two pins in against brake puck (E). The puck moves brake disk (A) against a second puck providing positive braking.

- A - Disk Brake
- B - Drive Shaft
- C - Brake Cable
- D - Brake Arm
- E - Brake Puck



M350675005D/F/100982

DIAGNOSE MALFUNCTIONS

Drive Sheave Operating at Too Low rpm.

Spring weak or broken.
Inspect clutch wedges (94C).
Inspect roller arm weights (102C).

Drive Sheave Operating at Too High rpm.

Wrong spring (102C or 94C).
Drive sheave dirty internally.
Worn spider buttons (102C).

Drive Sheave Sticking.

Belt mold builds up on center post and movable face cannot slide properly.

Drive Sheave Shifting Erratic.

Oil or grease on drive or driven sheaves.

Drive Belt Not Operating Smoothly in Drive Sheave.

Sheave faces rough, grooved, pitted or scored.
Drive belt defective.

Driven Sheave Not Opening Properly.

Ramp buttons worn.
Ramp on movable face damaged.
Movable sheave half binding on fixed half.
Incorrect spring.
Spring tensioned improperly.

Driven Sheave Opening Too Easily.

Spring weak or broken.
Spring pretensioned improperly.
Wrong cam.

Uneven Drive Belt Wear.

Sheaves misaligned.
Engine mounts loose.

Drive Belt Glazed.

Excessive slippage.
Oil on sheave surfaces.

Drive Belt Worn Narrow in One Section.

Excessive slippage caused by stuck track.

Drive Belt Too Tight at Idle Speed.

Engine idle set too fast.
Incorrect distance between sheaves.
Incorrect belt length.

Drive Belt Edge Cord Breakage.

Sheaves misaligned.

Brake Not Holding Properly.

Brake cable out of adjustment.
Brake pucks worn.
Brake pucks oil-saturated.
Key sheared on brake disk.

Brake Not Releasing Properly.

Return spring weak or broken.
Brake lever bent or damaged causing binding.

General Information

SNOWFIRE (94C) CLUTCH RECOMMENDATIONS

	Sea Level To 1219 m (4000 ft.)
Engagement - RPM	3000-3400
Governed Speed - RPM	5900-6100
Primary Spring	White
Primary Arm Kit	AM 54710 9, 3/4" Hole Size
Secondary Hole	#2
Secondary Cam	44°
Track Drive Shaft	7-Tooth Sprocket

5005D/H/100982

SPRINTFIRE (102C) CLUTCH RECOMMENDATIONS

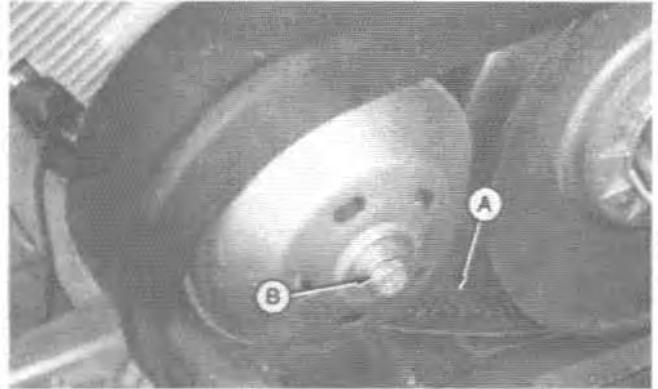
	Sea Level To 1219 m (4000 ft.)	1219 m (4000 ft.) To 2438 m(8000 ft.)	2438 m (8000 ft.) And Above
Engagement - RPM	3800-4000	4200-4400	4200-4400
Governed Speed - RPM	5900-6100	5900-6100	5900-6100
Primary Spacer	1	1	1
Primary Spring	Silver/Black	Gold	Purple
Primary Arm Kit	AM55607	AM55607	AM55687
Secondary Hole	#2	#2	#2
Secondary Cam	44°	44°	44°
Track Drive Shaft	8-Tooth Sprocket	8-Tooth Sprocket	7-Tooth Sprocket

5005D/H/100982



REMOVE DRIVE SHEAVE

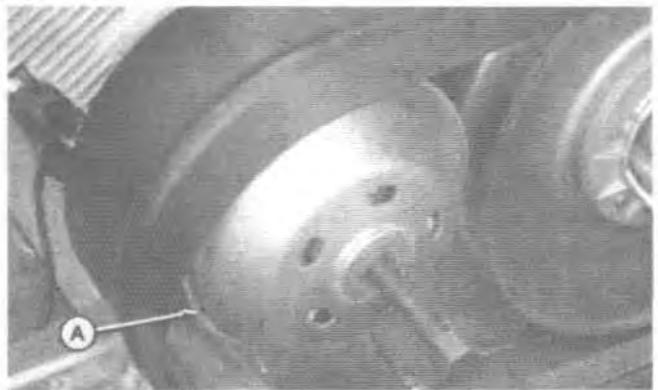
1. Remove drive belt (A).
2. Remove retaining screw and washer (B).



M30065/5010D/A/100982

3. Remove drive sheave (A).

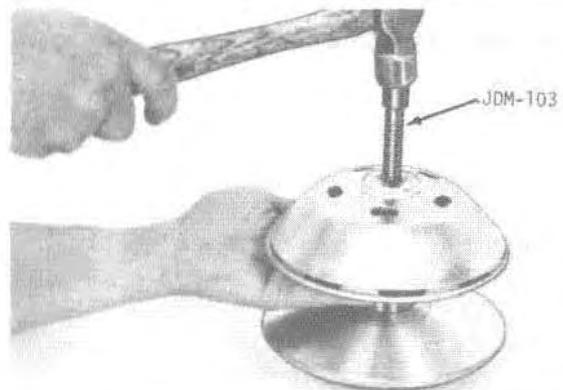
NOTE: Use an impact wrench or 1/2-in. socket wrench with long handle to remove retaining screw and to install JDM-103 Puller.



M30069/5010D/B/100982

DISASSEMBLE DRIVE SHEAVE

1. Leave JDM-103 Puller in drive sheave.
2. Hold the sheave as shown and strike puller with a hammer.
3. Remove JDM-103 Puller.



M28444/5010D/C/100982

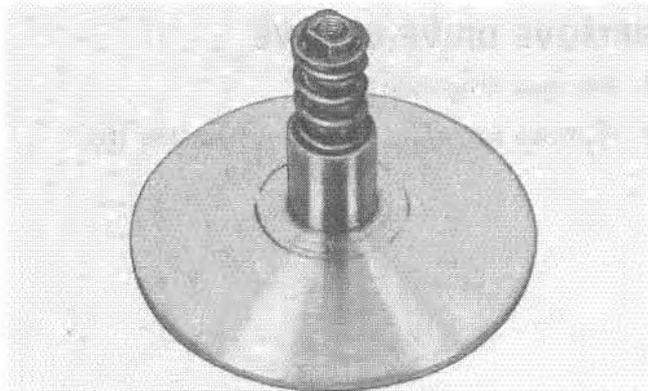
INSPECT SHEAVE

1. If bushings in movable face are worn or damaged, replace movable face. Bushings are not serviceable.
2. Check sheave faces for pitting or wear and replace as necessary.
3. Check spring and wedges for wear and replace as necessary.

S010D/D/100982

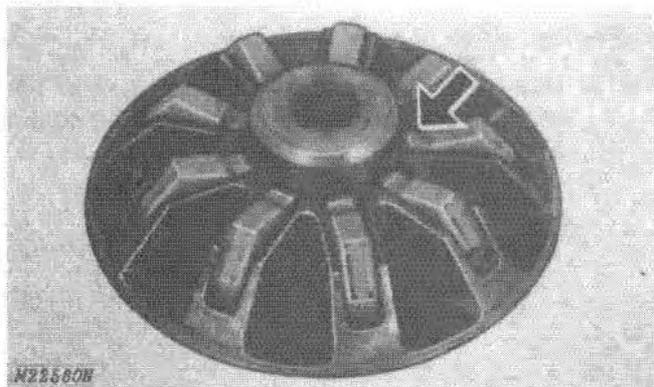
ASSEMBLE DRIVE SHEAVE

1. Install spring over hub of fixed face.



M22579/50100/E/100982

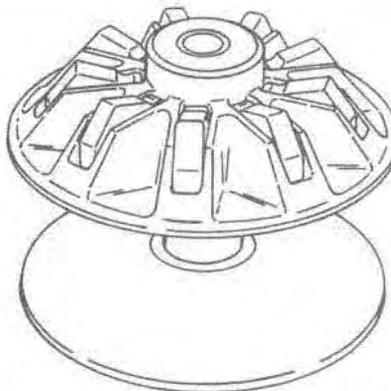
2. Install wedges in movable face with notch on wedge up and toward the center.



M22580B

2A5/M22580 N M225010 F 110681

3. Place movable face over fixed face hub and spring.



2A5/M22581 N M225010 G 110681

4. Place cover over movable face. Line up flats of the cover with flats of the post. Use your hands and press down on cover until it is retained on the post.

NOTE: Cover will be forced into place by the retaining bolt when clutch is installed on crankshaft.



2A5/M22582 N M225010 H 110681

INSTALL DRIVE SHEAVE

1. Install drive sheave on crankshaft.
2. Install retaining cap screw and washer. Torque cap screw to 68 N·m (50 lb-ft).

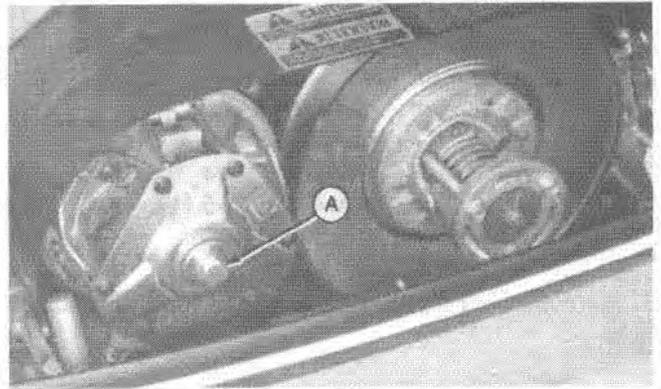
NOTE: Pull on recoil start rope to hold clutch when torquing cap screw.

4. Install drive belt so number on belt can be viewed from left side.

5010011100982

REMOVE DRIVE SHEAVE

1. Remove drive belt.
2. Remove retaining screw and washer (A).



M30070/5012D/A/100982

3. Screw JDM-41-1 Puller (A) into sheave hub until sheave comes loose from the crankshaft.

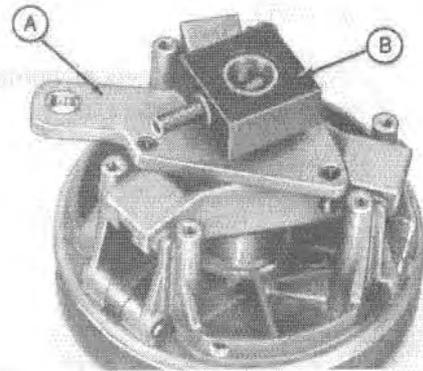
NOTE: Use an impact wrench or 1/2-in. socket wrench with long handle to remove retaining screw and to install JDM-41-1 Puller.



M30071/5012D/B/100982

DISASSEMBLE DRIVE SHEAVE

1. Remove every other screw from cover plate.
2. Remove three remaining cap screws equally.
3. Remove cover plate and spring.
4. Install JDM-41-3 Spider Tool (A) over hub.
5. Install JDM-41-5 Hub Lock Tool (B) over hub with pin of tool through cross hole in hub.



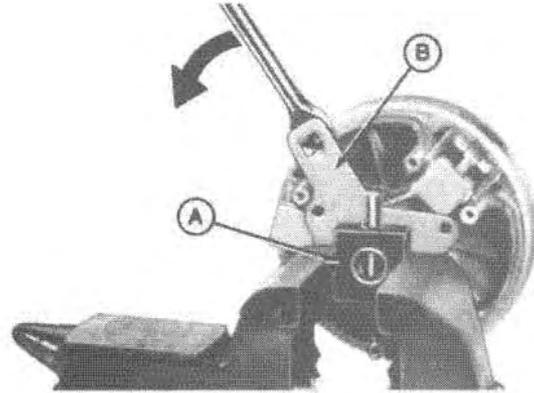
M19253/5012D/C/100982

6. Clamp assembly securely in vise. Install 1/2-in. socket wrench with long handle in Spider Tool (B). Turn counter-clockwise to loosen spider from hub.

IMPORTANT: Do not tighten vise too tight. Excess pressure on JDM-41-5 Hub Lock Tool can distort fixed face hub.

7. Remove Hub Lock (A) and Spider tools. Turn spider off hub.

NOTE: Remove spacer rings and movable face. Note spacers for reassembly.



ZAB/M19254 M22/S010A D 021081

INSPECT BUSHING

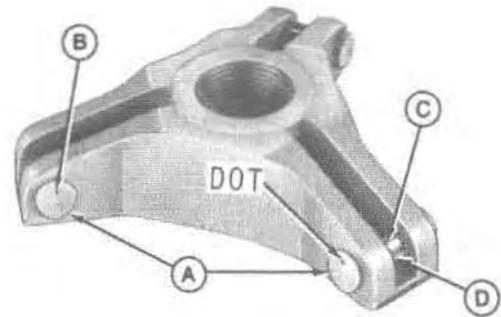
1. If bushing in cover plate is worn or damaged, replace cover plate. Bushing is not serviceable.



ZAB/M19255 M22/S010A E 021081

INSPECT GUIDE BUTTONS AND ROLLERS

1. Inspect guide buttons (A) and rollers (D) in spider. Replace if necessary.
2. Use pliers to remove guide buttons.
3. Remove pin, roller and three washers.
4. Install roller in spider with a fiber washer (C) on each side of roller. Fiber washer should be installed with fiber side facing roller.
5. Install pin and guide buttons (A). Tap buttons gently until seated.



IMPORTANT: Position small dot (B) on guide buttons (A) straight up or straight down. This matches bearing surface of guide button to bearing surface of movable face.

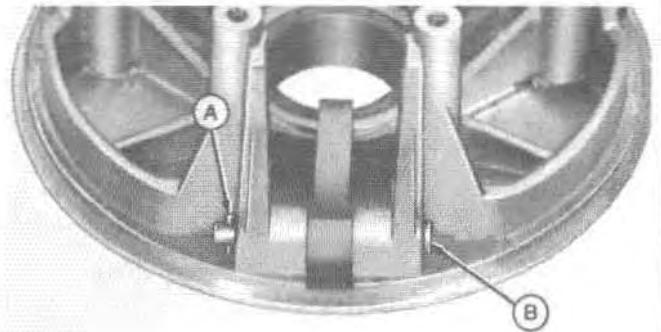
A - Guide Button
B - Dot

C - Fiber Washer
D - Roller

M23193/5012D/H/100962

INSPECT ARMS

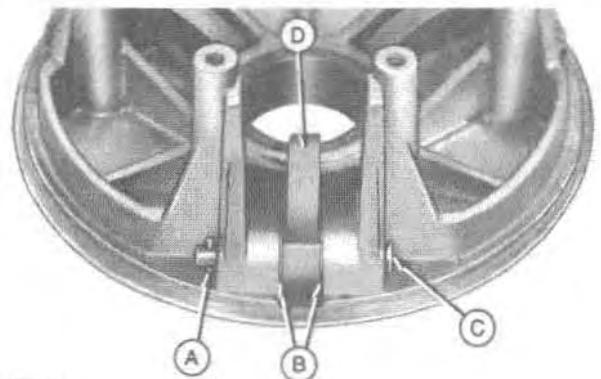
1. Inspect roller arms for wear and replace as necessary.
2. Use side cutters to remove spring pin (A).
3. Remove pivot pin (B), roller and three steel washers.



M23583/5012D/G/100962

4. Install roller arm (D) in movable face with a steel washer (B) on each side of arm.
5. Install pivot pin (C) from right to left. Install steel washer and NEW spring pin (A).

A - Spring Pin
B - Washer
C - Pivot Pin
D - Roller Arm



M23584T

M23584/5012D/H/100962

INSPECT FIXED AND MOVABLE FACES

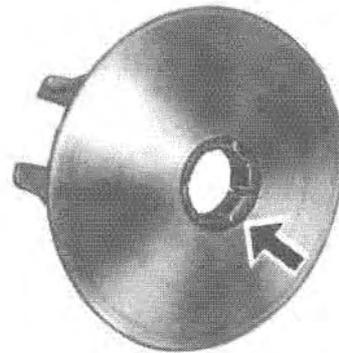
1. Check sheave faces for pitting or wear. Replace as necessary.
2. Inspect bushing of movable face and hub of fixed face for damage or wear.
3. Measure outside diameter of fixed face hub and inside diameter of movable face bushing. Allowable clearance should not exceed 0.762 mm (0.030-in.). If clearance is greater, replace movable face bushing.

5012D/1100982

4. Use a hacksaw blade to carefully cut through the movable face bushing in several places.

IMPORTANT: DO NOT saw into metal of movable face.

Remove bushing with a small cold chisel and hammer.



2A8;M19259 M22;5010A J 021081

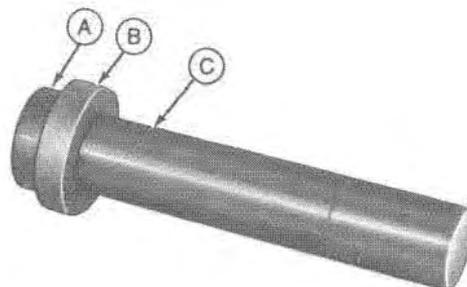
5. Install new bushing with snap ring up.



2A8;M19250 M22;5010A K 021081

6. Use Owatonna Tool Company, Bushing, Bearing and Seal Driver Set. Install 27516 Disk (B) and 27509 Disk (A) to 27488 Handle (C).

- A - 27509 Disk
- B - 27516 Disk
- C - 27488 Handle



M19251/5012D/L/100982

7. Use a press and JDM-50 Ring Compressor to install bushing flush with movable face.



M19062/5012D/M/100982

LUBRICATE DRIVE SHEAVE

Use Never-Seez Lubricant (PT569) or its equivalent on the following:

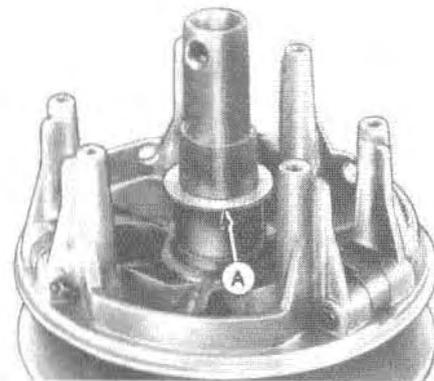
1. Arms and bolts in movable face.
2. Guide buttons in spider and mating surface of movable face.

NOTE: Use Loctite (T43512) on spider-to-hub threads.

2AA: M22.5010A W 021061

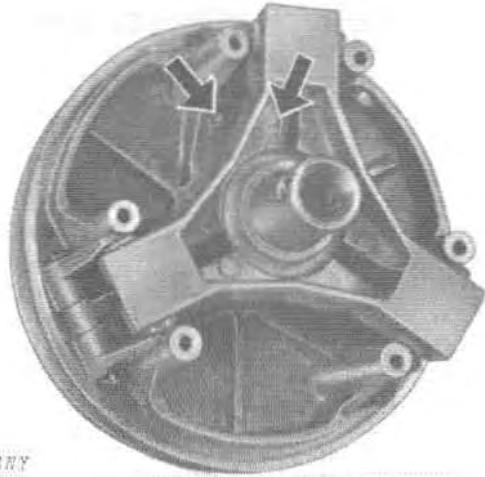
ASSEMBLE DRIVE SHEAVE

1. Install movable face over fixed face hub with required number of spacer rings (A).



M29304/5012D/O/100982

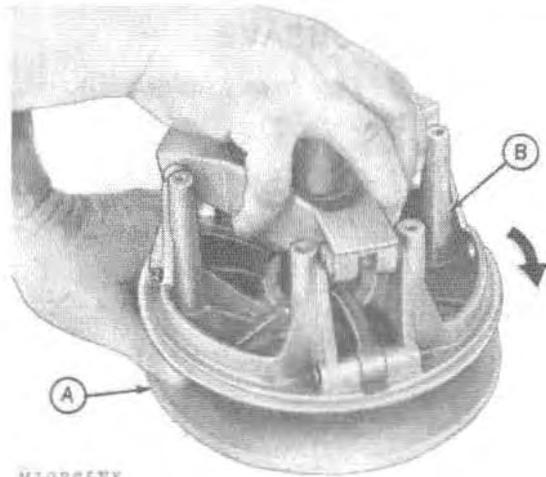
2. Install spider on movable face. Align identification marks on spider with identification marks on movable face. This is necessary for proper balance of drive sheave.



M19266NY

M192645012DIP1100982

3. Hold fixed sheave (A) and turn the spider and movable sheave (B) clockwise. Tighten the assembly as far as possible by hand.



M19266NY

M19265/5012D/Q/100982

4. Install JDM-41-3 Spider Tool (B) and JDM-41-5 Hub Lock Tool (A) over fixed face hub.

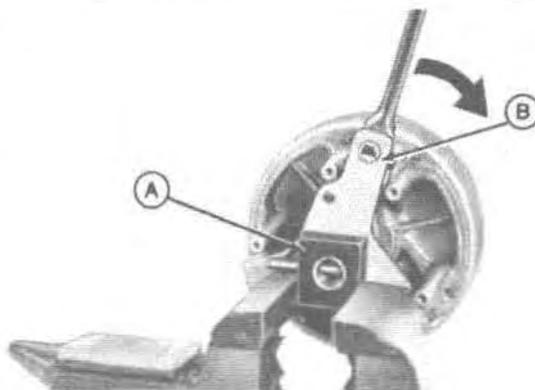
5. Clamp assembly very securely in vise.

IMPORTANT: Do not tighten vise too tight. Excess pressure on JDM-41-5 Hub Lock Tool can distort fixed face hub.

6. Install a 1/2-in. socket wrench with long handle in Spider Tool and turn clockwise to tighten spider to hub.

7. Remove Hub Lock and Spider Tools.

8. Install spring and cover plate. Tighten the six screws to 13 to 16 N·m (10 to 12 lb-ft).



M19266/5012D/R/100962

INSTALL DRIVE SHEAVE

1. Install drive sheave on crankshaft.

2. Install retaining cap screw and washer. Torque retaining cap screw to 68 N·m (50 lb-ft).

NOTE: Pull on recoil start rope until dogs engage. Hold rope firmly while torquing retaining cap screw.

3. Install drive belt and knock-out plug.

NOTE: Always install drive belt so number on belt can be read when viewed from the left side.

5012D/S/100962



REMOVE DRIVEN SHEAVE

1. Remove belt guard and drive belt.
2. Remove cap screw, washer and spacers. Remove driven sheave and key.



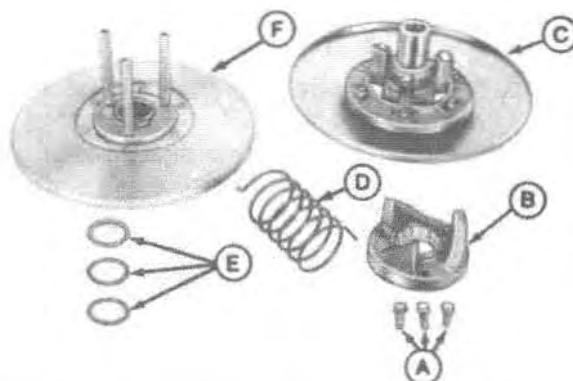
M30072-5015DIA/100982

DISASSEMBLE DRIVEN SHEAVE

1. Remove cam (B) from movable face (F).
2. Remove spring (D) and fixed face (C) with insert buttons.
3. Take note of spacers (E) between movable face and fixed face.

A—Cap Screws
B—Cam
C—Fixed Face

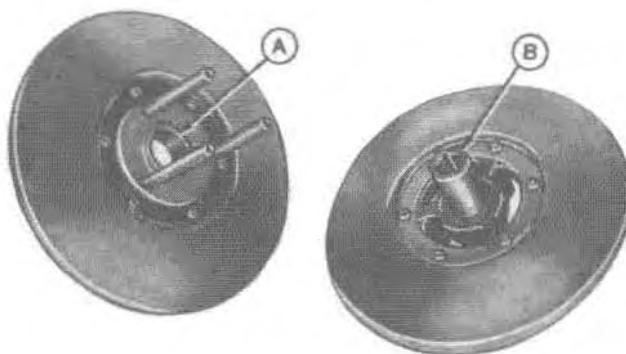
D—Spring
E—Spacers
F—Movable Face



2AS/M22045 M22,5015 R 110681

INSPECT DRIVEN SHEAVE

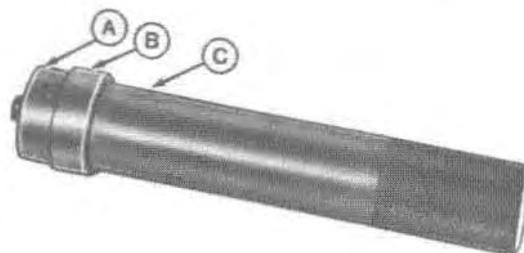
1. Clean all components in solvent.
2. Check movable face bushing (A) and fixed face hub (B) for wear. Replace parts as necessary. Excessive looseness could cause binding.



2AS/M19272 BY M22,5015 C 110681

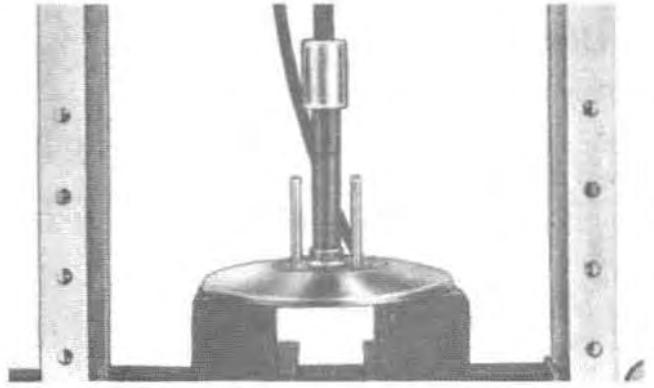
Replace movable face bushing as follows:

3. Use Owatonna Tool Company Bushing, Bearing and Seal Driver Sets. Install 27507 Disk (B) and 27505 Disk (A) on 27488 Handle (C).



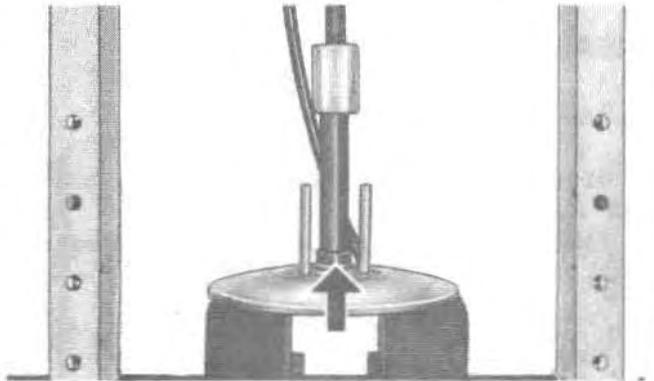
2AS/M19273 BY M22,5015 D 110681

4. Use a press to remove old bushing.



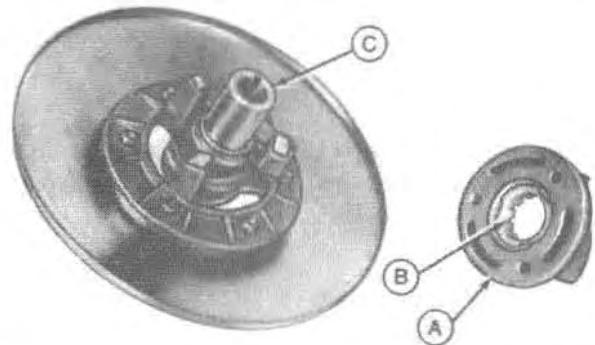
2ASM19274 BY M22/5015 E 110681

- 5. Use a press to install new bushing flush with the hub.
- 6. Inspect spring for cracks or pits. Replace as necessary.
- 7. Check sheave faces with a straight-edge. Replace if worn, grooved, scored or pitted.



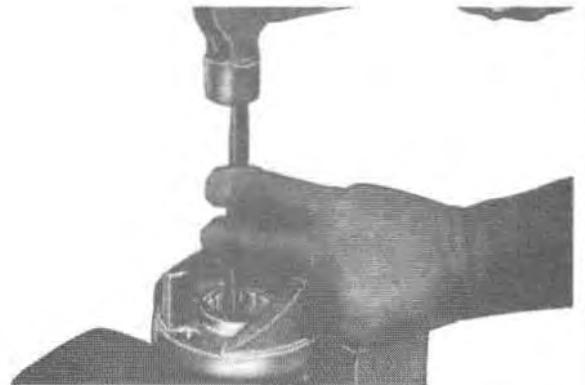
2ASM19275 BY M22/5015 F 110681

8. Check bushing (B) in cam (A) and fixed face hub (C) for wear. Replace as necessary.



2ASM19276 BY M22/5015 G 110681

9. Replace bushing by placing cam on two wooden blocks and use a cold chisel to remove.



2ASM19277 BY M22/5015 H 110681

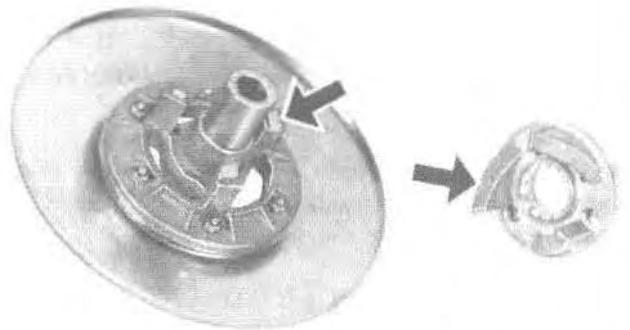
10. Install new bushing by pushing it in place with your thumbs. Be sure bushing is aligned properly when installing.



A25/M142/B BY M22/015 | 11076M1

11. Inspect insert buttons for wear. Buttons and mating surface on cam must be smooth. Replace insert buttons as a set.

NOTE: To remove worn buttons, heat tower slightly with a hand torch. Grasp button with a vice grip and pull button out.



M1W795P15DU110382

12. Replace broken insert buttons as follows: clamp a steel shank (do not use aluminum shank) pop rivet securely with a vise grips and heat end red hot with a hand torch. Push steel shank into center of broken insert button. Allow pop rivet steel shank to cool slightly and remove insert button.

NOTE: Repeat process until all of broken insert button is removed from bore.

13. Clean all glue from bore.

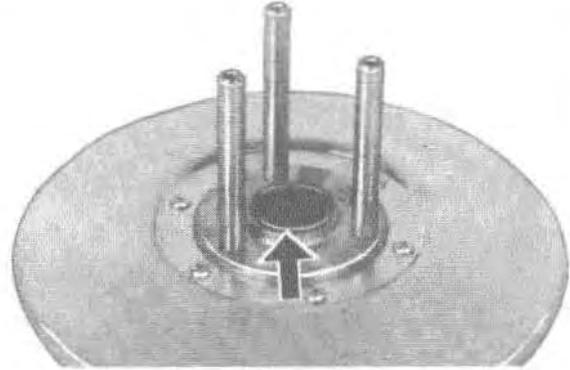
14. Use a plastic or wood mallet to gently tap button into bore until it is seated flush. DO NOT tap too hard; buttons are easily broken if hit too hard.



UC2835/015G.W/102982

ASSEMBLE DRIVEN SHEAVE

1. Lay movable sheave flat. Place spacers on hub.
2. Install fixed sheave hub through movable sheave.



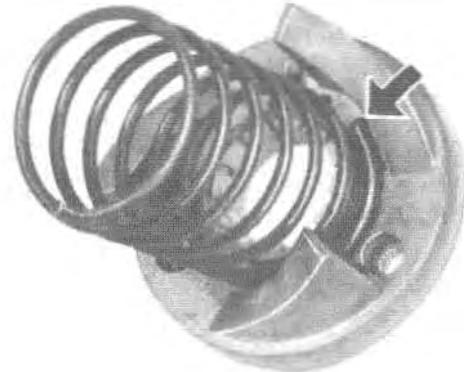
2A3-W14081 BY M22-5015 L 110681

3. Install spring in No. 2 hole in cam.

NOTE: The spring must always be pretensioned in the No. 2 hole.

As temperature or altitude increases, the drive sheave and carburetor must be modified to obtain proper governed speed. Do not modify the driven sheave.

Governed engine speed is 5900 to 6100 rpm.



2A3-W14082 BY M22-5015 M 110681

4. Install cam with spring over post of fixed face with tang of spring in hole in fixed face.
5. Rotate cam past the proper ramp. Push down on cam making sure posts of movable face fit in recesses in cam.
6. Install and tighten cap screws.

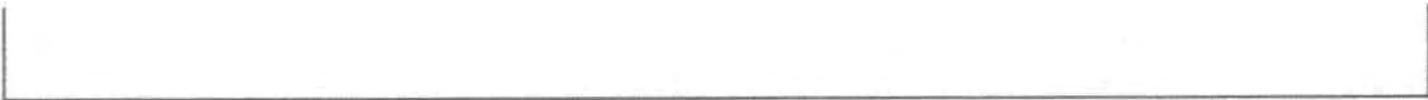


2A3-W14083 BY M22-5015 N 110681

INSTALL DRIVEN SHEAVE

1. Lubricate drive shaft and inside of hub with Never-Seez Lubricant (PT569).
2. Install spacers on shaft.
3. Place sheave in line with shaft and back key out of sheave.
4. Slide sheave on shaft and push key in to secure sheave to shaft.
5. Install washer and retaining cap screw. Torque cap screw to 27 N·m (20 lb-ft). Recheck alignment.
6. Install drive belt so that number on belt can be read when viewed from left side of snowmobile.
7. Install belt guard.

S0152/D/1008Z



REPLACE DRIVE BELT

NOTE: Belt guard removed for clarity.

1. Push in on center of driven sheave and lift belt over sheave half.
2. Remove belt from drive sheave.

IMPORTANT: Never pry belt over sheaves. No prying is necessary if driven sheave is opened correctly.



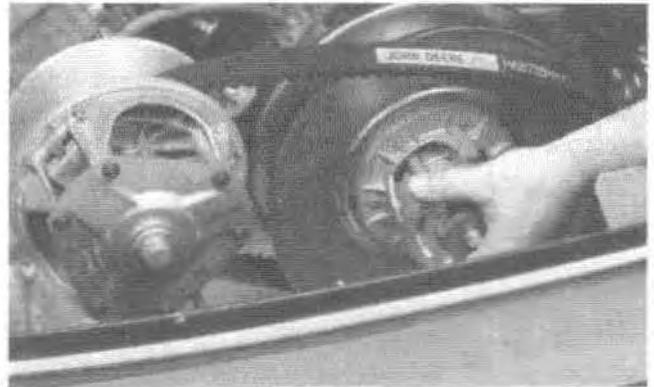
CAUTION: Keep fingers out of area between center of driven sheave halves when sheave is opened.

3. Install belt in opposite sequence. Install belt so number on belt can be read when viewed from the left side.

NOTE: The drive belt should be replaced when its width is reduced by 3.175 mm (1/8-in.). Correct drive belt width is 31.75 mm (1-1/4-in.).

IMPORTANT: If there is a loss of snowmobile performance or if the belt appears too loose, remove shims (anti-creep) from the outside of the driven sheave. Remove shims until the snowmobile just starts to "creep" at idle speed and then add back one shim. After this adjustment, if snowmobile performance is not satisfactory, realign drive and driven sheaves and install a new drive belt.

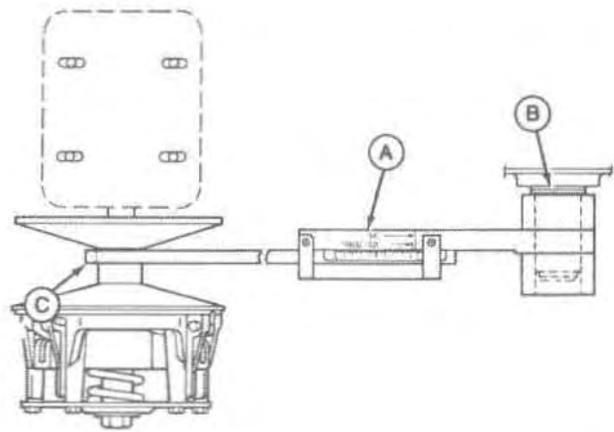
If snowmobile has a tendency to "creep" at idle speed after installing a new belt, add "anti-creep" washers to the outside of the driven sheave, as necessary, to stop "creep" at idle speed.



M30073/5020D/AV/100982

ALIGN CENTER DISTANCE (SPRINTFIRE)

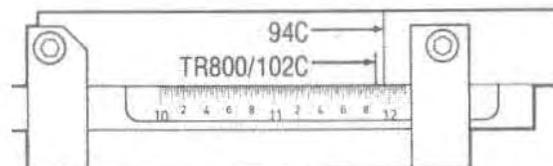
1. Install gauge (A) from Universal Clutch Alignment Tool Kit JDG-369 on the drive shaft (B) and hold the movable end of tool against front of the drive sheave hub (C).



M28994/5020/DVB/100962

2. Read the center distance dimension by matching the alignment mark on the scale for the 102C drive sheave. Correct center distance is 276 ± 0.8 mm (10.86 ± 0.030 -in.).

3. Center distance can be adjusted by loosening the engine mounting bolts and moving the engine forward or rearward.



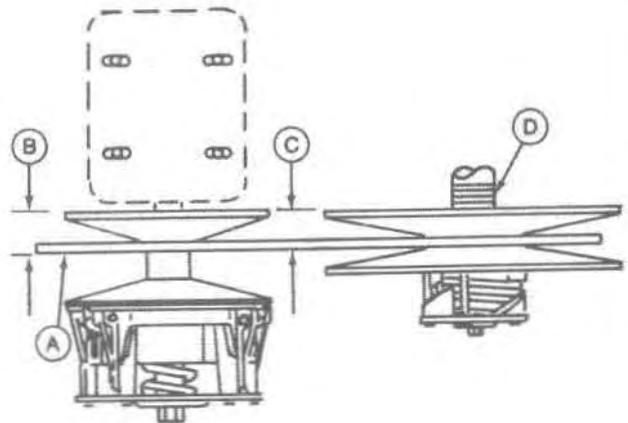
M31287/5020/IC/100962

ALIGN DRIVE BELT (SPRINTFIRE)

1. Remove drive belt.
2. Separate driven sheave and insert straight edge (A) from the Universal Clutch Alignment Tool Kit JDG-369 between drive and driven sheaves.
3. Measure distances (B and C) every 120 degrees (three places) on the drive sheave.
4. Use the following formula to calculate offset:

$$\frac{B + C}{2} = \text{OFFSET}$$

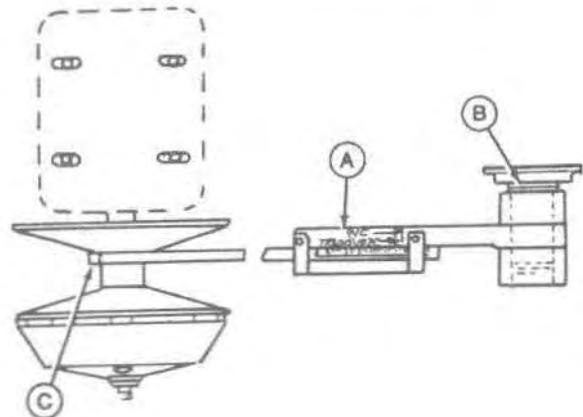
5. Offset should be 31.8 ± 0.8 mm (1.25 ± 0.030 -in.).
6. Add or remove shims (D) from between the driven sheave and drive shaft bearing. Shims are available in 0.018 or 0.060-in. thickness.



M29996/S020D/D1100982

ALIGN CENTER DISTANCE (SNOWFIRE)

1. Install gauge (A) from Universal Clutch Alignment Tool Kit JDG-369 on the drive shaft (B) and hold the movable end of tool against front of the drive sheave hub (C).

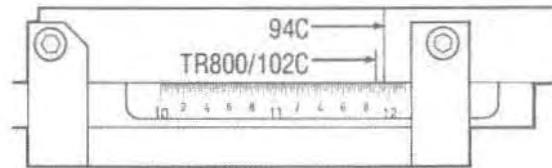


M32128/S020D/E1100982

Drive Belt

2. Read the center distance dimension by matching the alignment mark on the scale for the 94C drive sheave. Correct center distance is 274 ± 0.8 mm (10.80 ± 0.030 -in.).

3. Center distance can be adjusted by loosening the engine mounting bolts and moving the engine forward or rearward.



M31287/5030/01/100982

ALIGN DRIVE BELT (SNOWFIRE)

1. Remove drive belt.

2. Separate driven sheave and insert straight edge (A) from the Universal Clutch Alignment Tool Kit JDG-369 between drive and driven sheaves.

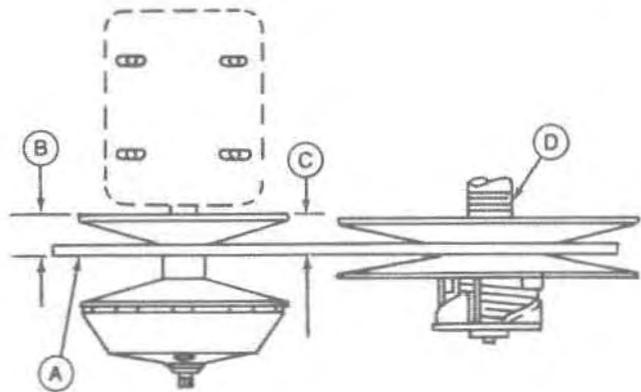
3. Measure distances (B and C) every 120 degrees (three places) on the drive sheave.

4. Use the following formula to calculate offset:

$$\frac{B + C}{2} = \text{OFFSET}$$

5. Offset should be 31.8 ± 0.8 mm (1.25 ± 0.030 -in.).

6. Add or remove shims (D) from between the driven sheave and drive shaft bearing. Shims are available in 0.018 or 0.060-in. thickness.



M3213050200/01/100982

DIAGNOSE MALFUNCTIONS

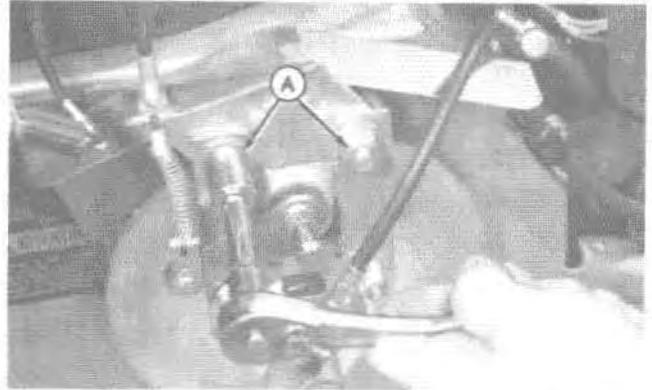
PROBLEM	CAUSE	SOLUTION
Uneven belt wear on the side only.	Sheave misalignment. Loose engine base.	Align sheaves. Replace or tighten base.
Belt glazed or has a baked appearance.	Insufficient pressure on belt sides. Excessive horsepower for belt and clutch. Oil on sheave surfaces.	Check drive sheave for worn flyweights or clutch arms. Be sure correct clutch is being used. Clean sheave surfaces.
Belt worn excessively in top width.	Excessive slippage. Rough or scratched sheave surfaces. Improper belt angle.	Check drive sheave for smooth operation. Replace or repair sheaves. Check alignment.
Belt worn narrow in one section.	Excess slippage due to frozen track or clutch not functioning properly.	Rotate track by hand until free. Repair or replace clutch.
Belt too tight at engine idle.	Idle speed too high. Incorrect belt length. Incorrect shims in secondary.	Reduce speed. Check belt. Add a shim.
Belt disintegration.	Excessive belt speed.	Check engine speed at wide open throttle.
Belt worn concave on sides.	Excessive ride out on drive sheave.	Repair or replace sheave. Belt too long.
Belt "Flip-Over" at high speed.	Sheave misalignment. Excessive belt speed. Excessive ride out on drive sheave.	Align sheaves. Reduce engine rpm. Belt too long.
Belt edge cord breakage.	Sheave misalignment. Improper belt.	Align sheaves. Check drive belt.
Flex cracks between cogs.	Belt worn out.	Replace belt.
Sheared cogs, compression section fractured or torn.	Improper belt. Belt rubbing stationary object.	Check belt. Check drive sheave.

11/1/82



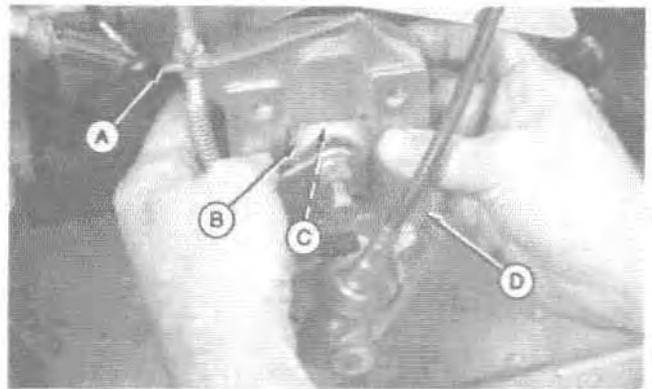
REMOVE DRIVE SHAFT

1. Remove muffler.
2. Remove nuts (A).



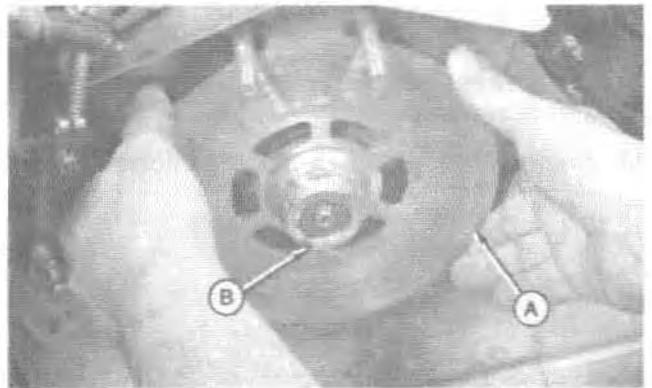
M30074/5025D/A/100982

3. Remove bracket (A), puck body (B) and puck (C).
4. On Sprintfire Snowmobile, remove speedometer bracket (D). Use care as bracket (D) is removed. Speedometer drive cable will come off with bracket (D).



M30075/5025D/B/100982

5. Remove brake disk (A) with spring (B). Do not lose woodruff key as disk (A) comes off.



M30076/5025D/C/100982

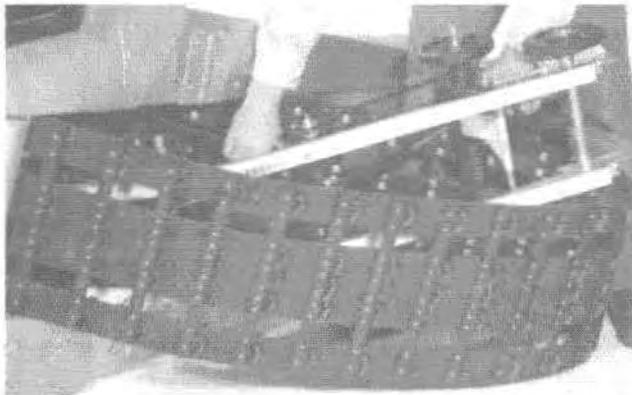
6. Remove belt guard and drive belt.
7. Remove cap screw, washer and spacers. Remove driven sheave and key.



M30072/5025D/G/1100982

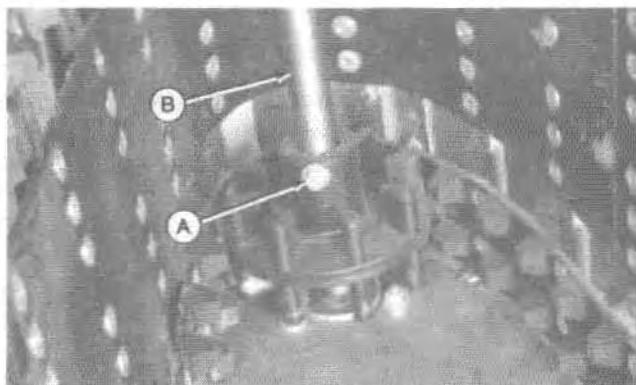
Drive Shaft

8. Remove suspension.



M30077/5025D/D/100982

9. Remove bolt (A) securing right-hand drive wheel (B) to shaft. Slide wheel to left side of tunnel.

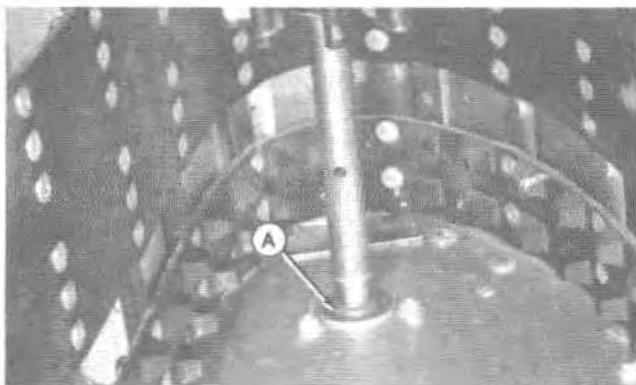


M30078/5025D/E/100982

10. Remove right-hand bearing (A) from tunnel.

11. Slide drive shaft assembly to the right side of tunnel and remove shaft.

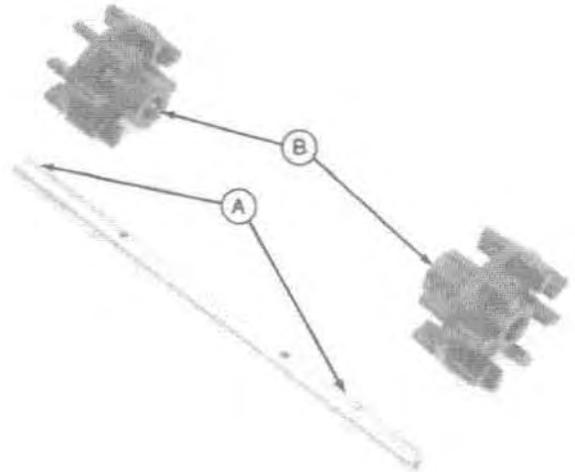
12. Remove left-hand bearing assembly.



M30079/5025D/F/100982

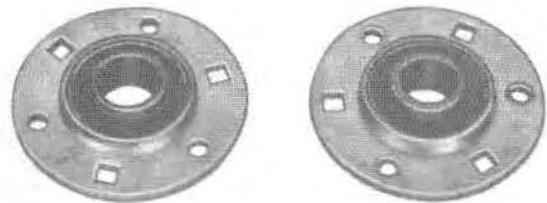
INSPECT DRIVE SHAFT

1. Remove drive wheels from shaft.
2. Check drive shaft bearing surfaces (A) for evidence of bearings turning on shaft. Replace shaft if defective.
3. Check drive wheels (B) for wear. Replace as necessary.



M30060/5025D/G/100982

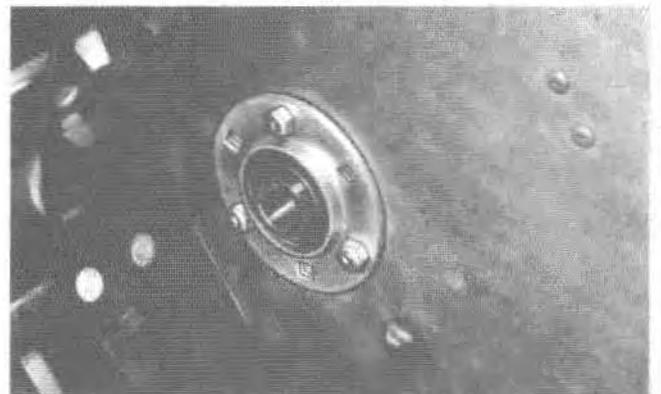
4. Check drive shaft bearings and replace them if they are binding or worn.



2AS/M229V M22-5025 E 110481

INSTALL DRIVE SHAFT

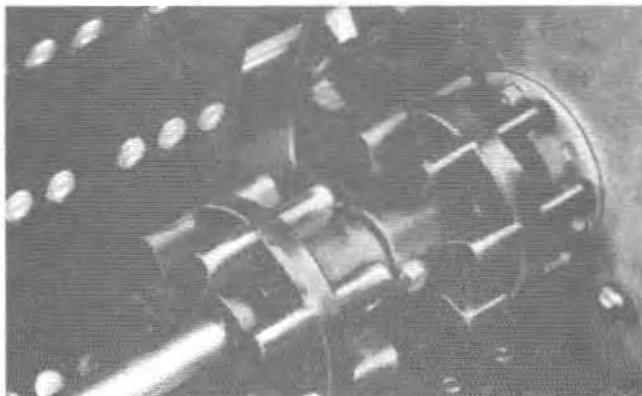
1. Install left-hand bearing assembly with locking flange of bearing toward the inside of the tunnel.
2. Install drive wheels on shaft. Secure left drive wheel to shaft. Do not secure right drive wheel at this time.



2AS/M229V M22-5025 F 110481

Drive Shaft

3. Install drive shaft in left-hand bearing.



2A5/N22194 M22:5025 G 110481

4. Install right-hand bearing assembly with locking flange of bearing toward the inside of tunnel.

5. Secure right-hand drive wheel to shaft. Be sure teeth of both drive wheels are aligned with each other.

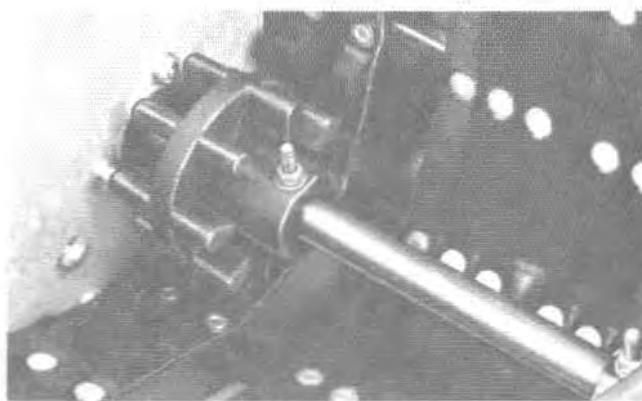
6. Install suspension.

7. Place key in drive shaft. Install flat spring in disk. Install brake disk.

8. Install brake puck body with backing plate and puck.

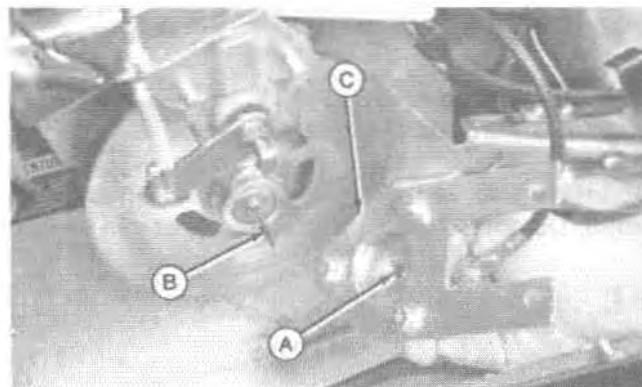
9. Install shims and driven sheave. Check belt alignment.

10. Tension track.



M22595/5025D/R/100982

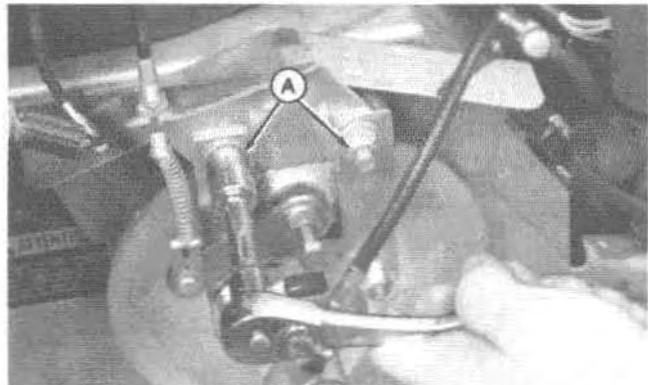
11. On Sprintfire Snowmobile, engage speedometer drive (A) with drive shaft (B). Install bracket (C).



M30081/5025D/L/100982

Drive Shaft

12. Install and tighten nuts (A).
13. Install muffler.
14. Check brake adjustment.

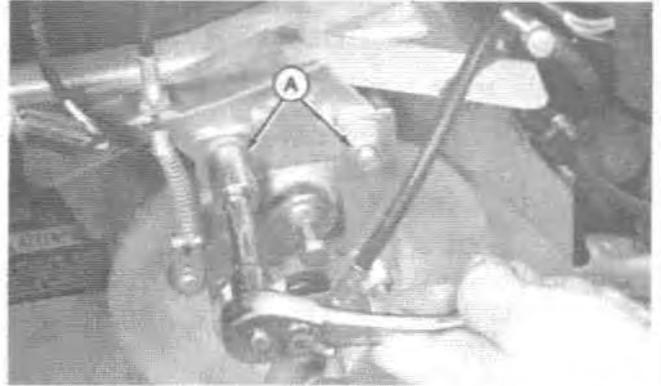


M30074/5025D/M1100982



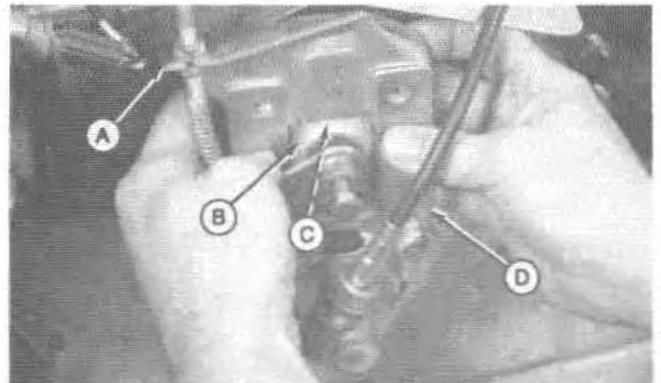
REMOVE BRAKE

1. Remove muffler.
2. Remove nuts (A).



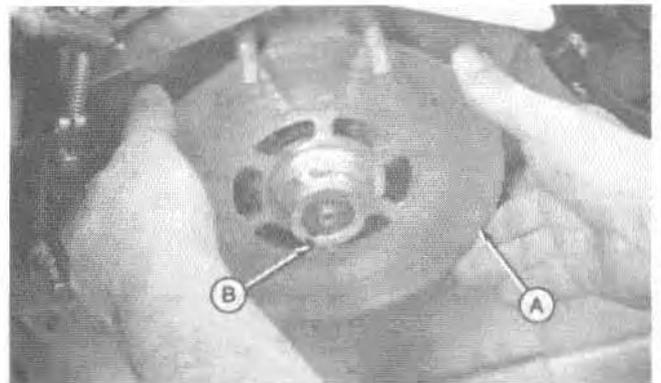
M30074/5030D/A/100982

3. Remove bracket (A), puck body (B) and puck (C).
4. On Sprintfire Snowmobile, remove speedometer bracket (D). Use care as bracket (D) is removed. Speedometer drive cable will come off with bracket (D).



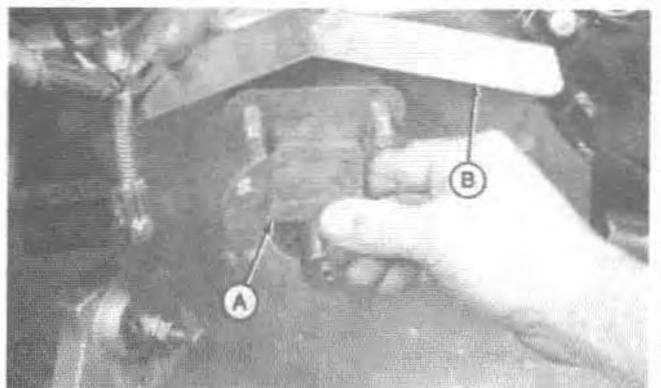
M30075/5030D/B/100982

5. Remove brake disk (A) with spring (B). Do not lose woodruff key as disk (A) comes off.



M30076/5030D/C/100982

7. Remove retainer (A) with puck. On Sprintfire Snowmobile, it is not necessary to remove bracket (B).



M30082/5030D/D/100982

INSPECT BRAKE COMPONENTS

1. Replace brake pucks if they are contaminated.

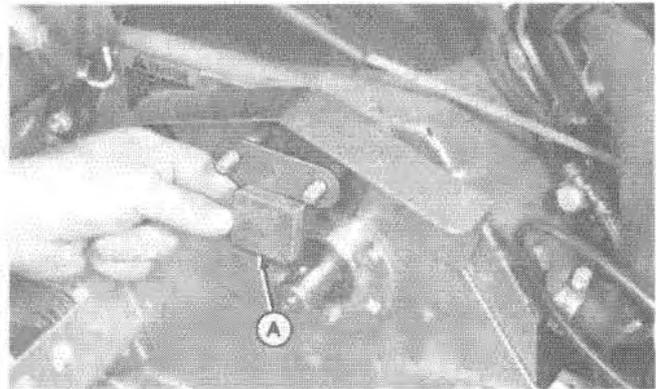
IMPORTANT: New pucks are 9.5 mm (3/8-in.) thick. If either puck is worn to only 4.8 mm (3/16-in.) in thickness, replace both pucks.

2. Inspect brake disk, arm, adjusting screw and brake cable. Replace worn or damaged parts.

5030D/E/100982

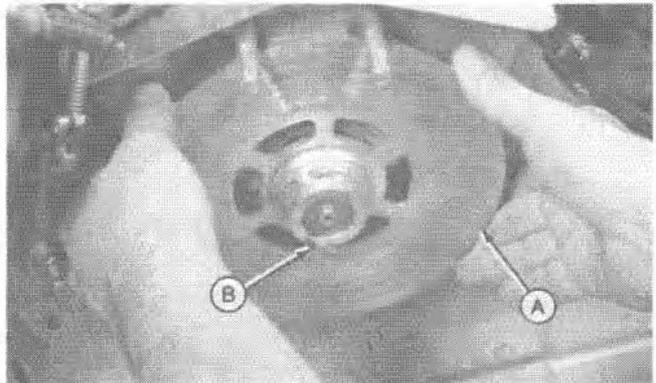
INSTALL BRAKE

1. Install retainer (A), with puck, over cap screws in tunnel.



M90083/5030D/F/100982

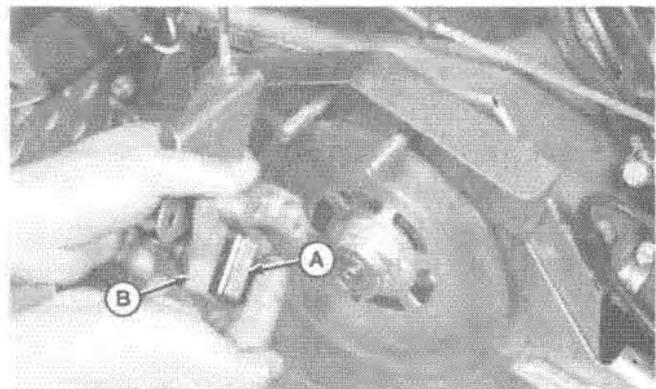
2. Check that woodruff key is on shaft. Use Never-Seez on shaft. Install disk (A) and spring (B).



M30076/5030D/G/100982

3. Install brake puck (A) in puck body (B).

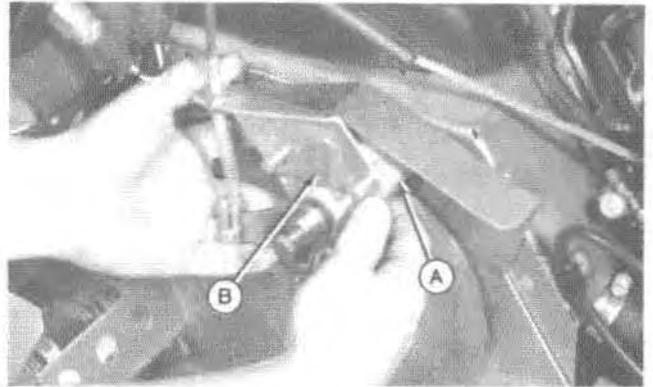
IMPORTANT: Set metal part of puck (A) against screw and not against brake disk.



M30084/5030D/H/100982

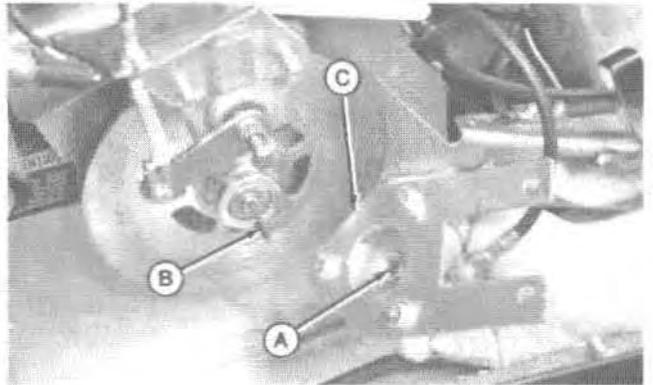
Mechanical Disk Brake

4. Install brake puck body (A) and bracket (B).



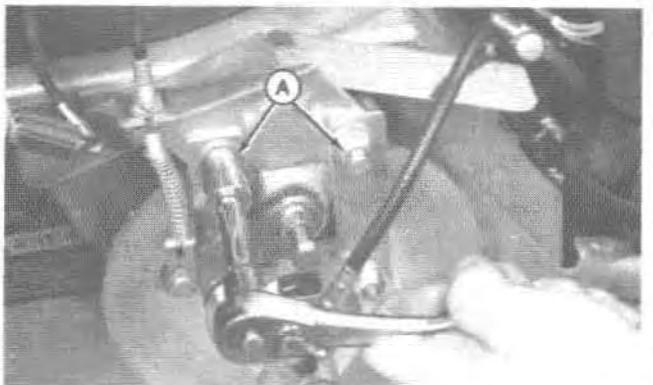
M300B5/5030D/L/100982

5. On Sprintfire Snowmobile, engage speedometer drive (A) with drive shaft (B). Install bracket (C).



M300B1/5030D/L/100982

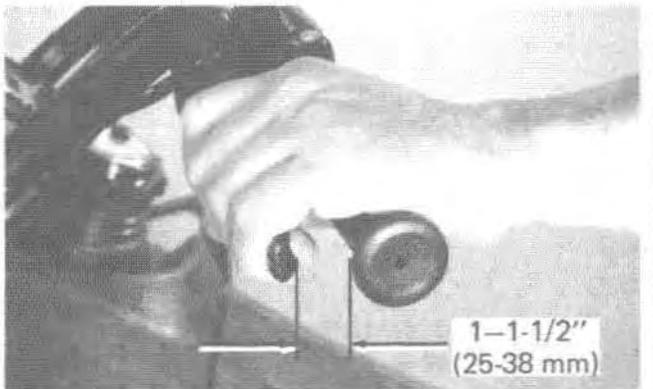
6. Install and tighten nuts (A).
7. Install muffler.



M30074/5030D/L/100982

ADJUST BRAKE

1. Apply brake control lever and measure distance from lever to handgrip. It should be 25-38 mm (1 to 1-1/2-in.)



M30912/5030D/L/100982

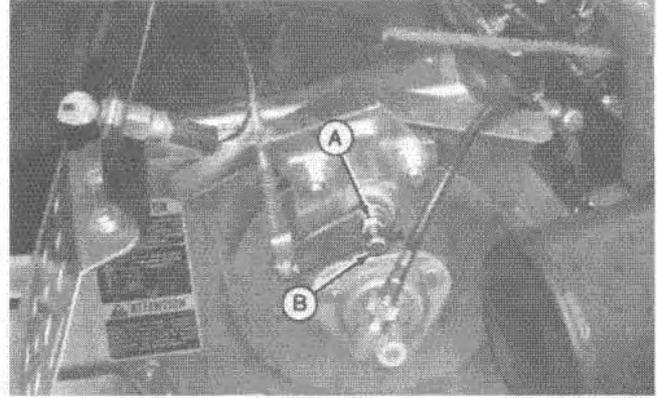
Mechanical Disk Brake

2. Adjust brake by loosening jam nut (A) and tightening screw (B). Tighten jam nut.

3. Repeat step 1 and readjust if necessary.

NOTE: Be certain dowel on end of brake cable is seated properly in recess of brake control lever.

4. After adjustment, check operation of stoplight switch.



Sprintfire Shown

M29125/50300/IM/100982

SPECIFICATIONS

Drive Belt Width.....	31.75 mm (1-1/4-in.)
Drive Belt Effective Length.....	1193.80 ± 6.35 mm (47.0 + 0.25-in.)
Center Distance — Sprintfire.....	276 ± 0.8 mm (10.86 ± 0.03-in.)
Drive Belt Offset — Sprintfire.....	31.8 ± 0.8 mm (1.25 ± 0.03-in.)
Center Distance — Snowfire.....	27.4 ± 0.8 mm (10.80 ± 0.03-in.)
Drive Belt Offset — Snowfire.....	31.8 ± 0.8 mm (1.25 ± 0.03-in.)

50350/A/100982

TORQUE FOR HARDWARE

Drive Sheave Retaining Cap Screw.....	68 N·m (50 lb-ft)
Driven Sheave Retaining Cap Screw.....	27 N·m (20 lb-ft)

50350/B/100982

Section 60 SUSPENSION

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SUSPENSION COMPONENTS

The slide suspension system consists of the skis and steering mechanism, the track, slide suspension, and rear idler assembly. The system also incorporates replaceable wear bars, adjustable suspension springs, and hydraulic shock absorber.

The rear idler shaft turns in double-lip, sealed ball bearings and is adjustable to properly tension the track.

The rubber track has lugs on the inside surface which engage the drive wheels on the drive shaft. The riveted steel grouser bars are replaceable.

The skis have replaceable wear rods and wear plates. The ski spindles are mounted in replaceable bearings. The tie rod ends are color-coded; silver color indicates right-hand threads, gold color indicates left-hand threads.

8005D/A/100982

DIAGNOSE MALFUNCTIONS

Track Edge Frayed.

Track out of alignment.

Track Grooved On Inner Surface.

Track running excessively tight.
Rear idler shaft bearings frozen.

Track Drive Ratcheting.

Track too loose.

Rear Idlers Turning On Shaft.

Rear idler shaft bearings frozen.

Loose Steering.

Tie rod ends loose.
Spindle bushings worn.
Spindle splines stripped.

Skis Not Turning Equally In Both Directions.

Tie rod adjusted improperly.
Steering arm installed improperly.

Rapid Ski Wear.

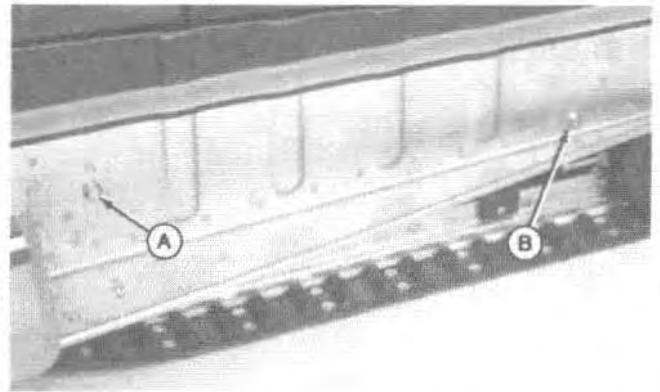
Skis out of alignment.
Wear rods worn out.
Spring wear plate worn out.
Running in marginal snow cover.

8005D/B/100982



REMOVE SUSPENSION

1. Remove two suspension retaining bolts (A and B) from each side of tunnel. Remove both rear bolts (B) first.

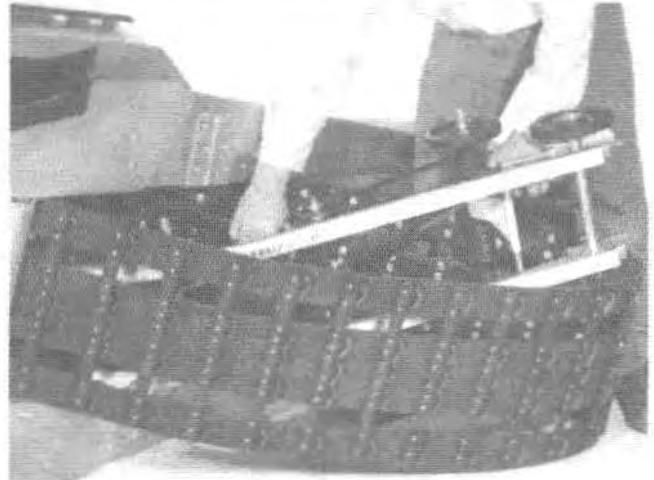


M30077/60100/A/100982

⚠ CAUTION: Gasoline is dangerous, even when mixed with oil. Avoid fire due to smoking or careless maintenance practices.

IMPORTANT: Siphon enough fuel and oil from the tanks to prevent spillage when snowmobile is turned on its side.

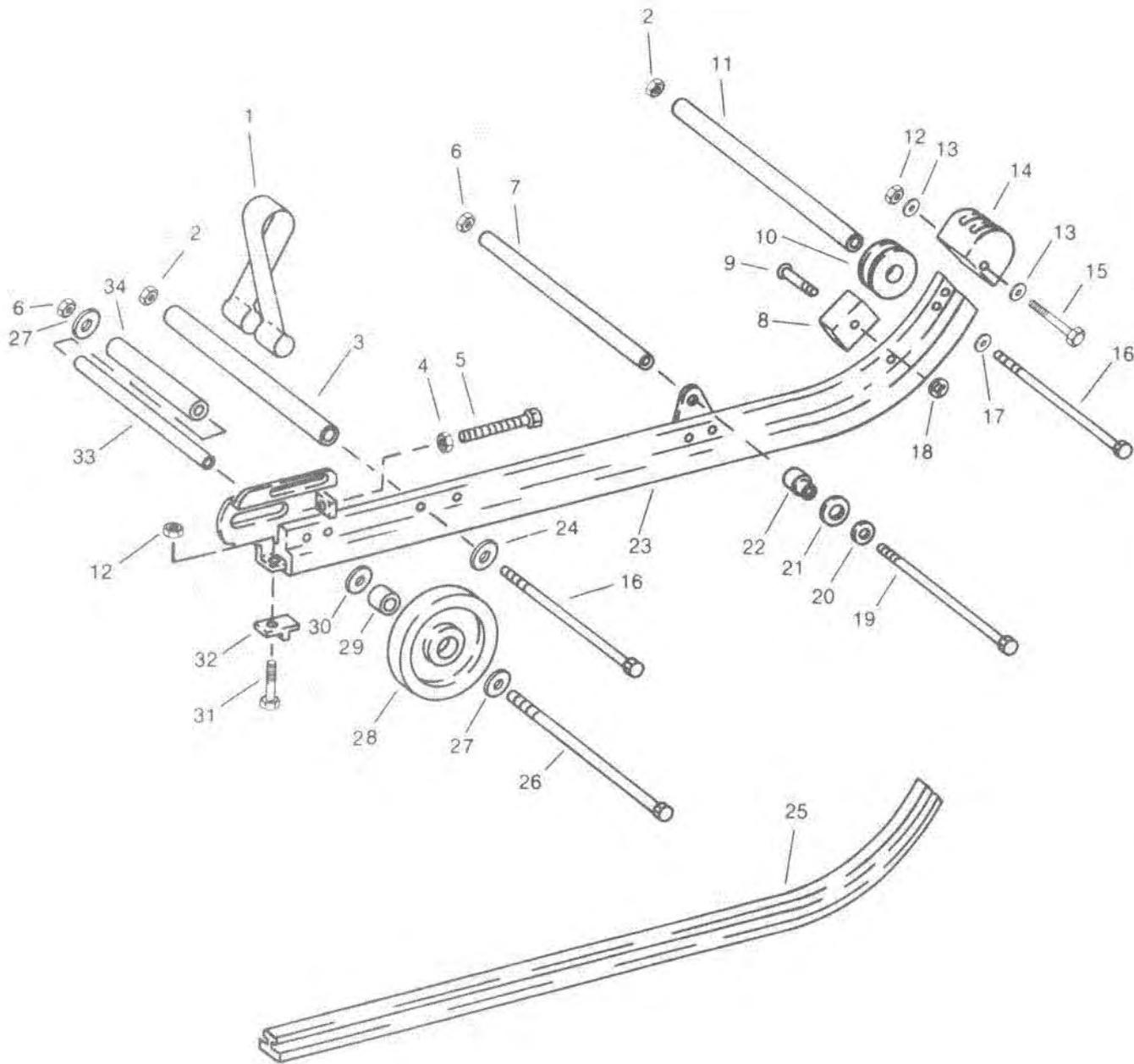
2. Turn snowmobile on its side and remove suspension.



M30077/60100/B/100982

Slide Suspension

DISASSEMBLE SUSPENSION



- 1 - Strap
- 2 - Nut
- 3 - Spacer
- 4 - Nut
- 5 - Cap Screw
- 6 - Lock Nut
- 7 - Bushing
- 8 - Bumper
- 9 - Rivet

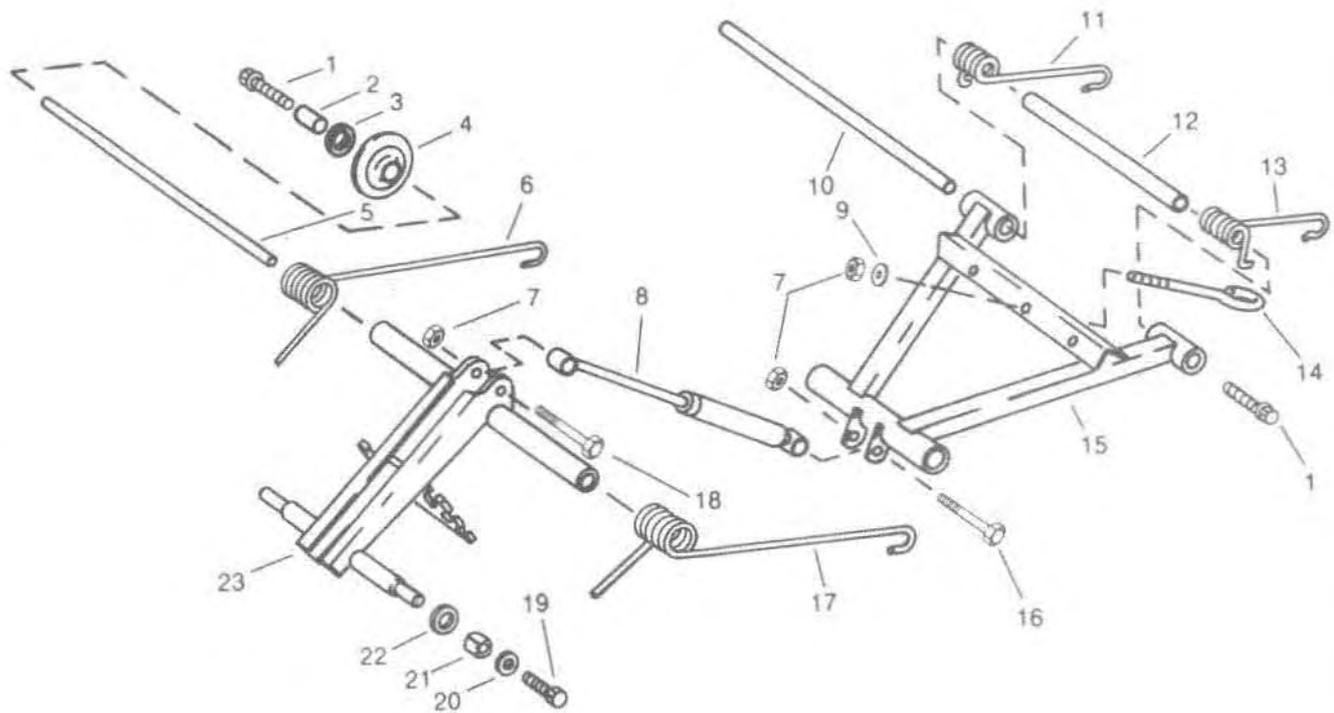
- 10 - Bearing
- 11 - Bushing
- 12 - Lock Nut
- 13 - Washer
- 14 - Cover
- 15 - Cap Screw
- 16 - Cap Screw
- 17 - Washer

- 18 - Snap Ring
- 19 - Cap Screw
- 20 - Washer
- 21 - Washer
- 22 - Spacer
- 23 - Rail
- 24 - Washer
- 25 - Runner
- 26 - Cap Screw

- 27 - Washer
- 28 - Wheel
- 29 - Spacer
- 30 - Washer
- 31 - Cap Screw
- 32 - Stop
- 33 - Spacer
- 34 - Spacer

M2997/8010D/C/100982

Slide Suspension



- 1 - Self-Locking Screw
- 2 - Spacer
- 3 - Washer
- 4 - Idler
- 5 - Bushing
- 6 - Spring
- 7 - Nut
- 8 - Absorber

- 9 - Washer
- 10 - Pin
- 11 - Spring
- 12 - Bushing
- 13 - Spring
- 14 - Eyebolt
- 15 - Arm
- 16 - Bolt

- 17 - Spring
- 18 - Bolt
- 19 - Cap Screw
- 20 - Washer
- 21 - Bearing
- 22 - Washer
- 23 - Arm

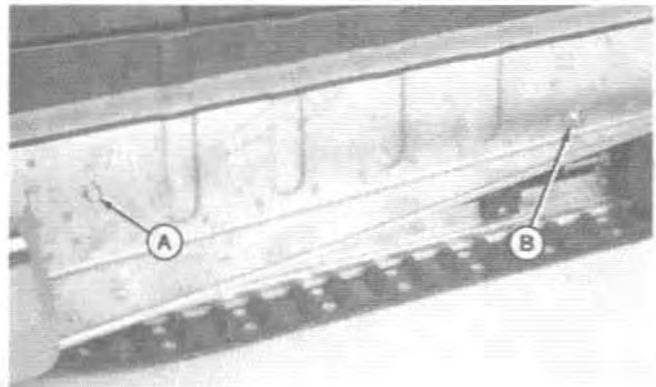
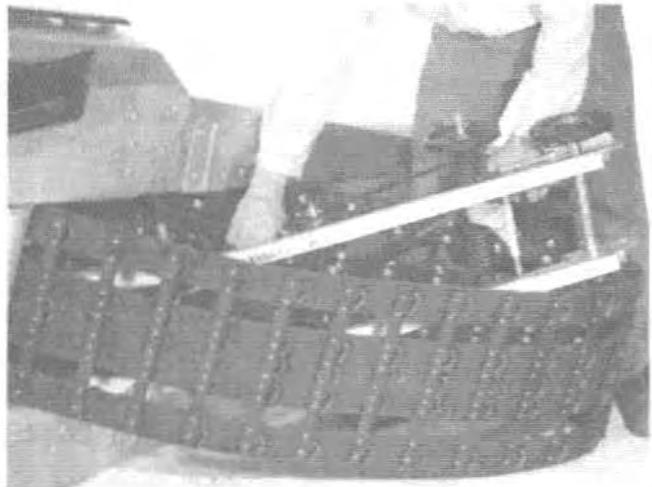
M2998B60100/C1/100962

INSTALL SUSPENSION

1. Position suspension in tunnel.
2. Install front two cap screws (A), then two rear cap screws (B). Tighten all four cap screws securely.

NOTE: It is important to keep these four screws tight. Check and tighten them periodically.

3. Check track tension.



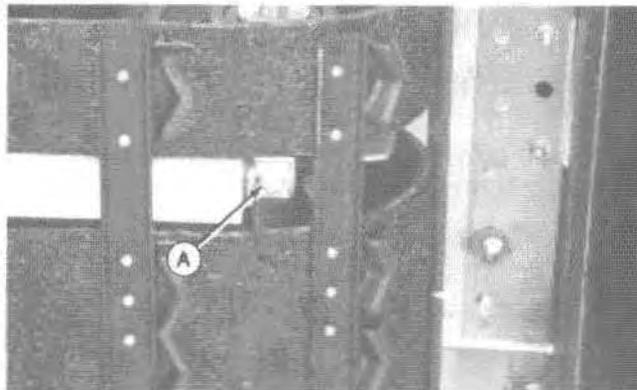
M30077/M30087/6010D/C2/100982

REPLACE SLIDE SUSPENSION WEAR BARS

CAUTION: Gasoline is dangerous, even when mixed with oil. Avoid fires due to smoking or careless maintenance practices.

IMPORTANT: Siphon enough fuel from the tank to prevent spillage when snowmobile is turned on its side.

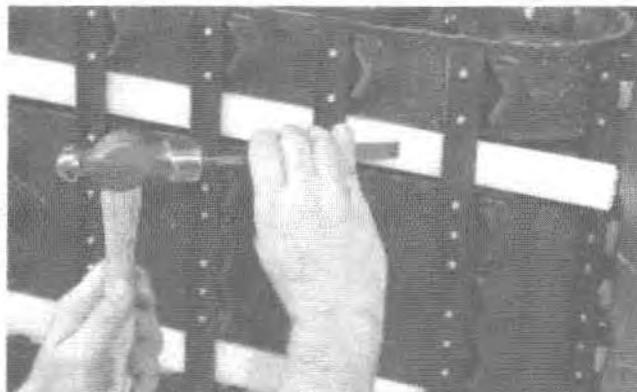
1. Turn snowmobile on its side.
2. Loosen track tension.
3. Remove wear bar retainer (A) from rear of slide rail.



M30088/60100/D/100982

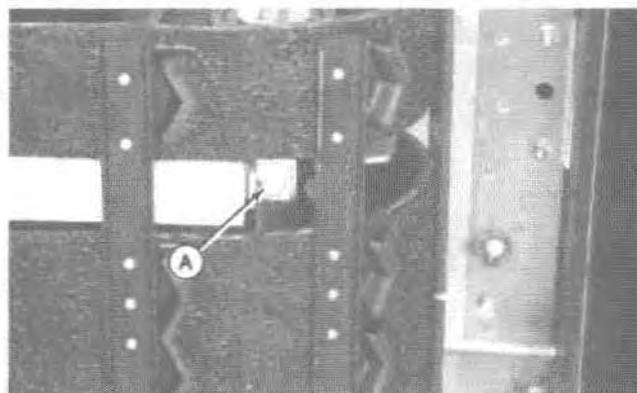
4. Rotate track until wear bar lines up with opening at rear of snowmobile.
5. Drive wear bar from slide rail with a hammer and cold chisel.

NOTE: When wear bar is worn through to slide rail, it may be necessary to remove suspension to replace wear bars.



M30089/60100/E/100982

6. Lubricate slide rail and wear bar with liquid soap solution.
7. Slide new wear bar in from rear. Drive in place with a soft mallet.
8. Install wear bar retainer (A).
9. Adjust track tension.



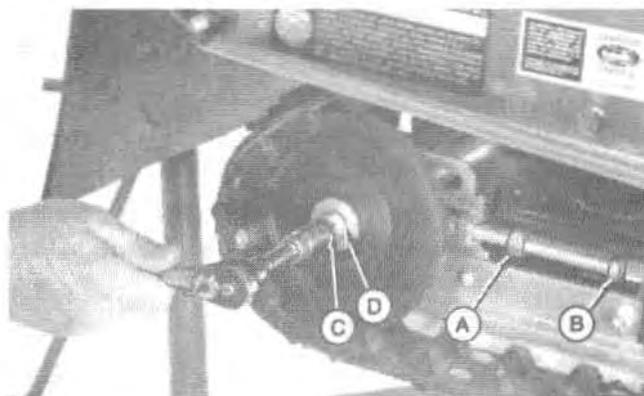
M30088/60100/F/100982

REPLACE REAR IDLER WHEELS AND AXLE

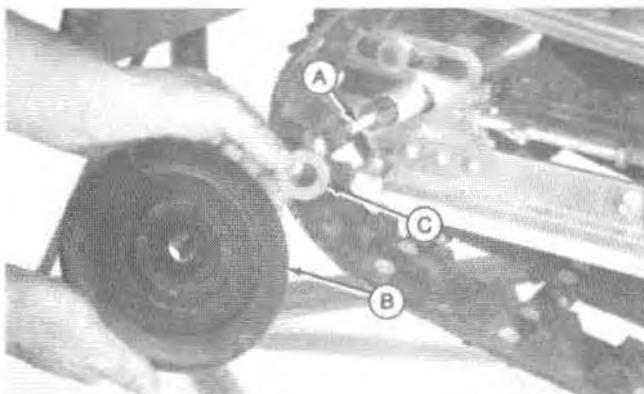
1. Suspend or support snowmobile so track is clear of ground.
2. Loosen jam nut (A) and completely back off track adjusting screw (B) on both sides of track.
3. Remove nut (C) and washer (D).

A - Jam Nut
B - Adjusting Screw

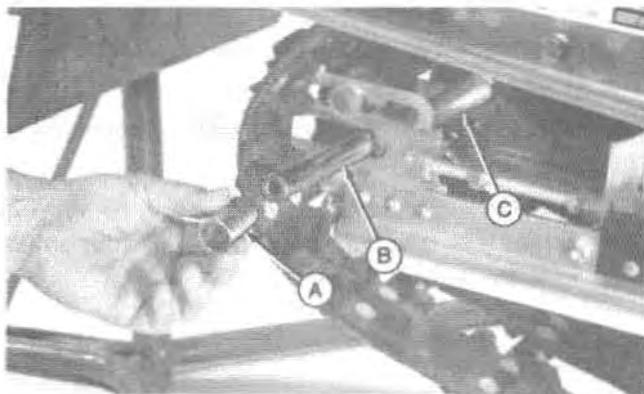
C - Nut
D - Washer



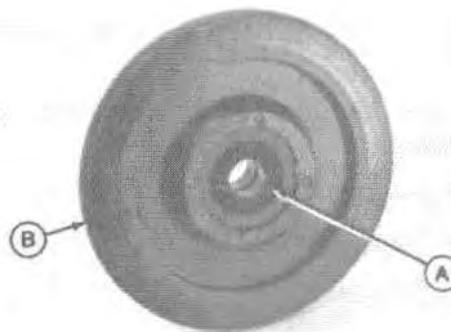
4. Remove three cap screws (A) and washer.
5. Remove idler wheel (B) from each side of track. Washer (C) will come off with wheel (B).



6. Remove spacer (A) from each side of axle shaft (B).
7. Remove axle shaft (B) and spacer (C).

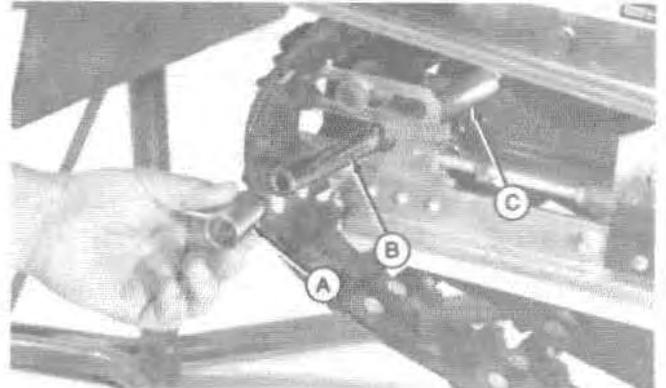


8. Inspect wheel bearing (A). Replace idler wheel (B) if bearing is worn.



Slide Suspension

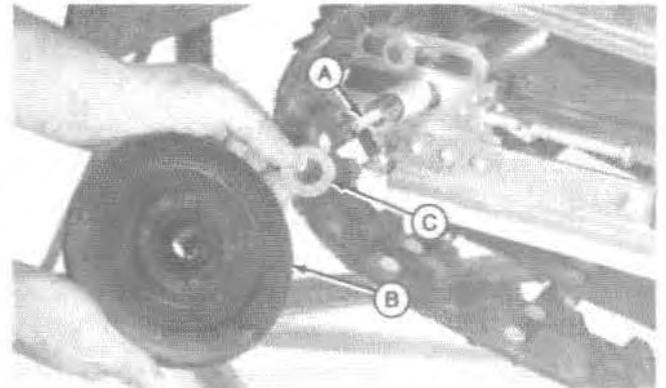
9. Install spacer (C) and axle shaft (B).
10. Install spacer (A) on each side of axle shaft (B).



M3003256102/M100980

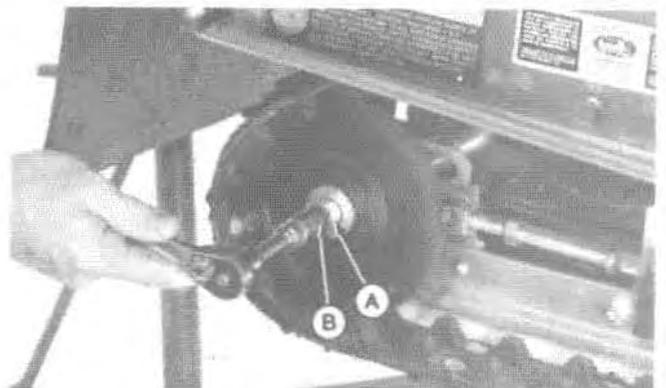
NOTE: Idler wheel (B) goes on shaft one way only. Shaft does not go all the way through idler wheel. If wheel does not go on shaft, turn wheel around and install.

11. Install washer (C) and idler wheel (B) on each side of track.
12. Install washer and through cap screw (A).



M3009480100/M100980

13. Install washer (A) and nut (B). Do not tighten nut.
14. Adjust track tension.

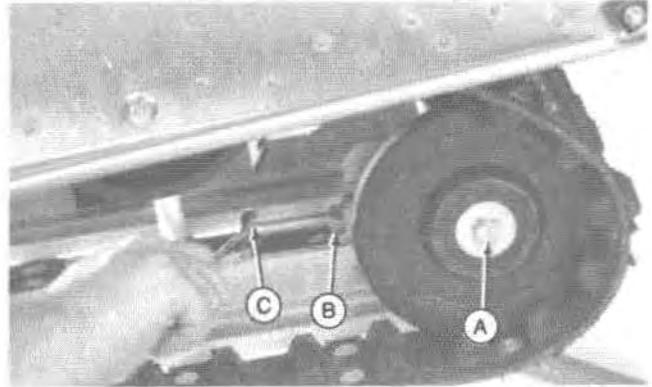


M3009480100/M100980

ADJUST TRACK TENSION

1. Suspend or support snowmobile so track is clear of ground.
2. Loosen rear idler wheels through bolt (A).
3. Loosen jam nuts (B). Turn adjusting screws (C) to tension track.
4. Measure below the lower shock absorber mount for clearance of flush to 6.35 mm (1/4 in.) between track and slide wear bar. Both sides should be equal. Tighten jam nuts (B).
6. Tighten bolt (A) to 34 N·m (25 lb-ft).
7. Start engine and allow track to rotate slowly several times. Turn off engine and allow track to coast to a stop. **DO NOT APPLY BRAKE TO STOP TRACK.**
8. Check alignment. Rear idler wheels should run in center of drive lugs.
9. Slide rail wear bar should be in middle of each slide rail opening of track.
10. If either Step 8 or 9 indicates a need for adjustment, repeat adjustment procedure.

NOTE: Track will run to the loose side. If track is too far to the left, tighten the left adjusting screw to move the track to the right.

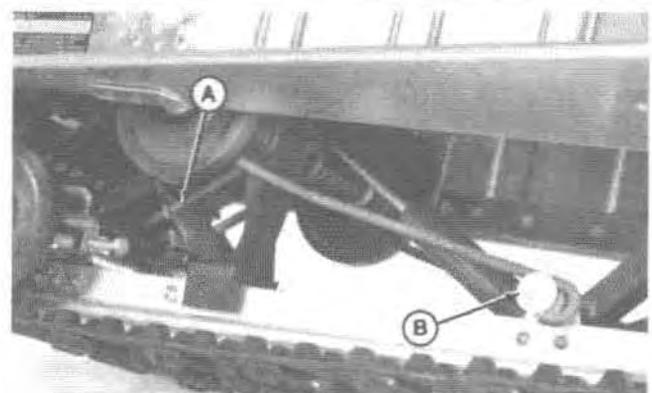


M30095-60100/IN/100962

ADJUST REAR SUSPENSION SPRINGS

Rear suspension springs (A) are in the middle position when assembled at the factory. Ride the snowmobile. If ride needs to be stiffer, move the springs to the upper position. If the ride needs to be softer, move the springs to the lower position.

NOTE: To change spring position, remove long arm of spring from front retainer (B), and pull out and down. Move short arm of spring to desired position and replace long arm on retainer.

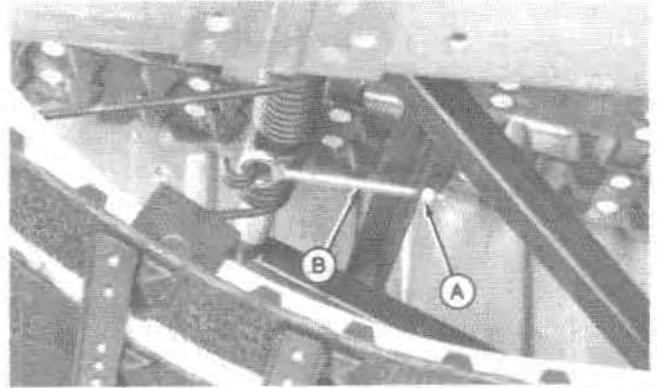


M29156/R01000/100962

ADJUST FRONT SUSPENSION SPRINGS

IMPORTANT: Never turn adjusting nut (A) all the way out. Screw (B) must protrude at least 12.7 mm (1/2 in.) through adjusting nut (A).

1. Turn adjusting nut (A) counterclockwise to reduce tension, clockwise to increase tension.
2. In deep snow (for more lift) increase tension. In light snow (for more steering control) reduce tension.



M30095A0100/P/100982



TRACK FAILURES COVERED UNDER WARRANTY

PLY SEPARATION

Ply separation is identified by parting of the rubber from the tensile cords on any of the three belts.

TRACK STRETCH

Track stretch occurs only on a used track. The first indication of track stretch is lack of adjustment on the track-adjusting screws. Remove the track and lay it flat. Measure ten pitches on the track. This distance should not exceed 56.12 m (22.15 in.).

NOTE: A pitch is the distance (center-to-center) from one drive lug to the other.

6D15D/A/100982

NON-WARRANTY TRACK FAILURES

OBSTRUCTION DAMAGE

Cuts, slashes or gouges in the track are caused by obstructions such as glass, sharp rocks, or buried steel. Damage will occur during rapid acceleration or side-skidding over foreign objects.

If the grouser bar is bent, broken, cracked or torn from the track due to buried objects, obstructions or road hazards, neither repair nor replacement will be considered for warranty.

When the grouser bar is torn from the track, rubber will be torn away and adhere to the bar.

WORN GROUSER BARS

Grouser bars wear from operating on rough and dry terrain such as non-covered fields, railroads, and highway roadsides, gravel roads and other non-approved snowmobile field conditions.

The suspension wear bar becomes hot. Sand, dirt and grit become imbedded in the wear bar causing wear on the grouser bars. The suspension wear bars must be replaced when this condition occurs.

LUG DAMAGE

Lug damage to the sides or rear edges of the lug is usually caused by lack of snow lubrication. Excessive track tension and dirt or soil (summer operating conditions) entering the drive mechanism are also frequent causes.

RACHETING DAMAGE

Racheting damage to the top of the lugs is caused by loose track tension, pulling too great a load, or frequent prolonged periods of rapid acceleration.

OVER-TENSION DAMAGE

Too much track tension causes excessive friction between the suspension wear bars and the grouser bars. The wear bars will melt and adhere to the grouser bars.

The first indication of this condition is the track may "stick" or have a tendency to "lock-up", causing loss of engine horsepower.

LOOSE TRACK DAMAGE

Operating a track too loose causes the outer edge to flex too much resulting in cracks in the outer belts. Some wear on the driving lugs will also occur. Riding double (excessive weight) can also cause the track to flex and break the edge.

IMPACT DAMAGE

Impact damage will cause the rubber on the tread side to open up allowing the cords to become visible. This may happen in more than one place.

EDGE DAMAGE

Edge damage is the fault of the operator. The most frequent cause is tipping the snowmobile on its side to clear the track, allowing the track to come in contact with an abrasive surface.

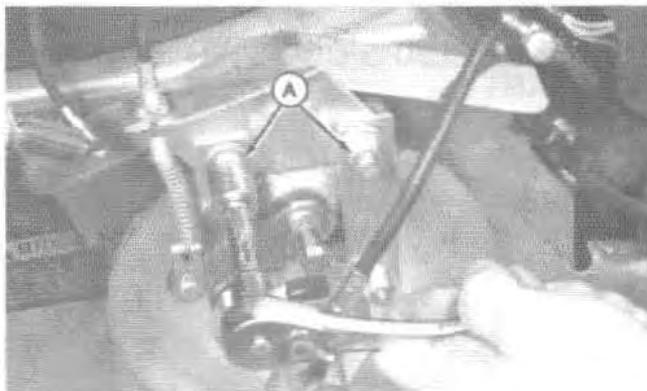
BROKEN GROUSER BAR

Grouser bar breakage is normal and expected in the center belt area of the track. Grouser bars are notched to determine the fatigue area for breakage. If the grouser bar breaks but remains secure to the track, it is not necessary to replace the grouser bar.

6D15D/B/100982

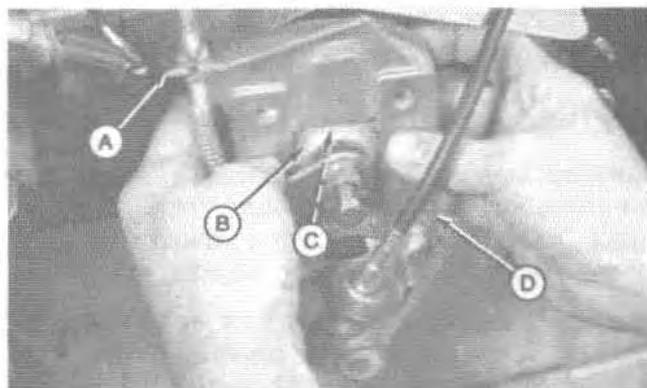
REMOVE TRACK

1. Remove muffler.
2. Remove nuts (A).



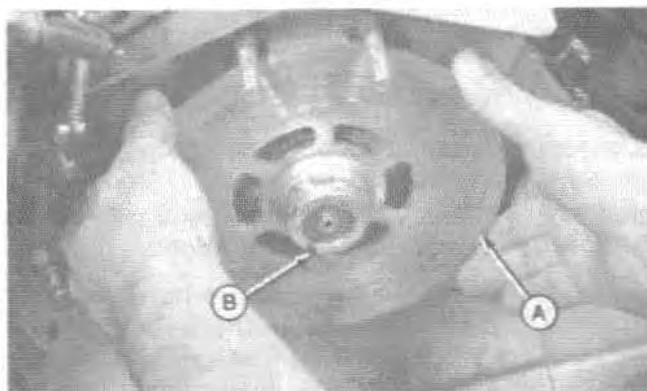
M30074/6015D/G/100982

3. Remove bracket (A), puck body (B) and puck (C).
4. On Sprintfire Snowmobile, remove speedometer bracket (D). Use care as bracket (D) is removed. Speedometer drive cable will come off with bracket (D).



M30075/6015D/H/100982

5. Remove brake disk (A) with spring (B). Do not lose woodruff key as disk (A) comes off.



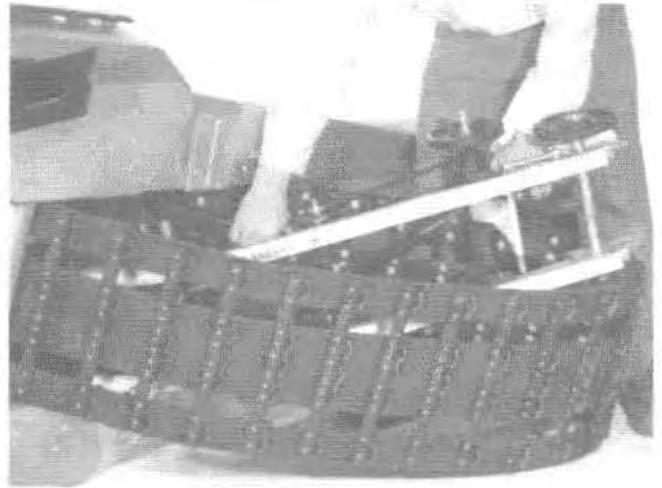
M30076/6015D/I/100982

6. Remove belt guard and drive belt.
7. Remove cap screw, washer and spacers. Remove driven sheave and key.



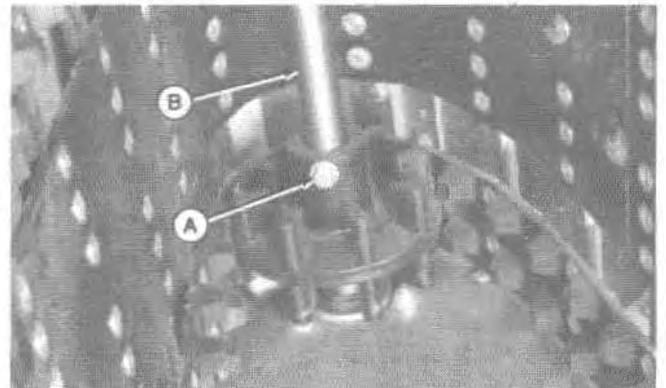
M30072/6015D/F/100982

8. Remove suspension.



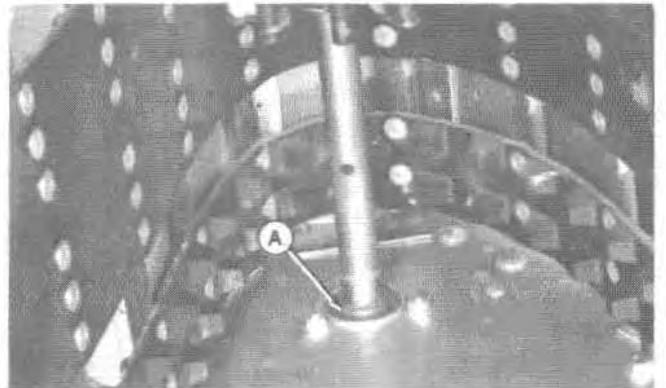
M30077R015D/G/100982

9. Remove bolt (A) securing right-hand drive wheel (B) to shaft. Slide wheel to left side of tunnel.



M30078R015D/H/100982

10. Remove right-hand bearing (A) from tunnel.
11. Slide drive shaft assembly to the right side of tunnel and remove shaft.



M30079R015D/I/100982

12. Remove track.



M3009760150/P100982

REPAIR TRACK

NOTE: Bent or broken grouser bars can be replaced individually. If a grouser bar is broken in the center, but is still securely attached to the belts, it need not be replaced.

1. Remove grouser bar rivets.
2. Position new grouser bar.



M2272560150/P100982

3. Install bolts from the inside (drive lug side of the track) with nut to the outside.
4. Tighten nuts securely and then peen the bolt tight against the nut.



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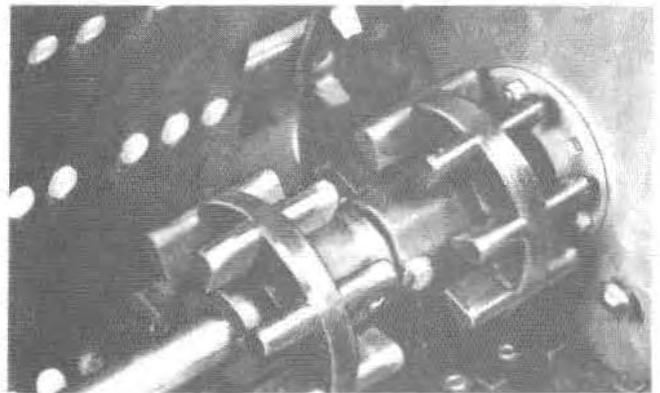
INSTALL TRACK

1. Place track in tunnel.



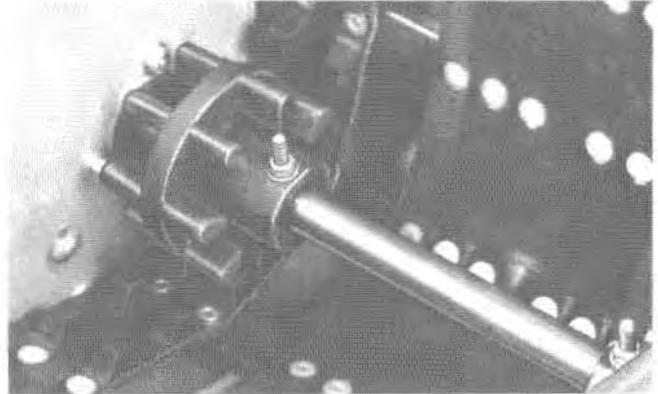
M300576515D/N/100982

2. Install drive shaft in left-hand bearing.



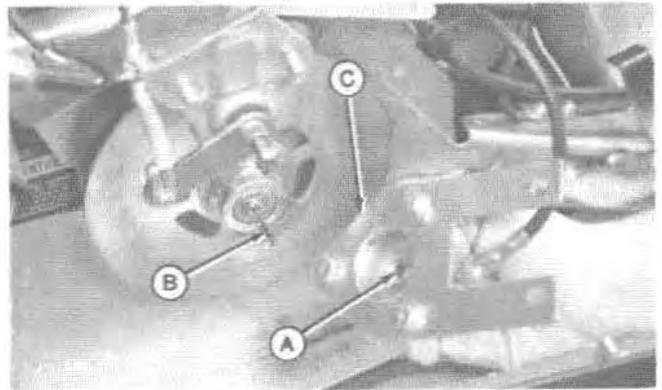
M2259415015D/L/100982

3. Install right-hand bearing assembly with locking flange of bearing toward inside of tunnel.
4. Secure right-hand drive wheel to shaft. Be sure teeth of both drive wheels are aligned with each other.
5. Install suspension.
6. Place woodruff key in drive shaft. Install flat spring in disk. Install brake disk.
7. Install brake puck body with backing plate and puck.
8. Install shims and driven sheave. Check belt alignment.
9. Tension track.



M2055C6015D/M/100982

10. On Sprintfire Snowmobile, engage speedometer drive (A) with drive shaft (B). Install bracket (C).



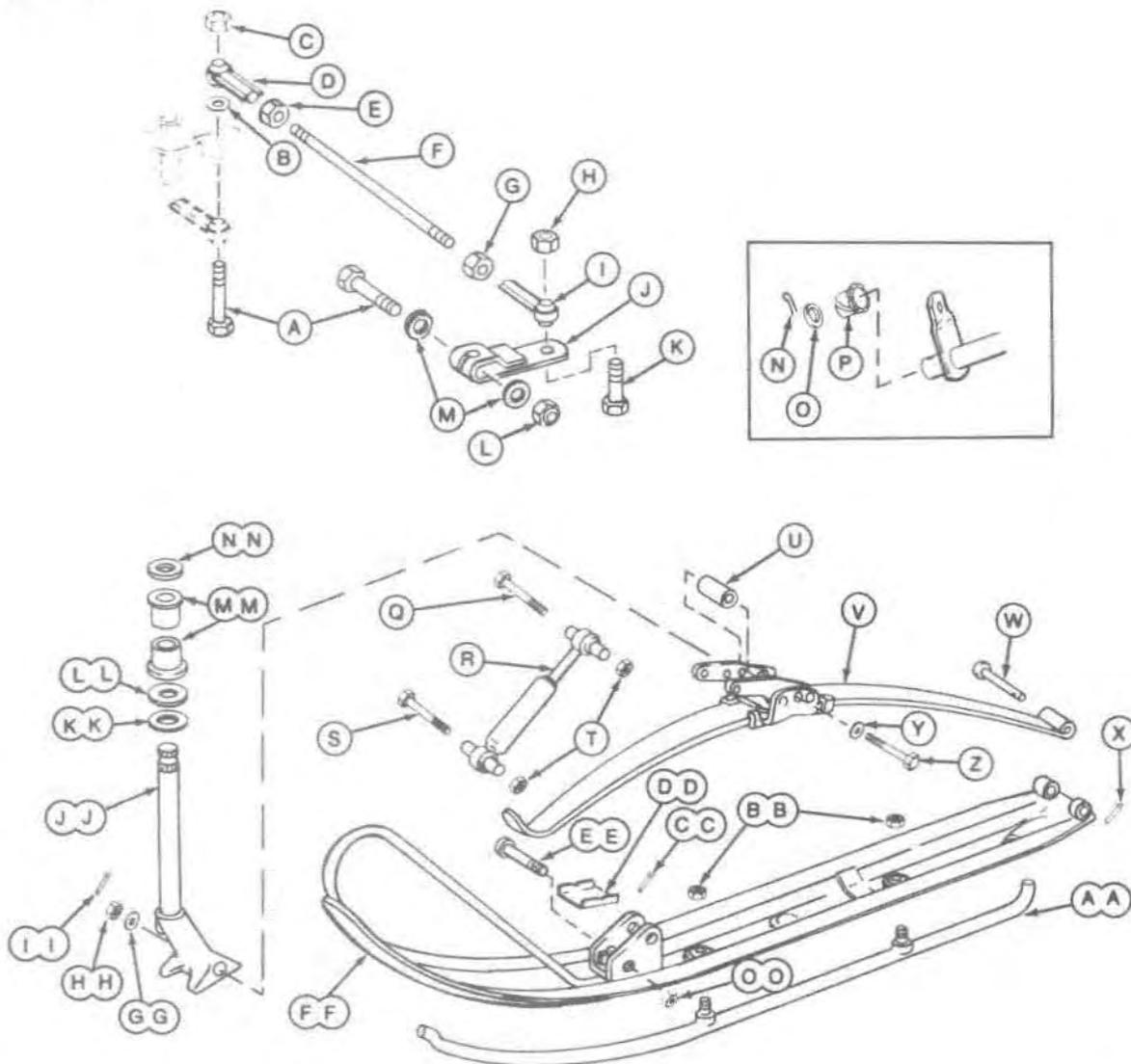
M20081R015D/N/100962

11. Install and tighten nuts (A).
12. Install muffler.
13. Check brake adjustment, Section 50.



M20074R015D/D/100982

SKI REPAIR



- A - Cap Screw
- B - Washer
- C - Lock Nut
- D - L.H. Rod End Bearing
- E - Nut (L.H. Threads)
- F - Tie Rod
- G - Nut (R.H. Threads)
- H - Lock Nut
- I - R.H. Rod End Bearing
- J - Steering Arm
- K - Cap Screw
- L - Lock Nut
- M - Flat Washer
- N - Cotter Pin

- O - Washer
- P - Nylon Bushing
- Q - Cap Screw
- R - Shock Absorber
- S - Cap Screw
- T - Lock Nuts
- U - Pivot Bushing
- V - Ski Spring
- W - Rear Spring Pin
- X - Cotter Pin
- Y - Washer
- Z - Ski Pivot Bolt
- AA - Wear Rod
- BB - Lock Nuts

- CC - Cotter Pin
- DD - Wear Plate
- EE - Front Spring Pin
- FF - Ski
- GG - Washer
- HH - Lock Nut
- II - Cotter Pin
- JJ - Spindle
- KK - Washer
- LL - Washer
- MM - Spindle Bushing
- NN - Washer
- OO - Nut

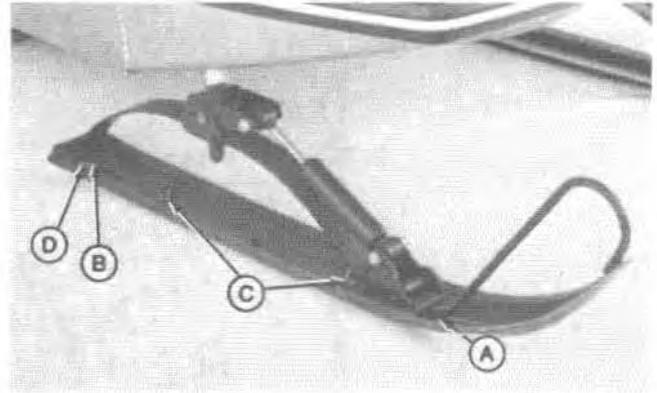
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REPLACE SKI WEAR RODS

1. Remove lock nuts (C). Pry wear rod (B) down to free studs from holes.
2. Slide rod forward to free rod from rear hole (D).
3. Place front of new wear rod in position through front hole (A). Slide wear rod to position studs and rear of rod. Install and tighten lock nuts (C).

A - Front Hole
B - Wear Rod

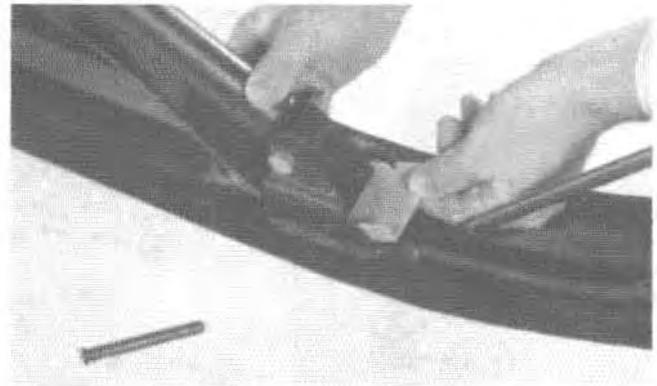
C - Lock Nuts
D - Rear Hole



REPLACE WEAR PLATES

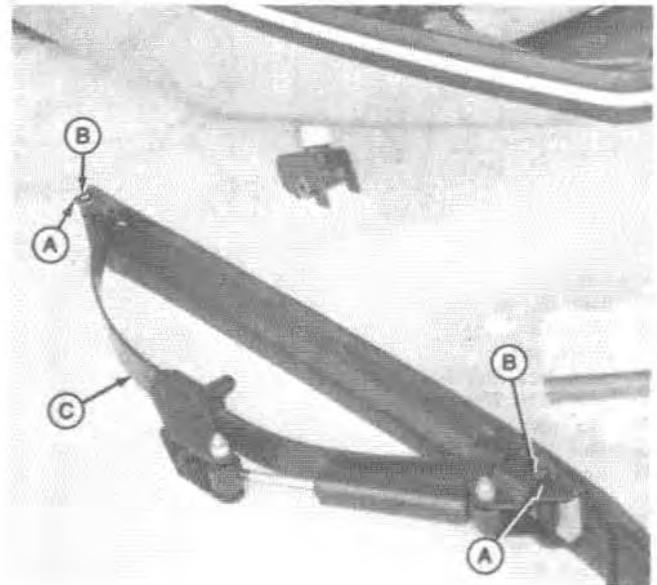
NOTE: Ski spring does not have to be removed to replace wear plate.

1. Remove cotter pin and drilled pin securing end of ski spring. Lift spring up and remove wear plate.
2. Install new wear plate. Position spring and install drilled pin and cotter pin.



REPLACE SKI SPRING

1. Remove ski from ski spindle.
2. Remove cotter pins (A) and drilled pins (B) securing spring assembly (C) to the ski.
3. Install new wear plate if necessary. Install new spring assembly to ski.
4. Attach ski assembly to spindle with cap screw, washer and lock nut. Torque nut to 53 N·m (39 lb-ft).



REPLACE SKI SPINDLES AND BUSHINGS

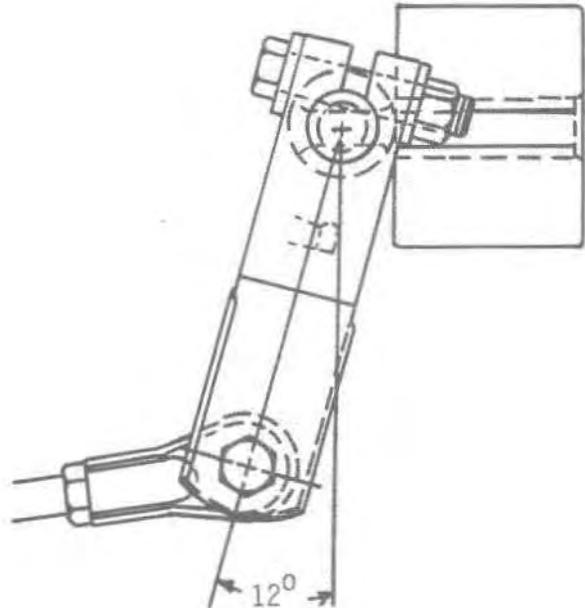
1. Remove ski and spring assembly.
2. Remove hardware securing the steering arm to the spindle.
3. Remove the spindle.
4. Use a drift punch to remove bushings. Drive lower bushing out from the top. Reverse procedure to remove the upper bushing.
5. Install new bushing until it bottoms on frame. Do not crack or distort bushing during installation.
6. Install washer on spindle and install spindle from the bottom.
7. Install steering arm and upper washers if needed and secure with hardware.
8. Install ski and spring assembly. Torque nut to 53 N·m (39 lb-ft).



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REPLACE STEERING ARMS

1. Position handlebars and skis to point straight ahead.
2. Remove muffler.
3. Remove belt guard, drive belt and drive sheave.
4. Disconnect tie rod from the steering arm.
5. Remove hardware securing steering arm to spindle and remove arm.
6. Install steering arm with rear of arm angled in 12° as shown.
7. Secure steering arm to spindle.
8. Connect tie rod and align skis.
9. Install muffler, drive sheave, drive belt and belt guard.



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REPLACE TIE ROD

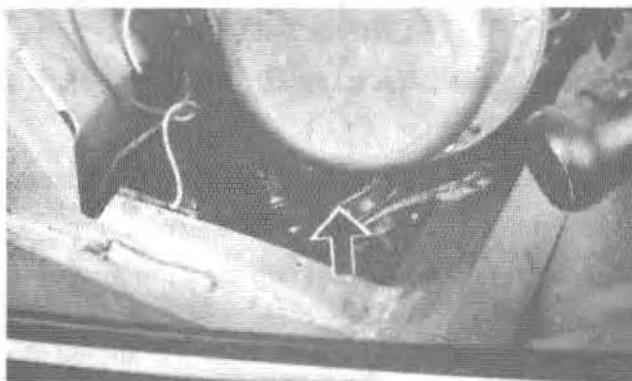
1. Remove tie rod from the steering arm and steering post.
2. Install new tie rod. Connect gold-colored end to left-hand steering arm and silver-colored end to right-hand steering arm. Silver color indicates right-hand threads, gold-color indicates left-hand threads.
3. Align skis.



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REPLACE STEERING POST AND BUSHINGS

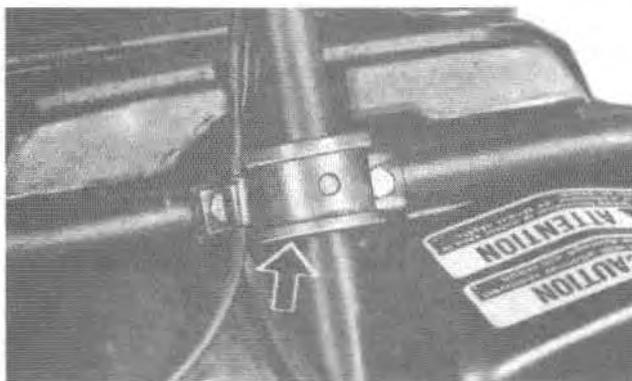
1. Loosen set screws and slide throttle and brake control handgrips off handlebars.
2. Remove muffler, muffler bracket, recoil starter, flywheel and flywheel housing.
3. Disconnect tie rods from steering post.
4. Remove cotter pin and washer from bottom of steering post.



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5. Remove upper bushing.
6. Pull up to remove steering post.
7. Install in opposite sequence.

NOTE: Replace worn or damaged bushings.

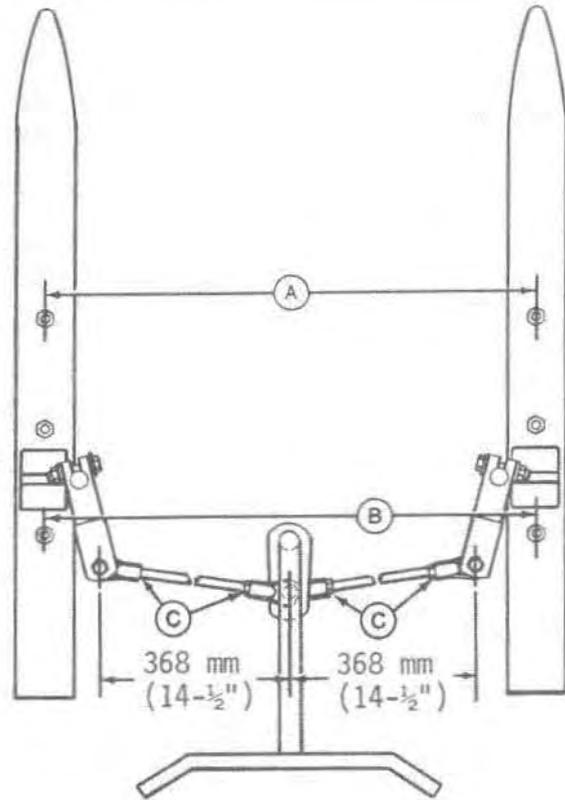


2A3M2275E WZL002 P 12042

ALIGN SKIS

1. Raise front of snowmobile to remove weight from skis. Point handlebars straight ahead.
2. Measure for equal distance over the front and rear wear rod nuts (A and B).
3. To adjust, remove muffler and drive belt.
4. Loosen jam nuts (C) on each end of both tie rods. Rotate tie rods to align skis. Tighten jam nuts when skis are aligned. Hold tie rod with vice grips when tightening jam nuts. This prevents stripping threads in ball joint.

IMPORTANT: When adjusting tie rods, length from center hole to center hole should not exceed 368 mm (14-1/2 in.). After jam nuts are tight, be sure tie rod ends swivel freely.



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ELIMINATE LOOSE STEERING

Two major causes of loose steering are:

1. Worn tie rod ends.
2. Worn spindle bushings.

CAUTION: Check steering components and hardware frequently for condition and tightness.

Replace worn parts.

M228025 K 120681



SPECIFICATIONS

Tie Rod Bolt-to-Steering Post.....	43 to 51 N·m (32 to 38 lb-ft)
Steering Arm-to-Spindle Bolt.....	30 to 38 N·m (22 to 28 lb-ft)
Tie Rod Jam Nuts.....	11 to 16 N·m (8 to 12 lb-ft)
Tie Rod End Bearing Center Distance.....	368 mm (14-1/2 in.)
Ski Mounting Cap Screw.....	53 N·m (39 lb-ft)

6025D/A*100982



Section 70 SERVICE TOOLS

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JDM-109A Mikuni Carburetor Tool Kit.....	70-10-02



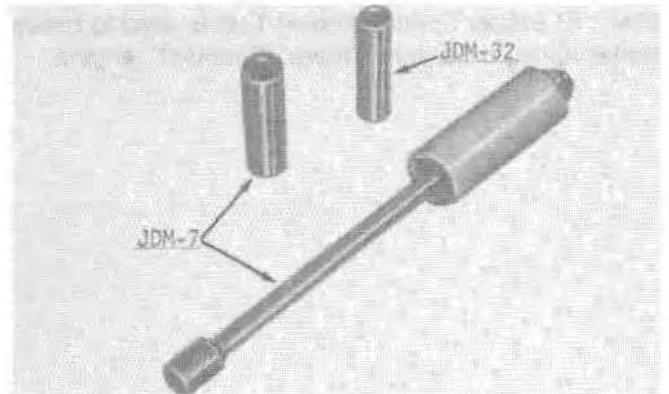
The essential tools listed in this group will service the John Deere Sprintfire and Snowfire Snomobiles. These essential tools are required for all snowmobile dealers. They can be ordered from:

Service Tool Division
Owatonna Tool Co.
P.O. Box 314
Owatonna, Minn. 55060

TC053/A/1009#2

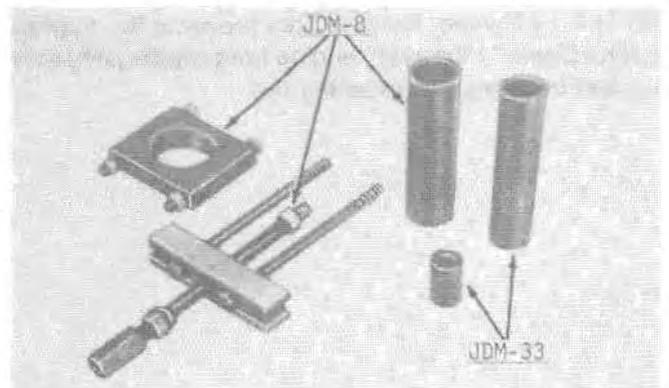
ENGINE TOOLS

JDM-7 Piston Pin Service Set is used to remove and install piston pins.



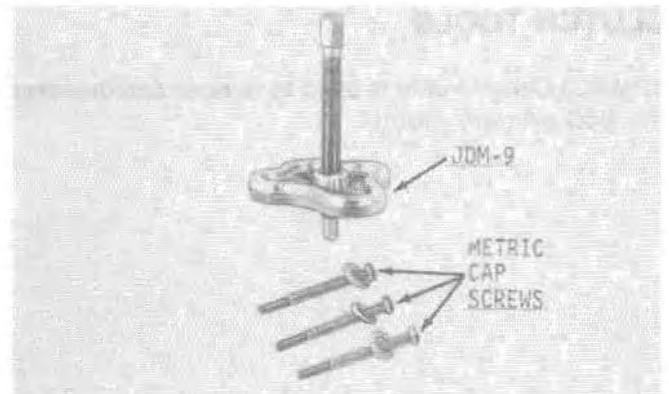
2AAM12482 NY M02-7005 BE 120681

JDM-8 Crankshaft Bearing Service Set and JDM-33 Bearing Tool Adapter Kit are used to remove and install the crankshaft bearings.



2AAM12846 NY M02-7005 C 120681

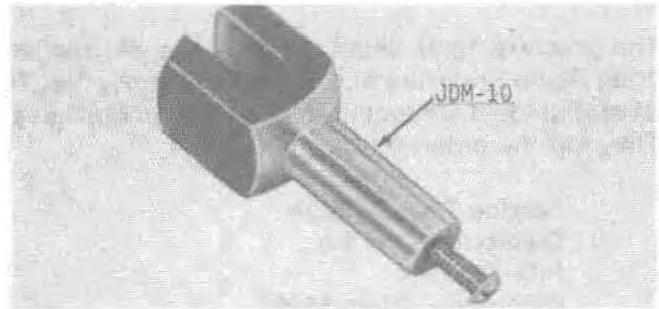
JDM-9 Flywheel Puller Assembly includes metric cap screws and washers to remove the flywheel.



2AAM12847 NY M02-7005 C 120681

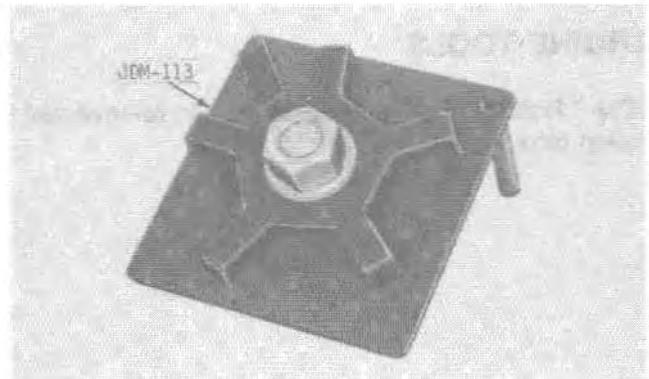
Essential Service Tools

JDM-10 Dial Indicator Mounting Bracket is used with JDM-15 Dial Indicator or equivalent to measure crankshaft runout.



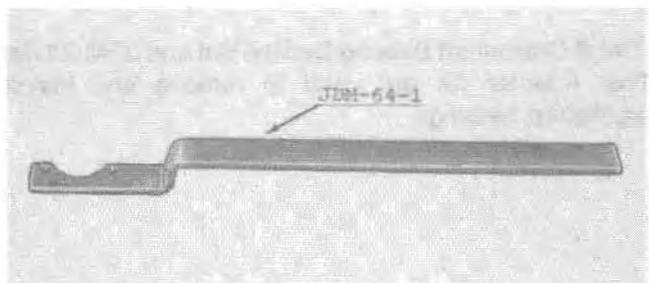
2AS-M12474 NY M027000 E 120681

JDM-113 Starter Spring Winding Tool is used to rewind the starter spring on a John Deere "Fireburst" engine.



2AS-M11473 Y M027000 H 120681

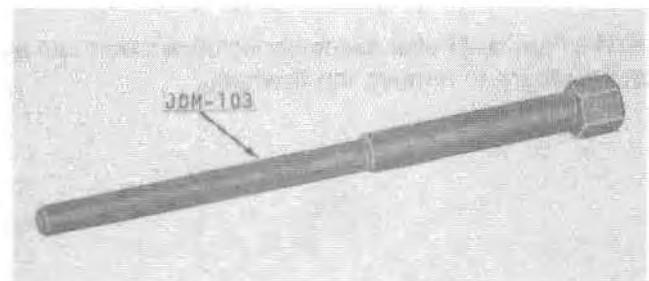
JDM-64-1 Flywheel Holding Tool prevents the flywheel on a John Deere "Fireburst" engine from rotating while removing and installing the retaining nut.



2AS-M18229 NY M027000 I 120681

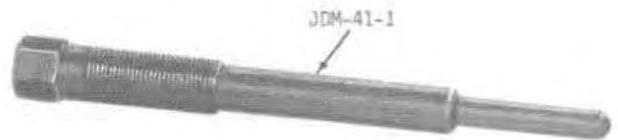
CLUTCH TOOLS

JDM-103 Clutch Puller is used to remove and disassemble the 94C primary clutch.



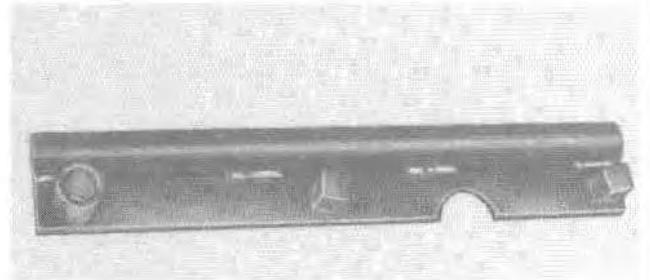
2AS-M22413 Y M027000 J 120681

JDM-41-1 Clutch Puller, is used to remove the 102C drive sheave.



M23674/70550/K/100962

JDG-47 Clutch Aligning Tool is used to accurately align the primary and secondary clutches on a John Deere "Fireburst" engine. This tool checks both center distance and offset simultaneously.



EALMEX316 V M227807 L 120961

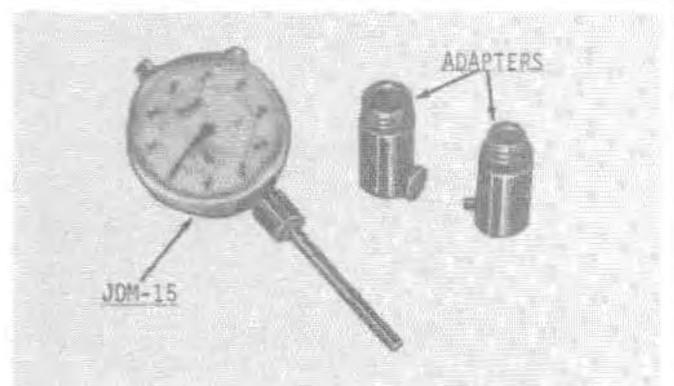
JDG-369 Universal Clutch Alignment Tool accurately aligns the drive and driven clutches on all John Deere snowmobiles.



M21236/70550/P/100962

ELECTRICAL TOOLS

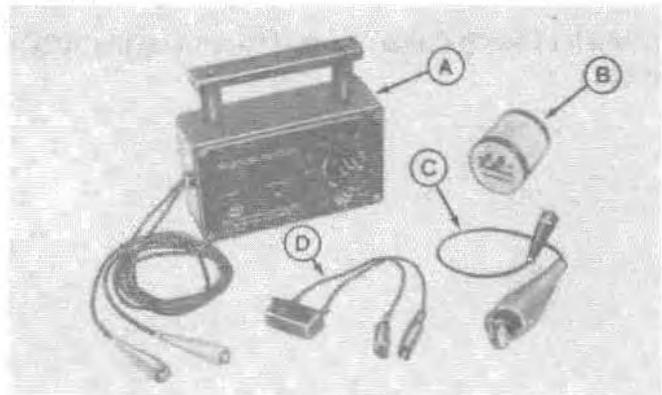
JDM-15 Snowmobile Timing Indicator is a dial indicator graduated in 0.001-inch increments with a 1-inch range and collar for fastening into the 14 mm and 18 mm spark plug hole. The adapters are included. The indicator also can be used with the JDM-10 Mounting Bracket to measure crankshaft runout.



EALM12467 WY M227905 W 120961

JDM-74 Capacitor Discharge Ignition (CDI) Tester consists of the tester (A), test simulator (B), test adapter (C) and load coil (D). The tester measures peak energy output of CDI units, magneto charge and trigger impulses.

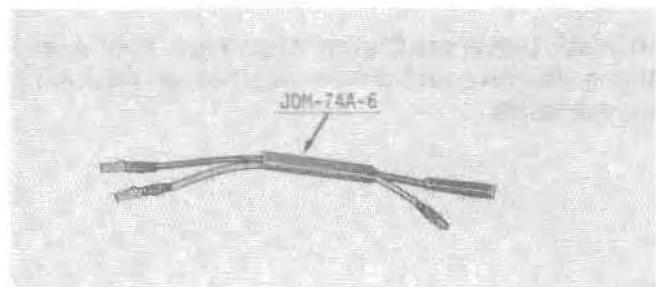
The ignition energy output is referenced against a 0-100 scale on the tester. The tester has two input ranges selected by a toggle switch. The "LOW" range senses AC or DC voltage from 0.5 to 27 volts. The "HIGH" range senses AC or DC voltage from approximately 70 to 500 volts.



A—Tester
B—Test Simulator
C—Test Adapter
D—Load Coil

2AS/M2848 M22/7005 N 120681

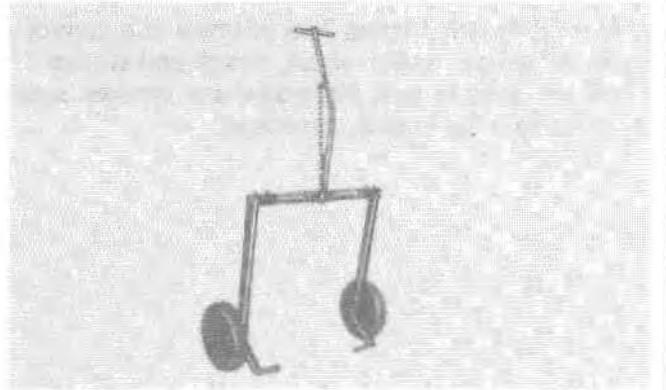
JDM-74A-6 Special Wiring Harness is used with the JDM-74 CD Tester to check magneto output, trigger impulse and CD unit output.



2AS/M23675 Y M22/7005 O 120681

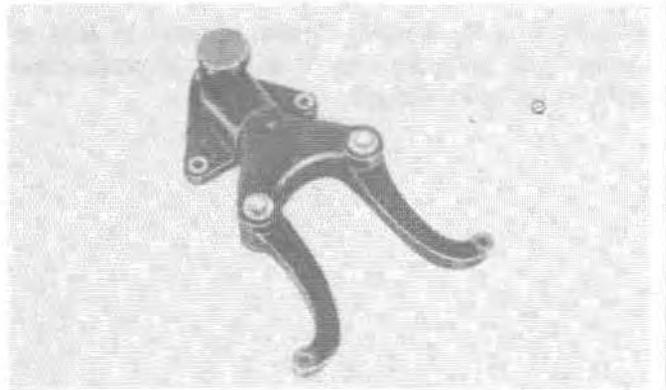
Group 10
CONVENIENCE SERVICE TOOLS

D-0524ST Snowmobile Dolly is used for moving snowmobiles in or out of the service shop or display area.



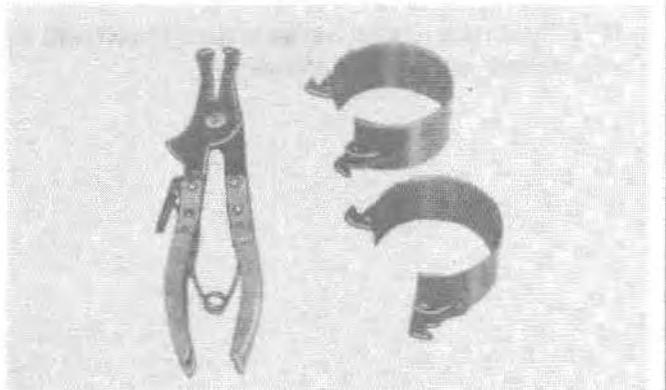
2AS/M18449 M22:7010 A 120481

JDM-16 Bench Mounted Service Fixture is used to mount all consumer product engines as well as hydrostatic units and may other components. Any component weighing 350 pounds or less may safely be rotated 360 degrees with positive stops at 90 degree increments.



2AS/M18450 M22:7010 B 120481

JDM-35 Ring Compressor is a band-type ring compressor with two adapters, usable with piston diameters of 2-1/8 in. to 2-5/8 in.



2AS/M18451 M22:7010 C 120481

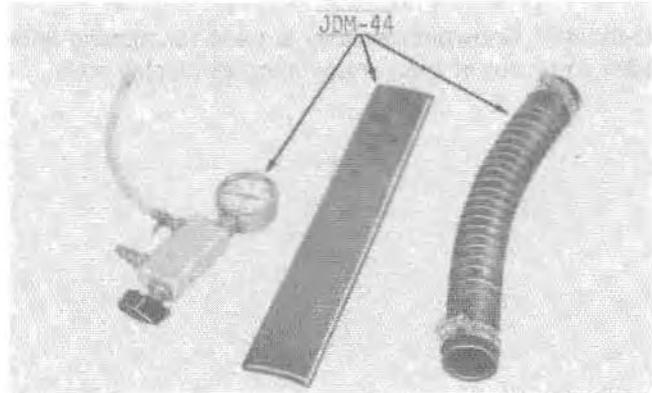
JDM-36 Piston Lock Ring Plier is used to install piston pin lock rings.



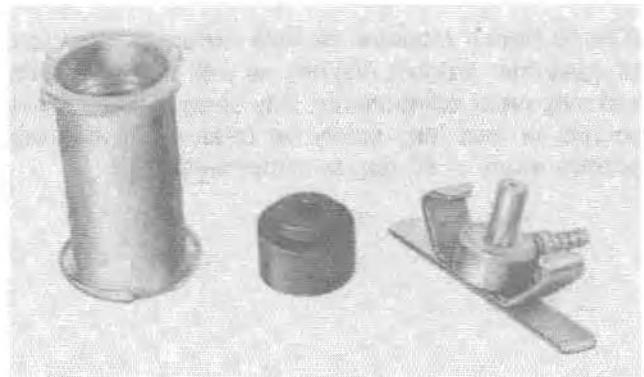
2AS/M12493 NY M22:7010 D 120481

Convenience Service Tools

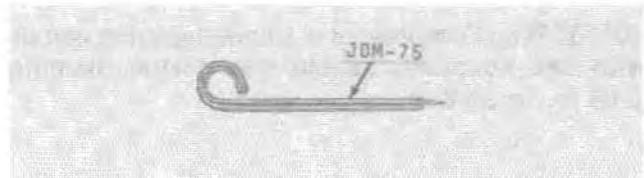
JDM-44 Pressure Testing Tool consists of a control valve, pressure gauge, rubber sheet, hoses and clamps. These items are used to seal the intake and exhaust system to pressure test the engine crankcase.



JDG-56 Cooling System Tester is used to test coolant system and pressure cap. It is used in conjunction with JDM-44 Pressure Gauge.



JDM75 Carburetor Choke Gauge is used to correctly set the choke plunger on Mikuni Carburetors.



JDM-109A Mikuni Carburetor Tool Kit is used for making adjustments on the Mikuni Carburetor.

