Consumer Goods.

JOHN DEERE

# Slide Text
# Snowmobile
# SM – 71


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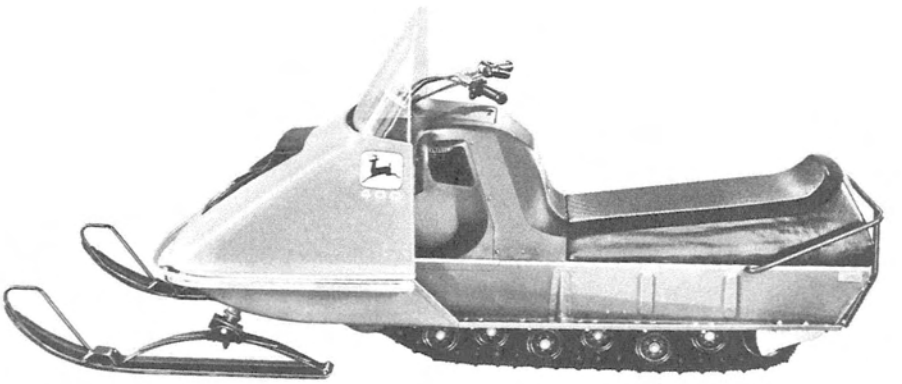
# New John Deere Snowmobiles



For more than 134 years, Deere and Company, Moline, Illinois, has produced quality-built farm and industrial equipment and consumer products designed to provide owners with more leisure time...greater energy at the end of the day...weekend freedom.

Now Deere and Company has announced the introduction of its first recreational vehicles to provide this same market with "fun machines" to use in these well-deserved "free hours"...the John Deere 400 and 500 Snowmobiles.

Carrying the company's familiar green and yellow colors, Deere's new snowmobile will be marketed throughout the United States and Canada by John Deere Consumer Products dealers and John Deere agricultural and industrial dealers who also market the company's line of consumer products.

With Deere's dealer organization and our reputation for quality-built products, we have an enviable position as we enter this new field. Few of the top snowmobile companies can match our parts and service facilities...and this is important in the snowmobile industry.

The John Deere 400 will be powered by a 339 cc. Canadian Curtiss Wright 2-cylinder 2-cycle engine developing 28 horsepower. The 500 has a similar 436 cc engine producing 36 horsepower. Both machines have 15-inch tracks.

With several years of grueling, destructive testing behind them, these snowmobiles have been designed and built to take rough treatment. Outstanding features include an isolated engine to reduce vibration...a variable speed, torque-sensitive transmission...a self-adjusting, oil-bath final drive...a heavy-duty, one-piece molded, polyurethane track...a unique trailing-bogie wheel suspension system.

The 400 and 500 offer peak performance and appearance with their rigid aluminum chassis with obstruction-free running boards...the sleek hood design...and the completely console-enclosed engine.

Safety hasn't been overlooked either. The 5 3/4-gallon steel fuel tank is equipped with a spill tray that lets overflow gasoline drain outside the machine. An energy-absorbing, "wipe-off" seat provides greater operator comfort...lessens chances of injury in event of an accident. The distortion-free windshield is shatter-proof. Drive and driven sheaves are protected with shields, hood and console. Controls are easy-to-reach and easy-to-operate. And in the event of a throttle freeze-up, you can stop the engine instantly with an emergency stop switch.

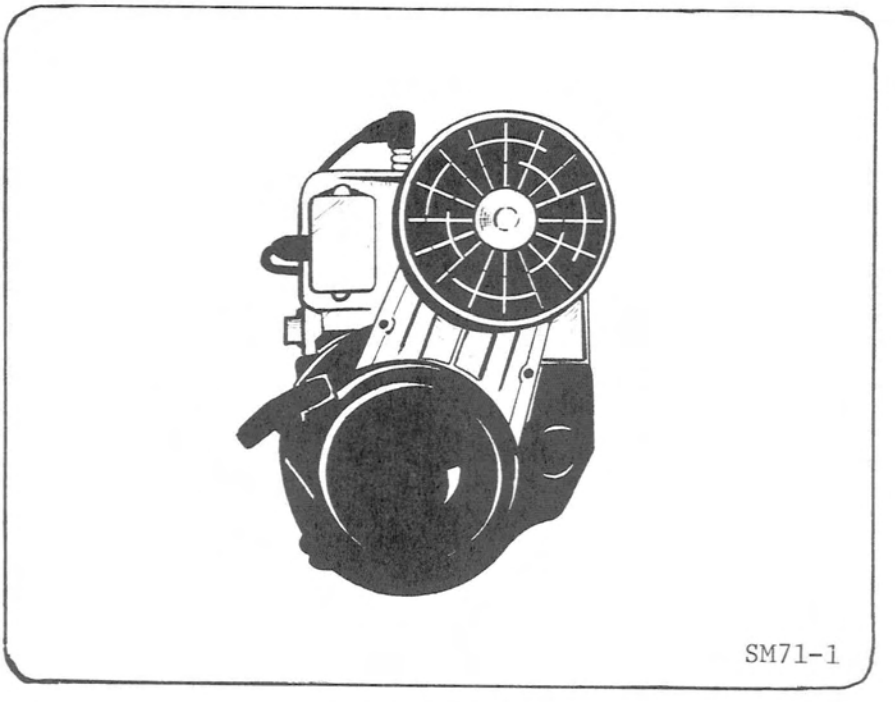
Added safety is also provided by the self-actuating band brake...wrap-around front bumper...rear bumper and handhold...a bright red brake light...and large reflective decals and trim strips visible from any angle of the machine.

Standard equipment includes a speedometer, trail-behind hitch, headlight and a brake-taillight combination.

Among the many items of extra equipment is an electric start kit, a high-torque final drive kit, tachometer, battery, snowmobile oil, snowmobile cover, a rear snow flap and a trickle charger.

# INDEX

# 2-CYCLE FUNDAMENTALS



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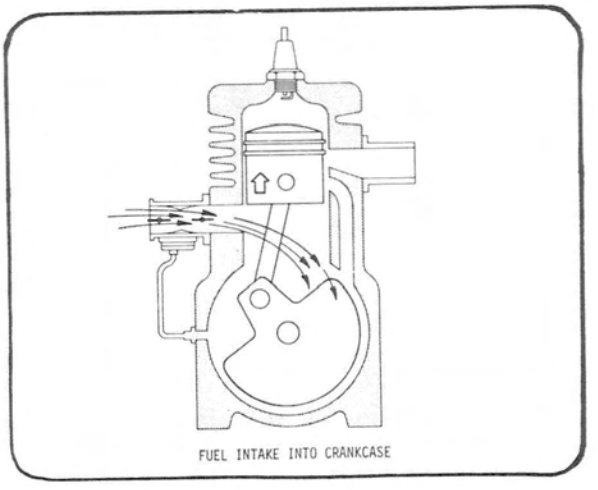
2-CYCLE DESIGN

Two-cycle engines are of the loop-scavenged, third port design. One feature of this design is that it eliminates the need for a pressure operated reed valve which could wear out or stick and give trouble. Two-cycle engines weigh less than 4-cycle engines because they do not have valve train, cam gear or crank gear, plus the fact that there is no oil sump required. Porting in the cylinder and movement of the piston serves to intake fuel and expel exhaust gases. The port arrangement typical of a C.C.W. Engine is shown in the following cutaway views of a cylinder barrel--note that the exhaust port is highest, the transfer port next and the intake port lowest of the three. As will be seen, the position of the ports is extremely important to operation of the engine. Actually there are four ports in C.C.W. Engines, but since two are transfer ports which serve the same function, the engines remain in the 3rd. port category. The loop-scavenging effect and function of the ports are depicted and described in further detail on the following pages. Remember that since each downward stroke is a power stroke, several functions must occur at the same time during each stroke.

Fuel is most important to operation of a 2-cycle engine for it not only imparts motion, but is the sole source of lubrication and also acts as a coolant. For this reason, the proper gasoline to oil ratio must always be maintained, the fuel must be thoroughly mixed and only oils blended specifically for 2-cycle, air-cooled operation should be used. Keep this in mind, when going through the following description, depicting one complete cycle in operation of a 2-cycle engine of the third port loop-scavenged design. The discussion starts off with the intake step in which fuel is drawn into the crankcase.

Intake - Crankcase:

As the piston moves upward in the cylinder, it lowers the pressure in the crankcase and exposes the intake port. Since pressure inside is now lower than atmospheric pressure outside, air rushes into the crankcase through the carburetor to equalize pressures and in so doing, pulls a new charge of fuel along with it into the crankcase. The metering of the fuel is described in detail later under the Fuel System heading. This charge, sometimes called the precharge, remains in the crankcase lubricating ball and needle bearings until the downstroke of the piston when the transfer ports are exposed.

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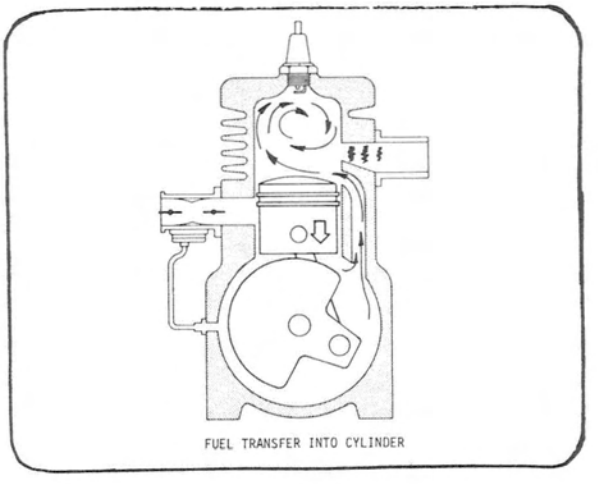
Transfer:

As the piston moves downward, it compresses the fuel that was previously charged into the crankcase. When the two transfer ports are exposed, this fuel charge is forced thru the transfer ports into the cylinder. The transfer ports are shaped to impart a swirling motion to the fuel as it enters the cylinder. This new charge of fuel does several things--it cools off the combustion area and also pushes or scavenges the remaining exhaust gases, forcing it out of the cylinder into the exhaust port. The loop-scavenging effect and the reflected sound waves coming from escaping hot gases are put to work to keep the fuel charge in the cylinder until piston travel once again closes off the exhaust port.

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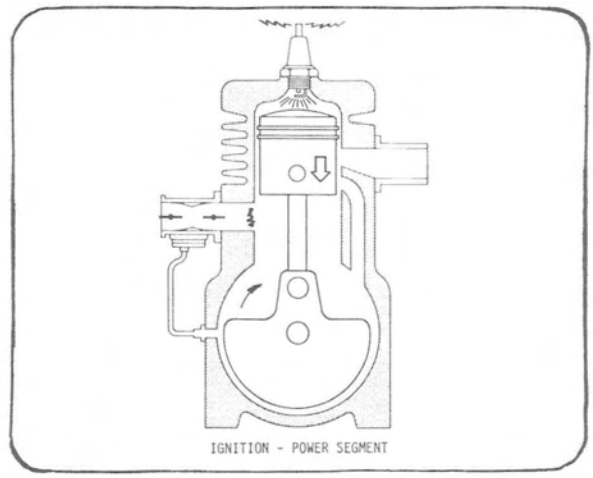
Compression - Ignition:

As the piston travels upward approaching top dead center (TDC), it compresses the fuel/air charge that was drawn into the cylinder through the transfer ports earlier. The fuel charge is compressed about 8 to 10 times its original volume. The spark to ignite the fuel/air mixture is timed to occur when the piston is just about at top dead center during starting but advances fully as soon as speed increases to provide the full force of combustion. This change in timing is accomplished by action of a flyweight type spark advance mechanism.

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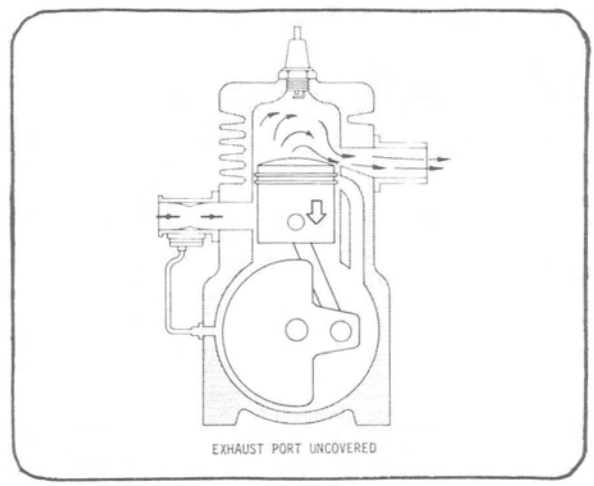
Power:

Immediately after the piston starts downward, peak combustion pressure from the burning gases is applied against the piston, driving it downward with maximum force. This inline motion is transmitted through the connecting rod to radial motion by the crankshaft. The force of combustion continues until the piston exposes the exhaust port.

Exhaust:

Actually, several functions take place simultaneously during the exhaust phase. When the piston moves downward far enough to expose the exhaust port, most of the burned exhaust gases are expelled from the cylinder--complete exhaust takes place after the piston drops low enough to expose the transfer ports which completes one cycle.

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# Specifications

| COMPONENT | | MODEL 400 | MODEL 500 |
|---|---|---|---|
| Engine | Manufacturer | Canadian<br>Curtiss-Wright | Canadian<br>Curtiss-Wright |
| | No. of Cylinders | 2 | 2 |
| | Bore | 60 mm. (2.36 in.) | 68 mm. (2.68 in.) |
| | Stroke | 60 mm. (2.36 in.) | 60 mm. (2.36 in.) |
| | Displacement | 339 cc. | 436 cc. |
| | Horse Power | 28 | 36 |
| | Compression Ratio | 8.2 - 1 | 7.8 - 1 |
| | Compression Pressure (Aver.) | 145 to 160 PSI | 145 to 160 PSI |
| Ignition | Manufacturer | Kokusan | Denso |
| | Lighting Coil | 75 Watts | 75 Watts |
| | Spark Plug Gap | .018 - .020 | .018 - .020 |
| | Breaker Points Gap | .012 - .016 | .012 - .016 |
| | Spark Plug | AC - S 41F<br>Champion L78 | AC - S 40F<br>Champion L78 |
| | Timing | $10^{o}$ - .023 $\pm$ .005 | $10^{o}$ - .023 $\pm$ .005 |
| Fuel | Carburetor Mfg. | Walbro | Walbro |
| | Carburetor Model | WR | WD |
| | Tank Capacity | 5.75 Gal. | 5.75 Gal. |
| | Mixing Ratio | 20:1 | 20:1 |
| | Gasoline | Regular or<br>Premium | Regular or<br>Premium |
| Power Train | Track Width | 15.5 in. | 15.5 in. |
| | Track Material | Polyurethane | Polyurethane |
| | Standard Gear Ratio | 2.19:1 | 2.19:1 |
| | Optional Gear Ratio | 2.44:1 | 2.44:1 |
| Chassis | Material | Aluminum | Aluminum |
| | Overall Length | 102.8 in. | 102.8 in. |
| | Overall Width | 36.7 in. | 36.7 in. |
| | Overall Height | 42.0 in. | 42.0 in. |
| | Weight (lbs. - Approx.) | 380 | 384 |
| Brake | Type | External Band | External Band |
| Lighting | Brake Light | 15 Watt | 15 Watt |
| | Headlight Bulb | 60 Watt | 60 Watt |
| Accessories | High-Torque Kit (2.44:1 Ratio) | AM 52270 | Same |
| | Electric Start Kit | AM 52155 | Same |
| | Rear Snow Flap | AM 52232 | Same |
| | Protective Cover | AM 52145 | Same |
| | Battery Charger | AM 32400 | Same |

# ENGINE

Removal and Disassembly:

A. Remove console and windshield.
B. Loosen belt shield and remove belt.
C. Disconnect fuel lines at carburetor.
D. Disconnect choke and throttle cables.
E. Disconnect electrical system at plug.
F. Remove (4) engine mounting bolts.
G. Disconnect exhaust adapter.
H. Lift engine up and rearward.

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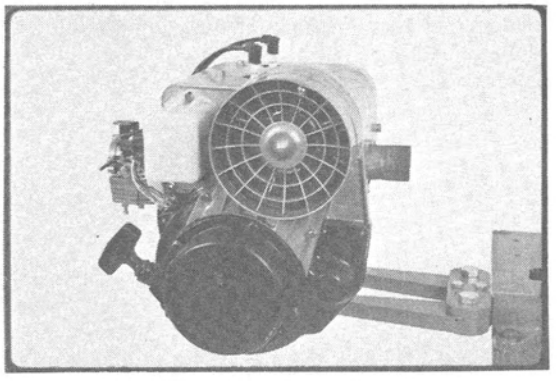

Engine Disassembly Preparation:

A. Thoroughly clean exterior surfaces of engine using suitable, safe cleaning solvent.
B. Disconnect spark plug wires.
C. Remove (10) cap screws securing cylinder cover. Remove cover.
D. Remove intake and exhaust manifolds.
E. Remove recoil starter assembly.
F. Disconnect high tension coils and remove from engine.
G. Remove starter cup, window plate.
H. Remove axial fan cover and slip fan belt off sheaves.
I. Remove the (2) Phillips screws securing ignition terminal coupler.
J. Position flywheel holding tool, JDM-2 and remove flywheel nut, lockwasher and flat washer.
K. Install flywheel puller, JDM-9, utilizing the three tapped holes in flywheel. Hold flywheel with JDM-2 tool. Break flywheel loose from crankshaft and leave in position until fan cover is removed.
L. Remove fan cover and flywheel assembly.
M. Remove converter assembly using appropriate tools (See Power Train section).

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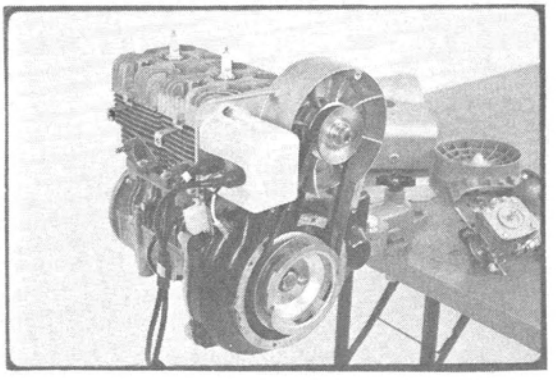

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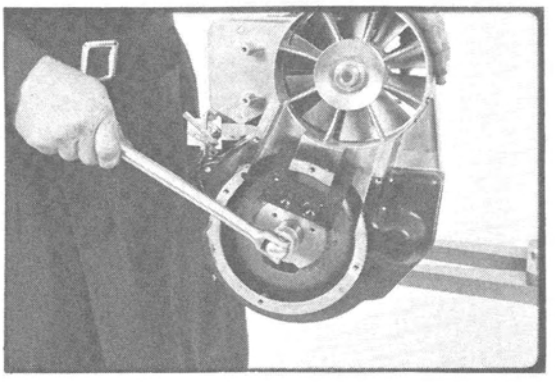

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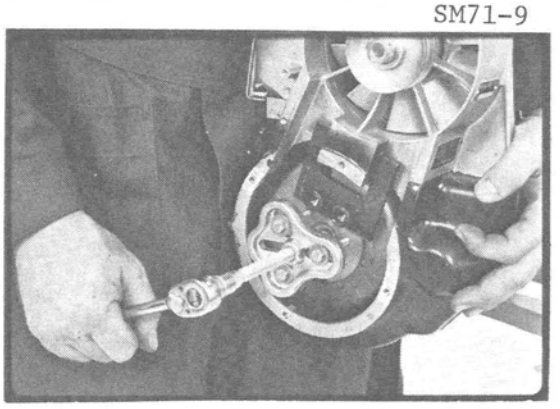

IMPORTANT

1. Do not over torque center bolt of flywheel puller.
2. Do not hammer on end of puller bolt, as damage to crankshaft or bearings may result.

Crankcase Disassembly:

A. Remove the (4) bolts securing fan backing plate to crankcase. Remove backing plate.
B. Remove stator assembly.

NOTE:

Unless being serviced, stator assembly should be stored inside flywheel to ensure retention of magnetic properties.

C. Remove the (5) hold-down (13MM) nuts and washers securing each cylinder head. Remove cylinder heads. Discard cylinder head gaskets.

NOTE:

If crankshaft is to be checked for twisted or bent ends, perform test at this stage of disassembly. Use JDM-10 dial indicator and adapter as shown. maximum run-out is not to exceed .005-inch.

D. Remove the (4) nuts securing each cylinder to crankcase. Remove each cylinder carefully to expose piston and connecting rod assembly. Discard cylinder base gasket.
E. Before removing pistons, be sure piston crowns are marked on the exhaust port side. If no mark is legible, inscribe accordingly.
F. Using a suitable circlip removal tool, remove circlips securing each piston pin.
G. Use the piston pin removal tool, JDM-7, to remove piston pins.

IMPORTANT

Exercise care when removing piston pins to prevent damage to needle bearings.

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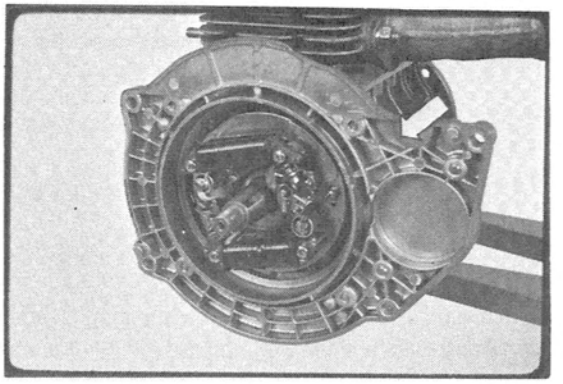

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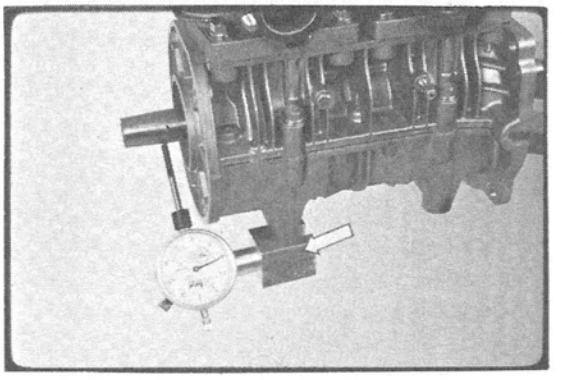

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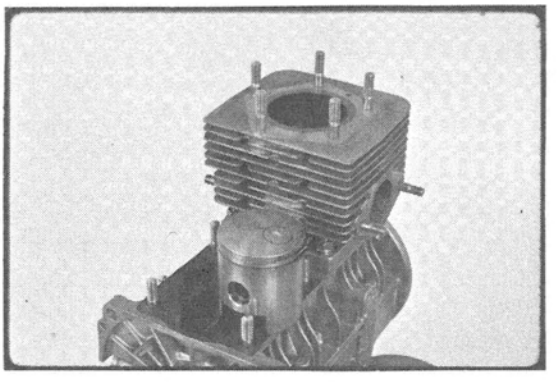

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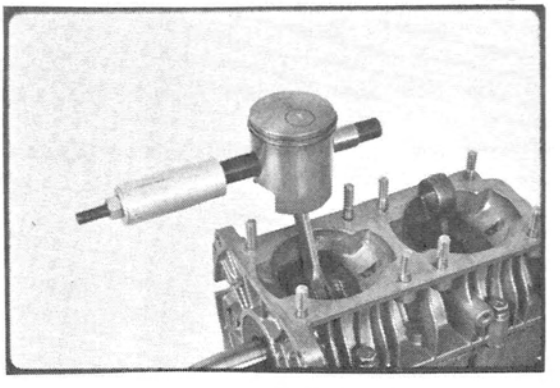

H. Remove the (10) cap screws, washers and cap screws joining the crankcase halves.

Separate crankcase by pulling the crankcase halves apart.

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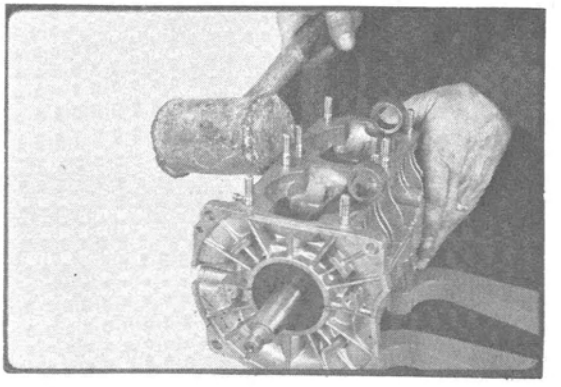

> IMPORTANT
>
> Do not use a screwdriver to pry the crankcase apart. If necessary, use a soft hammer to tap the case lightly on each end.

I. Remove crankshaft by lifting gently upward.
J. Remove the (4) seal retaining circlips from lower half of crankcase.

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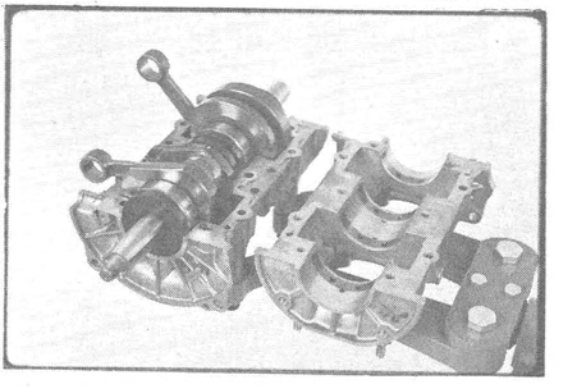
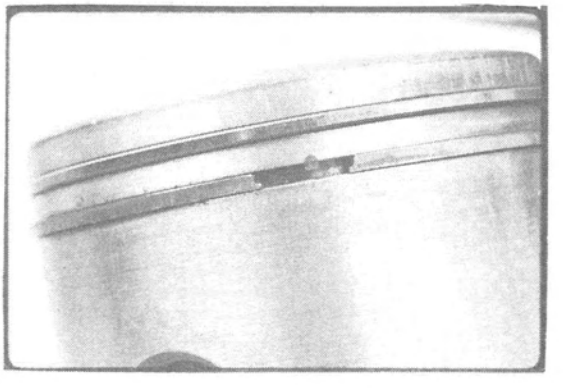


Cleaning:

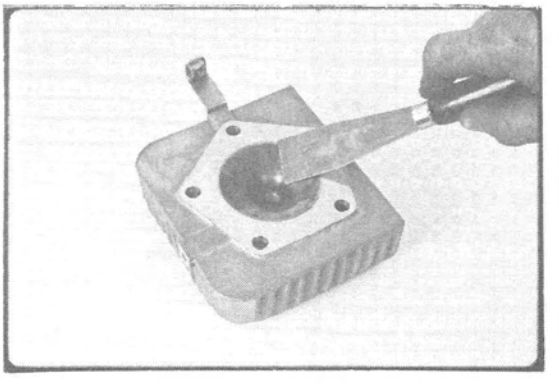
A. Prior to inspection, clean all parts thoroughly in a suitable cleaning solvent.
B. Clean crankshaft first to avoid dirty solvent from being lodged in crankshaft bearings.
C. Thoroughly dry all parts after cleaning.
D. Do not immerse magneto parts in cleaning solvent. Use suitable cleaning materials and compressed air for proper cleaning. Dry thoroughly.
E. Clean piston ring grooves with proper tool to avoid damage.
F. Clean carbon from piston crown and cylinder with a (non-ferrous) soft metal scraper.

SM71-16



> IMPORTANT
>
> Do not scrape down to base metal when removing heavy carbon deposits. Exercise care when cleaning spark plug recesses to prevent damage to threaded area.

SM71-17



Inspection and Analysis:

Inspect all components for obvious damage, wear, cracks and evidence of corrosion.

Repair or replace worn or damaged parts that fail to meet specifications.

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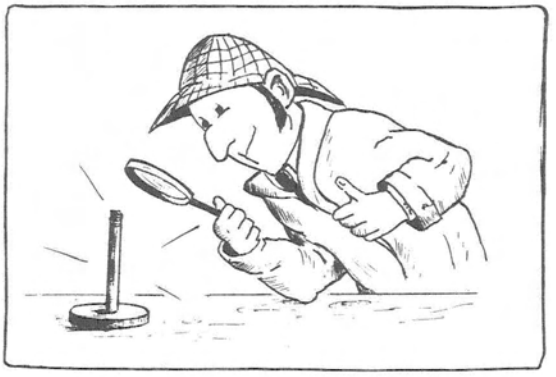

Cylinder Block:

A. Severe backfiring and power loss results from foreign material damage shown in slide **A**

Damage in this case was caused by a broken needle bearing.

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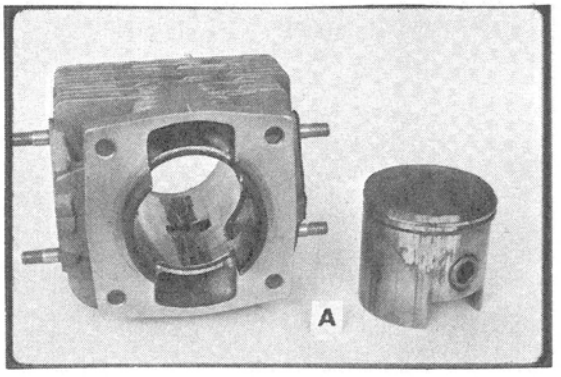
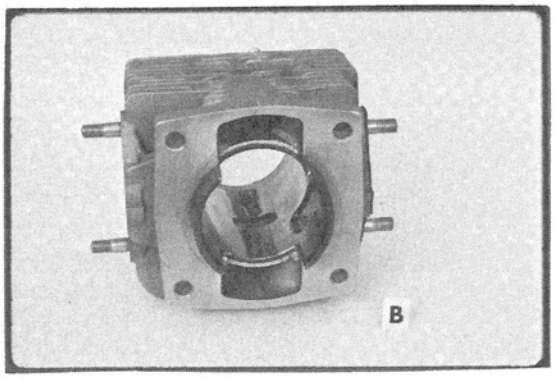



B. Slide **B** illustrates what can happen to a cylinder when a piston pin retaining ring is omitted.

In this case the pin worked out and neatly cut a groove in the cylinder wall.

As no noise is noticeable it went undetected until compression and power loss was evident.

SM71-20




C. Slide **C** illustrates a loose pin retaining ring damage. Metal shaved off piston worked between piston and cylinder wall, damaging both components.

Primary cause of retaining rings coming loose is carelessness during installation. Always double check retaining rings to insure that they are firmly locked into grooves.

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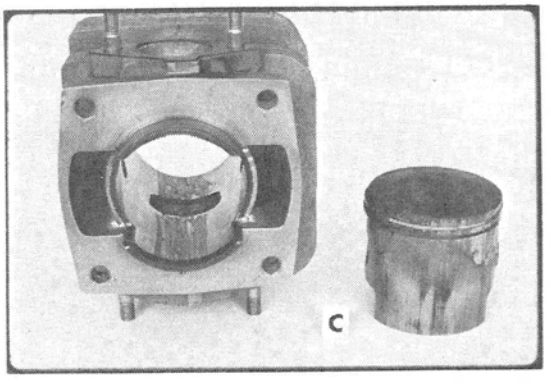

Piston and Rings:

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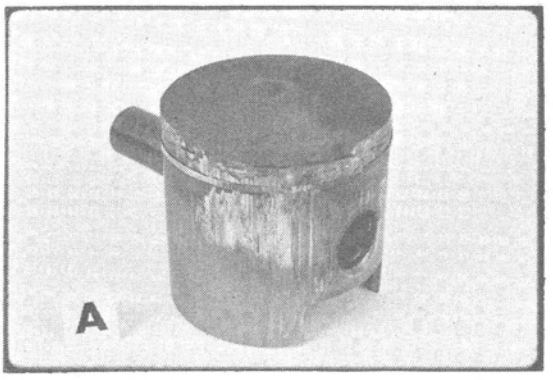
Slide A illustrates piston melting from overheating. Caused by carburetor lean out, insufficient cooling or too "hot" a spark plug.

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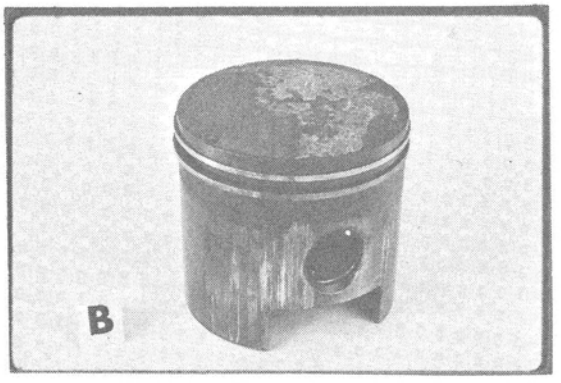
Slide B illustrates overheating and scuffing. It is generally due to the carburetor being leaned out. When this occurs the top ring looses tension and expands to hook and break against transfer or exhaust parts.

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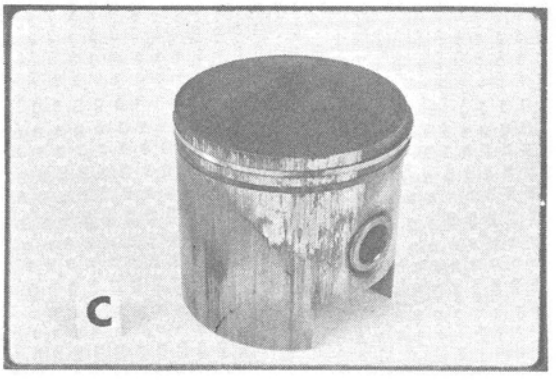
Slide C illustrates a carbon fouling condition. The usual complaint is continual spark plug fouling and dark exhaust smoke.

To avoid this condition, use the recommended oil/gas mixture ratio and correct spark plugs for operating conditions involved.

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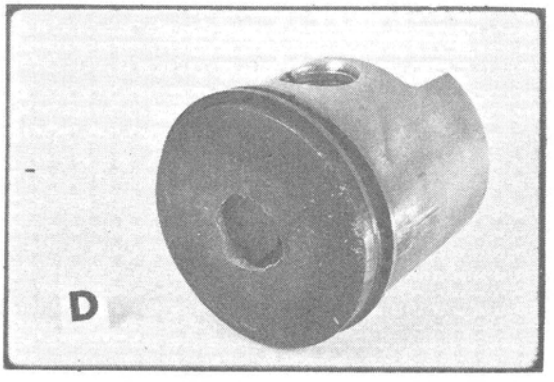
Piston burn-thru, illustrated in slide D, is the result of abnormally high combustion temperatures. These high temperatures are mainly caused by carburetor lean out, wrong timing, pre-ignition, detonation, poor quality oil or spark plugs being too "hot".

Off-center ventilation of piston is generally caused by glowing carbon deposits, which detonate fuel/air mixture before normal combustion takes place.



NOTE:

The most important points in preventing burn-thru are as follows:

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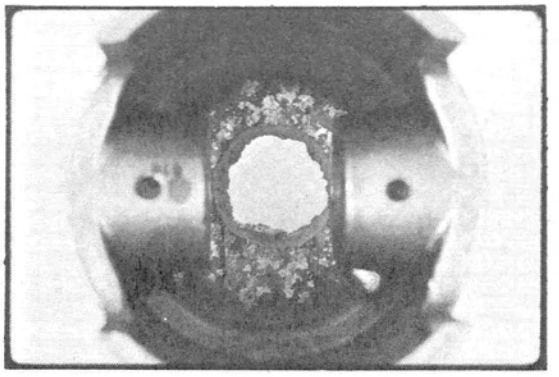


1. Keep Carburetor Properly Adjusted - When it is set right, it not only insure proper lubrication, but it provides correct fuel/air mixture for cooling.

2. Use the Right Spark Plug - If the plug is too "hot" for conditions, this can be a contributing factor especially if operating with carburetor set on the lean side.

3. Keep Timing Right - If timing is off so that ignition occurs too early or is over-advanced, overheating is certain.

4. Use Good Quality Gasoline - Make sure the octane rating is at least 92. Use only fresh gasoline.

5. Use the Right Oil - Make sure it is for 2-cycle, air-cooled operation. Also, mix it thoroughly and in correct proportion.

IMPORTANT

DO NOT EVER use unleaded fuels.

SPARK PLUG APPLICATION

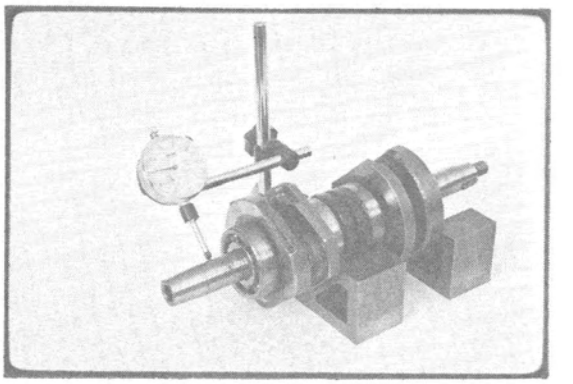
| TEMPERATURE RANGE | USE |
|---|---|
| Cold Plug | |
| Model 400 AC S40 F - Champion L57R<br>Model 500 AC S40 F - Champion L57R | Prolonged high speed running, with occasional slow down. |
| Normal Plug | |
| Model 400 AC S41 F - Champion L78<br>Model 500 AC S40 F - Champion L78 | General riding, mixed speeds and family pleasure rides. |
| Hot Plug | |
| Model 400 AC S42 F - Champion L81<br>Model 500 AC S42 F - Champion L81 | Loafing along. Sunday ride with occasional bursts of speed. |

Assembly:

Before starting the engine assembly, measure pistons and cylinders for wear. Check cylinder heads for distortion and crankshaft for damage and true alignment.

Use proper tools when checking engine components, such as "V" blocks or lathe for crankshaft and micrometers for measuring pistons and cylinders, etc.;

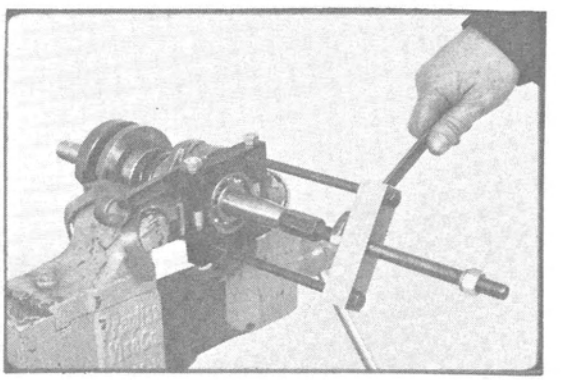
SM71-27



A. Begin assembly of engine by preparing crankshaft for installation.
B. Replace crankshaft PTO and flywheel end bearings if condition requires.

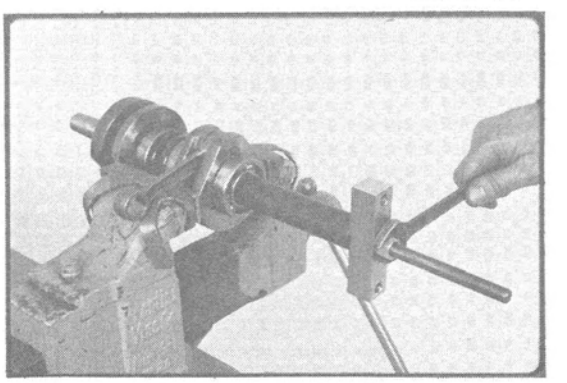
   Use JDM-8 crankshaft bearing service set to remove or install crankshaft end bearings.

SM71-28



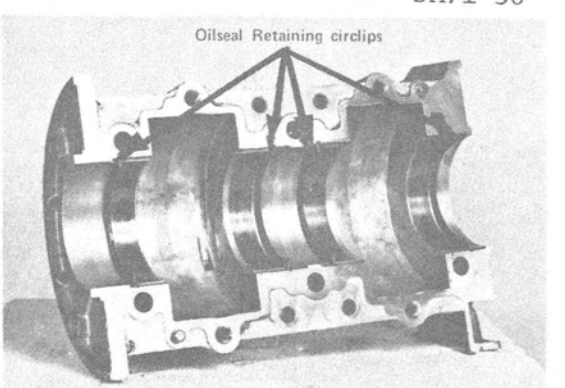
C. Always use new crankshaft seals when re-assembling. Leakage at seals can cause fuel mixture to lean out, thereby, resulting in possible engine damage.

SM71-29



D. Place crankcase lower half on work bench with flanged fan cover end to right hand side. Insert the (4) seal retaining circlips.

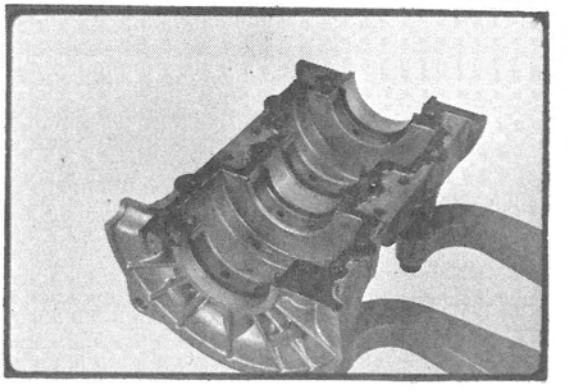
SM71-30



E. Apply a coat of good quality latex base non-hardening sealing compound to sealing surfaces of both crankcase halves.

(DO NOT permit sealer to run into interior of crankcase halves.)

SM71-31

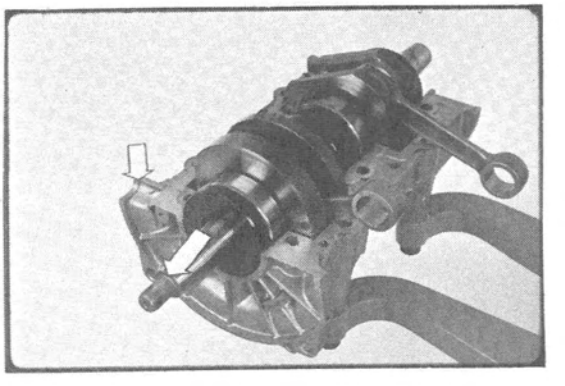


F. Install crankshaft into lower half of crankcase with threaded flywheel end toward right hand side.

Check to ensure seal retaining circlips do not become dislodged.

Apply a liberal amount of 2-cycle engine oil to crankshaft and bearings.

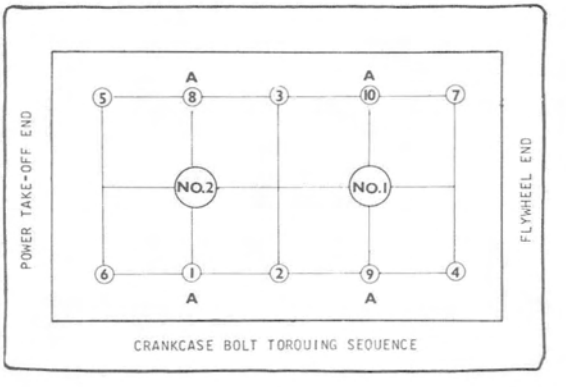
SM71-32



G. Reseat the crankcase halves; be sure the two dowel pins are properly engaged with mating holes in upper half of crankcase.

Install the four longer bolts at locations 2, 3, 4 and 7. Then, install upper bolts "A" and tighten lightly. Install remaining bolts and torque crankcase bolts in the pattern shown to 15-18 ft.-lbs.

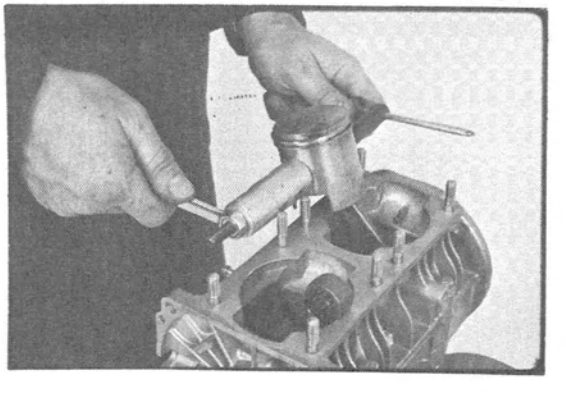
SM71-33




H. Next, lubricate piston pin needle bearings with engine oil, install in connecting rod.

Place piston over connecting rod, be sure marked side of piston is facing exhaust port. Position piston pin and assemble JDM-7 tool as shown. Pull pin into position, remove tool and insert circlips.

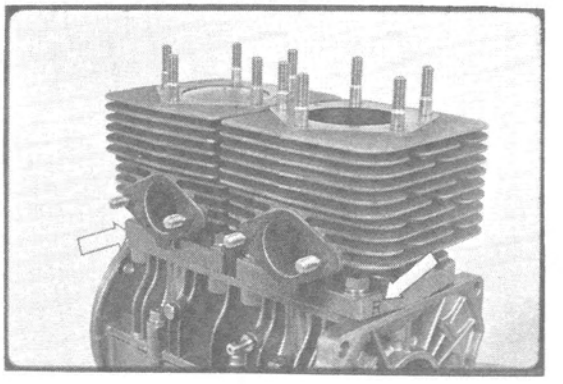
SM71-34



I. Install piston rings carefully, locating ring gap at groove locating pin.

Repeat steps (H) and (I) for the second piston.

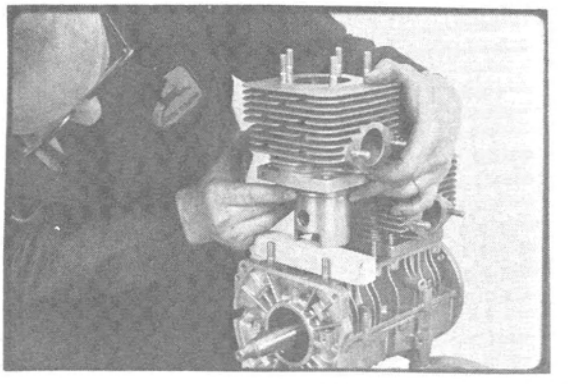
SM71-35



J. Install new base gaskets over cylinder studs.

Cylinders are identified by the letters "L" and "R". Locate "R" (right hand #1 cylinder) at flywheel end of crankcase (threaded end of crankshaft).

SM71-36

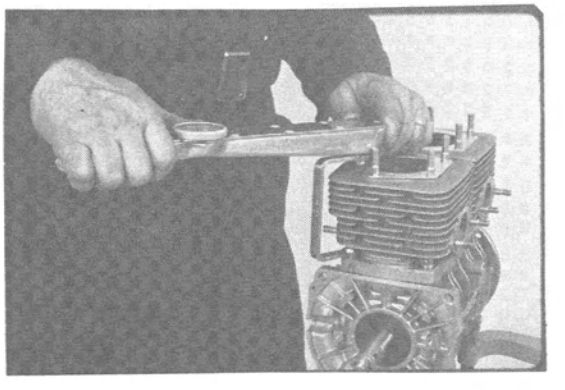


K. Lubricate pistons, rings and cylinders with 2-cycle engine oil.

Place a suitable wood block between piston and crankcase to steady piston.

Compress rings with fingers and gently slide cylinder over each ring. Be sure rings are centered on locating pins to prevent ring breakage.

SM71-37

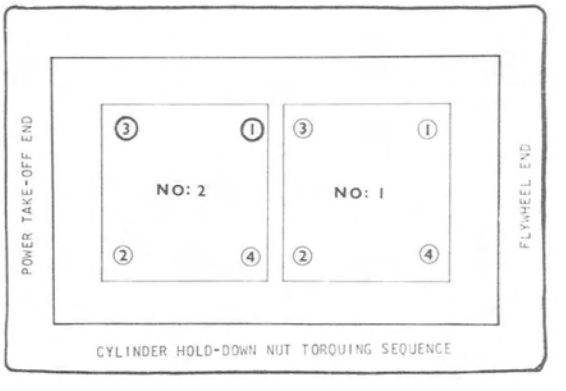


L. Position cylinders over hold down studs and install (8) washers, lock washers and nuts. Tighten nuts finger tight.

Install intake manifold, tighten manifold nuts firmly. This procedure aligns cylinders properly for better manifold sealing.

Tighten cylinder nuts 1, 2 and 3 to 15-18 ft. lbs., using torque wrench adapter, JDM-5. Remove intake manifold to torque number 4 nuts. Reinstall manifold using new gaskets and tighten firmly.

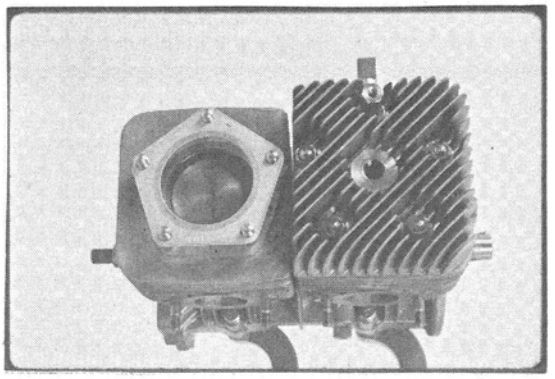
SM71-38



M. Install new cylinder head gaskets over hold down studs.

Position heads with machined side facing inwards and cylinder cover attaching brackets facing towards intake ports.

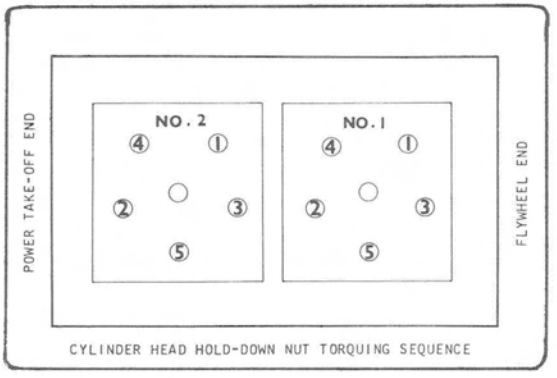
SM71-39



N. Install the two internally threaded nuts above intake ports. Use a flat washer and lock washer under each head retaining nut.

Torque nuts evenly to 15-18 ft. lbs. in the sequence shown. Plug spark plug holes to prevent entrance of foreign material.

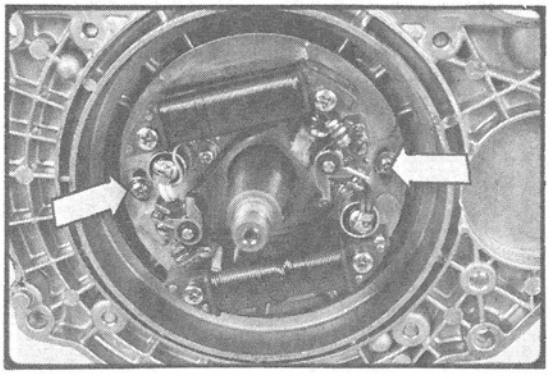
SM71-40




O. Install and secure stator to engine crankcase using (2) Phillips head screws. Position ignition wire bundle in the recess provided and install rubber grommet.

P. Install and secure backing plate to crankcase using (4) 8 x 28 cap screws, washers and lock washers.

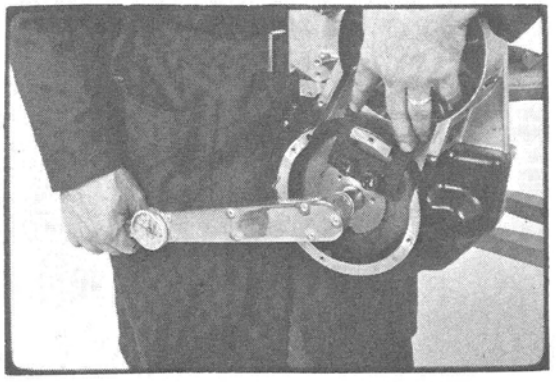
SM71-41



Q. Wipe crankshaft clean and install woodruff key. Position flywheel and install flat washer, lock washer and nut. Install fan cover and secure with (4) 8 x 28 cap screws, lock washers and flat washers.

Using JDM-2 Holding Tool and a torque wrench, tighten flywheel nut to 45-50 ft. lbs.

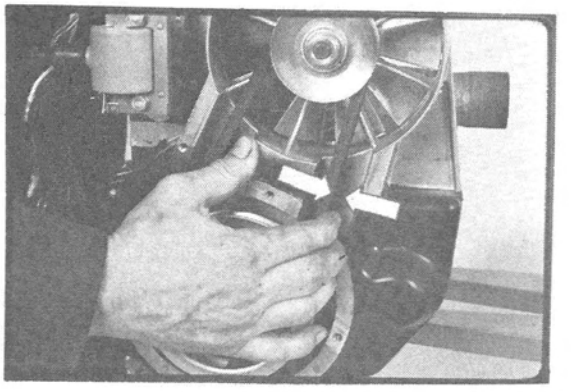
SM71-42



R. Install window plate, belt, belt pulley and starter cup. Inspect fan belt for proper tension. A properly adjusted fan belt should have approximately 1/4-inch side play when flexed by hand at a point near center of belt length.

Fan bearings are serviceable and can be removed easily. Both bearings are a light slip fit to fan shaft and have a light interference fit within fan housing.

SM71-43



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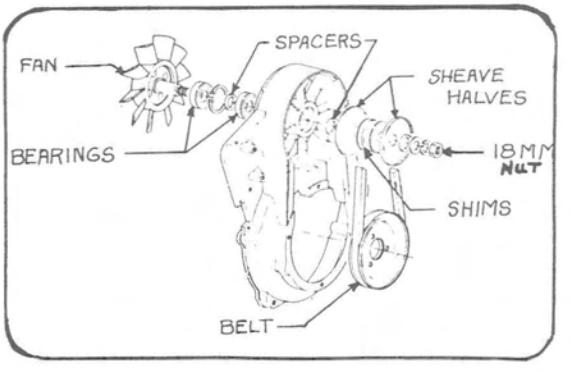



S. Adjust Fan Belt as Follows:

1. Remove 18MM nut, lock washer and plain washer from threaded end of fan shaft.
2. Remove outer sheave half. Remove one or more spacer shim(s) to achieve proper tension.
3. Reinstall outer sheave half. Be sure belt is properly seated between sheave halves. Tighten shaft nut securely. Replace belt if this adjustment does not provide proper 1/4-inch flex.

NOTE:

Retain surplus spacer shims for use when a new belt is to be installed.

T. Complete Engine Assembly as Follows:

1. Install electric starter motor if so equipped.
2. Install exhaust manifold.
3. Install ignition coils and spark plugs.
4. Install cylinder cover assembly.
5. Install carburetor. Be sure to place fibre block between carburetor and intake manifold.
6. Time ignition system. (Follow procedure outlined in Electrical section of this Slide/Text.)
7. Install recoil starter after engine has been properly timed.

RECOIL STARTER

Disassembly:

1. Untie knot in starter rope at handle. Remove handle and allow recoil to unwind.

2. Remove retaining nut, lock washer and flat washer from end of reel hub recoil to unwind.

3. Manipulate friction plate until spring eye aligns with slot and remove plate.

4. Remove (3) pawls, cup washer and spring. Note position of plain end of friction spring.

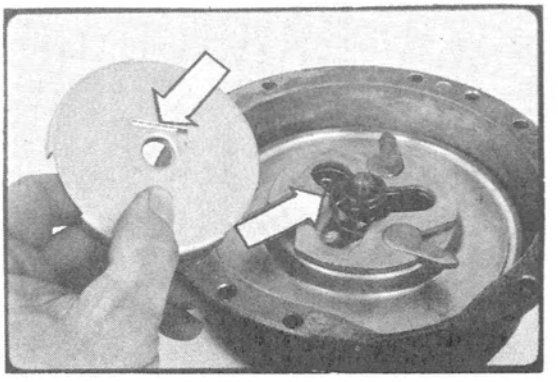
5. Lift out reel and rope. Unwind rope, inspect and replace, if necessary.

6. Lift long end of main spring from cover. Note direction of rotation.

7. Clean all parts and prepare to reassemble.

8. Use rewind tool, JDM-6, to wind spring. After completely wound install spring as shown. Complete assembly and install rope through rope guide after winding reel (3) complete turns. Install handle and test operation.

SM71-45



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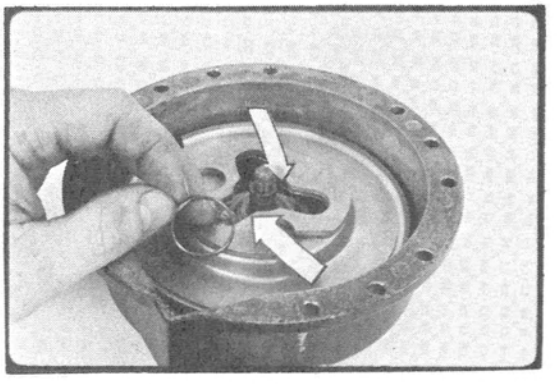

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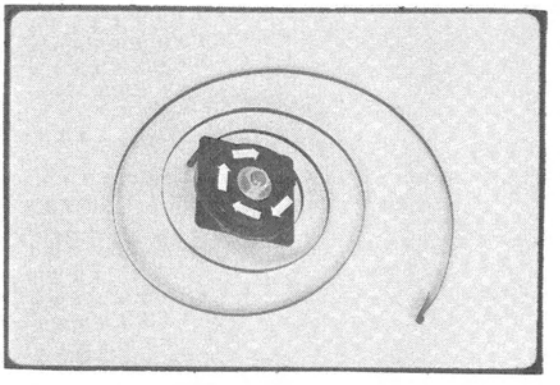

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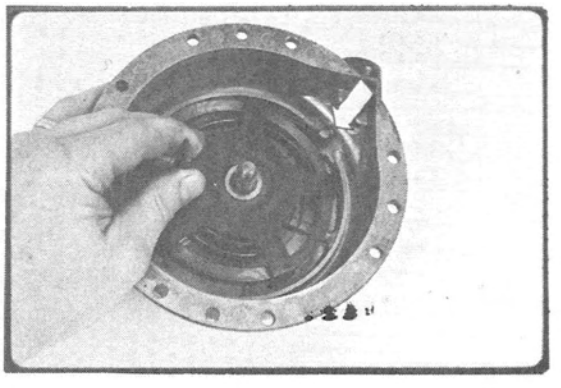


# TROUBLE SHOOTING

Always try to take a systematic approach to trouble shooting. First of all, determine what is actually causing the problem. To run, an engine needs the correct amount of fuel, a good ignition spark at precisely the right moment and, of course, sufficient compression.

## TROUBLE SHOOTING GUIDE

| ENGINE PROBLEM | POSSIBLE CAUSES (SEE DETAILS BELOW AND ON NEXT PAGE) | | | | | |
|---|---|---|---|---|---|---|
| | NO FUEL | INCORRECT FUEL | TOO MUCH FUEL | NO IGN. SPARK | POOR IGNITION | POOR COMPRESSION |
| WILL NOT START | X | | X | X | | |
| HARD STARTING | | X | X | | X | X |
| LACKS POWER | | X | X | | X | X |
| POOR ACCELERATION | | X | X | | X | X |
| PINGS UNDER LOAD | | X | | | X | |
| BACKFIRES, RUNS UNEVENLY | | X | | | X | |
| STOPS OR STALLS SUDDENLY | X | | | X | | X |

## FUEL RELATED CAUSES

NO FUEL

1. Tank empty
2. Tank vent closed or plugged
3. Line disconnected
4. Line kinked, plugged
5. Filter, screens blocked
6. Impulse tube off or plugged

INCORRECT FUEL

1. Stale fuel - won't vaporize
2. Air leaks - loose components
3. Improper fuel and/or mixture
4. Carburetor set wrong
5. Fuel lines restricted
6. Exhaust port blocked
7. Vapor lock

TOO MUCH FUEL

1. Overchoking, flooded
2. Restricted air intake
3. Carburetor set wrong
4. Carburetor malfunctioning
5. Wrong carburetor
6. Choke left on

FUEL SYSTEM TESTS:

FUEL IN COMBUSTION CHAMBER: If engine won't start, remove spark plug, if electrodes are wet this probably indicates fuel is getting to engine. If dry, check out system from carburetor back to tank.

FUEL TO CARBURETOR: If fuel flows out of carburetor and from inlet line when disconnected from carburetor, this indicates fuel is getting this far.

# TROUBLE SHOOTING GUIDE

## IGNITION RELATED CAUSES

NO IGNITION SPARK

1. Switch turned off
2. Leads disconnected or broken
3. Bad plugs
4. Ignition switch faulty
5. Breaker points oxidized
6. Breaker points stuck
7. Condenser faulty
8. Ignition coil faulty

POOR IGNITION

1. Plug wet
2. Plug gap incorrect
3. Plug carbon fouled
4. Wrong plug
5. Breaker points dirty or bad
6. Point gap wrong
7. Timing wrong
8. Condenser weak

IGNITION TESTS

SPARK PLUG: Remove plug, set gap at .020", place plug with side electrode against cylinder head then crank engine at speed sufficient to produce a good spark--if a sharp snappy spark is noted between the electrodes, this eliminates the ignition components as the fault--wrong timing could however be causing problems.

POINTS: If pitted or worn, replace--don't try to service. Clean dirty points, reset gap after servicing.

SWITCH: Unplug the switch (disconnect all terminals)--if the engine can be started with switch disconnected, check for wrong connections or if none are found replace the switch.

CONDENSER: Use commercial condenser tester per tester manufacturer's instructions--bad condenser will cause premature failure of points.

COIL: Check on coil tester--continuity must be indicated.

## COMPRESSION RELATED CAUSES

POOR COMPRESSION

1. Spark plug loose
2. Head loose
3. Head gasket leaking
4. Piston rings sticking
5. Cylinder badly worn
6. Burned piston

ABNORMAL COMPRESSION

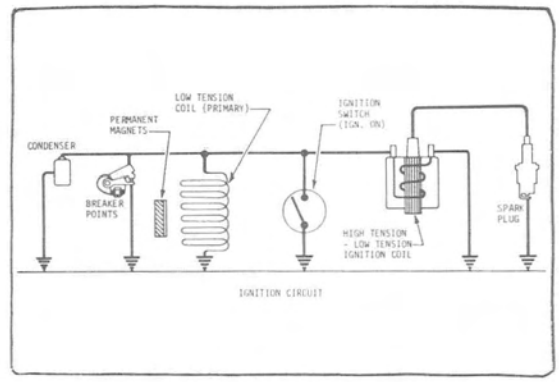
1. Build up of carbon
2. Wrong head

COMPRESSION TEST: Most causes of poor compression are readily evident. If none of the easier tests reveal the cause, it will be necessary to disassemble heads and cylinders to find reason. Insufficient fuel is often the primary factor leading to damage to pistons and cylinders--check out this system too.

# ELECTRICAL SYSTEM



SM71-49



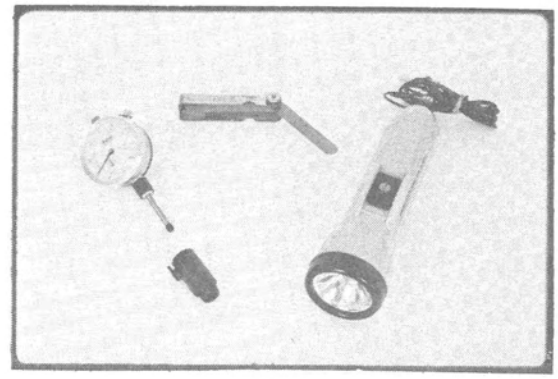

Engine Ignition System:

The 339 and 436 C.C.W. Engines utilize an individual low tension - high tension coil arrangement.

This means each cylinder has its own low tension and high tension coil, points and condenser.

A key switch is provided to ground system and stop engine.

SM71-50

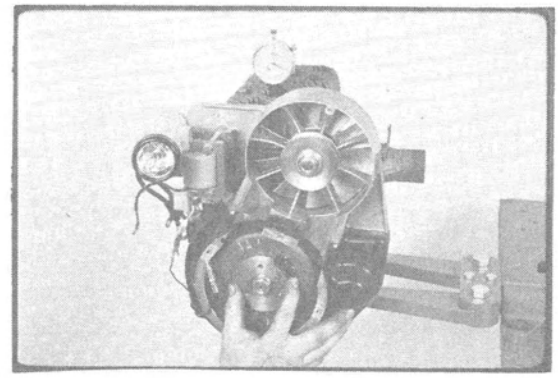


Timing Ignition System:
(Preferred Method)

The preferred method of engine ignition timing utilizes a dial indicator and a test light with a self-contained battery and a feeler gauge.

After engine overhaul or whenever contact breaker points have been replaced or adjusted, check and adjust timing to ensure proper engine performance.

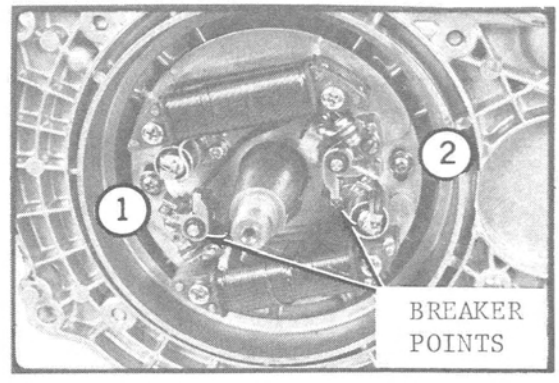
SM71-51



Time the Engine as Follows:

1. Remove recoil starter, starter cup and fan belt pulley. Remove flywheel window plate if installed.
2. Remove spark plugs and disconnect ignition at coupler.
3. Install dial indicator into #1 cylinder spark plug hole.
4. Rotate flywheel to locate #1 piston at true top dead center. This is the point at which dial indicator begins to reverse direction. Zero dial indicator at T.D.C.
5. Adjust #1 cylinder breaker point set to 0.014 $\pm$ 0.002-inch. This point set is identified by white wiring. Connect one lead on test light to white wire at coupler. Connect remaining test lead to ground.

SM71-52



6. Rotate flywheel counterclockwise until pointer of dial indicator reaches 0.023-inch before true T.D.C. At this point, the test light should go out to indicate points are just starting to open.

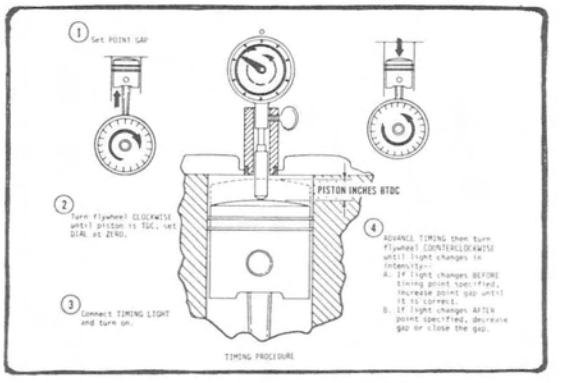
7. If test light fails to go out, adjust stator plate to the right or left until light goes out at .023 $\pm$ .005-inch measurement.

   Secure ignition stator plate in this position and recheck piston travel to verify timing accuracy.

8. Repeat procedure for #2 cylinder. Move dial indicator and relocate test light to the red wire in ignition coupler.

   Recheck piston travel to verify timing accuracy.

SM71-53

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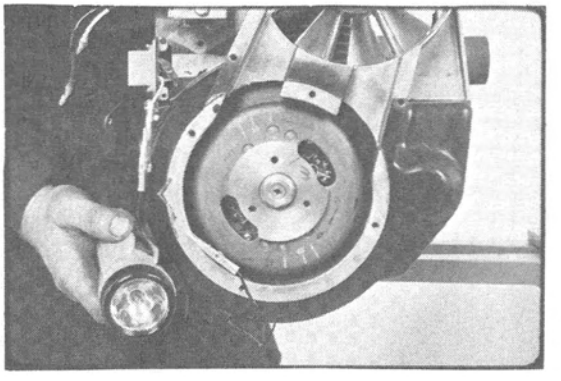
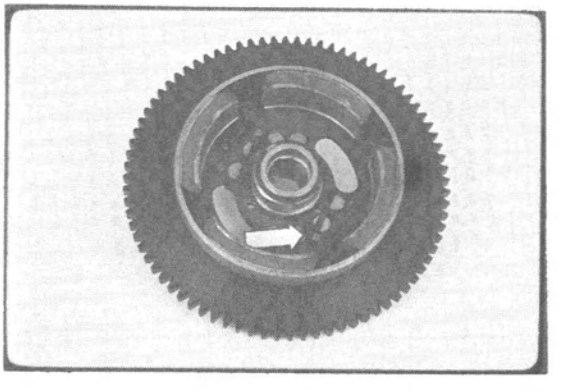


Flywheel:

Timing Advance Mechanism

In addition to the permanent magnets, the flywheel includes an advance/ retard mechanism. This consists of (2) flyweights, springs and a cam ring. This unit shifts from retard to advance as the centrifugal flyweights move outward. The ignition advance is accomplished by the point cam rotating to open points earlier in the power cycle.

SM71-55



Spark Plugs:

The heat range of a spark plug is very "important" to the operation of a 2-cycle engine. A plug must be hot enough to burn off combustion deposits, but at the same time, remain cool enough so that its heat does not pre-ignite fuel mixture, or cause piston damage.

Engines are equipped with standard plugs which are suitable for most operating conditions. If the engine is to be run for extended periods at either high or low speed, a special plug would be advisable. Select hotter than standard spark plugs for short, intermittent operation and colder than standard for high speed trail usage.

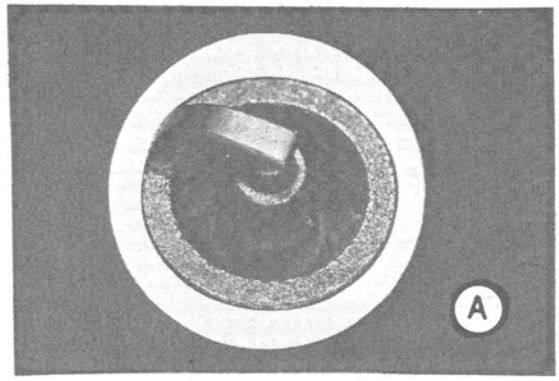
WARNING

Use hot spark plugs with caution. Piston and engine damage could result from pre-ignition created by overheated electrodes.

The following spark plugs are the result of improper application:

A. Carbon Fouled - Fuel mixture set too rich, or plugs too "cold".
B. Deposits on Electrodes - Poor quality gasoline.
C. Side Electrode Burned - Plug too hot for duty.
D. White Blistered Electrodes - Indicates overheating.

SM71-56

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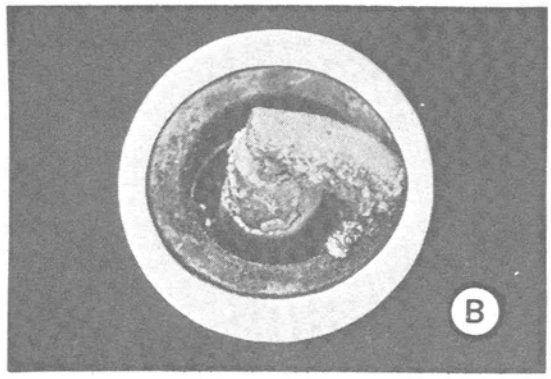


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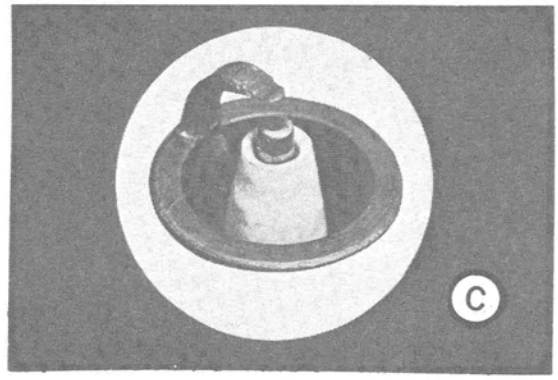


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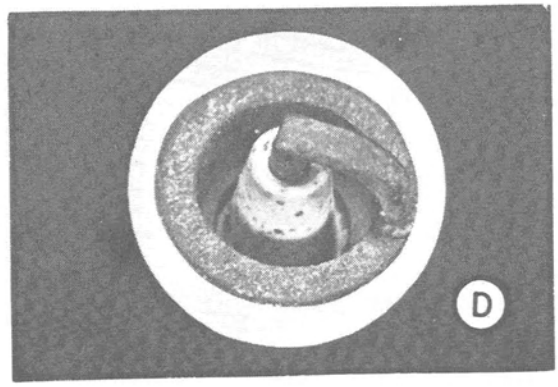



Spark Plug Gaskets:

The spark plug gasket is also very important to proper engine performance. If gasket is flattened from overtightening, it will conduct heat too fast, causing the plug to run cooler. On the other hand, if it is not crushed enough, it can leak, causing overheating and burned pistons.

Torque spark plugs to 15-20 ft. lbs. for proper heat transfer.

Lighting System:

The electrical system functions to provide energy for lighting and/or charging a 12 volt storage battery for electric starting.

An alternator coil is attached to the stator plate, using the magnetic fields of the permanent magnet flywheel, provides the electrical energy required.

A non-regulated, 75 watt electrical system is utilized in the John Deere Snowmobile.

The load controlled (or) non-regulated electrical system requires matching wattage loads to charging system capacity.

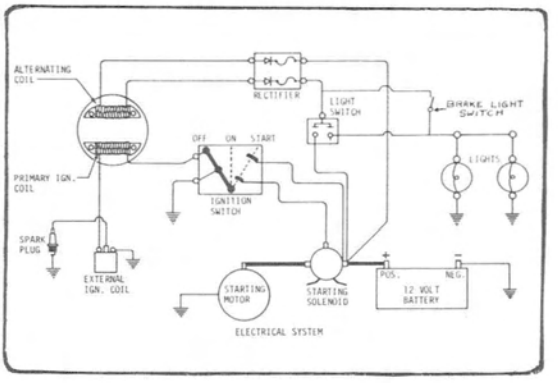
Example: A 60 watt headlight bulb and a 15 watt taillight bulb are utilized to absorb the 75 watt charging system output.

NOTE:

Therefore, when brake light switch is activated, the headlight must also burn to absorb the current being produced by the alternator.

Don't be alarmed. The snowmobile is not wired wrong, this method provides longer bulb life by absorbing all the wattage being produced.

SM71-60

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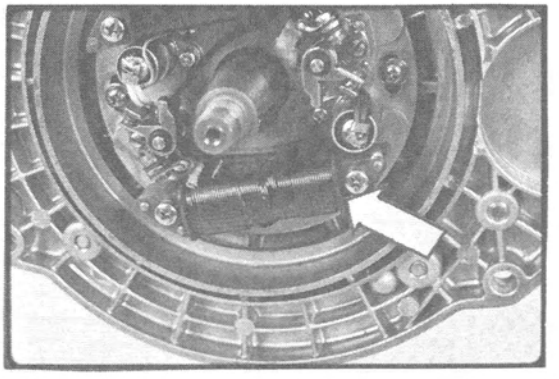


Electric Start:

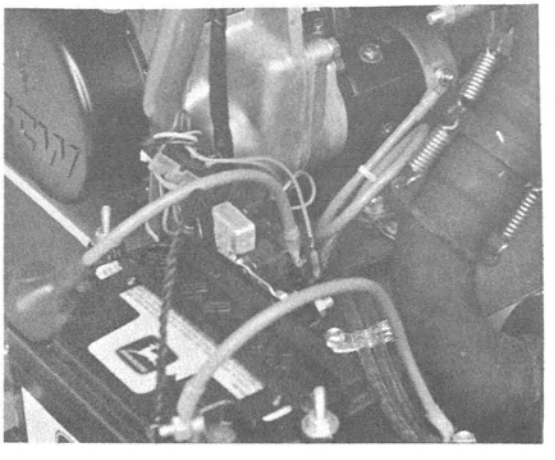
An electric start kit is available for dealer installation. Kit includes battery box, starter, solenoid cables and AC to DC current rectifier.

Install as shown. Be very careful of cable routing to avoid insulation burn through at exhaust pipe.

Follow instructiond includes with kit for proper wire routing and installation.

Route battery vent tubes through hole provided in bottom pan.

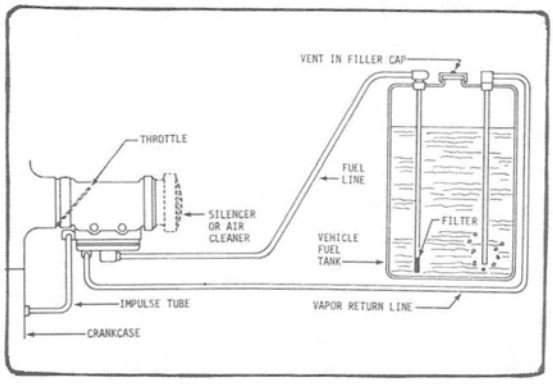
SM71-62



# FUEL SYSTEM



SM71-63




Fuel System:

The John Deere Snowmobile fuel system consists of a tank, fuel line, vapor line and an all position diaphragm carburetor.

A pumped vapor return fuel system is provided to eliminate vapor lock in the carburetor area.

SM71-64

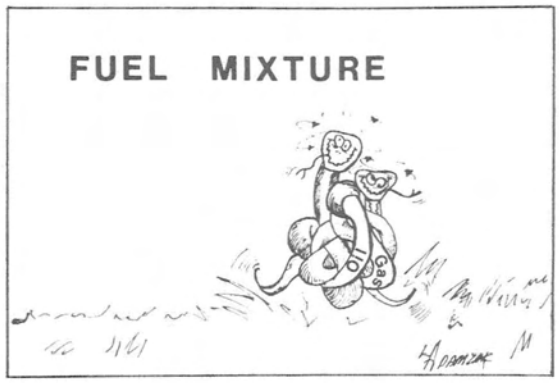
Fuel Requirements:

A good quality regular or premium grade gasoline with an octane rating of at least 92 is required.

CAUTION:

DO NOT USE NON-LEADED GASOLINE

SM71-65




Oil/Fuel Mixture:

Always use John Deere, 2-cycle, air-cooled engine oil or the equivilant. The oil must be of the ashless type, which prevents deposit formation.

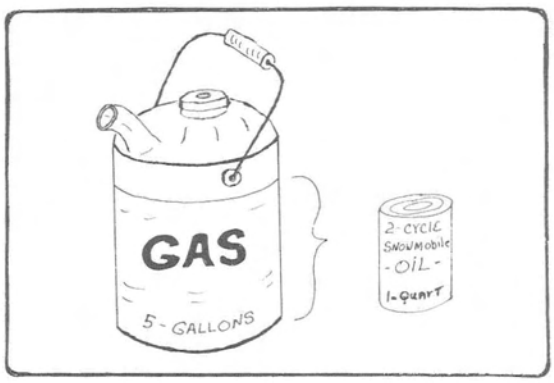
The proper mixing ratio is 20 to 1, which amounts to one quart of oil to five gallons of gasoline. Total, 21 quarts.

Mix gas and oil thoroughly in a separate container before filling fuel tank. The proper mixing procedure is to pour a small amount of gasoline into a container, add oil, mix well and then add balance of gasoline. Mix fuels at above freezing temperatures for best results. Properly mixed fuel and oil will remain mixed.

NOTE:

Be sure to use large enough container to receive a full 21 quart measure. Using a five gallon can and then adding a quart of oil creates a 19 to 1 mix ratio, which is too rich with oil.

SM71-66



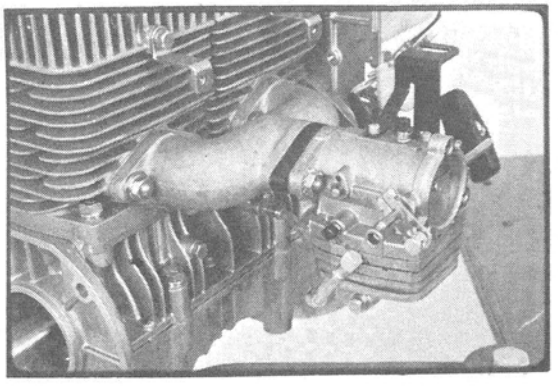
Carburetor:

An all position, high capacity, high performance carburetor is utilized on the 400 and 500 John Deere Snowmobiles.

The carburetor features are:

1. Unique pumped vapor removal.
2. High output, built-in fuel pump delivers all the fuel ever needed. Eliminates acceleration "flat spots" from idle to full throttle.
3. Three-stage throttle system, with exclusive diaphragm check valve. (Superior to ball check.)
4. Large diaphragm system provides precision fuel metering, gives a smooth engine performance from idle to wide open.

SM71-67



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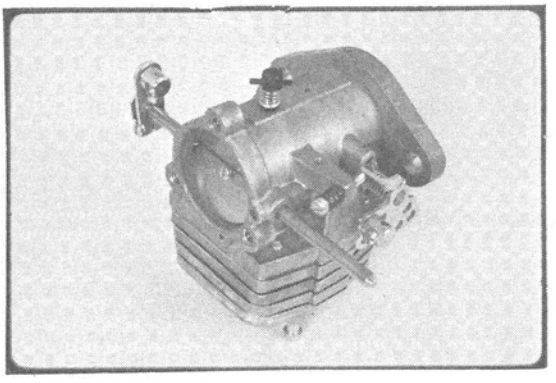
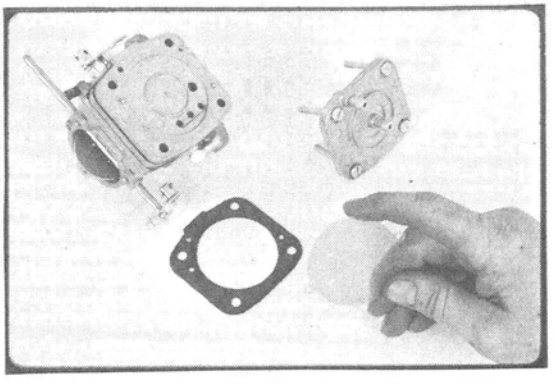


Fuel Filter Service:

Two fuel filter screens are utilized, one in the fuel tank on the fuel pick up tube, the other at the bottom of the carburetor base.

These screens must be kept clean to prevent fuel starvation, which could lead to engine damage.

SM71-69



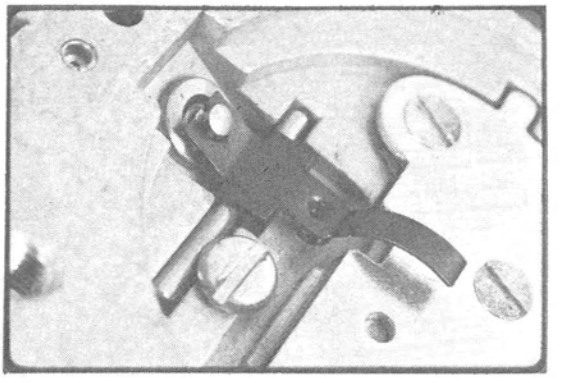
SERVICE HINTS

Dirt in the carburetor, richness and leanness are the three chief causes of faulty carburetor operation. Listed on the following page are the causes and their remedies.

Carburetor Richness:

1. Diaphragm lever set too high.
   (R) Set to specifications.
2. Dirt under inlet needle valve.
   (R) Remove and clean.
3. Metering lever spring not seated on dimple of metering lever.
   (R) Remove lever and install properly.
4. Fuel pump diaphragm leaking.
   (R) Replace with new diaphragm.
5. Dirt under umbrella check valve.
   (R) Blow through screen on the reverse side of plate.

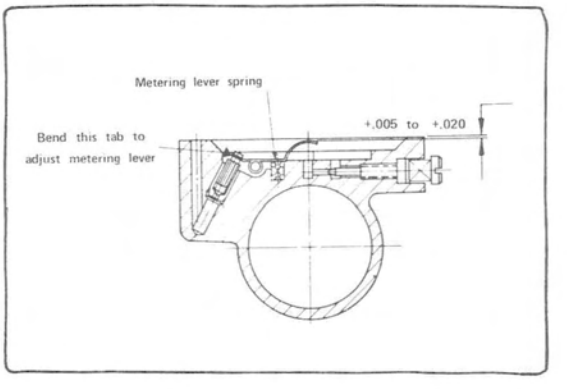
SM71-70



Carburetor Leanness:

1. Dirt in idle fuel channels.
   (R) Disassemble and clean carburetor.
2. Metering lever set too low.
   (R) Set flush with bases on chamber floor.
3. Leaky nozzle - check valve diaphragm.
   (R) Replace diaphragm.
4. Hole in metering diaphragm.
   (R) Replace diaphragm.
5. Pulse line from crankcase to carburetor plugged.
   (R) Clean.
6. Leaky manifold gaskets.
   (R) Replace gaskets.
7. Leaky diaphragm check valve.
   (R) Replace diaphragm check valve.
8. Fuel pump diaphragm check valve worn.
   (R) Replace fuel pump diaphragm.
9. Clogged fuel inlet screen.
   (R) Remove bottom plate and screen and clean.
10. Faulty fuel delivery system to carburetor.
    (R) Check complete fuel delivery system from pick-up in fuel tank to carburetor - fuel inlet for cracks, dirt, etc. Replace fuel line or pick-up filter when necessary.

SM71-71



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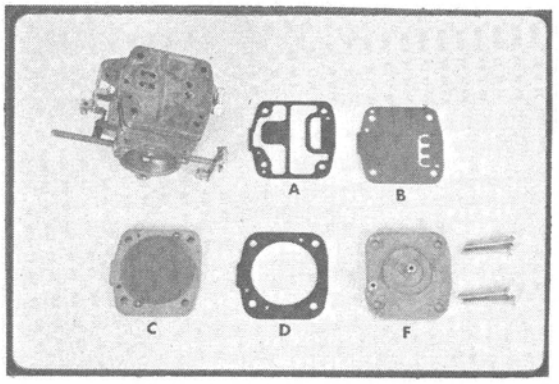
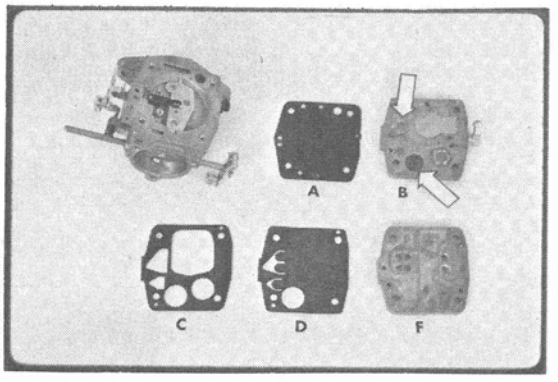



Disassembly Procedures:

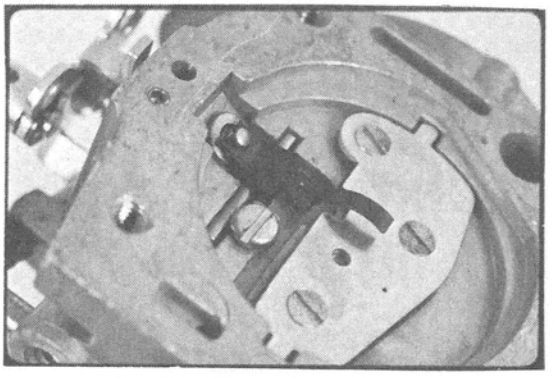
Disassemble (in sequence) for cleaning and repairing the carburetor.

1. Four bottom cover screws.
2. Filter screen and gasket.
3. Check valve diaphragm and gasket.
4. Fuel pump diaphragm and gasket.
5. Three check valve springs and main fuel leaf spring.
6. Metering diaphragm.
7. Metering lever pin screw.
8. Metering lever pin.
9. Metering lever spring.
10. Metering lever and inlet needle valve.
11. Three circuit plate screws.
12. Circuit plate.
13. Check valve diaphragm and gasket.
14. High speed (power) needle.
15. Low speed (idle) needle.
16. If choke and throttle levers show signs of wear, they should be replaced, otherwise need not be removed from the body.

SM71-73




SM71-74

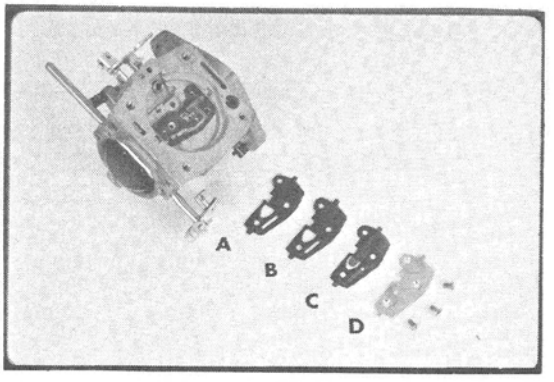


Wash all metallic components carefully with clean solvent or a good quality carburetor cleaner. Blow out all passages and blow off components (except diaphragms) with compressed air.

Replace all worn parts.

Reverse the above for reassembly.

SM71-75



Adjusting Throttle:

If throttle requires adjustment, loosen set screw on right side of carburetor and lengthen cable until lever touches handlebar at wide open throttle. Retighten set screw.

Adjusting Choke:

Push choke control knob on control panel all the way down.

If adjustment is required, loosen clamp on shaft and retighten with choke valve in open position....or release set screw on cable and retighten after cable is adjusted for proper choke operation.

Adjusting the Carburetor:

The John Deere 400 and 500 Snowmobiles are equipped with a Walbro Carburetor. Although the two machines have different model carburetors, their manner of adjustment is the same.

Carburetor adjustment is critical on a snowmobile engine. If high speed mixture is too rich, carbon will form inside the engine...if too lean,. engine will be severely damaged!

With engine shut off, adjust carburetor by closing both the high speed and low speed mixture needles. To do so, turn needles fully clockwise until closed. Do not overtighten.

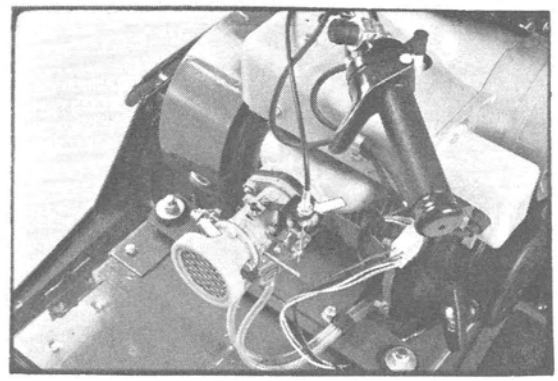
Then open idle needle "B" "1 1/8 turn" and high speed needle "A" "1 turn" by turning counterclockwise.

NOTE:

It is recommended that the carburetor be set initially as outlined above. Then the snowmobile should be taken for a short trial run.

When engine is operating at peak performance under load, open high speed mixture needle 1/8 turn counterclockwise so carburetor setting will not be too lean.

SM71-76



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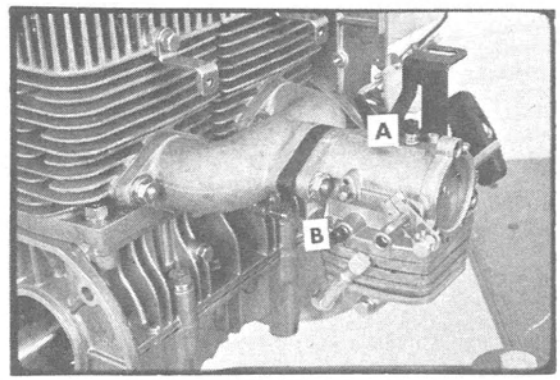


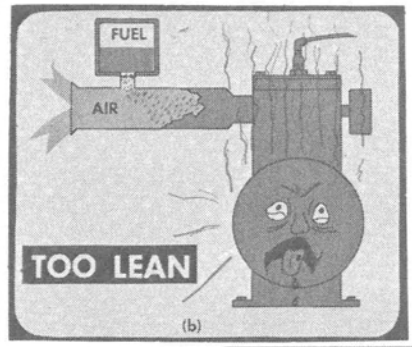


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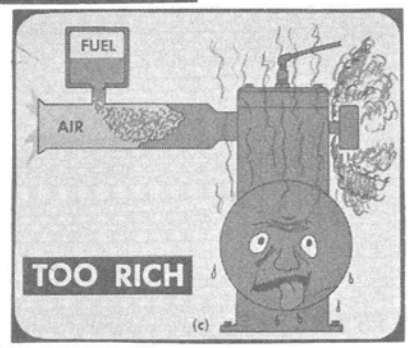
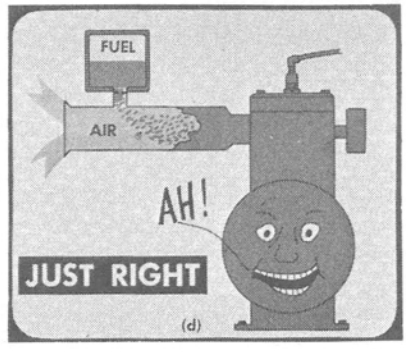
SM71-79



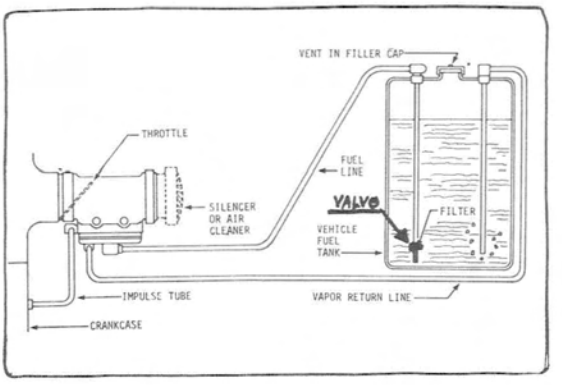

SM71-80

Fuel Lines:

Fuel and vapor lines can be identified by blowing into tank. The fuel intake line is equipped with a anti-drain back valve, which will restrict fuel or air from entering tank. Attach this line to center nipple at base of carburetor.

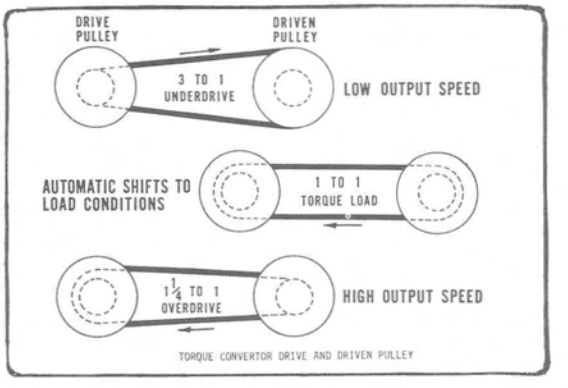
NOTE:

Fuel pick-up line is green while vapor return line is clear.



# POWER TRAIN

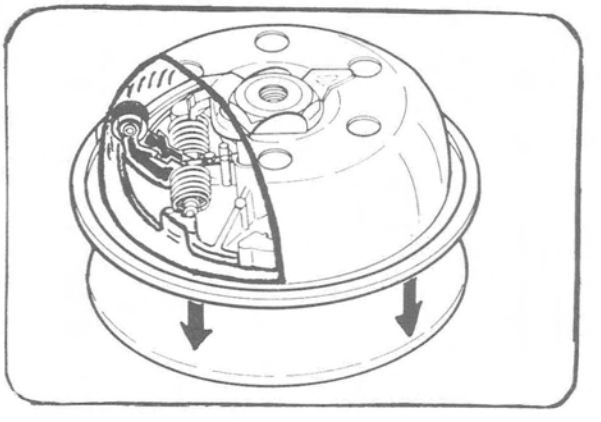
SM71-82




Torque Converter Clutch:
How It Works

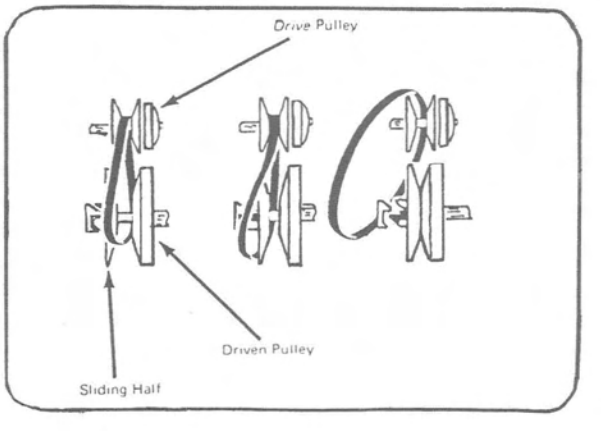
At Low speeds, the normal position of the driver pulley maintains the "V" drive belt at a smaller diameter, which with the corresponding larger diameter on the driven pulley, creates a "low gear" ratio.

SM71-83



As the speed increases, the centrifugally actuated roller weights follow the contour of the bowl shaped cover forcing the driver sheaves together. This action transmitted through the belt causes driven pulley spring to compress, thus achieving a "high gear" ratio.

SM71-84




Drive Belt Replacement:

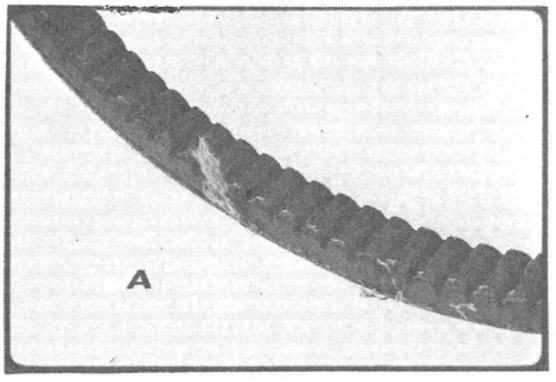
1. Loosen belt guard wing nut, bend guard forward.
2. Grasp old belt, and turning secondary sheave slightly to open, roll belt off sheave.
3. Install new drive belt over primary clutch sheave first, then start belt into bottom of secondary sheave and roll into place.

Drive Belt Trouble Shooting:

To determine malfunctions of the power train due to improper belt alignment or wear, refer to the examples and chart shown in the new Snowmobile Service Manual.

Research has proven that excessive wear and breakage of the drive belt can be eliminated by correct, periodic inspection and maintenance.

SM71-85

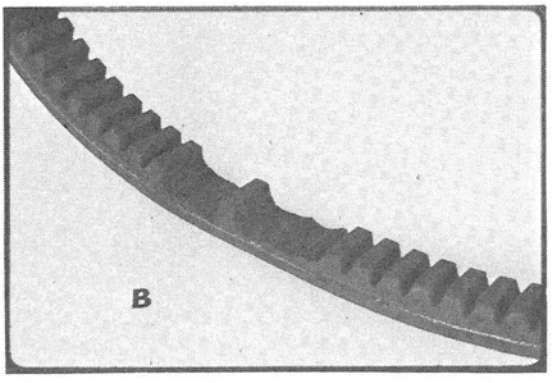



A. CONDITION - Edge Cord Breakage

Cause

1. Sheave misalignment.
2. Belt flip-over at high speed.

SM71-86

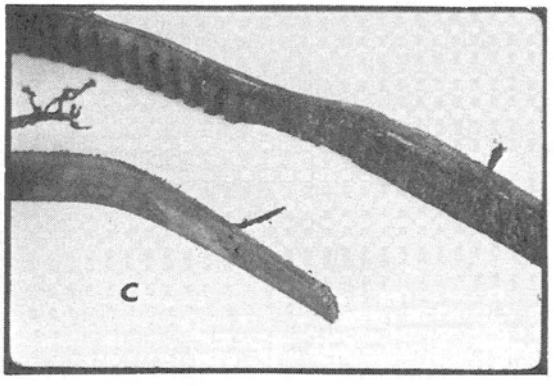



B. CONDITION - Sheared Cogs

Cause

1. Improper belt installation procedure.
2. Violent converter engagement with cold belt.
3. Severe overload.

SM71-87




C. CONDITION - Belt Disintegration

Cause

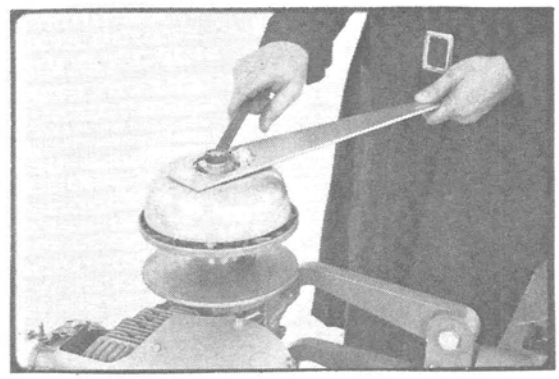
1. Oil on sheave surfaces.
2. Incorrect belt application.
3. Sheave misalignment.

Primary Torque Converter:

When removing the converter for service, avoid damage by careful handling.

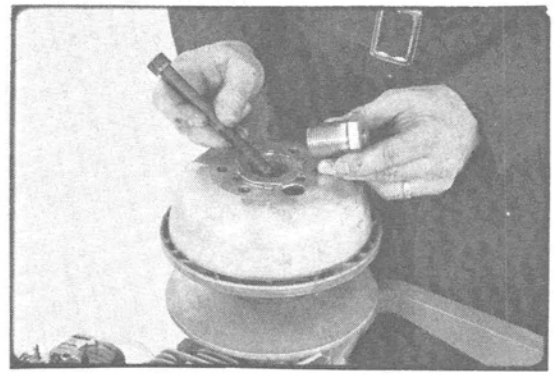
Use holding tool from JDM-12 clutch service set to prevent converter from turning when removing retainer cap screw and hub nut.

SM71-88



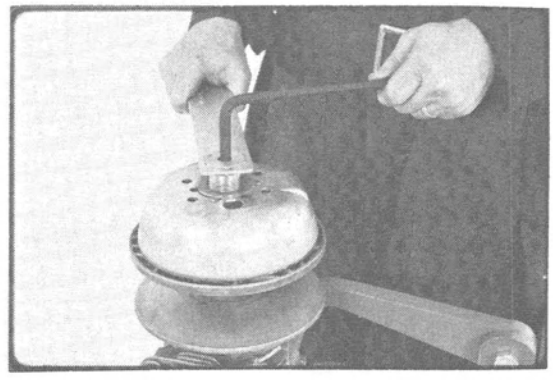
To remove torque converter from engine crankshaft, turn JDM-12 1/2" socket head cap screw into crankshaft, and re-install hub nut.

SM71-89



Next, place hub nut wrench on to nut and allen wrench into 1/2" socket head cap screw. Turn hub nut into converter, while holding allen wrench from turning, until converter is forced off crankshaft.

SM71-90

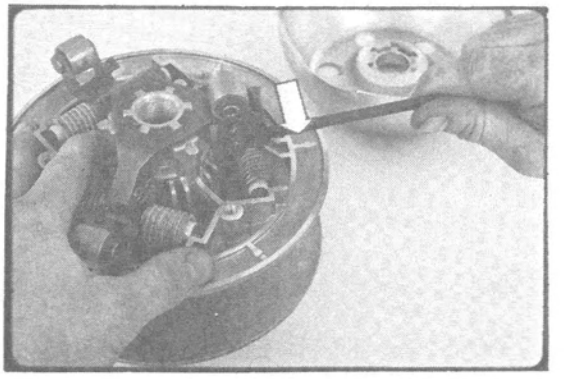


Torque Converter Disassembly:

After removing torque converter from engine, remove hub nut and ramp plate.

Unlatch all (6) roller arm springs with a screwdriver or JDM-4 clutch spring tool.

SM71-91

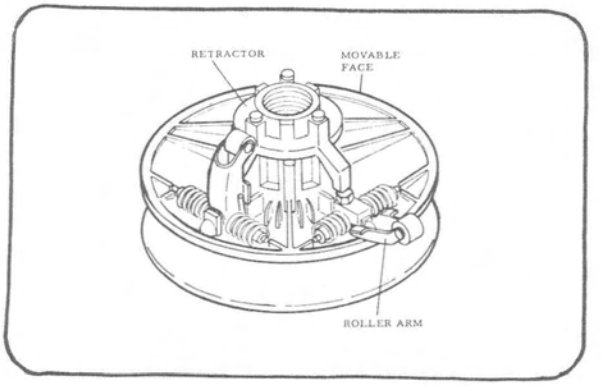


Next, note position of retractor before removing. Ramps of retractor align with roller arms.

To remove retractor, slide movable sheave half upward sharply, in slide hammer fashion. This will bump retractor off hub spline.

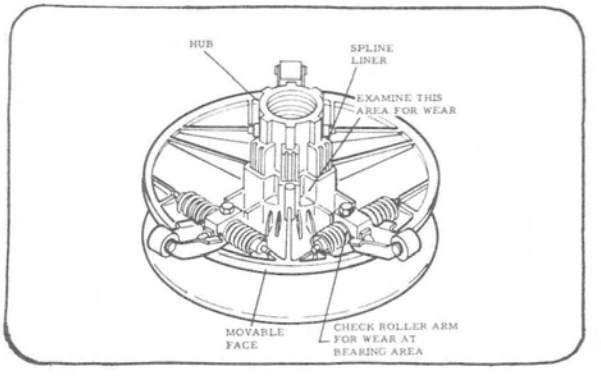
With movable sheave half removed, inspect spline groove and spline liners. Replace worn parts before reassembling.

SM71-92




Remove (3) cap screws, roller arms, pins and springs. Inspect arm rollers and pins for wear. Note condition of springs. Replace all (6) springs if wear is evident.

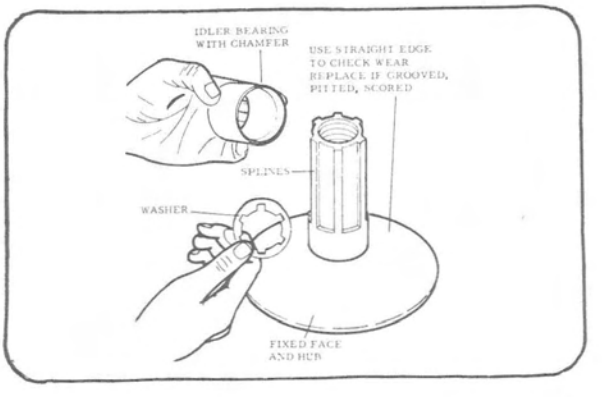
SM71-93




If idler bearing was removed, be sure to assemble with chamfered face toward fixed face. Idler bearing is a free turning, close fit on hub.

Also, examine belt faces of pulley halves, replace if worn or grooved.

SM71-94



Torque Converter Assembly:

Begin assembling by positioning idler bearing, spacer washer and spline liners on to hub. Deep end of spline liner toward fixed face end of sheave.

DO NOT USE LUBRICATION. Clean with dry cloth only.

Slide movable sheave over hub and liners.

Position retractor to align with roller arms.

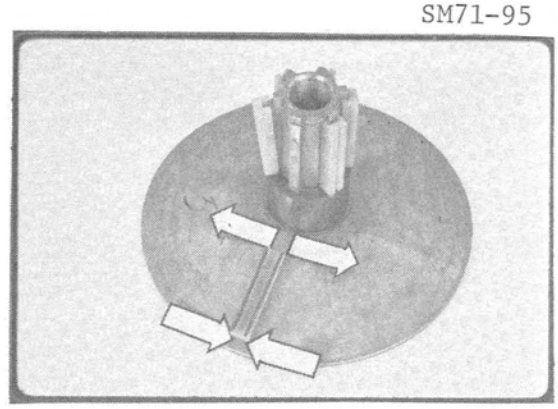
Invert ramp plate as shown for model 500 sheave and using the hub as a puller, force retractor on to hub until flush with spline end of hub. Remove hub nut and ramp plate and procede with assembly.

On model 400 sheave, drive retractor onto spline until seated.

Install roller arms and springs. Place long leg of spring toward roller arm as shown.

After all roller arms have been installed, lift movable sheave half upward and latch springs with JDM-4 spring tool.

SM71-95



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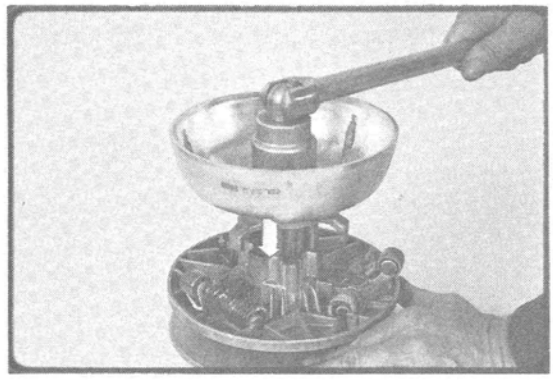

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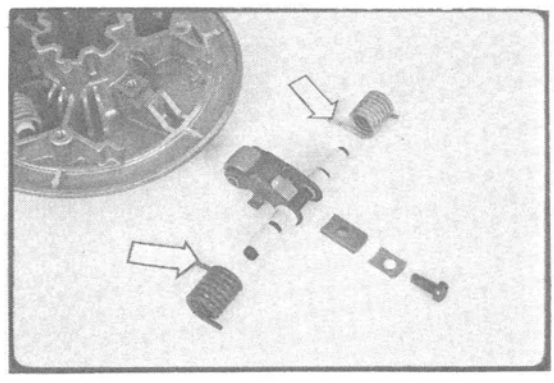

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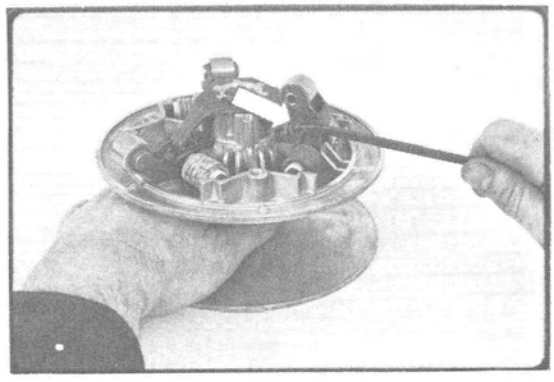
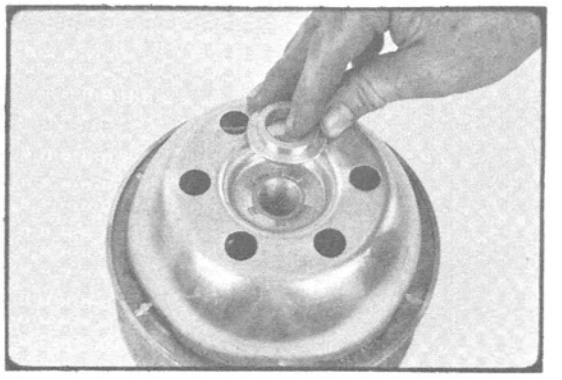


Install ramp plate aligning plate indentations with roller arms. Install lock plate (new) and hub nut and torque nut to specifications listed below:

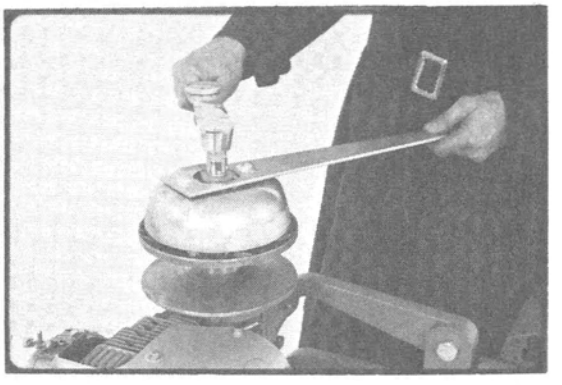
1. Model 400 - 125 ± 15 ft. lbs.
2. Model 500 - 150 ± 15 ft. lbs.

SM71-99



Be sure to wipe crankshaft tapered end dry, then slide converter into position. Secure with at least a SAE grade 5 cap screw or better. Be sure cap screw heads are marked with either three or six marks on head as shown. Torque converter retaining cap screw to 70-75 ft. lbs. using holding tool from JDM-12 tool set to prevent converter from turning.

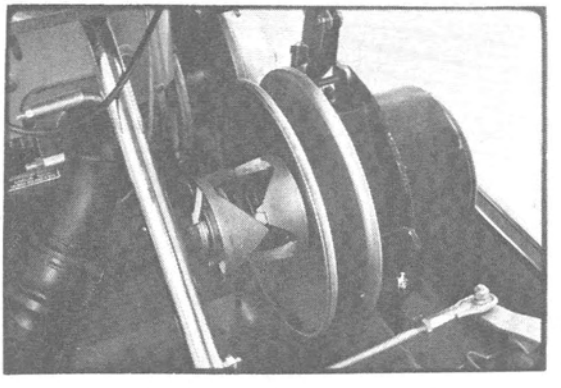
SM71-100



Servicing Secondary Driven Sheave:

Remove driven sheave by removing drive belt and retaining cap screw, then slide sheave inward off shaft and lift out.

SM71-101



Disassembly and Inspection:

Clean thoroughly before disassembly. Note position of spring anchor points.

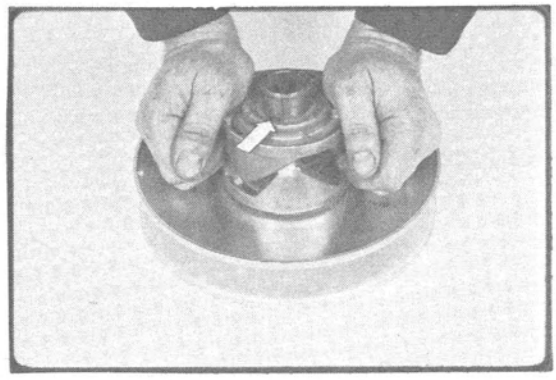
Release spring from top anchor point with screwdriver.

Place on bench, fixed face down. Position heels of hands on torque bracket. Press down on bracket to clear hub key. Turn bracket to lock bracket under key.

Remove snap ring. Turn torque bracket slowly to release and allow hub to slide up. Hold securely to prevent sudden release of spring.

Clean and examine all parts, replace if worn. Do not lubricate during reassembly.

SM71-102



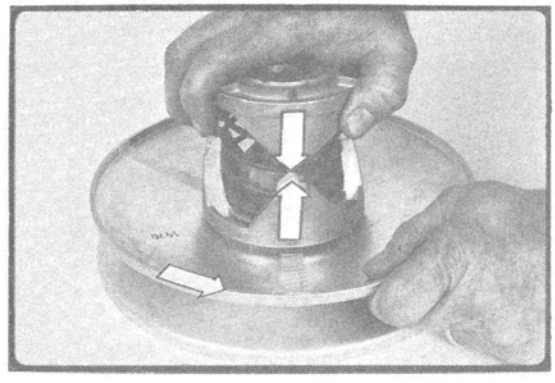
Assembly of Secondary Driven Sheave:

Place movable sheave on hub and install key. Engage spring in anchor lug of torque bracket and anchor lug of movable sheave.

Compress spring until there is approximately 1/8-inch clearance between ramps. Turn movable face 1/3 turn or two ramps counterclockwise then, press torque bracket down hub and lock under key.

Install snap ring and release torque bracket to seat against snap ring.

SM71-103



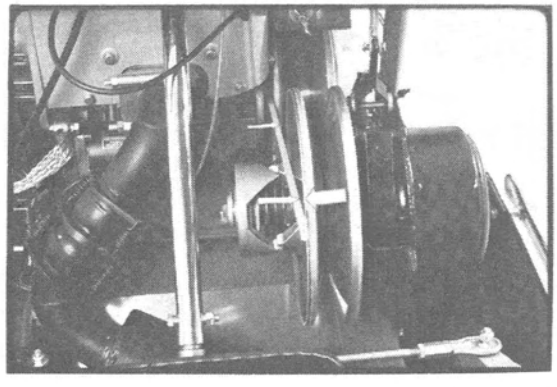
Aligning Belt Sheaves:

Place a straight edge on the engine side of the torque converter sheave as shown. Measure offset between straight edge and secondary drive sheave outer face. Measure in two places as secondary sheave must be parallel with converter. Dimensions are as follows:

400 series - 9/32-inch parallel offset
500 series - 1/4-inch parallel offset

If misalignment is noted, loosen engine mounting bolts and slide engine to obtain correct dimension.

SM71-104



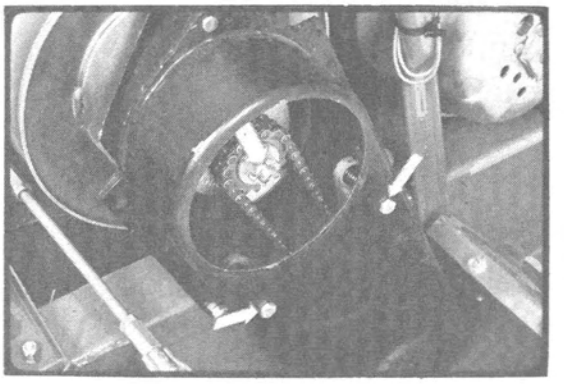
Cap Screw 20 ft lbs

DRIVE CHAIN

Disassembly:

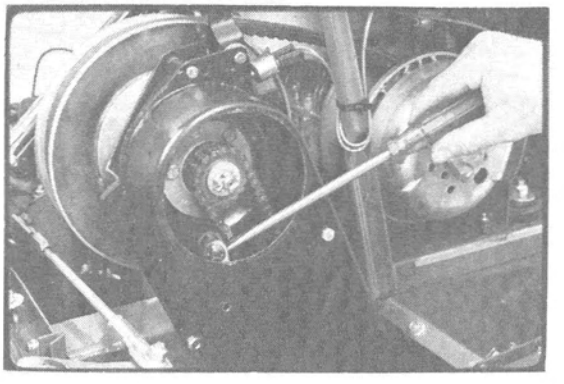
Remove chain case upper rubber plug. Remove chain tightener cap screws and upper sprocket slotted nut.

SM71-105



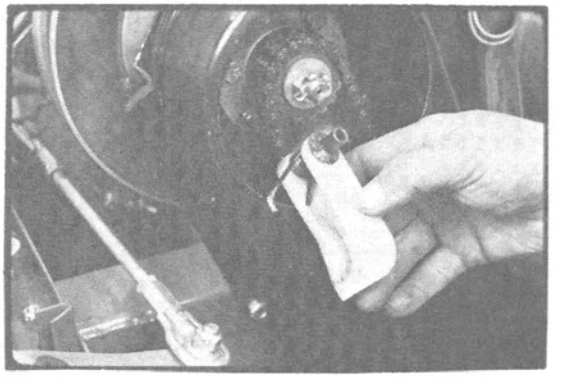
Lift chain tightener assemblies from chain case with large screwdriver.

SM71-106



Note spring and pivot arrangement. Inspect and replace nylon tightener pads if excessively worn. Reverse procedure to assemble.

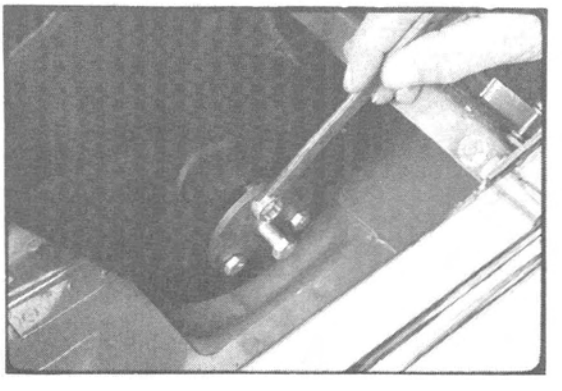
SM71-107



If lower drive sprocket is to be removed for either track or drive shaft servicing, use JDM-13 puller as shown.

Case must be refilled with enough SAE 30 oil (approximately 5 oz.) to cover chain at bottom of sprocket after assembly.

SM71-108



Brake System:

To replace brake pulley use the following procedure;

1. Remove chain tighteners to release chain tension.
2. Remove upper sprocket nut, sprocket and chain from shaft.
3. Remove secondary sheave assembly.
4. Remove chain case, upper bearing.
5. Drive upper shaft outward with a soft metal hammer. Be careful not to drop brake pulley woodruff key.

SM71-109

SEE PRECEDING SECTIONS FOR ILLUSTRATIONS OF CHAIN TIGHTENERS AND SECONDARY SHEAVE ASSEMBLY.

Assembly:

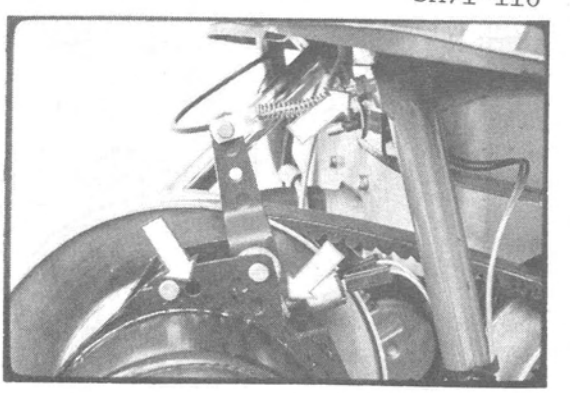
Reverse disassembly procedure, assembling bearing, sprocket, chain and tightener prior to installing secondary sheave.

When anchoring brake band, use forward anchor hole if band is new or nearly new. Anchor pin may be advanced to rear hole as band wears.

Adjust brake clevis for maximum effectiveness without band drag.

To replace band, remove anchor pins, actuating lever and brake light switch. Rotate band rearward and out of chain case. Reverse procedure to reinstall new brake band.

SM71-110



After brake is properly adjusted, adjust brake light switch for full plunger depression. Lock switch in position and test light and brake effectiveness. Brake should be able to lock track at approximately 20 MPH.

# suspension

Bogie Wheel System:

The John Deere Snowmobile's ability to negotiate any snow covered terrain and to handle well at all speeds is directly related to the trailing bogie wheel system.

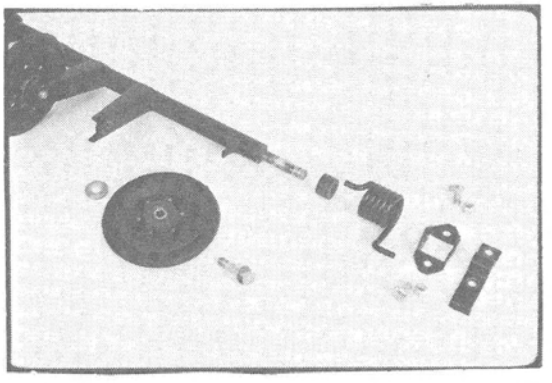
Correct maintenance and overhaul procedures will ensure smooth and trouble free operation.

SM71-111


Disassembly:

Repair or replacement of any of the (6) bogie wheel assemblies is simply a matter of removing (4) cap screws. Axle shaft and bogie wheel support is supported with resilient bushings to eliminate the need for grease fittings.

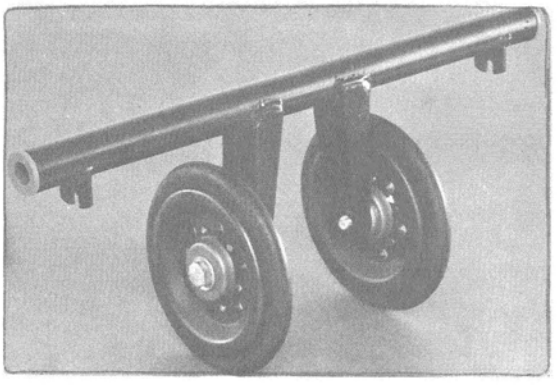
SM71-112



Service is reduced to inspection of parts for wear and replacement as needed.

Note that springs have a right and left placement. Be sure to assemble correctly. Long hooked leg of spring is clamped to rear of bogie axle.

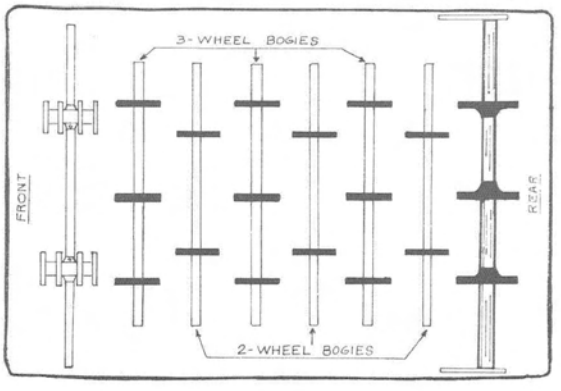
SM71-113



Bogie Wheel System Assembly:

Bogie wheels have sealed, anti-friction bearings. If worn or damaged, bogie wheels are to be replaced as an assembly. Be sure to tighten bogie wheel cap screw firmly.

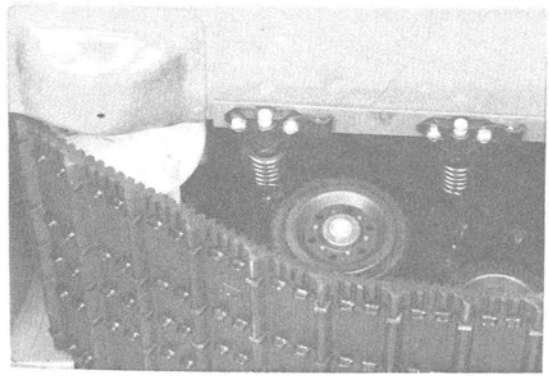
SM71-114




Two and three bogie wheel assemblies are arranged in an alternate pattern for equalized support of track. Be sure to replace assemblies in the pattern shown when reassembling.

Drive Axle - Removal:

SM71-115



The drive axle assembly can be removed for servicing without major disassembly of the suspension system or power train.
Remove axle drive sprocket from chaincase (See Chain Service section) and R.H. axle flange bearing cap screws. Remove cap screw from R.H. track drive sprocket and slide axle to the right, lift up and out. Rear track idler assembly should be removed to release track tension.

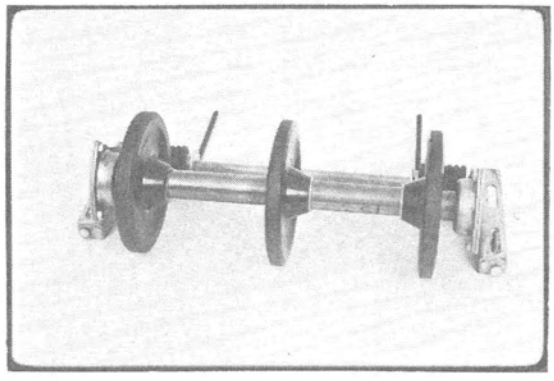
Drive Axle Inspection and Assembly:

Inspect track drive sprockets for wear or damage when servicing the axle assembly and/or bearings.

Note condition of track drive sprockets. Feathered lugs indicate that the snowmobile was run without snow lubrication. Replace sprockets if lugs are worn beyond 25% of lug diameter or, if steel lug pins are exposed.

Track Rear Idler Assembly:

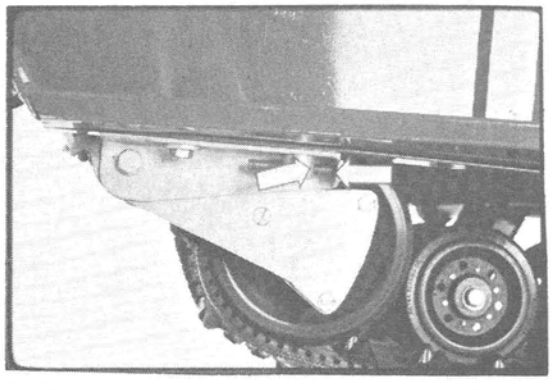
SM71-116



Track rear idler assembly consists of three idler wheels mounted on a pivoting axle. The pivoting axle is spring loaded to provide constant and equalized track tension.

Assemble outer idler wheels with hubs facing inward. Center idler may face either side, providing the short spacer is positioned on hub side of center idler wheel.

SM71-117



Track alignment and tension is accomplished by tightening or loosening adjusting bolts attached to "idler" mounting brackets.

All idler components are serviceable and should be inspected for wear whenever track or suspension work is required.

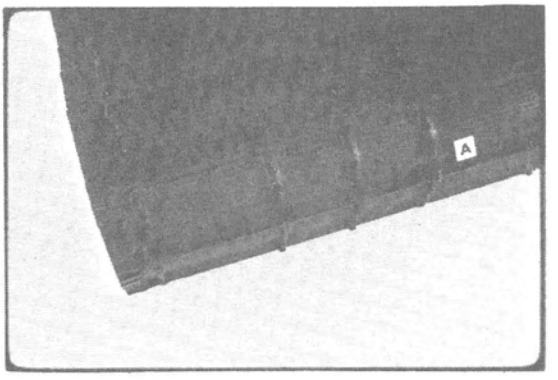
Track Removal:

To remove track, remove front drive axle assembly, all (6) bogie wheel assemblies and the rear track idler assembly.

Track Inspection:

The following slides are to be used as a guideline for determining track failures, which are or are not considered warranty.

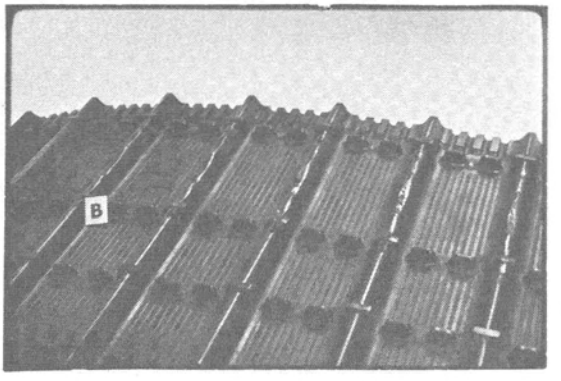
SM71-118




Condition A - Warranty

Cracks extending the full width of the track and/or down through the tensil cords.

SM71-119

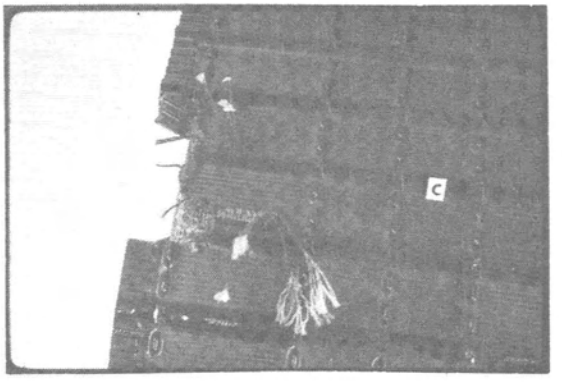



Condition B - Non-Warranty

This wear condition is due to operator tilting the machine on edge for carburetor adjusting purposes.

The operator should be advised of the detrimental affect of this procedure unless caution is taken.

SM71-120



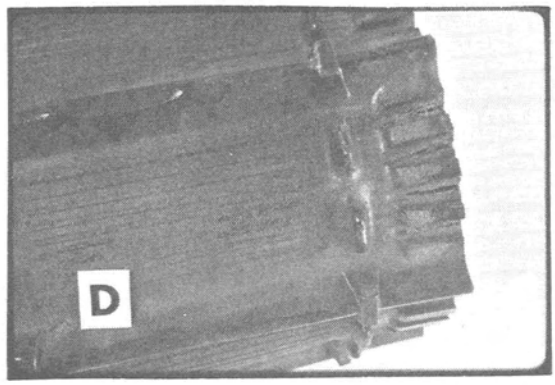

Condition C - Non-Warranty

Result of insufficient track tension, jumping, or overload.

SM71-121

Condition D - Non-Warranty

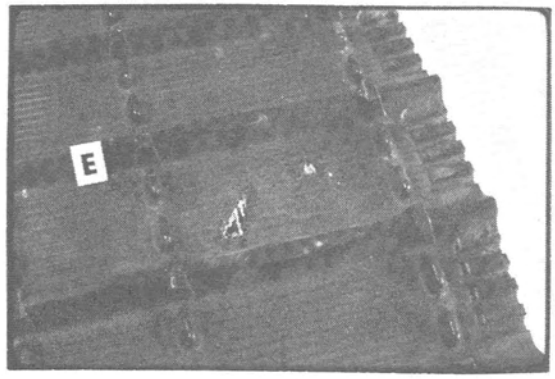
Edge cracking and minor cracking at the base of sipes and on track face.




SM71-122

Condition E - Non-Warranty

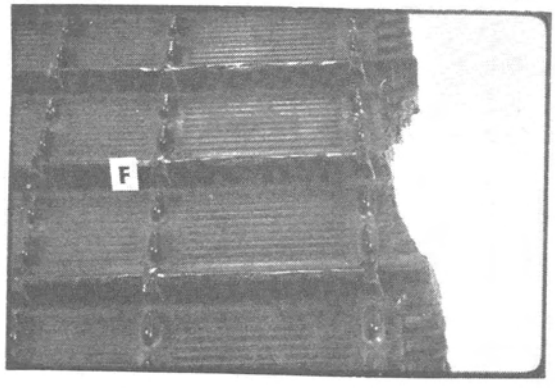
This shows an example of surface blemishes, which is not detrimental to track serviceability.



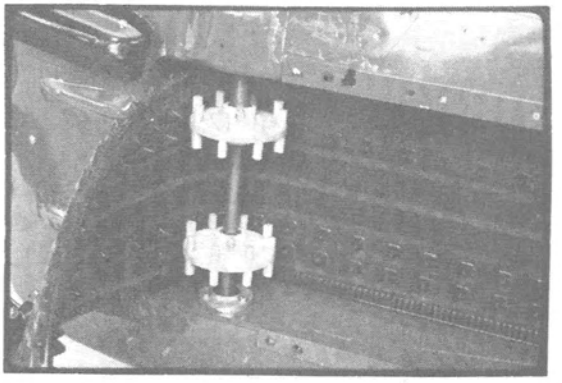

SM71-123

Condition F - Non-Warranty

Track edge damage caused by contact with rear track idler hangers. Track to hanger contact is possible when running over obstructions, insufficient track tension, jumping and overloading.



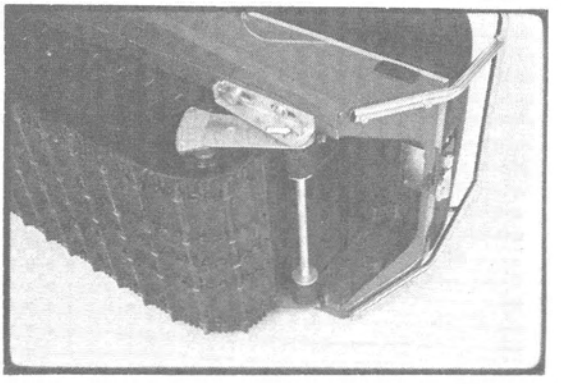
SM71-124



Track Installation:

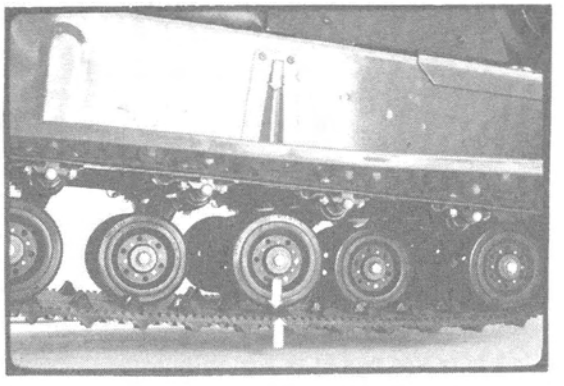
1. Position track into front of chassis.
2. Position drive shaft and sprocket assembly.
3. Install bearings and drive chain.
4. Rotate drive shaft after assembly to assure proper alignment and operation.
5. Install rear track idler assembly.

SM71-125



6. Install all (6) bogie assemblies alternating front to rear during assembly. The center (2) bogies being the last to be installed.
7. With all bogie assemblies installed, tighten all cap screws firmly with the exception of the rear track idler cap screws. These will be tightened after track adjustment is completed.

SM71-126

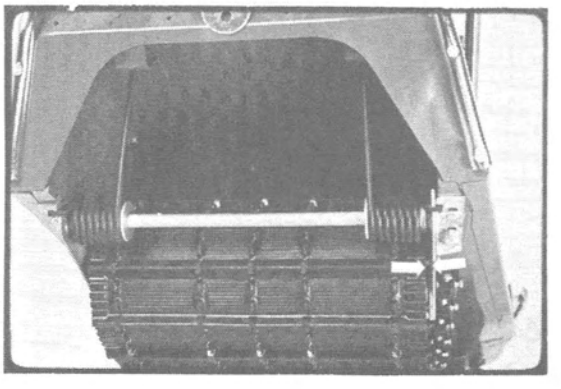


Track Tension Adjustments:

Tension track by turning adjusting screws equally on each side until 1/2-inch track sag is evident at center of bogie system with snowmobile blocked up off floor.

When proper tension and alignment is achieved, tighten the (4) idler bracket nuts securely.

SM71-127



Track Alignment:

Track tensioning and alignment work hand in hand.

After proper track tension is achieved, trial run snowmobile and check track alignment. Track tension adjusters must be adjusted to provide equal spacing between track and pivot brackets. Loosen one and tighten the other until track runs true.

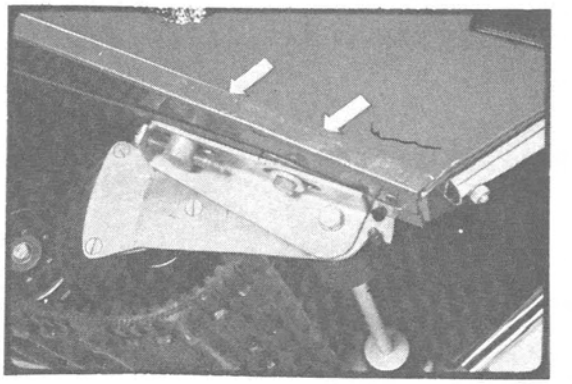
Later Tension Adjustments:

If parts wear or track should become stretched slightly after lengthy use, you may use up the entire length of adjustment on the adjusting screw.

There are additional adjustment holes provided on each side of the machine... both sets of bolts can be moved into holes to the rear of their present locations.

This rearward move of adjusters will provide a complete new range of track adjustments.

SM71-128

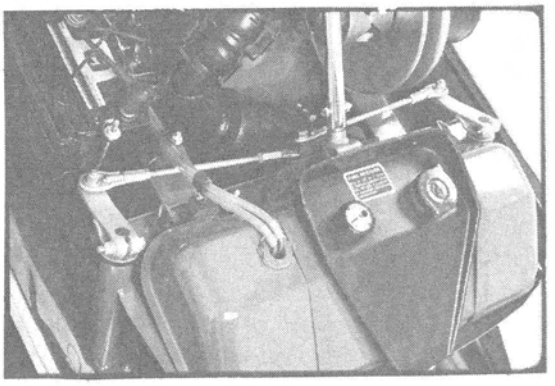


# steering

Steering System:

The steering system consists of a two piece steering column, adjustable tie rods, steering arms and spindles.

SM71-129

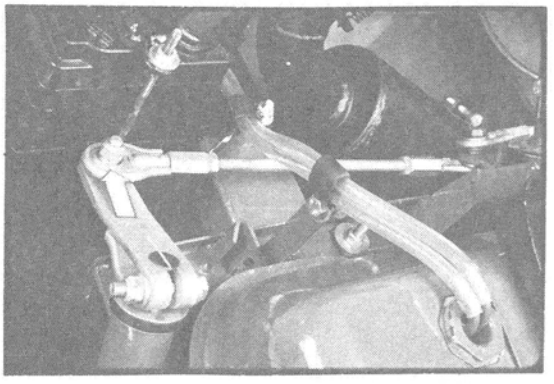


Disassembly and Inspection:

When disassembling steering, note position of left and right steering arms and the steering arm to spindle index marks.

Also, note positions of tie rods where they attach to steering column plate.

SM71-130

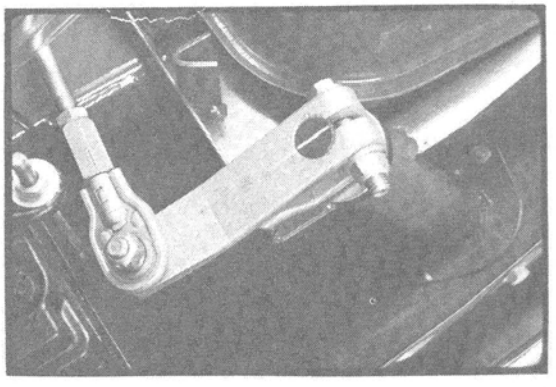


Assembly:

When assembling, be sure to position correct steering arm to its respective spindle. They are marked "L" and "R". Align index marks as shown.

Install tie rods with rolled edges up and use a spacer washer between tie rod and arm.

SM71-131

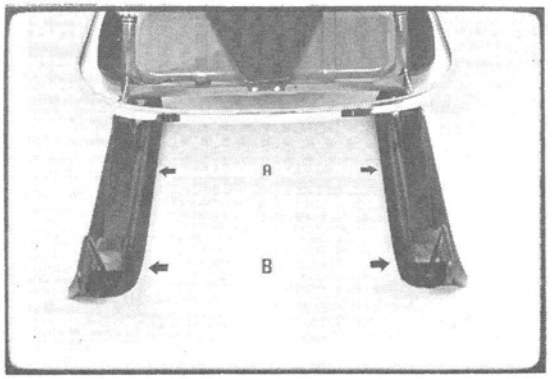


Adjusting Steering System:

Set handlebars in a straight forward position. Take measurements from the inside of each ski at the point where the wear rods are bolted to the top of the skis.

Take a second measurement at rear of skis just ahead of point of taper. If measurements are unequal, adjust each tie rod until the skis are parallel with each other.

SM71-132



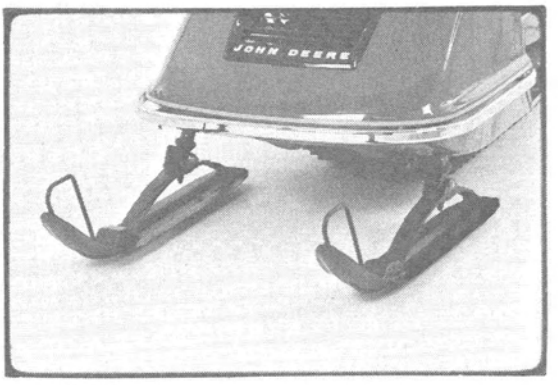
Ski System:

The ski system is designed for both steering and impact cushioning.

The ski tips enable the ski to glide over the snow without digging in.

The leaf springs are designed for comfort and proper handling ease. All ski components are manufactured from high quality, heat-treated steel to provide the ultimate in operator safety.

SM71-133




Repair Kit AB13919 Hood

Disassembly and Inspection:

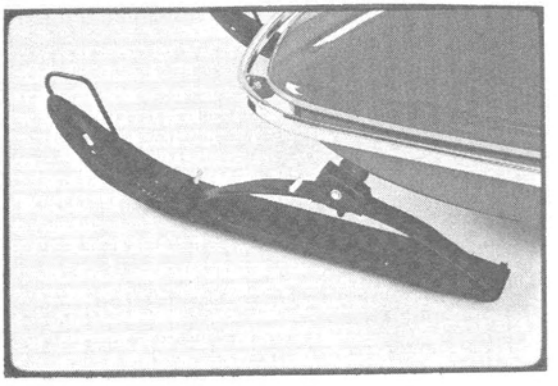
Visually check all components for wear, cracks, distortion and damage. Replace any questionable parts before assembling.

Replace ski wear rods if worn more than one-half of original thickness.

Inspect and replace wear plate under front of spring, if worn.

To provide the ultimate in safe operation, the spring leaves are not serviced separately. Any damaged or broken spring leaves require complete spring assembly replacement. Spring leaves fail progressively. Therefore, a single leaf replacement simply moves fail point to the next leaf. Complete spring assembly replacement helps eliminate the fail possibility and its resulting danger of ski loss.

SM71-134

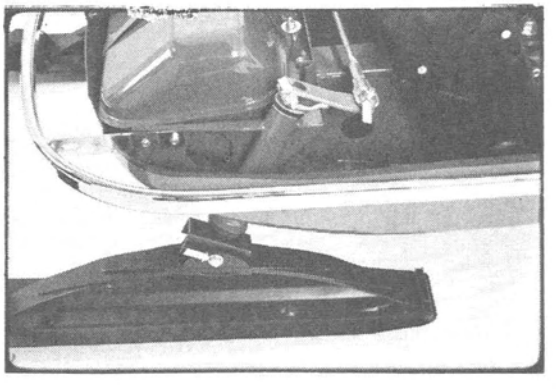


Assembly:

When assembling skis, be sure to use grade 5 cap screws or better to ensure against breakage.

Be sure cap screw heads are marked with either three or six marks as shown.

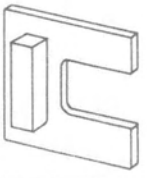
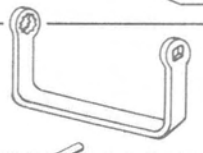
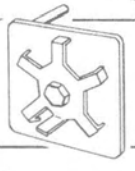
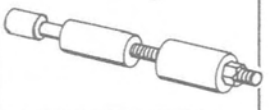
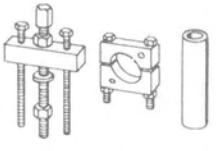
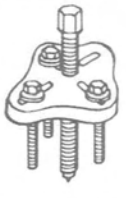
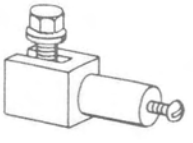
SM71-135



Lock nuts are utilized on all cap screws for safer operation.

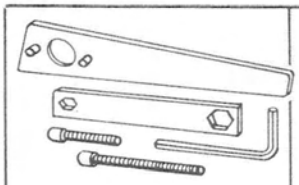
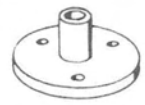
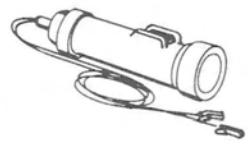
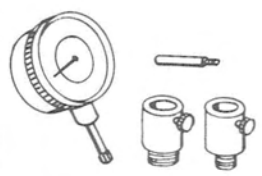
Be sure to torque all cap screws firmly whenever servicing.

# ESSENTIAL
# Special Service Tools
# for
# SNOWMOBILES

| | | |
|---|---|---|
|  | JDM-2 | FLYWHEEL HOLDING TOOL...Used to prevent rotation of flywheel during removal and installation of the retaining nut. For application on KEC 340 & 440 engines ..... |
|  | JDM-4 | SALSBURY CLUTCH SPRING TOOL...A dual purpose tool to release and/or seat the tension springs used in Salsbury clutches ..... |
|  | JDM-5 | CYLINDER NUT WRENCH...Provides a means of removing and then retorquing the cylinder to crankcase nuts on KEC 340 & 440 engines.. |
|  | JDM-6 | RECOIL STARTER SPRING WINDING TOOL...Makes the winding of KEC 340 & 440 recoil starter springs a fast, safe and easy operation..... |
|  | JDM-7 | PISTON PIN SERVICE SET...Removes and installs piston pins of KEC 340 & 440 engines without danger of damage to piston or rod bearings.. |
|  | JDM-8 | CRANKSHAFT BEARING SERVICE SET...Removes and installs the crankshaft bearings on both ends of KEC 340 & 440 crankshafts ..... |
|  | JDM-9 | FLYWHEEL PULLER ASSEMBLY...This versatile puller, provided with metric cap screws to remove the flywheels of KEC 340 & 440, can also be used with other sizes of cap screws to remove flywheels of most other consumer product engines ..... |
|  | JDM-10 | DIAL INDICATOR MOUNTING BRACKET...Used with JDM-15 or equivalent dial indicator to measure the crankshaft runout on KEC 340 & 440 engines..... |

CONTINUED

# ESSENTIAL SERVICE TOOLS

| | | |
|---|---|---|
|  | JDM-12 | SALSBURY CLUTCH SERVICE SET...Tool contains a ramp plate holding tool, ramp plate nut wrench, and clutch assembly puller to service both models of Salsbury clutches ..... |
|  | JDM-13 | SPROCKET PULLER...This tool is essential to the removal of the lower drive sprocket from the chain case of all John Deere snowmobiles. |
|  | JDM-14 | CONTINUITY TESTER...Used in conjunction with the JDM-15 to quickly and accurately establish engine timing. Ideal for locating open and closed circuits as well. For use on all snowmobiles and tractors ..... |
|  | JDM-15 | SNOWMOBILE TIMING INDICATOR...Dial indicator reading in .001 increments with 1" range and collar for fastening into the 14mm and 18mm spark plug hole adapters also included. Used with JDM-14 continuity tester to establish engine timing. Also used with tool JDM-10 to measure crankshaft runout. In addition, this tool is required to check crankshaft twist. Tool is used on all KEC 340 & 440 engines ..... |

# CONVENIENCE
# Special Service Tools
# for
# SNOWMOBILES

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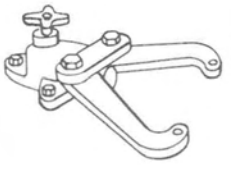
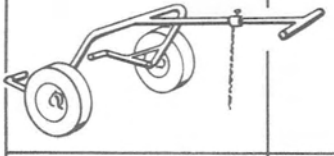
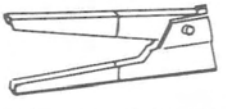
|  | JDM-16 | BENCH MOUNTED SERVICE FIXTURE...This tool will become an indispensable item in your shop--its universal design allows for mounting of all consumer product engines, as well as such things as hydrostatic units, selective control valves, hydraulic pumps and many more. When mounted, any component weighing 350 lbs. or less may safely be rotated 360° with positive stops at 90° increments ..... |
|  | JDM-17 | SNOWMOBILE DOLLY...Excellent for moving snowmobiles in and out of shop or display areas. Large 400 x 8 pneumatic tires make for easy operation. One model fits all units both wide and narrow track ..... |
|  | JDM-18 | POP RIVET TOOL...Heavy-duty hand operated pop rivet tool can be used with rivets up to 5/16" dia. with steel cores ..... |
|  | JDM-19 | 10MM METRIC SOCKET...10mm 12 point metric socket, 3/8" square drive. High quality alloy steel construction..... |
| | JDM-20 | 13MM METRIC SOCKET...13mm 12 point metric socket, 3/8" square drive. High quality alloy steel construction..... |
| | JDM-21 | 22MM METRIC SOCKET...22mm 12 point metric socket, 3/8" square drive. High quality alloy steel construction ..... |
|  | JDM-22 | 10MM METRIC COMBINATION WRENCH...High quality alloy steel construction ..... |
| | JDM-23 | 13MM METRIC COMBINATION WRENCH...High quality alloy steel construction ..... |

CONTINUED

# CONVENIENCE SERVICE TOOLS

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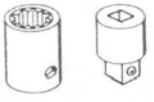
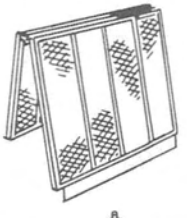
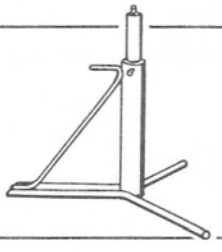
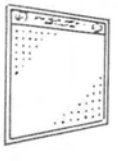
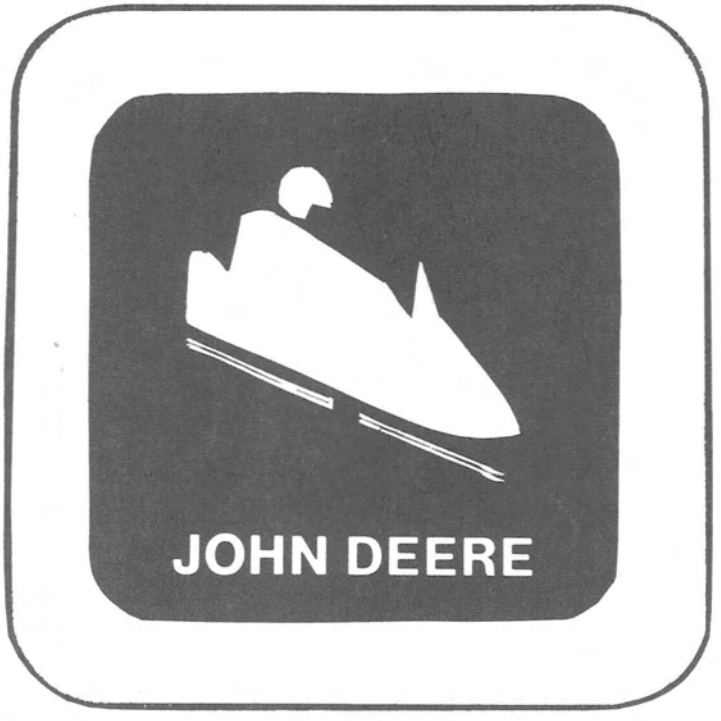
|---|---|---|
|  | JDM-24 | 1-1/8" SOCKET...1-1/8" 12 point socket with 1/2" square drive. For use with torque wrench on ramp nut of Mod. 400 snowmobile converters ..... |
|  | JDM-25 | 1-1/2" SOCKET & ADAPTER...1-1/2" 12 point socket 3/4" square drive with 3/4" to 1/2" sq. drive reducing adapter--for use with torque wrench on ramp nut of Mod. 500 snowmobile converters ..... |
|  | JDM-26 | FOLD-A-RAMP LOADING PLATFORM...41" wide, 1,000 lb. capacity ramp attaches to pickup tail gate. Folded ramp is 36" high. Lowered ramp extends 7' to ground where snowmobiles or lawn and garden tractors can quickly be loaded or unloaded ..... |
|  | JDM-27 | REAR STAND...Unit designed to hold snowmobile track off floor when machine is being serviced or stored..... |
|  | 41332 | TOOL STORAGE PANEL...Standard 24" x 28-1/2" pegboard panel for storage of tools not assigned to a specific tool board. Uses standard pegboard hangers on 1" centers. Organizes and stores tools for ready accessability. Imprinted with large "SERVICE TOOLS FOR JOHN DEERE" decal ..... |

# SERVICE NOTES:


JOHN DEERE