JOHN DEERE

UP- DATED

SERVICE TEXTBOOK

for

JOHN DEERE

340 Liquidator

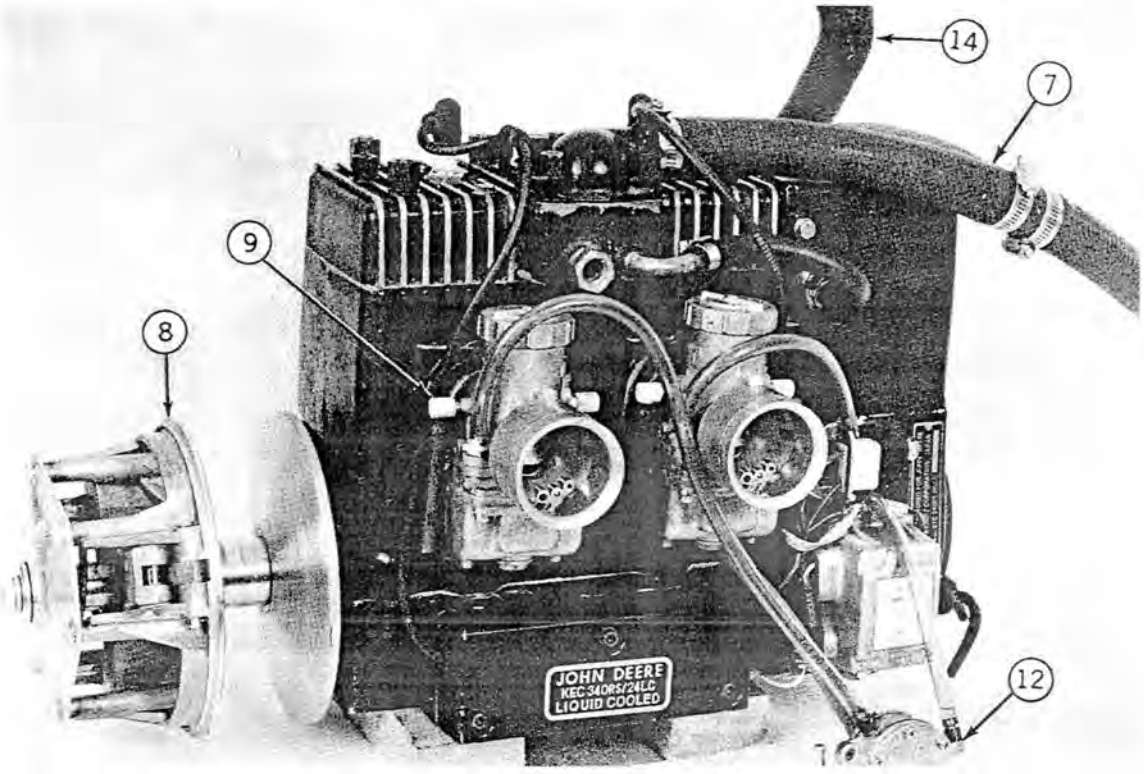
Litho in U.S.A. I-6 M67054

CONTENTS

LIQUIDATOR REBUILD PROGRAM 270M
1976 340 Liquidator (Serial No. 55,001-70,000)

The 1976 340 Liquidator did not perform as expected, resulting in some dissatisfied customers. This rebuild program was implemented to correct the premature piston scoring, clutch failure, and structural failures encountered in this past season.

The following parts are listed for your information as to what went into your 1976 Liquidator under the rebuild program.



Engine Kit Parts

*1. New, specially cammed pistons with rings.

*2. New cylinder assembly with new bore size.

*3. New gaskets.

*4. New piston pin needle bearings.

*5. New thermostat.

*6. Carburetor main jet changes.

7. Improved cooling system by-pass and all new hoses.

8. New primary drive clutch.

9. Improved carburetor venting.

*10. New rebuilt water pump.

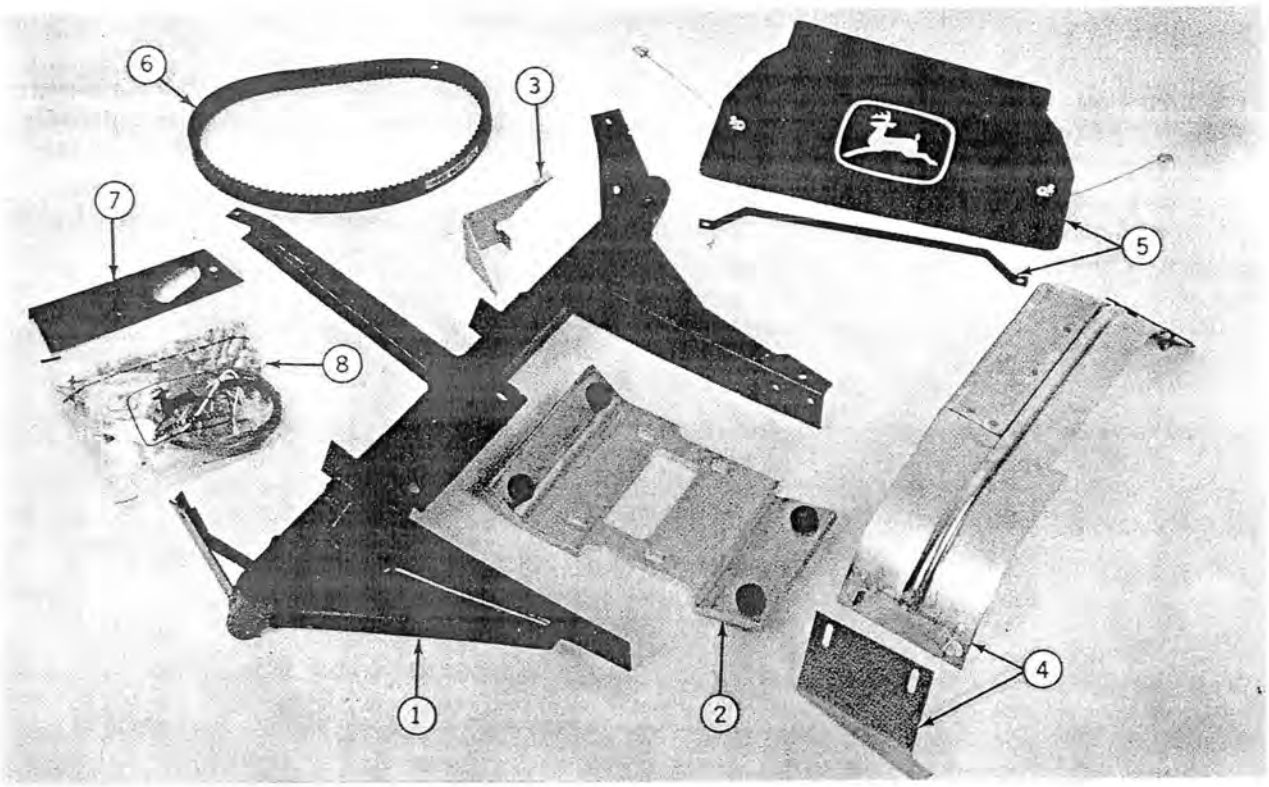
*11. Rebuilt and new ignition system.

*12. New fuel pump and hoses.

13. New carburetors (See page 11 for new parts added).

14. New lower engine hose.

NOTE: * *Parts not shown.*



Kit Parts

1. New front frame.
2. New engine base plate and mounts.
3. New fuel pump bracket.
4. New aluminum belt guard and bracket.
5. New snow flap and support.
6. New drive belt.
7. New reinforcement, R.H.
8. Bag of parts. Includes the following: new tensioner and spring assembly, new ski bolts, rail reinforcement bars, torque buttons, new brake pads, new chain case cover seal, all new hardware washers, bolts, nuts, cotter pins, and pop rivets.

The above parts will be installed on all snowmobiles. In addition the suspension and other related components will be checked for cracks and welded if necessary.

New coolant will be added to the cooling system. Chaincase oil will be replaced and the secondary torque buttons will be epoxied in place.

The snowmobile will be run on a chassis dyno for final performance check.

SPECIFICATIONS

COMPONENT	ITEM	SPECIFICATIONS
ENGINE	Manufacturer Model No. of Cylinders Bore Stroke Displacement Cooling	JD/Kioritz KEC 340 RS 24/LC 2 60 mm 60 mm 339 cc Liquid
FUEL SYSTEM	Carburetor Fuel Mixing Ratio	Mikuni VM 36 (2 used) 50:1*
ELECTRICAL SYSTEM	Ignition Spark Plug Timing (Dynamic) Lighting Coil Capacity	WICO, Capacitor Discharge Champion QN-19V (AM53787) 0.065 inch (17^{o}) BTDC 120 Watt
POWER TRAIN	Clutch Secondary Clutch Engagement Engine Maint. Speed Final Drive Ratio: Standard Optional Brake Drive Belt	Comet 102CS John Deere 4000 rpm (Max.) 8000-8500 rpm 1.86:1 1.67:1, 2.05:1, 2.47:1 Mechanical Disk M66345
TRACK AND SUSPENSION	Suspension Type Track Width Length	Slide (Wheel Kit Optional) Gates Poly Grouser 15.4 inches 121.73 inches, 3.29 pitch
CHASSIS AND BODY	Material: Tunnel and Pan Hood Windshield Overall Length Overall Width Overall Height Ski Stance Wheelbase Weight (lbs.)(w/coolant)	 Aluminum Fiberglass Polycarbonate 107.5 in. 40 in. 39 in. 32 in. 72 in. 500 lbs.
CAPACITIES	Fuel Type Coolant Type Chaincase	8.00 U.S. Gallons Premium Grade 4.0 Quart 50/50 Solution Ethylene Glycol/Water 5 ounces, SAE 30

*With John Deere snowmobile oil and Premium Grade gasoline. Use 40:1 ratio for first tankful.

DETAILED ENGINE SPECIFICATIONS

ITEM	NEW PART DIMENSION	WEAR TOLERANCE
Cylinder Bore	2.365 to 2.366 in.	2.371 in.
Connecting Rod (Small End)	0.9058 to 0.9063 in.	0.9071 in.
Connecting Rod Side Clearance (Large End)	0.013 in.	0.024 in.
Crankshaft Runout (Max.)	--------	0.003 in.
Crankshaft End Play (Max.)	--------	0.024 in.
Piston at Skirt	2.3575 to 2.3583 in.	2.350 in.
Piston Pin Bore	0.7476 to 0.7487 in.	0.7500 in.
Piston Pin	0.7477 to 0.7480 in.	0.7461 in.
Compression Pressure*	110 to 130 psi	

*Check compression with engine cold and throttle in wide open position. Pressure should not vary by more than 10 psi between cylinders.

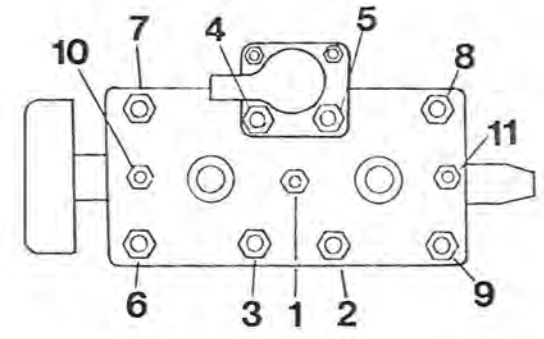
TORQUE SPECIFICATIONS

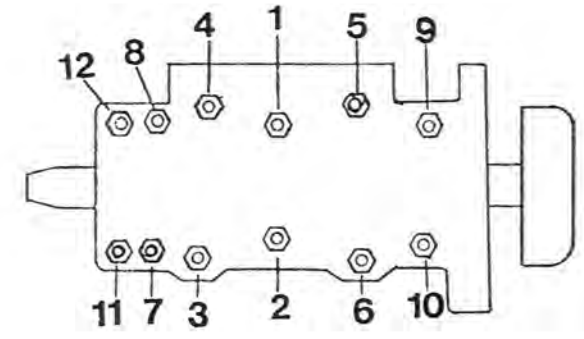
Cylinder Heads..... 8 mm - 175 in-lbs
10 mm - 260 in-lbs

Crankcase.....260 in-lbs

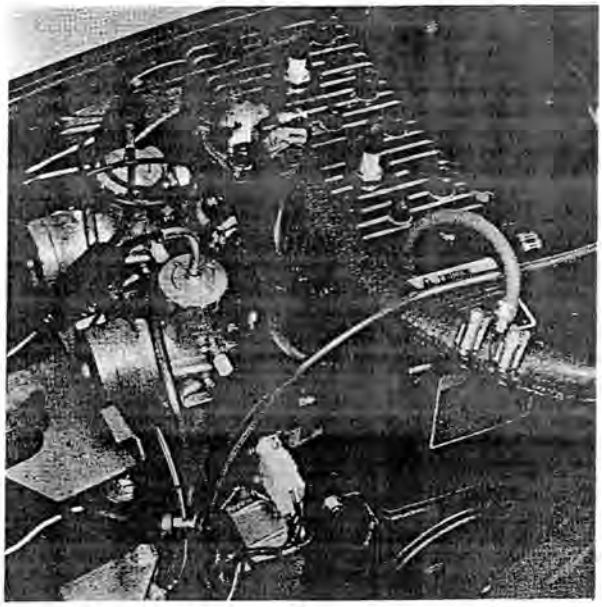
Flywheel.....60 ft-lbs

TORQUE SEQUENCE





ENGINE



The Kioritz 340 RS 24/LC engine is a totally new engine in the John Deere line and has the following features:

1. Liquid Cooling - This results in increased and more consistent power output, increased reliability, better fuel economy and lower sound levels.

2. Twin Carburetors - The two VM-36 Mikuni slide valve carburetors provide better breathing for increased power.

3. Capacitor Discharge Ignition - Wico CD ignition provides quicker starting, reduced plug fouling, and features surface gap spark plugs to eliminate spark plug induced pre-ignition.

4. Piston-Ported - To provide high output at high rpm.

5. Twin Expansion Pipes - To provide a broader power band.

6. Forged Pistons - these feature high strength, high silicone aluminum alloy with specially cammed and profiled skirts. Skirts are finished with a waved surface for better oil retention and lower friction. Two chrome half keystone piston rings are fitted for improved sealing and life. (See Page 9.)

7. Crankshaft - The crank is fitted with six main bearings for better support and features full circle throws for better balance and breathing.

8. Cast Iron Liners - To provide increased life.

9. PTO Seal Guard - To protect seal from failed drive belts and to better retain the seal.

IMPORTANT: Due to the high output of this engine, the following precautions must be taken to prevent engine failure:

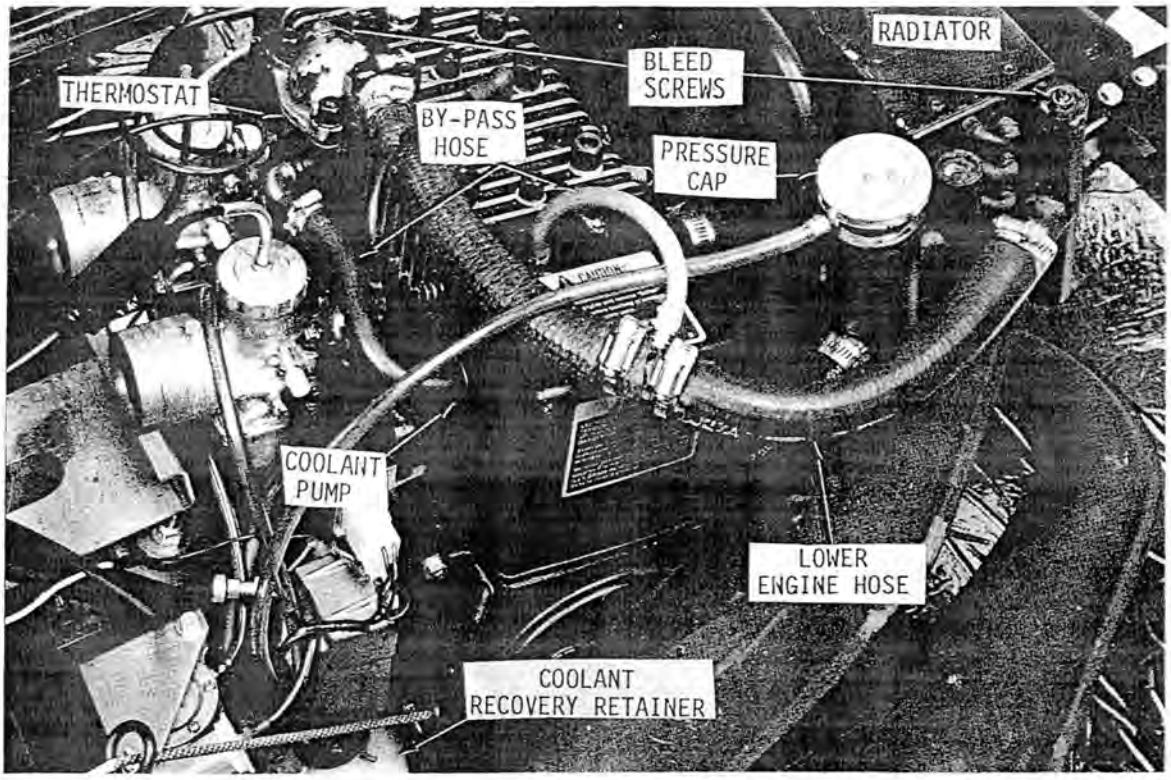
1. Use only Premium Grade leaded gasoline.

2. Mix gasoline and oil in a 50:1 ratio. (40:1 for first tankful).

3. Proper break-in is critical. DO NOT exceed 40 mph for the first 25 miles, nor force machine at full throttle in deep snow. An occasional burst of full power on hard packed snow will not be harmful.

4. Always warm-up engine prior to making a high-speed run.

5. Keep cooling system full, coolant pump belt tight, and radiator clean. Never allow temperature gauge needle to move out of yellow and into red zone. Shut down or increase travel speed with reduced load if this occurs.



Operation

The normal flow of coolant is from the radiator to the coolant pump, through the cylinders and cylinder heads, across the thermostat and then back to the radiator for cooling.

When the thermostat is closed (below 140°F.), coolant is not circulated through the radiator. The pump circulates coolant through only the engine using the by-pass hose.

When system pressure builds beyond 14-17 psi (cap pressure) some coolant passes the pressure cap and is caught in the coolant recovery container. When the system cools, this coolant is pulled back into the radiator.

Coolant

Use ethylene glycol anti-freeze mixed 50/50 with clean water. This provides protection to -40° Fahrenheit.

Do not use rust inhibitors, stop leak, or any other additives in the cooling system.

Draining System

Remove radiator pressure cap and remove lower engine hose to drain block. Flush sled with water after draining.

Cleaning System

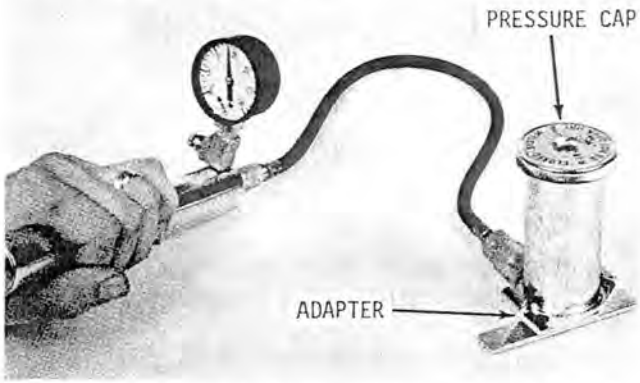
After draining, remove radiator hoses and back flush radiator with clean water. Do not use flushing additives.

Filling System

1. Remove bleed screws from cylinder head (1) and radiator.
2. Fill system until coolant runs out cylinder head bleed port. Install bleed screw and continue to fill until coolant runs out radiator port. Install final bleed screw and fill radiator to top, continue to fill until coolant runs into coolant recovery container, (Approx. 1/2 full). Install pressure cap.
3. Run for 5 minutes or to 140° on temperature gauge. Let cool and check coolant for proper level.

NOTE: The cooling system pressure tester shown in the following tests is a standard automotive unit available through Deere Gard as number JDM-77.

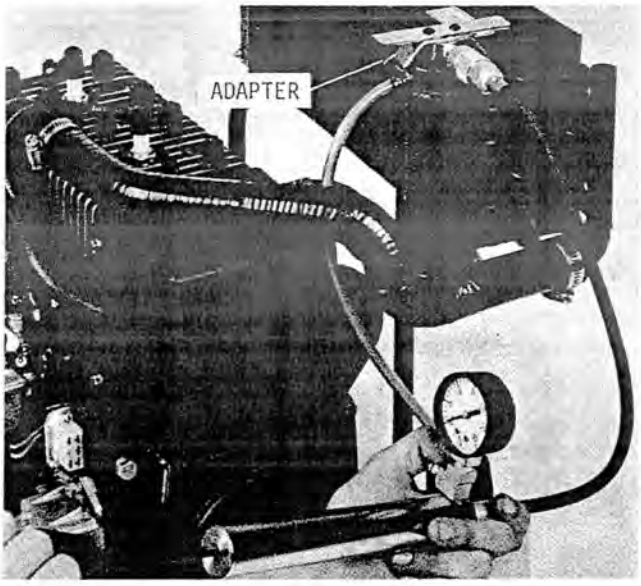
TESTING PRESSURE CAP



1. Install radiator pressure cap into tester as shown above.

2. Apply pressure to cap. Air should not leak past cap seal until 14-17 psi is reached. If it does, replace cap.

TESTING SYSTEM

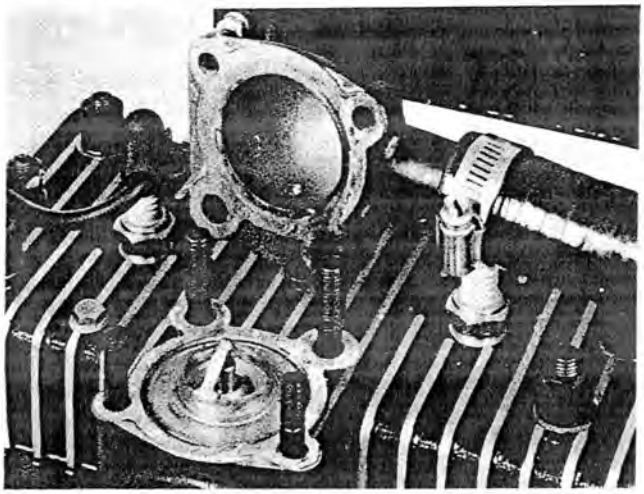


1. Connect pressure tester to radiator as shown above.

2. Pressurize system to 20 psi and shut off valve.

3. If system will not hold 20 psi without leakback, look for leaks at hose connections, coolant pump, cylinder heat, etc.

REPLACING THERMOSTAT



1. Drain system.

2. Remove outlet housing and remove thermostat.

3. Thermostat can be tested as follows:

   a. Suspend thermostat and thermometer in a container of water.

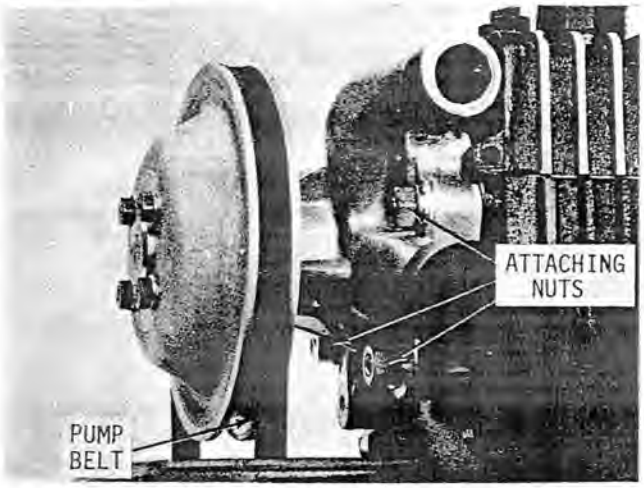
   b. Heat and stir water.

   c. Thermostat should begin to open at 140°F. It should be fully open (approx. 1/4 inch) at 162°F.

   d. Remove thermostat and observe closing.

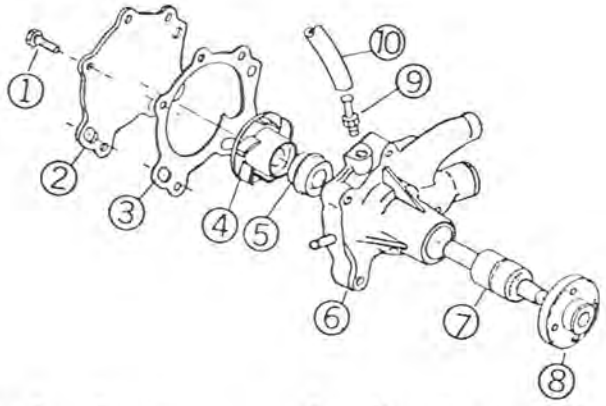
4. Reinstall in opposite order, using a new gasket. Be certain temperatures sensing portion of thermostat is installed into cylinder head as shown above.

PUMP BELT TENSION



1. Remove pump cover.
2. Belt should deflect no more than 3/8" when deflected midway between sheaves.
3. Tighten belt by loosening three pump attaching nuts and pivoting pump upward at rear. Tighten nuts.

PUMP REPAIR



1.	Cap Screw	6.	Housing
2.	Cover	7.	Bearing
3.	Gasket	8.	Pulley Bracket
4.	Impeller	9.	Pump Bleed
5.	Seal	10.	Pump Bleed Hose

A pump repair kit is available and consists of an impeller, gasket, seal and bearing.

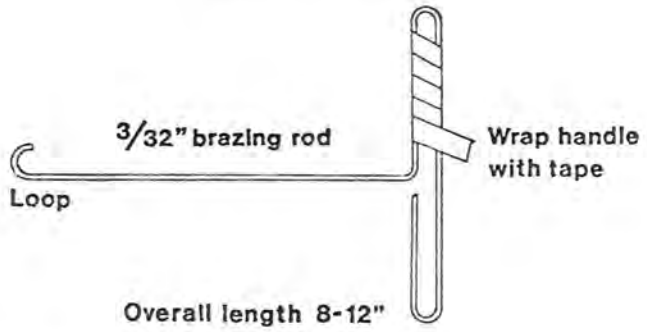
Disassembly

1. Remove pulley bracket by pressing shaft out of bracket.
2. Press the bearing, seal and impeller out bottom of housing.
3. Press bearing out of impeller.

Assembly

1. Press new seal into housing.
2. Coat bearing with light oil and press bearing outer race until it is flush with the top of the housing.
3. Press pulley bracket onto bearing shaft until flush.
4. Press impeller onto bearing shaft until approximately 0.009 inch clearance is provided between impeller and housing. Impeller must rotate freely after assembly.

EXHAUST SYSTEM



The tool pictured above can be easily constructed for removing or installing exhaust system springs quickly and safely. Hook the loop of the tool on the spring and pull to hook or unhook springs.

REPLACING PISTONS OR CYLINDERS

Disassembly

1. Drain coolant and remove exterior components; carburetors, coolant pump and exhaust manifold.
2. Remove cylinder head and cylinders, exposing pistons.
3. Remove pistons, using JDM-7 Piston Pin Set.

Repair

1. Clean aluminum off cylinders, if necessary, using sodium hydroxide. Lightly hone to remove score marks. Clean with soap and water after honing.
2. Check piston and cylinder clearances. See specifications on page 3.

Assembly

Clean up gasket surfaces and use new gaskets when assembling. Coat all moving parts with snowmobile oil prior to assembly.

1. Heat piston by placing on a 100 Watt light bulb.
2. Install pistons. IMPORTANT: To prevent piston ring ends from hooking the exhaust port, position piston so the ring retaining pins are on the intake side.
3. Install cylinder assembly being certain rings are properly positioned on pistons.
4. Install cylinder head and torque nuts in sequence shown on page 3.
5. Reinstall exterior components.

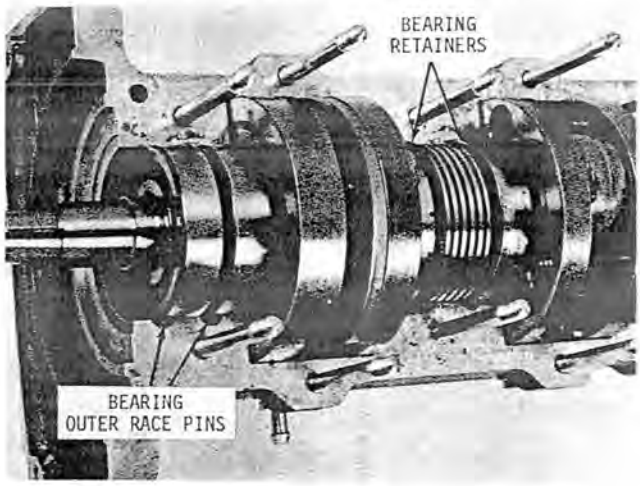
REPLACING CRANKSHAFT

Disassembly

1. Remove cylinder assembly and pistons.
2. Remove recoil starter, flywheel, stator and timing ring.
3. Separate crankcase halves using a mallet if necessary and lift out crankshaft.

Repair

1. Check condition of seals and bearings. Outer bearings (PTO or flywheel end) can be removed using Deere Gard puller set D-01049AA.
2. New bearings can be installed after heating inner race on a 100 Watt light bulb. Note position of outer race retaining pins. Pins must be to outside.
3. Check crankshaft runout, end play and connecting rod side clearance. See specifications on page 3.

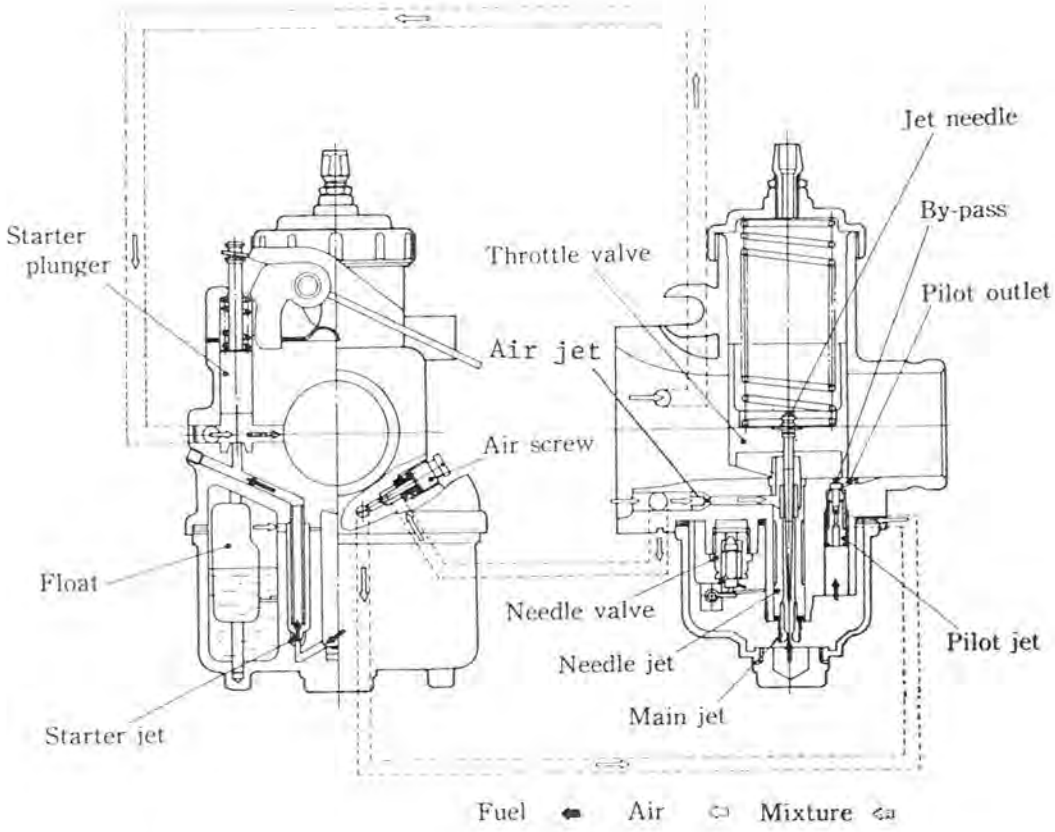


Assembly

1. Install crankshaft into upper crankcase half. Be certain seals and bearing retainers are properly positioned and that bearing outer race pins are in notches as shown above.
2. Coat sealing surfaces with a thin coat of RTV sealant (M64850). Install lower crankcase half and torque to specifications in sequence. See page 3.

FUEL SYSTEM

CARBURETOR



The functions of the Mikuni carburetor can be divided into the following: Pilot system, main system, float system and choke system.

PILOT SYSTEM (IDLE)

The pilot system consists of the pilot jet, air screw, pilot outlet and bypass. The ratio of the air/fuel mixture is controlled by adjusting the air screw.

MAIN SYSTEM

The main system consists of the air jet, jet needle, needle jet, main jet, and throttle valve. The ratio of air/fuel mixture is controlled by the jet needle and needle jet at mid-range and by the main jet at top end.

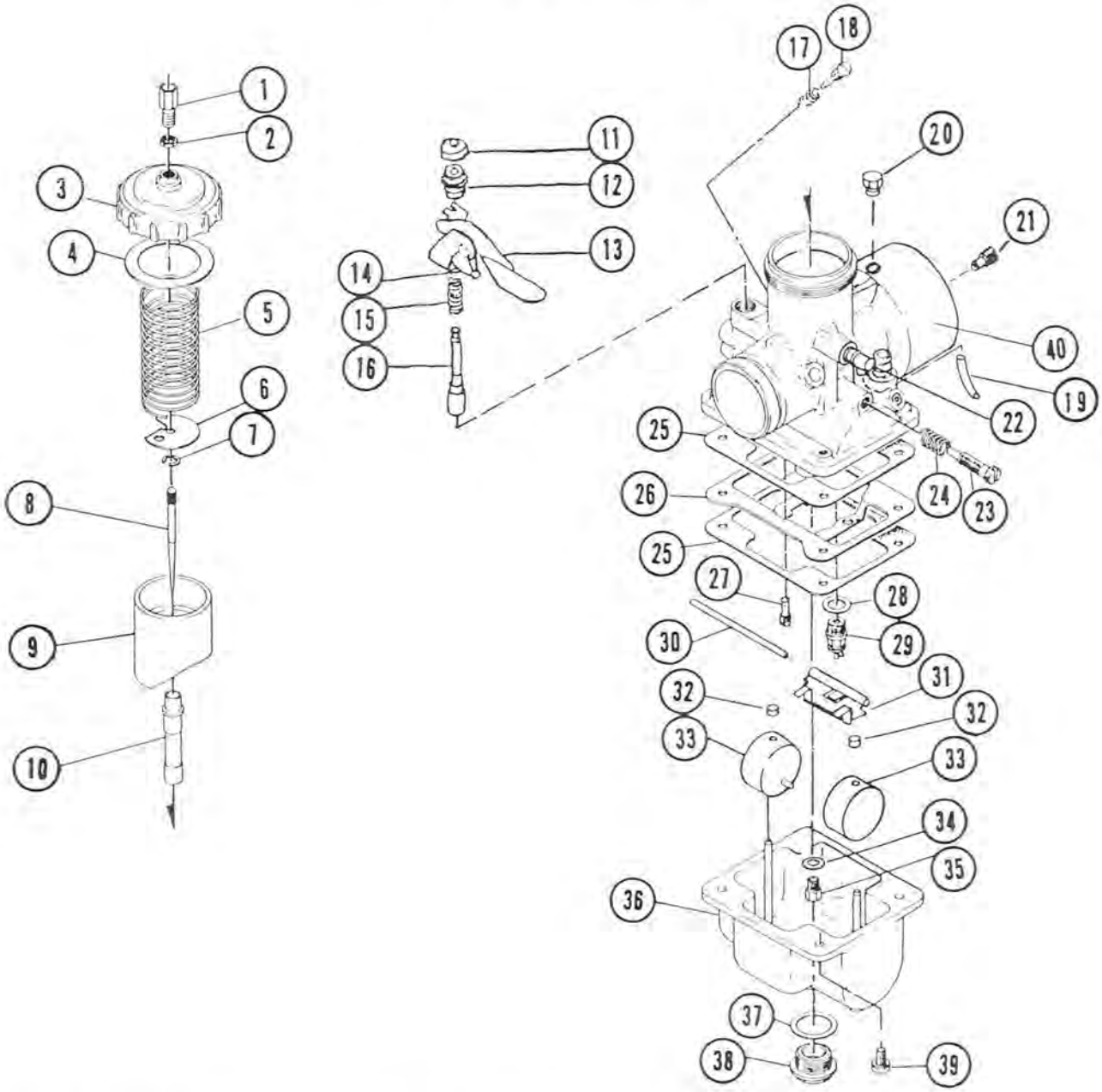
FLOAT SYSTEM

The float system consists of (2) independent floats and needle valve. The independent float system, along with a fuel surface stabilizing plate, maintain and stabilize the fuel at a constant level.

CHOKE SYSTEM (Fuel Enrichener)

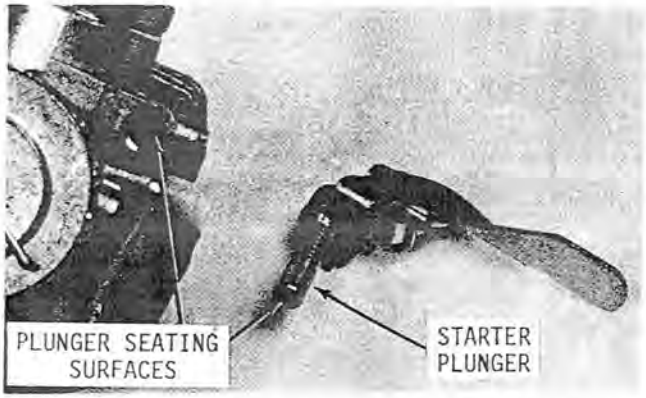
The choke system consists of the starter jet and starter plunger. This system meters additional fuel through a completely separate system, thus eliminating the need for a choke valve in the bore of the carburetor.

EXPLODED VIEW OF MIKUNI VM 36-45



1. Swivel Adapter
2. Lock Nut
3. Cap
4. Gasket
5. Throttle Valve Spring
6. Plate
7. E-Ring
8. Jet Needle (6DH4)
9. Throttle Valve (3.0)
10. Needle Jet (P-4, 159)
11. Rubber Cap
12. Plunger Fitting
13. Choke Lever
14. Leaf Spring
15. Plunger Spring
16. Plunger
17. Air Screw Spring
18. Air Screw
19. Vent Tubes (2)
20. Hex Screw Plug
21. Air Jet (0.7)
22. Tube Fittings (2 used)
23. Throttle Stop Screw
24. Stop Screw Spring
25. Gaskets (2 used)
26. Baffle Plate
27. Pilot Jet (50)
28. Gasket
29. Needle Valve Assembly
30. Float Arm Pin
31. Float Arm
32. Caps (2 used)
33. Floats (2 used)
34. Flat Washer
35. Main Jet (240)
36. Float Body
37. Gasket
38. Drain Plug
39. Screws (4 used)
40. Body

CHOKE SYSTEM



The choke system meters additional fuel for starting a cold engine. As the system requires negative pressure in order to function the throttle must be closed when starting.

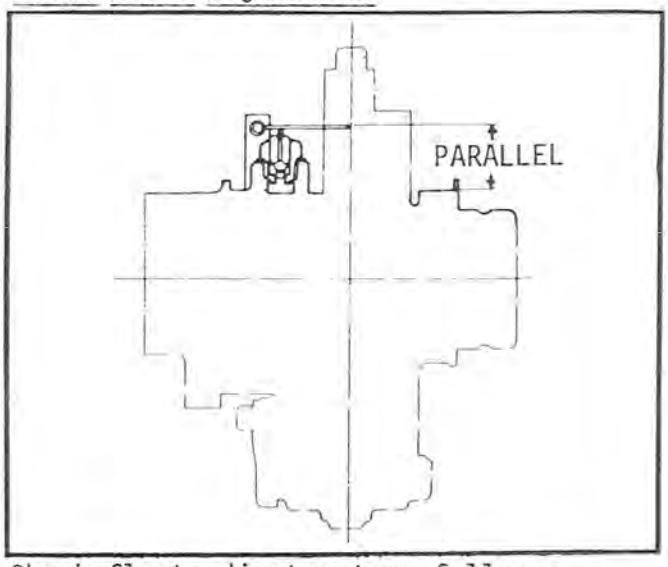
IMPORTANT: If the starter plungers do not properly seat when shut off, the carburetors will run RICH, adversely affecting the other systems.

Remove starter plungers from carburetor body. Check plunger seating surface for particles, or deterioration that could cause leakage. Also check seating surface in carburetor body.

Reassemble and check plungers for free operation and adequate retention in the "OFF" position.

ADJUSTMENTS

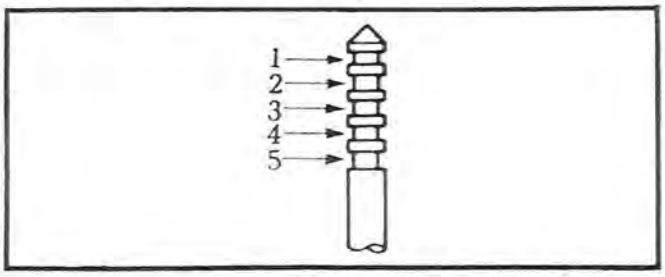
Float Level Adjustment



Check float adjustment as follows:

1. Remove the float chamber body from the carburetor.
2. Invert the carburetor. The float arm should be parallel to the float chamber seating surface on the carburetor body as shown above.
3. Bend needle-valve actuating tab, if necessary, to make parallel.

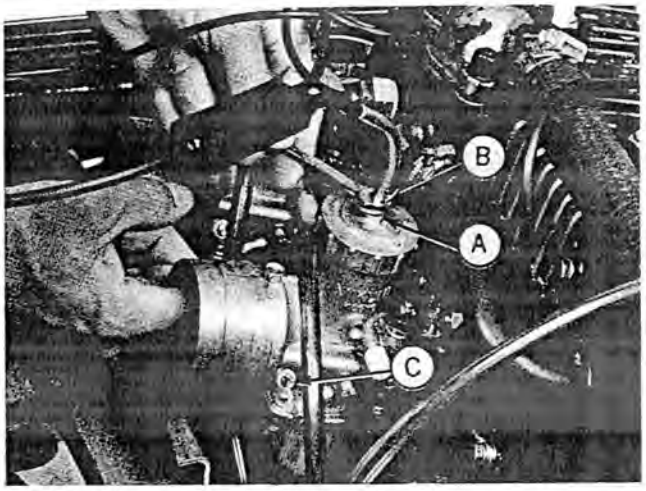
Jet Needle Adjustment



The jet needle can be set in one of 5 different settings to fine tune the mid-range mixture ratio. This setting does not affect idle or full speed operation.

The E-ring is factory assembled in groove No. 2 Groove No. 1 provides leaner mid-range operation; groove No. 5 provides richer midrange operation.

SYNCHRONIZING THE CARBURETORS



1. Clamp the throttle lever in the full throttle position, using either a strong rubber band or clamp.

2. Loosen lock nuts (A). Turn swivel adapters (B) clockwise or counterclockwise as required to make back edge of throttle valves (intake side) flush with top of carburetor bore.

3. Then back out swivel adapters (B) (counterclockwise) five complete turns. This will completely open valves making them flush on front (engine side).

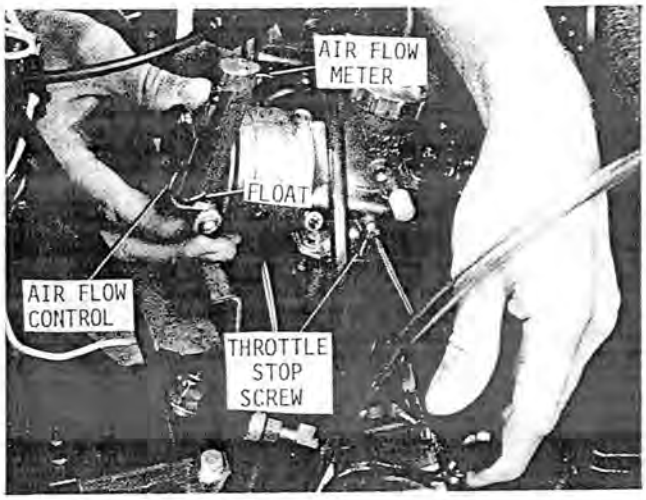
4. Carefully seat air screws (C). Back out 1-1/2 turns (counterclockwise).

5. Remove clamp from throttle and start and warm up engine. Turn throttle stop screws (equally) clockwise to raise idle speed; counterclockwise to lower speed. Idle speed should be 2200-2500 rpm.

   NOTE: It may be necessary to adjust air screws (C) slightly to provide smoothest idling. Turn screw out to lean mixture and in to enrichen mixture.

6. Open air flow control and place Air Flow Meter (JDM-64-2) over carburetor throat. Tube must be in a vertical position.

7. Slowly close air flow control until float (in tube) lines up with a graduated mark on tube.



8. Place air flow meter on second carburetor, without changing adjustment of air flow control.

9. Adjust throttle stop screw on second carburetor to bring float to same level as in step 7.

10. Support machine so track is off ground. Start engine and run at 4000 rpm. Place a wedge in throttle lever to maintain engine at this rpm.

11. Use Air Flow Meter (as in steps 6-8) to determine if carburetors are synchronized at this rpm. If not, turn swivel adapter counterclockwise on carburetor with lowest float level until float levels match.

    NOTE: Hold air flow meter on carburetor just long enough to get a reading. If placed over carburetor too long, engine will falter.

MIKUNI-JOHN DEERE PART NUMBERS

Main Jets Available

Jet	John Deere #	Jet	John Deere #
70	M66899	280	M65884
75	M66900	290	M66324
80	M66901	300	M66325
85	M66902	310	M66326
90	M66903	320	M66327
95	M66904	330	M66328
100	M66905	340	M66329
110	M66906	350	M66330
120	M65336	360	M66331
130	M65335	370	M66332
140	M65332	380	M66333
150	M65333	390	M66334
160	M65334	400	M66335
170	M65468	410	M66336
180	M65469	420	M66497
190	M65470	430	M66498
200	M65471	440	M66500
210	M65472	450	M66824
220	M65852	460	M66907
230	M65882	470	M66908
* 240	M65853	480	M66909
250	M65854	490	M66910
260	M65855	500	M66911
270	M65883		

Jet Needles

Mikuni #	John Deere #
6DH3	M65354
6DH2	M66656
6FL14	M66422
6DP1	M66926
6DH7	M66927
* 6DH4	M66928
6DP5	M66941

Throttle Valves - 36 MM

Mikuni #	John Deere #
0.5	M66884
1.0	M66885
1.5	M66886
2.0	M66887
2.5	M66658
3.0	* M66888
3.5	M66889

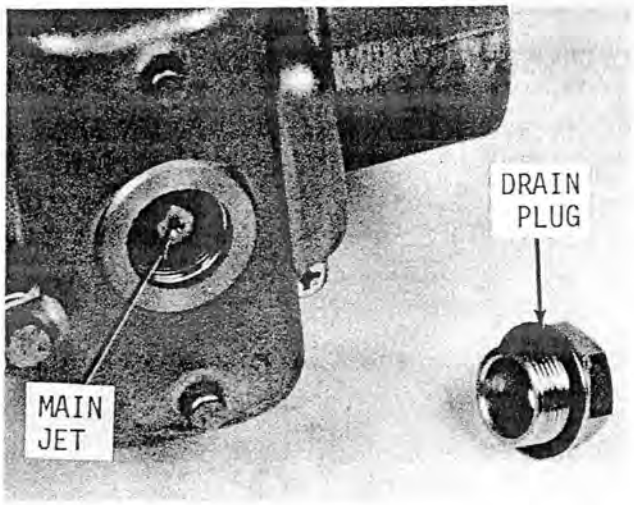
Main Jet Selection

The main jet meters fuel through the carburetor when operating in the 1/2-to-full throttle range. Temperature and altitude affect the density of air. In order to maintain a constant air/fuel ratio, which results in peak performance, the carburetors must be jetted richer or leaner for varying conditions.

Needle Jets	John Deere #	Pilot Jets	John Deere #	Air Jets	John Deere #
O-0	M66890	#15	M66912	0.5	M66499
O-2	M66891	#17.5	M66913	0.6	M66917
O-4	M66892	#20	M66745	0.7	M66033
O-6	M66893	#25	M66929	0.8	M66918
O-8	M66739	#30	M66844	0.9	M66919
P-0	M65340	#35	M66914	1.0	M66920
P-2	M66845	#40	M65355	1.2	M66921
P-4	* M66894	#45	M66746	1.4	M66922
P-6	M66741	#50	M66663	1.6	M66923
P-8	M66895	#55	M66672	1.8	M66924
Q-0	M66740	#60	M66915	2.0	M66925
Q-2	M66896				
Q-4	M66897				
Q-6	M66898				
Q-8	M66916				

* Factory Installed

CHANGING MAIN JET



To change the main jet, remove the drain plug from the bottom of the float chamber body. This provides access to the main jet.

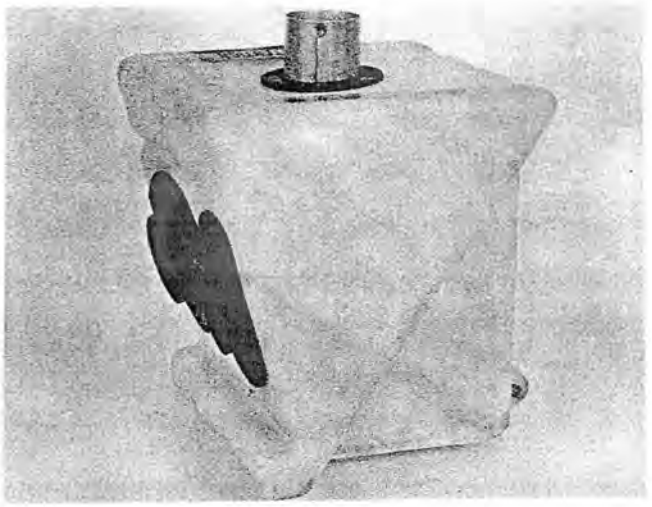
NOTE: Increased altitude - less fuel increased temperature - less fuel.

IMPORTANT: For maximum durability, the jetting should be as "rich" as possible for satisfactory performance. Indications of engine running lean can be noted by a very light coloring in the exhaust manifold, or very light color on the spark plug insulator.

INTAKE SILENCER

Periodically inspect foam filter for accumulation of debris or ice which could hamper performance.

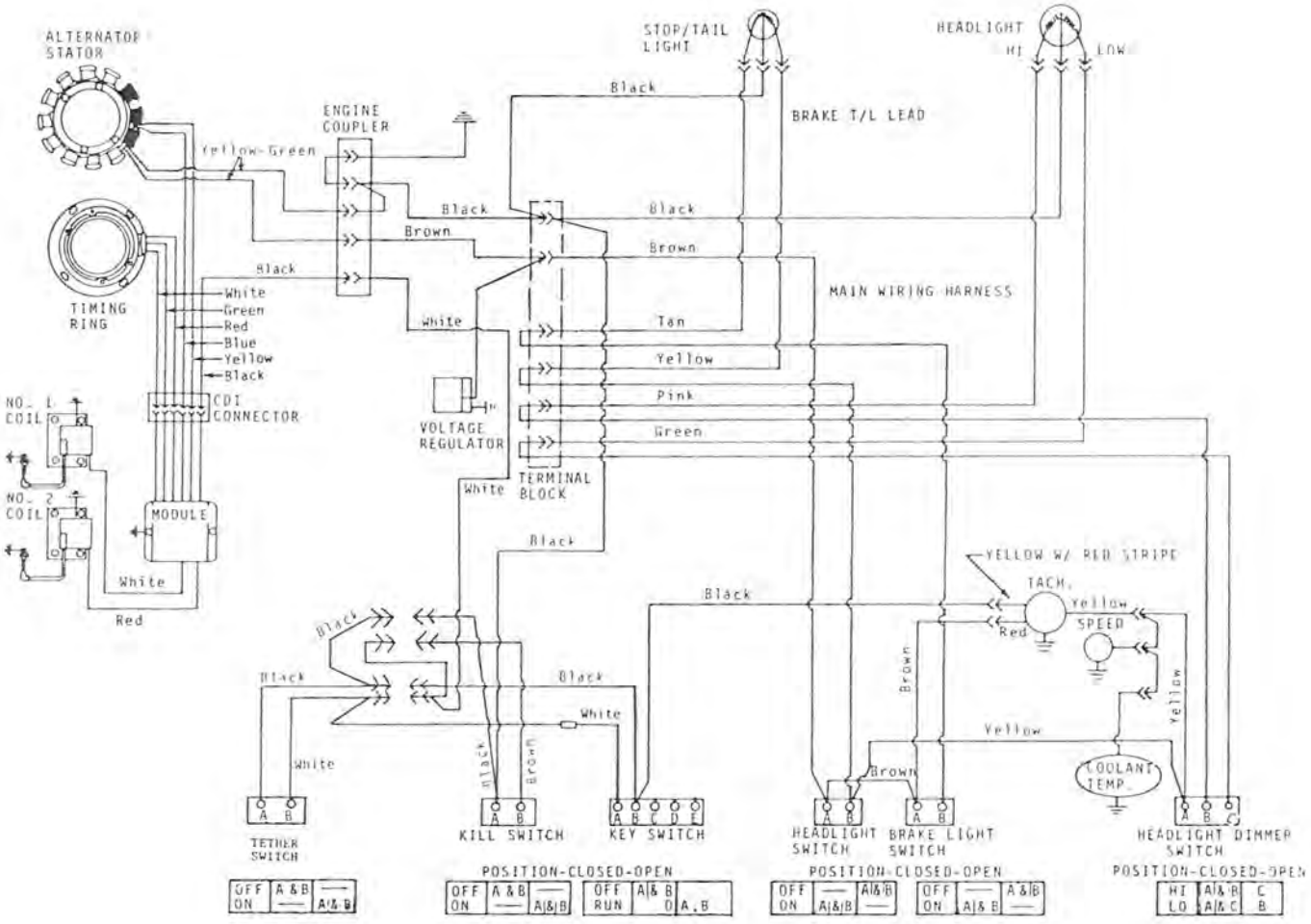
IMPORTANT: Never run engine without silencer as engine will run "lean". Removal of silencer will not improve performance.



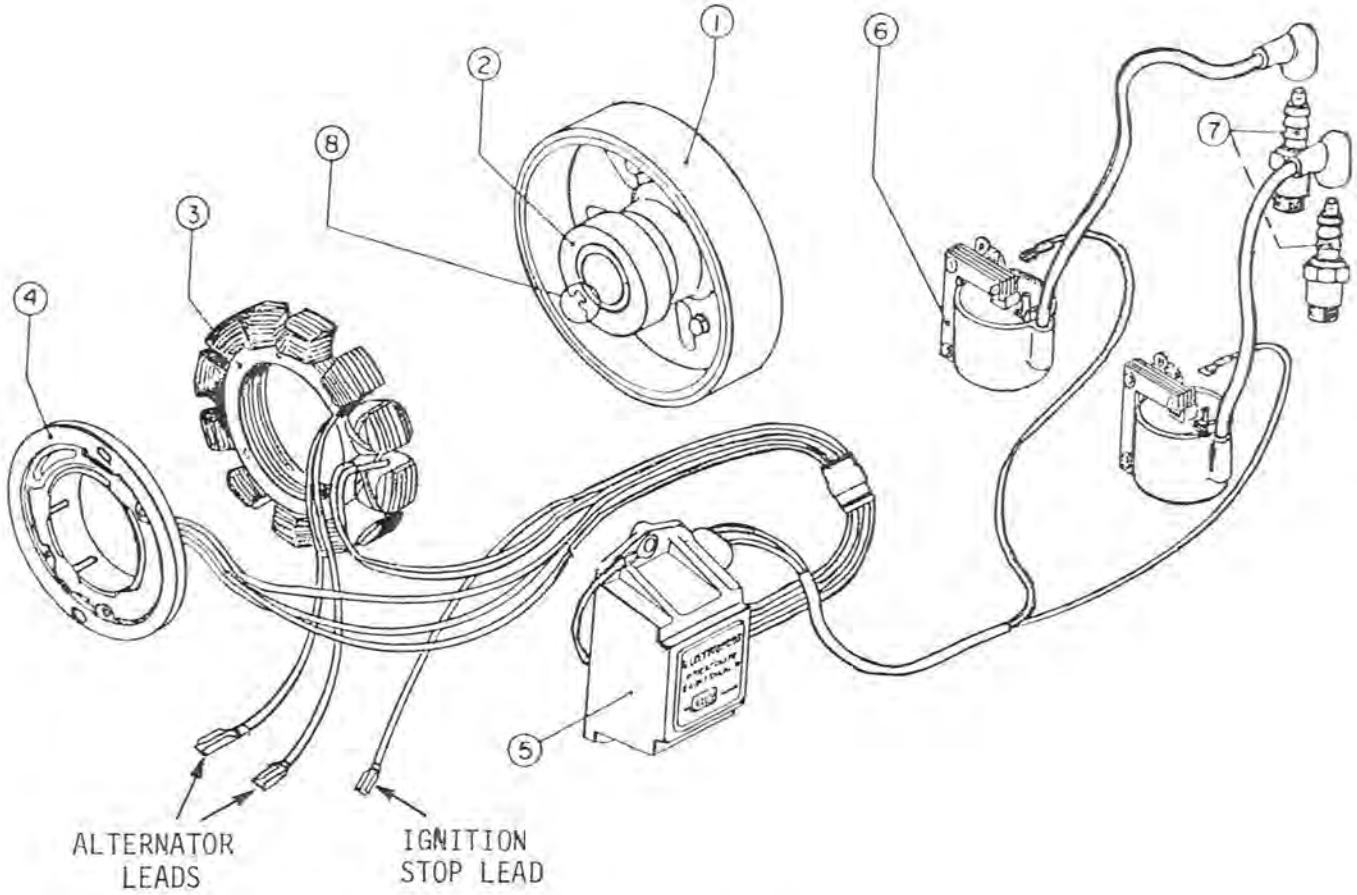
NOTE: Always check for air leaks around boots caused by improper assembly. Leaning out may occur if boots are not checked.

ELECTRICAL SYSTEM

WIRING DIAGRAM



IGNITION SYSTEM



1. Magnetic Flywheel Rotor
2. Ignition Timing Rotor
3. Alternator Stator
4. Ignition Timing Ring
5. Electronics Module
6. Ignition Transformers (Coils)
7. Surface Gap Spark Plug
8. Triggering Slot

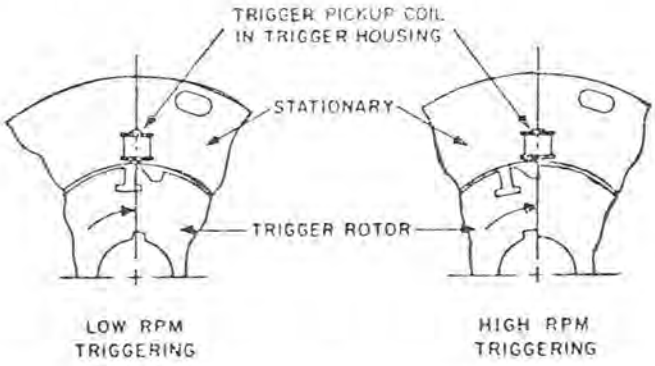
Principle of Operation

The Prestolite Electromag C. D. ignition system is a combination permanent magnet flywheel alternator and solid state breakerless capacitor discharge ignition system. The electromag is designed to supply the high voltage of the ignition system as well as generate the current required for lighting systems.

In operation, the flywheel rotor (1), which incorporates a special flexible magnet and is mounted on the engine crankshaft, revolves around the alternator stator (3) which is fixed to the engine. Current is generated in the windings on the twelve poles of the stator plate, nine of which supply power for the lights and three of which supply power for ignition.

The electronic module (5) incorporates the ignition capacitors and the necessary solid-state circuitry for charging and discharging them. The timing rotor (2) revolving within the timing ring (4) triggers the discharge of these capacitors through the electronics module to the ignition transformers (6), which "step up" the voltage to a level necessary to insure successful firing of the surface gap spark plugs (7). The special configuration of the triggering slot (8) in the timing rotor controls the electronic timing advance.

The triggering slot generates voltage in the trigger coils. In operation, the shallow portion of the triggering slot passes the trigger coils first.



However, at low RPM, the voltage generated by the shallow portion of the slot is not sufficient to trigger the electronics module. Therefore, the triggering is accomplished at the deep slotted portion. As engine speed increases to approximately 1000 RPM, the voltage generated by the shallow portion of the triggering slot becomes sufficient to trigger the electronics module, thereby advancing the timing 15 degrees. The retarded position allows easier starting.

PRELIMINARY CHECKS

⚠ *CAUTION: High Energy Ignition System can produce injurious electrical shock. Do not hold spark plugs, leads, or connectors in hand with engine running or when checking for spark.*

Check the black plug-in connector by electronics module to make certain connections are clean and tight. Check for broken leads and leads with damaged insulation. Check for clean and tight ground connections.

Using a test plug, check for spark discharges at both cylinders. If spark discharges are observed for both cylinders, the problem lies elsewhere in the engine. However, if engine starts but will not run over 2500-3500 RPM, the high speed windings on the stator or the electronic module could be at fault.

If spark discharges are not observed at the test plug, make certain the problem is not defective switches. This can be accomplished by uncoupling the large white coupler located above the electronic module, and repeating the check for spark discharges. This removes the key switch, kill switch and tether switch from the system.

If all checks to this point indicate a faulty ignition system, it is recommended that either an ohmmeter or the JDM-74 Tester be used to locate the faulty component.

TEST PROCEDURES

See Cyclone and Liquifire Service Manual (SM-2108) for JDM-74 Tester diagnostic procedures.

SPARK PLUGS

BRAND	PART NUMBER
Champion	QN-19V (AM53787)

A surface gap spark plug with a sooty appearance does not mean the plug is malfunctioning, as CD ignition is capable of firing a plug in this condition.

If the insulator around the center electrode appears "tracked", replacement is not necessary unless the "tracking" develops into a deep channel which can cause misfiring.

If the center electrode is burned back 1/32 inch below the insulator, the plug should be replaced.

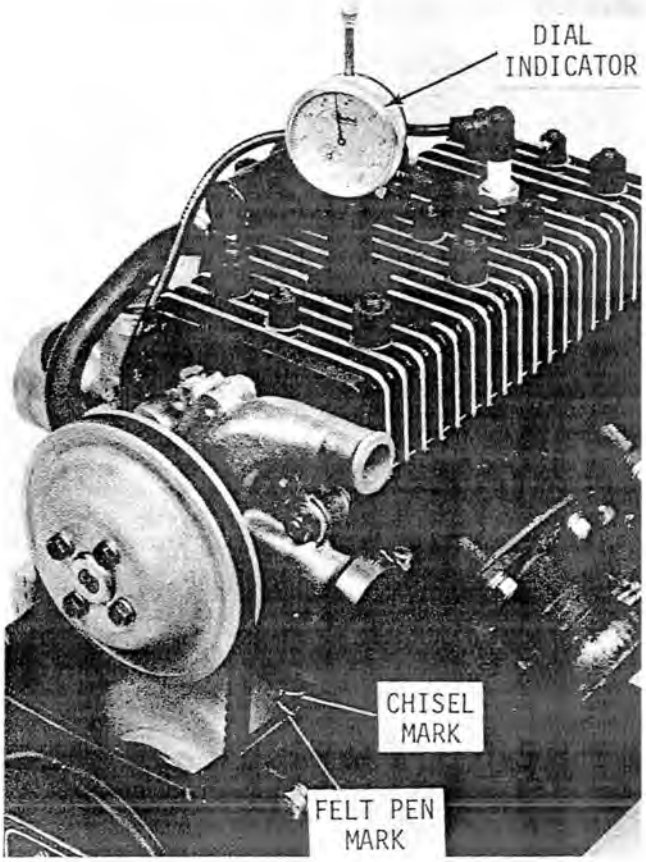
Spark Plug Color

Read the entire firing end of the plug, not just the insulator as in conventional plugs.

CONDITION	COLOR
Normal	Dark Brown
Too "Lean"	Light Brown
Too "Rich"	Black

IGNITION TIMING

Check and adjust ignition timing as follows:



1. Remove coolant pump cover. Using a small chisel, carefully mark the lip of crankcase by flywheel as shown above.

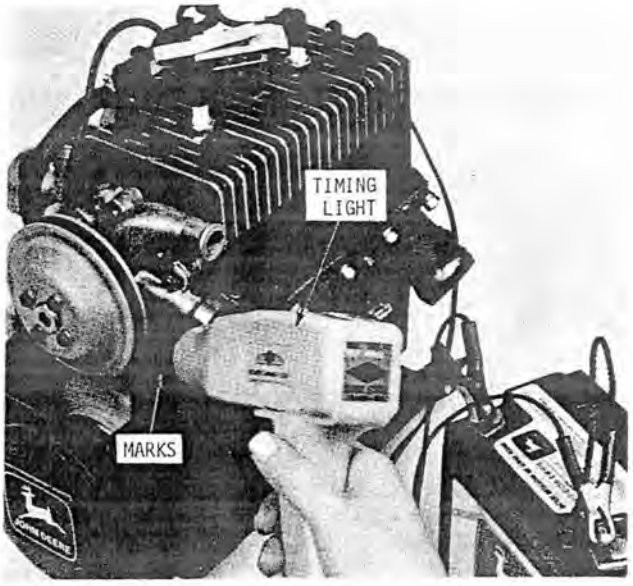
2. Install dial indicator in No. 1 spark plug hole.

3. Rotate crankshaft to locate TDC (Top Dead Center) and "zero" dial indicator.

4. Rotate crankshaft counterclockwise (opposite normal rotation) until dial indicator reads 0.065 inch BTDC (Before Top Dead Center).

5. With flywheel in this position, place a mark (with felt pen) on flywheel corresponding with chisel mark.

6. Remove dial indicator and reinstall spark plug.



7. Connect a timing light to No. 1 spark plug lead and to a 12-volt battery as shown above.

NOTE: A clamp-on type timing light (such as Merc-O-Tronic Model 712 pictured above) is preferred. CD ignition can damage a standard timing light.

8. Start engine and run at idle.

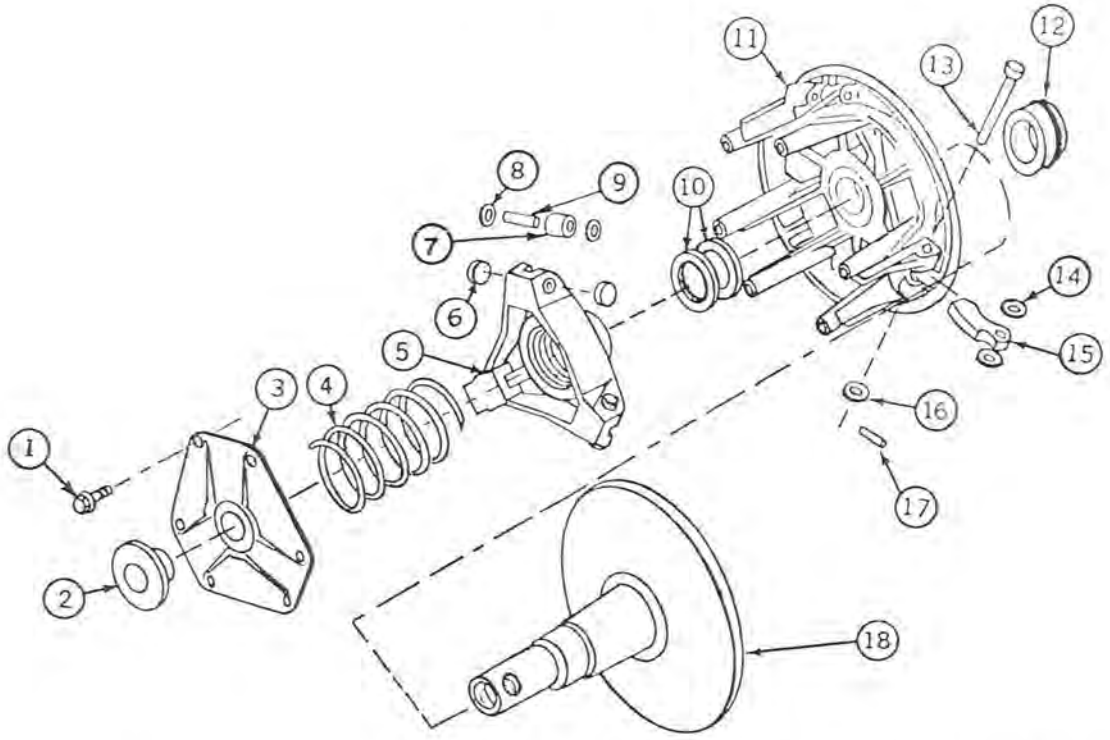
9. Aim timing light at flywheel. Marks should align.

10. If not, remove flywheel and alternator stator. Loosen (4) screws securing timing ring and rotate as necessary. Clockwise rotation retards timing: counterclockwise rotation advances timing. Retighten screws securely.

11. Reassemble and recheck timing.

POWER TRAIN

102CS COMET CLUTCH



1. Cap Screw (6 used)
2. Pilot Washer
3. Cover Plate w/Bushing
4. Cover
5. Spring (Brown)
6. Spider
7. Guide Button (6 used)
8. Thrust Washers
9. Roller Pin
10. Spacer Washer (2 used)
11. Movable Face
12. Movable Face Bushing
13. Pivot Pin (3 used)
14. Steel Washer (6 used)
15. Arms (Mod. F) (3 used)
16. Steel Washer (3 used)
17. Spring Pin (3 used)
18. Fixed Face w/Hub

Clutch Engagement	4000 rpm
Governed Engine Speed	8000-8500 rpm*

*At full upshift, engine may run 500 - 1000 rpm past maintenance speed, depending on operating conditions and gearing.

The modified "F" arms are notched to provide better acceleration. The clutch engages only slightly at 4000 rpm and does not shift hard until approximately 6000 rpm is reached. This prevents the engine from "bogging" at clutch engagement.

SERVICE

Use JDM-41-A clutch tool set for removal, disassembly, assembly, and installation. Refer to Cyclone and Liquifire Service Manual (SM-2108) for procedures.

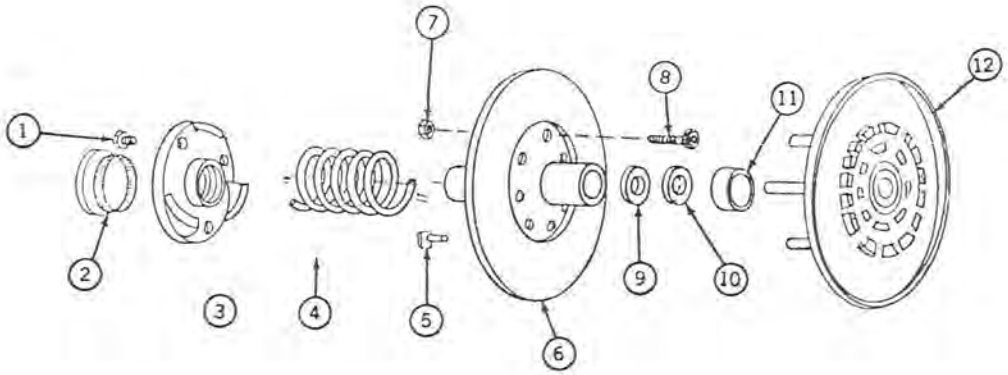
LUBRICATION

Duralon bushings (keys 3, 9, and 12) do not require lubrication. Lubricate cam arms and pivot pins (keys 13 and 15) with silicone spray or Never-Seez Lubricant. *NOTE: Use Loctite (grade AV, Red) on spider and hub threads.*

INSPECTION

Movable Face Bushings (keys 3 and 12) - check for excessive clearance with hub (key 18) which causes vibration, binding and a loss of engine maintenance rpm.
Roller Bushings (keys 8 and 9) - check rollers for freeness and excessive clearance. Excessive clearance puts arm in wrong relationship with roller, thus affecting performance.
Cam Arms - (key 15) - Check for free operation. If arms contact sides of spider (key 6), replace movable face (key 11) to reduce side clearance between guide buttons (key 7) and movable face.

SECONDARY SHEAVE



1. 5/16" x 1" Cap Screw (3 used)
2. Minlon Bushing
3. Cam Bracket (38^{o})
4. Spring (Blue)
5. Torque Button (3 used)
6. Fixed Sheave and Post
7. Elastic Lock Nut (12 used)
8. Button Head Screw (12 used)
9. Shim (0.030 inch)
10. Shim (0.040 inch)
11. Duralon Bushing
12. Movable Sheave

SERVICE

Refer to Cyclone and Liquifire Service Manual (SM-2108) for disassembly, bushing replacement, and assembly procedures.

INSPECTION

Inspect movable sheave and cam bushings (key 2 and 11) for excessive clearance with post (key 6). Excessive clearance will cause binding with resulting erratic performance.

LUBRICATION

No lubrication is required.

PRETENSION

The spring is factory assembled into the No. 2 hole in the cam.

It may be found necessary to pretension the spring differently to maintain an engine speed of 8000-8500 RPM (when at full throttle).

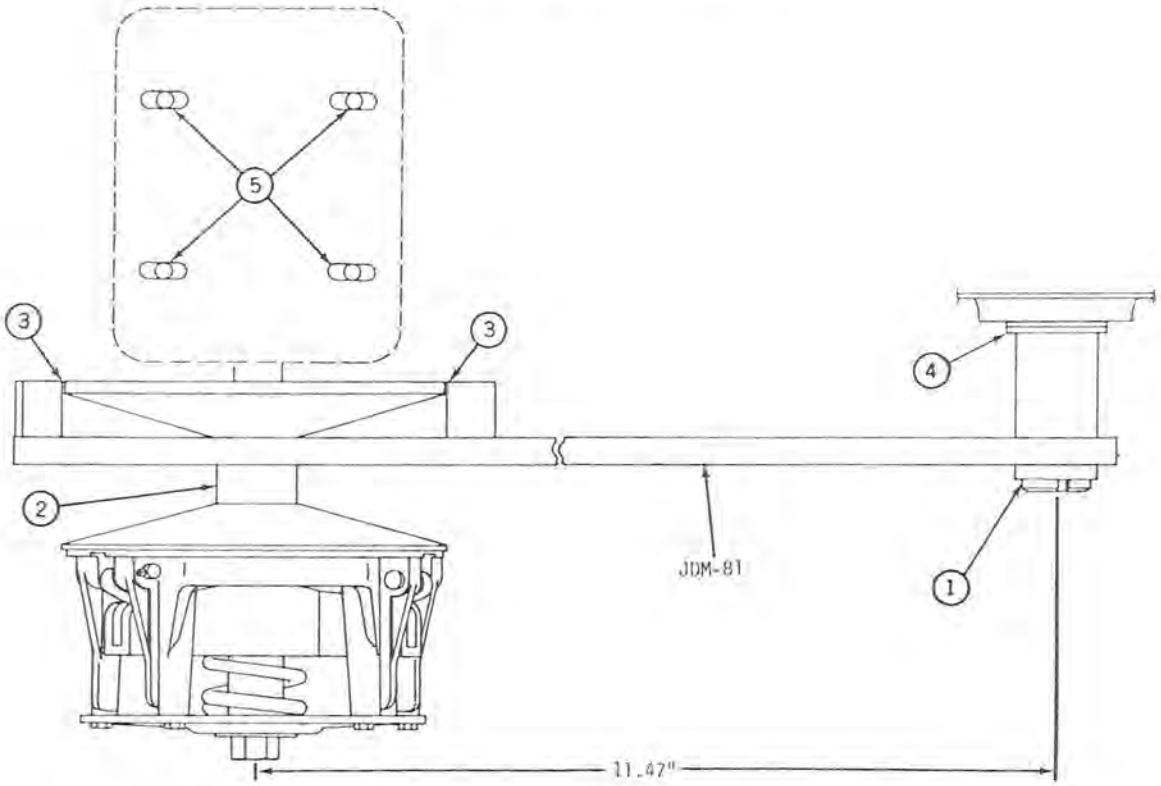
This becomes necessary with changes in temperatures and/or altitudes which affect engine horsepower.

Less pretension lowers engine maintenance speed; more pretension increases engine speed. Do not adjust to provide engine speed in excess of 8500 RPM.

PRETENSION CHART

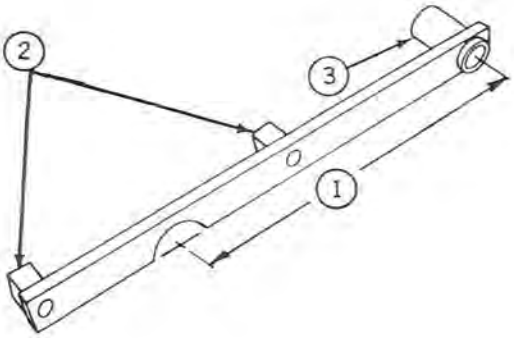
Insert spring tang in cam hole number	Place cam and spring over fixed face hub with tang on spring in hole of fixed face. Rotate cam clockwise past the ramp indicated.	Degrees of spring pretension.	Pounds of spring tension when measured at sheave rim.
1	1 ramp	50^{o}	5 lbs.
2 (std)	1 ramp	80^{o}	6 lbs.
3	1 ramp	110^{o}	8 lbs.
4	2 ramps	140^{o}	10 lbs.

INSTALLING ALIGNMENT TOOL



1. Slide tool over the secondary shaft.
2. If center distance is correct, the tool notch will fit over drive sheave hub.
3. Alignment and 1.30" offset are correct when the tabs are flush with engine side of fixed face.
4. Adding or removing shims on secondary shaft will change offset.
5. If center distance or alignment is incorrect, loosen four engine mounting bolts (located under engine base plate).
6. Align engine to driven clutch.
7. Tighten four mounting bolts.
8. Remove tool.

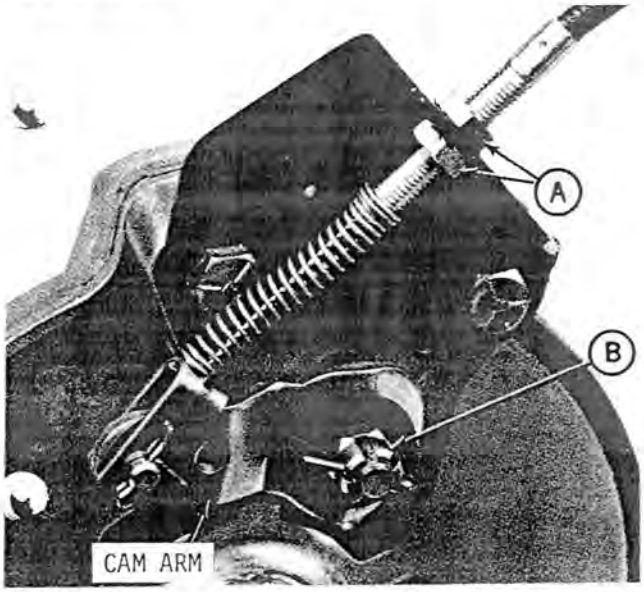
CHECKING CLUTCH ASSEMBLY



Alignment tool JDM-81 will check three dimensions.

1. Center distance is 11.47".
2. Sheave alignment and 1.30" offset is checked at tabs.
3. Secondary shims are measured with end of tool.

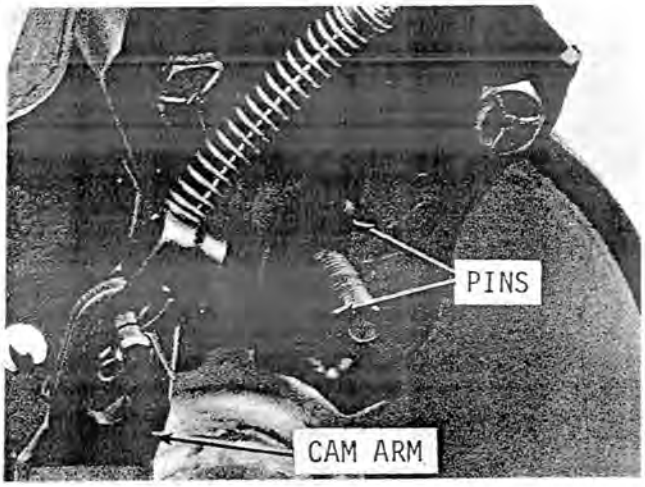
ADJUSTMENT



1. Adjust jam nuts on cable (A) as required to make cam arm point straight forward (horizontal).

2. Adjust nut (B) as required to provide 1 to 1-1/2 inches between brake lever and grip when brake is applied.

LUBRICATION



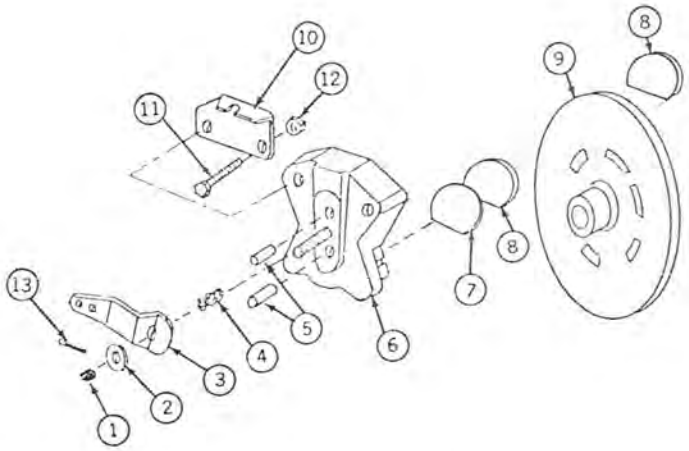
1. Remove cam arm.

2. Remove two pins.

3. Lubricate pins with Never-Seez Lubricant.

   Reinstall pins (rounded ends facing outward).

5. Reinstall cam arm and adjust tension as shown above.



1.	Nut	7.	Plate
2.	Washer	8.	Friction Pad (2 used)
3.	Cam Arm	9.	Brake Disk
4.	Spring	10.	Cable Bracket
5.	Pins (2 used)	11.	3/8 x 2 inch Cap Screw
6.	Casting	12.	Lock Nut
		13.	Cotter Pin

REPLACING BRAKE PADS

A brake repair kit is available which includes key 5, 7, and 8.

1. Remove casting (key 6).

2. Remove drive chain, sprockets and tensioner from chaincase.

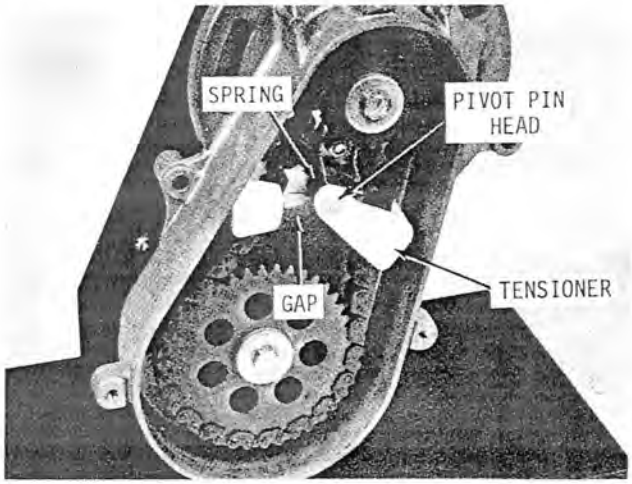
3. Remove secondary sheave.

4. Remove secondary shaft bearing and pull shaft out of chaincase and brake disk (key 9).

5. Install new parts and reassemble.

NOTE: Lubricate I. D. of brake disk (key 9) with Never-Seez before installing onto secondary shaft.

SERVICE

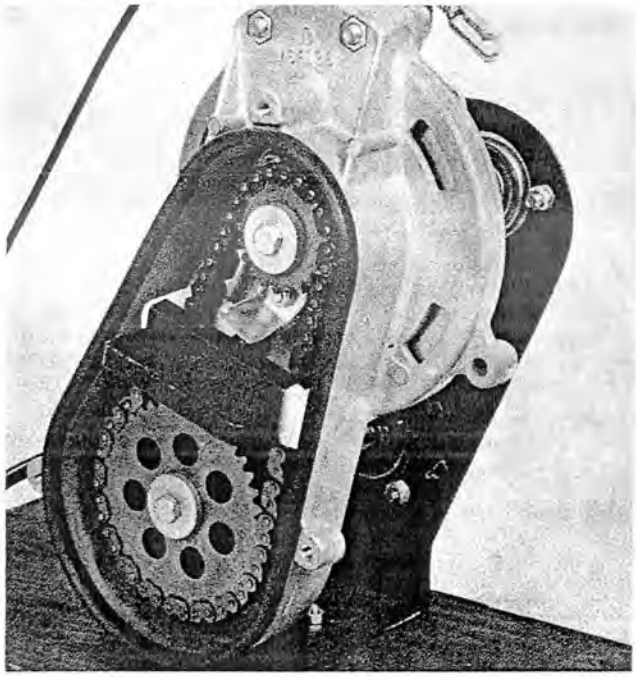


Removal

1. Remove cap screws securing upper and lower sprockets.
2. Remove sprockets, drive chain, and tensioner as an assembly.

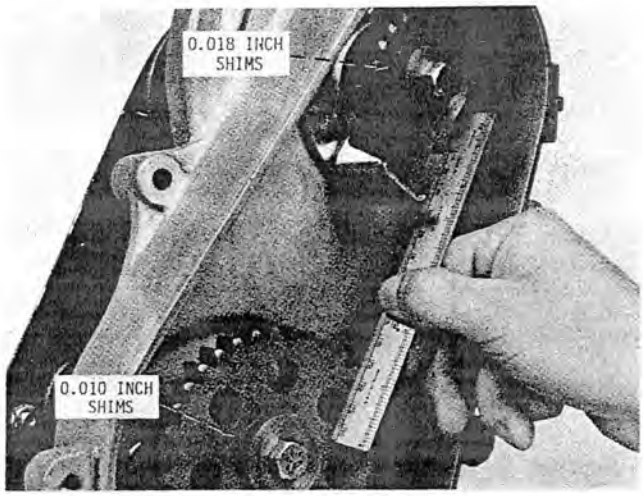
Installation

1. Check alignment as shown at right. Install sprockets, drive chain and tensioner as an assembly using JDM82 tool.



NOTE: See page 25 for lower sprockets spacers.

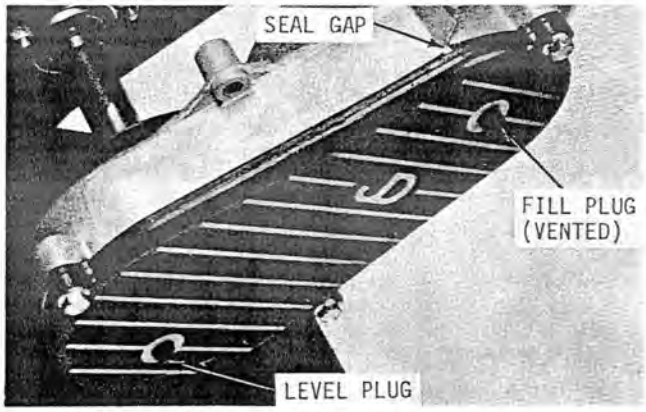
SPROCKET ALIGNMENT



1. Install sprockets (without chain and tensioner). Secure with cap screws.
2. Using a 6-inch rule, check alignment. Place rule on lower sprocket and slide upward.
3. Add shims behind upper or lower sprockets as required to obtain alignment.

NOTE: Do not use more than three shims behind upper sprocket or more than 10 shims behind lower sprocket. Shafts must not protrude through sprockets.

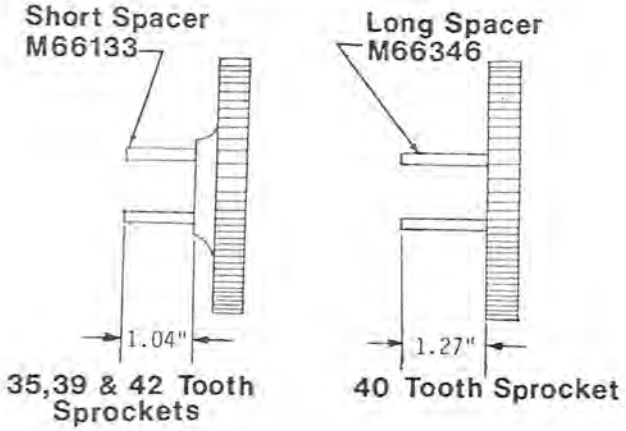
LUBRICATION



1. Remove fill and level plugs.
2. Add SAE 30 oil through fill hole until it runs from level hole.
3. Install plugs.

NOTE: To prevent oil spewage, it is important that gap in cover seal be placed as shown above and that vented plug is installed in the upper hole.

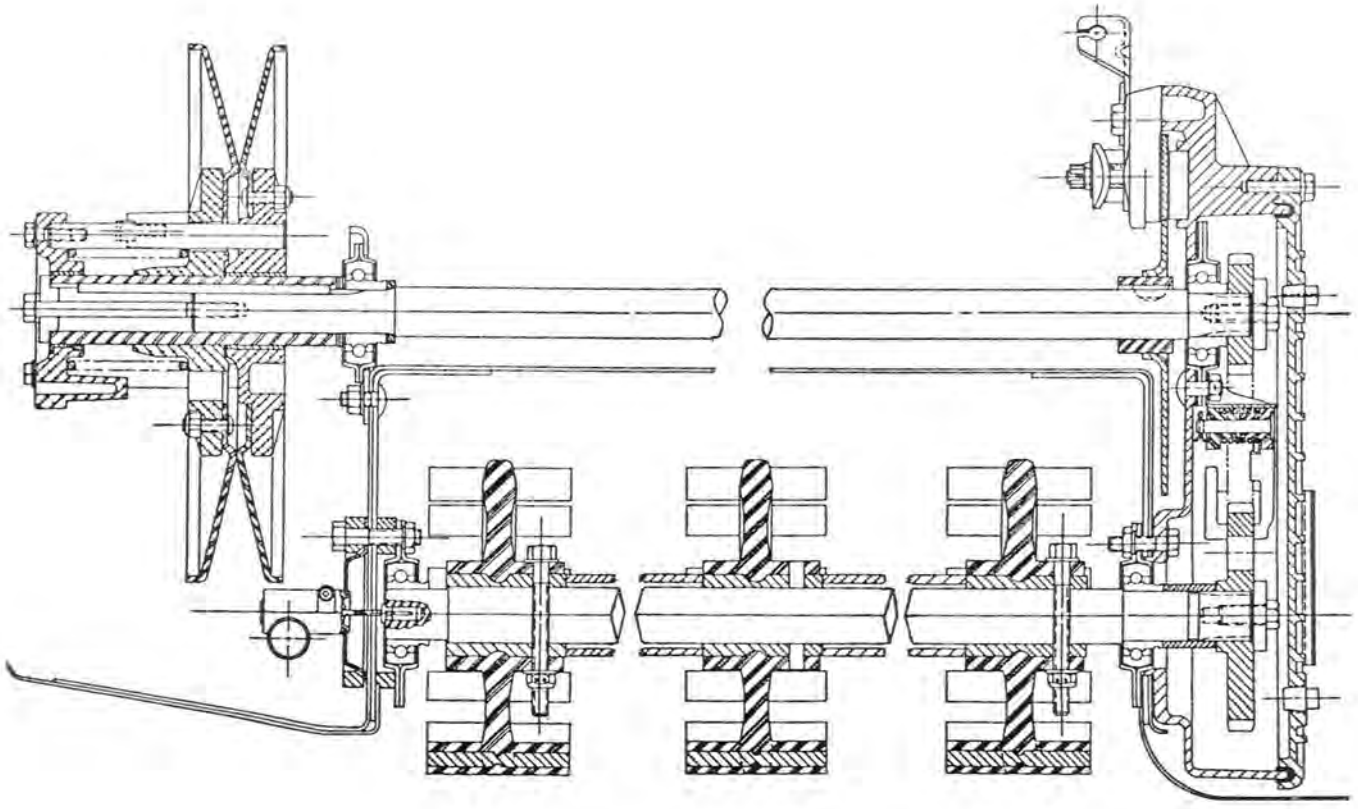
LOWER SPROCKET SPACERS



FINAL DRIVE RATIOS

	Upper Sprocket (No. of Teeth)	Lower Sprocket (No. of Teeth)	Chain Length (No. of Pitches)	Ratio
STOCK	21	39	66	1.86:1
Opt.	24	40	68	1.67:1
Opt.	17	35	62	2.06:1
Opt.	17	42	66	2.47:1

DRIVELINE CROSS SECTION

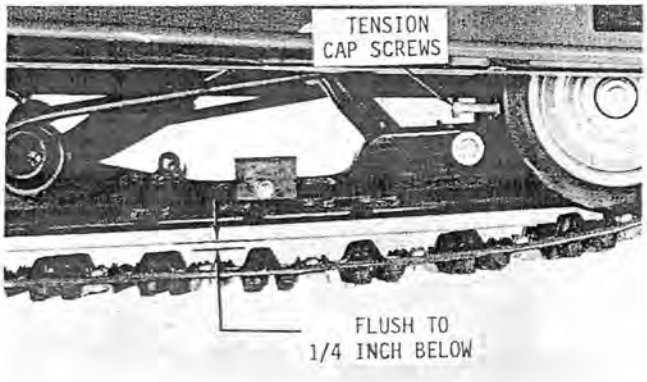


SUSPENSION

ADJUSTMENTS

TRACK TENSION

The following procedure is the preferred method of adjusting track. The method described in the operator's manual should be used only if facilities do not permit use of preferred method.



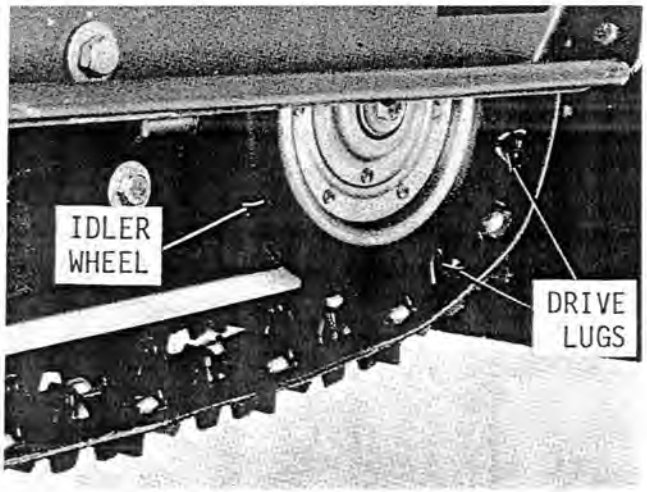
1. Securely support rear of snowmobile so track is off ground.

2. When properly tensioned, top of track drive lugs (midway in span) should be flush to 1/4-inch below bottom of wear bars as shown above.

3. Turn adjusting cap screws clockwise to increase tension; counterclockwise to decrease tension. Adjust each side as required. Tighten lock nuts after making adjustment.

TRACK ALIGNMENT

Track alignment should always be checked after adjusting track tension.



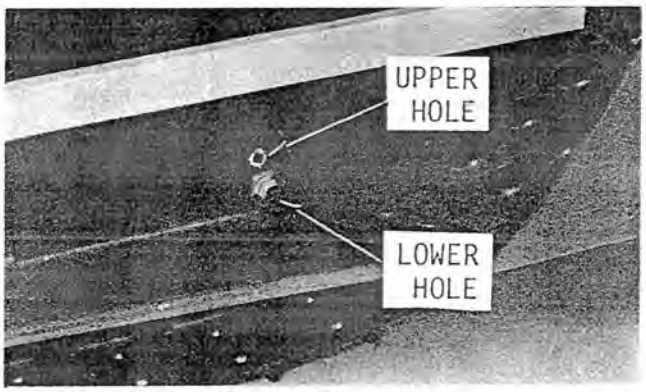
1. With rear of snowmobile securely supported, start engine and run track for short time. Let track coast to a stop. DO NOT apply brake as this can cause track to go out of alignment.

2. Check clearance between track drive lugs and rear idler wheels. This clearance should be equal on both sides of wheels.

3. A track will run to the loose side. If idler wheels are not centered between drive lugs, adjust track tension, as required, to equalize.

4. Repeat steps 1, 2 and 3 until idler wheels are centered between drive lugs.

FRONT PIVOT

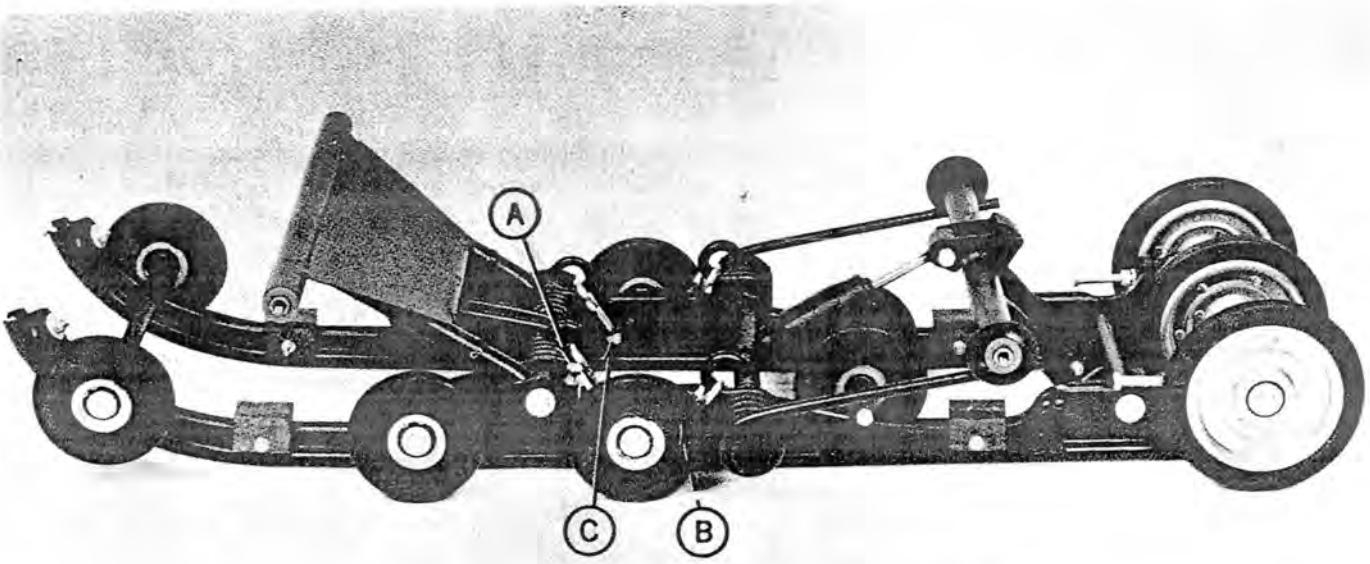


The front pivot can be placed in either of two positions in the tunnel:

Lower Hole - This position provides best ride and should be used for general snowmobiling.

Upper Hole - This position provides easier ski lift and should be used when riding in deep snow conditions.

NOTE: Check track tension after changing pivot arm position.



SLIDE SUSPENSION (WITH OPTIONAL WHEEL KIT)

STEERING RESPONSE (SKI LIFT)

1. Backing screws (A) Out increases ski lift, turning them in decreases lift.

2. Never back out screws more than the following:

   Front Pivot in Lower Hole - 0.23 inch
   Front Pivot in Upper Hole - 0.30 inch

NOTE: These dimensions are measured from underside of adjusting screw head to top of jam nut.

SUSPENSION SPRINGS

1. Loosen nuts (B) to soften rear pivot springs; tighten nuts to stiffen. Adjust as required to prevent bottoming.

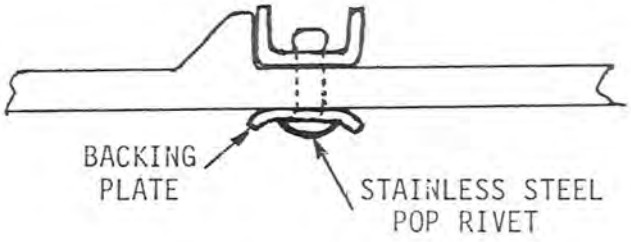
2. Loosen nuts (C) to soften front pivot springs; tighten to stiffen.

If a still softer setting is desired, remove one spring from front pivot. Adjust remaining spring as required.

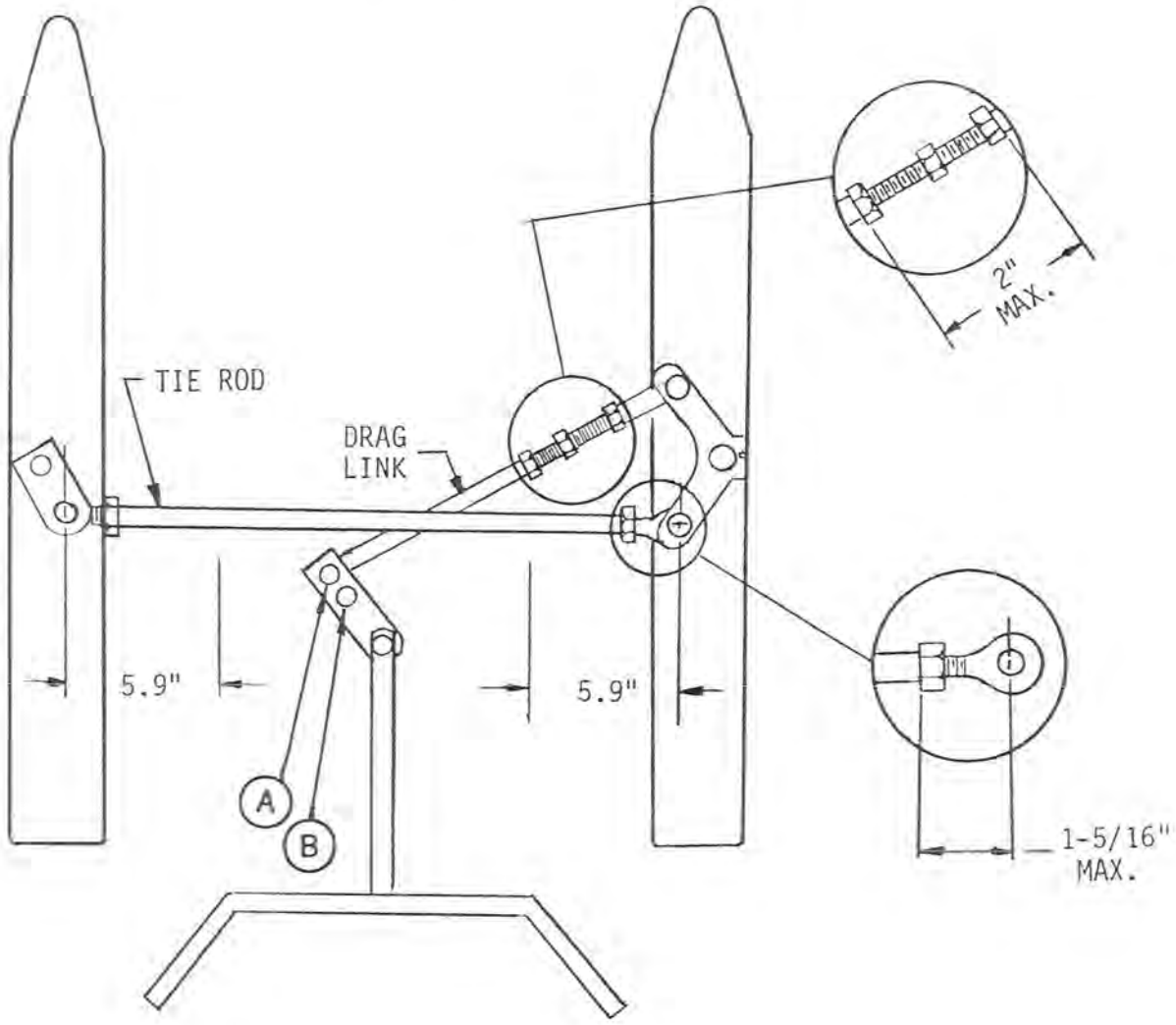
GROUSER BAR REPLACEMENT

1. Chisel off rivets and remove damaged grouser bar.

   NOTE: Do not chisel on the rivet head as damage to the track could easily result.



2. Install new bar, securing with stainless steel pop rivets and backing plate. Kit AM54160 contains the special stainless steel pop rivets and backing plates.



SKI ALIGNMENT

1. Adjust skis parallel by adjusting tie rod.
2. Adjust drag link as required to align handlebars with skis.

STEERING ARMS

1. With skis parallel and pointed straight forward, steering arms should be positioned on spindles to provide approximately 5.9 inches between steering arms and front frame as shown above.

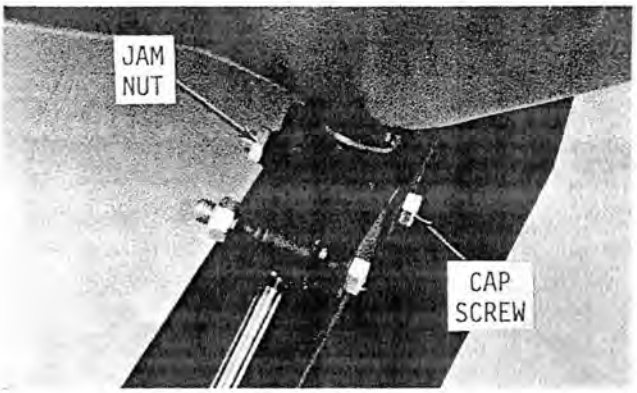
CENTER STEERING ARM

The drag link can be placed in either of two positions on the center steering arm.

Outer Hole (A) - Use for general snowmobiling. This setting provides minimum turning radius.

Inner Hole (B) - Use for high-speed running. This setting increases turning radius but reduces effort and provides a better feel of steering control.

INSTALLING SKIS



1. Thread in attaching cap screw until tight.

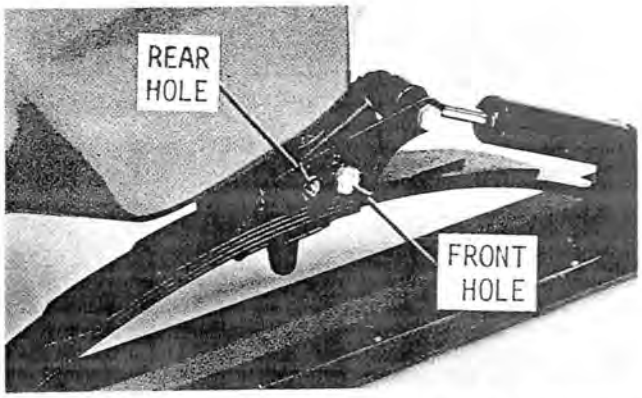
2. Back off approximately 1/4-turn or until ski pivots freely.

3. Install and tighten jam nut.

WEAR RODS

Standard equipment wear rods are steel. Carbide wear rods are available. See page 29.

SKI POSITIONS



The ski saddle can be placed in either of two positions.

Rear Hole - Use for general snowmobiling. This position provides easiest steering.

Front Hole - Use for high-speed running. This position increases ski castor thus reducing "darting". Steering effort is slightly increased.