

# **VIKING**

## **SNOWMOBILES**



# **OPERATORS MANUAL**

# **FULL SEASON WARRANTY**

VIKING SNOWMOBILES, INC. warrants each new VIKING for a complete snowmobile season against structural defects in materials and workmanship; providing the machine was properly maintained and used under normal conditions.

In the case of a purchase made within 60 days prior to the end of a season, considered to be April 30th, of any year, the warranty will apply from date of purchase until January 1st of the following year.

The Manufacturer's obligation under this warranty is limited to the repair or replacement of defective parts by an authorized VIKING dealer, proven to be defective in either material or workmanship.

This warranty is not valid if the VIKING snowmobile has been subjected to misuse, improper maintenance, negligence, accident, immersion under water, altered, rented, used for racing, repaired by unauthorized persons or with parts not designed for VIKINGS, or used on surface other than snow or ice. Further, this warranty does not apply to VANQUISHER models of VIKING snowmobiles as they are specifically intended for racing purposes.

This warranty does not apply to engine, carburetor, torque converters or drive tracks. They are subject to warranty of their own manufacturer. Drive belts, windshields, ski skags and brake and throttle cables are not covered by warranty.

This warranty is expressly in lieu of all other warranties, expressed or implied including all other obligations and liabilities on the part of VIKING SNOWMOBILES, INC. And VIKING SNOWMOBILES, INC. neither assumes nor authorizes any other person to assume for it any responsibility in connection with VIKING machines.

**VIKING SNOWMOBILES, INCORPORATED**

TWIN VALLEY, MINNESOTA 56584



# INDEX

	Page
Recommended Pre—Operating Tips . . . . .	2
Operating Controls . . . . .	3
Fuel Mixture . . . . .	4
Starting Procedure . . . . .	5
Break—In Procedure . . . . .	5
Carburetor Adjustment . . . . .	6
Lubrication . . . . .	7
Maintenance . . . . .	8-11
Operation and Care of Two Cycle Engines . . . . .	12-15
Summer Storage . . . . .	16
Engine and Chassis Specifications . . . . .	17
Records . . . . .	18

## RECOMMENDED PRE-OPERATING TIPS

### CHECK THE FOLLOWING ITEMS EACH TIME BEFORE STARTING YOUR VIKING

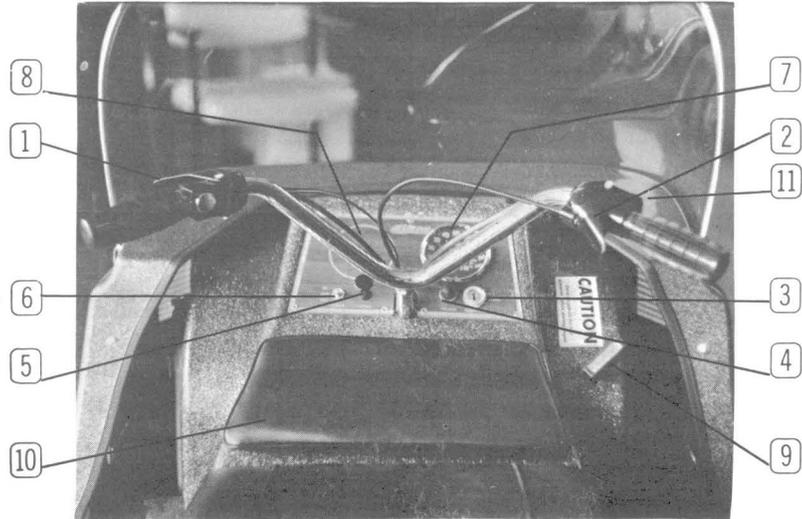
1. Check throttle and brake controls to be certain they operate freely. Brake should not be too tight but must have proper adjustment to insure good braking action.
2. Rock the machine to make certain track is not frozen to the ground.
3. Check fuel supply. Always fill fuel tank before making any trip and carry enough spare fuel for extended trips.
4. Check the steering mechanism to be certain skis turn freely.
5. After starting engine, turn machine on side and accelerate slowly to make certain track turns freely.
6. Always carry a spare drive belt and extra spark plugs as well as tools to facilitate changing. These items should be regarded as important as a spare tire in an automobile.

**CAUTION:** *Do not run engine at high RPM with the track off the ground.*



# OPERATING CONTROLS

1. FINGER TIP BRAKE CONTROL
2. FINGER TIP THROTTLE CONTROL
3. OFF ON START SWITCH
4. PRIMER BUTTON
5. CHOKE CONTROL
6. HI-LOW LIGHT SWITCH  
Operates only when ignition is on
7. SPEEDOMETER
8. TACHOMETER  
(Optional)
9. STARTING CABLE
10. TOOL AND GLOVE COMPARTMENT
11. SAFETY KILL-SWITCH



## FUEL MIXTURE

1. Always use a good grade of gasoline, free of water and dirt.
2. Use a good grade of 2 cycle air cooled engine oil which is specially blended for snowmobile use. Common outboard motor oil will break down under excessive heat. Whenever possible, have gasoline and oil at room temperatures when mixing.
3. \*Recommended oil-fuel mixture ratio:

<u>FUEL</u>	<u>OIL</u>
20 Parts	1 Part

\*Check engine manufacturer's recommendation.

4. Do not mix gas and oil in the machine tank. Using a clean container, fill to about  $\frac{1}{2}$  with gas, then add the full amount of oil and mix thoroughly, then fill with gas and re-mix.
5. When filling machine with pre-mixed supply, shake can to re-mix before filling. Gas and oil mixture may have a tendency to separate while setting.

### CAUTION

Excessive oil will cause carbonization of pistons, spark plugs, ports, and exhaust systems. Too little oil may cause piston seizure, overheating, and rod and bearing failure.

## STARTING PROCEDURE

1. Check Pre-Operating tips on page 1.
2. Turn ignition key to "ON" position.
3. Push primer button until pressure is felt, then push one more time.
4. Pull out choke.
5. (Manual Start Machines) Pull starter rope slowly until it engages and compression is felt, then pull hard. **CAUTION:** Avoid pulling rope to its limit or dropping rope from an extended position. When engine starts, push in choke slowly.
6. (Electric Start Machines) Turn ignition key to "START" position. As soon as engine starts, allow key to return to "ON" position. Push in choke slowly.
7. When starting cold engine, let the unit idle a few minutes before starting out.

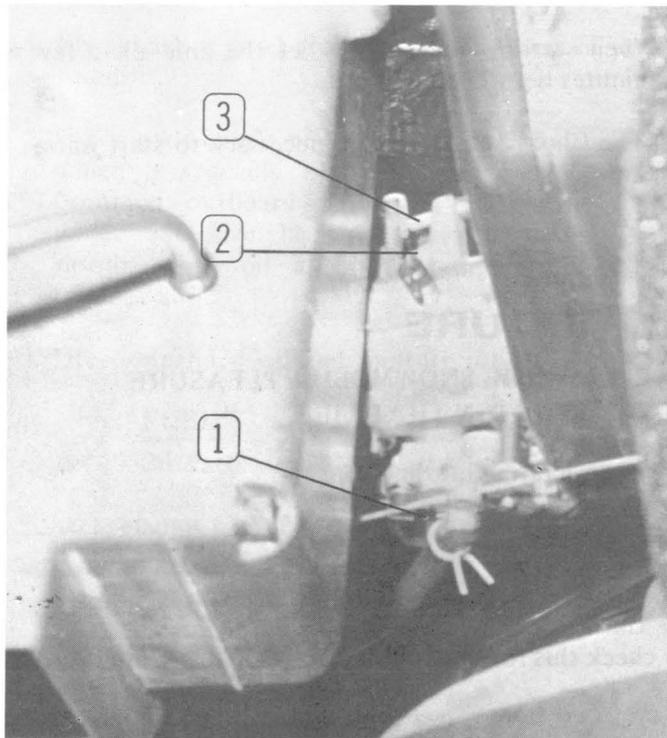
**NOTE:** Choking may not be necessary to start warm engine.

## BREAK-IN PROCEDURE

**YOUR NEW VIKING IS DESIGNED TO PROVIDE YEARS OF SNOWMOBILE PLEASURE.  
AN IMPROPER BREAK-IN PERIOD CAN SHORTEN THAT LIFE.**

1. Allow engine to warm-up a minute or two before accelerating into motion.
2. Do not operate engine at prolonged full throttle. For the first 20 hours (approximately)  $\frac{1}{2}$  to  $\frac{3}{4}$  throttle is recommended.
3. The carburetor has been set slightly rich for the break-in period. If you feel some adjustment is necessary, consult your dealer to check this for you.

## CARBURETOR ADJUSTMENT



Your carburetor has had approximate settings made on it at the factory, however, altitude and temperature differences may necessitate changes. Your dealer should have made these adjustments in his pre-delivery service of your machine.

No. 1 is the idle mixture screw. Approximately  $1\frac{1}{2}$  turns open is the recommended initial setting. Poor acceleration may indicate improper setting.

No. 2 is the high speed mixture screw. Recommended initial setting is from  $\frac{1}{4}$  to  $1\frac{1}{2}$  turns open. Too lean setting will lead to engine over-heating and possible failure. Too rich a setting will cause excess exhaust smoke, "four-cycling" and plug fouling. Just at the point of eliminating the "four-cycling" effect at full throttle is the correct setting. Only under full operating load can tests of setting be made.

No. 3 is the idle speed setting. This should be adjusted after the idle mixture screw is set to a speed below clutch engagement. Spring loaded adjustment screw is on the opposite side of carburetor.

### CAUTION

Do not adjust any part of carburetor while engine is running.

Note: If in doubt about any setting, contact your dealer.

# LUBRICATION

## 1. OIL BATH CHAIN CASE

During every month of operation, remove lower chain case cover. If necessary, fill with type "A" automatic transmission fluid to 1/4" below bottom chain case cover.

## 2. DRIVEN CLUTCH PULLEY

Every 40 hours of operation, remove belt (See maintenance section), open pulley and apply a thin coat of low temperature grease on shaft. Rotate movable face and apply a small amount of grease to ramp bushings.

## 3. DRIVE CLUTCH PULLEY

The Drive Clutch requires periodic lubrication. This may be done by placing a small amount of light oil through the openings in the cover onto the moving parts. The nylon slide may be lubricated with a small amount of silicone. Annually the entire unit should be disassembled and cleaned. **CAUTION:** Disassembling and reassembling the drive clutch should be done by your Dealer. This Clutch is balanced as an assembly and must be assembled properly or serious damage may be done to your engine and machine.

## 4. STEERING POST

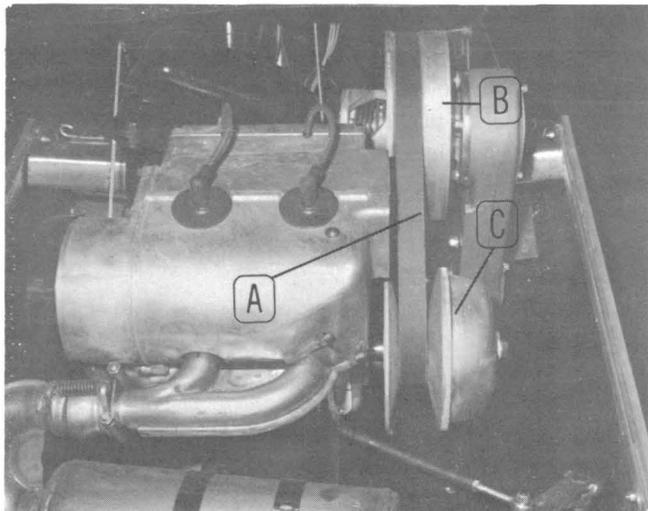
Occasionally, a small amount of light oil may be placed in the upper and lower steering post bearings.

**CAUTION:** Do not oil brake or throttle cables, as they will stiffen in cold temperatures.

# MAINTENANCE

## CHANGING CLUTCH BELT (Removal)

Apply pressure on brake handle, grasp moveable face of driven pulley and rotate backwards. Then grasp belt (A) with both hands and pull upwards until driven pulley (B) spreads allowing enough slack to roll belt off drive clutch (C). Then roll belt off upper side of driven pulley and rotate pulley until belt is free.



## INSTALLATION

Place belt around drive clutch, spread driven pulley in same manner as above, then roll belt unto driven pulley.

## CLUTCH ALIGNMENT

Your clutches have been pre-set at the factory for alignment, however, if you experience pre-mature belt failure or tendency for belt to turn over, consult your dealer to have clutch alignment checked.

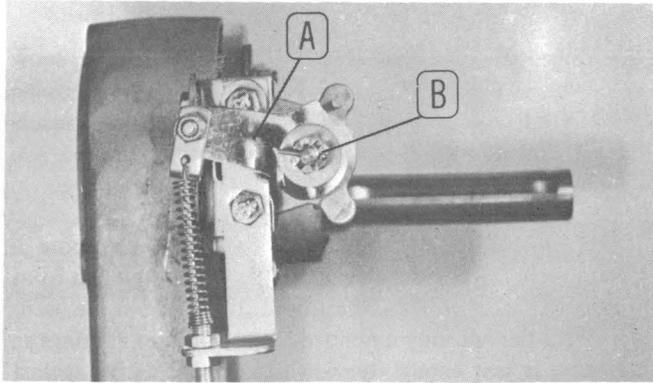
## CHANGING CLUTCH BELT

(1973 Twins with Air Silencer)

Remove the nut & washer from both rear motor mounts. Loosen front motor mount bolts, lift engine up and ahead so that there is enough clearance between the carburetor and the driven clutch to get the belt out.

**CAUTION:** Do not run engine with drive belt removed.

## MAINTENANCE (CONTINUED)

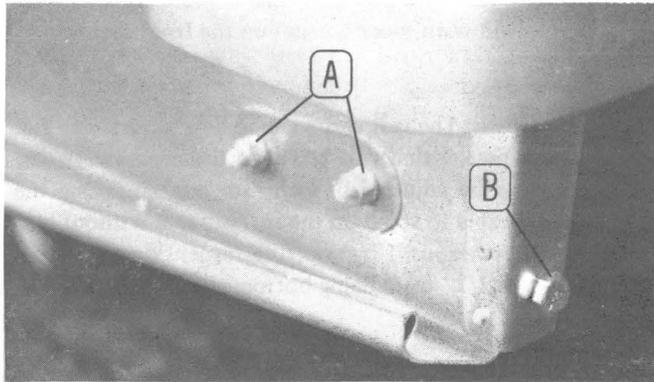


### BRAKE ADJUSTMENT

The brake cable is adjusted at the factory so that when brake handle is released, caliper lever (A) contacts stop pin. To adjust the brake shoes, tighten nut (B). **CAUTION:** Do not over tighten, always leave about  $\frac{3}{4}$  inch free travel on the brake handle. Check that clutch turns freely between shoes.

### TRACK TENSION AND ALIGNMENT

Track tension should be determined by measuring the distance from the front bogie axle center to the bottom of upper track in tunnel. If bogie axle is in lower setting, this dimension should be  $4 \frac{7}{8}$ ". If bogie axle is in upper setting, dimension should be  $3 \frac{3}{4}$ ".



If adjustment is required, loosen nuts (A) on both sides of machine. Tighten or loosen bolts (B) to provide proper track tension.

Raise rear of machine, start engine and run track. If track is not centered in tunnel, adjust tension bracket on either side to compensate. Re-tighten nuts (A).

## RAIL ADJUSTMENT

### Track Adjustment – Posi–Grip Suspension

The internal drive track should be adjusted so that it is just tight enough to keep the drive sprocket from jumping the drive lugs under hard acceleration. This may change slightly with the temperature, as the track will contract slightly in very cold temperatures.

If adjustment is needed, loosen the four suspension bolts. The two rear bolts are located below the front of the rear bumper. The two front bolts are located in front of the footrests. The adjusters are also located in front of the footrests. Either tighten or loosen the adjusters to provide proper track tension.

**CAUTION:** Be sure to adjust both sides equally and be sure to tighten the suspension bolts when proper tension is obtained.

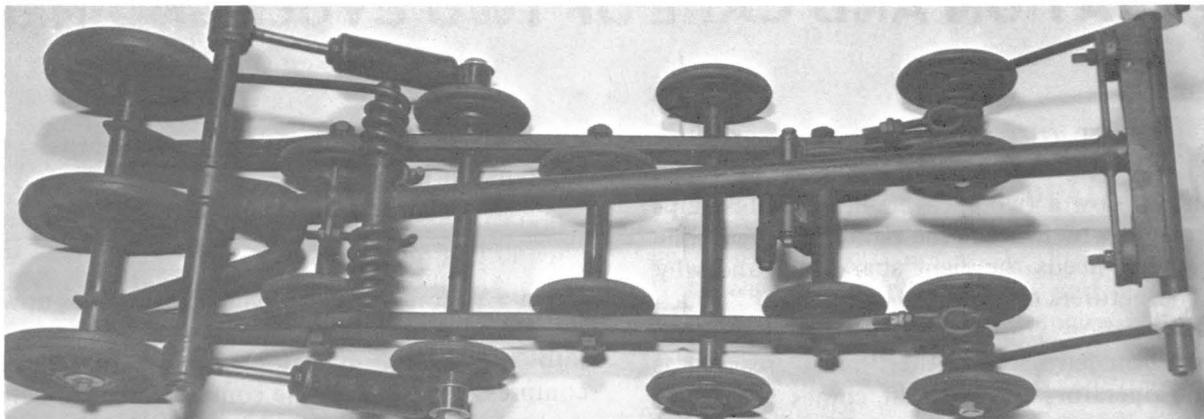
### SPRING ADJUSTMENT POSI–GRIP SUSPENSION

The Posi–Grip suspension is equipped with four individually adjustable torsion springs. These springs must be adjusted to

each individual rider according to the type of terrain, snow cover, and weight of the rider. The front springs determine mainly the handling & traction characteristic of your machine. The rear springs support the weight of the rider.

**FRONT SPRINGS:** If you do most of your riding in loose or powder snow, you will want very little tension on the front springs. To adjust for this condition, tip the machine on its side. With the rail fully extended, adjust the front springs so that there is just enough tension to keep the spring against the front shaft. For riding in snow that is more compacted or on trails, you will want more tension on the front springs.

**REAR SPRINGS:** The rear springs should be adjusted to the weight of the person that will be riding the machine. When the rear springs are adjusted properly for normal riding, the rider should be able to stand on the rear bumper without bottoming the suspension. However, the suspension should be between 1” and 1/2” from being bottomed.



### DRIVE CHAIN TENSION

Drive chain should have approximately  $1/8$ " deflection mid-way between sprockets in chain case. If adjustment is necessary, loosen the four nuts around the upper input shaft eccentric. Rotate eccentric until the  $1/8$ " deflection is attained. If shaft position is back of center, rotate eccentric forward. If shaft position is ahead of center, rotate backward. Check brake for proper alignment on brake drum and retighten the four nuts.

### SKI ALIGNMENT

For proper alignment, skis should be parallel. This can be checked by measuring the front and rear span between skis. If adjustment is necessary, remove the bolts attaching the tie rods to the steering arms. Loosen jam nut and screw tie rod end to proved proper alignment. Tighten jam nuts and replace bolts.

**NOTE:** When adjusting ski alignment, make certain both the skis and the handle bar are in a centered, "straight forward" position.

Check skag wear on skis periodically. Replace when excessive wear is evident.

# OPERATION AND CARE OF TWO CYCLE ENGINES

## FIRST, GET ACQUAINTED

Understanding how a two-cycle engine operates helps you understand why it needs the right diet of gasoline and oil, why it needs the right spark plug and why engine manufacturers tell you, "Don't baby it." Much of the information you want is in the pages that follow, but you have some other "must" reading as well — the operators manual that comes with your engine. Read it — and understand it — before you start your engine.

A two cycle engine differs from the four-cycle in your automobile or in your garden tractor.

\*It uses a gasoline-oil mixture for combustion and lubrication, not gasoline and oil separately as in your automobile engine.

\*It fires on every second stroke of the piston. Every down stroke of the piston is a power stroke

— a power stroke for every revolution of the crankshaft.

When a piston in a two-cycle engine moves upward in the cylinder (its first stroke), it draws a charge of fuel into the crankcase below and at the same time compresses the fuel in the combustion chamber above. As the piston completes the up stroke, the spark plug ignites the compressed fuel and the burning fuel expands and forces the piston downward (second stroke, or power stroke). In this down stroke, the piston not only provides power to turn the crankshaft but also compresses the new charge of fuel in the crankcase, then, as it continues downward, it clears the transfer ports in the cylinder wall, releasing the new charge of fuel through the ports and up into the combustion chamber where the new charge displaces the burned gasses, forcing them out through the exhaust port.

That's a lot of action to take place in a fraction of a second. You can realize what is going on inside your engine when you consider that at high speed – 6000 RMP, for example – the piston travels up and down and all this action takes place 100 times a second.

### **OIL – IT'S IMPORTANT**

The oil you pre-mix with the gasoline is the only lubrication your engine gets. Use a good oil, add it to the gasoline in the ratio prescribed by the engine manufacturer and mix the oil and gasoline thoroughly.

Oil is vital to the life of your engine. Too little oil means insufficient lubrication; it means that you may have to buy a replacement engine in short order. Too much oil means rapid fouling of spark plugs, rapid build-up of deposits in the combustion chamber, and excessive exhaust smoke.

### **CARBURETOR ADJUSTMENT— A JOB FOR YOUR DEALER**

The gasoline-oil mixture is the life blood of your engine and the more carefully you handle it the longer and more faithfully your engine will perform.

The mixture of gasoline and oil is fed to your engine by the carburetor. When the carburetor is properly adjusted, it mixes the fuel with the correct proportion of air to make a volatile mixture which serves as fuel for combustion as well as lubricant and coolant. Yes, “coolant” is right—the mixture helps to cool internal surfaces and to cool spark plug electrodes.

When the mixture is too “lean”—that is, too little fuel and too much air—the spark plug electrodes heat rapidly until they glow; in fact, they become so hot that they pre-ignite the fuel. This pre-ignition may cause serious problems – piston burning for example,

or complete engine failure and an expensive repair bill.

A lean mixture and the resultant overheating also may cause other major problems such as piston seizing and bearing failure — again, expensive repair bills.

Adjusting the carburetor is a job for your dealer. Proper adjustment is critical, and he has the technical information and know-how.

Fuel line restrictions, dirt or other foreign material in the carburetor, clogged fuel filters, loose impulse fittings and tubes also may cause fuel lean-out. Since the fuel pump is an integral part of the carburetor, its ability to supply fuel is regulated by the pulsing or varying pressures in the crankcase. If the pulse line — the one coming out of the engine crankcase and connecting to the carburetor — is loose, the pumping capacity is reduced and the result may be lean-out

and additional related problems. The following are indicators of poor pump performance:

- \* Hard starting
- \* Loss of power
- \* Backfiring
- \* Erratic engine performance

## SPARK PLUGS AND IGNITION

Now for the heartbeat of your engine — the ignition system. The ignition system has a flywheel magneto equipped with ignition points — just like your automobile. Points must be adjusted properly for good engine performance, and this too is a job for your service dealer, who has the necessary instruments, factory specifications, and know-how.

Spark plugs deliver the spark that ignites the fuel-air mixture to make the engine run.

Spark plugs are carefully selected by the engine manufacturer to give top performance under most conditions. The recommendations of the engine manufacturers should be followed carefully when spark plugs are replaced. Always carry spare plugs when touring with your machine – and a wrench to remove and install them.

Spark plug fouling, a common problem, is of two types primarily:

1. Carbon deposits. This build-up of deposits comes from everyday running. After many hours of operation, you may find that the plug gap is bridged by particles of carbon. If the bridge is removed, the plug can be re-installed. If the build-up of carbon is excessive, it is best to replace the plug with a new one.
2. Wet fouling. This usually occurs when the engine is flooded during cold starting. Wet fouling can be

cleared by removing the plug and holding a match or cigarette lighter to the point section to burn off excess fuel. Crank the engine over a few times with the plug removed to clear excessive fuel, install plugs, and start.

Both wet fouling and bridging may occur because of prolonged idling. Avoid excessive idling at all times. In stop-and-go operation, it is much easier to stop and re-start your engine each time than to remove and clean spark plugs that have fouled.

**CAUTION:** Do not attempt to clean spark plugs by sand blasting. Some sand could remain in the plug and ruin an expensive engine very quickly.

## SUMMER STORAGE

The following steps are recommended to prepare your **VIKING** for summer storage.

1. Thoroughly clean off machine and engine of dirt, oil, etc.
2. Hood and chassis can be cleaned and polished with an automotive type cleaner wax.
3. Track and suspension should be cleaned with a water hose, and allowed to dry thoroughly.
4. Apply grease to rear suspension arms.
5. Apply light oil around steering post bushings and spindle shafts, and all bare surfaces of ski assemblies.
6. Siphon gas from fuel tank and run engine until it stops. Remove spark plug and apply small amount of oil into spark plug hole. Turn engine over a few times and replace plug.
7. On electric start equipped models, remove battery, clean, charge and store in a cool dry place. It is recommended that an inactive battery be trickle-charged every 30 to 40 days.
8. Store machine in shed, off ground or cement on wooden blocks or boards. If stored outside, cover with tarpaulin, making sure windshield is not exposed to sunlight.

# SPECIFICATIONS

## CHASSIS

MODEL	APPROX. DRY. WT.	LENGTH W/SKIS	HEIGHT Less W.S.	WIDTH O. A.	FUEL CAP.	CLUTCH BELT NO.	TRACK WIDTH	TRACK LENGTH	SUSPENSION
Vigilante	325 lbs.	105"	29"	32"	5 gal.	41636	15"	112"	Bogey
Vigilante SS	360 lbs.	105"	29"	35"	8 gal.	41636	15"	121.5"	Posi-Grip
Vanguard	365 lbs.	105"	29"	35"	8 gal.	41636	17.5"	114"	Bogey
Vanguard SS	390 lbs.	105"	29"	35"	8 gal.	41636	17.5"	114"	Posi-Grip

## ENGINE

MFGR.	MODEL	NO. CYL.	APPROX. H. P.	DISP. C. C.	BORE	STROKE	IGN. TMG.	CHAMP. SPARK PLUGS		CARBURETOR	
								NORMAL	HEAVY	MFGR.	MODEL
Kohler	295-1T	1	20	294	2.953" 75cm	2.618" 66.5 cm	.90	K9	K7	Tillotson	HR-78A
Kohler	340-2T	2	24	338	2.441" 62cm	2.205" 56cm	.90	L81	L78	Tillotson	HR-79B
Kohler	340-2AX	2	28	338	2.411" 62cm	2.205" 56cm	.90	N2	N57	Tillotson	HR-79B
Kohler	440-2AX	2	37	436	2.677" 68cm	2.362" 62cm	.90	N2	N57	Walbro	WD1-1

Use this space to keep a record of the Model and Serial numbers of your machine and engine.

MACHINE: 340 VIKING

Model No. 414 3400 Serial No. 400107

ENGINE: Make \_\_\_\_\_

Model No. K-340 2T Serial No. C195 76

