

Owner's Manual

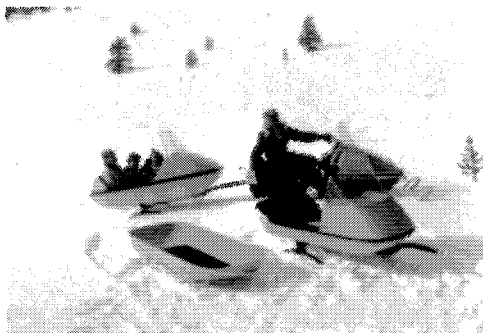
***ski-doo***\*

**Bombardier**

\*T.M. BOMBARDIER LTD.

# INDEX

<b>GENERAL INTRODUCTION</b> .....	1
<b>SERIES INTRODUCTION</b> .....	2
<b>SPECIFICATIONS</b> .....	3
<b>FUEL MIXING</b> .....	4, 5
fuel mixture ratio — which gasoline to use — which oil to use — fuel mixing procedure.	
<b>CONTROLS &amp; INSTRUMENTS</b> ....	6, 7
steering — throttle lever — brake lever — ignition switch — light switch — choke — manual starter — gear shift lever — lighter — tachometer — fuel.	
<b>PRE-START CHECK</b> .....	8
fuel tank quantity — throttle operation — brake operation — steering operation — skis and ski legs — (BREAK-IN).	
<b>STARTING PROCEDURE</b> .....	9
electric starting — manual starting.	
<b>DRIVING HINTS</b> .....	10, 11
driving positions — turning — surface conditions — tip — about your vehicle.	
<b>CLOTHING &amp; WEATHER</b> .....	12
chill factor chart.	
<b>NEW FEATURES</b> .....	13



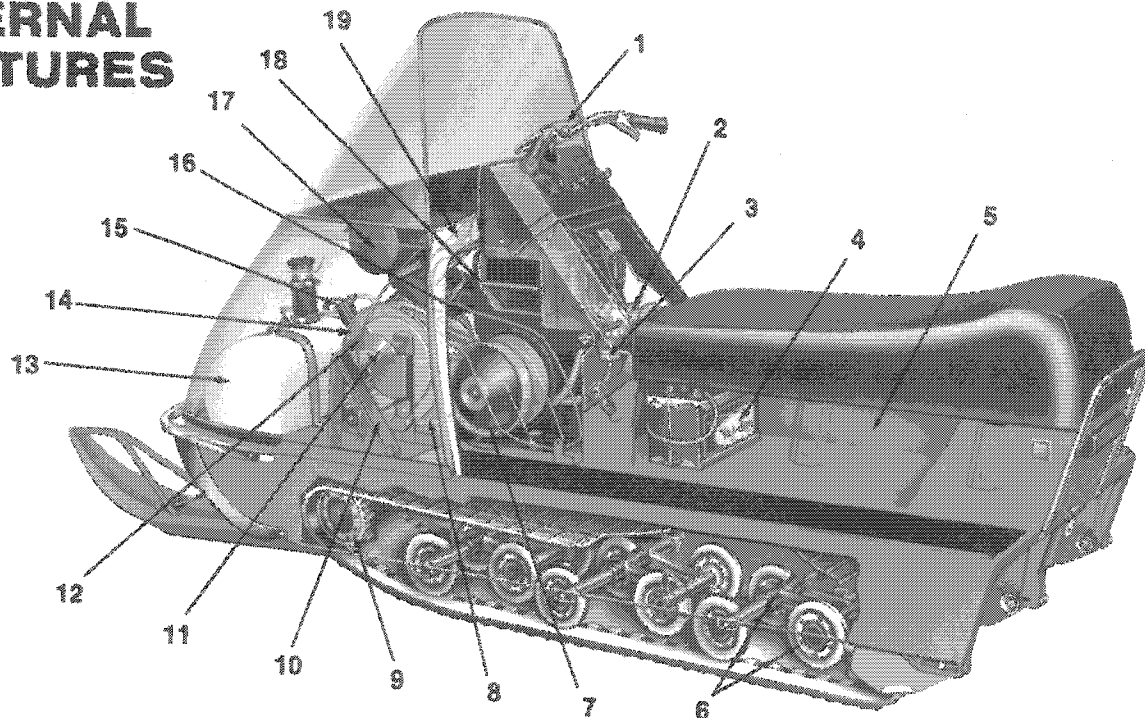
<b>DO'S</b> .....	14
<b>DON'TS</b> .....	15
<b>LUBRICATION</b> .....	16, 17
ski assembly — steering mechanism — throttle & brake — gear box oil level — bogie wheels — driven pulley — drive pulley — (TOOL KIT & USES).	
<b>CUTAWAY VIEW</b> .....	18
<b>MAINTENANCE</b> ....	19, 20, 21, 22, 23
spark plug(s) — battery — suspension springs — tracks — carburetor — drive belt condition — rectifier fuse — drive chain tension — brake — drive belt wear — steering adjustment — engine head nuts — engine mount bolts — electrical wiring — vehicle inspection.	

<b>IN CASE OF EMERGENCY</b> .....	24
emergency materials — assisting stranded vehicles — trouble shooting.	
<b>EMERGENCY GUIDE</b> .....	25
<b>TROUBLE SHOOTING GUIDE</b> .....	26, 27
<b>STORAGE</b> .....	28, 29, 30
track — suspension — ski assembly — fuel tank — carburetor — cylinder lubrication — gear box — controls — pulleys — battery — chassis.	
<b>GLOSSARY</b> .....	31
<b>HOW TO IDENTIFY YOUR SKI-DOO SNOWMOBILE</b> .....	32
parts & service	



# INTERNAL FEATURES

ILLUSTRATED:  
VALMONT



1. Throttle Cable

2. Carburetor

3. Fuel Filter

4. Battery

5. Storage Compartment

6. Bogie Wheel Set

7. Drive Pulley

8. Drive Belt

9. Front Sprocket

10. Foot Rest

11. Disc Brake

12. Brake Cable

13. Fuel Tank

14. Driven Pulley

15. Steering Arm

16. Transmission  
(Gear Box)

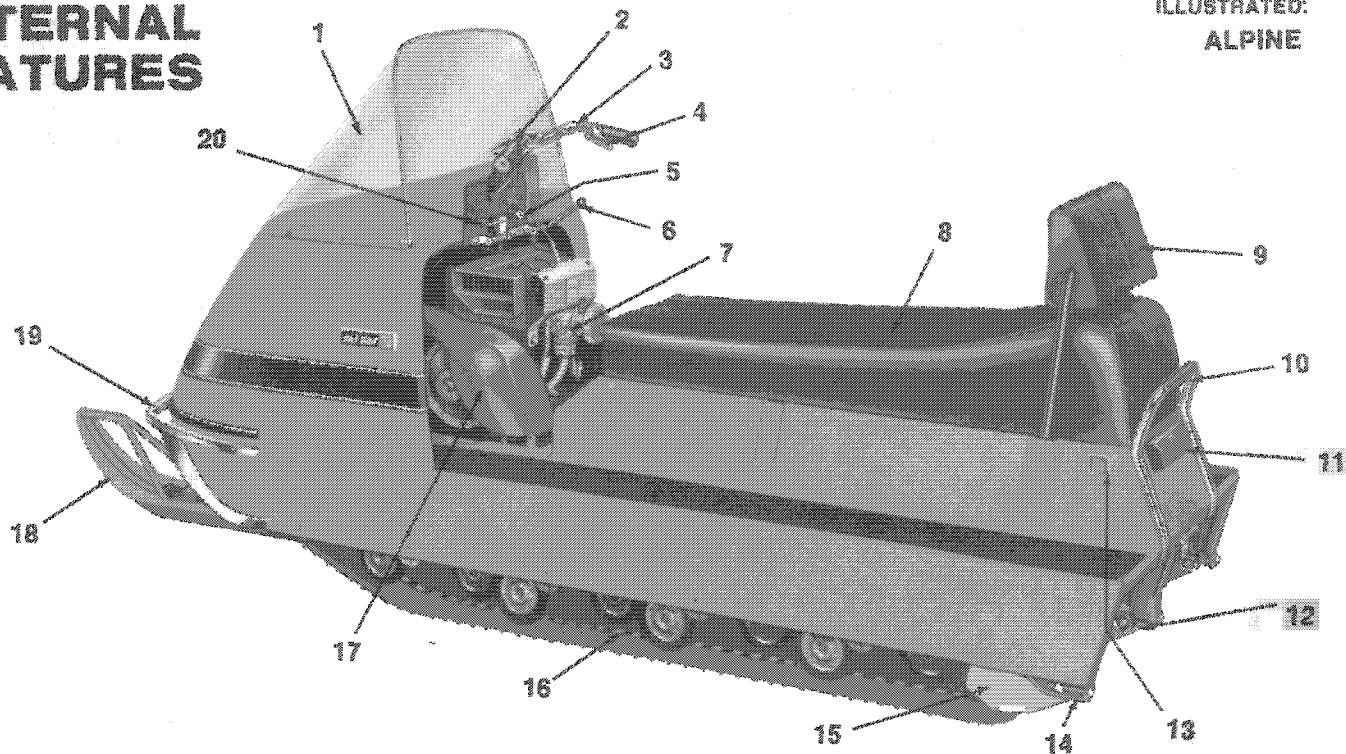
17. Muffler

18. Engine

19. Steering Column

# EXTERNAL FEATURES

ILLUSTRATED:  
ALPINE

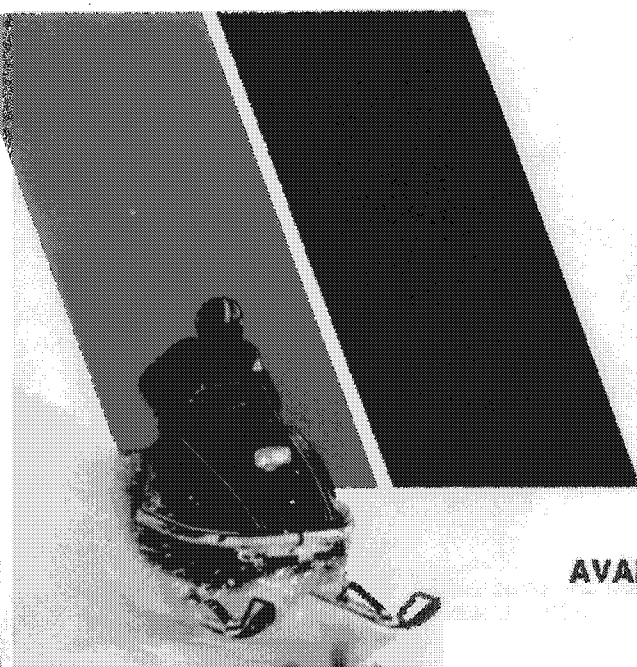


- |                    |                     |                       |                   |
|--------------------|---------------------|-----------------------|-------------------|
| 1. Windshield      | 6. Gear Shift Lever | 11. Taillight         | 16. Track Inserts |
| 2. Brake Lever     | 7. Choke            | 12. Suspension Spring | 17. Pulley Guard  |
| 3. Handlebars      | 8. Seat             | 13. Reflector         | 18. Ski Assembly  |
| 4. Throttle Lever  | 9. Back Rest        | 14. Adjuster Screw    | 19. Front Handle  |
| 5. Ignition Switch | 10. Rear Handle     | 15. Link Plate        | 20. Light Switch  |



**SERIOUS ABOUT SNOWMOBILING!**

*then Bombardier's new SHOP MANUAL is for you...*



***NOW, for the first time, Bombardier makes available to Owners of 1970 and 1971 Ski-Doo snowmobiles, a limited number of copies of the***

## **1970-1971 SKI-DOO SHOP MANUAL**

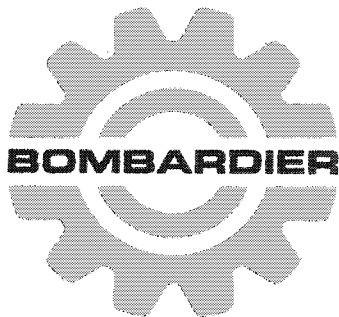
Completely illustrated, with over 150 full-sized pages, the contents includes entire sections on Engine — Carburetor — Chassis — Suspension — Electricals — Etc., lists step-by-step procedures for Repairs — Servicing — Tuning-Up and much, much more. Previously available only to Dealers and Service representatives, this Manual is the most authoritative of its kind . . . contains everything you'll ever need to know about your Ski-Doo snowmobile.

**AVAILABLE ONLY THROUGH AUTHORIZED SKI-DOO DEALERS.  
RESERVE YOUR COPY TODAY!**

Congratulations on your purchase of a new Ski-Doo snowmobile and welcome to the sport that has changed the face of winter. This year, Bombardier Limited presents a galaxy of 20 sparkling new performers in 6 exciting series — ELAN, OLYMPIQUE, NORDIC, T'NT, ALPINE and VALMONT.

Whichever model you have chosen, you will find it built to the highest standards of quality and craftsmanship, by the world's largest manufacturer of snow vehicles, Bombardier Ltd. — the people who originated snowmobiling.

Furthermore, each vehicle is backed by an international Ski-Doo Distributor and Dealer Network, so that wherever you are, in Snow Country, Parts and Service are available.



As impatient as you may be to try your new Ski-Doo snowmobile, there are three points that we would like to make first.

- (1) **READ** the entire Owner's Manual thoroughly before starting out. Whether you are an experienced driver or just beginning, there is so much that is new, that you will find the contents invaluable.
- (2) **KEEP** the Manual, in its weather-proof plastic envelope, with your Ski-Doo snowmobile at all times. In the event that the unexpected happens, it can often get you home again, with a minimum of inconvenience.
- (3) **DO** regular and proper Lubrication and Maintenance, as detailed in the Manual.

At Bombardier, we fully realize that the vehicle has been purchased primarily for enjoyment. Consequently, we start at the design stage to make your Ski-Doo snowmobile as care-free and service-free as possible.

And yet the importance of regular upkeep by the new owner cannot be overstressed. Treat Maintenance as part of the overall fun and your vehicle will retain that 'showroom' look and performance as long as you want.

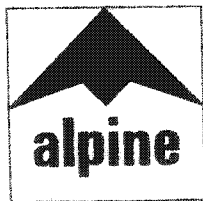


**LIFT COVER FLAP FOR  
ILLUSTRATED LISTING  
OF INTERNAL AND  
EXTERNAL FEATURES**

To help keep it fun, we have given a great deal of time and attention to simplifying and streamlining the Lubrication and Maintenance procedures in this Manual, so that they may be readily performed by anyone, regardless of prior experience.

For best results, set aside a regular time each week, then follow the simple steps listed under 'Weekly' or 'Monthly'. The few moments spent will pay you handsome dividends with years of trouble-free service.

Now that you are a member of the world's largest snowmobiling fraternity, the Ski-Doo Snowmobilers, we'll be looking for you on the Trails — meanwhile, A BIENTOT!



... Unique in all the world, with twin tracks, single ski, and a FORWARD/NEUTRAL/REVERSE gear shift lever.

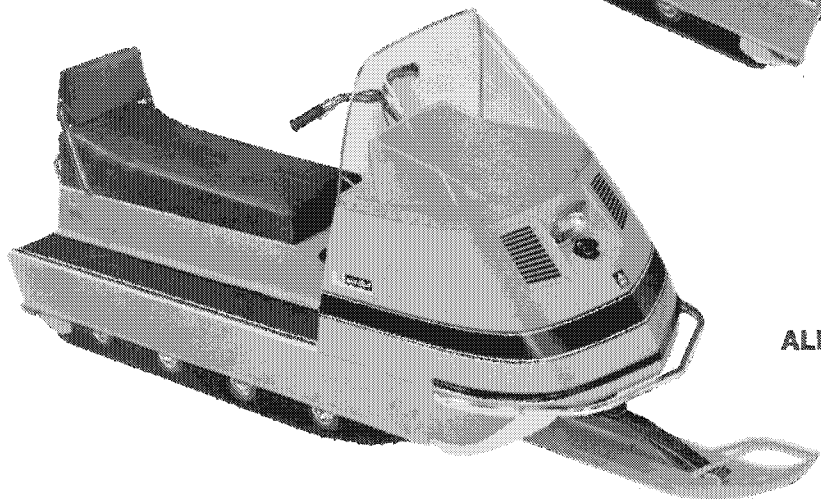
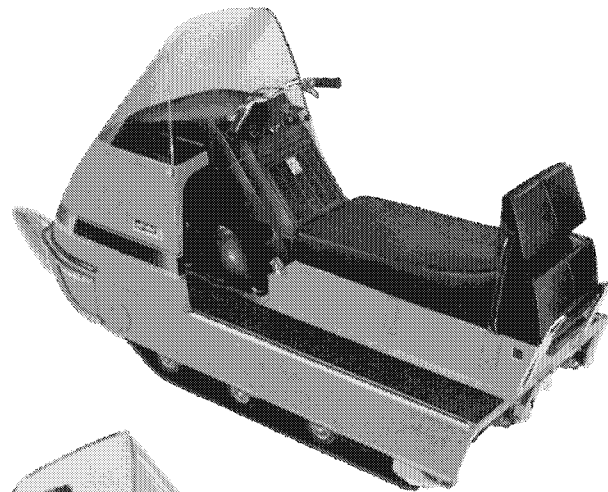
**ALPINE** — a truly reliable utility snowmobile, engineered to take it, wherever you take it... deep powder or steep slope. New, longer length, with a full set of extra bogies, gives this highly styled workhorse the lightest footprint in the industry.

**VALMONT** — handsomely appointed, stable, streamlined, that's Valmont. Climbs like a mountain goat, zips across open flats, reverses out of places where turning's tough — takes you everywhere... beautifully.

#### **STANDARD FEATURES INCLUDE:**

**Twin 15" Tracks • Single Ski • Forward/Neutral/Reverse Transmission • Underseat Storage Compartment • Front and Rear Handles • Side Reflectors • Push Plate • Disc Brake System • Trailer Hitch**

**VALMONT**

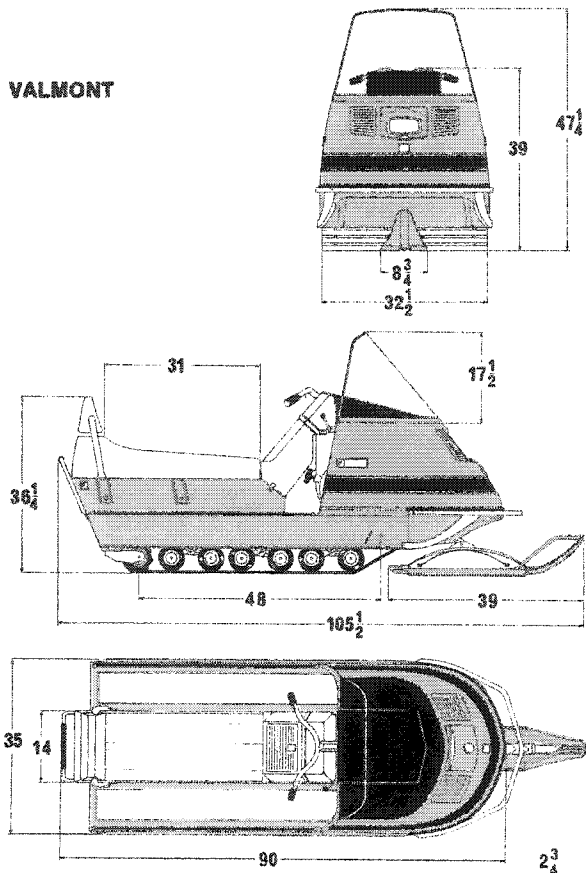


**ALPINE**



# SPECIFICATIONS

## VALMONT



ITEM	399R	399ER	640ER
<b>ENGINE</b>			
No. of Cylinders	TWO	TWO	TWO
Bore	2 x 64.5 M.M.	2 x 64.5 M.M.	2 x 76 M.M.
Stroke	2 x 61 M.M.	2 x 61 M.M.	2 x 70 M.M.
Displacement	399 c.c.	399 c.c.	635 c.c.
Horse Power	24	24	35
Compression Ratio	8.75:1	8.75:1	9:1
<b>CHASSIS</b>			
Overall Length — Alpine	113 3/4"	113 3/4"	113 3/4"
— Valmont	105 1/2"	105 1/2"	105 1/2"
Overall Width	35"	35"	35"
Height W/O Windshield	39"	39"	39"
Weight (Lbs.) — Alpine	508	543	578
— Valmont	450	485	520
Beating Area — Alpine	2160 sq. in.	2160 sq. in.	2160 sq. in.
— Valmont	1756 sq. in.	1756 sq. in.	1756 sq. in.
Grd. Pres. (P.S.I.) — Alpine	0.236	0.251	0.267
— Valmont	0.256	0.276	0.296
<b>POWER TRAIN</b>			
Track (Width)	2 x 15"	2 x 15"	2 x 15"
Standard Gear Ratio	13/39	13/39	13/29
Reverse	Standard	Standard	Standard
<b>IGNITION</b>			
Starting	Manual	Electric	Electric
Lighting Coil (Watts)	75W	75W	75W
Spark Plug(s) (Bosch)	W-240-T-1	W-240-T-1	M-280-T-31
Spark Plug (Gap)	.018" - .022"	.018" - .022"	.018" - .022"
Breaker Points (Gap)	.014" - .018"	.014" - .018"	.014" - .018"
<b>FUEL</b>			
Tank Capacity — Imp.	5 gals.	5 gals.	5 gals.
— U.S.	6.25 gals.	6.25 gals.	6.25 gals.
Mixing Ratio (Gas/Oil)	20:1	20:1	20:1
<b>BRAKE</b>			
Type	Disc	Disc	Disc
<b>ACCESSORIES</b>			
Tachometer — Alpine	Optional	Optional	Optional
— Valmont	Standard	Standard	Standard

# FUEL MIXING

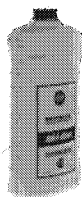


Fig. 1

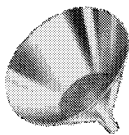


Fig. 2



Fig. 3

Unlike an automobile, a snowmobile **WILL NOT OPERATE** by merely adding gasoline alone to the fuel tank. To function properly, all engines, automotive or snowmobile, must have OIL. With a snowmobile however, the OIL must first be added to the GASOLINE in pre-measured amounts. Then both oil and gasoline should be thoroughly mixed together, **BEFORE** fueling the tank.

*NOTE: A mixture containing too little oil will cause overheating of the engine, which could result in serious internal damage (such as piston seizure or even a broken connecting rod or crankshaft). A mixture containing too much oil will cause excessive carbon formation resulting in pre-ignition, fouled spark plug(s) and loss of power.*

**5 GALLONS, REGULAR GASOLINE, + 1 QUART, SKI-DOO OIL = CORRECT FUEL MIXTURE.**

## FUEL MIXTURE RATIO

For the Rotax 2-cycle engine that powers your Ski-Doo snowmobile the correct gasoline to oil mixture ratio is **20 parts GASOLINE TO 1 PART OIL.**

The importance of using the correct Fuel Mixture cannot be overstressed. Prior experience has shown that the single largest cause of engine damage is from improper fuel mixtures.

## WHICH GASOLINE TO USE

The correct gasoline for your Ski-Doo snowmobile is regular gasoline, available from the pump at all service stations.

**WARNING — Never experiment with differing fuels or fuel ratios. Never use naphtha, methanol or similar products.**

## WHICH OIL TO USE

Use only Ski-Doo Oil (See Figure 1) available from any authorized Ski-Doo dealer. This oil, especially blended for the Rotax engine, has high resistance to carbon formation, excellent anti-wear characteristics and reduces engine deposits to a minimum.

**WARNING — Unless absolutely necessary (in case of emergency) do not use outboard or straight mineral oil. Never use multi-viscosity oils.**

## FUEL CONSUMPTION TABLE

MODELS 399 & 399E

Throttle	R.P.M.	H.P.	Time*
Full	5500	24	2h.
¾	5500	18	3h. 15m.
½	4500	12	6h. 15m.
¼	4500	6	8h.
Fuel Tank Capacity			5 Imp. gals./6.25 U.S. gals.

MODEL 640E

Throttle	R.P.M.	H.P.	Time*
Full	5500	35	1h. 15m.
¾	5500	24	1h. 30m.
½	4500	14	3h. 15m.
¼	4500	7	5h. 45m.
Fuel Tank Capacity			5 Imp. gals./6.25 U.S. gals.

\*Running Time (in Hours and Minutes)

The Fuel Consumption Table above is applicable to both Alpine and Valmont Models.

**IMPORTANT: The single largest cause of difficulty on the trail is running out of fuel. Be sure it does not happen to you. Don't explore new areas unless you have established fuel stops or are certain of an adequate fuel supply.**

## FUEL MIXING PROCEDURE

1. To mix the gasoline and oil always use a separate clean container. Never mix in your Ski-Doo snowmobile tank.
2. Pour the full amount of Ski-Doo Oil required for the total mixture into the container, add approximately half the amount of gasoline to be mixed and shake thoroughly.
3. Add the remainder of the gasoline and again thoroughly agitate the container.
4. Using a funnel with a fine mesh screen (See Fig. 2) to prevent the entry of water and foreign particles, transfer the fuel from container to tank.

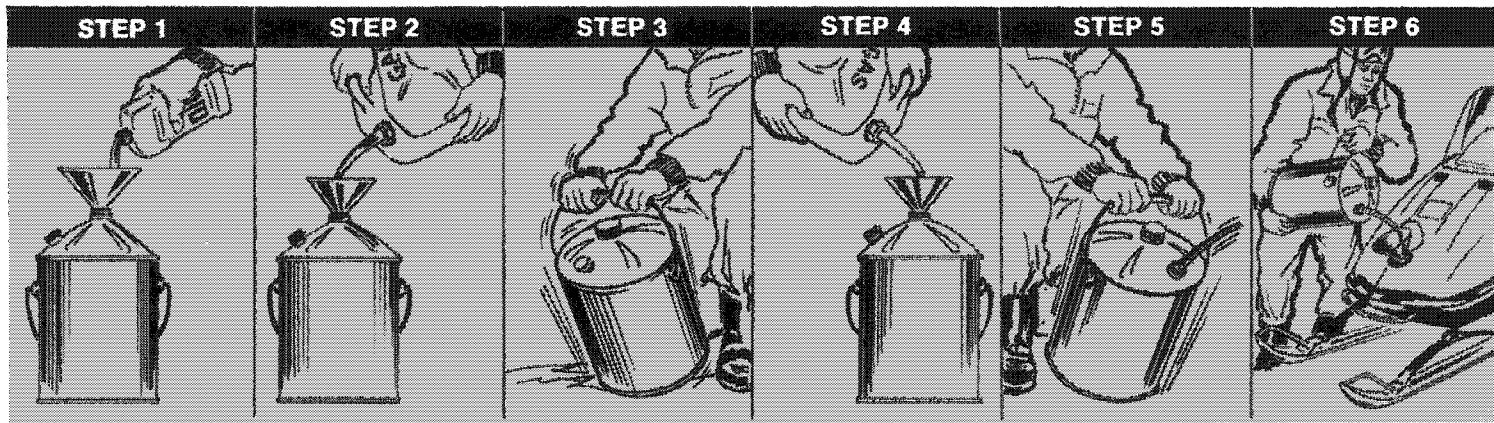
## FUEL SAVING TIPS \*

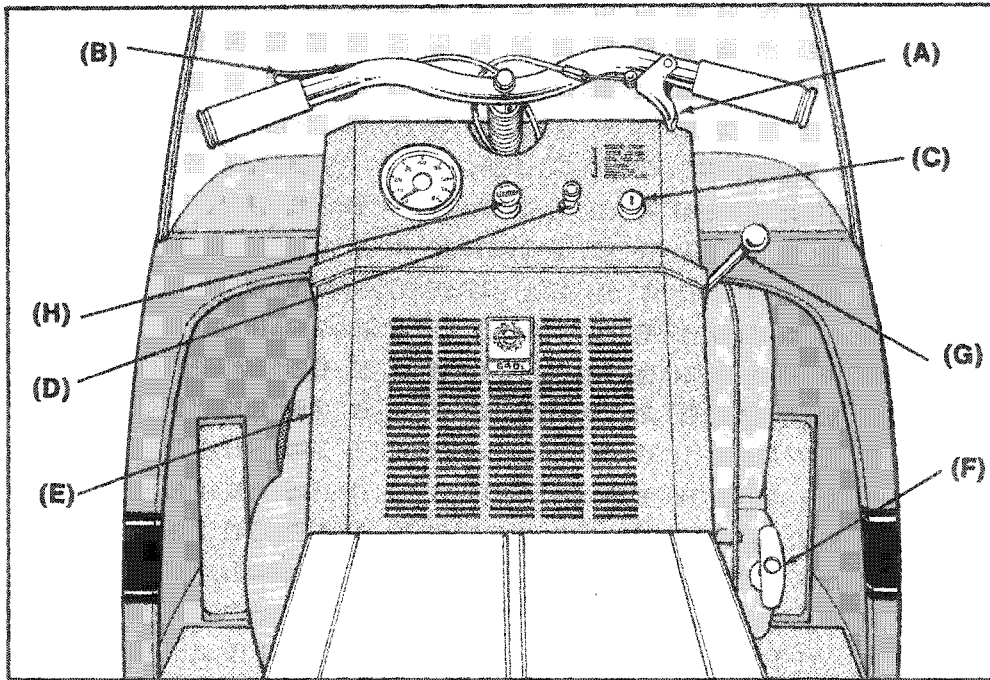
Don't let your engine idle for more than brief periods. While waiting for companions to catch up, or when stopping to rest on the trail, turn your ignition OFF. Not only do you save fuel, but you lessen the chance of spark plug fouling.

\* Don't run continuously with throttle fully open. You will find that your engine performs just as efficiently at about  $\frac{3}{4}$  throttle. To determine, (when it is safe to do so), bring vehicle up to full throttle, then slack off throttle slightly until vehicle starts to lose speed. Just before vehicle loses speed is the point of high speed efficiency.

The Fuel Consumption table above must be construed as approximate only. Results have been obtained by running static tests under full load, but cannot take into account such factors as snow conditions, less-than-ideal carburetor adjustments, etc.

A good idea is for you to rate the performance of your snowmobile at the first opportunity. Starting with a full fuel tank, mark the time of your departure. Then note time elapsed until tank is half-full. Repeat on different occasions to get a mean average of your snowmobiles' performance and length of running time under varying conditions.





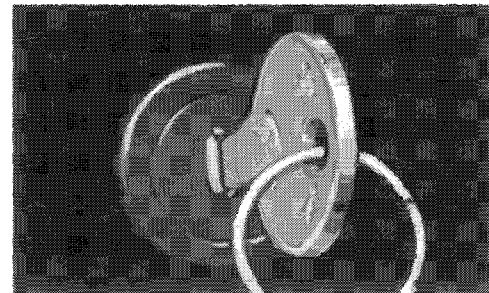
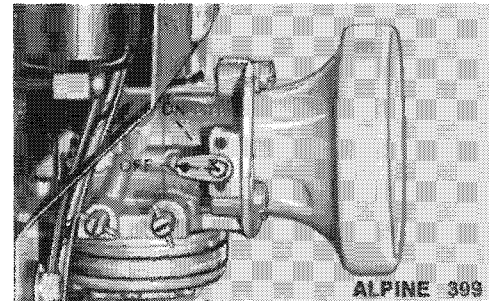
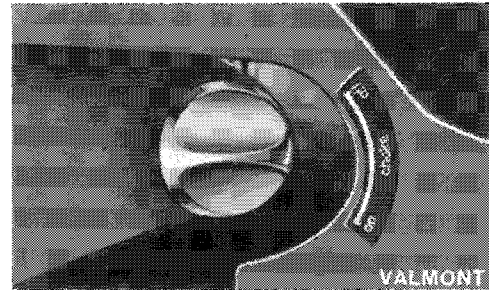
## CONTROLS & INSTRUMENTS

### STEERING

Your Ski-Doo snowmobile follows the direction in which the handlebars are rotated. To turn to the right, rotate handlebars right. To turn to the left, rotate left.

### THROTTLE LEVER (A)

Located on right handlebar. When lever is depressed, engine speed increases. When released, it automatically returns to IDLE. Engine speed is proportionate to the applied pressure on the lever.



Illustrated -  
VALMONT

## **BRAKE LEVER (B)**

Located on left handlebar. When lever is depressed, braking action is applied. When released, it automatically returns to the OFF position. Braking effect is proportionate to the applied pressure on the lever.

**CAUTION: Note that brakes do NOT operate when gear shift lever is in NEUTRAL position.**

## **IGNITION SWITCH (C)**

Manual Start Model (399R) has key operated, 2 position switch (OFF/ON).

Electric Models (399ER & 640ER) have spring-loaded contact added (OFF/ON/START) to activate starter mechanism.

## **LIGHT SWITCH (D)**

Two position, (OFF/ON) push-pull switch, located on dashboard, (yellow ring). Pull out to illuminate.

Single switch illuminates both headlamp and taillight, with engine running on Manual Start Models, with or without engine running on Electric Start Models.

*NOTE: (Electric Start Models only). Do NOT leave lights ON for more than brief periods, unless engine is running.*

## **CHOKE (E)**

(Alpine Models only). Two position,

(OFF/ON) lever, located on left side of carburetor. To engage choke, raise lever to vertical (ON) position. To disengage, depress lever to horizontal (OFF) position.

(Valmont Models only). Two position, (OFF/ON) dial knob, located on lower left side of console. To engage choke, turn dial clockwise to ON position. To disengage, turn counter-clockwise to OFF position.

*NOTE: The purpose of the choke is to reduce the amount of air flowing through the carburetor, in effect enriching the fuel/air mixture. However, leaving choke on after engine has started activates carbon formation inside the engine. Therefore, always turn choke knob to OFF once engine has started. NEVER OPERATE YOUR SNOWMOBILE WITH CHOKE ON.*

## **MANUAL STARTER (F)**

Automatic rewind type located on engine flywheel side, (lower right side). To start engine, pull handle. (See Starting Procedure, page 9.)

## **GEAR SHIFT LEVER (G)**

A 3 position, (FORWARD/NEUTRAL/REVERSE) gear shift lever is standard

on all Models. Push UP for forward, CENTRE for neutral, pull DOWN for reverse.

## **LIGHTER (H)**

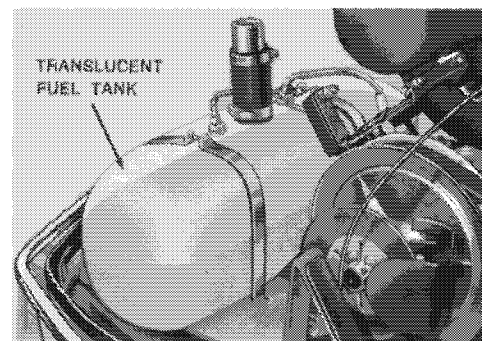
Standard equipment on Valmont Electric Models only, a cigarette lighter is located in centre of dashboard. Push in to activate, lighter pops up automatically when lit.

## **TACHOMETER**

A Tachometer, mounted on dashboard left, is standard on all Valmont Models, optional on all Alpine Models.

## **FUEL LEVEL**

Polyurethane fuel tank is translucent. To check fuel level, sight along inside of cab at either side of engine. At night, use flashlight to illuminate.



# PRE-START CHECK (daily, first run)

## FUEL TANK QUANTITY

Check that there is sufficient fuel in the tank for your trip. A good habit to acquire is to 'top off' (fill) the tank before starting out each day.

## THROTTLE OPERATION

Depress and release throttle lever several times to check that throttle opens easily and smoothly and returns to the IDLE position swiftly when released. If it does not return swiftly, apply light machine oil (sewing machine oil) on the cable, at cable ferrule. (See Fig. 9).

## BRAKE OPERATION

Depress and release brake lever several times to check that lever operates freely and returns to OFF position swiftly when released. Brake should apply fully when lever is  $\frac{1}{4}$ " (minimum clearance) from the handlebar grip.

## SKI AND SKI LEG

Check the condition and alignment of the ski assembly. Properly aligned, ski should be perpendicular to handlebars. Check ski coupler bolt, (bolt joining ski to ski leg). Tighten if necessary.

## BREAK-IN NOTES:

After the first 2 hours of operation, check tightness of carburetor flange nuts. Use the 13mm open end wrench included in the tool kit, and tighten if necessary.

Each 2 hours for first 6 hours, check tension of drive chain. (It is normal for new drive chain to lengthen or stretch). Before checking, be sure that vehicle has been run forward so that true free play will be on side exposed by inspection port. (See Fig. 4).

Check once, then turn driven pulley  $\frac{1}{2}$  turn counter-clockwise, check again. Starting from maximum reading, adjust chain tension to  $\frac{1}{4}$ " free play. (For proper procedure, see Drive Chain Tension, page 22).

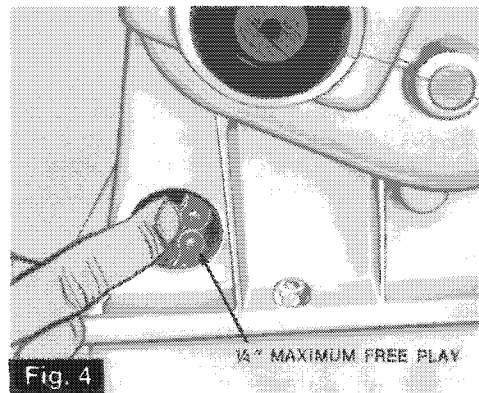


Fig. 4

$\frac{1}{4}$ " MAXIMUM FREE PLAY

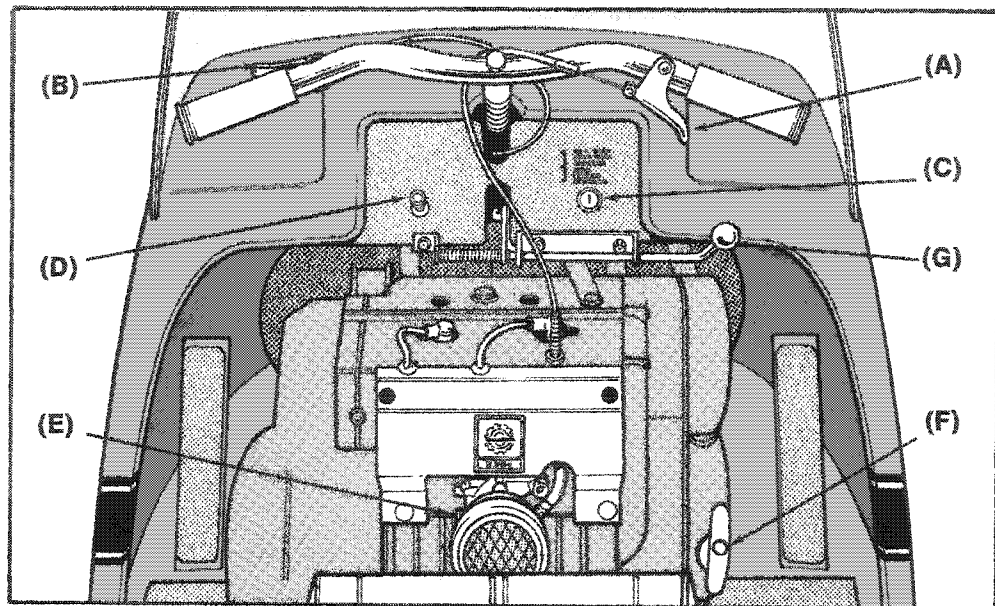
## BREAK-IN PERIOD AND DEALER FIRST INSPECTION

With all snowmobile engines, a break-in period is necessary before running at full throttle. Manufacturer's recommendation for the Rotax engine is **fifteen (15) operating hours** or the equivalent fuel consumption. (See page 4 for the equivalent fuel consumption of your vehicle). During this period, maximum throttle should not exceed  $\frac{3}{4}$ , except momentarily to attain cruising speed or avoid emergency.

Before you took delivery of your new Ski-Doo snowmobile, the carburetor was adjusted by your Dealer for a rich fuel mixture. This permits better lubrication and cooling of the entire engine. Do not readjust, regardless of excessive smoke in the exhaust.

After Break-In, when you return your vehicle to your Dealer for your **FREE DEALER FIRST INSPECTION**, he will reset the carburetor for normal operation.

**IMPORTANT: See Conditions of your Warranty, back cover.**



## STARTING PROCEDURE

### ELECTRIC STARTING

Wherever practical, place gear shift lever in NEUTRAL position when starting engine. Note however that brake DOES NOT operate with lever in NEUTRAL, so use caution and judgment on inclined surfaces.

For Models with electric starter:

1. Engage choke **(E)**. (Choke is not necessary if engine is warmed up.)
2. Test throttle operation, then apply throttle lever **(A)** slightly.
3. Insert key in ignition **(C)** and turn clockwise until starter engages.
4. Release throttle and return key to ON immediately engine has started.

### 5. Disengage choke **(E)**

*If engine does not start on first try, key must be turned fully back to OFF each time, before repeating procedure.*

*NOTE: A manual starter is standard equipment on all Ski-Doo snowmobiles. If for any reason the vehicle cannot be started electrically (defective starter, low or dead battery, etc.), follow the procedure outlined for manual starting.*

### MANUAL STARTING

Every Ski-Doo snowmobile is equipped with a manual starter (auto-rewind type) located on the flywheel side of the engine. To start the engine manually:

1. Insert key in ignition **(C)** and turn to ON.
2. Engage choke **(E)**. Choke is not necessary if engine is warmed up.)
3. Grasp manual starter handle **(F)** firmly and pull slowly until a resistance is felt. Then pull vigorously and engine will start. If engine does not start, allow handle to return slowly to its original position and repeat the procedure.

*NOTE: Do not pull starting rope to its fullest extent or allow starting handle to "fly back" to its original position.*

4. Disengage choke **(E)** immediately engine has started.

Illustrated -  
ALPINE

# DRIVING HINTS

Driver confidence and capability are the keys to full enjoyment of your new Ski-Doo snowmobile. For your first few runs, select a large clear flat area, then practice the uses and responses of the various controls and get the feel and balance of your vehicle.

When first using throttle and brake, most beginners press and release the levers too quickly, causing a corresponding 'jerking' of the machine. Instead, squeeze the levers firmly and smoothly so acceleration and braking are even.

When braking, remember that snowmobiles have a broad, flat track in continuous contact with the ground, so that the vehicle immediately starts to slow of its own accord as soon as the throttle lever is released. For most circumstances, this natural slowing action plus a gentle pressure on the brake are more than sufficient to stop the vehicle.

## DRIVING POSITIONS

There are 3 main driving positions on a snowmobile — (1) Standing, (2) Sitting, and (3) Kneeling. Each presents certain advantages depending on the nature of the terrain, the snow conditions, speed of the vehicle, the turns you desire or the personal preference of the driver.

**(1) Standing** — a position often adopted by beginners, allows for better weight distribution and permits you to respond to the movement of your snowmobile with surer control. With this position, however, always keep your knees slightly flexed to absorb surface shocks.

The position is undoubtedly the best for steep hills, climbing or going down, a short stretch of very bumpy trail or when manoeuvring in deep snow.

**(2) Sitting** — for all normal driving, the most comfortable position is the sitting position. Feet should be placed on footrests or footboards, body about midway back on the seat and body weight distributed between seat and footrests or footboards.

**(3) Kneeling** — crossing a steep slope, for example, from side to side, you will find the kneeling position a definite advantage. Place one foot on the footboard (on the high side of the hill), the opposite knee on the seat, then lean into the hill. If leaning left, your left foot should be on the footboard, your right knee on the seat, and vice-versa.

An alternate recommended kneeling position and one that is frequently used, is to place both knees on the seat, with one foot on each side, loosely pressing against the seat. This position is useful should you encounter bumpy trails where sitting is uncomfortable.

## TRACK TENSION

As only one of many new features, the track tension of your Ski-Doo snowmobile is readily adjustable. A slotted anchor holds the top of the track tensioner springs (4), and tension is adjusted by moving the springs to any of 3 positions. (See Fig. 7). All springs must always be moved equally, however.

Use furthest FORWARD position for riding on hard-packed snow, when carrying passengers or heavy loads; CENTRE position for all normal or high speed driving; BACK position when travelling in deep snow or new trails, hills or bumpy terrain.





## SURFACE CONDITIONS

**Deep Snow** — Your new Ski-Doo snowmobile is designed to negotiate almost any snow surface, including deep or newly-fallen snow. Two things are important however — (1) don't overload your machine (i.e. travel alone, not with passengers) and (2) maintain a reasonable forward speed at all times. Don't accelerate beyond the track's ability to cope with the surface underneath, and don't stop.

If your vehicle continues to make reasonable headway, responding to light changes in acceleration, you are safe enough to explore new areas. If not, turn in as wide an arc as possible and look for firmer trails.

**Icy Surface** — Ice or extremely hard-packed snow can be difficult to negotiate as both ski and tracks do not have much traction. Best advice is to slow down and avoid rapid acceleration or braking.

## QUICK TIP

Three good tips to follow to minimize your chances of being stranded are (1) stay on known trails and familiar terrain, (2) travel with friends or in company with other snowmobiles, and (3) do regular lubrication and maintenance faithfully.

## ABOUT YOUR VEHICLE

- A Tachometer, standard on all Valmont Models, is available as an option for all Alpine Models.

- A full-sized storage compartment, located under the seat, is standard on all Models. To gain access, remove backrest, raise left side of seat. Seat is hinged along right side, remains open when lifted. Taillight illuminates storage compartment at night.

- A push plate, at rear of vehicle, is standard on all Models.

- At the option of the owner, the twin tracks of the vehicle can be cambered. By raising the outer attachment of the bogie wheel sets, manoeuverability and turning performance are correspondingly increased.

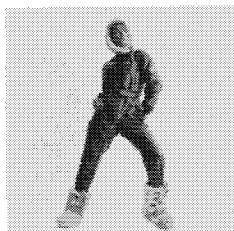
On each side of the vehicle, you will note that there are already partly drilled holes,  $1\frac{3}{8}$ " higher than the holes to which the outer ends of the cross shafts are presently affixed.

To add camber, drill holes fully through, using  $5/16$ " dia. drill. Remove cap screws securing the outer ends of the cross shafts, raise cross shafts to new position and reinstall.

*NOTE: Once holes have been drilled, both positions are interchangeable and may be changed at any time.*



# CLOTHING & WEATHER



To hundreds of thousands of enthusiasts, Snowmobiling has added an entirely new dimension to winter. To truly enjoy the fun, however, there is one item that is as indispensable as your Ski-Doo snowmobile — warm clothing.

As the accompanying chart shows, even moderate temperatures, when coupled with vehicle speed or wind velocity, produce a 'chill factor' often as much as 20 to 30 degrees below thermometer

readings. A good rule to follow, when deciding what to wear, is to dress to the 'chill factor', not the temperature.

Warm headgear, mitts and boots are the three most important items, for hands and feet, lacking sufficient movement as you drive, are subject to chilling faster than other areas of the body.

Proper outfitting from head to toe, however, is best of all — and Bombardier Limited, the people who know snowmobiling best, have considered your

comfort with a complete line of cold weather clothing. From underwear to outerwear, in high-fashion styling, these garments and accessories have been laboratory and field tested, not only to keep you warm, but also to give you the comfort and freedom of movement that the sport demands.

Marketed by Ski-Doo Sports Ltd. and stocked exclusively by local authorized Ski-Doo dealers everywhere, you are guaranteed warmer winters when you wear certified Ski-Doo sportswear.

		CHILL FACTOR CHART									
TEMPERATURE (in degrees Fahrenheit)	35°	32	22	15	11	7	5	3	2	1	0
	30°	27	16	9	4	0	-2	-4	-6	-8	-9
	25°	21	10	2	-3	-7	-10	-12	-14	-15	-16
	20°	16	4	-5	-10	-15	-18	-20	-21	-22	-23
	15°	11	-2	-11	-17	-22	-25	-27	-29	-30	-31
	10°	6	-9	-18	-25	-29	-33	-35	-37	-38	-39
	5°	0	-15	-27	-32	-36	-40	-42	-45	-47	-49
	0°	-5	-21	-36	-39	-44	-48	-51	-53	-55	-56
	-5°	-10	-27	-40	-46	-51	-55	-58	-61	-63	-64
	-10°	-15	-33	-45	-53	-59	-63	-67	-69	-71	-72
-15°	-20	-39	-52	-60	-66	-71	-74	-77	-79	-80	
-20°	-26	-46	-58	-67	-74	-79	-82	-85	-87	-88	
		5	10	15	20	25	30	35	40	45	50
		MILES PER HOUR (wind velocity or snowmobile speed)									

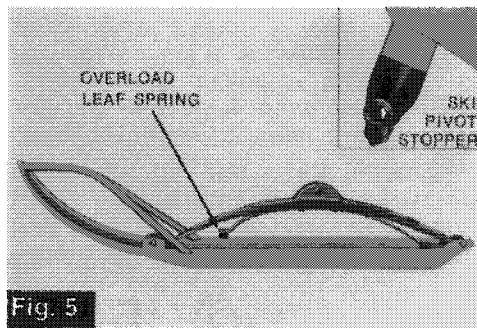
# NEW FEATURES

Year after year, Bombardier continues to be the World's largest seller of Snowmobiles and Snow-related equipment. Why? Well, one of the many reasons would certainly have to be our policy of continuous testing and improvement.

This year, for example, we have added more new features than in any other year in our history. In addition to brand new styling for the '70's, here are just a few of the many innovations that you will enjoy on your new Ski-Doo snowmobile.

## SKI PIVOT STOPPER

Purposefully designed to limit the arc of the ski around the ski coupler bolt, this hard steel mounting is another unique feature of Bombardier engineering.



## NEW TRACK DESIGN

On preliminary examination, you would almost expect this track to be mounted in the other direction. And yet, in the simplest terms, the technical explanation is easily understandable. As the track revolves, each tread, instead of digging away the snow, compacts it, so that the vehicle is propelled by pushing against a compacted bank of snow.

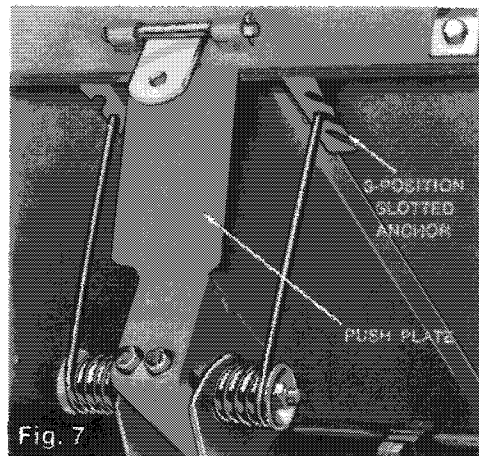


## OVERLOAD LEAF SPRING

Specifically designed to act only in the event of heavy or sudden overloads, this spring effectively dampens out surface shocks and jars, and is particularly effective on bumpy terrain. (See Fig. 5). Note too that rear tip of ski is contoured to facilitate steering when vehicle is in reverse.

## ADJUSTABLE TRACK TENSIONER SPRINGS

To enable you to adjust your track tension easily, to almost any type of snow condition, the tops of the track tensioner springs are held by a 3-position slotted anchor. (For details, see Driving Hints, Page 10 ).(See Fig. 7).



## OTHER FEATURES (Not Illustrated)

- Deep Cushioned Seat
- Bigger, Safer Taillight Lens
- Side Reflectors
- Improved Gear Shift Lever
- Stronger Suspension Springs
- Color-Coded Instruments

## DO'S



Before you start out, check to be sure that you and each member of your party are equipped with sufficient warm clothing and safety helmets.

Use the 'buddy' system. Always travel with at least one other snowmobile, especially in unfamiliar terrain or on trail rides. Even in snowmobiling, a pair beats one of a kind.

If you are planning to explore new areas, leave word of your approximate whereabouts and estimated time of return with someone. Remember, a snowmobile can often travel farther in 15 minutes than you can walk in a day.

Show respect and courtesy to other snowmobilers and to private property at all times.

Always make a full stop, then look carefully in both directions before crossing railroad tracks or roads. When travelling in pairs or in a group, have one member direct the others across, singly.

Insure your snowmobile against Public Liability.

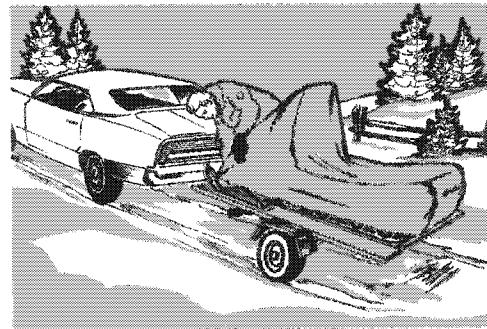
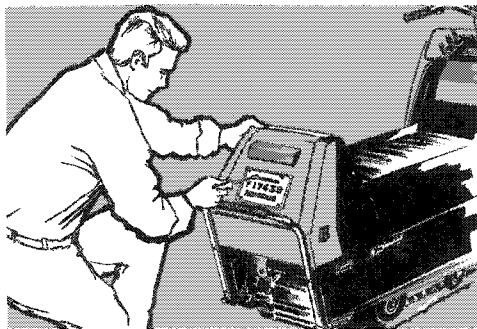
**Use a rigid hitch or tow-bar when pulling any sled or trailer behind your Ski-Doo snowmobile. Rigid hitches prevent tailgate collision when going downhill or on sudden stops.**

When trailering your Ski-Doo snowmobile, secure it solidly at both ends, protect it with a bright cover (Ski-Doo cover); then check that trailer hitch and safety chain are secure and that brake, flashers and parking lights are all in working order.

Be extremely careful when giving children a ride. Go more slowly and check frequently. Small children, are far safer in a Ski-Boose sled than on the seat of your snowmobile.

Always carry emergency materials and supplies (see Emergency, page 24), and do keep your Owners' Manual with the vehicle at all times. Should you encounter an emergency situation, knowing what to do can often make the difference between becoming stranded and returning safely.

**Register your Ski-Doo snowmobile at your nearest Licensing Bureau, where state or provincial laws require it, and affix Registration plate to rear of vehicle. Carry your registration certificate with you. It provides proof of ownership in the event that the vehicle becomes lost or stolen.**



# DONT'S



**Don't cut across in front of the line of travel of another snowmobile. Collision, or the threat of it, is serious with any moving vehicle.**

Don't risk injury or damage to your machine with needless and foolish stunting.

**Never ride on railway tracks. The sounds of your moving vehicle drown out noise of approaching trains.**

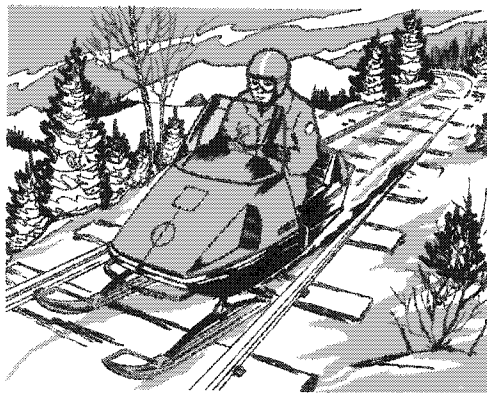
Never cut through fences or attempt to run over them. Give a wide berth to telephone poles. Hidden guy wires, unseen from a distance, can cause serious accidents.



**Don't lend your snowmobile to inexperienced or under-age drivers. Check state or Provincial minimum age limits for drivers.**

Unless you are certain of a fueling stop, never travel further than  $\frac{1}{2}$  of the fuel remaining in your tank. Even then, leave yourself a safety margin. Remember that a snowmobile does not necessarily travel the same distance each time on the same amount of fuel. A lot depends on speed, the snow conditions of the trail and the adjustment of the carburetor.

**Don't drive your snowmobile in the vicinity of skiers and keep off ski trails. Always respect the rights of those who enjoy winter in another way.**

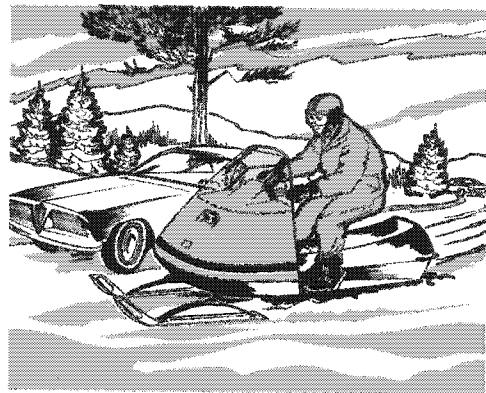


Don't smoke while refueling or while checking fuel level. Even mixed fuel gives off dangerous fumes.

**Don't overload your snowmobile. A Ski-Boose sled or other trailer carries far more than your snowmobile can, without noticeable loss of efficiency or manoeuvrability.**

Don't cross a river or lake without first being positive that the thickness of the ice is sufficient to support both you and your vehicle. Your life may depend on it. If at all in doubt, take an alternate route.

**Don't leave your keys in the ignition switch. It presents an invitation to thieves and a danger to children.**



# LUBRICATION

CODE*	WEEKLY	PAGE
L1	Steering Mechanism	16
L2	Ski Assembly	16
L3	Throttle and Brake	16
L4	Gear Box Oil Level	16
L5	Bogie Wheels	17
L6	Driven Pulley	17

CODE	MONTHLY	PAGE
L7	Drive Pulley	17

\*For reference to location of Part or Component, see Cutaway view, page 18.

For those procedures that require cab removal, unlock latches (2), disconnect electrical connectors (2), remove fuel tank cap and lift cab. (Valmont only), to remove console, undo latches (2) at base of console, then remove.

## (L1) STEERING MECHANISM

With cab removed, oil spring at top of steering column housing. Using Ski-Doo Oil or light machine oil (sewing machine oil), lubricate freely, allowing oil to run in. Oil mobile-contact point at bottom end of steering arm. Grease steering ball joint at top of steering arm, using small brush. (See Fig. 8).

## (L2) SKI ASSEMBLY

Grease ski leg at grease fitting (inside cab), using low temp. grease.

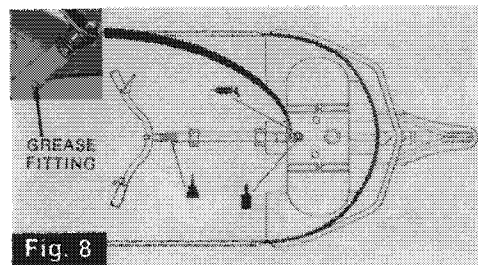


Fig. 8

## (L3) THROTTLE AND BRAKE

Oil brake and throttle cable slugs so they rotate freely in the levers. (See Fig. 9).

Lubricate cable housing sufficiently until oil coats internal cable. Activate levers and tilt machine to allow oil to run in.

Using light machine oil, lubricate throttle lever shaft. Also pivoting slug and spring at carburetor.

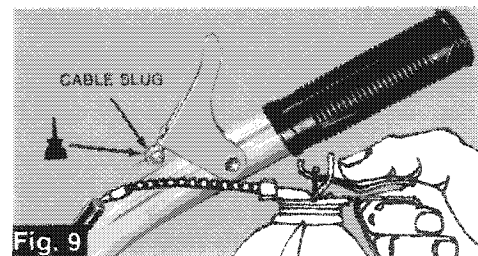


Fig. 9

## (L4) GEAR BOX OIL LEVEL

Note: All 399R and 399ER Models have an oil capacity of 12 ozs. 640ER Models have an oil capacity of 16 ozs. To check:

1. Remove rubber inspection cover, located at bottom right side of gear box.
2. Using a fairly rigid piece of wire as dipstick, check oil level. (See Fig. 10). On 399R and 399ER Models, level must reach  $2\frac{1}{4}$ ". On 640ER Models, level must reach  $3\frac{1}{4}$ " on dipstick.

To fill, remove filler cap (red cap) at top of gear box. Refill as required, using Ski-Doo Chain Case Oil.

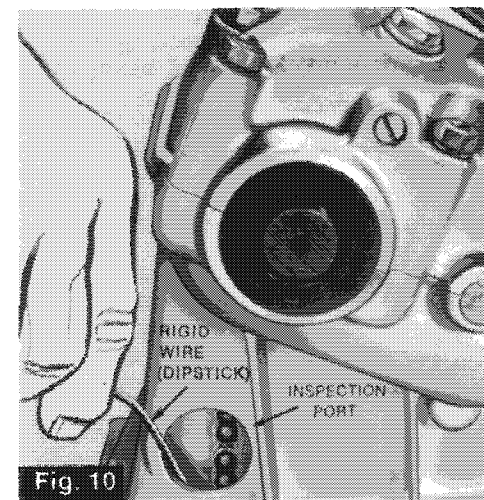


Fig. 10

### (L5) BOGIE WHEELS

Grease the suspension bogie wheels with low-temp grease, using low pressure grease gun. Pump through the grease fitting at the centre of each wheel until new grease appears on the inner side, at the joints. (See Fig. 11). Also grease rear axle, at grease fitting. (Fig.31)

To grease inside bogie wheels, tilt vehicle on its side, apply pressure on track to expose grease fittings. Repeat with other side.

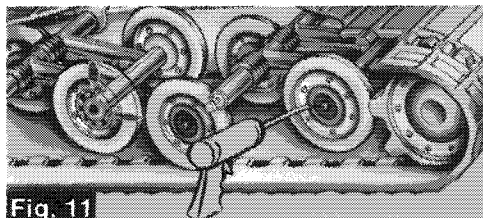


Fig. 11

### (L6) DRIVEN PULLEY

With cab removed, grease the driven pulley shaft, as follows:

1. Remove pulley guard and slip off drive belt. Open the driven pulley, (push and twist sliding half).

2. Apply light coating of low-temp grease on the shaft. Activate the sliding half several times to distribute grease over full length of shaft. (See Fig.12). Be careful that grease does not get onto inner halves of the pulley.

### (L7) DRIVE PULLEY (or each 100 hours)

1. Remove, cab, take off pulley guard, then slip off drive belt.
2. Unscrew the centrifugal governor bolt and remove the governor. If you do not have the proper tools, see your dealer.
3. Apply light coat of low-temp grease to the (4) flyweights and pack grease inside drive pulley shaft. (See Fig. 32).
4. Using light machine oil, (sewing machine oil) oil the governor bolt threads and replace governor.

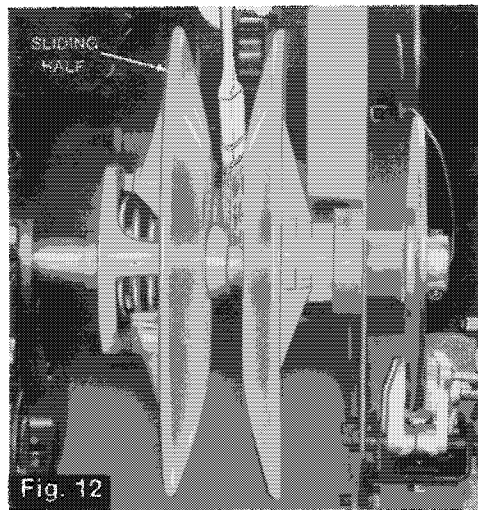


Fig. 12

### TOOL KIT & USES

Bombardier Ltd. equips each new Ski-Doo snowmobile with the following Tools, as standard equipment:

#### Screwdriver

Use for Carburetor adjustments, Carburetor Pivoting Slug Screw, to pry off Taillight Lens, to open Chain Case Access Covers.

#### Box Wrench (22/26 mm)

Use 22 mm end to remove and replace 'W' type Spark Plugs, 26 mm end for 'M' type Spark Plugs.

#### Box Wrench (11/13 mm)

Use 13 mm end for Engine Head Nuts, Transmission Gear Box Nuts (Alpine/Valmont models only).

#### Pin (8 x 130 mm)

Use as handle for Box Wrenches.

#### Angular Wrench (10/13 mm)

Use 10 mm end for Rewind Starter Unit Bolts. Use 13 mm end for right side Carburetor Flange Nut, right side Muffler Flange Nut.

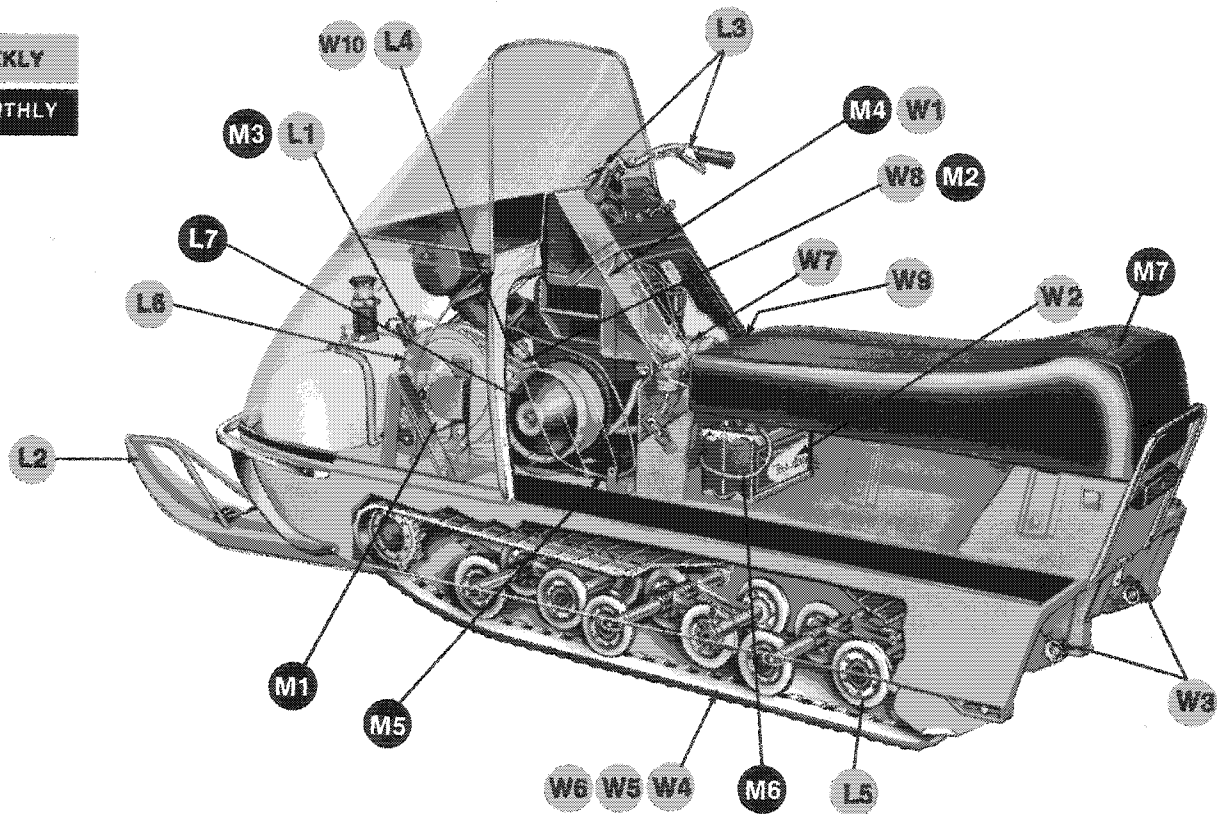
#### Open End Wrench (11/13 mm)

Use 13 mm end for left side Carburetor Flange Nut, left side Muffler Flange Nut (single cylinder models only).

# LUBRICATION AND MAINTENANCE GUIDE

WEEKLY

MONTHLY





# MAINTENANCE

CODE*	WEEKLY	PAGE
W1	Spark Plug(s)	19
W2†	Battery	19
W3	Suspension Springs	20
W4	Tracks	20
W5	Track Free Play	20
W6	Track Alignment	20
W7	Carburetor	21
W8	Drive Belt Condition	22
W9†	Rectifier Fuse	22
W10	Drive Chain Tension	22

CODE*	MONTHLY	PAGE
M1	Brake	22
M2	Drive Belt Wear	22
M3	Steering Adjustments	23
M4	Engine Head Nuts	23
M5	Engine Mount Bolts	23
M6	Electrical Wiring	23
M7	Vehicle Inspection	23

\*For reference to location of Part or Component, see Cutaway view, page 18.

†(Electric Model only).

## (W1) SPARK PLUG(S)

To check spark plug(s).

1. Remove cab, then disconnect the spark plug(s) wire(s).

2. Remove spark plug(s) using box wrench supplied in the tool kit (See Fig. 13).

3. Check condition of spark plug(s) Fig. 24. Normal color is "brownish". If spark plug(s) color is abnormal (black or light grey) the engine is not running under ideal conditions, due to either:

(i) Use of incorrect fuel mixture. (See Fuel Mixing, page 4).

(ii) Carburetor incorrectly set (See Carburetor Adjustment, page 21).

(iii) Wrong type of spark plug(s). (See Specifications, page 3 for correct spark plug. (Heat range).

4. Check spark plug(s) gap using a wire feeler gauge. Gap must be .018"-.022". Adjust if necessary and reinstall.

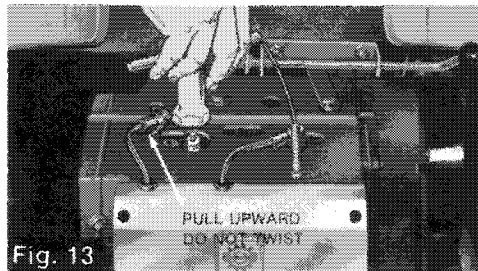


Fig. 13

## (W2) BATTERY (Electric Model only)

Remove battery caps, then check electrolyte level at each cell. Electrolyte level must touch bottom of filler hole. If necessary, add Distilled Water up to this level. (See Fig. 14).

(M) Check that battery connections are tight and free of corrosion. If not, remove corrosion, using a stiff brush, then clean with a solution of baking soda and water. Rinse and dry well.

After reconnecting, coat battery terminals and connectors with petroleum jelly, to retard corrosion.

Check that battery is well secured.

**WARNING: Do not allow cleaning solution to enter battery; it will destroy the chemical properties of the electrolyte.**

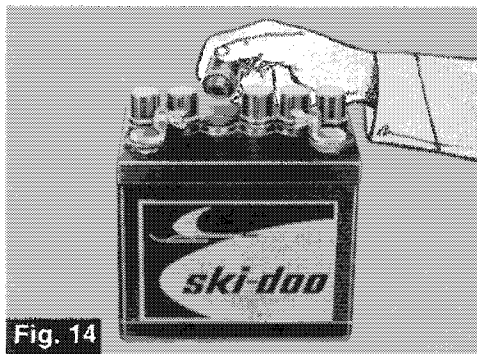


Fig. 14

### (W3) SUSPENSION SPRINGS

Visually inspect bogie wheel suspension set springs and suspension springs at rear sprocket. Replace or have dealer replace weak or broken springs.

### (W4) TRACKS

Lift rear of vehicle and support it off the ground. Put gear shift lever in neutral, so tracks are free to turn. With engine OFF, rotate tracks by hand, inspect condition. If bad cuts or missing track inserts are noted, see your dealer.

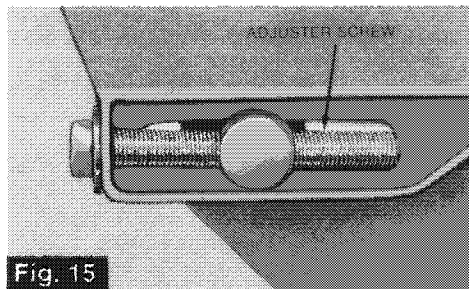


Fig. 15



Fig. 16

2 1/2" to 3"  
FREE PLAY

### (W5) TRACK FREE PLAY

Check that top of track tensioner springs are in CENTRE position of slotted anchor. (See Driving Hints, Page 10). Lift the rear of the vehicle and support it off the ground. Then press down with your hand on the middle part of the track. The free play (distance between track and bottom of centre suspension unit) should be 2 1/2" to 3". (See Fig. 16).

If necessary to adjust:

1. Using wrench, loosen both track adjusters by loosening the lock nuts situated on the inner side of the suspension rear springs. (See Fig. 17).
2. Adjust to proper free play by turning the adjuster screws, clockwise to tighten, counter-clockwise to slacken. (See Fig. 15). Make sure both sides are adjusted equally.
3. Retighten adjuster lock nuts firmly.
4. Repeat with other track.

*NOTE: Track free play and alignment are inter-related. DO NOT adjust one without checking the other.*

**WARNING: Do not attempt to move top of track tensioner springs forward or back to compensate for incorrect track free play. Never align track by advancing or retarding one spring.**

### (W6) TRACK ALIGNMENT

With the rear of the vehicle supported off the ground, start the engine and accelerate slightly so that tracks turn slowly. Check that tracks are well centered and turn evenly on rear sprockets.

The distance between the edges of the track and the link plates should be the same on both sides. Misalignment may cause excessive wear of track edges and sprocket teeth. If track is misaligned, readjust as follows:

1. Using wrench, loosen the adjuster lock nut (inner side of spring) on the side where the track is closest to the link plate. (See Fig. 17).
2. Turn track adjuster screw (on same side) clockwise until track realigns.
3. Run track slowly to check alignment. Readjust if necessary.
4. Retighten adjuster lock nut firmly.

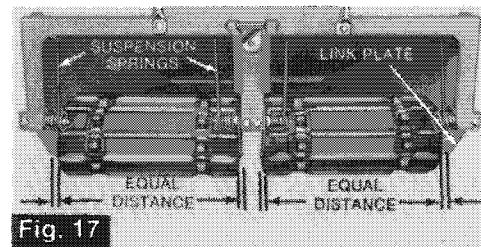


Fig. 17

## (W7) CARBURETOR

There are four (4) adjustments for the carburetor: (1) **Idle Speed Mixture**, (2) **Idle Speed**, (3) **Maximum Throttle Opening**, and (4) **High Speed Mixture**.

*NOTE: A relationship exists between adjustments (1) and (2) and also between (3) and (4). Do not correct one without checking the other.*

### IDLE SPEED MIXTURE ADJUSTMENT

A primary adjustment (with engine OFF) should be made by first turning screw fully clockwise, until it closes. Then back off screw  $\frac{3}{4}$  of a turn counter-clockwise.

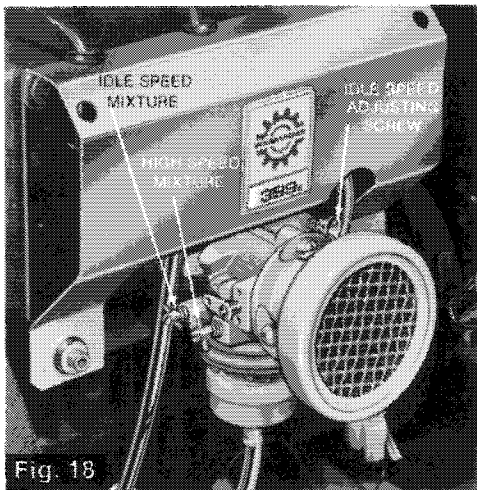


Fig. 18

Turning idle speed mixture screw clockwise produces a leaner mixture; (more air/less fuel) counter-clockwise, a richer mixture (less air/more fuel).

*NOTE: Do not close too tightly as screw and/or screw seat can be damaged.*

For final adjustment, start engine and allow it to warm up (at least 2 minutes). Turn idle speed mixture screw clockwise until engine reaches maximum r.p.m. (Beyond that point engine r.p.m. starts to decrease). From maximum r.p.m. back off screw  $\frac{1}{8}$  of a turn.

### IDLE SPEED ADJUSTMENT

Using a screwdriver, turn the idle speed adjusting screw clockwise to increase idling speed, counter-clockwise to decrease. (See Fig. 18 or 19).

### MAXIMUM THROTTLE OPENING

With engine OFF, press down the throttle lever. Throttle should be completely open when the lever gently touches the handlebar grip.

To adjust for maximum opening, loosen screw at point where cable joins carburetor lever. If alone, tie or clamp throttle lever to handlebar.

With finger, hold carburetor lever in fully open position (UP), pull cable downward until taut. Tighten screw.

### HIGH SPEED MIXTURE ADJUSTMENT

For primary adjustment, with engine OFF, turn adjusting screw fully clockwise until it closes. (Do not close too tightly as screw and/or screw seat can be damaged). Then back off screw  $\frac{1}{4}$  turns counter-clockwise.

For final adjustment, lift rear of vehicle and support it off the ground. Start engine and run up to full throttle. Turn screw clockwise until engine reaches maximum r.p.m. (Beyond that point r.p.m. starts to decrease). Back off screw  $\frac{1}{8}$  of a turn counter-clockwise.

**WARNING — Vehicle must be in FORWARD gear for high speed adjustment. Once adjustment is completed, return engine to idle AT ONCE, by gentle pressure on the brake lever.**

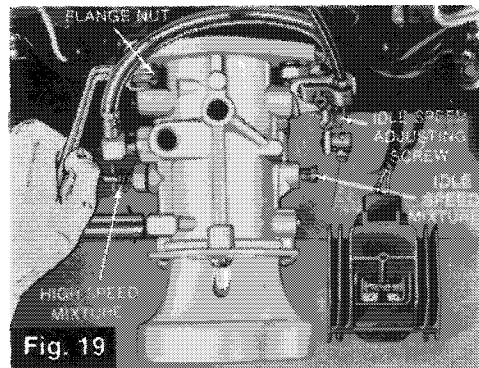


Fig. 19

### (W8) DRIVE BELT CONDITION

To check the condition of the drive belt:

1. Remove cab, take off pulley guard.
2. Lift the rear of the vehicle and support it off the ground.
3. With engine OFF, place gear shift lever in NEUTRAL position, grasp belt or driven pulley and rotate. Check condition of belt for cracks, fraying or abnormal wear. (Uneven wear, etc.).

If abnormal wear is noted, probable cause is misalignment of drive and driven pulleys. Contact your dealer.

### (W9) RECTIFIER FUSE (Electric Model only)

Rectifier is located at right, in front of seat. On Valmont Models only, remove console to expose. To examine, remove metallic cover, inspect fuse and if filament appears defective, replace.

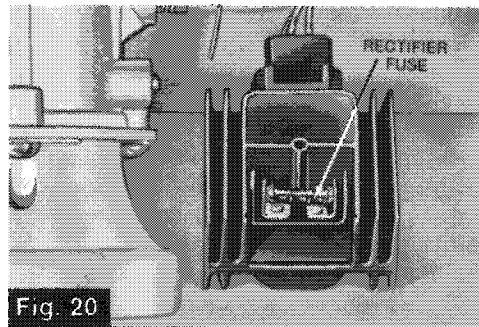


Fig. 20

### (W10) DRIVE CHAIN TENSION

*NOTE: Before checking tension, check that nuts securing gear box to frame are well tightened.*

With cab removed, check tension of drive chain. (To check, see Break-in notes, Fig. 4). Free play should not exceed 1/4". If necessary to adjust:

1. Remove cap screw locking chain tensioner in place. (See Fig. 21). Chain tensioner is located at bottom left of gear box.
2. Rotate the tensioner as required to obtain normal chain tension.
3. Replace cap screw and lock chain tensioner.

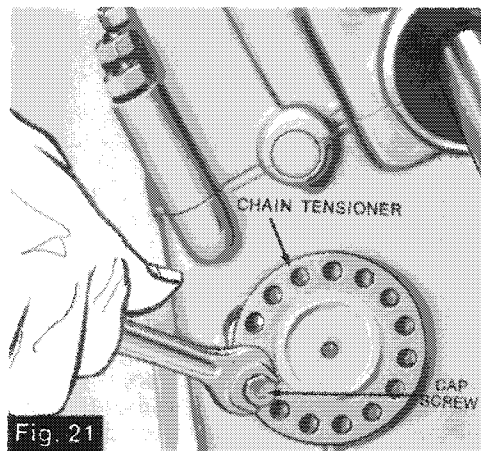


Fig. 21

### (M1) BRAKE

Check condition of brake mechanism by pressing brake lever. Brake should apply fully while lever is still 1/4" from handlebar. If adjustment is indicated:

1. With cab removed, slack off (several turns) cable lock nut, located at end of brake cable, on the frame.
2. If brake lever is too low, shorten brake cable. Grasp free end of cable with pliers and pull evenly. Retighten nut.
3. If brake lever is too high, lengthen brake cable. Depress brake lever slowly to position desired. Retighten nut.

**WARNING: Avoid getting oil or grease on brake disc.**

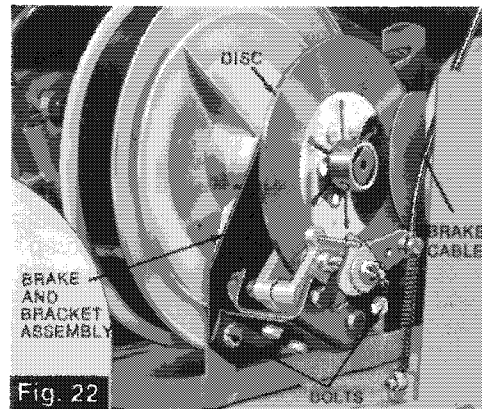


Fig. 22

## (M2) DRIVE BELT WEAR

Remove cab, take off pulley guard and check the wear of the drive belt. If belt is less than  $\frac{7}{8}$ " wide it should be replaced. To replace:

1. Disconnect the brake cable, at cable ferrule, next to brake mechanism.
2. Remove the 2 bolts holding the lower disc brake bracket to the frame. Pivot the assembly (brake and bracket) half a turn.

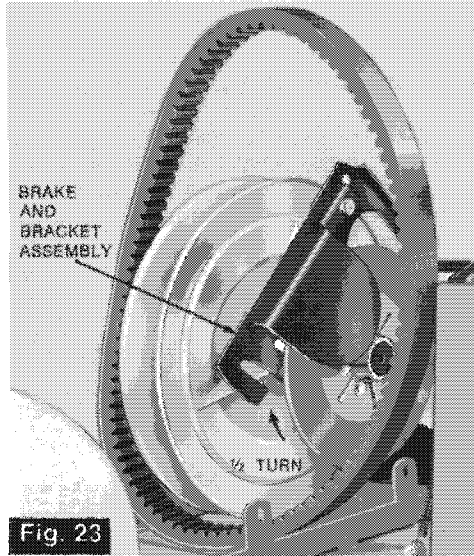


Fig. 23

3. Open the driven pulley, (larger pulley, most forward). Twist and push the sliding half, then hold in open position. Pull the bottom of the belt toward the driven pulley, then slip slackened belt over the top edge of the fixed half.

4. Slip the belt out from the drive pulley (centrifugal governor) and remove completely from vehicle by passing it under the driven pulley and disc brake assembly. (See Fig. 23).

5. To install new drive belt, follow REVERSE procedure.

6. After installation of drive belt, check that brake cable has not gone out of adjustment. If so, readjust. (See Brake, page 22).

## (M3) STEERING ADJUSTMENT

Check alignment of ski. It should be perpendicular to handlebars. If necessary to realign:

1. Remove bolt securing handlebars to steering column. (Note that handlebars are under tension of spring from steering column housing).
2. Remove handlebars, exposing splined end of steering column.
3. Rotate handlebars until perpendicular with ski, then replace on splined end. Retighten bolt.

*NOTE: In case of serious misalignment due to accident, contact your dealer.*

## (M4) ENGINE HEAD NUTS

With cab removed, check that engine head nuts are tight and equally torqued, (16 to 18 ft. lbs.).

## (M5) ENGINE MOUNT BOLTS

With cab removed, take off pulley guard then check all engine mount bolts. Retighten if necessary.

## (M6) ELECTRICAL WIRING

With cab removed, check electric wiring and components; retighten all loose connections. Check for stripped wires or damaged insulations. Repair or replace.

## (M7) VEHICLE INSPECTION

With cab removed, thoroughly inspect vehicle and tighten all loose bolts, nuts and linkages as necessary.

Replace cab, then clean the chassis throughout and wax the cab for greater protection. Ski-Doo Wax and special Ski-Doo Paint, for necessary touch ups, are available at your dealer.

## CONSOLE REMOVAL (Valmont Models only)

To expose carburetor, or for any procedure that requires removal of the console, undo latches (2) at base of console, remove console.

# IN CASE OF EMERGENCY

Emergency situations are accepted hazards with any moving vehicle. A hidden rock or stump on the trail, a blown fuse or burnt light bulb while driving at night, an empty fuel tank while miles from nowhere, can all cause varying degrees of inconvenience.

Unlike an automobile, which has a distinct advantage in that service stations are usually within walking distance, snowmobiles are specifically designed to travel OFF the highways. When the unexpected happens, the driver often has only his own ingenuity and that of his companions to return home safely.

Fortunately, 9 out of 10 difficulties encountered on the trail can be fixed on the trail. You must however, carry at least a minimum assortment of Tools and Spare Parts to enable you to effect minor repairs.

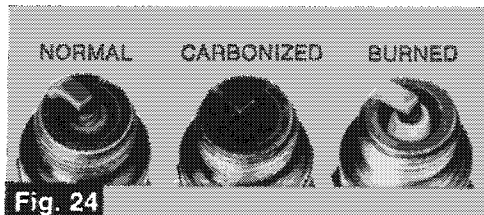


Fig. 24

## EMERGENCY MATERIALS

In addition to those Tools which the manufacturer provides, (See Tool Kit & Uses, Page 17), you should carry the following:

**Tools** — General Purpose Pliers — Adjustable Wrench (min.  $\frac{3}{4}$ " opening) — Flashlight — Fuel De-Icer.

**Spare Parts** — Spark Plug(s) — Drive Belt — Headlight Bulb — Light and Rectifier Fuses (Electric Model only) — Cable Wire — Starting or Towing Rope.

**IMPORTANT: Always carry spare Spark Plug(s) and Drive Belt. Check condition of Spark Plug(s) frequently (See Fig. 24) and look for signs of fouled or defective plug. Next to 'Out of Fuel', worn Spark Plugs are the single largest cause of trouble on the trail.**

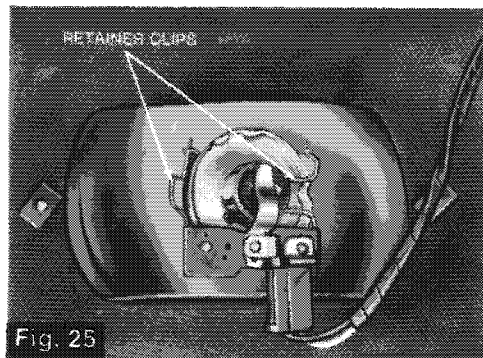


Fig. 25

## ASSISTING STRANDED VEHICLES

It is an unwritten law of snowmobiling that you go to the aid of any snowmobile stranded in the field. Should another vehicle have to be towed:

1. Remove the drive belt.
2. Tie both skis to your vehicle.
3. Taking the driver with you as a passenger, tow the vehicle back slowly.

For short distances or if tow rope is unavailable, you may PUSH both vehicle and driver. Manoeuvre your vehicle until ski rests snugly against backrest or rear of stranded vehicle, then proceed slowly.

## TROUBLE SHOOTING

The following charts list the "most likely to occur" problems, their possible causes and remedies. Should you encounter trouble on the trail, first identify the symptoms, then rectify, using your manual to assist you.

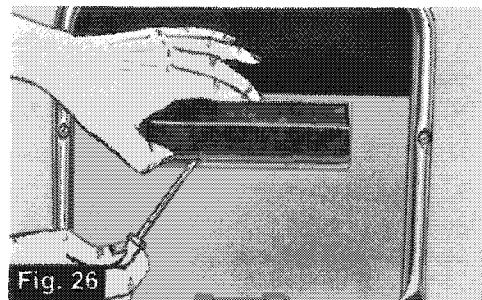


Fig. 26

# EMERGENCY GUIDE

TROUBLE	YOU SHOULD CARRY	WHAT TO DO (REMEDY)
<b>BURNT LIGHT BULB</b>	<b>Spare Headlamp and Taillight Bulbs</b>	If headlamp is burnt, unlock cab latches (2), remove cab. Unfasten bulb retainer clips (See Fig. 25). Detach bulb and replace. If taillight bulb is burnt, expose bulb by removing red plastic lens. To remove, squeeze at top and bottom of both ends with thumb and forefinger, OR pry off, using flat bladed screwdriver (Fig. 26).
<b>BROKEN THROTTLE CABLE</b>	<b>Spare Cable or length of Cable Wire. Pliers.</b>	Remove broken cable and replace with spare cable. In emergency if spare cable not available remove brake cable and use as throttle cable to return home or to nearest repair facility. (Brake cable is longer). Use extreme caution when going downhill, however.
<b>EMERGENCY TIPS</b>	<b>Some suggestions for long trips are Snowshoes, Axe, Waterproof Matches, High-energy Foods, plus the Tools &amp; Spare Parts listed above.</b>	<p>(1) Travel with friends or in company with other snowmobiles. When exploring new areas, always use the 'buddy' system. Even then, don't be foolhardy. Plan your trips and carry at least some sort of rough guide showing fuel stops and shelter. ALWAYS KNOW WHERE YOU ARE. Unless you do, stay on known trails and familiar terrain.</p> <p>(2) Do regular Lubrication and Maintenance faithfully. Read and understand the Maintenance procedures outlined in your Manual, then follow them.</p>
<b>FUSES (Electric Model only)</b>	<b>Spare Light and Rectifier Fuses. Flashlight.</b>	If both headlamp and taillight go out at same time, most possible cause is burnt fuse, (See Fig. 20). Check light and rectifier fuses, and if filaments are broken, replace. Light fuse is located directly behind electric starter, joined to starter. To examine, unscrew fuse retainer and withdraw fuse. Rectifier fuse is located at right, in front of seat. To examine, remove metallic cover, inspect fuse.
<b>OUT OF FUEL</b>	<b>1 or 2 Gallons Extra Fuel in Container.</b>	In emergency, fuel can be siphoned from companion or passing vehicle. To siphon, disconnect both fuel lines of vehicle with fuel, at carburetor. Position vehicle with fuel to be higher than vehicle with empty fuel tank. Run longer line into empty fuel tank, (or container, if available). Placing hand over open filler neck of tank with fuel, to form a seal and build pressure, blow into open end of shorter fuel line until flow starts.

# TROUBLE SHOOTING GUIDE

SYMPTOMS	POSSIBLE CAUSES	WHAT TO DO (REMEDY)
<b>ENGINE TURNS OVER BUT FAILS TO START OR STARTS WITH DIFFICULTY</b>	<b>1 — No fuel to the engine</b>	Check the tank level and fill up with correct gas-oil mixture. (Refer to Fuel Mixing, Page 4). Check for possible clogging of fuel line, item 5.
	<b>2 — Faulty ignition</b>	Disconnect spark plug wire(s) from plug, unscrew the spark plug cap, then hold wire about 1/8" from the cylinder head. Follow engine starting procedure and if no sparks appear, it means a faulty ignition system. Do not attempt to repair. Contact your dealer. If sparks do appear, check item 3.
	<b>3 — Spark plug(s)</b>	Check for fouled or defective spark plug(s). (See Fig 24). First complete item 2, above. Then disconnect spark plug wire, unscrew plug and remove from cylinder head. Reconnect wire and ground exposed plug to engine head, being careful to hold away from spark plug hole. Follow engine starting procedure and check for spark. If no sparks appear, replace spark plug.
	<b>4 — Flooded engine</b>	Turn choke to OFF, depress throttle lever fully and try to start engine.
	<b>5 — Clogged fuel line (water or dirt)</b>	Remove and clean the fuel filter. Change filter cartridge if necessary. Check the cleanliness of the fuel tank. Clean tank if necessary. (See Fuel Tank, Page 28).
	<b>6 — Idle speed adjustment</b>	Screw in the idle speed mixture adjusting screw and turn it back 3/4 of a turn. Make final adjustment with engine running and warmed up. (See Fig. 18 or 19).
	<b>7 — Faulty carburetor</b>	First make primary adjustments on carburetor. (See Maintenance Section, Page 21). If carburetor still faulty, contact your dealer for quick repair.
	<b>8 — Too much oil in fuel</b>	Drain the fuel tank and refill with the correct gas-oil mixture. (Refer to Fuel Mixing, Page 4).
	<b>9 — Breaker points</b>	Breaker points may be worn or out of adjustment. Contact your dealer.
	<b>10 — Poor engine compression</b>	Running with a lean fuel mixture may produce excessive engine wear resulting in poor engine compression. If this occurs, contact your dealer at once.
<b>ENGINE WILL NOT TURN MANUALLY</b>	<b>1 — Seized engine</b>	In the case of a seized engine, contact your dealer. Seizure is a direct result of poor lubrication.



<b>ENGINE WILL NOT START ELECTRICALLY (ELECTRIC MODEL ONLY)</b>	<b>1 — Wire connections</b>	Check for loose battery and starter connections. Tighten and clean if necessary. Try to restart engine electrically. If engine still does not start, check item 2.
	<b>2 — Light and rectifier fuses</b>	Check fuses. (For location, see Fuses, Page 22 ). Replace if necessary. Then do item 3.
	<b>3 — Battery</b>	Check condition of battery by turning lights on. If lights are dim or out, battery may be discharged or defective. Contact your dealer to charge or replace.
	<b>4 — Starter</b>	If wire connections, fuses and battery are all in working order, most probable cause of trouble is defective starter. Contact your dealer for quick repair.
<b>ENGINE LACKS ACCELERATION OR POWER</b>	<b>1 — Fouled or defective spark plug(s)</b>	Change your spark plug(s). Fouled spark plug(s) may be cleaned, regapped and tested by your dealer. Check for defective spark plug(s), (See Fig. 24), and change if necessary. (See Fig. 13).
	<b>2 — Clogged fuel line (water or dirt)</b>	Remove and clean fuel filter. Change filter cartridge if necessary. Check fuel line condition and connections. Check cleanliness of fuel tank. Clean if necessary.
	<b>3 — Carburetor</b>	Readjust the carburetor. (See Fig. 18 or 19). If the trouble persists, see your dealer.
	<b>4 — Defective ignition</b>	First check items 2 and 3 of "Engine turns over but fails to start or starts with difficulty". If the ignition system still seems defective, contact your dealer.
	<b>5 — Engine</b>	If unable to locate specific symptoms, contact your dealer.
<b>ENGINE CONTINUALLY BACKFIRES</b>	<b>1 — Faulty spark plug(s)</b>	Check item 1 of "Engine lacks acceleration or power".
	<b>2 — Overheated</b>	Carburetor Idle and/or High Speed mixture screws set too lean. Readjust.
	<b>3 — Engine timing incorrectly set</b>	Contact your dealer.
<b>SNOWMOBILE CANNOT REACH FULL SPEED</b>	<b>1 — Drive belt</b>	Check for defective or worn drive belt. Replace if necessary. (See Page 23).
	<b>2 — Pulley misaligned</b>	If the drive and driven pulleys are not aligned correctly, contact your dealer.
	<b>3 — Incorrect track adjustment</b>	Check track free play and alignment. Readjust to specifications. (See Maintenance Section, Page 20).
	<b>4 — Faulty engine</b>	Check items 1 to 5 of "Engine lacks acceleration or power".

# STORING PROCEDURE

In most areas of the country, the Ski-Doo snowmobile is a seasonal vehicle and will be out of service for the summer months. During that period, or if at any time your machine will not be in use for a month or more, then proper storage is a necessity. You can be sure that your Ski-Doo snowmobile will be in perfect condition when you come to use it again, if you carry out the following:

**IMPORTANT: The necessity of proper seasonal storage cannot be overstressed. If you lack the time or proper tools, be sure to see your authorized Ski-Doo Dealer.**

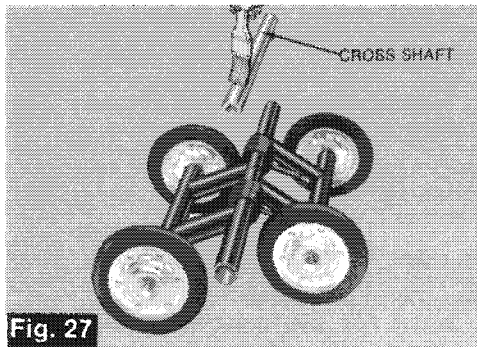
## (S1) TRACKS

1. Inspect track, replace missing inserts.
2. Release track tension by slacking track adjuster screws and leave in this condition during entire storage period. (See Fig. 15).
3. Unhook rear suspension springs (4).

*NOTE: Ski-Doo snowmobile should be stored in such a way that tracks do not stay in contact with cement floor or bare ground. Lift rear of vehicle until track is clear, then support with brace or trestle.*

## (S2) SUSPENSION

1. Remove all suspension bogie wheel sets from the vehicle.
2. Remove cross shaft from each bogie wheel set. Check condition of shaft and replace if bent or worn. Clean bogie wheel assembly and cross shaft of dirt.
3. Spray bogie wheel springs with Ski-Doo Metal Protector. If unavailable, wipe with cloth soaked in Ski-Doo Oil. Apply a coating of low temp grease on cross shaft.
4. Reassemble all bogie wheel sets, making sure each assembly moves freely.
5. Grease each bogie wheel until all old grease is flushed out. Grease rear axle, at grease fitting. (See Fig. 11&31).
6. Reinstall all bogie wheel sets.

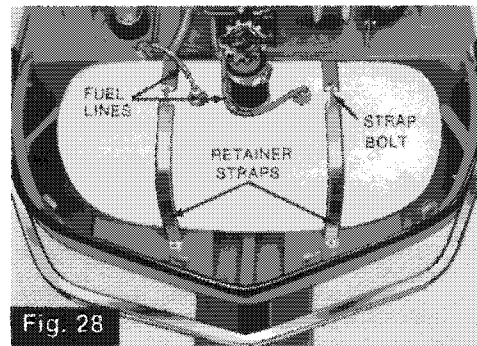


## (S3) SKI ASSEMBLY

1. Wash or brush all dirt or rust accumulation from ski and spring.
2. Apply grease at grease fitting on ski leg.
3. Check wear condition of ski runner and replace if necessary.
4. Apply Ski-Doo Metal Protector on entire ski assembly. If unavailable, wipe entire ski assembly with cloth or rag soaked in Ski-Doo Oil.

## (S4) FUEL TANK

1. Disconnect fuel lines by pulling lines away from tank.
2. Unbolt tank retainer straps.
3. Remove fuel tank.
4. Drain, then rinse inside of tank thoroughly with gasoline. Reinstall.



## (S5) CARBURETOR

The carburetor must be dried out completely to prevent gum formation during the storage period.

1. Assure that fuel lines are disconnected, then start the engine and run it out of gas.
2. Engage choke, (turn to ON), then pack the carburetor throat with a clean piece of cloth and turn the engine a few more times. The suction should eliminate the remaining fuel.

*NOTE: An alternate procedure is to use Stabil, an excellent product in the prevention of gum formation. Ask for it at your Ski-Doo dealer, then follow the mixing directions on the can. Pour mixture into clean container, insert fuel lines (previously disconnected) into mixture. Run engine for 2 minutes.*

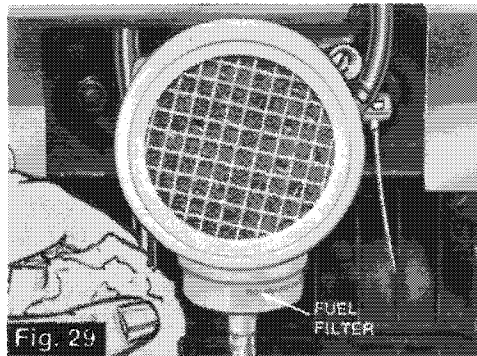


Fig. 29

## (S6) CYLINDER LUBRICATION

Engine internal parts must be lubricated to protect cylinder walls from possible rust during the storage months.

1. Remove spark plug(s). (See Fig. 13). Check condition, replace if necessary.
2. Connect ignition wire(s) to spark plug(s) and ground plug on engine head. This will prevent magneto damage.
3. Pour about one spoonful of Ski-Doo Oil into spark plug hole(s).
4. Turn the engine for about 30 seconds. On manual models, crank 10 to 12 times.
5. Replace spark plug(s).

*NOTE: This operation should be repeated every 3 months during storage.*

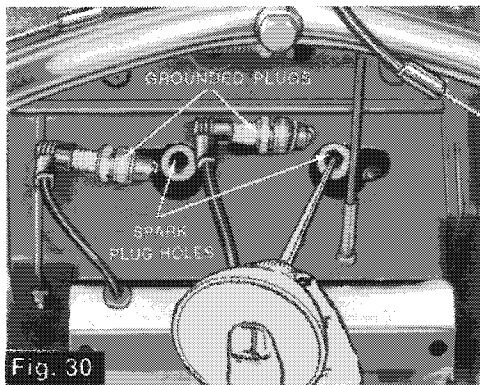


Fig. 30

## (S7) GEAR BOX

Drain transmission gear box and refill with 12 ozs. (399R & 399ER Models) or 16 ozs. (640ER Model), fresh Ski-Doo Chain Case Oil.

## (S8) CONTROLS

1. Oil steering mechanism linkage (See Fig. 8). Apply light machine oil on throttle and brake cables, at cable ferrule. (See Fig. 9).
2. Oil both bolts on brake mechanism. Avoid getting oil on brake shoe.
3. Coat all electrical connections and switches with Ski-Doo Metal Protector. If unavailable, use petroleum jelly.

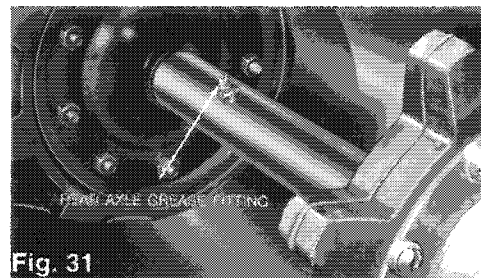


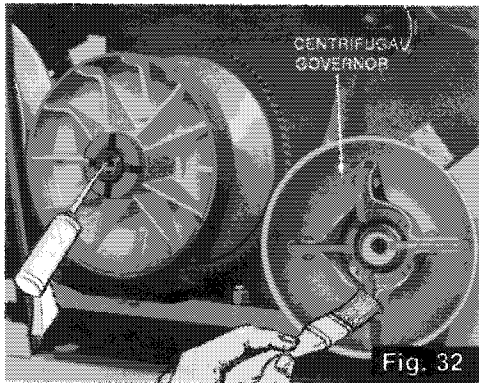
Fig. 31

**FOR FINEST RESULTS, SPECIFY ONLY GENUINE SKI-DOO PRODUCTS, CERTIFIED BOMBARDIER PARTS AND SERVICE, ALL AVAILABLE AT YOUR LOCAL AUTHORIZED SKI-DOO DEALER.**

### (S9) PULLEYS

1. Remove the drive belt.
2. Grease driven pulley shaft with low-temp. grease and wipe off excess. (See Fig. 12)
3. Remove centrifugal governor bolt and governor. If you do not have the proper tools, see your dealer.
4. Apply oil or grease on all moving parts of governor. (See Fig. 32).
5. Pack inside drive pulley shaft with low temp. grease and wipe off excess.
6. Oil governor bolt and reassemble centrifugal governor.
7. Spray entire pulley assembly with Ski-Doo Metal Protector.

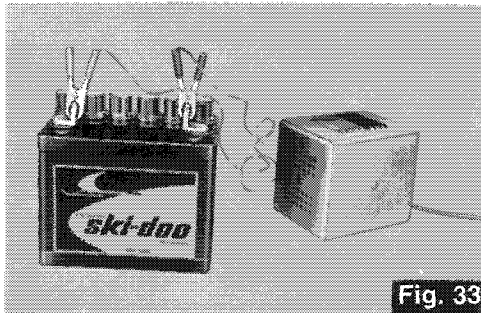
*NOTE: Leave drive belt off pulleys during entire storage period.*



### (S10) BATTERY (Electric Model only)

1. Raise seat to expose battery, then disconnect and remove.
2. Clean outside surface of battery with solution of baking soda and water. Remove all deposits from connection posts and rinse with clear tap water.
3. Check electrolyte level in each cell. Refill if necessary, using Distilled Water.
4. Spray battery terminals with Ski-Doo Metal Protector. If unavailable, use petroleum jelly.
5. Fully charge battery and store in a cool, dry place. (See Fig. 33).

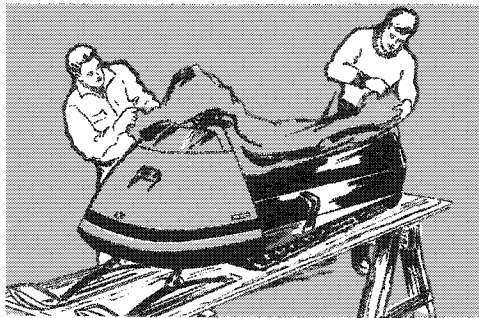
*NOTE: The stored battery will gradually lose its charge and begin to sulphate. If allowed to continue, the battery will become useless and cannot be salvaged. Fully recharge (trickle charge) at least every 40 days.*



### (S11) CHASSIS

1. Clean the vehicle thoroughly, removing all dirt and grease accumulation.
2. Inspect cab and repair damage if necessary. Repair kits are available at your authorized Ski-Doo dealer.
3. Wax the complete cab for better protection, using Ski-Doo Wax.
4. Touch up all worn metal spots where paint has been scratched or peeled off. Ask your dealer for Ski-Doo Paint.
5. Spray all bare metal parts of vehicle with Ski-Doo Metal Protector.
6. Protect the vehicle with a Ski-Doo cover or tarpaulin to prevent dust accumulation during storage.

*NOTE: If you are not equipped with the proper tools or cannot complete the correct storing procedures, see your local authorized Ski-Doo dealer.*



# GLOSSARY

**BOGIE WHEELS** — The wheels that form part of the suspension system. They absorb shock, act as stabilizers, and exert continued downward pressure on the track so that track will have continued contact with the snow surface.

**BORE** — The inside diameter of the cylinder(s).

**BRAKE DRUM** — The underside wall of the fixed half of the driven pulley. The pressure of a brake shoe applied against the brake drum is the principle used to slow or stop the vehicle.

**BREAKER POINTS** — Act as an interrupter switch to control the firing time of the spark plug.

**CAM SLIDER SHOES** — Nylon reinforcements that aid in the friction-free in and out movement of the sliding half of the driven pulley.

**CARBURETOR FLANGE** — That part of the carburetor body by which the carburetor is secured to the engine.

**CENTRIFUGAL GOVERNOR** — That portion of the drive pulley containing four flyweights.

**CONNECTING ROD** — Metal arm which connects the piston to the crankshaft.

**CRANKSHAFT** — The mechanical device that converts reciprocating motion to radial motion.

**CROSS SHAFT** — The transverse shaft that attaches the bogie wheel set to the frame.

**DRIVE CHAIN** — Connects the end of the driven pulley shaft to the drive sprocket.

**DRIVE PULLEY** — A variable pitch pulley which transmits power from the engine to the driven pulley by means of a drive belt.

**DRIVEN PULLEY** — A variable pitch pulley which transmits power from the drive pulley to the drive sprocket by means of the drive chain.

**DISPLACEMENT** — The volume of air displaced by a piston in a single stroke, measured in cubic centimeters.

**ELECTROLYTE** — The acid solution in a battery (water and sulphuric acid) which acts on the plates to produce current.

**INSERTS** — Steel clips that protect the track sprockets and track against wear.

**LINK PLATE** — A pivoting steel plate that links rear sprockets to the frame.

**RECTIFIER** — An electrical device used to convert alternating current to direct current, needed to charge battery.

**CHAIN TENSIONER** — Self-adjusting, friction-free block, used to keep proper tension on the drive chain.

**SKI RUNNERS** — Replaceable steel rods under the skis, that aid in controlling the steering and prevent ski wear on hard surfaces.

**SPRING SLIDER CUSHIONS** — A brass plate on which the front end of the ski spring moves.

**SPROCKETS** — Polyurethane or rubber toothed wheels, located at both ends of the track. Drive (front end) sprockets are used to transmit power from the drive-chain to the track. Rear sprockets aid in proper alignment of the track when running.

**STROKE** — The depth of travel of the piston(s). Stroke multiplied by the surface area of the cylinder is the displacement.

**THROTTLE** — A butterfly valve governing the ratio of fuel and air going to the engine.

**TIE RODS** — Steel rods which link the steering column arm to the ski leg arms. Lengthening or shortening the tie rods determines ski alignment.

**TORQUE WRENCH** — A wrench containing a device to measure in ft. lbs. the force at which a bolt is being tightened.

# HOW TO IDENTIFY YOUR SKI-DOO SNOWMOBILE

## FRAME, ENGINE AND TRACK(S) SERIAL NUMBERS

The frame, engine and track(s) of each Ski-Doo snowmobile are separately identified with individual serial numbers.

Useful in the event of Warranty claims, loss, theft, or dispute, they are prominently displayed and easy to locate.

### FRAME

The serial plate is located on the right side of frame, at rear.

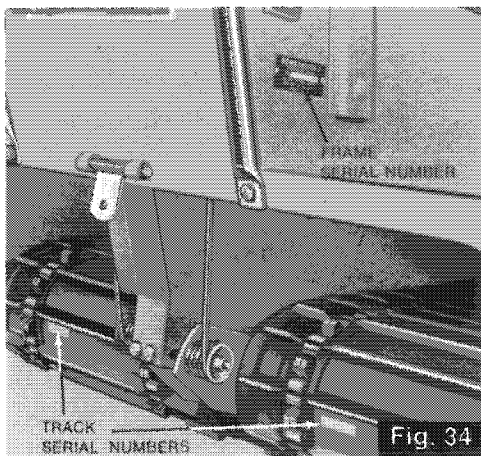
### ENGINE

The identification plate is located at the right side of the engine, on the fan cowl, above the manual starter handle.

### TRACK(S)

The serial number is stamped directly into the track, at one of the recesses formed by the track cross links. To locate, turn track slowly until number appears between the rear sprockets.

**IMPORTANT: Your Dealer retains a file copy of your registration. Should you lose or misplace your vehicle identification, he will be more than pleased to assist you.**



## PARTS & SERVICE

### SKI-DOO DEALER SERVICE RECORD

Your dealer retains a duplicate of your Registration Certificate for his files. On the reverse side of this certificate is a Service Record on which he keeps track of all repairs performed on your vehicle. Whenever your Ski-Doo snowmobile is serviced and/or repaired, initial the Service Record after the information has been properly recorded. Correct up-to-date records could save you time and money in the event of a further claim.

Bombardier Limited reserves the right to make changes in design and specifications, and/or to make additions to or improvements in its products without imposing any obligations upon itself to install them on its products previously manufactured.

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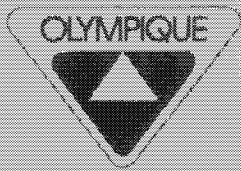
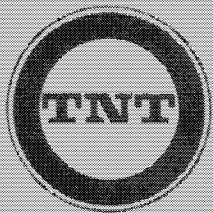
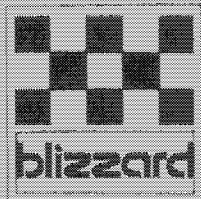
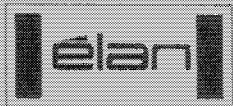
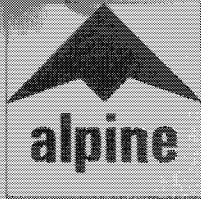
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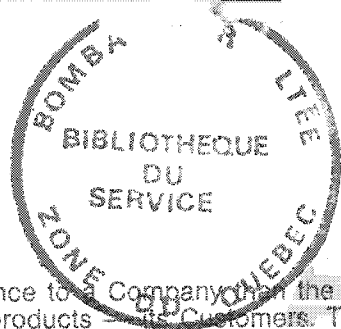


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CODE NUMBER 480-0023



# CONDITIONS OF YOUR Warranty \*



Nothing is of greater importance to a Company than the satisfaction of those people who buy and use its products — its Customers. To doubly ensure that satisfaction, at Bombardier we start by building each new Ski-Doo snowmobile to the highest standards of quality and craftsmanship. We constantly test every part and component and improve them, just as soon as newer and better ideas are presented.

Then we Warrant each vehicle and back it with the world's largest snowmobile Dealer network. As part of our policy, for example, before you purchase your new Ski-Doo snowmobile, your Dealer conducts a 24 point Pre-Delivery Check that assures its peak condition at the time of sale.

Yet nothing proves the soundness of a vehicle like running it. Slight adjustments that escape early detection, could lead to more serious difficulties later on. That is why this year we have added one more step — a FREE DEALER FIRST INSPECTION.

The service is without cost and entirely for your benefit. So operate and enjoy your new Ski-Doo snowmobile during Break-In, then bring it to your Dealer, AFTER 15 HOURS OF RUNNING.

HE WILL BE WAITING TO WELCOME YOU!

*\*The official Warranty issued by Bombardier Limited is printed on the back of your Registration Certificate, given to you by your Dealer on delivery.*



ELAN, OLYMPIQUE, NORDIC, T'NT, ALPINE AND VALMONT ARE MADE BY

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