CONTENTS

QUICK REFERENCE DATA

ATV INFORMATION

MODEL:_____ YEAR:_____

VIN NUMBER:_____

ENGINE SERIAL NUMBER:_____

CARBURETOR SERIAL NUMBER OR I.D. MARK:_____

TIRE INFLATION PRESSURE (COLD)*

Model	kPa	PSI
Front wheels	34.5	5
Rear wheels	34.5	5

*Tire pressure for original equipment tires. Aftermarket tires may require different inflation pressure.

RECOMMENDED LUBRICANTS, FLUIDS AND CAPACITIES

Item	Lubricant or fluid type
Engine oil	Polaris Premium 4 Synthetic 10W/40 or 10W/40 motor oil
Transmission oil	Polaris synthetic gear case oil (part No. 2871478)
Front gear case	Polaris front gearcase lube (part No. 2871653), or API GL5 80-90 gear lube
Front hubs	Polaris demand drive hub fluid (part No. 2871654), or ATF Type F.
Brake fluid	DOT 3 brake fluid
Coolant	50:50 mixture ethylene glycol-based coolant compounded for aluminum radiators and engines
Grease	Polaris all season grease, or equivalent

RECOMMENDED CAPACITIES

Item	Quantity
Engine oil	1.89 L (2 U.S. qts.)
Transmission oil	946.3 cc (32 U.S. oz.)
Front gear case (all years)	96 cc (3.25 U.S. oz.)
Front hubs	75 cc (2.5 U.S. oz.)
Coolant	Approx. 2.16 L (2.25 U.S. qts.)

MAINTENANCE AND TUNE-UP TORQUE SPECIFICATIONS

Item	N•m	in.-lb.	ft.-lb.
Crankcase oil drain plug	19	–	14
Cylinder head cover screws	8.2	72	–
Front gear case drain plug	9.4	83	–
Handlebar upper holder bolts	13-17	115-150	–
Oil tank drain plug	19	–	14
Oil tank screen and fitting	20	–	15
Valve adjuster locknuts	6-7	53-62	–
Wheel lug nuts			
Front	21	–	15
Rear	21	–	15

MAINTENANCE AND TUNE-UP SPECIFICATIONS

Item	Specification
Disc brake pad thickness wear limit	
2003 Sportsman 500 & 500 H.O.	
Rear brake	4.6 mm (0.180 in.)
All other models and years	
Front and rear brakes	3.81 mm (0.150 in.)
Valve clearance (cold)	
Intake and exhaust	0.15 mm (0.006 in.)
Spark plug	
400 cc	
Heat range	NGK BKR5E
Gap	0.9 mm (0.036 in.)
500 cc	
Heat range	
1996-1997	NGK BKR5ES
1998-2001	NGK BKR5E
2002-on	NGK BKR6E
Gap	
1996-1998	0.6-0.7 mm (0.024-0.028 in.
1999-2000	0.7 mm (0.028 in.)
2001-on	0.9 mm (0.036 in.)
Idle speed	
1996-1988, 2001-on	1100-1300 rpm
1997-2000	1000-1400 rpm
Carburetor pilot air screw (34 mm)	
1996	1 1/2 turns out
1997-1998	2 turns out
1999-2000	2 5/8 turns out
2001-on (400 cc)	2 3/4 turns out
Carburetor pilot air screw (40 mm)	
2001	2 1/2 turns out
2002-on	2 turns out

REPLACEMENT BULBS

Item	Specification
Headlights	12 volt, 60/60 watt Halogen
Grill mounted lights	
1996	12 volt, 37.5 watt (2)
1997	12 volt, 35 watt (2)
1998-on	12 volt, 27 watt
Taillight	12 volt, 8.26 watt
Brake light	12 volt, 6.9 watt
Indicator lights	
1996	12 volt, 1.25 watt
1997-on	12 volt, 1.0 watt

NOTE: Refer to the Supplement at the back of this manual for information unique to 2001-on models, including the Sportsman 400.

CHAPTER ONE

GENERAL INFORMATION

This detailed, comprehensive manual covers the Polaris Sportsman 400, 500 and Xplorer 500 4 × 4 from 1996-on.

Keep this book handy in the toolbox. Reading and using it will help to better understand how the vehicle runs, lower repair costs and generally improve personal satisfaction with the vehicle.

The following tables are included at the end of this chapter:

Table 1 lists model year and number.
Table 2 lists general dimensions.
Table 3 lists vehicle weight (dry).
Table 4 lists decimal and metric equivalents.
Table 5 lists general torque specifications.
Table 6 lists conversion tables.
Table 7 lists technical abbreviations.
Table 8 lists metric tap and drill sizes.

Tables 1-8 are at the end of this chapter.

MANUAL ORGANIZATION

All dimensions and capacities are expressed in English units familiar to U.S. mechanics, as well as in metric units.

This chapter provides general information and discusses equipment and tools useful both for preventive maintenance and troubleshooting.

Chapter Two provides methods and suggestions for the quick and accurate diagnosis and repair of problems. Troubleshooting procedures discuss typ-

ical symptoms and logical methods to pinpoint the trouble.

Chapter Three explains all periodic lubrication and routine maintenance necessary to keep the vehicle running well. Chapter Three also includes recommended tune-up procedures, eliminating the need to constantly consult chapters on the various assemblies.

Subsequent chapters describe specific systems such as the engine, clutch/drive belt system, transmission, exhaust, cooling, suspension and brakes. Each chapter provides disassembly, repair and assembly procedures in a simple step-by-step form.

If a repair is impractical for a home mechanic, it is so indicated. It is usually faster and less expensive to take such repairs to a dealer or competent repair shop. Specifications concerning a particular system are included at the end of the appropriate chapter.

Some of the procedures in this manual specify special tools. In most cases, the tool is illustrated either in actual use or alone. Well-equipped mechanics may find they can substitute similar tools already on hand or can fabricate their own.

NOTES, CAUTIONS AND WARNINGS

The terms NOTE, CAUTION and WARNING have specific meanings in this manual. A NOTE provides additional information to make a step or procedure easier or clearer. Disregarding a NOTE could cause inconvenience, but would not cause equipment damage or personal injury.

A CAUTION emphasizes areas where equipment damage could result. Disregarding a CAUTION could cause permanent mechanical damage; however, personal injury is unlikely.

A WARNING emphasizes areas where personal injury or even death could result from negligence. Mechanical damage may also occur. WARNINGS *are to be taken seriously.* In some cases, serious injury or death has resulted from disregarding similar warnings.

SAFETY FIRST

Professional mechanics can work for years and never sustain a serious injury. If a few rules of common sense and safety are observed, many safe hours can be enjoyed servicing the ATV. Ignoring these rules can injure someone working on the vehicle, or damage the ATV.

1. *Never* use gasoline or any type of low flash point solvent to clean parts. See *Cleaning Parts* and *Handling Gasoline Safely* in this chapter for additional information on parts cleaning, gasoline use and safety.

NOTE

The flash point is the lowest temperature at which the vapors from a combustible liquid will ignite when in open air. A low flash point solvent will ignite at a lower temperature than a high flash point solvent.

2. *Never* smoke or use a torch in the vicinity of flammable liquids in open containers, such as gasoline or cleaning solvent.

3. If welding or brazing is required on the vehicle, remove the fuel tank, carburetor, and front and rear shocks to a safe distance at least 50 feet (15 m) away.

4. Use the proper sized wrenches to avoid damage to fasteners.

5. When loosening a tight or stuck nut, be guided by what would happen if the wrench slips.

6. When replacing a fastener, make sure to use one with the same measurements and strength as the old one. Incorrect or mismatched fasteners can result in damage to the vehicle and possible personal injury. Beware of fastener kits that are filled with cheap and poorly made nuts, bolts, washers and cotter pins. Refer to *Fasteners* in this chapter for additional information.

7. Keep all hand and power tools in good condition. Wipe greasy and oily tools after using them. Dirty tools are difficult to hold and can cause injury. Replace or repair worn or damaged tools.

8. Keep the work area clean and uncluttered.

9. Wear safety goggles during all operations involving drilling, grinding, the use of a cold chisel, using chemicals, cleaning parts, when using compressed air or *anytime* the safety of eyes is involved.

10. Make sure to wear the correct type of clothes for the job. Long hair should be tied up or covered with a cap so that it cannot be caught by a piece of moving equipment or tool.

11. Keep an approved fire extinguisher nearby. Be sure it is rated for gasoline (Class B) and electrical (Class C) fires.

12. When drying bearings or other rotating parts with compressed air, never allow the air jet to rotate the bearing or part. The air jet is capable of rotating them at speeds far in excess of those for which they were designed. The bearing or rotating part is very likely to disintegrate and cause serious injury and damage. To prevent bearing damage when using compressed air, hold the inner bearing race by hand.

WARNING

The improper use of compressed air is very dangerous. Using compressed air to dust off clothes, the ATV or workbench can cause flying particles to be blown into eyes or skin. ***Never*** *direct or blow compressed air into skin or through any body opening (including cuts) as this can cause severe injury or death. Compressed air must be used carefully; never allow children to use or play with any compressed air equipment or hoses.*

13. Never work on the upper part of the vehicle while someone is working underneath it.

14. When putting the vehicle on a stand, make sure the vehicle is secure before walking away from it.

15. Never carry sharp tools in clothing pockets.

16. There is always a right and wrong way to use tools. Learn to use them the right way.

17. Do not start and run the ATV in an enclosed area. The exhaust gases contain carbon monoxide, a colorless, odorless, poisonous gas. Carbon monoxide levels build quickly in a small closed area and can cause unconsciousness and death in a short time. When it is necessary to start and run the vehicle during a service procedure, always do so outside, or in a service area equipped with a ventilating system.

CLEANING PARTS

Cleaning parts is one of the more tedious and difficult service jobs performed in the home garage. While there are a number of chemical cleaners and solvents available for home and shop use, most are poisonous and extremely flammable. To prevent chemical overexposure, vapor buildup, fire and serious injury, observe all manufacturer's directions and warnings while noting the following.

1. Read the entire product label before using the chemical. Observe the precautions and warnings on the label. Always know what type of chemical is being used.

2. If the chemical product must be mixed, measure the proper amount according to the directions.

3. Always provide sufficient ventilation when working with solvents or other chemicals. If a chemical can be smelled, there is some vapor in the air. The stronger the smell, the stronger the vapor concentration.

4. If a product is listed as combustible, flammable or an extremely flammable liquid, the danger of fire increases as the vapor collects and builds up in the shop.

5. If a product is listed as a poison, the vapor is poisonous as well as the liquid.

6. To prevent skin exposure, wear protective gloves when cleaning parts. Select a pair of chemical-resistant gloves suitable for the type of chemicals that will be used. Replace the gloves when they become thin, damaged, change color, or swell.

7. Wear safety goggles when using chemicals and cleaning parts.

8. Do not use more than one type of cleaning solvent at a time.

9. If a part must be heated to remove a bearing, clean it thoroughly to remove all oil, grease and cleaner residue. Then wash with soapy water and rinse with clear water.

10. Wear a respirator if the instruction label says to do so.

11. Keep chemical products out of reach of children and pets.

12. To prevent sparks, use a nylon bristle brush when cleaning parts.

13. When using a commercial parts washer, read and follow the manufacturer's instructions for selecting the type of solvent to use. Parts washers must be equipped with a fusible link designed to melt and drop the cover in the event of fire.

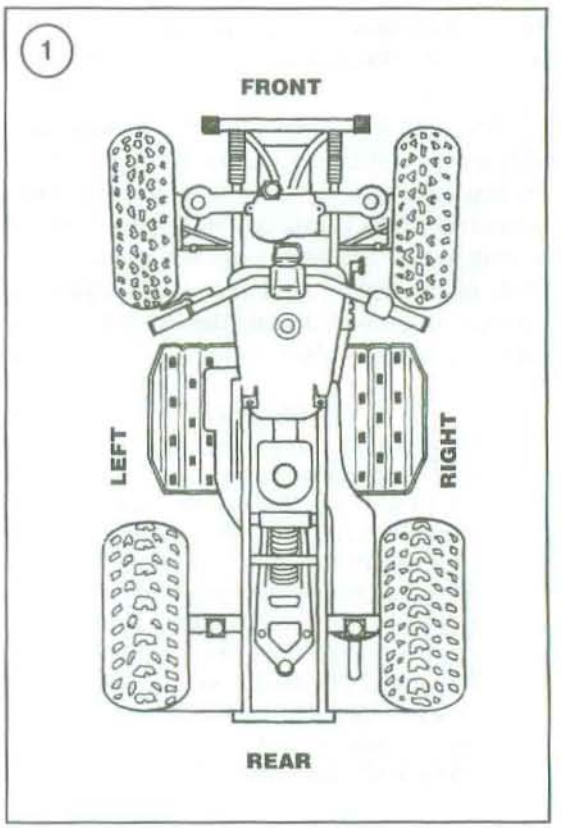
14. Wash both hands and arms thoroughly after cleaning parts.

HANDLING GASOLINE SAFELY

Gasoline, a volatile flammable liquid, is one of the most dangerous items in the shop. However, be-

cause gasoline is used so often, many people forget that it is a dangerous product. Gasoline should be used only as fuel for internal-combustion engines. Never use gasoline to clean parts, tools or to wash hands. When working on an ATV, motorcycle or any other type of gasoline engine, gasoline will always be present in the fuel tank, fuel line and carburetor. To avoid a disastrous accident when working around gasoline or on the fuel system, carefully observe the following precautions:

1. *Never* use gasoline to clean parts. See *Cleaning Parts* in this chapter for additional information on parts cleaning and safety.
2. When working on the fuel system, work outside or in a well-ventilated area.
3. Do not add fuel to the fuel tank or service the fuel system while the ATV is in the vicinity of open flames, sparks or where someone is smoking. Gasoline vapors are actually more dangerous than liquid gasoline. Because these vapors are heavier than air, they collect in low areas and are easily ignited.
4. Allow the engine to cool completely before working on any fuel system component.
5. When draining the carburetor, catch the gasoline in a plastic container and then pour it into a safety-approved gas can.
6. Do not store gasoline in any type of glass container. If the glass should break, a serious explosion or fire could occur.
7. Wipe up spilled gasoline immediately with dry rags. Store the rags in a metal container with a lid until they can be properly disposed of, or put them outside in a safe place to dry.
8. Do not pour water onto a gasoline fire. Water spreads the fire and makes it more difficult to put out. Use a Class B, BC, or ABC fire extinguisher to smother the flames and put the fire out.
9. Always turn the engine off before refueling. Use a wide-mouth funnel to prevent spilling gasoline onto the engine, exhaust pipe or muffler. Do not overfill the fuel tank. Leave an air space at the top of the fuel tank to prevent fuel from spilling out when installing the cap.
10. Always refuel the ATV while it is parked outside and away from all open flames and sparks.
11. When transporting the ATV in another vehicle, keep it upright with the fuel valve turned off.
12. Do not perform a spark test (as described in Chapter Two) if there is any gasoline leaking from the fuel tank, fuel line or carburetor.



SERVICE HINTS

Most of the service procedures covered are straightforward and can be performed by anyone reasonably handy with tools. It is suggested, however, that the personal capabilities be carefully considered before attempting any operation involving major disassembly of the engine.

Take time and do the job right. Do not forget that a newly rebuilt engine must be broken in the same way as a new one. Refer to the *Engine Break-In* procedure listed in Chapter Four and Chapter Five.

1. Front, as used in this manual, refers to the front of the vehicle; the front of any component is the end closest to the front of the vehicle. The left and right sides refer to the position of the parts as viewed by a rider sitting on the seat facing forward. For example, the throttle control is on the right side. These rules are simple, but confusion can cause a major inconvenience during service. See **Figure 1**.
2. Whenever servicing an engine or suspension component, secure the vehicle in a safe manner.
3. Tag all similar internal parts for location and mark all mating parts for position. Record number