CONTENTS

QUICK REFERENCE DATA

POLARIS MODEL NUMBERS

Year/Model	Model number
1985	
Scrambler	W857027
Trail Boss	W857527
1986	
Scrambler	W867027
Trail Boss	W867527
Trail Boss	W867627
1987	
Trail Boss	W877527
Cyclone	W877828
Trail Boss 4 × 4	W878027
Trail Boss 4 × 4	W878127
Trail Boss 4 × 4	W878327
1988	
Trail Boss 2 × 4	W887527
Trail Boss 4 × 4	W888127
Trail Boss 250 R/ES	X888528
Trail Boss 250 R/ES	W888528
1989	
Trail Boss	W898527
Trail Boss 2 × 4	W897527
Trail Boss 4 × 4	W898127
Big Boss 4 × 6	X898627
Big Boss 4 × 6	W898627
1990	
Trail Blazer	W907221
Trail Boss 250	W908527
Trail Boss 2 × 4	W907527
Trail Boss 2 × 4 - 350L	W907539
Trail Boss 4 × 4	W908127
Trail Boss 4 × 4 - 350L	W908139
Big Boss 4 × 6	W908627
1991	
Trail Blazer	W917221
Trail Boss 250	W918527
Trail Boss 2 × 4	W917527
Trail Boss 2 × 4 - 350L	W917539
Trail Boss 4 × 4	W918127
Trail Boss 4 × 4 - 350L	W918139
Big Boss 4 × 6	W918627
Big Boss 6 × 6	W918727
1992	
Trail Blazer	W927221
Trail Boss 250	W928527
Trail Boss 2 × 4	W927527
Trail Boss 2 × 4 - 350L	W927539
Trail Boss 4 × 4	W928127
Trail Boss 4 × 4 - 350L	W928139
Big Boss 4 × 6	W928627
Big Boss 6 × 6	W928727

(continued)

POLARIS MODEL NUMBERS (continued)

Year/Model	Model number
1993	
Trail Blazer	W937221
Trail Boss	W938527
Sportsman	W938039
250 2 × 4	W937527
350 2 × 4	W937539
250 4 × 4	W938127
350 4 × 4	W938139
250 6 × 6	W938727
350 6 × 6	W938739
1994	
Trail Blazer 2W	W947221
Trail Boss 2W	W948527
Sport	W948540
Sportsman	W948040
300 2 × 4	W947530
400 2 × 4	W947540
300 4 × 4	W948130
400 4 × 4	W948140
300 6 × 6	W948730
400 6 × 6	W948740
1995	
Trail Blazer	W957221
Trail Boss	W958527
300 2 × 4	W957530
400 2 × 4	W957540
300 4 × 4	W958130
Scrambler	W957840
Sport	W958540
Sportsman 4 × 4	W958040
Xplorer 4 × 4	W959140
Magnum 2 × 4	W957444
Magnum 4 × 4	W958144
400 6 × 6	W958740

W is the first letter of the Vehicle Identification Number for Standard production models.
X is the first letter of the Vehicle Identification Number for limited production pilot build models.
The first two numeric digits indicate the model year designation.
The third and fourth numeric digits indicate the chassis designation.
The fifth and sixth numeric digits indicate the engine used.

GENERAL DIMENSIONS

Model	Length cm (in.)	Width cm (in.)	Wheel base cm (in.)
1985			
Scrambler W857027	188.0 (74.00)	109.2 (43.00)	121.9 (48.00)
Trail Boss W857527	188.0 (74.00)	109.2 (43.00)	121.9 (48.00)
1986			
Scrambler W867027	188.0 (74.00)	109.2 (43.00)	116.8 (46.00)
Trail Boss W867527	188.0 (74.00)	109.2 (43.00)	116.8 (46.00)
Trail Boss W867627	188.0 (74.00)	109.2 (43.00)	116.8 (46.00)

(continued)

GENERAL DIMENSIONS (continued)

Model	Length cm (in.)	Width cm (in.)	Wheel base cm (in.)
1987			
Trail Boss W877527	177.8 (70.00)	110.5 (43.50)	115.6 (45.50)
Cyclone W877828	198.1 (78.00)	110.5 (43.50)	127.0 (50.00)
Trail Boss 4 × 4 W878027	177.8 (70.00)	113.0 (44.50)	120.7 (47.50)
Trail Boss 4 × 4 W878127	177.8 (70.00)	113.0 (44.50)	120.7 (47.50)
Trail Boss 4 × 4 W878327	177.8 (70.00)	113.0 (44.50)	120.7 (47.50)
1988			
Trail Boss 2 × 4 W887527	177.8 (70.00)	110.5 (43.50)	115.6 (45.50)
Trail Boss 4 × 4 W888127	117.8 (70.00)	113.0 (44.50)	120.7 (47.50)
Trail Boss 250 R/ES X888528	185.9 (73.20)	111.0 (43.70)	125.7 (49.50)
Trail Boss 250 R/ES W888528	185.9 (73.20)	111.0 (43.70)	125.7 (49.50)
1989			
Trail Boss W898527	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
Trail Boss 2 × 4 W897527	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
Trail Boss 4 × 4 W898127	185.9 (73.20)	113.0 (44.50)	125.7 (49.50)
Big Boss 4 × 6 X898627	247.7 (97.50)	113.0 (44.50)	190.5 (75.00)
Big Boss 4 × 6 W898627	247.7 (97.50)	113.0 (44.50)	190.5 (75.00)
1990			
Trail Blazer W907221	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
Trail Boss 250 W908527	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
Trail Boss 2 × 4			
250 Air cooled W907527	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
350 Liquid cooled W907539	195.6 (77.00)	111.8 (44.00)	126.4 (49.75)
Trail Boss 4 × 4			
250 Air cooled W908127	185.9 (73.20)	113.0 (44.50)	126.4 (49.75)
350 Liquid cooled W908139	195.6 (77.00)	113.0 (44.50)	126.4 (49.75)
Big Boss 4 × 6 W908627	247.7 (97.50)	112.8 (44.40)	190.5 (75.00)
1991			
Trail Blazer W917221	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
Trail Boss 250 W918527	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
Trail Boss 2 × 4			
250 Air cooled W917527	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)

(continued)

GENERAL DIMENSIONS (continued)

Model	Length cm (in.)	Width cm (in.)	Wheel base cm (in.)
1991 (continued)			
Trail Boss 2 × 4 (continued)			
350 Liquid cooled W917539	195.6 (77.00)	111.8 (44.00)	125.7 (49.75)
Trail Boss 4 × 4			
250 Air cooled W918127	185.9 (73.20)	113.0 (44.50)	126.4 (49.75)
Trail Boss 4 × 4			
350 Liquid cooled W918139	195.6 (77.00)	113.0 (44.50)	126.4 (49.75)
Big Boss 4 × 6 W918627	247.7 (97.50)	112.8 (44.40)	190.5 (75.00)
Big Boss 6 × 6 W918727	247.7 (97.50)	116.1 (45.70)	190.5 (75.00)
1992			
Trail Blazer W927221	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
Trail Boss 250 W928527	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
Trail Boss 2 × 4			
250 Air cooled W927527	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
350 Liquid cooled W927539	195.6 (77.00)	111.8 (44.00)	126.4 (49.75)
Trail Boss 4 × 4			
250 Air cooled W928127	185.9 (73.20)	113.0 (44.50)	126.4 (49.75)
350 Liquid cooled W928139	195.6 (77.00)	113.0 (44.50)	126.4 (49.75)
Big Boss 4 × 6 W928627	247.7 (97.50)	112.8 (44.40)	190.5 (75.00)
Big Boss 6 × 6 W928727	247.7 (97.50)	116.1 (45.70)	190.5 (75.00)
1993			
Trail Blazer W937221	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
Trail Boss W938527	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
Sportsman W938039	195.6 (77.00)	113.0 (44.50)	126.4 (49.75)
250 2 × 4 W937527	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
350 2 × 4 W937539	195.6 (77.00)	111.8 (44.00)	126.4 (49.75)
250 4 × 4 W938127	185.9 (73.20)	113.0 (44.50)	126.4 (49.75)
350 4 × 4 W938139	195.6 (77.00)	113.0 (44.50)	126.4 (49.75)
250 6 × 6 W938727	247.7 (97.50)	112.8 (44.40)	190.5 (75.00)
350 6 × 6 W938739	261.6 (103)	116.1 (45.70)	190.5 (75.00)
1994			
Trail Blazer 2W W947221	185.9 (73.2)	111.2 (44)	125.7 (49.5)

(continued)

GENERAL DIMENSIONS (continued)

Model	Length cm (in.)	Width cm (in.)	Wheel base cm (in.)
1994 (continued)			
Trail Boss 2W W948527	185.9 (73.2)	111.2 (44)	125.7 (49.5)
Sport W948540	182.9 (72)	111.2 (44)	126.4 (49.75)
Sportsman 4 × 4 W948040	195.6 (77)	116.8 (46)	126.4 (49.75)
Sportsman 4 × 4 W948040			
300 2 × 4 W947530	185.9 (73.2)	111.2 (44)	125.7 (49.5)
400 2 × 4 W947540	195.6 (77)	111.2 (44)	126.4 (49.75)
300 4 × 4 W948130	185.9 (73.2)	113 (44.5)	126.4 (49.75)
400 4 × 4 W948140	195.6 (77)	116.8 (46)	126.4 (49.75)
300 6 × 6 W948730	247.6 (97.5)	116.1 (45.7)	190.5 (75)
400 6 × 6 W948740	261.6 (103)	116.1 (45.7)	190.5 (75)
1995			
Trail Blazer W957221	185.9 (73.2)	111.8 (44)	125.7 (49.5)
Trail Boss W958527	185.9 (73.2	111.8 (44)	125.7 (49.5)
300 2 × 4 W957530	185.9 (73.2)	111.8 (44)	126.4 (49.75)
400 2 × 4 W957540	195.6 (77)	111.8 (44)	126.4 (49.75)
300 4 × 4 W958130	185.9 (73.2)	113 (44.5)	126.4 (49.75)
Scrambler W957840	189.2 (74.5)	115.6 (45.5)	123.2 (48.5)
Sport W958540	182.9 (72)	111.8 (44)	126.4 (49.75)
Sportsman 4 × 4 W958040	195.6 (77)	116.8 (46)	126.4 (49.75)
Xplorer 4 × 4 W959140	195.6 (77)	116.8 (46)	126.4 (49.75)
Magnum 2 × 4 W957444	195.6 (77)	118.1 (46.5)	126.4 (49.75)
Magnum 4 × 4 W958144	195.6 (77)	116.8 (46)	126.4 (49.75)
400 6 × 6 W958740	261.5 (103)	116.8 (46)	190.5 (75)

TECHNICAL ABBREVIATIONS

ABDC	After bottom dead center
ATDC	After top dead center
BBDC	Before bottom dead center
BDC	Bottom dead center
BTDC	Before top dead center
C	Celsius (Centigrade)
cc	Cubic centimeters

(continued)

TECHNICAL ABBREVIATIONS (continued)

CDI	Capacitor discharge ignition
cu. in.	Cubic inches
F	Fahrenheit
ft.-lb.	Foot-pounds
gal.	Gallons
H/A	High altitude
hp	Horsepower
in.	Inches
kg	Kilogram
kg/cm^2	Kilograms per square centimeter
kgm	Kilogram meters
km	Kilometer
l	Liter
m	Meter
MAG	Magneto
ml	Milliliter
mm	Millimeter
N•m	Newton-meters
oz.	Ounce
psi	Pounds per square inch
PTO	Power take off
pt.	Pints
qt.	Quarts
rpm	Revolutions per minute

RECOMMENDED LUBRICANTS

Item	Lubricant type
Ball-joints	A
Brake fluid	B
Control cables (throttle, choke, etc.)	D
Engine counterbalancer (models so equipped)	E
Engine injection oil (2-stroke models)	F
Engine oil (4-stroke models)	G
Front A arm pivot shafts	A
Front axle bearings (without front wheel drive)	A
Rear axle bearings	A
Steering post bushings	A
Swing arm bushings	A
Tie rod ends	A
Transmission	
Chain type (Type I, Table 6)	D
Gear type (Type II, Table 6)	H
Chain and gear type (Type III, Table 6)	D
Output shaft (with front wheel drive only)	A
EZ Shift selector (Type III, Table 6)	G

A. Grease that conforms to NLG1 No. 2, such as "Conoco Superlube M" or "Mobilgrease Special."
B. Brake fluid, DOT 3 only.
C. Polaris Cable Lube (number 2870510).
D. Polaris Chain Lube (number 2870464).
E. SAE 10W/30 engine oil.
F. Polaris Injection Oil.
G. Polaris SAE 40 (part No. 2871271) is recommended. API type SE or SF with SAE 10W/40 viscosity may be used.
H. SAE 30W engine oil.

APPROXIMATE REFILL CAPACITY

Oil injection reservoir		
2-stroke engines	1.89 L	2 qt.
Dry sump reservoir		
4-stroke engines	1.89 L	2 qt.
Liquid cooling system		
2-stroke engines (so equipped)	1.89 L	2 qt.
4-stroke engines	2.4 L	2.25 qt.
Fuel tank		
All 2-stroke models	15.12 L	4 gal.
4-stroke models	13.25 L	3.5 gal.
Transmission		
1985-1986 chain type	0.47 L	0.5 qt.
1987-1993 gear type	0.47 L	0.5 qt.
1993-1995 gear & chain EZ shift		
High-reverse shift	0.47 L	0.5 qt.
High/low/reverse shift	0.59 L	0.6 qt.

SPARK PLUGS

Model	NGK type	Champion type	Gap mm (in.)
1985-1987	BR8ES	RN4YC	0.51 (0.020)
1988	–	RN4YC	0.64 (0.025)
1989	BR8ES	RN4YC	0.70 (0.028)
1990-1995			
2-stroke models	BR8ES	–	0.70 (0.028)
4-stroke magnum	BKR6ES	–	0.64 (0.025)

IGNITION TIMING (WITH DIAL INDICATOR)*

	Figure 73	Degrees	mm	in.
1985-1987				
All models except Cyclone				
At 3,000 rpm	"A"	23-27	3.482	0.137
At 6,000 rpm	"A"	17.5-21.5	2.145	0.084
Cyclone				
At 3,000 rpm	"A"	21-25	2.959	0.117
At 6,000 rpm	"A"	15.5-19.5	1.729	0.068
1988				
EC25PF-03 engine				
At 3,000 rpm	"A" or "B"	23-27	3.482	0.137
At 6,000 rpm	"A" or "B"	19.5	2.145	0.084
EC25PF-04 engine				
At 3,000 rpm	"C"	27-31	4.646	0.183
At 6,000 rpm	"C"	19.5	2.145	0.084
1989				
All models				
At 3,000 rpm	"B"	25	3.482	0.137
At 6,000 rpm	"B"	20	2.249	0.089
1990-1995				
250 models				
At 3,000 rpm	"B"	25	3.482	0.137
At 6,000 rpm	"B"	20	2.249	0.089
300 models				
At 3,000 rpm	"B"	25	3.482	0.137
At 6,000 rpm	"B"	17	1.632	0.064

(continued)

IGNITION TIMING (WITH DIAL INDICATOR)* (continued)

	Figure 73	Degrees	mm	in.
1990-1995 (continued)				
350 & 400 models				
At 3,000 rpm	"D"	23.5	–3.504	–0.140
At 6,000 rpm	"D"	18	2.164	0.085
425 Magnum models				
At 3,000 rpm	"E"	30	–	–

* All specifications are before top dead center (BTDC).

VALVE CLEARANCE

	mm	in.
4-stroke engines		
Exhaust valves	0.15	0.006
Inlet valves	0.15	0.006

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Big Boss, Xplo
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CHAPTER ONE

GENERAL INFORMATION

This Clymer shop manual covers the 1985-1995 Polaris Scrambler, Trail Blazer, Trail Boss, Cyclone, Big Boss, Xplorer, Sport, Sportsman, and Magnum models. The text gives complete information on maintenance, tune-up, repair and overhaul. Hundreds of photos and drawings guide you through every step. This book includes all of the information you need to know to keep your Polaris running right.

A shop manual is a reference. You want to be able to find information fast. As in all Clymer books, this one is designed with you in mind. All chapters are thumb tabbed. Important items are extensively indexed at the rear of the book. All procedures, tables, photos and illustrations in this manual are for the reader who may be working on the ATV or using this manual for the first time. All the most frequently used specifications and capacities are summarized in the *Quick Reference Data* pages at the front of the book.

Keep the book handy in your tool box. It will help you to better understand how the ATV runs, lower repair and maintenance costs and generally improve your satisfaction with your Polaris ATV.

MANUAL ORGANIZATION

All dimensions and capacities are expressed in English units familiar to U.S. mechanics as well as in metric units. This chapter discusses equipment and tools useful both for preventative maintenance and troubleshooting. Refer to *Basic Hand Tools* in this chapter for the recommended tools that should be on hand for simple home repair and/or major overhaul.

Chapter Two provides methods and suggestions for quick and accurate diagnosis and repair of problems. Troubleshooting procedures discuss typical symptoms and logical methods to pinpoint the trouble.

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

Subsequent chapters describe specific systems such as the engine, clutch/belt drive, transmission, fuel, exhaust, electrical, suspension and brakes.

Each chapter provides disassembly, repair, and assembly procedures in 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.

Table 1 lists model number coverage.

General dimensions are listed in **Table 2.**

Table 3 lists vehicle weight.

Metric and U.S. standards are used throughout this manual. U.S. to metric conversion is given in **Table 4.**

Critical torque specifications are found in table form at the end of each chapter (as required). The general torque specifications listed in **Table 5** can be used when a torque specification is not listed for a specific component or assembly.

A list of general technical abbreviations is given in **Table 6.**

Metric tap drill sizes can be found in **Table 7.**

Table 8 lists windchill factors.

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

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 damage or personal injury.

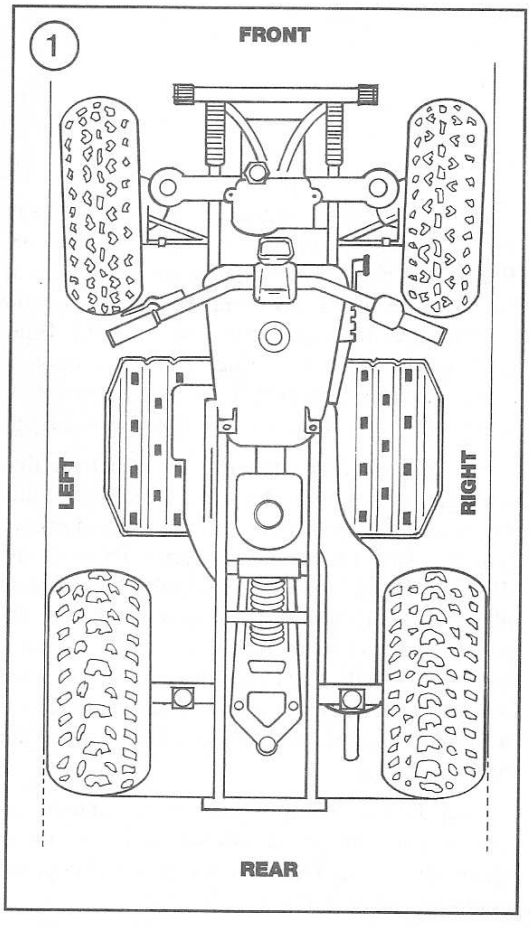
A CAUTION emphasizes an area where equipment damage could occur. Disregarding a CAUTION could cause permanent mechanical damage; however, personal injury is unlikely.

A WARNING emphasizes an area 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 and death have resulted from disregarding similar warnings.

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 you consider your own capabilities carefully before attempting any operation involving major disassembly.

1. "Front," as used in this manual, refers to the front of the ATV; 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 and facing forward. For example, the throttle control is on the right-hand side. These rules are simple, but confusion can cause a major inconvenience during service. See **Figure 1.**
2. When disassembling any engine or drive component, mark the parts for location. Also mark all parts which mate together. Small parts, such as bolts, can



4. Use the proper sized wrenches to avoid damage to fasteners and injury to yourself.

5. When loosening a tight or stuck nut, be guided by what would happen if the wrench slips. Be careful; protect yourself accordingly.

6. When replacing a fastener, always 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.

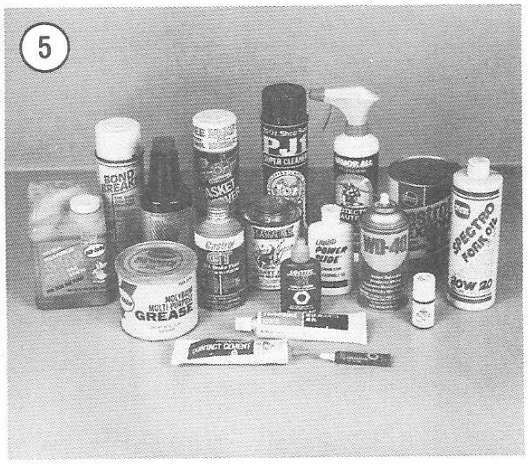
7. Keep all hand and power tools in good condition. Wipe greasy and oily tools after using them. They are difficult to hold and can cause injury. Replace or repair worn or damaged tools.

8. Keep your work area clean and uncluttered.

9. Wear safety goggles during all operations involving drilling, grinding, the use of a cold chisel or *anytime* you feel unsure about the safety of your eyes. Safety goggles should also be worn anytime solvent and compressed air is used to clean parts.

10. Keep an approved fire extinguisher (**Figure 3**) nearby. Be sure it is rated for gasoline (Class B) and electrical (Class C) fires.

11. 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 injury and bearing damage when using compressed air, hold the inner bearing race (**Figure 4**) by hand.



EXPENDABLE SUPPLIES

Certain expendable supplies (**Figure 5**) are required during maintenance and repair work. These include grease, oil, gasket cement, wiping cloths and cleaning solvent. Ask your dealer for the special locking compounds, special lubricants or other products which may be suggested by the manufacturer for maintenance or repair. Cleaning solvents may be available from servicing dealers or some hardware stores.

WARNING

Having a stack of clean shop cloths on hand is important when performing engine and suspension service work. Clean shop cloths should be stored safely, but present less danger than solvent and lubricant soaked cloths. Most local fire codes require that used shop cloths be stored in a sealed, metal container with a self-closing lid until they can be washed or discarded.

WARNING

Even mild solvents and other chemicals can be absorbed into your skin while cleaning parts. Health hazards ranging from mild discomfort to major infections can often be avoided by using a pair of petroleum-resistant gloves. These can be purchased from industrial supply houses or many hardware stores.

ENGINE AND CHASSIS SERIAL NUMBERS

Polaris all-terrain vehicles are identified by frame and engine identification numbers. The frame or Vehicle Identification Number (VIN) is stamped on the frame tube at one of the locations shown in **Figure 6**.

On 1985 and 1986 models, the vehicle's model number is located at A, **Figure 6** and the serial number is located at B, **Figure 6**.

On 1987 and 1988 models except 1988 R/ES model, the vehicle's model number is located at C, **Figure 6** and the serial number is located at D,

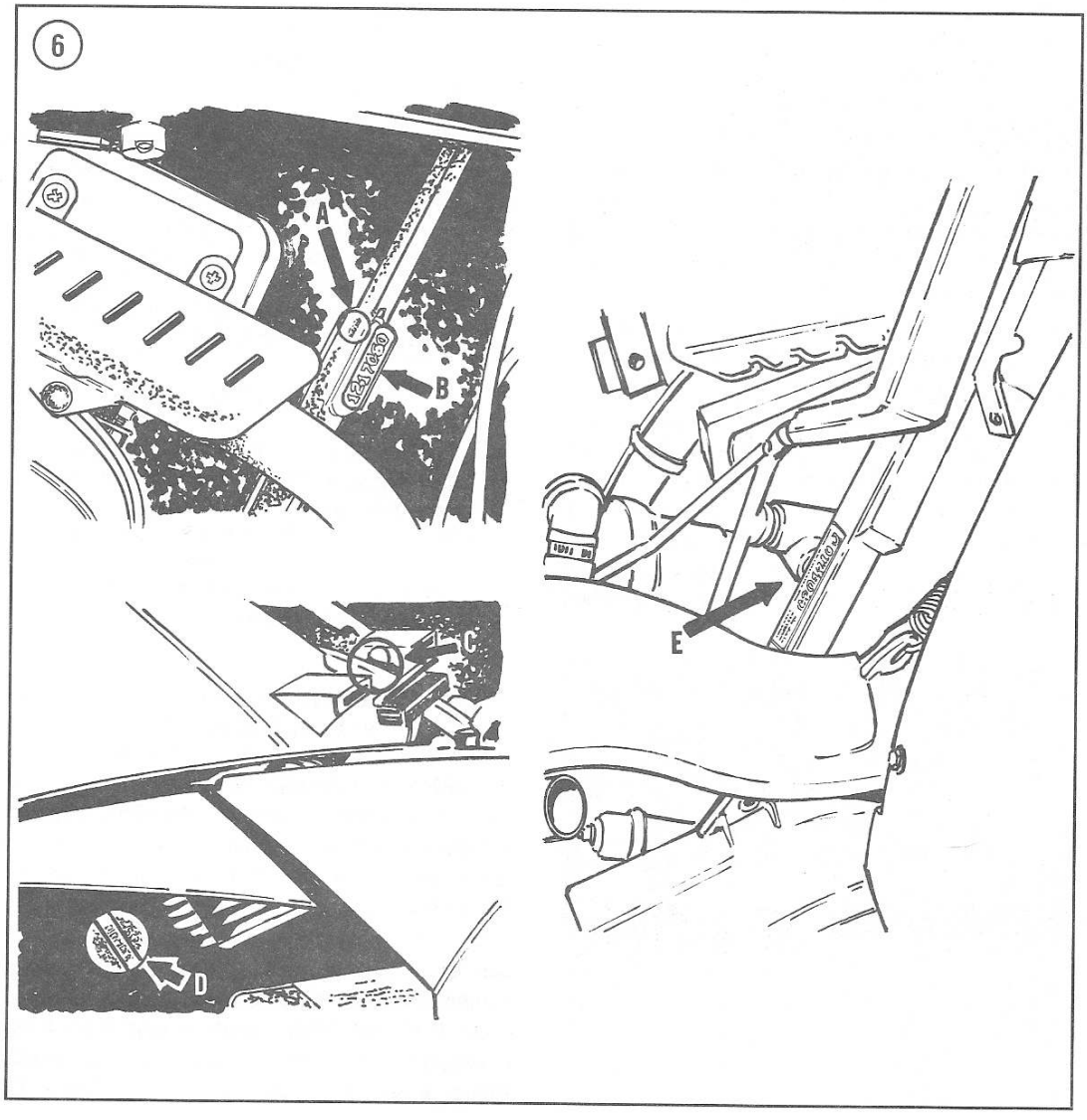
Figure 6. On 1988 R/ES model, the model and serial numbers are located at location D, **Figure 6**.

On 1989 and newer models, the vehicle's serial number is located at E, **Figure 6**.

The engine number of all models is stamped on the right-hand side of the crankcase as shown in **Figure 7**.

Figure 8 shows the breakdown of the model number found on Polaris vehicles covered in this manual. The first letter will be either a "W" or "X" and indicates if the model is a limited production (pilot) machine designated by "X" or a regular production machine designated by "W." The next two digits represent the year that the vehicle was manufactured. The last two digits in the vehicle's model number indicate the engine model. The model numbers are listed in **Table 1**.

Write down all serial and model numbers applicable to your machine and carry the numbers with you when you order parts from a dealer. Always order by year and engine and machine numbers. If possible, compare the old parts with the new ones before purchasing them. If the parts are not alike, have the parts manager explain the reason for the difference



and insist on assurance that the new parts will fit and are correct.

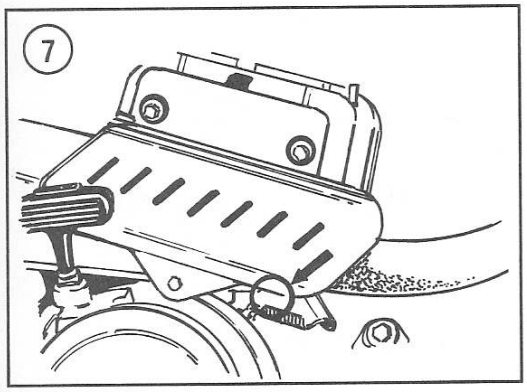
BASIC HAND TOOLS

Many of the procedures in this manual can be carried out with simple hand tools and test equipment familiar to the mechanic. Keep your tools clean and in a tool box. Keep them organized with home related tools stored together. After using a tool, wipe off dirt and grease with a clean cloth and return the tool to its correct place.

Top quality tools are essential; they are also more economical in the long run. If you are now starting to build your tool collection, avoid the "advertised specials" featured at some parts houses, discount stores and chain drug stores. These are usually a poor grade tool that can be sold cheaply and that is exactly what they are—*cheap*. They are usually made of inferior material and are thick, heavy and clumsy. Their rough finish makes them difficult to clean and they usually don't last very long. If it is ever your misfortune to use such tools you will probably find out that the wrenches do not fit the heads of fasteners correctly and will often damage the fastener.

Quality tools are made of alloy steel and are heat treated for greater strength. They are lighter and better balanced than cheap ones. Their surface is smooth, making them a pleasure to work with and easy to clean. The initial cost of good quality tools may be more but they are cheaper in the long run. Don't try to buy everything in all sizes in the beginning; do it a little at a time until you have the necessary tools.

The following tools are required to perform virtually any repair job. Each tool is described and the recommended sizes given for starting a tool collection. Additional tools and some duplicates may be added as you become familiar with the vehicle. Polaris all-terrain vehicles are built with metric and U.S. standard fasteners—so if you are starting your collection now, buy both sizes.



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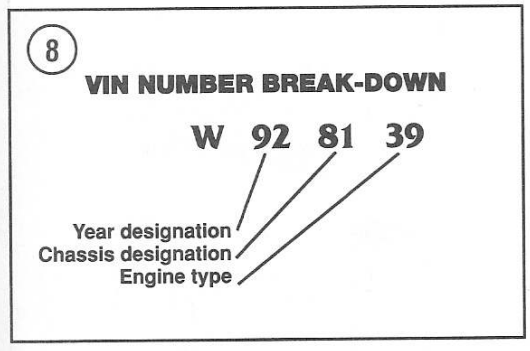

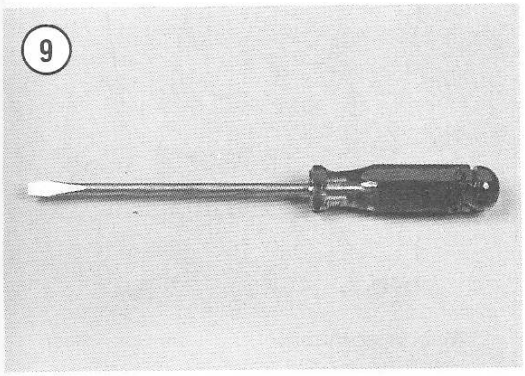

9

Screwdrivers

The screwdriver is a very basic tool, but if used improperly it will do more damage than good. The slot on a screw has a definite dimension and shape. A screwdriver must be selected to conform with that shape. Use a small screwdriver for small screws and a large one for large screws or the screw head will be damaged.

Two basic types of screwdrivers are required: common (flat-blade) screwdrivers (**Figure 9**) and Phillips screwdrivers (**Figure 10**).

Screwdrivers are available in sets which often include an assortment of common and Phillips blades. If you buy them individually, buy at least the following:

a. Common screwdriver—5/16 × 6 in. blade.

Table 1 POLARIS MODEL NUMBERS

Year/Model	Model number
1985	
Scrambler	W857027
Trail Boss	W857527
1986	
Scrambler	W867027
Trail Boss	W867527
Trail Boss	W867627
1987	
Trail Boss	W877527
Cyclone	W877828
Trail Boss 4 × 4	W878027
Trail Boss 4 × 4	W878127
Trail Boss 4 × 4	W878327
1988	
Trail Boss 2 × 4	W887527
Trail Boss 4 × 4	W888127
Trail Boss 250 R/ES	X888528
Trail Boss 250 R/ES	W888528
1989	
Trail Boss	W898527
Trail Boss 2 × 4	W897527
Trail Boss 4 × 4	W898127
Big Boss 4 × 6	X898627
Big Boss 4 × 6	W898627
1990	
Trail Blazer	W907221
Trail Boss 250	W908527
Trail Boss 2 × 4	W907527
Trail Boss 2 × 4 - 350L	W907539
Trail Boss 4 × 4	W908127
Trail Boss 4 × 4 - 350L	W908139
Big Boss 4 × 6	W908627
1991	
Trail Blazer	W917221
Trail Boss 250	W918527
Trail Boss 2 × 4	W917527
Trail Boss 2 × 4 - 350L	W917539
Trail Boss 4 × 4	W918127
Trail Boss 4 × 4 - 350L	W918139
Big Boss 4 × 6	W918627
Big Boss 6 × 6	W918727
1992	
Trail Blazer	W927221
Trail Boss 250	W928527
Trail Boss 2 × 4	W927527
Trail Boss 2 × 4 - 350L	W927539
Trail Boss 4 × 4	W928127
Trail Boss 4 × 4 - 350L	W928139
Big Boss 4 × 6	W928627
Big Boss 6 × 6	W928727
1993	
Trail Blazer	W937221
Trail Boss	W938527
Sportsman	W938039
250 2 × 4	W937527
350 2 × 4	W937539
250 4 × 4	W938127

(continued)

Table 1 POLARIS MODEL NUMBERS (continued)

Year/Model	Model number
Sportsman (continued)	
350 4 × 4	W938139
250 6 × 6	W938727
350 6 × 6	W938739
1994	
Trail Blazer 2W	W947221
Trail Boss 2W	W948527
Sport	W948540
Sportsman	W948040
300 2 × 4	W947530
400 2 × 4	W947540
300 4 × 4	W948130
400 4 × 4	W948140
300 6 × 6	W948730
400 6 × 6	W948740
1995	
Trail Blazer	W957221
Trail Boss	W958527
300 2 × 4	W957530
400 2 × 4	W957540
300 4 × 4	W958130
Scrambler	W957840
Sport	W958540
Sportsman 4 × 4	W958040
Xplorer 4 × 4	W959140
Magnum 2 × 4	W957444
Magnum 4 × 4	W958144
400 6 × 6	W958740

W is the first letter of the Vehicle Identification Number for standard production models.
X is the first letter of the Vehicle Identification Number for limited production pilot build models.
The first two numeric digits indicate the model year designation.
The third and fourth numeric digits indicate the chassis designation.
The fifth and sixth numeric digits indicate the engine used.

Table 2 GENERAL DIMENSIONS

Model	Length cm (in.)	Width cm (in.)	Wheel base cm (in.)
1985			
Scrambler W857027	188.0 (74.00)	109.2 (43.00)	121.9 (48.00)
Trail Boss W857527	188.0 (74.00)	109.2 (43.00)	121.9 (48.00)
1986			
Scrambler W867027	188.0 (74.00)	109.2 (43.00)	116.8 (46.00)
Trail Boss W867527	188.0 (74.00)	109.2 (43.00)	116.8 (46.00)
Trail Boss W867627	188.0 (74.00)	109.2 (43.00)	116.8 (46.00)
1987			
Trail Boss W877527	177.8 (70.00)	110.5 (43.50)	115.6 (45.50)
Cyclone W877828	198.1 (78.00)	110.5 (43.50)	127.0 (50.00)

(continued)

Table 2 GENERAL DIMENSIONS (continued)

Model	Length cm (in.)	Width cm (in.)	Wheel base cm (in.)
1987 (continued)			
Trail Boss 4 × 4 W878027	177.8 (70.00)	113.0 (44.50)	120.7 (47.50)
Trail Boss 4 × 4 W878127	177.8 (70.00)	113.0 (44.50)	120.7 (47.50)
Trail Boss 4 × 4 W878327	177.8 (70.00)	113.0 (44.50)	120.7 (47.50)
1988			
Trail Boss 2 × 4 W887527	177.8 (70.00)	110.5 (43.50)	115.6 (45.50)
Trail Boss 4 × 4 W888127	117.8 (70.00)	113.0 (44.50)	120.7 (47.50)
Trail Boss 250 R/ES X888528	185.9 (73.20)	111.0 (43.70)	125.7 (49.50)
Trail Boss 250 R/ES W888528	185.9 (73.20)	111.0 (43.70)	125.7 (49.50)
1989			
Trail Boss W898527	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
Trail Boss 2 × 4 W897527	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
Trail Boss 4 × 4 W898127	185.9 (73.20)	113.0 (44.50)	125.7 (49.50)
Big Boss 4 × 6 X898627	247.7 (97.50)	113.0 (44.50)	190.5 (75.00)
Big Boss 4 × 6 W898627	247.7 (97.50)	113.0 (44.50)	190.5 (75.00)
1990			
Trail Blazer W907221	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
Trail Boss 250 W908527	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
Trail Boss 2 × 4			
250 Air cooled W907527	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
350 Liquid cooled W907539	195.6 (77.00)	111.8 (44.00)	126.4 (49.75)
Trail Boss 4 × 4			
250 Air cooled W908127	185.9 (73.20)	113.0 (44.50)	126.4 (49.75)
350 Liquid cooled W908139	195.6 (77.00)	113.0 (44.50)	126.4 (49.75)
Big Boss 4 × 6 W908627	247.7 (97.50)	112.8 (44.40)	190.5 (75.00)
1991			
Trail Blazer W917221	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
Trail Boss 250 W918527	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
Trail Boss 2 × 4			
250 Air cooled W917527	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
350 Liquid cooled W917539	195.6 (77.00)	111.8 (44.00)	125.7 (49.75)
Trail Boss 4 × 4			
250 Air cooled W918127	185.9 (73.20)	113.0 (44.50)	126.4 (49.75)

(continued)

Table 2 GENERAL DIMENSIONS (continued)

Model	Length cm (in.)	Width cm (in.)	Wheel base cm (in.)
1991 (continued)			
Trail Boss 4 × 4 (continued)			
350 Liquid cooled W918139	195.6 (77.00)	113.0 (44.50)	126.4 (49.75)
Big Boss 4 × 6 W918627	247.7 (97.50)	112.8 (44.40)	190.5 (75.00)
Big Boss 6 × 6 W918727	247.7 (97.50)	116.1 (45.70)	190.5 (75.00)
1992			
Trail Blazer W927221	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
Trail Boss 250 W928527	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
Trail Boss 2 × 4			
250 Air cooled W927527	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
350 Liquid cooled W927539	195.6 (77.00)	111.8 (44.00)	126.4 (49.75)
Trail Boss 4 × 4			
250 Air cooled W928127	185.9 (73.20)	113.0 (44.50)	126.4 (49.75)
350 Liquid cooled W928139	195.6 (77.00)	113.0 (44.50)	126.4 (49.75)
Big Boss 4 × 6 W928627	247.7 (97.50)	112.8 (44.40)	190.5 (75.00)
Big Boss 6 × 6 W928727	247.7 (97.50)	116.1 (45.70)	190.5 (75.00)
1993			
Trail Blazer W937221	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
Trail Boss W938527	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
Sportsman W938039	195.6 (77.00)	113.0 (44.50)	126.4 (49.75)
250 2 × 4 W937527	185.9 (73.20)	111.8 (44.00)	125.7 (49.50)
350 2 × 4 W937539	195.6 (77.00)	111.8 (44.00)	126.4 (49.75)
250 4 × 4 W938127	185.9 (73.20)	113.0 (44.50)	126.4 (49.75)
350 4 × 4 W938139	195.6 (77.00)	113.0 (44.50)	126.4 (49.75)
250 6 × 6 W938727	247.7 (97.50)	112.8 (44.40)	190.5 (75.00)
350 6 × 6 W938739	261.6 (103)	116.1 (45.70)	190.5 (75.00)
1994			
Trail Blazer 2W W947221	185.9 (73.2)	111.2 (44)	125.7 (49.5)
Trail Boss 2W W948527	185.9 (73.2)	111.2 (44)	125.7 (49.5)
Sport W948540	182.9 (72)	111.2 (44)	126.4 (49.75)
Sportsman 4 × 4 W948040	195.6 (77)	116.8 (46)	126.4 (49.75)

(continued)

Table 2 GENERAL DIMENSIONS (continued)

Model	Length cm (in.)	Width cm (in.)	Wheel base cm (in.)
1994 (continued)			
Sportsman 4 × 4 W948040			
300 2 × 4 W947530	185.9 (73.2)	111.2 (44)	125.7 (49.5)
400 2 × 4 W947540	195.6 (77)	111.2 (44)	126.4 (49.75)
300 4 × 4 W948130	185.9 (73.2)	113 (44.5)	126.4 (49.75)
400 4 × 4 W948140	195.6 (77)	116.8 (46)	126.4 (49.75)
300 6 × 6 W948730	247.6 (97.5)	116.1 (45.7)	190.5 (75)
400 6 × 6 W948740	261.6 (103)	116.1 (45.7)	190.5 (75)
1995			
Trail Blazer W957221	185.9 (73.2)	111.8 (44)	125.7 (49.5)
Trail Boss W958527	185.9 (73.2	111.8 (44)	125.7 (49.5)
300 2 × 4 W957530	185.9 (73.2)	111.8 (44)	126.4 (49.75)
400 2 × 4 W957540	195.6 (77)	111.8 (44)	126.4 (49.75)
300 4 × 4 W958130	185.9 (73.2)	113 (44.5)	126.4 (49.75)
Scrambler W957840	189.2 (74.5)	115.6 (45.5)	123.2 (48.5)
Sport W958540	182.9 (72)	111.8 (44)	126.4 (49.75)
Sportsman 4 × 4 W958040	195.6 (77)	116.8 (46)	126.4 (49.75)
Xplorer 4 × 4 W959140	195.6 (77)	116.8 (46)	126.4 (49.75)
Magnum 2 × 4 W957444	195.6 (77)	118.1 (46.5)	126.4 (49.75)
Magnum 4 × 4 W958144	195.6 (77)	116.8 (46)	126.4 (49.75)
400 6 × 6 W958740	261.5 (103)	116.8 (46)	190.5 (75)

Table 3 VEHICLE WEIGHT

Model	kg	lb.
1985		
Scrambler W857027	172.4	380.0
Trail Boss W857527	199.6	440.0
1986		
Scrambler W867027	172.4	380.0
Trail Boss W867527	199.6	440.0
Trail Boss W867627	199.6	440.0
1987		
Trail Boss W877527	199.6	440.0
Cyclone W877828	181.4	400.0
Trail Boss 4 × 4 W878027	222.3	490.0
Trail Boss 4 × 4 W878127	222.3	490.0
Trail Boss 4 × 4 W878327	222.3	490.0

(continued)

Table 3 VEHICLE WEIGHT (continued)

Model	kg	lb.
1988		
Trail Boss 2 × 4 W887527	199.6	440.0
Trail Boss 4 × 4 W888127	222.3	490.0
Trail Boss 250 R/ES X888528	181.4	400.0
Trail Boss 250 R/ES W888528	181.4	400.0
1989		
Trail Boss W898527	181.4	400.0
Trail Boss 2 × 4 W897527	199.6	440.0
Trail Boss 4 × 4 W898127	222.3	490.0
Big Boss 4 × 6 X898627	294.8	650.0
Big Boss 4 × 6 W898627	294.8	650.0
1990		
Trail Blazer W907221	176.9	390.0
Trail Boss 250 W908527	192.8	425.0
Trail Boss 2 × 4		
250 Air cooled W907527	199.6	440.0
350 Liquid cooled W907539	222.3	490.0
Trail Boss 4 × 4		
250 Air cooled W908127	222.3	490.0
350 Liquid cooled W908139	254.0	560.0
Big Boss 4 × 6 W908627	294.8	650.0
1991		
Trail Blazer W917221	176.9	390.0
Trail Boss 250 W918527	192.8	425.0
Trail Boss 2 × 4		
250 Air cooled W917527	199.6	440.0
350 Liquid cooled W917539	222.3	490.0
Trail Boss 4 × 4		
250 Air cooled W918127	222.3	490.0
350 Liquid cooled W918139	254.0	560.0
Big Boss 4 × 6 W918627	294.8	650.0
Big Boss 6 × 6 W918727	340.2	750.0
1992		
Trail Blazer W927221	176.9	390.0
Trail Boss 250 W928527	192.8	425.0
Trail Boss 2 × 4		
250 Air cooled W927527	199.6	440.0
350 Liquid cooled W927539	222.3	490.0
Trail Boss 4 × 4		
250 Air cooled W928127	222.3	490.0
350 Liquid cooled W928139	254.0	560.0
Big Boss 4 × 6 W928627	294.8	650.0
Big Boss 6 × 6 W928727	340.2	750.0
1993		
Trail Blazer W937221	177	390.0
Trail Boss 250 W938527	192.8	425.0
Sportsman W938039	254.0	560.0
250 2 × 4 W937527	199.6	440.0
350 2 × 4 W937539	222.3	490.0
250 4 × 4 W938127	222.3	490.0
350 4 × 4 W938139	254.0	560.0
250 6 × 6 W938727	294.8	650.0
350 6 × 6 W938739	340.2	750.0
1994		
Trail Blazer 2W W947221	177.0	390.0
Trail Boss 2W W948527	192.8	425.0
Sport W948540	217.3	479.0

(continued)

Table 3 VEHICLE WEIGHT (continued)

Model	kg	lb.
1994 (continued)		
Sportsman 4 × 4 W948040	265.4	585.0
300 2 × 4 W947530	219.0	483.0
400 2 × 4 W947540	232.2	512.0
300 4 × 4 W948130	244.0	538.0
400 4 × 4 W948140	259.4	572.0
300 6 × 6 W948730	373.3	823.0
400 6 × 6 W948740	388.7	857.0
1995		
Trail Blazer W957221	177.0	390.0
Trail Boss W958527	193.0	425.0
300 2 × 4 W957530	219.0	483.0
400 2 × 4 W957540	232.0	512.0
300 4 × 4 W958130	244.0	538.0
Scrambler W957840	222.0	490.0
Sport W958540	217.0	479.0
Sportsman 4 × 4 W958040	265.4	585.0
Xplorer 4 × 4 W959140	258.6	570.0
Magnum 2 × 4 W957444	242.0	534.0
Magnum 4 × 4 W958144	270.0	595.0
400 6 × 6 W958740	389.0	857.0

Table 4 DECIMAL AND METRIC EQUIVALENTS

Fractions	Decimal in.	Metric mm	Fractions	Decimal in.	Metric mm
1/64	0.015625	0.39688	33/64	0.515625	13.09687
1/32	0.03125	0.79375	17/32	0.53125	13.49375
3/64	0.046875	1.19062	35/64	0.546875	13.89062
1/16	0.0625	1.58750	9/16	0.5625	14.28750
5/64	0.078125	1.98437	37/64	0.578125	14.68437
3/32	0.09375	2.38125	19/32	0.59375	15.08125
7/64	0.109375	2.77812	39/64	0.609375	15.47812
1/8	0.125	3.1750	5/8	0.625	15.87500
9/64	0.140625	3.57187	41/64	0.640625	16.27187
5/32	0.15625	3.96875	21/32	0.65625	16.66875
11/64	0.171875	4.36562	43/64	0.671875	17.06562
3/16	0.1875	4.76250	11/16	0.6875	17.46250
13/64	0.203125	5.15937	45/64	0.703125	17.85937
7/32	0.21875	5.55625	23/32	0.71875	18.25625
15/64	0.234375	5.95312	47/64	0.734375	18.65312
1/4	0.250	6.35000	3/4	0.750	19.05000
17/64	0.265625	6.74687	49/64	0.765625	19.44687
9/32	0.28125	7.14375	25/32	0.78125	19.84375
19/64	0.296875	7.54062	51/64	0.796875	20.24062
5/16	0.3125	7.93750	13/16	0.8125	20.63750
21/64	0.328125	8.33437	53/64	0.828125	21.03437
11/32	0.34375	8.73125	27/32	0.84375	21.43125
23/64	0.359375	9.12812	55/64	0.859375	22.82812
3/8	0.375	9.52500	7/8	0.875	22.22500
25/64	0.390625	9.92187	57/64	0.890625	22.62187
13/32	0.40625	10.31875	29/32	0.90625	23.01875
27/64	0.421875	10.71562	59/64	0.921875	23.41562
7/16	0.4375	11.11250	15/16	0.9375	23.81250
29/64	0.453125	11.50937	61/64	0.953125	24.20937
15/32	0.46875	11.90625	31/32	0.96875	24.60625
31/64	0.484375	12.30312	63/64	0.984375	25.00312
1/2	0.500	12.70000	1	1.00	25.40000

Metric mm
13.09687
13.49375
13.89062
14.28750
14.68437
15.08125
15.47812
15.87500
16.27187
16.66875
17.06562
17.46250
17.85937
18.25625
18.65312
19.05000
19.44687
19.84375
20.24062
20.63750
21.03437
21.43125
22.82812
22.22500
22.62187
23.01875
23.41562
23.81250
24.20937
24.60625
25.00312
25.40000

Table 5 GENERAL TORQUE SPECIFICATIONS

Item	N•m	ft.-lb.
Bolt		
6 mm	6	4.3
8 mm	15	11
10 mm	30	22
12 mm	55	40
14 mm	85	61
16 mm	130	94
Nut		
6 mm	6	4.3
8 mm	15	11
10 mm	30	22
12 mm	55	40
14 mm	85	61
16 mm	130	94

Table 6 TECHNICAL ABBREVIATIONS

ABDC	After bottom dead center
ATDC	After top dead center
BBDC	Before bottom dead center
BDC	Bottom dead center
BTDC	Before top dead center
C	Celsius (Centigrade)
cc	Cubic centimeters
CDI	Capacitor discharge ignition
cu. in.	Cubic inches
F	Fahrenheit
ft.-lb.	Foot-pound
gal.	Gallons
H/A	High altitude
hp	Horsepower
in.	Inches
kg	Kilogram
kg/cm^2	Kilograms per square centimeter
kgm	Kilogram meters
km	Kilometer
l	Liter
m	Meter
MAG	Magneto
ml	Milliliter
mm	Millimeter
N•m	Newton-meters
oz.	Ounce
psi	Pounds per square inch
PTO	Power take off
pt.	Pint
qt.	Quart
rpm	Revolutions per minute

Table 7 METRIC TAP DRILL SIZES

Metric (mm)	Drill size	Decimal equivalent	Nearest fraction
3 × 0.50	No. 39	0.0995	3/32
3 × 0.60	3.32	0.0937	3/32
4 × 0.70	No. 30	0.1285	1/8
4 × 0.75	1/8	0.125	1/8
5 × 0.80	No. 19	0.166	11/64
5 × 0.90	No. 20	0.161	5/32
6 × 1.00	No. 9	0.196	13/64
7 × 1.00	16/64	0.234	15/64
8 × 1.00	J	0.277	9/32
8 × 1.25	17/64	0.265	17/64
9 × 1.00	5/16	0.3125	5/16
9 × 1.25	5/16	0.3125	5/16
10 × 1.25	11/32	0.3437	11/32
10 × 1.50	R	0.339	11/32
11 × 1.50	3/8	0.375	3/8
12 × 1.50	13/32	0.406	13/32
12 × 1.75	13/32	0.406	13/32

Table 8 WINDCHILL FACTORS

Estimated wind speed in mph	Actual thermometer reading (°F)											
	50	40	30	20	10	0	–10	–20	–30	–40	–50	–60
	Equivalent temperature (°F)											
Calm	50	40	30	20	10	0	–10	–20	–30	–40	–50	–60
5	48	37	27	16	6	–5	–15	–26	–36	–47	–57	–68
10	40	28	16	4	–9	–21	–33	–46	–58	–70	–83	–95
15	36	22	9	–5	–18	–36	–45	–58	–72	–85	–99	–112
20	32	18	4	–10	–25	–39	–53	–67	–82	–96	–110	–124
25	30	16	0	–15	–29	–44	–59	–74	–88	–104	–118	–133
30	28	13	–2	–18	–33	–48	–63	–79	–94	–109	–125	–140
35	27	11	–4	–20	–35	–49	–67	–82	–98	–113	–129	–145
40	26	10	–6	–21	–37	–53	–69	–85	–100	–116	–132	–148
*	Little danger (for properly clothed person)				Increasing danger			Great danger				
					• Danger from freezing of exposed flesh •							

*Wind speeds greater than 40 mph have little additional effect.

–50	–60
–50	–60
–57	–68
–83	–95
–99	–112
–110	–124
–118	–133
–125	–140
–129	–145
–132	–148

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CHAPTER TWO

TROUBLESHOOTING

Diagnosing mechanical or electrical problems is relatively simple if you use orderly procedures and keep a few basic principles in mind. The first step in any troubleshooting procedure is to define the symptoms as closely as possible and then localize the problem. Subsequent steps involve testing and analyzing those areas which could cause the symptoms. A haphazard approach may eventually solve the problem, but it can be very costly in terms of wasted time and unnecessary parts replacement.

Proper lubrication, maintenance and periodic tune-ups as described in Chapter Three will reduce the necessity for troubleshooting. Even with the best of care, however, all vehicles are prone to problems which will require troubleshooting.

Never assume anything and do not overlook the obvious. If you are riding along and the engine suddenly quits, check the easiest, most accessible areas first. Has the spark plug wire fallen off? Is there fuel in the tank? Is the fuel shut-off valve turned ON?

If nothing obvious turns up in a quick check, look a little further. Learning to recognize and describe symptoms will make repairs easier for you or a mechanic at the shop. Describe problems accurately and fully. Did the engine lose power gradually and miss before stopping or did it stop suddenly with a bang? What color smoke (if any) came from the exhaust and so on.

After the symptoms are defined, areas which could cause problems can be tested and analyzed. Guessing at the cause of a problem may provide the solution, but it usually leads to frustration, wasted time and a series of expensive, unnecessary parts replacements.

You do not need expensive equipment or complicated test gear to determine whether you should attempt repairs at home. A few simple checks could save a large repair bill and lost time while your ATV sits in a dealer's service department. On the other hand, be realistic and *do not attempt repairs that are beyond your abilities*. Service departments tend to charge heavily for putting together an engine that someone else has disassembled. Some shops won't even take such a job, so use common sense and don't get in over your head.

OPERATING REQUIREMENTS

An engine needs 3 basics to run properly: correct fuel/air mixture, sufficient compression and a spark at the right time (**Figure 1**). If one basic requirement is missing, the engine will not run. Ignition problems are a frequent cause of breakdowns and the ignition system can be quickly and easily checked. Keep that in mind before you begin tampering with carburetor adjustments.

If the ATV has been sitting for any length of time and refuses to start, check and clean the spark plug. Then check the condition of the battery (if so equipped) to make sure it is fully charged. If these are okay, then inspect to the gasoline delivery system. This includes the tank, fuel shutoff valve, fuel pump and fuel line to the carburetor. Gasoline deposits may have gummed up the carburetor's fuel inlet needle, jets and small air passages. Gasoline tends to lose its potency after standing for long periods and condensation may contaminate it with water. Drain the old gas and try starting with a fresh tankful.

EMERGENCY TROUBLESHOOTING

If the ATV is difficult to start or won't start, it does not help to tear up the rewind starter or drain the battery using the electric starter (on models so equipped). Check for obvious problems even before getting out your tools. Go down the following list step by step. Do each one; you may be embarrassed to find that the emergency stop switch is in the OFF position, but it is better than draining the battery. If the engine still will not start, refer to the appropriate troubleshooting procedure which follows in this chapter.

1. Is there fuel in the tank? Open the filler cap and rock the vehicle. Listen for fuel sloshing around.

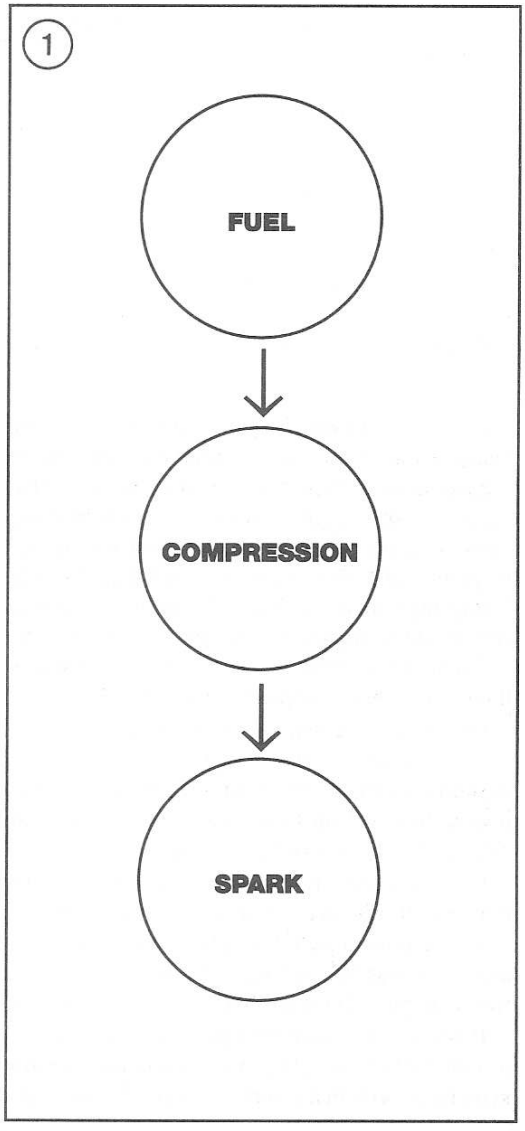
WARNING

Do not use an open flame to check in the tank. A serious explosion and fire will probably result.

2. Is the fuel shut-off in the ON position?
3. Make sure the emergency stop switch is not stuck in the OFF position.
4. Is the spark plug wire on tight? Push it on and rotate it slightly to clean the electrical connection between the spark plug and connector.
5. Is the starting enrichment (choke) knob in the correct position? A warm engine may be easily flooded by choking, but some engines may not start unless the mixture is enrichened. It helps to know the starting characteristics of the specific engine.

ENGINE STARTING

An engine that refuses to start or is difficult to start is very frustrating. More often than not, the problem



is very minor and can be found with a simple and logical troubleshooting procedure.

The following items show a beginning point from which to isolate engine starting problems.

Engine Fails to Start

Perform the following spark test to determine if the ignition system is operating properly.

1. Remove the spark plug.

NOTE

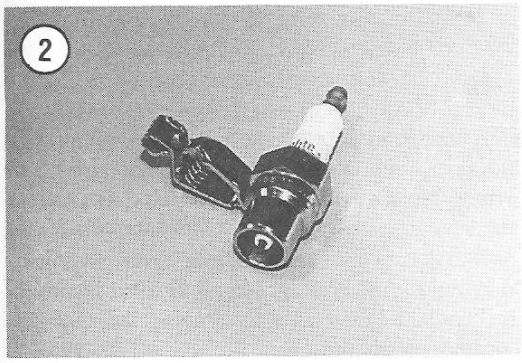
*A test plug (**Figure 2**) is a useful tool to check the ignition system. The clip makes attachment to a ground easier than a standard plug and the gap can be clearly viewed. Test plugs like the one shown are available from tool and parts suppliers that have ignition test equipment and service parts.*

2. Connect the spark plug wire and connector to the removed spark plug and touch the spark plug's base to a good ground like the bare aluminum of the engine cylinder head. Position the plug so that you can see the electrodes.

WARNING

If it is necessary to hold the high voltage lead, do so with an insulated pair of pliers. The high voltage generated by the ignition system could produce serious shocks that could be fatal.

3. Crank the engine with the electric or recoil starter and observe the spark plug electrodes exposed in Step 2. A fat blue spark should be evident across the electrodes.



4. If the spark is good, the problem is probably a lack of fuel, but check the condition of the installed spark plug. If the plug's condition is questioned, install a new spark plug of the correct type and heat range. Check to make sure the starting enrichment (choke) is in the correct position. Fuel must enter the cylinder, but the cylinder must not be flooded with fuel.
5. If the spark is not good or does not occur regularly, check the following possible causes.
   a. Loose electrical connections.
   b. Broken or shorted spark plug high tension lead.
   c. Shorted engine stop switch or connecting wires.
   d. Damaged ignition high tension coil.
   e. Damaged CDI unit.

Engine is Difficult to Start

Check for one or more of the following possible malfunctions:

a. Fouled spark plug.
b. Starting enrichment (choke) is incorrectly set.
c. Fuel system is contaminated.
d. Carburetor incorrectly adjusted.
e. Poor compression.
f. Incorrect type or damaged ignition high tension coil.
g. CDI unit faulty or improperly grounded.

Engine will not Crank

Check for one or more of the following possible malfunctions:

a. Recoil starter mechanism broken.
b. Discharged battery (models with electric starting).
c. Damaged electric starter, solenoid etc. (models with electric starting).
d. Internal engine damage, such as seized piston or crankshaft bearings.

ENGINE PERFORMANCE

In the following checklist, it is assumed that the engine runs, but is not operating at peak performance. This will serve as a starting point from which to isolate a performance problem.

The possible causes for each malfunction are listed in a logical sequence and in order of probability.

Engine is Hard to Start or Starts and Dies

a. Fuel tank empty or fuel tank vent is closed.
b. Obstructed fuel line, fuel shut-off valve or fuel filter.
c. Sticking carburetor float valve.
d. Carburetor incorrectly adjusted.
e. Improper operation of the starting enrichment (choke) valve.
f. Operator not allowing the engine to warm up before opening the throttle.
g. Fouled or improperly gapped spark plug.
h. Ignition timing incorrect.
i. Broken or damaged ignition coil.
j. Improper valve timing or improper valve clearance (4-stroke models).
k. Damaged reed valve (2-stroke models so equipped).
l. Clogged air filter element.
m. Contaminated fuel.
n. Engine flooded with fuel.
o. Damaged CDI unit.

Engine Will Not Idle or Irregular Idle

a. Carburetor incorrectly adjusted (either too lean or too rich).
b. Starting enrichment (choke) stuck or used improperly.
c. Fouled or improperly gapped spark plug.
d. Obstructed fuel line or fuel shut-off valve.
e. Vacuum leak between carburetor and cylinder.
f. Leaking compression (blown head gasket).
g. Incorrect ignition timing.
h. Improper valve timing or valve clearance (4-stroke models).
i. Low engine compression.

Engine Misses at High Speed

a. Fouled or improperly gapped spark plug.
b. Improper ignition timing.
c. Incorrect main jet installed.
d. Clogged carburetor jets.
e. Obstructed fuel line or fuel shut-off valve.
f. Incorrect valve timing (4-stroke models).
g. Damaged ignition coil or CDI unit.

Engine Overheating

a. Obstructed or broken cooling fins (air cooled models).
b. Obstructed radiator (liquid cooled models).
c. Low coolant level.
d. Improper ignition timing.
e. Improper spark plug heat range.
f. Vehicle overloaded.
g. Cooling fan not operating.
h. Fuel mixture too lean.

Engine Loses Power at Normal Riding Speed

a. Carburetor incorrectly adjusted.
b. Engine overheating.
c. Incorrect ignition timing.
d. Brake dragging (not releasing properly).

Engine Lacks Acceleration

a. Improperly adjusted carburetor (too lean).
b. Incorrect ignition timing.
c. Brake dragging.
d. Incorrect valve timing or valve clearance (4-stroke models).

Engine Backfires —Explosions in Muffler

a. Fouled or improperly gapped spark plug.
b. Incorrect ignition timing.
c. Contaminated fuel.
d. Lean fuel mixture.

ENGINE NOISES

A change in the sound is often the first clue that the rider notices indicating that something may be wrong. Noises are difficult to differentiate and even harder to describe. Experience is needed to diagnose sounds accurately, but identifying a problem quickly may reduce the cost of repair and some inconvenience. The following are some noises that may help locate sources of trouble.

Knocking or Pinging During Acceleration

a. Poor quality or contaminated fuel.
b. Spark plugs of the wrong heat range.

Slapping or Rattling Noise at Low Speed or During acceleration

a. May be piston slap caused by excessive piston-to-cylinder clearance.
b. May be caused by broken piston skirt.

Knocking or Rapping While Decelerating

May be caused by excessive (damaged) connecting rod bearing clearance.

Persistent Knocking and Vibration

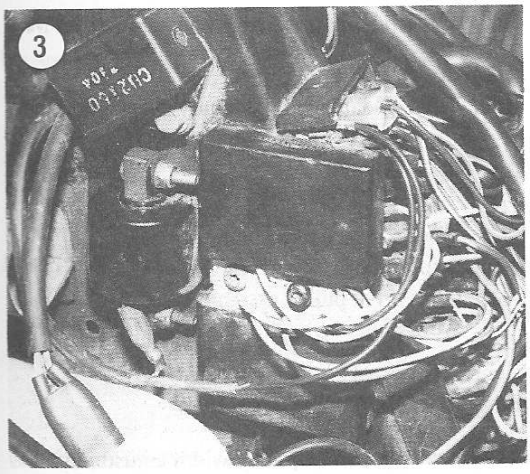
May be caused by excessive (damaged) main bearing clearance.

Rapid On-Off Squeal

a. Compression leak around the head gasket.
b. Loose spark plug and compression leak around plug.

EXCESSIVE VIBRATION

Most reports of excessive vibration result from the engine not attached securely to the vehicle frame. Also liquid cooled 350, 400 and 425 models are equipped with an internal engine balancer that may be assembled incorrectly.



TESTING ELECTRICAL COMPONENTS

Most dealers and parts houses will not accept returns of any electrical parts. When testing electrical components, make sure that you perform the test procedures as described in this chapter and that your test equipment is working properly. If a test result shows that the component is defective it is still a good idea to have the component retested by a Polaris dealer to verify the test result before purchasing a new component. Refer to **Figure 3**.

POWER TRAIN

The following items provide a starting point from which to troubleshoot power train malfunctions. The possible causes for each malfunction are listed in a logical sequence.

Low Engine Operating Speed (Engine Running Properly, but Lugs)

a. Drive pulley spring broken or wrong spring.
b. Drive pulley weight too heavy.
c. Belt slipping.

Engine Operating Speed Too High

a. Incorrect drive pulley spring.
b. Drive pulley weights too light.
c. Drive pulley binding.
d. Driven pulley binding.

Engine Speed Erratic During Speed or Load Changes

a. Drive pulley binding.
b. Driven pulley binding.
c. Pulley grooves worn.

Harsh Engagement

a. Drive belt worn (too narrow).
b. Incorrect pulley-to-pulley clearance adjustment.

Drive Belt Not Operating Smoothly in Primary Sheave

a. Drive pulley face is rough, grooved, pitted or scored.
b. Defective drive belt.

Uneven Drive Belt Wear

a. Misaligned drive and driven pulleys.
b. Loose engine mounts.

Glazed Drive Belt

a. Excessive slippage. May be caused by stuck brakes.
b. Engine idle speed too high.

Drive Belt Too Tight at Idle

a. Engine idle speed too high.
b. Incorrect distance between pulleys.
c. Incorrect belt length.

Drive Belt Edge Cord Failure

a. Misaligned drive and driven pulleys.
b. Loose engine mounts.

Drive Belt Turns Over

a. Incorrect belt.
b. Incorrect belt alignment.
c. Engine mount broken or loose.

Brake Not Holding Properly

a. Incorrect brake adjustment.
b. Worn brake pads.
c. Worn brake disc.
d. Oil saturated brake pads.
e. Sheared key on brake disc.
f. Air in hydraulic lines on models with hydraulic brakes.

Brake Not Releasing Properly

a. Weak or broken return spring.
b. Bent or damaged brake lever.
c. Incorrect brake adjustment.

Excessive Chain Noise

a. Incorrect chain tension.
b. Excessive chain stretch.
c. Worn sprocket teeth.
d. Damaged chain and/or sprockets.

Chain Slippage

a. Incorrect chain tension.
b. Excessive chain stretch.
c. Worn sprocket teeth.

Leaking Transmission

a. Loose bolts.
b. Damaged gasket.
c. Damaged oil seal(s).
d. Cracked or broken case.

Rapid Chain and Sprocket Wear

a. Misaligned sprockets.
b. Incorrect chain tension.

Drive Clutch Engages Before Specified Engagement RPM

a. Worn spring.
b. Incorrect weight.

Drive Clutch Engages After Engagement RPM

a. Incorrect spring.
b. Worn or damaged secondary sheave buttons.

Erratic Shifting

a. Worn rollers and bushings.
b. Scuffed or damaged weights.
c. Dirty drive pulley assembly.
d. Worn or damaged driven pulley ramp buttons.

Engine Bogs During Engagement

a. Incorrect driven pulley width adjustment.

b. Drive belt worn too thin.
c. Incorrect distance between drive and driven pulleys.

Drive or Driven Pulley Sticks

a. Damaged pulley assembly.
b. Moveable pulley damaged.
c. Dirty pulley assembly.

STEERING

Descriptions of handling problems are subjective, but the following items will provide a starting point from which to troubleshoot handling and steering problems. Some possible causes for each malfunction are listed in a logical sequence.

Generally Poor or Unpredictable Handling

a. Improper tire inflation pressure.
b. Improperly adjusted wheel alignment.
c. Worn or damaged steering components.
d. Worn or damaged suspension components.
e. Bent or broken frame.

Loose Steering

a. Loose steering post, bushings or steering column fasteners.
b. Loose tie rod ends.
c. Worn spindle bushings.

Unequal Steering

a. Improperly adjusted tie rods.
b. Improperly adjusted steering stops.
c. Damaged steering components.

Steering Wanders

a. Loose or worn steering components.
b. Improperly adjusted toe-out.
c. Worn or damaged tires.
d. Damaged shock absorber.
e. Bent or broken frame.

ENGINE ELECTRICAL SYSTEM TROUBLESHOOTING

All models are equipped with a capacitor discharge ignition system. This section describes complete ignition and charging system troubleshooting.

This solid state system uses no contact breaker points or other moving parts. Because of the solid state design, problems with the capacitor discharge system are relatively few. Problems are usually limited to no spark, but that lack of spark might only occur when the engine is subjected to certain temperatures, loads or vibrations. It is often easier to find the cause of no spark than those with intermittent problems. If the ignition has no spark, first check for broken or damaged wires. Also make sure that the engine stop switch wires are not shorted to ground.

Test Equipment

Basic testing of the ignition and electrical system can be performed with an accurate ohmmeter. A visual inspection and tests with an ohmmeter will usually pinpoint electrical problems caused by dirty or damaged connectors, faulty or damaged wiring or electrical components that may have cracked or broken. If basic checks fail to locate the problem, take your ATV to a Polaris dealer and have them troubleshoot the electrical system.

Precautions

Certain measures must be taken to protect the capacitor discharge system while testing. Instantaneous damage to semiconductors in the system will occur if the following is not observed.

1. Do not crank the engine if the CDI unit is not grounded to the engine.
2. Do not touch or disconnect any ignition components if the engine is running or while the battery cables are connected.
3. Keep all connections between the various units clean and tight. Be sure that the wiring connectors are pushed together firmly.

Troubleshooting Preparation

Refer to the wiring diagram for your model at the end of this book when performing the following.

NOTE

To test the wiring harness for poor connections in Step 1, bend the molded rubber connector while checking each wire for resistance.

1. Check the wiring harness for visible signs of damage.
2. Make sure all of the connectors (**Figure 4**) are properly attached as follows:

NOTE

*Never pull on the wires when separating an electrical connector. Pull only on the housing of the connector. See **Figure 5**.*

a. Disconnect each electrical connector in the ignition circuit. Check for bent or damaged male connector pins (**Figure 6**). A bent pin will not connect properly and will cause an open circuit.

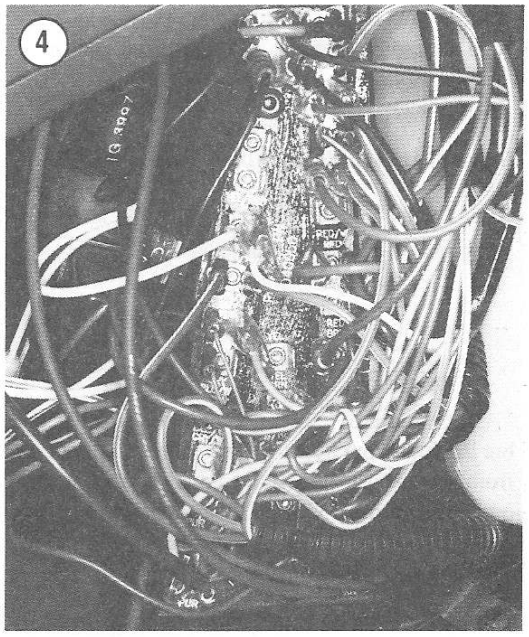
b. Check each female connector end. Make sure the metal connector at the end of each wire (**Figure 7**) is pushed all the way into the plastic connector. If not, use a small, narrow blade screwdriver to carefully push them in. Make sure you do not pinch or cut the wire. Also, make sure that you do not spread the connector.

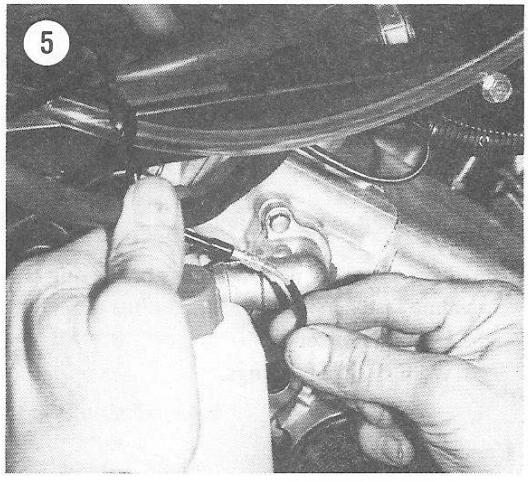
c. Check the wires to make sure that each is properly attached to a metal connector inside the plastic connector.

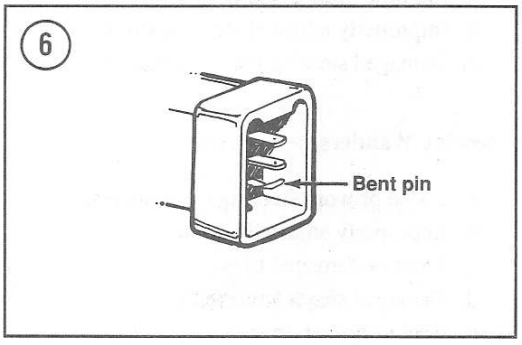
d. Make sure all electrical connectors are clean and free of corrosion. If necessary, clean the connectors with an electrical contact cleaner.

e. After making sure that all of the individual connectors are alright, push the connectors together until they "click." Make sure they are fully engaged and locked together (**Figure 8**).

3. Check all electrical components for a good ground to the engine.
4. Check all wiring for short circuits or open circuits.
5. Make sure the fuel tank has an adequate supply of fresh fuel and that the oil tank is properly filled.
6. Check spark plug cable routing (**Figure 9**) and be sure the cable is properly connected to spark plug.

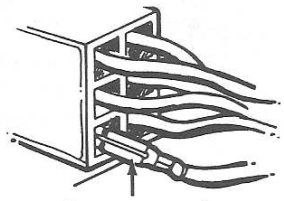






– Bent pin

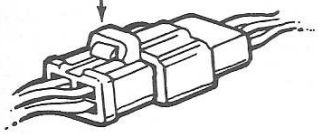
7



Loose connector

8

Locked



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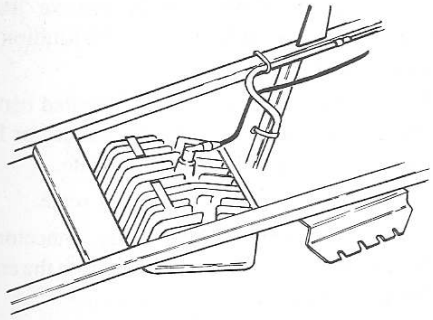
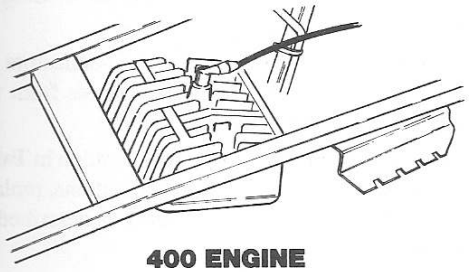
300 ENGINE



→ FRONT



400 ENGINE

CAUTION

To prevent expensive engine damage, refer to CAUTION under ***Spark Plug Removal*** *in Chapter Three.*

7. Remove the spark plug and check its condition. See Chapter Three.
8. Make the following spark test:

WARNING

During this test do not hold the spark plug, wire or connector with fingers or a serious electrical shock may result. If necessary, use a pair of insulated pliers to hold the spark plug wire.

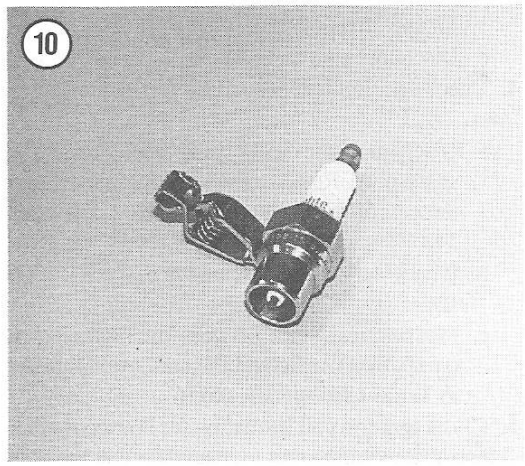
a. Remove the spark plug.

NOTE

A special test plug such as the one shown in ***Figure 10*** *is available from many parts suppliers. The clip can be attached to a good engine ground.*

b. Connect the spark plug cable connector to a spark plug that is known to be good (or the test plug) and touch the base of the spark plug base to a good ground like the engine cylinder head. Position the spark plug so you can see the electrode.
c. Turn the ignition switch ON and set the cut-out switches to the ON position.
d. Crank the engine with the starter. A fat blue spark should be evident across the spark plug electrode.

10



e. If there is no spark or only a weak one, check for loose connections at the coil. If all external wiring connections are good, check the remaining components of the ignition system.
f. Turn the ignition switch OFF.

Switch Tests

Test the ignition switch and the emergency cut-out switch as described in Chapter Eleven.

Ignition Component Resistance Test

An accurate ohmmeter is required to perform the following tests. Refer to **Figure 11** for 1985-1988 models with 250, 300 and 350L engines, **Figure 12** for models with 400L engine or **Figure 13** for Magnum models with 4-stroke engine.

Ignition high tension coil

Refer to **Figure 14.**

1. Locate the ignition high tension coil. It is attached to the frame above the engine. The coil is located under the headlight cover on late models.
2. Disconnect the black/yellow or black/white primary connector (A, **Figure 14**) from the high tension coil.
3. Check ignition coil primary resistance as follows:
   a. If necessary, switch ohmmeter to the R × 1 scale.
   b. Measure resistance between the small primary terminal and the coil ground. Refer to **Table 1** for specifications.
   c. Disconnect the meter leads.
4. Check ignition coil secondary resistance as follows:
   a. Disconnect the spark plug cable from the spark plug. Remove the spark plug cap from the end of the high-tension cable (B, **Figure 14**).
   b. If necessary, switch ohmmeter to the R × 1000 scale.
   c. Measure resistance between the high-tension (spark plug) cable and the coil ground. Refer to **Table 1** for specifications.
5. Check ignition coil insulation for cracks or other defects that would permit moisture to enter the coil. Internal damage can be checked using additional test equipment. If condition is questioned, take the coil to a Polaris dealer for additional tests.
6. If resistance test results are not as specified in Steps 3-5, the coil is probably faulty. Have the dealer recheck the coil to verify that the unit is faulty before buying a replacement.

NOTE

Normal resistance in both the primary and secondary (high-tension) coil winding is not a guarantee that the unit is working properly; only an operational spark test can tell if a coil is producing an adequate spark from the input voltage. A Polaris dealer may have the equipment to test the coil's output. If not, substitute a known good coil to see if the problem is fixed.

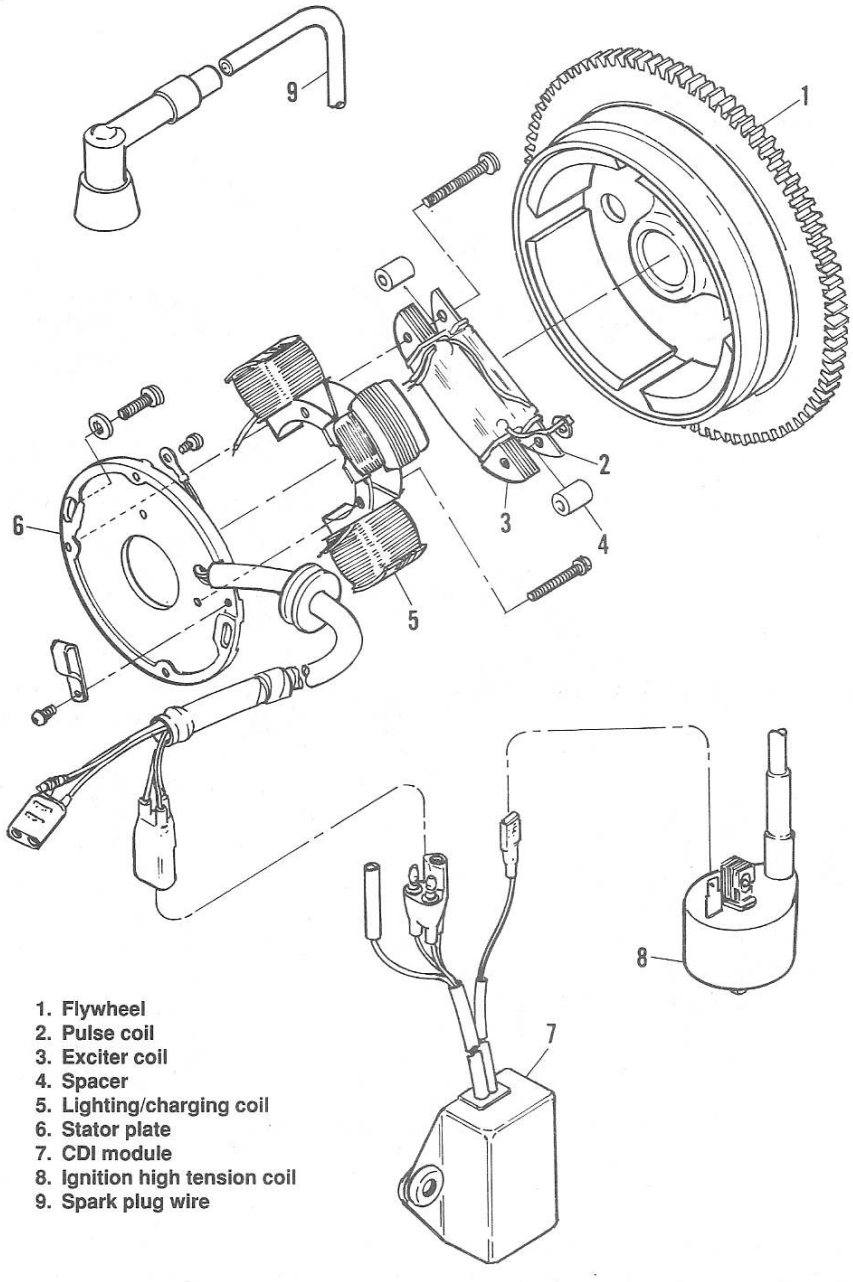
Ignition system exciter and pulser coils (1885-1987 models)

The ignition system is equipped with an exciter coil and a pulser coil attached to the stator plate located behind the engine flywheel.

1. Locate the three wires and connector leading from under the engine flywheel to the ignition CDI ignition module.
2. Separate the 3-prong connector located between the engine and the CDI unit. This connector has 3 wires: white, black/red and brown/white.
3. Switch the ohmmeter to the R × 1 scale.
4. Attach the ohmmeter between the connectors for the brown/white and the white wires from the engine to check the exciter coil.
5. Compare the reading to the specification in **Table 2.** If the reading is not within specifications, replace the exciter coil assembly as described in Chapter Eleven.
6. Attach the ohmmeter between the connectors for the brown/white and the black/red wires from the engine to check the pulser coil.
7. Compare the reading to the specification in **Table 2.** If the reading is not within specifications, replace the Pulser and Exciter coil assembly as described in Chapter Eleven.
8. Reconnect the 3-prong connector.

(11)

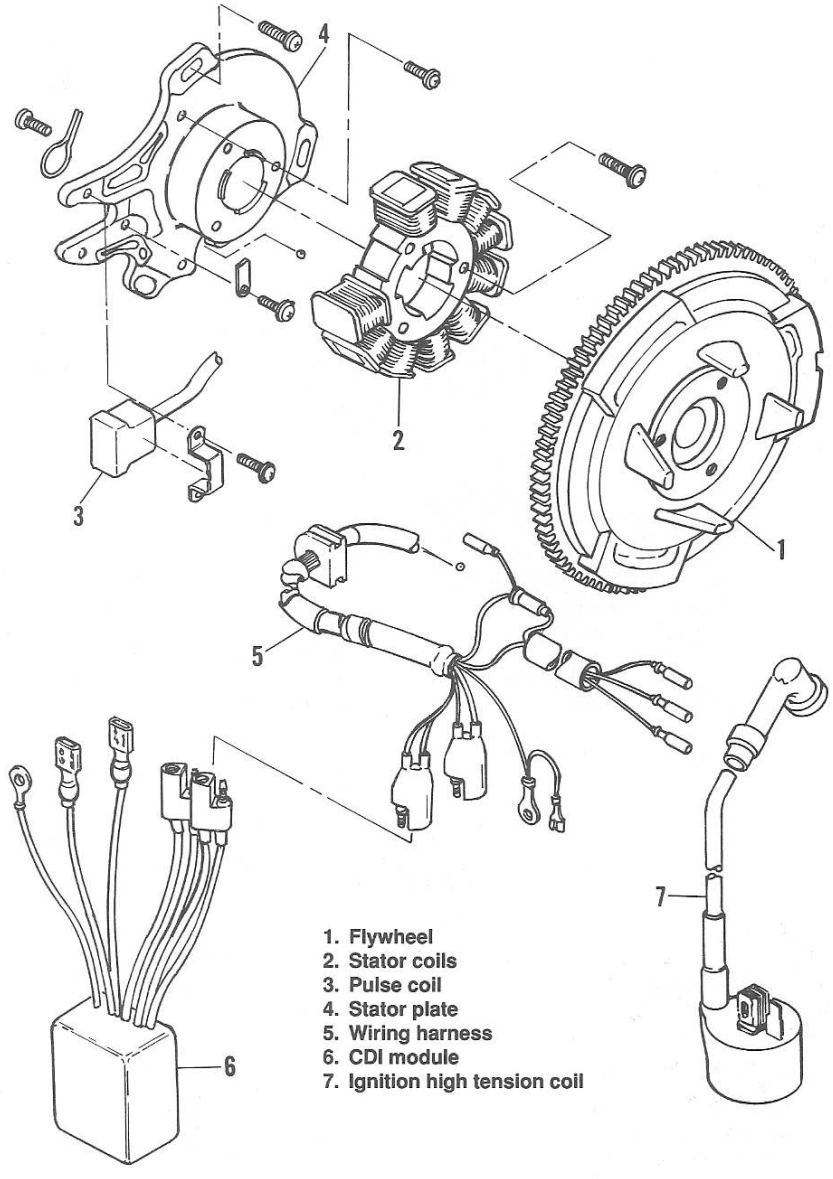
IGNITION (TYPICAL)
1985-1988 250 AND ALL 300 AND 350L MODELS



1. Flywheel
2. Pulse coil
3. Exciter coil
4. Spacer
5. Lighting/charging coil
6. Stator plate
7. CDI module
8. Ignition high tension coil
9. Spark plug wire

(12)

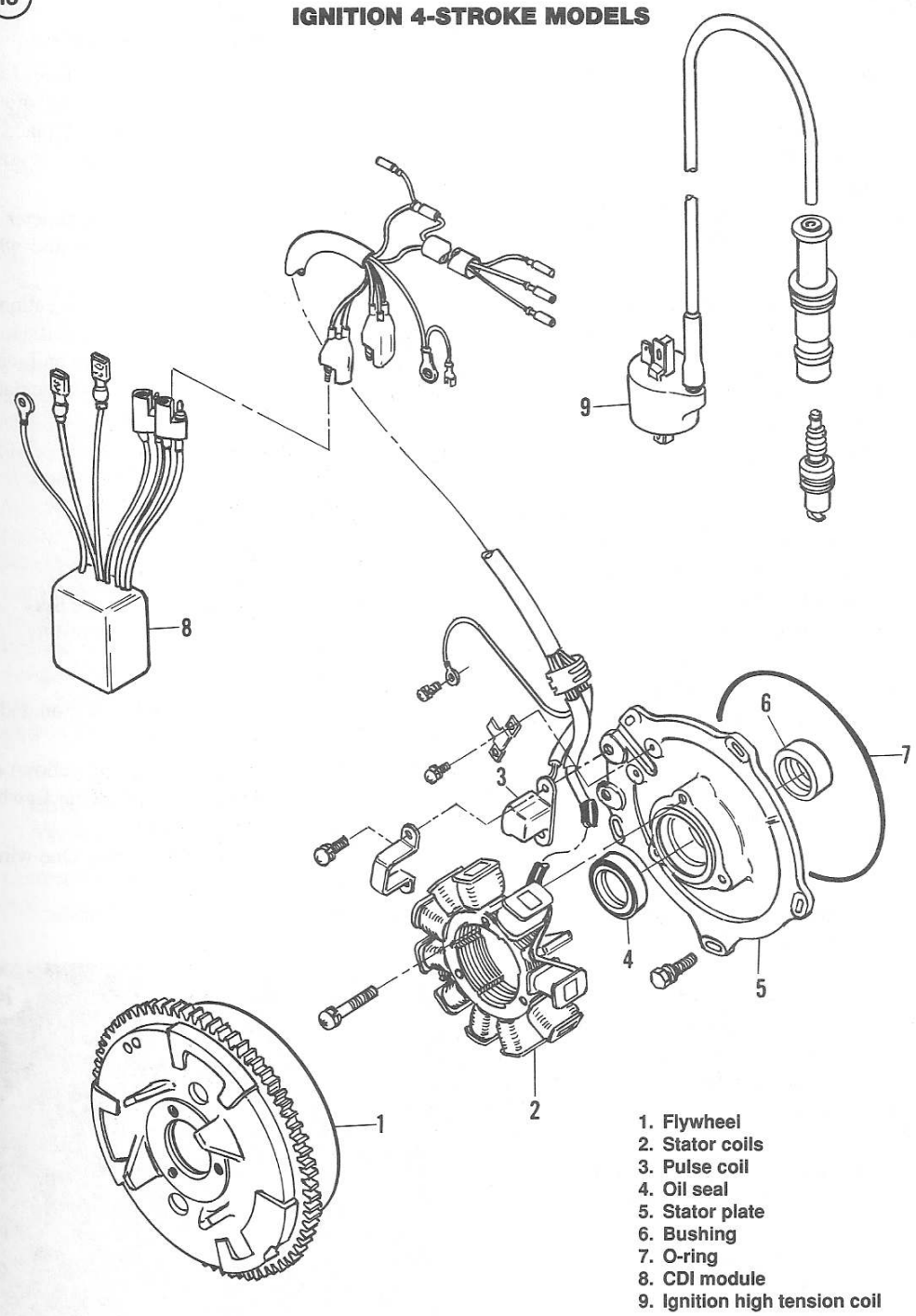
IGNITION 400L MODELS



1. Flywheel
2. Stator coils
3. Pulse coil
4. Stator plate
5. Wiring harness
6. CDI module
7. Ignition high tension coil

(13)

IGNITION 4-STROKE MODELS



1. Flywheel
2. Stator coils
3. Pulse coil
4. Oil seal
5. Stator plate
6. Bushing
7. O-ring
8. CDI module
9. Ignition high tension coil

Ignition system exciter coil (all 1988-on models with 150 watt alternator)

The ignition system is equipped with a single coil assembly that includes both the exciter coil (3, **Figure 11**) and the pulse coil (2, **Figure 11**). This coil assembly is attached to the stator plate located behind the engine flywheel.

1. Locate the three wires and connector leading from under the engine flywheel to the ignition CDI module.
2. Separate the connector located between the engine and the CDI unit. This connector contains the black/red and brown/white wires.
3. Switch the ohmmeter to the R × 1 scale.
4. Attach the ohmmeter between the brown/white and the black/red wires(end) from the engine to check the exciter coil.
5. Compare the reading to the specification in **Table 2**. If the measured resistance is not within specifications, replace the exciter/pulse coil assembly as described in Chapter Eleven.
6. Attach the ohmmeter between the connector for the black/red wire from the magneto and a good engine ground to test for a short circuit.
7. The test in Step 6 should indicate an open circuit (infinite resistance). If not, check the connecting wires for damage or replace the coil assembly as required.
8. Reattach the connectors.

Ignition system exciter and pulser coils (all models with 200 watt alternator)

The 400 and Magnum models equipped with 200 watt alternators are equipped with ignition system exciter and pulser coils attached to the stator plate. Magnum models are equipped with 2 exciter coils which must be tested separately. Refer to **Figures 12** and **13**.

1. Locate the wires leading from under the engine flywheel to the ignition CDI modlule. Locate the wire connectors.
2. Separate the wiring connectors located between the engine and CDI unit.
3. Switch the ohmmeter to the R × 1 scale.
4. Attach the ohmmeter between the connectors for the red and the black/red exciter coil wires.
5. Compare the reading of the specification in **Table 2**. If the resistance is not within specification, replace the exciter coil as described in Chapter Eleven.
6. On Magnum models, move the ohmmeter leads to the red and green exciter coil wires. Compare the reading to the specification in **Table 2**. Replace the exciter coil (Chapter Eleven) if resistance is not as specified.
7. To test the pulser coil, attach the ohmmeter between the connectors for the white/red and white wires leading from the engine.
8. Compare the resistance to the specification in **Table 2**. If the resistance is not within specification, inspect the pulser coil wires for damage and repair as necessary. If the wires are good, replace the pulser coil as described in Chapter Eleven.
9. Reattach all connectors.

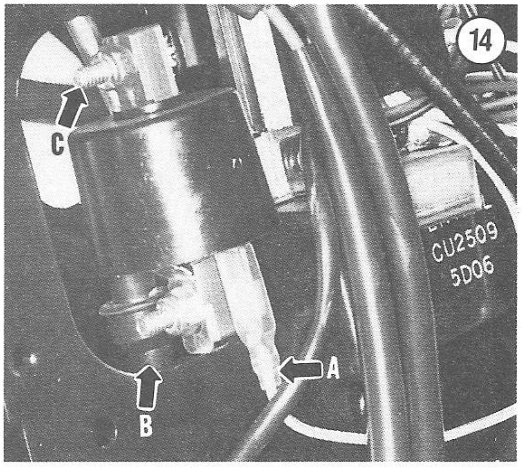
Lighting coil (1985-1992 models)

NOTE

*Refer to Chapter Eleven **Electrical Systems** for battery charging system testing and service procedures.*

The lighting coil on these models is mounted on the stator plate behind the flywheel.

1. Locate the 2 wires (yellow/red and yellow) and connector leading from under the engine flywheel connected to a two wire connector.
2. Disconnect the two wire connector. One wire is yellow and the other is yellow/red.
3. Switch the ohmmeter to the R × 1 scale.



4. Attach the ohmmeter between the yellow/red and yellow wires leading from the engine.
5. Compare the reading to the specification in **Table 3**. If the reading is not within 10% of the listed specification, replace the lighting coil assembly as described in Chapter Eleven.
6. Reattach the wire connectors.

VOLTAGE REGULATOR

NOTE
Be sure the lighting coil is operating properly before testing the voltage regulator.

If you are experiencing blown bulbs or if all of the lights are dim (filaments barely light), test the voltage regulator as follows. In addition, check the bulb filament; an overcharged condition will usually melt the filament rather then break it.

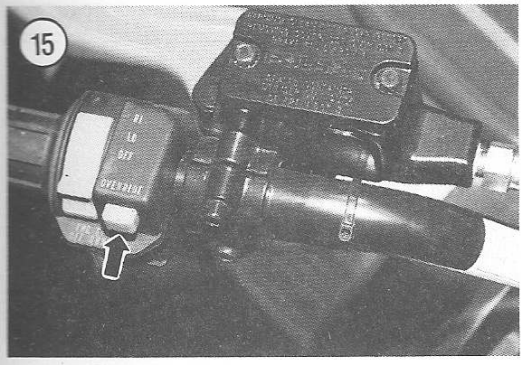
1. Lift the front and rear of the vehicle, so that all wheels are off the ground. Block the position of the vehicle so that it is not able to move.
2. Locate the voltage regulator and remove the covers necessary to attach voltmeter leads to the wires attached to the voltage regulator.
3. Set the voltmeter to the 25 volt DC scale, then connect the black (negative) voltmeter lead to a good ground on the vehicle frame.

NOTE
Do not disconnect leads from the voltage regulator when testing voltage output.

4. Connect the other (positive/red) voltmeter lead to the voltage regulator red wire.

WARNING
When performing the following steps, be sure that the area is clear and that no one walks behind the vehicle or serious injuries may result.

5. Have an assistant start the engine. When starting the engine, do not use the throttle to increase the engine speed more than necessary.
6. Slowly increase the engine rpm and observe the voltmeter reading. If the voltmeter indicates less than 13 volts or more than 14.6 volts, replace the voltage regulator.
7. Turn the engine off and disconnect the voltmeter.
8. Lower the ATV to the ground.



SPEED LIMITER

The reverse speed limiter is installed to prevent engine (and vehicle) speeds that are too fast for safe operation in reverse. The *OVERRIDE* switch (**Figure 15**) located on the left side of the handlebar permits the rider to manually override the safety speed limiting feature. In addition, some 1989 and later ATV's incorporate a safety feature called ETC (Electronic Throttle Control). If the throttle should stick at any position other than idle, the operator can return the throttle lever to idle. A switch incorporated into the throttle lever will energize the white wire to the speed limiter and prevent engine speeds above that of clutch engagement; thus preventing the vehicle from moving. Several different units have been used, so it is important to install the correct unit when replacing an old unit.

Many problems that cause a spark related miss are incorrectly blamed on the speed limiter. A quick check of the speed limiter can be accomplished by temporarily detaching the black wire from the speed limiter unit. If the engine operates satisfactorily with the black wire disconnected, first check the associated switches and wiring. Refer to the appropriate wiring diagrams. Repair or replace wiring, switches, or speed limiter as required. The speed limiter is a valuable safety device and the ATV should not be operated with the speed limiter disconnected or removed.

Throttle Lever Switch

To test the throttle lever switch (**Figure 16**) used on 1989 and later models, proceed as follows:

1. Disconnect the wires from the throttle lever switch.

2A. If the switch has two wires, proceed as follows.

a. Attach an ohmmeter to the white and red/white wires attached to the switch.
b. Move the throttle lever and check continuity between the white and red/white wires. Switch should be open (no continuity) when the throttle is open and closed (continuity) when the throttle is closed.

2B. If the switch has three wires, proceed as follows.

a. Attach an ohmmeter to the gray/white wire and to the red/white wire.
b. Move the throttle lever and check continuity between the gray/white wire and to the red/white wire. Switch should be open (no continuity) when the throttle is closed and closed (continuity) when the throttle is open.

3. If the throttle lever switch fails any of these tests, install a new switch.

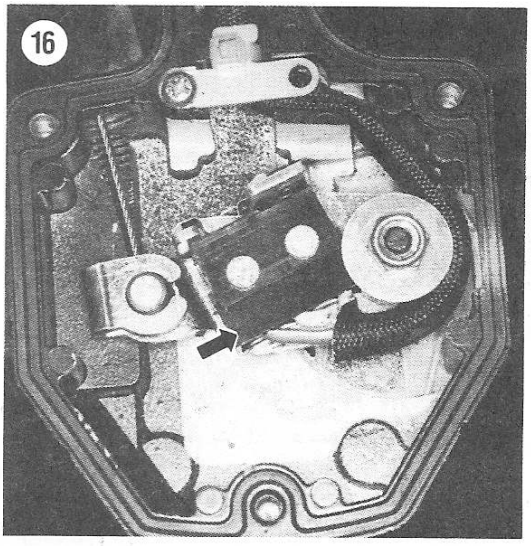


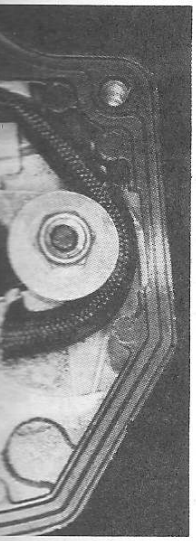
Table 1 IGNITION HIGH TENSION COIL

	Primary resistance	Secondary resistance *
1985-1995	0.3 ohms	6.3 K ohms

* With the spark plug cap removed. Coil secondary resistance should not be tested with the spark plug cap installed. The resistance of the cap used on late models is 3.7-6.3 K ohms.

Table 2 IGNITION GENERATING COIL

	Resistance
1985-1987	
Pulser (black/red to brown/white)	23 ohms
Exciter (brown white to white)	120 ohms
1988-1995 (except 400 and 425 engines with 200 Watt)	
Stator coil (black/red to brown/white)	120 ohms
1994-1995 (400 engines with 200 Watt)	
Pulser (white/red to white)	97 ohms
Exciter (black/red to brown/white)	226 ohms
1995 (425 engines)	
Pulser (white/red to white)	97 ohms
Exciter (red to green)	3.2 ohms
Exciter (black/red to brown/white)	450 ohms



he spark plug cap

Table 3 LIGHTING COIL

	Resistance
1985-1988 with 100 watt alternator	
Models without battery	
(yellow to yellow/red or brown)	0.45-0.60 ohms
Models with battery	
(yellow/red to yellow)	0.45-0.60 ohms
1989-on with 150 watt alternator	
250, 300, 350 & 400 engines	
(yellow/red to yellow)	0.25-0.35 ohms
400 & 425 engines with 200 watt alternator	
(yellow/red to yellow)	0.34 ohms
(yellow/brown to yellow)	0.17 ohms

Table 4 REVERSE SPEED LIMITER

	Low limit	High limit	ETC* limit
1987			
Trail Boss**			
Type LR40 (4060079)	3,200 rpm	4,800 rpm	–
Cyclone			
Type LR41 (4060081)	4,650 rpm	–	–
1988			
All models except R/ES			
Type LR42 (4060082)	3,400 rpm	–	–
Trail Boss R/ES			
Type LR43 (4060084)	3,900 rpm	–	–
1989-1993			
All models except Trail Blazer			
Type LR44 (4060085)	3,400 rpm	–	1,800 rpm
1990-early 1991 Trail Blazer			
Type LR-41-1 (4060089)	–	–	1,900 rpm
Late 1991-1993 Trail Blazer			
(with F/N/R transmission)			
Type LR47 (4060093)	3,500	–	1,900
1994-1995			
Trail Blazer (1994)			
Type LR47 (4060093)	3,500	–	1,900
Sport models			
Type LR49 (4060114)	2,800	–	1,200
All 400 models except Sport, Scrambler and 425			
Type LR44-2 (4060112)	3,400	–	1,200

* Electronic Throttle Control.
** The LR40 unit can be retrofitted to earlier models.

CHAPTER THREE

LUBRICATION, MAINTENANCE, AND TUNE-UP

Your Polaris ATV requires periodic maintenance to operate efficiently without breaking down. This chapter covers the regular maintenance required to keep your ATV in top shape. Regular, careful maintenance is the best guarantee for a trouble-free, long lasting vehicle. All-terrain vehicles are high-performance vehicles that demand proper lubrication, maintenance and tune-ups to maintain a high level of performance, extend engine life and extract the maximum economy of operation.

You can do your own lubrication, maintenance and tune-ups if you follow the correct procedures and use common sense. Always remember that damage can result from improper tuning and adjustment. In addition, where special tools or testers are called for during a particular maintenance or adjustment procedure, the tool should be used or you should refer service to a qualified Polaris dealer or repair shop.

The following information is based on recommendations from Polaris that will help you keep your ATV operating at its peak level.

Tables 1-11 are at the end of this chapter.

PRE-RIDE CHECKS

The following checks should be performed before the first ride of the day. Refer also to **Table 1**.

1. Inspect all fuel lines and fittings for leakage. Repair any leaks and clean up any spilled fuel.
2. Make sure the fuel tank is full of fresh gasoline.
3. Make sure the engine oil levels are correct. Add the correct type of oil if necessary.
   a. Engine oil injection reservoir (2-stroke models).
   b. Engine counterbalancer compartment (350L and 400L liquid cooled 2-stroke models).

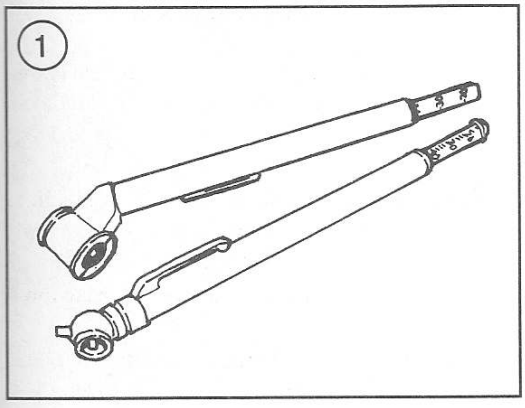
c. Engine oil reservoir (4-stroke models).

4. Make sure the transmission oil level is correct. Add the correct type of oil if necessary. Refer to **Table 4**.
5. Inspect cooling system before starting the engine.
   a. On liquid cooled models, check coolant level. If level is low, determine the cause of fluid loss. Also, make sure the outside of the radiator is clean.
   b. On air cooled models, make sure the cooling fins are clean.
6. Make sure the air filter is clean.
7. Check the throttle lever, brake lever and brake pedal for proper operation.
8. Check the brake fluid level (models with hydraulic brakes) of each master cylinder reservoir.
9. Check the front and rear suspension for proper operation and freedom of movement.
10. Check the drive chain(s) for excessive wear and correct tension. Adjust tension if necessary.
11. Check inflation of all tires. Refer to **Table 2**.
12. Check exhaust system for looseness or damage.
13. Check front wheel drive oil (models with front wheel drive).
14. Check wheels for tightness.
15. Check all lights, switches and other electrical systems for proper operation.
16. Make sure all fasteners are tight.

SERVICE INTERVALS

The service intervals shown in **Table 3** will help ensure long service under normal operating condition. However, if the vehicle is run in extremely dusty or wet conditions, service should be more frequent.

For convenience when maintaining your vehicle, most of the services listed in **Table 3** are described in this chapter; however, the text may refer you to another chapter for more complex service.



TIRES AND WHEELS

Tire Pressure

Tire pressure should be checked and adjusted to maintain the smoothness of the tire, good traction and handling and to get the maximum life from the tire. The recommended tire pressure of 20.7-34.5 kPa (3-5 psi) is too low to be measured with a standard tire pressure gauge. Inexpensive, accurate, low pressure gauges (**Figure 1**) can be purchased from your Polaris dealer that can be carried in your tool box or on the ATV.

The tire pressures recommended in **Table 2** are for the type and size of tires originally installed on your Polaris. If you have installed different tires, follow the tire pressure recommendation specified by the tire manufacturer.

WARNING

Always inflate both tires on the same axle to the same pressure. If the ATV is operated with unequal air pressures on opposite sides of the same axle, the vehicle will pull to one side and will handle poorly.

CAUTION

Do not overinflate the tires because they will be permanently distorted and damaged. If overinflated, they may bulge out similar to inflating an inner tube that is not within the constraints of a tire. If this happens the tire will ***not*** *return to its original contour.*

Tire Inspection

The tires take a lot of punishment. Inspect them frequently for wear, cuts, abrasions or other damage. If you find a nail or other object in the tire, mark its location with a light colored crayon before removing it. This will help you locate the hole for repair. Refer to Chapter Twelve for tire changing and repair information.

Measure the height of the tire tread (**Figure 2**) with a ruler. To obtain an accurate measurement of tire wear, measure a number of different knobs around the tire. If your inspection and measurements indicate that the tire is worn out, replace it as described in Chapter Twelve.

WARNING

Do not ride your vehicle with worn out or damaged tires. Flat, worn out or damaged tires can cause you to lose control of the ATV. Replace excessively worn or damaged tires immediately.

Rim Inspection

Inspect the condition of the wheel rims frequently, especially on the outer side. If the wheel has hit a tree or large rock, rim damage may be sufficient to cause an air leak. A bent wheel may also cause severe misalignment and vibration, resulting in an unsafe riding condition.

Make sure wheel mounting nuts are all in place and tight. Do not operate the vehicle if any of the wheel mounting studs are broken or missing or if any of the wheel mounting nuts are missing or loose.

BATTERY

All electric start models are equipped with a battery. In addition to checking and correcting the electrolyte level, the exterior of the battery, should be cleaned on a regular basis.

NOTE

Recycle your old battery. When you replace the old battery, be sure to turn in the old battery at that time. The lead plates and the plastic case can be recycled. Most ATV dealers will accept your old battery in trade when you purchase a new one. Never place an old battery in your household trash. It is illegal, in most states, to place any acid or lead (heavy metal) in landfills. There is also the danger of the battery being crushed in the trash truck and spraying acid on the truck or landfill operator.

Safety Precautions

When working with batteries, use extreme care to avoid spilling or splashing the electrolyte. This solution contains sulfuric acid, which can ruin clothing and cause serious chemical burns. If any electrolyte is spilled or splashed on clothing or skin, immediately neutralize it with a solution of baking soda and water, then flush with an abundance of clean water.

WARNING

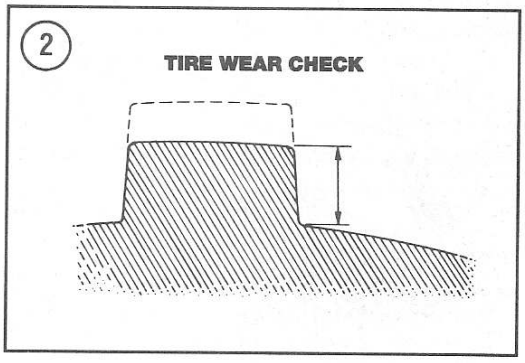
Electrolyte splashed into the eyes is extremely harmful. Safety glasses should always be worn while working with batteries. If electrolyte enters eyes, call a physician immediately, then force your eyes open and flood them with cool clean water for approximately 15 minutes.

If electrolyte is spilled or splashed onto any surface, it should be neutralized immediately with a baking soda and water solution, then rinsed with clean water.

While batteries are being charged, highly explosive hydrogen gas forms in each cell. Some of this gas escapes through the filler cap openings and may form an explosive atmosphere in and around the battery. This condition can persist for several hours. Sparks, an open flame or a lighted cigarette can ignite the gas, causing an explosion and possible personal injury.

Take the following precautions to prevent an explosion:

1. Do not smoke or permit any open flame near any battery being charged or which has been recently charged.



2. Do not disconnect live circuits at the battery terminals since a spark usually occurs when a live circuit is broken.

3. Take care when connecting or disconnecting any battery charger. Be sure its power switch is OFF before making or breaking any connections. Poor connections are a common cause of electrical arcs which cause explosions.

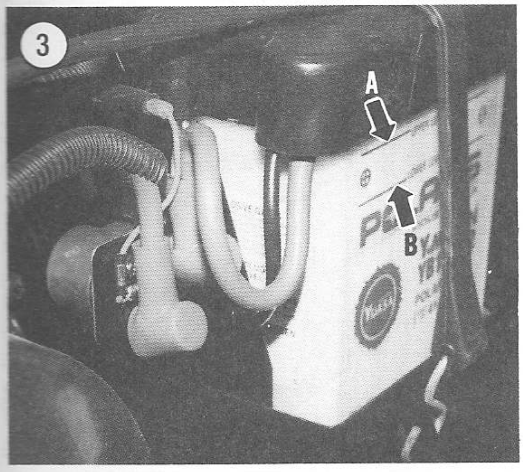
4. Keep children and pets away from charging equipment and batteries.

For maximum battery life, check the electrolyte level and state of charge periodically. Also, check the battery and connections for corrosion. In hot, dry climates check the battery more frequently. The electrolyte level should always be between the 2 marks (A and B, **Figure 3**). The electrolyte level for each cell can be seen through the battery case. If the electrolyte is below the level of the lower mark in one or more cells, add distilled water as required. To ensure proper mixing of the water and acid, operate the engine or charge the battery immediately after adding water. *Never* add battery acid instead of water—this will shorten the battery's life.

On all models covered in this manual, the negative (–) terminal of the battery is grounded. When removing the battery, disconnect the grounded negative (–) cable before detaching the positive (+) cable. This will minimize the chances of a tool shorting to ground when disconnecting the "hot" positive cable.

WARNING

When performing the following procedure, protect your eyes, skin and clothing. If electrolyte gets in your eyes, flush your eyes thoroughly with clean water and get prompt medical attention.



Battery Removal

The battery (**Figure 3**) is located under the left rear fender of models so equipped and provides power for electric starting. Observe the following when removing the battery:

1. Clean the battery case.
2. Disconnect the negative (–) battery lead from the battery before disconnecting the positive (+) lead.
3. Remove the battery hold down strap.
4. Detach the positive (+) lead from the battery terminal.
5. Lift the battery from the battery box (carrier).
6. Clean all dirt and corrosion from the outside of the battery case and from the battery box.

Battery Inspection and Servicing

The electrolyte level can be checked without removing the battery, but it should be removed and cleaned if electrolyte is added or if specific gravity is checked. The electrolyte level is visible through the battery case. Clean the battery case and observe the height of the fluid level in each cell. Maintain the electrolyte level between the 2 marks on the case (A and B, **Figure 3**). If the electrolyte level is low, remove and clean the battery thoroughly before servicing it.

1. Inspect the pad at the bottom of the battery box (carrier) for contamination or damage. Clean the battery box and pad with a solution of baking soda and water. Dry any bare metal, then repaint to protect surfaces from additional damage.
2. Check the entire battery case for cracks or other damage. If the battery case is warped, discolored or has a raised top, the battery has been overcharged or overheated.
3. Check the battery hold-down strap for acid damage, cracks or other damage. Replace the hold-down strap if required.
4. Check the battery terminal bolts, spacers and nuts for corrosion or other damage. Clean the parts in a solution of baking soda and water. Replace damaged parts.

NOTE

Keep cleaning solution out of the battery cells or the electrolyte will be seriously weakened.

5. Clean the top of the battery with a stiff bristle brush and water. If necessary, a solution of baking soda and water can be used to help clean, but be careful not to contaminate the electrolyte in the battery's cells with either soap or the baking soda solution.
6. Check the battery cable terminal ends for corrosion or other damage. If corrosion is minor, clean the battery cable clamps with a stiff wire brush. Install new cables if terminal ends or cables are severely damaged.

NOTE

Do not overfill the battery cells in Step 7. The electrolyte expands due to the heat of charging and will overflow if the level is above the upper level line.

7. Remove the caps from the battery cells and add distilled water, if necessary, to raise the level between the upper and lower level lines on the battery case.

Battery Testing

The best way to check the condition of a battery is to test the specific gravity of the electrolyte in each of the battery's cells using a hydrometer. Use a hydrometer that is marked with numbered graduations from 1.100 to 1.300 rather than one with color-coded bands. To use the hydrometer, proceed as follows:
1. Remove the battery.

NOTE

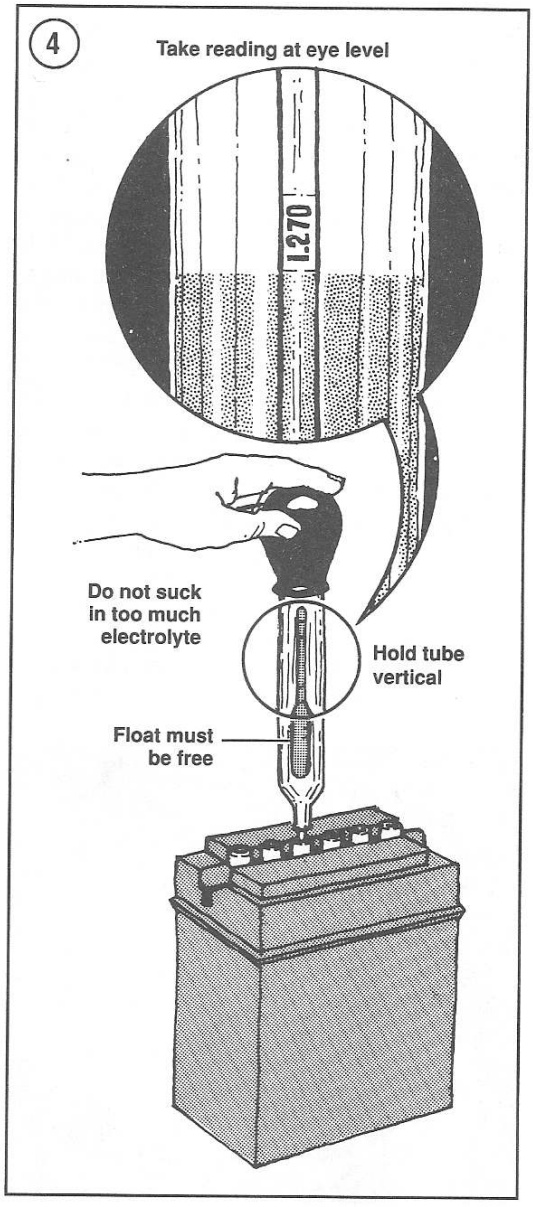
Keep cleaning solution out of the battery cells or the electrolyte will be seriously weakened.

2. Clean the top of the battery with a stiff bristle brush and water. If necessary, a solution of baking soda and water can be used to help clean, but be careful not to contaminate the electrolyte in the battery's cells.

NOTE

Do not attempt to test a battery with a hydrometer immediately after adding water to the cells. If possible, wait until after testing the specific gravity to add distilled water. If necessary to add water, charge the battery for 15-20 minutes at a rate high enough to cause vigorous gassing before checking the specific gravity.

3. Remove the caps from the battery's cells and check the level of the electrolyte.



NOTE

Draw enough electrolyte into the hydrometer to allow the weighted float inside the hydrometer to be suspended in the fluid.

4. Squeeze the rubber ball of the hydrometer, insert the tip into one cell and release the ball to draw electrolyte up into the hydrometer. When using a temperature compensating hydrometer, release the electrolyte and repeat the process several times until the tester has adjusted to the temperature of the electrolyte.
5. Hold the hydrometer vertically and observe the numbered line aligned with the surface of the electrolyte (**Figure 4**). This is the specific gravity of this cell.
6. Return the electrolyte to the cell from which it came.
7. Repeat the test described in Steps 4-6 for the remaining cells.

NOTE

Specific gravity is a measurement of the density or weight of the electrolyte as compared to plain water. As the battery is charged, the electrolyte becomes more dense. Therefore, specific gravity indicates the battery's state of charge.

8. The specific gravity of the electrolyte in each cell is an excellent indication of that cell's condition. Refer to **Figure 5**. The electrolyte in a fully charged cell will have specific gravity of 1.275-1.280, a cell in good condition will have specific gravity of 1.220-1.230. Any cell reading 1.120 or less should be considered discharged.

NOTE

If a temperature compensated hydrometer is not used, add 0.004 to the specific gravity for every 10° above 80° F (25° C). Subtract 0.004 to the specific gravity for every 10° below 80° F (25° C).

Battery Charging

While charging, the battery cells will bubble. If one cell does not have gas bubbles or if that cell's specific gravity is very low, the cell is probably defective.

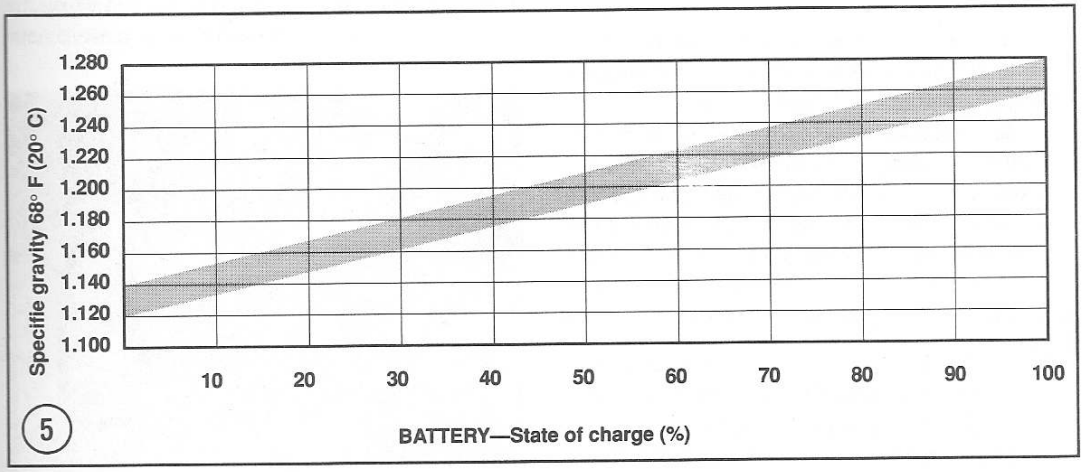
If a battery loses its charge (when not in use) within a week or if the specific gravity drops quickly, the battery is defective. A good battery should only discharge approximately 1% each day.

CAUTION

Always remove the battery from the vehicle before connecting charging equipment.

WARNING

During charging, highly explosive hydrogen gas is released from the battery. The battery should be charged only in a well-ventilated area away from any open flames, cigarettes or other ignition sources. Never check the charge of a battery by arcing across the terminals. The resulting spark can ignite the hydrogen gas, causing an explosion.



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